

Managing Superdome Complexes: A Guide for HP-UX System Administrators

HP 9000 Computers

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What's in This Document

Managing Superdome Complexes: A Guide for HP-UX System Administrators describes tasks and concepts related to configuring and partitioning an HP Superdome computer.

This document is divided into the following chapters and appendices:

- ❑ Chapter 1, Overview of the Superdome System Environment

- ❑ Chapter 2, Superdome Console and Service Interface

- ❑ Chapter 3, Managing the Overall Complex

- ❑ Chapter 4, Configuring and Managing Superdome Partitions

- ❑ Chapter 5, Booting and Resetting Superdome Partitions

- ❑ Appendix A, Planning Superdome Configurations

1

Overview of the Superdome System Environment

This chapter introduces the HP Superdome server environment by covering the following topics:

- “Overview of Superdome System Features” on page 14
- “HP Superdome System Hardware Components” on page 18
- “HP Superdome Cabinet Overview” on page 22
- “Supported Superdome Configurations and Hardware Configuration Rules” on page 24
- “Listing Your Superdome Server’s Hardware and Partition Configuration” on page 25
- “HP-UX 11i Features for Superdome Servers” on page 26
- “HP Superdome Console and Service Interfaces” on page 31

See “Related Information” on page 32 for additional sources of information.

Overview of Superdome System Features

Hewlett-Packard's new Superdome system provides a highly configurable, high-performance HP-UX server environment.

Figure 1-1 **HP Superdome Server Cabinet**



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Within each HP Superdome server cabinet are multiple **cells**, each of which contains processors and memory. Each server cabinet also can have multiple **I/O chassis** that provide PCI slots for I/O cards. Each I/O chassis is connected to one of the cells in the server.

All hardware within a server—including all cells, I/O chassis, cables, cabinet hardware, and power and utilities components—is considered to be a Superdome server **complex**. A Superdome complex can consist of one cabinet or two cabinet, as discussed in “HP Superdome Server Models” on page 16.

A major new feature of Superdome servers is the ability to manage the server hardware in units called *partitions*. The new **partition** capabilities allow you to configure a single Superdome server as one large system, or as multiple smaller systems.

HP Superdome Partitions

A new feature of HP Superdome systems is the ability to run multiple instances of the HP-UX 11i operating system on a single server. This capability is accomplished by defining multiple *partitions* within a Superdome server.

Because partitions are managed through software, you can reconfigure a server's partition definitions without physically modifying the server's hardware configuration.

See Chapter 4, "Configuring and Managing Superdome Partitions," on page 113 for details on performing tasks related to managing and configuring partitions.

Each partition establishes a subset of a Superdome server's hardware resources that are to be used as a system environment for booting a single instance of HP-UX.

A partition includes all cells assigned to it as well as all I/O chassis connected to those cells. These cells and I/O chassis are used exclusively by the partition and are not used by any other partitions in the complex.

All processors, memory, and I/O in a partition are available exclusively to the software running in the partition. This means that each partition runs its own private instance of Boot Console Handler (BCH) and HP-UX.

HP-UX 11i supports *static partitions*, which provide a fixed set of hardware resources for running a single operating system.

You can reconfigure partitions to include more, fewer, and/or different hardware resources, but doing so requires shutting down the operating system running in the partition, and resetting the partition as part of reconfiguring it.

HP Superdome Server Models

Three models of Superdome systems are available, providing a powerful base set of functionality and increasing capacities in the larger models.

See “HP Superdome System Hardware Components” on page 18 for details on the physical components that comprise a server.

All HP Superdome servers are highly scalable systems that allow you a tremendous amount of configurability to adapt the system to meet your particular hardware and software needs.

The three Superdome models include:

- **Superdome 16-way**—This single-cabinet server provides from 2 to 4 cells, each with 4 HP PA-RISC processors and up to 32 DIMMs.

The Superdome 16-way server provides up to 16 processors, 128 DIMMs, and up to 4 12-slot PCI I/O chassis.

The model string for Superdome 16-way servers is
9000/800/SD16000.

- **Superdome 32-way**—This single-cabinet server has from 2 to 8 cells, each with 4 HP PA-RISC processors and up to 32 DIMMs.

The Superdome 32-way server provides up to 32 processors, 256 DIMMs, and up to 4 12-slot PCI I/O chassis.

The model string for Superdome 32-way servers is
9000/800/SD32000.

- **Superdome 64-way**—This tightly interconnected dual-cabinet server has from 4 to 16 cells, each with 4 HP PA-RISC processors and up to 32 DIMMs.

The Superdome 64-way server provides up to 64 processors, 512 DIMMs, and up to 8 12-slot PCI I/O chassis. (Each of the two cabinets in a Superdome 64-way server provides up to 32 processors, 256 DIMMs, and up to 4 12-slot PCI I/O chassis.)

The model string for Superdome 64-way servers is
9000/800/SD64000.

With HP’s Superdome servers you can start with a system that meets your needs now, and add more components as your needs increase.

You can add components (cells and I/O chassis) to your existing system as needs arise, and can also upgrade to larger-capacity systems as

needed. A Superdome 16-way server can be upgraded to a Superdome 32-way server, and likewise the Superdome 32-way server can be upgraded to Superdome 64-way server.

Superdome System Hardware Configuration

Configuring HP Superdome system hardware involves performing the following tasks. You can manage the tasks and issues listed below by consulting with your HP sales or HP support representative.

When configuring your HP Superdome server, you have the following options.

- **Installing cells in cell slots** establishes which cell slots are physically populated with cell boards.

Superdome 16-way systems have 4 cell slots, Superdome 32-way systems have 8 cell slots, and there are 16 cell slots in Superdome 64-way systems.

- **Connecting cells to I/O chassis** establishes which I/O backplanes (chassis) are physically connected to which cells.

Each I/O chassis provides 12 PCI I/O slots.

Each cell can be directly connected to a single I/O chassis. This connection is established through a cable that connects the cell board to an I/O chassis system bus adapter.

- **Installing PCI cards in I/O chassis** determines which I/O cards populate which PCI slots in each I/O chassis.

The Core I/O card, if present, must be installed in PCI slot 0.

- **Installing Flex cables** (on Superdome 32-way and Superdome 64-way servers) establishes the type of backplane connections for a Superdome server.

For Superdome 32-way servers, a U-Turn connection is established to provide the best bandwidth within a single cabinet.

For Superdome 64-way servers, a Cross-Flex connection is established to provide the best bandwidth between the left and right system backplanes in the server's two cabinets.

See the sections that follow for details on Superdome hardware components and for information on system configuration requirements.

HP Superdome System Hardware Components

This section provides a brief review of the components that comprise an HP Superdome server.

As discussed in “HP Superdome Server Models” on page 16, three models of Superdome servers are available. Each model provides a different physical resource capacity (processors, memory, I/O), but provides the same powerful base functionality.

See also Appendix A for details on HP Superdome hardware configurations.

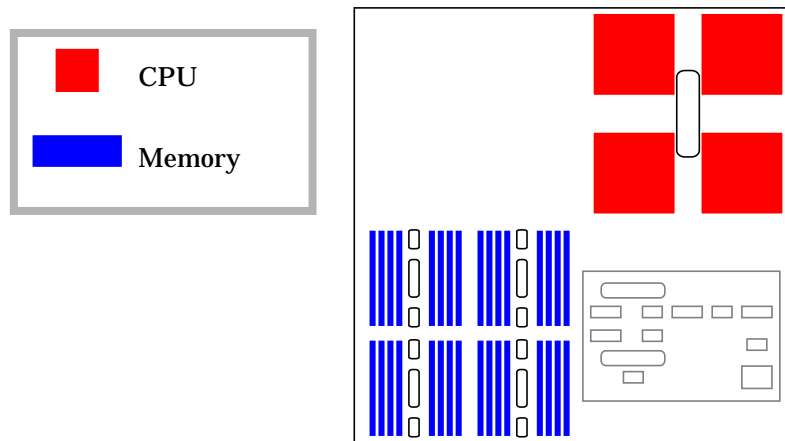
Each Superdome server is composed of the following elements:

- **Cells**

Each cell provides processors and memory, and optionally is connected to an I/O chassis residing in the same cabinet.

Up to 4 processors and 32 DIMMs can be installed in each cell.

Figure 1-2 HP Superdome Cell Overview



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- **I/O Chassis**

HP Superdome servers can contain up to four 12-slot I/O chassis per Superdome cabinet.

For the first release, each I/O chassis provides 12 PCI card slots and resides within the same system cabinet as the cells. Each I/O chassis is connected by cables to one of the cells in the same cabinet as the I/O chassis.

The HP Superdome cabinet contains two I/O bays, each of which supports up to two 12-slot I/O chassis. I/O bay 0 is in the front of the cabinet, and I/O bay 1 is in the cabinet's rear.

Within each I/O bay, the left I/O chassis is chassis 1, and the right I/O chassis is chassis 3. (Chassis numbers 0 and 4 are reserved for future support of 6-slot PCI chassis.)

PCI cards reside in the same cabinet as the cells and I/O chassis. However, all I/O devices (hard disks, DVD-ROM devices) must reside in an external cabinet.

Note that PCI slot numbers do not always correspond to the associated HP-UX hardware path. See "HP Superdome PCI I/O Slots and Hardware Paths" on page 29.

In each I/O chassis, PCI slots 4 to 7 provide 4xPCI (66 MHz, 400 Mbytes/sec.), and all others (slots 0 to 3 and 8 to 11) provide 2xPCI (33 MHz, 200 Mbytes/sec.).

In Superdome 12-slot I/O chassis, slots 0–6 share one of the chassis's I/O runway busses and slots 7–11 share the other I/O runway bus in the chassis.

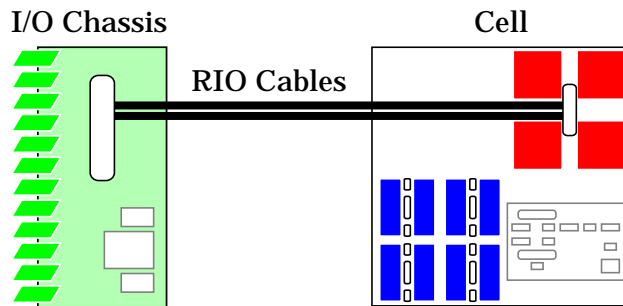
Following the first release, other Superdome I/O options will be available. External I/O expansion cabinets will provide room for additional I/O chassis. Also, when released, 6-slot I/O chassis also will be supported, with up to eight 6-slot I/O chassis within each Superdome cabinet.

- **Cables**

The two primary types of cables are: cell-to-I/O cables ("RIO cables") and backplane-connection cables ("Flex cables").

In order to make I/O accessible to the partitions you configure, you or your HP service representative must physically connect each I/O chassis to a cell within the cabinet using RIO cables.

Figure 1-3 HP Superdome Cell and I/O Connection



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The backplane-connection cables (Flex cables) establish how backplane crossbar components communicate within a Superdome server complex.

- **Power and Service (“Attention”) Lights**

Each cell and each I/O chassis has two sets of lights (LEDs): power/status LEDs (green) and service LEDs (amber/yellow).

Each cabinet has a red service (“Attention”) LED.

Chapter 4 includes details on using the `fruled` command or Partition Manager to manipulate (turn on or off) the cell, I/O chassis, and cabinet LEDs.

See the `fruled(1)` and `parmgr(1M)` manpages for details.

- **Power and Cooling (Fans)**

Both power and cooling can be redundant.

You can check the status of fans and power supplies using various methods described in this chapter and in Chapter 3. For example, the `parstatus -v -b0 HP-UX` command displays detailed information about cabinet 0’s power and cooling configuration.

Consult with your HP service or sales representative to determine the amount and placement of power and cooling components.

The following power components can be installed in each Superdome cabinet: one or two main power sources (PDCA 0 and PDCA 1), three backplane power components (HBPB 0–2), and up to six bulk power

supplies (BPS 0–5). Note that five BPS components is the minimum requirement per cabinet, and six can be installed for redundancy.

The following fans are installed in each Superdome cabinet: four blowers (0–3, at the cabinet's top) and five I/O fans (0–4, inside the cabinet above the I/O chassis).

See Figure 1-4 on page 22 for an overview of these items and their locations.

- **Utilities Components**

Each HP Superdome server complex has two categories of utilities boards: the boards that comprise the Guardian Service Processor (GSP), and the clock, power monitoring, and cabinet-level utilities board (UGUY).

Each Superdome cabinet has a UGUY board.

The GSP includes two types of boards: the SBCH, which provides the interface to the Customer LAN (GSP network interface 0), and the SBC, which provides the HP Private LAN (GSP network interface 1) as well as the remote RS-232 port for modem access and the local RS-232 port for direct access.

Each Superdome cabinet has an SBCH board, and in Superdome 64-way server complexes only cabinet 0 has an SBC board.

See Chapter 2 for details on using the Superdome console and utilities interfaces.

- **Service Management Station**

The Service Management Station is an HP A-Class workstation that is connected to the Superdome server for service and upgrade purposes.

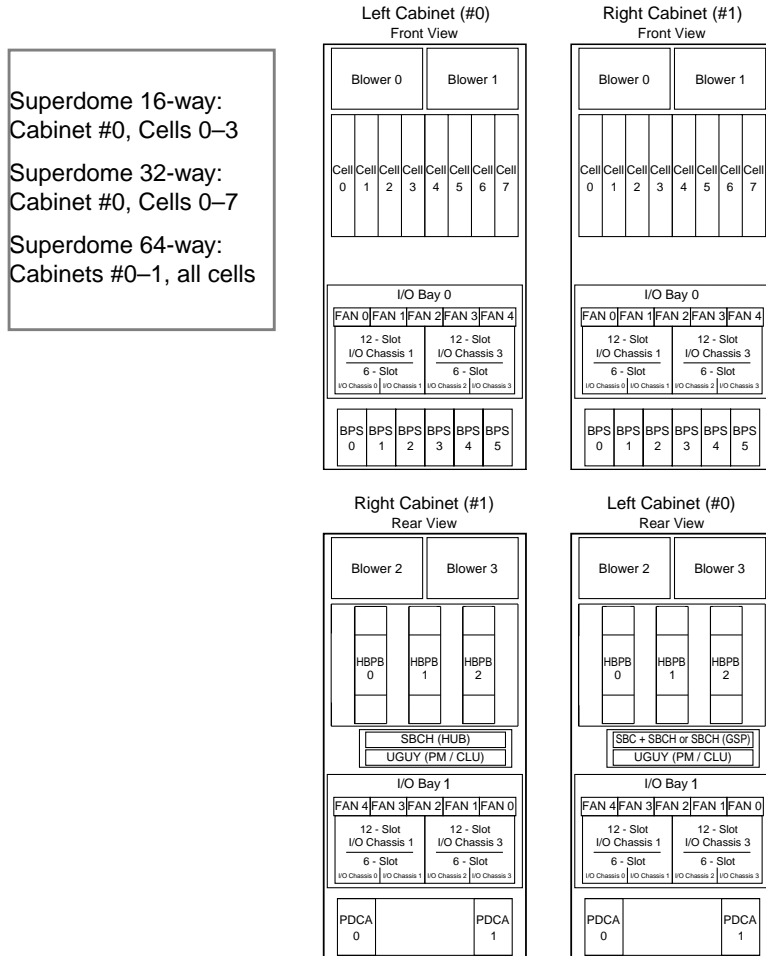
The Service Management Station is primarily used by HP service personnel for firmware upgrades, system scan purposes, and hardware verification purposes.

HP Superdome Cabinet Overview

This section provides a detailed look at the physical HP Superdome server cabinet, including the various indicator lights and the locations of the main components: cells, I/O bays, power, blowers, and so on.

These components are described in “HP Superdome System Hardware Components” on page 18.

Figure 1-4 HP Superdome Cabinet Overview



Each HP Superdome cabinet has the following physical features. Note that all I/O peripherals reside in an external rack, not in the Superdome cabinets.

- **Front**

The front of each cabinet includes the following items:

- Power—48V Power Switch.
- Cabinet LCD—Indicates the cabinet ID.
- Cabinet Service (“Attention”) LED.
- Cell Power LEDs and Cell Service LEDs—These LEDs are visible when the front cabinet door is open.

You can access the cells themselves by opening the cabinet door and also removing the RFI shield. Only HP support personnel may access cells, for instance when adding or replacing cells.

- I/O Chassis LEDs and Access—I/O bay 0 is located in the lower front part of the cabinet.

You can view the I/O chassis power LEDs and service LEDs when the front cabinet door is open. Each I/O chassis has its own power LED and service LED.

Each PCI card slot within each I/O chassis also has its own power LED and service LED.

- Bulk Power Supplies (BPS 0–5)—These power supplies are visible when the front cabinet door is open.

They are located in the bottom front of the cabinet.

- **Rear**

The rear of each cabinet includes the following items:

- Power—The main cabinet power breaker or power breakers. These are located in the bottom rear of the cabinet.
- Service Interface—The Guardian Service Processor (GSP) boards and the UGUY utilities board are located in the middle rear of the cabinet. Various physical service connections also are accessible here.
- I/O Chassis Access—I/O bay 1 is in the lower rear of each cabinet.

Supported Superdome Configurations and Hardware Configuration Rules

While HP Superdome servers are highly configurable systems, Hewlett-Packard recommends only specific hardware configurations and specific partition configurations.

Consult with your HP sales or service representative for assistance.

More information on recommended Superdome configurations can be found in Chapter 4, “Configuring and Managing Superdome Partitions,” on page 113. More information on hardware configuration rules can be found in Appendix A, “Planning Superdome Configurations,” on page 283.

Listing Your Superdome Server's Hardware and Partition Configuration

This section gives brief procedures and examples for determining your Superdome server's current hardware and partition configurations.

For more details on partition procedures, see Chapter 4, "Configuring and Managing Superdome Partitions," on page 113. Chapter 3 also provides details on obtaining information about Superdome system hardware.

- GSP command menu commands: CP, PS, ID
- `ioscan, ioscan -Ccell`
Scan and list all partition hardware, or all partition's currently active cells. Shows only active (currently booted) partition hardware.
- `parstatus -X`
Displays server complex attributes.
- `parstatus -B`
Displays summary details for all cabinets.
- `parstatus -V -b0` and, on Superdome 64-way, `parstatus -V -b1`
Prints detailed information about all cabinets.
- `parstatus -V -c#`
Prints detailed cell hardware status.
- `parstatus -I`
Prints I/O chassis status.
- `parstatus -P`, and `parstatus -V -p#`
Provides brief and detailed partition status.
- Partition Manager (`parmgr`)
The Partition Manager utility has a graphical interface and includes all features provided by the HP-UX partition commands.

HP-UX 11i Features for Superdome Servers

The HP-UX 11i release includes several new commands and utilities for managing and configuring HP Superdome partitions and system hardware. Also, the new `rad` command and the `ioscan` command provide Superdome-specific output as described in the following sections.

These key HP-UX 11i Superdome features are discussed below. For details on all HP-UX 11i features see the *HP-UX 11i Release Notes*.

- The following new HP-UX commands support managing and configuring Superdome partitions: `parstatus`, `parcreate`, `parmodify`, and `parremove`.

Two additional HP-UX commands support powering on/off Superdome hardware components and turning on/off their service LEDs: `frupower`, and `fruled`.

- The new Partition Manager (`parmgr`) graphical utility also supports the same Superdome tasks that the above commands support.
- The `ioscan` command provides Superdome-specific HP-UX hardware path output when you run it on Superdome servers.

HP-UX hardware paths on Superdome servers differ from hardware paths on other HP servers.

Also, the HP-UX hardware paths for PCI I/O slots within a Superdome I/O chassis do not always directly correlate to the PCI slot numbers.

See the following section (“HP-UX Hardware Paths on HP Superdome Systems” on page 27) for details on these HP-UX hardware path considerations.

- The new `rad` command is supported on several HP systems, including Superdome, for displaying I/O card information and performing card addition and replacement tasks.

You can use the `rad -q` command to display a summary of a partition’s available PCI I/O slots, cards, and other details. This output on Superdome servers differs from output on other servers.

See the following section (“`rad` Command Output on Superdome Servers” on page 30) for details on using `rad` on Superdome servers and for recommended restrictions.

HP-UX Hardware Paths on HP Superdome Systems

The HP-UX hardware path on HP Superdome systems is provided in the format described here. The `ioscan` HP-UX command reports the hardware path for components within the partition in which the command is issued.

Note that the `ioscan` command reports information only for the *currently active* hardware components *in the local partition*. It does not report details for hardware not assigned to the local partition.

The components of Superdome hardware paths are:

a/b/c/d/e.f.g

where these components are as follows

- a
Is the global cell number.
- b
Is a processor (10–13), memory (5), or a system bus adapter (0). Each Superdome I/O chassis has a single system bus adapter.
- c
Is a local bus adapter (the *LBA*, one for each PCI card slot in the chassis). The LBA connects its corresponding PCI card slot with the system bus adapter.

NOTE

The LBA number *is not necessarily the same* as the PCI slot number. See “HP Superdome PCI I/O Slots and Hardware Paths” on page 29 for important details.

- d
Is the card’s address on the slot’s PCI bus.
Typically this is 0 (zero), although the Superdome core I/O card has multiple devices and addresses in a single card.
- e
Is the function for the I/O card. Typically this is 0 (zero) for single-function cards.

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HP-UX 11i Features for Superdome Servers

- `f`
Is the target of the I/O device, or SCSI ID.
- `g`
Is a device-specific address such as a SCSI controller (initiator).

Refer to the *ioscan* (1M) manpage for details on using `ioscan` to list hardware path information.

HP Superdome PCI I/O Slots and Hardware Paths

You should note that on HP Superdome servers, the PCI card slots (within an HP Superdome I/O chassis) do not directly correspond to their *local bus adapter* (LBA) number, such as is reported by the `ioscan` HP-UX command.

The following table shows the correlation among HP Superdome PCI slots and the LBA number.

PCI Card Slot	LBA Number	HP-UX 11i Hardware Path
0	0	<i>cell/0/0</i>
1	1	<i>cell/0/1</i>
2	2	<i>cell/0/2</i>
3	3	<i>cell/0/3</i>
4	4	<i>cell/0/4</i>
5	6	<i>cell/0/6</i>
6	14	<i>cell/0/14</i>
7	12	<i>cell/0/12</i>
8	11	<i>cell/0/11</i>
9	10	<i>cell/0/10</i>
10	9	<i>cell/0/9</i>
11	8	<i>cell/0/8</i>

For an example, issue the `ioscan -C ba` command to lists the PCI slots (“Local PCI Bus Adapter”) for your partition.

The order in which `ioscan` reports the PCI slots (LBA Number order) *does not* correlate to the order in which the slots physically are arranged (PCI Card Slot order).

rad Command Output on Superdome Servers

This section covers the `rad` command's output on Superdome servers. For complete details refer to the *rad* (1M) manpage.

NOTE

When adding or replacing I/O cards use the equivalent SAM procedures, when possible, rather than using `rad`.

See also the *sam* (1M) and *rad* (1M) manpages.

On HP Superdome servers, the `rad` command reports PCI card slot details as shown in the following example output. The `rad` command reports details showing the PCI slot (*cabinet-bay-chassis-slot*) and the corresponding HP-UX hardware path (*cell/sba/lba/device*).

```
# rad -q
```

Slot	Path	Bus	Speed	Power	Occupied	Suspended	Driver(s) Capable
0-0-1-0	0/0/0	0	33	On	Yes	No	No
0-0-1-1	0/0/1/0	8	33	On	Yes	No	Yes
0-0-1-2	0/0/2/0	16	33	On	Yes	No	Yes
0-0-1-3	0/0/3/0	24	33	On	Yes	No	Yes
0-0-1-4	0/0/4/0	32	33	On	Yes	No	Yes
0-0-1-5	0/0/6/0	48	66	On	Yes	No	Yes
0-0-1-6	0/0/14/0	112	33	On	No	No	No
0-0-1-7	0/0/12/0	96	33	On	No	N/A	N/A
0-0-1-8	0/0/11/0	88	33	On	Yes	No	Yes
0-0-1-9	0/0/10/0	80	33	On	No	N/A	N/A
0-0-1-10	0/0/9/0	72	33	On	No	N/A	N/A
0-0-1-11	0/0/8/0	64	33	On	Yes	No	Yes
0-1-3-0	2/0/0	0	33	On	Yes	No	No
0-1-3-1	2/0/1/0	8	33	On	Yes	No	Yes
0-1-3-2	2/0/2/0	16	33	On	Yes	No	Yes
0-1-3-3	2/0/3/0	24	33	On	Yes	No	Yes
0-1-3-4	2/0/4/0	32	33	On	No	No	No
0-1-3-5	2/0/6/0	48	66	On	No	No	No
0-1-3-6	2/0/14/0	112	66	On	Yes	No	No
0-1-3-7	2/0/12/0	96	33	On	No	N/A	N/A
0-1-3-8	2/0/11/0	88	33	On	Yes	No	Yes
0-1-3-9	2/0/10/0	80	33	On	No	N/A	N/A
0-1-3-10	2/0/9/0	72	33	On	No	N/A	N/A
0-1-3-11	2/0/8/0	64	33	On	Yes	No	Yes

**Cabinet 0, Bay 0, Chassis 1, Slot 3
(rad slot notation: 0-0-1-3)**

**Cell 2, SBA 0, LBA 6, Device 0
(HP-UX hardware path: 2/0/6/0)**

For details on HP-UX hardware paths, refer to “HP-UX Hardware Paths on HP Superdome Systems” on page 27.

HP Superdome Console and Service Interfaces

This section presents a brief overview of Superdome console and service features.

Two methods of HP Superdome service and console use are:

- The Service Management Station (SMS)—An external A-Class workstation connected to an HP Superdome complex.

The SMS provides methods for performing scan tests of Superdome server hardware, upgrading system firmware components, and other service tasks.

- The Guardian Service Processor (GSP)—The GSP utility boards residing in the rear of an HP Superdome cabinet.

The GSP provides partition consoles, service and management commands, access to various logs, and partition “Virtual Front Panel” access.

Logging in to the Guardian Service Processor (GSP) for a system is the primary method for accessing HP Superdome service commands, logs, and consoles.

See Chapter 2, “Superdome Console and Service Interface,” on page 33 for details on service and console features, accounts, and restrictions.

The Service Management Station is provided primarily for HP-certified service and support personnel. For this reason, it is not discussed in detail in this book.

Related Information

This section lists other sources for information on the topics covered in this chapter.

Chapters in This Book

The following chapters in this book include details about topics covered in this chapter.

- Chapter 2, “Superdome Console and Service Interface,” on page 33
- Chapter 3, “Managing the Overall Complex,” on page 57
- Chapter 4, “Configuring and Managing Superdome Partitions,” on page 113
- Appendix A, “Planning Superdome Configurations,” on page 283

HP-UX Man Pages

The man pages listed here provide details on topics covered in this chapter.

- *fruled* (1), *frupower* (1M), *parcreate* (1M), *parmgr* (1M), *parmodify* (1M), *parstatus* (1), *rad* (1M)

Files in the Directory /use/share/doc

Files listed below are available on disk in the directory `/usr/share/doc` and give more details on topics covered in this chapter.

- `planning_Superdome_configs.pdf`—The *Planning Superdome Configurations* White Paper.

Information to help system administrators plan and implement valid, supported partition configurations. Also available as Appendix A, “Planning Superdome Configurations,” on page 283

Other Books

The following books also provide more details on topics addressed in this chapter. Most books are available at the `docs.hp.com` Web site.

- *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*

Web Sites

Additional information is available at the following sites on the Web.

- <http://docs.hp.com/>

The HP Technical Documentation home page.

Superdome Console and Service Interface

This chapter describes the main service and console interfaces for configuring, monitoring, and for booting HP Superdome servers.

The Guardian Service Processor (GSP) utility hardware provides a method of connecting to the Superdome complex to perform service or monitoring tasks.

The GSP provides console connections for each partition in a Superdome complex, gives you access to system logs, access to a “Virtual Front Panel” for each partition, and access to a command menu for performing various complex-wide tasks. The GSP also provides a point for viewing live and logged chassis codes.

Note that the Service Management Station (discussed in Chapter 1) is not covered in this Chapter. See Chapter 1 for details.

For details on using the GSP interface for managing Partitions, see Chapter 4. Also see Chapter 5 for more information on booting and rebooting using the GSP and console features that are introduced here.

The following topics are addressed in this chapter’s sections:

- “Overview of Superdome Service Interface Tasks and Concepts” on page 34
- “Overview of Superdome Console and Service Interfaces” on page 35
- “GSP Login Accounts and Access Levels” on page 37
- “Accessing the Superdome Guardian Service Processor (GSP)” on page 38
- “Using Superdome GSP Menus” on page 40
- “Accessing Partition Consoles” on page 44
- “Using GSP Commands” on page 46
- “Using Virtual Front Panels” on page 53
- “Using the GSP to Access Boot Console Handler (BCH)” on page 54
- “Related Information” on page 56

Overview of Superdome Service Interface Tasks and Concepts

Each Superdome complex has a single **Guardian Service Processor (GSP)**, which provides service and console access to the complex.

On the Superdome 64-way server, which includes two tightly interconnected cabinets that operate as a single server, the GSP is in the left cabinet (cabinet 0); the right cabinet has a subset of utility components.

Overview of Superdome Console and Service Interfaces

The Guardian Service Processor (GSP) is the main point for using a Superdome server's service and console interfaces. These interfaces provide the following features:

- **Partition Consoles**

Each partition on an HP Superdome server has its own console.

Enter **CO** at the GSP main menu to access the partition consoles; see “Accessing Partition Consoles” on page 44 for details.

Each partition's console provides access to:

- Boot Console Handler (BCH) for the partition

The BCH menu is available if the partition has booted but has not yet loaded or booted the HP-UX operating system.

- HP-UX Console for the partition

This partition console provides console login access to HP-UX and serves as `/dev/console` for the partition.

To exit the console, type **^b (Control-b)**.

- **System Log File Viewers**

Two types of logs are maintained for each Superdome complex: (1) partition console logs and (2) complex chassis code logs.

Access to these logs is available through the following GSP menus:

- The Console Logs Menu (**CL**)

Enter **CL** from the GSP main menu to access the console logs menu. To exit the console log, type **^b (Control-b)**.

Each partition has its own console log, which has a history of the partition console's output, including boot output, BCH activity, and any HP-UX console login activity.

The console log provides a limited history; it is a circular log file that overwrites the oldest information with the most recent.

— The Show Chassis Logs Menu (SL)

Three types of chassis code logs are maintained for each Superdome complex: (1) activity logs, (2) error logs, (3) live chassis code logs.

The activity log and error log provide a snapshot of past chassis codes.

The live chassis code log provides:

- Real-time view of chassis codes.
- The option of filtering the real-time chassis output to show only a specific cell, or specific partition.

All logs (activity, error, and live) can be displayed in different formats, including: brief format, text format, hex (with keywords), and raw hex format.

At the log menu, type `v` to change the display format, and type `^b` (**Control-b**) to exit the log viewer.

• **The GSP Command Menu**

GSP commands are provided for system service, status, access configuration, and manufacturing purposes.

See “Using GSP Commands” on page 46.

To exit the GSP command menu, enter `MA` to return to the GSP main menu.

Note that three levels of access to GSP commands are provided: Administrator, Operator, and Single Partition User.

Each GSP login account has a designated access level, which provides access to a subset of the GSP commands (or, for Administrator-level users, all commands).

• **Virtual Front Panels**

Provides a real-time display of each partition’s boot status and activity.

To exit a Virtual Front Panel, type `^b` (**Control-b**).

See “Using Virtual Front Panels” on page 53.

GSP Login Accounts and Access Levels

To use the Superdome service and console interfaces you must have account access to log in to the server's Guardian Service Processor (GSP).

Each Superdome complex has its own set of GSP accounts, which are defined for the complex and may differ from accounts on other Superdome servers.

The three GSP access levels are:

- **Administrator**
Provides access to all GSP commands, and access to all partition consoles and Virtual Front Panels.
- **Operator**
Provides access to a subset of GSP commands, and access to all partition consoles and Virtual Front Panels.
- **Single Partition User**
Provides access to a restricted subset of GSP commands, and access to a single partition's console and a single partition's Virtual Front Panel.

Each GSP login account has a specific login name and password.

Also, each GSP account may permit multiple concurrent login sessions (if it is a "multiple use" account), or may restrict account access to a single login session (for "single use" accounts).

Accessing the Superdome Guardian Service Processor (GSP)

This section describes how to log in to the GSP utility hardware for an HP Superdome complex.

You can connect to a Superdome server's GSP by using the telnet HP-UX command on a remote system. Use telnet to open a connection with the GSP, then log in by entering the GSP account name and corresponding password. Each GSP login account provides a specific level of access to the GSP menus and commands.

The following example shows a sample GSP login session.

Figure 2-1 **Example: Connecting to a Superdome Guardian Service Processor**

```
> telnet
telnet> open sdome-gsp
Trying...
Connected to sdome-gsp.hp.com.
Escape character is '^]'.
Local flow control off

GSP login: Accountname
GSP password:

                                WELCOME TO
                                SUPERDOME'S GUARDIAN SERVICE PROCESSOR

GSP MAIN MENU:

    CO: Consoles
    VFP: Virtual Front Panel
    CM: Command Menu
    CL: Console Logs
    SL: Show chassis Logs
    HE: Help
    X: Exit Connection

GSP>
```

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Procedure: Logging in to a GSP

This procedure is for logging in to a the Guardian Service Processor (GSP) for a Superdome complex.

- Step 1.** Use the HP-UX `telnet` command on a remote system to connect to the GSP utility hardware for the Superdome server.

You can connect directly from the command line, for example:

- `telnet sdome-g`

or run `telnet` first, and then issue the `open` command:

- `telnet`

```
telnet> open sdome-g
```

All `telnet` commands and escape options are supported while you are connected to the GSP. See the `telnet(1)` manpage for details.

(On non-HP-UX platforms such as various Windows environments you can instead use an alternate `telnet` program.)

- Step 2.** Log in using your GSP account name and password.

- GSP login: *Accountname*
GSP password: *Password*

- Step 3.** Use the GSP menus and commands as needed and log out when done.

To log out, select the “Exit Connection” menu item from the GSP Main Menu (enter `x` at the `GSP>` prompt).

You also can terminate a GSP login session by issuing the `telnet` escape key sequence `^]` (type: **Control-right bracket**) and entering `close` at the `telnet>` prompt.

NOTE

You should log out of any consoles and GSP menus before terminating your GSP `telnet` session.

Using Superdome GSP Menus

The Guardian Service Processor (GSP) provides a set of menus that give you access to various service commands, consoles, log files, and other features.

To use these menus, see “Navigating through GSP Menus” on page 42.

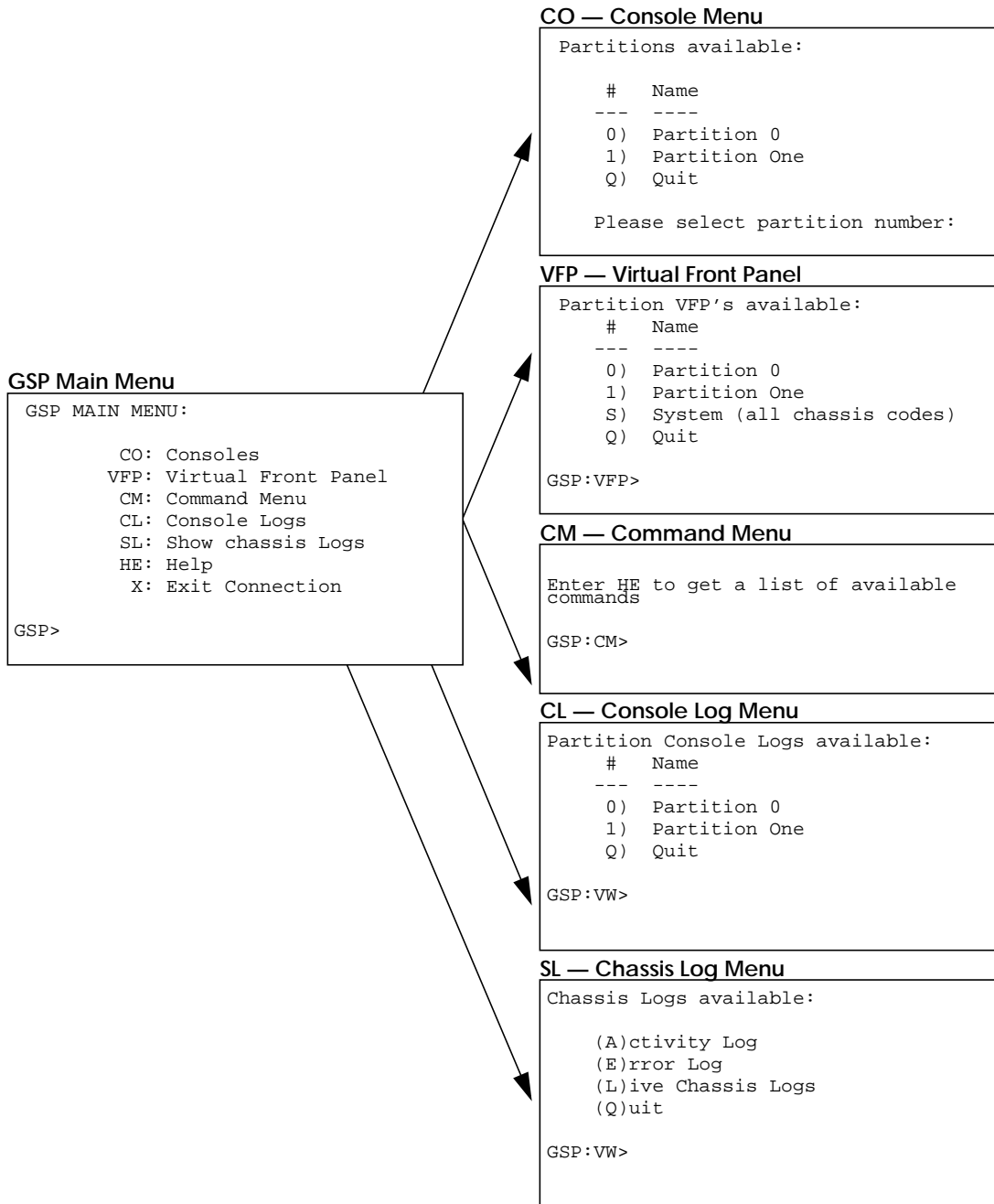
The following sub-menus are available from the GSP Main Menu when you log in to a Superdome server’s GSP utility hardware:

- **Console Menu**—Provides access to consoles for the Superdome server’s partitions.
- **Virtual Front Panel Menu**—Provides a Virtual Front Panel for various partitions or for the entire system.
- **Command Menu**—Includes service, status, system access, and manufacturing commands.
- **Console Log Viewer Menu**—Allows access to the Superdome server’s console logs.
- **Chassis Log Viewer Menu**—Allows access to the Superdome server’s chassis code logs.

These GSP menus provide a central point for managing an HP Superdome complex outside of HP-UX.

While the GSP menus provide many tools and details not available elsewhere, additional features are available from HP-UX running in a Superdome partition.

Figure 2-2 Overview of HP Superdome GSP Menus



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Navigating through GSP Menus

This section describes how to navigate through Superdome GSP menus and sub-menus.

As Figure 2-3 on page 43 shows, there are various commands and options for returning to the GSP Main Menu and escaping or ending a GSP login session.

The following list has additional tips for navigating through GSP menus and using GSP features:

- **Control-b**

Exit current console, console log, chassis log, or Virtual Front Panel.

When accessing a partition's console, any log files, or any Virtual Front Panel (VFP), you can exit and return to the GSP Main Menu by typing **^b** (**Control-b**).

- **Q** (or lower-case **q**)

Exit or cancel current menu prompt.

Enter **Q** (or lower-case **q**) as response to any menu prompt to exit the prompt and return to the previous sub-menu.

You can do this throughout the GSP sub-menus, including the console menus, various command menu prompts, and the log and VFP menus.

Note that, from the GSP command menu prompt (**GSP:CM>**) you must enter **MA** (not **Q**) to return to the GSP main menu. However, you can enter **Q** or **q** to cancel any command.

- **Control-]**

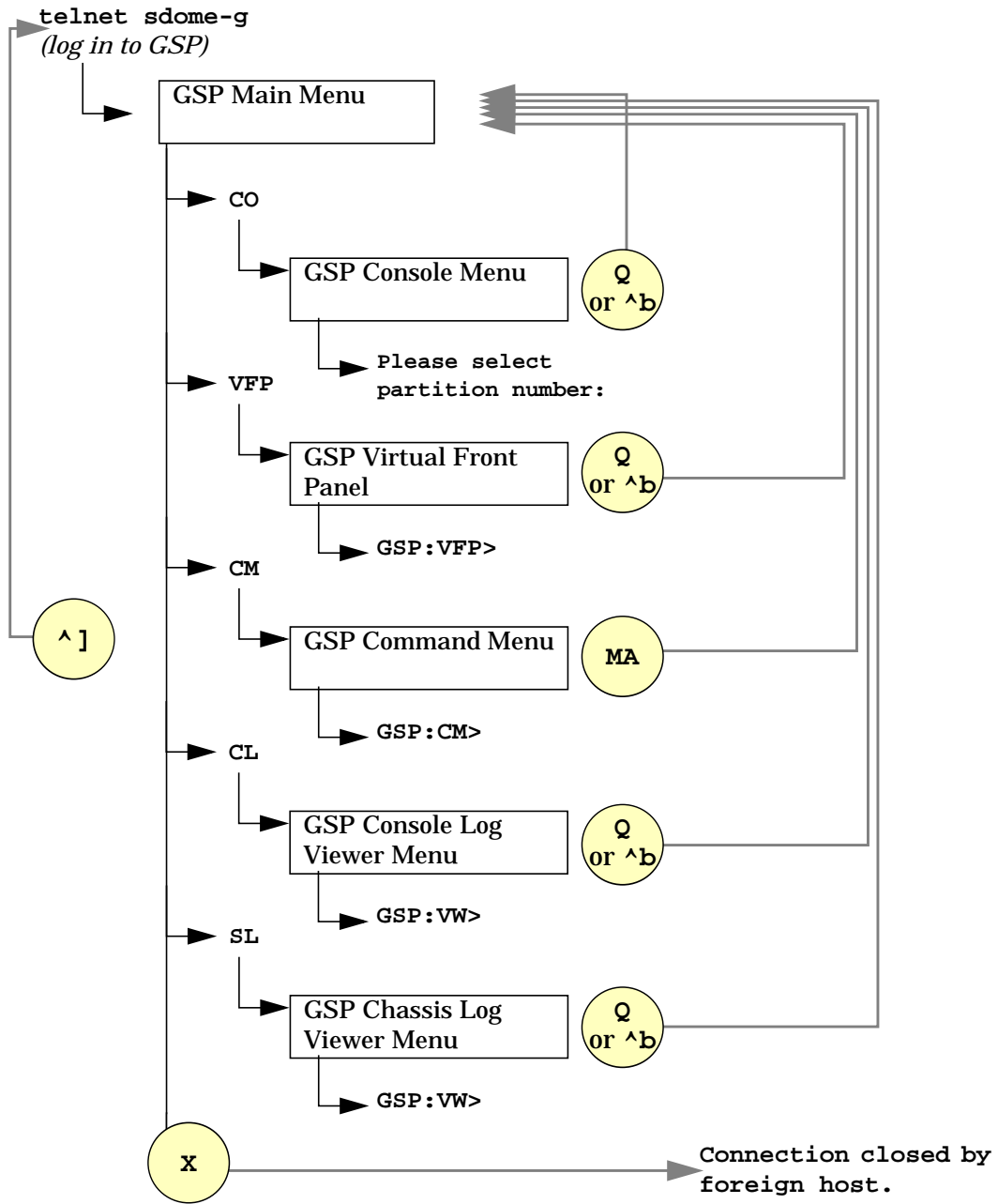
Escape the GSP connection and return to the telnet prompt.

At any time during your **telnet** connection to a Superdome server's GSP, you can type the **^]** (**Control-right bracket**) escape sequence.

This key sequence escapes back to the **telnet** prompt. When at the **telnet>** prompt you can use the following commands, among others: **?** (print telnet command help information), **close** (close the current connection), and **quit** (exit telnet).

To return to the GSP connection, type enter (or return) one or more times.

Figure 2-3 Navigating through HP Superdome GSP Menus



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Accessing Partition Consoles

The GSP Console Menu provides access to all partition consoles within a Superdome complex.

Each partition in a Superdome complex has its own console.

Enter **CO** from the GSP main menu to access a partition's console.

Only one console exists per partition. However, multiple connections to the console are supported, allowing multiple people to simultaneously view the console output. Only one connection per console permits write-access.

To force (gain) console write access for a partition's console, type **^ecf** (**Control-e c f**).

To exit the partition console, type **^b** (**Control-b**) to return to the GSP main menu.

The console menu gives you console access for the partition you specify. The resulting console can display a variety of information about the partition, including:

- Partition startup, shutdown, and reset output.
- The Boot Console Handler (BCH) menu, if the partition has not yet booted the HP-UX operating system and has completed Power-On Self Tests (POST).
- The HP-UX log-in prompt.
- HP-UX log-in access, also called "console shell access".

This is available if you have logged in to the partition from its console's HP-UX log-in prompt.

Partition Console Access versus Direct HP-UX Log-In

The following are factors to consider when deciding whether to interact with a partition through a GSP console or a direct HP-UX log-in:

- Whether you want to log your activity to the partition's console log (all GSP console activity is stored at least temporarily).

- Whether HP-UX is installed, booted, and properly configured on the partition.

If HP-UX is not installed on a partition, you should access the partition's console (through the GSP) in order to install and configure HP-UX.

See Chapter 5 for details on booting an HP-UX install source.

You should directly log in to HP-UX running on a partition when you do not need to use GSP features and do not want to record a log of your activity.

Before HP-UX has booted, the GSP consoles are the primary method of interacting with a partition.

After a partition has booted HP-UX, you should be able to connect to and log in to the partition directly, using `telnet` or `rlogin`.

If the HP-UX kernel booted on the partition does not have networking fully configured, you may need to log in using a GSP console connection to set up the partition's networking configuration (using `/sbin/set_parms`).

Using GSP Commands

This section summarizes the commonly used GSP commands, and provides details about the various categories of GSP commands. See Chapter 2 for details on using GSP commands to manage and configure Partitions.

To return to the GSP main menu from the command menu, enter the **MA** command.

All users connected to a Superdome server's GSP command menu share access to the menu.

Only one command can be issued at a time. For each command issued, the command and its output are displayed to all users currently accessing the GSP command menu.

Some commands are restricted and are available to GSP users who have Admin or Operator privileges only. You can issue any command that is valid at your access level by entering the command at the **GSP command menu prompt** (GSP:CM>).

When you list commands using the **HE** command, the commands are shown in the four following categories:

- Service commands—Support boot, reset, TOC, and other common service activities.
- Status commands—Give command help and system status information.
- System and access configuration commands—Provide ways to configure system security and console and diagnostic settings.
- Manufacturing commands—Allow trained HP service personnel to perform various tasks.

The following sections give more details about the available commands.

Commonly Used GSP Commands

The following list summarizes GSP commands that are commonly used by system administrators. All of these commands are available to all GSP users.

Table 2-1 Commonly Used GSP Commands

Command	Description
BO	Boot a protection domain.
CP	Display partition cell assignments.
HE	Help: list the available commands.
LS	Display LAN connected console status.
MA	Return to the GSP main menu.
PD	Set the default partition for the current GSP session.
PS	Display detailed power and hardware configuration status.
RS	Reset a protection domain.
RR	Reset a protection domain for reconfiguration.
TC	Send a TOC signal to a protection domain.
TE	Broadcast a message to all users of the GSP command menu.
WHO	List the GSP-connected users.

The above commonly used commands appear in the service, status, and the system and access configuration categories.

For additional commands, by category, see the following sections.

GSP Command Menu: Service Commands

The service commands available from the GSP Command menu provide boot, reset, power, TOC, status, and other commands for common service activities.

Table 2-2

GSP Command Menu: Service Commands

Service Command	Description
BO	Boot a protection domain.
DF	Display FRU information of an entity.
MA	Return to the Main menu.
MFG	Enter the manufacturing mode. (Administrator only.)
MR	Modem reset.
PE	Power entities on or off. (Administrator and operator only.)
RE	Reset entity. (Administrator and operator only.)
RR	Reset a protection domain for reconfiguration.
RS	Reset a protection domain.
TC	Send a TOC signal to a protection domain.
TE	Broadcast a message to all users of the GSP command menu.
VM	Margin the voltage in a cabinet.
WHO	Display a list of GSP-connected users.

GSP Command Menu: Status Commands

The status commands available from the GSP Command menu provide command help and system status information, such as the server's hardware configuration (the "USB topology").

All status commands are available to all GSP users.

Table 2-3

GSP Command Menu: Status Commands

Status Command	Description
CP	Display partition cell assignments.
HE	Display the list of available commands.
LS	Display LAN connected console status.
MS	Display the status of the modem.
PS	Display detailed power and hardware configuration status.

