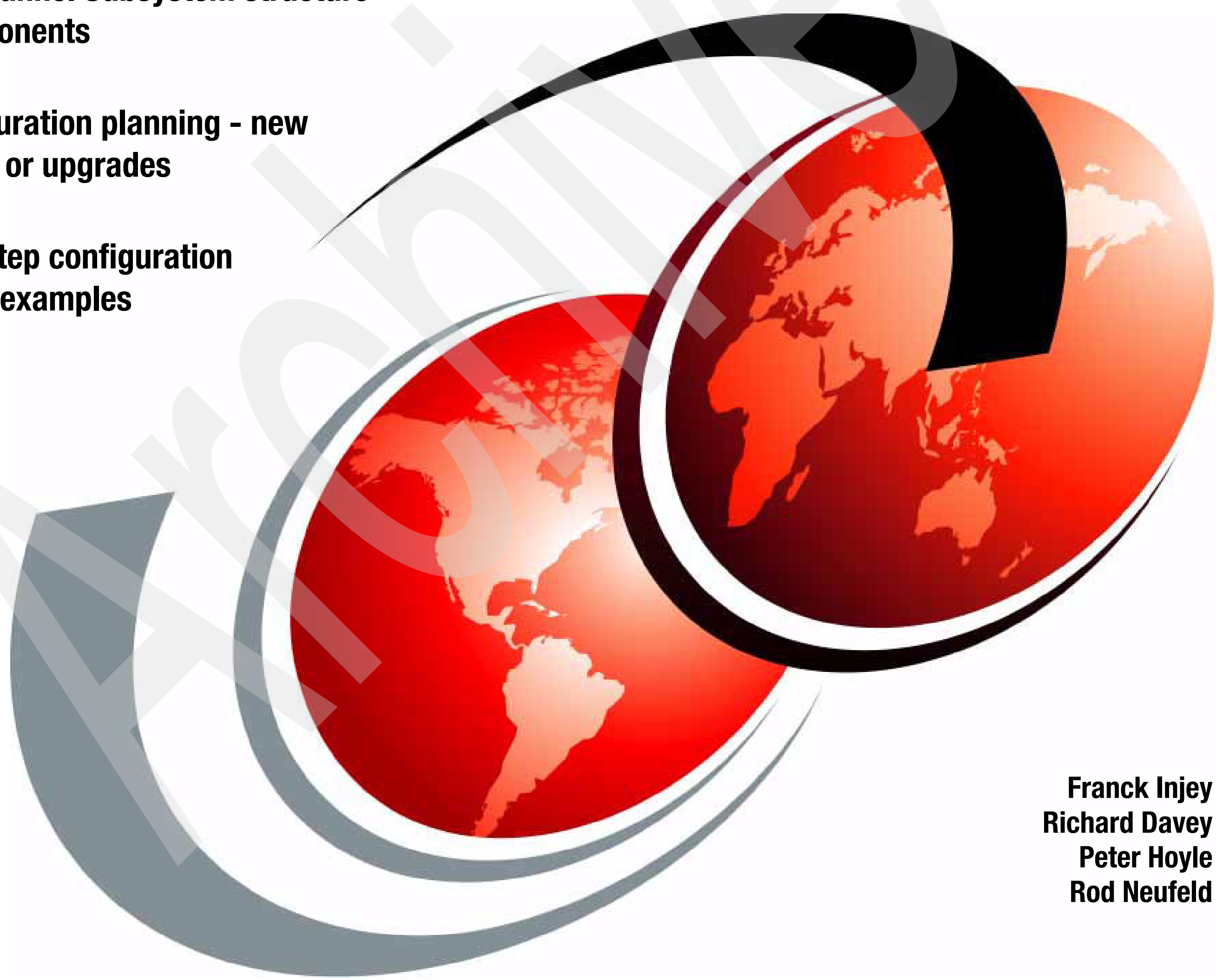
IBM System z9 109 Configuration Setup



z9-109 Channel Subsystem structure and components

I/O configuration planning - new processor or upgrades

Step-by-step configuration definition examples

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Peter Hoyle
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International Technical Support Organization

IBM System z9 109 Configuration Setup

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

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This edition applies to the IBM® System z9™ 109 server.

Contents

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Preface

The IBM® System z9™ 109 has many new features that require careful planning and a comprehensive understanding of all available configuration options and tools. This IBM Redbook will help you install, tailor, configure, and maintain this new server.

The book is presented in two parts. Part 1 assists you in planning and implementing a comprehensive configuration and implementation path for your IBM System z9 109 server. Part 2 presents configuration setup scenarios, and discusses each implementation example in detail.

The publication describes the tools and steps needed to configure the IBM System z9 109 server. It is intended for systems engineers, hardware planners, and anyone who needs to understand z9-109 system configuration and implementation. It is not intended as an introduction to mainframes, however; readers are expected to be generally familiar with current IBM System z9 technology and terminology.

This publication is part of a series. For a complete understanding of IBM System z9 109 capabilities, also refer to our companion Redbooks™, listed here:

- *IBM System z9 109 Technical Introduction,* SG24-6669
- *IBM System z9 and @server zSeries® Connectivity Handbook,* SG24-5444
- *IBM System z9 109 Technical Guide,* SG24-7124

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Part 1

Planning for the z9 109 configuration

1

Channel Subsystem overview

In this chapter we give an overview of the Channel Subsystem on z9-109 and discuss the following topics:

- The Channel Subsystem on z900 and z800
- z9-109 and multiple Logical Channel Subsystems

1.1 The Channel Subsystem on z900 and z800

The channels in the Channel Subsystem (CSS) permit the transfer of data between main storage and I/O devices or other servers under the controls 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. The Channel Subsystem on z900 and z800 can have up to 256 channel paths. A *channel path* is a single interface between a server and one or more control units. Commands and data are sent across a channel path to perform I/O requests.

A brief description of some entities that encompass the CSS follows.

Channel

A *channel* is 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 *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 the CSS. On z900 and z800, a CHPID number is assigned to every installed and active channel by the server, and it may be changed by an IBM service representative. On z9, z990, and z890, a CHPID number is assigned to a physical location by the user via HCD or IOCP.

Subchannel

A *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

A *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 may be housed separately, or it may 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 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 on page 5 depicts the relationship between the Channel Subsystem, the channels, the control units, and the I/O devices.

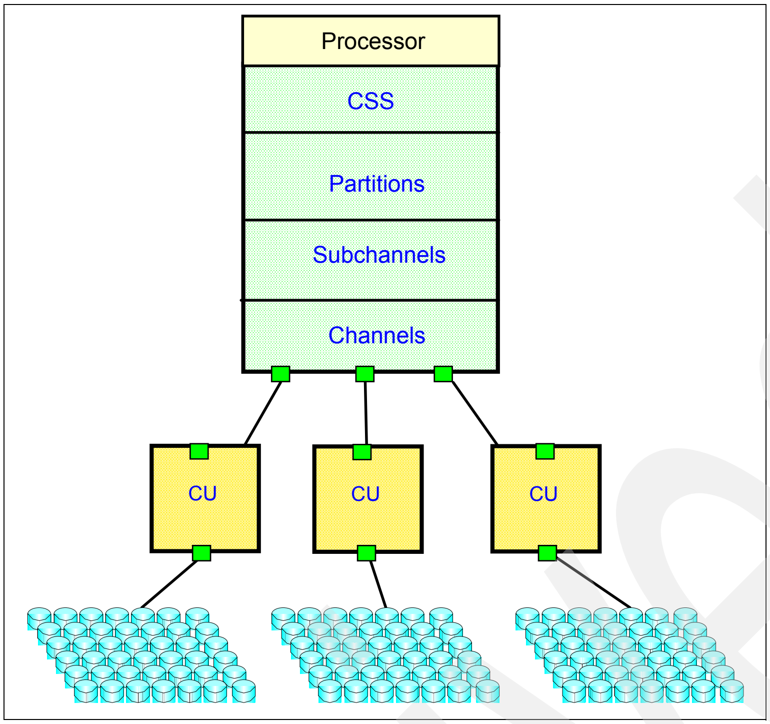


Figure 1-1 Channel Subsystem relationship to channels, control units, and I/O devices

Multiple Image Facility (MIF)

z800 and z900 servers can be configured in either BASIC mode or LPAR mode. When LPAR mode is selected, Processor Resource/Systems Manager™ (PR/SM™) allows the sharing of resources across logical partitions.

MIF enables channel sharing among PR/SM logical partitions running on System z™ servers. To establish resource sharing, each logical partition must have a number assigned. It is important to distinguish between the logical partition name, logical partition identifier, and logical partition number. The following definitions apply on z900 and z800:

Logical partition name

This name is defined through Hardware Configuration Definition (HCD) or an Input/Output Configuration Program (IOCP). It is the logical partition name in the RESOURCE statement in an IOCP. The name must be unique across the server.

Logical partition identifier

The logical partition identifier is used as the fourth hexadecimal digit of the operand stored by the Store CPU ID instruction. This value must be in the range x’0’ to x’F’.

The logical partition identifier must be unique for each active logical partition. The value is assigned on the General Page of the Image Profile for the logical partition in the Hardware Management Console (HMC).

The logical partition identifier does not have to be the same as the logical partition number. However, a reasonable choice would be to map the logical partition identifier to the logical partition number.

Logical partition number

The logical partition number is specified on the HCD partition list panel. This value must be in the range x’1’ to x’F’. This number is used within the IOCP for specific control unit requirements, for example the CTC control unit logical address of the remote CTC communicating system, when a shared channel path is used.

1.1.1 I/O sharing

I/O sharing was already possible in a pre-MIF ESCON® environment, where multiple systems could share control units, devices, and common links through ESCON Directors. Channel assignment, however, was more static. Channels could only be defined as reconfigurable, were dedicated to one logical partition at a particular time, and could not be shared by other logical partitions.

Multiple Image Facility (MIF) provides the same communication between logical partitions and I/O devices, but uses fewer physical channels and therefore, fewer ESCON Director ports and possible control unit link interfaces. Also, manual reassignment of channels between logical partitions to handle different workloads is no longer necessary, which improves reliability and availability.

With MIF, the server channel subsystem provides channel path sharing by extending the logical addressing capability of the ESCON architecture to host images (PR/SM logical partitions).

Each logical partition has its own view of a shared channel (logical channel path image) and each control unit connected to the shared channel (subsystem image). Nevertheless, it is still possible to define non-shared channels; see Figure 1-2.

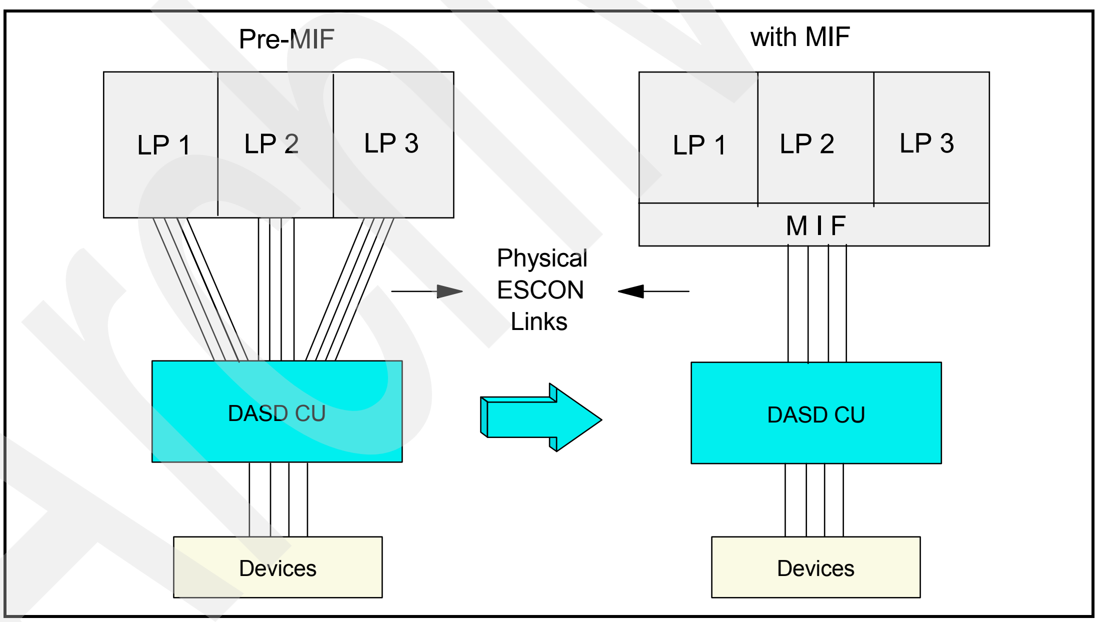


Figure 1-2 MIF channel consolidation example

This figure shows MIF support using ESCON channels; however, other channel types are supported with MIF, such as:

- FICON®
- OSA-2
- OSA-Express
- Coupling links

MIF allows sharing of ESCON-attached control units across the logical partitions within a CPC. This can reduce the number of channels, control unit channel adapters, and ESCD ports otherwise required to share control units across logical partitions.

Allocation of additional channels when adding new logical partitions or for availability reasons is no longer required, and elimination of underutilized channels is possible.

MIF eases system and configuration management tasks such as enabling disaster backup solutions, consolidating applications, and providing migration, test, and other special environments. Moreover, MIF improves system configuration flexibility, especially in handling greater numbers of logical partitions, through easier access to control units and reduced operational complexity.

1.1.2 CSS structure

The overall CSS structure for the z900 and z800 servers is illustrated in Figure 1-3. The logical partitions use MIF to share all CHPIDs. The CHPIDs map to physical channel ports on the server. The channel ports attach to director ports, then to control units that subsequently attach to the I/O devices.

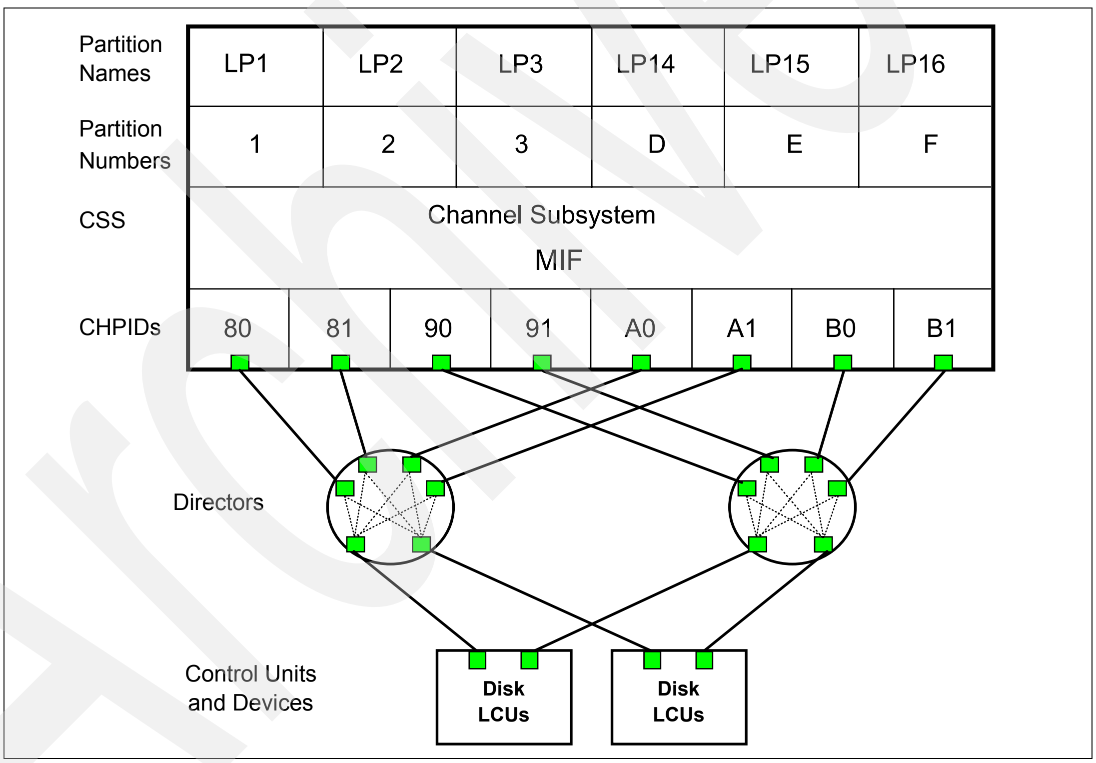


Figure 1-3 LCSS connectivity for z900 and z800 servers

Though not illustrated here, the CSS also provides communication between logical partitions within a physical server using internal channels.

1.2 z9-109 and multiple Logical Channel Subsystems

The multiple Logical Channel Subsystems (LCSS) concept was introduced with z990 and z890. It is also implemented in z9-109. The z9-109 server supports up to four Logical Channel Subsystems.

The design of z9-109 offers a considerable increase in processing power, memory sizes, and I/O connectivity. In support of the larger I/O capability, the Channel Subsystem has been scaled up correspondingly and the multiple LCSS concept is designed to do just that. New concepts are introduced to facilitate this architectural change and provide relief for the number of supported LPARs, channels, and devices available to the server.

Each Logical Channel Subsystem may have from 1 to 256 channels, and may in turn be configured with 1 to 15 logical partitions (LPARs), with a maximum of 60 logical partitions on a z9-109.

LCSSs are numbered from 0 to 3 and are sometimes referred to as the “CSS Image ID” (CSSID 0, 1, 2 or 3 for z9-109, and z990 and CSSID 0 and 1 for z890).

The multiple LCSSs concept is designed to scale up the I/O capacity of the servers. Multiple LCSSs remove limitations on the number of supported logical partitions and channel paths available to the server. Table 1-1 shows a summary for System z servers.

Table 1-1 LCSS comparison

	z9-109	**z990**	**z890**	**z800 and z900**
Number of LCSS	4 per server	4 per server	2 per server	1 per server
Devices in Subchannel set-0	63.75 K per LCSS 255 K per server	63 K per LCSS 252 K per server	63 K per LCSS 126 K per server	63 K per server
Devices in Subchannel set-1	64 K-1 per LCSS 256 K-4 per server	0	0	0
Partitions	15 per LCSS 60 per server	15 per LCSS 30 per server	15 per LCSS 30 per server	15 per server
CHPIDs	256 per LCSS 1024 per server	256 per LCSS 1024 per server	256 per LCSS 512 per server	256 per CSS 256 per server

1.2.1 Logical Channel Subsystem

Logical Channel Subsystem (LCSS) is a logical replication of CSS facilities: CHPIDS, control units, subchannels, and so on. This enables the definition of a balanced configuration for the processor and I/O capabilities. The LCSS for z9-109, z890, and z990 servers introduces significant changes to the I/O configuration.

It is strongly recommended that HCD be used to build and control z9-109 input/output configuration definitions. HCD provides the capability to make both dynamic hardware and software I/O configuration changes.

LPARs cannot be added until at least one LCSS has been defined. LPARs are defined to a LCSS, not to a server. An LPAR is associated with one LCSS only. CHPID numbers are unique within an LCSS; however, the same CHPID number can be reused within all LCSSs.

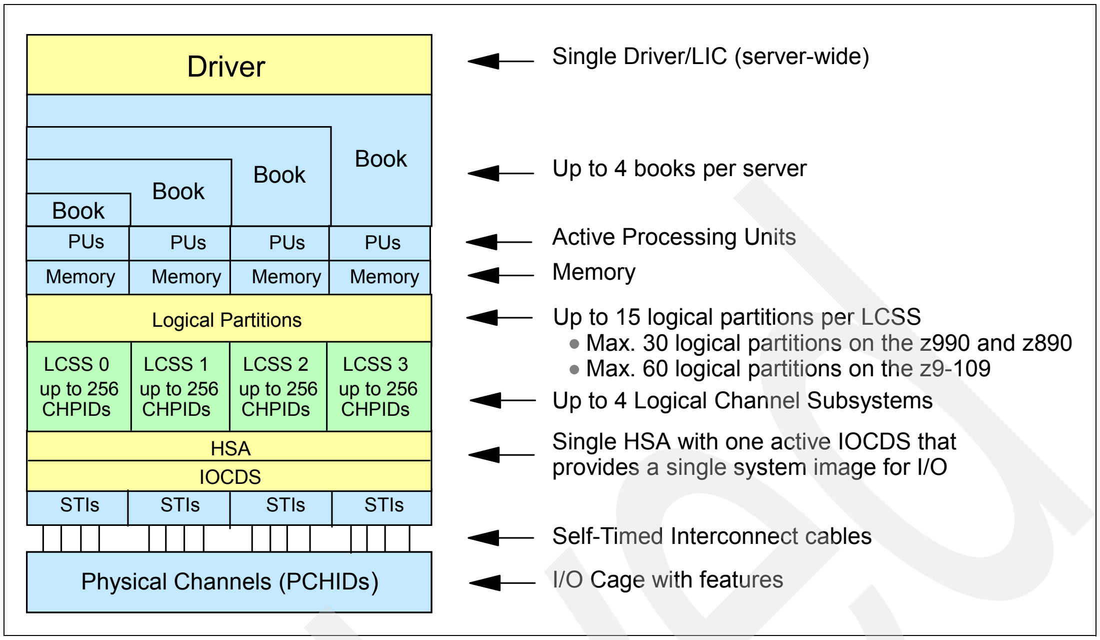


Figure 1-4 Logical view of multiple LCSSs in a multi-book server

The z9-109, z990, and z890 are still single servers. All Channel Subsystem Images (CSS Image or LCSS) 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 1-4 shows a logical view of these relationships. Note that each LCSS supports up to 15 logical partitions; a total of up to 60 logical partitions server-wide on z9-109.

MIF and multiple LCSSs

MIF enables resource sharing across LPARs within a single LCSS or across the LCSSs. When a channel is shared across LPARs in multiple LCSSs, it is known as “spanning”. See “Spanned channels” on page 16 for more information.

To support I/O resource sharing in a multiple LCSS, each logical partition must have a unique identification scheme. With the introduction of multiple LCSSs, the logical partition MIF Image ID is no longer unique within the z9-109, z990, and z890 servers. Therefore, the logical partition identifier value has been changed to provide a unique value for each logical partition within the same server, and is no longer specified by the user.

1.2.2 LCSSs resources

Logical partitions

A logical partition supports the running of an operating system, such as z/OS, and provides Central Processors (CPs), memory, subchannels and access to channels.

> **Note:** The z9-109 server does not support basic mode. Only LPAR mode can be defined.

It is important to distinguish between qualifiers that apply to a logical partition definition. Figure 1-6 on page 11 illustrates the terms used with System z servers.

The following definitions apply on z9-109, z990, and z890:

Logical partition name

The logical partition name is 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 LCSSs.

Logical partition number

The logical partition number cannot be specified by users; actually, it is not even visible to users. The concept of logical partition number used with z900, z800, and earlier servers has been replaced by MIF ID.

Logical partition identifier

The logical partition identifier is a number in the range of 00 to 3F, and it is assigned in the image profile through the Support Element (SE) or the Hardware Management Console (HMC). It is unique across the z9-109 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. In the examples shown in Part 2, "Configuration setup examples" on page 77, we use the LCSS number concatenated to the MIF Image ID, which means logical partition ID "3A" would be in LCSS "3" with MIFID "A". This fits within the allowed range of logical partition IDs and conveys useful information.

MIF ID

The MIF ID is defined via HCD or via IOCP. It is defined in the RESOURCE statement in the IOCP. It is in the range of x'1' to x'F' and is unique within a LCSS, but not unique across multiple LCSSs. Multiple LCSSs may specify the same MIF ID. The MIF ID is also known as "Image ID (IID)".

> **Important**: Some HCD and HCM panels may still refer users to the definition of a "logical partition number". For z9-109, z990, and z890, this is incorrect, and users should understand that the panel refers to the definition of a "MIF ID".

Putting together the new terminology and the concept of multiple LCSSs, we come up with a configuration as illustrated in Figure 1-5 on page 11. This configuration shows the relationship between LCSSs, logical partitions, and associated MIFIDs. LP1, LP2, and LP3 are defined to LCSS 0, and LP14, LP15, and LP16 are defined to LCSS 1.

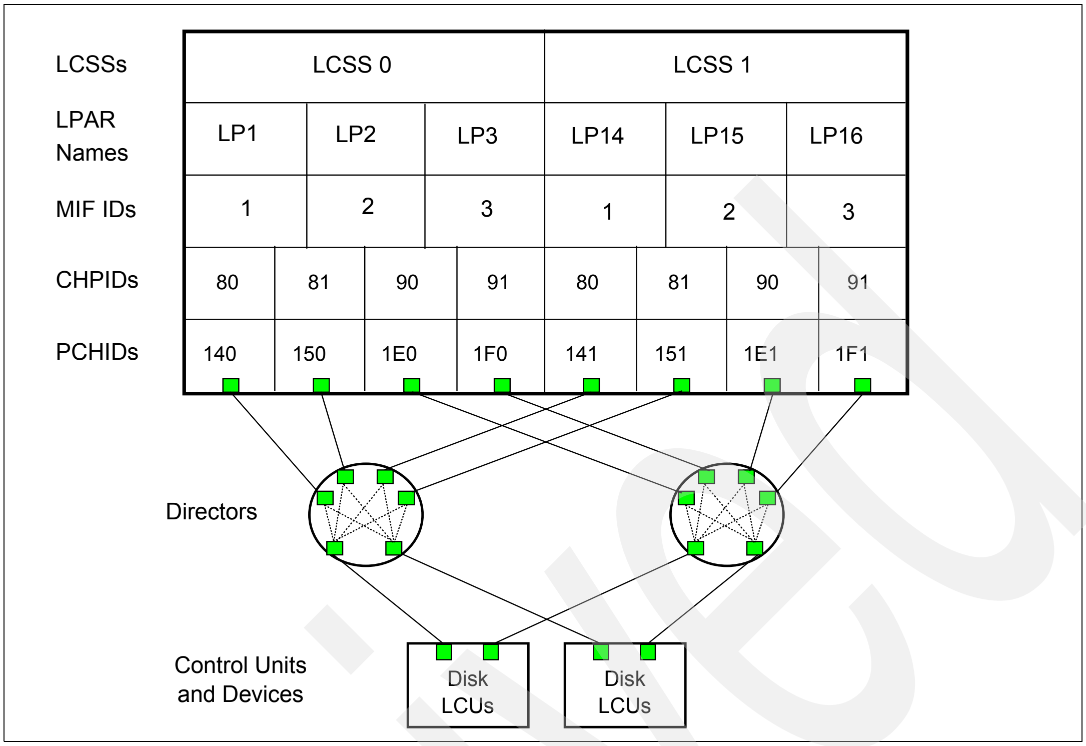


Figure 1-5 LCSS connectivity for a z9-109, z990, or z890 server

LCSSs are numbered from 0 to 3 and are sometimes referred to as the "CSS Image ID" or "CSSID" (CSSID 0, 1, 2, or 3 for z9-109 and z990, and CSSID 0 and 1 for z890).

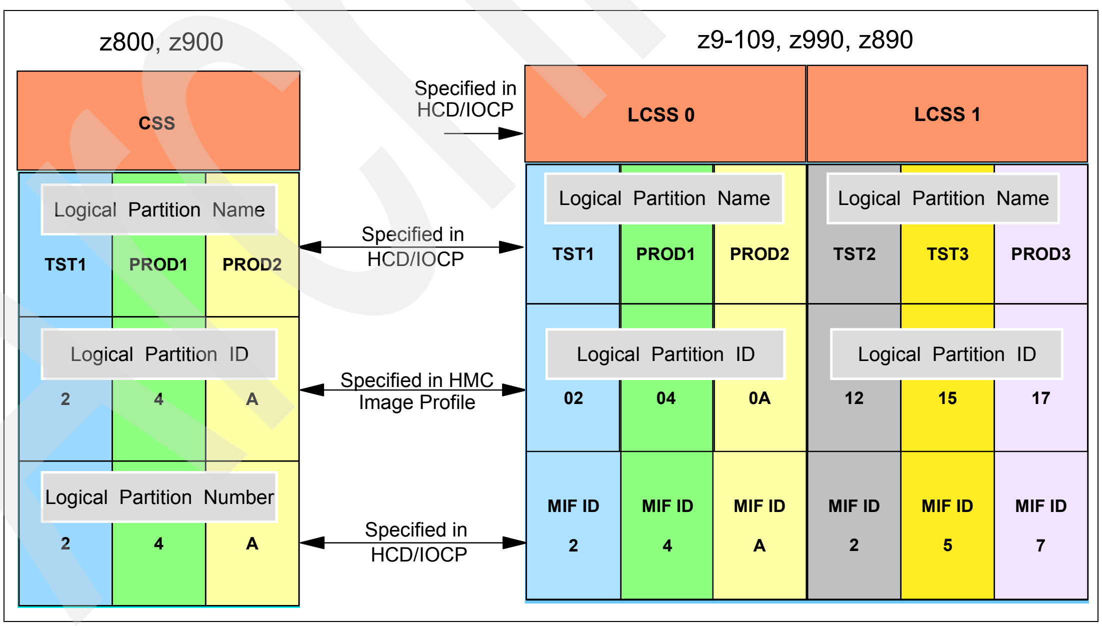


Figure 1-6 LCSS and logical partition definition - z9-109, z990, and z890 compared to z900, z800

Figure 1-6 illustrates the definition terms and the difference between z900 or z800, and other System z servers.

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 preceding 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`.

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 LCSS. On z9-109, z990, and z890, 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 Logical Channel Subsystem. That gives a maximum of 1024 CHPIDs when four LCSSs are defined. Each CHPID within a LCSS 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. PCHIDs values for z9-109 are shown in Table 1-3 on page 20 and Table 1-4 on page 21.

Subchannels

In z/Architecture™, each I/O device is represented by a separate set of controls for each logical partition, called *subchannels*, which are 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).

> **Note:** Introduced on z9-109, multiple Subchannel Sets (MSS) provide increased device addressability. Two subchannel sets are available:
>
> - Subchannel set-0 may have up to 63.75 K subchannels
> - Subchannel set-1 may have up to 64 K subchannels
>
> zSeries servers only have one subchannel set of 63 K subchannels. Prior to MSS, the z/Architecture provided a maximum of 64 K subchannels and an equal maximum number of I/O devices. 1 K of these subchannels was reserved for system use.

Multiple subchannel sets (MSS)

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.

> **Note:** MSS is a new functionality exclusive to z9-109, and should not be confused with multiple Channel Subsystems.

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 64 K-1 addresses, known as a *set*. IBM reserved 1024 subchannels, leaving 63 K-1 subchannels for general use[1].

The advent of Parallel Access to Volumes (PAV) has made this 63 K-1 subchannels limitation a problem for larger installations. With PAV, a single disk drive may consume up to four subchannels[2].

The solution allows *multiple* sets of subchannels, with a current implementation of two sets. Each set provides 64 K-1 addresses. Subchannel set 0 still reserves subchannels for IBM use, although the number of reserved subchannels is being reduced from 1024 to 256. Subchannel set 1 provides to the installation the full range of 64 K-1 addresses.

The two subchannel sets per LCSS enable a total of 63.75 K subchannels in set-0 and an additional 64 K-1 subchannels in set-1. Only PAV devices are supported in Subchannel set-1.

MSS is supported by ESCON, and FICON for CHPID type FC or FCV, and is supported by z/OS V1.7.

Each LCSS can have one or two subchannel sets, as shown in Figure 1-7 on page 14. In this example, LCSS-0 and LCSS-1 do not have a second MSS specified. In IOCP and in HCD, the default subchannel set is 0, so if you do not specify a subchannel set it will default to subchannel set-0.

[1] The number of reserved subchannels is changed from 1024 to 256, starting with the z9-109 server.
[2] Four appears to be a popular number, though usually overkill, for PAV. It represents the base address and three alias addresses.

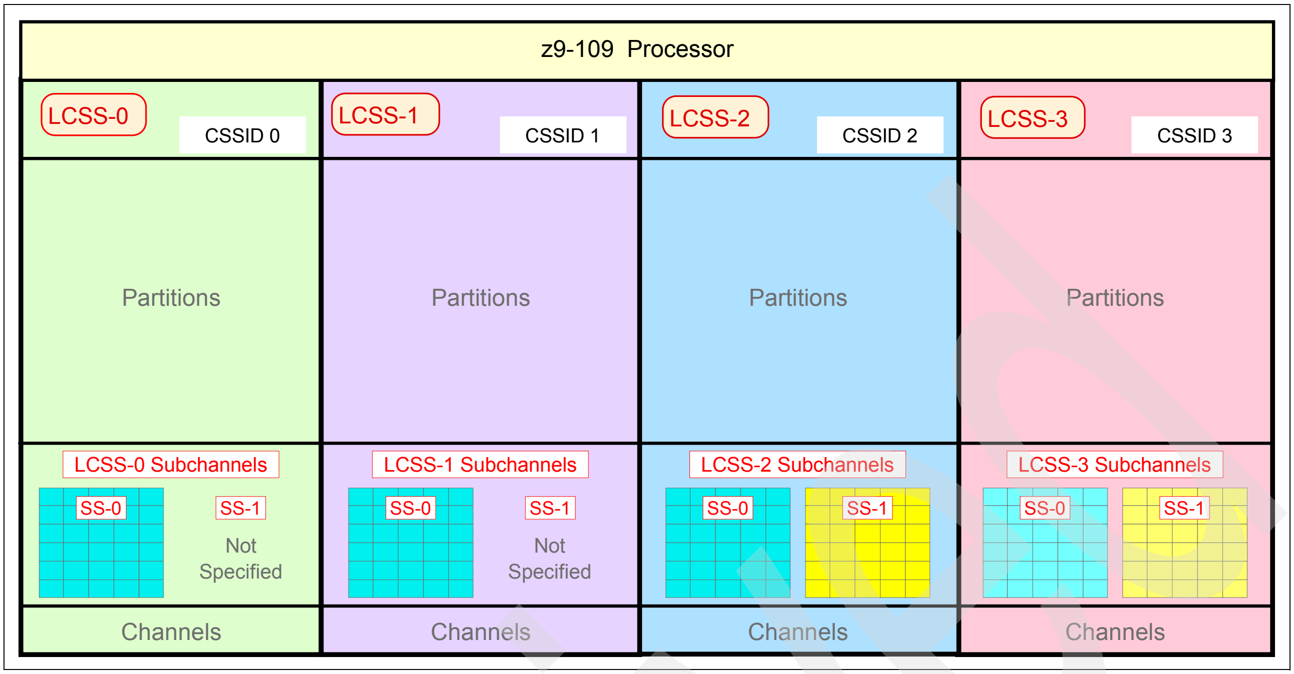


Figure 1-7 Multiple Subchannel Sets

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

There is no required correspondence between addresses in the two sets. For example, we might have device number 8000 in subchannel set 0 and device number 8000 in subchannel set 1, and they might refer to completely separate devices. (We know that the device number in subchannel set-1 must be an alias for z/OS, but that is all we can know from the device number.)

Likewise, device number 1234 (subchannel set-0) and device number 4321 (subchannel set-1) might be the base and an alias for the same device. There is no *required* correspondence between the device numbers used in the two subchannel sets.

The example shown in Figure 1-8 on page 15 shows a server with three LCSSs and a total of six logical partitions:

- Logical partitions A01, A02, A11, and A12 are only using SS0 for the DASD addresses 8000-8FFF, which contain both base and aliases.
- Logical partitions A21 and A22 are both using SS0 and SS1 to address the same DASD. They use SS0 to address the base addresses 8000-8044, and they use SS1 to address the alias addresses 8045-80FF.

In this example, A21 and A22 have more addresses available in SS0 because of defining the aliases in SS1. The 187 aliases that are defined in SS1 are free to use in SS0.

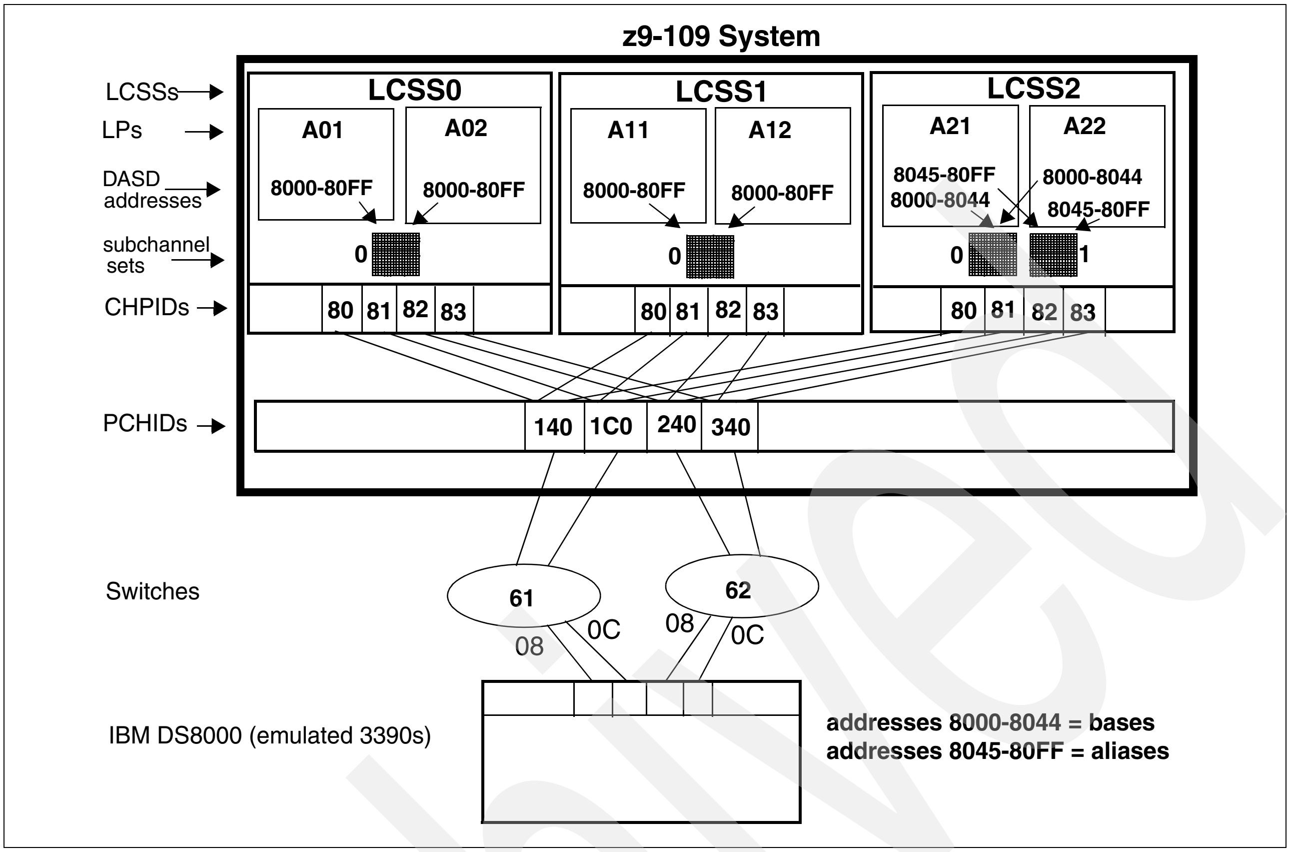


Figure 1-8 Configuration example with LCSSs, MSSs, and PCHIDs

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 statements

```
ID    MSG1='IODF01',                                               *
            MSG2='HAIMO.IODF01.WORK - 2005-05-23 13:59',           *
            SYSTEM=(2094,1),                                       *
            TOK=('SCZP101',008001136A3A2084135941210105143F00000000,*
            00000000,'05-05-23','13:59:41','        ','        ')
      RESOURCE PARTITION=((CSS(0),(A01,1),(A02,2)),(CSS(1),(A11,1),(*
            A12,2)),(CSS(2),(A21,1),(A22,2))),                     *
            MAXDEV=((CSS(0),65280,0),(CSS(1),65280,0),(CSS(2),65280,*
            65535))
      CHPID PATH=(CSS(0,1,2),80),SHARED,SWITCH=61,PCHID=140,TYPE=FC
      CHPID PATH=(CSS(0,1,2),81),SHARED,SWITCH=61,PCHID=1C0,TYPE=FC
      CHPID PATH=(CSS(0,1,2),82),SHARED,SWITCH=62,PCHID=240,TYPE=FC
      CHPID PATH=(CSS(0,1,2),83),SHARED,SWITCH=62,PCHID=340,TYPE=FC
      CNTLUNIT CUNUMBR=8000,                                       *
            PATH=((CSS(0),80,81,82,83),(CSS(1),80,81,82,83),(CSS(2),*
            80,81,82,83)),UNITADD=((00,256)),                      *
            LINK=((CSS(0),08,0C,08,0C),(CSS(1),08,0C,08,0C),(CSS(2),*
            08,0C,08,0C)),CUADD=0,UNIT=2105
      IODEVICE ADDRESS=(8000,069),CUNUMBR=(8000),STADET=Y,UNIT=3390B
      IODEVICE ADDRESS=(8045,187),CUNUMBR=(8000),STADET=Y,         *
            SCHSET=((CSS(2),1)),UNIT=3390A
```

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 may be housed separately, or it may 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 have two possibilities for I/O device sharing:

- MIF

  This enables channel sharing among logical partitions running in one Logical Channel Subsystem.

- Spanning

  This extends the MIF concept of sharing channels across logical partitions in a single LCSS, to sharing channels across logical partitions *and* Multiple Logical Channel Subsystems.

  Spanning is the ability for the channel to be configured to multiple Logical Channel Subsystems. When defined that way, the channels can be transparently shared by any or all of the configured logical partitions, regardless of the Logical 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 Logical Channel Subsystem.

MIF enables channel sharing among logical partitions running in one Logical Channel Subsystem. It is important to understand qualifiers that apply to a logical partition definition. The following definitions for z9-109, z990, and z890 are described in "Logical partitions" on page 9:

- Logical partition name
- Logical partition identifier
- MIF ID

Spanned channels

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

Figure 1-9 shows an example with two LCSSs using spanned channels. There are spanned external channels (with associated PCHIDs) and spanned internal channels (no associated PCHIDs).

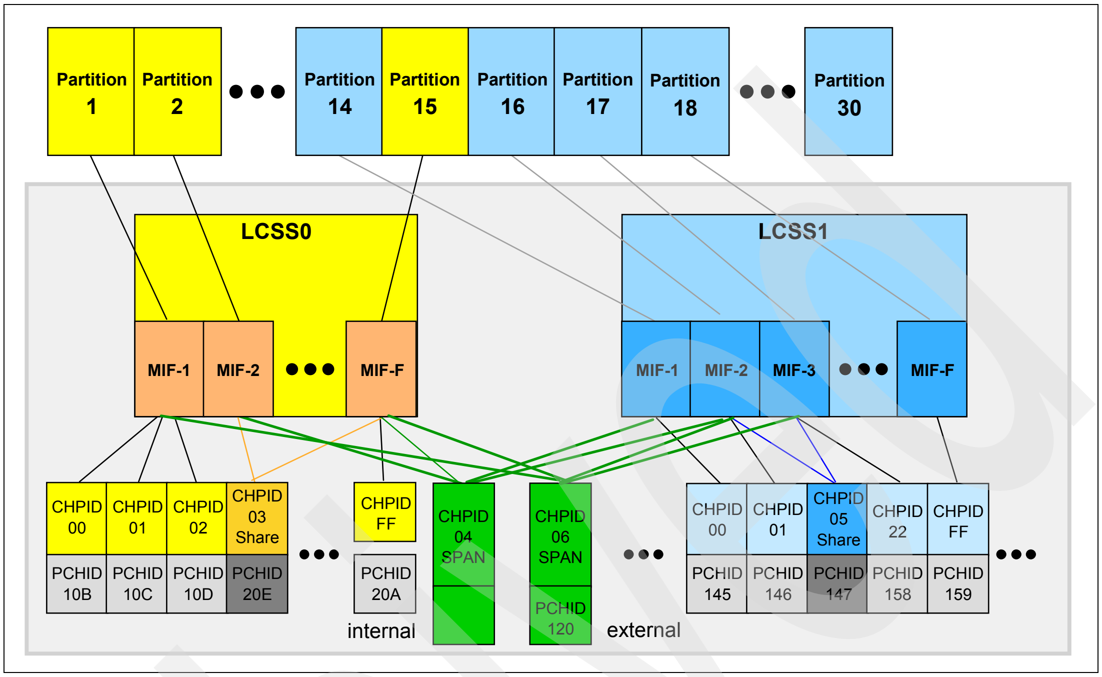


Figure 1-9 Two Logical Channel Subsystems with spanned channels (internal and external)

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 LCSS, but cannot be spanned across multiple LCSSs. 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
ESCON	External	CNC, CTC	Yes	No
		CVC, CBY	No	No
FICON Express	External	FC, FCP	Yes	Yes
		FCV	Yes	No
FICON Express2	External	FC, FCP	Yes	Yes
OSA-Express	External	OSD, OSE, OSC[a]	Yes	Yes
OSA-Express2	External	OSD, OSE, OSC[a], OSN[b]	Yes	Yes
ICB-4	External	CBP	Yes	Yes
ICB-3	External	CBP	Yes	Yes
ICB-2[c]	External	CBS	Yes	Yes
		CBR	No	No

Channel type		CHPID definition	MIF-shared channels	Spanned channels
ISC-3	External	CFP	Yes	Yes
		CFS[d]	Yes	Yes
		CFR[d]	No	No
IC	Internal	ICP	Yes	Yes
HiperSockets™	Internal	IQD	Yes	Yes

a. Supported on z9-109, z990, and z890.
b. Only supported by OSA-Express2 GbE and 1000BASE-T Ethernet features on a z9-109.
c. z9-109, z890, and z800 do not support ICB-2s.
d. ISC-3 compatibility mode is not supported on z9-109.

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. They 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.

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.

For System z9, there is a workstation-based tool for HSA estimation available from Resource Link™. The tool is discussed in more detail in 2.5.5, “Hardware System Area (HSA) estimator” on page 38.

Memory Bus Adapter (MBA)

A Memory Bus Adapter (MBA) fanout card is designed to provide the path for data between memory and I/O using Self-Timed Interconnect (STI) cables. The z9-109 server can have one to four books installed in the CPC. Each book includes up to eight MBAs, with a maximum of 32 MBAs for a four-book structure. Each MBA supports two 2.7 GigaBytes per second (GBps) STI connections. The z9-109 server is designed to contain up to a maximum of 64 total STI connections.

Self-Timed Interconnect (STI)

A Self-Timed Interconnect (STI) is an interface from the Memory Bus Adapter (MBA) to an STI-MP card, an STI-3 extender card, or an ICB-4. The MBA fanout cards each have two Self-Timed Interconnect (STI) jacks, resulting in a total of 16 STI connections on each z9-109 book. Each STI has a bidirectional bandwidth of 2.7 GB per second duplex, resulting in a maximum bandwidth of 43.2 GB per second per book. A four-book z9-109 server may have up to 64 STIs.

An STI-MP provides a new redundant I/O interconnection function. There is now a link between STI multiplexor cards such that if one of the STI connections is disconnected, the other STI connection could service both domains in the I/O cage. If this situation occurs, the data rate of a single z9-109 server STI (2.7 GB/s) must be shared across both domains. The redundant I/O interconnect potential is best if the two STIs are connected to different books.

I/O cage

An I/O cage contains the I/O cards. An I/O cage has seven domains, but in order to have the redundant I/O interconnect function available to all domains, an eighth STI connection is required for a z9-109 server I/O cage in which all seven domains are used. The eighth STI connection is only used if the primary STI for the last domain is disabled.

Figure 1-10 on page 20 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 as follows:

I/O Domain	I/O slots in domain
0	1, 3, 6, 8
1	2, 4, 7, 9
2	10, 12, 15, 17
3	11, 13, 16, 18
4	19, 21, 24, 26
5	20, 22, 25, 27
6	29, 30, 31, 32

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

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

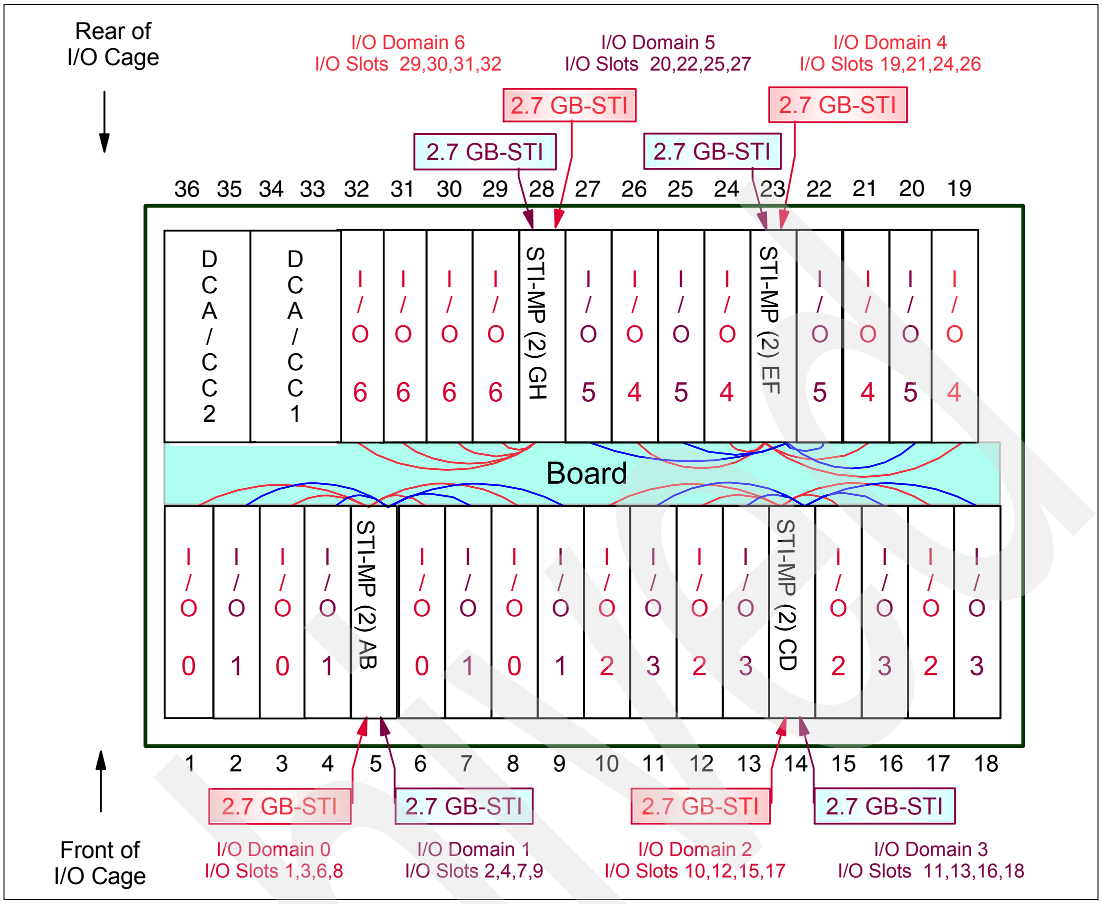


Figure 1-10 z9-109 I/O cage

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 1-3 lists the PCHID addresses used for the front locations in each I/O cage.

Table 1-3 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	0	100-10F	300-30F	500-50F
2	1	110-11F	310-31F	510-51F
3	0	120-12F	320-32F	520-52F
4	1	130-13F	330-33F	530-53F
5	STI MP (A8)			
6	0	140-14F	340-34F	540-54F
7	1	150-15F	350-35F	550-55F
8	0	160-16F	360-36F	560-56F
9	1	170-17F	370-37F	570-57F
10	2	180-18F	380-38F	580-58F

I/O slot #	I/O Domain	PCHID I/O cage 1 Front	PCHID I/O cage 2 Front	PCHID I/O cage 3 Front
11	3	190-19F	390-39F	590-59F
12	2	1A0-1AF	3A0-3AF	5A0-5AF
13	3	1B0-1BF	3B0-3BF	5B0-5BF
14	STI MP (A8)			
15	2	1C0-1CF	3C03CF	5C0-5CF
16	3	1D0-1DF	3D0-3DF	5D0-5DF
17	2	1E0-1DF	3E0-3EF	5E0-5EF
18	3	1F0-1FF	3F0-3FF	5F0-5FF

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

Table 1-4 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	4	200-20F	400-40F	600-60F
20	5	210-21F	410-41F	610-61F
21	4	220-22F	420-42F	620-62F
22	5	230-23F	430-43F	630-63F
23	STI MP (A8)			
24	4	240-24F	440-44F	640-64F
25	5	250-25F	450-45F	650-65F
26	4	260-26F	460-46F	660-66F
27	5	270-27F	470-47F	670-67F
28	STI MP (A4)			
29	6	280-28F	480-48F	680-68F
30	6	290-29F	490-49F	690-69F
31	6	2A0-2AF	4A0-4AF	6A0-6AF
32	6	2B0-2BF	4B0-4BF	6B0-6BF
33	DCAs			
34				
35	DCAs			
36				

1.2.3 Multiple LCSSs structure

No single component or single part of the CPC completely defines the multiple Logical Channel Subsystems on z9-109. 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.

The Channel Subsystem is involved during initialization of the server, definition, and activation of each logical partition to verify that all configuration rules are enforced:

1. Reset profile activate the z9-109 CPC
   - Assign an area of storage as the HSA.
   - Build the LCSS 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.

Figure 1-11 on page 23 illustrates the relationship between the various resources of the multiple LCSSs as described.

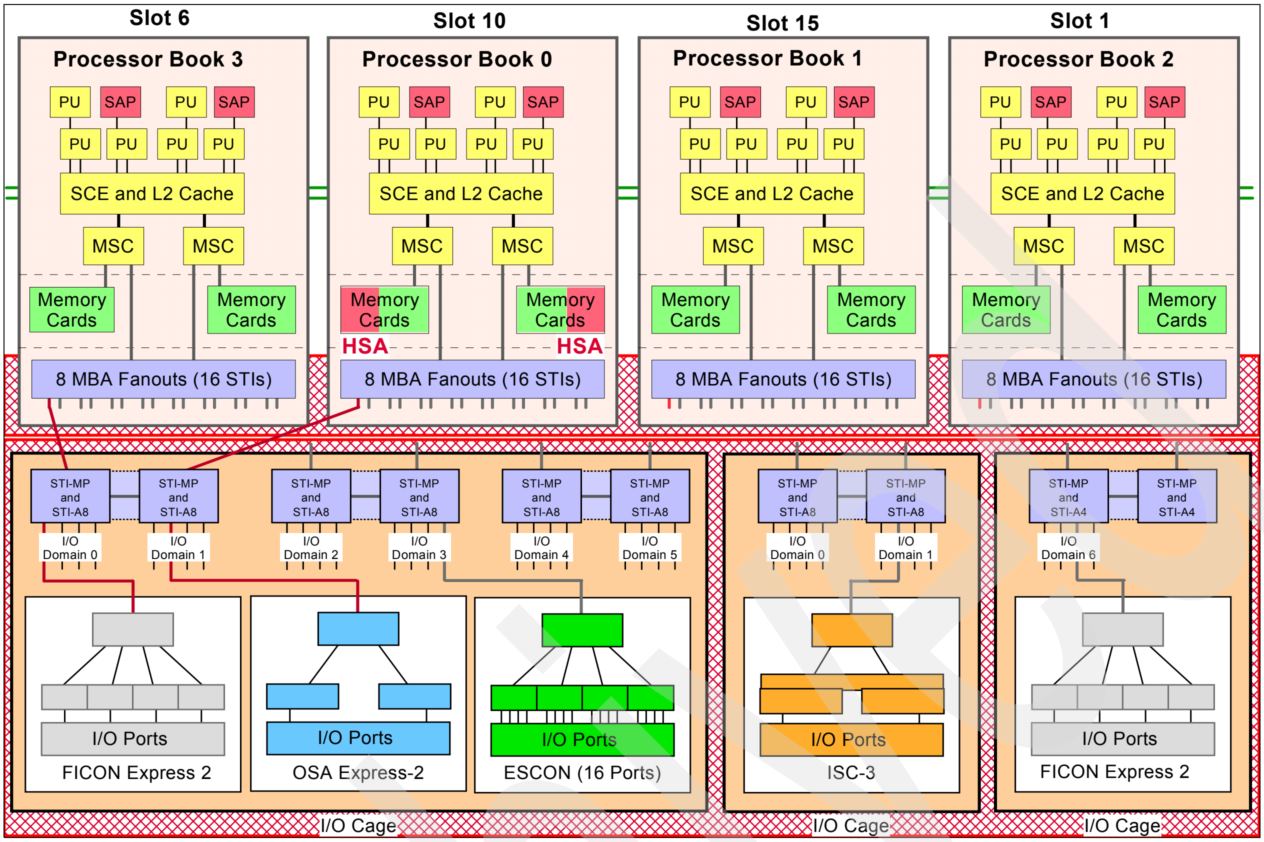


Figure 1-11 CSS components

1.2.4 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 can reserve a logical partition within an LCSS in the IOCDS used for power-on reset.

In order to define a reserved partition for future use, such a dynamic partition must be reserved within an LCSS. A reserved partition is defined with a partition name placeholder, a MIF ID, a usage type, and a description. An example of the definition and use of reserved logical partitions is provided in Chapter 11, “Reserved logical partitions” on page 405.

2

Resources and tools

In this chapter we describe the tools and resources used to set up the I/O configuration. We discuss the following topics:

- IBM Configurator for e-business (e-Config)
- Hardware Configuration Definition (HCD)
- Hardware Configuration Manager (HCM)
- Input/Output Configuration Program
- Resource Link
- Hardware Management Console V2.9.0

2.1 IBM Configurator for e-business (e-Config)

The e-Config tool is available to your IBM representative. It is used to configure new configurations or upgrades to an existing configuration. It also maintains installed features for those configurations.

Reports are generated by e-Config which are helpful in understanding what changes are being made for a system upgrade, and what the final configuration looks like.

2.2 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 z9-109 is available on all supported z/OS levels and z/VM® beginning with V4.4. HCD provides the capability to make both dynamic hardware and software I/O configuration changes. For z/OS, HCD is required for Dynamic I/O reconfiguration.

To ensure that you are running an operating system that allows you to use HCD to view and change the z9-109 configuration, refer to the information provided in 3.7, “Software support” on page 72.

z/OS V1.7 HCD is required to support z9-109 with Multiple Subchannel Sets. Therefore, if you need to define more than one Multiple Subchannel Set (MSS) per Logical Channel Subsystem (LCSS), you require z/OS V1.7 HCD.

z/OS V1.7 HCD also significantly reduces the size of the I/O Definition File (IODF) by using a new Version 5 IODF format, representing devices in device groups rather than containing individual device definition records.

> **Note:** Support for multiple Logical Channel Subsystems in HCD is only available on OS/390® V2R10 and z/OS V1R2 and later.

HCD provides the capability to make both dynamic hardware and software I/O configuration changes.

2.3 Hardware Configuration Manager (HCM)

> **Note:** It is assumed that the reader has prior knowledge of HCM. Only the new features are summarized here.

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 may 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.

2.3.1 Additional features in HCM for z/OS Version 1.7

Hardware Configuration Manager (HCM) for z/OS V1.7 now has new features which assist you in creating HCD reports and integration with the CHPID Mapping Tool:

- File → View IODF Reports
- Utilities → CHPID Mapping Tool Support
- Utilities → Check Configuration File

Next, we describe these features in more detail.

2.3.2 View IODF Reports

You now have the ability to create HCD reports via HCM using the feature View IODF Reports under the File Menu.

You need to be logged on and you can be using either a “work” or “production” IODF; refer to Figure 2-1.

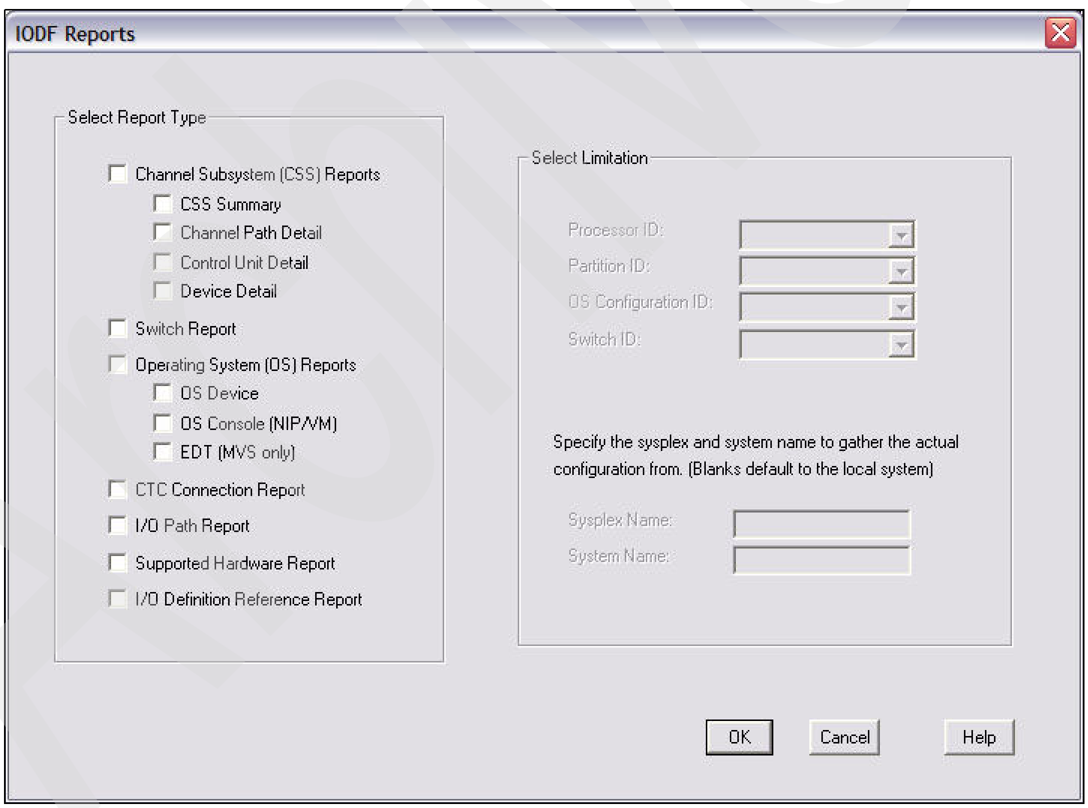


Figure 2-1 HCM - IODF Reports

2.3.3 CHPID Mapping Tool Support

HCM now has an interface into the CHPID Mapping Tool which assists in this process. 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.

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

Figure 2-2 shows the following options:

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

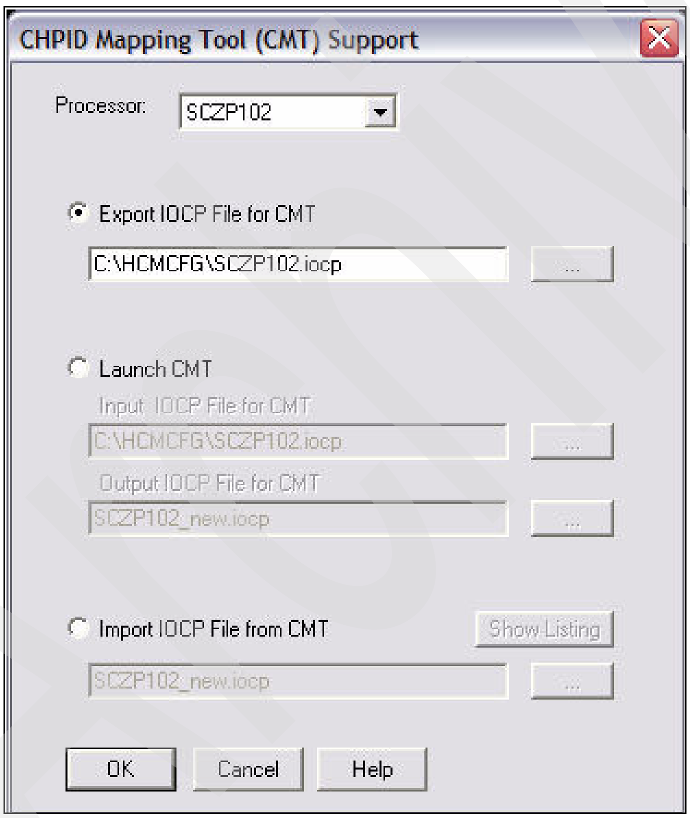


Figure 2-2 HCM - CHPID Mapping Tool Support

2.3.4 Check Configuration File

If data corruptions occur in the IODF, HCD has the ability to identify and often correct these corruptions by using the command **`HCD TRACE ON,LEVEL=1,ID=IODF,REPAIR`**.

HCM can now initiate the IODF check and optional repair; refer to Figure 2-3 on page 29. You need to be logged on and using the IODF that you want to check. You can also save the responses to a file for easy transfer to the IBM Support Center.

Additionally, you can check the integrity of the HCM data file.

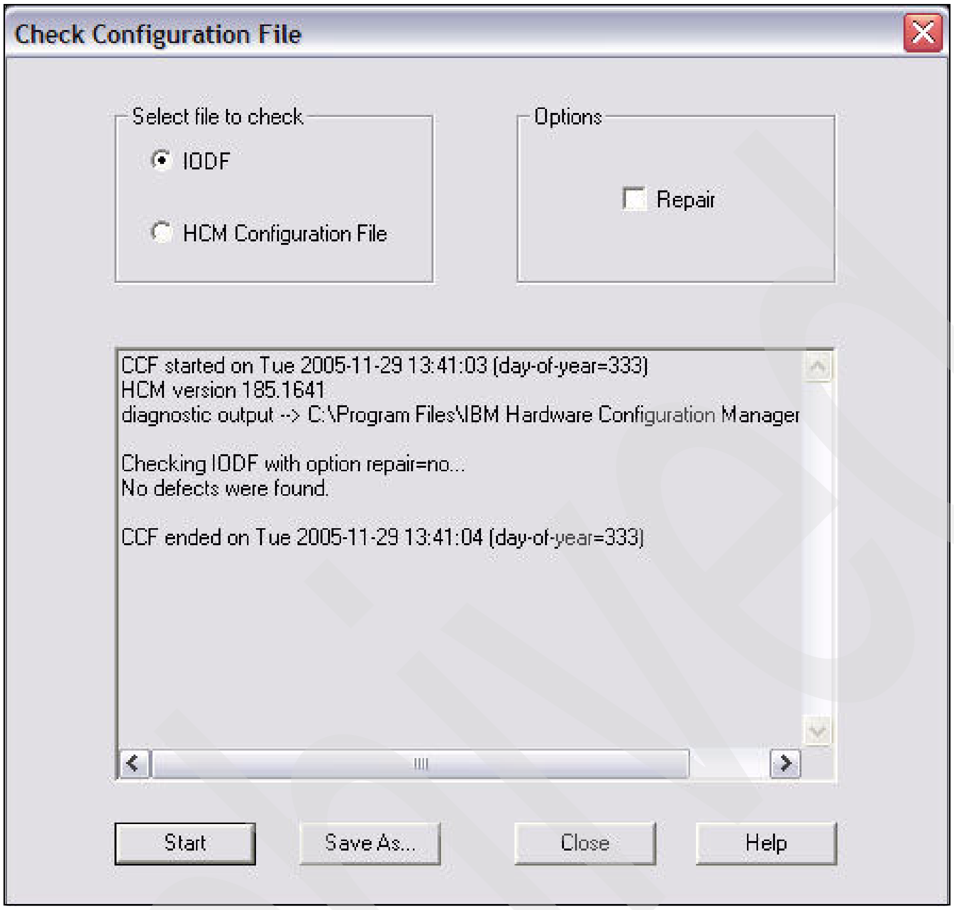


Figure 2-3 HCM - Check Configuration File (IODF)

Additionally, you can check the integrity of the HCM data file; refer to Figure 2-4 on page 30.

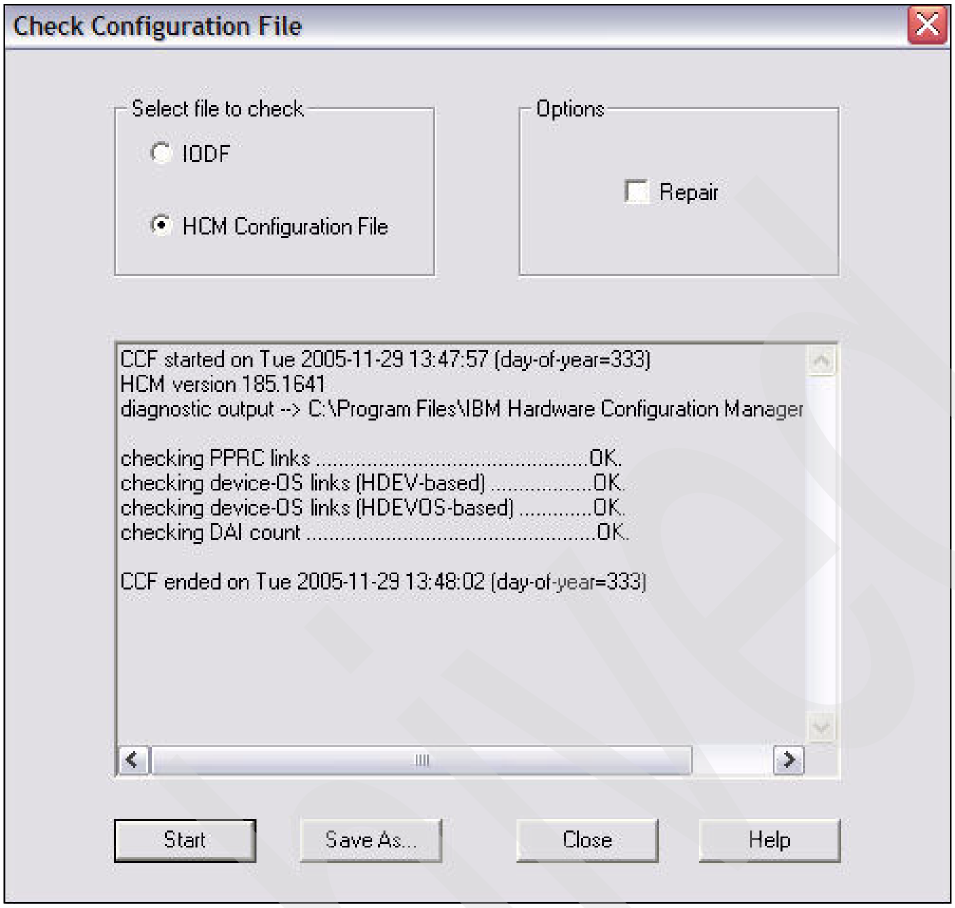


Figure 2-4 HCM - Check Configuration File (HCM Configuration File)

2.4 Input/Output Configuration Program

ICP IOCP supports z9-109 model CPCs and multiple LCSSs. Enhancements to IOCP allow you to define controls for multiple channel subsystems. These include changes to the way you define logical partitions, channel paths, and I/O devices. The z9-109 server also adds support for a second subchannel set, to provide relief for the limitations on the maximum number of devices.

ICP IOCP includes enhancements that allow you to define new sets of controls for CPCs. These enhancements affect the way you define logical partitions, channel paths, control units and devices. There are changes in the following areas:

- Number of Channel Subsystems
- Logical Partition Definition
- Channel Path Definition
- Control Unit Definition
- Device Definition

Note: Though it is possible to define the z9-109 configuration using only IOCP, we strongly recommend that you use HCD because of its error detection and management features.

Using ICPIOCP, it is possible to write an IOCDS in preparation for a CPC upgrade. You can write an IOCDS to a z890 or z990 CPC, regardless of whether the operating system supports z9-109:

- 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 earlier CPC until it is upgraded to a 2094.

You can also write an IOCDS when preparing to upgrade to a z9-109 from one of the following:

- zSeries 900 at EC J10638 or later
- zSeries 800

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). On earlier servers, IOCP stand-alone required basic mode to run. If you are moving from a z900 or previous server to a z9-109 server and you are running an earlier operating system version not supported on a z9-109 server, you may have to create a stand-alone IOCP to start up the new environment.

Note that z9-109 Support Elements do not have diskette drives. To work directly with the IOCP source statements, you must import it from the HMC diskette 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.

2.5 Resource Link

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

An IBM Registration ID is required to sign in the Resource Link Web site. Obtaining an IBM Registration ID takes only a few minutes to register for the initial steps.

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

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

When you access the Resource Link Web site, select **Tools** under the Resource Link column. This takes you to the Tools Web page containing servers and software; see Figure 2-5 on page 32.

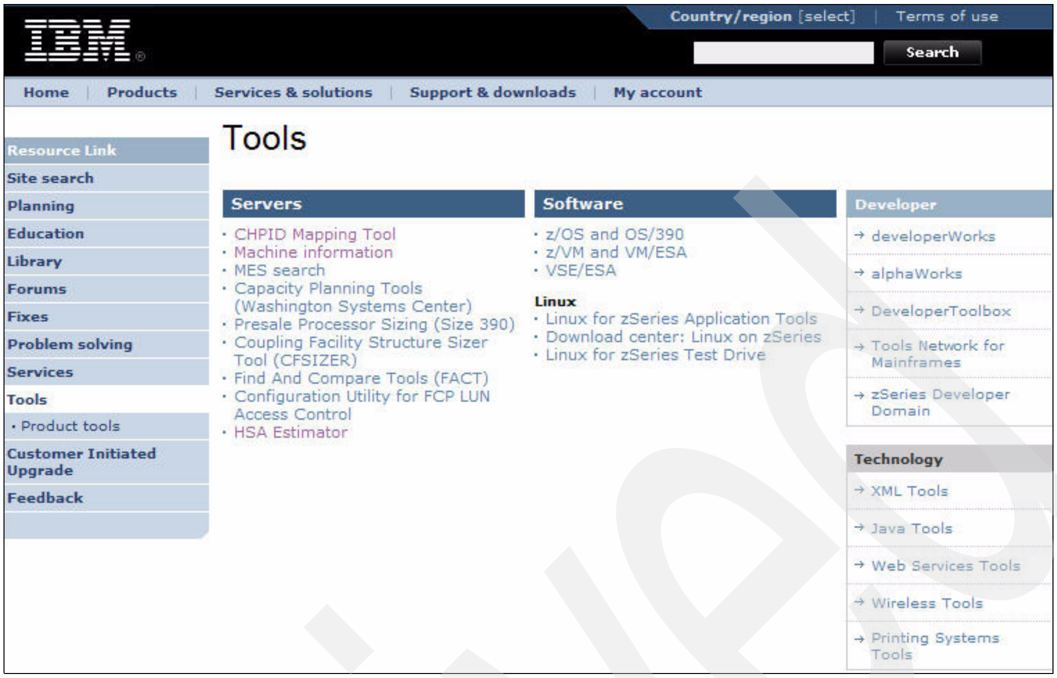


Figure 2-5 Resource Link - Tools page

We cover the following items:

- The CHPID Mapping Tool (CMT)
- I/O Configuration Data (CCN)
- Server Information
- HSA Estimator

Now we describe them in more detail.

2.5.1 CHPID Mapping Tool

The CHPID Mapping Tool (CMT) provides a mechanism to map CHPIDs onto PCHIDs as required on a z9-109. 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 z9-109 installation is illustrated in Figure 2-6 on page 33.

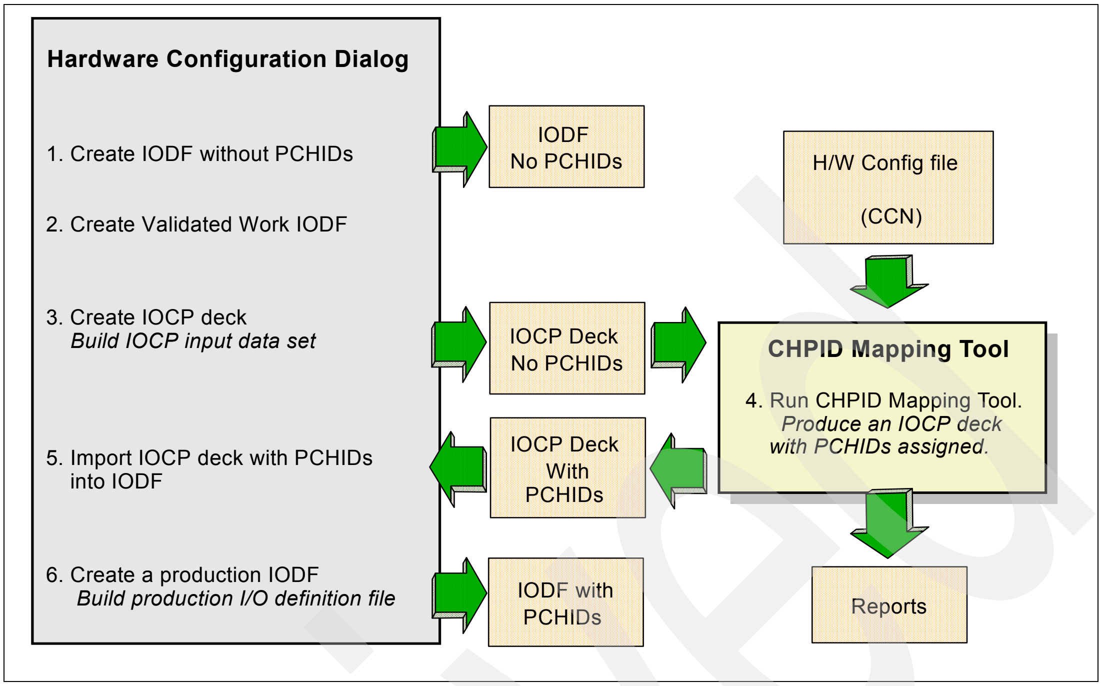


Figure 2-6 z9- 09 I/O configuration definition flow for a new install [1]

To access the CHPID Mapping Tool:

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

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

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

Figure 2-7 on page 34 shows the Resource Link - Tools (CHPID Mapping Tool) access link.

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.

[1] Figure 2-6 illustrates a new build process. When doing an upgrade from a z990, the PCHID values from the z990 must be retained in the IOCP input to the CHPID Mapping Tool.

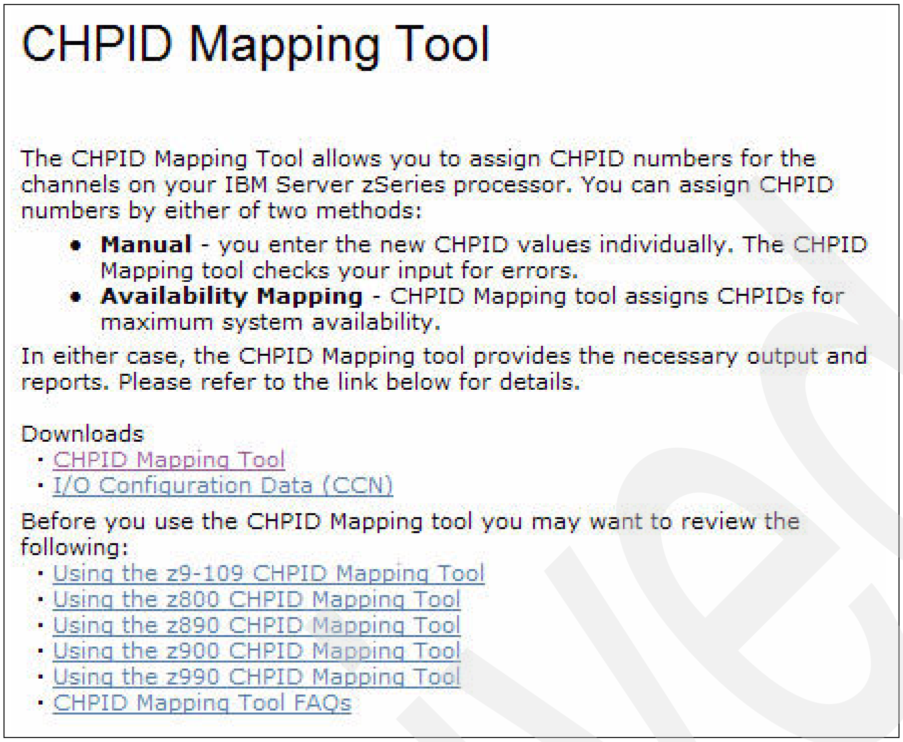


Figure 2-7 Resource Link - Tools (CHPID Mapping Tool)

At the Resource Link site, do the following:

- 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.
- Click the appropriate link and install/upgrade the CHPID Mapping Tool program.

2.5.2 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 done to your z9-109 order.

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

- Select **CHPID Mapping Tool**.

Alternatively, you can use the following URL:

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

- Under Downloads, click **I/O Configuration Data (CCN)**. This takes you to the CFReport download page, where you can enter your Customer Control Number (CCN); see Figure 2-8 on page 35.

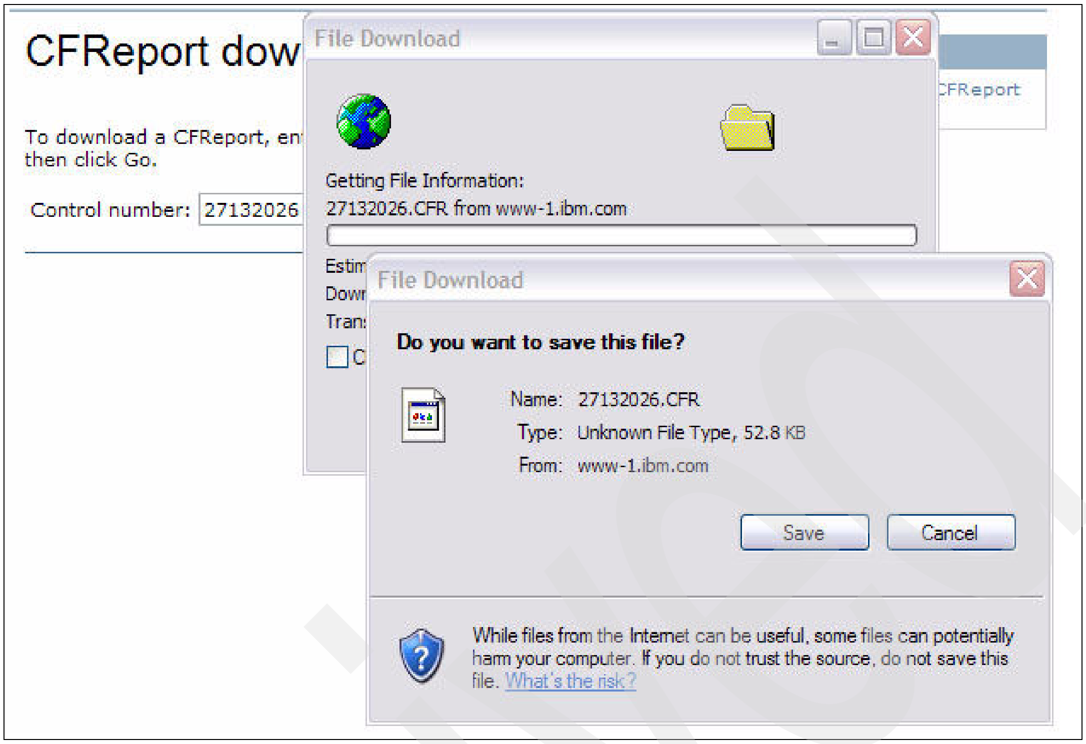


Figure 2-8 Resource Link - Tools (I/O Configuration Data CCN)

At the CFReport download page, do the following:

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

  You are prompted to save the nnnnnnnn.CFR file to your workstation
- Save the nnnnnnnn.CFR file for later input into the CHPID Mapping Tool.

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

2.5.3 Availability Mapping for z9-109

When planning and configuring the z9-109 server, you must plan for maximum server and device availability even in the event of a channel failure or multiple channel failures.

To help you configure z9-109 to ensure maximum availability based on the characteristics of the server, the CHPID Mapping Tool has an Availability Mapping option that assigns channels paths to avoid a single point of failure. You also have the option of switching to manual mapping if desired. And you can also 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 channels and 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 STI links.

1. Setting control unit priority

   Priorities are assigned in the IOCP source for each control unit. Priorities ranges can be assigned from 0001 to 9999. More that one control unit can have the same priority, which means that these control units can be mapped together for availability. The CHPID Mapping Tool maps the control units with the priority of 0001 first. It is advisable to leave gaps in the numbering (for example, 0010, 0020, 0030, and so on). This way, if you have device conflicts, you can assign new priorities.

Any control unit that does not have a priority specified is assigned the default priority *after* the numbered priorities are assigned. The default priority is the control unit with the most paths has the highest priority.

For control units with the same number of paths, the control unit number is used (for example, a control unit with a CUNUMBR of 1000 takes priority over 1100).

You can also define “priority group”, which is a set of control units having the same priority. Defining a set of logical control units with the same priority ensures that all paths are mapped for availability. This enables the CHPID Mapping Tool to understand the relationships between the control units.

After the priorities are entered, the CHPID Mapping Tool is ready to process them. The following options are available:

– Reset CHPIDs assigned by availability
– Reset CHPIDS assigned by manual remap
– Reset CHPIDs assigned by IOCP
– Reset CHPIDs assigned for Config files

You can reset none, any, or all of these CHPIDs options. Selecting none of the options processes only the unassigned CHPIDs.

> **Note:** Choosing to reset CHPIDs assigned by IOCP may require you to re-cable the hardware.

The priority statements are added as comment statements to the IOCP deck. They can be used the next time the IOCP source is loaded in the CHPID Mapping Tool.

2. Intersect

An *intersect* is a potential availability problem detected by the CMT. After processing the priorities, the CHPID Mapping Tool displays intersects on the next panel. Reason codes and explanations of the codes are displayed at the bottom of the panel in CMT.

These codes apply to channels on the same group, where these groups are defined by the same mapping priorities in the CHPID Mapping Tool.

The intersect warnings are as follows:

D	Assigned channels are on the same daughter card.
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 connected to the same book.

> **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 CHPID Mapping Tool can run out of high availability places to assign CHPIDs and therefore plugs more than one control unit on to the same channel card, STI, or MBA group.

Another possible cause for intersects could be that prior mapping to other groups has left a number of unassigned ports.

Intersects can be corrected by assigning a group that displays intersects to a lower-numbered priority, or by dividing the group into smaller groups.

3. CHPID Mapping Tool output for the z9-109 server

   The CHPID Mapping Tool output for z9-109 is different from 2064 servers. The PCHIDs are fixed 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 LCSS. 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.

2.5.4 Machine information

To access any of your zSeries 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-1.ibm.com/servers/resourcelink/hom03010.nsf/pages/machineinformation?OpenDocument`

- Click **View all machines**; see Figure 2-9.

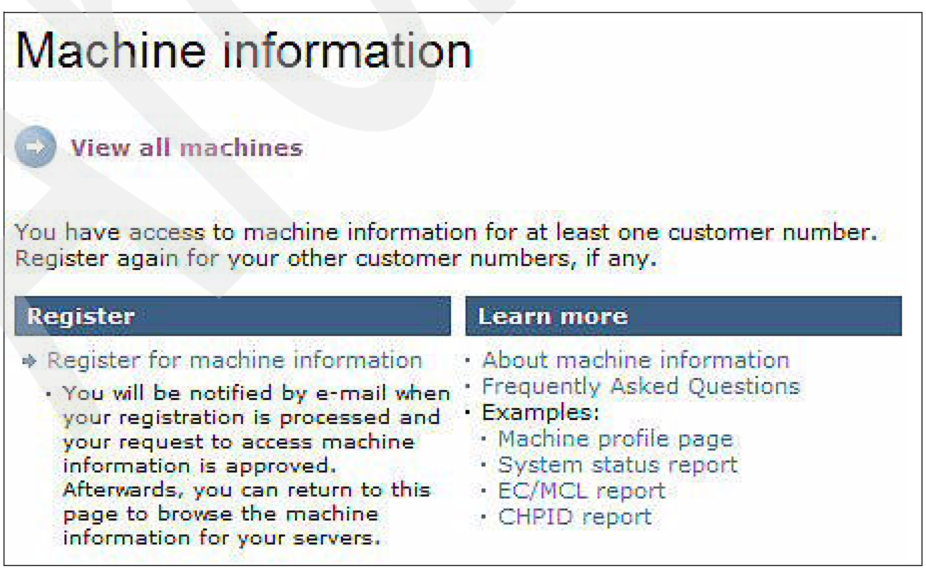


Figure 2-9 Resource Link - Tools (Machine information)

If none of your servers is 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 zSeries server you are inquiring about.
- Then click **CHPID**; a PCHPID report for that zSeries server will be displayed.

2.5.5 Hardware System Area (HSA) estimator

The Hardware System Area (HSA) is an area of memory in processor central storage that is used by the hardware. It is established during power-on reset (POR), using the information in the IOCDS.

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.

For System z9, a workstation-based tool for HSA estimation is available from Resource Link. Use this essential tool to determine ahead of time how much storage you need to purchase; see Figure 2-10 on page 39. Based on the requirements of HSA, you will know how much storage remains available for logical partitions.

To access the HSA estimator, do the following:

- Under Servers in the Tools panel, click **HSA Estimator**.

Alternatively, you can use the following URL:

`https://www-1.ibm.com/servers/resourcelink/hom03010.nsf/pages/hsamain?opendocument`

- Click the HSA Estimator that is appropriate for your server.

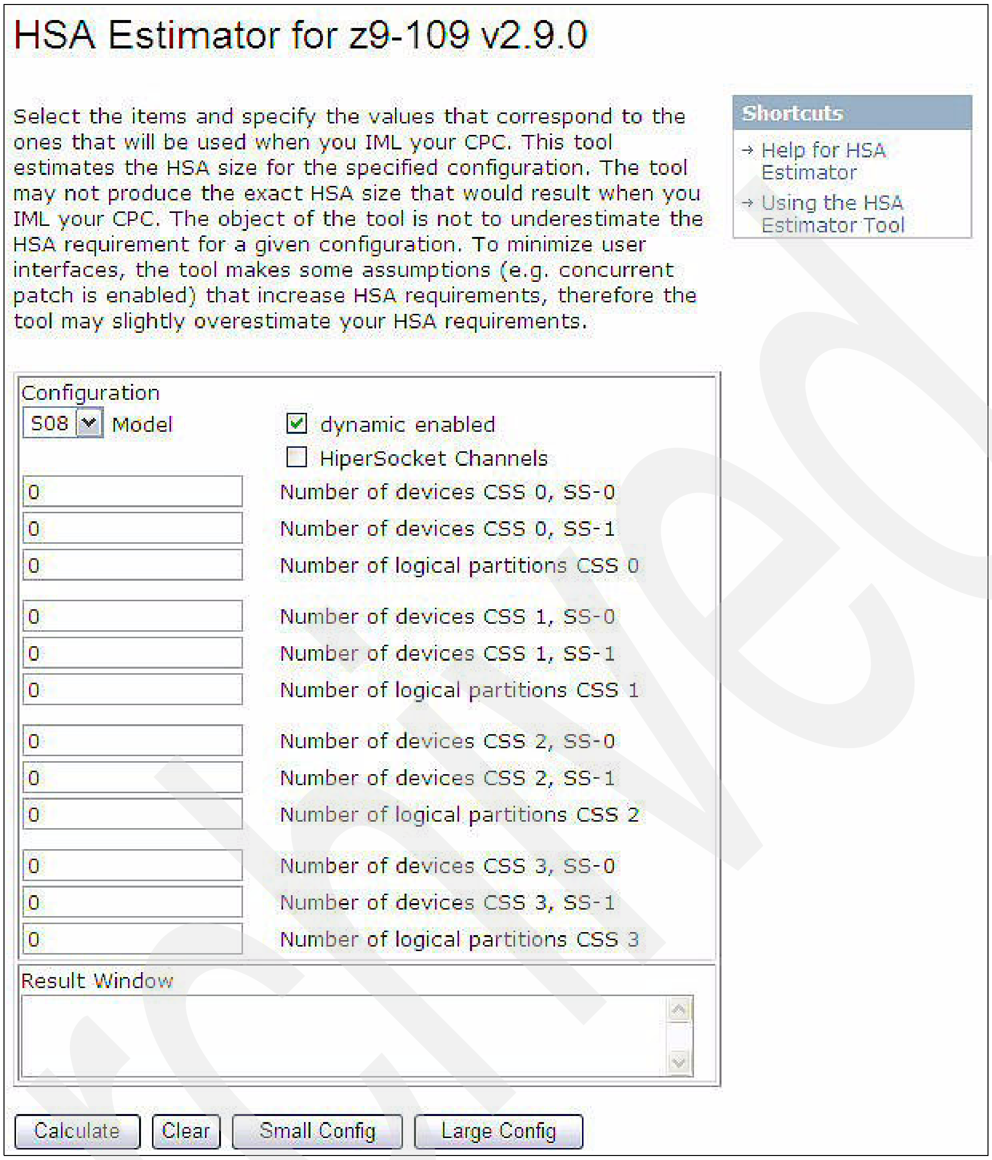


Figure 2-10 Resource Link - Tools (HSA Estimator)

- You are presented with a Web page containing panels where you can enter the following:
  - Server Model
  - Dynamic enabled (yes/no)
  - HiperSocket Channels (yes/no)
  - Number of devices for each Logical Channel Subsystem, Subchannel Set-1
  - Number of logical partitions for each Logical Channel Subsystem

> **Note:** You can find the information required for the "Number of devices" fields shown in Figure 2-10 in the IODF where you have set the MAXDEV values for each of the CSSs.

Important: You can also consider not using the MAXDEV default of 64512 that HCD uses if your device allocation falls significantly short of this value.

Because the Percentage Expansion Option has been removed from the Dynamic tab of the Image Profile on the HMC, the MAXDEV becomes the Expansion Option and may be allocating unnecessary Hardware System Area.

- Click **Calculate**, and you will be presented with the estimated storage that is allocated to HSA. Factor in the value you obtain here when you calculate the overall storage allocations for your System z9-109.

For further information, you can choose the shortcuts found on the HSA Estimator Web page.

2.6 Hardware Management Console V2.9.0

The z9-109 server has a new Hardware Management Console (HMC) with new implementation. The HMC application is no longer based on the OS/2® operating system. Instead, it uses an embedded environment and users have no access to the underlying operating system.

It is also a closed environment; the HMC workstation can run only the HMC application. This prohibits ESCON Director and Sysplex Timer® console applications; separate workstations are now needed for these functions.

When the HMC application is accessed now, the first panel that displays is a new welcome screen (not the login screen). The same screen is shown for both the local HMC or a remote browser user.

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 screen and a link to the logon screen; see Figure 2-11 on page 41.

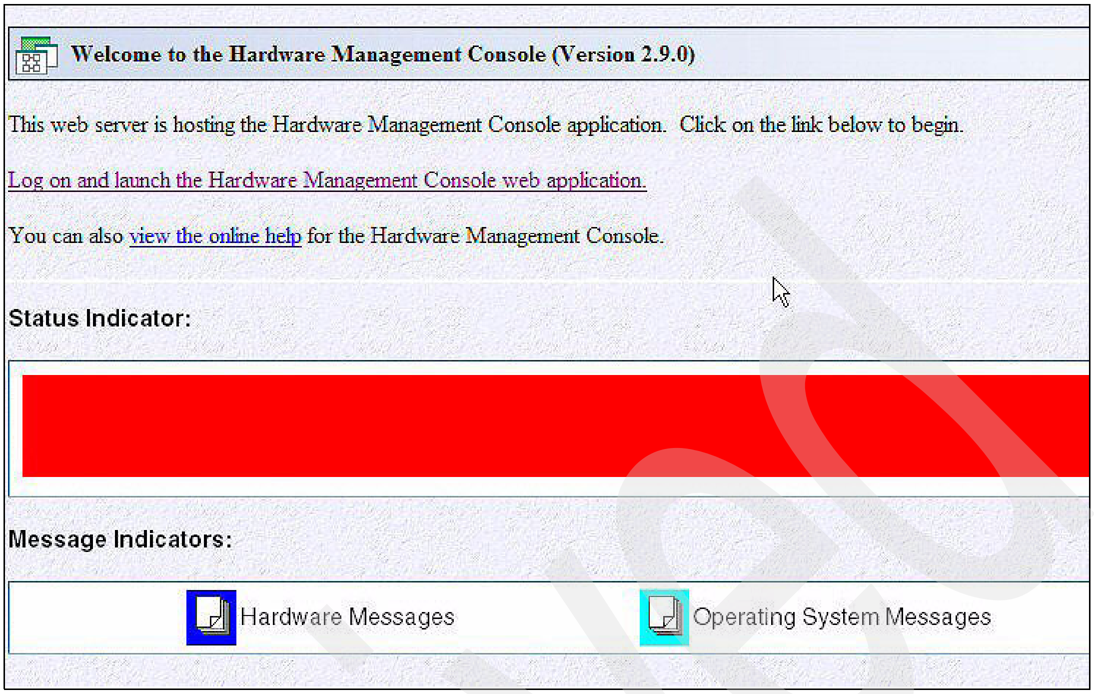


Figure 2-11 HMC Welcome panel, HMC workstation

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; see Figure 2-12.

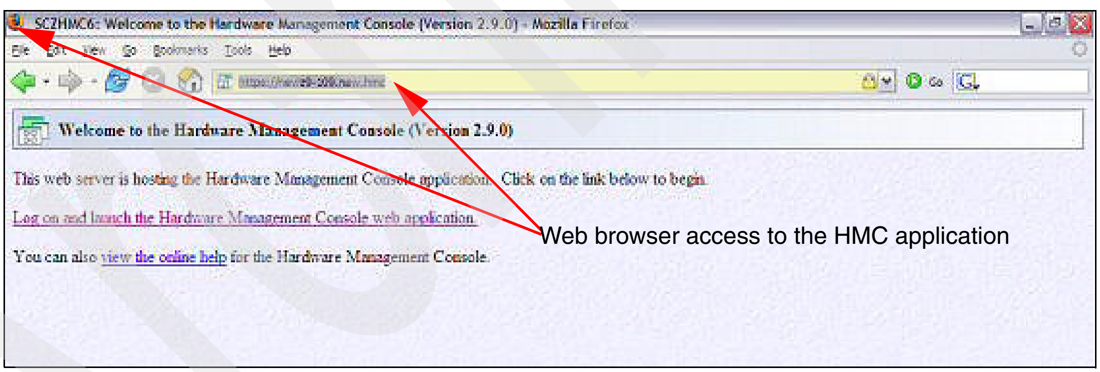


Figure 2-12 HMC welcome panel via Web browser

After you connect to the HMC application, you can log on. Click **Log on and launch the Hardware Management Console web application.** A valid user ID and password are needed to proceed with the logon.

Note that 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. Refer to Figure 2-13 on page 42.

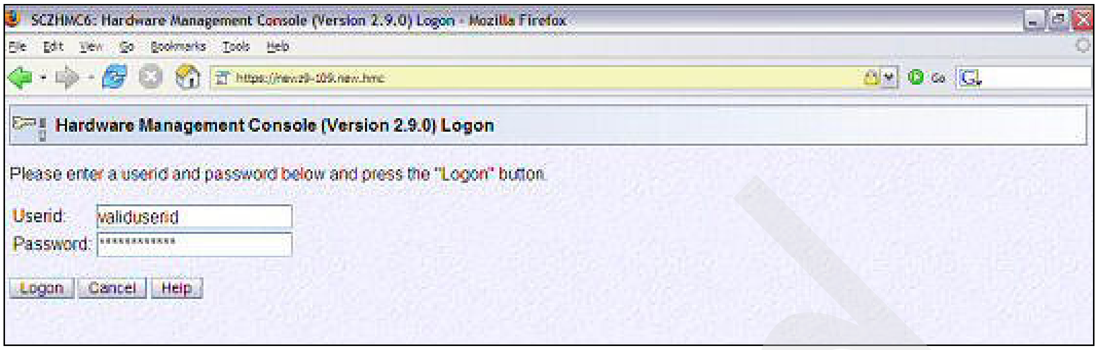


Figure 2-13 HMC application Web browser Logon screen

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:

- Classic view
- Tree-style user interface

2.6.1 HMC classic view

The default mode is the classic view, and it has the same look and feel as earlier zSeries HMC. In this redbook, we use the classic view for our examples; see Figure 2-14.

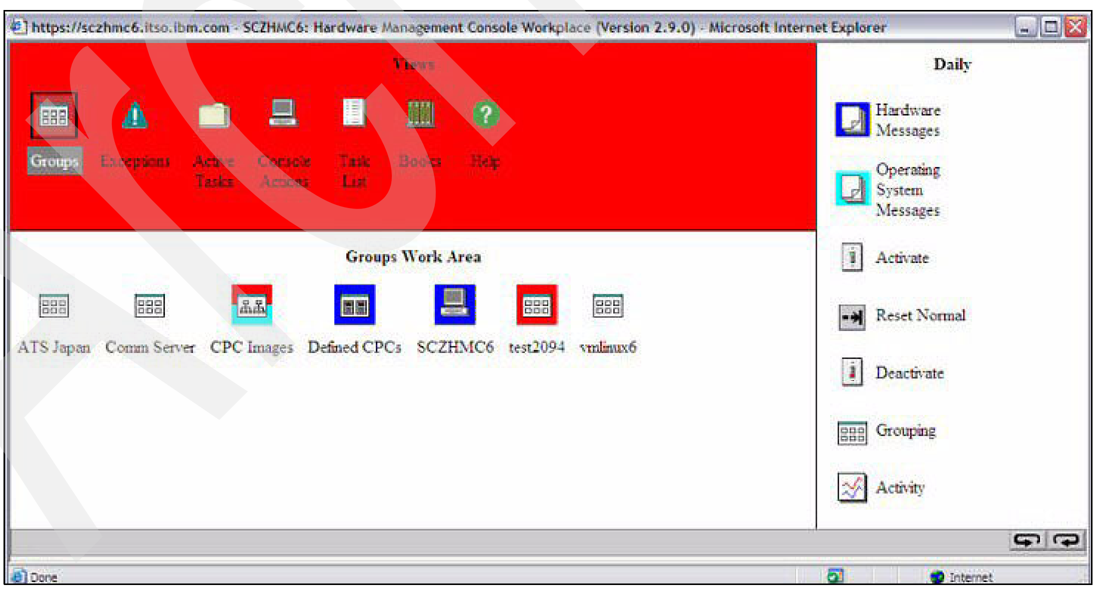


Figure 2-14 New HMC user interface (classic view)

2.6.2 HMC tree-style interface

The z9-109 HMC allows for an alternate, tree-style user interface. This interface provides drill-down and launch in context capabilities, as shown in Figure 2-15 and Figure 2-16 on page 44, and in Figure 2-17 on page 45.

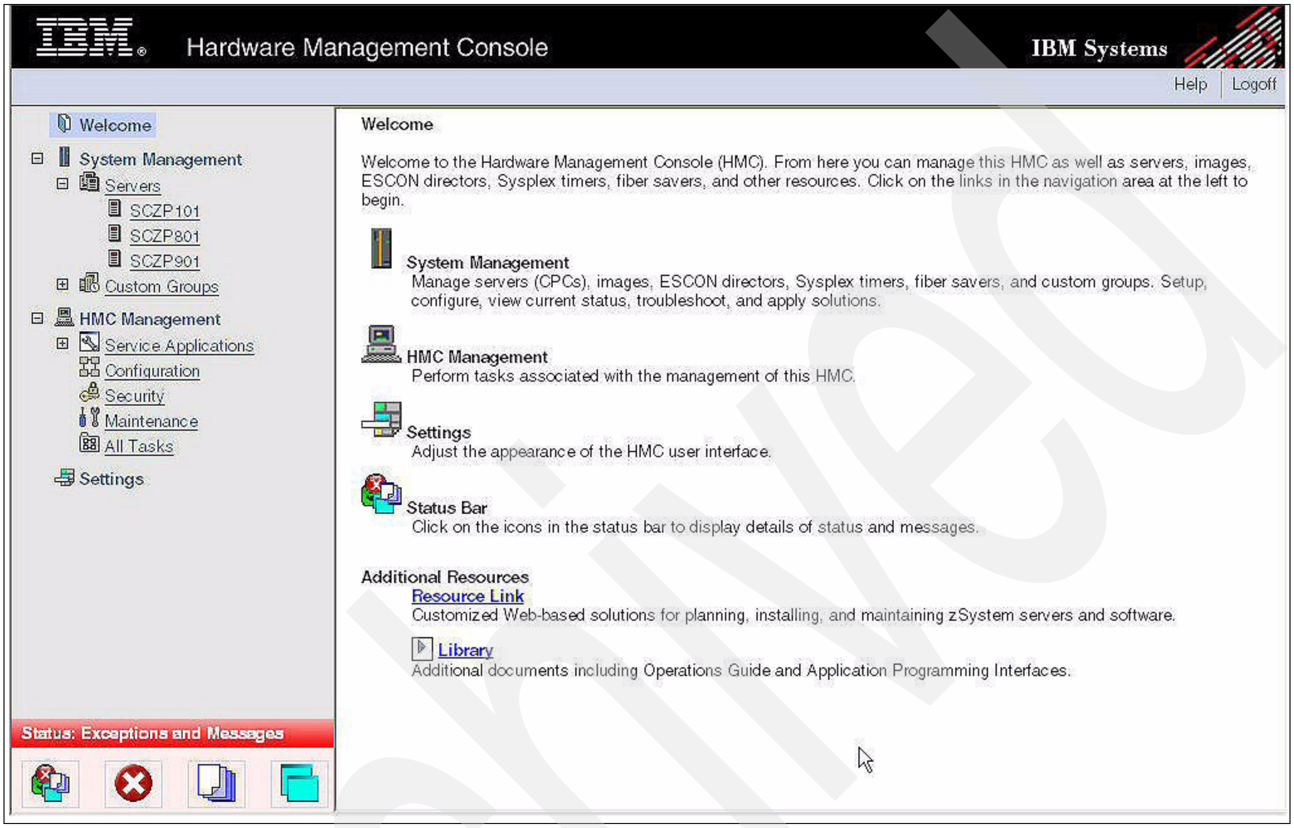


Figure 2-15 HHMC - Tree view (example 1)

A new option in the HMC application is the ability to change the GUI interface from the classic view to a tree view. The ability for a user to switch views is controlled by the ACSADMIN user who assigns the user profiles.

For a first installation or upgrade of a new z9-109, we recommend that user ID defaults be set to the classic view (this is the default choice). However, we also recommend that you authorize user IDs to change the GUI interface. ACSADMIN can authorize, or limit, a user's ability to switch from the classic view to the tree view. Figure 2-16 on page 44 shows another example of a tree view.

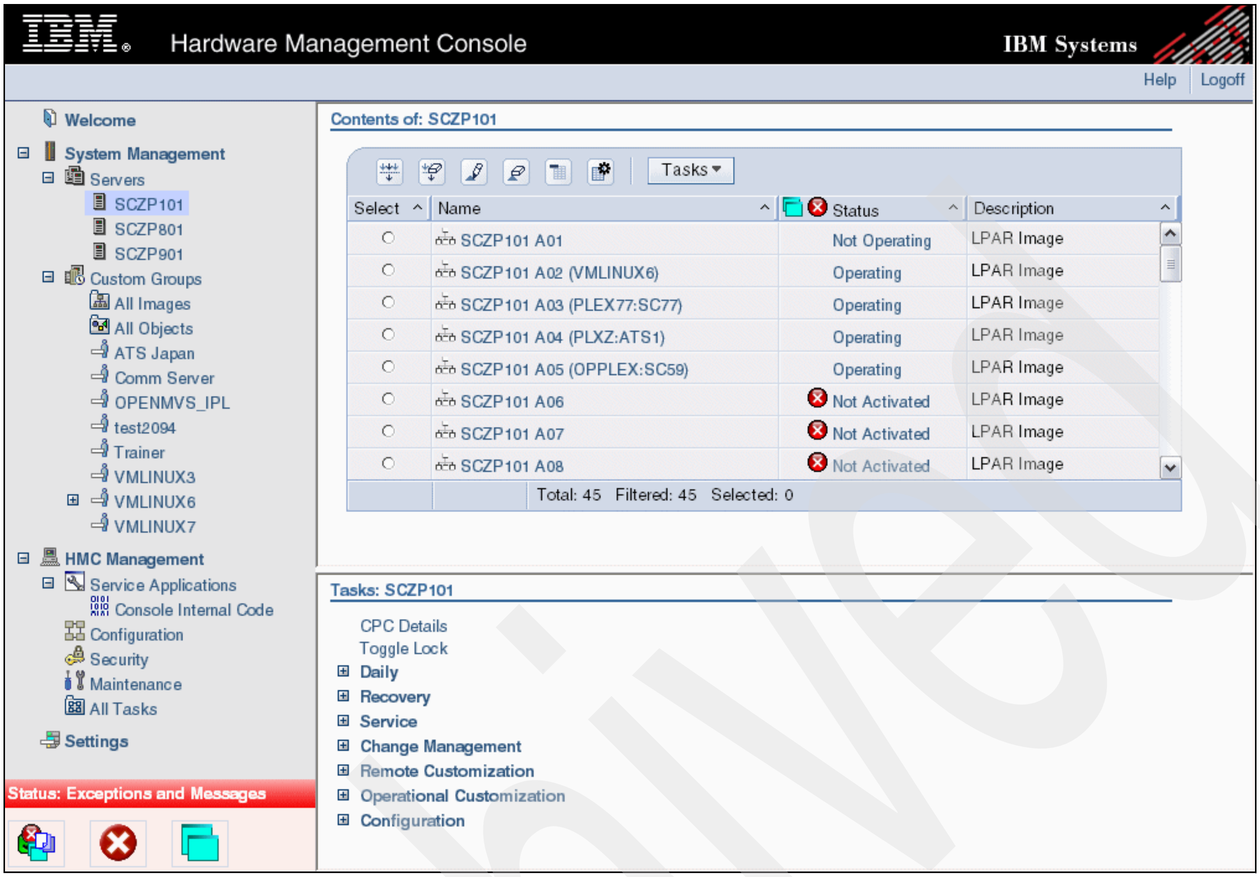


Figure 2-16 HHMC - Tree view (example 2)

2.6.3 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 V2.9.0 through a Web browser.

To access the HMC from a remote workstation, the workstation needs to be have TCP/IP connectivity to the operations LAN where the HMC is installed. At least one workstation with the HMC Application V2.9.0 is required to control and operate a z9-109 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 V2.9.0 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 screen. 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.

By placing the cursor over the CPC you want to perform an action against and right-clicking the mouse, you are presented with a list of menu options similar to those presented in the tasks section on the right-hand side of the screen; see Figure 2-17.

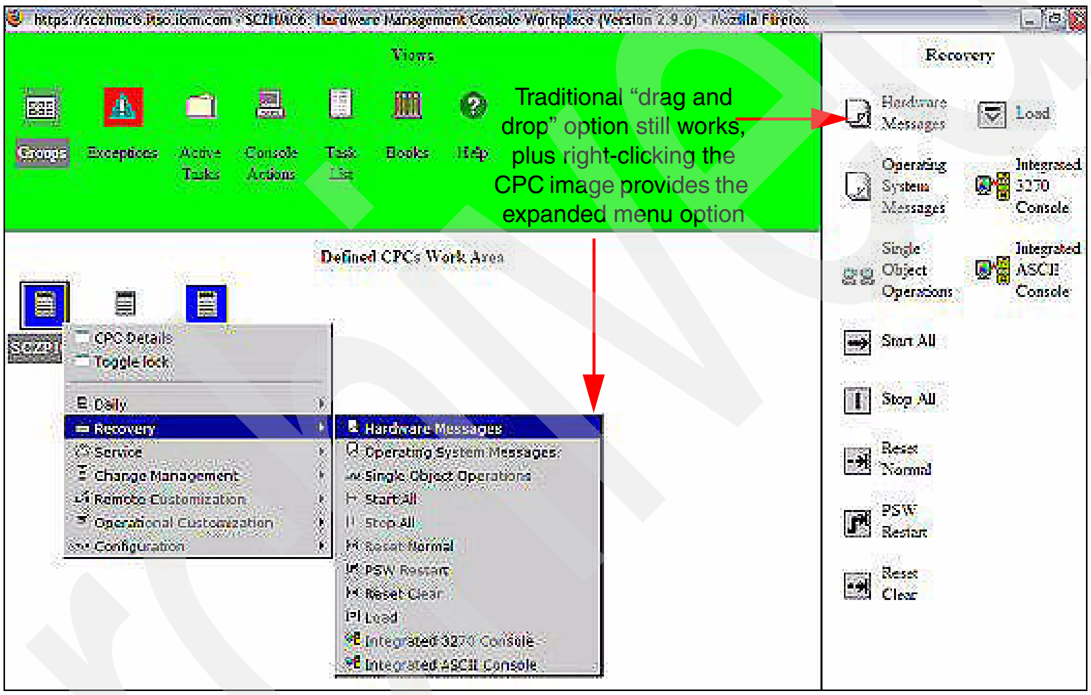


Figure 2-17 HMC application Web browser - additional functionality

You can lock out disruptive actions on objects. (Note that these are user-specific options, not global options. If you lock out a disruptive task via your Web browser, the task is locked out only out for your user ID, not for other users.)

The locking process is easier than on previous HMCs. Simply right-click the object you want to lock, and the option Toggle Lock will be displayed; see Figure 2-18 on page 46.

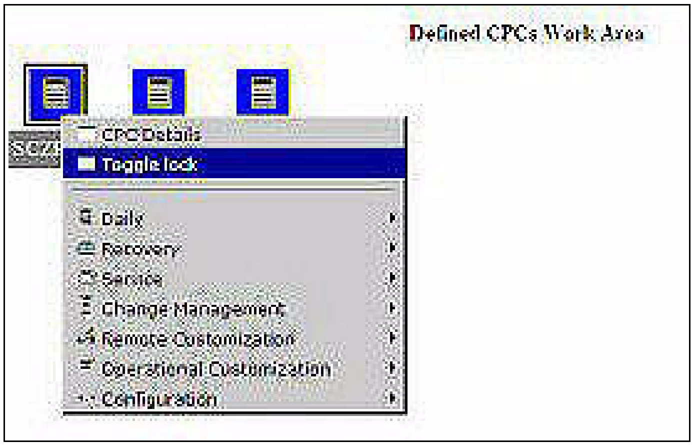


Figure 2-18 HMC application Web browser - locking option

Remember, when selecting the Toggle Lock option on the HMC, the object will be locked for disruptive tasks for *your* user ID. To unlock the object, select the Toggle Lock option again.

The workplace pop-up menu opens on any empty space in the workplace screen. Right-click any empty space in the workplace, and you will be presented with a pop-up menu displaying the options Console Actions and Groups. This is useful for navigating quickly to any console task you want to perform, and for viewing specific group definitions; see Figure 2-19.

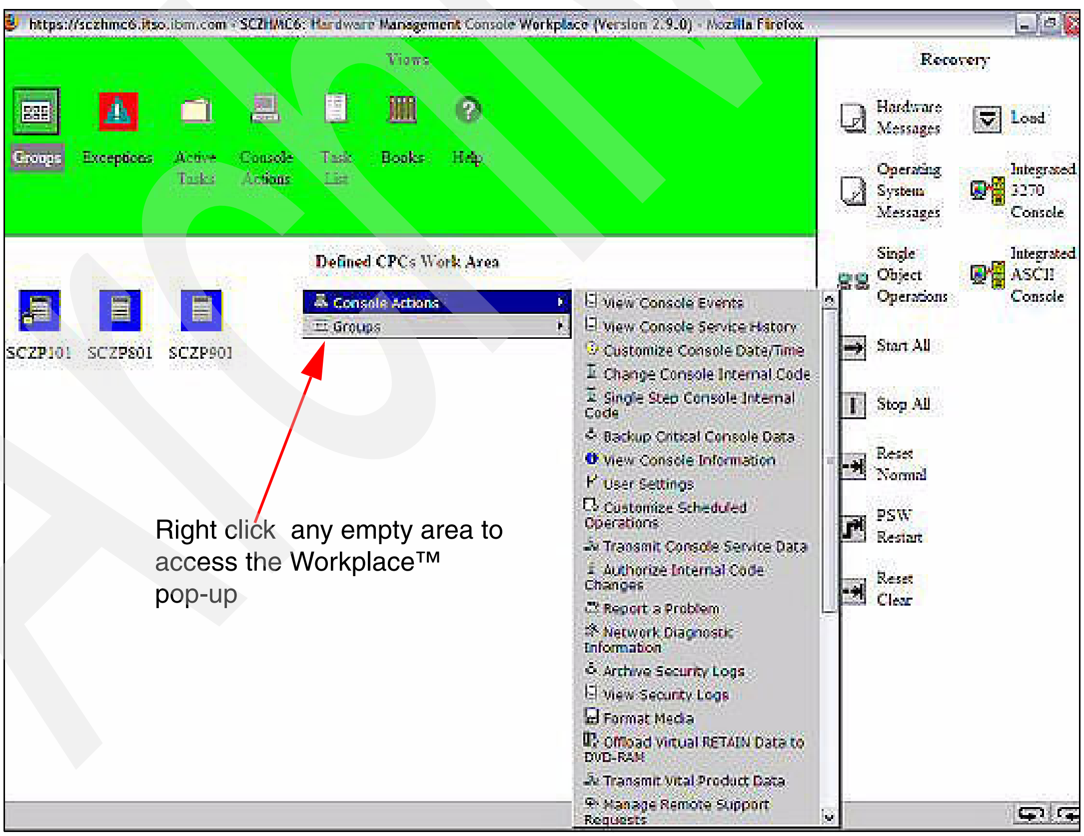


Figure 2-19 HMC application Web browser - quick navigation pop-up workplace

2.6.4 HMC-specific tasks

Most HMC tasks can be performed from a workstation by using a Web browser to log on to the HMC application. However, some tasks can only be performed by using the HMC workstation. One of these is importing an IOCP source file into the SE. The HMC must be used when importing an IOCP deck file from a diskette.

