Chapter 10

Devices

Introduction

With the proliferation of cell-based partitionable HP-UX systems, there is a lot to know about devices. Cell-based systems greatly increase the complexity of working with devices, such as determining in what partition devices are located, mapping card and slot numbers in I/O chassis, and other topics. Whether you use cell-based systems or not, you need to understand many important device-related commands, such as **ioscan**. Keep in mind that most device-related work on cell-based systems is relative to the partition in which you're working and not on a global systems basis. The tear-out card provided with this book also contains a lot of useful information related to devices. This chapter covers a variety of topics, including the following:

- Overview of device file.
- The **ioscan** command on an Integrity Superdome to show the components of an nPartition.
- The **info io** command run at the EFI shell prompt on HP Integrity (Itanium) servers provides information about all the components contained in a Node partition or nPartition.

• Identify card and slot numbers on and Integrity (Itanium) Superdome and rx system.

• Overview of OnLine Addition and Replacement (OLA/R) on an rx8620. This is done using the Web-based Peripheral Devices Tool (pd) that is invoked through the System Administration Manager (SAM).

• Overview of device-related commands **lsdev** and **lssf**.

The following section is a general overview of device files.

Device File Background

A device file is an interface to a physical device in the file system , and configuration information associated with each device file tells the kernel which device you're accessing and some details on how you want to access it. The HP-UX kernel needs to know a lot about a device before Input/Output (I/O) operations can be performed. Device files are in the **/dev** directory. There may also be a subdirectory under **/dev** used to further categorize the device files. Examples of a subdirectories are **/dev/dsk**, where disk device files are usually located, and **/dev/rmt**, where tape drive device files are located. The following figure shows the device file-naming convention.

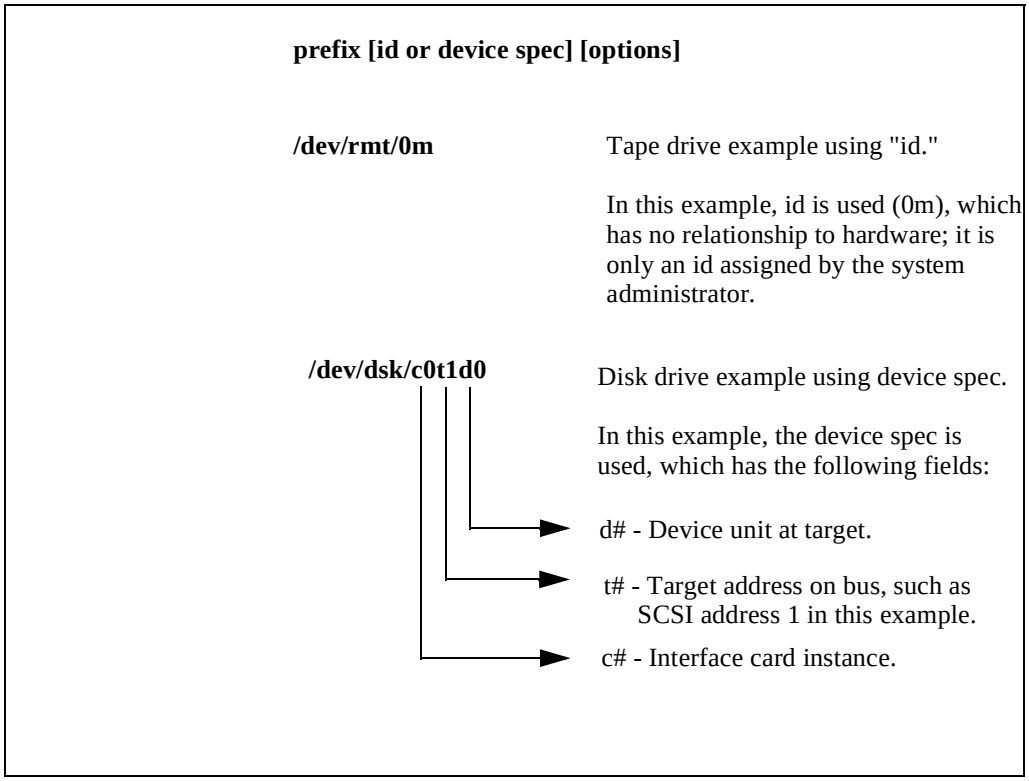

Figure 10-1 HP-UX 11i Device File Naming Convention

If you list the contents of **/dev**, you see many device files. These are for a variety of different devices that are created for you by HP-UX.

