SPARC M5-32 and SPARC M6-32 Servers

Administration Guide

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Using This Documentation

This document provides configuration and administration information for the SPARC M5-32 and SPARC M6-32 servers from Oracle. This document is written for technicians, system administrators, and authorized service providers who have advanced experience working with similar products.

- "Product Notes" on page xiii
- "Related Documentation" on page xiv
- "Feedback" on page xiv
- "Access to Oracle Support" on page xiv

Product Notes

For late-breaking information and known issues about this product, refer to the product notes at:

`http://www.oracle.com/goto/M5-32/docs`

`http://www.oracle.com/goto/M6-32/docs`

Related Documentation

Documentation	Links
SPARC M5-32 and SPARC M6-32 servers	http://www.oracle.com/goto/M5-32/docs http://www.oracle.com/goto/M6-32/docs
Oracle Integrated Lights Out Manager (ILOM)	http://www.oracle.com/goto/ILOM/docs
Oracle Solaris 11 OS	http://www.oracle.com/goto/Solaris11/docs
Oracle VM Server for SPARC	http://www.oracle.com/goto/VM-SPARC/docs
Oracle VTS	http://www.oracle.com/goto/VTS/docs
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Understanding the System Architecture

These topics describe the server architecture and provide general configuration guidelines and an overview of the tools you can use to administer the server.

- "Architectural Overview" on page 2
- "PDomain Types" on page 3
- "Understanding PCIe Device Root Complexes" on page 4
- "Understanding EMS SAS Paths to the Internal Drives" on page 36
- "Understanding Internal Drive Device Paths" on page 42
- "Understanding Network Port Device Paths" on page 71
- "Understanding Configuration Guidelines" on page 81

Related Information

- "Understanding System Administration Resources" on page 87
- "Configuring Domain Components" on page 167

Architectural Overview

You can configure this server to have as few as one and as many as four physical domains (PDomains). Each PDomain has its own installation of the Oracle Solaris OS, as well as its own set of fans and I/O boards. Each PDomain operates as an independent server that has full hardware isolation from other PDomains in the chassis.

Note – By default, the server is configured with a single PDomain that has an Oracle Solaris boot disk located on IOB0. Each IOB has its own boot disk (the lowest numbered disk on each IOB). This ensures that if you reconfigure the platform to have more than one PDomain, a preinstalled version of the Oracle Solaris OS is available on each PDomain.

A hardware or software failure on one PDomain will not affect the other PDomains in the chassis. There are two redundant SPs (SP0 and SP1) in the chassis. One of the SPs functions as the Active-SP and actively manages the chassis, while the other acts as the Standby-SP that will assume the Active-SP role in the event of a failure. You can use the Oracle ILOM software that is preinstalled on each SP to remotely monitor and control PDomains.

The server has four domain configurable units (DCUs), which are the building blocks of PDomains. You must configure a PDomain with at least one DCU, but a single PDomain can contain as many as four DCUs. Each DCU has four CPU memory units (CMUs) that have two memory boards and two CPU memory processors (CMPs). Each DCU is managed by its own SP Proxy (SPP), which monitors environmental sensors and manages the CMUs, memory controller, and DIMMs within the DCU. The Active-SP and SPPs communicate over a private VLAN to manage the system.

One of the SPPs on each PDomain is identified as a PDomain-SPP, which manages tasks for its PDomain. The PDomain-SPP also hosts the rKVMS service for the PDomain. If a PDomain has more than one DCU, only the rKVMS service on the PDomain-SPP is used.

Related Information

- "PDomain Types" on page 3
- "Understanding Configuration Guidelines" on page 81
- "Configuring Domain Components" on page 167
- "Administering SPs" on page 161

PDomain Types

You can configure either a PDomain or a Bounded PDomain. The type you specify might impact system performance and availability.

- **PDomain**. Communicates with all DCUs that are shared by a PDomain instance. In the event that an scalability switchboard (SSB) fails, availability will be impacted. Because this type of domain can have as many as four DCUs assigned to it, it can be used in configurations of up to 32 CMPs.

  The PDomains in this server are configured this way by default.

- **Bounded PDomain**. Communicates within a single DCU, which minimizes latency and is not impacted by SSB availability. Because this type of domain can have only one DCU assigned to it, it can be used only in configurations with 8 CMPs, or fewer.

Some server resources are shared by PDomains, while others can be assigned to an individual PDomain for its exclusive use until it is unassigned, at which time it is available for assignment to other PDomains.

For an animated overview of physical domains, refer to *Physical Domains and Multilayered Virtualization in Oracle's SPARC M5-32 and SPARC M6-32 Servers*. The animation is available at:

`http://youtu.be/VkFu6-PezHM`

Related Information

- "PDomain Guidelines" on page 82
- "Configuring Physical Domains" on page 167
- "Specifying a PDomain Type" on page 168

Understanding PCIe Device Root Complexes

A root complex is the CMP circuitry that provides the base to a PCIe I/O fabric. Each PCIe I/O fabric consists of the PCIe switches, PCIe slots, and leaf devices associated with the root complex. Understanding the relationship of the PCIe root complexes to the PCIe I/O fabrics will help you properly assign devices when configuring Oracle VM Server for SPARC logical domains.

There are 64 root complexes in this server (16 per DCU). See "Administering IOUs and PCIe Device Root Complexes" on page 179 for information about reconfiguring I/O paths that are assigned to the PCIe slots on a specific IOU and identifying root complexes using the Oracle VM Server for SPARC `ldm` command.

These topics describe the behavior of the PCIe switches, provide example configurations, and list the root complex names and device paths of each PCIe and EMS slot in the server.

- "Control Domain and Reserved Root Complexes" on page 4
- "PCIe Communication and Paths" on page 5
- "Fully-Populated Default Configuration" on page 5
- "Half-Populated Configuration" on page 7
- "Understanding PCIe Slot Root Complex Names and Device Paths" on page 8
- "PCIe Device Root Complex Failover Behavior" on page 32

Related Information

- "Understanding Internal Drive Device Paths" on page 42
- "Understanding Configuration Guidelines" on page 81

- *Server Service*
- *Oracle VM Server for SPARC 3.1 Administration Guide* at: `http://www.oracle.com/goto/VM-SPARC/docs`

Control Domain and Reserved Root Complexes

The control domain must own root complexes `pci_1`, `pci_17`, `pci_33`, `pci_49`. FMA faulty proxying will fail if the root complexes are assigned to a non-primary domain. See "FMA Fault Proxying and Reserved Root Complexes" on page 190 for details.

Related Information

- "Dedicated SP Interconnect Property Commands" on page 189
- "FMA Fault Proxying and Reserved Root Complexes" on page 190

PCIe Communication and Paths

PCIe I/O paths are routed from CMP root complexes, through PCIe switches, to a destination PCIe slot and/or EMS card. Each CMP provides two root complexes allowing it to attach to two PCIe switches. Each PCIe switch connects to two root complexes. In an ideal configuration, with all components present and functioning, two CMPs connect to each PCIe switch, and that switch is partitioned into two virtual switches with independent traffic channels. This configuration maximizes I/O bandwidth.

In the event of a failure or missing CMPs (and associated root complexes), the PCIe switch is merged into a single switch so that the remaining root complex services all downstream ports. This configuration maximizes I/O connectivity.

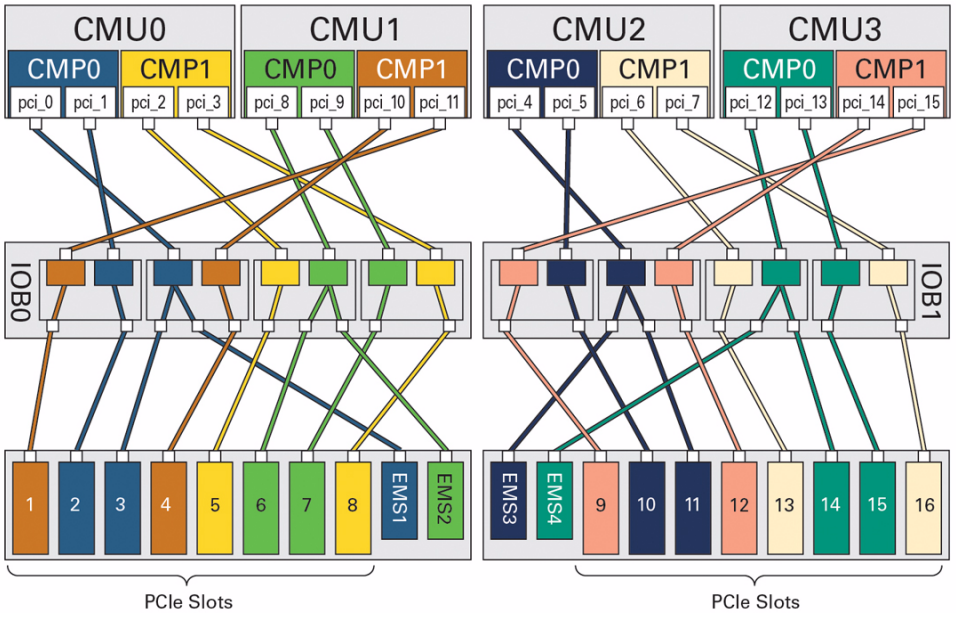
As long as there are no changes in the hardware components present in the configuration, the I/O paths will remain consistent following a boot or reset. If there are changes in the number of CMPs present (for example, if CMPs are added or removed), some I/O paths might change.

Related Information

- "Fully-Populated Default Configuration" on page 5
- "Half-Populated Configuration" on page 7
- "Understanding PCIe Slot Root Complex Names and Device Paths" on page 8
- "PCIe Device Root Complex Failover Behavior" on page 32

Fully-Populated Default Configuration

This illustration shows the default PCIe I/O fabrics of a fully-populated DCU0. Each PCIe and EMS slot is routed through the PCIe I/O switch fabric to its root complex. For example, PCIe slot 4 is routed to the `pci_10` root complex and EMS slot 3 is routed to the `pci_4` root complex.



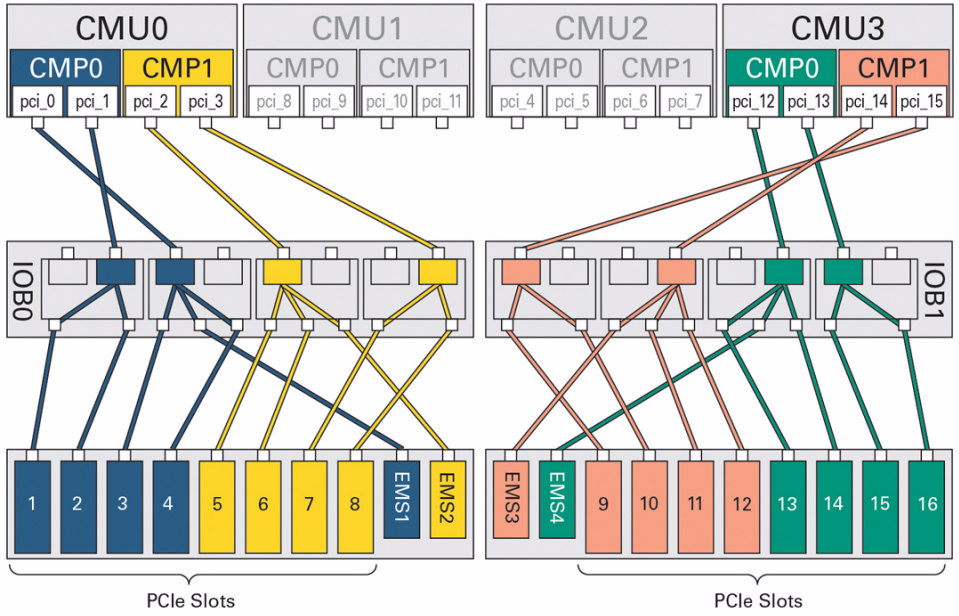
Related Information

- "PCIe Communication and Paths" on page 5
- "Half-Populated Configuration" on page 7
- "Understanding PCIe Slot Root Complex Names and Device Paths" on page 8
- "PCIe Device Root Complex Failover Behavior" on page 32

Half-Populated Configuration

In half-populated DCU configurations that contain two CMUs, the CMUs must be installed in positions CMU0 and CMU3 to maximize I/O connectivity. With this configuration, a half-populated DCU still has all of the PCIe and EMS slots available.

This illustration show a half-populated DCU0, which contains only CMU0 and CMU3. Each PCIe and EMS slot is routed through the PCIe I/O switch fabric to its root complex. Some of the PCIe and EMS slots are routed to different root complexes when compared to a fully-populated DCU. For example, PCIe slot 4 is routed to the `pci_0` root complex and EMS slot 3 is routed to the `pci_14` root complex.



Related Information

- "PCIe Communication and Paths" on page 5
- "Fully-Populated Default Configuration" on page 5
- "Understanding PCIe Slot Root Complex Names and Device Paths" on page 8
- "PCIe Device Root Complex Failover Behavior" on page 32

Understanding PCIe Slot Root Complex Names and Device Paths

These topics list the root complex names and the Oracle Solaris OS device paths for the PCIe and EMS slots in each DCU.

- "Understanding DCU0 Root Complex Names and Device Paths" on page 8
- "Understanding DCU1 Root Complex Names and Device Paths" on page 14
- "Understanding DCU2 Root Complexes and Device Paths" on page 20
- "Understanding DCU3 Root Complexes and Device Paths" on page 26

Related Information

- "PCIe Communication and Paths" on page 5
- "Fully-Populated Default Configuration" on page 5
- "Half-Populated Configuration" on page 7
- "PCIe Device Root Complex Failover Behavior" on page 32

Understanding DCU0 Root Complex Names and Device Paths

The 16 root complexes in DCU0 are numbered from `pci_0` to `pci_15`, but they are not in sequential order. These topics list the root complex names and the Oracle Solaris OS device paths for the PCIe and EMS slots in a fully-populated and half-populated DCU0.

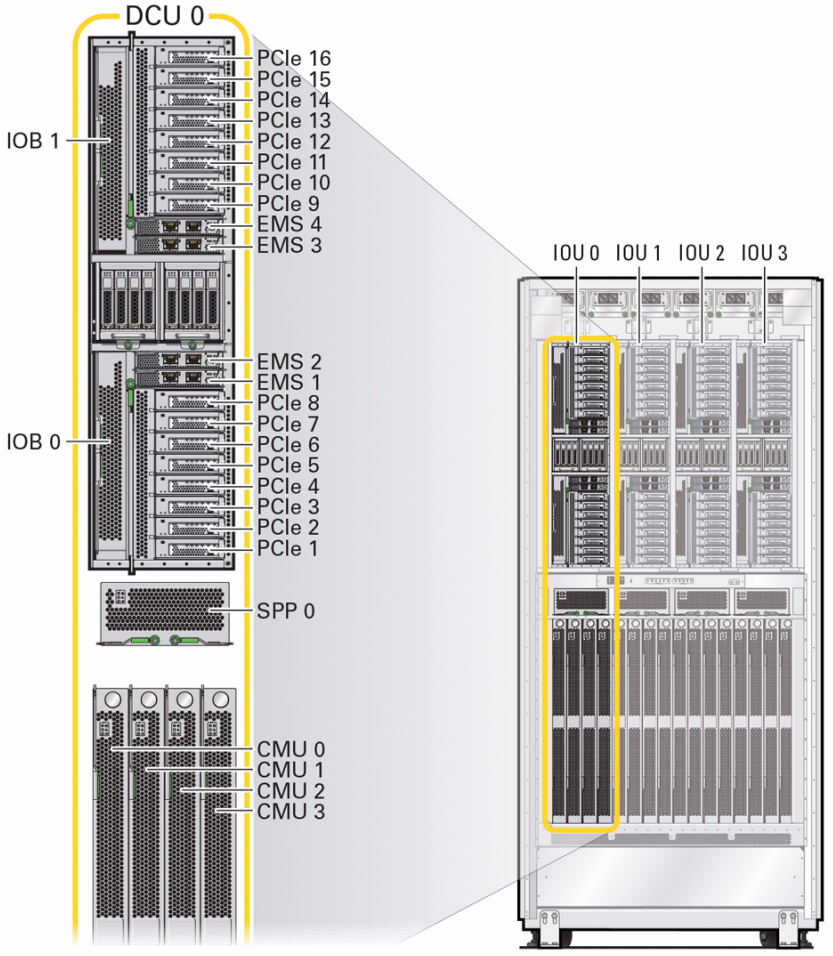
- "DCU0 PCIe and EMS Slot Locations" on page 9
- "Fully-Populated DCU0 PCIe Slot Root Complexes" on page 10
- "Half-Populated DCU0 PCIe Slot Root Complexes" on page 11

Related Information

- "Understanding DCU1 Root Complex Names and Device Paths" on page 14
- "Understanding DCU2 Root Complexes and Device Paths" on page 20
- "Understanding DCU3 Root Complexes and Device Paths" on page 26

DCU0 PCIe and EMS Slot Locations

This illustration shows the physical locations of the DCU0 PCIe and EMS slots.

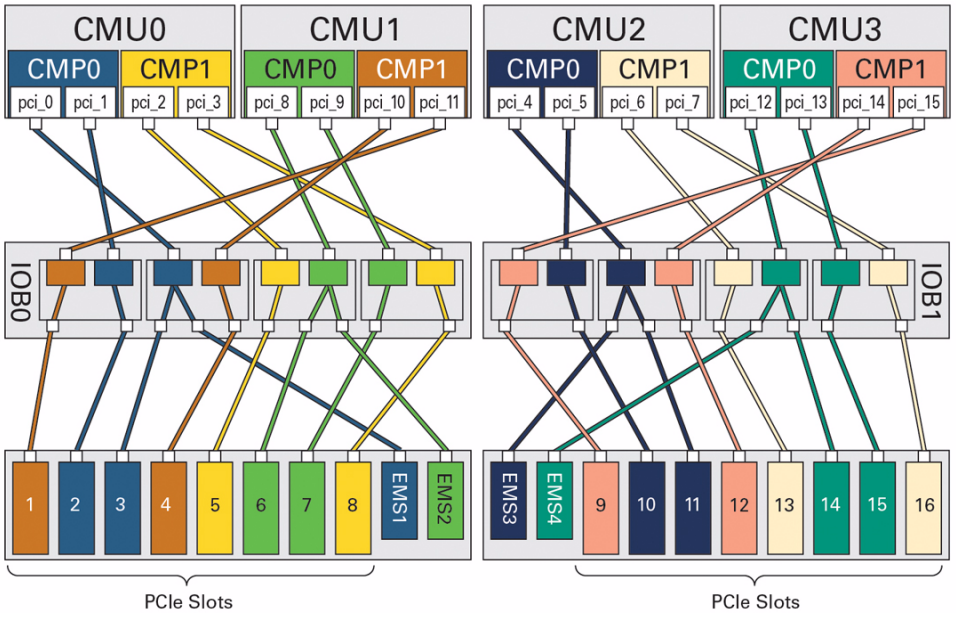


Related Information

- "DCU1 PCIe and EMS Slot Locations" on page 15
- "DCU2 PCIe and EMS Slot Locations" on page 21
- "DCU3 PCIe and EMS Slot Locations" on page 27

Fully-Populated DCU0 PCIe Slot Root Complexes

In a fully-populated default configuration, the PCIe I/O fabric paths from each root complex to the PCIe and EMS slots in a fully-populated DCU0.



This table lists information for each PCIe and EMS slot in a fully-populated DCU0.

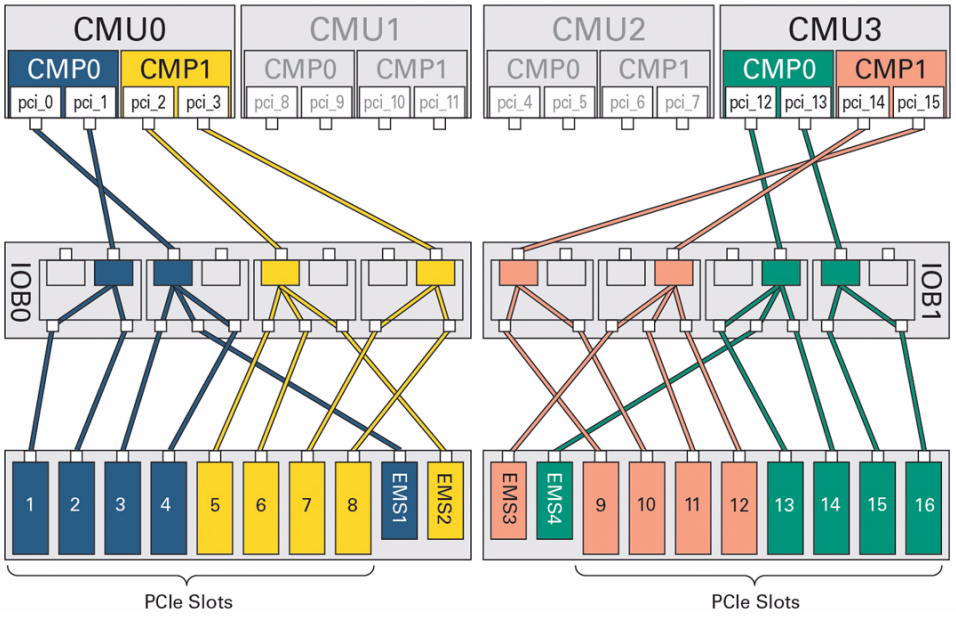
Slot	Root Complex	CMU No./CMP No.	Device Path	FRU Path
PCIe 1	pci_11	CMU1/CMP1	/pci@5c0/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE1
PCIe 2	pci_1	CMU0/CMP0	/pci@340/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE2
PCIe 3	pci_0	CMU0/CMP0	/pci@300/pci@1/pci@0/pci@6	/SYS/IOU0/PCIe3
PCIe 4	pci_10	CMU1/CMP1	/pci@580/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE4
PCIe 5	pci_2	CMU0/CMP1	/pci@380/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE5
PCIe 6	pci_8	CMU1/CMP0	/pci@500/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE6
PCIe 7	pci_9	CMU1/CMP0	/pci@540/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE7
PCIe 8	pci_3	CMU0/CMP1	/pci@3c0/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE8
PCIe 9	pci_15	CMU3/CMP1	/pci@6c0/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE9
PCIe 10	pci_5	CMU2/CMP0	/pci@440/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE10
PCIe 11	pci_4	CMU2/CMP0	/pci@400/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE11
PCIe 12	pci_14	CMU3/CMP0	/pci@680/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE12
PCIe 13	pci_6	CMU2/CMP1	/pci@480/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE13
PCIe 14	pci_12	CMU3/CMP0	/pci@600/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE14
PCIe 15	pci_13	CMU3/CMP0	/pci@640/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE15
PCIe 16	pci_7	CMU2/CMP1	/pci@4c0/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE16
EMS1	pci_0	CMU0/CMP0	/pci@300/pci@1/pci@0/pci@c	/SYS/IOU0/EMS1
EMS2	pci_8	CMU1/CMP0	/pci@500/pci@1/pci@0/pci@0	/SYS/IOU0/EMS2
EMS3	pci_4	CMU2/CMP0	/pci@400/pci@1/pci@0/pci@c	/SYS/IOU0/EMS3
EMS4	pci_12	CMU3/CMP0	/pci@600/pci@1/pci@0/pci@0	/SYS/IOU0/EMS4

Related Information

- "DCU0 PCIe and EMS Slot Locations" on page 9
- "Half-Populated DCU0 PCIe Slot Root Complexes" on page 11

Half-Populated DCU0 PCIe Slot Root Complexes

In a half-populated default configuration, the PCIe I/O fabric paths from each root complex to the PCIe and EMS slots in a half-populated DCU0. A half-populated DCU0 contains only CMU0 and CMU3.


CMU0
CMU1
CMU2
CMU3
CMP0
CMP1
pci_0
pci_1
pci_2
pci_3
pci_8
pci_9
pci_10
pci_11
pci_4
pci_5
pci_6
pci_7
pci_12
pci_13
pci_14
pci_15
IOB0
IOB1
1
2
3
4
5
6
7
8
EMS1
EMS2
EMS3
EMS4
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16
PCIe Slots
PCIe Slots

This table lists information for each PCIe and EMS slot in a half-populated DCU0.

Slot	Root Complex	CMU No./CMP No.	Device Path	FRU Path
PCIe 1	pci_1	CMU0/CMP0	/pci@340/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE1
PCIe 2	pci_1	CMU0/CMP0	/pci@340/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE2
PCIe 3	pci_0	CMU0/CMP0	/pci@300/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE3
PCIe 4	pci_0	CMU0/CMP0	/pci@300/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE4
PCIe 5	pci_2	CMU0/CMP1	/pci@380/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE5
PCIe 6	pci_2	CMU0/CMP1	/pci@380/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE6
PCIe 7	pci_3	CMU0/CMP1	/pci@3c0/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE7
PCIe 8	pci_3	CMU0/CMP1	/pci@3c0/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE8
PCIe 9	pci_15	CMU3/CMP1	/pci@6c0/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE9
PCIe 10	pci_15	CMU3/CMP1	/pci@6c0/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE10
PCIe 11	pci_14	CMU3/CMP1	/pci@680/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE11
PCIe 12	pci_14	CMU3/CMP1	/pci@680/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE12
PCIe 13	pci_12	CMU3/CMP0	/pci@600/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE13
PCIe 14	pci_12	CMU3/CMP0	/pci@600/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE14
PCIe 15	pci_13	CMU3/CMP0	/pci@640/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE15
PCIe 16	pci_13	CMU3/CMP0	/pci@640/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE16
EMS1	pci_0	CMU0/CMP0	/pci@300/pci@1/pci@0/pci@c	/SYS/IOU0/EMS1
EMS2	pci_2	CMU0/CMP1	/pci@380/pci@1/pci@0/pci@0	/SYS/IOU0/EMS2
EMS3	pci_14	CMU3/CMP1	/pci@680/pci@1/pci@0/pci@c	/SYS/IOU0/EMS3
EMS4	pci_12	CMU3/CMP0	/pci@600/pci@1/pci@0/pci@0	/SYS/IOU0/EMS4

Related Information

- "DCU0 PCIe and EMS Slot Locations" on page 9
- "Fully-Populated DCU0 PCIe Slot Root Complexes" on page 10

Understanding DCU1 Root Complex Names and Device Paths

The 16 root complexes in DCU1 are numbered from `pci_16` to `pci_31`, but they are not in sequential order. These topics list the root complex names and the Oracle Solaris OS device paths for the PCIe and EMS slots in a fully-populated and half-populated DCU1.

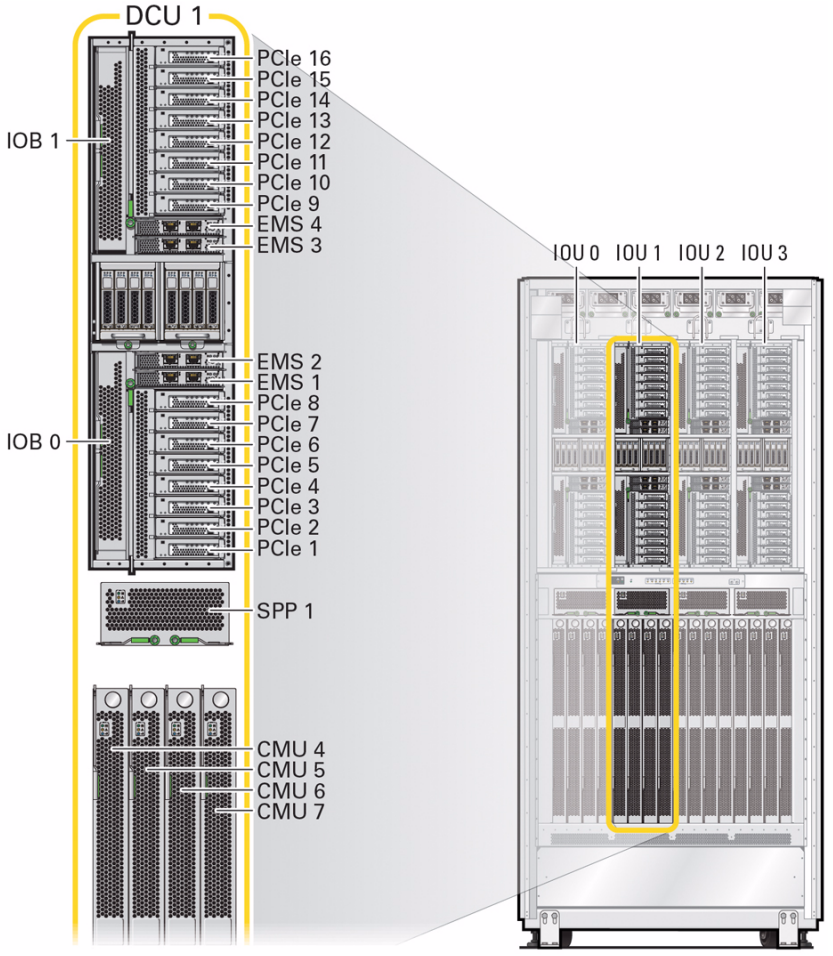
- "DCU1 PCIe and EMS Slot Locations" on page 15
- "Fully-Populated DCU1 PCIe Slot Root Complexes" on page 16
- "Half-Populated DCU1 PCIe Slot Root Complexes" on page 18

Related Information

- "Understanding DCU0 Root Complex Names and Device Paths" on page 8
- "Understanding DCU2 Root Complexes and Device Paths" on page 20
- "Understanding DCU3 Root Complexes and Device Paths" on page 26
- "Identify the Root Complex of a Device" on page 181

DCU1 PCIe and EMS Slot Locations

This illustration shows the physical locations of the DCU1 PCIe and EMS slots.

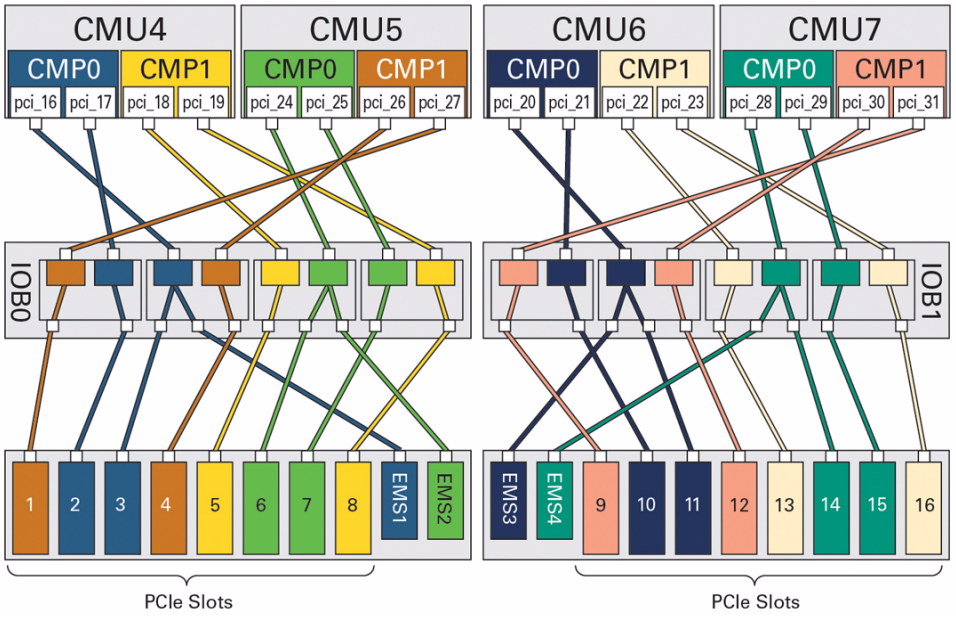


Related Information

- "DCU0 PCIe and EMS Slot Locations" on page 9
- "DCU2 PCIe and EMS Slot Locations" on page 21
- "DCU3 PCIe and EMS Slot Locations" on page 27

Fully-Populated DCU1 PCIe Slot Root Complexes

The following illustration displays the PCIe I/O fabric paths from each root complex to the PCIe and EMS slots in a fully-populated DCU1.



This table lists information for each PCIe and EMS slot in a fully-populated DCU1.

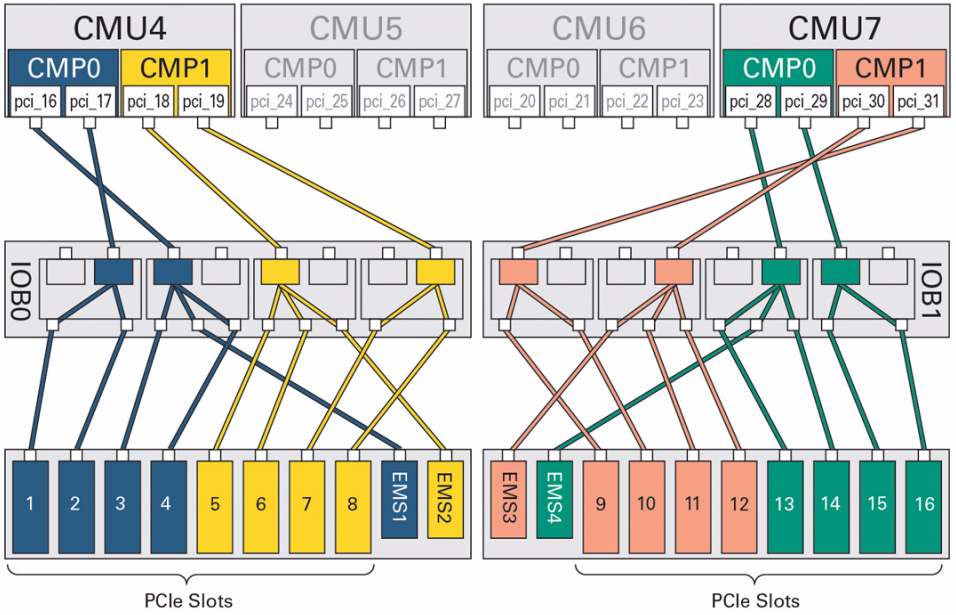
Slot	Root Complex	CMU No./CMP No.	Device Path	FRU Path
PCIe 1	pci_27	CMU5/CMP1	/pci@9c0/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE1
PCIe 2	pci_17	CMU4/CMP0	/pci@740/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE2
PCIe 3	pci_16	CMU4/CMP0	/pci@700/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE3
PCIe 4	pci_26	CMU5/CMP1	/pci@980/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE4
PCIe 5	pci_18	CMU4/CMP1	/pci@780/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE5
PCIe 6	pci_24	CMU5/CMP0	/pci@900/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE6
PCIe 7	pci_25	CMU5/CMP0	/pci@940/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE7
PCIe 8	pci_19	CMU4/CMP1	/pci@7c0/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE8
PCIe 9	pci_31	CMU7/CMP1	/pci@ac0/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE9
PCIe 10	pci_21	CMU6/CMP0	/pci@840/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE10
PCIe 11	pci_20	CMU6/CMP0	/pci@800/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE11
PCIe 12	pci_30	CMU7/CMP0	/pci@a80/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE12
PCIe 13	pci_22	CMU6/CMP1	/pci@880/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE13
PCIe 14	pci_28	CMU7/CMP0	/pci@a00/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE14
PCIe 15	pci_29	CMU7/CMP0	/pci@a40/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE15
PCIe 16	pci_23	CMU6/CMP1	/pci@8c0/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE16
EMS1	pci_16	CMU4/CMP0	/pci@700/pci@1/pci@0/pci@c	/SYS/IOU1/EMS1
EMS2	pci_24	CMU5/CMP0	/pci@900/pci@1/pci@0/pci@0	/SYS/IOU1/EMS2
EMS3	pci_20	CMU6/CMP0	/pci@800/pci@1/pci@0/pci@c	/SYS/IOU1/EMS3
EMS4	pci_28	CMU7/CMP0	/pci@a00/pci@1/pci@0/pci@0	/SYS/IOU1/EMS4

Related Information

- "DCU1 PCIe and EMS Slot Locations" on page 15
- "Half-Populated DCU1 PCIe Slot Root Complexes" on page 18

Half-Populated DCU1 PCIe Slot Root Complexes

This illustration shows the PCIe I/O fabric path from each root complex to the PCIe and EMS slots in a half-populated DCU1. A half-populated DCU1 contains only CMU4 and CMU7.



This table lists information for each PCIe and EMS slot in a half-populated DCU1.

Slot	Root Complex	CMU No./CMP No.	Device Path	FRU Path
PCIe 1	pci_17	CMU4/CMP0	/pci@740/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE1
PCIe 2	pci_17	CMU4/CMP0	/pci@740/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE2
PCIe 3	pci_16	CMU4/CMP0	/pci@700/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE3
PCIe 4	pci_16	CMU4/CMP0	/pci@700/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE4
PCIe 5	pci_18	CMU4/CMP1	/pci@780/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE5
PCIe 6	pci_18	CMU4/CMP1	/pci@780/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE6
PCIe 7	pci_19	CMU4/CMP1	/pci@7c0/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE7
PCIe 8	pci_19	CMU4/CMP1	/pci@7c0/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE8
PCIe 9	pci_31	CMU7/CMP1	/pci@ac0/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE9
PCIe 10	pci_31	CMU7/CMP1	/pci@ac0/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE10
PCIe 11	pci_30	CMU7/CMP1	/pci@a80/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE11
PCIe 12	pci_30	CMU7/CMP1	/pci@a80/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE12
PCIe 13	pci_28	CMU7/CMP0	/pci@a00/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE13
PCIe 14	pci_28	CMU7/CMP0	/pci@a00/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE14
PCIe 15	pci_29	CMU7/CMP0	/pci@a40/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE15
PCIe 16	pci_29	CMU7/CMP0	/pci@a40/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE16
EMS1	pci_16	CMU4/CMP0	/pci@700/pci@1/pci@0/pci@c	/SYS/IOU1/EMS1
EMS2	pci_18	CMU4/CMP1	/pci@780/pci@1/pci@0/pci@0	/SYS/IOU1/EMS2
EMS3	pci_30	CMU7/CMP1	/pci@a80/pci@1/pci@0/pci@c	/SYS/IOU1/EMS3
EMS4	pci_28	CMU7/CMP0	/pci@a00/pci@1/pci@0/pci@0	/SYS/IOU1/EMS4

Related Information

- "DCU1 PCIe and EMS Slot Locations" on page 15
- "Fully-Populated DCU1 PCIe Slot Root Complexes" on page 16

Understanding DCU2 Root Complexes and Device Paths

The 16 root complexes in DCU2 are numbered from `pci_32` to `pci_47`, but they are not in sequential order. These topics list the root complex names and the Oracle Solaris OS device paths for the PCIe and EMS slots in a fully-populated and half-populated DCU2.

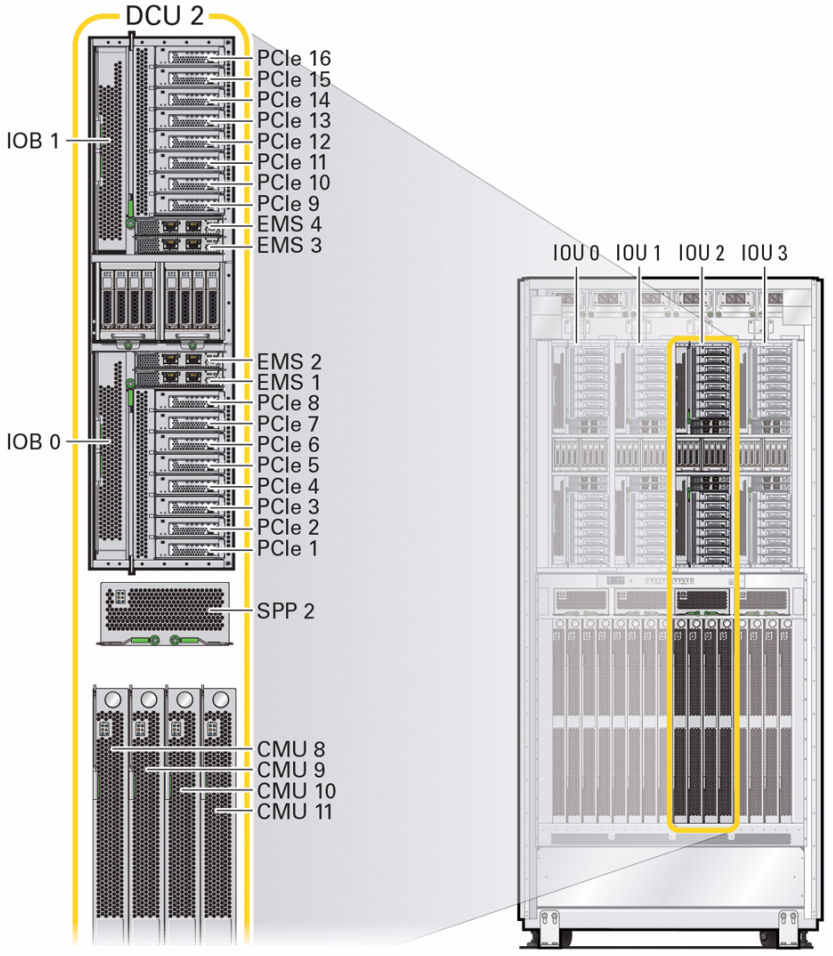
- "DCU2 PCIe and EMS Slot Locations" on page 21
- "Fully-Populated DCU2 PCIe Slot Root Complexes" on page 22
- "Half-Populated DCU2 PCIe Slot Root Complexes" on page 24

Related Information

- "Understanding DCU0 Root Complex Names and Device Paths" on page 8
- "Understanding DCU1 Root Complex Names and Device Paths" on page 14
- "Understanding DCU3 Root Complexes and Device Paths" on page 26
- "Identify the Root Complex of a Device" on page 181

DCU2 PCIe and EMS Slot Locations

This illustration shows the physical locations of the DCU2 PCIe and EMS slots.

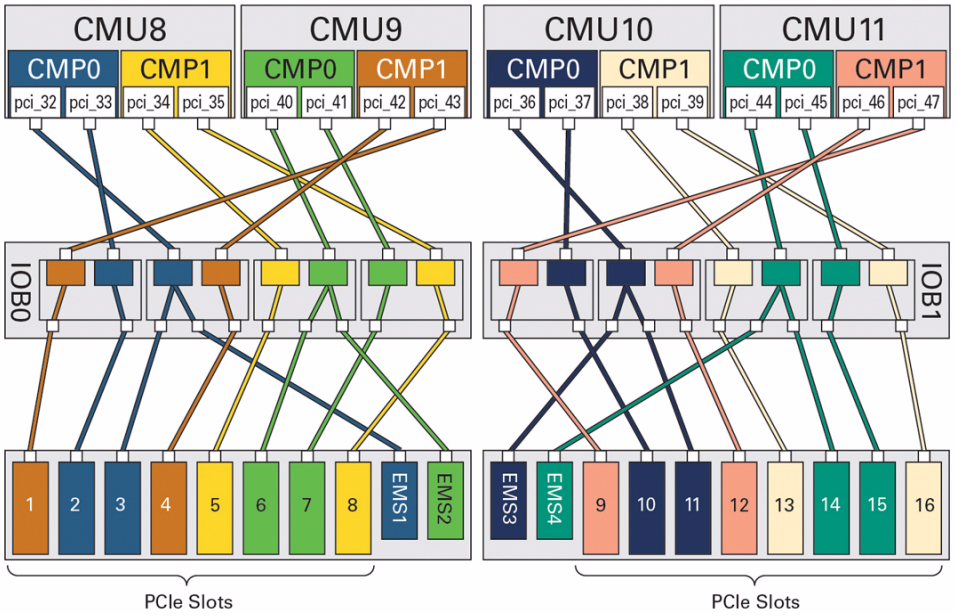


Related Information

- "DCU0 PCIe and EMS Slot Locations" on page 9
- "DCU1 PCIe and EMS Slot Locations" on page 15
- "DCU3 PCIe and EMS Slot Locations" on page 27

Fully-Populated DCU2 PCIe Slot Root Complexes

This illustration shows the PCIe I/O fabric paths from each root complex to the PCIe and EMS slots in a fully-populated DCU2.



This table lists information for each PCIe and EMS slot in a fully-populated DCU2.

