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# IBM System z10 Enterprise Class Configuration Setup



- **Plan I/O configuration for new processor or upgrade**
- **Configure I/O environment, STP, cryptographic adapters**
- **Step-by-step configuration definition examples**

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International Technical Support Organization

# IBM System z10 Enterprise Class Configuration Setup

July 2008



SG24-7571-00

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



**First Edition (July 2008)**

This edition applies to the System z10 Enterprise Class server.

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# Preface

This document will help you install, configure, and maintain the IBM® System z10™ Enterprise Class server. The System z10 offers new functions that require a comprehensive understanding of available configuration options.

This publication presents configuration setup scenarios, and discusses implementation examples in detail.

It is intended for systems engineers, hardware planners, and anyone who needs to understand System z™ configuration and implementation. Readers are expected to be generally familiar with current IBM System z technology and terminology.

## The team that wrote this book

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# Channel Subsystem overview

In this chapter we present an overview of the Channel Subsystem, including the following topics:

- Channel Subsystem
- Logical partitions
- Subchannel sets
- Channels
- The definition for Multiple CSS
- Activation

## 1.1 Channel Subsystem

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 allows other functions to resume after an I/O operation has been initiated. Brief descriptions of some key entities that comprise the CSS follow.

**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.

**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 z10 EC, a CHPID number is assigned to a physical location by the user via 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 depicts the relationship between the Channel Subsystem, the channels, the control units, and the I/O devices.

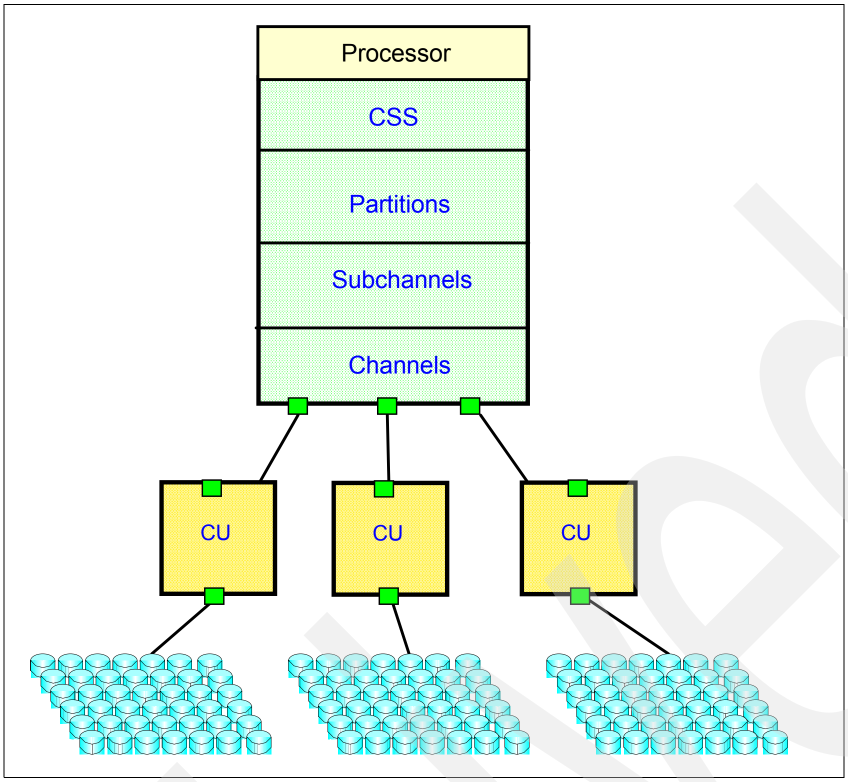


*Figure 1-1 Channel Subsystem relationship to channels, control units, and I/O devices*

## Multiple Channel Subsystem

The multiple Channel Subsystem (CSS) concept implemented in the System z servers is designed to offer considerable increases 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.

*Table 1-1 CSS features per System z model*

| | z10 EC, z9 EC | z9 BC | z990 | z890 |
|---|---|---|---|---|
| Number of CSS | 4 per server | 2 per server | 4 per server | 2 per server |
| Devices in subchannel set-0 | 63.75 K per CSS<br>255 K per server | 63.75 K per CSS<br>255 K per server | 63 K per CSS<br>252 K per server | 63 K per CSS<br>126 K per server |
| Devices in subchannel set-1 | 64 K-1 per CSS<br>256 K-4 per server | 64 K-1 per CSS<br>256 K-4 per server | 0 | 0 |
| Partitions | 15 per CSS<br>60 per server | 15 per CSS<br>30 per server | 15 per CSS<br>30 per server | 15 per CSS<br>30 per server |
| CHPIDs | 256 per CSS<br>1024 per server | 256 per CSS<br>512 per server | 256 per CSS<br>1024 per server | 256 per CSS<br>512 per server |

On the z10 EC all channel subsystem images are defined within a single I/O Configuration Data Set that is loaded into the server Hardware System Area (HSA) and initialized during power-on reset.

Figure 1-2 shows a logical view of these relationships. The z10 EC 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 z10 EC, z9 EC and z990, and CSSID 0 and 1 for z9 BC and z890).

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.

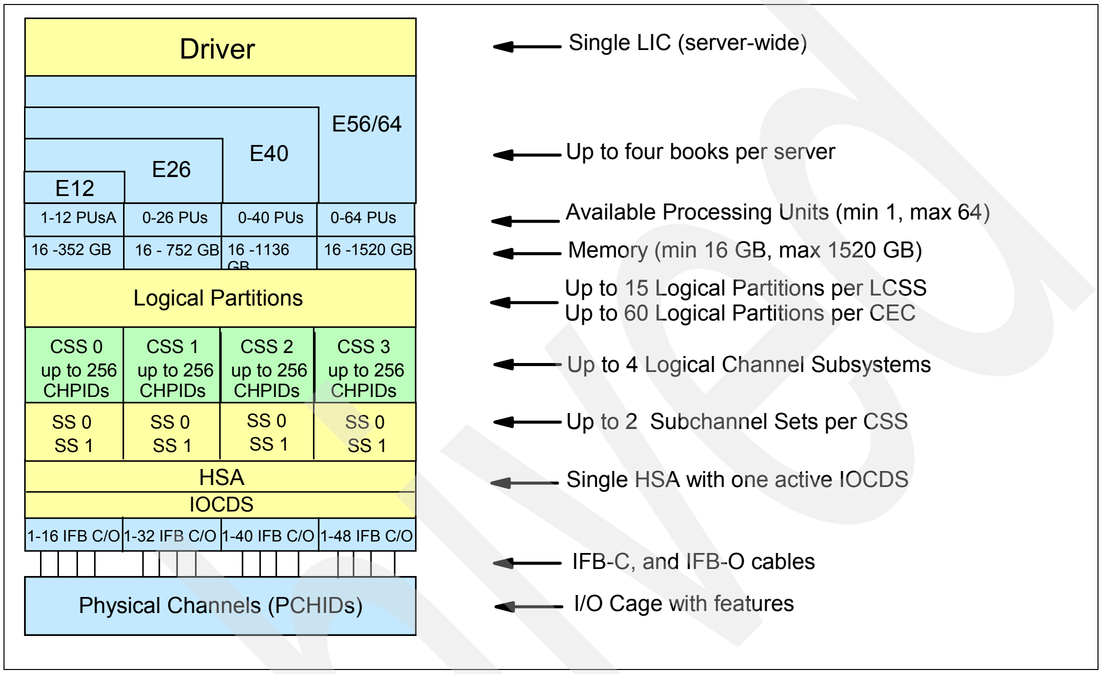



*Figure 1-2 Logical view of multiple CSSs in z10 EC server*

### 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 "Spanned channels" on page 8 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 z10 EC server does not support basic mode. Only LPAR mode can be defined.

The following definitions apply on 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 fits within the allowed range of logical partition IDs and conveys useful information.

- **MIF ID**: Defined via HCD, or via 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 illustrates 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 HCD and HCM panel refers to the definition of a “MIF ID” in each CSSID.

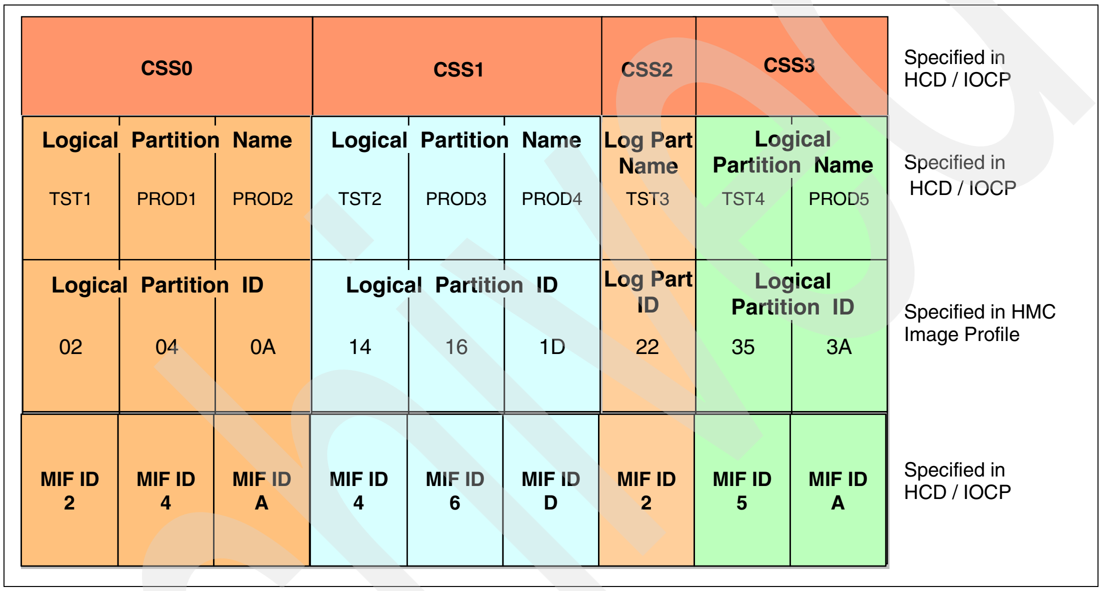



*Figure 1-3 CSS and logical partition definition of z10 EC*

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, 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 z/Architecture®, 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 forth. 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 two sets. Each set provides 64 K-1 addresses. Subchannel set 0 still reserves 256 subchannels for IBM use. Subchannel set 1 provides to the installation the full range of 64 K addresses.

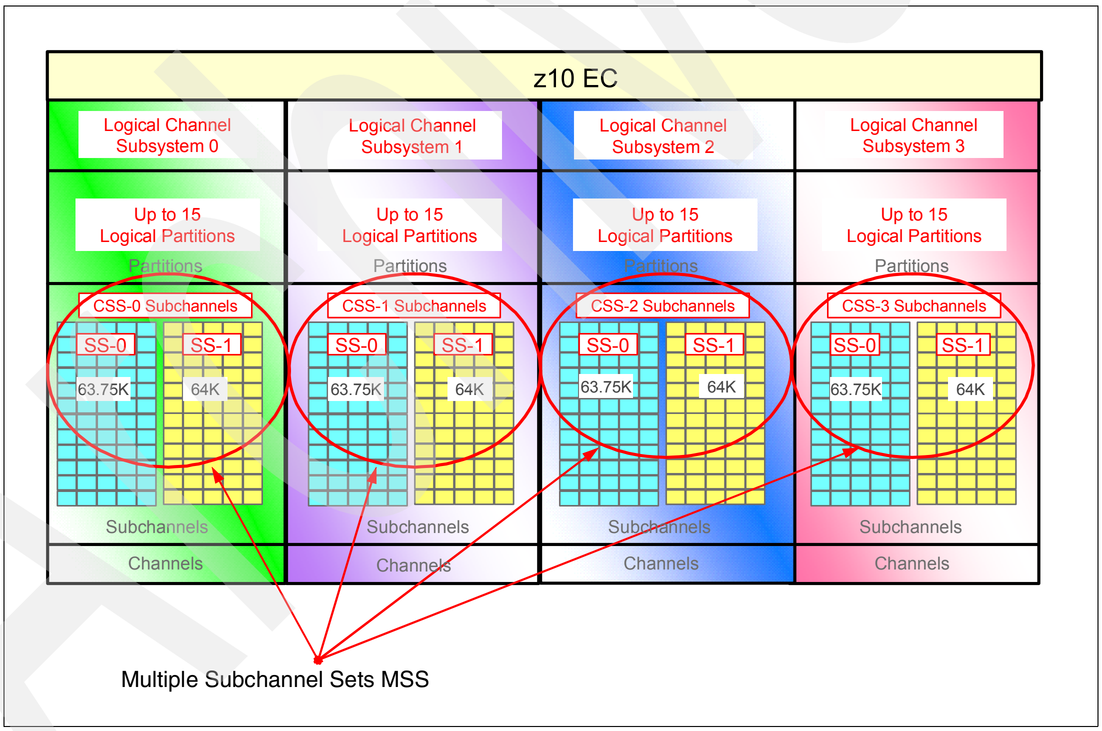



*Figure 1-4 Multiple Subchannel Sets*

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

The current implementation in z/OS limits the use of subchannel set 1 to disk alias devices. Subchannel set 0 can be used for base and for alias addresses.

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 DS8000™ series.

## 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 (CHPID)*

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 by the user via HCD or IOCP.

#### *Physical Channel ID (PCHID)*

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. That gives 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 follows the numbering scheme defined for the processor model. PCHID values are shown in Table 1-4 on page 13 and Table 1-5 on page 14.

#### *Adapter ID (AID)*

The Adapter ID assigned to each InfiniBand® link on a Host Channel Adapter 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 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.

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

### Control unit

A *control unit* 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.

## I/O sharing

There are now two possibilities for I/O device sharing:

- MIF

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

- Spanning

  This 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.

MIF enables channel sharing among logical partitions running in one channel subsystem. It is important to understand qualifiers that apply to a logical partition definition. The following definitions for z10 EC, z9 EC, z9 BC, z990, and z890 are described in "Logical partitions" on page 4:

- 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 on page 9 shows an example with two CSSs using spanned channels. There are spanned external channels (with associated PCHIDs) and spanned internal channels (no associated PCHIDs).

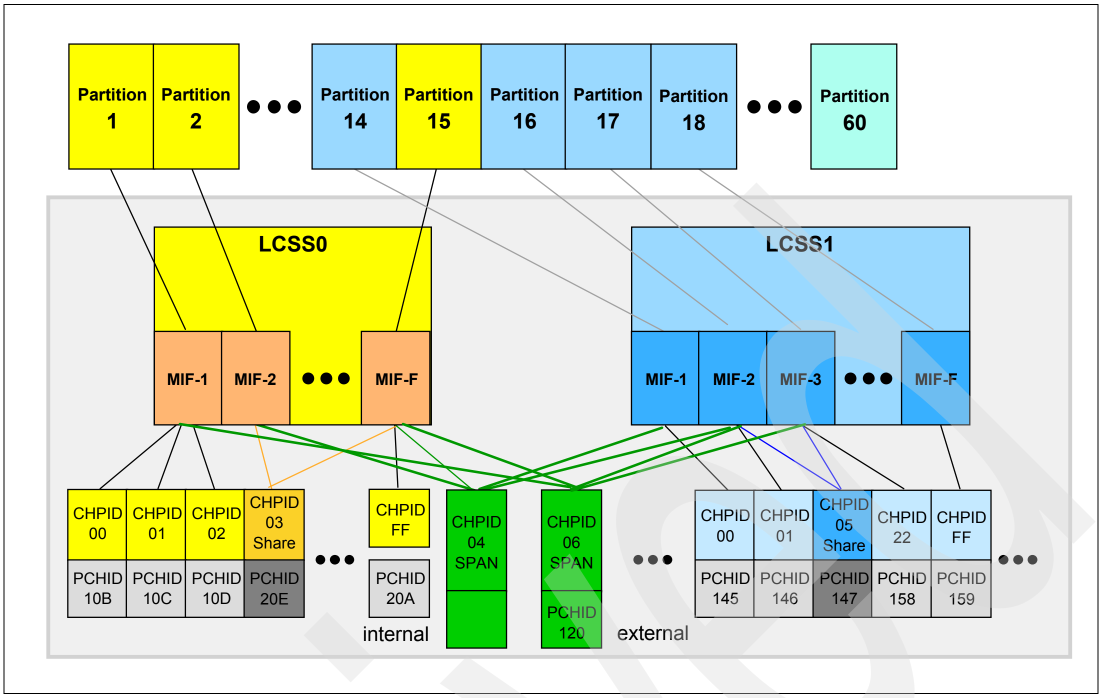



*Figure 1-5 MIF-Shared and Spanned channels*

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.

*Table 1-2 Spanned and shared channels*

| Channel type | | CHPID definition | MIF-shared channels | Spanned channels |
|---|---|---|---|---|
| FICON Express4 | External | FC, FCP | Yes | Yes |
| FICON Express2[a] | External | FC, FCP | Yes | Yes |
| FICON Express[a] | External | FC, FCP | Yes | Yes |
| | | FCV | Yes | No |
| ESCON | External | CNC, CTC | Yes | No |
| | | CVC, CBY | No | No |
| OSA-Express3 10 GbE | External | OSD | Yes | Yes |
| OSA-Express2 | External | OSD, OSE, OSC, OSN | Yes | Yes |
| ICB-4 | External | CBP | Yes | Yes |
| ISC-3 | External | CFP | Yes | Yes |
| InfiniBand Coupling | External | CIB | Yes | Yes |
| IC | Internal | ICP | Yes | Yes |
| HiperSockets™ | Internal | IQD | Yes | Yes |

a. Available if carried over during an upgrade

The example shown in Figure 1-6 shows a server with four CSSs:

- The logical CHPID numbers 50, 54, 5A, and 5E are shared channels between the logical partitions except for A0D, A0E, and A0F in CSS0, and A1D, 1D, and A1F in CSS1, which are defined with NOTPART parameters. These CHPIDs are defined as spanned channel for each physical ficon (TYPE=FC) channels, PCHID numbers 1F1, 571, 160, and 561.
- All logical partitions in each CSSs are using the subchannel sets SS0 and SS1 to address the same DASD. They use SS0 to address the base addresses C400-C431, and they use SS1 to address the alias addresses C432-C4FF.

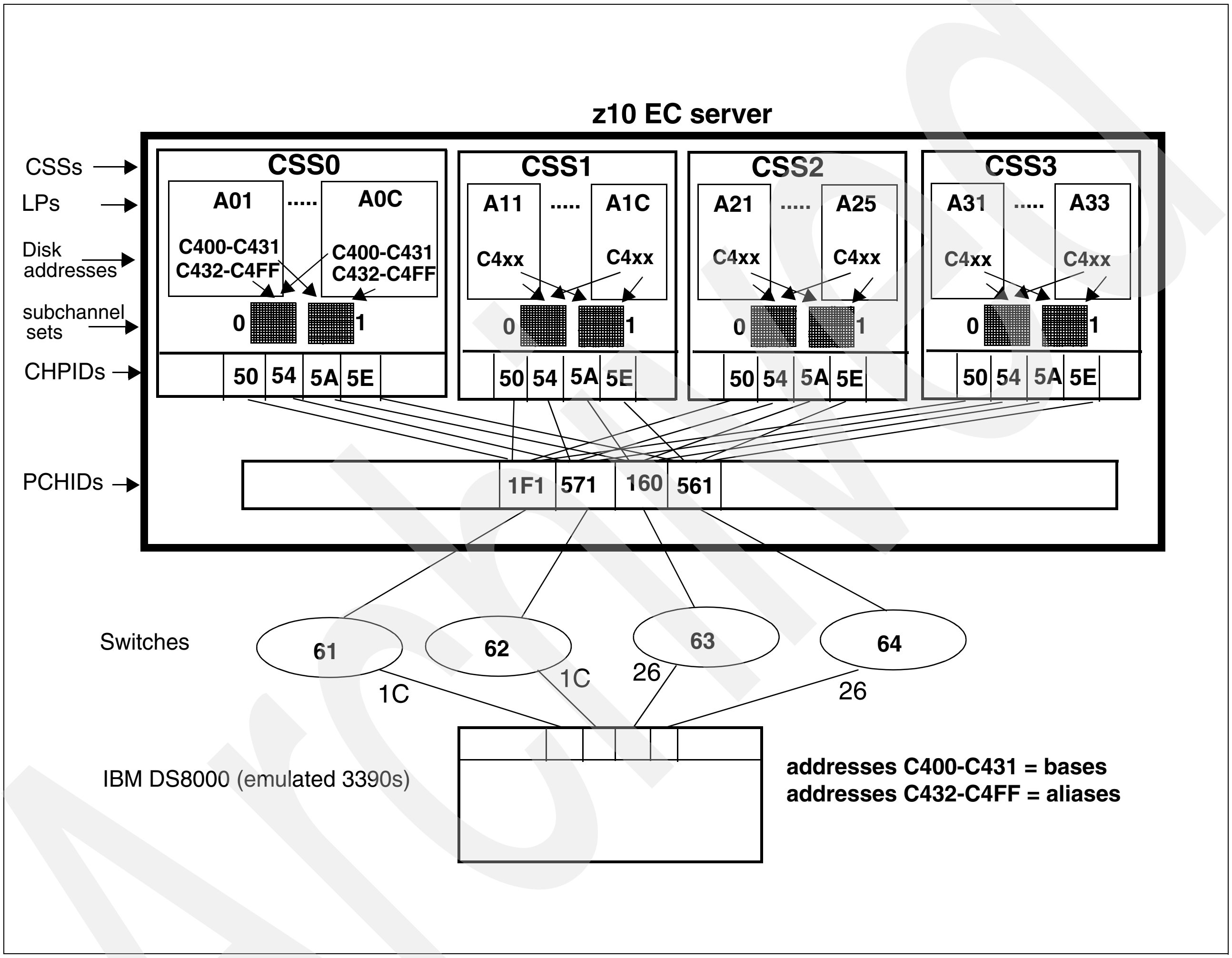



*Figure 1-6 Configuration example with CSSs, MSSs, and PCHIDs*

The IOCP statements in Example 1-1 are not intended to represent a real server, but are just used to illustrate the new elements involved.

*Example 1-1 IOCP Statement*

```
ID    MSG2='SYS6.IODF42 - 2007-12-07 09:12',SYSTEM=(2097,1),  *
      LSYSTEM=SCZP201,                                        *
      TOK=('SCZP201',00800006991E20940912039201073 41F00000000,*
      00000000,'07-12-07','09:12:03','SYS6','IODF42')
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),*
      (A21,1),(A22,2),(A23,3),(A24,4),(A25,5),(*,6),(*,7),(*,8*
      ),(*,9),(*,A),(*,B),(*,C),(*,D),(*,E),(*,F)),(CSS(3),(A3*
      1,1),(A32,2),(A33,3),(*,4),(*,5),(*,6),(*,7),(*,8),(*,9)*
      ,(*,A),(*,B),(*,C),(*,D),(*,E),(*,F)))
CHPID PATH=(CSS(0,1,2,3),50),SHARED,                            *
      NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1D,A1E,A1F*
      ),(=))),SWITCH=61,PCHID=1F1,TYPE=FC
CHPID PATH=(CSS(0,1,2,3),54),SHARED,                            *
      NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1D,A1E,A1F*
      ),(=))),SWITCH=62,PCHID=571,TYPE=FC
CHPID PATH=(CSS(0,1,2,3),5A),SHARED,                            *
      NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1D,A1E,A1F*
      ),(=))),SWITCH=63,PCHID=160,TYPE=FC
CHPID PATH=(CSS(0,1,2,3),5E),SHARED,                            *
      NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1D,A1E,A1F*
      ),(=))),SWITCH=64,PCHID=561,TYPE=FC
CNTLUNIT CUNUMBR=C400,                                          *
      PATH=((CSS(0),50,54,5A,5E),(CSS(1),50,54,5A,5E)),         *
      UNITADD=((00,256)),                                       *
      LINK=((CSS(0),1C,1C,26,26),(CSS(1),1C,1C,26,26)),         *
      CUADD=4,UNIT=2105
IODEVICE ADDRESS=(C400,050),CUNUMBR=(C400),STADET=Y,UNIT=3390B
IODEVICE ADDRESS=(C432,206),CUNUMBR=(C400),STADET=Y,SCHSET=1, *
      UNIT=3390A
```

## Channel Program (CP)

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 (SAP®).

## System Assist Processor (SAP)

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

## Hardware System Area (HSA)

The Hardware System Area (HSA) is an area of memory in the processor central 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). HSA Storage is allocated based on the size of the IOCDS (partitions, channels, control units and devices). Additional storage is reserved for Dynamic I/O reconfiguration, if enabled.

## 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 z10 EC server can have one to four books installed in the 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 an ICB or IFB 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 IFB-MP card in the I/O cage.
- Host Channel Adapter (optical), HCA2-O - provides coupling links connectivity to other z10 EC (HCA2-O) or z9 servers (HCA1-O).
- Memory Bus Adapter, MBA - is used for copper cable ICB-4 links only.

The HCA2-O fanout used for coupling links has 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.

## I/O cage

The z10 EC server holds a minimum of one I/O cage at the bottom of frame A and two optional I/O cages in the Z frame.

Each cage supports up to seven I/O domains and a total of 28 I/O card slots. Each I/O domain supports four I/O card slots as shown in Figure 1-7 on page 13.

Each I/O domain uses an IFB-MP card in the I/O cage and a copper cable connected to a Host Channel Adapter (HCA) fanout in the CEC cage. An I/O cage has seven domains, but in order to have the redundant I/O interconnect function available to all domains, an eighth domain connection is required for a z10 EC server I/O cage in which all seven domains are used. The eighth domain connection is only used if the primary IFB-MP for the last domain is disabled.

Figure 1-7 on page 13 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 1-6.

*Table 1-3 I/O domains*

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

I/O slots 5, 14, 23, and 28 contain the IFB-MP cards used for STI or 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.

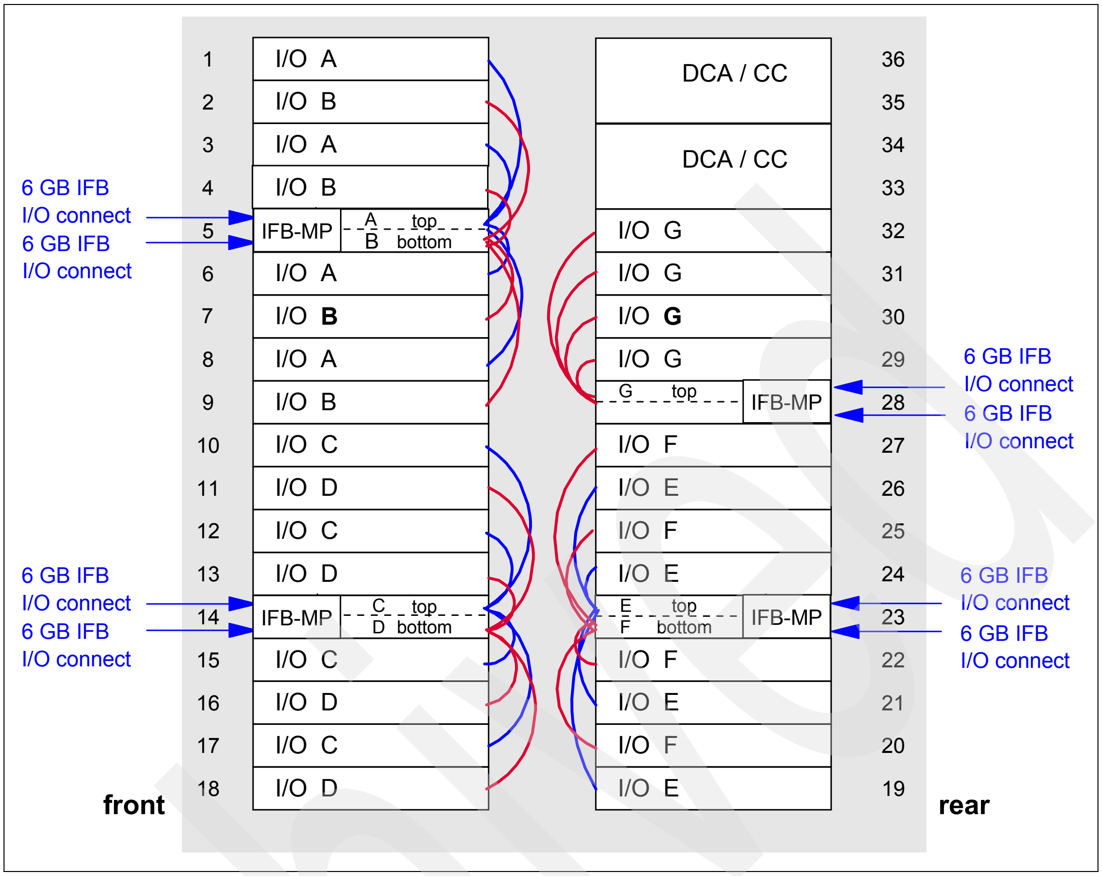



*Figure 1-7 z10 EC I/O Cage*

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 1-4 lists the PCHID addresses used for the front locations in each I/O cage.

*Table 1-4 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 |

| I/O slot # | I/O Domain | PCHID I/O cage 1 Front | PCHID I/O cage 2 Front | PCHID I/O cage 3 Front |
|---|---|---|---|---|
| 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 1-5 lists the PCHID addresses used for the rear locations in each I/O cage.

*Table 1-5 PCHIDs address range per 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 |
| 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 | | | | |

# 1.5 The definition for Multiple CSS

This section explains the new IODF definition for the z10 EC processor. For more information, see the manuals *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 with 2097 type is added by HCD, the maximum number of logical partitions is automatically generated in IODF; see the message in Figure 1-8.

```
 Processor List          Row 1 of 9 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  __________ ________________________________
 _ NEWPROC  2097     E12      LPAR  __________ ________________________________
 _ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
 _ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
 _ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
 _ SCZP201  2097     E26      LPAR  01DE502097 ________________________________
 _ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
 _ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
 ******************************* Bottom of data ********************************
+-------------------------------------------------------------------+
| Definition of processor NEWPROC has been extended to its maximum |
| configuration.                                                    |
+-------------------------------------------------------------------+
```

*Figure 1-8 HCD - Add a new z10 EC processor*

Figure 1-9 on page 16 is the channel subsystem list after a new 2097 processor is defined. The z10 EC supports the maximum four CSSs in a processor. You will notice that two 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.

```
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 . . . : NEWPROC

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
_ 0   65280     0       65535     0       ________________________________
_ 1   65280     0       65535     0       ________________________________
_ 2   65280     0       65535     0       ________________________________
_ 3   65280     0       65535     0       ________________________________
```

*Figure 1-9 Channel Subsystem List after defining a new z10 EC processor*

Each CSS can have a maximum of 15 logical partitions defined, so a z10 EC system can have up to 60 logical partitions, including reserved logical partitions.

Figure 1-10 is the partition list in a channel subsystem. Note that the logical partition names have not been assigned yet. 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. This asterisk ensures that the CSS treats this logical partition as a reserved logical partition.

The partition usage is also defined at this point as CF/OS. This means that these reserved logical partitions can be used as an operating system, Coupling Facility, or Linux® logical partition. This partition usage can be changed with a dynamic activate.

During the initial configuration setup (the definition of the new z10 EC processor) in HCD, change only definitions for the number of partitions that you want to work with.

```
                              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  . . . . : NEWPROC
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   ________________________________
_ *                7      CF/OS   ________________________________
```

*Figure 1-10 Partition list after defining a new z10 EC processor*

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. At this time, they are just place holders and no resources are assigned and allocated to them. Of course, the reserved logical partition isn't visible yet on the Contents of CPC in the HMC.

Notes 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 1-11.

```
ID    MSG2='MASAYAN.IODF41 - 2007-12-05 15:21',              *
      SYSTEM=(2097,1),                                       *
      TOK=('NEWPROC',00800001991E2094152132040107339F00000000,*
      00000000,'07-12-05','15:21:32','MASAYAN','IODF41')
RESOURCE PARTITION=((CSS(0),(TEST,1),(*,2),(*,3),(*,4),(*,5),(*
      *,6),(*,7),(*,8),(*,9),(*,A),(*,B),(*,C),(*,D),(*,E),(*,*
      F)),(CSS(1),(*,1),(*,2),(*,3),(*,4),(*,5),(*,6),(*,7),(**
      ,8),(*,9),(*,A),(*,B),(*,C),(*,D),(*,E),(*,F)),(CSS(2),(*
      *,1),(*,2),(*,3),(*,4),(*,5),(*,6),(*,7),(*,8),(*,9),(*,*
      A),(*,B),(*,C),(*,D),(*,E),(*,F)),(CSS(3),(*,1),(*,2),(**
      ,3),(*,4),(*,5),(*,6),(*,7),(*,8),(*,9),(*,A),(*,B),(*,C*
      ),(*,D),(*,E),(*,F)))
```

*Figure 1-11 Sample extract of IOCP deck*

**Note:** IOCP ignores the MAXDEV keyword on the RESOURCE statement and always reserves the maximum number of logical partitions.

## 1.6 Activation

No single component or single part of the CPC completely defines the channel subsystem on the z10 EC. It should be seen more like an architected construct that comprises many CPC resources, both hardware or 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 profile to activate the z10 EC 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. IPL/Load (Load Profile or Manual Load).
   – Perform an I/O system reset for the logical partition for all defined channel paths. The IPLed operating system starts the required I/O operations.

## Dynamic addition or deletion of a logical partition

With high availability requirements, if we expect that we may need a logical partition at some future date, we reserve all logical partitions within an CSS in the IOCDS used for power-on reset of a z10 EC™.

The HSA for the z10 EC 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 2097 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 9, “Reserved logical partitions” on page 369.

# 2

# Configuration planning

In this chapter we describe the planning steps to take when you install a z10 EC. These steps apply whether you are upgrading from an existing server or installing a new z10 EC.

We discuss the following topics:

- Tools

- Hardware Management Console (HMC)

- Channel considerations

## 2.1 Tools

This section summarizes the various tools available for the IBM System z platforms. Table 2-2 provides references to more detailed descriptions of the tools.

The examples in this document use tools, such as HCD and CMT, which refer to the Machine type as opposed to server names. Table 2-1 lists the Machine types for current IBM System z platforms.

*Table 2-1 IBM System z platforms and machine type*

| Server | Abbreviated name | Machine type |
|---|---|---|
| IBM System z10 Enterprise Class | z10 EC | 2097 |
| IBM System z9 Enterprise Class | z9 BC | 2096 |
| IBM System z9 Business Class | z9 EC | 2094 |
| IBM eServer zSeries 990 | z990 | 2084 |
| IBM eServer zSeries 890 | z890 | 2086 |

### Coupling Facility Structure Sizer (CFS)

The Coupling Facility Structure Sizer 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 (OSA/SF)

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 (zPCR)

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's LSPR data supporting all IBM System z processors as well as legacy 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.

*Table 2-2 Tools and references*

| Tool | Internet[a] address for more information |
|---|---|
| HCD | HCD and HCM Web page http://www.ibm.com/servers/eserver/zseries/zos/hcm/ |
| HCM | |

| Tool | Internet[a] address for more information |
|---|---|
| CMT | https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/chpidmain?Opendocument |
| CFS | http://www.ibm.com/systems/z/cfsizer/ |
| z/PCR | Getting Started with zPCR at http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1381 |
| OSA/SF | http://www.ibm.com/servers/eserver/zseries/zos/bkserv/r4pdf/osasf.html |
| Power Estimation Tool | https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/powerestimationmain?OpenDocument |

a. For the CMT and the Power Estimation Tool you need an ID to the Resource Link™ site.

### 2.1.1 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 what the final configuration looks like.

### 2.1.2 Resource Link

The first step in planning for installation of the z10 EC is accessing Resource Link. You need to register with a client site number, ID, and a valid e-mail address. Your IBM representative can assist you with this registration process.

Once you can access Resource Link, you will have access to a number of resources and tools that are needed in the installation process, as well as information regarding the z10 EC. A number of tools are available to simplify the installation process of a z10 EC. Even if you have worked with most of them before, be sure to check for the latest versions that are relevant to z10 EC. The tools include the CHPID Mapping Tool and the Coupling Facility Structure Sizer Tool.

Under the Education tab, you will find information about the new HMC application, as well as an online tutorial. There is also an education module for the CHPID Mapping Tool.

The IBM Resource Link Web site provides a number of additional tools and resources.

An IBM Registration ID is required to sign onto the Resource Link Web site. It only takes a few minutes to register to obtain an IBM Registration ID.

After you have an IBM ID, you can customize your profile to the servers that you are responsible for. The address for Resource Link is:

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

### 2.1.3 Hardware Configuration Definition (HCD)

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 z10 is available on all supported z/OS levels with 2097DEVICE PSP and z/VM beginning with V5.2 and V5.3. 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 HCD with 2094DEVICE PSP or higher is required to support InfiniBand coupling technology. This is required to be able to define CIB type CHPIDs.

### 2.1.4 Hardware Configuration Manager (HCM)

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

If this is something that your installation requires, 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 “stand alone” once an IODF is built and the configuration files (IODF##.HCM or IODF##.HCR) are created on your HCM workstation.

HCM V1.9 SL2 is now available; it introduces some support for the CHPID Mapping tool, which is described in more detail in the following section.

#### *CHPID Mapping Tool support*

HCM for z/OS V1.9 has an interface into 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.

You need to be logged on to HCM and using the “work” IODF that contains the server requiring 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

> **Note:** Always check IBM Resource Link Web site to verify that you have the latest version of the CHPID Mapping Tool installed.

Figure 2-1 shows the following options:

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

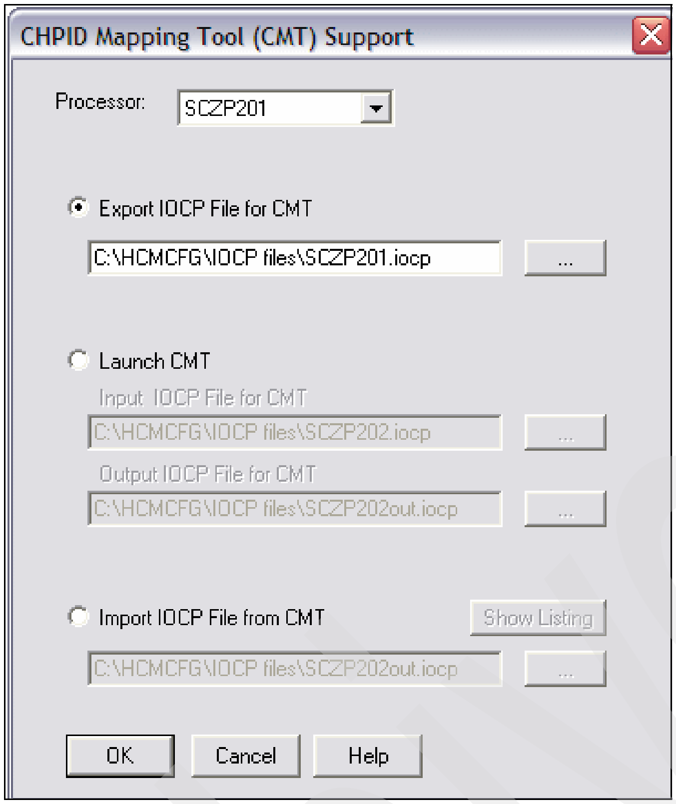



*Figure 2-1 HCM - CHPID Mapping Tool Support*

## 2.1.5 Input/Output Configuration Program

ICP IOCP Version 2 Release 1.0 is required to support 2097 model CPCs and coupling over InfiniBand channel paths TYPE=CIB.

> **Note:** Though it is possible to define the z10 EC 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 z9 BC, regardless of whether the operating system supports z10 EC:

- In z/OS or VSE, specify keyword CHECKCPC=NO in the PARM field of the EXEC statement.
- In CMS, use option NOCHKCPC.

The IOCDS cannot be used to power-on reset the CPC until it is upgraded to a 2097.

You can also write an IOCDS when preparing to upgrade to a z10 EC from a z9 EC or a z990.

> **Note:** IOCP can write an IOCDS in 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 now run in a logical partition (LPAR mode). If you are moving from a z9 or previous server to a z10 EC server and you are running an earlier operating system version not supported on a z10 EC server, you may have to create a stand-alone IOCP to start up the new environment.

Note that z10 EC Support Elements do not have diskette drives and HMCs running Ver 2.10 do not support diskette drives. To import the IOCP statements using stand-alone IOCP, you must copy the IOCP source statements to a USB Flash Memory Drive or FTP it from another system on the LAN.

For more details about the changes and requirements for ICP IOCP, refer to *Input/Output Configuration Program User's Guide,* SB10-7037.

## 2.1.6 CHPID Mapping Tool

The CHPID Mapping Tool (CMT) provides a mechanism to map CHPIDs to PCHIDs as required on a z10 EC. The CHPID Mapping Tool is optional but we strongly recommend that you use the CMT, as opposed to manually mapping the CHPIDs onto PCHIDs. Using the CMT provides the best availability recommendations for a particular configuration.

The process flow for a new z10 EC installation is illustrated in Figure 2-2.

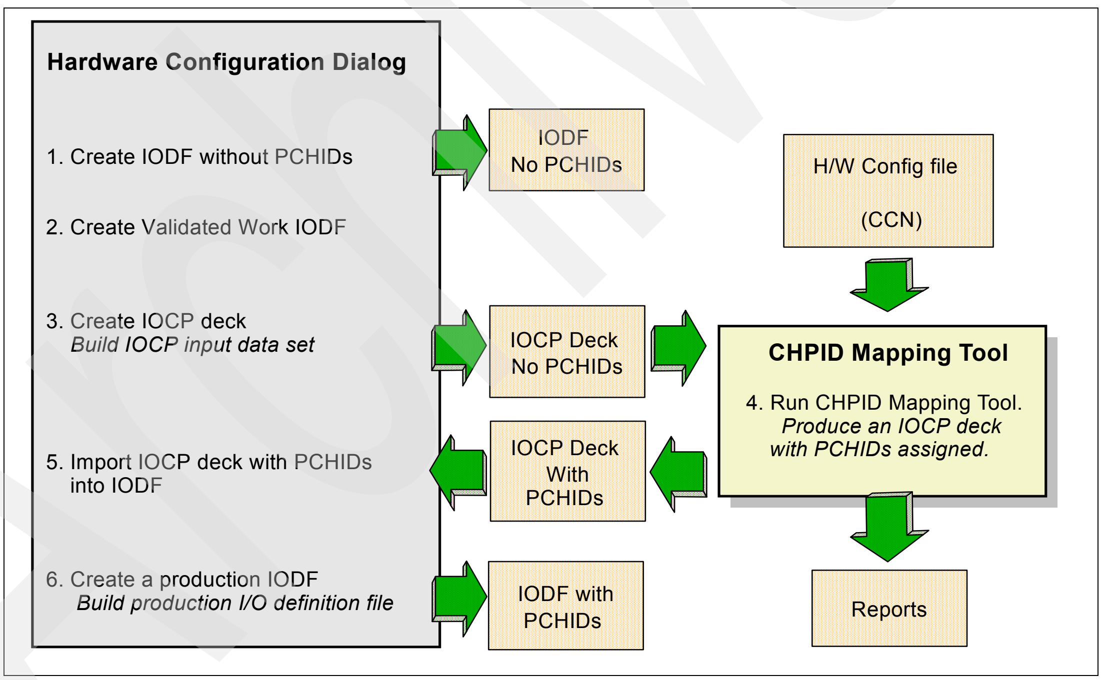



*Figure 2-2 z10 EC I/O configuration definition flow for a new install*

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

To access the CHPID Mapping Tool you must be logged into the Resource Link site:

- Select **CHPID Mapping Tool** under the Servers column on the Tools page.

Alternatively, you can access it by using the following URL:

https://www-01.ibm.com/servers/resourcelink/hom03010.nsf/pages/chpidmain?Opendocument

**Note:** Always verify that you have the latest version of the CHPID Mapping Tool installed on your PC.

For reference, you can also download a PDF version of *CHPID Mapping Tool Users Guide,* GC28-6825.

At the Resource Link site, do the following:

1. Under Downloads, click **CHPID Mapping Tool**. You are then given the option of downloading either the complete CMT program or a file that upgrades an existing CMT program you may already have installed on your workstation.
2. Click the appropriate link and install/upgrade the CHPID Mapping Tool program.

## I/O Configuration Data (Customer Control Number - CCN)

The Customer Control Number (CCN) is generated by your IBM Customer Representative when building your configuration order. This number is entered into Resource Link in order 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 z10 EC order.

To enter the CCN and download the CFReport, under Servers in the Tools panel:

1. Select **CHPID Mapping Tool**. Alternatively, you can use the following URL:

   https://www-1.ibm.com/servers/resourcelink/hom03010.nsf/pages/chpidmain?Opendocument

2. Under Downloads, click **I/O Configuration Data (CCN)**. This takes you to the CFReport download page, where you can enter your Customer Control Number.

At the CFReport download page, do the following:

1. Enter your 8-digit CCN in the panel, then click **Submit**.

   You are prompted to save the nnnnnnnn.CFR file to your workstation.

2. 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 z10 EC 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 z10 EC 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 if desired. 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, via the CHPID Mapping Tool, 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 is achieved by distributing channel paths across different channel cards and different Host Channel Adapters (HCAs) or on previous servers, the STI links.

The PCHIDs are fixed on the z10 EC 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 the IBM service representative.

There is also an IOCP deck with PCHIDs mapped to CHPIDs by CSS. This IOCP is migrated back into HCD and a production IODF can be built.

**Note:** The IOCP deck that is produced 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 will fail.

### Machine information

To access any of the machine information, you need to have your IBM ID authorized. This can be done under the line Register for machine information on the Machine information Web page, as follows:

- Under Servers in the Tools panel, click **Machine information**. Alternatively, you can use the following URL:

  https://www-01.ibm.com/servers/resourcelink/hom03010.nsf/pages/machineinformation?OpenDocument

- Click **View all machines.**

If none of your servers are accessible, then you need to request access via your IBM Customer Representative. Profiling is done against your Customer Number, so ensure 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. Do the following:

- Click the Serial Number of the server you are inquiring about.

Reports that are available include information about Customer data, System status, RC/MCL, CHPIDs, and MES.

## 2.2 Hardware Management Console (HMC)

The Hardware Management Console communicates with each Central Processor 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.

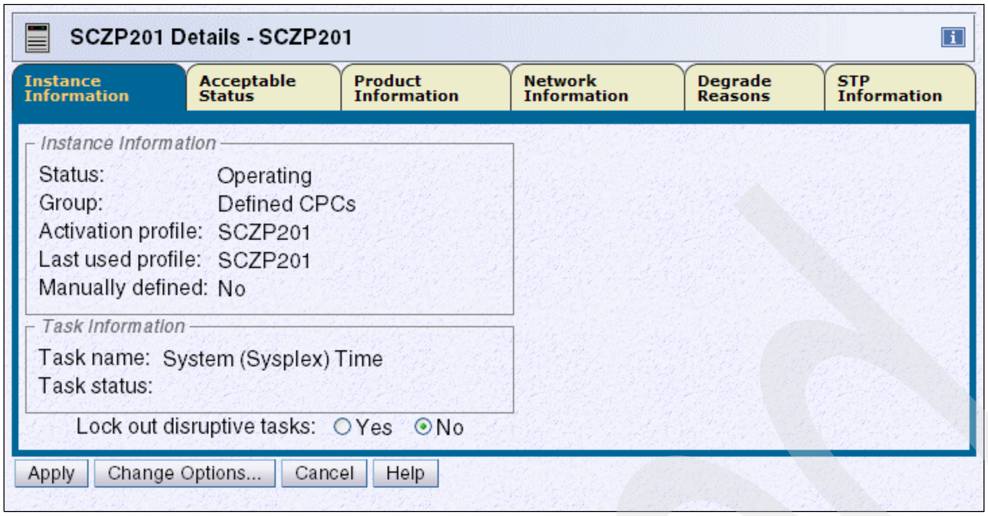



*Figure 2-3 HMC workplace - CPC details*

Starting with HMC Version 2.9.0 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. 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 since it involves inserting the media into a physical HMC drive.

While global enablement of remote access is controlled through the Customize Console Services task as shown in Figure 2-4, individual user level remote access enablement is managed using the user profiles console actions task.

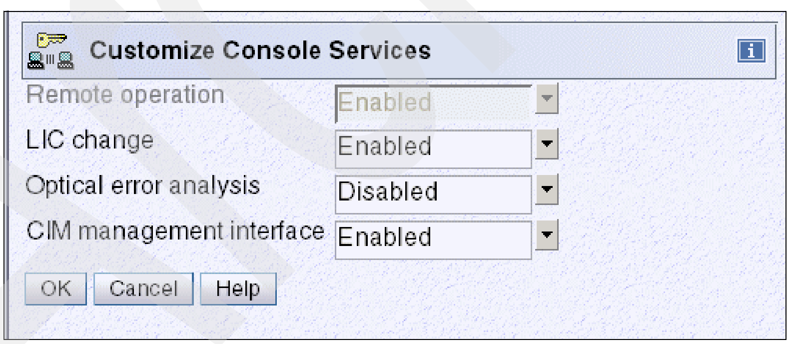



*Figure 2-4 Enablement of remote operation*

The console services can be customized as follows:

**Remote operation**: Use this service to control whether this Hardware Management Console can be operated from a remote workstation.

**LIC change**: This must be enabled to allow this console to change IBM Licensed Internal Code (LIC) on its defined Central Processor Complexes (CPCs) and their support elements.

**Optical error analysis**: Use this service to control whether this Hardware Management Console analyzes and reports optical problems for its defined objects.

**CIM management interface**: Controls whether this Hardware Management Console can be remotely managed using the Common Information Model (CIM) interface.

Individual user remote access enablement is accomplished by selecting the **Allow remote access via the web** check box on the User Properties panel, as shown in Figure 2-5. For a new user profile this box is unchecked by default.

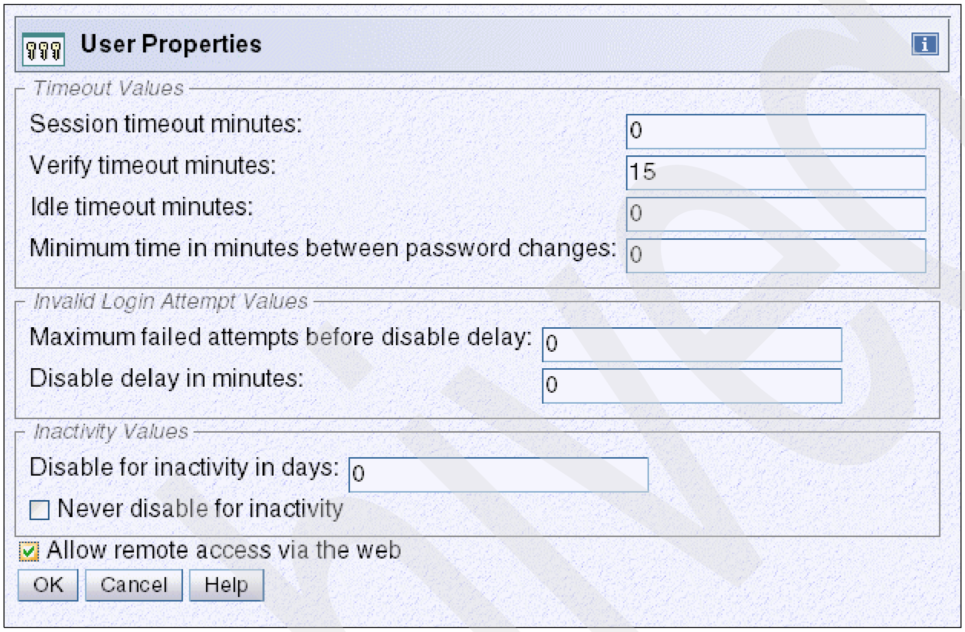



*Figure 2-5 User Properties panel*

Lightweight Directory Access Protocol (LDAP) support (see Figure 2-6) for Hardware Management Console user authentication allows a Hardware Management Console to be configured to use an LDAP server to perform user ID and password authentication at logon. The user ID is defined on the Hardware Management Console along with the roles to be given to the user ID. Hardware Management Console settings related to the user ID will continue to reside on the Hardware Management Console, and the LDAP directory will be 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.

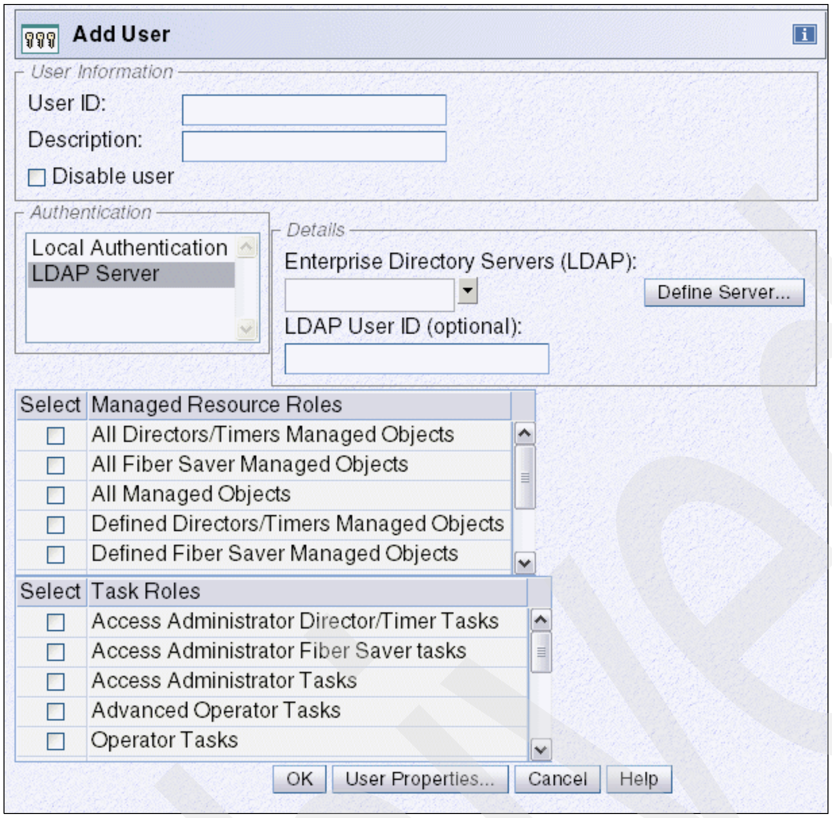



*Figure 2-6 LDAP server authentication*

### *Network security*

Network security is an 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.

As can be seen in Figure 2-7, there are four tabs on the Customize Network Settings panel. The tabs and customizable settings are as follows:

- **Identification**: The console name (the short host name), domain name (an entry here, together with the console name value, yields the long host name), and a console description.
- **LAN Adapters**: Contains a summarized list of all LAN adapters. From there, you can view and change addressing, routing, and other characteristics of this LAN to be changed.
- **Name Services**: Contains DNS and Domain Suffix values, which you can remove and add.
- **Routing**: Contains routing and default gateway information, which you can modify.

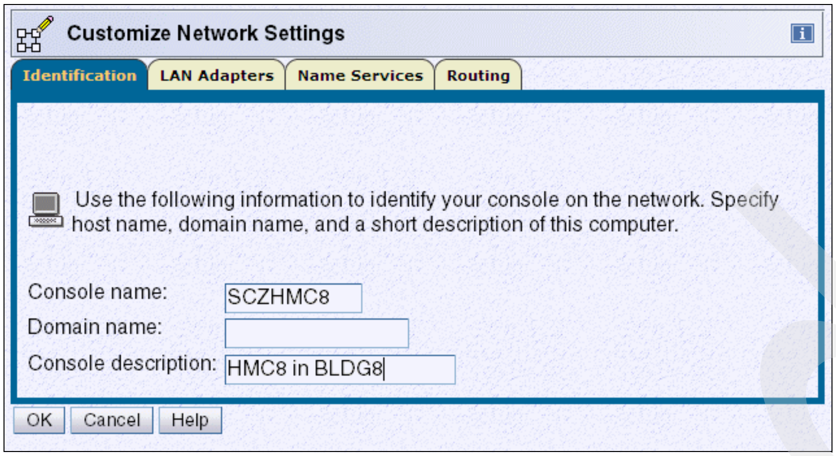



*Figure 2-7 Customize Network Settings*

Since access to the HMC is provided via 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, since 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.

Customers wishing to manage the certificates used on their HMCs can do so through the Certificate Management task, shown in Figure 2-8. This task provides the capability of getting information about the certificates used on the console, and it allows you to create a new certificate for the console, change the property values of the certificate, and work with existing and archived certificates or signing certificates.

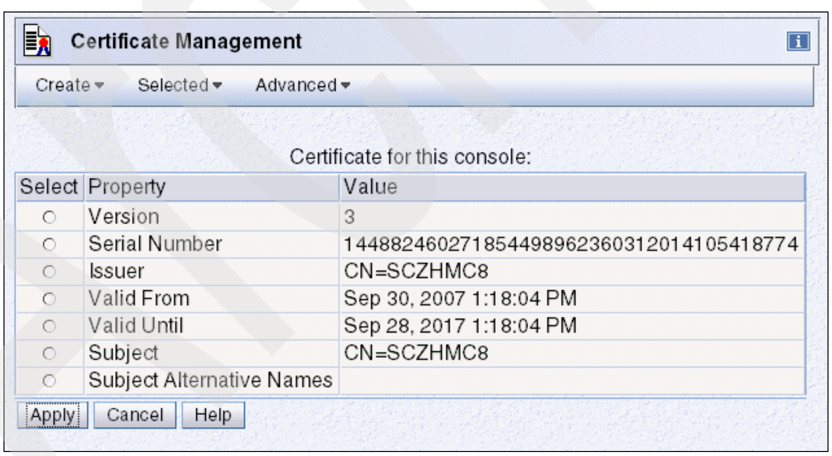



*Figure 2-8 Certificate management panel*

## 2.2.1 Hardware Management Console Application V2.10.0

The z10 EC server comes with a new version of Hardware Management Console (HMC).

New features include:

- Support for USB flash memory drive, due to the removal of the diskette drive.

- Additional help information can be viewed from the file descriptor area for each task window.
- The tree-style user interface is now the default user interface for all user IDs except the default SERVICE user ID or any user IDs assigned service roles.
- IPv6 support, providing additional support for the following tasks:
  a. Customize API settings
  b. Customize network settings
  c. CPC details
- The details window includes a Busy status tab specifying why an object is busy.

> **Note:** The Support Element shipped with the z10 EC runs Support Element Console application V2.10.0 which allows for the tree style user interface.

There are two ways to access the new HMC application. Both methods access the HMC via a Web browser.

The first method is from the HMC workstation itself. When the HMC is initialized, a Web browser automatically starts up and displays a welcome panel and a link to the logon panel (Figure 2-9). The second method is via a Web browser on any workstation that has connectivity to the operations LAN where the HMC is installed. In the browser address bar, you point to the IP address or URL of the HMC.

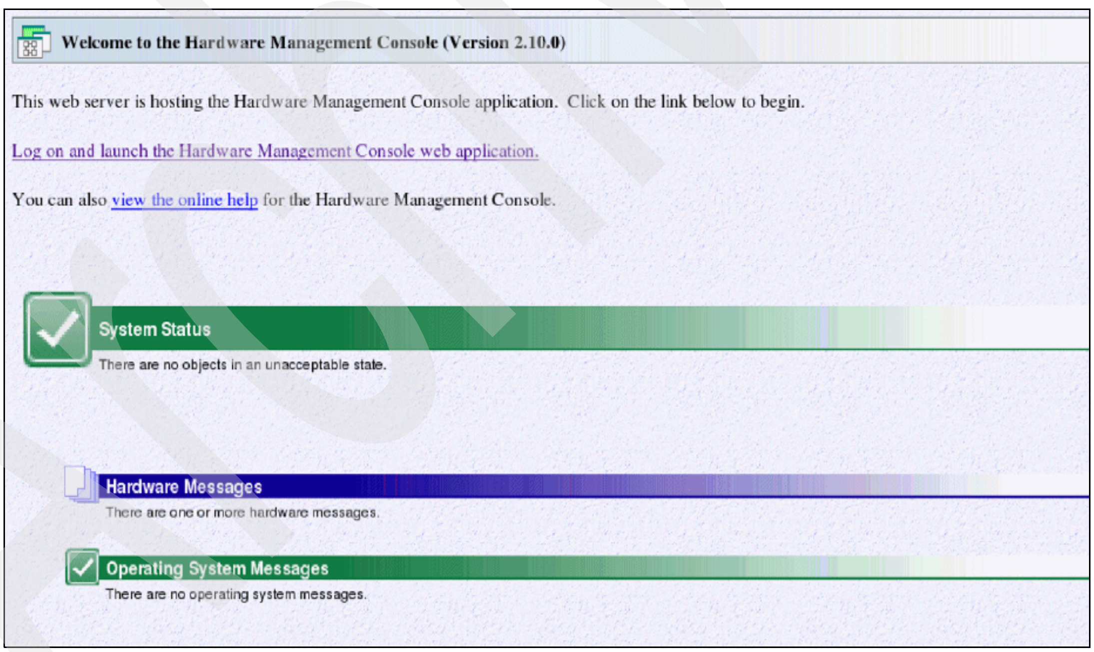



*Figure 2-9 HMC Welcome panel*

Click **Log on and launch the Hardware Management Console web application.** A valid user ID and password are needed to proceed with the logon. There is no difference whether you log on via the local HMC or via a Web browser from a remote workstation; the same logon panel is displayed in both cases (Figure 2-10).

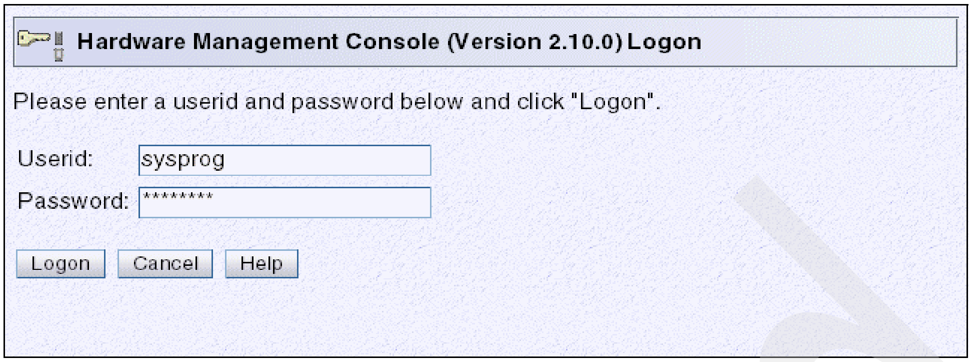



*Figure 2-10 HMC application Web browser logon window*

After successfully logging on, you can enter the HMC application. Depending on the access level granted to your user ID, you can perform all functions that were available to you on previous HMCs.

The main difference is that you can now access the HMC application from a workstation with a Web browser, and do not have to go to the HMC workstation to access the HMC application.

Two options are available for the user interface: the classic view and the tree style, with the tree style user interface being the default view.

In this book we used the tree style view for all HMC window examples. This interface provides “drill down” and “launch in context” capabilities, as shown in Figure 2-11 and Figure 2-12.

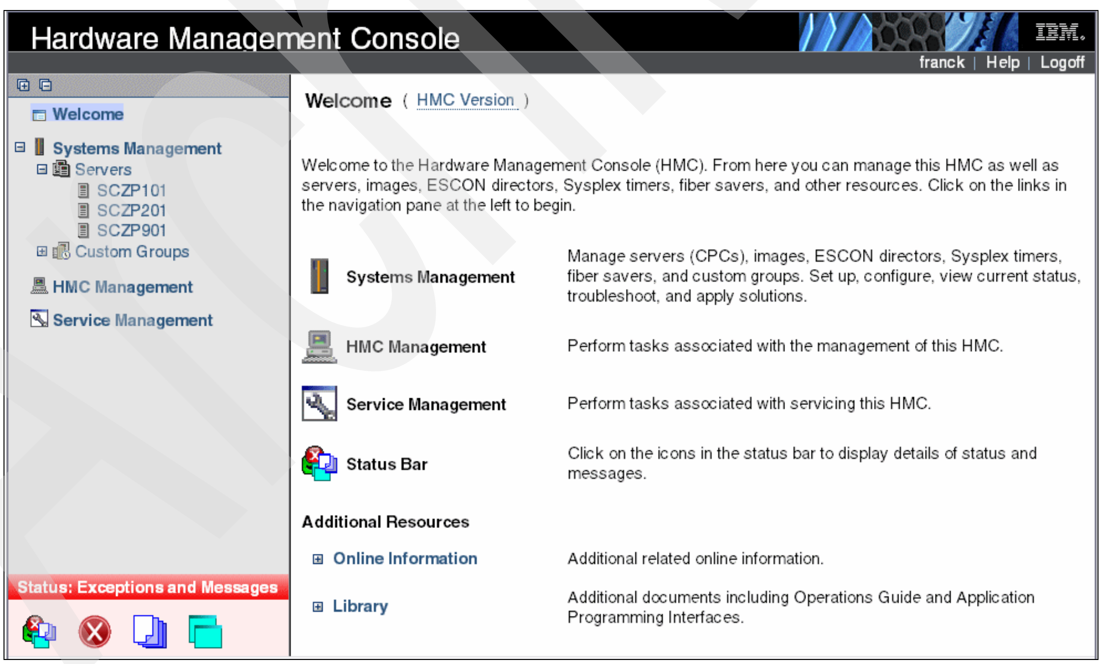



*Figure 2-11 HMC - Tree view (example 1)*

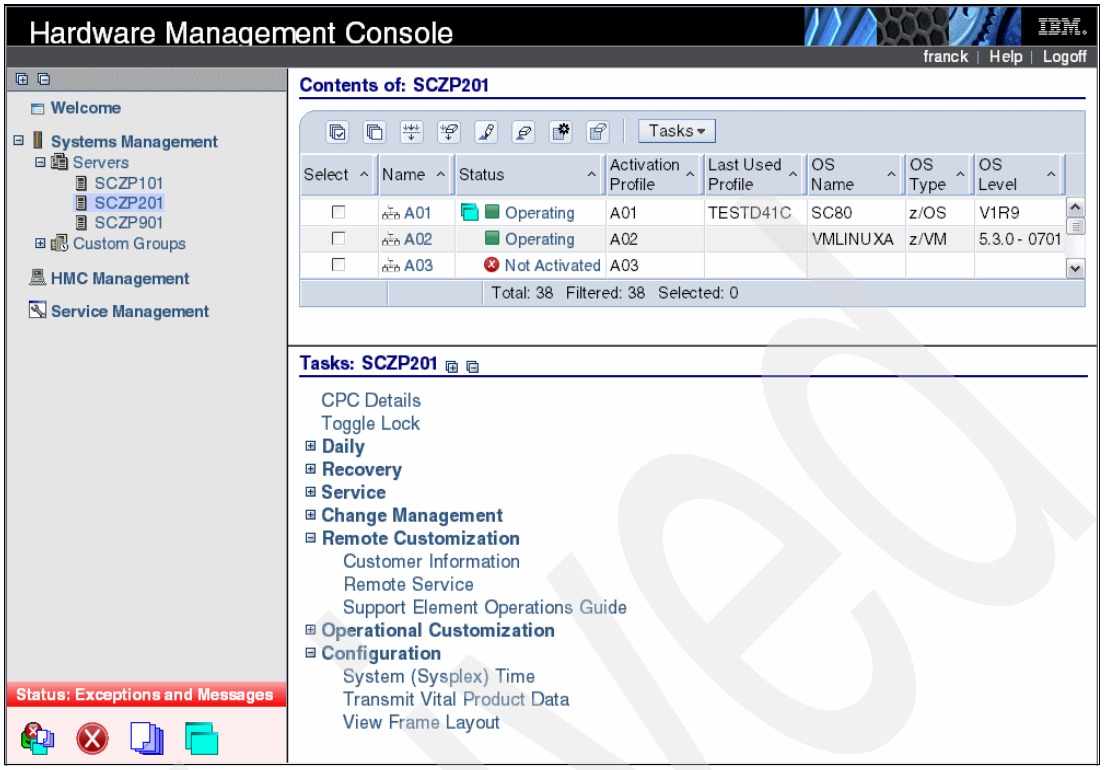



*Figure 2-12 HMC - Tree view (example 2)*

## HMC application

There is no direct interface to the HMC application except for the Web browser. Even when working from the local HMC workstation, you only access the HMC application via a Web browser. The HMC embedded operating system contains an HTTP server that enables access to the HMC application V2.10.0 through a Web browser.

To access the HMC from a remote workstation, the workstation needs to have TCP/IP connectivity to the operations LAN where the HMC is installed. At least one workstation with the HMC application V2.10.0 is required to control and operate a z10 EC server.

Multiple users can access the HMC concurrently from remote workstations. Users need only a supported Web browser installed on their workstations. Supported Web browsers include:

- Internet Explorer® 6.0 or later
- Mozilla 1.6 or later
- Firefox 1.0 or later
- Netscape 7.1 or later
- Opera 8.0 or later

> **Note:** A connection to the HMC Web server uses SSL encryption. A user public key certificate must be supplied with a new HMC installation. All browser connections to an HMC require a user ID and password.

HMC Application V2.10.0 uses pop-up windows, so ensure that you have pop-ups enabled in your Web browser. Otherwise, the HMC application will not function correctly.

Each time you perform a task or display, the result is presented to you in a new window.

Previously, when displaying hardware messages, you had to “scroll through” using the scroll buttons on the bottom right-hand side of the HMC panel. After you found the option, you would highlight the CPC by clicking it once, then double-clicking the Hardware Messages icon. Alternatively, you could “drag and drop” the CPC image on hardware messages. Those options still work, but now you have a new way to perform such tasks.

As previously mentioned, the HMC runs as a closed application. No other applications (such as the Sysplex Timer® console software) can be installed on the HMC. Also, the formatting capabilities of the underlying operating platform that make use of removable media are not available to the user. A new console actions task, Format Media, is provided. It is available to a local user only.

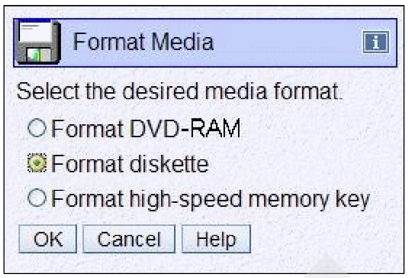



*Figure 2-13 HMC, Format media*

Refer to the *Hardware Management Console Operations Guide Version 2.10.0,* SC28-6867 for a complete description of the functions available. The Resource Link Web site also provides an online tutorial for the HMC application. Select the Education tab and follow the links to the HMC tutorial.

### 2.2.2 Remote Support Facility (RSF)

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 repair data
- Fix delivery 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 first be tried, and if this 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 2-14) or to connect indirectly from a customer-provided proxy server (Figure 2-15 on page 36). 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 2-3.

*Table 2-3 IBM Support Center server address list*

| America | Non-America |
|---|---|
| 129.42.160.48 | 129.42.160.48 |
| 129.42.160.49 | 129.42.160.50 |
| 207.25.252.200 | 207.25.252.200 |
| 207.25.252.204 | 207.25.252.205 |

**Note:** HTTPS port 443 is used for all communications.

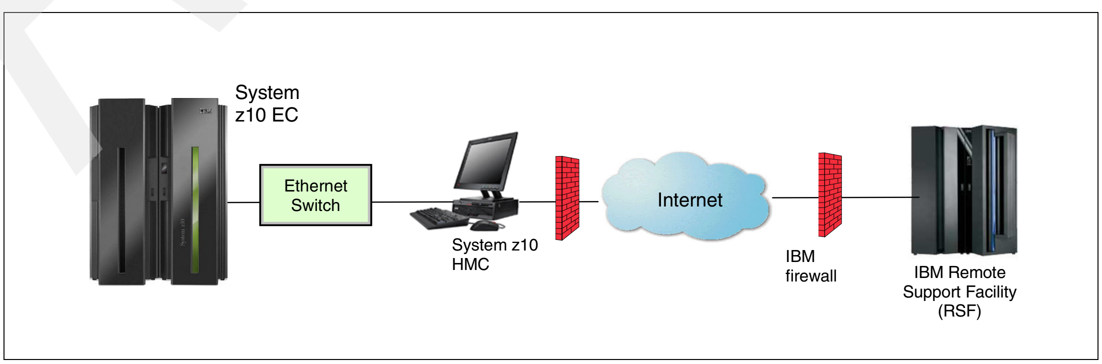



*Figure 2-14 Direct Internet connection*

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.

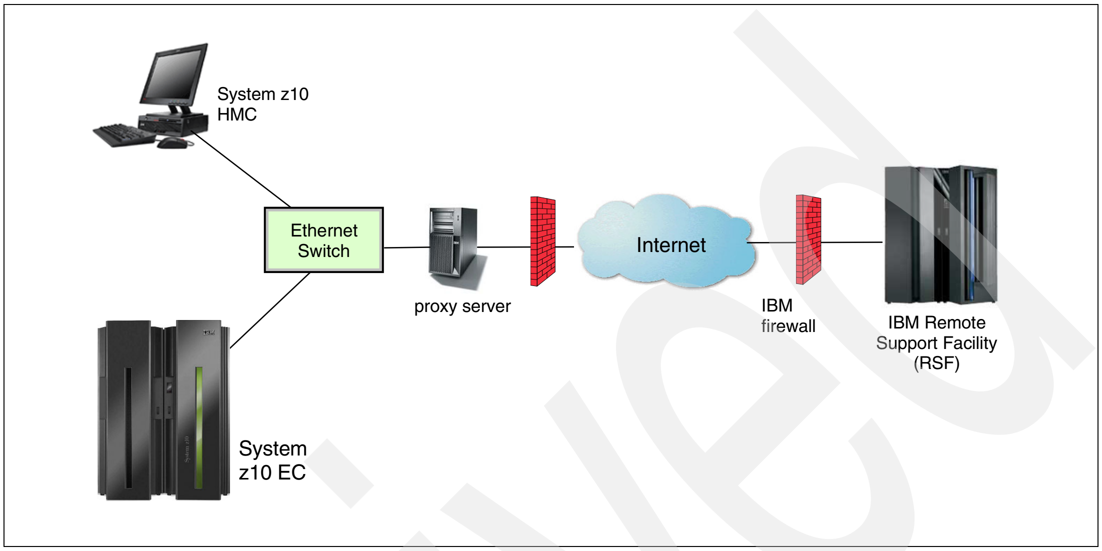



*Figure 2-15 Indirect Internet Connection with a proxy server*

If your installation requires the Hardware Management Console to be on 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.

### *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 RSF connection

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

### *Configuring dial out modem connection*

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

1. Select **Customize Customer Information**.
   - Enter Administrator information.
   - Enter System information.
   - Enter Account information.

   Close the pop-up window.

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

2. Select **Configure 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 pop-up window (Figure 2-16), select:

   - **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.
   - **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.

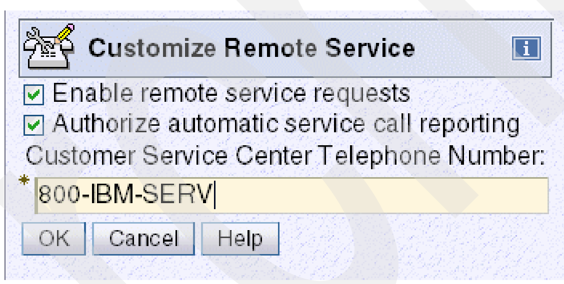



*Figure 2-16 Customize Remote Service*

   Click **OK** to close the window.

3. Select **Customize Outbound Connectivity**.

   In the pop-up window (Figure 2-17), select:

   - **Enable local system as a call-home server**. This allows the local Hardware Management Console to connect to your service provider's remote support facility for call-home requests.
   - Click **Allow dialing using the local modem**.

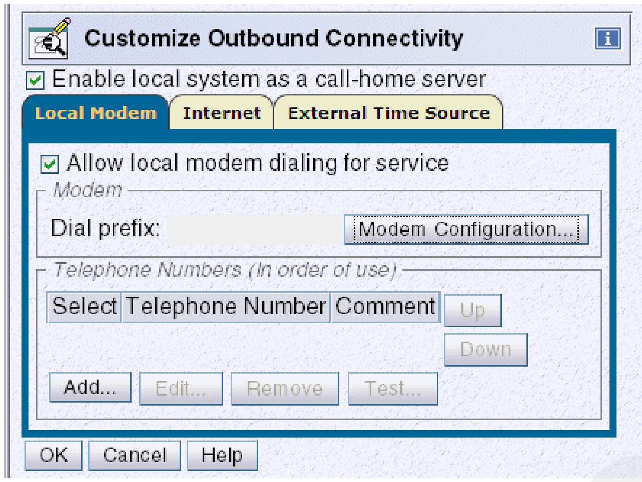



*Figure 2-17 Dial out connectivity*

4. Click **Modem Configuration**. Select the options to configure your modem (Figure 2-18).

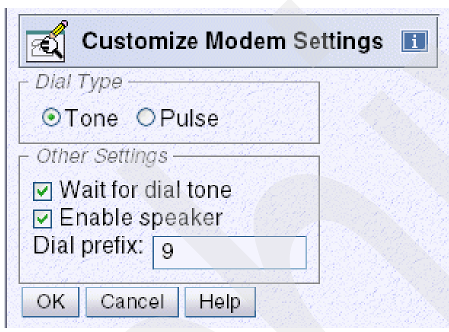



*Figure 2-18 Modem settings*

   – Specify dial type by selecting **Tone** or **Pulse**.
   – In the Other Settings area, click **Wait for a dial tone** and **Enable speaker**. Add a dial prefix if required.
   – Click **OK.**

5. Click **Add** on the Customize Outbound Connectivity window (Figure 2-19).

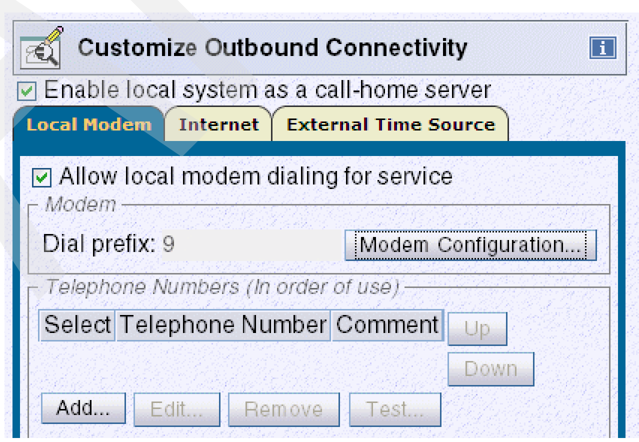



*Figure 2-19 Modem configuration*

6. The Add Telephone Number window is opened (Figure 2-20).

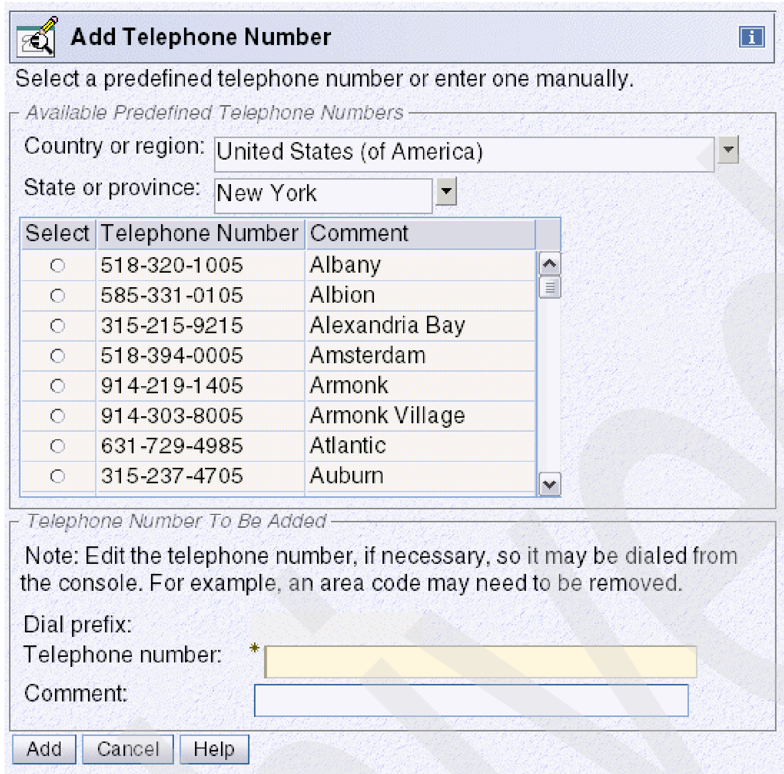



*Figure 2-20 Add Telephone Number for outbound dial out*

Make the following entries and selections:

- Select a Country or region.
- Select a State or province.
- Select a local phone number if available.
- Add toll-free numbers if available.
- Add toll numbers last.

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.

Select a phone number from the table list. Edit the phone number to enable it as a local call, if required. Click **Add.**

7. Test the modem connection (Figure 2-21).

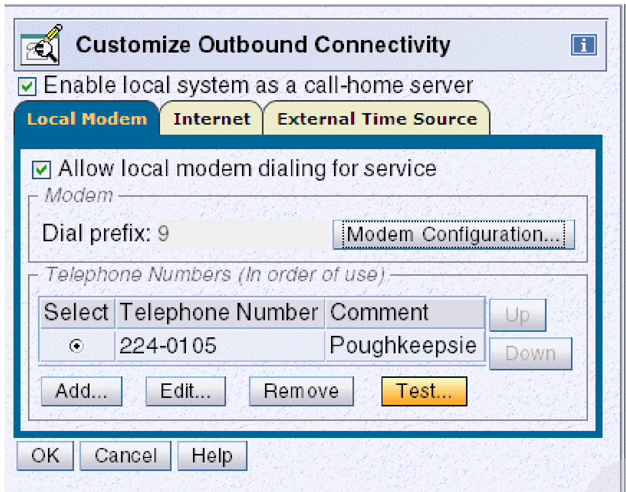



*Figure 2-21 Modem connection completed*

– Click **Test**.

– Click **Start** in the returned Test Telephone Number panel (Figure 2-22).

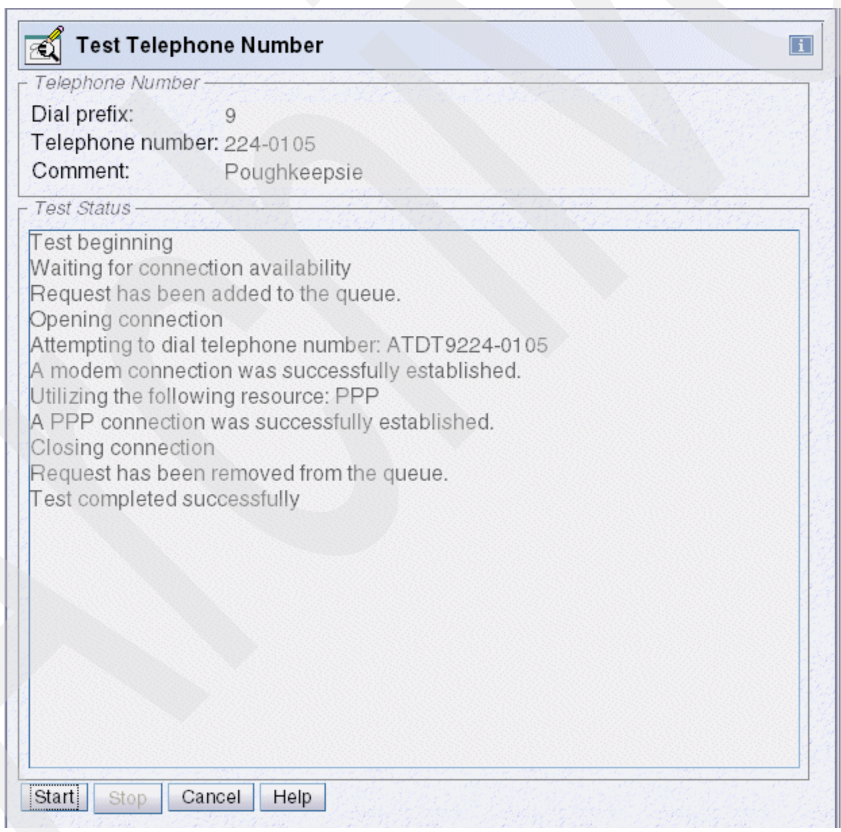



*Figure 2-22 Test modem connectivity*

– 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 using the following steps.

### *Configuring Internet connection*

The first two steps are the same as those for dial out connection; perform steps 1 and 2 as described on page 37. Continue with the following steps:

3. Select **Customize Outbound Connectivity** and click the Internet tab (Figure 2-23).

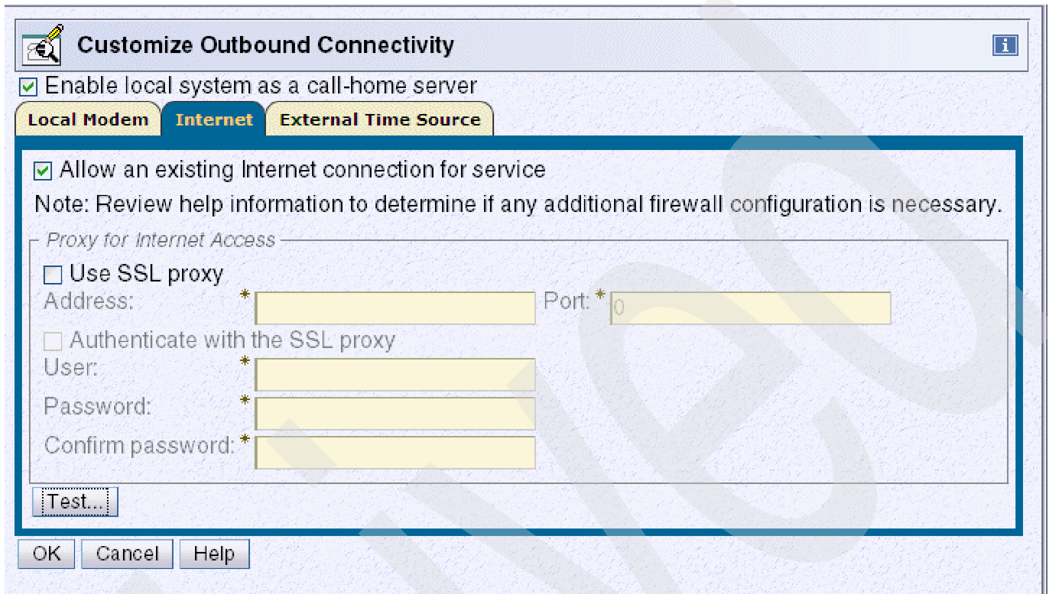



*Figure 2-23 Internet connection tab*

Click the **Allow use of an existing Internet connection** check box; click **Test**.

4. The Test Internet panel is displayed (Figure 2-24). Click **Start** and wait for the results.

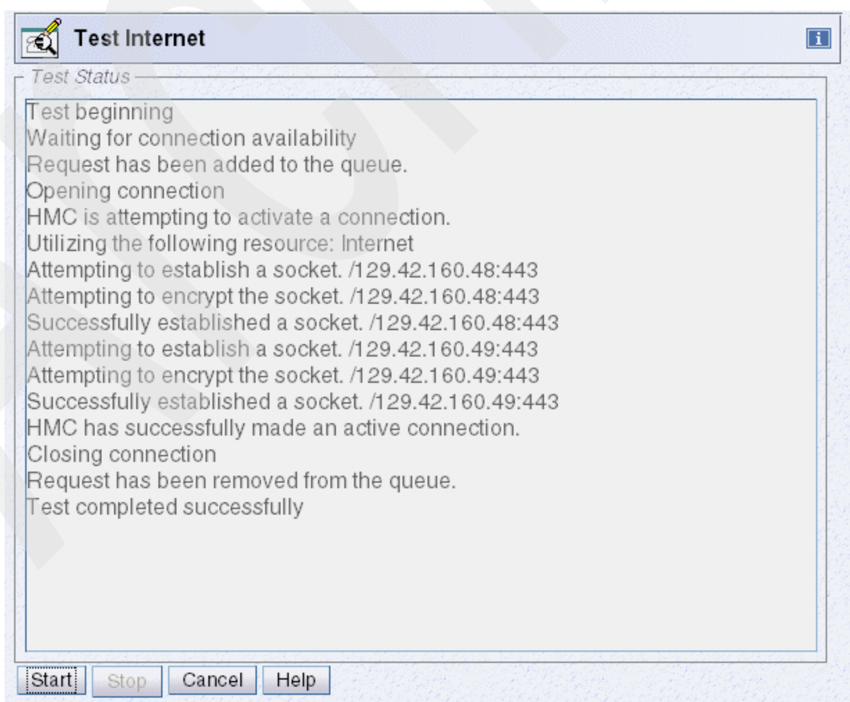



*Figure 2-24 Test for Internet connection*

If the test completes successfully, click **Cancel**.

If the test was not successful, or if an SSL Proxy is used, further network settings have to be considered.

5. Select **Customize Network Setting**, then the Identification tab in HMC Management (Figure 2-25).

> **Note:** To get access to the Customize Network Settings panel you must be logged on with an Access Administrator role.

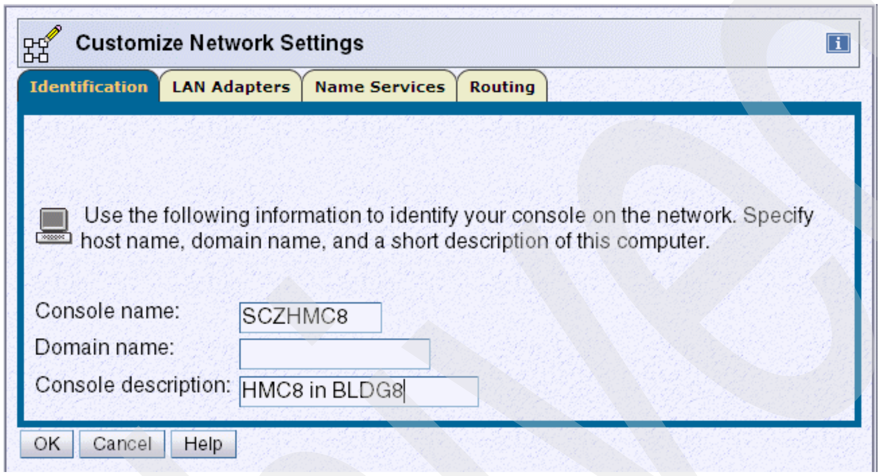



*Figure 2-25 Customize Network Settings, Identification*

Enter the Console name, Domain name, and a brief description.

6. Select the LAN Adapters tab (Figure 2-26). Select one of the adapters.

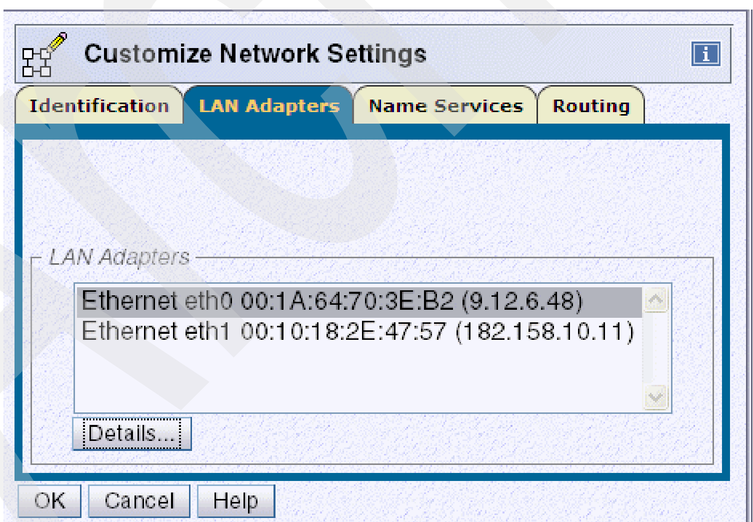



*Figure 2-26 Customize Network Settings, LAN Adapters*

7. Click **Details** to open the LAN Adapter Details panel (Figure 2-27).

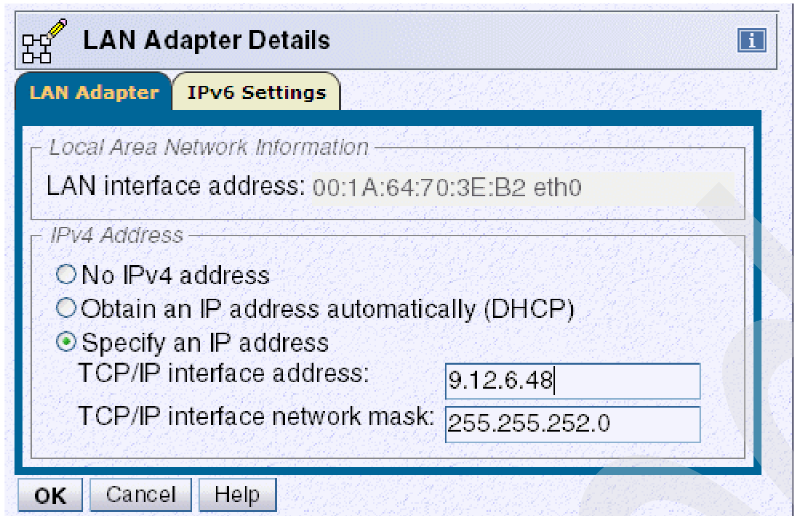



*Figure 2-27 LAN Adapter Details*

Select the IPv4 or IPv6 setting, make the required entries, and click **OK**. Repeat this procedure for the second LAN Adapter if necessary.

8. Select the Name Services tab in the Customize Network Settings panel (Figure 2-28).

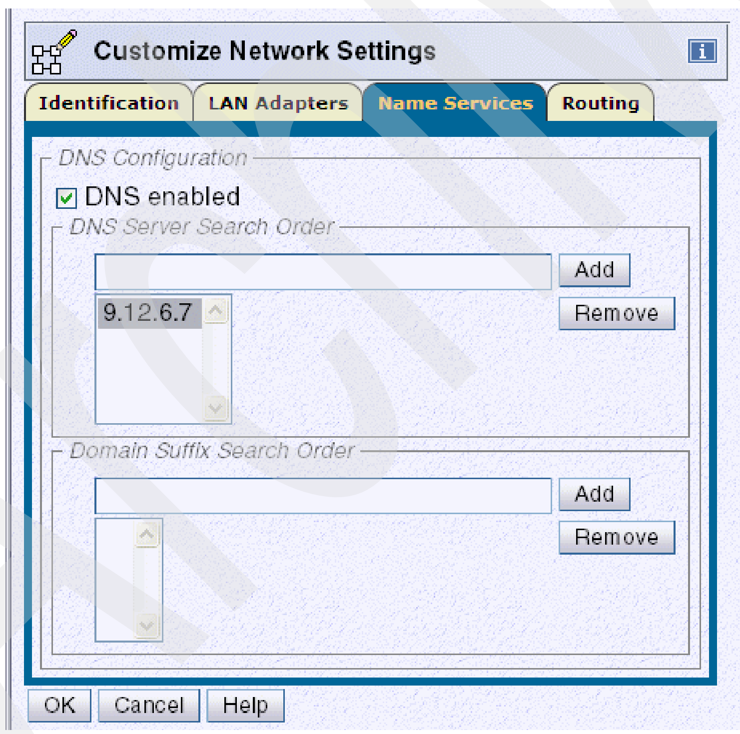



*Figure 2-28 Customize Network Settings, Name Services*

– Click the DNS enabled check box, if required.
– Enter the DNS Server Search Order IP address, if required, and click **Add**.
– Enter the Domain Suffix Search Order, if required, and click **Add**.

9. Select the Routing tab in the Customize Network Setting panel (Figure 2-29).

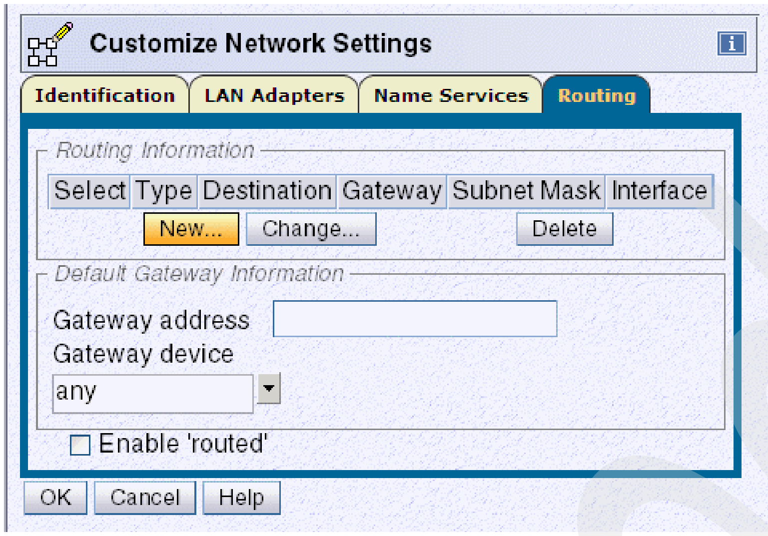



*Figure 2-29 Customize Network Settings, Routing*

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

10. Make the appropriate selections and entries on the Route Entry panel (Figure 2-30):
    - Route Entry Position
    - Route Type
    - Destination, Gateway and Subnet mask to match your network requirements
    - Adapter

    Click **OK**.

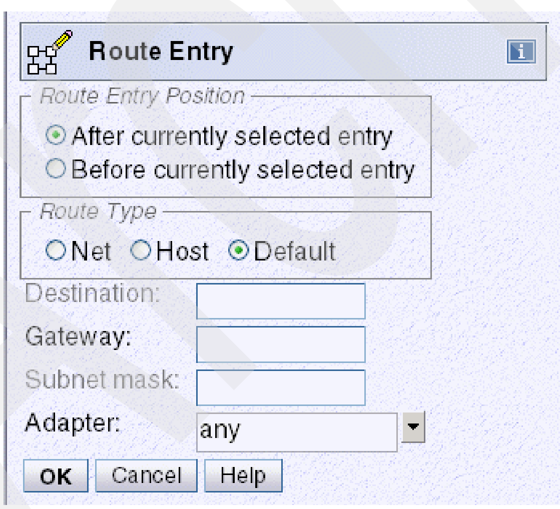



*Figure 2-30 Route Entry*

11. That opens the Customize Network Settings again. Fill in the Gateway information and click **OK**.

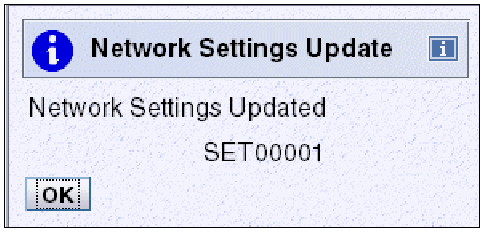


*Figure 2-31 Network Settings Updated*

The message SET00001 informs you that the network settings have been successfully updated.

Go back to step 8 to check your changed network settings. Remember you have to leave the Access Administrator role to go back to the Customize Outbound Connectivity function.

## 2.2.3 SNMP APIs

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. The protocol used between the network management application and agents is SNMP.

An SNMP agent can be configured for an HMC to allow other system management applications to use Management APIs to the Hardware Management Console Application. Enablement of the SNMP APIs is required to support z10 EC features such as the z/OS Capacity Provisioning Manager (CPM) or the Active Energy Manager (AEM), to monitor the power and thermal data of a z10 EC.

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 2-32 shows the Customize API Settings dialog, which is used to add SNMP information.

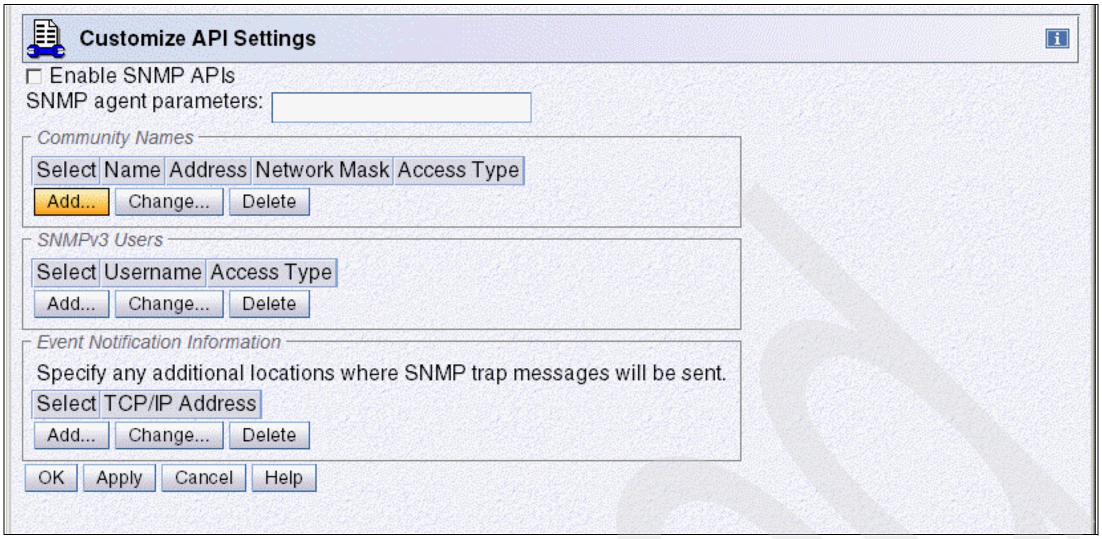



*Figure 2-32 Customize API Settings*

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 2-33 shows the Community Name Information panel that is displayed once 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 SNMP requests. |


*Figure 2-33 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** as shown in Figure 2-34.

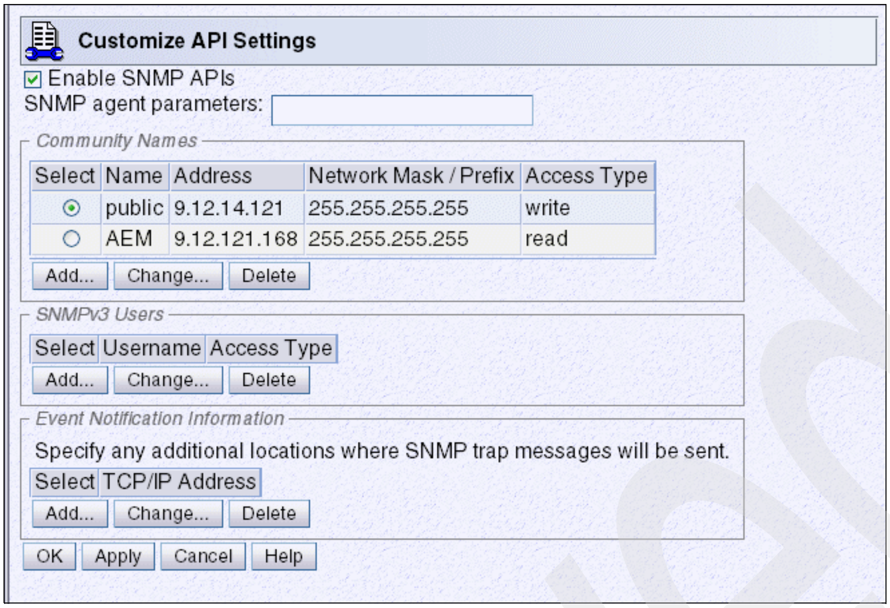



*Figure 2-34 Enable SNMP APIs*

After the SNMP APIs are enabled, the HMC must be restarted, as indicated by message ACT03092, shown in Figure 2-35.

**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.

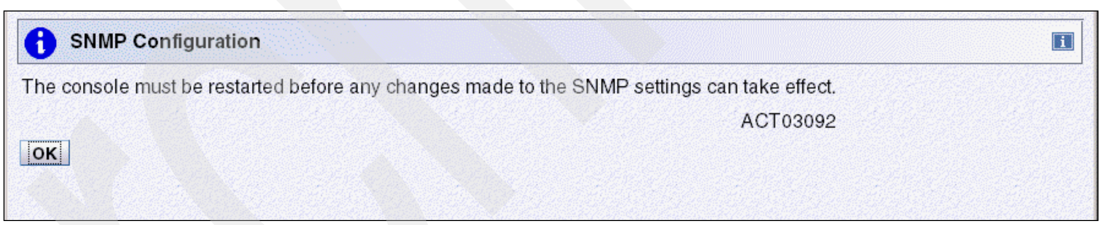



*Figure 2-35 ACT03092 message*

## 2.2.4 Connectivity for HMC and Support Element

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

- Four Ethernet cables (about 15 m). These connect to each Ethernet adapter in each SE.
- An Ethernet switch, automatically ordered.
- An HMC workstation with two Ethernet adapters and an HMC display.
- An optional modem interface.

The HMC and SE can be used to connect to an external time source (ETS) to maintain time accuracy for the connected server if the server time protocol (STP) is used. Details about the setup of the STP can be found in Chapter 7.1, "External Time Source setup" on page 306.

A modern view of the connections for the SE and HMC is shown in Figure 2-36.

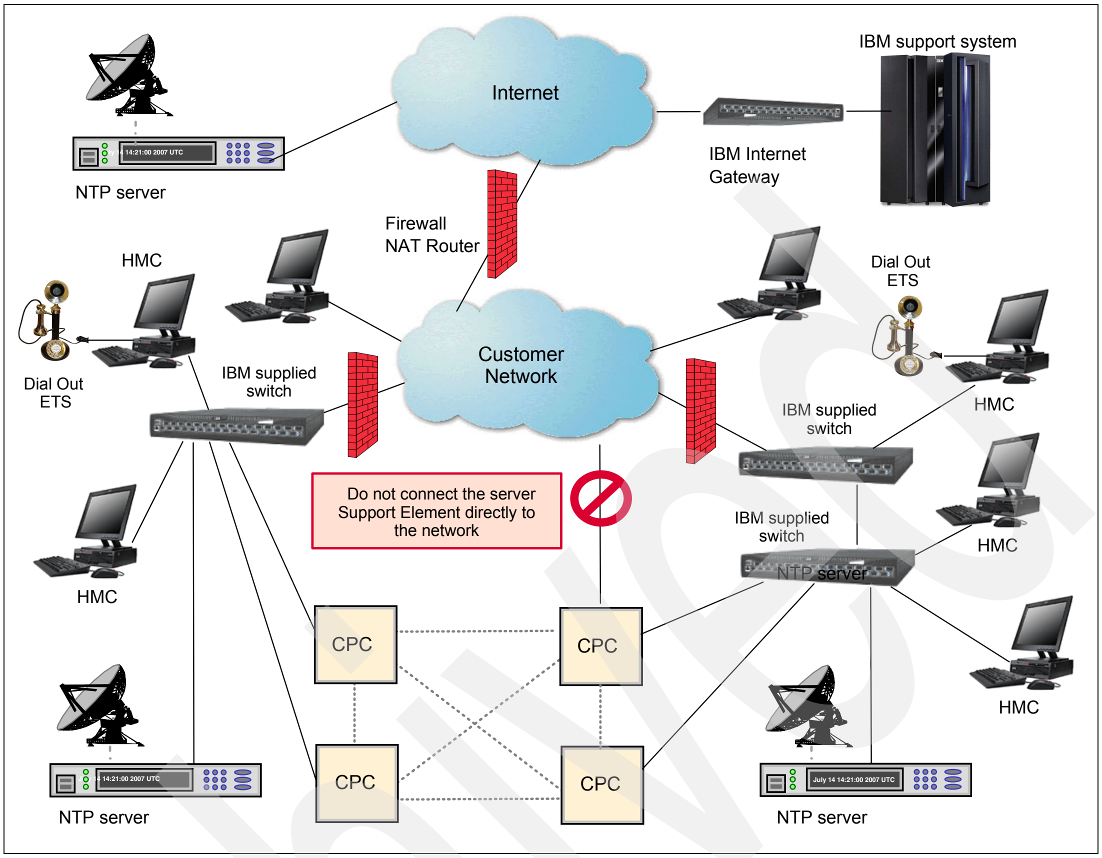



*Figure 2-36 HMC connection System z10 EC and System z9 server to NTP and RSF*

HMC Application V2.10.0 also supports the System z9, zSeries, and S/390® servers identified in Table 2-4 when at the correct driver and MCL level.

*Table 2-4 HMC back level system support*

| Server family | Server type | Driver level | SE version |
|---|---|---|---|
| z10 EC | 2097 | 73 | 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 |
| 9672 G6 | 9672/9674 | 26 | 1.6.2 |
| 9672 G5 | 9672/9674 | 26 | 1.6.2 |

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.

# 2.3 Channel considerations

With the introduction of InfiniBand connectivity for coupling links at the z10 EC, new definitions and rules must be considered. The planning necessary to implement them is covered in 2.3.7, “Coupling links” on page 58.

There are certain types of channels that are no longer supported on the z10 EC. Some feature codes can only be carried over to the z10 EC, but are no longer orderable features. If you have critical devices on a channel type that is no longer supported, you must plan to make alternative arrangements for connectivity before upgrading to the z10 EC.

This section introduces the connectivity options available on z10 EC. Table 2-5 lists the channel types and definitions that are supported on a z10 EC. The system-relevant rules for z10 EC are described in detail in subsequent paragraphs.

*Table 2-5 Supported channel types and definitions*

| Channel type | CHPID definition | MIF shared | Spanned |
|---|---|---|---|
| ESCON | CNC, CTC | Yes | No |
| | CVC, CBY | No | No |
| FICON Express[a] | FC, FCP | Yes | Yes |
| | FCV | Yes | No |
| FICON Express2[a]<br>FICON Express4 | FC, FCP | Yes | Yes |
| OSA Express2 | OSD, OSE, OSC, OSN | Yes | Yes |
| OSA Express3 | OSD | Yes | Yes |
| ICB-4 | CBP | Yes | Yes |
| ISC-3 | CFP | Yes | Yes |
| PSIFB | CIB | Yes | Yes |
| IC (Internal CHPID) | ICP | Yes | Yes |
| HiperSockets<br>(Internal CHPID) | IQD | Yes | Yes |

a. Feature is only available if carried over by an upgrade from previous server.

## 2.3.1 Parallel channels

The z10 EC does not support the attachment of parallel channels. Using a converter that converts ESCON connections to the parallel protocol enables devices with a parallel attachment to be used.

Parallel attached devices are connected to a converter, and the converter is connected to an ESCON channel defined as CVC or CBY. These channel types have to be defined as dedicated or reconfigurable. They cannot be defined as shared or spanned.

## 2.3.2 ESCON channels

ESCON channel support on a z10 EC is in the form 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 z10 EC use the industry standard MT-RJ connector.

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, DED).

If you have devices like 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 via 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 via an ESCON director.
- Switched point-to-point via maximum 2 chained ESCON directors, where at least one connection at one ESCON director has to be dedicated. This configuration allows for connections over extended distances.

## 2.3.3 FICON channels

A z10 EC allows FICON channels to be defined in three 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 MIF-shared and spanned; refer to Figure 2-37 on page 51.

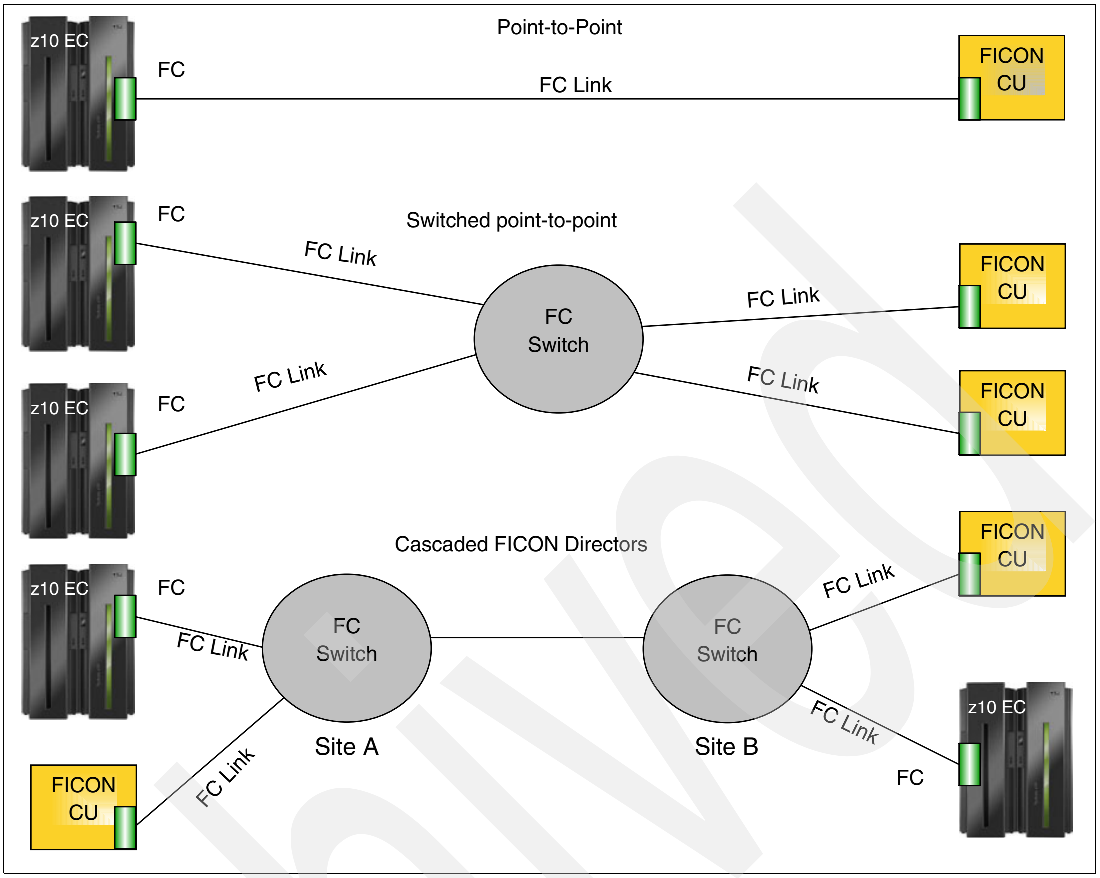



*Figure 2-37 Supported FICON topologies*

- FICON conversion mode (FCV)

  This mode allows ESCON devices to be accessed via a FICON Bridge port feature in a IBM 9032 model 5 ESCON Director.

  > **Note:** The IBM 9032 model 5 director has been withdrawn from marketing, and no replacement is available.

  On FICON Express2 or FICON Express4, you cannot define FCV channels. If you wish to still use FCV channels, the FICON Express LX cards must be carried over to the z10 EC. FCV channels can only be defined as MIF-shared. They cannot be spanned.

  > **Note:** IBM intends for System z10 EC to be the last server to support FICON Express LX and CHPID type FCV.

- Fibre Channel Protocol mode (FCP)

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

  The FICON Express4, FICON Express2, and FICON Express provide support for Fibre channel and SCSI interfaces in Linux environments. FCP channels can be defined as MIF-shared and spanned; see Figure 2-38 on page 52.