You can use either of two options to import the source file:

- Use the diskette drive on the HMC
- Use the File Transfer Program (FTP)

By default, the Support Element reads from the HMC diskette drive when importing the IOCP source file; see Figure 2-20. If accessible from the z9-109 operations LAN, an FTP location may be specified for the IOCP source file. This is useful for remote support.

Note: Some installations may have to address security concerns regarding the SE accessing a different location to retrieve the IOCP source.

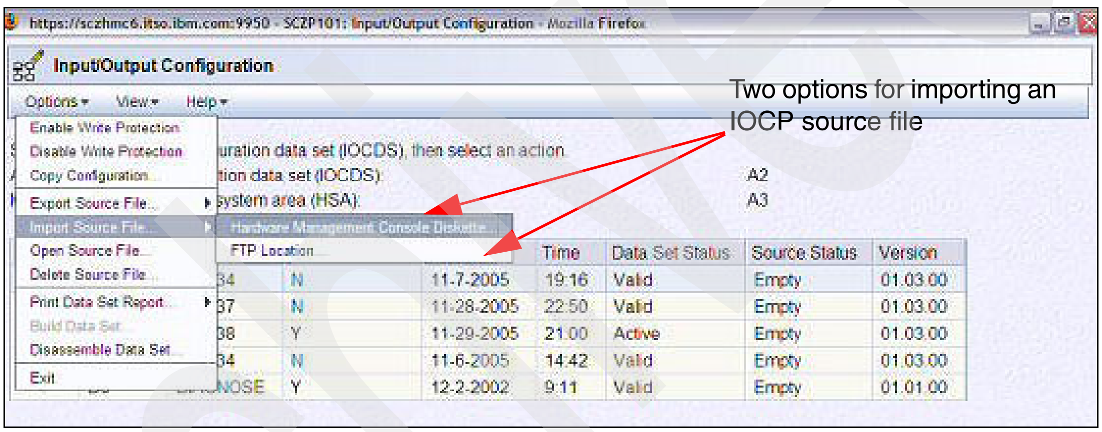


Figure 2-20 HMC application Web browser - IOCP source import function

Using the FTP option means that users can import files from a workstation other than the HMC; see Figure 2-21.

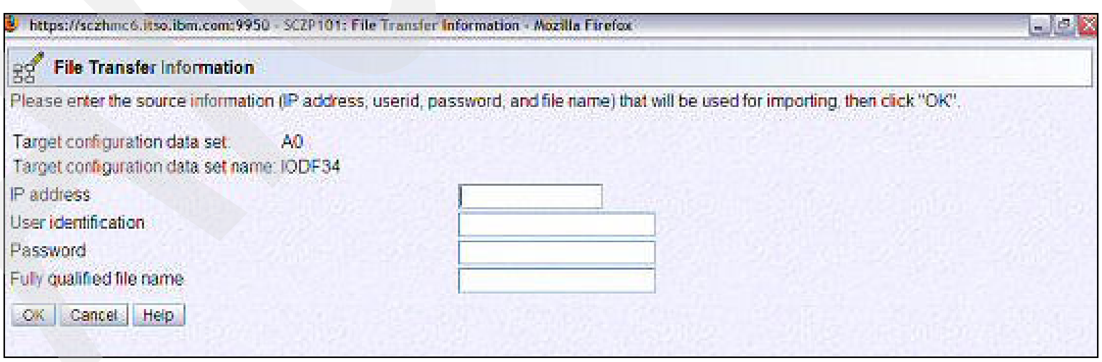


Figure 2-21 HMC - IOCP source FTP

If a user logs in to the SE, the session reserves the SE until the user logs out. No other user can establish a connection until the SE is released; see Figure 2-22 on page 48.

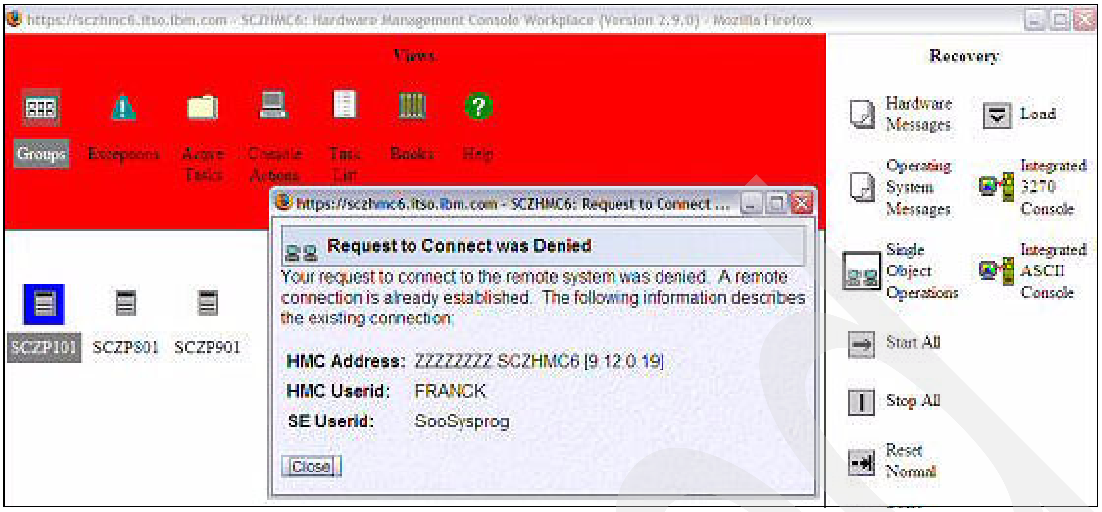


Figure 2-22 HMC application Web browser Single Object Operations - multiple user connections

3

I/O configuration planning

In this chapter we describe the planning steps to take when you install a z9-109. These steps apply whether you are upgrading from an existing server or installing a new z9-109.

We discuss the following topics:

- Tools
- Hardware Configuration Definition (HCD)
- Hardware Management Console (HMC)
- Logical partitions
- Channel considerations
- Capacity and concurrent upgrades
- Software support

3.1 Tools

The first step to planning for installation of the z9-109 is accessing Resource Link. You need to register with a client site number and 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 z9-109. There are a number of tools that are needed to simplify the installation process of a z9-109. If you have worked with most of them before, be sure to check for the latest versions that are relevant to z9-109. The tools include the CHPID Mapping Tool, the HSA size estimator, and the Coupling Facility Structure Sizer Tool.

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

You can reach the Resource Link Web site here:

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

The examples used in this document use tools, such as HCD or CMT, which refer to the Machine type as opposed to server names. Table 3-1 lists the Machine types for current IBM System z servers.

Table 3-1 IBM servers and Machine type

Server	Abbreviated name	Machine type
IBM System z9-109	z9-109	2094
IBM @server® zSeries 990	z990	2084
IBM @server zSeries 890	z890	2086
IBM @server zSeries 900	z900	2064
IBM @server zSeries 800	z800	2066

3.2 Hardware Configuration Definition (HCD)

Hardware Configuration Definition (HCD) provides the capability to make dynamic hardware and software I/O configuration changes. For ease of management, it is strongly recommended that you use HCD to build and control the z9-109, z890, or z990 input/output configuration definitions. To ensure that you are running an operating system that allows you to use HCD to view and change the z9-109 configuration, see 3.7, “Software support” on page 72.

If your system is not running at z/OS V1.7, you need to ensure that the operating system has the appropriate PTFs applied for HCD and IOCP, so that you can use the current HCD or HCM to define the z9-109, machine type 2094. Be aware that if you are running z/OS V1.7, the HCD version changes the IODF from V4 to V5 IODF.

HCD changed some of its displays to make them easier to read, and saves on space, in IODF V5. In the I/O device list, for example, where formerly every defined device was listed in the display, you will now see groups of devices listed together; see Figure 3-1 on page 51.

```
 I/O Device List      Row 615 of 911 More:
Command ===> ____________________________________________ Scroll ===> CS
Select one or more devices, then press Enter. To add, use F11.

  ----------Device------ --#--- --------Control Unit Numbers + --------
/ Number   Type +        CSS OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
_ 6400,36  3390B         3   6  6400 ____ ____ ____ ____ ____ ____ ____
_ 6494,108 3390A         3   5  6400 ____ ____ ____ ____ ____ ____ ____
_ 6500,36  3390B         3   6  6500 ____ ____ ____ ____ ____ ____ ____
_ 6594,108 3390A         3   5  6500 ____ ____ ____ ____ ____ ____ ____
_ 6600,36  3390B         3   6  6600 ____ ____ ____ ____ ____ ____ ____
_ 6694,108 3390A         3   5  6600 ____ ____ ____ ____ ____ ____ ____
_ 6700,36  3390B         3   6  6700 ____ ____ ____ ____ ____ ____ ____
_ 6794,108 3390A         3   5  6700 ____ ____ ____ ____ ____ ____ ____
_ 6800,50  3390B         1   1  6800 ____ ____ ____ ____ ____ ____ ____
_ 6832,206 3390A         1   1  6800 ____ ____ ____ ____ ____ ____ ____
_ 6900,50  3390B         1   1  6900 ____ ____ ____ ____ ____ ____ ____
_ 6932,206 3390A         1   1  6900 ____ ____ ____ ____ ____ ____ ____
_ 6A00,50  3390B         1   1  6A00 ____ ____ ____ ____ ____ ____ ____
_ 6A32,206 3390A         1   1  6A00 ____ ____ ____ ____ ____ ____ ____
_ 6B00,50  3390B         1   1  6B00 ____ ____ ____ ____ ____ ____ ____
_ 6B32,206 3390A         1   1  6B00 ____ ____ ____ ____ ____ ____ ____
_ 6C00,50  3390B         4   6  6C00 ____ ____ ____ ____ ____ ____ ____
_ 6C32,206 3390A         4   6  6C00 ____ ____ ____ ____ ____ ____ ____
_ 6D00,50  3390B         4   6  6D00 ____ ____ ____ ____ ____ ____ ____
```

Figure 3-1 HCD - example I/O Device List

Notes:

- If you are running z/OS 1.7 only on some systems, and upgrade the IODF to V5 from V4, all subsequent changes must be done using HCD from z/OS 1.7. You cannot use a z/OS pre-V1.7 HCD to update a V5 IODF.
- If you plan to use MSS, you *must* use HCD on a z/OS 1.7 system.

A V5 IODF uses significantly less disk space than a V4 IODF. An example of file size reduction when using an IODF V5 and HCD in z/OS 1.7 is shown in Table 3-2.

Table 3-2 Comparison of file size reduction

z/OS version	HCD version	IODF version	Device numbering grouping	IODF example size (4K blocks)	IODF example size (cylinders)
V1R4 - V1R6	V1R4	V4	No	318 K	1600
V1R7	V1R7	V5	Yes	14 K	78

You can verify the IODF version in HCD as follows:

- Select option **Maintain I/O definition files**.
- Then select option 4, **View I/O Definition file Information**.

The information shown in Figure 3-2 on page 52 is displayed.

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


 IODF name  . . . . . . : 'SYS6.IODF38'
 IODF type  . . . . . . : Production
 IODF version . . . . . : 5

 Creation date  . . . . : 2005-11-29
 Last update  . . . . . : 2005-11-29  14:57

 Volume serial number . : IODFPK
 Allocated space  . . . : 1247    (Number of 4K blocks)
 Used space . . . . . . : 1223    (Number of 4K blocks)
    thereof utilized (%)  97

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

Figure 3-2 HCD display for IODF version

3.2.1 HCD in z/OS V1.7 and Version 5 IODF

The HCD version shipped in z/OS V1R7 generates an IODF with a new version 5 format. When migrating to a version 5 IODF, you must make sure that coexistence code is installed on other z/OS V1R4/5/6 systems that access the IODF.

z/OS V1R4 through to R6 generate IODFs in Version 4 format; HCD in these z/OS releases cannot be upgraded to the HCD level included in z/OS V1R7. The consequence is that HCD in z/OS releases prior to V1.7 cannot create or update an IO definition file created or updated to IODF Version 5.

One reason for the change in IODF V5 is due to the requirement for more device definitions. With the introduction of Multiple Subchannel Sets, Global mirror, and so on, the number of devices in the IODF is increasing. Large IODFs also require more virtual storage and increased processing time, resulting in slower performance.

In z/OS V1.7, HCD provides a conversion function to upgrade from a V4 IODF to a V5 IODF.

When accessing an IODF in V4 format from a z/OS 1.7 system, the IODF format is converted to an in-storage IODF V5, and message CBDG549 is issued to inform the user that a back-level IODF is being accessed. However, as long as no migration is requested, the V5 IODF format is not saved and the copy on disk remains in the V4 IODF format.

After migration to the new Version 5 IODF, only a z/OS V1R7 system can update the IODF. Compatibility support (SPE) is provided so that activation functions can be processed using a pre-V1.7 release of z/OS when using the IODF V5 format. For z/OS V1R4 to R6 HCD, SPE OA07875 is provided, which allows read access to a V5 IODF.

> **Important:** An IO Definition file written in V5 format cannot be downgraded to V4, nor can it be updated by HCD in z/OS V1R4 to R6. Any HCD levels prior to z/OS V1R4 HCD cannot read a V5 IODF.

When an action non-supported on a V5 IODF is requested from a pre-V1.7 level of HCD, the request is denied and the following error message is issued:

```
CBDA493I Requested action can not be performed on version 5 IODF nnnn on z/OS 1.4 HCD.
```

Table 3-3 summarizes combinations to be considered for a migration from IODF V4 to V5.

Table 3-3 IODF migration to V5

	Function	z/OS V1R7	z/OS V1R4 to V1R6	
			Compatibility SPE installed	**Compatibility SPE *not* installed**
IODF V4 created by HCD prior to z/OS V1R7	HCD Read IODF	Yes	Yes	Yes
	HCD Write to IODF	No requires migration to IODF V5	Yes	Yes
	IPL	Yes	Yes	Yes
	Dynamic Activation	Yes	Yes	Yes
IODF V5 created by HCD z/OS V1R7	HCD Read IODF	Yes	Yes	No
	HCD Write to IODF	Yes	No	No
	IPL	Yes	Yes	No
	Dynamic Activation	Yes	Yes	No

3.2.2 Accessing a Version 4 IODF using z/OS V1.7 HCD

You can access a Version 4 IODF using z/OS V1.7 HCD, but the IODF will be temporarily upgraded in memory to a Version 5 IODF in order to permit access to the configuration information; see Figure 3-3.

```
 z/OS V1.7 HCD
+-------------- Maintain I/O Definition Files ---------------+ ___________
|                                                            |
|                                                            |
| Select one of the following tasks.                         |
|                                                            |
| __   1.  Delete I/O definition file                        |
|      2.  Copy I/O definition file                          |
|      3.  Change I/O definition file description            |
|      4.  View I/O definition file information              |
|      5.  Export I/O definition file                        |
|      6.  Import I/O definition file                        |
|      7.  Work with Configuration Packages                  |
|      8.  Upgrade I/O definition file to new format         |
|                                                            |
|  F1=Help     F2=Split    F3=Exit     F9=Swap    F12=Cancel |
+------------------------------------------------------------+
+--------------------------------------------------------------------------+
| IODF SYS6.IODF40 is a version 4 IODF. It has been temporarily upgraded to |
| a version 5 IODF.                                                         |
+--------------------------------------------------------------------------+
```

Figure 3-3 Accessing a Version 4 IODF using z/OS 1.7 HCD

If you then go to option 4 View I/O definition file description, you will notice that the IODF version is still Version 4—but now you are able to view the contents on the IODF; see Figure 3-4.

```
 z/OS V1.7 HCD
+--------------- Maintain I/O Definition Files ---------------+ ___________
|                                                              |
|   +---------------- View I/O Definition File Information -----------------+
| S |                                                                        |
|   |                                                                        |
| 4 | IODF name  . . . . . . . : 'SYS6.IODF40'                              |
|   | IODF type  . . . . . . . : Production                                 |
|   | IODF version . . . . . . : 4                                          |
|   |                                                                        |
|   | Creation date  . . . . . : 2005-06-14                                 |
|   | Last update  . . . . . . : 2005-06-14  16:23                          |
|   |                                                                        |
|   | Volume serial number . . : IODFPK                                     |
|   | Allocated space  . . . . : 16005   (Number of 4K blocks)              |
|   | Used space . . . . . . . : 15988   (Number of 4K blocks)              |
+-- |    thereof utilized (%)  5                                           |
r o |                                                                        |
    | Activity logging . . . . : Yes                                        |
O d | Backup IODF name . . . . :                                            |
    |                                                                        |
    | Description  . . . . . . :                                            |
    |                                                                        |
    +------------------------------------------------------------------------+
```

Figure 3-4 Viewing a Version 4 IODF using z/OS 1.7 HCD

3.2.3 Upgrade a Version 4 IODF to Version 5 with z/OS V1.7 HCD

If you need to update a Version 4 IODF with z/OS 1.7 HCD, you will have to upgrade the IODF to Version 5 format; select **Upgrade I/O definition file** in HCD option 6.8.

Select the IODF you wish to upgrade by entering its data set name in the Primary HCD panel. Then select option 6, **Maintain I/O definition files**. z/OS 1.7 HCD upgrades the in-storage copy of the IODF to a Version 5 IODF, as shown Figure 3-3 on page 53.

Now select option 8, **Upgrade I/O definition file to new format**. We recommend that you select option 1 for both Target of Upgrade and Condense IODF; see Figure 3-5 on page 55 and Figure 3-6 on page 55.

```
                       z/OS V1.7 HCD
C +--------------- Maintain I/O Definition Files ---------------+ ___________
  |                                                             |
  |   +--------------------- Upgrade I/O Definition File ---------------------+
  | S |                                                                       |
S |   |                                                                       |
  | 8 | Select a target for the IODF to be upgraded.                          |
6 |   |                                                                       |
  |   | IODF name . . . . . . . : 'SYS6.IODF40'                               |
  |   |                                                                       |
  |   | Target of upgrade . . . . 1   1.  To new work IODF                    |
  |   |                               2.  In place                            |
  |   |                                                                       |
  |   | Condense IODF . . . . . . 1   1.  Yes                                 |
  |   |                               2.  No                                  |
  |   |                                                                       |
  +-- |  F1=Help    F2=Split   F3=Exit    F9=Swap   F12=Cancel                |
For o +-----------------------------------------------------------------------+

I/O definition file . . . 'SYS6.IODF40'                          +
```

Figure 3-5 Upgrading a Version 4 IODF to Version 5 using z/OS 1.7 HCD

Figure 3-6 shows the results.

```
 z/OS V1.7 HCD
C +--------------- Maintain I/O Definition Files ---------------+ ___________
  |                                                             |
  |   +--------------------- Upgrade I/O Definition File ---------------------+
  | S |                                                                       |
S |   |   +----------------- Create Work I/O Definition File -----------------+
  | 8 | S |                                                                   |
6 |   |   |                                                                   |
  |   | I | The current IODF was created by an earlier HCD release, and you   |
  |   |   | have requested upgrade to a new data set. To create this data     |
  |   | T | set, specify the following values.                                |
  |   |   |                                                                   |
  |   |   | Source IODF  . . . . : 'SYS6.IODF40'                              |
  |   | C |   Allocated space  . : 15988                                      |
  |   |   |   Used space . . . . : 15988                                      |
  |   |   |                                                                   |
  +-- |   | IODF name  . . . . . . 'SYS6.IODF41.WORK'___________________      |
For o +-- |                                                                   |
          | Volume serial number . IODFPK  +                                  |
I/O defin |                                                                   |
          | Space allocation . . . 2000    (Number of 4K blocks)              |
          |                                                                   |
          |                                                                   |
          |  F1=Help    F2=Split   F3=Exit    F4=Prompt  F9=Swap   F12=Cancel |
          +-------------------------------------------------------------------+
```

Figure 3-6 Version 5 Work IODF Upgrade Target using z/OS 1.7 HCD

Finally, the completed process of upgrading the Version 4 IODF to Version 5 is shown in Figure 3-7 on page 56.

```
 z/OS V1.7 HCD
C +--------------- Maintain I/O Definition Files ---------------+ _________
  |                                                             |
  |                                                             |
  | Select one of the following tasks.                          |
S |                                                             |
  | 8   1.  Delete I/O definition file                          |
6 |     2.  Copy I/O definition file                            |
  |     3.  Change I/O definition file description              |
  |     4.  View I/O definition file information                |
  |     5.  Export I/O definition file                          |
  |     6.  Import I/O definition file                          |
  |     7.  Work with Configuration Packages                    |
  |     8.  Upgrade I/O definition file to new format           |
  |                                                             |
  |  F1=Help     F2=Split    F3=Exit     F9=Swap    F12=Cancel  |
  +-------------------------------------------------------------+
F +------------------------------------------------------------------------+
  | Back-level IODF upgraded to new z/OS 1.7 HCD format and stored in IODF |
I | SYS6.IODF41.WORK.                                                      |
  +------------------------------------------------------------------------+
```

Figure 3-7 Completed Version 5 Work IODF Upgrade using z/OS 1.7 HCD

Now when you display the newly created work IODF using HCD option 6.4, you will notice that the IODF is now a Version 5 and the number of 4 K blocks has significantly reduced from the Version 4 IODF; see Figure 3-8.

```
 z/OS V1.7 HCD
C +--------------- Maintain I/O Definition Files ---------------+ __________
  |                                                             |
  |   +---------------- View I/O Definition File Information -----------------+
  | S |                                                                       |
S |   |                                                                       |
  | 4 | IODF name  . . . . . . : 'SYS6.IODF41.WORK'                           |
6 |   | IODF type  . . . . . . : Work                                         |
  |   | IODF version . . . . . : 5                                            |
  |   |                                                                       |
  |   | Creation date  . . . . : 2005-11-17                                   |
  |   | Last update  . . . . . : 2005-11-17  17:23                            |
  |   |                                                                       |
  |   | Volume serial number . : IODFPK                                       |
  |   | Allocated space  . . . : 2000    (Number of 4K blocks)                |
  |   | Used space . . . . . . : 894     (Number of 4K blocks)                |
  +-- |    thereof utilized (%)  97                                           |
For o |                                                                       |
      | Activity logging . . . : No                                           |
I/O d | Backup IODF name . . . :                                              |
      |                                                                       |
      | Description  . . . . . :                                              |
      |                                                                       |
      +-----------------------------------------------------------------------+
```

Figure 3-8 Viewing a Version 5 IODF using z/OS 1.7 HCD

3.2.4 Hardware System Area (HSA) size estimator tool

The HSA size estimator tool helps you to plan your storage purchase more precisely. Many people are unaware of the increase in the approximate size of the HSA, even if only the server been upgraded, with no additional devices. Because of the many new features on the z9-109, and depending how many of the features you exploit, the size of the HSA can increase. Therefore, the amount of client usable storage can vary.

The HSA size estimator can be found in Resource Link, under the Tools tab. We recommend that you use this tool to ensure that you have configured adequate storage. 2.5.5, "Hardware System Area (HSA) estimator" on page 38 provides more information on how to use this tool.

As input, you need to enter the proposed configuration. Decide if you are going to use Dynamic I/O activation, HiperSockets, how many Channel Subsystems to use, how many partitions to use in each LCSS, as well as the number of devices to use in each LCSS.

and the number of Channel Subsystems (CSS), partitions, and devices in each LCSS. These options all affect the amount of usable storage and the HSA size on the z9-109 server. The maximum amount of storage that the HSA can go to is approximately 4.5 GB.

3.2.5 Coupling Facility Structure Sizer

The Coupling Facility Structure Sizer tool is used to monitor various aspects of Coupling Facility partitions. It is useful for gathering information on structure sizes, usage, potential bottle necks 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.

3.3 Hardware Management Console (HMC)

As previously mentioned, the HMC now runs as a closed application. No other applications (such as the Sysplex Timer console software) can be placed on the HMC.

On the HMC you can now utilize either the classic view that most readers are familiar with, or the new tree view. We recommend staying with the classic view for now. Once you are more comfortable with the new HMC application, you may want to try the new tree view and see if it is better suited to your setup.

The Resource Link Web site provides an online tutorial that helps to familiarize you with the new HMC application. Select the Education tab and follow the links to the HMC tutorial. Refer to 2.6, "Hardware Management Console V2.9.0" on page 40 for more detailed information.

Connectivity for HMC and SE

The HMC V2.9.0 only has Ethernet connections. Token ring adapters are not available.

The Support Element (SE) is connected to the HMC by one or two LANs. If the second is connected, it is used for automatic failover. The default HMC configuration has two Ethernet LAN interfaces, but if a previous HMC was upgraded to the new driver level, it still supports Token Ring connections. The HMC must have at least one Ethernet connection to connect to the SE.

A standard HMC setup is to have one HMC near the server, and the other in the Operations area. But this may no longer be needed, because the HMC application is accessed from any workstation with a supporting Web browser. The only requirement is to have one HMC on the LAN.

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

- Four Ethernet cables (about 15 m). These connect to each Ethernet adaptor in each SE. Usually only one adaptor is connected in each SE.
- An Ethernet switch, automatically ordered.
- An HMC workstation with two Ethernet adaptors and an HMC display. Older upgraded HMCs may have a Token Ring adaptor.
- A optional modem interface.

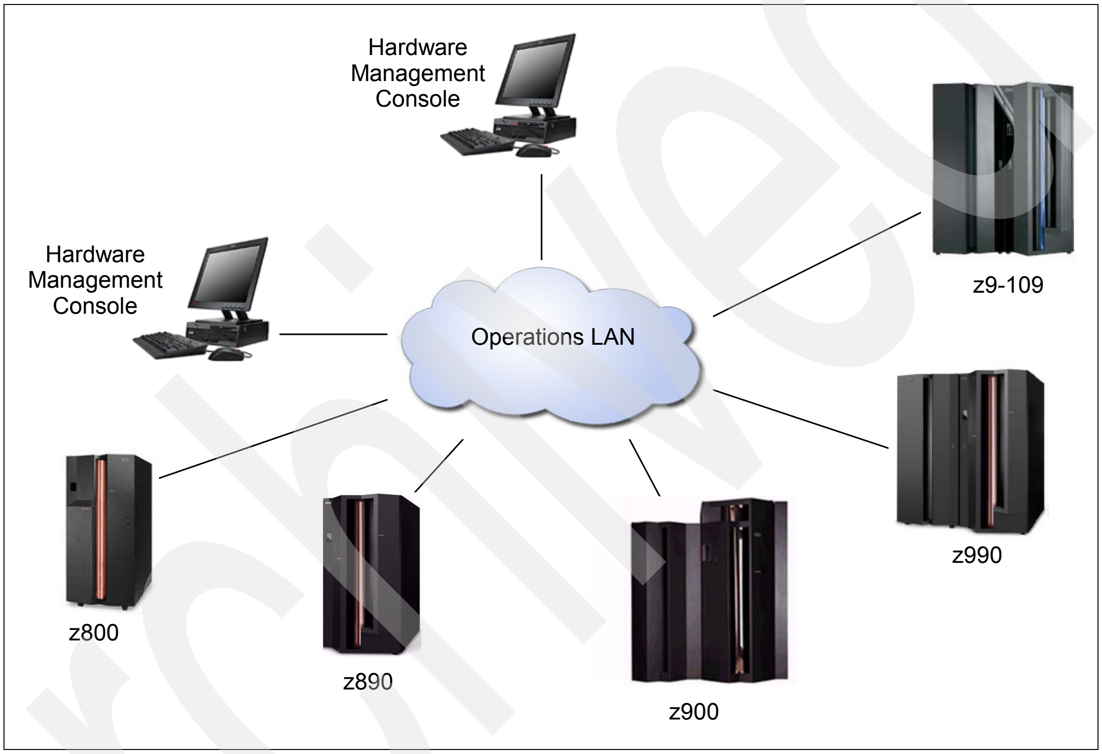


Figure 3-9 HMC connected to System z9 and zSeries servers

The modem (if present) is used for Remote Support Facility (RSF) connections to transfer MCLs and system status. If a fault occurs in the z9-109, the HMC can place a call to IBM Support and can also transfer error information and logs to reduce the impact of a server outage.

If there are HMCs running an HMC application level prior to V2.9.0 on the LAN, they are not able to control the new z9-109. The new HMC can operate previous servers, provided they have the correct driver level.

HMC support for previous zSeries and S/390 servers

HMC V2.9.0 also supports the following zSeries and S/390® servers when at the correct driver and MCL level:

- zSeries 990 at Driver 55 with MCL 132 to EC J13486
- zSeries 890 at Driver 55 with MCL 132 to EC J13486
- zSeries 900 at Driver 3G with MCL 194 to EC J11213
- zSeries 800 at Driver 3G with MCL 194 to EC J11213

- Parallel Enterprise Server - Generation 5 and 6 at Driver 26 with the following MCLs:
  - MCL 174 to EC F99918
  - MCL 009 to EC J11172
  - MCL 009 to EC J10392
  - MCL 006 to EC J11920

  Earlier drivers are not supported.

3.4 Logical partitions

The z9-109 can only run in LPAR mode. You can have a mixture of z/OS, zVM, Linux® and Coupling Facility partitions defined. Logical partitions are defined to each LCSS, and each LCSS can have a maximum of 15 logical partitions. A LCSS does not need to have a total of 15 logical partitions defined before defining logical partitions in the next LCSS.

With four LCSSs defined, you can have up to 60 logical partitions on a z9-109. LCSSs can also support Multiple Subchannel Sets (MSS), provided the logical partition is running z/OS V1.7; the second MSS can only be used for device type 3390A alias devices.

Once a logical partition is defined to a LCSS ID, whether it is a named or reserved logical partition, to add another logical partition or delete a logical partition from a LCSS requires a power-on reset.

Define logical partitions

Each LCSS can have 15 logical partitions and you can have a total to 60 logical partitions defined. When defining a logical partition, you need to decide the following:

- Which LCSS it is going to be defined in, if you have more than one LCSS.
- What its name is going to be, remembering that the name must be unique across the entire z9-109. That is, the name cannot be duplicated across the LCSSs; for reserved logical partitions use an asterisk (*).
- What the MIFID is going to be. This is a hexadecimal value between x'1' and x'F'. This value is limited to the LCSS that the logical partition is defined in. For example, you can have a logical partition numbered x'1' in both LCSS 0 and in LCSS 1.
- What its use is going to be. Logical partitions can be defined as OS (for z/OS, zVM or Linux), CF or CF/OS, which means it can be used as either.

Another consideration that you should plan for is the use of reserved logical partitions. Reserved logical partitions eliminate the need to power-on reset the server every time you need to add or remove a logical partition.

Reserved logical partitions are assigned no resources; they are just place holders in the z9-109 configuration that can be configured and dynamically activated when needed. For a full discussion refer to 12.

Assign channels

You can assign a maximum of 256 channels to a LCSS/logical partition. This means you can have 1024 channels defined (4 LCSS x 256 channels). However, you must note that spanned channels decrease the total number of channels available on the z9-109. Consider the following: if a z9-109 has two LCSSs, it means that 512 channels are supported. But if they are all defined as spanned, only 256 can be supported, which is the maximum that a logical partition can have defined.

Assign devices

If you have certain devices that need to be accessible only from certain logical partitions, then you have to make sure that the Candidate lists are updated accordingly for those devices. If you have a mixture of z/OS 1.7 and pre-z/OS 1.7 systems, and you want to use the MSS facility, ensure that you have updated the Candidate lists for the alias device type (3390A).

Only the z/OS 1.7 systems can see the alias devices in MSS1, which means that the logical partitions with z/OS 1.7 need to access only the aliases in MSS1—the other logical partitions must be excluded from seeing them.

3.5 Channel considerations

As previously mentioned, certain types of channels and channel definitions are no longer supported on the z9-109. Some feature codes can only be carried over to the z9-109, 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 z9-109.

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

A channel is considered spanned when its CHPID number in all LCSS is the same, and it is assigned to the same PCHID. When assigning a spanned channel, it is defined as OPERATION MODE = SPAN; see Figure 3-10.

```
____________________________ Add Channel Path _____________________________
e Specify or revise the following values.
Processor ID . . . . : SCZP101
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 3-10 HCD - define spanned channels

Another type of channel is the *internal channel*. Internal channels do not get assigned a PCHID value. There are two types of internal channels that can be used: ICP and IQD channels. Table 3-4 on page 61 lists the channel types and definitions that are supported on a z9-109.

Table 3-4 Supported channel types and definitions

Channel type	CHPID definition	MIF shared	Spanned
ESCON	CNC, CTC	Yes	No
	CVC, CBY	No	No
FICON Express	FC, FCP	Yes	Yes
	FCV	Yes	No
FICON Express2	FC, FCP	Yes	Yes
OSA Express	OSD, OSE, OSC	Yes	Yes
OSA Express2	OSD, OSE, OSC, OSN	Yes	Yes
ICB-4	CBP	Yes	Yes
ICB-3	CBP	Yes	Yes
ISC-3	CFP	Yes	Yes
IC (Internal CHPID)	ICP	Yes	Yes
HiperSockets (Internal CHPID)	IQD	Yes	Yes

3.5.1 Parallel channels

The z9-109 does not support the attachment of parallel channels. Devices using parallel channels need to be connected via a converter device, such as the IBM 9034 or Optica 34600 FXBT.

Parallel attached devices are connected to a converter, and the converter is connected to a 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.

3.5.2 FICON channels

A z9-109 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 3-11 on page 62.

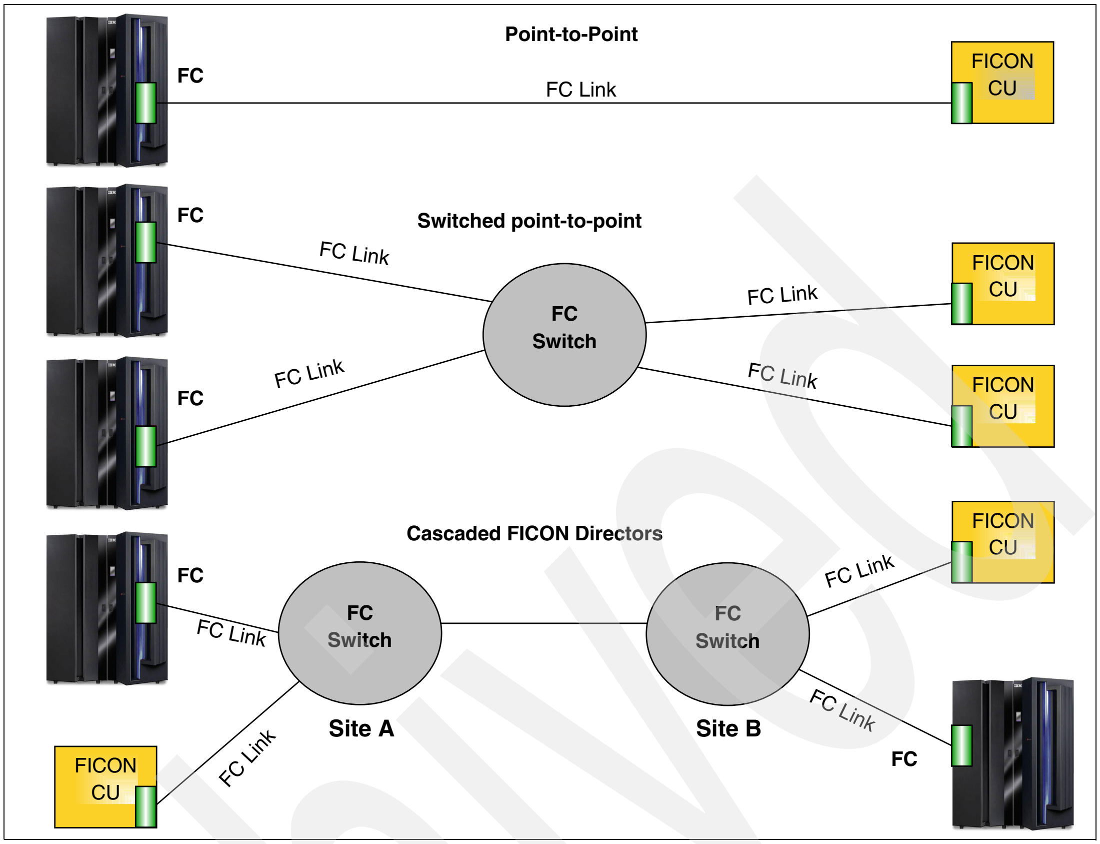


Figure 3-11 Supported FICON topologies

- 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. On FICON Express2, you cannot define FCV channels. If you wish to still use FCV channels, the FICON Express LX cards must be carried over to the z9-109. The IBM 9032 model 5 director has been withdrawn form marketing, and no replacement is available. FCV channels can only be defined as MIF-shared. They cannot be spanned.

- Fibre Channel Protocol mode (FCP)

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

  The z9-109 FICON Express and FICON Express2 provide support for Fibre channel and SCSI interfaces in Linux environments. FCP channels can be defined as MIF-shared and spanned; refer to Figure 3-12 on page 63.

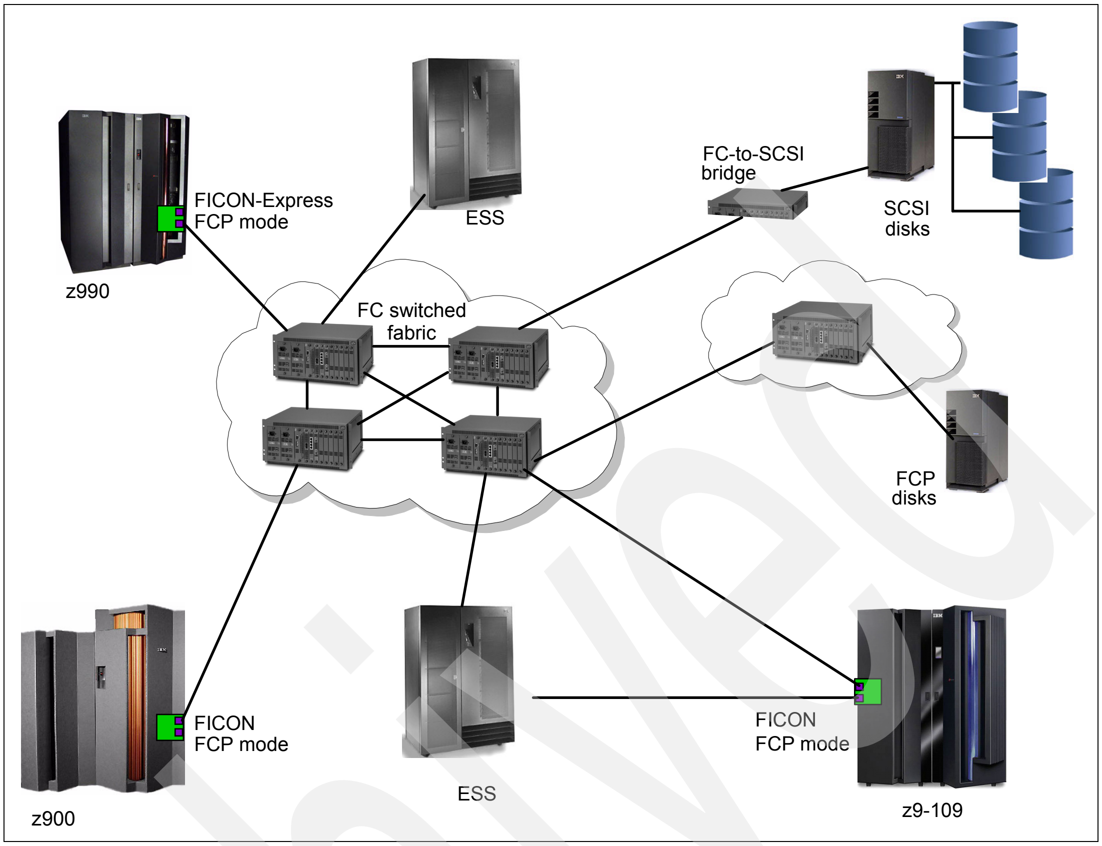


Figure 3-12 FCP connectivity topologies

3.5.3 ESCON Channels

ESCON channel support on a z9-109 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. If you are upgrading from a z900 that uses the 4-port ESCON card (feature code 2313), you need to ensure that you have sufficient MT-RJ/ESCON Duplex conversion kit jumper cables. All ESCON ports in the z9-109 use the industry standard MT-RJ connector.

ESCON channels cannot be defined as spanned. They can be defined as MIF-shared in a LCSS, but can only be configured to one LCSS at a time. Within a LCSS, 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 LCSSs that access the same 2074, then you need to configure a ESCON PCHID in each LCSS to access the 2074 via a 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 chained ESCON directors - This configuration allows for connections over extended distances.

3.5.4 Coupling links

The z9-109 does not allow ISC-3 links to be defined as sender (CFS) or receiver (CFR) CHPID types. All ISC-3 Coupling links must be defined in peer mode only (CFP).

Therefore, a z9-109 cannot connect to a 9672 G5/G6 server, as G5/G6 Coupling links are defined as CFS/CFR (compatibility mode). ICB-2 links are not supported. Only ICB-3 and ICB-4 can be used. It is recommended that ICB-4 Coupling Facility connections be used as these provide a greater data transfer rate. 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.
- ICB-3 and ICB-4 in peer mode (CBP). Intergrated Cluster Bus (ICB) channels are used to connect zSeries servers over short distances, to a maximum of 10 meters (33 feet). With three meters for internal routing in servers, it means that the servers can be no more that seven meters apart.
- Internal Coupling links in peer mode (ICP). Internal Coupling channels are zSeries linkless connections (controlled by Licensed Internal Code) that do not need any hardware or cabling. They provide connectivity between a Coupling Facility and logical partitions running on the same CPC.

When configuring a z9-109 in a Parallel Sysplex configuration, you need to ensure that the other zSeries servers have the correct channel type and definition to connect to a z9-109.

3.5.5 Open Systems Adapter (OSA)

The z9-109 supports the OSA Express and OSA Express2 features. The OSA Express feature can be carried over from a z990 during an upgrade, while the OSA Express2 are ordered as new features.

Certain OSA features are not supported on the z9-109, as follows:

- 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 passthru and SNA on the same port.
- OSA-2 FDDI

  Can be replaced by a multi-protocol router. The OSA-Express2 would have a Ethernet connection to the router, and the router would perform the FDDI conversion.
- OSA-Express 155 ATM

  Can be replaced by a OSA Express2 1000BASE-T Ethernet or OSA Express2 Gigabit Ethernet and a multi-protocol router with the appropriate network interfaces.
- OSA-Express Token Ring

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

A typical OSA network could appear as illustrated in Figure 3-13 on page 65, which shows all the current supported OSA connectivity across System z servers.

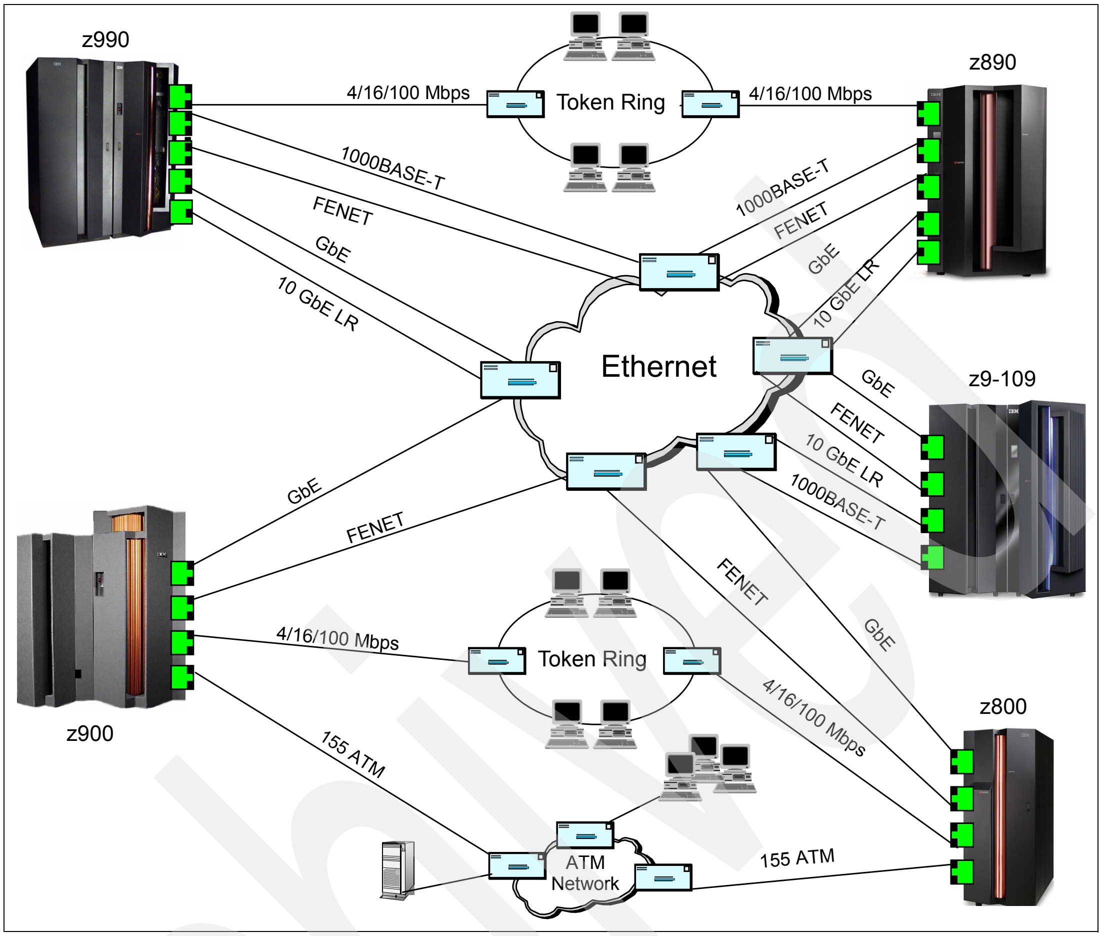


Figure 3-13 OSA supported connectivity across z Series servers

The OSA Express or OSA Express2 1000BASE-T Ethernet feature can also be used for OSA-Express Intergrated Console Controller (OSA-ICC). This allows you to configure a 3174 or 2074 console controller. These can be used as a replacement for 3174 or as a additional console controller to the 3174 or 2074. The OSA-ICC is a standard feature on the OSA Express and Express2 1000BASE-T Ethernet feature. It can be used by coding the channel type as OSC in HCD.

A new function on for the OSA Express2 on the z9-109 is the Integrated Channel Data Link Control function (OSA-CDLC). It uses OSA Express2 Gigabit Ethernet and OSA Express2 1000BASE-T Ethernet adaptors. The channel is defined as OSN (OSA-NCP) and can be used to replace IBM 3745 control units running NCP. As with OSA-ICC, OSA-NCP is a standard feature on the OSA Express2 Gigabit and 1000BASE-T Ethernet adaptors. In order to exploit this feature for OSA-NCP, you must use a Linux logical partition running the appropriate application.

3.5.6 HiperSockets

HiperSockets provide the fastest TCP/IP communications between z/OS, zVM, VSE/VSA, and Linux logical partitions on a z9-109. HiperSockets provide internal “virtual” local area networks that act like TCP/IP networks inside a z9-109. 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 HyperSocket is defined as a channel type IQD. It is assigned a CHPID value, but no PCHID. We recommend using the high CHPID range for IQD channels (x'FF, FE, FD, FC....) to ensure that no CHPID addressing conflicts occur with other real channels. When defining a 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 LCSS and as spanned channels across multiple LCSSs. An 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.

Figure 3-14 on page 67 shows how HiperSockets when defined as MIF-shared and spanned work. HiperSockets supported functions on a z9-109 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
- IPv6 support is exclusive to a z9-109 and requires z/OS v1.7.

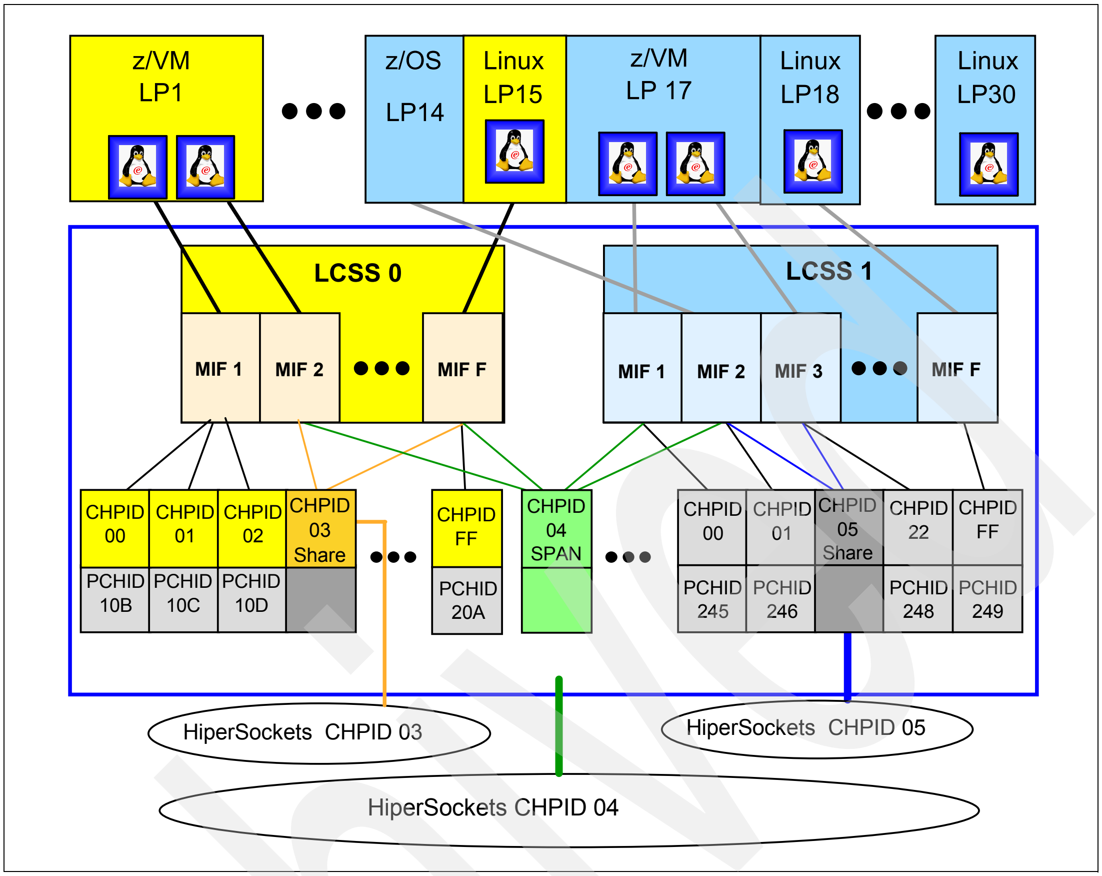


Figure 3-14 HiperSocket definitions on a z9-109

3.5.7 Configuration rules

Table 3-5 summarizes the maximum number of CHPID types supported on System z servers.

Table 3-5 System z9 and zSeries maximum number of supported channels

Maximum channel paths (CHPID type)	z9-109	z990	z890	z900		z800		
				General[a]	100	General[b]	0CF	0LF
Channel paths (total)	1024	1024[c]	420[d]	256	64	256	64	256
BL, BY	n/a	n/a	n/a	96	n/a	n/a	n/a	n/a
CVC, CBY, CNC, CTC	1024[e]	1024[c]	420[d]	256	n/a	240	n/a	240
FCV, FC, FCP, OSD, OSE,OSC[n], OSN[o]	336[f]	120	40	96	n/a	32	n/a	32
CFS, CFR, CFP, CBS, CBR CBP, ICP	64[g]	64	64[h]	64	64	58[h]	58[h]	n/a
CFS, CFR, CFP, CBS, CBR, CBP	64[g]	64	58[h]	64	64	26[h]	26[h]	n/a
CFS, CFR, CFP	48[i]	48	48	32	42[j]	24	24	n/a
CBS, CBR	n/a	8	n/a	16[k]	16	n/a	n/a	n/a

Maximum channel paths (CHPID type)	z9-109	z990	z890	z900		z800		
				General[a]	100	General[b]	0CF	0LF
CBP	32[l]	32[l]	16[m]	16	16	5	6	n/a
ICP	32	32	32	32	32	32	32	n/a
OSA	n/a	n/a	n/a	12	n/a	n/a	n/a	n/a
OSD, OSE, OSC[n], OSN[o]	48	48	40	24	n/a	24	n/a	24
IQD	16	16	16	4	n/a	4	n/a	4

a. For a z900 server, all models in the range 101-116, 1C1-1C9, 210-216, and 2C1-2C9.
b. z800 server general purpose models include the models 0A1, 0A2, 0B1, 0C1, and 001-004.
c. Model A08 supports only 720 channel paths total.
d. 420 refers to 28 card slots populated with ESCON cards having 15 active ports each.
e. Model S08 supports a total of 960 channel paths only.
f. The number of OSD, OSE, and OSC must not exceed the total of 48 channel paths.
g. Compatibility mode (CBR/CBS and CFR/CFS is not supported on z9-109
h. CBS/CBR channels are not supported on z800 and z890 servers.
i. ISC-3 in compatibility mode (CFR/CFS) is not supported on z9-109 servers.
j. The maximum of 42 CFS, CFR, and CFP channel paths on the z900-100 requires an RPQ. Without that RPQ, the maximum is 32.
k. The maximum of 16 CBS/CBR channel paths on the z900 server general purpose models requires an RPQ. Without the RPQ, the maximum is 8.
l. The maximum number of ICB-4 CBPs is 16. The maximum number for ICB-3 CBPs is 16.
m. The maximum number of ICB-4 CBPs is 8. The maximum number for ICB-3 CBPs is 16.
n. Not supported on z900 and z800 servers.
o. Only supported on the z9-109 server.

The maximum combined number of OSA-Express2, OSA-Express, FICON, FICON Express, FICON Express2, Crypto Express2, PCIXCC, PCICC, and PCICA features supported by a zSeries server family are:

- 60 features for the z990
- 20 features for the z890
- 48 features for the z900
- 16 features for the z800
- There is no maximum combined limit for the z9-109. All the I/O cages (84 slots) can be fully populated with these features on the z9-109.

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 logical channel subsystem (LCSS). When defining the I/O configuration for the server LCSS 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 LCSS(s) and logical partition(s)
- ESCON or FICON Director, where appropriate
- Control units attached to the channel paths
- I/O devices assigned to the control units

Some of the general IOCP rules for System z9 and zSeries servers are listed in Table 3-6 on page 69.

Table 3-6 zSeries server machine attributes

Constant machine attributes		z9-109	z990 z890	z900 z800
Maximum configurable Physical Control Units (PCUs)	per BL, BY, CVC, CBY	48[a]	48[a]	48[a]
	per OSD (OSA-Express2)	16	16	n/a
	per OSD (OSA-Express)	1	1	1
	per OSA, OSE, OSC, OSN	1	1	1
	per CFS, CBS	n/a	1	1
	per CFP, CBP, ICP	1	1	1
	PCUs or link addresses per CNC, CTC	120	120	120
	PCUs or link addresses per FCV[b], FC	256	256	256
	PCUs per FCP	1	1	1
	CUs per IQD	64	64	16
Maximum configurable devices	per CFS, CBS	n/a	2	2
	per CFP, CBP, ICP	7	7	7
	per CNC	1024	1024	1024
	per CTC	512	512	512
	per OSA, OSE	255	255	255
	per OSC	254[c]	254[c]	n/a
	per OSD (OSA-Express2)	1920	1920	n/a
	per OSD	480	480	240
	per FCP	480	480	240
	per FCV, FC	16K	16 K	16 K
	for all IQD channel paths	12K	12 K	3072

a. IOCP supports a maximum of 48 to allow you to overgen control units for a path. However, no more than eight control units on a path should be used at one time.
b. FCV channel paths can have link addresses in the range 01 - FE, and therefore have a maximum of 254 link addresses.
c. The number of console sessions is limited to 120 in HMC.

3.5.8 Other planning considerations

Note these additional planning considerations.

HCD considerations

If you are replacing/upgrading an existing zSeries server with a z9-109 that has fewer CHPIDs than the previous server, you may not want to remove the channel definitions you had defined in the previous server, but you do not have the available hardware in the new server. This could be because you plan to get more hardware at a later stage.

For example, supposing the number of FICON channels is less in the z9-109 than in the current zSeries server, but you plan to have more installed at a later stage. You can keep those CHPID definitions in the IODF, thereby saving you from redefining them when the hardware is installed at a later stage.

To keep channel definitions for CHPIDs that do not exist in the new z9-109, simply code an asterisk (*) in the PCHID field. HCD does not generate any CHPID statement to IOCP or the CHPID Mapping Tool for CHPIDs defined with a PCHID value of *.

When creating an IOCP source deck from HCD to be imported to the CHPID Mapping Tool, if there are any channel definitions that cannot be matched to available hardware definitions in the CFReport file, the import operation fails. Rather than deleting these channel definitions in HCD, change the PCHID to an asterisk (*) in HCD.

For Coupling channels, you must disconnect any excessive channels before exporting a IOCP source deck. When the hardware is installed into the z9-109, you can update the PCHID value with the proper PCHID, or a blank (if using the CHPID Mapping Tool), and build a new IODF for dynamic activation.

HSA requirements

Another important implication of the definition phase on a given server is the maximum number of subchannels in the Hardware System Area (HSA). This can have an impact on the amount of memory used by the HSA and how much memory is left. The amount of available memory, once HSA usage is removed, can determine how much memory you need to order. We recommend using the HSA Estimator tool to obtain a precise estimate.

Configuration files

As part of the I/O configuration planning, if you are performing an upgrade from a z990 to a z9-109 or an upgrade from a z9-109 to another z9-109, you need to consider certain channel types that have configuration information that resides on the z9-109 Support Element.

On the z9-109, z990, and z890, customization information for certain channel types is stored in files on the Support Element (SE).

The files are called *configuration files* (or config files) and they are named based on the PCHID value (physical location) of the channel. Table 3-7 lists channel or CHPID types that have config files on a z9-109, z990, or z890, as well as the type of configuration information stored in these files.

Table 3-7 Channel or CHPID type information in configuration files

Channel or CHPID type	Information stored in configuration files
OSA-Express2	Any user-specified MAC addresses and OAT tables
1000BaseT channel defined as CHPID type OSC	Console session information

For an upgrade from a z990 to a z9-109, or an MES for a z9-109, 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 the following:

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

Although the MES upgrade process preserves configuration files on an upgrade from a z990 to a z9-109, it is your responsibility to keep a backup of the customization data stored in the configuration files. For a push/pull upgrade, you must save and restore the information in the configuration files. They will not be automatically saved and restored in a push/pull type upgrade.

You need to record the following information:

- For OSA-Express2 channels, record all user-assigned MAC addresses by using the **Display or alter MAC address** function in Card-specific advanced facilities or user-specified OSA Address Tables (OAT).

  Note: If you are an OSA/SF user, 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.
- Also, any worldwide port name entered into the FICON switch configuration will need to be updated to identify the new 2094.

During an MES upgrade process, the following occurs:

- The channel cards will be moved as part of the normal rebalance of all I/Os.
- The configuration files will be automatically copied from your old system, restored to the new z9-109, 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.

> **Important:** These functions are performed automatically only for an *MES upgrade*. For any kind of push/pull upgrade, it is the client's responsibility to back up the configuration files and restore them to the new locations assigned after running the CHPID Mapping Tool.

3.6 Capacity and concurrent upgrades

The z9-109 has a number of options that allow for temporary or permanent concurrent upgrades to the server. In order to benefit from these functions, however, you must undertake prior planning for configuration resources such as memory, CPs, channels, and I/O.

For a complete description of the Capacity on Demand features and how to use them, refer to *Capacity On Demand User's Guide,* SC28-6846.

Enhanced Book Availability

This option is designed to reduce the impact of outages. EBA allows you to perform nondisruptive book upgrade or replacement. Along with redundant I/O interconnect, it allows a single book, in a multi-book server, to be removed and reinstalled during an upgrade or repair action.

Concurrent Book Add (CBA)

This option is designed to allow a z9-109 to be upgraded concurrently by adding a second, third, or fourth book without affecting processing.

Customer initiated upgrade (CUI)

This option is a Web-based solution that a client can use to order and install a permanent upgrade. This is done by creating a order in IBM Resource Link and then using Remote Service Facility (RSF) to download and activate.

The use of CIU requires a special contract and registration with IBM. CUI is also used for On/Off CoD and CBU. CUI allows concurrent upgrades of CPs, IFLs, zAAPs, and ICFs, as well as memory.

On/Off Capacity on Demand (On/Off CoD)

This option allows you to download a temporary server upgrade through Licensed Internal Code (LIC) enabling. This feature is server-specific and allows for only one order to be activated at a time. Multiple orders can be staged for each server.

Each z9-109 with On/Off CoD is allowed one test where no charge is incurred by the client, provided that the test does not exceed a 24-hour continuous period. The test must be deactivated within 24 hours, or you will be billed for the total time the test is active.

You can find an option to perform an On/Off CoD test in the Resource Link profile for each CPU that has On/Off CoD available.

Capacity Backup (CBU)

CBU is another temporary upgrade option that offers a robust disaster recovery solution. It allows for emergency backup server capacity when processing capacity has been lost elsewhere in the enterprise. It allows up to 90 days of additional capacity to be added to the z9-109.

For a z9-109 with the CBU option, you are allowed to perform up to five 10-day tests for the duration of the contract for the CBU feature. If the test in not deactivated before the end of the 10-day period, the performance of the z9-109 is progressively degraded until you deactivate the CBU feature.

Note: Although both the CBU and On/Off CoD can reside on the same server, only one can be active at a time.

3.7 Software support

The z9-109 has many new functions not available on zSeries servers. However, not all of these functions are available on every operating system. Find your operating system in the following tables and then determine whether your software is at the correct level.

2094DEVICE PSP bucket

In order to be able to define a z9-109 “type” 2094 and “model” S08, S18, S28, S38 or S54 in HCD, you require z9-109 hardware support installed on the operating system that you are using HCD on. This can be done by ordering a Preventative Service Planning (PSP) bucket (2094DEVICE), which installs the appropriate PTFs to support the System z9-109.

Note: Software support information is subject to change; therefore, for the most current information refer to the Preventive Service Planning (PSP) bucket (2094DEVICE).

z/OS V1R4 z990 Exploitation support

If you run z/OS V1.4 on System z9-109 and want to exploit some of the new features introduced with the z9-109, you need to install the z/OS V1R4 z990 Exploitation Feature along with some PTFs.

3.7.1 Operating system support summary

Table 3-8 summarizes the minimum levels of operating systems required by z9-109. z/OS V1 R4 must have either the Compatibility support feature or the Exploitation support feature installed to run on the z9-109.

z/OS 1.7 is the recommended level to support all functionality.

Table 3-8 z9-109 operating system support summary

Operating system	**ESA/390 (31-bit Mode)**	**z/Architect (64-bit mode)**	**Support**
z/OS V1 R4	Yes[a]	Yes	Basic support
z/OS V1 R5	No	Yes	Basic support
z/OS V1 R6	No	Yes	
z/OS V1 R7	No	Yes	Support for new HW functions
z/VM V4 R4	Yes	Yes	Basic support
z/VM V5 R1	No	Yes	Basic support
z/VM V5 R2	No	Yes	
Linux on System z9 - 64-bit	No	Yes	
Linux 390 - 31-bit	Yes	No	
VSE/ESA™ V2 R6	Yes	No	Basic support
VSE/ESA V2 R7	Yes	No	Basic support
z/VSE™ V3 R1	Yes	No	Basic support
TFP V4 R1	Yes	Yes	
z/TFP V1 R1	Yes	Yes	

a. Support through the IBM Accommodation Offering only available for z/OS 1.4

Basic support means that the operating system is capable of recognizing the z9-109 hardware features, but does not exploit them. *Support for new HW functions* means that *some* z9-109 hardware features are exploited. The features exploited may depend on a particular operating system. For example, the program-directed re-IPL feature is exploited only by Linux on System z9.

When running in 64-bit mode (z/Architecture), then Expanded Storage (ES) is supported by z/VM, but not by z/OS. However, if z/OS is used in 31-bit mode (ESA/390), then expanded Storage may be used.

Table 3-9 on page 74 lists the *lowest* levels of various operating systems that support the indicated functions on the z9-109. These lower levels may require PTFs, SPEs, or other additional software to provide the function.

z/OS 1.4 requires either the Compatibility support feature or the Exploitation support feature to run on a z9-109 server.

Table 3-9 Operating system support summary

Function	**z/OS**	**z/VM**	**z/VSE VSE**	**z/TPF TPF**	**Linux on System z9**
Base z9-109 support	1.4	4.4	3.1 2.7	1.1 4.1	SLES 8 RHEL 3
60 logical partitions	1.4[a]	4.4	3.1 N/A	1.1 4.1	SLES 8 RHEL 3
63.75 K subchannels	1.4	4.4			
Multiple subchannel sets	1.7				
MIDAW facility	1.6				
N_Port ID virtualization		5.1	3.1 N/A		SLES 9 with SP3[b]
FICON Link incident report	1.7				
Program directed re-IPL					TBD[b]
OSA Express2 1000BaseT (*CHPID OSC*)	1.4[a]	4.4	3.1 2.7		
OSA Express2 1000BaseT (*CHPID OSD*)	1.4[a]	4.4	3.1 2.7	1.1 4.4	SLES 8 RHEL 3
OSA Express2 1000BaseT (*CHPID OSE*)	1.4[a]	4.4	3.1 2.7		
OSA Express2 OSN	1.4[a]	5.1	3.1 N/A		TBD[b]
OSA Express2 GVRP	1.7	5.2	N/A	NA	TBD[b]
Hipersockets IPv6	1.6	5.2			
CryptoExpress2	1.6	5.1	3.1 2.7		TBD[b]
CPACF Enhancements	1.6	4.4			TBD[b]
Enhanced performance assist for z/VM guests		5.2			TBD[b]
Server Time Protocol[c]	1.7				

a. Exploitation support feature is required.
b. IBM is working with Linux Distribution Partners to provide this function.
c. Statement of Direction.

Note that use of the following functions, new with the z9-109, do *not* extend to zSeries servers:

- 60 logical partitions
- Single system image
- 63.75K subchannels
- Multiple subchannel sets (MSSs)
- MIDAW facility
- N_Port ID virtualization

- FICON link incident report
- Program-directed re-IPL
- OSA-Express2 1000BASE-T Ethernet
- OSA-Express2 GARP VLAN Registration Protocol
- OSA-Express2 OSN support
- HiperSockets IPv6
- Crypto Express2
- Enhanced performance assists for z/VM Linux guests

For the most current operating system information, refer to the following Web sites:

- z/OS

  http://www-1.ibm.com/servers/eserver/support/zseries/zos/

- z/VM

  http://www-1.ibm.com/servers/eserver/support/zseries/zvm/planning.html

- z/TPF

  http://www-306.ibm.com/software/htp/tpf/pages/maint.htm

- z/VSE

  http://www-1.ibm.com/servers/eserver/zseries/zvse/support/preventive.html

- Linux on System z9

  http://www-1.ibm.com/servers/eserver/zseries/os/linux/support.html

Part 2

Configuration setup examples

Part 2 contains several step-by-step setup examples, each organized as a separate chapter.

Although this structure generates some duplication of information across chapters, it provides greater retrievability as readers can select the self-contained chapter that best matches their case.

The following examples are provided:

4

MES upgrade from z900 to z9-109

In this chapter we describe the configuration steps to take when upgrading from a z900 to a z9-109 server.

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.

We discuss the following topics:

- Scenario overview
- HCD - migrate the existing 2064 IODFValidate the 2094 work IODF
- CMT - assign CHPIDs to PCHIDs
- HCD - update the 2094 work IODF with PCHIDs
- Build the 2094 production IODF
- Load the 2094 processor IOCDS
- 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 depicts the general process that we followed in this example. The numbered steps are described following the figure.

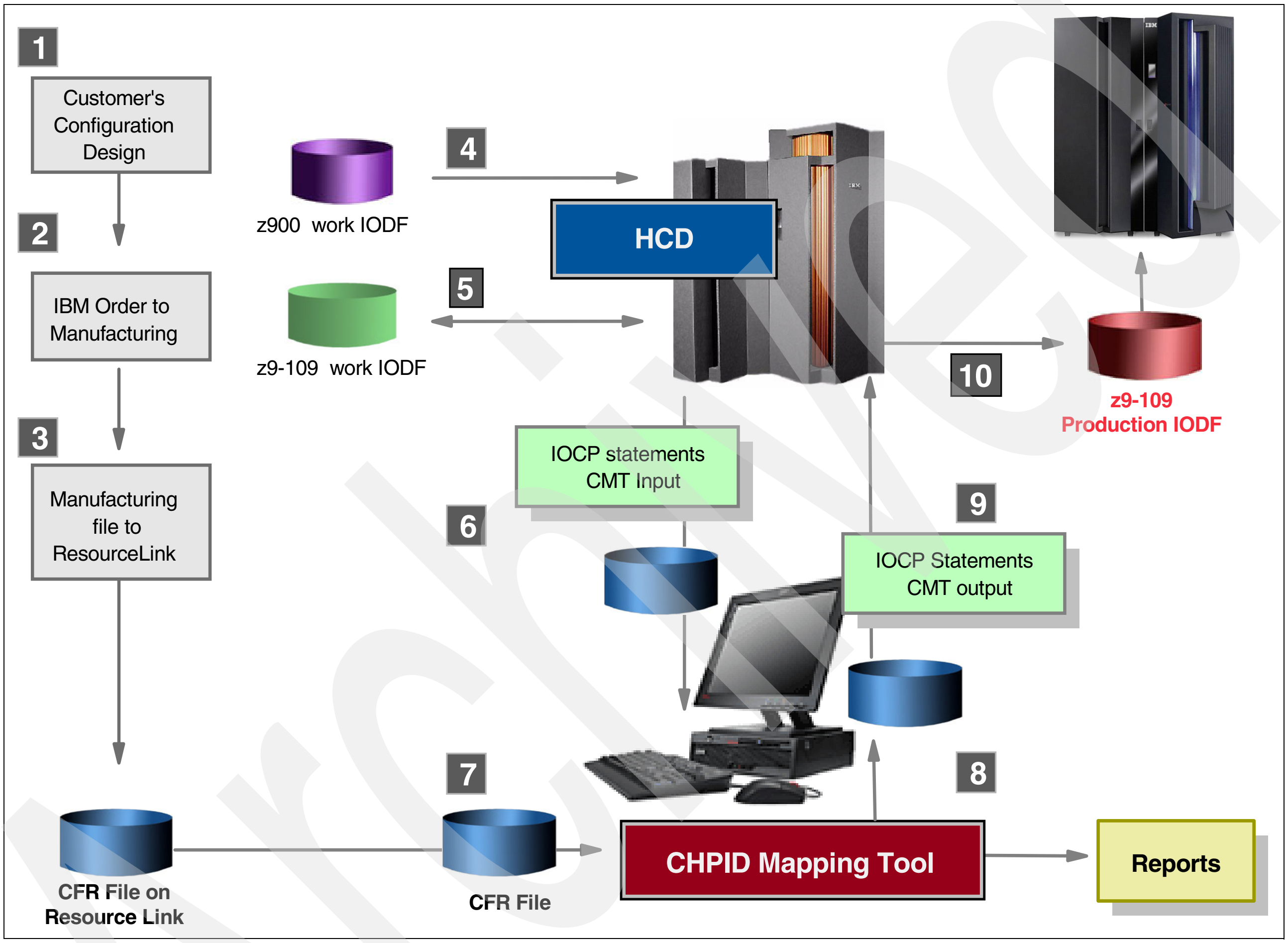


Figure 4-1 z900 to z9-109 - overall process flow

1. When you are planning to migrate to a z9-109, 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 z900 configuration is used as a starting point into HCD. The z900 production IODF is used as input to HCD to create a work IODF that will be the base to define the new z9-109 configuration.
5. When the new z9-109 configuration has been added and the obsolete hardware has been deleted, a validated version of the configuration is saved in a validated work IODF.

6. From the validated work IODF, create a file containing the z9-109 IOCP statements. This IOCP statements file is transferred to the workstation used for the CHPID Mapping Tool (CMT).
7. The configuration file created by IBM Manufacturing in step 3 is downloaded from Resource Link to the CMT workstation. This file is also used as input into the CHPID Mapping Tool.
8. The CHPID Mapping Tool uses the input data from files to map logical channels to physical ones on the new z9-109 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 order additional hardware 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 (and 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 z9-109 production IODF is created. The installation team uses the configuration data from the 2094 production IODF when the final power-on reset is done, yielding a z9-109 with an I/O configuration ready to be used.

If you are upgrading an existing CPC, you may be able to use HCD to write an IOCDS to your current 2064 in preparation for the upgrade. If you can write an IOCDS to your current 2064 in preparation for upgrading it to a 2094, 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 2064 to a 2094.

If the 2064 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, then 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 z900 to a z9-109 can be either in the form of a field upgrade to the existing z900, or a replacement (push/pull) of an existing z900 with a new z9-109. Note the following points:

1. A field upgrade means that the existing z900 processor serial number is retained during the upgrade.
2. A replacement of the existing z900 with a new z9-109 implies physically removing (push) the z900 and bringing in a new z9-109 (pull) to take its place. The replacement z9-109 has a new serial number which is different from that of the existing z900.

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

4.1.2 Planning considerations

Keep the following considerations in mind when planning your upgrade.

Coupling links

If you are currently using CFS, CFR, CBS or CBR CHPIDs, be aware that these are not supported on a 2094 server. They need to be replaced with peer mode links, CFP or CBP. The choice between using CF or CB links depends on what the planned CF connection topology looks like.

Additional CHPIDs

You may want to add more FC, ESCON, or OSA CHPIDs into the configuration. A new eConfig is built by your IBM service representative and you will receive a new CCN, so you can download an updated CFReport file from Resource Link to use as input into the CHPID Mapping Tool.

HMC

The z9-109 requires a new HMC and you require MCLs on the existing Support Element (SE) if you want to use the new HMC to access existing servers. The new HMC only uses Ethernet for its network connection.

Hardware and software support

Some software features exist that are only available with z/OS V1.7, such as Multiple Subchannel Sets (MSS). You also require HCD V1.7 in order to be able to define MSS, which creates a Version 5 IODF. Additionally, you need to apply the maintenance in the 2094DEVICE PSP Bucket to define the z9-109 via HCD.

Features no longer supported

When migrating from a z900 to a z9-109, certain channel types are no longer supported (parallel, byte, 4-port ESCON, OSA-2, ATM, Token Ring and ICB-2). If you currently have channels of these types, you need to perform actions to replace them with channel types that are supported on a z9-109. Allowing for dynamic expansion of HSA is now done using MAXDEV in HCD instead of on the HMC.

CPC ID versus Processor ID

HCD allows you to define different processor configurations to the same CPC. The Processor ID must be unique within the same IODF, but the CPC ID does not. Therefore, the CPC ID does not need to match the Processor ID.

If there is only one CPC ID, then it is a good idea to have it match the Processor ID. This is useful where you may have several processor/logical partition/control unit setups that share the same physical processor within the same IODF.

Verify that the Processor ID matches the one defined for the HWNAME parameter in the LOAD member in SYS1.IPLPARM.

The CPC ID 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 ID, not the Processor ID, that appears on the HMC.

When you view the Network information for a CPC via the HMC, you will observe that the SNA address is made up of a Network name and CPC ID separated by a dot. 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 or view the status of an IOCDS.

4.1.3 Upgrade scenario

This scenario describes the configuration steps to upgrade an existing 2064 to a 2094. We recommend that you define a new Processor ID for the 2094 and to keep the existing 2064 CPC ID for the 2094.

In this scenario, the key objective is the upgrade of the server, and no major I/O reconfiguration is to take place. It is assumed that:

- The 2094 connects to the same switch ports and control unit interfaces as previously.
- The control unit interfaces connect to the same switch ports as previously.
- The starting IODF is the current 2064 production IODF, and the target IODF is a new 2094 work IODF.

The example here shows a 2064-1C7 with a Processor ID of SCZP801 being upgraded, via MES upgrade, to a 2094-S18 with a Processor ID of SCZP102. The CPC ID of SCZP801 and serial number remain unchanged.

The following CHPID types are migrated:

- OSD, OSE
- CTC, CNC, FC, FCP, CVC, CBY, FCV
- CBP, CFP, ICP
- IQD

The following CHPID types are not supported on a 2094, and are *not* migrated.

- CBS, CBR, CFR, CFS
- BL, BY
- OSA

Table 4-1 summarizes the migration options and tool requirements. The step-by-step process is further documented in this chapter.

Table 4-1 2064 I/O configuration upgraded to a 2094

	Upgrade an existing 2064 to a 2094 (MES upgrade)
Processor ID	Required to set new Processor ID for the 2094
CPC ID	Recommended to be the same as the 2064
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	Add processor and copy CSS
CHPID Mapping Tool Program (CMT)	Required
CFReport File (CCN)	Required

	Upgrade an existing 2064 to a 2094 (MES upgrade)
IOCP (import from validated work IODF)	Yes
CMT PCHID reset	N/A, no PCHIDs on z900
CMT IOCP Output	Yes
CMT Reports	Yes, CHPID and CHPID to CU report

4.2 HCD - migrate the existing 2064 IODF

The following steps explain how to define the existing I/O configuration to the new 2094 server using HCD, and then migrate the channel subsystem and logical partitions from the 2064 to the 2094 server. Using HCD, the steps are as follows:

- Create a work IODF from the current 2064 production IODF and add a 2094 processor.
- Copy the channel subsystem from the 2064 to the new 2094 IODF, using subchannel set 0. Verify error messages and take corrective action as appropriate.
- Delete unsupported items (such as CFR, CFS, CBR, CBS, BL, BY, OSA CHPIDs) from the work IODF. If error messages remain, correct the errors and repeat step 2.
- Observe CF link messages for later reference.
- Delete the 2064 processor.
- Define partitions for LCSSs.
- Change MAXDEV for LCSSs.
- Redefine all required CF connections to other processors and any Internal CF connections required.
- Optionally, over-define channel paths.
- Define any additional CHPIDs, control units and devices you may be adding during the upgrade. This includes definition of CFP and CBP links for the CFs.
- Build a 2094 validated Work IODF.
- Create an IOCP statements file and file transfer to the workstation where CMT is installed. This step may also be performed with HCM.

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

Note: When upgrading from a 2064 to a 2094, you cannot use the method of repeating the 2064 and then changing the processor type to 2094 because you will receive the error message:

```
_ E   CBDA197I Processor change causes a switch between single and
#              multiple channel subsystem support. This is not possible
#              for processor xxxxxxxx.
Change of processor type-model leads to invalid definitions.
```

Instead, we recommend using the following technique:

- Add a 2094, then copy the channel subsystem from the 2064 to the 2094.
- Delete the original 2064.

Create work IODF from current 2064 production IODF

- Use HCD to select the current production IODF that contains the 2064 processor that you wish to upgrade. Create a work IODF by making some change to the production IODF. HCD prompts you for the data set name of the new work IODF. When creating the new work IODF, you need to ensure that you have enough space to add the new processor.

Add a 2094 processor

- From the HCD main panel, select option **1.3**, **Processor List**. The list as it appears prior to inserting the new 2094 processor is shown in Figure 4-2.

```
 Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                                Processor List       Row 1 of 7 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
******************************* Bottom of data ********************************
```

Figure 4-2 HCD - Processor List, before adding a new 2094

– Press PF11 to add a processor. The Add Processor panel is displayed, as shown in Figure 4-3. Insert a new processor - type 2094, then fill in the information and press Enter.

```
 ------------------------------- Add Processor ------------------------------


  Specify or revise the following values.

  Processor ID . . . . . . . . . SCZP102_

  Processor type . . . . . . . . 2094____  +
  Processor model  . . . . . . . S18_____  +
  Configuration mode . . . . . . LPAR      +
  Number of channel subsystems . . 4       +

  Serial number  . . . . . . . . 0008012094
  Description  . . . . . . . . . Upgrade 2064 to 2094_(upgrade)__

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

  Network name . . . . . . . . . USIBMSC   +
  CPC name . . . . . . . . . . . SCZP801   +
```

Figure 4-3 HCD - Add Processor panel, adding a 2094 processor

Note that in our example, we filled in the Network Name and CPC Name fields. Because this is a field upgrade, we keep the same Serial number, Network name, and CPC name.

We entered `4` in the field Number of channel subsystems. This does not mean that we are necessarily using all four LCSSs at this point; it is more a case of planning ahead.

HCD displays the resulting Processor List, as shown in Figure 4-4, and it includes the new processor that we just added.

```
 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  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2094     S18      LPAR  0008012094 Upgrade 2064 to 2094 (upgrade)
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
******************************* Bottom of data ********************************
```

Figure 4-4 HCD - Processor List panel, showing added 2094 processor

Copy channel subsystem from 2064 to new 2094 production IODF

- Select the current 2064 processor, SCZP801, by using a forward slash mark (/). Then select option **11**, **Copy to channel subsystem** to copy the channel subsystem from the existing processor to the new 2094 processor channel subsystem 0 (or whichever one you wish to use).

> **Note:** When you copy to the channel subsystem on the 2094, HCD uses defaults for the maximum number of devices (MAXDEV) in subchannel set 0 (SS0) and subchannel set 1 (SS1). They default to 65280 and 0 respectively, for each LCSS.
>
> Leaving the MAXDEV values at the defaults could cause you to waste HSA.

```
-------------- Actions on selected processors ---------------

 Select by number or action code and press Enter.

 11  1.  Add like . . . . . . . . . . . . . . . . (a)
     2.  Repeat (Copy) processor configurations (r)
     3.  Change . . . . . . . . . . . . . . . . . (c)
     4.  Prime serial number  . . . . . . . . . . (i)
     5.  Delete . . . . . . . . . . . . . . . . . (d)
     6.  View processor definition  . . . . . . (v)
     7.  View related CTC connections . . . . . (k)
     8.  Work with partitions . . . . . . (SMP) (p)
     9.  Work with attached channel paths (SMP) (s)
     10. Work with attached devices . . . (SMP) (u)
     11. Copy to channel subsystem  . . . (SMP) (y)
     12. Work with channel subsystems . . (XMP) (p,s)
```

Figure 4-5 HCD - Actions on selected processors, select option Copy to channel subsystem

- The next panel (Identify Target IODF) prompts for the name of the target IODF, as shown in Figure 4-6. By default, the field is the current work IODF, so press Enter.

```
------------------------- Identify Target IODF --------------------------


  Specify the IODF to which the configuration data is to be repeated.

  Target IODF name . . 'SYS10.IODF34.WORK'                         +
```

Figure 4-6 HCD - Identify Target IODF panel

- The next panel (Copy to Channel Subsystem) prompts for information regarding the target processor and the target channel subsystem.

```
---------------------- Copy to Channel Subsystem -----------------------

 Specify or revise the following values.


 Source processor:
 Processor ID  . . . . . : SCZP801

 Target channel subsystem:
 Processor ID  . . . . . . SCZP102_  +
 Channel subsystem ID  . . 0  +
```

Figure 4-7 HCD - Copy to Channel Subsystem panel

If NPIV is used, any worldwide port name entered into the FICON switch configuration will need to be updated to identify the new 2094.

Note: If the current processor has channel types that are not supported on the 2094 processor (such as parallel channels (type=BL) or coupling links that are defined as CFR or CFS), then HCD generates errors.

You need to change the channel definitions to be supported channel types for the new processor type. See Example 4-1 for a list of error messages generated for our example (to save space, we have merged the error messages from multiple screens onto one screen).

Example 4-1 HCD - error messages for non-supported channel types

```
/ Sev Msg. ID  Message Text
 _ E   CBDA154I Channel path type CBS is not supported by channel path
 #              ID 0.00.
 _ E   CBDA440I Operation mode SHR not allowed for channel path 0.00 of
 #              type CBS.
 _ E   CBDA154I Channel path type CBR is not supported by channel path
 #              ID 0.01.
 _ E   CBDA154I Channel path type CBS is not supported by channel path
 #              ID 0.02.
 _ E   CBDA440I Operation mode SHR not allowed for channel path 0.02 of
 #              type CBS.
 _ E   CBDA154I Channel path type CBR is not supported by channel path
 #              ID 0.03.
 _ E   CBDA154I Channel path type BL is not supported by channel path ID
 #              0.70.
 _ E   CBDA154I Channel path type BL is not supported by channel path ID
 #              0.71.
 _ E   CBDA154I Channel path type BL is not supported by channel path ID
 #              0.72.
 _ E   CBDA154I Channel path type BL is not supported by channel path ID
 #              0.73.
 _ E   CBDA154I Channel path type OSA is not supported by channel path
 #              ID 0.80.
 _ E   CBDA440I Operation mode SHR not allowed for channel path 0.80 of
 #              type OSA.
 _ W   CBDG441I The coupling facility connection between channel path 04
 #              of processor SCZP801 and channel path 0.C2 of processor
 #              SCZP901 is not copied.
 _ W   CBDG441I The coupling facility connection between channel path 05
 #              of processor SCZP801 and channel path 0.C3 of processor
 #              SCZP901 is not copied.
 _ W   CBDG441I The coupling facility connection between channel path 06
 #              of processor SCZP801 and channel path 1.C2 of processor
 #              SCZP901 is not copied.
 _ W   CBDG441I The coupling facility connection between channel path 07
 #              of processor SCZP801 and channel path 1.C3 of processor
 #              SCZP901 is not copied.
 _ W   CBDG441I The coupling facility connection between channel path FA
 #              of processor SCZP801 and channel path FB of processor
 #              SCZP801 is not copied.
 _ W   CBDG441I The coupling facility connection between channel path FB
 #              of processor SCZP801 and channel path FA of processor
 #              SCZP801 is not copied.
 _ I   CBDG272I Requested action on object SCZP801 failed.
```

- Execute the appropriate actions to correct the causes of the error messages. Note that message CBDG272I indicates that the requested copy was not performed because of errors:

```
CBDG272I Requested action on object SCZP801 failed
```

Refer to *IBM System z9 and @server zSeries Connectivity Handbook*, SG24-5444, for a list of supported channel types.

> **Note:** The channel path references for the 2094 processor are different from those of the 2064. For the 2094, the channel path is of the form:
>
> ```
> LCSS.CHPID
> ```
>
> So for channel path 0.C2, the error message is referencing CHPID C2 in LCSS 0.

- After the channel types have been changed to supported channel types, retry copying the channel subsystem again. When HCD does not detect any more error conditions, you should receive a screen similar to the one shown in Figure 4-8.

```
------------------------------- Message List --------------------------------
   Save  Query  Help
 ---------------------------------------------------------------------------
                                                            Row 12 of 20
 Command ===> ___________________________________________ Scroll ===> CSR

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

 / Sev Msg. ID  Message Text
 #              SCZP901 is not copied.
 _ W   CBDG441I The coupling facility connection between channel path FA
 #              of processor SCZP801 and channel path FB of processor
 #              SCZP801 is not copied.
 _ W   CBDG441I The coupling facility connection between channel path FB
 #              of processor SCZP801 and channel path FA of processor
 #              SCZP801 is not copied.
 _ I   CBDG271I Requested action on object SCZP801 successfully
 #              processed.
 ***************************** Bottom of data ******************************
```

Figure 4-8 HCD - warning messages for Copy to Channel Subsystem

Observe CF link messages for later reference

- Note the CF Link Information messages. Specifically, take note of CBDG441I messages, which indicate that the CF link connections have not been copied over to the 2094 definition.
- Note that the following informational message indicates that the copy action was performed:

```
CBDG271I Requested action on object SCZP801 successfully processed
```

Press PF3 to continue with the copy.

- HCD may then display a list of CTC connections (if any are present in the IODF); see Figure 4-9 on page 90. This provides you with the opportunity to modify them if necessary.

Press Enter to accept the CTC connections as displayed.

```
 ------------------------- CTC Connection Update List -------------------------
                                                                Row 1 of 548
 Command ===> ____________________________________________ Scroll ===> CSR

 The following CTC connections are recognized by HCD for the source
 configuration. Select CTC connections to be moved to the target
 configuration. Then press Enter.

 Target processor ID . . . . : SCZP102
 Target channel subsystem ID :

   -----------CTC or FC side----------- ---------CNC/FCV or FC side---------
 / Proc.CSSID Part.    Devices  CH CU   Proc.CSSID Part.    Devices  CH CU
 _ SCZP801    A01      4B00,4   5A 4B00 SCZP102.0  A02      5A90,4   5C 5A90
 _ SCZP801    A01      4B08,4   5B 4B08 SCZP102.0  A02      5A98,4   5D 5A98
 _ SCZP801    A01      4B10,4   5A 4B10 SCZP102.0  A03      5A90,4   5C 5A90
 _ SCZP801    A01      4B18,4   5B 4B18 SCZP102.0  A03      5A98,4   5D 5A98
 _ SCZP801    A01      4B30,4   5A 4B30 SCZP102.0  A05      5A90,4   5C 5A90
 _ SCZP801    A01      4B38,4   5B 4B38 SCZP102.0  A05      5A98,4   5D 5A98
 _ SCZP801    A01      4B40,4   5A 4B40 SCZP102.0  A06      5A90,4   5C 5A90
```

Figure 4-9 HCD - CTC Connection Update List

Set the MAXDEV value for each LCSS

One difference between 2064 and 2094 is that what was previously allowed for dynamic expansion in HSA is now done by setting MAXDEV values in each LCSS in HCD. The MAXDEV values can be seen in the Channel Subsystem List panel.

HCD defaults to 65280 for subchannel set 0 (SS0), and to 0 for subchannel set 1 (SS1). Defining more LCSSs than you are currently using is a way of planning ahead. However, you should be aware that if you leave the MAXDEV values at their defaults for each LCSS—whether used or not—the operating system allocates storage in the HSA.

Therefore, it is a good idea to use the HSA Estimator tool to determine the HSA usage, and then set the MAXDEV values for each LCSS, as you set them in the HSA Estimator tool.

> **Important:** Plan the MAXDEV values carefully because a power-on reset is necessary to change them.

To change the MAXDEV values in HCD, you must be in the Channel Subsystem List.

- From the Processor List panel shown in Figure 4-10 on page 91, type `s` next to the 2094 processor; see Figure 4-10 on page 91.

```
 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  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
s SCZP102  2094     S18      LPAR  0008012094 Upgrade 2064 to 2094 (upgrade)
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
******************************* Bottom of data ********************************
```

Figure 4-10 HCD - Processor List, option s - Work with attached channel paths

The Channel Subsystem List panel is displayed, as shown in Figure 4-11.

```
 Goto  Backup  Query  Help
 ------------------------------------------------------------------------------
                            Channel Subsystem List                  Row 1 of 4
 Command ===> _______________________________________________ Scroll ===> PAGE

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

 Processor ID . . . : SCZP102      Upgrade 2064 to 2094

   CSS Devices in SS0    Devices in SS1
 / ID  Maximum + Actual  Maximum + Actual  Description
 _ 0   65280     14188   0         0       ________________________________
 _ 1   65280     0       0         0       ________________________________
 _ 2   65280     0       0         0       ________________________________
 _ 3   65280     0       0         0       ________________________________
 ******************************* Bottom of data ********************************
```

Figure 4-11 HCD - Channel Subsystem List

- Change the MAXDEV values for SS0 and SS1. There are two ways to change these values, as described here:
  - Type directly over the values for each LCSS in the Channel Subsystem List, as shown in Figure 4-12 on page 92. HCD then displays the following message:

    ```
    Requested change has been performed, but cannot be activated dynamically.
    ```

    This message indicates that the change will only become effective at the next power-on reset of the 2094, using the IOCDS created from the current IODF (once production).

```
 Goto  Backup  Query  Help
 ------------------------------------------------------------------------------
                            Channel Subsystem List                 Row 1 of 4
 Command ===> _______________________________________________ Scroll ===> PAGE

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

 Processor ID . . . : SCZP102      Upgrade 2064 to 2094

   CSS Devices in SS0    Devices in SS1
 / ID  Maximum + Actual  Maximum + Actual  Description
 _ 0   32000     14188   0         0       ________________________________
 _ 1   10000     0       0         0       ________________________________
 _ 2       0     0       0         0       ________________________________
 _ 3       0     0       0         0       ________________________________
 ******************************* Bottom of data ********************************
```

Figure 4-12 HCD - Channel Subsystem List, updating MAXDEV values

– The second way to change the MAXDEV values is by typing c (for change) next to each LCSS to be changed, as shown in Figure 4-13.

```
 Goto  Backup  Query  Help
 ------------------------------------------------------------------------------
                            Channel Subsystem List                 Row 1 of 4
 Command ===> _______________________________________________ Scroll ===> PAGE

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

 Processor ID . . . : SCZP102      Upgrade 2064 to 2094

   CSS Devices in SS0    Devices in SS1
 / ID  Maximum + Actual  Maximum + Actual  Description
 c 0   65280     14188   0         0       ________________________________
 _ 1   65280     0       0         0       ________________________________
 _ 2   65280     0       0         0       ________________________________
 _ 3   65280     0       0         0       ________________________________
 ******************************* Bottom of data ********************************
```

Figure 4-13 HCD - Channel Subsystem List, option c, changing an LCSS

HCD then displays the Change Channel Subsystem panel, as shown in Figure 4-14 on page 93. From this panel, you can change the MAXDEV values for SS0 and SS1 for each LCSS (in this case, LCSS 0). After changing the fields that you want to update, press Enter.

HCD displays the Channel Subsystem List panel, with the updated fields and the following message:

```
Requested change has been performed, but cannot be activated dynamically.
```

This message indicates that the change will only become effective at the next power-on reset of the 2094, using the IOCDS created from the current IODF (once production).

```
------------------------ Change Channel Subsystem -------------------------

 Specify or revise the following values.

 Processor ID . . . . . . : SCZP102      Upgrade 2064 to 2094 (upgrade)
 Channel subsystem ID . . : 0

 Description  . . . . . . . ________________________________

 Maximum number of devices
   in subchannel set 0  . . 32000  +
   in subchannel set 1  . . 0      +
```

Figure 4-14 HCD - Change Channel Subsystem, change MAXDEV value

In our example, we did not change the MAXDEV values for SS1 in any LCSS. We could have changed any of these values to allow for future use of SS1 in any of our defined LCSSs. However, we left the MAXDEV values for SS1 as the default of 0 because the decision to start using SS1 is an option that requires more planning and is not usually done as part of an upgrade scenario.

Delete the current 2064 processor definition

At this point, the channel subsystem has been moved from the 2064 processor to the new 2094 processor. Now you delete the 2064 processor definition (SCZP801).

- From the HCD Processor List panel, type `d` (delete) next to processor `SCZP801`; see Figure 4-15.
- Press Enter to "Confirm Delete Processor".

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2094     S18      LPAR  0008012094 Upgrade 2064 to 2094 (replace)
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
d SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 4-15 HCD - Processor List (deleting processor)

Define logical partitions to all LCSSs on 2094

Define partitions for all logical channel subsystems (LCSS) on the new 2094. Since in our scenario we are migrating from a 2064 which has only one LCSS to a 2094 on which we have defined four LCSSs, at this point logical partitions must be defined to the three new LCSSs.

- From the Processor list panel, select the new 2094 processor by typing `p` (Work with partitions) and then press Enter; see Figure 4-16 on page 94.

Note: If you attempt to validate a work IODF or build a production IODF for a configuration that has LCSSs without any logical partition definitions, you receive the following message:

```
CBDA658I No partitions defined for channel subsystem procid.n.
```

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
p SCZP102  2094     S18      LPAR  0008012094 Upgrade 2064 to 2094 (upgrade)
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 4-16 HCD - Processor List, select Working with partitions

Note: You must define at least one logical partition on an LCSS before you can define any channels to that LCSS. Attempting to display the Channel Path List panel on an LCSS without partitions results in the error message:

```
Define at least one partition for the processor before defining channel paths.
```

The list of LCSSs is displayed. This is because logical partitions are defined to an LCSS and not to a processor. Select the LCSS in which the logical partitions are to be defined by typing p (Work with partitions), and press Enter.

For this example, we are going to add a logical partition to LCSS 1; see Figure 4-17. However, in order for the IODF to be validated, at least one logical partition needs to be created in each LCSS.

```
Goto  Backup  Query  Help
------------------------------------------------------------------------------
                            Channel Subsystem List                  Row 1 of 4
Command ===> _______________________________________________ Scroll ===> PAGE

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

Processor ID . . . : SCZP102      Upgrade 2064 to 2094

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
_ 0   65280     14188   0         0       ________________________________
p 1   65280     0       0         0       ________________________________
_ 2   65280     0       0         0       ________________________________
_ 3   65280     0       0         0       ________________________________
******************************* Bottom of data ********************************
```

Figure 4-17 HCD - Channel Subsystem List

The Partition List panel, which does not yet contain any partitions, will display; see Figure 4-18.

```
---------------------------- Partition List ----------------------------
   Goto  Backup  Query  Help
 ----------------------------------------------------------------------

 Command ===> ________________________________________ Scroll ===> PAGE

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

 Processor ID  . . . . : SCZP102   Upgrade 2064 to 2094 (upgrade)
 Configuration mode  . : LPAR
 Channel Subsystem ID  : 1

 / Partition Name   Number Usage + Description
 **************************** Bottom of data ****************************
```

Figure 4-18 HCD - Partition List panel, before adding a new logical partition

- Use PF11 (or type `Add` on the command line) to add a new logical partition. The Add Partition panel will display, as shown in Figure 4-19.

```
---------------------- Add Partition ----------------------


 Specify the following values.

 Partition name . . . ________
 Partition number . . _      (same as MIF image ID)
 Partition usage  . . OS     +

 Description  . . . . ________________________________
```

Figure 4-19 HCD - Add Partition

- Fill in the Partition name, Partition number, and Description fields and press Enter. Leave the Partition usage field as `OS`.

  If you know the names and descriptions for the new logical partitions, you can enter them now, as shown in Figure 4-20 on page 96.

If you only want to define reserved partitions, then type an asterisk (*) in the Partition name field to create a reserved partition (refer to “Create a reserved partition for future use.” on page 96 for more information about this topic).

```
---------------------- Add Partition ----------------------


 Specify the following values.

 Partition name . . . LPAR1___
 Partition number . . 1      (same as MIF image ID)
 Partition usage  . . OS     +

 Description  . . . . New LPAR in LCSS 1______________
```

Figure 4-20 HCD - Add Partition panel, after fields are filled in

The Partition List panel is displayed, with the new logical partition now added; see Figure 4-21.

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

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

 Processor ID  . . . . : SCZP102   Upgrade 2064 to 2094 (upgrade)
 Configuration mode  . : LPAR
 Channel Subsystem ID  : 1

 / Partition Name   Number Usage + Description
 _ LPAR1           1      OS      New LPAR in LCSS 1
 **************************** Bottom of data ****************************
```

Figure 4-21 HCD - Partition List panel, after adding a new logical partition

- Create a reserved partition for future use.

  Fill in the Partition name, Partition number, and Description fields and press Enter. Type an asterisk (*) in the Partition name field and leave the Partition usage field as `OS`.

```
---------------------- Add Partition ----------------------


 Specify the following values.

 Partition name . . . *_______
 Partition number . . 1      (same as MIF image ID)
 Partition usage  . . OS     +

 Description  . . . . Reserved LPAR 1_________________
```

Figure 4-22 HCD - Add Partition panel, after fields are filled in for reserved logical partition

The Partition List panel is displayed, with the new reserved logical partition now added; see Figure 4-23.

In order to make use of a reserved logical partition, there are a number of activities you need to perform. For more information about that topic, refer to Chapter 11, “Reserved logical partitions” on page 405.

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

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

 Processor ID  . . . . : SCZP102   Upgrade 2064 to 2094 (upgrade)
 Configuration mode  . : LPAR
 Channel Subsystem ID  : 1

 / Partition Name   Number Usage + Description
 _ *                1      OS      Reserved LPAR 1
 **************************** Bottom of data ****************************
```

Figure 4-23   HCD - Partition List panel, after adding a new logical partition

Reconnect the CF channel paths

You have to manually redefine the CF links that were broken when the channel subsystem was copied from the 2064 to the 2094 processor. We suggest that you obtain a CF connection report from the previous 2064 production IODF.

Over-define channel paths for future use

For an XMP processor, you can define a channel path that is not physically installed on the processor. This may be useful if you want to migrate from a server which had more channels defined than the target XMP processor has currently installed, or if you want to prepare a configuration for future upgrades of the channel cards. 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 is not taken into account by an IOCDS write. 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 *, 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 * with its valid PCHID.

To illustrate how we use over-defining in our example, we select a few CHPIDs in our configuration as having been left out of the upgrade until a future date. We can maintain the CHPID and control unit definitions in the IODF until the hardware is installed and PCHIDs are assigned to the CHPIDs. The Production IODF could then be activated dynamically and the PCHID/CHPID/control unit definitions would then become available to the operating system.

> **Note:** However, 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 not connected.

- Display the channels for processor SCZP102. Type `s` next to `SCZP102` on the Processor List panel, and then press Enter; see Figure 4-24.

```
                                Processor List       Row 4 of 7 More:       >
Command ===> _______________________________________________ Scroll ===> PAGE

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
s SCZP102  2094     S18      LPAR  0008012094 Upgrade 2064 to 2094 (upgrade)
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
******************************* Bottom of data ********************************
```

Figure 4-24 HCD - Processor List, select option s

- On the Channel Subsystem List panel shown in Figure 4-25, type `s` (Work with attached channel paths) next to `CSS ID 0` and press Enter.

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

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

Processor ID . . . : SCZP102      Upgrade 2064 to 2094 (upgrade)

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
s 0   65280     14188   0         0       ________________________________
_ 1   65280     0       0         0       ________________________________
_ 2   65280     0       0         0       ________________________________
_ 3   65280     0       0         0       ________________________________
******************************* Bottom of data ******************************
```

Figure 4-25 HCD - Channel Subsystem List

HCD displays the Channel Path List panel for CSS ID 0. Locate the channels that are over-defined in order to update them in HCD. In our example, four FICON channels (TYPE=FC) CHPIDs 5A to 5D are not in our new upgrade; see Figure 4-26 on page 99.

```
                              Channel Path List    Row 87 of 100 More:       >
Command ===> _______________________________________________ Scroll ===> PAGE

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

Processor ID . . . . : SCZP102      Upgrade 2064 to 2094 (upgrade)
Configuration mode . : LPAR
Channel Subsystem ID : 0

                    DynEntry Entry +
/ CHPID Type+ Mode+ Switch + Sw Port Con Mngd Description
_ 5A    FC    SHR   61       61 05       No   ________________________________
_ 5B    FC    SHR   62       62 05       No   ________________________________
_ 5C    FC    SHR   61       61 09       No   ________________________________
_ 5D    FC    SHR   62       62 09       No   ________________________________
_ 5E    FCP   SHR   __       __ __       No   61.0D
_ 5F    FCP   SHR   __       __ __       No   62.0D
_ 60    FCP   SHR   __       __ __       No   Octavian's 2105
_ 61    FCP   SHR   __       __ __       No   Octavian's 2105
_ EC    IQD   SHR   __       __ __       No   ________________________________
_ ED    IQD   SHR   __       __ __       No   ________________________________
_ EE    IQD   SHR   __       __ __       No   ________________________________
_ EF    IQD   SHR   __       __ __       No   ________________________________
_ FA    ICP   SHR   __       __ __   N   No   WTSCPLX1
_ FB    ICP   SHR   __       __ __   N   No   WTSCPLX1
****************************** Bottom of data ********************************
```

Figure 4-26 HCD - Channel Path List

- Type c next to each of the four CHPIDs in order to change the PCHID value to an asterisk (*), and then press Enter. The Change Channel Path Definition panel will be displayed for each CHPID selected, as shown in Figure 4-27.

```
--------------------- Change Channel Path Definition ----------------------


  Specify or revise the following values.

  Processor ID . . . . : SCZP102      Upgrade 2064 to 2094 (upgrade)
  Configuration mode . : LPAR
  Channel Subsystem ID : 0

  Channel path ID . . . . 5A    +            PCHID . . . ___
  Channel path type . . . FC    +
  Operation mode . . . . . SHR  +
  Managed . . . . . . . . No   (Yes or No)   I/O Cluster ________   +
  Description . . . . . . ________________________________

  Specify the following values only if connected to a switch:

  Dynamic  ntry switch ID  61  + (00 - FF)
  Entry switch ID . . . . 61  +
  Entry port . . . . . . . 05  +
```

Figure 4-27 HCD - Change Channel Path Definition

Type an asterisk (*) in the PCHID field and press Enter. Then press Enter again when prompted by HCD for the Access List and the Candidate List. Repeat the same operation for each CHPID that is over-defined.

Here is another way to change the PCHID values for the four CHPIDs:

- Press PF20 in the Channel Path List panel, update the PCHID fields directly on the panel, and then press Enter; see Figure 4-28.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                              Channel Path List    Row 87 of 100 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=A10
B=A11       C=A12       D=A13       E=A14       F=C3
                          I/O Cluster  --------- Partitions 0x -----
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   PCHID
_ 5A    FC    SHR   No    ________     a a a a a a a a a a a a a a _   *
_ 5B    FC    SHR   No    ________     a a a a a a a a a a a a a a _   *
_ 5C    FC    SHR   No    ________     a a a a a a a a a a a a a a _   *
_ 5D    FC    SHR   No    ________     a a a a a a a a a a a a a a _   *
_ 5E    FCP   SHR   No    ________     _ _ _ c _ _ _ _ c _ _ a _ _ _   ___
_ 5F    FCP   SHR   No    ________     _ _ _ c _ _ _ _ c _ _ a _ _ _   ___
_ 60    FCP   SHR   No    ________     _ _ _ c _ _ _ _ c _ _ a _ _ _   ___
_ 61    FCP   SHR   No    ________     _ _ _ c _ _ _ _ c _ _ a _ _ _   ___
_ EC    IQD   SHR   No    ________     a a a a a a a a a a a a a a _   ___
_ ED    IQD   SHR   No    ________     a a a a a a a a a a a a a a _   ___
_ EE    IQD   SHR   No    ________     a a a a a a a a a a a a a a _   ___
_ EF    IQD   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ a _ _ _   ___
_ FA    ICP   SHR   No    ________     a a a _ a a a a _ _ a _ a _ a   ___
_ FB    ICP   SHR   No    ________     a a a _ a a a a _ _ a _ a _ a   ___
******************************* Bottom of data ********************************
```

*Figure 4-28 HCD - Channel Path List, changing PCHID to **

Define additional I/O

This is where you define any additional CHPIDs, control units, and I/O devices that you may be adding to the 2094 configuration as part of the upgrade.

4.3 Validate the 2094 work IODF

Now the 2094 work IODF must be validated, as explained in this section.

- From the HCD main panel shown in Figure 4-29 on page 101, select option **2**, **Activate or process configuration data**, and press Enter.

```
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 . . . 'SYS10.IODF34.WORK'                    +
```

Figure 4-29 HCD - main menu, select Activate

- The Activate or Process Configuration Data panel is displayed as shown in Figure 4-30. Select option **12**, **Build validated work I/O definition file** and press Enter.

```
  ----- Activate or Process Configuration Data ------


   Select one of the following tasks.

   12  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 4-30 HCD - Activate or Process Configuration Data

HCD will now display messages related to the validation of the work IODF. Messages with a warning severity are generally acceptable; see Figure 4-31 on page 102.

Any message with a severity higher than W, however, will need to be resolved and then the validation must be redone.

```
------------------------------- Message List --------------------------------
   Save  Query  Help
 ---------------------------------------------------------------------------
                                                                Row 1 of 139
 Command ===> ___________________________________________ Scroll ===> PAGE

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

 / Sev Msg. ID  Message Text
 _ W   CBDG081I Following 2 operating system configurations of type MVS
 #              have no console devices defined: OPENMVS1, TRAINER
 _ W   CBDG061I Switch control unit must be defined for switch 20.
 _ W   CBDG061I Switch control unit must be defined for switch 90.
 _ W   CBDG061I Switch control unit must be defined for switch 91.
 _ W   CBDA857I No channel paths attached to partition A1D of processor
 #              SCZP101.1.
 _ W   CBDA857I No channel paths attached to partition A2D of processor
 #              SCZP101.2.
 _ W   CBDG483I CBP channel path 0.C0 of processor SCZP101 is not
 #              connected. It should be connected to a channel path of
 #              type CBP.
```

Figure 4-31 HCD - Message List, from validating a work IODF

- Press PF3 to exit the panel. A confirmation message `Requested action successfully processed` is displayed; see Figure 4-32. Proceed to the next step without leaving the panel.

```
 ----- Activate or Process Configuration Data ------

  Select one of the following tasks.

  12  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

+-------------------------------------------+
| Requested action successfully processed. |
+-------------------------------------------+
```

Figure 4-32 HCD - Activate or Process Configuration Data, validate work IODF confirmation

Create an IOCP deck for CHPID Mapping Tool

Now an IOCP deck must be created, as explained here.

- Select option **3**, **Build IOCP input data set**, and press Enter; see Figure 4-32.

```
----- 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 4-33 HCD - Activate or Process Configuration Data, option 3, Build IOCP

- HCD displays the list of available processors. Select the processor for which you would like to create the IOCP deck by typing a forward slash mark (/) next to it, and then press Enter; see Figure 4-34.

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

 Select one.

   Processor ID  Type     Model    Mode  Description
   ISGSYN        2064     1C7      LPAR
   ISGS11        2064     1C7      LPAR
   SCZP101       2094     S18      LPAR
 / SCZP102       2094     S18      LPAR  Upgrade 2064 to 2094 (upgrade)
   SCZP701       9672     XX7      LPAR
   SCZP901       2084     C24      LPAR
   WOJ1          2084     A08      LPAR
 **************************** Bottom of data *****************************
```

Figure 4-34 HCD - Available Processors, select processor for IOCP deck

- On the Build IOCP Input Data Set panel, shown in Figure 4-35 on page 104, enter the information regarding the IOCP dataset to be created.

  Fill in the IOCP input data set field, type `Yes` in the Input to Stand-alone IOCP? field, complete the Job statement information for the installation, and then press Enter. A batch job is submitted to create the data set and its content.

```
------------------------- Build IOCP Input Data Set -------------------------

 Specify or revise the following values.

 IODF name . . . . . . . . . : 'SYS10.IODF34.WORK'
 Processor ID  . . . . . . . : SCZP102
 Title1 . ________________________________________________________________
 Title2 : SYS10.IODF34.WORK - 2005-11-17 17:45

 IOCP input data set
 'iocp.text'________________________________________
 Input to Stand-alone IOCP?  Yes  (Yes or No)

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

Figure 4-35 HCD - Build IOCP Input Data Set

- In TSO, verify that the data set you just created exists and that it contains IOCP statements; see Figure 4-36 on page 105 for an example. This data set is used as input in "Import IOCP file into CHPID Mapping Tool" on page 108, so you need to download it from TSO to the 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.

- Note that part of the TOK statement has been blanked out with dots; see Example 4-2.

Example 4-2 HCD - IOCP file (TOK statement)

```
TOK=('SCZP102',00800221991E2094182844420105321F00000000,
00000000,'05-11-17','18:28:44','........','........')
```

This is a safeguard to ensure that this IOCP deck 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 from 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.

Examining the RESOURCE statement in Figure 4-36 on page 105, you see the logical partition definitions for each of the LCSSs, even the reserved logical partition definition `(CSS(1),(*,1))`.