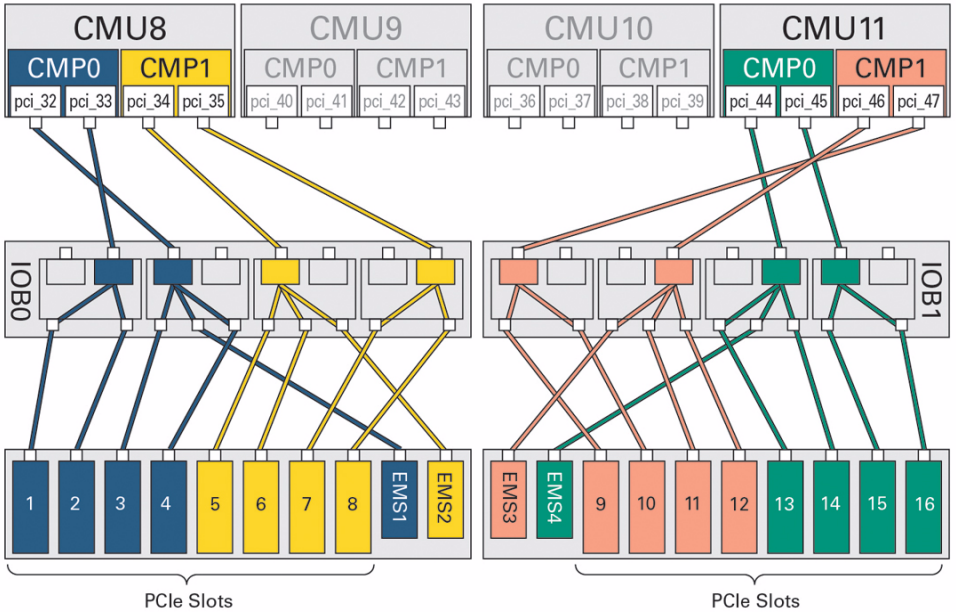
Slot	Root Complex	CMU No./CMP No.	Device Path	FRU Path
PCIe 1	pci_43	CMU9/CMP1	/pci@dc0/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE1
PCIe 2	pci_33	CMU8/CMP0	/pci@b40/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE2
PCIe 3	pci_32	CMU8/CMP0	/pci@b00/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE3
PCIe 4	pci_42	CMU9/CMP1	/pci@d80/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE4
PCIe 5	pci_34	CMU8/CMP1	/pci@b80/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE5
PCIe 6	pci_40	CMU9/CMP0	/pci@d00/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE6
PCIe 7	pci_41	CMU9/CMP0	/pci@d40/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE7
PCIe 8	pci_35	CMU8/CMP1	/pci@bc0/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE8
PCIe 9	pci_47	CMU11/CMP1	/pci@ec0/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE9
PCIe 10	pci_37	CMU10/CMP0	/pci@c40/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE10
PCIe 11	pci_36	CMU10/CMP0	/pci@c00/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE11
PCIe 12	pci_46	CMU11/CMP0	/pci@e80/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE12
PCIe 13	pci_38	CMU10/CMP1	/pci@c80/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE13
PCIe 14	pci_44	CMU11/CMP0	/pci@e00/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE14
PCIe 15	pci_45	CMU11/CMP0	/pci@e40/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE15
PCIe 16	pci_39	CMU10/CMP1	/pci@cc0/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE16
EMS1	pci_32	CMU8/CMP0	/pci@b00/pci@1/pci@0/pci@c	/SYS/IOU2/EMS1
EMS2	pci_40	CMU9/CMP0	/pci@d00/pci@1/pci@0/pci@0	/SYS/IOU2/EMS2
EMS3	pci_36	CMU10/CMP0	/pci@c00/pci@1/pci@0/pci@c	/SYS/IOU2/EMS3
EMS4	pci_44	CMU11/CMP0	/pci@e00/pci@1/pci@0/pci@0	/SYS/IOU2/EMS4

Related Information

- "DCU2 PCIe and EMS Slot Locations" on page 21
- "Half-Populated DCU2 PCIe Slot Root Complexes" on page 24

Half-Populated DCU2 PCIe Slot Root Complexes

This illustration shows the PCIe I/O fabric paths from each root complex to the PCIe and EMS slots in a half-populated DCU2. A half-populated DCU2 contains only CMU8 and CMU11.



This table lists information for each PCIe and EMS slot in a half-populated DCU2.

Slot	Root Complex	CMU No./CMP No.	Device Path	FRU Path
PCIe 1	pci_33	CMU8/CMP0	/pci@b40/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE1
PCIe 2	pci_33	CMU8/CMP0	/pci@b40/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE2
PCIe 3	pci_32	CMU8/CMP0	/pci@b00/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE3
PCIe 4	pci_32	CMU8/CMP0	/pci@b00/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE4
PCIe 5	pci_34	CMU8/CMP1	/pci@b80/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE5
PCIe 6	pci_34	CMU8/CMP1	/pci@b80/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE6
PCIe 7	pci_35	CMU8/CMP1	/pci@bc0/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE7
PCIe 8	pci_35	CMU8/CMP1	/pci@bc0/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE8
PCIe 9	pci_47	CMU11/CMP1	/pci@ec0/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE9
PCIe 10	pci_47	CMU11/CMP1	/pci@ec0/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE10
PCIe 11	pci_46	CMU11/CMP1	/pci@e80/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE11
PCIe 12	pci_46	CMU11/CMP1	/pci@e80/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE12
PCIe 13	pci_44	CMU11/CMP0	/pci@e00/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE13
PCIe 14	pci_44	CMU11/CMP0	/pci@e00/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE14
PCIe 15	pci_45	CMU11/CMP0	/pci@e40/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE15
PCIe 16	pci_45	CMU11/CMP0	/pci@e40/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE16
EMS1	pci_32	CMU8/CMP0	/pci@b00/pci@1/pci@0/pci@c	/SYS/IOU2/EMS1
EMS2	pci_34	CMU8/CMP1	/pci@b80/pci@1/pci@0/pci@0	/SYS/IOU2/EMS2
EMS3	pci_46	CMU11/CMP1	/pci@e80/pci@1/pci@0/pci@c	/SYS/IOU2/EMS3
EMS4	pci_44	CMU11/CMP0	/pci@e00/pci@1/pci@0/pci@0	/SYS/IOU2/EMS4

Related Information

- "DCU2 PCIe and EMS Slot Locations" on page 21
- "Fully-Populated DCU2 PCIe Slot Root Complexes" on page 22

Understanding DCU3 Root Complexes and Device Paths

The 16 root complexes in DCU3 are numbered from `pci_48` to `pci_63`, but they are not in sequential order. These topics list the root complex names and the Oracle Solaris OS device paths for the PCIe and EMS slots in a fully-populated and half-populated DCU3.

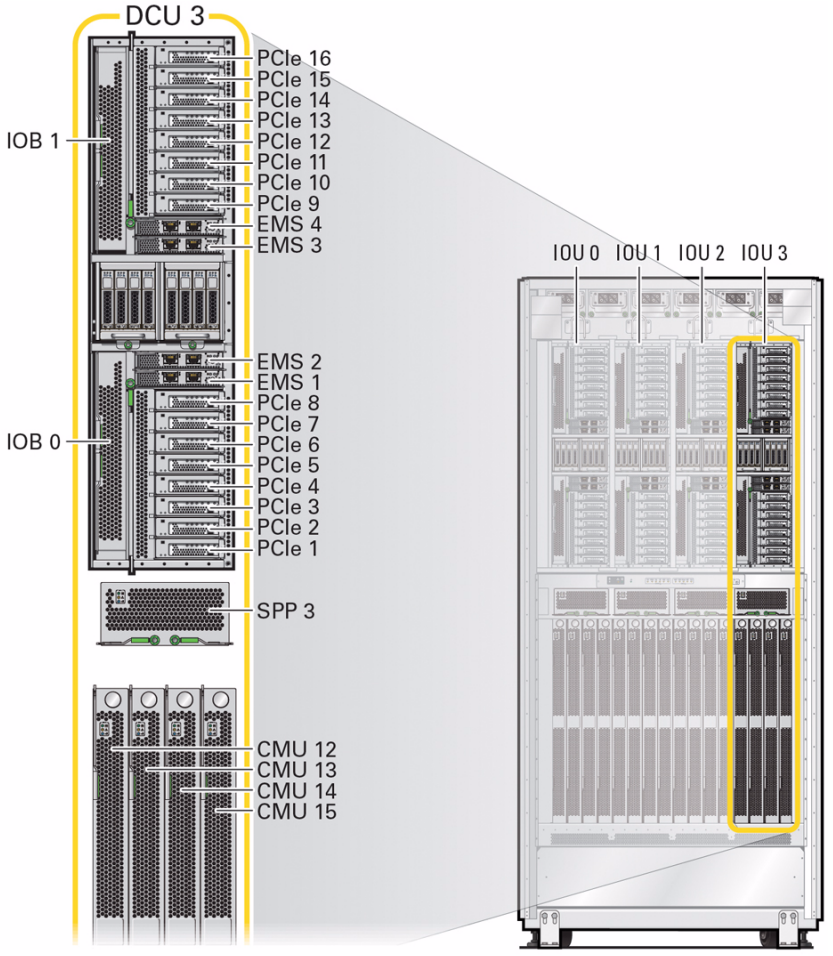
- "DCU3 PCIe and EMS Slot Locations" on page 27
- "Fully-Populated DCU3 PCIe Slot Root Complexes" on page 28
- "Half-Populated DCU3 PCIe Slot Root Complexes" on page 30

Related Information

- "Understanding DCU0 Root Complex Names and Device Paths" on page 8
- "Understanding DCU1 Root Complex Names and Device Paths" on page 14
- "Understanding DCU2 Root Complexes and Device Paths" on page 20
- "Identify the Root Complex of a Device" on page 181

DCU3 PCIe and EMS Slot Locations

This illustration shows the physical locations of the DCU3 PCIe and EMS slots.

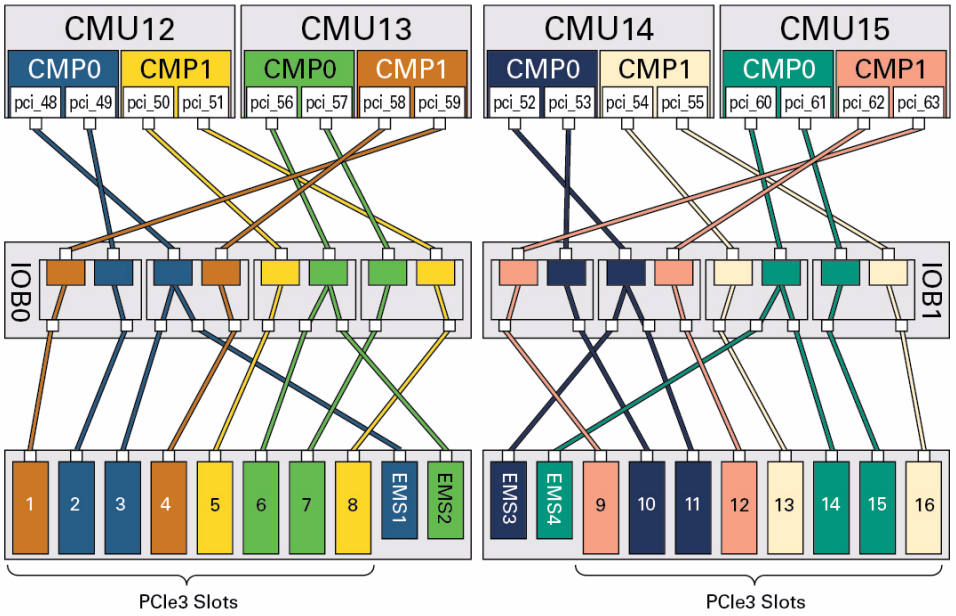


Related Information

- "DCU0 PCIe and EMS Slot Locations" on page 9
- "DCU1 PCIe and EMS Slot Locations" on page 15
- "DCU2 PCIe and EMS Slot Locations" on page 21

Fully-Populated DCU3 PCIe Slot Root Complexes

This illustration shows the PCIe I/O fabric paths from each root complex to the PCIe and EMS slots in a fully-populated DCU3.



This table lists information for each PCIe and EMS slot in a fully-populated DCU3.

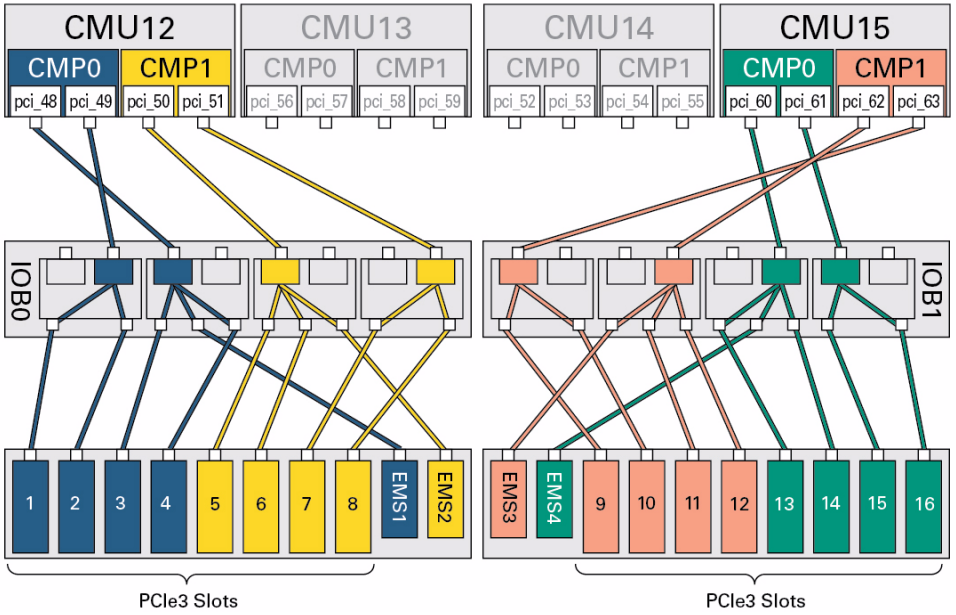
Slot	Root Complex	CMU No./CMP No.	Device Path	FRU Path
PCIe 1	pci_59	CMU13/CMP1	/pci@11c0/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE1
PCIe 2	pci_49	CMU12/CMP0	/pci@f40/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE2
PCIe 3	pci_48	CMU12/CMP0	/pci@f00/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE3
PCIe 4	pci_58	CMU13/CMP1	/pci@1180/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE4
PCIe 5	pci_50	CMU12/CMP1	/pci@f80/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE5
PCIe 6	pci_56	CMU13/CMP0	/pci@1100/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE6
PCIe 7	pci_57	CMU13/CMP0	/pci@1140/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE7
PCIe 8	pci_51	CMU12/CMP1	/pci@fc0/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE8
PCIe 9	pci_63	CMU15/CMP1	/pci@12c0/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE9
PCIe 10	pci_53	CMU14/CMP0	/pci@1040/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE10
PCIe 11	pci_52	CMU14/CMP0	/pci@1000/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE11
PCIe 12	pci_62	CMU15/CMP0	/pci@1280/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE12
PCIe 13	pci_54	CMU14/CMP1	/pci@1080/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE13
PCIe 14	pci_60	CMU15/CMP0	/pci@1200/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE14
PCIe 15	pci_61	CMU15/CMP0	/pci@1240/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE15
PCIe 16	pci_55	CMU14/CMP1	/pci@10c0/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE16
EMS1	pci_48	CMU12/CMP0	/pci@f00/pci@1/pci@0/pci@c	/SYS/IOU3/EMS1
EMS2	pci_56	CMU13/CMP0	/pci@1100/pci@1/pci@0/pci@0	/SYS/IOU3/EMS2
EMS3	pci_52	CMU14/CMP0	/pci@1000/pci@1/pci@0/pci@c	/SYS/IOU3/EMS3
EMS4	pci_60	CMU15/CMP0	/pci@1200/pci@1/pci@0/pci@0	/SYS/IOU3/EMS4

Related Information

- "DCU3 PCIe and EMS Slot Locations" on page 27
- "Half-Populated DCU3 PCIe Slot Root Complexes" on page 30

Half-Populated DCU3 PCIe Slot Root Complexes

This illustration shows the PCIe I/O fabric paths from each root complex to the PCIe and EMS slots in a half-populated DCU3. A half-populated DCU3 contains only CMU12 and CMU15.



This table lists information for each PCIe and EMS slot in a half-populated DCU3.

Slot	Root Complex	CMU No./CMP No.	Device Path	FRU Path
PCIe 1	pci_49	CMU12/CMP0	/pci@f40/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE1
PCIe 2	pci_49	CMU12/CMP0	/pci@f40/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE2
PCIe 3	pci_48	CMU12/CMP0	/pci@f00/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE3
PCIe 4	pci_48	CMU12/CMP0	/pci@f00/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE4
PCIe 5	pci_50	CMU12/CMP1	/pci@f80/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE5
PCIe 6	pci_50	CMU12/CMP1	/pci@f80/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE6
PCIe 7	pci_51	CMU12/CMP1	/pci@fc0/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE7
PCIe 8	pci_51	CMU12/CMP1	/pci@fc0/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE8
PCIe 9	pci_63	CMU15/CMP1	/pci@12c0/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE9
PCIe 10	pci_63	CMU15/CMP1	/pci@12c0/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE10
PCIe 11	pci_62	CMU15/CMP1	/pci@1280/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE11
PCIe 12	pci_62	CMU15/CMP1	/pci@1280/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE12
PCIe 13	pci_60	CMU15/CMP0	/pci@1200/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE13
PCIe 14	pci_60	CMU15/CMP0	/pci@1200/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE14
PCIe 15	pci_61	CMU15/CMP0	/pci@1240/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE15
PCIe 16	pci_61	CMU15/CMP0	/pci@1240/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE16
EMS1	pci_48	CMU12/CMP0	/pci@f00/pci@1/pci@0/pci@c	/SYS/IOU3/EMS1
EMS2	pci_50	CMU12/CMP1	/pci@f80/pci@1/pci@0/pci@0	/SYS/IOU3/EMS2
EMS3	pci_62	CMU15/CMP1	/pci@1280/pci@1/pci@0/pci@c	/SYS/IOU3/EMS3
EMS4	pci_60	CMU15/CMP0	/pci@1200/pci@1/pci@0/pci@0	/SYS/IOU3/EMS4

Related Information

- "DCU3 PCIe and EMS Slot Locations" on page 27
- "Fully-Populated DCU3 PCIe Slot Root Complexes" on page 28

PCIe Device Root Complex Failover Behavior

Each PCIe and EMS slot can be associated to either a primary root complex or a secondary root complex, depending on the configuration of the DCU. When the DCU contains four healthy CMUs, all of the PCIe and EMS slots will be associated to their primary root complexes.

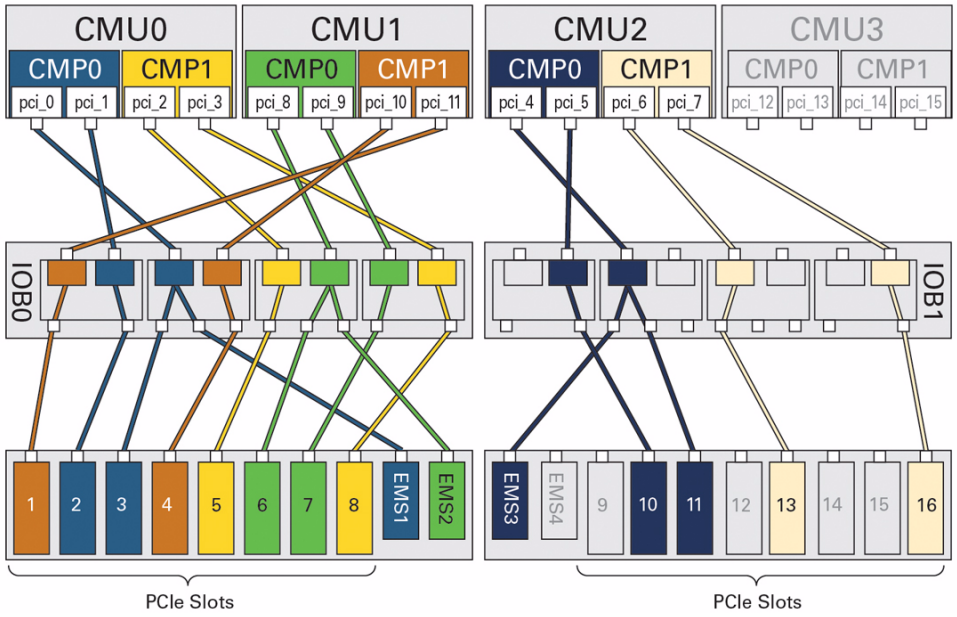
When a CMP or CMU fails, or when a CMU is removed, the primary root complexes on that CMP or CMU will no longer be available. Depending on how you set the Oracle ILOM `ioreconfigure` property on the PDomain host, the PCIe or EMS slots will either be rerouted to their secondary root complexes or the slots will no longer be available.

The `ioreconfigure` property signals under what conditions the PCIe I/O fabric paths from the root complexes to the slots will be created. After the server is powered on for the first time, the `ioreconfigure` property will be set to `true`. During the initial power on, the PCIe I/O fabric paths will be created for all of the PCIe and EMS slots in the server.

If you set the `ioreconfigure` property to `false`, the PCIe I/O fabric paths will not be recreated when a CMU or CMP fails or is removed. The PCIe and EMS slots routed to the primary root complexes on the missing CMU or CMP will no longer be available.

If you set the `ioreconfigure` property to `true`, the PCIe I/O fabric paths will be recreated when you next restart the PDomain. If the primary root complexes for PCIe or EMS slots are no longer available and you have set the `ioreconfigure` property to `true`, the PCIe I/O fabrics for these slots will be rerouted to their secondary root complexes and the virtual switches will be merged to function from a single root port.

In the following illustration, CMU3 has either failed or has been removed from DCU0. Since the `ioreconfigure` property is set to `false`, one EMS slot and four PCIe slots are no longer accessible.



The following illustration displays what happens when you set the `ioreconfigure` property to `true`. The PCIe and EMS slots that were once routed to the primary root complexes on CMU3 have been rerouted to their secondary root complexes on CMU2.

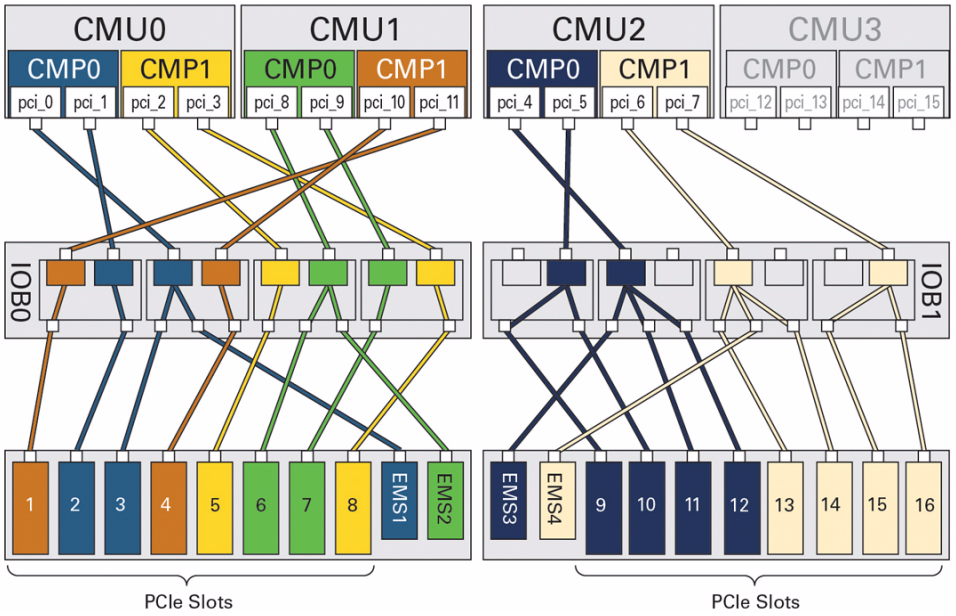
For example, PCIe slot 9 has been rerouted from its primary root complex, `pci_15`, to its secondary root complex, `pci_5`. The OpenBoot device path for PCIe slot 9 has changed from the primary path on CMU3/CMP1 (`pci@6c0`):

```
/pci@6c0/pci@1/pci@0/pci@8
```

To the secondary path on CMU2/CMU0 (`pci@440`):

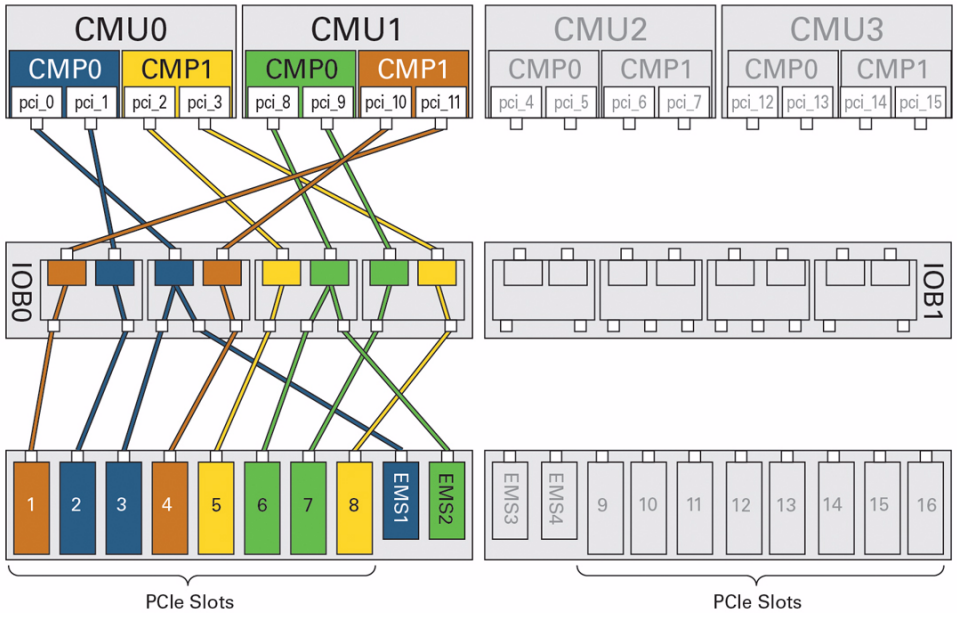
```
/pci@440/pci@1/pci@0/pci@8
```

Note – Any OpenBoot variables that reference the original (`pci@6c0`) device path will no longer work, even though there is now an equivalent, secondary device path.



In the following illustration, DCU0 contains only CMU0 and CMU1. Since the primary and secondary root complexes on CMU2 and CMU3 are no longer available, you cannot access EMS slots 3 and 4 and PCIe slots 9 through 16.

When neither the primary nor secondary root complex of a PCIe or EMS slot is available, you cannot access the slot as there is no electrical path from a working root complex through the PCIe I/O switch fabric to the slot.



Related Information

- "PCIe Communication and Paths" on page 5
- "Fully-Populated Default Configuration" on page 5
- "Half-Populated Configuration" on page 7
- "Understanding PCIe Slot Root Complex Names and Device Paths" on page 8
- "Manage I/O Path Reconfiguration Settings" on page 180
- "Identify the Root Complex of a Device" on page 181

Understanding EMS SAS Paths to the Internal Drives

These sections describe the SAS paths between the EMS modules and disk drives.

- "Drive Access With EMS SAS" on page 36
- "EMS and HDD Numbering" on page 37
- "SAS Paths From EMS Module to Drives" on page 37
- "SAS Pathing Examples" on page 39

Related Information

- "Understanding Internal Drive Device Paths" on page 42
- "Understanding PCIe Device Root Complexes" on page 4
- *Server Service*
- Oracle VM Server for SPARC Documentation Library (`http://www.oracle.com/goto/VM-SPARC/docs`)
- *Oracle Solaris 11.1 Administration: SAN Configuration and Multipathing*, `http://docs.oracle.com/cd/E26502_01/html/E29008/`

Drive Access With EMS SAS

The EMS SAS controllers provide access to the internal HDD or SSD drives.

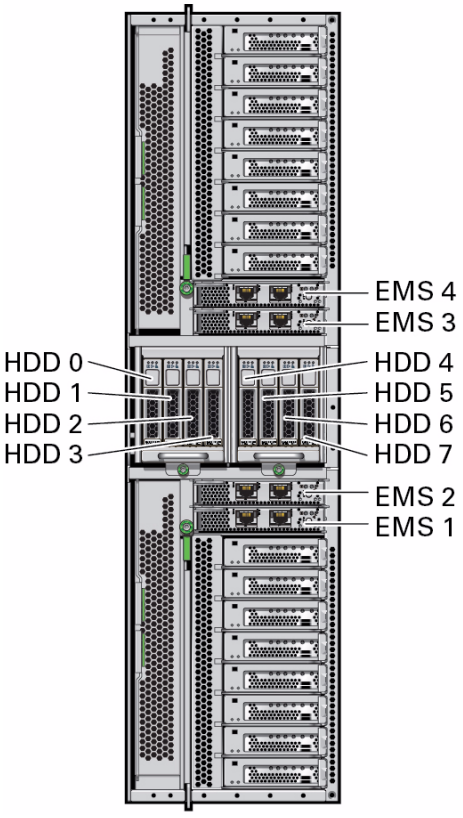
Each EMS module provides four SAS paths to four different drives. Likewise, each drive receives SAS paths from two different EMS modules. These redundant EMS SAS paths provide failure resiliency. If one EMS module fails, you can still access the internal drives through another EMS module. If a CMU or an IOB fails, you can continue to access the drives.

Related Information

- "EMS and HDD Numbering" on page 37
- "SAS Paths From EMS Module to Drives" on page 37
- "SAS Pathing Examples" on page 39

EMS and HDD Numbering

This illustration shows the label numbering of the EMS modules and drives in a single IOU.



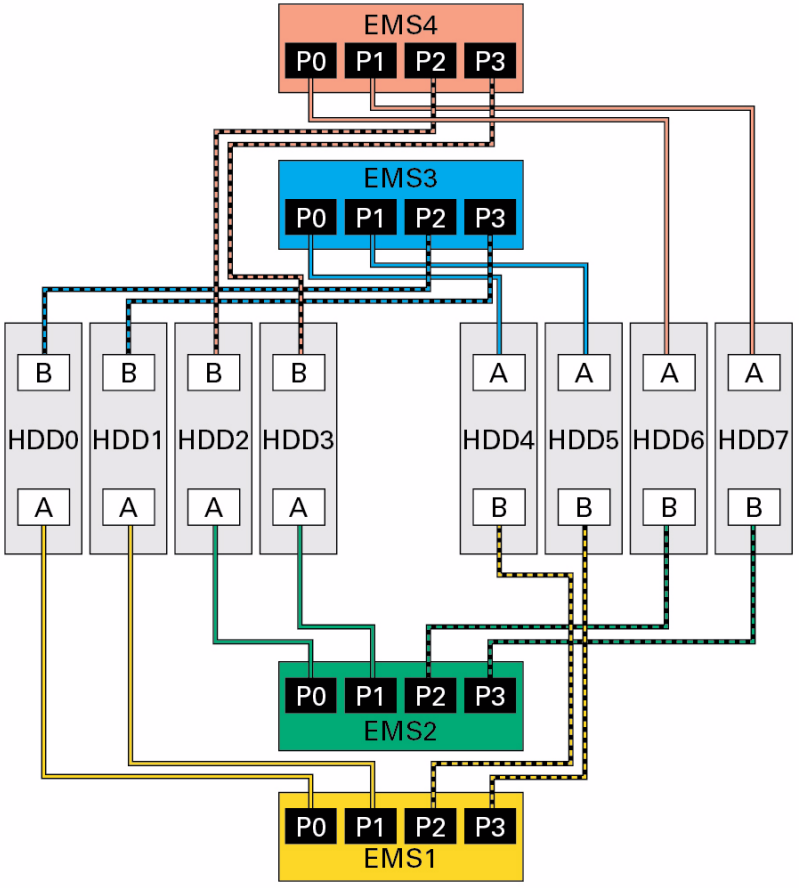
Related Information

- "Drive Access With EMS SAS" on page 36
- "SAS Paths From EMS Module to Drives" on page 37
- "SAS Pathing Examples" on page 39

SAS Paths From EMS Module to Drives

This illustration shows the SAS paths from the EMS modules to the drives.

Note – If the IOU contains SSDs, only the EMS SAS paths that are labeled A are available to the drives. Each SSD has only one SAS connection.



Caution – You must manage these SAS paths in Oracle VM Server for SPARC logical domains to prevent unwanted access to the drives. Two different logical domains could access the same drive, which could lead to data corruption and unprotected access to the data.

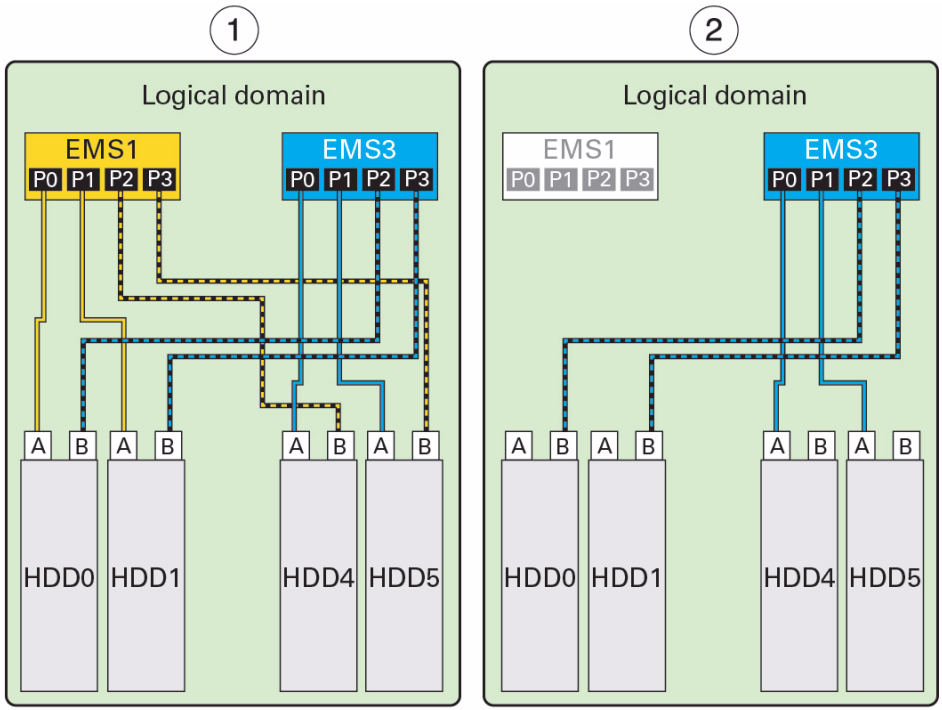
Consider these redundant SAS paths when assigning internal drives to logical domains. When configuring logical domains, include both EMS SAS paths to the drive or drives in the logical domain.

Related Information

- "Drive Access With EMS SAS" on page 36
- "EMS and HDD Numbering" on page 37
- "SAS Pathing Examples" on page 39

SAS Pathing Examples

The following illustration shows two examples of a logical domain containing both EMS1 and EMS3. Since both EMS1 and EMS3 provide EMS SAS paths to the same four drives, you can still access all of the drives if one EMS fails (in the second example, EMS1 has failed).



1 One logical domain displaying the redundant EMS SAS paths from the two EMS modules to the four drives.

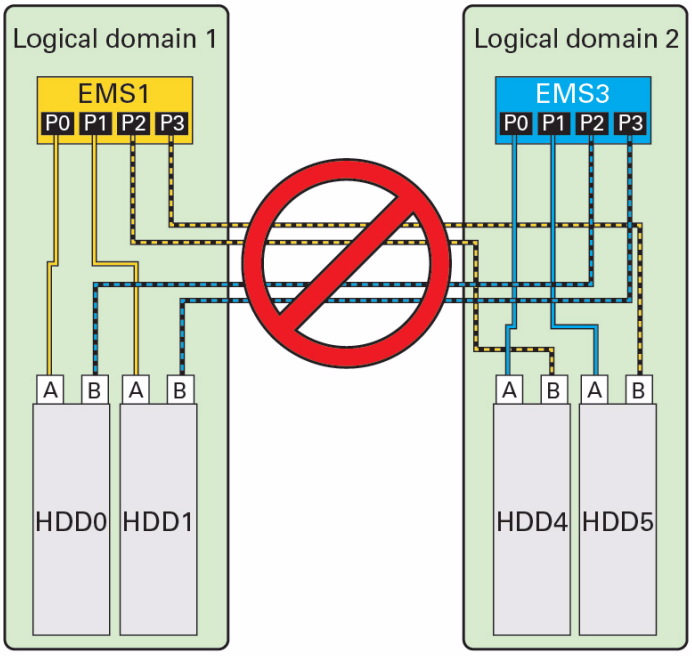
2 Same logical domain with EMS1 failed. EMS3 provides access to four drives.

When both SAS paths to a drive are within the same logical domain, you can configure them for redundancy using the Oracle Solaris I/O multipathing feature. This feature dynamically controls the paths to storage devices and manages storage path failures. If one SAS path fails, you can configure the multipathing feature to enable the other SAS path to take over.

Note – For complete information about configuring Oracle Solaris I/O multipathing, refer to the *Oracle Solaris 11.1 Administration: SAN Configuration and Multipathing* document, which is in the Oracle Solaris OS documentation library at `http://www.oracle.com/goto/Solaris11/docs`.

If both SAS paths to the same drive are assigned two different logical domains, make sure that the drive will only be accessed through a single SAS path. When two different logical domains access the same drive simultaneously, the data on the drive becomes corrupted.

For example, if one logical domain contains EMS1 and a second logical domain contains EMS3, both logical domains can access HDD0, HDD1, HDD4, and HDD5 through the two SAS paths to each drive. The same four drives will be displayed in command output in both logical domains.



In this example, configure each logical domain to access the drives through single SAS paths (labeled A). Avoid accessing the other drives through the remaining SAS paths (labeled B).

Caution – Never configure the same drive to be a boot device for two or more logical domains. Data corruption will result.

EMS module-to-drive mapping is as follows.

HDD Slot	EMS
HDD0	EMS1, EMS3
HDD1	EMS1, EMS3
HDD2	EMS2, EMS4
HDD3	EMS2, EMS4
HDD4	EMS3, EMS1
HDD5	EMS3, EMS1
HDD6	EMS4, EMS2
HDD7	EMS4, EMS2

Related Information

- "Drive Access With EMS SAS" on page 36
- "EMS and HDD Numbering" on page 37
- "SAS Paths From EMS Module to Drives" on page 37

Understanding Internal Drive Device Paths

The device paths and root complexes for each drive differ depending on whether the DCU containing the drives contains four CMUs (fully-populated) or two CMUs (half-populated). The following topics list the root complexes and device paths for the drives installed in fully-populated and half-populated DCUs.

Note – These topics show the root complexes as they are listed in the Oracle VM Server for SPARC `ldm list-io` command output. The root complexes are listed as `pci_`*x*, where *x* is a number from 0 to 63. For more information about the root complexes, see "Understanding PCIe Device Root Complexes" on page 4. For more information about the `ldm` command, refer to the Oracle VM Server for SPARC documentation.

- "HDD and SSD Device Path Differences" on page 43
- "Understanding DCU0 Drive Device Paths" on page 43
- "Understanding DCU1 Drive Device Paths" on page 50
- "Understanding DCU2 Drive Device Paths" on page 57
- "Understanding DCU3 Drive Device Paths" on page 64

Related Information

- "EMS and HDD Numbering" on page 37
- "Understanding PCIe Device Root Complexes" on page 4

- *Server Service*, servicing HDDs, SSDs, and drive filler panels
- Oracle VM Server for SPARC Documentation Library (`http://www.oracle.com/goto/VM-SPARC/docs`)

HDD and SSD Device Path Differences

The server supports HDDs or SSDs. The drive controllers inside the EMS modules access each type of drive.

The server can access each HDD through two EMS modules. Since each EMS module connects to a root complex, each HDD can be accessed by two root complexes. A root complex provides the base for a device path, so each HDD has two device paths.

Note – Since two root complexes can access each HDD, carefully plan any Oracle VM Server for SPARC configurations. For more information, see "SAS Pathing Examples" on page 39.

Unlike HDDs, which the server can access through two EMS modules, the server can access an SSD only through one EMS module. Since each SSD can be accessed by one root complex, each SSD has one device path.

Related Information

- "Understanding EMS SAS Paths to the Internal Drives" on page 36
- *Server Service*, understanding HDD and SSD slot configurations

Understanding DCU0 Drive Device Paths

These topics list the root complex names and the Oracle Solaris OS device paths for the drives in a fully-populated and half-populated DCU0.

- "Fully-Populated DCU0 Drive Device Paths" on page 44
- "Half-Populated DCU0 Hard Drive Device Paths" on page 47

Related Information

- "Understanding DCU1 Drive Device Paths" on page 50
- "Understanding DCU2 Drive Device Paths" on page 57
- "Understanding DCU3 Drive Device Paths" on page 64

Fully-Populated DCU0 Drive Device Paths

These illustrations display the paths from the root complexes to the drives in a DCU0 fully-populated with four CMUs. The first illustration displays the HDD paths and the second illustration displays the SSD paths.

FIGURE: HDD Paths in a Fully-Populated DCU0

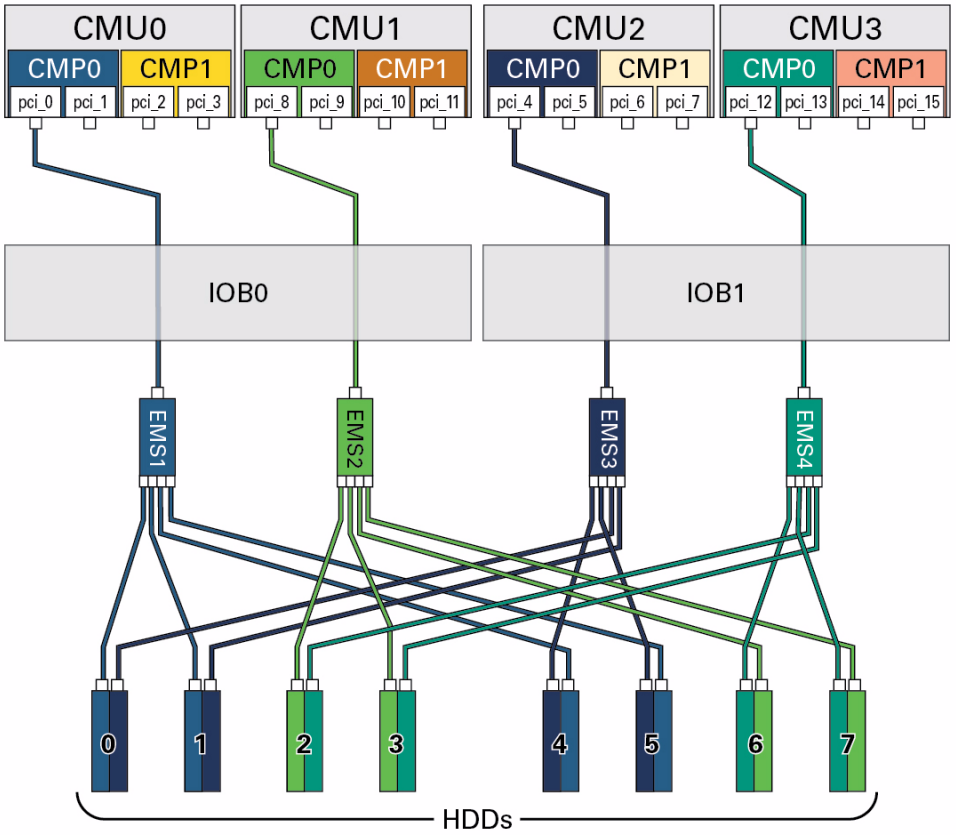
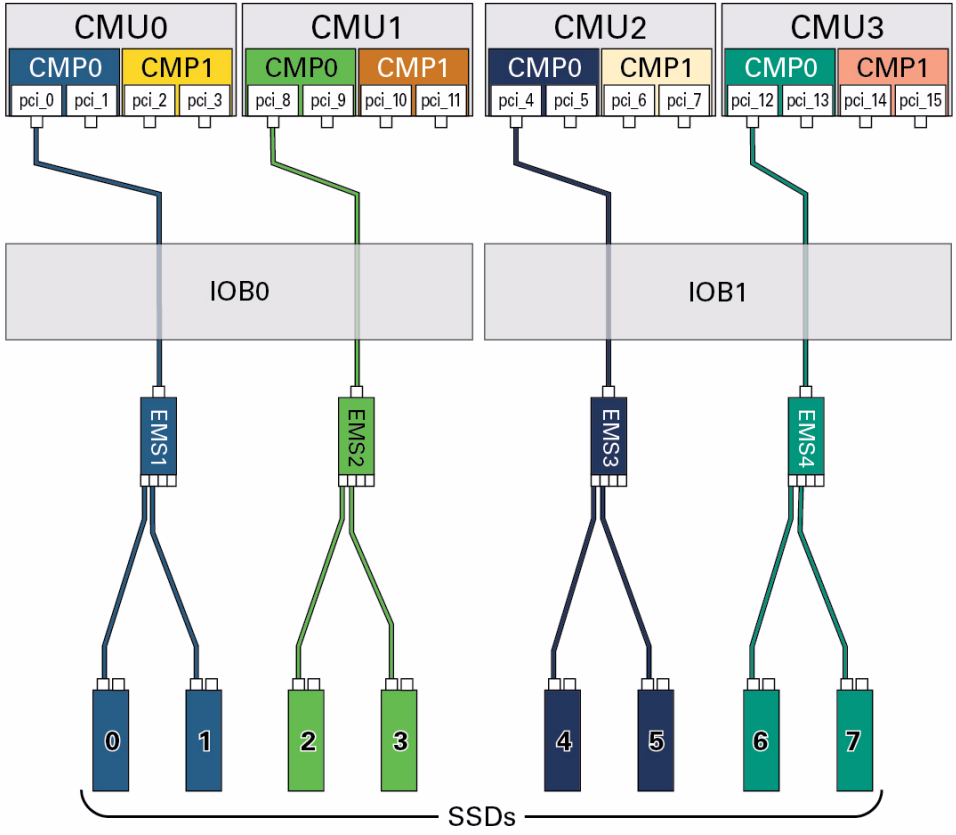


FIGURE: SSD Paths in a Fully-Populated DCU0



This table lists the root complexes and the device paths for a fully-populated DCU0 containing four CMUs.