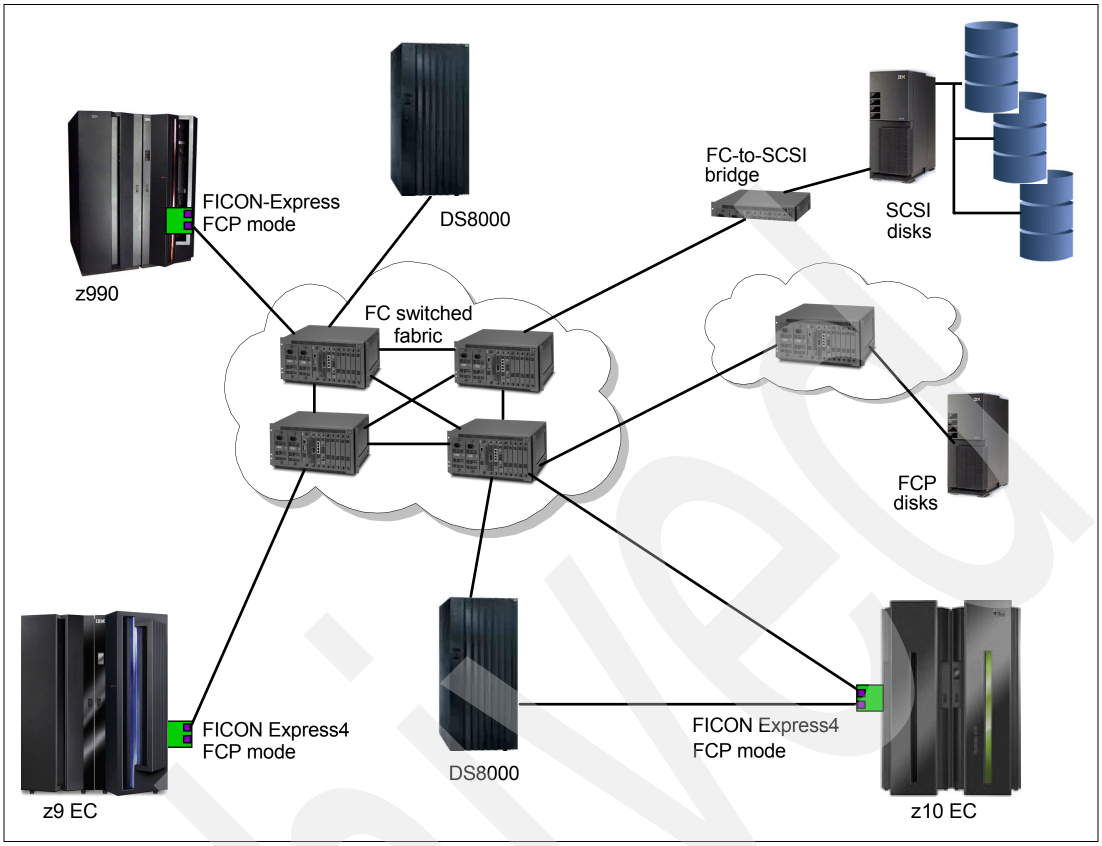



*Figure 2-38 FCP connectivity topologies*

## 2.3.4 Open Systems Adapter (OSA)

The z10 EC supports the OSA Express3 and OSA Express2 features. Depending on the specific feature, OSA Express2 can be carried over from a previous server during an upgrade or ordered as new features, while the OSA Express3 features are ordered as new features.

The following OSA features are not supported on the z10 EC:

- OSA-2

  Can be replaced by the equivalent OSA Express2 feature. This may require a new connector. All LAN Channel Stations (LCS) functions are available, that is, you can use the OSA Express2 feature in non-QDIO mode and have TCP/IP pass-thru and SNA on the same port.

- OSA-2 FDDI

  Can be replaced by a multiprotocol router. The OSA Express3 Gigabit Ethernet or OSA Express2 1000BASE-T Ethernet would have an Ethernet connection to the router, and the router would perform the FDDI conversion.

- OSA-Express 155 ATM

  Can be replaced by an OSA Express2 1000BASE-T Ethernet or OSA Express3 Gigabit Ethernet and a multiprotocol router with the appropriate network interfaces.

- OSA-Express Token Ring

  Can be replaced by a OSA Express2 1000BASE-T Ethernet or OSA Express3 Gigabit Ethernet and a multiprotocol router with the appropriate network interfaces.

A typical OSA network could appear as illustrated in Figure 2-39, which shows all the current supported OSA connectivity across System z servers.

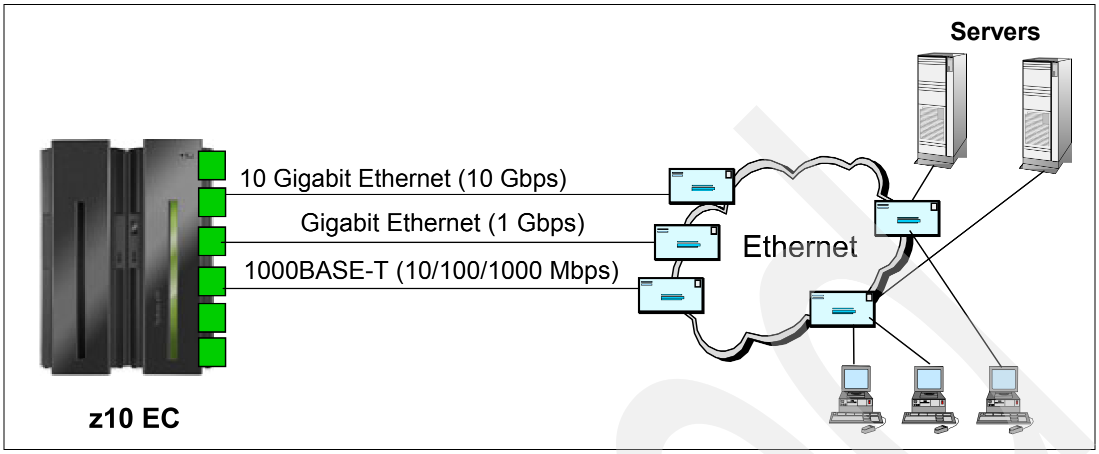



*Figure 2-39 OSA supported connectivity across z Series servers*

The OSA Express2 1000BASE-T Ethernet feature can also be used for OSA-Express Integrated Console Controller (OSA-ICC). The OSA-ICC provides a system console function at IPL time and operating systems support for multiple logical partitions. These 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 Express2 1000BASE-T Ethernet feature. It can be used by coding the channel type as OSC in HCD.

The OSA-Express2 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 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 exploit this feature for OSA-NCP, you must use a Linux logical partition running the appropriate application.

## 2.3.5 HiperSockets

HiperSockets provide the fastest TCP/IP communications between z/OS, zVM, VSE/VSA, and Linux logical partitions on a z10 EC. HiperSockets provide internal “virtual” local area networks that act like TCP/IP networks inside a z10 EC. This is achieved by the Licensed Internal Code (LIC) and supporting device drivers on the operating systems. It establishes a network with higher availability, security, simplicity, performance, and cost effectiveness than could be achieved using a 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 overheads and delays.

The HiperSocket is defined as a channel type IQD. It is assigned a CHPID value, but no PCHID. When defining an IQD channel, you have to set the maximum frame size in HCD. The default is 16 KB, but you can use 24 KB, 40 KB, or 64 KB.

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 wish to grant access to that LAN.

HiperSockets supported functions on a z10 EC include the following:

- 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 the HiperSockets.

- VLAN support for HiperSockets in a Linux environment

  VLANs can reduce overhead by allowing networks to be organized by traffic patterns and not physical locations. This allows for traffic flow over HiperSockets and between HiperSockets and OSA Express features.

- IP version 6 support on HiperSockets

## 2.3.6 PSIFB links

IBM System z10 Enterprise Class 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 in support of a single physical lane (1X), 4 physical lanes (4X), 8 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 as shown in Table 2-6.

*Table 2-6 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 z10 EC

The connectivity to the I/O cages (I/O domains) in the IBM System z10 Enterprise Class is supported by InfiniBand technology, which provides a data rate of 6 GBps.

For the IBM System z10 Enterprise Class an HCA2-C fanout in the front of a book connects via an IFB copper cable to the IFB-MP card in the I/O cage. As shown in Figure 2-40, there is a passive connection in the IFB-MP to provide the redundancy for the I/O interface. This 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 z10 EC and requires no further planning or actions.

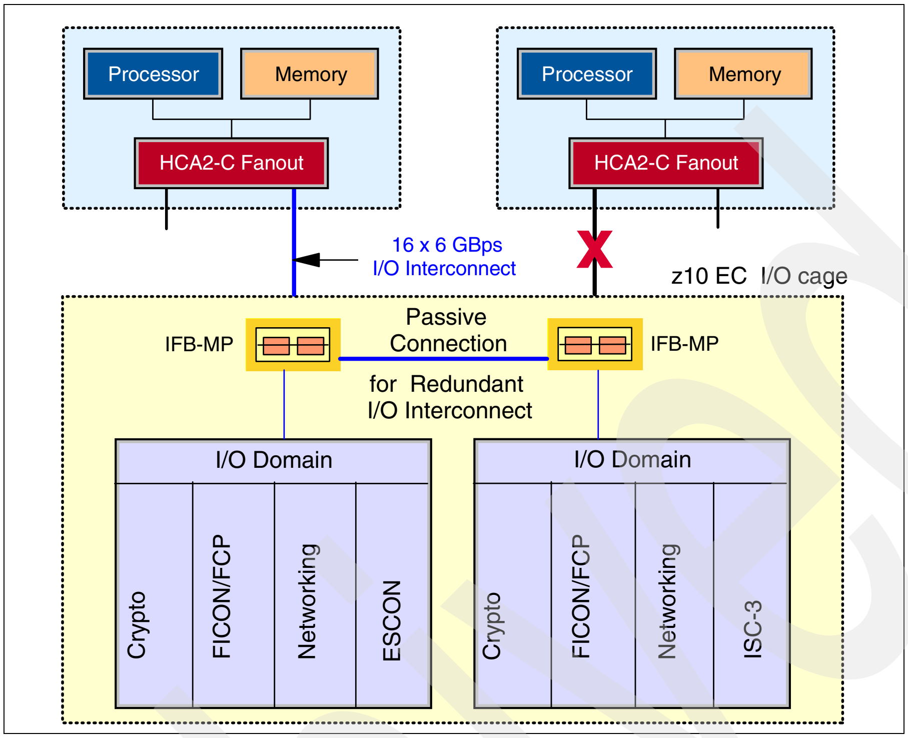



*Figure 2-40 Dataflow for a disconnected I/O interface link*

## InfiniBand coupling links

On the IBM System z10 Enterprise Class 2x IB-DDR is the high-speed link used to connect either two IBM System z10 Enterprise Class units together, or a System z10 EC to a System z9, in 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 realized 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 EC) via 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 (see Figure 2-41).

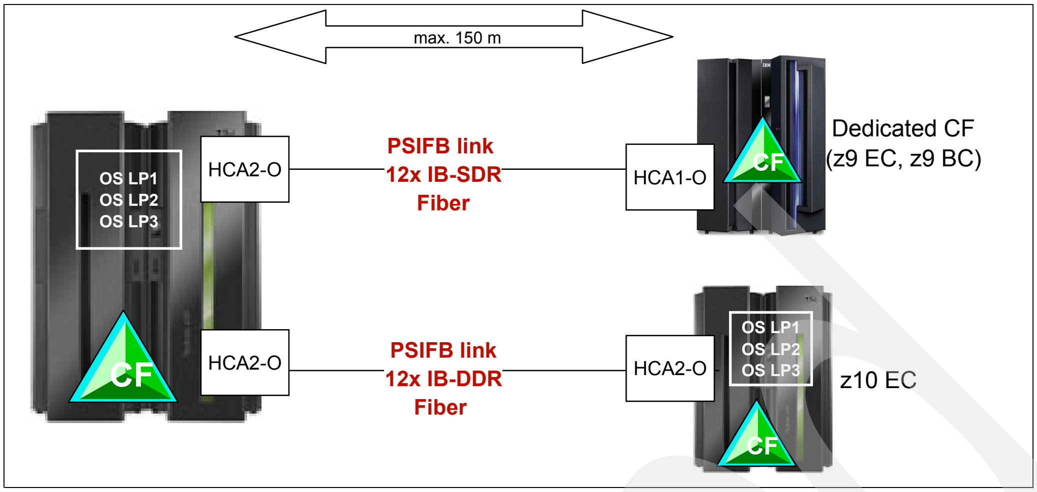



*Figure 2-41 InfiniBand coupling link connectivity for z10*

A System z9 with PSIFB feature installed can only be a standalone Coupling Facility.

**Note:** IBM has announced a Statement of Direction to support PSIFB links on general purpose System z9 EC and BC servers. When that support is made available, System z9 servers with general purpose processors, IFLs, zAAPs, or zIIPs will be able to utilize 12x IB-SDR links. Currently, 12x IB-SDR links are available on System z9 servers that have only ICF processors.

### Adapter ID (AID) assignment

The 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 from Table 2-7.

*Table 2-7 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 |

| Adapter location | Book | | | |
|---|---|---|---|---|
| | Fourth | First | Third | Second |
| 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 FSP cards (Functional Service Processor) and cannot be used for fanouts. Also the positions D1 and D2 are not available in the books in slots 10 and 15 of an E40 model, and all books of an E56 and E64 model.

Depending on the System z10 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, as well as in HMC/SE panels after installation. Refer to “Sample PCHID REPORT showing AID assignments” on page 62 for an example of a PCHID Report.

A maximum of 16 HCA2-O fanouts are supported on a IBM System z10 Enterprise Class , which provide a total of 32 ports. Nevertheless, the maximum value of 64 coupling link CHPIDs per system is still valid – including IC, ICB-4, 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. Note that the PSIFB CHPIDs can be shared or spanned across logical partitions on z10 servers. However, the number of coupling CHPIDs must not exceed the maximum of 64.

## PSIFB links and STP

PSIFB links are also valid to pass time synchronization signals using 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 via coupling links. It replaces the Sysplex Timer as a time source for interconnected systems. STP utilizes 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 *Server Time Protocol Planning Guide*, SG24-7280.

**Note:** It is strongly recommended that between any two servers exchanging STP messages, at least two physical coupling links are in use to prevent a single point of failure.

## Prerequisites

The implementation of PSIFB links requires a z10 EC system on at least one end of the connection. The hardware prerequisites for PSIFB are satisfied by the System z10 EC ordering process. Prerequisites for PSIFB links on System z9 are also resolved by the IBM ordering process, with the HCA1-O fanout feature (FC0167). Additional HSA will be 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 1.7 and later releases. At the time of writing, all currently available and supported releases will require additional PTFs. The information necessary to identify the required service is available in the Preventive Service Planning (PSP) buckets named 2094DEVICE and 2097DEVICE for System z10 and z9 respectively. The PSP information should be thoroughly reviewed early in the planning process to allow time for ordering and installing any necessary software maintenance.

One of the necessary software updates will include changes to Hardware Configuration Dialog (HCD). This support is necessary to define the configuration for z10 EC. In addition, if PSIFB links are defined between z10 EC and z9 BC or EC systems, a new selection has to be made for the processor type defined for the z9. A new support level selection that includes the 2094 basic support and CIB is available, see Figure 2-42. Select the option with CIB support to enable definition of PSIFB links which require a CHPID type of CIB.

```
                         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
/ XMP, 2094 support, CIB
```

*Figure 2-42 HCD processor type support levels for PSIFB*

### Cable requirements

The PSIFB link utilizes an industry standard optical fiber cable. However, this cable is new to the z10 EC and System z9 environment. 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 to provide 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 IBM System z10 Enterprise Class  and System z9 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 realize 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 z10 EC server supports three types of external coupling links: Parallel Sysplex over InfinBand (PSIFB) coupling links, Integrated Cluster Bus-4 (ICB-4) links, and InterSystem Channel-3 (ISC-3) links. There is one model-related exception: the 2097-E64 supports only PSIFB and ISC-3 (if an ICB-4 feature is required in a four book server model, RPQ 8P2334 must be ordered). 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.

**Note:** IBM System z10 Enterprise Class  will be the last server to support ICB-4 links.

## Coexistence

When implementing PSIFB links the requirements for z10 EC server coexistence must be considered. The z10 EC can *only* coexist with System z9 (EC or BC), z990, and z890 servers in a parallel sysplex. Any earlier servers (such as z800 or z900) in the parallel sysplex environment must be removed or replaced by a supported server before the z10 EC can be added. Figure 2-43 illustrates the supported coexistence environments as well as the types of supported coupling links on z10 EC servers. Note that a z10 EC server will support ICB-4 and ISC-3 connections, except for the z10 EC E64 model.

PSIFB links are available on z10 EC and System z9 servers. They are used to connect z10 EC servers to other z10 EC servers or to connect z10 EC servers to System z9 stand-alone coupling facility servers. In other words, for a System z9 to have PSIFB features installed it can have only Internal Coupling Facility (ICF) processors. If a System z9 has any general purpose processors, Integrated Facility for Linux (IFL) processors, System z9 Application Assist Processors (zAAPs), or IBM System z9 Integrated Information Processors (zIIPs) then it is not eligible for the PSIFB features.

**Note:** IBM has announced a Statement of Direction to support PSIFB links on general purpose System z9 EC and BC servers. When that support is made available, System z9 servers with general purpose processors, IFLs, zAAPs, or zIIPs will be able to utilize 12x IB-SDR links. Currently, 12x IB-SDR links are available on System z9 servers that have only ICF processors.

When configuring a z10 EC in a Parallel Sysplex configuration, you need to ensure that the other servers have the correct channel type and definition to connect to a z10 EC.

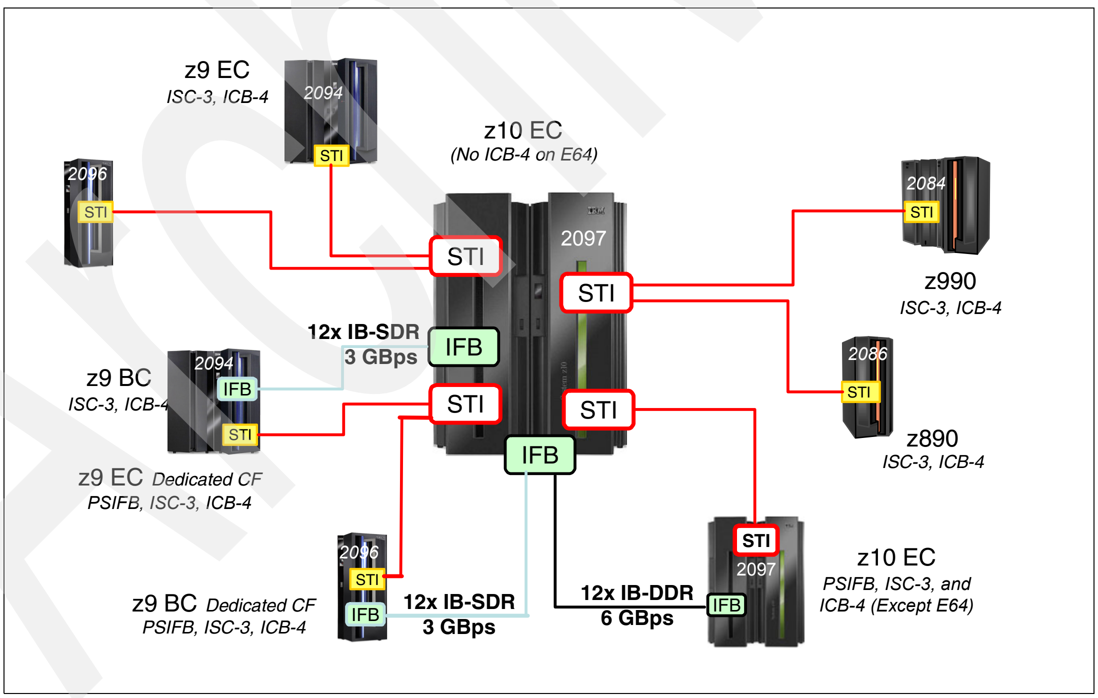



*Figure 2-43 Coupling link configuration options and supported coexistence for z10 EC*

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).
- ICB-4 in peer mode (CBP): Integrated Cluster Bus channels are used to connect servers over short distances, to a maximum of 10 meters (33 feet).
- PSIFB (CIB): This is a new CHPID type to identify a coupling over IB (CIB) channel path. The CHPID can be DED, REC, SHR or SPAN. The link supports point-to-point to up to 150m.
- 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.
- Up to 16 CIB CHPIDs can be defined to the same AID. 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 to 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). This is checked by HCD.
- 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. The current versions of IOCP/HCD will allow this type of configuration, but future versions of IOCP/HCD will prevent 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.
- Only CF-capable partitions may be specified in the access or candidate list of a CF peer channel path.

### Support for multiple CHPIDs per port

An important change from previous coupling link technology is 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. This allows configurations that were not possible with previous coupling link implementations. There are multiple reasons for utilizing this new support, such as:

- PSIFB links can be shared by multiple sysplexes. 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 may provide for a significant reduction in the number of coupling links required.

For ICB-3, ICB-4, and ISC-3 coupling links, each coupling link CHPID requires a physical link (Figure 2-44).

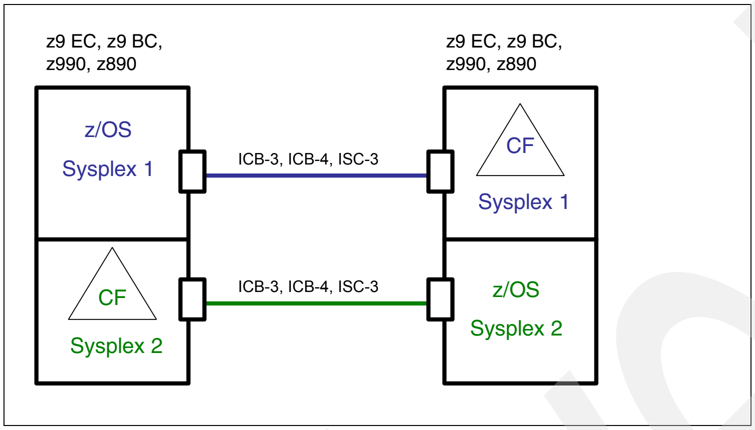



*Figure 2-44 Coupling links using ICB-3, ICB-4, ISC-3*

For PSIFB links, multiple CHPIDs can share a physical link (up to 16 per adapter). Refer to Figure 2-45.

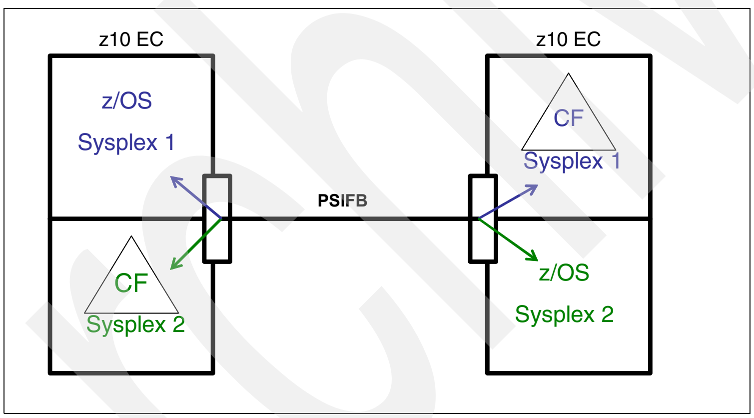



*Figure 2-45 Coupling links using PSIFB*

- 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 may also provide significant relief when multiple z/OS images on a single machine are sharing a coupling link CHPID via Multiple Image Facility (MIF). For heavily utilized systems this is often a source of subchannel busy conditions.

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

### Adapter ID (AID) and port assignments

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 Adapter ID (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 (AID) assignment" on page 56.

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 z10 EC model E26. 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 is 1B.

*Example 2-1 Sample PCHID REPORT showing AID assignments*

```
CHPIDSTART
  19756694                      PCHID REPORT                       Dec 16,2007
  Machine: 2097-E26  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 is moved from one slot location on a processor book to another, 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 will use 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. When the local system name is not present, it will default to the CPC name. We recommend using the same CPC name specified for the processor on the Hardware Management Console. This will help to avoid naming conflicts.

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

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.

### PSIFB link

A PSIFB link connects a port on a host channel adapter (HCA) via a physical cable to the equivalent one on a different server. The z10 EC supports up to 64 coupling link CHPIDs. The maximum number of coupling links allowed for each type is summarized in Table 2-8.

*Table 2-8 Maximum number of coupling links supported*

| Coupling link type | Order Increment | z10 EC Maximum[a] |
|---|---|---|
| IC | n/a | 32 |
| ICB-4 | 1 port | 16 |
| ISC-3 | 1 link | 48 |
| PSIFB | 2 ports (1 HCA) | 32 (16 HCAs) |

a. Maximum combined coupling link types and defined CHPIDs is 64.

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

It is important to note that the maximum number of coupling links and the maximum number of CHPIDs defined are both 64. 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. While these maximums have not changed, they must be considered when planning to utilize the flexibility allowed by the PSIFB links.

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

## 2.3.8 Configuration rules

Table 2-9 summarizes the maximum number of CHPID types supported on System IBM System z10 Enterprise Class .

*Table 2-9 IBM System z10 Enterprise Class maximum number of supported channels*

| Maximum channel paths (CHPID type) | z10 EC |
|---|---|
| Channel paths (total) | 1024[a] |
| CVC, CBY, CNC, CTC | 1024[a] |
| FCV[b], FC, FCP | 336 |
| OSD[c], OSE,OSC, OSN | 48 |
| CFP, CBP, ICP, CIB combined | 64 |
| CFP | 48 |
| CBP | 16 |
| ICP | 32 |
| CIB | 32 |
| IQD | 16 |

a. Model E12 supports a total of 960 channel paths only.
b. Only available if FICON Express is carried over on an upgrade (max. CHPID 120).
c. If OSA Express2 10 GbE LR is carried over on an upgrade the max. CHPID is 24.

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 via 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 2-10 IBM System z10 Enterprise Class server attributes*

| Attributes | | z10 EC |
|---|---|---|
| **Maximum configurable Physical Control Units (PCUs)** | per CVC, CBY | 48 |
| | per OSD | 16 |
| | per OSE, OSC, OSN | 1 |
| | per CFP, CBP, ICP, CIB | 1 |
| | PCUs or link addresses per CNC, CTC | 120 |
| | PCUs or link addresses per FCV[a], FC | 256 |
| | per FCP | 1 |
| | per IQD | 64 |
| **Maximum configurable devices** | per CFP, CBP, ICP, CIB | 256 |
| | per CNC | 1024 |
| | per CTC | 512 |
| | per OSE | 255[b] |
| | per OSC | 254[c] |
| | per OSD channel path with priority specification disabled | 1920 |
| | per OSD channel path with priority specification enabled | 480 |
| | per OSN (UNIT=OSN devices or subchannels) | 480 |
| | per OSN (UNIT=3745 devices or subchannels) | 180 |
| | per FCP | 480 |
| | per FCV, FC | 16K |
| | for all IQD channel paths | 12K |

a. FCV channel paths can have link addresses in the range 01 - FE, and therefore have a maximum of 254 link addresses.
b. 240 valid subchannels can be used
c. 120 valid subchannels can be used

When assigning channels, you must consider if you want to have certain types of channels defined as spanned. This means that some channels can access multiple CSSs. This takes 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 HCD; see Figure 2-46.

```
______________________________ 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 2-46 HCD - Define spanned channels*

3

# MES upgrade from System z9 EC to z10 EC

In this chapter we describe how to upgrade an existing System z9 EC to a z10 EC.

You can also upgrade from a z990 to a z10 EC; however, only examples of upgrading or replacing a System z9 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 exist, the results achieved in your environment may 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 - Migrate the existing 2094 IODF
- Save configuration files
- Validate the 2097 work IODF
- CHPID Mapping Tool actions
- HCD - Update the 2097 work IODF with PCHIDs
- HCD - Build the 2097 production IODF
- Load the 2097 processor IOCDS
- HMC steps for activation profiles

## 3.1 Scenario overview

We begin by providing an overall description of this scenario.

### 3.1.1 The configuration process

Figure 3-1 illustrates the general process flow that we follow in our example. The numbered steps are described following the figure.

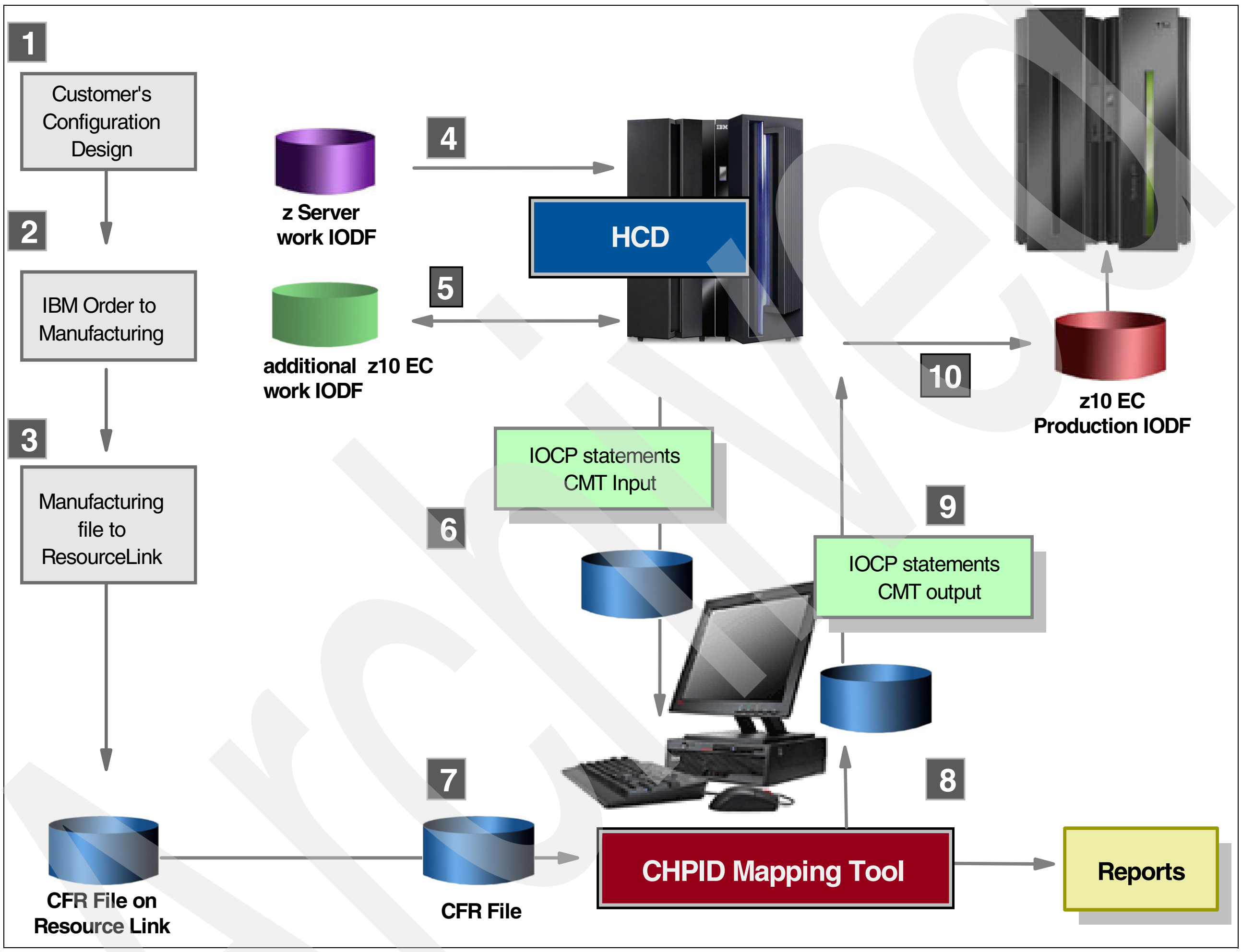



*Figure 3-1 CMT - Overall process flow*

1. When planning to migrate to a z10 EC, the IBM Technical Support team can help you to define a configuration design that meets your needs. The configuration then gets passed to the ordering step.
2. The IBM order for the configuration is created and passed to the manufacturing process.
3. The manufacturing process creates a configuration file that is stored on the IBM Resource Link Web site. This configuration file describes the hardware being ordered. This data is available for download by the client installation team.
4. The existing System z9 EC I/O configuration is used as a starting point into HCD. The System z9 EC production IODF is used as input to HCD to create a work IODF that will be the base to define the new z10 EC configuration.

5. When the new z10 EC configuration has been added and the obsolete hardware has been deleted, a validated version of the configuration is saved in a 2097 validated work IODF.
6. From the validated work IODF, create a file containing the z10 EC 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.
7. The configuration file created by the IBM Manufacturing process in step 3 is downloaded from Resource Link to the CMT workstation.
8. The CHPID Mapping Tool uses the input data from files to map logical channels to physical ones on the new z10 EC hardware.

   You might have to make decisions in response to situations that might arise, such as:

   a. Resolving situations in which the limitations on the purchased hardware cause a single point of failure (SPoF). You may need to purchase additional hardware in order to resolve some SPoF situations.
   b. Prioritizing certain hardware items over others.

   After processing by the CHPID Mapping Tool, 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.
9. 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.
10. Using HCD again, and using the validated work IODF file created in step 5 and the IOCP statements updated by the CHPID Mapping Tool, apply the physical channel assignments done by the CMT to the configuration data in the work IODF.

    After the physical channel data has been migrated into the work IODF, a 2097 production IODF is created and the final IOCP statements can be generated. The installation team uses the configuration data from the 2097 production IODF when the final power-on reset is done, yielding a z10 EC with an I/O configuration ready to be used.

If you are upgrading an existing 2094, you may be able to use HCD to write an IOCDS to your current 2094 in preparation for the upgrade. If you can write an IOCDS to your current 2094 in preparation for upgrading it to a 2097, 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 to a 2097. This scenario will use the HCD option Write IOCDS process.

If the 2094 is not connected using a LAN 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 diskette. If the file is too big to fit on a diskette, compress it using a zip-compatible program.

The migration path from a System z9 EC to a z10 EC can be either in the form of a field upgrade to the existing System z9 EC, or a replacement (push/pull) of an existing System z9 EC with a new z10 EC. Note the following points:

1. A *field upgrade* means that the existing System z9 EC processor serial number is retained during the upgrade.

2. A *replacement* of the existing System z9 EC by a new z10 EC implies physically removing (push) the System z9 EC and bringing in a new z10 EC (pull) to take its place. The replacement z10 EC has a new serial number which is different from that of the existing System z9 EC.

In this chapter, we document the *field upgrade* scenario.

## 3.1.2 Planning considerations

Table 3-1 lists the channel types as described in an IOCDS that are used with the System z10 EC.

*Table 3-1 Channels, links, and adapters with CHPID type*

| **Channels** | **CHPID Type** | **May be defined as Shared** | **May be defined as Spanned** |
|---|---|---|---|
| ESCON channels:<br>Connection Channel (ESCON architecture)<br>Channel to Channel (connects to CNC) | <br>CNC<br>CTC | <br>yes<br>ye | <br>no<br>no |
| FICON bridge. A FICON channel that attaches to an ESCON Director Model 5 | FCV | yes | no |
| FICON native channels that attach to FICON directors or directly to FICON control units | FC | yes | yes |
| FICON channels that attach to Fibre channel devices, switches, directors, or Fibre-Channel-to-SCSI bridges | FCP | yes | yes |
| ISC-3 peer mode channels (connects to another CFP) | CFP | yes | yes |
| ICB-4 peer channels (connects to another ICB-4) | CBP | yes | yes |
| IC peer channels (connects to another ICP) | ICP | yes | yes |
| InfiniBand host channel adapters (HCA) | CIB | yes | yes |
| HiperSocket (IQDIO) channels | IQD | yes | yes |
| OSA adapters using QDIO architecture | OSD | yes | yes |
| OSA adapters using non-QDIO architecture | OSE | yes | yes |
| OSA 1000Base-T adapters for OSA-ICC | OCE | yes | yes |
| OSA-Express2 adapters for NCP | OSN | yes | yes |

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=CBP - ICB-4 links
- CHPID Type=CIB - PSIFB links connecting to a 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 System z10 EC requires HMC Application Ver 2.10.0 or higher and only uses Ethernet for its network connection. The HMC and also 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 V1.9 or HCD V1.7 and later with 2097DEVICE PSP Bucket and PTFs is required to define and support some of the new features of the System z10 EC.

### Open Systems Adapter - Integrated Console Controller (OSA-ICC)

You might consider using OSA Express2 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 (FCP)

When using CHPIDs defined as TYPE=FCP, you may wish to consider NPIV.

### 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 may 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 via the HMC, note that the SNA address is made up of a Network name and CPC name separated by a dot (for example, USIBMSC.SCZP201). 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 1-8 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 will be 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.

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

### 3.1.3 MES upgrade scenario

This scenario describes the configuration steps to upgrade an existing 2094 to a 2097. Key factors are as follows:

- HCD requires a new Processor ID for the 2097.
- We recommend keeping the same CPC name for the 2097.
- The 2097 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 2094 production IODF.
- The target IODF is a new 2097 work IODF.

The example here uses a 2094-S18 with a Processor ID of SCZP101 and three CSSs (CSS ID=0, CSS ID=1 and CSS ID=2) and is being upgraded to a 2097-E26 with a Processor ID of SCZP202. The CPC name SCZP101 and serial number 000101 are not changed.

The following CHPID types are migrated:

- OSD, OSE, OSC, OSN
- CTC, CNC, FC, FCP
- CFP, CBP, ICP
- IQD

The following Hardware/CHPID types are not supported and not migrated to the 2097:

- PCIXCC and PCICA
- ICB-3 links
- ICB-2 links
- ISC-3 links in compatibility mode (CHPID types CFS and CFR)
- OSA-Express Token Ring

Table 3-2 summarizes the migration options and tool requirements. The step-by-step process is documented later in this chapter.

*Table 3-2 2094 I/O configuration migrated to a 2097*

| 2094 to 2097 | Upgrade an existing 2094 to a 2097 (MES upgrade) |
|---|---|
| Processor ID | Require to change 2094 to new ID |
| CPC name | Recommend 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 below) |
| 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 |

## 3.2 HCD - Migrate the existing 2094 IODF

The following steps explain how to define the existing I/O configuration to the new 2097 server using HCD, and then migrate the channel subsystem and logical partitions from the 2094 to the 2097 server. Using HCD, the sequence of operations is as follows:

1. Create a work IODF from the current 2094 production IODF.
2. Repeat the 2094 processor being upgraded.
3. Observe CF link messages for later reference.
4. Delete unsupported items for the repeated 2094.
5. Change the repeated 2094 to a 2097 and delete the 2094.
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. Possibly, over-define channel paths.
9. Save OSA configuration information.
10. Build a 2097 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 validated work IODF.

16. Build Production IODF and remote write the IOCP to an IOCDS on the processor.
17. Build Reset, Image and Load Profile.
18. Perform Power-on Reset (Activate) of 2097.

In the following sections, we describe these steps in more detail.

### Create work IODF from current 2094 production IODF

Use HCD to select the current production IODF that contains the 2094 processor you are upgrading (for example, SYS6.IODF38).

### Repeat the 2094 processor being upgraded

1. From the main HCD panel, select option **1.3**, **Processor List**. Type `r` (for repeat) next to the 2094 you want to upgrade, then press Enter (see Figure 3-2).

```
                                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  __________ ________________________________
_ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
_ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
r SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
```

*Figure 3-2 HCD - Processor List (repeating processor)*

2. You are presented with the Identify Target IODF panel. Do one of the following:
   – 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 now prompts you to enter the data set name of the Target IODF (for example, `SYS6.IODF39.WORK`).
4. You are presented with the Repeat Processor panel, as shown in Figure 3-3. Enter the Processor ID of the new 2097 (in this example, `SCZP202`) and leave all other fields unchanged, then press Enter to continue.

```
--------------------------- Repeat Processor ------------------------------

Specify or revise the following values.

Processor ID . . . . . . . . . SCZP202_

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  . . . . . . ________

+------------------------------------------+
|New IODF SYS6.IODF39.WORK defined.    |
+------------------------------------------+
```

*Figure 3-3   HCD - Repeat Processor*

## CF Link Information messages

At this point, you may be presented with Severity E, I, or W messages. As shown in Figure 3-4, in our example CBDG441I Severity I messages were mentioned in the introduction; these were received due to the CF Link CHPIDs not being copied over to the 2097 definition.

```
----------------------------- Message List --------------------------------
  Save  Query  Help

                                                Row 1 of 239
Command ===> ___________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Sev Msg. ID  Message Text
_ W   CBDG441I The coupling facility connection between channel path BE
#              of processor SCZP101 and channel path 66 of processor
#              P000STP1 is not copied.
_ W   CBDG441I The coupling facility connection between channel path BF
#              of processor SCZP101 and channel path 54 of processor
#              P000STP2 is not copied.
_ W   CBDG441I The coupling facility connection between channel path C0
#              of processor SCZP101 and channel path C5 of processor
#              SCZP901 is not copied.
_ I   CBDG271I Requested action on object SCZP101 successfully
#              processed.
```

*Figure 3-4   HCD - Message List (CBDG441I)*

Scroll down until you reach the end of the messages and notice message `CBDG271I requested action on object SCZP101 successfully processed`

Press PF3 or PF12 to continue. As shown in Figure 3-5, there is now an additional 2094 processor named SCZP202.

```
                               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  __________ ________________________________
_ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
_ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP202  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
```

*Figure 3-5 HCD - Processor List (repeated processor)*

## Change the 2094 to a 2097 and delete the 2094

At this point you can either leave the original copy of the 2094 (SCZP101), or delete it from the IODF. In our example, we kept it in the IODF for a few more steps.

Do the following:

1. Type `c` (for change) next to SCZP202 to change the 2094 to a 2097, then press Enter; see Figure 3-6.
2. Make the following updates, then press Enter:
   - Update `Processor type` to `2097`.
   - Update `Processor Model` to `E26`.
   - Update the 2094 part of the serial number to 2097 (that is, `0001012094` to `0001012097`).

```
 -------------------- Change Processor Definition -------------------

Specify or revise the following values.

Processor ID . . . . . . . . : SCZP202
Support level:
XMP, Basic 2094 support
Processor type . . . . . . . . 2097      +
Processor model  . . . . . . . E26       +
Configuration mode . . . . . . LPAR      +

Serial number  . . . . . . . . 02991E2097  +
Description  . . . . . . . . . ________________________________

Specify SNA address only if part of an S/390 microprocessor cluster:

Network name . . . . . . . . . USIBMSC   +
CPC name . . . . . . . . . . . SCZP101   +

Local system name  . . . . . . ________
```

*Figure 3-6 HCD - Change Processor Definition (changing repeated processor)*

3. Press Enter. The Update Channel Path Identifiers panel displays (Figure 3-7). We are not making any changes in our example.

```
+--------------------- Update Channel Path Identifiers ----------------------+
|                                                                 Row 1 of 125 |
| Command ===> __________________________________________ Scroll ===> CSR    |
|                                                                             |
| Specify any changes to the channel path identifiers in the list below.      |
|                                                                             |
| Processor ID . . . . : SCZP202                                              |
| Channel Subsystem ID : 0                                                    |
|                                                                             |
| CHPID  Type  Side  Until CHPID   New CHPID +                                |
| 00     OSD         __            00                                         |
| 01     OSD         __            01                                         |
| 02     OSD         __            02                                         |
| 03     OSD         __            03                                         |
| 04     OSD         __            04                                         |
| 05     OSD         __            05                                         |
| 07     OSC         __            07                                         |
| 08     OSD         __            08                                         |
| 09     OSE         __            09                                         |
| 0A     OSC         __            0A                                         |
| 0B     OSD         __            0B                                         |
|  F1=Help       F2=Split      F3=Exit       F4=Prompt     F5=Reset          |
|  F7=Backward   F8=Forward    F9=Swap      F12=Cancel    F22=Command        |
+-----------------------------------------------------------------------------+
```

*Figure 3-7 HCD - Update Channel Path Identifiers (not changed)*

4. Press Enter *for each of the Channel Subsystem IDs.*

Now the repeated 2094 processor is successfully changed to a 2097-E26; see Figure 3-8 on page 78.

```
                                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  __________ ________________________________
_ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
_ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP202  2097     E26      LPAR  02991E2097 ________________________________
_ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
******************************* Bottom of data ********************************




+-------------------------------------------------------------------+
| Definition of processor SCZP202 has been extended to its maximum |
| configuration.                                                    |
1+------------------------------------------------------------------+
```

*Figure 3-8 HCD - 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 is because part of the Central Storage is allocated as a fixed-size Hardware System Area that is not addressable by application programs. In HCD when you define as new or redefine a processor as 2097, HCD automatically defines the maximum configuration of four CSSs and 60 logical partitions.

## Delete the 2094 processor definition

Now that the 2094 has been repeated and changed to become a 2097, the original 2094 definition (SCZP101) must be deleted so that the required CF Links can be restored.

1. Type d (for delete) next to processor SCZP101 in the Processor List (Figure 3-9).

```
                                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  __________ ________________________________
_ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
_ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
d SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP202  2097     E26      LPAR  02991E2097 ________________________________
_ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
```

*Figure 3-9 HCD - Processor List (deleting processor)*

2. Press Enter to “Confirm Delete Processor”.

```
                                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  __________ ________________________________
_ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
_ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
_ SCZP202  2097     E26      LPAR  02991E2097 ________________________________
_ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
```

*Figure 3-10 HCD - Processor List (processor deleted)*

### Reconnect the CF channel paths not migrated

Manually redefine the CF Links you want from the SCZP202 processor to any other processor, along with any Internal CF Links desired. To help this effort, you can get a CF connection report from the previous production IODF containing the 2094. Alternatively, you can make a note of all CBDG441I error messages received in the previous step.

### Define additional I/O

Define any additional CHPIDs, control units and devices, CTCs, and so on that you may be adding into the 2097 during the upgrade.

### Over-define channel paths on an XMP processor

Sometimes you may need to define a channel path that is not physically installed on the processor. This may 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 over-define CHPIDs by using an asterisk (*) for the PCHID value. An over-defined 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 and CBP type CHPIDs, where these CHPIDs have connections to other CFP and CBP type CHPIDs.
>
> Therefore, HCD only allows you to define CFP and CBP type CHPIDS as over-defined if they are unconnected.
>
> If you define a CIB type CHPID, it must also be defined with an HCA Adapter ID (AID) and an HCA Port ID, represented in the AID/P column in the Channel Path List. HCD does not allow a CIB type CHPID to be defined as over-defined.

The 2097 production IODF can then be activated dynamically and the PCHID/CHPID/control unit definitions become available to the operating system.

- Figure 3-11 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     Filter Mode. 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
_ BE    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   3D8
_ BF    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   3D9
_ CE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   181
_ CF    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   111
_ EC    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   3C0
_ EE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   3D0
```

*Figure 3-11 HCD - Channel Path List (Reserving CHPIDs)*

- Figure 3-12 shows what the CHPID / PCHID definitions look like after being defined as over-defined.

```
                              Channel Path List     Filter Mode. 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
_ BE    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   *
_ BF    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   *
_ CE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ CF    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ EC    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ EE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
```

*Figure 3-12 HCD - Channel Path List (over-defined CHPIDs)*

## 3.3 Save configuration files

On the System z9 EC, and z9 BC, 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 3-3 lists CHPID types that have configuration files on a System z9 EC, and System z9 BC.

*Table 3-3 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 |
| 1000Base-T channel 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 can occur regardless of whether channels are moving.

The CHPID Mapping Tool can override PCHID assignments for:

- FICON channels supporting FCP
- OSA Express2 and channels supporting OSC

The MES upgrade process preserves configuration files on an upgrade from a z9 EC to a System z10 EC. However, it is your responsibility to keep a backup of the customization data stored in the configuration files.

During an MES upgrade, the following occurs:

- The channel cards will be moved as part of the normal rebalance of all I/Os.
- The configuration files will be copied from your old system, restored to the new System z10 EC, and renamed to match their new PCHIDs of the new physical locations of the channel cards.
- The CHPID Mapping Tool will force 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 Users Guide,* GC28-6825.

In this book, we show examples of backing up the configuration data with OSA/SF for OSA Express2 features, and with the HMC for OSA-ICC.

## 3.3.1 Save 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-Express and OSA-Express2 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-Express2 features that span server boundaries, as shown in Figure 3-14 on page 82.

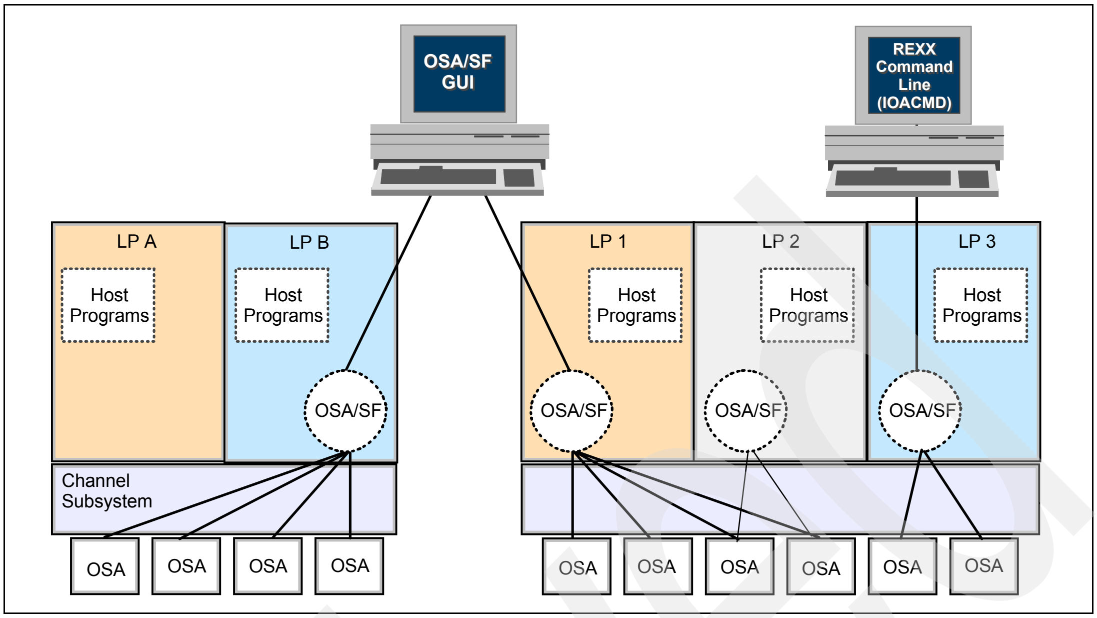



*Figure 3-13 OSA/SF*

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.

To customize and manage the OSA/SF feature, perform the following steps:

1. From a Windows workstation, start a DOS session and issue the command **`java ioajava`** to start the OSA/SF GUI. Log on to OSA/SF as shown in Figure 3-14.

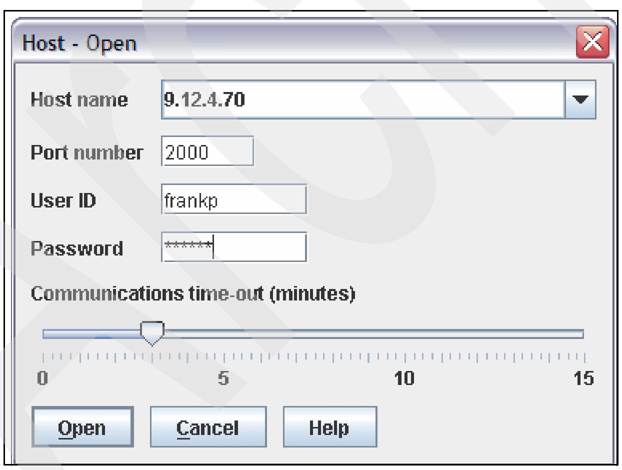



*Figure 3-14 OSA/SF Workstation Interface - Logon*

The OSA/SF main panels are displayed; see Figure 3-15 on page 83.

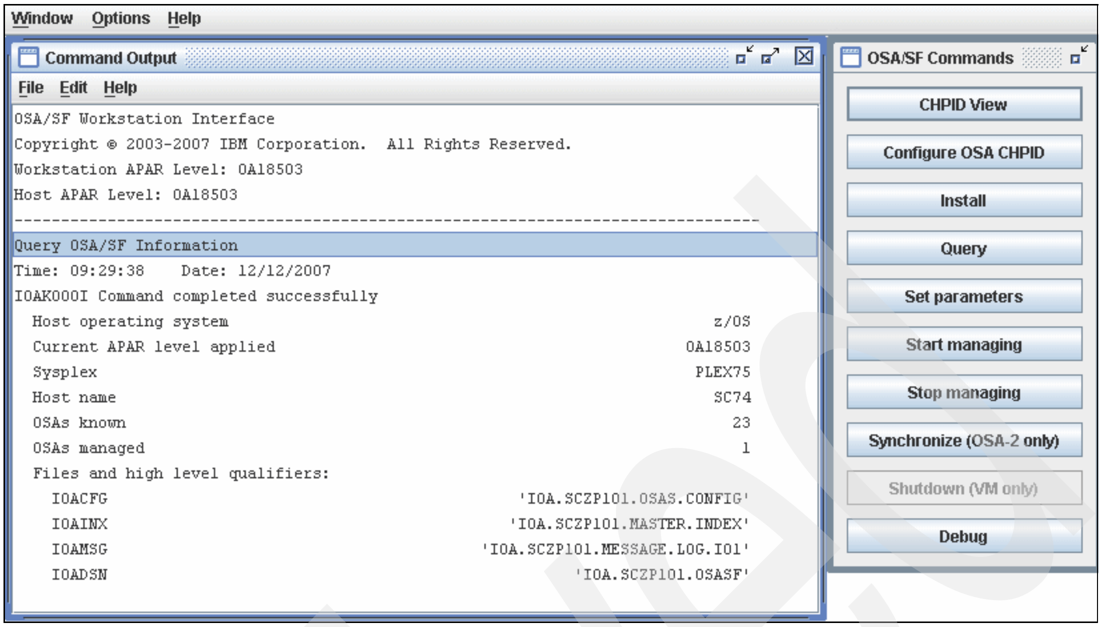



*Figure 3-15 OSA/SF Workstation Interface*

2. From the OSA/SF Commands panel, click **CHPID View.** The CHPID View panel is displayed; it lists all OSA features in the configuration; see Figure 3-17.

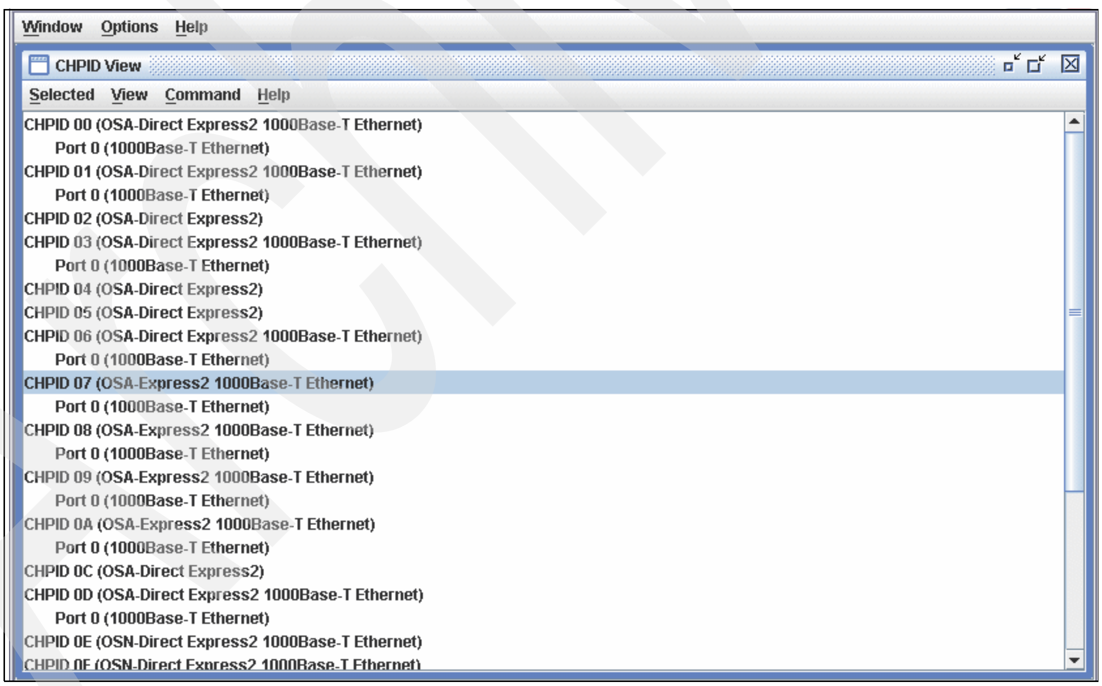



*Figure 3-16 OSA/SF Workstation Interface - CHPID view*

3. From the CHPID list displayed in the CHPID View panel, select the CHPID you want to work with. Click **Selected** → **Configurations** → **Configuration...**, as shown in Figure 3-17.

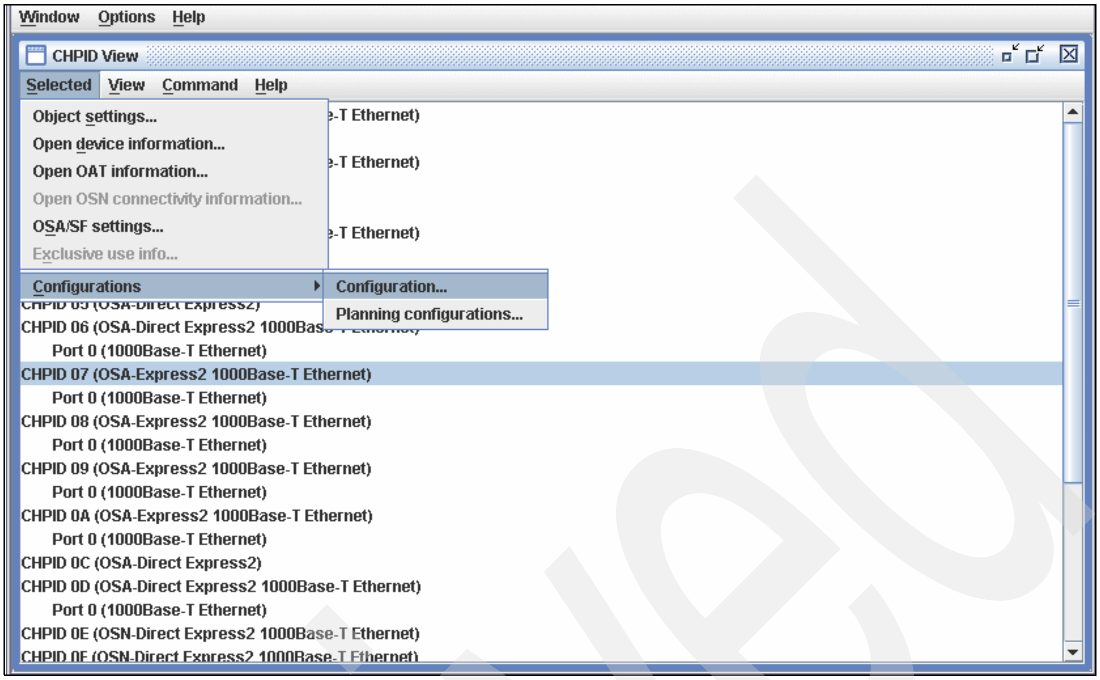



*Figure 3-17 OSA/SF Workstation Interface - Selected Configurations*

4. A CHPID configuration panel is displayed, with only blank information. From this panel, click **File** → **Get current configuration**; see Figure 3-18.

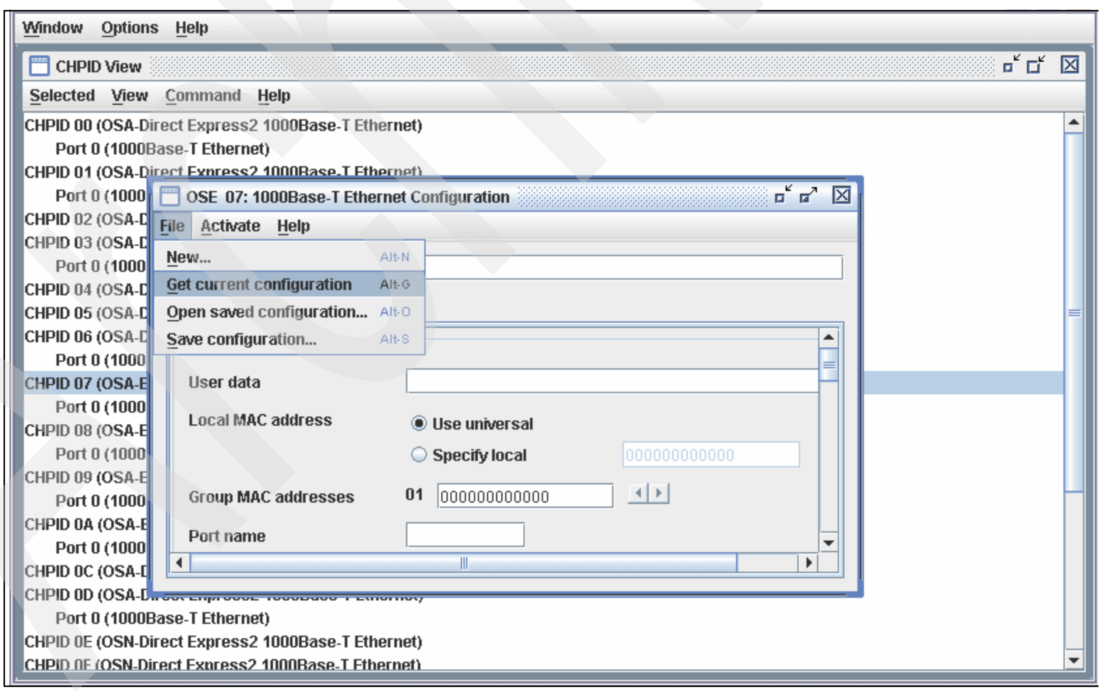



*Figure 3-18 OSA/SF Workstation Interface - get current configuration*

5. The CHPID configuration panel is displayed again, now with the current OSA CHPID configuration information. Fill in the Configuration name (Figure 3-19).

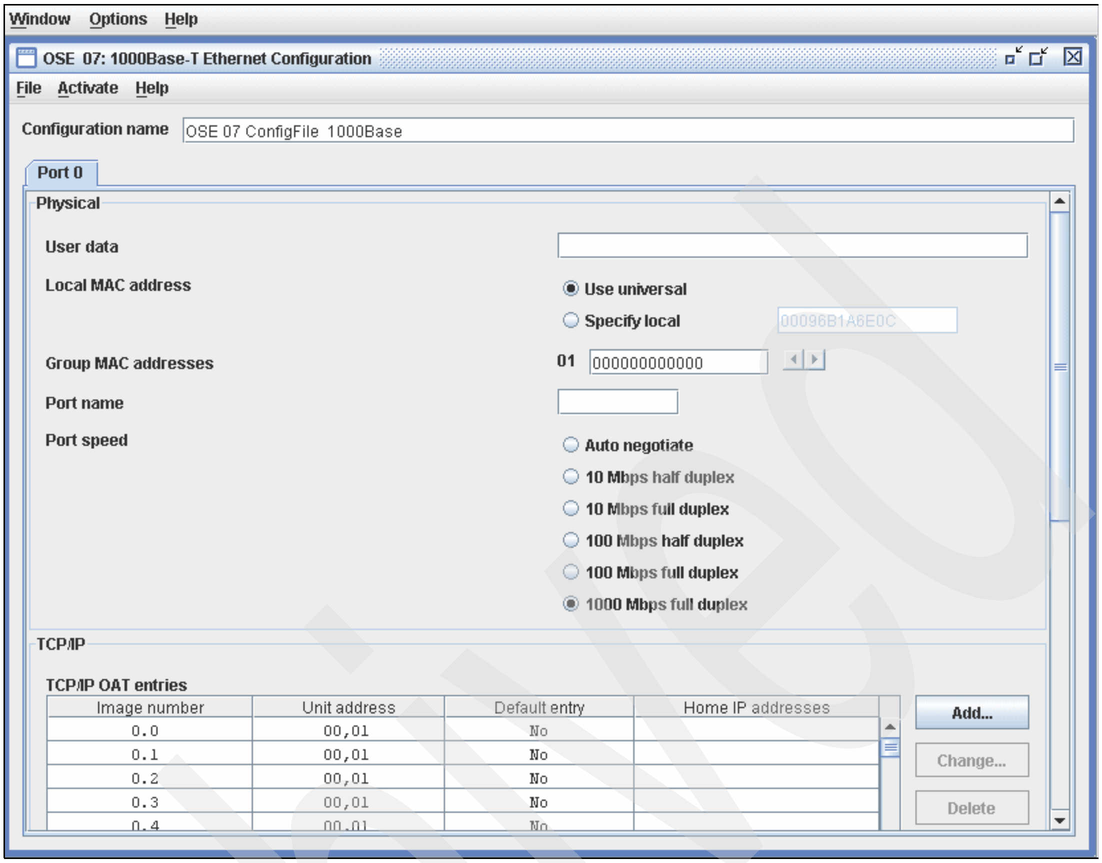



*Figure 3-19 OSA/SF Workstation Interface - Current configuration*

6. Click **File** → **Save configuration...** (Figure 3-20). The configuration file is saved by OSA/SF and can be reused later.

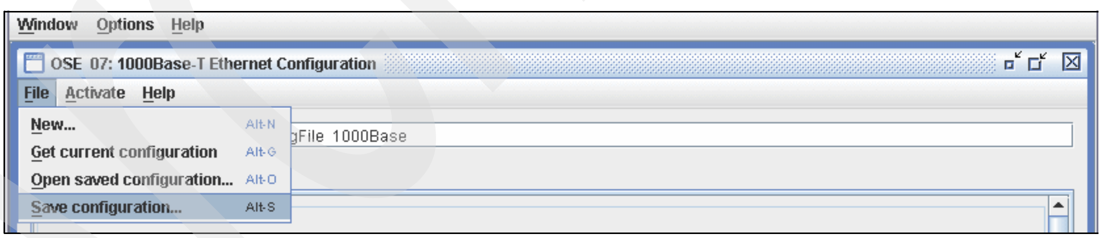



*Figure 3-20 OSA/SF Workstation Interface - Save current configuration*

You can use OSA/SF to install previously saved configuration information using the install and activate functions. Note that in order 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.

1. From the OSA/SF main view, initialize the CHPID view. Select **Configurations** → **Planning configurations...** (Figure 3-21).

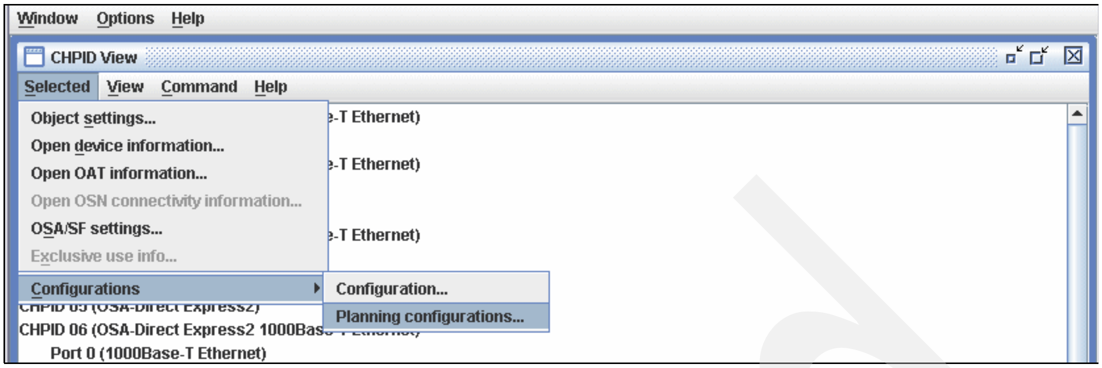



*Figure 3-21 OSA/SF Workstation Interface - Planning configurations*

2. The Configure OSA CHPID panel displays (Figure 3-22). Select the CHPID number and the CHPID Type that you want to define, and click **OK**.

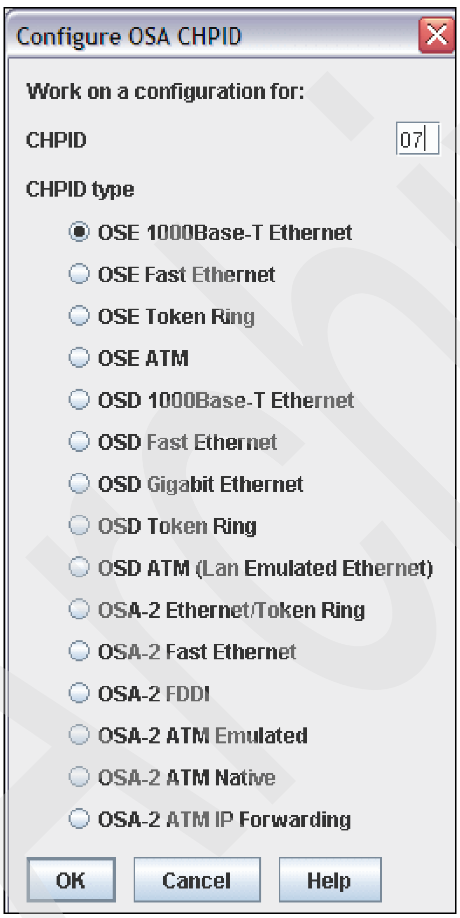



*Figure 3-22 OSA/SF Workstation Interface - Configure OSA CHPID*

3. OSA/SF displays a default panel for the type of feature selected. Click **File** → **Open saved configuration...** (Figure 3-23).

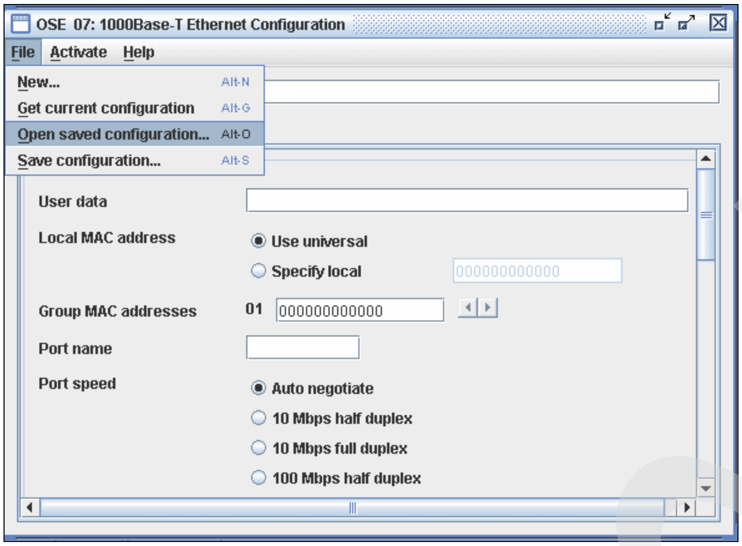



*Figure 3-23 OSA/SF Workstation Interface - Open saved configuration*

OSA/SF displays a Host Configuration List panel containing the names of previously saved configuration files that match the feature type (Figure 3-24).

Note that the Host Configuration List being displayed will vary with the OSA Express2 feature type selected in Figure 3-22. For example, a request for OSD 1000Base-T Ethernet displays the list shown in Figure 3-24.

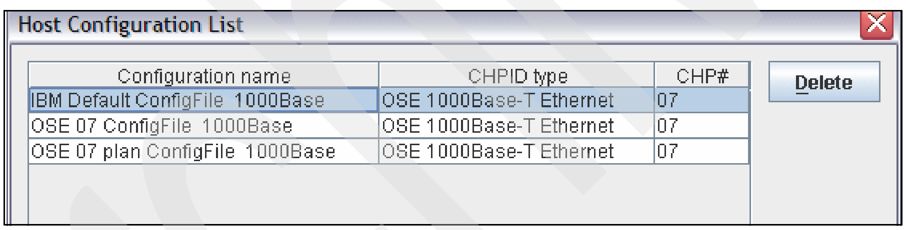



*Figure 3-24 OSA/SF Workstation Interface - Host configuration list (OSD 1000Base-T Ethernet)*

4. From the list, select the saved configuration name and click **Load**. Configuration information previously saved is now displayed on the OSA configuration panel. Any changes that may be needed can be done for this configuration with OSA/SF as shown in Figure 3-25.

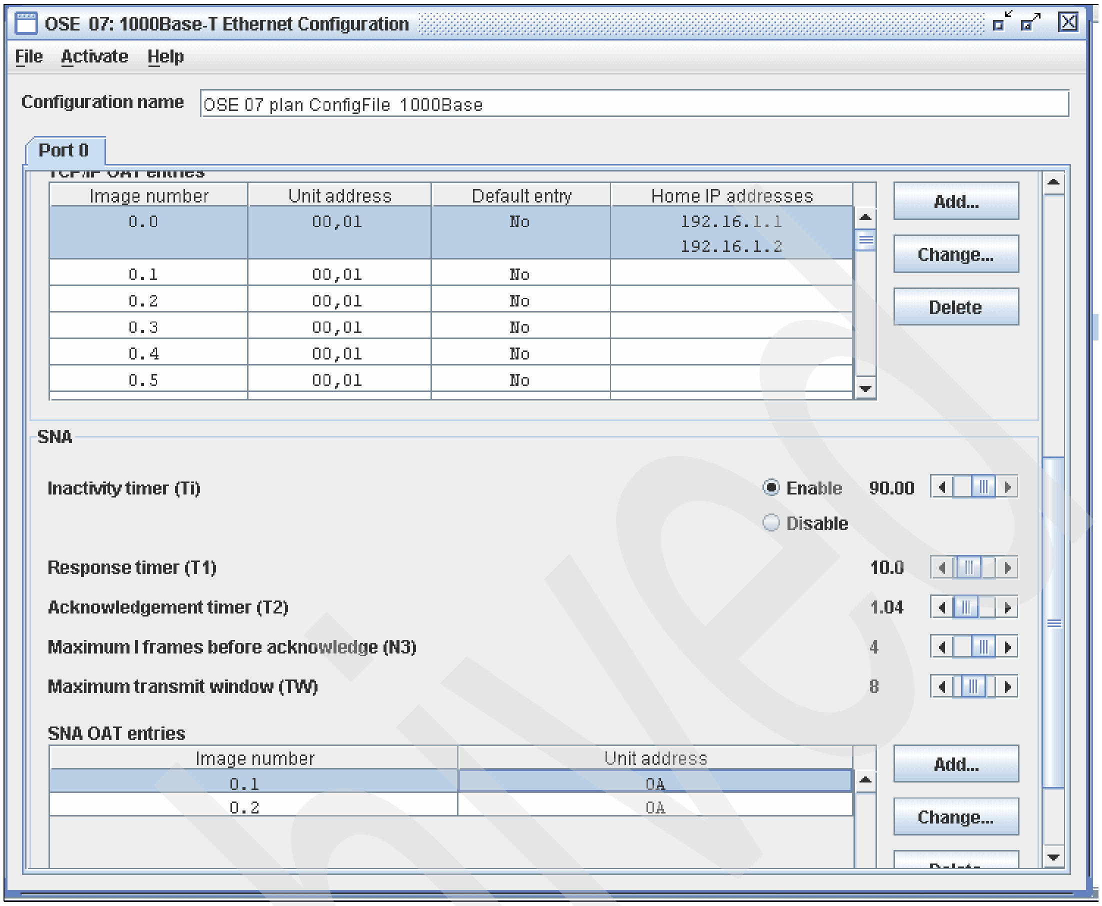



*Figure 3-25 OSA/SF Workstation Interface - Change Configuration*

5. Select **Activate** → **Activate with install** to restore the OSA feature configuration; see Figure 3-26 on page 89.

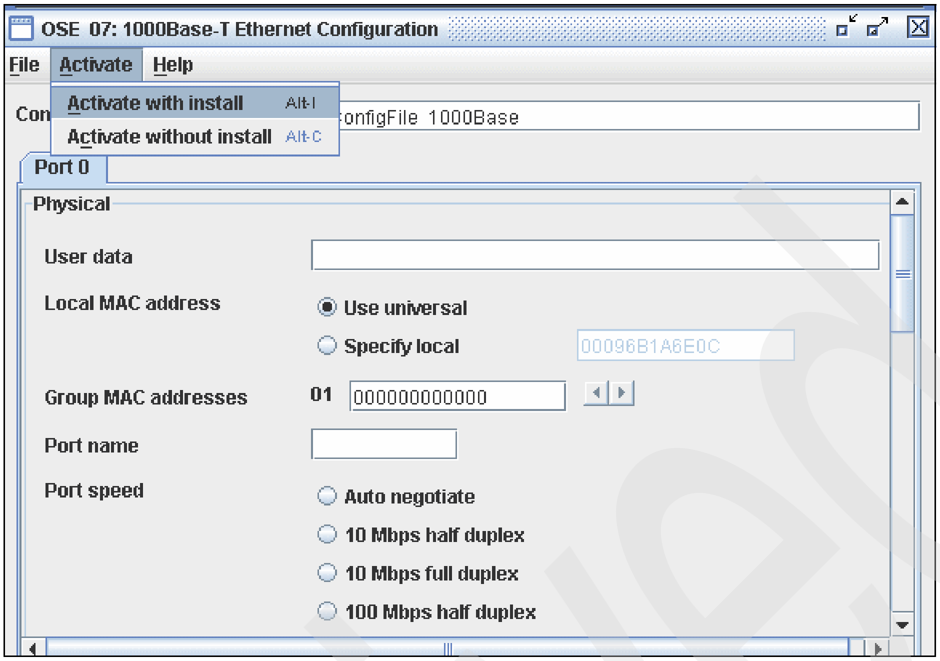


*Figure 3-26 OSA/SF Workstation Interface - Install*

## 3.3.2 OSA-ICC, CHPID=OSC

If the 2094 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 good practice to have a backup copy of these definitions.

### Export the configuration data for OSA-ICC using HMC Ver 2.9.2

To export the configuration data, follow these steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2094 (as opposed to a remote Web browser) and select the CPC that contains the OSC CHPIDs that you want to export the configuration data for (for example, SCZP101).
2. In the Defined CPCs Work Area, select the CPC that contains the OSC CHPIDs that you want to export the configuration data for (for example, SCZP101).
3. Under Operational Customization, double-click **OSA Advanced Facilities**.
4. Select the radio button for the Channel ID card that you want to export, then click **OK** (Figure 3-27 on page 90).

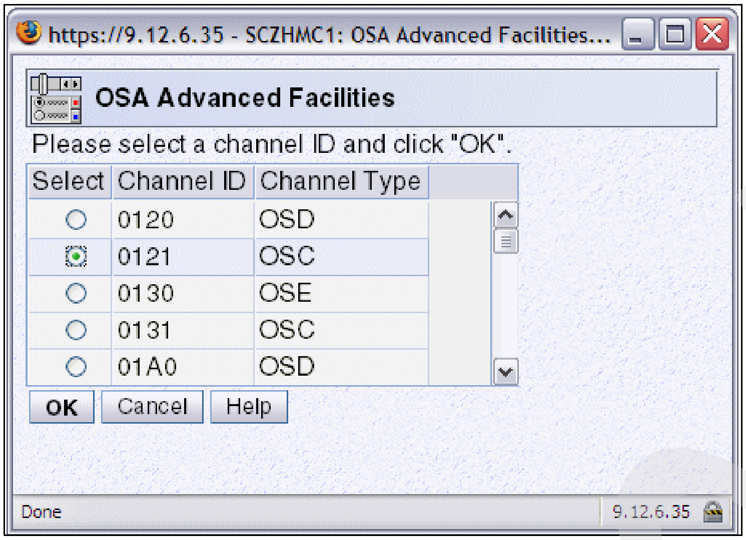



*Figure 3-27   HMC - OSA Advanced Facilities (OSC Channel)*

5. Select the radio button **Card specific advanced facilities...** and click **OK** (Figure 3-28).

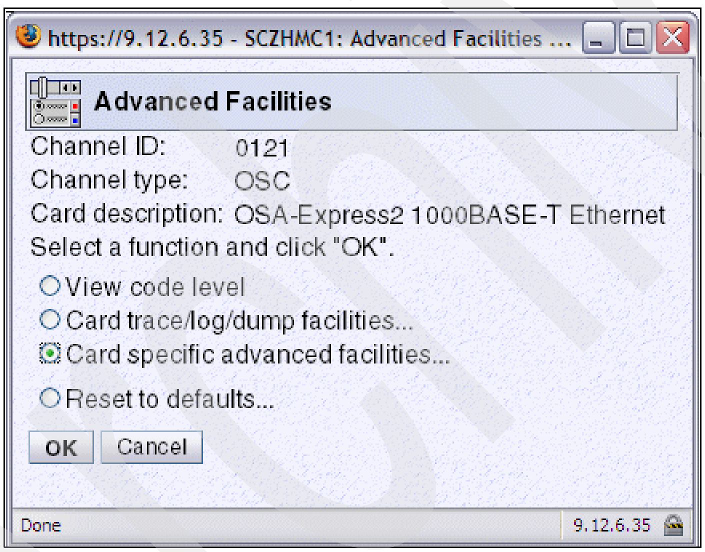



*Figure 3-28   HMC - OSA Advanced Facilities (Card specific)*

6. Select the radio button **Manual configuration options...**, and click **OK** (Figure 3-29 on page 91).

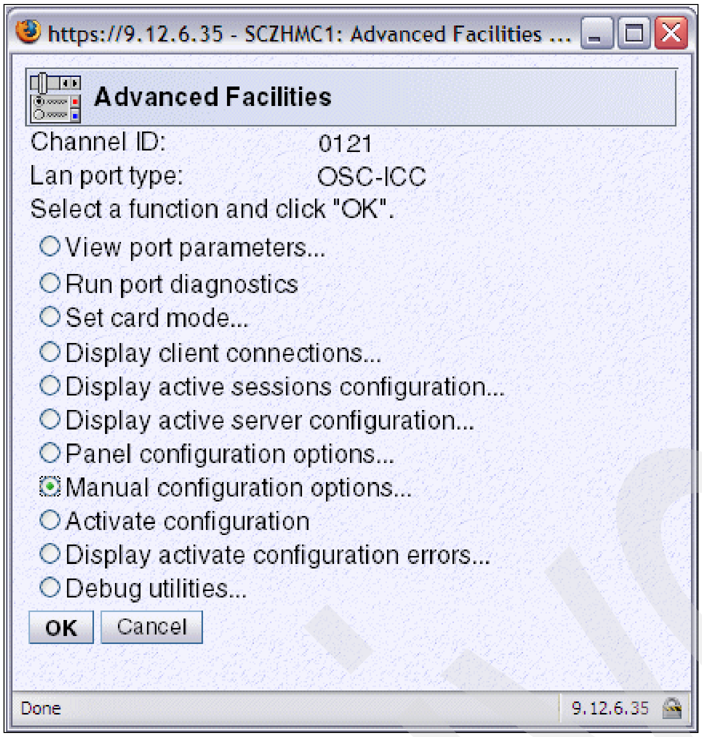



*Figure 3-29 HMC - OSA Advanced Facilities (Manual config)*

7. Select the radio button **Export source file** and click **OK** (Figure 3-30).

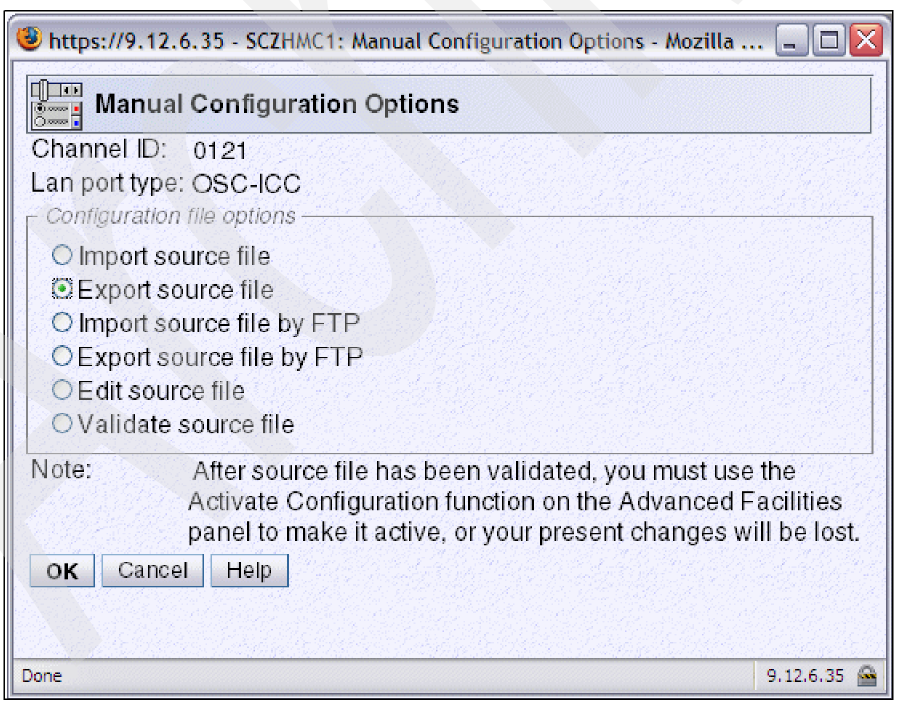



*Figure 3-30 HMC - OSA Advanced Facilities (Export source)*

8. The task requests a file name to be written onto the diskette. In our example we entered `OSC-ICC_0121`; see Figure 3-31 on page 92. Click **OK**.

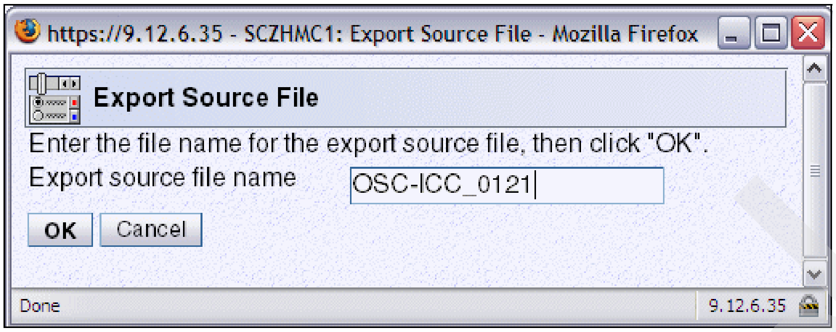



*Figure 3-31 HMC - OSA Advanced Facilities (Export filename)*

9. You are prompted to insert a diskette into the drive on the HMC workstation that you are logged on to (Figure 3-32). Insert the diskette and click **OK**.

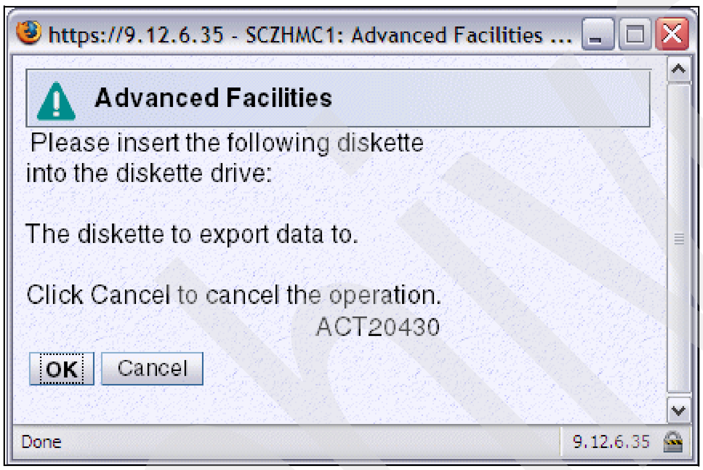



*Figure 3-32 HMC - OSA Advanced Facilities (Export insert diskette)*

10. The HMC task writes the configuration data for the Channel ID that was selected onto the diskette and displays a message panel when it has completed (Figure 3-33). Click **OK**.

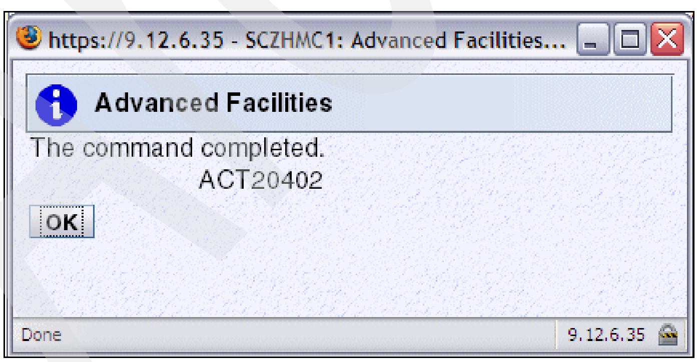



*Figure 3-33 HMC - OSA Advanced Facilities (Export completed)*

11. Remove the diskette from the drive as instructed by the message displayed in Figure 3-34 on page 93; click **OK**. You can now click **Cancel** to exit all OSA Advanced Facilities panels.

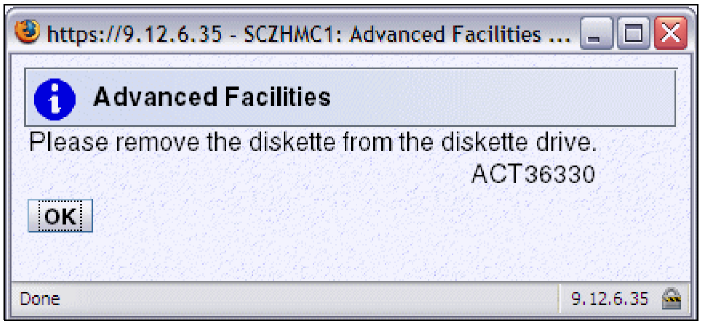



*Figure 3-34 HMC - OSA Advanced Facilities (Remove diskette)*

Figure 3-35 shows a sample of the configuration data downloaded on the diskette.

```
<OSC_SERVER>
  HOST_IP= 9.12.4.165
  DEFAULT_GATEWAY= 9.12.4.1
  SUBNET_MASK= 255.255.252.0
  PORT= 3270
  ETHERNET_FRAME= DIX
  MTU= 576
  NAME= OSAF080
</OSC_SERVER>


<CONFIG_SESSION>
<SESSION1>
  CSS= 00 IID= 07 DEVICE= F080
  GROUP=  "SCZCF080"
  CONSOLE_TYPE= 1     RESPONSE= OFF     READ_TIMEOUT= 60
</SESSION1>

<SESSION2>
  CSS= 01 IID= 07 DEVICE= F081
  GROUP=  "SCZCF081"
  CONSOLE_TYPE= 1     RESPONSE= OFF     READ_TIMEOUT= 60
</SESSION2>
......................................
......................................
<SESSION71>
  CSS= 00 IID= 01 DEVICE= F0BA
  GROUP=  "WTSC74"
  CONSOLE_TYPE= 1     RESPONSE= OFF     READ_TIMEOUT= 0
</SESSION71>

</CONFIG_SESSION>
```

*Figure 3-35 OSC configuration sample (OSC-0121)*

### Export the configuration data for OSA-ICC using HMC Ver 2.10.0

To export the configuration data, follow these steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2094 (as opposed to a remote Web browser) and select the CPC that contains the OSC CHPIDs that you want to export the configuration data for (for example, SCZP101).

> **Note:** An HMC upgraded from Ver 2.9.2 to Ver 2.10.0 may contain a usable floppy disk drive. A new HMC installed along with a z10 EC with Ver 2.10.0 will not contain a floppy disk drive.

2. Under Systems Management, click **Servers** to expand the list.
   a. On the right-hand pane you will see listed all servers defined to this HMC. Click the radio button for the server you wish to access (in this example SCZP101)
   b. Click the small pop-up menu arrow just after the CPC name and use this to expand to and select the **OSA Advanced Facilities** menu (Figure 3-36).

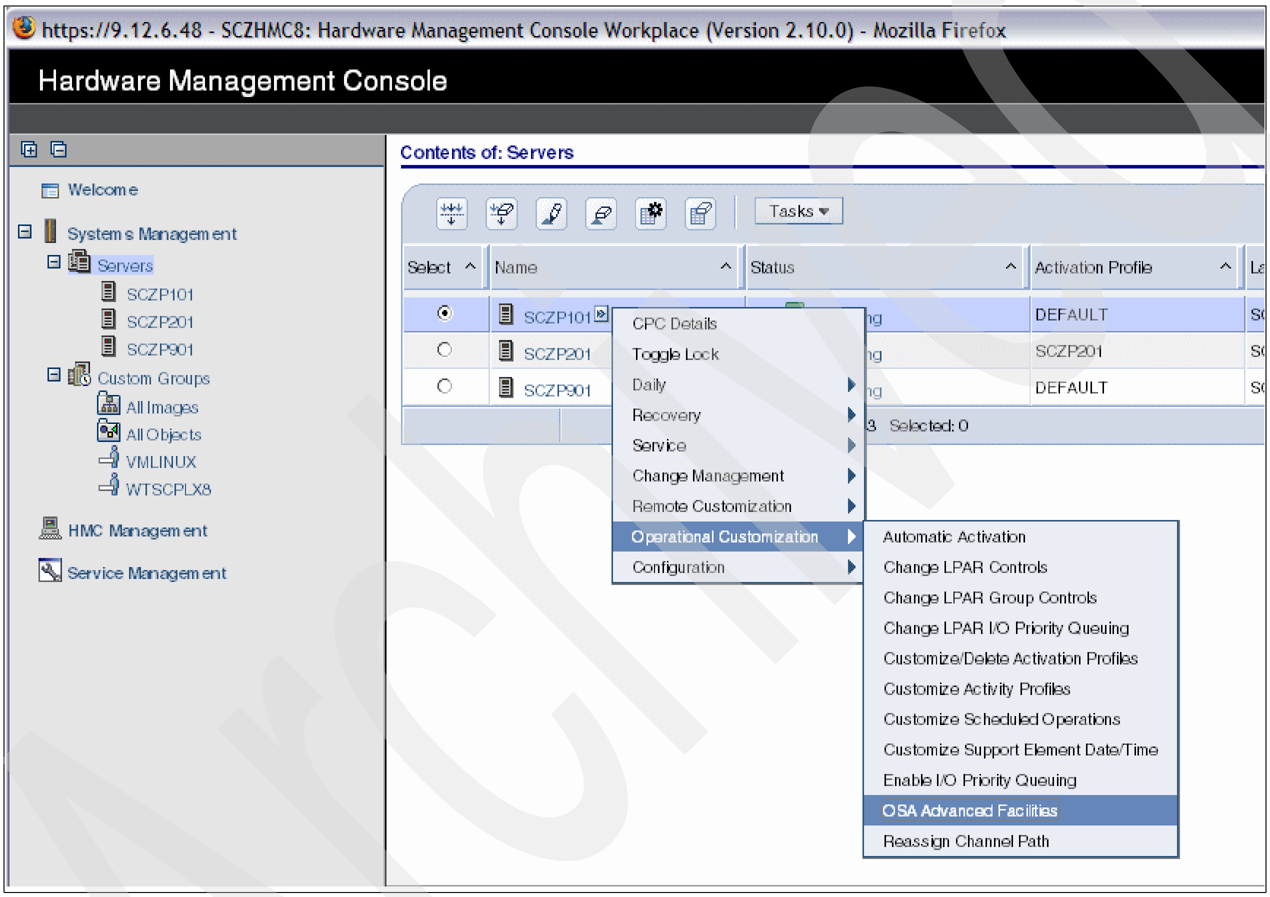



*Figure 3-36 HMC - OSA Advanced Facilities (Popup Menu)*

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 SCZP101).
   c. On the Tasks pad, click **Operational Customization** to expand it, and select **OSA Advanced Facilities** (Figure 3-37 on page 95).

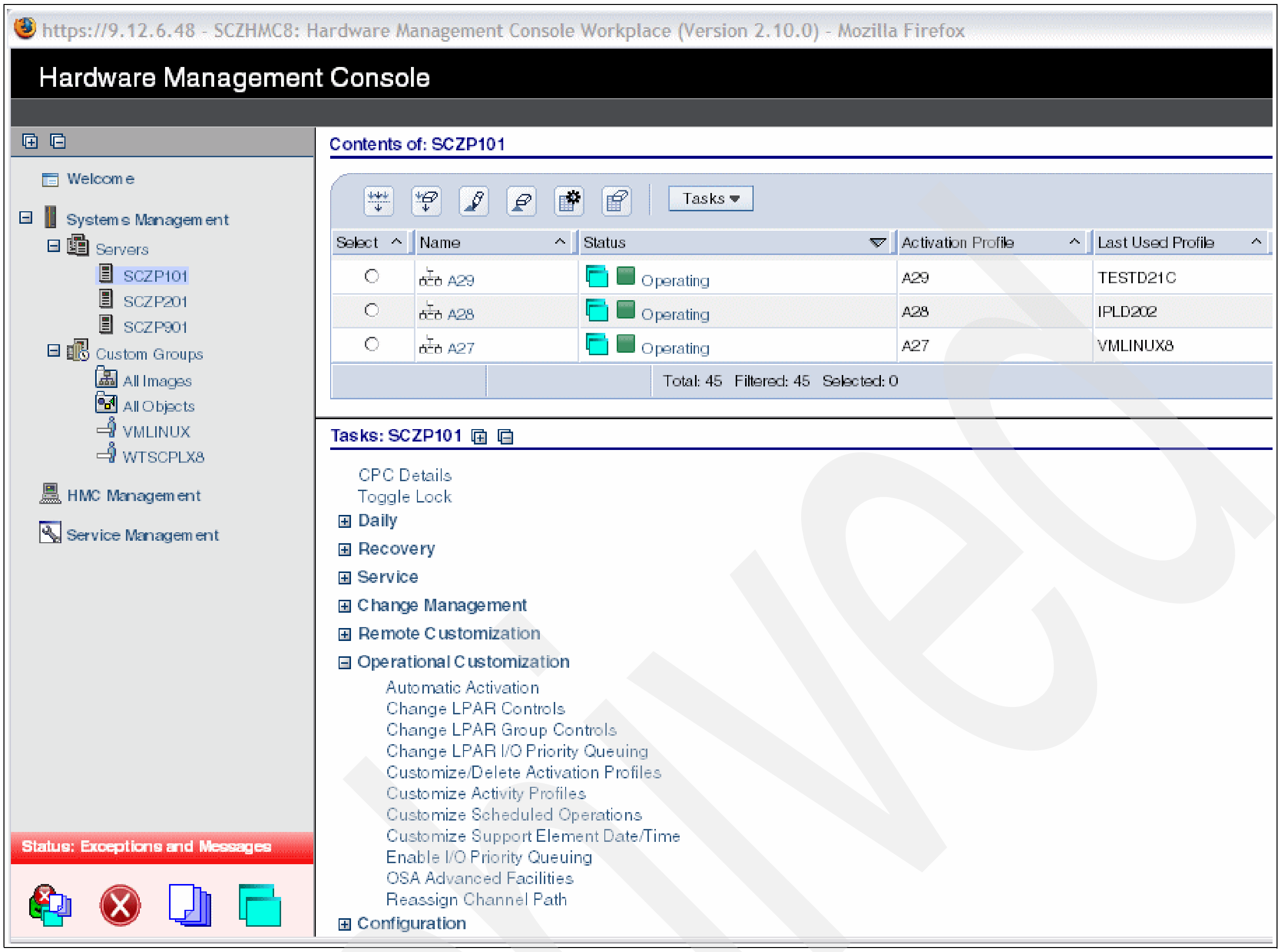



*Figure 3-37 HMC - OSA Advanced Facilities (Task Menu)*

4. Click the radio button for the Channel ID card that you want to export, then click **OK** (Figure 3-38).

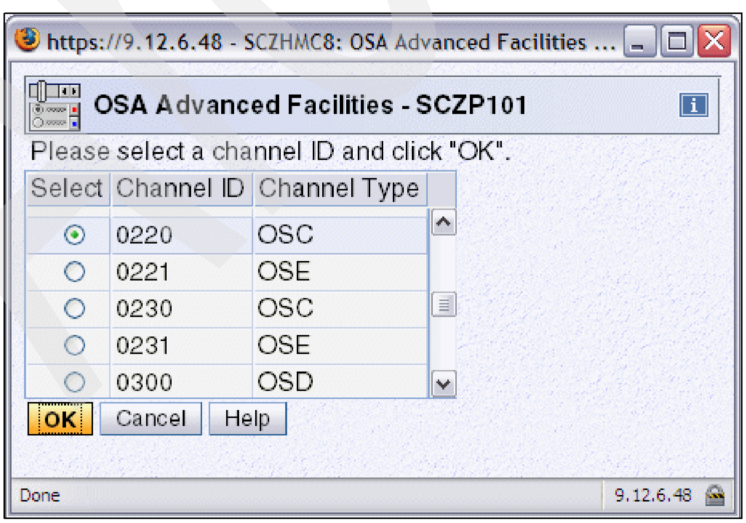



*Figure 3-38 HMC - OSA Advanced Facilities (OSC Channel)*

5. Select the radio button **Card specific advanced facilities...** and click **OK** (Figure 3-39).

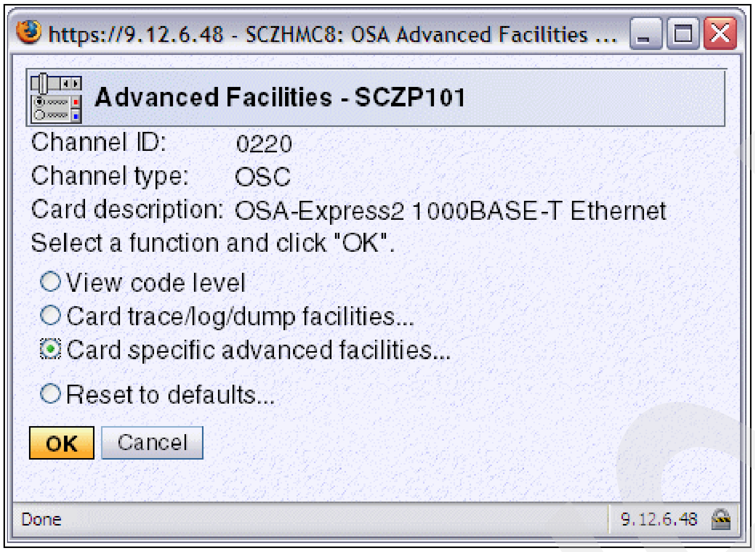



*Figure 3-39 HMC - OSA Advanced Facilities (Card specific)*

6. Select the radio button **Manual configuration options...** and click **OK** (Figure 3-40).

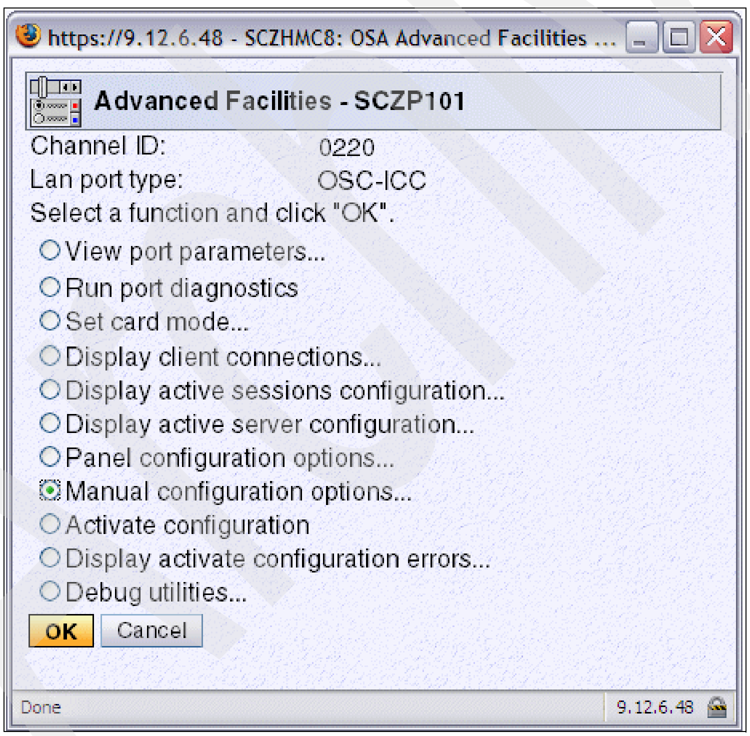



*Figure 3-40 HMC - OSA Advanced Facilities (Manual config)*

7. Select the radio button **Export source file** and click **OK (**Figure 3-41).

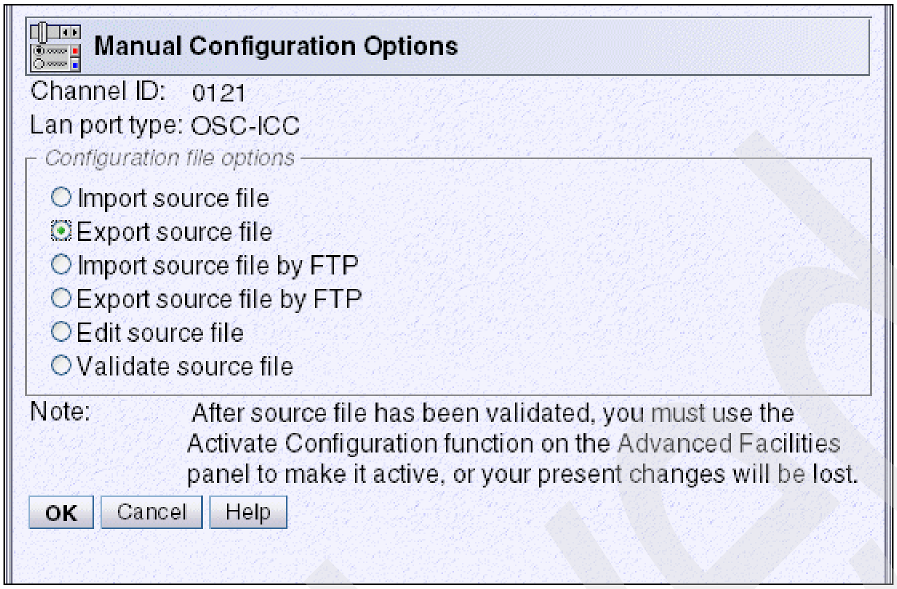



*Figure 3-41 HMC - OSA Advanced Facilities (Export source)*

8. The task requests a file name to be written onto the installed Media device. In our example we entered `OSC-ICC_0220` (Figure 3-42). Click **OK**.

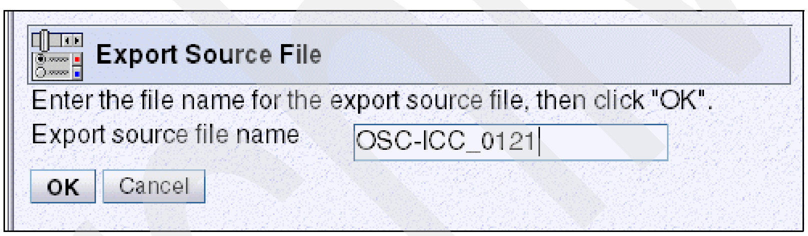



*Figure 3-42 HMC - OSA Advanced Facilities (Export filename)*

9. HMC displays panel ACT20430 with the following prompts:
   - Please insert the following removable media:
   - The removable media to export data to:
   - Click Cancel to cancel operation.

> **Note:** A suitable USB Flash Memory Drive must be inserted into the USB port prior to the next step so that it can be detected and be provided as an option for selection.

10. HMC detects the installed media.
11. HMC displays the panel Select Media Device - SCZP101.

    This task supports the following devices:
    - USB Flash Memory Drive, Diskette
    - Radio button - USB Flash Memory Drive
    - Radio button - Diskette Drive
12. Click the radio button for **USB Flash Memory Drive**, then click **OK**.

13. The HMC task writes the configuration data for the Channel ID that was selected onto the media device and displays a message panel when it has completed (Figure 3-33). Click **OK**.

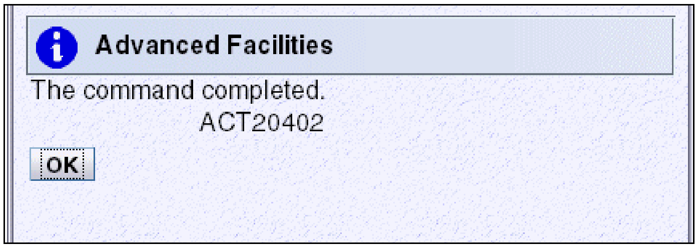



*Figure 3-43 HMC - OSA Advanced Facilities (Export completed)*

14. You can remove the USB Flash Memory Drive at any time, then click **OK**. Click **Cancel** to exit all OSA Advanced Facilities panels.

Figure 3-35 shows a sample of the configuration data downloaded on the diskette.

```
<OSC_SERVER>
  HOST_IP= 9.12.4.165
  DEFAULT_GATEWAY= 9.12.4.1
  SUBNET_MASK= 255.255.252.0
  PORT= 3270
  ETHERNET_FRAME= DIX
  MTU= 576
  NAME= OSAF080
</OSC_SERVER>


<CONFIG_SESSION>
<SESSION1>
  CSS= 00 IID= 07 DEVICE= F080
  GROUP=  "SCZCF080"
  CONSOLE_TYPE= 1    RESPONSE= OFF    READ_TIMEOUT= 60
</SESSION1>

<SESSION2>
  CSS= 01 IID= 07 DEVICE= F081
  GROUP=  "SCZCF081"
  CONSOLE_TYPE= 1    RESPONSE= OFF    READ_TIMEOUT= 60
</SESSION2>
.....................................
.....................................
<SESSION71>
  CSS= 00 IID= 01 DEVICE= F0BA
  GROUP=  "WTSC74"
  CONSOLE_TYPE= 1    RESPONSE= OFF    READ_TIMEOUT= 0
</SESSION71>

</CONFIG_SESSION>
```

*Figure 3-44 OSC configuration sample (OSC-0121)*

## 3.4 Validate the 2097 work IODF

### Validate the work IODF

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 notice that the IODF type is now `Work - Validated`; see Figure 3-45.

```
+---------------- View I/O Definition File Information -----------------+

IODF name  . . . . . . : 'SYS6.IODF39.WORK'
IODF type  . . . . . . : Work - Validated
IODF version . . . . . : 5

Creation date  . . . . : 2007-11-29
Last update  . . . . . : 2007-11-30  17:27

Volume serial number . : IODFWK
Allocated space  . . . : 2000    (Number of 4K blocks)
Used space . . . . . . : 1582    (Number of 4K blocks)
   thereof utilized (%)  90

Activity logging . . . : No
Backup IODF name . . . :

Description  . . . . . :



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

*Figure 3-45 HCD - View I/O Definition File Information (validated work IODF)*

### 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 PC. You can then launch the CHPID Mapping Tool, create an updated IOCP statements file, and transfer the file back to the host.

1. Select HCD option 2.3, **Build IOCP input data set**, and press Enter; see Figure 3-46 on page 100.

```
---- 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 statements
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

*Figure 3-46 HCD - Activate or Process Configuration Data (Build IOCP for SCZP202)*

2. HCD displays the list of available processors to chose from. Select the processor SCZP202 by typing a forward slash mark (/) and then press Enter (Figure 3-47).

```
 -------------------------- Available Processors ---------------------------
                                                                 Row 1 of 7
   Command ===> ___________________________________________________________

Select one.

  Processor ID  Type      Model    Mode  Description
  ISGSYN        2064      1C7      LPAR
  ISGS11        2064      1C7      LPAR
  P000STP1      2084      C24      LPAR
  P000STP2      2094      S08      LPAR
/ SCZP202       2097      E26      LPAR
  SCZP801       2064      1C7      LPAR
  SCZP901       2084      C24      LPAR
**************************** Bottom of data *****************************
```

*Figure 3-47 HCD - 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. Fill in the following fields:
   - `Title1`
   - `IOCP input data set`
   - Enter `Yes` in the field Input to Stand-alone IOCP.
   - Fill in 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.IODF39.WORK'
Processor ID  . . . . . . . : SCZP202
Title1 . IODF39___________________________________________________________
Title2 : SYS6.IODF39.WORK - 2007-11-30 17:27

IOCP input data set
'SYS6.IODF39.IOCPIN.SCZP202'____________________
Input to Stand-alone IOCP?  Yes  (Yes or No)

Job statement information
//WIOCDS  JOB (ACCOUNT),'NAME'
//*
//*
```

*Figure 3-48 HCD - Build IOCP Input Data Set*

5. In TSO, verify that the data set just created exists, and that it contains IOCP statements; see Figure 3-49.

   The data set is used as input into the CHPID Mapping Tool.

```
ID    MSG1='IODF39',
      MSG2='SYS6.IODF39.WORK - 2007-11-30 17:27',
      SYSTEM=(2097,1),
      TOK=('SCZP202',00800001991E2094172730040107334F00000000,
      00000000,'07-11-30','17:27:30','........','........')
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),(*,1),(*,2),(*,3),(*,4),(*,5),(*,6),(*,
      7),(*,8),(*,9),(*,A),(*,B),(*,C),(*,D),(*,E),(*,F)))
CHPID PATH=(CSS(0,1,2),00),SHARED,
      NOTPART=((CSS(0),(A0B,A0C,A0D,A0E,A0F),(=)),(CSS(1),(A1B
      ,A1C,A1D,A1E,A1F),(=)),(CSS(2),(A2B,A2C,A2D,A2E,A2F),(=)
      )),PCHID=340,TYPE=OSD
CHPID PATH=(CSS(0,1,2),01),SHARED,
      NOTPART=((CSS(0),(A0B,A0C,A0D,A0E,A0F),(=)),(CSS(1),(A1B
      ,A1C,A1D,A1E,A1F),(=)),(CSS(2),(A2B,A2C,A2D,A2E,A2F),(=)
      )),PCHID=1C0,TYPE=OSD
```

*Figure 3-49 HCD - IOCP input data set contents (truncated)*

Also note that part of the TOK statement has been blanked out with dots (Example 3-1).

*Example 3-1 HCD - IOCP file (TOK statement)*

```
TOK=('SCZP202',00800001991E2094172730040107334F00000000,*
00000000,'07-11-30','17:27:30','........','........')
```

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 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 `SCZP202in.iocp`.

## 3.5 CHPID Mapping Tool actions

In the following steps we take the output from the previous set of HCD steps (IOCP), and the output from the 2097 order process (CFReport). Using the CHPID Mapping Tool, we assign PCHIDs to each of the CHPIDs for the 2097.

For this process, the CHPID Mapping Tool (CMT) must be downloaded. Refer to “CHPID Mapping Tool” on page 24, 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, follow these steps:

1. Import the IOCP statements file and the CFReport file into the CHPID Mapping Tool. Getting 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 file transfer back to the host z/OS image. This step may be performed with HCM.

> **Note:** When upgrading from a 2094 to a 2097, it is mandatory to use the CHPID Mapping Tool level that supports the 2097. The internal availability characteristics of the 2097 are different from previous System z processors.

### Import the CFReport file into the CHPID Mapping Tool

1. Start the CHPID Mapping Tool on your workstation.
2. Import the CFReport file into the CHPID Mapping Tool.
3. Click **File** → **Import CFReport file** (Figure 3-50).