```
         ID    MSG2='SYS10.IODF34.WORK - 2005-11-17 18:28',           *
               SYSTEM=(2094,1),                                        *
               TOK=('SCZP102',00800221991E20941828444201O5321F00000000,*
               00000000,'05-11-17','18:28:44','........','........')
         RESOURCE PARTITION=((CSS(0),(A01,1),(A02,2),(A03,3),(A04,4),(A*
               05,5),(A06,6),(A07,7),(A08,8),(A09,9),(A10,A),(A11,B),(A*
               12,C),(A13,D),(A14,E),(C3,F)),(CSS(1),(*,1)),(CSS(2),(LP*
               AR2,2)),(CSS(3),(LPAR3,3))),                            *
               MAXDEV=((CSS(0),65280,0),(CSS(1),65280,0),(CSS(2),65280,*
               0),(CSS(3),65280,0))
         CHPID PATH=(CSS(0),04),SHARED,                                *
               PARTITION=((A01,A02,A03,A05,A06,A07,A08,A09,A10,A11,A13,*
               C3),(=)),TYPE=CBP
         CHPID PATH=(CSS(0),05),SHARED,                                *
               PARTITION=((A01,A02,A03,A05,A06,A07,A08,A09,A10,A11,A13,*
               C3),(=)),TYPE=CBP
         CHPID PATH=(CSS(0),06),SHARED,                                *
               PARTITION=((A01,A02,A03,A05,A06,A07,A08,A09,A10,A11,A13,*
               C3),(=)),TYPE=CBP
         CHPID PATH=(CSS(0),07),SHARED,                                *
               PARTITION=((A01,A02,A03,A05,A06,A07,A08,A09,A10,A11,A13,*
               C3),(=)),TYPE=CBP
         CHPID PATH=(CSS(0),08),SHARED,                                *
               PARTITION=((A01,A02,A03,A04,A05,A06,A07,A08,A09,A10,A11,*
               A12,A13,A14),(=)),TYPE=OSD
         CHPID PATH=(CSS(0),09),SHARED,PARTITION=((A04,A12),(=)),      *
            .
            .
            .
         CHPID PATH=(CSS(0),59),SHARED,                                *
               PARTITION=((A01,A02,A03,A04,A05,A06,A07,A08,A09,A10,A11,*
               A12,A13,A14),(=)),SWITCH=AF,TYPE=CNC
         CHPID PATH=(CSS(0),5E),SHARED,PARTITION=((A12),(A04,A09)),    *
               TYPE=FCP
         CHPID PATH=(CSS(0),5F),SHARED,PARTITION=((A12),(A04,A09)),    *
               TYPE=FCP
         CHPID PATH=(CSS(0),60),SHARED,PARTITION=((A12),(A04,A09)),    *
               TYPE=FCP
         CHPID PATH=(CSS(0),61),SHARED,PARTITION=((A12),(A04,A09)),    *
               TYPE=FCP
            .
            .
            .
         CNTLUNIT CUNUMBR=FFFC,PATH=((CSS(0),FA,FB)),UNIT=CFP
         IODEVICE ADDRESS=(FFEB,007),CUNUMBR=(FFFC),UNIT=CFP
         IODEVICE ADDRESS=(FFF2,007),CUNUMBR=(FFFC),UNIT=CFP
******************************** Bottom of Data ********************************
```

Figure 4-36 IOCP input data set contents

Note that CHPIDs 5A - 5D do not appear in the IOCP deck. HCD maintains the definitions, but neither IOCP nor the CMT support an asterisk (*) for a PCHID, so HCD does not pass these definitions to IOCP or the CMT.

4.4 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 2094 order process (CFReport). Using the CHPID Mapping Tool, we assign PCHIDs to the channels in the configuration.

For this process, the CHPID Mapping Tool (CMT) must be downloaded and installed. Refer to 2.5.1, “CHPID Mapping Tool” on page 32 for information about downloading and installing the CMT. If you already have the CHPID Mapping Tool installed, then verify that you have the latest updates available.

Note: In this scenario we are coming from a 2064 (which does not have PCHIDs), so we do not have to take into consideration the current channel mapping when assigning the new PCHIDs.

Using the CHPID Mapping Tool, follow these steps:

- Import the 2094 IOCP statements file and “upgrade” the CFReport file into the CHPID Mapping Tool. Getting the IOCP statements may be performed with HCM.
- Set the priority for single-path control units and other control units that need special consideration.
- Run the CHPID Mapping Tool availability function.
- Create CHPID Mapping Tool CHPID reports.
- Create an updated 2094 IOCP statements file and file transfer back to the system image running HCD. This step may be performed with HCM.

Import CFReport order file into CHPID Mapping Tool

- Start the CHPID Mapping Tool on your workstation, and click **File** → **Import CFReport Order file**; see Figure 4-37.

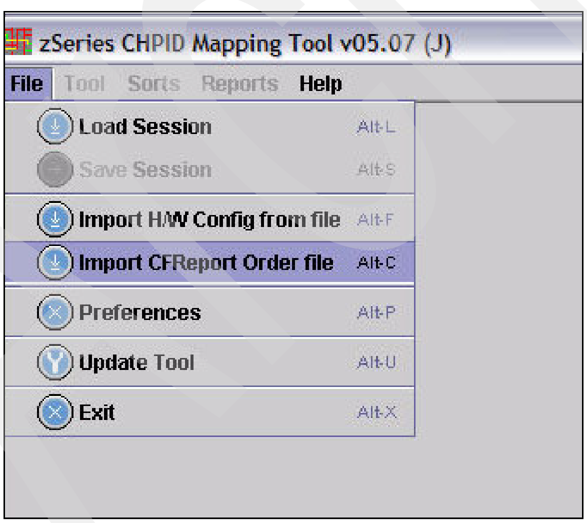


Figure 4-37 CMT - select Import CFReport Order file

- Select the CFReport file on your workstation to import into the CHPID Mapping Tool and click **Open**; see Figure 4-38 on page 107.

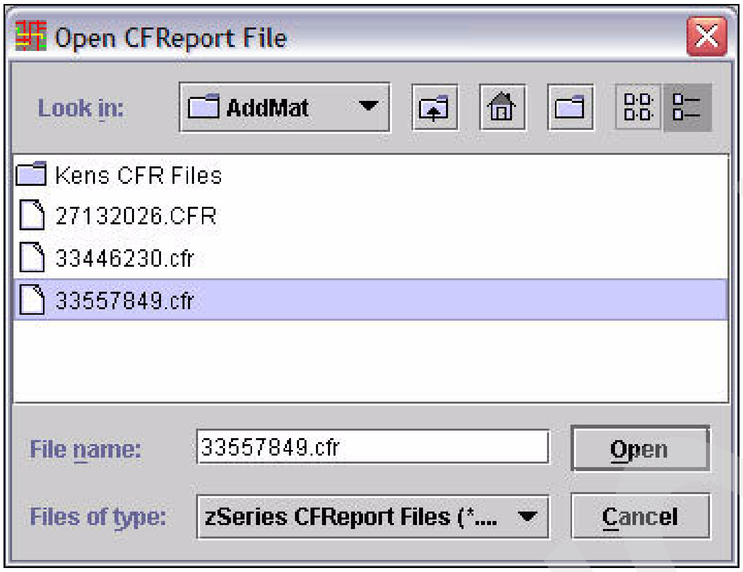


Figure 4-38 CMT - Open CFReport File

- CMT displays the information from the CFReport on the left-hand side of the screen; see Figure 4-39.

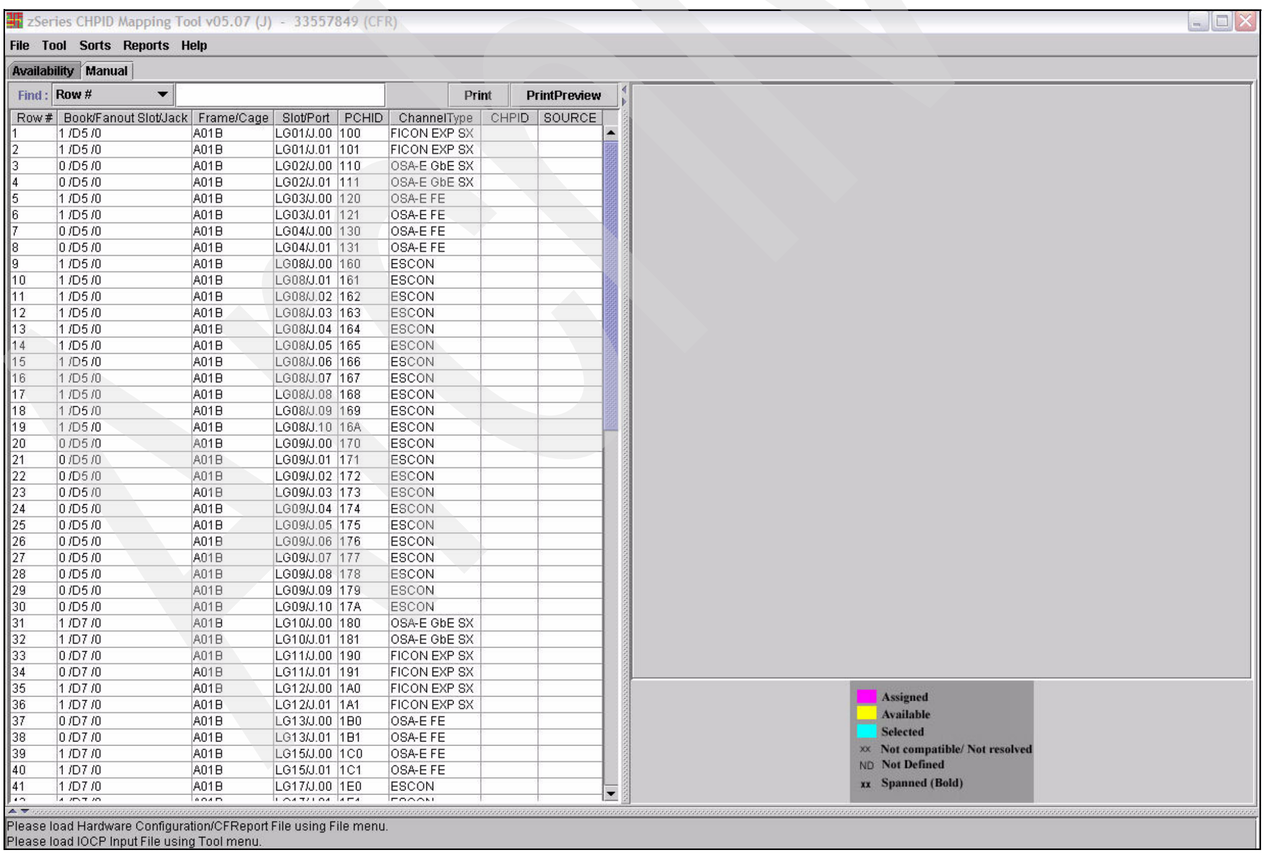


Figure 4-39 CMT - after importing CFReport file

Import IOCP file into CHPID Mapping Tool

- Click **Tool** → **Import IOCP File**; see Figure 4-40. Import the IOCP file created in “Create an IOCP deck for CHPID Mapping Tool” on page 102.

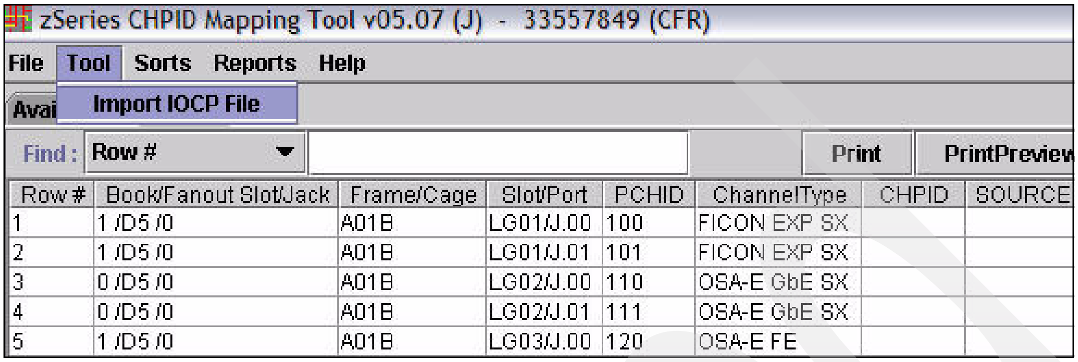


Figure 4-40 CMT - select Tool menu item Import IOCP file

Select the IOCP file on your workstation to import into the CHPID Mapping Tool and click **Open**; see Figure 4-41.

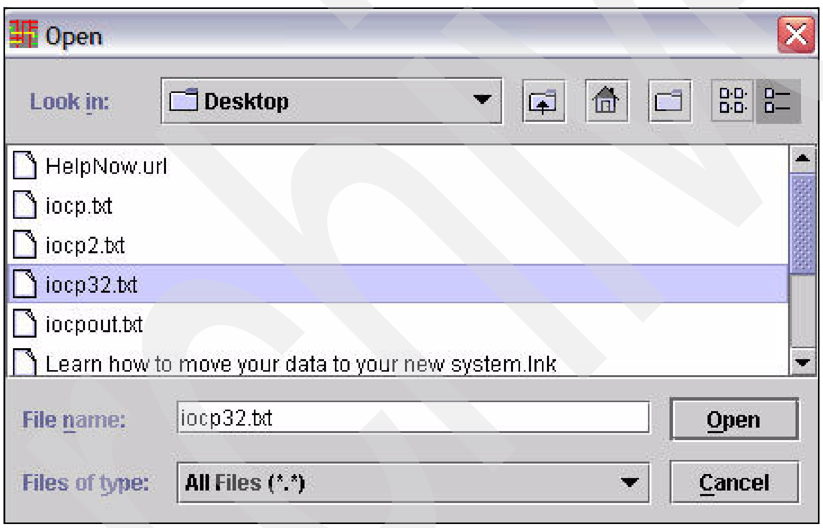


Figure 4-41 CMT - Open IOCP file

Hardware resolution

The CHPID Mapping Tool may prompt you to resolve issues that may arise from importing the IOCP file. In our example, clarification on the OSD CHPIDs was required; see Figure 4-42 on page 109.

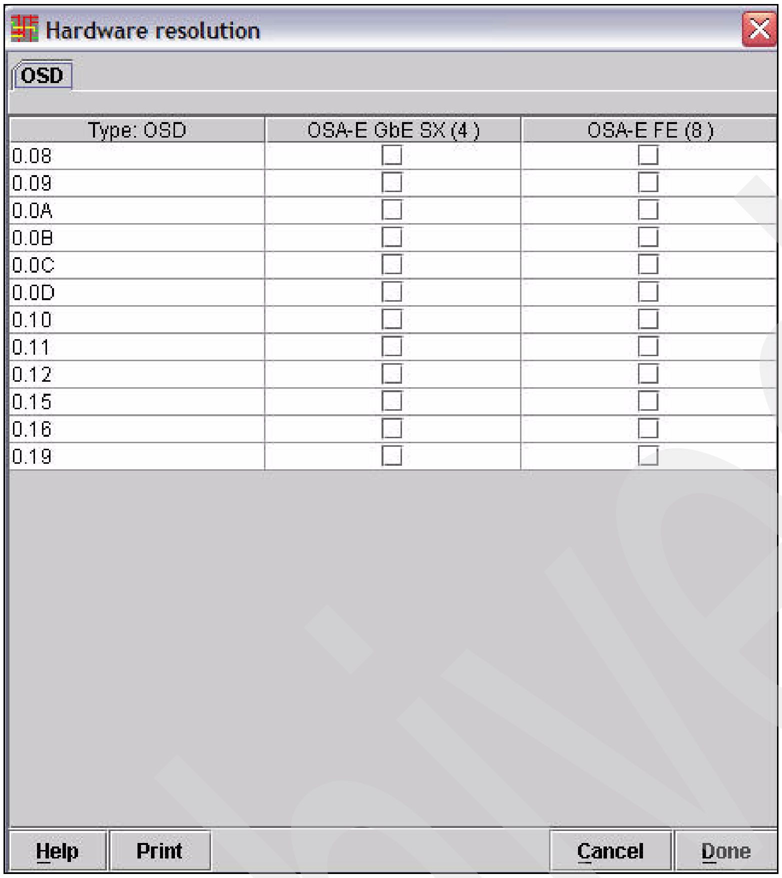


Figure 4-42 CMT - Hardware resolution after IOCP import

- Select one tab at a time. In this example, there is only one tab. In our example, CMT needs to know which channels are OSA-E GbE SX and which are OSA-E FE.

  Check off what each of the channels are to be used for. Perform the hardware resolution for the channels under each tab. Once completed, click **Done**; see Figure 4-43 on page 110.

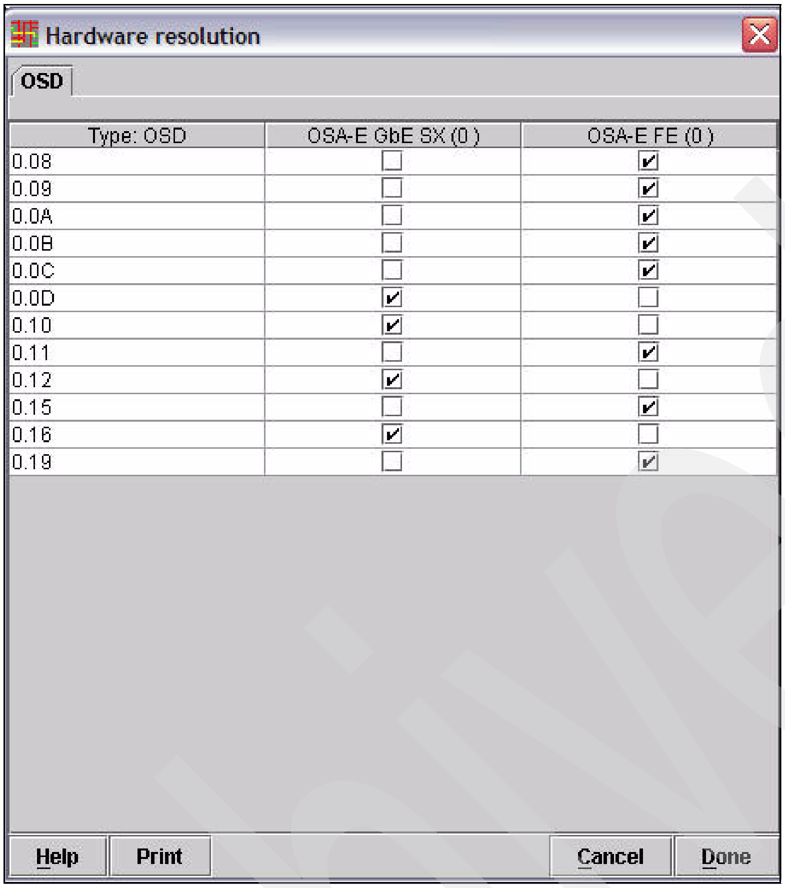


Figure 4-43 CMT - Hardware resolution after IOCP import, resolved

- In our example, CMT displays a message indicating that the order contains more hardware than we have defined in the IOCP that was exported from HCD; see Figure 4-44.

Figure 4-44 CMT - Information, more hardware than required by IOCP

  This message was most likely issued because we changed TYPE=FC CHPIDS to an asterisk (*). This is probably not a normal occurrence, as we would normally define all hardware that was ordered in HCD. Press OK to continue.

- The CHPID Mapping Tool displays all of the currently known information; see Figure 4-44.

  Note that the CHPID and SOURCE columns are blank. These are filled in after the CMT assigns CHPIDs to PCHIDs.

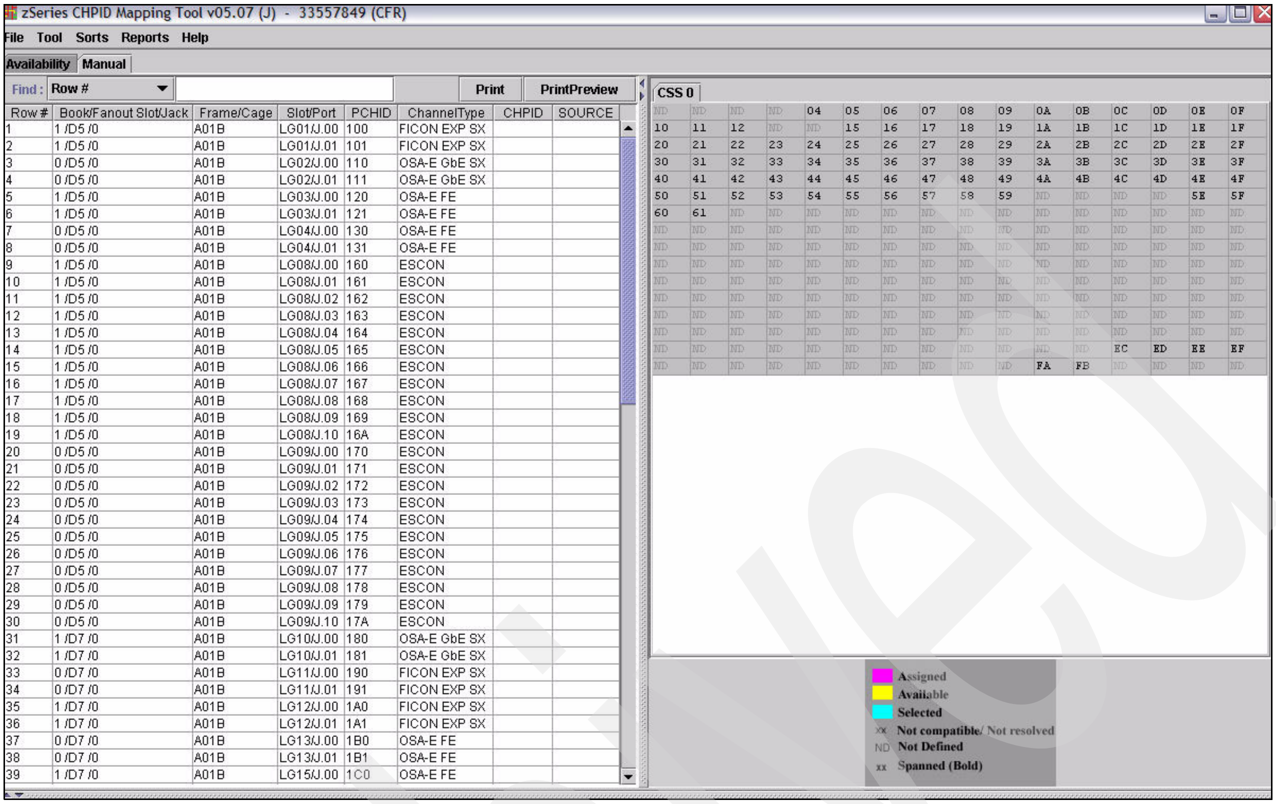


Figure 4-45 CMT - after importing IOCP file

Set control unit priority manually

Setting priorities specifies the order in which the control units and associated CHPID assignments should be processed for availability. The key requirement of mapping for high availability is accurately assigning priority numbers to the control units. Priority numbers represent the order in which the tool maps the control units.

Normally, we would only assign priorities to certain control units, for example:

- Single-path control units (give them the same priority)
- CTC control units (give them the same priority)
- OSC consoles

For more information about setting priority for availability, refer to *CHPID Mapping Tool User's Guide*, GC28-6825.

To set the priority, click the **Availability** tab, below the File menu. Fill in the Priority column for the control units that need special handling.

In our example, shown in Figure 4-46 on page 112, we defined all CTC control units going to the same CPC to have the same priority. However, CTCs going to different CPCs get different priorities.

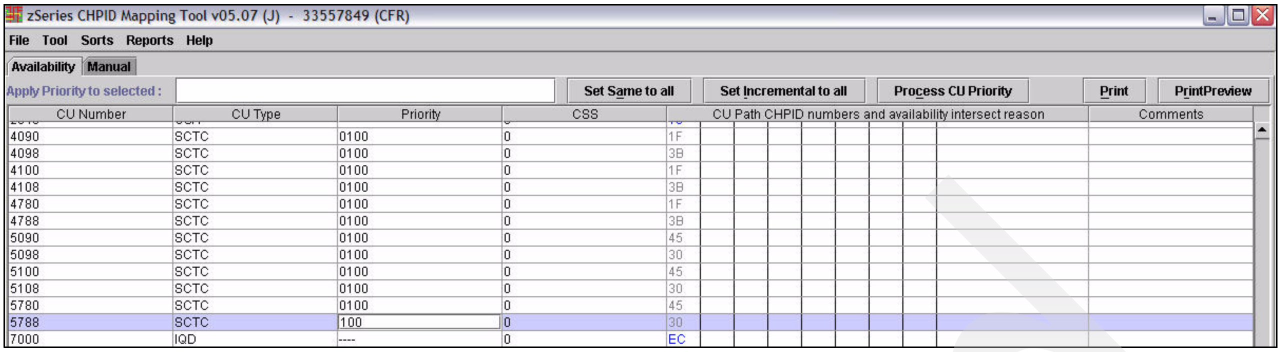


Figure 4-46 CMT - set control unit priority

Set PCHIDs based on availability

To set PCHIDs based on availability, follow these steps:

- Click **Process CU Priority** and a window pops up. The **Reset CHPID Assignments** panel, shown in Figure 4-47, allows you to change the CHPID values as follows:
  - – Based on availability
  - – Manually
  - – For only those assigned in the IOCP

  In our example, we have chosen to assign the CHPIDs based on availability. After selecting how the CHPIDs are assigned, click **Process**.

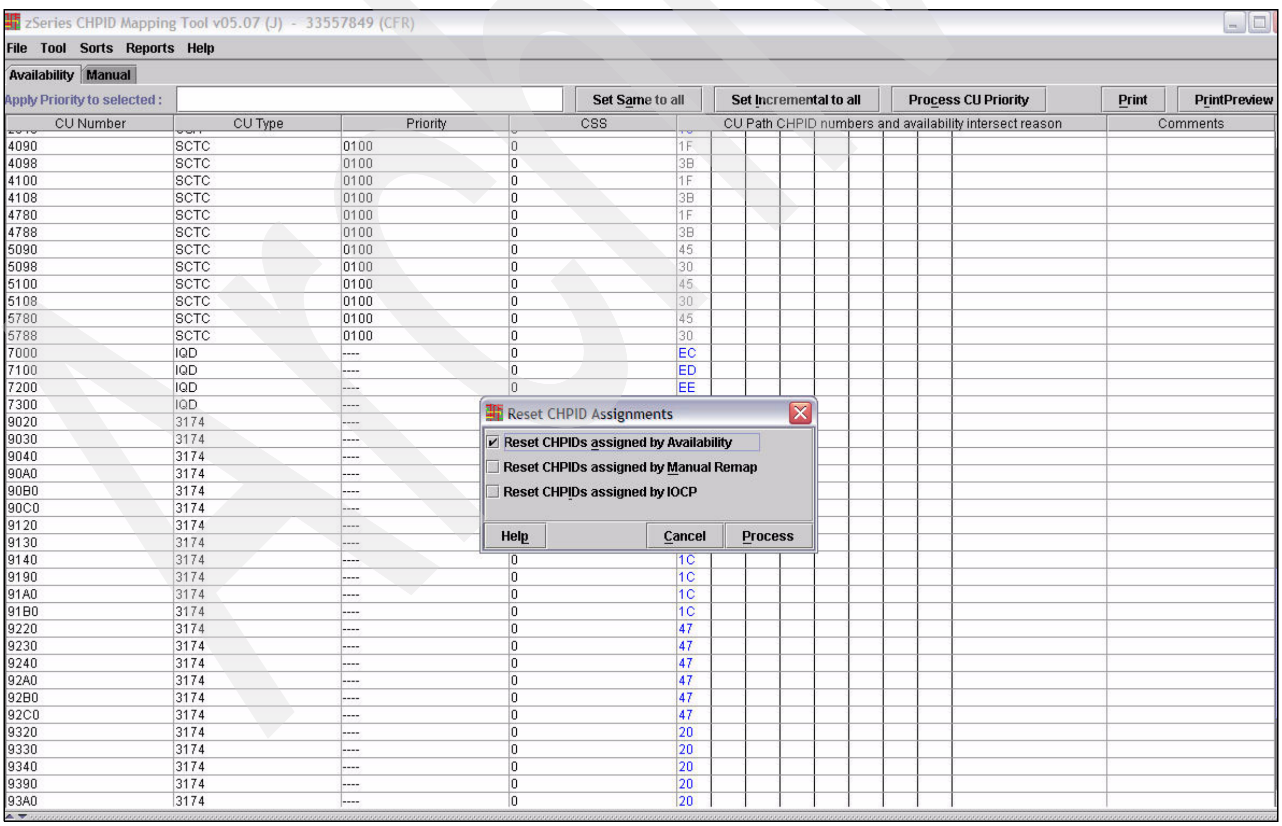


Figure 4-47 CMT - Reset CHPID Assignments by availability

After the CHPID Mapping Tool has assigned the CHPIDs, it displays a message indicating the results of the process. Depending on your hardware configuration and your IOCP, you may or may not have intersects.

In our example, we have C and D type intersects; see Figure 4-48.

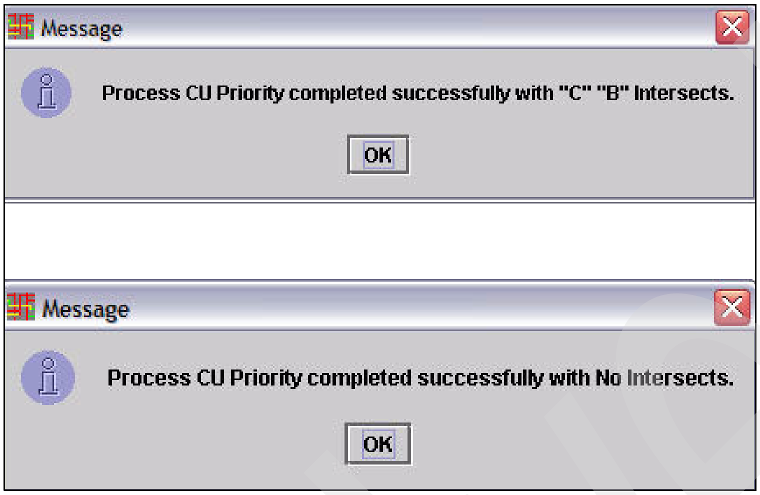


Figure 4-48 CMT - Process CU Priority completion messages

- Click **OK** whether or not you have intersects. You may 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 **Sort** → **By CU Priority**; see Figure 4-49.

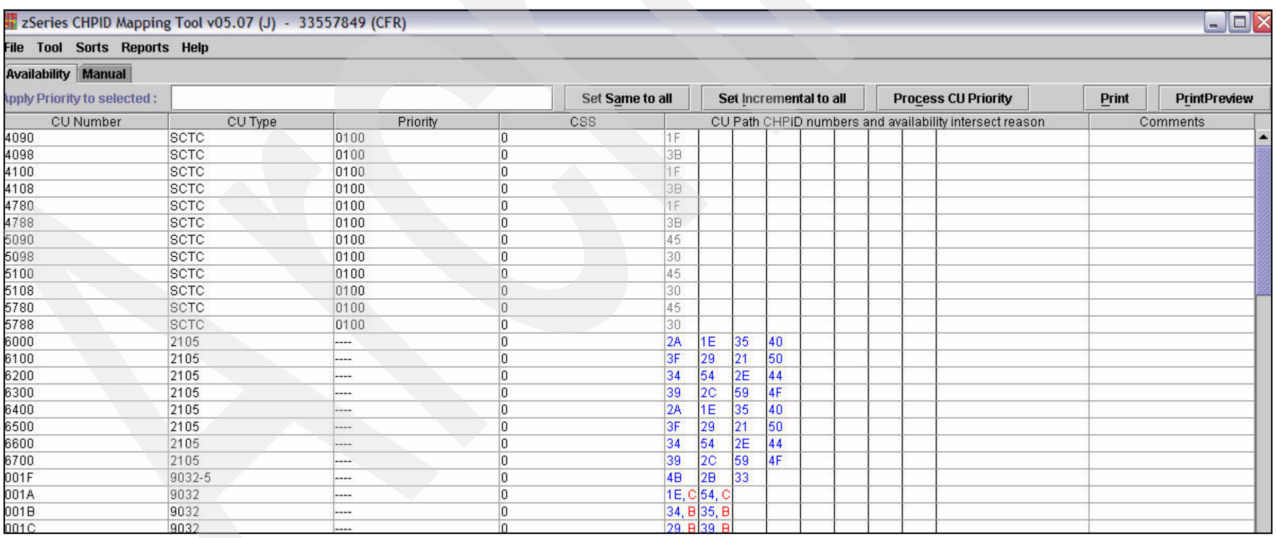


Figure 4-49 CMT - Availability display with B intersects

Resolve intersects

In our example, we have intersects. Intersects occur when the tool is not able to spread all of the paths across availability boundaries for a given control unit. *CHPID Mapping Tool User's Guide*, GC28-6825, explains the steps needed to resolve intersects (ensure that you refer to the most recent edition).

The following list defines the possible intersects:

D	Assigned channels are on the same daughter card.
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	Greater than half the assigned channels are connected to the same book.

You must evaluate each intersect in order to determine if it causes an unacceptable single point of failure (SPoF) situation. Resolving some SPoFs may require the purchase of additional hardware.

> **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.

Figure 4-50 illustrates what the various intersects mean in terms of which parts of the configuration each intersect type refers to.

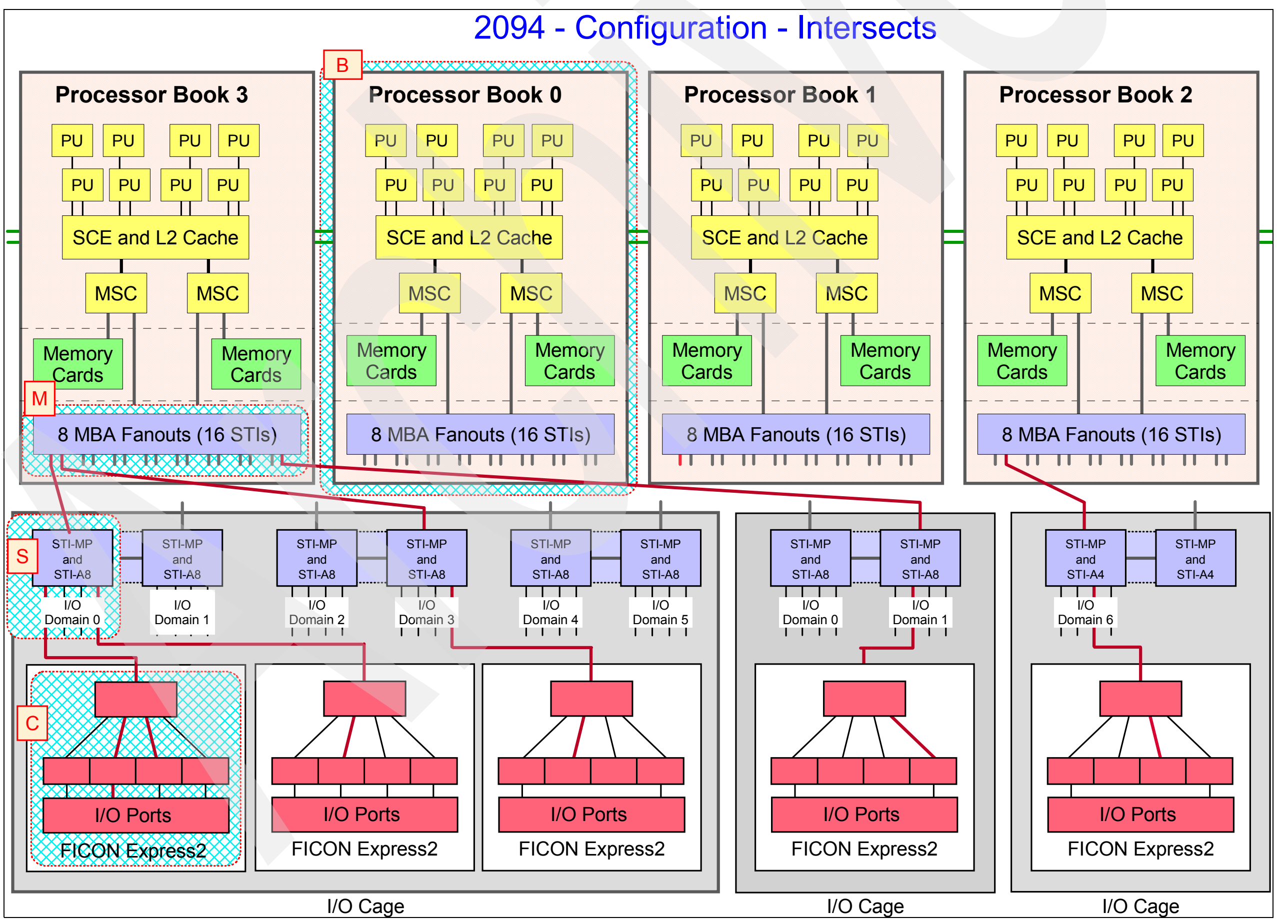


Figure 4-50 CMT - configuration intersects

Select the Manual tab to see the results of mapping the CHPIDs; refer to Figure 4-51 on page 115. Note that most CHPID and SOURCE columns are no longer blank.The CHPID

Mapping Tool has assigned CHPIDs to PCHIDs, and has placed the value Avail in the SOURCE column, indicating that the CHPID values were assigned based on availability.

Also note that a few CHPID and SOURCE columns are still blank. These correspond to TYPE=FC CHPIDs that we previously changed to an asterisk (*) in HCD.

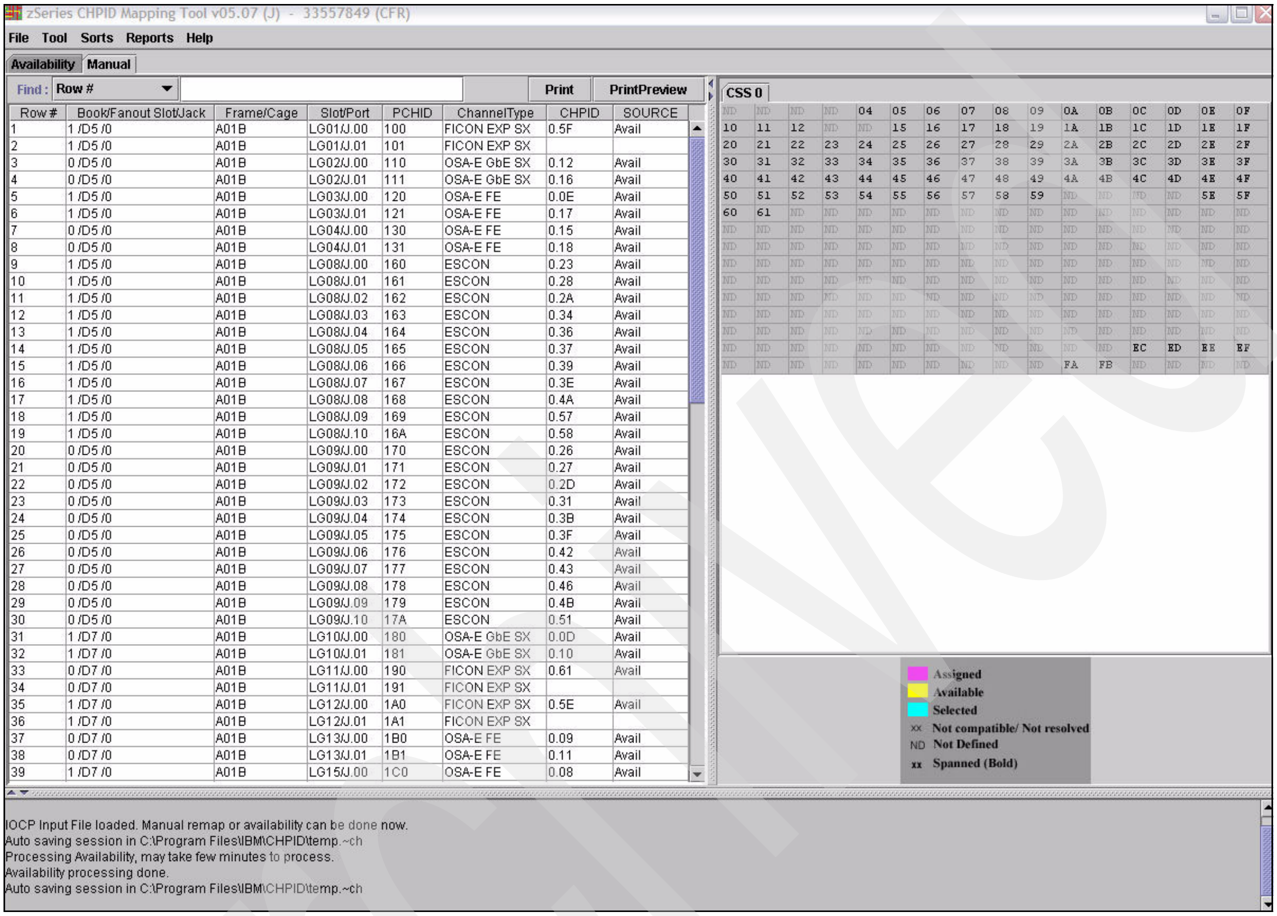


Figure 4-51 CMT - after CHPID assignments

Create CHPID Mapping Tool reports

CMT 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 two reports in this example (the CHPID Report and the CHPID to Control Unit Report). However, all built-in reports are printed in the same way, as explained here.

CHPID Report

- Click **Reports** → **CHPID Report;** see Figure 4-52 on page 116**.**

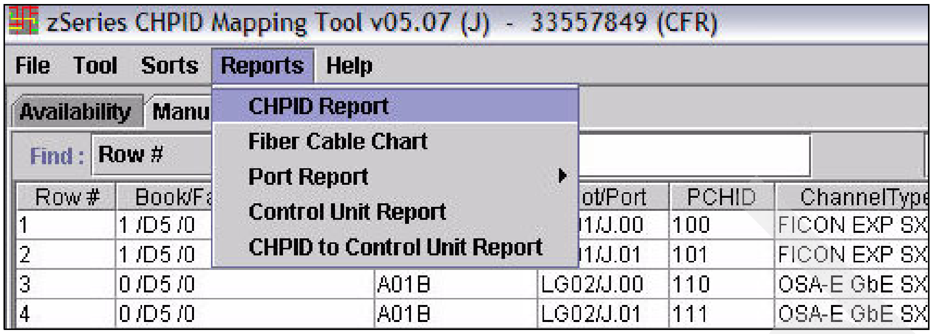


Figure 4-52 CMT - select CHPID Report

- Enter the Report File Name (or accept the default name offered by the CMT) and click **Save**; see Figure 4-53.

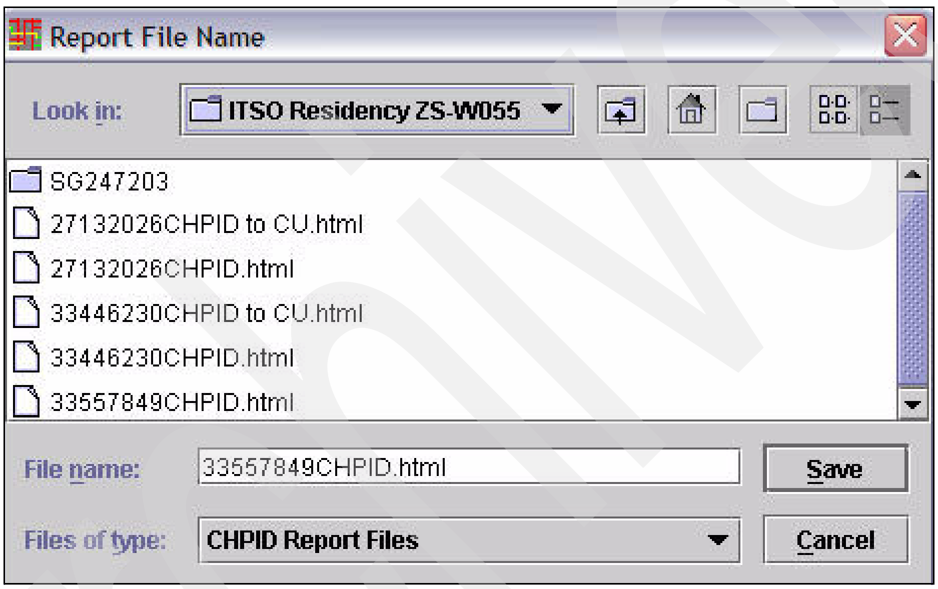


Figure 4-53 CMT - Report File Name

- The CHPID Mapping Tool opens a browser window with the CHPID Report; see Figure 4-54 on page 117. 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: 33557849(CFR)
Machine: 2094-S18

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number.
accurate before proceeding.

Book/Fanout Slot/Jack	Cage	Slot	F/C	CSS.CHPID/PCHID/Ports
1/ D5/ J.0	A01B	01	2320	0.5F/100/J00 ----/101/J01
0/ D5/ J.0	A01B	02	2365	0.12/110/J00 0.16/111/J01
1/ D5/ J.0	A01B	03	2366	0.0E/120/J00 0.17/121/J01
0/ D5/ J.0	A01B	04	2366	0.15/130/J00 0.18/131/J01
1/ D5/ J.0	A01B	08	2323	0.23/160/J00 0.28/161/J01 0.2A/162/J02 0.34/163/J03 0.36/164/J04 0.37/165/J05 0.39/166/J06 0.3E/167/J07 0.4A/168/J08 0.57/169/J09 0.58/16A/J10
0/ D5/ J.0	A01B	09	2323	0.26/170/J00 0.27/171/J01 0.2D/172/J02 0.31/173/J03 0.3B/174/J04 0.3F/175/J05 0.42/176/J06 0.43/177/J07 0.46/178/J08 0.4B/179/J09 0.51/17A/J10
1/ D7/ J.0	A01B	10	2365	0.0D/180/J00 0.10/181/J01
0/ D7/ J.0	A01B	11	2320	0.61/190/J00 ----/191/J01
1/ D7/ J.0	A01B	12	2320	0.5E/1A0/J00 ----/1A1/J01

Figure 4-54 CMT - CHPID Report

CHPID to Control Unit Report

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

- Click **Reports** → **CHPID to Control Unit Report**.
- Click **Save**.
- The CHPID Mapping Tool opens a browser window with the CHPID to Control Unit Report; see Figure 4-55. You may be prompted to accept active content to display the report in your browser.

CHPID Mapping Tool - CHPID to CU Report

Control Number: 33557849(CFR)
Machine: 2094-S18

IOCP file: iocp32.txt

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number and the
this configuration is still accurate before proceeding.

CSS	CHPID	Type	Book/Jack/MBA	Port	PCHID	CU Number
0	04	CBP	0/ 0/ 8	A01B LG32 J.01	2B0	S016
0	05	CBP	1/ 0/ 8	A01B LG31 J.01	2A0	S015
0	06	CBP	0/ 0/ 8	A01B LG32 J.02	2B1	S014
0	07	CBP	1/ 0/ 8	A01B LG31 J.02	2A1	S013
0	08	OSD	1/ 0/ 7	A01B LG15 J.00	1C0	2100
0	09	OSD	0/ 0/ 7	A01B LG13 J.00	1B0	2180
0	0A	OSD	1/ 1/ 5	A01B LG19 J.00	200	22E0
0	0B	OSD	0/ 1/ 5	A01B LG22 J.00	230	2360
0	0C	OSD	1/ 0/ 7	A01B LG15 J.01	1C1	2380

Figure 4-55 CMT - CHPID to CU Report

Create updated IOCP

Create an IOCP deck for input back into HCD. This IOCP deck now has the CHPIDs assigned to PCHIDs.

- Select **Tool** → **Create Updated IOCP File**; seeFigure 4-56.

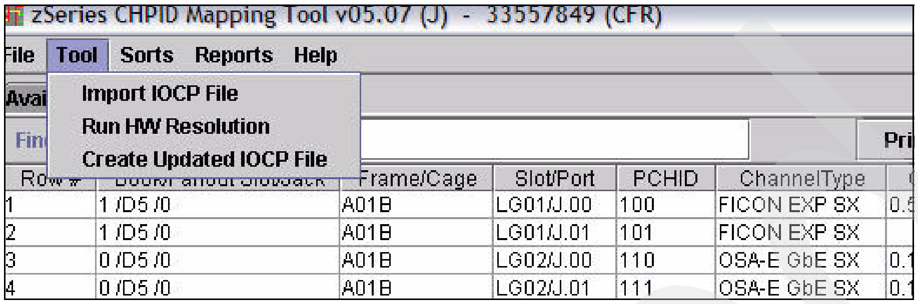


Figure 4-56 CMT - Create Updated IOCP File

- Enter File name and location for the IOCP output file and click **Save**; see Figure 4-57.

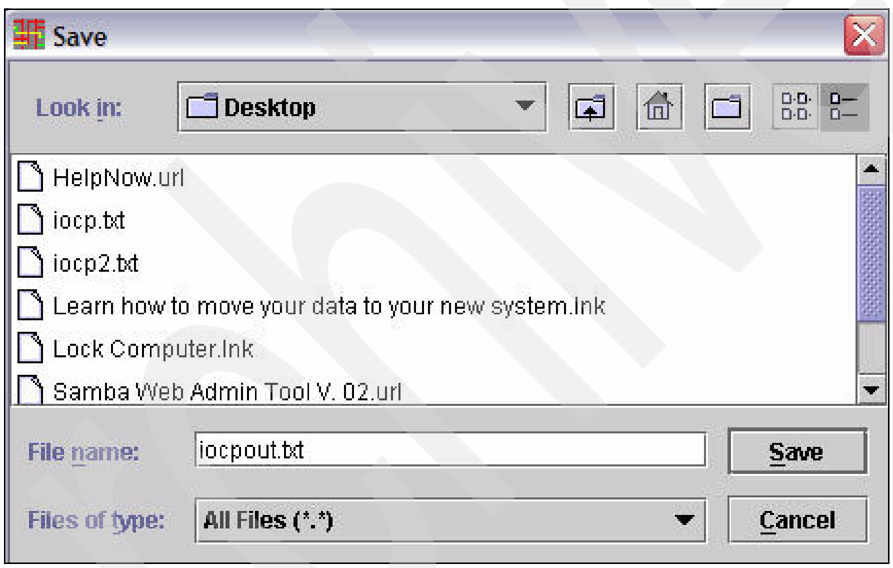


Figure 4-57 CMT - Save IOCP output file

> **Note:** The resulting file (iocpout.txt, in our example) needs to be uploaded to the z/OS image on which you have the work IODF that was used previously to create the IOCP input data set.

The CHPID Mapping Tool displays an informational message regarding what to do for the final execution of the tool, as shown in Figure 4-59 on page 120.

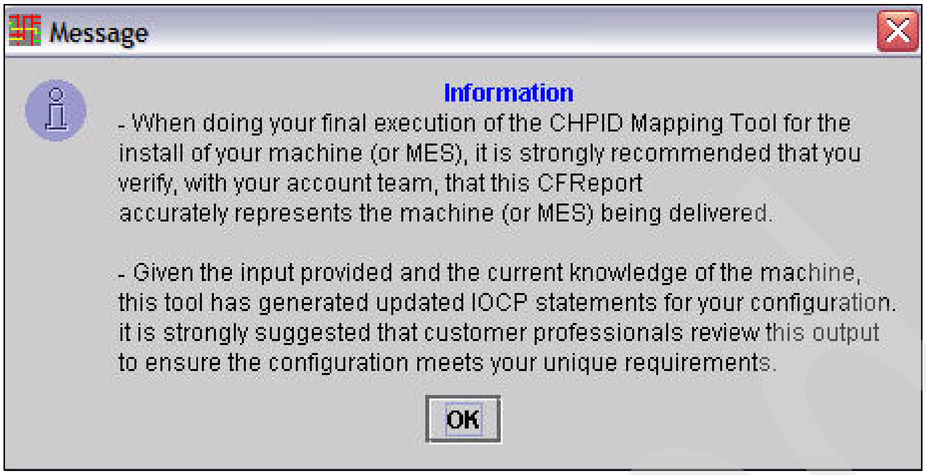


Figure 4-58 CMT - Information message regarding final execution of CMT

4.5 HCD - update the 2094 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:

- Upload the iocpout.txt file 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 inserted statements at the end of the file, which begin with *CMT. These statements reflect the CCN reference number, as well as control unit priorities set in the CHPID Mapping Tool.

> **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 4-3.

Example 4-3 HCD - Updated IOCP statements file with CMT statements

```
         IODEVICE ADDRESS=(FFEB,007),CUNUMBR=(FFFC),UNIT=CFP
         IODEVICE ADDRESS=(FFF2,007),CUNUMBR=(FFFC),UNIT=CFP
*CMT* VERSION=000
*CMT* CCN=33557849(CFR)
*CMT* 4090.0=0100,4098.0=0100,4100.0=0100,4108.0=0100,4780.0=0100
*CMT* 4788.0=0100,5090.0=0100,5098.0=0100,5100.0=0100,5108.0=0100
*CMT* 5780.0=0100,5788.0=0100
```

> **Important:** We recommend that you do not update the priorities outside of the CHPID Mapping Tool.

Update the 2094 work IODF

- From the HCD main panel shown in Figure 4-59 on page 120, enter the work IODF name used. Select option **5**, **Migrate configuration data**.

```
z/OS V1.7 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 . . . 'SYS10.IODF34.WORK'                +
```

Figure 4-59 HCD - main menu, select Migrate configuration data

- From the Migrate Configuration Data panel shown in Figure 4-60, select option **1**, **Migrate IOCP/OS data**, and then press Enter.

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


  Select one of the following tasks.

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

Figure 4-60 HCD - Migrate Configuration Data

- HCD displays the Migrate IOCP Data panel, as shown in Figure 4-61 on page 121. 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.
`Processing mode`	Select option **2** to save the results of the migration. (Prior to using 2, however, try 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 . . . . . . . . . . . . SCZP102   +   CSS ID . . . . . . . _  +
 OS configuration ID  . . . . . . . . TEST2094  +

 Combined IOCP/MVSCP input data set . _____________________________________
 IOCP only input data set . . . . . . IOCPOUT.TEXT
 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 4-61   HCD - Migrate IOCP / MVSCP / HCPRIO Data panel

HCD now 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 4-62.

```
 -------------------------- 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
  #                      SYS10.IODF34.WORK.
  ***************************** Bottom of data ******************************
```

Figure 4-62   HCD - Migration Message List

- At this point, the work IODF contained both the CHPID definitions and the mapping to PCHIDs that was done using the CHPID Mapping Tool. Press PF3 to continue.

4.6 Build the 2094 production IODF

Using HCD again, the sequence to build the 2094 production IOCF is as follows:

- Create the 2094 production IODF.
- Write the 2094 processor configuration to the 2064 IOCDS using the option write IOCDS in preparation of upgrade.

Create the 2094 Production IODF

In order to make use of the definitions that we updated in HCD, the next step is to create a production IODF, as follows:

- Select option **2**, **Activate or process configuration data** from the HCD main menu; see Figure 4-63.

```
z/OS V1.7 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 . . . 'SYS10.IODF34.WORK'                  +
```

Figure 4-63 HCD - main menu, select Activate or process configuration data

- The Activate or Process Configuration Data panel is displayed; see Figure 4-64. 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 4-64 HCD - Activate or Process Configuration Data, select Build production IODF

- The Message List panel is displayed; see Figure 4-65 on page 123. Verify that you have only 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 the process until you have no messages indicating problems. Press PF3 to continue.

```
------------------------------- Message List --------------------------------
  Save  Query  Help
 --------------------------------------------------------------------------
                                                               Row 1 of 139
 Command ===> ___________________________________________ Scroll ===> PAGE

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

 / Sev Msg. ID  Message Text
 _ W   CBDG081I Following 2 operating system configurations of type MVS
 #              have no console devices defined: OPENMVS1, TRAINER
 _ W   CBDG061I Switch control unit must be defined for switch 20.
 _ W   CBDG061I Switch control unit must be defined for switch 90.
 _ W   CBDG061I Switch control unit must be defined for switch 91.
 _ W   CBDA857I No channel paths attached to partition A1D of processor
 #              SCZP101.1.
 _ W   CBDA857I No channel paths attached to partition A2D of processor
 #              SCZP101.2.
 _ W   CBDG483I CBP channel path 0.C0 of processor SCZP101 is not
 #              connected. It should be connected to a channel path of
 #              type CBP.
```

Figure 4-65 HCD - Message List

- HCD displays the Build Production I/O Definition File panel; see Figure 4-66. 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 . . . : 'SYS10.IODF34.WORK'

  Production IODF name . 'SYS10.IODF34'
  Volume serial number . SYS100  +

  Continue using as current IODF:
  2   1.  The work IODF in use at present
      2.  The new production IODF specified above
```

Figure 4-66 HCD - Build Production I/O Definition File

- The Define Descriptor Fields panel displays; see Figure 4-67 on page 124. 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  . : 'SYS10.IODF34'

  Descriptor field 1  . . . SYS10
  Descriptor field 2  . . . IODF34
```

Figure 4-67 HCD - Define Descriptor Fields

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

  `Production IODF SYS10.IODF34 created.`

Proceed to the next step to activate the configuration for 2064 to 2094.

4.7 Load the 2094 processor IOCDS

At this point, we have a production IODF, which is SYS10.IODF34. Now the IOCDS needs to be updated on the existing 2064 hardware in preparation for the upgrade. When the upgraded hardware is power-on reset, the IOCDS takes effect. The final step is to IPL the new hardware using this IODF.

Update the IOCDS

- From the HCD main panel, select option **2**, **Activate or process configuration data**; see Figure 4-68. Verify that the IODF is the production one created in "Build the 2094 production IODF" on page 121, and then press Enter.

```
z/OS V1.7 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 . . . 'SYS10.IODF34'                 +
```

Figure 4-68 HCD - main menu, select Activate or process configuration data

- HCD displays the Activate or Process Configuration Data panel; see Figure 4-69. Select option **11**, **Build and manage S/390 microprocessor IOCDSs and IPL attributes**.

```
----- Activate or Process Configuration Data ------


  Select one of the following tasks.

  11  1.  Build production I/O definition file
      2.  Build IOCDS
      3.  Build IOCP input data set
      4.  Create JES3 initialization stream data
      5.  View active configuration
      6.  Activate or verify configuration
          dynamically
      7.  Activate configuration sysplex-wide
      8.  Activate switch configuration
      9.  Save switch configuration
      10. Build I/O configuration statements
      11. Build and manage S/390 microprocessor
          IOCDSs and IPL attributes
      12. Build validated work I/O definition file
```

Figure 4-69 HCD - Activate or Process Configuration Data, select Build IOCDSs

> **Note:** In this example, we are doing a field upgrade on a 2064 so we create an IOCDS on the existing hardware to be used to power-on reset the upgraded hardware - 2094.
>
> An alternative would be to create an IOCP deck from HCD and then do a stand-alone IOCP on the upgraded 2094, using the IOCP deck as input.

The S/390 Microprocessor Cluster List panel displays; see Figure 4-70. Select the current 2064 CPC from the list by using a forward slash mark (/), and 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.SCZP701    9672   XX7     SCZP701
/ USIBMSC.SCZP801    2064   1C7     SCZP801
_ USIBMSC.SCZP901    2084   C24     SCZP901
****************************** Bottom of data ********************************
```

Figure 4-70 HCD - S/390 Microprocessor Cluster List

The Actions on selected CPCs panel displays; see Figure 4-71 on page 126. 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 4-71 HCD - Actions on selected CPCs, Work with IOCDSs

On the IOCDS List panel, shown in Figure 4-72, select the IOCDS that you want to update by using /, and 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.SCZP801  IODF34   LPAR   POR        Yes       No          Yes-POR
_ A1.SCZP801  IBM-PAT2 LPAR   Alternate  No        No          No
_ A2.SCZP801  IODF33   LPAR   Alternate  No        No          No
/ A3.SCZP801  IODF34   LPAR   Alternate  Yes       No          No
******************************* Bottom of data ********************************
```

Figure 4-72 HCD - IOCDS List

On the Actions on selected IOCDSs panel, shown in Figure 4-73, select option **1**, **Update IOCDS** and 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 4-73 HCD - Actions on selected IOCDSs

The Build IOCDSs panel is displayed; see Figure 4-74 on page 127. Verify that all the information is correct. Fill in the field `Title1` and press Enter.

> **Note:** Specifying yes in the field `Write IOCDS in preparation of upgrade` is only required when you are upgrading the existing hardware and you wish to write the IOCDS for the 2094 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 . . . . . . . . . : 'SYS10.IODF34'

  Title1 . Upgrading 2064 to 2064__________________________________________
  Title2 : SYS10.IODF34 - 2005-11-22 10:22

                             Write IOCDS in
  IOCDS        Switch IOCDS  preparation of upgrade
  A3.SCZP102   No            yes
  **************************** Bottom of data *****************************
```

Figure 4-74 HCD - Build IOCDSs

On the Job Statement Information panel, shown in Figure 4-75, fill in the job statements as required by the installation and press Enter. The job is submitted to update the IOCDS.

Note: Make sure the job is routed to execute on the 2064 that is being upgraded.

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

  Specify or revise the job statement information.

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

Figure 4-75 HCD - Job Statement Information

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 A3 IOCDS REPLACED.
```

Note that the IOCDS is marked invalid. It contains 2094 information that the current 2064 server does not recognize.

4.8 HMC steps for activation profiles

Follow these steps for activation profiles.

Build the Reset Profile and point to required IOCDS

Now that the processor configuration 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 2094 after it has been upgraded.

Do the following:

- Log on to the HMC and select the 2064 that you are upgrading in Defined CPCs Work Area.
- Under Operational Customization, select **Customize/Delete Activation Profiles**.
- Select the Last Used Reset Profile and then select **Customize**.
- Save this Last Used profile with a new Profile name, to be referred to when the power-on reset is required (for example, SCZP801T).
- Select the new Profile and then select **Customize**.
- Click the IOCDS that you just updated in the previous step (A3, as shown in Figure 4-74 on page 127). On the new version of HMC, you receive message ACTB0219, shown in Figure 4-76.

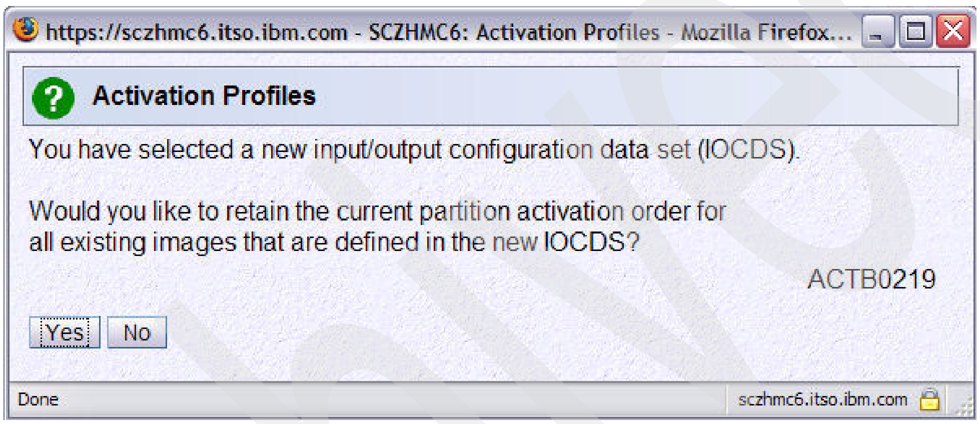


Figure 4-76 HMC - Activation Profiles (received when changing IOCDS)

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

Build/Verify Image Profiles

- While still in the Reset Profile, you can now review the Image (logical partition) Profile attributes. If you are adding additional resources (that is, storage or CPs) to the 2094 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 2064 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 2094.
- Additionally if you have used the HWNAME parameter to point to the Processor.id, then this needs to be updated to point to the new Processor.id. (in this example, from SCZP801 to SCZP102).

Performing a power-on reset (POR) of the 2094

- After the 2064 processor has been upgraded to a 2094, 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 will perform another power-on reset using the Reset Profile created in the previous step (in this example, SCZP801T).
- After the power-on reset finishes, the logical partitions are ready to be IPLed.

5

Replace a z900 with a z9-109

In this chapter, we describe how to replace a z900 with a z9-109 processor.

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 2064 IODF
- Validate the work IODF and produce IOCP statements
- CHPID Mapping Tool
- HCD - update the 2094 work IODF with PCHIDs
- Build the 2094 production IODF
- Load the 2094 processor IOCDS
- 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 illustrates the general process flow that we follow in our example. The numbered steps are described following the figure.

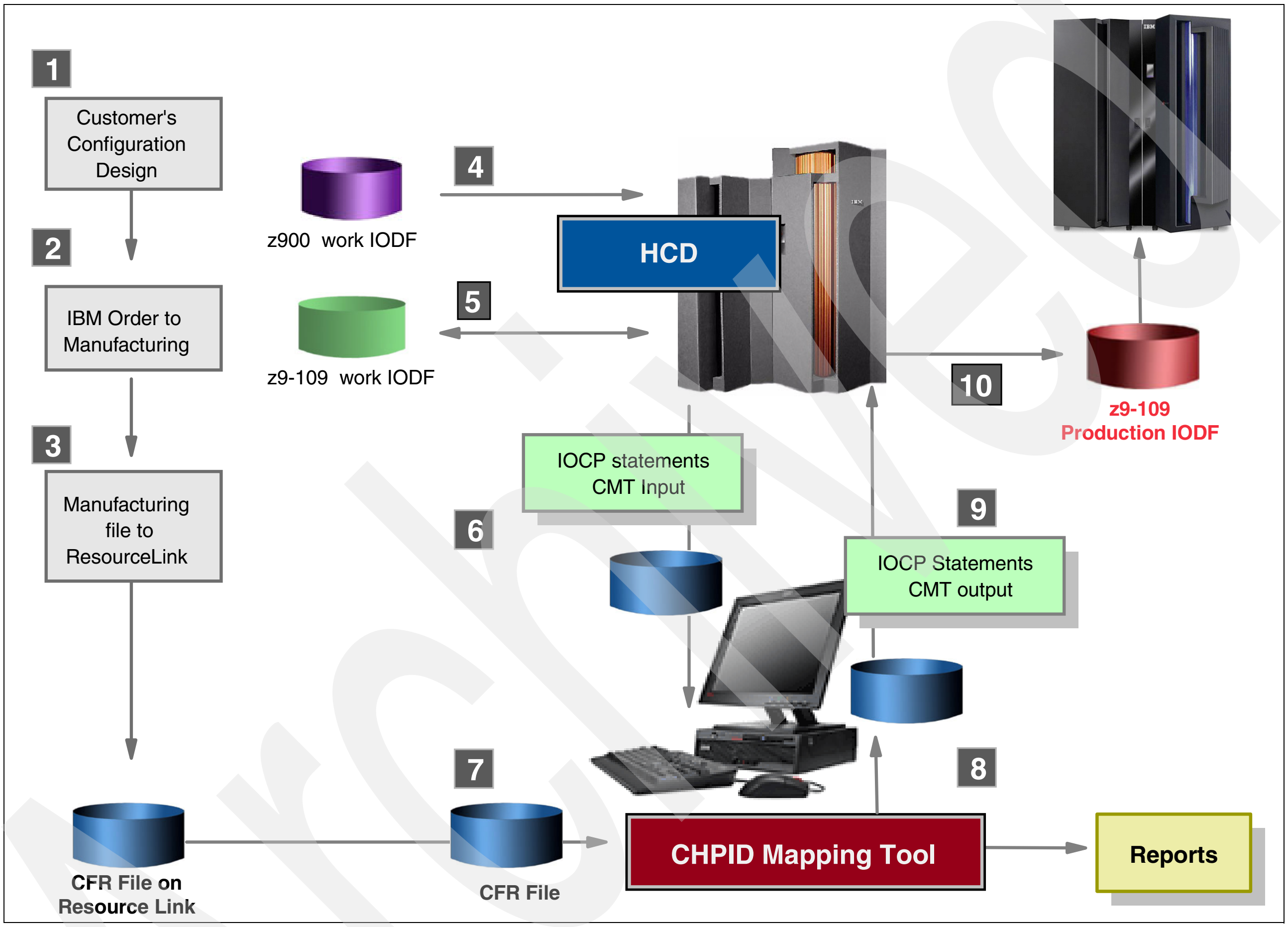


Figure 5-1 z900 to z9-109 - overall process flow

1. When you are planning to migrate to a z9-109, 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 z900 I/O configuration is used as a starting point into HCD. The z900 production IODF is used as input to HCD to create a work IODF that will be the base to define the new z9-109 configuration.
5. When the new z9-109 configuration has been added and the obsolete hardware has been deleted, a validated version of the configuration is saved in a 2094 validated work IODF.

6. From the validated work IODF, create a file containing the z9-109 IOCP statements. This IOCP statements file is transferred to the workstation used for the CHPID Mapping Tool (CMT).
7. The file created by the IBM Manufacturing process in step 3 is downloaded from Resource Link to the CMT workstation. This file is also used as input into the CHPID Mapping Tool.
8. The CHPID Mapping Tool uses the input data from files to map logical channels to physical ones on the new z9-109 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 z9-109 production IODF is created and the final IOCP statements can be generated.

    The installation team uses the configuration data written in step 10 when the final power-on reset is done, yielding a z9-109 with an I/O configuration ready to be used.

If you are upgrading an existing CPC, you may be able to use HCD to write an IOCDS to the new 2094 in preparation for the upgrade. If you can write an IOCDS to the new 2094 in preparation for upgrade, do so and inform the IBM service representative 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 installing a 2094.

If the new 2094 is not connected using a LAN to the CPC where HCD is running, or 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 z900 to a z9-109 can be either in the form of a field upgrade to the existing z900, or a replacement (push/pull) of an existing z900 with a new z9-109.

- A field upgrade means that the existing z900 processor serial number is retained during the upgrade.
- A replacement of the existing z900 with a new z9-109 implies physically removing (push) the z900 and bringing in a new z9-109 (pull) to take its place. The replacement z9-109 has a new serial number that is different from the existing z900.

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

5.1.2 Planning considerations

Keep the following considerations in mind during your planning phase.

Coupling links

If you are currently using CBS/CBR or CFS/CFR CHPIDs, be aware that these are not supported on a z9-109. They need to be replaced with CBP or CFP CHPIDs.

Additional CHPIDs

You may want to add more FC, ESCON, or OSA CHPIDs into the configuration. A new eConfig is built by your IBM Representative and you receive a new CCN, so you can download an updated CFReport file from Resource Link to use as input into the CHPID Mapping Tool.

HMC

The z9-109 requires a new HMC and you require MCLs on the existing Support Element (SE) if you want to use the new HMC to access existing processors. The new HMC only uses Ethernet for its network connection.

Hardware and software support

Some software features exist that are only available with z/OS V1.7, such as Multiple Subchannel Sets (MSS). You also require HCD V1.7 to be able to define MSS, which creates a Version 5 IODF.

Additionally, you require PTFs from the 2094DEVICE PSP Bucket to define z9-109 type processors via HCD.

Features no longer supported

In migrating from a z900 to a z9-109, certain channel types are no longer supported (parallel, 4-port ESCON, OSA-2, ATM, Token ring and ICB-2). If you currently have any of these features, you need to perform actions to replace them with features that are supported on a z9-109. Allowing for dynamic expansion of HSA is now done using MAXDEV in HCD instead of on the HMC.

CPC ID 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 ID does not. Therefore, the CPC ID does not need to match the Processor ID. If there is only one CPC ID, then it is a good idea that it match the Processor ID. This is useful where you may have several Processor/logical partition/control unit setups that share the same physical processor within the same IODF.

Verify that the Processor ID matches the one defined for the HWNAME parameter in the LOAD member in SYS1.IPLPARM.

The CPC ID is coded in HCD Option 1.3 under View Processor Definition in the CPC name field under SNA address, along with a Network name. Note that it is the CPC ID, 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 ID separated by a dot. 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 or view the status of an IOCDS.

5.1.3 Push/pull scenario

This scenario describes the configuration steps to replace an existing 2064 processor with a 2094 processor.

- HCD requires a new Processor ID for the 2094.
- We recommend defining a new CPC ID for the 2094.
- The 2094 processor connects to the same switch ports and control unit interfaces as previously. The control unit interfaces connect to the same switch ports as previously.
- The starting IODF is the current z900 production IODF and the target IODF is a new Work IODF.

The example we use shows a 2064-1C7 with a Processor ID of SCZP801 being replaced (via push/pull) with a 2094-S18 with a Processor ID of SCZP102. The CPC ID of SCZP801 is changed to SCZP102. The 2094 comes with a new serial number.

From the existing I/O configuration, the following CHPID types are transferred from the 2064 to the new 2094 processor:

- OSD, OSE
- CTC, CNC, FC, FCP, CVC, CBY, FCV
- CBP, CFP, ICP
- IQD

The following CHPID types are not migrated as they are not supported on a 2094:

- CBS, CBR, CFR, CFS
- BL, BY
- OSA

Table 5-1 summarizes the push/pull scenario options and requirements.

Table 5-1 2064 I/O configuration migrated to a new 2094

	Replace an existing 2064 with a 2094 (push/pull)
Processor ID	Requires new ID
CPC ID	New ID
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	Add processor and copy CSS
CHPID Mapping Tool Program (CMT)	Required
CFReport File (CCN)	Required
IOCP (import from validated work IODF)	Required
CHPID Mapping Tool Actions (PCHID reset)	N/A, no PCHIDs
CHPID Mapping Tool IOCP Output	Yes
CHPID Mapping Tool Reports	Yes, CHPID and CHPID to CU report

5.2 HCD - migrate the existing 2064 IODF

The following steps describe how to define the existing I/O configuration to the new 2094 server using HCD, and then migrate the channel subsystem and logical partitions from the 2064 to the 2094 server.

Using HCD, follow these steps:

- Create a work IODF from the current 2064 production IODF and add a 2094 processor.
- Copy the channel subsystem from the 2064 to the new 2094 IODF, using subchannel set 0. Verify error messages.
- Delete unsupported items (such as CFR, CBS, CBR, CBS, BL, BY and OSA CHPIDs) from the work IODF. If error messages remain, correct the errors and redo the copy channel subsystem step.
- Observe CF link messages for later reference.
- Delete the 2064 processor.
- Define partitions for LCSSs.
- Change MAXDEV for LCSSs.
- Redefine all required CF connections to other processors and any Internal CF connections required.
- Optionally, over-define channel paths for future use.
- Define any additional CHPIDs, control units and devices you may be adding during the new 2094 installation. This includes definition of CFP and CBP links for the CFs.
- Build a 2094 validated work IODF.
- Create an IOCP statements file and file transfer to the workstation where CMT is installed. This step may be performed with HCM.

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

Note: When upgrading from a 2064 to a 2094, you cannot use the method of repeating the 2064 and then changing the processor type to 2094 because you will receive the following error message:

```
_ E   CBDA197I Processor change causes a switch between single and
#              multiple channel subsystem support. This is not possible
#              for processor xxxxxxxx.
Change of processor type-model leads to invalid definitions.
```

Instead, we recommend that you use the following technique:

- Add a 2094, then copy the channel subsystem from the 2064 to the 2094
- Next, delete the original 2064.

Create a work IODF from the 2064 production IODF

- In HCD, select the current production IODF that contains the 2064 processor that you want to replace with a 2094.
- Create the work IODF by making some change to the production IODF. HCD prompts you for the data set name of the new work IODF. When creating the new work IODF, you need to ensure that you have enough space to add the new processor.

Add a 2094 processor

- Select HCD option **1.3**, **Processor List**. The configuration prior to inserting the new processor is depicted in the HCD Processor List in Figure 5-2.

```
 Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                                Processor List       Row 1 of 7 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
******************************* Bottom of data ********************************
```

Figure 5-2 HCD - Processor List, before adding a new 2094

- Insert a new processor - type 2094.

  Press PF11 to display the Add Processor panel shown in Figure 5-3.

  Fill in the panel and press Enter. Note that in our example, we do not fill in the Network Name and CPC Name fields. However, if you know what these names are when adding the processor to HCD, then you can fill them in. The Serial number field is supplied by your IBM service representative.

  Note that we entered `4` in the field Number of channel subsystems. This does not mean that we will necessarily be using all four LCSSs in the beginning. Instead, it is more a case of planning ahead.

```
 ------------------------------- Add Processor -------------------------------

  Specify or revise the following values.

  Processor ID . . . . . . . . . SCZP102_

  Processor type . . . . . . . . 2094____  +
  Processor model  . . . . . . . S18_____  +
  Configuration mode . . . . . . LPAR      +
  Number of channel subsystems . . 4       +

  Serial number  . . . . . . . . 0001022094
  Description  . . . . . . . . . Upgrade 2064 to 2094_(replace)__

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

  Network name . . . . . . . . . ________  +
  CPC name . . . . . . . . . . . ________  +
```

Figure 5-3 HCD - Add Processor panel, adding a 2094 processor

- The resulting Processor List, shown in Figure 5-4, includes the new processor that we just added.

```
 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  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2094     S18      LPAR  0001022094 Upgrade 2064 to 2094 (replace)
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
******************************* Bottom of data ********************************
```

Figure 5-4 HCD - Processor List panel, showing added 2094 processor

Copy the 2064 channel subsystem to the 2094

- Select the current processor, SCZP801, by using a slash mark (/), and then select option 11 to copy the channel subsystem from the existing processor to the new processor channel subsystem 0 (or whichever one you wish to use) using HCD option `Copy to channel subsystem`; see Figure 5-5.

```
 -------------- Actions on selected processors ---------------

  Select by number or action code and press Enter.

  11  1.  Add like . . . . . . . . . . . . . . . . (a)
      2.  Repeat (Copy) processor configurations (r)
      3.  Change . . . . . . . . . . . . . . . . . (c)
      4.  Prime serial number  . . . . . . . . . (i)
      5.  Delete . . . . . . . . . . . . . . . . . (d)
      6.  View processor definition  . . . . . . (v)
      7.  View related CTC connections . . . . . (k)
      8.  Work with partitions . . . . . . (SMP) (p)
      9.  Work with attached channel paths (SMP) (s)
      10. Work with attached devices . . . (SMP) (u)
      11. Copy to channel subsystem  . . . (SMP) (y)
      12. Work with channel subsystems . . (XMP) (p,s)
```

Figure 5-5 HCD - Actions on selected processors, select copy to channel subsystem option

- HCD prompts you to fill in the name of the target IODF; see Figure 5-6 on page 139. By default, the field is the current work IODF. Press Enter.

```
------------------------- Identify Target IODF --------------------------


  Specify the IODF to which the configuration data is to be repeated.

  Target IODF name . . 'SYS10.IODF34.WORK'                         +
```

Figure 5-6 HCD - Identify Target IODF

- HCD prompts you to fill in the information regarding the target processor and the target channel subsystem; see Figure 5-7.

```
---------------------- Copy to Channel Subsystem -----------------------

 Specify or revise the following values.


 Source processor:
 Processor ID  . . . . . : SCZP801

 Target channel subsystem:
 Processor ID  . . . . . . SCZP102_  +
 Channel subsystem ID  . . 0  +
```

Figure 5-7 HCD - Copy to Channel Subsystem

> **Note:** If the current processor has channel types that are not supported on the 2094 processor (such as copper channels (type = BL) or coupling links that are defined as CFR or CFS), then HCD generates errors. You need to change the channel definitions to be supported channel types for the new processor type.
>
> See Example 5-1 for the list of error messages generated for our example (to save space, we have merged the error messages from multiple screens onto one screen).

Example 5-1 HCD - error messages for non-supported channel types

```
/ Sev Msg. ID  Message Text
 _ E   CBDA154I Channel path type CBS is not supported by channel path
 #              ID 0.00.
 _ E   CBDA440I Operation mode SHR not allowed for channel path 0.00 of
 #              type CBS.
 _ E   CBDA154I Channel path type CBR is not supported by channel path
 #              ID 0.01.
 _ E   CBDA154I Channel path type CBS is not supported by channel path
 #              ID 0.02.
 _ E   CBDA440I Operation mode SHR not allowed for channel path 0.02 of
 #              type CBS.
 _ E   CBDA154I Channel path type CBR is not supported by channel path
 #              ID 0.03.
 _ E   CBDA154I Channel path type BL is not supported by channel path ID
 #              0.70.
 _ E   CBDA154I Channel path type BL is not supported by channel path ID
 #              0.71.
 _ E   CBDA154I Channel path type BL is not supported by channel path ID
 #              0.72.
 _ E   CBDA154I Channel path type BL is not supported by channel path ID
```

```
#              0.73.
_ E   CBDA154I Channel path type OSA is not supported by channel path
#              ID 0.80.
_ E   CBDA440I Operation mode SHR not allowed for channel path 0.80 of
#              type OSA.
_ W   CBDG441I The coupling facility connection between channel path 04
#              of processor SCZP801 and channel path 0.C2 of processor
#              SCZP901 is not copied.
_ W   CBDG441I The coupling facility connection between channel path 05
#              of processor SCZP801 and channel path 0.C3 of processor
#              SCZP901 is not copied.
_ W   CBDG441I The coupling facility connection between channel path 06
#              of processor SCZP801 and channel path 1.C2 of processor
#              SCZP901 is not copied.
_ W   CBDG441I The coupling facility connection between channel path 07
#              of processor SCZP801 and channel path 1.C3 of processor
#              SCZP901 is not copied.
_ W   CBDG441I The coupling facility connection between channel path FA
#              of processor SCZP801 and channel path FB of processor
#              SCZP801 is not copied.
_ W   CBDG441I The coupling facility connection between channel path FB
#              of processor SCZP801 and channel path FA of processor
#              SCZP801 is not copied.
_ I   CBDG272I Requested action on object SCZP801 failed.
```

- Execute the appropriate actions to correct the error messages. Refer to *IBM System z9 and @server zSeries Connectivity Handbook*, SG24-5444, for a list of supported channel types. Note the following informational message indicates that the action was not performed because of previous errors:

  `CBDG272I Requested action on object SCZP801 failed`

  > **Note:** The channel path references for the 2094 processor are different from those of the 2064: `channel path 0.C2`. For the 2094, the channel path is in the form:
  >
  > `LCSS.CHPID`
  >
  > So for channel path 0.C2, the error message is referencing CHPID C2 in LCSS 0.

- After the channel types have been changed to supported channel types, retry copying the channel subsystem again; refer to “Copy the 2064 channel subsystem to the 2094” on page 138. When HCD does not detect any more error conditions, you should receive a screen similar to the one shown in Figure 5-8 on page 141.

```
------------------------------- Message List ------------------------------
   Save  Query  Help
 --------------------------------------------------------------------------
                                                                Row 12 of 20
 Command ===> ___________________________________________ Scroll ===> CSR

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

 / Sev Msg. ID  Message Text
 #              SCZP901 is not copied.
 _ W   CBDG441I The coupling facility connection between channel path FA
 #              of processor SCZP801 and channel path FB of processor
 #              SCZP801 is not copied.
 _ W   CBDG441I The coupling facility connection between channel path FB
 #              of processor SCZP801 and channel path FA of processor
 #              SCZP801 is not copied.
 _ I   CBDG271I Requested action on object SCZP801 successfully
 #              processed.
 ***************************** Bottom of data ******************************
```

Figure 5-8   HCD - warning messages for Copy to channel subsystem

Observe CF link messages for later reference

- Note the CF Link Information messages. Specifically, take note of the `CBDG441I` messages, which indicate that the CF link connections have not been copied over to the 2094 definition.

  Note that the following informational message, displayed in Figure 5-8, indicates that the copy action was performed:

  `CBDG271I Requested action on object SCZP801 successfully processed`

  Press PF3 to continue with the copy.

- HCD may then display a list of CTC connections (if any are present in the IODF); see Figure 5-9 on page 142. This provides you with the opportunity to modify them if necessary.

  Press Enter to accept the CTC connections as displayed.

```
------------------------- CTC Connection Update List -------------------------
                                                              Row 1 of 548
 Command ===> ____________________________________________ Scroll ===> CSR

 The following CTC connections are recognized by HCD for the source
 configuration. Select CTC connections to be moved to the target
 configuration. Then press Enter.

 Target processor ID . . . . : SCZP102
 Target channel subsystem ID :

   -----------CTC or FC side----------- ---------CNC/FCV or FC side---------
 / Proc.CSSID Part.    Devices  CH CU   Proc.CSSID Part.    Devices  CH CU
 _ SCZP801    A01      4B00,4   5A 4B00 SCZP102.0  A02      5A90,4   5C 5A90
 _ SCZP801    A01      4B08,4   5B 4B08 SCZP102.0  A02      5A98,4   5D 5A98
 _ SCZP801    A01      4B10,4   5A 4B10 SCZP102.0  A03      5A90,4   5C 5A90
 _ SCZP801    A01      4B18,4   5B 4B18 SCZP102.0  A03      5A98,4   5D 5A98
 _ SCZP801    A01      4B30,4   5A 4B30 SCZP102.0  A05      5A90,4   5C 5A90
 _ SCZP801    A01      4B38,4   5B 4B38 SCZP102.0  A05      5A98,4   5D 5A98
 _ SCZP801    A01      4B40,4   5A 4B40 SCZP102.0  A06      5A90,4   5C 5A90
```

Figure 5-9 HCD - CTC Connection Update List

Set the MAXDEV values for each LCSS

One difference between the 2064 and the 2094 is that what was previously allowed for dynamic expansion in HSA is now done by setting MAXDEV values in each LCSS in HCD. The MAXDEV values can be seen in the Channel Subsystem List panel.

HCD defaults to 65280 for subchannel set 0 (SS0), and to 0 for subchannel set 1 (SS1). Defining more LCSSs than you are currently using is a way of planning ahead. However, you should be aware that if you leave the MAXDEV values at their defaults for each LCSS—whether used or not—the operating system allocates storage in the HSA.

Therefore, it is a good idea to use the HSA Estimator tool to determine the HSA usage, and then set the MAXDEV values for each LCSS, as you set them in the HSA Estimator tool.

- To change the MAXDEV values, you must be in the Channel Subsystem List. From the Processor List panel, type `s` next to the 2094 processor; see Figure 5-10 on page 143.

```
 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  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
s SCZP102  2094     S18      LPAR  0001022094 Upgrade 2064 to 2094 (upgrade)
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
******************************* Bottom of data ********************************
```

Figure 5-10 HCD - Processor List, option “S”, Work with attached channel paths

- The Channel Subsystem List panel is displayed; see Figure 5-11.

```
 Goto  Backup  Query  Help
 ------------------------------------------------------------------------------
                             Channel Subsystem List                 Row 1 of 4
 Command ===> _______________________________________________ Scroll ===> PAGE

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

 Processor ID . . . : SCZP102      Upgrade 2064 to 2094

   CSS Devices in SS0    Devices in SS1
 / ID  Maximum + Actual  Maximum + Actual  Description
 _ 0   65280     14188   0         0       ________________________________
 _ 1   65280     0       0         0       ________________________________
 _ 2   65280     0       0         0       ________________________________
 _ 3   65280     0       0         0       ________________________________
 ******************************* Bottom of data ********************************
```

Figure 5-11 HCD - Channel Subsystem List

- Change the MAXDEV values for SS0 and SS1. There are two ways to change these values.
  - Type directly over the values for each LCSS in the Channel Subsystem List, as shown in Figure 5-12 on page 144. HCD displays the following message:

    `Requested change has been performed, but cannot be activated dynamically.`

    This message indicates that the change will only become effective at the next power-on reset of the 2094, using the IOCDS created from the current IODF (once production).

```
Goto  Backup  Query  Help
------------------------------------------------------------------------------
                            Channel Subsystem List                Row 1 of 4
Command ===> _______________________________________________ Scroll ===> PAGE

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

Processor ID . . . : SCZP102      Upgrade 2064 to 2094

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
_ 0   32000     14188   0         0       ________________________________
_ 1   10000     0       0         0       ________________________________
_ 2       0     0       0         0       ________________________________
_ 3       0     0       0         0       ________________________________
******************************* Bottom of data ********************************
```

Figure 5-12 HCD - Channel Subsystem List, updating MAXDEV values

– The second way to change the MAXDEV values is by typing c (for change) next to each LCSS to be changed; see Figure 5-13.

```
Goto  Backup  Query  Help
------------------------------------------------------------------------------
                            Channel Subsystem List                Row 1 of 4
Command ===> _______________________________________________ Scroll ===> PAGE

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

Processor ID . . . : SCZP102      Upgrade 2064 to 2094

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
c 0   65280     14188   0         0       ________________________________
_ 1   65280     0       0         0       ________________________________
_ 2   65280     0       0         0       ________________________________
_ 3   65280     0       0         0       ________________________________
******************************* Bottom of data ********************************
```

Figure 5-13 HCD - Channel Subsystem List, option c, changing an LCSS

HCD then displays the Change Channel Subsystem panel, as shown in Figure 5-14 on page 145. From this panel, you can change the MAXDEV values for SS0 and SS1 for each LCSS (in this example, LCSS 0). After changing the fields that you want to update, press Enter.

HCD displays the Channel Subsystem List panel, with the updated fields and the following message:

```
Requested change has been performed, but cannot be activated dynamically.
```

This message indicates that the change will only become effective at the next power-on reset of the 2094, using the IOCDS created from the current IODF (once production).

```
------------------------ Change Channel Subsystem -------------------------

 Specify or revise the following values.

 Processor ID . . . . . . : SCZP102      Upgrade 2064 to 2094 (upgrade)
 Channel subsystem ID . . : 0

 Description  . . . . . . . ________________________________

 Maximum number of devices
   in subchannel set 0  . . 32000  +
   in subchannel set 1  . . 0      +
```

Figure 5-14   HCD - Change Channel Subsystem, change MAXDEV value

In our example, we did not change the MAXDEV values for SS1 in any of the LCSSs. We could have changed any of these values to allow for future use of SS1 in any of our defined LCSSs. However, we left the MAXDEV values for SS1 as the default of 0 because the decision to start using SS1 requires additional planning and is not usually done as part of an upgrade scenario.

Delete the current 2064 processor definition

At this point, the channel subsystem has been moved from the 2064 processor to the new 2094 processor. Now you delete the 2064 processor definition (SCZP801).

- From the HCD Processor List panel, type `d` (for delete) next to processor `SCZP801`; see Figure 5-15.
- Press Enter to “Confirm Delete Processor”.

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2094     S18      LPAR  0001022094 Upgrade 2064 to 2094 (replace)
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
d SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 5-15   HCD - Processor List (deleting processor)

Define logical partitions to all LCSSs on the 2094

Define partitions for all logical channel subsystems (LCSS) on the new 2094. Since we are migrating from a 2064 that has only one LCSS to a 2094 on which we have defined four LCSSs, we must define logical partitions on the three new LCSSs.

Note: If you attempt to validate a work IODF or build a production IODF for a configuration that has LCSSs without any logical partition definitions, you get the Severity E message:

```
CBDA658I No partitions defined for channel subsystem procid.n.
```

- From the Processor List, type p (Work with partitions) and press Enter; see Figure 5-16.

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
p SCZP102  2094     S18      LPAR  0001022094 Upgrade 2064 to 2094 (replace)
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 5-16 HCD - Processor List, Working with partitions

Note: You must define at least one logical partition on an LCSS before you can define any channels to the LCSS. An attempt to display the Channel Path List panel on an LCSS without partitions results in the error message:

```
Define at least one partition for the processor before defining channel paths.
```

- HCD displays the list of LCSSs. This is because you define logical partitions to an LCSS and not to a processor.

  Select the LCSS in which the logical partitions are to be defined by typing p (Work with partitions), and press Enter; see Figure 5-17 on page 147.

  For this example, we adding a logical partition to LCSS 1. However, in order for the IODF to be validated or built, at least one logical partition must be created in each LCSS.

```
Goto  Backup  Query  Help
------------------------------------------------------------------------------
                            Channel Subsystem List                  Row 1 of 4
Command ===> _______________________________________________ Scroll ===> PAGE

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

Processor ID . . . : SCZP102      Upgrade 2064 to 2094 (replace)

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
_ 0   65280     14188   0         0       ________________________________
p 1   65280     0       0         0       ________________________________
_ 2   65280     0       0         0       ________________________________
_ 3   65280     0       0         0       ________________________________
******************************* Bottom of data ********************************
```

Figure 5-17   HCD - Channel Subsystem List

- The Partition List panel is displayed, which does not yet contain any partitions; see Figure 5-18.

```
---------------------------- Partition List ----------------------------
  Goto  Backup  Query  Help
------------------------------------------------------------------------

Command ===> ________________________________________ Scroll ===> PAGE

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

Processor ID  . . . . : SCZP102   Upgrade 2064 to 2094 (replace)
Configuration mode  . : LPAR
Channel Subsystem ID  : 1

/ Partition Name   Number Usage + Description
**************************** Bottom of data ****************************
```

Figure 5-18   HCD - Partition List panel, before adding a new logical partition

Use PF11 (or type `add` on the command line) to add a new logical partition. HCD displays the Add Partition panel; see Figure 5-19 on page 148.

Fill in the `Partition name`, `Partition number`, and `Description` fields and press Enter. Leave the `Partition usage field` as `OS`.

If you only want to define reserved partitions, then type an asterisk (*) in the Partition name field to create a reserved partition (refer to “Create a reserved partition for future use.” on page 148 for more information about this topic).

```
---------------------- Add Partition ----------------------


 Specify the following values.

 Partition name . . . LPAR1___
 Partition number . . 1      (same as MIF image ID)
 Partition usage  . . OS     +

 Description  . . . . New LPAR in LCSS 1_____________
```

Figure 5-19 HCD - Add Partition panel, after fields are filled in

- The Partition List panel displays, with the new logical partition now added; see Figure 5-20.

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

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

 Processor ID  . . . . : SCZP102   Upgrade 2064 to 2094 (replace)
 Configuration mode  . : LPAR
 Channel Subsystem ID  : 1

 / Partition Name   Number Usage + Description
 _ LPAR1            1      OS      New LPAR in LCSS 1
 **************************** Bottom of data ****************************
```

Figure 5-20 HCD - Partition List panel, after adding a new logical partition

- Create a reserved partition for future use.

  Fill in the `Partition name`, `Partition number`, and `Description` fields and press Enter. Type an asterisk (*) in the Partition name field and leave the Partition usage field as `OS`; see Figure 5-21.

```
---------------------- Add Partition ----------------------


 Specify the following values.

 Partition name . . . *_______
 Partition number . . 1      (same as MIF image ID)
 Partition usage  . . OS     +

 Description  . . . . Reserved LPAR 1_________________
```

Figure 5-21 HCD - Add Partition panel, after fields are filled in for reserved logical partition

- The Partition List panel is displayed, with the new reserved logical partition now added; see Figure 5-22.

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

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

 Processor ID  . . . . : SCZP102   Upgrade 2064 to 2094 (replace)
 Configuration mode  . : LPAR
 Channel Subsystem ID  : 1

 / Partition Name   Number Usage + Description
 _ *                1      OS      Reserved LPAR 1
 **************************** Bottom of data ****************************
```

Figure 5-22   HCD - Partition List panel, after adding a new logical partition

There are a number of tasks you need to complete in order to make use of a reserved logical partition. For more information, refer to Chapter 11, “Reserved logical partitions” on page 405.

Reconnect the CF channel paths

You have to manually redefine the CF links that were broken when the channel subsystem was copied from the 2064 to the 2094 processor. We suggest that you obtain a CF connection report from the previous 2064 production IODF.

Over-define CHPIDs for future use

For an XMP processor, you can define a channel path that is not physically installed on the processor. This may be useful if you want to migrate from a server which had more channels defined than the target XMP processor has currently installed, or if you want to prepare a configuration for future upgrades of the channel cards.

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 is not taken into account by an IOCDS write. 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 * with its valid PCHID.

To illustrate how we use over-defining in our example, we select a few CHPIDs in our configuration as having been left out of the upgrade until a future date. We can maintain the CHPID and control unit definitions in the IODF until the hardware is installed and PCHIDs are assigned to the CHPIDs.

The Production IODF could then be activated dynamically and the PCHID/CHPID/control unit definitions would then become available to the operating system.

Note: However, 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 not connected.

- Display the channels for processor SCZP102. On the Processor List panel, type s next to SCZP102 and press Enter; see Figure 5-23.

```
                                Processor List       Row 4 of 7 More:       >
Command ===> _______________________________________________ Scroll ===> PAGE

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
s SCZP102  2094     S18      LPAR  0001022094 Upgrade 2064 to 2094 (replace)
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
****************************** Bottom of data ********************************
```

Figure 5-23 HCD - Processor List, select option s

- The Channel Subsystem List panel is displayed; see Figure 5-24. Type s (Work with attached channel paths) next to CSS ID 0 and press Enter.

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

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

Processor ID . . . : SCZP102      Upgrade 2064 to 2094 (replace)

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
s 0   65280     14188   0         0       ________________________________
_ 1   65280     0       0         0       ________________________________
_ 2   65280     0       0         0       ________________________________
_ 3   65280     0       0         0       ________________________________
****************************** Bottom of data *******************************
```

Figure 5-24 HCD - Channel Subsystem List

- The Channel Path List panel for CSS ID 0 is displayed; see Figure 5-25 on page 151.

  Locate the channels that are over-defined in order to update them in HCD. We have decided not to install four FICON channels (TYPE=FC), which are CHPIDs 5A to 5D in our example.

```
                              Channel Path List    Row 87 of 100 More:       >
Command ===> _______________________________________________ Scroll ===> PAGE

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

Processor ID . . . . : SCZP102      Upgrade 2064 to 2094 (replace)
Configuration mode . : LPAR
Channel Subsystem ID : 0

                    DynEntry Entry +
/ CHPID Type+ Mode+ Switch + Sw Port Con Mngd Description
_ 5A    FC    SHR   61       61 05       No   ________________________________
_ 5B    FC    SHR   62       62 05       No   ________________________________
_ 5C    FC    SHR   61       61 09       No   ________________________________
_ 5D    FC    SHR   62       62 09       No   ________________________________
_ 5E    FCP   SHR   __       __ __       No   61.0D
_ 5F    FCP   SHR   __       __ __       No   62.0D
_ 60    FCP   SHR   __       __ __       No   Octavian's 2105
_ 61    FCP   SHR   __       __ __       No   Octavian's 2105
_ EC    IQD   SHR   __       __ __       No   ________________________________
_ ED    IQD   SHR   __       __ __       No   ________________________________
_ EE    IQD   SHR   __       __ __       No   ________________________________
_ EF    IQD   SHR   __       __ __       No   ________________________________
_ FA    ICP   SHR   __       __ __   N   No   WTSCPLX1
_ FB    ICP   SHR   __       __ __   N   No   WTSCPLX1
****************************** Bottom of data ********************************
```

Figure 5-25 HCD - Channel Path List

- Type c next to each of the four CHPIDs in order to change the PCHID value to an asterisk (*), and then press Enter.

  The Change Channel Path Definition panel is displayed for each CHPID selected; see Figure 5-26.

```
--------------------- Change Channel Path Definition ----------------------

  Specify or revise the following values.

  Processor ID . . . . : SCZP102      Upgrade 2064 to 2094 (replace)
  Configuration mode . : LPAR
  Channel Subsystem ID : 0

  Channel path ID  . . . . 5A    +            PCHID . . . ___
  Channel path type  . . . FC    +
  Operation mode . . . . . SHR   +
  Managed  . . . . . . . . No   (Yes or No)   I/O Cluster ________  +
  Description  . . . . . . ________________________________

  Specify the following values only if connected to a switch:

  Dynamic  ntry switch ID  61  + (00 - FF)
  Entry switch ID  . . . . 61  +
  Entry port . . . . . . . 05  +
```

Figure 5-26 HCD - Change Channel Path Definition

- Enter * in the PCHID field and press Enter.

- Press Enter when prompted by HCD for the Access List and the Candidate List.
- Repeat this same change for each CHPID that is being over-defined. After each change, HCD again displays the Channel Path List panel, as shown in Figure 5-25 on page 151.

Here is another way to change the PCHID values for the four CHPIDs:

- Press PF20 in the Channel Path List panel, update the PCHID fields directly on the panel, and then press Enter; see Figure 5-27.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                              Channel Path List    Row 87 of 100 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=A10
B=A11       C=A12       D=A13       E=A14       F=C3
                          I/O Cluster  --------- Partitions 0x -----
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   PCHID
_ 5A    FC    SHR   No    ________     a a a a a a a a a a a a a a _   *
_ 5B    FC    SHR   No    ________     a a a a a a a a a a a a a a _   *
_ 5C    FC    SHR   No    ________     a a a a a a a a a a a a a a _   *
_ 5D    FC    SHR   No    ________     a a a a a a a a a a a a a a _   *
_ 5E    FCP   SHR   No    ________     _ _ _ c _ _ _ _ c _ _ a _ _ _   ___
_ 5F    FCP   SHR   No    ________     _ _ _ c _ _ _ _ c _ _ a _ _ _   ___
_ 60    FCP   SHR   No    ________     _ _ _ c _ _ _ _ c _ _ a _ _ _   ___
_ 61    FCP   SHR   No    ________     _ _ _ c _ _ _ _ c _ _ a _ _ _   ___
_ EC    IQD   SHR   No    ________     a a a a a a a a a a a a a a _   ___
_ ED    IQD   SHR   No    ________     a a a a a a a a a a a a a a _   ___
_ EE    IQD   SHR   No    ________     a a a a a a a a a a a a a a _   ___
_ EF    IQD   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ a _ _ _   ___
_ FA    ICP   SHR   No    ________     a a a _ a a a a _ _ a _ a _ a   ___
_ FB    ICP   SHR   No    ________     a a a _ a a a a _ _ a _ a _ a   ___
****************************** Bottom of data ********************************
```

Figure 5-27 HCD - Channel Path List, changing PCHID to an asterisk (*)

Define additional I/O

This is where you define any additional CHPIDs, control units, and I/O devices that you may be adding to the 2094 configuration as part of the upgrade.

5.3 Validate the work IODF and produce IOCP statements

Validate the work IODF

- From the HCD main panel shown in Figure 5-28 on page 153, select option **2**, **Activate or process configuration data**, and press Enter.

```
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 . . . 'SYS10.IODF34.WORK'                    +
```

Figure 5-28 HCD - main menu, select Activate

- The Activate or Process Configuration Data panel is displayed; see Figure 5-29. Select option **12**, **Build validated work I/O definition file**, and then press Enter.

```
  ----- Activate or Process Configuration Data ------


   Select one of the following tasks.

   12  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 5-29 HCD - Activate or Process Configuration Data

HCD displays messages related to validating the work IODF; see Figure 5-30 on page 154.

```
------------------------------- Message List --------------------------------
   Save  Query  Help
 ---------------------------------------------------------------------------
                                                               Row 1 of 139
 Command ===> ___________________________________________ Scroll ===> PAGE

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

 / Sev Msg. ID  Message Text
 _ W   CBDG081I Following 2 operating system configurations of type MVS
 #              have no console devices defined: OPENMVS1, TRAINER
 _ W   CBDG061I Switch control unit must be defined for switch 20.
 _ W   CBDG061I Switch control unit must be defined for switch 90.
 _ W   CBDG061I Switch control unit must be defined for switch 91.
 _ W   CBDA857I No channel paths attached to partition A1D of processor
 #              SCZP101.1.
 _ W   CBDA857I No channel paths attached to partition A2D of processor
 #              SCZP101.2.
 _ W   CBDG483I CBP channel path 0.C0 of processor SCZP101 is not
 #              connected. It should be connected to a channel path of
 #              type CBP.
```

Figure 5-30 HCD - Message List, from validating a work IODF

Messages with a Severity of W (warning) are acceptable. Any message with a Severity higher than W needs to be resolved and the validate can be redone.

- Press PF3 to exit this panel. A confirmation message `Requested action successfully processed` is displayed; see Figure 5-31. Proceed to the next step without leaving the panel.

```
------ Activate or Process Configuration Data -------

  Select one of the following tasks.

  12  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

+------------------------------------------+
| Requested action successfully processed. |
+------------------------------------------+
```

Figure 5-31 HCD - Activate or Process Configuration Data, validate work IODF confirmation

Create IOCP statements for the CHPID Mapping Tool

Now an IOCP deck must be created, as explained here.

- Select option **3**, **Build IOCP input data set** and press Enter; see Figure 5-32.

```
----- 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 5-32 HCD - Activate or Process Configuration Data, option 3, Build IOCP

- HCD displays the list of available processors. Select the processor for which you would like to create the IOCP deck by typing a forward slash mark (/) next to it, and then press Enter; see Figure 5-33.

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

 Select one.

   Processor ID  Type     Model    Mode  Description
   ISGSYN        2064     1C7      LPAR
   ISGS11        2064     1C7      LPAR
   SCZP101       2094     S18      LPAR
 / SCZP102       2094     S18      LPAR  Upgrade 2064 to 2094 (replace)
   SCZP701       9672     XX7      LPAR
   SCZP901       2084     C24      LPAR
   WOJ1          2084     A08      LPAR
 *************************** Bottom of data ****************************
```

Figure 5-33 HCD - Available Processors, select processor for IOCP deck

- On the Build IOCP Input Data Set panel, shown in Figure 5-34 on page 156, enter the information regarding the IOCP data set to be created.
- Fill in the IOCP input data set field, type `Yes` in the Input to Stand-alone IOCP? field, complete the Job statement information for the installation, and then press Enter. A batch job is submitted to create the data set and its content.

```
------------------------- Build IOCP Input Data Set -------------------------

  Specify or revise the following values.

  IODF name . . . . . . . . . : 'SYS10.IODF34.WORK'
  Processor ID  . . . . . . . : SCZP102
  Title1 . ________________________________________________________________
  Title2 : SYS10.IODF34.WORK - 2005-11-17 17:45

  IOCP input data set
  'iocp.text'_________________________________________
  Input to Stand-alone IOCP?  Yes  (Yes or No)

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

Figure 5-34 HCD - Build IOCP Input Data Set

- In TSO, verify that the data set you just created exists and that it contains IOCP statements; see Figure 5-35 on page 157 for an example. This data set is used as input in "Import IOCP file into CHPID Mapping Tool" on page 108. You need to download it 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.

- Note that part of the TOK statement has been blanked out with dots; see Example 5-2.

Example 5-2 HCD - IOCP file (TOK statement)

```
TOK=('SCZP102',00800221991E2094101534700105336F00000000,
00000000,'05-12-02','10:15:34','........','........')
```

This is a safeguard to ensure that this IOCP deck 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 from 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.

Examining the RESOURCE statement shown in Figure 5-35 on page 157, we see the logical partition definitions for each of the LCSSs, even the reserved logical partition definition `(CSS(1),(*,1))`.