Note – Each SAS drive has its own, unique World Wide Name. In the following device paths, replace *WWN* with the World Wide Name of the specific drive.

TABLE: Device Paths for Drives in a Fully-Populated DCU0

Drive	EMS	Root Complex	Device Path
HDD0	EMS1	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_4	/pci@400/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD1	EMS1	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_4	/pci@400/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD2	EMS2	pci_8	/pci@500/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD3	EMS2	pci_8	/pci@500/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD4	EMS3	pci_4	/pci@400/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD5	EMS3	pci_4	/pci@400/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD6	EMS4	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_8	/pci@500/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD7	EMS4	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_8	/pci@500/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a

Related Information

- "Understanding DCU0 Root Complex Names and Device Paths" on page 8
- "Understanding EMS SAS Paths to the Internal Drives" on page 36
- "EMS and HDD Numbering" on page 37
- "Half-Populated DCU0 Hard Drive Device Paths" on page 47

Half-Populated DCU0 Hard Drive Device Paths

These illustrations display the paths from the root complexes to the drives in a half-populated DCU0. A half-populated DCU0 contains only CMU0 and CMU3. The first illustration shows the HDD paths and the second illustration shows the SSD paths.

FIGURE: HDD Paths in a Half-Populated DCU0

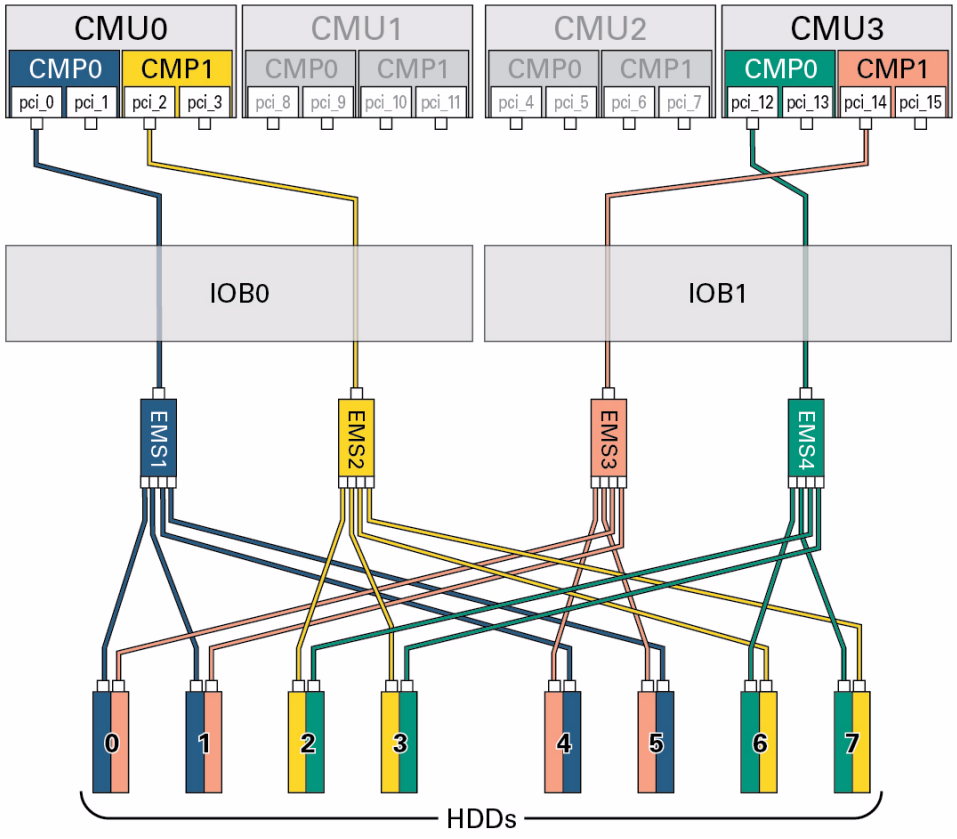
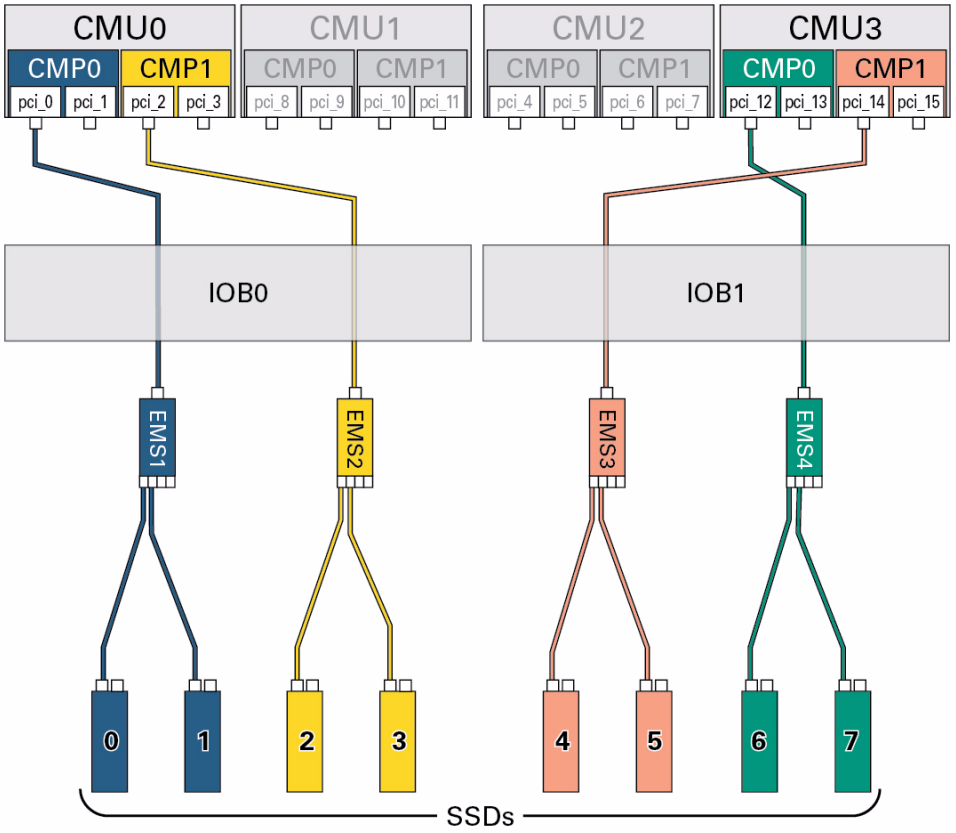


FIGURE: SSD Paths in a Half-Populated DCU0



This table lists the root complexes and the device paths for a half-populated DCU0. A half-populated DCU0 contains only CMU0 and CMU3.

Note – Each SAS drive has its own, unique World Wide Name. In the following device paths, replace *WWN* with the World Wide Name of the specific drive.

TABLE: Device Paths for Drives in a Half-Populated DCU0

Drive	EMS	Root Complex	Device Path
HDD0	EMS1	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_14	/pci@680/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD1	EMS1	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_14	/pci@680/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD2	EMS2	pci_2	/pci@380/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD3	EMS2	pci_2	/pci@380/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD4	EMS3	pci_14	/pci@680/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD5	EMS3	pci_14	/pci@680/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD6	EMS4	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_2	/pci@380/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD7	EMS4	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_2	/pci@380/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a

Related Information

- "Understanding DCU0 Root Complex Names and Device Paths" on page 8
- "Understanding EMS SAS Paths to the Internal Drives" on page 36
- "EMS and HDD Numbering" on page 37
- "Fully-Populated DCU0 Drive Device Paths" on page 44

Understanding DCU1 Drive Device Paths

These topics list the root complex names and the Oracle Solaris OS device paths for the drives in a fully-populated and half-populated DCU1.

- "Fully-Populated DCU1 Drive Device Paths" on page 50
- "Half-Populated DCU1 Drive Device Paths" on page 54

Related Information

- "Understanding DCU0 Drive Device Paths" on page 43
- "Understanding DCU2 Drive Device Paths" on page 57
- "Understanding DCU3 Drive Device Paths" on page 64

Fully-Populated DCU1 Drive Device Paths

These illustrations display the paths from the root complexes to the drives in a DCU1 fully-populated with four CMUs. The first illustration displays the HDD paths and the second illustration displays the SSD paths.

FIGURE: HDD Paths in a Fully-Populated DCU1

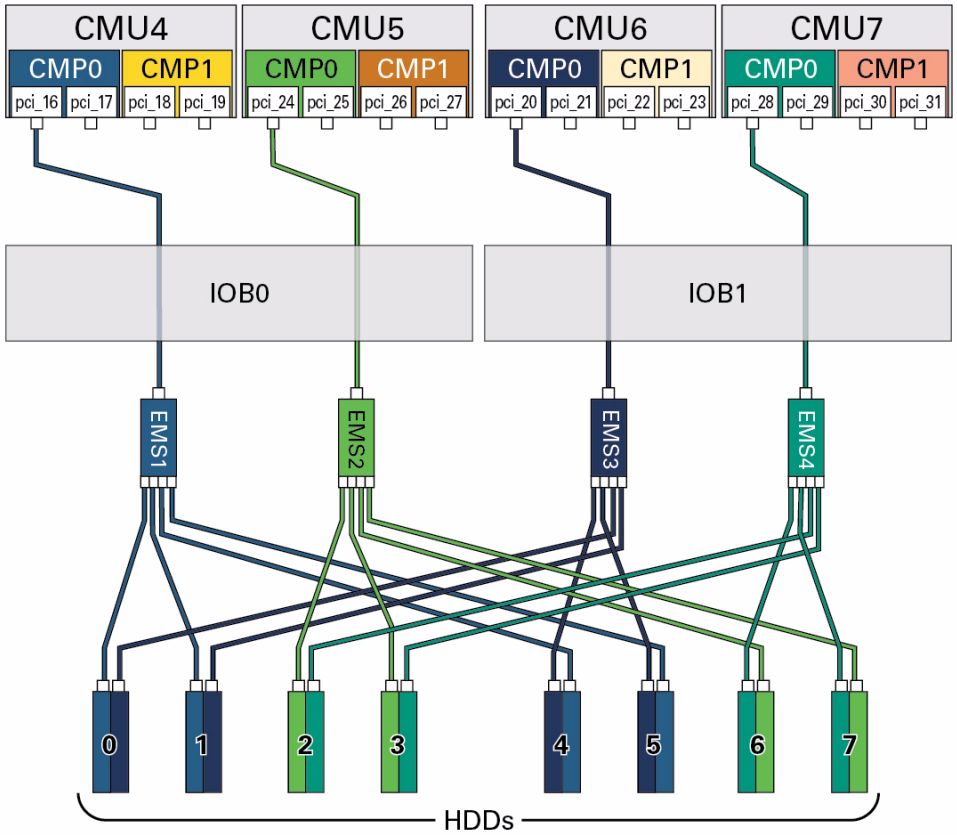
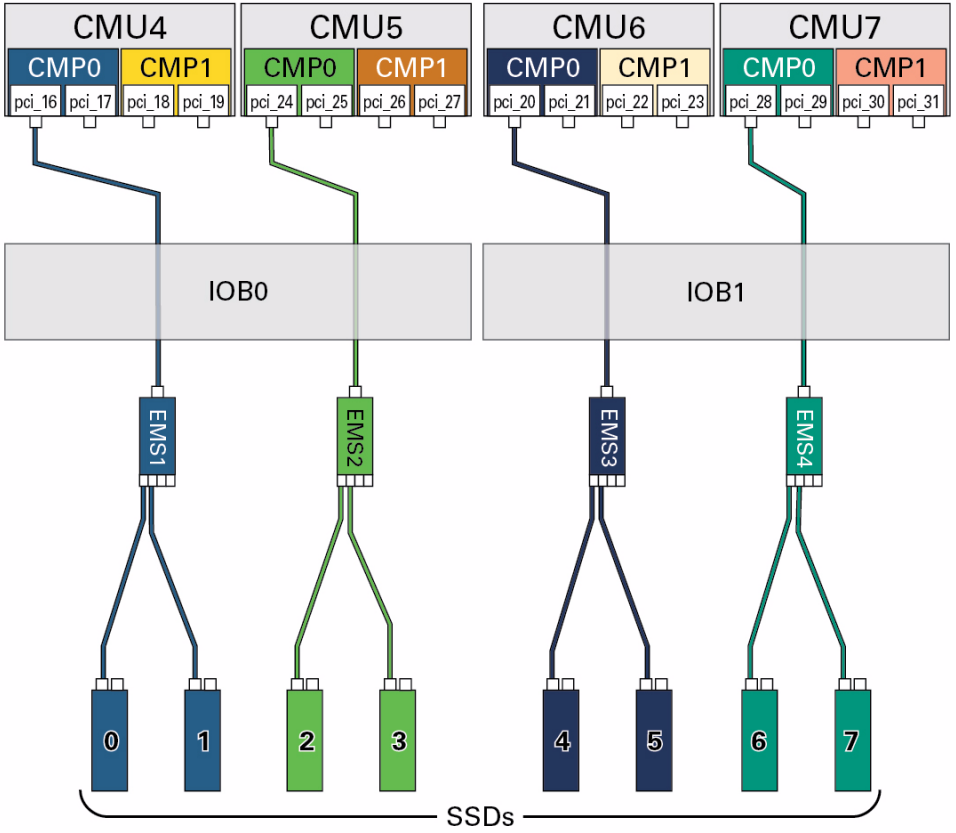


FIGURE: SSD Paths in a Fully-Populated DCU1



This table lists the root complexes and the device paths for a fully-populated DCU1 with four CMUs.

Note – Each SAS drive has its own, unique World Wide Name. In the following device paths, replace *WWN* with the World Wide Name of the specific drive.

TABLE: Device Paths for Drives in a Fully-Populated DCU1

Drive	EMS	Root Complex	Device Path
HDD0	EMS1	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_20	/pci@800/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD1	EMS1	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_20	/pci@800/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD2	EMS2	pci_24	/pci@900/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD3	EMS2	pci_24	/pci@900/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD4	EMS3	pci_20	/pci@800/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD5	EMS3	pci_20	/pci@800/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD6	EMS4	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_24	/pci@900/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD7	EMS4	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_24	/pci@900/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a

Related Information

- "Understanding DCU1 Root Complex Names and Device Paths" on page 14
- "Understanding EMS SAS Paths to the Internal Drives" on page 36
- "EMS and HDD Numbering" on page 37
- "Half-Populated DCU1 Drive Device Paths" on page 54

Half-Populated DCU1 Drive Device Paths

These illustrations display the paths from the root complexes to the drives in a half-populated DCU1. A half-populated DCU1 contains only CMU4 and CMU7. The first illustration shows the HDD paths and the second illustration shows the SSD paths.

FIGURE: HDD Paths in a Half-Populated DCU1

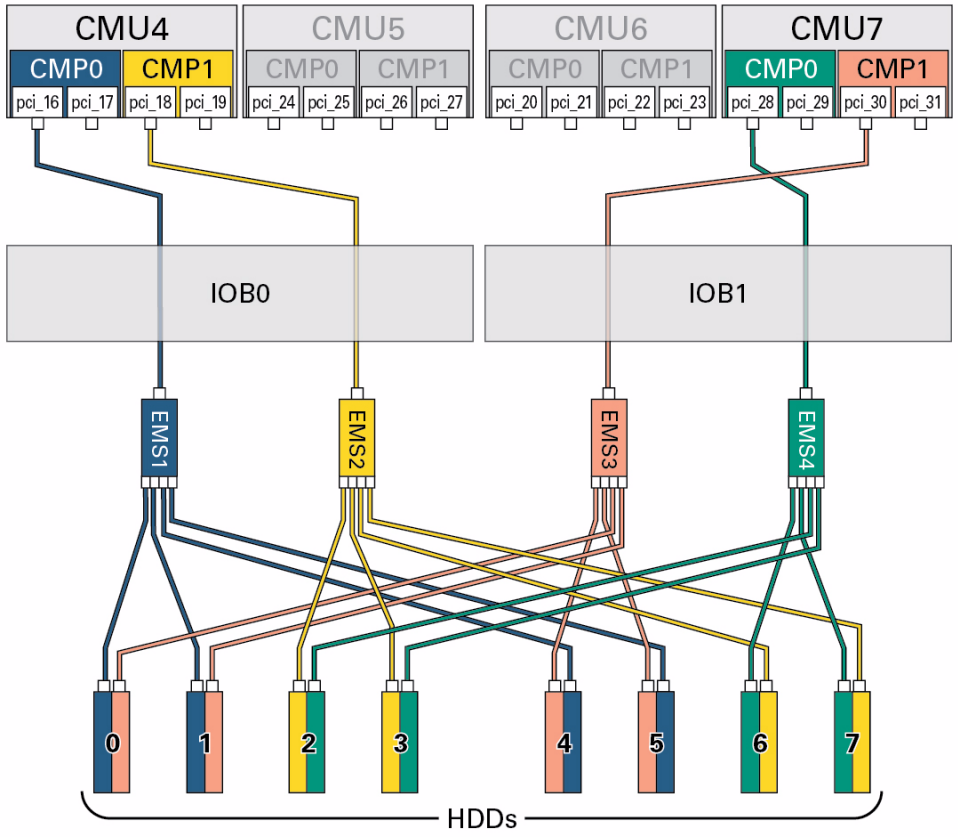
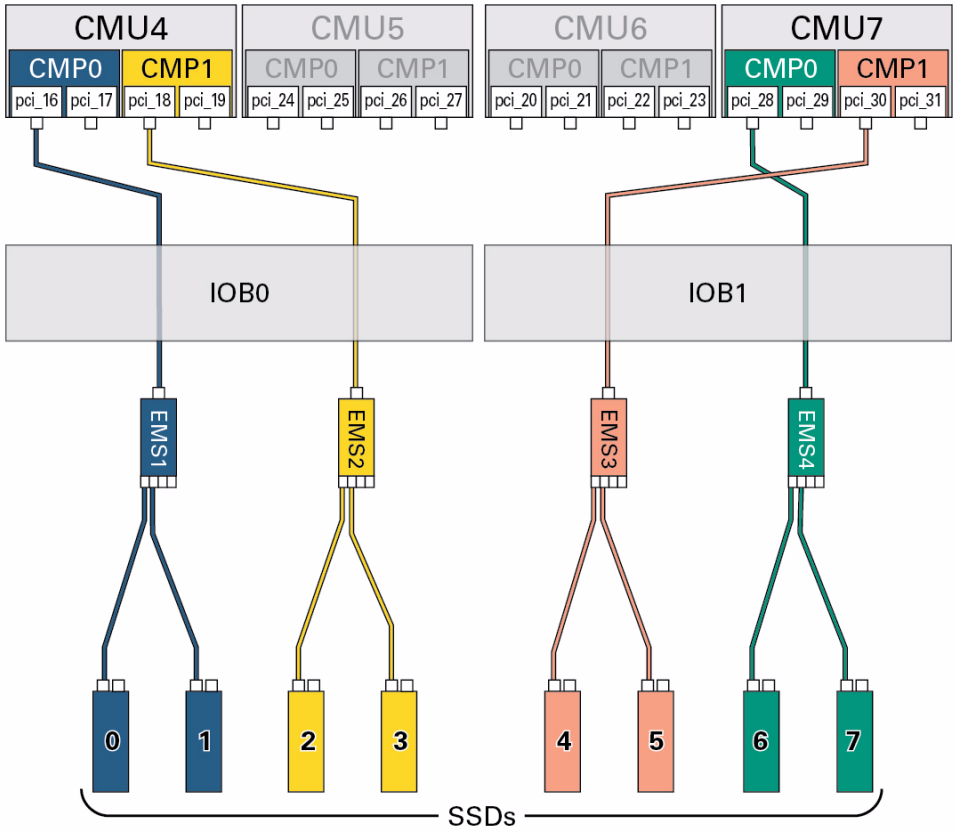


FIGURE: SSD Paths in a Half-Populated DCU1



This table lists the root complexes and the device paths for a half-populated DCU1. A half-populated DCU1 contains only CMU4 and CMU7.

Note – Each SAS drive has its own, unique World Wide Name. In the following device paths, replace *WWN* with the World Wide Name of the specific drive.

TABLE: Device Paths for Drives in a Half-Populated DCU1

Drive	EMS	Root Complex	Device Path
HDD0	EMS1	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_30	/pci@a80/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD1	EMS1	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_30	/pci@a80/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD2	EMS2	pci_18	/pci@780/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD3	EMS2	pci_18	/pci@780/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD4	EMS3	pci_30	/pci@a80/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD5	EMS3	pci_30	/pci@a80/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD6	EMS4	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_18	/pci@780/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD7	EMS4	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_18	/pci@780/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a

Related Information

- "Understanding DCU1 Root Complex Names and Device Paths" on page 14
- "Understanding EMS SAS Paths to the Internal Drives" on page 36
- "EMS and HDD Numbering" on page 37
- "Fully-Populated DCU1 Drive Device Paths" on page 50

Understanding DCU2 Drive Device Paths

These topics list the root complex names and the Oracle Solaris OS device paths for the drives in a fully-populated and half-populated DCU2.

- "Fully-Populated DCU2 Drive Device Paths" on page 57
- "Half-Populated DCU2 Drive Device Paths" on page 61

Related Information

- "Understanding DCU0 Drive Device Paths" on page 43
- "Understanding DCU1 Drive Device Paths" on page 50
- "Understanding DCU3 Drive Device Paths" on page 64

Fully-Populated DCU2 Drive Device Paths

These illustrations display the paths from the root complexes to the drives in a DCU2 fully-populated with four CMUs. The first illustration displays the HDD paths and the second illustration displays the SSD paths.

FIGURE: HDD Paths in a Fully-Populated DCU2

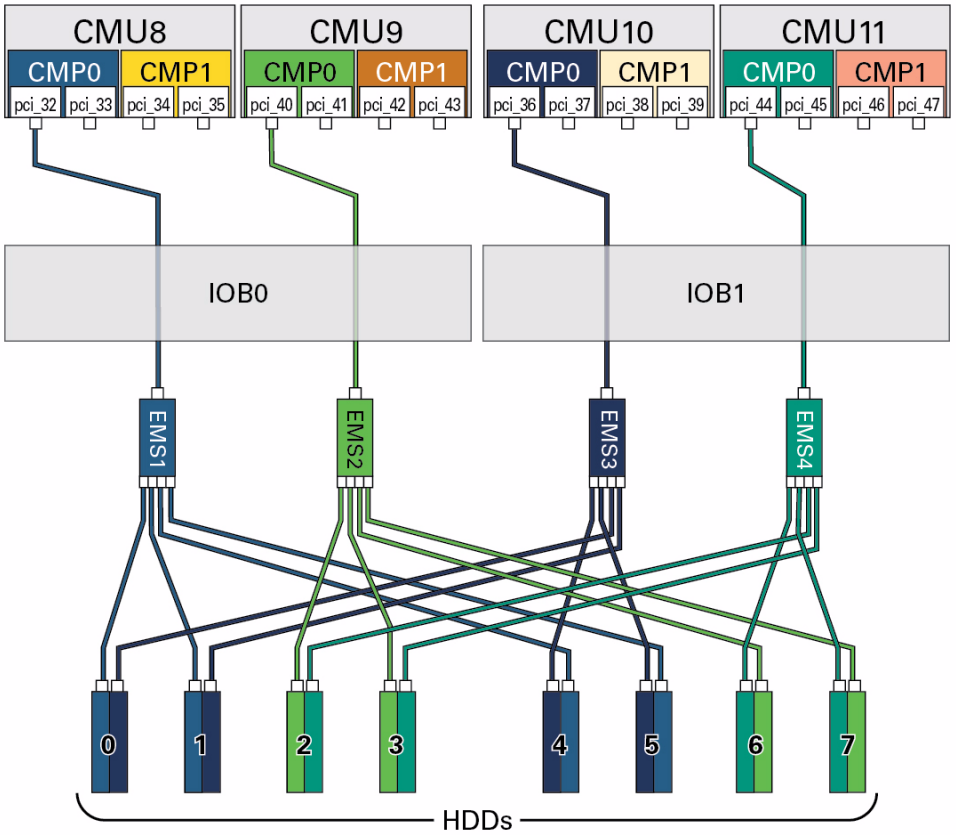
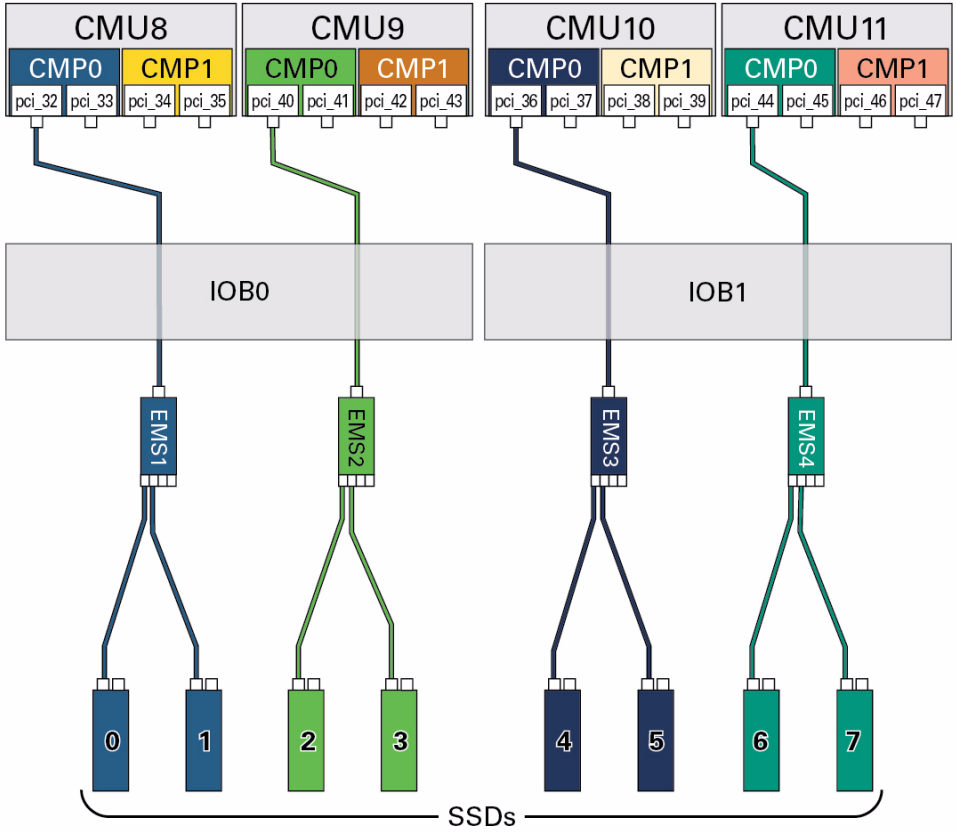


FIGURE: SSD Paths in a Fully-Populated DCU2



This table lists the root complexes and the device paths for a fully-populated DCU2 with four CMUs.

Note – Each SAS drive has its own, unique World Wide Name. In the following device paths, replace *WWN* with the World Wide Name of the specific drive.

TABLE: Device Paths for Drives in a Fully-Populated DCU2

Drive	EMS	Root Complex	Device Path
HDD0	EMS1	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_36	/pci@c00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD1	EMS1	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_36	/pci@c00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD2	EMS2	pci_40	/pci@d00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD3	EMS2	pci_40	/pci@d00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD4	EMS3	pci_36	/pci@c00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD5	EMS3	pci_36	/pci@c00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD6	EMS4	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_40	/pci@d00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD7	EMS4	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_40	/pci@d00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a

Related Information

- "Understanding DCU2 Root Complexes and Device Paths" on page 20
- "Understanding EMS SAS Paths to the Internal Drives" on page 36
- "EMS and HDD Numbering" on page 37
- "Half-Populated DCU2 Drive Device Paths" on page 61

Half-Populated DCU2 Drive Device Paths

These illustrations display the paths from the root complexes to the drives in a half-populated DCU2. A half-populated DCU2 contains only CMU8 and CMU11. The first illustration shows the HDD paths and the second illustration shows the SSD paths.

FIGURE: HDD Paths in a Half-Populated DCU2

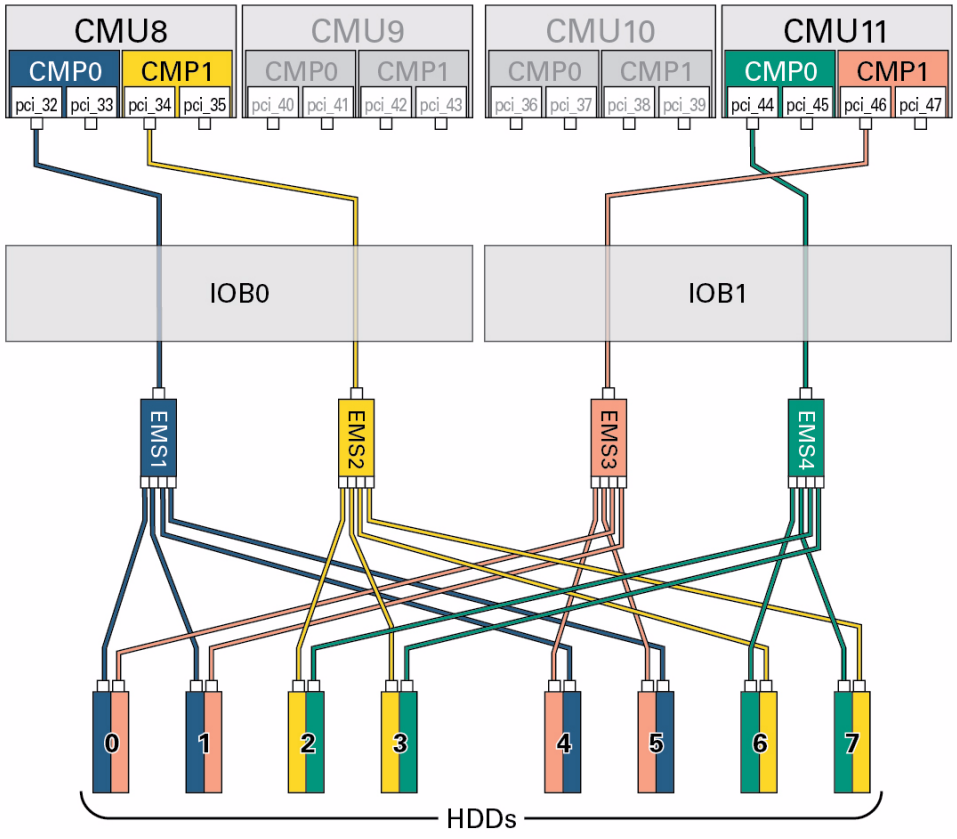
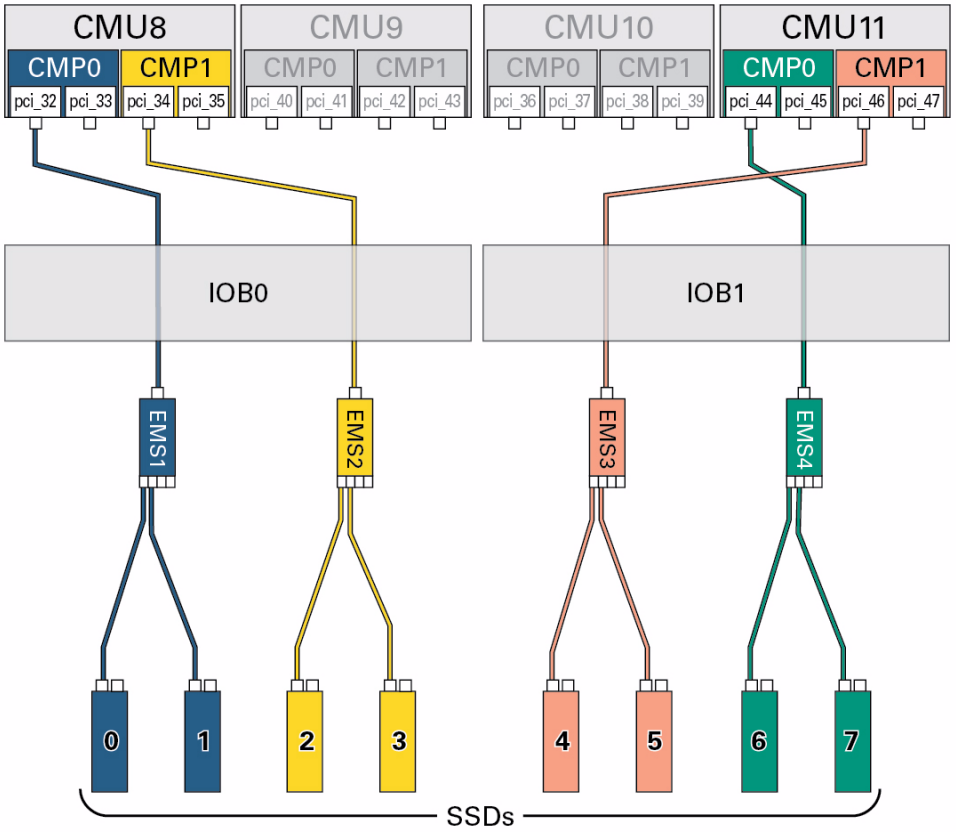


FIGURE: SSD Paths in a Half-Populated DCU2



This table lists the root complexes and the device paths for a half-populated DCU2. A half-populated DCU2 contains only CMU8 and CMU11.

Note – Each SAS drive has its own, unique World Wide Name. In the following device paths, replace *WWN* with the World Wide Name of the specific drive.

TABLE: Device Paths for Drives in a Half-Populated DCU2

Drive	EMS	Root Complex	Device Path
HDD0	EMS1	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_46	/pci@e80/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD1	EMS1	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_46	/pci@e80/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD2	EMS2	pci_34	/pci@b80/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD3	EMS2	pci_34	/pci@b80/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD4	EMS3	pci_46	/pci@e80/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD5	EMS3	pci_46	/pci@e80/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD6	EMS4	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_34	/pci@b80/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD7	EMS4	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_34	/pci@b80/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a

Related Information

- "Understanding DCU2 Root Complexes and Device Paths" on page 20
- "Understanding EMS SAS Paths to the Internal Drives" on page 36
- "EMS and HDD Numbering" on page 37
- "Fully-Populated DCU2 Drive Device Paths" on page 57

Understanding DCU3 Drive Device Paths

These topics list the root complex names and the Oracle Solaris OS device paths for the drives in a fully-populated and half-populated DCU3.

- "Fully-Populated DCU3 Drive Device Paths" on page 64
- "Half-Populated DCU3 Drive Device Paths" on page 68

Related Information

- "Understanding DCU0 Drive Device Paths" on page 43
- "Understanding DCU1 Drive Device Paths" on page 50
- "Understanding DCU2 Drive Device Paths" on page 57

Fully-Populated DCU3 Drive Device Paths

These illustrations display the paths from the root complexes to the drives in a DCU3 fully-populated with four CMUs. The first illustration displays the HDD paths and the second illustration displays the SSD paths.

FIGURE: HDD Paths in a Fully-Populated DCU3

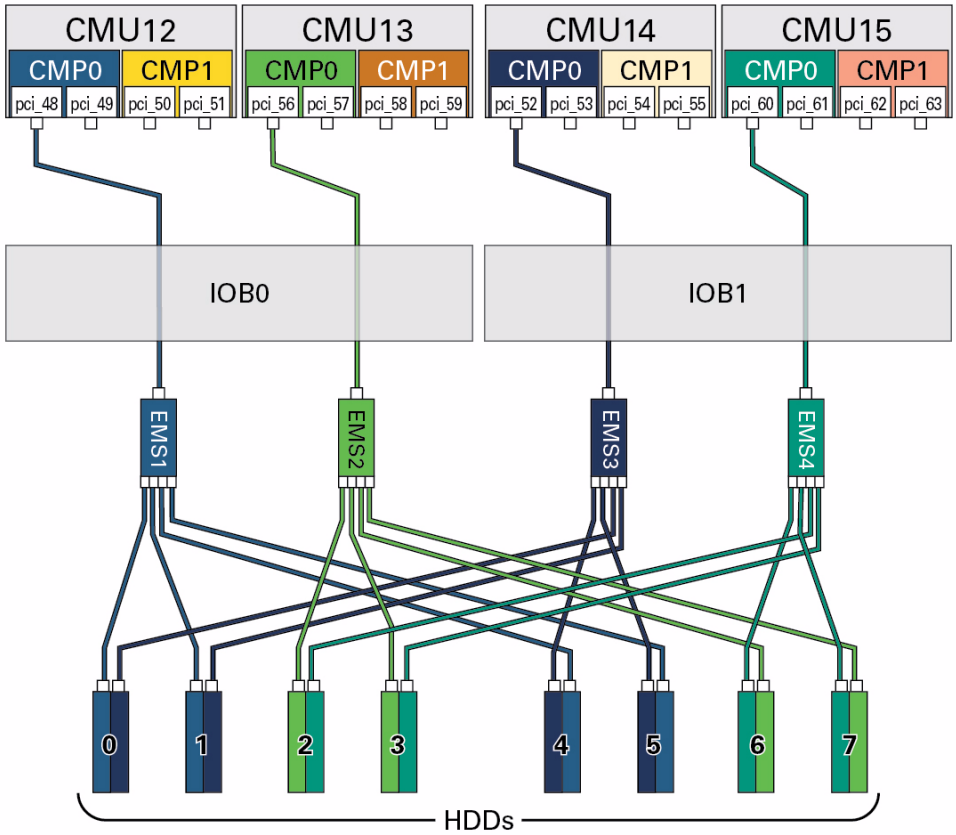
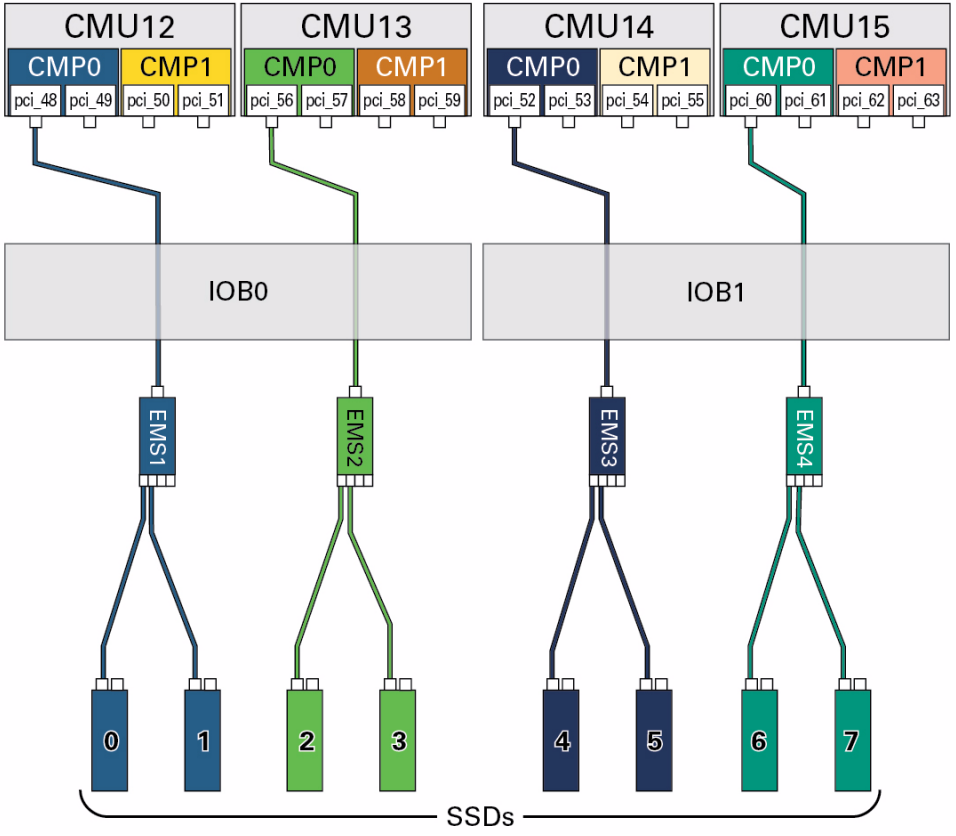


FIGURE: SSD Paths in a Fully-Populated DCU3



This table lists the root complexes and the device paths for a fully-populated DCU3 with four CMUs.

Note – Each SAS drive has its own, unique World Wide Name. In the following device paths, replace *WWN* with the World Wide Name of the specific drive.

TABLE: Device Paths for Drives in a Fully-Populated DCU3

Drive	EMS	Root Complex	Device Path
HDD0	EMS1	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_52	/pci@1000/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD1	EMS1	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_52	/pci@1000/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD2	EMS2	pci_56	/pci@1100/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD3	EMS2	pci_56	/pci@1100/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD4	EMS3	pci_52	/pci@1000/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD5	EMS3	pci_52	/pci@1000/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD6	EMS4	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_56	/pci@1100/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD7	EMS4	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_56	/pci@1100/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a

Related Information

- "Understanding DCU3 Root Complexes and Device Paths" on page 26
- "Understanding EMS SAS Paths to the Internal Drives" on page 36
- "EMS and HDD Numbering" on page 37
- "Half-Populated DCU3 Drive Device Paths" on page 68

Half-Populated DCU3 Drive Device Paths

These illustrations display the paths from the root complexes to the drives in a half-populated DCU3. A half-populated DCU3 contains only CMU12 and CMU15. The first illustration shows the HDD paths and the second illustration shows the SSD paths.