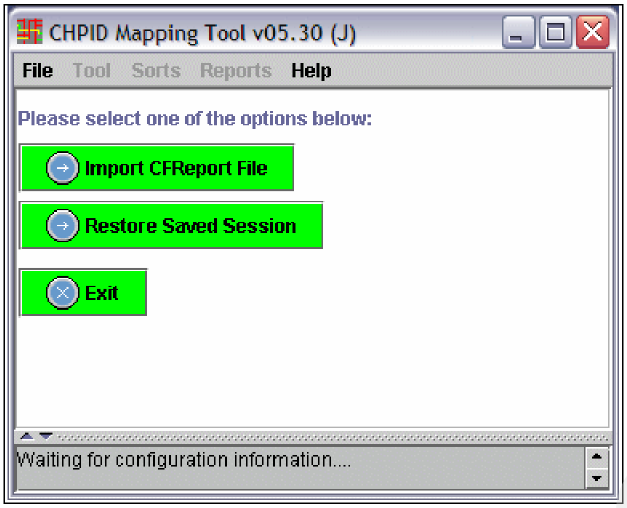



Figure 3-50 CMT - Import CFReport Order file

4. Select the CFReport file to import and click **Open** (Figure 3-51). Information from the CFReport is displayed on the left-hand side of the window (Figure 3-52 on page 104).

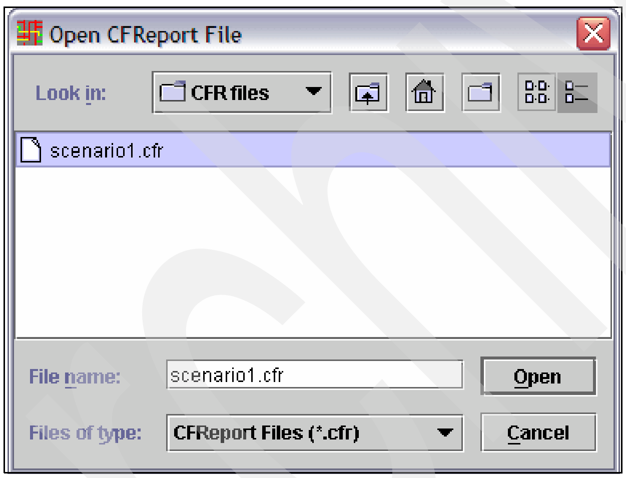



Figure 3-51 CMT - Open CFReport file

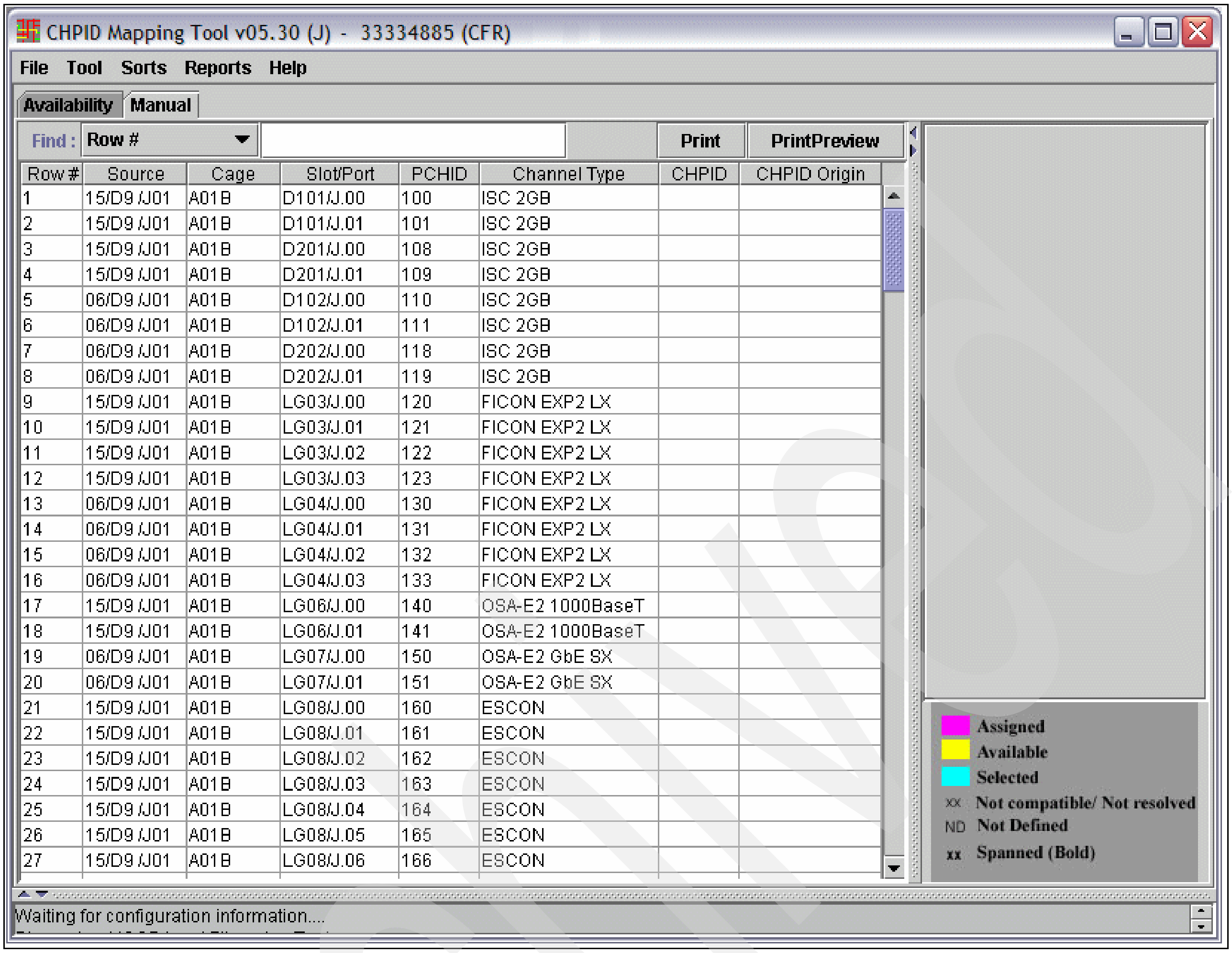



*Figure 3-52 CMT - Imported CFReport Order file*

## Import the 2094 IOCP file into the CHPID Mapping Tool

1. To import the IOCP file, click **Tool** → **Import IOCP File** (Figure 3-53).

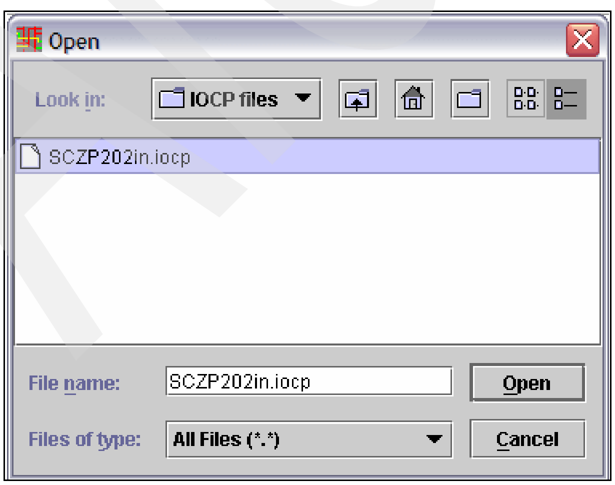



*Figure 3-53 CMT - Import IOCP file*

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 issued the following:

- **Matching CHPID** - This window lists all CHPIDs that are assigned with PCHIDs that have been moved during MES upgrade. This 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** - 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 unchecked.
- **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 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 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 unchecked.
- **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.

In order 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.

## CHPIDs that may have configuration files associated

As shown in Figure 3-54, here you can see any PCHIDs that could potentially have configuration files associated with them. Click **OK**.

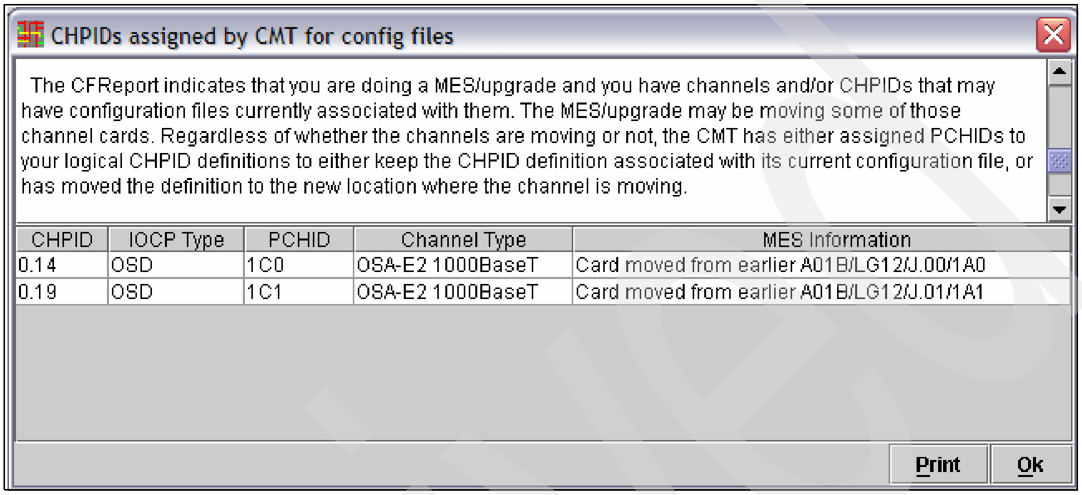



*Figure 3-54 CMT - CHPIDs assigned by CMT*

## Resolve CHPIDs with PCHID conflict

Now the CMT displays the CHPIDs with PCHID conflicts; see Figure 3-55.

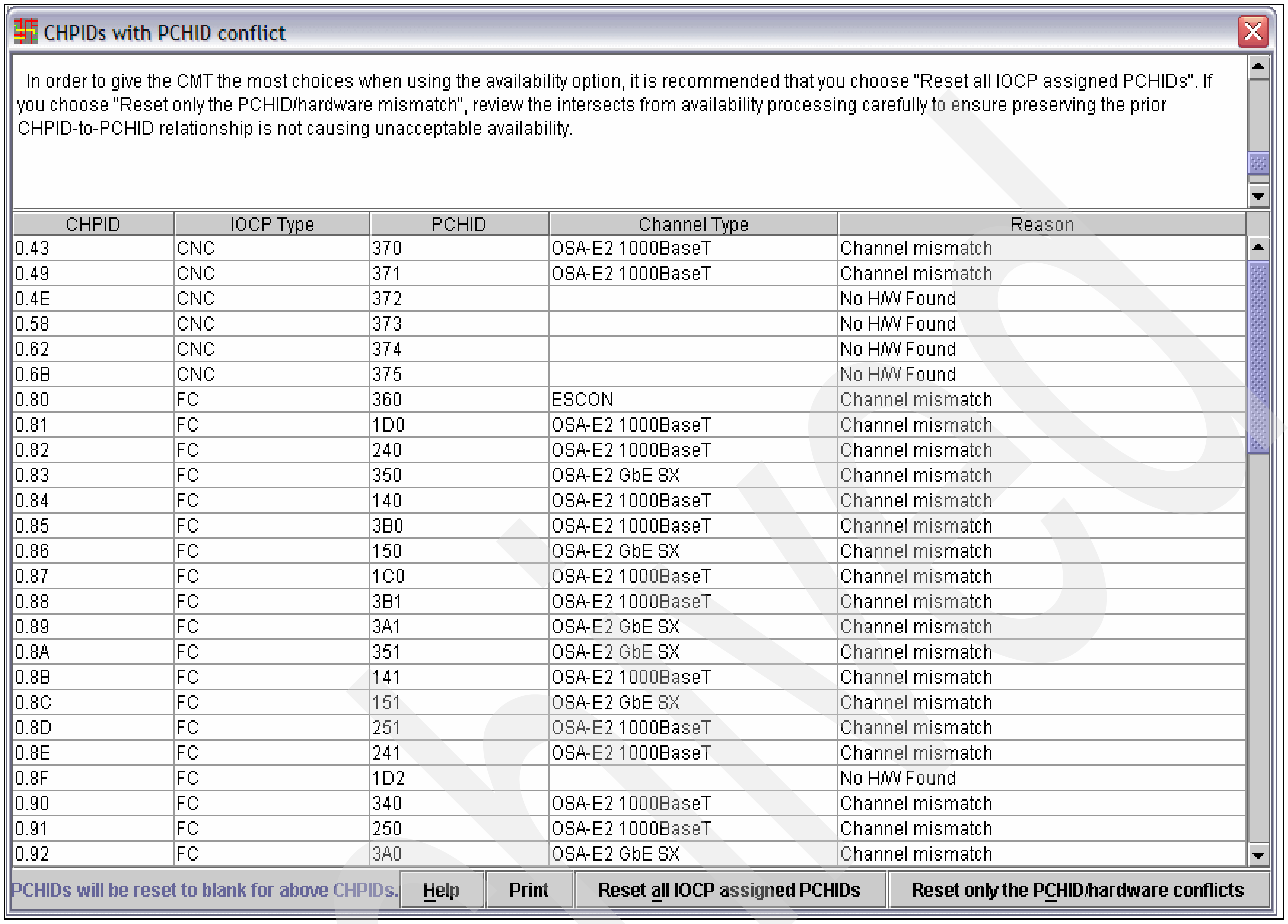



*Figure 3-55 CMT - CHPIDs with PCHID conflicts*

In our example we selected **Reset only the PCHID/hardware conflicts**.

## Resolve 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 3-56). Click **OK.**

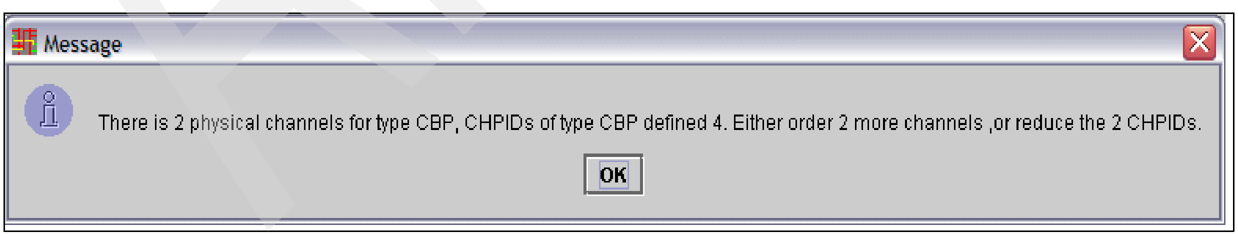



*Figure 3-56 CMT - Required Hardware unavailable*

The following message is issued:

```
CHPIDs with invalid/incompatible hardware found.
```

We left excessive numbers of CHPID types *CBP* in our IODF to show how the CHPID Mapping Tool would handle this condition and to give an opportunity to explain how you can resolve this situation. Refer to “Over-define channel paths on an XMP processor” on page 79.

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 CBP/CFP CHPID definitions in the IODF and expect to have CBP/CFP CHPIDs installed in the processor at a later date.

**Note:** Other CHPID types can also be *over-defined* by entering an asterisk (*) for the PCHID value, with the exception of CIB type CHPID definitions.

Alternatively, you could remove the CBP/CFP CHPID definitions from the IODF.

To continue with this example, follow these steps:

1. Go back into the IODF and change the PCHID values for the CBP/CFP CHPIDs (or any other CHPIDs that have no supporting hardware in the CFReport) to an asterisk (*).
2. Re-validate the IODF; use HCD option 2.12.
3. Recreate the IOCP statements file and file transfer to your PC.
4. Import the IOCP file; click **Tool** → **Import IOCP File**.

> **Note**: If you look at the IOCP statements file now, notice that the CBP/CFP 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.

### 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, TYPE=OSE and TYPE=FC channels.

In each case, we must check off what each of the channels is used for; see Figure 3-57. The image in the lower right-hand side shows what we had selected for the FC channels.

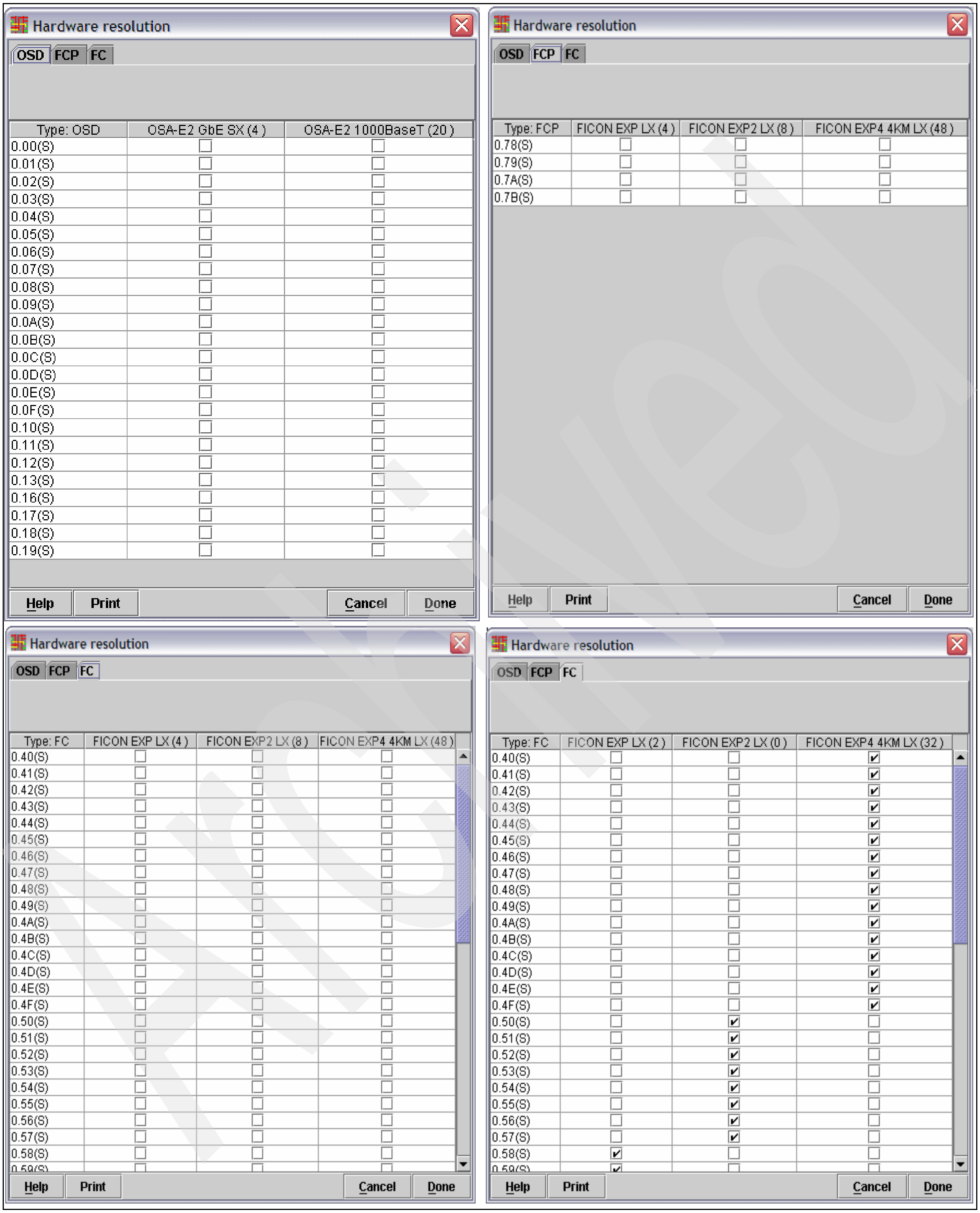



*Figure 3-57 CMT - Hardware resolution after IOCP import*

- Select one tab at a time. In one of our examples, the CHPID Mapping Tool needs to know which channel type the FC and FCP CHPID definitions use between the FICON Express2 and FICON Express4 hardware. 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.

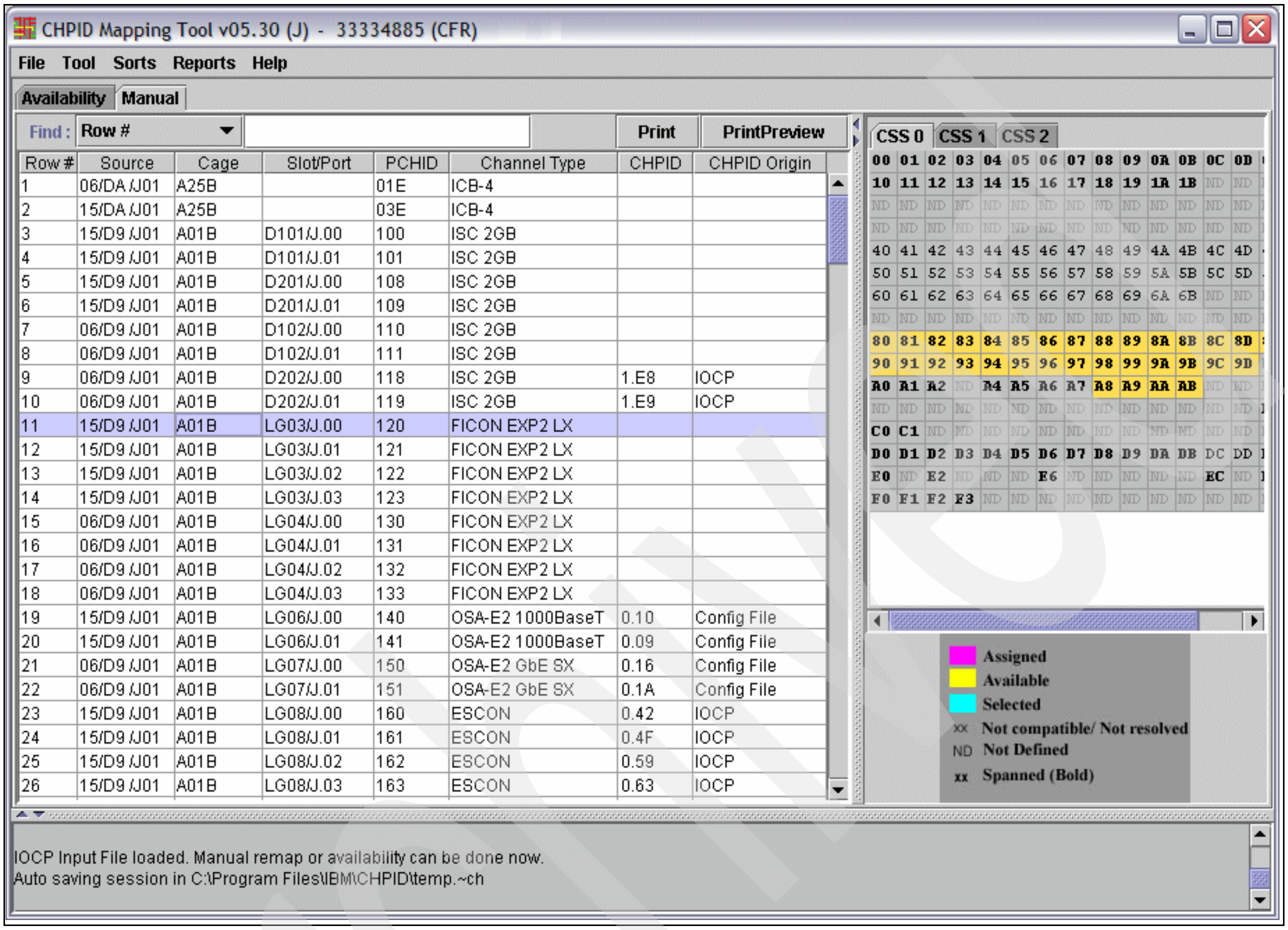



*Figure 3-58 CMT - Manual tab*

## Process CU Priority

If you are importing an IOCP statements file from a 2094 that had CU Priority values defined, you may want to review the CU Priority beforehand. The CHPID Mapping Tool can then perform the availability functions appropriately for a 2097. Follow these steps:

1. Under the File menu, click the **Availability** tab.
2. Click **Process CU Priority** and a window pops up.

   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 selected **Reset CHPIDs assigned by Availability** and **Reset CHPIDs assigned by IOCP**; see Figure 3-59 on page 111.

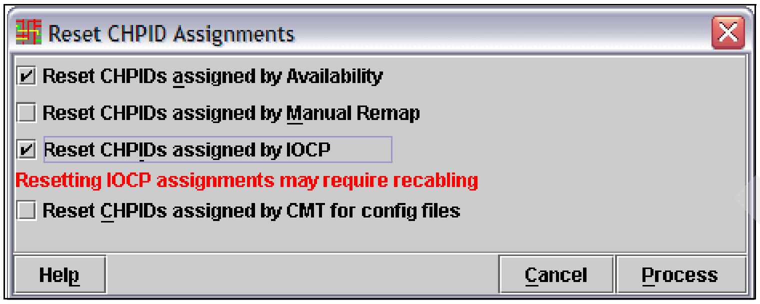



*Figure 3-59 CMT - Reset CHPID Assignments*

The 2097 has different availability rules than the 2094, 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 3-60).

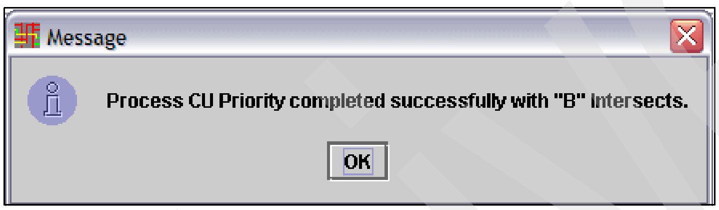



*Figure 3-60 CMT - Process CU Priority completion message*

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 “B” 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.

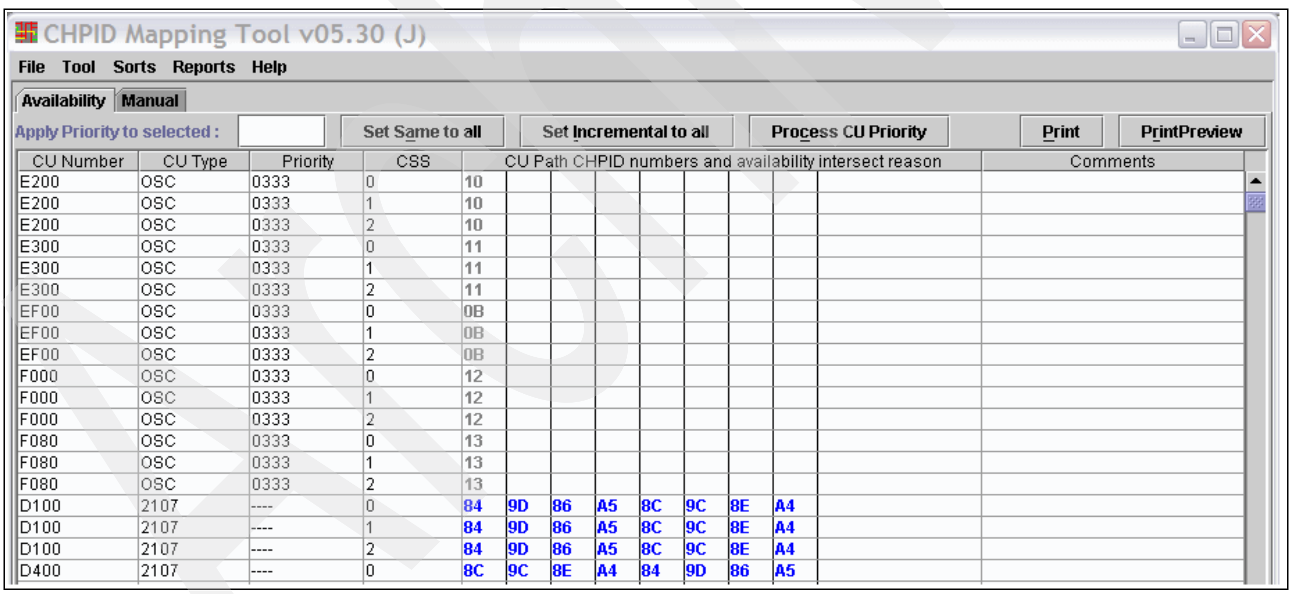
4. Click **OK**. You can now display the results of the channel mapping. You can also sort the report in different ways. For example, to see how the CHPID Mapping Tool ranked the control units, select **Sorts** → **By CU Priority**.

> **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 illustrates how CU Priority values are represented in the IOCP file.

5. You 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.

   Page through the listing and search through the column CU Number for any control units you want to set priority for. In our example, we set the OSC type CU Numbers to priority 333; see Figure 3-61.




| CU Number | CU Type | Priority | CSS | CU Path CHPID numbers and availability intersect reason | | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E200 | OSC | 0333 | 0 | 10 | | | | | | | | | |
| E200 | OSC | 0333 | 1 | 10 | | | | | | | | | |
| E200 | OSC | 0333 | 2 | 10 | | | | | | | | | |
| E300 | OSC | 0333 | 0 | 11 | | | | | | | | | |
| E300 | OSC | 0333 | 1 | 11 | | | | | | | | | |
| E300 | OSC | 0333 | 2 | 11 | | | | | | | | | |
| EF00 | OSC | 0333 | 0 | 0B | | | | | | | | | |
| EF00 | OSC | 0333 | 1 | 0B | | | | | | | | | |
| EF00 | OSC | 0333 | 2 | 0B | | | | | | | | | |
| F000 | OSC | 0333 | 0 | 12 | | | | | | | | | |
| F000 | OSC | 0333 | 1 | 12 | | | | | | | | | |
| F000 | OSC | 0333 | 2 | 12 | | | | | | | | | |
| F080 | OSC | 0333 | 0 | 13 | | | | | | | | | |
| F080 | OSC | 0333 | 1 | 13 | | | | | | | | | |
| F080 | OSC | 0333 | 2 | 13 | | | | | | | | | |
| D100 | 2107 | ---- | 0 | 84 | 9D | 86 | A5 | 8C | 9C | 8E | A4 | | |
| D100 | 2107 | ---- | 1 | 84 | 9D | 86 | A5 | 8C | 9C | 8E | A4 | | |
| D100 | 2107 | ---- | 2 | 84 | 9D | 86 | A5 | 8C | 9C | 8E | A4 | | |
| D400 | 2107 | ---- | 0 | 8C | 9C | 8E | A4 | 84 | 9D | 86 | A5 | | |

*Figure 3-61 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.

6. Under the File menu, click the **Availability** tab again.
7. Click **Process CU Priority** and a window pops up.

   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**.
8. Click **Process**. Then click **Sorts** → **By CU Priority**; notice that the OSC type control units with priority of 333 have sorted to the top of the list.
9. Select the **Manual** tab; Figure 3-62 shows the results of mapping the CHPIDs.

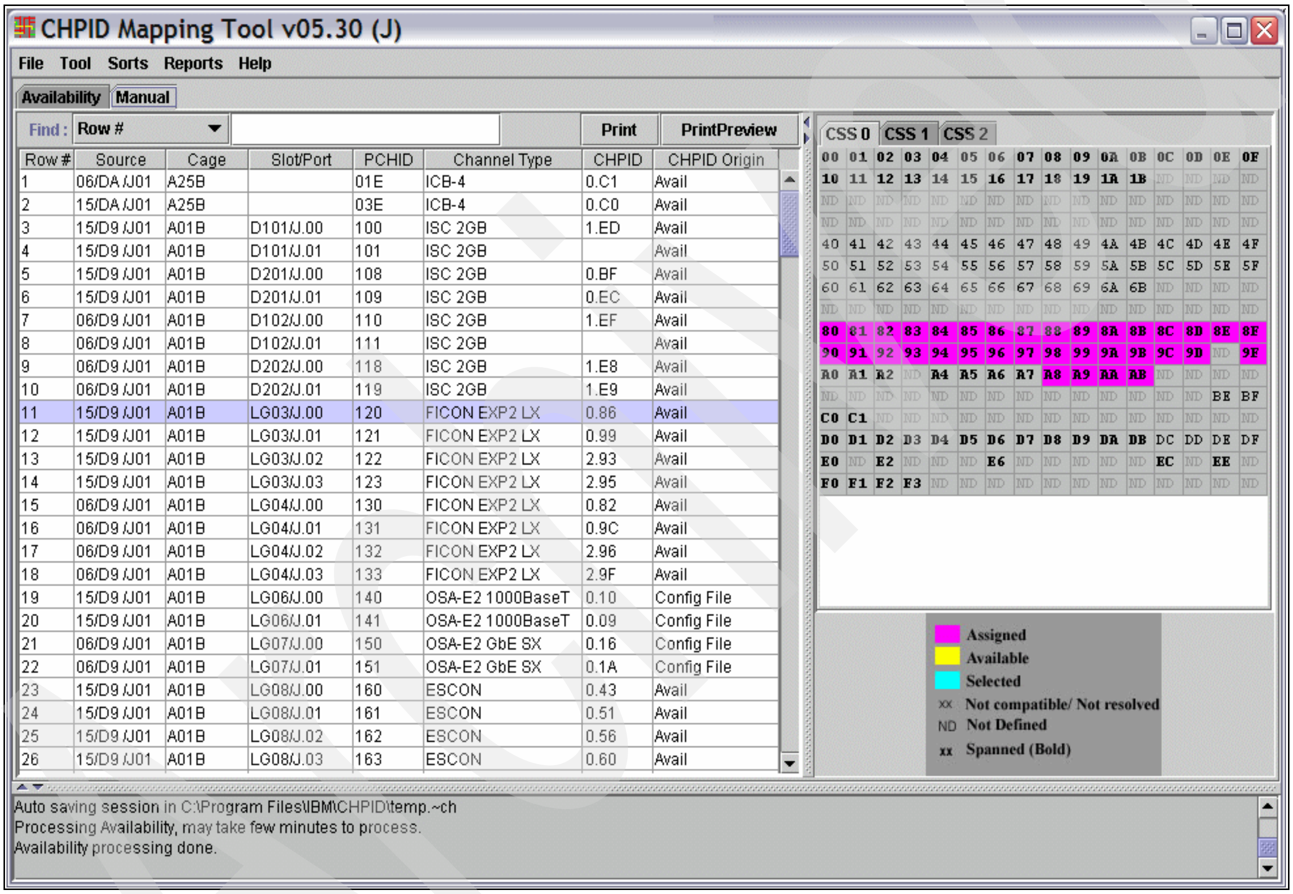



*Figure 3-62 CMT - Manual (CHPIDs assigned)*

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 value Avail in the CHPID Origin column, indicating that the CHPID values were assigned based on availability.

## CHPIDs not connected to Control Units

Under the **Availability** tab, click **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,” see Figure 3-63.

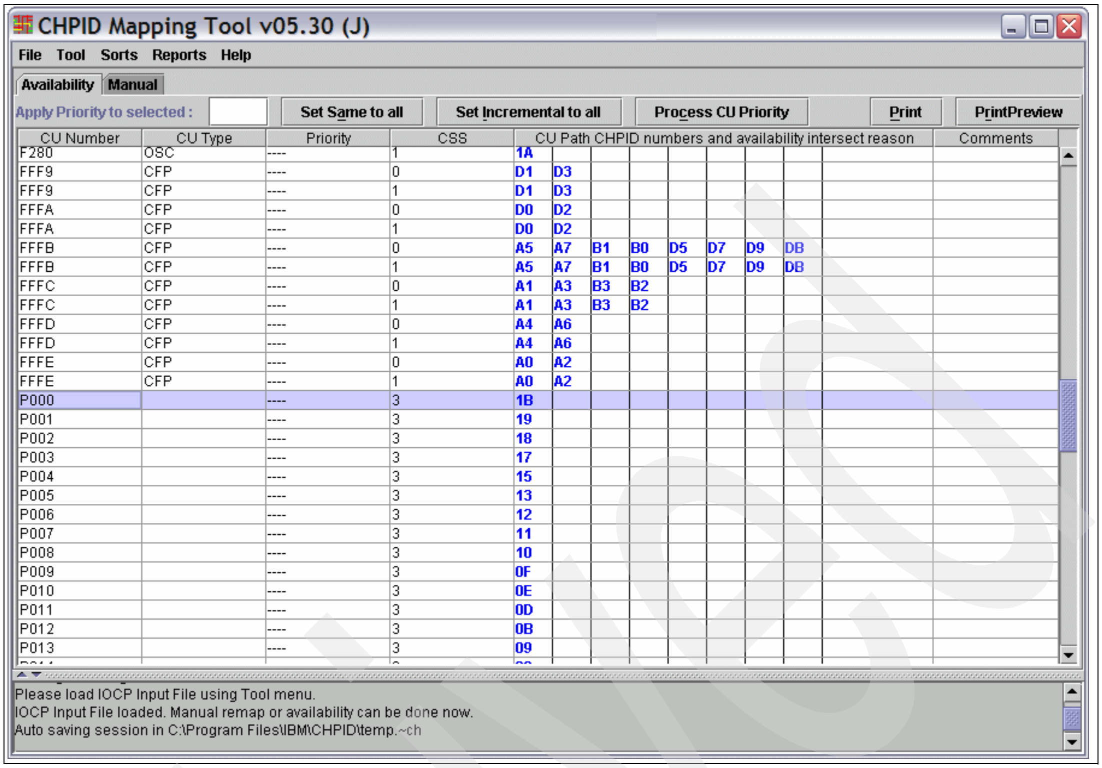


*Figure 3-63 CMT - Sort by Control Unit*

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 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 will allow the availability mapping function to pick PCHIDs that will afford your new control unit good availability.

## Create reports

The CHPID Mapping Tool offers built-in reports, which are available from the Reports pull-down menu. You can also print the information on 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 will install 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 to help with labelling the cables. The labels must include the PCHID or cage/slot/port information before system delivery.

### *CHPID Report*

1. Click **Reports** → **CHPID Report** (Figure 3-64).

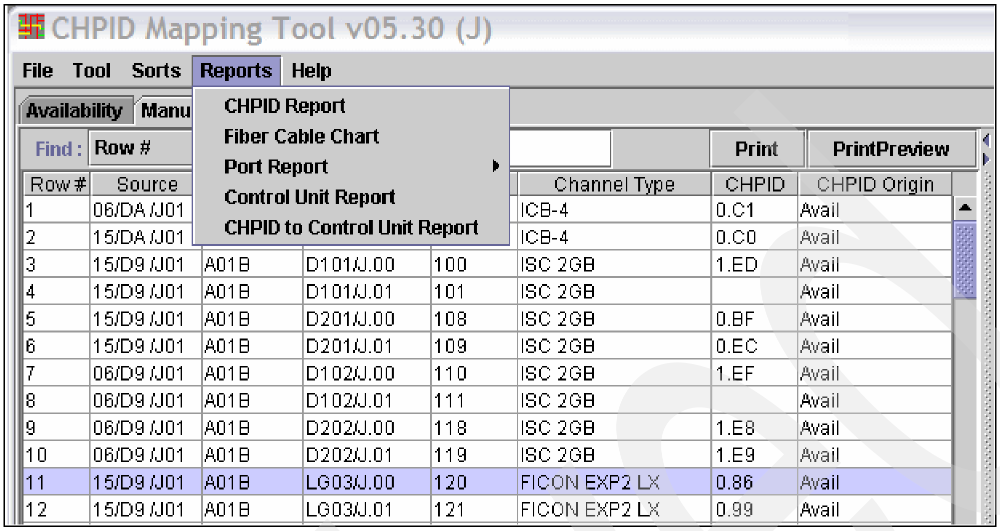



*Figure 3-64 CMT - Select CHPID Report*

2. Enter the Report File Name (or accept the default name offered by CMT) and click **Save** (Figure 3-65).

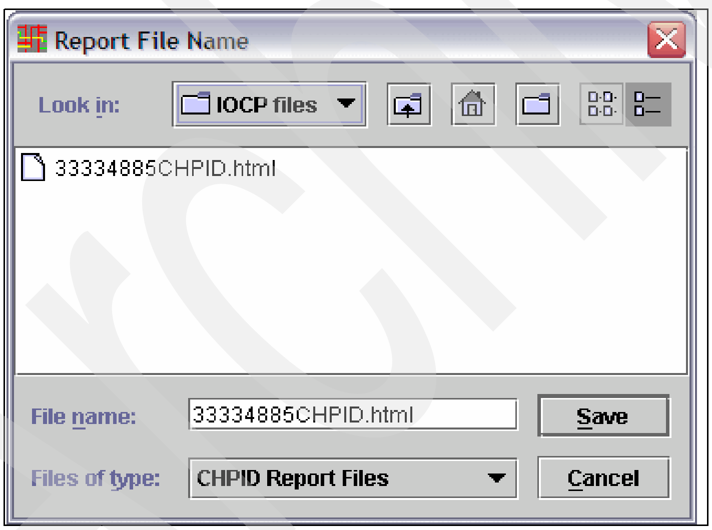



*Figure 3-65 CMT - Report File Name*

3. The CHPID Mapping Tool opens a browser window with the CHPID report; see Figure 3-66. 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: 33334885(CFR)
Machine: 2097-E26

Report Created: Nov. 30, 2007
IOCP File: SCZP202in.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/ DA | A25B | DA06 | 3393 | 0.C1(S)/01E/J01 |
| 15/ DA | A25B | DA15 | 3393 | 0.C0(S)/03E/J01 |
| 15/ D9/ J.01 | A01B | D101 | 0218 | 1.ED/100/J00 _.__/101/J01 |
| 15/ D9/ J.01 | A01B | D201 | 0218 | 0.BF/108/J00 0.EC(S)/109/J01 |
| 06/ D9/ J.01 | A01B | D102 | 0218 | 1.EF/110/J00 _.__/111/J01 |
| 06/ D9/ J.01 | A01B | D202 | 0218 | 1.E8/118/J00 1.E9/119/J01 |
| 15/ D9/ J.01 | A01B | 03 | 3319 | 0.86(S)/120/J00 0.99(S)/121/J01 2.93(S)/122/J02 2.95(S)/123/J03 |
| 06/ D9/ J.01 | A01B | 04 | 3319 | 0.82(S)/130/J00 0.9C(S)/131/J01 2.96(S)/132/J02 2.9F(S)/133/J03 |
| 15/ D9/ J.01 | A01B | 06 | 3366 | 0.10(S)/140/J00 0.09(S)/141/J01 |
| 06/ D9/ J.01 | A01B | 07 | 3365 | 0.16(S)/150/J00 0.1A(S)/151/J01 |
| 15/ D9/ J.01 | A01B | 08 | 2323 | 0.43/160/J00 0.51/161/J01 0.56/162/J02 0.60/163/J03 0.63/164/J04 0.68/165/J05 1.44/166/J06 1.49/167/J07 1.53/168/J08 1.5A/169/J09 1.61/16A/J10 1.69/16B/J11 2.48/16C/J12 2.51/16D/J13 2.63/16E/J14 |
| 06/ D9/ J.01 | A01B | 09 | 2323 | 0.48/170/J00 0.4A/171/J01 0.4F/172/J02 0.50/173/J03 0.67/174/J04 0.6A/175/J05 1.46/176/J06 1.47/177/J07 1.52/178/J08 1.59/179/J09 1.5E/17A/J10 2.4D/17B/J11 2.58/17C/J12 2.65/17D/J13 |
| 06/ D8/ J.01 | A01B | D110 | 0218 | 0.BE/180/J00 0.EE(S)/181/J01 |

*Figure 3-66 CMT - CHPID Report*

At the end of this CHPID report there is a list of CHPIDs with modified PCHID/AID assignments (Figure 3-67). 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

| CHPIDs | Previous PCHID/AID | Current PCHID/AID | Current Location | F/C |
|---|---|---|---|---|
| 0.00 | 1B0 | 340 | Z01BLG06J.00 | 3366 |
| 0.01 | 1A0 | 1C0 | A01BLG15J.00 | 3366 |
| 0.02 | 390 | 370 | Z01BLG09J.00 | 3366 |
| 0.03 | 380 | 3D0 | Z01BLG16J.00 | 3366 |
| 0.04 | 320 | 240 | A01BLG24J.00 | 3366 |
| 0.05 | 330 | 3C0 | Z01BLG15J.00 | 3366 |
| 0.06 | 120 | 250 | A01BLG25J.00 | 3366 |
| 0.07 | 130 | 1D0 | A01BLG16J.00 | 3366 |
| 0.08 | 231 | 3B1 | Z01BLG13J.01 | 3366 |
| 0.09 | 221 | 141 | A01BLG06J.01 | 3366 |
| 0.0A | 1A1 | 1C1 | A01BLG15J.01 | 3366 |
| 0.0B | 1B1 | 341 | Z01BLG06J.01 | 3366 |
| 0.0C | 391 | 371 | Z01BLG09J.01 | 3366 |
| 0.0D | 381 | 3D1 | Z01BLG16J.01 | 3366 |
| 0.0E | 321 | 241 | A01BLG24J.01 | 3366 |
| 0.0F | 331 | 3C1 | Z01BLG15J.01 | 3366 |
| 0.10 | 220 | 140 | A01BLG06J.00 | 3366 |
| 0.11 | 230 | 3B0 | Z01BLG13J.00 | 3366 |
| 0.12 | 131 | 1D1 | A01BLG16J.01 | 3366 |
| 0.13 | 121 | 251 | A01BLG25J.01 | 3366 |
| 0.14 | 210 | 1A0 | A01BLG12J.00 | 3365 |

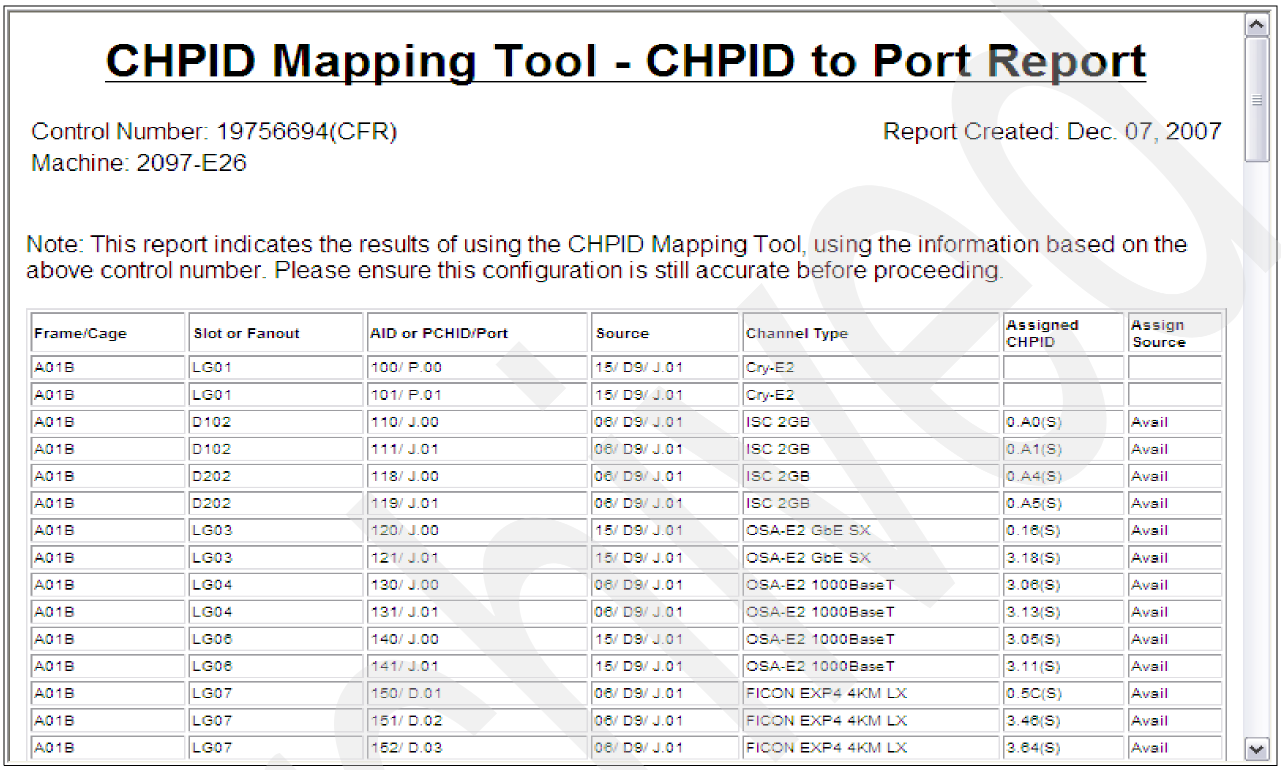
*Figure 3-67 List of CHPIDs having modified PCHID assignment*

### *Port Report - Sorted by Location*

1. Click **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 3-68).

2. You may be prompted to accept active content. Accept the active content in order to display the report in your browser.



CHPID Mapping Tool - CHPID to Port Report

Control Number: 19756694(CFR) Report Created: Dec. 07, 2007
Machine: 2097-E26

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.

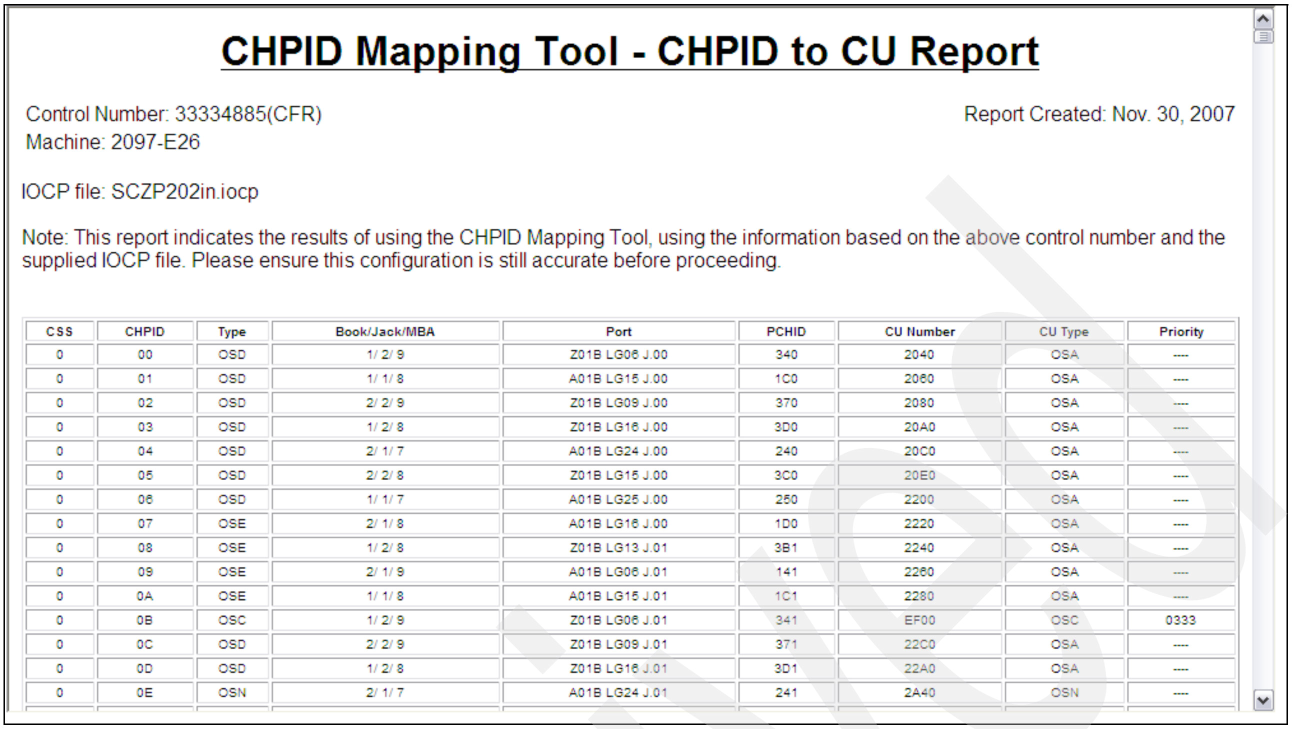
| Frame/Cage | Slot or Fanout | AID or PCHID/Port | Source | Channel Type | Assigned CHPID | Assign Source |
|---|---|---|---|---|---|---|
| A01B | LG01 | 100/ P.00 | 15/ D9/ J.01 | Cry-E2 | | |
| A01B | LG01 | 101/ P.01 | 15/ D9/ J.01 | Cry-E2 | | |
| A01B | D102 | 110/ J.00 | 06/ D9/ J.01 | ISC 2GB | 0.A0(S) | Avail |
| A01B | D102 | 111/ J.01 | 06/ D9/ J.01 | ISC 2GB | 0.A1(S) | Avail |
| A01B | D202 | 118/ J.00 | 06/ D9/ J.01 | ISC 2GB | 0.A4(S) | Avail |
| A01B | D202 | 119/ J.01 | 06/ D9/ J.01 | ISC 2GB | 0.A5(S) | Avail |
| A01B | LG03 | 120/ J.00 | 15/ D9/ J.01 | OSA-E2 GbE SX | 0.16(S) | Avail |
| A01B | LG03 | 121/ J.01 | 15/ D9/ J.01 | OSA-E2 GbE SX | 3.18(S) | Avail |
| A01B | LG04 | 130/ J.00 | 06/ D9/ J.01 | OSA-E2 1000BaseT | 3.06(S) | Avail |
| A01B | LG04 | 131/ J.01 | 06/ D9/ J.01 | OSA-E2 1000BaseT | 3.13(S) | Avail |
| A01B | LG06 | 140/ J.00 | 15/ D9/ J.01 | OSA-E2 1000BaseT | 3.05(S) | Avail |
| A01B | LG06 | 141/ J.01 | 15/ D9/ J.01 | OSA-E2 1000BaseT | 3.11(S) | Avail |
| A01B | LG07 | 150/ D.01 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 0.5C(S) | Avail |
| A01B | LG07 | 151/ D.02 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 3.46(S) | Avail |
| A01B | LG07 | 152/ D.03 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 3.64(S) | Avail |

*Figure 3-68 CMT - CHPID to Port Report*

### *Create the CHPID to Control Unit Report*

These reports are created in a similar way to the CHPID Report:

1. Click **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; see Figure 3-70 on page 118. 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: 33334885(CFR)
Machine: 2097-E26

Report Created: Nov. 30, 2007

IOCP file: SCZP202in.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 | Book/Jack/MBA | Port | PCHID | CU Number | CU Type | Priority |
|---|---|---|---|---|---|---|---|---|
| 0 | 00 | OSD | 1/ 2/ 9 | Z01B LG06 J.00 | 340 | 2040 | OSA | ---- |
| 0 | 01 | OSD | 1/ 1/ 8 | A01B LG15 J.00 | 1C0 | 2060 | OSA | ---- |
| 0 | 02 | OSD | 2/ 2/ 9 | Z01B LG09 J.00 | 370 | 2080 | OSA | ---- |
| 0 | 03 | OSD | 1/ 2/ 8 | Z01B LG16 J.00 | 3D0 | 20A0 | OSA | ---- |
| 0 | 04 | OSD | 2/ 1/ 7 | A01B LG24 J.00 | 240 | 20C0 | OSA | ---- |
| 0 | 05 | OSD | 2/ 2/ 8 | Z01B LG15 J.00 | 3C0 | 20E0 | OSA | ---- |
| 0 | 06 | OSD | 1/ 1/ 7 | A01B LG25 J.00 | 250 | 2200 | OSA | ---- |
| 0 | 07 | OSE | 2/ 1/ 8 | A01B LG16 J.00 | 1D0 | 2220 | OSA | ---- |
| 0 | 08 | OSE | 1/ 2/ 8 | Z01B LG13 J.01 | 3B1 | 2240 | OSA | ---- |
| 0 | 09 | OSE | 2/ 1/ 9 | A01B LG06 J.01 | 141 | 2260 | OSA | ---- |
| 0 | 0A | OSE | 1/ 1/ 8 | A01B LG15 J.01 | 1C1 | 2280 | OSA | ---- |
| 0 | 0B | OSC | 1/ 2/ 9 | Z01B LG06 J.01 | 341 | EF00 | OSC | 0333 |
| 0 | 0C | OSD | 2/ 2/ 9 | Z01B LG09 J.01 | 371 | 22C0 | OSA | ---- |
| 0 | 0D | OSD | 1/ 2/ 8 | Z01B LG16 J.01 | 3D1 | 22A0 | OSA | ---- |
| 0 | 0E | OSN | 2/ 1/ 7 | A01B LG24 J.01 | 241 | 2A40 | OSN | ---- |

*Figure 3-69 CMT - CHPID to CU Report*

## Create 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.

Create an IOCP statements file for input back into the IODF via HCD. This IOCP statements file now has the CHPIDs assigned to PCHIDs.

1. Click **Tool** → **Create Updated IOCP File** (Figure 3-70).

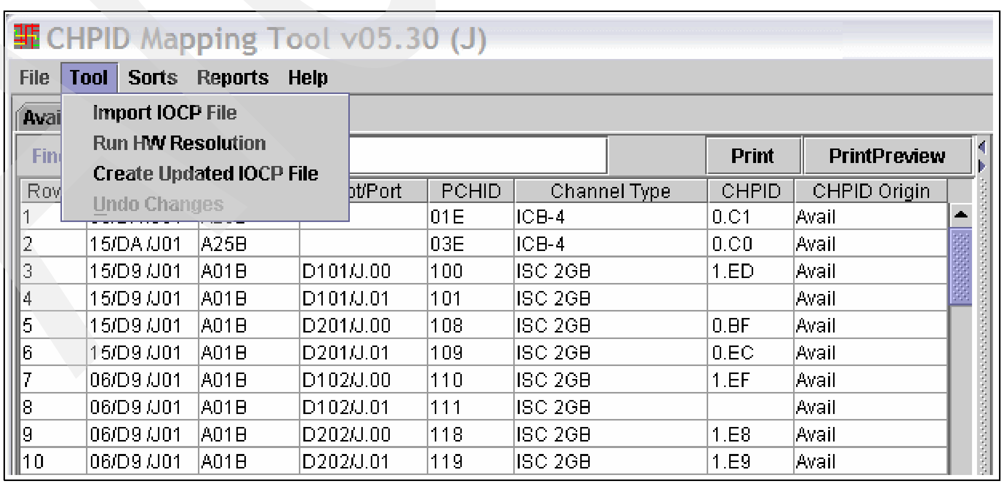



*Figure 3-70 CMT - Create Updated IOCP File*

2. Enter the File name and location for the IOCP output file and click **Save** (Figure 3-71).

> **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.

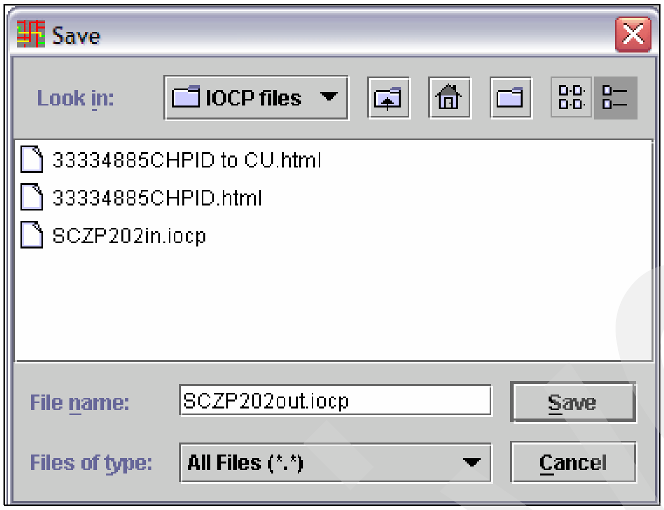



*Figure 3-71 CMT - Save IOCP output file*

3. The CMT displays an informational message, shown in Figure 3-72, regarding what to do for the final execution of the tool.

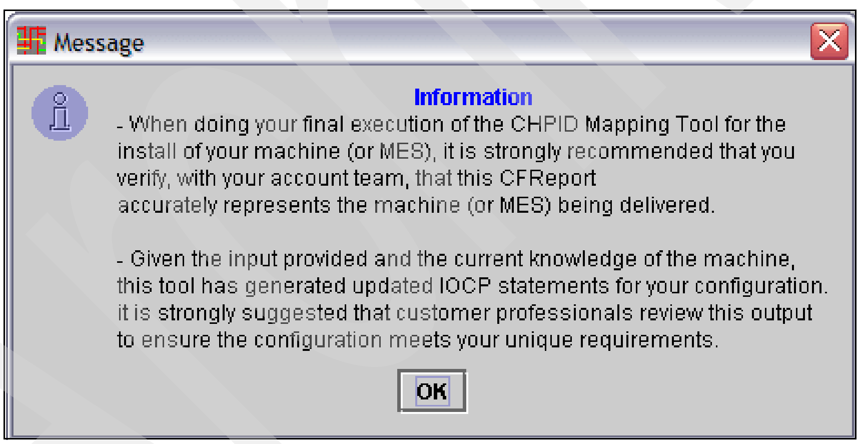



*Figure 3-72 CMT - Informational message*

4. The CHPID Mapping Tool program can be shut down now. Click **File** → **Exit** (Figure 3-73).

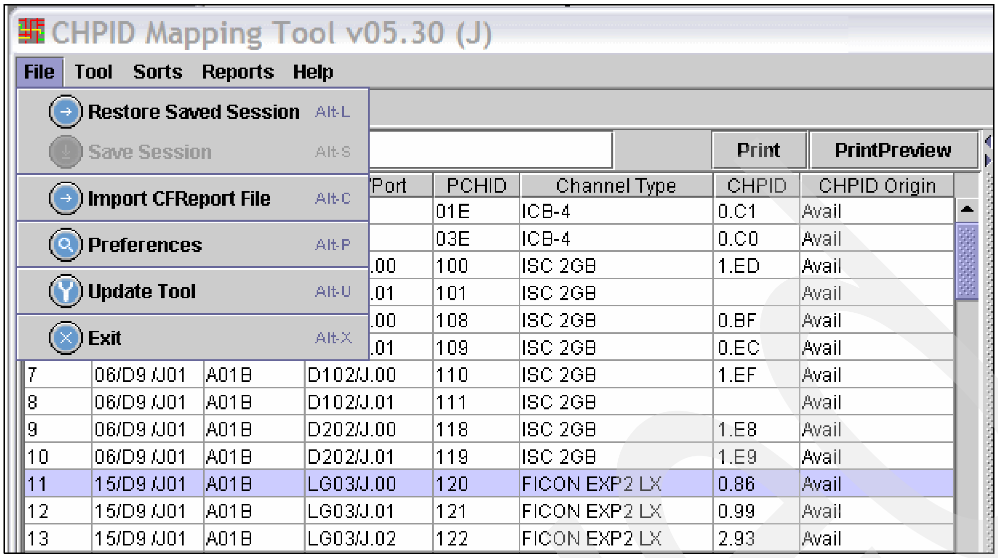



*Figure 3-73 CMT - Exit program*

## 3.6 HCD - Update the 2097 work IODF with PCHIDs

After mapping the CHPIDs to PCHIDs using the CHPID Mapping Tool, the information needs to be transferred back into HCD, as follows:

1. Upload the IOCP file created by the CMT (sczp202out.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 will notice that the CMT has left a reference to the CCN. Also notice 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 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; see Example 3-2.

*Example 3-2 HCD - Updated IOCP statements file (with CMT statements)*

```
.             PATH=((CSS(0),D0,D2,DA),(CSS(1),D0,D2,DA)),UNIT=CFP
        IODEVICE ADDRESS=(FF07,007),CUNUMBR=(FFF6),UNIT=CFP
        IODEVICE ADDRESS=(FF82,007),CUNUMBR=(FFF6),UNIT=CFP
        IODEVICE ADDRESS=(FFB3,007),CUNUMBR=(FFF6),UNIT=CFP
*CMT* VERSION=000
*CMT* CCN=33334885(CFR)
*CMT* E200.0=0333,E200.1=0333,E200.2=0333,E300.0=0333,E300.1=0333
*CMT* E300.2=0333,EF00.0=0333,EF00.1=0333,EF00.2=0333,F000.0=0333
*CMT* F000.1=0333,F000.2=0333,F080.0=0333,F080.1=0333,F080.2=0333
******************************** Bottom of Data ********************************
```

2. From the HCD main panel shown in Figure 3-74, enter the work IODF name used. Select option **5**, **Migrate configuration data**.

```
                          z/OS V1.9 HCD
Command ===> ________________________________________________________________

                              Hardware Configuration

Select one of the following.

5_   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.IODF39.WORK'                              +
```

*Figure 3-74 HCD - main menu, select Migrate configuration data*

3. From the Migrate Configuration Data panel shown in Figure 3-75, select option **1**, **Migrate IOCP/OS data**, then press Enter.

```
----------- Migrate Configuration Data -------------


  Select one of the following tasks.

  1   1.  Migrate IOCP/OS data
      2.  Migrate switch configuration data
```

*Figure 3-75 HCD - Migrate Configuration Data*

4. On the Migrate IOCP Data panel shown in Figure 3-76, fill in the following fields and then press Enter:

| | |
|---|---|
| Processor ID | Use the same one 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 TSO (see 3.7, “HCD - Build the 2097 production IODF” on page 123). |
| Processing mode | Select option **2** to save the results of the migration. (Prior to using 2, however, try to migrate using option **1**, in order 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 . . . . . . . . . . . . SCZP202   +   CSS ID . . . . . . _  +
 OS configuration ID  . . . . . . . . TEST2097 +

 Combined IOCP/MVSCP input data set . _____________________________________
 IOCP only input data set . . . . . . 'SYS6.IODF39.IOCPOUT.SCZP202'
 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 3-76 HCD - 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 3-77). 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.

```
 -------------------------- Migration Message List ---------------------------
    Query Help
  --------------------------------------------------------------------------
                                                                 Row 1 of 2
  Command ===> ___________________________________________ Scroll ===> PAGE

  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.IODF39.WORK.
  **************************** Bottom of data ******************************
```

*Figure 3-77 HCD - 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.

## 3.7 HCD - Build the 2097 production IODF

To make use of the definitions that we updated in HCD, we need to create a 2097 production IODF from our work IODF and remotely or locally write the IODF to the 2094 IOCDS using Write IOCDS in preparation of upgrade, as follows:

1. From the HCD main panel, select option **2**, **Activate or process configuration data** (Figure 3-78).

```
                       z/OS V1.9 HCD
Command ===> ________________________________________________________________

                           Hardware Configuration

Select one of the following.

2   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.IODF39.WORK'                                +
```

*Figure 3-78 HCD - 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 3-79).

```
----- 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 statements
      11. Build and manage S/390 microprocessor
          IOCDSs and IPL attributes
      12. Build validated work I/O definition file
```

*Figure 3-79 HCD - Activate or Process Configuration Data, select Build production IODF*

3. HCD displays the Message List panel (Figure 3-80). 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 139

 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 61.0C to
 #              control unit 8000 exceeded. Actually defined: 312
 _ W   CBDG092I Maximum number of 256 logical paths on link 61.10 to
 #              control unit 8000 exceeded. Actually defined: 424
 _ W   CBDG092I Maximum number of 256 logical paths on link 61.14 to
 #              control unit 8000 exceeded. Actually defined: 424
 _ W   CBDG092I Maximum number of 256 logical paths on link 62.08 to
 #              control unit 8000 exceeded. Actually defined: 312
 _ W   CBDG092I Maximum number of 256 logical paths on link 62.0C to
 #              control unit 8000 exceeded. Actually defined: 312
 _ W   CBDG092I Maximum number of 256 logical paths on link 62.10 to
 #              control unit 8000 exceeded. Actually defined: 312
```

*Figure 3-80 HCD - Message List (building Production IODF)*

4. Press PF3 to continue.
5. HCD displays the Build Production I/O Definition File panel. Fill in the fields `Production IODF name` and `Volume serial number`, and then press Enter (Figure 3-81).

```
-------------- Build Production I/O Definition File ---------------


  Specify the following values, and choose how to continue.

  Work IODF name . . . : 'SYS6.IODF39.WORK'

  Production IODF name . 'SYS6.IODF39'
  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 3-81 HCD - Build Production I/O Definition File*

6. HCD displays the Define Descriptor Fields panel (Figure 3-82). 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.IODF39'

  Descriptor field 1  . . . SYS6
  Descriptor field 2  . . . IODF39
```

*Figure 3-82 HCD - Define Descriptor Fields*

7. HCD displays the following message, indicating that the production IODF was successfully created:

   ```
   Production IODF SYS6.IODF39 created.
   ```

Proceed to the next section to implement the configuration on the 2097.

## 3.8 Load the 2097 processor IOCDS

At this point, we have a production IODF, which is SYS6.IODF39. Now we need to update the IOCDS on the server that will be upgraded (for example, SCZP101 → SCZP202). The IOCDS will be available to power-on reset after the processor has been upgraded.

### Update the IOCDS

1. From the HCD main panel, select option **2**, **Activate or process configuration data** (Figure 3-83). Verify that the IODF is the production one created in the previous step, then press Enter.

```
z/OS V1.9 HCD
Command ===> ________________________________________________________________

                          Hardware Configuration

Select one of the following.

2   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.IODF39'
```

*Figure 3-83 HCD - main menu, select Activate or process configuration data*

2. The Activate or Process Configuration Data panel displays (Figure 3-84). Select option **11**, **Build and manage S/390 microprocessor IOCDSs and IPL attributes**, then press Enter.

   **Note:** In this example, we are assuming that we have connectivity to the 2094 that is being upgraded via the HMC local network in order to create an IOCDS.

   In the case where the server being upgraded is not accessible from the HMC LAN, we would need to create an IOCP file from HCD and then do a stand-alone IOCP. This is done using the same process as 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.

```
----- 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 statements
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

*Figure 3-84 HCD - Activate or Process Configuration Data - Select Build IOCDSs*

3. The S/390 Microprocessor Cluster List panel displays (Figure 3-85). Select the 2094 being upgraded from the list by typing a forward slash (/) to update one of its IOCDSs, then press Enter.

```
 Goto  Query  Help
 ------------------------------------------------------------------------------
                      S/390 Microprocessor Cluster List             Row 1 of 4
 Command ===> _______________________________________________ Scroll ===> PAGE

 Select one or more CPCs, then press Enter.

   --------------CPC--------------   IODF
 / SNA Address        Type   Model   Processor ID
 / USIBMSC.SCZP101    2094   S18     SCZP101
 _ USIBMSC.SCZP701    9672   XX7     SCZP701
 _ USIBMSC.SCZP801    2064   1C7     SCZP801
 _ USIBMSC.SCZP901    2084   C24     SCZP102
 ******************************* Bottom of data ********************************
```

*Figure 3-85 HCD - S/390 Microprocessor Cluster List*

4. The Actions on selected CPCs panel displays (Figure 3-86). Select option **1**, **Work with IOCDSs**, and then 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 3-86 HCD - Actions on selected CPCs, Work with IOCDSs*

5. The IOCDS List panel displays (Figure 3-87). Select the IOCDS that you wish to update for the 2097 upgrade by typing a forward slash (/), then press Enter.

```
 . Goto  Query  Help
 ------------------------------------------------------------------------------
                                  IOCDS List         Row 1 of 4 More:       >
 Command ===> _______________________________________________ Scroll ===> PAGE

 Select one or a group of IOCDSs, then press Enter.

                                          -----Token Match----- Write
 / IOCDS        Name      Type   Status     IOCDS/HSA IOCDS/Proc. Protect
 / A0.SCZP202   IODF35    LPAR   Alternate  No        No          No
 _ A1.SCZP202   IODF36    LPAR   POR        Yes       No          Yes-POR
 _ A2.SCZP202   IODF33    LPAR   Alternate  No        No          No
 _ A3.SCZP202   IODF34    LPAR   Alternate  No        No          No
 ******************************* Bottom of data ********************************
```

*Figure 3-87 HCD - IOCDS List*

6. The Actions on selected IOCDSs panel displays (Figure 3-88). Select option **1**, **Update IOCDS**, then 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 3-88 HCD - Actions on selected IOCDSs*

7. The Build IOCDSs panel displays (Figure 3-89). Verify that all the information is correct. Fill in the field `Title1`, then press Enter.

> **Note:** Specifying `YES` in the `Write IOCDS in preparation of upgrade` field is only required when you are upgrading the existing hardware and you wish to write the IOCDS for a 2097 from the existing hardware. The yes value permits the writing of an IOCDS that contains information that the current hardware does not recognize.

```
------------------------------- Build IOCDSs ---------------------------------
                                                                  Row 1 of 1
  Command ===> ___________________________________________ Scroll ===> PAGE

  Specify or revise the following values.

  IODF name . . . . . . . . . : 'SYS6.IODF39'

  Title1 . TEST39 __________________________________________________________
  Title2 : SYS6.IODF39 - 2007-11-30 18:33

                              Write IOCDS in
  IOCDS        Switch IOCDS  preparation of upgrade
  A0.SCZP102   No            YES
  ***************************** Bottom of data ******************************
```

*Figure 3-89 HCD - Build IOCDSs*

8. Because `YES` was specified for the field Write IOCDS in preparation of upgrade, HCD now displays a confirmation panel (Figure 3-90). 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
 A0.SCZP202
 ***************************** Bottom of data ******************************
```

*Figure 3-90 HCD - Build IOCDS (Confirm Write IOCDS)*

9. The Job Statement Information panel displays (Figure 3-91). Fill in the job statements as required by the installation, then press Enter. HCD submits the job to update the IOCDS.

> **Note:** Route the job to execute on the image you are logged on to. In that way, you know that the image can “see” the new 2097 in order to update its IOCDS.

```
 ------------------------- Job Statement Information --------------------------

   Specify or revise the job statement information.

   Job statement information
   //WIOCDS  JOB (ACCOUNT),'NAME'
   //*
   //*
   //*
```

*Figure 3-91 HCD - 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 A0 IOCDS REPLACED.`

    Now if you return to HCD option 2.11 and view the IOCDS, you will note that the SNA Address remains at USIBMSC.SCZP101 (Figure 3-92 on page 130).

```
  Goto  Query  Help
------------------------------------------------------------------------------
                      S/390 Microprocessor Cluster List             Row 1 of 4
Command ===> _______________________________________________ Scroll ===> PAGE

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address        Type   Model   Processor ID
s USIBMSC.SCZP101    2094   S18     SCZP101
_ USIBMSC.SCZP701    9672   XX7     SCZP701
_ USIBMSC.SCZP801    2064   1C7     SCZP801
_ USIBMSC.SCZP901    2084   C24     SCZP102
******************************* Bottom of data ********************************
```

*Figure 3-92 HCD - IOCDS with upgrade IODF*

Also, when you select USIBMSC.SCZP101, notice that IOCDS A0 (which we wrote the upgrade IODF to) has a status of Invalid Status (Figure 3-93). This occurs because we specified YES for Write IOCDS in preparation for upgrade, and the IOCDS contains IOCP statements and code relevant only for a 2097 processor.

The status will switch when this processor is upgraded to a 2097. The 2097 IOCDS status will change to Alternate and the 2094 IOCDSs will change to Invalid.

> **Note:** We recommend that the IOCDS written in preparation for the upgrade be rewritten normally at your earliest convenience. Subsequent MESs may cause an IOCDS written in preparation for an upgrade to become invalid.

```
  Goto  Query  Help
------------------------------------------------------------------------------
                                IOCDS List         Row 1 of 4 More:       >
Command ===> _______________________________________________ Scroll ===> PAGE

Select one or a group of IOCDSs, then press Enter.

                                       -----Token Match----- Write
/ IOCDS       Name     Type   Status     IOCDS/HSA IOCDS/Proc. Protect
_ A0.SCZP202  TEST39   LPAR   Invalid    No        No          No
_ A1.SCZP202  IODF36   LPAR   POR        Yes       No          Yes-POR
_ A2.SCZP202  IODF33   LPAR   Alternate  No        No          No
_ A3.SCZP202  IODF34   LPAR   Alternate  No        No          No
******************************* Bottom of data ********************************
```

*Figure 3-93 HCD - IOCDS showing Invalid Status*

## 3.9 HMC steps for activation profiles

### 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 2097 after it has been upgraded.

Do the following:

1. Log on to the HMC and select the 2094 that you are upgrading in Defined CPCs Work Area.

> **Note:** We will be using Ver 2.9.2 HMC because it is presumed that this is the HMC you will have with the 2094 when performing an upgrade to 2097.

2. Under Operational Customization, select **Customize/Delete Activation Profiles**.
3. Select the “Last Used” Reset Profile and choose **Customize**.
4. Save this “Last Used” profile with a new Profile name to be referred to when the power-on reset is required (for example, SCZP101T).
5. Select the new Profile and click **Customize**.
6. Click the IOCDS that you just updated in the previous step (for example, IOCDS-A0). The message shown in Figure 3-94 displays.

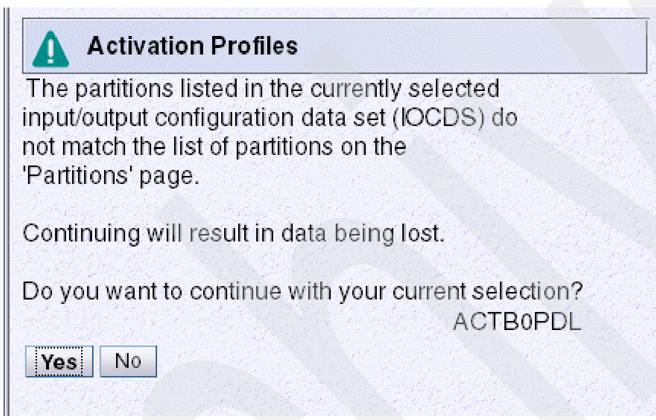



*Figure 3-94 HMC - Activation Profiles, message ACTB0PDL*

Depending on circumstances, you may wish to select Yes or No. At this point, you may want to review the Partition Activation List.

7. Click **Yes** and notice the warning message that is displayed (Figure 3-95 on page 132).

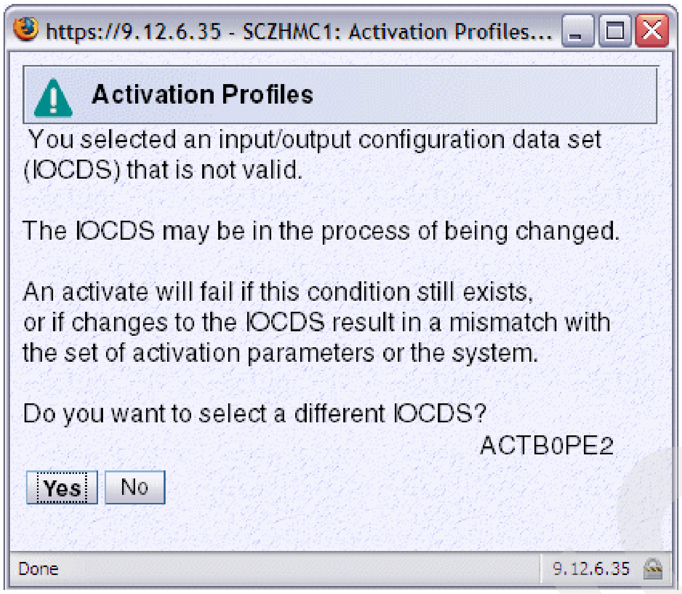



*Figure 3-95 HMC - Activation Profiles (IOCDS not valid warning message)*

8. When you click **Yes** the following warning message will be displayed (Figure 3-96).

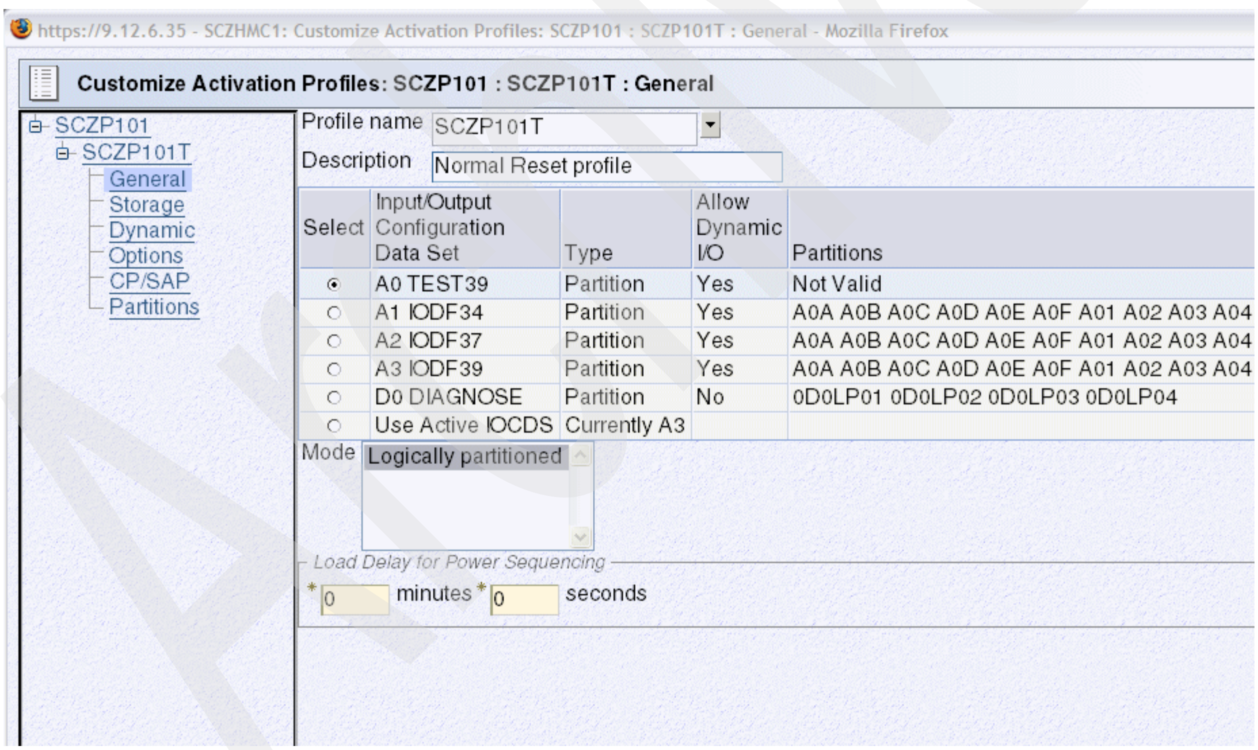



*Figure 3-96 HMC - Activation Profiles (IOCDS Not Valid warning message)*

## Build/Verify Image Profiles

While still in the Reset Profile, you can now review the Image Profile attributes. If you are adding additional resources (that is, storage or CPs) to the 2097 during the upgrade, you may not be able to add these to the Image Profile at this time.

## Build/Verify Load Profiles

Go through the Load (IPL) Profiles for this 2094 and verify that you are satisfied with all the IPL and LOADPARM parameters that have been defined for the Images.

## Build/Verify Load Members in SYS#.IPLPARM

You may require additional Load Members defined in SYS#.IPLPARM after the processor has been upgraded to the 2097.

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 SCZP101 to SCZP202).

## STP configuration

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 7, “Server Time Protocol setup” on page 305 for details.

## Performing a power-on reset (POR) of the 2097

When the 2094 processor has been upgraded to a 2097, the IBM service representative performs a power-on reset with a Diagnostic IOCDS.

After this 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. You perform another power-on reset using the Reset Profile created in the previous step.

# 4

# Replace a System z9 EC with a z10 EC

In this chapter we describe how to replace an existing System z9 EC with a z10 EC.

You can also upgrade from a z990 to a System z10 EC; however, only examples of upgrading or replacing a System z9 EC are shown in this book. An upgrade includes all frames, cages, support cards and new I/O features.

Because a wide variety of different environments exist, the results achieved in your environment may 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 - Migrate the existing 2094 IODF
- Save and restore configuration files
- Validate the 2097 work IODF
- CMT - Assign CHPIDs to PCHIDs
- HCD - Migrate PCHIDs back into work IODF
- Build the production IODF
- Implementing the processor configuration on a 2097
- HMC steps for activation profiles

## 4.1 Scenario overview

We begin by providing an overall description of this scenario.

### 4.1.1 The configuration process

Figure 4-1 illustrates the general process flow that we follow in our example. The numbered steps are described following the figure.

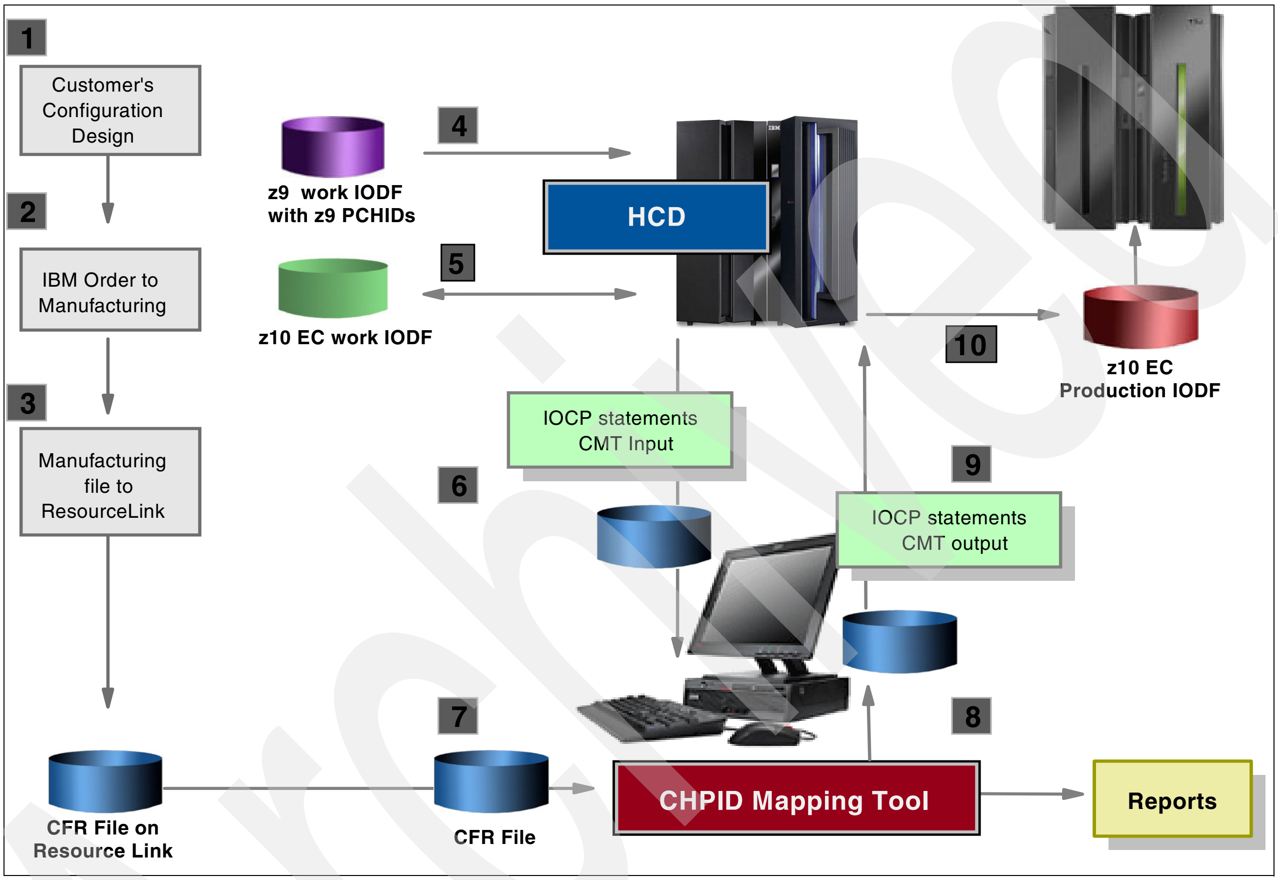



*Figure 4-1 CMT - Overall process flow*

1. When you are planning to migrate to a System z10 EC, the IBM Technical Support team can help you to define a configuration design that meets your needs. The configuration then gets passed to the ordering step.
2. The IBM order for the configuration is created and passed to the manufacturing process.
3. The manufacturing process creates a configuration file that is stored on the IBM Resource Link Web site. The configuration file describes the hardware being ordered. This data is available for download by the client installation team.
4. The existing System z9 EC I/O configuration is used as a starting point into HCD. The System z9 EC production IODF is used as input to HCD to create a work IODF that will be the base to define the new System z10 EC configuration.
5. When the new System z10 EC configuration has been added and the obsolete hardware has been deleted, a validated version of the configuration is saved in a 2097 validated work IODF.

6. From the validated work IODF, create a file containing the z10 EC 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.
7. The configuration file created by the IBM Manufacturing process in step 3 is downloaded from Resource Link to the CMT workstation.
8. The CHPID Mapping Tool uses the input data from files to map logical channels to physical ones on the new System z10 EC hardware.

   You may have to make decisions in response to situations that may arise, such as:

   a. Resolving situations in which the limitations on the purchased hardware cause a single point of failure (SPoF). You may need to purchase additional hardware in order to resolve some SPoF situations.
   b. Prioritizing certain hardware items over others.

   After processing by the CHPID Mapping Tool, 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.
9. 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.
10. Using HCD again, and taking as input the validated work IODF file created in step 5 and the IOCP statements updated by the CHPID Mapping Tool, apply the physical channel assignments done by the CMT to the configuration data in the work IODF.

    After the physical channel data has been migrated into the work IODF, a 2097 production IODF is created and the final IOCP statements can be generated.

    The installation team uses the configuration data from the 2097 production IODF when the final power-on reset is done, yielding a z10 EC with an I/O configuration ready to be used.

If you are upgrading an existing 2094, you may be able to use HCD to write an IOCDS to your current 2094 in preparation for the upgrade. If you can write an IOCDS to your current 2094 in preparation for upgrading it to a 2097, do so and inform the IBM service representative which IOCDS to use.

If the new 2097 is not connected using a LAN to the CPC where HCD is running, or you are not upgrading or cannot write an IOCDS using HCD in preparation for the upgrade, then use HCD to produce an IOCP input file and download the input file to a USB Flash Memory Drive.

The IOCP input file will then need to be loaded into the 2097 Support Element IOCDS using the Stand-Alone Input/Output Configuration Program. Refer to Technical Manual SB10-7152 for details.

> **Note:** Using the HCD option Write IOCDS in preparation of an upgrade is the preferred method for writing the initial IOCDS when installing a new 2097. This scenario uses the HCD option Write IOCDS process.

The migration path from a System z9 EC to a z10 EC can be either in the form of a field upgrade to the existing System z9 EC, or a replacement (push/pull) of an existing System z9 EC with a new z10 EC. Note the following points:

1. A *field upgrade* means that the existing System z9 EC processor serial number is retained during the upgrade.

2. A *replacement* of the existing System z9 EC by a new System z10 EC implies physically removing (*push*) the System z9 EC and bringing in a new System z10 EC (*pull*) to take its place. The replacement z10 EC has a new serial number, different from the existing System z9 EC.

In this chapter, we document the *push/pull* scenario.

### 4.1.2 Planning considerations

The follow table lists the channel types as described in an IOCDS that are used with the System z10 EC.

*Table 4-1 Channels, links, and adapters with CHPID type.*

| Channels | CHPID Type | May be defined as Shared | May be defined as Spanned |
|---|---|---|---|
| ESCON channels:<br>Connection Channel (ESCON architecture)<br>Channel to Channel (connects to CNC) | <br>CNC<br>CTC | <br>yes<br>ye | <br>no<br>no |
| FICON bridge. A FICON channel that attaches to an ESCON Director Model 5 | FCV | yes | no |
| FICON native channels that attach to FICON directors or directly to FICON control units | FC | yes | yes |
| FICON channels that attach to Fibre channel devices, switches, directors, or Fibre-Channel-to-SCSI bridges | FCP | yes | yes |
| ISC-3 peer mode channels (connects to another CFP) | CFP | yes | yes |
| ICB-4 peer channels (connects to another ICB-4) | CBP | yes | yes |
| IC peer channels (connects to another ICP) | ICP | yes | yes |
| InfiniBand host channel adapters (HCA) | CIB | yes | yes |
| HiperSocket (IQDIO) channels | IQD | yes | yes |
| OSA adapters using QDIO architecture | OSD | yes | yes |
| OSA adapters using non-QDIO architecture | OSE | yes | yes |
| OSA 1000Base-T adapters for OSA-ICC | OCE | yes | yes |
| OSA-Express2 adapters for NCP | OSN | yes | yes |

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=CBP - ICB-4 links
- CHPID Type=CIB - PSIFB links connecting to a 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 System z10 EC requires HMC Application Ver 2.10.0 or higher and only uses Ethernet for its network connection. The HMC and also the Service Elements do not contain a floppy disc drive, thus requiring the use of a USB Flash Memory Drive to input and back up customer configuration data.

### Software support

HCD V1.9 or HCD V1.7 and later with 2097DEVICE PSP Bucket and PTFs is required to define and support some of the new features of the System z10 EC.

### Open Systems Adapter - Integrated Console Controller (OSA-ICC)

You might consider using OSA Express2 1000BaseT 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 (FCP)

When using CHPIDs defined as TYPE=FCP, you may wish to consider NPIV.

### 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 may 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 via the HMC, note that the SNA address is made up of a Network name and CPC name separated by a dot (for example, USIBMSC.SCZP201). 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 1-8 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 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 will be 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.

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 |

### 4.1.3 Replace scenario (push/pull)

This scenario describes the configuration steps needed to replace an existing 2094 processor with a new 2097 processor. Key factors and procedures are as follows:

- HCD requires a new Processor ID for the 2097.
- HCD requires a new CPC name for the 2097.
- The 2097 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 2094 production IODF.
- The target IODF is a new 2097 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 2094-S18 with a Processor ID of SCZP101 and three CSSs (CSS ID=0, CSS ID=1 and CSS ID=2) and replaces it with a 2097-E26 with a Processor ID of SCZP202.

The CPC name SCZP101 and serial number 000101 change to the CPC name of SCZP202 and serial number of 000202.

The following CHPID types are migrated:

- OSD, OSE, OSC, OSN
- CTC, CNC, FC, FCP

- CBP, CFP, ICP
- IQD

The following Hardware/CHPID types are not supported and not migrated to the 2097:

- PCIXCC and PCICA
- ICB-3 links
- ICB-2 links
- ISC-3 links in compatibility mode (CHPID types CFS and CFR)
- OSA-Express Token Ring

Table 4-2 summarizes the migration options and tool requirements. The step-by-step process is documented later in this chapter.

*Table 4-2 2094 I/O configuration migrated to a 2097*

| 2094 to 2097 | Replace existing 2094 with a 2097 (push/pull) |
|---|---|
| Processor.id | Require to change 2094 to new ID |
| CPC name | New 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 below) |
| 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 |

## 4.2 HCD - Migrate the existing 2094 IODF

The following steps explain how to define the existing I/O configuration to the new 2097 IODF, and then migrate the channel subsystem and logical partitions from the 2094 to the 2097 server. Using HCD, the sequence of operations is as follows:

1. Create a 2097 work IODF from the current 2094 production IODF.
2. Repeat the 2094 processor being replaced.
3. Observe Coupling Link messages for later reference.
4. Delete unsupported items from the repeated 2094.
5. Change the repeated 2094 to a 2097, then delete the 2094.
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. Over-define channel paths.
9. Save OSA configuration information.
10. Build a validated 2097 work IODF.
11. Create an IOCP statements file and file transfer to the workstation running the CHPID Mapping Tool. This step can also be performed with HCM.
12. Create an IOCP statements file and file transfer 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 validated work IODF.
17. Build Production IODF and remote write the IOCP to an IOCDS on the processor; if not possible, copy the IOCP statements to a USB Memory Flash Drive.
18. Run Stand-Alone Input/Output Configuration Program to load the IOCP statements onto the 2097 Service Element IOCDS.
19. Build Reset, Image, and Load Profile.
20. Perform Power-on Reset (Activate) of 2097.

In the following sections, we describe these steps in more detail.

### Create 2097 work IODF from current 2094 production IODF

In HCD, select the current production IODF that contains the 2094 processor that you are replacing (for example, SYS6.IODF38).

### Repeat the 2094 processor being replaced

1. From the main HCD panel, select option **1.3**, **Processor List**. Type `r` (for repeat) next to the 2094 you wish to replace, then press Enter (Figure 4-2).

```
                                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  __________ ________________________________
_ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
_ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
r SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP201  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
```

*Figure 4-2 HCD - Processor List (repeating processor)*

2. You are presented with the Identify Target IODF panel. Do one of the following:
   - 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.IODF49.WORK).
4. You are presented with the Repeat Processor panel, as shown in Figure 4-3. Enter the Processor ID of the new 2097 (in this example, SCZP202) and leave all other fields unchanged, then press Enter to continue.

```
---------------------------- Repeat Processor -------------------------

Specify or revise the following values.

Processor ID . . . . . . . . . SCZP202_

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  . . . . . . ________

+-------------------------------------------+
| New IODF SYS6.IODF49.WORK defined.        |
+-------------------------------------------+
```

*Figure 4-3 HCD - Repeat Processor (defining new processor ID)*

## Coupling Link Information messages

At this point, you may be presented with Severity E, I, or W messages. As shown in Figure 4-4, in our example CBDG441I messages were mentioned in the introduction; these were received due to the Coupling Link CHPIDs not being copied over to the 2094 definition.

```
----------------------------- Message List --------------------------------
  Save  Query  Help

                                                                Row 1 of 239
Command ===> ___________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Sev Msg. ID  Message Text
_ W   CBDG441I The coupling facility connection between channel path BE
#              of processor SCZP101 and channel path 66 of processor
#              P00OSTP1 is not copied.
_ W   CBDG441I The coupling facility connection between channel path BF
#              of processor SCZP101 and channel path 54 of processor
#              P00OSTP2 is not copied.
_ W   CBDG441I The coupling facility connection between channel path C0
#              of processor SCZP101 and channel path C5 of processor
#              SCZP901 is not copied.
_ I   CBDG271I Requested action on object SCZP101 successfully
#              processed.
```

*Figure 4-4 HCD - Message List (CBDG441I)*

Press PF3 or PF12 to continue. As shown in Figure 4-5 on page 144, there is now an additional 2094 processor named SCZP202.

```
                               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  __________ ________________________________
_ P00OSTP1 2084     C24      LPAR  01534A2084 ________________________________
_ P00OSTP2 2094     S08      LPAR  0BAD4E2094 ________________________________
_ SCZP202  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
```

*Figure 4-5 HCD - Processor List (repeated processor)*

## Change the 2094 to a 2097 and delete the 2094

At this point you can either leave the original copy of the 2094 (SCZP101), or delete it from the IODF. In our example, we left it in the IODF for a few more steps.

Do the following:

1. Type `c` (change) next to SCZP202 to change the 2094 to a 2097, then press Enter. The Change Processor Definition panel is displayed (Figure 4-6).
2. Make the following updates, then press Enter:
   - Update `Processor type` to `2097`.
   - Update `Processor Model` to E26.

– Update `Serial Number` to `0002022097`.

– Update `CPC name` to `SCZP202`.

```
---------------------- Change Processor Definition ----------------------


Specify or revise the following values.

Processor ID . . . . . . . . : SCZP202
Support level:
XMP, Basic 2094 support
Processor type . . . . . . . . 2097     +
Processor model  . . . . . . . E26      +
Configuration mode . . . . . . LPAR     +

Serial number  . . . . . . . . 0002022097  +
Description  . . . . . . . . . ________________________________

Specify SNA address only if part of an S/390 microprocessor cluster:

Network name . . . . . . . . . USIBMSC   +
CPC name . . . . . . . . . . . SCZP202   +

Local system name  . . . . . . ________
```

*Figure 4-6   HCD - Change Processor Definition (changing repeated processor)*

3. Press Enter. The Update Channel Path Identifiers panel displays (Figure 4-7). In our example we made no changes.

```
--------------------- Update Channel Path Identifiers ----------------------
                                                               Row 1 of 125
 Command ===> __________________________________________ Scroll ===> CSR

 Specify any changes to the channel path identifiers in the list below.

 Processor ID . . . . : SCZP202
 Channel Subsystem ID : 0

 CHPID  Type  Side  Until CHPID   New CHPID +
 00     OSD         __            00
 01     OSD         __            01
 02     OSD         __            02
 03     OSD         __            03
 04     OSD         __            04
 05     OSD         __            05
 07     OSC         __            07
 08     OSD         __            08
 09     OSE         __            09
 0A     OSC         __            0A
 0B     OSD         __            0B
```

*Figure 4-7   HCD - Update Channel Path Identifiers (not changed)*

4. Press Enter “for each of the Channel Subsystem IDs.”

Now the repeated 2094 processor has been successfully changed to a 2097-E26; see Figure 4-8 on page 146.

```
                                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  __________ ________________________________
_ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
_ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP202  2097     E26      LPAR  02991E2097 ________________________________
_ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
******************************* Bottom of data ********************************




+-------------------------------------------------------------------+
| Definition of processor SCZP202 has been extended to its maximum |
| configuration.                                                   |
1+-------------------------------------------------------------------+
```

*Figure 4-8 HCD - 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 is 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, HCD automatically defines the maximum configuration of four CSSs and 60 logical partitions.

## Delete the 2094 processor definition

Now that the 2094 has been repeated and changed to become a 2097, the original 2094 definition (SCZP101) must now be deleted so that the required Coupling Links can be restored.

1. Type d (for delete) next to the processor SCZP101 in the Processor List (Figure 4-9 on page 147).

```
                              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  __________ ________________________________
_ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
_ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
d SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP202  2097     E26      LPAR  0002022097 ________________________________
_ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
```

*Figure 4-9 HCD - Processor List (Deleting processor)*

2. Press Enter to "Confirm Delete Processor".

```
                              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  __________ ________________________________
_ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
_ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
_ SCZP202  2097     E26      LPAR  0002022097 ________________________________
_ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
```

*Figure 4-10 HCD - Processor List (Processor deleted)*

## Reconnect the Coupling Link channel paths not migrated

Next, you need to manually redefine the Coupling Links you want from the SCZP202 processor to any other processor, along with any Internal Coupling Links desired. To help this effort, you can get a CF connection report from the previous production IODF containing the 2094. Alternatively, you can make a note of all CBDG441I error messages received in the previous step.

## Define additional I/O

At this point, define any additional CHPIDs, control units and devices, CTCs, and so on that you may be adding into the 2097 during the upgrade.

## Over-define channel paths on an XMP processor

Sometimes you may need to define a channel path that is not physically installed on the processor. This may 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 over-define CHPIDs by using an asterisk (*) for the PCHID value. An over-defined 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 * by its valid PCHID.

> **Note:** This is not the case for CFP and CBP type CHPIDs, where these CHPIDs have connections to other CFP and CBP type CHPIDs.
>
> Therefore, HCD only allows you to define CFP and CBP type CHPIDS as over-defined if they are unconnected.
>
> If you define a CIB type CHPID, it must also be defined with an HCA Adapter ID (AID) and an HCA Port ID, represented in the AID/P column in the Channel Path List. HCD does not allow a CIB type CHPID to be defined as over-defined.

The 2097 production IODF can then be activated dynamically and the PCHID/CHPID/control unit definitions become available to the operating system.

- Figure 4-11 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     Filter Mode. 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
_ BE    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   3D8
_ BF    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   3D9
_ CE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   181
_ CF    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   111
_ EC    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   3C0
_ EE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   3D0
```

*Figure 4-11 HCD - Channel Path List (Reserving CHPIDs)*

- Figure 4-12 shows what the CHPID/PCHID definitions look like after being defined as over-defined.

```
                              Channel Path List     Filter Mode. 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
_ BE    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   *
_ BF    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   *
_ CE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ CF    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ EC    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ EE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
```

*Figure 4-12 HCD - Channel Path List (over-defined CHPIDs)*

## 4.3 Save and restore configuration files

On the System z9 EC, and System z9 BC, 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 4-3 lists CHPID types that have configuration files on a System z9 EC, and System z9 BC.

*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 |
| 1000BaseT channel<br>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 can occur regardless of whether channels are moving.

The CHPID Mapping Tool can override PCHID assignments for:

- FICON channels supporting FCP
- OSA Express2 and channels supporting OSC

During an MES upgrade, the following occurs:

- The channel cards are moved as part of the normal rebalance of all I/Os.
- The configuration files are copied from your old system, restored to the new System z10 EC, and renamed to match their new PCHIDs of the new physical locations of the channel cards.

- The CHPID Mapping Tool will force 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.

Although the MES upgrade process preserves configuration files on an upgrade from a System z9 EC to a z10 EC, it is your responsibility to keep a backup of the customization data stored in the configuration files.

For a push/pull upgrade, it is your responsibility to export the configuration files from the existing 2094 and import them on the new 2097, as described here:

- For OSA-Express2 channels, export user-assigned MAC addresses using the Display or alter MAC address function in card-specific advanced facilities or user-specified OSA Address Tables (OATs).

  Another method is to use OSA/SF to back up and restore the configuration information for the OSA-Express2 channels.

- For CHPIDs defined as OSC (OSA-ICC), use the Export source file function in Manual configuration options.

For more information about configuration files, refer to Appendix A, "An explanation of configuration files" *in CHPID Mapping Tool Users Guide,* GC28-6825.

In this book, we show examples of backing up the configuration data with OSA/SF for OSA Express2 features, and with the HMC for OSA-ICC.

### 4.3.1 Save and restore 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-Express and OSA-Express2 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 has 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-Express2 features that span server boundaries, as shown in Figure 4-13 on page 151.

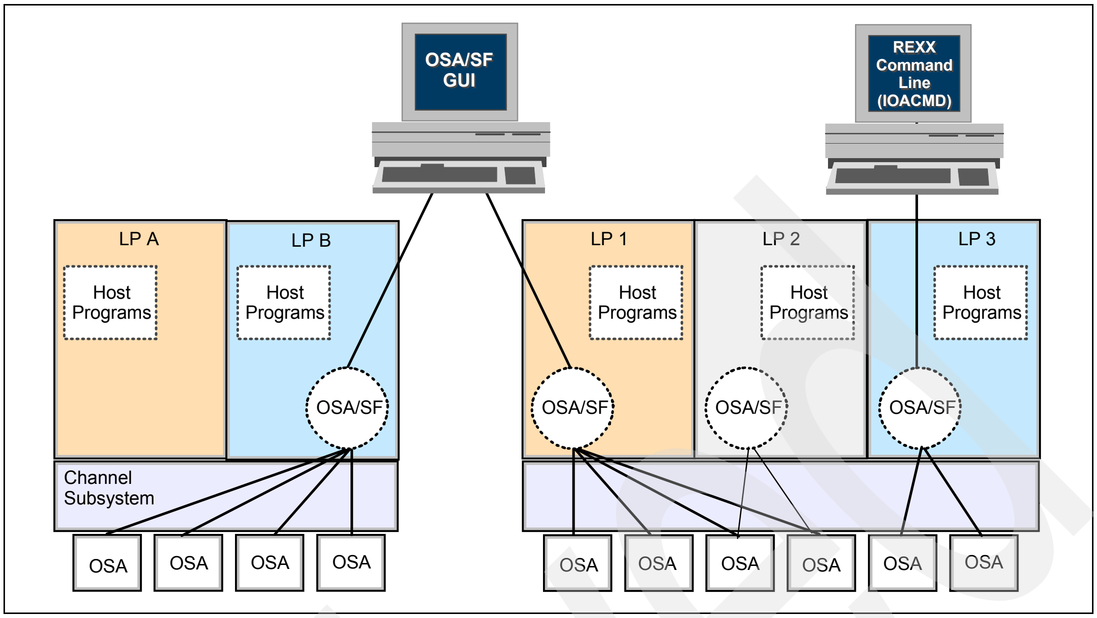



*Figure 4-13 OSA/SF*

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.

1. From a Windows workstation, start a DOS session and issue the command **java ioajava** to start the OSA/SF GUI.
2. Log on to OSA/SF, as shown in Figure 4-14.

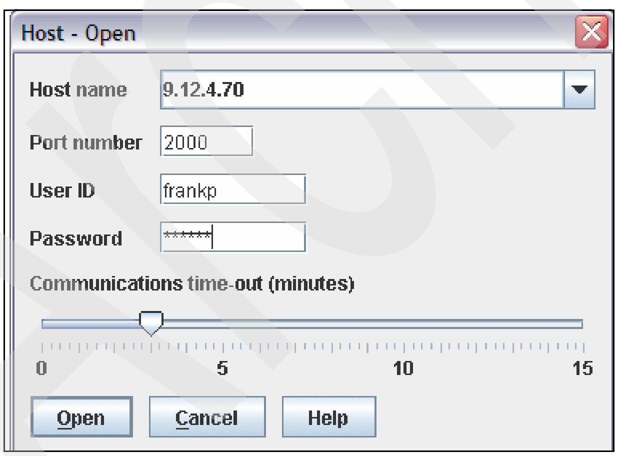



*Figure 4-14 OSA/SF Workstation Interface - Logon*

The OSA/SF main panels are displayed; see Figure 4-15 on page 152.

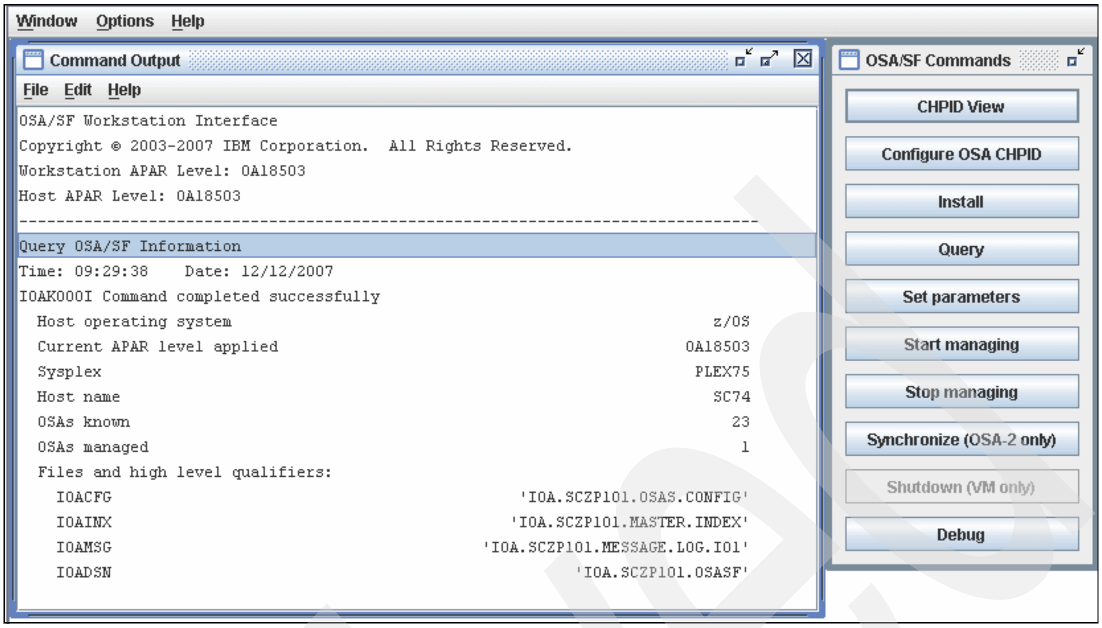



*Figure 4-15 OSA/SF Workstation Interface*

3. From the OSA/SF Commands panel, click **CHPID View.** The CHPID View panel is displayed; it lists all OSA features in the configuration (Figure 4-16).

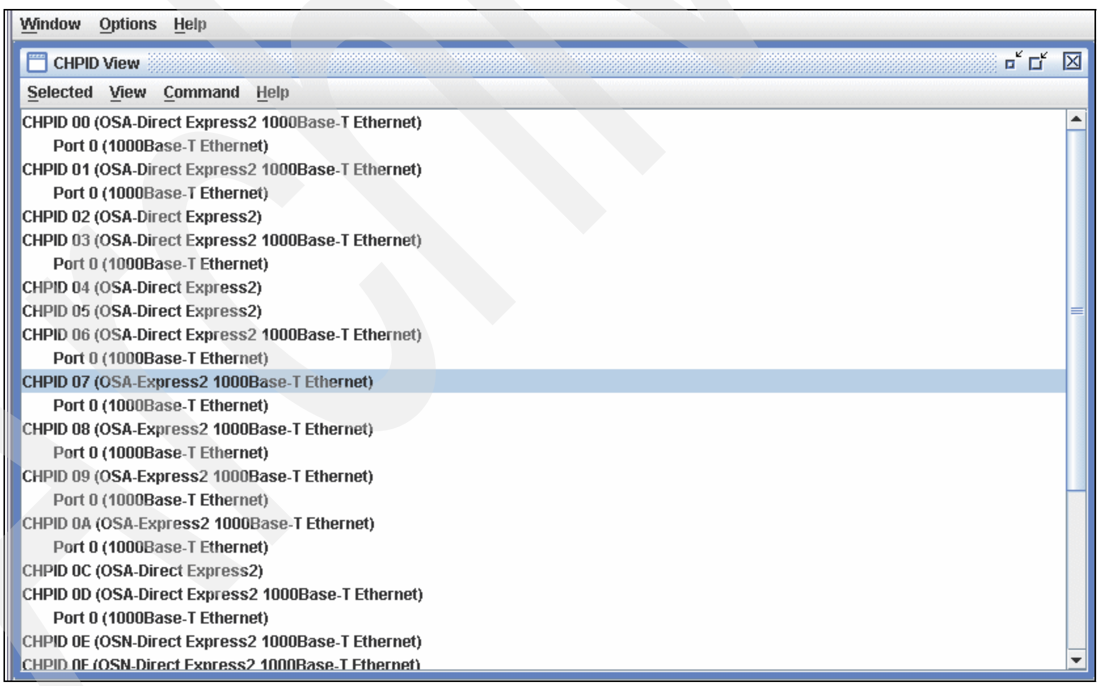



*Figure 4-16 OSA/SF Workstation Interface - CHPID view*

4. Select the CHPID you want to work with from the list. Click **Selected** → **Configurations** → **Configuration...**, as shown in Figure 4-17.

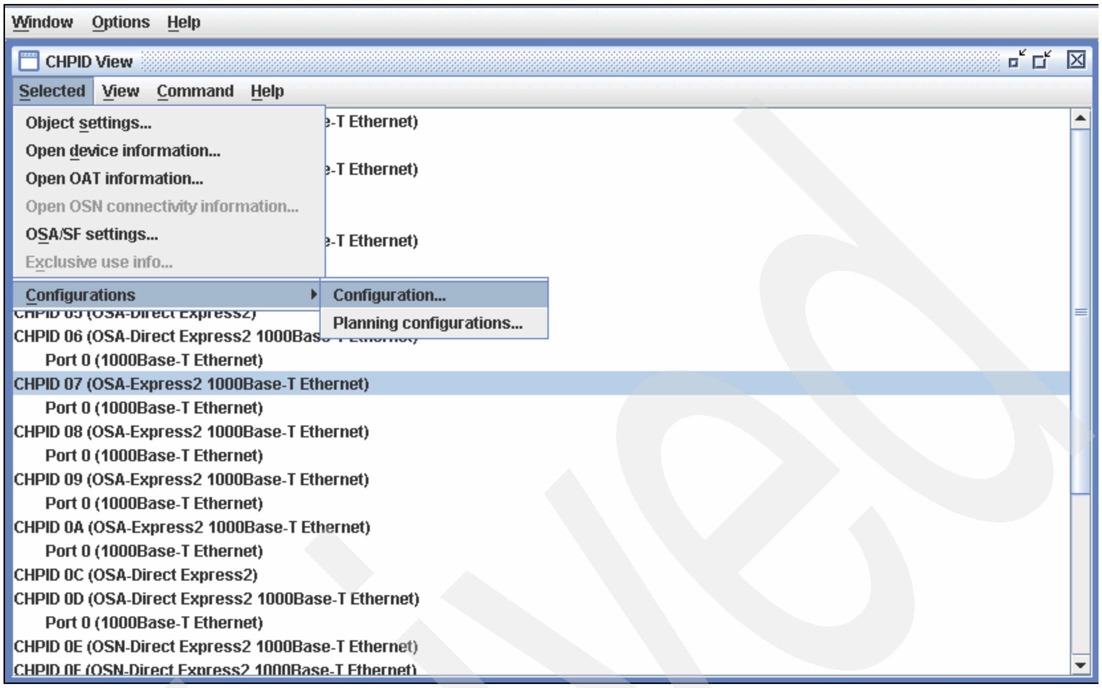



*Figure 4-17 OSA/SF Workstation Interface - Selected Configurations*

5. A CHPID configuration panel is displayed, with information fields left blank. From this panel, click **File** → **Get current configuration** (Figure 4-18).