```
        ID    MSG2='SYS10.IODF34.WORK - 2005-12-02 10:15',           *
              SYSTEM=(2094,1),                                         *
              TOK=('SCZP102',00800221991E20941015347001O5336F00000000,*
              00000000,'05-12-02','10:15:34','        ','        ')
        RESOURCE PARTITION=((CSS(0),(A01,1),(A02,2),(A03,3),(A04,4),(A*
              05,5),(A06,6),(A07,7),(A08,8),(A09,9),(A10,A),(A11,B),(A*
              12,C),(A13,D),(A14,E),(C3,F)),(CSS(1),(*,1)),(CSS(2),(LP*
              AR2,2)),(CSS(3),(LPAR3,3))),                             *
              MAXDEV=((CSS(0),65280,0),(CSS(1),65280,0),(CSS(2),65280,*
              0),(CSS(3),65280,0))
        CHPID PATH=(CSS(0),04),SHARED,                                 *
              PARTITION=((A01,A02,A03,A05,A06,A07,A08,A09,A10,A11,A13,*
              C3),(=)),TYPE=CBP
        CHPID PATH=(CSS(0),05),SHARED,                                 *
              PARTITION=((A01,A02,A03,A05,A06,A07,A08,A09,A10,A11,A13,*
              C3),(=)),TYPE=CBP
        CHPID PATH=(CSS(0),06),SHARED,                                 *
              PARTITION=((A01,A02,A03,A05,A06,A07,A08,A09,A10,A11,A13,*
              C3),(=)),TYPE=CBP
        CHPID PATH=(CSS(0),07),SHARED,                                 *
              PARTITION=((A01,A02,A03,A05,A06,A07,A08,A09,A10,A11,A13,*
              C3),(=)),TYPE=CBP
        CHPID PATH=(CSS(0),08),SHARED,                                 *
              PARTITION=((A01,A02,A03,A04,A05,A06,A07,A08,A09,A10,A11,*
              A12,A13,A14),(=)),TYPE=OSD
        CHPID PATH=(CSS(0),09),SHARED,PARTITION=((A04,A12),(=)),      *
           .
           .
           .
        CHPID PATH=(CSS(0),59),SHARED,                                 *
              PARTITION=((A01,A02,A03,A04,A05,A06,A07,A08,A09,A10,A11,*
              A12,A13,A14),(=)),SWITCH=AF,TYPE=CNC
        CHPID PATH=(CSS(0),5E),SHARED,PARTITION=((A12),(A04,A09)),    *
              TYPE=FCP
        CHPID PATH=(CSS(0),5F),SHARED,PARTITION=((A12),(A04,A09)),    *
              TYPE=FCP
        CHPID PATH=(CSS(0),60),SHARED,PARTITION=((A12),(A04,A09)),    *
              TYPE=FCP
        CHPID PATH=(CSS(0),61),SHARED,PARTITION=((A12),(A04,A09)),    *
              TYPE=FCP
           .
           .
           .
        CNTLUNIT CUNUMBR=FFFC,PATH=((CSS(0),FA,FB)),UNIT=CFP
        IODEVICE ADDRESS=(FFEB,007),CUNUMBR=(FFFC),UNIT=CFP
        IODEVICE ADDRESS=(FFF2,007),CUNUMBR=(FFFC),UNIT=CFP
******************************** Bottom of Data ********************************
```

Figure 5-35 IOCP input data set contents

Note that the CHPIDs 5A - 5D do not appear in the IOCP deck. HCD maintains the definitions, but does not pass these definitions to IOCP or the CHPID Mapping Tool.

- Now, proceed to the CHPID Mapping Tool.

5.4 CHPID Mapping Tool

In the following steps, we take the output from the previous set of HCD steps (IOCP), as well as the output from the 2094 order process (CFReport). Using the CHPID Mapping Tool, we assign PCHIDs to each of the CHPIDs in the new 2094.

Note: In this scenario, we are coming from a 2064 (which does not have PCHIDs), so we do not have to take into consideration the current CHPID mapping in assigning the new PCHIDs.

For this process, the CHPID Mapping Tool (CMT) must be downloaded and installed. Refer to 2.5.1, "CHPID Mapping Tool" on page 32 for information about downloading and installing the CMT. If you already have the CHPID Mapping Tool installed, then verify that you have the latest updates available.

Using the CHPID Mapping Tool, follow these steps:

- Import the 2094 IOCP statements file and "upgrade" the CFReport file into the CHPID Mapping Tool. Getting the IOCP statements may be performed with HCM.
- Set the priority for single-path control units and other control units that would override CMT defaults.
- Run the CHPID Mapping Tool availability function.
- Create CHPID Mapping Tool CHPID reports.
- Create an updated 2094 IOCP statements file and file transfer back to the system image running HCD. This step may be performed with HCM.

Import the CFReport order file into CHPID Mapping Tool

- Start the CHPID Mapping Tool on your workstation, and click **File** → **Import CFReport Order file**; see Figure 5-36.

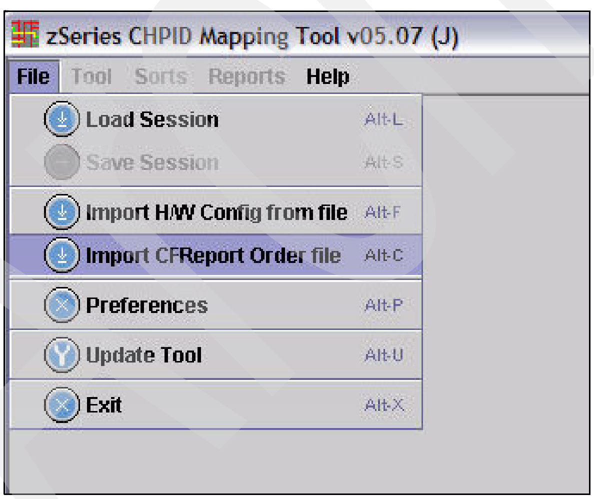


Figure 5-36 CMT - select Import CFReport Order file

- Select the CFReport file on your workstation to import into the CHPID Mapping Tool and click Open; see Figure 5-37 on page 159.

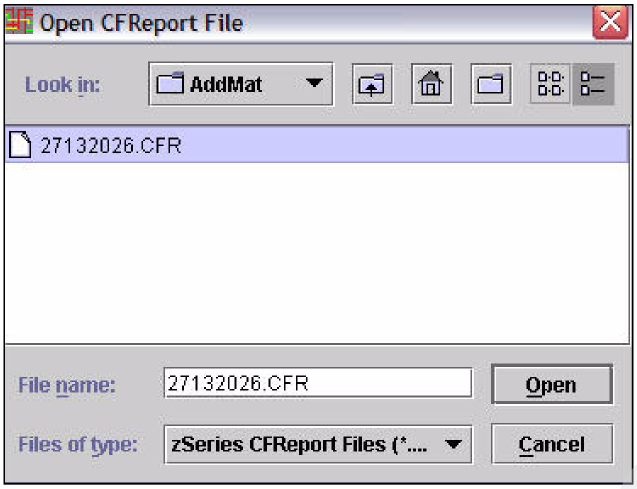


Figure 5-37 CMT - Open CFReport File

- The CHPID Mapping Tool displays the information from the CFReport on the left-hand side of the screen; see Figure 5-38.

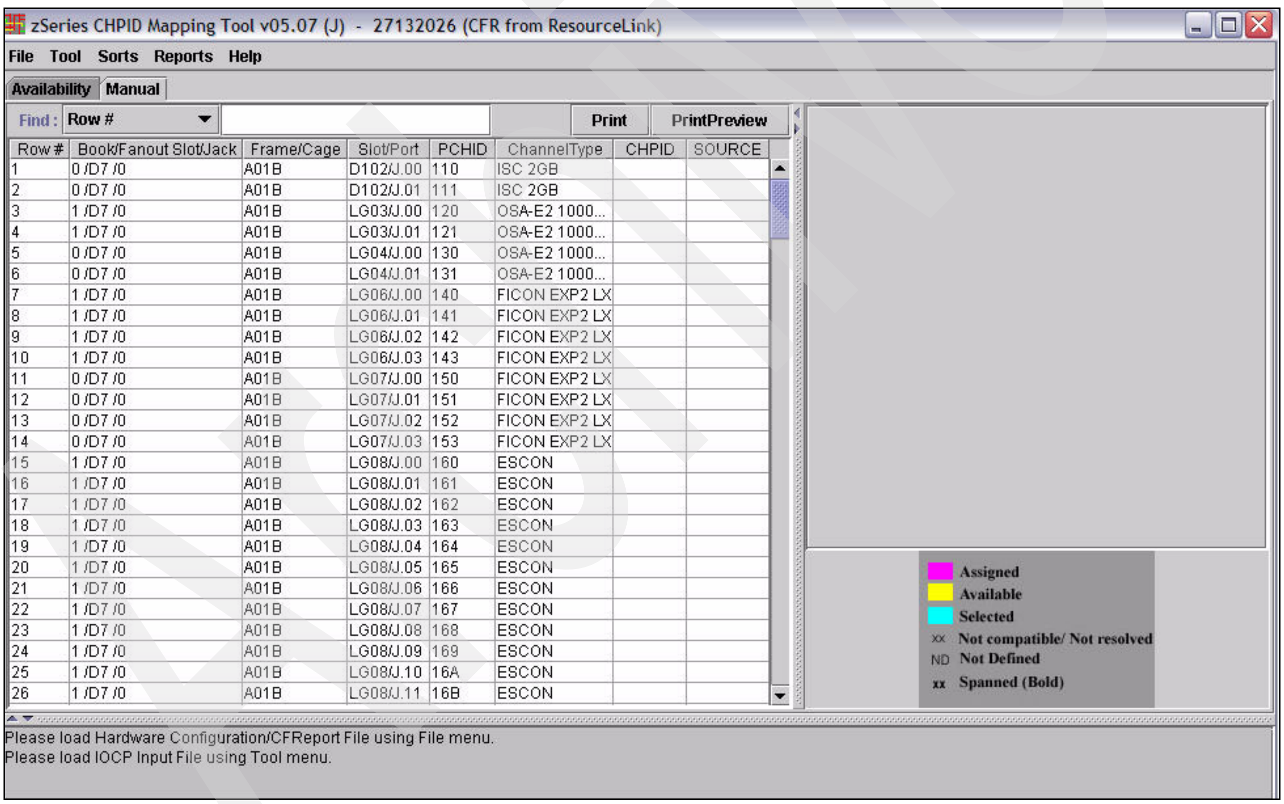


Figure 5-38 CMT - after importing CFReport file

Import IOCP file into the CHPID Mapping Tool

- Import the IOCP file previously created in "Create IOCP statements for the CHPID Mapping Tool" on page 155, then click **Tool** → **Import** IOCP File; see Figure 5-39 on page 160.

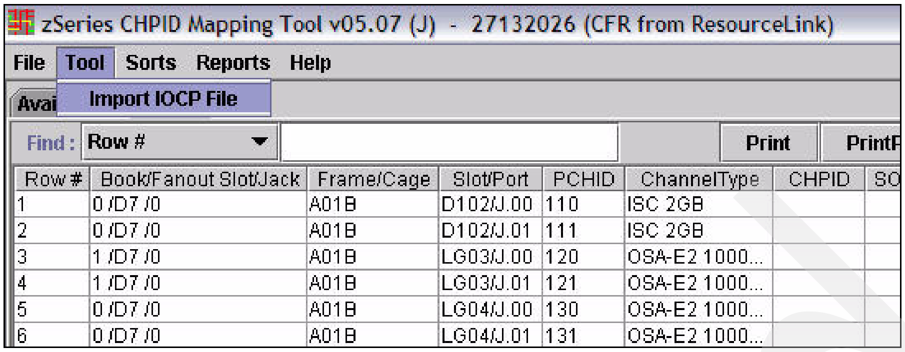


Figure 5-39 CMT - select Tool - Import IOCP file

- Select the IOCP file on your workstation to load into the CHPID Mapping Tool and click Open; see Figure 5-40.

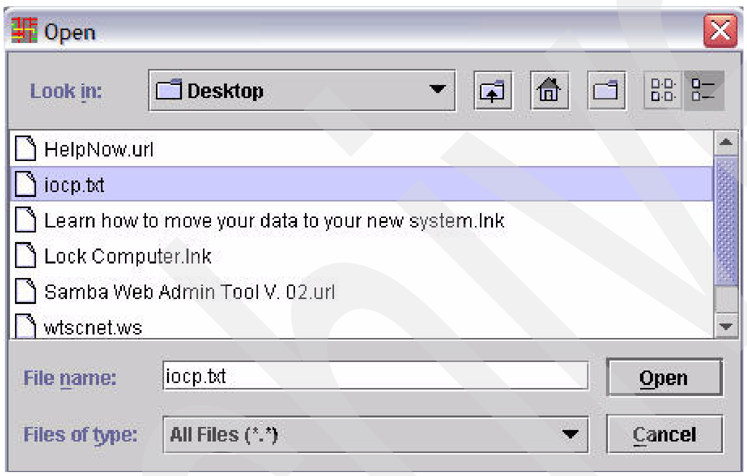


Figure 5-40 CMT - Open IOCP file

Hardware resolution

The CHPID Mapping Tool may prompt you to resolve any issues that may arise from importing the IOCP file.

In our example, clarification on the TYPE=OSD and TYPE=CBP channels was needed; see Figure 5-41 on page 161.

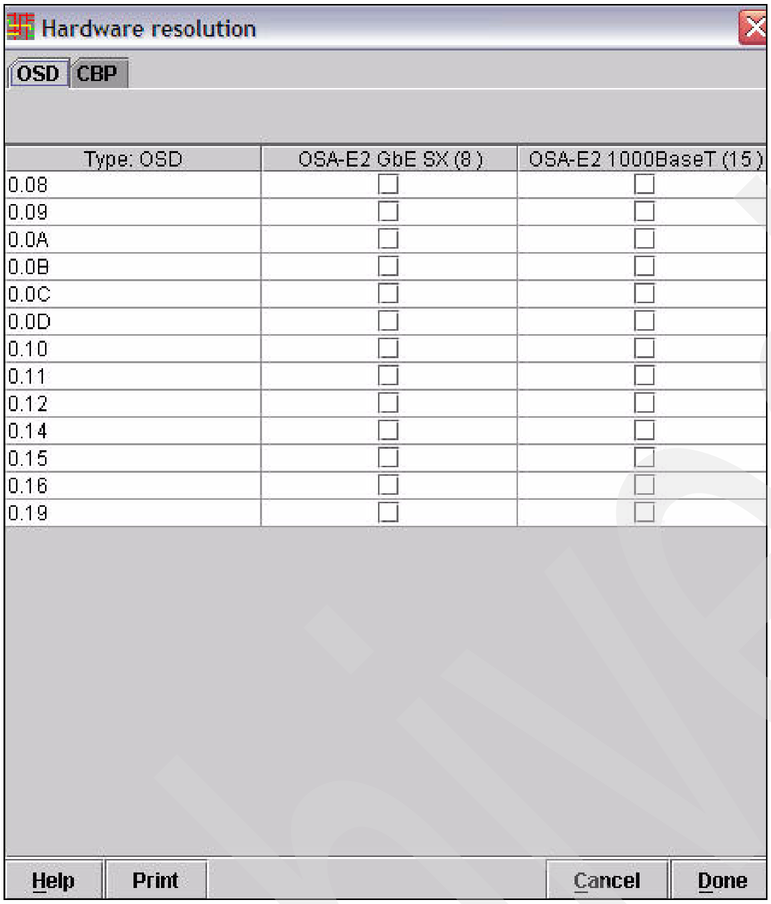


Figure 5-41 CMT - Hardware resolution after IOCP import

- Select one tab at a time. In our example, the CHPID Mapping Tool needs to know which channels are OSA-E2 GbE SX and which are OSA-E2 1000BaseT.
- Check off what each of the channels are used for. Perform the hardware resolution for the channels under each tab. Once completed, click Done; see Figure 5-42.

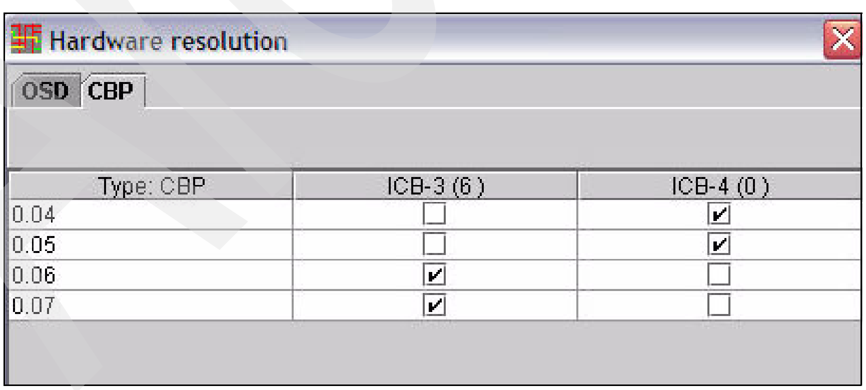


Figure 5-42 CMT - Hardware resolution after IOCP import, resolved

In our example, the CHPID Mapping Tool displays a message indicating that our order contains more hardware than we have defined in the IOCP that was exported from HCD.

Figure 5-43 CMT - Information, more hardware than required by IOCP

- This message was most likely issued as a result of our changing the TYPE=FC CHPIDs to an asterisk (*). This is probably not a normal occurrence, as we would normally define all hardware that was ordered in HCD. Press OK to continue.

  The CHPID Mapping Tool displays all of the currently known information; see Figure 5-44.

  Note that the CHPID and SOURCE columns are blank. These are filled in once the CHPID Mapping Tool assigns the CHPIDs to PCHIDs.

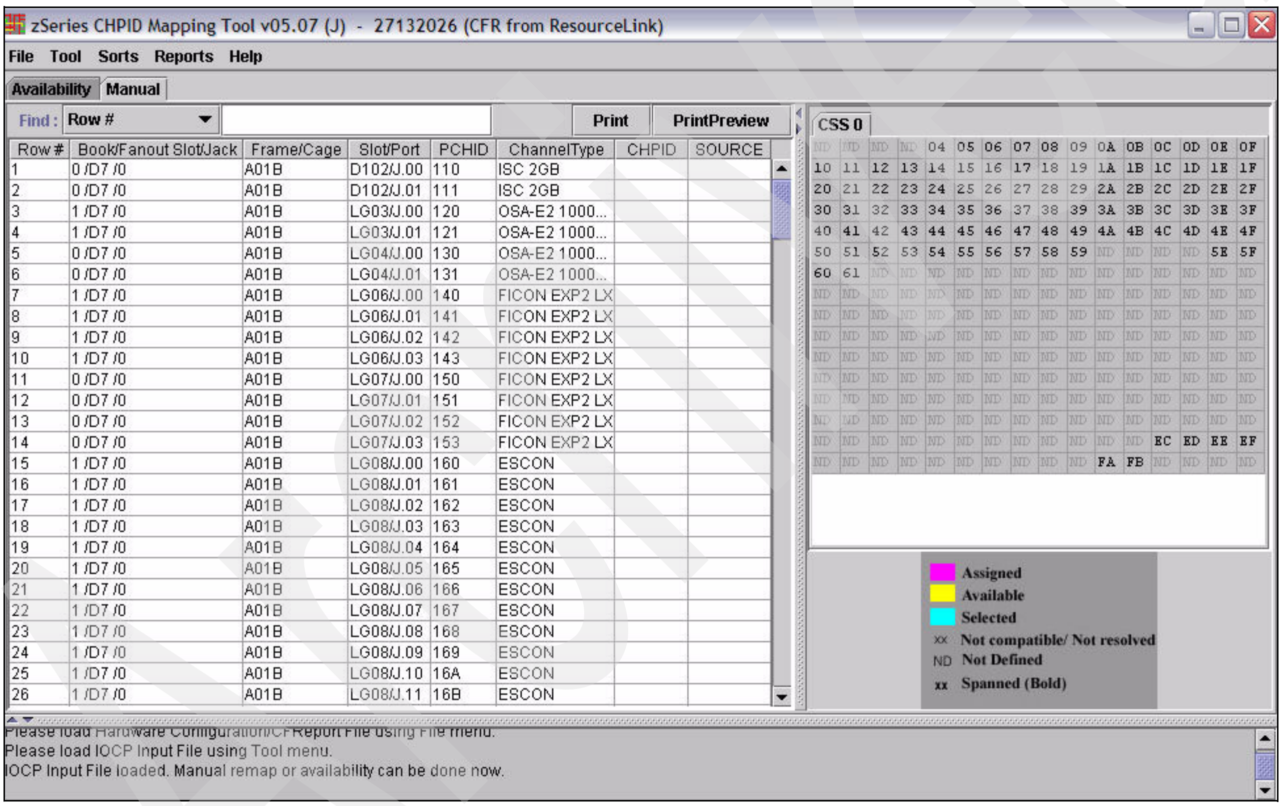


Figure 5-44 CMT - after importing IOCP file

Set CU priority manually

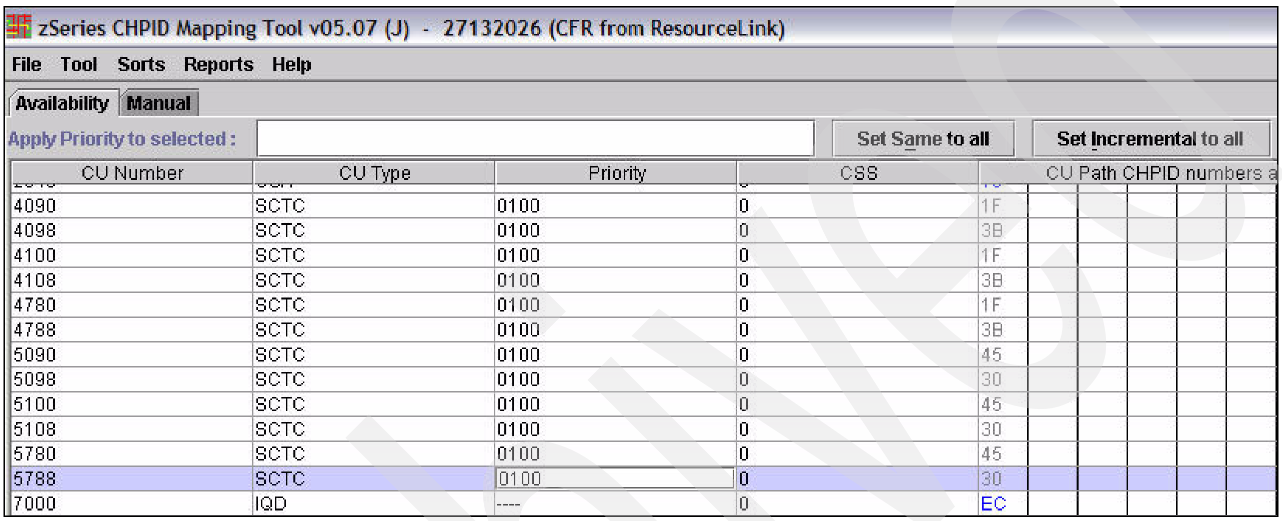
Setting priorities specifies the order in which the control units and associated CHPID assignments should be processed for availability. The key requirement of mapping for high availability is accurately assigning priority numbers to the control units. Priority numbers represent the order in which the tool maps the control units.

Normally, we would only assign priorities to certain control units, for example:

- Single-path control units (give them the same priority).
- Give the same priority to CTC control units going to the same CPC (however, CTCs going to different CPCs should be assigned different priorities).
- OSC consoles.

  For more information about setting priority for availability, refer to *CHPID Mapping Tool User's Guide*, GC28-6825.

- Click the Availability tab, below the File menu. Fill in the Priority column for those control units that need special handling; see Figure 5-45.



CU Number	CU Type	Priority	CSS	CU Path CHPID numbers a
4090	SCTC	0100	0	1F
4098	SCTC	0100	0	3B
4100	SCTC	0100	0	1F
4108	SCTC	0100	0	3B
4780	SCTC	0100	0	1F
4788	SCTC	0100	0	3B
5090	SCTC	0100	0	45
5098	SCTC	0100	0	30
5100	SCTC	0100	0	45
5108	SCTC	0100	0	30
5780	SCTC	0100	0	45
5788	SCTC	0100	0	30
7000	IQD	----	0	EC

Figure 5-45 CMT - set CU priority

Process CU Priority

- Select **Process CU Priority** and a window pops up. The Reset CHPID Assignment window allows you to change the CHPID values:
  - Based on availability
  - For only those assigned in the IOCP
  - Manually

  In our example, we selected **Reset CHPIDs assigned by Availability**. The point here is to reset as many assignments as possible to allow as many options for the availability functions. After selecting how CHPIDs are reset, click Process.

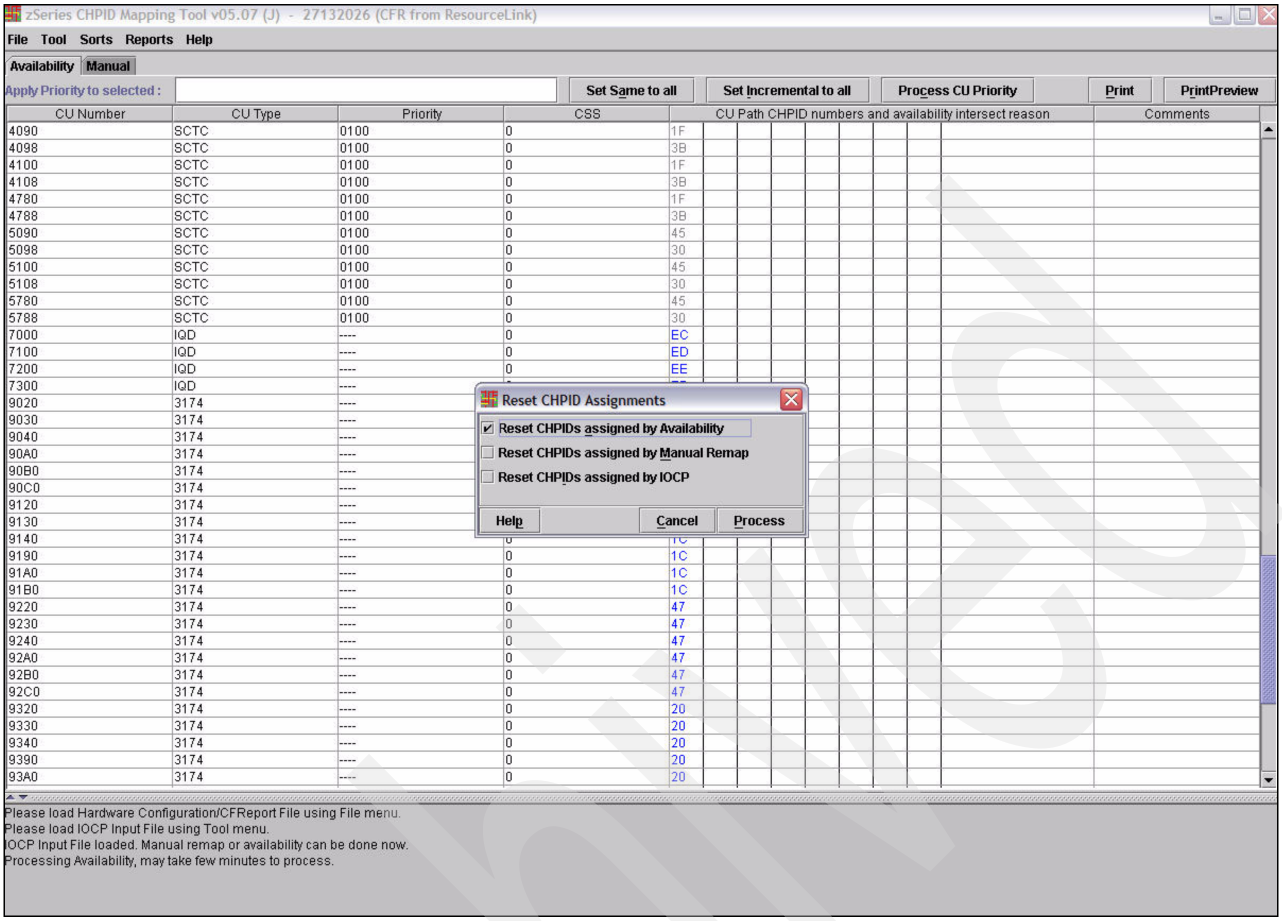


Figure 5-46 CMT - Reset CHPID Assignments

- After the CHPID Mapping Tool has assigned the CHPIDs, it displays a message indicating the results of the process; see Figure 5-47. Depending on the hardware configuration and the IOCP statements, you may or may not have intersects.

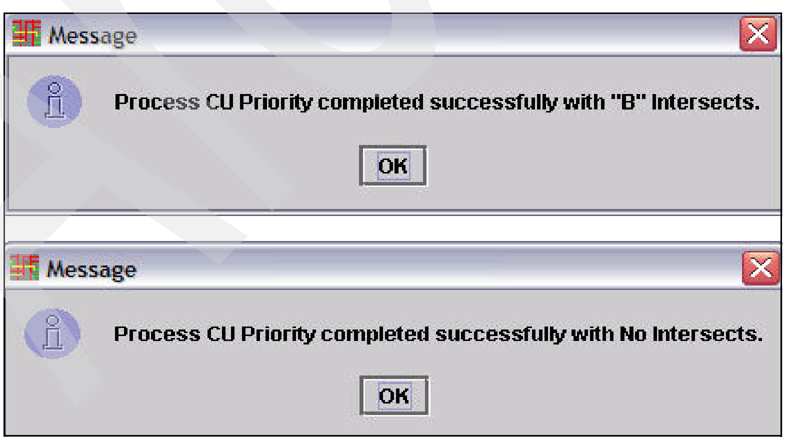


Figure 5-47 CMT - Process CU Priority completion message

- In our example, we have B intersects. Click **OK** whether or not you have intersects.

- 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 **Sort** → **By CU Priority**; see Figure 5-48.

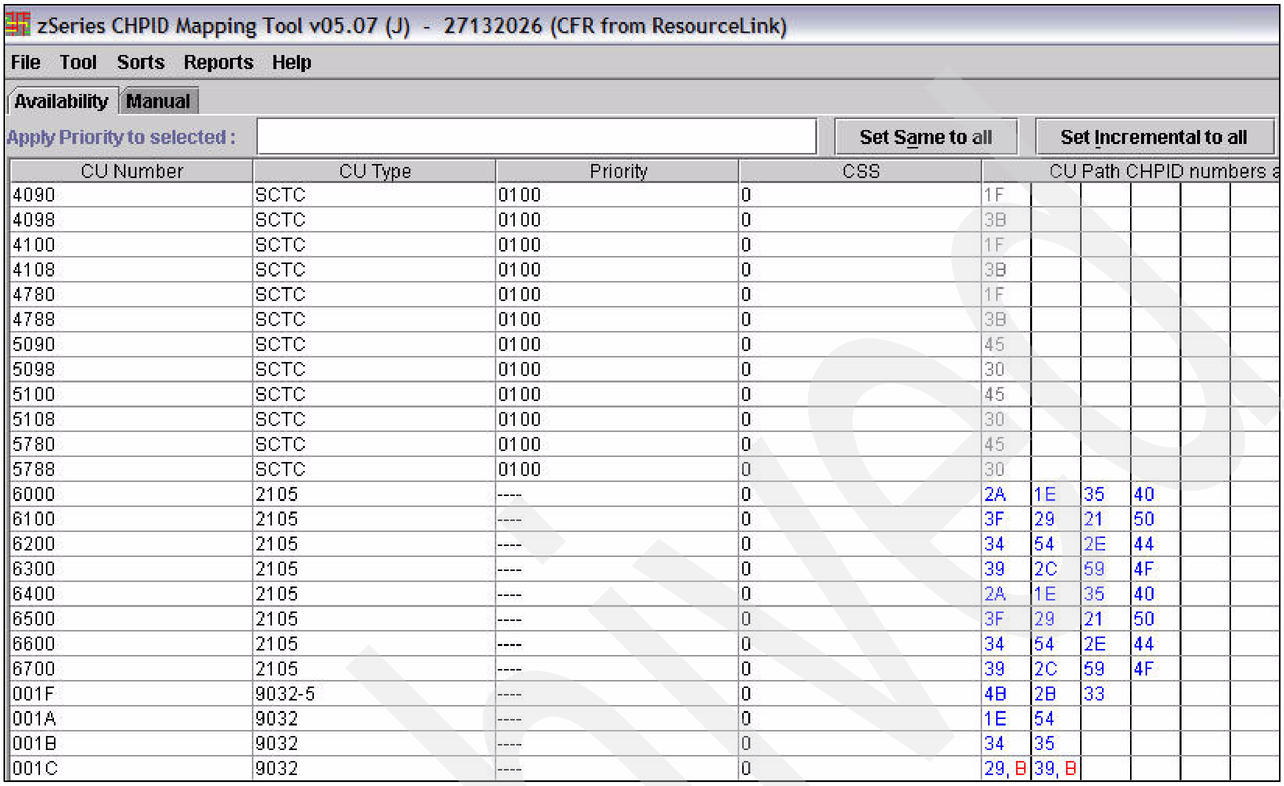


Figure 5-48 CMT - Availability display with B and C intersects

Resolve intersects

In our example, we have intersects. Intersects occur when the tool is not able to spread all of the paths across availability boundaries for a given control unit. *CHPID Mapping Tool User's Guide*, GC28-6825, explains the steps needed to resolve intersects (ensure that you refer to the most recent edition).

The following list defines the possible intersects:

D Assigned channels are on the same daughter card.

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 Greater than half the assigned channels are connected to the same book.

You must evaluate each intersect in order to determine if it causes an unacceptable single point of failure (SPoF) situation. Resolving some SPoFs may require the purchase of additional hardware.

> **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.

Figure 5-49 provides a visual illustration of what the various intersects mean in terms of which parts of the configuration each intersect type refers to.

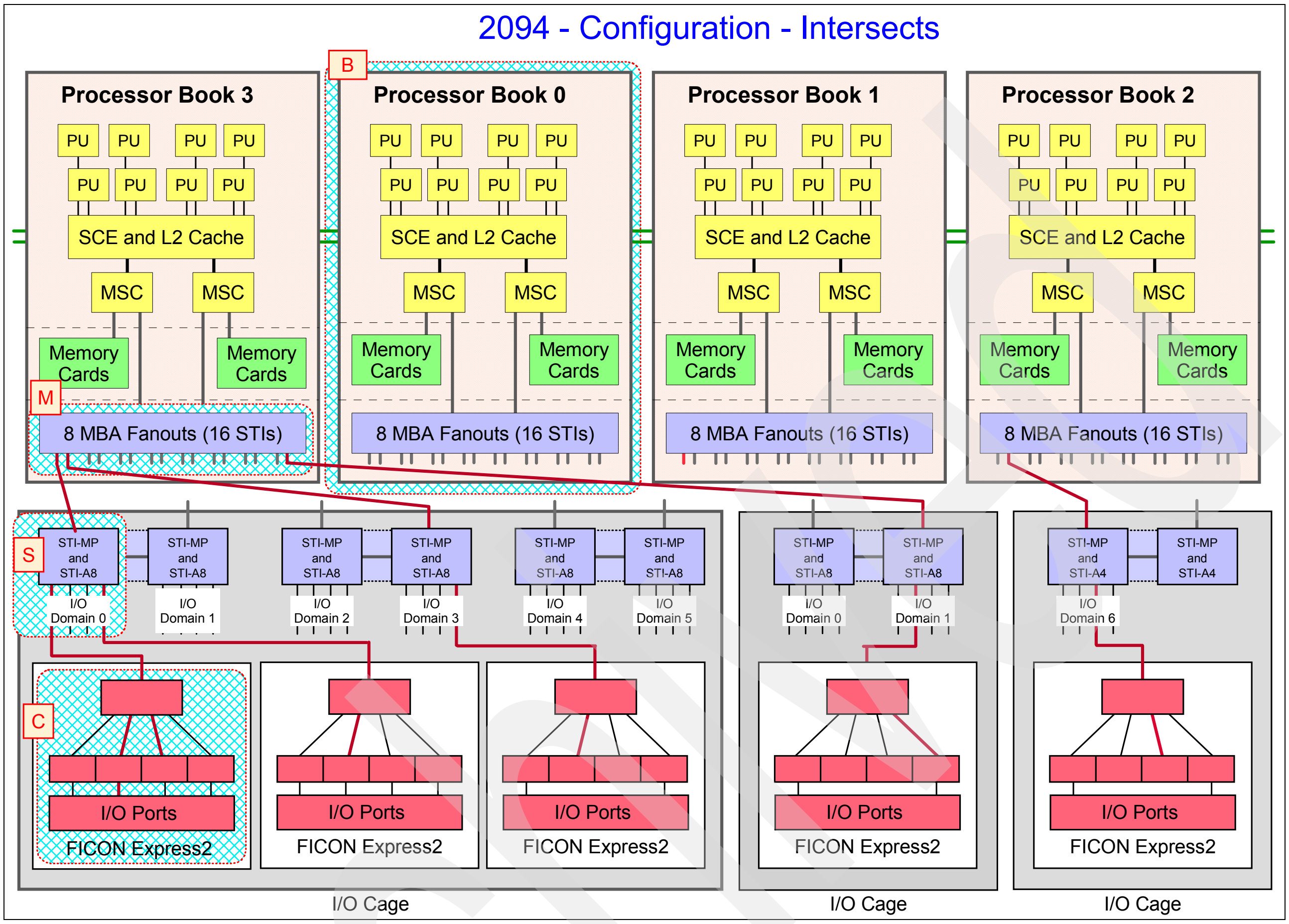


Figure 5-49 CMT - Configuration Intersects

- Select the Manual tab to see the results of mapping the CHPIDs. Note that the CHPID column and the SOURCE column are no longer all blank; see Figure 5-50 on page 167.

  The CHPID Mapping Tool has assigned CHPIDs to PCHIDs and it has placed the value Avail in the SOURCE column, indicating that the CHPID values were assigned based on availability. The remaining blanks correspond to where we have hardware in the order and nothing in HCD.

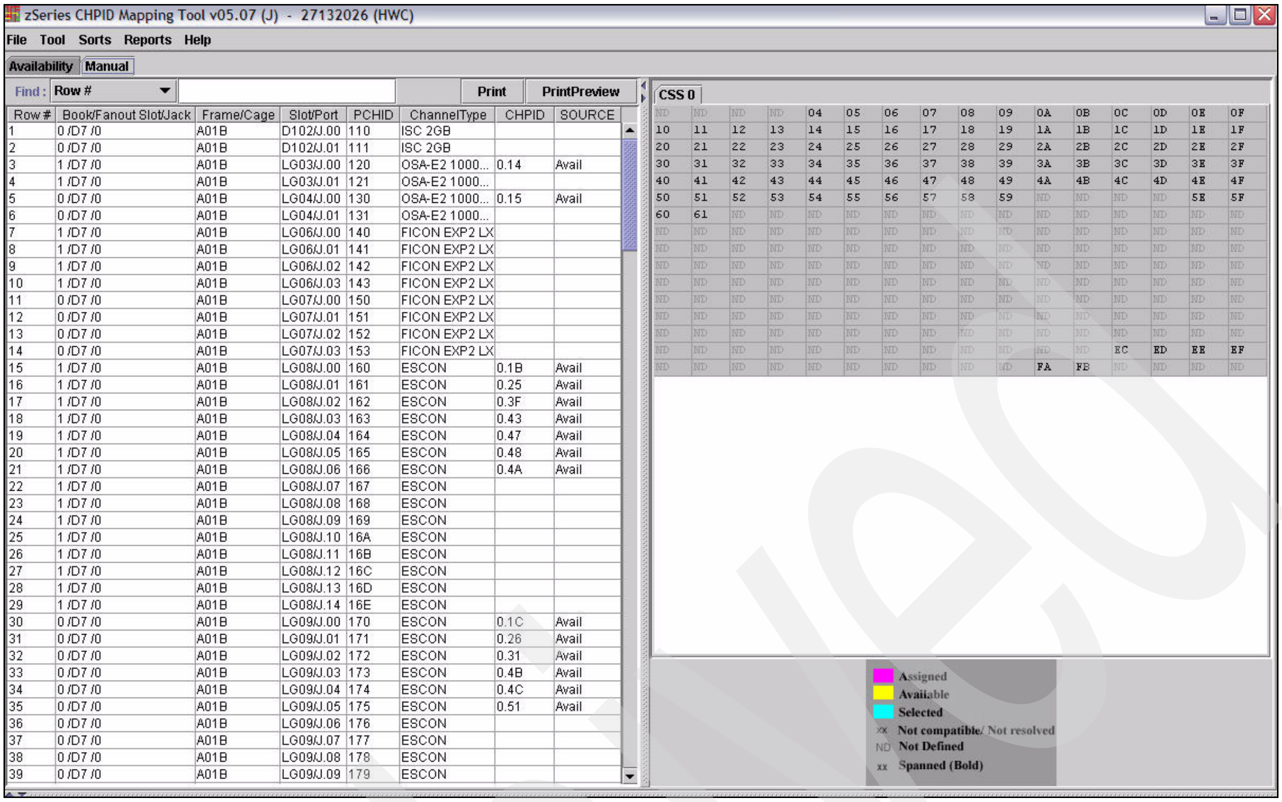


Figure 5-50 CMT - after CHPID assignments

Create reports

CMT 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 two reports in this example (the CHPID Report and the CHPID to Control Unit Report). However, all built-in reports are printed in the same way, as explained here.

CHPID Report

- Click **Reports** → **CHPID Report**; see Figure 5-51.

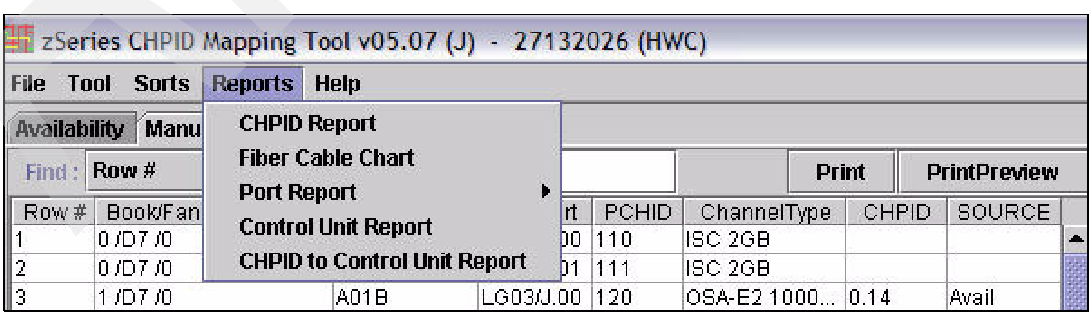


Figure 5-51 CMT - select CHPID Report

- On the next panel, shown in Figure 5-52 on page 168, enter the report File name or accept the proposed default name and select Save.

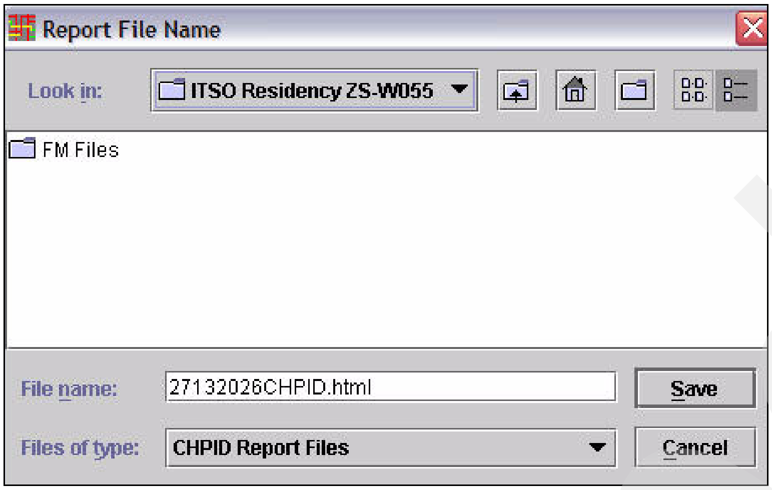
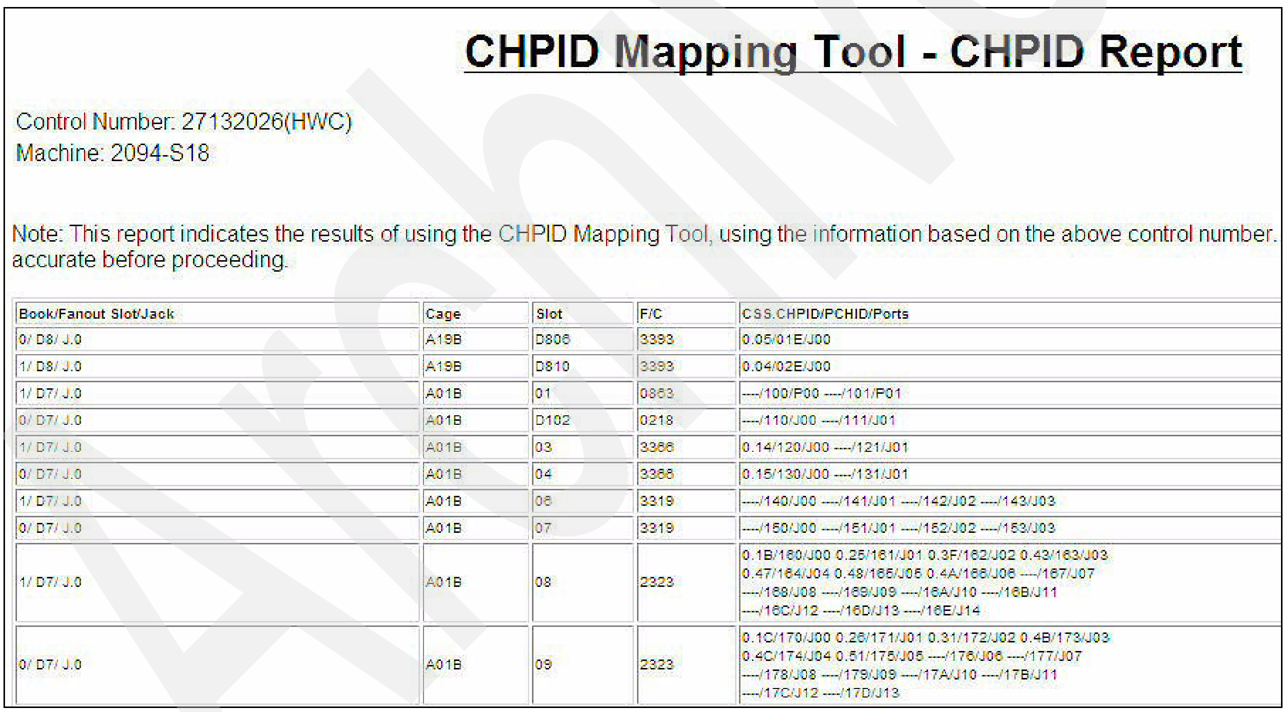


Figure 5-52 CMT - Report File Name

- The CHPID Mapping Tool opens a browser window with the CHPID Report; see Figure 5-53. 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: 27132026(HWC)
Machine: 2094-S18

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. accurate before proceeding.

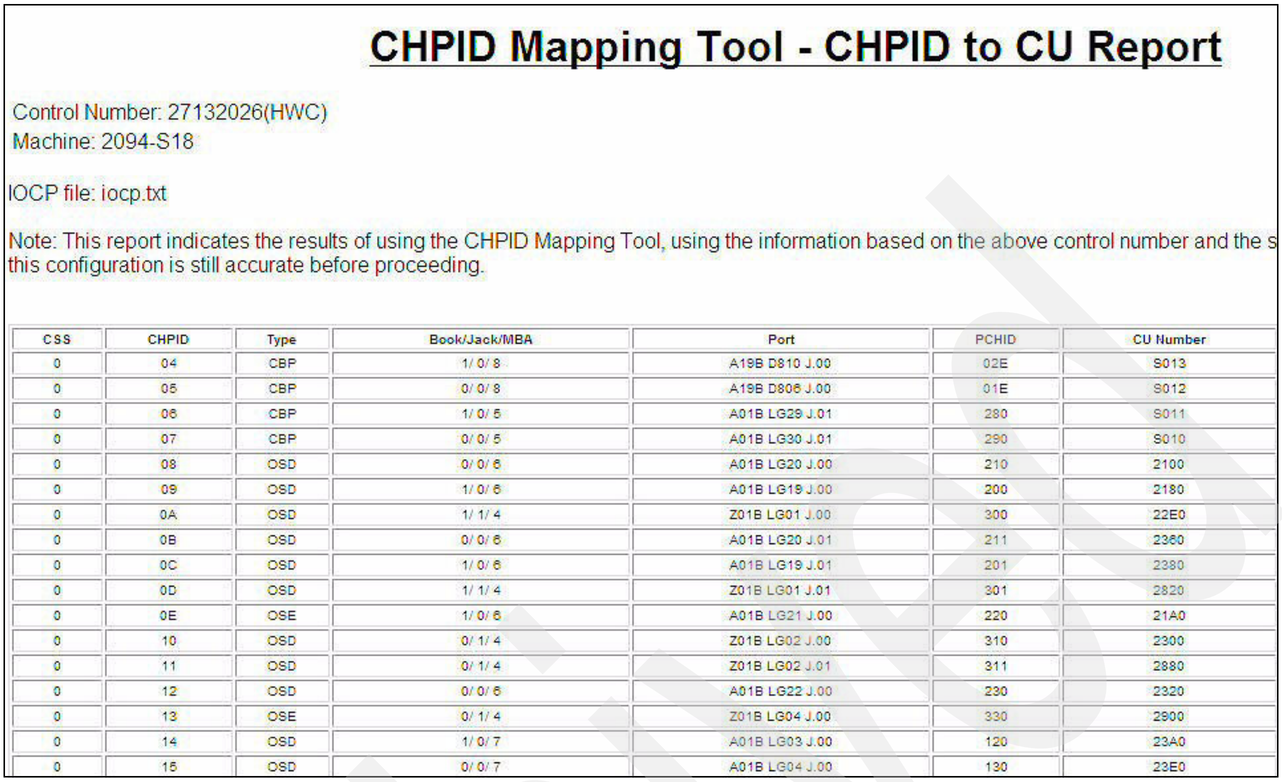
Book/Fanout Slot/Jack	Cage	Slot	F/C	CSS.CHPID/PCHID/Ports
0/ D8/ J.0	A19B	D806	3393	0.05/01E/J00
1/ D8/ J.0	A19B	D810	3393	0.04/02E/J00
1/ D7/ J.0	A01B	01	0863	----/100/P00 ----/101/P01
0/ D7/ J.0	A01B	D102	0218	----/110/J00 ----/111/J01
1/ D7/ J.0	A01B	03	3366	0.14/120/J00 ----/121/J01
0/ D7/ J.0	A01B	04	3366	0.15/130/J00 ----/131/J01
1/ D7/ J.0	A01B	06	3319	----/140/J00 ----/141/J01 ----/142/J02 ----/143/J03
0/ D7/ J.0	A01B	07	3319	----/150/J00 ----/151/J01 ----/152/J02 ----/153/J03
1/ D7/ J.0	A01B	08	2323	0.1B/160/J00 0.25/161/J01 0.3F/162/J02 0.43/163/J03 0.47/164/J04 0.48/165/J05 0.4A/166/J06 ----/167/J07 ----/168/J08 ----/169/J09 ----/16A/J10 ----/16B/J11 ----/16C/J12 ----/16D/J13 ----/16E/J14
0/ D7/ J.0	A01B	09	2323	0.1C/170/J00 0.26/171/J01 0.31/172/J02 0.4B/173/J03 0.4C/174/J04 0.51/175/J05 ----/176/J06 ----/177/J07 ----/178/J08 ----/179/J09 ----/17A/J10 ----/17B/J11 ----/17C/J12 ----/17D/J13

Figure 5-53 CMT - CHPID Report

CHPID to Control Unit Report

1. Click **Reports** → **CHPID to Control Unit Report**, and then click Save (assuming that you accept the default report name).

   The CHPID Mapping Tool opens a browser window with the CHPID to Control Unit Report, see Figure 5-54 on page 169. 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: 27132026(HWC)
Machine: 2094-S18

IOCP file: iocp.txt

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number and the s
this configuration is still accurate before proceeding.

CSS	CHPID	Type	Book/Jack/MBA	Port	PCHID	CU Number
0	04	CBP	1/ 0/ 8	A19B D810 J.00	02E	S013
0	05	CBP	0/ 0/ 8	A19B D806 J.00	01E	S012
0	06	CBP	1/ 0/ 5	A01B LG29 J.01	280	S011
0	07	CBP	0/ 0/ 5	A01B LG30 J.01	290	S010
0	08	OSD	0/ 0/ 6	A01B LG20 J.00	210	2100
0	09	OSD	1/ 0/ 6	A01B LG19 J.00	200	2180
0	0A	OSD	1/ 1/ 4	Z01B LG01 J.00	300	22E0
0	0B	OSD	0/ 0/ 6	A01B LG20 J.01	211	2360
0	0C	OSD	1/ 0/ 6	A01B LG19 J.01	201	2380
0	0D	OSD	1/ 1/ 4	Z01B LG01 J.01	301	2820
0	0E	OSE	1/ 0/ 6	A01B LG21 J.00	220	21A0
0	10	OSD	0/ 1/ 4	Z01B LG02 J.00	310	2300
0	11	OSD	0/ 1/ 4	Z01B LG02 J.01	311	2880
0	12	OSD	0/ 0/ 6	A01B LG22 J.00	230	2320
0	13	OSE	0/ 1/ 4	Z01B LG04 J.00	330	2900
0	14	OSD	1/ 0/ 7	A01B LG03 J.00	120	23A0
0	15	OSD	0/ 0/ 7	A01B LG04 J.00	130	23E0

Figure 5-54 CMT - CHPID to CU Report

Create updated IOCP

Create an IOCP deck for input back into HCD. This IOCP deck now has the CHPIDs assigned to PCHIDs.

- Click **Tool** → **Create Updated IOCP File**; see Figure 5-55.

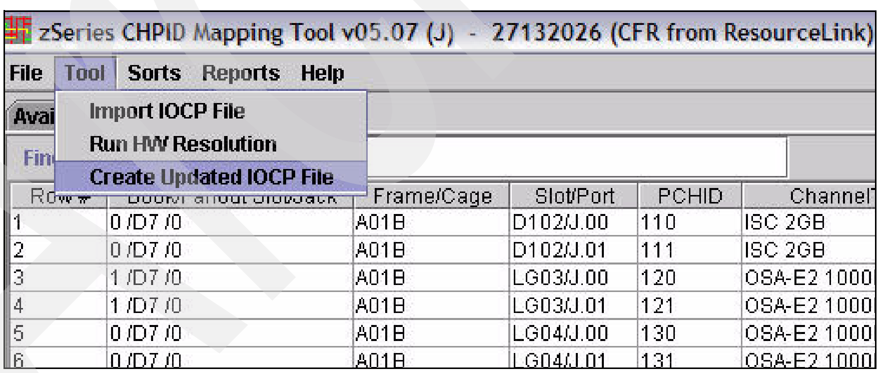


Figure 5-55 CMT - Create Updated IOCP File

- Specify a File name and location for the IOCP output file and click Save.

> **Note:** This file needs to be uploaded to the z/OS image on which you have the work IODF which was used previously to create the IOCP input data set.

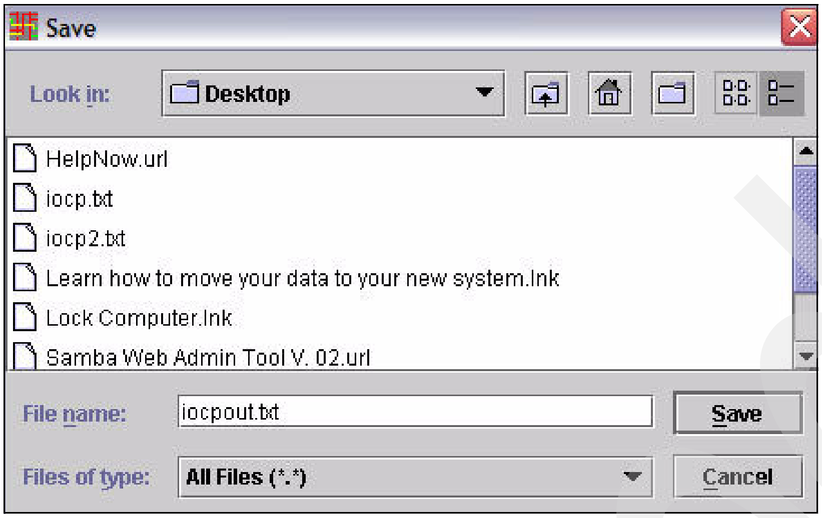


Figure 5-56 CMT - Save IOCP output file

The CHPID Mapping Tool displays an informational message, see Figure 5-57.

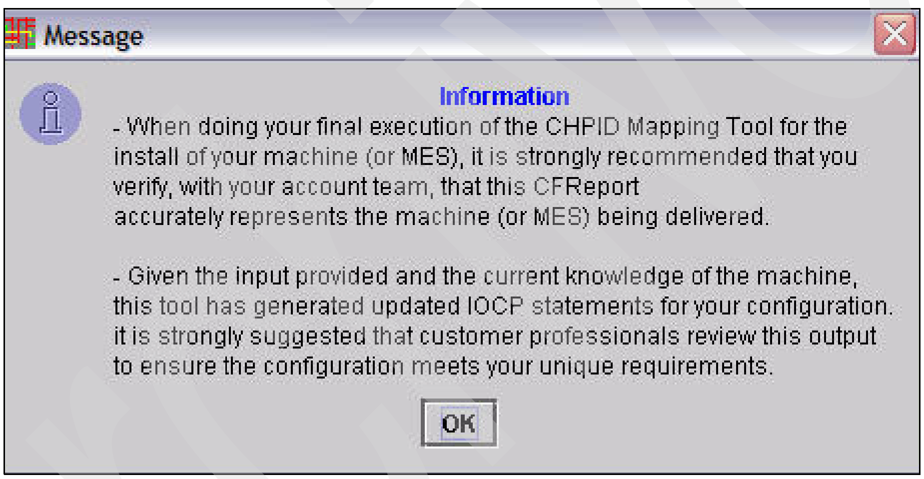


Figure 5-57 CMT - Information message

5.5 HCD - update the 2094 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:

- Upload the iocpout.txt file 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 inserted statements at the end of the file, which begin with *CMT. These statements reflect the CCN reference number, as well as control unit priorities set in the CHPID Mapping Tool.

> **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 5-3 on page 171.

Example 5-3 HCD - Updated IOCP statements file (with CMT statements)

```
        IODEVICE ADDRESS=(FFEB,007),CUNUMBR=(FFFC),UNIT=CFP
        IODEVICE ADDRESS=(FFF2,007),CUNUMBR=(FFFC),UNIT=CFP
*CMT* VERSION=000
*CMT* CCN=27132026(HWC)
*CMT* 4090.0=0100,4098.0=0100,4100.0=0100,4108.0=0100,4780.0=0100
*CMT* 4788.0=0100,5090.0=0100,5098.0=0100,5100.0=0100,5108.0=0100
*CMT* 5780.0=0100,5788.0=0100
```

- Enter the work IODF name that was used to create the IOCP input data set for the CHPID Mapping Tool on the HCD main menu. Select option **5**, **Migrate configuration data**; see Figure 5-58.

```
z/OS V1.7 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 . . . 'SYS10.IODF34.WORK'                +
```

Figure 5-58 HCD - main menu, select Migrate configuration data

- The Migrate Configuration Data panel is displayed; see Figure 5-59. Enter 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 5-59 HCD - Migrate Configuration Data

The Migrate IOCP Data panel is displayed; see Figure 5-60 on page 172.

- Fill in the following fields and 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.
`Processing mode`	Select option **2** to save the results of the migration. (Prior to using 2, however, try using option **1** to validate the operation.)
`Migrate options`	Select option **3** for PCHIDS. Only the PCHIDs are migrated into the work IODF.

```
-------------------- Migrate IOCP / MVSCP / HCPRIO Data --------------------


 Specify or revise the following values.

 Processor ID . . . . . . . . . . . . SCZP102   +   CSS ID . . . . . . _  +
 OS configuration ID  . . . . . . . . TEST2094  +

 Combined IOCP/MVSCP input data set . _____________________________________
 IOCP only input data set . . . . . . 'IOCPOUT.TEXT'
 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 5-60 HCD - Migrate IOCP / MVSCP / HCPRIO Data

HCD now 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 5-61 on page 173.

- 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 to continue to the next step.

```
-------------------------- 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
 #                     SYS10.IODF34.WORK.
 *************************** Bottom of data ******************************
```

Figure 5-61 HCD - Migration Message List

5.6 Build the 2094 production IODF

In order to make use of the definitions that we have updated in HCD, we need to create a production IODF from our work IODF.

- From the HCD main menu, select option **2**, **Activate or process configuration data**; see Figure 5-62.

```
z/OS V1.7 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 . . . 'SYS10.IODF34.WORK'               +
```

Figure 5-62 HCD - main menu, select activate or process configuration data

- The Activate or Process Configuration Data panel is displayed; see Figure 5-63 on page 174. 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 5-63 HCD - Activate or Process Configuration Data, select Build production IODF

- The Message List panel is displayed; see Figure 5-64. Verify that you have only 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. Press PF3 to exit this panel.

```
------------------------------ Message List --------------------------------
  Save  Query  Help
 --------------------------------------------------------------------------
                                                           Row 1 of 139
 Command ===> ___________________________________________ Scroll ===> PAGE

 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 5-64 HCD - Message List

- The Build Production I/O Definition File panel is displayed; see Figure 5-65 on page 175. 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 . . . : 'SYS10.IODF34.WORK'

  Production IODF name . 'SYS10.IODF34'
  Volume serial number . SYS100  +

  Continue using as current IODF:
  2   1.  The work IODF in use at present
      2.  The new production IODF specified above
```

Figure 5-65 HCD - Build Production I/O Definition File

- The Define Descriptor Fields panel is displayed; see Figure 5-66. Press Enter to accept the descriptor fields defaulted, or type in different values, and then press Enter.

```
-------------------- Define Descriptor Fields --------------------


  Specify or revise the following values.

  Production IODF name  . : 'SYS10.IODF34'

  Descriptor field 1  . . . SYS10
  Descriptor field 2  . . . IODF34
```

Figure 5-66 HCD - Define Descriptor Fields

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

```
Production IODF SYS10.IODF34 created.
```

- Proceed to the steps to update the 2094 configuration.

5.7 Load the 2094 processor IOCDS

At this point, we have a production IODF - SYS10.IODF34. Now we need to update the IOCDS on the new hardware and activate the hardware with the updated IOCDS.

Write the 2094 configuration to the IOCDS

- From the HCD main menu, select option **2**, **Activate or process configuration data**; see Figure 5-66. Verify that the IODF is the production one created in “Build the 2094 production IODF” on page 173. Press Enter.

```
z/OS V1.7 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 . . . 'SYS10.IODF34'              +
```

Figure 5-67 HCD - main menu, select Activate or process configuration data

- From the Activate or Process Configuration Data panel, select option **11**, **Build and manage S/390 microprocessor IOCDSs and IPL attributes**; see Figure 5-67.

> **Note:** In this example, we are assuming that we have connectivity to the new 2094 via the HMC local network in order to create an IOCDS to be used to power-on reset the 2094. However, this may not be the case for all installations.
>
> When the new 2094 is not accessible from the HMC local network, you would need to create an IOCP deck from HCD and then run a stand-alone IOCP on the 2094.

```
----- 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 5-68 HCD - Activate or Process Configuration Data, select Build IOCDSs

- The S/390 Microprocessor Cluster List panel displays; see Figure 5-68. Select the target 2064 CPC from the list by using a forward slash mark (/), and 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.SCZP102    2094   S18     SCZP102
 _ USIBMSC.SCZP701    9672   XX7     SCZP701
 _ USIBMSC.SCZP801    2064   1C7     SCZP801
 _ USIBMSC.SCZP901    2084   C24     SCZP901
 ******************************* Bottom of data ********************************
```

Figure 5-69 HCD - S/390 Microprocessor Cluster List

- The Actions on selected CPCs panel displays; see Figure 5-71. 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 5-70 HCD - Actions on selected CPCs, Work with IOCDSs

- The IOCDS List panel displays; see Figure 5-71. Select the IOCDS that you wish to update for the new 2094 by using a forward slash mark (/), and 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.SCZP102  IODF34   LPAR   POR        Yes       No          Yes-POR
 _ A1.SCZP102  IBM-PAT2 LPAR   Alternate  No        No          No
 _ A2.SCZP102  IODF33   LPAR   Alternate  No        No          No
 / A3.SCZP102  IODF34   LPAR   Alternate  Yes       No          No
 ******************************* Bottom of data ********************************
```

Figure 5-71 HCD - IOCDS List

- The Actions on selected IOCDSs panel displays; see Figure 5-72 on page 178. 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 5-72 HCD - Actions on selected IOCDSs

- The Build IOCDSs panel is displayed; see Figure 5-73. Verify that all the information is correct, fill in the field `Title1`, and then press Enter.

> **Note:** Specifying yes in the field `Write IOCDS in preparation of upgrade` is only required when you are upgrading the existing hardware and you want to write the IOCDS for the 2094 from the existing hardware.
>
> The yes value permits the writing of an IOCDS that contains information that the current hardware may not recognize.

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

  Specify or revise the following values.

  IODF name . . . . . . . . . : 'SYS10.IODF34'

  Title1 . Upgrading 2064 to 2094 (replace)________________________________
  Title2 : SYS10.IODF34 - 2005-11-22 10:22

                             Write IOCDS in
  IOCDS        Switch IOCDS  preparation of upgrade
  A3.SCZP102   No            no
***************************** Bottom of data ******************************
```

Figure 5-73 HCD - Build IOCDSs

The Job Statement Information panel is displayed; see Figure 5-74 on page 179. Fill in the job statements as required by the installation and press Enter. HCD submits the job to update the IOCDS.

> **Note:** Route the job to execute on a z/OS image on which you are logged on to TSO. In that way, you know that the image can “see” the new 2094 in order to update its IOCDS.

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

  Specify or revise the job statement information.

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

Figure 5-74 HCD - Job Statement Information

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 A3 IOCDS REPLACED.
```

5.8 HMC steps for activation profiles

Build the Reset Profile and point to required IOCDS

Now that the processor configuration 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 2094 after it has been installed.

- Log on to the HMC and select the 2064 that you are replacing in Defined CPCs Work Area.
- Under Operational Customization, select **Customize/Delete Activation Profiles**.
- Select the “Last Used” Reset Profile and select **Customize**.
- Save this “Last Used” profile with a new Profile name to be referred to when the power-on reset is required (for example, SCZP801T).
- Select the new Profile and select **Customize**.
- Click the IOCDS that you just updated in the previous step (A3, as shown in Figure 5-73 on page 178).

On the new version of HMC you receive the message shown in Figure 5-75.

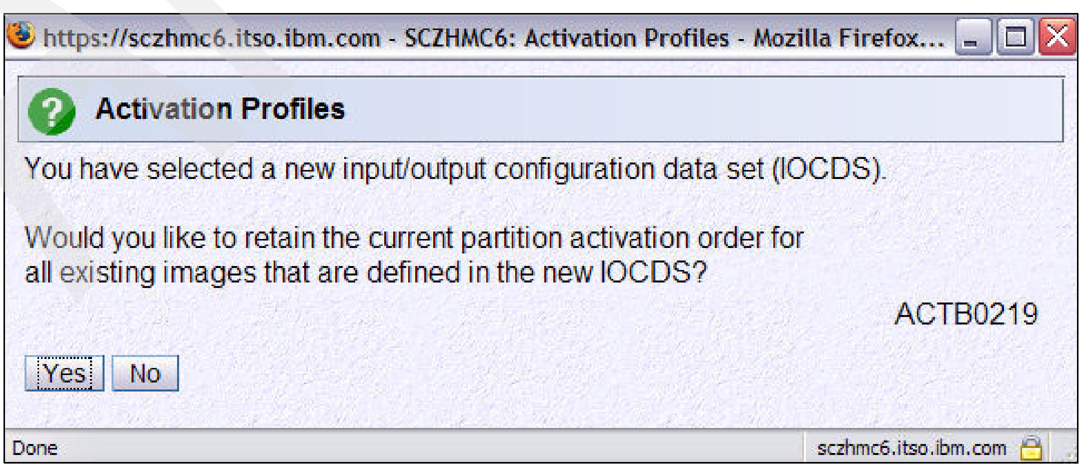


Figure 5-75 HMC - Activation Profiles (received when changing IOCDS)

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

Build/Verify Image Profiles

- While still in the Reset Profile, you can now review the Image (logical partition) Profile attributes. If you are adding additional resources (storage or CPs) to the 2094 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 2094.
- Additionally, if you have used the HWNAME parameter to point to the Processor.id, then this needs to be updated to point to the new Processor.id (in this example, from SCZP801 to SCZP102).

Performing a power-on reset (POR) of the 2094

- After the 2094 processor has been installed, the IBM service representative will perform 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, and you will perform another power-on reset using the Reset Profile created in the previous step (in this example, SCZP801T).
- After the power-on reset is finished, the logical partitions are ready to be IPLed.

6

MES upgrade from z990 to z9-109

In this chapter we describe how to upgrade an existing z990 to a z9-109 server.

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 2084 IODF
- Save configuration files
- Validate the 2094 work IODF
- CHPID Mapping Tool actions
- HCD - update the 2094 work IODF with PCHIDs
- HCD - build the 2094 production IODF
- Load the 2094 processor IOCDS
- 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 illustrates the general process flow that we follow in our example. The numbered steps are described following the figure.

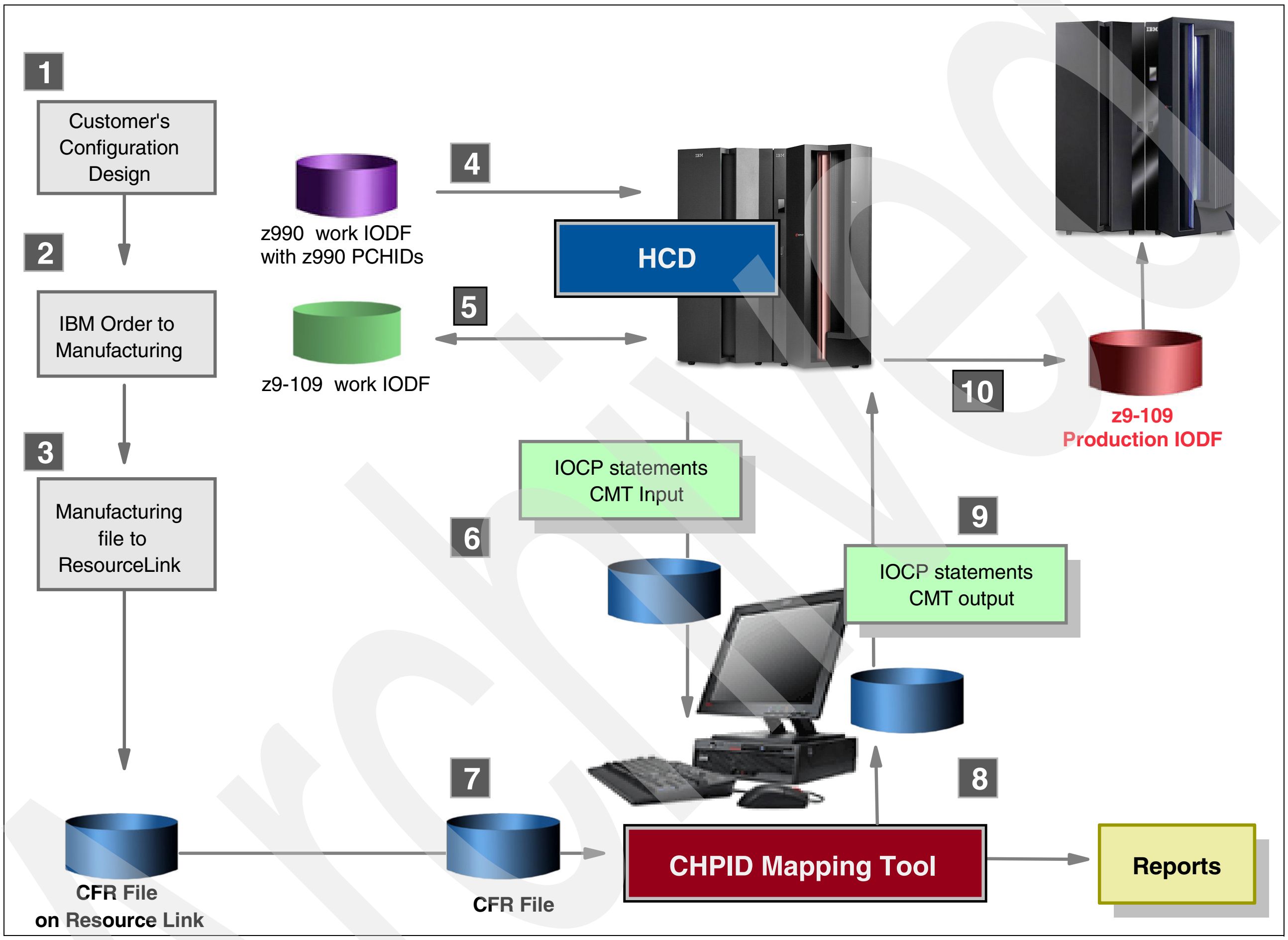


Figure 6-1 CMT - Overall process flow

1. When planning to migrate to a z9-109, 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 z990 I/O configuration is used as a starting point into HCD. The z990 production IODF is used as input to HCD to create a work IODF that will be the base to define the new z9-109 configuration.
5. When the new z9-109 configuration has been added and the obsolete hardware has been deleted, a validated version of the configuration is saved in a 2094 validated work IODF.

6. From the validated work IODF, create a file containing the z9-109 IOCP statements. This IOCP statements file is transferred to the workstation used for the CHPID Mapping Tool (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 z9-109 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 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 2094 production IODF is created and the final IOCP statements can be generated. The installation team uses the configuration data from the 2094 production IODF when the final power-on reset is done, yielding a z9-109 with an I/O configuration ready to be used.

If you are upgrading an existing 2084, you may be able to use HCD to write an IOCDS to your current 2084 in preparation for the upgrade. If you can write an IOCDS to your current 2084 in preparation for upgrading it to a 2094, 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 2084 to a 2094.

If the 2084 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 z990 to a z9-109 can be either in the form of a field upgrade to the existing z990, or a replacement (push/pull) of an existing z990 with a new z9-109. Note the following points:

1. A field upgrade means that the existing z990 processor serial number is retained during the upgrade.
2. A replacement of the existing z990 by a new z9-109 implies physically removing (push) the z990 and bringing in a new z9-109 (pull) to take its place. The replacement z9-109 has a new serial number which is different from that of the existing z990.

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

6.1.2 Planning considerations

Keep the following considerations in mind when planning your upgrade.

Coupling links

If you are currently using CBS/CBR or CFS/CFR CHPIDs, be aware that these are not supported on a z9-109 server. They need to be replaced with CBP or CFP CHPIDs. ICB-2 and ISC-3 links in compatibility mode are not supported on the 2094.

Additional CHPIDs

You may want to add more FC, ESCON, or OSA CHPIDs into the configuration. A new eConfig needs to be built by your IBM service representative and you will receive a new CCN, so you can download an updated CFReport file from Resource Link to use as input into the CMT.

HMC

The z9-109 requires a new HMC and you require MCLs on the existing Support Element (SE) if you want to use the new HMC to access the existing processors. The new HMC only uses Ethernet for its network connection.

Hardware and software support

There are software features that are only available with z/OS V1.7, such as Multiple Subchannel Sets (MSS). You also require HCD V1.7 in order to be able to define MSS, which creates a Version 5 IODF. Additionally, you need PTFs from the 2094DEVICE PSP Bucket to define z9-109 type processors via HCD.

Features no longer supported

When migrating from a z990 to a z9-109, certain channel types are no longer supported (OSA-Express Token Ring, ICB-2 and ISC-3 links in Compatibility mode, and cryptographic features earlier than Crypto Express2. If you currently have any of these features, you need to take actions to replace them with features that are supported on a z9-109.

Backup configuration files

Ensure that you have a backup copy of the configuration files for I/O features that use them.

> **Note:** Back up OSA-Express 2 definitions using OSA Support Facility (OSA-SF).

CPC ID 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 ID does not. Therefore, the CPC ID does not need to match the Processor ID. This is useful in situations where you may have several Processor/logical partition/control unit setups that share the same physical CPC within the same IODF.

> **Note:** As mentioned, you can have a different Processor ID with a CPC ID.
>
> However, if you do not need to support multiple processor images, we recommend that the Processor ID and CPC ID match.

Verify that the Processor ID matches the one defined for the HWNAME parameter in the LOAD member in SYS1.IPLPARM.

The CPC ID 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 ID, not the Processor ID, that appears on the HMC.

When you view the Network information for a CPC via the HMC, observe that the SNA address is made up of a Network name and CPC ID separated by a dot (for example, USIBMSC.SCZP901). 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.

6.1.3 MES upgrade scenario

This scenario describes the configuration steps to upgrade an existing 2084 to a 2094.

- HCD requires a new Processor ID for the 2094.
- We recommend keeping the same CPC ID for the 2094.
- The 2094 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 2084 production IODF.
- The target IODF is a new 2094 work IODF.

The example here uses a 2084-C24 with a Processor ID of SCZP901 and two LCSSs (CSS ID=0 and CSS ID=1) being upgraded to a 2094-S18 with a Processor ID of SCZP102. The CPC ID SCZP901 and serial number 000901 are not changed.

The following CHPID types are migrated:

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

The following CHPID type are not supported and not migrated to the 2094:

- OSA-Express Token Ring, OSA-Express ATM
- ICB-2, ISC-3 in Compatibility mode
- All crypto features except Crypto Express2

Table 6-1 summarizes the migration options and tool requirements. The step-by-step process is further documented in this chapter.

Table 6-1 2084 I/O configuration migrated to a 2094

	Upgrade an existing 2084 to a 2094 (MES upgrade)
Processor ID	Require to change 2084 to new ID
CPC ID	Recommend to be the same ID
Channel to switch port connections	Same ports
Control Unit to switch port connections	Same ports
Starting IODF	Current active production IODF

	Upgrade an existing 2084 to a 2094 (MES upgrade)
Target IODF	Create a new work IODF
HCD action	Repeat and Change (see below)
CHPID Mapping Tool (CMT) Program	Required
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

6.2 HCD - migrate the existing 2084 IODF

The following steps explain how to define the existing I/O configuration to the new 2094 server using HCD, and then migrate the channel subsystem and logical partitions from the 2084 to the 2094 server. Using HCD, the sequence of operations is as follows:

1. Create a work IODF from the current 2084 production IODF.
2. Repeat the 2084 processor being upgraded.
3. Observe CF link messages for later reference.
4. Delete unsupported items (for example, CBS/CBR CHPIDs) from the repeated 2084.
5. Change the repeated 2084 to a 2094 and delete the 2084.
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. Build a 2094 validated work IODF.
10. Create an IOCP statements file and file transfer to your workstation. This step may be performed with HCM.

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

Create work IODF from current 2084 production IODF

- Use HCD to select the current production IODF that contains the 2084 processor you are upgrading (for example, 'SYS6.IODF35').

Repeat the 2084 processor being upgraded

- From the main HCD panel, select option **1.3**, **Processor List**. Type `r` (for repeat) next to the 2084 you want to upgrade, then press Enter; see Figure 6-2 on page 187.

```
.                               Processor List       Row 1 of 7 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
r SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 6-2 HCD - Processor List (repeating processor)

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.
- The Create Work I/O Definition File panel now prompts you to enter the data set name of the Target IODF (for example, 'SYS6.IODF37.WORK').
- You are presented with the Repeat Processor panel, as shown in Figure 6-3. Enter the Processor ID of the new 2094 (in this example, SCZP102) and leave all other fields unchanged, then press Enter to continue.

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

Specify or revise the following values.

Processor ID . . . . . . . . . SCZP102_

Processor type . . . . . . . : 2084
Processor model  . . . . . . : C24
Configuration mode . . . . . : LPAR

Serial number  . . . . . . . . 0009012084
Description  . . . . . . . . . ________________________________

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

Network name . . . . . . . . . USIBMSC   +
CPC name . . . . . . . . . . . SCZP901   +

+-----------------------------------+
| New IODF SYS6.IODF37.WORK defined. |
+-----------------------------------+
```

Figure 6-3 HCD - Repeat Processor (defining new Processor ID)

CF Link Information messages

At this point, you may be presented with Severity E, I, or W messages. As shown in Figure 6-4, 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 2094 definition.

```
 ------------------------------- Message List --------------------------------
    Save  Query  Help
                                                                Row 1 of 90
  Command ===> ___________________________________________ Scroll ===> CSR

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

  / Sev Msg. ID  Message Text
  _ I   CBDG441I The coupling facility connection between channel path
  #              0.C2 of processor SCZP901 and channel path 04 of
  #              processor SCZP801 is not copied.
  _ I   CBDG441I The coupling facility connection between channel path
  #              0.C3 of processor SCZP901 and channel path 05 of
  #              processor SCZP801 is not copied.
  _ I   CBDG441I The coupling facility connection between channel path
  #              0.D0 of processor SCZP901 and channel path 0.D2 of
  #              processor SCZP901 is not copied.
  _ I   CBDG441I The coupling facility connection between channel path
  #              0.D1 of processor SCZP901 and channel path 0.D3 of
```

Figure 6-4 HCD - Message List (CBDG441I)

Press PF3 or PF12 to continue. As shown in Figure 6-5, there is now an additional 2084 processor named SCZP102.

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2084     C24      LPAR  0009012084 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 6-5 HCD - Processor List (repeated processor)

Change the 2084 to a 2094 and delete the 2084

At this point you can either leave the original copy of the 2084 (SCZP901), or delete it from the IODF. In our example, we kept it in the IODF for a few more steps.

Do the following:

- Type c (for change) next to SCZP102 to change the 2084 to a 2094, then press Enter; see Figure 6-6. Next, make these updates:
  - Update `Processor type` to `2094`.
  - Update `Processor Model` to `S18`.
  - Update the 2084 part of the serial number to 2094 (that is, `0009012084` to `0009012094`).
- Press Enter.

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


 Specify or revise the following values.

 Processor ID . . . . . . . . : SCZP102
 Support level:
 XMP, 3xx models, OSC

 Processor type . . . . . . . . 2094      +
 Processor model  . . . . . . . S18       +
 Configuration mode . . . . . . LPAR   +

 Serial number  . . . . . . . . 0009012094  +
 Description  . . . . . . . . . ________________________________

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

 Network name . . . . . . . . . USIBMSC   +
 CPC name . . . . . . . . . . . SCZP901 +
```

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

Delete items unsupported on a 2094

In this example we left some CBR CHPIDs defined so that the CBDA155I Severity E error message would be issued; see Figure 6-7.

```
------------------------------- Message List --------------------------------
   Save  Query  Help
 ---------------------------------------------------------------------------
                                                                  Row 1 of 2
 Command ===> ___________________________________________ Scroll ===> CSR

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

 / Sev Msg. ID  Message Text
 _ E   CBDA155I Too many channel paths of type CBR defined. Maximum is 0
 #              for processor SCZP102.
 ***************************** Bottom of data ******************************

  +--------------------------------------------------------------+
  | The change of processor rules leads to invalid definitions. |
  +--------------------------------------------------------------+
```

Figure 6-7 HCD - Message List (CBDA1551I)

- Press PF12 twice to return. Now go into the Channel Path List for the Repeated processor (for example, SCZP102) and correct the CHPID types that HCD received the errors for.

  Type `c` once again next to the SCZP102 processor definition; press Enter.

  – Update `Processor type` to `2094`.
  – Update `Processor Model` to `S18`.
  – Update the 2084 part of the Serial Number to 2094 (that is, `0009012084` to `0009012094`).

- Press Enter. The Update Channel Path Identifiers panel displays; see Figure 6-8. We are not changing 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 . . . . : SCZP102                                              |
| 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 6-8 HCD - Update Channel Path Identifiers (not changed)

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

Now the repeated 2084 processor is successfully changed to a 2094-S18; see Figure 6-9 on page 191.

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2094     S18      LPAR  0009012094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 6-9 HCD - Processor List (changed processor)

Delete the 2084 processor definition

Now that the 2084 has been repeated and changed to become a 2094, the original 2084 definition (SCZP109) must now be deleted so that the required CF Links can be restored.

- Type d (for delete) next to processor SCZP901 in the Processor List; see Figure 6-10.

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2094     S18      LPAR  0009012094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
d SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 6-10 HCD - Processor List (deleting processor)

- 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  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2094     S18      LPAR  0009012094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 6-11 HCD - Processor List (processor deleted)

Reconnect the CF channel paths not migrated

Next, you need to manually redefine the CF Links you want from the SCZP102 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 2084. 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 2094 during the upgrade.

Over-define channel paths on an XMP processor

For an XMP processor, you can define a channel path that is not physically installed on the processor. This may be useful if you want to migrate from a server which had more channels defined than the target XMP processor has currently installed, or if you want to prepare a configuration for future upgrades of the channel cards.

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 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 asterisk (*) with its valid PCHID.

In our example we have four CHPIDs with control unit definitions, but the upgraded processor does not have any PCHIDs to assign to these CHPIDs. However, we can maintain the CHPID and control unit definitions in the IODF until the hardware is installed and PCHIDs are assigned to the CHPIDs.

> **Note:** However, 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.

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

- Figure 6-12 shows what the CHPID / PCHID definitions look like before. Press PF20 (right) in the Channel Path List.

```
 Channel Path List   Row 116 of 127 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Channel Subsystem ID : 1
1=A11       2=A12       3=A13       4=A14       5=A15
6=A16       7=A17       8=A18       9=A19       A=A1A
B=A1B       C=A1C       D=A1D       E=A1E       F=A1F
                        I/O Cluster  --------- Partitions 1x -----
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   PCHID
_ E0    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D0
_ E1    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D1
_ E2    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D8
_ E3    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D9
_ F0    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F1    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F2    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F3    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FC    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FD    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FE    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FF    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
******************************* Bottom of data ********************************
```

Figure 6-12 HCD - Channel Path List (Reserving CHPIDs)

- Figure 6-13 on page 194 shows what the CHPID / PCHID definitions look like after.

```
 Channel Path List   Row 116 of 127 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Channel Subsystem ID : 1
1=A11       2=A12       3=A13       4=A14       5=A15
6=A16       7=A17       8=A18       9=A19       A=A1A
B=A1B       C=A1C       D=A1D       E=A1E       F=A1F
                          I/O Cluster  --------- Partitions 1x -----
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   PCHID
_ E0    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E1    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E2    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E3    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ F0    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F1    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F2    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F3    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FC    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FD    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FE    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FF    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
******************************* Bottom of data ********************************
```

Figure 6-13   HCD - Channel Path List (Reserved CHPIDs)

6.3 Save configuration files

On the z9-109, z990, and z890, 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 6-2 lists CHPID types that have configuration files on a z9-109, z990 or z890.

Table 6-2   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 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 z990 to a z9-109. 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 z9-109, 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 redbook, we show examples of backing up the configuration data with OSA/SF for OSA Express2 features, and with the HMC for OSA-ICC.

6.3.1 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 the Windows® 2000, Windows XP, and Linux software platforms 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 6-15 on page 196.

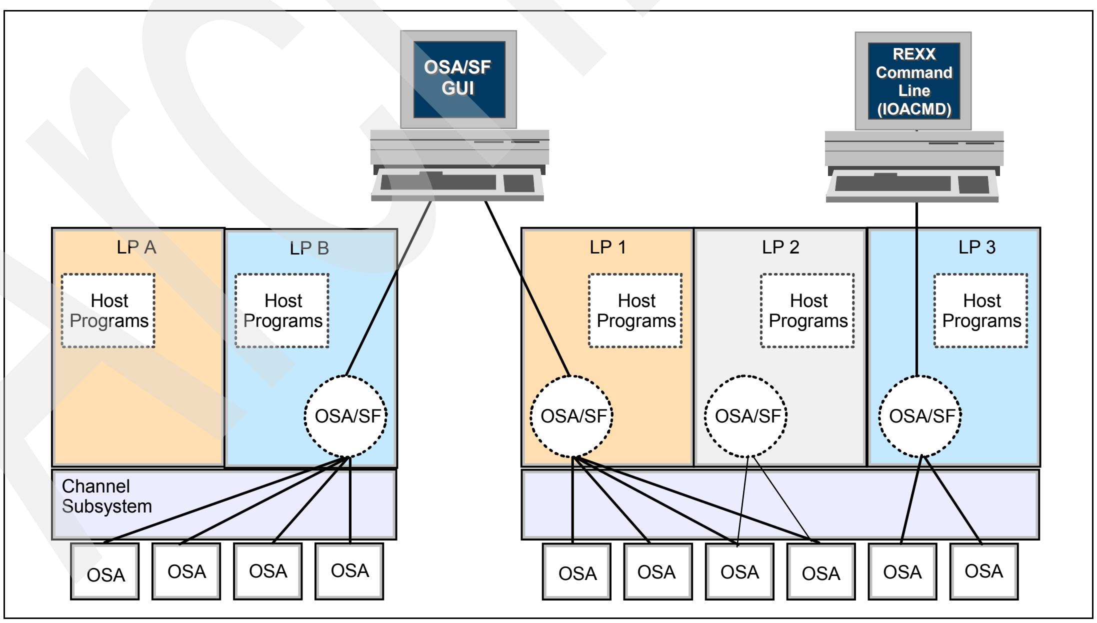


Figure 6-14 OSA/SF

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.

- 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 6-15.

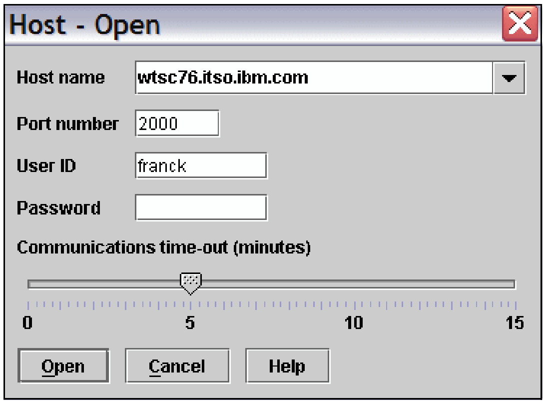


Figure 6-15 OSA/SF Workstation Interface - Logon

The OSA/SF main panels are displayed; see Figure 6-16.

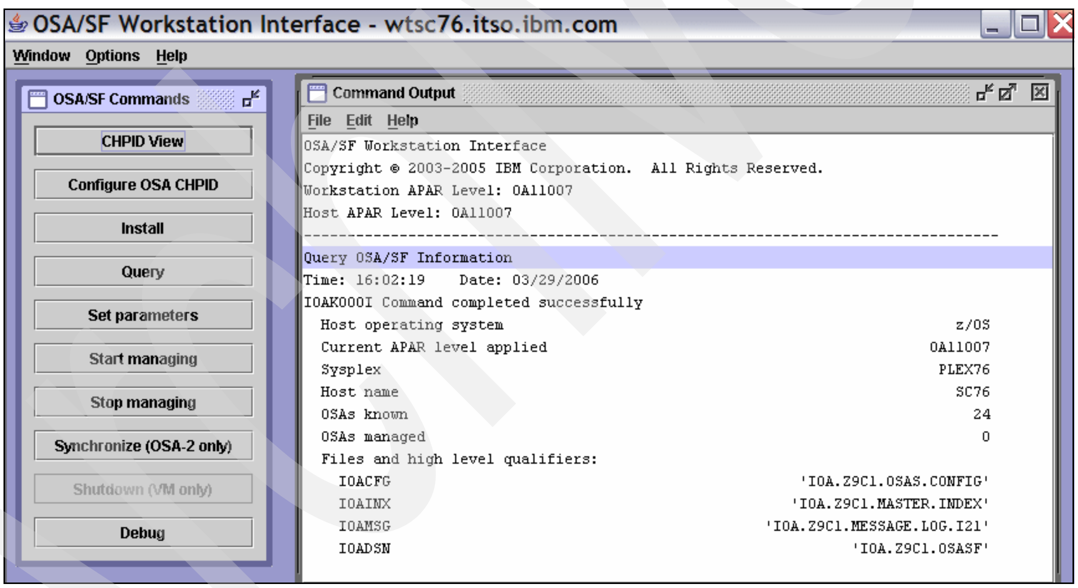


Figure 6-16 OSA/SF Workstation Interface

- 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 6-18 on page 197.

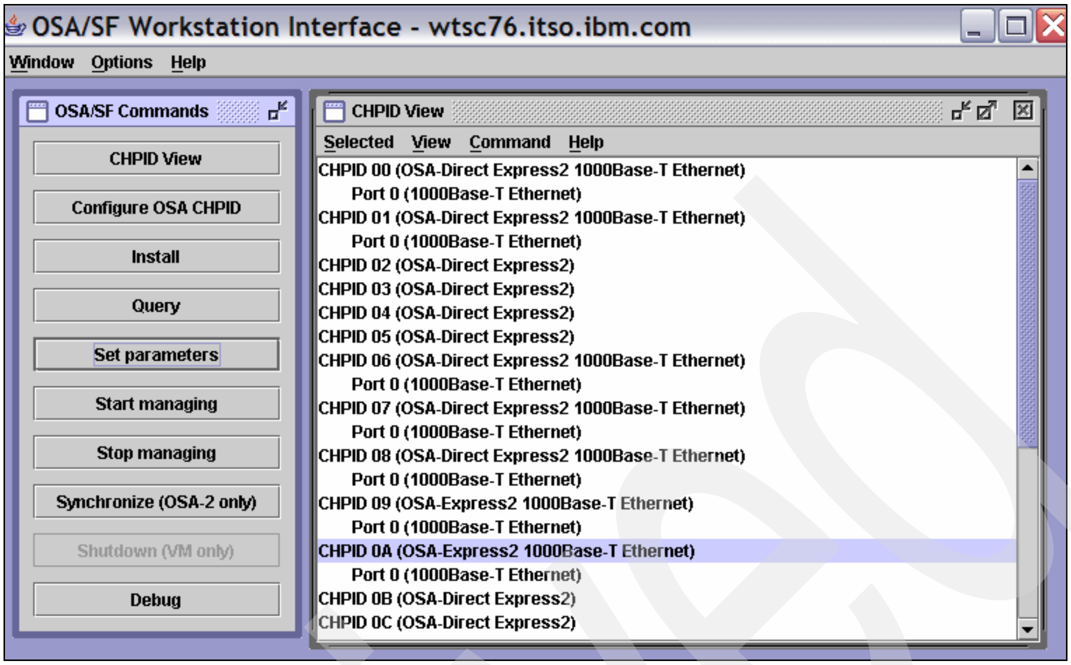


Figure 6-17 OSA/SF Workstation Interface - CHPID view

- 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 6-18.

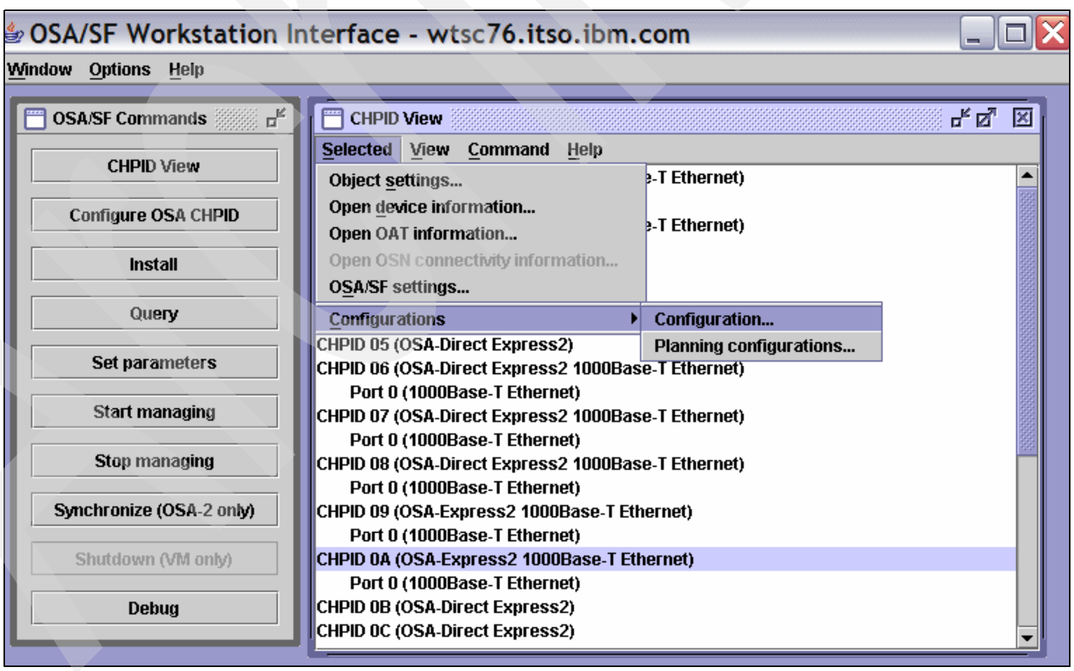


Figure 6-18 OSA/SF Workstation Interface - Selected Configurations

- A CHPID configuration panel is displayed, with only blank information. From this panel, click **File** → **Get current configuration**; see Figure 6-19 on page 198.

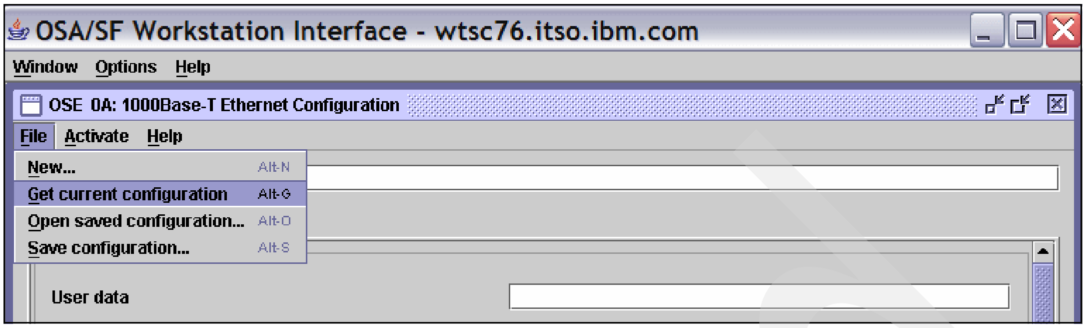


Figure 6-19 OSA/SF Workstation Interface - get current configuration

- The CHPID configuration panel is displayed again, now with the current OSA CHPID configuration information. Fill in the Configuration name, see Figure 6-20.

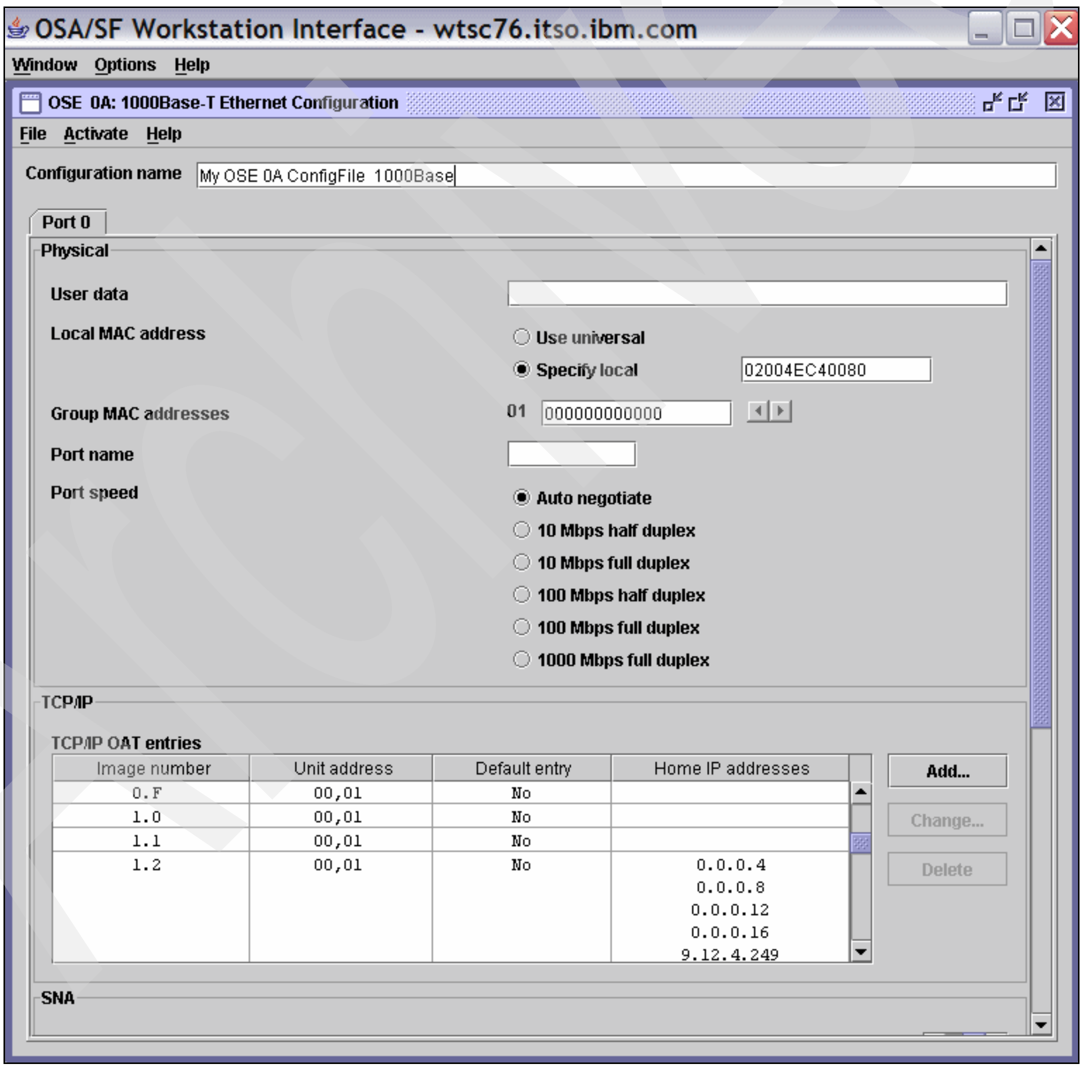


Figure 6-20 OSA/SF Workstation Interface - Current configuration

- Click **File** → **Save configuration...**; see Figure 6-21 on page 199. The configuration file is saved by OSA/SF and can be reused later.

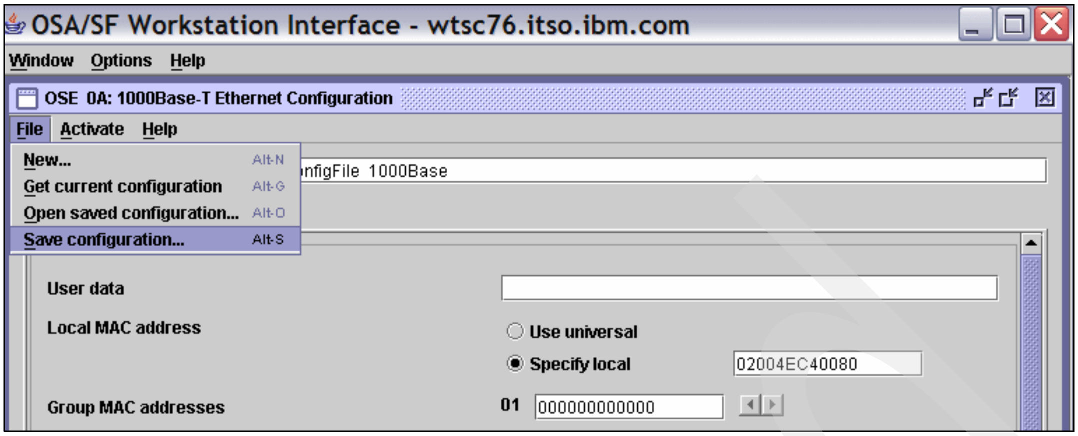


Figure 6-21 OSA/SF Workstation Interface - Save current configuration

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.

- From the OSA/SF main view, initialize the CHPID view. Select **Configurations** → **Planning configurations...**; see Figure 6-22.

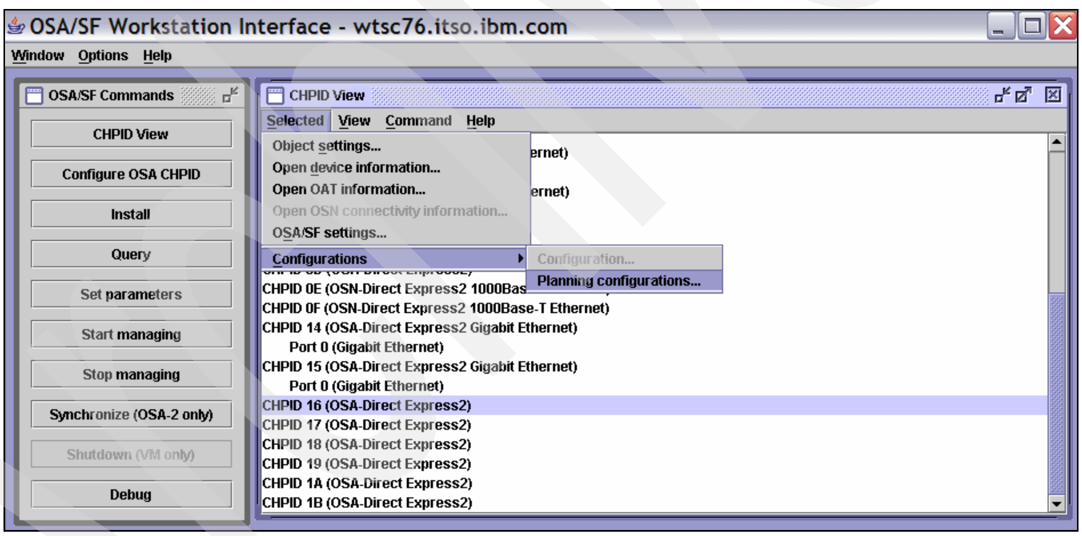


Figure 6-22 OSA/SF Workstation Interface - Planning configurations

- The Configure OSA CHPID panel displays, see Figure 6-23 on page 200. Select the CHPID number and the CHPID Type that you want to define, and then click **OK**.

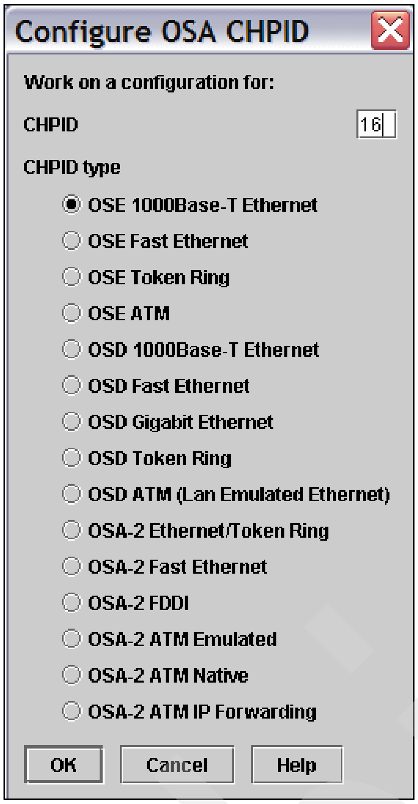


Figure 6-23 OSA/SF Workstation Interface - Configure OSA CHPID

- OSA/SF displays a default panel for the type of feature selected. Click **File** → **Open saved configuration...**; see Figure 6-24.

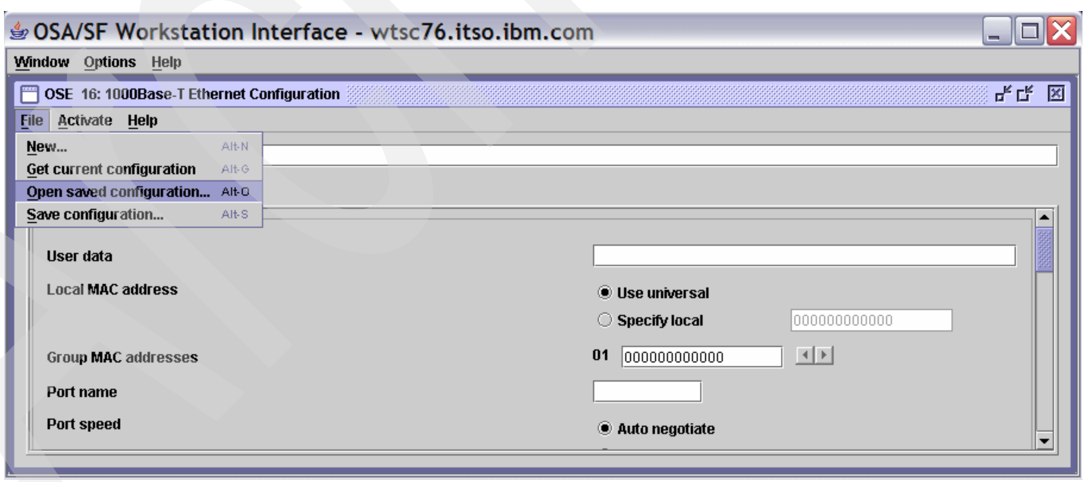


Figure 6-24 OSA/SF Workstation Interface - Open saved configuration

OSA/SF displays a Host Configuration List panel containing the names of previously saved configuration files that match the feature type; see Figure 6-25 on page 201.

Note that the Host Configuration List being displayed will vary with the OSA Express2 feature type selected in Figure 6-23.

For example, a request for OSD 1000BaseT Ethernet displays the list shown in Figure 6-25.

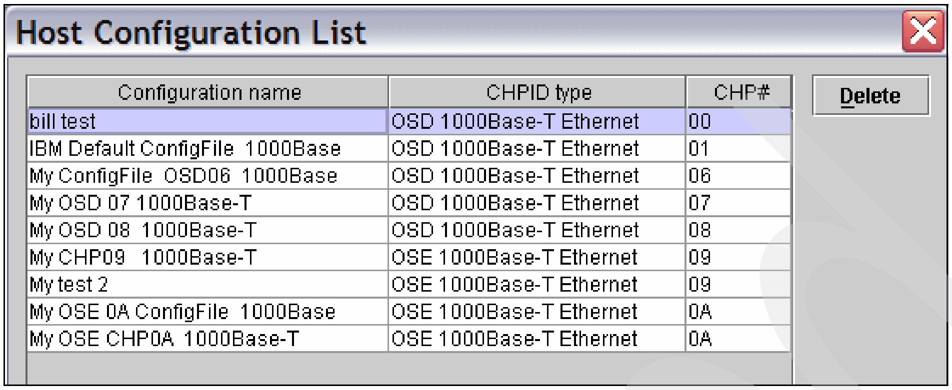


Figure 6-25 OSA/SF Workstation Interface - Host configuration list (OSD 1000Base T Ethernet)

However, a request for OSD Gigabit Ethernet displays the list shown in Figure 6-26.

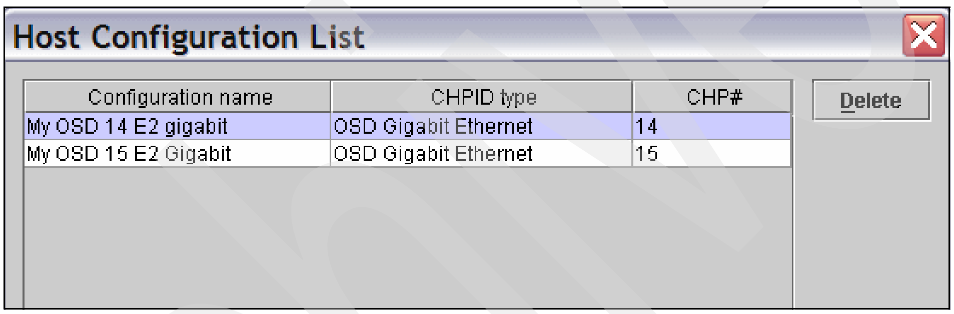


Figure 6-26 OSA/SF Workstation Interface - Host configuration list (OSD Gigabit Ethernet)

From the list, select the saved configuration name and click **Load**. Configuration information previously saved is now displayed on the OSA configuration panel.

- Select **Activate** → **Activate with install** to restore the OSA feature configuration; see Figure 6-28 on page 203.

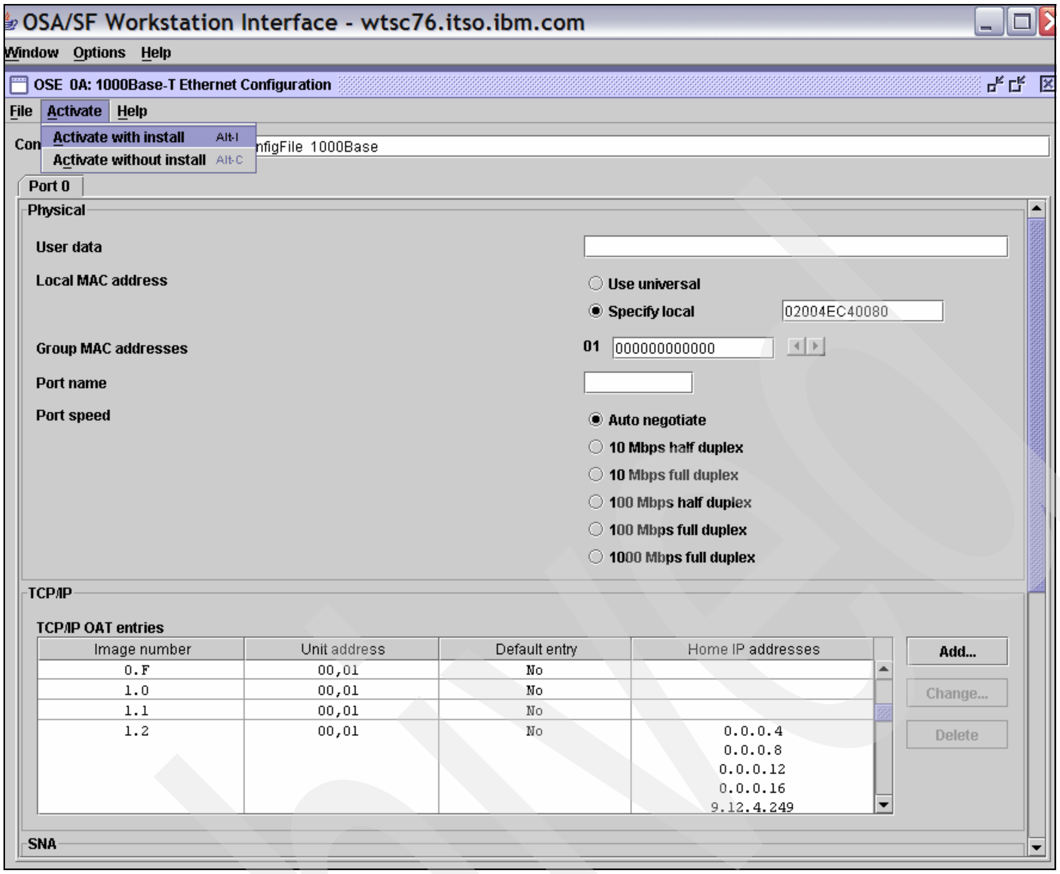


Figure 6-27 OSA/SF Workstation Interface - Install

6.3.2 OSA-ICC, CHPID=OSC

If the 2084 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. So it is good practice to have a backup copy of these definitions.

Export the configuration data for OSA-ICC

To export the configuration data, follow these steps:

- Logon to the HMC that has a diskette drive installed.
- 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, SCZP901).
- Under Operational Customization, double-click **OSA Advanced Facilities**.
- Select the radio button for the Channel ID card that you want to export, then click **OK**; see Figure 6-28 on page 203.

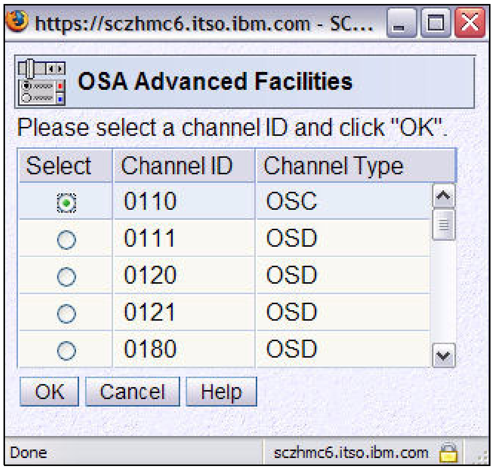


Figure 6-28 HMC - OSA Advanced Facilities (OSC Channel)

- Select the radio button **Card specific advanced facilities...** and click **OK**; see Figure 6-29.

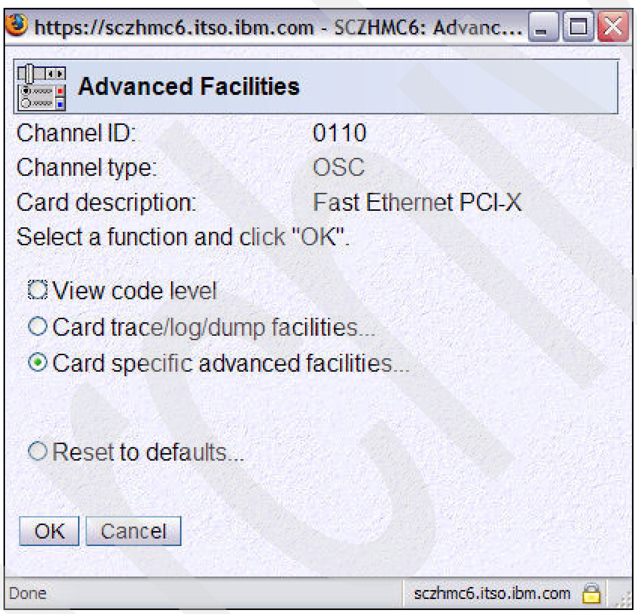


Figure 6-29 HMC - OSA Advanced Facilities (Card specific)

- Select the radio button **Manual configuration options...**, and click **OK**; see Figure 6-30 on page 204.

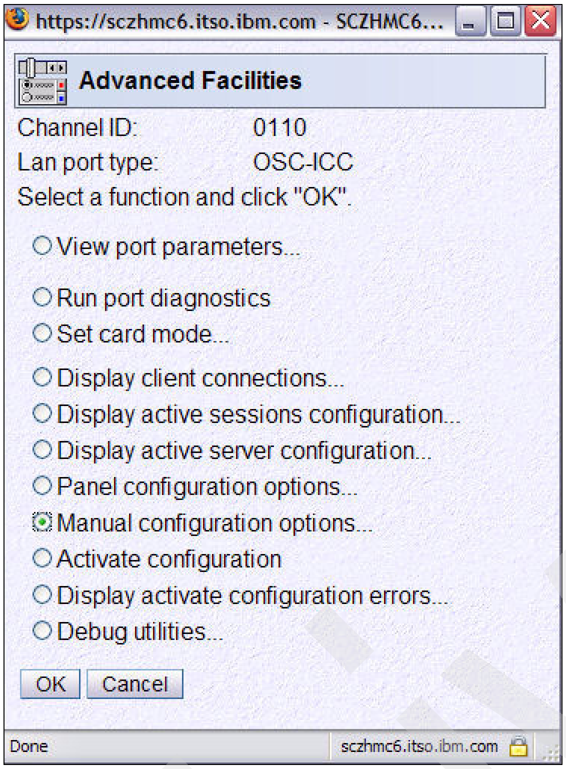


Figure 6-30 HMC - OSA Advanced Facilities (Manual config)

- Select the radio button Export source file and click **OK**; see Figure 6-31.

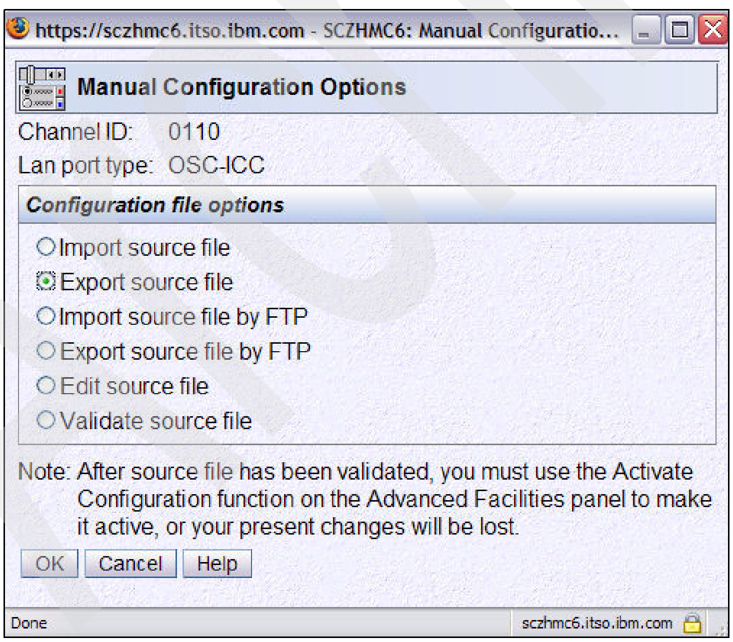


Figure 6-31 HMC - OSA Advanced Facilities (Export source)

- The task requests a file name to be written onto the diskette. In our example we entered `OSC-ICC_0110`; see Figure 6-32 on page 205. Click **OK**.

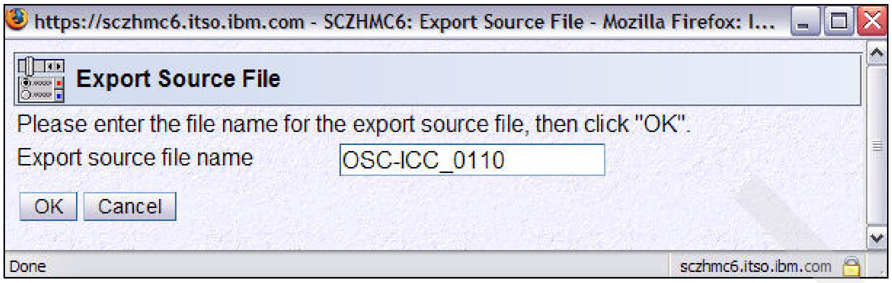


Figure 6-32 HMC - OSA Advanced Facilities (Export filename)

- You are prompted to insert a diskette into the drive on the HMC workstation that you are logged on to; see Figure 6-33.

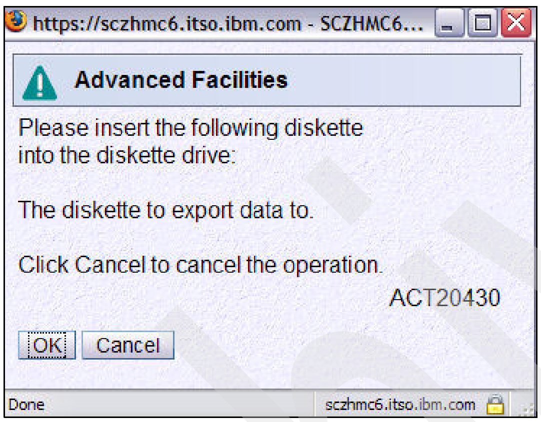


Figure 6-33 HMC - OSA Advanced Facilities (Export insert diskette)

- Insert the diskette and click **OK**. The HMC task writes the configuration data for the Channel ID that was selected onto the diskette and displays a message window when it has completed; click OK.

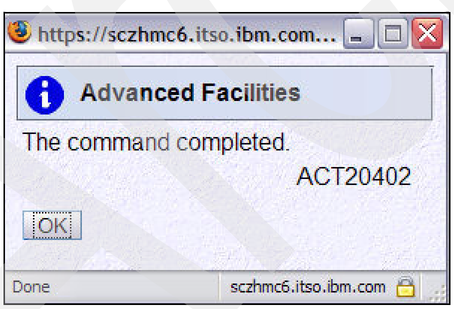


Figure 6-34 HMC - OSA Advanced Facilities (Export completed)

- Remove the diskette from the drive as instructed by the message displayed in Figure 6-35 on page 206; click **OK**. You can now click **Cancel** to exit all OSA Advanced Facilities windows.

Figure 6-35 HMC - OSA Advanced Facilities (Remove diskette)

Figure 6-36 shows a sample of the configuration data downloaded on the diskette

```
<OSC_SERVER>
  HOST_IP= 10.10.4.2
  DEFAULT_GATEWAY= 10.10.4.1
  SUBNET_MASK= 255.255.0.0
  PORT= 1024
  ETHERNET_FRAME= DIX
  MTU= 1492
  NAME= OSCE000
</OSC_SERVER>


<CONFIG_SESSION>
<SESSION1>
  CSS=  01 IID=  01 DEVICE=  E000
  GROUP=  "SC64E000"
  CONSOLE_TYPE=  2    RESPONSE=  ON
  READ_TIMEOUT=  60
  DEFER_HOST_DISCONNECT=  600
  CLIENT_IP= 10.10.10.2
</SESSION1>

<SESSION2>
  CSS=  01 IID=  01 DEVICE=  E001
  GROUP=  "SC64E001"
  CONSOLE_TYPE=  2    RESPONSE=  ON
  READ_TIMEOUT=  60
  DEFER_HOST_DISCONNECT=  600
  CLIENT_IP= 10.10.11.2
</SESSION2>
.....................................
.....................................
<SESSION24>
  CSS=  01 IID=  0C DEVICE=  0035
  GROUP=  "VM50035"
  CONSOLE_TYPE=  3    RESPONSE=  OFF
  READ_TIMEOUT=  60
  CLIENT_IP= 10.10.12.2
</SESSION24>

</CONFIG_SESSION>
```

Figure 6-36 OSC configuration sample (OSC-0110)

6.4 Validate the 2094 work IODF

Validate the work IODF

- Select HCD option **2.12**, **Build validated work I/O definition file**. Review the Message List and correct any errors.
- Press PF3 to continue; the message `Requested action successfully processed` is displayed.
- Go to HCD option **6.4**,**View I/O Definition File Information** and notice that the IODF type is now `Work - Validated`; see Figure 6-37

```
+---------------- View I/O Definition File Information -----------------+
|                                                                       |
| IODF name  . . . . . . : 'SYS6.IODF37.WORK'                          |
| IODF type  . . . . . . : Work - Validated                            |
| IODF version . . . . . : 5                                           |
|                                                                       |
| Creation date  . . . . : 2005-11-28                                  |
| Last update  . . . . . : 2005-11-28  18:44                           |
|                                                                       |
| Volume serial number . : BH6ST2                                      |
| Allocated space  . . . : 2048    (Number of 4K blocks)               |
| Used space . . . . . . : 1304    (Number of 4K blocks)               |
|    thereof utilized (%)  91                                          |
|                                                                       |
| Activity logging . . . : No                                          |
| Backup IODF name . . . :                                             |
|                                                                       |
| Description  . . . . . :                                             |
|                                                                       |
|  F1=Help    F2=Split   F3=Exit    F9=Swap   F12=Cancel               |
+-----------------------------------------------------------------------+
```

Figure 6-37 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.