FIGURE: HDD Paths in a Half-Populated DCU3

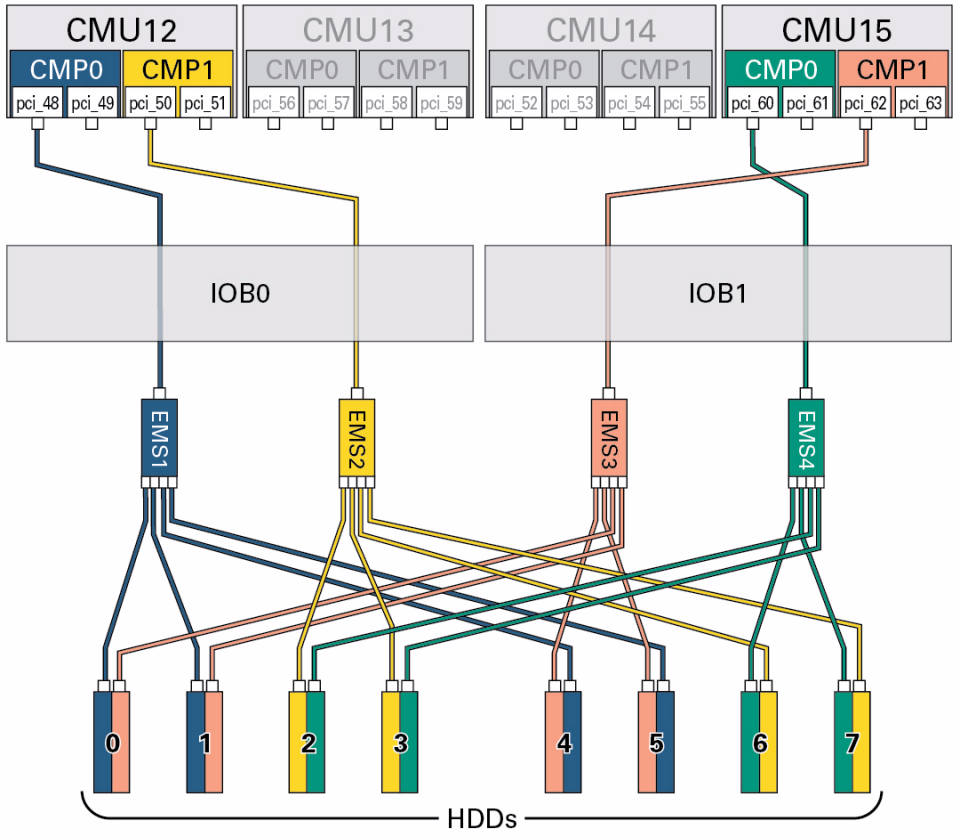
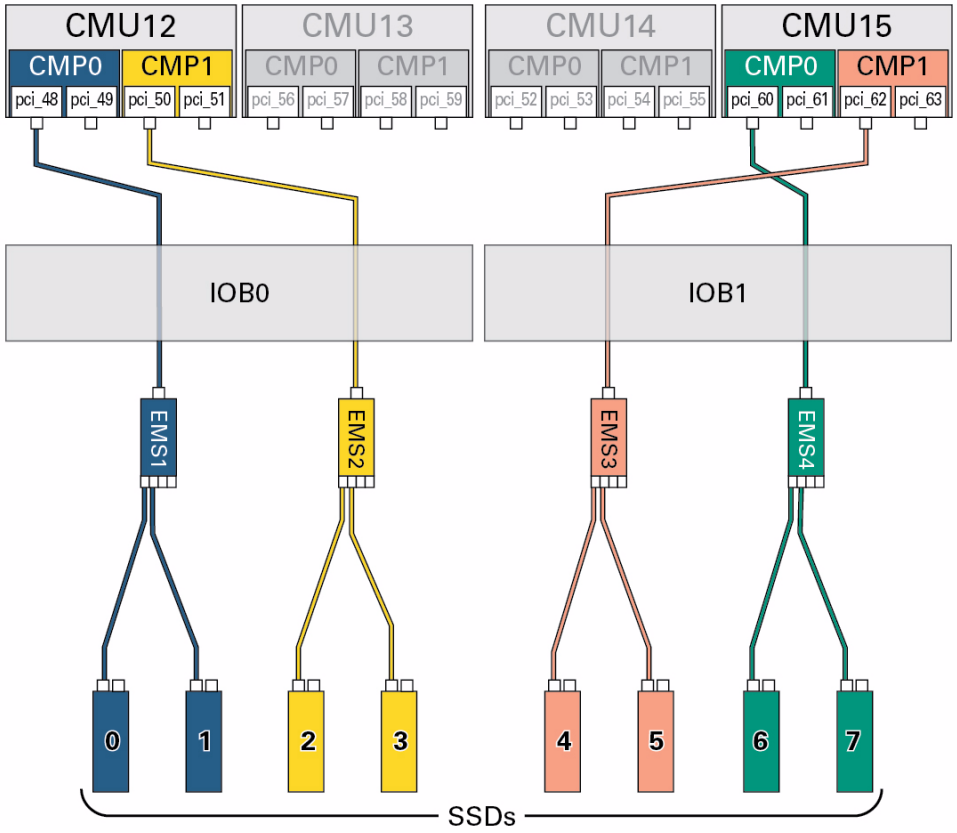


FIGURE: SSD Paths in a Half-Populated DCU3



This table lists the root complexes and the device paths for a half-populated DCU3. A half-populated DCU3 contains only CMU12 and CMU15.

Note – Each SAS drive has its own, unique World Wide Name. In the following device paths, replace *WWN* with the World Wide Name of the specific drive.

TABLE: Device Paths for Drives in a Half-Populated DCU3

Drive	EMS	Root Complex	Device Path
HDD0	EMS1	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_62	/pci@1280/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD1	EMS1	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS3	pci_62	/pci@1280/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD2	EMS2	pci_50	/pci@f80/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD3	EMS2	pci_50	/pci@f80/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS4	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD4	EMS3	pci_62	/pci@1280/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD5	EMS3	pci_62	/pci@1280/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS1	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD6	EMS4	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_50	/pci@f80/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
HDD7	EMS4	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a
	EMS2	pci_50	/pci@f80/pci@1/pci@0/pci@0/pci@0/pci@4/scsi@0/disk@w*WWN*,0:a

Related Information

- "Understanding DCU3 Root Complexes and Device Paths" on page 26
- "Understanding EMS SAS Paths to the Internal Drives" on page 36
- "EMS and HDD Numbering" on page 37
- "Fully-Populated DCU3 Drive Device Paths" on page 64

Understanding Network Port Device Paths

Each EMS module contains two 10 GbE network ports, numbered 0 and 1. The device paths and root complexes for each network port differ depending on whether the DCU containing the drives contains four CMUs (fully-populated) or two CMUs (half-populated). The following topics list the root complexes and device paths for the network ports installed in fully-populated and half-populated DCUs.

Note – These topics show the root complexes as they are listed in the Oracle VM Server for SPARC `ldm list-io` command output. The root complexes are listed as `pci_`*x*, where *x* is a number from 0 to 63. For more information about the root complexes, see "Understanding PCIe Device Root Complexes" on page 4. For more information about the `ldm` command, refer to the Oracle VM Server for SPARC documentation.

- "Network Port Numbering" on page 71
- "DCU0 Network Port Device Paths" on page 73
- "DCU1 Network Port Device Paths" on page 75
- "DCU2 Network Port Device Paths" on page 77
- "DCU3 Network Port Device Paths" on page 79

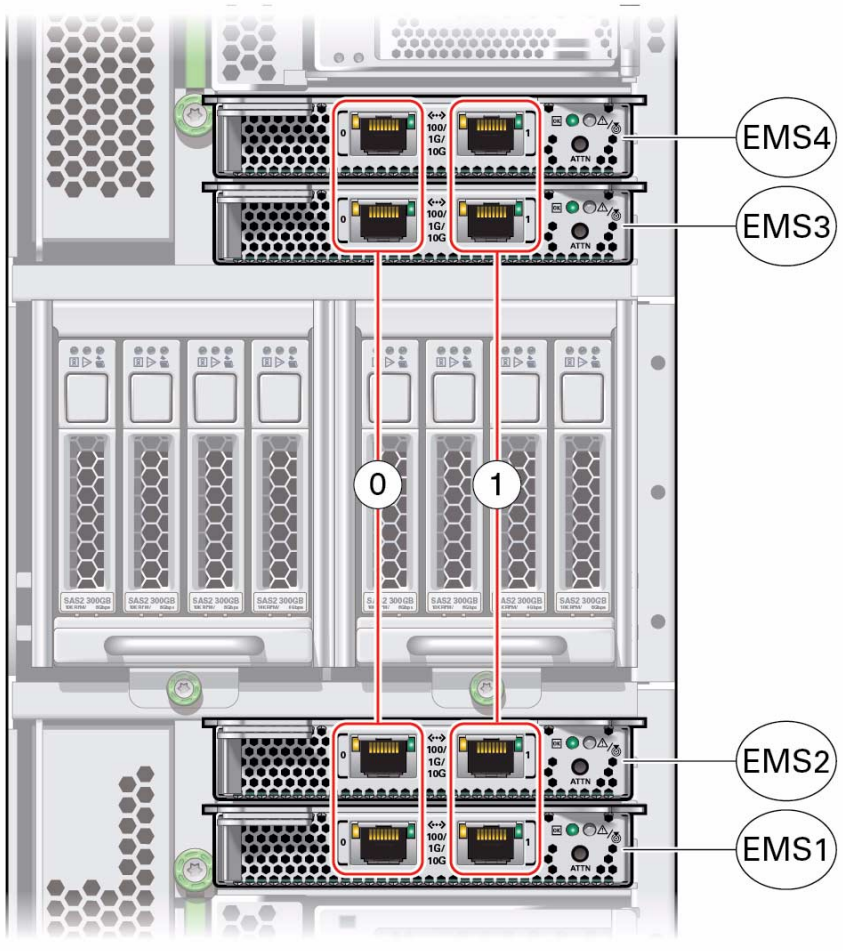
Related Information

- "Understanding PCIe Device Root Complexes" on page 4
- "Understanding EMS SAS Paths to the Internal Drives" on page 36
- "Understanding Internal Drive Device Paths" on page 42

Network Port Numbering

Each DCU can have up to four EMS modules, and each EMS module contains two 10 GbE network ports, numbered 0 and 1.

Note – For instructions on the cabling these ports, refer to *Installation*, connect the EMS network cables.



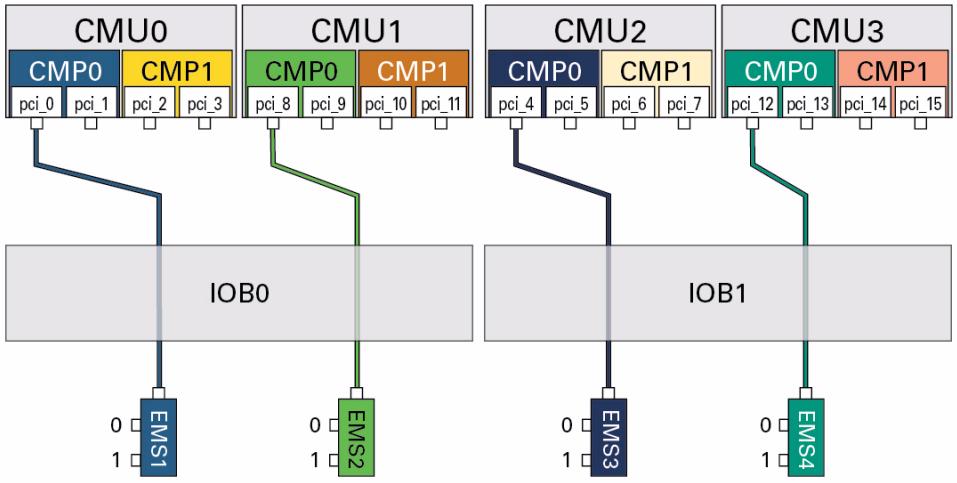
Related Information

- "Understanding PCIe Slot Root Complex Names and Device Paths" on page 8
- "EMS and HDD Numbering" on page 37
- "Understanding Internal Drive Device Paths" on page 42

DCU0 Network Port Device Paths

This illustration displays the paths from the root complexes to the EMS network ports in a fully-populated DCU0.

FIGURE: Network Port Paths in a Fully-Populated DCU0



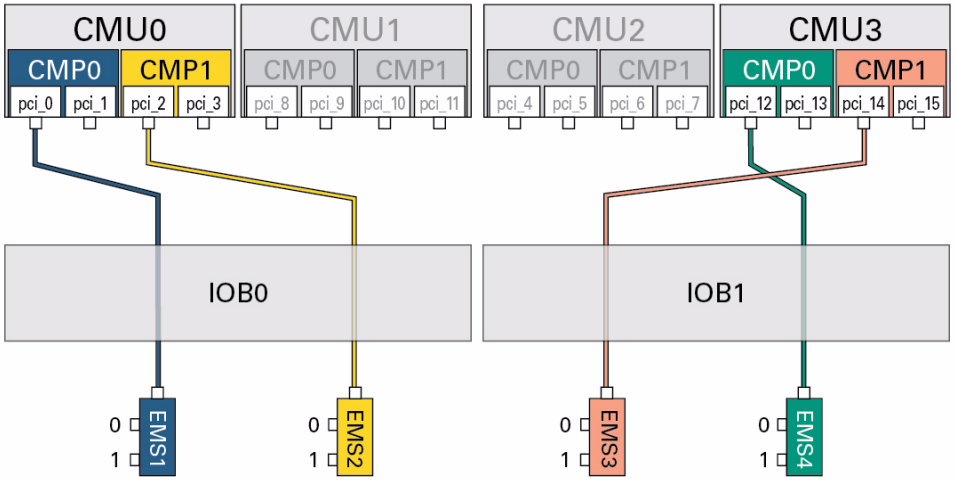
This table lists the EMS network port device paths in a fully-populated DCU0.

TABLE: Network Port Device Paths in a Fully-Populated DCU0

EMS	Net Port	Root Complex	Device Path
EMS1	0	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS1	1	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS2	0	pci_8	/pci@500/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS2	1	pci_8	/pci@500/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1
EMS3	0	pci_4	/pci@400/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS3	1	pci_4	/pci@400/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS4	0	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS4	1	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1

This illustration displays the paths from the root complexes to the EMS network ports in a half-populated DCU0. A half-populated DCU0 contains only CMU0 and CMU3.

FIGURE: Network Port Paths in a Half-Populated DCU0



This table lists the EMS network port device paths in a half-populated DCU0.

TABLE: Network Port Device Paths in a Half-Populated DCU0

EMS	Net Port	Root Complex	Device Path
EMS1	0	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS1	1	pci_0	/pci@300/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS2	0	pci_2	/pci@380/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS2	1	pci_2	/pci@380/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1
EMS3	0	pci_14	/pci@680/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS3	1	pci_14	/pci@680/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS4	0	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS4	1	pci_12	/pci@600/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1

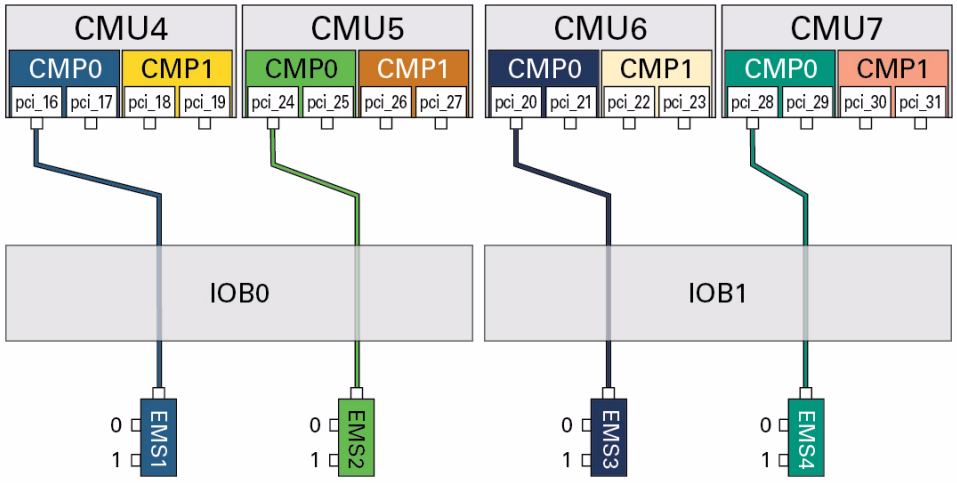
Related Information

- "Understanding DCU0 Root Complex Names and Device Paths" on page 8
- "Understanding DCU0 Drive Device Paths" on page 43

DCU1 Network Port Device Paths

This illustration displays the paths from the root complexes to the EMS network ports in a fully-populated DCU1.

FIGURE: Network Port Paths in a Fully-Populated DCU1



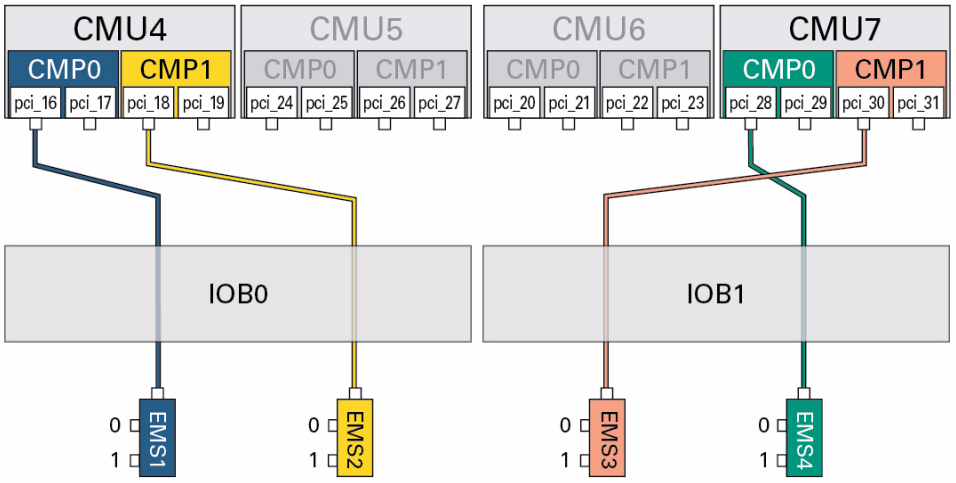
This table lists the EMS network port device paths in a fully-populated DCU1.

TABLE: Network Port Device Paths in a Fully-Populated DCU1

EMS	Net Port	Root Complex	Device Path
EMS1	0	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS1	1	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS2	0	pci_24	/pci@900/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS2	1	pci_24	/pci@900/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1
EMS3	0	pci_20	/pci@800/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS3	1	pci_20	/pci@800/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS4	0	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS4	1	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1

This illustration displays the paths from the root complexes to the EMS network ports in a half-populated DCU1. A half-populated DCU1 contains only CMU4 and CMU7.

FIGURE: Network Port Paths in a Half-Populated DCU1



This table lists the EMS network port device paths in a half-populated DCU1.

TABLE: Network Port Device Paths in a Half-Populated DCU1

EMS	Net Port	Root Complex	Device Path
EMS1	0	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS1	1	pci_16	/pci@700/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS2	0	pci_18	/pci@780/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS2	1	pci_18	/pci@780/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1
EMS3	0	pci_30	/pci@a80/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS3	1	pci_30	/pci@a80/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS4	0	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS4	1	pci_28	/pci@a00/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1

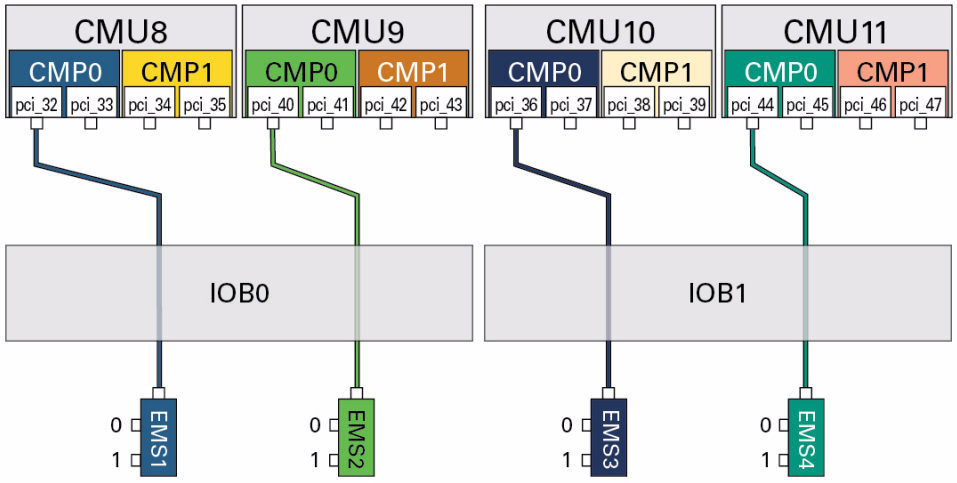
Related Information

- "Understanding DCU1 Root Complex Names and Device Paths" on page 14
- "Understanding DCU1 Drive Device Paths" on page 50

DCU2 Network Port Device Paths

This illustration displays the paths from the root complexes to the EMS network ports in a fully-populated DCU2.

FIGURE: Network Port Paths in a Fully-Populated DCU2



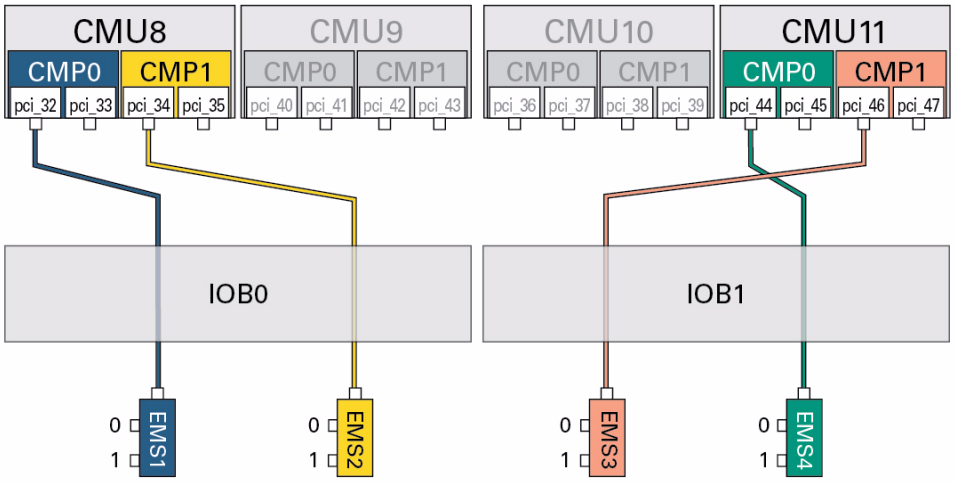
This table lists the EMS network port device paths in a fully-populated DCU2.

TABLE: Network Port Device Paths in a Fully-Populated DCU2

EMS	Net Port	Root Complex	Device Path
EMS1	0	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS1	1	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS2	0	pci_40	/pci@d00/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS2	1	pci_40	/pci@d00/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1
EMS3	0	pci_36	/pci@c00/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS3	1	pci_36	/pci@c00/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS4	0	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS4	1	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1

This illustration displays the paths from the root complexes to the EMS network ports in a half-populated DCU2. A half-populated DCU2 contains only CMU8 and CMU11.

FIGURE: Network Port Paths in a Half-Populated DCU2



This table lists the EMS network port device paths in a half-populated DCU2.

TABLE: Network Port Device Paths in a Half-Populated DCU2

EMS	Net Port	Root Complex	Device Path
EMS1	0	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS1	1	pci_32	/pci@b00/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS2	0	pci_34	/pci@b80/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS2	1	pci_34	/pci@b80/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1
EMS3	0	pci_46	/pci@e80/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS3	1	pci_46	/pci@e80/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS4	0	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS4	1	pci_44	/pci@e00/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1

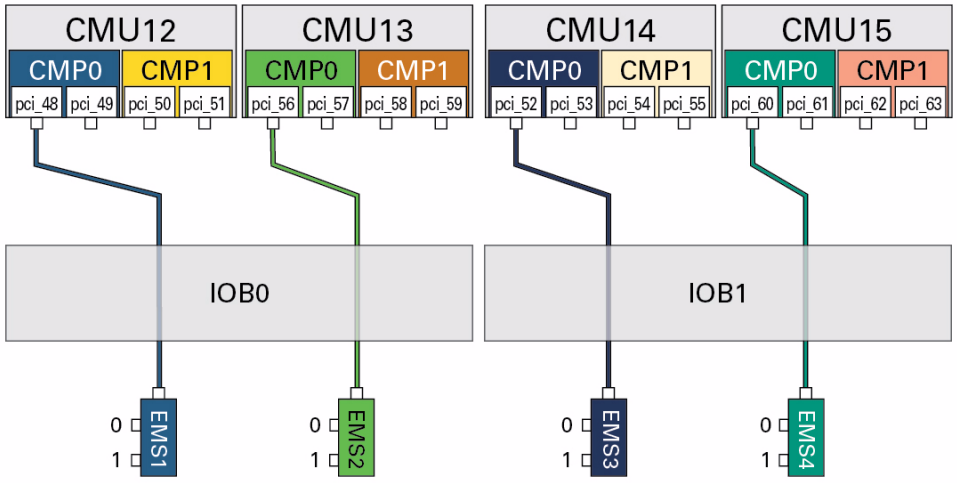
Related Information

- "Understanding DCU2 Root Complexes and Device Paths" on page 20
- "Understanding DCU2 Drive Device Paths" on page 57

DCU3 Network Port Device Paths

This illustration displays the paths from the root complexes to the EMS network ports in a fully-populated DCU3.

FIGURE: Network Port Paths in a Fully-Populated DCU3



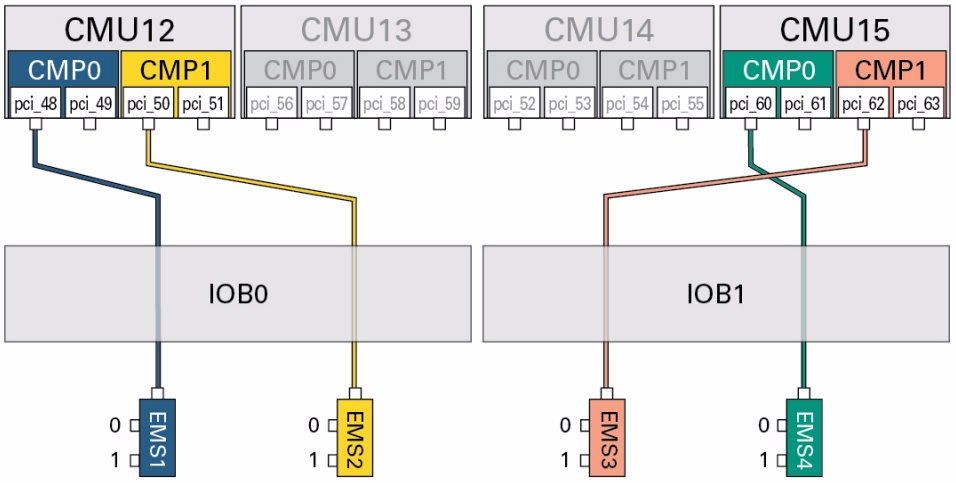
This table lists the EMS network port device paths in a fully-populated DCU3.

TABLE: Network Port Device Paths in a Fully-Populated DCU3

EMS	Net Port	Root Complex	Device Path
EMS1	0	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS1	1	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS2	0	pci_56	/pci@1100/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS2	1	pci_56	/pci@1100/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1
EMS3	0	pci_52	/pci@1000/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS3	1	pci_52	/pci@1000/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS4	0	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS4	1	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1

This illustration displays the paths from the root complexes to the EMS network ports in a half-populated DCU3. A half-populated DCU3 contains only CMU12 and CMU15.

FIGURE: Network Port Paths in a Half-Populated DCU3



This table lists the EMS network port device paths in a half-populated DCU3.

TABLE: Network Port Device Paths in a Half-Populated DCU3

EMS	Net Port	Root Complex	Device Path
EMS1	0	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS1	1	pci_48	/pci@f00/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS2	0	pci_50	/pci@f80/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS2	1	pci_50	/pci@f80/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1
EMS3	0	pci_62	/pci@1280/pci@1/pci@0/pci@c/pci@0/pci@0/network@0
EMS3	1	pci_62	/pci@1280/pci@1/pci@0/pci@c/pci@0/pci@0/network@0,1
EMS4	0	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@0/network@0
EMS4	1	pci_60	/pci@1200/pci@1/pci@0/pci@0/pci@0/pci@0/network@0,1

Related Information

- "Understanding DCU3 Root Complexes and Device Paths" on page 26
- "Understanding DCU3 Drive Device Paths" on page 64

Understanding Configuration Guidelines

Configurations must adhere to the configuration guidelines noted in the following topics.

- "SP and SPP Guidelines" on page 81
- "PDomain Guidelines" on page 82
- "DCU, CMU, and CMP Guidelines" on page 82
- "CMU Configuration Examples" on page 84
- "Memory (DIMM) Guidelines" on page 85

Related Information

- *Server Installation*, Oracle Solaris OS configuration parameters
- *Server Service*, supported configurations

SP and SPP Guidelines

- Dual-redundant SPs (SP0, SP1) are individually accessible from the external network, and you must configure them separately. The Active SP IP address moves between SP0 and SP1, depending on which SP is controlling the chassis. Configure the IP address for the Active SP to enable you to connect to this IP address to manage the chassis, instead of accessing SP0 or SP1 separately.
- Configure the SP to work with an NTP server to ensure that Oracle ILOM and Oracle Solaris reference the same time source.
- One SPP is assigned to manage each PDomain. One of these SPPs is identified as a PDomain-SPP, which is responsible for hosting the KVMS server. You must assign an IP address for each PDomain-SPP.
- Root complexes `pci_1`, `pci_17`, `pci_33`, and `pci_49` are part of interconnect paths from the SP and SPPs to the DCUs. Do not assign these root complexes to non-primary domains, as they must always be available to the control domain. See "FMA Fault Proxying and Reserved Root Complexes" on page 190 for details.

Related Information

- "Configuring the SP Network" on page 153

PDomain Guidelines

- A non-Bounded PDomain can have up to four DCUs assigned to it.
- In configurations where a DCU has only two CMUs, individual CMPs can be unconfigured. In configurations where a DCU has three or four CMUs, an entire CMU will be unconfigured if a CMP needs to be reconfigured.
- In a multiple-DCU configuration, PDomain_0 should contain SAS0 and rKVMS from each DCU.

Related Information

- "Configuring Domain Components" on page 167

DCU, CMU, and CMP Guidelines

- Supported CMU configurations within a single DCU are as follows:
  - All four CMUs are installed: rKVMS is supported with redundant paths, all PCIe and EMS slots are accessible, and CMUs are redundant.
  - Only the first and second CMUs installed: rKVMS is supported and Bounded PDomains have redundant rKVMS paths. If any CMP fails in a Bounded PDomain, the rKVMS connection remains. PCIe slots 9–16 and EMS slots 3–4 are inaccessible. There is no CMU redundancy, so if either CMU fails, the DCU cannot access the SSBs.
  - Only the first and fourth CMUs installed: rKVMS is supported with no redundancy. If the CMU in the first slot fails, the rKVMS connection is lost. All PCIe and EMS slots are accessible, but if one CMU fails, half of the slots will be disabled. There is no CMU redundancy, so if either CMU fails, the DCU cannot access the SSBs.
  - Only the second and third CMUs installed: rKVMS is supported with no redundancy. If the CMU in the second slot fails, the rKVMS connection is lost. All PCIe and EMS slots are accessible, but if one CMU fails, half of the slots will be disabled. There is no CMU redundancy, so if either CMU fails, the DCU cannot access the SSBs.
  - Only the third and fourth CMUs installed: rKVMS is not supported. PCIe slots 1–8 and EMS slots 1–2 are inaccessible. There is no CMU redundancy, so if either CMU fails, the DCU cannot access the SSBs.
  - Three CMUs installed in any order: rKVMS is supported and all PCIe and EMS slots are accessible. Only one CMU pair and half of the PCIe and EMS slots are redundant. rKVMS is redundant when CMUs are installed in the first and second slots.
  - Configurations with only the first and third CMUs installed or only the second and fourth CMUs installed are not supported.

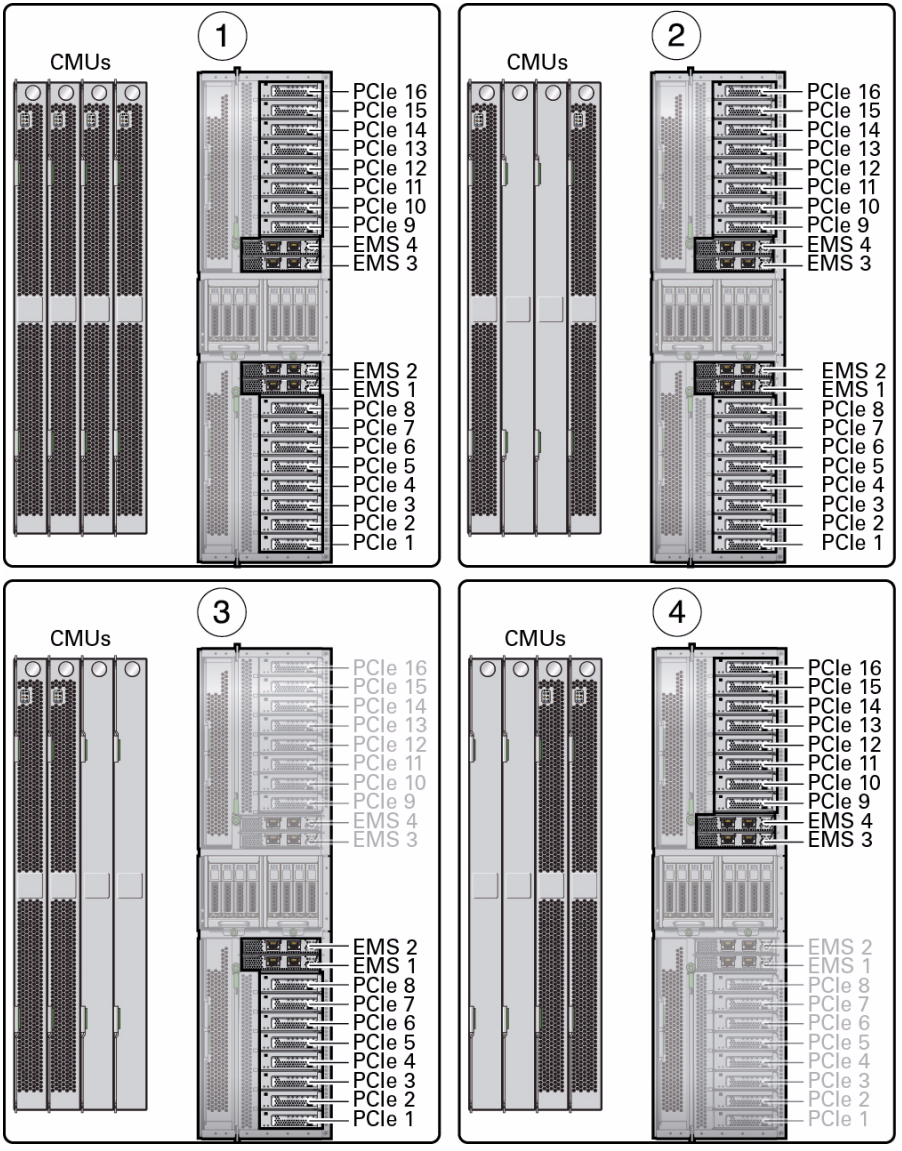
- A single DCU in a non-Bounded PDomain must have at least two functioning CMUs (one even numbered and one odd numbered) to access the SSBs.
- In configurations where a DCU has only two CMUs, individual CMPs can be unconfigured. In configurations where a DCU has three or four CMUs, an entire CMU will be unconfigured if a CMP needs to be reconfigured.
- A Bounded PDomain can have only one DCU assigned to it and can have a minimum of one CMP.
- When a CMP or CMU fails, or when a CMU is removed, the primary root complexes on that CMP or CMU will no longer be available. For guidelines about setting the Oracle ILOM `ioreconfigure` property on the PDomain host, see "PCIe Device Root Complex Failover Behavior" on page 32.
- Do not assign root complexes `pci_1`, `pci_17`, `pci_33`, and `pci_49` to non-primary domains. The four root complexes must always be available to the control domain. See "FMA Fault Proxying and Reserved Root Complexes" on page 190 for details.
- Do not assign an empty DCU to a PDomain. If the system selects the SPP for the empty DCU to be the PDomain-SPP, the DCU to SP interconnect will fail. See "FMA Fault Proxying and Reserved Root Complexes" on page 190 for details.
- Do not mix SPARC M5 CMUs and SPARC M6 CMUs within the same DCU. A DCU must only contain the same CMU version.

Related Information

- "CMU Configuration Examples" on page 84
- "Administering DCUs" on page 174
- "Administering CMUs, CMPs, and DIMMs" on page 177

CMU Configuration Examples

The availability of the PCIe and EMS slots within a DCU depends on the number and location of the installed CMUs.



No.	Description
1	All PCIe and EMS slots are available when all four CMUs are installed.
2	All PCIe and EMS slots are available when one CMU is installed in the first slot and a second CMU is installed in the fourth slot.
3	Only PCIe slots 1–8 and EMS slots 1–2 are available when only the first and second CMU slots contain CMUs.
4	Only PCIe slots 9–16 and EMS slots 3–4 are available when only the third and fourth CMU slots contain CMUs.

Note – All PCIe and EMS slots are available when a DCU contains three CMUs in any arrangement.

Note – When a Bounded PDomain contains one CMU, only half of the PCIe and EMS slots are available. For example, when the single CMU is installed in one of the left two CMU slots, PCIe slots 1–8 and EMS slots 1–2 are available. When the CMU is installed in one of the right two CMU slots, PCIe slots 9–16 and EMS slots 3–4 are available.

Related Information

- "Understanding PCIe Slot Root Complex Names and Device Paths" on page 8
- "DCU, CMU, and CMP Guidelines" on page 82
- "Administering CMUs, CMPs, and DIMMs" on page 177

Memory (DIMM) Guidelines

All populated DIMMs on a memory board/CMU must be the same size and type. DIMMs of different sizes (16 GB and 32 GB) can be mixed in the server, but they cannot be mixed on the same CMU.

Related Information

- "Administering CMUs, CMPs, and DIMMs" on page 177
- *Server Service*, memory configuration

Understanding System Administration Resources

These topics provide an overview of the tools you can use to administer the server.

- "Oracle ILOM Overview" on page 88
- "Understanding Platform-Specific Oracle ILOM Features" on page 89
- "Oracle Solaris OS Overview" on page 91
- "OpenBoot Overview" on page 91
- "Oracle VM Server for SPARC Overview" on page 92
- "Multipathing Software Overview" on page 92
- "Oracle ILOM Remote System Console Plus Overview" on page 93
- "Oracle Hardware Management Pack Overview" on page 94
- "Oracle Enterprise Manager Ops Center" on page 94
- "Time Synchronization and NTP Service" on page 95
- "SNMP Service" on page 95
- "Multi-Domain Extensions to ILOM MIBs" on page 96
- "Active Directory" on page 98
- "LDAP/SSL" on page 98

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/goto/ILOM/docs)
- Oracle Solaris Documentation Library (http://www.oracle.com/goto/Solaris11/docs)
- *OpenBoot 4.x Command Reference Manual* at: http://docs.oracle.com/cd/E23824_01/
- Oracle VM Server for SPARC Documentation Library (http://www.oracle.com/goto/VM-SPARC/docs)

Oracle ILOM Overview

Oracle Integrated Lights Out Manager (Oracle ILOM) is system management firmware that is preinstalled on some SPARC servers. Oracle ILOM enables you to actively manage and monitor components installed in your server. Oracle ILOM provides a browser-based interface and a command-line interface, as well as SNMP and IPMI interfaces.

The Oracle ILOM SP runs independently of the server and regardless of the server power state as long as AC power is connected to the server. When you connect the server to AC power, the ILOM service processor immediately starts up and begins monitoring the server. All environmental monitoring and control are handled by Oracle ILOM.

The -> prompt indicates that you are interacting with the Oracle ILOM SP directly. This prompt is the first prompt you see when you log in to the server through the SER MGT port or NET MGT port, regardless of the host's power state.

You can also access the Oracle ILOM SP prompt (->) from the OpenBoot `ok` prompt, or from the Oracle Solaris shell prompt, provided the system console is configured to be accessible through the SER MGT and NET MGT ports.

For more information about how to work with Oracle ILOM features that are common to all platforms managed by Oracle ILOM, see the Oracle ILOM documentation.

Related Information

- Oracle ILOM Documentation Library (`http://www.oracle.com/goto/ILOM/docs`)
- "Understanding Platform-Specific Oracle ILOM Features" on page 89
- "Unsupported Oracle ILOM Features" on page 90
- "Logging In to Oracle ILOM" on page 100

Understanding Platform-Specific Oracle ILOM Features

Oracle ILOM operates on many platforms, supporting features that are common to all platforms. Some Oracle ILOM features belong to only a subset of platforms. This topic describes the difference between Oracle ILOM features supported on this server and the common set of features, which are described in the Oracle ILOM base documentation.

- "Server-Specific and New Oracle ILOM Features and Requirements" on page 89
- "Unsupported Oracle OS Features" on page 90
- "Unsupported Oracle ILOM Features" on page 90

Related Information

- *SPARC M5-32 and SPARC M6-32 Servers Product Notes*
- Oracle ILOM Documentation Library (`http://www.oracle.com/goto/ILOM/docs`)

Server-Specific and New Oracle ILOM Features and Requirements

Oracle ILOM has these requirements and supports these features on this server:

- You can create up to 60 user accounts in Oracle ILOM. As many as 25 concurrent user sessions (SSH or web) are supported per SP.
- Certain Oracle ILOM tasks can be performed for the platform and for any available PDomain. This means that user roles must be properly assigned at the platform or domain level, and that specific commands must be provided for either the platform or PDomain. For information about the commands that must be executed at the domain level, see "Identifying Domain-Level Commands" on page 183.
- The Oracle ILOM MIB file `SUN-ILOM-CONTROL-MIB`, which provides objects for configuring and managing all Oracle ILOM functions has been modified to include a hostgroups tables to support per-domain user roles. Extensions to the Oracle ILOM MIBs are also provided. See "Multi-Domain Extensions to ILOM MIBs" on page 96, "Configuring User Accounts (SNMP)" on page 141, and "Configuring Host Groups to Authenticate User Accounts (SNMP)" on page 146.

- A new POST diagnostics hardware change property (`trigger`) is the *default setting* for the server, and causes POST to run each time the server is AC power-cycled. If you want to ensure that POST runs on each power cycle the trigger property must be set to `power-on-reset` or `all-resets`. For more information on enabling SPARC diagnostics to run at boot, refer to the Oracle ILOM documentation.
- `/SP/policy` is supported for use on servers with the 9.0.2 update of the system firmware (SPARC M5-32 servers with updated firmware and all SPARC M6-32 servers).

Related Information

- Oracle ILOM Documentation Library (`http://www.oracle.com/goto/ILOM/docs`)
- *SPARC M5-32 and SPARC M6-32 Servers Product Notes*

Unsupported Oracle OS Features

Among the Oracle OS features commonly supported on other Oracle Sun servers, the following features are *not* support on this server:

- The onboard SAS controllers on the base I/O card do not support hardware RAID.

Related Information

- Oracle Solaris Documentation Library (`http://www.oracle.com/goto/Solaris11/docs`)
- *SPARC M5-32 and SPARC M6-32 Servers Product Notes*

Unsupported Oracle ILOM Features

Among the Oracle ILOM features commonly supported on other Oracle Sun servers, Oracle ILOM does *not* support the following features on this server:

- `/SP/policy` is not supported for use on SPARC M5-32 servers that are running the 9.0.1 version of the system firmware.
- The POST diagnostics `user-reset` trigger is not supported.
- The Storage Redirection CLI is not supported for use with Oracle ILOM 3.2.