Most of the balance of this chapter discusses performing various tasks with devices, such as listing them with **ioscan**, mapping cards to physical slots, and so on.

The next section covers the **ioscan** command.

The ioscan Command

This section starts by issuing some **ioscan** commands so you can see the various components in an nPartition on a 16-cell board system. The first command shows the processors. Coming shortly is an overview of the **olrad -q**

command in which processors are not shown because, at the time of this writing, they are not OLA/R. The following **ioscan** output uses options to produce information about the processors in nPartition 0 that are configured into the kernel:

```
[rx8620b{root}:/roothome]>ioscan -fnkCprocessor
Class       I  H/W Path  Driver    S/W State H/W Type  Description
============================================================
processor   0  0/120     processor CLAIMED   PROCESSOR Processor
processor   1  0/121     processor CLAIMED   PROCESSOR Processor
processor   2  0/122     processor CLAIMED   PROCESSOR Processor
processor   3  0/123     processor CLAIMED   PROCESSOR Processor
processor   4  2/120     processor CLAIMED   PROCESSOR Processor
processor   5  2/121     processor CLAIMED   PROCESSOR Processor
processor   6  2/122     processor CLAIMED   PROCESSOR Processor
processor   7  2/123     processor CLAIMED   PROCESSOR Processor
processor   8  3/120     processor CLAIMED   PROCESSOR Processor
processor   9  3/121     processor CLAIMED   PROCESSOR Processor
processor  10  3/122     processor CLAIMED   PROCESSOR Processor
processor  11  3/123     processor CLAIMED   PROCESSOR Processor
[rx8620b{root}:/roothome]>
```

This output shows 12 processors in the nPartition that are on cell boards 0, 2, and 3 as indicated by the leading number in the hardware path. The second number in the hardware path is that of the processor.

This **ioscan** output produced information about the cell boards that are configured into nPartition *0*, but 4 cell boards exist in this system. To see information about a specific cell board in the system, issue **parstatus -c***cell-boardnumber,* such as **parstatus -c3**, for information about cell board 3, as shown in the following listing:

```
[rx8620b{root}:/roothome]>parstatus -c3

[Cell]
                        CPU     Memory                                  Use
                        OK/     (GB)                            Core    On
Hardware   Actual       Deconf/ OK/                             Cell    Next Par
Location   Usage        Max     Deconf    Connected To          Capable Boot Num
========== ============ ======= ========= ==================== ======= ==== ===
cab0,cell3 Active Base  4/0/8   16.0/0.0  -                     no      yes  0

Notes: * = Cell has no interleaved memory.
```

nPartition commands are covered extensively in Chapter 4; Node Partitions (nPartitions) and Management Processor Overview. This command

shows that cell board 3 is part of *Par Num* 0 which is the partition to which we're connected. Cell board 1 is missing from the list of 12 processors that are part of nPartition 0, as we saw in the earlier **ioscan -fnkCprocessor** output. I now run **parstatus -c1** to see if cell board 1 is devoted to an nPartition:

```
[rx8620b{root}:/roothome]>parstatus -c1

[Cell]
                        CPU     Memory                                  Use
                        OK/     (GB)                            Core    On
Hardware   Actual       Deconf/ OK/                             Cell    Next Par
Location   Usage        Max     Deconf    Connected To          Capable Boot Num
========== ============ ======= ========= ==================== ======= ==== ===
cab0,cell1 Active Core  4/0/8   16.0/0.0  cab0,bay0,chassis1    yes     yes  1

Notes: * = Cell has no interleaved memory.
        [rx8620b{root}:/roothome]>
```

Although the nPartitions chapter covers partition-related commands in detail, it is important to know the basics of working with cell boards and partition commands in order to work with devices. The **info io** command, which is run at the EFI shell prompt, is also an important command related to devices that is covered in an upcoming section.