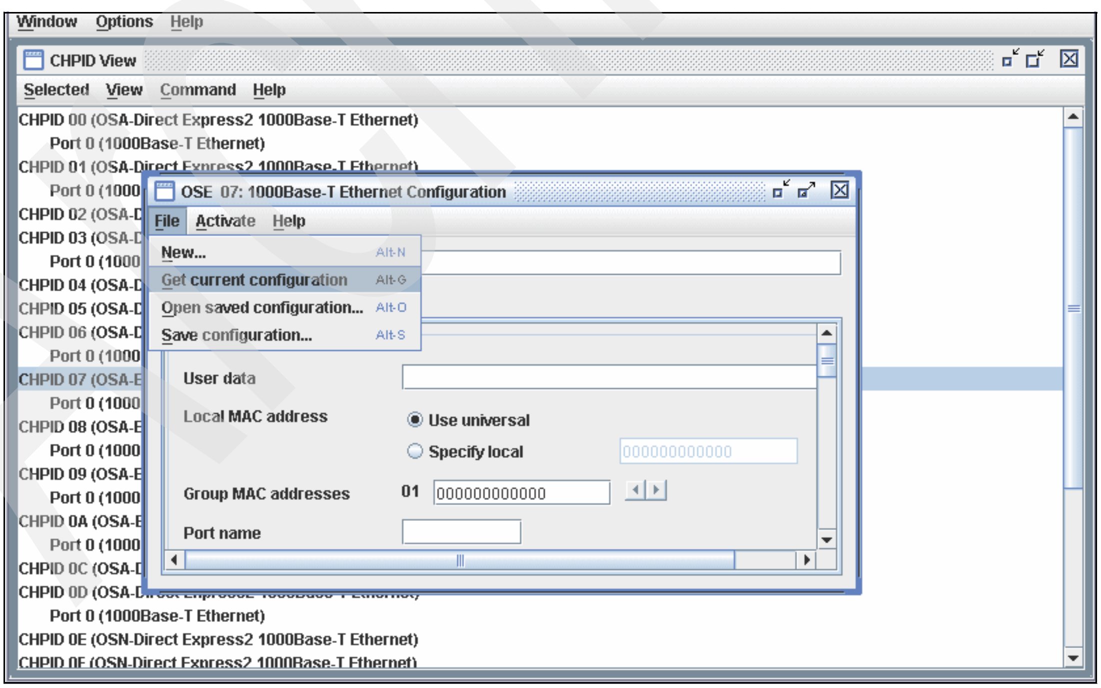



*Figure 4-18 OSA/SF Workstation Interface - get current configuration*

6. The CHPID configuration panel is displayed again, now with the current OSA CHPID configuration information. Fill in the Configuration name (Figure 4-19).

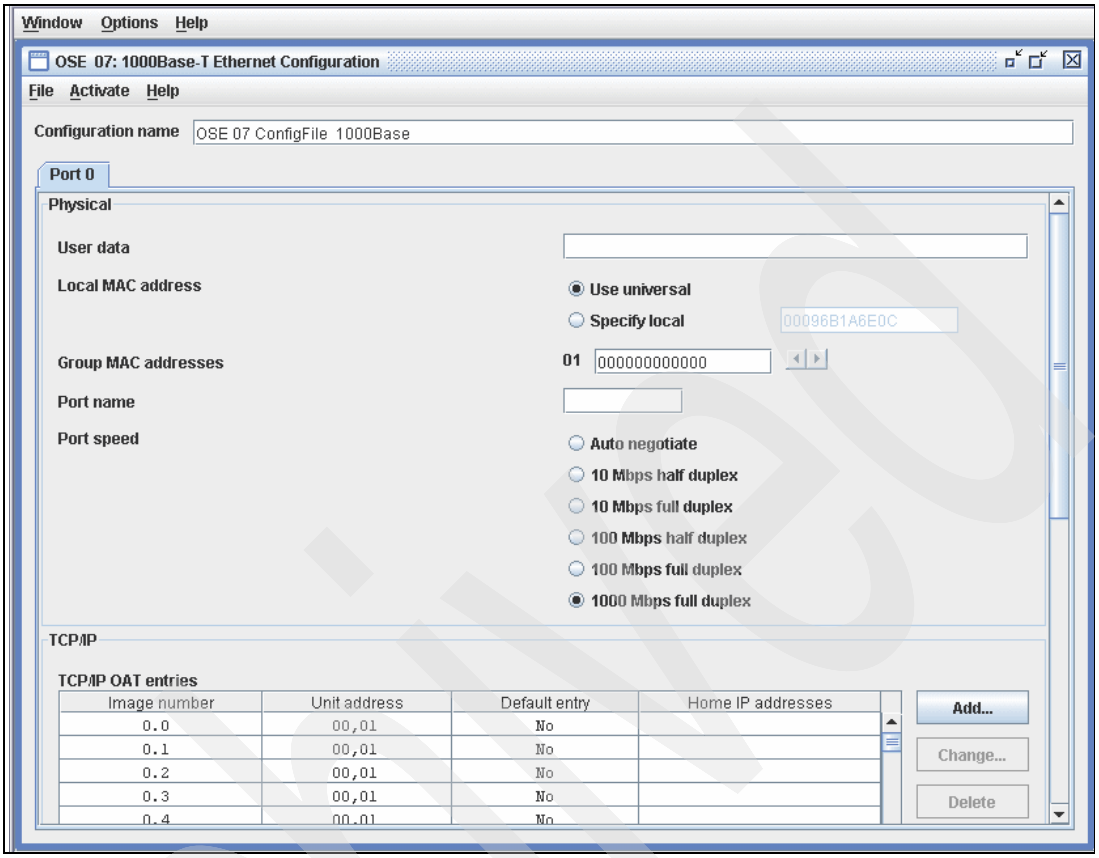



*Figure 4-19 OSA/SF Workstation Interface - Current configuration*

7. Click **File** → **Save configuration...** (Figure 4-20). The configuration file is saved by OSA/SF and can be reused later.

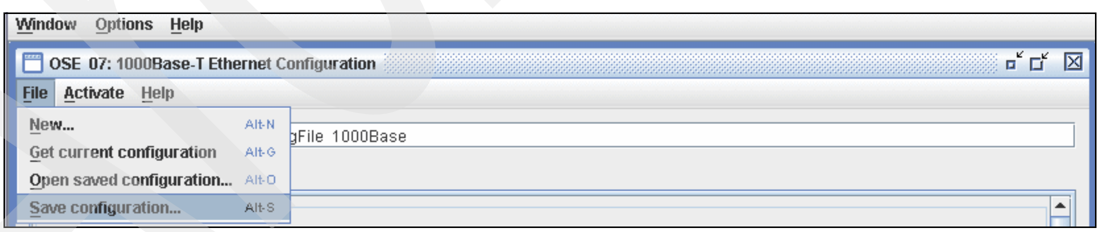



*Figure 4-20 OSA/SF Workstation Interface - Save current configuration*

You can use OSA/SF to install previously saved configuration information using the install and activate functions. Note that in order to be able 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.

1. From the OSA/SF main view, initialize the CHPID view. Select **Configurations** → **Planning configurations...** (Figure 4-21).

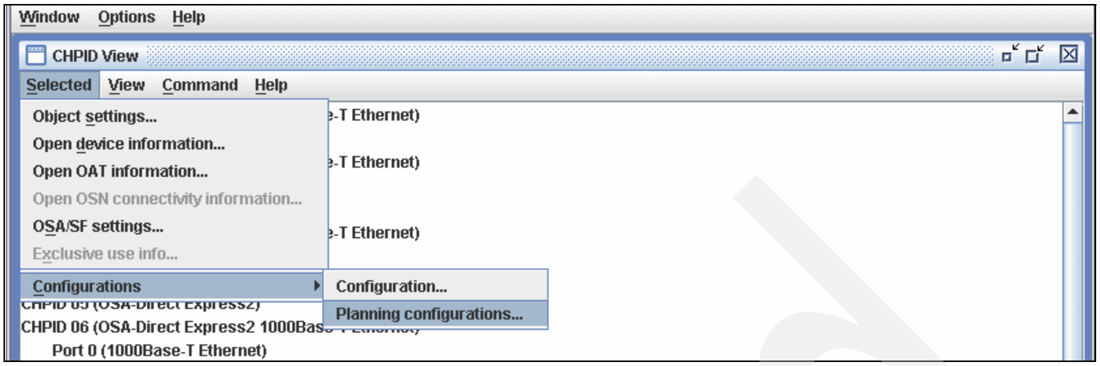



*Figure 4-21 OSA/SF Workstation Interface - Planning configurations*

2. The Configure OSA CHPID panel displays (Figure 4-22). Select the CHPID number and the CHPID Type that you want to define, then click **OK**.

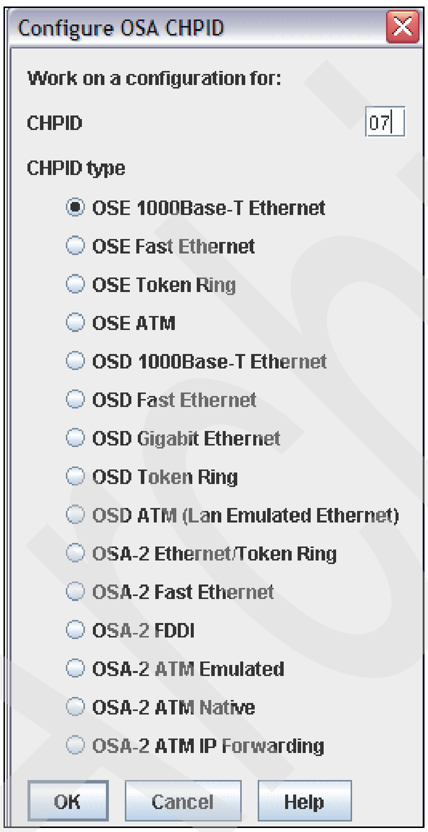



*Figure 4-22 OSA/SF Workstation Interface - Configure OSA CHPID*

3. OSA/SF displays a default panel for the type of feature selected. Click **File** → **Open saved configuration...** (Figure 4-23 on page 156).


*Figure 4-23 OSA/SF Workstation Interface - Open saved configuration*

4. OSA/SF displays a Host Configuration List panel containing the names of previously saved configuration files that match the feature type (Figure 4-24).

   Note that the Host Configuration List being displayed will vary with the OSA Express2 feature type selected in Figure 4-22. For example, a request for OSD 1000BaseT Ethernet displays the list shown in Figure 4-24.

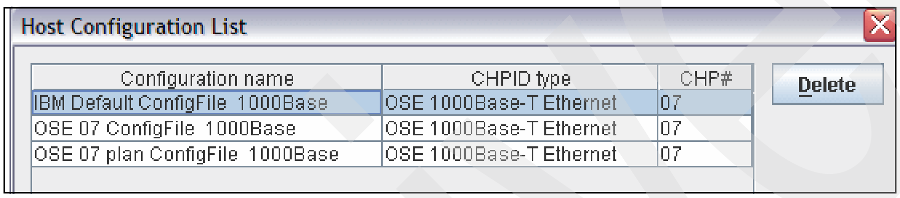



*Figure 4-24 OSA/SF Workstation Interface - Host configuration list (OSD 1000Base T Ethernet)*

5. From the list, select the saved configuration name and click **Load**. Configuration information previously saved is now displayed on the OSA configuration panel. Any changes that may be needed can be done for this configuration with OSA/SF as shown in Figure 4-25.

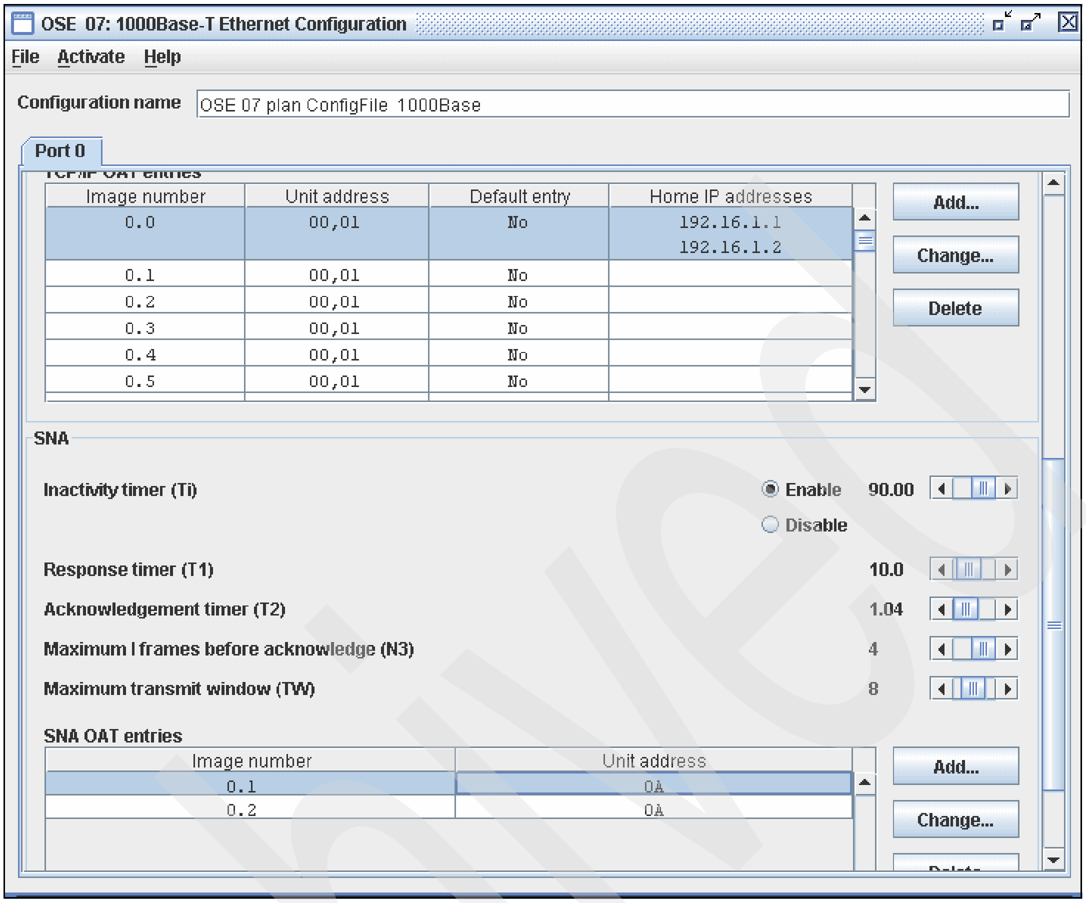



*Figure 4-25 OSA/SF Workstation Interface - Change Configuration*

6. Select **Activate** → **Activate with install** to restore the OSA feature configuration (Figure 4-26 on page 158).

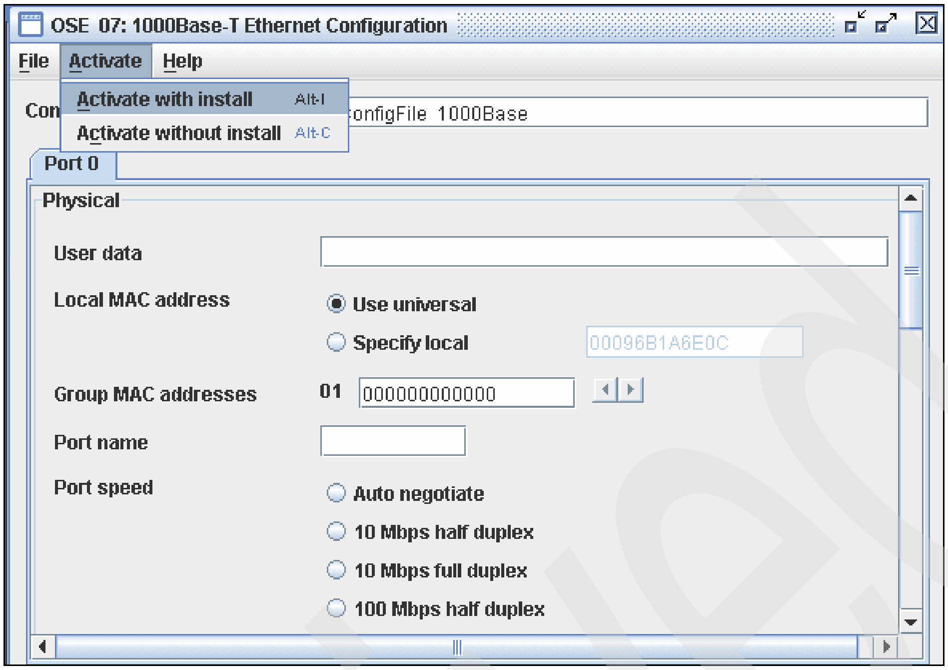



*Figure 4-26 OSA/SF Workstation Interface - Install*

## 4.3.2 OSA-ICC, CHPID=OSC

If the 2084 contains any TYPE=OSC CHPIDs, then there is a good chance that the existing PCHID will be remapped to a different PCHID when the 2084 processor is replaced with a 2094.

Operator Console, TN3270, and Printer definitions are stored and managed on the Support Element for that particular CPC, and their definitions only are associated with a PCHID, not a CHPID.

Therefore, if you wish to retain these OSC definitions after the replacement, you need to export the definitions to a diskette and import them to the remapped PCHID after the processor replacement has been completed.

### Exporting the configuration data for OSA-ICC channels

To export the configuration data, follow these steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2094, as opposed to a remote Web browser, and select the CPC that contains the OSC CHPIDs that you want to export the configuration data for (for example, SCZP101).
2. In the Defined CPCs Work Area, select the CPC that contains the OSC CHPIDs you want to export the configuration data for (for example, SCZP101).
3. Under Operational Customization, double-click **OSA Advanced Facilities**.
4. Select the radio button for the Channel ID card you want to export, then click **OK** (Figure 4-27 on page 159).

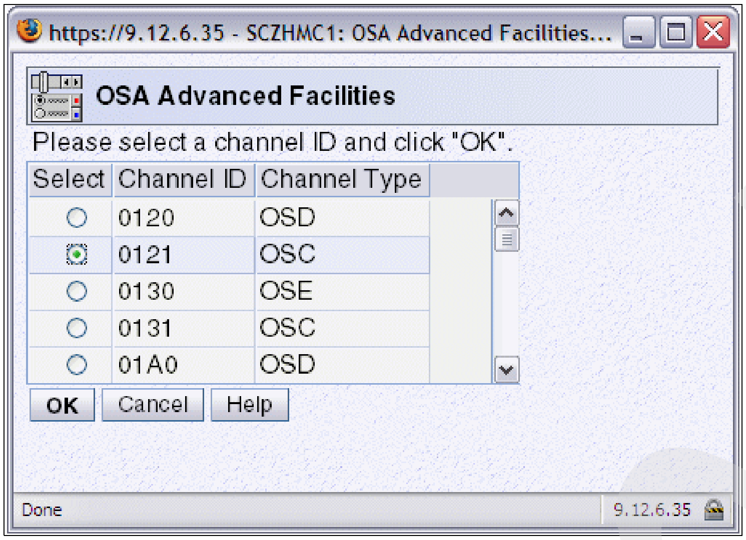



*Figure 4-27 HMC - OSA Advanced Facilities (OSC Channel)*

5. Select the radio button **Card specific advanced facilities**..., then click **OK** (Figure 4-28).

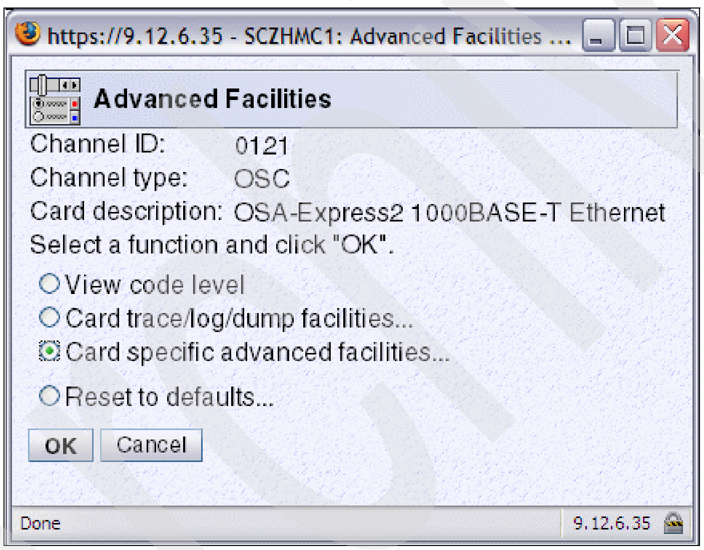



*Figure 4-28 HMC - OSA Advanced Facilities (Card specific)*

6. Select the radio button **Manual configuration options**..., then click **OK** (Figure 4-29 on page 160).

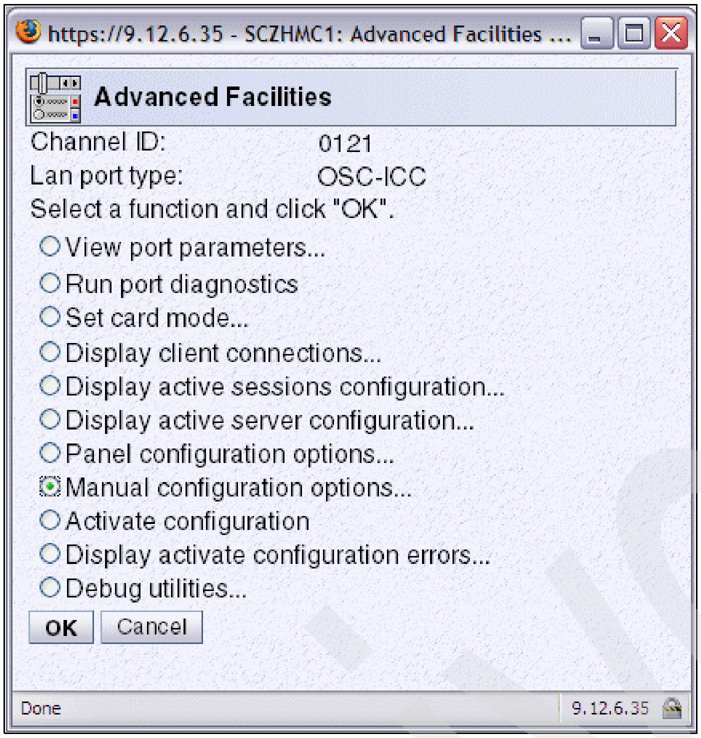



*Figure 4-29 HMC - OSA Advanced Facilities (Manual config)*

7. Select the radio button **Export source file**, then click **OK** (Figure 4-30).

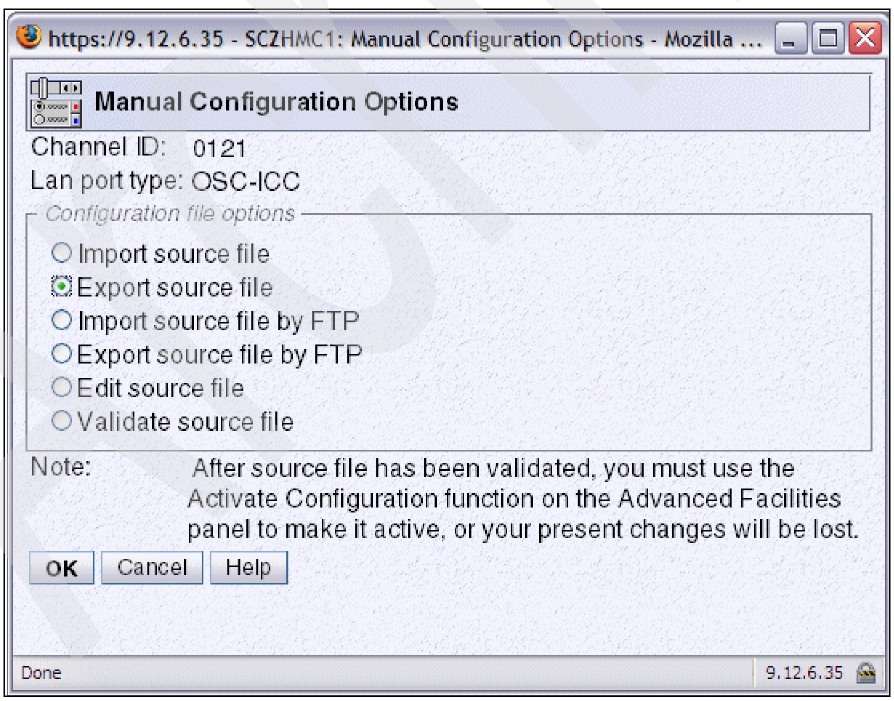



*Figure 4-30 HMC - OSA Advanced Facilities (Export source)*

8. The HMC prompts you to enter a file name to be written onto the diskette (in the example shown in Figure 4-31 on page 161, we used `OSC-ICC_0121`). Type in the file name, then click **OK**.


*Figure 4-31 HMC - OSA Advanced Facilities (Export file name)*

9. The HMC prompts you to insert a diskette into the drive on the HMC that you are logged on to (Figure 4-32). Insert the diskette, then click **OK**.

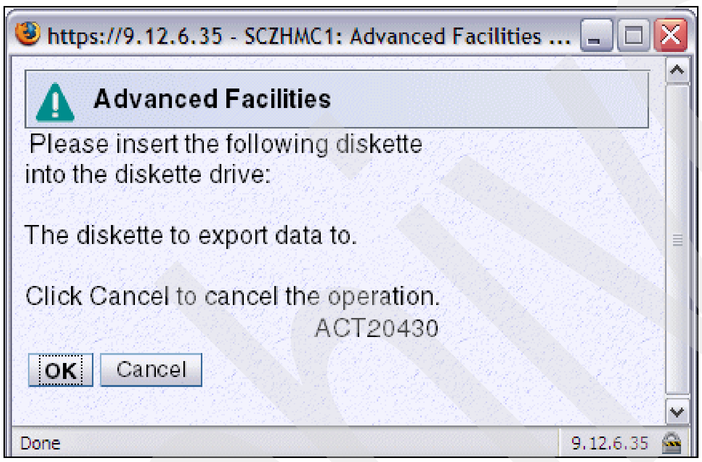



*Figure 4-32 HMC - OSA Advanced Facilities (Export insert diskette)*

10. The HMC writes the configuration data for the Channel ID that was selected onto the diskette and displays a "command completed" panel when it has finished; see Figure 4-33. Click **OK**.

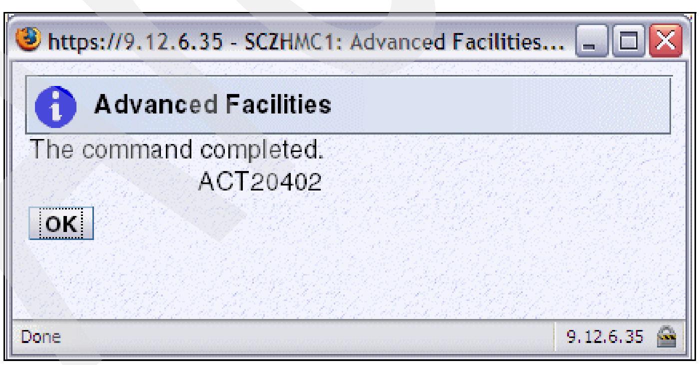



*Figure 4-33 HMC - OSA Advanced Facilities (Export completed)*

11. Remove the diskette from the drive, then click **OK** (Figure 4-34 on page 162).

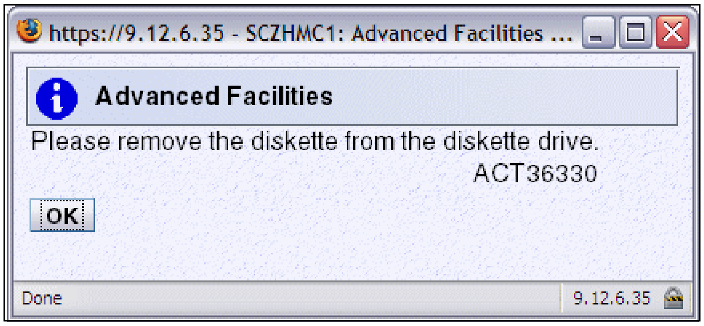



*Figure 4-34 HMC - OSA Advanced Facilities (Remove diskette)*

12. Click **Cancel** to exit all the panels and return to the Defined CPCs Work Area. Figure 4-35 illustrates a sample of the configuration data in the diskette file.

```
<OSC_SERVER>
  HOST_IP= 9.12.4.165
  DEFAULT_GATEWAY= 9.12.4.1
  SUBNET_MASK= 255.255.252.0
  PORT= 3270
  ETHERNET_FRAME= DIX
  MTU= 576
  NAME= OSAF080
</OSC_SERVER>


<CONFIG_SESSION>
<SESSION1>
  CSS= 00 IID= 07 DEVICE= F080
  GROUP=  "SCZCF080"
  CONSOLE_TYPE= 1    RESPONSE= OFF    READ_TIMEOUT= 60
</SESSION1>

<SESSION2>
  CSS= 01 IID= 07 DEVICE= F081
  GROUP=  "SCZCF081"
  CONSOLE_TYPE= 1    RESPONSE= OFF    READ_TIMEOUT= 60
</SESSION2>
.....................................
.....................................
<SESSION71>
  CSS= 00 IID= 01 DEVICE= F0BA
  GROUP=  "WTSC74"
  CONSOLE_TYPE= 1    RESPONSE= OFF    READ_TIMEOUT= 0
</SESSION71>

</CONFIG_SESSION>
```

*Figure 4-35 OSC configuration sample (OSC-0121)*

## Export the configuration data for OSA-ICC using HMC Ver 2.10.0

To export the configuration data, perform these steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2094, as opposed to a remote Web browser, and select the CPC that contains the OSC CHPIDs that you want to export the configuration data for (for example, SCZP101).

**Note:** A HMC upgraded from Ver 2.9.2 to Ver 2.10.0 may contain a usable floppy disk drive. A new HMC installed along with a System z10 EC as Ver 2.10.0 will not contain a floppy disk drive.

2. Under Systems Management, click **Servers** to expand the list.
   a. On the pad to the right you will see listed all servers defined to this HMC. Click the radio button for the server you wish to access (in this example SCZP101).
   b. Click the small pop-up menu arrow just after the CPC name and use this to expand to and select the **OSA Advanced Facilities** menu (Figure 4-36).

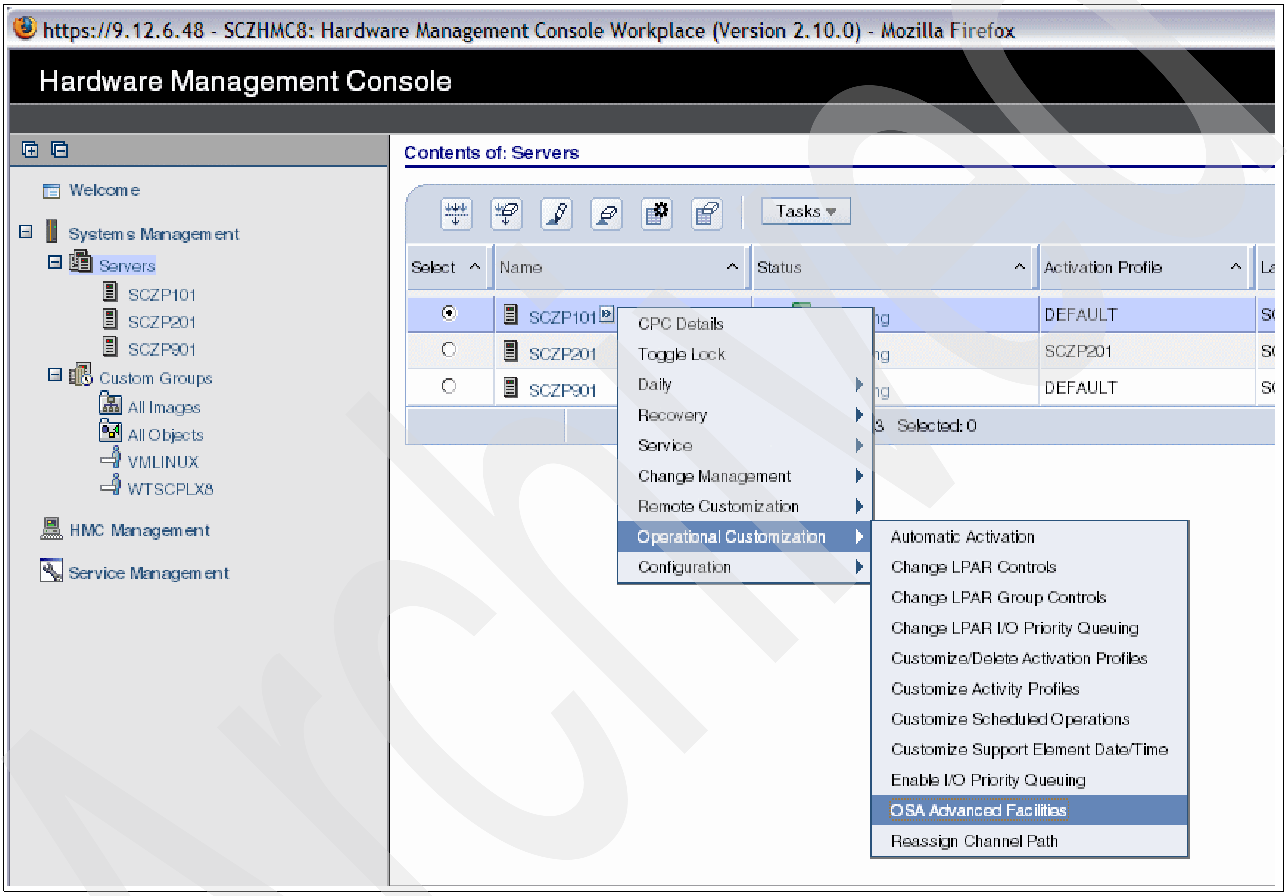



*Figure 4-36 HMC - OSA Advanced Facilities (Popup Menu)*

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 SCZP101).
   c. On the Tasks pad, click **Operational Customization** to expand it, and select **OSA Advanced Facilities** (Figure 4-37 on page 164).

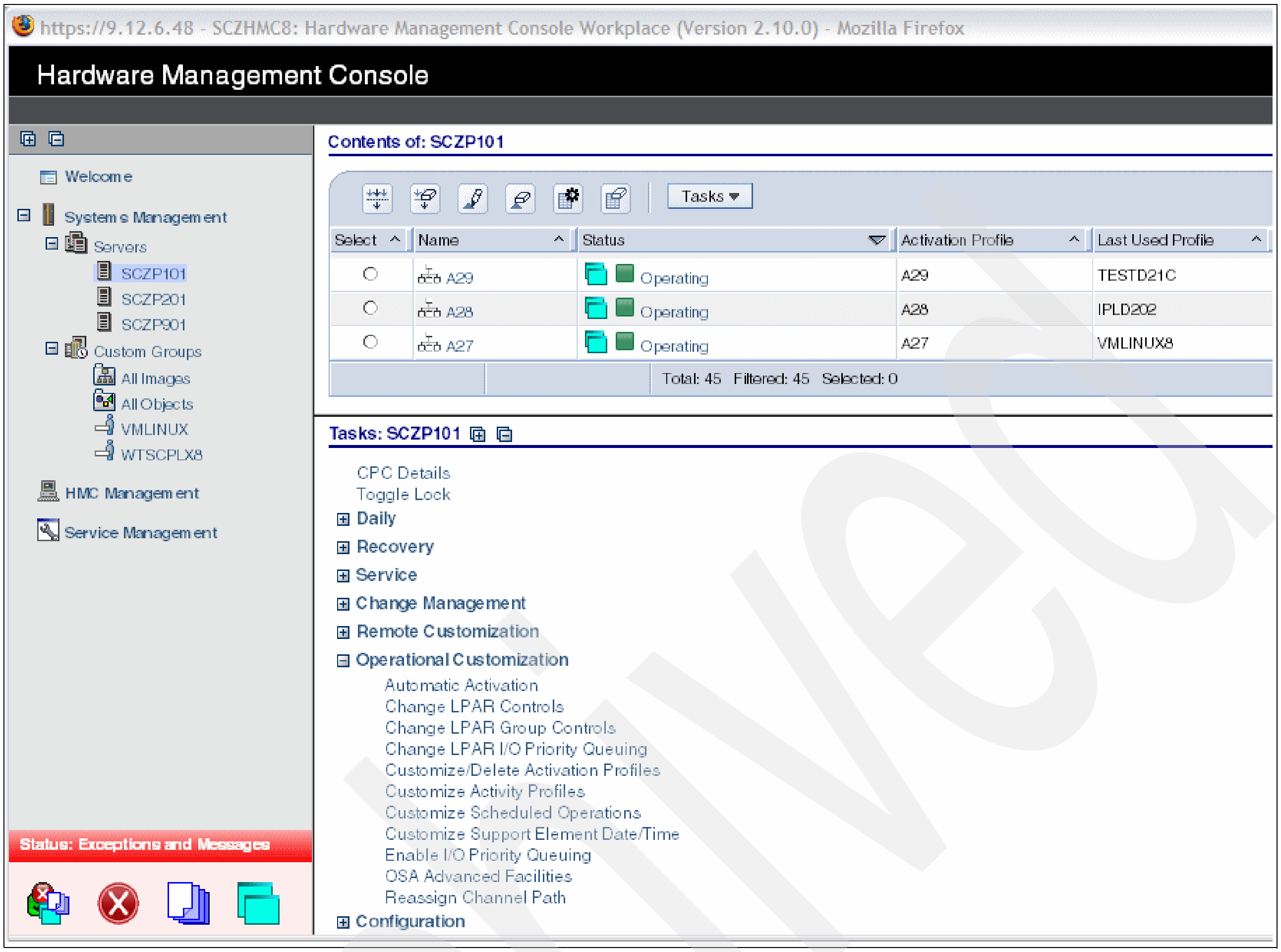



*Figure 4-37 HMC - OSA Advanced Facilities (Task Menu)*

4. Click the radio button for the Channel ID card that you want to export, then click **OK** (Figure 4-38).

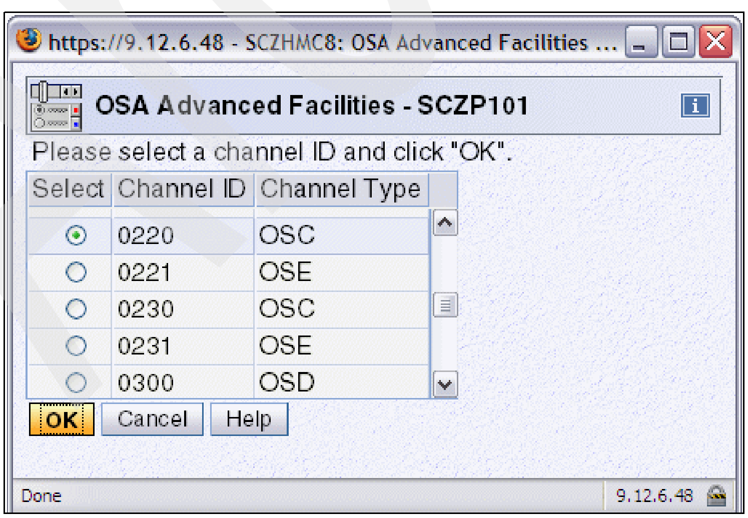



*Figure 4-38 HMC - OSA Advanced Facilities (OSC Channel)*

5. Select the radio button **Card specific advanced facilities...** and click **OK** (Figure 4-39).

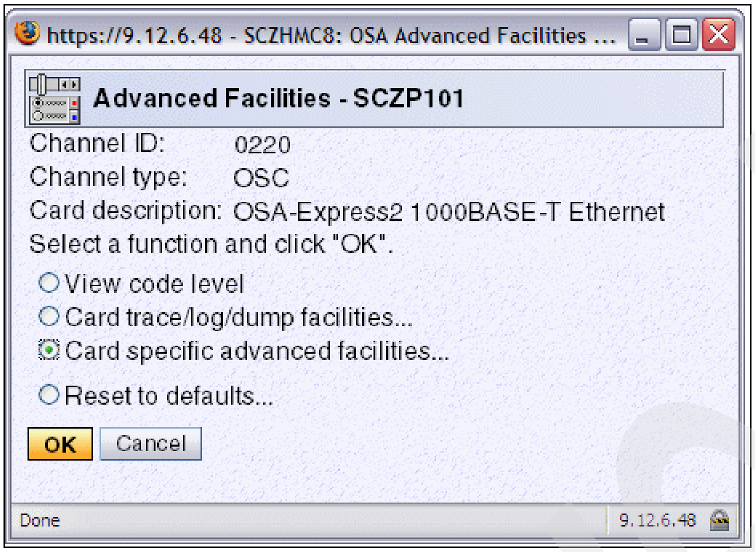



*Figure 4-39 HMC - OSA Advanced Facilities (Card specific)*

6. Select the radio button **Manual configuration options...**, and click **OK** (Figure 4-40).

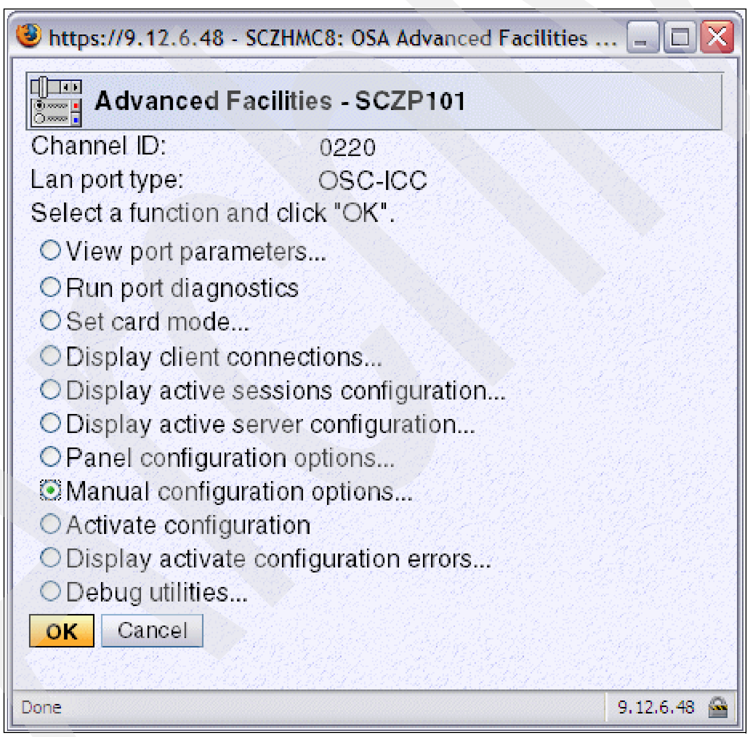



*Figure 4-40 HMC - OSA Advanced Facilities (Manual config)*

7. Select the radio button **Export source file** and click **OK** (Figure 4-41).

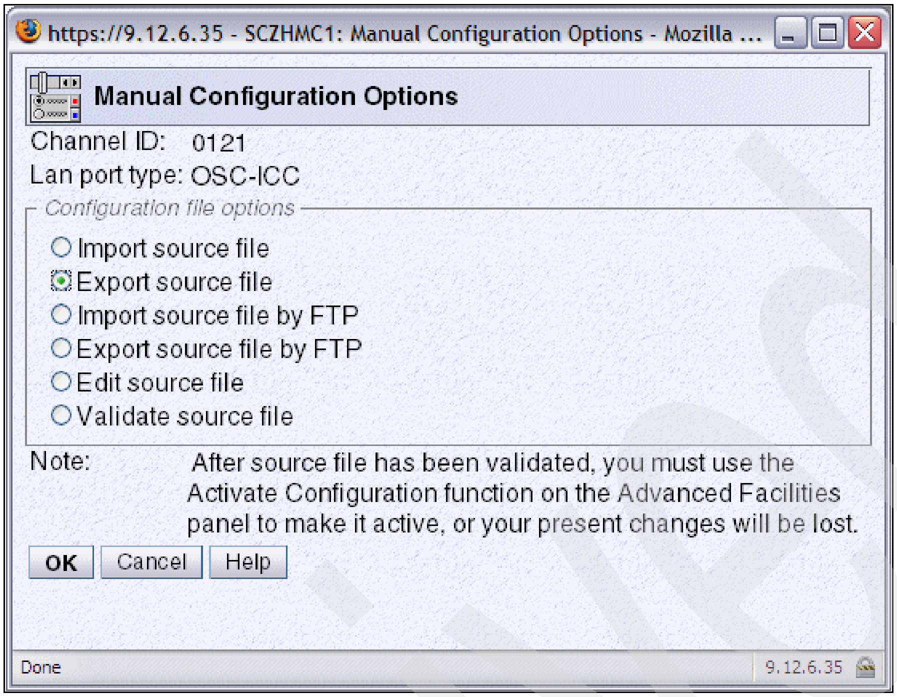



*Figure 4-41 HMC - OSA Advanced Facilities (Export source)*

8. The task requests a file name to be written onto the installed Media device. In our example we entered `OSC-ICC_0220` (Figure 4-42). Click **OK**.

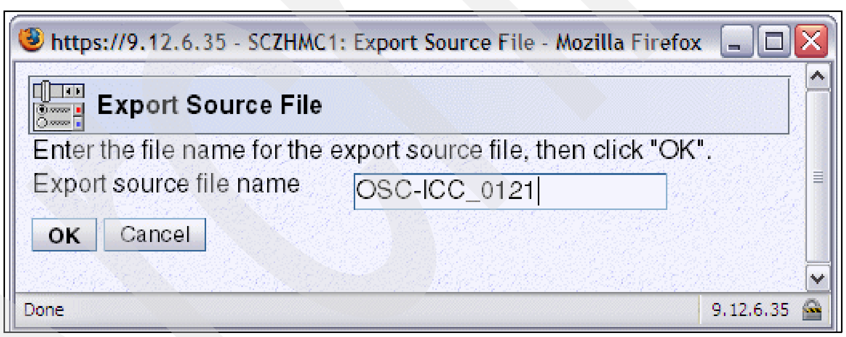



*Figure 4-42 HMC - OSA Advanced Facilities (Export filename)*

9. The HMC displays panel ACT20430 with the following prompts:
   – Please insert the following removable media:
   – The removable media to export data to:
   – Click Cancel to cancel operation.

> **Note:** A suitable USB Flash Memory Drive must be inserted into the USB port prior to the next step so that it can be detected and be provided as an option for selection.

10. HMC detects the installed media.

11. HMC displays the Select Media Device - SCZP101 panel.

This task supports the following devices:

– USB Flash Memory Drive, Diskette
– Radio Button - USB Flash Memory Drive
– Radio Button - Diskette Drive

12. Click the radio button for **USB Flash Memory Drive**, then click **OK**.

13. The HMC task writes the configuration data for the Channel ID that was selected onto the media device and displays a message panel when it has completed (Figure 4-43). Click **OK**.

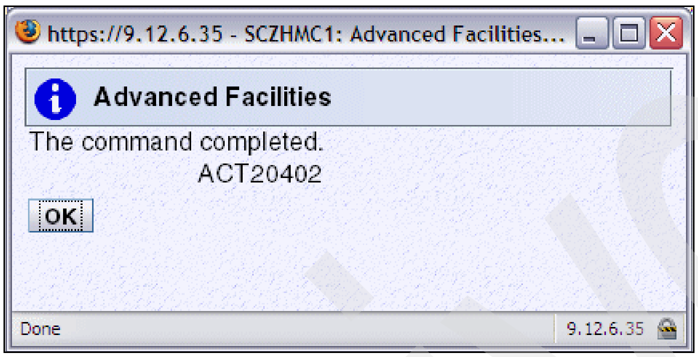



*Figure 4-43 HMC - OSA Advanced Facilities (Export completed)*

14. You can remove the USB Flash Memory Drive at any time; click **OK**. Click **Cancel** to exit all OSA Advanced Facilities panels.

Figure 4-44 shows a sample of the configuration data downloaded on the flash drive.

```
<OSC_SERVER>
  HOST_IP= 9.12.4.165
  DEFAULT_GATEWAY= 9.12.4.1
  SUBNET_MASK= 255.255.252.0
  PORT= 3270
  ETHERNET_FRAME= DIX
  MTU= 576
  NAME= OSAF080
</OSC_SERVER>


<CONFIG_SESSION>
<SESSION1>
  CSS= 00 IID= 07 DEVICE= F080
  GROUP=  "SCZCF080"
  CONSOLE_TYPE= 1    RESPONSE= OFF    READ_TIMEOUT= 60
</SESSION1>

<SESSION2>
  CSS= 01 IID= 07 DEVICE= F081
  GROUP=  "SCZCF081"
  CONSOLE_TYPE= 1    RESPONSE= OFF    READ_TIMEOUT= 60
</SESSION2>
......................................
......................................
<SESSION71>
  CSS= 00 IID= 01 DEVICE= F0BA
  GROUP=  "WTSC74"
  CONSOLE_TYPE= 1    RESPONSE= OFF    READ_TIMEOUT= 0
</SESSION71>

</CONFIG_SESSION>
```

*Figure 4-44 OSC configuration sample (OSC-0121)*

## 4.4 Validate the 2097 work IODF

In this section we explain the steps needed to validate the 2097 work IODF.

### Validate the work IODF

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. Select HCD option **6.4, View I/O Definition File Information** and notice that the IODF type is now `Work - Validated`; see Figure 4-45.

```
---------------- View I/O Definition File Information ------------


 IODF name  . . . . . . . : 'SYS6.IODF49.WORK'
 IODF type  . . . . . . . : Work - Validated
 IODF version . . . . . . : 5

 Creation date  . . . . . : 2007-12-03
 Last update  . . . . . . : 2007-12-03  15:43

 Volume serial number . . : BH8ST2
 Allocated space  . . . . : 2000    (Number of 4K blocks)
 Used space . . . . . . . : 1582    (Number of 4K blocks)
    thereof utilized (%)  90

 Activity logging . . . . : No
 Backup IODF name . . . . :

 Description  . . . . . . :
```

*Figure 4-45 HCD - View I/O Definition File Information (Validated work IODF)*

## 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 PC. You can then launch the CHPID Mapping Tool, create an updated IOCP statements file, and transfer the file back to the host.

1. Select HCD option **2.3, Build IOCP input data set**, then press Enter (Figure 4-46).

```
 ---- 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 statements
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

*Figure 4-46 HCD - Activate or Process Configuration Data (Build IOCP for SCZP102)*

2. HCD displays the list of available processors to chose from. Select processor SCZP202 by typing a forward slash (/), then press Enter (Figure 4-47 on page 170).

```
----------------------- Available Processors ---------------------------
                                                              Row 1 of 8
Command ===> __________________________________________________________

Select one.

  Processor ID  Type     Model    Mode  Description
  ISGSYN        2064     1C7      LPAR
  ISGS11        2064     1C7      LPAR
  P000STP1      2084     C24      LPAR
  P000STP2      2094     S08      LPAR
/ SCZP202       2097     E26      LPAR
  SCZP801       2064     1C7      LPAR
  SCZP901       2084     C24      LPAR
*************************** Bottom of data ****************************
```

*Figure 4-47 HCD - 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; see Figure 4-48 on page 170. Fill in the following fields:
   - `Title1.`
   - `IOCP input data set.`
   - Type `Yes` in the field Input to Stand-alone IOCP.
   - Fill in 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.IODF49.WORK'
Processor ID  . . . . . . . : SCZP202
Title1 . IODF49_________________________________________________________
Title2 : SYS6.IODF49.WORK - 2007-12-03 15:43

IOCP input data set
'SYS6.IODF49.IOCPIN.SCZP202'_____________________
Input to Stand-alone IOCP?  Yes  (Yes or No)

Job statement information
//WIOCDS  JOB (ACCOUNT),'NAME'
//*
//*
```

*Figure 4-48 HCD - Build IOCP Input Data Set*

5. In TSO, verify that the data set you just created exists and that it contains IOCP statements (Figure 4-49 on page 171).

   This data set is used as input into the CHPID Mapping Tool.

```
ID    MSG1='IODF49',                                                  *
      MSG2='SYS6.IODF49.WORK - 2007-12-03 15:43',                     *
      SYSTEM=(2097,1),                                                *
      TOK=('SCZP202',00800001991E2094154302750107337F00000000,*
      00000000,'07-12-03','15:43:02','........','........')
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),(*,1),(*,2),(*,3),(*,4),(*,5),(*,6),(*,*
      7),(*,8),(*,9),(*,A),(*,B),(*,C),(*,D),(*,E),(*,F)))
CHPID PATH=(CSS(0,1,2),00),SHARED,                                    *
      NOTPART=((CSS(0),(A0B,A0C,A0D,A0E,A0F),(=)),(CSS(1),(A1B*
      ,A1C,A1D,A1E,A1F),(=)),(CSS(2),(A2B,A2C,A2D,A2E,A2F),(=)*
      )),PCHID=1B0,TYPE=OSD
CHPID PATH=(CSS(0,1,2),01),SHARED,                                    *
      NOTPART=((CSS(0),(A0B,A0C,A0D,A0E,A0F),(=)),(CSS(1),(A1B*
      ,A1C,A1D,A1E,A1F),(=)),(CSS(2),(A2B,A2C,A2D,A2E,A2F),(=)*
      )),PCHID=1A0,TYPE=OSD
```

*Figure 4-49 HCD - IOCP input data set contents (truncated)*

Also note that part of the TOK statement has been blanked out with dots (Example 4-1).

*Example 4-1 HCD - IOCP file (TOK statement)*

```
 TOK=('SCZP202',00800001991E2094154302750107337F00000000,*
00000000,'07-12-03','15:43:02','........','........')
```

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 TSO 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 SCZP202in.iocp.

## 4.5 CMT - Assign CHPIDs to PCHIDs

In the following steps we take the output from the previous set of HCD steps (IOCP), and the output from the 2097 order process (CFReport). Using the CHPID Mapping Tool, we assign PCHIDs to each of the CHPIDs for the 2097.

For this process, the CHPID Mapping Tool (CMT) must be downloaded. Refer to "CHPID Mapping Tool" on page 24 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, follow these steps:

1. Import the IOCP statements file and the CFReport file into the CHPID Mapping Tool. Getting the IOCP statements can 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 file transfer back to the host z/OS image. This step may be performed with HCM.

**Note:** When upgrading from a 2094 to a 2097, it is mandatory to use the CHPID Mapping Tool level that supports the 2097. The internal availability characteristics of the 2097 are different from those of the previous System z processors.

### Import the CFReport file into the CHPID Mapping Tool

1. Start the CHPID Mapping Tool on your workstation.
2. Import the CFReport file into the CHPID Mapping Tool.
3. Click **File** → **Import CFReport file** (Figure 4-50).

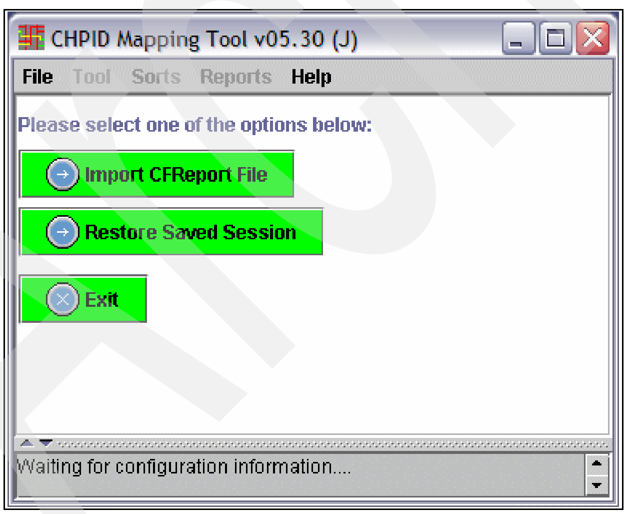



*Figure 4-50 CMT - Import CFReport Order file*

4. Select the CFReport file on your workstation to import into the CHPID Mapping Tool and click **Open** (Figure 4-51).

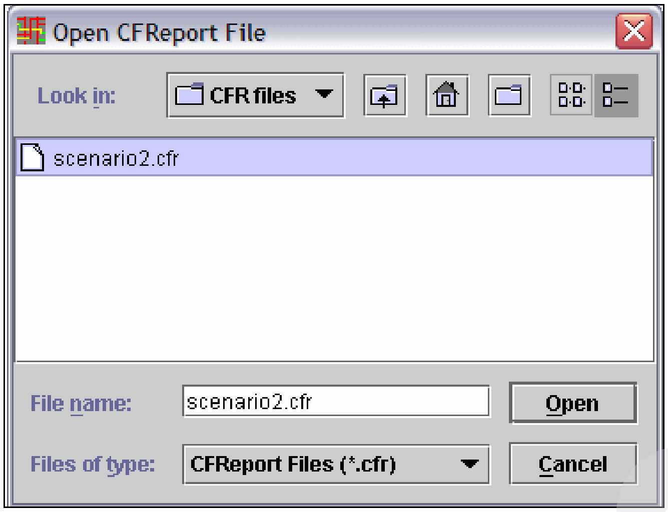



*Figure 4-51 CMT - Open CFReport Order file*

5. The CHPID Mapping Tool displays the information from the CFReport on the left-hand side of the screen (Figure 4-52).

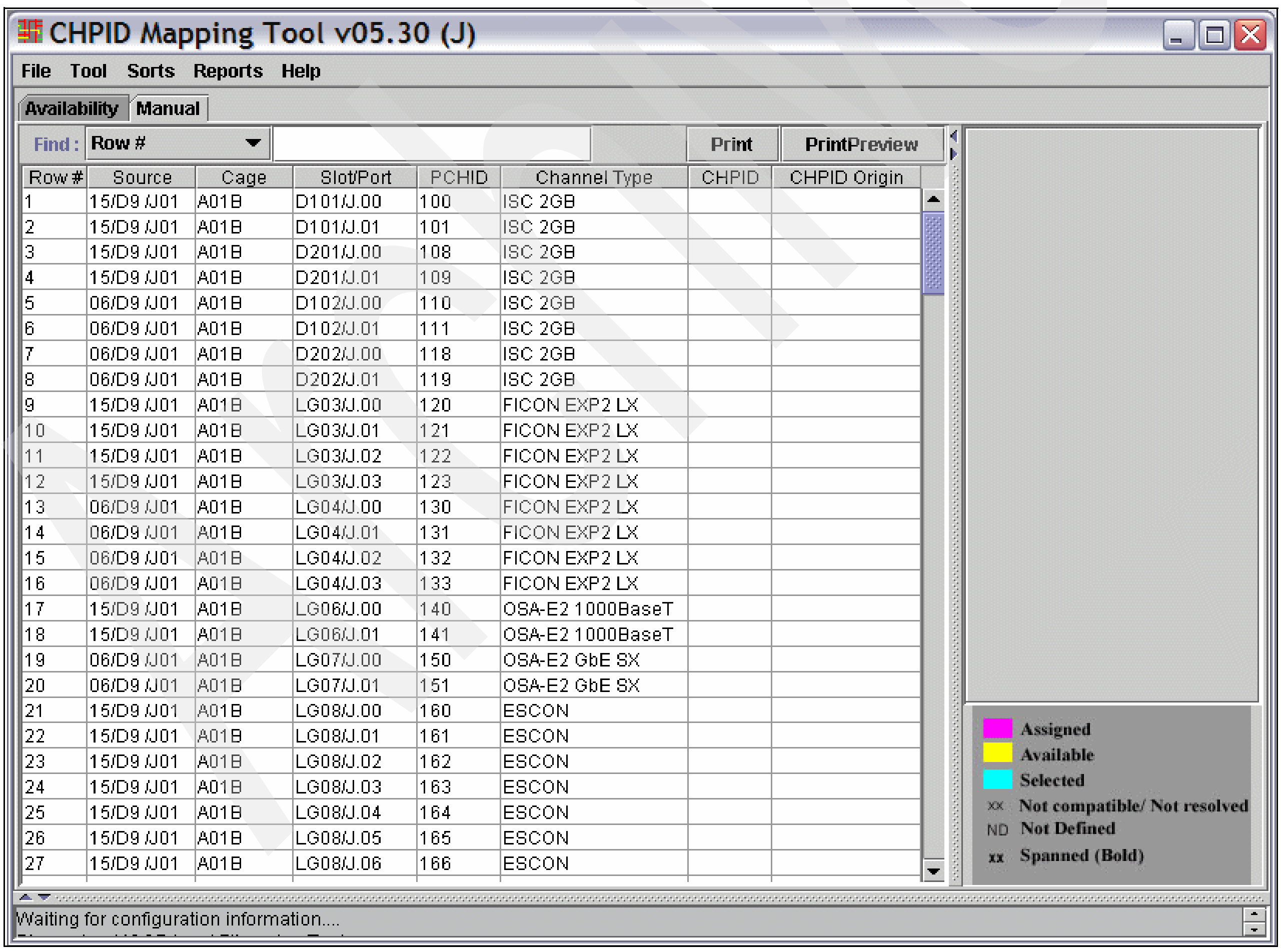



*Figure 4-52 CMT - Importing CFReport Order file*

## Import 2094 IOCP file into CHPID Mapping Tool

1. Import the IOCP file by clicking **Tool** → **Import IOCP File** (Figure 4-53).

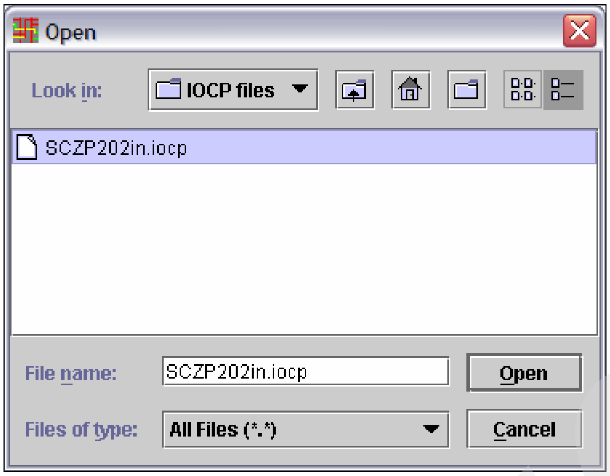



*Figure 4-53 CMT - Import IOCP files*

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 issued the following:

   – **Matching CHPID** - This window lists all CHPIDs that are assigned with PCHIDs that have been moved during MES upgrade. This 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** - 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 unchecked.

   – **Reset CHPIDs assigned by the CHPID Mapping Tool 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 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 unchecked.

– **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.

The CFReport indicates that you are doing a MES/upgrade and you have channels 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 CHPID Mapping Tool has either assigned PCHIDs to the 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.

In order 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.

## CHPIDs that may have configuration files associated

Figure 4-54 shows CMT listing PCHIDs that could potentially have configuration files associated with them. Click **OK**.

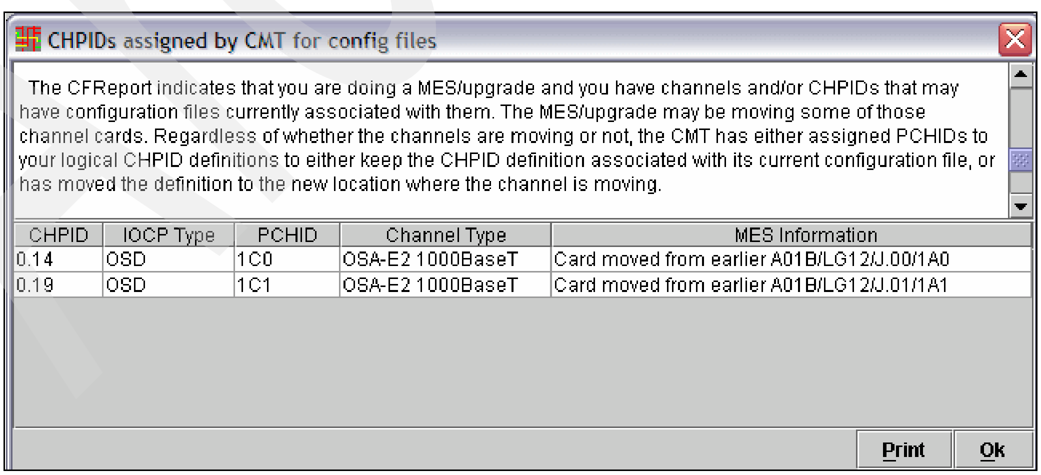
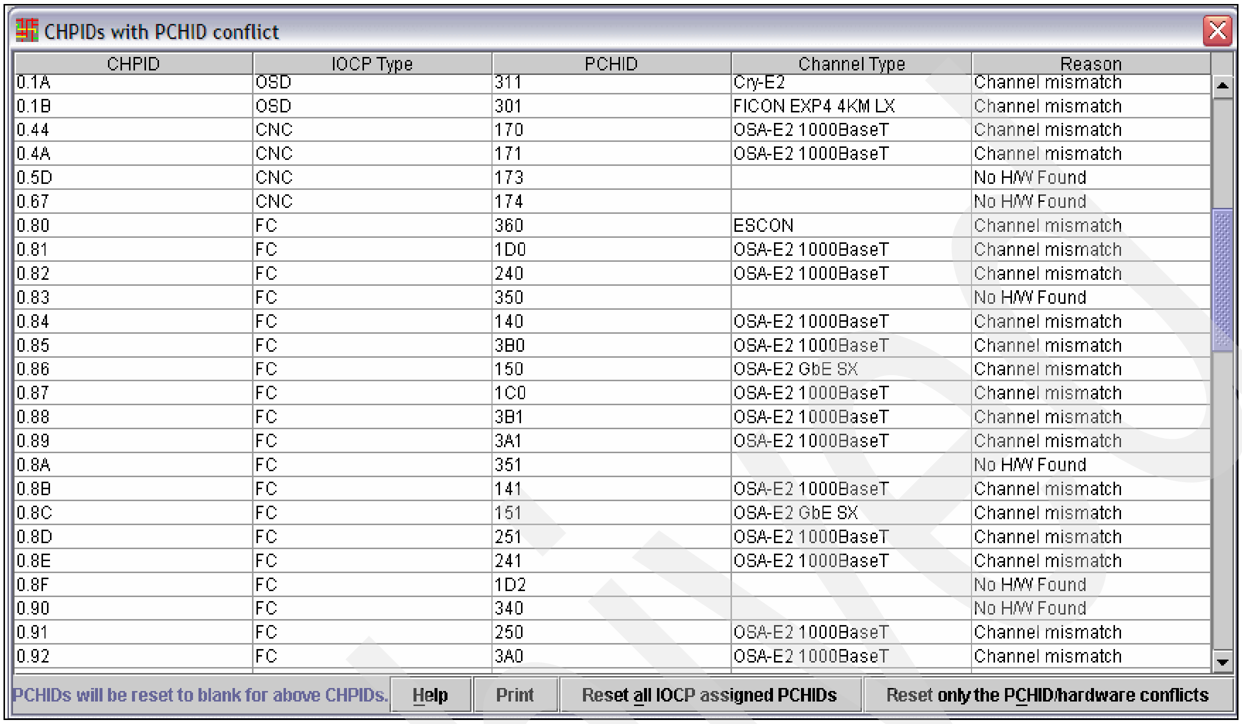



*Figure 4-54 CMT - CHPIDs assigned by CMT*

## CHPIDs with PCHID conflicts

Now the CMT displays CHPIDs with PCHID conflicts. In our example, we selected **Reset only the PCHID/hardware conflicts**.



CHPIDs with PCHID conflict

| CHPID | IOCP Type | PCHID | Channel Type | Reason |
|---|---|---|---|---|
| 0.1A | OSD | 311 | Cry-E2 | Channel mismatch |
| 0.1B | OSD | 301 | FICON EXP4 4KM LX | Channel mismatch |
| 0.44 | CNC | 170 | OSA-E2 1000BaseT | Channel mismatch |
| 0.4A | CNC | 171 | OSA-E2 1000BaseT | Channel mismatch |
| 0.5D | CNC | 173 | | No H/W Found |
| 0.67 | CNC | 174 | | No H/W Found |
| 0.80 | FC | 360 | ESCON | Channel mismatch |
| 0.81 | FC | 1D0 | OSA-E2 1000BaseT | Channel mismatch |
| 0.82 | FC | 240 | OSA-E2 1000BaseT | Channel mismatch |
| 0.83 | FC | 350 | | No H/W Found |
| 0.84 | FC | 140 | OSA-E2 1000BaseT | Channel mismatch |
| 0.85 | FC | 3B0 | OSA-E2 1000BaseT | Channel mismatch |
| 0.86 | FC | 150 | OSA-E2 GbE SX | Channel mismatch |
| 0.87 | FC | 1C0 | OSA-E2 1000BaseT | Channel mismatch |
| 0.88 | FC | 3B1 | OSA-E2 1000BaseT | Channel mismatch |
| 0.89 | FC | 3A1 | OSA-E2 1000BaseT | Channel mismatch |
| 0.8A | FC | 351 | | No H/W Found |
| 0.8B | FC | 141 | OSA-E2 1000BaseT | Channel mismatch |
| 0.8C | FC | 151 | OSA-E2 GbE SX | Channel mismatch |
| 0.8D | FC | 251 | OSA-E2 1000BaseT | Channel mismatch |
| 0.8E | FC | 241 | OSA-E2 1000BaseT | Channel mismatch |
| 0.8F | FC | 1D2 | | No H/W Found |
| 0.90 | FC | 340 | | No H/W Found |
| 0.91 | FC | 250 | OSA-E2 1000BaseT | Channel mismatch |
| 0.92 | FC | 3A0 | OSA-E2 1000BaseT | Channel mismatch |

PCHIDs will be reset to blank for above CHPIDs. Help | Print | Reset all IOCP assigned PCHIDs | Reset only the PCHID/hardware conflicts

*Figure 4-55 CMT - CHPIDs with PCHID conflicts*

## Resolve 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 4-56). Click **OK.**

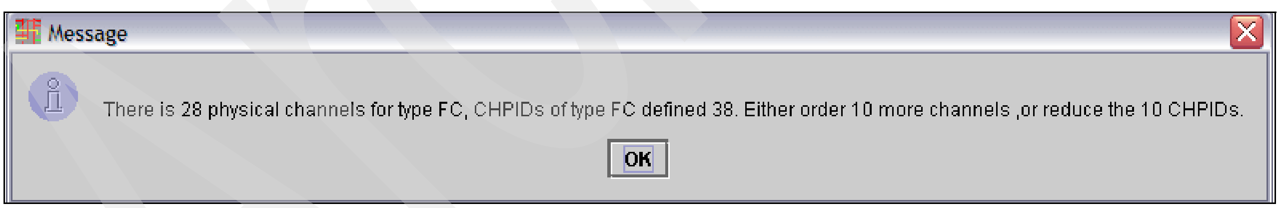



*Figure 4-56 CMT - Required Hardware unavailable*

The following message is issued:

```
CHPIDs with invalid/incompatible hardware found.
```

We left excessive numbers of CHPID types “FC” in our IODF to show how the CHPID Mapping Tool would handle this condition and to give an opportunity to explain how you can resolve this situation. Refer to “Over-define channel paths on an XMP processor” on page 147.

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 FC CHPID definitions in the IODF and expect to have FC CHPIDs installed in the processor at a later date.

**Note:** Other CHPID types may also be *over-defined* by entering an asterisk (*) for the PCHID value, with the exception of CIB type CHPID definitions.

Alternatively, you could remove the FC CHPID definitions from the IODF.

To continue with this example, follow these steps:

1. Go back into the IODF and change the PCHID values for the FC CHPIDs (or any other CHPIDs that have no supporting hardware in the CFReport) and change the value to an asterisk (*).
2. Re-validate the IODF; use HCD option 2.12.
3. Recreate the IOCP statements file and file transfer to your PC.
4. Import the IOCP file; click **Tool** → **Import IOCP File**.

   **Note:** If you look at the IOCP statements file now, notice that the FC 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.

## 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, TYPE=OSE and TYPE=FC channels.

In each case, we must check off what each of the channels is used for. In Figure 4-57 on page 178, the image in the lower right-hand side shows what we had selected for the FC channels.

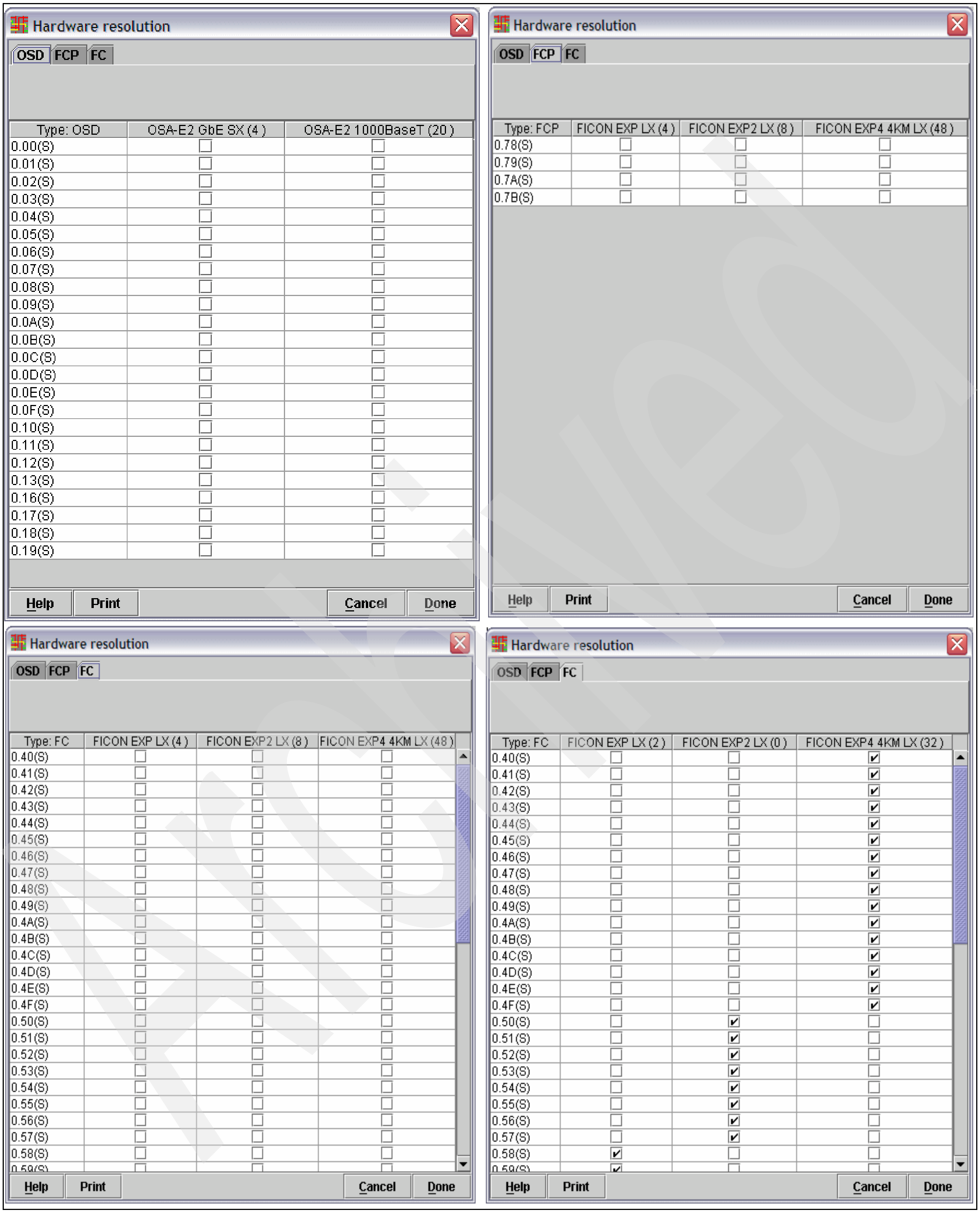



*Figure 4-57 CMT - Hardware resolution after IOCP import*

Select one tab at a time. Click 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.

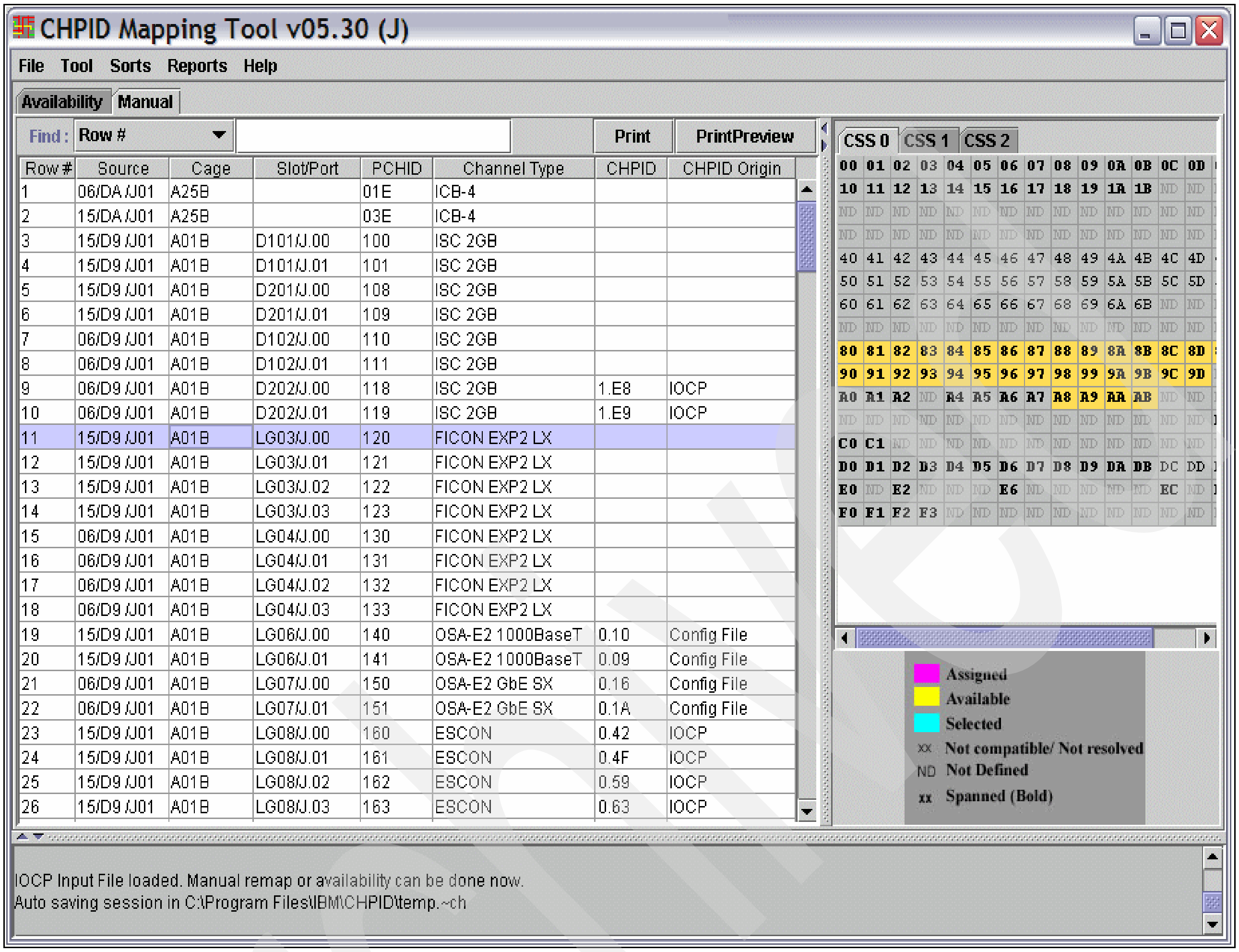



Figure 4-58 CMT - Manual Tab

## Process CU Priority

If you are importing an IOCP statements file from a 2094 that had CU Priority values defined, you may want to review the CU Priority beforehand. The CHPID Mapping Tool can then perform the availability functions appropriately for a 2097. Follow these steps:

1. Under the File menu, click the **Availability** tab.
2. Click **Process CU Priority** and a window pops up.

   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 selected **Reset CHPIDs assigned by Availability** and **Reset CHPIDs assigned by IOCP**; see Figure 4-59 on page 180.

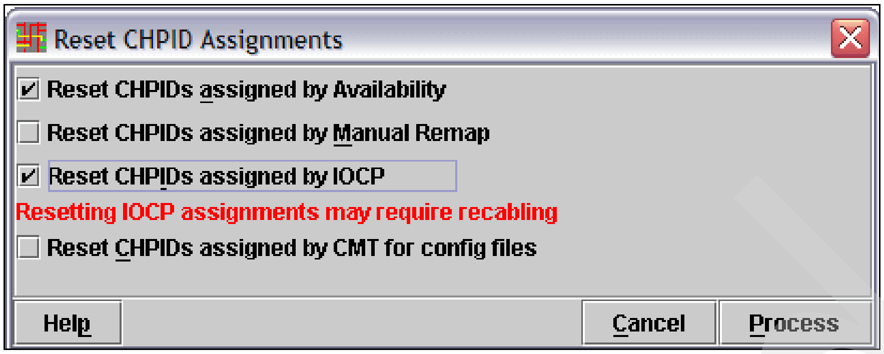



*Figure 4-59 CMT - Reset CHPID Assignments*

The 2097 has different availability rules than the 2094, so all PCHID assignments that were still in the input IOCP needed to be removed.

3. Click **Process**. After the CHPID Mapping Tool has assigned the CHPIDs, it displays a message indicating the results of the process. Click **OK** (Figure 4-60).

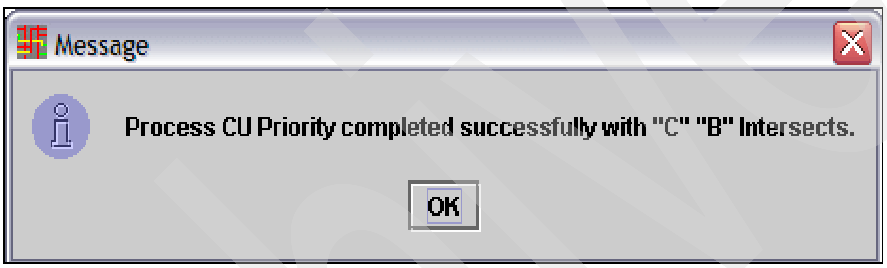



*Figure 4-60 CMT - Process CU Priority completion message*

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.

Our example returned the “C” and “B” intersects.

> **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.

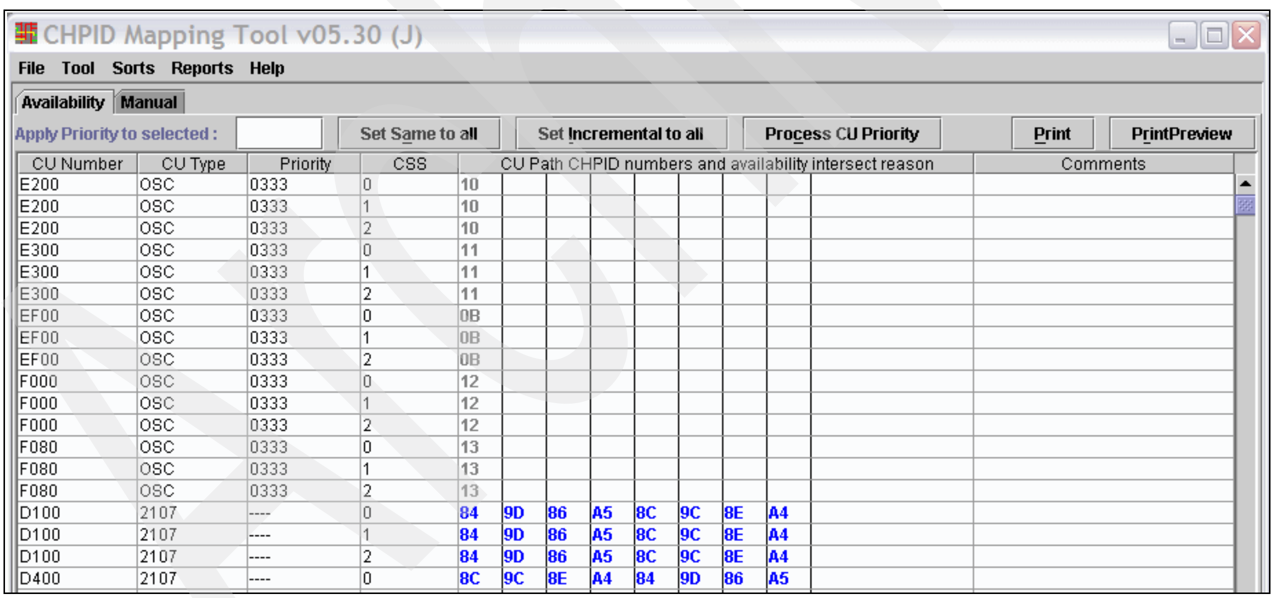
4. Click **OK**. You can now display the results of the channel mapping. You can also sort the report in different ways. For example, to see how the CHPID Mapping Tool ranked the control units, select **Sorts** → **By CU Priority**.

> **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 illustrates how CU Priority values are represented in the IOCP file.

5. You 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.

   Page through the listing and search through the column CU Number for any control units you want to set priority for. In our example, we set the OSC type CU Numbers to priority 333; see Figure 4-61.




| CU Number | CU Type | Priority | CSS | CU Path CHPID numbers and availability intersect reason | | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E200 | OSC | 0333 | 0 | 10 | | | | | | | | | |
| E200 | OSC | 0333 | 1 | 10 | | | | | | | | | |
| E200 | OSC | 0333 | 2 | 10 | | | | | | | | | |
| E300 | OSC | 0333 | 0 | 11 | | | | | | | | | |
| E300 | OSC | 0333 | 1 | 11 | | | | | | | | | |
| E300 | OSC | 0333 | 2 | 11 | | | | | | | | | |
| EF00 | OSC | 0333 | 0 | 0B | | | | | | | | | |
| EF00 | OSC | 0333 | 1 | 0B | | | | | | | | | |
| EF00 | OSC | 0333 | 2 | 0B | | | | | | | | | |
| F000 | OSC | 0333 | 0 | 12 | | | | | | | | | |
| F000 | OSC | 0333 | 1 | 12 | | | | | | | | | |
| F000 | OSC | 0333 | 2 | 12 | | | | | | | | | |
| F080 | OSC | 0333 | 0 | 13 | | | | | | | | | |
| F080 | OSC | 0333 | 1 | 13 | | | | | | | | | |
| F080 | OSC | 0333 | 2 | 13 | | | | | | | | | |
| D100 | 2107 | ---- | 0 | 84 | 9D | 86 | A5 | 8C | 9C | 8E | A4 | | |
| D100 | 2107 | ---- | 1 | 84 | 9D | 86 | A5 | 8C | 9C | 8E | A4 | | |
| D100 | 2107 | ---- | 2 | 84 | 9D | 86 | A5 | 8C | 9C | 8E | A4 | | |
| D400 | 2107 | ---- | 0 | 8C | 9C | 8E | A4 | 84 | 9D | 86 | A5 | | |

*Figure 4-61   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.

6. Under the File menu, click the **Availability** tab again.
7. Click **Process CU Priority** and a window pops up.

   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**.
8. Click **Process**. Then click **Sorts** → **By CU Priority**; notice that the OSC type control units with priority of 333 have sorted to the top of the list.
9. Select the **Manual** tab; Figure 4-62 shows the results of mapping the CHPIDs.

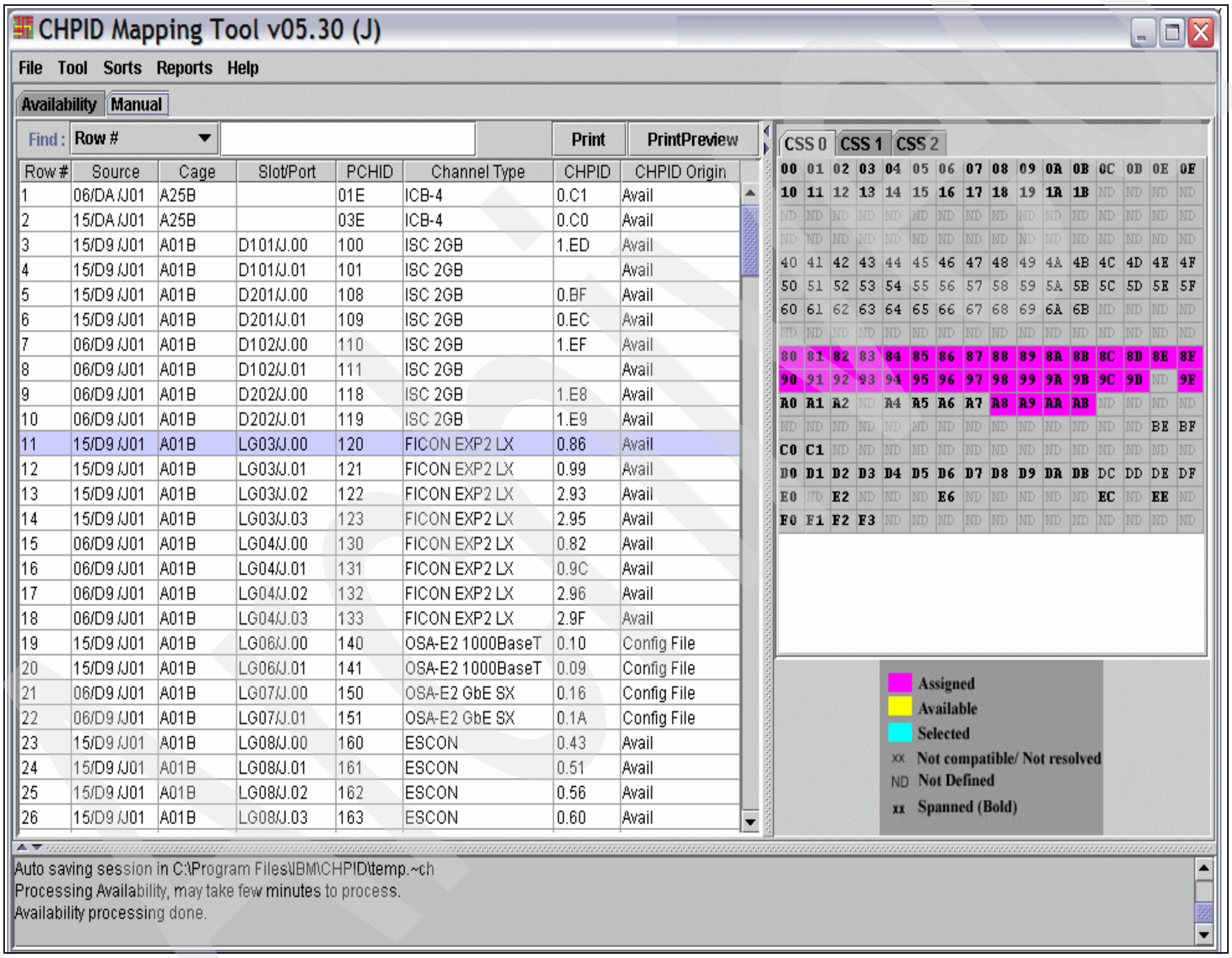



*Figure 4-62 CMT - Manual (CHPIDs assigned)*

Note that the CHPID and CHPID Origin columns are no longer blank because the CHPID Mapping Tool has assigned CHPIDs to PCHIDs and has placed the value `Avail` in the CHPID Origin column, indicating that the CHPID values were assigned based on availability.

## CHPIDs not connected to Control Units

Under the **Availability** tab, click **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 4-63).

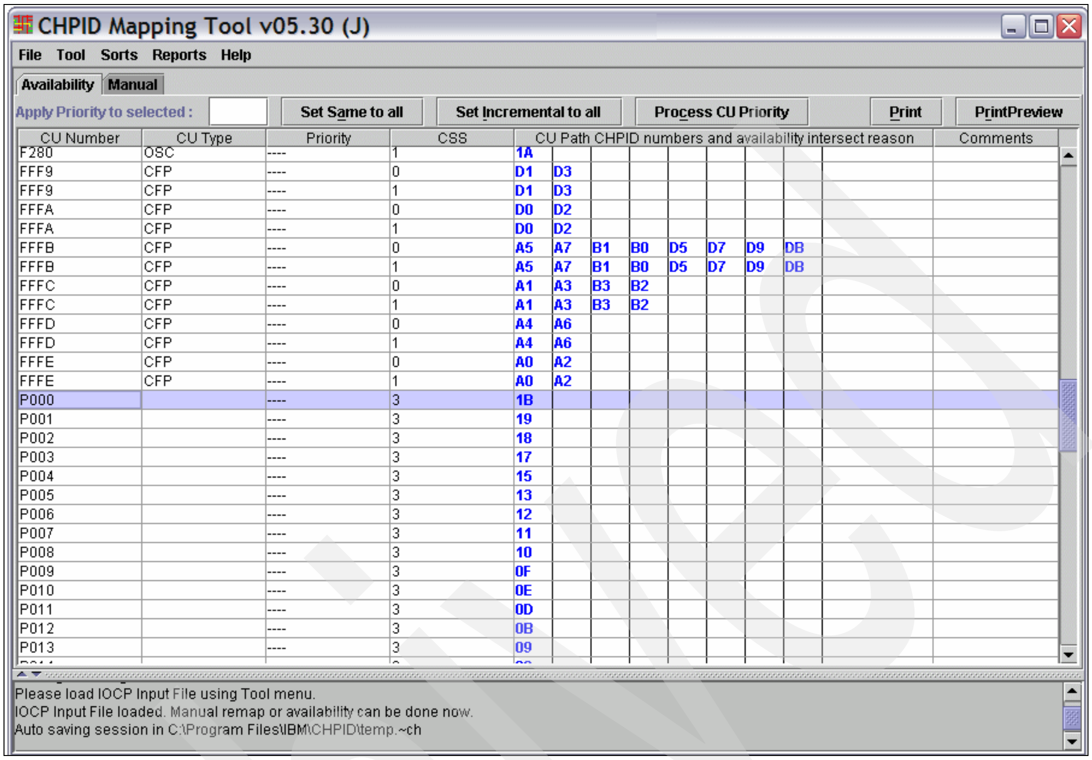



*Figure 4-63 CMT - Sort by Control Unit*

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 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 will allow the availability mapping function to pick PCHIDs that will afford your new control unit good availability.

## Create CHPID Mapping Tool reports

The CHPID Mapping Tool offers built-in reports, which are available from the Reports pull-down menu. You can also print the information on the Availability 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 will install 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 to help with labelling the cables. The labels must include the PCHID or cage/slot/port information before system delivery.

### *CHPID Report*

1. Click **Reports** → **CHPID Report** (Figure 4-64).

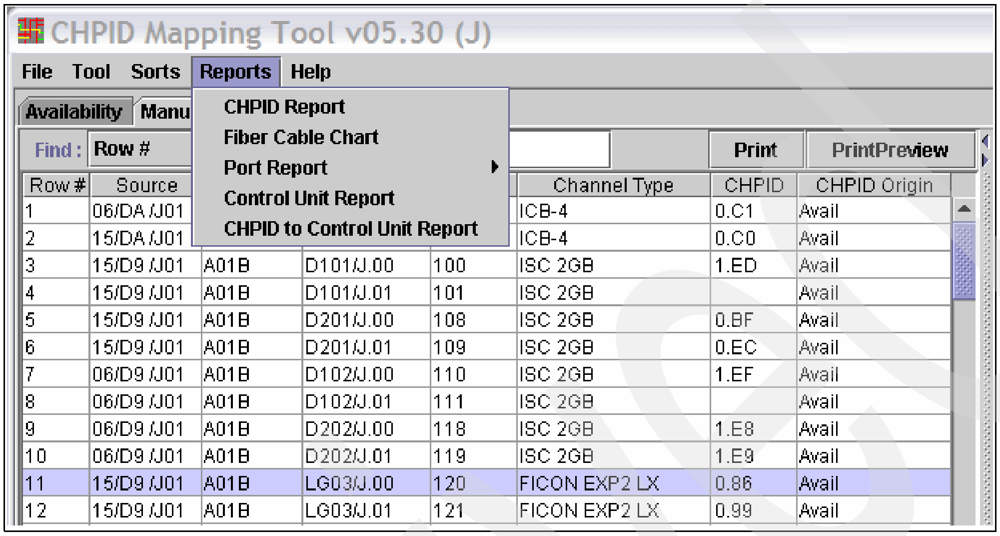



*Figure 4-64 CMT - select CHPID Report*

2. Enter the Report File Name (or accept the default name offered by the CMT) and click **Save** (Figure 4-65).

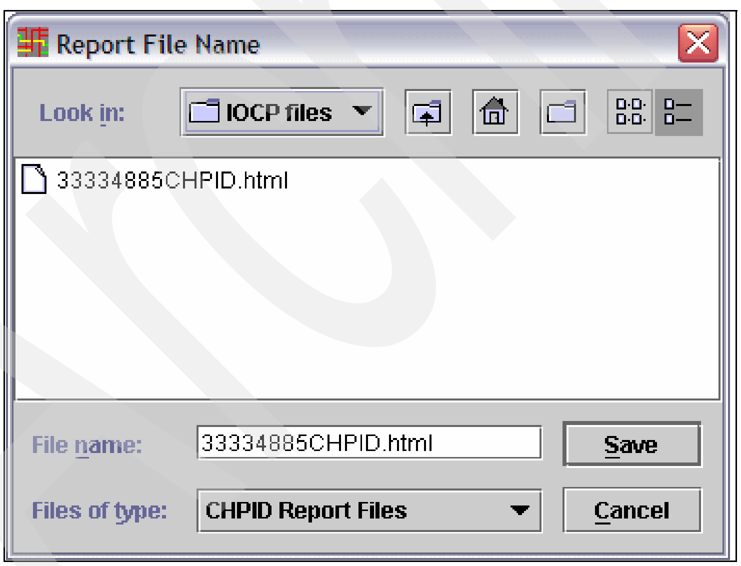
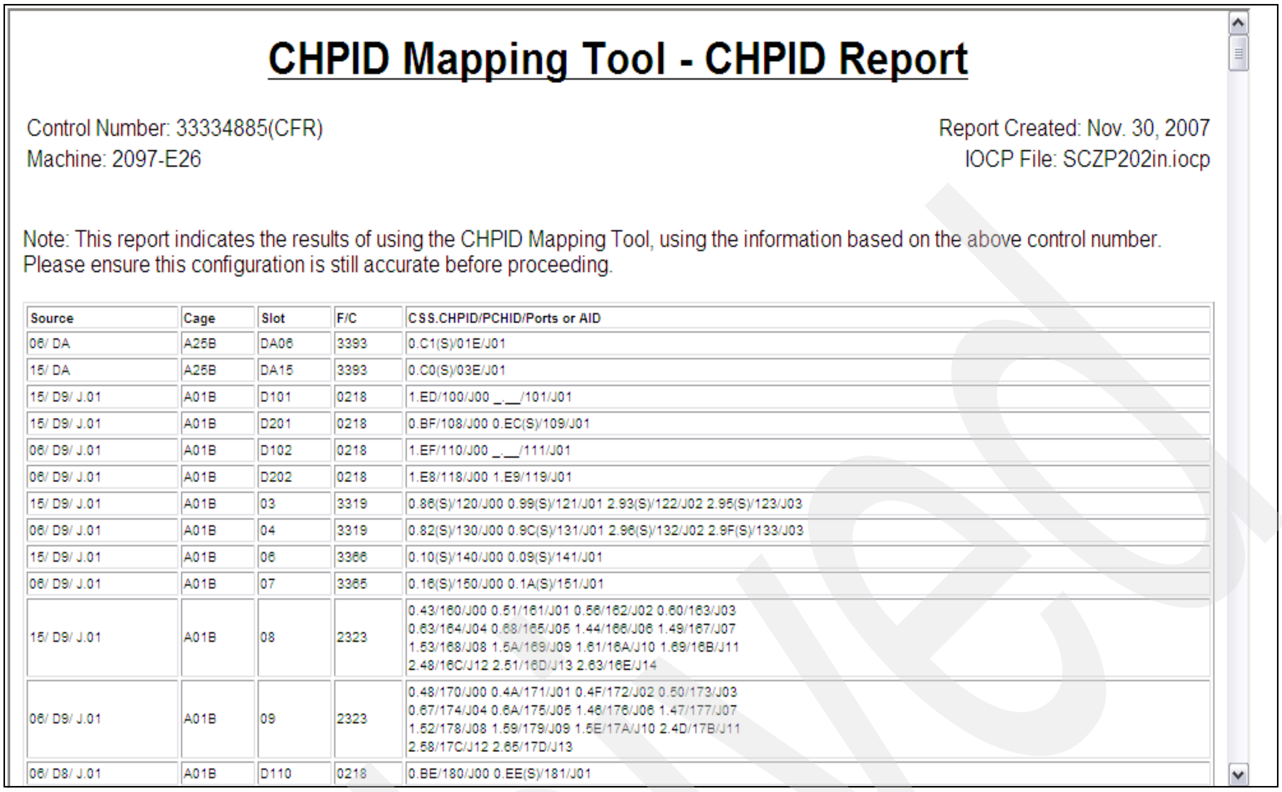



*Figure 4-65 CMT - Report File Name*

3. The CHPID Mapping Tool opens a browser window with the CHPID report; see Figure 4-66 on page 185. 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: 33334885(CFR)
Machine: 2097-E26

Report Created: Nov. 30, 2007
IOCP File: SCZP202in.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/ DA | A25B | DA06 | 3393 | 0.C1(S)/01E/J01 |
| 15/ DA | A25B | DA15 | 3393 | 0.C0(S)/03E/J01 |
| 15/ D9/ J.01 | A01B | D101 | 0218 | 1.ED/100/J00 _.__/101/J01 |
| 15/ D9/ J.01 | A01B | D201 | 0218 | 0.BF/108/J00 0.EC(S)/109/J01 |
| 06/ D9/ J.01 | A01B | D102 | 0218 | 1.EF/110/J00 _.__/111/J01 |
| 06/ D9/ J.01 | A01B | D202 | 0218 | 1.E8/118/J00 1.E9/119/J01 |
| 15/ D9/ J.01 | A01B | 03 | 3319 | 0.86(S)/120/J00 0.99(S)/121/J01 2.93(S)/122/J02 2.95(S)/123/J03 |
| 06/ D9/ J.01 | A01B | 04 | 3319 | 0.82(S)/130/J00 0.9C(S)/131/J01 2.96(S)/132/J02 2.9F(S)/133/J03 |
| 15/ D9/ J.01 | A01B | 06 | 3366 | 0.10(S)/140/J00 0.09(S)/141/J01 |
| 06/ D9/ J.01 | A01B | 07 | 3365 | 0.16(S)/150/J00 0.1A(S)/151/J01 |
| 15/ D9/ J.01 | A01B | 08 | 2323 | 0.43/160/J00 0.51/161/J01 0.56/162/J02 0.60/163/J03<br>0.63/164/J04 0.68/165/J05 1.44/166/J06 1.49/167/J07<br>1.53/168/J08 1.5A/169/J09 1.61/16A/J10 1.69/16B/J11<br>2.48/16C/J12 2.51/16D/J13 2.63/16E/J14 |
| 06/ D9/ J.01 | A01B | 09 | 2323 | 0.48/170/J00 0.4A/171/J01 0.4F/172/J02 0.50/173/J03<br>0.67/174/J04 0.6A/175/J05 1.46/176/J06 1.47/177/J07<br>1.52/178/J08 1.59/179/J09 1.5E/17A/J10 2.4D/17B/J11<br>2.58/17C/J12 2.65/17D/J13 |
| 06/ D8/ J.01 | A01B | D110 | 0218 | 0.BE/180/J00 0.EE(S)/181/J01 |

*Figure 4-66 CMT - CHPID Report*

### *Port Report - Sorted by Location*

1. Click **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 4-67 on page 186).

2. You may be prompted to accept active content. Accept the active content in order to display the report in your browser.

**CHPID Mapping Tool - CHPID to Port Report**

Control Number: 19756694(CFR) Report Created: Dec. 07, 2007
Machine: 2097-E26

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.

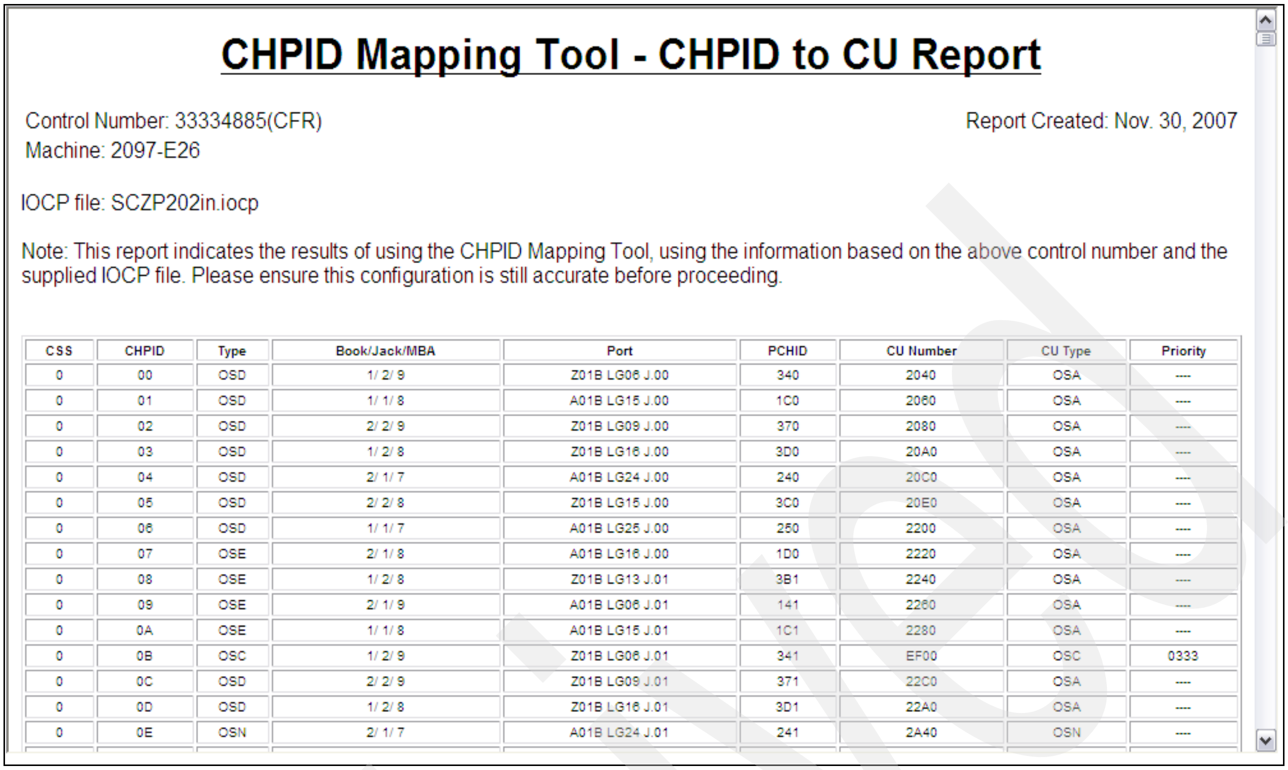
| Frame/Cage | Slot or Fanout | AID or PCHID/Port | Source | Channel Type | Assigned CHPID | Assign Source |
|---|---|---|---|---|---|---|
| A01B | LG01 | 100/ P.00 | 15/ D9/ J.01 | Cry-E2 | | |
| A01B | LG01 | 101/ P.01 | 15/ D9/ J.01 | Cry-E2 | | |
| A01B | D102 | 110/ J.00 | 06/ D9/ J.01 | ISC 2GB | 0.A0(S) | Avail |
| A01B | D102 | 111/ J.01 | 06/ D9/ J.01 | ISC 2GB | 0.A1(S) | Avail |
| A01B | D202 | 118/ J.00 | 06/ D9/ J.01 | ISC 2GB | 0.A4(S) | Avail |
| A01B | D202 | 119/ J.01 | 06/ D9/ J.01 | ISC 2GB | 0.A5(S) | Avail |
| A01B | LG03 | 120/ J.00 | 15/ D9/ J.01 | OSA-E2 GbE SX | 0.16(S) | Avail |
| A01B | LG03 | 121/ J.01 | 15/ D9/ J.01 | OSA-E2 GbE SX | 3.18(S) | Avail |
| A01B | LG04 | 130/ J.00 | 06/ D9/ J.01 | OSA-E2 1000BaseT | 3.06(S) | Avail |
| A01B | LG04 | 131/ J.01 | 06/ D9/ J.01 | OSA-E2 1000BaseT | 3.13(S) | Avail |
| A01B | LG06 | 140/ J.00 | 15/ D9/ J.01 | OSA-E2 1000BaseT | 3.05(S) | Avail |
| A01B | LG06 | 141/ J.01 | 15/ D9/ J.01 | OSA-E2 1000BaseT | 3.11(S) | Avail |
| A01B | LG07 | 150/ D.01 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 0.5C(S) | Avail |
| A01B | LG07 | 151/ D.02 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 3.46(S) | Avail |
| A01B | LG07 | 152/ D.03 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 3.64(S) | Avail |

*Figure 4-67 CMT - CHPID to Port Report*

### *Create the CHPID to Control Unit Report*

These reports are created in a similar way to the CHPID Report:

1. Click **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; see Figure 4-68 on page 187. 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: 33334885(CFR) Report Created: Nov. 30, 2007
Machine: 2097-E26

IOCP file: SCZP202in.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 | Book/Jack/MBA | Port | PCHID | CU Number | CU Type | Priority |
|---|---|---|---|---|---|---|---|---|
| 0 | 00 | OSD | 1/ 2/ 9 | Z01B LG06 J.00 | 340 | 2040 | OSA | ---- |
| 0 | 01 | OSD | 1/ 1/ 8 | A01B LG15 J.00 | 1C0 | 2060 | OSA | ---- |
| 0 | 02 | OSD | 2/ 2/ 9 | Z01B LG09 J.00 | 370 | 2080 | OSA | ---- |
| 0 | 03 | OSD | 1/ 2/ 8 | Z01B LG16 J.00 | 3D0 | 20A0 | OSA | ---- |
| 0 | 04 | OSD | 2/ 1/ 7 | A01B LG24 J.00 | 240 | 20C0 | OSA | ---- |
| 0 | 05 | OSD | 2/ 2/ 8 | Z01B LG15 J.00 | 3C0 | 20E0 | OSA | ---- |
| 0 | 06 | OSD | 1/ 1/ 7 | A01B LG25 J.00 | 250 | 2200 | OSA | ---- |
| 0 | 07 | OSE | 2/ 1/ 8 | A01B LG16 J.00 | 1D0 | 2220 | OSA | ---- |
| 0 | 08 | OSE | 1/ 2/ 8 | Z01B LG13 J.01 | 3B1 | 2240 | OSA | ---- |
| 0 | 09 | OSE | 2/ 1/ 9 | A01B LG06 J.01 | 141 | 2260 | OSA | ---- |
| 0 | 0A | OSE | 1/ 1/ 8 | A01B LG15 J.01 | 1C1 | 2280 | OSA | ---- |
| 0 | 0B | OSC | 1/ 2/ 9 | Z01B LG06 J.01 | 341 | EF00 | OSC | 0333 |
| 0 | 0C | OSD | 2/ 2/ 9 | Z01B LG09 J.01 | 371 | 22C0 | OSA | ---- |
| 0 | 0D | OSD | 1/ 2/ 8 | Z01B LG16 J.01 | 3D1 | 22A0 | OSA | ---- |
| 0 | 0E | OSN | 2/ 1/ 7 | A01B LG24 J.01 | 241 | 2A40 | OSN | ---- |

*Figure 4-68 CMT - CHPID to CU Report*

## Create updated IOCP

Create an IOCP statements file for input back into the IODF via HCD. This IOCP statements file now has the CHPIDs assigned to PCHIDs.

1. Click **Tool** → **Create Updated IOCP File** (Figure 4-69).

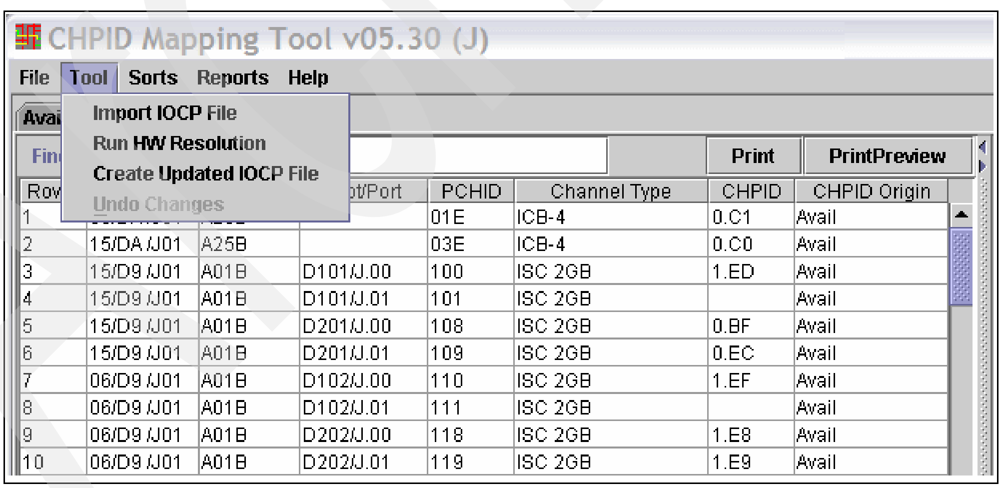



*Figure 4-69 CMT - Create Updated IOCP File*

2. Enter the File name and location for the IOCP output file, and click **Save** (Figure 4-70).

> **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.

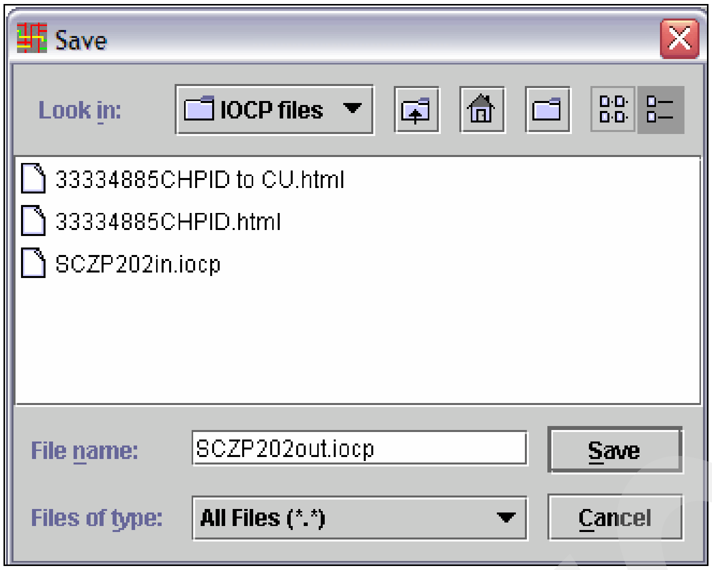



*Figure 4-70 CMT - Save IOCP output file*

3. The CMT displays an informational message, shown in Figure 4-71, regarding what to do for the final execution of the tool.