Related Information

- *SPARC M5-32 and SPARC M6-32 Servers Product Notes*

Oracle Solaris OS Overview

Each PDomain has its own installation of the Oracle Solaris OS, which includes commands and other software resources to use for server administration. For an introduction to management tools in the Oracle Solaris release, see *System Administration Guide: Basic Administration* in the Oracle Solaris documentation collection. For information about the preinstalled version of the Oracle Solaris OS that is available on each PDomain, see "Architectural Overview" on page 2.

The Oracle Solaris software includes the Oracle VTS software. Oracle VTS tests and validates Oracle hardware by verifying the connectivity and functionality of hardware devices, controllers, and peripherals.

Related Information

- Oracle Solaris Documentation Library (http://www.oracle.com/goto/Solaris11/docs)
- Oracle VTS Documentation Library (http://www.oracle.com/goto/VTS/docs)

OpenBoot Overview

The OpenBoot firmware starts the OS, validates installed hardware, and can be used for other server administration tasks below the OS level. For information about OpenBoot commands, see the OpenBoot documentation in the Oracle Solaris documentation library under "Important Information From Previous Releases."

Related Information

- *OpenBoot 4.x Command Reference Manual* at: http://docs.oracle.com/cd/E23824_01/

Oracle VM Server for SPARC Overview

A *logical domain* is a discrete logical grouping of operating systems, resources, and identities within a single computer system. Application software can run in logical domains. Each logical domain can be created, destroyed, reconfigured, and rebooted independently.

Oracle VM Server for SPARC software enables you to create and manage logical domains. The number of logical domains you can create depends on the hardware configuration of the server on which Oracle VM Server for SPARC Manager is installed. A PDomain with a single DCU can have as many as 128 logical domains, but to follow the best practice of aligning logical domains on core boundaries, you should configure no more than 48 logical domains per PDomain.

You can virtualize resources and define network, storage, and other I/O devices as services that can be shared between domains.

The Oracle VM Server for SPARC configurations are stored on the SP. Using Oracle VM Server for SPARC CLI commands, you can add a configuration, specify a configuration to be used, and list the configurations on the SP. You can also use the Oracle ILOM `set /Servers/PDomains/PDomain_`*x*`/HOST/bootmode config=` *configfile* command to specify an Oracle VM Server boot configuration.

Related Information

- "Boot Mode Commands" on page 186
- Oracle VM Server for SPARC Documentation Library (`http://www.oracle.com/goto/VM-SPARC/docs`)

Multipathing Software Overview

Multipathing software enables you to define and control redundant physical paths to I/O devices such as storage devices and network interfaces. If the active path to a device becomes unavailable, the software can automatically switch to an alternate path to maintain availability. This capability is known as *automatic failover*. To take advantage of multipathing capabilities, you must configure the server with redundant hardware, such as redundant network interfaces or two host bus adapters connected to the same dual-ported storage array.

For this server, you can use different types of multipathing software, including:

- **Oracle Solaris IP Network Multipathing software** provides multipathing and load-balancing capabilities for IP network interfaces. For instructions on configuring and administering Oracle Solaris IP Network Multipathing, refer to the *IP Network Multipathing Administration Guide* provided with your specific Oracle Solaris release.
- **StorageTek Traffic Manager** is an architecture fully integrated within the Oracle Solaris OS (beginning with the Oracle Solaris 8 release) that enables I/O devices to be accessed through multiple host controller interfaces from a single instance of the I/O device. For more information about StorageTek Traffic Manager, refer to your Oracle Solaris OS documentation.

Related Information

- Oracle Solaris Documentation Library and the *IP Network Multipathing Administration Guide* at:

  `http://www.oracle.com/goto/Solaris11/docs`

Oracle ILOM Remote System Console Plus Overview

Oracle ILOM Remote System Console Plus is a Java application that enables you to remotely redirect and control the following devices on the host server. This group of devices is commonly abbreviated as KVMS.

- Keyboard
- Video display
- Mouse
- Serial connection
- Storage devices or images (CD/DVD)

Related Information

- "Redirecting KVMS Devices" on page 111
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

  `http://www.oracle.com/goto/ILOM/docs`

Oracle Hardware Management Pack Overview

Oracle Hardware Management Pack enables you to manage and configure Oracle servers from the host OS. To use these tools, you must install the software on your server. After installing the software, you will be able to perform these tasks:

- Monitor Oracle hardware with the host IP address.
- Monitor storage devices.
- Query, update, and validate firmware versions on supported SAS storage devices.
- Restore, set, and view Oracle ILOM configuration settings.
- Use the IPMI tool to access and manage Oracle servers.

Related Information

- Oracle Hardware Management Pack software at:

  http://support.oracle.com

- Oracle Hardware Management Pack Documentation Library (http://www.oracle.com/goto/OHMP/docs)

Oracle Enterprise Manager Ops Center

You can monitor and manage this server along with other servers and assets using Oracle Enterprise Manager Ops Center software. Run this software's discovery process to add information about your server to a database of physical servers, virtual systems, operating systems, networks, and storage. You can then use this software to monitor and manage all of these products from a single interface.

For more information about Oracle Enterprise Manager Ops Center, refer to its product page and documentation library:

- Oracle Enterprise Manager Ops Center

  http://www.oracle.com/technetwork/oem/ops-center/

- Oracle Enterprise Manager Ops Center Documentation

  http://www.oracle.com/technetwork/documentation/index.html#em

For instructions on using the software to discover and deploy the SPARC M5-32 and SPARC M6-32 servers, refer to *Discovering and Managing Oracle SPARC M5 and M6 Servers* guide. You can find this guide by selecting the Deploy How Tos tab on the documentation library. For example, find the Oracle Enterprise Manager Ops Center 12c Release 2 Deploy How Tos tab here:

`http://www.oracle.com/pls/topic/lookup?ctx=oc122&id=deployhowto`

Related Information

- Oracle Enterprise Manager Ops Center Downloads

  `http://www.oracle.com/technetwork/oem/ops-center/oem-ops-center-188778.html`

- *Server Service*, detecting and managing faults

Time Synchronization and NTP Service

When PDomains are powered on, their clocks synchronize to the NTP server when the system is configured to listen to NTP multicast (the default for the current Oracle Solaris OS). If the PDomains and SPs use the same NTP server, events logged in the Oracle Solaris OS and on the SP can be correlated based on their time stamps. If the PDomains and SPs use different NTP servers, their times might drift, and correlating log files could become difficult. If you connect a domain to an NTP server other than the one used by the SP, ensure that both are low-stratum NTP servers that provide the same degree of accuracy.

Related Information

- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

  `http://www.oracle.com/goto/ILOM/docs`

SNMP Service

The SNMP agent is preinstalled on this server and runs on Oracle ILOM, so all SNMP management occurs through Oracle ILOM. To manage the server using SNMP, you must install an SNMP client application (for example, HMP, Openview, or Tivoli).

The SNMP agent is active only on the Active SP. In the event of failover, the SNMP agent is restarted on the newly assigned Active SP.

Related Information

- "Configuring User Accounts (SNMP)" on page 141
- "Configuring Host Groups to Authenticate User Accounts (SNMP)" on page 146
- *Oracle ILOM Protocol Management Reference for SNMP, IPMI, CIM, WS-MAN* at:

  `http://www.oracle.com/goto/ILOM/docs`

Multi-Domain Extensions to ILOM MIBs

The ILOM MIB files `SUN-ILOM-CONTROL-MIB` and `SUN-HW-CTRL-MIB` have been extended to provide a multi-domain version of existing ILOM MIB objects. The MIB files containing the extensions are available under `/SP/services/snmp/mibs` in the ILOM CLI.

Refer to the *Oracle ILOM Protocol Management Reference for SNMP, IPMI, CIM, MS-MAN* for examples of the single domain versions of these objects.

In the case of `SUN-ILOM-CONTROL-MIB`, the extensions correspond to the following multi-domain tables.

- `ilomCtrlSPARCDiagsTable` provides a listing of properties for configuring SPARC-specific diagnostics for each domain.
- `ilomCtrlSPARCHostControlTable` provides a listing of properties for configuring SPARC-specific host software for each domain.
- `ilomCtrlSPARCBootModeTable` provides a listing of properties for configuring SPARC-specific boot mode features for each domain.
- `ilomCtrlSPARCKeySwitchTable` provides a listing of properties for controlling the SPARC-specific virtual key switch for each domain.
- `ilomCtrlSPARCDomainDCUTable` provides a listing of properties for configuring SPARC-specific assigned DCUs for each domain.
- `ilomCtrlNetInterconnectGlobalCfgTable` provides a listing of interconnect configuration entries that can be modified in a multi-domain system.
- `ilomCtrlNetInterconnectGlobalOperTable` provides a listing of interconnect configuration entries that are read-only in a multi-domain system.

In addition, the following SPARC-specific chassis-level diagnostics are available:

- `ilomCtrlSPARCChassisDiagsMode`

- ilomCtrlSPARCChassisDiagsTrigger
- ilomCtrlSPARCChassisDiagsHWChangeLevel
- ilomCtrlSPARCChassisDiagsPowerOnLevel
- ilomCtrlSPARCChassisDiagsErrorRestLevel

Refer to the SUN-ILOM-CONTROL-MIB file for detailed information about these objects.

In the case of SUN-HW-CTRL-MIB, the extensions correspond to the following multi-domain tables:

- sunHwCtrlDomainPowerMgmtConsumptionTable provides a listing of power consumption entries that can be displayed and modified in a multi-domain system.
- sunHwCtrlDomainPowerMgmtBudgetSettingsTable provides a listing of power management budget settings in a multi-domain system.
- sunHwCtrlDomainPowerMgmtConsumptionThresholdsTable provides a listing of domain power management consumption entries.
- sunHwCtrlTpmTable provides a listing of properties for controlling the access modes of the Trusted Platform Module (TPM) device for each domain.

Refer to the SUN-HW-CTRL-MIB file for detailed information about these objects.

Related Information

- "Configuring User Accounts (SNMP)" on page 141
- *Oracle ILOM Protocol Management Reference for SNMP, IPMI, CIM, WS-MAN* at:

  http://www.oracle.com/goto/ILOM/docs

Active Directory

Oracle ILOM supports Active Directory, the distributed directory service included with Microsoft Windows Server operating systems. Like an LDAP directory service implementation, Active Directory is used to authenticate user credentials.

Related Information

- "Configure Host Groups for Active Directory or LDAP/SSL (CLI)" on page 145
- "Configure Host Groups for Active Directory (SNMP)" on page 148
- *Oracle ILOM Protocol Management Reference for SNMP, IPMI, CIM, WS-MAN* at:

  http://www.oracle.com/goto/ILOM/docs

LDAP/SSL

LDAP/SSL offers enhanced security to LDAP users by way of SSL technology. To configure LDAP/SSL in a SP, you enter basic data (such as primary server, port number, and certificate mode) and optional data (such as alternate server or event or severity levels). You can enter this data using the LDAP/SSL configuration page of the Oracle ILOM web interface, the CLI, or SNMP.

Related Information

- "Configure Host Groups for Active Directory or LDAP/SSL (CLI)" on page 145
- "Configure Host Groups for LDAP/SSL (SNMP)" on page 150
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

  http://www.oracle.com/goto/ILOM/docs

Accessing the Server

These topics describe how to access the server using various administration tools:

- "Establish a Network Management Connection to Oracle ILOM" on page 99
- "Logging In to Oracle ILOM" on page 100
- "Log Out of Oracle ILOM" on page 104
- "Switch Between the Oracle ILOM CLI and the System Console on a Host" on page 104
- "Accessing the ok Prompt" on page 105
- "Redirecting KVMS Devices" on page 111

Related Information

- Oracle ILOM documentation (http://www.oracle.com/goto/ILOM/docs)

▼ Establish a Network Management Connection to Oracle ILOM

Follow these instructions to establish a local or remote management connection to Oracle ILOM on either of the redundant SPs (SP0 and SP1). You can connect to Oracle ILOM on each SP using either the SER MGT port, used for local connections, or the NET MGT port, used for remote connections.

1. **Ensure that you have connected cables to the SER MGT or NET MGT ports on the two SPs.**

   Refer to *Servers Installation.*

2. **If you connect through the SER MGT port, press Enter on the terminal device that is connected to the SP.**

   This action establishes a connection to Oracle ILOM on the SP.

   For information about configuring specific types of connections (for example, dedicated or sideband network connections, dedicated local connections, or dedicated interconnect connections), refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* and "Dedicated SP Interconnect Property Commands" on page 189.

Related Information

- Oracle ILOM Documentation Library (`http://www.oracle.com/goto/ILOM/docs`)
- "Logging In to Oracle ILOM" on page 100

Logging In to Oracle ILOM

Oracle ILOM is available when the server is in any of these modes:

- Standby power mode
- While the OS is booting
- Fully powered on and booted

For more information, see "Controlling the Power State" on page 117.

After connecting to Oracle ILOM, use the following information to log in so you can start performing system administration tasks.

Description	Links
Identify default account name and password.	"Oracle ILOM Root Password" on page 101
Log in to and out of the Oracle ILOM web interface.	"Log In to Oracle ILOM (Web Interface)" on page 101 "Log Out of Oracle ILOM" on page 104
Log in to and out of the Oracle ILOM CLI through a network connection.	"Log In to the SP (Remote)" on page 102 "Log Out of Oracle ILOM" on page 104
Log in to and out of the Oracle ILOM CLI directly through a terminal device connected to the SER MGT port.	"Log In to the SP (Local)" on page 103 "Log Out of Oracle ILOM" on page 104
Switch from the Oracle ILOM CLI to the host console and back.	"Switch Between the Oracle ILOM CLI and the System Console on a Host" on page 104

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/goto/ILOM/docs)
- "Establish a Network Management Connection to Oracle ILOM" on page 99
- "Updating the Firmware" on page 213

Oracle ILOM Root Password

The server ships with a root account that you use to initially log in to Oracle ILOM. This account has administrative privileges (read and write) for all Oracle ILOM features, functions, and commands. The default password is `changeme`.

To prevent unauthorized access, change the password. You must have user (u) permissions to change the root password.

Note – To provide optimum server security, change the default server password.

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/goto/ILOM/docs)

▼ Log In to Oracle ILOM (Web Interface)

You must configure the SP parameters shown in "Configure SP Network Settings" on page 155 before you can use the Oracle ILOM web interface. After the SP boots, access Oracle ILOM to configure and manage the system.

1. **Ensure that you have network access to the SP you want to administer.**

   Refer to *Server Installation* for available connections.

2. **In a web browser, type the IP address or hostname for the server SP you want to administer.**

   For information about locating the IP address for `ACTIVE_SP`, `SP0`, or `SP1`, see "View Configuration Details for SPs and Hosts" on page 160.

3. **Type an Oracle ILOM user name and password, and then click Log In.**

   The Summary page is displayed.

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/goto/ILOM/docs)
- "Logging In to Oracle ILOM (CLI)" on page 102
- "Log Out of Oracle ILOM" on page 104

Logging In to Oracle ILOM (CLI)

Use these topics to log in to the Oracle ILOM CLI over a network or through the SER MGT port.

- "Log In to the SP (Remote)" on page 102
- "Log In to the SP (Local)" on page 103

▼ Log In to the SP (Remote)

You must configure the SP parameters shown in "Configure SP Network Settings" on page 155 before you can use the NET MGT port.

Use this method to log in to the Oracle ILOM CLI when you are logging in over the network.

1. **Access a terminal device that is connected to the SP through the network.**
2. **Using a Secure Shell (SSH) session, log in to Oracle ILOM in one of the following ways:**
   - If you are logging in with the default `root` account password, type the following at the system prompt:

```
$ ssh root@system-ip-address
```

   - If you are logging in with a user account that was created for you by the system administrator, type the following at the system prompt:

```
$ ssh user@system-ip-address
```

Note – When entering an IPv6 address or Link-Local IPv6 address, you must enclose the address within brackets. However, when you specify an IPv6 address to log in to Oracle ILOM using SSH, do not enclose the IPv6 address in brackets.

3. **At the system prompt, type the password of your user account (for the default `root` account, this is `changeme`).**

   When the CLI prompt is displayed (-> is the default prompt), you are connected to the SP and can now use Oracle ILOM to administer the system.

Related Information

- Oracle ILOM Documentation Library (`http://www.oracle.com/goto/ILOM/docs`)
- "Log In to Oracle ILOM (Web Interface)" on page 101
- "Log In to the SP (Local)" on page 103
- "Log Out of Oracle ILOM" on page 104
- "Switch Between the Oracle ILOM CLI and the System Console on a Host" on page 104

▼ Log In to the SP (Local)

Use this method to log in to the Oracle ILOM CLI when you are directly attached to the SER MGT ports.

1. **Ensure that you have connected cables to the SER MGT ports on the two SPs and have connected terminals to each SP.**

   Refer to *Server Installation.*

2. **Connect to Oracle ILOM.**

   See "Establish a Network Management Connection to Oracle ILOM" on page 99.

3. **Type your Oracle ILOM user name and password (for the default `root` account, the password is `changeme`).**

Related Information

- Oracle ILOM Documentation Library (`http://www.oracle.com/goto/ILOM/docs`)
- "Log In to Oracle ILOM (Web Interface)" on page 101
- "Log In to the SP (Remote)" on page 102
- "Log Out of Oracle ILOM" on page 104
- "Switch Between the Oracle ILOM CLI and the System Console on a Host" on page 104

▼ Log Out of Oracle ILOM

- **Perform one of these actions:**
  - **From the Oracle ILOM CLI**:

    Type -> **exit**
  - **From the Oracle ILOM web interface**:

    Click the Log Out button in the upper right corner.

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/goto/ILOM/docs)
- "Log In to Oracle ILOM (Web Interface)" on page 101
- "Logging In to Oracle ILOM (CLI)" on page 102
- "Switch Between the Oracle ILOM CLI and the System Console on a Host" on page 104

▼ Switch Between the Oracle ILOM CLI and the System Console on a Host

When you are logged into the Oracle ILOM CLI, you can switch the connection to the host.

Tip – To connect to the Oracle ILOM CLI and access the system console on a host simultaneously, start two CLI sessions. Use one session to access the host console. Use the other session to access the Oracle ILOM CLI.

This server has one system console for each PDomain. When logging into a system console, you must specify the PDomain to which you want to connect.

The following example shows how to connect to the PDomain specified as `PDomain_2`.

1. **Log in to the Oracle ILOM CLI.**

   See "Logging In to Oracle ILOM (CLI)" on page 102.

2. **From Oracle ILOM, access the PDomain.**

```
-> start /Servers/PDomains/PDomain_2/HOST/console  [-option]
Are you sure you want to start
/Servers/PDomains/PDomain_2/HOST/console (y/n)? y

Serial console started.  To stop, type #. (
```

where *option* can be:

- `-f|force` – Enables a user with a Console (`c`) role to take the console from any current user and force that user into view mode.
- `-script` – Bypasses the prompt for a yes or no confirmation.

3. **To switch back to Oracle ILOM, type #.**

Note – To change or set the escape character function type:
`/Servers/PDomains/PDomain_x/HOST/console escapechars`

Related Information

- Oracle ILOM Documentation Library (`http://www.oracle.com/goto/ILOM/docs`)
- "Log In to Oracle ILOM (Web Interface)" on page 101
- "Logging In to Oracle ILOM (CLI)" on page 102
- "Log Out of Oracle ILOM" on page 104

Accessing the `ok` Prompt

When accessing the `ok` prompt, you must specify the PDomain to which you want to connect. Use one of these methods if you need to reach the `ok` prompt, depending on the current state of the server.

Caution – When you need to shutdown the OS to reach the `ok` prompt, do so by performing a graceful shutdown of the OS. Any other method might result in the loss of server state data.

- "OpenBoot ok Prompt" on page 106
- "Connect to a PDomain When the System Is Unconfigured and Powered Off" on page 107

- "Connect to a PDomain When the Oracle Solaris OS Is Running" on page 108
- "Connect to a PDomain When the Oracle Solaris OS Is Unresponsive" on page 108
- "Get to the ok Prompt When the Host Is Powered On (Web Interface)" on page 109
- "Connect to an LDoms Guest Domain" on page 110

Related Information

- *OpenBoot 4.x Command Reference Manual* at: `http://docs.oracle.com/cd/E23824_01/`

OpenBoot `ok` Prompt

When the host is powered on but the OS is not booted, you communicate with the OpenBoot firmware. The OpenBoot firmware displays `ok` as its prompt.

These are common tasks that you can perform at the `ok` prompt.

Task	For more information
Boot the host	"Manually Boot the OS (ok Prompt)" on page 133
Configure OpenBoot parameters	"View OpenBoot Parameters" on page 128 "Change the Default Boot Device (ok Prompt)" on page 124
Eject media	At the `ok` prompt, type: `help eject`

For information about OpenBoot commands, see the OpenBoot documentation in the Oracle Solaris documentation library under "Important Information From Previous Releases."

Related Information

- *OpenBoot 4.x Command Reference Manual* at: `http://docs.oracle.com/cd/E23824_01/`

▼ Connect to a PDomain When the System Is Unconfigured and Powered Off

Perform this task to connect to a specific PDomain at the `ok` prompt when the system is not configured and is powered off. You might perform this task as part of the installation process.

1. **Configure the PDomain.**

   See "Configuring Domain Components" on page 167.

2. **Specify that the boot sequence should stop at the `ok` prompt.**

   From Oracle ILOM, type:

```
-> set /Servers/PDomains/PDomain_x/HOST/bootmode script="setenv
auto-boot? false"
```

3. **Start the host.**

```
-> start /Servers/PDomains/PDomain_x/HOST
```

4. **Start the PDomain host console.**

```
-> start /Servers/PDomains/PDomain_x/HOST/console
Are you sure you want to start
/Servers/PDomains/PDomain_x/HOST/console (y/n)? y
Serial console started. To stop, type #.
```

   The server might take several minutes to complete POST and then displays the `ok` prompt.

Related Information

- "Connect to a PDomain When the Oracle Solaris OS Is Running" on page 108
- "Connect to a PDomain When the Oracle Solaris OS Is Unresponsive" on page 108
- "Get to the ok Prompt When the Host Is Powered On (Web Interface)" on page 109
- "Connect to an LDoms Guest Domain" on page 110

▼ Connect to a PDomain When the Oracle Solaris OS Is Running

Perform this task to connect to a specific PDomain at the `ok` prompt when the Oracle Solaris OS is running and responsive.

1. **Specify that the boot sequence should stop at the `ok` prompt.**

   From the host for the control domain, type:

```
# eeprom auto-boot?=false
```

2. **Reboot the Oracle Solaris OS.**

```
# shutdown -g0 -i6 -y
```

Related Information

- "Connect to a PDomain When the System Is Unconfigured and Powered Off" on page 107
- "Connect to a PDomain When the Oracle Solaris OS Is Unresponsive" on page 108
- "Get to the ok Prompt When the Host Is Powered On (Web Interface)" on page 109
- "Connect to an LDoms Guest Domain" on page 110

▼ Connect to a PDomain When the Oracle Solaris OS Is Unresponsive

Perform this task to connect to a specific PDomain at the `ok` prompt when the Oracle Solaris OS is unresponsive.

1. **Specify that the boot sequence should stop at the `ok` prompt.**

   From Oracle ILOM, type:

```
-> set /Servers/PDomains/PDomain_x/HOST/bootmode script="setenv
auto-boot? false"
```

Note – Setting the `auto-boot` parameter to `false` is a one-time setting. The next time a PDomain is reset, the `auto-boot` parameter returns to its default setting.

2. **Reset the PDomain.**

```
-> reset /Servers/PDomains/PDomain_x/HOST
```

Related Information

- "Connect to a PDomain When the System Is Unconfigured and Powered Off" on page 107
- "Connect to a PDomain When the Oracle Solaris OS Is Running" on page 108
- "Get to the ok Prompt When the Host Is Powered On (Web Interface)" on page 109
- "Connect to an LDoms Guest Domain" on page 110

▼ Get to the ok Prompt When the Host Is Powered On (Web Interface)

Use this procedure when the host is powered down and you want to get to the ok prompt when the host is powered on.

1. **Log in to Oracle ILOM.**

   "Log In to Oracle ILOM (Web Interface)" on page 101.

Note – If you have a modular system, make sure you are managing the correct server module.

---

2. **In the Oracle ILOM web interface, in the left navigation pane, choose Host Management > Host Boot Mode.**

   The Host Boot Mode page is displayed.

3. **Apply these changes to the Host Boot Mode Settings:**

   a. **For State, select: Reset NVRAM**

      This setting applies a one-time NVRAM (OpenBoot) change based on the script setting, then resets the NVRAM to default settings on the next host reset.

   b. **For Script, type: `setenv auto-boot? false`**

      This setting configures the host to stop at the ok prompt instead of automatically booting the preinstalled OS.

   c. **Click Save.**

Note – You have 10 minutes to perform the next step. After 10 minutes, the state is automatically returned to normal.

4. **In the left navigation panel, click Host Management > Power Control.**
5. **Select Reset from the pull-down menu, and click Save.**
6. **In the left navigation panel, click Remote Control > Redirection.**
7. **Select Use Serial Redirection, and click Launch Remote Console.**

   As the host resets, messages are displayed in the serial console. The `ok` prompt is displayed when the reset activity completes.

Related Information

- "Connect to a PDomain When the System Is Unconfigured and Powered Off" on page 107
- "Connect to a PDomain When the Oracle Solaris OS Is Running" on page 108
- "Connect to a PDomain When the Oracle Solaris OS Is Unresponsive" on page 108
- "Connect to an LDoms Guest Domain" on page 110

▼ Connect to an LDoms Guest Domain

Perform this task to connect to an LDoms guest at the `ok` prompt.

1. **Specify that the boot sequence should stop at the `ok` prompt.**

   From the host for an LDoms guest, type:

```
/opt/SUNWldm/bin/ldm set-variable auto-boot\?=false guestx
```

2. **Reboot the Oracle Solaris OS.**

```
# shutdown -g0 -i6 -y
```

Related Information

- "Connect to a PDomain When the System Is Unconfigured and Powered Off" on page 107
- "Connect to a PDomain When the Oracle Solaris OS Is Running" on page 108
- "Connect to a PDomain When the Oracle Solaris OS Is Unresponsive" on page 108
- "Get to the ok Prompt When the Host Is Powered On (Web Interface)" on page 109

Redirecting KVMS Devices

The KVMS software that is preinstalled on this server allows for both video-redirection and serial-redirection connections to the Oracle Solaris OS. However, only the serial-redirection connection supports the Oracle Solaris console. Video redirection provides a standard X-session connection to the Oracle Solaris OS.

Console message can only be seen over the serial-redirection connections and not over video-redirection connections. To see the redirected devices at the OpenBoot prompt, you need to start the video-redirection window before OpenBoot runs. If you start the session after OpenBoot starts, type `reset-all` to discovery and display the redirected devices.

See the following topics for information about configuring remote redirection KVMS devices using Oracle ILOM Remote System Console Plus or the CLI.

Note – For information about the impact of your configuration on KVMS redundancy, see "DCU, CMU, and CMP Guidelines" on page 82.

- "Configuring KVMS Settings" on page 111
- "Connect to Oracle ILOM Remote System Console Plus" on page 113
- "Enable Video Redirection From the Oracle Solaris OS" on page 113
- "Configure Multiple Display Devices" on page 114
- "Reestablish KVMS Connection to SPPs After a Reboot" on page 116

Related Information

- "OpenBoot Overview" on page 91
- "Oracle ILOM Remote System Console Plus Overview" on page 93
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

  `http://www.oracle.com/goto/ILOM/docs`

Configuring KVMS Settings

- "Configure KVMS Settings (Web Interface)" on page 112
- "Configure KVMS Settings (CLI)" on page 112

Related Information

- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

  http://www.oracle.com/goto/ILOM/docs

▼ Configure KVMS Settings (Web Interface)

1. **Log in to Oracle ILOM.**

   See "Log In to Oracle ILOM (Web Interface)" on page 101.

2. **Log on to the correct PDomain.**

   Select the PDomain from the drop-down list on the top corner of the screen.

3. **Specify the KVMS settings as documented in the Oracle ILOM documentation.**

Related Information

- "Configure KVMS Settings (CLI)" on page 112
- "Log Out of Oracle ILOM" on page 104
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

  http://www.oracle.com/goto/ILOM/docs

▼ Configure KVMS Settings (CLI)

1. **Log in to Oracle ILOM.**

   See "Logging In to Oracle ILOM (CLI)" on page 102.

2. **Specify the correct settings from the following location, specifying the appropriate properties as documented in the Oracle ILOM documentation.**

```
-> set /Servers/PDomains/PDomain_x/SP/services/kvms property
```

3. **To enable KVMS access to a PDomain, configure the SPP network settings for a specific PDomain.**

   See "Configure SP Network Settings" on page 155.

Related Information

- "Configure KVMS Settings (Web Interface)" on page 112
- "Log Out of Oracle ILOM" on page 104
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

  http://www.oracle.com/goto/ILOM/docs

▼ Connect to Oracle ILOM Remote System Console Plus

Oracle ILOM Remote System Console Plus is available from the web interface.

1. **Modify the KVMS settings, if needed.**

   See "Configuring KVMS Settings" on page 111.

2. **Connect to Remote System Console Plus.**

   From the Oracle ILOM web interface, click Remote Control --> Redirection.

Related Information

- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

  http://www.oracle.com/goto/ILOM/docs

▼ Enable Video Redirection From the Oracle Solaris OS

If an X server has not already been enabled on the Oracle Solaris OS, video redirection will display a blank screen. Complete these steps to install X server packages on the server so you can access the command prompt for a video redirection session.

1. **From the Oracle Solaris OS prompt, install the X server packages.**

```
# pkg install group/system/solaris-desktop
```

2. **Reboot the PDomain to start the GNOME display manager server.**

```
# shutdown -g0 -i6 -y
```

   After the PDomain reboots, use these commands to control the GNOME domain manager (`gdm`) service when needed:

   - Disable the `gdm` service:

```
# svcadm disable gdm
```

   - Enable the `gdm` service:

```
# svcadm enable gdm
```

- Restart the `gdm` service:

```
# svcadm restart gdm
```

Note – The OpenBoot `input-device=rkeyboard` and `output-device=rscreen` properties are not supported on this server.

Related Information

- "Oracle Solaris OS Overview" on page 91
- Oracle Solaris Documentation Library (`http://www.oracle.com/goto/Solaris11/docs`)

▼ Configure Multiple Display Devices

Note – The GNOME desktop runs on the X Window System. In this procedure, the term *X session* is used generically to identify this environment.

When a PDomain contains more than one DCU, and you want to use video redirection to access the PDomain, you must configure the PDomain with multiple X sessions. Since each X session runs on a display device in a DCU, there should be as many X sessions as there are DCUs assigned to the PDomain.

This multiple X-session configuration supports video redirection failover. While all X sessions in a PDomain run simultaneously, only one is the active X session in a KVMS connection. If the DCU running the active session fails, the network connection to the Oracle ILOM Remote System Console Plus terminates. The next time you connect to the Remote System Console Plus, a new X session, running on the display device of a different DCU, becomes the active session.

To configure a multiple-DCU PDomain with multiple X sessions, complete the following steps:

1. **Disable the GNOME display manager (`gdm`).**

```
# svcadm disable gdm
```

2. **Set the ConsoleKit** `consolekit/sessions` **property based on the number of DCUs in the PDomain.**

```
# svccfg -s system/consolekit setprop \
consolekit/sessions = astring: "sessions-to-configure"
```

Replace *sessions-to-configure* with:

- `Local` – if the PDomain contains one DCU (default value)
- `MultiDCU0;MultiDCU1` – if the PDomain contains two DCUs
- `MultiDCU0;MultiDCU1;MultiDCU2` – if the PDomain contains three DCUs
- `MultiDCU0;MultiDCU1;MultiDCU2;MultiDCU3` – if the PDomain contains four DCUs

Note – If the PDomain contains only one DCU, you do not need to set this property and can leave the value set to the default `Local` setting.

---

3. **Enable the** `consolekit/sessions` **property.**

```
# svcadm restart consolekit
```

4. **(Optional) Check the last line of this file to confirm that the X sessions have been set correctly:**

   `/etc/ConsoleKit/seats.d/00-primary.seat`

   For example, here is the line for a PDomain containing two DCUs:

```
Sessions=MultiDCU0;MultiDCU1;
```

5. **Enable the GNOME display manager (**`gdm`**).**

```
# svcadm enable gdm
```

Related Information

- Oracle Solaris Documentation Library (http://www.oracle.com/goto/Solaris11/docs)

Reestablish KVMS Connection to SPPs After a Reboot

One SPP is assigned to manage each DCU. One of these SPPs is identified as a PDomain-SPP, which is responsible for hosting the KVMS server. In some cases (for example, if the PDomain-SPP that hosts the KVMS server reboots), the network connection to Oracle ILOM Remote System Console Plus might terminate. The PDomain will not automatically attempt to re-establish these links.

If you need to reestablish remote links, complete the procedure in "Connect to Oracle ILOM Remote System Console Plus" on page 113.

Related Information

- "Network Resources Overview" on page 153
- *Server Installation*, understanding the hardware architecture

Controlling the Server, Domains, and Devices

Use these topics to control basic server and domain operations.

- "Controlling the Power State" on page 117
- "Resetting the Server, SP, or Domains" on page 121
- "Managing the Server's Boot Behavior" on page 124
- "Booting and Shutting Down the OS" on page 131

Related Information

- *Server Service*

Controlling the Power State

On this server, you can connect to the system or to a specific PDomain. You can also start or stop the whole system or an individual PDomain.

Use these topics to understand and control the power state:

Description	Commands and Links
Learn about the different power states.	"Power States" on page 118
Change the power state.	"Power On" on page 118 "Power Off" on page 119
Reset a PDomain.	"Reset a Physical Domain" on page 123
Reset the SP.	"Resetting the SP Configuration" on page 121

Related Information

- "Resetting the Server, SP, or Domains" on page 121
- "Managing the Server's Boot Behavior" on page 124
- "Booting and Shutting Down the OS" on page 131

Power States

The server can be in one of these states:

- **No power applied** – No power is applied to the server. For example, when the power cords are not connected, or the datacenter power breaker is off.
- **Standby** – Power is applied to the server, the SP is running, but main power is not applied to the host. You can access Oracle ILOM on the SP in Standby state.
- **Fully powered on** – The host is powered on and you can access Oracle ILOM. Once the server boots the OS, you can also access Oracle ILOM and the operating systems running on the PDomains.

Related Information

- *Oracle ILOM Getting Started Guide* at: `http://www.oracle.com/goto/ILOM/docs`
- "Power On" on page 118
- "Reset a Physical Domain" on page 123
- "Resetting the SP Configuration" on page 121
- "Reset the Server (Oracle Solaris)" on page 121
- "Power Off" on page 119
- "Host Power Commands" on page 185

▼ Power On

You can start each PDomain separately, or you can power on all configured domains on the system by typing `start /System` from Oracle ILOM.

To connect to a specific domain, user accounts on each must be assigned console (c) user roles. To perform power operations on the server or a specific domain, user accounts on each must be assigned reset (r) user roles.

1. **Log in to Oracle ILOM.**

   See "Logging In to Oracle ILOM" on page 100.

2. **At the Oracle ILOM prompt, connect to a specific PDomain so you can view the console output.**

   This example connects to `PDomain_2`.

```
-> start /Servers/PDomains/PDomain_2/HOST/console
Are you sure you want to start
/Servers/PDomains/PDomain_2/HOST/console (y/n) ? y
Connecting /Servers/PDomains/PDomain_2/HOST/console
```

Note – When starting a PDomain after applying AC power to the chassis, it may take as long as 25 minutes for the PDomain to power on.

---

3. **At the Oracle ILOM prompt, power on a specific PDomain.**

   This example powers on `PDomain_2`.

```
-> start /Servers/PDomains/PDomain_2/HOST
Are you sure you want to start /Servers/PDomains/PDomain_2/HOST
(y/n) ? y
Starting /Servers/PDomains/PDomain_2/HOST
->
```

Note – To skip being prompted for confirmation, use the `-script` option in the `start` command.

Related Information

- *Oracle ILOM Getting Started Guide* at: `http://www.oracle.com/goto/ILOM/docs`
- "Power States" on page 118
- "Reset a Physical Domain" on page 123
- "Resetting the SP Configuration" on page 121
- "Reset the Server (Oracle Solaris)" on page 121
- "Power Off" on page 119
- "Host Power Commands" on page 185

▼ Power Off

You can power off each PDomain separately, or you can power off all configured domains on the system by typing `stop /System`.

To perform power operations on the server or a specific domain, user accounts on each must be assigned reset (r) user roles.

1. **Log in to Oracle ILOM.**

   "Logging In to Oracle ILOM (CLI)" on page 102.

2. **At the Oracle ILOM prompt, stop the PDomain(s) as required for your situation:**

   - To shut down the OS gracefully then power off all PDomains, leaving the server in standby, type:

```
-> stop /System
Are you sure you want to stop /System (y/n) ? y
Stopping /System

->
```

   - To shut down the OS gracefully then power off a specific PDomain (`PDomain_2` in this example), type:

```
-> stop /Servers/PDomains/PDomain_2/HOST
Are you sure you want to stop /Servers/PDomains/PDomain_2/HOST
(y/n) ? y
Stopping /Servers/PDomains/PDomain_2/HOST

->
```

   - To immediately turn off power to a specific PDomain, type:

```
-> stop -f /Servers/PDomains/PDomain_2/HOST
Are you sure you want to immediately stop
/Servers/PDomains/PDomain_2/HOST (y/n) ? y
Stopping /Servers/PDomains/PDomain_2/HOST immediately
->
```

Note – To perform an immediate shutdown, use the `-force -script` option from the `stop` command. Ensure that all data is saved before typing this command.

Related Information

- Oracle ILOM Getting Started Guide at: `http://www.oracle.com/goto/ILOM/docs`
- "Power On" on page 118
- "Reset a Physical Domain" on page 123
- "Reset the Server (Oracle Solaris)" on page 121

Resetting the Server, SP, or Domains

Use these topics to reset the server (and all active domains), the SP, or a specific PDomain.

- "Reset the Server (Oracle Solaris)" on page 121
- "Resetting the SP Configuration" on page 121
- "Reset a Physical Domain" on page 123

Related Information

- "Controlling the Power State" on page 117
- "Managing the Server's Boot Behavior" on page 124
- "Booting and Shutting Down the OS" on page 131

▼ Reset the Server (Oracle Solaris)

You do not have to power the server off and on to reset it.

- **To reset the server from the Oracle Solaris prompt, type one of the following commands:**

```
# shutdown -g0 -i6 -y
```

or

```
# reboot
```

Related Information

- "Power On" on page 118
- "Power Off" on page 119
- "Reset a Physical Domain" on page 123
- "Host Power Commands" on page 185

Resetting the SP Configuration

Resetting the SP disconnects your current Oracle ILOM session.

Use these topics to reset the SP:

- "Reset the SP (Web Interface)" on page 122
- "Reset the SP (CLI)" on page 122

▼ Reset the SP (Web Interface)

You must have reset (r) permissions on the server to reset the SP. As part of this operation, all SPs are rebooted.

- **From the Oracle ILOM web interface, click ILOM Administration > Maintenance, select the Reset SP tab, and click Reset SP.**

  All SPs will be reset.

Related Information

- Oracle ILOM Getting Started Guide at: `http://www.oracle.com/goto/ILOM/docs`
- "Power States" on page 118
- "Reset a Physical Domain" on page 123
- "Reset the SP (CLI)" on page 122
- "Host Power Commands" on page 185

▼ Reset the SP (CLI)

You must have reset (r) permissions on the server to reset the ILOM configuration to default settings.

- **Reset the SP:**
  - To reset all of the SPs without changing the system configuration:

```
-> reset /SP
```

  - To reset the Oracle ILOM configuration to its default settings and reboot the SPs:

```
-> set /SP reset_to_defaults=value
-> stop /System
-> reset /SP
```

    where *value* can be:

- `all` – Removes all of the SP configuration data and log files will not be removed.
- `factory` – Removes all SP configuration data and all log files and history.
- `none` – Cancels any previous values. If you want to use this property, do so before using the `reset` command.

Related Information

- *Oracle ILOM Getting Started Guide* at: `http://www.oracle.com/goto/ILOM/docs`
- "Power States" on page 118
- "Reset a Physical Domain" on page 123
- "Reset the SP (Web Interface)" on page 122
- "Host Power Commands" on page 185

▼ Reset a Physical Domain

The Oracle ILOM `reset` command generates a graceful or forced hardware reset. By default, the `reset` command gracefully resets the hardware.

You must reset each PDomain separately. The following examples show how to perform a graceful and forced reset of the PDomain specified as `PDomain_2`.

To reset a specific domain, user accounts on each PDomain must be assigned reset (r) user roles.

- **Type one of the following commands to reset the server.**
  - Perform a graceful reset from Oracle ILOM:

```
-> reset /Servers/PDomains/PDomain_2/HOST
Are you sure you want to reset /Servers/PDomains/PDomain_2/HOST
(y/n) ? y
Resetting /Servers/PDomains/PDomain_2/HOST

->
```

  - If a graceful reset is not possible, perform a forced hardware reset from Oracle ILOM:

```
-> reset -f /Servers/PDomains/PDomain_2/HOST
Are you sure you want to immediately reset
/Servers/PDomains/PDomain_2/HOST (y/n) ? y
Resetting /Servers/PDomains/PDomain_2/HOST immediately
->
```

Related Information

- *Oracle ILOM Getting Started Guide* at: `http://www.oracle.com/goto/ILOM/docs`
- "Power States" on page 118
- "Resetting the SP Configuration" on page 121
- "Reset the Server (Oracle Solaris)" on page 121
- "Host Power Commands" on page 185

Managing the Server's Boot Behavior

Use these topics to change the default boot configuration.

- "Change the Default Boot Device (ok Prompt)" on page 124
- "Create an OpenBoot Boot Path to a Boot Disk" on page 125
- "Enable or Disable Automatic Booting (ok Prompt)" on page 127
- "View OpenBoot Parameters" on page 128
- "OpenBoot Boot Configuration Parameters" on page 129
- "printenv Output" on page 130

  For more comprehensive information about customizing how the server boots, refer to the Oracle Solaris documentation for your release. For a listing of commands set from `/Servers/PDomains/PDomain_`*x*`/HOST/bootmode` for this server, see "Boot Mode Commands" on page 186.

Related Information

- "Controlling the Power State" on page 117
- "Resetting the Server, SP, or Domains" on page 121
- "Booting and Shutting Down the OS" on page 131
- Oracle Solaris Documentation Library (`http://www.oracle.com/goto/Solaris11/docs`)

▼ Change the Default Boot Device (`ok` Prompt)

Use this procedure to configure the OpenBoot to boot from a specific device. This change is permanent but only takes effect after a reset.

1. **Get to the `ok` prompt.**

   See "Accessing the ok Prompt" on page 105.

2. **Configure the `boot-device` parameter with the correct boot device.**

```
ok setenv boot-device boot-device
```

   where *boot-device* is a valid device from which to boot.