GSP Command Menu: System and Access Configuration Commands

The System and Access Configuration commands available from the GSP command menu provide ways to configure system security and console and diagnostic settings.

These commands also enable you to specify a default partition for your current GSP session, and allow for modifying some Superdome complex configuration settings.

Most of the system access commands are for use by HP service and support personnel.

Some of these commands are restricted. Users with an “Admin” access level can use all System and Access Configuration commands. Users with an “Operator” or “Single Partition User” access level can issue a subset of the System and Access Configuration commands, as the following table indicates.

Table 2-4 GSP Command Menu: System and Access Configuration Commands

Access Level(s)	System / Access Config Command	Description
Administrator	AR	Configure the automatic system restart.
Administrator, Operator	CA	Configure asynchronous and modem parameters.
Administrator, Operator	CC	Initiate a complex configuration.
Administrator	DATE	Set the time and date.
Administrator	DC	Reset parameters to default configuration.
Administrator, Operator	DI	Disconnect remote or LAN console.
Administrator	DL	Disable LAN console access.

Table 2-4 GSP Command Menu: System and Access Configuration Commands

Access Level(s)	System / Access Config Command	Description
Administrator	EL	Enable LAN console access.
Administrator, Operator, Single Partition User	ER	Configure remote/modem port access options.
Administrator, Operator, Single Partition User	ID	Change certain Group A complex profile fields.
Administrator, Operator	IT	Modify command interface inactivity time-out.
Administrator	LC	Configure LAN connections.
Administrator, Operator, Single Partition User	LS	Display LAN connected console status.
Administrator	ND	Enable/disable network diagnostics.
Administrator, Operator	PD	Modify default partition for this login session.
Administrator, Operator	RL	Rekey complex profile lock.
Administrator	SO	Configure security options and access control.
Administrator, Operator	XD	SUB diagnostics and reset.

GSP: Manufacturing Commands

You normally should not need to use any of the various manufacturing commands available from the GSP command menu.

CAUTION

The manufacturing commands are provided for use by *Hewlett-Packard service personnel only*.

Table 2-5

GSP Command Menu: Manufacturing Commands

Manufacturing Command	Description
CM	Modify clock margin.
MFG	Enter the manufacturing mode. (Administrator only.)
RD	Read utility processor memory.
RU	Reset USB device.
VT	Display the trace buffer of a firmware entity.
WF	Write FRU ID data of an entity.
WR	Write utility processor memory.

Using Virtual Front Panels

The GSP Virtual Front Panel menu provides ways to monitor the chassis codes for a particular partition or the entire system (all partitions).

The Virtual Front Panel (VFP) provides a real-time display of activity on the selected partition(s).

To interpret the VFP output see Chapter 5 for details.

```
E indicates error since last boot
  Partition 0 state           Activity
  -----
  Cell(s) Booting:          710 Logs

# Cell state                 Activity
- -----
0 Early CPU selftest        Cell firmware test           232 Logs
1 Early CPU selftest        Processor test                 230 Logs
2 Memory discovery          Physical memory test          242 Logs

GSP:VFP (^B to Quit) >
```

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AES-2, p.59/gsp-6.2.2

Using the GSP to Access Boot Console Handler (BCH)

This section gives some brief details on how to access the Boot Console Handler (BCH) menu for a specific Superdome partition. See Chapter 5 for details on booting and rebooting Superdome partitions.

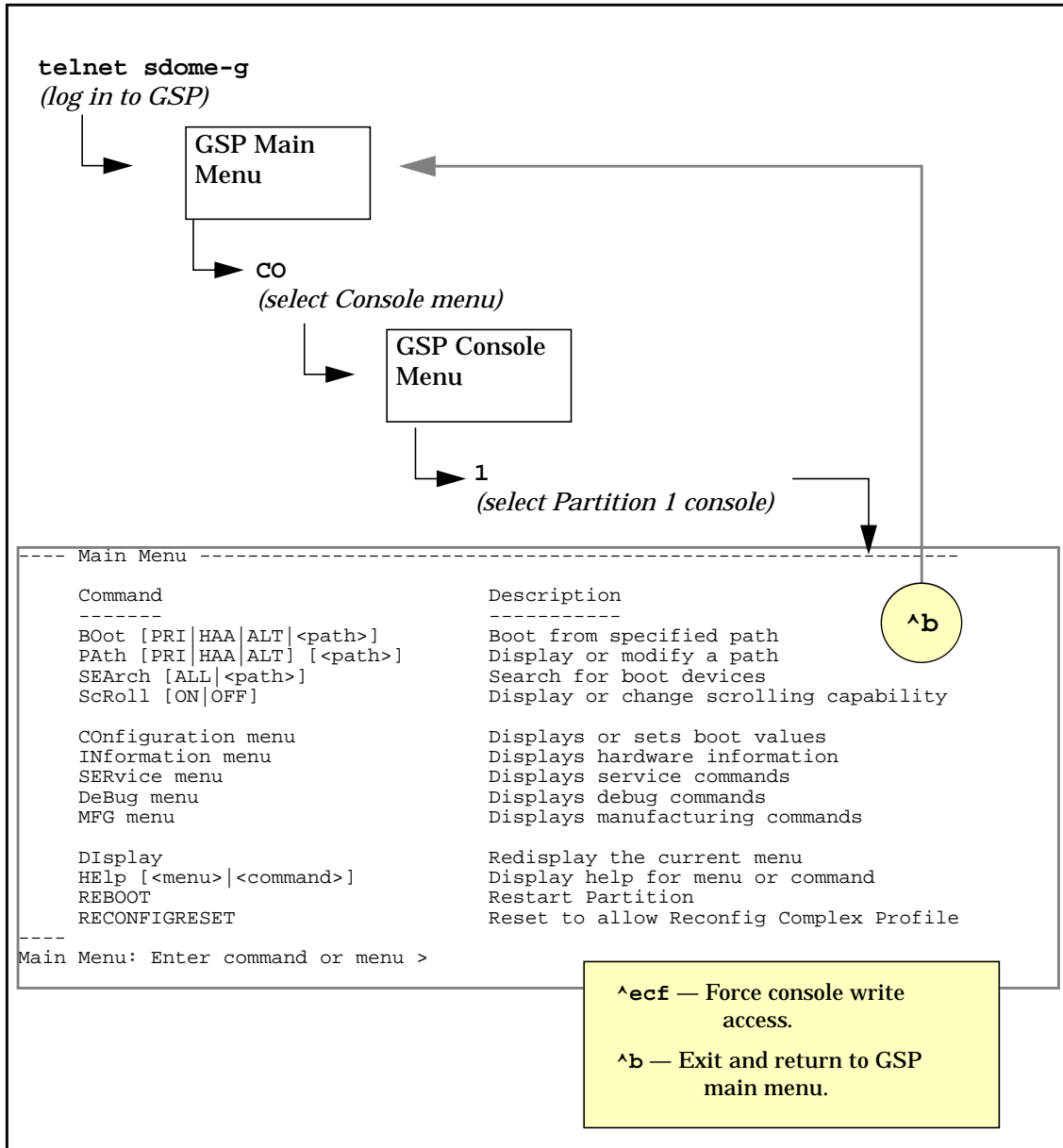
The BCH menu is provided for managing and configuring the HP-UX boot process for a Superdome partition. Each partition in a Superdome complex provides its own BCH menu through the partition's console.

Note that on HP Superdome servers, the BCH menu differs slightly from the BCH menu on other HP 9000 servers.

The BCH menu is available after a partition has been powered on, has completed all Power-On Self Tests (POST), and has proceeded to BCH.

Once you begin the HP-UX boot process and load ISL, the BCH menu is no longer available.

Figure 2-4 Accessing a Partition's BCH Menu



Related Information

This section lists other sources for information on the topics covered in this chapter.

Chapters in This Book

The following chapters in this book include details about topics covered in this chapter.

- Chapter 1, “Overview of the Superdome System Environment,” on page 13
- Chapter 3, “Managing the Overall Complex,” on page 57
- Chapter 4, “Configuring and Managing Superdome Partitions,” on page 113
- Chapter 5, “Booting and Resetting Superdome Partitions,” on page 221

HP-UX Man Pages

The man pages listed here provide details on topics covered in this chapter.

- *telnet* (1)

Other Books

The following books also provide more details on topics addressed in this chapter. Most books are available at the docs.hp.com Web site.

- *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*

Web Sites

Additional information is available at the following sites on the Web.

- <http://docs.hp.com/>

The HP Technical Documentation home page. This site provides online access to HP-UX documentation, Superdome system hardware documentation, related development tools manuals, and other information.

Collectively, all of the hardware components within a Superdome system are referred to as a **complex**. Each Superdome complex is comprised of the following building blocks: cabinets (including power, cooling, and utility hardware), cells, and I/O chassis.

You can configure each Superdome complex into one or more **partitions**: independent virtual systems each capable of running an instance of HP-UX. See Chapter 4, “Configuring and Managing Superdome Partitions,” on page 113 for procedures on managing the partitions within your Superdome complex (such as how to assign cells, and their connected I/O chassis, to partitions).

The hardware components that are used by the overall complex (for example, power supplies, utility hardware, and blowers) are not assigned to specific partitions.

This chapter covers the tasks you perform to manage the components that are common to all partitions in your Superdome complex.

NOTE

Each Superdome complex has only one active Guardian Service Processor (GSP). The GSP is a key Superdome administration tool and is described in Chapter 2, “Superdome Console and Service Interface,” on page 33.

Introduction to Complex-wide Tasks

The tasks described in this chapter are arranged in three categories:

- “Viewing / Setting the Complex Hardware Configuration” on page 61
- “Detecting / Controlling Power in the Complex” on page 83
- “Viewing the Current Status of the Complex” on page 101

The following table lists the tasks you will need to do in order to manage the components of a Superdome complex that are common to all partitions, the complex-wide tasks. The procedures for accomplishing these tasks are described throughout the chapter.

You can use the following tools to perform these tasks.

BCH	The Boot Console Handler (BCH) interface.
GSP	Guardian Service Processor (GSP) menus.
HP-UX Commands	HP-UX commands related to Superdome administration.
Partition Manager	The Partition Manager, a graphical interface for managing the components and partitions in your Superdome complex.

When a task can be performed using your choice of more than one of the above tools, a procedure is provided for each tool.

Table 3-1 HP Superdome Complex-Wide Tasks

Task Description	Tools
“Naming / Renaming a Superdome Complex” on page 62	<ul style="list-style-type: none">• Partition Manager (<code>parmgr</code>)
“Determining Which Partitions are Defined in the Complex” on page 63	<ul style="list-style-type: none">• HP-UX Commands: <code>parstatus</code>• Partition Manager (<code>parmgr</code>)
“Determining How Many Cabinets are Present in a Complex” on page 65	<ul style="list-style-type: none">• HP-UX Commands: <code>parstatus</code>• Partition Manager (<code>parmgr</code>)

Table 3-1 HP Superdome Complex-Wide Tasks

Task Description	Tools
“Determining the Processor and Memory Configurations of Cells” on page 67	<ul style="list-style-type: none"> • BCH • GSP • HP-UX Commands: <code>parstatus</code> • Partition Manager (<code>parmgr</code>)
“Determining Firmware Versions in a Partition or Complex” on page 73	<ul style="list-style-type: none"> • BCH • GSP • HP-UX Commands: <code>parstatus</code> • Partition Manager (<code>parmgr</code>)
“Determining the Serial Number of a Complex” on page 79	<ul style="list-style-type: none"> • HP-UX Commands: <code>parstatus</code> • Partition Manager (<code>parmgr</code>)
“Determining the Product Number of a Complex” on page 81	<ul style="list-style-type: none"> • HP-UX Commands: <code>parstatus</code> • Partition Manager (<code>parmgr</code>)
“Determining Hardware Power Status” on page 84	<ul style="list-style-type: none"> • GSP • HP-UX Commands: <code>parstatus</code> • Partition Manager (<code>parmgr</code>)
“Powering Cells and I/O Chassis On and Off” on page 93	<ul style="list-style-type: none"> • GSP • HP-UX Commands: <code>parstatus</code> • Partition Manager (<code>parmgr</code>)
“Turning Service Indicator Lights (LEDs) On and Off” on page 97	<ul style="list-style-type: none"> • HP-UX Commands: <code>parstatus</code> • Partition Manager (<code>parmgr</code>)
“Analyzing the Health of the Complex” on page 102	<ul style="list-style-type: none"> • Partition Manager (<code>parmgr</code>)
“Determining if Processors Have Failed” on page 103	<ul style="list-style-type: none"> • HP-UX Commands: <code>parstatus</code> • Partition Manager (<code>parmgr</code>)

Table 3-1 HP Superdome Complex-Wide Tasks

Task Description	Tools
“Determining if Memory DIMMS Have Failed” on page 105	<ul style="list-style-type: none">• HP-UX Commands: <code>parstatus</code>• Partition Manager (<code>parmgr</code>)
“Determining if Blowers, Fans, or Power Supplies Have Failed” on page 108	<ul style="list-style-type: none">• HP-UX Commands: <code>parstatus</code>• Partition Manager (<code>parmgr</code>)

Viewing / Setting the Complex Hardware Configuration

The procedures in this section allow you to gather information about how your Superdome complex is currently configured.

The following procedures are available in this section:

- “Naming / Renaming a Superdome Complex” on page 62
- “Determining Which Partitions are Defined in the Complex” on page 63
- “Determining How Many Cabinets are Present in a Complex” on page 65
- “Determining the Processor and Memory Configurations of Cells” on page 67
- “Determining Firmware Versions in a Partition or Complex” on page 73
- “Determining the Serial Number of a Complex” on page 79
- “Determining the Product Number of a Complex” on page 81

See Table 3-1 on page 58 for a list of all complex-wide procedures.

Naming / Renaming a Superdome Complex

When you are working with more than one Superdome complex, it is useful to distinguish them by assigning them each a unique name. This is especially helpful if you are viewing information about multiple complexes on a single monitor. The complex name will be displayed as the root of the tree shown on the left-hand side of the Partition Manager display, and in many other useful places.

You can perform this task using Partition Manager.

- | |
|--|
| <ul style="list-style-type: none">• “Partition Manager” on page 62 |
|--|

Setting / Changing the Complex Name

Partition Manager

Step 1. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Step 2. From any screen in the Partition Manager from the `Complex` menu choose `Set Complex Name`

Step 3. A pop-up window will appear with the previous name for the complex. If no name was previously assigned, the default name will be `MyComplex`. Enter the new name for your complex in the pop-up window.

Valid Complex names:

- ✓ Must have at least 1 and no more than 20 characters
- ✓ The first character cannot be a space
- ✓ Can include alphabetic, numeric, and most punctuation characters (including spaces)

Step 4. Click `OK` to set the new name or `Cancel` to keep the previously defined name

Determining Which Partitions are Defined in the Complex

A list of the partitions currently defined in a Superdome complex can be displayed using the HP-UX command `parstatus`, or using the Partition Manager.

You can perform this task using HP-UX commands or Partition Manager.

- “HP-UX Commands” on page 63
- “Partition Manager” on page 63

HP-UX Commands

Step 1. The `-P` option to the `parstatus` command will display a list of partitions and their current status:

```
/usr/sbin/parstatus -P
```

```
# parstatus -P
[Partition]
Par          # of # of I/O
Num Status   Cells Chassis Core cell  Partition Name (first 30 chars)
====
0 active     2     2     cab0,cell0 jules00
1 active     2     2     cab0,cell4 jules01
#
```

Partition Manager

Step 1. Run the Partition Manager (`parmgr`).

The left-hand side of the Partition Manager’s primary display window always displays a list of the partitions currently defined in the complex (plus the special partition known as “Available Resources” which contains all of the resources that are not currently assigned to any other partition).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Determining How Many Cabinets are Present in a Complex

If you are working with a Superdome complex that is at a remote location, a complex that you might not be familiar with, you cannot simply walk over to it and observe how many cabinets it has. However, you can use the HP-UX command `parstatus` or the Partition Manager to determine this information.

You can perform this task using HP-UX commands or Partition Manager.

- “HP-UX Commands” on page 65
- “Partition Manager” on page 65

HP-UX Commands

Step 1. The `-B` option to the `parstatus` command will display a list of cabinets and their current status:

```
/usr/sbin/parstatus -B
```

```
# parstatus -B
[Cabinet]
          Cabinet   I/O       Bulk Power   Backplane
          Blowers   Fans       Supplies    Power Boards
          OK/       OK/       OK/         OK/
Cab      Failed/   Failed/   Failed/     Failed/
Num Cabinet Type N Status  N Status  N Status  N Status      GSP
====  =====  =====  =====  =====  =====  =====
 0 SD64000    4/ 0/ N+  5/ 0/ ?    5/ 0/ N+    3/ 0/ N+    active
 1 SD64000    4/ 0/ N+  5/ 0/ ?    5/ 0/ N+    3/ 0/ N+    none

Notes: N+ = There are one or more spare items (fans/power supplies).
       N   = The number of items meets but does not exceed the need.
       N- = There are insufficient items to meet the need.
       ?   = The adequacy of the cooling system/power supplies is unknown.

#
```

Partition Manager

Step 1. Run the Partition Manager (`parmgr`).

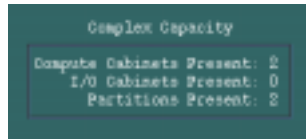
The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

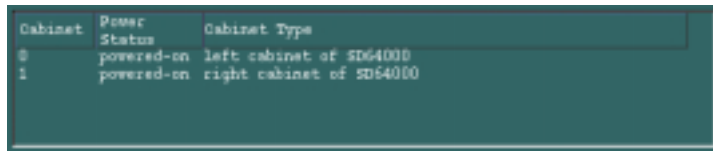
For details see “How to Start The Partition Manager” on page 141.

Step 2. Select “Show Complex Details” from the “Complex” menu

The Complex Details Window will pop-up, displaying its “General” panel. The number of cabinets in the Complex is displayed near the center of the General panel, under “Complex Capacity”.



Step 3. For more cabinet information, click on the Cabinet Info tab to display the cabinet information panel.



Cabinet	Power Status	Cabinet Type
0	powered-on	left cabinet of SD64000
1	powered-on	right cabinet of SD64000

Step 4. [Optional] Print the results to a file or printer by clicking on the “Print . . .” button. A “Print Dialog” window will pop-up.

Enter the file name or printer name information, select the paper type (if appropriate), and click on the Print button to create the file or printout.

Determining the Processor and Memory Configurations of Cells

You can determine the processor and memory configuration for cells in a Superdome complex by using the procedures provided in this section.

You can perform this task using GSP menus, the BCH interface, HP-UX commands, or Partition Manager.

- “GSP” on page 67
- “BCH” on page 68
- “HP-UX Commands” on page 69
- “Partition Manager” on page 71

GSP

Use this procedure to check cell processor and memory configurations from the Superdome complex’s GSP command menu.

You can use the GSP to check these details for any cell in the complex.

Step 1. Log in to the Superdome complex’s GSP and access the GSP command menu.

From the GSP main menu, enter CM to access the command menu.

Step 2. Issue the GSP command menu’s PS command and specify the cell whose processor and memory details you want to view.

The PS command reports details for the cell including its processor configuration (CPU population) and its memory configuration (DIMM population).

For the cell memory configuration details, the PS command displays each populated DIMM and identifies it using its DIMM ID number (0–31).

The following example shows details for cell 0 in cabinet 0, which has four processors (0–3) and four DIMMs installed (0, 4, 8, and 12).

Managing the Overall Complex

Viewing / Setting the Complex Hardware Configuration

```
GSP:CM> PS
This command displays detailed power and hardware configuration status.

You may display detailed power and hardware status for the following items:

  B - Cabinet (UGUY)
  C - Cell
  G - GSP
  I - Core IO
     Select Device: c
     Enter cabinet number: 0
     Enter slot number: 0

HW status for Cell 0 in cabinet 0: NO FAILURE DETECTED

Power status: on, no fault
Boot is not blocked; PDH memory is shared
Attention LED is off
RIO cable status: connected
RIO cable connection physical location: cabinet 0, IO bay 0, IO chassis 1
Core cell is cabinet 0, cell 0

PDH status LEDs: ****

          CPUs
          0 1 2 3
Populated * * * *
Over temperature

DIMMs populated:
0 . . . 4 . . . 8 . . .12 . . .16 . . .20 . . .24 . . .28 . . .
* . . . * . . . * . . . *

PDC firmware rev 6.0
PDH controller firmware rev 6.0, time stamp: JUL 20 20:40:46 2000
GSP:CM>
```

BCH

Use this procedure to check cell processor and memory configurations from a partition's BCH interface. You can check these details only for the cells assigned to the local partition.

- Step 1.** Access the BCH interface for the partition to which the cell is assigned, and access the BCH information menu.

From the BCH main menu, enter IN to access the BCH information menu. (If you are not at the BCH main menu, enter MA to go to the main menu.)

- Step 2.** From the BCH information menu, check the processor or memory status for all cells by issuing the PR and ME commands.

The BCH information menu's PR command reports details about all processors on all active cells in the partition.

The ME command reports details about all active cells' memory configurations. The ME command summarizes memory (DIMM) details for each ranks of memory. Each rank is a set of 4 DIMMs.

These BCH commands do not report details for inactive cells.

```

Information Menu: Enter command > PR
PROCESSOR INFORMATION
  Cell      Cab/Slot  CPU    Speed    HVERSION  SVERSION  CVERSION  Processor State
  ---      -
  4         0/4      0      552 MHz  0x5c70    0x0491    0x0301    Active
              1      552 MHz  0x5c70    0x0491    0x0301    Idle
              2      552 MHz  0x5c70    0x0491    0x0301    Idle
              3      552 MHz  0x5c70    0x0491    0x0301    Idle
  6         0/6      0      552 MHz  0x5c70    0x0491    0x0301    Idle
              1      552 MHz  0x5c70    0x0491    0x0301    Idle
              2      552 MHz  0x5c70    0x0491    0x0301    Idle
              3      552 MHz  0x5c70    0x0491    0x0301    Idle

Information Menu: Enter command > ME
Partition Memory Information
  Cell  DIMM Rank 0/1  DIMM Rank 2/3  DIMM Rank 4/5  DIMM Rank 6/7
  ---  -
  4    2048MB Active  ---            ---            ---
  6    2048MB Active  ---            ---            ---

  Partition Total Memory:  4096
  Partition Active Memory: 4096
  Partition Deconfigured Memory: 0

* status is scheduled to change on next boot.
Information Menu: Enter command >
  
```

HP-UX Commands Use this procedure to check cell processor and memory configurations from HP-UX running on any of the partitions in the Superdome complex.

You can check these details for any cell in the complex.

Step 1. Log in to HP-UX running on one of the Superdome complex's partitions.

You can check processor and memory details from HP-UX running on any of the complex's partitions.

Step 2. Use the `parstatus` command to view detailed cell hardware information, including processor and memory configurations.

You can use any of the following `parstatus` commands to view details about the cell processor and memory configurations within the complex:

- `parstatus -V -c#`
List detailed processor and memory configuration information for the specified cell.
- `parstatus -C`
List brief processor and memory information for all cells in the entire Superdome complex.
- `parstatus -V -p#`
List brief processor and memory information for all cells assigned to the specified partition.

The following example shows the `parstatus -V -c0` command's output. This presents detailed information about cell 0 in cabinet 0.

```
# parstatus -V -c0
[Cell]
Hardware Location      : cab0,cell0
Global Cell Number    : 0
Actual Usage          : active core
Normal Usage          : base
Connected To          : cab0,bay0,chassis1
Core Cell Capable     : yes
Firmware Revision     : 5.0
Failure Usage         : activate
Use On Next Boot      : yes
Partition Number      : 0
Partition Name        : jules00

[CPU Details]
Type : 23664
Speed : 552 MHz
CPU Status
=== =====
 0 ok
 1 ok
 2 ok
 3 ok
CPUs
-----
OK      : 4
Deconf  : 0
Max     : 4

[Memory Details]
DIMM Size (MB) Status
=====
 0 512 ok
 4 512 ok
 8 512 ok
12 512 ok
Memory
-----
DIMM OK      : 4
DIMM Deconf  : 0
Max DIMMs   : 32
Memory OK    : 2.00 GB
Memory Deconf : 0.00 GB
#
```

Partition Manager

- Step 1.** Log into any running partition in the complex as the root user and start `parmgr` using the command:

```
/opt/parmgr/bin/parmgr
```

When `parmgr` starts, it displays the complex-level view which lists the partitions on the right-hand side of the display.

NOTE

If you are already running `parmgr` (regardless of what view level you are currently displaying), existing partitions are listed in the left-hand column of the screen, identified by their partition number in parentheses, for example:

eMail Room (par 1)

Golf Course Design System (par 3)

- Step 2.** Using the left mouse button, click on the name of the partition that you are interested in (on the left-hand side of the `parmgr` display). This will display the resources (cell boards and I/O chassis) that are associated with that partition.
- Step 3.** For each cell board now listed on the right-hand side of the `parmgr` display, click on its entry and select `Show Cell Details ...` from the Cell menu.

This will display a new window, the Cell Details window:

Managing the Overall Complex
Viewing / Setting the Complex Hardware Configuration



There are two panels in the Cell Details window: General, and CPUs/Memory.

- Step 4.** To see how many processors a cell board has, and their current status, or to see how much memory is installed on the selected cell board, click on the CPUs/Memory tab.

Determining Firmware Versions in a Partition or Complex

Each Superdome complex has six types of firmware installed on the hardware components within the complex.

Superdome Hardware	Firmware Component(s)
Guardian Service Processor (GSP)	GSP Firmware
UGUY Utilities Board	PM Firmware CLU Firmware
Superdome Cell Board	PDC Firmware PDCH Firmware
Superdome Core I/O Card	CIO Firmware

Each hardware component (cell, core I/O card, GSP, or UGUY board) must have the corresponding firmware component(s) installed.

In general, within a Superdome complex every instance of a firmware component should be the same version; for example, every core I/O card should have the same version of the CIO firmware installed. Within a partition, every cell *must* have matching firmware versions installed.

You can perform this task using GSP menus, HP-UX commands, or Partition Manager.

- “GSP” on page 73
- “BCH” on page 75
- “HP-UX Commands” on page 76
- “Partition Manager” on page 77

GSP

Follow this procedure to use the GSP command menu to display the firmware versions installed on cells, core I/O cards, GSPs, and UGUY utility boards.

Step 1. Log in to the Superdome complex's GSP and access the GSP command menu.

From the GSP main menu, enter CM to access the command menu.

Step 2. Use the GPS command menu's PS command to list details, including all installed firmware versions, for any specified hardware component in the Superdome complex.

The PS command allows you to specify any of the following components and list detailed information, including the installed firmware version.

- **Cabinet**—List the PM and CLU firmware installed on the specified cabinet's UGUY utilities board.
- **Cell**—List the PDC and PDHC firmware installed on the specified cell.
- **GSP**—List the GSP firmware installed on the GPS.
- **Core I/O**—List the CIO firmware installed on the specified core I/O card.

The following example shows using the PS command to list the PM and CLU firmware versions for the UGUY utilities board in cabinet number 1.

```
GSP:CM> PS
This command displays detailed power and hardware configuration status.
The following GSP bus devices were found:
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|Cab.  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 0    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    |
| 1    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    |
| 8    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    | *    |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
You may display detailed power and hardware status for the following items:
  B - Cabinet (UGUY)
  C - Cell
  G - GSP
  I - Core IO
Select Device: b
  Enter cabinet number: 1
HW status for SD64000 compute cabinet #1: NO FAILURE DETECTED
PM firmware rev 6.8, time stamp: FRI SEP 22 16:16:19 2000
CLU firmware rev 6.10, time stamp: WED SEP 06 20:56:50 2000
GSP:CM>
```

BCH

Follow this procedure to use the partition’s BCH interface to list the PDC version installed on active cells within the partition.

Step 1. Access the BCH interface for the partition to which the cells are assigned, and access the BCH information menu.

From the BCH main menu, enter IN to access the BCH information menu. (If you are not at the BCH main menu, enter MA to go to the main menu.)

Step 2. Issue the BCH information menu’s FV command to list the PDC version installed on all active cells in the partition.

To list both the PDC and PDHC firmware versions for a cell, use the GSP.

The following example shows the FV command displaying the PDC version for cells 0 and 2 (the only active cells in the partition).

```
Information Menu: Enter command > FV
FIRMWARE INFORMATION

  Cell   Cab/Slot   PDC Ver   PDC Date Code   PDC ICM   PDC Utils
  ----   -
  00     00/00     006.000   40.34           000       000
  02     00/02     006.000   40.34           000       000

Information Menu: Enter command >
```

HP-UX Commands Follow this procedure to list the PDC firmware version for any cell in the Superdome complex from HP-UX.

To list both the PDC and PDHC firmware versions for a cell, use the GSP.

Step 1. Log in to HP-UX running on one of the Superdome complex's partitions.

You can list any cell's PDC firmware version from HP-UX running on any of the complex's partitions.

Step 2. Issue the `parstatus -V -c#` command to list details about the specified cell, including its PDC firmware version.

```
# parstatus -V -c2
[Cell]
Hardware Location      : cab0,cell2
Global Cell Number    : 2
Actual Usage          : active base
Normal Usage          : base
Connected To          : cab0,bay1,chassis3
Core Cell Capable     : yes
Firmware Revision     : 6.0
Failure Usage         : activate
Use On Next Boot      : yes
Partition Number      : 0
Partition Name        : jules00
```

Partition Manager

- Step 1.** Log into any running partition in the complex as the root user and start parmgr using the command:

```
/opt/parmgr/bin/parmgr
```

When parmgr starts, it displays the complex-level view which lists the partitions on the right-hand side of the display.

NOTE

If you are already running parmgr (regardless of what view level you are currently displaying), existing partitions are listed in the left-hand column of the screen, identified by their partition number in parentheses, for example:

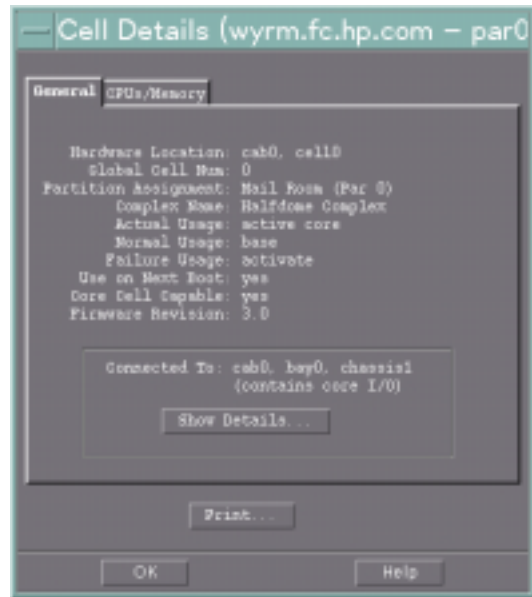
eMail Room (par 1)

Golf Course Design System (par 3)

- Step 2.** Using the left mouse button, click on the name of the partition that you are interested in (on the left-hand side of the parmgr display). This will display the resources (cell boards and I/O chassis) that are associated with that partition.
- Step 3.** For each cell board now listed on the right-hand side of the parmgr display, click on its entry and select `Show Cell Details ...` from the Cell menu.

This will display a new window, the Cell Details window:

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Viewing / Setting the Complex Hardware Configuration



There are two panels in the Cell Details window: General, and CPUs/Memory.

Step 4. To see the firmware revision for the selected cell board, click on the General tab.

Determining the Serial Number of a Complex

If you need to determine the serial number of your Superdome complex, for example when making a support call, you can use the `-x` option to the HP-UX command `parstatus`, or you can use the Partition Manager to locate this information.

You can perform this task using HP-UX commands or Partition Manager.

- “HP-UX Commands” on page 79
- “Partition Manager” on page 79

HP-UX Commands

Step 1. `/usr/sbin/parstatus -x`

```
# parstatus -X
[Complex]
  Complex Name : Superdome Two
  Complex Capacity
    Compute Cabinet (8 cell capable) : 1
  Active GSP Location : cabinet 0
  Model : 9000/800/SD32000
  Serial Number : 543212345
  Current Product Number : 00000a
  Original Product Number : 00000a
  Complex Profile Revision : 1.0
  The total number of Partitions Present : 2
#
```

Partition Manager

Step 1. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Step 2. Select “Show Complex Details” from the “Complex” menu

The Complex Details Window will pop-up, displaying its “General” panel which includes Superdome serial number information.

Step 3. [Optional] Print the results to a file or printer by clicking on the “Print . . .” button. A “Print Dialog” window will be displayed.

Determining the Product Number of a Complex

If you need to determine the product number of your Superdome complex, for example when making a support call, you can use the `-x` option to the HP-UX command `parstatus`, or you can use the Partition Manager to locate this information.

You can perform this task using HP-UX commands or Partition Manager.

- “HP-UX Commands” on page 81
- “Partition Manager” on page 81

HP-UX Commands

Step 1. `/usr/sbin/parstatus -X`

```
# parstatus -X
[Complex]
  Complex Name : Superdome Two
  Complex Capacity
    Compute Cabinet (8 cell capable) : 1
  Active GSP Location : cabinet 0
  Model : 9000/800/SD32000
  Serial Number : 543212345
  Current Product Number : 00000a
  Original Product Number : 00000a
  Complex Profile Revision : 1.0
  The total number of Partitions Present : 2
#
```

Partition Manager

Step 1. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Step 2. Select “Show Complex Details” from the “Complex” menu

The Complex Details Window will pop-up, displaying its “General” panel which includes Superdome product number information.

Step 3. [Optional] Print the results to a file or printer by clicking on the “Print . . .” button. A “Print Dialog” window will pop-up.

Enter the file name or printer name information, select the paper type (if appropriate), and click on the Print button to create the file or printout.

Detecting / Controlling Power in the Complex

The procedures in this section allow you to gather information about (and control) the power status of the various components in your Superdome complex.

The following procedures are available in this section:

- “Determining Hardware Power Status” on page 84
- “Powering Cells and I/O Chassis On and Off” on page 93
- “Turning Service Indicator Lights (LEDs) On and Off” on page 97

See Table 3-1 on page 58 for a list of all complex-wide procedures.

Determining Hardware Power Status

You can use system software to check whether the following Superdome complex components are powered on or powered off:

- Superdome Cabinets
- Cell Boards
- I/O Chassis
- Individual PCI Slots

The procedures described in this section allow you to check power status from remote locations, without physically inspecting the Superdome server hardware.

You can perform this task using the GSP command menu, HP-UX commands, and Partition Manager.

- “GSP” on page 84
- “HP-UX Commands” on page 86
- “Partition Manager” on page 89

GSP

The following procedure uses the GSP command menu to check power status for Superdome cabinets, cells, and core I/O.

- Step 1.** Log in to the Superdome complex’s GSP and access the GSP command menu.

From the GSP main menu, enter CM to access the command menu.

The following example shows cabinet power details for cabinet 0 of an SD64000 model Superdome server.

```
Select Device: b
Enter cabinet number: 0
HW status for SD64000 compute cabinet #0: NO FAILURE DETECTED
Power switch: on; Power: enabled, good; Door: closed
Fan speed: normal; Temperature state: normal
Redundancy state: fans or blowers redundant, BPSs redundant
```

	Main BP	Main BP Power Boards		Cells							IO Backplanes						
		0	1	2	3	4	5	6	7	IO Bay 0 Chassis			IO Bay 1 Chassis				
		0	1	2	3	4	5	6	7	0	1	2	3	0	1	2	3
Populated	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Power Enabled	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Powered On	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Power Fault																	
Attention LED								*				*					

	BPS					Cabinet Blowers			IO Fans					
	0	1	2	3	4	0	1	2	3	0	1	2	3	4
Populated	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Failed														

```
PM firmware rev 6.6, time stamp: FRI SEP 08 19:36:47 2000
CLU firmware rev 6.10, time stamp: WED SEP 06 20:56:50 2000
GSP:CM>
```

HP-UX Commands The frupower, parstatus, and rad commands enable you to check Superdome power status from HP-UX.

This procedure describes how to use these HP-UX commands to check cabinet, cell, and I/O chassis, and PCI card slot power details.

Step 1. Log in to HP-UX running on one of the Superdome complex's partitions.

You can check the power status for cabinets, cells, and I/O chassis from any partition.

To check the power status for PCI card slots, you must log in to the local partition where the corresponding PCI card cage resides.

Step 2. Issue the HP-UX commands to check the power status for the Superdome complex components of interest to you.

You can check power status details by using the HP-UX commands shown in the following list.

For more details on these HP-UX commands, see the manpage for *parstatus* (1), *frupower* (1M), and *rad* (1M).

This list covers cabinet, cell, I/O chassis, and PCI card slot power.

- **Cabinet Power**—Use the *parstatus* command for Superdome cabinet power information.

Specify both the verbose (*-v*) and cabinet number (*-b#*) options.

For example, *parstatus -v -b0* prints a detailed status for cabinet number 0.

```
# parstatus -v -b0
[Cabinet]
          Cabinet   I/O       Bulk Power   Backplane
          Blowers   Fans       Supplies    Power Boards
          OK/        OK/        OK/          OK/
Cab      Failed/    Failed/    Failed/      Failed/
Num Cabinet Type N Status   N Status   N Status   N Status   GSP
=====
0  SD32000      4/ 0/ N+  5/ 0/ ?    5/ 0/ N+   3/ 0/ N+   active

Bulk Power Supplies(BPS)
=====
Power Supply 0 ok
Power Supply 1 ok
Power Supply 2 ok
Power Supply 3 ok
Power Supply 4 ok

Backplane Power Boards
=====
Power Supply 0 ok
Power Supply 1 ok
Power Supply 2 ok

Notes: N+ = There are one or more spare items (fans/power supplies).
       N  = The number of items meets but does not exceed the need.
       N- = There are insufficient items to meet the need.
       ?  = The adequacy of the cooling system/power supplies is unknown.

#
```

The *parstatus* command can give details about each cabinet's bulk power supplies (BPS 0–5, if installed) and backplane power boards, in addition to other details about cabinet fans and blowers.

Managing the Overall Complex
 Detecting / Controlling Power in the Complex

- **Cell Power**—Use the `frupower` command for cell power status.

For status on all cells' power, use the `frupower -d -C` command.

For status on a specific cell's power, use `frupower -d -c#` and specify the cell ID.

```
# frupower -d -C
Global cell 0; cabinet 0, cell 0 is powered on.
Global cell 2; cabinet 0, cell 2 is powered on.
Global cell 4; cabinet 0, cell 4 is powered on.
Global cell 6; cabinet 0, cell 6 is powered off.
# frupower -d -c4
Global cell 4; cabinet 0, cell 4 is powered on.
#
```

- **I/O Chassis Power**—Use the `frupower` command for I/O chassis power status.

For status on all I/O chassis' power, use the `frupower -d -I` command.

For status on a specific I/O chassis' power, use `frupower -d -i#/#/#` and specify the I/O chassis (*cabinet/bay/chassis*).

```
# frupower -d -I
Cabinet 0, bay 0, chassis 1 is powered on.
Cabinet 0, bay 0, chassis 3 is powered on.
Cabinet 0, bay 1, chassis 1 is powered off.
Cabinet 0, bay 1, chassis 3 is powered on.
# frupower -d -i0/1/3
Cabinet 0, bay 1, chassis 3 is powered on.
#
```

- **PCI Card Slot Power**—Use the `rad -q` command and option to list details including PCI card slot power for all PCI card slots within the local partition.

```
# rad -q
```

Slot	Path	Bus	Speed	Power	Occupied	Suspended	Driver(s) Capable
0-0-1-0	0/0/0	0	33	On	Yes	No	No
0-0-1-1	0/0/1/0	8	33	On	No	N/A	N/A
0-0-1-2	0/0/2/0	16	33	On	Yes	No	Yes
0-0-1-3	0/0/3/0	24	33	On	No	N/A	N/A
0-0-1-4	0/0/4/0	32	33	On	No	N/A	N/A
0-0-1-5	0/0/6/0	48	33	On	No	N/A	N/A
0-0-1-6	0/0/14/0	112	33	On	Yes	No	Yes
0-1-3-0	2/0/0	0	33	On	Yes	No	No
0-1-3-1	2/0/1/0	8	33	On	No	N/A	N/A
0-1-3-2	2/0/2/0	16	33	On	No	N/A	N/A
0-1-3-10	2/0/9/0	72	33	On	No	N/A	N/A
0-1-3-11	2/0/8/0	64	33	On	No	N/A	N/A

```
#
```

The `rad` command provides information for the local partition only.

Partition Manager How to Determine if a Cell Board has Power:

Step 1. Run the Partition Manager (`parmgr`).

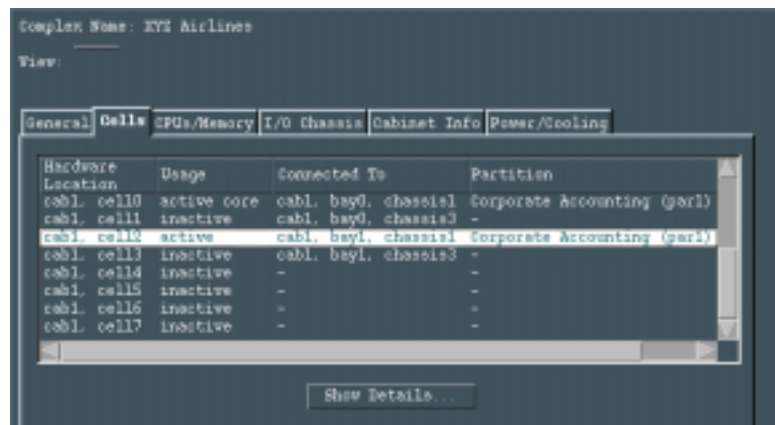
The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Step 2. From the Complex menu, select Show Complex Details. This will bring up a new window with several panels of information about the complex.

Step 3. Click on the tab marked Cells to bring up the panel that contains the status of the cells in the complex.



Step 4. Locate the entry for the cell board that you are interested in, and look at the Usage column to find the current status of the cell. Cell boards with a usage value of powered-off were powered off at the time of the last scan of the complex. All other values indicate a cell board that was powered on at the time of the last complex scan.

NOTE

For safety reasons do not rely on this value unless you have just updated the display by rescanning the complex. Cell boards may have changed state if time has passed since the last complex scan.

To force a rescan of the complex, hit the **Rescan Complex** button in the lower-right corner of the `Complex Details` window.

How to Determine if an I/O Chassis has Power:

Step 1. Run the Partition Manager (`parmgr`).

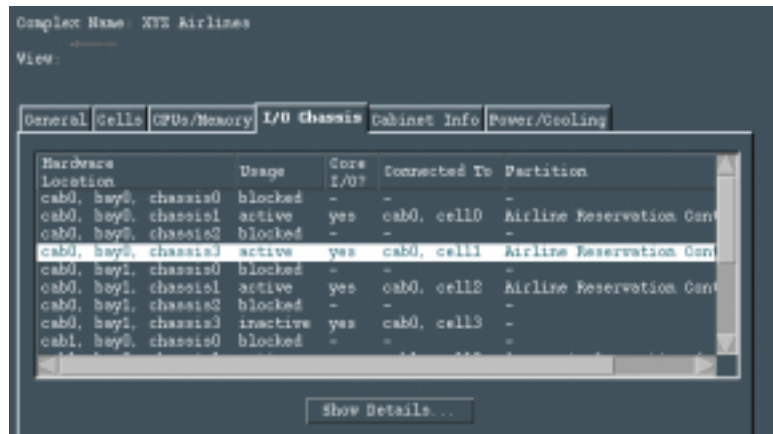
The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Step 2. From the `Complex` menu, select `Show Complex Details`. This will bring up a new window with several panels of information about the complex.

Step 3. Click on the tab marked `I/O Chassis` to bring up the panel that contains the status of the `I/O Chassis` in the complex.



Step 4. Locate the entry for the chassis that you are interested in, and look at the Usage column to find the current status of the chassis. I/O chassis with a usage value of powered-off were powered off at the time of the last scan of the complex. All other values indicate a chassis that was powered on at the time of the last complex scan.

NOTE

For safety reasons do not rely on this value unless you have just updated the display by rescanning the complex. I/O Chassis may have changed state if time has passed since the last complex scan.

To force a rescan of the complex, hit the **Rescan Complex** button in the lower-right corner of the Complex Details window.

How to Determine if a PCI I/O Slot has Power

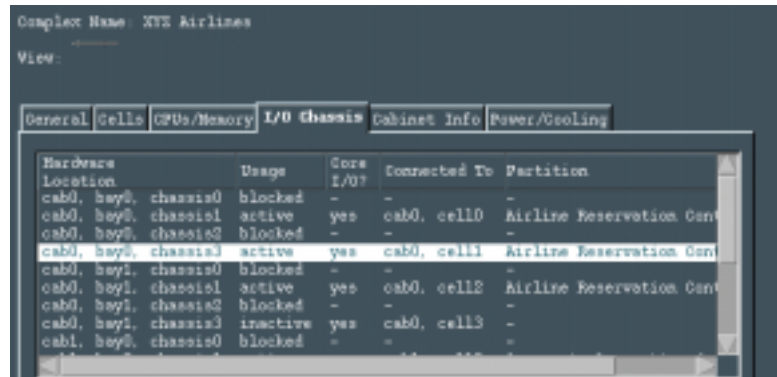
Step 1. Run the Partition Manager

`/opt/parmgr/bin/parmgr`

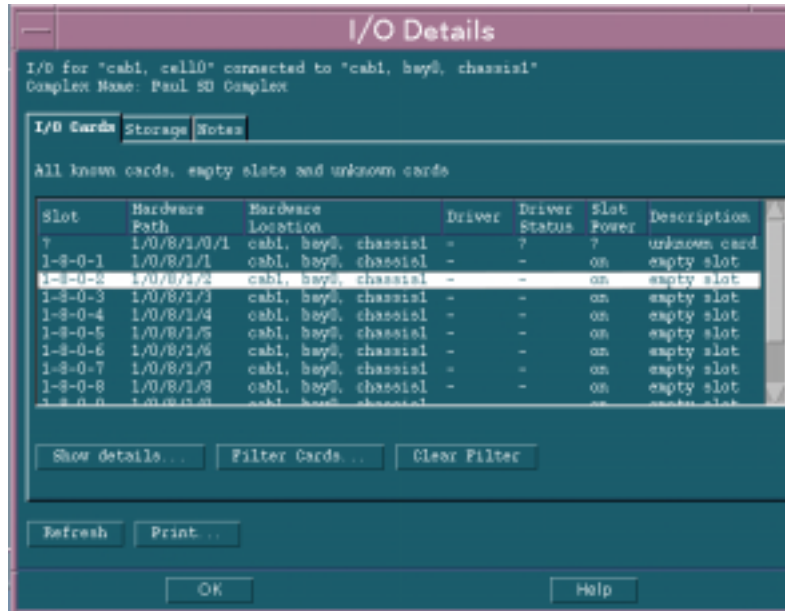
Step 2. From the Complex menu, select Show Complex Details. This will bring up a new window with several panels of information about the complex.

Step 3. Click on the tab marked I/O Chassis to bring up the panel that contains the status of the I/O Chassis in the complex.

Managing the Overall Complex
 Detecting / Controlling Power in the Complex



Step 4. Click on the entry for the I/O chassis that contains the slot you are interested in, and then click the **Show Details ...** button, to display a new window containing the power status of the individual slots in the chassis.



Powering Cells and I/O Chassis On and Off

You can power on or power off cells and I/O chassis within a Superdome complex by using system software.

The procedures in this section allow you to control power for Superdome cells and I/O chassis from remote locations, without physically accessing the Superdome server hardware.

NOTE

On Superdome servers, powering on a cell also powers on any I/O chassis attached to the cell. Likewise, powering off a cell will power off any I/O chassis attached to the cell.

For details on checking Superdome hardware power status, see “Determining Hardware Power Status” on page 84.

You can perform this task using GSP menus, HP-UX commands, or Partition Manager.

- “GSP” on page 93
- “HP-UX Commands” on page 95
- “Partition Manager” on page 96

GSP

Use this procedure to power on or power off cells, I/O chassis, and cabinets through the Superdome complex’s GSP.

From the GSP command menu, you can manage the power for all components within the Superdome complex, regardless of the components’ partition assignments (if any).

CAUTION

Be certain to *correctly specify* the cell, I/O chassis, or cabinet when using the GSP command menu’s PE command to power on or off hardware.

The PE command *does not check* whether the hardware is actively being used.

Step 1. Log in to the Superdome complex's GSP and access the GSP command menu.

From the GSP main menu, enter CM to access the command menu.

Step 2. Issue the PE command and specify the type of hardware whose power you want to turn on or turn off.

You can manage power to cells, I/O chassis, and cabinets (including all components in the cabinet).

Step 3. Specify the hardware device to power on or power off.

For cells, specify both the cabinet and cell slot in which the cell resides.

For I/O chassis, specify the cabinet, bay, and chassis where it resides.

Note the following issues when using the GSP command menu to manage Superdome hardware power.

- When you power off an I/O chassis from the GSP command menu, the system firmware resets the cell attached to the I/O chassis.
- When you power off a cell, the firmware also powers off any I/O chassis attached to the cell.
- When you power off a cabinet, the firmware also powers off all cells and I/O chassis in the cabinet.