To see all the components in your nPartition, issue the **ioscan -f** command as shown in the following listing:

```
[rx8620b{root}:/roothome]>ioscan -f
Class       I  H/W Path       Driver    S/W State   H/W Type     Description
==========================================================================
root        0                  root      CLAIMED     BUS_NEXUS
cell        0  0               cell      CLAIMED     BUS_NEXUS
ioa         0  0/0             sba       CLAIMED     BUS_NEXUS    System Bus
                                                                  Adapter (127b)
ba          1  0/0/0           lba       CLAIMED     BUS_NEXUS    Local PCI Bus
                                                                  Adapter (1054)
tty         0  0/0/0/0/0       asio0     CLAIMED     INTERFACE    PCI SimpleComm
                                                                  (103c1290)
tty         1  0/0/0/0/1       asio0     CLAIMED     INTERFACE    PCI Serial (103c1048)
lan         0  0/0/0/1/0       igelan    CLAIMED     INTERFACE    HP A7109-60001 PCI
                                                                  1000Base-T Core
ext_bus     0  0/0/0/2/0       c8xx      CLAIMED     INTERFACE    SCSI C1010 Ultra Wide
                                                                  Single-Ended
target      1  0/0/0/2/0.6     tgt       CLAIMED     DEVICE
disk        0  0/0/0/2/0.6.0   sdisk     CLAIMED     DEVICE       HP 146 GST3146807LC
target      2  0/0/0/2/0.7     tgt       CLAIMED     DEVICE
ctl         0  0/0/0/2/0.7.0   sctl      CLAIMED     DEVICE       Initiator
ext_bus     1  0/0/0/2/1       c8xx      CLAIMED     INTERFACE    SCSI C1010 Ultra Wide
                                                                  Single-Ended
target      0  0/0/0/2/1.2     tgt       CLAIMED     DEVICE
disk        1  0/0/0/2/1.2.0   sdisk     CLAIMED     DEVICE       HP      DVD-ROM 305
target      3  0/0/0/2/1.7     tgt       CLAIMED     DEVICE
ctl         1  0/0/0/2/1.7.0   sctl      CLAIMED     DEVICE       Initiator
ext_bus     2  0/0/0/3/0       c8xx      CLAIMED     INTERFACE    SCSI C1010 Ultra Wide
```

```
                                                                  Single-Ended
target       4  0/0/0/3/0.6     tgt        CLAIMED     DEVICE
disk         2  0/0/0/3/0.6.0   sdisk      CLAIMED     DEVICE       HP 146 GST3146807LC
target       5  0/0/0/3/0.7     tgt        CLAIMED     DEVICE
ctl          2  0/0/0/3/0.7.0   sctl       CLAIMED     DEVICE       Initiator
ext_bus      3  0/0/0/3/1       c8xx       CLAIMED     INTERFACE    SCSI C1010 Ultra160
                                                                  Wide LVD
target       6  0/0/0/3/1.7     tgt        CLAIMED     DEVICE
ctl          3  0/0/0/3/1.7.0   sctl       CLAIMED     DEVICE       Initiator
ba           2  0/0/1           lba        CLAIMED     BUS_NEXUS    Local PCI-X Bus
                                                                  Adapter (122e)
ba           3  0/0/2           lba        CLAIMED     BUS_NEXUS    Local PCI-X Bus
                                                                  Adapter (122e)
ba           4  0/0/4           lba        CLAIMED     BUS_NEXUS    Local PCI-X Bus
                                                                  Adapter (122e)
ba           5  0/0/6           lba        CLAIMED     BUS_NEXUS    Local PCI-X Bus
                                                                  Adapter (122e)
ext_bus      4  0/0/6/1/0       c8xx       CLAIMED     INTERFACE    SCSI C1010 Ultra160
                                                                  Wide LVD A6829-60101
target       7  0/0/6/1/0.7     tgt        CLAIMED     DEVICE
ctl          4  0/0/6/1/0.7.0   sctl       CLAIMED     DEVICE       Initiator
ext_bus      5  0/0/6/1/1       c8xx       CLAIMED     INTERFACE    SCSI C1010 Ultra160
                                                                  Wide LVD A6829-60101
target       8  0/0/6/1/1.7     tgt        CLAIMED     DEVICE
ctl          5  0/0/6/1/1.7.0   sctl       CLAIMED     DEVICE       Initiator
ba           6  0/0/8           lba        CLAIMED     BUS_NEXUS    Local PCI-X Bus
                                                                  Adapter (122e)
fc           0  0/0/8/1/0       td         CLAIMED     INTERFACE    HP Tachyon XL2 Fibre
                                                                       Channel Mass Storage Adapter
ba           7  0/0/10          lba        CLAIMED     BUS_NEXUS    Local PCI-X Bus
                                                                  Adapter (122e)
fc           1  0/0/10/1/0      td         CLAIMED     INTERFACE    HP Tachyon XL2 Fibre
                                                                       Channel Mass Storage Adapter
ba           8  0/0/12          lba        CLAIMED     BUS_NEXUS    Local PCI-X Bus
                                                                  Adapter (122e)
lan          1  0/0/12/1/0      igelan     CLAIMED     INTERFACE    HP A6825-60101 PCI
                                                                  1000Base-T Adapter
ba           9  0/0/14          lba        CLAIMED     BUS_NEXUS    Local PCI-X Bus
                                                                  Adapter (122e)
lan          2  0/0/14/1/0      igelan     CLAIMED     INTERFACE    HP A6825-60101 PCI
                                                                  1000Base-T Adapter
processor    0  0/120           processor  CLAIMED     PROCESSOR    Processor
processor    1  0/121           processor  CLAIMED     PROCESSOR    Processor
processor    2  0/122           processor  CLAIMED     PROCESSOR    Processor
processor    3  0/123           processor  CLAIMED     PROCESSOR    Processor
ba          10  0/250           pdh        CLAIMED     BUS_NEXUS    Core I/O Adapter
ipmi         0  0/250/0         ipmi       CLAIMED     INTERFACE    IPMI Controller
acpi_node    0  0/250/1         acpi_node  CLAIMED     INTERFACE    Acpi Hardware
cell         1  2               cell       CLAIMED     BUS_NEXUS
processor    4  2/120           processor  CLAIMED     PROCESSOR    Processor
processor    5  2/121           processor  CLAIMED     PROCESSOR    Processor
processor    6  2/122           processor  CLAIMED     PROCESSOR    Processor
processor    7  2/123           processor  CLAIMED     PROCESSOR    Processor
ba          11  2/250           pdh        CLAIMED     BUS_NEXUS    Core I/O Adapter
acpi_node    1  2/250/0         acpi_node  CLAIMED     INTERFACE    Acpi Hardware
cell         2  3               cell       CLAIMED     BUS_NEXUS
processor    8  3/120           processor  CLAIMED     PROCESSOR    Processor
processor    9  3/121           processor  CLAIMED     PROCESSOR    Processor
processor   10  3/122           processor  CLAIMED     PROCESSOR    Processor
processor   11  3/123           processor  CLAIMED     PROCESSOR    Processor
ba          12  3/250           pdh        CLAIMED     BUS_NEXUS    Core I/O Adapter
acpi_node    2  3/250/0         acpi_node  CLAIMED     INTERFACE    Acpi Hardware
ba           0  255/255         swspBus    CLAIMED     VIRTBUS
[rx8620b{root}:/roothome]>
```