3. **Verify the change.**

```
ok printenv boot-device
```

4. **Reset the host.**

```
ok reset-all
```

Related Information

- "Create an OpenBoot Boot Path to a Boot Disk" on page 125
- "Enable or Disable Automatic Booting (ok Prompt)" on page 127
- "View OpenBoot Parameters" on page 128
- "OpenBoot Boot Configuration Parameters" on page 129
- "printenv Output" on page 130

▼ Create an OpenBoot Boot Path to a Boot Disk

1. **Display the paths for the disks that are configured on the system.**

```
ok show-disks
      j) /pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk
      ....
```

2. **List the SCSI devices in the server and note the physical slot number for the target boot disk.**

```
ok probe-scsi-all /pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4
      /pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0
     Code Version 1.00.62, MPT Version 2.00, Firmware Version 10.00.00.00
     Target 9
     Unit 0 Disk HITACHI H106060SDSUN600G A2B0 1172123568 Blocks, 600 GB
     SASDeviceName 5000cca025061ff0 SASAddress 5000cca025061ff1 PhyNum 0
     Target a
     Unit 0 Disk HITACHI H106060SDSUN600G A2B0 1172123568 Blocks, 600 GB
     SASDeviceName 5000cca0250696c4 SASAddress 5000cca0250696c5 PhyNum 1
     Target b
     Unit 0 Disk HITACHI H106060SDSUN600G A2B0 1172123568 Blocks, 600 GB
     SASDeviceName 5000cca01612a4e4  SASAddress 5000cca01612a4e6  PhyNum 2
     Target c
     Unit 0 Disk HITACHI H106060SDSUN600G A2B0 1172123568 Blocks, 600 GB
     SASDeviceName 5000cca016102264  SASAddress 5000cca016102266  PhyNum 3
```

3. **Reset the system.**

```
ok reset-all
```

4. **Create a boot alias to the chosen disk path (in this example, physical disk 0, where 0 represents the value of** `PhyNum 0` **reported by the** `probe-scsi-all` **command).**

```
ok nvalias disk /pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk@p0
   /pci@f00/pci@1/pci@0/pci@c/pci@0/pci@4/scsi@0/disk
```

5. **Boot the newly configured boot disk (if desired).**

```
ok boot disk
```

Related Information

- "Change the Default Boot Device (ok Prompt)" on page 124
- "Enable or Disable Automatic Booting (ok Prompt)" on page 127
- "View OpenBoot Parameters" on page 128
- "OpenBoot Boot Configuration Parameters" on page 129
- "printenv Output" on page 130

▼ Enable or Disable Automatic Booting (`ok` Prompt)

Use one of these procedures to configure OpenBoot so that a host reset or power on attempts to boot the OS automatically, or does not. This change is permanent but only takes effect after a host reset.

1. **Get to the `ok` prompt.**

   See "Accessing the ok Prompt" on page 105.

2. **Set the OpenBoot `auto-boot?` parameter to `true` or `false`.**

   - `true` – (Default) The host automatically attempts to boot from the devices specified in *boot-device* when you configured the `boot-device` parameter.

Note – If you are configuring the host for maximum availability, configure the host to automatically reboot following either an error or a hardware reconfiguration by setting `auto-boot?` and `auto-boot-on-error?` to `true`. The default value for `auto-boot-on-error?` is `false`.

   - `false` – The host does not automatically boot. You can boot manually.

   For example, to change the default setting, type

```
ok setenv auto-boot? false
```

3. **Verify the change.**

```
ok printenv auto-boot?
auto-boot? = false
```

4. **Reset the host.**

```
ok reset-all
```

   The host resets. After initialization, the host attempts to boot or not based on your configuration.

Related Information

- "Change the Default Boot Device (ok Prompt)" on page 124
- "Create an OpenBoot Boot Path to a Boot Disk" on page 125
- "View OpenBoot Parameters" on page 128
- "OpenBoot Boot Configuration Parameters" on page 129

- "printenv Output" on page 130

▼ View OpenBoot Parameters

1. **View the value for an individual OpenBoot parameter using one of these methods:**
   - From the `ok` prompt, type:

```
printenv parameter
```

     where *parameter* is a valid OpenBoot parameter.

     For an example of `printenv` output, see "printenv Output" on page 130.
   - From Oracle Solaris, type:

```
eeprom parameter
```

     where *parameter* is a valid OpenBoot parameter.

2. **View all of the OpenBoot parameters using one of these methods:**
   - From the `ok` prompt, type:

```
printenv
```

   - From Oracle Solaris, type:

```
eeprom
```

   For descriptions of which OpenBoot parameters control the way the system boots, see "OpenBoot Boot Configuration Parameters" on page 129.

Related Information

- "Change the Default Boot Device (ok Prompt)" on page 124
- "Create an OpenBoot Boot Path to a Boot Disk" on page 125
- "Enable or Disable Automatic Booting (ok Prompt)" on page 127
- "OpenBoot Boot Configuration Parameters" on page 129
- "printenv Output" on page 130

OpenBoot Boot Configuration Parameters

Parameter	Default Value	Description
auto-boot-on-error?	false	Controls whether or not the host attempts to boot after POST detects a hardware reconfiguration or error and enables the selection of the auto-boot behavior in the presence of detected errors. • false – Host does not attempt to boot and stops at the ok prompt. • true – When auto-boot? is also set to true, the host automatically attempts to boot from the selected device following a hardware reconfiguration or error, which is necessary for maximum availability.
auto-boot?	true	Controls whether or not the system automatically boots after a system reset or when the power is turned on. • true – Automatically attempts to boot from the devices specified in boot-device. • false – Host does not attempt to boot and stops at ok prompt.
boot-command	boot	Specifies the command to be executed when auto-boot? is true. • boot – Boot kernel from devices specified in boot-device. • boot net – Boot kernel from the network. • boot cdrom – Boot kernel from the CD-ROM. • boot disk1:h – Boot from disk1 partition h. • boot tape – Boot default file from tape. • boot *device-path* – Boot from the device specified as *device_path*. For a list of aliases on your server, type devalias.
boot-device	disk net	Contains the name of the default boot device.
boot-file		An optional parameter that provides boot arguments that are used when OpenBoot is not in diagnostic mode.
diag-switch?	false	If the value is true, run in the Diagnostic mode.
network-boot-arguments		An optional parameter that enables you to set configuration parameters to be used by OpenBoot when you perform a WAN boot. Setting this parameter takes precedence over any default boot parameter values. Refer to the eeprom(1M) man page for details.

Related Information

- "Change the Default Boot Device (ok Prompt)" on page 124
- "Create an OpenBoot Boot Path to a Boot Disk" on page 125
- "Enable or Disable Automatic Booting (ok Prompt)" on page 127
- "View OpenBoot Parameters" on page 128
- "printenv Output" on page 130

printenv Output

```
{0} ok printenv
Variable Name           Value                          Default Value

ttya-rts-dtr-off        false                          false
ttya-ignore-cd          true                           true
keyboard-layout
reboot-command
security-mode           none                           No default
security-password                                      No default
security-#badlogins     0                              No default
verbosity               min                            min
diag-switch?            false                          false
local-mac-address?      true                           true
fcode-debug?            false                          false
scsi-initiator-id       7                              7
oem-logo                                               No default
oem-logo?               false                          false
oem-banner                                             No default
oem-banner?             false                          false
ansi-terminal?          true                           true
screen-#columns         80                             80
screen-#rows            34                             34
ttya-mode               9600,8,n,1,-                   9600,8,n,1,-
output-device           virtual-console                virtual-console
input-device            virtual-console                virtual-console
auto-boot-on-error?     false                          false
load-base               16384                          16384
auto-boot?              false                          true
network-boot-arguments
boot-command            boot                           boot
boot-file
boot-device             disk net                       disk net
multipath-boot?         false                          false
boot-device-index       0                              0
use-nvramrc?            false                          false
nvramrc
error-reset-recovery    boot                           boot
```

Related Information

- "Change the Default Boot Device (ok Prompt)" on page 124
- "Create an OpenBoot Boot Path to a Boot Disk" on page 125

- "Enable or Disable Automatic Booting (ok Prompt)" on page 127
- "View OpenBoot Parameters" on page 128
- "OpenBoot Boot Configuration Parameters" on page 129

Booting and Shutting Down the OS

There are several ways to boot and shut down the server. Use the tasks in this table that best suit your situation.

Description	Links
Learn about the boot sequence.	"Boot Sequence" on page 131
Boot a server that is configured to boot at power-on (the default configuration) using Oracle ILOM.	"Boot the OS (Oracle ILOM)" on page 132
Boot a server that is at the `ok` prompt.	"Manually Boot the OS (ok Prompt)" on page 133
Shut down the OS using the Oracle Solaris `init` command.	"Shut Down the OS (init Command)" on page 134
Shut down the OS using the Oracle Solaris `shutdown` command.	"Shut Down the OS (shutdown Command)" on page 135

Related Information

- "Controlling the Power State" on page 117
- "Resetting the Server, SP, or Domains" on page 121
- "Managing the Server's Boot Behavior" on page 124

Boot Sequence

In addition to controlling the power state of the host, you can also control how and when the OS is booted.

When the host is powered on, it can be in one of these states:

- Booted – The operating system is running in one of these levels:
  - 3 – The OS is running in multiuser mode with all resources enabled.
  - S – The OS is running in single-user mode and some resources are not enabled.

- At the `ok` prompt – The OS is not running. You communicate with the OpenBoot firmware on the host.

By default, the host automatically attempts to boot when the host is reset or powered on. The host first seeks a local boot drive. If the host cannot boot from the drive, the host attempts to boot from the network. See "Boot the OS (Oracle ILOM)" on page 132.

These steps describe the high-level boot sequence:

1. A host reset is initiated.
2. OpenBoot runs and OpenBoot parameters are read.

   These are the primary OpenBoot parameters and default values that determine how the server boots (see "View OpenBoot Parameters" on page 128):

   - `diag-switch? false`
   - `auto-boot? true`
   - `boot-device disk net`
3. A boot block is read from the boot device to locate a boot program.
4. The boot program loads the kernel into memory.
5. The kernel is executed and takes control.

You can configure booting parameters from the OS or at the `ok` prompt. You can also affect the boot behavior through Oracle ILOM.

Refer to the Oracle Solaris OS documentation for information about the boot process and how to configure booting in the Oracle Solaris OS.

Related Information

- Oracle Solaris Documentation Library (`http://www.oracle.com/goto/Solaris11/docs`)

▼ Boot the OS (Oracle ILOM)

By default, the host automatically attempts to boot when the host is reset or powered on.

1. **Log in to Oracle ILOM.**

   "Log In to Oracle ILOM (Web Interface)" on page 101.

2. **From the Oracle ILOM web interface, click Host Management > Power Control and select a PDomain from the Actions list box.**

3. **If the Open Boot parameters are configured with default values, boot the host from the Oracle ILOM web interface.**

   From Host Management > Power Control, select any of the reset, power on, or power cycle actions and click Save.

Note – If the OpenBoot boot parameters are not configured with default values, when you reset the host, the host might stop at the `ok` prompt, and you will need to boot from the `ok` prompt.

Related Information

- "Manually Boot the OS (ok Prompt)" on page 133
- Oracle Solaris Documentation Library (`http://www.oracle.com/goto/Solaris11/docs`)

▼ Manually Boot the OS (`ok` Prompt)

Use this procedure when you are at the `ok` prompt and you want to boot the OS.

- **Boot the host using one of these methods:**
  - Boot from the devices specified in the OpenBoot `boot-device` parameter:

```
ok boot
```

  - Specify a device to boot from:

```
ok boot boot-device
```

    where *boot-device* is a valid device from which to boot.

Related Information

- "OpenBoot Boot Configuration Parameters" on page 129
- Oracle Solaris Documentation Library (`http://www.oracle.com/goto/Solaris11/docs`)

Shutting Down the OS

You can use either of the following methods to shutdown the OS:

Description	Links
Terminate all active processes on a system and then synchronize the disks before changing run levels.	"Shut Down the OS (init Command)" on page 134
Send a warning message and then terminate active processes on a system to reach a specified run level.	"Resetting the SP Configuration" on page 121

Related Information

- Oracle Solaris Documentation Library (http://www.oracle.com/goto/Solaris11/docs)

▼ Shut Down the OS (`init` Command)

1. **Log in to Oracle Solaris as a user with root privileges.**
2. **Shut down the OS.**

   Specify run level `0` to shut down the OS and display the `ok` prompt.

```
# init 0
# svc.startd: The system is coming down.  Please wait.
svc.startd: 126 system services are now being stopped.
Sep 21 13:31:31 systemA.us.oracle.com syslogd: going down on signal
15
svc.startd: Killing user processes.
Sep 21 13:31:37 The system is down.  Shutdown took 23 seconds.
syncing file systems... done
Program terminated
M5-32 or M6-32, No Keyboard
Copyright (c) 1998, 2013, Oracle and/or its affiliates. All rights
reserved.
OpenBoot 4.35. 63 GB memory available, Serial #100279958.
Ethernet address 0:21:28:fa:26:96, Host ID: 85fa2696.
{0} ok
```

Related Information

- Oracle Solaris Documentation Library (http://www.oracle.com/goto/Solaris11/docs)

▼ Shut Down the OS (`shutdown` Command)

1. **Log in to the Oracle Solaris OS as a user with root privileges.**
2. **Shut down the OS.**

   In this example, these command options shut down the OS to the `ok` prompt:

   - `-g0` – Specifies a grace period of 0 seconds.
   - `-i0` – Specifies the run level 0, which is equivalent to the `init 0` command.
   - `-y` – Pre-answers the confirmation question so that the command runs without user intervention.

```
# shutdown -g0 -i0 -y
# svc.startd: The system is coming down. Please wait.
svc.startd: 106 system services are now being stopped.
Sep 12 17:52:11 bur381-14 syslogd: going down on signal 15
svc.startd: The system is down.
syncing file systems...done
Program terminated

SPARC M5-32 or M6-32, No Keyboard
Copyright (c) 1998, 2013, Oracle and/or its affiliates. All rights
reserved.
OpenBoot 4.33.1, 32256 MB memory available, Serial #95593628.
Ethernet address 0:21:28:b2:a4:9c, Host ID: 85b2a49c.
{0} ok
```

Related Information

- Oracle Solaris Documentation Library (http://www.oracle.com/goto/Solaris11/docs)

Configuring Oracle ILOM User Accounts and Roles

Use these topics to set up user accounts and roles and to configure other permission-related settings in Oracle ILOM.

- "Managing User Accounts" on page 137
- "Managing User Authentication" on page 143

Related Information

- Oracle ILOM documentation library (`http://www.oracle.com/goto/ILOM/docs`)

Managing User Accounts

The Oracle ILOM software that is preinstalled on this server is preconfigured with one user account (`root`). This user can then create additional user accounts, as needed.

For a secure log in method, enable an SSH service. Refer to the Oracle ILOM documentation for more information.

For information about viewing user account properties or deleting existing user accounts, refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance*.

Use these topics to manage user accounts with Oracle ILOM.

- "User Authorization Overview" on page 138
- "Understanding Platform and Host-Specific User Role Assignments" on page 139
- "Configure User Accounts (CLI)" on page 140
- "Configuring User Accounts (SNMP)" on page 141

Related Information

- "Managing User Authentication" on page 143
- Oracle ILOM Documentation Library (http://www.oracle.com/goto/ILOM/docs)

User Authorization Overview

The SP is an appliance. In an appliance model, users or management agents can access the SP and its components only through authorized user interfaces. Users and agents cannot access any of the underlying operating system interfaces, and users cannot install individual software components on the SP.

A user account is a record of an individual user that can be verified through a user name and password. This server supports 60 user accounts for log in to the SP.

Each user account is assigned specific roles that allow a user to execute certain Oracle ILOM commands and perform certain actions on a specific set of components. Those components can be physical components, domains, or physical components within a domain. By specifying roles for each user, you can control which operations each user is allowed to perform.

When you assign user roles to a user account for a specific component (for example, a PDomain), the capabilities granted mirror those of the user roles assigned for the platform, but they are restricted to commands executed on the given component. Refer to specific tasks for information about the user roles required and commands used to perform certain tasks on the server and on individual domains.

Note – Only user roles of administrator (`a`), console (`c`), and reset (`r`) can be assigned for individual PDomains.

Refer to the Oracle ILOM documentation for a complete listing of all of the predefined user roles available for the server.

Related Information

- "Understanding Platform and Host-Specific User Role Assignments" on page 139
- "Configure User Accounts (CLI)" on page 140
- "Configuring User Accounts (SNMP)" on page 141
- Oracle ILOM Documentation Library (http://www.oracle.com/goto/ILOM/docs)

Understanding Platform and Host-Specific User Role Assignments

User roles are configured for this server using Oracle ILOM as follows:

- Configure platform-level user roles to specify a user's access to all hosts and components that are shared by all hosts. Configure these user roles from `/SP/users/`*userid*`/role=`*value*, as documented in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

  `http://www.oracle.com/goto/ILOM/docs`.

- Configure host-level user roles to specify a user's access to a specific host and components that are specific to that host. Host-specific components are located under `/Servers/PDomains/PDomain_`*x*`/HOST`. Configure these user roles from `/SP/users/`*userid*`/host_role/host`*x*`_role=`*value*. For information about properties that are configured for individual PDomains or their related SPs, see "Identifying Domain-Level Commands" on page 183.

For example, if an administrator assigns either of the following user roles for a given user that user will be able to start or stop PDomain_2:

- `/SP/users/`*userid*`/role=r` (which enables the user to access all hosts)
- `/SP/users/`*userid*`/host_role/host2_role=`r (which enables the user to access specifically PDomain_2)

If, however, the administrator wants to restrict the user's access to PDomain_0 and PDomain_1, and wants to enable the user to perform any task on PDomain_2 and to start, stop, and reset PDomain_3, the following host-specific roles would need to be defined:

```
set /SP/users/userid/role=o
set /SP/users/userid/host_roles/host0_role=""
set /SP/users/userid/host_roles/host1_role=""
set /SP/users/userid/host_roles/host2_role=acr
set /SP/users/userid/host_roles/host3_role=r
```

Related Information

- "User Authorization Overview" on page 138
- "Configure User Accounts (CLI)" on page 140
- "Configuring User Accounts (SNMP)" on page 141
- Oracle ILOM Documentation Library (`http://www.oracle.com/goto/ILOM/docs`)

▼ Configure User Accounts (CLI)

If you need to provide controlled access to Oracle ILOM, use this procedure to create up to 60 user accounts with specific roles.

You must have user (u) permissions to configure local user accounts.

1. **Log in to the Oracle ILOM CLI.**

   See "Logging In to Oracle ILOM (CLI)" on page 102.

2. **Create a user account:**

```
-> create /SP/users/newusername
Creating user...
Created /SP/users/username
```

3. **Set a user password:**

```
-> set /SP/users/username password=password
Enter new password: ********
Enter new password again: ********
```

4. **Assign user roles for each active PDomain:**

```
-> set /SP/users/username/host_roles hostx_role=acr
Set 'hostx_role' to 'acr'
```

Note – Only user roles of administrator (a), console (c), and reset (r) can be assigned for individual PDomains.

---

5. **Continue to your next task.**

   Consider these tasks:

   - Additional SP configuration – Refer to the Oracle ILOM documentation.
   - "Log Out of Oracle ILOM" on page 104

Related Information

- "Oracle ILOM Root Password" on page 101
- "User Authorization Overview" on page 138
- "Configuring User Accounts (SNMP)" on page 141
- Oracle ILOM Documentation Library (http://www.oracle.com/goto/ILOM/docs)

Configuring User Accounts (SNMP)

- "Local Domain-Specific User Roles" on page 141
- "Manage Domain-Specific User Roles" on page 142

Related Information

- "Establish a Network Management Connection to Oracle ILOM" on page 99
- "Oracle ILOM Root Password" on page 101
- "Configure User Accounts (CLI)" on page 140
- *Oracle ILOM Protocol Management Reference for SNMP, IPMI, CIM, WS-MAN* at:

  `http://www.oracle.com/goto/ILOM/docs`

Local Domain-Specific User Roles

For this server, the `SUN-ILOM-CONTROL-MIB` file includes a table for domain-specific roles (`ilomCtrlLocalUserTable`). This table lists the user roles associated with each PDomain that is available on the system as shown in the following sample Oracle ILOM CLI output.

```
->/SP/users/userid
 Targets:
 host_roles
show /SP/users/userid/host_roles
 Properties:
    HOST0_role = acr
    HOST1_role = (none)
    HOST2_role = r
    HOST3_role = cr
```

In this example, *userid* corresponds to the integer identifier of the Active Directory Host Groups entry. The available host role values (`a,c,r`, where a=admin, c= console, and r=reset) appear under `ILOMCtrlUserHostRolesTC` in the `SUN-ILOM-CONTROL-MIB` file.

Related Information

- "Manage Domain-Specific User Roles" on page 142

▼ Manage Domain-Specific User Roles

The examples in this section use the following values to show how to view and change user roles for a specific user account on a specific PDomain:

- Host group user ID: `user2`
- Domain index: 1, which corresponds to domain ID 0 because SNMP table indexing starts at 1 (refer to `ilomCtrlRolesDomainIndex` in the `SUN-ILOM-CONTROL-MIB` file)
- Existing host roles: `a,c,r`
- New host roles: `a,r`

Note – For a description of the MIB object used in this procedure, see the table that follows the procedure.

---

1. **Log in to a host that has an SNMP tool and the Oracle ILOM MIBs installed.**

   For example, type:

   ssh *username***@***SNMP-manager-ipaddress*

   `Password:` *password*

2. **Refer to the following SNMP command examples:**

   - To view the current host roles for a specific user on a specific domain, type:

```
% snmpget -v1 -cprivate -mALL SNMP-agent-ipaddress
ilomCtrlLocalUserHostRoles.\"user2\".1
SUN-ILOM-CONTROL-MIB::ilomCtrlLocalUserHostRoles."user2".1 =
STRING: "acr"
```

Note – SNMP table indexing starts at 1, so the domain index for domain 0 is 1.

   - To specify new host roles for a specific user on a specific domain, type:

```
% snmpset -v1 -cprivate -mALL SNMP-agent-ipaddress
ilomCtrlLocalUserHostRoles.\"user2\".1 s "ar"
SUN-ILOM-CONTROL-MIB::ilomCtrlLocalUserHostRoles."user2".1 =
STRING: "ar"
```

The following table describes the local user host group SNMP MIB objects.

MIB Object	Description	Allowed Values	Type	Default
ilomCtrlLocalUser HostRoles	The host roles for the host referred to by ilomCtrlRolesDomainIndex and assigned to the user referred to by ilomCtrlLocalUserUsername.	admin(a), console(c), reset(r)	String	None

Related Information

- "Local Domain-Specific User Roles" on page 141

Managing User Authentication

Oracle ILOM can authenticate user accounts through local accounts that you configure or against a remote user database, such as Active Directory or LDAP/SSL. With remote authentication, you can use a centralized user database rather than configuring local accounts on each Oracle ILOM instance.

- "User Authentication Overview" on page 143
- "Configuring Host Groups to Authenticate User Accounts (CLI)" on page 144
- "Configuring Host Groups to Authenticate User Accounts (SNMP)" on page 146

Related Information

- "Configuring User Accounts (SNMP)" on page 141
- Oracle ILOM Documentation Library (http://www.oracle.com/goto/ILOM/docs)

User Authentication Overview

User access can be remotely authenticated and authorized based on a user's membership in a host group. A user can belong to more than one host group, and on this server, you can configure up to 10 host groups using the Oracle ILOM web interface, the CLI, or SNMP.

You can use Active Directory or LDAP/SSL to configure host groups for remote user authentication.

- Active Directory provides both authentication of user credentials and authorization of user access levels to networked resources.

- LDAP/SSL offers enhanced security to LDAP users.

The tasks involved in configuring host groups include managing certificates (LDAP/SSL), administrator groups, operator groups, custom groups, and user domains.

For more information about setting Active Directory, LDAP/SSL, and SNMP management properties with the Oracle ILOM features that are common to all platforms managed by Oracle ILOM, refer to the Oracle ILOM Documentation Library.

Related Information

- "Configuring Host Groups to Authenticate User Accounts (CLI)" on page 144
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

  `http://www.oracle.com/goto/ILOM/docs`
- *Oracle ILOM Protocol Management Reference for SNMP, IPMI, CIM, WS-MAN* at:

  `http://www.oracle.com/goto/ILOM/docs`

Configuring Host Groups to Authenticate User Accounts (CLI)

These topics contain information about configuring as many as 10 host groups to authenticate users on multiple-domain systems using the Oracle ILOM CLI.

- "Host Group Properties (CLI)" on page 144
- "Configure Host Groups for Active Directory or LDAP/SSL (CLI)" on page 145

Host Group Properties (CLI)

Manage host groups using the Oracle ILOM CLI from the following locations:

`/SP/clients/activedirectory/hostgroups/<id>/`

and

`/SP/clients/ldapssl/hostgroups/<id>/`

with the following properties:

Property	Description
name	Read/write property that represents the Active Directory or LDAP/SSL group name for the specified host group.
hosts	Read/write property that lists the PDomain for which this host group assigns roles. Values can be set using the list management approach (set hosts="+HOST3").
roles	Read/write property that specifies the domain-specific privilege levels for the host group. This property supports any of the individual host role ID combinations of a, c, and r (for example, acr) where a=admin, c=console, and r=reset.

Note – Users will need the u role to modify any settings under host groups.

Related Information

- "Configuring Host Groups to Authenticate User Accounts (CLI)" on page 144

▼ Configure Host Groups for Active Directory or LDAP/SSL (CLI)

You must have user (u) permissions to configure host groups.

1. **Log in to the Oracle ILOM CLI.**

   See "Log In to the SP (Remote)" on page 102.

2. **Enter the name of the host group.**

   - For Active Directory:

```
-> set /SP/clients/activedirectory/hostgroups/id/ name=value
Set name to value
```

   - For LDAP/SSL:

```
-> set /SP/clients/ldapssl/hostgroups/id/ name=value
Set name to 'value'
```

3. **Specify which hosts you want to be members of the specified host group.**

- For Active Directory:

```
-> set /SP/clients/activedirectory/hostgroups/id/ hosts=
"/HOSTx/HOSTy"
Set hosts to '/HOSTx /HOSTy'
```

- For LDAP/SSL:

```
-> set /SP/clients/ldapssl/hostgroups/id/ hosts="/HOSTx="/HOSTx
/HOSTy"
Set hosts to '/HOSTx /HOSTy'
```

4. **Specify the appropriate roles for this host group.**

   Only roles a, c, and r are available for host groups. See "User Authorization Overview" on page 138.

   - For Active Directory:

```
-> set /SP/clients/activedirectory/hostgroups/id roles=value
Set roles to value
```

   - For LDAP/SSL:

```
-> set /SP/clients/ldapssl/hostgroups/id roles=value
Set roles to value
```

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/goto/ILOM/docs)
- "Establish a Network Management Connection to Oracle ILOM" on page 99

Configuring Host Groups to Authenticate User Accounts (SNMP)

Use one of the following procedures to configure as many as 10 host groups to authenticate users on multiple-domain systems using SNMP.

Note – Users need the u role to modify any settings under host groups.

- "Host Group Properties (SNMP)" on page 147
- "Configure Host Groups for Active Directory (SNMP)" on page 148

■ "Configure Host Groups for LDAP/SSL (SNMP)" on page 150

Host Group Properties (SNMP)

Manage host groups using SNMP from the following tables in the SUN-ILOM-CONTROL-MIB file: ilomCtrlActiveDirHostGroupsTable and ilomCtrlLdapSslHostGroupsTable.

The following table describes the Active Directory Host Groups SNMP MIB objects.

MIB Object	Description	Allowed Values	Type	Default
ilomCtrlActive DirHostGroupId	An integer identifier of the Active Directory host group entry.	1 to 10 This object is not accessible for reading or writing.	Integer	None
ilomCtrlActiveDir HostGroupName	Specify a distinguished name that exactly matches one of the group names on the Active Directory server. Any user belonging to one of the groups in this table will be assigned the Oracle ILOM role based on the entry's configuration for roles.	*name* (maximum of 255 characters)	String	None
ilomCtrlActiveDir HostGroupHosts	Specify the hosts, for example /HOST0 for which this host group assigns roles. Any user belonging to one of the host groups in this table will be assigned the ILOM host roles for the list of /HOST*x* configuration.	List of hosts with list members, for example, /HOST0 /HOST1 /HOST2 /HOST3	String	None
ilomCtrlActiveDir HostGroupRoles	Specify the host roles that a user authenticated through Active Directory should have. Set this property to any of the individual role IDs of a, c, and r to configure the possible privilege level for hosts. Set this to 'none' to clear the value. Host role IDs can be joined together. For example, acr, where a=admin, c=console, and r=reset.	admin(a), console(c), reset(r), none	String	None

The following table describes the LDAP/SSL Host Groups SNMP MIB objects.

MIB Object	Description	Allowed Values	Type	Default
ilomCtrlLdap SslHostGroupId	An integer identifier of the LDAP/SSL Host Groups entry.	1 to 10 This object is not accessible for reading or writing.	Integer	None
ilomCtrlLdap SslHostGroup Name	This string should contain a distinguished name that exactly matches one of the group names on the LDAP/SSL server. Any user belonging to one of these groups in this table will be assigned the Oracle ILOM role based on the entry's configuration for host roles.	*name* (maximum of 255 characters)	String	None
ilomCtrlLdap SslGroupHosts	This string should list hosts, for example /HOST0, for which this host group assigns roles. Any user belonging to one of the host groups in this table will be assigned the Oracle ILOM host roles for the list of /HOST*x* configuration.	List of hosts with list members, for example, /HOST0 /HOST1 /HOST2 /HOST3	String	None
ilomCtrlLdap SslHostGroup Roles	Specify the host roles that a user authenticated through LDAP/SSL should have. Set this property to any of the individual role IDs of a, c, and r to configure the possible privilege level for hosts. Set this to 'none' to clear the value. Host role IDs can be joined together. For example, 'acr', where a=admin, c=console, and r=reset.	admin(a), console(c), reset(r), none	String	None

Related Information

- "Configure Host Groups for LDAP/SSL (SNMP)" on page 150
- "Configure Host Groups for LDAP/SSL (SNMP)" on page 150

▼ Configure Host Groups for Active Directory (SNMP)

The examples in this section use the following values:

- Host group ID number: 2
- Existing host group name: platadm

- New host group name: platops
- Host that is assigned roles by this host group: HOST2
- New host that is assigned roles by this host group: HOST1
- Existing host group roles: a,r
- New host group roles: a,c,r

Note – You can use the `set` command to configure the Active Directory Host Groups settings. For a description of the MIB objects used in this procedure, see the tables in "Host Group Properties (SNMP)" on page 147.

---

1. **Log in to a host that has an SNMP tool and the Oracle ILOM MIBs installed. For example, type:**

   ssh *username***@***snmp-manager-ipaddress*

   `Password:` *password*

2. **Refer to the following SNMP command examples:**

   - To view the current name of a specific Active Directory host group, type:

```
% snmpget -v1 -cprivate -mALL SNMP-agent-ipaddress ilomCtrlActiveDirHostGroupName.2
SUN-ILOM-CONTROL-MIB::ilomCtrlActiveDirHostGroupName.2 = STRING: platadm
```

   - To specify a new name for a specific Active Directory host group, type:

```
% snmpset -v1 -cprivate -mALL SNMP-agent-ipaddress ilomCtrlActiveDirHostGroupName.2
s "platops"
SUN-ILOM-CONTROL-MIB::ilomCtrlActiveDirHostGroupName.2 = STRING: platops
```

   - To specify the hosts for which a specific host group assigns roles, type:

```
% snmpget -v1 -cprivate -mALL SNMP-agent-ipaddress
ilomCtrlActiveDirHostGroupHosts.2
SUN-ILOM-CONTROL-MIB::ilomCtrlActiveDirHostGroupHosts.2 = STRING: /HOST2
% snmpset -v1 -cprivate -mALL SNMP-agent-ipaddress
ilomCtrlActiveDirHostGroupHosts.2 s "/HOST1"
SUN-ILOM-CONTROL-MIB::ilomCtrlActiveDirHostGroupHosts.2 = STRING: /HOST1
```

   - To view the roles of a specific Active Directory host group, type:

```
% snmpget -v1 -cprivate -mALL SNMP-agent-ipaddress
ilomCtrlActiveDirHostGroupRoles.2
SUN-ILOM-CONTROL-MIB::ilomCtrlActiveDirHostGroupRoles.2 = STRING: "ar"
```

- To specify new roles for a specific Active Directory host group and to verify the new roles, type:

```
% snmpset -v1 -cprivate -mALL SNMP-agent-ipaddress
ilomCtrlActiveDirHostGroupRoles.2 s "acr"
SUN-ILOM-CONTROL-MIB::ilomCtrlActiveDirHostGroupRoles.2 = STRING: "acr"
% snmpget -v1 -cprivate -mALL SNMP-agent-ipaddress
ilomCtrlActiveDirHostGroupRoles.2
SUN-ILOM-CONTROL-MIB::ilomCtrlActiveDirHostGroupRoles.2 = STRING: "acr"
```

Related Information

- "Configure Host Groups for LDAP/SSL (SNMP)" on page 150

▼ Configure Host Groups for LDAP/SSL (SNMP)

The examples in this section use the following values:

- Host group ID number: 3
- Existing host group name: platadm
- New host group name: platops
- Hosts that are assigned roles by this host group: /HOST1, /HOST2
- New hosts that are assigned roles by this host group: /HOST1, /HOST3
- Existing host group roles: a,r
- New host group roles: a,c,r

Note – You can use the `get` and `set` commands to configure the LDAP/SSL Host Groups settings. For a description of the MIB objects used in this procedure, see the tables in "Host Group Properties (SNMP)" on page 147.

---

1. **Log in to a host that has an SNMP tool and the Oracle ILOM MIBs installed. For example, type:**

   ssh *username***@***snmp_manager_ipaddress*

   `Password:` *password*

2. **Refer to the following SNMP command examples:**
   - To view the name of a specific LDAP/SSL host group, type:

```
% snmpget -v1 -cprivate -mALL SNMP-agent-ipaddress ilomCtrlLdapSslHostGroupName.3
SUN-ILOM-CONTROL-MIB::ilomCtrlLdapSslHostGroupName.3 = STRING:
CN=SpSuperCust,OU=Groups,DC=johns,DC=sun,DC=com
```

- To specify a new name for a specific LDAP/SSL host group and to verify the change has been made, type:

```
% snmpset -v1 -cprivate -mALL SNMP-agent-ipaddress ilomCtrlLdapSslHostGroupName.3 s
CN=SpSuperCust,OU=Groups,DC=bills,DC=sun,DC=com
SUN-ILOM-CONTROL-MIB::ilomCtrlLdapSslHostGroupName.3 = STRING:
CN=SpSuperCust,OU=Groups,DC=bills,DC=sun,DC=com
% snmpget -v1 -cprivate -mALL SNMP-agent-ipaddress ilomCtrlLdapSslHostGroupName.3
SUN-ILOM-CONTROL-MIB::ilomCtrlLdapSslHostGroupName.3 = STRING:
CN=SpSuperCust,OU=Groups,DC=bills,DC=sun,DC=com
```

- To specify the hosts for which a specific host group assigns roles, type:

```
% snmpget -v1 -cprivate -mALL SNMP_agent_ipaddress ilomCtrlLdapSslHostGroupHosts.3
SUN-ILOM-CONTROL-MIB::ilomCtrlLdapSslHostGroupHosts.3 = STRING: /HOST1 /HOST2
% snmpset -v1 -cprivate -mALL SNMP-agent-ipaddress ilomCtrlLdapSslHostGroupHosts.3
s "/HOST1 /HOST3"
SUN-ILOM-CONTROL-MIB::ilomCtrlLdapSslHostGroupHosts.3 = STRING: /HOST1 /HOST3
```

- To view the roles of a specific LDAP/SSL host group, type:

```
% snmpget -v1 -cprivate -mALL SNMP_agent_ipaddress ilomCtrlLdapSslHostGroupRoles.3
SUN-ILOM-CONTROL-MIB::ilomCtrlLdapSslHostGroupRoles.3 = STRING: "ar"
```

- To specify new roles for a specific LDAP/SSL host group and to verify the new roles, type:

```
% snmpset -v1 -cprivate -mALL SNMP-agent-ipaddress ilomCtrlLdapSslHostGroupRoles.3
s "acr"
SUN-ILOM-CONTROL-MIB::ilomCtrlLdapSslHostGroupRoles.3 = STRING: "acr"
% snmpget -v1 -cprivate -mALL SNMP-agent-ipaddress ilomCtrlLdapSslHostGroupRoles.3
SUN-ILOM-CONTROL-MIB::ilomCtrlLdapSslHostGroupRoles.3 = STRING: "acr"
```

Related Information

- "Configure Host Groups for LDAP/SSL (SNMP)" on page 150

Configuring the SP Network

Use these topics for information about:

- "Network Resources Overview" on page 153
- "Record Network Parameter Values" on page 154
- "Configure SP Network Settings" on page 155
- "Viewing the Network Configuration" on page 158
- "Administering SPs" on page 161
- "Managing IP Addresses" on page 163
- "Display the MAC Address" on page 165

Related Information

- "Architectural Overview" on page 2
- "SP and SPP Guidelines" on page 81

- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at: `http://www.oracle.com/goto/ILOM/docs`

Network Resources Overview

This server has a pair of redundant SPs (SP0 and SP1). One of the SPs functions as the Active-SP to manage the platform, and the other acts as a Standby-SP that will assume the Active-SP role in the event of a failure.

Both SPs are individually accessible from the external network, so they need to be configured separately with unique IP addresses. As part of failover, the IP address assigned to an Active-SP migrates to the new Active-SP, depending on which SP is controlling the chassis. To enable you to connect to this IP address to manage the chassis, instead of accessing SP0 or SP1 separately, you must configure the IP address for the Active SP.

In addition, the server is capable of supporting up to four PDomains. One of the SPPs on each PDomain is identified as a PDomain-SPP, and it is responsible for managing tasks for the PDomain and hosting the rKVMS service for the PDomain. To enable rKVMS access to a PDomain, you need to configure the SPP network settings for that PDomain. PDomain-SPPs are also accessible from the external network, as long as you have configured IP addresses for them.

Related Information

- "Architectural Overview" on page 2
- "SP and SPP Guidelines" on page 81
- "Configure SP Network Settings" on page 155
- "Determine Which SP Is the Active SP" on page 161
- "Managing IP Addresses" on page 163
- "Configuring KVMS Settings" on page 111

▼ Record Network Parameter Values

- **Before you configure the SP, make note of the following network parameter values for your specific network configuration (your Network Administrator should be able to provide this information):**

Description	Path and Properties
Determine whether or not the selected SP or host is on the network. This property is enabled by default.	`/SP/network/SP0/ state=`*enabled*`|`*disabled* `/SP/network/SP1/ state=`*enabled*`|`*disabled* `/SP/network/ACTIVE_SP/ state=`*enabled*`|`*disabled* `/SP/network/HOST`*x*`/ state=`*enabled*`|`*disabled*

Determine the static IP address for the selected SP or host.	`/SP/network/SP0/ ipaddress`
	`/SP/network/SP1/ ipaddress`
	`/SP/network/ACTIVE_SP/ ipaddress`
	`/SP/network/HOST`*x*`/ ipaddress`

Assign a static IP address for the selected SP or host.	`/SP/network/SP0/ pendingipaddress=`*value* `/SP/network/SP1/ pendingipaddress=`*value* `/SP/network/ACTIVE_SP/ pendingipaddress=`*value* `/SP/network/HOST`*x*`/ pendingipaddress=`*value*
Determine the IP address for the subnet gateway.	`/SP/network pendingipgateway`

Description	Path and Properties
Assign the IP address for the subnet gateway.	`/SP/network pendingipgateway=`*gateway_ip*
Determine the netmask for the SP subnet.	`/SP/network pendingipnetmask`
Assign the netmask for the SP subnet.	`/SP/network pendingipnetmask=`*netmask*
Determine the MAC address of the selected SP.	`/SP/network/SP0/ macaddress` `/SP/network/SP1/ macaddress`
Determine the factory-assigned MAC address of the selected active SP or host.	`/ACTIVE_SP/ macaddress` `/SP/network/HOST`*x*`/ macaddress`
Commit the SP to use the pending settings, including those in SP0, SP1, ACTIVE, and HOST*x*.	`/SP/network commitpending=true`
Learn the IPv6 address for the SP from a network router configured for IPv6.	`/SP/network/SP0/ipv6 autoconfig=`*stateless* | *none* `/SP/network/SP1/ipv6 autoconfig=`*stateless* | *none* `/SP/network/ACTIVE_SP/ipv6 autoconfig=`*stateless* | *none* `/SP/network/HOST`*x*`/ipv6 autoconfig=`*stateless* | *none*
Specify a IPv6 static IP for the SP.	`/SP/network/SP0/ipv6 static_ipaddress=` *ipaddress* | *subnetmask* `/SP/network/SP1/ipv6 static_ipaddress=` *ipaddress* | *subnetmask* `/SP/network/ACTIVE_SP/ipv6 static_ipaddress=` *ipaddress* | *subnetmask* `/SP/network/HOST`*x*`/ipv6 static_ipaddress=` *ipaddress* | *subnetmask*

Related Information

- "SP and SPP Guidelines" on page 81
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at: `http://www.oracle.com/goto/ILOM/docs`

▼ Configure SP Network Settings

1. **After the SP boots, log in to the SP.**
   - If you are powering on the system for the first time after installation, use the SP serial ports to power on the system and run POST. You can then manually configure the SP NET MGT port.

Note – The NET MGT port is not operational until you configure network settings for the SP.

See "Log In to the SP (Local)" on page 103.

- If you have already configured the NET MGT port, log in to the SP through the NET MGT port.

2. **Set up the network connection with a static IP configuration using information collected in "Record Network Parameter Values" on page 154.**

Note – This server does not support DHCP at this time.

a. Set the IP address for the SP gateway.

```
-> set /SP/network pendingipgateway=aaa.bbb.ccc.ddd
Set "pendingipgateway" to "aaa.bbb.ccc.ddd"
```

b. Set the netmask that applies to all components in the chassis.

```
-> set /SP/network pendingipnetmask=255.255.255.0
Set "pendingipnetmask" to "255.255.255.0"
```

This example uses `255.255.255.0` to set the netmask. Your network environment subnet might require a different netmask. Use a netmask number most appropriate to your environment.

c. Assign IP addresses for `SP0`, `SP1`, the Active SP, and all PDomain-SPPs.

- For `SP0`:

```
-> set /SP/network/SP0/ pendingipaddress=xxx.xxx.xxx.xxx
Set "pendingipaddress" to "xxx.xxx.xxx.xxx"
```

- For `SP1`:

```
-> set /SP/network/SP1/ pendingipaddress=xxx.xxx.xxx.xxx
Set "pendingipaddress" to "xxx.xxx.xxx.xxx "
```

- For the Active SP:

```
-> set /SP/network/ACTIVE_SP/ pendingipaddress=xxx.xxx.xxx.xxx
Set "pendingipaddress" to "xxx.xxx.xxx.xxx "
```

- For each PDomain (HOST0–HOST3):

```
-> set /SP/network/HOSTx/ pendingipaddress=xxx.xxx.xxx.xxx
Set "pendingipaddress" to "xxx.xxx.xxx.xxx "
```

Note – If you are connecting to Oracle ILOM over a LAN, you will have to reconnect to Oracle ILOM after committing any IP property changes.

3. Verify that the parameters were set correctly.

For brevity, this example shows only the output for the IP address property.

```
-> show /SP/network -level 2 -output table ipaddress ipnetmask
ipgateway
  /SP/network -level 2 -output table ipaddress ipnetmask ipgateway
 Target               | Property                | Value
 ---------------------+-------------------------+-----------------
 /SP/network/         | ipaddress               | 0.0.0.0
 ACTIVE_SP            |                         |
 /SP/network/HOST0    | ipaddress               | 0.0.0.0
 /SP/network/HOST1    | ipaddress               | 0.0.0.0
 /SP/network/HOST2    | ipaddress               | 0.0.0.0
 /SP/network/HOST3    | ipaddress               | 0.0.0.0
 /SP/network/SP0      | ipaddress               | 0.10.0.0
 /SP/network/SP1      | ipaddress               | 0.0.0.0
 . . . . . .
 . . . . . .
->
```

Note – After setting the configuration parameters, you must enter the `set /SP/network commitpending=true` command for the new values to take affect.

4. Commit the changes to the SP network parameters.

```
-> set /SP/network commitpending=true
Set "commitpending" to "true"
```

Note – You can run the `show /SP/network` command again (after performing the `set /SP/network commitpending=true` command) to verify that the parameters have been updated.

You can now use the NET MGT port at any time to access the SP.