The GSP *does not check* whether the specified component is being used; this means you can power cycle hardware that a partition is actively using.

In the following example the GSP powers off cell 2 in cabinet 0.

```
GSP:CM> PE
This command controls power enable to a hardware device.
  B - Cabinet
  C - Cell
  I - IO Chassis
    Select Device: c
Enter cabinet number: 0
Enter slot number: 2
The power is ON for the Cell in Cabinet 0, Slot 2.
In what state do you want the power for the
Cell in Cabinet 0, Slot 2? (ON/OFF) OFF
GSP:CM>
```

HP-UX Commands Use this procedure to power on or power off cells (and their associated I/O chassis) using HP-UX commands.

When using HP-UX commands to manage power, you are restricted to powering on or off *inactive cells* that are either assigned to the local partition or are not assigned to a partition.

You cannot use HP-UX commands to manage the power of active cells or cells assigned to a remote partition. To power on or off an I/O chassis using `frupower`, do so by power cycling the cell to which it is connected.

Step 1. Log in to HP-UX running on one of the Superdome complex's partitions.

To manage a cell's power you must log in to the partition to which the cell is assigned.

If the cell is not assigned to a partition, you can manage its power from any partition.

Step 2. Use the `frupower` command to turn on or turn off the cell's power.

Specify the `frupower -f` option to power off a cell. This also powers off any I/O chassis connected to the cell.

Specify the `frupower -o` option to power on a cell. This also powers on any I/O chassis connected to the cell.

The example that follows shows several sample `frupower` commands and their results.

```
# frupower -f -c0
Error: Can not power off active cell 0.
# frupower -f -c2
# frupower -o -c2
# frupower -f -c6
Error: Cell 6 belongs to partition 1. Can not power off cell.
#
# frupower -f -i0/1/1
Error: I/O chassis 0/1/1 is attached to a powered-on free cell 4. Please power
off the free cell.
#
```

In the above example, cell 0 is active and thus cannot be powered off using `frupower`. Cell 2 is inactive and is powered off (`frupower -f -c2`) and then powered back on (`frupower -o -c2`). Cell 6 is assigned to a remote partition (partition number 1) and thus cannot be powered off. I/O chassis 0/1/1 is attached to cell 4, so to power it off cell 4 must be powered off.

Partition Manager Powering cells on and off can be done through the Partition Manager, though the Partition Manager limits what you can do based on whether the cell you are trying to control is in an active state, and whether it is in the local partition or a remote partition. If you attempt to power off a cell in a remote partition the Partition Manager will report an error message. The Partition Manager will also not allow you to power off an active cell by not making available the menu item to do so when an active cell is selected. Also, cell boards must be configured into a partition before you can power them on.

To power on a cell board or to power off an inactive cell board in the local partition:

- Step 1.** On the left-hand side of the Partition Manager's primary display window, highlight the entry for the *partition* that contains the cell that you want to power on/off. This will display a list of cells and I/O chassis for the partition on the right-hand side of the window.
- Step 2.** On the right-hand side of the window, highlight the entry for the *cell* that you want to control power to.
- Step 3.** From the Cell menu, select Power On Cell (or Power Off Cell)

If an I/O chassis is attached to the cell board that you are powering on or off, the I/O chassis will also be powered on or off, respectively.

Turning Service Indicator Lights (LEDs) On and Off

Within an HP Superdome complex, every cell and I/O chassis has a **service indicator LED** that is an amber (orange) “attention” light. You can illuminate these service LEDs to indicate which cells and I/O chassis require maintenance or inspection.

Each Superdome cabinet also has a **cabinet number LED** on the cabinet’s front panel. You can set this cabinet number LED to flash in order to indicate that the cabinet’s components requires servicing.

Under normal situations when a cabinet and its components do not require maintenance, all service and cabinet number LEDs are turned off (not illuminated and not flashing).

You can manually turn on (illuminate or flash) the service or cabinet number LEDs for components that require attention. You can illuminate the service LED for any cell slot or I/O chassis slot in a cabinet, regardless of whether the slot is empty or powered off,

Also on Superdome servers, the individual PCI slots within an I/O chassis have attention indicator LEDs. For details on **PCI card slot lights**, including how to turn them on or off, refer to the *rad* (1M) manpage.

You can perform this task using HP-UX commands or Partition Manager.
<ul style="list-style-type: none">• “HP-UX Commands” on page 97• “Partition Manager” on page 99

HP-UX Commands Use this procedure to turn on and turn off service indicator lights using the `fruled` command.

Step 1. Log in to HP-UX running on one of the Superdome complex’s partitions.

You can turn on or off any of the service and cabinet LEDs in a Superdome complex from HP-UX running on any of the complex’s partitions.

Step 2. Use the `fruled` command to turn on or off cabinet number LEDs or the service LEDs for cells and I/O chassis.

Use the `fruled -f` option to turn off an LED and use `fruled -o` to turn on an LED.

When issuing the `fruled` command, specify cells and I/O chassis using the notation described in the `fruled (1)` manpage.

The following example turns off and turns on various cell, I/O chassis, and cabinet LEDs.

```
# fruled -f -C          Turn off all cell and I/O chassis service LEDs.
# fruled -f -I

# fruled -o -c0 -c2 -c4  Turn on service LEDs for cells 0, 2, and 4 and
# fruled -o -i0/0/1 -i0/0/3 I/O chassis 0/0/1 and 0/0/3. Flash the cabinet
# fruled -o -b0          number LED for cabinet 0.

# fruled -f -C          Turn off all cell and I/O chassis service LEDs
# fruled -f -I          and stop blinking the cabinet number LED.
# fruled -f -b0
#
```

For complete details refer to the `fruled (1)` manpage.

Step 3. If you want to check the status of cell and I/O chassis LEDs, use the GSP command menu's PS command.

Log in to the Superdome complex's GSP and access the command menu.

In the following example, the service LEDs for cells 0, 2, and 4 are turned on, as are the service LEDs for I/O chassis 0/0/1 and 0/0/3.

```
GSP:CM> PS
This command displays detailed power and hardware configuration status.

You may display detailed power and hardware status for the following items:

  B - Cabinet (UGUY)
  C - Cell
  G - GSP
  I - Core IO
    Select Device: b

  Enter cabinet number: 0

HW status for SD32000 compute cabinet #0: NO FAILURE DETECTED
Power switch: on; Power: enabled, good; Door: closed
Fan speed: normal; Temperature state: normal
Redundancy state: blowers redundant, BPSs redundant
```

	Main BP	Main BP Power Boards			Cells							IO Backplanes								
		0	1	2	0	1	2	3	4	5	6	7	IO Bay 0 Chassis			IO Bay 1 Chassis				
		0	1	2	0	1	2	3	4	5	6	7	0	1	2	3	0	1	2	3
Populated	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Power Enabled	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Powered On	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Power Fault																				
Attention LED					*	*	*						*	*						

Partition Manager The Partition Manager can be used to temporarily turn on service indicator lights for cells and I/O chassis.

Step 1. Use the Partition Manager's tree structure locate and select the cell board, or I/O Chassis associated with the LED that you want to light.

Cell board indicator LEDs:

Select Light Cell LED from the Cell menu. In addition to lighting the LED on the cell board, the two-digit cabinet number for the cabinet containing the cell board will flash.

I/O chassis indicator LEDs:

Select Light I/O Chassis LED from the I/O menu. In addition to lighting the LED on the I/O chassis, and the two-digit cabinet number for the cabinet containing the I/O chassis will flash.

- Step 2.** A requestor will appear, regardless of the type of indicator you chose to light. When you are finished locating the indicated hardware, you can extinguish the indicators by clicking on the **OK** button in the requestor.

Viewing the Current Status of the Complex

The procedures in this section allow you to gather information about the operating status of the various components in your Superdome complex.

The following procedures are available in this section:

- “Analyzing the Health of the Complex” on page 102
- “Determining if Processors Have Failed” on page 103
- “Determining if Memory DIMMS Have Failed” on page 105
- “Determining if Blowers, Fans, or Power Supplies Have Failed” on page 108

See Table 3-1 on page 58 for a list of all complex-wide procedures.

Analyzing the Health of the Complex

The easiest way to get an overall picture of how well your Superdome Complex is functioning is to use the Partition Manager's "Analyze Complex Health" feature. This will run a series of problem detectors to check everything from cell boards, to I/O chassis, to the fans and blowers that cool the system and the power supplies that power Superdome components.

You can perform this task using the Partition Manager.

- | |
|---|
| <ul style="list-style-type: none">• "Partition Manager" on page 102 |
|---|

Partition Manager

Step 1. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see "How to Start The Partition Manager" on page 141.

Step 2. Select "Analyze Complex Health" from the "Complex" menu

A pop-up window will report the results of the analysis.

Step 3. [Optional] Print the results to a file or printer by clicking on the "Print . . ." button. A "Print Dialog" window will pop-up.

Enter the file name or printer name information, select the paper type (if appropriate), and click on the Print button to create the file or printout.

Determining if Processors Have Failed

If you are specifically interested in the status of processors on a particular cell board, you can get this information using the HP-UX `parstatus` command, or the Partition Manager.

You can perform this task using HP-UX commands or Partition Manager.

- “HP-UX Commands” on page 103
- “Partition Manager” on page 104

HP-UX Commands From any partition in the complex, the `parstatus` command (see *parstatus* (1)) can be used to determine the operating status of a cell's processors.

Step 1. `/usr/sbin/parstatus -V -c cell_number`

These options to `parstatus` will display detailed information about the cell specified by `cell_number`. In addition to status information about what cell the partition is assigned to, the status of the memory modules on the cell board, and other useful information, the status of the cell's processors is displayed. For example:

```
/usr/sbin/parstatus -V -c 5
```

```
# parstatus -V -c5
[Cell]
Hardware Location      : cab0,cell15
Global Cell Number    : 5
Actual Usage          : active base
Normal Usage          : base

[CPU Details]
Type : 23664
Speed : 552 MHz
CPU Status
====
0    ok
1    failed
2    ok
3    failed
CPUs
=====
OK      : 2
Failed  : 2
Max     : 4
```

Any processors listed as `failed` have either failed self tests or have been deconfigured via the Boot Console Handler's `CPUCONFIG` command.

Partition Manager

Step 1. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Step 2. Click on the partition (or “Available Resources”) on the left-hand-side of the Partition Manager’s primary display. This will show the list of cells and I/O chassis for the partition on the right-hand-side of the display.

Step 3. On the right-hand-side of the display, double-click on the entry for the cell board that contains the processors you want to check on. This brings up the “Cell Details” pop-up window.

Step 4. Click on the “CPUs/Memory” tab to bring up the panel containing the status of the processors for the selected cell board.

Step 5. [Optional] Print the results to a file or printer by clicking on the “Print . . .” button. A “Print Dialog” window will pop-up.

Enter the file name or printer name information, select the paper type (if appropriate), and click on the Print button to create the file or printout.

Determining if Memory DIMMS Have Failed

Use this procedure from any partition in the complex, to determine if memory modules have failed.

You can perform this task using HP-UX commands or Partition Manager.

- “HP-UX Commands” on page 105
- “Partition Manager” on page 106

HP-UX Commands The `parstatus` command (see *parstatus* (1)) can be used to determine the operating status of a cell's processors.

Step 1. `/usr/sbin/parstatus -V -c cell_number`

These options to `parstatus` will display detailed information about the cell specified by `cell_number`. In addition to status information about what cell the partition is assigned to, the status of the processors on the cell board, and other useful information, the status of the cell's memory modules is displayed. For example:

```
/usr/sbin/parstatus -V -c 2
```

NOTE

Any memory listed as failed has failed self-tests or has been deconfigured via the Boot Console Handler service menu's `DIMMDEALLOC` command.

Any DIMM in the same memory rank as a DIMM that has failed (or has been deallocated) will also be deallocated. DIMM memory modules operate in (and must be installed/removed in) physical groups known as **memory ranks**.

In the following example, memory modules 3, 7, 11, and 15 are part of the same rank. Any one (or more) of the DIMMS might have failed self-tests, or might have been deallocated by software.

Managing the Overall Complex

Viewing the Current Status of the Complex

```
# parstatus -v -c2
[Cell]
Hardware Location      : cab0,cell2
Global Cell Number    : 2
Actual Usage          : active base
Normal Usage          : base
Connected To          : cab 0,bay1,chassis3

[Memory Details]
DIMM Size (MB) Status
==== =====
0 512 ok
1 512 ok
2 512 ok
3 512 failed
4 512 ok
5 512 ok
6 512 ok
7 512 failed
8 512 ok
9 512 ok
10 512 ok
11 512 failed
12 512 ok
13 512 ok
14 512 ok
15 512 failed
16 512 ok
17 512 ok
18 512 ok
19 512 ok
20 512 ok
21 512 ok
22 512 ok
23 512 ok
24 512 ok
25 512 ok
26 512 ok
27 512 ok
28 512 ok
29 512 ok
30 512 ok
31 512 ok
Memory
=====
DIMM OK      : 28
DIMM Deconf  : 4
Max DIMMs    : 32
Memory OK    : 14.00 GB
Memory Deconf : 2.00 GB
#
```

Partition Manager

Step 1. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser

- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

- Step 2.** Click on the partition (or “Available Resources”) on the left-hand-side of the Partition Manager’s primary display. This will show the list of cells and I/O chassis for the partition on the right-hand-side of the display.
- Step 3.** On the right-hand-side of the display, double-click on the entry for the cell board that contains the processors you want to check on. This brings up the “Cell Details” pop-up window.
- Step 4.** Click on the “CPUs/Memory” tab to bring up the panel containing the status of the memory modules (DIMMs) for the selected cell board.
- Step 5.** [Optional] Print the results to a file or printer by clicking on the “Print . . .” button. A “Print Dialog” window will pop-up.

Enter the file name or printer name information, select the paper type (if appropriate), and click on the Print button to create the file or printout.

Determining if Blowers, Fans, or Power Supplies Have Failed

If you are working with a Superdome complex that is at a remote location, you cannot simply walk over to it and observe the operational status of the blowers, fans, and power supplies in the complex. However, you can use the HP-UX `parstatus` command (see `parstatus(1)`) or the Partition Manager to determine this information.

You can perform this task using HP-UX commands or Partition Manager.

- “HP-UX Commands” on page 108
- “Partition Manager” on page 109

HP-UX Commands The `parstatus` command can report the status of the power and cooling components of a Superdome complex on a cabinet by cabinet basis. In the following command, substitute `cabinet_number` for the number of the cabinet whose status you want to know.

Step 1. `/usr/sbin/parstatus -V -b cabinet_number`

For example: `/usr/sbin/parstatus -V -b 0`

```
# parstatus -V -b0
[Cabinet]
          Cabinet   I/O       Bulk Power  Backplane
          Blowers   Fans       Supplies   Power Boards
          OK/       OK/       OK/       OK/
Cab      Failed/   Failed/   Failed/   Failed/
Num Cabinet Type N Status  N Status  N Status  N Status  GSP
=====
0  SD32000      4/ 0/ N+  5/ 0/ ?   3/ 1/ N   3/ 0/ N+  active

Cabinet Blowers
=====
Fan 0 ok
Fan 1 ok
Fan 2 ok
Fan 3 ok

I/O Fans
=====
Fan 0 ok
Fan 1 ok
Fan 2 ok
Fan 3 ok
Fan 4 ok

Bulk Power Supplies(BPS)
=====
Power Supply 0 ok
Power Supply 1 ok
Power Supply 3 failed
Power Supply 4 ok

Backplane Power Boards
=====
Power Supply 0 ok
Power Supply 1 ok
Power Supply 2 ok

Notes: N+ = There are one or more spare items (fans/power supplies).
       N  = The number of items meets but does not exceed the need.
       N- = There are insufficient items to meet the need.
       ?  = The adequacy of the cooling system/power supplies is unknown.

#
```

Partition Manager

Step 1. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Managing the Overall Complex
Viewing the Current Status of the Complex

Step 2. Select “Show Complex Details” from the “Complex” menu

The Complex Details Window will pop-up, displaying its “General” panel.

Step 3. Click on the Power/Cooling tab to bring up the panel that contains information about the status of the blowers, fans and power supplies in your complex.

Step 4. [Optional] Print the results to a file or printer by clicking on the “Print . . .” button. A “Print Dialog” window will pop-up.

Enter the file name or printer name information, select the paper type (if appropriate), and click on the Print button to create the file or printout.

Related Information

This section lists other sources for information on the topics covered in this chapter.

Chapters in This Book

The following chapters in this book include details about topics covered in this chapter.

- Chapter 1, “Overview of the Superdome System Environment,” on page 13
- Chapter 2, “Superdome Console and Service Interface,” on page 33

HP-UX Man Pages

The man pages listed here provide details on topics covered in this chapter.

- *fruled* (1), *frupower* (1M), *parmgr* (1M), *parstatus* (1), *rad* (1M)

Other Books

The following books also provide more details on topics addressed in this chapter. Most books are available at the `docs.hp.com` Web site.

- *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*

Web Sites

Additional information is available at the following sites on the Web.

- <http://docs.hp.com/>

The HP Technical Documentation home page. This site provides online access to HP-UX documentation, Superdome system hardware documentation, related development tools manuals, and other information.

Managing the Overall Complex
Related Information

Configuring and Managing Superdome Partitions

This chapter describes the tools, procedures, and guidelines for configuring and managing Superdome partitions.

On an HP Superdome system, each **partition** is a “logical server.” One or more cells (processors and memory), and I/O chassis (I/O cards and devices) are assigned to the partition for its exclusive use.

Each partition runs a single instance of HP-UX and can boot, reboot, and operate independently of other partitions and hardware within the Superdome complex.

The Superdome **complex** includes all hardware within a Superdome system: all cabinets, cells, I/O chassis, I/O devices and racks, utilities and interconnecting hardware, power supplies, and fans.

You can configure one or more partitions within a Superdome complex, allowing the hardware to function as a single HP-UX server or as many servers.

See the following sections for details:

- “Introduction to Partition Tasks” on page 114
- “Overview of Superdome Partition Concepts” on page 117
- “Configuring Superdome Hardware and Partitions” on page 122
- “Overview of Partition Management Tools” on page 132
- “HP-UX Superdome Configuration Commands—An Introduction” on page 135
- “The Partition Manager—A Guided Tour” on page 140
- “Procedures for Managing Partitions” on page 152
- “HP-UX Superdome Configuration Commands—Details and Syntax” on page 208
- “Related Information” on page 218

Introduction to Partition Tasks

The following table lists the supported partition configuration tasks on HP Superdome servers.

Detailed procedures for all tasks in Table 4-1 are provided in “Procedures for Managing Partitions” on page 152.

You can perform each of these tasks using one or more of the following software tools: the Guardian Service Processor (GSP) menus, the Boot Console Handler (BCH) menu, HP-UX commands, and Partition Manager. See “Overview of Partition Management Tools” on page 132 for details on these tools.

Table 4-1 Partition Configuration and Management Tasks

Task Procedures	Task Description	Tools
“Creating a Genesis Partition” on page 153	Establish a one-cell partition. This “Genesis Partition” can be used for all subsequent partition configurations in a Superdome server’s complex.	GSP
“Restoring a Complex Profile” on page 156	Revert to the previous complex profile configuration.	GSP
“Determining the Local (Current) Partition Number” on page 159	Determine which partition you currently are using. Known as the “local partition”.	BCH HP-UX: <code>parstatus</code>
“Creating a New Partition” on page 161	Create a partition, using at least one available cell that is connected to an I/O chassis with core I/O installed.	HP-UX: <code>parcreate</code> Partition Manager (<code>parmgr</code>)
“Deleting (Removing) a Partition” on page 170	Remove a partition definition, thus making its cells and I/O available for other use.	HP-UX: <code>parremove</code> Partition Manager (<code>parmgr</code>)

Table 4-1 Partition Configuration and Management Tasks

Task Procedures	Task Description	Tools
“Naming and Renaming Partitions” on page 174	Establish the partition’s name, which is used in various reports and console menus.	BCH HP-UX: parmodify Partition Manager (parmgr)
“Modifying Partitions’ Boot Paths” on page 177	Set the boot device paths, including the PRI, ALT, and HAA devices.	BCH HP-UX: parmodify
“Adding Cells to a Partition” on page 178	Add an additional cell to an existing partition.	HP-UX: parmodify Partition Manager (parmgr)
“Removing Cells from a Partition” on page 181	Remove a cell (and any associated I/O) from a partition, thus making the cell and I/O available for other use.	HP-UX: parmodify Partition Manager (parmgr)
“Setting and Checking a Partition’s Core Cell Choices” on page 185	Set and list which cell(s) are to be used as the “core cell” if the primary core cell fails.	BCH HP-UX: parmodify Partition Manager (parmgr)
“Setting and Checking Cell Attributes” on page 189	Set and list cell attributes, including the “use-on-next-boot” setting.	BCH HP-UX: parstatus, parmodify Partition Manager (parmgr)
“Moving Cells to a Different Partition” on page 196	Use software tools to assign cells (and associated I/O) to different partitions. This can involve running the appropriate software tools on multiple partitions.	HP-UX Partition Manager (parmgr)

Table 4-1 Partition Configuration and Management Tasks

Task Procedures	Task Description	Tools
“Moving I/O to a Different Partition” on page 198	Using software only, you can accomplish this by assigning the corresponding cell (to which the I/O is connected) to a different partition.	HP-UX Partition Manager (parmgr)
“Moving an I/O Chassis to a Different Cell” on page 200	HP Service Personnel Only Accomplish this by reconfiguring the cell-to-I/O cables.	None. Must reconfigure the hardware.
“Listing All Configured Partitions” on page 201	List all partitions currently configured within a Superdome complex.	GSP HP-UX: parstatus Partition Manager (parmgr)
“Listing Cell Partition Assignments” on page 205	List all cells, or selected cells, within a Superdome complex, including the cells’ partition configuration status.	HP-UX: parstatus
“Consolidating Multiple Partitions” on page 206	Reassign all cells in one partition to belong to another partition.	HP-UX Partition Manager (parmgr)
“Unlocking Complex Profiles” on page 207	Use With Extreme Caution Unlock the Stable Complex Configuration Data and/or the Partition Configuration Data for one of the complex’s partitions.	HP-UX: parunlock

Overview of Superdome Partition Concepts

The following concepts and issues related to configuring partitions are introduced in this section:

- “Local and Remote Partitions” on page 117
- “Active and Inactive Partitions” on page 117
- “Types of Cells” on page 118
- “Genesis Partition” on page 119
- “Partition Numbers” on page 120
- “Complex Profiles” on page 120

More details on general Superdome complex tasks and features are available in Chapter 3.

Local and Remote Partitions

When you log in to HP-UX running on a partition, or when you access a partition’s console, the partition you are accessing is considered to be the **local partition**. All other partitions in the complex are considered to be **remote partitions** whose resources you are not currently using.

You can manage and reconfigure the local partition while it remains booted. To initiate some changes, such as adding or removing cells, you must perform a reboot-for-reconfiguration.

In most cases you also can manage all other partitions in the complex (the remote partitions) from your local partition. However, when you perform some tasks on remote partitions, such as adding or removing cells, the remote partition must be *inactive* (in a ready-for-reconfig state).

You can use the `parstatus -w` command to list the partition number for the local partition.

```
# parstatus -w
The local partition number is 1.
#
```

Active and Inactive Partitions

Each partition can be **active** or **inactive**, depending on its boot state.

A partition that is *active* is not in a boot-is-blocked state. It can be booted to the Boot Console Handler (BCH) interface and can load and run HP-UX.

An *inactive partition* is in a **ready-for-reconfig** state, and thus all cells in the partition are in a **boot-is-blocked** state at a cell firmware level.

When managing and configuring partitions, you can reconfigure all features of the local partition. You also can reconfigure all features of remote partitions that are inactive.

You can modify many partition attributes for remote partitions that are active, but you cannot add or remove cells from active remote partitions.

Use the `parstatus -P HP-UX` command to list all partitions and their boot states (active or inactive).

```
# parstatus -P
[Partition]
Par
Num Status      # of # of I/O
      Cells Chassis Core cell  Partition Name (first 30 chars)
-----
0 active         3    2    cab0,cell0 jules00
1 active         3    2    cab0,cell14 jules01
#
```

To make a partition inactive, put the partition into a ready-for-reconfig state. You can accomplish this by using the BCH interface's `RECONFIGRESET` command, by using the GSP command menu's `RR` command, or by using either of the following HP-UX commands:
`shutdown -R -H` or `reboot -R -H`,

If using the GSP command menu's `RR` command, you should ensure that the partition is not running HP-UX. First shut down HP-UX before issuing the `RR` command.

See Chapter 5 for details on booting and resetting partitions.

Types of Cells

For the HP-UX 11i release on Superdome servers, all cells within a partition are **base cells** that belong only to the partition to which they are assigned. (Future releases may support additional types of cells.)

When creating partitions and assigning cells to partitions using HP-UX 11i utilities, you must specify that the cells are base cells.

One of the cells in each partition must serve as the active **core cell**. The core cell is a cell that is connected to an I/O chassis with a core I/O card in PCI card slot 0. This core cell serves as a monarch cell that controls the partition until HP-UX is booted. The core cell's core I/O card is used and a processor on the core cell runs the Boot Console Handler (BCH) code while all other processors are idle until HP-UX is booted.

Although you can have multiple cells with I/O chassis and core I/O cards within the same partition, only one core I/O card is active (the one belonging to the core cell).

You also can define one or more **core cell choices**, which are cells you specify to be used as the core cell. If your first core cell choice does not boot or is otherwise unable to serve as the core cell then the partition attempts to use the second core cell choice. You can specify up to four core cell choices.

If you do not specify any core cell choices, the lowest numbered eligible cell in the partition (that is, the lowest numbered cell that is attached to a chassis containing a core I/O card) is used as the core cell. This cell also is used if all core cell choices fail to qualify as the active core cell.

To list details about all cells in a Superdome complex, including their current partition assignments, their current actual usage, and related I/O details, you can issue the `parstatus -C HP-UX` command.

```
# parstatus -C
[Cell]
Hardware      Actual      CPU      Memory      Use
Location      Usage      OK/      (GB)      Core      On
              Deconf/    OK/      Deconf      Cell      Next Par
              Max        Deconf      Connected To  Capable  Boot Num
=====
cab0,cell10  active core  4/0/4    8.2/ 0.0  cab 0,bay0,chassis1  yes    yes  0
cab0,cell11  active base  4/0/4    4.1/ 0.0  -                    no     yes  0
cab0,cell12  active base  2/0/4    16.4/ 0.0 cab 0,bay1,chassis3  yes    yes  0
cab0,cell13  absent      -         -         -                    -     -    -
cab0,cell14  active core  2/0/4    2.0/ 0.0  cab 0,bay0,chassis3  yes    yes  1
cab0,cell15  active base  4/0/4    4.1/ 0.0  -                    no     yes  1
cab0,cell16  active base  2/0/4    4.1/ 0.0  cab 0,bay1,chassis1  yes    yes  1
cab0,cell17  absent      -         -         -                    -     -    -
#
```

Genesis Partition The **Genesis Partition** is the initial, one-cell partition that you create on an HP Superdome complex. You use the Genesis Partition as the point where you begin configuring and managing all partitions in the complex. It always is partition number 0.

The Genesis Partition consists of one cell that is connected to an I/O chassis. The I/O chassis must have a core I/O card in slot 0, and it also must have a bootable disk (and associated PCI card) installed.

If HP-UX is not installed on the Genesis Partition's disk(s), you can boot the Genesis Partition to the Boot Console Handler (BCH) menu and from

that point install HP-UX. This installation requires either having access to an HP-UX install server, or a DVD-ROM drive (and associated PCI card) connected to the I/O chassis.

After you boot HP-UX on the Genesis Partition, you can modify the partition to include additional cells. You also can create other, new partitions and can modify them from the Genesis Partition or any other partition running HP-UX.

Note that—once you create additional partitions—you do not necessarily have to use the Genesis Partition to perform your partition management and configuration tasks.

Other than being the first (and initially the only) partition, the Genesis Partition does not have any special properties not available to other partitions.

Partition Numbers Each partition has its own unique **partition number** that the partition commands and utilities use to identify it.

When you create a partition, the Guardian Service Processor (GSP) assigns the partition the lowest available partition number. For example, the Genesis Partition always is partition number 0 because it is the first partition to be created, and the second partition is partition number 1.

After you remove a partition, the GSP also unassigns the partition number; as a result the GSP can assign the number when it creates a new partition. For example, if you remove partition number 2 then the GSP can reassign partition number 2 when it creates a new partition if all lower numbers (partition numbers 0 and 1) already are assigned.

Complex Profiles When you configure and reconfigure partitions and modify partition settings, you do so by using utilities to manipulate the Superdome server's **complex profile**.

The Guardian Service Processor (GSP) manages the complex profile in different portions. Each portion of the complex profile defines attributes that determine how the complex's hardware resources are made available and are used.

To modify the configuration information kept in the complex profile, you can use the GSP command menu, the partition Boot Console Handler interface, or the HP-UX partition commands and Partition Manager.

Each complex profile maintains the following information for the complex.

- **Stable Complex Configuration Data**

This portion of the complex profile stores complex-wide information, including the following details:

- The name of the complex.
- Which cells are assigned to which partitions, and which cells are unassigned (those on the free cell list, which are available to be assigned to any partition).
- The model number, model string, product numbers, and the serial number for the complex.

The Superdome complex's Guardian Service Processor (GSP) stores the Stable Complex Configuration Data.

- **Partition Configuration Data**

This portion of the complex profile stores partition-specific information.

The Partition Configuration Data includes the following details:

- The partition's name, number, and IP address.
- The PRI, HAA, and ALT boot paths and boot actions.
- The failure-usage policy for each cell in the partition.
- The use-on-next-boot setting for each cell. This determines whether the cell is booted to join (rendezvous) the rest of the cells.
- The core cell preferences: the preferred core cell and alternate core cell settings.

Each partition has its own Partition Configuration Data, a copy of which is stored on each cell in the partition.

The Guardian Service Processor (GSP) manages all complex profile data and keeps all copies coherent.

Configuring Superdome Hardware and Partitions

You can arrange Superdome system components, such as cells and I/O chassis, both physically (by configuring hardware) and logically (by defining partitions using software).

The following sections discuss the hardware requirements and configuration guidelines for partitions, and the procedure for assigning cells to partitions.

The way in which you configure your system hardware and partitions can significantly affect the system's performance and reliability. For this reason, *HP recommends and sells only specific Superdome hardware and partition configurations.*

In most situations you will physically configure each HP Superdome server once, when the system is installed. You can change the partition configurations, which define the cells and settings for each partition, without hardware changes.

The following list provides a high-level overview for planning, installing, and configuring an HP Superdome system.

- Plan your overall Superdome hardware and partition configuration.

Consult with your Hewlett-Packard sales or support representative for assistance in planning your Superdome complex.

Also refer to Appendix A, "Planning Superdome Configurations," on page 283 for rules and guidelines for planning your system configuration.

- Install and configure the hardware.

Install the cabinets, cells, I/O chassis, PCI cards, disks, and other hardware. HP personnel can assist in the site preparation plans.

NOTE

Only HP personnel should install the Superdome server hardware.

- Configure the partitions.

Your partition configuration should exactly match the overall configuration you established with your HP representative.

NOTE

To ensure that your chosen Superdome configuration is recommended by HP and will match your requirements, check with your HP sales or support representative for assistance.

Partition Hardware Requirements

The physical hardware prerequisites, shown below, determine which cells and I/O chassis are eligible to be configured in a partition.

Every partition you configure *must meet the following basic hardware requirements*:

- Each partition must have at least two cells.
- The same firmware revision must be present on all cells.
- At least one cell in every partition must be connected to an I/O chassis that has a core I/O card installed in PCI slot 0.

Note that only one core I/O card is active per partition.

If multiple core I/O cards are installed—that is, if a partition has multiple cell-to-I/O chassis connections with more than one chassis having a core I/O card—then only the core I/O connected to the core cell is active.

- The I/O chassis containing the active core I/O card also should have the following devices and cards installed:
 - The HP-UX boot device (and FW SCSI or FibreChannel card)
 - DVD-ROM (and Ultra SCSI card)
 - Network card(s)
- All cells in a partition must have the same *processor revision level* and *processor clock speed*.
- The memory configuration of all cells in a partition must be identical to achieve best performance and availability.

This means that each of a partition's cells should have:

- the same *number of DIMMs*, preferably a multiple of 8 DIMMs
- the same *capacity (size)* and the same *locations (population)* of DIMMs

Also refer to Appendix A, “Planning Superdome Configurations,” on page 283 for further hardware planning information.

Partition Configuration Guidelines

HP offers the following general partition configuration guidelines in addition to the hardware prerequisites listed in the previous section.

These guidelines are incorporated in the procedure that follows (“Procedure for Assigning Cells to Partitions” on page 126).

Use these guidelines to help determine which cells to assign to the partitions you create.

- **Allocate partitions in order of size.**

Assign cells to the partition that has the largest cell count first, and the partition with the fewest cells last.

This provides more appropriate cell assignments for larger partitions (those with more cells). Any smaller partitions with fewer cells are more easily accommodated in the remaining, available cells.

- **Place each partition within an empty cabinet, if possible.**

This applies to partitions in Superdome 64-way systems only.

Assign the partition cells from a cabinet whose cells have no partition assignments, if possible. Do this before assigning cells from a cabinet that already has cells assigned to another partition. Doing so can help minimize contentions for using cabinet backplane connections.

- **Assign each partition cells from an unused “cell quad”, if possible.**

Each “cell quad” is a set of four cells that share the same cabinet backplane connections (crossbar chips). Cell slots 0–3 comprise one cell quad, and cell slots 4–7 comprise the second cell quad.

Cells that share the same crossbar chips (cabinet backplane connections) have the best cross-cell memory performance.

Partitions with cells on different crossbar chips have higher memory latency (worse memory performance) than partitions whose cells all share the same crossbar chip. This applies to partitions that have all cells in the same cabinet and to partitions that include cells in different cabinets.

Procedure for Assigning Cells to Partitions

Use this procedure to help decide which cells to assign to partitions in your Superdome complex.

NOTE

Consult with your HP sales or support representative, and refer to Appendix A, “Planning Superdome Configurations,” on page 283 for important planning information before implementing partition changes on your Superdome complex.

The following steps provide a basic procedure for selecting cells for the partitions you will create on your Superdome complex.

- Step 1.** Determine the sizes of the partitions you will configure in the Superdome complex.

Before configuring any partitions, determine how many partitions you plan to configure and establish each partition’s size (the number of cells). Your HP representative can assist you in this step.

- Step 2.** Select the largest unassigned partition.

If you will configure multiple partitions in the complex, assign cells to the largest partition first and configure the smallest partition last.

You will choose cells, confirm their eligibility, and assign them to the partition in the following steps.

- Step 3.** Choose which cells you will assign to the partition by using the following partition configuration charts:

- For Superdome 16-way and Superdome 32-way systems, use the configuration charts in Figure 4-1 on page 130.
- For Superdome 64-way systems, use the configuration chart in Figure 4-2 on page 131.

These charts list which cell slots HP recommends assigning to partitions, based on the partition size and type of Superdome server.

For partitions for which HP recommends multiple configurations, select the first available set of cells. For example, for a two-cell partition select configuration 2A, if possible, before selecting 2B or 2C.

Step 4. Confirm that the cells you have selected are eligible to be assigned to the partition.

For the cells to be eligible, they must meet these requirements:

- The cells must be present (installed) and must not be assigned to another partition.
- The cells must meet the hardware requirements listed in “Partition Hardware Requirements” on page 124.

If one or more of the cells does not adhere to these requirements, go back to step 3 and select a different set of cells for the partition.

Step 5. Assign the cells to the partition.

You can either create a new partition that includes the selected cells, or you can modify an existing partition so that it conforms to the partition configuration recommended by the configuration chart.

Examples

The following example cell assignments show how the procedure discussed above selects cells for two sample complex configurations. Refer to the procedure, above, and the recommended partition charts that follow.

For reference in the following examples, Figure 4-1 and Figure 4-2 on page 131 list a unique number for each partition *configuration set*. (For example, config set 4 shows the four two-cell partition configurations that HP recommends for Superdome 32-way servers.)

- **Example 1**

Superdome 32-way—Six-Cell Partition and Two-Cell Partition

A Superdome 32-way server with a six-cell and two-cell partition would be configured with partitions 6A and 2B, as shown in Figure 4-1.

In Figure 4-1, configuration sets 4–10 are eligible to be assigned on Superdome 32-way servers. The assignments are:

1. 6A (config set 8), the recommended six-cell partition.
2. 2B (config set 4), because cells 0 and 2 (2A) are assigned to 6A.
3. Partitions 6A and 2B use all cells in the complex.

- **Example 2**

Superdome 64-way—Seven-Cell Partition and Two Four-Cell Partitions

A Superdome 64-way server with a seven-cell partition and two four-cell partitions would be configured with partitions 7A, 4B, and 4E, as shown in Figure 4-2.

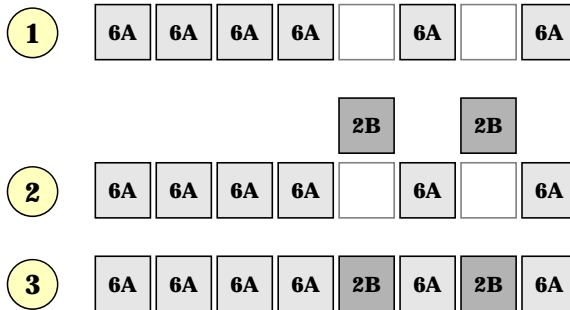
In Figure 4-2, configuration sets 11–29 are eligible to be assigned on Superdome 64-way servers.

1. 7A (config set 20), the first recommended seven-cell partition.
2. 4B (config set 16), because cells in 4A are used by 7A.
3. 4E (config set 17), because some or all cells in 4A–D are assigned.
4. Partitions 7A, 4B, and 4E use all cells except one (cabinet 1, cell 4).

The following example illustrations show how the two example complex partition configurations would be selected, using Figure 4-1 and Figure 4-2 to determine which recommended partitions to use.

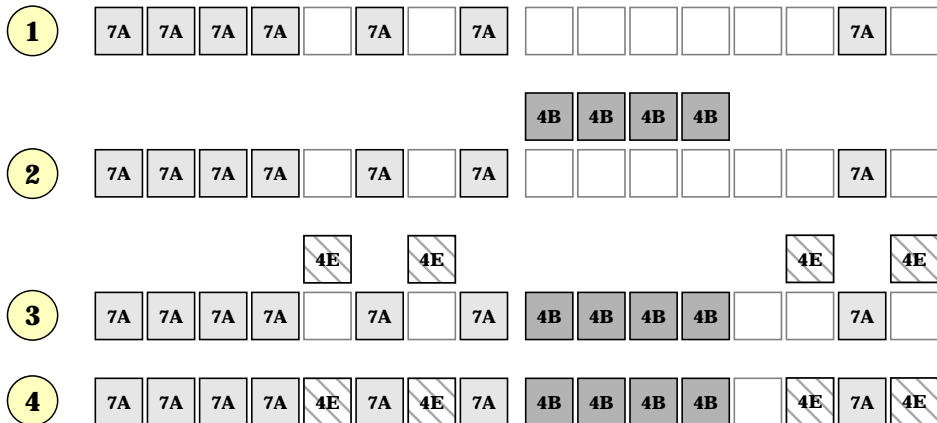
Example 1

Superdome 32-way complex partition configuration.
 One six-cell partition and one two-cell partition.



Example 2

Superdome 64-way complex partition configuration.
 One seven-cell partition and two four-cell partitions.



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Figure 4-1 Superdome 16-way and Superdome 32-way Recommended Partition Configurations

Cell Slots	Config Set	Superdome 16-way			
		0	1	2	3
Two-Cell Partitions	1	2A	2B	2A	2B
Three-Cell Partition	2	3A	3A	3A	
Four-Cell Partition	3	4A	4A	4A	4A

Cell Slots	Config Set	Superdome 32-way							
		0	1	2	3	4	5	6	7
Two-Cell Partitions	4	2A	2C	2A	2C	2B	2D	2B	2D
Three-Cell Partitions	5	3A	3A	3A		3B	3B	3B	
Four-Cell Partitions	6	4A	4A	4A	4A	4B	4B	4B	4B
Five-Cell Partition	7	5A	5A	5A	5A				5A
Six-Cell Partition	8	6A	6A	6A	6A		6A		6A
Seven-Cell Partition	9	7A	7A	7A	7A		7A	7A	7A
Eight-Cell Partition	10	8A	8A	8A	8A	8A	8A	8A	8A

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Figure 4-2 Superdome 64-way Recommended Partition Configurations

Cell Slots	Config Set	Superdome 64-way Cabinet 0								Superdome 64-way Cabinet 1							
		0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Two-Cell Partitions	11	2A	2E	2A	2E	2C	2G	2C	2G	2B	2F	2B	2F	2D	2H	2D	2H
	12														2I	2I	
	13					2J										2J	
Three-Cell Partitions	14	3A	3A	3A		3C	3C	3C		3B	3B	3B		3D	3D	3D	
	15														3E	3E	3E
Four-Cell Partitions	16	4A	4A	4A	4A	4C	4C	4C	4C	4B	4B	4B	4B	4D	4D	4D	4D
	17					4E		4E							4E		4E
Five-Cell Partitions	18	5A	5A	5A	5A				5A	5B	5B	5B	5B				5B
Six-Cell Partitions	19	6A	6A	6A	6A		6A		6A	6B	6B	6B	6B		6B		6B
Seven-Cell Partitions	20	7A	7A	7A	7A		7A	7B	7A	7B	7B	7B	7B		7B	7A	7B
Eight-Cell Partitions	21	8A	8A	8A	8A	8B	8A	8B	8A	8B	8B	8B	8B	8A	8B	8A	8B
Nine-Cell Partition	22	9A	9A	9A	9A	9A	9A		9A					9A		9A	
Ten-Cell Partition	23	10A	10A	10A	10A	10A	10A	10A	10A					10A		10A	
Eleven-Cell Partition	24	11A	11A	11A	11A	11A	11A	11A	11A					11A	11A	11A	
Twelve-Cell Partition	25	12A	12A	12A	12A	12A	12A	12A	12A					12A	12A	12A	12A
Thirteen-Cell Partition	26	13A	13A	13A	13A	13A	13A	13A	13A					13A	13A	13A	13A
Fourteen-Cell Partition	27	14A	14A	14A	14A	14A	14A	14A	14A		14A			14A	14A	14A	14A
Fifteen-Cell Partition	28	15A	15A	15A	15A	15A	15A	15A	15A		15A	15A	15A	15A	15A	15A	15A
Sixteen-Cell Partition	29	16A	16A	16A	16A	16A	16A	16A	16A	16A	16A	16A	16A	16A	16A	16A	16A

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Overview of Partition Management Tools

You can use several different software tools to create, modify, and monitor HP Superdome partitions and hardware. These tools have capabilities that overlap in some cases, but each also has unique features and access requirements.

The available tools for managing partitions are:

- Guardian Service Processor (GSP) menus
- Boot Console Handler (BCH) interface
- HP-UX Superdome Configuration Commands
- Partition Manager (`parmgr`)
- System Administration Manager (SAM)

The following table lists all these tools and describes each tool's features and capabilities. You can use this table to select the most appropriate partition management tool based on the tasks you need to perform and the ways in which you can access the system.

Table 4-2 HP Superdome Partition Management Tools

Partition Tool	Features and Restrictions
Guardian Service Processor (GSP) menus	<p>Description—The GSP menus provide a complex-wide service interface that can allow access to all hardware and partitions.</p> <p>Availability—Using the GSP menus requires logging in to the GSP. Your GSP login account determines your level of access.</p> <p>Unique Features—GSP commands, access to partition consoles, Virtual Front Panels for live partition status details, ability to power cycle hardware, ability to reset and TOC partitions, ability to view live chassis codes, and access to console and chassis code log files.</p> <p>Tasks Supported—Monitoring and managing all partitions and hardware within a Superdome complex.</p> <p>Detailed GSP Information—See Chapter 2, “Superdome Console and Service Interface,” on page 33.</p>

Table 4-2 HP Superdome Partition Management Tools

Partition Tool	Features and Restrictions
<p>Boot Console Handler (BCH) interface</p>	<p>Description—The BCH interface is the method for interacting with a partition before it has booted HP-UX. Each partition's BCH interface provides menus for configuring partition settings and booting HP-UX.</p> <p>Availability—Using a partition's BCH interface requires accessing the partition's console through the GSP console menu.</p> <p>Unique Features—Allows you to select which device and which HP-UX kernel is booted, to configure the “boot actions” for devices, and to software-deallocate CPUs.</p> <p>Tasks Supported—Configuring and managing the HP-UX boot process, getting partition-specific information, resetting the partition, configuring various partition settings.</p> <p>Detailed BCH Information—See Chapter 2, “Superdome Console and Service Interface,” on page 33.</p>
<p>HP-UX Superdome Configuration Commands</p>	<p>Description—The HP-UX Superdome configuration commands allow you to configure, modify, and monitor partitions and hardware within a Superdome complex.</p> <p>Availability—Using the HP-UX Superdome configuration commands requires logging in to HP-UX running on a partition. All users can issue the <code>parstatus</code> and <code>fruled</code> commands, but all other commands require <code>root</code> user permissions.</p> <p>Unique Features—Allows you to manage partitions and hardware when HP-UX is in single-user mode and when you are logged in with text-only terminal access.</p> <p>Tasks Supported—Configuring, modifying, and getting information about partitions and hardware within a Superdome complex.</p> <p>Detailed Information—See “HP-UX Superdome Configuration Commands—An Introduction” on page 135.</p>

Table 4-2 HP Superdome Partition Management Tools

Partition Tool	Features and Restrictions
Partition Manager (parmgr)	<p>Description—Partition Manager provides a graphical interface for configuring, modifying, and managing partitions and hardware within a Superdome complex.</p> <p>Availability—You can use Partition Manager when HP-UX is running in multi-user mode on the partition. You can use Partition Manager as a stand-alone X-Window application (/opt/parmgr/bin/parmgr), or can use the equivalent Web console or SAM area.</p> <p>Unique Features—Provides a graphical user interface and also supports Web console access. Performs additional error checking beyond what the HP-UX Superdome commands support. Also supports I/O card addition and replacement.</p> <p>Tasks Supported—Configuring, modifying, and getting information about partitions and hardware within a Superdome complex.</p> <p>Detailed Information—See “The Partition Manager—A Guided Tour” on page 140 or the parmgr online help.</p>
System Administration Manager (SAM)	<p>Description—When using SAM as a graphical interface, you can launch the Partition Manager utility as a SAM area.</p> <p>See Partition Manager, above, for details.</p>

HP-UX Superdome Configuration Commands—An Introduction

HP-UX Release 11i provides you with several new HP-UX commands for configuring and managing HP Superdome partitions and hardware, including: `parcreate`, `parmodify`, `parremove`, `parstatus`, `parunlock`, `fruled`, and `frupower`.

These commands allow you to create, modify, and monitor partitions, get detailed system hardware information, and manipulate LEDs and power.

When using these commands, you can specify cells and I/O chassis using the methods shown in “Specifying Cells and I/O Chassis” on page 137.

NOTE

The HP-UX Superdome configuration commands are supported only on HP Superdome servers.

These commands are supported by HP-UX kernels built with Superdome architectural support enabled (the `hd_fabric` driver).

Table 4-3 describes the Superdome configuration commands and lists the sections where you can find each command’s syntax and more details on its use.

Table 4-3 **HP-UX Commands for Configuring Superdome Partitions**

Command	Description
<code>parcreate</code>	Create a new partition; <code>root</code> permission is required. See “ <code>parcreate</code> Command” on page 209.
<code>parmodify</code>	Modify an existing partition; <code>root</code> permission is required. See “ <code>parmodify</code> Command” on page 211.
<code>parremove</code>	Remove an existing partition; <code>root</code> permission is required. See “ <code>parremove</code> Command” on page 213.

Table 4-3 HP-UX Commands for Configuring Superdome Partitions

Command	Description
parstatus	Display partition information and hardware details for a Superdome complex. See “parstatus Command” on page 215.
parunlock	Unlock complex profile data (use this command with caution); root permission is required. See “parunlock Command” on page 217.
fruled	Turn the amber service LEDs on or off for cells, cabinets, and I/O chassis. See the <i>fruled</i> (1) manpage for details.
frupower	Turn power on or off for cells and I/O chassis; root permission is required. See the <i>frupower</i> (1M) manpage for details.

Advantages of Using the HP-UX Superdome Configuration Commands

You can use several different tools to manage, configure, and monitor the partitions and hardware within a Superdome complex, as discussed in “Overview of Partition Management Tools” on page 132.

The HP-UX Superdome configuration commands have the following advantages over the other tools:

- They provide a simple, command-driven interface you can use when HP-UX is in single-user mode, and when X-Windows support is not available.
- They support creating scripts to log and monitor status information for all partitions and hardware in a Superdome complex.
- They do not require operating a graphical interface.