- Select HCD option **2.3**, **Build IOCP input data set**, and then press Enter; see Figure 6-38 on page 208.

```
----- 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 6-38 HCD - Activate or Process Configuration Data (Build IOCP for SCZP102)

- HCD displays the list of available processors to chose from. Select the processor SCZP102 by using a forward slash mark (/) and then press Enter; see Figure 6-39.

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

 Select one.

   Processor ID  Type     Model    Mode  Description
   ISGSYN        2064     1C7      LPAR
   ISGS11        2064     1C7      LPAR
   SCZP101       2094     S18      LPAR
 / SCZP102       2094     S18      LPAR
   SCZP701       9672     XX7      LPAR
   SCZP801       2064     1C7      LPAR
   WOJ1          2084     A08      LPAR
 **************************** Bottom of data *****************************
```

Figure 6-39 HCD - Available Processors (select processor for IOCP file)

- 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.
- Press Enter; HCD submits a batch job to create the data set.

```
------------------------- Build IOCP Input Data Set --------------------------

  Specify or revise the following values.

  IODF name . . . . . . . . . : 'SYS6.IODF37.WORK'
  Processor ID  . . . . . . . : SCZP102
  Title1 . IODF37___________________________________________________________
  Title2 : SYS6.IODF37.WORK - 2005-11-28 17:45

  IOCP input data set
  'SYS6.IODF37.IOCPIN.SCZP102'_____________________________________
  Input to Stand-alone IOCP?  Yes  (Yes or No)

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

Figure 6-40   HCD - Build IOCP Input Data Set

- In TSO, verify that the data set just created exists, and that it contains IOCP statements; see Figure 6-41.

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

```
ID    MSG1='IODF37',                                            *
      MSG2='SYS6.IODF37.WORK - 2005-11-23 16:59',               *
      SYSTEM=(2094,1),                                          *
      TOK=('SCZP102',00800221991E2094165932680105327F00000000,*
      00000000,'05-11-23','16:59:32','........','........')
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))),       *
      MAXDEV=((CSS(0),64512,0),(CSS(1),64512,0))
CHPID PATH=(CSS(0),00),SHARED,                                  *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=120,TYPE=OSD
CHPID PATH=(CSS(0),01),SHARED,                                  *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=300,TYPE=OSD
CHPID PATH=(CSS(0),02),SHARED,                                  *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=1B0,TYPE=OSD
CHPID PATH=(CSS(0),03),SHARED,                                  *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=180,TYPE=OSD
CHPID PATH=(CSS(0,1),04),SHARED,                                *
```

Figure 6-41   HCD - IOCP input data set contents (truncated)

- Also note that part of the TOK statement has been blanked out with dots; see Example 6-1 on page 210.

Example 6-1 HCD - IOCP file (TOK statement)

```
TOK=('SCZP102',00800221991E2094184459480105332F00000000,
00000000,'05-11-28','18:44:59','........','........')
```

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 in order for the process to be valid. The IOCP file cannot be used directly by the IOCP program.

- 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 IODF37.TXT.

6.5 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 2094 order process (CFReport). Using the CHPID Mapping Tool, we assign PCHIDs to each of the CHPIDs for the 2094.

For this process, the CHPID Mapping Tool (CMT) must be downloaded. Refer to 2.5.1, “CHPID Mapping Tool” on page 32, 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:

- Import IOCP statements file and the CFReport file into the CHPID Mapping Tool. Getting the IOCP statements may be performed with HCM.
- Resolve CHPIDs with a PCHID conflict.
- Resolve CHPIDs without associated hardware.
- Resolve Hardware resolution.
- Set the priority for single-path control units and other control units that would override the CHPID Mapping Tool default priorities.
- Run the CHPID Mapping Tool availability function.
- Create CHPID Mapping Tool reports.
- Create 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 2084 to a 2094, it is mandatory to use the CHPID Mapping Tool level that supports the 2094. The internal availability characteristics of the 2094 are different from the previous zSeries processors.

Import the CFReport order file into the CHPID Mapping Tool

- Start the CHPID Mapping Tool on your workstation.
- Import the CFReport order file into the CHPID Mapping Tool.

► Click **File** → **Import CFReport Order file**; see Figure 6-42.

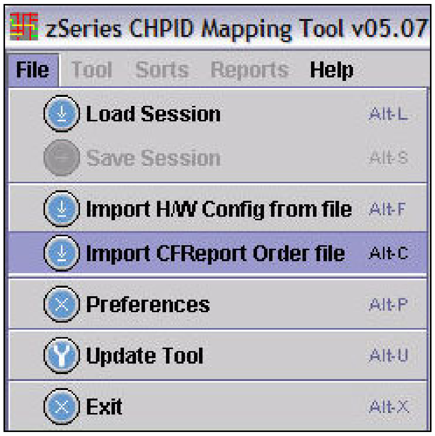


Figure 6-42 CMT - Import CFReport Order file

► Select the CFReport file to import and click **Open**; see Figure 6-43.

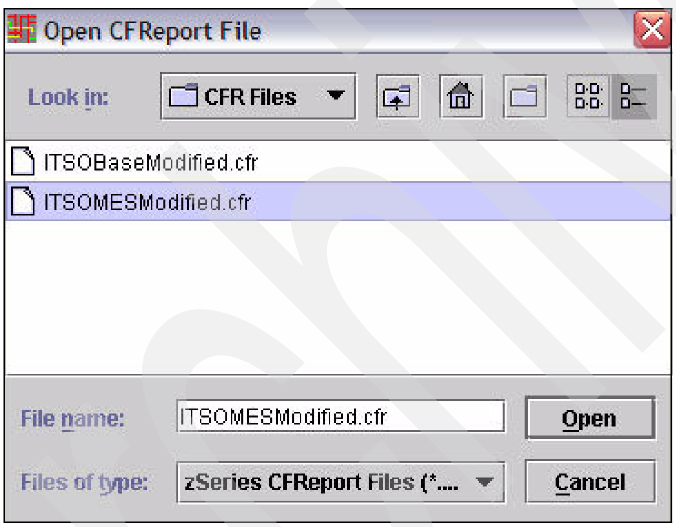
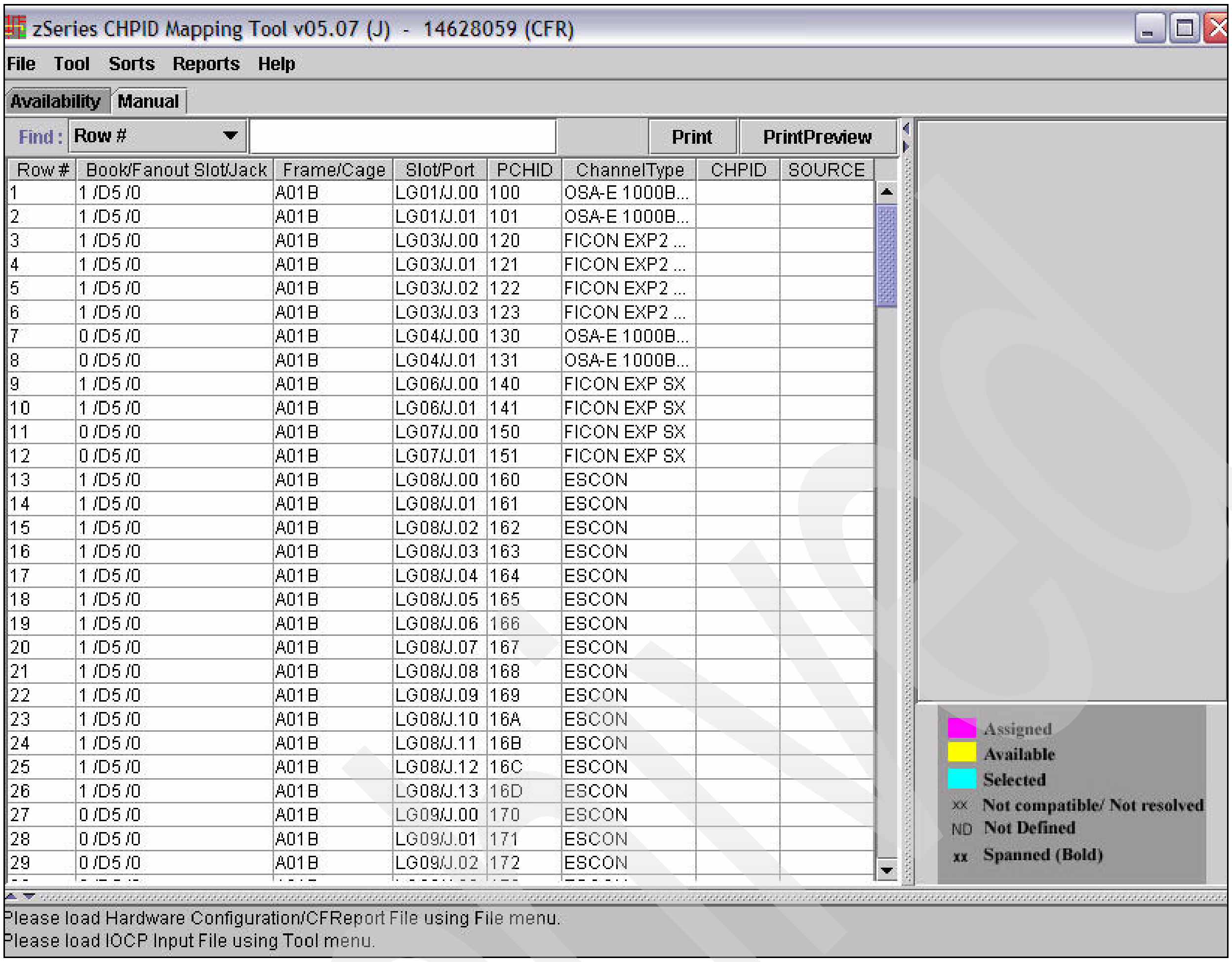


Figure 6-43 CMT - Open CFReport Order file

► Information from the CFReport is displayed on the left-hand side of the screen; see Figure 6-44 on page 212.



Row #	Book/Fanout Slot/Jack	Frame/Cage	Slot/Port	PCHID	ChannelType	CHPID	SOURCE
1	1 /D5 /0	A01B	LG01/J.00	100	OSA-E 1000B...		
2	1 /D5 /0	A01B	LG01/J.01	101	OSA-E 1000B...		
3	1 /D5 /0	A01B	LG03/J.00	120	FICON EXP2 ...		
4	1 /D5 /0	A01B	LG03/J.01	121	FICON EXP2 ...		
5	1 /D5 /0	A01B	LG03/J.02	122	FICON EXP2 ...		
6	1 /D5 /0	A01B	LG03/J.03	123	FICON EXP2 ...		
7	0 /D5 /0	A01B	LG04/J.00	130	OSA-E 1000B...		
8	0 /D5 /0	A01B	LG04/J.01	131	OSA-E 1000B...		
9	1 /D5 /0	A01B	LG06/J.00	140	FICON EXP SX		
10	1 /D5 /0	A01B	LG06/J.01	141	FICON EXP SX		
11	0 /D5 /0	A01B	LG07/J.00	150	FICON EXP SX		
12	0 /D5 /0	A01B	LG07/J.01	151	FICON EXP SX		
13	1 /D5 /0	A01B	LG08/J.00	160	ESCON		
14	1 /D5 /0	A01B	LG08/J.01	161	ESCON		
15	1 /D5 /0	A01B	LG08/J.02	162	ESCON		
16	1 /D5 /0	A01B	LG08/J.03	163	ESCON		
17	1 /D5 /0	A01B	LG08/J.04	164	ESCON		
18	1 /D5 /0	A01B	LG08/J.05	165	ESCON		
19	1 /D5 /0	A01B	LG08/J.06	166	ESCON		
20	1 /D5 /0	A01B	LG08/J.07	167	ESCON		
21	1 /D5 /0	A01B	LG08/J.08	168	ESCON		
22	1 /D5 /0	A01B	LG08/J.09	169	ESCON		
23	1 /D5 /0	A01B	LG08/J.10	16A	ESCON		
24	1 /D5 /0	A01B	LG08/J.11	16B	ESCON		
25	1 /D5 /0	A01B	LG08/J.12	16C	ESCON		
26	1 /D5 /0	A01B	LG08/J.13	16D	ESCON		
27	0 /D5 /0	A01B	LG09/J.00	170	ESCON		
28	0 /D5 /0	A01B	LG09/J.01	171	ESCON		
29	0 /D5 /0	A01B	LG09/J.02	172	ESCON		

Figure 6-44 CMT - Imported CFReport Order file

Import the 2094 IOCP file into the CHPID Mapping Tool

- Import the IOCP file. Click **Tool** → **Import** IOCP File; see Figure 6-45 on page 213.

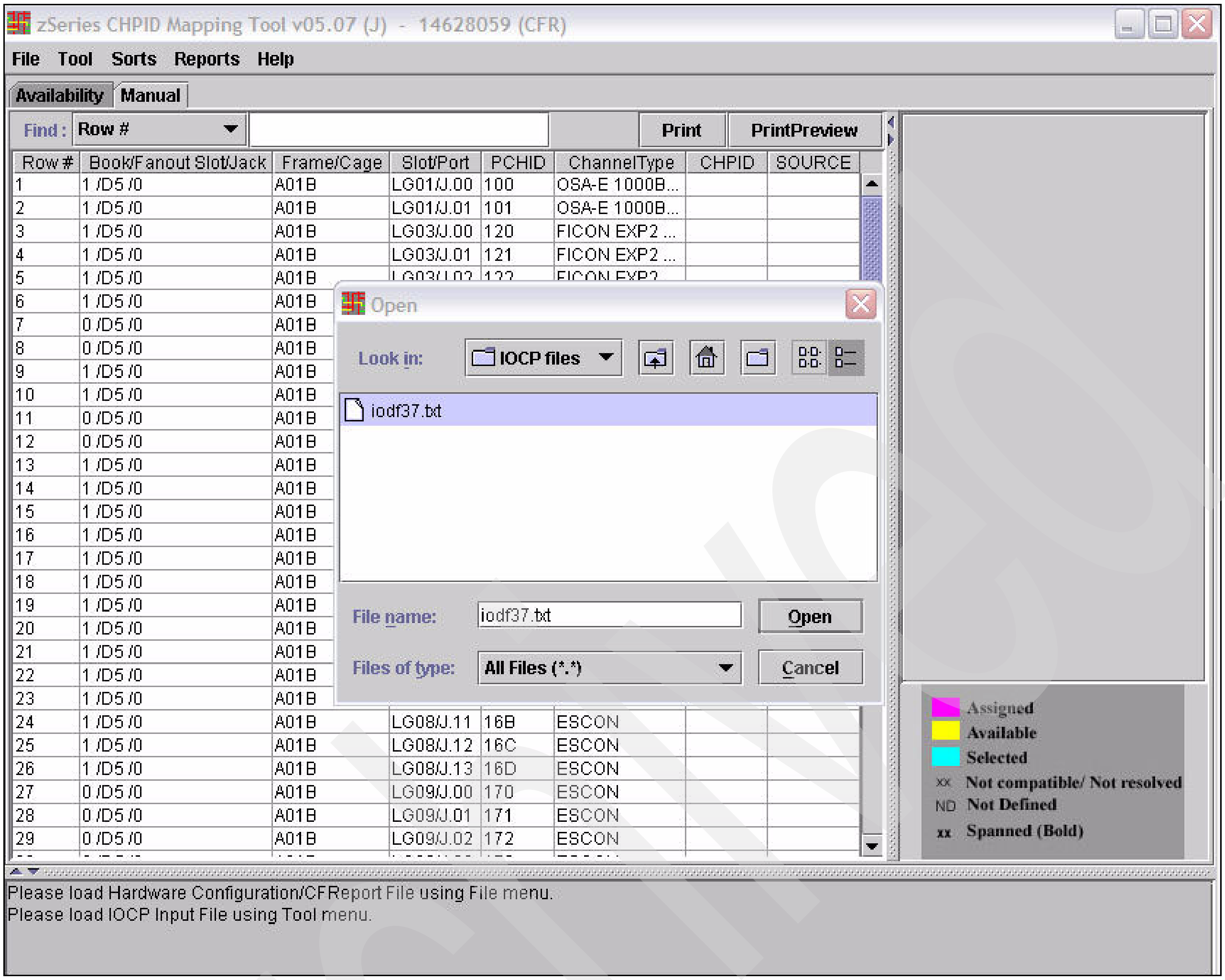


Figure 6-45 CMT - Import IOCP files

- 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 above 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.

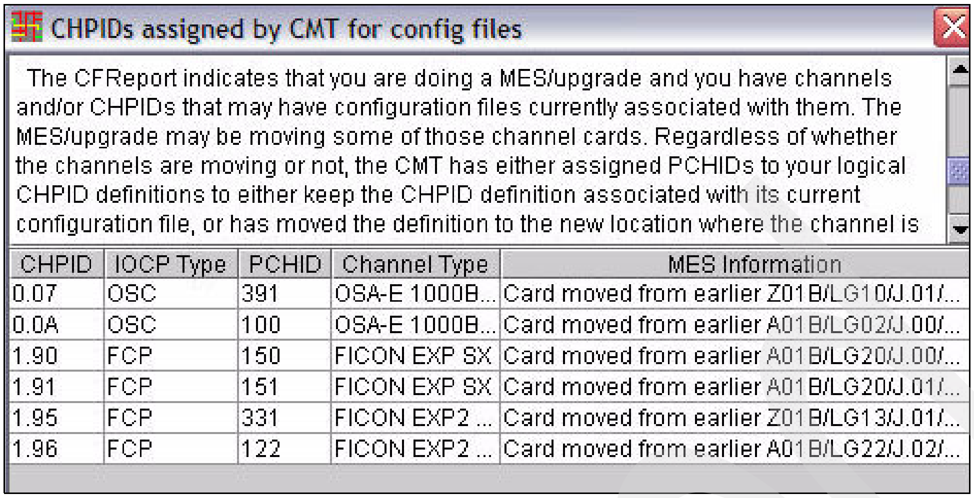
In order to give the CHPID Mapping Tool the most choices when using the availability option, we recommend that you choose **Reset all IOCP assigned PCHIDs**.

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

As shown in Figure 6-46 on page 215, here you can see any PCHIDs that could potentially have configuration files associated with them. Click **OK**.

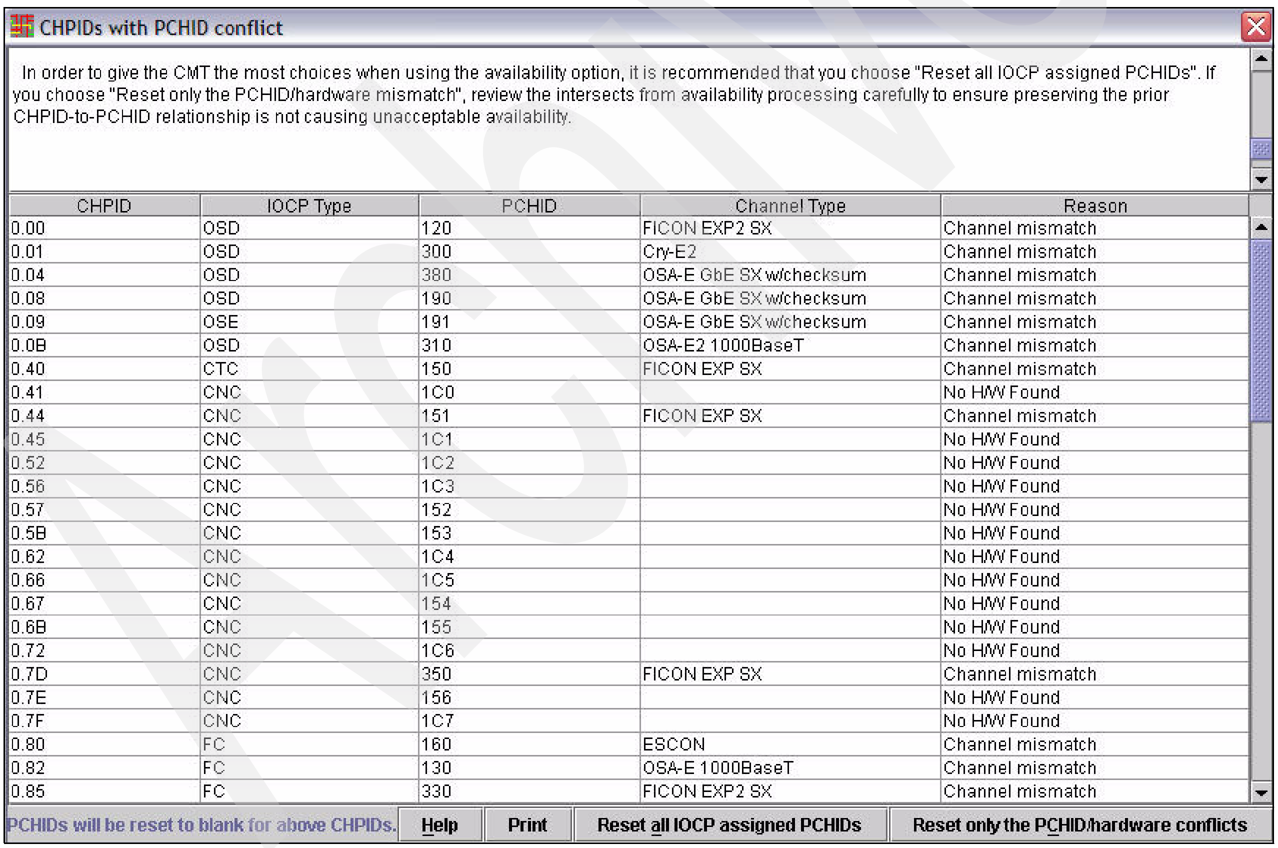


CHPID	IOCP Type	PCHID	Channel Type	MES Information
0.07	OSC	391	OSA-E 1000B...	Card moved from earlier Z01B/LG10/J.01/...
0.0A	OSC	100	OSA-E 1000B...	Card moved from earlier A01B/LG02/J.00/...
1.90	FCP	150	FICON EXP SX	Card moved from earlier A01B/LG20/J.00/...
1.91	FCP	151	FICON EXP SX	Card moved from earlier A01B/LG20/J.01/...
1.95	FCP	331	FICON EXP2 ...	Card moved from earlier Z01B/LG13/J.01/...
1.96	FCP	122	FICON EXP2 ...	Card moved from earlier A01B/LG22/J.02/...

Figure 6-46 CMT - CHPIDs assigned by CMT

Resolve CHPIDs with PCHID conflict

Now the CMT displays the CHPIDs with PCHID conflicts; see Figure 6-47.



CHPID	IOCP Type	PCHID	Channel Type	Reason
0.00	OSD	120	FICON EXP2 SX	Channel mismatch
0.01	OSD	300	Cry-E2	Channel mismatch
0.04	OSD	380	OSA-E GbE SX w/checksum	Channel mismatch
0.08	OSD	190	OSA-E GbE SX w/checksum	Channel mismatch
0.09	OSE	191	OSA-E GbE SX w/checksum	Channel mismatch
0.0B	OSD	310	OSA-E2 1000BaseT	Channel mismatch
0.40	CTC	150	FICON EXP SX	Channel mismatch
0.41	CNC	1C0		No H/W Found
0.44	CNC	151	FICON EXP SX	Channel mismatch
0.45	CNC	1C1		No H/W Found
0.52	CNC	1C2		No H/W Found
0.56	CNC	1C3		No H/W Found
0.57	CNC	152		No H/W Found
0.5B	CNC	153		No H/W Found
0.62	CNC	1C4		No H/W Found
0.66	CNC	1C5		No H/W Found
0.67	CNC	154		No H/W Found
0.6B	CNC	155		No H/W Found
0.72	CNC	1C6		No H/W Found
0.7D	CNC	350	FICON EXP SX	Channel mismatch
0.7E	CNC	156		No H/W Found
0.7F	CNC	1C7		No H/W Found
0.80	FC	160	ESCON	Channel mismatch
0.82	FC	130	OSA-E 1000BaseT	Channel mismatch
0.85	FC	330	FICON EXP2 SX	Channel mismatch

Figure 6-47 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; see Figure 6-48.

Figure 6-48 CMT - Required Hardware unavailable

The following message is issued:

```
The CHPID Mapping Tool is now halted. It requires the condition to be resolved.
```

We left these CHPID types “CFP” 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 192.

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 CFP CHPID definitions in the IODF and expect to have CFP 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.

Alternatively, you could remove the 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 CFP 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:** f you look at the IOCP statements file now, notice that the 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 6-49. The image in the lower right-hand side shows what we had selected for the FC channels.

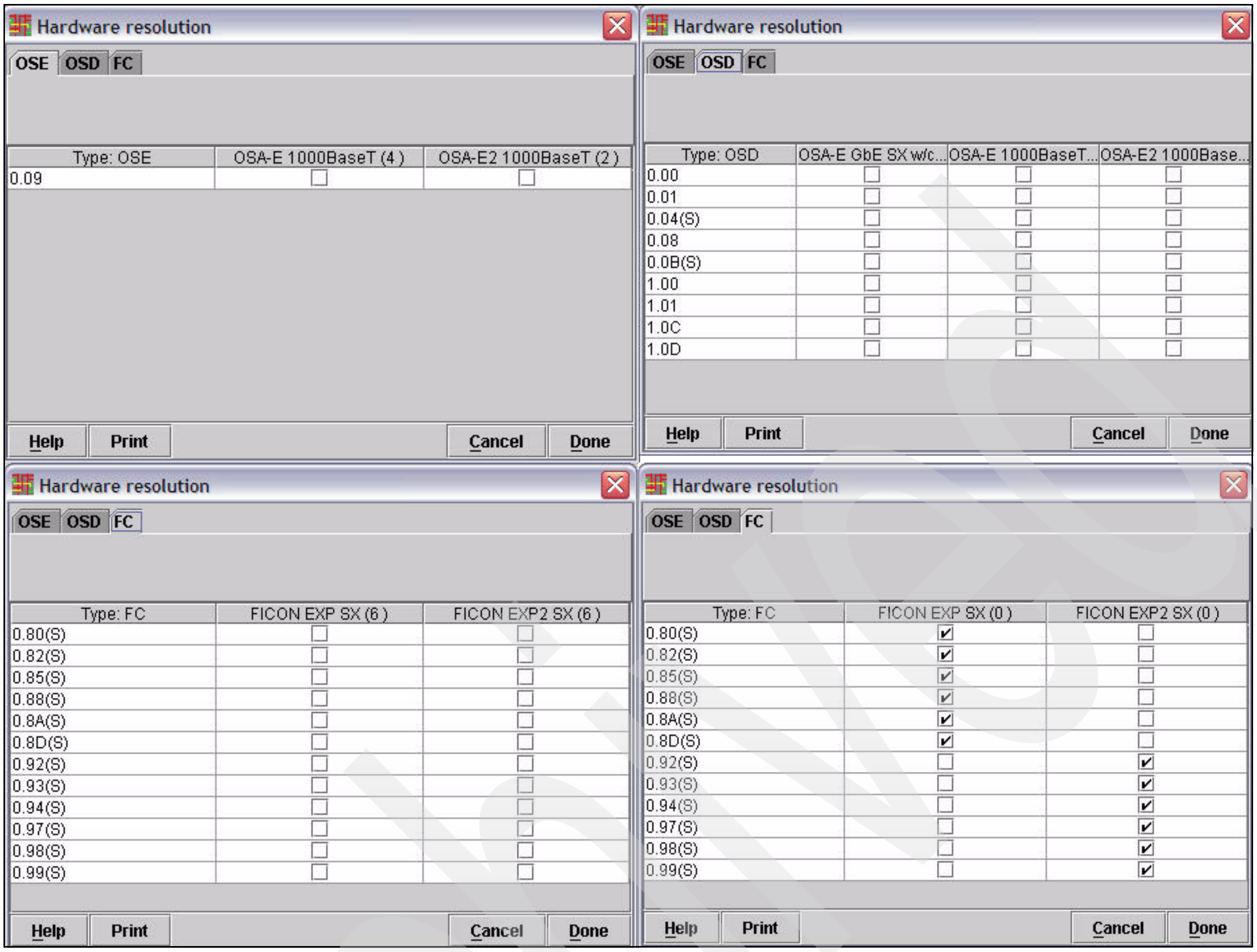


Figure 6-49 CMT - Hardware resolution after IOCP import

- Select one tab at a time. In one of our examples, the CHPID Mapping Tool needs to know which channel type the OSE CHPID definition uses between OSA-Express and OSA-Express 2. 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. Note that in Figure 6-50 on page 218, the CHPID and SOURCE columns contain blanks. These are filled in after CMT assigns the CHPIDs to PCHIDs.

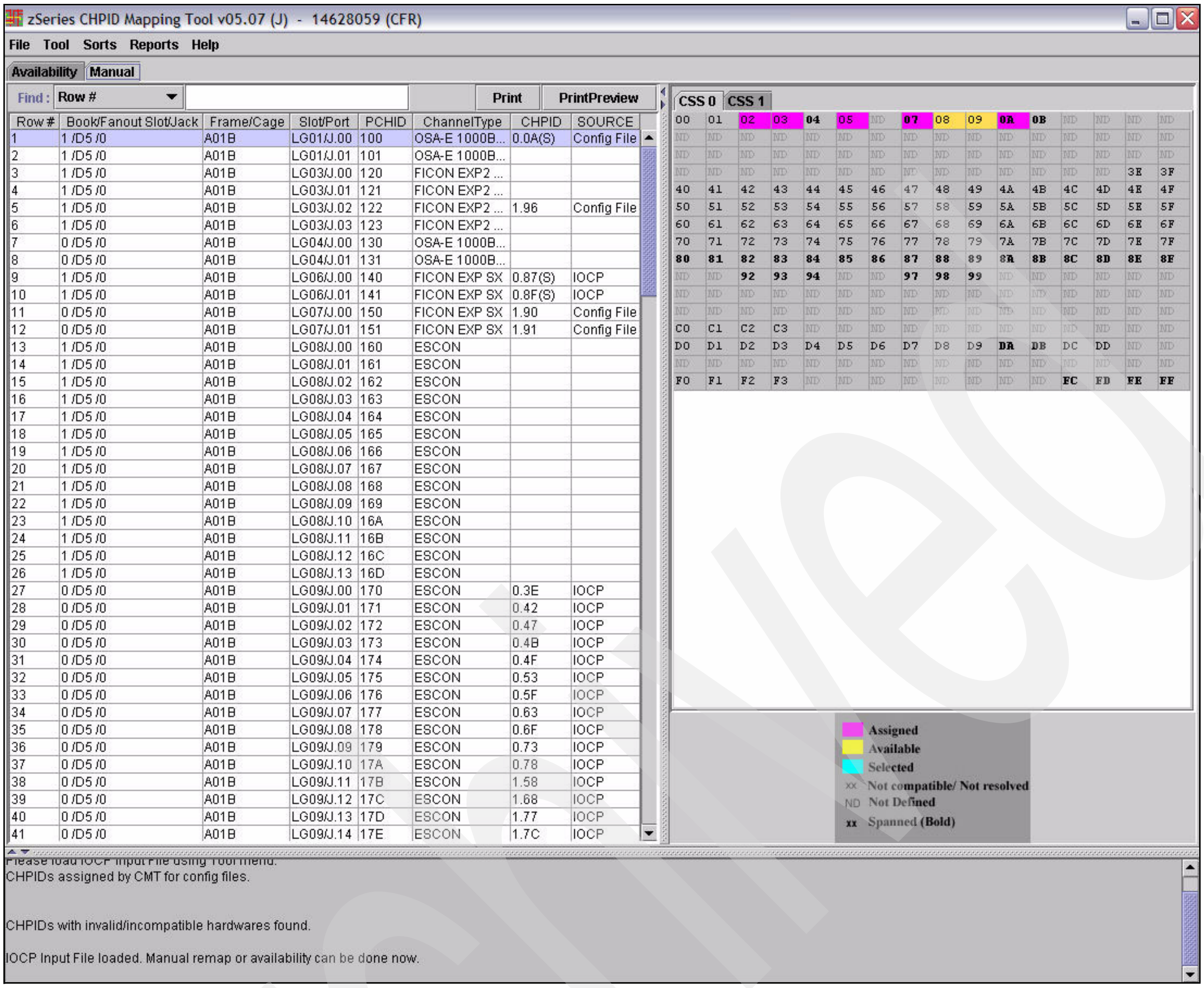


Figure 6-50 CMT - Manual Tab

Process CU Priority

If you are importing an IOCP statements file from a 2084 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 2094. Follow these steps:

- Under the File menu, click the **Availability** tab.
- 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 6-51 on page 219.

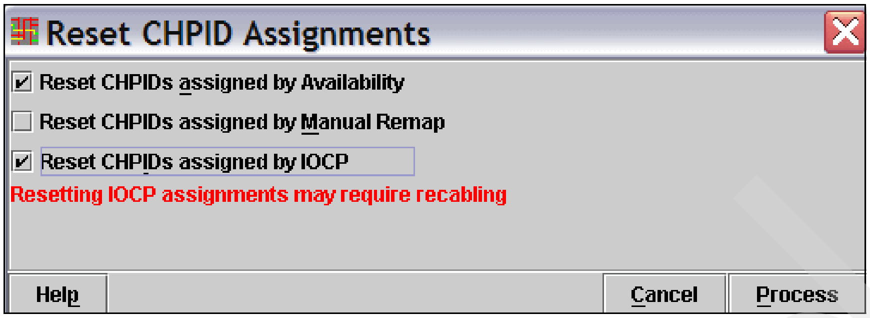


Figure 6-51 CMT - Reset CHPID Assignments

The 2094 has different availability rules than the 2084, so we need to remove all PCHIDs assignment that were still in the IOCP.

- Click **Process**. After the CHPID Mapping Tool has reset the CHPIDs, it displays a message indicating the results of the process; see Figure 6-52.

Figure 6-52 CMT - Process CU Priority completion message

Our example returned the following intersects:

C Two or more assigned channels use the same channel card.
M All assigned channels are supported by the same MBA group.
B More than half the assigned channels are connected to the same book.

> **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.

- 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.

- 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 E000 and E100 to priority 333; see Figure 6-53.

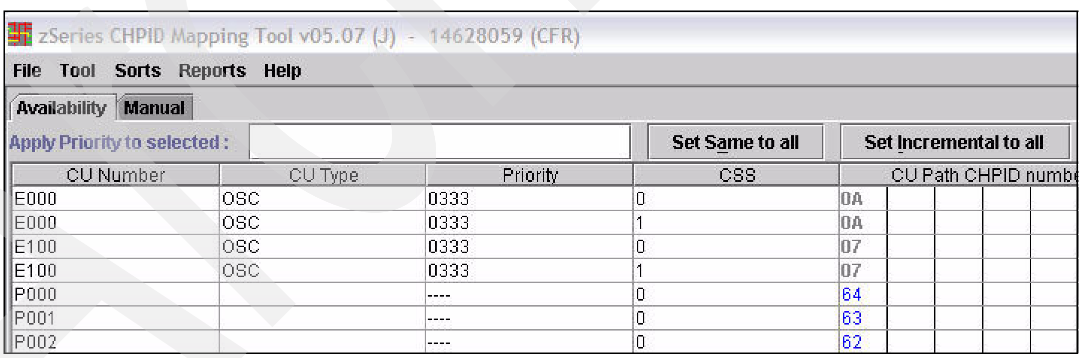


Figure 6-53 CMT Set CU Priority

- Under the File menu, click the **Availability** tab again.
- 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**.

- 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.
- Select the Manual tab; Figure 6-54 shows the results of mapping the CHPIDs.

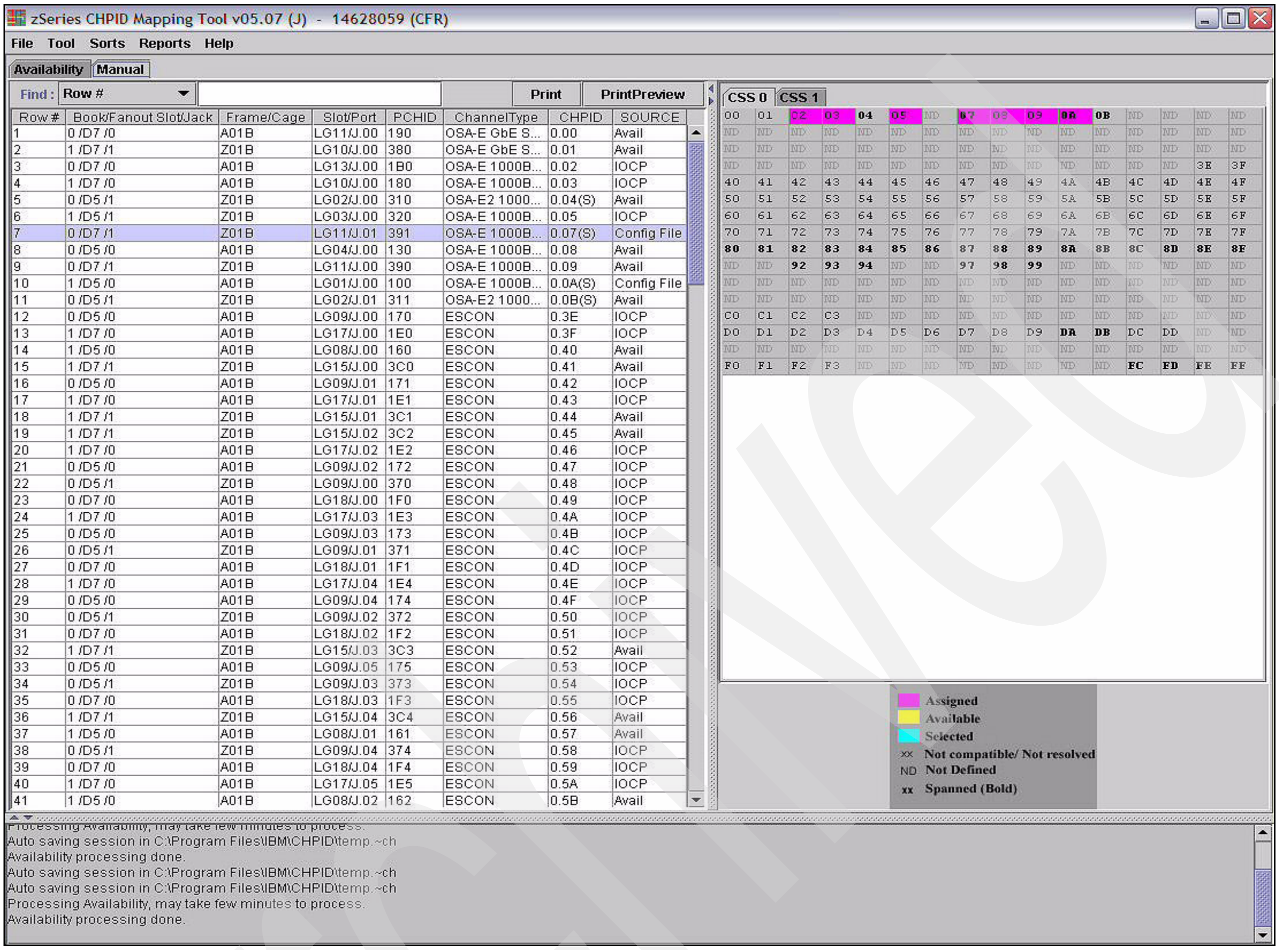


Figure 6-54 CMT - Manual (CHPIDs assigned)

As you can see, the CHPID and SOURCE columns are no longer blank. The CMT has assigned CHPIDs to PCHIDs and it has placed the value Avail in the SOURCE column, indicating that the CHPID values were assigned based on 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 two reports in this example (the CHPID Report and the CHPID to Control Unit Report). However, all the built-in reports are printed in the same way, as explained here.

CHPID Report

Click **Reports** → **CHPID Report**; see Figure 6-55 on page 222.

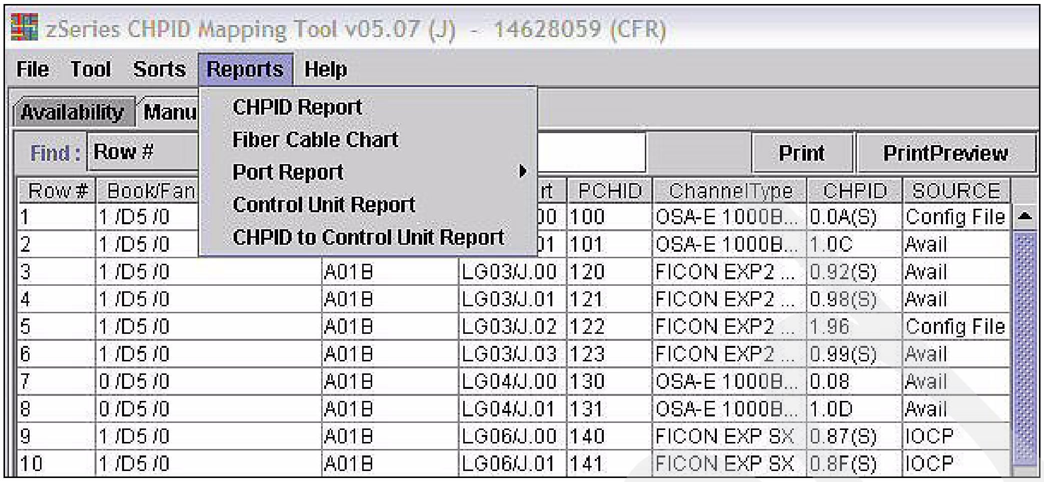


Figure 6-55 CMT - select CHPID Report

- Enter the Report File Name (or accept the default name offered by CMT) and click **Save**; see Figure 6-56.

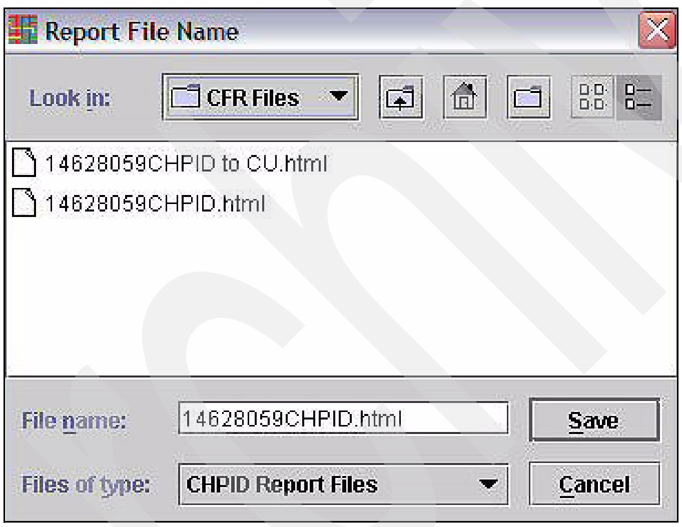


Figure 6-56 CMT - Report File Name

- The CHPID Mapping Tool opens a browser window with the CHPID report; see Figure 6-56. 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: 14628059(CFR)
Machine: 2094-S18

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this

Book/Fanout Slot/Jack	Cage	Slot	F/C	CSS.CHPID/PCHID/Ports
1/ D5/ J.0	A01B	01	1366	(0,1).0A/100/J00 1.0C/101/J01
0/ D5/ J.0	A01B	02	0863	----/110/P00 ----/111/P01
1/ D5/ J.0	A01B	03	3320	(0,1).92/120/J00 (0,1).98/121/J01 1.96/122/J02 (0,1).99/123/J03
0/ D5/ J.0	A01B	04	1366	0.08/130/J00 1.0D/131/J01
1/ D5/ J.0	A01B	06	2320	(0,1).87/140/J00 (0,1).8F/141/J01
0/ D5/ J.0	A01B	07	2320	1.90/150/J00 1.91/151/J01
1/ D5/ J.0	A01B	08	2323	0.40/160/J00 0.57/161/J01 0.5B/162/J02 0.62/163/J03 0.67/164/J04 0.72/165/J05 1.41/166/J06 1.48/167/J07 1.4C/168/J08 1.50/169/J09 1.5C/16A/J10 1.65/16B/J11 1.6D/16C/J12 1.75/16D/J13

Figure 6-57 CMT - CHPID Report

At the end of the CHPID report, there is a list of CHPIDs with PCHIDs different than the z990; see Figure 6-58. This report is valuable for moving cables.

List of CHPIDs having modified PCHID assignments

CHPIDs	Previous PCHID	Previous Location	F/C	Current PCHID	Current Location	F/C
0.00	120	A01BLG03J.00	3366	1B0	A01BLG13J.00	3366
0.01	300	Z01BLG01J.00	3365	210	A01BLG20J.00	3365
0.02	1B0	A01BLG13J.00	3366	230	A01BLG22J.00	3366
0.03	180	A01BD110J.00	0218	120	A01BLG03J.00	3366
0.04	380	Z01BLG10J.00	3366	1A0	A01BLG12J.00	3366
0.05	320	Z01BLG03J.00	3366	330	Z01BLG04J.00	3366
0.07	*	----	----	231	A01BLG22J.01	3366
0.08	190	A01BLG11P.00	0863	1B1	A01BLG13J.01	3366
0.09	191	A01BLG11P.01	0863	1A1	A01BLG12J.01	3366
0.0A	*	----	----	220	A01BLG21J.00	3366
0.0B	310	Z01BLG02J.00	3365	300	Z01BLG01J.00	3365
0.3E	170	A01BLG09J.00	2323	270	A01BLG27J.00	2323
0.3F	1E0	A01BLG17J.00	2323	260	A01BLG26J.00	2323

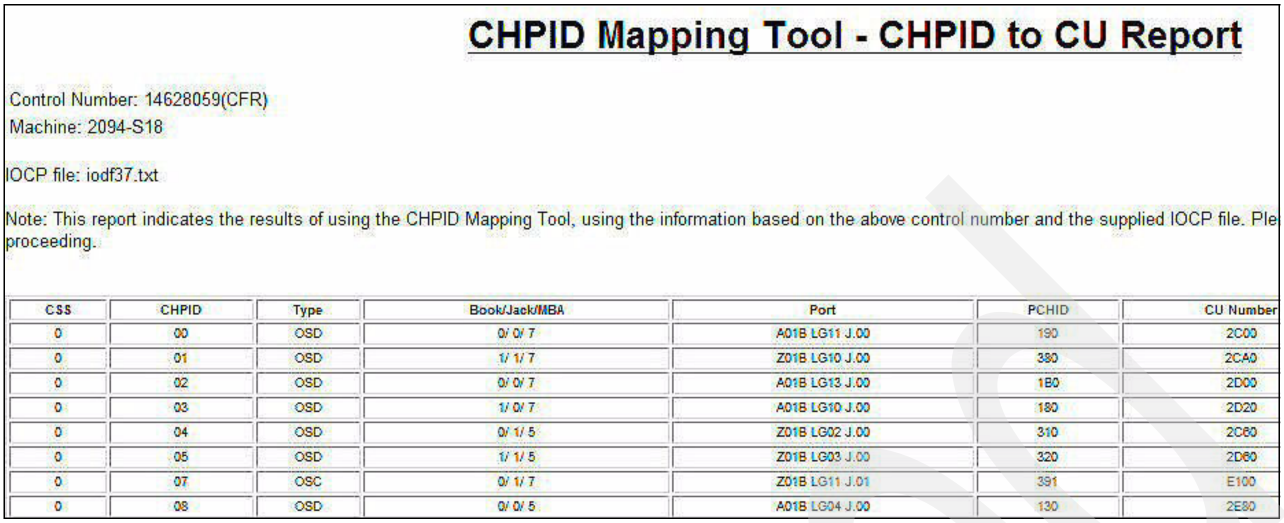
Done My Computer

Figure 6-58 List of CHPIDs having modified PCHID assignment

Create the CHPID to Control Unit Report

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

- Click **Reports** → **CHPID to Control Unit Report**.
- Click **Save**.
- The CHPID Mapping Tool opens a browser window with the CHPID to Control Unit Report; see Figure 6-60 on page 224. 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: 14628059(CFR)
Machine: 2094-S18

IOCP file: iodf37.txt

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. Ple
proceeding.

CSS	CHPID	Type	Book/Jack/MBA	Port	PCHID	CU Number
0	00	OSD	0/ 0/ 7	A01B LG11 J.00	190	2C00
0	01	OSD	1/ 1/ 7	Z01B LG10 J.00	380	2CA0
0	02	OSD	0/ 0/ 7	A01B LG13 J.00	1B0	2D00
0	03	OSD	1/ 0/ 7	A01B LG10 J.00	180	2D20
0	04	OSD	0/ 1/ 5	Z01B LG02 J.00	310	2C60
0	05	OSD	1/ 1/ 5	Z01B LG03 J.00	320	2D60
0	07	OSC	0/ 1/ 7	Z01B LG11 J.01	391	E100
0	08	OSD	0/ 0/ 5	A01B LG04 J.00	130	2E80

Figure 6-59 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.

- Click **Tool** → **Create Updated IOCP File**; see Figure 6-60.

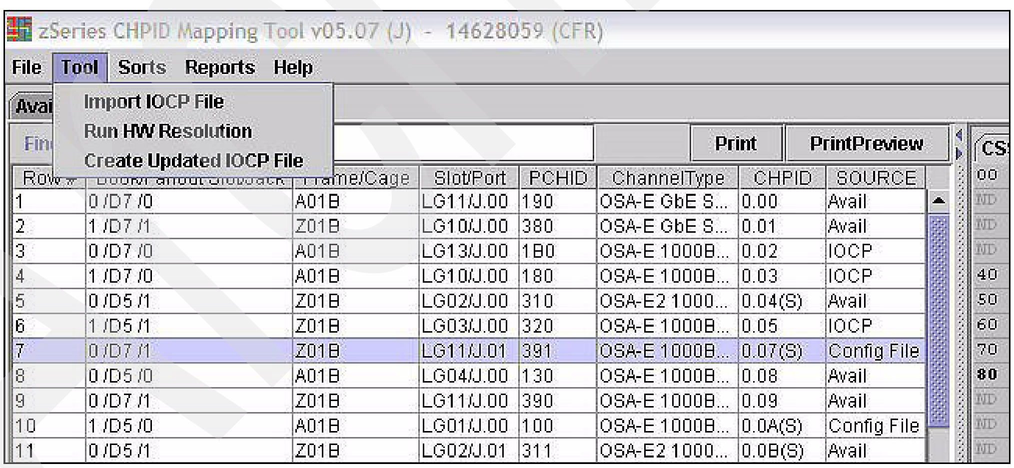


Figure 6-60 CMT - Create Updated IOCP File

- Enter the File name and location for the IOCP output file and click **Save**; see Figure 6-61 on page 225.

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.

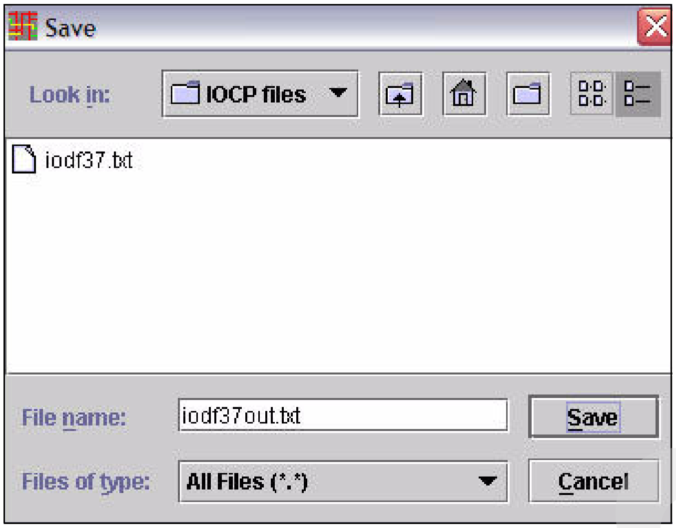


Figure 6-61 CMT - Save IOCP output file

- The CMT displays an informational message, shown in Figure 6-62, regarding what to do for the final execution of the tool.

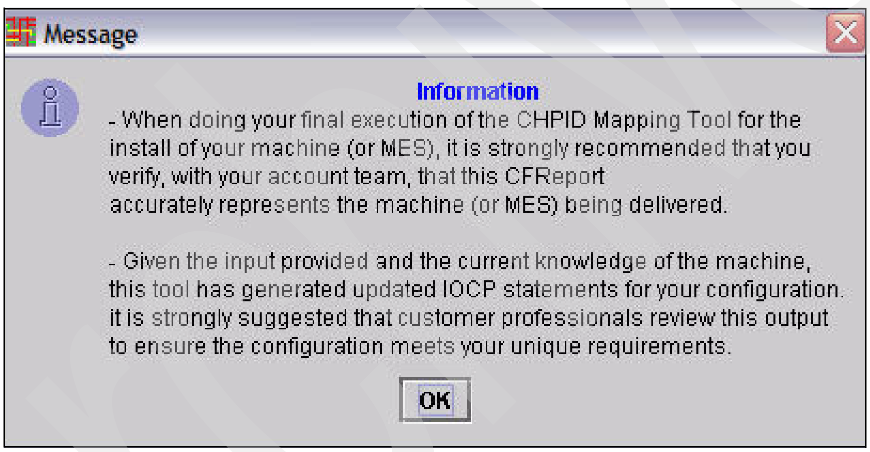


Figure 6-62 CMT - informational message

6.6 HCD - update the 2094 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:

- Upload the IOCP file created by the CMT (iodf37out.txt, 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 E000 and E100.

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 6-2.

Example 6-2 HCD - Updated IOCP statements file (with CMT statements

```
.        IODEVICE ADDRESS=(FFE3,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFF9,007),CUNUMBR=(FFFE),UNIT=CFP
*CMT* VERSION=000
*CMT* CCN=14628059(CFR)
*CMT* E000.0=0333,E000.1=0333,E100.0=0333,E100.1=0333
******************************** Bottom of Data ********************************
```

- From the HCD main panel shown in Figure 6-63, enter the work IODF name used. Select option **5**, **Migrate configuration data**.

```
z/OS V1.7 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.IODF37.WORK'                        +
```

Figure 6-63 HCD - main menu, select Migrate configuration data

- From the Migrate Configuration Data panel shown in Figure 6-64, select option **1**, **Migrate IOCP/OS data**, and then press Enter.

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


  Select one of the following tasks.

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

Figure 6-64 HCD - Migrate Configuration Data

- On the Migrate IOCP Data panel, shown in Figure 6-65, 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 6.7, "HCD - build the 2094 production IODF" on page 228).
`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 . . . . . . . . . . . . . SCZP102   +   CSS ID . . . . . . _  +
 OS configuration ID  . . . . . . . . . TEST2094  +

 Combined IOCP/MVSCP input data set . _____________________________________
 IOCP only input data set . . . . . . . 'SYS6.IODF37.IOCPOUT.SCZP102'
 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 6-65 HCD - Migrate IOCP / MVSCP / HCPRIO Data

- 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 6-66 on page 228. 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.IODF37.WORK.
 **************************** Bottom of data *****************************
```

Figure 6-66 HCD - Migration Message List

- Press PF3 and you should receive the following message:

  `IOCP/Operating system deck migration processing complete, return code = 0.`

- Press PF3 again to continue.

6.7 HCD - build the 2094 production IODF

To make use of the definitions that we updated in HCD, we need to create a 2094 production IODF from our work IODF and remote or local write the IODF to the 2084 IOCDS using Write IOCDS in preparation of upgrade, as follows:

- From the HCD main panel, select option **2**, **Activate or process configuration data**; see Figure 6-67.

```
z/OS V1.7 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.IODF37.WORK'                            +
```

Figure 6-67 HCD - main menu, select activate or process configuration data

- HCD displays the Activate or Process Configuration Data panel. Select option **1**, **Build production I/O definition file**, and press Enter; see Figure 6-68 on page 229.

```
----- 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 6-68 HCD - Activate or Process Configuration Data, select Build production IODF

- HCD displays the Message List panel; see Figure 6-69. 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 6-69 HCD - Message List (building Production IODF)

- Press PF3 to continue.
- 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; see Figure 6-70 on page 230.

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


  Specify the following values, and choose how to continue.

  Work IODF name . . . : 'SYS6.IODF37.WORK'

  Production IODF name . 'SYS6.IODF37'
  Volume serial number . IODFPK  +

  Continue using as current IODF:
  2   1.  The work IODF in use at present
      2.  The new production IODF specified above
```

Figure 6-70 HCD - Build Production I/O Definition File

- HCD displays the Define Descriptor Fields panel; see Figure 6-71. 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.IODF37'

  Descriptor field 1  . . . SYS6
  Descriptor field 2  . . . IODF37
```

Figure 6-71 HCD - Define Descriptor Fields

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

  `Production IODF SYS6.IODF37 created.`

Proceed to the next step to implement the configuration on the 2094.

6.8 Load the 2094 processor IOCDS

At this point, we have a production IODF, which is SYS6.IODF37. Now we need to update the IOCDS on the server that will be upgraded (for example, SCZP901 -> SCZP102). The IOCDS will be available to power-on reset after the processor has been upgraded.

Update the IOCDS

- From the HCD main panel, select option **2**, **Activate or process configuration data**; see Figure 6-72 on page 231. Verify that the IODF is the production one created in the previous step, and then press Enter.

```
z/OS V1.7 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.IODF37'
```

Figure 6-72 HCD - main menu, select Activate or process configuration data

- The Activate or Process Configuration Data panel displays; see Figure 6-73 on page 232. Select option **11**, **Build and manage S/390 microprocessor IOCDSs and IPL attributes** and then press Enter.

  Note: In this example, we are assuming that we have connectivity to the 2084 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 6-73 HCD - Activate or Process Configuration Data, select Build IOCDSs

- The S/390 Microprocessor Cluster List panel displays; see Figure 6-74. Select the 2084 being upgraded from the list by using a forward slash mark (/) to update one of its IOCDSs, and 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 6-74 HCD - S/390 Microprocessor Cluster List

- The Actions on selected CPCs panel displays; see Figure 6-75. 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 6-75 HCD - Actions on selected CPCs, Work with IOCDSs

- The IOCDS List panel displays; see Figure 6-76. Select the IOCDS that you wish to update for the 2094 upgrade by using /, and 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.SCZP102  IODF34   LPAR   POR        Yes       No          Yes-POR
_ A1.SCZP102  IODF36   LPAR   Alternate  No        No          No
_ A2.SCZP102  IODF33   LPAR   Alternate  No        No          No
/ A3.SCZP102  IODF34   LPAR   Alternate  No        No          No
******************************* Bottom of data ********************************
```

Figure 6-76 HCD - IOCDS List

- The Actions on selected IOCDSs panel displays; see Figure 6-77. Select option**1**, **Update IOCDS**, and 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 6-77 HCD - Actions on selected IOCDSs

- The Build IOCDSs panel displays; see Figure 6-78 on page 234. Verify that all the information is correct. Fill in the field `Title1`, and 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 2094 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.IODF37'

  Title1 . IODF37 __________________________________________________________
  Title2 : SYS6.IODF37 - 2005-11-22 10:22

                           Write IOCDS in
  IOCDS        Switch IOCDS  preparation of upgrade
  A3.SCZP102   No            YES
  ***************************** Bottom of data ******************************
```

Figure 6-78 HCD - Build IOCDSs

- Because yes was specified for the field Write IOCDS in preparation of upgrade, HCD now displays a confirmation panel; see Figure 6-79. 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                                                                        |
| A3.SCZP102                                                                   |
| ***************************** Bottom of data ***************************** |
```

Figure 6-79 HCD - Build IOCDS (Confirm Write IOCDS)

- The Job Statement Information panel displays; see Figure 6-80 on page 235. Fill in the job statements as required by the installation, and then press Enter. HCD submits the job to update the IOCDS.

> **Note:** Route the job to execute on the image on which you are logged on to. In that way, you know that the image can “see” the new 2094 in order to update its IOCDS.

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

  Specify or revise the job statement information.

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

Figure 6-80   HCD - Job Statement Information

- 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 A3 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.SCZP901; see Figure 6-81.

```
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
 s USIBMSC.SCZP901    2084   C24     SCZP102
 ******************************* Bottom of data ********************************
```

Figure 6-81   HCD - IOCDS with upgrade IODF

Also, when you select USIBMSC.SCZP901, notice that IOCDS A3 (which we wrote the upgrade IODF to) has a status of Invalid Status; see Figure 6-82 on page 236. 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 2094 processor.

The status changes to Alternate after this processor is upgraded to a 2094.

> **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.SCZP102  IODF34   LPAR   POR        Yes       No          Yes-POR
 _ A1.SCZP102  IODF36   LPAR   Alternate  No        No          No
 _ A2.SCZP102  IODF33   LPAR   Alternate  No        No          No
 _ A3.SCZP102  IODF37   LPAR   Invalid    No        No          No
 ******************************* Bottom of data ********************************
```

Figure 6-82 HCD - IOCDS showing Invalid Status

6.9 HMC steps for activation profiles

Follow these 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 2094 after it has been upgraded.

Do the following:

- Log on to the HMC and select the 2084 that you are upgrading in Defined CPCs Work Area.
- Under Operational Customization, select **Customize/Delete Activation Profiles**.
- Select the "Last Used" Reset Profile and choose **Customize**.
- Save this "Last Used" profile with a new Profile name to be referred to when the power-on reset is required (for example, SCZP901T).
- Select the new Profile and click **Customize**.
- Click the IOCDS that you just updated in the previous step (for example, IOCDS-A3). The message shown in Figure 6-82 displays.

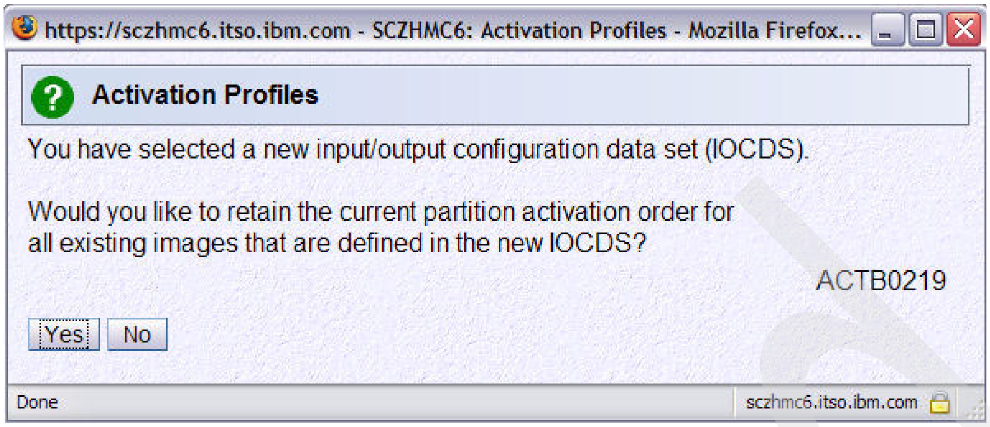


Figure 6-83 HMC - Activation Profiles (received when changing IOCDS)

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

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 2094 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 2084 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 2094.
- 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 SCZP901 to SCZP102).

Performing a power-on reset (POR) of the 2094

When the 2084 processor has been upgraded to a 2094, 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.

7

Replace a z990 with a z9-109

In this chapter we describe how to replace an existing z990 with a z9-109.

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 2084 IODF
- Save and restore configuration files
- Validate the 2094 work IODF
- CMT - assign CHPIDs to PCHIDs
- Migrate PCHIDs back into work IODF
- Build the production IODF
- Implementing the processor configuration on a 2094
- HMC steps for activation profiles

7.1 Scenario overview

We begin by providing an overall description of this scenario.

7.1.1 The configuration process

Figure 7-1 illustrates the general process flow that we follow in our example. The numbered steps are described following the figure.

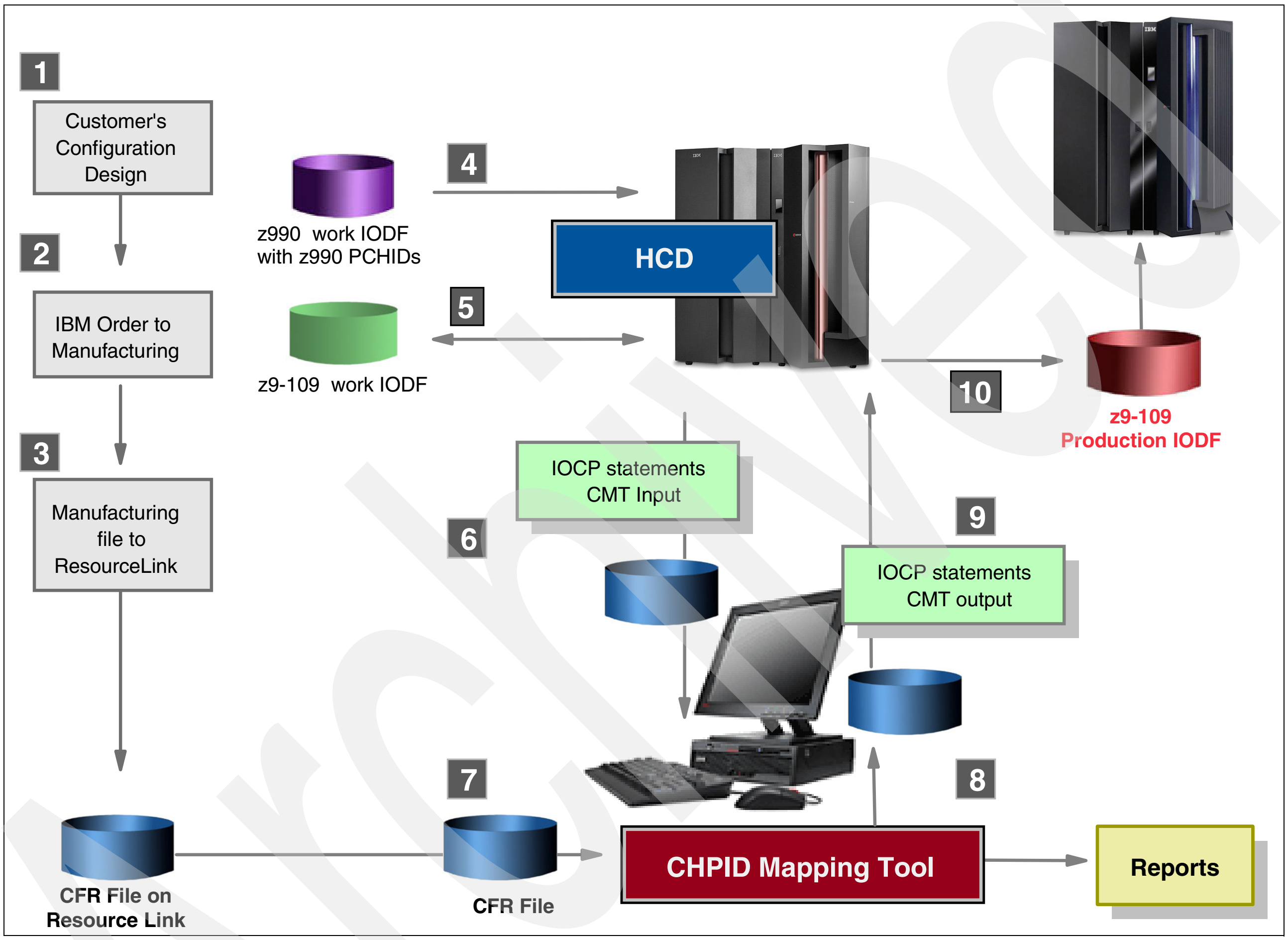


Figure 7-1 CMT - overall process flow

1. When you are planning to migrate to a z9-109, 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 z990 I/O configuration is used as a starting point into HCD. The z990 production IODF is used as input to HCD to create a work IODF that will be the base to define the new z9-109 configuration.
5. When the new z9-109 configuration has been added and the obsolete hardware has been deleted, a validated version of the configuration is saved in a 2094 validated work IODF.

6. From the validated work IODF, create a file containing the z9-109 IOCP statements. This IOCP statements file is transferred to the workstation used for the CHPID Mapping Tool (CMT).
7. The 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 z9-109 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 2094 production IODF is created and the final IOCP statements can be generated.

    The installation team uses the configuration data from the 2094 production IODF when the final power-on reset is done, yielding a z9-109 with an I/O configuration ready to be used.

If you are upgrading an existing 2084, you may be able to use HCD to write an IOCDS to your current 2084 in preparation for the upgrade. If you can write an IOCDS to your current 2084 in preparation for upgrading it to a 2094, do so and inform the IBM service representative 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 installing a new 2094.

If the new 2094 is not connected using a LAN to the CPC where HCD is running, or 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 z990 to a z9-109 can be either in the form of a field upgrade to the existing z990, or a replacement (push/pull) of an existing z990 with a new z9-109. Note the following points:

1. A field upgrade means that the existing z990 processor serial number is retained during the upgrade.
2. A replacement of the existing z990 by a new z9-109 implies physically removing (push) the z990 and bringing in a new z9-109 (pull) to take its place. The replacement z9-109 has a new serial number, different from the existing z990.

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

7.1.2 Planning considerations

Keep the following considerations in mind during your planning phase.

Coupling links

If you are currently using CBS/CBR or CFS/CFR CHPIDs, be aware that these are not supported on a z9-109. They need to be replaced with CBP or CFP CHPIDs.

These are not supported:

- ICB-2 links
- ISC-3 links in Compatibility mode

Additional CHPIDs

You may want to add more FC, ESCON or OSA CHPIDs into the configuration. A new eConfig is built by your IBM Representative and you receive a new CCN, so you can download an updated CFReport file from Resource Link to use as input into the CHPID Mapping Tool.

HMC

The z9-109 requires a new HMC and you require MCLs on the existing Support Element (SE) if you want to use the new HMC to access existing processors. The new HMC only uses Ethernet for its network connection.

Hardware and software support

Some software features exist that are only available with z/OS V1.7, such as Multiple Subchannel Sets (MSS). You also require HCD V1.7 to be able to define MSS which creates a Version 5 IODF.

Additionally, you require PTFs from the 2094DEVICE PSP Bucket to define z9-109 type processors via HCD.

Features no longer supported

In migrating from a z990 to a z9-109, certain channel types are no longer supported (OSA-Express Token Ring, ICB-2 and ISC-3 Links in Compatibility mode, and Crypto features other than Crypto Express2). If you currently have any of these features, you need to perform actions to replace them with features that are supported on a z9-109. As was already the case on z990, allowing for dynamic expansion of HSA is now done using MAXDEV in HCD.

Export/Import configuration files

Make sure you have a copy of the configuration files for I/O features that use them. Regarding Open Systems Adapter, if you have any OSA Express2, or any OSA Express defined as TYPE=OSC, make sure you have a copy of the configuration files.

During a push/pull upgrade, it is your responsibility to export configuration information from the 2084 and import it on the new 2094.

> **Note:** Back up OSA-Express2 definitions using the OSA Support Facility (OSA-SF).

If NPIV is used, any worldwide port name entered into the FICON switch configuration will need to be updated to identify the new 2094.

CPC.ID verses 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 ID does not. Therefore, the CPC ID does not need to match the Processor ID. This is useful in cases where you may have several Processor/logical partition/control unit setups that share the same physical CPC within the same IODF.

Verify that the Processor.ID matches the one defined for the HWNAME parameter in the LOAD member in SYS1.IPLPARM.

The CPC.ID is coded in HCD option 1.3 under View Processor Definition in the CPC name field under SNA address, along with a Network name. Note that it is the CPC.ID, 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 ID separated by a dot (for example, USIBMSC.SCZP901). 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.

> **Note:** You have the ability to have a different Processor.ID with a CPC.ID. However, if you do not have the requirement to support multiple processor images, then we recommend that the Processor.ID and CPC.ID match.

7.1.3 Replace scenario (push/pull)

This scenario describes the configuration steps needed to replace an existing 2084 processor with a new 2094 processor.

- HCD requires a new Processor ID for the 2094.
- HCD requires a new CPC ID for the 2094.
- The 2094 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 2084 production IODF.
- The target IODF is a new 2094 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 2084-C24 with a Processor.ID of SCZP901 and two LCSSs (CSS ID=0 and CSS ID=1), and replaces it with a 2094-S18 with a Processor.ID of SCZP102.

The CPC.ID of SCZP901 and serial number 000901 changes to the CPC.ID of SCZP102 and serial number 000102.

The following CHPID types are migrated:

- OSD, OSE, OSC
- CTC, CNC, FC, FCP, FCV, CVC, CBY
- CBP, CFP, ICP
- IQD

The following CHPID types are not supported and *not* migrated to the 2094.

- OSA-Express Token Ring, OSA-Express ATM
- ICB-2, ISC-3 in Compatibility mode
- All crypto features except Crypto Express2

Table 7-1 summarizes the migration options and tool requirements. The step-by-step process is further documented in this chapter.

Table 7-1 2084 I/O configuration migrated to a 2094

2084 to 2094	**Replace existing 2084 with a 2094 (push/pull)**
Processor.id	Require to change 2084 to new ID
CPC.id	New ID
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)	Required
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

7.2 HCD - migrate the existing 2084 IODF

- The following steps explain how to define the existing I/O configuration to the new 2094 IODF, and then migrate the channel subsystem and logical partitions from the 2084 to the 2094 server. Using HCD, the sequence of operations is as follows:
- Create a 2094 work IODF from the current 2084 production IODF.
- Repeat the 2084 processor being replaced.
- Observe CF Link messages for later reference.
- Delete unsupported items from the repeated 2084.
- Change the repeated 2084 to a 2094, then delete the 2084.

- Redefine all required CF connections to other processors and any Internal CF connections required.
- Define any additional CHPIDs, control units and devices you may be adding in the replacement.
- Over-define channel paths.
- Build a validated 2094 work IODF.
- Create an IOCP statements file and file transfer to the workstation running the CHPID Mapping Tool. This step may also be performed with HCM.

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

Create 2094 work IODF from current 2084 production IODF

- In HCD, select the current production IODF that contains the 2084 processor that you are replacing (for example, ‘SYS6.IODF35’).

Repeat the 2084 processor being replaced

- From the main HCD panel, select option **1.3**, **Processor List**. Type `r` (for repeat) next to the 2084 you wish to replace, then press Enter; see Table 7-2 on page 252.

```
.                               Processor List        Row 1 of 7 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
r SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 7-2 HCD - Processor List (repeating processor)

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.
- The Create Work I/O Definition File panel prompts you to enter the data set name of the target IODF (for example, ‘SYS6.IODF38.WORK’).

You are presented with the Repeat Processor panel, as shown in Figure 7-3 on page 246.

- Enter the Processor ID of the new 2094 (in this example, SCZP102) and leave all other fields unchanged, then press Enter to continue.

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

 Specify or revise the following values.

 Processor ID . . . . . . . . . SCZP102_

 Processor type . . . . . . . : 2084
 Processor model  . . . . . . : C24
 Configuration mode . . . . . : LPAR

 Serial number  . . . . . . . . 0009012084
 Description  . . . . . . . . . ________________________________

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

 Network name . . . . . . . . . USIBMSC   +
 CPC name . . . . . . . . . . . SCZP901   +

+-----------------------------------+
| New IODF SYS6.IODF38.WORK defined. |
+-----------------------------------+
```

Figure 7-3 HCD - Repeat Processor (defining new processor id)

CF Link Information messages

At this point, you may be presented with Severity E, I, or W messages. As shown in Figure 7-4, in our example CBDG441I messages were mentioned in the introduction; these were received due to the CF Link CHPIDs not being copied over to the 2094 definition.

```
------------------------------- Message List -----------------------------
  Save  Query  Help
--------------------------------------------------------------------------
                                                             Row 1 of 90
Command ===> ___________________________________________ Scroll ===> CSR

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

/ Sev Msg. ID  Message Text
_ I   CBDG441I The coupling facility connection between channel path
#              0.C2 of processor SCZP901 and channel path 04 of
#              processor SCZP801 is not copied.
_ I   CBDG441I The coupling facility connection between channel path
#              0.C3 of processor SCZP901 and channel path 05 of
#              processor SCZP801 is not copied.
_ I   CBDG441I The coupling facility connection between channel path
#              0.D0 of processor SCZP901 and channel path 0.D2 of
#              processor SCZP901 is not copied.
_ I   CBDG441I The coupling facility connection between channel path
#              0.D1 of processor SCZP901 and channel path 0.D3 of
 F1=Help       F2=Split      F3=Exit       F4=Prompt     F5=Reset
 F7=Backward   F8=Forward    F9=Swap      F10=Actions   F12=Cancel
F13=Instruct  F22=Command
```

Figure 7-4 HCD - Message List (CBDG441I)

- Press PF3 or PF12 to continue. As shown in Figure 7-5 on page 247, there is now an additional 2084 processor named SCZP102.

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2084     C24      LPAR  0009012084 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 7-5 HCD - Processor List (repeated processor)

Change the 2084 to a 2094 and delete the 2084

At this point you can either leave the original copy of the 2084 (SCZP901), or delete it from the IODF. In our example, we left it in the IODF for a few more steps.

Do the following:

- Type c (change) next to SCZP102 to change the 2084 to a 2094, then press Enter; see Figure 7-6. Next, make these updates:
  a. Update `Processor type` to `2094`.
  b. Update `Processor Model` to `S18`.
  c. Update `Serial Number` to `0001022094`.
  d. Update `CPC name` to `SCZP102`.
- Press Enter.

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

 Specify or revise the following values.

 Processor ID . . . . . . . . : SCZP102
 Support level:
 XMP, 3xx models, OSC

 Processor type . . . . . . . . 2094      +
 Processor model  . . . . . . . S18       +
 Configuration mode . . . . . . LPAR   +

 Serial number  . . . . . . . . 0001022094  +
 Description  . . . . . . . . . ________________________________

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

 Network name . . . . . . . . . USIBMSC   +
 CPC name . . . . . . . . . . . SCZP102 +
```

Figure 7-6 HCD - Change Processor Definition (changing repeated processor)

Delete items unsupported on a 2094

In this example we left some CBR CHPIDs defined so that the CBDA155I Severity E error message would be issued; see Figure 7-7.

```
------------------------------- Message List --------------------------------
  Save  Query  Help
---------------------------------------------------------------------------
                                                                 Row 1 of 2
Command ===> ___________________________________________ Scroll ===> CSR

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

/ Sev Msg. ID  Message Text
_ E   CBDA155I Too many channel paths of type CBR defined. Maximum is 0
#              for processor SCZP102.
***************************** Bottom of data ******************************

+--------------------------------------------------------------+
| The change of processor rules leads to invalid definitions. |
+--------------------------------------------------------------+
```

Figure 7-7 HCD - message CBDA1551I

- Press PF12 twice to Cancel. Then go into the Channel Path List for the Repeated processor SCZP102 and correct the CHPID types that HCD received the errors for.

  After completing this task, type `c` next to the SCZP102 processor definition and press Enter.

  a. Update `Processor type` to `2094`.

  b. Update `Processor Model` to `S18`.

  c. Update `Serial Number` to `0001022094`.

  d. Update `CPC` name to `SCZP102`.

- Press Enter. The Update Channel Path Identifiers panel displays; see Figure 7-8 on page 249. We are not changing, 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 . . . . : SCZP102
 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 7-8 HCD - Update Channel Path Identifiers (not changed)

- Press Enter "for each of the Channel Subsystem IDs".

Now the repeated 2084 processor has been successfully changed to a 2094-S18; see Figure 7-9.

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2094     S18      LPAR  0009012094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 7-9 HCD - Processor List (changed processor)

Delete the 2084 processor definition

Now that the 2084 has been repeated and changed to become a 2094, the original 2084 definition (SCZP109) must now be deleted so that the required CF Links can be restored.

- Type `d` (for delete) next to the processor SCZP901 in the Processor List; see Figure 7-10 on page 250.

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2094     S18      LPAR  0001022094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
d SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 7-10 HCD - Processor List (deleting processor)

- 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  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP102  2094     S18      LPAR  0009012094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 7-11 HCD - Processor List (processor deleted)

Reconnect the CF channel paths not migrated

Next, you need to manually redefine the CF Links you want from the SCZP102 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 2084. 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 2094 during the replacement.

Over-define channel paths on an XMP processor

For an XMP processor, you can define a channel path that is not physically installed on the processor. This can be useful if you want to migrate from a server which had more channels defined than the target XMP processor has currently installed, or if you want to prepare a configuration for future upgrades of the channel cards.

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 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 asterisk (*) with its valid PCHID.

In our example we have four CHPIDs with control unit definitions, but the replacement processor does not have any PCHIDs to assign to these CHPIDs. However, we can maintain the CHPID and control unit definitions in the IODF until the hardware is installed and PCHIDs are assigned to the CHPIDs.

> **Note:** However, 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 not connected.

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

- Figure 7-12 illustrates what the CHPID/PCHID definitions look like before being defined as over-defined. Press PF20 (right) in the Channel Path List.

```
 Channel Path List   Row 116 of 127 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Channel Subsystem ID : 1
1=A11       2=A12       3=A13       4=A14       5=A15
6=A16       7=A17       8=A18       9=A19       A=A1A
B=A1B       C=A1C       D=A1D       E=A1E       F=A1F
                          I/O Cluster  --------- Partitions 1x -----
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   PCHID
_ E0    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D0
_ E1    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D1
_ E2    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D8
_ E3    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D9
_ F0    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F1    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F2    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F3    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FC    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FD    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FE    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FF    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
******************************* Bottom of data ********************************
```

Figure 7-12 HCD - Channel Path List (Reserving CHPIDs)

Figure 7-13 on page 252 illustrates what the CHPID/PCHID definitions looked like after being defined as over-defined.

```
 Channel Path List   Row 116 of 127 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Channel Subsystem ID : 1
1=A11       2=A12       3=A13       4=A14       5=A15
6=A16       7=A17       8=A18       9=A19       A=A1A
B=A1B       C=A1C       D=A1D       E=A1E       F=A1F
                          I/O Cluster  --------- Partitions 1x -----
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   PCHID
_ E0    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E1    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E2    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E3    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ F0    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F1    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F2    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F3    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FC    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FD    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FE    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FF    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
****************************** Bottom of data *******************************
```

Figure 7-13 HCD - Channel Path List (over-defined CHPIDs)

7.3 Save and restore configuration files

If you are performing an upgrade from a z990 to a z9-109, or an upgrade from a z9-109 to another z9-109, you need to consider certain channel types that have configuration information that resides on the z990 or z9-109 Support Element.

On the z9-109, z990, and z890, 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 PCHID value (physical location) of the channel.

Table 7-2 lists the CHPID types that have configuration files on a z9-109, z990, or z890.

Table 7-2 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 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 the following:

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

During an MES upgrade process, the following occurs:

- The channel cards will be moved as part of the normal rebalance of all the I/Os.
- The configuration files will be automatically copied from your old system, restored to the new z9-109, 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 z990 to a z9-109, 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 export the configuration files from the existing 2084 and import them on the new 2094, 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.

7.3.1 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 the Windows 2000, Windows XP, and Linux software platforms 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 7-14 on page 254.

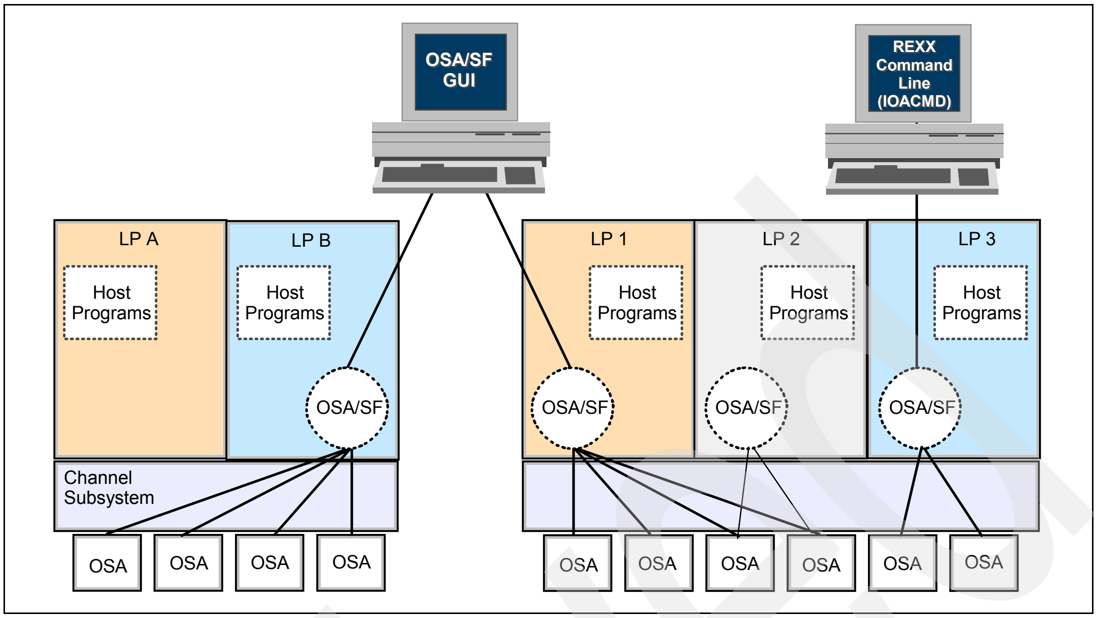


Figure 7-14 OSA/SF

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.

- 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 7-15.

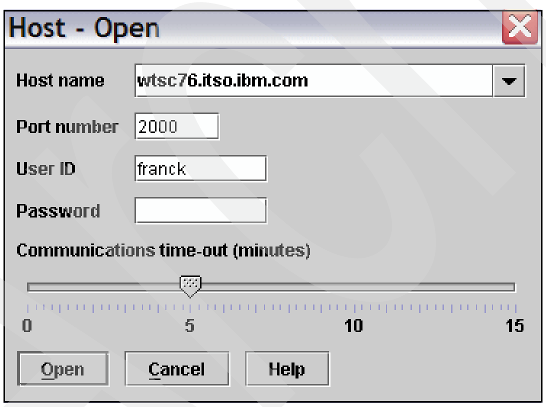


Figure 7-15 OSA/SF Workstation Interface - Logon

The OSA/SF main panels are displayed; see Figure 7-16 on page 255.

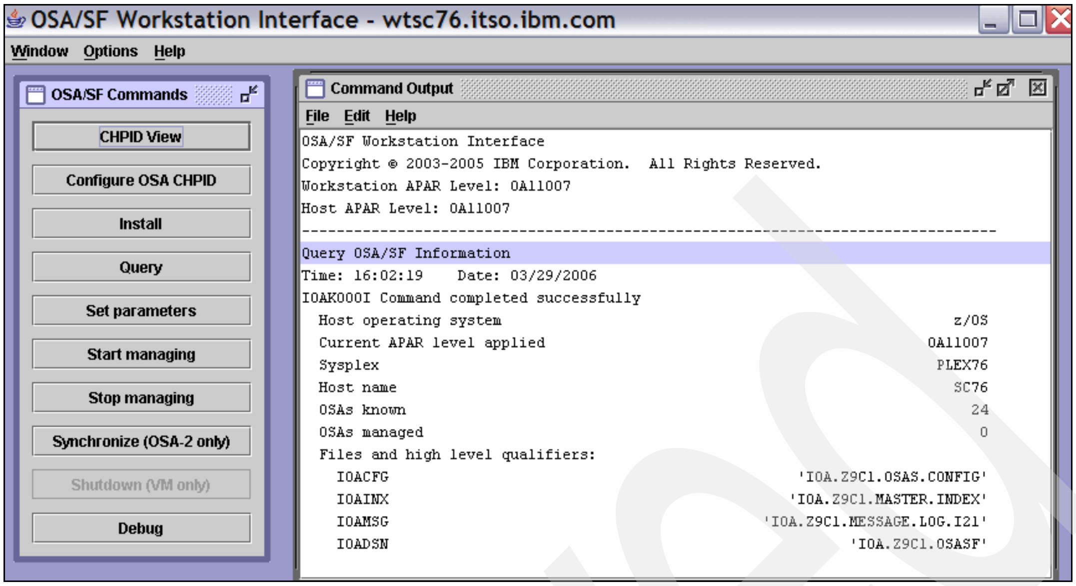


Figure 7-16 OSA/SF Workstation Interface

- 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 7-17.

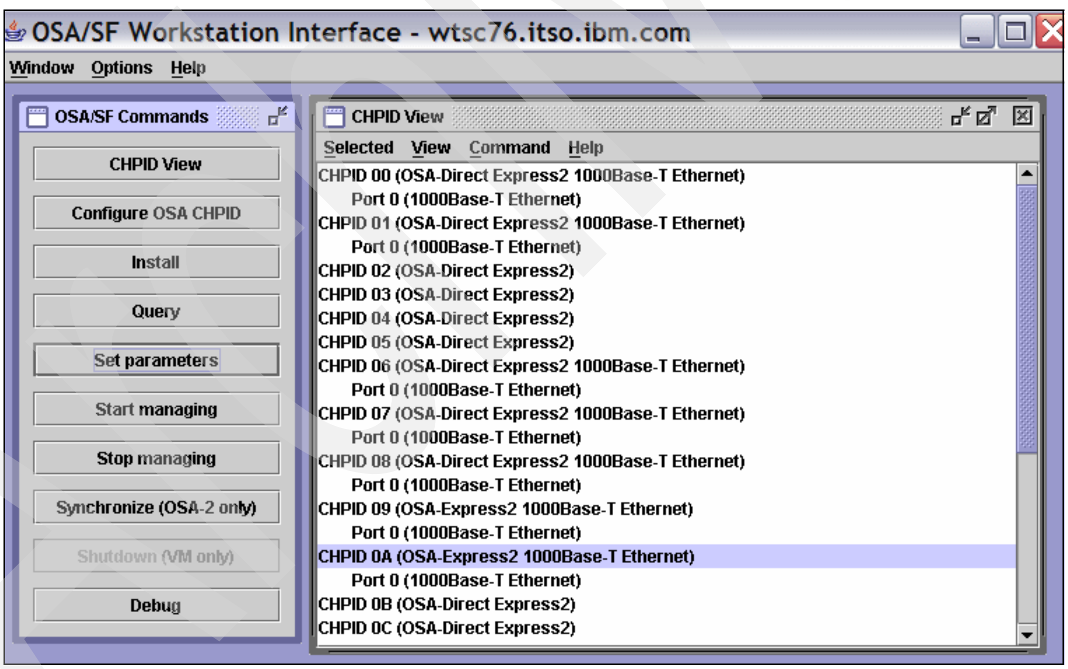


Figure 7-17 OSA/SF Workstation Interface - CHPID view

- 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 7-18 on page 256.

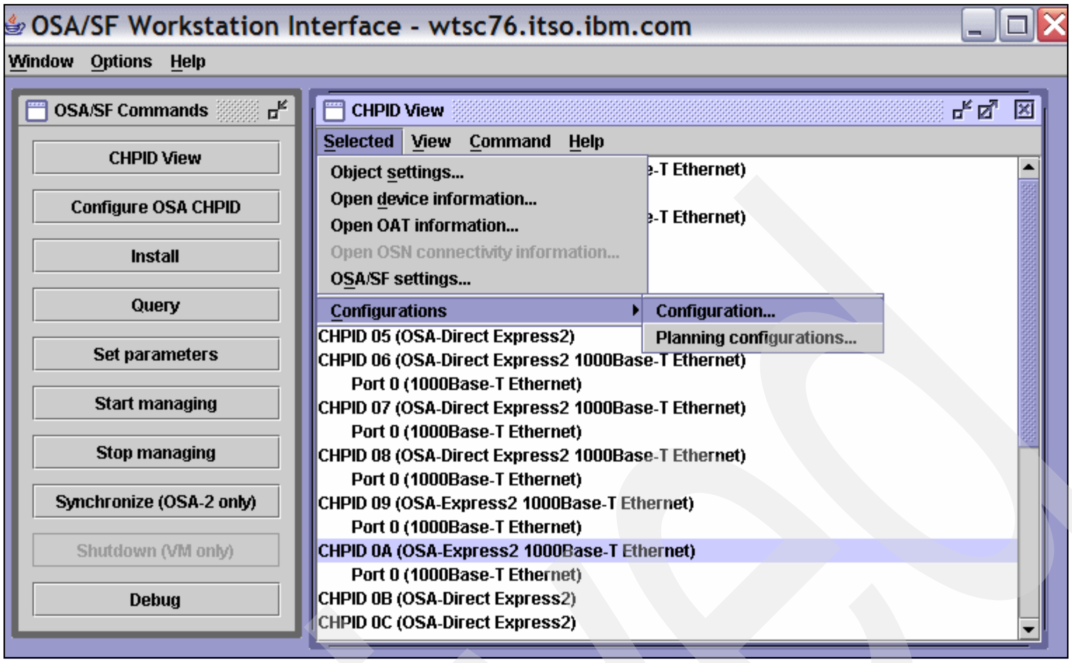


Figure 7-18 OSA/SF Workstation Interface - Selected Configurations

- A CHPID configuration panel is displayed, with only blank information. From this panel, click **File** → **Get current configuration**; see Figure 7-19.

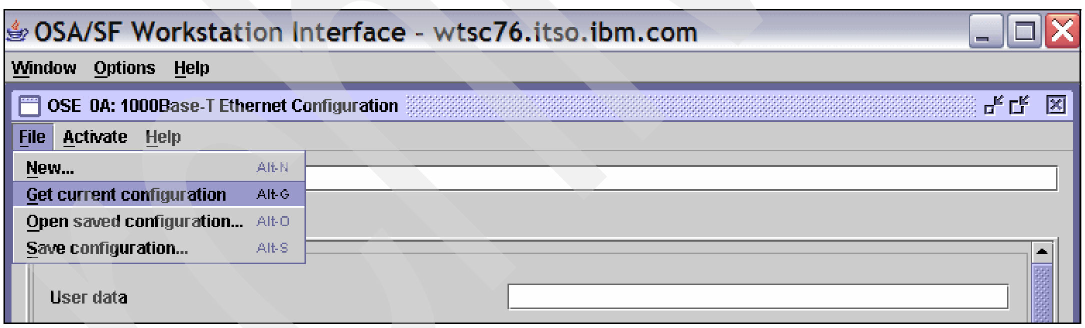


Figure 7-19 OSA/SF Workstation Interface - get current configuration

- The CHPID configuration panel is displayed again, now with the current OSA CHPID configuration information. Fill in the Configuration name, see Figure 7-20 on page 257.

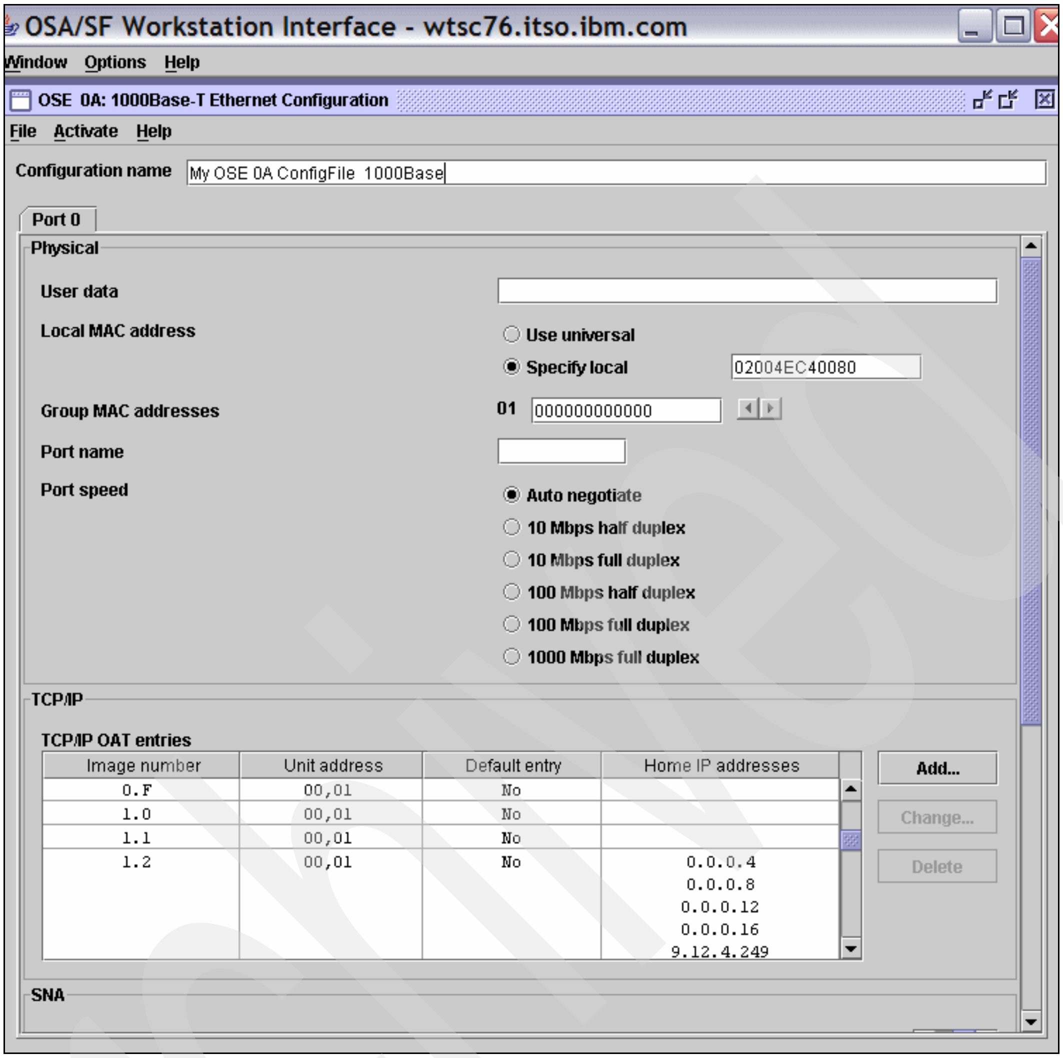


Figure 7-20 OSA/SF Workstation Interface - Current configuration

- Click **File** → **Save configuration...**; see Figure 7-21. The configuration file is saved by OSA/SF and can be reused later.

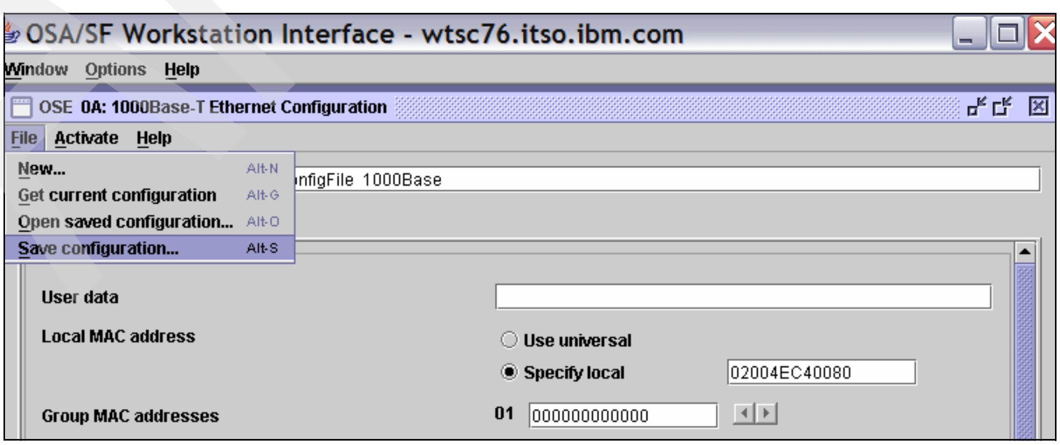


Figure 7-21 OSA/SF Workstation Interface - Save current configuration

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.

- From the OSA/SF main view, initialize the CHPID view. Select **Configurations** → **Planning configurations...**; see Figure 7-22.

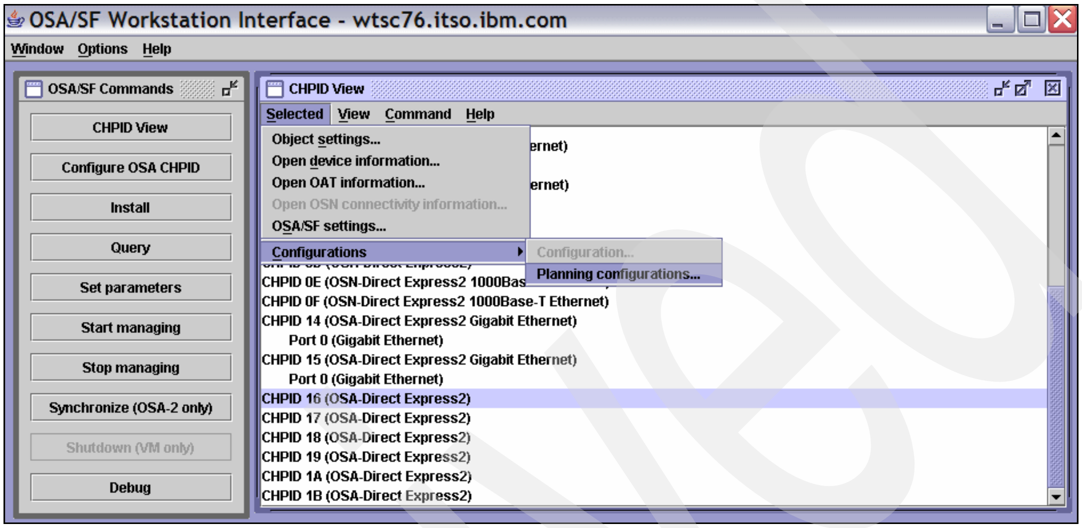


Figure 7-22 OSA/SF Workstation Interface - Planning configurations

The Configure OSA CHPID panel displays, see Figure 7-23 on page 259.

- Select the CHPID number and the CHPID Type that you want to define, and then click **OK**.

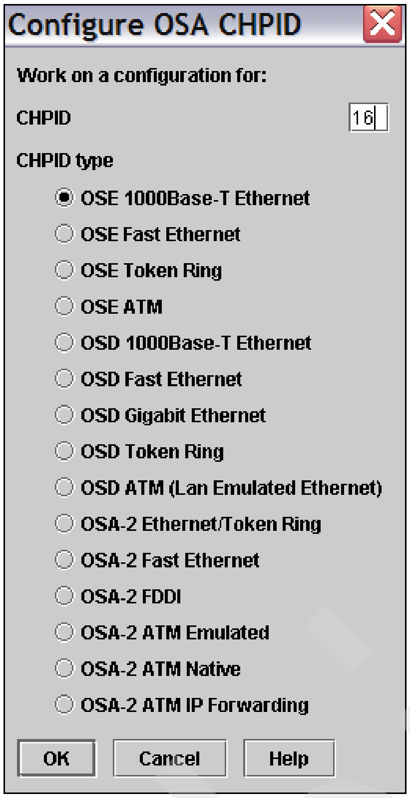


Figure 7-23 OSA/SF Workstation Interface - Configure OSA CHPID

- OSA/SF displays a default panel for the type of feature selected. Click **File** → **Open saved configuration...**; see Figure 7-24.

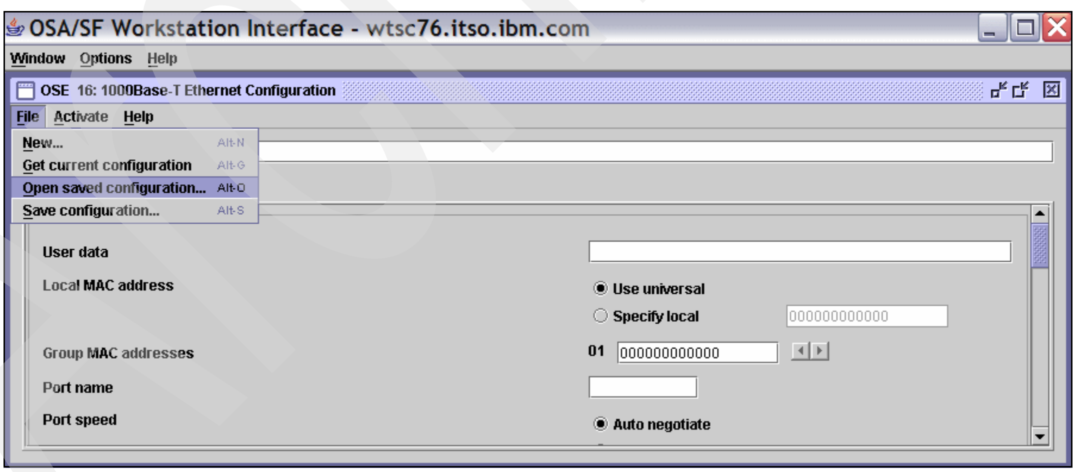


Figure 7-24 OSA/SF Workstation Interface - Open saved configuration

OSA/SF displays a Host Configuration List panel containing the names of previously saved configuration files that match the feature type; see Figure 7-25 on page 260.

Note that the Host Configuration List being displayed will vary with the OSA Express2 feature type selected in Figure 7-23.

For example, a request for OSD 1000BaseT Ethernet displays the list shown in Figure 7-25.

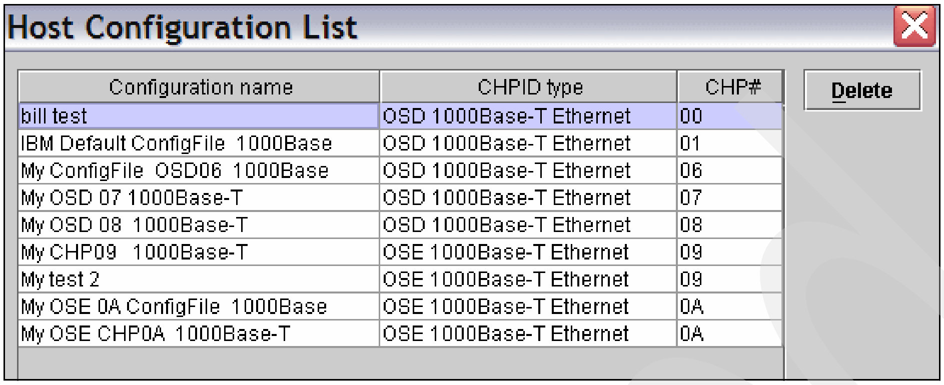


Figure 7-25 OSA/SF Workstation Interface - Host configuration list (OSD 1000Base T Ethernet)

However, a request for OSD Gigabit Ethernet displays the list shown in Figure 7-26.

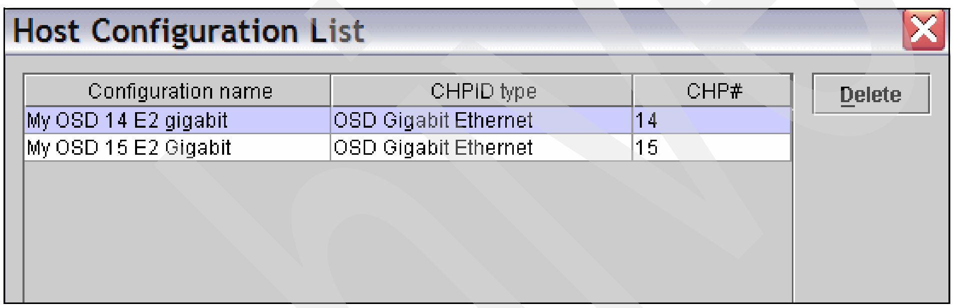


Figure 7-26 OSA/SF Workstation Interface - Host configuration list (OSD Gigabit Ethernet)

- From the list, select the saved configuration name and click **Load**. Configuration information previously saved is now displayed on the OSA configuration panel.
- Select **Activate** → **Activate with install** to restore the OSA feature configuration; see Figure 7-27 on page 261.

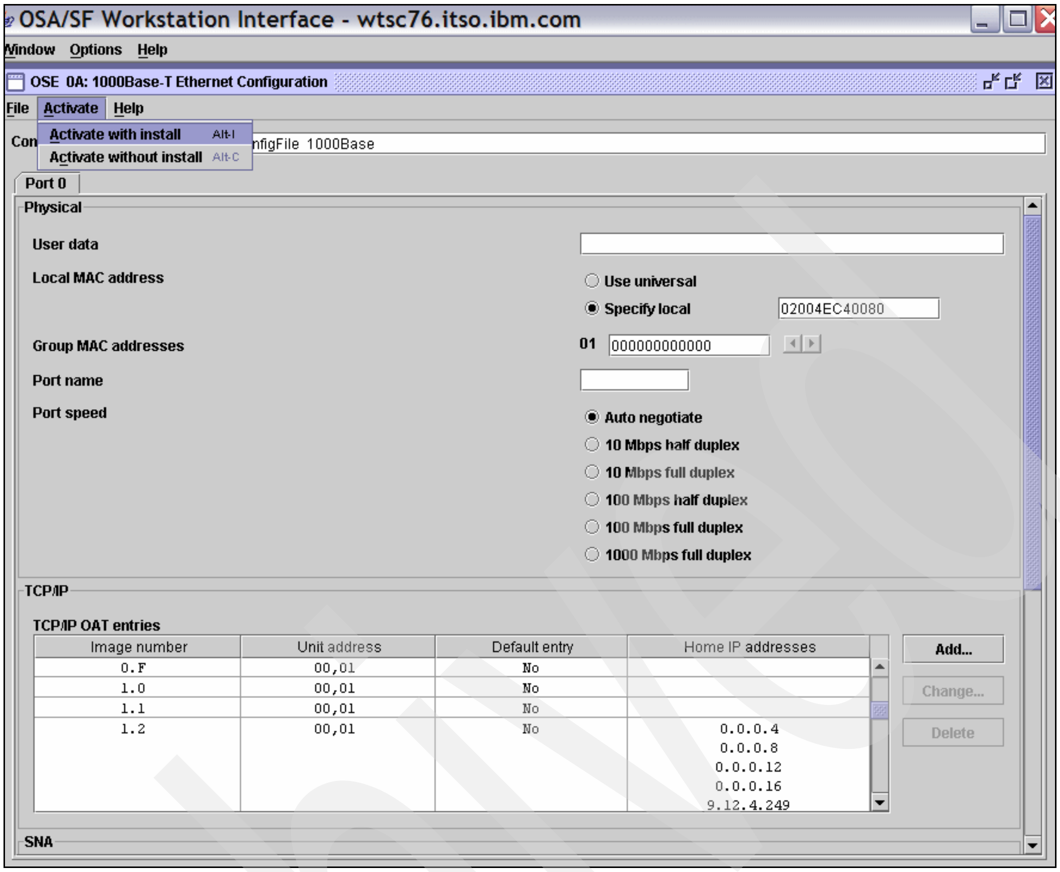


Figure 7-27 OSA/SF Workstation Interface - Install

7.3.2 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:

- Log on to the HMC that has a diskette drive installed.
- In the Defined CPCs Work Area, select the CPC that contains the OSC CHPIDs you want to export the configuration data for (for example, SCZP901).
- Under Operational Customization, double-click **OSA Advanced Facilities**.
- Select the radio button for the Channel ID card you want to export, then click **OK**; see Figure 7-28 on page 262.

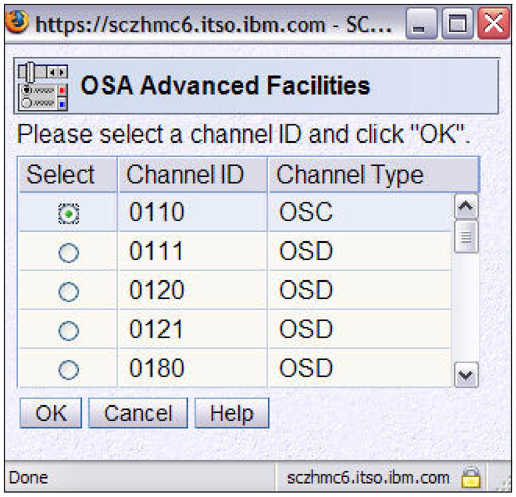


Figure 7-28 HMC - OSA Advanced Facilities (OSC Channel)

- Select the radio button Card specific advanced facilities..., then click **OK**; see Figure 7-29.

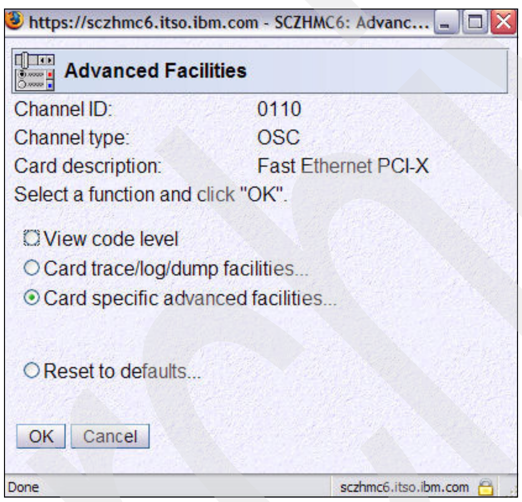


Figure 7-29 HMC - OSA Advanced Facilities (Card specific)

- Select the radio button Manual configuration options..., then click **OK**; see Figure 7-30 on page 263.

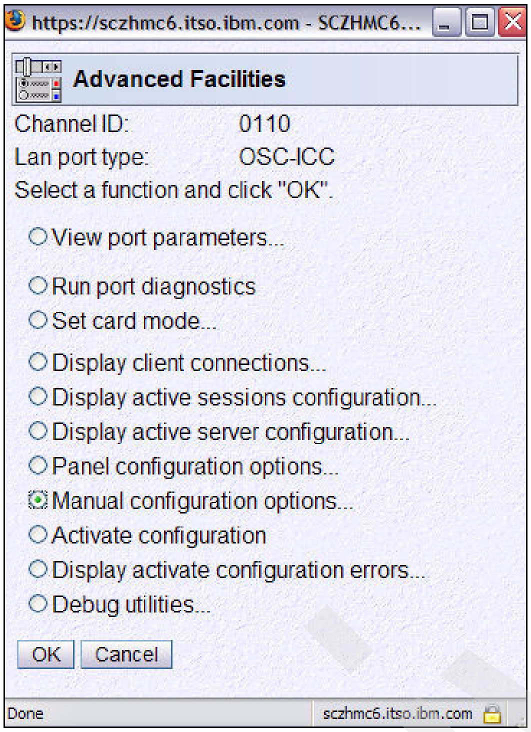


Figure 7-30 HMC - OSA Advanced Facilities (Manual config)

3. Select the radio button Export source file, then click **OK**; see Figure 7-31.

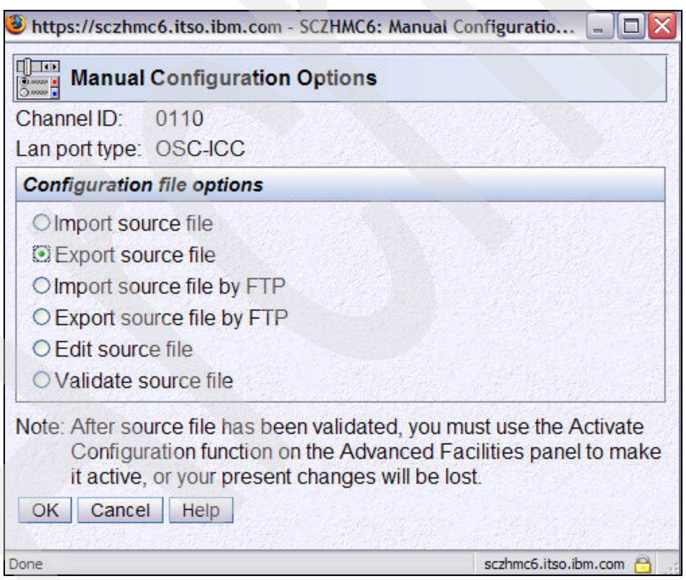


Figure 7-31 HMC - OSA Advanced Facilities (Export source)

4. The HMC prompts you to enter a file name to be written onto the diskette (in the example shown in Figure 7-32 on page 264, we used `OSC-ICC_0110`). Type in the file name, then click **OK**.

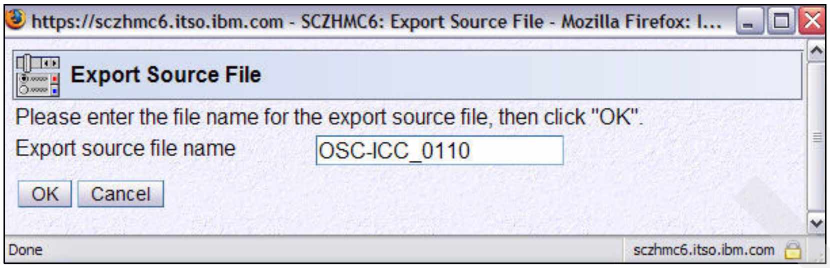


Figure 7-32 HMC - OSA Advanced Facilities (Export filename)

The HMC prompts you to insert a diskette into the drive on the HMC that you are logged onto; see Figure 7-33.

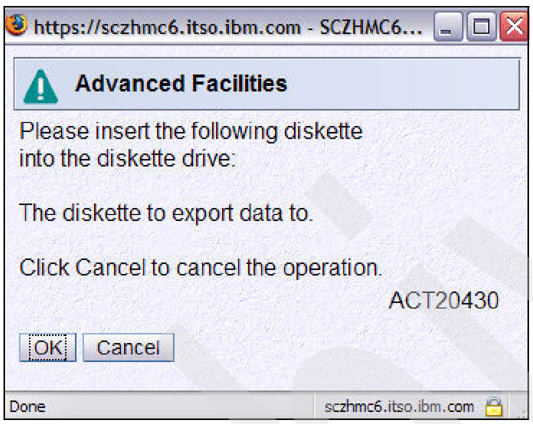


Figure 7-33 HMC - OSA Advanced Facilities (Export insert diskette)

- Insert the diskette, then click **OK**.

  The HMC writes the configuration data for the Channel ID that was selected onto the diskette and displays a “command completed” window when it has completed; see Figure 7-34. Click **OK**.

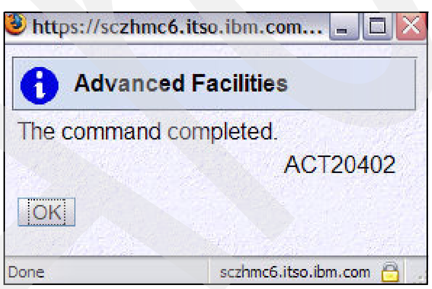


Figure 7-34 HMC - OSA Advanced Facilities (Export completed)

- Remove the diskette from the drive, then click **OK**; see Figure 7-35 on page 265.

Figure 7-35 HMC - OSA Advanced Facilities (Remove diskette)

You can now click **Cancel** to exit all the windows and return to the Defined CPCs Work Area. Figure 7-36 illustrates a sample of the configuration data in the diskette file.

```
<OSC_SERVER>
  HOST_IP= 10.10.4.2
  DEFAULT_GATEWAY= 10.10.4.1
  SUBNET_MASK= 255.255.0.0
  PORT= 1024
  ETHERNET_FRAME= DIX
  MTU= 1492
  NAME= OSCE000
</OSC_SERVER>


<CONFIG_SESSION>
<SESSION1>
  CSS=  01 IID=  01 DEVICE=  E000
  GROUP=  "SC64E000"
  CONSOLE_TYPE=  2    RESPONSE=  ON
  READ_TIMEOUT=  60
  DEFER_HOST_DISCONNECT=  600
  CLIENT_IP= 10.10.10.2
</SESSION1>

<SESSION2>
  CSS=  01 IID=  01 DEVICE=  E001
  GROUP=  "SC64E001"
  CONSOLE_TYPE=  2    RESPONSE=  ON
  READ_TIMEOUT=  60
  DEFER_HOST_DISCONNECT=  600
  CLIENT_IP= 10.10.11.2
</SESSION2>
......................................
......................................
<SESSION24>
  CSS=  01 IID=  0C DEVICE=  0035
  GROUP=  "VM50035"
  CONSOLE_TYPE=  3    RESPONSE=  OFF
  READ_TIMEOUT=  60
  CLIENT_IP= 10.10.12.2
</SESSION24>

</CONFIG_SESSION>
```

Figure 7-36 OSC configuration sample (OSC-0110)

7.4 Validate the 2094 work IODF

In this section we explain the steps needed to validate the 2094 work IODF.

Validate the work IODF

- Select HCD option `2.12`, **Build validated work I/O definition file**. Review the Message List and correct any errors.
- Press PF3 to continue; the message `Requested action successfully processed` is displayed.
- Select HCD option **6.4**, **View I/O Definition File Information** and notice that the IODF type is now `Work - Validated`; see Figure 7-37.

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

 IODF name  . . . . . . . : 'SYS6.IODF38.WORK'
 IODF type  . . . . . . . : Work - Validated
 IODF version . . . . . . : 5

 Creation date  . . . . . : 2005-11-28
 Last update  . . . . . . : 2005-11-28  18:44

 Volume serial number . . : BH6ST2
 Allocated space  . . . . : 2048    (Number of 4K blocks)
 Used space . . . . . . . : 1304    (Number of 4K blocks)
    thereof utilized (%)  91

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

 Description  . . . . . . :
```

Figure 7-37 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.

- Select HCD option **2.3**, **Build IOCP input data set**, then press Enter; see Figure 7-38 on page 267.

```
----- 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 7-38 HCD - Activate or Process Configuration Data (Build IOCP for SCZP102)

- HCD displays the list of available processors to chose from. Select processor SCZP102 by using a forward slash mark (/), then press Enter; see Figure 7-39.

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

 Select one.