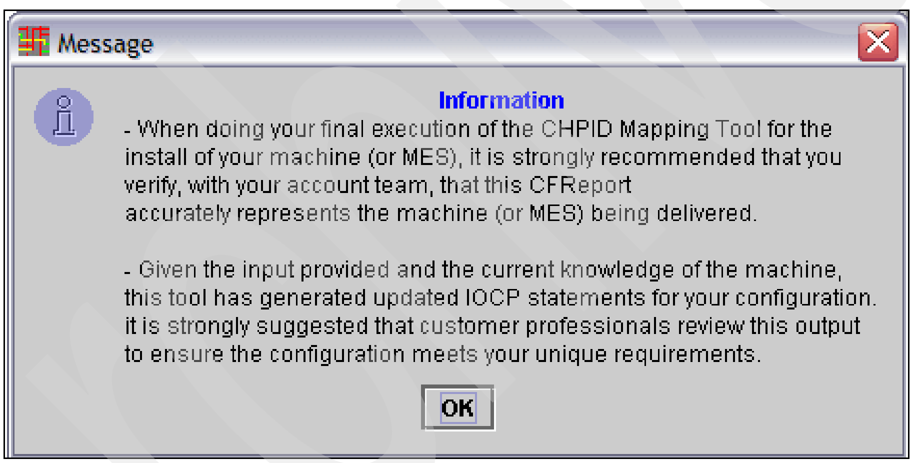



*Figure 4-71 CMT - informational message*

**Note:** If you are an HCM user, you may prefer to use HCM to transfer the updated IOCP statements file back to the host.

4. The CHPID Mapping Tool program can be shut down now. Click **File** → **Exit (**Figure 4-72).

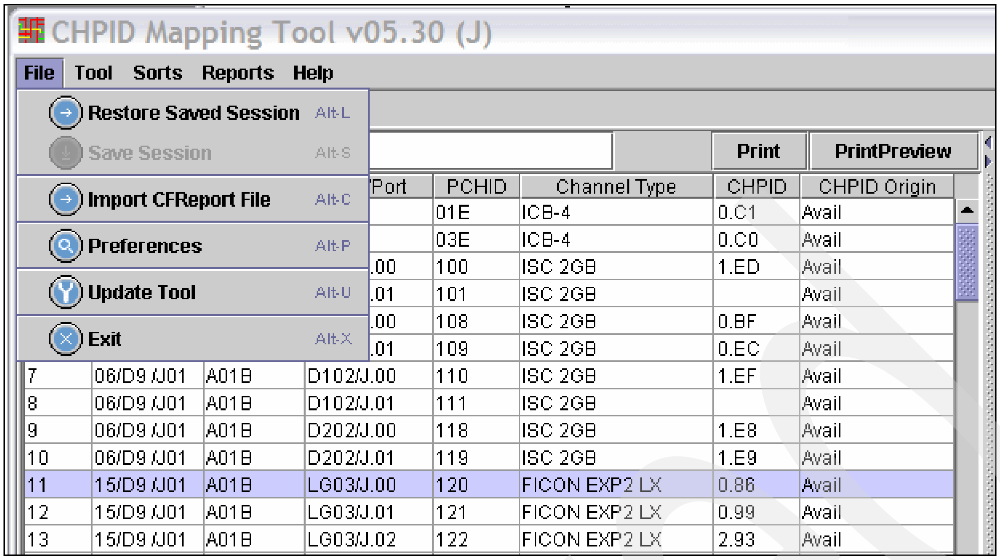


*Figure 4-72 CMT - Exit program*

## 4.6 HCD - Migrate PCHIDs back into work IODF

After mapping the CHPIDs to PCHIDs using the CHPID Mapping Tool, the information needs to be transferred back in HCD, as follows:

1. Upload the IOCP file created by the CMT (sczp202out.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 will notice that the CMT has left a reference to the CCN. Also notice 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 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; see Example 4-2.

   *Example 4-2 HCD - Updated IOCP statements file (with CMT statements)*

```
               PATH=((CSS(0),D0,D2,DA),(CSS(1),D0,D2,DA)),UNIT=CFP
         IODEVICE ADDRESS=(FF07,007),CUNUMBR=(FFF6),UNIT=CFP
         IODEVICE ADDRESS=(FF82,007),CUNUMBR=(FFF6),UNIT=CFP
         IODEVICE ADDRESS=(FFB3,007),CUNUMBR=(FFF6),UNIT=CFP
*CMT* VERSION=000
*CMT* CCN=33442976(CFR)
*CMT* E200.0=0333,E200.1=0333,E200.2=0333,E300.0=0333,E300.1=0333
*CMT* E300.2=0333,EF00.0=0333,EF00.1=0333,EF00.2=0333,F000.0=0333
*CMT* F000.1=0333,F000.2=0333,F080.0=0333,F080.1=0333,F080.2=0333
```

2. From the HCD main panel shown in Figure 4-73, enter the work IODF name used to create the IOCP input data set for the CHPID Mapping Tool. Select option **5**, **Migrate configuration data**.

```
                         z/OS V1.9 HCD
Command ===> ________________________________________________________________

                            Hardware Configuration

Select one of the following.

5_  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.IODF49.WORK'                                +
```

*Figure 4-73 HCD - main menu, select Migrate configuration data*

3. From the Migrate Configuration Data panel shown in Figure 4-74, select option **1**, **Migrate IOCP/OS data**, then press Enter.

```
----------- Migrate Configuration Data -------------


  Select one of the following tasks.

  1   1.  Migrate IOCP/OS data
      2.  Migrate switch configuration data
```

*Figure 4-74 HCD - Migrate Configuration Data*

4. HCD displays the Migrate IOCP Data panel, as shown in Figure 4-75 on page 191. Fill in the following fields and then press Enter:

| | |
|---|---|
| `Processor ID` | Use the same one 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 TSO (see 4.7, "Build the production IODF" on page 192). |
| `Processing mode` | Select option **2** to save the results of the migration. (Prior to using 2, however, try to migrate using option **1**, in order to validate the operation). |
| `Migrate options` | Select option **3** for PCHIDS. Only the PCHIDs are to be migrated into the work IODF. |

```
-------------------- Migrate IOCP / MVSCP / HCPRIO Data --------------------


 Specify or revise the following values.

 Processor ID . . . . . . . . . . . . . SCZP202   +   CSS ID . . . . . . . _  +
 OS configuration ID  . . . . . . . . . TEST2097 +

 Combined IOCP/MVSCP input data set . _____________________________________
 IOCP only input data set . . . . . . . 'SYS6.IODF49.IOCPOUT.SCZP202'
 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 4-75   HCD - Migrate IOCP / MVSCP / HCPRIO Data*

5. HCD displays any errors or warning messages resulting from the migration action. In our example, the only message received indicated that the migration was successful; see Figure 4-76.

```
 ------------------------- 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.IODF49.WORK.
 ***************************** Bottom of data ******************************
```

*Figure 4-76   HCD - 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 message:

   `IOCP/Operating system deck migration processing complete, return code = 0.`

7. Press PF3 again.

## 4.7 Build the production IODF

In order to make use of the definitions that we updated in HCD, the next step is to create a production IODF from the work IODF, as follows:

1. From the HCD main menu, select option **2**, **Activate or process configuration data (**Figure 4-77).

```
                       z/OS V1.9 HCD
Command ===> ________________________________________________________________

                           Hardware Configuration

Select one of the following.

2   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.IODF49.WORK'                                +
```

*Figure 4-77 HCD - main menu, select activate or process configuration data*

2. The Activate or Process Configuration Data panel displays (Figure 4-78). 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 statements
      11. Build and manage S/390 microprocessor
          IOCDSs and IPL attributes
      12. Build validated work I/O definition file
```

*Figure 4-78 HCD - Activate or Process Configuration Data, select Build production IODF*

3. The Message List panel displays (Figure 4-79). 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. Press PF3 to continue.

```
 ------------------------------- Message List --------------------------------
    Save  Query  Help
  ---------------------------------------------------------------------------
                                                                 Row 1 of 139

  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 61.0C to
  #              control unit 8000 exceeded. Actually defined: 312
  _ W   CBDG092I Maximum number of 256 logical paths on link 61.10 to
  #              control unit 8000 exceeded. Actually defined: 424
  _ W   CBDG092I Maximum number of 256 logical paths on link 61.14 to
  #              control unit 8000 exceeded. Actually defined: 424
  _ W   CBDG092I Maximum number of 256 logical paths on link 62.08 to
  #              control unit 8000 exceeded. Actually defined: 312
  _ W   CBDG092I Maximum number of 256 logical paths on link 62.0C to
  #              control unit 8000 exceeded. Actually defined: 312
  _ W   CBDG092I Maximum number of 256 logical paths on link 62.10 to
  #              control unit 8000 exceeded. Actually defined: 312
```

*Figure 4-79 HCD - Message List (building Production IODF)*

4. The Build Production I/O Definition File panel displays (Figure 4-80). Fill in the fields `Production IODF name` and `Volume serial number` and press Enter.

```
 -------------- Build Production I/O Definition File ---------------


   Specify the following values, and choose how to continue.

   Work IODF name . . . : 'SYS6.IODF49.WORK'

   Production IODF name . 'SYS6.IODF49'
   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 4-80 HCD - Build Production I/O Definition File*

5. The Define Descriptor Fields panel displays (Figure 4-81 on page 194). 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.IODF49'

  Descriptor field 1  . . . SYS6
  Descriptor field 2  . . . IODF49
```

*Figure 4-81 HCD - Define Descriptor Fields*

6. HCD displays the following message, indicating that the production IODF was successfully created:

   `Production IODF SYS6.IODF49 created.`

Proceed to the steps to implement the configuration on the 2097.

## 4.8 Implementing the processor configuration on a 2097

At this point there is a production IODF, which is called SYS6.IODF49. Now the IOCDS component of the IODF needs to be updated on the replacement CPC that is being installed (for example, SCZP202) and activated (POR) using this IOCDS. The final step is to IPL the processor using this IODF. (Describing how to IPL the new hardware is beyond the scope of this book.)

There are 2 possible ways to load the IOCP Statements onto the 2097 Service Element IOCDS:

- HCD, using Option 2.11
- HMC, using Stand-Alone Input/Output Configuration Program

While both ways are valid methods to write the new configuration to the IOCDS, we recommend using HCD Option 2.11. However, your 2097 processor and Service Element that are replacing the 2094 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 will need to use the Stand-Alone IOCP process.

Firstly we describe using HCD Option 2.11

### Updating the IOCDS using HCD Option 2.11

1. From the HCD main menu, select option **2**, **Activate or process configuration data**; see Figure 4-82 on page 195. Ensure that the IODF is the production one created in the previous step. Press Enter.

```
                       z/OS V1.9 HCD
Command ===> _____________________________________________________

                           Hardware Configuration

Select one of the following.

2   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.IODF49'                      +
```

*Figure 4-82 HCD - main menu, select Activate or process configuration data*

2. The Activate or Process Configuration Data panel is displayed; see Figure 4-83 on page 196. Select option **11**, **Build and manage S/390 microprocessor IOCDSs and IPL attributes**.

   > **Note:** In this example, we are assuming that the replacement 2097 has been delivered and has connectivity to the HMC LAN so we can create an IOCDS from which to power-on reset. This may not be the case for all readers.

   If the new 2097 is not accessible from the HMC LAN, we would need to copy the IOCP statements onto a USB Flash Memory Drive and import them onto the 2097 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.

```
                    z/OS V1.9 HCD
----- 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 statements
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

*Figure 4-83 HCD - Activate or Process Configuration Data, select Build IOCDSs*

3. The S/390 Microprocessor Cluster List panel is displayed (Figure 4-84). Use a forward slash mark (/) to select the new 2097 from the list in order to update one of its IOCDSs. Press Enter.

```
Goto  Query  Help
 ------------------------------------------------------------------------------
                      S/390 Microprocessor Cluster List             Row 1 of 4
 Command ===> _______________________________________________ Scroll ===> PAGE

 Select one or more CPCs, then press Enter.

   --------------CPC--------------   IODF
 / SNA Address        Type   Model   Processor ID
 / USIBMSC.SCZP202    2097   E26     SCZP202
 _ USIBMSC.SCZP101    2094   S18     SCZP101
 _ USIBMSC.SCZP801    2064   1C7     SCZP801
 _ USIBMSC.SCZP901    2084   C24     SCZP102
 ****************************** Bottom of data ********************************
```

*Figure 4-84 HCD - S/390 Microprocessor Cluster List*

4. The Actions on selected CPCs panel is displayed (Figure 4-85). 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 4-85 HCD - Actions on selected CPCs, Work with IOCDSs*

5. The IOCDS List panel is displayed (Figure 4-86). Select the IOCDS that you wish to update for the 2097 install by typing a slash (/) and then press Enter.

```
 Goto  Query  Help
------------------------------------------------------------------------------
                                  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.SCZP202  DIAG00   LPAR   Alternate  No        No          No
_ A1.SCZP202  DIAG01   LPAR   POR        Yes       No          Yes-POR
_ A2.SCZP202  DIAG02   LPAR   Alternate  No        No          No
_ A3.SCZP202  DIAG03   LPAR   Alternate  No        No          No
```

*Figure 4-86 HCD - IOCDS List*

6. The Actions on selected IOCDSs panel is displayed (Figure 4-87). 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 4-87 HCD - Actions on selected IOCDSs*

7. The Build IOCDSs panel is displayed; see Figure 4-88. Verify that all the information is correct.
8. Fill in the field `Title1` and then press Enter.

```
Goto  Query  Help
------------------------------ Build IOCDSs -------------------------------
                                                                 Row 1 of 1
Command ===> ___________________________________________ Scroll ===> CSR

Specify or revise the following values.

IODF name . . . . . . . . . : 'SYS6.IODF49'

Title1 . TEST49__________________________________________________________
Title2 : SYS6.IODF49 - 2007-12-03 19:03

                           Write IOCDS in
IOCDS        Switch IOCDS  preparation of upgrade
A0.SCZP202 No            No
**************************** Bottom of data ******************************
```

*Figure 4-88 HCD - Build IOCDSs*

9. The Job Statement Information panel is displayed (Figure 4-89). Fill in 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
   //WIOCDS  JOB (ACCOUNT),'NAME'
   //*
   //*
   //*
```

*Figure 4-89 HCD - 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 a message like the following:

```
ICP057I IOCP JOB WIOCDS SUCCESSFUL. LEVEL A0 IOCDS REPLACED.
```

Now if you return to HCD option 2.11 and view the IOCDS, note that the SNA Address is at `USIBMSC.SCZP202`; see Figure 4-90.

```
Goto  Query  Help
 ------------------------------------------------------------------------------
                      S/390 Microprocessor Cluster List             Row 1 of 4
 Command ===> _______________________________________________ Scroll ===> PAGE

 Select one or more CPCs, then press Enter.

   --------------CPC--------------   IODF
 / SNA Address        Type   Model   Processor ID
 s USIBMSC.SCZP202    2097   E26     SCZP202
 _ USIBMSC.SCZP101    2094   S18     SCZP101
 _ USIBMSC.SCZP801    2064   1C7     SCZP801
 _ USIBMSC.SCZP901    2084   C24     SCZP102
 ****************************** Bottom of data ********************************
```

*Figure 4-90   HCD - IOCDS with replacement IODF*

Figure 4-91 shows the updated IOCDS.

```
 Goto  Query  Help
------------------------------------------------------------------------------
                                  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.SCZP202  TEST49   LPAR   Alternate  No        Yes         No
_ A1.SCZP202  DIAG01   LPAR   POR        Yes       No          Yes-POR
_ A2.SCZP202  DIAG02   LPAR   Alternate  No        No          No
_ A3.SCZP202  DIAG03   LPAR   Alternate  No        No          No
```

*Figure 4-91   HCD - IOCDS showing Alternate Status*

## Updating the IOCDS using Stand-Alone Input/Output Config Program

**Note:** Refer to the Stand-Alone Input/Output Configuration Program User's Guide SB10-7152 for detailed information on 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.

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2097, as opposed to a remote Web browser, and select the new 2097, 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 is to create an environment on the processor that will allow 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 128MB of storage and use this partition to run the I/O Configuration Program.
4. Under Systems Management, click **Servers** to expand the list.

5. Under Servers, click the server to select it (in this example SCZP202).
6. On the Tasks pad, click **Recovery** → **Single Object Operations** → **Yes**.
7. On the Tasks pad, click **CPC Configuration** → **Input/output (I/O) Configuration**.
8. Click the radio button for the Data Set you wish to load the IOCDS into.

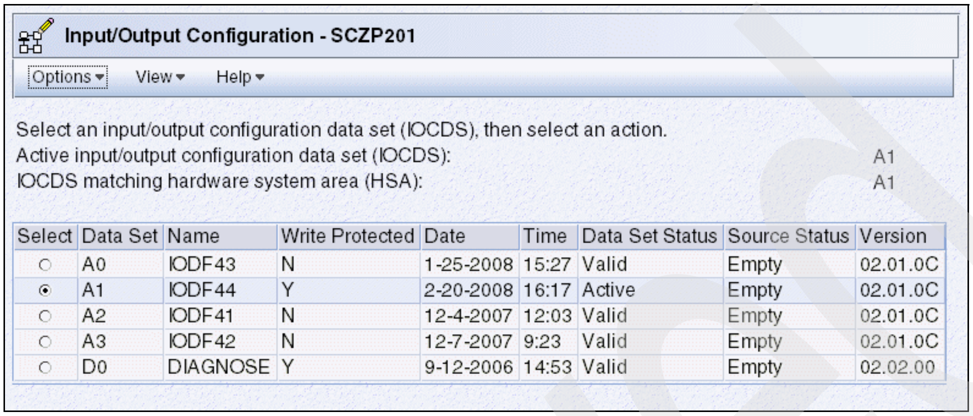



*Figure 4-92 HMC - Select IOCDS for Stand-alone IOCP*

9. Click **Options** → **Import Source File** → **Hardware Management Console USB Flash Memory Drive**.

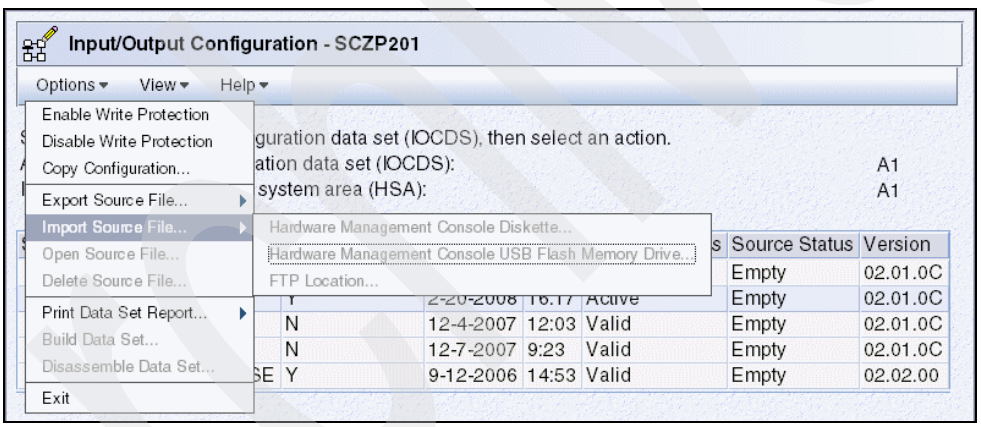



*Figure 4-93 HMC - Import source file*

10. Select the source file name and click **OK**.

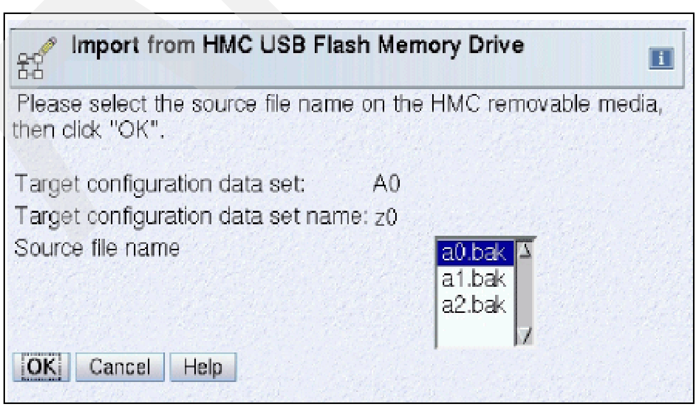



*Figure 4-94 HMC - Select source file*

11. Now that the IOCP statements have been imported, a Build Data Set needs to be performed to:
    - Process the source file data for the selected I/O configuration.
    - Check the syntax and validates the configuration.
    - Generate an IOCDS and, if there are no errors, write the IOCDS to the support element hard disk.
    - Write the I/O configuration source (IOCS) file to the support element hard disk with any IOCP messages embedded in the file.

    Click **OK**.
12. This will now initiate a load of the IOCP code into the targeted LPAR (previously activated) and the program will perform the Build Data Set steps.

If the build was successful and there are no caution or warning messages, the resultant IOCDS has been written to the support element hard disk. This IOCDS is now ready to be selected via a Reset Profile and the 2097 may be activated (Power-on Reset) with the production IODF.

## 4.9 HMC steps for activation profiles

### Build the Production Reset Profile and point 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 new 2097 after it has been handed over from the IBM service representative.

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2097 or use a remote Web browser and select the new 2097.
2. Under Systems Management, click **Servers** to expand the list.
3. Under Servers, click the server to select it (in this example SCZP202).
4. On the Tasks pad, click **Operational Customization** to expand it, and select **Customize/Delete Activation Profiles.**
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, SCZP202).
7. Select the new Profile and click **Customize selected profile**.
8. Click the IOCDS that you just updated in the previous step. Message ACTB0PDL is displayed; see Figure 4-95.

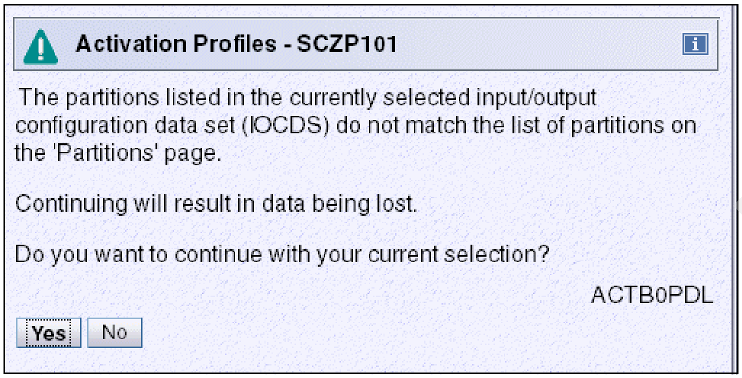


*Figure 4-95 HMC - Activation Profiles, message ACTB0PDL*

Depending on the circumstances, you may wish to answer **Yes** or **No**. You may now wish to review the Partition Activation List.

## STP configuration

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 7, “Server Time Protocol setup” on page 305 for details.

## Build Image Profiles

While still in the Reset Profile, you can now review the Image Profile attributes.

## Build Load Profiles

Go through and create Load (IPL) Profiles using the “DEFAULTLOAD” Load profile as a skeleton for all the logical partitions that you are IPLing on this processor.

## Build Load Members in SYS#.IPLPARM

You require Load Members defined in SYS#.IPLPARM when IPLing from the new 2097.

Additionally, if you are going to use the HWNAME parameter to point to the Processor.ID in the Load members, then make sure you use the correct name (SCZP202, in our example).

## Performing a power-on reset of the 2097

The 2097 is now ready to be Activated (Power-on Reset) using the Production Reset Profile.

5

# Install an additional System z10 EC

In this chapter we describe how to add a new z10 EC into an existing System z environment.

Because a wide variety of different environments exist, 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 System z9 EC and a System z10 EC using CHPID type = CIB

We discuss the following topics:

- Scenario overview
- HCD - Create a 2097 work IODF
- Validate the 2097 work IODF
- CHPID Mapping Tool actions
- Migrate PCHIDs back into the 2097 work IODF
- HCD - build the 2097 production IODF
- Implementing the processor configuration on the 2097
- HMC steps for activation profiles

## 5.1 Scenario overview

We begin by providing an overall description of this scenario.

### 5.1.1 The configuration process

Figure 5-1 depicts the general process that we followed in this example. The numbered steps are described following the figure.

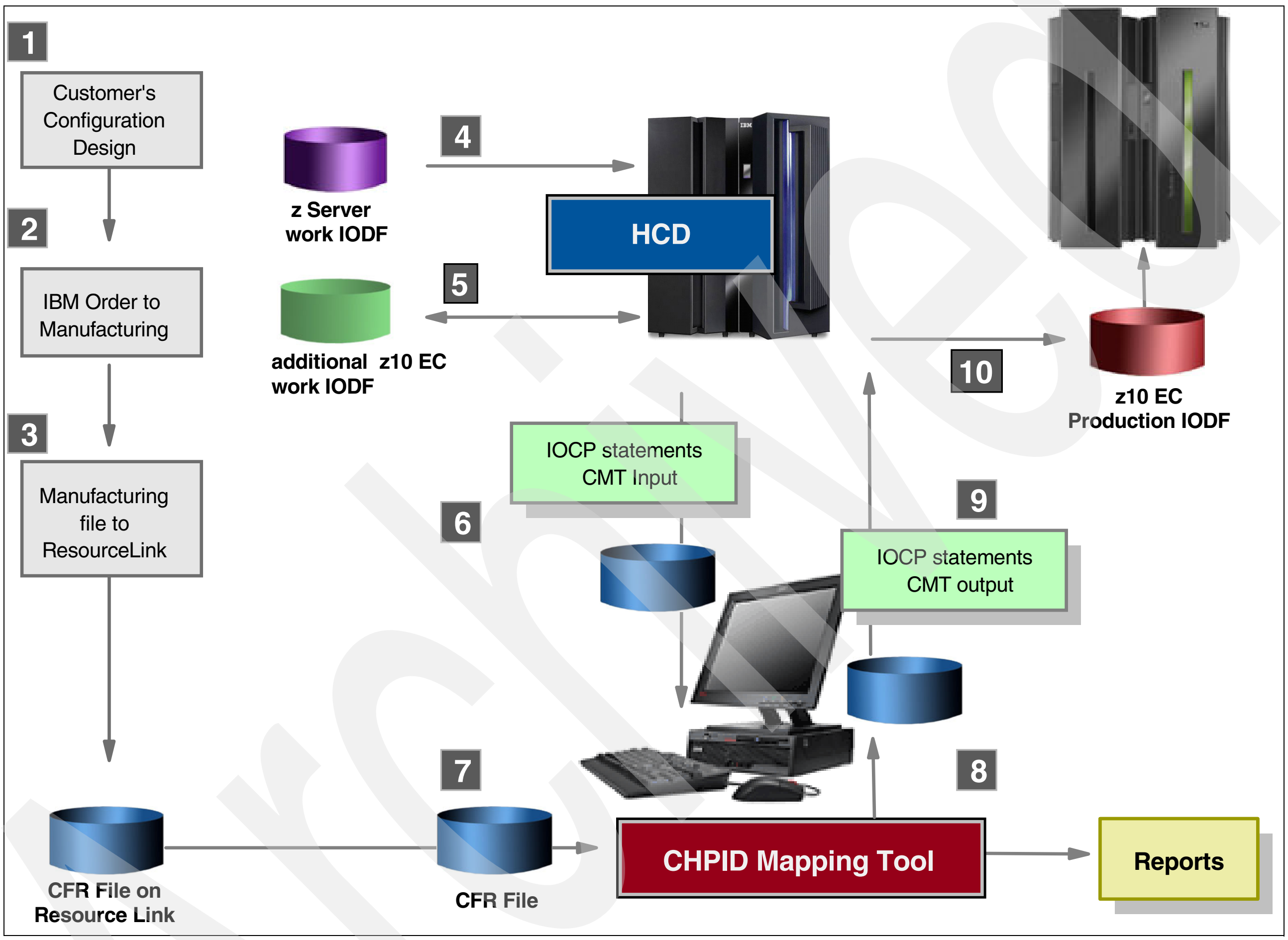



Figure 5-1 CMT - Overall process flow

1. When you are planning to add a System z10 EC to your environment, the IBM Technical Support team can help to define a configuration that meets your needs. The configuration then gets passed to the ordering step.
2. The IBM order for the configuration is created and passed to the manufacturing process.
3. The manufacturing process creates a configuration file that is stored on the IBM Resource Link Web site. This configuration file describes the hardware being ordered. This data is available for download by the client installation team.
4. The existing System z I/O configuration is used as a starting point into HCD. The current production IODF is used as input to HCD to create a work IODF that will be the base to define the new System z10 configuration.

5. When the new System z10 EC configuration has been added and the obsolete hardware has been deleted, a validated version of the configuration is saved in a 2097 validated work IODF.
6. From the validated work IODF, create a file containing the z10 EC IOCP statements. This file is transferred to the workstation used for the CHPID Mapping Tool. HCM may also be used to transfer the IOCP deck to and from the CMT.
7. The configuration file created by the IBM Manufacturing process in step 3 is downloaded from Resource Link to the CHPID Mapping Tool workstation.
8. The CHPID Mapping Tool uses the input data from files to map logical channels to physical ones on the new System z10 EC hardware.

   You might have to make decisions in response to situations that might arise, such as:

   a. Resolving situations in which the limitations on the purchased hardware cause a single point of failure (SPoF). You may need to purchase additional hardware in order to resolve some SPoF situations.
   b. Prioritizing certain hardware items over others.

   After processing by the CHPID Mapping Tool, 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.
9. The file containing the updated IOCP statements created by the CHPID Mapping Tool, now containing the physical channels assignment, is transferred to the host system.
10. Using HCD again, and taking as input the validated work IODF file created in step 5 and the IOCP statements updated by the CHPID Mapping Tool (CMT), apply the physical channel assignments done by the CMT to the configuration data in the work IODF.

    After the physical channel data has been migrated into the work IODF, a 2097 production IODF is created and the final IOCP statements can be generated.

The IBM installation team uses the configuration data written in step 10 when the final power-on reset is done, yielding a System z10 EC with the client I/O configuration that is ready to be used.

When installing a new 2097, you may be able to use HCD to write an IOCDS to the 2097 in preparation for an upgrade if you have another computer system in another location that connects to your new 2097. If you can write an IOCDS to the 2097, do so and let the IBM service representative know which IOCDS to use.

If the new 2097 is not connected using a LAN to the CPC where HCD is running, or you are not upgrading or cannot write an IOCDS using HCD in preparation for the upgrade, then use HCD to produce an IOCP input file and download the input file to a USB Flash Memory Drive.

The IOCP input file will then need to be loaded into the 2097 Support Element IOCDS using the Stand-Alone Input/Output Configuration Program. Refer to Technical Manual SB10-7152 for details.

**Note:** Using the HCD option **Write IOCDS** in preparation of an upgrade is the preferred method for writing the initial IOCDS when installing a new 2097. However, you may need to use the Stand-Alone Input/Output Configuration Program process.

## 5.1.2 Planning considerations

The follow table lists the channel types as described in an IOCDS that are used with the System z10 EC.

*Table 5-1 Channels, links, and adapters with CHPID type*

| Channels | CHPID Type | May be defined as Shared | May be defined as Spanned |
|---|---|---|---|
| ESCON channels:<br>Connection Channel (ESCON architecture)<br>Channel to Channel (connects to CNC) | CNC<br>CTC | yes<br>ye | no<br>no |
| FICON bridge. A FICON channel that attaches to an ESCON Director Model 5 | FCV | yes | no |
| FICON native channels that attach to FICON directors or directly to FICON control units | FC | yes | yes |
| FICON channels that attach to Fibre channel devices, switches, directors, or Fibre-Channel-to-SCSI bridges | FCP | yes | yes |
| ISC-3 peer mode channels (connects to another CFP) | CFP | yes | yes |
| ICB-4 peer channels (connects to another ICB-4) | CBP | yes | yes |
| IC peer channels (connects to another ICP) | ICP | yes | yes |
| InfiniBand host channel adapters (HCA) | CIB | yes | yes |
| HiperSocket (IQDIO) channels | IQD | yes | yes |
| OSA adapters using QDIO architecture | OSD | yes | yes |
| OSA adapters using non-QDIO architecture | OSE | yes | yes |
| OSA 1000Base-T adapters for OSA-ICC | OCE | yes | yes |
| OSA-Express2 adapters for NCP | OSN | yes | yes |

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=CBP - ICB-4 links
- CHPID Type=CIB - PSIFB links connecting to an HCA2-O fanout
- CHPID Type=ICP - Internal Coupling links.

**Note:** Coupling links can be defined as both Coupling and STP links or STP-only links.

### *HMC*

The System z10 EC requires HMC Application Ver 2.10.0 or later and only uses Ethernet for its network connection. The HMC and also 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 V1.9 or HCD V1.7 and later with 2097DEVICE PSP Bucket and PTFs is required to define and support some of the new features of the System z10 EC.

### Open Systems Adapter - Integrated Console Controller (OSA-ICC)

You might consider using OSA Express2 1000BaseT 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 (FCP)

When using CHPIDs defined as TYPE=FCP, you may wish to consider NPIV.

### 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 may 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 via the HMC, note that the SNA address is made up of a Network name and CPC name separated by a dot (for example, USIBMSC.SCZP201). 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 1-8 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 or not.

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 will be 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.

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 |

### 5.1.3 Additional 2097 scenario

In this scenario we describe the configuration steps to install a new 2097 processor into an existing hardware environment. Key considerations are as follows:

- HCD requires a new Processor ID for the 2097.
- We recommend defining a new CPC name for 2097.
- The 2097 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 2097 work IODF.

This example shows an existing System z9 EC (2094-S18) with Processor ID of SCZP101 and three CSSs (CSS ID=0, CSS ID=1 and CSS ID=2). We will be adding a new System z10 EC (2097-E26) with Processor.ID SCZP201 and with fours CSSs (CSS ID=0, CSS ID=1, CSS ID=2 and CSS ID=3). The CPC name of SCZP201 and serial number of 000201 is used for the 2097.

The following CHPID types are defined:

- FC, FCP, CTC, CNC
- OSD, OSE, OSC, OSN
- CFP, CBP, ICP, CIB
- IQD

The following Hardware/CHPID types are not supported on the 2097:

- PCIXCC and PCICA
- ICB-3 links
- ICB-2 links
- ISC-3 links in compatibility mode (CHPID types CFS and CFR)
- OSA-Express Token Ring

*Table 5-2 Additional 2097 I/O configuration*

| New 2097 | Additional 2097 to connect to same switch ports and control units that existing processors connect to (additional new) |
|---|---|
| Processor ID | Require new Processor ID |
| CPC name | Require 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 below) |
| 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.

## 5.2 HCD - Create a 2097 work IODF

The following steps are used to define a new 2097 server to the existing I/O configuration using HCD:

1. Create a 2097 work IODF from a current production IODF.
2. Add the processor.
3. Change required partition names and usage from reserved.
4. Add CHPIDs.
5. Connect FICON and ESCON CHPIDs to existing switches, to 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, Communication devices, directly or via switches.
10. Create OSA (OSC, OSD, OSE, OSN).
11. Build a validated work IODF.

12. Create an IOCP statements file and file transfer 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 Production IODF and remote write the IOCP to an IOCDS on the processor, or if not possible, copy the IOCP statements to a USB Memory Flash Drive.
18. Run Stand-Alone Input/Output Configuration Program to load the IOCP statements onto the 2097 Service Element IOCDS.
19. Build Reset, Image and Load Profile.
20. Perform Power-on Reset (Activate) of 2097.

### Create a work IODF from current Production IODF

Select the current production IODF in HCD that contains the existing hardware environment that will be connected to the new 2097 (for example, 'SYS6.IODF68').

### Add the new 2097 processor

1. From the HCD main menu, select option **1.3**, **Processor List** (Figure 5-2).
2. Type `add` or press PF11 (add) to add a new processor, then press Enter.

```
  Goto  Filter  Backup  Query  Help
-------------------------------------------------------------------------------
                                Processor List       Row 1 of 8 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  __________ ________________________________
_ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
_ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
```

*Figure 5-2 HCD - Processor List (adding processor)*

- The Add Processor panel displays (Figure 5-3).

```
------------------------------ 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  . . . . . . . ________
 F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
F12=Cancel
```

*Figure 5-3 HCD - Add Processor (blank values)*

3. Specify the appropriate values. In our example, we entered the following values:

| | |
|---|---|
| Add Processor ID: | `SCZP201` |
| Add Processor type: | `2097` |
| Add Processor model: | `E26` |
| Number of channel subsystems: | Leave blank for the moment |
| Add Serial number: | `0002012097` |
| Add Network name: | `USIBMSC` |
| Add CPC name: | `SCZP201` |
| Local System Name: | Leave blank for the moment |

Figure 5-4 on page 212 shows the values we added.

```
------------------------------ Add Processor -----------------------------

Specify or revise the following values.

Processor ID . . . . . . . . . . SCZP201_
Processor type . . . . . . . . . 2097____  +
Processor model  . . . . . . . . E26_____  +
Configuration mode . . . . . . . LPAR      +
Number of channel subsystems . . _         +

Serial number  . . . . . . . . . 0002012097
Description  . . . . . . . . . . ________________________________

Specify SNA address only if part of an S/390 microprocessor cluster:

Network name . . . . . . . . . . USIBMSC_  +
CPC name . . . . . . . . . . . . SCZP201_  +

Local system name  . . . . . . . ________
```

*Figure 5-4 HCD - Add Processor (adding values)*

4. Press Enter. The Create Work I/O Definition File panel prompts you to enter the data set name of the Target IODF (for example, `SYS6.IODF69.WORK`).
5. Press Enter. You now have an additional 2097 processor named SCZP201; see Figure 5-5.

   Notice the message displayed at the bottom of the panel indicating that the processor definition has been extended to its maximum configuration. This is because part of the Central 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 2097, HCD automatically defines the maximum configuration of four CSSs and 60 logical partitions.

```
  Goto  Filter  Backup  Query  Help
 ------------------------------------------------------------------------------
                                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  __________ ________________________________
 _ P000STP1 2084     C24      LPAR  01534A2084 ________________________________
 _ P000STP2 2094     S08      LPAR  0BAD4E2094 ________________________________
 _ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
 _ SCZP201  2097     E26      LPAR  0002012097 ________________________________
 _ SCZP801  2064     1C7      LPAR  010ECB2064 ________________________________
 _ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
 ****************************** Bottom of data *******************************




+-------------------------------------------------------------------+
| Definition of processor SCZP201 has been extended to its maximum  |
| configuration.                                                    |
+-------------------------------------------------------------------+
```

*Figure 5-5 HCD - processor List (new process or added)*

6. Type s next to the SCZP201 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.

```
                            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 . . . : SCZP201

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
_ 0   65280     0       65535     0       ________________________________
_ 1   65280     0       65535     0       ________________________________
_ 2   65280     0       65535     0       ________________________________
_ 3   65280     0       65535     0       ________________________________
```

*Figure 5-6 HCD - Channel Subsystem List (newly defined CSS)*

> **Note:** The MAXDEV values are automatically set when defining a 2097 due to the fixed Hardware System Area (HSA) on a 2097 processor.

7. Type 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 5-7 on page 214).

```
---------------------------- Partition List ----------------------------
                                                            Row 1 of 15
 Command ===> _______________________________________ Scroll ===> CSR

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

 Processor ID  . . . . : SCZP201
 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 5-7 HCD - Partition List*

If you scroll down you will see the remaining reserved logical partitions defined for this CSS.

8. Define the resources to the new 2097 processor.

> **Note:** For specific details on defining processors, partitions, switches, control units, devices, and so forth, refer to *z/OS HCD Users Guide,* SC33-7988 and *IOCP Users Guide,* SB10-7037.

9. Define the resources to the new 2097 processor:
   - Change Reserved partitions for each desired CSS to required partition name and usage. Not all partitions need to be changed at this point but can be modified later via a Dynamic IODF Activate.
   - Add CHPIDs to each CSS, with no PCHIDs assigned.
   - Define a Partition Access list for these CHPIDs.
   - 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 will explain in more detail in the next section on how to define CIB type coupling facility links and set up a CIB coupling link between the 2094 and the new 2097.

14. Create CTCs (ESCON or FICON).
15. Define logical paths to existing control units for DASD, tape, printers, communications controllers directly or via the FICON or ESCON switches.
16. Create OSA resources (for example, OSC, OSD, OSE, OSN).

## Over-define channel paths

Sometimes you may need to define a channel path that is not physically installed on the processor. This may 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 over-define CHPIDs by using an asterisk (*) for the PCHID value. An over-defined 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 and CBP type CHPIDs, where these CHPIDs have connections to other CFP and CBP type CHPIDs.
>
> Therefore, HCD only allows you to define CFP and CBP type CHPIDS as over-defined if they are unconnected.
>
> If you define a CIB type CHPID, it must also be defined with an HCA Adapter ID (AID) and an HCA Port ID, represented in the AID/P column in the Channel Path List. HCD does not allow a CIB type CHPID to be defined as over-defined.

The 2097 production IODF can then be activated dynamically and the PCHID/CHPID/control unit definitions become available to the operating system.

- Figure 5-8 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     Filter Mode. 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
_ BE    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   3D8
_ BF    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   3D9
_ CE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   181
_ CF    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   111
_ EC    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   3C0
_ EE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   3D0
```

*Figure 5-8 HCD - Channel Path List (Reserving CHPIDs)*

- Figure 5-9 illustrates what the CHPID/PCHID definitions look like after being defined as over-defined.

```
                              Channel Path List     Filter Mode. 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
_ BE    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   *
_ BF    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   *
_ CE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ CF    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ EC    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ EE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
```

*Figure 5-9 HCD - Channel Path List (over-defined CHPIDs)*

## Add CHPID type=CIB channels and PSIFB links

In this section we define CIB CHPIDs to the 2094 (running as a dedicated coupling processor) and the 2097, 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.

1. From the HCD main menu, select option **1.3**, **Processor List** (Figure 5-10).
2. Type c next to SCZP101 (the 2094) and press Enter.

```
------------------------ 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 5-10 HCD - Change Processor Definition (display Support level)*

3. Notice 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 will be changed to get 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 is defaulted 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 5-11, 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 5-11   HCD - Change Processor Definition (display Support level)

Notice the Support Level in Figure 5-11 and see how the 2094 is currently set to **XMP, Basic 2094 support**.

5. Press Enter. HCD will give you the option to change the Support Level to include CIB support (Figure 5-12).

```
------------------------- 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 5-12   HCD - Change Processor Definition (changing support level)

6. Type s next to ‘XMP, 2094 support, CIB’ and press Enter.

**Note:** Currently PSIFB links using CIB type CHPIDs are only supported on a 2094 when running as a standalone coupling facility.

IBM has announced a statement of Direction to support PSIFB links on general purpose System z9 EC and BC servers. When that support is made available, System z9 servers with general purpose processors, IFLs, zAAPs, or zIIPS will be able to utilize 12x IB-SDR links.

Now we add some CIB type CHPIDs to the 2094 and 2097 processors and define a PSIFB link using the following steps:

1. Review the PCHID report that came with the 2094 and look for the AID. In our example we will use AID=0A and AID=1A (HCA1-O).
2. Review the PCHID report that came with the 2097 and do the same. In our example we will use AID=0B and AIB=1B (HCA2-O). Refer to Figure 5-13 to see the Adapter IDs for the Host Channel Adapter F/C 0163 on the 2097.

**Note:** Once installed, Adapter IDs can also be found via the HMC/SE panels.

```
CHPIDSTART
  33442976                      PCHID REPORT                      Nov 30,2007
  Machine: 2097-E26  SN1
  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Source          Cage  Slot  F/C    PCHID/Ports or AID             Comment
  06/D6           A25B  D606  0163   AID=0B

  15/D6           A25B  D615  0163   AID=1B

  06/DA           A25B  DA06  3393   01E/J01 01F/J02

  15/DA           A25B  DA15  3393   03E/J01 03F/J02

  15/D9/J01       A01B  D101  0218   100/J00

  15/D9/J01       A01B  D201  0218   108/J00

  06/D9/J01       A01B  D102  0218   110/J00 111/J01

  06/D9/J01       A01B  D202  0218   118/J00 119/J01
```

*Figure 5-13 HCD - 2097 PCHID Report (showing AIDs)*

3. In the processor list, type s next to the 2094 and press Enter.
4. Type s next to the CSS where you wish to define the CIB CHPIDs and press Enter.
5. Type `add` or press PF11 (add) to add new chpids and press Enter (Figure 5-14 on page 220).

```
                              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 5-14 HCD - Channel Path List (adding chpids)*

6. Enter the appropriate values. As shown in Figure 5-15, for our example we specified 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 5-15 HCD - Add Channel Path (adding chpids)*

7. Press Enter. HCD will now display the Specify HCA Attributes panel.

8. Enter the appropriate values. As shown in Figure 5-16, for our example we specified 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 5-16 HCD - Specify HCA Attributes for 2094 (defining AID and port)*

9. Press Enter. HCD will go through the normal Define Access and Candidate List panels for the new CHPID.

10. Follow the same procedure to define a new CIB type CHPID to the 2097. For our example we specified the following values:

    Channel path ID: 80
    Channel path type: `CIB`
    Operational mode: `SHR`

> **Note:** Figure 5-17 on page 221 is an example of the HCM panel used to create any CHPID. This example shows CHPID 80, type = CIB as SHR.

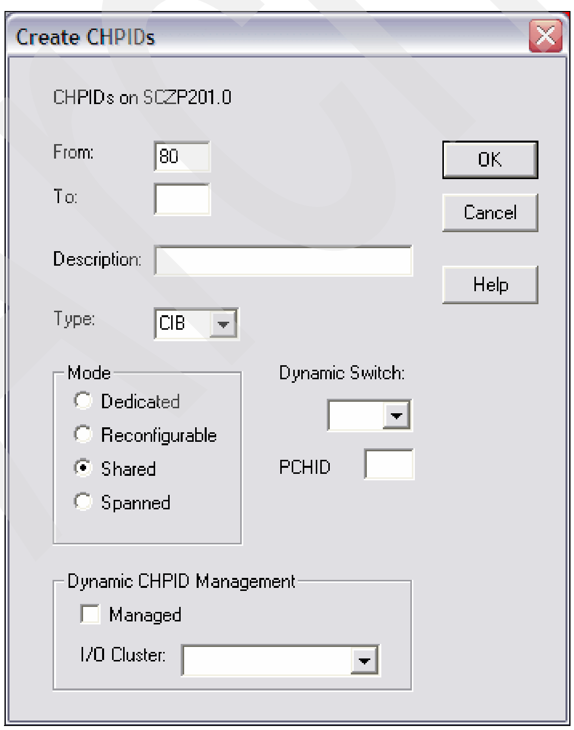



*Figure 5-17 HCM - Create CHPID (type = CIB)*

Adapter ID of the HCA: `0B`
Port on the HCA: `1`

```
------------------ 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 5-18 HCD - Specify HCA Attributes for 2097 (defining AID and port)*

**Note:** The corresponding HCM panel looks like Figure 5-19.

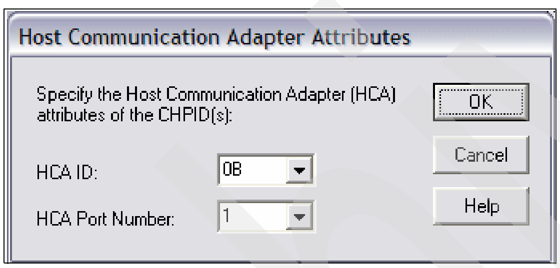



*Figure 5-19 HCM - Define Host Communications Adapter parameters*

11. Define the following CHPIDs and a coupling link between:
    - 2094 CHPID B1 as type=CIB using AID/P=0A/2
    - 2097 CHPID 90 as type=CIB using AID/P=0B/2
12. In HCD, display the Channel Path List for the 2097 and press PF20 (right). Notice how HCD represents a CIB CHPID in the AID/P column as opposed to a PCHID (Figure 5-20).

```
                              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
_ 80    CIB   SHR   No    ________     a _ _ _ _ _ _ _ _ _ _ _ _ _ _   0B/1
_ 90    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 5-20 HCD - Channel Path List (displaying AID/P)*

**Note:** Figure 5-21 illustrates how HCM represents CIB CHPIDs with the HCA ID and HCA Port.

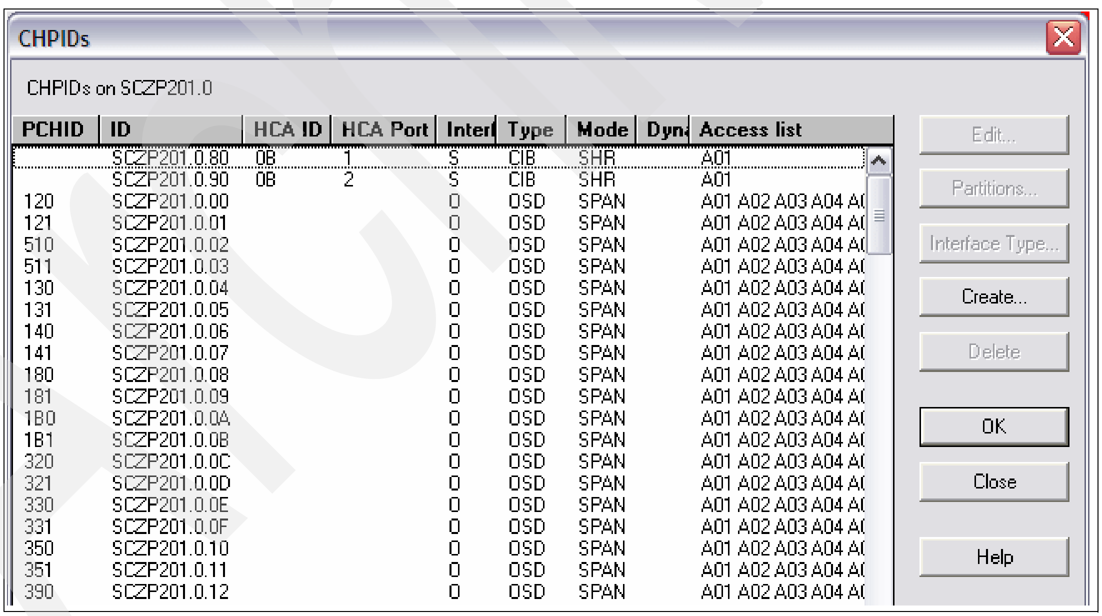



*Figure 5-21 HCM - CHPID summary showing CIB CHPIDs*

13. That concludes the CIB CHPID definitions. Now define a coupling link between these two sets of CIB CHPIDs as you would with a CFP or CBP type CHPID. Figure 5-22 on page 224 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 . . . . . . : SCZP201
 Channel subsystem ID . . : 0
 Channel path ID  . . . . : 80
 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 5-22   HCD - View CF Control Units and Devices*

14. From the HCD main menu, select option **1.3**, **Processor List**, and press PF20 (right) to display the SNA Address and Local Name (Figure 5-23).

```
                                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    ________      ________ ________
_ P000STP1 2084     C24      LPAR    IBM390PS      P000STP1 ________
_ P000STP2 2094     S08      LPAR    ZZZZZZZZ      P000STP2 ________
_ SCZP101  2094     S18      LPAR    USIBMSC       SCZP101  SCZP101
_ SCZP201  2097     E26      LPAR    USIBMSC       SCZP201  SCZP201
_ SCZP801  2064     1C7      LPAR    USIBMSC       SCZP801  ________
_ SCZP901  2084     C24      LPAR    USIBMSC       SCZP901  ________
```

*Figure 5-23   HCD - Processor List (displaying local system name)*

**Note:** As described previously, in most cases the local system name value will default to the recommended value of the CPC name, unless during a new processor add the CPC name was not specified. In this case, HCD will also leave 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 5-28 on page 227.

## 5.3 Validate the 2097 work IODF

1. Select HCD option **2.12**, **Build validated work I/O definition file**.
2. Observe the Message List and review.
3. Press PF3 to continue; you should receive the following message:

   `Requested action successfully processed`
4. Go to HCD option **6.4**, **View I/O Definition File Information** (Figure 5-24). Note that the IODF type is now `Work - Validated`.

```
 ------------- View I/O Definition File Information -------------

IODF name  . . . . . . : 'SYS6.IODF69.WORK'
IODF type  . . . . . . : Work - Validated
IODF version . . . . . : 5

Creation date  . . . . : 2007-12-04
Last update  . . . . . : 2007-12-04  16:53

Volume serial number . : BH8ST2
Allocated space  . . . : 2000    (Number of 4K blocks)
Used space . . . . . . : 1464    (Number of 4K blocks)
   thereof utilized (%)  97

Activity logging . . . : No
Backup IODF name . . . :

Description  . . . . . : Description  . . . . . :
```

*Figure 5-24 HCD - View I/O Definition File Information (validated work IODF)*

### Create the IOCP statements for the CHPID Mapping Tool

**Note:** You may prefer to use HCM to create the IOCP statements file and transfer the file to your PC. You can then launch the CHPID Mapping Tool, create an updated IOCP statements file, and transfer the file back to the host.

1. Select HCD option **2.3, Build IOCP input data set**, and press Enter (Figure 5-25 on page 226).

```
----- 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 statements
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

*Figure 5-25 HCD - Activate or Process Configuration Data (Build IOCP for SCZP201)*

2. HCD displays the list of available processors to chose from (Figure 5-26). Select the processor SCZP201 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
  P000STP1      2084     C24      LPAR
  P000STP2      2094     S08      LPAR
  SCZP101       2094     S18      LPAR
/ SCZP201       2097     E26      LPAR
  SCZP801       2064     1C7      LPAR
  SCZP901       2084     C24      LPAR
**************************** Bottom of data *****************************
```

*Figure 5-26 HCD - 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; see Figure 5-27.

   Fill in the following fields:

   – Title1
   – IOCP input data set
   – Enter `Yes` in the field `Input to Stand-alone IOCP?`
   – 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.IODF69.WORK'
Processor ID  . . . . . . . : SCZP201
Title1 . IODF69__________________________________________________________
Title2 : SYS6.IODF69.WORK - 2007-12-04 16:53

IOCP input data set
'SYS6.IODF69.IOCPIN.SCZP201'_________________________
Input to Stand-alone IOCP?  Yes  (Yes or No)

Job statement information
//WIOCP   JOB (ACCOUNT),'NAME'
//*
//*
```

*Figure 5-27 HCD - 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; see Figure 5-28 on page 227. Also shown here is the LSYSTEM keyword and the CHPID statement showing the CPATH and CSYSTEM keywords.

```
ID    MSG1='IODF69',                                            *
      MSG2='SYS6.IODF69.WORK - 2007-12-04 16:53',               *
      SYSTEM=(2097,1),LSYSTEM=SCZP201,                          *
      TOK=('SCZP201',00800001991E2094165352310107338F00000000,*
      00000000,'07-12-04','16:53:52','........','........')
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),*
      (A21,1),(A22,2),(A23,3),(A24,4),(A25,5),(*,6),(*,7),(*,8*
      ),(*,9),(*,A),(*,B),(*,C),(*,D),(*,E),(*,F)),(CSS(3),(A3*
      1,1),(A32,2),(A33,3),(*,4),(*,5),(*,6),(*,7),(*,8),(*,9)*
      ,(*,A),(*,B),(*,C),(*,D),(*,E),(*,F)))
CHPID PATH=(CSS(0,1,2,3),00),SHARED,                            *
      NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1D,A1E,A1F*
      ),(=))),PCHID=120,TYPE=OSD
CHPID PATH=(CSS(0,1,2,3),01),SHARED,                            *
      NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1D,A1E,A1F*
      ),(=))),PCHID=121,TYPE=OSD
.................................................................
CHPID PATH=(CSS(0),80),SHARED,PARTITION=((A01),(=)),            *
      CPATH=(CSS(0),B0),CSYSTEM=SCZP101,AID=0B,PORT=1,TYPE=CIB
.................................................................
CNTLUNIT CUNUMBR=FFDC,PATH=((CSS(0),80)),UNIT=CFP
IODEVICE ADDRESS=(FD86,007),CUNUMBR=(FFDC),UNIT=CFP
```

*Figure 5-28 HCD - IOCP input data set contents (truncated)*

Note that part of the TOK statement has been blanked out with dots; see Example 5-1 on page 228.

*Example 5-1 HCD - IOCP file (TOK statement)*

```
TOK=('SCZP201',00800001991E2094165352310107338F00000000,*
00000000,'07-12-04','16:53:52','........','........')
```

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 TSO 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 SCZP201in.iocp

## 5.4 CHPID Mapping Tool actions

In the following process, we take the output from the previous set of HCD steps (IOCP), as well as the output from the 2097 order process (CFReport). We then use the CHPID Mapping Tool to assign PCHIDs to channels in the configuration.

Download and install the CHPID Mapping Tool. Refer to “CHPID Mapping Tool” on page 24, 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, follow these steps:

1. Import the IOCP statements file and the new 2097 CFReport file into the CHPID Mapping Tool. Getting 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 file transfer back to the host. This step can be performed with HCM.

### Import the CFReport order file into the CHPID Mapping Tool

1. Start the CHPID Mapping Tool on your workstation.
2. Import the CFReport order file into the CHPID Mapping Tool by clicking **File** → **Import CFReport Order file** (Figure 5-29).

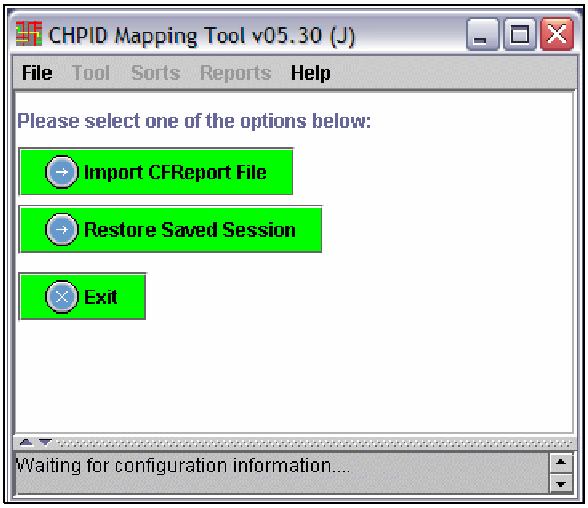



*Figure 5-29 CMT - Import CFReport Order file*

3. Select the CFReport file on your workstation to import into the CHPID Mapping Tool and click **Open** (Figure 5-30).

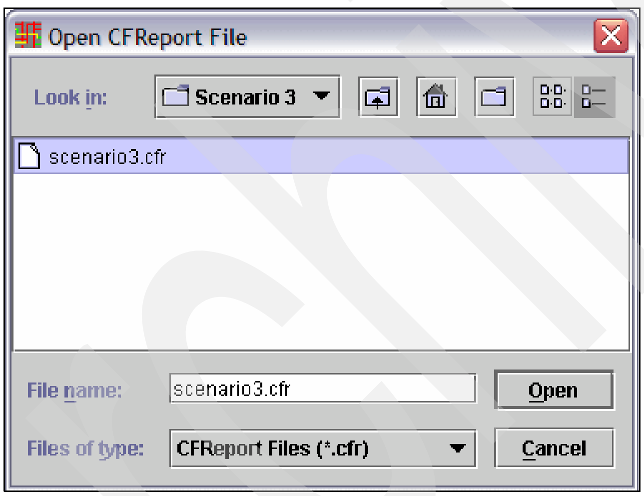



*Figure 5-30 CMT - Open CFReport Order file*

The CHPID Mapping Tool displays the information from the CFReport on the left-hand side of the window (Figure 5-31).

> **Note:** This display also shows the Adapter IDs for the two HCAs that have been ordered for this processor.

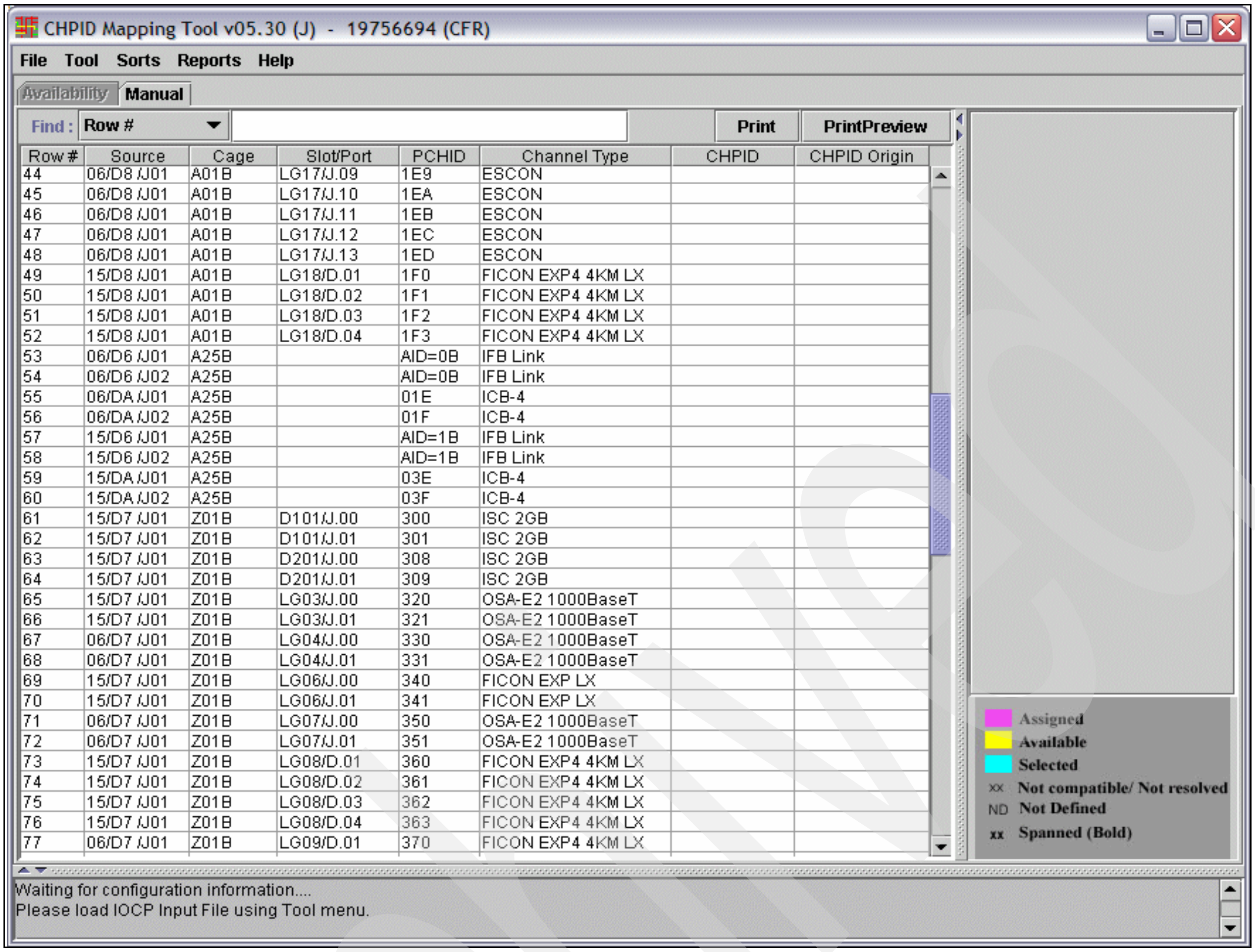



*Figure 5-31 CMT - Importing CFReport Order file*

## Import IOCP file into the CHPID Mapping Tool

1. Import the IOCP file by clicking **Tool** → **Import IOCP File** (Figure 5-32).

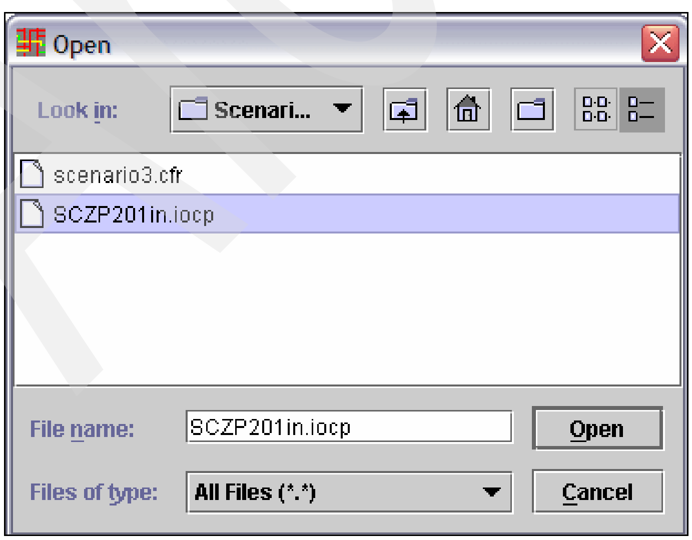



*Figure 5-32 CMT - Import IOCP files*

2. Select the IOCP file on your workstation to import into the CHPID Mapping Tool and click **Open**.

### Hardware resolution

The CHPID Mapping Tool may prompt you to resolve any issues that might arise from importing the IOCP file. In our example, the CHPID Mapping Tool requests clarification on the TYPE=OSD, TYPE=FCP, and TYPE=FC channels.

In each case, we must check off what each of the channels is used for. The image on the lower right-hand side of Figure 5-33 on page 232 shows what we have selected for the FC channels.

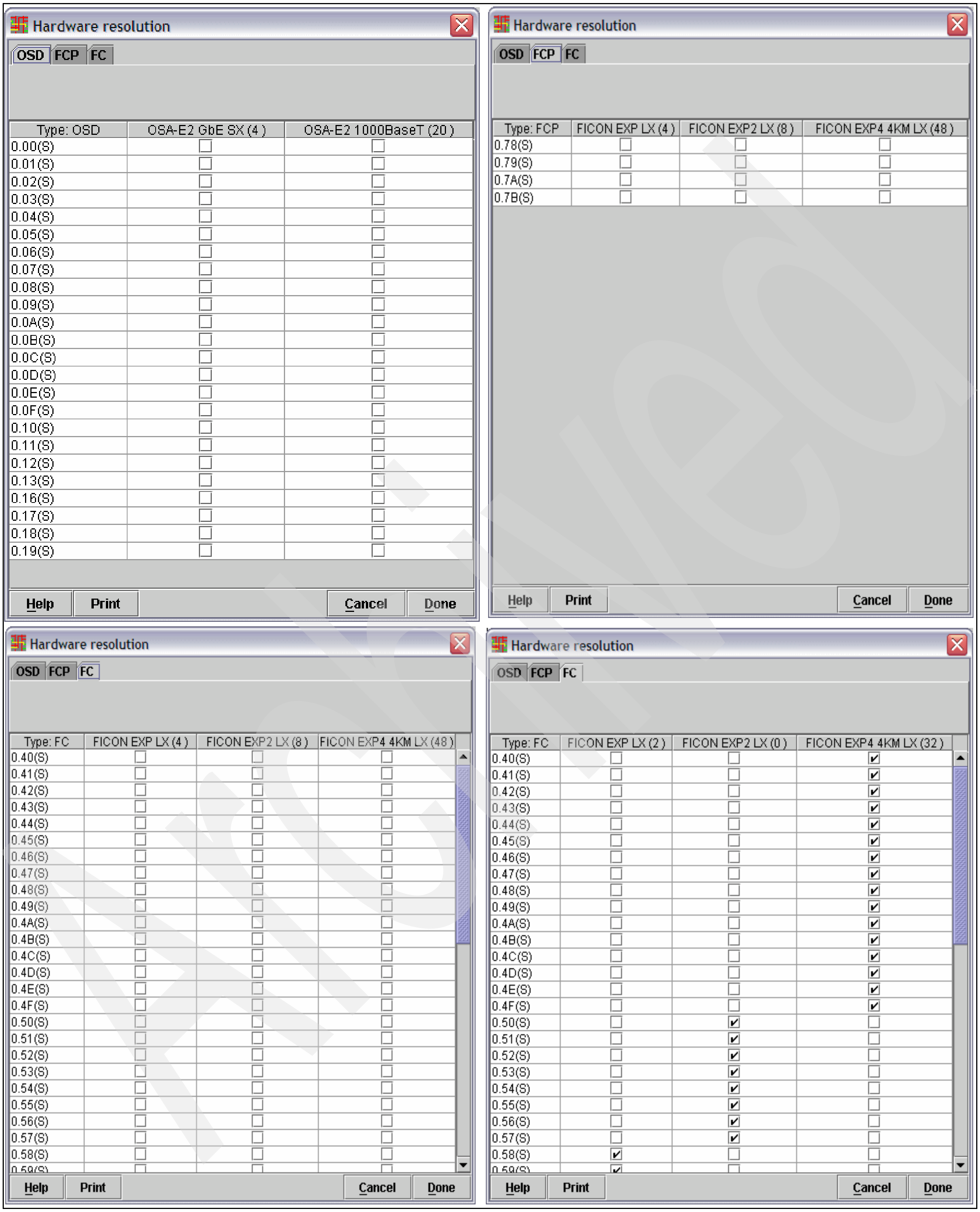


*Figure 5-33 CMT - Hardware resolution after IOCP import*

Select one tab at a time. Click the desired box and move to the next tab until all CHPID definitions have hardware selected.

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 5-34).

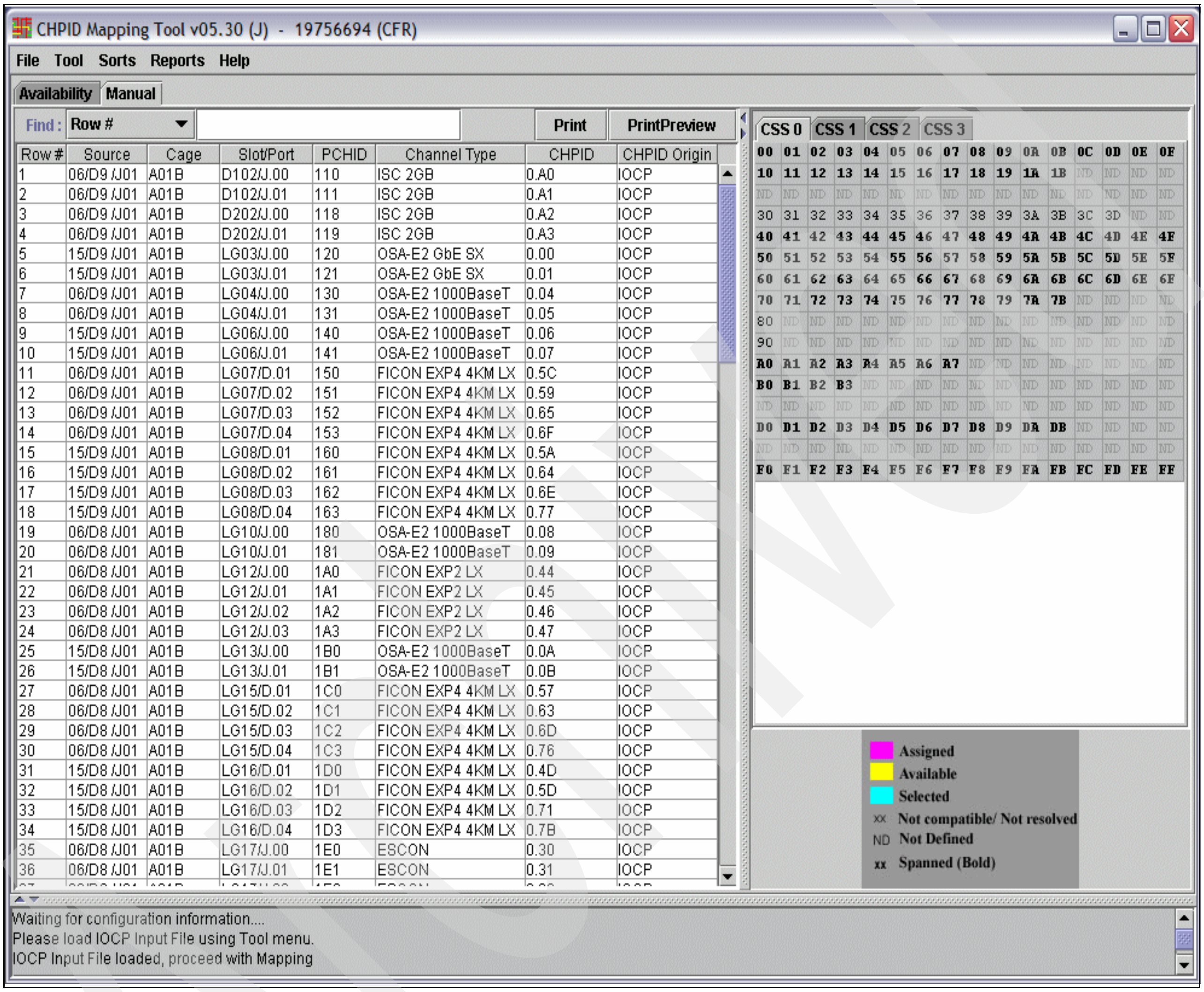



*Figure 5-34 CMT - Manual tab*

## Set control unit priority manually

1. Under the File menu, click the **Availability** tab.
2. Click **Process CU Priority** and a window pops up.

   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** because no PCHIDs were defined in the IOCP input and we did not assign any in the manual panel.
3. Click **Process**; see Figure 5-35 on page 234.

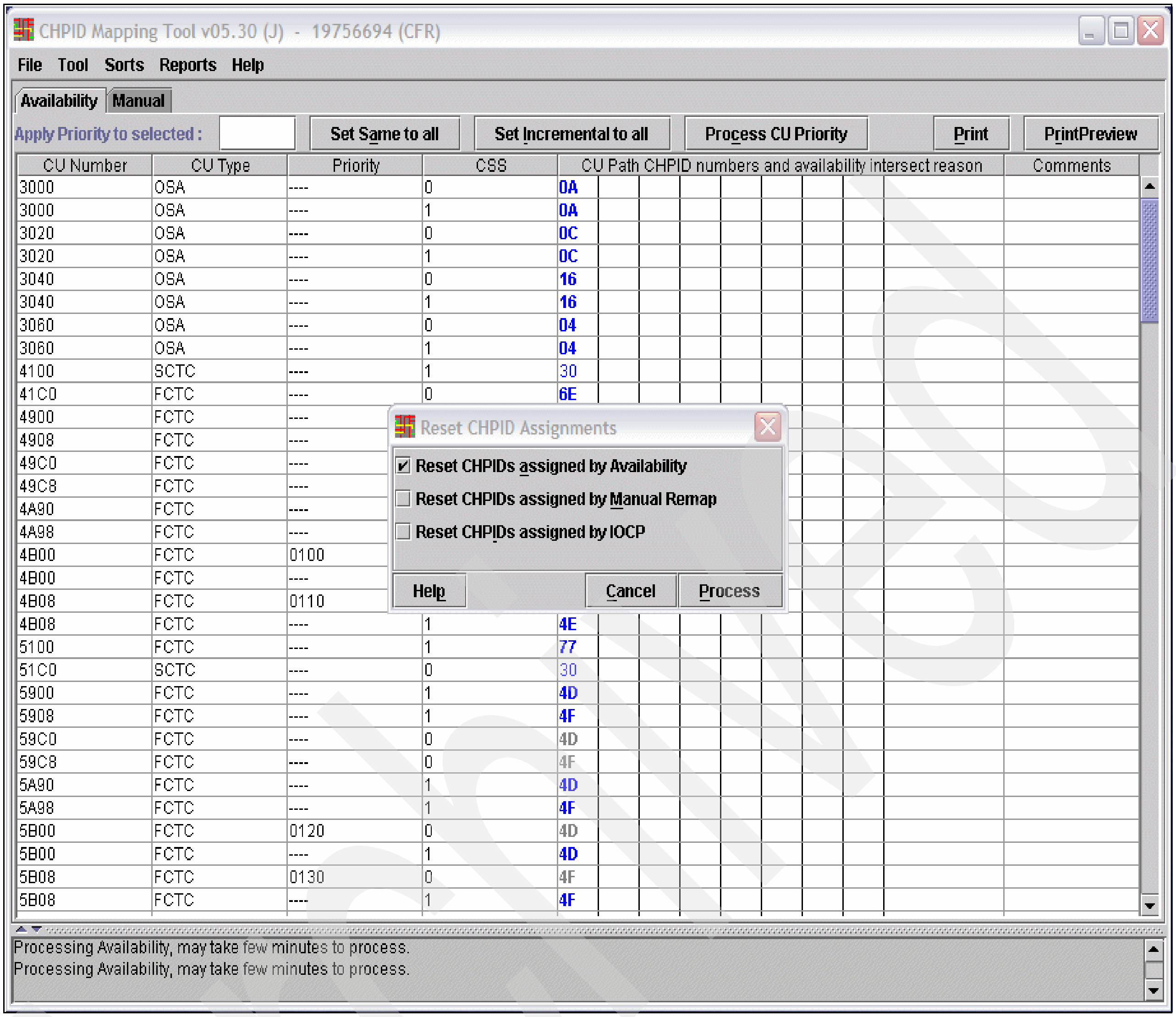



*Figure 5-35 CMT - Reset CHPID Assignments by Availability*

4. After the CHPID Mapping Tool has assigned the CHPIDs, a message indicating the results of the process is displayed (Figure 5-36).

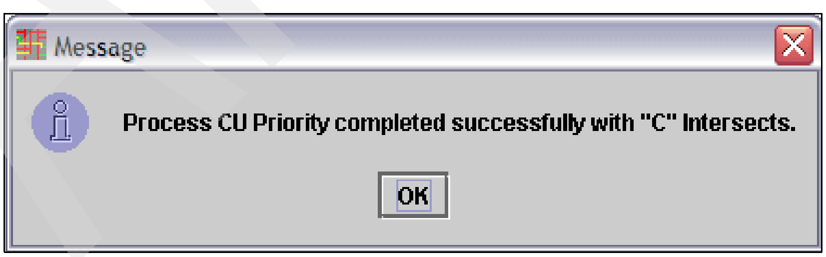



*Figure 5-36 CMT - Process CU Priority completion message*

Our example only returned “**C**” type intersects, which we deliberately defined to show the example of defining 2 x PSIFB links on the same HCA (refer to Figure 5-20).

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 5-37 shows the “**C**” intersects under the availability tab.

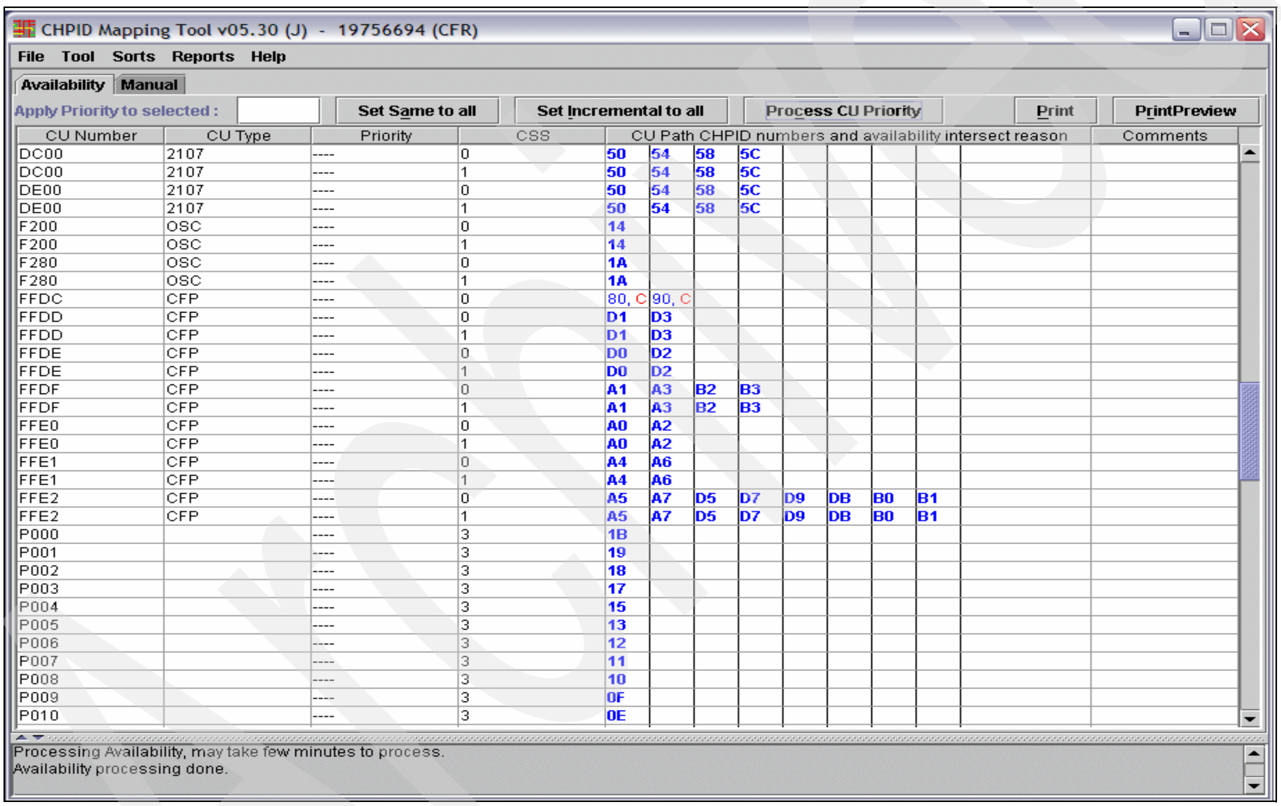



*Figure 5-37 CMT - C type intersects via Availability tab*

6. Now click the **Manual** tab and notice the "**C**" intersects (Figure 5-38).

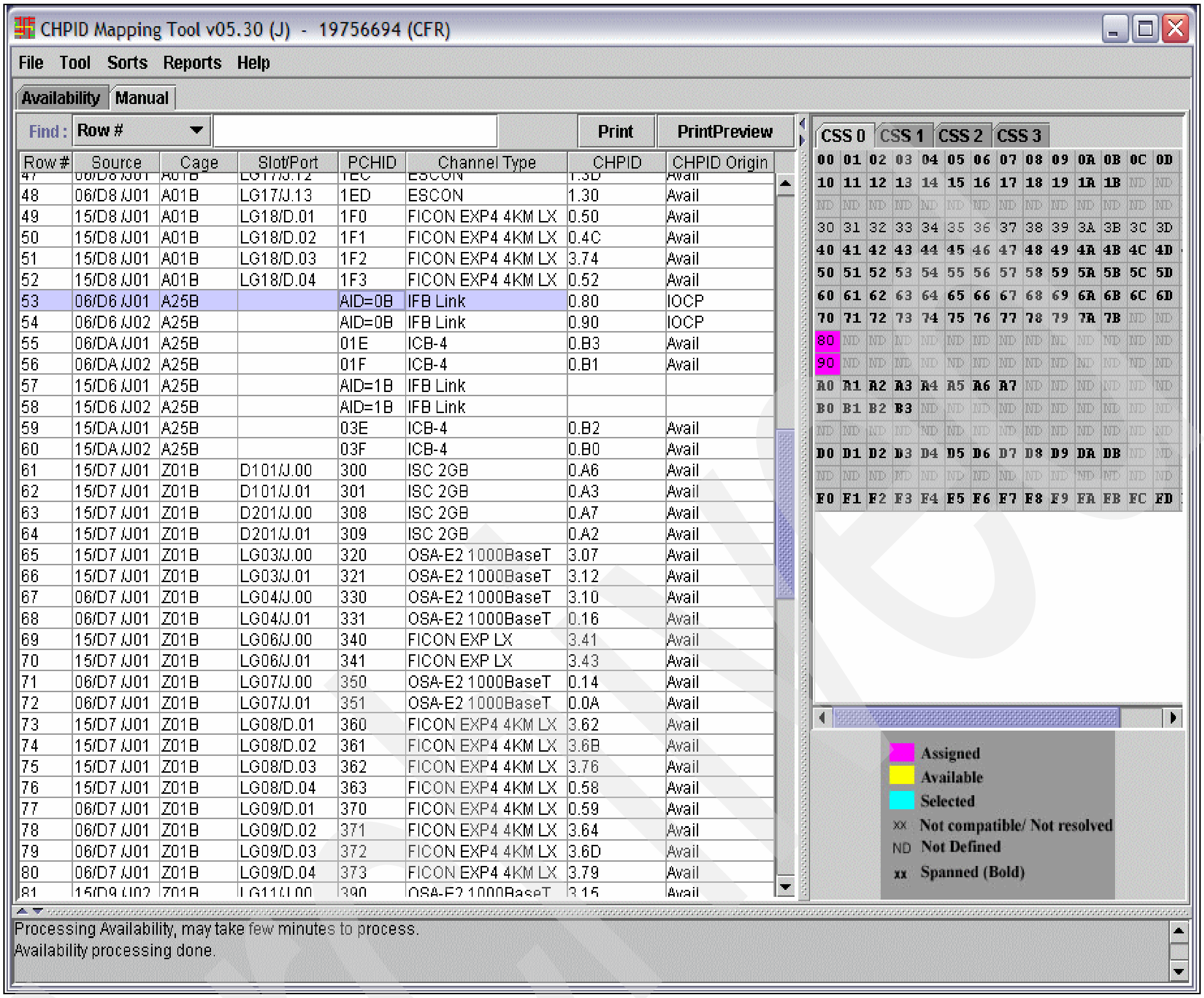



*Figure 5-38 CMT - C type intersects via Manual tab*

The CHPID Mapping Tool can only identify these intersects, 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, click **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 you want to set priority for.

  In our example we set the OSC type CU Numbers F200 and F280 to priority 333 plus a few FCTCs and a 2107 CU; see Figure 5-39.

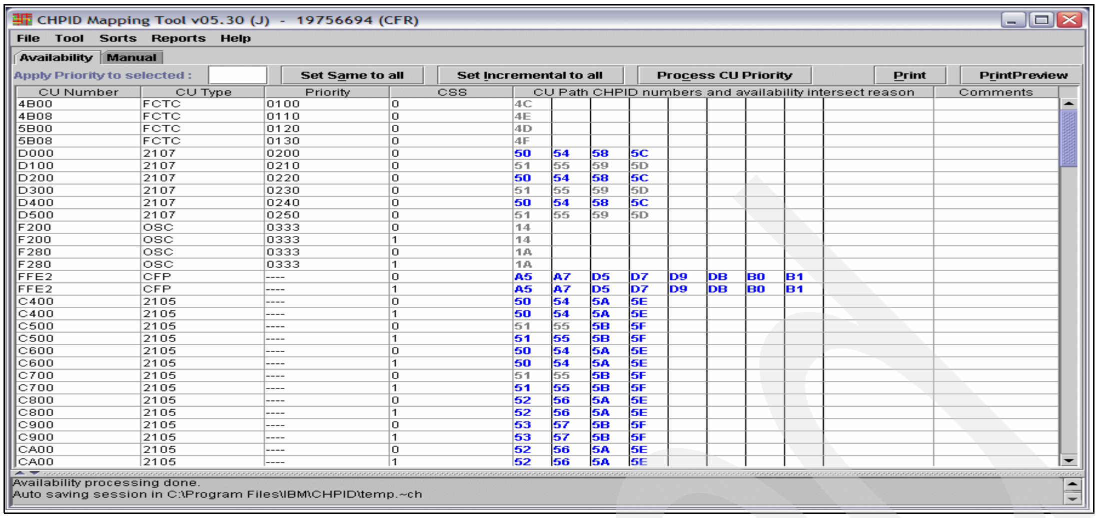



*Figure 5-39 CMT Set CU Priority*

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.

1. Under the File menu, click the **Availability** tab.
2. Click **Process CU Priority**. The Reset CHPID Assignment window opens to allow 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**.
3. Click **Process**.
4. Click **Sorts** → **By CU Priority** and you notice that the OSC type control units with priority of 333 have sorted to the top of the list.
5. Select the **Manual** tab to view the results of mapping the CHPIDs (Figure 5-40 on page 238).

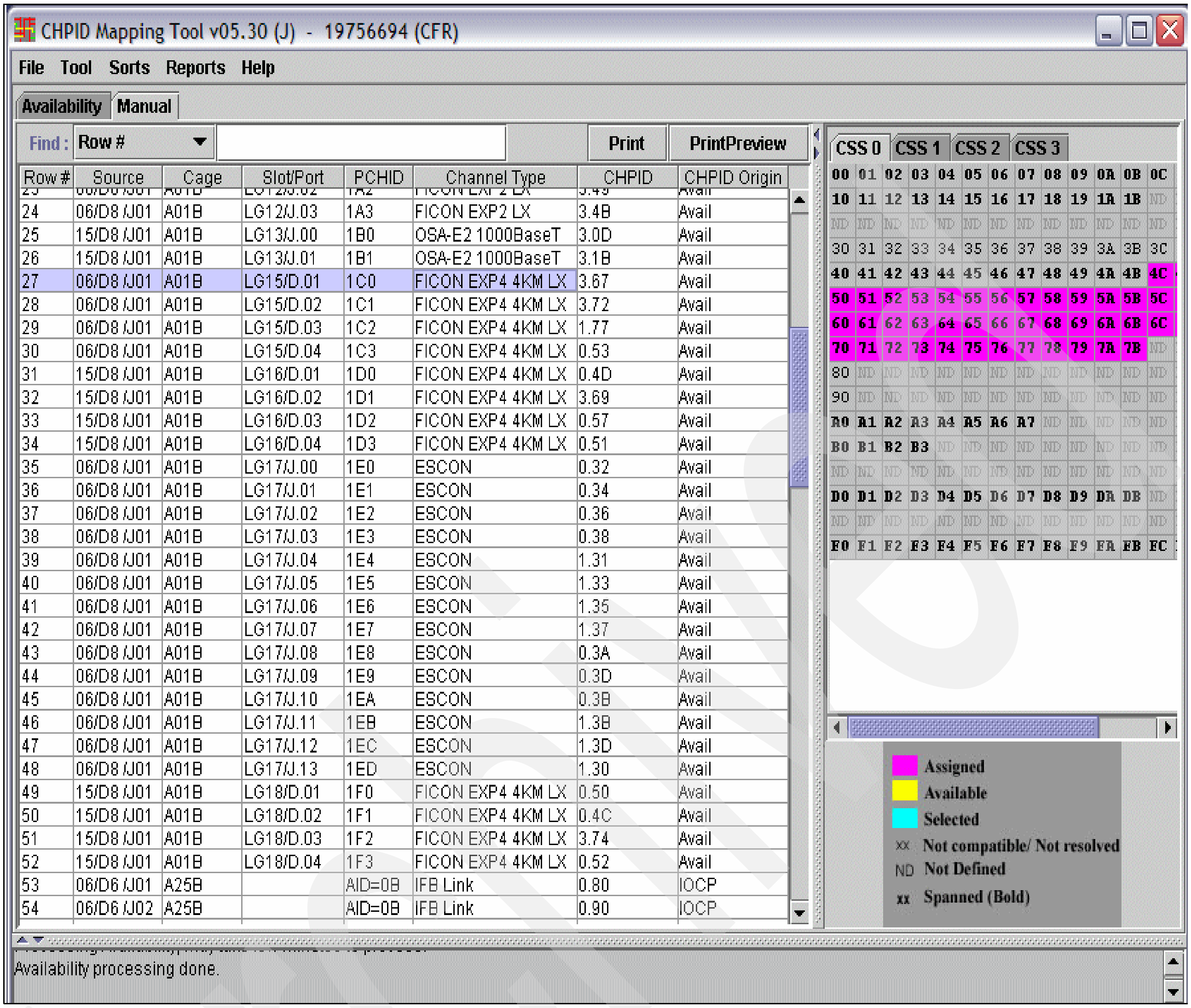



*Figure 5-40 CMT - Manual (CHPIDs assigned)*

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 value “Avail” in the CHPID Origin column, indicating that the CHPID values were assigned based on availability.

## CHPIDs not connected to Control Units

Under the **Availability** tab, click **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 5-41).

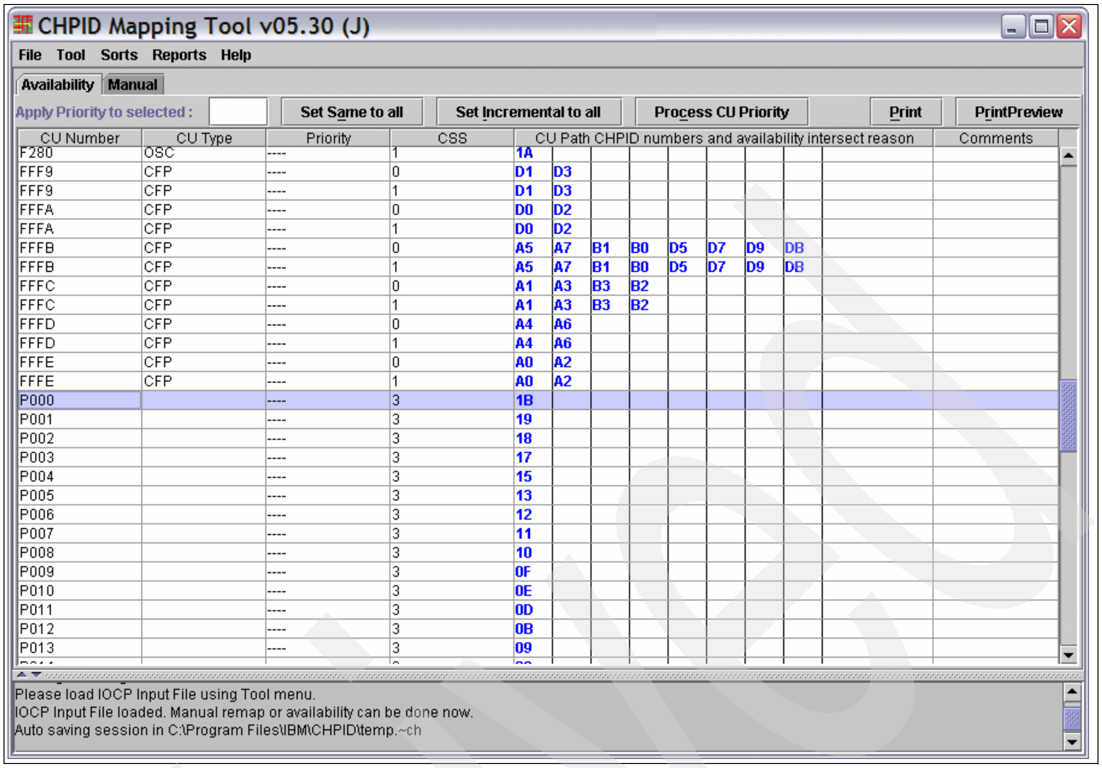



*Figure 5-41 CMT - Sort by Control Unit*

- 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 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 will allow the availability mapping function to pick PCHIDs that will afford your new control unit good availability.

## Create reports for the hardware team

The CHPID Mapping Tool has built-in reports, which are available from the Reports pull-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, as explained here.

The person who will install 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 to help with labelling the cables. The labels must include the PCHID or cage/slot/port information before system delivery.

### *CHPID Report*

1. Click **Reports** → **CHPID Report** (Figure 5-42).

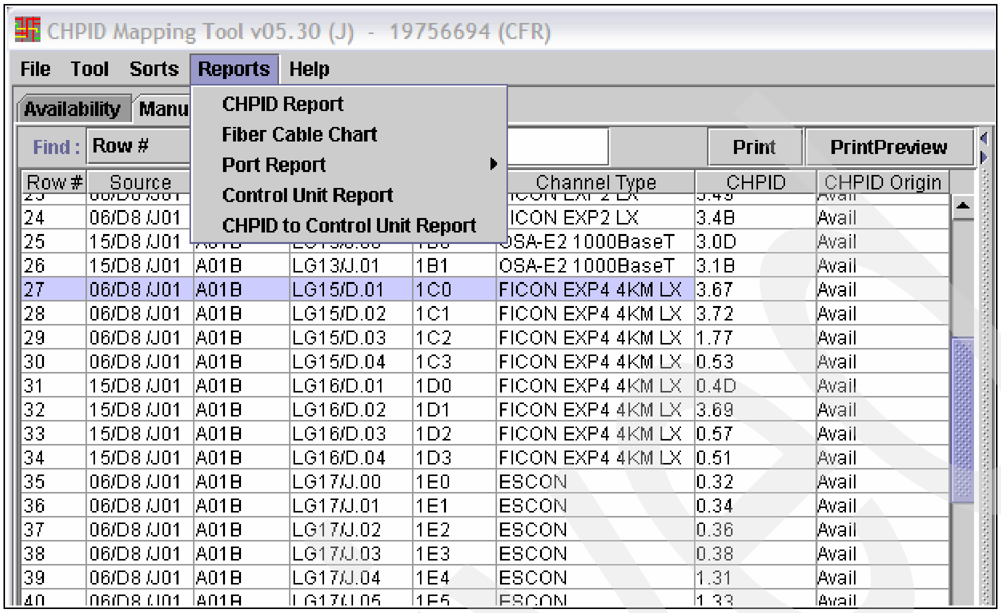



*Figure 5-42 CMT - select CHPID Report*

2. Enter the report File name, or accept the name that the CHPID Mapping Tool enters and click **Save** (Figure 5-43).

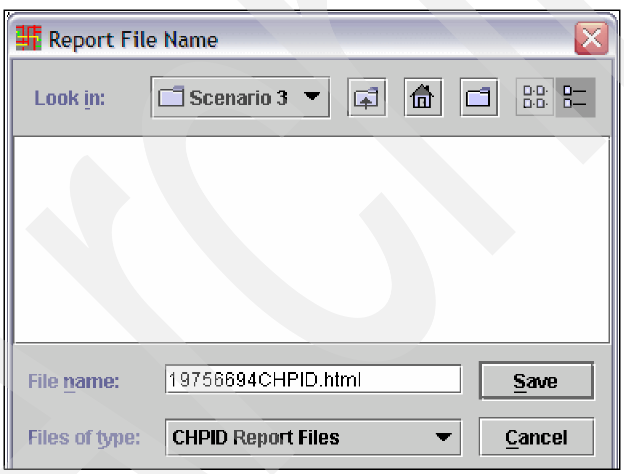



*Figure 5-43 CMT - Report File Name*

The CHPID Mapping Tool opens a browser window with the CHPID report (Figure 5-44 on page 241).

3. You may be prompted to accept active content. Accept the active content in order to display the report in your browser.

# CHPID Mapping Tool - CHPID Report

Control Number: 19756694(CFR)
Machine: 2097-E26

Report Created: Dec. 14, 2007
IOCP File: sczp201in.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/ D6 | A25B | D606 | 0163 | AID=0B J01/0.80 J02/0.90 |
| 15/ D6 | A25B | D615 | 0163 | AID=1B J02/_.__ J01/_.__ |
| 06/ DA | A25B | DA06 | 3393 | 0.B3(S)/01E/J01 |
| 06/ DA | A25B | DA06 | 3393 | 0.B1(S)/01F/J02 |
| 15/ DA | A25B | DA15 | 3393 | 0.B2(S)/03E/J01 |
| 15/ DA | A25B | DA15 | 3393 | 0.B0(S)/03F/J02 |
| 15/ D9/ J.01 | A01B | 01 | 0863 | _.__/100/P00 _.__/101/P01 |
| 06/ D9/ J.01 | A01B | D102 | 0218 | 0.A4(S)/110/J00 0.A1(S)/111/J01 |
| 06/ D9/ J.01 | A01B | D202 | 0218 | 0.A0(S)/118/J00 0.A5(S)/119/J01 |
| 15/ D9/ J.01 | A01B | 03 | 3365 | 3.01(S)/120/J00 3.03(S)/121/J01 |
| 06/ D9/ J.01 | A01B | 04 | 3366 | 3.0B(S)/130/J00 3.19(S)/131/J01 |
| 15/ D9/ J.01 | A01B | 06 | 3366 | 3.09(S)/140/J00 3.17(S)/141/J01 |
| 06/ D9/ J.01 | A01B | 07 | 3324 | 3.66(S)/150/D01 3.71(S)/151/D02 3.7B(S)/152/D03 0.5C(S)/153/D04 |
| 15/ D9/ J.01 | A01B | 08 | 3324 | 3.70(S)/160/D01 3.7A(S)/161/D02 0.5D(S)/162/D03 3.65(S)/163/D04 |
| 06/ D8/ J.01 | A01B | 10 | 3366 | 3.0E(S)/180/J00 3.18(S)/181/J01 |
| 15/ D8/ J.01 | A01B | 11 | 0863 | _.__/190/P00 _.__/191/P01 |
| 06/ D8/ J.01 | A01B | 12 | 3319 | 3.45(S)/1A0/J00 3.47(S)/1A1/J01 3.49(S)/1A2/J02 3.4B(S)/1A3/J03 |

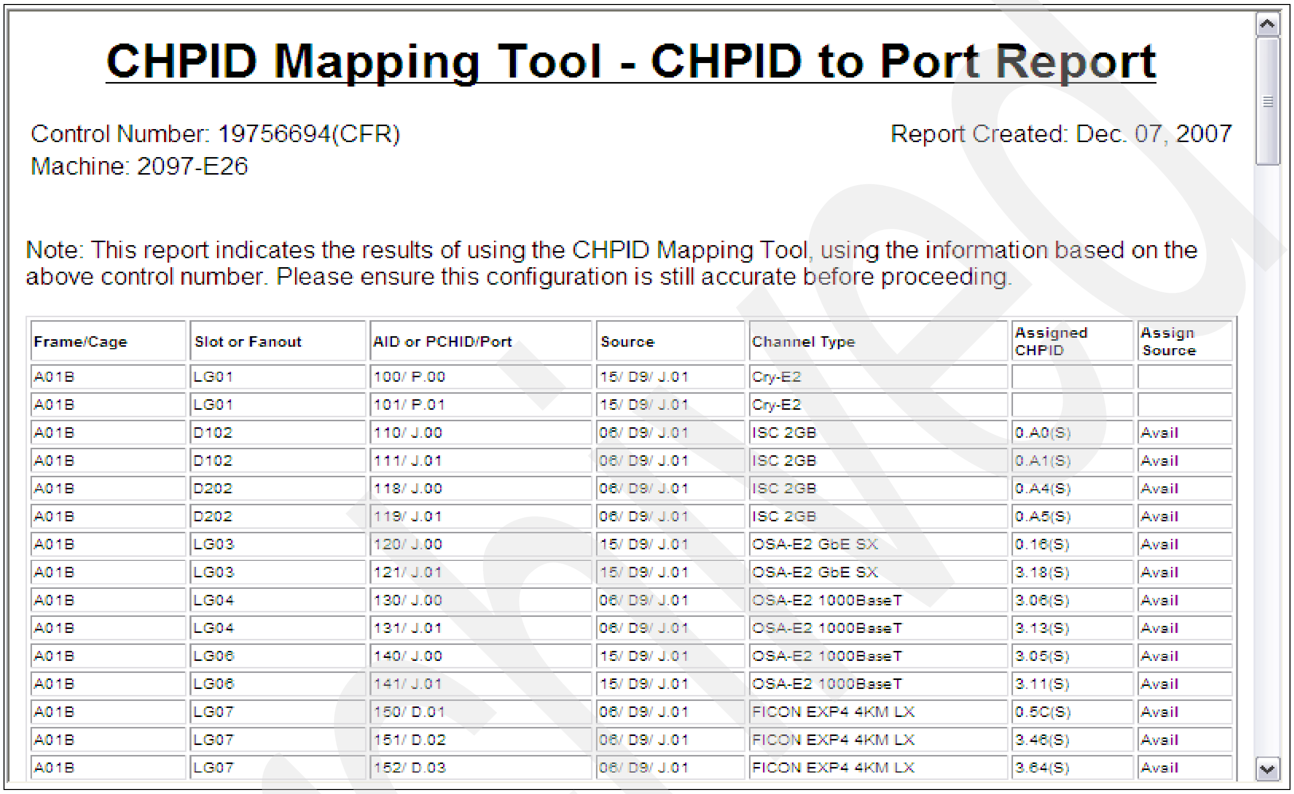
*Figure 5-44 CMT - CHPID Report*

### *Port Report sorted by location*

1. Click **Reports** → **Port Report** → **Sorted by Location**. 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 5-45 on page 242).

2. You may be prompted to accept active content. Accept the active content in order to display the report in your browser.



# CHPID Mapping Tool - CHPID to Port Report

Control Number: 19756694(CFR)
Report Created: Dec. 07, 2007
Machine: 2097-E26

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 | Assign Source |
|---|---|---|---|---|---|---|
| A01B | LG01 | 100/ P.00 | 15/ D9/ J.01 | Cry-E2 | | |
| A01B | LG01 | 101/ P.01 | 15/ D9/ J.01 | Cry-E2 | | |
| A01B | D102 | 110/ J.00 | 06/ D9/ J.01 | ISC 2GB | 0.A0(S) | Avail |
| A01B | D102 | 111/ J.01 | 06/ D9/ J.01 | ISC 2GB | 0.A1(S) | Avail |
| A01B | D202 | 118/ J.00 | 06/ D9/ J.01 | ISC 2GB | 0.A4(S) | Avail |
| A01B | D202 | 119/ J.01 | 06/ D9/ J.01 | ISC 2GB | 0.A5(S) | Avail |
| A01B | LG03 | 120/ J.00 | 15/ D9/ J.01 | OSA-E2 GbE SX | 0.16(S) | Avail |
| A01B | LG03 | 121/ J.01 | 15/ D9/ J.01 | OSA-E2 GbE SX | 3.18(S) | Avail |
| A01B | LG04 | 130/ J.00 | 06/ D9/ J.01 | OSA-E2 1000BaseT | 3.06(S) | Avail |
| A01B | LG04 | 131/ J.01 | 06/ D9/ J.01 | OSA-E2 1000BaseT | 3.13(S) | Avail |
| A01B | LG06 | 140/ J.00 | 15/ D9/ J.01 | OSA-E2 1000BaseT | 3.05(S) | Avail |
| A01B | LG06 | 141/ J.01 | 15/ D9/ J.01 | OSA-E2 1000BaseT | 3.11(S) | Avail |
| A01B | LG07 | 150/ D.01 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 0.5C(S) | Avail |
| A01B | LG07 | 151/ D.02 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 3.46(S) | Avail |
| A01B | LG07 | 152/ D.03 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 3.64(S) | Avail |

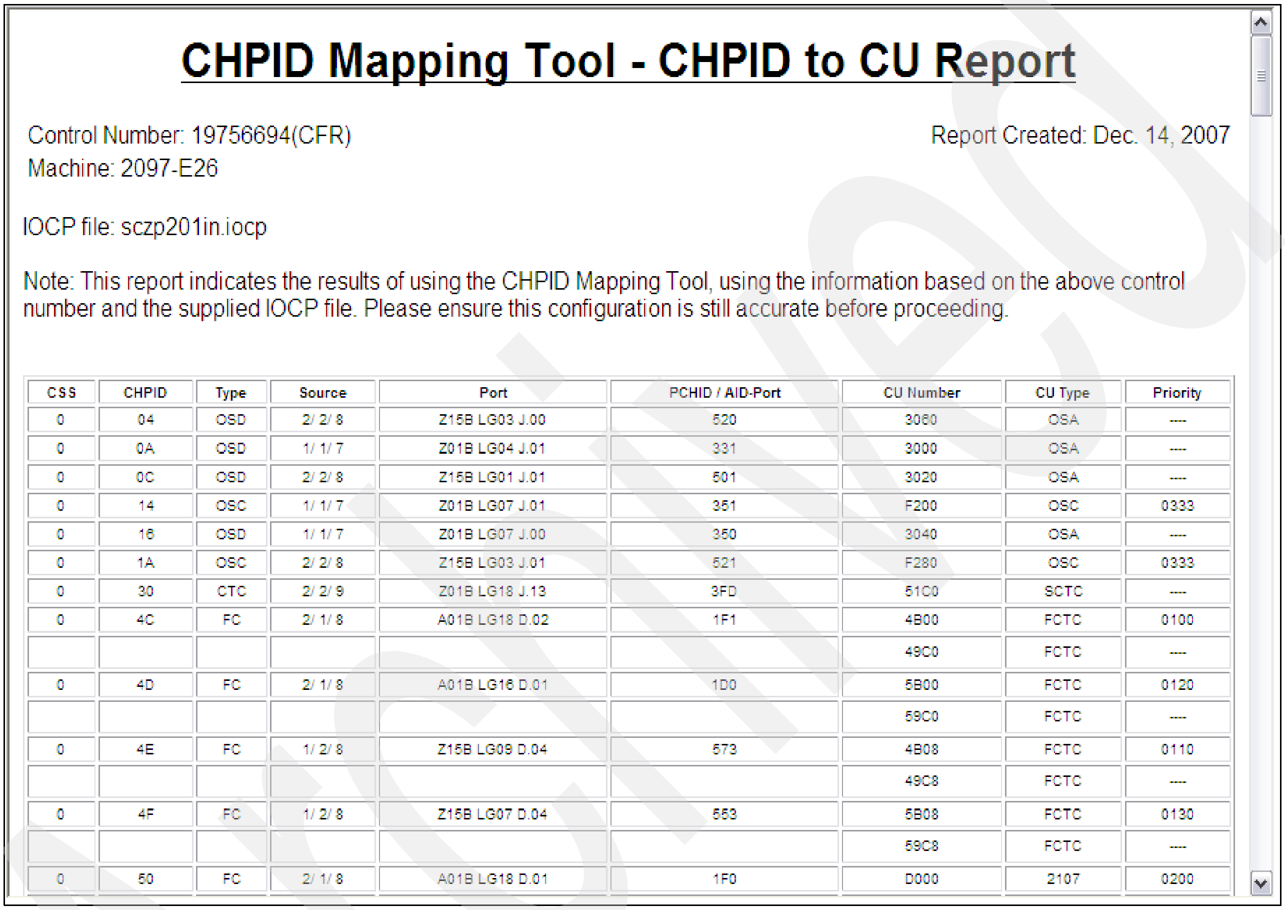
*Figure 5-45 CMT - CHPID to Port Report*

### *CHPID to Control Unit Report*

1. Click **Reports** → **CHPID to Control Unit Report**. Click **Save** (assuming that you accept the CHPID Mapping Tool report name).

   The CHPID Mapping Tool opens a browser window with the CHPID to Control Unit Report (Figure 5-46).

2. You may be prompted to accept active content. Accept the active content in order to display the report in your browser.



CHPID Mapping Tool - CHPID to CU Report

Control Number: 19756694(CFR)

Report Created: Dec. 14, 2007

Machine: 2097-E26

IOCP file: sczp201in.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 | 04 | OSD | 2/ 2/ 8 | Z15B LG03 J.00 | 520 | 3060 | OSA | ---- |
| 0 | 0A | OSD | 1/ 1/ 7 | Z01B LG04 J.01 | 331 | 3000 | OSA | ---- |
| 0 | 0C | OSD | 2/ 2/ 8 | Z15B LG01 J.01 | 501 | 3020 | OSA | ---- |
| 0 | 14 | OSC | 1/ 1/ 7 | Z01B LG07 J.01 | 351 | F200 | OSC | 0333 |
| 0 | 16 | OSD | 1/ 1/ 7 | Z01B LG07 J.00 | 350 | 3040 | OSA | ---- |
| 0 | 1A | OSC | 2/ 2/ 8 | Z15B LG03 J.01 | 521 | F280 | OSC | 0333 |
| 0 | 30 | CTC | 2/ 2/ 9 | Z01B LG18 J.13 | 3FD | 51C0 | SCTC | ---- |
| 0 | 4C | FC | 2/ 1/ 8 | A01B LG18 D.02 | 1F1 | 4B00 | FCTC | 0100 |
| | | | | | | 49C0 | FCTC | ---- |
| 0 | 4D | FC | 2/ 1/ 8 | A01B LG16 D.01 | 1D0 | 5B00 | FCTC | 0120 |
| | | | | | | 59C0 | FCTC | ---- |
| 0 | 4E | FC | 1/ 2/ 8 | Z15B LG09 D.04 | 573 | 4B08 | FCTC | 0110 |
| | | | | | | 49C8 | FCTC | ---- |
| 0 | 4F | FC | 1/ 2/ 8 | Z15B LG07 D.04 | 553 | 5B08 | FCTC | 0130 |
| | | | | | | 59C8 | FCTC | ---- |
| 0 | 50 | FC | 2/ 1/ 8 | A01B LG18 D.01 | 1F0 | D000 | 2107 | 0200 |

*Figure 5-46 CMT - CHPID to CU Report*

## Create the updated IOCP file

> **Note:** You may 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 via HCD. This IOCP statements file now has the CHPIDs assigned to PCHIDs.

1. Click **Tool** → **Create Updated IOCP File** (see Figure 5-47 on page 244).

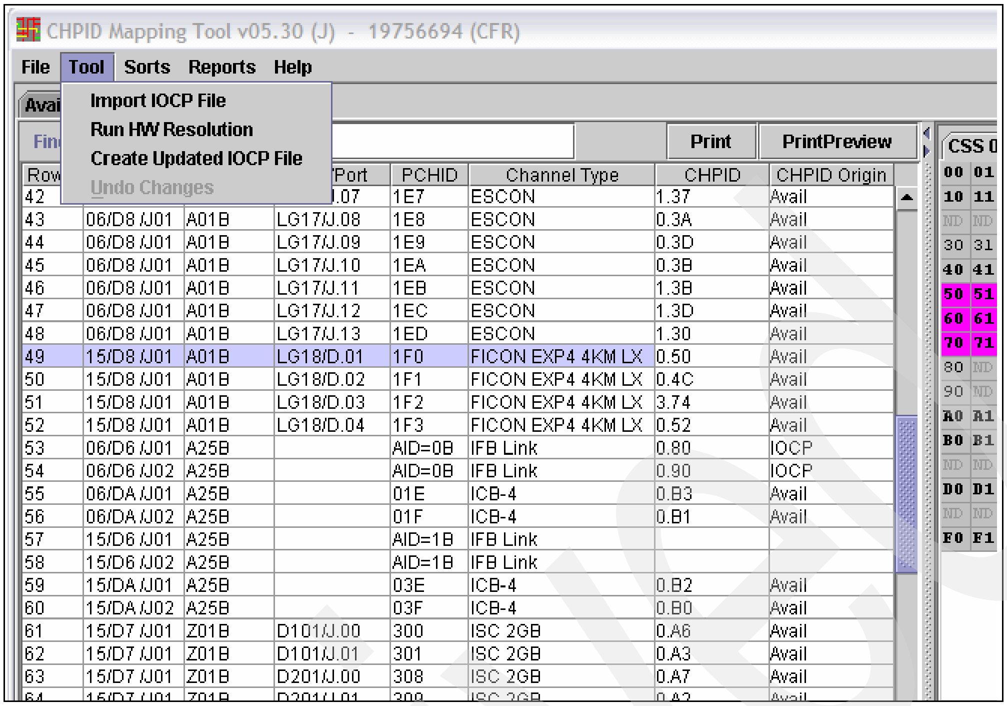


*Figure 5-47 CMT - Create Updated IOCP File*

2. Enter File name and location for the IOCP output file, then click **Save** (Figure 5-48).

> **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.