Specifying Cells and I/O Chassis

When you use the HP-UX Superdome configuration commands to manage, configure, and inquire about cells and I/O chassis, you must use the cell and I/O chassis notation described in this section.

Cell Format

Use either of the following two formats to specify cells when using the HP-UX Superdome configuration commands:

- **Global Cell Number Format**

This cell ID format is identical to the cells' HP-UX hardware path, as reported by `ioscan`.

In global format, cells in cabinet 0 are numbered from 0 to 7, and on SD64000 servers cells in cabinet 1 are numbered from 8 to 15.

Cell Slot	0	1	2	3	4	5	6	7
Cabinet 0 Global Format	0	1	2	3	4	5	6	7
Cabinet 1 Global Format	8	9	10	11	12	13	14	15

- **Cell Hardware Location Format**

This cell ID format uses two numbers to represent each cell: the cabinet ID and the cabinet-relative cell ID (the cell slot where the cell resides).

In hardware location format, cells in cabinet 0 are numbered from 0/0 to 0/7, and on SD64000 servers cells in cabinet 1 are numbered from 1/0 to 1/7.

Cell Slot	0	1	2	3	4	5	6	7
Cabinet 0 HW Loc Format	0/0	0/1	0/2	0/3	0/4	0/5	0/6	0/7
Cabinet 1 HW Loc Format	1/0	1/1	1/2	1/3	1/4	1/5	1/6	1/7

Both of these cell ID formats specify each cell's precise physical location in a Superdome complex. For example `parstatus -c9` and `parstatus -c1/1` refer to the same cell.

```
# parstatus -c9
[Cell]
          CPU      Memory
          OK/      (GB)
Hardware  Actual   Deconf/  OK/      Core      Use
Location  Usage    Max      Deconf   Connected Cell     Next Par
=====  =====  =====  =====  =====  =====  =====  =====
cab1,cell1 active base 4/0/4    8.2/ 0.0 -          no      yes  1

# parstatus -c1/1
[Cell]
          CPU      Memory
          OK/      (GB)
Hardware  Actual   Deconf/  OK/      Core      Use
Location  Usage    Max      Deconf   Connected Cell     Next Par
=====  =====  =====  =====  =====  =====  =====  =====
cab1,cell1 active base 4/0/4    8.2/ 0.0 -          no      yes  1

#
```

I/O Format

Use the following **I/O hardware location format** when specifying an I/O chassis to the HP-UX Superdome configuration commands:

cabinet/bay/chassis

The *cabinet*, *bay*, and *chassis* fields (for example, 0/1/3) specify the physical location of the I/O chassis. The values of these fields are as follows:

- *cabinet* is either 0 (the left cabinet) or 1 (the right cabinet, if present).
 For the first release, up to two Superdome cabinets are supported. Superdome 64 Way systems have two cabinets, all others have one.
- *bay* is either 0 (the front bay in cabinet) or 1 (the rear bay).
- *chassis* can be from 0 to 3.

HP Superdome server support two 12-slot I/O chassis per I/O bay for the first release. Each bay can contain chassis 1 (the left chassis in the bay) and chassis 3 (the right chassis).

The following example shows the `parstatus` command listing details about two different I/O chassis (cabinet 0/bay 0/chassis 1, and cabinet 0/bay 1/chassis 3).

```
# parstatus -i0/0/1
[Chassis]
Hardware Location Usage Core Connected Par
IO To Num
=====
cab 0,bay0,chassis1 active yes cab0,cell10 0

# parstatus -i0/1/3
[Chassis]
Hardware Location Usage Core Connected Par
IO To Num
=====
cab 0,bay1,chassis3 active yes cab0,cell12 0

#
```

You also can use the `parstatus -I` command to list all I/O chassis within a Superdome complex, and can use the `rad -q` command to list of all PCI I/O slots currently available in the local partition and their status. These commands' output show which chassis are present.

In this example, both commands show details for chassis 0/0/1 and 0/1/3.

```
# parstatus -I
[Chassis]
Hardware Location Usage Core Connected Par
IO To Num
=====
cab 0,bay0,chassis0 absent - - -
cab 0,bay0,chassis1 active yes cab0,cell10 0
cab 0,bay0,chassis2 absent - - -
cab 0,bay0,chassis3 active yes cab0,cell14 1
cab 0,bay1,chassis0 absent - - -
cab 0,bay1,chassis1 active yes cab0,cell16 1
cab 0,bay1,chassis2 absent - - -
cab 0,bay1,chassis3 active yes cab0,cell18 1

# rad -q
Slot Path Bus Speed Power Occupied Suspended Capacity
0-0-1-0 0/0/0 0 33 On Yes No No
0-0-1-1 0/0/1/0 8 33 On Yes No Yes
0-0-1-2 0/0/2/0 16 33 On Yes No Yes
0-0-1-3 0/0/3/0 24 33 On Yes No Yes
0-0-1-4 0/0/4/0 32 33 On Yes No Yes
0-0-1-5 0/0/6/0 48 66 On Yes No Yes
0-0-1-6 0/0/14/0 112 33 On No N/A N/A
0-0-1-7 0/0/12/0 96 33 On No N/A N/A
0-0-1-8 0/0/11/0 88 33 On Yes No Yes
0-0-1-9 0/0/10/0 80 33 On No N/A N/A
0-0-1-10 0/0/9/0 72 33 On No N/A N/A
0-0-1-11 0/0/8/0 64 33 On Yes No Yes
0-1-3-0 2/0/0/0 0 33 On Yes No No
0-1-3-1 2/0/1/0 8 33 On Yes No Yes
0-1-3-2 2/0/2/0 16 33 On Yes No Yes
0-1-3-3 2/0/3/0 24 33 On Yes No Yes
0-1-3-4 2/0/4/0 32 33 On No N/A N/A
0-1-3-5 2/0/6/0 48 33 On No N/A N/A
0-1-3-6 2/0/14/0 112 66 On Yes No Yes
0-1-3-7 2/0/12/0 96 33 On No N/A N/A
0-1-3-8 2/0/11/0 88 33 On Yes No Yes
0-1-3-9 2/0/10/0 80 33 On No N/A N/A
0-1-3-10 2/0/9/0 72 33 On No N/A N/A
0-1-3-11 2/0/8/0 64 33 On Yes No Yes

#
```

Cabinet 0/Bay 1/Chassis 3 (0/1/3)

The Partition Manager—A Guided Tour

The Partition Manager provides a graphical user interface for configuring partitions (and other resources) in your Superdome complex. Patterned after a commonly used PC-based file exploration utility, the Partition Manager (also known as `parmgr`) is easy to learn and use.

NOTE

The Partition Manager is equipped with an extensive help system that describes the rich set of navigational tools more extensively than what is covered here. This section is intended to help you start-up the Partition Manager, and show you the basic areas that Partition Manager covers.

Advantages of Using The Partition Manager

There are a variety of tools that can be used to configure the partitions in a Superdome complex, each having its own advantages over the others. Which tool is best to use for a given task depends on how comfortable you are with using the tool, and the specific task you are trying to do. The Partition Manager has the following advantages over the other tools:

- It is a graphical user interface that can be run from any X-Terminal or from a Web browser
- It has a built-in set of problem detectors to help you quickly figure out the source of a problem in your complex.
- It has a robust set of error checks to help prevent you from creating illegal configurations or performing steps of a task in the wrong order.
- It prevents you from having to learn or remember many different HP-UX commands and their options.
- It is organized around the very objects that you will be configuring:
 - Cells
 - I/O Chassis
 - Partitions
 - Available (not yet configured) Resources

How to Start The Partition Manager

Though it can be used to configure all of the partitions in a Superdome complex (except the Genesis Partition), the Partition Manager must run in (or via) an existing partition in the complex that you are configuring.

NOTE

The Partition Manager will run in a Genesis Partition, so even if the Genesis Partition is the only active partition in the complex, you can still use `parmgr` to define the other partitions that you need.

You can also run the Partition Manager via a supported Web browser from a Microsoft Windows-based PC that has access to the Superdome complex, but you must be connected to a partition running HP-UX and the Apache web server. Only the graphical interface runs in the Web browser; the Partition Manager itself runs under HP-UX in the Superdome partition.

Starting Partition Manager from the HP-UX Command Line

You can run the Partition Manager directly from an HP-UX command-line prompt. Its path is:

```
/opt/parmgr/bin/parmgr
```

IMPORTANT

Partition Manager does not have a text mode interface. You need to set your shell's "DISPLAY" environment variable so that Partition Manager can display its windows on an X-Server based display. Also be sure that the user running Partition Manager has permission to write to the display represented by the value of the DISPLAY environment variable (see *xhost* (1M)).

TIP

If you are running `parmgr` from the command line, you can specify a task and parameters associated with that task to start `parmgr` at a specific point and perform only that task. For information on what tasks you can do this with (and the parameters that those tasks require), see *parmgr* (1M).

Starting Partition Manager from SAM

From SAM: If you are running SAM, the Partition Manager is one of the selections available from the primary level of SAM's interface

Starting Partition Manager From a Web Browser

From an HP-UX environment, the preferred method of running Partition Manager is from the HP-UX command line as described in the previous section. It is also possible to run Partition Manager from a web browser if you are working from a Microsoft Windows-based PC.

Requirements To use this feature, a web server must be installed and configured *on the partition where you will run Partition Manager*. The Apache web server will be automatically installed and configured when the ObAM Runtime Environment bundle (required by Partition Manager) is installed. This is currently the only web server supported by the ObAM Runtime Environment. Though already installed, the web server must be activated before it can be used. See “Configuring the Web Server” on page 144 for more information.

Because of dependencies on the Java runtime Environment and the Java Plug-in, running Partition Manager from a web browser is currently supported only in the following client environments:

Table 4-4 Supported Client-side Environments

Operating System	<ul style="list-style-type: none">• Windows® 95, or• Windows® 98, or• Windows® NT 4.0 with Service Pack 3 or later
Browser	<ul style="list-style-type: none">• Netscape Navigator® version 4.5 or later, or• Internet Explorer version 4.01 or later
Java™ Plug-in	JPI 1.1.3 only
Java™ Runtime Environment	JRE 1.1.8 only

Both the Java Plug-in and the Java Runtime Environment are included with the ObAM Runtime Environment bundle. When the web server is

first activated, point your browser to the following URL to view instructions on installing and configuring the Java Plug-in and the Java Runtime Environment:

```
http://hostname:1188/jpi/pc-compatible-only.html
```

where *hostname* is the network hostname of the partition that will run Partition Manager.

By default, only systems from the same network domain may access the web server running on a partition. See “Configuring the Web Server” on page 144 for information on changing this setting.

Launching Partition Manager in the Web Browser Once the Java Plug-in and Java Runtime Environment are properly installed, Partition Manager can be started by pointing a supported web browser at the URL:

```
http://hostname:1188/parmgr
```

where *hostname* is the network hostname of the partition that will run Partition Manager.

A welcome page containing the following links will be displayed:

- Run Partition Manager
- Configure Browser

This step must be performed before Partition Manager can be started from a web browser.

- Technical References

A link into the Partition Manager online help system.

Clicking on the Run Partition Manager link will display the Partition Manager launch page in a new browser window.

IMPORTANT

The launch page must remain open or Partition Manager will immediately terminate. The launch page hides the browser window tool bar and menu bar, so that you cannot accidentally navigate out of Partition Manager in this window. Navigating forward or backward from your *original browser window* will not affect Partition Manager.

Before Partition Manager is launched, a login dialog will appear, prompting for a user name and password. Only the superuser is allowed to run Partition Manager.

Once the user is authorized, Partition Manager will be launched in a window outside the browser. Additional dialogs for the tasks performed by Partition Manager will be displayed in new windows (just as though you were running the program locally). When you request online help, another browser window (with full browser navigation) will be activated to display the help topic.

When you are finished using Partition Manager, you must close the launch page after exiting Partition Manager.

Configuring the Web Server The Apache web server will be automatically installed and configured when the ObAM Runtime Environment bundle (required by Partition Manager) is installed. Apache is currently the only web server supported by the ObAM Runtime Environment. This server can be used to host any ObAM-based application.

By default, only systems from the same network domain can access Partition Manager from the web server. For example, if the server is running on a partition whose network address is `server.site1.ourco.com`, then only systems in the `site1.ourco.com` domain will be able to launch Partition Manager on this server. This access is controlled by the file `/usr/obam/server/conf/httpd.conf`.

There are two entries in the file of the form:

```
Allow from ...  
Allow from ...
```

If Partition Manager was installed during a cold install of HP-UX, these fields will contain the string `insert_domain_here`, since the network domain was not available at the time that the configuration script was run. In this case, edit this file and replace those strings with the actual domain name (for example: `site1.ourco.com`). If you do not do this, no one will have permission to access Partition Manager via the web. Additional modifications can be made to these fields to grant other systems and domains access to the server.

The web server must be activated before it can be used. To activate the web server, as the superuser run the following HP-UX command:


```
/usr/obam/server/bin/apachectl start
```

If you modify the configuration file after the web server has already been started, you must restart it by executing the following HP-UX command before the new configuration will be recognized:

```
/usr/obam/server/bin/apachectl restart
```

TIP

If you want to start the web server automatically every time the partition is booted, the `WEBADMIN` variable should be set to 1 in the system configuration file `/etc/rc.config.d/webadmin` (the default value for this variable is 0).

Log files containing startup, authentication and configuration problems are stored in the directory `/usr/obam/server/logs`.

Troubleshooting Web Browser Access to Partition Manager

Because several components are involved in web browser access to Partition Manager, a number of things could cause problems:

Problem: When attempting to access the URL (`http://hostname:1188/parmgr`), the following error message is displayed:

```
The requested URL could not be retrieved.  
Connection Failed.
```

What to do: Make sure that the web server daemon (`httpd`) is running. It can be started by executing the following command (as the root user) on the partition where you are attempting to run Partition Manager:

```
/usr/obam/server/bin/apachectl start
```

Problem: A `Permission Denied` message is displayed when browsing to the welcome page.

What to do: Check the network domain/access settings in the Apache web server configuration file.

The Apache server maintains an error log in the file `/usr/obam/server/logs/error_log`. This log can be consulted to help diagnose problems with web access to Partition Manager. If the log consumes too much disk

space, delete (or move) it and restart the Apache web server using the command:

```
/usr/obam/server/bin/apachectl restart
```

Problem: On the client side, the Java console is enabled, but is not being displayed when Partition Manager is started.

What to do: Try shutting down the browser and restarting it.

Problem: If Partition Manager abnormally terminates after being launched from the browser, the Java Virtual Machine on the PC might be left in a corrupted state. Subsequent attempts to launch Partition Manager from the browser might produce abnormal behavior such as:

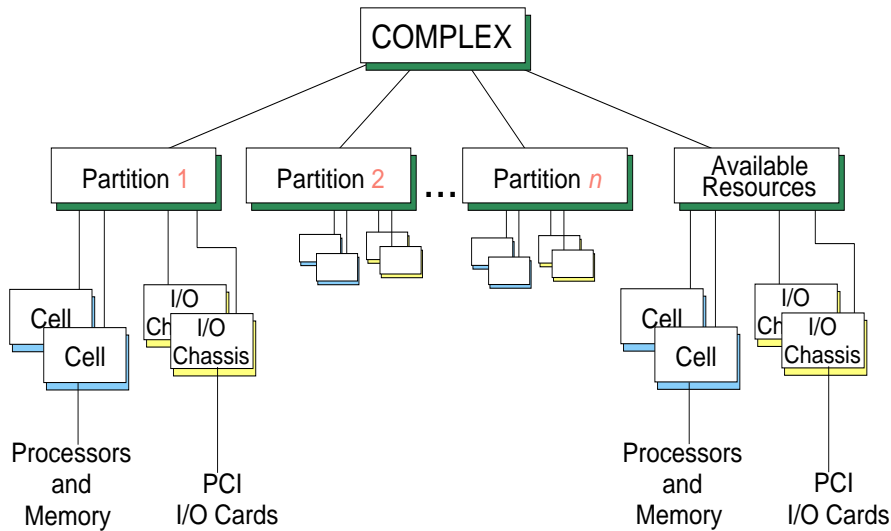
- Partition Manager appears to be stuck in a waiting state indefinitely
- Additional instances of Partition Manager start up spontaneously

What to do: Terminate the browser, restart it, and attempt to launch Partition Manager again. If the problem persists, reboot your PC and try again.

Navigating through The Partition Manager

Superdome computers and the Partition Manager are designed around an object hierarchy. The root of the hierarchy is the complex. It contains objects (representing both physical and logical entities) in various levels below the complex: these include partitions, cells, I/O chassis, PCI I/O cards, processors, and memory modules. The hierarchy is shown in Figure 4-3.

Figure 4-3 Partition Manager Object Hierarchy



Partition Manager Views

The Partition Manager allows you to view a Superdome complex at various levels of detail. At all levels the primary display window is displayed in two panes:

Object List The left-hand-side of the display shows the hierarchical list of objects in the complex. Various levels of the list can be expanded or compressed using the + and - icons in the list's display.

Object Summary The right-hand-side of the display shows basic information about the object currently highlighted in the object list.

In addition to the two display areas there are several other display elements common to all Partition Manager levels:

Menu Bar Across the top of the display is a menu bar that you can use to customize the display and that provides a pull-down menu of actions that can be performed from the current screen. The specific items on the menu bar and what they represent are described in the Partition Manager's help system.

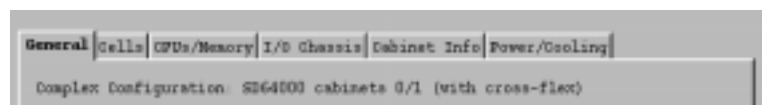
- Tool Bar** Underneath the menu bar is a tool bar that allows you to change view types and levels, and bring up the help system.
- Context Menu** The context menu provides a shortcut to all of the items on the menu bar that apply to the current context. To bring up the context menu, press the right mouse button while the mouse pointer is in the Object Summary pane (right-hand-side of the display).
- The items available in the context menu depend on which, if any, object is currently selected in the Object Summary pane. If no object is selected, then the context menu will show the actions that are always available for the current screen. If an object is selected, then the context menu will show these actions, as well as actions specific to the selected object.

Viewing Complex-Level Information

When started with no parameters (or from a Web browser), the Partition Manager will initially show the state of a Superdome computer at the complex level. Both the left and right sides of the display will show a list of the partitions currently defined in the complex and a special “partition” called `Available Resources`. `Available Resources` is a container used to hold and display the resources in the complex that are not part of any other partition.

Complex Details

In addition to the list of partitions defined in the complex, a lot of detailed information about the resources of the complex is available. To view this information, use the context menu, or the `Complex` drop-down menu in the menu bar to select `Show Complex Details ...`. This will bring up a new window containing six panels of information about various elements of the complex.



Click on the tab for each panel to familiarize yourself with what information is available in each area. Partition Manager’s help system describes in detail what is available under each tab.

Viewing Partition Information

If you want information about the resources of a specific partition, first select the partition by clicking on its name in the object list on the left-hand-side of the display. The right-hand-side of the display will update to show a summary of the resources for the selected partition.

Partition Details

By default Partition Manager will list which cells and I/O chassis are part of the selected partition. In addition to this list, a lot of detailed information about the resources for the selected partition is available. To view this information, use the context menu, or the “Partition” drop-down menu in the menu bar to select “Show Partition Details ...”. This will bring up a new window containing four panels of information about various elements of the complex.



Viewing Cell Information

Partitions are logical collections of cell boards. Cell boards contain (among other things), the processors and memory modules of the complex. The Partition Manager lets you query cell boards to determine how many processors and how much memory they contain, and the status of those items.

Cell Details

Unlike the higher levels of the object hierarchy, there is no summary level for cells. If you click on the name of a partition in the object list on the left portion of Partition Manager’s primary display area (to bring up the list of cells and chassis that comprise that partition), then on the right-hand-side of the display double-click on the entry for the cell that you want to know about, the Cell Details window will be displayed.

The Cell Details window has two panels of information:

General	The General panel shows the current status and usage settings of the cell itself, and if an I/O chassis is connected to the cell, you can click on the “Show
---------	--

Details . . .” button to get information about that chassis.

CPUs / Memory The CPUs / Memory panel provides a list of processors, and memory modules along with their type and status.

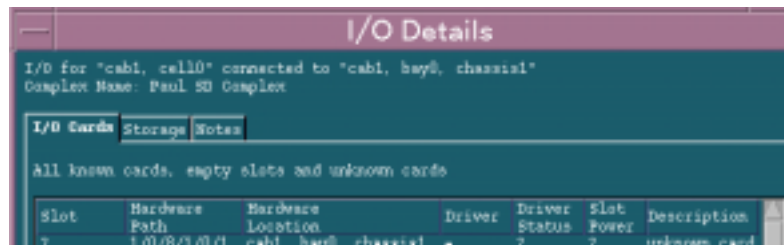
Viewing I/O Chassis Information

At least one of the cell boards in every partition must have an I/O chassis connected to it (more than one can). The I/O chassis holds the I/O cards that connect devices such as network cards and disk drives to the complex.

At least one of the I/O chassis associated with a partition must contain a core I/O board allowing devices in that chassis to be used to boot the system.

I/O Details

After selecting a partition from the object list on the left-hand-side of the Partition Manager’s primary display window, single-click on the entry for the I/O chassis (on the right-hand-side of the display) that you want to query. Then select Show I/O Details . . . from the I/O menu to bring up the I/O Details window containing information about the selected I/O chassis.



The I/O Details window has three panels of information:

I/O Cards The I/O Cards panel displays information about the cards in the I/O chassis, the hardware paths to those cards, the drivers used by those cards, and whether or not the slot that the cards are plugged into have power.

Storage The Storage panel contains a list of mass storage devices attached to the I/O cards associated with the cell, partition, cabinet, or complex you have selected.

Notes The `Notes` panel contains a list of errors, warnings, and notes about the information available on the `I/O Cards` and `Storage` tabs. For example, if I/O information is not available for a particular cell, a message will be displayed in the notes panel.

The entries in the `I/O Details` window can be filtered to show a sub-set of all available information. This allows you to focus on specific cards or entries. Details on what each of the above panels show and how to filter the output are available in the Partition Manager help system.

Task Wizards

The Partition Manager is equipped with several task wizards to guide you through tasks that have many steps (for example creating a new partition). These behave in a similar way to many PC software setup routines.

Several of these wizards can be launched directly by specifying the appropriate parameters when starting the Partition Manager from an HP-UX command-line prompt. For details on these parameters, see *parmgr* (1M).

Procedures for Managing Partitions

You can use the detailed procedures given in this section to configure and manage your Superdome server's partitions.

You can perform these tasks using several different partition management tools, including the Guardian Service Processor (GSP) menus, the Boot Console Handler (BCH) interface, HP-UX commands, and the Partition Manager (`parmgr`) utility. For details on these tools see "Overview of Partition Management Tools" on page 132.

For a list summarizing all the procedures in this section see Table 4-1 on page 114.

Creating a Genesis Partition

When you create a Genesis Partition, you establish a one-cell partition on the HP Superdome complex. The Genesis Partition replaces all other partitions, and once created it is the only partition on the system. Additional details are given in “Genesis Partition” on page 119.

You can perform this task using the GSP menus.

- “GSP” on page 153

The only way to create a Genesis Partition is to use the Guardian Service Processor (GSP) command menu.

GSP

The following procedure creates a Genesis Partition on an HP Superdome server.

As a result of this procedure, *all existing partitions are destroyed* and are replaced with a single, one-cell partition (the Genesis Partition).

You can revert to the previous partition configuration, if any existed before you created the Genesis Partition. For details see “Restoring a Complex Profile” on page 156.

- Step 1.** Save all current partition configuration details, if any partitions are configured in the complex.

Saving the current partition information provides you the details you would need to re-create all partitions as they currently exist.

Use the `parstatus` command (or an equivalent `parmgr` procedure) to save configuration details about each partition.

For each partition, use the `parstatus -vp#` command to display detailed information. You can gather this information from any partition in the system.

- Step 2.** Determine which cell will be configured as the Genesis Partition.

The cell must be connected to an I/O chassis. The I/O chassis must have a core I/O card installed, and must have a bootable disk (or a DVD-ROM drive for install media, and a disk onto which HP-UX can be installed).

Step 3. Ensure that all partitions within the complex are in a ready-for-reconfig state.

If a partition is running HP-UX, you can shut down the partition to a ready-for-reconfig state by using the `shutdown -R- H` command.

Or you can put the partition into a ready-for-reconfig state using the BCH interface's `RECONFIGRESET` command or using the GSP command menu's `RR` command.

Step 4. Log in to the Superdome server's Guardian Service Processor (GSP).

Log in as a user with Administrator privileges, which are required for creating a Genesis Partition.

Step 5. Enter the GSP command menu.

From the GSP main menu, enter `CM` to access the command menu.

Step 6. Issue the `CC` command, select `Genesis Complex Profile`, and specify the cabinet and cell slot for the cell that will comprise the Genesis Partition.

```
GSP:CM> CC

This command allows you to change the complex profile.

WARNING: You must shut down all Protection Domains before executing
this command.

G - Genesis Complex Profile
L - Last Complex Profile
  Select Profile: g

  Enter Cabinet number: 0

  Enter Slot number: 0

  Do you want to modify the complex profile? (Y/[N]) y

  -> The complex profile will be modified.
GSP:CM>
```

Step 7. Confirm that the Genesis Partition was successfully created.

If the Genesis Partition is successfully created, the `CC` command reports that the “complex profile will be modified”.

When the Genesis Partition is created, it is in a boot-is-blocked state, so must be booted manually.

Step 8. Issue the `BO` command to boot the Genesis Partition.

This boots the partition to the Boot Console Handler (BCH) interface.

```
GSP:CM> BO

#   Name
---  ----
0)  Partition 0

Select a protection domain number : 0

Do you want to boot Protection Domain number 0,
named Partition 0 ? (Y/[N]) Y

-> The selected Protection Domain will be booted.
GSP:CM>
```

Step 9. Configure the partition as appropriate and necessary.

You may wish to set the boot paths (PRI, ALT, and HAA), the core cell preferences, the partition name, and other settings. You also may need to add cells to the partition.

See “Introduction to Partition Tasks” on page 114 for a table of partition configuration tasks that you can perform.

Restoring a Complex Profile

You can restore a previous complex profile configuration, which effectively allows you to undo your last partition configuration change.

Restoring the previous complex profile allows you to revert to the previous complex configuration—including all partition configurations—that existed before you made your last change.

Because restoring a prior complex profile requires shutting down all partitions, you should use this procedure only when absolutely necessary.

You can perform this task using the GSP menus.
<ul style="list-style-type: none">• “GSP” on page 156 <p>The only method of restoring a prior complex profile is to use the Guardian Service Processor (GSP) command menu.</p>

GSP

The following procedure restores the prior complex configuration that existed before you made your last partition configuration change.

- Step 1.** Ensure that all partitions within the complex are in a ready-for-reconfig state.

You can put the partition into a ready-for-reconfig state by using the `shutdown -R -H` command, the BCH interface's `RECONFIGRESET` command, or using the GSP command menu's `RR` command.

- Step 2.** Log in to the Superdome server's Guardian Service Processor (GSP).

Log in as a user with Administrator privileges, which are required for restoring the previous complex profile configuration.

- Step 3.** Enter the GSP command menu.

From the GSP main menu, enter `CM` to access the command menu.

Step 4. Issue the CC command, select Last Complex Profile, and confirm that you want to modify the complex profile configuration.

```
GSP:CM> CC

This command allows you to change the complex profile.

WARNING: You must shut down all Protection Domains before executing
this command.

G - Genesis Complex Profile
L - Last Complex Profile
Select Profile: 1

Do you want to modify the complex profile? (Y/[N]) y

-> The complex profile will be modified.
GSP:CM>
```

Step 5. Confirm that the partition cell assignments are what you intended to establish.

Use the GSP command menu's CP command to display the current complex profile configuration.

```
GSP:CM> CP

-----
Cabinet | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
-----+-----+-----+-----+-----+-----+-----+-----+-----
Slot    | 01234567|01234567|01234567|01234567|01234567|01234567|01234567|01234567|
-----+-----+-----+-----+-----+-----+-----+-----+-----
PD 0    |X.X.....|.....|.....|.....|.....|.....|.....|.....|
PD 1    |...X.X..|.....|.....|.....|.....|.....|.....|.....|
PD 2    |.X.X....|.....|.....|.....|.....|.....|.....|.....|
PD 3    |.....X.X|.....|.....|.....|.....|.....|.....|.....|
-----+-----+-----+-----+-----+-----+-----+-----+-----
GSP:CM>
```

If the partition cell assignments are not what you intended—that is, if you prefer the partition configuration you had before you restored the

existing partition configuration—you can repeat this procedure to restore the configuration you had before beginning the procedure.

One level of undo is provided by the GSP command menu's `CC` command.

This allows you to undo your last partition change, and undo your undo.

Step 6. Issue the `BO` command to boot any partitions you want to make active.

After you use the `CC` command, all partitions still are in a boot-is-blocked state and thus are *inactive* partitions. You can use the GSP command menu's `BO` command to boot the partitions.

Determining the Local (Current) Partition Number

On a single HP Superdome complex you can potentially access many partitions. Use the procedures here to determine the local partition you currently are using.

You can perform this task using the BCH interface or HP-UX commands.

- “BCH” on page 159
- “HP-UX Commands” on page 160

BCH

Use this procedure to determine the local partition number from the BCH interface.

Step 1. Access the Boot Console Handler (BCH) interface for the partition, and access the BCH configuration menu.

Enter CO from the BCH main menu to access the configuration menu. If you are at a BCH menu other than the main menu, enter MA to access the main menu.

Step 2. From the BCH configuration menu, enter the PD command to list the local partition's name and partition number.

```
Configuration Menu: Enter command > PD
Partition Number: 1
Partition Name: jules01
Configuration Menu: Enter command >
```

HP-UX Commands The following procedure uses the `parstatus` HP-UX commands to determine the partition number of the local (current) partition.

Step 1. Log in to HP-UX running on the partition.

Step 2. Issue the `parstatus -w` command to list the partition number for the local partition.

```
# parstatus -w
The local partition number is 0.
# parstatus -P
[Partition]
Par          # of # of I/O
Num Status   Cells Chassis Core cell Partition Name (first 30 chars)
-----
0  active    2      2    cab0,cell10 jules00
1  active    2      2    cab0,cell14 jules01
#
```

The `parstatus -P` command lists all partitions within the Superdome complex, including the local partition.

Creating a New Partition

Use the procedures in this section when creating new partitions using the available cells within your Superdome complex.

At least one cell in each partition must be connected to an I/O chassis that has the appropriate PCI cards and devices installed.

When creating a partition, *you must adhere to the requirements and guidelines* described in “Partition Configuration Guidelines” on page 125. HP recommends only a specific set of partition configurations.

If no partitions exist on your HP Superdome complex, you must first establish a “Genesis Partition” before creating other partitions. See “Creating a Genesis Partition” on page 153.

You can perform this task using HP-UX commands or Partition Manager.

- “HP-UX Commands” on page 161
- “Partition Manager” on page 166

HP-UX Commands The following procedure uses the `parstatus`, `parcreate`, and `parmodify` HP-UX commands to create a new partition on a Superdome server.

This procedure uses `parstatus` to find available (unassigned) cells, uses `parcreate` to create a partition using the cells, and uses `parmodify` to modify the partition’s settings and configure it for general use.

One alternative to using the following five-step procedure is to replace steps 2–5 with a single `parcreate` command.

For example, the commands performed in steps 2–5 could be replaced with the following `parcreate` command line.

```
# parcreate -c4:base:y:ri -c6:base:y:ri -P "Partition Green" -r0/4 -r0/6 -b 4/0/1/0/0.9 -B  
Partition Created. The partition number is : 1  
#
```

Note that in the above alternative, the `-B` option is specified, thus causing the partition to be booted immediately.

Configuring and Managing Superdome Partitions Procedures for Managing Partitions

Step 1. Plan your partition configuration by selecting which cells will comprise the new partition.

Use the `parstatus -AC` command to list all unassigned (available) cells in your Superdome complex.

```
# parstatus -AC
[Cell]

Hardware      Actual      CPU      Memory      Core      Use
Location      Usage      Max      Failed/OK/  (GB)      cell      On      Par
              Usage      Max      Failed/OK/  (GB)      Capable  Boot  Num
=====
cab0,cell11   absent     -        -           -         -         -       -
cab0,cell13   absent     -        -           -         -         -       -
cab0,cell14   power on   4/0/4    2.0/0.0     cab 0,bay0,chassis3  yes      -       -
cab0,cell15   absent     -        -           -         -         -       -
cab0,cell16   power on   4/0/4    2.0/0.0     cab 0,bay1,chassis1  yes      -       -
cab0,cell17   absent     -        -           -         -         -       -

#
```

You can select any of the cells listed to create the new partition; only the cells that are not “absent” are eligible to be assigned.

Note that HP recommends only specific Superdome partition configurations.

See “Procedure for Assigning Cells to Partitions” on page 126 for details on the hardware requirements and related guidelines.

Step 2. After confirming that cells you have chosen would form an HP-supported partition configuration, create a partition using the cells.

Use the `parcreate -c` command to create a new partition using the cells you specify.

Do not specify the `-B` option, which would immediately boot the newly created partition, thus making it active and preventing you from further modifying it.

Note that, because you did not specify `-B`, the partition will be created but it will remain “inactive” until you explicitly boot it (using the GSP command menu’s `BO` command).

When you create a multiple-cell partition, you should specify the `-c` option multiple times (once for each cell) issuing a single command line.

```
# parcreate -c4:base:y:ri -c6:base:y:ri
Partition Created. The partition number is : 1
#
```

If the partition is successfully created, the `parcreate` command reports “Partition Created” and reports the partition number (“partition number is...”).

The `parcreate` command’s `-c` option is as follows:

```
-c cell:[cell_type]:[use_on_next_boot]:[failure_usage]
```

This option specifies the cell ID (*cell*) to be assigned to the partition.

- The only valid *cell_type* value is:

base Base cell (the default).

- The valid *use_on_next_boot* values for cells are:

y Participate in reboot (the default).

n Do not participate in reboot.

- The only valid *failure_usage* value is:

ri Reactivate with interleave (the default)

For details, see the `parcreate(1M)` manpage or see “`parcreate` Command” on page 209.

Step 3. Modify the partition configuration in order to set the partition name, core cell, core alternate cells, and boot paths.

Use the `parmodify` command to modify the partition's configuration.

```
# parmodify -p1 -P "hostname05"  
Command succeeded.  
# parmodify -p1 -r0/4 -r0/6  
Command succeeded.  
# parmodify -p1 -b 4/0/1/0/0.9  
Command succeeded.  
#
```

If each modification takes place, `parmodify` reports “Command succeeded”.

You can specify each configuration option on a separate command line, or can combine all options into a single, longer command line.

For details on the various options for modifying partition settings, see the *parmodify(1M)* manpage or see “`parmodify` Command” on page 211.

See also the table of configuration tasks in “Introduction to Partition Tasks” on page 114.

Step 4. Confirm the partition's configuration settings.

Use the `parstatus -Vp#` command to list details about your newly created and configured partition.

If any configuration details should be modified, use the `parmodify` command before booting the partition.

```
# parstatus -Vp1
[Partition]
Partition Number      : 1
Partition Name       : hostname05
Status               : inactive
IP address           :
Primary Boot Path    : 4/0/1/0/0.9
Alternate Boot Path  : 0/0/0/0/0/0/0/0.0.0
HA Alternate Boot Path : 0/0/0/0/0/0/0/0.0.0
PDC Revision        : 104.1
IODCH Version       : 23664
CPU Speed           : 552 MHz
Core Cell           : ?
Core Cell Alternate  :
                    0. cab0,cell4
                    1. cab0,cell6

[Cell]

```

Hardware Location	Actual Usage	CPU OK/Failed/Max	Memory (GB) OK/Failed	Connected To	Core Cell Capable	Use On Next Boot	Par Num
cab0,cell4	inactive	4/0/4	2.0/ 0.0	cab 0,bay0,chassis3	yes	yes	1
cab0,cell6	inactive	4/0/4	2.0/ 0.0	cab 0,bay1,chassis1	yes	yes	1

```

[Chassis]
Hardware location  Usage      Core IO  Connected To  Par Num
=====
cab 0,bay0,chassis3 inactive  yes  cab0,cell4  1
cab 0,bay1,chassis1 inactive  yes  cab0,cell6  1
#

```

Step 5. Boot your newly created partition.

Use the GSP command menu's `B0` command to boot the partition.

Partition Manager

- Step 1.** Determine which cell boards and I/O Chassis are to be a part of the partition you are creating.

NOTE

At least one cell in the partition *must* have an I/O chassis connected to it that has a core I/O board in I/O chassis slot 0. Without this, the Partition Manager will not let you create the partition.

- Step 2.** Free up needed resources from other partitions (if necessary).

If the partition you want to create will use resources that are currently allocated to other partitions, or hardware that has not yet been installed, you will need to make those resources available before continuing with this procedure. If you will be using cells or I/O chassis that are currently in use by another partition in the complex, see “Moving Cells to a Different Partition” on page 196 and “Moving I/O to a Different Partition” on page 198 for help on freeing up those resources.

- Step 3.** Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

TIP

The Partition Manager can be started from the HP-UX command line with a special option (`-t create`) to go directly to the screen for creating a new partition. The *parmgr* (1M) manpage has complete details on `parmgr` options.

```
/opt/parmgr/bin/parmgr -t create
```

Step 4. Select `Create Partition...` from the `Partition` menu.

Step 5. The `Create Partition` task wizard will, in seven stages, guide you through the process of creating the new partition:

1. Naming (identifying) the partition.
2. Selecting the cells for the partition.
3. Setting the attributes for the cells you select in Stage 2.
4. Setting which cells can be core cells and in which order they should be tried when the partition boots.
5. Specifying whether or not to immediately (automatically) boot the partition after it is created.
6. Verifying all of the settings for the partition before actually creating the partition.
7. Create the partition.

After completing each stage, use the **Next >** button to proceed to the next stage. Until you press the **Finish** button in Stage 7 you can use the **< Back** button to return to previous stages and change incorrect settings.

As you traverse the stages here are some important things to remember:

Stage 1: Name the Partition

Partition names have the following characteristics:

- Can contain from 1 to 64 characters.
- Valid characters are: A-Z, a-z, 0-9, hyphen (-), and space ().
- Names do *not* have to be unique. They are labels to help you identify the partitions using terms meaningful to your operation. The operating system and the Partition Manager use **partition numbers** to uniquely identify partitions.

Stage 2: Select Cells

Using the **<--Add-->** and **-Remove->** buttons, adjust the two lists so that the `Assign to the Partition` list contains only the cells that you want to be part of the new partition.

Stage 3: Set Cell Attributes

Specify each cell's "Failure Usage".

Cells can be included in a partition for several reasons, most notably:

- Performance
- Redundancy (High Availability)

Cells can operate in two modes: **normal mode** and **failure mode**. In normal mode all of the processors and memory in a cell are operating normally, and participating in the partition's operations. However, if a processor or memory DIMM fails during the initialization of a cell (at boot time or power-on) the cell is placed in failure mode. For performance reasons, it is not always desirable to have cells in a partition with differing amounts of memory or processors; that is, it is sometimes better to have a cell *not* participate in a partition unless it is 100% functional.

What you are configuring in this step is what happens when a cell in this partition is in failure mode. You can configure this for each cell in the partition. Your choices are:

- Activate the cell (with whatever processors and memory are still working).
- Do not activate the cell (unless all of its processors and all of its memory DIMMS are working).

Stage 4: Select Core Cell Choices

Step 6. The cell that is actually used to boot the system is known as the **core cell**.

Any cell that is attached to an I/O chassis containing core I/O can qualify as the core cell. If the partition contains more than one such cell, you need to specify the order of preference for core cell; **PDC** (Processor Dependent Code) will (if possible) select the core cell on this basis during the boot process. The cell with the I/O chassis attached to it that contains your primary boot device is the one to designate as the first choice. The Partition Manager will select an appropriate default, and it is usually okay to accept what it offers.

If you have alternate boot devices (attached to I/O chassis attached to other cells), you can specify the order in which they will be tried.

Stage 5: Initial Boot Options

Specify whether or not you want to have the new partition automatically booted immediately after it is created.

Stage 6: Verify the Partition Settings

At this point, the Partition Manager will show you a summary of the resources and settings that will define your new partition. If anything needs changing, use the < **Back** button (multiple times if necessary) to return to the appropriate screen to make the adjustment, or **Cancel** to abort the whole task and start over.

Be sure to verify the information on each of the panels

- General
- Cells
- CPUs / Memory
- I/O Chassis
- HA Checks

to be sure that everything looks okay. If it does, proceed to the final stage of the partition definition process.

Stage 7: Create the Partition

Once you have verified that all of the settings are correct, carefully read the instructions on the final screen before clicking the **Finish** button to actually create your new partition.

CAUTION

This is your final chance to abort the operation. Once you click **Finish**, the partition will actually be created on your Superdome complex.

Deleting (Removing) a Partition

You can delete (remove) any partition within an HP Superdome complex. The supported partition deletion methods provide restrictions, for security reasons: you can delete only the local partition and inactive remote partitions.

Use extreme caution before deleting a partition.

Deleting a partition causes all the partition's cells (and any I/O resources connected to the cells) to be unassigned and available for general use.

After deleting a partition, it is possible to restore its settings by using the procedure described in "Restoring a Complex Profile" on page 156. However, note that this procedure requires shutting down all partitions in order to restore the previous complex profile configuration.

You can perform this task using HP-UX commands or Partition Manager.

- "HP-UX Commands" on page 170
- "Partition Manager" on page 172

HP-UX Commands The following procedure removes a partition using HP-UX commands.

Step 1. List all partitions, and check the status for the partition you plan to remove.

Use `parstatus -P` to list the status for all partitions.

```
# parstatus -P
[Partition]
Par          # of # of I/O
Num Status   Cells Chassis Core cell Partition Name (first 30 chars)
=== =====
0 active     2     2     cab0,cell0          Partition 0
1 inactive   2     2     ?                   Partition One
#
```

You can only delete the local partition and inactive remote partitions. If you are planning to remove a remote partition, check to see whether the partition is inactive.

Step 2. If you plan to remove a *remote partition* that currently is active, then put the partition into a ready-for-reconfig state.

If a partition is running HP-UX, you can shut down the partition to a ready-for-reconfig state by using the `shutdown -R -H` command.

You also can put the partition into a ready-for-reconfig state using the BCH interface's `RECONFIGRESET` command or using the GSP command menu's `RR` command.

See Chapter 5 for details on resetting partitions.

Step 3. Save all current configuration details about the partition you plan to remove.

Use the `parstatus -V -p#` command to display all current configuration information related to the partition you plan to remove.

Save this information, as you can use it to manually recreate the partition if necessary.

Step 4. Remove the partition.

There are two possible ways to remove a partition: removing the local partition and removing an inactive remote partition.

- To remove an inactive remote partition perform the following steps.

1. Issue the `parremove -p#` command to remove the inactive remote partition.

```
# parremove -p1
```

2. Issue the `parstatus -P` command to confirm that the partition was removed.

If the partition was removed, it no longer is listed in the `parstatus` command's output.

- To remove the local partition (the partition on which you currently are issuing commands) perform the following steps.

1. Shut down all applications and warn users. Follow the same procedures you would use if you were to reboot the partition.

2. Issue the `parremove -F -p#` command, which initiates the complex profile revisions that will take place when the partition is removed.

When using `parremove` to remove the local partition, you must specify both the `-p#` option (to specify the local partition number) and the `-F` option (to force-remove the local partition).

```
# parremove -F -p0
Use "shutdown -R" to shutdown the partition.
The partition deletion will be effective only after the shutdown.
#
```

Note that the local partition still remains active following the `parremove` command.

However, the partition reconfiguration (its deletion) is pending and you should proceed with the next step as quickly as possible.

3. Reboot the partition for reconfiguration (reboot-for-reconfig).

Use the `shutdown -R` command.

This shuts down the partition and reboots all cells so that the pending configuration changes occur and the partition is deleted.

Note that the `reboot -r` and the `shutdown -r` commands *will not* properly perform the reconfiguration; specify the `-R` option.

See Chapter 5 for more details on resetting partitions.

After you complete this step, the partition has been deleted and the cells (and associated I/O chassis) that used to be assigned to the partition now are unassigned and are available for other use.

Partition Manager

- Step 1.** *Determine which partition you want to remove, and prepare it for removal.*
 - a. If necessary, shut down any applications that are running in the partition
 - b. (optional) If necessary, shut down the operating system that is running in the partition. This is good practice, but `parmgr` will shut down HP-UX for you if you have not previously done this.

NOTE

If you will be running the Partition Manager in the partition that you are removing, you cannot shut down HP-UX or you will not be able to run the Partition Manager. Therefore, proceed directly to the next step.

Step 2. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from an HP-UX command line, from a Web browser, or from the HP-UX System Administration Manager (SAM). For details see “How to Start The Partition Manager” on page 141.

Step 3. On the left-hand side of the Partition Manager’s primary display window, highlight the entry for the partition that you want to remove.

Step 4. From the `Partition` menu, select `Delete Partition`. Using the confirmation requestor that appears, verify that you are about to remove the correct partition.

NOTE

If HP-UX is still running on the partition that you are trying to remove, the Partition Manager will prompt you to shut it down before showing the confirmation box described above.

Once you have confirmed that it is okay to remove the partition, the Partition Manager will do so and return you to the complex level screen. The resources formerly consumed by the partition you have just removed will be returned to the “available resources” pool.

Naming and Renaming Partitions

You can name and rename partitions using the methods described here. Only the local partition, or inactive remote partitions, can be renamed.

Partition names are used, in addition to partition numbers, in various reports and menus that the Guardian Service Processor (GSP) and the HP-UX partition tools provide.

You can perform this task using the BCH interface, HP-UX commands, or Partition Manager.

- “BCH” on page 174
- “HP-UX Commands” on page 175
- “Partition Manager” on page 176

BCH

This procedure checks and sets the local partition’s name using the BCH menu’s `PD` command, which is available from the BCH configuration menu.

Step 1. Log in to the Guardian Service Processor (GSP) for the Superdome server where the partition resides.

Step 2. Access the partition’s console.

From the GSP main menu, enter `CO` to access the console menu and select the partition.

If necessary, type `^ecf` (**Control-e c f**) to get write access for the console.

Note that if the partition is booted to HP-UX, you should instead use the HP-UX command method of modifying the partition name.

Step 3. Access the BCH interface’s configuration menu.

From the main menu, enter `CO` to access the configuration menu.

If at another menu, enter `MA` to access the main menu, then `CO`.

Step 4. At the BCH configuration menu, use the `PD` command to check and set the local partition’s name.

Enter `PD` to check the current name, or enter `PD New Name` to set the partition's name to the new name. No quotation marks are needed when specifying the new name.

```
Configuration Menu: Enter command > PD
Partition Number: 1
  Partition Name: Partition 1
Configuration Menu: Enter command >
Configuration Menu: Enter command > PD My New Name
  Partition Name: My New Name
Configuration Menu: Enter command > PD
Partition Number: 1
  Partition Name: My New Name
Configuration Menu: Enter command >
```

HP-UX Commands This procedure checks and sets the partition name for the local partition or for remote partitions using the `parmodify` command.

Step 1. List the current partition states and names using the `parstatus -P` command.

This shows all partitions, their current status (active or inactive) and their partition numbers and partition names.

Step 2. Using the `parmodify` command, set the partition name for either the local partition or for a remote partition.

```
# parmodify -p1 -P "New Name"
Command succeeded.
#
```

If the partition is successfully renamed, `parmodify` reports that the “Command succeeded”.

If the partition name contains blank spaces then quotation marks must surround the name.

Partition Manager

Step 1. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Step 2. On the left-hand side of the Partition Manager’s primary display window, highlight the entry for the partition that you want to remove.

Step 3. From the `Partition` menu, select `Modify Partition`.

The `Modify Partition` window will be displayed. The `General` panel is the place to enter the new partition name.

Step 4. In the `Partition Name` field of the `General` panel, enter the new name and click the `Ok` button.

A confirmation window will be displayed, asking you to confirm the change to the partition. Though changing the name of a partition is fairly benign, other changes that you can make to a partition can have serious consequences to your complex. This is the reason for this confirmation request.

Step 5. If you have only changed the name of the partition, it is safe to click the `Ok` button in the confirmation window to complete the name change.

A final pop-up window (a confirmation message) will appear, letting you know that you have been successful in changing the name. Click on its `Ok` button to dismiss this window and return to the complex-level View (`parmgr`’s main display).

Modifying Partitions' Boot Paths

Each HP Superdome partition has its own boot path settings that specify the primary (PRI), alternate (ALT), and high-availability alternate (HAA) boot devices. See Chapter 5 for details on boot paths and procedures for booting and rebooting partitions.

You can modify boot path settings for the local partition and remote partitions within the same Superdome complex.

You can perform this task using the BCH interface or HP-UX commands.

- “BCH” on page 177
- “HP-UX Commands” on page 177

BCH

This procedure modifies boot path variables using the BCH menu.

Step 1. Access the Boot Console Handler (BCH) main menu for the partition.