The **ioscan** output has the following fields in it:

- The device class
- The instance number of the device
- The hardware path of the device
- The kernel driver used for the device
- The software state of the device which is *CLAIMED* for all the devices in the output
- The hardware type of the device
- A description field

All components in nPartition 0 are shown in this output. Because I did not use the *-k* option, all components are listed, not just those built into the kernel. This **ioscan** output includes all components in nPartition *0*. The form of the **ioscan** output for an nPartition looks like the following for the hardware path:

```
    Field 1         Field 2     Field3     Field 4  Field 5  Field 6
Global cell no./proc, mem, or SBA/LBA/Card address/Function/dev addr
```

Because the cell number is the first field, you know immediately what cells are in the partition you're viewing. The I/O chassis connected to a cell board is automatically part of the partition. The global cell number is related to multiple cabinets.

This output is ideal for viewing the hierarchy of the system, in this case, an rx8620, which is a four-cell-board HP Integrity (Itanium) system. The second line of the listing shows a cell board at 0. The next line shows a system bus adapter (SBA) at 0/0. The next line shows a local bus adapter (LBA) at 0/0/0. These three lines provide an overview of the hierarchy of the system with a cell board, SBA, and LBA as you work your way down the tree.

Chapter 4 also covers **ioscan** and the components in partitions.

This output shows cell boards 0, 2, and 3 in this nPartition, as you saw in the **ioscan -fnkCprocessor** output.