   Processor ID  Type     Model    Mode  Description
   ISGSYN        2064     1C7      LPAR
   ISGS11        2064     1C7      LPAR
   SCZP101       2094     S18      LPAR
 / SCZP102       2094     S18      LPAR
   SCZP701       9672     XX7      LPAR
   SCZP801       2064     1C7      LPAR
   WOJ1          2084     A08      LPAR
 *************************** Bottom of data *****************************
```

Figure 7-39 HCD - Available Processors (select processor for IOCP file)

- HCD presents a panel on which you enter information regarding the IOCP input data set to be created; see Figure 7-40 on page 268. 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
- 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.IODF38.WORK'
  Processor ID  . . . . . . . : SCZP102
  Title1 . IODF38_________________________________________________________
  Title2 : SYS6.IODF38.WORK - 2005-11-28 17:45

  IOCP input data set
  'SYS6.IODF38.IOCPIN.SCZP102'_____________________________________
  Input to Stand-alone IOCP?  Yes  (Yes or No)

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

Figure 7-40   HCD - Build IOCP Input Data Set

- In TSO, verify that the data set you just created exists and that it contains IOCP statements; see Figure 7-41.

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

```
ID    MSG1='IODF38',                                            *
      MSG2='SYS6.IODF38.WORK - 2005-11-23 16:59',               *
      SYSTEM=(2094,1),                                          *
      TOK=('SCZP102',00800221991E2094165932680105327F00000000,*
      00000000,'05-11-23','16:59:32','........','........')
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))),       *
      MAXDEV=((CSS(0),64512,0),(CSS(1),64512,0))
CHPID PATH=(CSS(0),00),SHARED,                                  *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=120,TYPE=OSD
CHPID PATH=(CSS(0),01),SHARED,                                  *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=300,TYPE=OSD
CHPID PATH=(CSS(0),02),SHARED,                                  *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=1B0,TYPE=OSD
CHPID PATH=(CSS(0),03),SHARED,                                  *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=180,TYPE=OSD
CHPID PATH=(CSS(0,1),04),SHARED,                                *
```

Figure 7-41   HCD - IOCP input data set contents (truncated)

- Also note that part of the TOK statement has been blanked out with dots; see Example 7-1 on page 269.

Example 7-1 HCD - IOCP file (TOK statement)

```
TOK=('SCZP102',00800221991E2094184459480105332F00000000,
00000000,'05-11-28','18:44:59','........','........')
```

This is a safeguard to ensure that this IOCP file cannot be written to a processor and used for a p242

ower-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.

- 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 IODF37.TXT.

7.5 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 2094 order process (CFReport). Using the CHPID Mapping Tool, we assign PCHIDs to each of the CHPIDs for the 2094.

For this process, the CHPID Mapping Tool (CMT) must be downloaded. Refer to 2.5.1, “CHPID Mapping Tool” on page 32, 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:

- Import the IOCP statements file and the “new” CFReport file into the CHPID Mapping Tool. Getting the IOCP statements may be performed with HCM.
- Resolve CHPIDs with PCHID conflicts.
- Resolve CHPIDs without associated hardware.
- Resolve hardware resolution.
- Set the priority for single-path control units and other control units that would override the CHPID Mapping Tool default priorities.
- Run the CHPID Mapping Tool availability function.
- Create the CHPID Mapping Tool CHPID reports.
- Create an updated IOCP statements file and file transfer back to the host. This step may be performed with HCM.

> **Note:** When moving from a 2084 to a 2094, we strongly recommend that you use the CHPID Mapping Tool that supports the 2094. The availability characteristics of the 2094 are different from previous zSeries processors.

Import the CFReport order file into the CHPID Mapping Tool

- Start the CHPID Mapping Tool on your workstation.
- Import the CFReport order file into the CHPID Mapping Tool as follows:
  – Click **File** → **Import CFReport Order file**; see Figure 7-42.

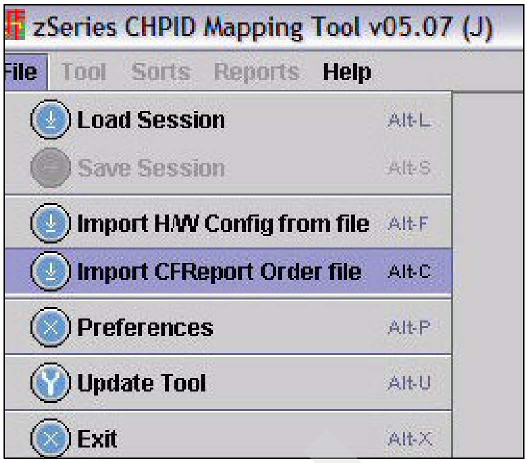


Figure 7-42 CMT - Import CFReport Order file

- Select the CFReport file on your workstation to import into the CHPID Mapping Tool and click **Open**; see Figure 7-43.

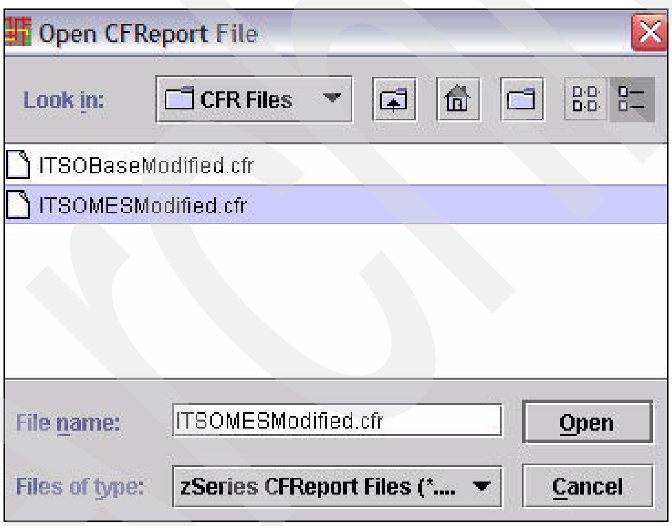


Figure 7-43 CMT - Open CFReport Order file

- The CHPID Mapping Tool displays the information from the CFReport on the left-hand side of the screen; see Figure 7-44 on page 271.

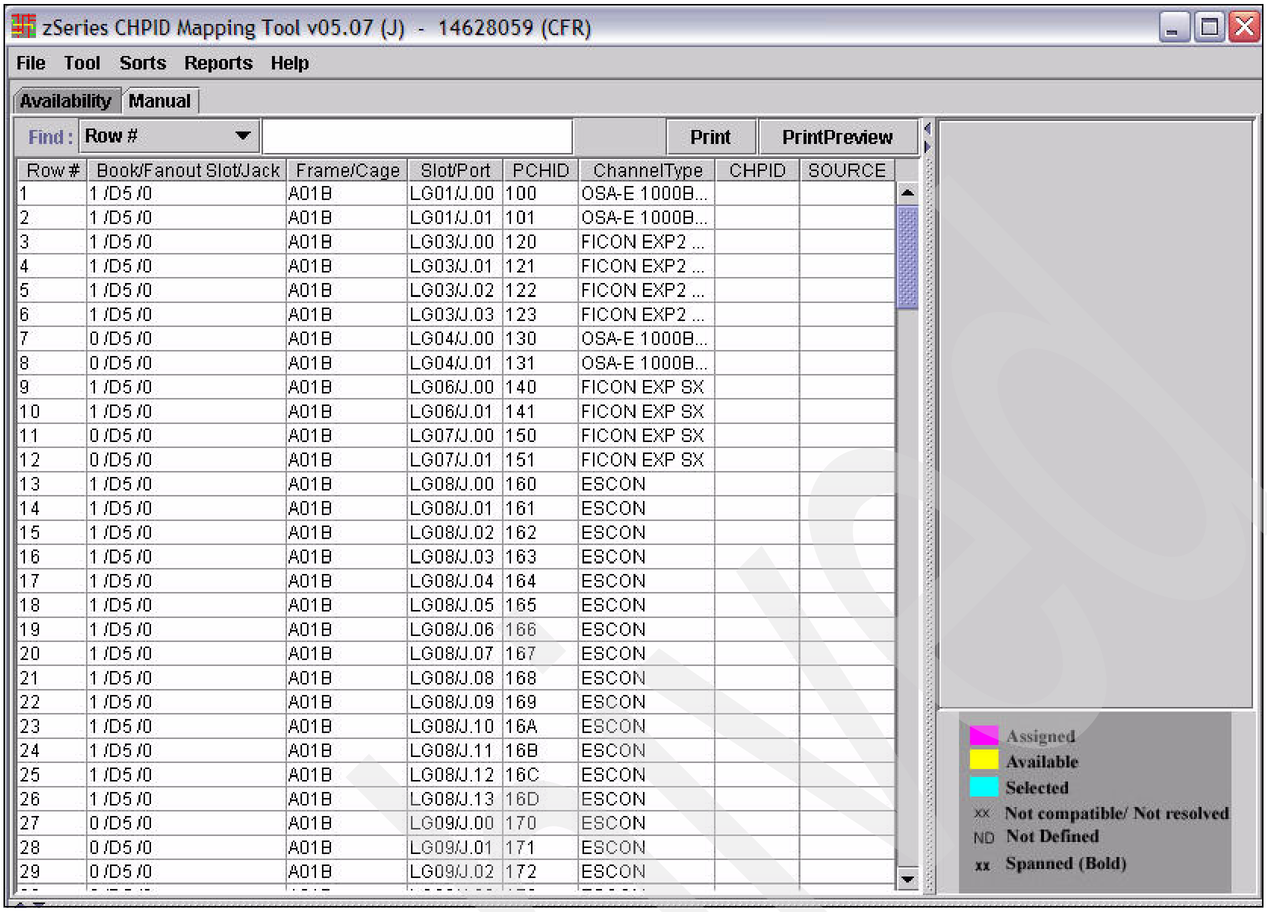


Figure 7-44 CMT - Importing CFReport Order file

Import 2094 IOCP file into CHPID Mapping Tool

- Import the IOCP file by clicking **Tool** → **Import IOCP File**; see Figure 7-45 on page 272.

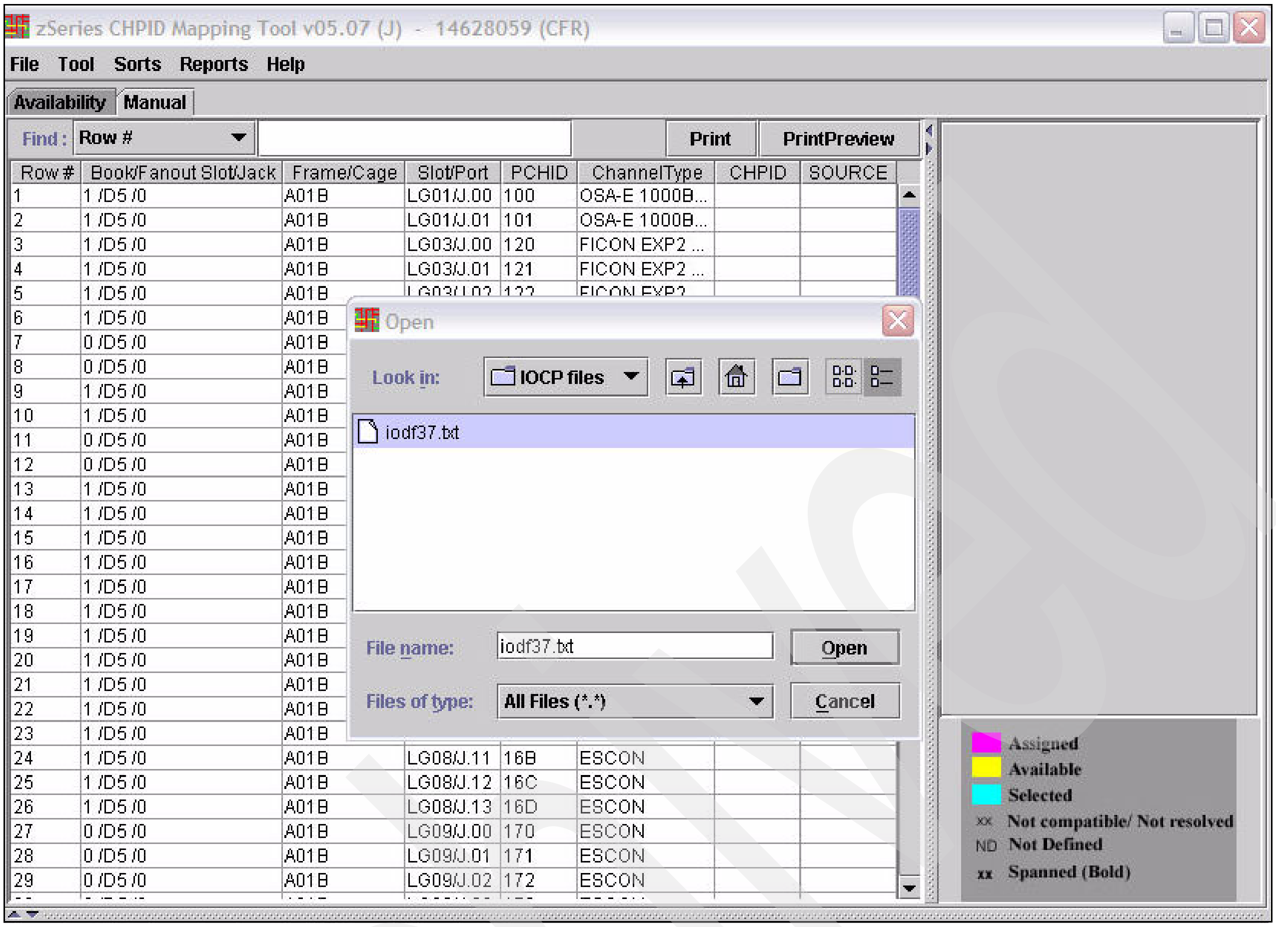


Figure 7-45 CMT - Import IOCP files

- 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 messages:

  Matching CHPID - This window lists all CHPIDs that are assigned with PCHIDs that have been moved during MES upgrade. This message is for informational purposes only.

  Invalid CHPID - This window lists all 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 the given PCHID.

  HW Resolution - There are a few CHPIDs that support more than one available channel type. The user should select the preferred channel type for the 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 PCHIDs for these CHPIDs are not reset.

  By default, this option is unchecked.

CHPIDs that may have configuration files associated

Figure 7-46 shows CMT listing PCHIDs that could potentially have configuration files associated with them. Click **OK**.

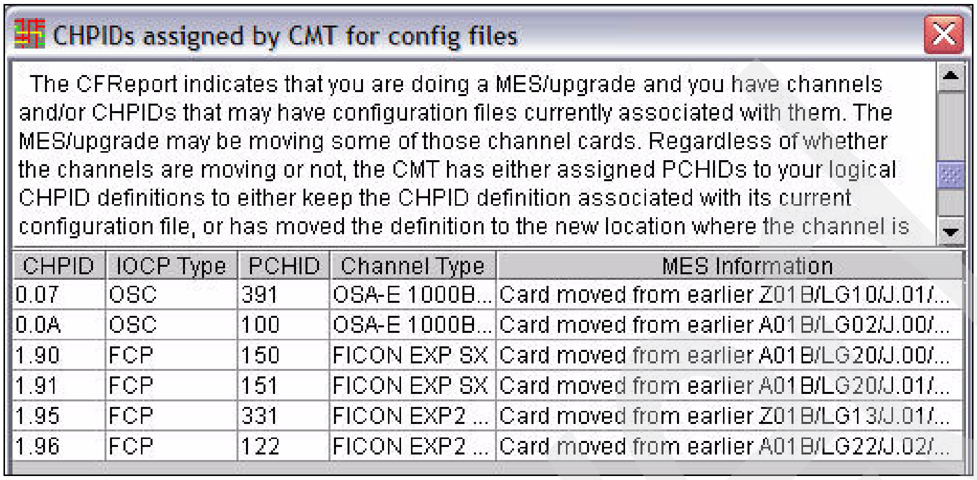


Figure 7-46 CMT - CHPIDs assigned by CMT

CHPIDs with PCHID conflicts

Now the CMT displays CHPIDs with PCHID conflicts. In our example, we selected **Reset only the PCHID/hardware conflicts**.

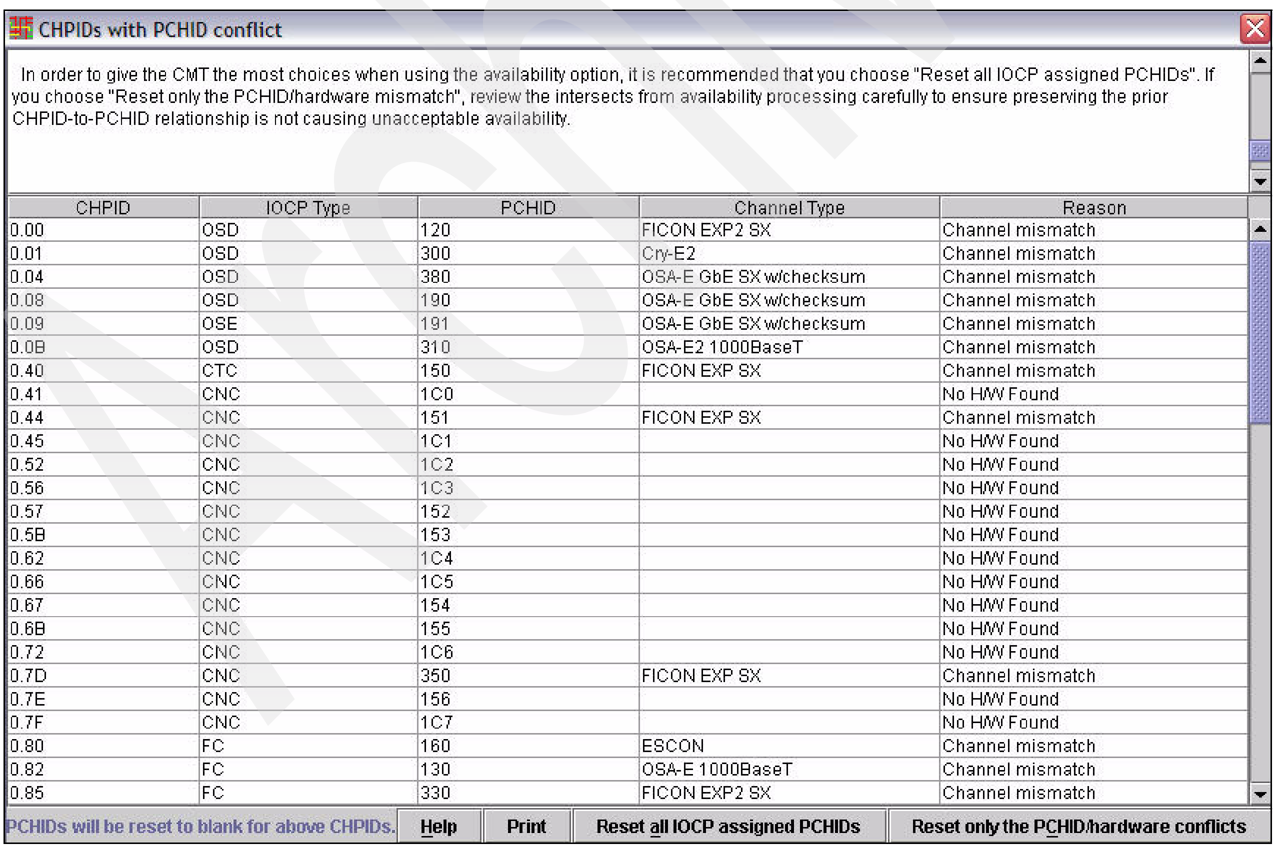


Figure 7-47 CMT - CHPIDs with PCHID conflicts

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; see Figure 7-48.

Figure 7-48 CMT - Required Hardware unavailable

The following message is issued:

```
The CHPID Mapping Tool is halted now and requires this condition to be resolved.
```

We left these CHPID types “CFP” 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.

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 CFP CHPID definitions in the IODF and expect to have CFP 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.

Alternatively, you could remove the 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 CFP 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 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. In Figure 7-49 on page 275, the image in the lower right-hand side shows what we had selected for the FC channels.

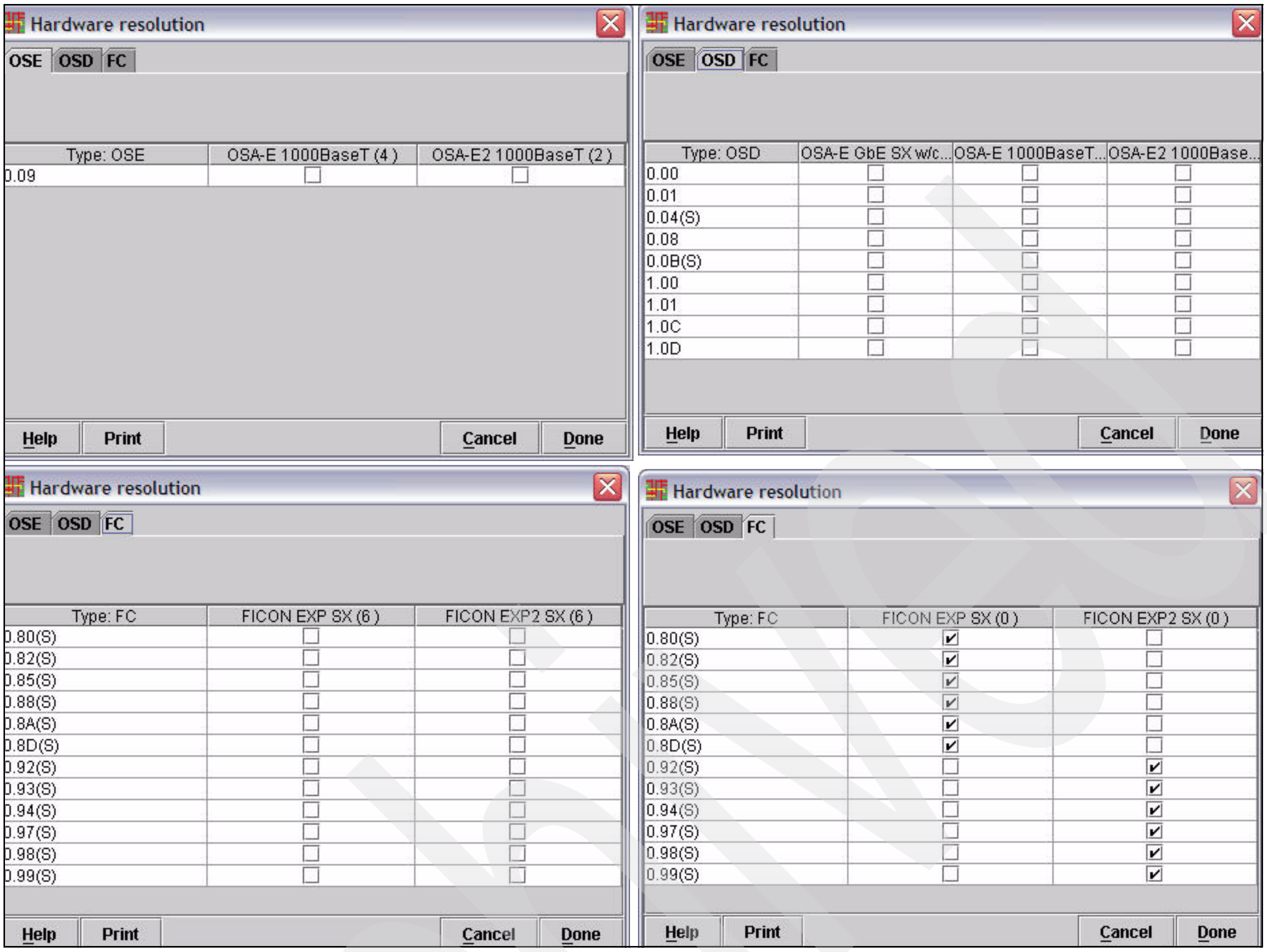


Figure 7-49 CMT - Hardware resolution after IOCP import

- 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. Note that in Figure 7-50 on page 276, the CHPID and SOURCE columns contain blanks. These are filled in after CMT assigns the CHPIDs to PCHIDs.

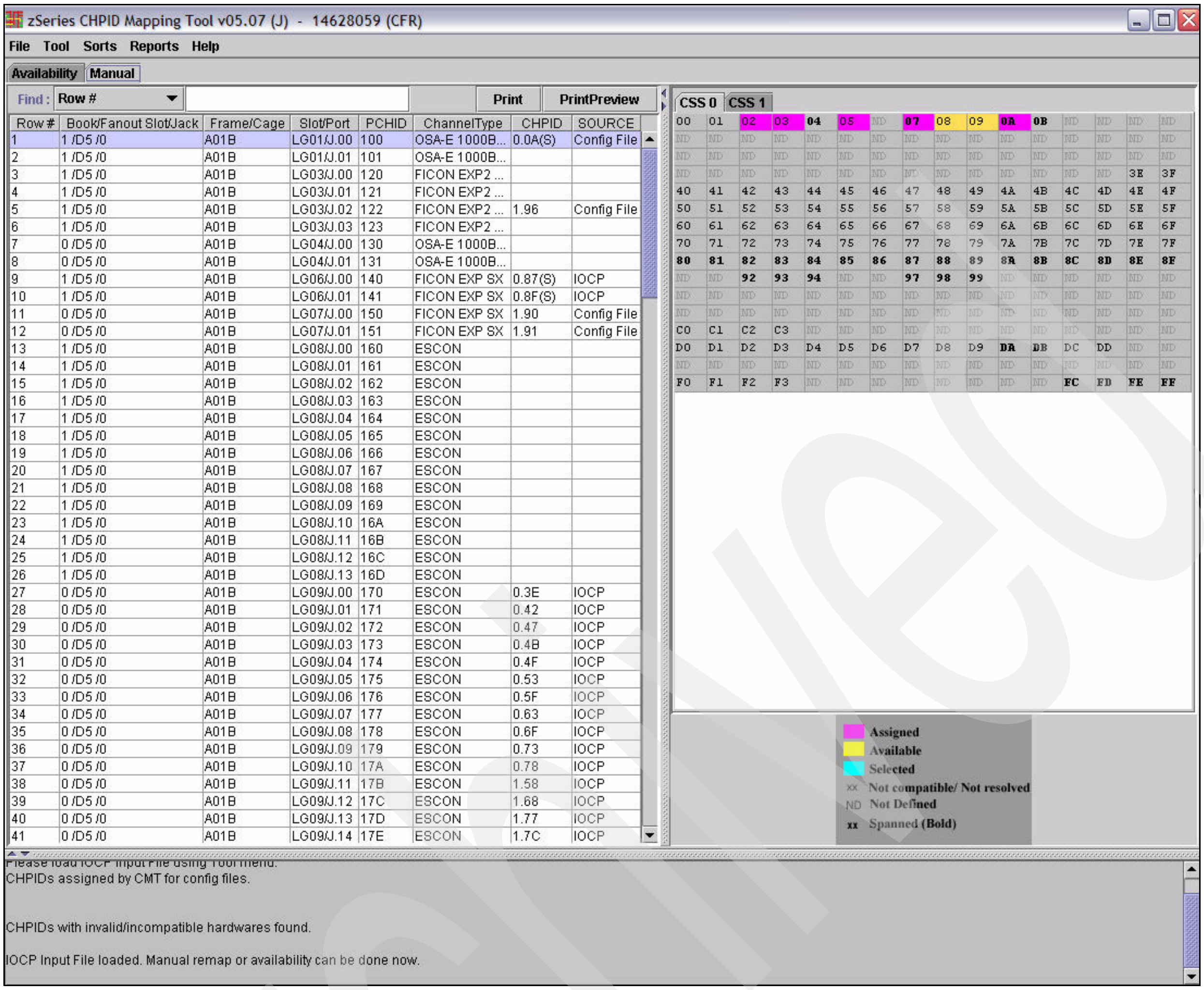


Figure 7-50 CMT - Manual Tab

Process CU Priority

If you are importing an IOCP statements file from a 2084 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 2094.

- Under the File menu, click the **Availability** tab.
- 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 7-51 on page 277.

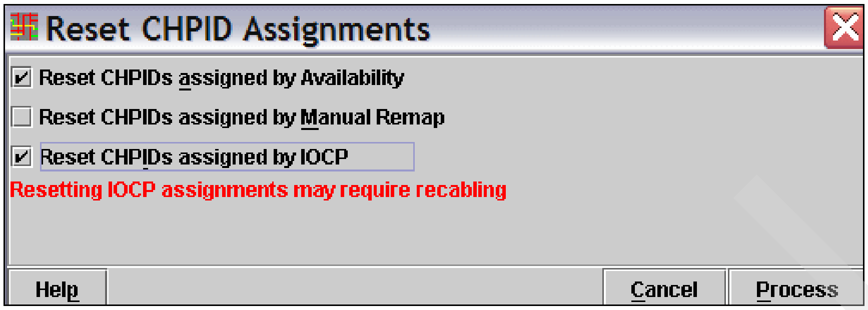


Figure 7-51 CMT - Reset CHPID Assignments

The 2094 has different availability rules than the 2084, so all PCHID assignments that were still in the input IOCP needed to be removed, as follows.

- Click **Process**. After the CHPID Mapping Tool has assigned the CHPIDs, it displays a message indicating the results of the process. Click **OK**; see Figure 7-52.

Figure 7-52 CMT - Process CU Priority completion message

Our example returned the following intersects:

C	Two or more assigned channels use the same channel card.
M	All the assigned channels are supported by the same MBA group.
B	Greater than half the assigned channels are connected to the same book.

> **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.

- 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
> ```

- 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 E000 and E100 to priority 333; see Figure 7-53.

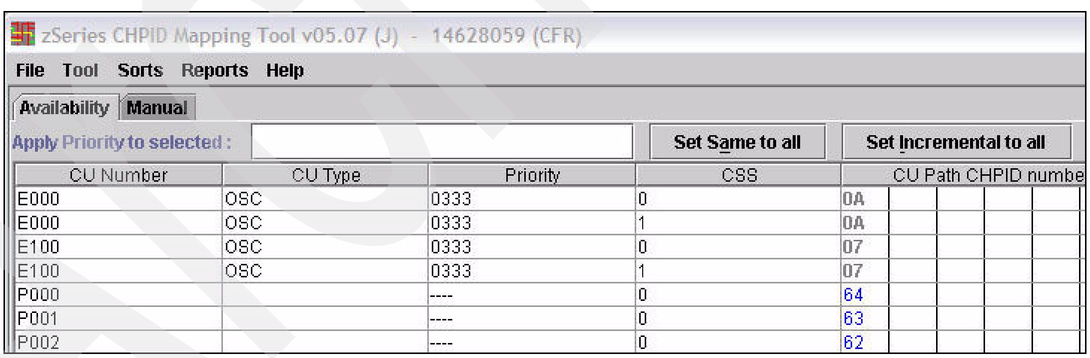


Figure 7-53 CMT Set CU Priority

- Under the File menu, click the **Availability** tab again.
- 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
  – Reset CHPIDs assigned by CMT for config files

  In our example, we selected all the reset options.

- 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.
- Select the Manual tab; Figure 7-54 shows the results of mapping the CHPIDs.

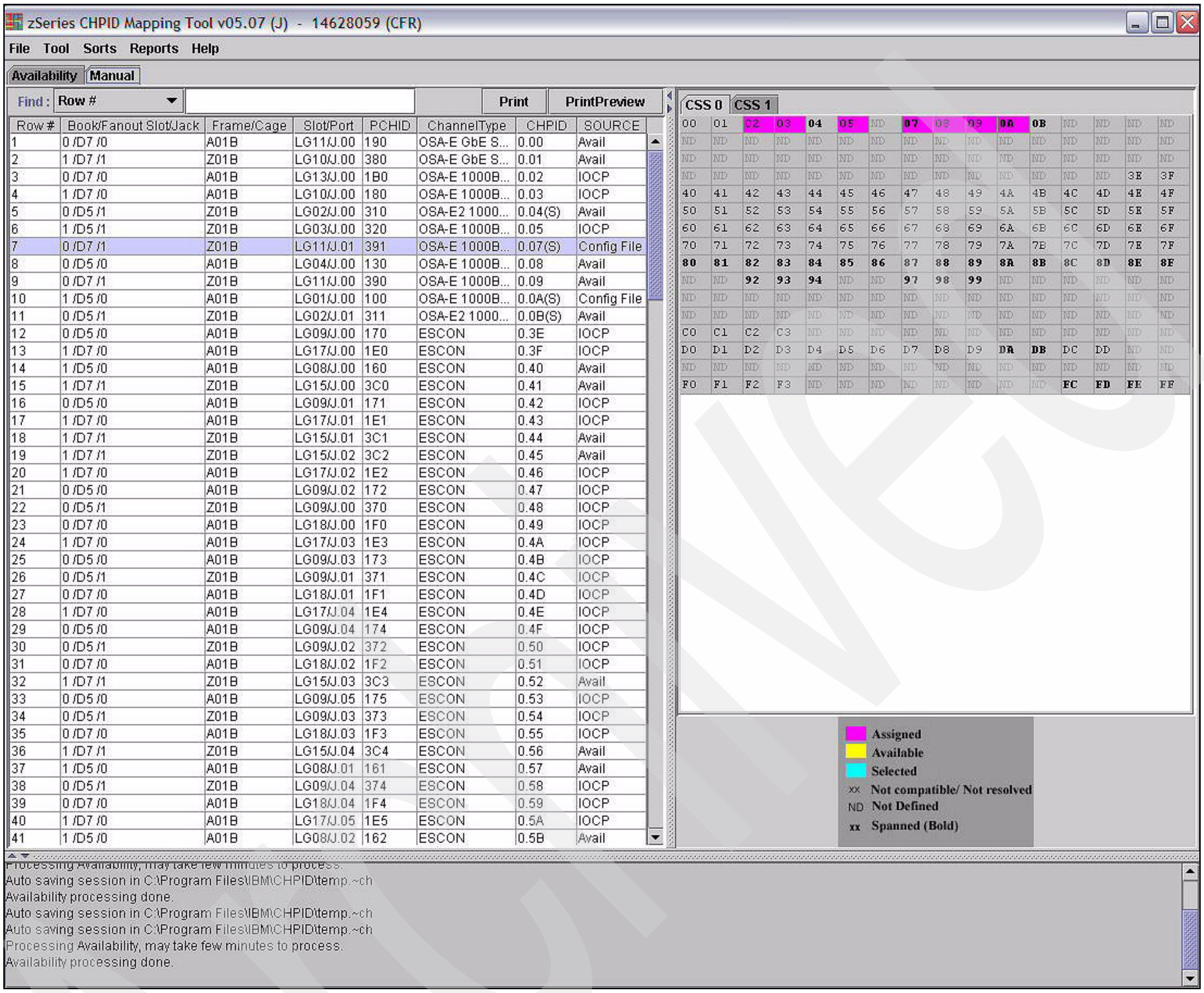


Figure 7-54 CMT - Manual (CHPIDs assigned)

Note that the CHPID and SOURCE columns are no longer blank, because the CHPID Mapping Tool has assigned CHPIDs to PCHIDs and has placed the value Avail in the SOURCE column, indicating that the CHPID values were assigned based on 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 two reports in this example (the CHPID Report and the CHPID to Control Unit Report). However, all the built-in reports are printed in the same way, as explained here.

CHPID Report

- Click **Reports** → **CHPID Report**; see Figure 7-55.

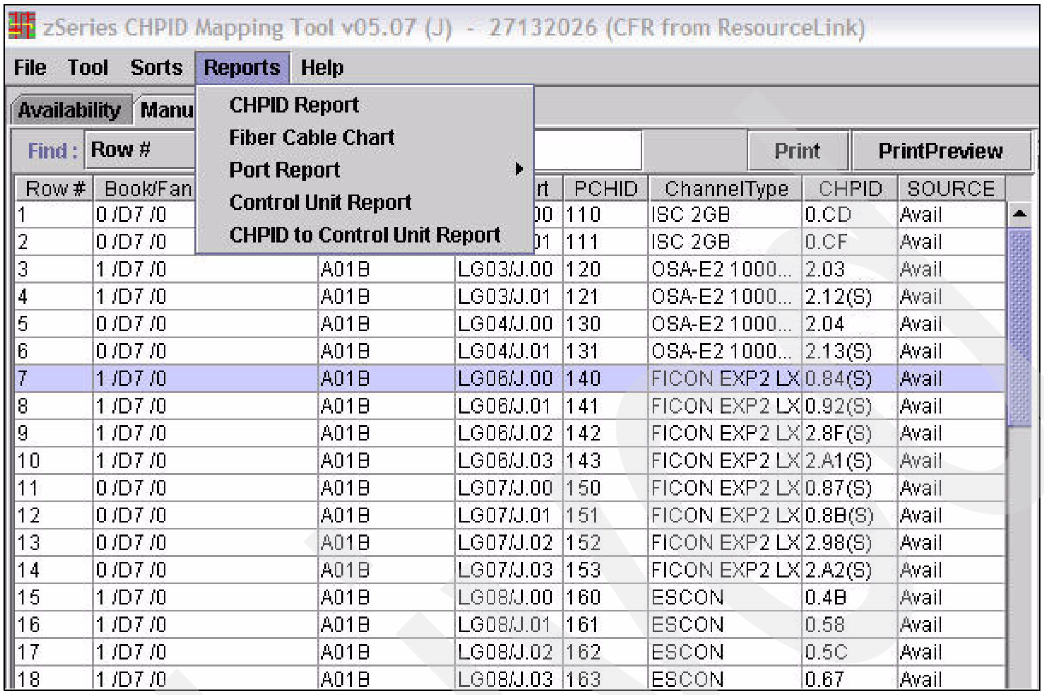


Figure 7-55 CMT - select CHPID Report

- Enter the Report File Name (or accept the default name offered by the CMT) and click **Save**; see Figure 7-56.

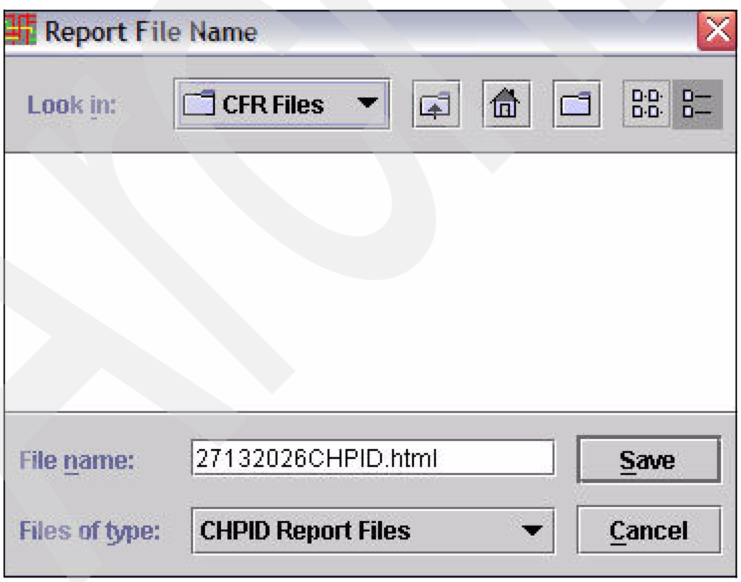


Figure 7-56 CMT - Report File Name

- The CHPID Mapping Tool opens a browser window with the CHPID report; see Figure 7-57 on page 281. 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: 27132026(CFR from ResourceLink)
Machine: 2094-S18

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this

Book/Fanout Slot/Jack	Cage	Slot	F/C	CSS.CHPID/PCHID/Ports
0/ D8/ J.0	A19B	D806	3393	0.C9/01E/J00
1/ D8/ J.0	A19B	D810	3393	0.C8/02E/J00
1/ D7/ J.0	A01B	01	0863	----/100/P00 ----/101/P01
0/ D7/ J.0	A01B	D102	0218	0.CD/110/J00 0.CF/111/J01
1/ D7/ J.0	A01B	03	3366	2.03/120/J00 (0,1,2).12/121/J01
0/ D7/ J.0	A01B	04	3366	2.04/130/J00 (0,1,2).13/131/J01
1/ D7/ J.0	A01B	06	3319	(0,1,2).84/140/J00 (0,1,2).92/141/J01 (0,1,2).8F/142/J02 (0,1,2).A1/143/J03
0/ D7/ J.0	A01B	07	3319	(0,1,2).87/150/J00 (0,1,2).8B/151/J01 (0,1,2).98/152/J02 (0,1,2).A2/153/J03
1/ D7/ J.0	A01B	08	2323	0.4B/160/J00 0.58/161/J01 0.5C/162/J02 0.67/163/J03 1.4F/164/J04 1.58/165/J05 1.5A/166/J06 1.61/167/J07 1.68/168/J08 2.42/169/J09 2.43/16A/J10 2.4E/16B/J11 2.59/16C/J12 2.60/16D/J13 2.69/16E/J14
0/ D7/ J.0	A01B	09	2323	0.44/170/J00 0.4A/171/J01 0.57/172/J02 0.5B/173/J03 1.42/174/J04 1.4E/175/J05 1.51/176/J06 1.57/177/J07 1.60/178/J08 2.49/179/J09 2.51/17A/J10 2.58/17B/J11 2.5F/17C/J12 2.68/17D/J13
1/ D4/ J.0	A01B	D110	0218	0.CC/180/J00 0.CE/181/J01
0/ D4/ J.0	A01B	11	0863	----/190/P00 ----/191/P01
1/ D4/ J.0	A01B	12	3366	(0,1,2).14/1A0/J00 (0,1,2).18/1A1/J01

Figure 7-57 CMT - CHPID Report

Create the CHPID to Control Unit Report

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

- Click **Reports** → **CHPID to Control Unit Report**.
- Click **Save**.
- The CHPID Mapping Tool opens a browser window with the CHPID to Control Unit Report; see Figure 7-58. 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: 14628059(CFR)
Machine: 2094-S18

IOCP file: iodf37.txt

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. Ple
proceeding.

CSS	CHPID	Type	Book/Jack/MBA	Port	PCHID	CU Number
0	00	OSD	0/ 0/ 7	A01B LG11 J.00	190	2C00
0	01	OSD	1/ 1/ 7	Z01B LG10 J.00	380	2CA0
0	02	OSD	0/ 0/ 7	A01B LG13 J.00	1B0	2D00
0	03	OSD	1/ 0/ 7	A01B LG10 J.00	180	2D20
0	04	OSD	0/ 1/ 5	Z01B LG02 J.00	310	2C60
0	05	OSD	1/ 1/ 5	Z01B LG03 J.00	320	2D60
0	07	OSC	0/ 1/ 7	Z01B LG11 J.01	391	E100
0	08	OSD	0/ 0/ 5	A01B LG04 J.00	130	2E80

Figure 7-58 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.

- Click **Tool** → **Create Updated IOCP File**; see Figure 7-59.

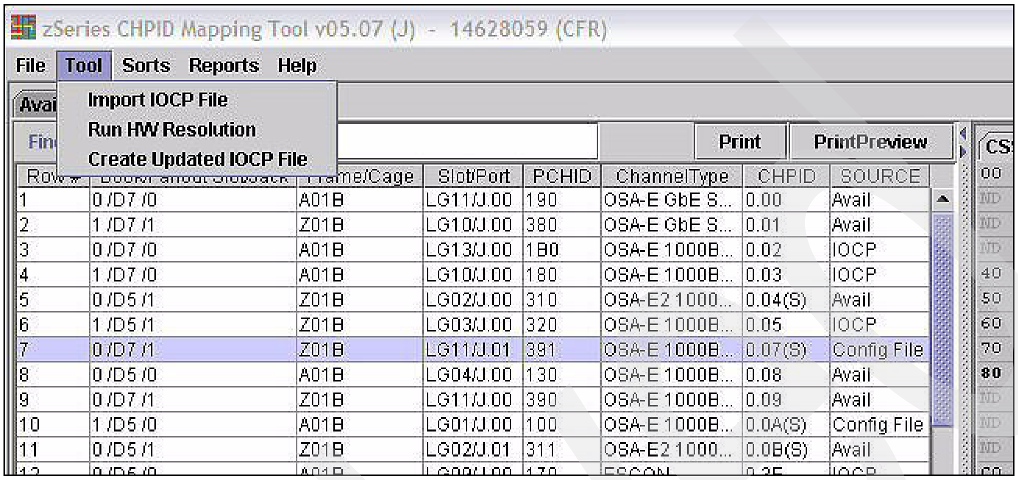


Figure 7-59 CMT - Create Updated IOCP File

- Enter the File name and location for the IOCP output file, and click **Save**; see Figure 7-60.

> **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.

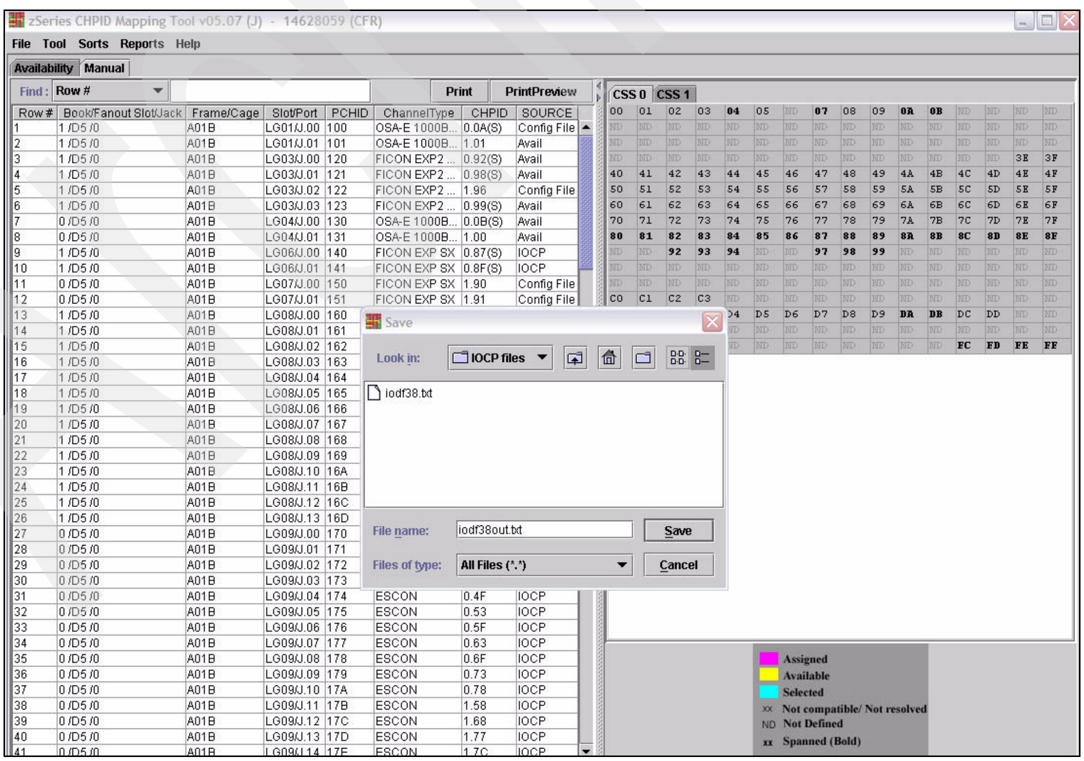


Figure 7-60 CMT - Save IOCP output file

- The CMT displays an informational message, shown in Figure 7-61, regarding what to do for the final execution of the tool.

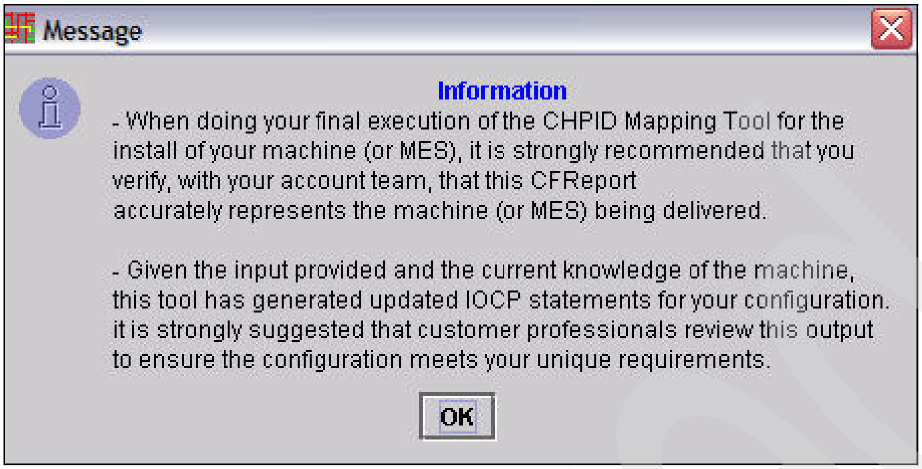


Figure 7-61 CMT - informational message

> **Note:** If you are an HCM user, you may prefer to use HCM to transfer the updated IOCP statements file back to the host.

7.6 Migrate PCHIDs back into work IODF

After mapping the CHPIDs to PCHIDs using the CHPID Mapping Tool, the information needs to be transferred back into HCD. We do this by using the updated IOCP statement file (for example, IODF38OUT.TXT), as follows:

- Upload the iodf38out.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.

  Looking at the updated IOCP statements file, you will notice that the CHPID Mapping Tool has inserted statements at the end of the file, which begin with *CMT. These statements reflect the CCN reference number, as well as control unit priorities set in the CHPID Mapping Tool. Also notice the CU Priority values we added for the OSC control units E000 and E100.

  > **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 7-2.

Example 7-2 HCD - Updated IOCP statements file (with CMT statements)

```
.        IODEVICE ADDRESS=(FFE3,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFF9,007),CUNUMBR=(FFFE),UNIT=CFP
*CMT* VERSION=000
*CMT* CCN=14628059(CFR)
*CMT* E000.0=0333,E000.1=0333,E100.0=0333,E100.1=0333
****************************** Bottom of Data ******************************
```

- From the HCD main panel shown in Figure 7-62, 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 V1.7 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.IODF38.WORK'                          +
```

Figure 7-62 HCD - main menu, select Migrate configuration data

- From the Migrate Configuration Data panel shown in Figure 7-63, select option **1**, **Migrate IOCP/OS data**, and then press Enter.

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


  Select one of the following tasks.

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

Figure 7-63 HCD - Migrate Configuration Data

- HCD displays the Migrate IOCP Data panel, as shown in Figure 7-64 on page 285. 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 7.7, "Build the production IODF" on page 286).
`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 . . . . . . . . . . . . SCZP102   +   CSS ID . . . . . . . _  +
 OS configuration ID  . . . . . . . . TEST2094  +

 Combined IOCP/MVSCP input data set . _____________________________________
 IOCP only input data set . . . . . . 'SYS6.IODF38.IOCPOUT.SCZP102'
 MVSCP only or HCPRIO input data set  _____________________________________
            Associated with processor ________  +
                            partition ________  +
 Processing mode  . . . . . . . . . . 2   1.  Validate
                                          2.  Save

 Migrate options  . . . . . . . . . . 3   1.  Complete
                                          2.  Incremental
                                          3.  PCHIDs
 MACLIB used  . . . . . . . 'SYS1.MACLIB'
 Volume serial number . . . ______  + (if not cataloged)
```

Figure 7-64 HCD - Migrate IOCP / MVSCP / HCPRIO Data

- 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 7-65.

```
 -------------------------- 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.IODF38.WORK.
  ***************************** Bottom of data ******************************
```

Figure 7-65 HCD - Migration Message List

- 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.`

- Press PF3 again.

7.7 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:

- From the HCD main menu, select option **2**, **Activate or process configuration data**; see Figure 7-66.

```
z/OS V1.7 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.IODF38.WORK'                            +
```

Figure 7-66 HCD - main menu, select activate or process configuration data

- The Activate or Process Configuration Data panel displays; see Figure 7-67. 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 7-67 HCD - Activate or Process Configuration Data, select Build production IODF

- The Message List panel displays; see Figure 7-68 on page 287. 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 7-68 HCD - Message List (building Production IODF)

- The Build Production I/O Definition File panel displays; see Figure 7-69. 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.IODF38.WORK'

  Production IODF name . 'SYS6.IODF38'
  Volume serial number . IODFPK  +

  Continue using as current IODF:
  2   1.  The work IODF in use at present
      2.  The new production IODF specified above
```

Figure 7-69 HCD - Build Production I/O Definition File

- The Define Descriptor Fields panel displays; see Figure 7-70 on page 288. 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.IODF38'

  Descriptor field 1  . . . SYS6
  Descriptor field 2  . . . IODF38
```

Figure 7-70   HCD - Define Descriptor Fields

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

  `Production IODF SYS6.IODF38 created.`

Proceed to the steps to implement the configuration on the 2094.

7.8 Implementing the processor configuration on a 2094

At this point, we have a production IODF, which is SYS6.IODF38. Now we need to update the IOCDS on the replacement CPC (for example, SCZP102) and power-on reset using this IOCDS. The final step is to IPL the replacement processor using this IODF.

Note: A discussion of how to IPL the new hardware is beyond the scope of this publication.

Updating the IOCDS

- From the HCD main menu, select option **2**, **Activate or process configuration data**; see Figure 7-71. Ensure that the IODF is the production one created in “Build the production IODF” on page 286, and then press Enter.

```
z/OS V1.7 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.IODF38'
```

Figure 7-71   HCD - main menu, select Activate or process configuration data

- The Activate or Process Configuration Data panel displays; see Figure 7-72. 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 replacement 2094 via the HMC LAN in order to create an IOCDS from which we Power-On Reset from. This may not be the case for all readers.
>
> In the case where the replacement 2094 is not accessible from the HMC LAN, we would need to create an IOCP file from HCD and then do a stand-alone IOCP on the replacement 2094, using the IOCP file as input. (This is done with 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 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 7-72 HCD - Activate or Process Configuration Data, select Build IOCDSs

- The S/390 Microprocessor Cluster List panel displays. Select the replacement 2094 from the list by using a forward slash mark (/) to update one of its IOCDSs; see Figure 7-73 on page 290. 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.SCZP102    2094   S18     SCZP102
******************************* Bottom of data ********************************
```

Figure 7-73 HCD - S/390 Microprocessor Cluster List

- The Actions on selected CPCs panel displays; see Figure 7-74. 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 7-74 HCD - Actions on selected CPCs, Work with IOCDSs

- The IOCDS List panel displays; see Figure 7-75. Select the IOCDS that you wish to update for the replacement 2094 by using a forward slash mark (/), and 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.SCZP102  IODF34    LPAR   POR        Yes       No          Yes-POR
_ A1.SCZP102  IODF36    LPAR   Alternate  No        No          No
_ A2.SCZP102  IODF33    LPAR   Alternate  No        No          No
/ A3.SCZP102  IODF34    LPAR   Alternate  No        No          No
******************************* Bottom of data ********************************
```

Figure 7-75 HCD - IOCDS List

- The Actions on selected IOCDSs panel displays; see Figure 7-76 on page 291. Select option **1**, **Update IOCDS**, and press Enter.

```
---------------- Actions on selected IOCDSs -----------------


  Select by number or action code and press Enter.

  1_  1.  Update IOCDS . . . . . . . . . . . . (u)
      2.  Switch IOCDS . . . . . . . . . . . . (s)
      3.  Enable write protection  . . . . . . (e)
      4.  Disable write protection . . . . . . (w)
```

Figure 7-76 HCD - Actions on selected IOCDSs

- The Build IOCDSs panel displays; see Figure 7-77. Verify that all the information is correct. Fill in the field `Title1` and press Enter.

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

  Specify or revise the following values.

  IODF name . . . . . . . . . : 'SYS6.IODF38'

  Title1 . IODF38 _________________________________________________________
  Title2 : SYS6.IODF38 - 2005-11-22 10:22

                             Write IOCDS in
  IOCDS        Switch IOCDS  preparation of upgrade
  A3.SCZP102   No            No
  ***************************** Bottom of data ******************************
```

Figure 7-77 HCD - Build IOCDSs

- The Job Statement Information panel displays; see Figure 7-78. Fill in the job statements as required by the installation and press Enter. HCD submits the job to update the IOCDS.

> **Note:** Route the job to execute on the image where you are logged on to TSO. That way, you know that the image can “see” the new 2094 in order to update its IOCDS.

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



  Specify or revise the job statement information.



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

Figure 7-78 HCD - Job Statement Information

- 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 A3 IOCDS REPLACED.
```

- Return to HCD option 2.11 and view the IOCDS; you will note that the SNA Address remains at USIBMSC.SCZP102, as shown in Figure 7-79.

```
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
 s USIBMSC.SCZP102    2094   S18     SCZP102
 ******************************* Bottom of data ********************************
```

Figure 7-79 HCD - IOCDS with replacement IODF

Figure 7-80 shows the updated IOCDS.

```
. 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.SCZP102  IODF34   LPAR   POR        Yes       No          Yes-POR
 _ A1.SCZP102  IODF36   LPAR   Alternate  No        No          No
 _ A2.SCZP102  IODF33   LPAR   Alternate  No        No          No
 _ A3.SCZP102  IODF38   LPAR   Alternate  Yes       Yes         No
 ******************************* Bottom of data ********************************
```

Figure 7-80 HCD - IOCDS showing updated IOCDS

7.9 HMC steps for activation profiles

Follow these steps for activation profiles.

Building the Reset Profile and pointing to the required IOCDS

Now that the IODF has been written to an IOCDS, a Reset (power-on reset) Profile needs to be built to point to that IOCDS. The Reset Profile is used to power-on reset the 2094 after it has been handed over from the IBM service representative.

1. Log on to the HMC and select the replacement 2094 (presuming that it has been defined to the Defined CPCs Work Area).

2. Under Operational Customization, select **Customize/Delete Activation Profiles**.
3. Select the Last Used Reset Profile and then click **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, SCZP102).
5. Select the new Profile and then click **Customize**.
6. Click the IOCDS that you just updated in step 5 (for example, IOCDS-A3).

   On the new version of HMC you receive message ACTB0219, shown in Figure 7-81.

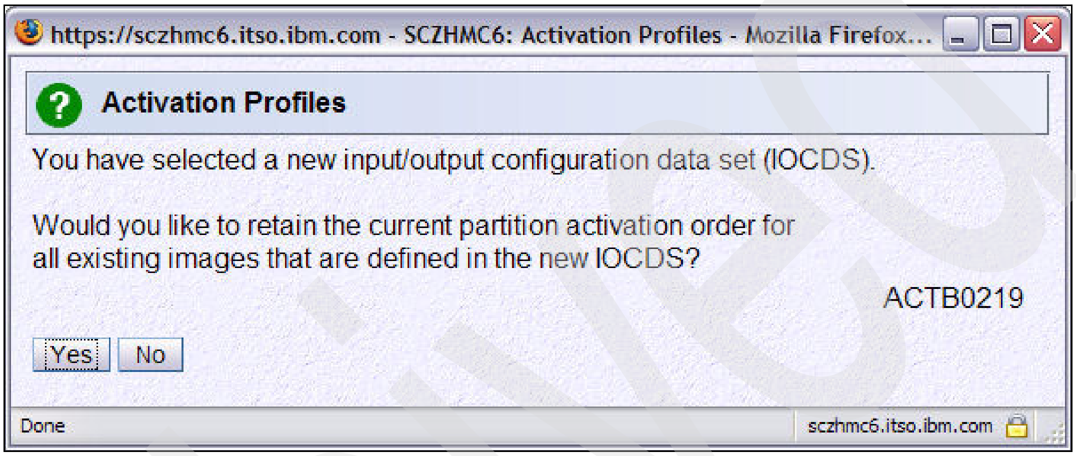


Figure 7-81 HMC - Activation Profiles (received when changing IOCDS)

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

Build/Verify Image Profiles

- While still in the Reset Profile, you can now review the Image Profile attributes.

Build/Verify Load Profiles

- Create Load (IPL) Profiles for all logical partitions that you are IPLing on this processor. Alternatively, you may prefer to copy and paste the Load Profiles from the 2084 that is being replaced with this processor.

Build/Verify Load Members in SYS#.IPLPARM

- You may require additional Load Members to be defined in SYS#.IPLPARM when IPLing from the replacement 2094.
- Additionally, if you are using existing Load Members and if you have used the HWNAME parameter to point to the Processor.ID, then this needs to be updated to point to the new Processor.ID (in this example, from SCZP901 to SCZP102).

Performing a power-on reset (POR) of the 2094

After the 2094 processor has been installed, 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 will perform another power-on reset using the Reset Profile created in the previous step (in this example, SCZP102).

After the power-on reset finishes, the logical partitions are ready to be IPLed.

8

Install an additional z9-109

In this chapter we describe how to add a new z9-109 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.

We discuss the following topics:

- Scenario overview
- HCD - create a 2094 Work IODF
- Validate the 2094 work IODF
- CHPID Mapping Tool actions
- HCD - update the 2094 work IODF with PCHIDs
- HCD - build the 2094 production IODF
- Implementing the processor configuration on the 2094
- HMC steps for activation profiles

8.1 Scenario overview

We begin by providing an overall description of this scenario.

8.1.1 The configuration process

Figure 8-1 depicts the general process that we followed in this example. The numbered steps are described following the figure.

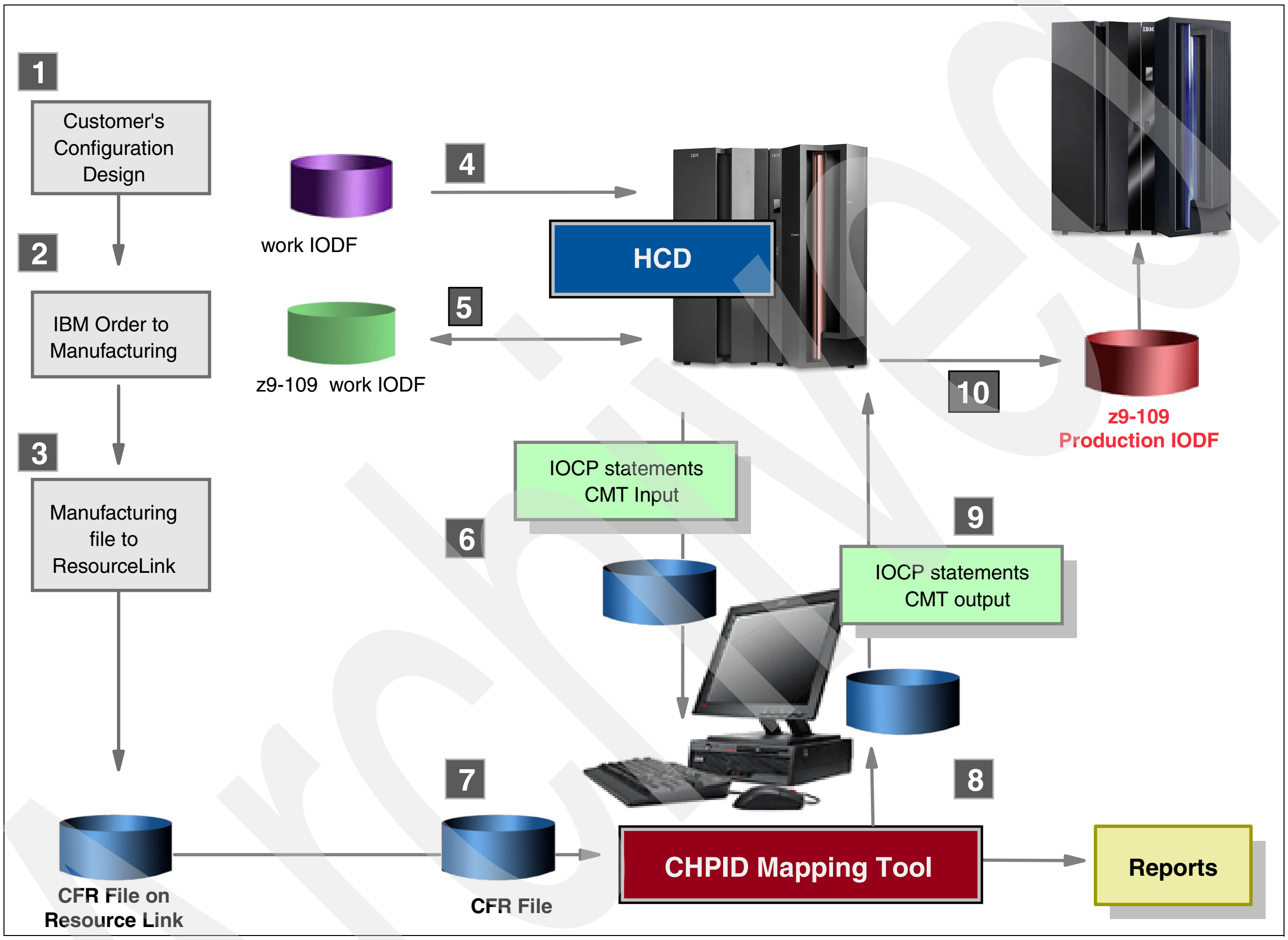


Figure 8-1 CMT - Overall process flow

1. When you are planning to migrate to a z9-109, 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 z9-109 configuration.
5. When the new z9-109 configuration has been added and the obsolete hardware has been deleted, a validated version of the configuration is saved in a 2094 validated work IODF.

6. From the validated work IODF, create a file containing the z9-109 IOCP statements. This file is transferred to the workstation used for the CHPID Mapping Tool.
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 z9-109 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, 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 2094 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 z9-109 with the client I/O configuration that is ready to be used.

If you are installing a new 2084, you may be able to use HCD to write an IOCDS to the 2094 in preparation for an upgrade. If you can write an IOCDS to the 2094, 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 installing a new 2094.

If the new 2094 is not connected using a LAN to the CPC where HCD is running, or 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.

8.1.2 Planning considerations

Keep the following considerations in mind when planning your upgrade.

Coupling links

If you are currently using CBS/CBR or CFS/CFR CHPIDs to connect between processors, be aware that these are not supported on a z9-109. They need to be replaced with CBP or CFP. ICB-2 and ISC-3 links in compatibility mode are not supported on the 2094.

Additional CHPIDs

You may want to add more FC, ESCON, or OSA CHPIDs into the configuration. A new eConfig needs to be built by your IBM service representative and you receive a new CCN, so that you can download an updated CFReport file from Resource Link to use as input into the CHPID Mapping Tool.

HMC

The z9-109 requires a new HMC and you require MCLs on the existing Support Elements if you want to use the new HMC to access existing processors. The new HMC only uses Ethernet for its network connection.

Hardware and software support

There are software features that are only available with z/OS V1.7, such as Multiple Subchannel Sets (MSS). You also require HCD V1.7 in order to be able to define MSS, which creates a Version 5 IODF. Additionally, you require PTFs from the 2094DEVICE PSP Bucket to define z9-109 type processors via HCD.

Features no longer supported

There are channel types that are no longer supported (OSA-Express Token Ring, ICB-2 and ISC-3 Links in Compatibility mode and all crypto features except Crypto Express2). If you currently have control units that require these channel types, you need to take action to replace them with channel types that are supported on a z9-109. As was already the case on z990, dynamic expansion of HSA is now done using the MAXDEV definition.

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

If you are currently using 2074 type console controllers, you may want to consider using OSA Express2 CHPIDs defined as TYPE=OSC. These OSA Express2 features allow you to set up console function supported by a configuration file defined on the Support Element for that processor.

Fibre Channel Protocol (FCP)

If you are currently using CHPIDs defined as TYPE=FCP, you may need to consider NPIV.

CPC ID verses 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 ID does not. Therefore, the CPC ID 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 ID 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 ID, not the Processor ID, that appears on the HMC.

When you view the Network information for a CPC via the HMC, observe that the SNA address is made up of a Network name and CPC ID separated by a dot (for example, USIBMSC.SCZP901). 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.

8.1.3 Additional 2094 scenario

In this scenario we describe the configuration steps to install a new 2094 processor into an existing hardware environment.

- HCD requires a new Processor ID for the 2094.
- We recommend defining a new CPC ID for 2094.
- The 2094 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 2094 work IODF.

In this example we define a z9-109 (2094-S18) with Processor ID of SCZP103 and three LCSSs (CSS ID=0, CSS ID=1 and CSS ID=2). The CPC ID of SCZP103 and serial number of 000103 is used for the 2094

The following CHPID types are defined.

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

Table 8-1 Additional 2094

New 2094	Additional 2094 to connect to same switch ports and control units that existing processors connect to (additional new)
Processor Id	Require new Processor ID
CPC ID	Require new CPC ID
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	Required
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 ID.

However, if you do not need to support multiple processor images, we recommend that the Processor ID and CPC ID match.

8.2 HCD - create a 2094 Work IODF

The following steps explain how to define the existing I/O configuration to the new 2094 server using HCD, then migrate the channel subsystem and logical partitions from a 2084 to the new 2094 server. Using HCD, the sequence is as follows:

- Create a 2094 work IODF from a current production IODF.
- Add the 2094 processor.
- Add logical partitions.
- Add CHPIDs.
- Connect FICON and ESCON CHPIDs to existing switches, to available ports
- Create any additional control units unique to this processor and connect CHPIDs.
- Define all required CF connections to other processors and any Internal CF connections required.
- Create CTCs.
- Connect to existing control units for DASD, Tape, Printer, Communication devices, directly or via switches.
- Create OSA (OSC, OSD, OSE, OSN).
- Build a validated work IODF.
- Create an IOCP statements file and file transfer to your CHPID Mapping Tool workstation. This step may also be performed with HCM.

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 2094 (for example, 'SYS6.IODF35').

Add the new 2094 processor

- From the HCD main menu, select option **1.3**, **Processor List**; see Figure 8-2.
- Type `add` or press PF11 (add) to add a new processor, then press Enter.

```
.                                Processor List        Row 1 of 7 More:       >
Command ===> add____________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 8-2 HCD - Processor List (adding processor)

The Add Processor panel displays; see Figure 8-2.

```
------------------------------- 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 . . . . . . . . . . . . ________  +
```

Figure 8-3 HCD - Add Processor (blank values)

- For our example we specified the following values:

  a. Add Processor ID of `SCZP103`.

  b. Add Processor type of `2094`.

  c. Add Processor model of `S18`.

  d. Add Number of channel subsystems of `3`.

  e. Add Serial number of `0001032094`.

  f. Add Network name of `USIBMSC`.

  g. Add CPC name of `SCZP103`.

  Figure 8-4 on page 302 shows the values we added.

```
------------------------------- Add Processor -------------------------------


Specify or revise the following values.

Processor ID . . . . . . . . . SCZP103

Processor type . . . . . . . . 2094____  +
Processor model  . . . . . . . S18_____  +
Configuration mode . . . . . . LPAR      +
Number of channel subsystems . . 3       +

Serial number  . . . . . . . . 0001032094
Description  . . . . . . . . . ________________________________

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

Network name . . . . . . . . . USIBMSC_  +
CPC name . . . . . . . . . . . SCZP103_  +
```

Figure 8-4 HCD - Add Processor (adding values)

- 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.IODF39.WORK').
- Press Enter. You now have an additional 2094 processor named SCZP103; see Figure 8-5.

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 ________________________________
_ SCZP103  2094     S18      LPAR  0001032094 ________________________________
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
******************************* Bottom of data ********************************

                   +--------------------------------------+
 F1=Help      F2=S | New IODF HOYLE.IODF39.WORK defined. | et     F7=Backward
 F8=Forward   F9=S +--------------------------------------+ cel   F13=Instruct
F20=Right    F22=Command
```

Figure 8-5 HCD - processor List (new process or added)

- Type s next to the SCZP103 and press Enter.

```
.                           Channel Subsystem List               Row 1 of 2
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID . . . : SCZP103

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
_ 0   65280     0       0         0       ________________________________
_ 1   65280     0       0         0       ________________________________
_ 2   65280     0       0         0       ________________________________
******************************* Bottom of data ********************************
```

Figure 8-6 HCD - Channel Subsystem List (newly defined CSS)

Here you see three Channel Subsystems defined with the default MAXDEV values of 65280 set by HCD. You should consider changing these values if you will not be defining this many devices.

> **Note:** This value affects the amount of HSA that is allocated during power-on reset.
>
> Changing this value requires a new power-on reset.

- Now you need to define the resources to the new 2094 processor:
  a. Add partitions to each CSS.
  b. Add CHPIDs to each CSS. At this time, they are without PCHIDs assigned.
  c. Define a Partition Access list for these CHPIDs.
  d. Define a Partition Candidate list for these CHPIDs.
- Connect FICON and ESCON CHPIDs to available ports on existing switches.
- Connect FICON and ESCON CHPIDs directly to control units, where applicable.
- Create any control units unique for this processor and connect CHPIDs.
- Define all required coupling links to other processors in the hardware environment, and also any internal coupling links required.
- Create CTCs (ESCON or FICON).
- Define logical paths to existing control units for DASD, tape, printers, communications controllers directly or via the FICON or ESCON switches.
- Create OSA resources (for example, OSC, OSD, OSE, OSN).

Over-define channel paths

For an XMP processor, you can 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:** However, 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.

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

- Figure 8-7 illustrates what the CHPID/PCHID definitions look like before being defined as over-defined. Press PF20 (right) in the Channel Path List.

```
 Channel Path List   Row 116 of 127 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Channel Subsystem ID : 1
1=A11       2=A12       3=A13       4=A14       5=A15
6=A16       7=A17       8=A18       9=A19       A=A1A
B=A1B       C=A1C       D=A1D       E=A1E       F=A1F
                          I/O Cluster  --------- Partitions 1x -----
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   PCHID
_ E0    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D0
_ E1    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D1
_ E2    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D8
_ E3    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D9
_ F0    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F1    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F2    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F3    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FC    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FD    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FE    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FF    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
******************************* Bottom of data ********************************
```

Figure 8-7 HCD - Channel Path List (Reserving CHPIDs)

- Figure 8-8 on page 305 illustrates what the CHPID/PCHID definitions look like after being defined as over-defined.

```
 Channel Path List   Row 116 of 127 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Channel Subsystem ID : 1
1=A11       2=A12       3=A13       4=A14       5=A15
6=A16       7=A17       8=A18       9=A19       A=A1A
B=A1B       C=A1C       D=A1D       E=A1E       F=A1F
                          I/O Cluster  --------- Partitions 1x -----
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   PCHID
_ E0    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E1    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E2    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E3    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ F0    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F1    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F2    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F3    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FC    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FD    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FE    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FF    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
******************************* Bottom of data ********************************
```

Figure 8-8 HCD - Channel Path List (over-defined CHPIDs)

8.3 Validate the 2094 work IODF

Validate the work IODF

- Select HCD option **2.12**, **Build validated work I/O definition file**.
- Observe the Message List and review.
- Press PF3 to continue; you should receive the following message:

  `Requested action successfully processed`

- Go to HCD option **6.4**, **View I/O Definition File Information**; see Figure 8-9 on page 306. 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  . . . . : 2005-11-30
 Last update  . . . . . : 2005-11-30  18:44

 Volume serial number . : BH6ST2
 Allocated space  . . . : 2048    (Number of 4K blocks)
 Used space . . . . . . : 1304    (Number of 4K blocks)
    thereof utilized (%)  91

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

 Description  . . . . . :
```

Figure 8-9   HCD - View I/O Definition File Information (validated work IODF)

Create the IOCP statements for the CHPID Mapping Tool

Note: If you are a HCM user, you may prefer to use HCM to create the IOCP statements file and transfer the file to the PC. You can then launch the CHPID Mapping Tool, create an updated IOCP statements file, and transfer the file back to the host.

- Select HCD option 2.3, **Build IOCP input data set**, and press Enter; see Figure 8-10.

```
----- 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 8-10   HCD - Activate or Process Configuration Data (Build IOCP for SCZP103)

- HCD displays the list of available processors to chose from; see Figure 8-11 on page 307. Select the processor SCZP103 by using a forward slash mark (/), and then press Enter.

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

  Select one.

    Processor ID  Type     Model    Mode  Description
    ISGSYN        2064     1C7      LPAR
    ISGS11        2064     1C7      LPAR
    SCZP101       2094     S18      LPAR
  / SCZP103       2094     S18      LPAR
    SCZP701       9672     XX7      LPAR
    SCZP801       2064     1C7      LPAR
    WOJ1          2084     A08      LPAR
  **************************** Bottom of data *****************************
```

Figure 8-11 HCD - Available Processors (select processor for IOCP file)

- HCD displays a panel on which you enter information regarding the IOCP input data set to be created; see Figure 8-12.

  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 the installation.

- 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  . . . . . . . : SCZP103
  Title1 . IODF39___________________________________________________________
  Title2 : SYS6.IODF39.WORK - 2005-11-30 18:44

  IOCP input data set
  'SYS6.IODF39.IOCPIN.SCZP103'_____________________________________
  Input to Stand-alone IOCP?  Yes  (Yes or No)

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

Figure 8-12 HCD - Build IOCP Input Data Set

- 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 8-13 on page 308.

```
ID    MSG1='IODF39',                                               *
      MSG2='SYS6.IODF39.WORK - 2005-11-30 18:44',                  *
      SYSTEM=(2094,1),                                             *
      TOK=('SCZP103',00800221991E20941659326801053 27F00000000,*
      00000000,'05-11-30','18:44:32','........','........')
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))),       *
      MAXDEV=((CSS(0),64512,0),(CSS(1),64512,0))
CHPID PATH=(CSS(0),00),SHARED,                                     *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=120,TYPE=OSD
CHPID PATH=(CSS(0),01),SHARED,                                     *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=300,TYPE=OSD
CHPID PATH=(CSS(0),02),SHARED,                                     *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=1B0,TYPE=OSD
CHPID PATH=(CSS(0),03),SHARED,                                     *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=180,TYPE=OSD
CHPID PATH=(CSS(0,1),04),SHARED,                                   *
```

Figure 8-13 HCD - IOCP input data set contents (truncated)

Note that part of the TOK statement has been blanked out with dots; see Example 8-1.

Example 8-1 HCD - IOCP file (TOK statement)

```
TOK=('SCZP103',00800221991E20941844594801053 32F00000000,
00000000,'05-11-30','18:44:59','........','........')
```

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.

- 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 SCZP103.IOCP.

8.4 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 2094 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 2.5.1, “CHPID Mapping Tool” on page 32 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:

- Import the IOCP statements file and the new 2094 CFReport file into the CHPID Mapping Tool. Getting the IOCP statements may be performed with HCM.
- Resolve CHPIDs without associated hardware.
- Resolve Hardware resolution.
- Set CU Priority for single-path control units and other control units that would override the CHPID Mapping Tool default priorities.
- Run the CHPID Mapping Tool availability function.
- Create the CHPID Mapping Tool CHPID reports.
- Create updated IOCP statements file and file transfer back to the host. This step may be performed with HCM.

Import the CFReport order file into the CHPID Mapping Tool

- Start the CHPID Mapping Tool on your workstation.
- Import the CFReport order file into the CHPID Mapping Tool by clicking **File** → **Import CFReport Order file**; see Figure 8-14.

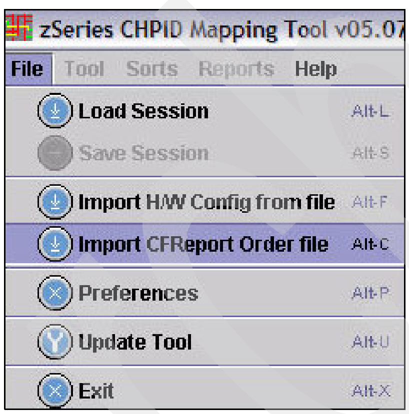


Figure 8-14 CMT - Import CFReport Order file

Select the CFReport file on your workstation to import into the CHPID Mapping Tool and click **Open**; see Figure 8-15 on page 310.

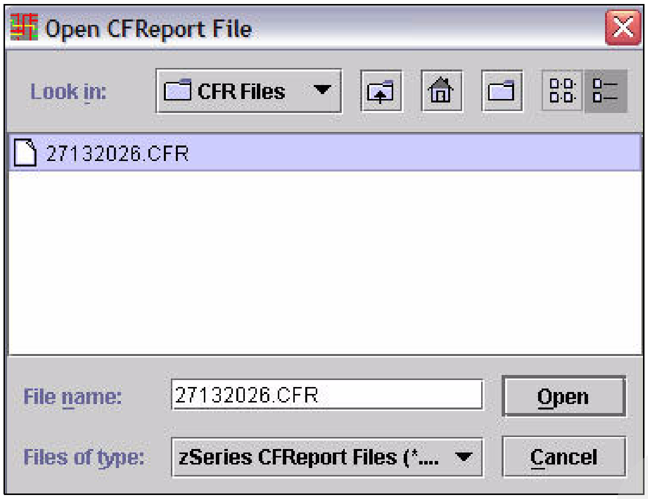


Figure 8-15 CMT - Open CFReport Order file

The CHPID Mapping Tool displays the information from the CFReport on the left-hand side of the screen; see Figure 8-16.

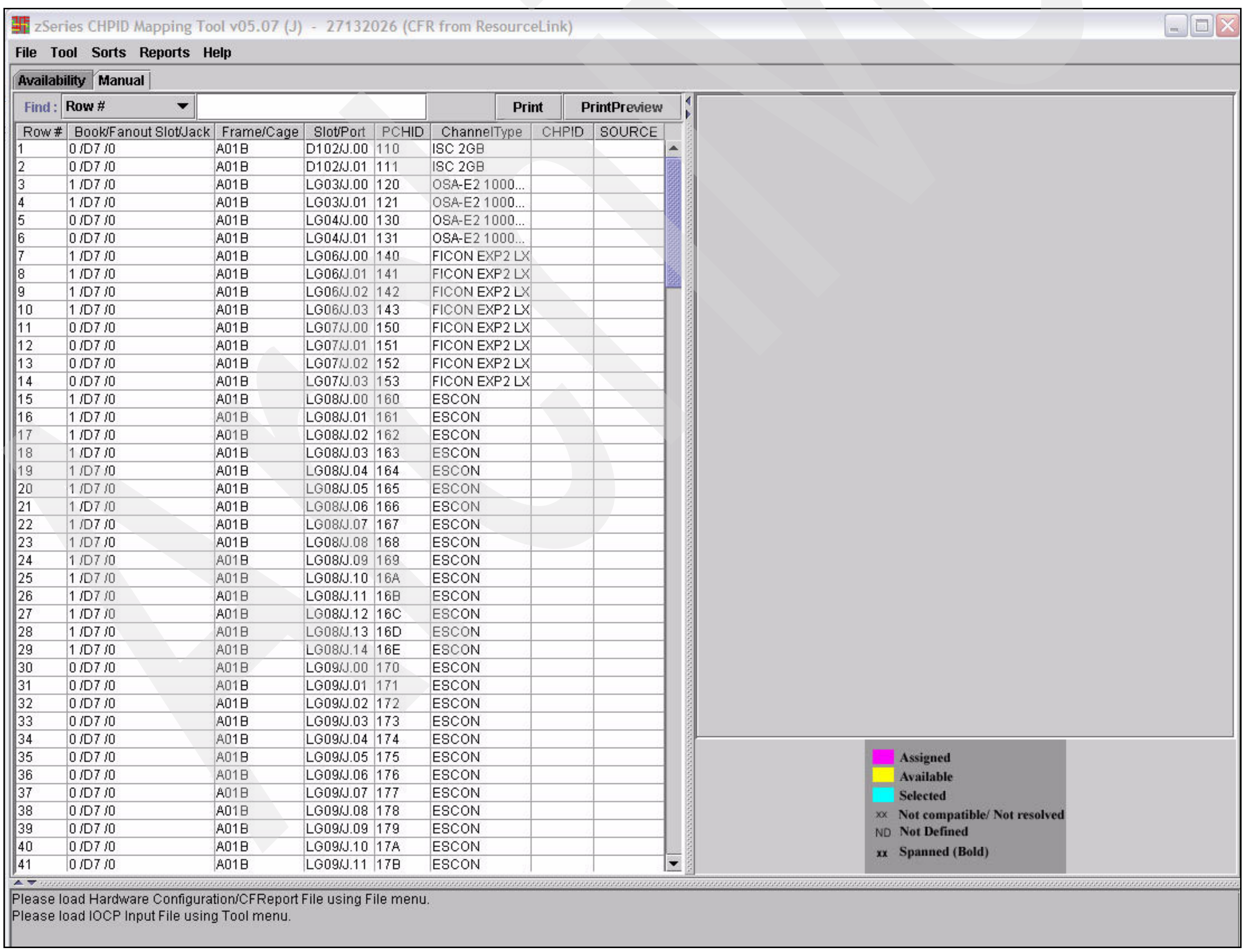


Figure 8-16 CMT - Importing CFReport Order file

Import IOCP file into the CHPID Mapping Tool

- Import the IOCP file by clicking **Tool** → **Import IOCP File**; see Figure 8-17.

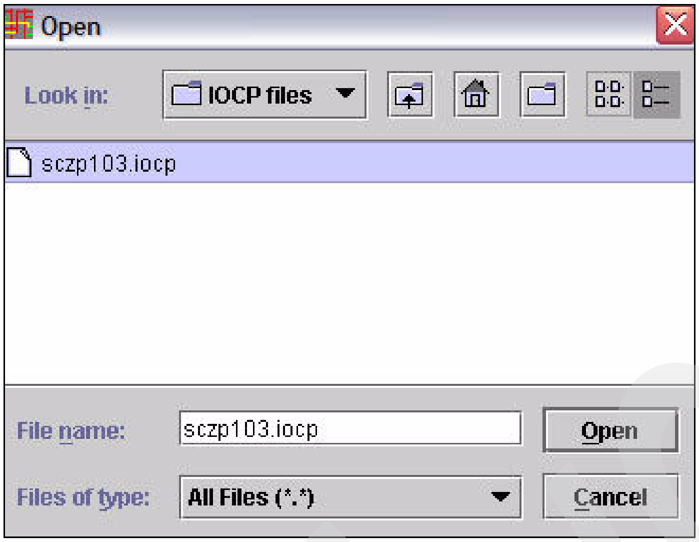


Figure 8-17 CMT - Import IOCP files

- 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 wanted clarification on TYPE=OSD, TYPE=OSE, and TYPE=FC channels.

In each case, we must check off what each of the channels are used for. The image in the lower right-hand side shows what we have selected for the FC channels; see Figure 8-18 on page 312.

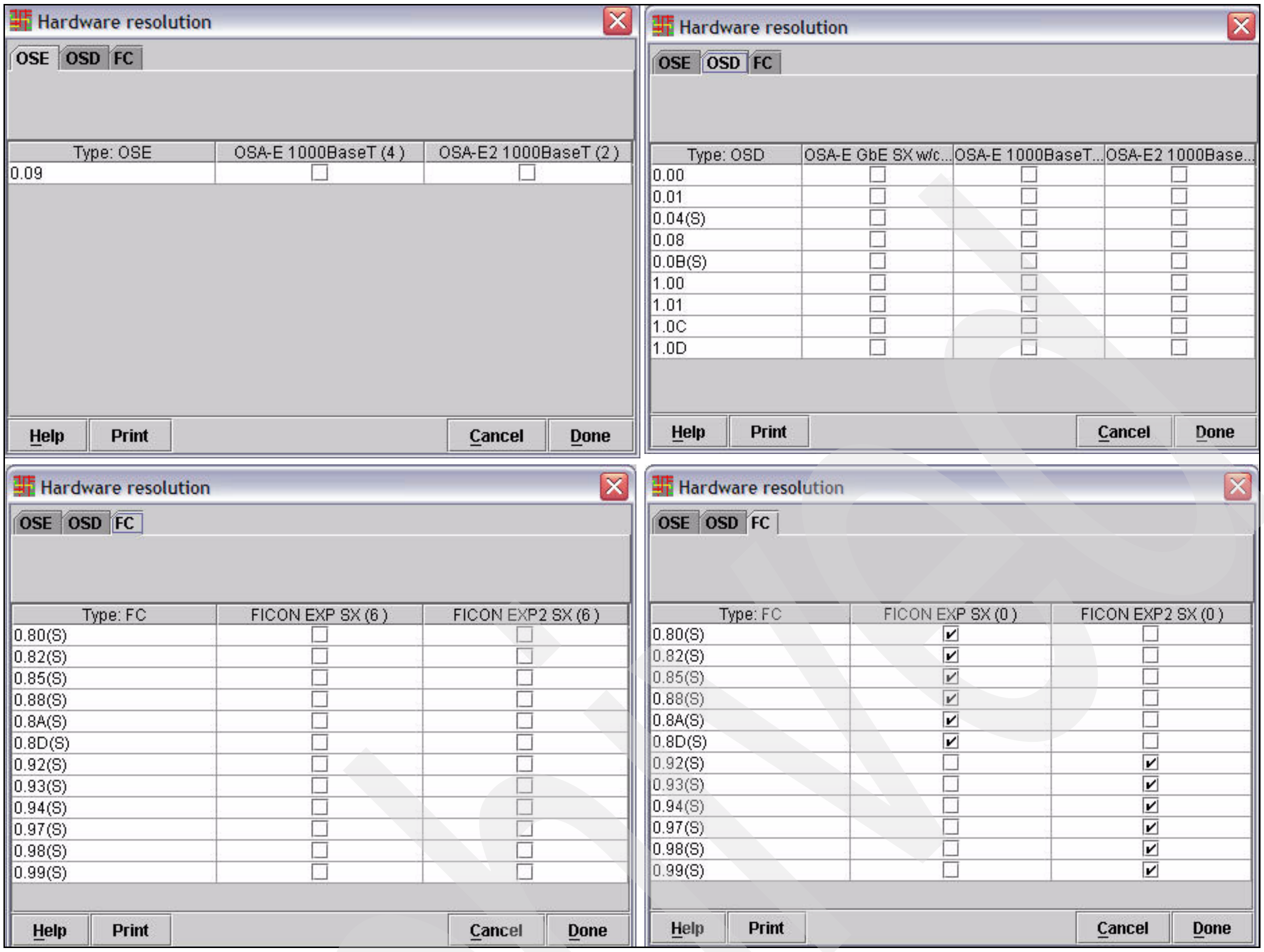


Figure 8-18 CMT - Hardware resolution after IOCP import

- 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. In Figure 8-19 on page 313, note that the CHPID column and the SOURCE column contain blanks. These are filled in after the CHPID Mapping Tool assigns the CHPIDs to PCHIDs.

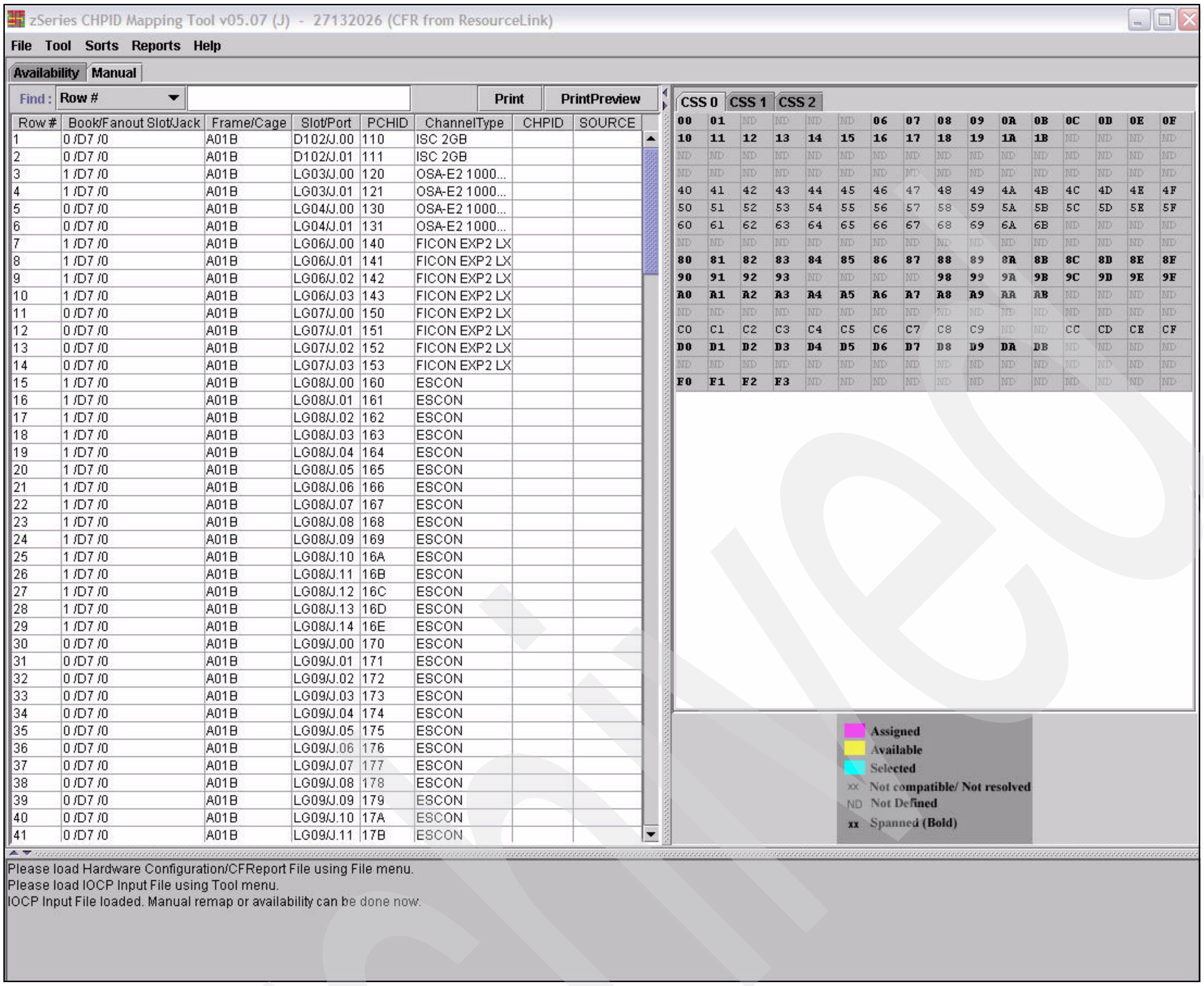


Figure 8-19 CMT - Manual tab

Set control unit priority manually

- Under the File menu, click the **Availability** tab.
- 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.
- Click **Process**; see Figure 8-20 on page 314.

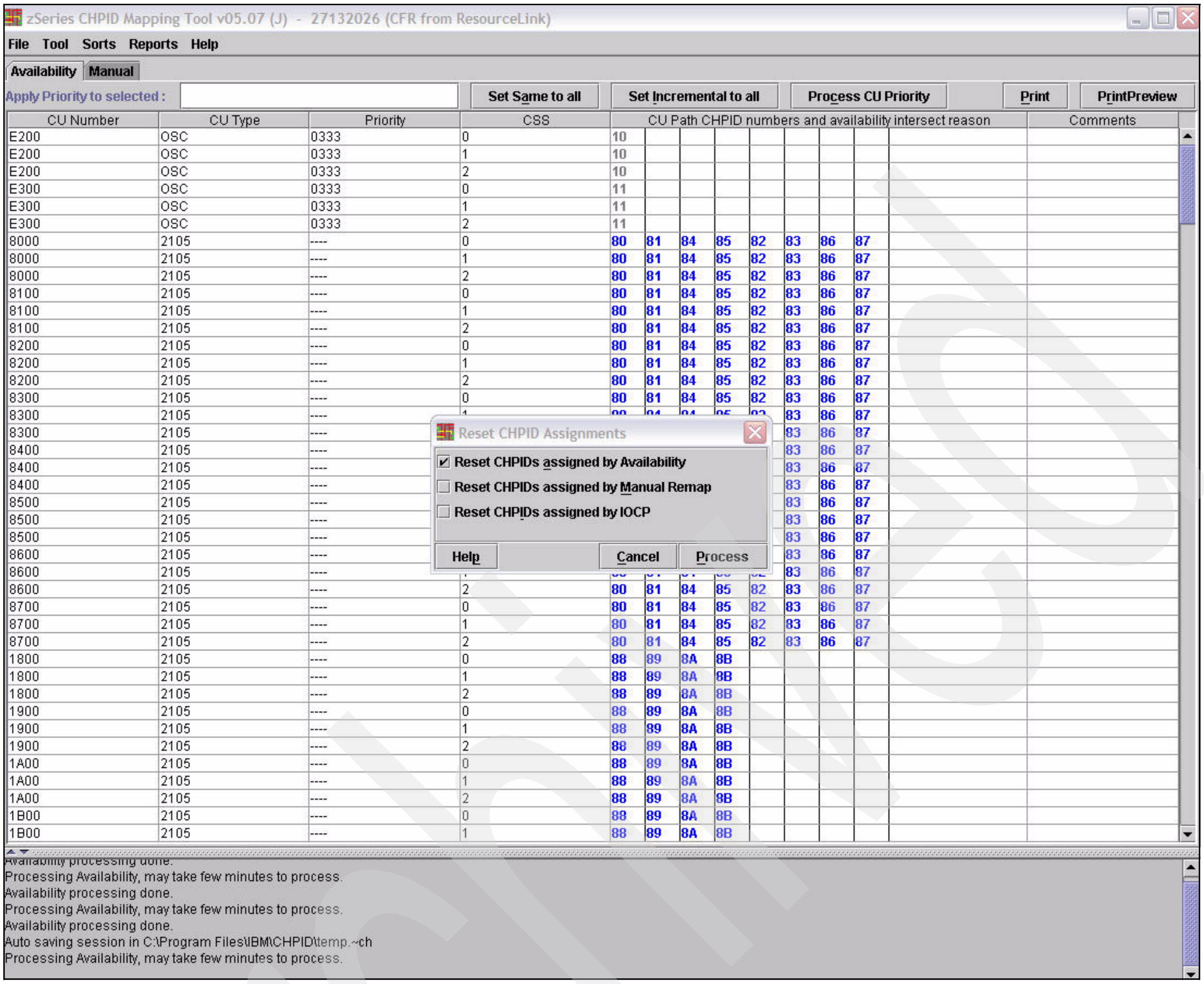


Figure 8-20 CMT - Reset CHPID Assignments by Availability

After the CHPID Mapping Tool has assigned the CHPIDs, it displays a message indicating the results of the process; see Figure 8-21.

Figure 8-21 CMT - Process CU Priority completion message

Our example returned a successful message with no intersects.

The following list defines the possible intersects:

C	Two or more assigned channels use the same channel card.
M	All assigned channels are supported by the same MBA group.
B	Greater than half the assigned channels are connected to the same book.

> **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.

- 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, 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.
- Page through the listing and search through the CU Number column for any control units you want to set priority for.

  In our example we are setting the OSC type CU Numbers E000 and E100 to priority 333; see Figure 8-22.

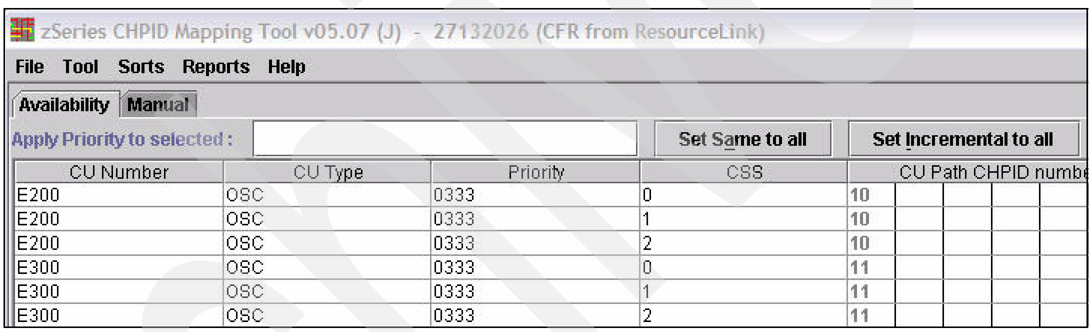


Figure 8-22 CMT Set CU Priority

- Under the File menu, click the **Availability** tab.
- 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**.
- Click Process.
- 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.
- Select the Manual tab to view the results of mapping the CHPIDs; see Figure 8-23 on page 316.

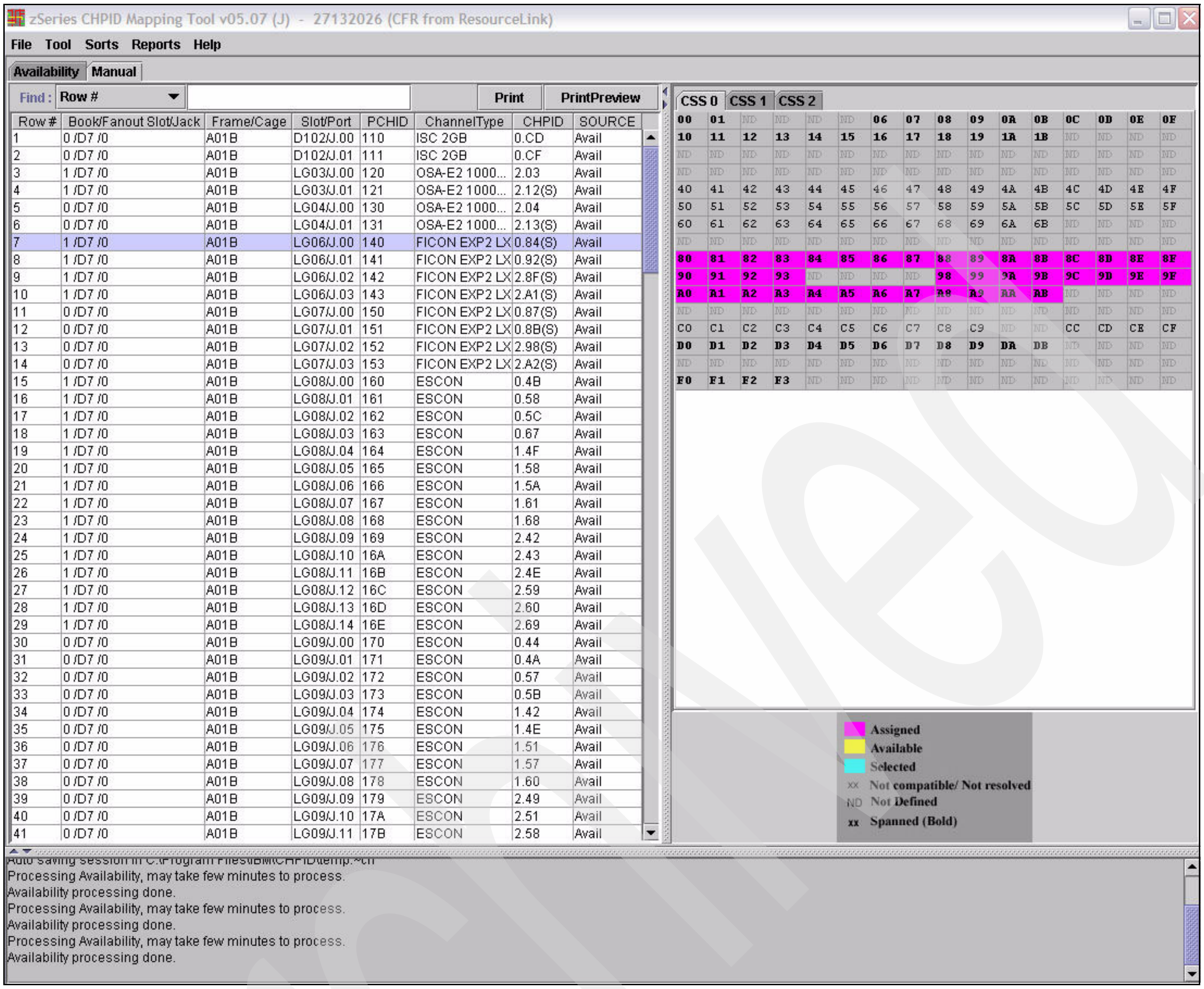


Figure 8-23 CMT - Manual (CHPIDs assigned)

Note that the CHPID column and the SOURCE column are no longer blank. The CHPID Mapping Tool has assigned CHPIDs to PCHIDs, and placed the value Avail in the SOURCE column, indicating that the CHPID values were assigned based on availability.

Create reports for the hardware team

The CHPID Mapping Tool provides 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 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 two reports in this example (the CHPID Report and the CHPID to Control Unit Report). However, all built-in reports are printed in the same way, as explained here.

CHPID Report

- Click **Reports** → **CHPID Report**; see Figure 8-24.

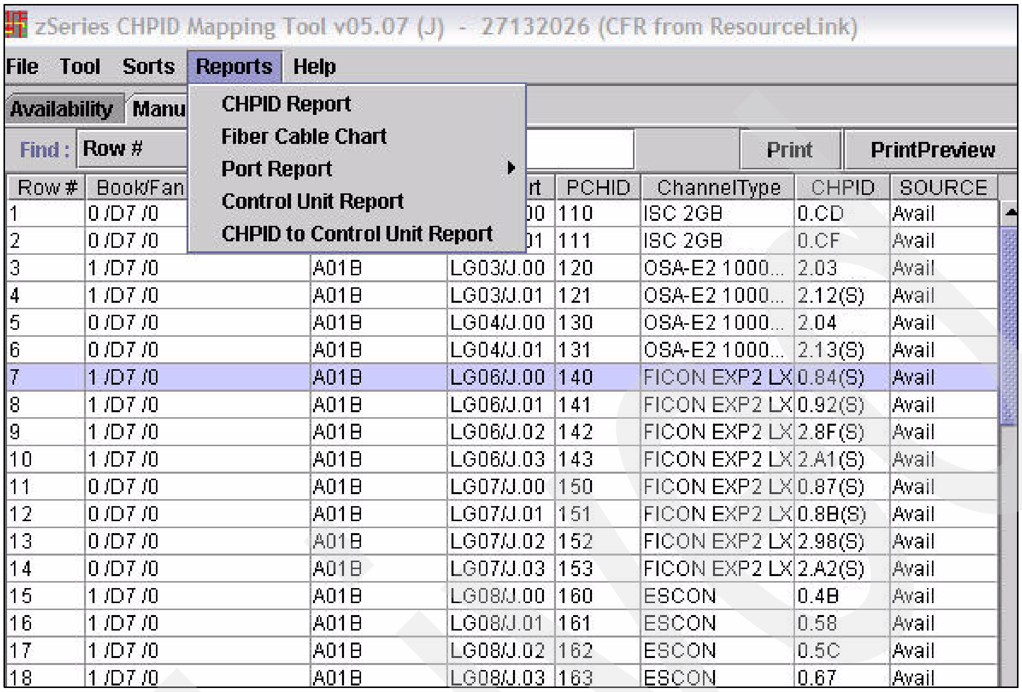


Figure 8-24 CMT - select CHPID Report

- Enter the report File name, or accept the name that the CHPID Mapping Tool enters and then click **Save**; see Figure 8-25.

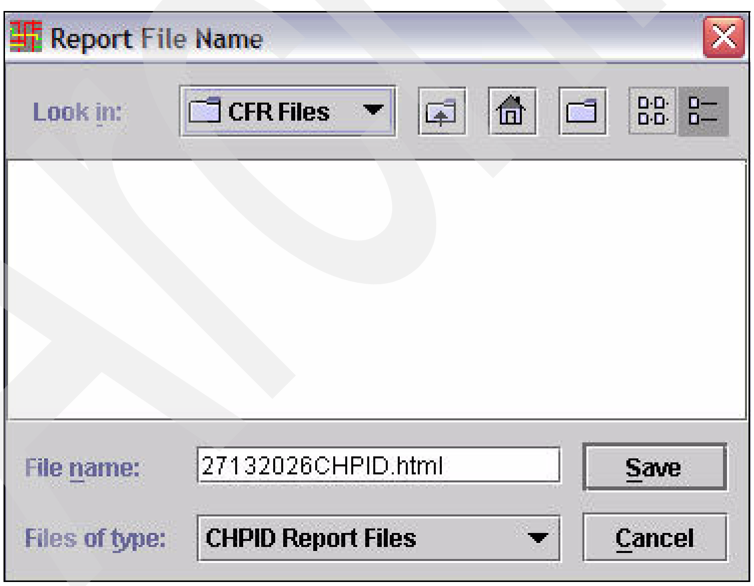


Figure 8-25 CMT - Report File Name

- The CHPID Mapping Tool opens a browser window with the CHPID report. You may be prompted to accept active content. Accept the active content in order to display the report in your browser; see Figure 8-26 on page 318.

CHPID Mapping Tool - CHPID Report

Control Number: 27132026(CFR from ResourceLink)
Machine: 2094-S18

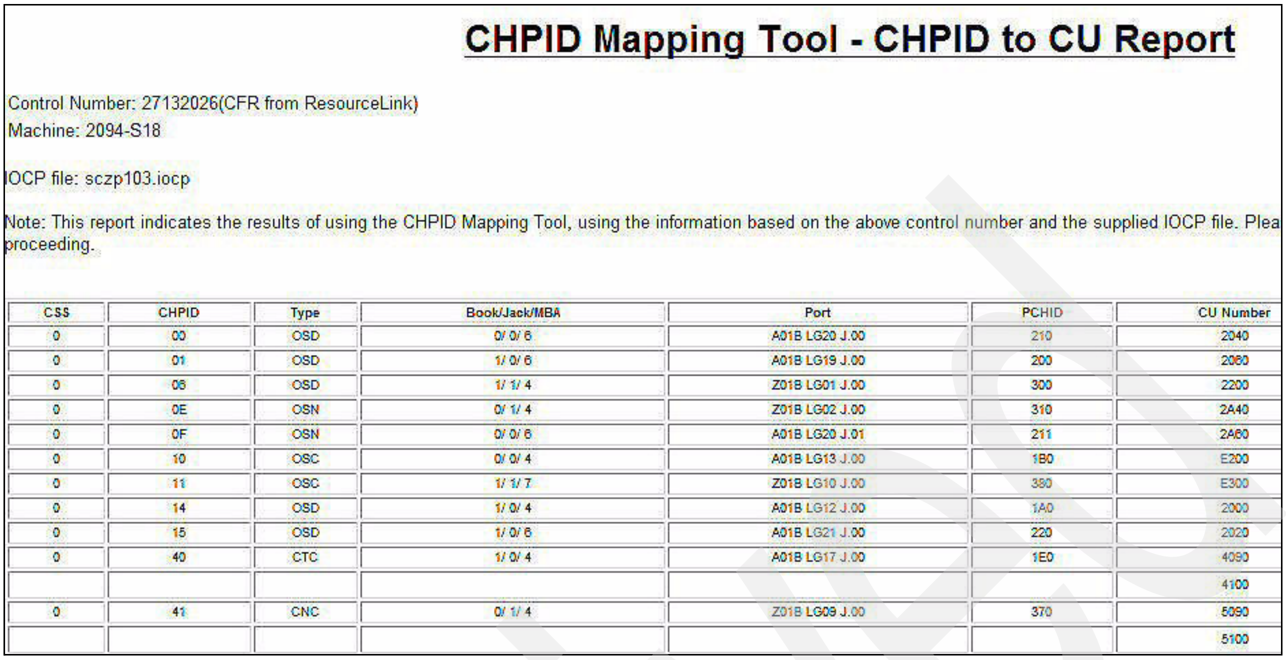
Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this

Book/Fanout Slot/Jack	Cage	Slot	F/C	CSS.CHPID/PCHID/Ports
0/ D8/ J.0	A19B	D806	3393	0.C9/01E/J00
1/ D8/ J.0	A19B	D810	3393	0.C8/02E/J00
1/ D7/ J.0	A01B	01	0863	---/100/P00 ---/101/P01
0/ D7/ J.0	A01B	D102	0218	0.CD/110/J00 0.CF/111/J01
1/ D7/ J.0	A01B	03	3366	2.03/120/J00 (0,1,2).12/121/J01
0/ D7/ J.0	A01B	04	3366	2.04/130/J00 (0,1,2).13/131/J01
1/ D7/ J.0	A01B	06	3319	(0,1,2).84/140/J00 (0,1,2).92/141/J01 (0,1,2).8F/142/J02 (0,1,2).A1/143/J03
0/ D7/ J.0	A01B	07	3319	(0,1,2).87/150/J00 (0,1,2).8B/151/J01 (0,1,2).98/152/J02 (0,1,2).A2/153/J03
1/ D7/ J.0	A01B	08	2323	0.4B/160/J00 0.58/161/J01 0.5C/162/J02 0.67/163/J03 1.4F/164/J04 1.58/165/J05 1.5A/166/J06 1.61/167/J07 1.68/168/J08 2.42/169/J09 2.43/16A/J10 2.4E/16B/J11 2.59/16C/J12 2.60/16D/J13 2.69/16E/J14
0/ D7/ J.0	A01B	09	2323	0.44/170/J00 0.4A/171/J01 0.57/172/J02 0.5B/173/J03 1.42/174/J04 1.4E/175/J05 1.51/176/J06 1.57/177/J07 1.60/178/J08 2.49/179/J09 2.51/17A/J10 2.58/17B/J11 2.5F/17C/J12 2.68/17D/J13
1/ D4/ J.0	A01B	D110	0218	0.CC/180/J00 0.CE/181/J01
0/ D4/ J.0	A01B	11	0863	---/190/P00 ---/191/P01
1/ D4/ J.0	A01B	12	3366	(0,1,2).14/1A0/J00 (0,1,2).18/1A1/J01

Figure 8-26 CMT - CHPID Report

CHPID to Control Unit Report

- 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; see Figure 8-27 on page 319. 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: 27132026(CFR from ResourceLink)
Machine: 2094-S18

IOCP file: sczp103.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. Plea proceeding.

CSS	CHPID	Type	Book/Jack/MBA	Port	PCHID	CU Number
0	00	OSD	0/ 0/ 6	A01B LG20 J.00	210	2040
0	01	OSD	1/ 0/ 6	A01B LG19 J.00	200	2060
0	06	OSD	1/ 1/ 4	Z01B LG01 J.00	300	2200
0	0E	OSN	0/ 1/ 4	Z01B LG02 J.00	310	2A40
0	0F	OSN	0/ 0/ 6	A01B LG20 J.01	211	2A60
0	10	OSC	0/ 0/ 4	A01B LG13 J.00	1B0	E200
0	11	OSC	1/ 1/ 7	Z01B LG10 J.00	380	E300
0	14	OSD	1/ 0/ 4	A01B LG12 J.00	1A0	2000
0	15	OSD	1/ 0/ 6	A01B LG21 J.00	220	2020
0	40	CTC	1/ 0/ 4	A01B LG17 J.00	1E0	4090
						4100
0	41	CNC	0/ 1/ 4	Z01B LG09 J.00	370	5090
						5100

Figure 8-27 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 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.

- Click **Tool** → **Create Updated IOCP File**; see Figure 8-28.

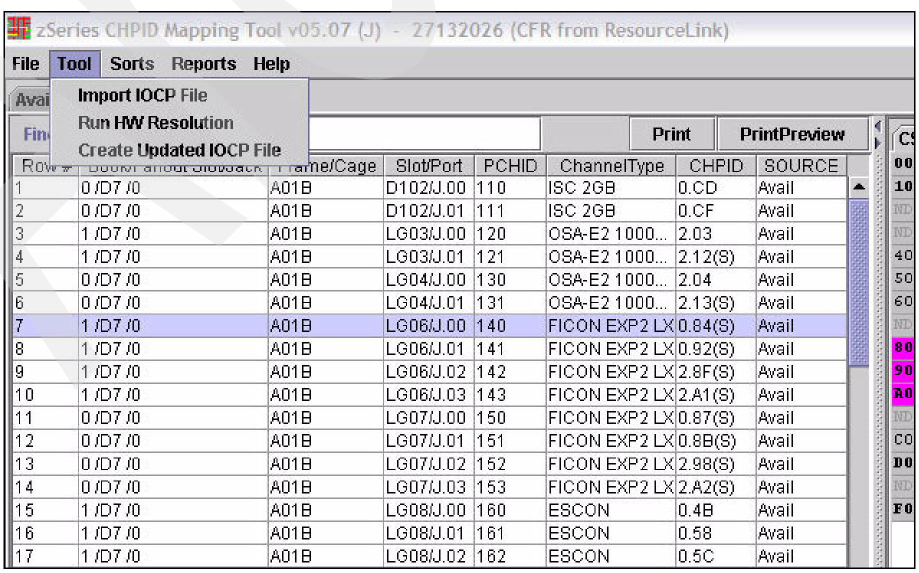


Figure 8-28 CMT - Create Updated IOCP File

- Enter **File name** and location for the IOCP output file, and then click Save; see Figure 8-29

> **Note:** The 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.

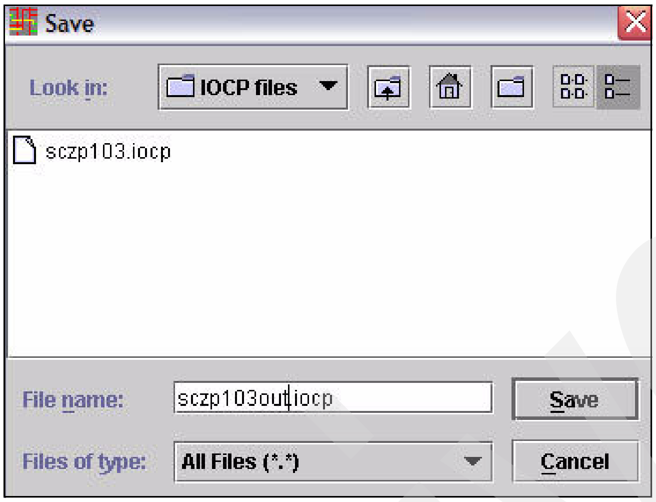


Figure 8-29 CMT - Save IOCP output file

- The CHPID Mapping Tool displays an informational message, shown in Figure 8-30, regarding what to do for the final execution of the tool.

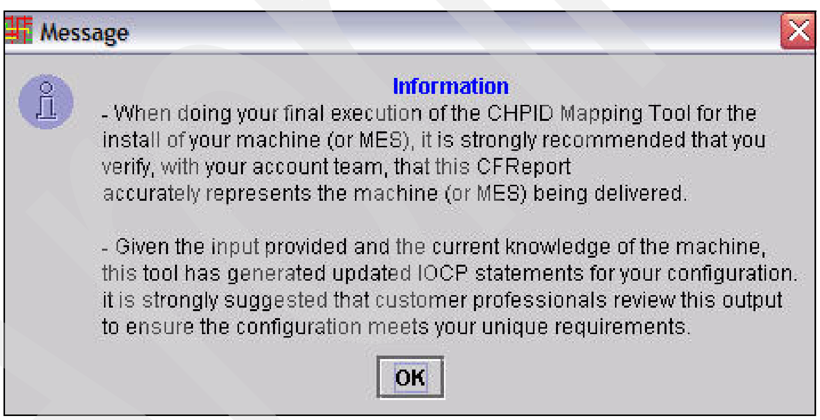


Figure 8-30 CMT - informational message

8.5 HCD - update the 2094 work IODF with PCHIDs

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, sczp103out.txt), as follows:

- Upload the sczp103out.txt file to the z/OS image. 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 E200 and E300.