Step 2. Use the `PA` command to list current PRI, HAA, and ALT settings.

Enter `PA` with no arguments to list all paths.

Step 3. Specify `PA` with arguments to set the boot path you desire to modify.

For example, `PA PRI 4/0/1/0/0.6` sets the PRI boot path variable to 4/0/1/0/0.6.

HP-UX Commands

This procedure modifies a partition's boot path variables using the `parmodify` HP-UX command.

Step 1. Issue the `parstatus -Vp#` command to list details, including boot paths, for the partition.

Step 2. If the partition is local, or if it is an inactive remote partition, use the `parmodify` command to modify the desired boot path.

Issue `parmodify -p# -bpri` to modify the PRI boot path.

Use the `parmodify -s` option for the HAA path, and `-t` for the ALT path.

See “`parmodify` Command” on page 211 for details.

Adding Cells to a Partition

Adding cells to a partition involves selecting available cells (those not currently assigned to a partition) and assigning them to an existing partition. Both the selected cells and any I/O chassis connected to the cells are assigned to the designated partition.

When adding cells to a partition, *you must adhere to the requirements and guidelines* described in “Partition Configuration Guidelines” on page 125. Hewlett-Packard supports only a specific set of partition configurations.

You can add cells to the local partition or to any remote partitions in the same Superdome complex.

You can perform this task using HP-UX commands or Partition Manager.

- “HP-UX Commands” on page 178
- “Partition Manager” on page 179

HP-UX Commands This procedure adds cells to a partition using HP-UX commands.

- Step 1.** Use the `parstatus -AC` command to list all available (unassigned) cells in the complex.
- Step 2.** Select the eligible cell from the list, based on your previous planning.
- Step 3.** Modify the partition.

Use the `parmodify -p# -a#...` command to add the cell. If modifying a remote partition, you can specify the `-B` option as well.

See “parmodify Command” on page 211 for details on the options you must specify (`-a#:base:use-on-next-boot:ri`) when adding the cell.

- Step 4.** Perform a reboot-for-reconfig on the modified partition, if needed.

If you added the cell to an active (local or remote) partition, *you must use* the `shutdown -R` or `reboot -R` command to reboot the partition. You must perform this step to add the cell to the partition. If you added the

cell to an inactive remote partition, and you did not specify `-B`, then use the GSP command menu's `BO` command to boot the partition.

Partition Manager

Step 1. Through careful planning, determine which cell(s) you want to add to the partition.

Step 2. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Step 3. On the left-hand-side of the Partition Manager's primary display window, highlight the entry for the partition that you want to add cells to. This will display (on the right-hand side of the window) a list of the cells and I/O chassis currently associated with the partition.

Step 4. From the Partition View screen, select Modify Partition from the Partition menu. This will bring up a new window showing two lists:

On the left	On the left, a list of cells currently in the partition
On the right	On the right, a list of available cells (cells that can be added to the partition)

Step 5. Highlight the available cells that you want to add to the partition (multiple cells can be selected by holding down the `CTRL` button while selecting the second and subsequent cells), then click the `<--Add-->` button between the two lists. When the list on the left-hand side contains all of the cells you want to include in the partition proceed to the next step.

Step 6. *Before clicking on the `OK` button*, make any desired changes to the settings for the cells that are now to be a part of the partition:

- Do you want to change which cell in the partition will be the primary **core cell**?
- Do you want any of the new cells in the partition to be **alternate core cells**?

- Do you want to change the **failure usage** for any of the cells in the partition?
- Do you want to change which cells will be used by the partition the **next** time it is booted?

All of these things can be set from the `Modify Partition` window before you proceed. For help in changing any of these items, see “Setting and Checking a Partition’s Core Cell Choices” on page 185.

Step 7. When you have completed any changes you want to make in the settings for the cells in this partition, click on the **OK** button to complete the partition modification.

A confirmation window will confirm that you have successfully (almost) added the cells. See the next step for important information.

Step 8. *As soon as possible reboot the partition using the special `reboot-for-reconfiguration` option:*

NOTE

Your changes will not take effect until you reboot the partition with the special **reboot-for-reconfiguration** option.

It is not necessary (when *adding* a cell to a partition) to immediately reboot, but the complex profile will be locked, preventing further changes until this special reboot occurs. For more information on rebooting a partition for reconfiguration, see “Performing a Reboot-for-Reconfig for a Partition” on page 263.

Removing Cells from a Partition

Removing a cell involves

1. using a partition configuration tool to designate that the cell be removed from a partition
2. rebooting the partition for reconfiguration (performing a *reboot-for-reconfig*).

Once a cell is removed from a partition, the cell is unassigned and available for general use, along with any I/O resources connected to the cell.

Note that, when you remove a cell from a partition, the cell's I/O chassis also is removed from the partition. As a result, any I/O devices associated with the cell are made unavailable to the partition.

Also note that at least one cell in each partition must be connected to an I/O chassis that has a core I/O card installed and an HP-UX boot device attached.

When removing cells from a partition, *you must adhere to the requirements and guidelines* described in “Partition Configuration Guidelines” on page 125. Hewlett-Packard recommends only a specific set of partition configurations.

You can remove any cell from the local partition, and you can remove any inactive cell from remote partitions within the same Superdome complex.

You can perform this task using HP-UX commands or Partition Manager.

- “HP-UX Commands” on page 181
- “Partition Manager” on page 183

HP-UX Commands This procedure describes how to remove cells from a partition using HP-UX commands.

Step 1. List the current partition assignments for all cells.

Use the `parstatus -C` command to list all cells in the complex, and check the partition assignment for cell that you want to remove.

Determine the partition number of the partition to which the cell is assigned.

Step 2. List the current status for the partition.

Use the `parstatus -p#` command to list the partition's status (active or inactive); specify the partition number for the cell's partition.

The partition to which the cell is assigned must be inactive, or the cell must be assigned to the local cell.

Step 3. Remove the cell from the partition to which it is assigned.

If the cell is the last cell in the partition, you must instead use the `parremove` command to remove the partition. (See “`parremove Command`” on page 213 for details.)

To remove the cell from its partition, issue the `parmodify` command.

- If removing from the local partition, specify the `-B` option.

Specify `parmodify -p# -d# -B` and specify the partition number (`-p#`) and the cell ID for the cell to be deleted (`-d#`).

- If removing from an inactive remote partition, you need not specify `-B` unless you want to reboot the partition immediately.

Specify `parmodify -p# -d#` and specify the partition number (`-p#`) and the cell ID for the cell to be deleted (`-d#`).

Specify `-B` when removing the remote partition's cell only if you want to reboot-for-reconfig the partition immediately after the cell is removed.

Step 4. As necessary, perform a reboot-for-reconfiguration on the partition being modified.

On the local partition, *you must* issue the `shutdown -R` command or the `reboot -R` command to reboot the partition and perform the partition reconfiguration (deleting the cell).

On the remote partition, if you did not specify `-B`, then use the GSP command menu's `BO` command to boot the partition.

Partition Manager

Step 1. Determine which cell(s) you want to remove from the partition.

Step 2. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Step 3. From the left-hand-side of the Partition Manager’s primary display window, highlight the entry for the partition that you want to remove cells from. This will open up the Partition View showing the cells and I/O chassis currently associated with the partition.

Step 4. From the Partition View screen, select `Modify Partition` from the `Partition` menu. This will bring up a new window showing two lists:

On the left	On the left, a list of cells currently in the partition
On the right	On the right, a list of available cells (cells that can be added to the partition)

Step 5. In the list of cells currently in the partition highlight the cells that you want to remove from the partition (multiple cells can be selected by holding down the **CTRL** button while selecting the second and subsequent cells), then click the **--Remove-->** button between the two lists. When the list on the left-hand side contains only the cells you want to remain in the partition proceed to the next step.

Step 6. *Before clicking on the **OK** button*, make any desired changes to the settings for the remaining cells in the partition:

- Do you want to change which cell in the partition will be the **core cell**?
- Do you want to make any changes (for any of the remaining cells in the partition) as to which ones should be **alternate core cells**?
- Do you want to change the **failure usage** for any of the cells remaining in the partition?

- Do you want to change which cells will be used by the partition the **next** time it is booted?

All of these things can be set from the `Modify Partition` window before you proceed. For help in changing any of these items, see “Setting and Checking a Partition’s Core Cell Choices” on page 185.

- Step 7.** When you have completed any changes you want to make in the settings for the cells in this partition, click on the OK button to complete the partition modification.

NOTE

If the cell(s) that you are attempting to remove are active cells in the local partition, *you will be forced to immediately reboot the local partition* using the special reboot-for-reconfiguration option. *Do not* click on the OK button unless you are sure it is okay to reboot the local partition now!

If you are attempting to remove a cell that is an active cell in the local partition, a warning will be displayed to alert you.

-
- Step 8.** Immediately reboot the partition using the reboot-for-reconfiguration option: issue the `shutdown -R` or `reboot -R` command.

Setting and Checking a Partition's Core Cell Choices

You can establish each partition's *core cell choices*. The core cell and core alternate cell settings establish which cells in the partition are preferred to be used as the **core cell**.

For details about core cells, see “Types of Cells” on page 118.

You can perform this task using the BCH interface, HP-UX commands, or Partition Manager.

- “BCH” on page 185
- “HP-UX Commands” on page 186
- “Partition Manager” on page 187

BCH

This procedure uses the BCH interface to set the core cell and core alternate cell settings for a partition.

Step 1. Access the BCH menu for the partition whose core cell choices you wish to set.

Step 2. Access the BCH configuration menu for the partition.

From the BCH main menu, enter `CO` to enter the configuration menu.

Step 3. Issue the `COC` command to check current core cell preferences.

Entering `COC` with no arguments lists all core cell preferences.

Step 4. Issue the `COC` command, with arguments, to set or change core cell preferences.

For example, `COC 1 4` sets the first core alternate preference to be cell ID 4.

Likewise, `COC 0 2` sets the core cell preference to be 2.

Step 5. If you have changed the setting for the core cell, and you want the cell you have specified to immediately become active as the core cell, reboot the partition: issue the BCH menu's REBOOT command.

This step is optional. If you do not perform this step, the active core cell will change (if you've modified the setting) the next time the partition is rebooted.

HP-UX Commands This procedure uses HP-UX commands to set the core cell and core alternate cell preferences for a partition.

Step 1. Check the current core cell settings and core cell use.

Use the `parstatus -V -p#` command to list detailed partition status, including the current active core cell, and the alternate core cell settings.

```
# parstatus -V -p0
[Partition]
Partition Number      : 0
Partition Name       : jules00
Status               : active
IP address           : 0.0.0.0
Primary Boot Path    : 0/0/2/0/0.13.0
Alternate Boot Path  : 0/0/2/0/0.0.0
HA Alternate Boot Path : 0/0/2/0/0.14.0
PDC Revision        : 6.0
IODCH Version       : 23664
CPU Speed           : 552 MHz
Core Cell           : cab0,cell0
Core Cell Alternate [1]: cab0,cell10
Core Cell Alternate [2]: cab0,cell12

Hardware Location  Usage      Core Connected  Par
IO To Num
=====
cab0,bay0,chassis1 active     yes cab0,cell10 0
cab0,bay1,chassis3 active     yes cab0,cell12 0

#
```

The active (current) core cell is listed by `parstatus` as the “Core Cell”.

The core cell preferences are listed by `parstatus` as “Core Cell Alternates”. The “Core Cell Alternate” settings that `parstatus` lists, if any, indicate the preferred core cell as “1” and the core alternates, if any, as “2” through “4”.

Step 2. Modify the partition's core cell settings.

You can modify the local partition or any remote partition in the Superdome complex.

Use the `parmodify` command: `parmodify -p# -r# -r#...`

Specify the partition number (`-p#`) and the cell ID (`-r#`) for all cells you wish to designate as core cell preferences.

```
# parmodify -p0 -r2 -r0
Command succeeded.
#
```

The order in which you list the cells is the order in which the partition's core cell preferences are established; the first cell listed is the first preferred core cell (preference 1), and the subsequent cells are alternate core cells (preferences 2 through 4, if specified).

Step 3. If you wish to immediately change the active core cell, boot or reboot the partition whose core cell choices you have changed.

If you have modified the local partition, issue the `reboot` or `shutdown` command with the `-r` option to boot the partition with the new core cell preference serving as the active core cell. (You *do not need* to perform a reboot-for-reconfig of the partition.)

If you have modified an inactive remote partition, use the GSP command menu's `BO` command to boot the remote partition; the designated core cell preferences will be used to select the active core cell.

Partition Manager To modify the core cell settings for a partition using the Partition Manager:

Step 1. Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser

- the System Administration Manager utility (SAM)

For details see “How to Start The Partition Manager” on page 141.

Step 2. On the left-hand side of the Partition Manager’s primary display window, highlight the entry for the partition you want to modify.

The right-hand side of the display will change to show the resources currently assigned to the partition.

Step 3. From the `Partition` menu, select `Modify Partition`.

Step 4. Adjust the core cell settings in the `Modify Partition` window:

a. The `Core Cell Choices` panel shows all the cells that are attached to an I/O chassis with a core I/O cards in slot 0. If more than one cell is listed here, you can change the order in which they are tried when the partition boots.

b. To adjust the order in which the cells are tried, select the entry for the cell that you want tried first. Then, choose `1st` from the drop down menu labeled `Core Cell Choice:` and click the **Modify** button.

If this cell was not already the first core cell choice, the list will be updated to reflect your change, and the other cells renumbered.

c. Repeat the previous step for your 2nd and subsequent core cell choices. When the list reflects the order you want, click the **OK** button in the `Modify Partition` window to submit your changes.

Setting and Checking Cell Attributes

Each cell assigned to a partition has several attributes that determine when the cell is used.

You can list and set each cell's *use-on-next-boot* and *failure-usage* attribute settings. These settings determine when the cell becomes active by joining the partition during the boot process.

- **Use on Next Boot**

The *use-on-next-boot* setting for each cell indicates whether the cell will be used (active) the next time the partition is booted.

- **Failure Usage**

The *failure-usage* setting (the `Failure Mode`, in Partition Manager) for each cell indicates whether the cell will be used, if possible, if any processors or memory fail during the cell's self-tests.

NOTE

HP-UX Release 11i supports only one cell failure-usage setting: *reactivate with interleave*.

The *reactivate-with-interleave* setting allows a cell to join its partition following processor or memory failures during the cell's self tests. The cell joins its partition if at least one processor and any valid amount of memory passes self tests. Any of the cell's components that fail (processors or memory) are not available to the partition.

HP-UX will support other failure-usage settings in future releases.

The procedures that follow describe how to list and set these cell attributes.

You can perform this task using the BCH interface, HP-UX commands, or Partition Manager.

- “BCH” on page 190
- “HP-UX” on page 192
- “Partition Manager” on page 194

BCH

You can list and set a cell's *use-on-next-boot* setting by using the BCH interface for the cell's partition.

Use the following procedure to modify the use-on-next-boot settings from BCH. Note that you cannot use the BCH interface to list or modify cell failure-usage settings. Instead use HP-UX commands or Partition Manager.

- Step 1.** Log in to the Superdome complex's GSP, access the partition's console, and access the BCH main menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

- Step 2.** Access the BCH configuration menu by entering CO from the BCH main menu.

If you are at a BCH menu other than the main menu, enter MA to return to the BCH interface's main menu and then access the BCH configuration menu.

- Step 3.** From the BCH configuration menu, use the CELLCONFIG command to list or set each cell's *use-on-next-boot* setting.

To list the use-on-next-boot settings for all cells in the partition, issue the CELLCONFIG command with no arguments.

```
Configuration Menu: Enter command > CELLCONFIG

Cell Configuration Data for Partition
-----
Configured Set   : 0x00000000000000050
Deconfigured Set : 0x00000000000000000
Free Cell Set    : 0xfffffffffffffaa

Cell   Cab/  Cell State  Configuration Status
-----
  4   0/4    Alive       Configured
  6   0/6    Alive       Configured

Configuration Menu: Enter command >
```

To change the use-on-next-boot setting for a cell, issue the CELLCONFIG command: CELLCONFIG *cell* [ON|OFF]

For example, `CELLCONFIG 6 OFF` sets the use-on-next-boot setting for cell 6 to OFF. This causes the cell to not be used (not rendezvous) in the partition the next time the partition boots.

```
Configuration Menu: Enter command > CELLCONFIG 6 OFF
Are you sure you want to DECONFIGURE cell 6 for next boot? (y/[n]) >> y
Cell 6 will be disabled during next reboot.
Configuration Menu: Enter command >
```

Step 4. Reboot the partition to use the cells' new use-on-next-boot settings.

If you have changed any cell use-on-next-boot settings for the partition, you should reboot the partition in either of two ways.

Do either of the following.

- Use the BCH interface's `RECONFIGRESET` command to put the partition in a ready-for-reconfig state, then use the GSP command menu's `BO` command to boot the partition.

If you have changed any cell from OFF ("n", do not use on next boot) to ON ("y", use the cell on next boot) then you must perform these two tasks; this resets and reconfigures the partition and boots it.

BCH

```
Configuration Menu: Enter command > RECONFIGRESET
Reset the partition for reconfiguration of Complex Profile ...
```

GSP

```
GSP:CM> BO
This command boots the selected partition.
#   Name
---  ---
0)  jules00
1)  jules01
Select a partition number: 1
Do you want to boot partition number 1? (Y/[N]) y
-> The selected partition will be booted.
GSP:CM>
```

- Use the BCH interface's `REBOOT` command to perform a reboot.

If you have only changed cell configurations from ON to OFF perform a reboot. Any cells set to not be used will still be assigned to the partition but will not be used (will not rendezvous) in the partition.

HP-UX

You can use HP-UX commands to list and configure the *use-on-next-boot* and *failure-usage* settings for cells assigned to any partitions within the Superdome complex.

Step 1. Log in to HP-UX running on the partition.

You can log in to HP-UX on the partition either by directly connecting with `telnet` or `rlogin`, or by logging in to its complex's GSP and accessing the partition's console. Connecting through the GSP allows you to maintain partition console access after HP-UX has shut down.

Step 2. From the HP-UX command line, use the `parstatus` command to list the *use-on-next-boot* and *failure-usage* attribute settings for cells in the Superdome complex.

Use either `parstatus -C` or `parstatus -V -c#` to list the cell attribute settings. The following examples and text describe both these commands.

You can list and modify any cell's settings from HP-UX running on any partition in the Superdome complex. These settings may be reported as follows.

- A *use-on-next-boot* value of “yes” means the cell will be active as part of the partition the next time the partition boots.
 “Yes” is equivalent to a BCH cell configuration value of ON and “no” is equivalent to OFF.
- A *failure-usage* setting of “activate” indicates that the cell is set to reactivate with interleave in the event of any failure during the cell's self test.

Use the `parstatus -C` command to list the *use-on-next-boot* setting for all cells, which is shown in the “Use On Next Boot” column.

```
# parstatus -C
[Cell]
          CPU      Memory      Use
Hardware  Actual   OK/      (GB)      Core
Location  Usage   Deconf/  OK/      Cell
          Max   Deconf   Deconf   Connected To  Capable  Next  Par
=====  =====  =====  =====  =====  =====  =====  =====
cab0,cell0 active core  4/0/4    2.0/ 0.0  cab0,bay0,chassis1  yes     yes  0
cab0,cell1 absent  -        -        -        -                -       -    -
cab0,cell2 active base  4/0/4    2.0/ 0.0  cab0,bay1,chassis3  yes     yes  0
cab0,cell3 absent  -        -        -        -                -       -    -
cab0,cell4 active core  4/0/4    2.0/ 0.0  cab0,bay0,chassis3  yes     yes  1
cab0,cell5 absent  -        -        -        -                -       -    -
cab0,cell6 active base  4/0/4    2.0/ 0.0  cab0,bay1,chassis1  no      yes  1
cab0,cell7 absent  -        -        -        -                -       -    -
#
```


To list a specific cell's failure-usage and use-on-next boot settings, issue the `parstatus -V -c#` command and specify the cell number.

```
# parstatus -V -c2
[Cell]
Hardware Location      : cab0,cell2
Global Cell Number    : 2
Actual Usage          : active base
Normal Usage          : base
Connected To          : cab0,bay1,chassis3
Core Cell Capable     : yes
Firmware Revision     : 6.0
Failure Usage         : activate
Use On Next Boot      : yes
Partition Number      : 0

Memory OK              : 2.00 GB
Memory Deconf         : 0.00 GB
#
```

Step 3. To modify a cell's *use-on-next-boot* and *failure-usage* attribute settings, use the `parmodify` command and specify the cell's new settings.

Specify both the `-p` (partition number) and `-m` (modify cell) options when using `parmodify`. The following example modifies cell 2 to not be used the next time its partition (partition number 0) boots.

```
# parmodify -p0 -m2:base:n:ri
Command succeeded.
#
```

The `parmodify` command's `-m` option is as follows:

```
-m cell:[cell_type]:[use_on_next_boot]:[failure_usage]
```

This option specifies the cell ID (*cell*) whose settings are modified using the following arguments.

- The only valid *cell_type* value is `base` (base cell).
- The valid *use_on_next_boot* values for cells are:
 - y Participate in reboot (the default).
 - n Do not participate in reboot.
- The only valid *failure_usage* value for cells is `ri` (reactivate and interleave).

For details, see the `parmodify` (1M) manpage or see “`parmodify` Command” on page 211.

- Step 4.** If you have modified a cell's attribute settings, for the settings to be used you must reboot the partition to which the cell is assigned.

Rebooting the cell's partition allows the partition to use each cell's new attribute settings.

If a cell's use-on-next-boot setting is changed from "n" (do not use) to "y" (use), you must perform a *reboot-for-reconfig* of the cell's partition by using the `shutdown -R` or `reboot -R` command.

Otherwise, if the cell use-on-next-boot settings are only changed from "y" to "n" then you can perform a standard reboot using the `shutdown -r` or `reboot -r` command.

Partition Manager To modify the attribute settings for a cell using the Partition Manager:

- Step 1.** Run the Partition Manager (`parmgr`).

The Partition Manager can be run from:

- an HP-UX command line
- a Web browser
- the System Administration Manager utility (SAM)

For details see "How to Start The Partition Manager" on page 141.

- Step 2.** On the left-hand side of the Partition Manager's primary display window, highlight the entry for the partition you want to modify.

The right-hand side of the display will change to show the resources currently assigned to the partition.

- Step 3.** From the `Partition` menu, select `Modify Partition`.

The `Change Cell Attributes` panel allows you to change the `Use on Next Boot` settings for the cells in the selected partition.

- Step 4.** Adjust the cell attribute settings in the `Modify Partition` window:

- a.** In the `Change Cell Attributes` panel of the `Modify Partition` window, a list of cells in the partition will be displayed, showing each cell's current settings for `Use on Next Boot` and "Failure Usage".

- b.** To change whether or not a cell will be used the next time the selected partition is booted, highlight the entry for the cell for which you want to modify the settings for and click the **Modify Cell(s) ...** button.

The `Modify Cell Attributes` window will be displayed allowing you to modify the cell's `Use on Next Boot` setting.

- c.** Using the drop down menu in the `Modify Cell Attributes` window, specify:

- Whether or not you want the cell to be used the next time the partition is booted.

After setting the `Use on Next Boot` attribute, click on the **OK** button in the `Modify Cell Attributes` window to complete the selection.

- d.** Repeat the preceding step for all cells that you want to modify. When the list of cells reflects your desired settings, click on the **OK** button in the `Modify Partition` window to register your changes and return to the Partition Manager's primary display window.

NOTE

Your changes to the partition will not take effect until the next time the partition is rebooted.

Moving Cells to a Different Partition

To move a cell to a different partition, use the high-level procedure describe here. This involves:

1. making the cells current partition inactive
2. removing the cell from its current partition
3. adding the cell to the new partition
4. rebooting the cell's new partition

You must adhere to the requirements and guidelines described in “Procedure for Assigning Cells to Partitions” on page 126 when moving cells among partitions. Both the partition from which the cell is removed and the partition to which the cell is assigned must conform to these guidelines.

When you remove a cell from a partition, the cell's I/O chassis also is removed from the partition. As a result, any I/O devices associated with the cell are made unavailable to the partition.

CAUTION

Moving a cell or I/O chassis from one partition to another is effectively the same as moving the associated I/O devices from one computer to another.

All precautions you would take when moving I/O devices from one computer to another should be taken here. Notably, LVM volume groups that are being moved from one partition to another need to be exported from their original partition **before** the cell or I/O chassis is moved (see *vgexport* (1M) and *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*!).

Procedure

Use the following high-level procedure to move a cell to a different partition. You can perform these steps using either HP-UX commands or Partition Manager (`parmgr`).

- Step 1.** Use the procedure “Removing Cells from a Partition” on page 181 to remove the cell(s) that you want to move to the other partition.

In this step you perform a reboot-for-reconfig of the partition that initially contains the desired cell(s). This returns the cells to the free cell list so that they are available in the next step.

Step 2. Use the procedure “Adding Cells to a Partition” on page 178 to add the cell(s) you made available in step 1 to the partition (that will be their new location).

This step requires that you perform a reboot-for-reconfig of the partition to which the cells are being added. This reboot-for-reconfig makes the cells available for use in the new location.

Moving I/O to a Different Partition

CAUTION

Moving a cell or I/O chassis from one partition to another is effectively the same as moving the associated I/O devices from one computer to another.

All precautions you would take when moving I/O devices from one computer to another should be taken here. Notably, LVM volume groups that are being moved from one partition to another need to be exported from their original partition **before** the cell or I/O chassis is moved (see *vgexport* (1M) and *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*!).

You have the following options for moving I/O from one partition to another.

- **Moving a single I/O card to different partition.**

If you just need to move a single I/O card, you can move the card from the I/O chassis in which it currently is installed to an I/O chassis that is available in the partition where you want it to reside.

This is essentially the same as moving an I/O card from one system to another.

- **Moving an I/O chassis to a different partition.**

If you need to move an entire I/O chassis from one partition to another, you can use either of the following methods.

- Connect the I/O chassis cables to a cell in the partition.

Only HP service personnel should perform this task. Contact HP to have the I/O chassis cables connected to a different cell.

For details see “Moving an I/O Chassis to a Different Cell” on page 200

- Assign the cell to which the I/O chassis is connected to belong to a different partition.

Reconfigure the complex so that the cell to which the I/O chassis is connected is assigned the partition in which you want the I/O to be available.

For details see “Moving Cells to a Different Partition” on page 196.

Disks, filesystems, volume groups, and networking may need to be reconfigured once the I/O chassis is moved to its new partition.

Moving an I/O Chassis to a Different Cell

Each I/O chassis is physically cabled to one of the cells in the same Superdome complex. This cabling makes the I/O chassis available to the cell and to the partition to which the cell is assigned.

Normally each I/O chassis remains directly cabled to the same cell. However if your needs require connecting the I/O chassis to a different cell you can do so by coordinating with your HP service representative.

CAUTION

Do not move the cables that connect I/O chassis to cell boards. *This is an operation that only Hewlett-Packard service personnel should perform.*

When changing the I/O-to-cell cabling for an I/O chassis, you must consider the following issues.

- All devices that are connected to cards in the I/O chassis will be available only to the partition to which the I/O chassis' cell is assigned.

Connecting an I/O chassis to a different cell can cause the partition to not meet the hardware requirements if, for example, doing so causes the partition to not have a core I/O card or boot disk available.

If cabling the I/O chassis to a different cell causes the I/O to be assigned to a different partition, you must consider how this will affect the current partition.

For details see “Partition Hardware Requirements” on page 124.

- The hardware paths to all cards in the I/O chassis will change when the chassis is connected to a different cell.

This will likely affect LVM physical volume headers and other HP-UX hardware paths. Devices and logical volumes may not be accessible until you reconfigure HP-UX and/or LVM.

- Any partitions that contain the source and/or the destination cells for the I/O chassis must be shut down and powered off when changing the I/O chassis cabling to the cells.

Plan the recabling of your Superdome I/O chassis by referring to the guidelines in “Partition Hardware Requirements” on page 124, Appendix A, “Planning Superdome Configurations,” on page 283, and by coordinating with your HP sales or service representative.

Listing All Configured Partitions

You can configure each Superdome complex to include one or more partitions that are composed of cells in the complex.

This section presents ways to list all partitions that are configured in a Superdome complex.

You can perform this task using GSP menus, HP-UX commands, or Partition Manager.

- “GSP” on page 201
- “HP-UX Commands” on page 202
- “Partition Manager” on page 204

GSP

Use this procedure to list all partitions in a Superdome complex by using the complex’s GSP command menu.

Step 1. Log in to the Superdome complex’s GSP and access the GSP command menu.

After logging in to the GSP, enter CM to select the GSP command menu.

```
# telnet sdome-s
Trying...
Connected to sdome-s.rsn.hp.com.
Escape character is '^]'.
Local flow control off

GSP login: Accountname
GSP password:

CO: Consoles
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Logs
SL: Show chassis Logs
HE: Help
X: Exit Connection

GSP> CM

Enter HE to get a list of available commands

GSP:CM>
```

Step 2. From the GSP command menu, enter the CP command to list all configured partitions within the Superdome complex.

The GSP command menu's CP command lists each partition (by partition number) and indicates which cells from each cabinet are assigned to the partition.

In the following example the complex has two partitions: partition number 0 has cells 0 and 2, and partition number 1 has cells 4 and 6.

```
GSP:CM> CP
```

Cabinet	0	1	2	3	4	5	6	7
Slot	01234567	01234567	01234567	01234567	01234567	01234567	01234567	01234567
Part 0	X.X.....	.....	.....	.....	.....	.....	.....	.....
Part 1	...X.X.	.....	.....	.....	.....	.....	.....	.....

```
GSP:CM>
```

The partition names *are not listed* by the CP command. The GSP command menu's CP command lists each partition by number.

To the right of each partition number is a list of cells assigned to the partition. Each assigned cell is marked with an "X" indicating that it belongs to the partition.

The cell slot (0 to 7) and cabinet number (0 or above) are listed above each cell.

HP-UX Commands Use this procedure to list information about all partitions in a Superdome complex by using HP-UX commands.

From any partition in a complex, you can list details about all cells and partitions within the complex.

Step 1. Log in to HP-UX running on one of the Superdome complex's partitions.

You can log in to HP-UX on the partition either by directly connecting with `telnet` or `rlogin`, or by logging in to its complex's GSP and accessing the partition's console.

Step 2. Issue the `parstatus -P` command to list brief details about all partitions in the Superdome complex.

The `parstatus -P` command lists all partitions and shows each partition's number, the number of cells and I/O chassis assigned to it, the partition's active core cell, and its name.

```
# parstatus -P
[Partition]
Par          # of # of I/O
Num Status   Cells Chassis Core cell Partition Name (first 30 chars)
====
0  active    2     2     cab0,cell10 jules00
1  active    2     2     cab0,cell14 jules01
#
```

While a partition is booting, the `parstatus` command cannot determine the partition's I/O chassis and core cell information. When this is the case `parstatus` does not count the I/O chassis and reports a question mark (?) for the core cell. When the partition has completed booting, `parstatus` reports all details.

Step 3. Issue the `parstatus -C` command to list detailed information about all cells and partitions in the Superdome complex.

The `parstatus -C` command presents more detailed information about all cells and partitions. These details include each cell's status (active, inactive), its processor and memory configuration, its I/O chassis connections (if any), the cell's use-on-next-boot setting, and partition assignment.

```
# parstatus -C
[Cell]
Hardware      CPU      Memory      Core      Use
Location      Actual   OK/          Deconf/   Cell      On
Usage         Max      Deconf      Connected To Capable Boot Num
=====
cab0,cell10   active  core  4/0/4   2.0/ 0.0  cab0,bay0,chassis1  yes  yes  0
cab0,cell11   absent  -      -      -      -      -
cab0,cell12   active  base  4/0/4   2.0/ 0.0  cab0,bay1,chassis3  yes  yes  0
cab0,cell13   absent  -      -      -      -      -
cab0,cell14   active  core  4/0/4   2.0/ 0.0  cab0,bay0,chassis3  yes  yes  1
cab0,cell15   absent  -      -      -      -      -
cab0,cell16   active  base  4/0/4   2.0/ 0.0  cab0,bay1,chassis1  no   yes  1
cab0,cell17   absent  -      -      -      -      -
#
```

For cells and partitions that have not finished booting, the `parstatus` command cannot determine processor, memory, or I/O details and instead reports a question mark (?) for these details.

Partition Manager

Step 1. Run the Partition Manager:

```
/opt/parmgr/bin/parmgr
```

When the Partition Manager starts up both the left-hand-side and the right-hand-side of the display will list the partitions in the complex.

If you are already running the Partition Manager and are not at the Complex View, just click on the root of the tree (My Complex) on the left-hand-side of the display to display the list of partitions.

Listing Cell Partition Assignments

Each cell in a Superdome complex is either assigned to a partition, or it is unassigned (it is on the “free cell list”).

This section presents a method for listing all cells in a Superdome complex and their partition assignments (if any).

You can perform this task using HP-UX commands.

- “HP-UX” on page 205

HP-UX

This procedure uses the `parstatus` HP-UX command to list all cells in a Superdome complex along with any partition assignments.

Step 1. Log in to HP-UX running on one of the Superdome complex’s partitions.

Step 2. Issue the `parstatus -C` command to list all cells, any I/O chassis connections, and any partition assignments for the cells.

In addition to reporting the cells’ partition assignments (listed in the “Par Num” column), the `parstatus` command reports each cell’s current status (absent, inactive, active core, active base) in the “Actual Usage” column.

```
# parstatus -C
[Cell]
      CPU      Memory
Hardware  Actual   OK/    (GB)
Location  Usage   Deconf/ OK/
          Max    Deconf  Connected To
=====  =====  =====  =====  =====  =====  =====
cab0,cell10 active core  4/0/4   2.0/ 0.0  cab0,bay0,chassis1  yes   yes  0
cab0,cell11 absent          -         -         -                   -     -    -
cab0,cell12 active base  4/0/4   2.0/ 0.0  cab0,bay1,chassis3  yes   yes  0
cab0,cell13 absent          -         -         -                   -     -    -
cab0,cell14 active core  4/0/4   2.0/ 0.0  cab0,bay0,chassis3  yes   yes  1
cab0,cell15 absent          -         -         -                   -     -    -
cab0,cell16 inactive  4/0/4   2.0/ 0.0  cab0,bay1,chassis1  no    -    -
cab0,cell17 absent          -         -         -                   -     -    -
#
```

For cells that are not assigned to a partition, `parstatus` lists a hyphen (-) in the “Par Num” column instead of the cell’s partition number.

Consolidating Multiple Partitions

Consolidating multiple partitions involves (1) removing a partition, thus making all the partition's cell available to be assigned to other partitions, and (2) assigning those cells to another partition.

This general process effectively removes one or more virtual systems (partitions) and allocates those resources to another partition within the same Superdome complex.

Procedure Use the following high-level procedure when consolidating partitions.

Step 1. Determine the overall partition configuration you wish to establish for the Superdome complex.

To accomplish this planning refer to “Configuring Superdome Hardware and Partitions” on page 122 and Appendix A, “Planning Superdome Configurations,” on page 283 for basic guidance.

Also refer to your HP sales or support representative to ensure that the new Superdome complex configuration establishes an HP-recommended partition configuration.

Step 2. Remove the partitions whose cells (and associated I/O chassis) will be consolidated into another partition.

See “Deleting (Removing) a Partition” on page 170 for details on this task.

Step 3. Assign the cells that you made available in the previous step to a partition, either by creating a new partition or by adding them to an existing partition.

To create a new partition using the newly available resources use the procedure listed in “Creating a New Partition” on page 161.

To add the resources to an existing partition refer to “Adding Cells to a Partition” on page 178.

NOTE

You must configure all I/O devices within the newly created partition for HP-UX to make the devices available.

Unlocking Complex Profiles

Unlocking complex profiles **is not recommended**. You can, if required, use the `parunlock` command.

See “parunlock Command” on page 217 for details.

HP-UX Superdome Configuration Commands—Details and Syntax

This section provides you with additional details and the command-line syntax for the new HP-UX Superdome configuration commands.

The following HP-UX commands are covered here:

- parcreate Command
- parmodify Command
- parremove Command
- parstatus Command
- parunlock Command

For a general introduction to using these commands, see “HP-UX Superdome Configuration Commands—An Introduction” on page 135.

NOTE

The command information provided on the following pages is provided for quick reference. These are *not* the manpages. Please consult the corresponding manpages on your system for the most up-to-date information on the syntax and options for these commands, information which could have changed since this manual was published.

parcreate Command

NOTE

For the most up-to-date reference information on the `parcreate` command, see the *parcreate* (1M) manpage on your system. The information here is provided for quick reference.

The `parcreate` command creates a new partition. This command takes the specified cells (and any attached I/O chassis) from the free cell list and assigns them to the partition.

This command finds an available partition number and assigns it to the new partition. It returns the partition number of the newly created partition.

Root permission is required to use `parcreate`.

parcreate Command Syntax

The command-line syntax for `parcreate` is:

See the *parcreate* (1M) manpage for additional details.

Synopsis

```
parcreate [-P PartitionName] [-I IPaddress]  
-c cell: [cell_type]: [use_on_next_boot]: [failure_usage] [-c...]  
[-b path] [-t path] [-s path] [-r cell] [-r...] [-B] [-k s_lock]
```

For details on specifying cells, cabinets, and I/O chassis, see “Specifying Cells and I/O Chassis” on page 137.

Options

- P *PartitionName* Specifies the name of the new partition.
- I *IPaddress* Specifies the IP address that should be used by management tools (like SAM) to address this partition.
- c *cell*: [*cell_type*]: [*use_on_next_boot*]: [*failure_usage*]
Specifies the cell(s) to be assigned to the partition.
 - The only valid *cell_type* value is:
 - base Base cell (the default).
 - The valid *use_on_next_boot* values for cells are:
 - y Participate in reboot. (The default.)
 - n Do not participate in reboot.

- The only valid *failure_usage* value is:
 - `ri` Reactivate with interleave (the default).
- b *path* Specifies the primary (PRI) boot path.
- t *path* Specifies the alternate (ALT) boot path.
- s *path* Specifies the secondary (HAA) boot path.
- r *cell* Specifies the root alternates. One to four cells can be specified.
- B Specifies to boot the partition. The default is not to boot.

parmodify Command

NOTE

For the most up-to-date reference information on the `parmodify` command, see the *parmodify* (1M) manpage on your system. The information here is provided for quick reference.

You can use the `parmodify` command to modify the following attributes of an existing partition:

- Partition name
- Cell assignments (add cells or remove cells)
- Attributes of existing cells (such as the “use on next boot” setting)
- Core cell and core alternate cells
- Boot paths (the primary, alternate, and HA alternate paths)
- Partition’s IP address

Root permission is required to use this command.

parmodify Command Syntax

The command-line syntax for `parmodify` is:

See the *parmodify* (1M) manpage for additional details.

Synopsis

```
parmodify -p PartitionNumber  
-a cell: [cell_type]: [use_on_next_boot]: [failure_usage] [-a... ] |  
-m cell: [cell_type]: [use_on_next_boot]: [failure_usage] [-m... ] |  
-I IPaddress | -r cell [-r... ] | -d cell [-d... ] | -b path |  
-t path | -s path | -P PartitionName | -B | -k s_lock:p_lock
```

The `-p` option is required.

For details on specifying cells, cabinets, and I/O chassis, see “Specifying Cells and I/O Chassis” on page 137.

Options

The `parmodify` command supports the following command-line options.

`-p` *PartitionNumber*

Specifies the partition to be modified. *PartitionNumber* specifies the unique number (integer) assigned to the partition. The `-p` option is required.

Note that you must also to specify any one or more of the following options.

- a *cell* : [*cell_type*] : [*use_on_next_boot*] : [*failure_usage*]**
Specifies the cell(s) to be added to the partition.
- The valid *cell_type* value is:
 - base** Base cell. (The default.)
 - The valid *use_on_next_boot* values for cells are:
 - y** Participate in reboot. (The default.)
 - n** Do not participate in reboot.
 - The only valid *failure_usage* value is:
 - ri** Reactivate with interleave (the default).
- m *cell* : [*cell_type*] : [*use_on_next_boot*] : [*failure_usage*]**
Modify attributes of a cell already assigned the partition.
For details on *cell_type*, *use_on_next_boot*, and *failure_usage* see the **-a** option's descriptions (above).
- I *IPaddress*** Specifies the IP address that should be used by management tools (like SAM) to address this partition.
- r *cell*** Specifies the core cell and core alternate cells. One to four core cell choices can be specified.
- d *cell*** Remove the specified cell from the partition.
- b *path*** Specifies the primary (PRI) boot path.
- t *path*** Specifies the alternate (ALT) boot path.
- s *path*** Specifies the secondary (HAA) boot path.
- P *PartitionName*** Specifies the name of the partition.
- B** Specifies whether to boot the partition. The default is not to boot.

parremove Command

NOTE

For the most up-to-date reference information on the `parremove` command, see the `parremove` (1M) manpage on your system. The information here is provided for quick reference.

The `parremove` command removes an existing partition. This will remove all cells from the partition and destroy the partition definition.

After a partition is removed, to re-create it you must do so from HP-UX running on another partition in the same complex.

Root permission is required to run this command.

NOTE

This command fails if a partition is booted/active. This means all the cells in the partition must be shutdown for reconfiguration before using the `parremove` command.

This note does not apply if the partition being deleted is the local partition and the `-F` option has been specified.

parremove Command Syntax

The command-line syntax for `parremove` is:

See the `parremove` (1M) manpage for additional details.

Synopsis

```
parremove -p PartitionNumber [-F] [-k s_lock:p_lock]
```

Options

`-p PartitionNumber` Specifies the partition to be removed.

`-F` Forcibly remove the partition. If the partition is inactive, the partition is removed. If the partition is active and if it is the local partition, the partition is removed.

If the partition is active but is not the local partition, then the partition *will not* be removed.

`-k s_lock:p_lock` For use by SAM, not available to command-line users.

parstatus Command

NOTE

For the most up-to-date reference information on the `parstatus` command, see the *parstatus* (1) manpage on your system. The information here is provided for quick reference.

The `parstatus` command displays information about the partitions or hardware within a Superdome complex. If you specify no arguments, `parstatus` lists information about all major components of the complex.

You can specify an individual entity (cell, I/O chassis, cabinet, or partition) to restrict the output to information about that component.

All users can issue this command.

parstatus Command Syntax

The command-line syntax for `parstatus` is:

See the *parstatus* (1) manpage for additional details.

Synopsis

```
parstatus -s
parstatus -w
parstatus [-X]
parstatus [-A] [-M] -C|-I
parstatus [-M] -B|-P
parstatus [-M] -i IOchassis [-i...]
parstatus [-V|-M] -c cell [-c...]
parstatus [-V|-M] -b cabinet [-b...]
parstatus [-V|-M] -p PartitionNumber [-p...]
```

For details on specifying cells, cabinets, and I/O chassis, see “Specifying Cells and I/O Chassis” on page 137.

Options

-s	Indicate (through <code>parstatus</code> exist status) whether the system is an HP Superdome platform.
-x	Display the partition number for the local partition.

-X	Display the complex's attributes.
-A	Only display the available resources in the complex.
-V	Increase the amount of information displayed.
-M	Produce a machine readable/parseable output.
-C	Show information for all the cells in the complex.
-I	Show information for all I/O chassis in the complex.
-B	Show information for all cabinets in the complex.
-P	Show information for all partitions in the complex.
-c <i>cell</i>	Show information about the specified cell.
-i <i>IOchassis</i>	Show information about the specified I/O chassis.
-b <i>cabinet</i>	Show information about the specified cabinet.
-p <i>partition</i>	Show information about the specified partition.

parunlock Command

NOTE

For the most up-to-date reference information on the `parunlock` command, see the *parunlock* (1M) manpage on your system. The information here is provided for quick reference.

The `parunlock` command unlocks the Stable Complex Configuration Data or Partition Configuration Data.

Use this command with extreme caution.

Synopsis

```
parunlock [-p PartitionNumber] [-s]
```

```
parunlock -A
```

See the *parunlock* (1M) manpage for details.

Options

`-p` *PartitionNumber*

Unlock the Partition Configuration Data of the specified partition.

`-s`

Unlock the Stable Complex Configuration Data.

`-A`

Unlock the Stable Complex Configuration Data and the Partition Configuration Data of all the partitions in the complex.

Related Information

This section lists other sources for information on the topics covered in this chapter.

Chapters in This Book

The following chapters in this book include details about topics covered in this chapter.

- Chapter 1, “Overview of the Superdome System Environment,” on page 13—Gives an overview of the Superdome server environment and relevant tasks.
- Chapter 5, “Booting and Resetting Superdome Partitions,” on page 221—Gives an overview of the Superdome booting relevant tasks.

HP-UX Man Pages

The man pages listed here provide details on topics covered in this chapter.

- HP-UX Superdome commands—See “HP-UX Superdome Configuration Commands—An Introduction” on page 135 for details.
- SAM and Partition Manager—*sam* (1M), *parmgr* (1M)

Files in the Directory /use/share/doc

Files listed below are available on disk in the directory `/usr/share/doc` and give more details on topics covered in this chapter.

- `planning_Superdome_configs.pdf`—The *Planning Superdome Configurations* White Paper.

Information to help system administrators plan and implement valid, supported partition configurations. Also available as Appendix A, “Planning Superdome Configurations,” on page 283

Other Books

The following books also provide more details on topics addressed in this chapter. Most books are available at the `docs.hp.com` Web site.

- *Managing Systems and Workgroups: A Guide for HP-UX System Administrators*

Web Sites

Additional information is available at the following sites on the Web.

- <http://docs.hp.com/>

The Hewlett-Packard Technical Documentation home page. This site provides free online access to HP-UX documentation, hardware documentation, related development information, and more.

Configuring and Managing Superdome Partitions
Related Information

Booting and Resetting Superdome Partitions

This chapter covers the tasks and concepts involved in booting HP Superdome partitions.

HP Superdome servers and partitions boot in much the same way as do other HP 9000 servers, but you can boot, reboot, and reset each partition independently of the other partitions within a Superdome complex.

This chapter covers the following topics:

- “Introduction to Boot and Reset Tasks” on page 222
- “Overview of Partition Booting Concepts and Issues” on page 225
- “Planning and Configuring Partition Boot Settings” on page 235
- “Tools for Managing Superdome Booting” on page 239
- “Procedures for Booting and Resetting Partitions” on page 241
- “Related Information” on page 282

Introduction to Boot and Reset Tasks

The following table lists the supported partition boot and reset tasks for HP Superdome servers.

Detailed procedures for the tasks listed in Table 5-1 are provided in “Procedures for Booting and Resetting Partitions” on page 241.

You can perform many of the tasks listed in Table 5-1 using one or more of the following tools: the Guardian Service Processor (GSP) menus, the Boot Console Handler (BCH) interface, the system loaders (ISL and hpux), and HP-UX commands.

For details on these tools see “Tools for Managing Superdome Booting” on page 239.

Table 5-1 HP Superdome Booting and Resetting Tasks

Task Procedures	Description	Tools
“Monitoring Partition Boot Activity” on page 242	Observe a partition’s progress as the partition’s hardware and HP-UX boot by viewing the partition’s Virtual Front Panel (VFP).	GSP
“Accessing a Partition’s Console and BCH Interface” on page 244	Interact with a partition’s BCH interface by accessing it through the partition’s console.	GSP
“Finding Bootable Devices” on page 248	Search for and list all bootable devices connected to a partition.	BCH
“Bootting a Partition Past Boot-Is-Blocked” on page 250	Boot a partition past boot-is-blocked, such as when a partition is in a ready-for-reconfig state. This makes the partition <i>active</i> .	GSP
“Bootting HP-UX on a Partition” on page 252	Boot HP-UX on a partition.	BCH

Table 5-1 HP Superdome Booting and Resetting Tasks

Task Procedures	Description	Tools
“Booting HP-UX in Single-User or LVM-Maintenance Mode” on page 254	Boot HP-UX on a partition, but boot in single-user or LVM-maintenance mode.	BCH ISL and hpux
“Booting from an HP-UX Installation Source” on page 256	Boot the partition from an HP-UX installation source, in order to install HP-UX on the partition.	BCH
“Booting a Partition to the ISL Prompt” on page 257	Boot a partition to the ISL prompt. Allows using ISL and the Secondary System Loader (hpux) to further manage the HP-UX boot process.	BCH
“Shutting Down HP-UX on a Partition” on page 258	Shut down the instance of HP-UX running on a partition.	HP-UX: reboot, shutdown
“Rebooting or Resetting a Partition” on page 260	Either reboot HP-UX running on the partition, or reset the partition hardware from the BCH interface or the GSP command menu.	GSP BCH HP-UX: reboot, shutdown
“Performing a Reboot-for-Reconfig for a Partition” on page 263	Reboot a partition in order to modify its partition settings or implement changes to the partition.	HP-UX: reboot, shutdown
“Resetting a Partition to a Ready-for-Reconfig State” on page 264	Reset the partition and leave it in a ready-for-reconfig state in which all cells remain at boot-is-blocked (BIB). This makes the partition <i>inactive</i> .	GSP BCH HP-UX: reboot, shutdown
“Performing a Transfer-of-Control (TOC) Reset of a Partition” on page 267	Send a Transfer-of-Control (TOC) reset to a partition, in order to reset and perform a crash dump.	GSP

Table 5-1 HP Superdome Booting and Resetting Tasks

Task Procedures	Description	Tools
“Listing Partition Boot Settings” on page 269	List the current settings that establish the partition’s boot-time behavior.	BCH HP-UX: parmodify
“Configuring Boot Paths for a Partition” on page 273	Set the primary (PRI) high-availability (HAA), and alternate (ALT) boot path variables for a partition.	BCH HP-UX: parmodify
“Configuring Boot Actions for Partition Boot Paths” on page 275	Set the action that takes place when the partition’s boot process references each boot path variable (PRI, HAA, ALT).	BCH
“Configuring Auto Start for a Partition” on page 276	Set whether or not the partition automatically attempts to boot HP-UX after any of the partition’s components fails self-test.	BCH
“Configuring Fast Boot Settings for a Partition” on page 277	Enable or disable boot-time tests performed by partition hardware.	BCH
“Configuring the Boot Timer for a Partition” on page 278	Set the time (number of seconds) that the BCH interface allows for booting a device.	BCH
“Deconfiguring Cells, Processors, and Memory” on page 279	Software-deconfigure cells, processors, and memory within a partition.	See Chapter 3
“Configuring Automatic System Restart for a Partition” on page 280	Set whether the partition automatically restarts.	GSP
“Powering On and Powering Off Partition Hardware” on page 281	Power on or power off cells or I/O chassis in a partition.	See Chapter 3

Overview of Partition Booting Concepts and Issues

This section covers the issues, options, and features related to booting HP Superdome partitions. Also covered are the requirements for booting and an overview of the cell and partition boot process.