For more information about modifying default connectivity configuration properties with the Oracle ILOM features that are common to all platforms managed by Oracle ILOM, refer to the core Oracle ILOM documentation.

Related Information

- "SP and SPP Guidelines" on page 81
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at: `http://www.oracle.com/goto/ILOM/docs`

Viewing the Network Configuration

Use these topics to view network settings for the network and individual SPs and hosts.

- "View Configuration Details for the Network" on page 159
- "View Configuration Details for SPs and Hosts" on page 160

Related Information

- "Network Resources Overview" on page 153
- "Record Network Parameter Values" on page 154
- "Configure SP Network Settings" on page 155

▼ View Configuration Details for the Network

- **Run this command to view your server's network configuration information:**

```
-> show /SP/network
```

For example:

```
-> show /SP/network
  /SP/network
     Targets:
         ACTIVE_SP
         HOST0
         HOST1
         HOST2
         HOST3
         SP0
         SP1
         ipv6
         test
     Properties:
         commitpending = (Cannot show property)
         dhcp_clientid = none
         dhcp_server_ip = none
         ipdiscovery = static
         ipgateway = 10.134.132.254
         ipnetmask = 255.255.252.0
         pendingipdiscovery = static
         pendingipgateway = 10.134.132.254
         pendingipnetmask = 255.255.252.0
     Commands:
         cd
         set
         show
```

Related Information

- "SP and SPP Guidelines" on page 81
- "View Configuration Details for SPs and Hosts" on page 160
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at: http://www.oracle.com/goto/ILOM/docs

▼ View Configuration Details for SPs and Hosts

- **Run the `show` command from the following locations to view network configuration information for a specific SP or host:**

Description	Path and Command
Determine configuration details for the Active SP.	`/SP/network/ACTIVE_SP` `/SP/network/ACTIVE_SP/ipv6`
Determine configuration details for SP0.	`/SP/network/SP0` `/SP/network/SP0/ipv6`
Determine configuration details for SP1.	`/SP/network/SP1` `/SP/network/SP1/ipv6`
Determine configuration details for a specific host.	`/SP/network/HOST`*x* `/SP/network/HOST`*x*`/ipv6`

```
-> show /SP/network/ACTIVE_SP
  /SP/network/ACTIVE_SP
     Targets:
     Properties:
         ipaddress = 10.134.132.99
         macaddress = 00:21:28:A4:53:FC
         pendingipaddress = 10.134.132.99
         state = enabled
     Commands:
         cd
         set
         show
```

Related Information

- "SP and SPP Guidelines" on page 81
- "View Configuration Details for the Network" on page 159
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at: http://www.oracle.com/goto/ILOM/docs

Administering SPs

- "Determine Which SP Is the Active SP" on page 161
- "Change the Current Role of the SP Pair" on page 162
- "Disable or Re-Enable Network Access to an SP or Host" on page 163

Related Information

- "Network Resources Overview" on page 153
- "Record Network Parameter Values" on page 154
- "Configure SP Network Settings" on page 155
- "Viewing the Network Configuration" on page 158
- "Managing IP Addresses" on page 163
- "Display the MAC Address" on page 165

▼ Determine Which SP Is the Active SP

The following example shows that SP1 is assigned the status of the Active SP.

- **On an SP, type:**

```
-> show /SP/redundancy
  /SP/redundancy
     Targets:
     Properties:
         fru_name = /SYS/SP1
         initiate_failover_action = (none)
         status = Active
     Commands:
         cd
         set
         show
```

The `status` property can display the following responses.

Status	Response
The selected SP is the Active SP.	`status = Active`
The selected SP is the Standby SP.	`status = Standby`

Status	Response
The system has only one SP because, for example, one SP has failed to respond to or join the network.	`status = Standalone`

Related Information

- "SP and SPP Guidelines" on page 81
- "Change the Current Role of the SP Pair" on page 162
- "Disable or Re-Enable Network Access to an SP or Host" on page 163

▼ Change the Current Role of the SP Pair

Complete this task to change the current roles of the SP pair. For example, you might want to change the SP that is currently identified as the Active SP to be the Standby SP if you are replacing it.

1. **Log in to Oracle ILOM.**

   See "Logging In to Oracle ILOM (CLI)" on page 102.

2. **Determine which SP is currently identified as ACTIVE_SP.**

   See "Determine Which SP Is the Active SP" on page 161.

3. **If you want to change the role of the SP pair, effectively causing the Active SP to become the Standby SP, and the Standby SP to become the Active SP, type:**

```
-> set /SP/redundancy initiate_failover_action=true
```

Related Information

- "SP and SPP Guidelines" on page 81
- "Determine Which SP Is the Active SP" on page 161
- "Disable or Re-Enable Network Access to an SP or Host" on page 163

▼ Disable or Re-Enable Network Access to an SP or Host

- **At the Oracle ILOM prompt, use the `state` property to enable or disable the SP's network interface:**

```
-> set /SP/network/SP-Host state=value
```

where *SP-Host* can be:

- `/SP/network/ACTIVE_SP`
- `/SP/network/SP0`
- `/SP/network/SP1`
- `/SP/network/HOSTx`

and *value* can be:

- `enabled` (default)
- `disabled`

Related Information

- "SP and SPP Guidelines" on page 81
- "Determine Which SP Is the Active SP" on page 161
- "Change the Current Role of the SP Pair" on page 162

Managing IP Addresses

Use these tasks to display the current IP addresses for SPs or hosts and to assign an IP address to a specific SP or host.

- "Display IP Addresses" on page 164
- "Assign an IP Address" on page 165

Related Information

- "Network Resources Overview" on page 153
- "Record Network Parameter Values" on page 154
- "Configure SP Network Settings" on page 155
- "Viewing the Network Configuration" on page 158

- "Display the MAC Address" on page 165

▼ Display IP Addresses

- **View all assigned IP addresses (the `ipaddress` property).**

```
-> show /SP/network
  /SP/network
     Targets:
     Properties:
         commitpending = (Cannot show property)
         ipdiscovery = static
         ipgateway = xxx.xxx.xxx.xxx
         ipnetmask = 255.255.252.0
         pendingipdiscovery = static
         pendingipgateway = xxx.xxx.xxx.xxx
         pendingipnetmask = 255.255.255.0

  /SP/network/ACTIVE_SP
         ipaddress = xxx.xxx.xxx.xxx
         macaddress = 00:21:28:A4:53:FC
         pendingipaddress = xxx.xxx.xxx.xxx
         state = enabled
 . . . . . .
 . . . . . .
     Commands:
         cd
         set
         show
->
```

Alternatively, to view the IP address for a specific SP, SPP, or host, execute the `show` command from one of the following directories:

- `/SP/network/ACTIVE_SP`
- `/SP/network/SP0`
- `/SP/network/SP1`
- `/SP/network/HOST`*x*

Related Information

- "SP and SPP Guidelines" on page 81
- "Assign an IP Address" on page 165
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at: `http://www.oracle.com/goto/ILOM/docs`

▼ Assign an IP Address

- **Assign IP addresses for all SPs and PDomain-SPPs.**
  - For the Active SP:

```
-> set /SP/network/ACTIVE_SP/ pendingipaddress=xxx.xxx.xxx.xxx
Set "pendingipaddress" to "xxx.xxx.xxx.xxx "
```

  - For SP0:

```
-> set /SP/network/SP0/ pendingipaddress=xxx.xxx.xxx.xxx
Set "pendingipaddress" to "xxx.xxx.xxx.xxx"
```

  - For SP1:

```
-> set /SP/network/SP1/ pendingipaddress=xxx.xxx.xxx.xxx
Set "pendingipaddress" to "xxx.xxx.xxx.xxx"
```

  - For each SPP selected as the PDomain-SPP on hosts 0–3:

```
-> set /SP/network/HOSTx/ pendingipaddress=xxx.xxx.xxx.xxx
Set "pendingipaddress" to "xxx.xxx.xxx.xxx"
```

Related Information

- "SP and SPP Guidelines" on page 81
- "Display IP Addresses" on page 164
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at: http://www.oracle.com/goto/ILOM/docs

▼ Display the MAC Address

MAC addresses for the Active SP and all hosts are automatically configured by the server software, so you cannot set or change the property. The value is read and determined from the server's removable system configuration card (SCC PROM) or from the server module's ID PROM and then stored as a property in Oracle ILOM.

- **View all assigned MAC addresses (the `macaddress` property).**

```
-> show /SP/network
  /SP/network
     Targets:
     Properties:
         commitpending = (Cannot show property)
         ipdiscovery = static
         ipgateway = xxx.xxx.xxx.xxx
         ipnetmask = 255.255.252.0
         pendingipdiscovery = static
         pendingipgateway = xxx.xxx.xxx.xxx
         pendingipnetmask = 255.255.255.0

  /SP/network/ACTIVE_SP
         ipaddress = xxx.xxx.xxx.xxx
         macaddress = 00:21:28:A4:53:FC
         pendingipaddress = xxx.xxx.xxx.xxx
         state = enabled
 . . . . . .
 . . . . . .

     Commands:
         cd
         set
         show
->
```

Alternatively, to view the MAC address for a specific SP, SPP, or host, execute the `show` command from one of the following directories:

- `/SP/network/ACTIVE_SP`
- `/SP/network/SP0`
- `/SP/network/SP1`
- `/SP/network/HOST`*x*

Related Information

- "Network Resources Overview" on page 153
- "Record Network Parameter Values" on page 154
- "Configure SP Network Settings" on page 155
- "Viewing the Network Configuration" on page 158
- "Administering SPs" on page 161
- "Managing IP Addresses" on page 163

Configuring Domain Components

These topics include procedures for configuring components and features for individual PDomains.

- "Configuring Physical Domains" on page 167
- "Administering DCUs" on page 174
- "Administering CMUs, CMPs, and DIMMs" on page 177
- "Administering IOUs and PCIe Device Root Complexes" on page 179
- "Identifying Domain-Level Commands" on page 183

Related Information

- "Understanding the System Architecture" on page 1
- "Understanding System Administration Resources" on page 87

Configuring Physical Domains

Each PDomain is represented as `/Servers/PDomains/PDomain_`*x*`/HOST` in Oracle ILOM, where *x* ranges from 0 to one less than the maximum number of possible PDomains in the system (`PDomain_0`, `PDomain_1`, `PDomain_2`, `PDomain_3`).

For information about the preinstalled version of the Oracle Solaris OS that is available on each PDomain, see "Architectural Overview" on page 2.

Refer to these topics for information about administering PDomains.

- "Determine PDomain Type" on page 168
- "Specifying a PDomain Type" on page 168
- "Assign DCUs to a PDomain" on page 171
- "Unassign DCUs From a PDomain" on page 173

Related Information

- "PDomain Types" on page 3
- "Identifying Domain-Level Commands" on page 183

▼ Determine PDomain Type

The following task requires that the user account for a PDomain has the `admin` (`a`) role.

- **Determine whether or not the PDomain is a Bounded PDomain.**

```
-> show /Servers/PDomains/PDomain_x/HOST/ expandable
/Servers/PDomains/PDomain_x/HOST
 Properties:
     expandable = true|false
->
```

Note – The `expandable=true` setting indicates a non-Bounded PDomain. The `expandable=false` setting indicates a Bounded PDomain.

Related Information

- "PDomain Types" on page 3
- "Specifying a PDomain Type" on page 168

Specifying a PDomain Type

Specify the PDomain type for each active PDomain, where:

- `expandable=true` configures the type as a non-Bounded PDomain.
- `expandable=false` configures the type as a Bounded PDomain.

The default setting is `expandable=true`.

Caution – The PDomain type affects the physical address assignment of the devices in the PDomain. Consequently, if you have created Oracle VM Server for SPARC logical domains on the PDomain, and you change the PDomain type, you will not be able to boot the logical domain configuration when you restart the PDomain. You must reconfigure the logical domain configuration.

Use one of these topics to specify a PDomain type.

- "Configure a Non-Bounded PDomain" on page 169
- "Configure a Bounded PDomain" on page 169

Related Information

- "PDomain Types" on page 3
- "PDomain Guidelines" on page 82

▼ Configure a Non-Bounded PDomain

The domains in this server are configured as non-Bounded PDomains by default. You will only configure a domain to be a non-Bounded PDomain if it has previously been configured as a Bounded PDomain.

The following task requires that the user account for the PDomain has a user role of `admin` (a).

1. Configure the domain to be a non-Bounded PDomain.

```
-> set /Servers/PDomains/PDomain_x/HOST/ expandable=true
Set expandable to true
->
```

2. Verify that the PDomain is now configured as specified.

```
-> show /Servers/PDomains/PDomain_x/HOST/ expandable
/Servers/PDomains/PDomain_x/HOST
 Properties:
     expandable = true
->
```

Related Information

- "PDomain Types" on page 3
- "Determine PDomain Type" on page 168
- "Configure a Bounded PDomain" on page 169

▼ Configure a Bounded PDomain

The domains in this server are configured as non-Bounded PDomains by default.

The following task requires that the user account for the PDomain has a user role of `admin` (`a`).

1. **Determine how many DCUs are currently assigned to the PDomain.**

   When a non-Bounded PDomain has more than one DCU assigned to it, you must remove all but one of the DCUs before you can reconfigure it to be a Bounded PDomain. If you do not do so, the command will fail.

```
-> show /Servers/PDomains/PDomain_x/HOST/ dcus_assigned
/Servers/PDomains/PDomain_x/HOST
 Properties:
     dcus_assigned = /SYS/DCUx /SYS/DCUy
->
```

2. **If more than one DCU is assigned to the PDomain, remove the additional DCUs by specifying which DCU should remain in the current PDomain.**

   For example, to leave only DCU0 assigned to a PDomain that currently has DCU0, DCU1, and DCU2 assigned to it, type:

```
-> set /Servers/PDomains/PDomain_x/HOST/ dcus_assigned="/SYS/DCU0"
Set 'dcus_assigned' to '/SYS/DCU0'
->
```

3. **Specify a PDomain type.**

   This example configures the PDomain to be a Bounded PDomain.

```
-> set /Servers/PDomains/PDomain_x/HOST/ expandable=false
Set expandable to false
->
```

4. **Verify that the PDomain is now configured as specified.**

```
-> show /Servers/PDomains/PDomain_x/HOST/ expandable
/Servers/PDomains/PDomain_x/HOST
  Properties:
      expandable = false
->
```

Related Information

- "PDomain Types" on page 3
- "Determine PDomain Type" on page 168
- "Configure a Non-Bounded PDomain" on page 169
- "Unassign DCUs From a PDomain" on page 173

▼ Assign DCUs to a PDomain

You can assign as few as one and as many as four DCUs to a non-Bounded PDomain. A Bounded PDomain can have only one DCU assigned to it.

The following task requires that the user account for the PDomain has a user role of `admin` (a).

1. **For Bounded PDomains only, unassign the currently assigned DCU from the PDomain.**

   See "Unassign DCUs From a PDomain" on page 173.

2. **Check the availability of DCUs.**

   Only DCUs listed as available can be assigned to a PDomain.

   This example shows that only DCU2 and DCU3 are available for assignment to `PDomain_1`, which is a non-Bounded PDomain.

```
-> show /Servers/PDomains/PDomain_1/HOST dcus_available
  /Servers/PDomains/PDomain_1/HOST DCU_2,DCU_3
    Properties:
        dcus_available = /SYS/DCU2 /SYS/DCU3
```

Note – If the DCU you want to assign is not listed, you must locate and unassign it before it will be available. See "Unassign DCUs From a PDomain" on page 173.

---

3. **Specify which DCU should be assignable to the current PDomain.**

   The `dcus_assignable` property enables you to control which DCUs can be assigned to a PDomain.

```
-> set /Servers/PDomains/PDomain_1/HOST dcus_assignable=
"/SYS/DCU2"
Set dcus_assignable to /SYS/DCU2
->
```

Note – When you make a DCU available for assignment to a non-Bounded PDomain with the `dcus_assignable` property, the DCU is not added to the list of available DCUs; it replaces the existing DCUs. For example, if you start with `dcus_assignable=DCU0`, and you want both DCU0 and DCU1 to be available for assignment, you must specify `dcus_assignable=/SYS/DCU0 /SYS/DCU1`. If, instead, you specify `dcus_assignable=/SYS/DCU1`, the list of available DCUs will be changed to only DCU1; DCU0 will no longer be included in the list.

---

4. **Assign a DCU to the current PDomain.**

```
-> set /Servers/PDomains/PDomain_1/HOST/ dcus_assigned=
"/SYS/DCU2"
Set dcus_assigned to /SYS/DCU2
->
```

5. **Type the following commands and wait for them to return the following values to ensure that subsequent executions of** `/Servers/PDomains/PDomain_1/HOST` **will be able to run to completion.**

   a. **When you first run the following command, the system might return a value of** `operation_in_progress = Host DCU reconfiguration in progress`**. Continue to run the command until you receive the following output.**

```
-> show /Servers/PDomains/PDomain_1/HOST operation_in_progress
 /Servers/PDomains/PDomain_1/HOST
  Properties:
     operation_in_progress = none
->
```

   b. **Run this command until the system returns the following information.**

```
-> show /Servers/PDomains/PDomain_1/SP
/Servers/PDomains/PDomain_1/SP
 Targets:
     network
     powermgmt
     services
     sessions
 Properties:
     current_hostname = xxx-xxx-xx-spp0
     hostname = xxx-xxx-xx-spp0
 Commands:
     cd
     reset
     set
     show
     version
->
```

   Waiting for these two commands to complete ensures that subsequent executions of `start /Servers/PDomains/PDomain_1/HOST` will be able to run to completion.

6. **Verify that the DCU was added to the PDomain.**

```
-> show /Servers/PDomains/PDomain_1/HOST dcus_assigned
/Servers/PDomains/PDomain_1/HOST
  Properties:
      dcus_assigned = /SYS/DCU2
->
```

Related Information

- "Architectural Overview" on page 2
- "Power On" on page 118
- "Unassign DCUs From a PDomain" on page 173

▼ Unassign DCUs From a PDomain

If a DCU is assigned to a PDomain, you must unassign it before you can assign it to another PDomain.

1. **Determine to which PDomain a DCU is currently assigned.**

   This example shows that DCU2 is assigned to PDomain1.

```
-> show /System/DCUs/DCU_2 host_assigned
 /System/DCUs/DCU_2
  Properties:
      host_assigned = /HOST1
->
```

2. **Unassign DCUs from the PDomain.**

   You can remove all DCUs from a PDomain, or you can remove a specific DCU from a PDomain.

   - To remove all assigned DCUs from PDomain_1:

```
-> set /Servers/PDomains/PDomain_1/HOST/ dcus_assigned=""
Set 'dcus_assigned' to ''
->
```

- To remove only DCU2 from a PDomain that has DCU0, DCU1, and DCU2 assigned to it, specify the DCUs that should remain in the PDomain. In this example, remove DCU2 by assigning only DCU0 and DCU1.

```
-> set /Servers/PDomains/PDomain_1/HOST/ dcus_assigned="/SYS/DCU0
/SYS/DCU1"
Set 'dcus_assigned' to '/SYS/DCU0,/SYS/DCU1'
->
```

3. **Verify that the DCU is now available for assignment to a different PDomain (in this case, PDomain_2).**

```
-> show /Servers/PDomains/PDomain_2/HOST/ dcus_available
  Properties:
     dcus_available = /SYS/DCU2,/SYS/DCU3
```

Related Information

- "Assign DCUs to a PDomain" on page 171

Administering DCUs

Each DCU is represented as /System/DCUs/DCU_*x* in Oracle ILOM, where *x* ranges from 0 to one less than the maximum number of possible DCUs in a PDomain (`DCU_0`, `DCU_1`, `DCU_2`, `DCU_3`).

Use these topics to configure and view additional information about all of the DCUs in a system and about specific DCUs.

- "Determine Current DCU Assignment" on page 174
- "Migrate DCUs to a New PDomain (CLI)" on page 175

Related Information

- "Architectural Overview" on page 2
- "Identifying Domain-Level Commands" on page 183

▼ Determine Current DCU Assignment

- **Use one of these methods to determine DCU assignment.**

- Determine to which PDomain a specific DCU is assigned.

```
-> show /System/DCUs/DCU_x host_assigned
   /System/DCUs/DCUx
    Properties:
      host_assigned = HOSTx
```

- Determine which DCUs are assigned to a specific PDomain.

```
-> show /Servers/PDomains/PDomain_x/ dcus_assigned
   /Servers/PDomains/PDomain_x/HOST
    Properties:
      dcus_assigned = /SYS/DCUx
```

Related Information

- "View DCU Resources and Firmware Versions" on page 207
- "View System-Level DCU Properties (CLI)" on page 204
- "View Individual DCU Properties" on page 206
- "DCU, CMU, and CMP Guidelines" on page 82

▼ Migrate DCUs to a New PDomain (CLI)

In this example, DCU0 and DCU1 are assigned to PDomain_0, and DCU2 and DCU_3 are assigned to PDomain_1. Follow these steps to move DCU3 to PDomain_0.

Note – Changing a PDomain configuration might require you to reconfigure the system's boot disks. See "Managing the Server's Boot Behavior" on page 124 for more information.

---

1. **Stop the PDomain of the DCU that you want to migrate.**

   This example stops PDomain_1.

```
-> stop /Servers/PDomains/PDomain_1/HOST
Are you sure you want to stop
/Servers/PDomains/PDomain_1/HOST/console (y/n) ? y
Stopping /Servers/PDomains/PDomain_1/HOST
->
```

2. **Specify which DCU should remain with the current PDomain, effectively unassigning the DCU you want to migrate.**

   This example assigns `DCU2` to `PDomain_1`, effectively removing `DCU3` from the PDomain.

```
-> set /Servers/PDomains/PDomain_1/HOST dcus_assigned="/SYS/DCU2"
Set 'dcus_assigned' to 'DCU2'
->
```

3. **Verify that the remaining DCU is still assignable to the current PDomain.**

   This example verifies that `DCU2` remains in the list of DCUs that can be assigned to `PDomain_1`.

```
-> show /Servers/PDomains/PDomain_1/HOST dcus_assignable
   /Servers/PDomains/PDomain_1/HOST
    Properties:
      dcus_assignable = /SYS/DCU0 /SYS/DCU1 /SYS/DCU2 /SYS/DCU3
```

4. **Stop the PDomain to which you will add the DCU.**

   This example stops `PDomain_0`.

```
-> stop /Servers/PDomains/PDomain_0/HOST
Are you sure you want to stop /Servers/PDomains/PDomain_0/HOST
(y/n)? y
Stopping /Servers/PDomain_0/HOST

->
```

5. **Verify that the DCU is assignable to the current PDomain.**

   This example verifies that `DCU3` appears in the list of DCUs that can be assigned to `PDomain_0`. If the desired DCU does not appear in the list of DCUs that can be assigned, assign it as shown in Step 2.

```
-> show /Servers/PDomains/PDomain_0/HOST dcus_assignable
   /Servers/PDomains/PDomain_0/HOST
    Properties:
      dcus_assignable = /SYS/DCU0 /SYS/DCU1 /SYS/DCU2 /SYS/DCU3
```

6. **Assign the DCU to the new PDomain.**

   This example reassigns DCU3 to PDomain_0 in addition to DCU0 and DCU1, which were previously available for assignment to the PDomain.

```
-> set /Servers/PDomains/PDomain_0/HOST dcus_assigned="/SYS/DCU0
/SYS/DCU1 /SYS/DCU3"
Set dcus_assigned to /SYS/DCU0 /SYS/DCU1 /SYS/DCU3
```

7. **Start the PDomain that was stopped in** Step 1**.**

```
-> start /Servers/PDomains/PDomain_1/HOST
Are you sure you want to start /Servers/PDomains/PDomain_1/HOST/
(y/n) ? y
Starting /Servers/PDomains/PDomain_1/HOST
->
```

Related Information

- "View DCU Resources and Firmware Versions" on page 207
- "View System-Level DCU Properties (CLI)" on page 204
- "View Individual DCU Properties" on page 206
- "DCU, CMU, and CMP Guidelines" on page 82

Administering CMUs, CMPs, and DIMMs

Each DCU has four CPU memory units (CMUs) that have two memory boards, two CPU memory processors (CMPs), and 64 DIMM slots.

Each CMU is represented as /System/DCUs/DCU_*x*/CMU_*x* in Oracle ILOM where CMU_*x* ranges from 0 to one less than the maximum number of possible CMUs in a DCU (CMU_0, CMU_1, CMU_2, CMU_3). For DCU_0/CMU_*x*, *x* = 0–3. For DCU_1/CMU_*x*, *x* = 4–7, and so on to CMU_15.

Each CMP is represented as /System/Processors/CPUs/CPU_*x* in Oracle ILOM where CMP_*x* ranges from 0 to 31. The CMP targets have a location property that corresponds to the CMU/CMP pair. For example, location might equal CMU0/CMP0 (processor board 0 and host processor 0).

Each DIMM is represented as /System/Memory/DIMMs/DIMM_*x* in Oracle ILOM.

See this topic for information about viewing information about the installed CMUs.

- "Display Summary of Installed CMUs" on page 178

Related Information

- "DCU, CMU, and CMP Guidelines" on page 82
- "Memory (DIMM) Guidelines" on page 85
- "View Individual CMU Properties" on page 208
- *Server Service*, memory configuration

▼ Display Summary of Installed CMUs

- **Use one of these methods to display information about the CMUs installed in the system.**
  - Determine the total number of CMUs installed in the system.

```
-> show /System/Processors summary_description
   /System/Processors
    Properties:
      summary_description = Twelve Oracle SPARC / M6
```

  - Determine how many CMUs are installed in a particular DCU.

```
-> show -level 2 /System/DCUs cpu_summary
   /System/DCUs/DCU_0
    Properties:
      cpu_summary = Zero CPU

   /System/DCUs/DCU_1
    Properties:
      cpu_summary = Four Oracle SPARC M6

   /System/DCUs/DCU_2
    Properties:
      cpu_summary = Zero CPU

   /System/DCUs/DCU_3
    Properties:
      cpu_summary = Eight Oracle SPARC M6
```

Note – These example configurations show a total of 12 Oracle SPARC M6 CMUs installed in the system. The type of CMU reported depends on the type installed in your system, so the system could report the presence of Oracle SPARC M5 CMUs, instead. Under some conditions (for example, following the installation or removal of a CMU) the system might return an incorrect value or a value of "Oracle SPARC," with no type identified. The system will return the correct CMU type once the DCU or CMU has been successfully restarted.

Related Information

- "View DCU Resources and Firmware Versions" on page 207
- "View System-Level DCU Properties (CLI)" on page 204
- "View Individual DCU Properties" on page 206
- "DCU, CMU, and CMP Guidelines" on page 82

Administering IOUs and PCIe Device Root Complexes

There are 4 IOUs in this system; one for each DCU. Each IOU has 2 I/O boards, 4 EMS modules, 16 PCIe slots, and 8 disk drives. Each IOU is represented as `/SYS/IOU_`*x* in Oracle ILOM (`IOU_0`, `IOU_1`, `IOU_2`, `IOU_3`).

There are 64 root complexes in this server (16 per DCU). These root complexes are named `pci_0` to `pci_63`. See "Understanding PCIe Slot Root Complex Names and Device Paths" on page 8 for the root complex names of each PCIe and EMS slot in the server.

The following topics explain how to reconfigure I/O paths that are assigned to the PCIe slots on a specific IOU and how to identify root complexes using the Oracle VM Server for SPARC `ldm` command.

Note – These topics do not describe how to create logical domains using the Oracle VM Server for SPARC software. Refer to the Oracle VM Server for SPARC documentation for complete instructions on installing and configuring logical domains on the server.

- "Manage I/O Path Reconfiguration Settings" on page 180
- "Identify the Root Complex of a Device" on page 181

Related Information

- "PCIe Communication and Paths" on page 5
- "Understanding PCIe Slot Root Complex Names and Device Paths" on page 8

▼ Manage I/O Path Reconfiguration Settings

Use `ioreconfigure` to control under what conditions on the host (if any) the state of the hardware is checked after a PDomain is started or reset, and if necessary, whether I/O paths should be reconfigured to optimize system performance based on the current CMP configuration.

Note – Reconfiguring the I/O paths will change the PCIe addresses and external addresses associated with boot devices.

- **Specify how I/O paths are checked and reconfigured on a specific PDomain.**

```
-> set /Servers/PDomains/PDomain_x/HOST/ ioreconfigure=value
```

  - `true` – Checks and reconfigures, if necessary, the I/O paths each time the PDomain is powered on or reset. PCIe switches will be configured to create the minimum required number of virtual switches to connect all of the available root complexes, which might result in changes to the I/O paths.
  - `false` – If a new CMP (root complex) has been added since the last boot or reset, and the associated I/O paths were previously inaccessible, add the new paths. Never reconfigures the I/O paths. This is the recommended setting once a system has been configured.
  - `add_only` – If a new CMP (root complex) has been added since the last boot or reset, reconfigure the I/O paths for optimal bandwidth by placing the switch in its unmerged configuration, which might result in changes to the I/O paths.

  The default value is `true`. When the control domain creates its first guest domain, then the `ioreconfigure` variable is set to `add_only`.

Note – If the PCIE switches in the I/O path are not currently in use, and `ioreconfigure` is set to `true`, configure the I/O paths for maximum connectivity. Otherwise, configure the new paths for optimal I/ O bandwidth.

Related Information

- "Understanding PCIe Device Root Complexes" on page 4
- "PCIe Device Root Complex Failover Behavior" on page 32

▼ Identify the Root Complex of a Device

The Oracle VM Server for SPARC `ldm list-io` command lists the root complexes and I/O devices on a single PDomain. By searching the `ldm list-io` output for a specific PCIe or EMS slot number, you can determine the root complex of an installed PCIe device.

The `ldm list-io` command displays the root complexes and the PCIe devices in the PDomain. The `ldm list-io` output is divided into three sections:

- A list of the root complexes in the PDomain (labeled `BUS`).
- A list of PCIe and EMS slots that includes whether the slots are occupied (`OCC`) with a device or empty (`EMP`).
- A list of I/O devices installed in the PDomain.

Note – For more information about the `ldm` command and for instructions on assigning devices to I/O domains, refer to the Oracle VM Server for SPARC documentation.

---

1. **Understand the hardware configuration of your PDomain.**

   A PDomain can include one to four DCUs and each DCU can contain two or four CMUs. The `ldm` command output will contain all of the PCIe and EMS slots in the PDomain.

2. **Review the root complex names for each DCU in your physical domain.**

   See "Understanding PCIe Device Root Complexes" on page 4 for a list of the root complexes and FRU names for every PCIe and EMS slot in the server.

3. **At a superuser prompt, use the `grep` command to search `ldm list-io` output to display the root complex for a PCIe slot.**

   Use the `grep` command with the IOU number and slot number of the slot to search the `ldm list-io` output to list the root complex:

```
# ldm list-io | grep IOUy/PCIEx
```

   Replace *y* with the IOU number containing the slot and *x* with the number of the slot. The IOU number will be the same as the DCU number (DCU2 contains IOU2).

   For example, to determine the root complex of the PCIe slot 12 of IOU0, type:

```
# ldm list-io | grep IOU0/PCIE12
/SYS/IOU0/PCIE12                        PCIE   pci_14   primary  EMP
```

   The root complex is shown in the third column of the output. In the preceding example, `pci_14` is the root complex for PCIe slot 12 in IOU0.

   To determine the root complex of EMS slot 3 in IOU1, type:

```
# ldm list-io | grep IOU1/EMS3
/SYS/IOU1/EMS3/CARD/NET0                PCIE   pci_20   primary  OCC
/SYS/IOU1/EMS3/CARD/SCSI                PCIE   pci_20   primary  OCC
/SYS/IOU1/EMS3/CARD/NET0/IOVNET.PF0       PF     pci_20   primary
/SYS/IOU1/EMS3/CARD/NET0/IOVNET.PF1       PF     pci_20   primary
```

   The root complex of EMS slot 3 in IOU1 (and DCU1) is `pci_20`. The `ldm` output also includes the network and SAS devices associated with the EMS module.

Related Information

- Oracle VM Server for SPARC documentation (`http://www.oracle.com/goto/VM-SPARC/docs`)
- "Understanding PCIe Device Root Complexes" on page 4
- "Understanding PCIe Slot Root Complex Names and Device Paths" on page 8

Identifying Domain-Level Commands

Most of the properties you can configure using Oracle ILOM are configured for the entire system. However, some properties are configured for an individual PDomain or its related SP.

This topic provides the platform-specific Oracle ILOM features that are available on this server, as well as the common set of features that are executed from `/Servers/PDomains/PDomain_x/HOST` for this server rather than from `/HOST`, as documented in the Oracle ILOM documentation.

For more information about the properties you can set for features that are common to all platforms managed by Oracle ILOM, refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

`http://www.oracle.com/goto/ILOM/docs`

These topics provide the path from which you can execute domain-level commands.

- "PDomain Configuration and Monitoring Commands" on page 183
- "Host Power Commands" on page 185
- "Boot Mode Commands" on page 186
- "Power Management Commands" on page 187
- "Single Sign-On Service Network Deployment Commands" on page 188
- "Dedicated SP Interconnect Property Commands" on page 189
- "Virtual Keyswitch Property Commands" on page 192
- "PDomain Monitoring Commands" on page 193
- "Verified Boot Commands" on page 193

Related Information

- "PDomain Types" on page 3

- *Server Service*

PDomain Configuration and Monitoring Commands

In addition to the standard Oracle ILOM domain properties, you can define or view the following properties for each PDomain.

Task	Command
Specify a PDomain type.	-> **set /Servers/PDomains/PDomain_*x*/HOST expandable=***value***** where `true` is a non-Bounded PDomain and `false` is a Bounded PDomain.
Specify which DCUs can be assigned to the current PDomain.	-> **set /Servers/PDomains/PDomain_*x*/HOST dcus_assignable= /SYS/DCU*x* DCU*y*** where *x*, *y*, etc. are any DCU 0–3.
Assign or remove DCUs to or from a PDomain by specifying which DCU should now be assigned to the specified DCU.	-> **set /Servers/PDomains/PDomain_*x*/HOST dcus_assigned= /SYS/DCU*x***
View which DCUs can be assigned to the current PDomain and are not currently assigned to another PDomain (are not listed under `dcus_assigned`). Once you assign a DCU to a PDomain, it appears under `dcus_available`.	-> **show /Servers/PDomains/PDomain_*x*/HOST dcus_available**
View MAC address and OpenBoot and HOST versions.	-> **show /Servers/PDomains/PDomain_*x*/HOST macaddress** -> **show /Servers/PDomains/PDomain_*x*/HOST obp_version** -> **show /Servers/PDomains/PDomain_*x*/HOST post_version**
View Alert Management properties for a specific PDomain.	-> **show /Servers/PDomains/PDomain_*x*/SP/alertmgmt**
View SNMP properties for a specific PDomain.	-> **show /Servers/PDomains/PDomain_*x*/SP/services/snmp**

For more information about the properties for configuration and monitoring commands that are common to all platforms managed by Oracle ILOM, refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

`http://www.oracle.com/goto/ILOM/docs`

Related Information

- "Display the MAC Address" on page 165
- "Configuring Physical Domains" on page 167
- "Administering DCUs" on page 174
- "Display the Firmware Version" on page 213

Host Power Commands

You can start, stop, or reset the whole system or an individual PDomain, and you can connect to each PDomain on the server separately.

To perform these tasks, user accounts on the server and on individual PDomains must be assigned console (c) user roles. User accounts for the components you want to start, stop, or reset must be assigned reset (r) user roles.

The following table shows the commands for connecting to and controlling components using the Oracle ILOM CLI.

Task	Command
Connect to the host console.	-> **start /Servers/PDomains/PDomain_*x*/HOST/console**
Perform power operations on all domains.	-> **start /System** -> **stop /System** -> **reset /System**
Perform power operations on a specific domain.	-> **start /Servers/PDomains/PDomain_*x*/HOST** -> **stop /Servers/PDomains/PDomain_*x*/HOST** -> **reset /Servers/PDomains/PDomain_*x*/HOST**
Specify if the host should continue to boot domains that experience a fatal error.	-> **set /Servers/PDomains/PDomain_*x*/HOST autorunonerror=** *value*
Specify what Oracle ILOM should do when the host leaves the RUNNING state (when the watchdog timer expires).	-> **set /Servers/PDomains/PDomain_*x*/HOST autorestart=***value*

For information about the available values for these properties and for information about features that are common to all platforms managed by Oracle ILOM, refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

`http://www.oracle.com/goto/ILOM/docs`

Related Information

- "Power States" on page 118
- "Power On" on page 118
- "Power Off" on page 119
- "Reset the SP (CLI)" on page 122
- "Reset the SP (Web Interface)" on page 122
- "Reset a Physical Domain" on page 123

Boot Mode Commands

Boot mode (`bootmode`) properties enable you to override the default method the server uses when it boots. This ability is useful to override particular OpenBoot or Oracle VM Server settings that might be incorrect, to set up OpenBoot variables using a script, or to perform similar tasks.

For example, if the OpenBoot settings have become corrupt, you can set the `bootmode` state property to `reset_nvram` and then reset the server to its factory default OpenBoot settings.

Service personnel might instruct you to use the `bootmode` script property for problem resolution. The full extent of script capabilities are not documented and exist primarily for debugging.

Because `bootmode` is intended to be used to correct a problem with the OpenBoot or Oracle VM Server settings, the `bootmode` takes effect for a single boot only. Additionally, to prevent an administrator from setting a `bootmode` state property and forgetting about it, a `bootmode` state property expires if the host is not reset within 10 minutes of the `bootmode` state property being set.

Use the Oracle ILOM boot mode properties to specify how the host boots when correcting a problem with OpenBoot or Oracle VM Server for SPARC settings.

The following table shows the commands for connecting to and controlling components using the Oracle ILOM CLI.

Task	Command
Configure the host boot mode.	1. Determine the valid Oracle VM server configurations on your SP. -> **show /Servers/PDomains/PDomain_*x*/HOST/domain/configs** 2. Set the boot mode configuration. -> **set /Servers/PDomains/PDomain_*x*/HOST/bootmode config=***configname*
Change the host boot mode behavior at reset.	-> **set /Servers/PDomains/PDomain_*x*/HOST/bootmode state=** *value*
Manage the host boot mode script.	-> **set /Servers/PDomains/PDomain_*x*/HOST/bootmode script=** *value*
Display the host boot mode expiration date.	-> **show /Servers/PDomains/PDomain_*x*/HOST/bootmode expires**
Override OpenBoot settings to reset the server.	-> **set /Servers/PDomains/PDomain_*x*/HOST/domain/control auto-boot=disabled** -> **reset /Servers/PDomains/PDomain_*x*/HOST/domain/control [-force] [-script]**

For information about setting boot mode properties with the features that are common to all platforms managed by Oracle ILOM, refer to the Oracle ILOM documentation at:

http://www.oracle.com/goto/ILOM/docs

Related Information

- "Change the Default Boot Device (ok Prompt)" on page 124
- "Create an OpenBoot Boot Path to a Boot Disk" on page 125
- "Enable or Disable Automatic Booting (ok Prompt)" on page 127
- "Boot the OS (Oracle ILOM)" on page 132
- "Manually Boot the OS (ok Prompt)" on page 133

Power Management Commands

You can optionally set system management policies to control power-on and power-off policies on boot.

You must configure the following properties separately for a specific PDomain. These properties cannot be set for the entire system under `/SP`.

Task	Command
View power allocated for a specific PDomain.	**show /Servers/PDomains/PDomain_*x*/SP/powermgmt/budget**
Configure power allocated for a specific PDomain.	**set /Servers/PDomains/PDomain_*x*/SP/powermgmt/budget**
View power consumption properties for a specific PDomain.	**show /Servers/PDomains/PDomain_*x*/SP/powermgmt/powerconf**
Configure power consumption properties for a specific PDomain.	**set /Servers/PDomains/PDomain_*x*/SP/powermgmt/powerconf**

For information about setting power management properties with the features that are common to all platforms managed by Oracle ILOM, refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

http://www.oracle.com/goto/ILOM/docs

Related Information

- "Power States" on page 118

- "Power On" on page 118
- "Power Off" on page 119
- "Reset the SP (CLI)" on page 122
- "Reset the SP (Web Interface)" on page 122
- "Reset a Physical Domain" on page 123

Single Sign-On Service Network Deployment Commands

You can optionally modify default network deployment properties. Configure these properties separately for a specific PDomain. These properties cannot be set for the entire system.

Task	Command
View Single Sign On properties for a specific PDomain.	**show /Servers/PDomains/PDomain_*x*/SP/services/sso**
View whether Single Sign On for a specific PDomain is disabled or enabled.	**show /Servers/PDomains/PDomain_*x*/SP/services/sso/state**
View KVMS properties for a specific PDomain.	**show /Servers/PDomains/PDomain_*x*/SP/services/kvms**

For more information about setting network deployment properties with the features that are common to all platforms managed by Oracle ILOM, refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

http://www.oracle.com/goto/ILOM/docs

Related Information

- "Oracle ILOM Remote System Console Plus Overview" on page 93

Dedicated SP Interconnect Property Commands

You can establish an internal connection to Oracle ILOM on the active SP from a host OS client without using the NET MGT port. The internal connection is called an *interconnect* and uses an internal Ethernet-over-USB interface.

Configure this property for a specific PDomain. This property cannot be set for the entire system.

Caution – If the interconnect becomes unavailable, synchronization of FMA fault lists can fail without warning. See "FMA Fault Proxying and Reserved Root Complexes" on page 190 for details.

Task	Command
View the dedicated interconnect settings for a PDomain.	**show /Servers/PDomains/PDomain_*x*/SP/network/interconnect**
Configure the dedicated interconnect settings for a PDomain.	**set /Servers/PDomains/PDomain_*x*/SP/network/interconnect**

For information about the available values for these properties and for information about features that are common to all platforms managed by Oracle ILOM, refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

`http://www.oracle.com/goto/ILOM/docs`

Related Information

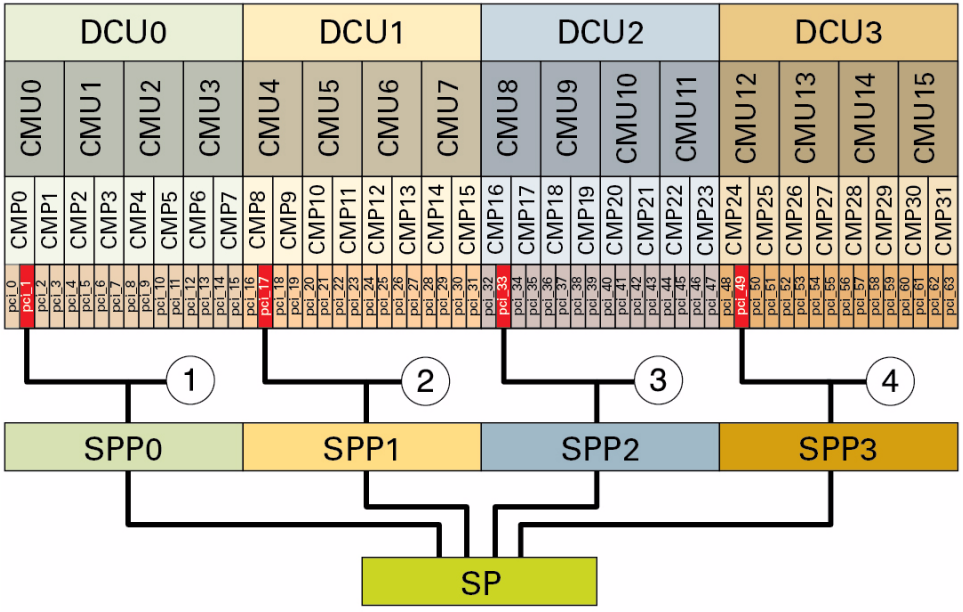
- "Establish a Network Management Connection to Oracle ILOM" on page 99
- "FMA Fault Proxying and Reserved Root Complexes" on page 190

FMA Fault Proxying and Reserved Root Complexes

Always reserve root complexes `pci_1`, `pci_17`, `pci_33`, and `pci_49` for use by the control domain. Never assign these root complexes to a non-primary domain. Control domains use paths through these reserved root complexes to maintain synchronized lists of faults in the PDomain host and the active SP.