> **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 8-2.

Example 8-2 HCD - Updated IOCP statements file (with CMT statements)

```
.        IODEVICE ADDRESS=(FEB3,007),CUNUMBR=(FFEE),UNIT=CFP
         IODEVICE ADDRESS=(FEC1,007),CUNUMBR=(FFEE),UNIT=CFP
*CMT* VERSION=000
*CMT* CCN=27132026(CFR from ResourceLink)
*CMT* E200.0=0333,E200.1=0333,E200.2=0333,E300.0=0333,E300.1=0333
*CMT* E300.2=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.

- 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 8-31 on page 322. Select option **5**, **Migrate configuration data**.

```
z/OS V1.7 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 8-31 HCD - main menu, select Migrate configuration data

The Migrate Configuration Data panel displays; see Figure 8-32. 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 8-32 HCD - Migrate Configuration Data

- HCD displays the Migrate IOCP Data panel; see Figure 8-33 on page 323. 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 8.6, "HCD - build the 2094 production IODF" on page 324).
`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 . . . . . . . . . . . . SCZP103   +   CSS ID . . . . . . _  +
 OS configuration ID  . . . . . . . . TEST2094  +

 Combined IOCP/MVSCP input data set . _____________________________________
 IOCP only input data set . . . . . . 'SYS6.IODF39.IOCPOUT.SCZP103'
 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 8-33 HCD - Migrate IOCP / MVSCP / HCPRIO Data

- 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 8-34.

```
-------------------------- 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 8-34 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.

- Press PF3; you should receive the following message:

```
IOCP/Operating system deck migration processing complete, return code = 0
```

- Press PF3 again.

8.6 HCD - build the 2094 production IODF

In order to make use of the definitions that we have updated in HCD, a production IODF needs to be created from the work IODF. Follow these steps:

- From the HCD main menu, select option **2**, **Activate or process configuration data**; see Figure 8-35.

```
z/OS V1.7 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 8-35 HCD - main menu, select Activate or process configuration data

- The Activate or Process Configuration Data panel displays; see Figure 8-36. 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 8-36 HCD - Activate or Process Configuration Data, select Build production IODF

- The Message List panel displays; see Figure 8-36. 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 8-37 HCD - Message List (building Production IODF)

- Press PF3 to continue. The Build Production I/O Definition File panel displays; see Figure 8-38. 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 . IODFPK  +

  Continue using as current IODF:
  2   1.  The work IODF in use at present
      2.  The new production IODF specified above
```

Figure 8-38 HCD - Build Production I/O Definition File

- The Define Descriptor Fields panel displays; see Figure 8-39 on page 326. Press Enter to accept the descriptor fields selected by HCD, or specify 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 8-39 HCD - Define Descriptor Fields

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

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

- Proceed to the steps to implement the configuration on the 2094.

8.7 Implementing the processor configuration on the 2094

At this point, we have a production IODF, which is SYS6.IODF39. Now the IOCDS needs to be updated on the new CPC that is being installed (for example, SCZP103) and power-on reset using this IOCDS. The final step would be to IPL the processor using this IODF.

Describing how to IPL the new hardware is beyond the scope of this redbook.

Updating the IOCDS

- From the HCD main menu, select option **2**, **Activate or process configuration data**. Ensure that the IODF is the production one created in the previous step; see Figure 8-40. Press Enter.

```
z/OS V1.7 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 8-40 HCD - main menu, select Activate or process configuration data

- The Activate or Process Configuration Data panel is displayed. 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 2094 via the HMC LAN in order to create an IOCDS from which to power-on reset. This may not be the case for all readers.

  In situations where the new 2094 is not accessible from the HMC LAN, we would need to create a diskette containing the IOCP statements and import them on the 2094 HMC to run a stand-alone IOCP. Creating a file on diskette 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 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 8-41 HCD - Activate or Process Configuration Data, select Build IOCDSs

- The S/390 Microprocessor Cluster List panel is displayed; see Figure 8-42 on page 328. Select the new 2094 from the list by using a forward slash mark (/) to update one of its IOCDSs, and 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.SCZP103    2094   S18     SCZP103
_ USIBMSC.SCZP701    9672   XX7     SCZP701
_ USIBMSC.SCZP801    2064   1C7     SCZP801
_ USIBMSC.SCZP901    2084   C24     SCZP102
******************************* Bottom of data ********************************
```

Figure 8-42 HCD - S/390 Microprocessor Cluster List

- The Actions on selected CPCs panel is displayed; see Figure 8-43. 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 8-43 HCD - Actions on selected CPCs, Work with IOCDSs

- The IOCDS List panel displays; see Figure 8-44. Select the IOCDS that you wish to update for the 2094 upgrade using a /, 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.SCZP103  DIAG00   LPAR   POR        Yes       No          Yes-POR
/ A1.SCZP103  DIAG01   LPAR   Alternate  No        No          No
_ A2.SCZP103  DIAG02   LPAR   Alternate  No        No          No
_ A3.SCZP103  DIAG03   LPAR   Alternate  No        No          No
******************************* Bottom of data ********************************
```

Figure 8-44 HCD - IOCDS List

- The Actions on selected IOCDSs panel displays; see Figure 8-45 on page 329. Select option **1**, **Update IOCDS**, and 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 8-45 HCD - Actions on selected IOCDSs

- The Build IOCDSs panel displays; see Figure 8-46. Verify that all the information is correct. Fill in the field `Title1` and then press Enter.

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

  Specify or revise the following values.

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

  Title1 . IODF39 __________________________________________________________
  Title2 : SYS6.IODF39 - 2005-11-30 19:22

                           Write IOCDS in
  IOCDS        Switch IOCDS  preparation of upgrade
  A1.SCZP103   No            No
  ***************************** Bottom of data ******************************
```

Figure 8-46 HCD - Build IOCDSs

- The Job Statement Information panel displays; see Figure 8-47. 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 8-47 HCD - Job Statement Information

- 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, you will note that the SNA Address is at `USIBMSC.SCZP103`; see Figure 8-48.

```
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
 s USIBMSC.SCZP103    2094   S18     SCZP103
 _ USIBMSC.SCZP701    9672   XX7     SCZP701
 _ USIBMSC.SCZP801    2064   1C7     SCZP801
 _ USIBMSC.SCZP901    2084   C24     SCZP102
 ****************************** Bottom of data ********************************
```

Figure 8-48 HCD - IOCDS updating new 2094

Figure 8-49 shows the Alternate status.

```
. 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.SCZP103  DIAG00    LPAR   POR        Yes       No          Yes-POR
 _ A1.SCZP103  IODF39    LPAR   Alternate  Yes       Yes         No
 _ A2.SCZP103  DIAG02    LPAR   Alternate  No        No          No
 _ A3.SCZP103  DIAG03    LPAR   Alternate  No        No          No
 ****************************** Bottom of data ********************************
```

Figure 8-49 HCD - IOCDS showing Alternate Status

8.8 HMC steps for activation profiles

Follow these steps for activation profiles.

Build a 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 new 2094 after it has been handed over to you from the IBM service representative.

- Log on to the HMC and select the new 2094, assuming it has been defined to your Defined CPCs Work Area.
- Under Operational Customization, select **Customize/Delete Activation Profiles**.
- Select the “DEFAULT” Reset Profile and click **Customize**.

- Save this “DEFAULT” profile with a new Profile name to be referred to when the power-on reset is required (for example, SCZP103).
- Now select the new Profile and click **Customize**.
- Click the IOCDS that you just updated in the previous step (A1, as shown in Figure 8-46 on page 329). On the HMC, you will receive message ACTB0219, as shown in Figure 8-50.

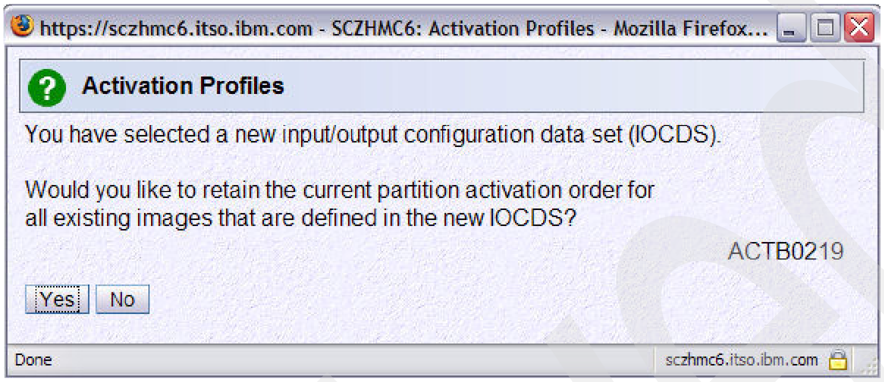


Figure 8-50 HMC - Activation Profiles (received when changing IOCDS)

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

Build Image Profiles

While still in the Reset Profile, you can now create 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 2094. 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 SCZP103 in this example.

Performing a power-on reset (POR) of the 2094

After the 2094 processor has been installed, 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 where you perform another power-on reset using the Reset Profile created in the previous step (in this example, SCZP103).

After the power-on reset has been completed, the logical partitions are ready to be IPLed.

9

Install a new z9-109

In this chapter we describe how to install a z9-109 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 2094 Work IODF
- Validate the 2094 work IODF
- CHPID Mapping Tool actions
- Migrate PCHIDs back into the 2094 work IODF
- HCD steps to build production IODF
- Implementing the processor configuration on the 2094
- HMC steps for activation profiles

9.1 Scenario overview

We begin by providing an overall description of this scenario.

9.1.1 The configuration process

Figure 9-1 depicts the general process that we followed in this example. The numbered steps are described following the figure.

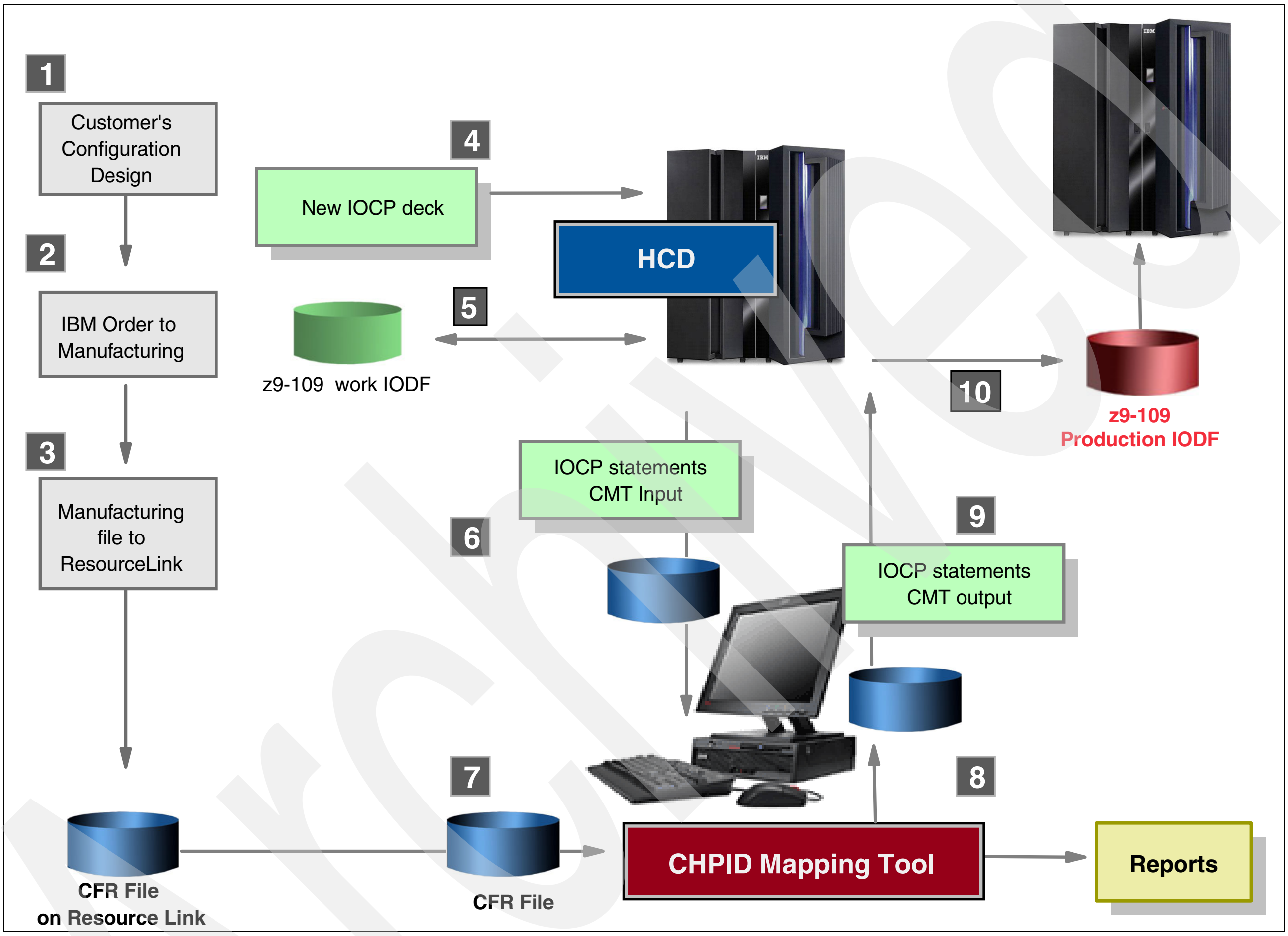


Figure 9-1 CMT - Overall process flow

1. When planning to install a new z9-109, the IBM Technical Support team can help you 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 new IOCP deck created on another System z processor in 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, a validated 2094 work IODF is created.

6. From the validated work IODF, create a file containing the z9-109 IOCP statements. This file is transferred to the workstation used for the CHPID Mapping Tool.
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 z9-109 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 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 channels assignment, 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 2094 production IODF is created and the final IUOCP statements can be generated.

    The IBM hardware team uses the configuration data written in step 10 when the final power-on reset is done, yielding a z9-109 with the client's configuration on it that is ready to be used by the client.

When installing a new 2084, you may be able to use HCD to write an IOCDS to the 2094 in preparation for an upgrade. If you can write an IOCDS to the 2094, do so and let the IBM service representative know which IOCDS to use.

> **Note:** Using HCD option Write IOCDS in preparation of an upgrade is the preferred method for writing the initial IOCDS when installing a new 2094.

If the new 2094 is not connected using a LAN to the CPC where HCD is running, or you are not upgrading or cannot write an IOCDS in preparation for the upgrade, then 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.

9.1.2 Planning considerations

Keep the following considerations in mind when planning your configuration.

Coupling links

CBS/CBR and CFS/CFR CHPIDs are not supported on a z9-109. You need to use CFP or CBP CHPIDs. ICB-2 and ISC-3 links in Compatibility mode are not supported on the 2094.

HMC

The z9-109 requires a new HMC and only uses Ethernet for its network connection.

Software support

There are software features which are only available with z/OS V1.7 (such as Multiple Subchannel Sets (MSS), for example). You also require HCD V1.7 to be able to define MSS, which creates a Version 5 IODF. Additionally, you require PTFs from the 2094DEVICE PSP Bucket to define z9-109 processors via HCD.

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

You might consider using OSA Express2 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.ID 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 ID does not. Therefore, the CPC ID 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.ID 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.ID, 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 ID separated by a dot (for example, SIBMSC.SCZP901). 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.

9.1.3 Adding a new 2094 to a new hardware environment

In this scenario we describe the configuration steps in installing a new 2094 processor into a new environment. The 2094 is the first processor on the floor and is being connected to new switches and control unit interfaces.

- HCD requires a new Processor ID for the 2094.
- We recommend defining a new CPC ID for the 2094.
- The 2094 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 2094-S18 with Processor.ID of SCZP103 and with three LCSSs (CSS ID=0, CSS ID=1, and CSS ID=2). The CPC.ID of SCZP103 and serial number of 000103 is used for the 2094.

The following CHPID types are defined:

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

Table 9-1 New 2094 in a new installation

New 2094	Additional 2094 to connect to new switch ports and control units that do not currently exist (new installation)
Processor.id	Require new Processor.ID
CPC.id	Require new CPC.ID
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)	Required
CFReport File (CCN)	Required
IOCP (import from validated work IODF)	Yes
CHPID Mapping Tool Actions (PCHID reset)	Yes
CHPID Mapping Tool IOCP Output	Yes
CHPID Mapping Tool Reports	Yes (CHPID and CHPID to CU Report)

Note: As mentioned, you can have a different Processor ID with a CPC ID.

However, if you do not need to support multiple processor images, we recommend that the Processor.ID and CPC.ID match.

9.2 HCD - create a 2094 Work IODF

The following steps explain how to define a new 2094 configuration using HCD:

- Create a 2094 work IODF, either new or from an existing production IODF.
- Add the processor.
- Add the partitions.
- Add CHPIDs.
- Add FICON and ESCON Switches.
- Add operating system configurations.
- Create the Eligible Device Table (EDT).
- Create esoterics for the EDT.
- Connect FICON and ESCON CHPIDs to new switches, spreading connections over as many switches and physical port cards as possible, where appropriate.
- Create control units unique to this processor.
- Create devices appropriate to the control units.

- Define devices to the operating system configurations and any esoterics, where appropriate.
- Connect control units to CHPIDs or switch ports, then CHPIDs.
- Define all required CF connections to other processors and any Internal CF connections required.
- Create CTCs:
  - Create OSA configuration (OSC, OSD, OSE, OSN).
  - Define Nucleus Initialization Program (NIP) consoles.
  - Build validated Work IODF.
  - Create an IOCP statements file and file transfer to your PC. This step may be performed with HCM.

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

Create new Work IODF

Create and select a new work IODF where you add the new 2094 processor definition (for example, 'SYS6.IODF39.WORK').

Add 2094 processor

- From the HCD main menu, select option **1.3**, **Processor List**; see Figure 9-2. Then press PF11 (or type `add` on the command line) to add a new processor and press Enter.

```
                                Processor List
Command ===> add____________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
******************************* Bottom of data ********************************
```

Figure 9-2 HCD - Processor List (adding processor)

- The Add Processor panel is displayed; see Figure 9-3 on page 339.

```
------------------------------- 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 . . . . . . . . . . . ________  +
```

Figure 9-3 HCD - Add Processor (blank values)

- For our example we specified the following values:
  - Add the Processor ID of SCZP103.
  - Add the Processor type of 2094.
  - Add the Processor model of S18.
  - Add the Number of channel subsystems of 3.
  - Add the Serial number of 0001032094.
  - Add the Network name of USIBMSC.
  - Add the CPC name of SCZP103.

  Figure 9-4 on page 340 shows the values we added.

```
------------------------------ Add Processor ------------------------------


 Specify or revise the following values.

 Processor ID . . . . . . . . . . SCZP103

 Processor type . . . . . . . . . 2094____  +
 Processor model  . . . . . . . . S18_____  +
 Configuration mode . . . . . . . LPAR      +
 Number of channel subsystems . . 3         +

 Serial number  . . . . . . . . . 0001032094
 Description  . . . . . . . . . . ________________________________

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

 Network name . . . . . . . . . . USIBMSC_  +
 CPC name . . . . . . . . . . . . SCZP103_  +
```

Figure 9-4   HCD - Add Processor (adding values)

- Press Enter. The Processor List panel displays, showing the additional 2094 processor named SCZP103; see Figure 9-5.

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

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ SCZP103  2094     S18      LPAR  0001032094 ________________________________
******************************* Bottom of data ********************************
```

Figure 9-5   HCD - processor List (new process or added)

- Type s next to the SCZP103 and press Enter; see Figure 9-6 on page 341.

```
.                              Channel Subsystem List                 Row 1 of 2
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID . . . : SCZP103

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
_ 0   65280     0       0         0       ________________________________
_ 1   65280     0       0         0       ________________________________
_ 2   65280     0       0         0       ________________________________
******************************* Bottom of data ********************************
```

Figure 9-6 HCD - Channel Subsystem List (newly defined CSS)

Here you see three Channel Subsystems defined with the default MAXDEV values of 65280 set by HCD. You should consider changing these values if you will not be defining this many devices.

> **Note:** This value affects the amount of HSA that is allocated during power-on reset.
>
> Changing this value requires a new power-on reset.

- Now you need to define the resources to the new 2094 processor:
  - Add partitions to each CSS.
  - 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.
- Add FICON and ESCON switches.
- Add operating system configurations:
  - Create an Eligible Device Table (EDT) for each of these operating system configurations.
  - 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:
  - Create devices appropriate to the control units.
  - Define devices to operating system configurations and any esoterics, where appropriate.
  - 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 have added 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

For an XMP processor, you can 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:** However, 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.

The 2094 production IODF can then be activated dynamically and the PCHID/CHPID/control unit definitions become available to the operating system.

- Figure 9-7 illustrates what the CHPID/PCHID definitions look like before being defined as over-defined. Press PF20 (right) in the Channel Path List.

```
 Channel Path List   Row 116 of 127 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Channel Subsystem ID : 1
1=A11       2=A12       3=A13       4=A14       5=A15
6=A16       7=A17       8=A18       9=A19       A=A1A
B=A1B       C=A1C       D=A1D       E=A1E       F=A1F
                          I/O Cluster  --------- Partitions 1x -----
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   PCHID
_ E0    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D0
_ E1    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D1
_ E2    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D8
_ E3    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   3D9
_ F0    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F1    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F2    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F3    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FC    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FD    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FE    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FF    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
******************************* Bottom of data ********************************
```

Figure 9-7 HCD - Channel Path List (Reserving CHPIDs)

- Figure 9-8 illustrates what the CHPID/PCHID definitions look like after being defined as over-defined.

```
 Channel Path List   Row 116 of 127 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Channel Subsystem ID : 1
1=A11       2=A12       3=A13       4=A14       5=A15
6=A16       7=A17       8=A18       9=A19       A=A1A
B=A1B       C=A1C       D=A1D       E=A1E       F=A1F
                          I/O Cluster  --------- Partitions 1x -----
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   PCHID
_ E0    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E1    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E2    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ E3    CFP   SHR   No    ________     _ _ _ _ a _ _ _ _ _ _ _ _ _ _   *
_ F0    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F1    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F2    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ F3    IQD   SHR   No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FC    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FD    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FE    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
_ FF    IQD   SPAN  No    ________     a a a a a a a a a a a _ _ _ _   ___
******************************* Bottom of data ********************************
```

Figure 9-8 HCD - Channel Path List (over-defined CHPIDs)

9.3 Validate the 2094 work IODF

Validate the work IODF

- Select HCD option **2.12**, **Build validated work I/O definition file**.
- Observe the Message List and review.
- Press PF3 to continue; you should receive the following message:

  `Requested action successfully processed`

- Go to HCD option **6.4**, **View I/O Definition File Information**; see Figure 9-9 on page 344. 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  . . . . : 2005-11-30
 Last update  . . . . . : 2005-11-30  18:44

 Volume serial number . : BH6ST2
 Allocated space  . . . : 2048    (Number of 4K blocks)
 Used space . . . . . . : 1304    (Number of 4K blocks)
    thereof utilized (%)  91

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

 Description  . . . . . :
```

Figure 9-9 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.

- Select HCD option **2.3**, **Build IOCP input data set**, and press Enter; see Figure 9-10.

```
 ----- 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 9-10 HCD - Activate or Process Configuration Data (Build IOCP for SCZP103)

- HCD displays the list of available processors to chose from. Select the processor SCZP103 by using a forward slash mark (/), and then press Enter; see Figure 9-11 on page 345.

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

  Select one.

    Processor ID  Type     Model    Mode  Description
  / SCZP103       2094     S18      LPAR
  **************************** Bottom of data *****************************
```

Figure 9-11 HCD - Available Processors (select processor for IOCP file)

HCD presents a panel on which you enter information regarding the IOCP input data set to be created; see Figure 9-12.

- 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.
- 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  . . . . . . . : SCZP103
  Title1 . IODF39__________________________________________________________
  Title2 : SYS6.IODF39.WORK - 2005-11-30 18:44

  IOCP input data set
  'SYS6.IODF39.IOCPIN.SCZP103'_____________________________________
  Input to Stand-alone IOCP?  Yes  (Yes or No)

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

Figure 9-12 HCD - Build IOCP Input Data Set

- Verify in TSO that the data set just created exists, and that it contains IOCP statements; see Figure 9-13 on page 346. This data set is used as input into the CHPID Mapping Tool.

```
ID    MSG1='IODF39',                                              *
      MSG2='SYS6.IODF39.WORK - 2005-11-30 18:44',                 *
      SYSTEM=(2094,1),                                            *
      TOK=('SCZP103',00800221991E2094165932680105327F00000000,*
      00000000,'05-11-30','18:44:32','........','........')
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))),       *
      MAXDEV=((CSS(0),64512,0),(CSS(1),64512,0))
CHPID PATH=(CSS(0),00),SHARED,                                    *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=120,TYPE=OSD
CHPID PATH=(CSS(0),01),SHARED,                                    *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=300,TYPE=OSD
CHPID PATH=(CSS(0),02),SHARED,                                    *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=1B0,TYPE=OSD
CHPID PATH=(CSS(0),03),SHARED,                                    *
      PARTITION=((A0A,A0B,A0C,A01,A02,A03,A04,A05,A06,A07,A08,*
      A09),(=)),PCHID=180,TYPE=OSD
CHPID PATH=(CSS(0,1),04),SHARED,                                  *
```

Figure 9-13 HCD - IOCP input data set contents (truncated)

Note that part of the TOK statement has been blanked out with dots; see Example 9-1.

Example 9-1 HCD - IOCP file (TOK statement)

```
TOK=('SCZP103',00800221991E2094184459480105332F00000000,
00000000,'05-11-30','18:44:59','........','........')
```

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.

- 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 SCZP103.IOCP.

9.4 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 2094 order process (CFReport). Using the CHPID Mapping Tool, we assign PCHIDs to each of the CHPIDs for the 2094.

Download and install the CHPID Mapping Tool. Refer to 2.5.1, “CHPID Mapping Tool” on page 32 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:

- Import IOCP statements file and “new” CFReport file into the CHPID Mapping Tool. Getting the IOCP statements may be performed with HCM.
- Resolve CHPIDs without associated hardware.
- Resolve Hardware resolution.
- Set CU Priority for single-path control units and other control units that would override the CHPID Mapping Tool default priorities.
- Run the CHPID Mapping Tool availability function.
- Create the CHPID Mapping Tool reports.
- Create updated IOCP statements file and file transfer back to the host. This step may be performed with HCM.

Import the CFReport order file into the CHPID Mapping Tool

- Start the CHPID Mapping Tool on your workstation.
- Import the CFReport order file into the CHPID Mapping Tool by clicking **File** → **Import CFReport Order file**; see Figure 9-14.

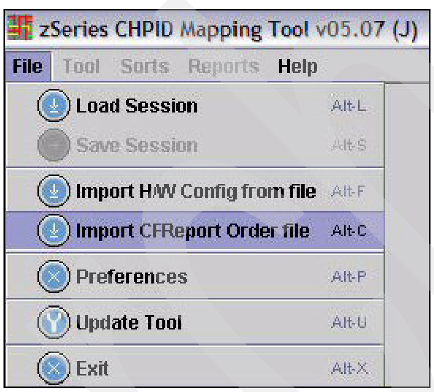


Figure 9-14 CMT - Import CFReport Order file

- Select the CFReport file on your workstation to import into the CHPID Mapping Tool and click **Open**; see Figure 9-15 on page 348.

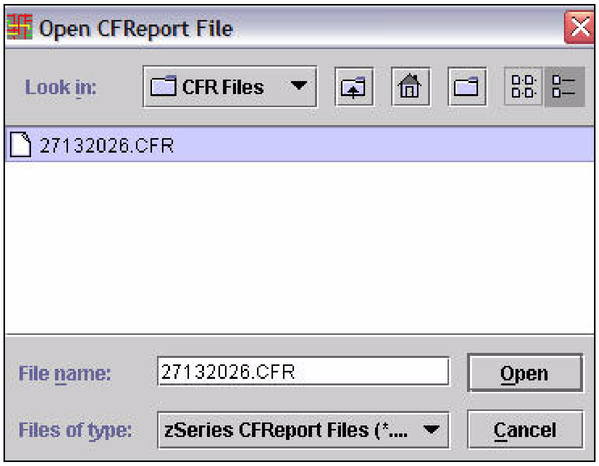


Figure 9-15 CMT - Open CFReport Order file

The CHPID Mapping Tool displays the information from the CFReport on the left-hand side of the screen; see Figure 9-16.

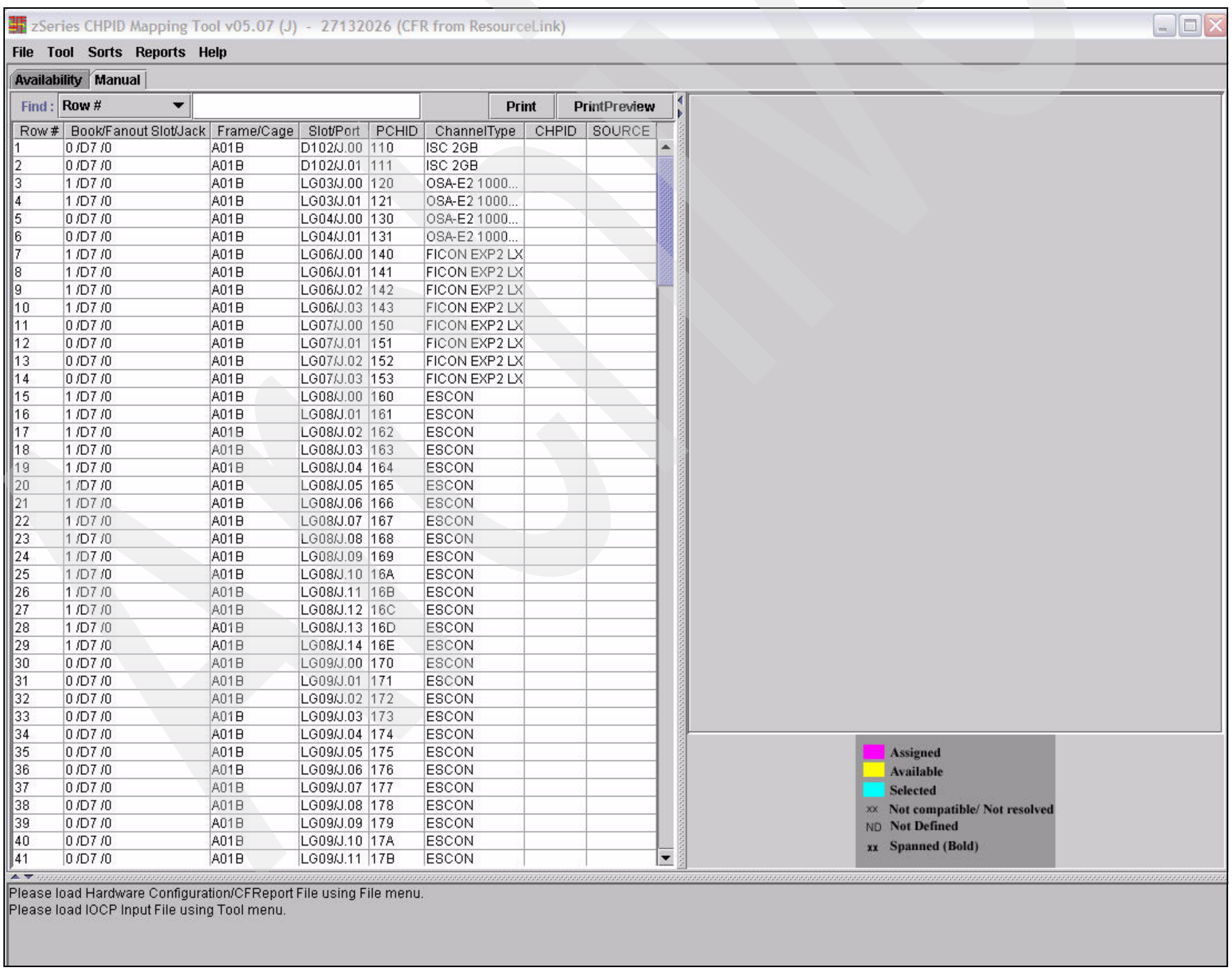


Figure 9-16 CMT - Importing CFReport Order file

Import IOCP file into the CHPID Mapping Tool

Import the IOCP file by clicking **Tool** → **Import IOCP File**; see Figure 9-17.

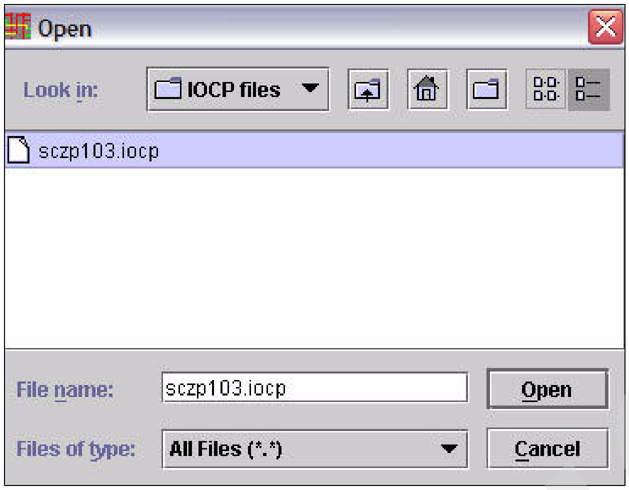


Figure 9-17 CMT - Import IOCP files

- 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=OSE, and TYPE=FC channels.

In each case, we must check off what each of the channels are used for. The image in the lower right-hand side shows what we have selected for the FC channels; see Figure 9-18 on page 350.

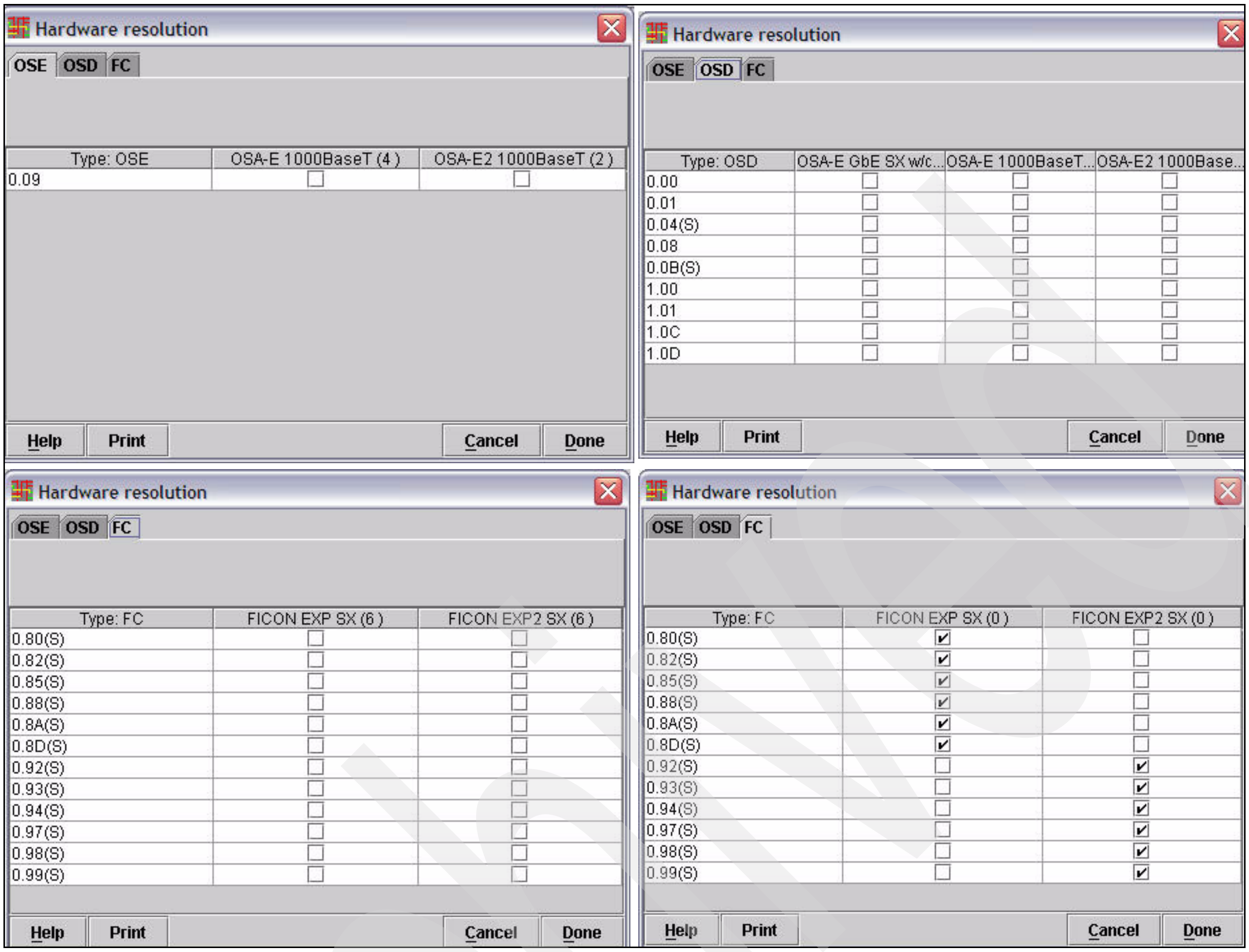


Figure 9-18 CMT - Hardware resolution after IOCP import

- 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. In Figure 9-19 on page 351, note that the CHPID column and the SOURCE columns contain blanks. These are filled in after the CHPID Mapping Tool assigns the CHPIDs to PCHIDs.

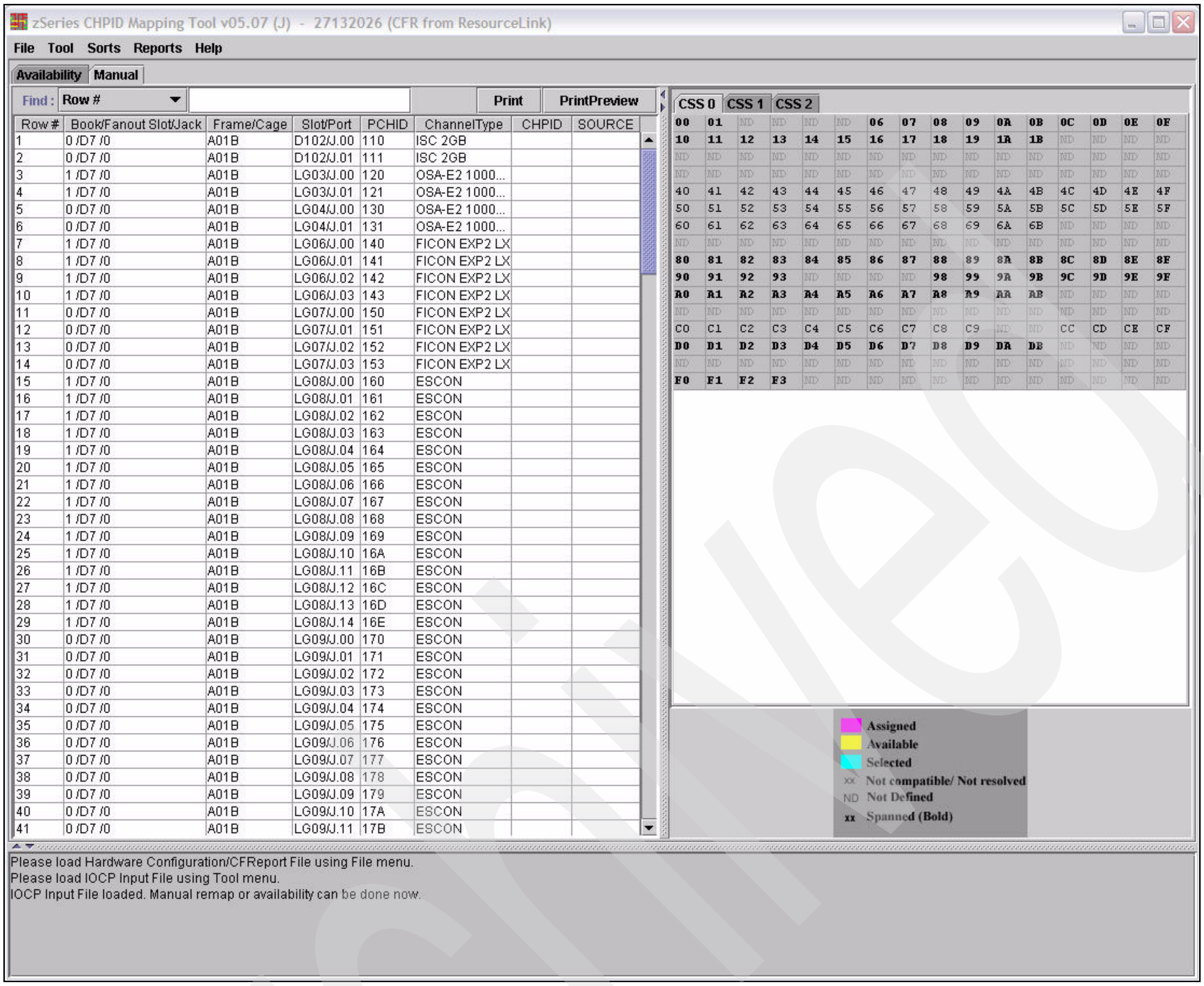


Figure 9-19 CMT - Manual tab

Set control unit priority manually

- Under the File menu, click the **Availability** tab.
- Click **Process CU Priority** and a window pops up; see Figure 9-20 on page 352.

  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 have 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.
- Click **Process**.

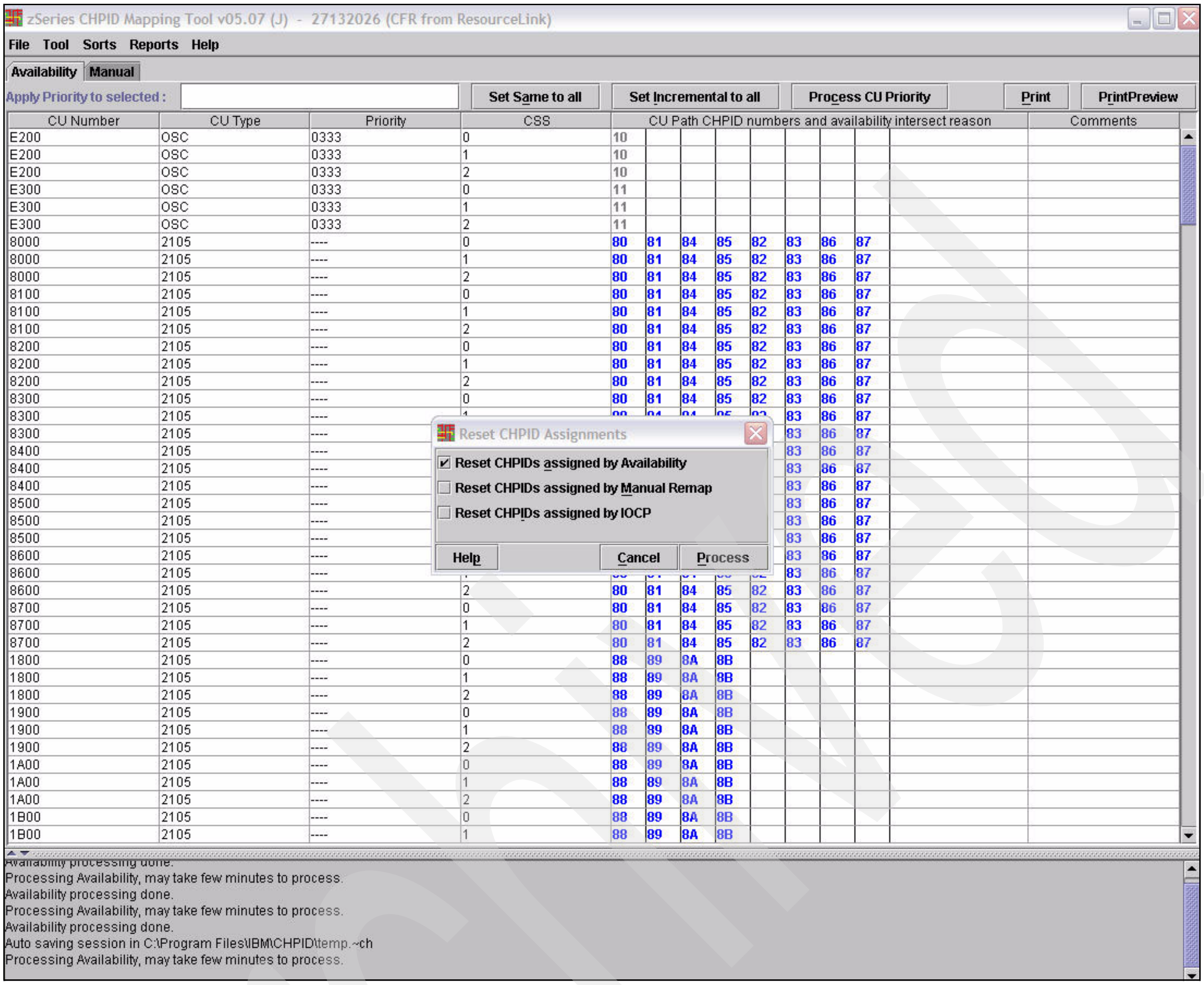


Figure 9-20 CMT - Reset CHPID Assignments by availability

After the CHPID Mapping Tool has assigned the CHPIDs, it displays a message indicating the results of the process; see Figure 9-21.

Figure 9-21 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.

Possible intersects can include the following:

C Two or more assigned channels use the same channel card.
M All assigned channels are supported by the same MBA group.
B More than half the assigned channels are connected to the same book.

- 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, 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.
- 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 E200 and E300 to priority 333; see Figure 9-22.

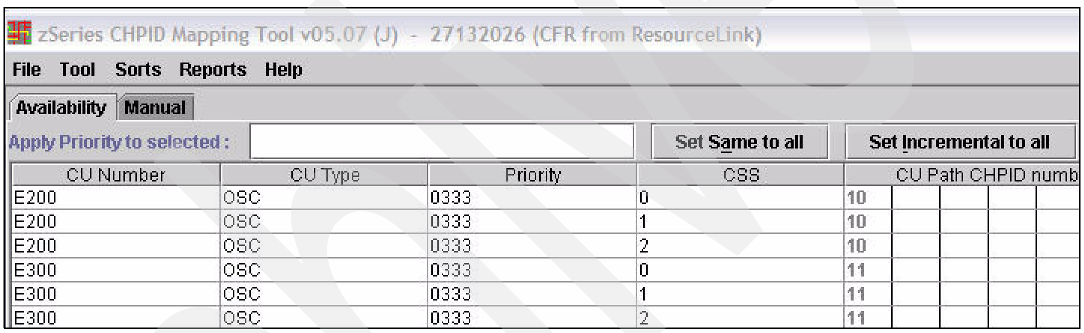


Figure 9-22 CMT Set CU Priority

- Under the File menu, click the **Availability** tab.
- 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**.
- Click **Process**.
- 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.
- Select the Manual tab and view the results of mapping the CHPIDs; see Figure 9-23 on page 354.

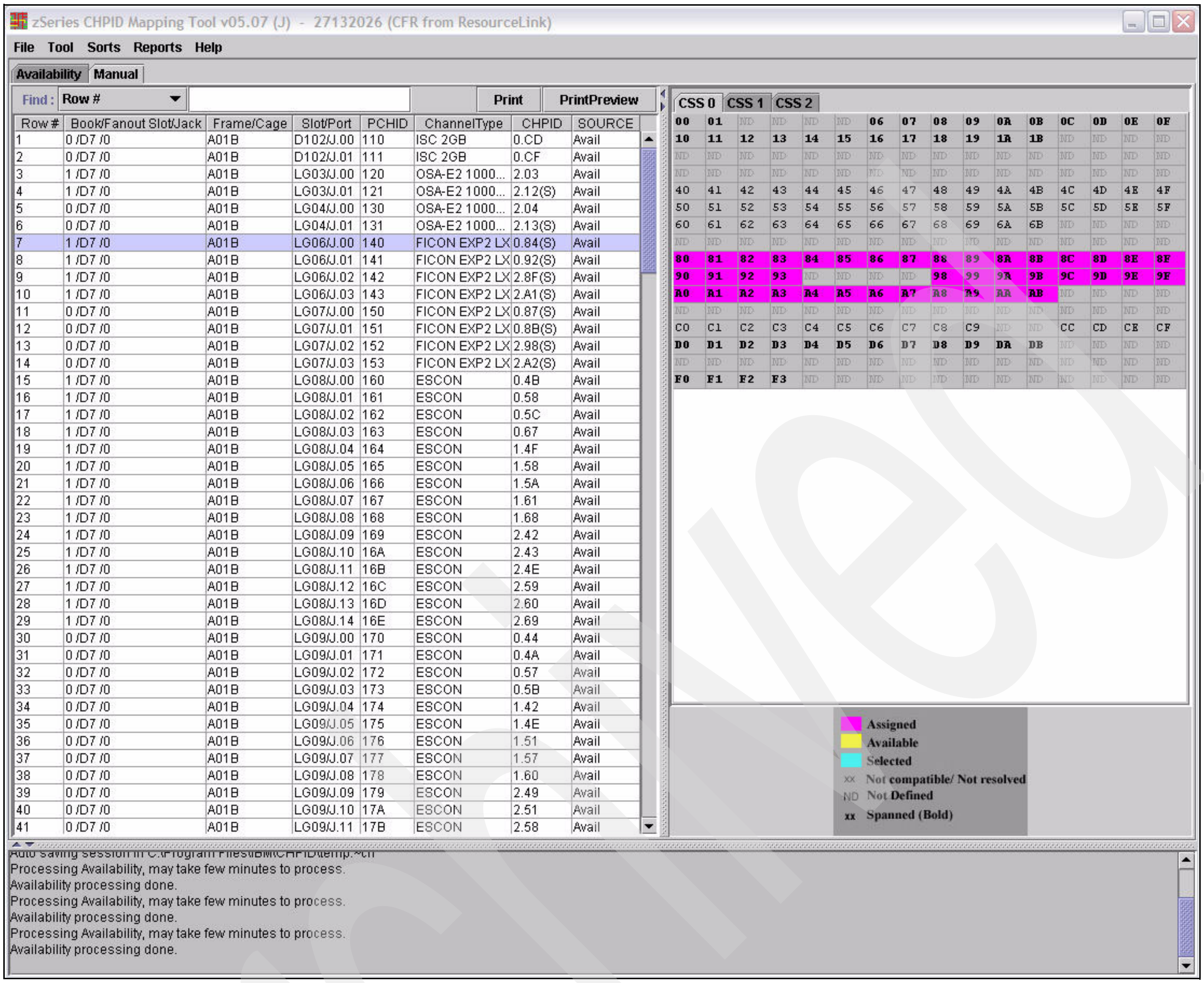


Figure 9-23 CMT - Manual (CHPIDs assigned)

Note that the CHPID column and the SOURCE columns are no longer blank. The CHPID Mapping Tool has assigned CHPIDs to PCHIDs and it has placed the value Avail in the SOURCE column, indicating that the CHPID values were assigned based on 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 two reports in this example (the CHPID Report and the CHPID to Control Unit Report). However, all built-in reports are printed in the same way, as explained here.

CHPID Report

- Click **Reports** → **CHPID Report**; see Figure 9-24.

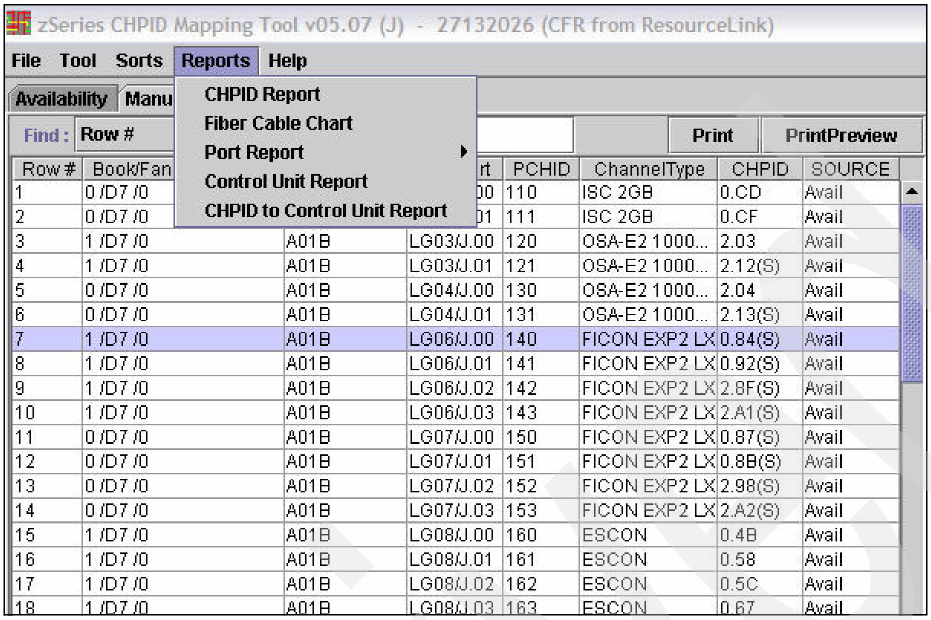


Figure 9-24 CMT - select CHPID Report

- Enter the report File name, or accept the name that the CHPID Mapping Tool enters and then click **Save**; see Figure 9-25.

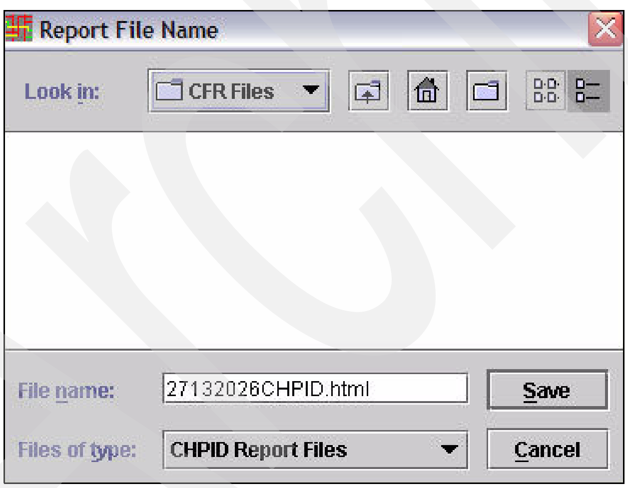


Figure 9-25 CMT - Report File Name

The CHPID Mapping Tool opens a browser window with the CHPID report; see Figure 9-26 on page 356.

- 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: 27132026(CFR from ResourceLink)
Machine: 2094-S18

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this

Book/Fanout Slot/Jack	Cage	Slot	F/C	CSS.CHPID/PCHID/Ports
0/ D8/ J.0	A19B	D806	3393	0.C9/01E/J00
1/ D8/ J.0	A19B	D810	3393	0.C8/02E/J00
1/ D7/ J.0	A01B	01	0863	---/100/P00 ---/101/P01
0/ D7/ J.0	A01B	D102	0218	0.CD/110/J00 0.CF/111/J01
1/ D7/ J.0	A01B	03	3366	2.03/120/J00 (0,1,2).12/121/J01
0/ D7/ J.0	A01B	04	3366	2.04/130/J00 (0,1,2).13/131/J01
1/ D7/ J.0	A01B	06	3319	(0,1,2).84/140/J00 (0,1,2).92/141/J01 (0,1,2).8F/142/J02 (0,1,2).A1/143/J03
0/ D7/ J.0	A01B	07	3319	(0,1,2).87/150/J00 (0,1,2).8B/151/J01 (0,1,2).98/152/J02 (0,1,2).A2/153/J03
1/ D7/ J.0	A01B	08	2323	0.4B/160/J00 0.58/161/J01 0.5C/162/J02 0.67/163/J03 1.4F/164/J04 1.58/165/J05 1.5A/166/J06 1.61/167/J07 1.68/168/J08 2.42/169/J09 2.43/16A/J10 2.4E/16B/J11 2.59/16C/J12 2.60/16D/J13 2.69/16E/J14
0/ D7/ J.0	A01B	09	2323	0.44/170/J00 0.4A/171/J01 0.57/172/J02 0.5B/173/J03 1.42/174/J04 1.4E/175/J05 1.51/176/J06 1.57/177/J07 1.60/178/J08 2.49/179/J09 2.51/17A/J10 2.58/17B/J11 2.5F/17C/J12 2.68/17D/J13
1/ D4/ J.0	A01B	D110	0218	0.CC/180/J00 0.CE/181/J01
0/ D4/ J.0	A01B	11	0863	---/190/P00 ---/191/P01
1/ D4/ J.0	A01B	12	3366	(0,1,2).14/1A0/J00 (0,1,2).18/1A1/J01

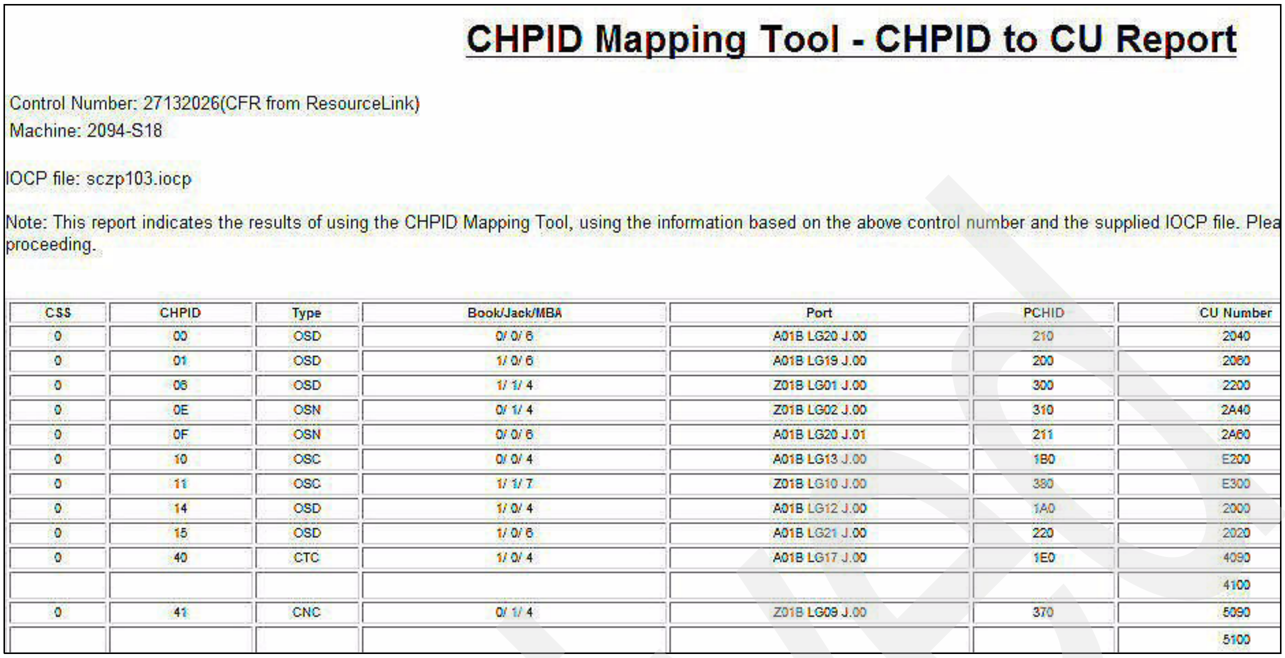
Figure 9-26 CMT - CHPID Report

CHPID to Control Unit Report

- Click **Reports** → **CHPID to Control Unit Report**, 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 Control Unit Report; see Figure 9-27 on page 357.

- 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: 27132026(CFR from ResourceLink)
Machine: 2094-S18

IOCP file: sczp103.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. Plea proceeding.

CSS	CHPID	Type	Book/Jack/MBA	Port	PCHID	CU Number
0	00	OSD	0/ 0/ 6	A01B LG20 J.00	210	2040
0	01	OSD	1/ 0/ 6	A01B LG19 J.00	200	2060
0	06	OSD	1/ 1/ 4	Z01B LG01 J.00	300	2200
0	0E	OSN	0/ 1/ 4	Z01B LG02 J.00	310	2A40
0	0F	OSN	0/ 0/ 6	A01B LG20 J.01	211	2A60
0	10	OSC	0/ 0/ 4	A01B LG13 J.00	1B0	E200
0	11	OSC	1/ 1/ 7	Z01B LG10 J.00	380	E300
0	14	OSD	1/ 0/ 4	A01B LG12 J.00	1A0	2000
0	15	OSD	1/ 0/ 6	A01B LG21 J.00	220	2020
0	40	CTC	1/ 0/ 4	A01B LG17 J.00	1E0	4090
						4100
0	41	CNC	0/ 1/ 4	Z01B LG09 J.00	370	5090
						5100

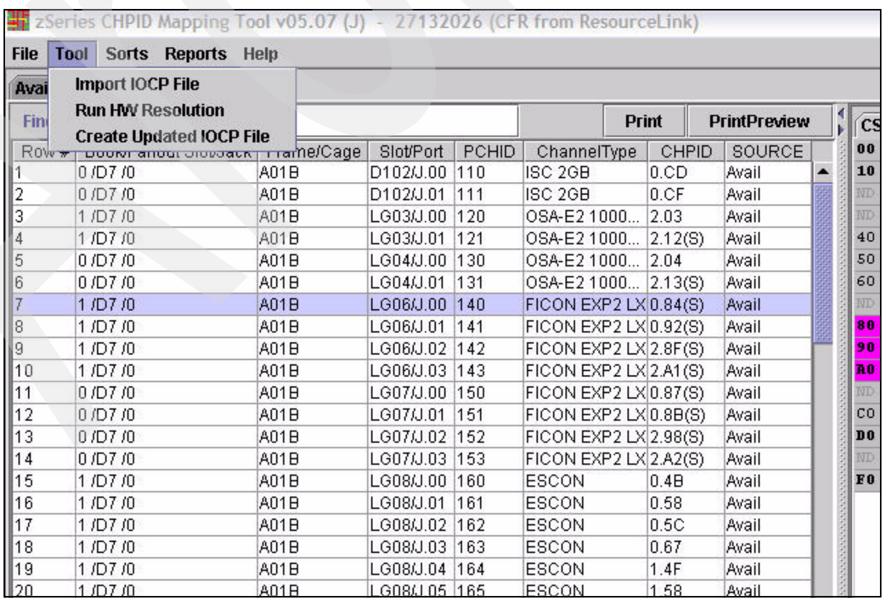
Figure 9-27 CMT - CHPID to CU Report

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.

- Click **Tool** → **Create Updated IOCP File**; see Figure 9-28.



Row #	[illegible]	Frame/Cage	Slot/Port	PCHID	ChannelType	CHPID	SOURCE
1	0 /D7 /0	A01B	D102/J.00	110	ISC 2GB	0.CD	Avail
2	0 /D7 /0	A01B	D102/J.01	111	ISC 2GB	0.CF	Avail
3	1 /D7 /0	A01B	LG03/J.00	120	OSA-E2 1000...	2.03	Avail
4	1 /D7 /0	A01B	LG03/J.01	121	OSA-E2 1000...	2.12(S)	Avail
5	0 /D7 /0	A01B	LG04/J.00	130	OSA-E2 1000...	2.04	Avail
6	0 /D7 /0	A01B	LG04/J.01	131	OSA-E2 1000...	2.13(S)	Avail
7	1 /D7 /0	A01B	LG06/J.00	140	FICON EXP2 LX	0.84(S)	Avail
8	1 /D7 /0	A01B	LG06/J.01	141	FICON EXP2 LX	0.92(S)	Avail
9	1 /D7 /0	A01B	LG06/J.02	142	FICON EXP2 LX	2.8F(S)	Avail
10	1 /D7 /0	A01B	LG06/J.03	143	FICON EXP2 LX	2.A1(S)	Avail
11	0 /D7 /0	A01B	LG07/J.00	150	FICON EXP2 LX	0.87(S)	Avail
12	0 /D7 /0	A01B	LG07/J.01	151	FICON EXP2 LX	0.8B(S)	Avail
13	0 /D7 /0	A01B	LG07/J.02	152	FICON EXP2 LX	2.98(S)	Avail
14	0 /D7 /0	A01B	LG07/J.03	153	FICON EXP2 LX	2.A2(S)	Avail
15	1 /D7 /0	A01B	LG08/J.00	160	ESCON	0.4B	Avail
16	1 /D7 /0	A01B	LG08/J.01	161	ESCON	0.58	Avail
17	1 /D7 /0	A01B	LG08/J.02	162	ESCON	0.5C	Avail
18	1 /D7 /0	A01B	LG08/J.03	163	ESCON	0.67	Avail
19	1 /D7 /0	A01B	LG08/J.04	164	ESCON	1.4F	Avail
20	1 /D7 /0	A01B	LG08/J.05	165	ESCON	1.58	Avail

Figure 9-28 CMT - Create Updated IOCP File

- Enter **File name** and location for the IOCP output file and click **Save**; see Figure 9-29.

> **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.

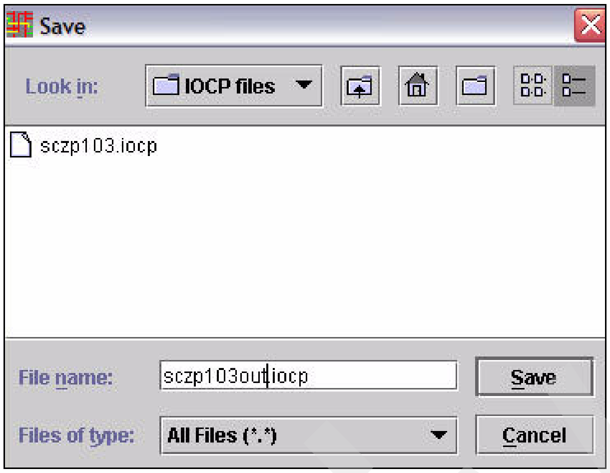


Figure 9-29 CMT - Save IOCP output file

- The CHPID Mapping Tool displays an informational message regarding what to do for the final execution of the tool; see Figure 9-30.

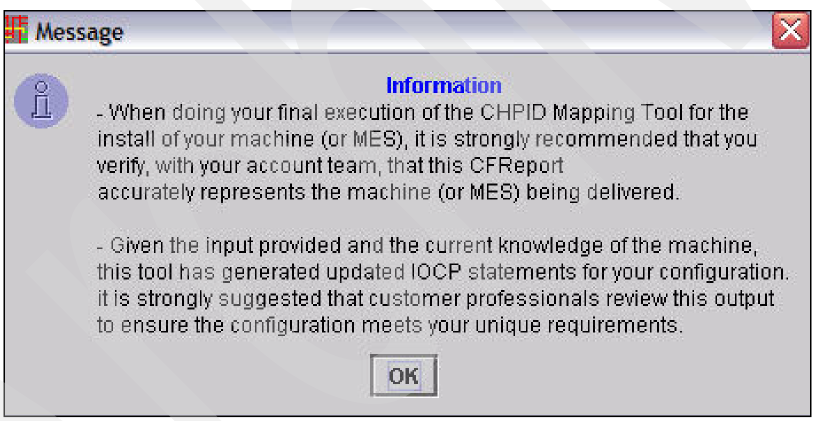


Figure 9-30 CMT - informational message

9.5 Migrate PCHIDs back into the 2094 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, sczp103out.txt).

Upload the sczp103out.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 E200 and E300.

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 9-2.

Example 9-2 HCD - Updated IOCP statements file (with CMT statements)

```
.        IODEVICE ADDRESS=(FEB3,007),CUNUMBR=(FFEE),UNIT=CFP
         IODEVICE ADDRESS=(FEC1,007),CUNUMBR=(FFEE),UNIT=CFP
*CMT* VERSION=000
*CMT* CCN=27132026(CFR from ResourceLink)
*CMT* E200.0=0333,E200.1=0333,E200.2=0333,E300.0=0333,E300.1=0333
*CMT* E300.2=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.

- Enter the work IODF name that we used to create the IOCP input data set for the CHPID Mapping Tool on the HCD main menu.

  Select option **5**, **Migrate configuration data**; see Figure 9-31.

```
z/OS V1.7 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 9-31 HCD - main menu, select Migrate configuration data

- The Migrate Configuration Data panel is displayed; see Figure 9-32 on page 360. Enter 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 9-32 HCD - Migrate Configuration Data

- HCD displays the Migrate IOCP Data panel. 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 9.6, "HCD steps to build production IODF" on page 361).
`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.

Then press Enter.

```
-------------------- Migrate IOCP / MVSCP / HCPRIO Data --------------------


 Specify or revise the following values.

 Processor ID . . . . . . . . . . . . SCZP103   +   CSS ID . . . . . . _  +
 OS configuration ID  . . . . . . . . TEST2094  +

 Combined IOCP/MVSCP input data set . _____________________________________
 IOCP only input data set . . . . . . 'SYS6.IODF39.IOCPOUT.SCZP103'
 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 9-33 HCD - Migrate IOCP / MVSCP / HCPRIO Data

- 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 9-34 on page 361.

```
-------------------------- 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 9-34 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.

- Press PF3 and you should receive the following message:

```
IOCP/Operating system deck migration processing complete, return code = 0.
```

- Press PF3 again.

9.6 HCD steps to build 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:

- From the HCD main menu, select option **2**, **Activate or process configuration data**; see Figure 9-35.

```
z/OS V1.7 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 9-35 HCD - main menu, select Activate or process configuration data

- The Activate or Process Configuration Data panel is displayed; see Figure 9-36. 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 9-36 HCD - Activate or Process Configuration Data, select Build production IODF

- The Message List panel is displayed; see Figure 9-37. 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 9-37 HCD - Message List (building Production IODF)

- Press PF3 to continue.
- The Build Production I/O Definition File panel is displayed; see Figure 9-38 on page 363. 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 . IODFPK  +

  Continue using as current IODF:
  2   1.  The work IODF in use at present
      2.  The new production IODF specified above
```

Figure 9-38 HCD - Build Production I/O Definition File

- The Define Descriptor Fields panel is displayed; see Figure 9-39. 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 9-39 HCD - Define Descriptor Fields

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

  `Production IODF SYS6.IODF39 created.`

- Proceed to the steps to implement the configuration on the 2094.

9.7 Implementing the processor configuration on the 2094

At this point there is a production IODF, which is SYS6.IODF39. Now the IOCDS needs to be updated on the new CPC that is being installed (for example, SCZP103) and power-on reset using this IOCDS. The final step would be to IPL the processor using this IODF.

Describing how to IPL the new hardware is beyond the scope of this redbook.

Updating the IOCDS

- From the HCD main menu, select option **2**, **Activate or process configuration data**; see Figure 9-40 on page 364. Ensure that the IODF is the production one created in the previous step. Press Enter.

```
z/OS V1.7 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 9-40   HCD - main menu, select Activate or process configuration data

- The Activate or Process Configuration Data panel is displayed; see Figure 9-41 on page 365. 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 2094 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 2094 is not accessible from the HMC LAN, we would need to create a diskette containing the IOCP statements and import them on the 2094 HMC to run a stand-alone IOCP. Creating a file on diskette 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 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 9-41 HCD - Activate or Process Configuration Data, select Build IOCDSs

The S/390 Microprocessor Cluster List panel is displayed; see Figure 9-42. Use a forward slash mark (/) to select the new 2094 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.SCZP103    2094   S18     SCZP103
****************************** Bottom of data *******************************
```

Figure 9-42 HCD - S/390 Microprocessor Cluster List

The Actions on selected CPCs panel is displayed; see Figure 9-43. 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 9-43 HCD - Actions on selected CPCs, Work with IOCDSs

The IOCDS List panel is displayed; see Figure 9-44 on page 366. Select the IOCDS that you wish to update for the 2094 upgrade by using / and 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.SCZP103  DIAG00   LPAR   POR        Yes       No          Yes-POR
/ A1.SCZP103  DIAG01   LPAR   Alternate  No        No          No
_ A2.SCZP103  DIAG02   LPAR   Alternate  No        No          No
_ A3.SCZP103  DIAG03   LPAR   Alternate  No        No          No
******************************* Bottom of data ********************************
```

Figure 9-44 HCD - IOCDS List

- The Actions on selected IOCDSs panel is displayed; see Figure 9-45. 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 9-45 HCD - Actions on selected IOCDSs

- The Build IOCDSs panel is displayed; see Figure 9-46. Verify that all the information is correct.
- Fill in the field `Title1` and then press Enter.

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

  Specify or revise the following values.

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

  Title1 . IODF39 _________________________________________________________
  Title2 : SYS6.IODF39 - 2005-11-30 19:22

                             Write IOCDS in
  IOCDS        Switch IOCDS  preparation of upgrade
  A1.SCZP103   No            No
  ***************************** Bottom of data ******************************
```

Figure 9-46 HCD - Build IOCDSs

- The Job Statement Information panel is displayed; see Figure 9-47. 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 9-47 HCD - Job Statement Information

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.SCZP103`; see Figure 9-48.

```
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.SCZP103    2094   S18     SCZP103
 ****************************** Bottom of data ********************************
```

Figure 9-48 HCD - IOCDS updating new 2094

Figure 9-49 shows the Alternate Status.