Details are in the following sections.

- “Reboot and Reset Options for Superdome Partitions” on page 225
- “Superdome Booting Features” on page 227
- “Partition and Cell Boot States and Activities” on page 229
- “Requirements for Booting Partitions” on page 231
- “Partition Cell and HP-UX Booting Process” on page 232

Reboot and Reset Options for Superdome Partitions

Two new types of reboot and reset are provided for reconfiguring Superdome server partitions. These two reset methods allow you to perform a reboot-for-reconfig for a partition, and allow you to put a partition into a ready-for-reconfig state.

In order to modify a partition, you perform a *reboot-for-reconfiguration* to add or remove cells from the partition. The `shutdown -R` and `reboot -R` commands support this new rebooting procedure.

You also can put a partition into a *reconfig-reset* state, which makes the partition and all cells assigned to it inactive. When at reconfig-reset, all the partition's cells are at **boot-is-blocked** and do not proceed with partition rendezvous. This also allows you to add or remove cells from the partition from a different, remote partition within the Superdome complex.

To reboot a partition into the reconfig-reset state, use the `shutdown -R -H` or `reboot -R -H` command, the BCH interface's `RECONFIGRESET` command, or the GSP command menu's `RR` command.

See “Performing a Reboot-for-Reconfig for a Partition” on page 263, or “Resetting a Partition to a Ready-for-Reconfig State” on page 264 for details.

Types of Superdome Booting

The following list summarizes all types of booting, rebooting, and resetting that are supported for HP Superdome partitions.

- **Reboot**—Shuts down HP-UX and reboots the partition.

Only the partition’s active cells are rebooted.

You can reboot the partition using either of the following HP-UX commands: `shutdown -r` or `reboot -r`.

- **Halt**—Shuts down HP-UX, halts all processing on the partition, and does not reboot.

To perform this task, use either of the following HP-UX commands: `shutdown -h` or `reboot -h`. To reboot a halted partition, use the GSP command menu’s `RS` command.

- **Reset**—Resets the partition.

Only the partition’s active cells are reset.

You can reset the partition using the BCH interface’s `RESET` command or the GSP command menu’s `RS` command.

- **Boot**—Boots a partition past the *ready-for-reconfig* state: proceeds past boot-is-blocked (BIB) and performs partition cell rendezvous.

You can perform this task using the GSP command menu’s `BO` command.

- **Reboot-for-Reconfig**—Shuts down HP-UX (if using `shutdown` or `reboot`) and reboots the partition so that any partition reconfigurations take place.

All cells—including any inactive cells and all newly added or deleted cells—reboot and are reconfigured, and all cells with a “y” *use-on-next-boot* setting participate in partition rendezvous and synchronize to boot as a single partition.

This is the method of initiating a partition reconfiguration following any partition modifications using the `parmodify` command or Partition Manager.

You can perform a reboot-for-reconfig using either of the following HP-UX commands: `shutdown -R` or `reboot -R`.

- **Ready-for-Reconfig State**—Shuts down a partition, performs any partition reconfigurations, and keeps all cells at a boot-is-blocked (BIB) “cell firmware” state, thus making the partition and all of its cells inactive. When a partition is in a ready-for-reconfig state, you can reconfigure (or remove) the partition from a remote partition.

All cells—including any inactive cells and all newly added or deleted cells—reboot and are reconfigured, and all cells remain at BIB.

You can put a partition into a ready-for-reconfig state by using the `shutdown -R -H` or `reboot -R -H` command, using the BCH interface's `RECONFIGRESET` command, or using the GSP command menu's `RR` command.

When rebooting a partition under normal circumstances (when not reconfiguring or halting the partition) use the `shutdown -r` or `reboot -r` commands.

Superdome Booting Features

This section provides an overview of several new boot issues for HP Superdome servers.

On HP Superdome servers each partition is booted, rebooted, shut down, and reset individually.

In most cases you will boot and reboot Superdome partitions using the same basic procedures that are used on other HP 9000 servers.

The following list describes several new issues related to booting, rebooting, and power cycling partitions on HP Superdome servers:

- HP Superdome server resources (cells and I/O chassis) are configured into one or more partitions, each of which can boot a single instance of HP-UX. Each partition can boot and reboot independently of others.
- All of a partition's cells and I/O chassis must be powered on and active in order to contribute resources to the partition.
- You can perform all reset and power cycling tasks remotely.

Superdome server cabinets do not have TOC or reset switches.

Instead, you issue TOCs using a Guardian Service Processor (GSP) command and issue resets using GSP commands or BCH interface commands. **Use caution when resetting or sending a TOC**

signal from the GSP command menu; be certain to reset the correct partition.

- The GSP command menu's `RS` (reset) command provides the method for resetting and booting a Superdome partition's hardware after the partition has been shut down and halted.

You can shut down and halt a partition by using the `shutdown -h` or `reboot -h` commands.

- Before powering off a Superdome hardware component, such as a cell or I/O chassis, the components should either be inactive, unassigned (not assigned to any partition), or should be assigned to a partition that has been shut down and halted or is in a *ready-for-reconfig* state.
- Three boot path variables—`PRI`, `HAA`, and `ALT`— are supported by each HP Superdome partition.

By convention, the `PRI` path is the primary boot device. The `HAA` device should be a mirror of the `PRI` device. The `ALT` device typically should be a tape or DVD-ROM device used for booting install or recovery media.

When a partition boots, the partition attempts first to boot the `PRI` device using its `PRI` boot action settings. If this fails, the partition can attempt to boot the `HAA` device using its boot action settings. If `HAA` fails to boot, the partition finally can attempt to boot the `ALT` device.

- You can specify *boot actions* for each boot path variable (`PRI`, `HAA`, and `ALT`) by using the BCH configuration menu's `PF` command (Path Flag). The boot action designates what task is performed (boot, skip, go to BCH) for the device. For details see “Configuring Boot Actions for Partition Boot Paths” on page 275.

For specific boot procedures that address the above Superdome-specific concerns, see “Introduction to Boot and Reset Tasks” on page 222.

Partition and Cell Boot States and Activities

Using a partition's Virtual Front Panel, you can view details about partition and cells boot states and activities. From the GSP main menu, select the VFP menu for Virtual Front Panel options.

You can view a Virtual Front Panel for a specific partition that includes details for all cells in the partition, as shown below.

```

E indicates error since last boot
  Partition 1 state      Activity
  -----
  Cell(s) Booting:    192 Logs

#  Cell state          Activity
-  -----
4  Early CPU selftest  Cell firmware test      95  Logs
6  Early CPU selftest  Cell firmware test      95  Logs

GSP:VFP (^B to Quit) >
  
```

You also can view a system-wide VFP, which shows a summary of each partition's current state and its activity.

See “Monitoring Partition Boot Activity” on page 242 for details on accessing a partition VFP or system-wide VFP. The following table presents the partition and cell states and activities that you can observe from a partition's Virtual Front Panel.

Note that inactive cells remain at a “Boot Is Blocked (BIB)” state following I/O discovery and do not participate in partition rendezvous.

Table 5-2 Superdome Partition and Cell Boot States and Activities

Partition State	Partition Activity	Cell States	Cell Activities
Cell(s) Booting		Booting	Cell firmware configuration, Cell firmware test, Cell PDH controller configuration
Cell(s) Booting		Early CPU self-test	Processor test, Cell firmware test, Processor firmware slave rendezvous
Cell(s) Booting		Memory discovery	Physical memory test

Table 5-2 Superdome Partition and Cell Boot States and Activities

Partition State	Partition Activity	Cell States	Cell Activities
Cell(s) Booting		Late CPU self-test	Processor test, Cell firmware test, Processor firmware slave rendezvous
Cell(s) Booting		I/O discovery	I/O system bus adapter configuration, I/O local bus adapter configuration
Cell(s) Booting		Remote fabric initialization	Partition rendezvous slave rendezvous
Memory Interleave	Memory controller configuration	Cell has joined partition	
At Boot Console Handler (BCH)	Partition firmware	Cell has joined partition	
ISL Menu		Cell has joined partition	
HPUX Loader Init		Cell has joined partition	
HPUX Launch	Processor system initialization	Cell has joined partition	
HPUX Launch	Partition IPL launch configuration	Cell has joined partition	
HPUX Launch	Processor display_activity update	Cell has joined partition	
HPUX init process start		Cell has joined partition	
HPUX heartbeat		Cell has joined partition	

Requirements for Booting Partitions

Before you boot a partition, HP recommends that the partition meet the requirements listed here.

- All partitions within a Superdome complex *must conform* to an HP-recommended complex configuration.

See Chapter 4, “Configuring and Managing Superdome Partitions,” on page 113 for partition requirements and guidelines.

- All the partition’s cells that are designated to be used during the current partition boot should be powered on.

Any cells not powered on will not be available to the partition. During partition rendezvous, the partition will wait up to 10 minutes for all designated cells (those set to be used on the current boot) to report in to the partition and rendezvous.

The partition does not wait to rendezvous with assigned cells that are designated to not be used for the current boot (inactive cells).

- All I/O devices for the partition should be powered on.
- All complex profile information for the partition must be coherent.

This means all cells assigned to the partition must have identical complex profile information (Partition Configuration Data). This is managed by the partition configuration tools, described in Chapter 4, “Configuring and Managing Superdome Partitions,” on page 113.

After you add or remove a cell from a partition, you must perform a *reboot-for-reconfig* of the partition to synchronize the complex profile data throughout the partition; this also causes all the partition’s cells to boot and allows the assigned and active cells to go through the partition rendezvous procedure.

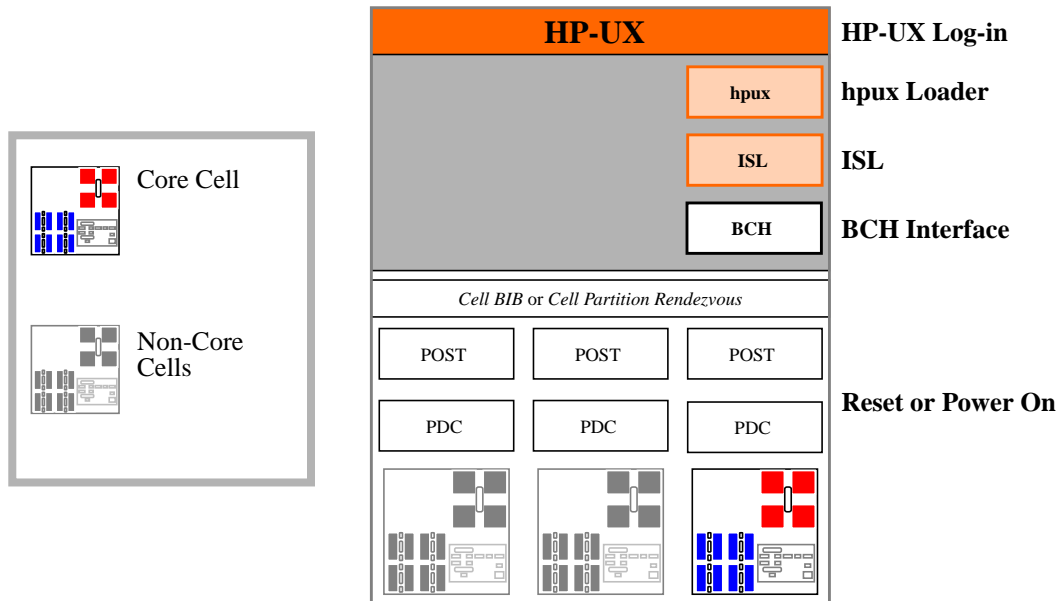
For details on configuring partitions see Chapter 4, “Configuring and Managing Superdome Partitions,” on page 113. See also Chapter 3, “Managing the Overall Complex,” on page 57 for details about powering on and powering off system components.

Partition Cell and HP-UX Booting Process

On HP Superdome servers, each partition goes through the stages described here when proceeding from being powered on (or reset) to booting the HP-UX operating system.

See also Appendix A for a discussion of the Superdome cell booting process.

The HP-UX boot process on Superdome servers is similar to the process on other HP servers: power-on/reset, PDC, POST, BCH, ISL, hpux (the secondary system loader), and finally the HP-UX operating system is booted.



HP Superdome partitions go through the following process, from power on to booting HP-UX:

1. Power-On or Reboot

Power is turned on for components of the partition (or for the entire complex). Or the partition is reset or rebooted.

2. Processor Dependent Code (PDC)

Each cell runs its own copy of the PDC firmware.

3. **Power-On Self Test (POST)**

Cells and other system components go through self-test (POST) activities.

4. **Boot-Is-Blocked (BIB) or Partition Rendezvous**

Each cell whose use-on-next-boot value is “n” (do not use) remains at boot-is-blocked and does not proceed to rendezvous with the other cells in the partition.

Likewise, when a partition is reset to a *ready-for-reconfig* state, all cells in the partition remain at boot-is-blocked.

All cells at BIB are *inactive* cells that can be powered on or off or removed from the partition without affecting the rest of the partition.

Cells not at BIB proceed to rendezvous with the other cells in the partition; they form the partition and proceed to boot to the BCH interface or boot the HP-UX operating system.

The partition allows *up to ten minutes* for all cells participating in cell partition rendezvous to complete self-test and rendezvous.

Partition rendezvous completes when either of the following occurs: all cells with a “y” *use-on-next-boot* setting complete self-test and rendezvous, or ten minutes expires since rendezvous began (at that point, any cells that have not participated in rendezvous are not made available to the partition and thus are inactive cells).

5. **Boot Console Handler (BCH)**

The BCH interface provides the main method for interacting with a partition during its boot process. BCH runs on top of PDC, and it provides menus for getting partition status details, for configuring various partition boot settings, and for issuing HP-UX boot and reboot commands.

See Chapter 2, “Superdome Console and Service Interface,” on page 33 for details on using the BCH menu and other service tools.

One processor on the partition’s core cell runs BCH and all other processors in the partition are idle while the BCH interface is available.

When a partition’s boot paths and boot actions are set accordingly, a partition can skip past the BCH interface and automatically boot HP-UX.

6. Initial System Loader (ISL) and Secondary System Loader (hpux)

In most situations you need not use the ISL and hpux interfaces. However, when using the BCH interface's BO (boot) command you can select to stop at the ISL prompt to perform more detailed booting tasks. For example, you can use the ISL interface to boot HP-UX in single-user or LVM-maintenance mode, or to boot an HP-UX kernel other than /stand/vmunix.

7. HP-UX Operating System

The HP-UX operating system boots on a partition once ISL and the Secondary System Loader (hpux) specify which kernel is to be booted. Normally the /stand/vmunix kernel is selected.

While all of a partition's cells go through their individual self tests, only the core cell is active until HP-UX is booted.

Planning and Configuring Partition Boot Settings

Each partition has its own collection of boot-related settings that specify which hardware manages the boot process (the core cell), how the boot process proceeds (automatically boot, or wait for BCH commands), and which I/O device is selected for booting HP-UX.

You can configure boot settings at any time, but should do so when you initially configure your Superdome hardware. Following this, you need not reconfigure boot settings unless you want to change the partition's boot behavior, specify different primary, alternate, or high-availability devices, or account for partition configuration changes.

The following sections give more details on configuring boot settings.

- “Configurable Boot Settings” on page 235
- “Guidelines for Configuring Partition Boot Settings” on page 237

Configurable Boot Settings

You can configure each partition's boot settings by using the partition's BCH interface or by running HP-UX utilities on the partition.

It also is possible to configure a remote (non-local) partition's boot settings by using the `parmodify` HP-UX command. See Chapter 4 for details on using `parmodify` and other partition configuration issues.

You can configure the following boot settings for each partition.

- **Boot Device Paths**—The boot device paths specify the primary boot device (PRI boot path), the high-availability alternate device (HAA boot path), and the alternate device (ALT boot path),

The PRI path specifies the default device booted by the BCH interface's `BOOT` command. The HAA path typically specifies a device that is a mirror of the PRI device. The ALT path normally is a third, alternate or backup bootable device.

- **Boot Options**—Options include the *auto-start* option, and the *boot action* associated with each boot path (PRI, ALT, and HAA).

The **auto-start** option specifies what occurs when any of a partition's components (processors or memory) fails self-test. By default, AUTOSTART is OFF, causing the partition to stop at the BCH interface following a self-test failure. If AUTOSTART is ON then the partition proceeds with the normal boot behavior following a failure.

The normal partition boot behavior is for the partition to perform the **boot action** for each boot path, as necessary, in the order of path priorities (PRI first, then HAA, and finally ALT). The boot action determines what action is performed for the path when booting: go to the BCH interface, attempt to boot HP-UX from the path, or skip the path.

After you have set a path's boot action to "boot from this path", the the partition will automatically attempt to boot HP-UX from the path the next time the partition boots and references the path.

You can stop the partition from automatically booting, and instead access the BCH interface, by pressing any key within ten seconds.

```
Primary Boot Path: 0/0/1/0/0.8
Boot Actions:    Boot from this path.
                If unsuccessful, go to BCH.

-----
Attempting to boot using the primary path.
-----

To discontinue, press any key within 10 seconds.
```

The partition's BCH menu is made available when all paths and boot actions do not boot HP-UX, and whenever AUTOSTART is OFF and one of the partition's components fails self-test. In either case you can manually boot HP-UX using the BCH interface's menus.

- **Core Cell**—The **core cell** is the cell that "runs" the partition before it boots HP-UX. A processor on the core cell serves as the monarch processor that runs Boot Console Handler (BCH). Also, the core cell is the one whose core I/O card is active for the partition.

You can designate one core cell and up to three **core cell alternates**, which are used as the core cell if the designated primary core cell fails.

Designating a different core cell does not alter the partition's boot behavior but can have high-availability implications (for example, if

the core cell is not directly connected to the I/O chassis where the boot device resides). See Appendix A for more details.

- **Cell “Use-on-Next-Boot” Setting**—Each cell in a partition has an associated *use-on-next-boot* setting that determines if the cell’s resources are used by the partition.

This setting does not affect the cell’s partition membership; it only affects whether the partition to which the cell belongs uses the cell.

When set to “y” (use the cell), the setting allows the cell’s processors, memory, and any connected I/O to be made available for use by the partition. This setting causes the cell to be *active* when it is booted as part of the partition.

When set to “n” (do not use the cell), the setting causes the cell’s associated resources to not be available for use by the partition, and the cell is an *inactive* member of the partition. The cell still is assigned to the partition, but is used only if the cell is made active.

The *use-on-next-boot* setting does not directly affect the partition’s boot behavior, but it can cause I/O connected to an unused cell to be unavailable.

To configure these boot-related settings refer to “Introduction to Boot and Reset Tasks” on page 222. Several methods are available for configuring these settings.

Guidelines for Configuring Partition Boot Settings

The following boot settings are recommended, but are not required.

You should consider the following guidelines, based on your system configuration and use.

- Designate alternate core cell choices.
This requires that the partition have at least two cells, each connected to an I/O chassis that contains a core I/O card. This provides redundancy and potentially improved system availability.
- Configure HAA and ALT boot devices in addition to the PRI device.
This establishes additional bootable devices, including the mirrored (HAA) boot disk, which provide redundancy in case the PRI device fails.

Typically the HAA device is a secondary boot device that is a mirror of the PRI device, and the ALT device is an alternate device such as DVD-ROM or tape device from which the system can boot via install or recovery media.

- Ensure that the core I/O, PRI boot device, and network card(s) all are connected to same cell (the core cell).

This configuration ensures that the core cell is directly connected to the I/O required for booting the partition and providing network connections. This eliminates the requirement for multiple cells to be functional to provide basic partition services.

The above guidelines are general suggestions for configuring boot settings. Refer to Appendix A, “Planning Superdome Configurations,” on page 283 or contact your HP representative for more detailed Superdome server configuration plans.

Tools for Managing Superdome Booting

HP Superdome servers support the following software tools for configuring and managing partition boot settings.

For an overview of procedures that use these boot management tools, see “Introduction to Boot and Reset Tasks” on page 222.

While these tools do overlap in some of the functionality they provide, each provides unique capabilities. The primary tools for managing HP Superdome booting are shown in the following list.

- **Guardian Service Processor (GSP)**—Users who have access to a Superdome complex’s GSP menus can reset partitions, put partitions into a ready-for-reconfig state, and TOC the partitions in the complex. The GSP also provides power on and power off commands for power cycling system hardware components.
- **Boot Console Handler (BCH)**—Each partition’s BCH interface provides commands booting for HP-UX, rebooting the partition, putting the partition into a ready-for-reconfig state, configuring boot-related settings, and checking the partition’s hardware and boot-setting configurations.
- **HP-UX System Loaders (ISL and hpux)**—When you issue the BCH interface’s BOOT command to boot a device on the partition, the boot process provides you the following option:

```
Do you wish to stop at the ISL prompt prior to booting?  
(y/n)
```

Replying “y” (yes, do stop at ISL) allows you to interact directly with a boot device’s Initial System Loader (ISL) and the Secondary System Loader (hpux). You can list files that reside on the device, such as kernel files in `/stand`, and can specify boot arguments to the hpux loader.

Replying “n” (no, do not stop at ISL) skips the ISL prompt and proceeds to boot HP-UX on the partition.

See the *isl* (1M) and *hpux* (1M) manpages for details.

- **HP-UX utilities**—Several HP-UX utilities allow you to check and set a partition's HP-UX boot options, check other partitions' boot settings, and perform reboot, shutdown, and reboot-for-reconfiguration tasks.

The `reboot`, `shutdown`, `parmodify`, and `parstatus` commands provide these features.

Procedures for Booting and Resetting Partitions

Use the detailed procedures given in this section to boot and reset partitions and to configure boot-related settings for your Superdome partitions.

You can perform these tasks using one or more of the following tools:

- The Guardian Service Processor (GSP) menus.
- The Boot Console Handler (BCH) interface.
- The system loaders (ISL and hpux).
- HP-UX commands.

For details on these tools see “Tools for Managing Superdome Booting” on page 239.

Table 5-1 on page 222 provides a summary of all the procedures in this section.

Monitoring Partition Boot Activity

On HP Superdome servers you can monitor the partition boot process, from power-on or reset to HP-UX start-up, using the Virtual Front Panel for the partition.

You can perform this task using the GSP menu.

- “GSP” on page 242

For details on the partition and cell boot states and activities that you can observe from a partition’s Virtual Front Panel, refer to Table 5-2 on page 229.

GSP

Use the following procedure to access a partition’s Virtual Front Panel (VFP) to monitor the partition as it boots. The VFP is available from the Superdome complex’s GSP main menu.

Step 1. From the GSP main menu, select the Virtual Front Panel option.

Each partition has its own VFP that displays details about the partition’s cells and the partition’s boot state and activity.

```
GSP MAIN MENU:
Utility Subsystem FW Revision Level: SR_XXXX_D

    CO: Consoles
    VFP: Virtual Front Panel
    CM: Command Menu
    CL: Console Logs
    SL: Show chassis Logs
    HE: Help
    X: Exit Connection

GSP> VFP
```

If you are accessing the GSP using a single-partition-user account, selecting the VFP option takes you directly to the partition’s Virtual Front Panel.

If accessing the GSP using an operator or administrator account, you can select the VFP for any single partition, or can select a *system VFP* that displays the partition state and activity for all partitions within the Superdome complex.

Step 2. Select the partition you wish to monitor.

Skip this step if you are accessing the GSP using a single-partition-user account.

If using an operator or administrator account, select the partition to monitor or select the system VFP to monitor all partitions.

```
Partition VFP's available:
#   Name
---  ----
0)  jules00
1)  jules01
S)  System (all chassis codes)
Q)  Quit
GSP:VFP> 1
```

Step 3. View the VFP details for information about the partition and its current boot state.

The VFP provides information about the partition state, partition activity, each cell's state, and each cell's activity. The VFP updates automatically as the cell or partition state and activities change.

```
E indicates error since last boot
Partition 1 state          Activity
-----
Cell(s) Booting:         57 Logs

#   Cell state          Activity
-   -----
4   Booting             Cell firmware test      28   Logs
6   Booting             Cell firmware test      28   Logs
GSP:VFP (^B to Quit) >
```

To exit the VFP and return to the GSP main menu, type **^b (Control-b)**.

See Chapter 2, “Superdome Console and Service Interface,” on page 33 for details on the VFP and partition console access.

Accessing a Partition's Console and BCH Interface

Each partition has its own Boot Console Handler (BCH) interface that provides you a method for interacting with the partition before HP-UX has booted. The BCH interface allows you to manage the partition's HP-UX boot process and to configure various boot-related settings.

Each partition's BCH interface is available through the partition's console and is accessible before HP-UX has booted.

You can perform this task using the GSP menu.
--

- | |
|---|
| <ul style="list-style-type: none">• “GSP” on page 245 |
|---|

Before performing this procedure, check the partition's console or its Virtual Front Panel to check the partition's current state.

- At the BCH interface.
If so, you can access the BCH interface or reboot BCH if needed.
- Booted to ISL.
If so, exit ISL using the EXIT command to exit ISL and return to the BCH interface.
- Booted to HP-UX.
If the partition has booted HP-UX, reboot HP-UX and if necessary interrupt the automatic boot process to reach the BCH interface.

The following procedure describes how to access a partition's console and its BCH interface.

GSP Use the following procedure to access a partition's console and BCH interface.

Step 1. Log in to the GSP for the partition's Superdome complex.

Use `telnet` to connect to the Superdome complex's GSP.

```
# telnet sdome-s
Trying...
Connected to sdome-s.rsn.hp.com.
Escape character is '^]'.
Local flow control off

GSP login: Accountname
GSP password:

                               Welcome to
                               Superdome's Guardian Service Processor
```

Step 2. Select the GSP console menu from the GSP main menu.

Each partition has its own console, which is available from the GSP main menu.

```
GSP MAIN MENU:
Utility Subsystem FW Revision Level: SR_XXXX_D

    CO: Consoles
    VFP: Virtual Front Panel
    CM: Command Menu
    CL: Console Logs
    SL: Show chassis Logs
    HE: Help
    X: Exit Connection

GSP> CO
```

If you are accessing the GSP using a single-partition-user account, selecting the CO (console) option takes you directly to the partition's console.

If using an operator or administrator account, you can access the console for any of the partitions within the Superdome complex.

Booting and Resetting Superdome Partitions Procedures for Booting and Resetting Partitions

Step 3. Select the partition whose console (and BCH interface) you wish to access.

Skip this step if you are accessing the GSP using a single-partition-user account.

If using an operator or administrator account, select the partition whose console you wish to access.

```
GSP> CO

Partitions available:
#   Name
---  ----
0)  jules00
1)  jules01
Q)  Quit

Please select partition number: 1

Connecting to Console: jules01

(Use ^B to return to main menu.)

[A few lines of context from the console log:]

-----

SERvice menu                Displays service commands

DISplay                    Redisplay the current menu
HElP [<menu>|<command>]    Display help for menu or command
REBOOT                    Restart Partition
RECONFIGRESET              Reset to allow Reconfig Complex Profile

-----
Main Menu: Enter command or menu >
-----
```

The console displays the last 10 lines of console output when you connect to it. This provides you a view of the most recent console activity.

Step 4. Gain interactive access to the partition console.

To interact with the partition console, press **Enter** to access the currently available prompt, if any. Typically the BCH interface or the HP-UX login or command prompt is available from the partition console.

In the following situations you cannot interact with the partition's console. In these cases you can wait until the console is available, or you can force interactive access.

- When the partition is resetting, or when it is booting HP-UX, you cannot interact with software running on the partition.

Once the partition has completed resetting, or has completed booting HP-UX, you can interact with the partition's BCH or HP-UX prompts.

- When another user already is attached to the console, you can access the partition's console only in spy (read-only) mode.

Spy mode allows you to view console information but does not enable you to enter commands. If you attempt to type when accessing a partition console in spy mode, the console prints the following message.

```
[Read-only - use ^Ecf to attach to console.]
```

When in spy mode, you can force access to the partition's console by typing **^ecf** (**Control-e c f**). Doing this provides you interactive console access and forces ("bumps") the user who was using the console into spy mode.

```
[Bumped user - Admin.]
```

To exit the partition console and return to the GSP main menu, type **^b** (**Control-b**).

Finding Bootable Devices

You can search for and find bootable devices for a partition by using the BCH interface's SEARCH command. This searches for all bootable devices connected to any of the partition's currently used cells.

Note that you cannot access any I/O connected to a partition's unused cells (those cells that are deconfigured for the current partition boot). As a consequence, the BCH menu's SEARCH command will not report any devices connected to deconfigured cells.

You can perform this task using the BCH interface.

- | |
|---|
| <ul style="list-style-type: none">• "BCH" on page 248 |
|---|

BCH

Use the following procedure to find and list the bootable devices that are available to a partition.

To perform this task, access the partition's BCH interface through the partition's console.

- Step 1.** Log in to the Superdome complex's GSP and access the partition's console.

From the partition console you access the partition's BCH interface to search for bootable devices. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

- Step 2.** From the BCH interface's main menu, issue the SEARCH command to find and list bootable devices in the partition.

When accessing the partition's BCH interface, if you are not at the BCH main menu then enter MA to return to the BCH main menu.

The SEARCH command reports the potential boot devices it locates.

```
----- Main Menu -----
Command                Description
-----
BBoot [PRI|HAA|ALT|<path>]  Boot from specified path
Path [PRI|HAA|ALT] [<path>]  Display or modify a path
SEArch [ALL|<path>]        Search for boot devices
ScRoll [ON|OFF]           Display or change scrolling capability

Configuration menu        Displays or sets boot values
INformation menu         Displays hardware information
SERvice menu             Displays service commands

Display                  Redisplay the current menu
HElp [<menu>|<command>]   Display help for menu or command
REBOOT                  Restart Partition
RECONFIGRESET           Reset to allow Reconfig Complex Profile
-----
Main Menu: Enter command or menu > SEARCH
Searching for potential boot device(s)
This may take several minutes.

To discontinue search, press any key (termination may not be immediate).

Path#  Device Path (dec)                Device Type
-----
P0     0/0/1/0/0.15                      Random access media
P1     0/0/1/0/0.12                      Random access media
P2     0/0/1/0/0.11                      Random access media
P3     0/0/1/0/0.9                       Random access media
P4     0/0/1/0/0.8                       Random access media
P5     0/0/1/0/0.6                       Random access media

Main Menu: Enter command or menu >
```

The SEARCH command lists up to the first 20 potential boot devices that it locates, and lists each with a path number (P0 through P19).

To boot a device that was reported by the SEARCH command, specify the path number or the full device path. For example, BOOT P0 would boot the path listed as path number P0.

Booting a Partition Past Boot-Is-Blocked

When a partition is inactive, all cells in the partition are in a boot-is-blocked state. This is the case when a partition is in a ready-for-reconfig state.

You can boot a partition to make it active by using the GSP command menu's BO (boot) command. This boots the cells past boot-is-blocked and allows the cells to rendezvous and form the partition.

You can perform this task using the GSP menu.

- “GSP” on page 250

GSP

Use the following procedure to boot a partition past boot-is-blocked to make the partition active.

To determine whether a partition is in a boot-is-blocked (ready-for-reconfig) state, use the partition's Virtual Front Panel to monitor the partition's boot activity. If all of the partition's cells are at boot-is-blocked, the partition is halted at a ready-for-reconfig state.

Step 1. Log in to the Superdome complex's GSP and access the GSP command menu.

After logging in to the GSP, enter CM to select the GSP command menu.

```
# telnet sdome-s
Trying...
Connected to sdome-s.rsn.hp.com.
Escape character is '^]'.
Local flow control off

GSP login: Accountname
GSP password:

CO: Consoles
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Logs
SL: Show chassis Logs
HE: Help
X: Exit Connection

GSP> CM

Enter HE to get a list of available commands

GSP:CM>
```

Step 2. From the GSP command menu, enter the BO command and specify which partition is to be booted.

The GSP releases the selected partition from boot-is-blocked: the configured cells proceed past boot-is-blocked and rendezvous to form the partition. As a result of the BO command, the partition is active and no longer is in a ready-for-reconfig state.

Any cells that are not configured (those with a “n” use-on-next-boot setting) remain inactive at boot-is-blocked.

```
GSP:CM> BO
This command boots the selected partition.

#   Name
---  ----
0)  jules00
1)  jules01

Select a partition number: 0

Do you want to boot partition number 0? (Y/[N]) y

-> The selected partition will be booted.
GSP:CM>
```

When the partition becomes active it proceeds through the normal boot process: the partition performs, as necessary, the boot action set for each of the boot paths (PRI, HAA, ALT).

If you use the GSP command menu's BO command to attempt to boot a partition that already is active, the command has no effect.

Booting HP-UX on a Partition

You can boot HP-UX on a partition using the BCH interface, which is available from the partition's console. Each partition has its own console that is available from its Superdome complex's GSP console menu.

Each partition can boot and reboot its instance of HP-UX independently from all other partitions.

You can perform this task using the BCH interface.

- “BCH” on page 252

BCH

Use the following procedure to boot HP-UX on a partition using the partition's BCH interface.

A partition will automatically boot HP-UX when the partition's boot paths (PRI, HAA, ALT) and corresponding boot actions are appropriately set. If one of the partition's components fails self-test, then if AUTOSTART is OFF the partition stops booting at the BCH interface.

- Step 1.** Log in to the Superdome complex's GSP, access the partition's console, and access the BCH main menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

- Step 2.** Select the device you wish to boot.

From the BCH main menu, use the PATH command to list any boot path variable settings. The primary (PRI) boot path normally is set to the main boot device for the partition. You also can use the SEARCH command to find and list potentially bootable devices for the partition.

```
Main Menu: Enter command or menu > PATH

    Primary Boot Path:  0/0/2/0/0.13
                       0/0/2/0/0.d    (hex)
HA Alternate Boot Path: 0/0/2/0/0.14
                       0/0/2/0/0.e    (hex)

    Alternate Boot Path: 0/0/2/0/0.0
                       0/0/2/0/0.0    (hex)
Main Menu: Enter command or menu >
```

Step 3. Boot the device using the BCH interface's BOOT command.

To boot the /stand/vmunix HP-UX kernel from the device without stopping at the ISL prompt, enter **n** to automatically proceed past ISL. In most situations you will boot /stand/vmunix and not need to stop at ISL.

```
Main Menu: Enter command or menu > BOOT PRI

Primary Boot Path: 0/0/1/0/0.15

Do you wish to stop at the ISL prompt prior to booting? (y/n) >> n

ISL booting hpux

Boot
: disk(0/0/1/0/0.15.0.0.0.0.0;0)/stand/vmunix
```

To boot an HP-UX kernel other than /stand/vmunix, or to boot HP-UX in single-user or LVM-maintenance mode, stop at the ISL prompt and specify the appropriate arguments to the `hpux` loader.

You can issue the BOOT command in any of the following ways:

- **BOOT**

Issuing the BOOT command with no arguments boots the device at the primary (PRI) boot path.

- **BOOT *bootvariable***

This command boots the device indicated by the specified boot path, where *bootvariable* is the PRI, HAA, or ALT boot path. For example, **BOOT PRI** boots the primary boot path.

- **BOOT LAN INSTALL** or **BOOT LAN.*ip-address* INSTALL**

The BOOT... INSTALL commands boot HP-UX from the default HP-UX install server or from the server specified by *ip-address*.

- **BOOT *path***

This command boots the device at the specified *path*.

You can specify the *path* in HP-UX hardware path notation (for example, 0/1/2/3/4.5.6) or in “path label” format (for example, P0 or P1). If you specify the *path* in path label format then *path* refers to a device path reported by the last SEARCH command.

Booting HP-UX in Single-User or LVM-Maintenance Mode

You can boot HP-UX in single-user mode or LVM-maintenance mode. To do this use the BCH interface to boot the desired device, and use the Initial System Loader (ISL) and the Secondary System Loader (hpux) to specify the options for booting HP-UX in the desired mode.

See the *hpux* (1M) manpage for details on options for other boot modes.

You can perform this task using the BCH interface and the ISL and hpux loaders.

- “BCH, ISL, and hpux” on page 254

BCH, ISL, and hpux

Use the following procedure to boot HP-UX in single-user mode or LVM-maintenance mode on a partition.

- Step 1.** Log in to the Superdome complex’s GSP, access the partition’s console, and access the BCH main menu.

From the partition console you access the partition’s BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

- Step 2.** Boot the desired device using the BCH interface’s BOOT command, and specify that the partition stop at the ISL prompt prior to booting.

```
Main Menu: Enter command or menu > BOOT 0/0/2/0/0.13
BCH Directed Boot Path: 0/0/2/0/0.13

Do you wish to stop at the ISL prompt prior to booting? (y/n) >> y
Initializing boot Device.
ISL Revision A.00.42 JUN 19, 1999
ISL>
```

- Step 3.** From the ISL prompt, issue the appropriate Secondary System Loader (hpux) command to boot the HP-UX kernel in the desired mode.

Use the hpux loader to specify the boot mode options and to specify which kernel to boot on the partition.

- To boot HP-UX in single-user mode: `hpux boot -is /stand/vmunix`
- To boot in LVM-maintenance mode: `hpux boot -lm /stand/vmunix`

```
ISL Revision A.00.42 JUN 19, 1999
ISL> hpux -is /stand/vmunix
Boot
: disk(0/0/2/0/0.13.0.0.0.0;0)/stand/vmunix
8241152 + 1736704 + 1402336 start 0x21a0e8
INIT: Overriding default level with level 's'
INIT: SINGLE USER MODE
INIT: Running /sbin/sh
#
```

See the *hpux (1M)* manpage for a detailed list of `hpux` loader options. To boot HP-UX at the default run level use `hpux boot /stand/vmunix`.

To exit the ISL prompt and return to the BCH interface, issue the `EXIT` command instead of specifying one of the above `hpux` loader commands.

Booting from an HP-UX Installation Source

You can boot a partition from an HP-UX installation source—such as an install CD or an Ignite server—by specifying the install source using the BCH interface’s BOOT command.

This allows you to install HP-UX on any of the partition’s eligible devices.

NOTE

For instructions on installing HP-UX on your boot disk, see the installation and update guide (*HP-UX 11i Installation and Update Guide*) supplied with the HP-UX operating environment media.

You can perform this task using the BCH interface.

- | |
|---|
| <ul style="list-style-type: none">• “BCH” on page 256 |
|---|

BCH

Use the following procedure to boot an HP-UX install source on a partition using the partition’s BCH interface.

- Step 1.** Log in to the Superdome complex’s GSP, access the partition’s console, and access the BCH main menu.

From the partition console you access the partition’s BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

- Step 2.** Select the HP-UX install source that you wish to boot.

From the BCH main menu, you can boot from an Ignite server or install CD-ROM in order to install HP-UX.

You can use the SEARCH command to find and list potentially bootable devices for the partition, including any DVD-ROM devices that may have CD-ROM install media. The ALT boot path also might be set to the DVD-ROM device’s path.

- Step 3.** Boot the install source using the BCH interface’s BOOT command.

Specify the device path where the install media resides or specify the install server.

For details on booting, see “Booting HP-UX on a Partition” on page 252.

Booting a Partition to the ISL Prompt

You can stop a partition's booting at the Initial System Loader (ISL) in order to interact with the ISL prompt. Normally you will not need to access ISL unless you need to use the Secondary System Loader (hpux).

For details about ISL, see the *isl* (1M) manpage.

You can perform this task using the BCH interface.

- “BCH” on page 257

BCH

Use the following procedure to boot a partition to the ISL prompt.

On HP Superdome servers many of the ISL commands *are not supported*. For example, AUTOBOOT, AUTOSEARCH, and PRIMPATH are not supported at ISL. These and other features are instead supported on Superdome servers by each partition's BCH interface.

To exit ISL and return to the BCH interface enter the EXIT command at the ISL prompt. For help enter HELP at the ISL prompt.

- Step 1.** Log in to the Superdome complex's GSP, access the partition's console, and access the BCH main menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

- Step 2.** Boot the desired device using the BCH interface's BOOT command, and specify that the partition stop at the ISL prompt prior to booting.

```
Main Menu: Enter command or menu > BOOT 0/0/2/0/0.13
BCH Directed Boot Path: 0/0/2/0/0.13

Do you wish to stop at the ISL prompt prior to booting? (y/n) >> y
Initializing boot Device.
ISL Revision A.00.42 JUN 19, 1999
ISL>
```

Shutting Down HP-UX on a Partition

When HP-UX is running on a partition, you can shut down HP-UX using either the `shutdown` command or the `reset` command.

On Superdome servers you have the following four options when shutting down HP-UX:

- Shut down HP-UX and halt the partition.
- Shut down HP-UX and reboot the partition.
- Perform a *reboot-for-reconfig* of the partition.
- Reboot the partition and keep it at a *ready-for-reconfig* state.

These options are discussed in the procedure that follows. For details see the *shutdown* (1M) or *reboot* (1M) manpages.

You can perform this task using HP-UX commands.
--

- | |
|---|
| <ul style="list-style-type: none">• “HP-UX” on page 258 |
|---|

HP-UX

Use the following procedure when shutting down HP-UX on a partition.

Step 1. Log in to HP-UX running on the partition.

You can log in to HP-UX on the partition either by directly connecting with `telnet` or `rlogin`, or by logging in to its complex's GSP and accessing the partition's console. Connecting through the GSP allows you to maintain partition console access after HP-UX has shut down.

Step 2. Issue the `shutdown` or `reboot` command with the appropriate command-line options.

NOTE

The `reboot` command does not invoke the shutdown scripts associated with subsystems. The `shutdown` command invokes the scripts and terminates all running processes in an orderly and cautious manner.

The command-line options you specify dictate the way in which HP-UX is shut down, whether the partition is rebooted, and whether any partition configuration changes (adding or removing cells) take place.

Refer to the following list for the available HP-UX shut down options for Superdome partitions.

- **Shut down HP-UX and halt the partition.**

Use the `shutdown -h` or `reboot -h` command to shut down and halt the partition.

This leaves the partition and all its cells in an *active* state (the partition cannot be reconfigured) after HP-UX shuts down and halts.

To reboot the partition you must reset the partition using the GSP command menu's RS command.

- **Shut down HP-UX and reboot the partition.**

Use the `shutdown -r` or `reboot -r` command to shut down and reboot the partition.

- **Perform a reboot-for-reconfig of the partition.**

Use the `shutdown -R` or `reboot -R` command to perform a reboot-for-reconfig.

This shuts down HP-UX, reconfigures the partition if needed, and reboots the partition.

- **Reboot the partition and put it in to a ready-for-reconfig state.**

Use the `shutdown -R -H` or `reboot -R -H` command to put the partition into a ready-for-reconfig state.

This leaves the partition and all its cells in an *inactive* state (the partition can be reconfigured).

To reboot the partition you must do so manually by using the GSP command menu's BO command.

If HP-UX is halted on the partition, thus not allowing you to use the `shutdown` or `reboot` command, you can reboot or reset the partition by issuing command from the GSP command menu.

Rebooting or Resetting a Partition

You can reset a partition by using the GSP command menu, using the partition's BCH interface, or by issuing commands from HP-UX running on the partition.

Using the procedures in this section, you can reset a partition and boot it back to BCH or HP-UX.

HP Superdome servers also support other types of partition resetting. For details on these other partition reset methods, see the following sections:

- “Shutting Down HP-UX on a Partition” on page 258
- “Performing a Reboot-for-Reconfig for a Partition” on page 263
- “Resetting a Partition to a Ready-for-Reconfig State” on page 264
- “Performing a Transfer-of-Control (TOC) Reset of a Partition” on page 267

You should, if possible, shut down HP-UX before resetting a partition.

You can perform this task using the GSP command menu, the BCH interface, or HP-UX commands.

- “GSP” on page 260
- “BCH” on page 261
- “HP-UX” on page 262

GSP

Use the following procedure to reset a partition using the GSP command menu.

Step 1. Log in to the Superdome complex's GSP and access the GSP command menu.

After logging in to the GSP, enter CM to select the GSP command menu.

```
GSP login: Accountname
GSP password:

GSP> CM

Enter HE to get a list of available commands

GSP:CM>
```

Step 2. At the GSP command menu, enter the RS command, specify which partition is to be reset, and confirm whether to reset it.

The GSP command menu's RS command resets all active cells in the partition and reboots them past partition rendezvous to BCH or HP-UX.

If you are accessing the GSP using a single-partition-user account, the RS command selects which partition is to be reset: the partition that your account allows you to access.

If using an operator or administrator GPS account, you can select which of the Superdome complex's partitions you want to reset.

IMPORTANT

Be certain to correctly select the partition to be reset.

```
GSP:CM> RS
This command resets the selected partition.
WARNING: Execution of this command irrecoverably halts all system
         processing and I/O activity and restarts the selected
         partition.

#   Name
---  ---
0)  jules00
1)  jules01

Select a partition number: 1

Do you want to reset partition number 1? (Y/[N]) y

-> The selected partition will be reset.
GSP:CM>
```

BCH

Use the following procedure to reset a partition using the partition's BCH interface.

Step 1. Log in to the Superdome complex's GSP, access the partition's console, and access the BCH main menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

Booting and Resetting Superdome Partitions Procedures for Booting and Resetting Partitions

Step 2. From the partition's BCH main menu, enter the REBOOT command to reboot the partition.

The BCH interface's REBOOT command resets all active cells in the partition and reboots them past partition rendezvous to BCH or HP-UX.

```
----- Main Menu -----
Command                Description
-----
B0ot [PRI|HAA|ALT] <path>  Boot from specified path
P0ath [PRI|HAA|ALT] [ <path>]  Display or modify a path

REBOOT                Restart Partition
RECONFIGRESET         Reset to allow Reconfig Complex Profile

-----
Main Menu: Enter command or menu > REBOOT
Rebooting the partition ...
```

HP-UX

Use the following procedure to reset a partition by using HP-UX commands running on the partition.

Step 1. Log in to HP-UX running on the partition.

You can log in to HP-UX on the partition either by directly connecting with `telnet` or `rlogin`, or by logging in to its complex's GSP and accessing the partition's console. Connecting through the GSP allows you to maintain partition console access after HP-UX has shut down.

Step 2. Issue the `shutdown` or `reboot` command and specify the `-r` option.

The `shutdown -r` and `reboot -r` commands shut down HP-UX and reboot the partition.

NOTE

The `reboot` command does not invoke the shutdown scripts associated with subsystems. The `shutdown` command invokes the scripts and terminates all running processes in an orderly and cautious manner.

Performing a Reboot-for-Reconfig for a Partition

When you perform a *reboot-for-reconfig* of a partition, the HP-UX command that you issue (`shutdown` or `reboot`) does the following tasks:

- Shuts down HP-UX and resets all cells that are assigned to the partition, including any inactive cells.
- Reconfigures the partition if necessary (adds or removes cells).
- Boots all cells in the partition.

You should perform a *reboot-for-reconfig* of a partition whenever you add or remove cells from the partition, and whenever you need to allow an inactive cell to join the partition (such as after changing a cell's *use-on-next-boot* value from “n” to “y”).

You can perform this task using HP-UX commands.
--

- | |
|---|
| <ul style="list-style-type: none">• “HP-UX” on page 263 |
|---|

HP-UX

Use the following procedure to perform a *reboot-for-reconfig* for a partition.

Step 1. Log in to HP-UX running on the partition.

You can log in to HP-UX on the partition either by directly connecting with `telnet` or `rlogin`, or by logging in to its complex's GSP and accessing the partition's console. Connecting through the GSP allows you to maintain partition console access after HP-UX has shut down.