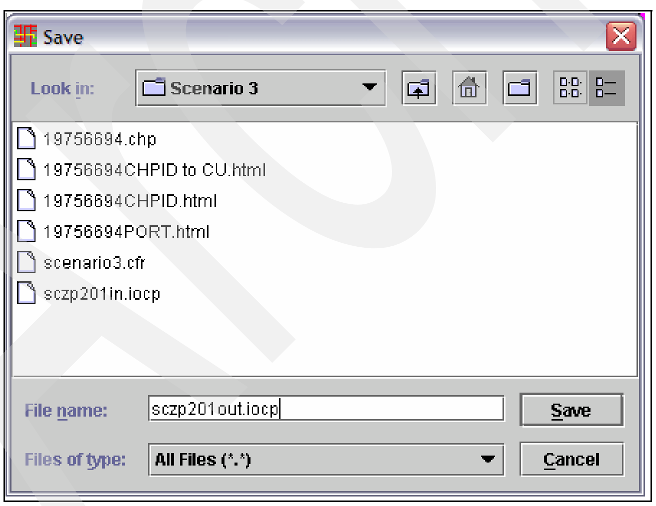


*Figure 5-48 CMT - Save IOCP output file*

3. The CHPID Mapping Tool displays an informational message, shown in Figure 5-49 on page 245, regarding what to do for the final execution of the tool.

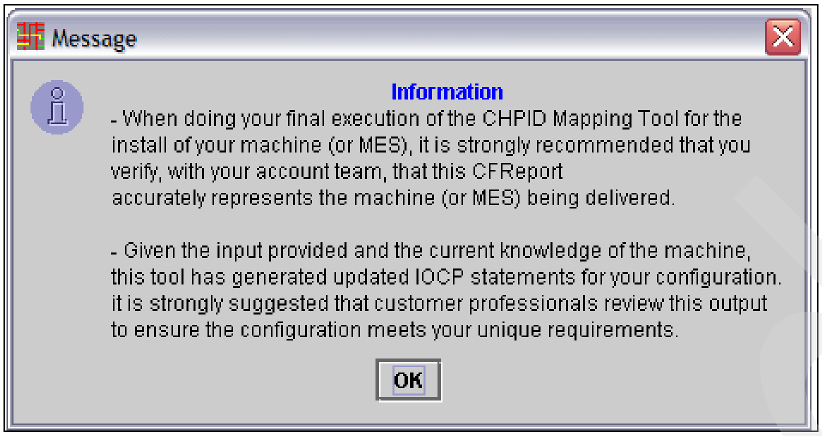



*Figure 5-49 CMT - informational message*

## 5.5 Migrate PCHIDs back into the 2097 work IODF

After mapping the CHPIDs to PCHIDs using the CHPID Mapping Tool, this information needs to be input back to HCD. This is accomplished by using the updated IOCP statement file (for example, sczp201out.iocp), as follows:

1. Upload the sczp201out.txt file to the z/OS image in order to migrate the PCHID information into HCD. 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 the updated IOCP statements file, notice that the CHPID Mapping Tool has left its mark with reference to the CCN. Also notice the CU Priority values added for the OSC control units, F200 and F280, and for some other CUs.

> **Note:** Control unit priorities are stored in the IOCP output file created by the CHPID Mapping Tool 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; see Example 5-2.

*Example 5-2 HCD - Updated IOCP statements file (with CMT statements)*

```
         IODEVICE ADDRESS=(FFDD,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFF9,007),CUNUMBR=(FFFE),UNIT=CFP
*CMT* VERSION=000
*CMT* CCN=19756694(CFR)
*CMT* 4B00.0=0100,4B08.0=0110,5B00.0=0120,5B08.0=0130,D000.0=0200
*CMT* D100.0=0210,D200.0=0220,D300.0=0230,D400.0=0240,D500.0=0250
*CMT* F200.0=0333,F200.1=0333,F280.0=0333,F280.1=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 used to create the IOCP input data set for the CHPID Mapping Tool on the HCD main menu; see Figure 5-50 on page 246. Select option **5**, **Migrate configuration data**.

```
                       z/OS V1.9 HCD
Command ===> ______________________________________________________

                           Hardware Configuration

Select one of the following.

5_  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.IODF69.WORK'                     +
```

*Figure 5-50 HCD - main menu, select Migrate configuration data*

3. The Migrate Configuration Data panel displays; see Figure 5-51. 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 5-51 HCD - Migrate Configuration Data*

4. HCD displays the Migrate IOCP Data panel; see Figure 5-52 on page 247. Fill in the following fields:

| | |
|---|---|
| `Processor ID` | Use the same one as 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 TSO (see 5.6, “HCD - build the 2097 production IODF” on page 248). |
| `Processing mode` | Use **2** to save the results of the migration. (Prior to using 2, however, try to migrate using **1**, in order to validate the operation.) |
| `Migrate options` | Use **3** for PCHIDS. Only the PCHIDs are migrated into the work IODF. |

Then press Enter.

```
------------------- Migrate IOCP / MVSCP / HCPRIO Data --------------------

Specify or revise the following values.

Processor ID . . . . . . . . . . . . SCZP201_  +   CSS ID . . . . . .    +
OS configuration ID  . . . . . . . . TEST2097  +

Combined IOCP/MVSCP input data set . _____________________________________
IOCP only input data set . . . . . . 'SYS6.IODF69.IOCPOUT.SCZP201'
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 5-52 HCD - 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; see Figure 5-53.

```
------------------------- 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.IODF69.WORK.
```

*Figure 5-53 HCD - Migration Message List*

This is the message that you should also 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.

## 5.6 HCD - build the 2097 production IODF

In order to make use of the definitions that were updated in HCD, a production IODF needs to be created from the work IODF. Follow these steps:

1. From the HCD main menu, select option **2**, **Activate or process configuration data** (see Figure 5-54).

```
                       z/OS V1.9 HCD
Command ===> ______________________________________________________

                           Hardware Configuration

Select one of the following.

2   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.IODF69.WORK'                  +
```

*Figure 5-54 HCD - Main menu, select Activate or process configuration data*

2. The Activate or Process Configuration Data panel is displayed (Figure 5-55). 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 statements
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

*Figure 5-55 HCD - Activate or Process Configuration Data, select Build production IODF*

3. The Message List panel is displayed (Figure 5-56). 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 4
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.
***************************** Bottom of data ******************************
```

*Figure 5-56 HCD - Message List (building Production IODF)*

4. Press PF3 to continue.
5. The Build Production I/O Definition File panel is displayed (Figure 5-57). Fill in the fields Production IODF name and Volume serial number, then press Enter.

```
------------- Build Production I/O Definition File ------------


Specify the following values, and choose how to continue.

Work IODF name . . . : 'SYS6.IODF69.WORK'

Production IODF name . 'SYS6.IODF69'______________________
Volume serial number . BH8ST1  +

Continue using as current IODF:
2   1.  The work IODF in use at present
    2.  The new production IODF specified above
```

*Figure 5-57 HCD - Build Production I/O Definition File*

6. The Define Descriptor Fields panel is displayed (Figure 5-58). 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.IODF39'

Descriptor field 1  . . . SYS6
Descriptor field 2  . . . IODF39
```

*Figure 5-58 HCD - Define Descriptor Fields*

7. HCD displays the following message, indicating that the production IODF was successfully created:

```
Production IODF SYS6.IODF69 created.
```

Proceed to the steps to implement the configuration on the 2097.

## 5.7 Implementing the processor configuration on the 2097

At this point there is a production IODF called SYS6.IODF69. Now the IOCDS component of the IODF needs to be updated on the new CPC that is being installed (for example, SCZP201) and activated (POR) using this IOCDS. The final step would be to POR the processor using this IOCDS.

Describing how to POR the new hardware is beyond the scope of this book.

There are 2 possible ways to load the IOCP Statements onto the 2097 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 2097 processor and Service Element may not be connected to the system where the configuration was generated or to any system where HCD is running. In that case you will need to use the Stand-Alone IOCP process.

First we will describe using HCD Option 2.11

### Updating the IOCDS using HCD Option 2.11

1. From the HCD main menu, select option **2**, **Activate or process configuration data** (Figure 5-59). Ensure that the IODF is the production one created in the previous step. Press Enter.

```
                        z/OS V1.9 HCD
Command ===> _____________________________________________________

                            Hardware Configuration

Select one of the following.

2   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.IODF69'                 +
```

*Figure 5-59 HCD - Main menu, select Activate or process configuration data*

2. The Activate or Process Configuration Data panel is displayed (Figure 5-60). Select option **11**, **Build and manage S/390 microprocessor IOCDSs and IPL attributes**.

   **Note:** In this example, we are assuming that we have connectivity to the new 2097 via the HMC LAN in order to create an IOCDS from which we power-on reset. This may not be the case for all readers.

   If the new 2097 is not accessible from the HMC LAN, you would need to copy the IOCP statements onto a USB Flash Memory Drive and import them to the 2097 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.

```
                    z/OS V1.9 HCD
----- 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 statements
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

*Figure 5-60 HCD - Activate or Process Configuration Data, select Build IOCDSs*

3. The S/390 Microprocessor Cluster List panel is displayed (Figure 5-61). Use a forward slash (/) to select the new 2097 from the list in order to update one of its IOCDSs. Press Enter.

```
Goto  Query  Help
------------------------------------------------------------------------------
                      S/390 Microprocessor Cluster List            Row 1 of 4
Command ===> _______________________________________________ Scroll ===> PAGE

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address        Type   Model   Processor ID
/ USIBMSC.SCZP201    2097   E26     SCZP201
_ USIBMSC.SCZP101    2094   S18     SCZP101
_ USIBMSC.SCZP801    2064   1C7     SCZP801
_ USIBMSC.SCZP901    2084   C24     SCZP102
******************************* Bottom of data ********************************
```

*Figure 5-61 HCD - S/390 Microprocessor Cluster List*

4. The Actions on selected CPCs panel is displayed (Figure 5-62). 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 5-62 HCD - Actions on selected CPCs, Work with IOCDSs*

5. The IOCDS List panel is displayed (Figure 5-63). Select the IOCDS that you wish to update for the 2097 install using the forward slash (/), then press Enter.

```
  Goto  Query  Help
------------------------------------------------------------------------------
                                  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.SCZP201  DIAG00   LPAR   POR        Yes       No          Yes-POR
/ A1.SCZP201  LPAR     Alternate         No        No          No
_ A2.SCZP201  DIAG02   LPAR   Alternate  No        No          No
_ A3.SCZP201  DIAG03   LPAR   Alternate  No        No          No
******************************* Bottom of data ********************************
```

*Figure 5-63 HCD - IOCDS List*

6. The Actions on selected IOCDSs panel is displayed (Figure 5-64). 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 5-64 HCD - Actions on selected IOCDSs*

7. The Build IOCDSs panel is displayed; see Figure 5-65. Verify that all the information is correct.
8. Fill in the field Title1 and press Enter.

```
------------------------------- Build IOCDSs ---------------------------------
                                                                   Row 1 of 1
  Command ===> ____________________________________________ Scroll ===> CSR

  Specify or revise the following values.

  IODF name . . . . . . . . . : 'SYS6.IODF69'

  Title1 . IODF69 __________________________________________________________
  Title2 : SYS6.IODF69 - 2007-11-28 18:49

                             Write IOCDS in
  IOCDS        Switch IOCDS  preparation of upgrade
  A1.SCZP201   No            No
  ***************************** Bottom of data ******************************
```

*Figure 5-65 HCD - Build IOCDSs*

9. The Job Statement Information panel is displayed (Figure 5-66). Fill in 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
  //WIOCDS  JOB (ACCOUNT),'NAME'
  //*
  //*
  //*
```

*Figure 5-66 HCD - 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 a message like the following:

    `ICP057I IOCP JOB WIOCDS SUCCESSFUL. LEVEL A1 IOCDS REPLACED.`

11. Now if you return to HCD option 2.11 and view the IOCDS, note that the SNA Address is at `USIBMSC.SCZP201`; see Figure 5-67 on page 254.

```
Goto  Query  Help
------------------------------------------------------------------------------
                      S/390 Microprocessor Cluster List            Row 1 of 4
Command ===> _______________________________________________ Scroll ===> PAGE

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address        Type   Model   Processor ID
s USIBMSC.SCZP201    2097   E26     SCZP201
_ USIBMSC.SCZP101    2094   S18     SCZP101
_ USIBMSC.SCZP801    2064   1C7     SCZP801
_ USIBMSC.SCZP901    2084   C24     SCZP102
****************************** Bottom of data *******************************
```

*Figure 5-67 HCD - IOCDS with replacement IODF*

12. Figure 5-68 shows the Alternate status.

```
  Goto  Query  Help
------------------------------------------------------------------------------
                                  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.SCZP201  DIAG00   LPAR   POR        Yes       No          Yes-POR
_ A1.SCZP201  IODF69   LPAR   Alternate  Yes       Yes         No
_ A2.SCZP201  DIAG02   LPAR   Alternate  No        No          No
_ A3.SCZP201  DIAG03   LPAR   Alternate  No        No          No
****************************** Bottom of data *******************************
```

*Figure 5-68 HCD - IOCDS showing Alternate Status*

## Updating the IOCDS using 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.

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2097, as opposed to a remote Web browser, and select the new 2097, 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 is to create an environment on the processor that will allow 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 128MB of storage and use this LPAR to run the I/O Configuration Program.
4. Under Systems Management, click **Servers** to expand the list; click the server of interest to select it. (In this example we selected **SCZP201**).

5. On the Tasks pad, click **Recovery** to expand it, and select **Single Object Operations**.
6. Click **Yes** to confirm connection.
7. On the Tasks pad, find CPC Configuration, and select **Input/output (I/O) Configuration**.
8. Click the radio button for the Data Set into which you want to load the IOCDS.

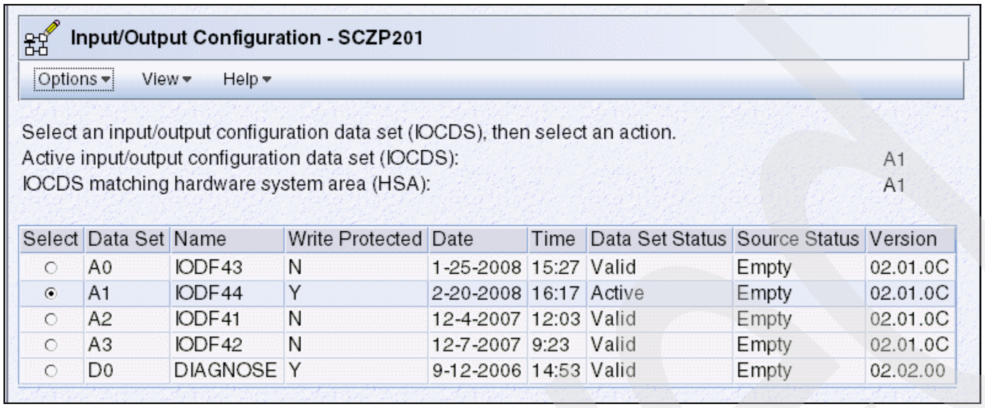



*Figure 5-69 HMC - Select IOCDS for Stand-alone IOCP*

9. Select **Options** → **Import Source File** → **Hardware Management Console USB Flash Memory Drive**.

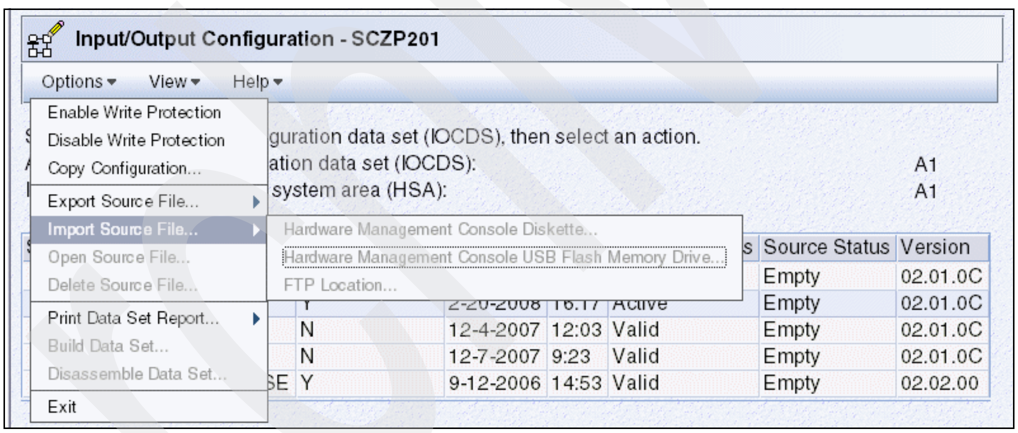



*Figure 5-70 HMC - Import Source File*

10. Select the source file name and click **OK**.

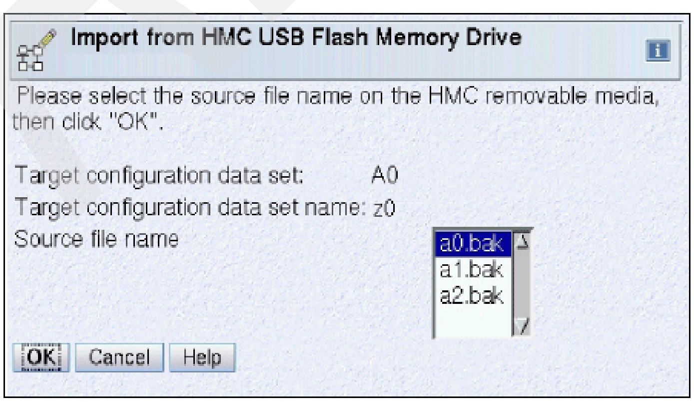



*Figure 5-71 HMC - Select Source File*

11. Now that the IOCP statements have been imported, a Build Data Set is performed to:
   - Process the source file data for the selected I/O configuration.
   - Check the syntax and validate the configuration.
   - Generate an IOCDS and, if there are no errors, write the IOCDS to the support element hard disk.
   - Write the I/O configuration source (IOCS) file to the support element hard disk with any IOCP messages embedded in the file.

   Click **OK**. This will initiate a load of the IOCP code into the targeted LPAR (previously activated) and the program will perform the Build Data Set steps.

   If the build was successful and there are no caution or warning messages, the resultant IOCDS has been written to the support element hard disk.

This IOCDS is now ready to be selected via a Reset Profile and the 2097 can be activated (Power-on Reset) with the production IODF.

## 5.8 HMC steps for activation profiles

### Build the Production Reset Profile and point to required IOCDS

Now that the IODF has been written to an IOCDS, a Reset (Power-on Reset) Profile must be built to point to that IOCDS. This Reset Profile is used to power-on reset the new 2097 after it has been handed over from the IBM service representative.

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2097, or use a remote Web browser and select the new 2097.
2. Under **Systems Management**, click **Servers** to expand the list, then click the server to select it (in this example, **SCZP201**).
3. On the Tasks pad, select **Operational Customization** → **Customize/Delete Activation Profiles.**
4. Select the DEFAULT Reset Profile and click **Customize selected profile**.
5. Save this DEFAULT profile with a new Profile name to be referred to when the power-on reset is required (for example, SCZP201).
6. Select the new Profile and click **Customize selected profile**.
7. Click the IOCDS that you just updated in the previous step (A1).
8. Message ACTB0PDL is displayed; see Figure 5-72.

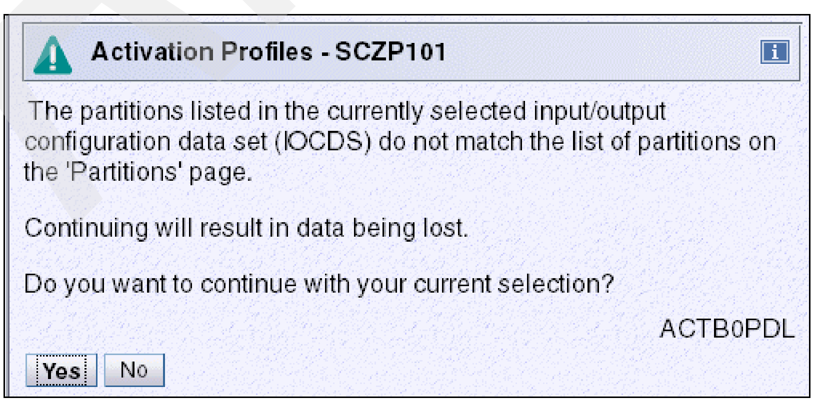



*Figure 5-72 HMC - Activation Profiles (received when changing IOCDS)*

9. Depending on the circumstances, you may wish to answer Yes or No. You can now review the Partition Activation List, if desired.

## Configure STP

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 7, “Server Time Protocol setup” on page 305 for details.

## Build Image Profiles

While still in the Reset Profile, you can now review the Image Profile attributes.

## Build Load Profiles

Go through and create Load (IPL) Profiles using the DEFAULTLOAD Load profile as a skeleton for all the logical partitions that you are IPLing on this processor.

## Build Load Members in SYS#.IPLPARM

You require Load Members defined in SYS#.IPLPARM when IPLing from the new 2097.

Additionally, if you are going to use the HWNAME parameter to point to the Processor.ID in the Load members, make sure you use the correct name (in our example, SCZP201).

## Performing a power-on reset of the 2097

The 2097 is now ready to be Activated (Power-on Reset) using the Production Reset Profile.

6

# Install a new System z10 EC

In this chapter we describe how to install a System z10 EC into a new hardware environment.

Because a wide variety of different environments exist, your environment does 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 - Create a 2097 Work IODF
- Validate the 2097 work IODF
- CHPID Mapping Tool actions
- Migrate PCHIDs back into the 2097 work IODF
- HCD steps to build production IODF
- Implementing the processor configuration on the 2097
- HMC steps for activation profiles

# 6.1 Scenario overview

We begin by providing an overall description of this scenario.

## 6.1.1 The configuration process

Figure 6-1 depicts the general process that we followed in this example. The numbered steps are described following the figure.

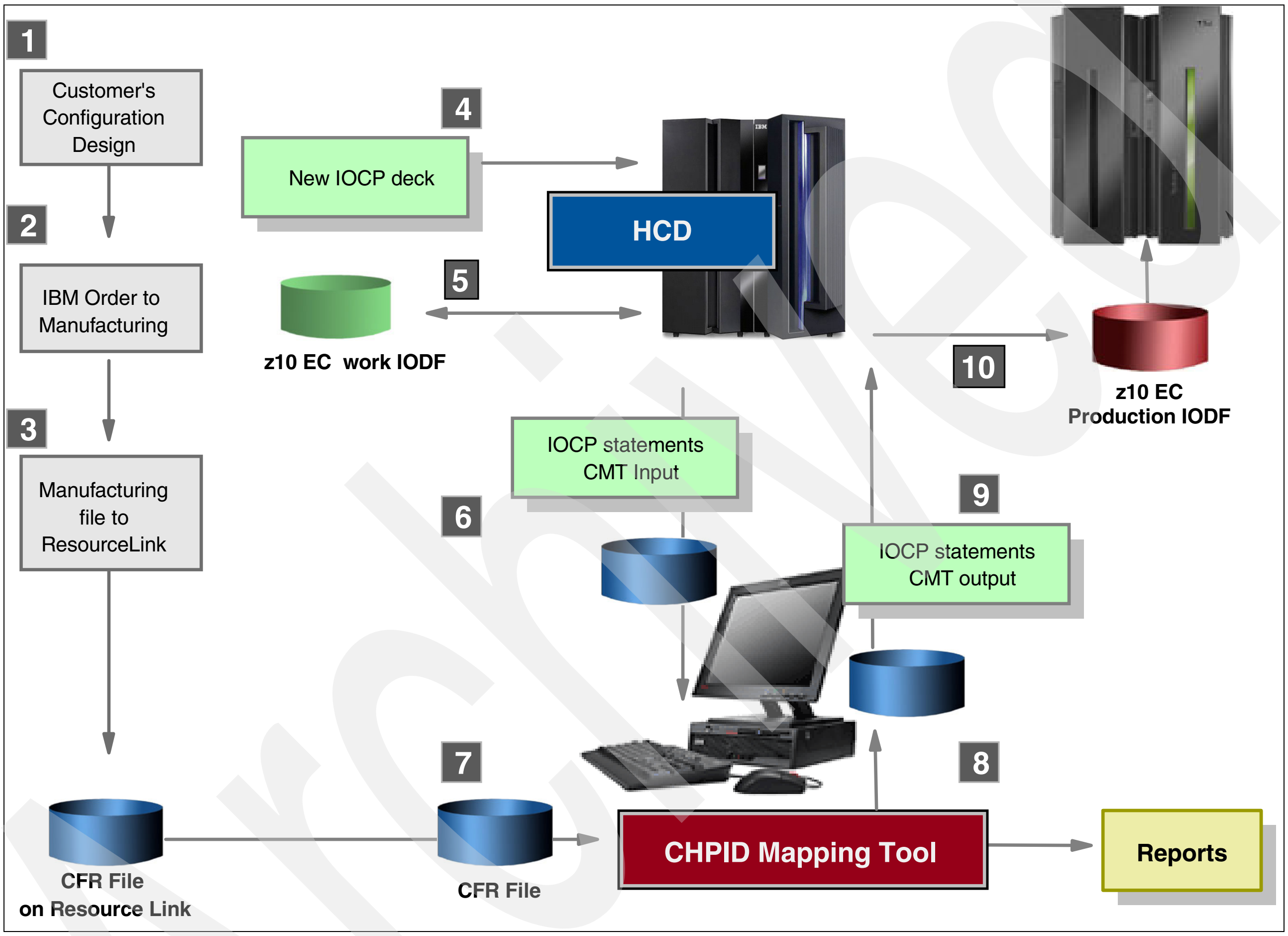



*Figure 6-1 CMT - Overall process flow*

1. When planning to install a new System z10 EC, the IBM Technical Support team can help to define a configuration that meets your needs. The configuration is then passed to the ordering step.
2. The IBM order for the configuration is created and passed to the manufacturing process.
3. The manufacturing process creates a configuration file that is stored on the IBM Resource Link Web site. The configuration file describes the hardware being ordered. This data is available for download by the client installation team.
4. The client starts with a completely new work IODF file created on another System z processor in this or another site, or produced on behalf of them by the IBM service representative. The client uses this as input into the HCD tool, which is used to create the client's view of the new configuration.

5. After all of the new hardware has been added to the HCD definition, a validated 2097 work IODF is created.
6. From the validated work IODF, create a file containing the z10 EC IOCP statements. This file is transferred to the workstation and used for the CHPID Mapping Tool. HCM may also be used here to transfer the IOCP deck to and from the CMT.
7. The configuration file created by IBM Manufacturing in step 3 is downloaded from Resource Link to the CHPID Mapping Tool workstation.
8. The CHPID Mapping Tool uses the input data from files to map logical channels to physical ones on the new System z10 EC hardware.

   You might have to make decisions in response to situations that might arise, such as:

   a. Resolving situations in which the limitations on the ordered hardware causes a single point of failure (SPoF). You may need to purchase additional hardware in order to resolve some SPoF situations.
   b. Prioritizing certain hardware items over others.

   After processing by the CHPID Mapping Tool, 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.
9. The file containing the updated IOCP statements created by the CHPID Mapping Tool, now containing the physical channel assignments, is transferred to the host system.
10. Using HCD, take as input the validated work IODF file created in step 5 and the IOCP statements updated by the CHPID Mapping Tool. Apply the physical channel assignments done by the CMT to the configuration data in the work IODF.

    After the physical channel data has been migrated into the work IODF, a 2097 production IODF is created and the final IOCP statements can be generated.

    The IBM hardware team uses the configuration data written in this step when the final power-on reset is done, yielding a System z10 EC with the client's configuration on it and ready to be used by the client.

When installing a new 2097, you may be able to use HCD (Option 2.11) to write an IOCDS to the 2097 in preparation for an upgrade if you have another computer system in another location that connects to your new 2097. If you can write an IOCDS to the 2097, do so and let the IBM service representative know which IOCDS to use.

If the new 2097 is not connected using a LAN to the CPC where HCD is running, or you are not upgrading or cannot write an IOCDS using HCD in preparation for the upgrade, then use HCD to produce an IOCP input file and download the input file to a USB Flash Memory Drive. The memory drive is then given to the IBM service representative.

The IOCP input file will be loaded into the 2097 Support Element IOCDS using the Stand-Alone Input/Output Configuration Program. Refer to Technical Manual SB10-7152 for details.

Normally it is the responsibility of the IBM service representative to hand over a newly installed processor in power-on reset complete state, but there is no reason why the customer cannot run additional Stand-alone IOCPs after handover, to modify or add additional IODFs to the new processor.

**Note:** Using HCD option 2.11 (remote IOCDS build) with **Write IOCDS in preparation of an upgrade=yes** is the preferred method for writing the initial IOCDS when installing a new 2097. However, in this scenario, the Stand-Alone Input/Output Configuration Program process is described.

## 6.1.2 Planning considerations

Table 6-1 lists the channel types as described in an IOCDS that are used with the System z10 EC.

*Table 6-1 Channels, links, and adapters with CHPID type.*

| Channels | CHPID Type | May be defined as Shared | May be defined as Spanned |
|---|---|---|---|
| ESCON channels:<br>Connection Channel (ESCON architecture)<br>Channel to Channel (connects to CNC) | <br>CNC<br>CTC | <br>yes<br>ye | <br>no<br>no |
| FICON bridge. A FICON channel that attaches to an ESCON Director Model 5 | FCV | yes | no |
| FICON native channels that attach to FICON directors or directly to FICON control units | FC | yes | yes |
| FICON channels that attach to Fibre channel devices, switches, directors, or Fibre-Channel-to-SCSI bridges | FCP | yes | yes |
| ISC-3 peer mode channels (connects to another CFP) | CFP | yes | yes |
| ICB-4 peer channels (connects to another ICB-4) | CBP | yes | yes |
| IC peer channels (connects to another ICP) | ICP | yes | yes |
| InfiniBand host channel adapters (HCA) | CIB | yes | yes |
| HiperSocket (IQDIO) channels | IQD | yes | yes |
| OSA adapters using QDIO architecture | OSD | yes | yes |
| OSA adapters using non-QDIO architecture | OSE | yes | yes |
| OSA 1000Base-T adapters for OSA-ICC | OCE | yes | yes |
| OSA-Express2 adapters for NCP | OSN | yes | yes |

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=CBP - ICB-4 links
- CHPID Type=CIB - PSIFB links connecting to a 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 System z10 EC requires HMC Application Ver 2.10.0 or later and only uses Ethernet for its network connection. The HMC and also the Service Elements do not contain a floppy disc drive, requiring the use of a USB Flash Memory Drive to input and backup customer configuration data.

### Software support

HCD V1.9 or HCD V1.7 and higher with 2097DEVICE PSP Bucket and PTFs is required to define and support some of the new features of the System z10 EC.

### Open Systems Adapter - Integrated Console Controller (OSA-ICC)

You might consider using OSA Express2 1000BaseT 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 (FCP)

When using CHPIDs defined as TYPE=FCP, you may wish to consider NPIV.

### CPC name versus Processor ID

HCD allows you to define different Processors (Logical) to the same CPC (Physical). The Processor ID must 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 may 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 via the HMC, note that the SNA address is made up of a Network name and CPC name separated by a dot (for example, USIBMSC.SCZP201). 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 1-8 alphanumeric character 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 will be 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.

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 2097 to a new hardware environment

In this scenario we describe the configuration steps for installing a new 2097 processor into a new environment. The 2097 is the first processor 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 2097.
- We recommend defining a new CPC name for the 2097.
- The 2097 processor 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.

This example shows a 2097-E26 with Processor.ID of SCZP203 and with four CSSs (CSS ID=0, CSS ID=1, CSS ID=2 and CSS ID=3). The CPC name of SCZP203 and serial number of 000203 is used for the 2097.

The following CHPID types are defined:

- FC, FCP, CTC, CNC
- OSD, OSE, OSC, OSN
- CFP, CBP, ICP, CIB
- IQD

The following Hardware/CHPID types are not supported on the 2097:

- PCIXCC and PCICA
- ICB-3 links
- ICB-2 links
- ISC-3 links in compatibility mode (CHPID types CFS and CFR)
- OSA-Express Token Ring

*Table 6-2 New 2097 in a new installation*

| New 2097 | Additional 2097 to connect to new switch ports and control units that do not currently exist (new installation) |
|---|---|
| Processor.id | Require new Processor.ID |
| CPC name | Require new CPC name |
| Channel to switch port connections | New ports |
| Control Unit to switch port connections | New ports |
| Starting IODF | Current active production IODF |
| Target IODF | Create a new work IODF |
| HCD action | Add Processor (see below) |
| 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<br>(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 - Create a 2097 Work IODF

The following steps explain how to define a new 2097 configuration using HCD:

1. Create a 2097 work IODF, either new or from an existing production IODF.
2. Add the processor.
3. Change 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. Create esoterics for 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, then CHPIDs.
14. Define all required coupling connections to other processors and any Internal coupling connections required.
15. Create CTCs.
16. Create OSA configuration (OSC, OSD, OSE, OSN).
17. Define Nucleus Initialization Program (NIP) consoles.
18. Build validated Work IODF.
19. Create an IOCP statements file and file transfer to your PC for input into the CMT. This step can be performed with 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 validated work IODF.
24. Build Production IODF and remote write the IOCP to an IOCDS on the processor or, if not possible, copy the IOCP statements to a USB Memory Flash Drive.
25. Run Stand-Alone Input/Output Configuration Program to load the IOCP statements onto the 2097 Service Element IOCDS.
26. Build Reset, Image, and Load Profile.
27. Perform Power-on Reset (Activate) of 2097.

In the following sections, we describe some of these steps in more detail. For specific details on defining processors, partitions, switches, control units, devices, and so forth in an IODF using HCD, refer to *z/OS HCD Users Guide* SC33-7988 and *IOCP Users Guide* SB10-7037.

## Create new Work IODF

Create and select a new work IODF where you add the new 2097 processor definition (for example, 'SYS6.IODF39.WORK').

## Add 2097 processor

1. From the HCD main menu, select option **1.3**, **Processor List** (Figure 6-2). Press PF11 (or type `add` on the command line) to add a new processor; press Enter. The Add Processor panel is displayed (Figure 6-3 on page 267).

```
                              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
```

*Figure 6-2 HCD - Processor List (adding 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 HCD - Add Processor (blank values)*

2. Enter the appropriate information on the Add Processor panel. For our example we specified the following values:

   Processor ID: `SCZP203`
   Processor type: `2097`
   Processor model: `E26`
   Number of channel subsystems: `4`

   If this field is left blank, then 4 will be defined. If any number below 4 is entered, then the following error message will be displayed:
   `Minimum configuration not defined for processor SCZP203.`

   Serial number: `0002032097`
   Network name: `USIBMSC`
   CPC name: `SCZP203`

   Figure 6-4 on page 268 shows the values we added.

```
--------------------------- Add Processor -----------------------------

Specify or revise the following values.

Processor ID . . . . . . . . . . SCZP203_
Processor type . . . . . . . . . 2097____  +
Processor model  . . . . . . . . E26_____  +
Configuration mode . . . . . . . LPAR      +
Number of channel subsystems . . 4         +

Serial number  . . . . . . . . . 0002032097
Description  . . . . . . . . . . ________________________________

Specify SNA address only if part of an S/390 microprocessor cluster:

Network name . . . . . . . . . . USIBMSC_  +
CPC name . . . . . . . . . . . . SCZP203_  +

Local system name  . . . . . . . ________
```

*Figure 6-4 HCD - Add Processor (adding values)*

3. Press Enter. The Processor List panel displays, showing the additional 2097 processor named SCZP203 (Figure 6-5).

   Notice the message displayed at the bottom of the panel indicating that the processor definition has been extended to its maximum configuration. This is because part of the Central 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 2097, 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
_ SCZP203  2097     E26      LPAR  0002032097 ________________________________
******************************* Bottom of data ********************************

+-------------------------------------------------------------------+
| Definition of processor SCZP203 has been extended to its maximum |
| configuration.                                                    |
+-------------------------------------------------------------------+
```

*Figure 6-5 HCD - processor List (new process or added)*

4. Type s next to the SCZP203 and press Enter (Figure 6-6 on page 269).

```
                            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 . . . : SCZP203

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
_ 0   65280     0       65535     0       ________________________________
_ 1   65280     0       65535     0       ________________________________
_ 2   65280     0       65535     0       ________________________________
_ 3   65280     0       65535     0       ________________________________
```

*Figure 6-6 HCD - Channel Subsystem List*

Here you can see four (or maximum) Channel Subsystems defined with the default MAXDEV value of 65280 set by HCD.

> **Note:** The MAXDEV values are automatically set when defining a 2097 due to the fixed Hardware System Area (HSA) on a 2097 processor.

5. Type 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 -----------------------------
                                                              Row 1 of 15
 Command ===> ________________________________________ Scroll ===> CSR

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

 Processor ID  . . . . : SCZP203
 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 HCD - Partition List*

Scroll down to see the remaining reserved logical partitions defined for this CSS.

6. Define the resources to the new 2097 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 via 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 on defining processors, partitions, switches, control units, devices, and so forth, refer to *z/OS HCD Users Guide,* SC33-7988 and *IOCP Users Guide,* SB10-7037.

- Add FICON and ESCON switches.
- Add operating system configurations:
  a. Create an Eligible Device Table (EDT) for each of these operating system configurations.
  b. Create esoterics for each of these EDTs.
- Connect FICON and ESCON CHPIDs to the new switches, spreading connections over as many switches and physical port cards as possible, where appropriate.
- 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, then CHPIDs.
- Define all required internal coupling links and peer coupling links to any other new processors you may be adding to the IODF.
- Create ESCON and FICON CTCs.
- Create OSA control units (OSC, OSD, OSE, OSN).
- Define Nucleus Initialization Program (NIP) consoles.

### Over-define channel paths

Sometimes you may need to define a channel path that is not physically installed on the processor. This may 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 over-define CHPIDs by using an asterisk (*) for the PCHID value. An over-defined 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 * by its valid PCHID.

> **Note:** This is not the case for CFP and CBP type CHPIDs, where these CHPIDs have connections to other CFP and CBP type CHPIDs.
>
> Therefore, HCD only allows you to define CFP and CBP type CHPIDS as over-defined if they are unconnected.
>
> If you define a CIB type CHPID, it must also be defined with an HCA Adapter ID (AID) and an HCA Port ID, represented in the AID/P column in the Channel Path List. HCD does not allow a CIB type CHPID to be defined as over-defined.

The 2097 production IODF can then be activated dynamically and the PCHID/CHPID/control unit definitions become available to the operating system.

- Figure 6-8 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     Filter Mode. 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
_ BE    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   3D8
_ BF    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   3D9
_ CE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   181
_ CF    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   111
_ EC    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   3C0
_ EE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   3D0
```

*Figure 6-8 HCD - Channel Path List (Reserving CHPIDs)*

- Figure 6-9 illustrates what the CHPID/PCHID definitions look like after being defined as over-defined.

```
                              Channel Path List     Filter Mode. 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
_ BE    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   *
_ BF    CFP   SHR   No    ________     _ _ _ _ _ _ _ _ _ _ _ _ a _ _   *
_ CE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ CF    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ EC    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
_ EE    CFP   SPAN  No    ________     _ _ a _ _ _ _ _ _ _ _ _ _ _ _   *
```

*Figure 6-9 HCD - Channel Path List (over-defined CHPIDs)*

## 6.3 Validate the 2097 work IODF

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. Go to 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.IODF39.WORK'
IODF type  . . . . . . . : Work - Validated
IODF version . . . . . . : 5

Creation date  . . . . . : 2007-11-28
Last update  . . . . . . : 2007-11-28  14:10

Volume serial number . . : BH8ST1
Allocated space  . . . . : 2000    (Number of 4K blocks)
Used space . . . . . . . : 201     (Number of 4K blocks)
   thereof utilized (%)  86

Activity logging . . . . : No
Backup IODF name . . . . :

Description  . . . . . . :
```

*Figure 6-10 HCD - View I/O Definition File Information (validated work IODF)*

## Create 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 PC. You can then launch the CHPID Mapping Tool, create an updated IOCP statements file, and transfer the file back to the host.

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 statements
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

*Figure 6-11 HCD - Activate or Process Configuration Data (Build IOCP for SCZP203)*

2. HCD displays the list of available processors to chose from. Select the processor SCZP203 by using a forward slash mark (/), and then press Enter (Figure 6-12).

```
------------------------- Available Processors ---------------------------
                                                                Row 1 of 1
Command ===> __________________________________________________________

Select one.

  Processor ID  Type     Model    Mode  Description
/ SCZP203       2097     E26      LPAR
************************ Bottom of data **************************
```

*Figure 6-12 HCD - Available Processors (select processor for IOCP file)*

3. HCD presents a panel on which you enter information regarding the IOCP input data set to be created (Figure 6-13). Enter the appropriate information. In our exercise, we entered the following values:

   Title1: `IODF39`
   IOCP input data set: `'SYS6.IODF39.IOCPIN.SCZP203'`
   Input to Stand-alone IOCP? `Yes`
   Job statement information as shown

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.IODF39.WORK'
 Processor ID  . . . . . . . : SCZP203
 Title1 . IODF39_________________________________________________________
 Title2 : SYS6.IODF39.WORK - 2007-11-28 14:10

 IOCP input data set
 'SYS6.IODF39.IOCPIN.SCZP203'_________________
 Input to Stand-alone IOCP?  Yes  (Yes or No)

 Job statement information
 //WIOCP   JOB (ACCOUNT),'NAME'
 //*
 //*
 //*
```

*Figure 6-13 HCD - 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='IODF39',                                              *
       MSG2='SYS6.IODF39.WORK - 2007-11-28 14:10',                 *
       SYSTEM=(2097,1),LSYSTEM=SCZP203,                            *
       TOK=('SCZP203',00800001DE50209714105971010733 2F00000000,*
       00000000,'07-11-28','14:10:59','........','........')
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),*
       (A21,1),(A22,2),(A23,3),(A24,4),(A25,5),(*,6),(*,7),(*,8*
       ),(*,9),(*,A),(*,B),(*,C),(*,D),(*,E),(*,F)),(CSS(3),(A3*
       1,1),(A32,2),(A33,3),(*,4),(*,5),(*,6),(*,7),(*,8),(*,9)*
       ,(*,A),(*,B),(*,C),(*,D),(*,E),(*,F)))
CHPID PATH=(CSS(0,1,2,3),00),SHARED,                               *
       NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1D,A1E,A1F*
       ),(=))),TYPE=OSD
CHPID PATH=(CSS(0,1,2,3),01),SHARED,                               *
       NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1D,A1E,A1F*
       ),(=))),TYPE=OSD
CHPID PATH=(CSS(0,1,2,3),02),SHARED,                               *
       NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1D,A1E,A1F*
       ),(=))),TYPE=OSD
CHPID PATH=(CSS(0,1,2,3),03),SHARED,                               *
```

*Figure 6-14 HCD - 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 HCD - IOCP file (TOK statement)*

```
TOK=('SCZP203',00800001DE50209714105971010 7332F00000000,*
00000000,'07-11-28','14:10:59','........','........')
```

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 TSO 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 SCZP203in.iocp.

## 6.4 CHPID Mapping Tool actions

In the following steps we take the output from the previous set of HCD steps (IOCP), as well as the output from the 2097 order process (CFReport). Using the CHPID Mapping Tool, we assign PCHIDs to each of the CHPIDs for the 2097.

Download and install the CHPID Mapping Tool. Refer to "CHPID Mapping Tool" on page 24, for information about obtaining and installing the CMT. If you already have the CHPID Mapping Tool installed, then verify that you have the latest updates installed.

Using the CHPID Mapping Tool, follow these steps:

1. Import IOCP statements file and "new" CFReport file into the CHPID Mapping Tool. Getting 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 reports.
7. Create updated IOCP statements file and file transfer back to the host. This step can be performed with HCM.

### Import the CFReport file into the CHPID Mapping Tool

1. Start the CHPID Mapping Tool on your workstation.
2. Import the CFReport file into the CHPID Mapping Tool by clicking **File → Import CFReport file** (Figure 6-15 on page 276).

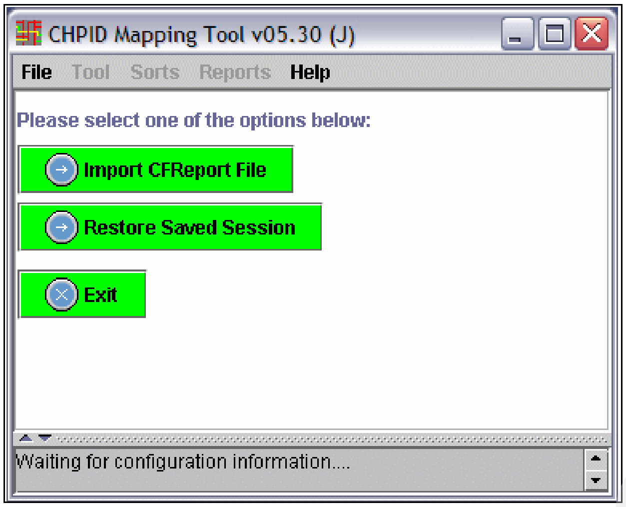



*Figure 6-15 CMT - Import CFReport file*

3. Select the CFReport file on your workstation to import into the CHPID Mapping Tool and click **Open** (Figure 6-16).

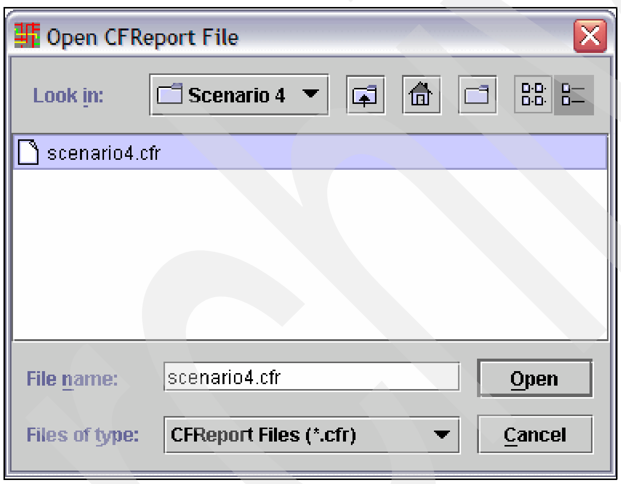
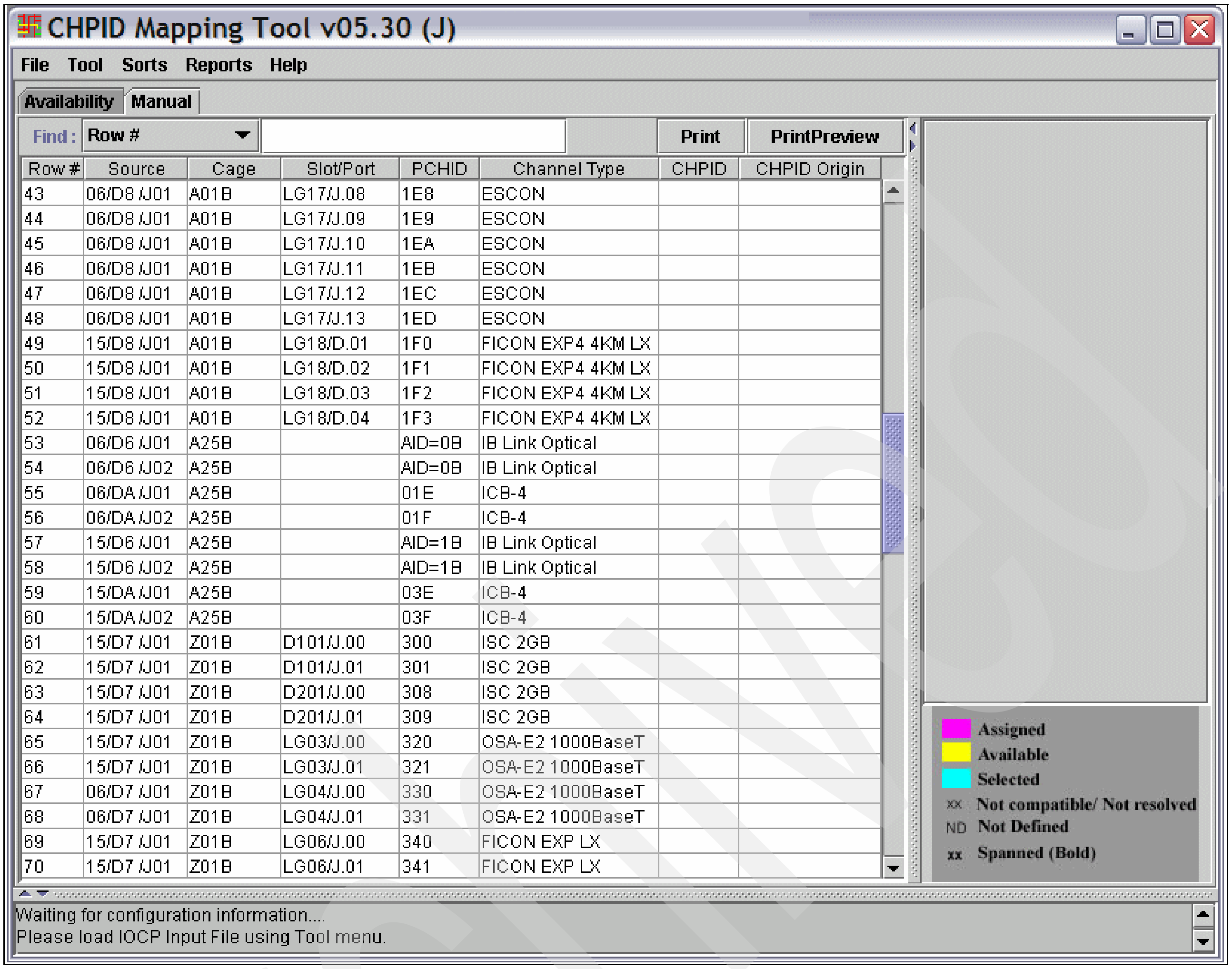



*Figure 6-16 CMT - Open CFReport file*

The CHPID Mapping Tool displays the information from the CFReport on the left-hand side of the window (Figure 6-17 on page 277).




| Row # | Source | Cage | Slot/Port | PCHID | Channel Type | CHPID | CHPID Origin |
|---|---|---|---|---|---|---|---|
| 43 | 06/D8/J01 | A01B | LG17/J.08 | 1E8 | ESCON | | |
| 44 | 06/D8/J01 | A01B | LG17/J.09 | 1E9 | ESCON | | |
| 45 | 06/D8/J01 | A01B | LG17/J.10 | 1EA | ESCON | | |
| 46 | 06/D8/J01 | A01B | LG17/J.11 | 1EB | ESCON | | |
| 47 | 06/D8/J01 | A01B | LG17/J.12 | 1EC | ESCON | | |
| 48 | 06/D8/J01 | A01B | LG17/J.13 | 1ED | ESCON | | |
| 49 | 15/D8/J01 | A01B | LG18/D.01 | 1F0 | FICON EXP4 4KM LX | | |
| 50 | 15/D8/J01 | A01B | LG18/D.02 | 1F1 | FICON EXP4 4KM LX | | |
| 51 | 15/D8/J01 | A01B | LG18/D.03 | 1F2 | FICON EXP4 4KM LX | | |
| 52 | 15/D8/J01 | A01B | LG18/D.04 | 1F3 | FICON EXP4 4KM LX | | |
| 53 | 06/D6/J01 | A25B | | AID=0B | IB Link Optical | | |
| 54 | 06/D6/J02 | A25B | | AID=0B | IB Link Optical | | |
| 55 | 06/DA/J01 | A25B | | 01E | ICB-4 | | |
| 56 | 06/DA/J02 | A25B | | 01F | ICB-4 | | |
| 57 | 15/D6/J01 | A25B | | AID=1B | IB Link Optical | | |
| 58 | 15/D6/J02 | A25B | | AID=1B | IB Link Optical | | |
| 59 | 15/DA/J01 | A25B | | 03E | ICB-4 | | |
| 60 | 15/DA/J02 | A25B | | 03F | ICB-4 | | |
| 61 | 15/D7/J01 | Z01B | D101/J.00 | 300 | ISC 2GB | | |
| 62 | 15/D7/J01 | Z01B | D101/J.01 | 301 | ISC 2GB | | |
| 63 | 15/D7/J01 | Z01B | D201/J.00 | 308 | ISC 2GB | | |
| 64 | 15/D7/J01 | Z01B | D201/J.01 | 309 | ISC 2GB | | |
| 65 | 15/D7/J01 | Z01B | LG03/J.00 | 320 | OSA-E2 1000BaseT | | |
| 66 | 15/D7/J01 | Z01B | LG03/J.01 | 321 | OSA-E2 1000BaseT | | |
| 67 | 06/D7/J01 | Z01B | LG04/J.00 | 330 | OSA-E2 1000BaseT | | |
| 68 | 06/D7/J01 | Z01B | LG04/J.01 | 331 | OSA-E2 1000BaseT | | |
| 69 | 15/D7/J01 | Z01B | LG06/J.00 | 340 | FICON EXP LX | | |
| 70 | 15/D7/J01 | Z01B | LG06/J.01 | 341 | FICON EXP LX | | |

*Figure 6-17 CMT - Importing CFReport file*

## Import IOCP file into the CHPID Mapping Tool

1. Import the IOCP file by clicking **Tool** → **Import IOCP File** (Figure 6-18).

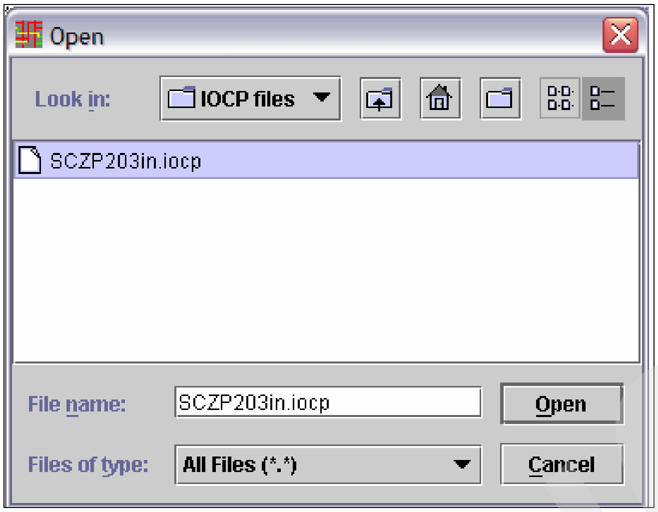



*Figure 6-18 CMT - Import IOCP files*

2. Select the IOCP file on your workstation to import into the CHPID Mapping Tool and click **Open**.

## Hardware resolution

The CHPID Mapping Tool may prompt you to resolve any issues that may arise from importing the IOCP file. In our example, the CHPID Mapping Tool requests clarification on the TYPE=OSD, TYPE=FCP, and TYPE=FC channels.

In each case, we must check off what each of the channels is used for. The image in the lower right-hand side of Figure 6-19 shows what we have selected for the FC channels.

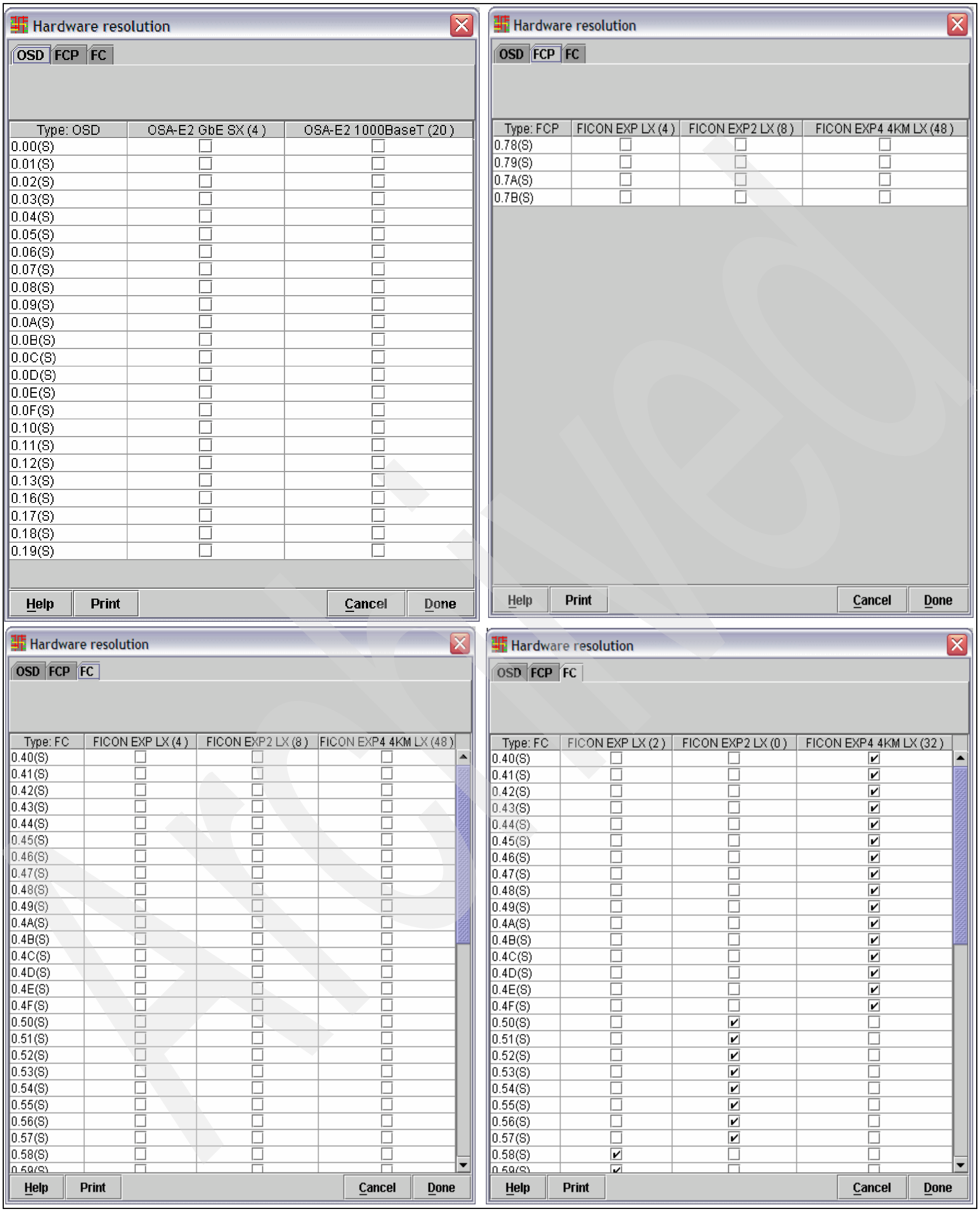



*Figure 6-19 CMT - Hardware resolution after IOCP import*

1. Select one tab at a time. Click the desired box and move to the next tab until all CHPID definitions have hardware selected.
2. Click **Done**.
3. The CHPID Mapping Tool displays all of the currently known information. In Figure 6-20, note that the CHPID column and the CHPID Origin columns contain blanks. These are filled in after the CHPID Mapping Tool assigns the CHPIDs to PCHIDs.

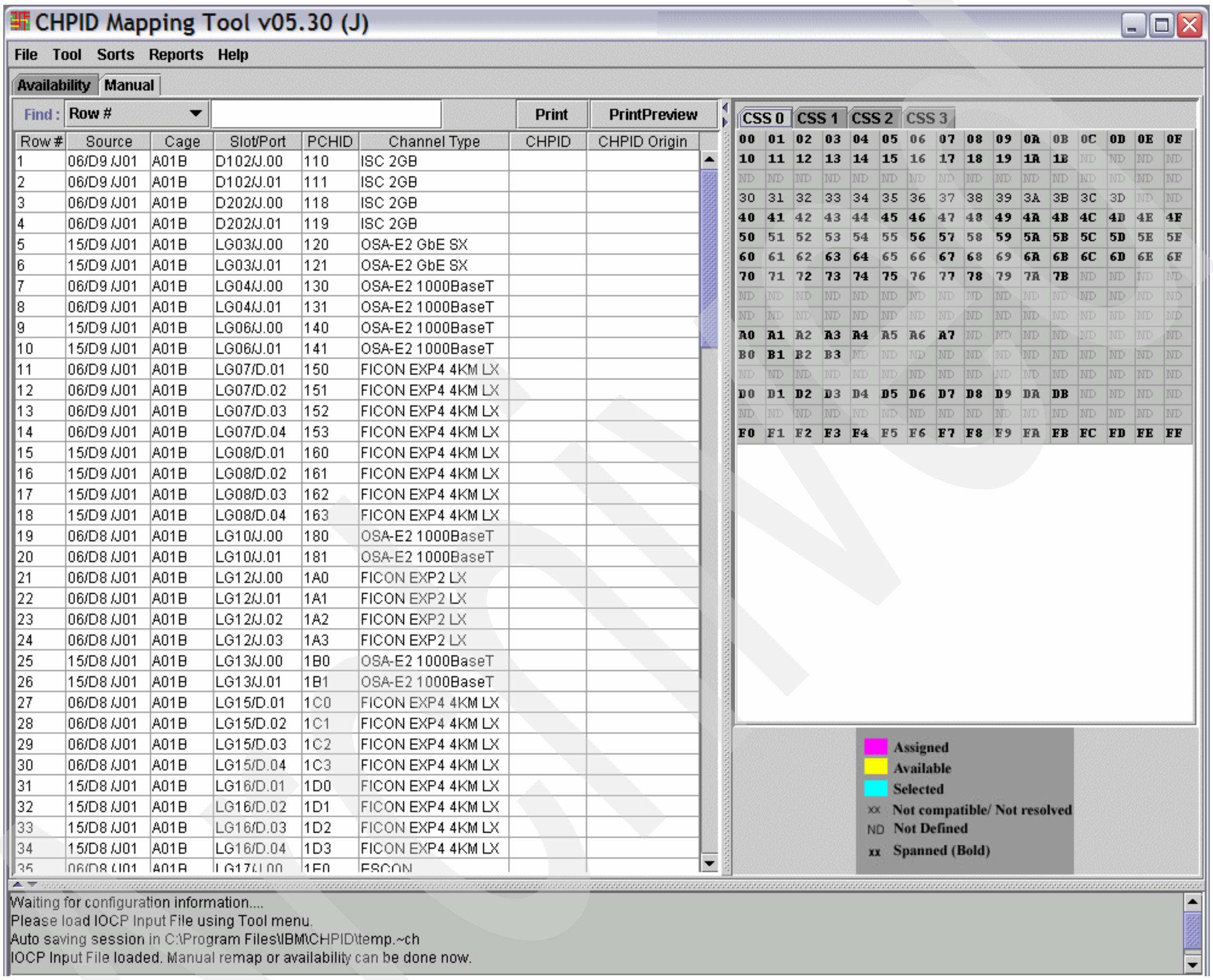



*Figure 6-20 CMT - Manual tab*

## Set control unit priority manually

1. Under the File menu, click the **Availability** tab.
2. Click **Process CU Priority** and a window pops up; see Figure 6-21 on page 281.

   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** because no PCHIDs were defined in the IOCP input and we did not assign any in the manual panel.
3. Click **Process**.

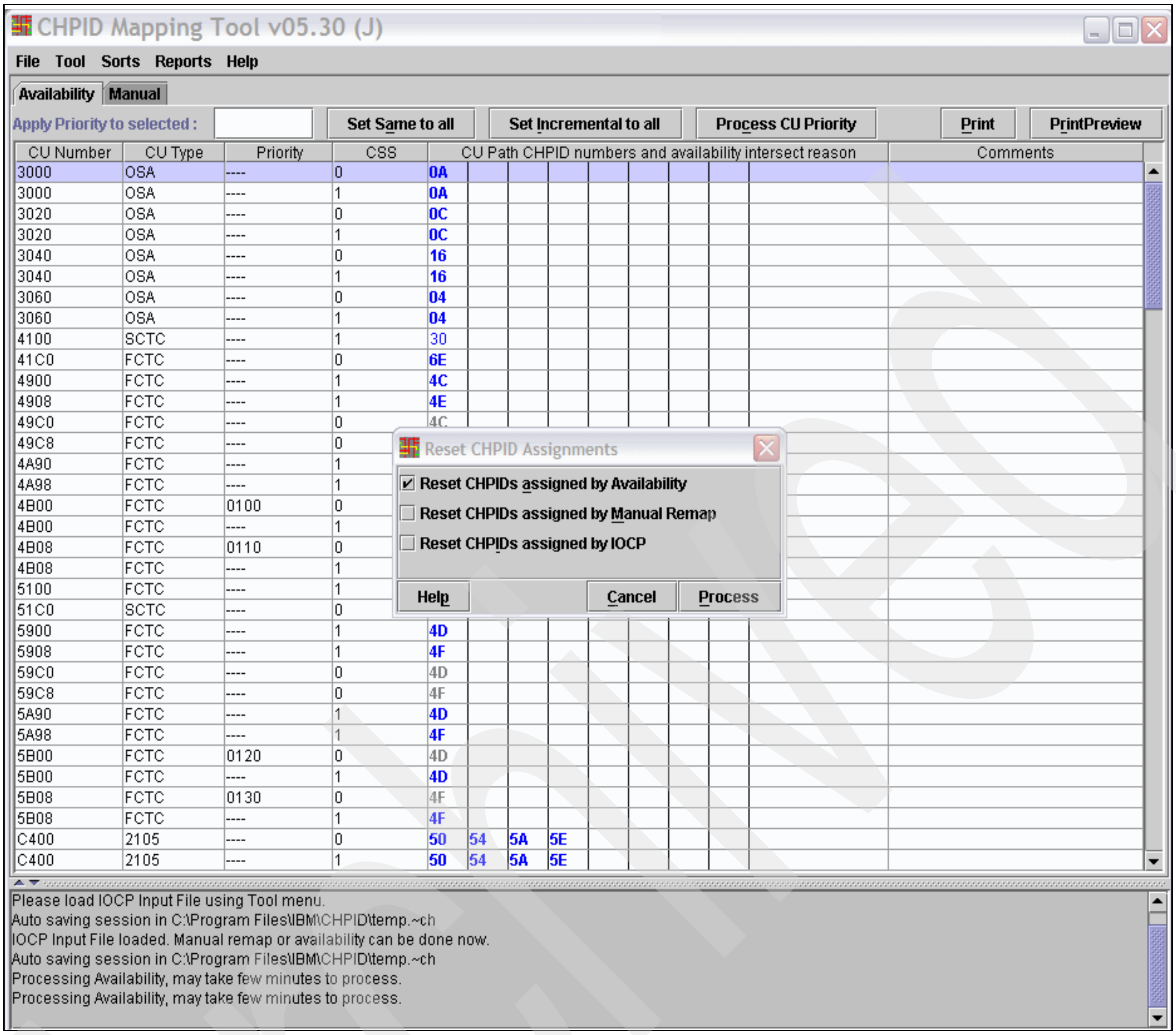


Figure 6-21 CMT - Reset CHPID Assignments by availability

After the CHPID Mapping Tool has assigned the CHPIDs, it displays a message indicating the results of the process (Figure 6-22).

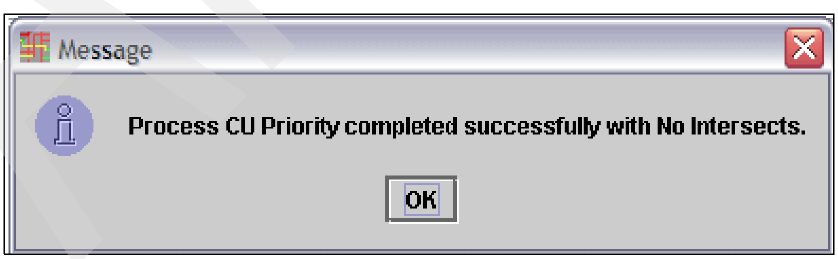



Figure 6-22 CMT - Process CU Priority completion message

Our example returned a successful message with no intersects.

> **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.

The possible intersects are as follows:

**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.

4. Click **OK.**
5. You can now display the result 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, click **Sorts** → **By CU Priority**.

   Our example does not contain any control units set with CU Priority, but we 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.
6. Go through the listing and search through the CU Number column for any control units you want to set priority for.

   In our example we set the OSC type CU Numbers F200 and F280 to priority 333 plus a few FCTCs and a 2107 CU; see Figure 6-23.

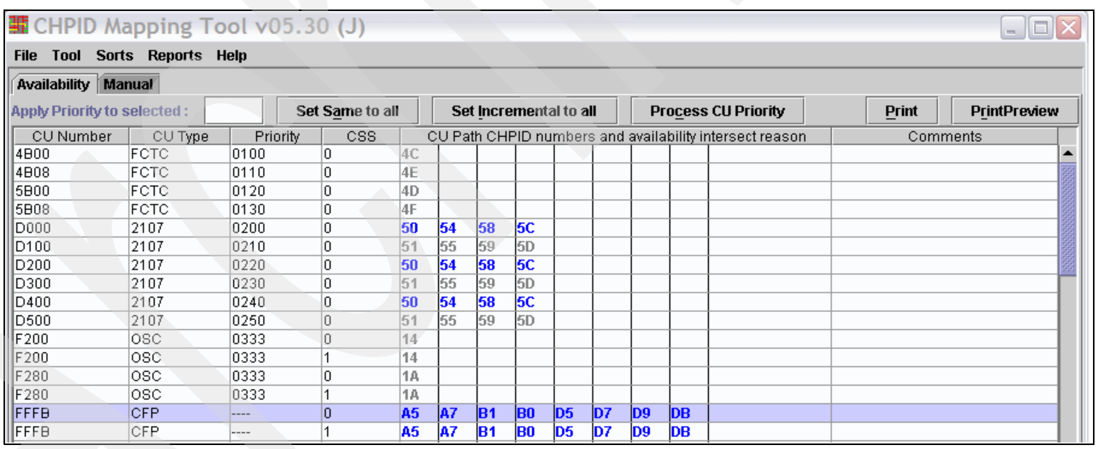



*Figure 6-23 CMT - Set CU Priority*

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.

7. Under the File menu, click the **Availability** tab.

8. Click **Process CU Priority** and a window pops up.

   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**.

10. Click **Sorts** → **By CU Priority** and you notice that the OSC type control units with priority of 333 have sorted to the top of the list.

11. Select the **Manual** tab and view the results of mapping the CHPIDs (Figure 6-24).

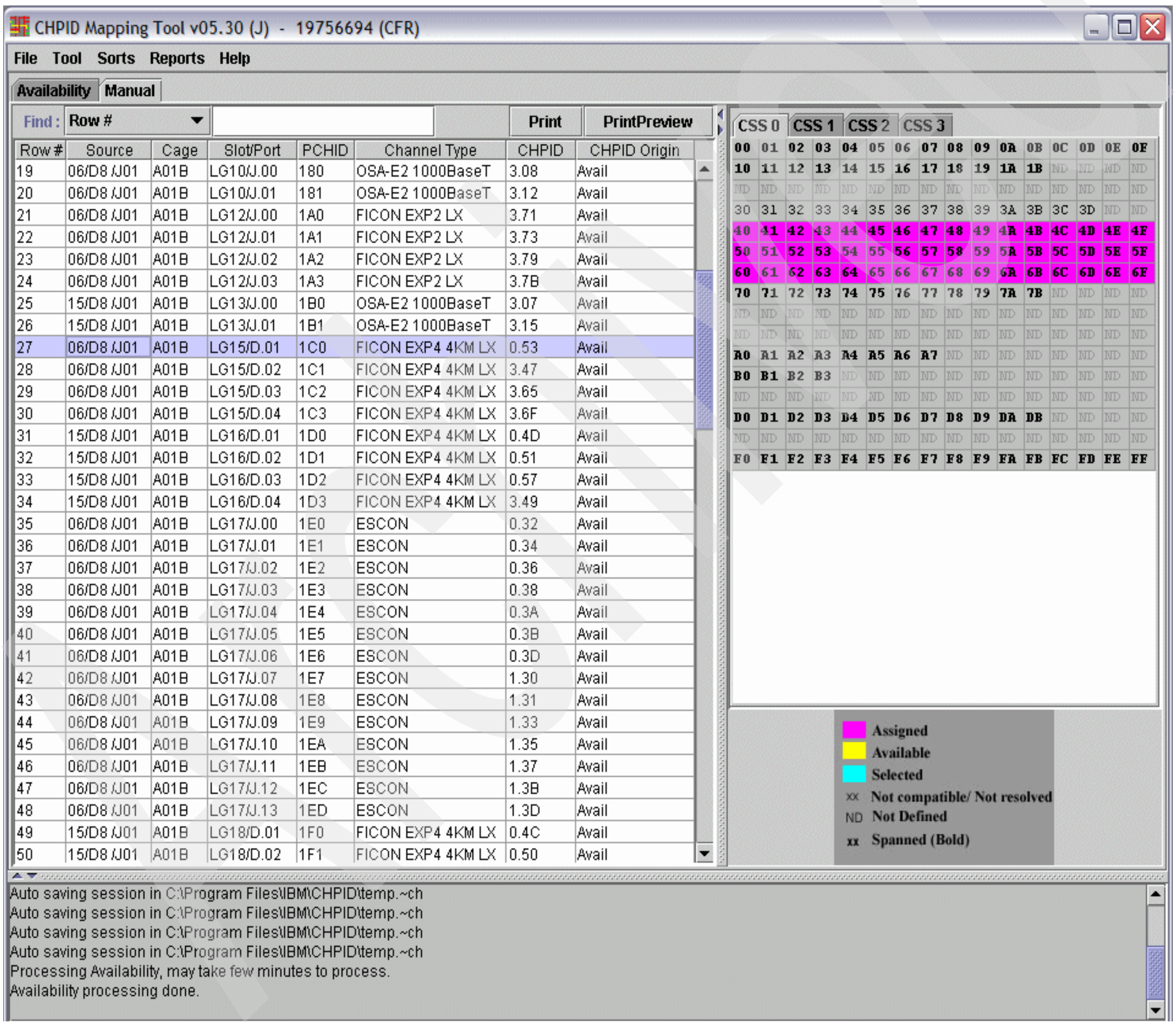



*Figure 6-24 CMT - Manual (CHPIDs assigned)*

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 value `Avail` in the CHPID Origin column, indicating that the CHPID values were assigned based on availability.

## CHPIDs not connected to Control Units

1. Under the **Availability** tab, click **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 6-25).

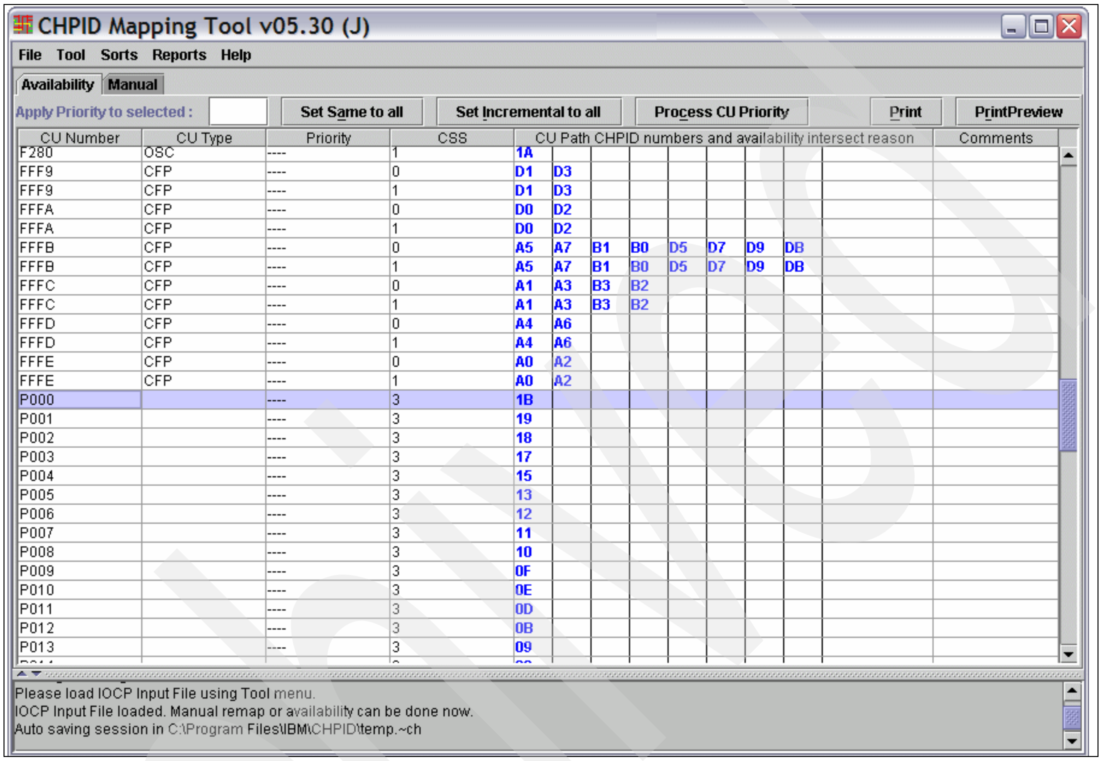



*Figure 6-25 CMT - Sort by Control Unit*

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 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 will allow the availability mapping function to pick PCHIDs that will afford your new control unit good availability.

## Create reports for the hardware team

The CHPID Mapping Tool has built-in reports, which are available from the Reports pull-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 will install 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 to help with labelling the cables. The labels must include the PCHID or cage/slot/port information before system delivery.

### *CHPID Report*

1. Click **Reports** → **CHPID Report** (Figure 6-26).

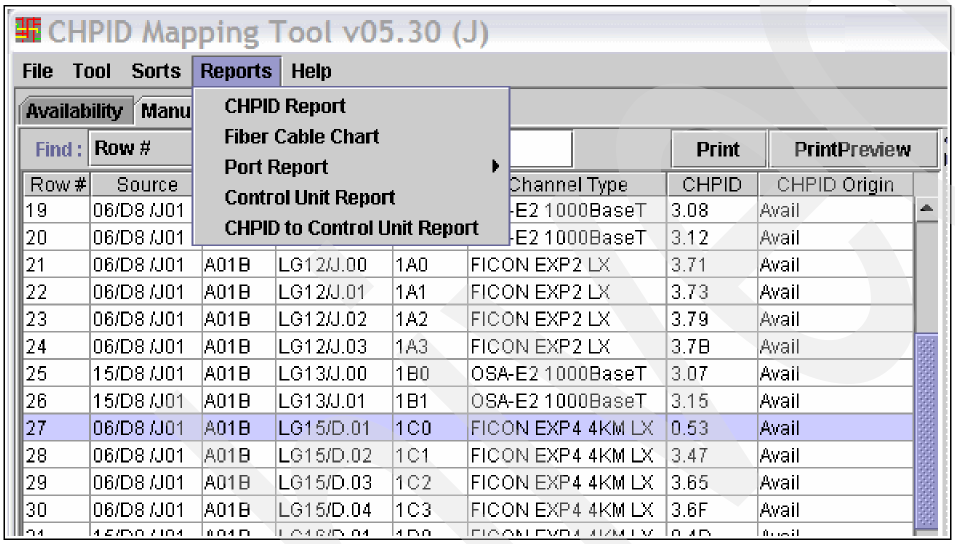



*Figure 6-26 CMT - select CHPID Report*

2. Enter the report File name (or accept the name that the CHPID Mapping Tool enters) and click **Save** (Figure 6-27).

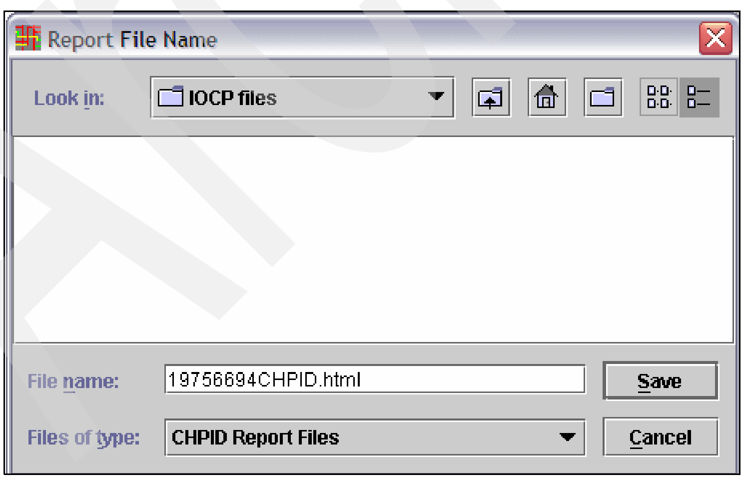



*Figure 6-27 CMT - Report File Name*

3. The CHPID Mapping Tool opens a browser window with the CHPID report; see Figure 6-28 on page 286. You may be prompted to accept active content. Accept the active content in order to display the report in your browser.

# CHPID Mapping Tool - CHPID Report

Control Number: 19756694(CFR)
Machine: 2097-E26

Report Created: Nov. 28, 2007
IOCP File: SCZP203.iocp

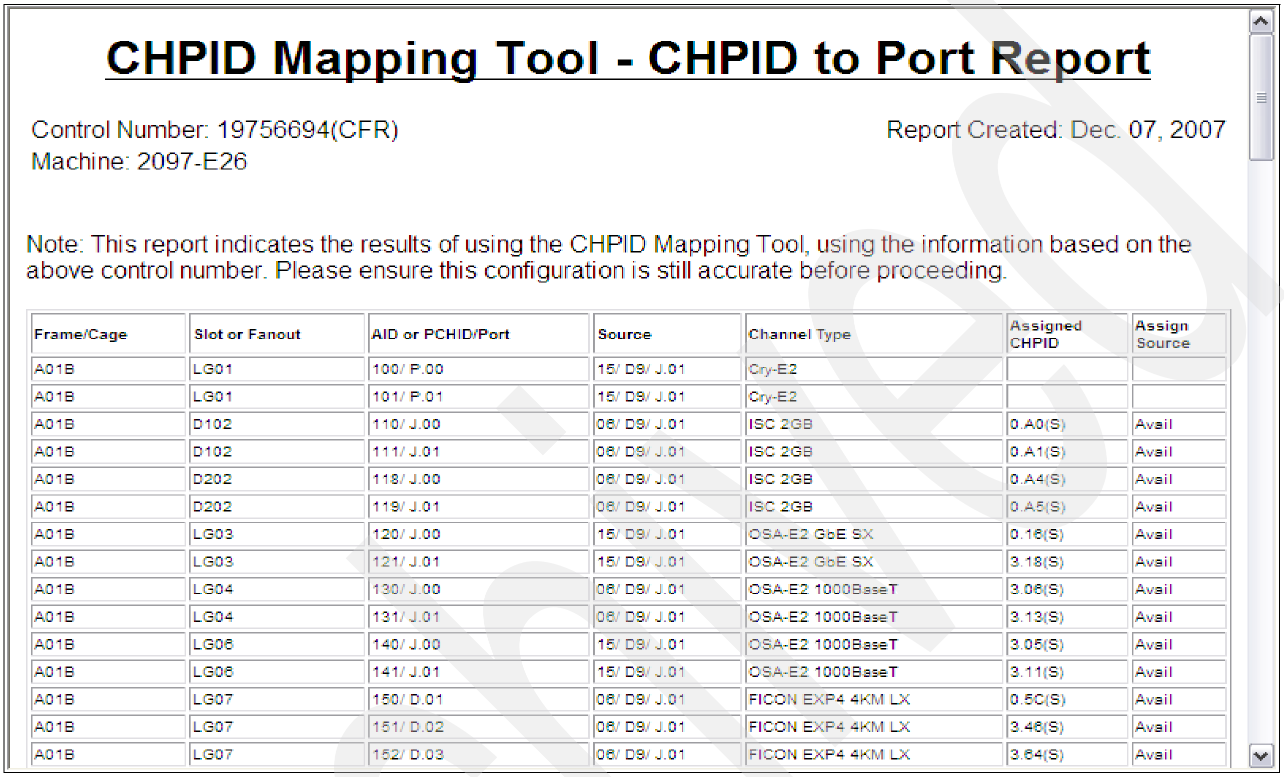
Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this configuration is still accurate before proceeding.

| Source | Cage | Slot | F/C | CSS.CHPID/PCHID/Ports or AID |
|---|---|---|---|---|
| 06/ DA | A25B | DA06 | 3393 | 0.B0(S)/01E/J01 |
| 06/ DA | A25B | DA06 | 3393 | 0.B2(S)/01F/J02 |
| 15/ DA | A25B | DA15 | 3393 | 0.B1(S)/03E/J01 |
| 15/ DA | A25B | DA15 | 3393 | 0.B3(S)/03F/J02 |
| 06/ D6 | A25B | D606 | 0163 | AID=0B J01/_.__ J02/_.__ |
| 15/ D9/ J.01 | A01B | 01 | 0863 | _.__/100/P00 _.__/101/P01 |
| 06/ D9/ J.01 | A01B | D102 | 0218 | 0.A0(S)/110/J00 0.A1(S)/111/J01 |
| 06/ D9/ J.01 | A01B | D202 | 0218 | 0.A4(S)/118/J00 0.A5(S)/119/J01 |
| 15/ D9/ J.01 | A01B | 03 | 3365 | 0.16(S)/120/J00 3.18(S)/121/J01 |
| 06/ D9/ J.01 | A01B | 04 | 3366 | 3.06(S)/130/J00 3.13(S)/131/J01 |
| 15/ D9/ J.01 | A01B | 06 | 3366 | 3.05(S)/140/J00 3.11(S)/141/J01 |
| 06/ D9/ J.01 | A01B | 07 | 3324 | 0.5C(S)/150/D01 3.46(S)/151/D02 3.64(S)/152/D03 3.6D(S)/153/D04 |
| 15/ D9/ J.01 | A01B | 08 | 3324 | 0.5D(S)/160/D01 3.45(S)/161/D02 3.63(S)/162/D03 3.6C(S)/163/D04 |
| 06/ D8/ J.01 | A01B | 10 | 3366 | 3.08(S)/180/J00 3.12(S)/181/J01 |
| 15/ D8/ J.01 | A01B | 11 | 0863 | _.__/190/P00 _.__/191/P01 |
| 06/ D8/ J.01 | A01B | 12 | 3319 | 3.71(S)/1A0/J00 3.73(S)/1A1/J01 3.79(S)/1A2/J02 3.7B(S)/1A3/J03 |

*Figure 6-28 CMT - CHPID Report*

### *Port Report - Sorted by Location*

1. Click **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 6-29). You may be prompted to accept active content. Accept the active content in order to display the report in your browser.



# CHPID Mapping Tool - CHPID to Port Report

Control Number: 19756694(CFR) Report Created: Dec. 07, 2007
Machine: 2097-E26

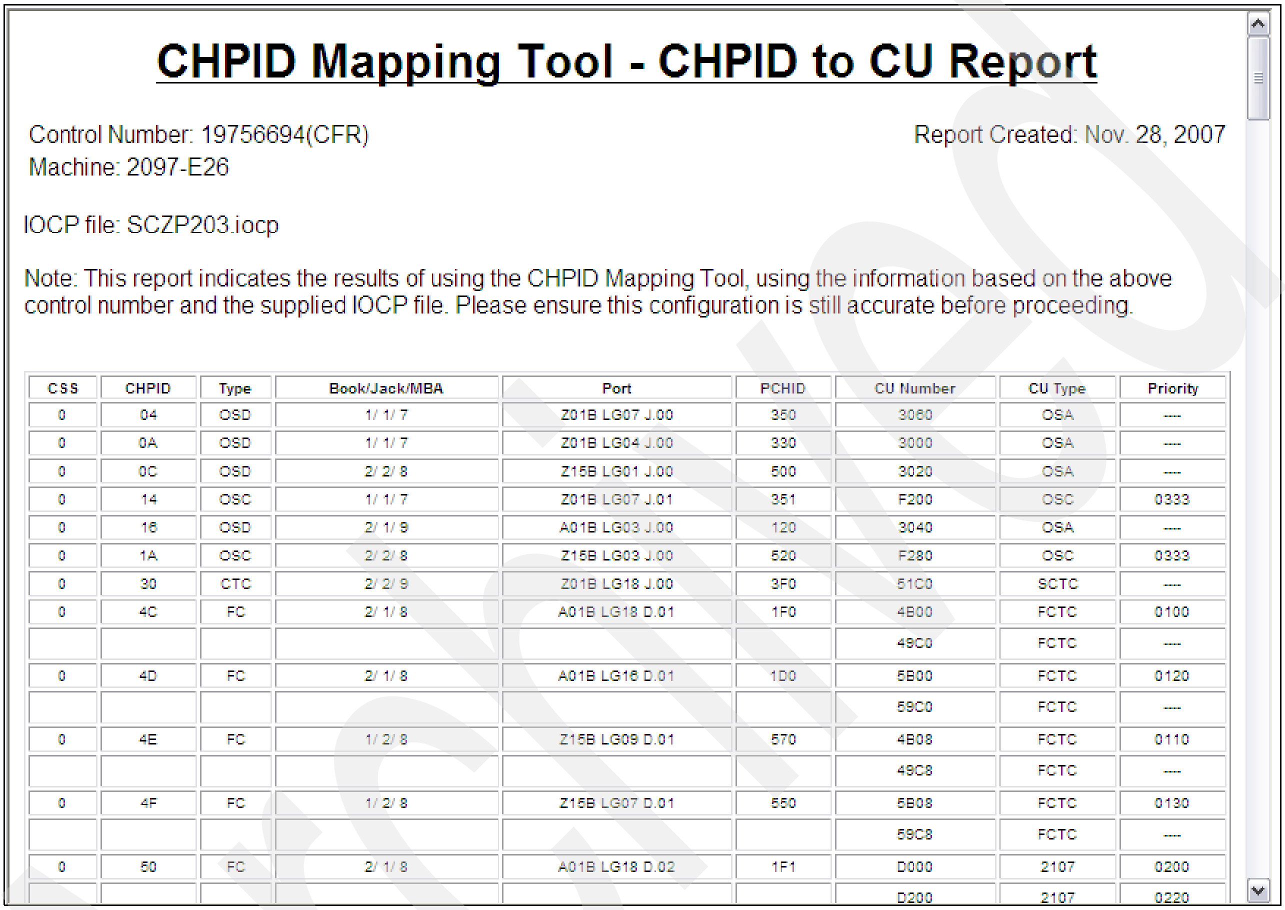
Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this configuration is still accurate before proceeding.

| Frame/Cage | Slot or Fanout | AID or PCHID/Port | Source | Channel Type | Assigned CHPID | Assign Source |
|---|---|---|---|---|---|---|
| A01B | LG01 | 100/ P.00 | 15/ D9/ J.01 | Cry-E2 | | |
| A01B | LG01 | 101/ P.01 | 15/ D9/ J.01 | Cry-E2 | | |
| A01B | D102 | 110/ J.00 | 06/ D9/ J.01 | ISC 2GB | 0.A0(S) | Avail |
| A01B | D102 | 111/ J.01 | 06/ D9/ J.01 | ISC 2GB | 0.A1(S) | Avail |
| A01B | D202 | 118/ J.00 | 06/ D9/ J.01 | ISC 2GB | 0.A4(S) | Avail |
| A01B | D202 | 119/ J.01 | 06/ D9/ J.01 | ISC 2GB | 0.A5(S) | Avail |
| A01B | LG03 | 120/ J.00 | 15/ D9/ J.01 | OSA-E2 GbE SX | 0.16(S) | Avail |
| A01B | LG03 | 121/ J.01 | 15/ D9/ J.01 | OSA-E2 GbE SX | 3.18(S) | Avail |
| A01B | LG04 | 130/ J.00 | 06/ D9/ J.01 | OSA-E2 1000BaseT | 3.06(S) | Avail |
| A01B | LG04 | 131/ J.01 | 06/ D9/ J.01 | OSA-E2 1000BaseT | 3.13(S) | Avail |
| A01B | LG06 | 140/ J.00 | 15/ D9/ J.01 | OSA-E2 1000BaseT | 3.05(S) | Avail |
| A01B | LG06 | 141/ J.01 | 15/ D9/ J.01 | OSA-E2 1000BaseT | 3.11(S) | Avail |
| A01B | LG07 | 150/ D.01 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 0.5C(S) | Avail |
| A01B | LG07 | 151/ D.02 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 3.46(S) | Avail |
| A01B | LG07 | 152/ D.03 | 06/ D9/ J.01 | FICON EXP4 4KM LX | 3.64(S) | Avail |

*Figure 6-29 CMT - CHPID to Port Report*

### *CHPID to Control Unit Report*

1. Click **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 6-30). You may be prompted to accept active content. Accept the active content in order to display the report in your browser.



CHPID Mapping Tool - CHPID to CU Report

Control Number: 19756694(CFR)
Report Created: Nov. 28, 2007
Machine: 2097-E26

IOCP file: SCZP203.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 | Book/Jack/MBA | Port | PCHID | CU Number | CU Type | Priority |
|---|---|---|---|---|---|---|---|---|
| 0 | 04 | OSD | 1/ 1/ 7 | Z01B LG07 J.00 | 350 | 3060 | OSA | ---- |
| 0 | 0A | OSD | 1/ 1/ 7 | Z01B LG04 J.00 | 330 | 3000 | OSA | ---- |
| 0 | 0C | OSD | 2/ 2/ 8 | Z15B LG01 J.00 | 500 | 3020 | OSA | ---- |
| 0 | 14 | OSC | 1/ 1/ 7 | Z01B LG07 J.01 | 351 | F200 | OSC | 0333 |
| 0 | 16 | OSD | 2/ 1/ 9 | A01B LG03 J.00 | 120 | 3040 | OSA | ---- |
| 0 | 1A | OSC | 2/ 2/ 8 | Z15B LG03 J.00 | 520 | F280 | OSC | 0333 |
| 0 | 30 | CTC | 2/ 2/ 9 | Z01B LG18 J.00 | 3F0 | 51C0 | SCTC | ---- |
| 0 | 4C | FC | 2/ 1/ 8 | A01B LG18 D.01 | 1F0 | 4B00 | FCTC | 0100 |
| | | | | | | 49C0 | FCTC | ---- |
| 0 | 4D | FC | 2/ 1/ 8 | A01B LG16 D.01 | 1D0 | 5B00 | FCTC | 0120 |
| | | | | | | 59C0 | FCTC | ---- |
| 0 | 4E | FC | 1/ 2/ 8 | Z15B LG09 D.01 | 570 | 4B08 | FCTC | 0110 |
| | | | | | | 49C8 | FCTC | ---- |
| 0 | 4F | FC | 1/ 2/ 8 | Z15B LG07 D.01 | 550 | 5B08 | FCTC | 0130 |
| | | | | | | 59C8 | FCTC | ---- |
| 0 | 50 | FC | 2/ 1/ 8 | A01B LG18 D.02 | 1F1 | D000 | 2107 | 0200 |
| | | | | | | D200 | 2107 | 0220 |

*Figure 6-30 CMT - CHPID to CU Report*

## Create 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.

Create an IOCP statements file for input back into the IODF via HCD. This IOCP statements file now has the CHPIDs assigned to PCHIDs.

1. Click **Tool** → **Create Updated IOCP File** (Figure 6-31).

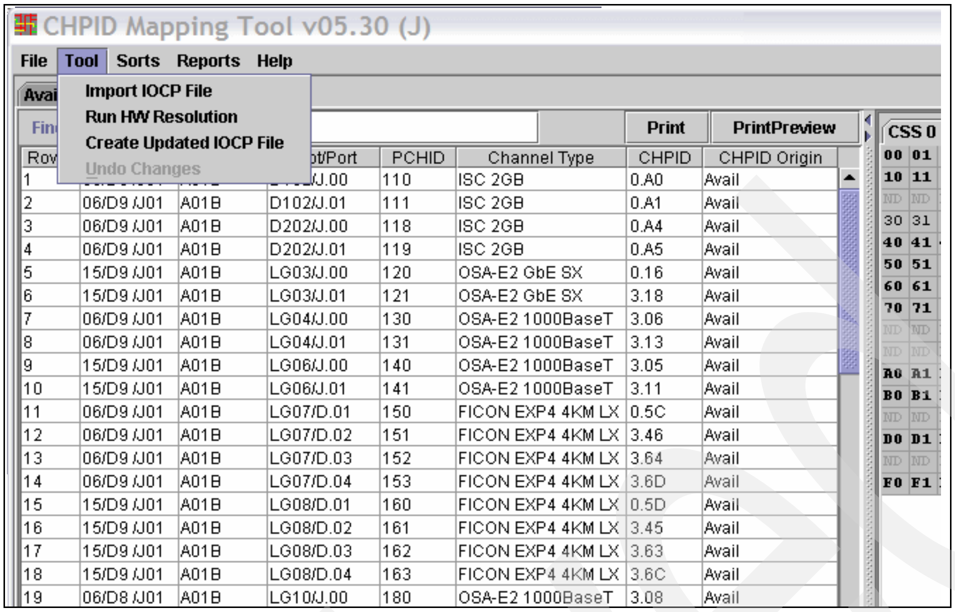



Figure 6-31 CMT - Create Updated IOCP File

2. Enter File name and location for the IOCP output file and click **Save (**Figure 6-32).

> **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.

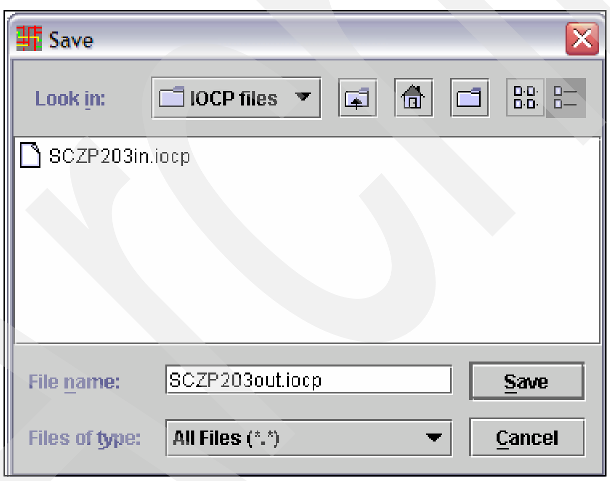



Figure 6-32 CMT - Save IOCP output file

3. The CHPID Mapping Tool displays an informational message regarding what to do for the final execution of the tool (Figure 6-33).

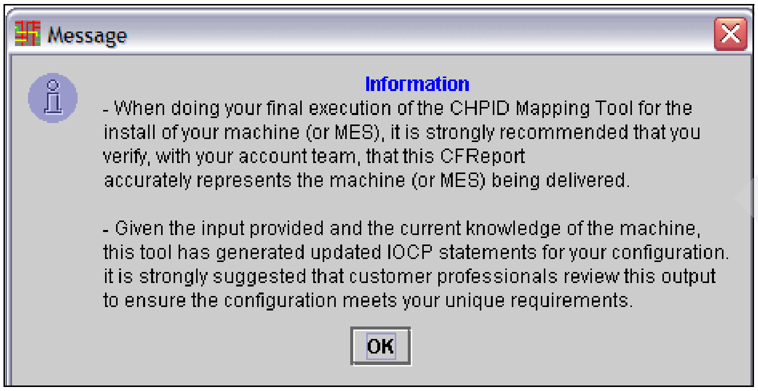



*Figure 6-33 CMT - informational message*

## 6.5 Migrate PCHIDs back into the 2097 work IODF

Once we have mapped the CHPIDs to PCHIDs using the CHPID Mapping Tool, we need to input this information back into HCD. We do this using the updated IOCP statement file (for example, sczp203out.iocp).

1. Upload the sczp203out.iocp file to the z/OS image in order to migrate the PCHID information into HCD. 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 the updated IOCP statements file, notice that the CHPID Mapping Tool has left its mark with reference to the CCN. Also notice the CU Priority values added for the OSC control units F200 and F280 and also some other CUs.

   > **Note:** Control unit priorities are stored in the IOCP output file created by the CHPID Mapping Tool 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; see Example 6-2.

   *Example 6-2 HCD - Updated IOCP statements file (with CMT statements)*

```
                  IODEVICE ADDRESS=(FFDD,007),CUNUMBR=(FFFE),UNIT=CFP
                  IODEVICE ADDRESS=(FFF9,007),CUNUMBR=(FFFE),UNIT=CFP
    *CMT* VERSION=000
    *CMT* CCN=19756694(CFR)
    *CMT* 4B00.0=0100,4B08.0=0110,5B00.0=0120,5B08.0=0130,D000.0=0200
    *CMT* D100.0=0210,D200.0=0220,D300.0=0230,D400.0=0240,D500.0=0250
    *CMT* F200.0=0333,F200.1=0333,F280.0=0333,F280.1=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, that task 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 6-34).

```
                       z/OS V1.9 HCD
Command ===> ______________________________________________________

                           Hardware Configuration

Select one of the following.

5   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.IODF39.WORK'                  +
```

*Figure 6-34 HCD - main menu, select Migrate configuration data*

3. The Migrate Configuration Data panel is displayed (Figure 6-35). 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 6-35 HCD - Migrate Configuration Data*

4. HCD displays the Migrate IOCP Data panel. Fill in the following fields and then press Enter:

| | |
|---|---|
| `Processor ID` | Use the same one as 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 TSO (see 6.6, "HCD steps to build production IODF" on page 293). |
| `Processing mode` | Select option **2** to save the results of the migration. (Prior to using 2, however, try to migrate using option **1**, in order 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 . . . . . . . . . . . . SCZP203   +   CSS ID . . . . . . . _  +
OS configuration ID  . . . . . . . . TEST2097  +

Combined IOCP/MVSCP input data set . _____________________________________
IOCP only input data set . . . . . . 'SYS6.IODF39.IOCPOUT.SCZP203'
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 6-36 HCD - 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 6-37).

```
 -------------------------- 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.IODF39.WORK.
******************************** Bottom of data *****************************
```

*Figure 6-37 HCD - 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 steps to build production IODF

In order to make use of the definitions that were updated in HCD, we must create a production IODF from the work IODF. This is done with the following steps:

1. From the HCD main menu, select option **2**, **Activate or process configuration data** (Figure 6-38).

```
                       z/OS V1.9 HCD
Command ===> ______________________________________________________

                           Hardware Configuration

Select one of the following.

2   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.IODF39.WORK'                     +
```

*Figure 6-38 HCD - Main menu, select Activate or process configuration data*

2. The Activate or Process Configuration Data panel is displayed (Figure 6-39). 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 statements
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

*Figure 6-39 HCD - Activate or Process Configuration Data, select Build production IODF*

3. The Message List panel is displayed (Figure 6-40). 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 4
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.
***************************** Bottom of data *****************************
```

*Figure 6-40 HCD - Message List (building Production IODF)*

4. Press PF3 to continue.
5. The Build Production I/O Definition File panel is displayed (Figure 6-41). Fill in the fields `Production IODF name` and `Volume serial number`, and then press Enter.

```
------------- Build Production I/O Definition File ------------


Specify the following values, and choose how to continue.

Work IODF name . . . : 'SYS6.IODF39.WORK'

Production IODF name . 'SYS6.IODF39'______________________
Volume serial number . BH8ST1  +

Continue using as current IODF:
2   1.  The work IODF in use at present
    2.  The new production IODF specified above
```

*Figure 6-41 HCD - Build Production I/O Definition File*

6. The Define Descriptor Fields panel is displayed (Figure 6-42). 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.IODF39'

Descriptor field 1  . . . SYS6
Descriptor field 2  . . . IODF39
```

*Figure 6-42 HCD - Define Descriptor Fields*

7. HCD displays the following message, indicating that the production IODF was successfully created:

```
Production IODF SYS6.IODF39 created.
```

Proceed to the next section to implement the configuration on the 2097.

## 6.7 Implementing the processor configuration on the 2097

At this point there is a production IODF, which is called SYS6.IODF39. Now the IOCDS component of the IODF needs to be updated on the new CPC that is being installed (for example, SCZP203) and activated (POR) using this IOCDS. The final step is to POR the processor using this IOCDS.

Describing how to POR the new hardware is beyond the scope of this book.

There are 2 possible ways to load the IOCP Statements onto the 2097 Service Element IOCDS:

- HCD, using Option 2.11
- HMC, using 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 2097 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 will need to use the Stand-Alone IOCP process.

First we describe using HCD Option 2.11.

### Updating the IOCDS using HCD Option 2.11

1. From the HCD main menu, select option **2, Activate or process configuration data** (Figure 6-43 on page 296). Ensure that the IODF is the production one created in the previous step. Press Enter.

```
                       z/OS V1.9 HCD
Command ===> _____________________________________________________

                           Hardware Configuration

Select one of the following.

2   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.IODF39'                        +
```

*Figure 6-43   HCD - main menu, select Activate or process configuration data*

2. The Activate or Process Configuration Data panel is displayed (Figure 6-44 on page 297). Select option **11**, **Build and manage S/390 microprocessor IOCDSs and IPL attributes**.

   **Note:** In this example, we are assuming that we have connectivity to the new 2097 via the HMC LAN in order to create an IOCDS from which we power-on reset. This may not be the case for all readers.

   If the new 2097 is not accessible from the HMC LAN, we would need to copy the IOCP statements onto a USB Flash Memory Drive and import them on to the 2097 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.

```
                    z/OS V1.9 HCD
----- 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 statements
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

*Figure 6-44 HCD - Activate or Process Configuration Data, select Build IOCDSs*

3. The S/390 Microprocessor Cluster List panel is displayed (Figure 6-45). Use a forward slash (/) to select the new 2097 from the list in order to update one of its IOCDSs. Press Enter.

```
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.SCZP203    2097   E26     SCZP203
****************************** Bottom of data ********************************
```

*Figure 6-45 HCD - S/390 Microprocessor Cluster List*

4. The Actions on selected CPCs panel is displayed (Figure 6-46). 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 6-46 HCD - Actions on selected CPCs, Work with IOCDSs*

5. The IOCDS List panel is displayed (Figure 6-47 on page 298). Select the IOCDS that you wish to update for the 2097 install by typing a slash (/), then press Enter.

```
  Goto  Query  Help
 ------------------------------------------------------------------------------
                                  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.SCZP203  DIAG00   LPAR   POR        Yes       No          Yes-POR
 / A1.SCZP203  DIAG01   LPAR   Alternate  No        No          No
 _ A2.SCZP203  DIAG02   LPAR   Alternate  No        No          No
 _ A3.SCZP203  DIAG03   LPAR   Alternate  No        No          No
 ******************************* Bottom of data ********************************
```

*Figure 6-47 HCD - IOCDS List*

6. The Actions on selected IOCDSs panel is displayed (Figure 6-48). 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 6-48 HCD - Actions on selected IOCDSs*

7. The Build IOCDSs panel is displayed (Figure 6-49). Verify that all the information is correct.

   Fill in the field `Title1` and press Enter.

```
 ------------------------------- Build IOCDSs ---------------------------------
                                                                  Row 1 of 1
   Command ===> ___________________________________________ Scroll ===> CSR

   Specify or revise the following values.

   IODF name . . . . . . . . . : 'SYS6.IODF39'

   Title1 . IODF39 _________________________________________________________
   Title2 : SYS6.IODF39 - 2007-11-28 18:49

                              Write IOCDS in
   IOCDS        Switch IOCDS  preparation of upgrade
   A1.SCZP203   No            No
   ***************************** Bottom of data ******************************
```

*Figure 6-49 HCD - Build IOCDSs*

8. The Job Statement Information panel is displayed (Figure 6-50). Fill in 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
  //WIOCDS  JOB (ACCOUNT),'NAME'
  //*
  //*
  //*
```

*Figure 6-50 HCD - 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 A1 IOCDS REPLACED.`

   Now if you return to HCD option 2.11 and view the IOCDS, note that the SNA Address is at `USIBMSC.SCZP203` (Figure 6-51).

```
Goto  Query  Help
------------------------------------------------------------------------------
                      S/390 Microprocessor Cluster List             Row 1 of 4
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address        Type   Model   Processor ID
s USIBMSC.SCZP203    2097   E26     SCZP203
******************************* Bottom of data ********************************
```

*Figure 6-51 HCD - IOCDS with replacement IODF*

Figure 6-52 shows the Alternate status.

```
  Goto  Query  Help
------------------------------------------------------------------------------
                                  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.SCZP203  DIAG00   LPAR   POR        Yes       No          Yes-POR
_ A1.SCZP203  IODF39   LPAR   Alternate  Yes       Yes         No
_ A2.SCZP203  DIAG02   LPAR   Alternate  No        No          No
_ A3.SCZP203  DIAG03   LPAR   Alternate  No        No          No
******************************* Bottom of data ********************************
```

*Figure 6-52 HCD - IOCDS showing Alternate Status*

## Updating the IOCDS using 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 onto a USB Flash Memory Drive and retain.

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2097, as opposed to a remote Web browser, and select the new 2097, 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 is done to create an environment on the processor that will allow 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 128MB of storage and use this partition to run the I/O Configuration Program.
4. Under Systems Management, click **Servers** to expand the list; click a server to select it (in this example we selected **SCZP203**).
5. On the Tasks pad, click **Recovery** to expand it, and select **Single Object Operations**.
6. Click **Yes** to confirm connection.
7. On the Tasks pad, find CPC Configuration, and select **Input/output (I/O) Configuration**.
8. Click the radio button for the Data Set you wish you load the IOCDS into.

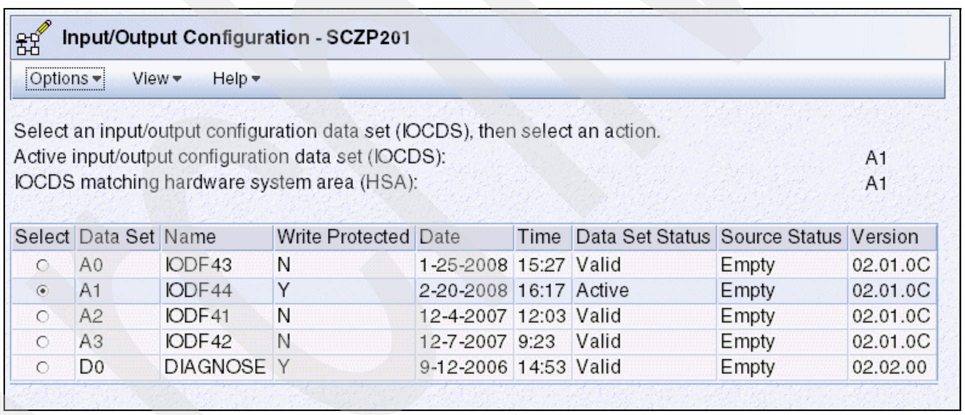



*Figure 6-53 HMC - Select IOCDS for Stand-alone IOCP*

9. Click **Options** → **Import Source File** → **Hardware Management Console USB Flash Memory Drive**.

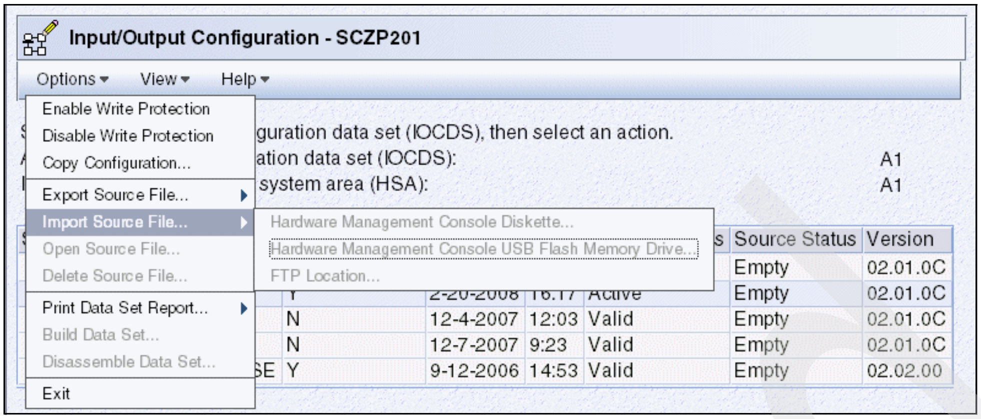



Figure 6-54 HMC - Import Source File

10.Select the source file name and click **OK**.

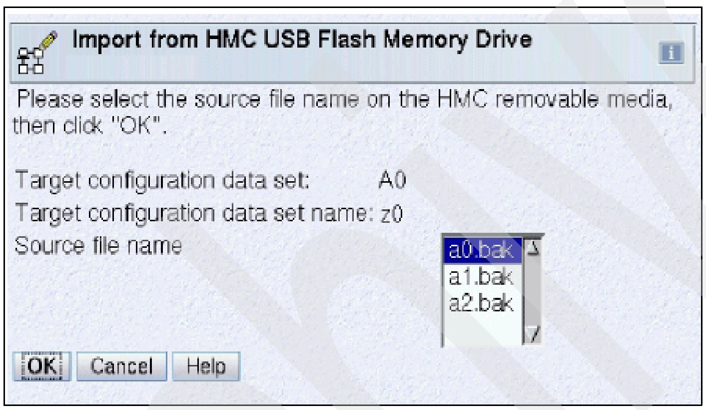



Figure 6-55 HMC - Select source file

11.Now that the IOCP statements have been imported, perform a Build Data Set to:

- Process the source file data for the selected I/O configuration.
- Check the syntax and validates the configuration.
- Generate an IOCDS and, if there are no errors, writes the IOCDS to the support element hard disk.
- Write the I/O configuration source (IOCS) file to the support element hard disk with any IOCP messages embedded in the file.

Click **OK**. This initiates a load of the IOCP code into the targeted LPAR (previously activated) and the program will perform the Build Data Set steps.

If the build was successful and there are no caution or warning messages, the resultant IOCDS has been written to the support element hard disk.

This IOCDS is now ready to be selected via a Reset Profile and the 2097 may be activated (Power-on Reset) with the production IODF.

# 6.8 HMC steps for activation profiles

### Build the Production Reset Profile and point to required IOCDS

Now that the IODF has been written to an IOCDS, a Reset (Power-on Reset) Profile must be built to point to that IOCDS. This Reset Profile is used to power-on reset the new 2097 after it has been handed over from the IBM service representative.

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2097 or use a remote Web browser and select the new 2097.
2. Under Systems Management, click **Servers** to expand the list; click the server to select it (in this example we selected **SCZP203**).
3. On the Tasks pad, click **Operational Customization** to expand it, and select **Customize/Delete Activation Profiles.**
4. Select the DEFAULT Reset Profile and click **Customize selected profile**.
5. Save this DEFAULT profile with a new Profile name to be referred to when the power-on reset is required (for example, SCZP203).
6. Select the new Profile and click **Customize selected profile**.
7. Click the IOCDS that you just updated in the previous step.
8. Message ACTB0PDL is displayed (Figure 6-56).

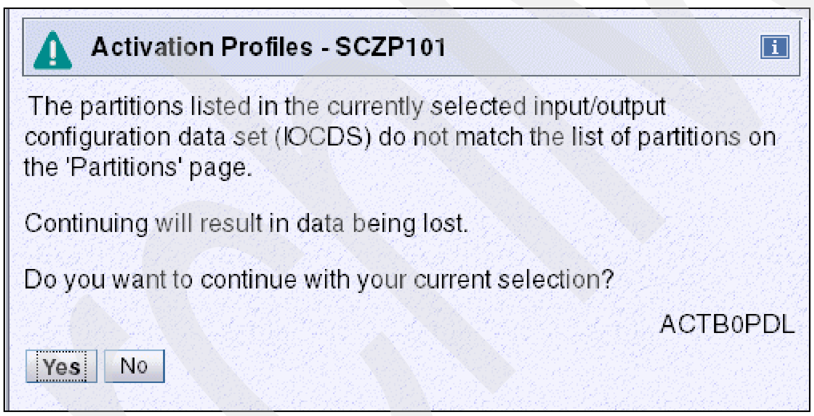



*Figure 6-56 HMC - Activation Profiles message ACTB0PDL*

Depending on the circumstances, you may wish to answer Yes or No. You can now review the Partition Activation List if you want to.