Many LBAs are shown in the **ioscan** output, which means that there are many slots in the I/O chassis of this system. This hierarchy is further evident if you use the *-e* option in **ioscan**, which shows the EFI device paths:

```
[rx8620b{root}:/dev/dsk]>ioscan -e
H/W Path       Class                      Description
=====================================================
               root
0              cell
0/0                ioa                    System Bus Adapter (127b)
0/0/0                 ba                  Local PCI Bus Adapter (1054)
0/0/0/0/0                   tty           PCI SimpleComm (103c1290)
0/0/0/0/1                   tty           PCI Serial (103c1048)
0/0/0/1/0                   lan           HP A7109-60001 PCI 1000Base-T Core
0/0/0/2/0                   ext_bus       SCSI C1010 Ultra Wide Single-Ended
0/0/0/2/0.6                    target
0/0/0/2/0.6.0                     disk    HP 146 GST3146807LC
       Acpi(000222F0,0)/Pci(2|0)/Scsi(Pun6,Lun0)/HD(Part1,Sig75AD9336-9ECC-11D8-8002-
D6217B60E588)/\EFI\HPUX\HPUX.EFI
0/0/0/2/0.7                    target
0/0/0/2/0.7.0                     ctl     Initiator
0/0/0/2/1                   ext_bus       SCSI C1010 Ultra Wide Single-Ended
0/0/0/2/1.2                    target
0/0/0/2/1.2.0                     disk    HP      DVD-ROM 305
       Acpi(000222F0,0)/Pci(2|1)/Scsi(Pun2,Lun0)/\EFI\HPUX\HPUX.EFI
0/0/0/2/1.7                    target
0/0/0/2/1.7.0                     ctl     Initiator
0/0/0/3/0                   ext_bus       SCSI C1010 Ultra Wide Single-Ended
0/0/0/3/0.6                    target
0/0/0/3/0.6.0                     disk    HP 146 GST3146807LC
       Acpi(000222F0,0)/Pci(3|0)/Scsi(Pun6,Lun0)/\EFI\HPUX\HPUX.EFI
0/0/0/3/0.7                    target
0/0/0/3/0.7.0                     ctl     Initiator
0/0/0/3/1                   ext_bus       SCSI C1010 Ultra160 Wide LVD
0/0/0/3/1.7                    target
0/0/0/3/1.7.0                     ctl     Initiator
0/0/1                 ba                  Local PCI-X Bus Adapter (122e)
0/0/2                 ba                  Local PCI-X Bus Adapter (122e)
0/0/4                 ba                  Local PCI-X Bus Adapter (122e)
0/0/6                 ba                  Local PCI-X Bus Adapter (122e)
0/0/6/1/0                   ext_bus       SCSI C1010 Ultra160 Wide LVD A6829-60101
0/0/6/1/0.7                    target
0/0/6/1/0.7.0                     ctl     Initiator
0/0/6/1/1                   ext_bus       SCSI C1010 Ultra160 Wide LVD A6829-60101
0/0/6/1/1.7                    target
0/0/6/1/1.7.0                     ctl     Initiator
0/0/8                 ba                  Local PCI-X Bus Adapter (122e)
0/0/8/1/0                fc           HP Tachyon XL2 Fibre Channel Mass Storage Adapter
0/0/10                ba                  Local PCI-X Bus Adapter (122e)
0/0/10/1/0               fc           HP Tachyon XL2 Fibre Channel Mass Storage Adapter
0/0/12                ba                  Local PCI-X Bus Adapter (122e)
0/0/12/1/0                  lan           HP A6825-60101 PCI 1000Base-T Adapter
0/0/14                ba                  Local PCI-X Bus Adapter (122e)
0/0/14/1/0                  lan           HP A6825-60101 PCI 1000Base-T Adapter
0/120              processor              Processor
0/121              processor              Processor
0/122              processor              Processor
0/123              processor              Processor
0/250              ba                     Core I/O Adapter
0/250/0               ipmi                IPMI Controller
0/250/1               acpi_node           Acpi Hardware
2              cell
2/120              processor              Processor
2/121              processor              Processor
2/122              processor              Processor
2/123              processor              Processor
2/250              ba                     Core I/O Adapter
2/250/0               acpi_node           Acpi Hardware
3              cell
3/120              processor              Processor
3/121              processor              Processor
3/122              processor              Processor
3/123              processor              Processor
3/250              ba                     Core I/O Adapter
3/250/0               acpi_node           Acpi Hardware
255/255            ba
[rx8620b{root}:/dev/dsk]>
```