Step 2. Issue the `shutdown` or `reboot` command and specify the `-R` option.

The `shutdown -R` and `reboot -R` commands shut down HP-UX, reboot all cells assigned to the partition, perform any partition reconfigurations, and boot all cells.

NOTE

The `reboot` command does not invoke the shutdown scripts associated with subsystems. The `shutdown` command invokes the scripts and terminates all running processes in an orderly and cautious manner.

Resetting a Partition to a Ready-for-Reconfig State

Resetting a partition to a *ready-for-reconfig* state performs any changes to the partition's configuration and puts the partition and all its cells in a boot-is-blocked (inactive) state.

You can reset a partition to ready-for-reconfig by using the GSP command menu, the partition's BCH interface, or HP-UX commands. Each of these methods performs the following tasks:

- Shuts down HP-UX and resets all cells that are assigned to the partition, including any inactive cells.
- Reconfigures the partition if necessary (adds or removes cells).
- Keeps all cells at a boot-is-blocked state; the partition and all cells assigned to it are inactive.

To boot a partition after you have reset it to ready-for-reconfig, you must use the GSP command menu's BO command.

You should reset a partition to ready-for-reconfig whenever you need for the partition and its cells to be inactive. This enables you to modify the partition's configuration from the GSP or from HP-UX running on a remote partition in the same Superdome complex.

You can perform this task using the GSP menu, the BCH interface, or HP-UX commands.

- "GSP" on page 264
- "BCH" on page 265
- "HP-UX" on page 266

GSP

Use this procedure to reset a partition to a ready-for-reconfig state from the GSP command menu.

- Step 1.** Log in to the Superdome complex's GSP and access the GSP command menu.

After logging in to the GSP, enter CM to select the GSP command menu.

```
GSP> CM
Enter HE to get a list of available commands
GSP:CM>
```


- Step 2.** At the GSP command menu, enter the RR command, specify which partition is to be reset, and confirm whether to reset it to ready-for-reconfig.

The GSP command menu's RR command resets all cells in the partition, performs any partition reconfigurations, and halts all cells at a boot-is-blocked state, thus making the partition and all its cells inactive.

If you are accessing the GSP using a single-partition-user account, the RR command selects which partition is to be reset: the partition that your account allows you to access.

If using an operator or administrator GPS account, you can select which of the Superdome complex's partitions you want to reset.

IMPORTANT

Be certain to correctly select the partition to be reset.

```
GSP:CM> RR

This command resets for reconfiguration the selected partition.
WARNING: Execution of this command irrecoverably halts all system
         processing and I/O activity and restarts the selected
         partition in a way that it can be reconfigured.

#   Name
---  ---
0)  jules00
1)  jules01

Select a partition number: 1

Do you want to reset for reconfiguration partition number 1? (Y/[N]) y

-> The selected partition will be reset for reconfiguration.
GSP:CM>
```

BCH

Use this procedure to reset a partition to a ready-for-reconfig state by using the partition's BCH interface.

- Step 1.** Log in to the Superdome complex's GSP, access the partition's console, and access the BCH main menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

Booting and Resetting Superdome Partitions Procedures for Booting and Resetting Partitions

Step 2. From the partition's BCH main menu, enter the RECONFIGRESET command to reset the partition to a ready-for-reconfig state.

The BCH interface's RECONFIGRESET command resets all cells in the partition, performs any partition reconfigurations, and halts all cells at a boot-is-blocked state, thus making the partition and all its cells inactive.

```
----- Main Menu -----
Command                Description
-----
B0ot [PRI|HAA|ALT|<path>]  Boot from specified path
P0ath [PRI|HAA|ALT| [<path>]  Display or modify a path

REBOOT                  Restart Partition
RECONFIGRESET           Reset to allow Reconfig Complex Profile

-----
Main Menu: Enter command or menu > RECONFIGRESET
Reset the partition for reconfiguration of Complex Profile ...
```

HP-UX

Use the following procedure to reset a partition to a ready-for-reconfig state by issuing the shutdown or reboot command from HP-UX running on the partition.

Step 1. Log in to HP-UX running on the partition.

You can log in to HP-UX on the partition either by directly connecting with telnet or rlogin, or by logging in to its complex's GSP and accessing the partition's console.

Step 2. Issue the shutdown or reboot command and specify both the -R and the -H option.

Both the shutdown -R -H command and the reboot -R -H command shut down HP-UX, reset all cells in the partition, perform any partition reconfigurations, and halt all cells at a boot-is-blocked state, thus making the partition and all its cells inactive

NOTE

The reboot command does not invoke the shutdown scripts associated with subsystems. The shutdown command invokes the scripts and terminates all running processes in an orderly and cautious manner.

Performing a Transfer-of-Control (TOC) Reset of a Partition

You can use the GSP command menu's TC command to perform a transfer-of-control (TOC) reset on a partition.

If crash dump is configured for HP-UX on the partition, when you TOC the partition while it is running HP-UX the partition performs a crash dump and gives you an opportunity select the type of dump.

You can perform this task using the GSP menu.

- “GSP” on page 267

GSP

Use this procedure to perform a transfer-of-control (TOC) reset of a partition.

- Step 1.** Log in to the Superdome complex's GSP and access the GSP command menu.

After logging in to the GSP, enter CM to select the GSP command menu.

```
GSP> CM
Enter HE to get a list of available commands
GSP:CM>
```

- Step 2.** At the GSP command menu, enter the TC command, specify which partition is to be reset, and confirm whether to TOC the partition.

The TC command performs a transfer-of-control reset on the specified partition.

If you are accessing the GSP using a single-partition-user account, the TOC command selects which partition is to be reset: the partition that your account allows you to access.

If using an operator or administrator GPS account, you can select which of the Superdome complex's partitions you want to TOC.

Booting and Resetting Superdome Partitions Procedures for Booting and Resetting Partitions

IMPORTANT

Be certain to correctly select the partition to be reset.

```
GSP:CM> TC
This command TOCs the selected partition.

WARNING: Execution of this command irrecoverably halts all system
         processing and I/O activity and restarts the selected
         partition.

#   Name
---  ---
0)  jules00
1)  jules01

Select a partition number: 0

Do you want to TOC partition number 0? (Y/[N]) y

-> The selected partition will be TOCed.
GSP:CM>
```

Step 3. Once you have initiated the TOC, you can observe its progress and select the type of crash dump through the partition's console.

Once the partition completes the dump, or once you cancel it, the partition reboots.

```
***** Unexpected TOC. Processor HPA FFFFFFFF'FC07C000 *****
GENERAL REGISTERS:
r00/03 00000000'00000000 00000000'0099CA2C 00000000'00000000 00000000'010BB790
r04/07 00000000'00000002 00000000'010BC140 00000000'0080F000 00000000'00AA2490
r08/11 00000000'00000001 00000000'0099A800 00000000'0099A800 00000000'0099C800

Processor 8 TOC:  pcsq.pcoq = 0'0.0'12675c
                  isr.iior  = 0'10340004.0'2f8bfd30

Boot device reset done.
*** The dump will be a SELECTIVE dump: 457 of 4080 megabytes.
*** To change this dump type, press any key within 10 seconds.
*** Proceeding with selective dump.

*** The dump may be aborted at any time by pressing ESC.
*** Dumping: 7% complete (32 of 457 MB) (device 64:0x2)
```

Listing Partition Boot Settings

You can list a partition's boot-related settings by using the partition's BCH interface or by using the `parstatus` HP-UX command.

This section covers listing a partition's boot settings.

Refer to the following procedures for details on configuring a partition's boot settings.

- “Configuring Boot Paths for a Partition” on page 273
- “Configuring Boot Actions for Partition Boot Paths” on page 275
- “Configuring Auto Start for a Partition” on page 276
- “Configuring Fast Boot Settings for a Partition” on page 277
- “Configuring the Boot Timer for a Partition” on page 278
- “Deconfiguring Cells, Processors, and Memory” on page 279

You can perform this task using the BCH interface or HP-UX commands.

- “BCH” on page 269
- “HP-UX” on page 271

The BCH interface provides the most information about boot settings.

BCH

Use this procedure to list a partition's boot settings using the BCH interface.

- Step 1.** Log in to the Superdome complex's GSP, access the partition's console, and access the BCH main menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

- Step 2.** Access the BCH menu that provides the information you want to list.

The BCH interface's *main menu*, the *information menu*, and the *configuration menu* provide commands for listing (and setting) boot options for the partition.

Booting and Resetting Superdome Partitions
Procedures for Booting and Resetting Partitions

Use the following list to determine which BCH menu and command provides the boot information that interests you.

- **BCH main menu**

If you are at one of the other BCH menus, enter MA to return to the BCH interface's main menu.

PATH	Displays or sets the boot paths: primary (PRI), high-availability (HAA), and alternate (ALT).
------	---

- **BCH configuration menu**

From the BCH main menu, enter CO to access the configuration menu.

AU	Displays or sets the auto-start flag, which determines whether the boot process proceeds following a self-test failure.
BOOTTIMER	Displays or sets the time allowed for booting.
CELLCONFIG	Displays or sets the (de)configuration of cells.
CORECELL	Displays or sets the core cell choices.
FASTBOOT	Displays or specifies whether certain self-tests are run during the boot process.
PATHFLAGS	Displays or sets the boot action for each boot path.

- **BCH information menu**

From the BCH main menu, enter IN to access the information menu.

BOOTINFO	Displays boot configuration information.
----------	--

Step 3. At the appropriate BCH menu, issue the BCH command to display the boot information of interest to you.

For details on the relevant BCH commands, refer to the list in the previous step. Enter the command with no arguments to display (and not reconfigure) the boot setting.

The following example shows using the PATH command to list the partition's boot paths, then accessing the BCH configuration menu and issuing the AU command to list the partition's auto-start setting.

```
Main Menu: Enter command or menu > PATH
    Primary Boot Path:  4/0/2/0/0.10
                       4/0/2/0/0.a   (hex)
HA Alternate Boot Path: 4/0/1/0/0.6
                       4/0/1/0/0.6   (hex)
    Alternate Boot Path: 4/0/1/0/0.5
                       4/0/1/0/0.5   (hex)
Main Menu: Enter command or menu > CO
----- Configuration Menu -----
Command                               Description
-----                               -
Autostart [ON|OFF]                     Display or set the auto start flag
BootID [<cell>[<proc>[<bootid>]]]      Display or set Boot Identifier
BootTimer [0-200]                       Seconds allowed for boot attempt

Configuration Menu: Enter command > AU
    Autostart:                OFF
Configuration Menu: Enter command >
```

HP-UX

Use this procedure to list a partition's boot settings with HP-UX commands. You can get information about the local partition or any of the other, remote partitions in the Superdome complex.

NOTE

Use the `parstatus` command to get partition boot information.

The `setboot` command only provides accurate information about the local partition's PRI and ALT boot paths. The `setboot` information about auto-start and auto-search is not relevant to the local partition.

Step 1. Log in to HP-UX running on the partition.

You can log in to HP-UX on the partition either by directly connecting with `telnet` or `rlogin`, or by logging in to its complex's GSP and accessing the partition's console.

Step 2. Issue the `parstatus -V -p#` command to list detailed information about the specified partition, including boot-related details.

Booting and Resetting Superdome Partitions

Procedures for Booting and Resetting Partitions

The boot setting information that `parstatus` reports is equivalent to the following BCH commands: `PATH`, `CELLCONFIG`, and `CORECELL`.

The following example lists detailed information for partition number 0, including the partition's boot path settings, its core cell information, and its cells' use-on-next-boot settings.

```
# parstatus -V -p0
[Partition]
Partition Number      : 0
Partition Name       : jules00
Status               : active
IP address           : 0.0.0.0
Primary Boot Path    : 0/0/2/0/0.13.0
Alternate Boot Path  : 0/0/2/0/0.0.0
HA Alternate Boot Path : 0/0/2/0/0.14.0
PDC Revision        : 6.0
IODCH Version       : 23664
CPU Speed           : 552 MHz
Core Cell           : cab0,cell0
Core Cell Alternate [1]: cab0,cell0
Core Cell Alternate [2]: cab0,cell2

[Cell]

```

Hardware Location	Actual Usage	CPU OK/Max	Memory (GB) OK/Deconf	Connected To	Core Cell Capable	Use On Next Boot	Par Num
cab0,cell0	active core	4/0/4	2.0/ 0.0	cab0,bay0,chassis1	yes	yes	0
cab0,cell2	active base	4/0/4	2.0/ 0.0	cab0,bay1,chassis3	yes	yes	0

```

[Chassis]
Hardware Location Usage      Core Connected Par
IO To Num
=====
cab0,bay0,chassis1 active    yes cab0,cell0 0
cab0,bay1,chassis3 active    yes cab0,cell2 0
#

```

As the above example shows, the primary (PRI) boot path is 0/0/2/0/0.13.0, the active core cell is cell 0, and the core cell preferences are cell 0 (first preference) and cell 2 (second preference). Both of the partition's cells are set to be used ("yes") the next time the partition boots. Both cells are actively used ("active core" and "active base").

Configuring *Boot Paths* for a Partition

Each partition in an HP Superdome complex has three boot path variables.

The boot path variables are: primary (PRI), secondary (HAA, the “high-availability alternate”), and the alternate (ALT) boot device paths. Typically, HAA is a mirror of PRI, and ALT refers to a DVD-ROM or tape device.

This section describes how to set these variables.

You can perform this task using the BCH interface or HP-UX commands.

- “BCH” on page 273
- “HP-UX Commands” on page 274

BCH

Use the following procedure to configure a partition’s boot paths through its BCH interface.

- Step 1.** Determine the device path for the target boot device, and select which boot path variable (PRI, HAA, ALT) will be configured with the target boot device’s path.
- Step 2.** Access the partition BCH interface’s main menu and check the current setting for the selected boot path variable (PRI, HAA, or ALT).

Check the setting by using the BCH menu’s `PATH` command, which can be abbreviated as `PA`. For example, to display all boot path settings enter `PA` with no arguments:

```
Main Menu: Enter command or menu > PA
    Primary Boot Path:  4/0/3/0/0.1
                        4/0/3/0/0.1      (hex)
HA Alternate Boot Path: 2/0/1/0/0.5
                        2/0/1/0/0.5      (hex)
    Alternate Boot Path: 2/0/1/0/0.6
                        2/0/1/0/0.6      (hex)
Main Menu: Enter command or menu >
```

Booting and Resetting Superdome Partitions
Procedures for Booting and Resetting Partitions

Step 3. As necessary, configure the boot path variable to the new value that corresponds to the target boot device.

Use the BCH main menu's `PATH` command.

For example, to set the PRI boot path to a new value (4/0/2/0/0.10, in this case):

```
Main Menu: Enter command or menu > PA PRI 4/0/2/0/0.10.0
Primary Boot Path: 4/0/2/0/0.10
                  4/0/2/0/0.a (hex)
Main Menu: Enter command or menu >
```

The new boot path setting takes place immediately.

HP-UX Commands Use this procedure to set a partition's boot path variables from HP-UX.

Step 1. Log in to HP-UX running on any partition in the complex.

You can modify the boot paths for any partition from any other partition in the complex.

Step 2. Use the `parmodify` command to set the desired boot path.

The `parmodify -p# -b` option sets the PRI boot device for the specified partition number (`-p#`). The `-s` option sets the HAA path, and the `-t` option sets the ALT path.

For example, to set the PRI and HAA boot paths for partition 0:

```
# parmodify -p0 -b 0/0/4/0/0.8.0 -s 0/0/4/0/0.9.0
Command succeeded.
#
```

The above example sets partition number 0's PRI boot path to 0/0/4/0/0.8.0 and sets the HAA boot path to 0/0/4/0/0.9.0.

Configuring *Boot Actions* for Partition Boot Paths

Each boot path for a partition has associated with it a *boot action*. The boot actions are set through *path flags*, which can be set to the following values:

- 0—Go to BCH (Boot Console Handler).
- 1—Boot from this path. If unsuccessful, go to BCH.
- 2—Boot from this path. If unsuccessful, go to the next path.
- 3—Skip this path and go to the next path.

The order of boot paths is: PRI, then HAA, then ALT. When a partition boots, the partition attempts to perform the boot action for the PRI path (and the HAA and ALT actions, as needed).

NOTE

Following a self-test failure, a partition references its boot actions only if the partition's AUTOSTART value is set to ON.

You can perform this task using the BCH interface.

- “BCH” on page 275

BCH

Use this procedure to set the boot actions for a partition's boot paths.

- Step 1.** Log in to the Superdome complex's GSP, access the partition's console, and access the BCH configuration menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

From the BCH main menu, enter CO to access the BCH configuration menu.

- Step 2.** List and set the path flags (boot actions) for the partition's boot paths.

Enter the PATHFLAGS command with no arguments to list the current boot path settings and their path flag settings.

Enter `PATHFLAGS path value` to set the path flag *value* for the specified boot *path*. The *path* may be PRI, HAA, or ALT, and the *value* may be 0–3.

Configuring *Auto Start* for a Partition

The BCH interface's *auto-start* setting for each partition determines how the boot process occurs when one of the partition's components (processors or memory) fails self-test.

By default AUTOSTART is set to OFF, and the partition stops at the BCH interface when a processor or DIMM fails self-test.

When AUTOSTART is ON, the partition proceeds with the normal boot process and performs the boot actions for its boot paths as necessary.

You can perform this task using the BCH interface.

- | |
|---|
| <ul style="list-style-type: none">• “BCH” on page 276 |
|---|

BCH

Use this procedure to configure *auto-start* for a partition.

- Step 1.** Log in to the Superdome complex's GSP, access the partition's console, and access the BCH configuration menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

From the BCH main menu, enter CO to access the BCH configuration menu.

- Step 2.** From the BCH configuration menu, use the AU command to list or set auto-start for the partition.

Enter AU with no arguments to list the auto-start setting.

Enter AU ON to set auto-start to ON, or AU OFF to set it to OFF.

Configuring *Fast Boot* Settings for a Partition

The *fast boot* settings for a partition determine the self-tests that the partition performs during power on or partition boot.

NOTE

On Superdome servers use the BCH interface's FASTBOOT command to set the fast boot settings. Do not use the ISL interface, which has no effect for Superdome partition self tests.

You can perform this task using the BCH interface.

- “BCH” on page 277

BCH

Use this procedure to set a partition's fast boot settings.

- Step 1.** Log in to the Superdome complex's GSP, access the partition's console, and access the BCH configuration menu.

From the partition console you access the partition's BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

From the BCH main menu, enter CO to access the BCH configuration menu.

- Step 2.** From the BCH configuration menu use the FASTBOOT command to list or set the partition's fast boot settings.

Enter FASTBOOT with no arguments to display the current fast boot settings. This lists which self tests are set to be performed or skipped.

For more details on setting self tests, enter HELP FASTBOOT for help.

NOTE

HP recommends that *all self tests* be performed for all partitions. To enable all tests for a partition, use the FASTBOOT RUN command at the partition's BCH configuration menu

Configuring the Boot Timer for a Partition

The boot timer setting establishes the number of seconds a partition will wait for a boot device before timing out.

You can perform this task using the BCH interface.

- | |
|---|
| <ul style="list-style-type: none">• “BCH” on page 278 |
|---|

BCH

Use this procedure to configure a partition’s boot timer setting.

- Step 1.** Log in to the Superdome complex’s GSP, access the partition’s console, and access the BCH configuration menu.

From the partition console you access the partition’s BCH interface. If the partition is not at the BCH interface you must either boot the partition or shut down HP-UX to return to the BCH interface.

From the BCH main menu, enter CO to access the BCH configuration menu.

- Step 2.** From the BCH configuration menu, use the BOOTTIMER command to list or set the boot timer setting.

Enter BOOTTIMER with no arguments to list the setting.

Enter BOOTTIMER *seconds* to set the boot timer setting to the specified (*seconds*) number of seconds.

Deconfiguring Cells, Processors, and Memory

Refer to Chapter 3, “Managing the Overall Complex,” on page 57 for details on deconfiguring cells, processors, and memory for a partition.

Configuring *Automatic System Restart* for a Partition

Only GSP users who have administrator authority can configure automatic system restart for a partition.

To perform this task use the GSP command menu's AR command.

CAUTION

Refer to your HP support representative for details and assistance in setting automatic system restart. This setting enables a partition to automatically reset upon specified events.

Powering On and Powering Off Partition Hardware

Chapter 3, “Managing the Overall Complex,” on page 57 contains details on powering on and powering off HP Superdome hardware components.

Related Information

This section lists other sources for information on the topics covered in this chapter.

Chapters in This Book

The following chapters in this book include additional details about topics covered in this chapter.

- Chapter 3, “Managing the Overall Complex,” on page 57
- Chapter 4, “Configuring and Managing Superdome Partitions,” on page 113

HP-UX Man Pages

The man pages listed here provide further information on topics covered in this chapter.

- *hpux* (1M), *isl* (1M), *setboot* (1M), *reboot* (1M), *shutdown* (1M), *parmodify* (1M), *init* (1M)

Files in the Directory /use/share/doc

Files listed below are available on disk in the directory `/usr/share/doc` and give more details on topics covered in this chapter.

- *Planning Superdome Configurations* (`planning_Superdome_configs.pdf`)

Other Books

The following books also provide more details on topics addressed in this chapter. Most books are available at the `docs.hp.com` Web site.

- *Managing Systems and Workgroups*

Web Sites

Additional information is available at the following sites on the Web.

- <http://docs.hp.com/>

The Hewlett-Packard Technical Documentation home page. This site provides online access to HP-UX documentation, SD-Class system hardware documentation, related development tools manuals, and other information.

- <http://www.hp.com/go/superdome>

A **Planning Superdome Configurations**

What follows is a white paper intended to help system administrators and system architects plan, configure and reconfigure the structural components of a Superdome complex.

It contains the following sections:

1. “How To Use this Document” on page 284.
2. “Building Blocks and Definitions” on page 286.
3. “Rules and Guidelines for Configuring a Complex” on page 323.

How To Use this Document

Terms:

- **Cell:** see “What is a Cell?” on page 303.
 - **Unassigned cell:** see “Cell Types” on page 309.
- **Complex:** see “What Is a Complex?” on page 292.
- **I/O chassis:** see “What is an I/O Chassis?” on page 317.
- **Partition:** see “What is a Partition?” on page 298.

Full Glossary on page 287 .

The primary purpose of this paper is to help you plan how to reconfigure a Superdome **complex**, though you may also find it useful for mapping out a Superdome you intend to order.

The heart of the document is the section “Rules and Guidelines for Configuring a Complex” on page 323, but if you are unfamiliar with the Superdome architecture, start with the “Building Blocks and Definitions” on page 286.

There are two ways to reconfigure a Superdome:

- Physically move components such as **cells** and **I/O chassis**; *or*
- Logically reassign cells from one **partition** to another.

As a customer, you must not make changes of the first type yourself: a Hewlett-Packard Customer Engineer or Service Engineer must be the person to move major components such as cells, I/O chassis and cabinets; that is, anything larger than an I/O card. Use this paper to help you plan such changes, but don't attempt to carry them out yourself.

But you can make changes of the second type, reassigning cells from one partition to another, or assigning **unassigned** cells. Such changes can affect performance and high-availability substantially, so it is important that you read the “Rules and Guidelines for Configuring a Complex” on page 323 carefully before proceeding. Then use chapter 4 of the manual *Managing Superdome Complexes* to guide you through the necessary tasks.

You may be reading this paper in the form of an appendix to *Managing Superdome Complexes*, or as PDF file delivered in the `/usr/share/doc` directory of an HP-UX 11i system. The most recent version is published on Hewlett-Packard's documentation website, `docs.hp.com`. To check that version for changes, go to `docs.hp.com`, then choose "Browse by Topic", then "HP-UX 11i Operating System" and then "White Papers" under "System Administration".

Building Blocks and Definitions

Outline of this Section

- “Glossary” on page 287
- “What is a Superdome System?” on page 291
- “What Is a Complex?” on page 292
- “What is the Guardian Service Processor?” on page 296
- “What is a Partition?” on page 298
- “What is a CPU Cabinet?” on page 299
- “What is a Cell?” on page 303
- “What is an XBC (Crossbar Controller)?” on page 312
- “Crossbar Connections” on page 314
- “What is an I/O Chassis?” on page 317
- “What is an I/O Expansion Cabinet?” on page 320
- “The Console and the Support Management System” on page 321

Glossary

- **16-, 32-, 64-way-capable system:**

The three Superdome models currently available; see “What is a CPU Cabinet?” on page 299.

- **CPU cabinet:**

Superdome’s hardware “box”; see “What is a CPU Cabinet?” on page 299.

- **Cell; cell board:**

Superdome’s hardware building blocks, containing memory, processors and other core components; see “What is a Cell?” on page 303.

- active cell:**

a cell in use in a partition; see “Active Cell” on page 309.

- base cell:**

a cell assigned to a partition; see “Base Cell” on page 309.

- core (root) cell:**

the cell that supports the console for its partition, and performs other key functions; see “Core Cell” on page 309.

- inactive cell:** a cell assigned to a partition which is not available to the operating system running on that partition; see “Active Cell” on page 309.

- unassigned (free) cell:** a cell that has not been assigned to any partition.

- viable core cell:** a **base cell** that is attached to an **I/O chassis** that contains a **core I/O** card. See “Core Cell” on page 309.

- **Cell Controller (CC):**

The chip on each **cell** that is responsible for maintaining data coherency across all the cells in a partition, connecting the cell to I/O (via the **System Bus Adapter**) and to the **crossbar controller (XBC)**. See “Cell Components” on page 304.

- **Cell I/O:**

Refers to the connection between **cells** and **I/O chassis**, which contain I/O cards; see “Cell I/O” on page 308.

- **Complex:**
A hardware configuration that can support multiple instances of an operating system (by means of **partitions**); see “What Is a Complex?” on page 292.
- **Complex Profile:**
The data structure managed by the GSP that represents the configuration of a complex. See “The Complex Profile” on page 292.
- **Core I/O:**
Comprises console support and 10/100 Base T LAN; see “Core I/O” on page 318.
- **Cross-Flex:**
The cabling used to connect the **crossbars** in a **64-way-capable** system; see “Crossbar Connections” on page 314.
- **Crossbar; crossbar controller (XBC):**
The backplane board that **cells** plug into, and its controlling chips; see “What is an XBC (Crossbar Controller)?” on page 312.
- **DIMM:**
Dual Inline Memory Module; see “Memory” on page 308.
- **Guardian Service Processor:**
The board that maintains configuration information about the **complex** and oversees configuration changes; see “What is the Guardian Service Processor?” on page 296.
- **iCOD:**
Instant Capacity on Demand. Allows you to activate inactive processors. See “Instant Capacity on Demand (iCOD)” on page 307.
- **I/O chassis (cardcage):**
A card cage containing 12 I/O slots; see “What is an I/O Chassis?” on page 317
- **I/O expansion cabinet:**
An external cabinet containing up to six 12-slot **I/O chassis**; see “What is an I/O Expansion Cabinet?” on page 320.

- **I/O slots:**
The slots in an **I/O chassis**; see “I/O Cards” on page 317.
- **IPL:**
Initial Program Load(er). See “What Happens when a Cell Boots” on page 311.
- **Local Bus Adapter:**
The chip that connects an individual I/O slot to the **System Bus Adapter**, and thence to a **cell**; see “Cell Connectivity” on page 308.
- **Monarch CPU:**
The processor that performs selftest and other functions when a cell is activated as part of a booting partition. See “What Happens when a Cell Boots” on page 311. Often used to refer specifically to the **core cell’s** monarch CPU.
- **PCI cards:**
Peripheral Interface Cards, often called simply “I/O cards”; see “I/O Cards” on page 317.
- **PDC:**
Processor Dependent Code. See “What Happens when a Cell Boots” on page 311.
- **Partition:**
A **cell**, or usually group of cells, running an instance of an operating system in a **Complex**; see “What is a Partition?” on page 298.
- **Partition Manager (parmgr):**
A menu-driven software tool (`/opt/parmgr/bin/parmgr`) that runs under HP-UX and is used to configure and reconfigure **complexes**. Can be executed locally on a **partition**, or remotely from a PC via a web browser.
- **Quad:**
A group of four cell slots that are connected to a single **crossbar controller (XBC)**. See “What is an XBC (Crossbar Controller)?” on page 312.

- **SAM:**
The menu-driven System Administration Manager tool used to configure HP-UX.
- **Single Computer Board (SBC) and SBC Hub (SBCH):**
The components of the **Guardian Service Processor (GSP)**. See “What is the Guardian Service Processor?” on page 296. There is one SBC per **complex**, and one SBCH per **CPU cabinet**.
- **Support Management Station (SMS); scan station:**
A workstation connected to Superdome **complexes** to run diagnostics; see “Support Management Station (SMS)” on page 322.
- **System Bus Adapter:**
The chip that connects a **cell** to an **I/O chassis**; see “Cell Connectivity” on page 308.
- **XBC:**
See **crossbar controller**, and “What is an XBC (Crossbar Controller)?” on page 312.

What is a Superdome System?

Terms:

- **Cell:** see “What is a Cell?” on page 303.
- **Complex:** see “What Is a Complex?” on page 292.
- **CPU cabinet:** see “What is a CPU Cabinet?” on page 299.
- **Partition:** see “What is a Partition?” on page 298.

Full Glossary on page 287 .

Superdome is a high-end server that can be (though it does not have to be) partitioned into several systems-within-a-system, each running its own operating-system “image” or instance. These systems-within-a-system are called **partitions**; the system that includes all the partitions is called a **complex**.

The primary hardware building-blocks are **cells**, which are housed in **CPU cabinets**; when configuring a system, you combine cells to create a partition.

At first release a Superdome system comprises either one or two cabinets, each holding a maximum of eight cells (and a minimum of one).

What Is a Complex?

Terms:

- **Active, inactive, unassigned cell:** see “Active Cell” on page 309.
- **Cell:** see “What is a Cell?” on page 303.
- **Core cell:** see “Core Cell” on page 309.
- **CPU cabinet; 32-way-capable system; 64-way-capable system:** see “What is a CPU Cabinet?” on page 299.
- **Guardian Service Processor (GSP):** see “What is the Guardian Service Processor?” on page 296.
- **iCOD:** see “Instant Capacity on Demand (iCOD)” on page 307.
- **Partition:** see “What is a Partition?” on page 298.
- **XBC:** see “What is an XBC (Crossbar Controller)?” on page 312.

Full Glossary on page 287 .

A complex can be defined as a single hardware configuration that can support more than one instance of an operating system (by means of **partitions**).

- In hardware terms, a complex is the sum of all the hardware resources in, and attached to, one or more **CPU cabinets** that are cabled together.
- In software terms, it is the sum of all the partitions.

A maximum of two CPU cabinets (**32-way-capable systems**) can be combined into a complex. This is done by cabling together the crossbars (**XBCs**) from the two adjacent cabinets; this configuration is called a **64-way-capable system**.

The Complex Profile

Information about the complex is stored in the **complex profile**, which is written by the commands used to configure the complex (and indirectly by the **Partition Manager (parmgr)**, which invokes those commands) and maintained by the **Guardian Service Processor (GSP)**.

The complex profile is used by **PDC (Processor Dependent Code)**, the HP-UX kernel and the **Partition Manager (parmgr)**, as well as by the GSP. It consists of three parts:

- **Stable complex configuration information (Group A)**, including:
 - Attributes of the complex (its name, model number, serial number, etc)
 - cell-to-partition assignments and unassigned cells**
 - XBC connections**
 - other complex-wide information
- **Dynamic complex configuration information (Group B)**.
Complex profile revision information, used to make sure that all cells and partitions have the same information about the configuration of the complex.
- **Partition configuration information (Group C)**, including:
 - Partition name
 - Partition number
 - IP address
 - Primary boot path
 - Alternate boot path and High Availability alternate boot path (see “Paths to boot and root disk” on page 339)
 - Boot timer
 - KGM (Known Good Memory)
 - Autostart and other flags
 - Console and keyboard paths
 - Core cell** selection table
 - “Use on boot” flag for each cell, indicating whether or not each of the partition’s cells will be activated next time the partition boots. The default is to activate the cell.
 - “Failure policy” for each cell, indicating whether or not the cell is to be activated as part of the partition if selftest reveals a processor or memory-module failure, but the cell is otherwise viable. The default is to activate the cell.

- ❑ **iCOD** information indicating how many processors in the partition, if any, you have not purchased; see “Instant Capacity on Demand (iCOD)” on page 307.

What Actions Change the Complex Profile?

Table A-1

Action	Affected Cells	Affected Part(s) of Profile
Create a partition	All cells in the partition	Groups A and C
Delete a partition	All cells in the partition	Groups A and C
Add cells to a partition	Cells being added	Group A
Remove inactive cells from a partition	Cells being removed	Group A
Remove active cells from a partition	All cells in the partition (requires rebooting the partition)	Group A

When Are Complex Profile Changes Broadcast to Cells? A copy of the complex profile is stored in each cell’s memory. The GSP updates the cells’ copies of the profile under the following circumstances:

- If the stable complex configuration information (Group A) has changed:
 - ❑ If no cell’s partition assignment has changed, the changes are broadcast immediately.
 - ❑ If only inactive cells’ assignments have been changed, the changes are broadcast immediately.
 - ❑ If an active cell’s partition assignment has changed, the changes are broadcast once the cell is inactive (that is, no cells will receive the new information until the affected cell is inactive).

- If the partition configuration information (Group C) has changed:
 - ❑ The changes are broadcast to the cells in that partition immediately, though the information will normally not be used until the next time the partition boots.

Point to note: The GSP will not update stable complex configuration information (Group A) for *any* cell unless it can update *all* cells, and it cannot update the partition assignment of an active cell.

What is the Guardian Service Processor?

Terms:

- **Complex:** see “What Is a Complex?” on page 292.
- **CPU cabinet:** see “What is a CPU Cabinet?” on page 299.
- **Partition:** see “What is a Partition?” on page 298.
- **Support Management Station (SMS):** see “Support Management Station (SMS)” on page 322.

Full Glossary on page 287 .

One **CPU cabinet** in each **complex** contains the **Guardian Service Processor (GSP)**, comprising a **Single Computer Board (SBC)** and an **SBC hub (SBCH)**. The GSP maintains configuration information about the complex and oversees configuration changes; see “The Complex Profile” on page 292.

Specifically, the GSP is needed for:

- Access to the complex console.
- Getting information about the configuration of a **partition** other than the one you are on, or the complex.
- Changing partition or routing configuration.
- Propagating diagnostic chassis logs.
- Notification of events in partitions other than the one you are on.

More broadly, the GSP and its menu interface comprise a command center for managing the complex, providing the following capabilities:

- Always-on capability.
The GSP is alive so long as the circuit breakers are closed.
 - Access control.
Provides three levels of capabilities.
 - Multiple access methods:
 - Local RS232 port, providing support for directly connected terminal or laptop computer.
 - Remote-modem port.
 - Customer LAN port, providing support for telnet access.
 - HP private LAN, providing support for telnet access, diagnostics, and firmware updates from the **Support Management Station**.
- See “The Console and the Support Management System” on page 321 for a diagram.
- Multi-user access to the complex.
Multiple users can log in through the LAN port simultaneously and manage different partitions or examine the state of the complex.
 - Multi-user access to a partition’s console.
Multiple users can telnet simultaneously to a given partition’s console.
 - Virtual Front Panel (VPF).
Displays the boot/run state for a given partition.
 - Power on/off, system reset and TOC (Transfer of Control) capabilities.

For information on using the GSP to perform specific system-management tasks, see chapters 2, 4 and 5 of the manual *Managing Superdome Complexes* (you may be reading this paper in the form of an appendix to that manual).

What is a Partition?

Terms:

- **Cell:** see “What is a Cell?” on page 303.
- **Complex:** see “What Is a Complex?” on page 292.
- **CPU cabinet:** see “What is a CPU Cabinet?” on page 299.
- **I/O chassis:** see “What is an I/O Chassis?” on page 317.

Full Glossary on page 287 .

A partition corresponds roughly to a single, standalone system. Each **complex** can be subdivided into several partitions, each containing one or (usually) more **cells** and running a single instance of the operating system (at first release, HP-UX 11i only).

Partitioning the resources of the complex in this way makes it easy to run multiple applications on the same physical system; you can allocate physical resources and tune the operating system running on each partition depending on the needs of the application (or the most important application) you intend to run on it.

Alternatively, you can configure the complex as a single partition, allowing all the resources to be focussed on a single set of tasks, for example a large online transaction-processing application.

At first release, the maximum number of cells in a single partition is sixteen (two **CPU cabinets** containing a maximum of eight cells each); the minimum is one. Similarly, the maximum number of partitions in a complex at first release is sixteen (sixteen single-cell partitions); the minimum is one (a single partition containing any number or cells from one to sixteen).

Each partition must contain at least one cell that is attached to an **IO chassis**; see “Partitions, Cells and I/O Chassis” on page 333 for more information.

You can increase or reduce the processing power of a partition by adding or deleting cells (at first release, you must shut down the operating system running on the affected partition(s) before moving cells, and before configuration changes will take effect). Though HP-UX 11i does include commands for some configuration tasks, HP recommends you use the Partition Manager (parmgr) to configure partitions.

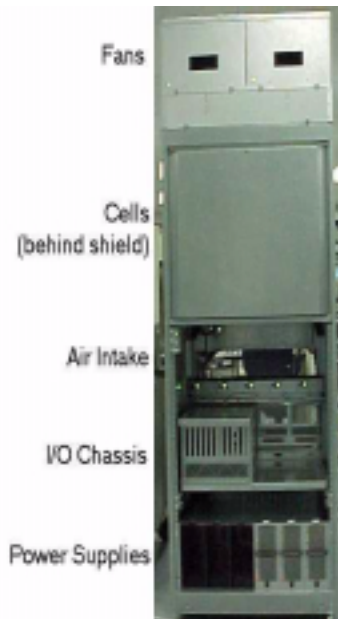
There are performance and high-availability issues you need to consider before you install a new cell or move an existing one or re-assign it to another partition; see “Choosing Cells for Partitions” on page 325.

What is a CPU Cabinet?

Terms:

- **Cell:** see “What is a Cell?” on page 303
- **Complex:** see “What Is a Complex?” on page 292
- **I/O chassis:** see “What is an I/O Chassis?” on page 317
- **Guardian Service Processor:** see “What is the Guardian Service Processor?” on page 296.

Full Glossary on page 287

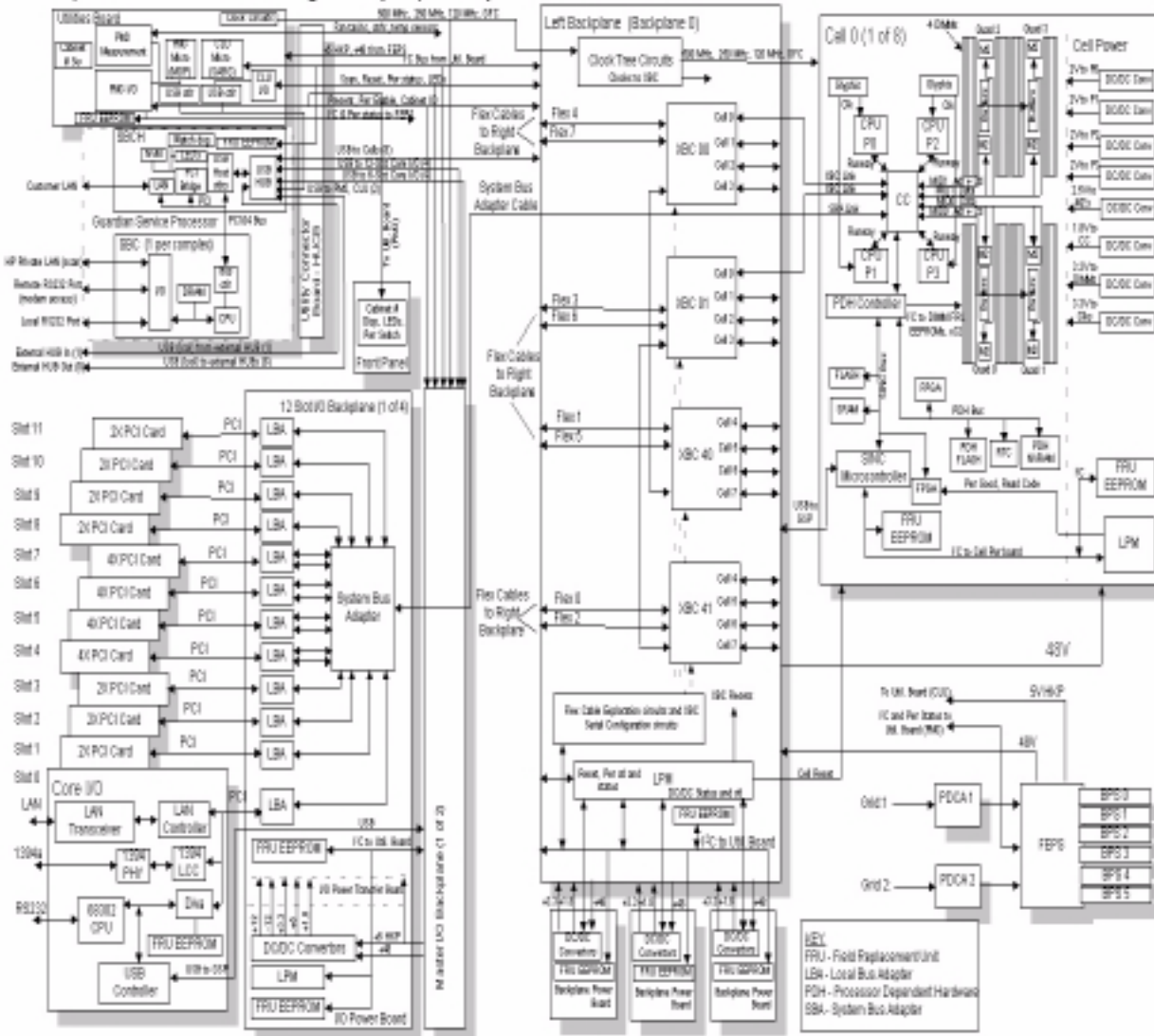


A CPU cabinet is Superdome's hardware "box." It contains:

- **cells;**
- The **Guardian Service Processor** (one per **complex**);
- **I/O chassis** (a maximum of four chassis for a maximum of 48 slots);
- five top-venting I/O fans;
- four top-venting cabinet fans;
- six power supplies, connected to the power source by one or (for redundancy) two cables.

This block diagram shows how all the components in a 32-way-capable system communicate.

SuperDome Cabinet showing 32 way capable system



NOTE

A CPU cabinet has no room for internal disks; all peripherals are external, attached to the I/O chassis.

Cabinets can be cabled together to form a **complex**. A complex comprises a maximum of two cabinets. A single cabinet is a **16-way-capable** (SD1600) or **32-way-capable** (SD3200) system; two contiguous cabinets cabled together are a **64-way-capable** system (SD6400).

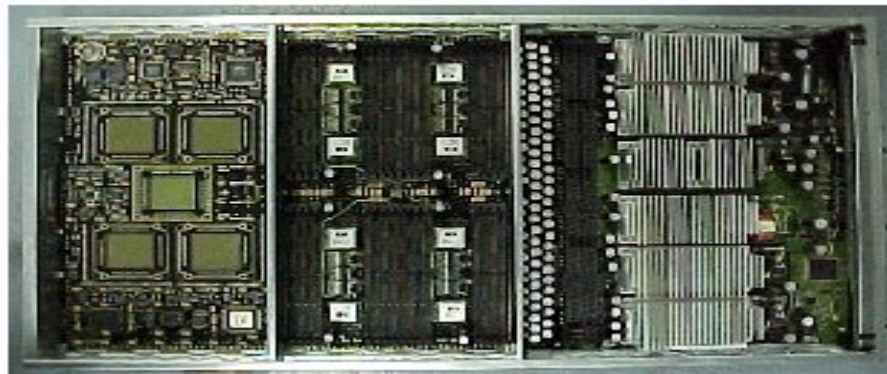


What is a Cell?

Terms:

- **CPU cabinet:** see “What is a CPU Cabinet?” on page 299.
- **Cell Controller (CC):** see “Cell Controller (CC)” on page 306.
- **Complex:** see “What Is a Complex?” on page 292.
- **Complex profile:** see “The Complex Profile” on page 292.
- **Core I/O:** see “Core I/O” on page 318.
- **GSP:** see “What is the Guardian Service Processor?” on page 296.
- **I/O chassis:** see “What is an I/O Chassis?” on page 317.
- **I/O Expansion cabinet:** see “What is an I/O Expansion Cabinet?” on page 320.
- **Partition:** see “What is a Partition?” on page 298.
- **Superdome system:** see “What is a Superdome System?” on page 291.
- **System Bus Adapter:** see “Cell I/O” on page 308.
- **XBC link:** see “What is an XBC (Crossbar Controller)?” on page 312.

Full Glossary on page 287 .



*In the picture above, the rightmost section of the board is power bricks and capacitors; the center section is space for DIMMs, and the left section contains sockets for four processors surrounding a socket for the **cell controller (CC)**.*

A cell, or cell board, is the basic building block of a **Superdome system**. When configuring or reconfiguring a **complex**, you assign cells to **partitions**. A cell provides processing power comparable to that of a mid-range server, but a Superdome system supports this processing power with much greater memory capacity and I/O bandwidth. For more information, see:

- “Cell Components” on page 304.
- “Cell Compatibility” on page 308.
- “Cell Connectivity” on page 308.
- “Cell Types” on page 309.
- “What Happens when a Cell Boots” on page 311.

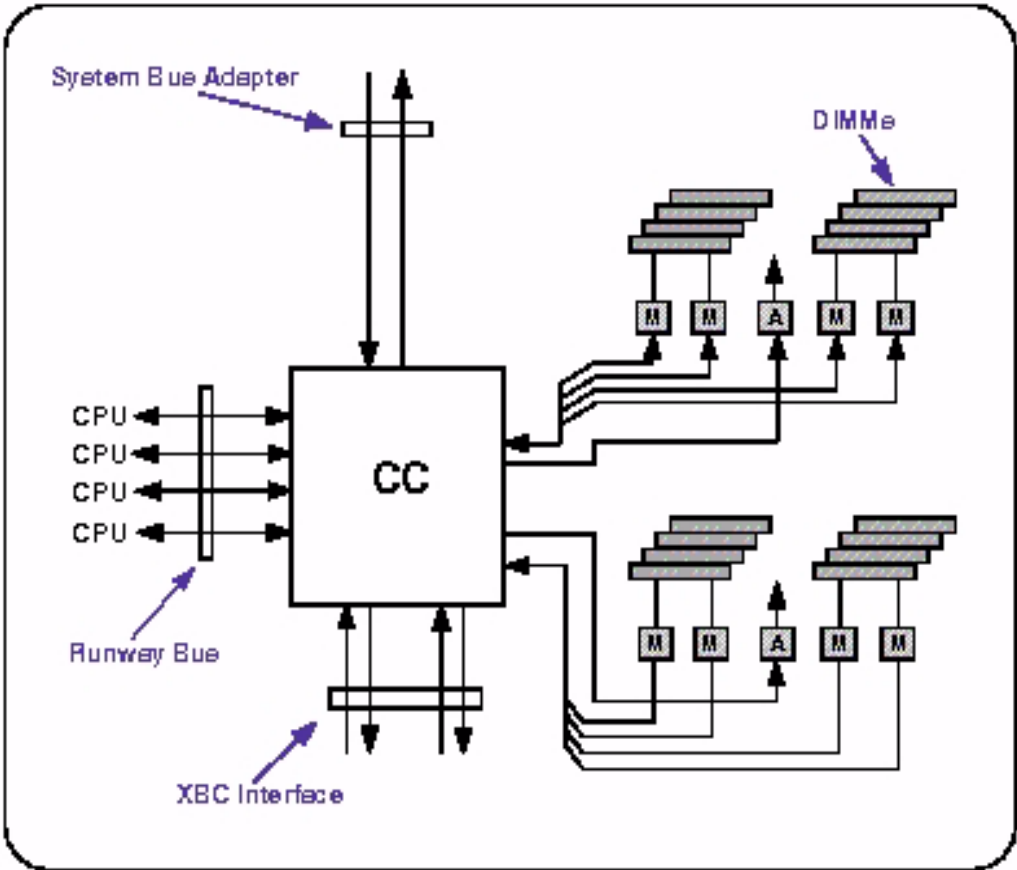
Cell Components

A cell is a single logic board containing:

- power converters;
- data busses;
- processors; see “Processors” on page 307;
- memory; see “Memory” on page 308;
- one **cell controller (CC)**; see “Cell Controller (CC)” on page 306.

This diagram shows how these components are connected.

Cell Block Diagram



This cell contains four double speed busses, each connecting a single processor to the **cell controller(CC)** chip, which controls the cell's memory and links the cell to other cells and to I/O.

Cell Controller (CC) The cell controller chip co-ordinates memory between the major components of a cell board -

- memory controllers (DIMMs),
- processors,
- the I/O bus (**System Bus Adapter**)

- and determines if a request requires communication with another cell or with the I/O subsystem.