### STP configuration

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 7, “Server Time Protocol setup” on page 305 for details.

### Build Image Profiles

While still in the Reset Profile, you can now review the Image Profile attributes.

### Build Load Profiles

Go through and create Load (IPL) Profiles using the DEFAULTLOAD Load profile as a skeleton for all the logical partitions that you are IPLing on this processor.

## Build Load Members in SYS#.IPLPARM

You require Load Members defined in SYS#.IPLPARM when IPLing from the new 2097.

Additionally, if you are going to use the HWNAME parameter to point to the Processor.ID in the Load members, then make sure you use the correct name (SCZP203, in our example).

## Performing a Power-on reset

The 2097 is now ready to be Activated (Power-on Reset) using the Production Reset Profile.

7

# Server Time Protocol setup

This chapter describes the STP setup when a new System z10 EC is installed. It contains the following sections:

- External Time Source setup
- Add the System z10 EC to an existing CTN
- Create a new STP-only CTN



## 7.1 External Time Source setup

To maintain time accuracy, 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 CTN, if the Sysplex Timer has an external time source configured, it will be used and time accuracy will be maintained by the Sysplex Timer. The Sysplex Timer ETS 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 to be used to maintain time accuracy, it should be configured before:

- A migration from a Mixed to STP-only CTN.
- Configuration of a new STP-only CTN. If the ETS is used to initialize the Coordinated Server Time, the ETS must be configured before the time is initialized.

The ETS can be configured to:

- Dial out to telephone time services.

  Using the dial out to telephone time service consists of two steps:

  a. Configure an HMC to dial out to telephone time services. At the Customize Outbound Connectivity task on the HMC, select both of the following check boxes:

     - Enable local system as a call-home server
     - Allow external time source dialing using the local modem

     This enables the configuration of the external time source. Configuration of the ETS should be done on multiple HMCs in order 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 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 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 to be 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 will make gradual adjustments by steering the CST to the time obtained from the external time source.

- Access an NTP server.

  The NTP server must be defined on the SE of the servers that can be assigned as Current Time Server. NTP becomes active once a server is configured as the Current Time Server within the CTN.

  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.

**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.

## 7.1.1 ETS dial out configuration

### HMC setup for ETS dial out configuration

The HMC setup can be considered as the first step of ETS dial out configuration. It makes the HMC “capable” of dialing up to a time service provider.

To configure the dial out telephone connection:

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 Customize Outbound Connectivity dialog is displayed (Figure 7-1). Make sure the “Enable local system as a call-home server” check box is selected to enable configuration of the external time source.

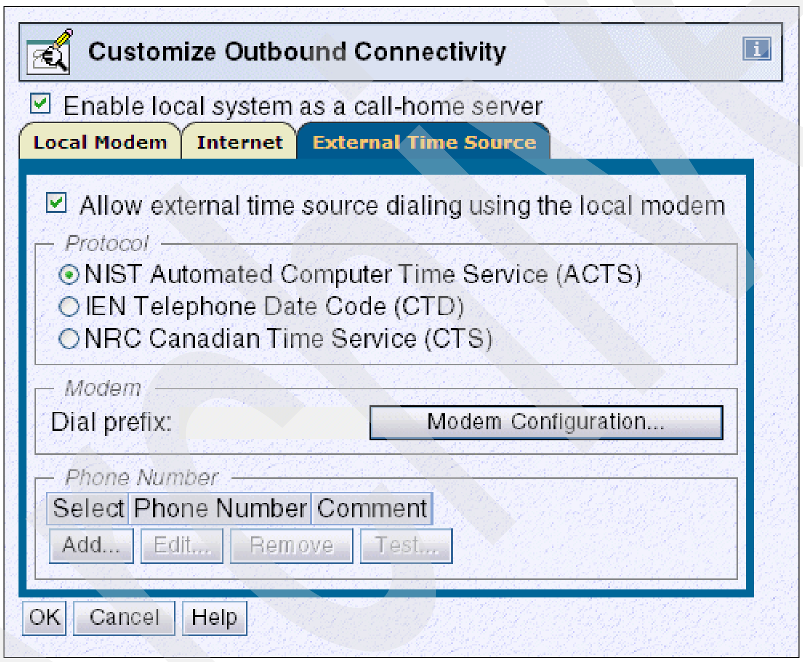



*Figure 7-1 Customize Outbound Connectivity - External Time Source*

3. On 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:

   – NIST (National Institute of Standards and Technology) representing the Automated Computer Time Service (ACTS), typically used in the USA

   – IEN (Instituto Elettrotecnico Nazionale) representing the Telephone Date Code (CTD), typically used in Europe

   – NRC (National Research Council) representing the Canadian Time Service (CTS), typically used in Canada

   The countries’ Time Service provider must be contacted to determine which protocol they support and what phone number should be used.

4. Click the **Modem Configuration** button. The Customize Modem Settings dialog allows you to specify tone or pulse dialing, Wait for dial tone, Enable speaker, and Dial prefix (Figure 7-2). Make the appropriate selections and click **OK**.

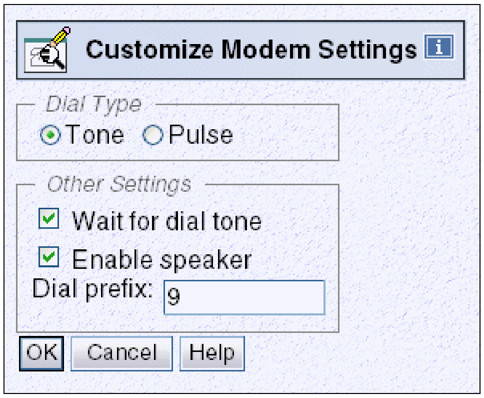



*Figure 7-2 Customize Modem Settings panel*

5. Enter the appropriate Phone number in the Add External Time Source Phone Number dialog (Figure 7-3).

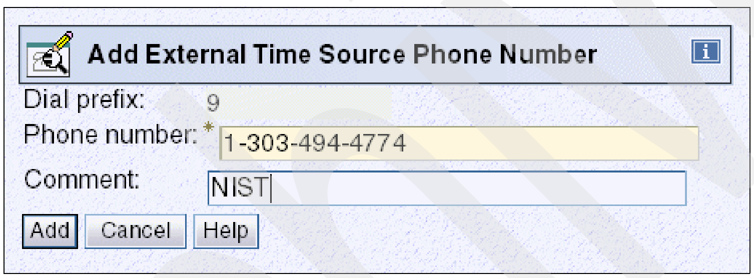



*Figure 7-3 Add External Time Source Phone Number panel*

6. When the dial-out phone number has been added, the Test button in the Customize Outbound Connectivity panel becomes selectable. Click **Test** to ensure that the correct configuration and connectivity to the ETS service provider has been accomplished. See Figure 7-4.

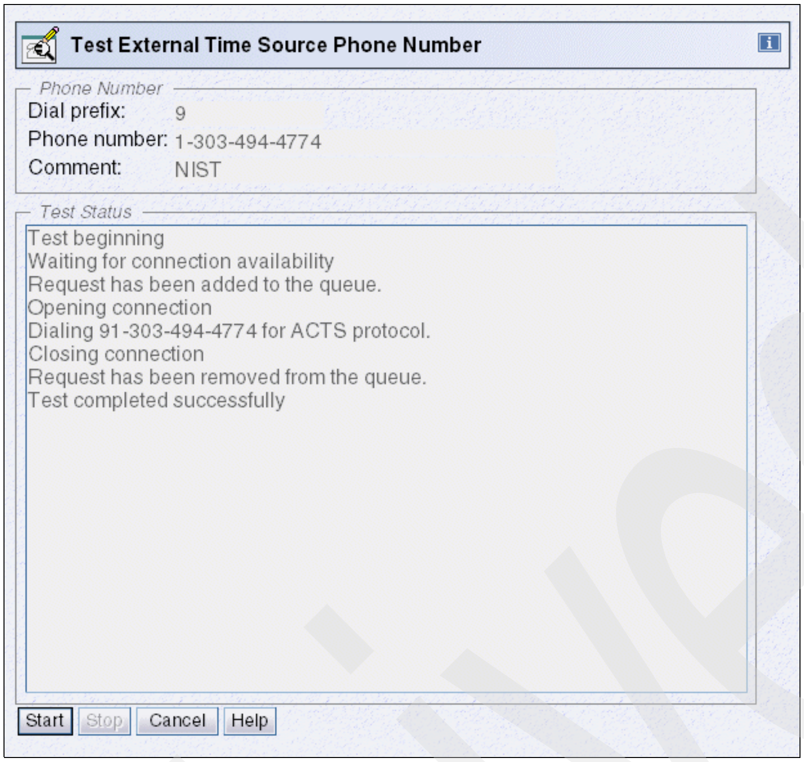



*Figure 7-4 Test External Time Source Phone Number*

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 can be accomplished by performing the same steps for the second HMC that has all the CTS candidates in its Server group.

## 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.

1. Select the Server as the target object, then select **Operational Customization** → **Customize Operational Customization** → **Options** → **New**. This opens the Add a Scheduled Operation dialog as shown in Figure 7-5 on page 310.

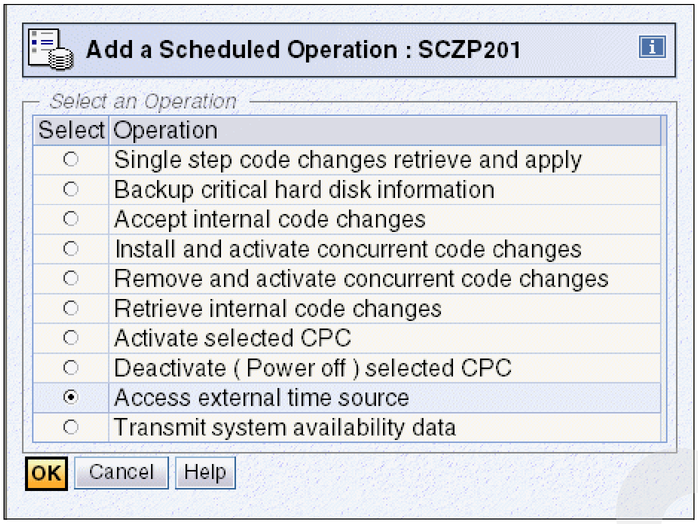



*Figure 7-5 Add a Scheduled Operation*

2. Select the "Access external time source" radio button and click **OK**. The Set up a Scheduled Operation dialog opens as shown in Figure 7-6.

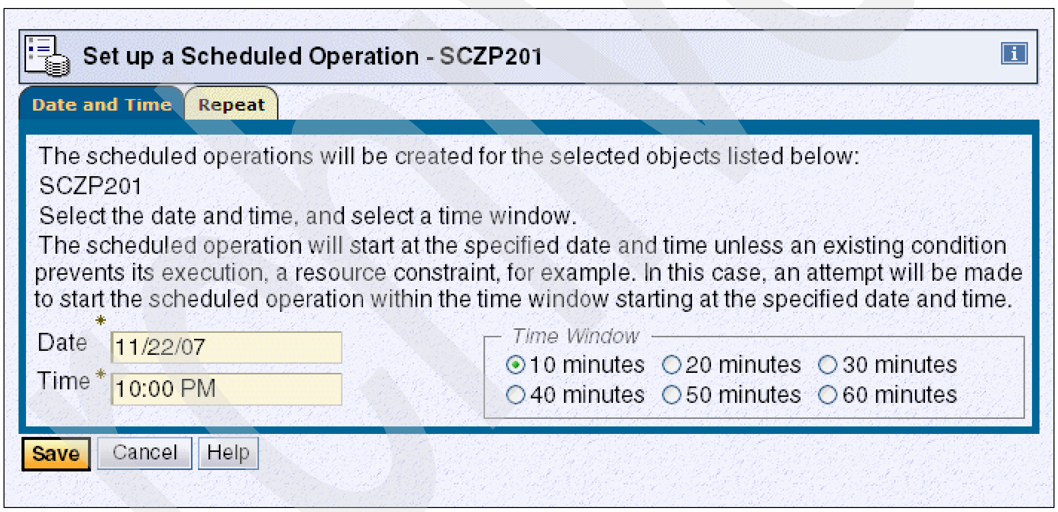



*Figure 7-6 Set up a Scheduled Operation/Date and Time*

3. Enter a Date and Time when the scheduled operation should be performed. The default Time Window of 10 minutes should be sufficient in the case this scheduled operation gets prevented by any resource constraint. For the ETS query we recommend setting up a repeated scheduled operation as a periodic time adjustment to continuously maintain time accuracy. The repeat option is shown in Figure 7-7.
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 will have the ETS device contacted once a week on the days previously selected. Check the option "Repeat indefinitely" to make sure this scheduled operation will never expire.

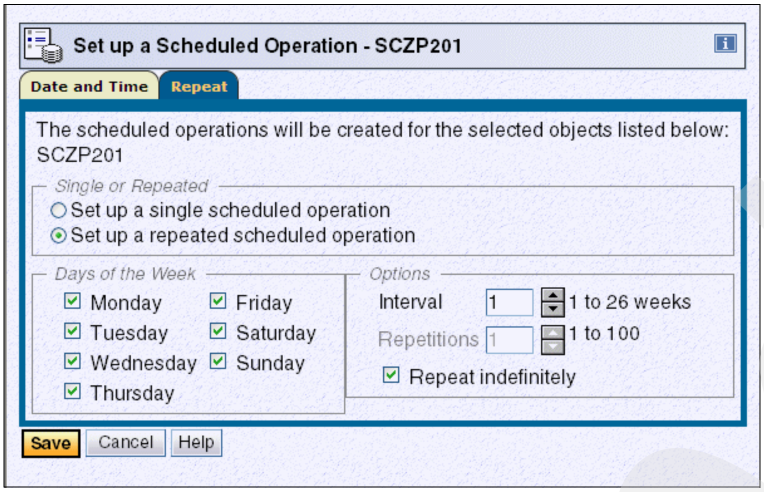



*Figure 7-7 Set up a Scheduled Operation/Repeat*

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 may need to be done for another SE, if relevant.

## 7.1.2 Configure NTP as the External Time Source

STP uses time adjustment only from the NTP server configured on the Current Time Server. However, in an STP-only CTN where the NTP client function is used, we recommend that the NTP function be configured on each server that can be assigned the CTS role. It is typical for the CTS to be the Preferred Time Server (PTS). If the PTS has an ETS configured, it is highly recommended to also configure the ETS on the Backup Time Server. The NTP time server will only be used to adjust the Coordinated Server Time if the server is the Current Time Server.

To configure the NTP Time Server, perform the following steps:

1. Click the Server to be set up for NTP on the HMC.
2. Click the **System (Sysplex) Time** option available in the Tasks section. Select the ETS Configuration tab.

   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:** Servers that do not support NTP (z990, z890) will not display the ETS Configuration tab, even though these servers can be part of the STP-only CTN.

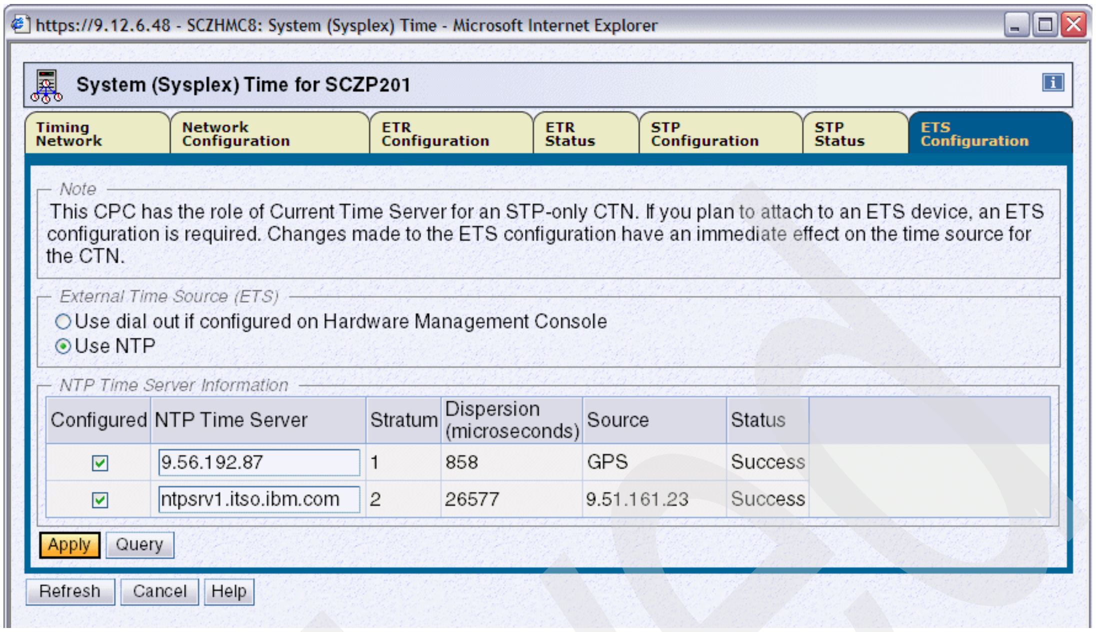



*Figure 7-8 ETS Configuration*

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.

   Use the task **Customize Network Settings** → **Name services** in the Support Element Console Applications.

   Refer to the manual *System z10 Support Element Operations Guide V2.10.0*, SC28-6868 or *System z9 Support Element Operations Guide (Version 2.9.2)* SC28-6860 for information about how to customize network settings for the Support Element.

4. Click the **Query** button to test the access and fill in the Stratum, Dispersion, Source, and Status table fields for the corresponding NTP server.
5. Click the **Apply** button to set NTP server configuration as shown in Figure 7-8.

The *Dispersion*, expressed in microseconds, on the ETS Configuration tab is an indication of the accuracy of the time obtained from the NTP server time relative to its source. For example, if the NTP server indicates a time of t0 and a dispersion of 100, it means that the time retrieved from the NTP server is t0 plus or minus 100 microseconds relative to the NTP server's source. If the NTP server's time source is an external source, like GPS or WWV, the NTP server's source will be accurate to UTC by the dispersion value. If the NTP server lost connection to the external source and is running off of its internal clock, whether calibrated or uncalibrated, the accuracy relative to UTC cannot be guaranteed.

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 will be GPS, or radio signals such as WWV. A list of examples of known Stratum 1 source values is shown in Table 7-1. 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.

*Table 7-1 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 | un-calibrated 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 |

When both NTP servers are configured, the NTP client code will select the NTP server with the highest Stratum level (Stratum 1 will be selected over Stratum 2). If the Stratum levels are the same, the NTP server with the lowest dispersion is selected. Entries with unsuccessful status are not considered as potential time sources. The specific NTP server selection occurs during each access.

NTP server access is driven from the CTS, once every 10 minutes, with an adjust time occurring once an hour. In case of a bad NTP server access, a hardware message is posted to alert the customer to take corrective action.

For servers that are PTS or BTS, but not the CTS, the NTP server access is driven from the CTS, once every 10 minutes, with a time adjustment issued every hour. This adjustment is ignored by the STP facility if the server is not the CTS. This monitoring is done to detect NTP server problems. In the case of NTP server access failures or changes in stratum level or source ID, a hardware message is posted. For all other servers, the NTP server is not accessed.

The NTP server configuration takes effect when the user clicks the **Apply** button. The information is saved on the Support Element. When the CTS is configured in an STP-only CTN, NTP accesses begin using the saved information.

No user message is displayed on the HMC when STP accesses the NTP server. When a time adjustment is requested, an entry message is generated in the Support Element Console Events log. An example is shown in Table 7-2.

To view the console log from the HMC application:

1. Select the CTS.
2. Select **Recovery** → **Single Object Mode** to log on to the Support Element.
3. From the SE workplace, select **Service Management** → **View Console Events**.

*Table 7-2 Support Element Console events*

| Date | Time | Console event |
|---|---|---|
| 09/10/2007 | 12:18:54.570 | This CPC is requesting an adjustment to the Coordinated Server Time after contacting an External Time Source via NTP [0.000798 seconds]. |
| 09/10/2007 | 11:18:54.550 | This CPC is requesting an adjustment to the Coordinated Server Time after contacting an External Time Source via NTP [-0.036087 seconds]. |
| 09/10/2007 | 10:18:54.600 | This CPC is requesting an adjustment to the Coordinated Server Time after contacting an External Time Source via NTP [-0.157594 seconds]. |

This completes the configuration of an external time source. The ETS will be ready for use when an STP-only CTN is activated, either as a new STP-only CTN or as a result of a migration from a Mixed CTN.

## 7.2 Add the System z10 EC 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 the System z10 EC into this existing Mixed CTN.

The server can be added in two different ways:

- A Mixed CTN, using either ETR or STP timing mode.

  The starting point for this implementation is a Mixed CTN consisting of one or more servers and Sysplex Timers. The System z10 EC can join this Mixed CTN in two ways:

  – Using ETR timing mode: In this case, the System z10 EC needs ETR connectivity established to the existing Sysplex Timers.

  – Using STP timing mode: In this case, Sysplex Timer connectivity is not required. If the connection exists, the ETR ports on the System z10 EC must be disabled as part of the implementation.

  It is assumed that the System z10 EC has 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.

## 7.2.1 Add the System z10 EC to an existing Mixed CTN in ETR 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 System z10 EC to this existing Mixed CTN using ETR timing mode:

- Set the CTN ID for the System z10 EC.
- Attach and enable the ETR ports.

In our example the existing Mixed CTN consists of two servers, named SCZP101 and SCZP901, using CTN ID [ITSOPOK] - [31].

### Setting the CTN ID

Because this is a Mixed CTN, both the ETR ID and the STP ID must be defined in order to have the System z10 EC join the Mixed CTN.

1. From the ETR Configuration tab set the state to Enabled for both Port 0 and Port 1, and enter the ETR Network ID to match one of the existing Mixed CTNs. Click **Apply**. The CTN ID for the server becomes [ ] - [31], in line with the value already defined in our example Mixed CTN. See Figure 7-9.

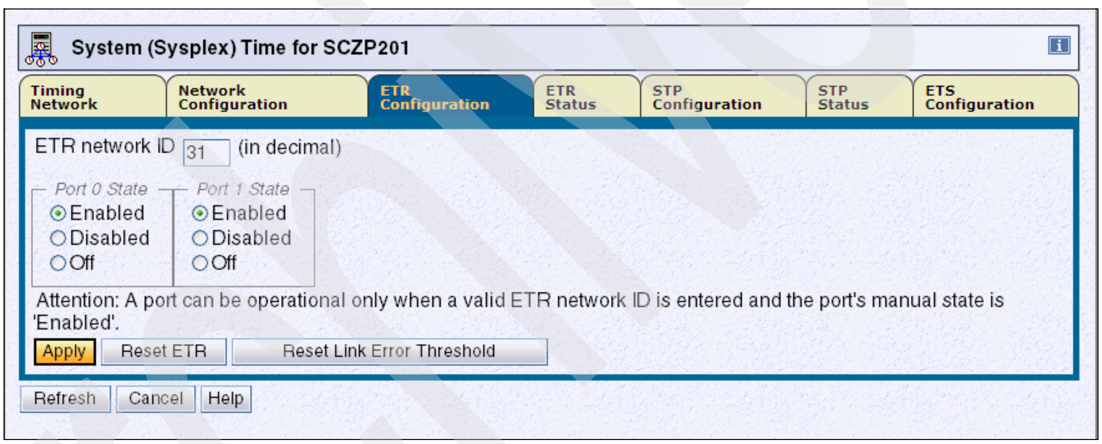



*Figure 7-9 Define ETR Network ID*

2. From the STP Configuration tab enter the STP ID. The ETR Network ID field is read only. It displays the value entered in the previous step. See Figure 7-10.

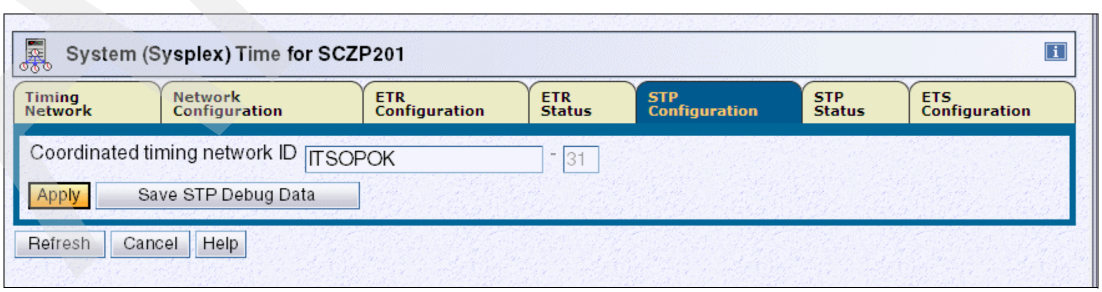



*Figure 7-10 STP Configuration tab: Define STP ID*

3. Click **Apply**. The CTN ID for the server becomes **[ITSOPOK] - [31]**, in line with the value defined for the existing Mixed CTN.

## Verification

The server STP configuration can be verified from the Timing Network tab shown in Figure 7-11.

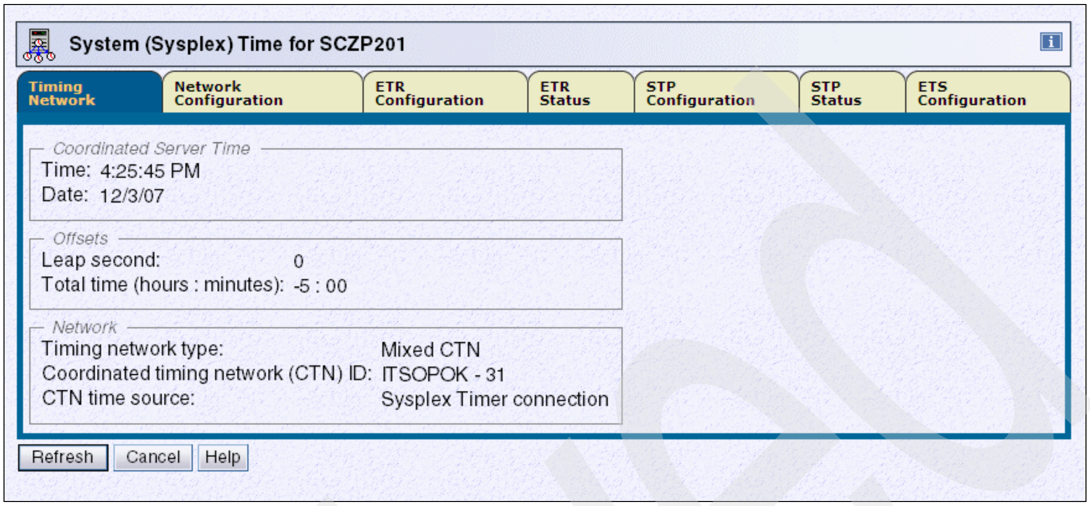



*Figure 7-11 Timing Network tab, SCZP201*

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 7-12 indicates that the server timing mode is External Time Reference (ETR).

The STP Status tab also reflects the fact that coupling links are initialized for STP since both ends of the link are configured. Similar information is now reflected on the STP Status tab at the other end of the links, on server SCZP101 and SCZP901.

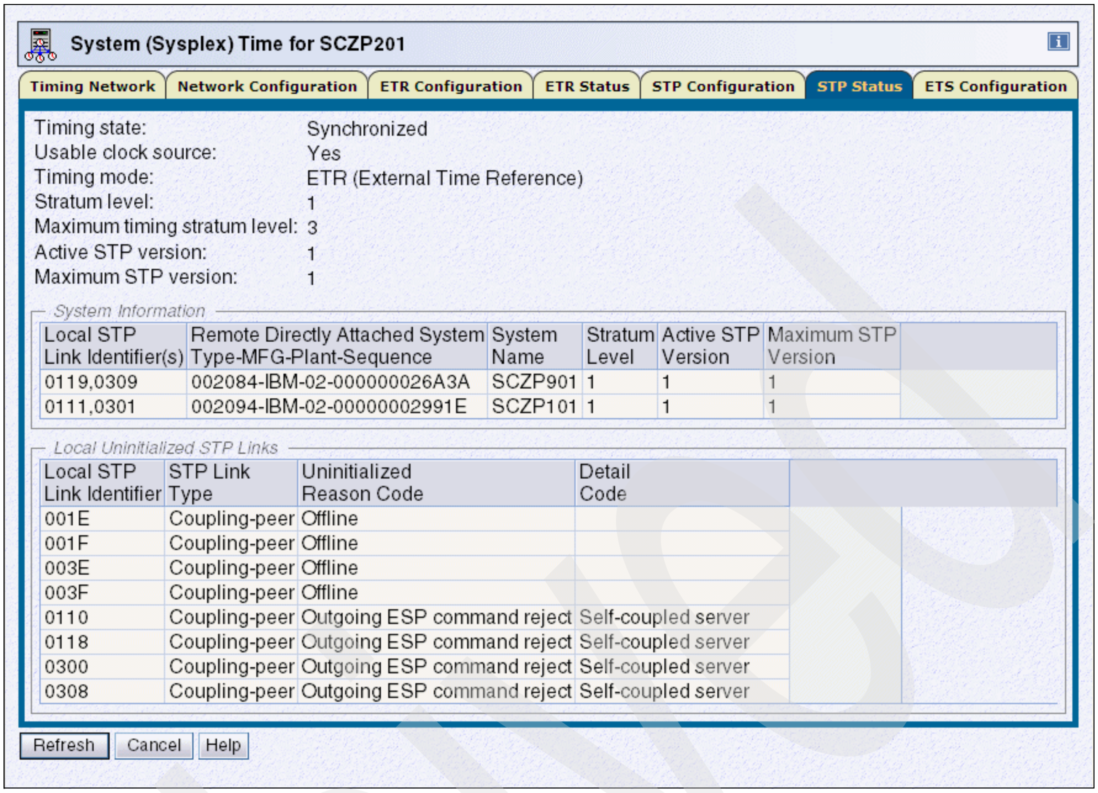



*Figure 7-12 STP Status tab, SCZP201*

Once a z/OS image has been IPLed on server SCZP201, the response to the **`Display ETR`** command, message IEA282I, now indicates the CTN ID, as shown in Example 7-1. The message also indicates the synchronization mode along with the ETR details.

*Example 7-1 D ETR command and response in ETR mode*

```
D ETR
IEA282I 10.51.52 TIMING STATUS 512
SYNCHRONIZATION MODE = ETR
  CPC PORT 0    <== ACTIVE        CPC PORT 1
  OPERATIONAL                     OPERATIONAL
  ENABLED                         ENABLED
  ETR NET ID=31                   ETR NET ID=31
  ETR PORT=00                     ETR PORT=00
  ETR ID=00                       ETR ID=01
  THIS SERVER IS PART OF TIMING NETWORK ITSOPOK -31
```

This completes the procedure for adding the System z10 EC to an existing CTN using ETR timing mode.

The System z10 EC is now part of the CTN and is using the Sysplex Timer as time source.

## 7.2.2 Add the System z10 EC 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 System z10 EC to this existing Mixed CTN using STP timing mode.

In our configuration we are showing a Mixed CTN consisting of servers SCZP101 and SCZP901. Server SCZP201 will be added to this CTN using STP timing mode.

If STP is enabled, the new System z10 EC 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 is not connected to the Sysplex Timer it can be configured to join the Mixed CTN using STP timing mode. The System z10 EC 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.

### *From the ETR Configuration tab*

Set both Port 0 and Port 1 states to Disabled and enter the ETR Network ID to match the one of the existing Mixed CTN. Click **Apply**. The CTN ID for the server becomes [ ] - [31], in line with the value already defined in our example Mixed CTN. See Figure 7-13.

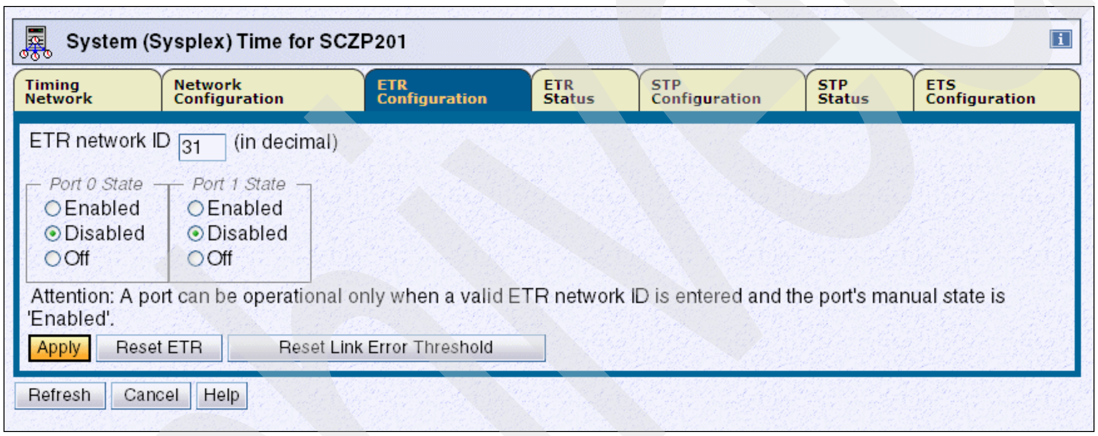



*Figure 7-13 Define ETR Network ID*

### *From the STP Configuration tab*

From the STP Configuration tab enter the STP ID. The ETR Network ID field is read only. It displays the value entered in the previous step. See Figure 7-14.

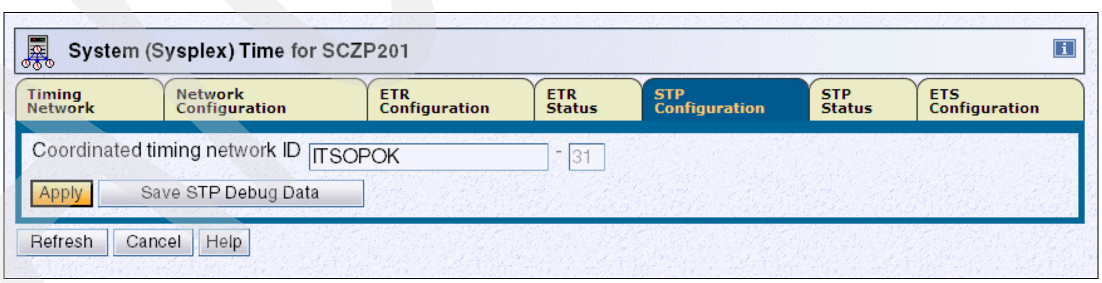



*Figure 7-14 STP Configuration tab, define STP ID*

Click **Apply**. The CTN ID for the server becomes **[ITSOPOK] - [31]**, in line 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 will automatically join the server to the Mixed CTN.

## Verification

1. The server STP configuration can be verified from the Timing Network tab shown in Figure 7-15.

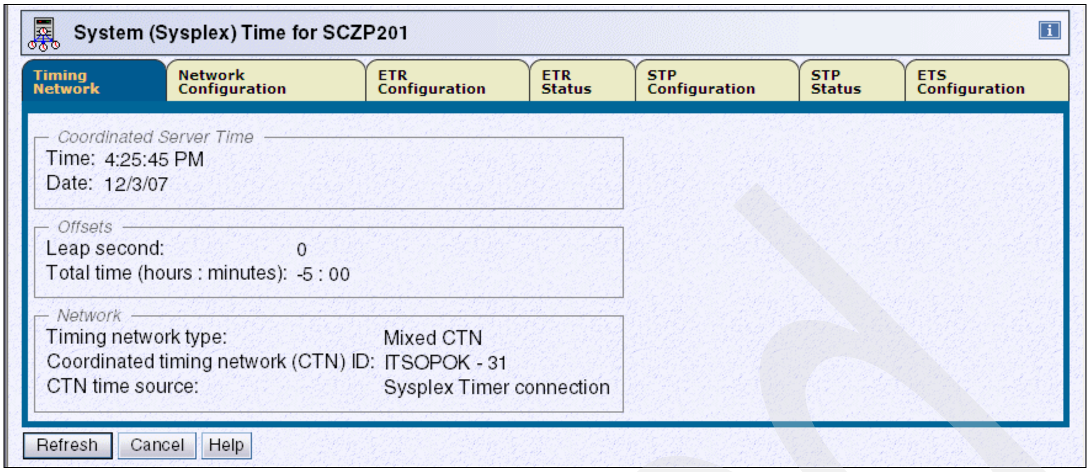



*Figure 7-15 Timing Network tab, SCZP201*

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 7-16 indicates that the server timing mode is STP.

The STP Status tab also reflects the fact that coupling links are initialized for STP since both ends of the link are configured. Similar information is now reflected on the STP Status tab at the other end of the links, on server SCZP101 and SCZP901.

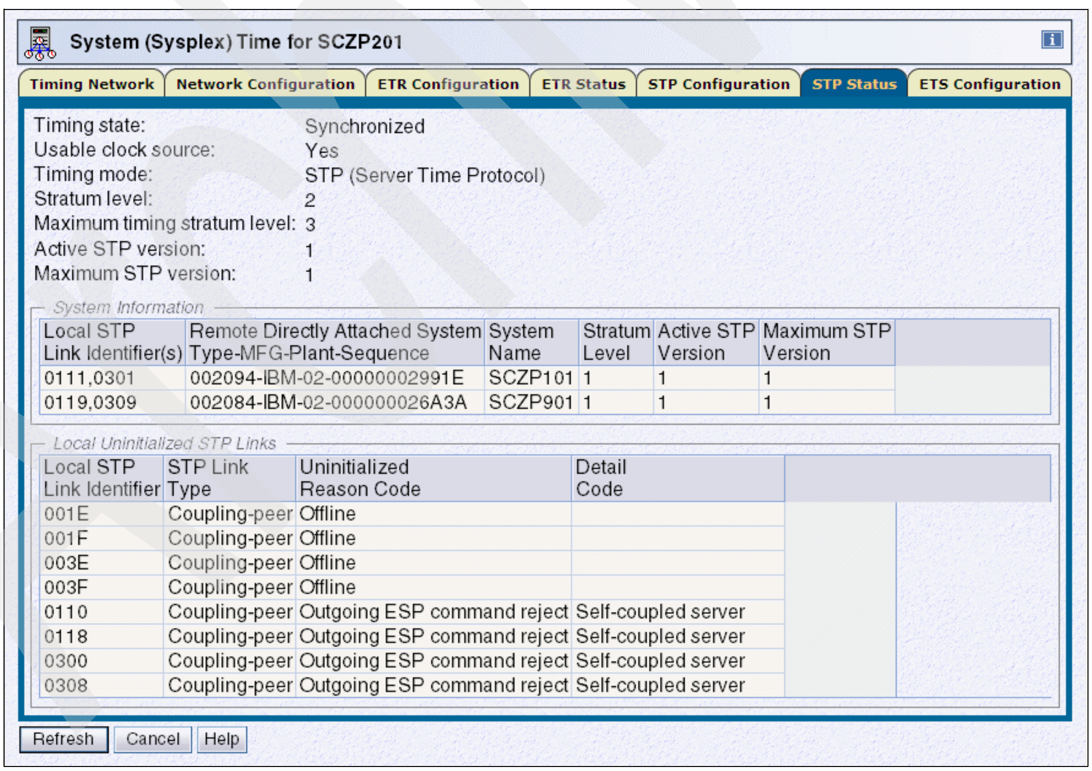



*Figure 7-16 STP Status tab, SCZP201*

Once a z/OS image has been IPLed on Server SCZP201, the response to the **`Display ETR`** command, message IEA386I, now indicates the CTN ID, as shown in Example 7-2. The message also indicates the synchronization mode along with the number of usable Timing links.

*Example 7-2 D ETR command and response in ETR mode*

```
D ETR
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
```

This completes adding the System z10 EC to an existing CTN using the STP timing mode.

The System z10 EC is now part of the CTN as configured and is using the Sysplex Timer as time source. Further reconfigurations, such as migrating to an STP-only CTN, can be done following the procedures presented in *IBM Server Time Protocol Implementation Guide,* SG24-7281.

## 7.2.3 Add the System z10 EC 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 System z10 EC to this existing STP-only CTN.

### 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 is of 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 1 to 8 characters. The valid characters are A–Z, a–z, 0–9, ‘-’ and ‘_’.
- The ETR Network ID is always null for an STP-only CTN.

### Setting the STP Network ID

The STP Network ID is entered using the STP Configuration tab, as shown in Figure 7-17. The CTN ID must match the one already defined to the existing STP-only CTN.

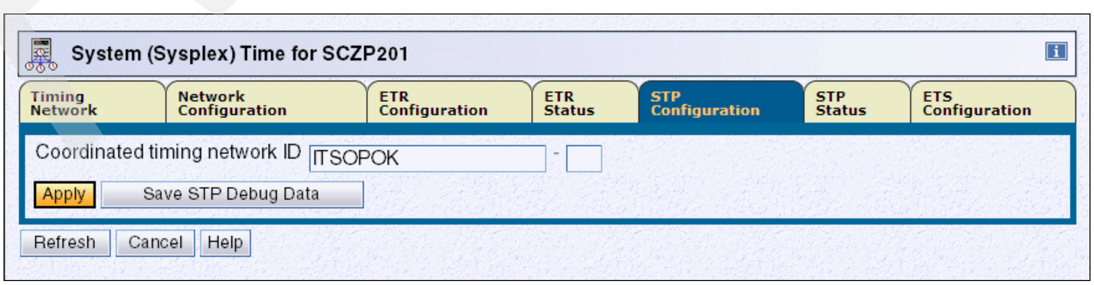



*Figure 7-17 System (Sysplex) Time - STP Configuration tab*

Message ACT37315 will be posted once the CTN change has been completed as shown in Figure 7-18.

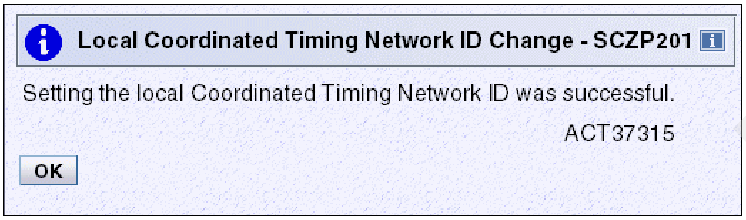



*Figure 7-18 Message ACT37315*

## Assigning roles

If the new configuration consists of two or three 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, as shown in Figure 7-19. Because the CTS already exists, the Force configuration option is not required, nor recommended, in this step.

Since the existing configuration consists of servers SCZP101 and SCZP901 being assigned as PTS and BTS, we are showing the new System z10 EC being configured as the Arbiter. Because the assignment of roles does have significant effect on the recovery behavior of the CTN it is recommended to have the planning tasks and checklist from *Server Time Protocol Planning Guide*, SG24-7280 reviewed.

The z10 EC 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 can be done in the same step. However, the recommendations and considerations for the roles in an STP-only CTN as explained in the *Server Time Protocol Planning Guide*, SG24-7280 should be reviewed first.

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 SCZP201 is assigned as Arbiter, as shown in Figure 7-19 on page 322.

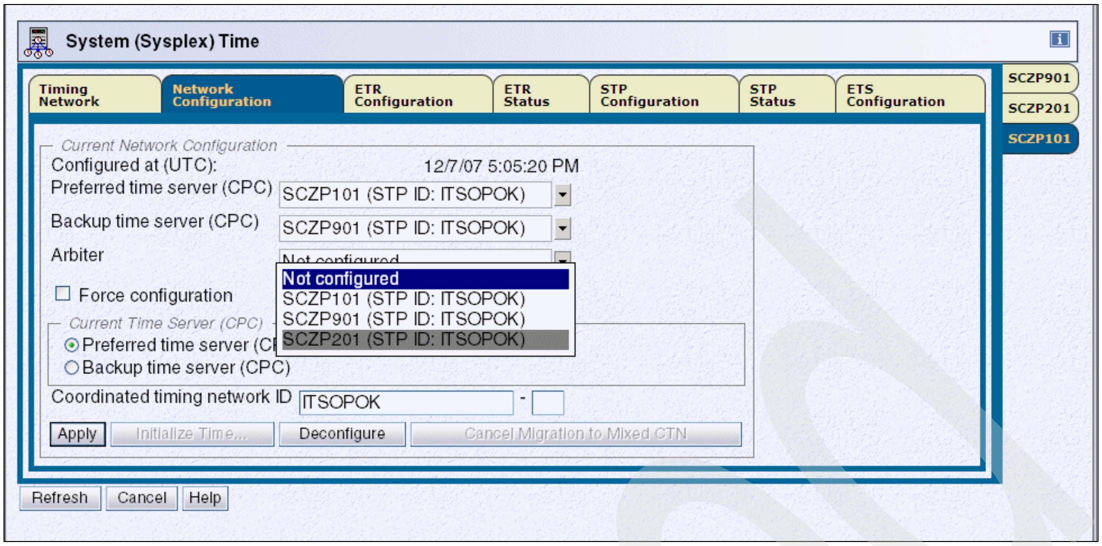



*Figure 7-19 Network Configuration tab, define SCZP201 as Arbiter*

The Network Configuration Change Confirmation message ACT37357 is displayed, as shown in Figure 7-20.

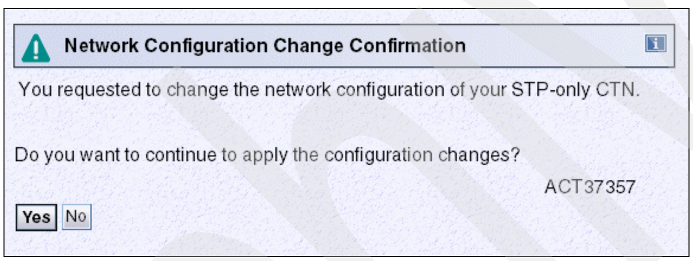



*Figure 7-20 Network Configuration Change Confirmation message ACT37357*

Click **Yes** on the confirmation panel. The Modify Network Configuration successful message ACT37341 is displayed, as shown in Figure 7-21.

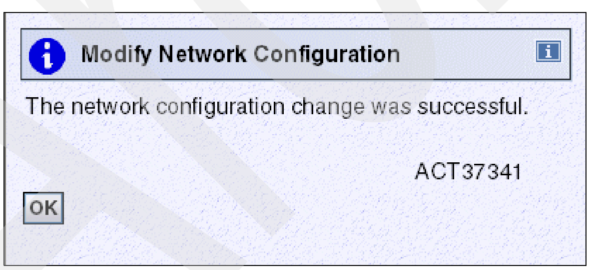



*Figure 7-21 Modify Network Configuration message ACT37341*

This completes the CTN configuration.

## Verification

- For verification from the HMC:

  To verify the successful activation of the STP-only CTN, select the **STP Status** tab (shown in Figure 7-22). The STP status indicates the following:

  – The Timing state is Synchronized.
  – The Timing mode is STP.

– The Stratum level is 2 because the System z10 EC does have coupling link connectivity to the CTS.
– The Local STP Timing links.

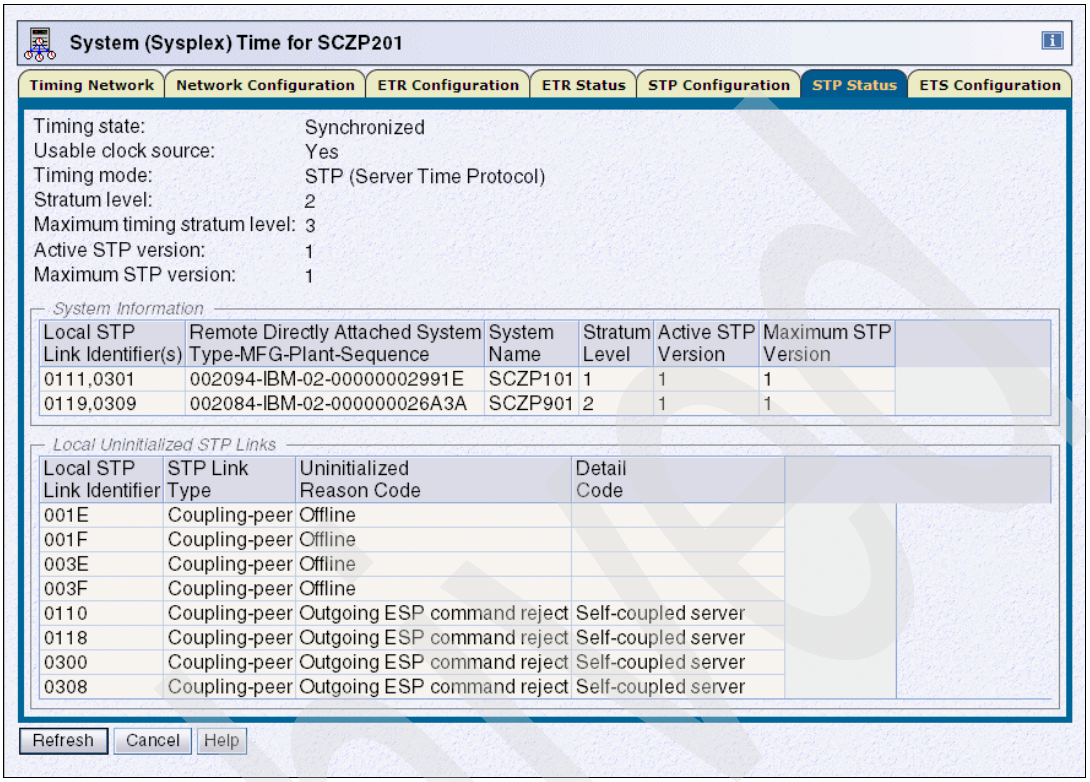


*Figure 7-22 STP Status tab, Stratum 2*

- For verification from z/OS

  Once a z/OS image has been IPLed on Server SCZP201, the response to the **`Display ETR`** command shows also Stratum level and synchronization status. The z/OS command **`Display ETR`** returns message IEA386I displaying 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 7-4 shows the output of the command **`Display ETR`** for z/OS system images SC80 residing on the Arbiter of this STP-only CTN.

*Example 7-3 Display ETR commands and responses*

```
IEA386I 14.17.17 TIMING STATUS 390
SYNCHRONIZATION MODE = STP
  THIS SERVER IS A STRATUM 2
  CTN ID = ITSOPOK
  THE STRATUM 1 NODE ID = 002094.S18.IBM.02.00000002991E
  THIS IS THE ARBITER SERVER
  NUMBER OF USABLE TIMING LINKS =  4
```

This completes the System z10 EC configuration to add it to an existing STP-only CTN.

The System z10 EC is now part of the CTN as configured and is using STP as time source. Further reconfigurations such restarting the CTN, reassigning server roles or changing offsets can be done by following the *IBM Server Time Protocol Implementation Guide,* SG24-7281.

# 7.3 Create a new STP-only CTN

The starting configuration is an STP-enabled server that needs to be configured into an STP-only CTN. In this section we are showing a single server that creates a new CTN. Once these tasks have been finished, additional servers can join this CTN by using the procedure given in "Add the System z10 EC to an existing STP-only CTN" on page 320.

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 set time zone, leap seconds, and date and time.
3. Assign 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. If the server is a z990 or z890, it does not support the NTP client function. Nevertheless, it can participate in an STP-only CTN where a System z10 or System z9 is the CTS and has an ETS configured to NTP. More information about the dial out function at the HMC and the required setup for the HMC/SE can be found in "ETS dial out configuration" on page 307.

## 7.3.1 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 is of 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 1–8 characters. The valid characters are A–Z, a–z, 0–9, '-' and '_'.
- The ETR Network ID is always null for an STP-only CTN.

### Setting the STP Network ID

The STP Network ID is entered using the STP Configuration tab, as shown in Figure 7-23. The same CTN ID must be entered on every server that will participate in the STP-only CTN.

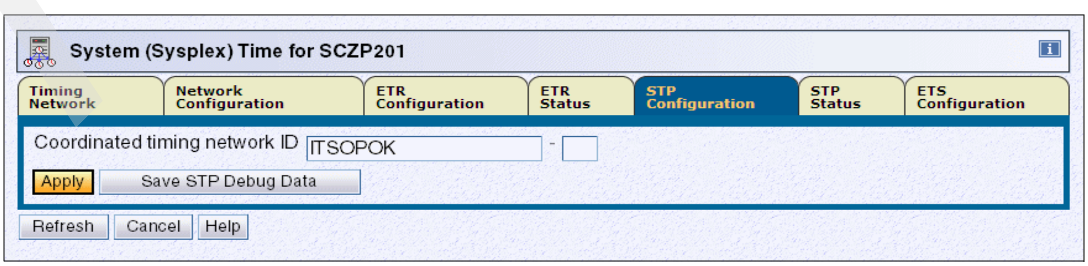



*Figure 7-23 System (Sysplex) Time - STP Configuration tab*

Message ACT37315 will be posted once the CTN change has been completed, as shown in Figure 7-24.

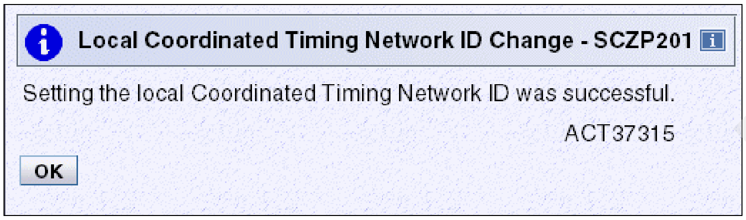



*Figure 7-24 Message ACT37315*

## 7.3.2 Initialize 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 shown in Figure 7-25.

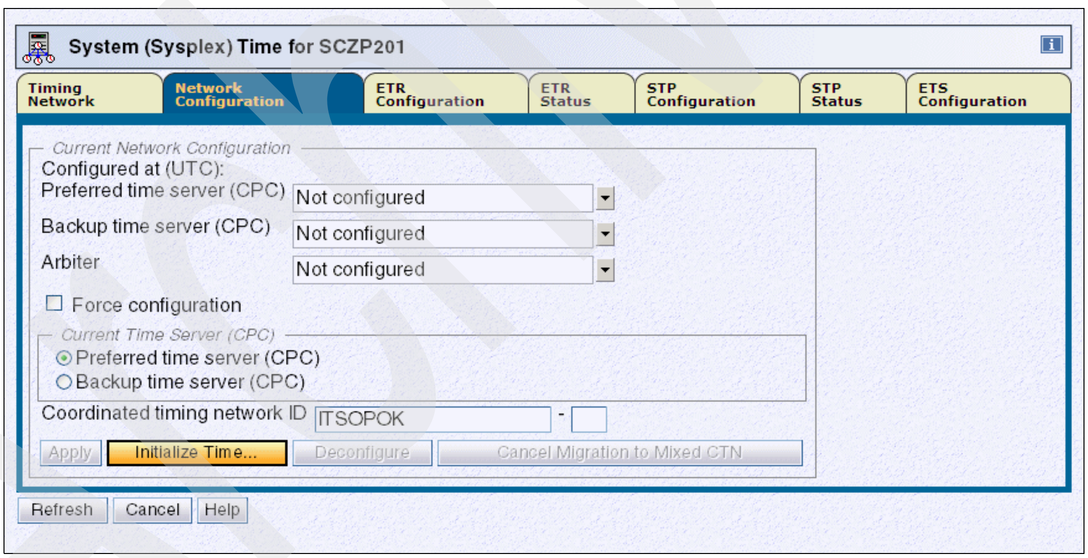



*Figure 7-25 Initialize Time button*

Click **Initialize Time** to display the Initialize Time panel shown in Figure 7-26 on page 326. There are three radio buttons on the panel, each representing a task that must be completed before a Network Configuration can be applied for an STP-only CTN.

The three tasks related to initializing the time are: Set leap seconds, Set time zone, and Set date and time. As each task is completed, the corresponding box in the Complete column is selected.

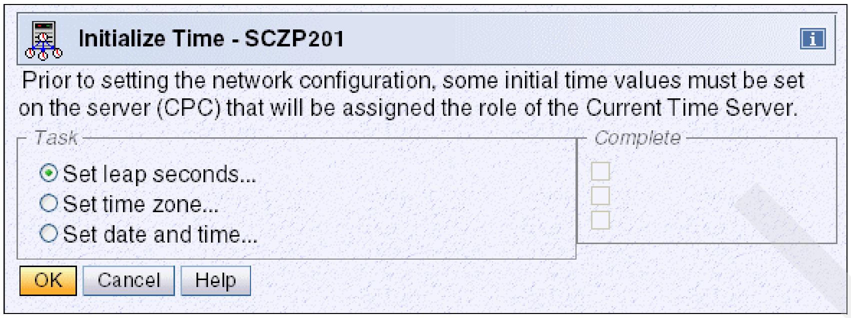



Figure 7-26 HMC workplace - Initialize Time

### *Set 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 7-27 illustrates the initial Adjust Leap Seconds panel. Although the installation may 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.

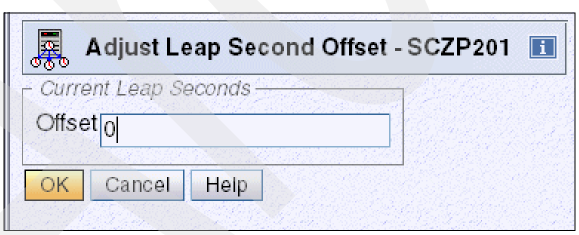



Figure 7-27 Initialize Time - Set leap seconds

### *Set time zone*

The panel shown in Figure 7-28 is used to set initial time zone parameters for the CTN. The current time zone must be set by selecting an entry from the Time zone drop-down box.

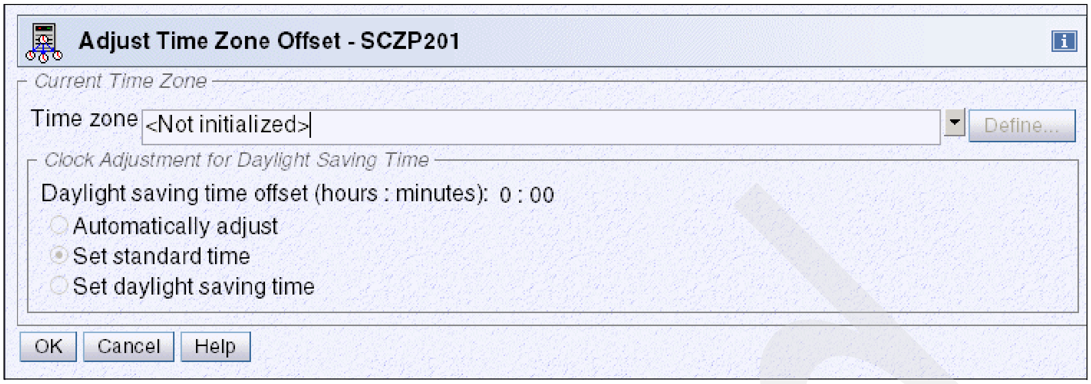



*Figure 7-28 Adjust Time Zone Offset, initial view*

Click the time zone drop-down arrow to display a list of all the time zones that are supported, as shown in Figure 7-29. 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.

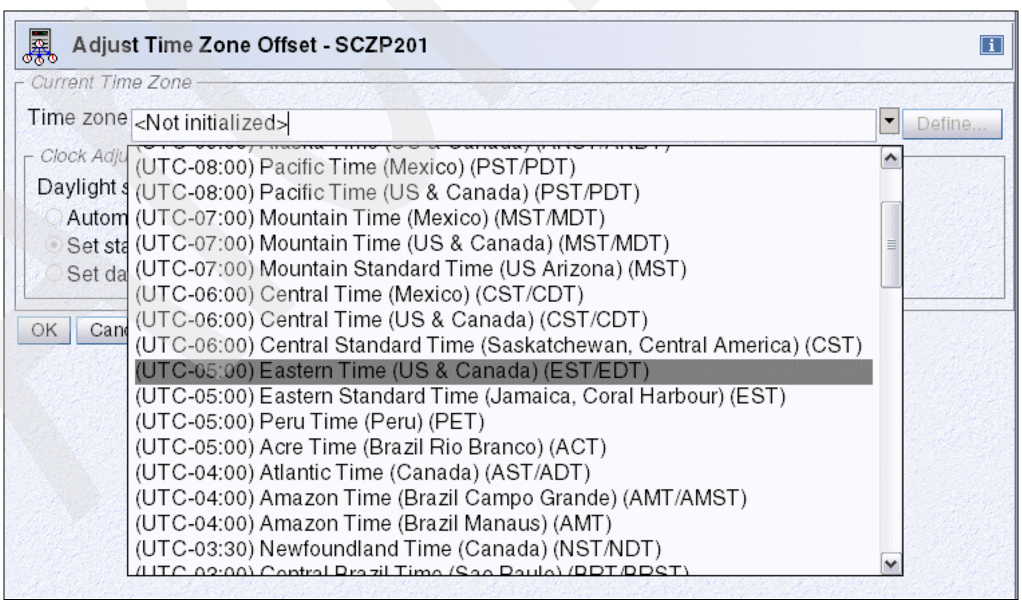



*Figure 7-29 Time Zone drop down menu*

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. It is used to display the Define Time Zone Algorithm panel shown in Figure 7-30.

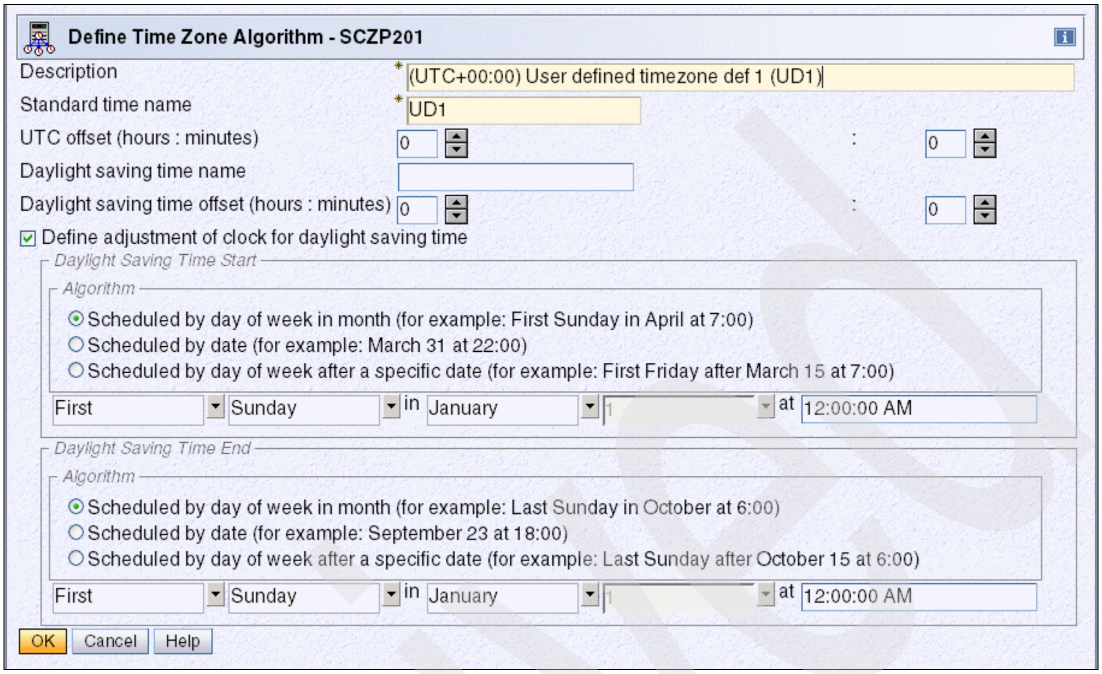



*Figure 7-30 Define Time Zone Algorithm*

The Description (maximum 80 characters) and Standard time name fields (maximum four characters) must be entered. Otherwise, an error message appears when **OK** is clicked. The standard time name is an abbreviation displayed on various panels to differentiate standard time from daylight saving time.

The UTC offset must be entered in +/- hours and minutes and ranges from -14 to +14 hours.

Also, if the time zone is subject to daylight saving time adjustments, then the daylight saving time name and daylight saving offset must be specified. Optionally, algorithms for daylight saving time start and daylight saving time end can be defined to support automatic clock adjustment by selecting the option **Define adjustment of clock for daylight saving time**. The algorithm is saved when **OK** is clicked, but it is not sent to the STP facility until **OK** is clicked on the Adjust Time Zone Offset panel.

### *Set date and time*

The final task in the sequence is to initialize the date and time. Three different methods are provided.

1. If the local date and time are to be set to specific values, click the **Set date and time** button. Date and time values can be entered in each field. The value filled in 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 box.
2. If an ETS is configured, either through dial out or NTP server, the date and time should be initialized by selecting the option **Use External Time Source to set date and time**. This will ensure that the Coordinated Server Time will match 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.

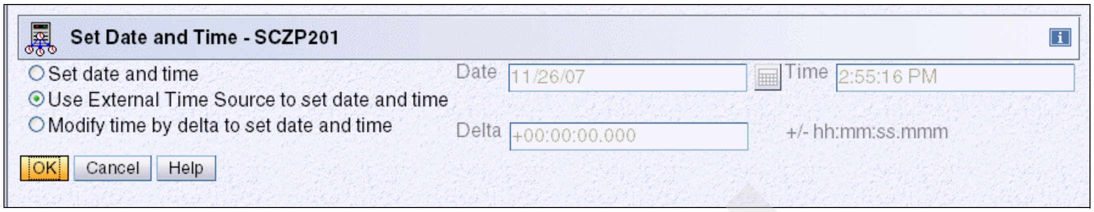


*Figure 7-31 Set Date and Time via External Time Source*

Click the option **Use External Time Source to set date and time** as shown in Figure 7-31. Click **OK**.

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 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.

Message ACT37382 is displayed upon successful completion of the Set Date and Time operation (Figure 7-32). Click **OK**.

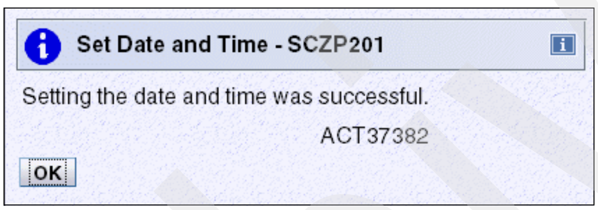


*Figure 7-32 Set Date and Time successful, message ACT 37382*

The Initialize Time panel shown in Figure 7-34 is displayed again.

In order 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** **(**Figure 7-33).

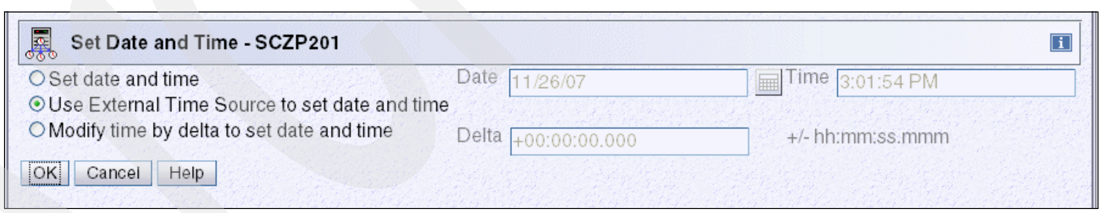


*Figure 7-33 Set Date and Time via External Time Source*

It is the only way the user can verify the information obtained from the external time source. To leave the panel without change, use the **Cancel** button.

3. A delta value can be specified through selection of 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 panel have a check mark in the Complete column (see Figure 7-34). Click **Cancel** to exit the Initialize Time task and return to the Network Configuration tab.

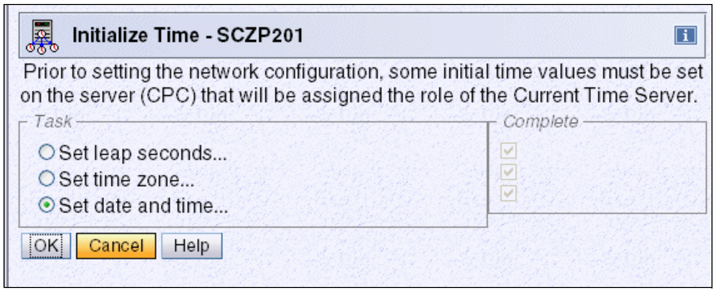


*Figure 7-34 Initialize Time complete*

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 the next section.

## 7.3.3 Assigning the PTS role

Now that the Initialize Time task has been completed, the **Apply** button on the Network Configuration page is enabled, as shown in Figure 7-35. The server role can be assigned.

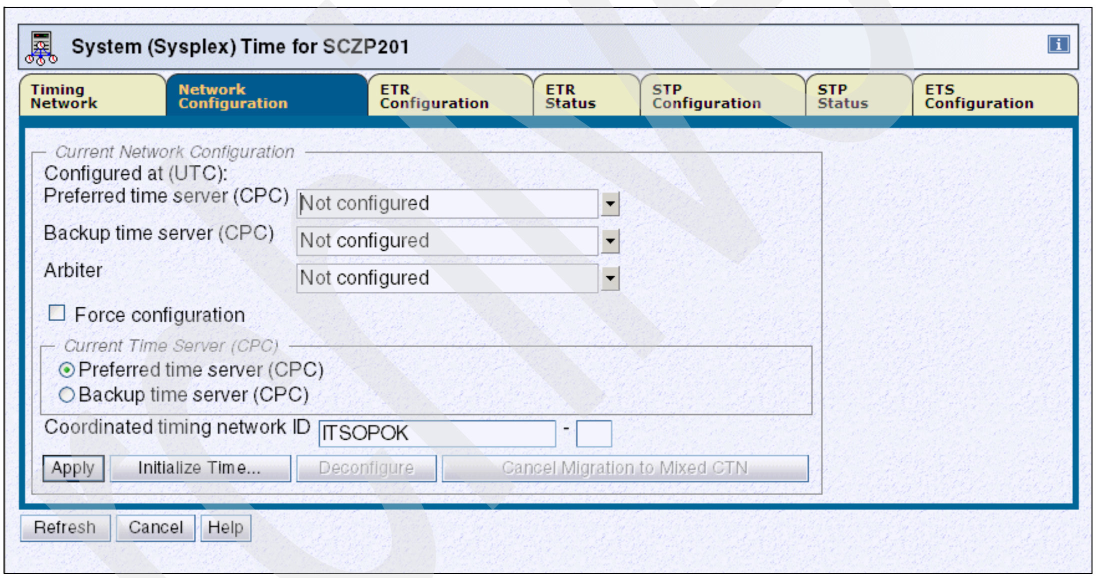


*Figure 7-35 Network Configuration tab, after time initialization*

Because this is the first server within this “new” CTN we are going to 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, to be configured as BTS and Arbiter. (This is covered in section “Add the System z10 EC to an existing STP-only CTN” on page 320.)

To configure a new STP-only CTN, begin by selecting the **Force configuration** check box. **Force configuration** specifies whether connectivity between the Preferred Time Server and other servers with a defined role will be 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 check box is not used the request is rejected and message ACT37346, shown in Figure 7-36, is displayed. Click **OK** to return to the Network Configuration tab.

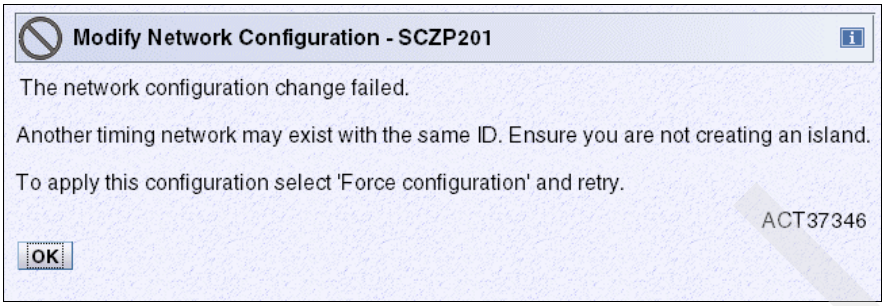



*Figure 7-36 Force configuration required, message ACT37346*

On the Network Configuration tab (Figure 7-37) the radio button in the Current Time Server section is pointing to the PTS. Since the PTS will be 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 in order to bypass connectivity verification because a Current Time Server does not yet exist.

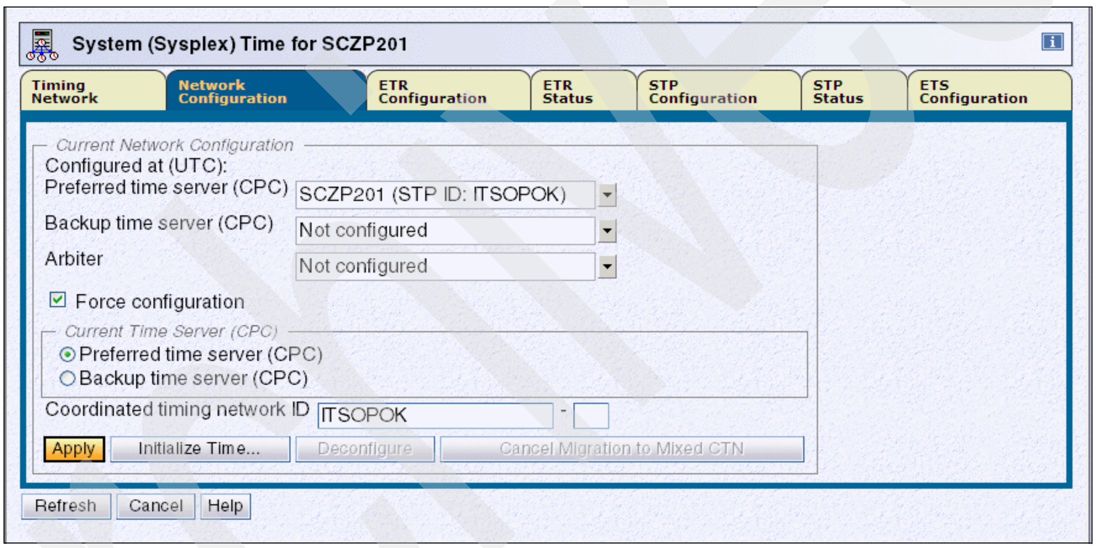



*Figure 7-37 Network Configuration tab, define the CTS*

Now that the Force configuration check box is selected, Network Configuration Change Confirmation message ACT37348 is displayed (Figure 7-38). Click **Yes** to confirm.

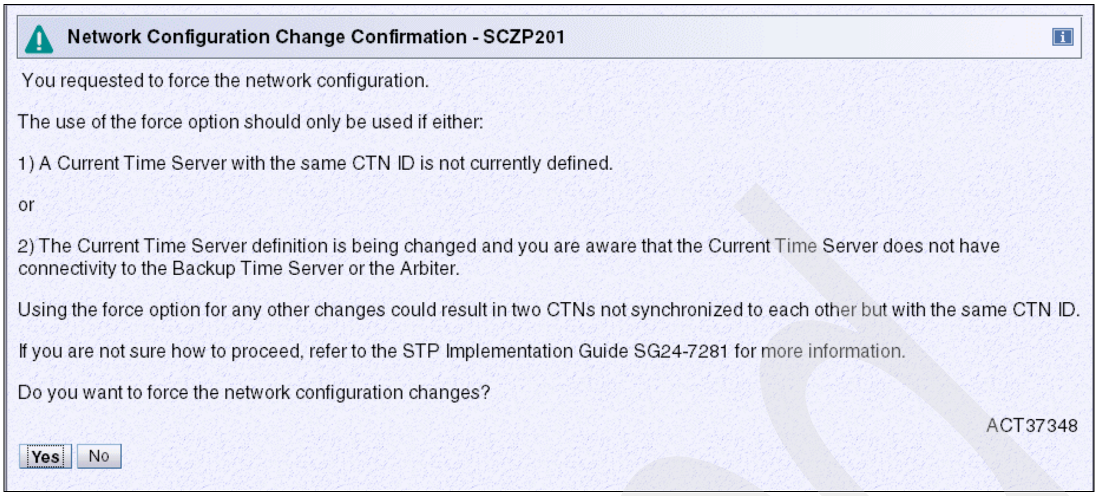



*Figure 7-38 Network Configuration Change Confirmation, message ACT37348*

Assignment of the CTS globally transitions all servers with the same CTN ID to STP timing mode. This is confirmed by message ACT 37341, shown in Figure 7-39.

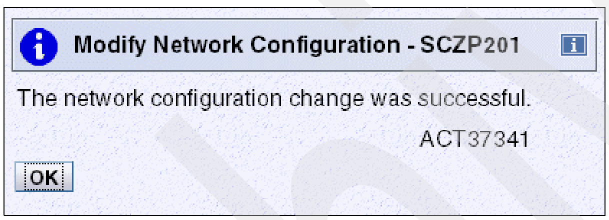



*Figure 7-39 Modify Network Configuration successful, message ACT37341*

## Verification

- For verification from the HMC:

  To verify the successful activation of the STP-only CTN, select the **Timing Network** tab (shown in Figure 7-40). The Network portion indicates:

  – 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 where the Coordinated Server Time is currently being steered from. If the NTP server is a stratum 1, the user should expect to see one of the clock sources identified in Table 7-1, “NTP Stratum 1 clock sources” on page 313.

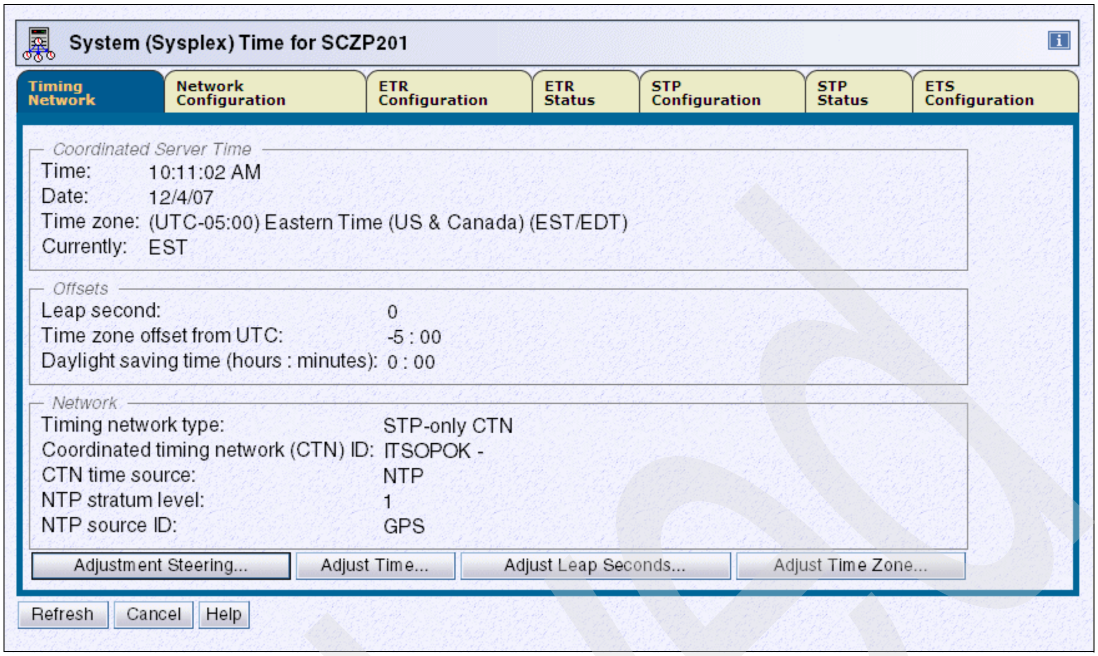



*Figure 7-40 System (Sysplex) Time - Timing Network tab*

- For verification from z/OS:

  Once a z/OS image residing on the server went 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 message IEA386I displaying the following information:

  – Synchronization mode
  – Stratum level
  – The node ID of the current Stratum 1 server in the CTN
  – The server role

  Example 7-4 shows the output of the command **Display ETR** for z/OS system image SC80 on the PTS.

*Example 7-4 Display ETR commands and responses*

```
SC80 RESPONSES -----------------------------------------------------
IEA386I 16.37.39 TIMING STATUS 151
SYNCHRONIZATION MODE = STP
  THIS SERVER IS A STRATUM 1
  CTN ID = ITSOPOK
  THE STRATUM 1 NODE ID = 002097.E26.IBM.02.00000001DE50
  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 command **Display XCF,SYSPLEX,ALL** indicates the timing mode of Sysplex system images is STP, as shown in Example 7-5.

*Example 7-5 Display XCF,S,ALL command and response*