```
. 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.SCZP103  DIAG00   LPAR   POR        Yes       No          Yes-POR
 _ A1.SCZP103  IODF39   LPAR   Alternate  Yes       Yes         No
 _ A2.SCZP103  DIAG02   LPAR   Alternate  No        No          No
 _ A3.SCZP103  DIAG03   LPAR   Alternate  No        No          No
 ****************************** Bottom of data ********************************
```

Figure 9-49 HCD - IOCDS showing Alternate Status

9.8 HMC steps for activation profiles

Build the 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 2094 after it has been handed over from the IBM service representative.

- Log on to the HMC and select the new 2094, assuming it has been defined to the Defined CPCs Work Area.
- Under Operational Customization, select **Customize/Delete Activation Profiles**.
- Select the “DEFAULT” Reset Profile and click **Customize**.
- Save this “DEFAULT” profile with a new Profile name to be referred to when the power-on reset is required (for example, SCZP103).
- Now select the new Profile and click **Customize**.
- Click the IOCDS that you just updated in the previous step (A1).

  Message ACTB0219 is displayed; see Figure 9-50.

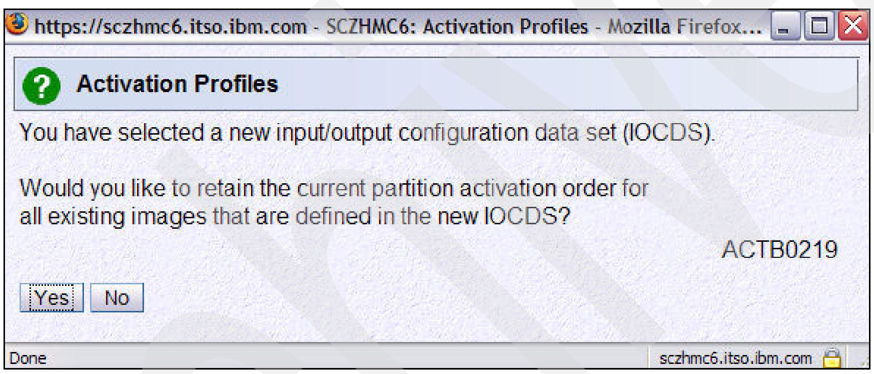


Figure 9-50 HMC - Activation Profiles (received when changing IOCDS)

Depending on the circumstances, you may wish to answer Yes or No. You may now wish to review the Partition Activation List

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 2094.
- 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 (SCZP103, in our example).

Performing a power-on reset of the 2094

After the 2094 processor has been installed, 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.

10

Crypto Express2 configuration

In this chapter we provide information about Crypto Express2 configuration on a z9-109 server. 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
- Logical partition cryptographic definition
- Configuration using the Support Element
- Configure the PCI-X Adapter to Coprocessor or Accelerator
- Activation and Deactivation using ICSF

10.1 Crypto Express2 configuration

We begin by taking a look at Crypto Express2 configuration rules and planning.

10.1.1 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. Feature code 3863 enables the DES and TDES algorithms on the CPACF (the SHA-1 algorithm is always enabled).

- The total number of Crypto Express2 features may not exceed eight per z9-109 server.
- 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 Logical Channel Subsystem pool, but each feature is assigned two PCHIDs, one per PCI-X adapter.

Table 10-1 summarizes the Cryptographic feature codes for z9-109.

Table 10-1 Cryptographic Feature codes

Feature code	Description
3863	Crypto enablement feature Prerequisite to use the CPACF or Crypto Express2 features
0863	Crypto Express2 feature
0855	TKE 5.0 LIC
0859	TKE workstation
0887	TKE Smart Card Reader
0888	TKE additional smart cards

10.1.2 Configuration planning

The z9-109 server 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 z9-109 server 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 z9-109 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 may 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 may be enabled from the TKE and normal operations may resume.

  See *z/OS ICSF TKE Workstation User's Guide,* SA22-7524, for more information.
- The definition of domain indexes and cryptographic coprocessor numbers in the Candidate list for each logical partition should be planned ahead to prepare the cryptographic configuration for nondisruptive changes.

  A change to a logical partition image profile to modify its domain index(es) or Candidate list is disruptive to the partition. It requires a partition deactivation-activation to take effect.
- 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 may 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 may be defined for more than one logical partition. This may 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.

  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.

[1] The Nondisruptive Hardware Change is only available when logged on to the Support Element in Service mode.

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 10-2 illustrates 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 10-2 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 LP02	LP05	LP04		LP04	
PCI-X adapter 1	CEX2C/A	LP01 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						

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.

In the example shown in Table 10-2:

- Logical partition LP04 and LP05 use different domain numbers for PCI-X cryptographic 0, there is no conflict. The combination, domain number and cryptographic coprocessor number, is unique across partitions.
- 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.

Each PCI-X adapter provides 16 domains, and up to 60 partitions can be defined and active. on the z9-109. 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.

Note: More Crypto Express2 features may be needed to satisfy application performance or availability requirements.

10.2 Logical partition cryptographic definition

The z9-109 server only operates in LPAR mode. For each logical partition that requires access to a PCI-X adapter, configured as either accelerator or coprocessor, you must customize the partition image profile.

This is done using the z9-109 Hardware Management Console or Support Element workplace.

First, initiate an HMC session, as described in the next section.

10.2.1 HMC session

The HMC Application Version 2.9.0 for the z9-109 server uses a completely new internal design; see Figure 10-1. Although the general look and feel has been preserved, it no longer uses an OS/2-based system.

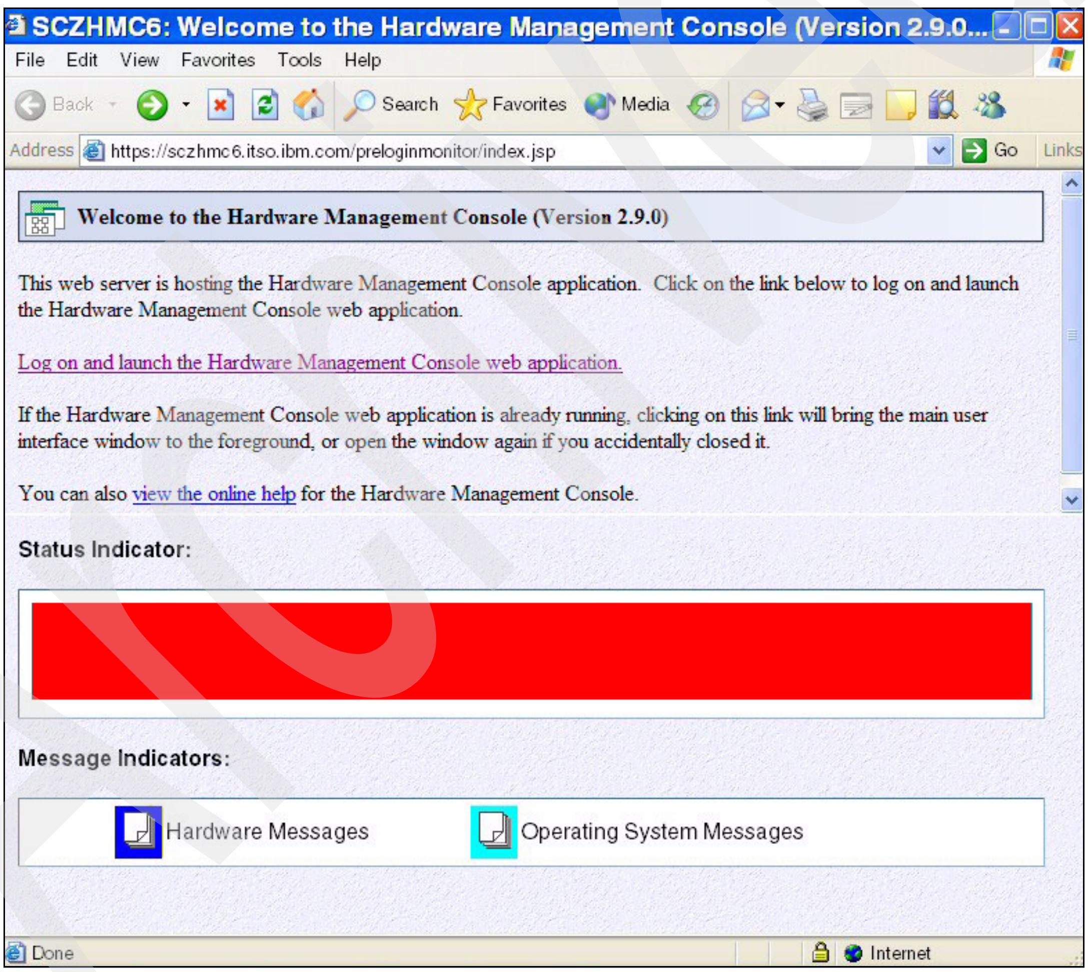


Figure 10-1 Welcome to the HMC

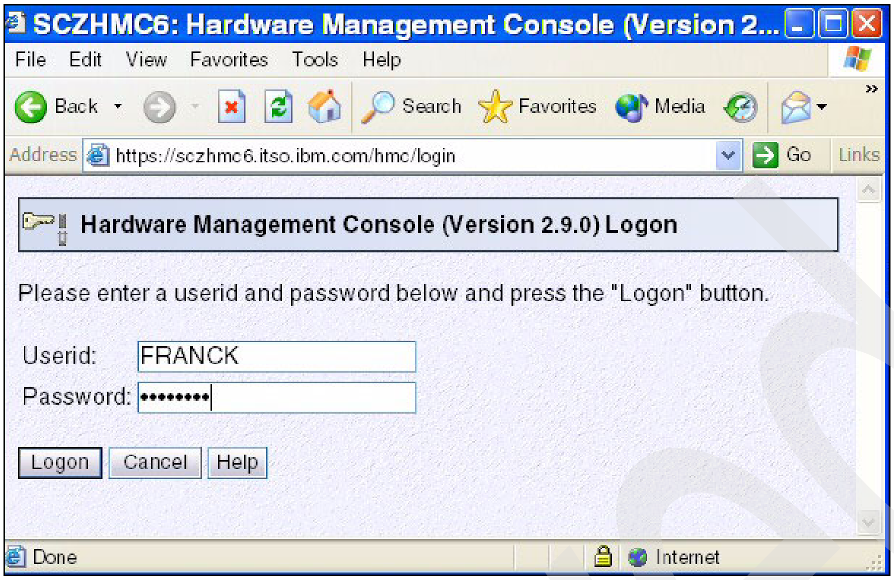


Figure 10-2 HMC Logon

- Sign on to the HMC using SYSPROG or an identification with equivalent rights, as shown in Figure 10-2.
- The initial HMC Workplace is displayed. Open Groups from the Views area, and double-click **Defined CPCs** from the Groups Work Area. If multiple CPCs are connected to the HMC, select the one you want to connect to.
- In the Task List area, rotate to the CPC Recovery in the Task List; see Figure 10-3.
- Drag and drop (right-click and hold) the selected CPC to the Single Object Operations task icon.

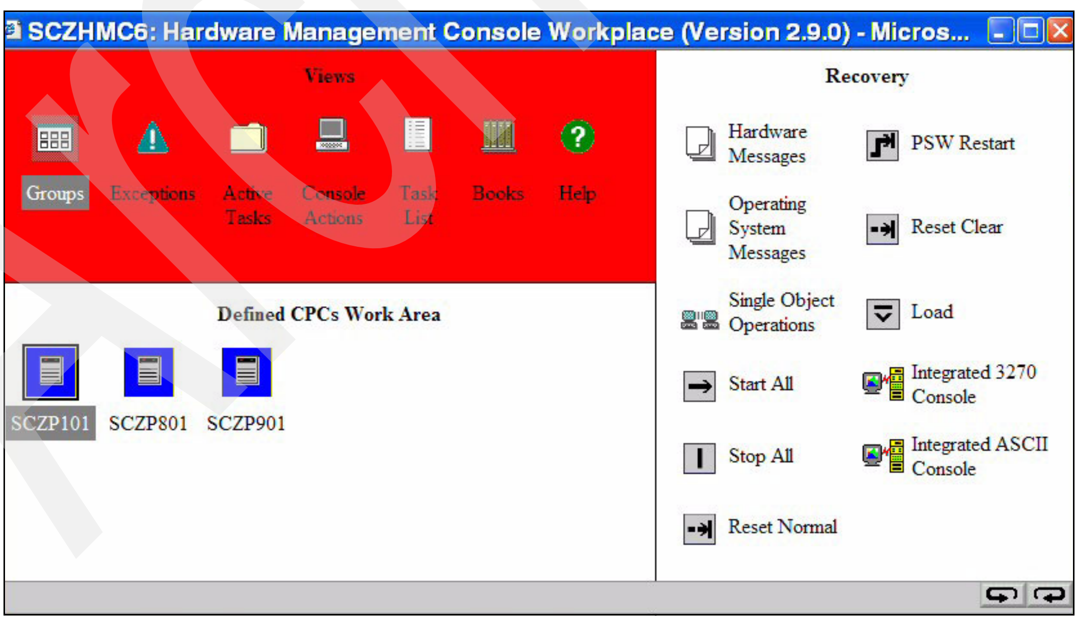


Figure 10-3 Defined CPCs Work Area and CPC Recovery

- A Single Object Operations Task Confirmation panel is displayed, as shown in Figure 10-4. Click **Yes** to confirm.

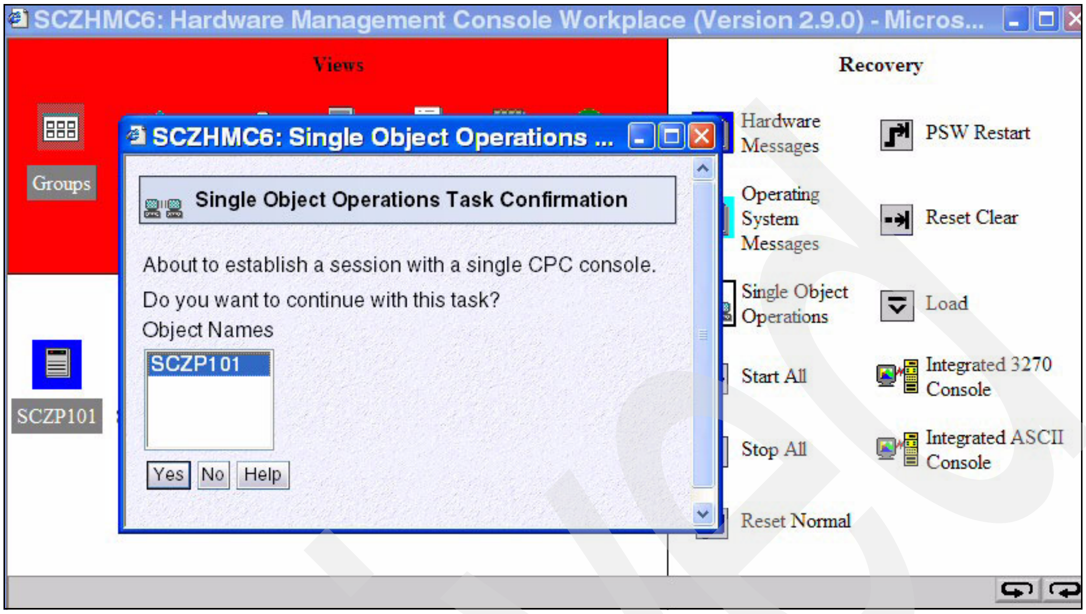


Figure 10-4 Single Object Operations Task Confirmation

The Support Element Workplace session opens, as shown in Figure 10-5.

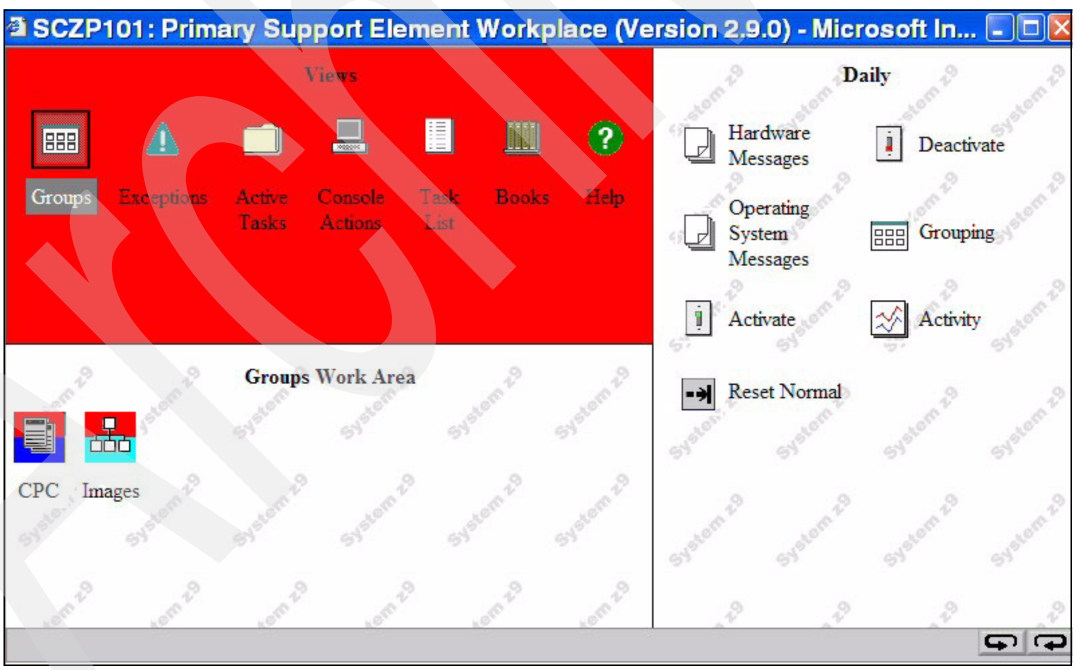


Figure 10-5 Primary SE Workplace

10.2.2 CPACF DES/TDES enablement feature

The z9-109 crypto enablement feature (#3863) enables DES and TDES algorithms on the CPACF. It is a prerequisite for using the Crypto Express2 feature. You can check whether the CPACF feature is properly installed on the processor from the CPC details panel.

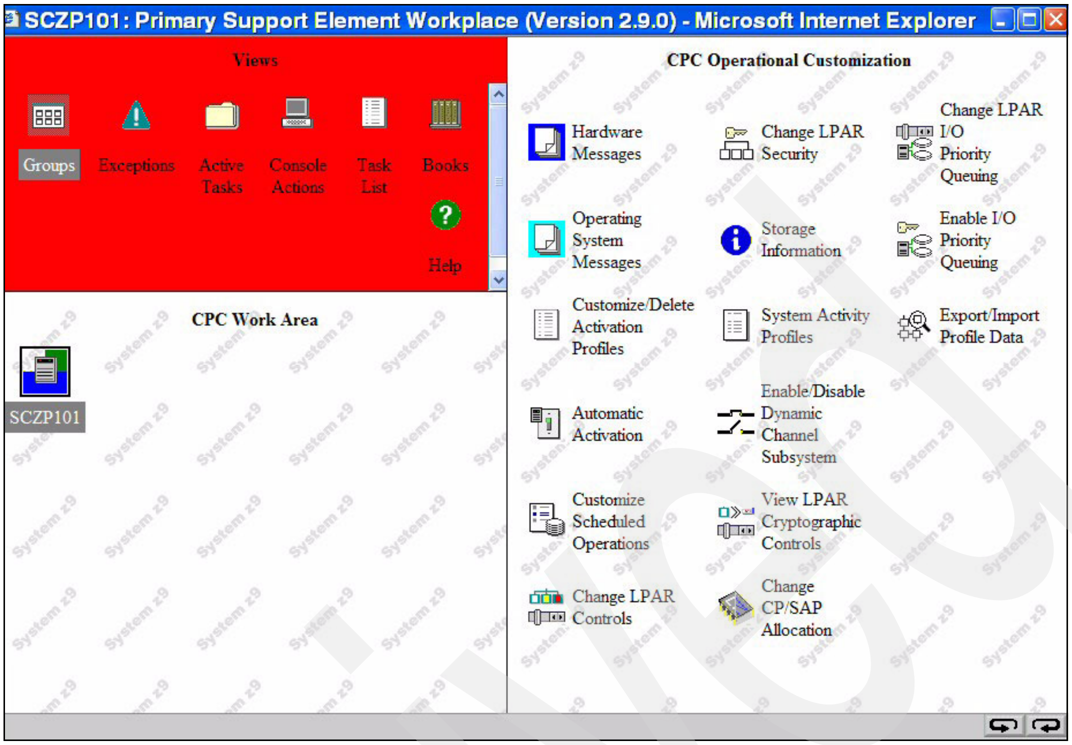


Figure 10-6 SE Workplace - CPC Work Area and CPC Operational Customization

From the Support Element Workplace shown in Figure 10-6:

- From the Views area, open **Groups** and **CPC**.
- Select the CPC icon in the CPC Work Area view and double-click it. This opens the CPC details panel shown in Figure 10-7.

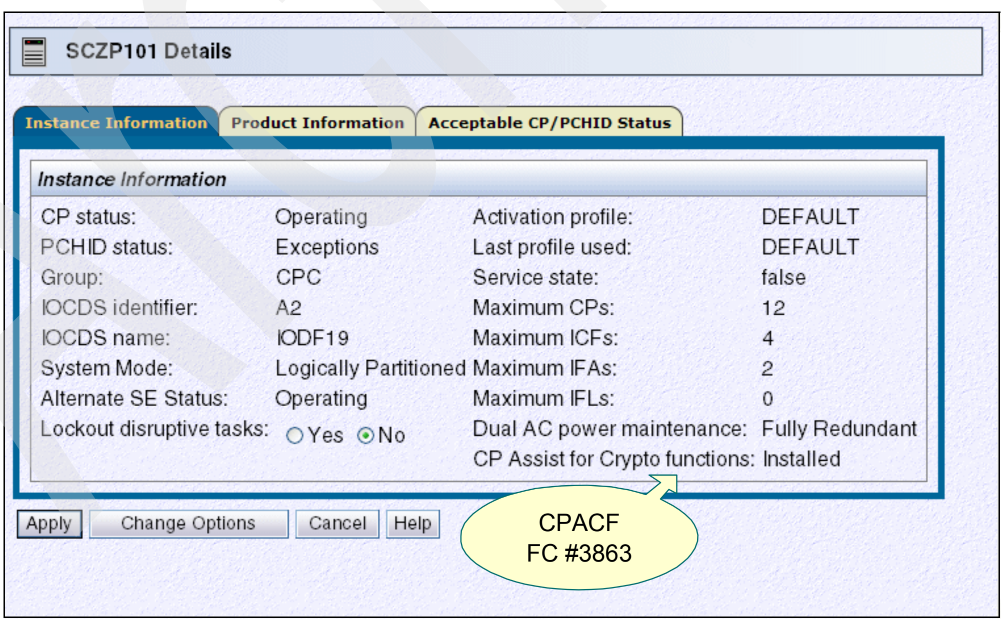


Figure 10-7 SE Workplace - CPC Details

- Verify the CPACF DES/TDES enablement feature.

- If the panel displays `CP Assist for Crypto Functions: Installed`, the cryptographic enablement feature code 3863 is installed.
- If the panel displays `CP Assist for Crypto Functions: Not Installed`, then feature code 3863 is not installed. You may still customize the partition image profiles, but cryptographic functions do not operate.
- Click **Cancel** to return.

10.2.3 Customize the partition image profiles

The next step is to define, in the image profile for each partition, where you intend to enable cryptographic operations:

- Its Usage domain index
- Its Control Domain Index
- Its PCI Cryptographic Coprocessor Candidate List
- Its PCI Cryptographic Coprocessor Online List

This is accomplished through the Customize/Delete Activation Profile task.

> **Note:** The Customize/Delete Activation Profile is also available from the HMC Workplace. The scope of the task also depends on the object selected. Whether you decide to work with a CPC object or with an image profile selected from the Image Work Area does not change the result.
>
> For this document we chose to use the SE Workplace and worked from the CPC object.

From the CPC Work Area, as shown in Figure 10-6 on page 378:

1. In the Task List Work Area, rotate to locate the CPC Operational Customization.
2. Make sure the CPC icon is selected.
3. In the CPC Operational Customization task list, double-click **Customize/Delete Activation Profile**. This opens the list shown in Figure 10-8 on page 380.

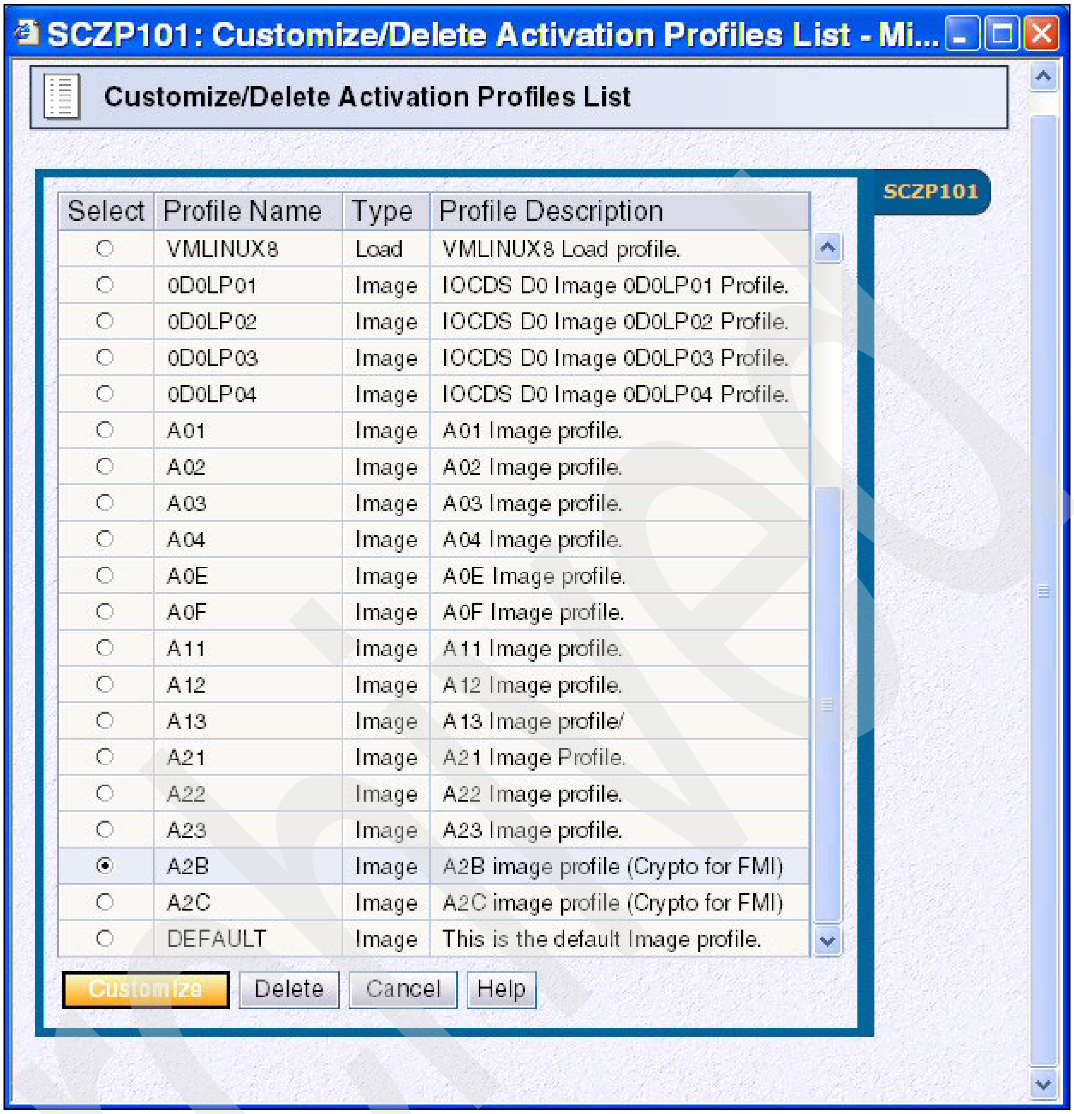


Figure 10-8 Customize/Delete Activation Profiles List

4. From the list, select the name of the partition image profile you want to configure and click **Customize**. This brings up the Customize image profiles notebook shown in Figure 10-9 on page 381.

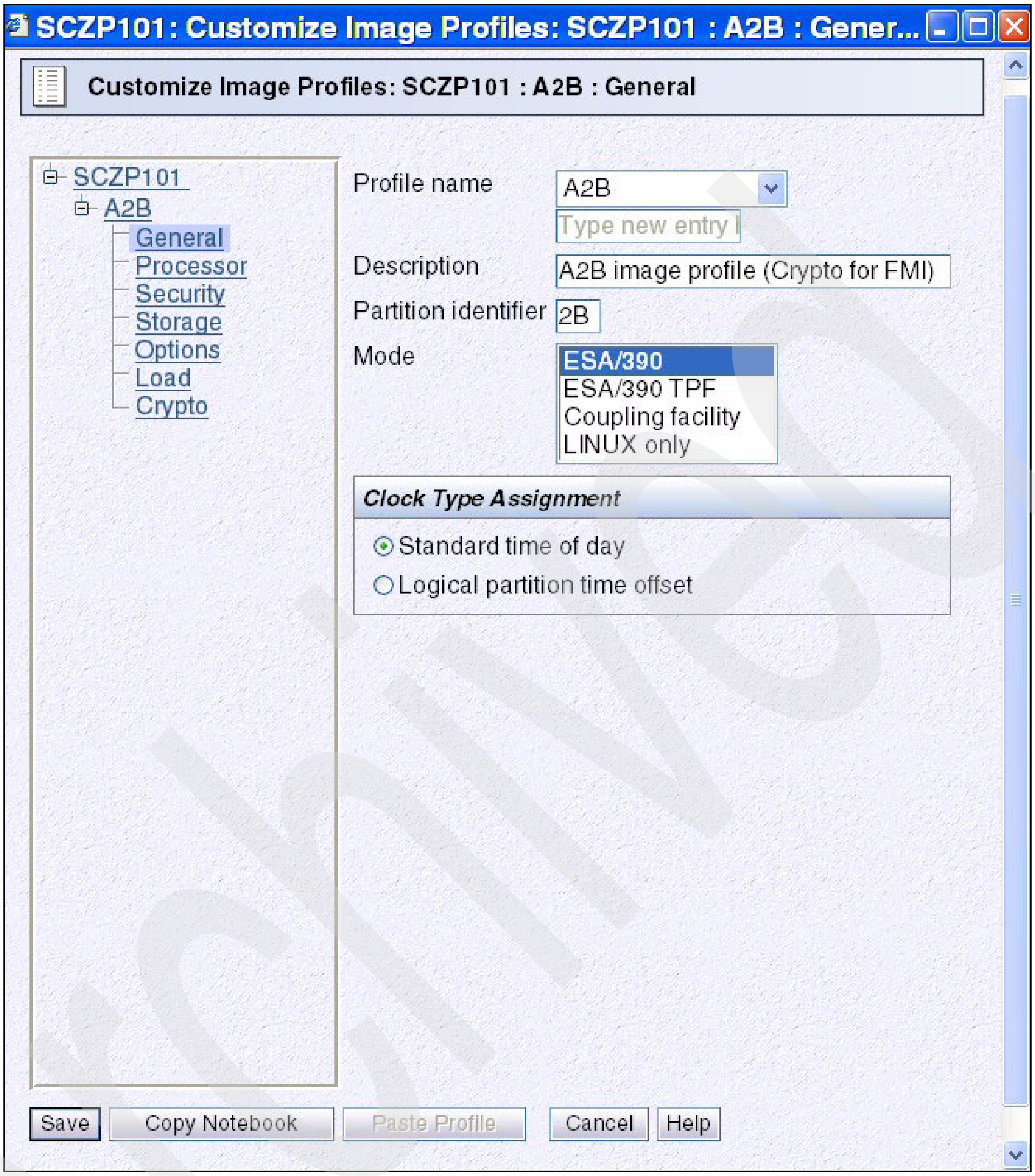


Figure 10-9 Customize Image Profiles - General

5. From the tree, select the **PCI Crypto** option. The PCI Crypto panel shown in Figure 10-10 on page 382 and Figure 10-11 on page 382 is displayed.

   The definitions can be changed in the image profile, whether or not the logical partition is active. However, the new definitions will not take effect until the next time the partition is activated.

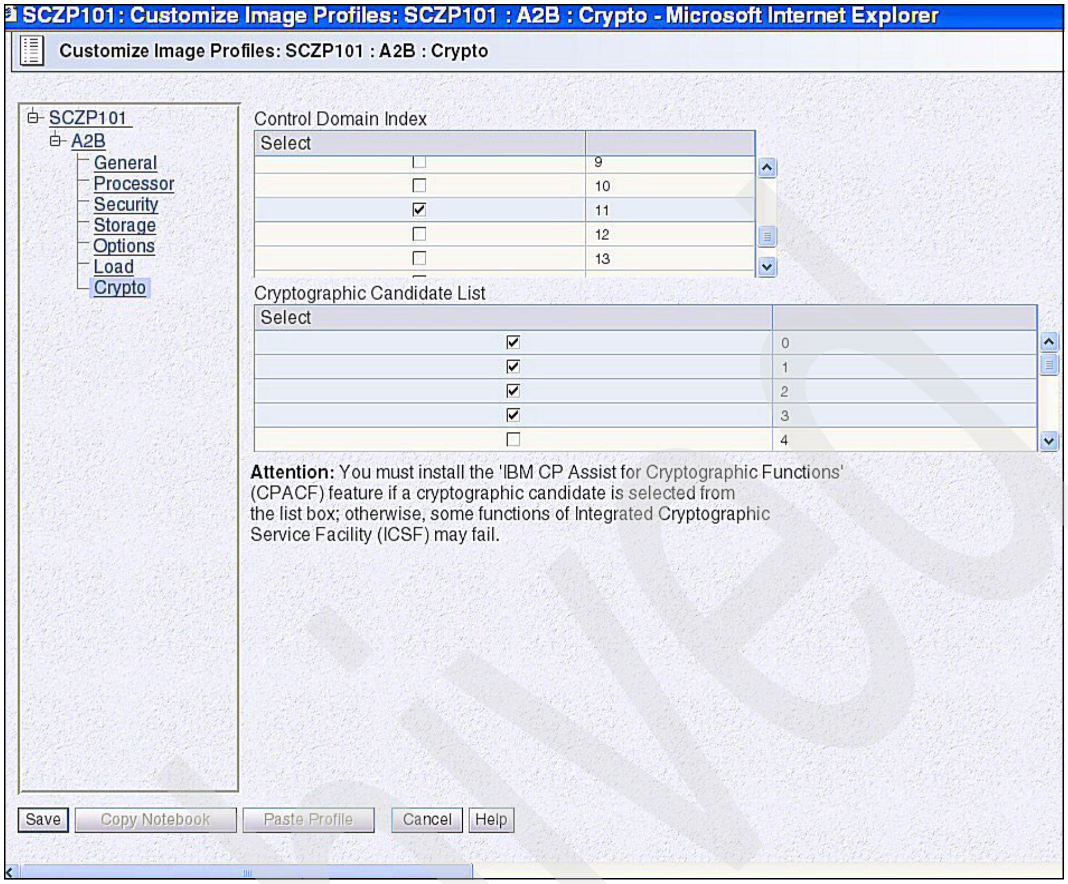


Figure 10-10 Customize Image Profiles - Crypto (part1)

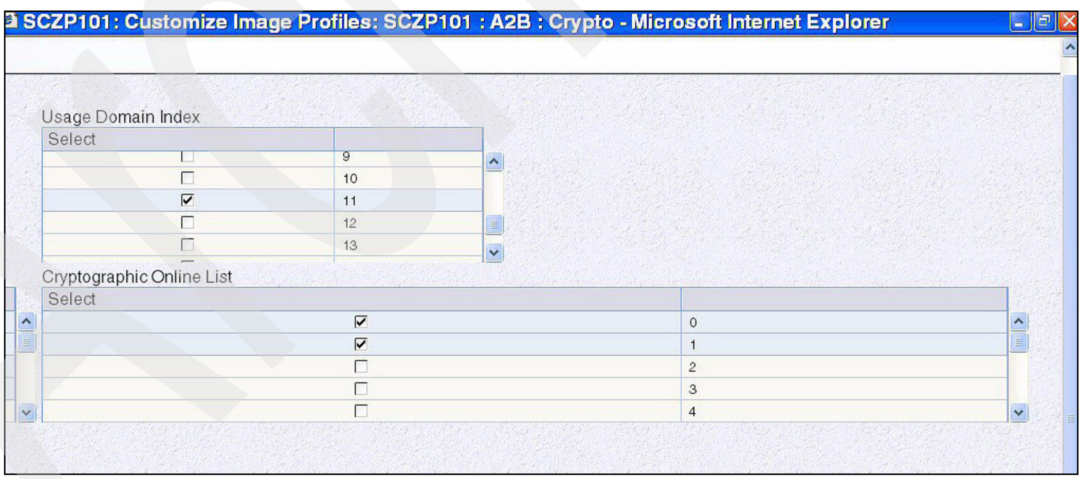


Figure 10-11 Customize Image Profiles - Crypto (part2)

Note the following explanations:

– 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 LCSS they are defined to, but the combination PCI-X adapter number and usage domain index number must be *unique* across all partitions planned to be active at the same time.

Although it is possible to define duplicate combinations of PCI-X adapter numbers and usage domain indexes, such logical partitions cannot be concurrently active. This is a valid option, for example, for backup configurations.

– Control domain index

Identifies the cryptographic coprocessor domain indexes that can be administered from this logical partition 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. An error message is displayed; see Figure 10-12.

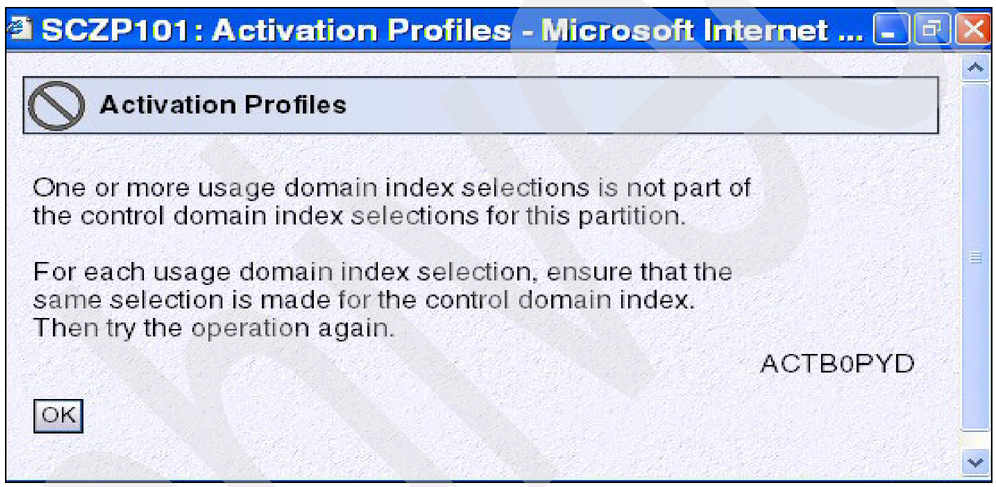


Figure 10-12 Error message ACTB0PYD - usage domain and control domain index

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.

When a new Crypto Express2 feature is installed and the PCI-X adapter numbers have been previously selected in a partition Candidate list, they can be dynamically configured to the partition from the Support Element using the Configure On/Off option in the Crypto Service Operations task list.

A PCI-X adapter number not in the partition Candidate List cannot be configured on to the partition.

– 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 on the partition PCI Cryptographic Candidate list but not on the PCI Cryptographic Online list are in a "configured off" state (Standby). They can later be configured on to the partition from the Support Element by using the Configure On/Off option in Crypto Service Operations task list (see 10.3.3, "Config On/Off from the CPC Work Area" on page 393).

When the partition is activated, no error condition is reported if a cryptographic coprocessor number selected in the partition Online list is not installed. The cryptographic coprocessor is ignored and the activation process continues.

When a cryptographic coprocessor number selected in the partition Online list has been previously configured off to the partition, it is automatically configured back on when the partition is next activated.

If the cryptographic coprocessor number and usage domain index combination for the coprocessor selected in the partition Online list are already in use by another active logical partition, activation of the logical partition fails; see "Logical partition activation" on page 385.

6. When you have completed the PCI Crypto definitions, click **Save**. A pop-up panel request confirmation appears, as shown in Figure 10-13.

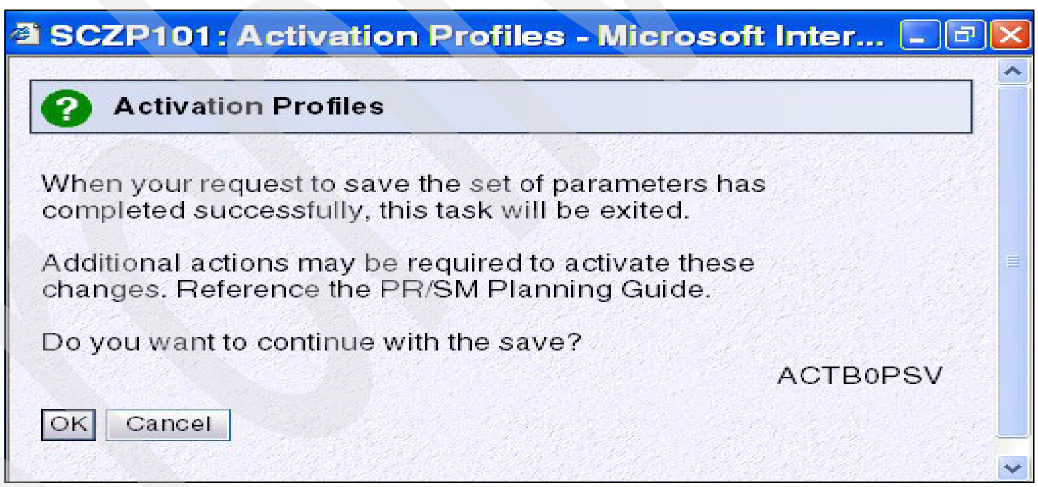


Figure 10-13 Save Activation confirmation message ACTB0PSV

Click **OK** to return to the Customize/Delete Activation Profiles list shown in Figure 10-8 on page 380.

Repeat steps 4 through 6 for each logical partition that needs to be customized for Crypto Express2 operation.

Important: A power-on reset is not necessary, but definition changes entered in the partition image profile will not take effect until the next time the partition is activated.

Logical partition activation

If more than one combination of Usage domain index and PCI Cryptographic Candidate list values is being used, the conflict is only detected when a partition is activated while another active partition already owns the same combination value. An error message is issued at the time the partition is activated. This is illustrated in the example shown in Figure 10-14. In this example, partitions A2B and A2C have cryptographic definitions conflicting with already active partitions.

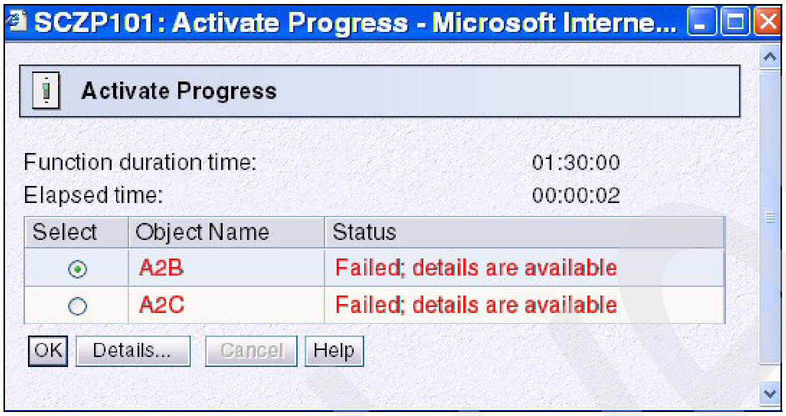


Figure 10-14 Activate Progress Status

Click **Details** to display the Activate Task Details shown in Figure 10-15.

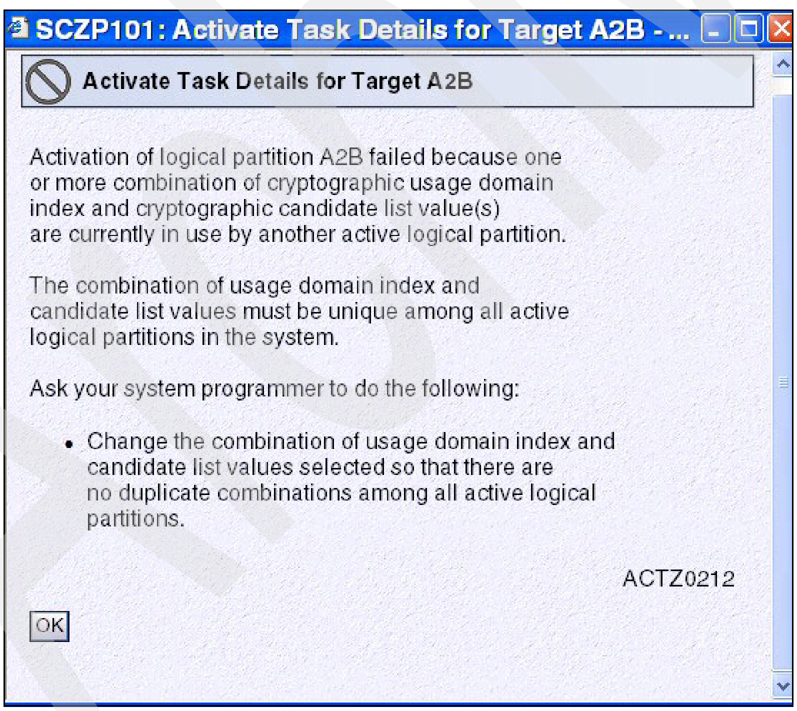


Figure 10-15 Activation Failure Details

Log off from the SE/HMC session

When cryptographic definitions are complete, log off the SE and HMC. First, log off from the Support Element session.

- Double-click **Console Actions**; see Figure 16 on page 386.

- Point to the **Logoff** task and double-click. A new panel, shown in Figure 17, requests to choose between Logoff or Disconnect. Select **Logoff** and click **OK**.

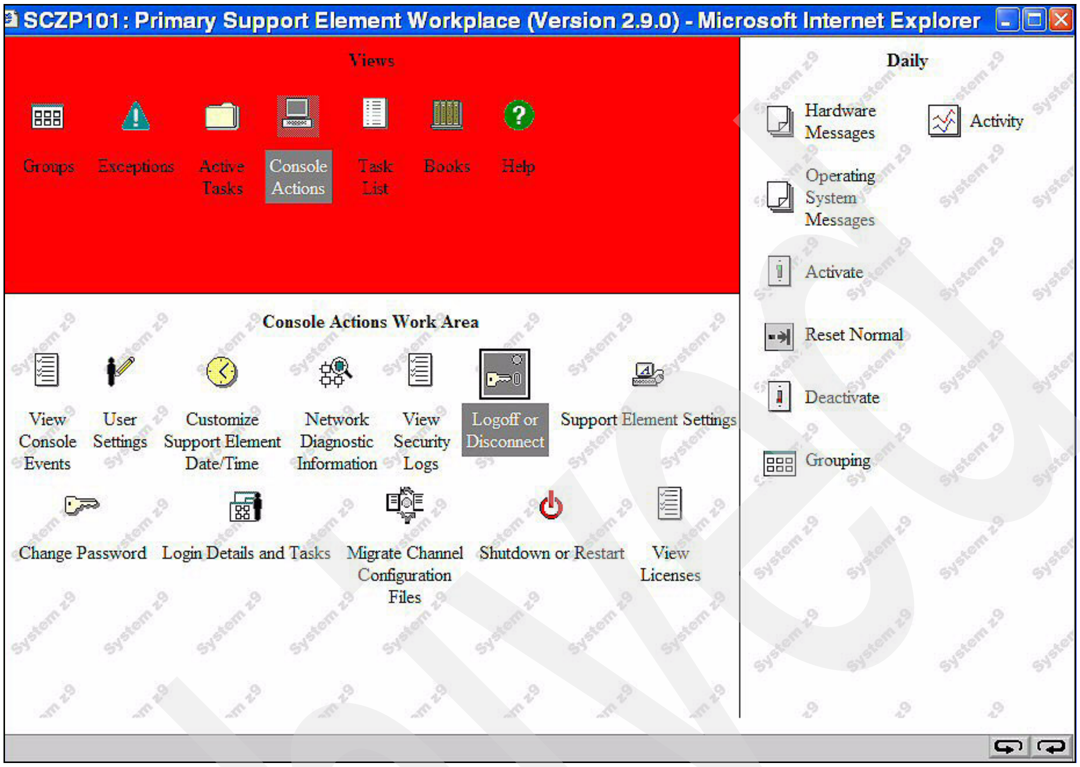


Figure 16 Logoff Support Element

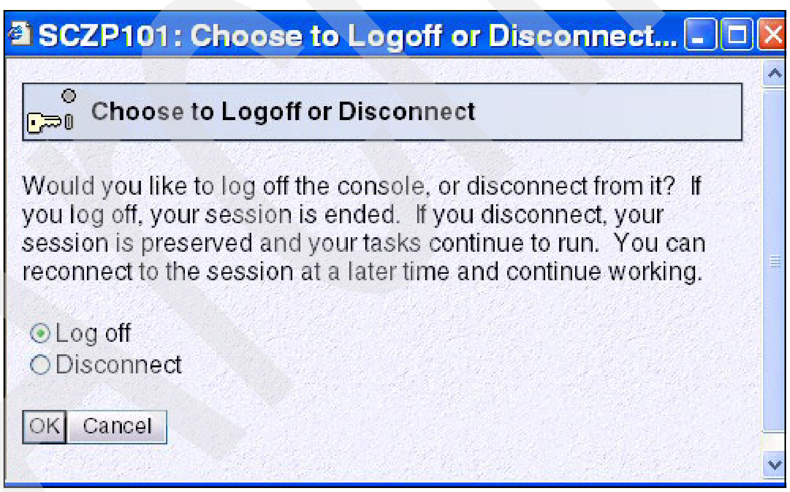


Figure 17 Choose Logoff or Disconnect

Then, log off from the HMC session:

- In the Views Area, double-click **Console Actions**.
- Point to the **Logoff** task and double-click. The Logoff or Disconnect choice is offered again; select **Logoff** and click **OK**.

10.3 Configuration using the Support Element

Reconfiguration of a cryptographic coprocessor to a logical partition is done from the z9-109 Support Element Workplace. The ICSF Coprocessor Management panel provides a way to display the status and activate or deactivate a coprocessor; refer to 10.5, "Activation and Deactivation using ICSF" on page 399.

> **Important:** There is no z/OS command to display the status or configure the PCI-X adapters On/Off.

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 active partitions).
- Configure a cryptographic coprocessor On/Off to a logical partition.

These tasks require you to work from the SE Workplace; to get to the appropriate SE task, log on to the SE directly or use the single object operations task from the HMC Workplace; refer to 10.2.1, "HMC session" on page 375.

PCI Cryptographic Management

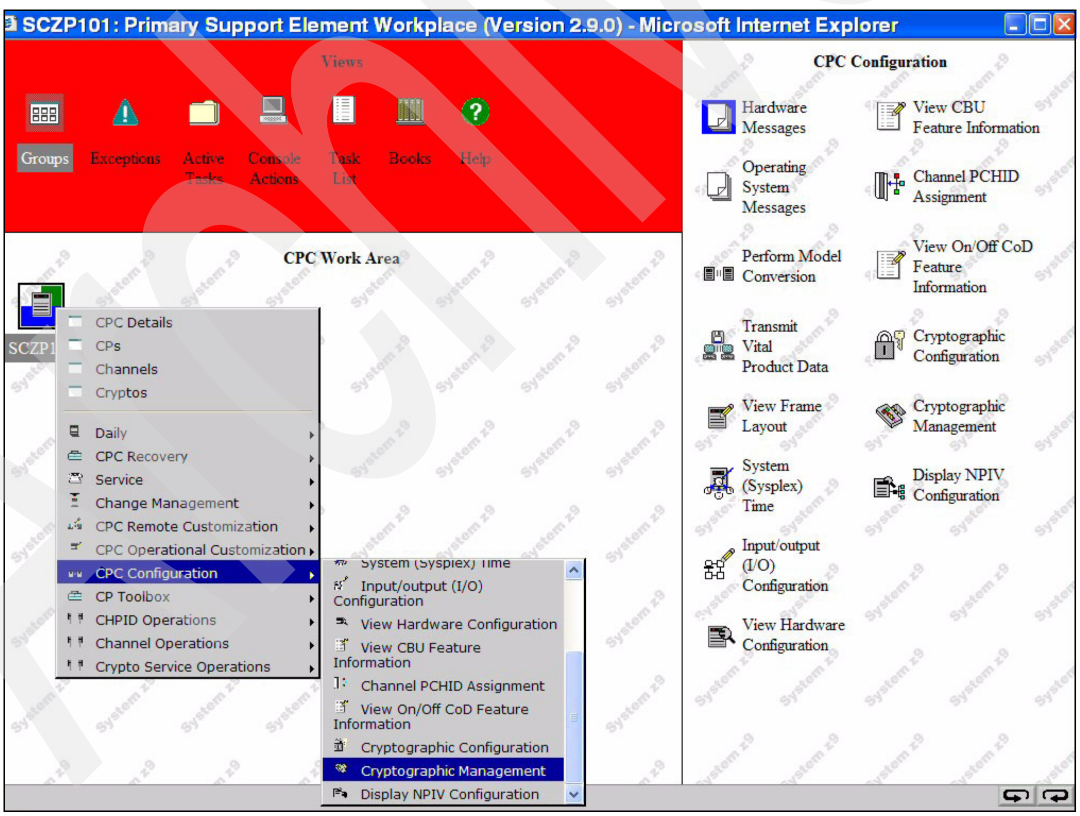


Figure 10-18 Support Element Workplace - CPC Configuration

From the Support Element Workplace:

- From the Views area, open **Groups** to display the CPC work area; see Figure 10-18. In the CPC Work Area, right-click the CPC object to display the context menu.

- Select **CPC Configuration** → **Cryptographic Management**.

This brings up the PCI Cryptographic Management panel shown in Figure 10-19. Use this panel to display the installed cryptographic configuration, 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 make 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.

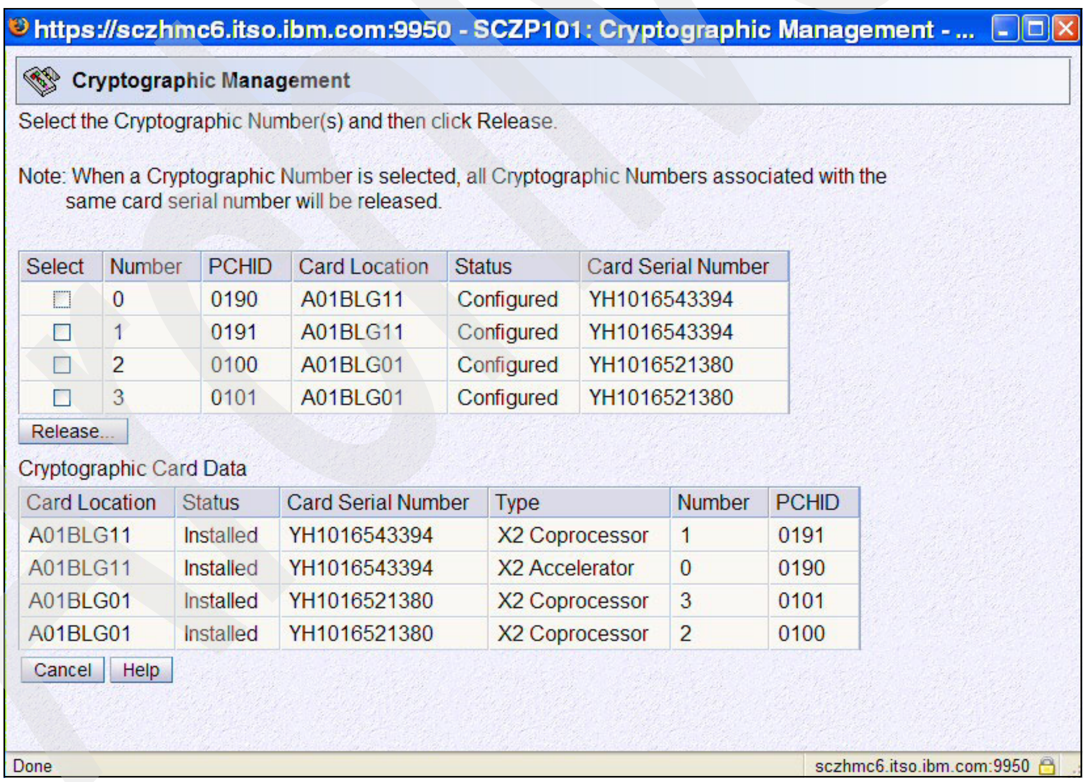


Figure 10-19 Support Element Workplace - Cryptographic Management

10.3.1 LPAR Cryptographic Controls

To visualize active partitions' cryptographic definitions from the SE Workplace:

- Open **Groups** from the Views area and select **CPC**. Select the CPC object.

- In the Task List work area, select the **CPC Operational Customization Task List**; see Figure 10-20.
- From the task list, select and double-click **View LPAR Cryptographic Controls**. This brings up the panel shown on Figure 10-21 on page 390.

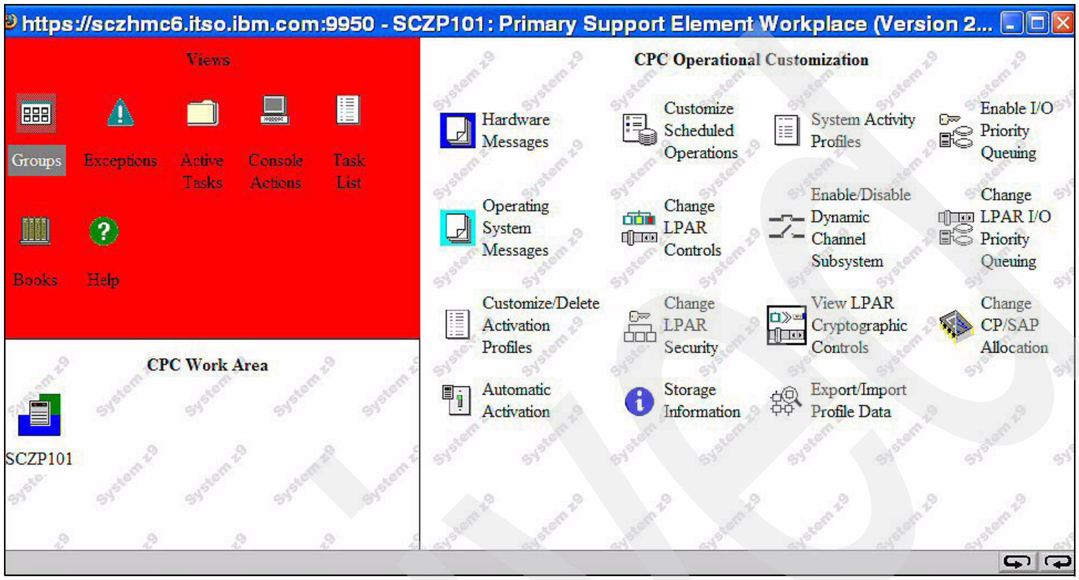


Figure 10-20 Support Element Workplace - CPC Operational Customization

The View LPAR Cryptographic Controls panel displays the definition of Usage and Control domain indexes, and PCI Cryptographic Candidate and Online lists. Use the tab with the partition name to navigate through the logical partitions. Only active logical partitions are listed.

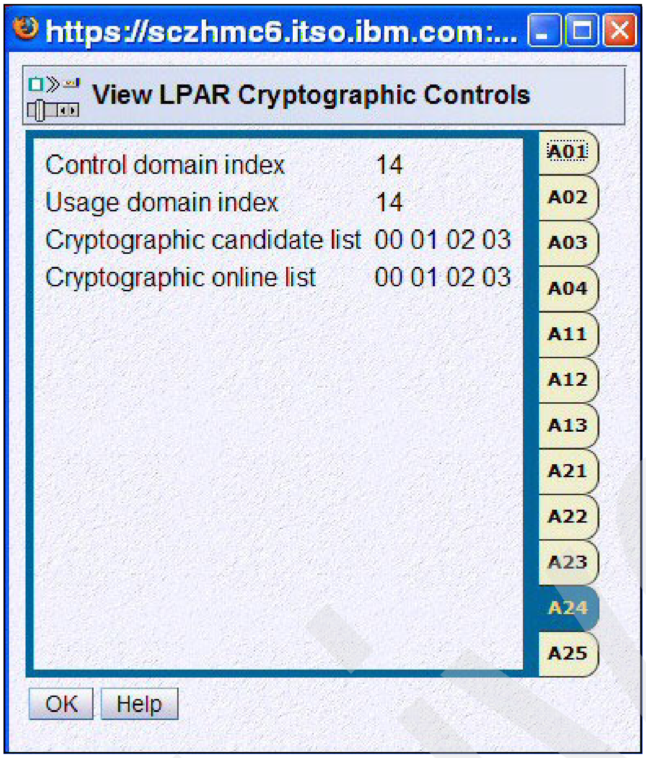


Figure 10-21 Support Element Workplace - View LPAR Cryptographic Controls

The panel is for information 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 from the Crypto Service Operations Task list. You can apply the Configure On/Off task to either the CPC object or to a specific image selected from the Images Work Area.

10.3.2 Config On/Off from the Images Work Area

In this section, we describe the flow using the Images Work Area path. Use this path if you intend to reconfigure only one logical partition image.

From the SE Workplace:

- From Views, select **Groups** → **Images**.
- In the Images Work Area, right-click the selected image icon to bring up the context menu shown in Figure 10-22 on page 391.

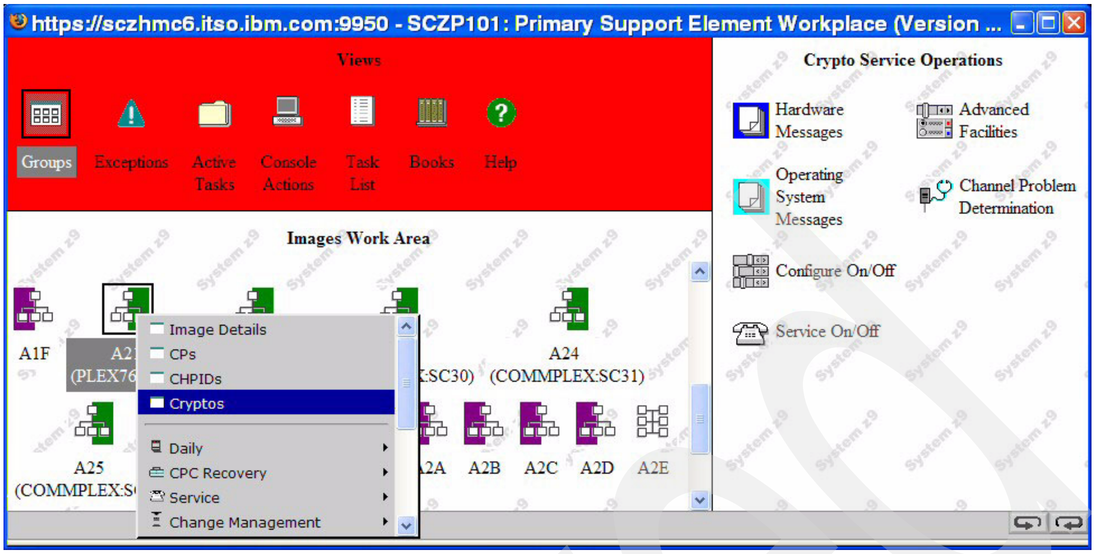


Figure 10-22 Support Element Workplace - Images Work Area

- Select **Cryptos**. The PCI Crypto Work Area is displayed; see Figure 10-23.

> **Note:** When the PCI Crypto Work Area is accessed from the Images Work Area, the identification displayed below each PCI-X adapter icon indicates the cryptographic coprocessor number. When it is accessed from the CPC Work Area, the identification displayed below each icon is the PCHID number.

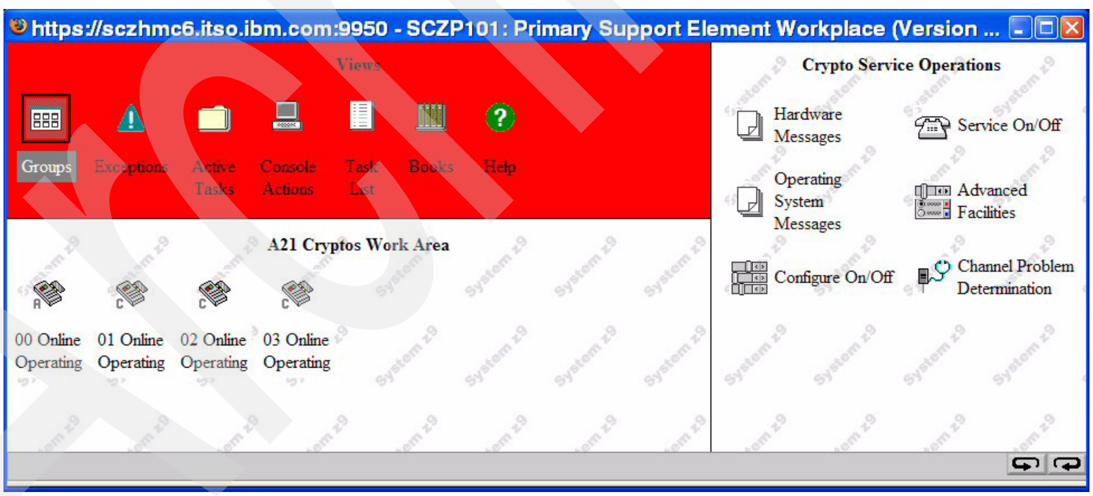


Figure 10-23 Support Element Workplace - Logical Partition Cryptos Work Area

- Each icon displays `C` or `A` to indicate whether the PCI-X Cryptographic adapter is configured as a coprocessor or as an accelerator; see Figure 10-24 on page 392.

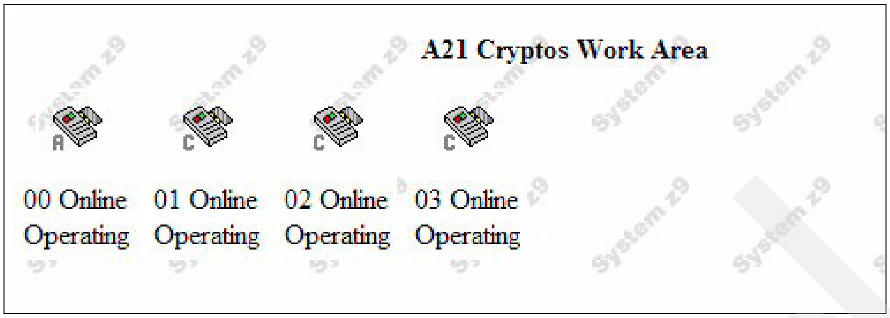


Figure 10-24 Support Element Workplace - Logical Partition Cryptos Work Area

- From the PCI Crypto Work Area, select the cryptographic icon and drag and drop it on the Configure On/Off Task. The Configure Channel Path On/Off panel is displayed; see Figure 10-25.

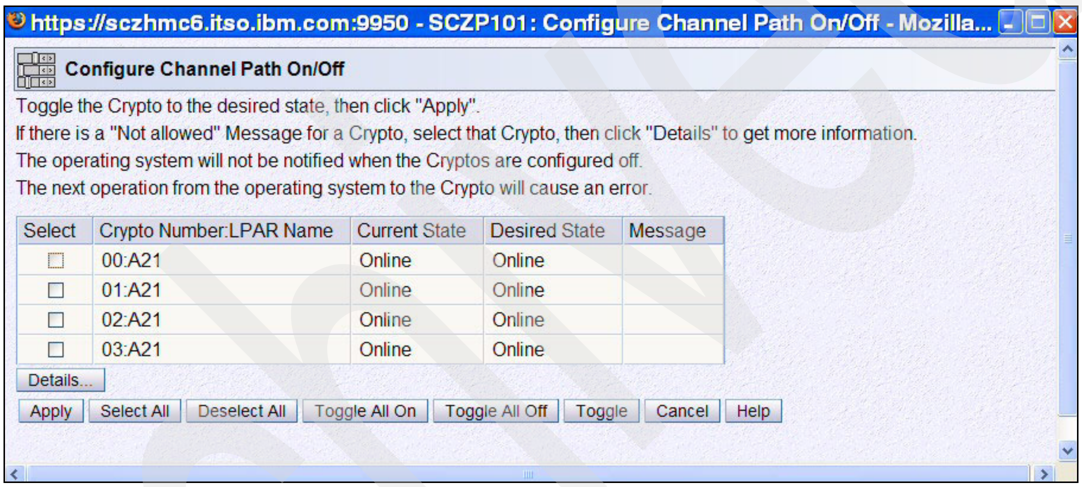


Figure 10-25 Support Element Workplace - Configure Channel Path On/Off

- Select the coprocessor number you want, click **Toggle** to switch to the desired state. Then press **Apply** to initiate the configuration change.

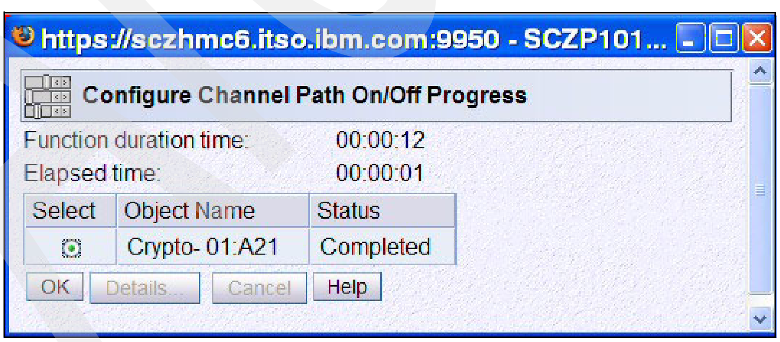


Figure 10-26 Support Element Workplace - Configure Channel Path On/Off Progress

- A Configure Channel Path On/Off Progress panel pops up to indicate the operation is in progress; see Figure 10-26. When the status is complete, press **OK** to return to the Configure Channel Path On/Off panel shown in Figure 10-25. If the operation fails, click **Details** to display the error information.

- When you have completed reconfiguration for all partitions, press **Cancel**.

> **Important:** We recommend that you deactivate a coprocessor from the ICSF Coprocessor Management panel *before* it is configured off from the Support Element. This provides a smooth way to quiesce use of the coprocessor to applications before it is configured off; refer to 10.5, “Activation and Deactivation using ICSF” on page 399.

- Log off the SE and the HMC, as explained in “Log off from the SE/HMC session” on page 385.

10.3.3 Config On/Off from the CPC Work Area

When using the CPC Work Area, the scope of cryptographic objects displayed spans all defined logical partitions, active or not (note that you cannot issue a Config On/Off command to a cryptographic coprocessor in an inactive logical partition).

Use this path when you want to configure a cryptographic processor across multiple logical partitions. From the SE Workplace:

- From Views, select **Groups** → **CPC**.
- In the CPC Work Area, right-click the selected CPC icon. From the context menu select **Cryptos**, as shown in Figure 10-27.

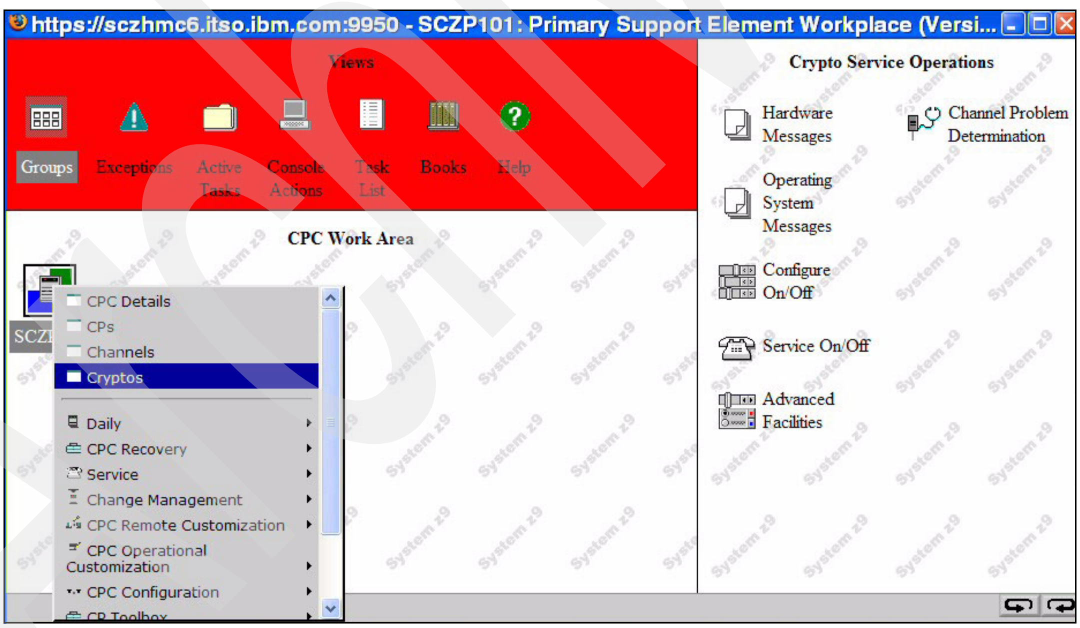


Figure 10-27 Support Element Workplace - CPC Work Area

- The PCI Crypto Work Area is displayed, as shown in Figure 10-28 on page 394.

> **Note:** When the PCI Crypto Work Area is accessed from the CPC Work Area, the identification displayed below the coprocessor object icon is the PCHID number assigned, *not* the coprocessor number.

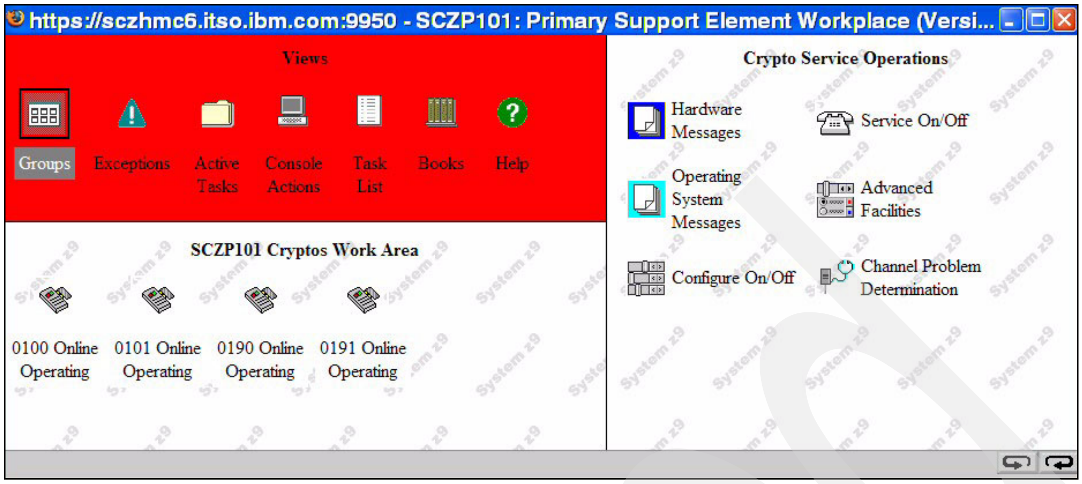


Figure 10-28 Support Element Workplace - CPC Cryptos Work Area and Crypto Service Operations

- From the PCI Crypto Work Area, select the cryptographic coprocessor icons, then right-click to display the context menu. Select **Crypto Service Operations** → **Configure On/Off.** The Configure Channel Path On/Off panel is displayed; see Figure 10-29.

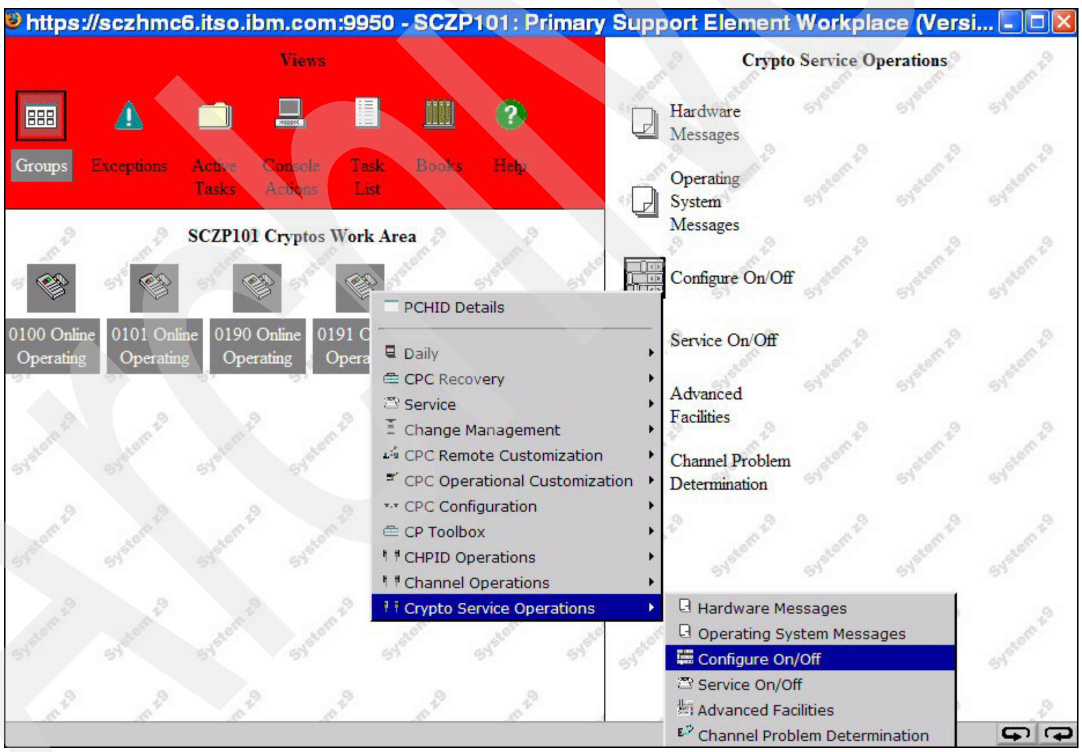


Figure 10-29 Support Element Workplace - Cryptos Service Operations, Configure On/Off

Although the PCI-X Cryptographic adapter does not use a CHPID, you would reach the same panel when selecting the sequence **CHPID Operations** → **Configure On/Off** from the context menu, as illustrated in Figure 10-30 on page 395.

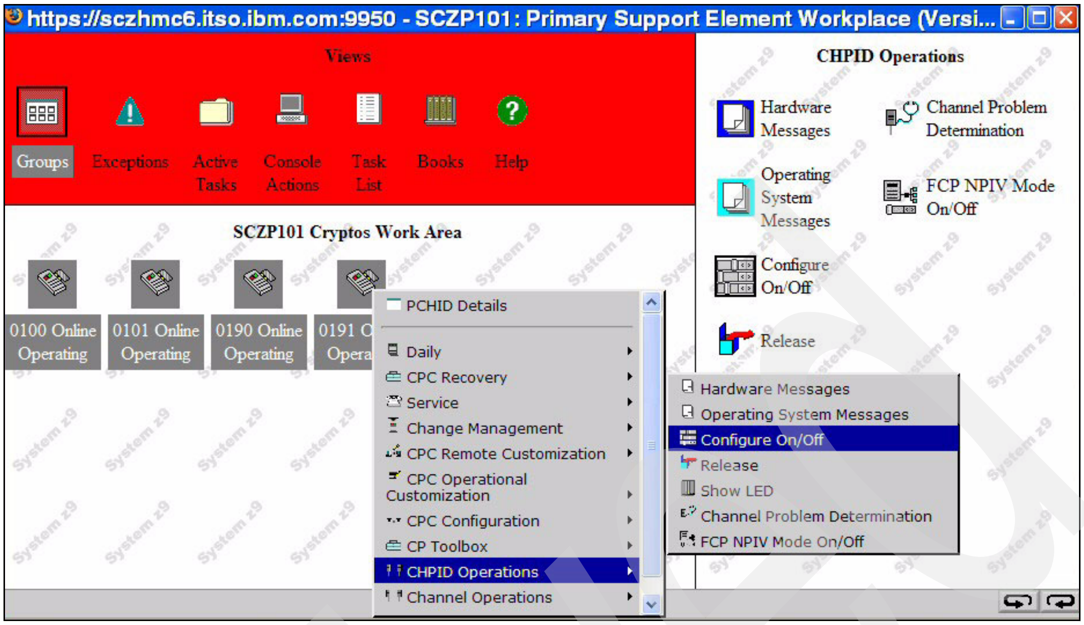


Figure 10-30 Support Element Workplace - CHPID Operations, Configure On/Off

Since we are now using the CPC object, all partitions that have the PCI-X cryptographic adapter in their Candidate list are listed, whether active or inactive.

If the partition is not active, you cannot configure its PCI-X Cryptographic adapter On/Off and the indication `Not Allowed` is displayed in the message area for the partition. The list is sorted first by PCI Cryptographic Coprocessor number, then by partition.

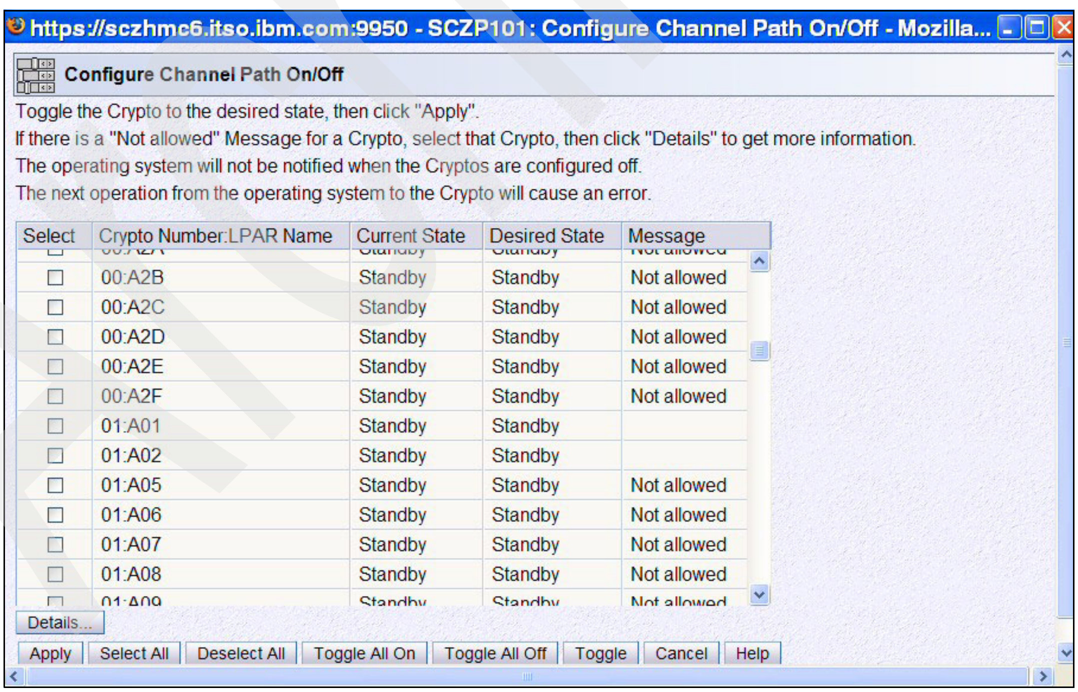


Figure 10-31 Support Element Workplace - Configure Channel Path On/Off

- From the list, select the desired coprocessor/partition and use **Toggle** to change the status to the desired state. Then press **Apply**.

  The Configure Channel Path On/Off Progress panel is displayed; see Figure 10-32.

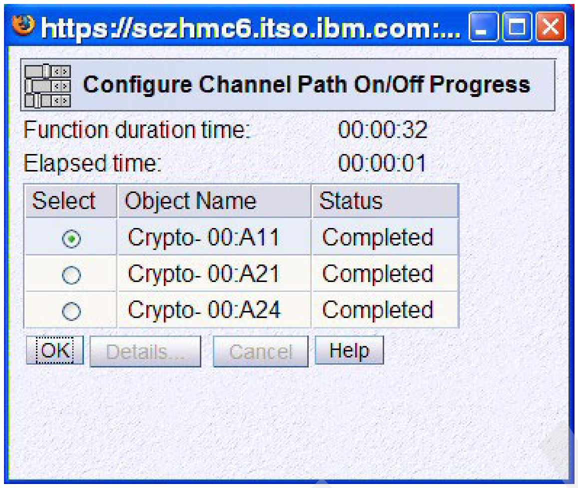


Figure 10-32 SE Workplace - Configure Channel Path On/Off Progress

- When the operation is completed, press **OK** to return to the Configure Channel Path On/Off panel shown in Figure 10-31 on page 395.
- When you have completed configuration On/Off for all PCI-X Cryptographic adapters, press **Cancel** to exit the Cryptos task and log off the SE and the HMC, as explained in "Log off from the SE/HMC session" on page 385.

10.4 Configure 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 between 16 logical partitions.

When a PCI-X adapter is configured as a coprocessor, it can still perform accelerator functions, albeit much slower than when configured as accelerator. When it is configured as an accelerator, it cannot perform coprocessor functions.

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 on the z9-109. Therefore, Crypto Express2 features carried forward from z990 to System z9 may take advantage of the reconfiguration capability.

To reconfigure the PCI-X Adapter, do the following:

- Make sure the PCI-X Cryptographic adapter status is Off; the reconfiguration is enabled only for PCI-X adapters that are Off**.**

  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 10.3.3, "Config On/Off from the CPC Work Area" on page 393.
- From Views, select **Groups** → **CPC**.
- In the CPC Work Area, right-click the selected CPC icon. From the context menu, select **CPC Configuration** → **Cryptographic Configuration** as shown in Figure 10-33.

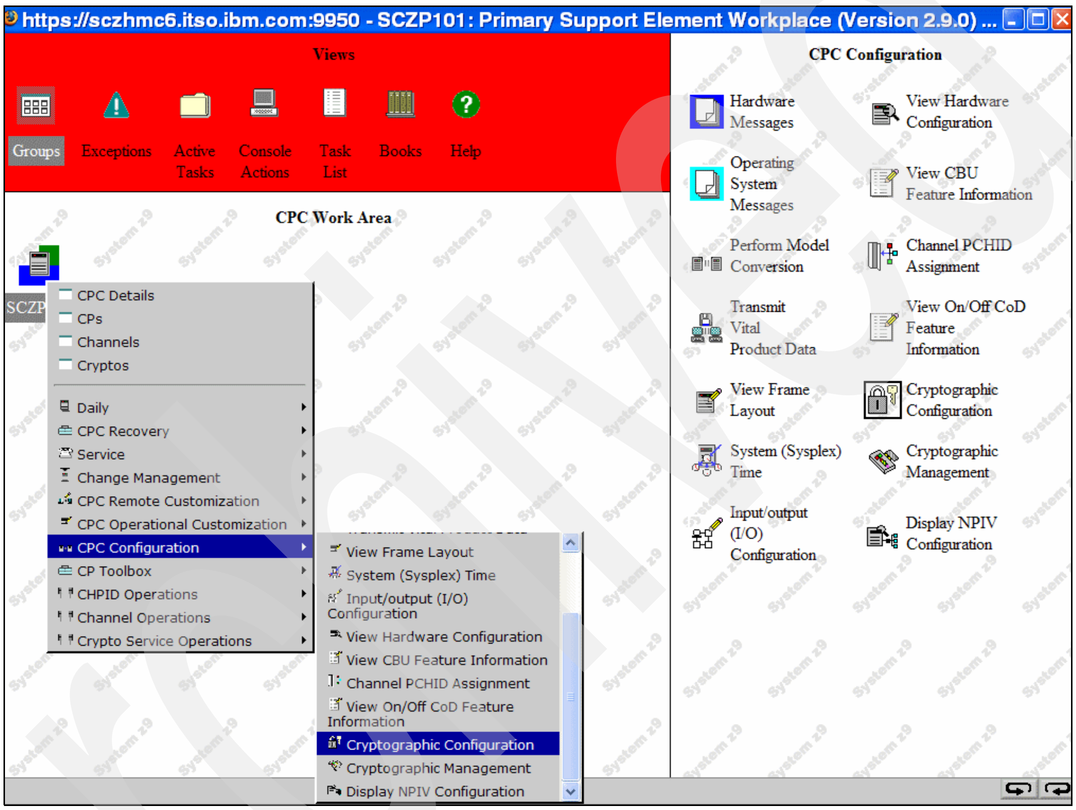


Figure 10-33 Support Element Workplace - CPC Cryptos Work Area and Crypto Service Operations

The Cryptographic configuration panel is displayed; see Figure 10-34 on page 398.

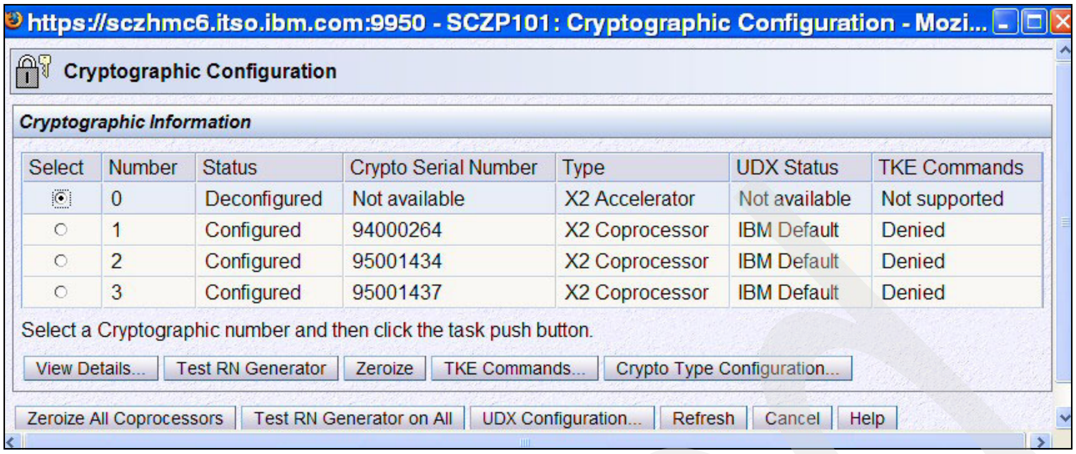


Figure 10-34 SE Workplace - Cryptographic Configuration

- From the Crypto Configuration panel, select the target PCI-X adapter and click **Crypto Type Configuration** to display the Crypto Type Configuration panel shown in Figure 10-35.
- On the Crypto Type Configuration panel select a target configuration for the Crypto; choose either **Coprocessor** or **Accelerator**. If Accelerator is selected, there is also an option to zeroize the coprocessor. Press **OK**.

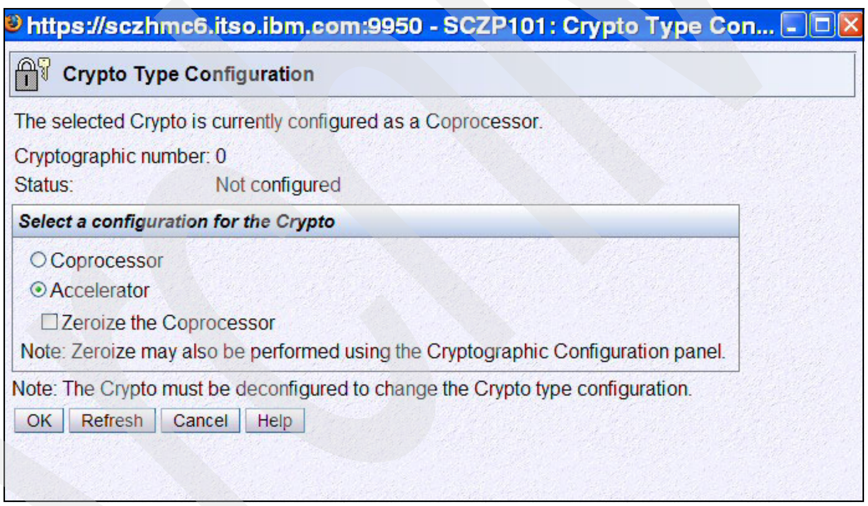


Figure 10-35 SE Workplace - Crypto Type Configuration

- A confirmation message is issued first; click **Yes**; see Figure 10-36.

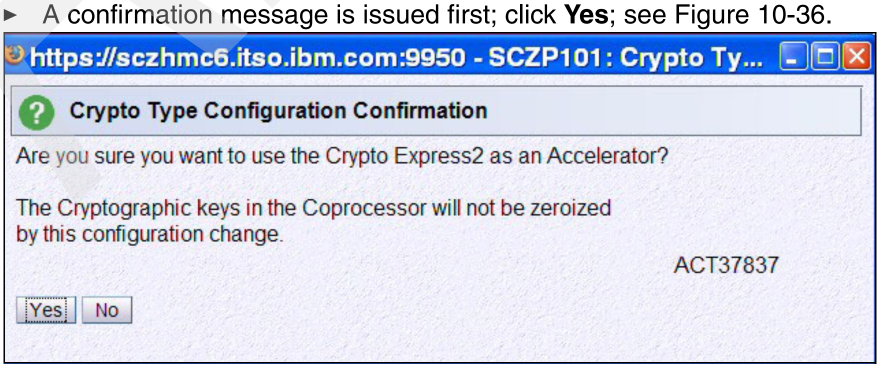


Figure 10-36 SE Workplace - Crypto Type Configuration Confirmation, message ACT37837

- It is followed by a completion message; press **OK**. See Figure 10-37.

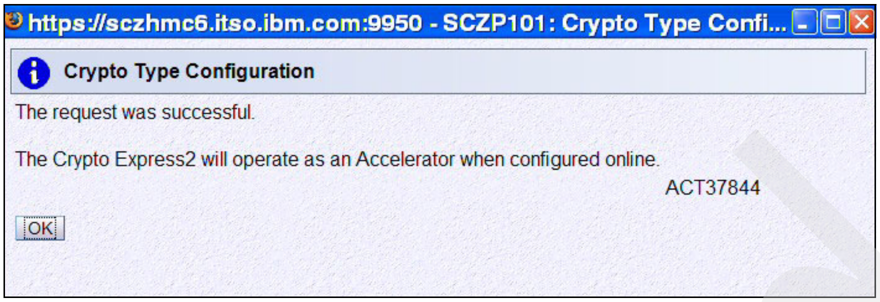


Figure 10-37 SE Workplace - Crypto Type Configuration, message ACT37844

- Configure the PCI-X Cryptographic adapter back On, using the procedure explained in 10.3.3, "Config On/Off from the CPC Work Area" on page 393.

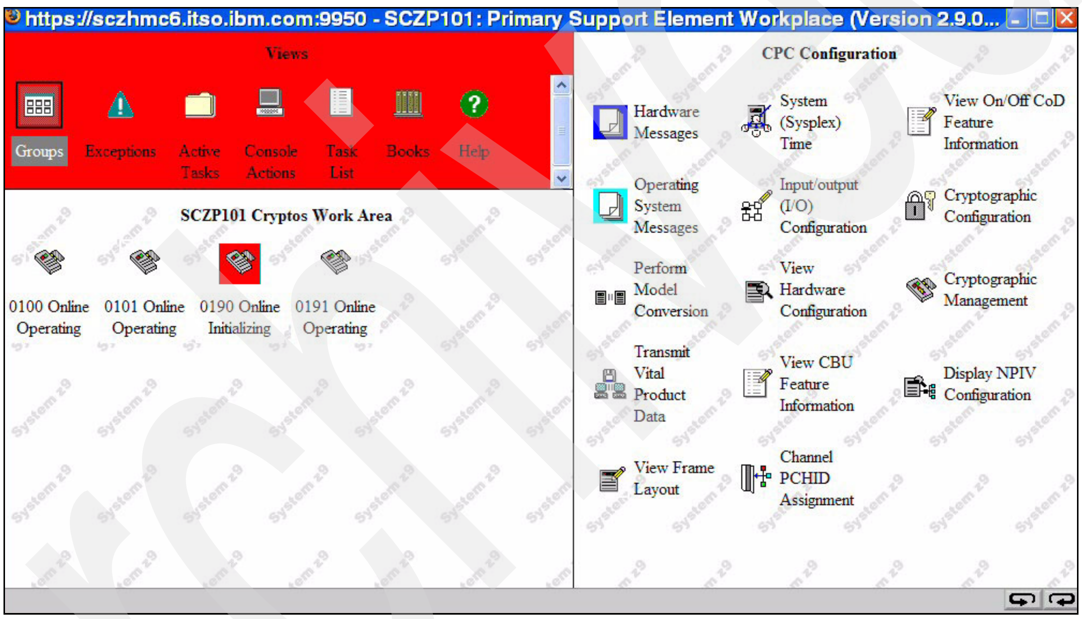


Figure 10-38 SE Workplace - CPC Cryptos Work Area

The reconfigured PCI-X Adapter status may display `Initializing`, as shown in Figure 10-38, before returning to Operating. When the PCI-X adapter is back online, it should then be activated back online from the ICSF Coprocessor Management panel.

10.5 Activation and Deactivation using ICSF

ICSF provides a TSO-ISPF Coprocessor Management panel to display or change the status, Active or Deactivated, 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 z9-109 Support Element.

From the ICSF main menu, select **option 1** to display the ICSF Coprocessor Management panel; see Figure 10-39 on page 400.

```
HCR7730  -------------- Integrated Cryptographic Service Facility--------------
OPTION ===>
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 10-39 Integrated Cryptographic Service Facility Main Panel

Cryptographic coprocessors that are currently configured on the partition are displayed on the ICSF Coprocessor Management panel; see Figure 10-40.

- In the list, enter action character `A` or `D` to switch a coprocessor status to Active or Deactivated. When a coprocessor is deactivated through ICSF, it cannot be used by applications running in that system image.

```
 ------------------------- ICSF Coprocessor Management -------- Row 1 to 4 of 4
 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
     -----------      -------------   ------
 .   E01              94000264        ONLINE
 .   E02              95001434        ONLINE
 .   E03              95001437        ONLINE
 .   F00                              ACTIVE
 ******************************* Bottom of data *******************************


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

Figure 10-40 ICSF Coprocessor Management

- The Active/Deactivated status viewed from ICSF Coprocessor Management does not change the Online/Standby status set from the z9-109 Support Element; see Example 10-1 on page 401.

Example 10-1 ICSF - Coprocessor Hardware Status

```
---------------------- ICSF - Coprocessor Hardware Status ---------------------
 COMMAND ===>                                                     SCROLL ===>
                                                                 CRYPTO DOMAIN: 11

 REGISTER STATUS                 COPROCESSOR E03
  Crypto Serial Number         : 95001437
  Status                       : ONLINE
  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 : EMPTY
      Verification pattern     :
      Hash pattern             :
                               :
    Asymmetric-Keys Master Key
      New Master Key register  : EMPTY
      Hash pattern             :
                               :
    Old Master Key register    : EMPTY
      Hash pattern             :
                               :
    New Master Key register    : EMPTY
      Verification pattern     :
      Hash pattern             :
                               :
    Old Master Key register    : EMPTY
      Verification pattern     :
      Hash pattern             :
                               :
    Current Master Key register : EMPTY
      Verification pattern     :
      Hash pattern             :
                               :
  Asymmetric-Keys Master Key
    New Master Key register    : EMPTY
      Hash pattern             :
                               :
    Old Master Key register    : EMPTY
      Hash pattern             :
                               :
    Current Master Key register : EMPTY
      Hash pattern             :
                               :
```

When a coprocessor is configured off to the partition from the SE (Standby status), it is viewed Offline on the ICSF Coprocessor Management panel.

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 either:

– At the time the partition is activated, if the coprocessor is installed and the coprocessor number is part of the partition Online list

– Or when the coprocessor is first configured online to the partition using the Config On/Off task from the SE Workplace

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.

Help information from ICSF Coprocessor Management, shown in Figure 10-41 on page 403, describes valid actions and status displayed for each type of cryptographic coprocessor.

```
------------- Help for Coprocessor Management --------------------------------
COMMAND ===>

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 10-41 ICSF - Help from Coprocessor Management

11

Reserved logical partitions

In this chapter we explain how to implement and use reserved logical partition on a 2094 processor.

We cover the following topics:

- Introduction to reserved logical partitions
- HCD definition
- Customize and activate
- Deactivate and un-name a reserved logical partition
- Rename a reserved logical partition
- Crypto Express2 considerations

11.1 Introduction to reserved logical partitions

Since the introduction of the zSeries 2084 GA2, it is possible to configure a predefined reserved logical partition for later use. These logical partitions can be named, given resources and activated when needed. Logical partitions can also be deactivated and unnamed, meaning they become 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, for example, the need for a new z/OS image, the removal of redundant z/OS images or even the consolidation of logical partitions from another zSeries server on to a 2094 server. 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 and memory upgrades and channel upgrades, means that the need for a power-on reset of the 2094 is kept to a minimum. This in turn means that the unnecessary downtime on active logical partitions is also reduced.

> **Note:** Reserved logical partitions must be defined during the initial configuration and definition of the 2094 server. Once the server has been power-on reset and is active, additional reserved logical partitions cannot be defined. To add reserved logical partitions, another power-on reset is required.

The ability to use reserved logical partitions depends on certain prerequisite hardware and software requirements been in place before this function can be used. The 2094 server as well as the 2084 and 2086 servers support the definition and use of reserved logical partitions. A reserved logical partition has to be defined, using HCD, with an asterisk (*) in the name field.

Each LCSS can have a maximum of 15 logical partitions defined, including reserved logical partitions. It is possible to “reserve” a whole LCSS by defining it with only reserved logical partitions.

The operating system must be z/OS V1R6 or above to create or name a reserved logical partition. Note also that Independent Software Vendor (ISV) software that relies on the logical partition MIFID needs to be updated.

11.2 HCD definition

During the initial configuration setup of the 2094, we recommend that reserved logical partitions be defined on the Logical Channel Subsystems that may need them on.

To do the initial setup of reserved logical partitions, follow these steps:

- From the **define, modify** or **view** option for **Processors** in HCD, you see the display shown in Figure 11-1 on page 407.

```
Processor List        Row 1 of 7 More:
Command ===> _______________________________________________ Scroll ===> PAGE

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  0001012094 Reserving LPARS
_ SCZP701  9672     XX7      LPAR  0007019672 ________________________________
_ SCZP801  2064     1C7      LPAR  0008012064 ________________________________
_ SCZP901  2084     C24      LPAR  0009012084 ________________________________
_ WOJ1     2084     A08      LPAR  __________ ________________________________
```

Figure 11-1 HCD processor definition List

- Select the server you want to add the reserved logical partition to, then select the partition list for the CSS ID that you want to add a reserved logical partition to; see Figure 11-2.

  Remember, an LCSS cannot have more that 15 logical partitions defined.

```
Channel Subsystem List                Row 1 of 3
Command ===> _______________________________________________ Scroll ===> PAGE

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

Processor ID . . . : SCZP101      Reserving LPARS

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
_ 0   65280     7412    0         0       ________________________________
p 1   65280     7156    0         0       ________________________________
_ 2   65280     8419    65535     1       ________________________________
```

Figure 11-2 HCD Channel Subsystem List

- From the Partition list, add a new partition. The reserved logical partition has an asterisk (*) in the partition name field. The asterisk (*) ensures that the CSS treats this logical partition as a reserved logical partition.

  A partition number and a partition usage need to be defined at this point. No resources are allocated to it and it is not visible on Defined images screen on the HMC workplace.

  After the value for the partition number has been set (the value can be between x'1' and x'F') and the server has been power-on reset, changing the partition number requires a configuration change and a new power-on reset. The partition usage can be changed with a dynamic activate; see Figure 11-3 on page 408.

```
Command ===> ________________________________________ Scroll ===> PAGE

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

Processor ID  . . . . : SCZP101   Reserving LPARS
Configuration mode  . : LPAR
Channel   *------------------ Add Partition --------------------------*
          |                                                            |
/ Partiti |                                                            |
_ A1E     | Specify the following values.                              |
/ A1F     |                                                            |
_ A11     | Partition name . . . *                                     |
_ A12     | Partition number . . 5      (same as MIF image ID)         |
_ A13     | Partition usage  . . CF/OS  +                              |
_ A14     |                                                            |
********* | Description  . . . . Reserved LPAR___________________      |
```

Figure 11-3 HCD adding a reserved Partition

> **Tip:** In the Partition usage field, we recommend using CF/OS. This means that the reserved logical partition can be used as an operating system, Coupling Facility, or Linux logical partition.

- The reserved partition appears in HCD in the defined processor list. Repeat the procedure for all the defined reserved partitions you want to add; see Figure 11-4.

```
-  ----------------------------- Partition List -----------------------------
      Goto  Backup  Query  Help
    ----------------------------------------------------------------------
                                                               Row 2 of 8
    Command ===> ________________________________________ Scroll ===> CSR

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

    Processor ID  . . . . : SCZP101   Reserving LPARS
    Configuration mode  . : LPAR
    Channel Subsystem ID  : 1

    / Partition Name   Number Usage + Description
    _ A1F              F      CF      ________________________________
    _ A11              1      OS      SC75
    _ A12              2      OS      VMLINUX7
    _ A13              3      OS      SCxx
    _ A14              4      OS      ________________________________
    _ *                5      CF/OS   Reserved LPAR
    _ *                6      CF/OS   Reserved LPAR
```

Figure 11-4 HCD Partition List with reserved logical partitions

Note that in the IOCP deck produced by HCD, the Resource Partition statement shows the reserved partitions with * in the name field, as shown in Figure 11-5 on page 409.

```
************************ Top of Data ***************************
 ID    MSG1='Reserved LPAR',                                  *
       MSG2='RRDCUST.IODF34.WORK - 2005-11-17 18:28',         *
       SYSTEM=(2094,1),                                       *
       TOK=('SCZP101',00800221991E2094182806580105321F00000000,*
       00000000,'05-11-17','18:28:06','........','........')
 RESOURCE PARTITION=((CSS(0),(A0A,A),(A0B,B),(A0C,C),(A0D,D),(A*
       0E,E),(A0F,F),(A01,1),(A02,2),(A03,3),(A04,4),(A05,5),(A*
       06,6),(A07,7),(A08,8),(A09,9)),(CSS(1),(A1E,E),(A1F,F),(*
       A11,1),(A12,2),(A13,3),(A14,4),(*,5),(*,6)),(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))),                                                 *
       MAXDEV=((CSS(0),65280,0),(CSS(1),65280,0),(CSS(2),65280,*
       65535))
```

Figure 11-5 Sample extract of IOCP deck

The reserved logical partitions configuration are now ready.

The reserved logical partitions can only be seen as definitions in HCD or HCM, or in the IOCP deck. At this time, they are just place holders (reserved logical partitions require extra space in the HSA) and no resources are assigned to them.

11.3 Customize and activate

To activate a reserved logical partition, an HCD configuration change is required to assign a name and customize the Activation Profile for the new logical partition.

It is assumed that the 2094 server has sufficient resources for the new logical partition, which include memory, channels and CPs. The following are discussed:

- Name a reserved logical partition
- Allocate hardware resources
- Configuration Activate
- Customize the Activation Profile
- Set logical partition security
- Logical partition storage assignment
- Cryptographic definitions
- Deactivate logical partition
- Renaming a z/OS logical partition to a Linux logical partition

We discuss these tasks in more detail in the following sections.

11.3.1 Name a reserved logical partition

- Using HCD, assign a name to the new logical partition. Remember that this name is in the IPL load member, and we recommend using a name that conforms to your standard. Also remember that the partition number (MIFID) cannot change from what it was set to in the initial partition definition when this partition was created as a reserved logical partition. This value has been set by the power-on reset; see Figure 11-6 on page 410.

```
----------------------------- Partition List -----------------------------
   Goto  Backup  Query  Help
 ------------------------------------------------------------------------

 Command ===> ________________________________________ Scroll ===> CSR

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

 Processor ID  . . . . : SCZP101   Reserving LPARS
 Configuration mode  . : LPAR
 Channel   +------------- Change Partition Definition ----------------+
           |                                                          |
 / Partiti |                                                          |
 _ A1F     | Specify or revise the following values.                  |
 _ A11     |                                                          |
 _ A12     | Partition name . . . A15                                 |
 _ A13     | Partition number . . 5      (same as MIF image ID)       |
 _ A14     | Partition usage  . . CF/OS  +                            |
 c *       |                                                          |
 _ *       | Description  . . . . NEW NAMED LPAR                      |
```

Figure 11-6   HCD - Partition List, assigning a name to a reserved logical partition

11.3.2 Allocate hardware resources

- Next, you need to assign the channels the logical partition uses to access all the devices it needs. Remember to define devices such as SCTC, FCTC and Coupling links if needed. Failure to do so can mean having to activate a new configuration. An operating system configuration may have to be created if using a different one to those defined. Remember to also ensure that devices like disk subsystems have sufficient logical channel connections to support the new logical partition I/O activity.

```
------------- Update CHPID Access and Candidate Lists -------------
                                                       Row 1 of 128
Command ===> _________________________________ Scroll ===> CSR

Select channel paths to include or exclude, then press Enter.

Partition name . . : A15       NEW NAMED LPAR

                       ---Partition Included In---
/ CHPID  Type   Mode   Access List  Candidate List
/ 00     OSD    SPAN   yes          No
/ 01     OSD    SPAN   yes          No
/ 06     OSD    SPAN   yes          No
/ 07     OSD    SPAN   yes          No
/ 08     OSD    SPAN   No           No
/ 09     OSD    SPAN   No           No
/ 0A     OSD    SPAN   No           No
```

Figure 11-7   HCD - Update CHPID Access and Candidate List

All devices on the selected CHPIDs are available to the newly named logical partition. If you have devices that you do not want to connect to the newly named logical partition, those devices must have their candidate lists updated to exclude the newly named logical partition. If some devices already have candidate lists, the new logical partition is not included in that candidate list; see Figure 11-7 on page 410.

Your partition is now named and has all its necessary resources defined from a HCD perspective. At this point, a production IODF can be built.

11.3.3 Configuration Activate

Before the new configuration can be activated, there are a number of definitions that need to be put in place:

- In the activation profile on the HMC application, the option to allow Dynamic I/O changes needs to be enabled *and* it must have been enabled before the last power-on reset of the 2094 server. If this is not the case, a power-on reset is needed to change the reserved logical partition to a named logical partition; see Figure 11-8.

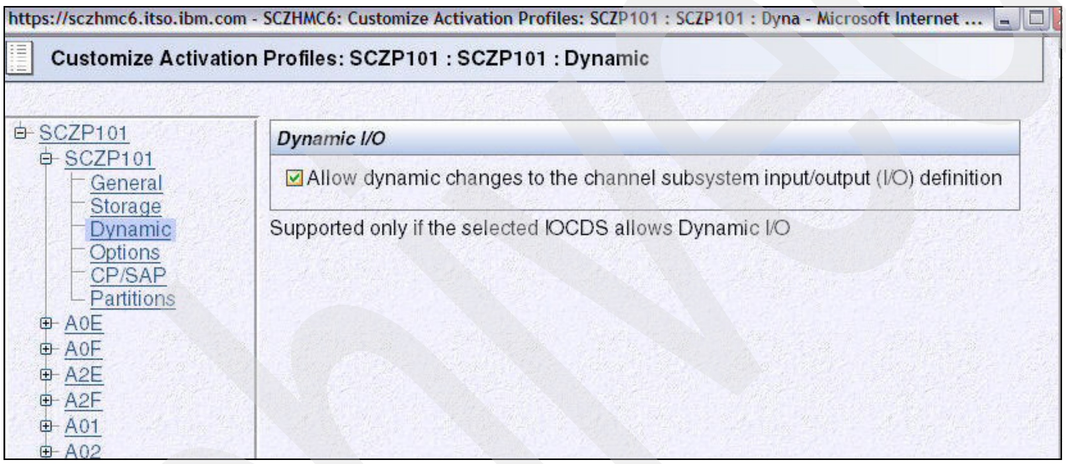

Figure 11-8 HCM Application activation Profile

- A z/OS image at release V1R6 or later is needed to issue the activate commands for the new configuration. The commands can be issued through HCD or as a z/OS system commands.

  However, 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 11-9 on page 412.

```
D IOS,CONFIG(ALL)
IOS506I 11.52.57 I/O CONFIG DATA 142
ACTIVE IODF DATA SET = SYS6.IODF34
CONFIGURATION ID = TEST2094       EDT ID = 01
TOKEN:  PROCESSOR DATE     TIME     DESCRIPTION
 SOURCE: SCZP101  05-10-29 14:51:15 SYS6     IODF34
ACTIVE CSS:  2    SUBCHANNEL SETS IN USE: 0, 1
HARDWARE SYSTEM AREA AVAILABLE FOR CONFIGURATION CHANGES
PHYSICAL CONTROL UNITS              8101
CSS  0 - LOGICAL CONTROL UNITS      4033
 SS  0   SUBCHANNELS               57868
CSS  1 - LOGICAL CONTROL UNITS      4037
 SS  0   SUBCHANNELS               58124
CSS  2 - LOGICAL CONTROL UNITS      4013
 SS  0   SUBCHANNELS               56861
 SS  1   SUBCHANNELS               65534
ELIGIBLE DEVICE TABLE LATCH COUNTS
        0 OUTSTANDING BINDS ON PRIMARY EDT
```

Figure 11-9 Display ios,config(all)

This display shows that the source IODF and the active IODF are the same, therefore, a full Activate can be done.

You can also use the HCD option **Activate or process configuration data**, and then option **View active configuration**; this gives you the display shown in Figure 11-10.

```
  +----- Activate or Process Configuration Data ------+ _____________________
  |                                                   |
+------------------------------- Message List --------------------------------+
|   Save  Query  Help                                                          |
| --------------------------------------------------------------------------  |
|                                                              Row 1 of 2  |
| Command ===> ___________________________________________ Scroll ===> CSR    |
|                                                                              |
| Messages are sorted by severity. Select one or more, then press Enter.      |
|                                                                              |
| / Sev Msg. ID  Message Text                                                  |
| _ I   CBDA781I Your system configuration provides full dynamic               |
| #              reconfiguration capability.                                   |
| ***************************** Bottom of data ****************************** |
```

Figure 11-10 HCD display for dynamic activation query

After verification, 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 MVS **`activate`** command, or via HCD.

- In HCD, select option **Activate or process configuration data** to activate the new configuration. Then select option **6**, **Activate or verify configuration dynamically**. Next, use option **1**, **Activate new hardware and software configuration**, which allows you to do a full dynamic activation; see Figure 11-11 on page 413.

```
---------------- Activate or Verify Configuration ----------------


The currently active IODF matches the hardware I/O
configuration.  Both hardware and software definitions may be
changed. Select one of the following tasks.

  _ 1.  Activate new hardware and software configuration.
    2.  Activate software configuration only. Validate
        hardware changes. Process changes to Coupling
        Facility elements.
    3.  Activate software configuration only.
    4.  Verify active configuration against system.
    5.  Verify target configuration against system.
    6.  Build CONFIGxx member.
```

Figure 11-11 HCD Dynamic activate via HCD

After the dynamic activate completes successfully, you need to write a new IOCDS and make it the active IOCDS on the server. This is because the current IOCDS in the Activation Profile on the HMC application does not have the newly named logical partition, and you cannot assign a Activation profile for the logical partition.

After writing the new IOCDS, you can use the HMC task to update the activation profile for the newly defined logical partition.

11.3.4 Customize the Activation Profile

- From the HMC application, select the Customize/Delete Activation Profile for the server to which you have added the new logical partition. Select the desired Reset profile and click **Customize;** see Figure 11-12 on page 414.
- After you are in the Reset profile, select the new IOCDS that was written to the server. A pop-up screen will display, asking if you want to maintain the logical partition activation order. We recommend selecting **no**.
- Decide when this new logical partition is to be activated after a power-on reset and update the activation order appropriately. However, if you wish to keep it as it is, you can do so.

  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.

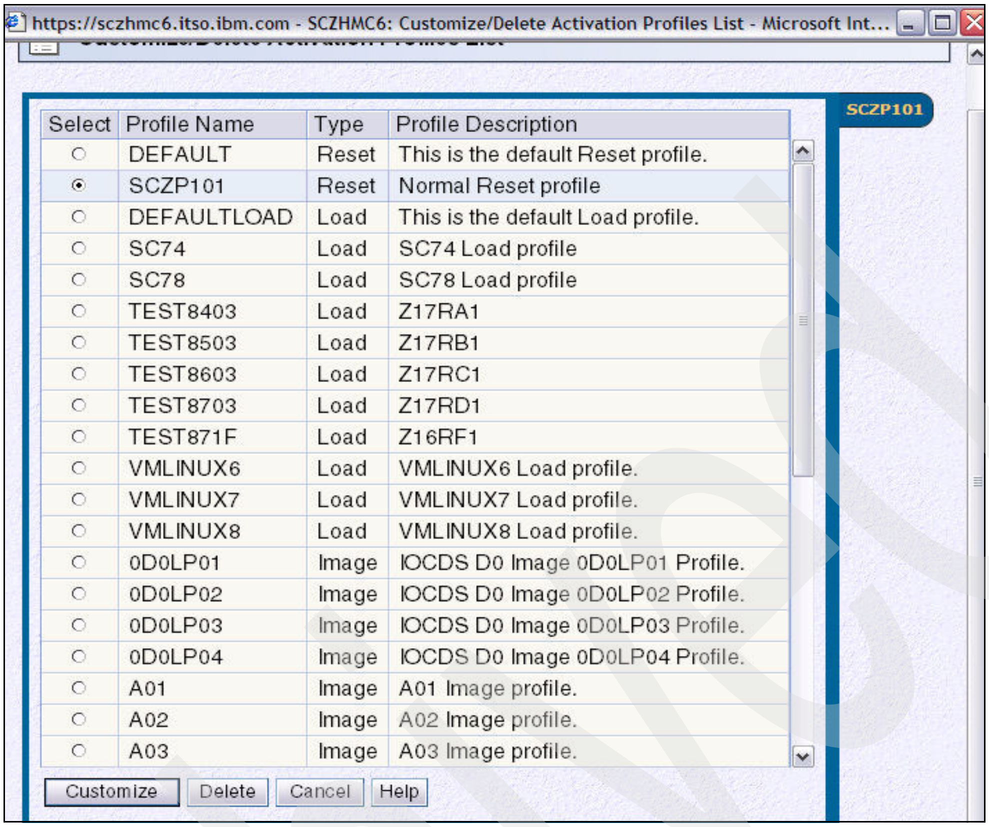

Figure 11-12   HMC -Console Workplace Customize/delete Activation profiles

You are now ready to define all the necessary resources to the new logical partition.

Remember that if you do not have unassigned storage or unused storage, you need to re-assign storage from an active partition or partitions. This is only possible if the logical partitions from which the storage has been removed have Reconfigure Storage Unit (RSU) definitions in place.

Define the resources to the new logical partition

The resources that the new logical partition needs to use must be updated before the logical partition is activated. These include the following:

- Partition Identifier

  Assign a partition identifier to the new logical partition. Remember to use a unassigned value that is not in use by any other partition. If the new logical partition is to used as a Coupling Facility, the partition ID is important when defining/updating the CFRM policy.

- Operating mode

  Here you can define how this partition is to be used. The options are ESA/390, ESA/390 TPF, Coupling Facility or LINUX only; see Figure 11-13 on page 415.

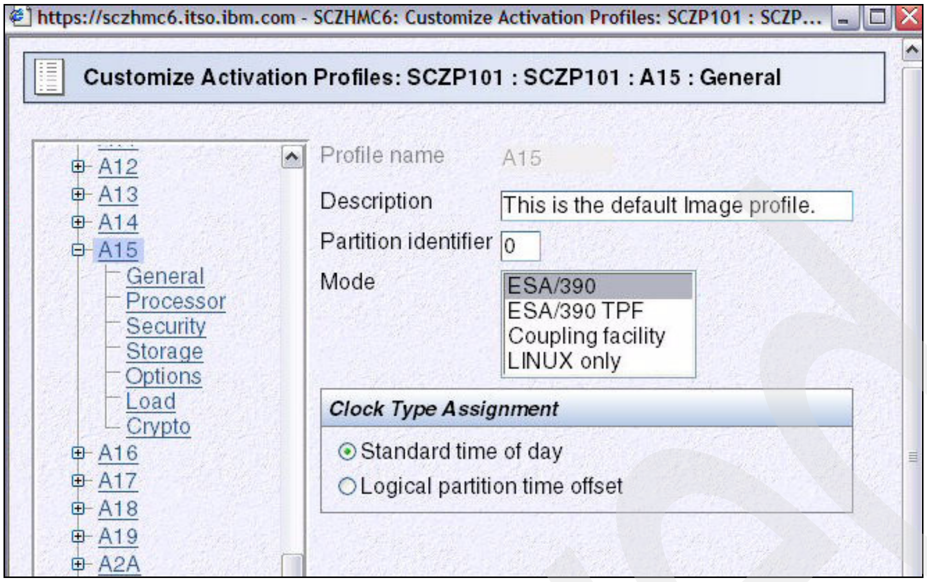

Figure 11-13 HMC General profile update

- Clock assignment

  The clock value allows you to use a External Time Reference (ETR) such as a Sysplex Timer, or an internal TOD clock if this is a standalone server. You can also set a offset value to the 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 apropriate option; see Figure 11-14.

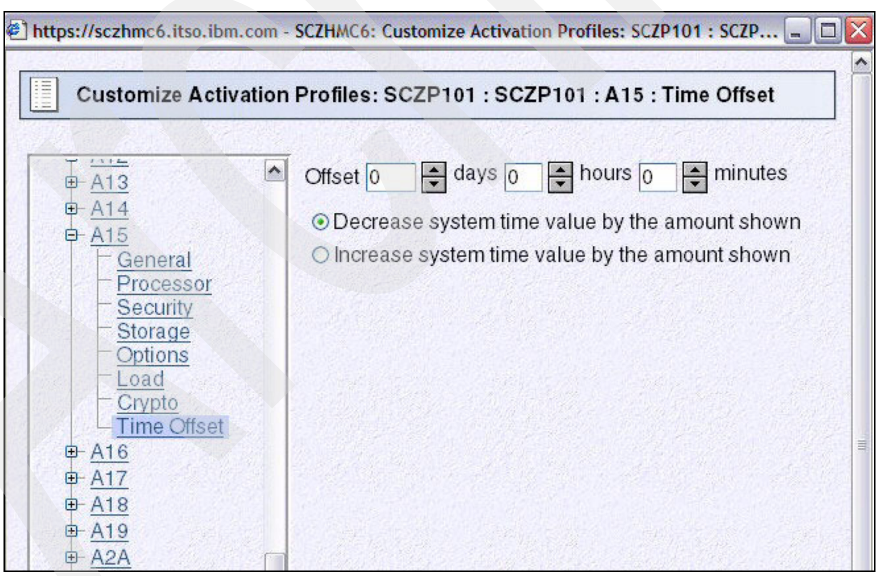

Figure 11-14 HMC Time Offset profile

Set the processor assignment values

- From the Logical Processor Assignment panel, you specify the new logical partition CP assignment. If you operate this logical partition with shared processors (that is, Not

Dedicated Central Processors), then you need to set the processing weight and, if needed, the initial capping value and the Work Load Manager values.

You must set the number of initial CPs, while reserved Logical CPs is optional. Initial CPs refers to how many CPs come online when the logical partition is IPLd. Reserved CPs refers to how many CPs 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 CPs are enabled, they can be configured online and used immediately; see Figure 11-15.

Note: Do not define more CPs for a logical partition than the operating system running on that logical partition is capable of supporting.

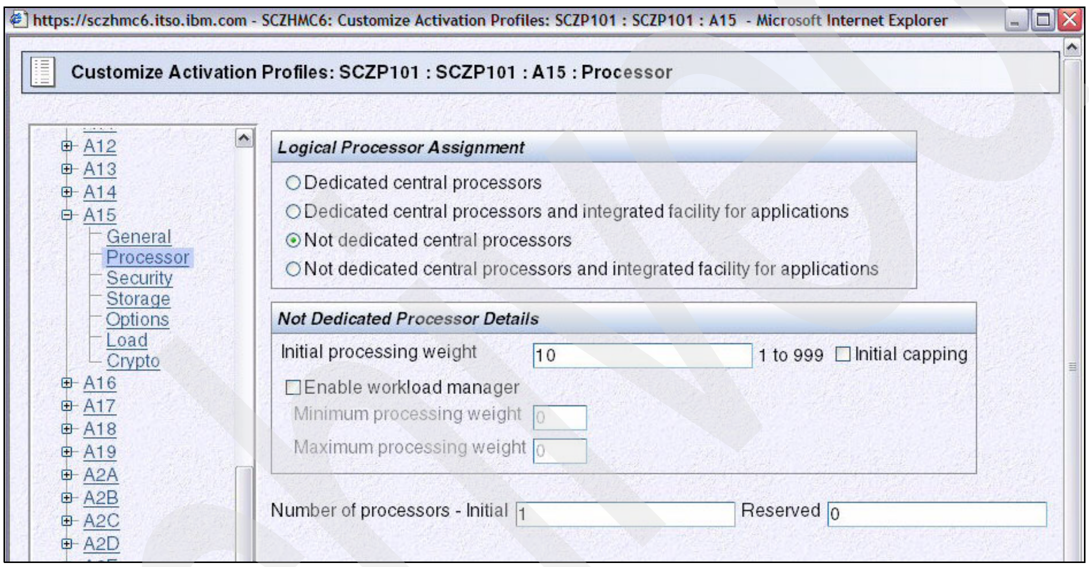

Figure 11-15 HCM Logical processor Assignment

11.3.5 Set logical partition security

- 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 may be selected; see Figure 11-16 on page 417.

Note: Enabling I/O Configuration Control also allows OSA/SF to manage OSA channels across the entire server.

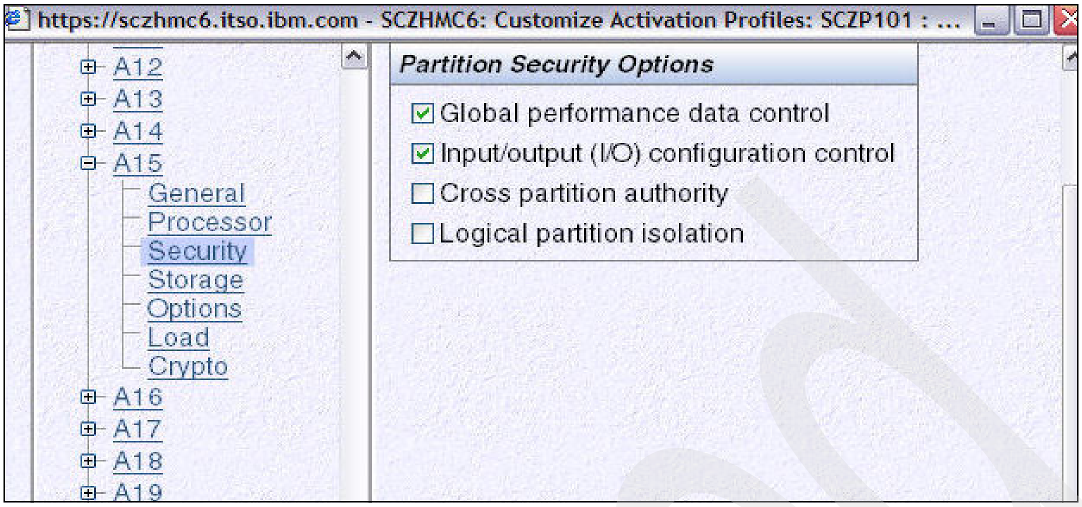

Figure 11-16 HMC logical partition Security options

11.3.6 Logical partition storage assignment

- Storage assignments are set from the Storage panel. There are two options, namely Central and Expanded.

  If you are running in 64-bit exploitation mode, only set Central Storage values.

  In 31-bit compatibility mode, Central and Expanded values may be set. Note that in compatibility mode, although more than 2048 MB of central storage can be allocated, the z/OS system that is IPLd on this image can only have 2048 MB of central storage, plus whatever amount of expanded storage is allocated.

  The storage is allocated in increments of 64 MB for all storage. The allocation for the new storage is done from two sources. First, if there is unused storage that may be available on the 2094 server which can be allocated. This may be unassigned storage or from inactive logical partitions.

  The second source is to remove storage from other active logical partitions on the server. This is called Dynamic Storage Reconfiguration (DSR). In order to remove storage from active images, they must use the correct Reconfigurable Storage unit (RSU) settings.

  By setting reserved storage values on a logical partition definition, you can do memory upgrades at a later stage, nondisruptively. The reserved storage value can be set even if the additional memory is not installed in the server. The maximum amount of central storage you can define to logical partition is 128 GB; see Figure 11-17 on page 418.

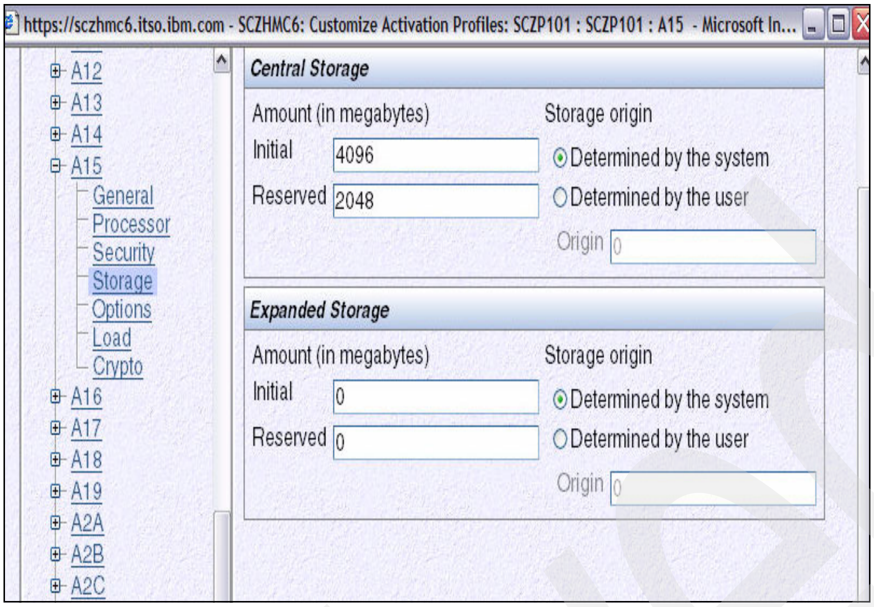

Figure 11-17 HMC Customize Activation Profile: Storage allocations

11.3.7 Cryptographic definitions

If the newly named logical partition is using cryptographic services, you must enable these options via the Activation profile before partition activation. Make sure that the Control Domain Index and Usage Domain Index are correct and do not conflict with any other logical partitions on the 2094 server. If you duplicate definition values across logical partitions, you are not be able to save the logical partition activation profiles until you correct the Cryptographic definitions; see Figure 11-18.

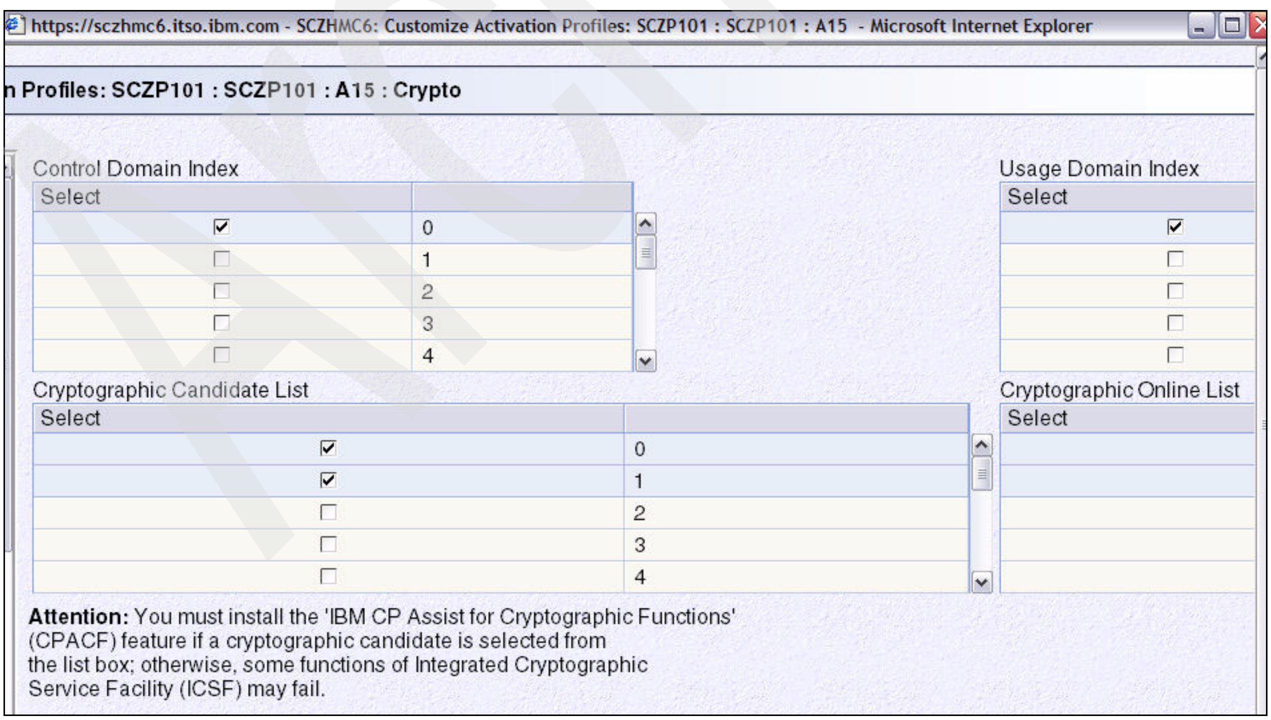

Figure 11-18 HMC - customize Activation profiles: Crypto

After all the values have been updated and saved, the logical partition can be activated and IPLed.

Remember that if you use Cryptographic services on this new logical partition, these values need to be set before the logical partition is activated and the operating system image IPLed.

11.4 Deactivate and un-name a reserved logical partition

Deactivate logical partition

Deactivating a logical partition is a straightforward process. Once the image has been reset, the logical partition can be deactivated from the HMC application Daily Task. This frees up all the partitions resources such as memory, CPs and channels. The logical partition appears in the deactivated state on the HMC application; see Figure 11-19.

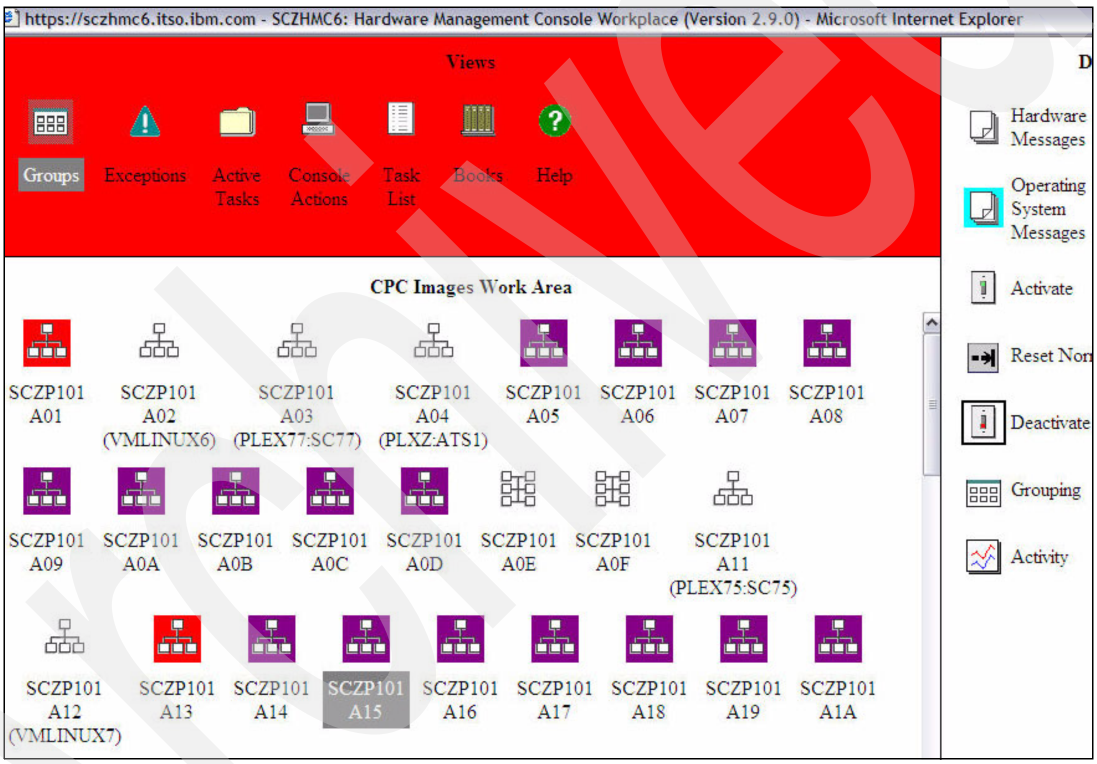

Figure 11-19 HMC Workplace - Deactivate logical partition

After deactivation is complete, you can make changes via HCD or HCM to revert the logical partition back to a reserved logical partition.

HCD definition changes

The process of changing a named logical partition to a reserved logical partition is the reverse of naming of a logical partition. We recommend that—before making any changes in HCD for the logical partition that has been changed to reserved status—you verify which channels and devices were 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.

- In HCD, select the Channel Subsystem id with the partition you want to change to a reserved logical partition.

  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.

  Select the Change logical partition option and proceed to the Update CHPID Access and Candidate Lists; see Figure 11-20.

```
+---------------------------- Partition List _________
|   Goto  Backup  Query  Help
| - +------------- Update CHPID Access and Candidate Lists
|   |
| C | Command ===> _________________________________ Scrol
|   |
| S | Select channel paths to include or exclude, then pre
|   |
| P | Partition name . . : A15       NEW NAMED LPAR
| C |
| C |                        ---Partition Included In---
|   | / CHPID  Type   Mode   Access List  Candidate List
| / | _ 00     OSD    SPAN   no           No
| c | _ 01     OSD    SPAN   no           No
| _ | _ 06     OSD    SPAN   no           No
| _ | _ 07     OSD    SPAN   no           No
| _ | _ 08     OSD    SPAN   Yes          No
| _ | _ 09     OSD    SPAN   Yes          No
| _ | _ 0A     OSD    SPAN   Yes          No
| _ | _ 0B     OSD    SPAN   Yes          No
|   | _ 0C     OSD    SPAN   Yes          No
|   | _ 0D     OSD    SPAN   Yes          No
| F | _ 0E     OSN    SPAN   Yes          No
```

Figure 11-20 HCD - Update CHPID Access and Candidate Lists

- Change all the CHPID Access and Candidate Lists to `No`. That way, all channels are removed from the logical partition.
- After this is completed, proceed to renaming the partition; see Figure 11-21.

```
 -------------- Change Partition Definition ---------------


  Specify or revise the following values.

  Partition name . . . *
  Partition number . . 5      (same as MIF image ID)
  Partition usage  . . CF/OS  +

  Description  . . . . LPAR changed to reserved status_
```

Figure 11-21 HCD - Change partition definition to reserved status

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, as shown in Figure 11-22. You are now ready to activate the new configuration. Verify that the hardware and software definitions are in sync so that dynamic activate can be performed.

```
----------------------------- Partition List -----------------------------
   Goto  Backup  Query  Help
 ------------------------------------------------------------------------
                                                              Row 9 of 15
 Command ===> ________________________________________ Scroll ===> CSR

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

 Processor ID  . . . . : SCZP101
 Configuration mode  . : LPAR
 Channel Subsystem ID  : 1

 / Partition Name   Number Usage + Description
 _ A13              3      OS      SCxx
 _ A14              4      OS      ________________________________
 _ A16              6      OS      ________________________________
 _ A17              7      OS      ________________________________
 _ A18              8      OS      ________________________________
 _ A19              9      OS      ________________________________
 _ *                5      CF/OS   LPAR changed to reserved status
```

Figure 11-22 HCD - Change Partition Definition to reserved status

Removing resources form the Activation profiles

When the new configuration has been activated and the logical partition removed, you can remove the resources defined from the Activation Profile on the HMC application. The important resource is storage, as you may want to add this to another partition.

After all the resources have been removed, you should 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. Here you see 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.

11.5 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.
- Then name, assign resource and activate the reserved logical partition.

There are special considerations to take note of 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 needs need to 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, and how to name a reserved logical partition, in other sections of this chapter. 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 already available (including storage, channels and IFLs or CPs).

The sequence is as follows:

1. In the IODF, remove all assigned channels and, optionally, any devices that may be in the candidate list for the logical partition that has 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 a active z/OS logical partition on the 2094 server where the logical partition is been renamed, or via the HCD panels. After activate has completed successfully, proceed to naming the logical partition.
4. Using the work version of the IODF activated in the 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 number *cannot* be changed. This value has been set on the 2094 from the last power-on reset; see Figure 11-23 on page 423.

```
-------------- Change Partition Definition ---------------


Specify or revise the following values.

Partition name . . . A15LINUX
Partition number . . 5      (same as MIF image ID)
Partition usage  . . CF/OS  +

Description  . . . . Renamed z/OS to LINUX LPAR
```

Figure 11-23 HCD - Assigning logical partition name and usage

> **Note:** If the 2094 server that you are renaming a partition on already has a Coupling Facility with peer mode Coupling links defined, you should change the Partition usage value to OS only, as 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. After naming the reserved logical partition, you can 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.
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 2094 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 mach the new name you have assigned. Change the activation profile to point to the new IOCDS and pay attention to the activation order of all the logical partitions.

11.6 Crypto Express2 considerations

When renaming a logical partition NAME1 to NAME2—and logical partition NAME1 was using cryptographic services—it must be remembered that the MIFID is retained across the logical partition name change.

Therefore, if cryptographic functions were used, then the master keys in the Crypto Express2 card that were associated with logical partition NAME1 are retained for logical partition NAME2. There is no explicit action taken against a Cryptographic component for the logical partition name change.

Cryptographic coprocessors are set up with AP numbers and domain indices. These are assigned to a partition profile of a given name. The client can assign them to the partition and change, or clear them when needed. It is the client’s responsibility to assign these “lanes” and therefore the client is therefore responsible if he changes who uses them.

The Crypto Express2 feature does not use a CHPID, but logical partitions in all LCSSs have access to the PCI-X Cryptographic adapter if it is defined in the Candidate list. Each PCI-X Cryptographic Adapter can be defined to up to 16 active logical partitions.

Glossary

active configuration. In an ESCON environment, the ESCON Director configuration determined by the status of the current set of connectivity attributes. Contrast with *saved configuration*.

ADMF. Asynchronous Data Mover Facility.

allowed. In an ESCON Director, the attribute that, when set, establishes dynamic connectivity capability. Contrast with *prohibited*.

American National Standards Institute (ANSI). An organization consisting of producers, consumers, and general interest groups, which establishes the procedures by which accredited organizations create and maintain voluntary industry standards in the United States.

ANSI. See *American National Standards Institute*.

AP. Adjunct processor.

APAR. See *authorized program analysis report*.

Application Assist Processor (AAP). A special processor configured for running Java applications on z9-109, z990 and z890 class servers.

ARP. Address Resolution Protocol.

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 and z890 servers.

BBU. Battery Back-up Unit.

BL. Parallel block multiplexer channel.

blocked. In an ESCON or FICON Director, the attribute that, when set, removes the communication capability of a specific port. Contrast with *unblocked*.

BPA. Bulk Power Assembly.

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.

BY. Parallel byte multiplexer channel.

CAP. Cryptographic Asynchronous Processor.

CAW. channel address word.

CBA. Concurrent Book Add.

CBP. Integrated cluster bus Coupling Facility peer channel.

CBU. Capacity BackUp.

CBY. ESCON byte multiplexer channel.

CCC. Channel control check.

CCF. Cryptographic Coprocessor Facility.

CCL. Communication Controller for Linux CCL.

CCW. Channel command word.

CDC. Channel data check.

CEC. Central Electronic Complex.

central processor. The part of the computer that contains the sequencing and processing facilities for instruction execution, initial program load, and other machine operations.

central processor complex. A physical collection of hardware that consists of Central Storage, one or more central processors, timers, and channels.

CFCC. Coupling Facility Control Code.

chained. In an ESCON environment, pertaining to the physical attachment of two ESCON Directors (ESCDs) to each other.

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 address. In S/370™ mode, the 8 left-most bits of an input/output address that identify the channel. See also device address and input/output address.

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 or FICON 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.

CIU. Customer Initiated Upgrade.

cladding. In an optical cable, the region of low refractive index surrounding the core. See also *core* and *optical fiber.*

CMOS. Complementary metal-oxide semiconductor.

CMT. CHPID Mapping Tool.

CNC. Mnemonic for an ESCON channel used to communicate to an ESCON-capable device.

command chaining. The fetching of a new channel command word (CCW) immediately following the completion of the previous CCW.

command retry. A channel and control unit procedure that causes a command to be retried without requiring an I/O interrupt.

concurrent maintenance. Hardware maintenance actions performed by a service representative while normal operations continue without interruption. See also *nondisruptive installation* and *nondisruptive removal*.

configuration matrix. In an ESCON environment, an array of connectivity attributes that appear as rows and columns on a display device and can be used to determine or change active and saved configurations.

connected. In an ESCON Director, the attribute that, when set, establishes a dedicated connection between two ESCON ports. Contrast with *disconnected.*

connection. In an ESCON Director, an association established between two ports that provides a physical communication path between them.

connectivity attribute. In an ESCON Director, the characteristic that determines a particular element of a port's status. See *allowed, blocked, connected, disconnected, prohibited,* and *unblocked.*

control unit. A hardware unit that controls the reading, writing, or displaying of data at one or more input/output units.

core. (1) In an optical cable, the central region of an optical fiber through which light is transmitted. (2) In an optical cable, the central region of an optical fiber that has an index of refraction greater than the surrounding cladding material. See also *cladding* and *optical fiber.*

coupler. In an ESCON environment, link hardware used to join optical fiber connectors of the same type. Contrast with *adapter.*

Coupling Facility. A special logical partition that provides high-speed caching, list processing, and locking functions in a sysplex.

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.

CP. Central Processor.

CPACF. CP Assist for Cryptographic Function.

CPC. Central Processor Complex.

CPU. Central Processing Unit.

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.

CUoD. Capacity Upgrade on Demand

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.*

DAT. Dynamic address translation.

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.

data streaming. In an I/O interface, a mode of operation that provides a method of data transfer at up to 4.5 MB per second. Data streaming is not interlocked between the sender and the receiver. Once data transfer begins, the sender does not wait for acknowledgment from the receiver before sending the next byte. The control unit determines the data transfer rate.

DCA. Distributed Converter Assembly.

DCAF. Distributed Console Access Facility.

DCM. Dynamic CHPID Management.

DDM. See *disk drive module.*

dedicated connection. In an ESCON Director, a connection between two ports that is not affected by information contained in the transmission frames. This connection, which restricts those ports from communicating with any other port, can be established or removed only as a result of actions performed by a host control program or at the ESCD console. Contrast with *dynamic connection*. **Note:** The two links having a dedicated connection appear as one continuous link.

default. Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

DES. Data Encryption Standard.

destination. Any point or location, such as a node, station, or a particular terminal, to which information is to be sent.

device. A mechanical, electrical, or electronic contrivance with a specific purpose.

device address. In ESA/390 architecture and z/Architecture, the field of an ESCON or FICON (FC mode) device-level frame that selects a specific device on a control unit image.

device number. (1) In ESA/390 architecture and 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.

DH. Diffie-Hellman.

direct access storage device (DASD). A mass storage medium on which a computer stores data.

disconnected. In an ESCON Director, the attribute that, when set, removes a dedicated connection. Contrast with *connected.*

disk. A physical or logical storage media on which a computer stores data (sometimes referred to as a "magnetic disk").

disk drive module (DDM). A disk storage medium that you use for any host data that is stored within a disk subsystem.

distribution panel. (1) In an ESCON or FICON environment, a panel that provides a central location for the attachment of trunk and jumper cables and can be mounted in a rack, wiring closet, or on a wall.

duplex. Pertaining to communication in which data or control information can be sent and received at the same time. Contrast with *half duplex.*

duplex connector. In an ESCON environment, an optical fiber component that terminates both jumper cable fibers in one housing and provides physical keying for attachment to a duplex receptacle.

duplex receptacle. In an ESCON environment, a fixed or stationary optical fiber component that provides a keyed attachment method for a duplex connector.

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 connectivity. In an ESCON Director, the capability that allows connections to be established and removed at any time.

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.

dynamic storage reconfiguration. A PR/SM LPAR function that allows central or Expanded Storage to be added or removed from a logical partition without disrupting the system control program operating in the logical partition.

EBA. Enhanced Book Availability.

ECC. Error checking and correction.

ECKD. Extended count key data.

EEPROM. electrically erasable programmable read only memory.

EIA. Electronics Industries Association. One EIA unit is 1.75 inches or 44.45mm.

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 provides 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.

ESCD console. The ESCON Director display and keyboard device used to perform operator and service tasks at the ESCD.

ESCM. Enterprise Systems Connection Manager.

ESCON. See *Enterprise System Connection.*

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.

ETR. External time reference.

FC-AL. Fibre Channel Arbitrated Loop.

FCS. See *Fibre Channel standard.*

FCTC. FICON Channel-to-Channel.

fiber. See *optical fiber.*

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.

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. (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.

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).

field replaceable unit (FRU). An assembly that is replaced in its entirety when any one of its required components fails.

FRU. Field-replaceable unit.

GARP. Generic Attribute Registration Protocol.

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.

GVRP. GARP VLAN Registration Protocol.

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 hardware such as the z9-109 or zSeries processors.

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.

HDA. Head and disk assembly.

HDD. See *hard disk drive.*

head and disk assembly. The portion of an HDD associated with the medium and the read/write head.

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).

IBF. Internal Battery Feature.

ICB. Integrated Cluster Bus link.

ICF. Internal Coupling Facility.

ICP. Internal Coupling Facility peer channel.

ICSF. Integrated Cryptographic Service Facility.

ID. See *identifier.*

IDAW. Indirect data address word.

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.

IMS. Information Management System.

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.

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.

I/O. See *input/output*.

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).

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.

ISDN. Integrated-Services Digital Network.

ITR. Internal throughput rate.

ITRR. Internal Throughput 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.

LCSS. See *Logical Channel Subsystem.*

LCU. See *Logical Control Unit.*

LED. See *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. (1) In an ESCON or FICON environment, the physical connection and transmission medium used between an optical transmitter and an optical receiver. A link consists of two conductors, one used for sending and the other for receiving, thereby providing a duplex communication path. (2) In an ESCON or FICON I/O interface, the physical connection and transmission medium used between a channel and a control unit, a channel and an ESCON or FICON Director, a control unit and an ESCON or FICON Director, or, at times, between two ESCON Directors or two FICON Directors.

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.

logical address. The address found in the instruction address portion of the program status word (PSW). If translation is off, the logical address is the real address. If translation is on, the logical address is the virtual address.

Logical Channel Subsystem (LCSS). A defined subset of the server hardware (subchannels, channels, and I/O interfaces) that is used to support the operation of a Logical Channel Subsystem. The LCSS relieves the processor of direct I/O communication tasks, and performs path management functions. Uses a collection of subchannels (defined to the LCSS) to direct a channel to control the flow of information between its defined I/O devices and main storage.

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 (LPAR). 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.

logical switch number (LSN). A two-digit number used by the I/O Configuration Program (IOCP) to identify a specific ESCON Director.

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.*

LPAR. See *logical partition.*

LUPS. Local Uninterruptible Power Supply.

MAC. Message Authentication Code.

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.

MAU. Multistation access unit.

Mb. Megabit.

MB. Megabyte.

MBA. Memory bus adapter.

MCCU. Multisystem channel communication unit.

MCL. See *maintenance change level.*

MCM. Multi Chip Module.

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.

MIDAW. Modified Indirect Data Address Word.

MIF. Multiple Image Facility.

MRU. Modular Refrigeration Unit.

MSA. Motor Scroll Assembly.

MSC chip. Memory Storage Control chip.

MT-RJ. 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.

multidrop topology. A network topology that allows multiple control units to share a common channel path, reducing the number of paths between channels and control units.

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.*

ND. See *node descriptor*.

NED. See *node-element descriptor.*

node descriptor. In an ESCON and FICON environment, a node descriptor (ND) is a 32-byte field that describes a node, channel, ESCON Director port, FICON Director port, or a control unit.

node-element descriptor. In an ESCON and FICON environment, a node-element descriptor (NED) is a 32-byte field that describes a node element, such as a disk device.

NPIV. N_Port ID Virtualization.

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. Any filament made of dialectic materials that guides light, regardless of its ability to send signals. See also *fiber optics* and *optical waveguide*.

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 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*.

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. 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-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.

PCHID. Physical Channel Identifier.

PCI. Peripheral Component Interconnect.

PCICC. PCI Cryptographic Coprocessor.

PCI-X. Peripheral Component Interconnect eXtended.

physical channel identifier (PCHID). A value assigned to each physically installed and enabled channel in the server that uniquely identifies that channel. For the System z9 109, the assigned PCHID values are between 000 and 6FF.

PIN. Personal Identification Number.

PKA. Public-Key-Algorithm.

PKSC. Public-Key Secure Cable.

POR. power-on reset.

port address. In an ESCON Director or a FICON Director, an address used to specify port connectivity parameters and to assign link addresses for attached channels and control units. See also *link address.*

port card. In an ESCON or FICON environment, a field-replaceable hardware component that provides the optomechanical attachment method for jumper cables and performs specific device-dependent logic functions.

port name. In an ESCON Director or a FICON Director, a user-defined symbolic name of 24 characters or less that identifies a particular port.

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. 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.

power-on reset state. The condition after a machine power-on sequence and before an IPL of the control program.

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.

prohibited. In an ESCON Director or FICON Director, the attribute that, when set, removes dynamic connectivity capability. Contrast with *allowed.*

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.

PR/SM. Processor Resource/Systems Manager.

PSC. Power Sequence Controller.

PSCN. Power Service Control Network.

PSP. Preventive Service Planning.

PTF. See *program temporary fix*.

QDIO. Queued Direct Input/Output.

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.

RII. Redundant I/O Interconnect.

RMF. Resource Measurement Facility.

route. The path that an ESCON frame or FICON frame (Fibre Channel frame) takes from a channel through an ESCON Director or FICON Director to a control unit/device.

RSA. Rivest-Shamir-Adelman.

saved configuration. In an ESCON or FICON environment, a stored set of connectivity attributes whose values determine a configuration that can be used to replace all or part of the ESCON Director's or FICON Director's active configuration. Contrast with *active configuration*.

SC chip. Storage Controller chip.

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.

SCSW. Subchannel status word.

SD chip. System Data cache chip.

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.

Small Computer System Interface (SCSI). (1) An ANSI standard for a logical interface to a computer peripherals and for a computer peripheral interface. The interface uses a SCSI logical protocol over an I/O interface that configures attached targets and initiators in a multi-drop bus topology. (2) A standard hardware interface that enables a variety of peripheral devices to communicate with one another.

SNMP. Simple network management protocol.

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 Logical Channel Subsystem to which the logical partition is configured.

STI. See *Self-Timed Interconnect.*

STI-MP. Self-Timed Interconnect Multiplexor.

storage director. In a logical entity consisting of one or more physical storage paths in the same storage cluster.

STP. Server Time Protocol. A time synchronization feature designed to enable multiple servers to maintain time synchronization with each other.

subchannel. A logical function of a Channel Subsystem associated with the management of a single device.

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.

Support Element (SE). (1) An internal control element of a processor that assists in many of the processor 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 control units. See also *multidrop topology.*

sysplex. A set of systems communicating and cooperating with each other through certain multisystem hardware components and software services to process client workloads.

Sysplex Timer. An IBM table-top unit that synchronizes the time-of-day (TOD) clocks in as many as 16 processors or processor sides.

system reset. To reinitialize the execution of a program by repeating the load operation.

TDES. Triple Data Encryption Standard.

time-of-day (TOD) clock. A system hardware feature that is incremented once every microsecond, 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.

TKE. Trusted Key Entry.

TOD. See *Time of day.*

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.

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.

unblocked. In an ESCON Director, the attribute that, when set, establishes communication capability for a specific port. Contrast with *blocked.*

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.

UPC. Universal Power Controller.

UPS. Uninterruptible Power Supply.

VLAN. Virtual Local Area Network.

VPD. Vital Product Data.

WLM. Workload Manager.

z/Architecture. An IBM architecture for mainframe computers and peripherals. Processors that follow this architecture include the System z9 and zSeries servers.

zAAP. System z9 and zSeries Application Assist Processor. See *Application Assist Processor (AAP*).

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

IBM Redbooks

For information on ordering these publications, see “How to get IBM Redbooks” on page 439. Note that some of the documents referenced here may be available in softcopy only.

- *IBM System z9 and @server zSeries Connectivity Handbook*, SG24-5444
- *OSA-Express Implementation Guide*, SG24-5948
- *IBM @server zSeries 900 Technical Guide*, SG24-5975
- *IBM @server zSeries 890 Technical Introduction*, SG24-6310
- *Technical Introduction: IBM @server zSeries 800*, SG24-6515
- *IBM System z9 109 Technical Introduction*, SG24-6669
- *IBM @server zSeries 990 Technical Guide*, SG24-6947
- *IBM System z9 109 Technical Guide*, SG24-7124

Other publications

These publications are also relevant as further information sources:

- *IBM Journal of Research and Development,* Volume 48, Number 3/4, 2004

  http://researchweb.watson.ibm.com/journal/rd/483/wyman.html
- *z/OS Hardware Configuration Definition: User's Guide*, SC33-7988
- *z/OS Hardware Configuration Definition Planning*, GA22-7525
- *Hardware Configuration Definition: User's Guide*, SC28-1848
- *Hardware Configuration Definition Planning*, GC28-1750
- *CHPID Mapping Tool User's Guide*, GC28-6825
- *z/VM Input/Output Configuration Manual*, SC24-6044
- *System z9 109 Stand-Alone Input/Output Configuration Program User's Guide,* SB10-7152
- *System z9 109 and @server zSeries 890 and 990 Input/Output Configuration Program User's Guide for ICP IOCP,* SB10-7037
- *System z9 109 Processor Resource/Systems Manager Planning Guide,* SB10-7041
- *System z9 109 System Overview,* SA22-6833
- *System z9 109 Installation Manual for Physical Planning,* GC28-6844
- *Support Element Operations Guide (V2.9.0),* SC28-6845
- *Capacity On Demand User's Guide,* SC28-6846
- *System z9, @server zSeries, and S/390 Functional Matrix*, GM13-0623

- *Hardware Management Console Operations Guide Version 2.9.0,* SC28-6821
- *z/OS Cryptographic Services Integrated Cryptographic Service Facility Overview,* SA22-7519
- *z/OS Cryptographic Services Integrated Cryptographic Service Facility System Programmer's Guide,* SA22-7520
- *z/OS 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 ICSF TKE Workstation User's Guide,* SA22-7524
- *z/Architecture Principles of Operation,* SA22-7832
- *Open Systems Adapter-Express Customer's Guide and Reference*, SA22-7935

Online resources

These Web sites and URLs are also relevant as further information sources:

- Resource Link

  `http://www.ibm.com/servers/resourcelink`
- IBM HCD/HCM Web page

  `http://www.ibm.com/s390/products/hcm`
- IBM cryptocards Web site

  `http://www.ibm.com/security/cryptocards`
- GDPS

  `http://www.ibm.com/server/eserver/zseries/gdps.html`
- z/OS

  `http://www-1.ibm.com/servers/eserver/support/zseries/zos/`
- z/VM

  `http://www-1.ibm.com/servers/eserver/support/zseries/zvm/planning.html`
- z/TPF

  `http://www-306.ibm.com/software/htp/tpf/pages/maint.htm`
- z/VSE

  `http://www-1.ibm.com/servers/eserver/zseries/zvse/support/preventive.html`
- Linux on System z9

  `http://www-1.ibm.com/servers/eserver/zseries/os/linux/support.html`

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IBM System z9 109 Configuration Setup

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250 <-> 459 pages

IBM System z9 109 Configuration Setup

z9-109 Channel Subsystem structure and components

I/O configuration planning - new processor or upgrades

Step-by-step configuration definition examples

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This redbook is part of a series. For a complete understanding of IBM System z9 109 capabilities, also refer to our companion Redbooks:
- *IBM System z9 109 Technical Introduction,* SG24-6669
- *IBM System z9 109 and @server zSeries Connectivity Handbook,* SG24-5444
-*IBM System z9 109 Technical Guide,* SG24-7124

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