The CC has two interfaces which leave the cell:

- the **crossbar interface (XBC link)**, through which all communication to other cells flows;
- the **System Bus Adapter**, which connects the cell to an I/O subsystem.

See “Cell Components” on page 304 for a block diagram.

Processors Each cell contains four processors. All the processors in the same **partition** must be of the same type (the partition will not boot if they are not). At first release, the only processor type available is PA-8600.

Instant Capacity on Demand (iCOD) All cells are delivered with four processors, but you pay only for the processors you use. For example, a cell ordered with two active processors will be delivered with two active and two inactive processors. If and when you need additional capacity, you can use the Partition Manager (parmgr) to turn on one or both of the inactive processors, and HP will bill you accordingly.

NOTE

iCOD is a separately orderable product which is not available with the earliest Superdome shipments; those systems use a different method for turning on inactive processors. Contact your HP Sales Representative for more information.

Order for Activating Processors. The algorithm the HP tools use to activate new processors is:

1. There must be at least one active CPU per cell.
2. CPUs are activated round-robin across cells within a partition (that is, first processor 0 in each cell, then processor 3 in each cell, and so on following rule 3). This means that the number of active processors per cell will differ by at most one across the partition.
3. CPUs are enabled on a cell board in the order 0, 3, 1, 2. This spreads the CPUs across the two internal Cell Controller busses and allocates CPUs in the best thermal fashion.
4. When a failed CPU is replaced, choose one from the same cell when possible. If it is not possible, choose the next available CPU following rules 2 and 3.

Performance and High Availability For best performance, all cells in the same partition should contain the same number of active processors. For high-availability reasons, each cell should contain at least two active processors. See also “Choosing Cells for Partitions” on page 325.

Memory Each cell can contain up to 16 GB RAM in 2 GB increments.

Performance and High Availability For high availability reasons, a cell should contain at least 8 memory DIMMs (Dual Inline Memory Modules) for a minimum of 4 GB RAM. For the best performance, all the cells in a partition should contain the same amount of RAM. This is because all the memory in a partition is **fully cache-line-interleaved**, meaning that each cell's memory forms part of a common pool used by processes running on that partition. If one cell in the partition has more memory than the others, that cell will contribute disproportionately to the pool and the connections to and from it will be overworked, degrading performance.

See also “Choosing Cells for Partitions” on page 325.

Cell Compatibility

When a partition boots, PDC selects a **core cell** (see “Core Cell” on page 309). Other cells in the partition are allowed to boot if they match the core cell in the following respects:

- The firmware revisions have the same major number.
- The cache sizes of the processors are the same, and the processors are of the same type.

The Partition Manager (parmgr) will warn you if you try to configure an incompatible cell into a partition.

Cell Connectivity

Cells communicate with each other (within a **partition**); and with I/O devices by means of an I/O chassis (or, if the cell in question is not connected to an I/O chassis, via a cell that is connected to I/O).

Cell I/O At least one cell in a partition must be connected to an I/O chassis, and preferably more than one (see “Partitions, Cells and I/O Chassis” on page 333).

A cell can be connected to no more than one **I/O chassis**, and an I/O chassis can be connected to no more than one cell. Unless you add an **I/O expansion cabinet**, this means that a maximum of four cells (out of a possible eight in a CPU cabinet) can be directly connected to I/O. Adding an I/O expansion cabinet would theoretically allow all eight cells in a full CPU cabinet to be connected to I/O. Cells that have I/O are connected to an I/O chassis via the **System Bus Adapter**, which in turn is connected to the cards in the individual I/O slots, via **Local Bus Adapter** chips. See “I/O Cards” on page 317 for more information.

Crossbar Link to CPU Cabinet Cells are connected to the cabinet by means of the cell controller's **crossbar (XBC) link**. A maximum of four cells plug into a crossbar; there are two crossbar in a CPU cabinet. See “What is an XBC (Crossbar Controller)?” on page 312 for more information.

Cell Types

Active Cell An active cell is a cell that has been assigned to a **partition**, has power enabled, and is integrated into the operating system running on the partition.

An **inactive cell** is a cell that has been assigned to a partition, but was not activated when the partition booted (either because you de-activated it by means of its “use on next boot” flag in the **complex profile** or because of a failure). An **unassigned cell** does not currently belong to any partition.

Base Cell A base cell is a cell that has been assigned to a partition.

Core Cell A core cell (also known as the **root cell**) is the cell that the Processor-Dependent Code (PDC) has selected at boot time to perform the following set of roles and functions for the partition:

- Support the console
- Support the system clock
- Maintain copies of the GSP chassis logs
- Via the **monarch** CPU, perform the system boot and execute **IPL (Initial Program Load)** for the partition.
- Keep the “master copy” for some data structures
- Serve as the criterion for the compatibility of the other cells in the partition; see “Cell Compatibility” on page 308.

To qualify as a **viable core cell**, a cell must be a **base cell** and must be attached to an **I/O chassis** that contains a **core I/O** card. A partition's core cell, the one from which it boots, should normally be its lowest-numbered cell, but partitions can (and, for high-availability reasons, should) have more than one viable core cell.

NOTE

In a booted partition that has more than one viable core cell, the only core I/O card that is active is the core cell's.

How the Core Cell is Selected. If a partition has more than one viable core cell, PDC (Processor Dependent Code) decides when the partition is booting which cell should be the core cell. It does this on the basis of a prioritized list which is part of the Partition Configuration Data maintained by the GSP. If PDC detects any problem with the first cell on the list or its I/O, PDC will choose the second cell on the list; if both of these are faulty and there is a third, it will choose the third, and so on. If all the cells in the list are faulty (or there are no cells in the list) PDC will check all the cells in the partition that have core I/O (starting with the lowest- numbered cell) until it finds a viable core cell or it has exhausted all the possibilities.

You can use Partition Manager (parmgr) to modify this list, and so designate which should be the primary, secondary or later choice for the core cell; but normally you should accept Partition Manager's defaults unless you have a particular reason not to.

See also "Partitions, Cells and I/O Chassis" on page 333.

What Happens when a Cell Boots

This section explains how a cell becomes active as its partition boots. The sequence is as follows:

1. The system administrator enables power to the cell.
(This can be done by means of the HP-UX `frupower` command, or from SAM or the **GSP**.)
2. The cell is held in the **reset** state until power stabilizes.
3. The cell is released from reset and **boot is blocked** (that is, the cell is on but is not allowed to boot).
4. The cell's **monarch processor's PDC** (Processor-Dependent Code) sets a flag that signals the GSP that it can post a new **complex profile** (the complex profile is replicated in every cell's memory; see "The Complex Profile" on page 292).
5. The cell's monarch processor's PDC performs selftests, identifies the cell's hardware, checks for I/O (is the cell connected to an I/O chassis, and if so what devices are connected?) and identifies everything the cell is connected to via its crossbar link (**XBC**).
6. The cell reports its hardware configuration to the GSP.
7. The GSP ensures that the cell's copy of the complex profile has current information, reflecting both the cell's partition and the complex as a whole.
8. The GSP clears the "boot is blocked" flag, allowing the cell to boot.
9. The cell's monarch processor's PDC checks that the cell is compatible with the other cells in the partition (see "Cell Compatibility" on page 308).
10. If the cell is compatible, its monarch processor's PDC reads the complex profile and the cell boots as part of its partition.

If this is the **core cell**, its monarch CPU performs the system boot and executes IPL (Initial Program Load) for the partition.

What is an XBC (Crossbar Controller)?

Terms:

- **64-way-capable system; CPU cabinet:** see “What is a CPU Cabinet?” on page 299.
- **Cell:** see “What is a Cell?” on page 303.
- **Cell Controller:** see “Cell Controller (CC)” on page 306.
- **Partition:** see “What is a Partition?” on page 298.

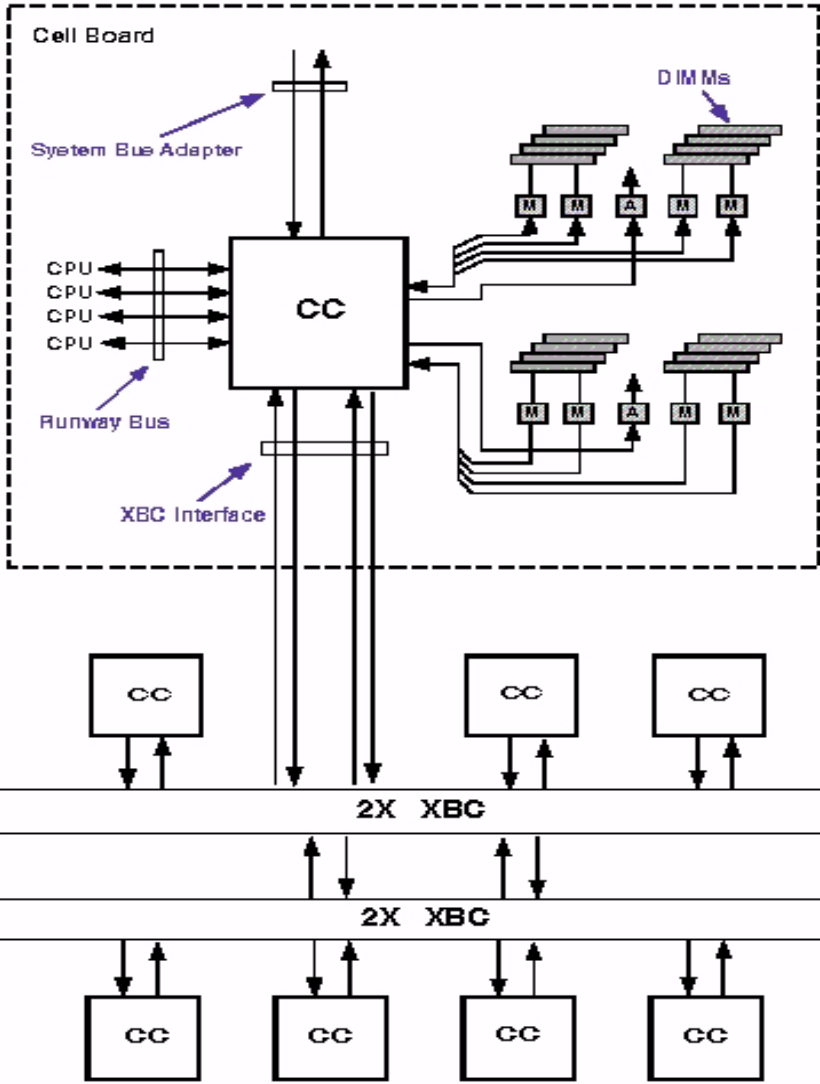
Full Glossary on page 287 .

Each **CPU cabinet** contains two crossbar backplane boards. Each **cell** plugs into one of these crossbars by means of a pair of connectors, forming a connection between the **cell controller (CC)** and the crossbar controller. The crossbar controller comprises two chips and is also known as the **XBC**.

There are two crossbars (and thus two XBCs) in a CPU cabinet, and a maximum of four cells plug into each, allowing a maximum of eight cells in a cabinet.

This diagram shows how cells connect to the backplane.

Cell Board/Backplane Connection



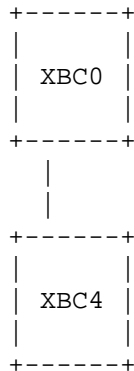
The two XBCs in a cabinet are connected to each other and, in a **64-way-capable system**, to the two XBCs in the other cabinet as well. These connections allow cells to communicate and to share memory both within and across crossbars, allowing **partitions** comprising more than four cells.

You need to be careful when configuring partitions that cross crossbar boundaries; not all configurations which are physically possible are supported. See “Choosing Cells for Partitions” on page 325.

Crossbar Connections

Three of the ports on a crossbar controller (**XBC**) are reserved for connections to other XBCs on other crossbars in the **complex**. One of these ports is used to connect to the other XBC in the same cabinet. This is a direct crossbar-to-crossbar connection (set in etch on the board) and is not configurable:

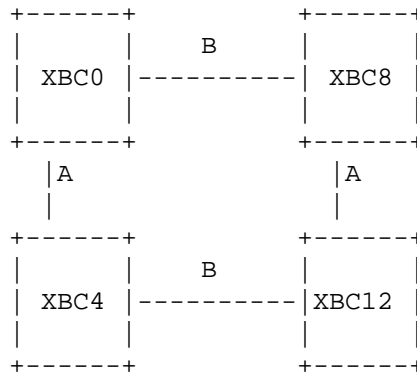
Direct Link



The direct XBC-XBC link between crossbars in a cabinet.

In a 64-way-capable-system, another of these three ports connects the crossbar to the corresponding XBC in the other cabinet:

Direct and Flex Links (64-way-capable-system)



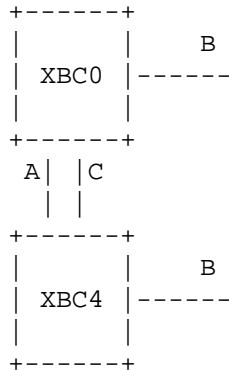
This figure shows the XBC-XBC links between crossbars (A) and the flex links between corresponding XBCs in two cabinets (B).

This leaves one more port for an XBC connection. The way this last port is connected defines the difference between a **U-Turn** and a **Cross-Flex** connection.

Cross-Flex and U-Turn

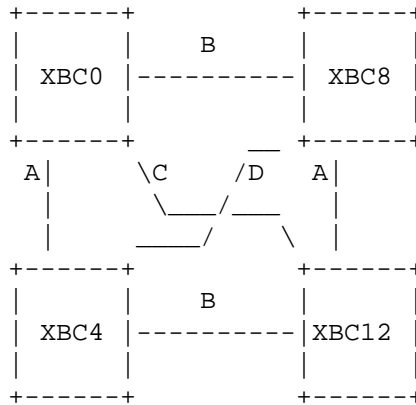
- If the last port is connected to the other XBC in the *same* cabinet (that is, a second XBC-XBC connection to the second XBC in the same cabinet), this is a **U-Turn** connection.
- If the connection is to the other XBC in another cabinet (such that XBC 0 is cabled to XBC 12), this is a **Cross-Flex** connection.

U-Turn (32-way-capable-system)



*In this figure, C shows a second XBC-XBC link (a flex link) between XBCs in the same cabinet. This is a U-Turn configuration for a **32-way-capable-system**. Note that the ports labeled B are not connected to anything.*

Cross-Flex (64-way-capable-system)



*This figure shows XBC-XBC links (C and D) connecting XBC 0 to XBC 12, and XBC 8 to XBC 12, in the other cabinet. This is a Cross-Flex configuration for a **64-way-capable-system**.*

See “Recommendations for Cabling Crossbar Controllers (XBCs)” on page 324 for guidelines on when to use which type of configuration.

What is an I/O Chassis?

Terms:

- **CPU cabinet:** see “What is a CPU Cabinet?” on page 299.
- **Cell:** see “What is a Cell?” on page 303.
- **Partition:** see “What is a Partition?” on page 298.
- **GSP (Guardian Service Processor):** see “What is the Guardian Service Processor?” on page 296.

Full Glossary on page 287 .

An **I/O chassis** enables a **cell**, and hence a **partition** to communicate with I/O devices such as the system console, disk drives and the network. It contains slots for I/O cards and is sometimes referred to as a **cardcage**.

At first release, each **CPU cabinet** holds a maximum of four I/O chassis, two in each of the cabinet's two **I/O bays** (front and rear). I/O bays are the apertures in the CPU cabinet that the I/O chassis fit into. Partition Manager and other utilities report the location of an IO chassis in the form:

```
cabinet_#, bay_#, chassis_#
```

At first release, only 12-slot chassis are available.

See “Partitions, Cells and I/O Chassis” on page 333 for more information.

I/O Cards

At first release, each I/O chassis contains 12 **PCI** (Peripheral Card Interface) slots, numbered 0-11, right to left when looking at the chassis from the front.

- Slots 0, 1, 2, 3, 8, 9, 10, and 11 are 2X (33MHZ) 5-volt-only slots.
- Slots 4, 5, 6, and 7 are 4X (66MHZ) 3.3-volt-only slots.
- **Universal** PCI cards (cards that support both 5 and 3.3 volts) can plug into any slot, but keep in mind that:
 - ❑ Universal 2X PCI cards plugged into 4X slots will run only at 2X speed (33MHZ).
 - ❑ Universal 4X PCI cards plugged into 2X slots will also run only at 2X speed.

Core I/O Each partition must contain at least one cell that is attached to an I/O chassis containing **core I/O**, which comprises primarily:

- console support
- 10/100 BaseT LAN

Placement of Core I/O, Boot and Removable Media Cards:

- Put the **core-I/O card** in the rightmost slot (**slot 0**) of an I/O chassis (this is the only slot it can go in).
- Put the **boot device controller** in the same I/O chassis as the core I/O card. If the boot device controller is a 4X card, put it in **slot 4** of this chassis. If it is a 2X card, put it in **slot 1** of this chassis.
- Put the **removable media card** (e.g., for a DVD drive) in **slot 8** of this chassis.

Configuring and Controlling an I/O Chassis

Before a chassis is installed in its I/O bay and cabled to a cell, you will not be able to power it on. Once the chassis is cabled to a cell, powering on the cell will power on the chassis and powering off the cell will power off the chassis. Powering off a chassis that is attached to an active cell requires some planning.

Powering Off an I/O Chassis

You can power off an I/O chassis only if it is **inactive**. If the chassis is cabled to a cell, and the cell is active in a partition (that is, the partition has booted and the cell has booted as part of the partition) then the chassis is **active**.

This means that in order to power off a chassis (to do maintenance or replace it, for example) you need to shut down the partition and do one of the following:

- While the partition is down, use the **GSP** command menu to power off the chassis (a good approach if you need to replace the chassis and a spare is on hand - once the spare has been installed you can boot the partition).
- Disconnect the chassis from the cell, boot the partition, then go to the GSP command menu to power off the chassis (appropriate if the partition has to be back online as fast as possible and whatever needs to be done to the chassis might take some time).
- While the partition is down, from another partition set the “use on next boot” flag off for the cell attached to the chassis, then boot the partition; then you can power off the cell and chassis because the cell is not active.

What is an I/O Expansion Cabinet?

Terms:

- **CPU cabinet:** see “What is a CPU Cabinet?” on page 299.
- **I/O chassis:** see “What is an I/O Chassis?” on page 317.

Full Glossary on page 287 .

NOTE

I/O expansion cabinets are not available with early shipments of Superdome. Contact your HP Sales Representative for up-to-date information.

An I/O expansion cabinet contains up to six twelve-slot I/O chassis (cardcages). Unlike a **CPU cabinet**, it contains no slots for cells.

You need an I/O expansion cabinet if:

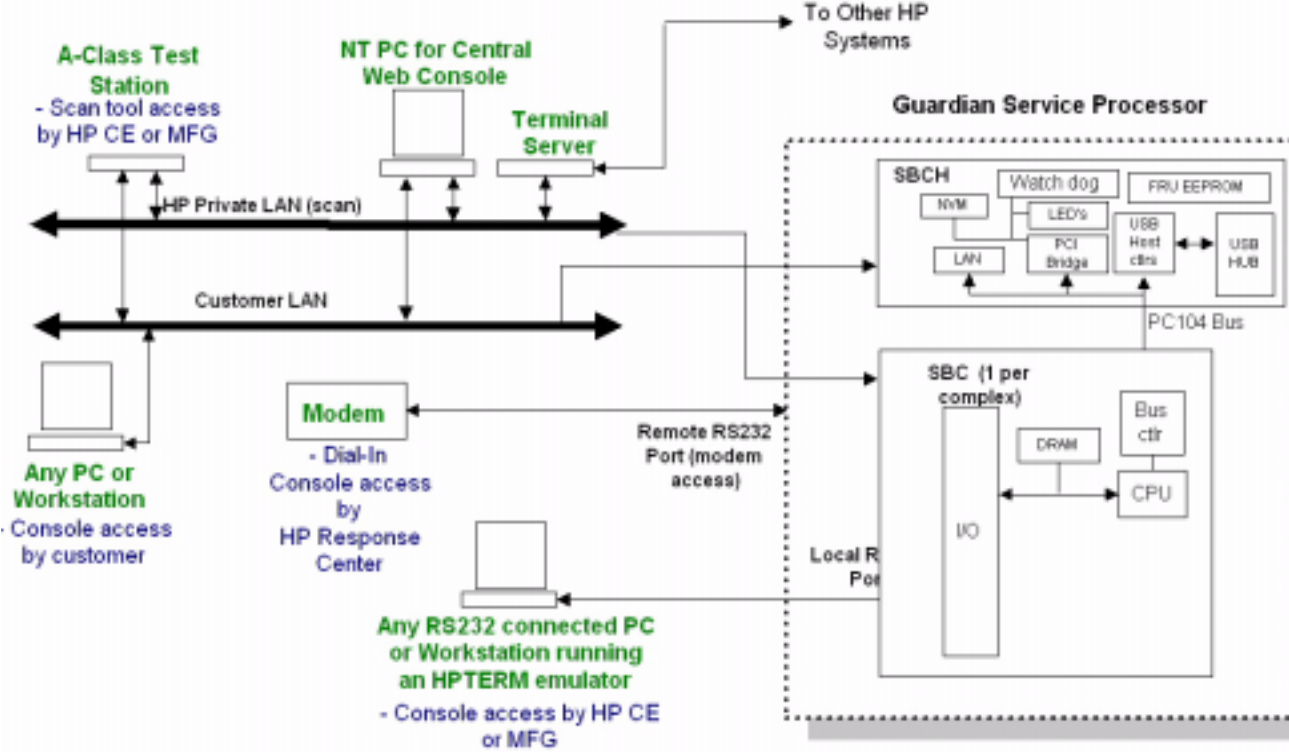
- you need more than 48 I/O slots per CPU cabinet; or
- you need to attach I/O to more than four cells in a CPU cabinet.

For more information see:

- “Cell I/O” on page 308.
- “Partitions, Cells and I/O Chassis” on page 333.

The Console and the Support Management System

Block Diagram of Console Connections to SuperDome



Support Management Station (SMS)

The Support Management Station (SMS), sometimes called a scan station, is an HP-UX workstation (A500 or equivalent) that runs Superdome diagnostics and testing tools. These tools are used by HP Customer Engineers or Service Engineers to monitor the health of your Superdome systems and to aid in system upgrades and hardware replacement.

An SMS can monitor up to sixteen Superdome complexes; the intention is that there should be one per site or data center. It is best to install the SMS near the complex or complexes it manages, so that the diagnostic tools and the hardware under inspection are all in one spot.

The SMS is connected to the complexes it monitors by means of a dedicated LAN; a second LAN card can be connected to the local site LAN. If the SMS monitors more than one complex, it will require a hub for the dedicated LAN.

Rules and Guidelines for Configuring a Complex

This section contains information on the following topics:

- “Recommendations for Cabling Crossbar Controllers (XBCs)” on page 324.
- “Choosing Cells for Partitions” on page 325.
- “Partitions, Cells and I/O Chassis” on page 333.
- “Checklist for Performance” on page 341.
- “Checklist for High Availability” on page 342.

Recommendations for Cabling Crossbar Controllers (XBCs)

Before you go on, read:

- “What is a Partition?” on page 298.
- “What is a Cell?” on page 303.
- “What is an XBC (Crossbar Controller)?” on page 312:
 - “Crossbar Connections” on page 314.

Other terms and concepts:

- **32-way, 64-way-capable system:** see “What is a CPU Cabinet?” on page 299.
- **CPU cabinet:** see “What is a CPU Cabinet?” on page 299.
- **Complex:** see “What Is a Complex?” on page 292.

When Do You Need To Think about Cabling?

Use this section when you are creating a new **complex**, or adding a **CPU cabinet** to a complex (or removing a CPU cabinet).

The crossbar controllers (**XBCs**) within a CPU cabinet are connected to each other by one direct connection which is not configurable - it's always there. You need to decide whether to use **U-Turn** or **Cross-Flex** cabling to connect the two remaining ports; see “Crossbar Connections” on page 314 for explanations and diagrams.

Guidelines for Performance

- **Always configure a 32-way-capable system with U-Turn.**
 - U-Turn provides twice the bandwidth between XBCs in the same cabinet.
- **Always configure a 64-way-capable-system with Cross-Flex.**

Cross-Flex increases bandwidth between cabinets in a 64-way-capable-system, providing the best performance for large partitions.

U-Turn is not recommended in a 64-way-capable-system because it would reduce the bandwidth between the cabinets; for example, there would be no direct connection between XBC 4 and XBC 8 in a U-Turn 64-way-capable-system, resulting in two hops for any communication between cells on these crossbars.

Choosing Cells for Partitions

Before you go on, read:

- “What is a Partition?” on page 298.
- “What is a Cell?” on page 303:
 - “Core Cell” on page 309
- “What is an XBC (Crossbar Controller)?” on page 312:
 - “Crossbar Connections” on page 314.

Other terms and concepts:

- “Recommendations for Cabling Crossbar Controllers (XBCs)” on page 324.
- **16-, 32- 64-way-capable-system, CPU cabinet:**
see “What is a CPU Cabinet?” on page 299.

Points to Note

- A partition is similar to a conventional single system. This means that the partition as a whole has access to all the resources in it: processors, memory and I/O are all shared among all the cells in the partition.
- A **16-way-capable system** should have at least two cells, a **32-way-capable system** should have at least four cells, and a **64-way-capable system** should have at least eight cells.

Building a Complex from Scratch

When building a complex from scratch, begin with the largest partition and proceed to the smallest.

Put the first cell of the largest partition in slot 0 of the left CPU cabinet, then start the next largest partition in the lowest-numbered of the remaining empty slots, and so on. Systems configured at the factory are built according to the following algorithm:

- Allocate partitions from largest to smallest.
- When starting a new partition:
 1. fill empty cabinets before adding to a partially populated cabinet;
 2. within a partially populated cabinet, next fill empty **quads** (that is, slots 0-3 or 4-7 in a cabinet);
 3. fill remaining slots from left to right by first filling in the even-numbered slots, then the odd.

Exception: Partitions larger than six cells in a 64-way-capable system are *not* built in a simple left-to-right fashion. For example, if you have a factory-configured eight-cell partition, you will probably notice that it is spread across three crossbars, with six cells in one cabinet and two in the other. A 64-way-capable system has only one link between any two crossbars (see the Cross-Flex cabling diagram under “Cross-Flex and U-Turn” on page 315), and confining the eight-cell partition to two crossbars would overload that link. Testing shows that spreading this partition across three crossbars results in much better performance.

If you are planning to configure or reconfigure a large partition (seven cells or more) in a 64-way-capable system, consult your HP Service Engineer or Customer Engineer for specific guidance.

Starting-slots for new partitions. The factory chooses starting slots in the following order, using the lowest priority-number that corresponds to an empty slot with enough empty slots to the right of it to build the partition:

Priority	Cabinet-Slot	Priority	Cabinet-Slot
1	0-0	9	0-1
2	1-0	10	1-1
3	0-4	11	05
4	1-4	12	1-5
5	0-2	13	0-3
6	1-2	14	1-3
7	0-6	15	0-7
8	1-6	16	1-7

Guidelines for Performance and High Availability

In general, what you do to improve performance will also improve availability. Exceptions are noted below.

Read the guidelines that follow in conjunction with “Partitions, Cells and I/O Chassis” on page 333.

When To Add Cells

- **Use all the possible resources within existing cells before adding cells to a partition.**

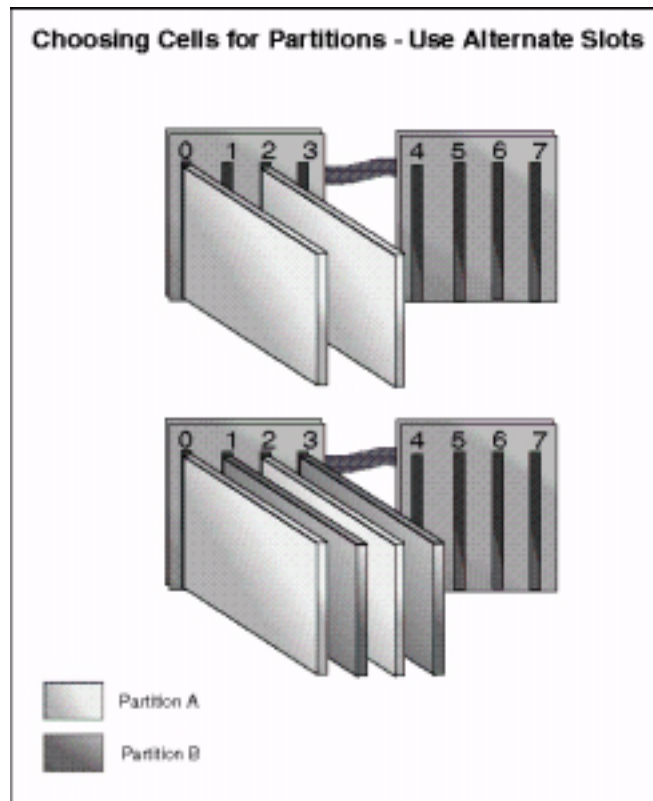
Example: If you need eight processors and 32 GB of RAM, configure a partition containing two cells with four active processors and 16 GB of RAM each, rather than four cells with two active processors and 8 GB of RAM each.

This guideline will help ensure the best performance; but there may be cases in which you want to add cells for the sake of high availability.

Where To Add Cells

- **If the cells in a given partition will not fill all four of the slots in a given crossbar, plug the cells into alternate slots.**

Explanation: Pairs of slots (0 and 1, 2 and 3, etc.) share ports on the crossbar controller (**XBC**). To even out traffic, a partition that uses only two slots in a crossbar should use slots that don't share ports, such as 0 and 2, or 1 and 3. For example, configure two two-cell partitions in a single cabinet by assigning slots 0 and 2 to the first partition and slots 1 and 3 to the second.



Rule of thumb: When starting to add cells to a crossbar that has no occupied slots, fill the even slots first, then the odd slots.

- **If a partition comprises four cells or fewer, all the cells should be connected to the same crossbar.**

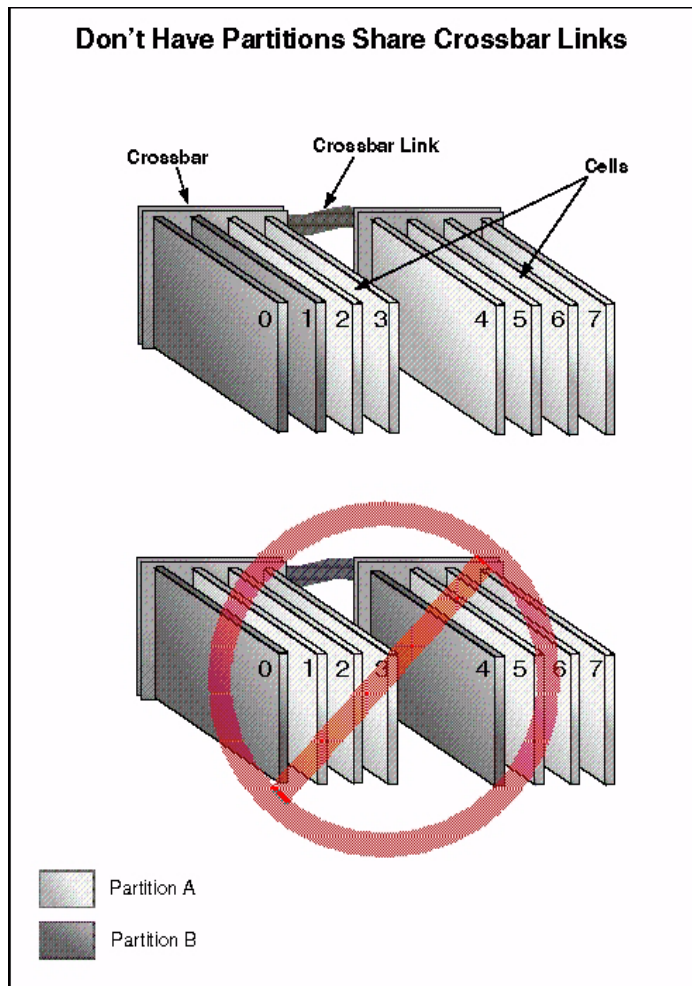
For example, two four-cell partitions should be configured such that the cells of each plug into a single crossbar.

Explanation: There are two crossbars to a CPU cabinet, and a maximum of four cells can plug into each. The crossbars are linked by means of their crossbar controllers (XBCs) but traffic that does not cross an XBC link is faster than traffic that does. In addition, a partition that depends on only one XBC is less vulnerable to hardware failure than a partition that depends on two.

Exception: A 64-way-capable system containing a large partition may need to break this rule. For example, if you have a system with an eight-cell partition and two four-cell partitions, one of the four-cell partitions is probably spread across two crossbars, one in each cabinet. In this large configuration the goal is to spread the load for the complex as a whole across the available links, getting good performance for all partitions rather than optimal for some and much worse for others. See the **Exception** under “Building a Complex from Scratch” on page 326.

- **Do not configure partitions such that two or more partitions share the same crossbar link.**

Explanation: A crossbar link is the link between the two crossbar controllers (XBCs) in a CPU cabinet. A partition comprising more than four cells must use a crossbar link, since there is one XBC per crossbar and a maximum of four cells can plug into one crossbar. A six-cell partition, for example, must use a crossbar link. When loading an empty cabinet, you should configure a six-cell partition such that it occupies all the slots (0-3) on the left crossbar and two of the slots on the right crossbar; you could then use the remaining two slots on the right crossbar for a two-cell partition. But you should not configure a six-cell partition such that it occupies three slots on each crossbar and then configure a second, two-cell partition from the remaining slots, because both partitions would then be using the same crossbar link. That could result in slower traffic and the loss of both partitions if the link fails.



Exception: A 64-way-capable system containing a large partition may need to break this rule. See the **Exceptions** under the previous guideline and “Building a Complex from Scratch” on page 326.

Distributing Resources

- **Each partition should consist of at least two cells.**
- **Each partition should contain at least two viable core cells.**

See “Partitions, Cells and I/O Chassis” on page 333 for more information.

- **Each cell should have at least two active CPUs.**
- **Configure cells into partitions by powers of two if possible.**

Because of the way memory interleaving is implemented (that is, memory sharing among cells) you will get the best memory performance from partitions comprising two, four, eight or sixteen cells. (Single-cell partitions also provide good memory performance, but are not recommended for other reasons.)

- **Configure the same number of active processors and the same amount of memory for each cell in a partition.**

Partitions that conform to this guideline will perform better than those that do not, because an uneven distribution of resources will result in an uneven workload, overworking some connections and underusing others.

- **Each cell should have at least eight memory DIMMs (Dual Inline Memory Modules), for a minimum of 4 GB RAM per cell at first release.**

Explanation: Memory is packaged in four-DIMM increments. A failure of one DIMM will cause the remaining three in the package to shut down. If the cell has only four DIMMs in all (2 GB at first release), it will be unbootable until the defective memory is replaced, whereas a cell that has at least eight DIMMs (4 GB at first release) can be rebooted even if four DIMMs are inactive.

- **Add memory to cells in increments of eight DIMMs (two packages of four DIMMs each).**

At first release, this means each cell’s total memory should be evenly divisible by 4 GB.

Explanation: There are two memory busses on the cell board. When the busses are loaded equally, memory traffic can be spread evenly across them to provide the maximum bandwidth.

Guidelines for Expandability

When populating a CPU cabinet, plan, as far as possible, not only for your immediate needs but also for what you may want to add in the future.

For example, if you define four 2-cell partitions in a 32-way-capable-system, you are leaving no room for expansion in that cabinet. If you have only the one 32-way-capable-system and you need the four partitions, then this configuration may be the only option, but suppose you need only two 2-cell partitions to begin with. In that case it would be best to assign two cells from each crossbar to each partition. Now you have room to expand either or both partitions to four cells while still keeping each partition within the confines of a single crossbar.

Partitions, Cells and I/O Chassis

Before you go on, read:

- “What is a Cell?” on page 303:
 - “Cell I/O” on page 308.
 - “Core Cell” on page 309.
- “What is an I/O Chassis?” on page 317:
 - “Core I/O” on page 318
- “What is an I/O Expansion Cabinet?” on page 320.
- “What is a Partition?” on page 298.

Other terms and concepts:

- **16-, 32-way, 64-way-capable system; CPU cabinet:** see “What is a CPU Cabinet?” on page 299.
- **Complex:** see “What Is a Complex?” on page 292.
- **GSP:** see “What is the Guardian Service Processor?” on page 296.
- **System Bus Adapter:** see “Cell I/O” on page 308.

Points To Note

- In a **partition** containing more than one **cell**, all I/O is accessible from all the cells.

For example, in a four-cell partition in which two cells are attached to **IO chassis**, code being run by a processor in one of the cells that is not attached to an I/O chassis will have the same access to disks and other I/O devices as the cells to which the I/O chassis are physically attached.

Each partition must have I/O, meaning that at least one cell in each partition must be attached to an I/O chassis, but this does not mean every cell in every partition needs to be attached to an I/O chassis (in fact, that is not possible without an **IO expansion cabinet**.)

NOTE

I/O expansion cabinets are not available with early shipments of Superdome. Contact your HP Sales Representative for up-to-date information.

- A cell must be active in a partition before the partition can use an I/O chassis attached to that cell.

That is, the cell that is attached to the I/O chassis must not only have been assigned to the partition, but also powered on and booted; see “What Happens when a Cell Boots” on page 311.

- A **16- or 32-way-capable system** should have at least two I/O chassis, and a **64-way-capable system** should have at least four I/O chassis.
- The failure of a cell or an I/O chassis will bring down the partition it belongs to, but you can provide redundancy that will allow you to reboot the partition with a minimum of downtime; see “Guidelines for High Availability” on page 338.

When planning or reconfiguring a **complex**, first map out the partitions, then plan the I/O for each partition as you would for a single system, then assign the I/O to individual cells following the rules and guidelines below.

Loading and Assigning I/O Chassis

As shipped from the factory, I/O chassis will be loaded into the **CPU cabinet** and assigned to cells in the following order:

I/O Bay#	Chassis#	Position
1	3	rear right
0	1	front left
1	1	rear left
0	3	front right

It’s a good idea to keep to this order when you add I/O chassis to an installed system.

Given the above layout, populate an empty CPU cabinet as follows.

Attach the first I/O chassis (I/O chassis 3 on the right of I/O bay 1, in the rear of the CPU cabinet, or in the rear of the left CPU cabinet if this is a 64-way-capable system) to the lowest-numbered cell in the lowest-numbered partition in the complex. This chassis should contain a **core I/O** card.

Then continue by assigning the second I/O chassis to the first cell in the next partition; continue until all partitions in (or beginning in) this CPU cabinet have an I/O chassis inside the CPU cabinet attached to their lowest-numbered cell; each of these chassis should contain a core I/O card. Then start over with the first partition and assign additional chassis (including chassis in an expansion cabinet, if any) to the partitions as needed.

When loading and assigning chassis, keep the following considerations in mind (some of these are discussed in more detail in the rules and guidelines that follow):

- A partition's **core cell** (the cell it boots from by default) should normally be its lowest-numbered cell.
- Each partition's core cell should be attached to an I/O chassis inside the CPU cabinet if possible.
- When configuring additional (alternate) core cells for a partition, use the partition's next lowest-numbered cells, and, if the partition crosses CPU cabinet boundaries, use the cells in the left cabinet first.

For example, if you want to attach core I/O to three cells in a partition that comprises seven cells in the left cabinet and two in the right, attach the three chassis containing core I/O cards to the partition's three lowest-numbered cells in the left cabinet.

- The I/O chassis in the rear of the CPU cabinet are easier to work with.
- It is better not to cross **System Bus Adapter** cables.

The four cables on the left should attach to the four left cells and the four cables on the right to the four right cells.

- Allow for future expansion.

For example, if you plan to add cells to this CPU cabinet in the future, and they will form a new partition, leave a slot to add an I/O chassis (to be attached to the new partition's core cell). See "Guidelines for Expandability" on page 340.

Rules

- Each I/O chassis can be connected to only one cell, and each cell can be connected to only one I/O chassis.

See “Cell I/O” on page 308 for more information.

- Each partition must contain at least one cell that is attached to an I/O chassis containing core I/O. This cell should be the lowest-numbered cell in the partition (the leftmost cell in the partition when you are looking at the cabinet from the front). The I/O chassis should have the following cards:

- The core I/O card itself.

Put the core I/O card in the rightmost slot (slot 0; this is the only slot it can go in).

- The boot device controller.

Put the boot device controller in slot 4 of this chassis if it is a 4X card, or in slot 1 if it is a 2X card.

- A removable-media controller card (e.g., for a DVD drive).

Put the card for a removable-media device in slot 8 of this chassis.

- A networking card.

Use this for the partition’s connection to the main LAN (e.g., your site LAN). (The networking connection in the core I/O card is not the best choice for this.)

This cell will be the **core cell**, used for booting the partition; and it will be by default **PDC**’s first choice for booting a partition that contains more than one **viable core cell** (that is, more than one cell attached to an I/O chassis containing core I/O; see “Guidelines for High Availability” on page 338).

See also “Core Cell” on page 309.

- A cell can be attached to an I/O chassis in the same CPU cabinet, or in an expansion cabinet, but not to an I/O chassis in another CPU cabinet.
- A **32-way-capable system** can support only one I/O expansion cabinet; a **64-way-capable system** can support one or two expansion cabinets.

- An I/O expansion cabinet can be used by only one complex.
This means that the two CPU cabinets in a 64-way-capable system can share an expansion cabinet, but two 32-way-capable systems (that is, single cabinets not combined into a 64-way-capable system) cannot.

NOTE

The two CPU cabinets in a 64-way-capable system can share the *first* expansion cabinet, but the second can be used by cells in the right CPU cabinet only.

Guidelines for High Availability

- Make sure that more than one cell in each partition has an I/O chassis containing core I/O (partitions containing only one cell, or connected to only one I/O chassis, are not recommended).

The cells attached to chassis containing core I/O should be the partition's lowest-numbered cells. Each I/O chassis that contains core I/O should also contain cards for a boot device and networking, placed as described under "Rules" on page 336, but only one chassis with core I/O also has to have a removable-media controller card (this chassis should normally be the one attached to the lowest-numbered cell).

This redundancy will allow you to reboot the partition and continue to use it if any one cell connected to core I/O should fail in any respect (e.g., a failure in the cell itself, the I/O chassis it's attached to, or the core I/O card in the I/O chassis).

- As far as possible, keep all the I/O chassis for a single partition in a single cabinet.

Add an expansion cabinet only when all the slots in all the I/O chassis in the CPU cabinet(s) have been used up; and in a 64-way-capable system, add a second expansion cabinet only when all the available slots in the first expansion cabinet have been used up.

But see "Guidelines for Expandability" on page 340 for a possible exception.

- If you are using an I/O expansion cabinet, make sure each partition has at least one cell attached to core I/O *inside the CPU cabinet*.
- Put a core I/O card and a boot card in every I/O chassis.
- Within a partition, spread redundant cards across I/O chassis such that if one I/O chassis fails, you still have sufficient connections to run the system.
- Attach critical disk devices to cards in more than one I/O chassis, and hence to more than one cell.

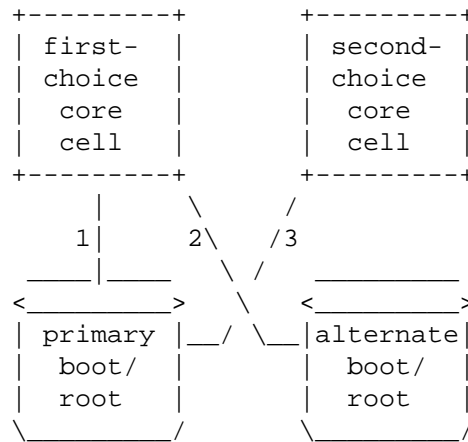
Some disk devices (such as a disk array with two SCSI controllers) can be connected to more than one card. Use such devices for root and boot disks, and also for disks containing mission-critical data. This will allow you to get to the data on the disk even if the cell to which it

is primarily connected is disabled (or one card or any single connection fails).

Paths to boot and root disk

For a partition performing mission-critical tasks, configure the following paths to the boot device:

1. Primary attached to one viable core cell.
2. Secondary attached to the same viable core cell.
3. Primary attached to a second viable core cell:



This allows for automatic reboot upon any single failure.

In the above diagram, the “first-choice core cell” should be the lowest-numbered cell in the partition; the “second-choice core cell” should be the second-lowest-numbered cell in the partition.

- Attach more than one viable core cell in each partition to the network.

This will allow the partition to reboot and continue to function even if one core cell is disabled, or one card fails.

- Place cards in an I/O chassis in the following order (bearing in mind that the core I/O card, if there is one, must always be in the first slot):
 1. boot device cards
 2. data device cards
 3. networking cards
 4. other cards

Guidelines for Performance

- If more than one cell in a partition is attached to an I/O chassis, spread out the I/O devices amongst the cells.

Performance will probably not be as good if all or most I/O operations go through one cell.

- Do not use the core I/O card as the partition's main connection to the network (to your site LAN, for example).
- Within a partition, assign 4X cards evenly across I/O chassis to even out the bandwidth. See "I/O Cards" on page 317 for more information.
- Make sure all 4X I/O cards are in 4X slots (see "I/O Cards" on page 317).
- Within an I/O chassis, spread the cards out as evenly as possible.

The **System Bus Adapter** that connects the chassis to its cell is split into two halves, one serving each half of the chassis and each with its own cache, so it is best to distribute the load between the two halves.

Guidelines for Expandability

There is one case in which you may want to consider ordering an I/O expansion cabinet even if all the I/O chassis inside the CPU cabinet have not been used up.

Suppose for example you have a CPU cabinet containing a single partition comprising six cells and using three out of the four possible I/O chassis inside the CPU cabinet. If the slots in these three chassis are all used and you need to attach more I/O devices, it may not be a good idea to begin filling up the fourth I/O chassis.

If you ever intend to create a new partition using the two remaining cell slots in this cabinet, you should reserve the fourth I/O chassis for that partition, so as to meet the high-availability requirement that every partition in (or beginning in) a CPU cabinet should have a cell attached to core I/O inside that cabinet.

In this case, you should order an I/O expansion cabinet to accommodate the I/O needs of the original partition. (I/O expansion cabinets will be available shortly after the first Superdome shipments.)

Checklist for Performance

This section summarizes the recommendations in “Recommendations for Cabling Crossbar Controllers (XBCs)” on page 324, “Choosing Cells for Partitions” on page 325 and “Partitions, Cells and I/O Chassis” on page 333. Explanations are in those sections or as noted in parentheses below.

- ❑ A 32-way-capable-system should be connected in a **U-Turn configuration**; a 64-way-capable system should be cabled in a **Cross-Flex** configuration.

Processors and Memory

- ❑ Each cell in a partition should have the same number of active processors.
- ❑ Each cell in a partition should have the same amount of memory (see “Memory” on page 308).
- ❑ Each cell’s total memory should be evenly divisible by 4 GB.

Cell Placement

- ❑ If the cells in a given partition will not fill all four of the slots in a given crossbar, plug the cells into alternate slots.
- ❑ If a partition comprises four cells or fewer, all the cells should be connected to the same crossbar.
- ❑ Do not configure partitions such that two or more partitions share the same crossbar link.

Distributing Resources

- ❑ Use all the possible resources within existing cells rather than adding cells to a partition.
- ❑ All 4X I/O cards should be in 4X slots (see “I/O Cards” on page 317).
- ❑ Do not use the core I/O card as the partition’s main connection to the network (to your site LAN, for example).
- ❑ If more than one cell in a partition is attached to an I/O chassis, spread out the I/O devices amongst the cells.
- ❑ Within a partition, assign 4X cards evenly across I/O chassis (see “I/O Cards” on page 25).
- ❑ Within an I/O chassis, spread the cards out as evenly as possible.

Checklist for High Availability

In many cases, best practices for high availability are the same as those for performance, though the underlying reasons are different.

This section summarizes the recommendations in “Recommendations for Cabling Crossbar Controllers (XBCs)” on page 324, “Choosing Cells for Partitions” on page 325 and “Partitions, Cells and I/O Chassis” on page 333. Explanations are in those sections.

- Each cell should have at least eight memory DIMMs (Dual Inline Memory Modules), for a minimum of 4 GB RAM per cell at first release.
- Processors and Memory**
- Each cell should have at least two active processors.
- Cell Placement**
- If a partition comprises four cells or fewer, all the cells should be connected to the same crossbar.
 - Do not configure partitions such that two or more partitions share the same crossbar link.
- Distributing Resources**
- Each partition should consist of at least two cells.
 - Each partition should contain at least two viable core cells.
 - Each cell should have at least two active CPUs.
 - As far as possible, keep all the I/O chassis for a single partition in a single CPU cabinet.
 - If you are using an I/O expansion cabinet, make sure each partition has at least one cell attached to core I/O *inside the CPU cabinet*.
 - Put a core I/O card and a boot card in every I/O chassis.
 - Within a partition, spread redundant cards across I/O chassis such that if one I/O chassis fails, you still have sufficient connections to I/O devices to run the system.
 - Attach any critical disk device to cards in more than one I/O chassis, and hence to more than one cell.
 - Attach more than one cell in each partition to the network.

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