```
D XCF,S,ALL
IXC335I  16.45.05  DISPLAY XCF 174
SYSTEM   TYPE SERIAL LPAR STATUS TIME        SYSTEM STATUS
SC80     2097 DE50   01   11/28/2007 16:45:05 ACTIVE        TM=STP
SC81     2097 DE50   11   11/28/2007 16:45:03 ACTIVE        TM=STP
```

This completes the STP-only CTN configuration. Additional servers can be added to this CTN using the procedure documented in “Add the System z10 EC to an existing STP-only CTN” on page 320.

8

# Crypto Express2 configuration

In this chapter we provide information about Crypto Express2 configuration on a System z10 EC. We cover cryptographic domains, configuration rules, and points to consider when planning for nondisruptive installation of cryptographic features.

Step-by-step definition and configuration of the Crypto Express2 feature to a logical partition are explained.

The following topics are discussed:

- Crypto Express2 configuration overview
  - Configuration rules
  - Configuration planning
- Cryptographic definition
  - HMC/SE session to System z10 EC
  - Check CPACF DES/TDES enablement feature installed
  - Logical partition cryptographic definition
  - Cryptographic configuration using the Support Element
- Activation and deactivation using ICSF

## 8.1 Crypto Express2 configuration overview

This section provides a brief overview of configuration rules and planning considerations.

### 8.1.1 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 via 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 via 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 is seeing a logical crypto 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 Express2 feature. This feature enables the DES and TDES algorithms on the CPACF, which are supported by z/OS, z/VM, and Linux on System z. On the other hand, SHA-1, SHA-256, SHA-384, and SHA-512 are shipped enabled on all servers and do not require this feature.

- The total number of Crypto Express2 features may not exceed eight per System z10 EC.
- Each Crypto Express2 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 Express2 feature does not use CHPIDs from the channel subsystem pool, but each feature is assigned two PCHIDs, one per PCI-X adapter.

Table 8-1 summarizes the Cryptographic feature codes for System z10 EC.

*Table 8-1 Cryptographic Feature codes*

| Feature code | Description |
|---|---|
| 3863 | CPACF DES/TDES enablement feature<br>Prerequisite to use the CPACF (except for SHA-1, SHA-256, SHA-384, and SHA-512) and Crypto Express2 features. |
| 0863 | Crypto Express2 feature<br>A maximum of eight features can be ordered. Each feature contains two PCI-X cryptographic adapters. |
| 0839/0859 | Trusted Key Entry (TKE) 5.0 workstation<br>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 5.0 LIC or later is required. |
| 0855 | TKE 5.0 LIC (carried forward only) |
| 0856 | TKE 5.1 LIC (carried forward only) |
| 0857 | TKE 5.2 LIC |
| 0887 | TKE Smart Card Reader |
| 0888 | TKE Additional Smart Cards |

## 8.1.2 Configuration planning

The System z10 EC 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 System z10 EC allows up to 60 logical partitions to be active concurrently. Each PCI-X adapter on a Crypto Express2 feature supports 16 domains, whether it is configured as a Crypto Express2 accelerator or a Crypto Express2 coprocessor.

When all 60 logical partitions on the System z10 EC are active and require concurrent access to cryptographic functions provided by a PCI-X adapter, the configuration must include at least two Crypto Express2 features, but should have four for redundancy.

- For availability, assignment of multiple PCI-X adapters of the same type (Crypto Express2 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 Express2 coprocessor creates an application single point of failure, since 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" on page 348.
- Crypto Express2 features can be installed concurrently by use of the Nondisruptive Hardware Change[1] task. To dynamically enable use of 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 Express2 features are assigned coprocessor numbers sequentially during the power-on-Reset following the installation.

[1] The Nondisruptive Hardware Change is only available when logged on to the Support Element in Service mode.

However, when a Crypto Express2 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 Express2 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 8-2 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 8-2 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 | CEX2C/A | LP00<br>LP02 | LP05 | LP04 | | LP04 | |
| PCI-X adapter 1 | CEX2C/A | LP01<br>LP02 | | | | | |
| PCI-X adapter 2 | CEX2C/A | LP00 | | | | | |
| .../... | | | | | | | |
| .../... | | | | | | | |
| PCI-X adapter 13 | CEX2C/A | | | | | | |
| PCI-X adapter 14 | CEX2C/A | | | | | | |
| PCI-X adapter 15 | CEX2C/A | | | | | | |

**Important:** Any given cell should contain only one active logical partition since the combination of cryptographic coprocessor number and usage domain index must be unique across all *active* logical partitions.

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. The combination, domain number and cryptographic coprocessor number, is unique across partitions.

Each PCI-X adapter provides 16 domains, and up to 60 partitions can be defined and active on the System z10 EC. To allow all 60 logical partitions to use cryptographic services, either accelerator or coprocessor, requires at a minimum two Crypto Express2 features without redundancy, or four Crypto Express2 features if redundancy is required.

For more detailed information regarding the Crypto Express2 feature for System z, check the following site;

http://www.ibm.com/systems/z/security/cryptography.html

## 8.2 Cryptographic definition

This section provides detailed steps for configuring Crypto Express2 for System z.

### 8.2.1 HMC/SE session to System z10 EC

The System z10 EC also operates only in LPAR mode. For each logical partition that requires access to a PCI-X adapter, configured as either an accelerator or coprocessor, you must customize the partition image profile. This is done using the System z10 EC Hardware Management Console or Support Element workplace.

The System z10 EC requires the HMC Application V2.10.0. This application allows you to choose the interface style in which you prefer to work from the following choices:

- Tree style user interface
- Classic style user interface

Keep in mind that it no longer uses an OS/2-based system.

The tree style user interface (tree interface) is the default for Operator, Advanced Operator, Access Administrator, and System Programmer user roles, but not for the Service Representative user role. You can change the mode by selecting the **UI style** tab in the **User Settings** menu.

1. Sign on to the HMC using **SYSPROG** or an identification with equivalent rights. The initial HMC Workplace™ after logging in is displayed, as shown in Figure 8-1 on page 340. All images captured for this book are in tree mode.

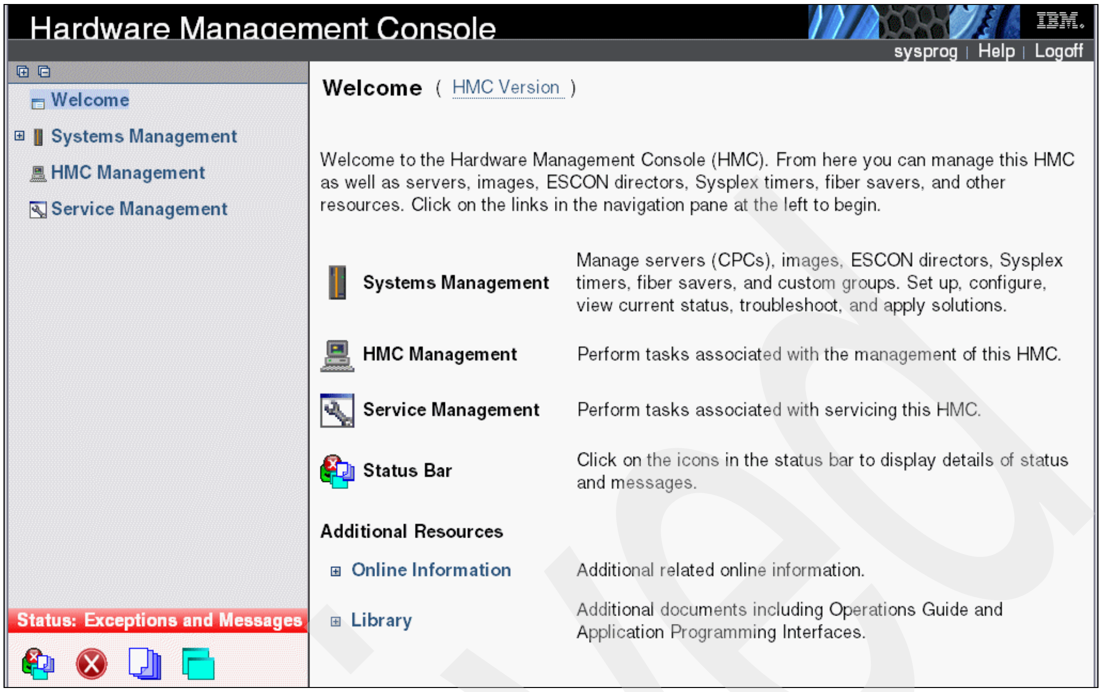



*Figure 8-1 Welcome page after logging in HMC*

2. If multiple CPCs are connected to the HMC, select and click the one you want to connect to from the Servers menu in the Systems Management group. You can see the Contents area (upper right of panel) and Tasks area (lower right of panel) in tree mode, shown in Figure 8-2 on page 341.
3. When you use the Support Element, locate and click the **Single Object Operations** task from the Recovery section. You can log in after you respond to the confirmation panel, shown in Figure 8-3 on page 341.

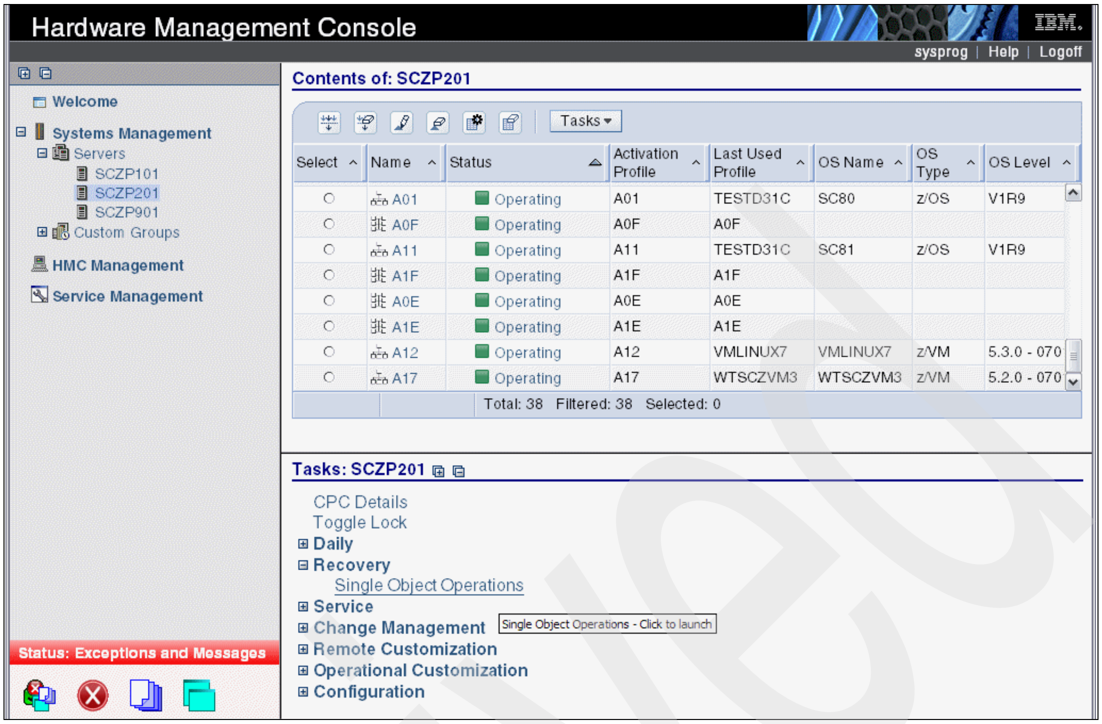



*Figure 8-2 Contents and Tasks of CPCs*

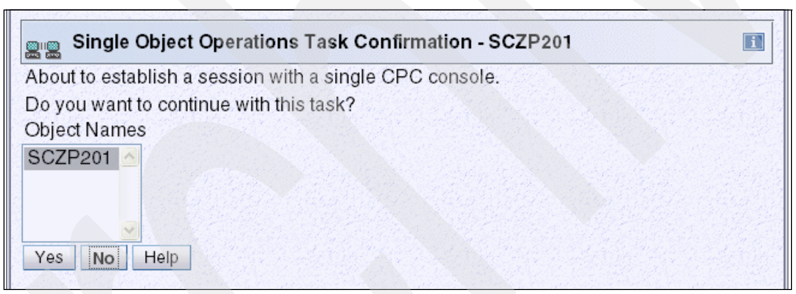



*Figure 8-3 Single Object Operations Task Confirmation*

## 8.2.2 Check CPACF DES/TDES enablement feature installed

The System z10 EC crypto enablement feature (#3863) enables DES and TDES algorithms on the CPACF. It is a prerequisite for using the Crypto Express2 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).

1. Access the SE Welcome page. Compared with the HMC window (Figure 8-1 on page 340), notice the difference in the panel's title and also the presence of a logo in the background of the SE panel.

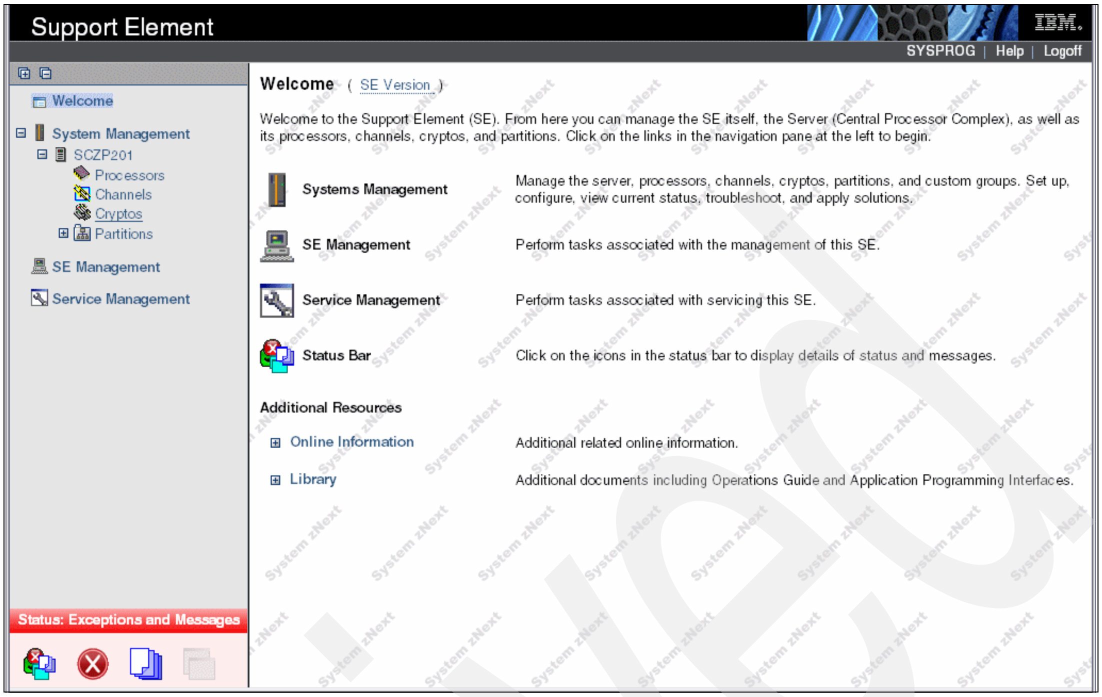



*Figure 8-4 SE Welcome page*

2. From the Systems Management section on the left side of the panel, locate and click CPC. The right-hand panel displays Contents and Tasks areas for that CPC (Figure 8-5).

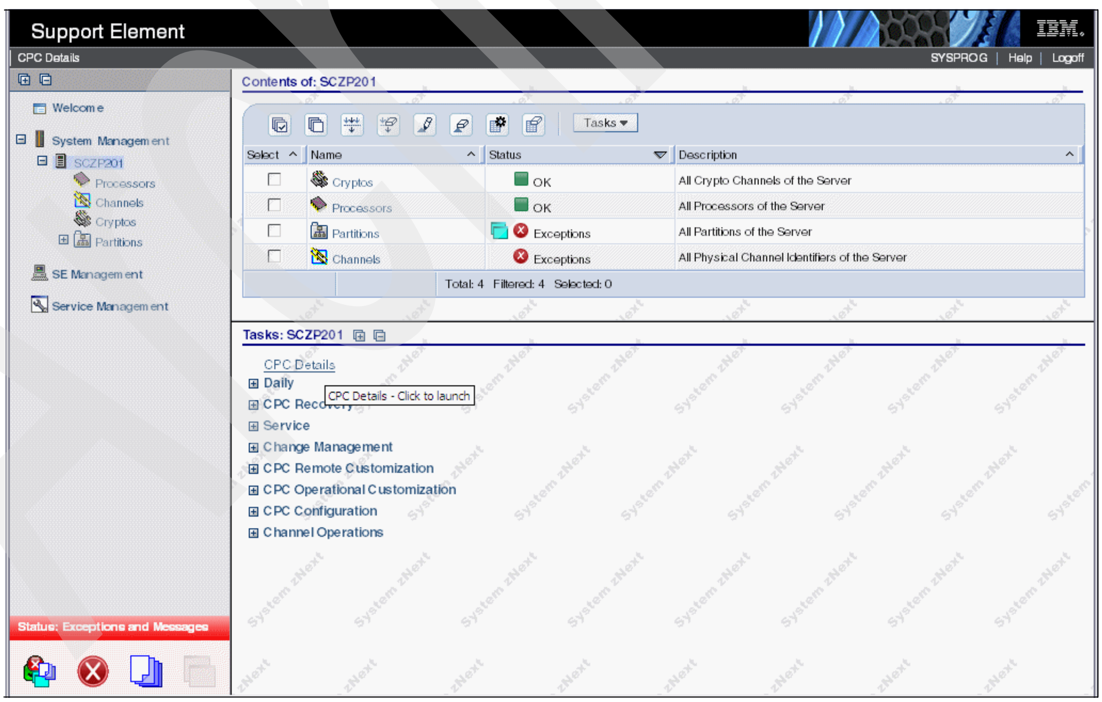



*Figure 8-5 SE - Contents and Tasks area of CPC*

3. Click the **CPC Details** menu at the top of the Tasks area. This opens the CPC details panel shown in (Figure 8-6).

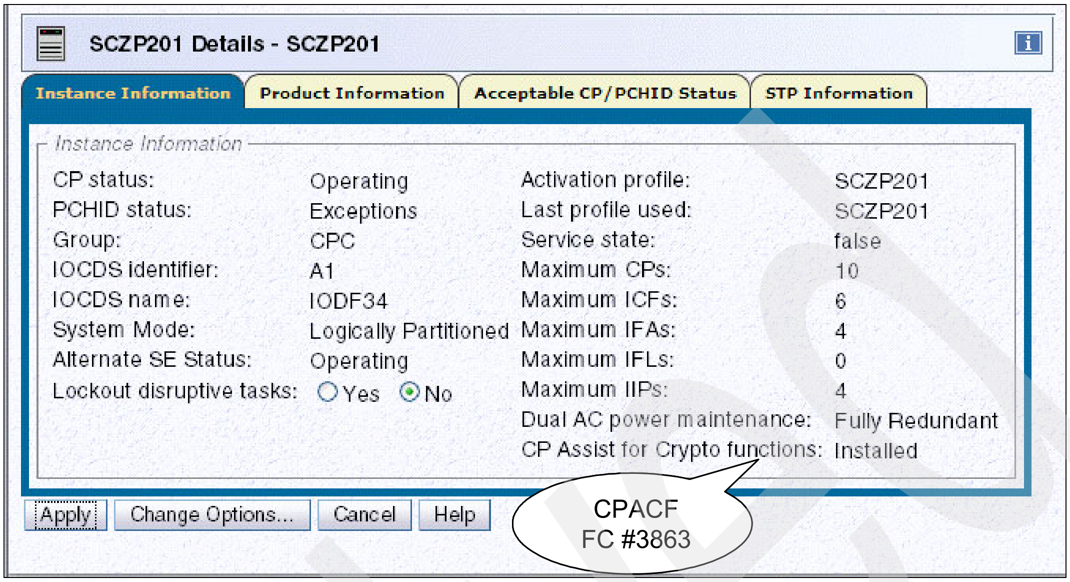



*Figure 8-6 SE - CPC Details*

4. Select the **Instance Information** tab to verify the CPACF DES/TDES enablement feature.
5. If the panel displays `CP Assist for Crypto Functions: Installed`, the CPACF enablement feature code 3863 is installed.
6. If the panel displays `CP Assist for Crypto Functions: Not Installed`, then feature code 3863 is not installed. You can still customize the partition image profiles, but cryptographic functions do not operate.
7. Click **Cancel** to return.

## 8.2.3 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 is accomplished through the **Customize/Delete Activation Profile** task. You need to modify the cryptographic initial definition from the crypto tab in the image profile, as shown in Figure 8-7 on page 344. After this operation, any changes to the image profile require a DEACTIVATE and ACTIVATE of the logical partition for the change take effect, so the cryptographic definition is disruptive to a running system.

**Important:** 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, shown in Figure 8-12 on page 350.

With this new function, you can dynamically add and remove the cryptographic feature without stopping a running operating system. For details on how to use this function refer to “Change LPAR Cryptographic Controls” on page 348.

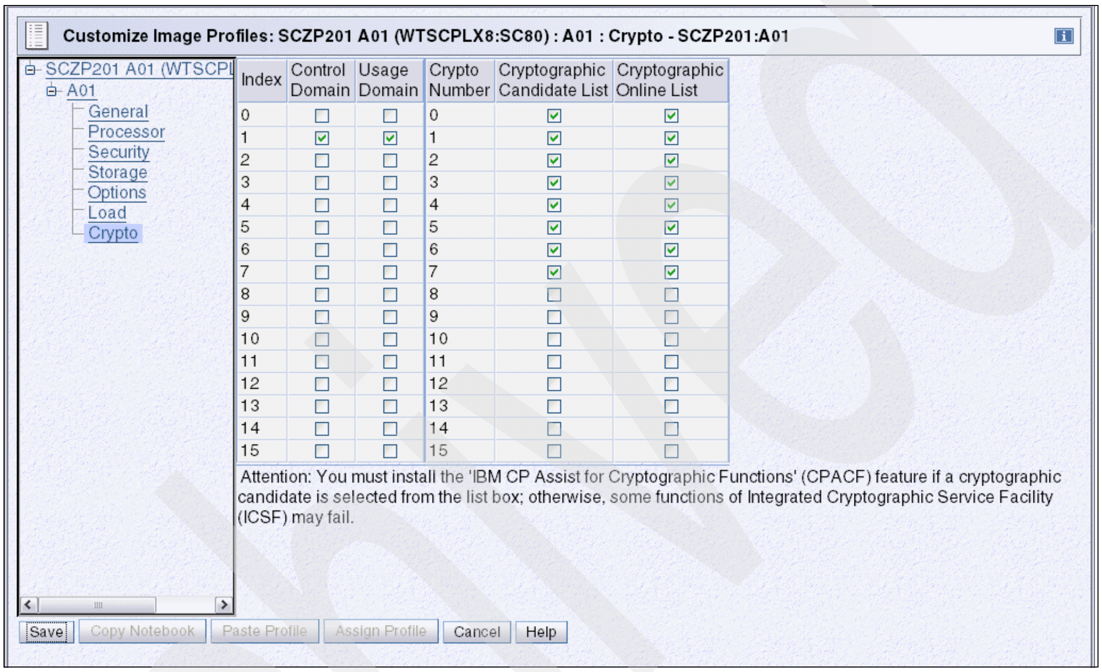



*Figure 8-7 Customize Image Profiles - Crypto*

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 should 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 of which CSS they are defined to, 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.

  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 scrollable 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.

  You can also add the cryptographic coprocessor candidate list after activating the logical partition non disruptively using the **Change LPAR Cryptographic Controls** task from the SE. For more information, see “Change LPAR Cryptographic Controls” on page 348.

  If the cryptographic coprocessor number and usage domain index combination for the coprocessor selected in the partition Online list is already in use by another active logical partition, activation of the logical partition or change of cryptographic controls task fails; see Figure 8-8. In this conflicting case, you have to check cryptographic information for all active logical partitions from the **Summary** tab of the **View LPAR Cryptographic Controls** task, as shown in Figure 8-10 on page 348, and resolve the error based on the collected data (assign a unique combination of PCI-X adapter number and usage domain index number).

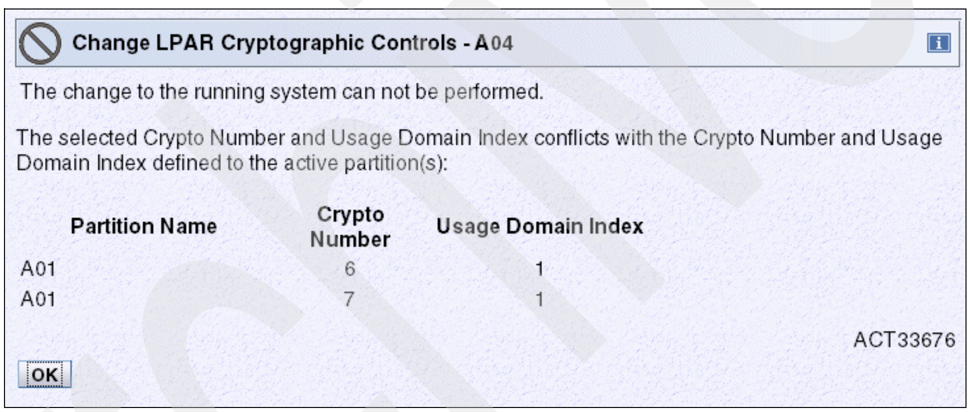



*Figure 8-8 SE - Change LPAR Cryptographic Controls, message ACT33676*

- 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 Candidate list but not on the PCI Cryptographic 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 “Config On/Off to the logical partition” on page 359.

  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 partition’s Online list is always selected from the image profile for each logical partition, and these settings *cannot* be updated dynamically for a running system; see “SE - Change LPAR Cryptographic Controls, message ACT33677” on page 350.

## 8.2.4 Cryptographic configuration using the Support Element

From the Support Element, you can do the following:

- 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 use 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 8-9 on page 347 shows the Cryptographic Management panel. Use this panel to release 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 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 still retain assignment 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.

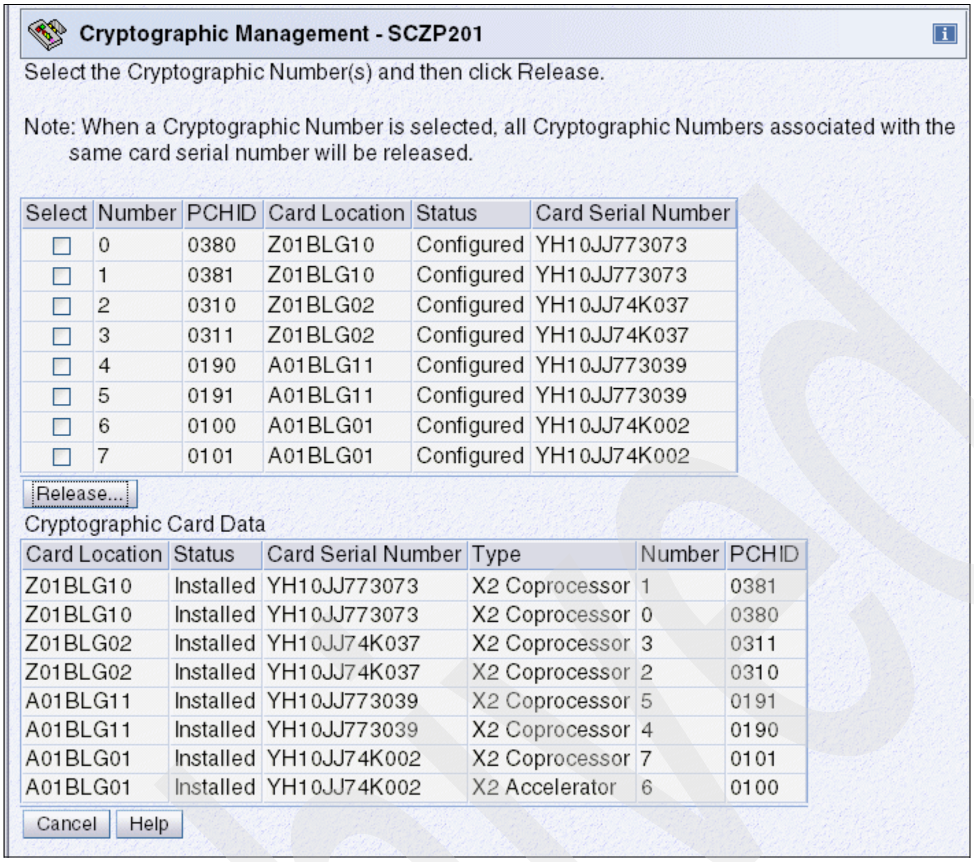



*Figure 8-9 SE - Cryptographic Management*

### View LPAR cryptographic controls

You can visualize active partition cryptographic definitions from the SE.

Select the CPCs, locate and click the **View LPAR Cryptographic Controls** task in CPC Configuration section.

The resulting panel 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 which are assigned for all active logical partition from the **Summary** tab shown in Figure 8-10 on page 348.
>
> 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 very useful when defining or changing the Usage domain index for a logical partition. (Refer to “Change LPAR Cryptographic Controls” on page 348).

This panel is informational only. You can see the definitions, but you cannot change them from this panel. To modify the cryptographic coprocessor On/Off status requires the use of the **Configure On/Off** task, which is discussed in “Config On/Off to the logical partition” on page 359.

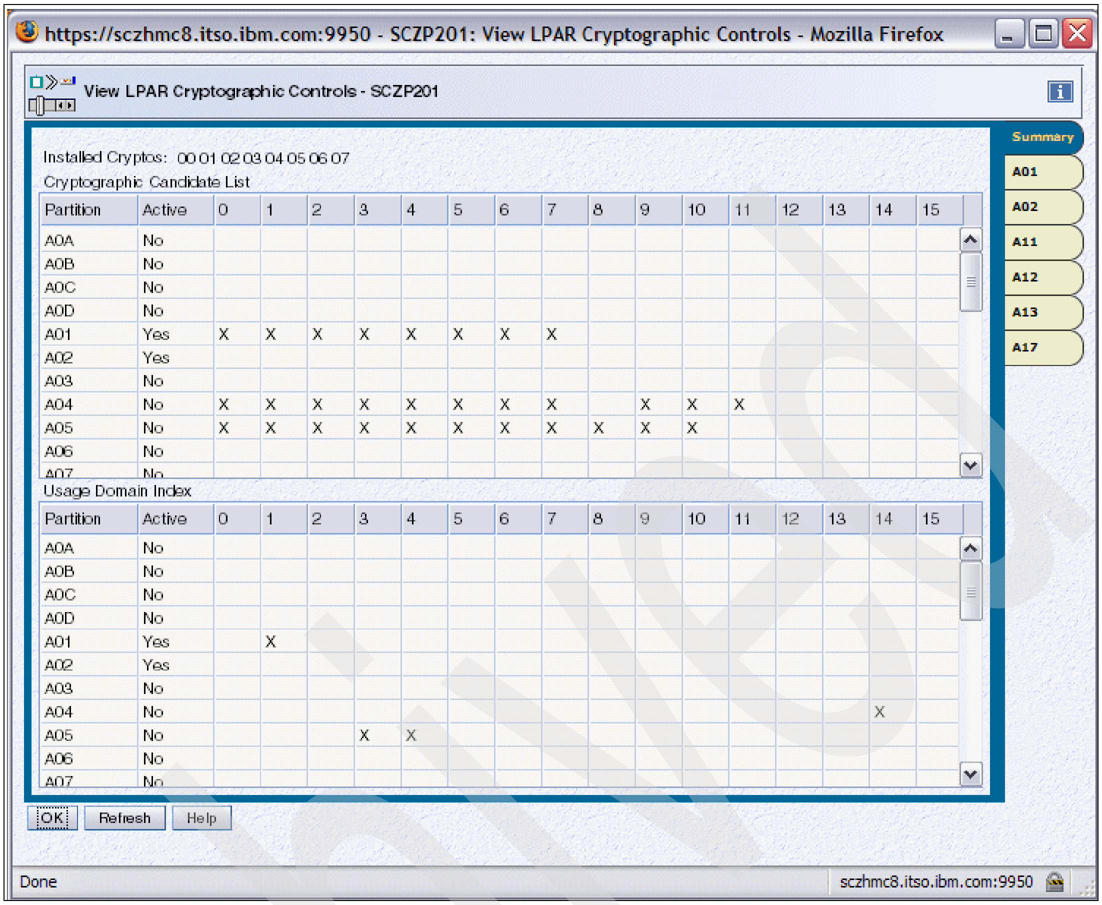



*Figure 8-10 SE - View LPAR Cryptographic Controls*

## Change LPAR Cryptographic Controls

For each logical partition, you have to define:

- Usage domain index
- Control domain index
- Cryptographic Coprocessor Candidate list
- Cryptographic Coprocessor Online list

The **Change LPAR Cryptographic Controls** function is included in the Support Element for System z10 EC. You can perform the following operations using this function:

- Add a crypto to a logical partition for the first time.
- Add a crypto to a logical partition already using crypto.
- Remove a crypto from a logical partition.
- Zeroize, or clear the cryptographic secure keys for a given usage domain.

You can use this task as a substitute when making cryptographic changes for existing Image Profiles from the Customization/Delete Activation Profiles task in HMC or SE. See the manual *Support Element Operations Guide V2.10.0,* SC28-6868 for more information.

## *Dynamic assignment of the cryptographic definition to the partition*

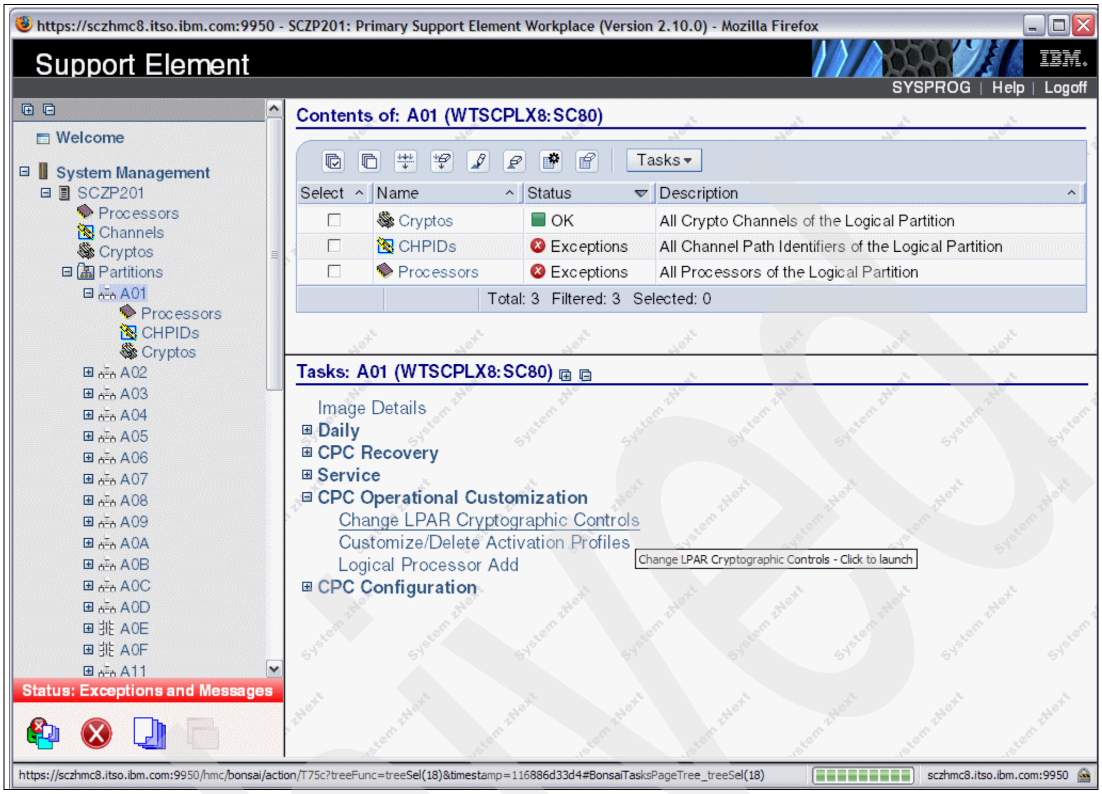



*Figure 8-11 SE - Change LPAR Cryptographic Controls task*

1. Select the logical partition, click the **Change LPAR Cryptographic Controls** task from CPC Operational Customization (Figure 8-11).
2. Select Usage and Control domain index and Cryptographic Candidate and Online list numbers that you want to assign. After checking each box, click the **Change Running System** button, as shown in Figure 8-12 on page 350.

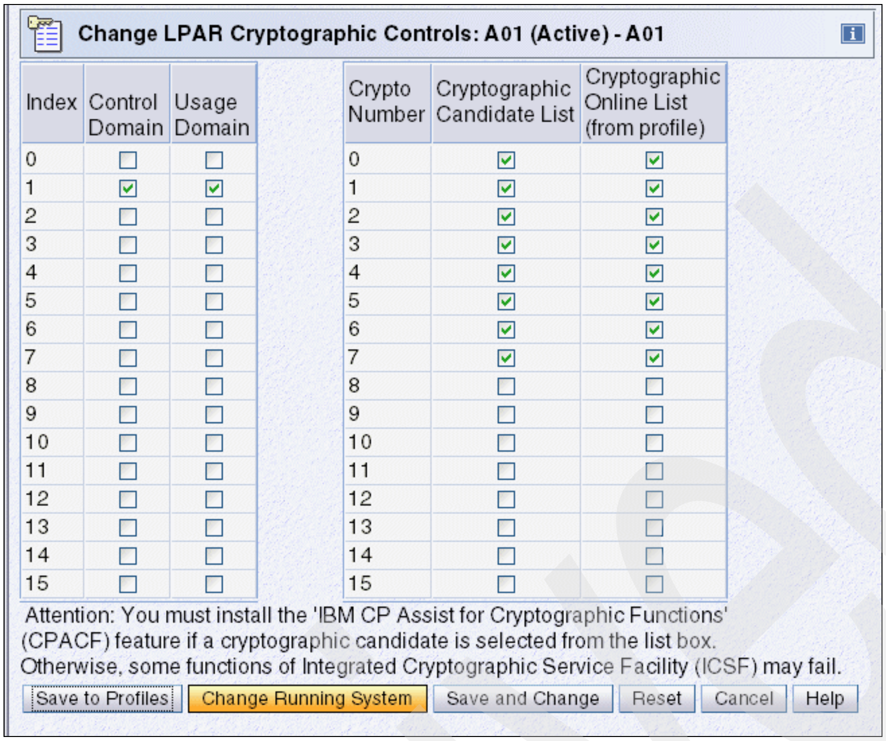



*Figure 8-12 Change LPAR Cryptographic Controls (Change Running System)*

3. Figure 8-13 shows the message indicating that only the Cryptographic Online List cannot be changed by this task dynamically, so changes are ignored. The Cryptographic Online list definition is always selected from the image profile for each logical partition. Click **OK**.

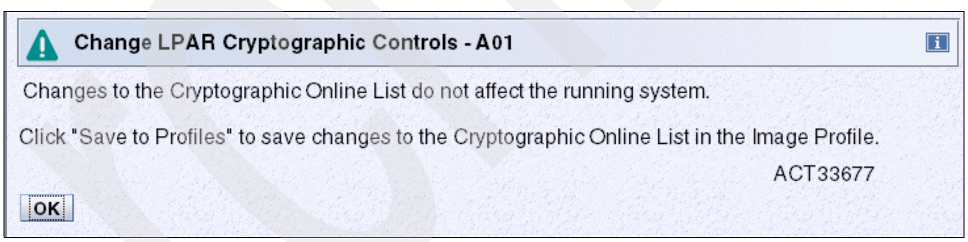



*Figure 8-13 SE - Change LPAR Cryptographic Controls, message ACT33677*

4. When you add or change the control or usage domain index and cryptographic coprocessor number dynamically for a running system, the confirmation message shown in Figure 8-14 is displayed. Click **Yes.**

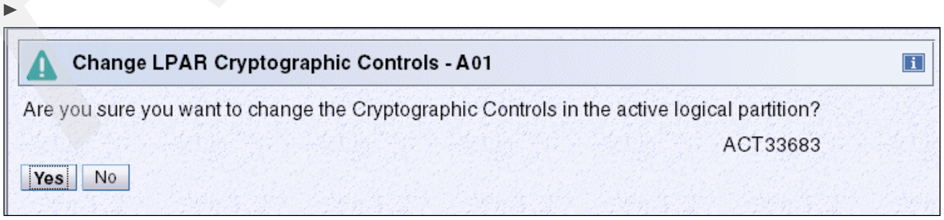



*Figure 8-14 SE - Change LPAR Cryptographic Controls, message ACT33683*

5. A status panel indicates the result of a dynamic add or change of a cryptographic definition to an LPAR, as shown in Figure 8-15 on page 351.

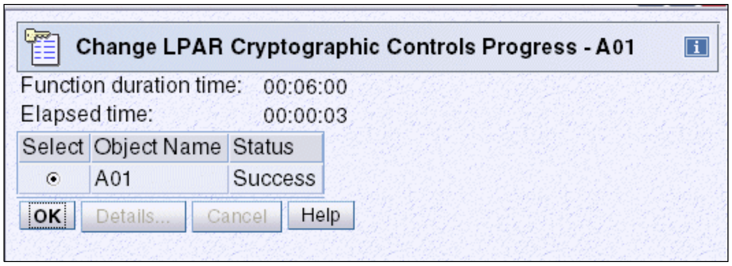



*Figure 8-15 SE - Change LPAR Cryptographic Controls (Success)*

### *Dynamic removal of the cryptographic definition*

You can also 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.

- 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 8-16.

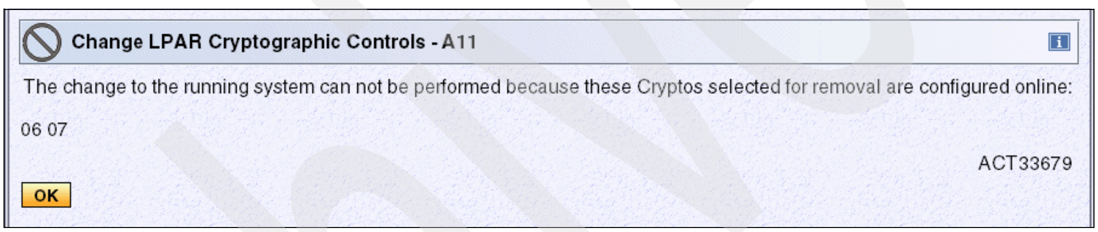



*Figure 8-16 SE - Change LPAR Cryptographic Controls, message ACT33679*

- 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 panel; see in Figure 8-12 on page 350. After deselecting (unchecking) the definitions for a logical partition, you remove a definition dynamically by clicking **Change Running System**.
- When you only remove the definition of the cryptographic lists, the zeroize panel appears; see Figure 8-17 on page 352. Remove the check to zeroize each crypto number, then click **OK**.

> **Note:** You can zeroize a usage domain to clear the coprocessor configuration data and all cryptographic keys manually using the **Cryptographic Configuration** task.
>
> From the Change LPAR Cryptographic Controls task, since you cannot see at a glance all cryptographic information, including the usage domains for other logical partitions, we recommend you remove the check for zeroize. For more information about zeroize, see “Reconfiguration of the PCI-X Adapter to Coprocessor or Accelerator” on page 353.

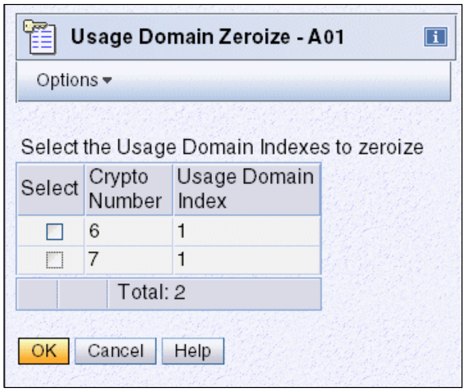



*Figure 8-17 SE - Change LPAR Cryptographic Controls*

- Click **Yes** when the confirmation dialog is displayed to change the cryptographic settings dynamically. As the message in Figure 8-18 shows, the task was completed successfully.

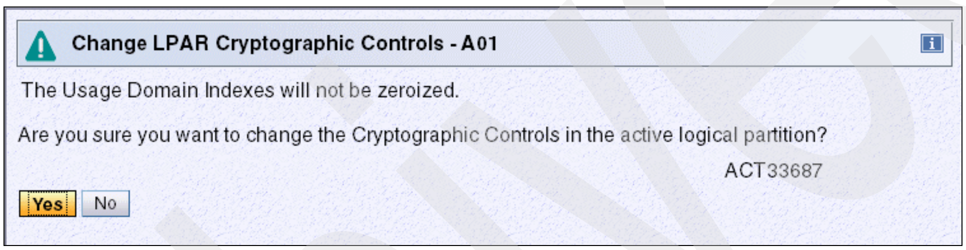



*Figure 8-18 SE - Change LPAR Cryptographic Controls, message ACT33687*

### *Save the cryptographic definition to the image profile*

The operations explained in this section are temporary changes to a running system in the logical partition. Remember to save the cryptographic definitions that you defined to the current image profile of the changed logical partition by clicking the **Save to Profiles** option. You can also change the image profile for a logical partition using the **Customize/Delete Activation Profile** task from the HMC.

1. To save the changes to the logical partitions image profile click **Save to Profiles**, as shown in Figure 8-19 on page 353.

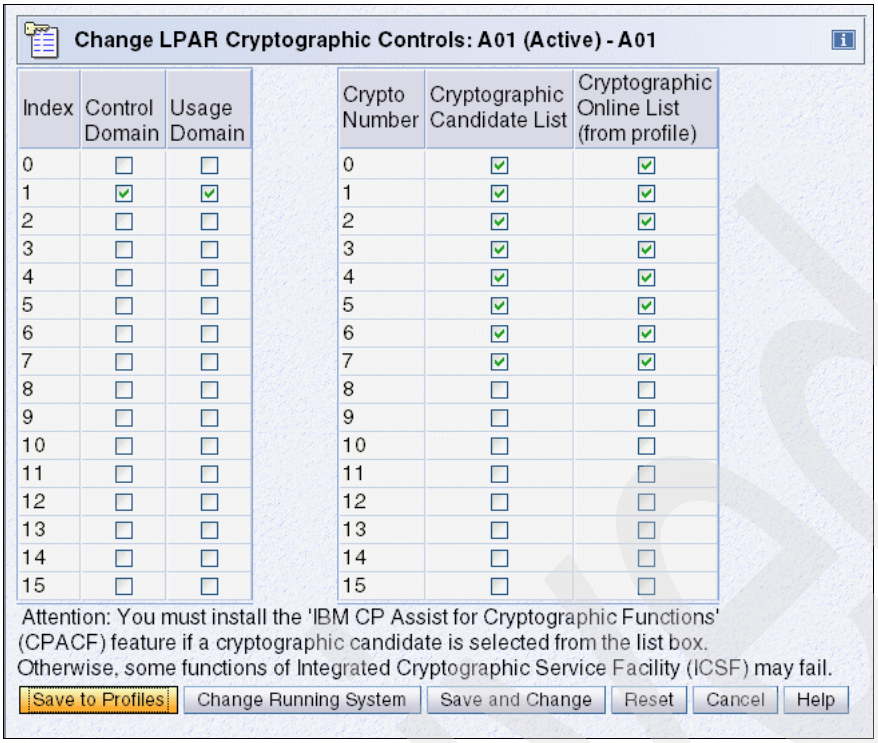



*Figure 8-19 SE - Change Crypto Graphic Controls (Save to Profiles)*

2. Click **Yes** to the confirmation message to implement the image profile change, as shown in Figure 8-20.

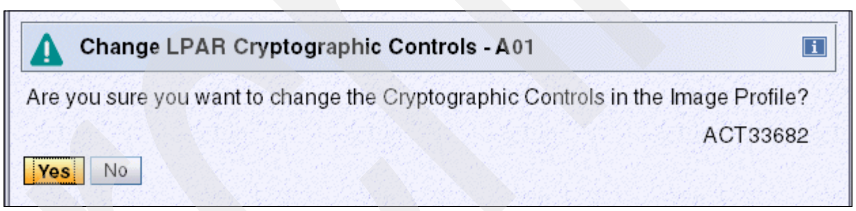



*Figure 8-20 SE - Change LPAR Cryptographic Controls, message ACT33682*

The Change LPAR Cryptographic Controls task is used to perform a change in Crypto Express2 configuration without deactivation of the partition. Any other method will require you to shut down operating systems running in the logical partition that is the target of cryptographic settings updates. For more information about hot plugging crypto features, see the manual *IBM System z10 Enterprise Class Processor Resource/Systems Manager™ Planning Guide,* SB10-7153.

## Reconfiguration of the PCI-X Adapter to Coprocessor or Accelerator

Each PCI-X Cryptographic adapter on a Crypto Express2 feature can be configured either as a coprocessor or as an accelerator. Each Crypto Express2 feature can be configured as:

- Two Crypto Express2 coprocessors
- One Crypto Express2 coprocessor and one accelerator
- Two Crypto Express2 accelerators

Whether it is configured as a coprocessor or an accelerator, each PCI-X Cryptographic adapter can be shared among 16 logical partitions.

### *Configure from Coprocessor to Accelerator*

During installation of a Crypto Express2 feature, both PCI-X Cryptographic adapters are configured by default as coprocessors. The reconfiguration is fully supported in Licensed Internal Code. Therefore, Crypto Express2 features carried forward from System z9 to System z10 EC can take advantage of the reconfiguration capability.

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, do the following:

1. Select the CPC that has crypto adapters you want to reconfigure and click the **Cryptographic Configuration** task.
2. The reconfiguration is enabled only for PCI-X adapters that are Off, so make sure the PCI-X Cryptographic adapter status for that crypto channel is **Deconfigured**; see Figure 8-21.

   If necessary, configure the PCI-X Cryptographic adapter **Off** for all partitions that have it in their candidate list. To configure the PCI-X Cryptographic adapter **Off**, use the procedure described in “Config On/Off to the logical partition” on page 359.
3. Select the number of the crypto channel and click the **Crypto Type Configuration** option.

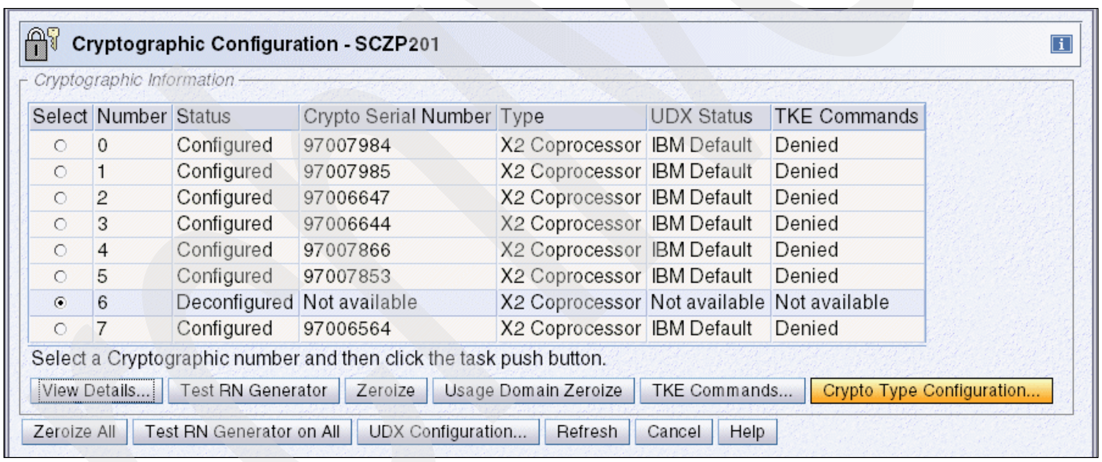



*Figure 8-21 SE - Cryptographic Configuration task (Coprocessor)*

4. Change the configuration for the crypto adapter. The selected crypto channel is currently configured as a Coprocessor (Figure 8-22 on page 355). Select **Accelerator** in the panel.

   When you select Accelerator, you can zeroize the selected coprocessor by clicking the Zeroize the Coprocessor check box on the Crypto Type Configuration panel. Remove the check for Zeroize the Coprocessor 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 remove the check for each crypto channel.

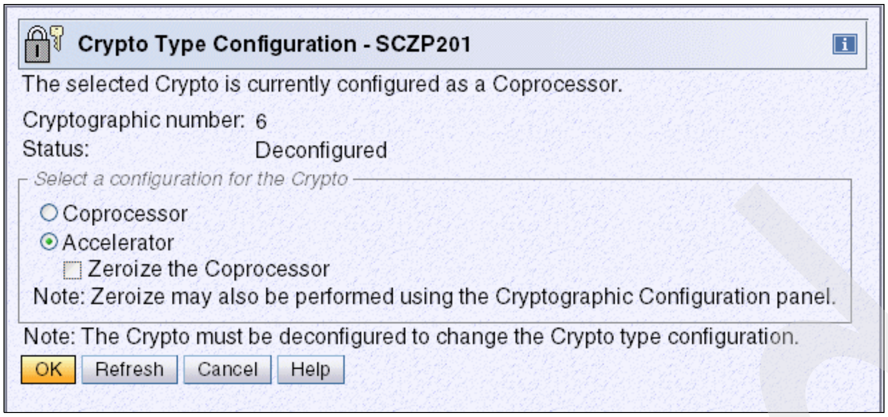



*Figure 8-22 SE - Crypto Type Configuration (Coprocessor to Accelerator)*

5. Click **Yes** when the confirmation dialog shown in Figure 8-23 is displayed.

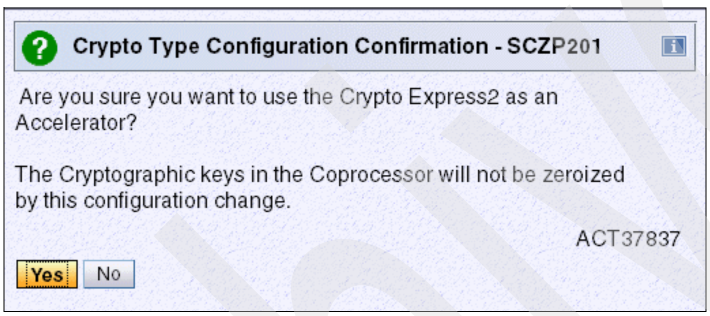



*Figure 8-23 SE - Crypto Type Configuration Confirmation, message ACT37837*

6. Check that your request completed successfully (Figure 8-24). Click **OK** to return to the Crypto Type Configuration panel.

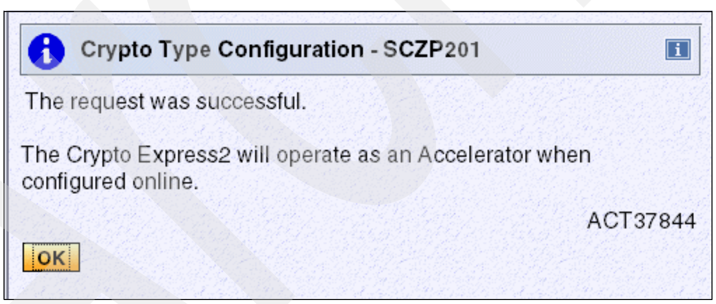



*Figure 8-24 SE - Crypto Type Configuration Confirmation, message ACT37844*

7. Click **Cancel** on the Crypto Type Configuration panel to return to the Cryptographic Configuration task panel. You can confirm that the target crypto channel changed to cryptographic accelerator type in the Cryptographic Configuration task panel (Figure 8-25 on page 356).

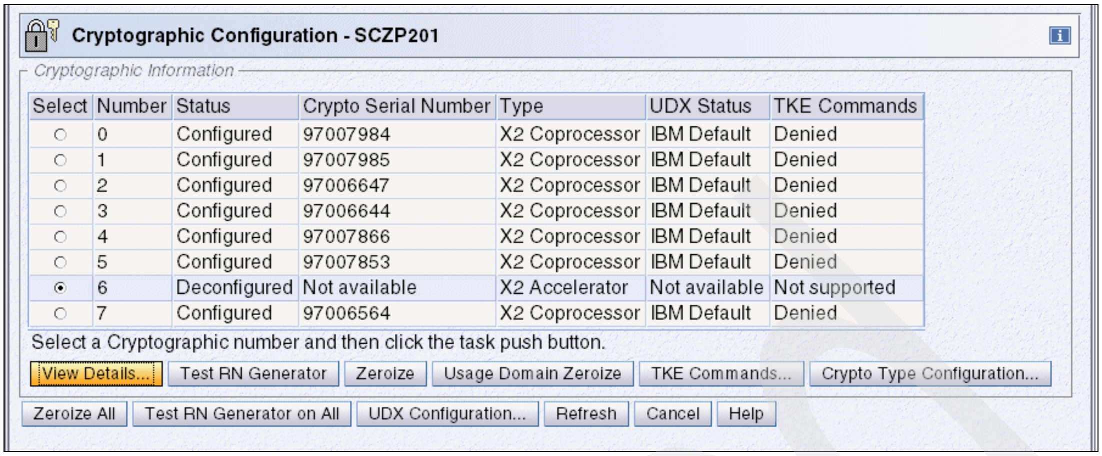



*Figure 8-25 SE - Cryptographic Configuration (Accelerator)*

8. Click the **View Details** option for detailed information (Figure 8-26).
9. Finally, click **Cancel** to return.

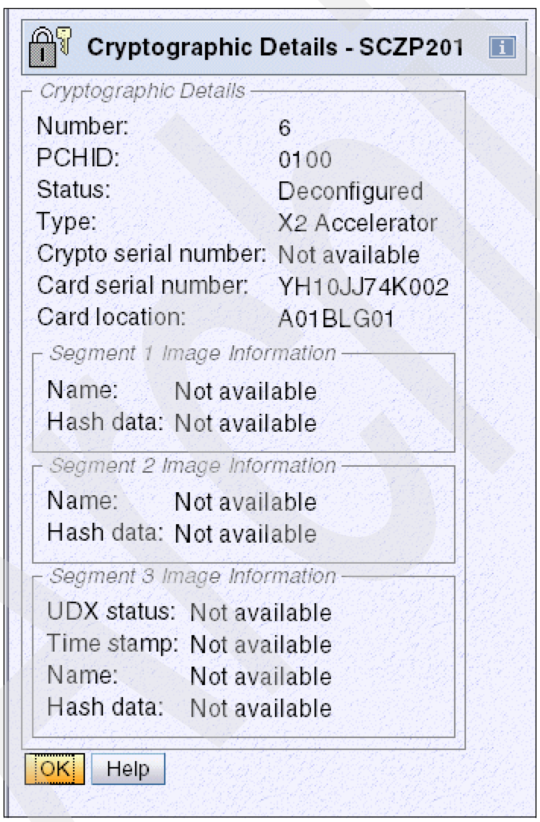



*Figure 8-26 SE - Cryptographic Details (Accelerator)*

### *Configure from Accelerator to Coprocessor*

Use the following steps to configure from an Accelerator to a Coprocessor:

1. Select the number of the crypto channel that you want to change (it must be in a Deconfigured status), and click the **Crypto Type Configuration** option (Figure 8-27).

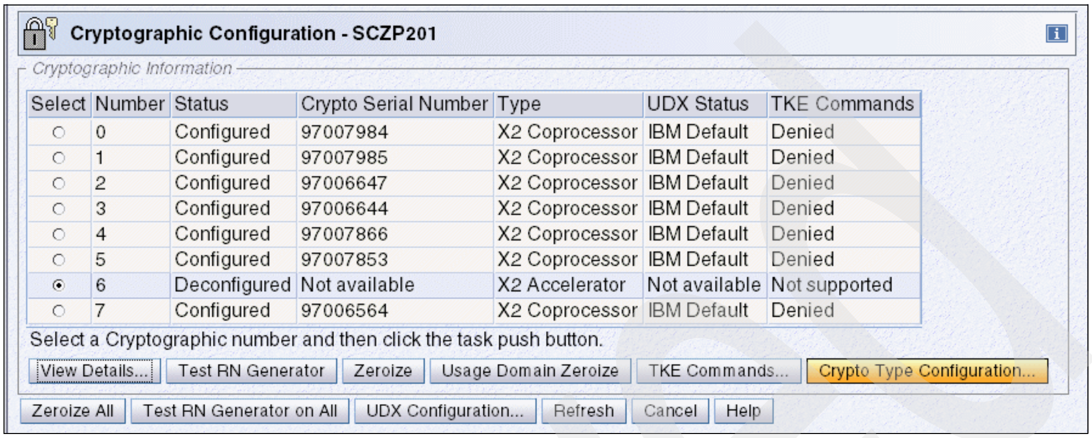


*Figure 8-27 Cryptographic Configuration (Accelerator)*

2. The selected crypto channel is currently configured as an Accelerator, as shown in Figure 8-28. Select **Coprocessor** and click **OK** in the panel.

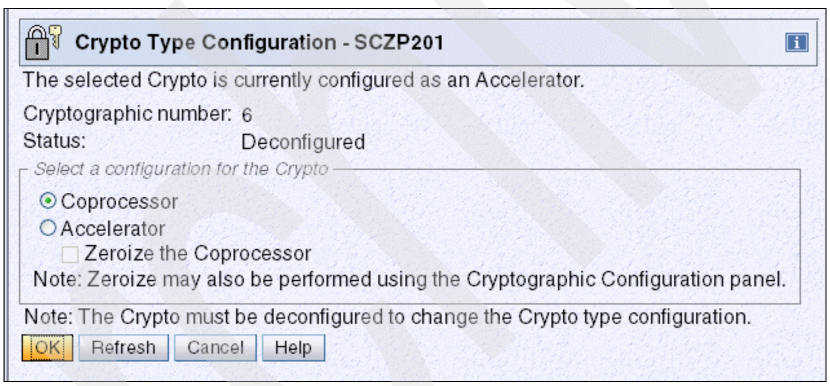


*Figure 8-28 Crypto Type Configuration (Accelerator to Coprocessor)*

3. Click **Yes** in the confirmation message dialog displayed (Figure 8-29).

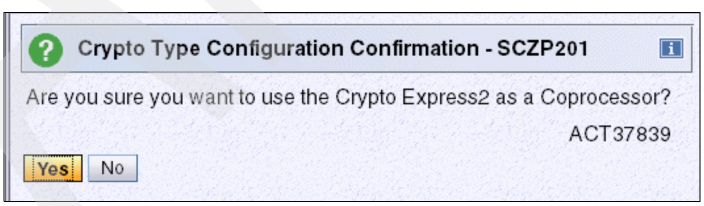


*Figure 8-29 Crypto Type Configuration, message ACT37839*

4. When your request has completed successfully, the message shown in Figure 8-30 is displayed. Click **OK**.

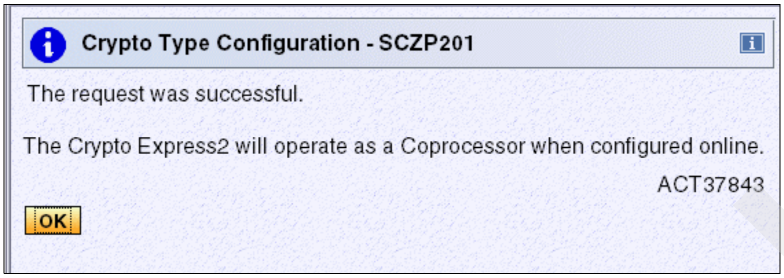



*Figure 8-30 Crypto Type Configuration, message ACT37843*

5. Click **Cancel** in the Crypto Type Configuration panel; the Crypto Configuration task panel is shown again. You can confirm that the crypto channel has been changed to a cryptographic accelerator type from the Cryptographic Configuration task panel, as shown in Figure 8-31.

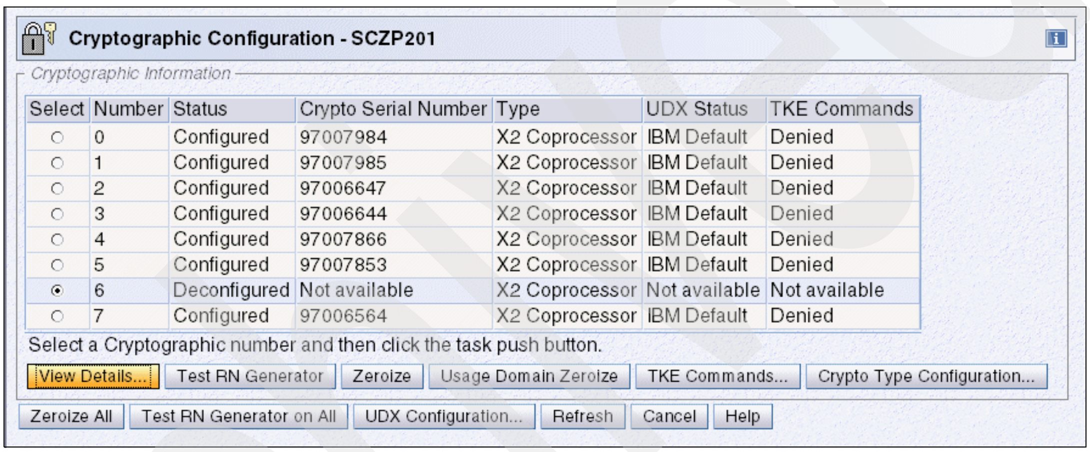



*Figure 8-31 Cryptographic Configuration (Coprocessor)*

6. Click the **View Details** option for complete details (Figure 8-32 on page 359).

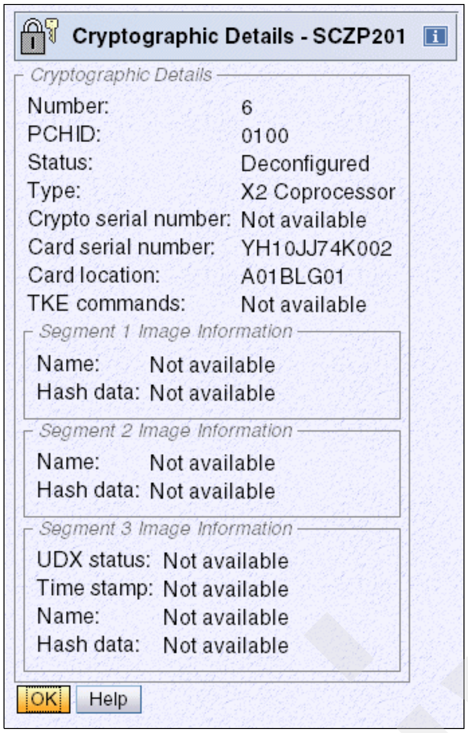



*Figure 8-32 Cryptographic Details (Coprocessor)*

Using this task from the Support Element allows you to reconfigure the PCI-X Adapter manually.

## Config On/Off to the logical partition

After you have defined the cryptographic settings to each logical partition, the next step is to change the coprocessor/accelerator lists from offline (Standby) to online dynamically. If you can perform a reactivate (DEACTIVATE and ACTIVATE) of the image profiles for the logical partitions whose Cryptographic Online Lists have been updated, then the dynamic operation is not needed.

To change the lists to online status dynamically, use the following steps:

1. From the SE, select the **Systems Management** function. Select the target server, click **Partitions,** and then select the target logical partition. Click the **Cryptos** selection for the target logical partition. In the Contents of Cryptos panel, select the Crypto IDs that are to be changed. In Figure 8-33 on page 360, one Cryptographic accelerator (06) and one coprocessor (07) to LOGICAL PARTITION (A01) 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 standby (offline - this means only the definition of candidate list to that logical partition) in the active configuration.

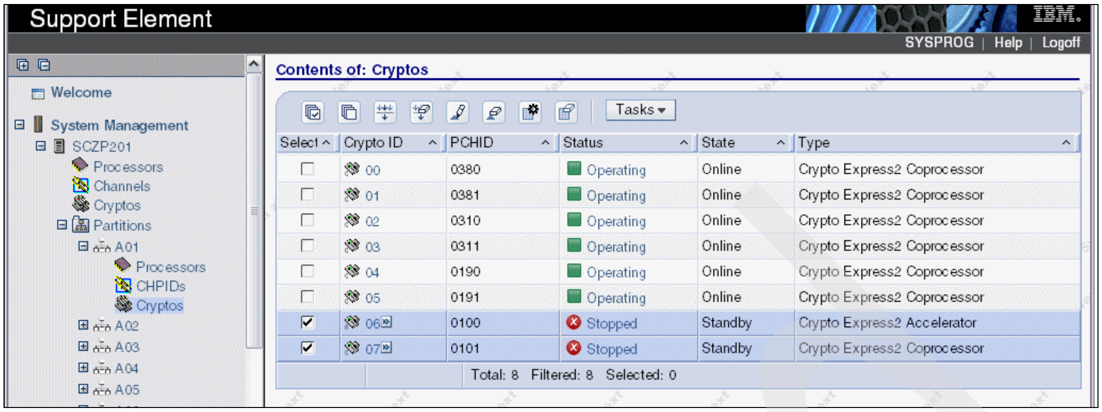



*Figure 8-33 SE Crypto Service Operations - Standby*

3. Select the crypto channel numbers you want, click **Toggle** to switch from Standby to Online in the desired state. If you choose multiple crypto channels at the same time, click the **Toggle All On** option as shown in Figure 8-34 on page 360.

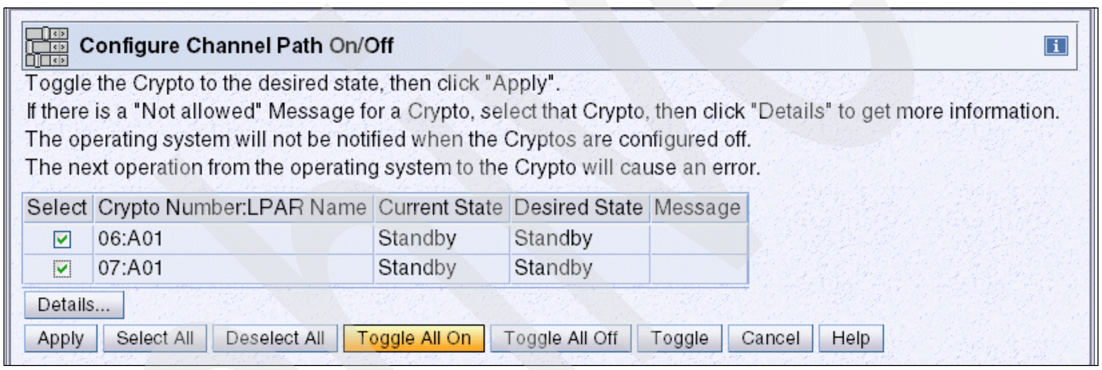



*Figure 8-34 SE Crypto Config On/Off (Toggle All On)*

4. After confirming the desired state for your requested crypto channels is set to Online, click the **Apply** button (Figure 8-35).

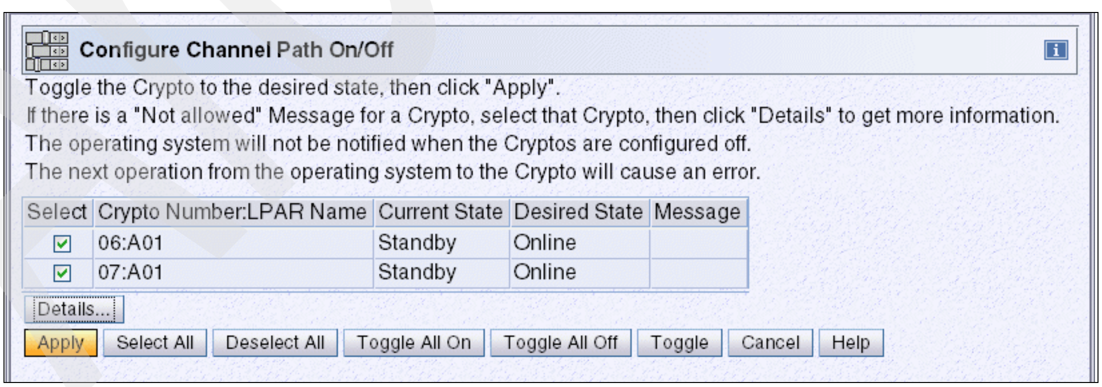



*Figure 8-35 SE Crypto Config On/Off (Standby to Online)*

5. A progress panel indicates the status of your request. Confirm that your request for configure channel path On/Off is completed (Figure 8-36). Press **OK**.
6. After checking that the Current State of the Crypto channels has been changed to Online, click **Cancel** to return.

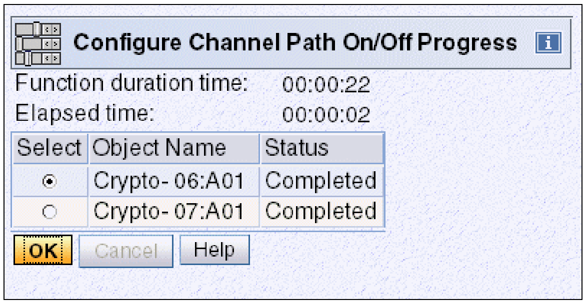



*Figure 8-36 SE Crypto Config On/Off (Online completed)*

7. Finally, you can view the contents of the Cryptos panel of the logical partition to confirm that the target crypto channels are now in an Online and Operating status (Figure 8-37).

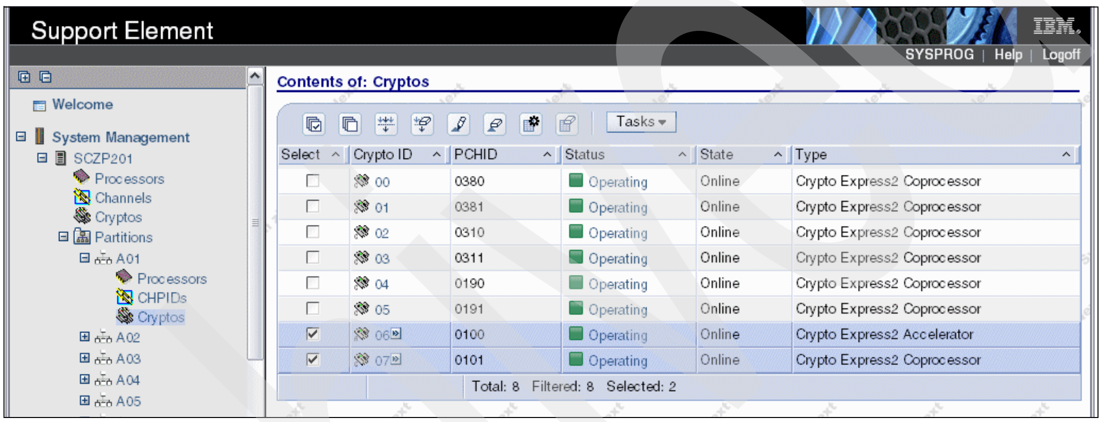



*Figure 8-37 SE Crypto Service Operations - Online*

### *Change channel into Standby (Offline)*

Similarly, the procedure to change to Standby (Offline) uses the following steps:

1. For a target logical partition select the Crypto IDs to be changed to Standby. For example, we select two crypto processors (06 and 07) which are currently in an online state. Click **Configure On/Off** task in Crypto Service Operations.
2. Select all crypto channel numbers you want, click **Toggle All off** to switch from Online to Standby in the desired state (Figure 8-38).

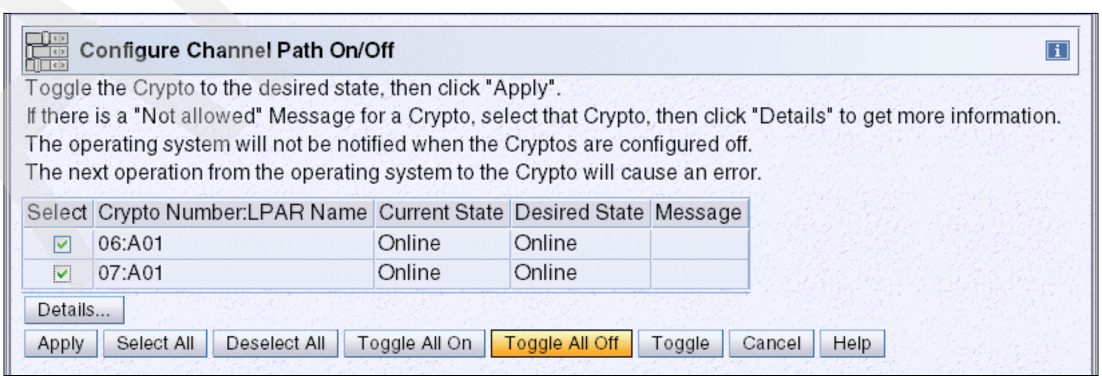



*Figure 8-38 SE Crypto Config On/Off (Toggle All Off)*

3. After confirming that the desired state for your requested crypto channel is Standby, click the **Apply** button (Figure 8-39 on page 362).

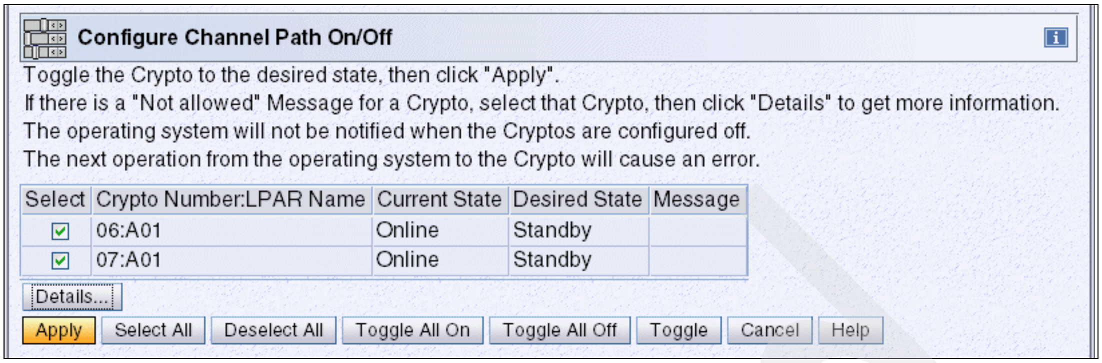



*Figure 8-39 SE Crypto Config On/Off (Online to Standby)*

4. When your request to configure a channel path On/Off is completed, the confirmation dialog shown in Figure 8-40 is displayed. Click **OK**.

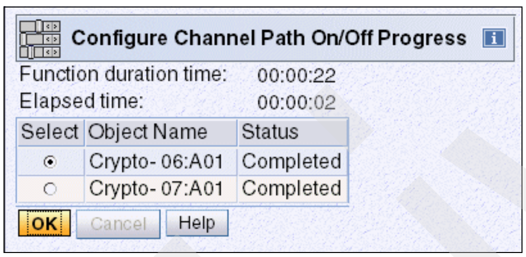



*Figure 8-40 SE Crypto Config On/Off (Standby Completed)*

## 8.3 Activation and deactivation using ICSF

ICSF provides an ISPF Coprocessor Management panel to display or change the status, Active or Deactivate, of cryptographic coprocessors. This only refers to the coprocessor status to 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 display the ICSF Coprocessor Management panel (Figure 8-41 on page 363).

```
HCR7750  -------------- Integrated Cryptographic Service Facility--------------
 OPTION ===> 1
 Enter the number of the desired option.

   1  COPROCESSOR MGMT -  Management of Cryptographic Coprocessors
   2  MASTER KEY       -  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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      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.
```

*Figure 8-41 Integrated Cryptographic Service Facility Main Panel*

Cryptographic coprocessors that are currently configured on the partition are displayed on the ICSF Coprocessor Management panel (Figure 8-42).

```
------------------------- 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
     -----------      -------------   ------
 .   E00              97007984        ACTIVE
 .   E01              97007985        ACTIVE
 .   E02              97006647        ACTIVE
 .   E03              97006644        ACTIVE
 .   E04              97007866        ACTIVE
 .   E05              97007853        ACTIVE
******************************* Bottom of data ********************************
```

*Figure 8-42 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 8-43).

```
 ------------------------ 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
     -----------      -------------   ------
 .   E00              97007984        ACTIVE
 .   E01              97007985        ACTIVE
 .   E02              97006647        ACTIVE
 .   E03              97006644        ACTIVE
 .   E04              97007866        ACTIVE
 .   E05              97007853        ACTIVE
 .   E07                              OFFLINE
 .   F06                              OFFLINE
******************************* Bottom of data ********************************
```

*Figure 8-43   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.

```
 ------------------------ 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
     -----------      -------------   ------
 .   E00              97007984        ACTIVE
 .   E01              97007985        ACTIVE
 .   E02              97006647        ACTIVE
 .   E03              97006644        ACTIVE
 .   E04              97007866        ACTIVE
 .   E05              97007853        ACTIVE
 .   E07              97006564        ACTIVE
 .   F06                              ACTIVE
******************************* Bottom of data ********************************
```

*Figure 8-44   ICSF Coprocessor Management (Online)*

In the list shown in Figure 8-44, enter action character `A` or `D` to switch a coprocessor status to Active or Deactivated. When a coprocessor is deactivated through ICSF, shown in Figure 8-45, it cannot be used by applications running in that system image.

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 (before it is configured off from the SE), 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
    -----------      -------------   ------
.   E00              97007984        ACTIVE
.   E01              97007985        ACTIVE
.   E02              97006647        ACTIVE
.   E03              97006644        ACTIVE
.   E04              97007866        ACTIVE
.   E05              97007853        ACTIVE
.   E07              97006564        DEACTIVATED
.   F06                              DEACTIVATED
******************************* Bottom of data ********************************
```

*Figure 8-45 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 8-46).

```
---------------------- 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 8-46 ICSF - Coprocessor Hardware Status*

Help information from ICSF Coprocessor Management, shown in Figure 8-47, 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,
   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 PCIXCC/CEX2C for clear master key entry.
  'k'      Selects the PCIXCC/CEX2C for DES operational key load
  'r'      Causes the PCIXCC/CEX2C default role to be displayed.
  's'      Causes complete hardware status to be displayed for an PCIXCC/CEX2C.
 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 symmetric-keys master key is valid.
   - ONLINE:    The symmetric-keys master key is not valid.
   - OFFLINE:   The coprocessor is installed but not available to ICSF.
   - DISABLED:  The coprocessor has been removed from service by a TKE work
                station.
   - DEACTIVATED: The coprocessor has been deactivated (see action characters).
   - 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 8-47 ICSF Help for Coprocessor Management*

9

# Reserved logical partitions

In this chapter we explain how to implement and use reserved logical partitions on the System z10 EC.

We cover the following topics in this chapter:

- Introduction to reserved logical partitions
- Name and activate a reserved logical partition
- Un-name a reserved logical partition
- Rename a reserved logical partition



 

## 9.1 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 to this, 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 may be the need, for example, for the addition of a new z/OS image, the removal of redundant z/OS images, or even the consolidation of logical partitions from multiple servers. All of this can be done without disrupting the operating logical partitions. The use of reserved logical partitions also includes logical partitions to be 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 System z10 EC 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 (CSS) and Subchannel Sets (SS). These definitions influence the Hardware System Area storage size which a processor requires. The reserved logical partitions also require extra space in the HSA. However, it is no longer a requirement to plan for HSA growth due to additional definitions while planning for the System z10 EC.

**Important:** On System z10 EC, a fixed amount (16 GB) is reserved for HSA storage size and is fenced off from customer purchased memory. When defining a z10 EC 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 relieves the user of 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 MIF ID might need to be updated.

## 9.2 Name and activate a reserved logical partition

To activate a reserved logical partition, an HCD configuration change is required in order 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 System z10 EC 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:

- Name a reserved logical partition.
- Activate the configuration on the System z10 EC.
- Customize the Activation Profile.

We discuss these tasks in more detail in the following sections.

### 9.2.1 Name a reserved logical partition

To name the reserved logical partition, follow these steps using HCD:

1. From the HCD primary menu select option **1. Define, modify, or view configuration data**, 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 will display 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 9-1 shows logical partition number “6” in CSS ID 2 is reserved, its name displayed as “*”.

```
--------------------------sss Partition List --------------------------ss
  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  . . . . : SCZP201
 Configuration mode  . : LPAR
 Channel Subsystem ID  : 2

 / Partition Name   Number Usage + Description
 _ A21              1      OS      ________________________________
 _ A22              2      OS      ________________________________
 _ A23              3      OS      ________________________________
 _ A24              4      OS      ________________________________
 _ A25              5      OS      ________________________________
 c *                6      CF/OS   New Named LPAR
 _ *                7      CF/OS   Reserved LPAR
```

*Figure 9-1 HCD - Changing a reserved logical partition*

Figure 9-2 shows that logical partition is given the new name A26. 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.

3. Change Partition usage, if necessary.

```
------------- Change Partition Definition ----------

 Specify or revise the following values.

 Partition name . . . A26
 Partition number . . 6      (same as MIF image ID)
 Partition usage  . . OS     +

 Description  . . . . New Named LPAR
```

*Figure 9-2 HCD - naming to a reserved logical partition*

4. Assign all channels required by the logical partition to access the devices it needs using the **Include in access list (a)** options (Figure 9-3 on page 373). All devices on the selected CHPIDs are available to the newly named logical partition.

   These channels depend on what works on that newly named logical partition; you might need to define devices such as CTC and Coupling links, including InfiniBand (CIB). An operating system configuration may have to be created if 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 connect to the newly named logical partition, those channels must have their candidate lists updated to exclude the newly named logical partition using the **Include in candidate list (c)** option. If some devices already have candidate lists, the new logical partition is not included in that candidate list.

```
------------- Update CHPID Access and Candidate Lists -------------
                                                      Row 1 of 104
 Command ===> _________________________________ Scroll ===> CSR

 Select channel paths to include or exclude, then press Enter.

 Partition name . . : A26       New Named LPAR

                        ---Partition Included In---
 / CHPID  Type   Mode   Access List  Candidate List
 _ 00     OSD    SPAN   Yes          No
 _ 01     OSD    SPAN   Yes          No
 _ 02     OSD    SPAN   Yes          No
 _ 03     OSD    SPAN   Yes          No
 _ 04     OSD    SPAN   No           No
 _ 05     OSD    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
```

*Figure 9-3 HCD - Update CHPID to new named logical partition*

6. Your partition is now named and has all its necessary resources defined from an HCD perspective (Figure 9-4). At this point, a production IODF can be built.

```
--------------------------sss Partition List --------------------------sss
   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  . . . . : SCZP201
 Configuration mode  . : LPAR
 Channel Subsystem ID  : 2

 / Partition Name   Number Usage + Description
 _ A21              1      OS      ________________________________
 _ A22              2      OS      ________________________________
 _ A23              3      OS      ________________________________
 _ A24              4      OS      ________________________________
 _ A25              5      OS      ________________________________
 _ A26              6      OS      New Named LPAR
 _ *                7      CF/OS   Reserved LPAR
```

*Figure 9-4 HCD - Partition List with new named logical partition*

## 9.2.2 Activate the configuration on the System z10 EC

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).

### Check the definition for IODF dynamic change

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 System z10 EC (Figure 9-5). If this isn't the case, a power-on reset is needed to change the reserved logical partition to a named logical partition.

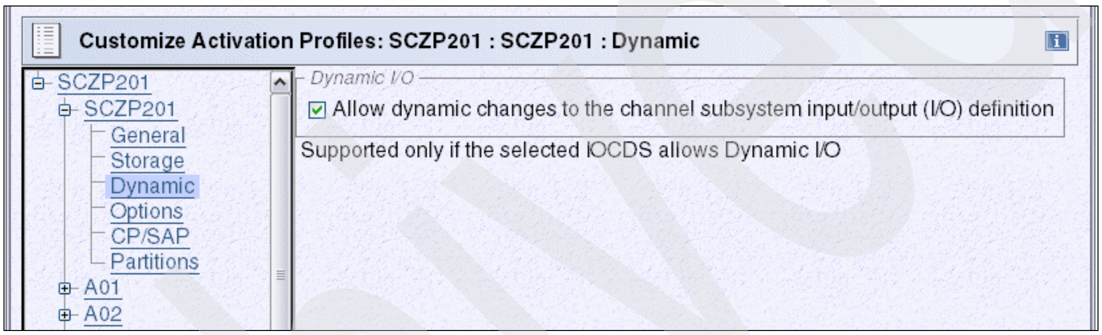


*Figure 9-5 HMC - Dynamic section in reset profile*

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 V1R6, so when that command is issued in the system running on System z10 EC for which z/OS V1R7 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 Activates can be done. From a system console issue **`d ios,config(all)`**. You should see a display similar to the one in Figure 9-6 on page 375. This display shows that the source IODF and the active IODF are the same (SYS6.IODF41); therefore, a full Activate can be done.

```
D IOS,CONFIG(ALL)
IOS506I 12.26.18 I/O CONFIG DATA 529
ACTIVE IODF DATA SET = SYS6.IODF41
CONFIGURATION ID = TEST2097 EDT ID = 01
TOKEN:  PROCESSOR DATE     TIME     DESCRIPTION
 SOURCE: SCZP201  07-12-04 11:59:35 SYS6     IODF41
ACTIVE CSS:  0    SUBCHANNEL SETS CONFIGURED: 0, 1
CHANNEL MEASUREMENT BLOCK FACILITY IS ACTIVE
HARDWARE SYSTEM AREA AVAILABLE FOR CONFIGURATION CHANGES
PHYSICAL CONTROL UNITS              8133
CSS  0 - LOGICAL CONTROL UNITS      4039
 SS  0   SUBCHANNELS               63608
 SS  1   SUBCHANNELS               62365
CSS  1 - LOGICAL CONTROL UNITS      4035
 SS  0   SUBCHANNELS               63592
 SS  1   SUBCHANNELS               62365
CSS  2 - LOGICAL CONTROL UNITS      4088
 SS  0   SUBCHANNELS               65280
 SS  1   SUBCHANNELS               65535
CSS  3 - LOGICAL CONTROL UNITS      4088
 SS  0   SUBCHANNELS               65280
 SS  1   SUBCHANNELS               65535
ELIGIBLE DEVICE TABLE LATCH COUNTS
        0 OUTSTANDING BINDS ON PRIMARY EDT
```

*Figure 9-6 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 ACTIVATE can be performed (Figure 9-7). This option gives you the message CBDA781I as shown in Figure 9-8 on page 376.

```
------------------------- View Active Configuration -------------------------

 Currently active IODF  . . : SYS6.IODF41
    Creation date . . . . . : 07-12-04
    Volume serial number  . : IODFPK

 Configuration ID . . . . . : TEST2097 Sysplex systems
 EDT ID . . . . . . . . . . : 01

 HSA token  . . . . . . . . : SCZP201  07-12-04 11:59:35 SYS6     IODF41

 Activation scope:
 Hardware changes allowed . : Yes
 Software changes allowed . : Yes

 ENTER to view details on the activation scope.
```

*Figure 9-7 HCD - View Active Configuration*

```
+----s Activate or Process Configuration Data ------+ ____________________

------------------------------ Message List ------------------------------
  Save  Query  Help
 --------------------------------------------------------------------------
                                                                Row 1 of 2
Command ===> ___________________________________________ Scroll ===> PAGE

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 9-8   HCD - display message for View Active Configuration

## Activate a new IODF

After verification of the current definition, the new configuration can be activated dynamically. Watch for error messages and correct any that occur. The dynamic activate can be done either by using the z/OS **activate** command, or via HCD.

1. In HCD, select option **2. Activate or process configuration data**, 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 9-9).

```
---------------- 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 9-9   HCD - Activate or Verify Configuration panel

2. Test to verify that the new production IODF can be successfully activated. You can accomplish this by setting the **Test only** option to `Yes` in HCD or using the z/OS **activate iodf=xx,test** 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 9-10 on page 377).

```
------------- Activate New Hardware and Software Configuration -------------

 Specify or revise the values for IODF activation.

 Currently active IODF . : SYS6.IODF41
    Processor ID . . . . : SCZP201
    Configuration ID . . : TEST2097 Sysplex systems
    EDT ID . . . . . . . : 01

 IODF to be activated  . : SYS6.IODF4F
    Processor ID . . . . . SCZP201   +
    Configuration ID . . . TEST2097  +     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 9-10 HCD - Activate new IODF*

4. Check all messages in the resulting panel, as shown in Figure 9-11, and verify that the dynamic activate completed successfully. Notice that the action performed by this HCD panel is the same as issuing the z/OS **`activate iodf=xx`** command.
5. Confirm the current active IODF by using the **View active configuration** option in HCD or the z/OS **`d ios,config`** command. Now you can view the newly defined logical partition name in the contents of the CPC when you log into the HMC.

```
 ------ Activate or Process Configuration Data -----------------------------

------------------------------ Message List -------------------------------
   Save  Query  Help
 --------------------------------------------------------------------------
                                                                 Row 1 of 5
 Command ===> ___________________________________________ Scroll ===> PAGE

 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   CBDA899I Following partitions are to be added to processor
 #              SCZP201: 2.A26
 _ I   CBDA126I ACTIVATE IODF=4F command was accepted.
 ***************************** Bottom of data ******************************
```

*Figure 9-11 HCD - Activate new IODF, message*

6. Install a new IOCDS to the System z10 EC and make it the active IOCDS on the server for the next POR. From HCD, select option **2. Activate or process configuration data**, 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.

## 9.2.3 Customize the Activation Profile

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 9-12).

After you are in the reset profile, select the new IOCDS that was written to the server in the General page. A pop-up window will display, 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.

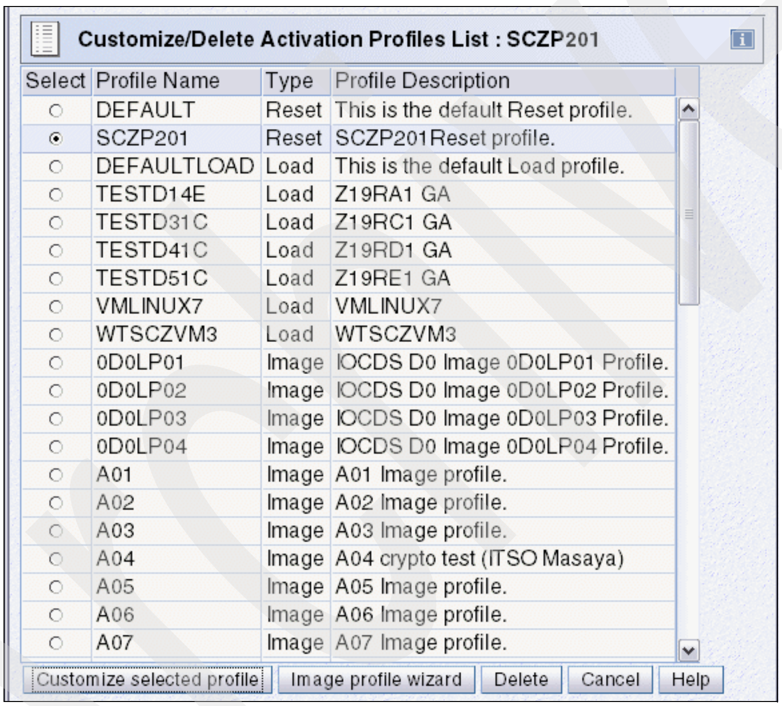


*Figure 9-12 HMC - Customize/Delete Activation Profile*

### Define 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 which contained a newly named logical partition, you can view that logical partition from 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 from 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

- Partition identifier

  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 LPs are X'00' through X'3F'. The LP identifier must be unique for each active LP. 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.

- Operation mode

  You can define how this partition is to be used. The mode of an LP, depending on the model, can be ESA/390, ESA/390 TPF, Linux-Only, z/VM, or Coupling Facility. The mode of an LP must support the mode of the control program loaded into it. ESA/390 LPs support ESA/390 control programs, Coupling Facility LPs support the coupling facility control code, z/VM LPs support z/VM, and Linux-Only LPs 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 standalone server. You can also set an offset value to the STP or ETR clock here if you wish 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.

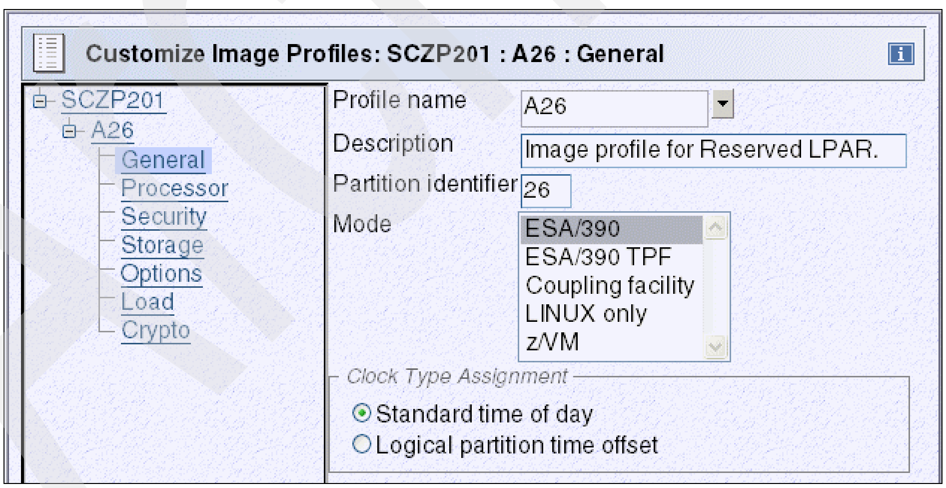


*Figure 9-13 HMC - General page in Image Profile*

### 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 LP selected on the General page.

- Logical Processor Assignments

  Figure 9-14 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 the logical partition is IPLed; *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 for 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 see *TechDocs: Getting Started with zPCR (IBM Processor Capacity Reference)*, Doc:PRS689.

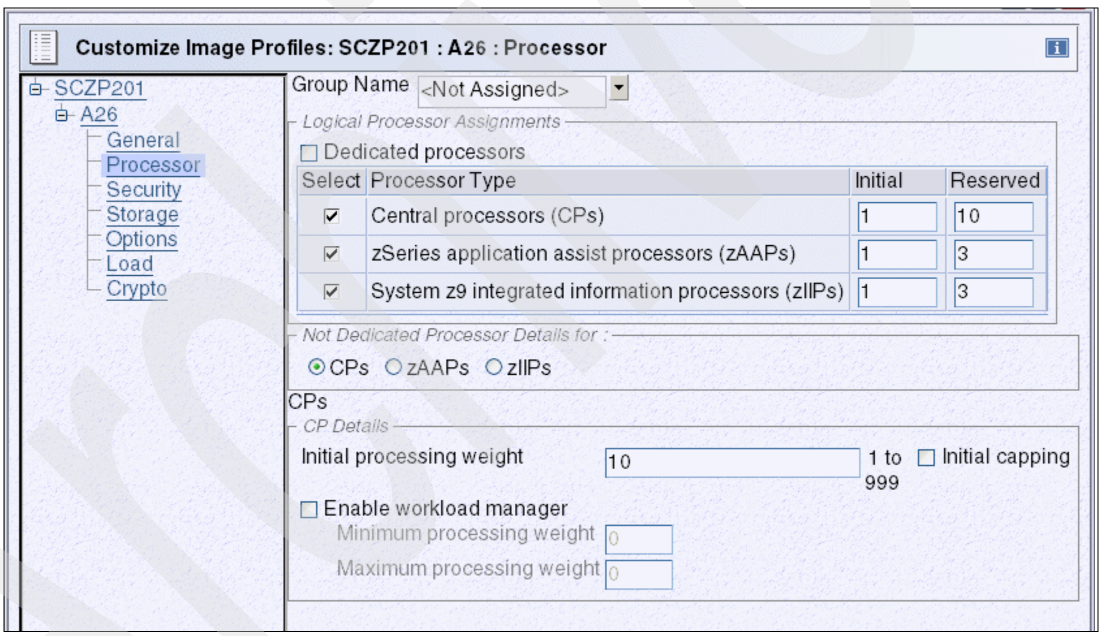


*Figure 9-14 HMC Processor page in image profile*

## *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 System z10 EC can support a minimum of 16 GB to a maximum of 1.5 TB of memory, with 384 GB per book, 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 9-15). This also shows that Hardware System Area (HSA) size is a fixed value (16384 MB/16 GB). The sum of central 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 panel.

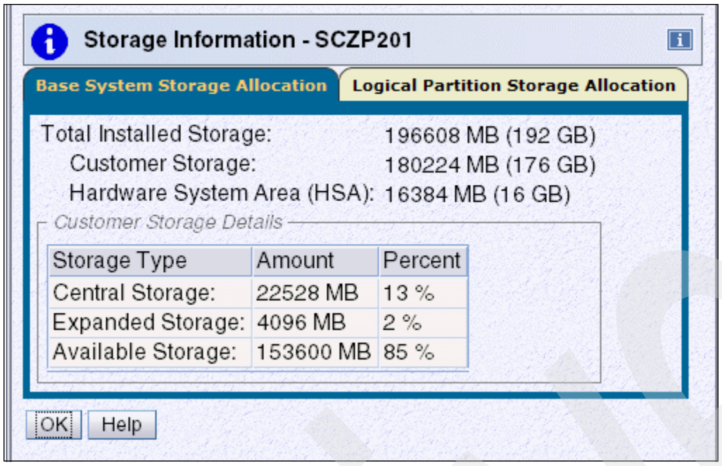


*Figure 9-15 SE - Storage Information*

Storage options are set from the Storage page in the image profile (Figure 9-16 on page 382). On the System z10 EC, memory can be assigned as a combination of Central Storage and Expanded Storage, supporting up to 60 logical partitions. Enter the value (in megabytes) of each storage space.

*Initial* storage is the amount of storage to be allocated to the LP at activation; *reserved* storage is the amount of additional storage requested for the LP. Reserved storage is storage that can be dynamically brought online to the LP at some point after LP activation. Entering 0 for reserved storage limits storage to the initial amount for the duration of the LP activation.

Granularity of Central Storage for a logical partition is dependent on the largest Central Storage amount defined for either initial or reserved Central Storage, as shown in Table 9-1. The granularity applies across all Central Storage defined, both initial and reserved. For example, for an LP with an initial storage amount of 60 GB and a reserved storage amount of 160 GB, the Central Storage granularity of both initial and reserved Central Storage is 512 MB. Expanded Storage granularity is fixed at 256 MB. Expanded Storage granularity applies across the expanded storage input fields.

*Table 9-1 Central Storage granularity*

| **LP Central Storage amount** | **Logical partition storage granularity** |
|---|---|
| Central storage amount <= 128 GB | 256 MB |
| 128 GB < central storage amount <= 256 GB | 512 MB |
| 256 GB < central storage amount <= 512 GB | 1 GB |
| 512 GB < central storage amount <= 1 TB | 2 GB |

Remember that either a z/Architecture (64-bit) mode or an ESA/390 (31-bit) architecture mode operating system can run in an ESA/390 image on a System z10 EC. Any ESA/390 image can be defined with more than 2 GB of Central Storage and can have Expanded

Storage. These options allow you to configure more storage resources than the operating system is capable of addressing.

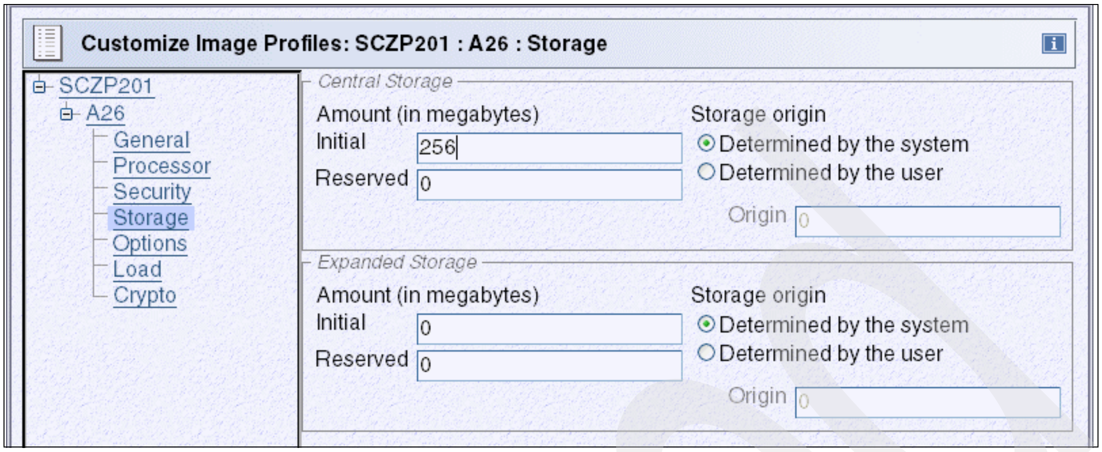


*Figure 9-16 HMC - Storage page in image profile*

### *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 System z10 EC. 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 8.2.4, “Cryptographic configuration using the Support Element” on page 346.

## Activate a reserved logical partition

After all the values have been updated and saved, the logical partition can be activated and IPLed. This operation is done from HMC.

1. Select the logical partition from the HMC Contents of 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 9-17).

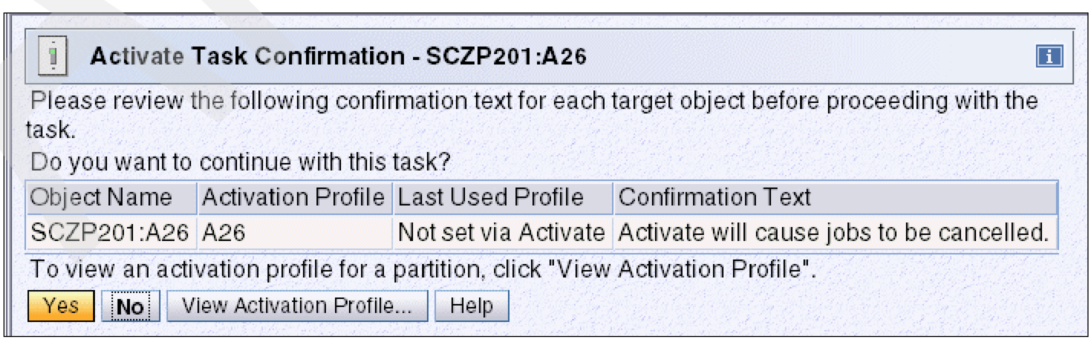


*Figure 9-17 HMC - Activate Task Confirmation*

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 9-18).

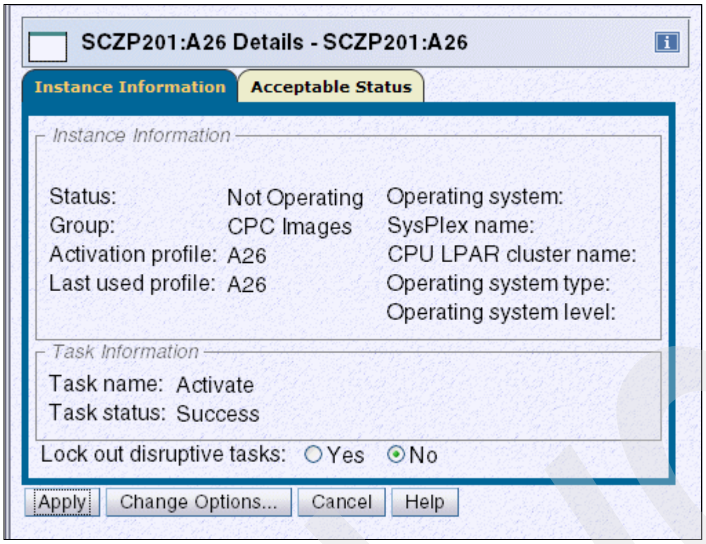

*Figure 9-18 HMC - Details after activating a new logical partition*

Finally, you can IPL an operating system in the newly named logical partition.

## 9.3 Un-name a reserved logical partition

This section explains the steps to change an active logical partition into a reserved partition whose name is removed (Un-name).

### Deactivate logical partition

First, this requires the deactivation of the target logical partition. Deactivating a logical partition is a straightforward process. Once the image has been reset, the logical partition can be deactivated from the **Deactivate** task in the HMC. This frees up all the partition's resources, such as memory, CPs, and channels.

### HCD definition changes

After deactivation is complete, make changes via 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 may generate errors if they have been included in the candidate lists for the logical partition that is changed to reserved status.

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 9-1 on page 371.

> **Note:** First remove all the assigned CHPIDs for this logical partition. Failure to do this before attempting to change the logical partition name to an asterisk (*) results in HCD generating errors.

2. Select the **Change logical partition** option and proceed to the Update CHPID Access and Candidate Lists panel, shown in Figure 9-3 on page 373. Change all the CHPID Access and Candidate Lists to `No`. This removes all channels from the logical partition.
3. After this is completed, proceed to renaming the partition. When renaming is completed, note that the reserved partition is now at the end of the partition list and has an asterisk (*) in the name field. You are now ready to activate the new configuration.

## Dynamic activation of configuration

For dynamic activation of the production IODF, perform the following steps:

1. Use option **1**, **Activate new hardware and software configuration**, as shown in Figure 9-9 on page 376. When a new configuration that has a reserved logical partition (un-named) is activated, you must add the force option. If the force option is not added, the activation fails with an IOS500I message as shown in Figure 9-19.

```
 ----- Activate or Process Configuration Data -------  ____________________

------------------------------ Message List ------------------------------
   Save  Query  Help
 --------------------------------------------------------------------------
                                                                 Row 1 of 8
 Command ===> ___________________________________________ Scroll ===> PAGE

 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   CBDA878I Following partitions are to be deleted from processor
 #              SCZP201: 2.A26
 _ I   CBDA126I ACTIVATE IODF=41 command was accepted.
 ***************************** Bottom of data ******************************
```

*Figure 9-19 HCD - Activate new IODF remove logical partition, message (bad case)*

2. Set the **Allow hardware deletes** option to `Yes` (Figure 9-20 on page 385).
3. Check all messages in the result panel (Figure 9-21 on page 385), and verify that the dynamic activate completed successfully. The activate action performed by HCD can also be accomplished by issuing the z/OS **`activate iodf=xx,force=device`** command.

```
------------- Activate New Hardware and Software Configuration -------------


 Specify or revise the values for IODF activation.

 Currently active IODF . : SYS6.IODF4F
    Processor ID . . . . : SCZP201
    Configuration ID . . : TEST2097 Sysplex systems
    EDT ID . . . . . . . : 01

 IODF to be activated  . : SYS6.IODF41
    Processor ID . . . . . SCZP201   +
    Configuration ID . . . TEST2097  +     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)  . . . . . . . . . . . . . . . . . No   (Yes or No)
 Write IOCDS  . . . . . . . . . . . . . . . . . . . . No   (Yes or No)
 Switch IOCDS for next POR  . . . . . . . . . . . . . No   (Yes or No)
```

*Figure 9-20 Activate New Hardware and Software Configuration*

```
 -----s Activate or Process Configuration Data ----- ____________________

------------------------------ Message List -------------------------------
   Save  Query  Help
 --------------------------------------------------------------------------
                                                                 Row 1 of 5
 Command ===> ___________________________________________ Scroll ===> PAGE

 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   CBDA878I Following partitions are to be deleted from processor
 #              SCZP201: 2.A26
 _ I   CBDA126I ACTIVATE IODF=41,FORCE=DEVICE command was accepted.
 ***************************** Bottom of data ******************************
```

*Figure 9-21 HCD - Activate new IODF remove logical partition, message*

## Removing resources from the activation profiles

When the new configuration has been activated and the logical partition removed, you can remove the resources defined to the logical partition from the Activation Profile on the HMC. The important resource is storage; you may want to add this to another partition.

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.

## 9.4 Rename 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:

- Deactivate and un-name a named logical partition, making it reserved.
- Name, assign resources, and activate 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 "Un-name a reserved logical partition" on page 383, and how to name a reserved logical partition in "Name a reserved logical partition" on page 371. 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 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 System z10 EC where the logical partition is being renamed, or via the HCD panels.

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 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, FCV, OSD, OSE, OSN, OSC, 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 z/Linux systems.

6. You can now build a new production IODF for dynamic activation. The Dynamic Activate can be done once again via the z/OS **`activate`** command, or via the HCD panels.

   After the activate has completed successfully, you should write a new IOCDS to the SE. The current IOCDS in the Activation Profile for the System z10 EC 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.

# 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 390. Note that some of the documents referenced here may be available in softcopy only.

- *IBM System z10 Enterprise Class Technical Introduction,* SG24-7515
- *IBM System z10 Enterprise Class Technical Guide,* SG24-7516
- *IBM System z Connectivity Handbook*, SG24-5444
- *Getting Started with InfiniBand on System z10 and System z9,* SG24-7539
- *Server Time Protocol Planning Guide*, SG24-7280
- *Server Time Protocol Implementation Guide*, SG24-7281

## Other publications

These publications are also relevant as further information sources:

- *Hardware Management Console Operations Guide Version 2.10.0,* SC28-6867
- *Support Element Operations Guide V2.10.0,* SC28-6868
- *Hardware Configuration Definition User's Guide*, SC33-7988
- *IOCP User's Guide,* SB10-7037
- *Stand-Alone Input/Output Configuration Program User's Guide,* SB10-7152
- *Planning for Fiber Optic Links,* GA23-0367
- *CHPID Mapping Tool User's Guide,* GC28-6825
- *Common Information Model (CIM) Management Interfaces,* SB10-7154
- *IBM System z10 Enterprise Class Installation Manual,* GC28-6865
- *IBM System z10 Enterprise Class Installation Manual for Physical Planning,* GC28-6864
- *IBM System z10 Enterprise Class Processor Resource/Systems Manager Planning Guide,* SB10-7153
- *IBM System z10 Enterprise Class System Overview,* SA22-1084
- *IBM System z10 Enterprise Class Capacity on Demand User's Guide,* SC28-6871
- *IBM System z Functional Matrix,* ZSW0-1335
- *z/Architecture Principles of Operation,* SA22-7832
- *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


# Online resources

These Web sites are also relevant as further information sources:

- IBM Resource Link:

  http://www.ibm.com/servers/resourcelink/
- Server Time protocol Web page:

  http://www-03.ibm.com/servers/eserver/zseries/pso/stp.html

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# Glossary

**American National Standards Institute (ANSI)**. An organization consisting of producers, consumers, and general interest groups that establishes the procedures by which accredited organizations create and maintain voluntary industry standards in the United States.

**ANSI.** See *American National Standards Institute*.

**APAR.** See *authorized program analysis report*.

**Attached Server (AS).** From the perspective of a server, a server to which one or more STP paths have been established as specified by the Establish Path Procedure.

**authorized program analysis report (APAR).** A report of a problem caused by a suspected defect in a current, unaltered release of a program.

**basic mode.** A S/390 central processing mode that does not use logical partitioning. Contrast with logically partitioned (LPAR) mode. Basic mode is not available on System z9, z990, or z890 servers.

**Branch History Table (BHT).**

**Branch Target Buffer (BTB).**

**bus.** (1) A facility for transferring data between several devices located between two end points, only one device being able to transmit at a given moment. (2) A network configuration in which nodes are interconnected through a bidirectional transmission medium. (3) One or more conductors used for transmitting signals or power.

**CBP.** Integrated cluster bus coupling facility peer link.

**CCC.** Channel control check.

**CDC.** Channel data check.

**central processor complex**. A physical collection of hardware that consists of main storage, one or more central processors, timers, and channels.

**central processor.** A processor that contains the sequencing and processing facilities for instruction execution, interruption action, timing functions, initial program loading, and other machine-related functions.

**CFCC.** Coupling Facility Control Code.

**channel control check.** A category of I/O errors affecting channel controls and sensed by the channel to which a device is attached. See also *channel data check*.

**channel data check.** A category of I/O errors indicating a machine error in transferring data to or from storage and sensed by the channel to which a device is attached. See also *channel control check*.

**channel Licensed Internal Code.** That part of the channel subsystem Licensed Internal Code used to start, maintain, and end all operations on the I/O interface. See also *IOP Licensed Internal Code*.

**channel path (CHP)**. A single interface between a central processor and one or more control units along which signals and data can be sent to perform I/O requests.

**channel path configuration**. In an ESCON or FICON environment, the connection between a channel and a control unit or between a channel, an ESCON Director, and one or more control units. See also *point-to-point channel path configuration* and *switched point-to-point channel path configuration*.

**channel path identifier (CHPID).** In a Channel Subsystem, a value assigned to each installed channel path of the system that uniquely identifies that path to the system.

**Channel Subsystem (CSS).** Relieves the processor of direct I/O communication tasks, and performs path management functions. Uses a collection of subchannels to direct a channel to control the flow of information between I/O devices and main storage.

**channel.** (1) A processor system element that controls one channel path, whose mode of operation depends on the type of hardware to which it is attached. In a Channel Subsystem, each channel controls an I/O interface between the channel control element and the logically attached control units. (2) In the ESA/390 and z/Architecture, the part of a Channel Subsystem that manages a single I/O interface between a Channel Subsystem and a set of controllers (control units).

**channel-attached.** (1) Pertaining to attachment of devices directly by data channels (I/O channels) to a computer. (2) Pertaining to devices attached to a controlling unit by cables rather than by telecommunication lines.

**channel-to-channel adapter (CTCA)**. An input/output device that is used by a program in one system to communicate with a program in another system.

**check stop.** The state that occurs when an error makes it impossible or undesirable to continue the operation in progress.

**CHPID.** Channel path identifier.

**CMAS.** CICS® SM address space.

**CMOS.** Complementary metal-oxide semiconductor.

**CMT.** CHPID Mapping Tool.

**CNC.** Mnemonic for an ESCON channel used to communicate to an ESCON-capable device.

**Communication Error.** A communication error has been recognized for the attached server indicating that the attached server has not communicated with this server for a period greater than the freewheel period.

**concurrent maintenance.** Hardware maintenance actions performed by a service representative while normal operations continue without interruption. See also *nondisruptive installation* and *nondisruptive removal*.

**Configuration Error.** A configuration error has been recognized for the attached server indicating the attached server has provided a mismatched CTN ID on one of the paths to the attached server.

**control unit.** A hardware unit that controls the reading, writing, or displaying of data at one or more input/output units.

**Coordinated Server Time (CST).** The time maintained at each Stratum 1 server in a CTN; it is the reference time for the CTN. CST may be provided to a server via the Hardware Management Console or by a Sysplex Timer.

**Coordinated Timing Network (CTN).** A collection of servers, each of which exchanges STP timekeeping messages with attached servers so that all servers in the CTN may synchronize to Coordinated Server Time (CST). The servers that make up a CTN are all configured with a common identifier, referred to as a CTN ID.

**Coordinated Timing Network ID.** Specifies the ID for the Coordinated Timing Network (CTN) that the server is participating in. The form is STP ID-ETR ID.

- If the server is not a member of any timing network, there will be no values in the fields.
- If it is participating in an ETR network, you will see '*-xx*', where xx is a value from 0-31.
- If it is participating in a Mixed CTN, you will see '*cccccccc - xx*', where ccccccc is 1-8 characters and xx is a value from 0-31. The valid characters for the STP ID are A-Z, a-z, 0-9, '-', and '_'.

Changes made to the Coordinated Timing Network ID are applied to the entire timing network. If a valid STP ID exists, changing the ID results in all CPCs in the STP timing network becoming members of a different CTN. If the ETR ID is specified when in an STP network, the STP-only network will transition back to a Mixed network.

**coupler.** In an ESCON environment, link hardware used to join optical fiber connectors of the same type. Contrast with *adapter*.

**coupling facility control code.** The Licensed Internal Code (LIC) that runs in a coupling facility logical partition to provide shared storage management functions for a Sysplex.

**coupling facility.** A special logical partition that provides high-speed caching, list processing, and locking functions in a Sysplex.

**CP.** Central Processor.

**CPC.** Central Processor Complex

**CPU Timer.** The CPU timer provides a means for measuring elapsed CPU time and for causing an interruption when a specified amount of time has elapsed. In a configuration with more than one CPU, each CPU has a separate CPU timer.

**CPU.** Central Processing Unit.

**CST.** Coordinated Server Time

**CTC.** (1) Channel-to-channel. (2) Mnemonic for an ESCON channel attached to another ESCON channel.

**CTCA.** see *channel-to-channel adapter*.

**CU.** Control unit.

**CUA®.** Control unit address.

**CUADD**. Control unit logical address.

**CULA.** Control unit logical address.

**Current Time Server**. Specifies if the Preferred Time Server or Backup Time Server is the Current Time Server. The Current Time Server identifies where the time reference is currently coming from. The Current Time Server cannot be the Backup Time Server unless there is a Preferred/Backup (dual) or Preferred/Backup/Arbiter (triad) configuration.

**CVC.** Mnemonic for an ESCON channel attached to an IBM 9034 convertor. The 9034 converts from ESCON CVC signals to parallel channel interface (OEMI) communication operating in block multiplex mode (Bus and Tag). Contrast with *CBY*.

**data sharing.** The ability of concurrent subsystems (such as DB2® or IMS™ DB) or application programs to directly access and change the same data while maintaining data integrity.

**default.** Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

**device number.** (1) In the ESA/390 architecture and the z/Architecture, a four-hexidecimal-character identifier, for example 19A0, that you associate with a device to facilitate communication between the program and the host operator. (2) The device number that you associate with a subchannel that uniquely identifies an I/O device.

**device.** A mechanical, electrical, or electronic contrivance with a specific purpose.

**direct access storage device (DASD).** A mass storage medium on which a computer stores data.

**Dispersion.** A value that contains the CST dispersion reported by the attached server. The value represents the dispersion of the TOD clock at the attached server relative to the Preferred Time Server in the synchronization path selected by the attached server.

**dual**. A term sometimes used to describe a Preferred/Backup server configuration.

**Dual-Inn Memory Module (DIMM).** A series of random access memory integrated circuits.

**duplex.** Pertaining to communication in which data or control information can be sent and received at the same time. Contrast with *half duplex.*

**dynamic connection.** In an ESCON Director, a connection between two ports, established or removed by the ESCD and that, when active, appears as one continuous link. The duration of the connection depends on the protocol defined for the frames transmitted through the ports and on the state of the ports. Contrast with *dedicated connection.*

**dynamic I/O Reconfiguration**. A S/390 function that allows I/O configuration changes to be made non-disruptively to the current operating I/O configuration.

**EAF.** See ETR Attachment Facility

**ECC.** error checking and correction.

**EEPROM.** electrically erasable programmable read only memory.

**EIA.** Electronics Industries Association. One EIA unit is 1.75 inches or 44.45 mm.

**EMIF.** See *ESCON Multiple Image Facility.*

**Enterprise System Connection (ESCON).** (1) An ESA/390 computer peripheral interface. The I/O interface uses ESA/390 logical protocols over a serial interface that configures attached units to a communication fabric. (2) A set of IBM products and services that provide a dynamically connected environment within an enterprise.

**Enterprise Systems Architecture/390 (ESA/390).** An IBM architecture for mainframe computers and peripherals. Processors that follow this architecture include the S/390 Server family of processors.

**environmental error record editing and printing program (EREP)**. The program that makes the data contained in the system recorder file available for further analysis.

**EPO.** Emergency power off.

**ESA/390.** See *Enterprise Systems Architecture/390.*

**ESCD.** Enterprise Systems Connection (ESCON) Director.

**ESCM.** Enterprise Systems Connection Manager.

**ESCON channel.** A channel having an Enterprise Systems Connection channel-to-control-unit I/O interface that uses optical cables as a transmission medium. May operate in CBY, CNC, CTC, or CVC mode. Contrast with *parallel channel.*

**ESCON Director.** An I/O interface switch that provides the interconnection capability of multiple ESCON interfaces (or FICON FCV (9032-5) in a distributed-star topology.

**ESCON Multiple Image Facility (MIF).** A function that allows logical partitions to share an ESCON channel path (and other channel types) by providing each logical partition with its own channel-subsystem image.

**ESCON.** See *Enterprise System Connection.*

**ETR Attachment Facility (EAF).** A feature on a server where a Sysplex Timer is attached. For example, FC6155, FC6150, or FC6152 are EAF feature codes. Sometimes these features or facilities are standard with no feature code and sometimes they must be specifically ordered, depending on the server and the specific configuration.

**ETR ID**. Identifies the Sysplex Timer that sends ETR signals.

**ETR Network ID**. Identifies the network ID of the Sysplex Timer that the ETR Attachment Facility ports are connected to.

**ETR port number**. Identifies the port number of the Sysplex Timer output port which is sends ETR signals.

**ETR Timing Mode.** When the configuration is in ETR-timing mode, the TOD clock has been initialized to the ETR and is being stepped by stepping signals from ETR. To be in ETR-timing mode, the configuration must be part of an ETR network.

**ETR.** External time reference.

**FC-AL**. Fibre Channel Arbitrated Loop.

**FCS.** See *Fibre Channel standard.*

**FCTC.** FICON Channel-to-Channel

**fiber optic cable.** See *optical cable.*

**fiber optics.** The branch of optical technology concerned with the transmission of radiant power through fibers made of transparent materials, such as glass, fused silica, and plastic.
Note**:** Telecommunication applications of fiber optics use optical fibers. Either a single discrete fiber or a non-spatially aligned fiber bundle can be used for each information channel. Such fibers are often called optical fibers to differentiate them from fibers used in non-communication applications.

**fiber.** See *optical fiber*.

**Fibre Channel standard.** An ANSI standard for a computer peripheral interface. The I/O interface defines a protocol for communication over a serial interface that configures attached units to a communication fabric. The protocol has four layers. The lower of the four layers defines the physical media and interface, the upper of the four layers defines one or more logical protocols (for example, FCP for SCSI command protocols and FC-SB-2 for FICON for ESA/390). Refer to ANSI X3.230.1999x.

**FICON channel.** A channel having a Fibre Channel channel-to-control-unit I/O interface that uses optical cables as a transmission medium. The FICON channel may operate in (1) FC mode (FICON native mode - FC-SB-2/3), (2) FCV mode (FICON conversion mode to a IBM 9032-5), or (3) FCP mode (FICON channel operating in “open mode”, which is FC-FCP).

**FICON.** (1) An ESA/390 and z/Architecture computer peripheral interface. The I/O interface uses ESA/390 and z/Architecture logical protocols over a FICON serial interface that configures attached units to a FICON communication fabric. (2) An FC4 adopted standard that defines an effective mechanism for the export of the SBCON command protocol via Fibre Channels.

**field replaceable unit (FRU)**. An assembly that is replaced in its entirety when any one of its required components fails.

**Freewheel Mode.** A secondary server enters freewheel mode when the attached server it has selected as its clock source stops providing timekeeping data. The server remains in freewheel mode until the server selects another attached server as its clock source or the server enters the no-usable-clock-source state. A server that is in freewheel mode is said to be “freewheeling”.

**FRU.** Field-replaceable unit.

**Gb.** Gigabit.

**GB.** Gigabyte.

**GbE**. Gigabit Ethernet.

**gigabit (Gb)**. A unit of measure for storage size. One gigabit equals one billion bits.

**Gigabit (Gb)**. Usually used to refer to a data rate, the number of gigabits being transferred in one second.

**Gigabit Ethernet.** An OSA channel (type OSD)

**gigabyte (GB).** (1) A unit of measure for storage size. One gigabyte equals 1,073,741,824 bytes. (2) Loosely, one billion bytes.

**half duplex.** In data communication, pertaining to transmission in only one direction at a time. Contrast with *duplex.*

**hard disk drive.** (1) A storage media within a storage server used to maintain information that the storage server requires. (2) A mass storage medium for computers that is typically available as a fixed disk or a removable cartridge.

**Hardware Management Console.** A console used to monitor and control the Central Processing Complex.

**hardware system area (HSA).** A logical area of central storage, not addressable by application programs, used to store Licensed Internal Code and control information.

**HCD.** hardware configuration definition.

**HDD.** See *hard disk drive.*

**head and disk assembly.** The portion of an HDD associated with the medium and the read/write head.

**HMCA.** Hardware Management Console Application.

**Host Channel Adapter (HCA).** Provides connection between the book and an I/O cage (HCA2-C), as well as between the book and an external coupling link (HCA2-O).

**I/O configuration.** The collection of channel paths, control units, and I/O devices that attaches to the processor. This may also include channel switches (for example, an ESCON Director).

**I/O.** See *input/output*.

**IC.** Internal Coupling link

**ICB.** Integrated Cluster Bus link

**ICF.** Internal coupling facility

**ICMF.** Integrated Coupling Migration Facility.

**ICP.** Internal coupling facility peer channel.

**ID.** See *identifier.*

**Identifier.** A unique name or address that identifies things such as programs, devices, or systems.

**IFA.** Integrated Facility for Applications.

**IFCC.** interface control check.

**IFL.** Integrated Facility for Linux

**IML.** Initial machine load. A procedure that prepares a device for use

**InfiniBand** An industry-standard specification that defines an input/output architecture used to interconnect servers, communications infrastructure equipment, storage and embedded systems

**initial machine load (IML)**. A procedure that prepares a device for use.

**initial program load (IPL).** (1) The initialization procedure that causes an operating system to commence operation. (2) The process by which a configuration image is loaded into storage at the beginning of a work day or after a system malfunction. (3) The process of loading system programs and preparing a system to run jobs.

**initial program load (IPL).** (1) The initialization procedure that causes an operating system to commence operation. (2) The process by which a configuration image is loaded into storage at the beginning of a work day or after a system malfunction. (3) The process of loading system programs and preparing a system to run jobs.

**input/output (I/O).** (1) Pertaining to a device whose parts can perform an input process and an output process at the same time. (2) Pertaining to a functional unit or channel involved in an input process, output process, or both, concurrently or not, and to the data involved in such a process. (3) Pertaining to input, output, or both.

**input/output configuration data set (IOCDS).** The data set in the processor (in the support element) that contains an I/O configuration definition built by the input/output configuration program (IOCP).

**input/output configuration program (IOCP).** A program that defines the channels, I/O devices, paths to the I/O devices, and the addresses of the I/O devices to a system. The output is written to an IOCDS.

**Integrated Facility for Applications (IFA)**. A general purpose assist processor for running specific types of applications. See *Application Assist Processor* (AAP).

**interface.** (1) A shared boundary between two functional units, defined by functional characteristics, signal characteristics, or other characteristics as appropriate. The concept includes the specification of the connection of two devices having different functions. (2) Hardware, software, or both, that links systems, programs, or devices.

**IOCDS.** See *Input/Output configuration data set.*

**IOCP.** See *Input/Output configuration control program.*

**IODF.** The data set that contains the S/390 I/O configuration definition file produced during the defining of the S/390 I/O configuration by HCD. Used as a source for IPL, IOCP, and Dynamic I/O Reconfiguration.

**IPL.** See *initial program load.*

**IRD.** Intelligent Resource Director.

**ISC-3**. Inter System Channel-3

**ITR.** Internal throughput rate

**ITRR.** Internal thoughput rate ratio

**jumper cable.** In an ESCON and FICON environment, an optical cable having two conductors that provides physical attachment between a channel and a distribution panel or an ESCON Director port or a control unit/devices, or between an ESCON Director port and a distribution panel or a control unit/device, or between a control unit/device and a distribution panel. Contrast with *trunk cable.*

**LAN.** See *local area network*.

**laser**. A device that produces optical radiation using a population inversion to provide *light amplification by stimulated emission of radiation* and (generally) an optical resonant cavity to provide positive feedback. Laser radiation can be highly coherent temporally, or spatially, or both.

**LC connector.** An optical fibre cable duplex connector that terminates both jumper cable fibres into one housing and provides physical keying for attachment to an LC duplex receptacle. For technical details, see the NCITS - American National Standard for Information Technology - Fibre Channel Standards document FC-PI.

**LCU.** See *Logical Control Unit.*

**LED.** Light-emitting diode.

**LIC**. see *Licensed Internal Code*.

**LIC-CC.** Licensed Internal Code Configuration Control

**Licensed Internal Code (LIC).** Software provided for use on specific IBM machines and licensed to customers under the terms of IBM Customer Agreement. Microcode can be Licensed Internal Code and licensed as such.

**light-emitting diode (LED).** A semiconductor chip that gives off visible or infrared light when activated. Contrast *Laser*.

**link address.** On an ESCON or a FICON interface, the portion of a source or destination address in a frame that ESCON or FICON uses to route a frame through an ESCON or FICON director. ESCON and FICON associates the link address with a specific switch port that is on the ESCON or FICON director. **Note:** For ESCON, there is a one-byte link address. For FICON, there can be a one-byte or two-byte link address specified. One-byte link address for a FICON non-cascade topology and two-byte link address supports a FICON cascade switch topology. See also *port address.*

**local area network (LAN).** A computer network located in a user's premises within a limited geographic area.

**Local Timing Mode**. When the configuration is in local timing mode, the TOD clock has been initialized to a local time and is being stepped at the rate of the local hardware oscillator. The configuration is not part of a synchronized timing network.

**logical control unit (LCU)**. A separately addressable control unit function within a physical control unit. Usually a physical control unit that supports several LCUs. For ESCON, the maximum number of LCUs that can be in a control unit (and addressed from the same ESCON fiber link) is 16; they are addressed from x'0' to x'F'.

**logical partition.** A set of functions that create a programming environment that is defined by the ESA/390 and z/Architecture. A logical partition is conceptually similar to a virtual machine environment, except that LPAR is a function of the processor and does not depend on an operating system to create the virtual machine environment.

**logical processor.** In LPAR mode, a central processor in a logical partition.

**logically partitioned (LPAR) mode**. A central processor mode, available on the Configuration frame when using the PR/SM facility, that allows an operator to allocate processor hardware resources among logical partitions. Contrast with *basic mode.*

**machine check.** An error condition that is caused by an equipment malfunction.

**maintenance change level (MCL)**. A change to correct a single licensed internal code design defect. Higher quality than a patch, and intended for broad distribution. Considered functionally equivalent to a software PTF.

**MAS.** CICS managed application system

**MAU.** multistation access unit.

**Mb.** Megabit

**MB.** Megabyte.

**MBA.** memory bus adapter.

**MCL.** see *maintenance change level*.

**MCM.** Multi-chip Module. Electronic package where multiple integrated circuits, semiconductor dies, or other modules are packaged in such a way as to facilitate their use as a single integrated circuit.

**MDA.** Motor Drive Assembly.

**megabit (Mb).** A unit of measure for storage size. One megabit equals 1,000,000 bits.

**megabyte (MB)**. (1) A unit of measure for storage size. One megabyte equals 1,048,576 bytes. (2) Loosely, one million bytes.

**Message Time Ordering (MTO).** The capability on a I/O data path to ensure that information about the path is not delivered to a system that represents an event in the future relative to the TOD clock at the receiving system.

**Message Time Ordering Facility (MTOF).** A server that has MTOF is capable of exploiting MTO.

**MIF.** *multiple image facility*

**Mixed CTN.** Timing network that contains a collection of servers, and has at least one STP-configured server stepping to timing signals provided by the Sysplex Timer. STP-configured servers in the Mixed CTN not stepping to the Sysplex Timer achieve synchronization by exchanging STP messages.

**MRU.** Modular Refrigeration Unit.

**MTRJ.** An optical fibre cable duplex connector that terminates both jumper cable fibres into one housing and provides physical keying for attachment to an MT-RJ duplex receptacle. For technical details, see the NCITS - American National Standard for Information Technology - Fibre Channel Standards document FC-PI.

**multi-mode optical fiber.** A graded-index or step-index optical fiber that allows more than one bound mode to propagate. Contrast with *single-mode optical fiber*.

**Multiple Image Facility (MIF).** In the ESA/390 architecture and z/Architecture, a function that allows logical partitions to share a channel path by providing each logical partition with its own set of subchannels for accessing a common device.

**National Committee for Information Technology Standards**. NCITS develops national standards and its technical experts participate on behalf of the United States in the international standards activities of ISO/IEC JTC 1, information technology.

**NCITS.** See *National Committee for Information Technology Standards.*

**Node Descriptor.** A node descriptor is an unique set of data describing the element such as a device, a Server or a coupling facility. It contains information such as: Type/Model, manufacturer, plant, and serial number that makes the element unique.

**OEMI.** See *original equipment manufacturers information.*

**open system.** A system whose characteristics comply with standards made available throughout the industry and that therefore can be connected to other systems complying with the same standards.

**optical cable assembly.** An optical cable that is connector-terminated. Generally, an optical cable that has been terminated by a manufacturer and is ready for installation. See also *jumper cable* and *optical cable*.

**optical cable.** A fiber, multiple fibers, or a fiber bundle in a structure built to meet optical, mechanical, and environmental specifications. See also *jumper cable*, *optical cable assembly*, and *trunk cable.*

**optical fiber connector.** A hardware component that transfers optical power between two optical fibers or bundles and is designed to be repeatedly connected and disconnected.

**optical fiber.** Any filament made of dialectic materials that guides light, regardless of its ability to send signals. See also *fiber optics* and *optical waveguide*.

**optical waveguide.** (1) A structure capable of guiding optical power. (2) In optical communications, generally a fiber designed to transmit optical signals. See *optical fiber.*

**original equipment manufacturers information (OEMI).** A reference to an IBM guideline for a computer peripheral interface. More specifically, refers to IBM S/360™ and S/370™ Channel to Control Unit Original Equipment Manufacture's Information. The interfaces use ESA/390 and z/Architecture logical protocols over an I/O interface that configures attached units in a multi-drop bus environment.

**OSA.** Open System Adapter

**parallel channel.** A channel having a System/360™ and System/370™ channel-to-control-unit I/O interface that uses bus and tag cables as a transmission medium. Contrast with *ESCON channel*.

**Parallel Sysplex InfiniBand (PSIFB) link**. Parallel Sysplex coupling links between servers and coupling facilities using InfiniBand technology

**path group**. The ESA/390 and z/Architecture term for a set of channel paths that are defined to a controller as being associated with a single S/390 image. The channel paths are in a group state and are online to the host.

**path.** In a channel or communication network, any route between any two nodes. For ESCON or FICON, this would be the route between the channel and the control unit/device, or sometimes from the operating system control block for the device and the device itself.

**path-group identifier**. The ESA/390 and z/Architecture term for the identifier that uniquely identifies a given logical partition. The path-group identifier is used in communication between the system image and a device. The identifier associates the path-group with one or more channel paths, thereby defining these paths to the control unit as being associated with the same system image.

**Pattern History Table (PHT).**

**PCHID.** Physical channel identifier.

**physical channel identifier (PCHID).** A value assigned to each physically installed and enabled channel in the CPC that uniquely identifies that channel to the system. For the System z9 109, the assigned PCHID values are between 000 and 6FF.

**Physical TOD Clock.** The physical-TOD clock is the hardware clock at a server that is stepped by a hardware oscillator or, when a Sysplex Timer port is enabled, that is stepped by synchronizabtion signals from the Sysplex Timer.

**POR.** Power-on reset.

**port**. (1) An access point for data entry or exit. (2) A receptacle on a device to which a cable for another device is attached. See also *duplex receptacle*.

**power-on reset state.** The condition after a machine power-on sequence and before an IPL of the control program.

**power-on reset.** A function that re-initializes all the hardware in the system and loads the internal code that enables the machine to load and run an operating system. This function is intended as a recovery function.

**PR/SM.** Processor Resource/Systems Manager.

**Preferred Time Server.** The server assigned as the most likely choice as the Current Time Server (active stratum-1).

**processor complex.** A system configuration that consists of all the machines required for operation, for example, a Processor Unit, a processor controller, a system display, a service support display, and a power and coolant distribution unit.

**program status word (PSW)**. An area in storage used to indicate the sequence in which instructions are executed, and to hold and indicate the status of the computer system.

**program temporary fix (PTF).** A temporary solution or bypass of a problem diagnosed by IBM in a current unaltered release of a program.

**protocol.** (1) A set of semantic and syntactic rules that determines the behavior of functional units in achieving communication. (2) In SNA, the meanings of and the sequencing rules for requests and responses used for managing the network, transferring data, and synchronizing the states of network components. (3) A specification for the format and relative timing of information exchanged between communicating parties.

**PSP.** preventive service planning.

**PTF.** See *program temporary fix*.

**RAS.** reliability, availability, serviceability.

**remote service facility (RSF)**. (1) A control program plus associated communication equipment that allows local personnel to connect to an IBM service center, and allows remote personnel to operate the remote system or send new internal code fixes to it, if properly authorized. (2) A system facility invoked by Licensed Internal Code that provides procedures for problem determination and error detection.

**RETAIN.** Remote Technical Assistance and Information Network.

**RMF™.** Resource Measurement Facility.

**SC Connector.** An optical fibre cable duplex connector that terminates both jumper cable fibres into one housing and provides physical keying for attachment to an LC duplex receptacle. For technical details, see the NCITS - American National Standard for Information Technology - Fibre Channel Standards document FC-PI.

**SCP.** System control program.

**SE**. see *Support Element.*

**SEC**. System Engineering Change.

**Self-Timed Interconnect (STI).** An interconnect path cable that has one or more conductors that transit information serially between two interconnected units without requiring any clock signals to recover that data. The interface performs clock recovery independently on each serial data stream and uses information in the data stream to determine character boundaries and inter-conductor synchronization.

**Serial Electrically Erasable Programable Read Only Memory (SEEPROM).** A chip that uses a serial interface to the circuit board

**Server Timing Mode.** The timing mode specifies the method by which the TOD clock is maintained for purposes of synchronization within a timing network. A TOD clock operates in one of the following timing modes: Local Timing Mode, ETR Timing Mode or STP timing Mode. To be in STP timing mode, the server must be part of an STP network.

**Skew Rate:** The maximum oscillator skew rate difference is equal to the maximum possible difference in oscillator skew rates between any two servers in the CTN according the skew rate tolerances specified for the oscillators. For example, if all oscillators in the CTN are operating with a skew rate tolerance of +/- 2 ppm, the maximum oscillator skew rate difference is equal to 4 ppm representing the worst case oscillator skew rate difference between any two oscillators in the CTN.

**spanning channels.** MIF spanning channels have the ability to be configured to multiple Channel SubSystems, and be transparently shared by any or all of the configured logical partitions without regard to the channel subsystem to which the logical partition is configured.

**STI.** see *Self-Timed Interconnect.*

**Stopped State.** When a configuration is in the stopped state, the TOD clock is either in the stopped state or TOD-clock recovery is in progress. After TOD-clock recovery completes, the TOD clock enters either the synchronized or unsynchronized state.

**STP Link.** A physical connection between two servers that is capable of supporting STP message transmission and reception. An STP link may include DWDMs and repeaters as part of the link.

**STP Path.** The combination of an STP link and STP facility resources required to perform STP message functions.

**STP timing mode.** When the server is in STP-timing mode, the TOD clock has been initialized to coordinated server time (CST) and is being stepped at the rate of the local hardware oscillator. In STP timing mode, the TOD clock is steered so as to maintain, or attain, synchronization with CST. To be in STP-timing mode, the server must be part of an STP network.

**STP.** Server Time Protocol. A time synchronization feature designed to enable multliple servers to maintain time synchronization with each other.

**Stratum Level.** In a timing network based on STP, Stratum is used as a mean to define the hierarchy of a server in the timing network. A stratum level of *n* is associated with each server and indicates the server is *n-1* hops away from the Current Time Server. A Stratum 1 server is the highest level in the hierarchy in the CTN. A stratum level of zero is used to indicate that the stratum level is undefined.

**Stratum-1 Configuration.** Is defined for STP-only CTNs and specifies the server that is to act as the active stratum-1 server. The configuration may also define an alternate and Arbiter server. All servers are identified by node descriptors.

**subchannel.** The facility that provides all of the information necessary to start, control, and complete an I/O operation. subchannel number. A system-unique 16-bit value used to address a subchannel.

**subsystem.** (1) A secondary or subordinate system, or programming support, usually capable of operating independently of or asynchronously with a controlling system.

**Superscalar processor.** A processor where multiple instructions can be executed at each cycle

**Support Element (SE).** (1) an internal control element of a server that assists in many of the server operational functions. (2) A hardware unit that provides communications, monitoring, and diagnostic functions to a central processor complex (CPC).

**switched point-to-point channel path configuration.** In an ESCON or FICON I/O interface, a configuration that consists of a link between a channel and an ESCON Director and one or more links from the ESCD, each of which attaches to a control unit. This configuration depends on the capabilities of the ESCD for establishing and removing connections between channels and control units. Contrast with point-to-point channel path configuration.

**switched point-to-point topology.** A network topology that uses switching facilities to provide multiple communication paths between channels and contro units. See also *multidrop topology.*

**Synchronization Threshold.** The amount of time that TOD clocks in a CTN are allowed to differ from CST and still be considered synchronized. The value is set so that it is less than one half of the best-case communication time between two servers over communication paths that do not support message-time ordering (MTO).

**Synchronized State.** When a server is in the synchronized timing state, the TOD clock is in synchronization with the timing-network reference time as defined below:

- If the configuration is in ETR-timing mode, the server is synchronized with the ETR.
- If the server is in STP timing mode, the server is synchronized with coordinated server time (CST).

A server that is in the local-timing or uninitialized-timing mode is never in the synchronized state.

**Synchronized.** A timing state that indicates that the TOD clock for a server is within the synchronization threshold value relative to CST.

**Sysplex Timer.** An IBM table-top unit that synchronizes the time-of-day (TOD) clocks in as many as 16 processors or processor sides.

**Sysplex.** A set of systems communicating and cooperating with each other through certain multisystem hardware components and software services to process customer workloads.

**system reset.** To reinitialize the execution of a program by repeating the load operation.

**System TOD Clock.** The system-TOD clock at a server is formed by adding the TOD-clock offset to the physical-TOD clock.

**Time server.** A computing system that has the STP facility installed and enabled.

**Time zone.** (1) Any of the 24 longitudinal divisions of Earth's surface in which a standard time is kept, the primary division being that bisected by the Greenwich meridian. Each zone is 15° of longitude in width, with local variations, and observes a clock time one hour earlier than the zone immediately to the east. (2) In some countries, standard time zones are not an integral number of hours different from UTC. STP supports time-zone offsets in integral number of minutes.

**time-of-day (TOD) clock.** A system hardware feature that is nominally incremented once every microsecond in bit position 51 and provides a consistent measure of elapsed time suitable for indicating date and time. The TOD clock runs regardless of whether the processor is in a running, wait, or stopped state.

**TOD clock state.** The following states are distinguished for the TOD clock: set, not set, stopped, error, and not operational.
The state determines the condition code set by execution of STORE CLOCK, STORE CLOCK EXTENDED, and STORE CLOCK FAST. The clock is incremented, and is said to be running, when it is in either the set state or the not-set state

**TOD Error State.** The clock enters the error state when a malfunction is detected that is likely to have affected the validity of the clock value. It depends on the model whether the clock can be placed in this state. A timing-facility-damage machine-check-interruption condition is generated on each CPU in the configuration whenever the clock enters the error state. When the TOD-clock-steering facility is installed, the TOD clock is never reported to be in the error state. Errors in the TOD clock cause a system check stop.

**TOD Not-Operational State**. The clock is in the not-operational state when its power is off or when it is disabled for maintenance. It depends on the model whether the clock can be placed in this state. Whenever the clock enters the not-operational state, a timing-facility-damage machine-check-interruption condition is generated on each CPU in the configuration. When the TOD-clock-steering facility is installed, the TOD clock is never reported to be in the not-operational state.

**TOD Not-Set State**. When the power for the clock is turned on, the clock is set to zero, and the clock enters the not-set state. The clock is incremented when in the not-set state. When the TOD-clock-steering facility is installed, the TOD clock is never reported to be in the not-set state, as the TOD clock is placed in the set state as part of the initialmachine-loading (IML) process.

**TOD Programmable Register**. Each CPU has a TOD programmable register. Bits 16-31 of the register contain the programmable field that is appended on the right to the TOD-clock value by STORE CLOCK EXTENDED. The register is loaded by SET CLOCK PROGRAMMABLE FIELD. The contents of the register are reset to a value of all zeros by initial CPU reset.

**TOD Set State.** The clock enters the set state only from the stopped state. The change of state is under control of the TOD-clock-sync-control bit, bit 34 of control register 0, of the CPU which most recently caused the clock to enter the stopped state. If the bit is zero, the clock enters the set state at the completion of execution of SET CLOCK. If the bit is one, the clock remains in the stopped state until the bit is set to zero on that CPU or until another CPU executes a SET CLOCK instruction affecting the clock. If an external time reference (ETR) is installed, a signal from the ETR may be used to set the set state from the stopped state. Incrementing of the clock begins with the first stepping pulse after the clock enters the set state.

**TOD Stopped State.** The clock enters the stopped state when SET CLOCK is executed and the execution results in the clock being set. This occurs when SET CLOCK is executed without encountering any exceptions and either any manual TOD-clock control in the configuration is set to the enable-set position or the TOD-clock-control-override control, bit 42 of control register 14, is one. The clock can be placed in the stopped state from the set, not-set, and error states. The clock is not incremented while in the stopped state.

**TOD Timing State.** The timing state indicates the synchronization state of the TOD clock with respect to the timing network reference time.

**TOD.** see *Time of day*.

**TOD-Clock Offset.** The TOD-clock offset is a value that when added to the physical-TOD clock produces the system-TOD clock. The TOD-clock-offset may be gradually steered or stepped to keep the system-TOD clock synchronized to CST.

**TOD-clock steering.** Provides a means to change the apparent stepping rate of the TOD clock without changing the physical hardware oscillator which steps the physical clock. This is accomplished by means of a TOD-offset register which is added to the physical clock to produce a logical-TOD-clock value.

**TPF.** see *Transaction processing facility*.

**Transaction Processing Facility.** Transaction Processing Facility is a specialized high availability operating system designed to provide quick response times to very high volumes of messages from large networks of terminals and workstations.

**triad**. A term sometimes used to describe a Preferred/Backup/Arbiter server configuration.

**trunk cable.** In an ESCON environment, a cable consisting of multiple fiber pairs that do not directly attach to an active device. This cable usually exists between distribution panels and can be located within, or external to, a building. Contrast with *jumper cable*.

**TSO.** Time sharing option.

**UCW**. unit control word.

**unit address.** The ESA/390 and z/Architecture term for the address associated with a device on a given controller. On ESCON or FICON interfaces, the unit address is the same as the device address. On OEMI interfaces, the unit address specifies a controller and device pair on the interface.

**Unsynchronized State.** When a server is in the unsynchronized timing state, the TOD clock is not in synchronization with the timing network reference time as defined below:

- If the server is in ETR-timing mode, the server has lost synchronization with the ETR.
- If the server is in STP timing mode, the server has lost or has not been able to attain synchronization with coordinated server time (CST). The server is out of synchronization with CST when the TOD clock differs from CST by an amount that exceeds a model dependent STP-sync-check-threshold value.

**UPS.** uninterruptible power supply.

**VLAN.** Virtual Local Area Network.

**z/Architecture.** An IBM architecture for mainframe computers and peripherals.

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SG24-7571-00 ISBN 0738485128