Caution – If a control domain cannot access the reserved root complexes, it cannot synchronize the FMA fault lists. You will not be warned if this failure occurs.

These reserved root complexes are part of private internal networks (interconnects) that connect DCUs and SPPs to the SPs.



1	This path continues to PCIe slot 2 in IOU0 in a fully-populated DCU0, or to slots 1 and 2 in IOU0 in a half-populated DCU0.
2	This path continues to PCIe slot 2 in IOU1 in a fully-populated DCU1, or to slots 1 and 2 in IOU1 in a half-populated DCU1.
3	This path continues to PCIe slot 2 in IOU2 in a fully-populated DCU2, or to slots 1 and 2 in IOU2 in a half-populated DCU2.

4	This path continues to PCIe slot 2 in IOU3 in a fully-populated DCU3, or to slots 1 and 2 in IOU3 in a half-populated DCU3.

If a PDomain has more than one DCU, the PDomain's interconnect uses only one of these paths. However, any SPP can become a Pdomain-SPP, so all root complexes in a PDomain must continue to be owned by the control domain.

Caution – Do not assign an empty DCU to a PDomain. If the system selects the SPP for the empty DCU to be the PDomain-SPP, the DCU-to-SP interconnect will fail, and FMA fault lists on the host and the SP will be unsynchronized.

Note – You can assign PCIe slot 2 in a fully-populated DCU to a non-primary domain. The adapter card in that slot must support DIO. Similarly, in a half-populated DCU, you can assign both slots 1 and 2 to non-primary domains. For details, see the *Oracle VM Server for SPARC 3.1 Administration Guide*, creating an I/O domain by assigning PCIe endpoint devices at:
`http://www.oracle.com/goto/VM-SPARC/docs`.

Related Information

- "Control Domain and Reserved Root Complexes" on page 4
- "Dedicated SP Interconnect Property Commands" on page 189
- Oracle VM Server for SPARC documentation
  (`http://www.oracle.com/goto/VM-SPARC/docs`)

Virtual Keyswitch Property Commands

Configure this property separately for each PDomain to specify how the PDomain will power on. This property cannot be set for the entire system.

Task	Command
Set the position of the virtual keyswitch for a specific PDomain.	**`set /Servers/PDomains/PDomain_`***x*`**/HOST keyswitch_state=`** *value* where *value* is `normal`, `Standby`, `Diag`, or `Locked`.

For information about the available values for these properties and for information about Oracle ILOM features that are common to all platforms managed by Oracle ILOM, refer to the Oracle ILOM documentation at:

`http://www.oracle.com/goto/ILOM/docs`

Related Information

- "Power States" on page 118
- "Power On" on page 118
- "Power Off" on page 119
- "Discover Faults Using POST" on page 210
- "Update the Firmware" on page 214

PDomain Monitoring Commands

You can monitor the status and health of PDomains using the following properties.

Task	Command
Set the mode of the TPM device on the next power on event.	**set /Servers/PDomains/PDomain_*x*/HOST/tpm** mode=*value*
Clear the TPM state on the next power on event.	**set /Servers/PDomains/PDomain_*x*/HOST/tpm forceclear=***value* where `true` clears the TPM state and `false` (default) logs the TPM state.
Determine whether or not the state capture script will run when catastrophic errors occur.	**set /Servers/PDomains/PDomain_*x*/HOST state_capture_on_error=***value* where `enabled` (default) allows the script to run and `disabled` prevents the script from running.
Set the state for fatal error capturing and handling.	**set /Servers/PDomains/PDomain_*x*/HOST state_capture_status=***value* where `enabled` (default) reports fatal errors. Other properties include `disabled`, `debug`, `fatal-in-progress`, and `debug-fatal-in-progress`.

For information about the available values for these properties and for information about Oracle ILOM features that are common to all platforms managed by Oracle ILOM, refer to the Oracle ILOM documentation at:

`http://www.oracle.com/goto/ILOM/docs`

Related Information

- "Discover Faults Using POST" on page 210

Verified Boot Commands

The Oracle Verified Boot function enables Oracle Solaris to verify the integrity of software and firmware that is installed on the server before it is loaded and executed. When Oracle Solaris verifies that specific software or firmware has not been tampered with, the module is assigned a system certificate.

Use Oracle ILOM to perform the following verification-related tasks:

- Enable the Oracle Verified Boot function
- Display preinstalled system certificates
- Manage custom system certificates

For information about setting Oracle Verified Boot properties with the features that are common to all platforms managed by Oracle ILOM, refer to the Oracle ILOM documentation at:

http://www.oracle.com/goto/ILOM/docs

The following table shows the commands used to perform these tasks using the Oracle ILOM CLI.

Task	Command
Enable verification.	• Enable boot verification for boot blocks and the initial two Oracle Solaris modules, UNIX and GENUNIX on a specific domain. If verification fails for a boot block, UNIX, or GENUNIX, Oracle Solaris logs an error message and generates a system panic. -> **set /Servers/PDomains/PDomain_*x*/HOST/verified_boot/boot_policy=enforce** • Enable boot verification for module policies (modules after UNIX and GENUNIX) on a specific domain. If verification fails for a Solaris module, Oracle Solaris logs an error message and does not load the module, but Oracle Solaris will continue to execute. -> **set /Servers/PDomains/PDomain_*x*/HOST/verified_boot/module_policy=enforce** **Note -** Setting either of these properties to `warning` causes Oracle Solaris to log an error message with no further action.

Task	Command
View system certificates.	• View the preinstalled certificates for a specific domain. -> **show /Servers/PDomains/PDomain_*x*/HOST/verified_boot/system_certs** • View the user-managed certificates for a specific domain. -> **show /Servers/PDomains/PDomain_*x*/HOST/verified_boot/user_certs** • View the preinstalled Oracle Solaris system certificate for a specific domain. -> **show /Servers/PDomains/PDomain_*x*/HOST/verified_boot/system_certs/1** • View the user-managed certificates for a specific domain. -> **show /Servers/PDomains/PDomain_*x*/HOST/verified_boot/user_certs/*x*** where *x* is a value of 1–5, indicating which public key certificate you want to load.
Delete a user-managed certificate.	-> **reset /Servers/PDomains/PDomain_*x*/HOST/verified_boot/user_certs/*x***

Verify the deletion of a user-managed certificate.	-> **show /Servers/PDomains/PDomain_*x*/HOST/verified_boot/user_certs/*x* issuer**
	`/Servers/PDomains/PDomain_x/HOST/verified_boot/usercerts/x`
	`Properties:`
	`issuer = (none)`

Related Information

- "Boot Mode Commands" on page 186
- "Managing the Server's Boot Behavior" on page 124

Monitoring the Server

This server provides many ways to identify faulty behavior, including LEDs, Oracle ILOM, and POST. For specific information about LEDs, and for complete troubleshooting information, refer to the service manual for your server.

- "Locating the Server" on page 197
- "Obtain the Server Serial Number" on page 199
- "Viewing Server and Component Information" on page 200
- "Monitoring Faults" on page 209

Related Information

- "Understanding Platform-Specific Oracle ILOM Features" on page 89
- *Server Service*

Locating the Server

Use one of these topics to physically locate the server by illuminating the server's Locate LED.

- "Locate the Server (Web Interface)" on page 197
- "Locate the Server (CLI)" on page 198

Related Information

- "Viewing Server and Component Information" on page 200

▼ Locate the Server (Web Interface)

1. **Log in to the Oracle ILOM web interface.**

   See "Logging In to Oracle ILOM" on page 100.

2. **View the System Information > Summary page.**
3. **Click the Locator Indicator button in the Actions panel.**
4. **When prompted, click Yes to confirm the action.**

   The server's Locate LED lights so that you can physically identify the server.
5. **Use one of these actions to turn off the Locate LED:**
   - **At the server** – Press the Locate LED button.
   - **From the Oracle ILOM web interface** – On the Summary page, click the Locator Indicator button.

Related Information

- *Server Installation*, front panel components
- "Establish a Network Management Connection to Oracle ILOM" on page 99
- "Locate the Server (CLI)" on page 198

▼ Locate the Server (CLI)

If you need to service a component, lighting the system Locate LED assists in easily identifying the correct server. You do not need administrator permissions to use the following commands.

1. **Log in to Oracle ILOM.**

   See "Log In to Oracle ILOM (Web Interface)" on page 101.
2. **Manage the Locate LED with the following commands from the ILOM SP prompt.**
   - To turn on the Locator LED, type:

```
-> set /System/ locator_indicator=on
```

   - To turn off the Locator LED, type:

```
-> set /System/ locator_indicator=off
```

   - To display the state of the Locator LED, type:

```
-> show System/ locator_indicator
```

Related Information

- "Monitoring Faults" on page 209

- "Locate the Server (Web Interface)" on page 197

▼ Obtain the Server Serial Number

- **Use one of these methods to obtain the server identification and serial number:**
  - **Use administrative tools** – You can obtain the server serial number by typing `show /SYS product_serial_number` in Oracle ILOM.
  - **Use the label on the server –** Access information from the label on the front of the server, on the right side of the cabinet at the door opening.
    - View the server serial number (SysSN) on the label.
    - Use a barcode reader.
    - Use a mobile or stationary RFID reader within a 9 ft. range. The serial number of the RFID tag is not the same as the serial number of the server, but can be used for asset inventory.

Related Information

- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* available at: `http://www.oracle.com/goto/ILOM/docs`

Viewing Server and Component Information

In addition to the system-wide and subcomponent statuses you can access with Oracle ILOM, for this server you can view the state of individual PDomains or specific components (DCUs, CMUs, or CMPs).

To view the information, the user accounts for each component must be assigned read-only operator (o) user roles.

- "Viewing System-Level Information" on page 200
- "Viewing Individual Component Properties" on page 205

Related Information

- "Identifying Domain-Level Commands" on page 183
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* available at: `http://www.oracle.com/goto/ILOM/docs`

Viewing System-Level Information

These topics describe how to display information about specific components.

- "Determine the Server Model Type (CLI)" on page 201
- "Display Installed Components List (CLI)" on page 201
- "View System Power Consumption (CLI)" on page 203
- "View the Power State and Status (CLI)" on page 204
- "View System-Level DCU Properties (CLI)" on page 204

Related Information

- "Viewing Individual Component Properties" on page 205

▼ Display Server Information (Web Interface)

1. **Log in to the Oracle ILOM web interface.**

   See "Log In to Oracle ILOM (Web Interface)" on page 101.

2. **View the Summary page.**

   The summary page provides this information:

   - **General Information panel** – Provides general information such as the serial number, firmware version, primary OS, host MAC address, SP IP addresses and MAC addresses.
   - **Actions panel** – Provides the power state of the host.
   - **Status panel** – Provides the overall status of the server components.

3. **Click on specific components listed under System Information for more details.**

4. **Log out of Oracle ILOM.**

   See "Log Out of Oracle ILOM" on page 104.

Related Information

- "Establish a Network Management Connection to Oracle ILOM" on page 99
- "Display Installed Components List (CLI)" on page 201

▼ Determine the Server Model Type (CLI)

- **Determine the server model type (either SPARC M5 or SPARC M6 is returned).**

```
-> show /system model
   model = SPARC Mx
```

Related Information

- "Obtain the Server Serial Number" on page 199
- "Display Server Information (Web Interface)" on page 200
- "Display Installed Components List (CLI)" on page 201

▼ Display Installed Components List (CLI)

- **Display information about the components installed in the sever.**

Note – This is a sample of `show components` output. Specific components will vary based on your server.

```
-> show components
Target                       | Property                | Value
-----------------------------+-------------------------+-------------
/SYS/CLOCK0                  | current_config_state    | Enabled
/SYS/CMU0                    | current_config_state    | Degraded
/SYS/CMU0/CMP0               | current_config_state    | Degraded
/SYS/CMU0/CMP0/BOB000        | current_config_state    | Enabled
/SYS/CMU0/CMP0/BOB001        | current_config_state    | Enabled
/SYS/CMU0/CMP0/BOB010        | current_config_state    | Enabled
/SYS/CMU0/CMP0/BOB011        | current_config_state    | Enabled
/SYS/CMU0/CMP0/BOB100        | current_config_state    | Enabled
/SYS/CMU0/CMP0/BOB111        | current_config_state    | Enabled
/SYS/CMU0/CMP0/CLINK0        | current_config_state    | Enabled
/SYS/CMU0/CMP0/CLINK1        | current_config_state    | Enabled
/SYS/CMU0/CMP0/CLINK2        | current_config_state    | Enabled
/SYS/CMU0/CMP0/CLINK3        | current_config_state    | Enabled
/SYS/CMU0/CMP0/CLINK4        | current_config_state    | Enabled
/SYS/CMU0/CMP0/CLINK5        | current_config_state    | Enabled
/SYS/CMU0/CMP0/CLINK6        | current_config_state    | Enabled
/SYS/CMU0/CMP0/CORE0         | current_config_state    | Enabled
/SYS/CMU0/CMP0/CORE0/L2C     | current_config_state    | Enabled
.....
/SYS/CMU0/CMP0/D0000         | current_config_state    | Enabled
/SYS/CMU0/CMP0/D0001         | current_config_state    | Enabled
.....
```

Related Information

- "Display Server Information (Web Interface)" on page 200

▼ View System Power Consumption (Web Interface)

Use this procedure to view the server's current, statistical, and historical power consumption data. You can also view the power allocation requirements for the server components.

1. **Log in to the Oracle ILOM web interface.**

   See "Log In to Oracle ILOM (Web Interface)" on page 101.

2. **View the Power Management > Consumption page.**

   The server's power consumption wattage value is displayed for the Actual Power and Peak Permitted Power properties.

   The consumption metric identifies the input power wattage that the server is currently consuming. The peak permitted power consumption metric identifies the maximum power wattage the server can consume.

3. **View the power allocation requirements shown for the components.**

4. **View the Power Management > Statistics page.**

   The power usage statistics are displayed in 15-, 30-, and 60-second intervals.

   The per-component power map provides power wattage allocations for each server component.

5. **View the Power Management > History page.**

   The power history for the minimum, average, and maximum power usage is displayed.

6. **Log out of Oracle ILOM.**

   See "Log Out of Oracle ILOM" on page 104.

Related Information

- "Establish a Network Management Connection to Oracle ILOM" on page 99
- *Server Service*, detecting and managing faults

▼ View System Power Consumption (CLI)

- **View the power consumption and maximum allowed power.**

```
-> show /System/Power
/System/Power
 Targets:
   Power_Supplies
 Properties:
   health = OK
   health_details = -
   actual_power_consumption = 3911 watts
   max_permitted_power = 23170 watts
   installed_power_supplies = 6
   max_power_supplies = 12
```

Related Information

- "Host Power Commands" on page 185

- "Power Management Commands" on page 187
- "View System Power Consumption (Web Interface)" on page 202

▼ View the Power State and Status (CLI)

- **View the power state and status for all PDomains.**

```
-> show /Servers/PDomains/ -level 2 -t power_state status
Target                                                | Property     | Value
------------------------------------------------------+--------------+-----------
/Servers/PDomains/PDomain_0/HOST                      | power_state  | Off
/Servers/PDomains/PDomain_0/HOST                      | status       | Powered Off
/Servers/PDomains/PDomain_0/System                    | power_state  | Off
/Servers/PDomains/PDomain_0/System/DCUs/DCU_0         | power_state  | Off
/Servers/PDomains/PDomain_0/System/DCUs/DCU_0/CMU0    | power_state  | Off
/Servers/PDomains/PDomain_0/System/DCUs/DCU_0/CMU1    | power_state  | Off
/Servers/PDomains/PDomain_0/System/DCUs/DCU_0/CMU2    | power_state  | Off
```

Related Information

- "Host Power Commands" on page 185
- "Power Management Commands" on page 187
- "View System Power Consumption (Web Interface)" on page 202

▼ View System-Level DCU Properties (CLI)

- **View information and health status details for all DCUs in the system.**

```
-> show /System/DCUs
   /SYS/DCUs
    Targets:
      DCU_0
      DCU_1
      DCU_2
      DCU_3
    Properties:
      health = OK
      health_details = -
      installed_dcus = 4
      max_dcus = 4
```

Related Information

- "Determine Current DCU Assignment" on page 174

- "Domain Configuration Commands" on page 226
- "Hardware Control Commands" on page 229

Viewing Individual Component Properties

These topics describe how to display information about specific components.

- "View Individual PDomain Properties" on page 205
- "View Individual DCU Properties" on page 206
- "View DCU Resources and Firmware Versions" on page 207
- "Determine the CMU Type" on page 208
- "View Individual CMU Properties" on page 208
- "View Individual CMP Properties" on page 209

Related Information

- "Viewing System-Level Information" on page 200

▼ View Individual PDomain Properties

- **View information and health status details for a specific PDomain.**

```
-> show /Servers/PDomains/PDomain_0/HOST
/Servers/PDomains/PDomain_0/Host
 Targets:
   VPS
   VPS_CPUS
   VPS_FANS
   VPS_MEMORY
   bootmode
   console
   diag
   domain
   status_history
   tpm
 Properties:
   autorestart = none
   autorunonerror = none
   dcus_assignable = /SYS/DCU0 /SYS/DCU1 /SYS/DCU2 /SYS/DCU3
   dcus_assigned = /SYS/DCU0
   dcus_available = /SYS/DCU1
   expandable = true
```

```
   gm_version = GM 1.3.0.build_22a_aa2b8029fa58 2012/12/11 18:46
[m4_m5-glued:debug] 2012/12/11, 18:46
   hostconfig_version = Hostconfig 1.3.0.build_22a_aa2b8029fa58 2012/12/11
18:02 [m4_m5-32:debug]
   hypervisor_version = Hypervisor 1.12.0.build_22a_0624f45e1e44 2012/12/11
18:36 [great:m4_m5-platform:debug]
   ioreconfigure = true
   keyswitch_state = Normal
   macaddress = 00:21:28:9a:ef:7c
   obp_version = OpenBoot 4.35.0.build_22 2012/12/06 15:02
   post_version = POST 5.0.0.build_22_9b17d1e17642 2012/12/10 14:28
   power_state = On
   send_break_action = (Cannot show property)
   sp_name = /SYS/SPP0
   state_capture_on_error = enabled
   state_capture_status = enabled
   status = Powered On
   status_detail = 20121220 16:09:27: Start Host in progress: Step 4 of 9
   sysfw_version = Sun System Firmware: dev build jmc@sca-rh5-0 (r77760) Tue Dec
11 19:54:05 PST 2012
```

Related Information

- "PDomain Configuration and Monitoring Commands" on page 183

▼ View Individual DCU Properties

- **View the health status and properties for a specific DCU.**

```
-> show /System/DCUs/DCU_0

/System/DCUs/DCU_0
 Targets:
     CMU_0
     CMU_1
     CMU_2
     CMU_3

 Properties:
     health = OK
     health_details = -
     power_state = On
     cpu_summary = Eight Oracle SPARC M6
     memory_summary = 4096 GB
     location = DCU0 (Domain Configuration Unit 0)
     host_assigned = /HOST0
     fan_list = FM6/FAN0 (Fan Module 6 Fan 0), FM6/FAN1 (Fan Module 6 Fan 1),
```

```
                FM7/FAN0 (Fan Module 7 Fan 0), FM7/FAN1 (Fan Module 7 Fan 1),
                FM14/FAN0 (Fan Module 14 Fan 0), FM14/FAN1 (Fan Module 14 Fan 1),
                FM15/FAN0 (Fan Module 15 Fan 0), FM15/FAN1 (Fan Module 15 Fan 1),
                FM26/FAN0 (Fan Module 26 Fan 0), FM26/FAN1 (Fan Module 26 Fan 1),
                FM27/FAN0 (Fan Module 27 Fan 0), FM27/FAN1 (Fan Module 27 Fan 1),
                FM34/FAN0 (Fan Module 34 Fan 0), FM34/FAN1 (Fan Module 34 Fan 1),
                FM35/FAN0 (Fan Module 35 Fan 0), FM35/FAN1 (Fan Module 35 Fan 1)

 Commands:
     cd
     set
     show
```

Related Information

- "Determine Current DCU Assignment" on page 174
- "Domain Configuration Commands" on page 226

▼ View DCU Resources and Firmware Versions

- **List the resources that are part of a DCU.**

```
-> show /System/DCUs/DCU_x
 /SYS/DCUx
  Targets:
    VPS_CPUS
    VPS_FANS
    VPS_MEMORY
  Properties:
     members = /SYS/CMU0/CMP0 /SYS/CMU0/CMP1 /SYS/CMU1/CMP0
     /SYS/CMU1/CMP1
     /SYS/CMU2/CMP0 /SYS/CMU2/CMP1 /SYS/CMU3/CMP0
     /SYS/CMU3/CMP1
     /SYS/IOU0/IOB0/PCIE_SWITCH0 /SYS/IOU0/IOB0/PCIE_SWITCH1
     /SYS/IOU0/IOB0/PCIE_SWITCH2 /SYS/IOU0/IOB0/PCIE_SWITCH3
     /SYS/IOU0/IOB1/PCIE_SWITCH0 /SYS/IOU0/IOB1/PCIE_SWITCH1
     SYS/IOU0/IOB1/PCIE_SWITCH2 /SYS/IOU0/IOB1/PCIE_SWITCH3
     assigned_to = /HOSTx
     gm_version = GM dev_nightly_1e01101dcc67 2012/08/19 18:56 [m4-glued:debug]
2012/08/19, 18:56
     hostconfig_version = Hostconfig dev_nightly_1e01101dcc67 2012/08/19 18:35
[m4-32:debug]
     hypervisor_version = Hypervisor dev_nightly_497f9238ff5b 2012/08/19 18:08
[great:m4-platform:debug]
```

```
      obp_version = OpenBoot 4.35.0.build_05 2012/08/19 18:12 [ obp #0]
      post_version = POST 5.00.x.development 2012/08/19 18:14
      sysfw_version = Sun System Firmware: dev build cyan@sca-rh5-1 (r75373) Mon
Aug 20 18:24:50 PDT 2012
```

Related Information

- "Determine Current DCU Assignment" on page 174
- "Administering CMUs, CMPs, and DIMMs" on page 177
- "Display the Firmware Version" on page 213
- "Update the Firmware" on page 214

▼ Determine the CMU Type

- **Determine the CMU type (either Oracle SPARC M5 or Oracle SPARC M6 are returned).**

```
-> show /System/Processors/CPUs/CPU_x model
   model = Oracle SPARC Mx
```

Related Information

- "DCU, CMU, and CMP Guidelines" on page 82
- "Determine Current DCU Assignment" on page 174
- "Administering CMUs, CMPs, and DIMMs" on page 177

▼ View Individual CMU Properties

- **View the health status and properties for a specific CMU (CMU0, in this example).**

```
-> show /System/DCUs/DCU_0/CMU_0
   health = OK
   health_details = -
   requested_state = Enabled
   current_config_state = Enabled
   power_state = On
   model = Assy CMU
   location = CMU0 (Processor Board 0)
   part_number = 7070507
   fru_rev_level = 07
   serial_number = 465769T+1322FE00DW
   action = (none)
```

Related Information

- "DCU, CMU, and CMP Guidelines" on page 82
- "Administering CMUs, CMPs, and DIMMs" on page 177

▼ View Individual CMP Properties

- **View the health status and properties for a specific CMP (CMP0, in this example).**

```
-> show /System/Processors/CPUs/CPU_0
   health = OK
   health_details = -
   requested_state = Enabled
   part_number = Not Available
   serial_number = 00000000000000042c918c8430002e2
   location = CMU0/CMP0 (Processor Board 0 Host Processor 0)
   model = Oracle SPARC M5
   max_clock_speed = 2.667 GHz
   total_cores = 6
   enabled_cores = 6
   temperature = Not Available
```

Related Information

- "DCU, CMU, and CMP Guidelines" on page 82
- "Administering CMUs, CMPs, and DIMMs" on page 177

Monitoring Faults

The following topics provide the server-specific paths that are required for performing certain fault monitoring activities on this server. Refer to the server service manual and the Oracle ILOM documentation for complete troubleshooting and fault monitoring information.

- "Discover Faults Using POST" on page 210
- "Display Console History" on page 210

Related Information

- "Viewing Server and Component Information" on page 200

- Oracle ILOM Documentation Library at:
  http://www.oracle.com/goto/ILOM/docs
- *Server Service*

▼ Discover Faults Using POST

The virtual keyswitch can be used to run full POST diagnostics without having to modify the diagnostic property settings. Note that POST diagnostics can take a significant amount of time to run at server reset.

1. **Log in to Oracle ILOM.**

   See "Log In to Oracle ILOM (Web Interface)" on page 101.

2. **Set the server to run full POST diagnostics upon server reset.**

```
-> set /Servers/PDomains/PDomain_x/HOST keyswitch_state=diag
```

3. **Reset the PDomain.**

```
-> reset /Servers/PDomains/PDomain_x/HOST
```

4. **Return to the previous diagnostic settings *after* running POST.**

```
-> set /Servers/PDomains/PDomain_x/HOST keyswitch_state=normal
```

Related Information

- "Locate the Server (CLI)" on page 198
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* available at:
  http://www.oracle.com/goto/ILOM/docs

▼ Display Console History

Use the `/Servers/PDomains/PDomain_x/HOST/console/history` console output buffer to write all types of log information.

- **Manage the console history log.**

```
-> set /Servers/PDomains/PDomain_x/HOST/console/history property=option [...]
-> show /Servers/PDomains/PDomain_x/HOST/console/history
```

where *property* can be:

- `line_count` – This option accepts a value within the range of 1 to 2048 lines. Specify "" for an unlimited number of lines. The default is all lines.
- `pause_count` – This option accepts a value of 1 to any valid integer or "" for infinite number of lines. The default is not to pause.
- `start_from` – The options are:
  - `end` – The last line (most recent) in the buffer (the default).
  - `beginning` – The first line in the buffer.

    Type `show /Servers/PDomains/PDomain_x/HOST/console/history` without first setting any arguments with the `set` command to cause Oracle ILOM to display all lines of the console log, starting from the end.

Note – Time stamps in the console log reflect server time. By default, the Oracle ILOM console log uses UTC/GMT, but you can use the `/SP/clock timezone` command to the set the SP clock to use other time zones. The Oracle Solaris OS system time is independent of the Oracle ILOM time.

Related Information

- Oracle Solaris Documentation Library at: `http://www.oracle.com/goto/Solaris11/docs`
- *Oracle ILOM Administrator's Guide for Configuration and Maintenance* available at: `http://www.oracle.com/goto/ILOM/docs`

Updating the Firmware

These topics describe how to update the system firmware and view current versions of firmware for this server.

- "Display the Firmware Version" on page 213
- "Firmware Update Overview" on page 214
- "Update the Firmware" on page 214

Related Information

- *SPARC M5-32 and SPARC M6-32 Servers Product Notes*

▼ Display the Firmware Version

- **Display the available system firmware properties that can be reported on for a specific PDomain.**

```
-> show /Servers/PDomains/PDomain_x/HOST
   gm_version
   hostconfig_version
   hypervisor_version
   obp_version
   post_version
   sysfw_version
```

To display information about a version of firmware on a specific PDomain, type:

```
-> show /Servers/PDomains/PDomain_x/HOST property
```

where property is any of the above noted firmware properties.

Related Information

- *SPARC M5-32 and SPARC M6-32 Servers Product Notes*
- "Firmware Update Overview" on page 214
- "Update the Firmware" on page 214

Firmware Update Overview

On this server, you can update the firmware without impacting hosts that are running on PDomains. For hosts that are running, the firmware will automatically be updated when the running PDomains are powered off then powered on.

In the event that you try to update the firmware with a version that is incompatible with the firmware on the running PDomains, the system will instruct you to shut down the hosts with the incompatible version and then update to the new firmware version. Optionally, to ensure that all SPs and hosts move to the new image in lock-step, you must power off all hosts.

In addition, Oracle ILOM ensures that the system is upgraded automatically to the correct firmware when swapping SPs and powering hosts off then on.

The firmware image you install to update the system firmware includes all necessary firmware components, including the Oracle ILOM firmware, OpenBoot firmware, POST firmware, and miscellaneous files. The firmware image is installed in the flash memory of the SP.

Related Information

- Oracle ILOM Documentation Library at: `http://www.oracle.com/goto/ILOM/docs`
- "Display the Firmware Version" on page 213
- "Update the Firmware" on page 214

▼ Update the Firmware

To update the firmware, you must have an administrator (`a`) or field engineering (`s`) role.

For information about the available system firmware versions for the current release of the server, refer to the Product Notes.

1. **Ensure that the Oracle ILOM SP NET MGT port is configured.**

   Refer to *Server Installation* for instructions.

2. **Open an SSH session to connect to the SP.**

```
% ssh root@xxx.xxx.xxx.xxx
...
Are you sure you want to continue connecting (yes/no) ? yes

...
Password:  password (nothing displayed)
Waiting for daemons to initialize...

Daemons ready

Integrated Lights Out Manager

Version 3.x.x.x

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->
```

3. **(Optional) If you want to update the firmware on all hosts while the system firmware update takes place, individually power off the PDomains.**

   Powering off the PDomains is not required. If any PDomain remains powered on during the firmware update, the firmware on those PDomains will not be updated during the system's firmware update. On those PDomains, the firmware will automatically be updated as the PDomains are restarted.

```
-> stop /Servers/PDomains/PDomain_x/HOST
```

Note – Firmware that is on DCUs that are not assigned to a PDomain will be updated with the update of the system firmware. Unassigned DCUs don't need to be part of a host for their firmware to be updated.

---

4. **For all PDomains, set the** `keyswitch_state` **parameter to** `normal`**.**

```
-> set /Servers/PDomains/PDomain_x/HOST keyswitch_state=normal
```

Note – If the `keyswitch_state` parameter is not set to `normal`, the system will be unable to update the firmware because keyswitch is in the locked position.

5. **Type the `load` command with the path to the new flash image.**

   The `load` command updates the SP flash image and the host firmware. The `load` command requires the following information:

   - IP address of a TFTP server on the network that can access the flash image.
   - Full path name to the flash image that the IP address can access.

     The command usage is as follows:

     `load [-script] -source` *protocol://xxx.xxx.xx.xxx/pathname*

     where:

     - *protocol* can be http, https, ftp, tftp, sftp, scp.
     - `-script` does not prompt for confirmation and acts as if `yes` was specified.
     - `-source` specifies the IP address and full URL to the flash image.

   Depending on the power state of the PDomains and the firmware compatibility, you will see one of the following results:

   - If all hosts are powered off, no firmware compatibility messages should be displayed, as shown in the following example:

```
-> load -source http://xxx.xxx.xx.xxx/pathname
NOTE: An upgrade takes several minutes to complete. ILOM
      will enter a special mode to load new firmware. No
      other tasks can be performed in ILOM until the
      firmware upgrade is complete and ILOM is reset.

Are you sure you want to load the specified file (y/n)?y
Preserve the configuration (y/n)? y
2012-10-05 07:59:29 Download firmware package ...
2012-10-05 08:02:32 Check firmware package ...
2012-10-05 08:02:58 SP /SYS/SPP0 firmware update started ...
2012-10-05 08:02:58 SP /SYS/SPP1 firmware update started ...
.............................................................
Firmware update is complete.
ILOM will now be restarted with the new firmware.
->
```

   - If some hosts are powered up (`HOST0` in this example), but no incompatibility is detected, the upgrade will proceed as follows:

```
-> load -source http://xxx.xxx.xx.xxx/pathname
NOTE: An upgrade takes several minutes to complete. ILOM
      will enter a special mode to load new firmware. No
```

```
      other tasks can be performed in ILOM until the
      firmware upgrade is complete and ILOM is reset.

NOTE: HOST0 is powered on; HOST0 firmware will be updated
      automatically when HOST0 is restarted.

Are you sure you want to load the specified file (y/n)?y
Preserve the configuration (y/n)? y
2012-10-05 06:43:13 Download firmware package ...
2012-10-05 06:46:29 Check firmware package ...
2012-10-05 06:47:09 SP /SYS/SPP0 firmware update started ...
2012-10-05 06:47:10 SP /SYS/SPP1 firmware update started ...
.............................................................
Firmware update is complete.
ILOM will now be restarted with the new firmware.
->
```

Note – As indicated in this example, the firmware for `PDomain_0` is automatically updated only when the PDomain is restarted.

- In the event that a load operation occurs with incompatible firmware, the operation proceeds as follows:

```
-> load -source http://xxx.xxx.xx.xxx/pathname
NOTE: An upgrade takes several minutes to complete. ILOM
      will enter a special mode to load new firmware. No
      other tasks can be performed in ILOM until the
      firmware upgrade is complete and ILOM is reset.

NOTE: HOST0 is powered on; HOST0 firmware will be updated
      automatically when HOST0 is restarted.

Are you sure you want to load the specified file (y/n)? y
Preserve the configuration (y/n)? y
2012-10-05 07:06:53 Download firmware package ...
2012-10-05 07:09:54 Check firmware package ...
Incompatible FW version running on domain. Stop domain ID 0 before
upgrading firmware upgrade failed: FW compatibility check failed
2012-10-05 07:09:56 Firmware upgrade cancelled

Firmware update failed.
load: Command Failed
->
```

Note – As indicated in this example, for the `load` command to proceed successfully, you must power off the specified PDomain (PDomain_0, in this example).

- If the `no-preserve-configuration` option for the `load` command is selected by answering no to the question "Preserve the configuration (y/n)," then all hosts must be powered off. If `load` command is issued when hosts are powered on and you answer the same question with "no," the following messages is displayed in the output of the load operation:

```
-> load -source http://xxx.xxx.xx.xxx/pathname
NOTE: An upgrade takes several minutes to complete. ILOM
      will enter a special mode to load new firmware. No
      other tasks can be performed in ILOM until the
      firmware upgrade is complete and ILOM is reset.

NOTE: HOST0 is powered on; HOST0 firmware will be updated
      automatically when HOST0 is restarted.

Are you sure you want to load the specified file (y/n)? y
Preserve existing configuration (y/n)? n
2013-01-28 20:35:51 Download firmware package ...
2013-01-28 20:38:46 Check firmware package ...
No-preserve-configuration option passed. Stop domain ID 0
before upgrading firmware
upgrade failed: No-preserve-configuration option passed,
stop all domains before upgrading firmware
2013-01-28 20:39:16 Firmware upgrade cancelled

Firmware update failed.
load: Command Failed
->
```

Note – As indicated in the previous example, for the `load` command to proceed successfully, you must power off the specified PDomain (`PDomain_0`, in this example).

After the flash image has been updated, the Main SP automatically resets, runs diagnostics, and returns to the login prompt on the serial console.

```
U-Boot 2010.03

Custom Pilot3 U-Boot 0.1 (Jun  6 2012 - 20:04:50) r74178
***
Net:   faradaynic#0, faradaynic#1
Enter Diagnostics Mode
```

```
['q'uick/'n'ormal(default)/e'x'tended(manufacturing mode)]...0
Diagnostics Mode - NORMAL
<DIAGS> Memory Data Bus Test ... PASSED
<DIAGS> Memory Address Bus Test ... PASSED
I2C Probe Test - SP
      Bus     Device                          Address Result
      ===     ============================    ======= ======
       6                  SP FRUID (U1101)    0xA0    PASSED
       6               DS1338(RTC) (U1102)    0xD0    PASSED

<DIAGS> PHY #0 R/W Test ... PASSED
<DIAGS> PHY #0 Link Status ... PASSED
<DIAGS> ETHERNET PHY #0, Internal Loopback Test ... PASSED
## Booting image at 110a2000 ... ***

Mounting local filesystems...
Mounted all disk partitions.

Configuring network interfaces...FTGMAC100: eth0:ftgmac100_open
Starting system log daemon: syslogd and klogd.
Starting capidirect daemon: capidirectd . Done
Starting Event Manager: eventmgr  . Done
Starting ipmi log manager daemon: logmgr . Done
Starting IPMI Stack: . Done
Starting sshd.
Starting SP fishwrap cache daemon: fishwrapd . Done
Starting Host deamon: hostd . Done
Starting Network Controller Sideband Interface Daemon: ncsid . Done
Starting Platform Obfuscation Daemon: pod . Done
Starting lu main daemon: lumain . Done
Starting Detection/Diagnosis After System Boot: dasboot  Done
Starting Servicetags discoverer: stdiscoverer.
Starting Servicetags listener: stlistener.
Starting Dynamic FRUID Daemon: dynafrud  Done

hostname login:
```

Related Information

- *SPARC M5-32 and SPARC M6-32 Servers Product Notes*
- "Display the Firmware Version" on page 213

XSCF and Oracle ILOM Command Comparison

These topics provide command-by-command comparisons of the XSCF and the default Oracle ILOM CLI command sets for the SPARC M5-32 and SPARC M6-32 servers from Oracle.

- "Identifying SP Configuration and Administration Commands" on page 221
- "Identifying Domain Administration Commands" on page 226

Related Information

- SPARC Enterprise M9000 Server Documentation (http://docs.oracle.com/cd/E19415-01)
- Oracle ILOM Documentation Library (http://www.oracle.com/goto/ILOM/docs)

Identifying SP Configuration and Administration Commands

These topics describe some of the most commonly used SP configuration and administration commands that are available through Oracle ILOM. For more information about network deployment and administration properties for the Oracle ILOM features that are common to all platforms managed by Oracle ILOM, see the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

http://www.oracle.com/goto/ILOM/docs

Refer to the following tables for information about these topics:

- "User Account Administration Commands" on page 222
- "Network Configuration/Administration Commands" on page 223
- "SP Access Control Commands" on page 224

- "SP Maintenance Commands" on page 224
- "Time Administration Commands" on page 225
- "SP Miscellaneous Commands" on page 225

Related Information

- "Configuring Oracle ILOM User Accounts and Roles" on page 137
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`

User Account Administration Commands

XSCF Command	Description	Oracle ILOM Command
`adduser`	Create a user account on the host and for each active PDomain.	`create /SP/users/`*`newusername`* `role=aucros[password=`*`password`*`]`
`password`	Manage user passwords and expiration settings.	`set /SP/users/`*`username`*` password`
`setprivileges`	Assign user roles for the host and for each active PDomain.	`set /SP/users/`*`username`*` role=aucros` `set /SP/users/`*`username`*`/host_roles host`*`x`*`_role=acr`
`deleteuser`	Delete a user account.	`delete /SP/users/`*`username`*
`showuser`	Display user account information.	`show -d targets /SP/users` `show -d properties -l all /SP/users`

Related Information

- "Configuring Oracle ILOM User Accounts and Roles" on page 137
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

Network Configuration/Administration Commands

XSCF Command	Description	Oracle ILOM Command
`setnetwork`	Set a network interface.	`set /SP/network pendingipdiscovery=static pendingipnetmask=`*ipnetmask*
	Set or remove a network interface for the Active SP.	`set /SP/network/ACTIVE_SP pendingipaddress state=enabled`
	Set or remove a network interface for SP0.	`set /SP/network/SP0 pendingipaddress=value state=enabled`
	Set or remove a network interface for SP1.	`set /SP/network/SP1 pendingipaddress=value state=enabled`
`shownetwork`	Display information of network interfaces.	`show -l all -o table /SP/network`
`applynetwork`	Apply network information.	`set /SP/network/commitpending=true`
`setroute`	Set routing information for a network interface.	`set /SP/network pendingipgateway= ipgateway`
`showroute`	Display routing information for a network interface.	`show /SP/network ipgateway`
`sethostname`	Set a host name and a DNS domain name.	`set /SP hostname=value`
`showhostname`	Display the current host name.	`show /SP current_hostname`
`setnameserver`	Set the DNS servers and the DNS search paths.	`set /SP/clients/dns auto_dns= enabled|disabled` `set /SP/clients/dns nameserver=` *ip-address-1*`,` *ip-address-2*`,` *ip-address-3* `set /SP/clients/dns_searchpath=` *domain-1.com*`,` *domain-2.edu*
`shownameserver`	Display the registered DNS servers and the DNS search paths.	`show /SP/clients/dns`

Related Information

- "Configuring the SP Network" on page 153
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

SP Access Control Commands

XSCF Command	Description	Oracle ILOM Command

`setssh`	Configure the settings for the SSH service used in the network.	`set /SP/services/ssh state=[enabled|disabled]`
		`set /SP/services/ssh generate_new_key_type=[rsa|dsa] generate_new_key_action=true`
		`set /SP/services/ssh restart_sshd_action=true`

`showssh`	Display the settings of the SSH service that is configured for the network.	`show /SP/services/ssh` `show /SP/services/ssh/keys`

Related Information

- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

SP Maintenance Commands

XSCF Command	Description	Oracle ILOM Command
`version -c xcp`	Display the firmware version.	`version` `show /System system_fw_version`
`rebootxscf`	Reset all of the SPs in the system, including the Standby-SP and the SPPs. You can also reset each SP or SPP individually.	`reset /SP` `reset /SYS/SP`*x* or `reset /SYS/SPP`*x*
`switchscf`	Change the SPs from the active and standby states.	`set /SP/redundancy/initiate_failover_action=true`

Related Information

- "Resetting the SP Configuration" on page 121
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

Time Administration Commands

XSCF Command	Description	Oracle ILOM Command
`setdate`	Set the date and time.	`set /SP/clock` *datetime=MMDDhhmmYYYY.ss*
`showdate`	Display the date and time.	`show /SP/clock datetime`
`settimezone`	Set the time zone and Daylight Savings Time.	`set /SP/clock timezone=`*value*
`showtimezone`	Display the time zone and Daylight Savings Time.	`show /SP/clock timezone`

Related Information

- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

SP Miscellaneous Commands

XSCF Command	Description	Oracle ILOM Command
`setaltitude`	Set the altitude of the system.	`set /SP system_altitude=`*value*
`showaltitude`	Display the altitude of the system.	`show /SP system_altitude`

Related Information

- *Server Installation*, set the altitude of the server
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

Identifying Domain Administration Commands

This section describes some of the most commonly used domain configuration and fault handling commands that are available through Oracle ILOM, including command paths that are specific to this server. For more information about the Oracle ILOM administration features that are common to all platforms managed by Oracle ILOM, see the *Oracle ILOM Administrator's Guide for Configuration and Maintenance* at:

`http://www.oracle.com/goto/ILOM/docs`

Refer to the following tables for information about these topics:

- "Domain Configuration Commands" on page 226
- "Domain Control Commands" on page 228
- "Fault Management Commands" on page 228
- "Hardware Control Commands" on page 229

Related Information

- "Configuring Domain Components" on page 167
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

Domain Configuration Commands

Note – The following XSCF and Oracle ILOM commands describe how to assign resources to a domain before you start the host, but do not cover details on how to dynamically add or remove resources for a running domain.

XSCF Command	Description	Oracle ILOM Command
`addboard -c assign`	Assign resources to a PDomain.	This example shows assigning DCU0 and DCU1 to PDomain_2: `set /Servers/PDomains/PDomain_2/HOST dcus_assigned="/SYS/DCU0 /SYS/DCU1"`

`deleteboard -c unassign`	Unassign resources from a PDomain configuration.	This example shows removing DCU0 from PDomain_2 following an earlier action where DCU0 and DCU1 had been assigned to that host:
		`set /Servers/PDomains/PDomain_2/HOST dcus_assigned="SYS/DCU1"`
		You can also remove all DCUs as follows:
		`set /Servers/PDomains/PDomain_x/HOST/ dcus_assigned=""`

`setdcl`	Set a domain component list.	`set /Servers/PDomains/PDomain_x/HOST dcus_assignable="/SYS/DCUy /SYS/DCUz"`
`showdcl`	Display the current domain component list, which lists the DCUs that can be assigned to the specified PDomain.	`show /Servers/PDomains/PDomain_x/HOST dcus_assignable`
`setdomainmode`	Set the modes of operation for the specified PDomain.	`set /Servers/PDomains/PDomain_x/HOST/ diag` `set /Servers/PDomains/PDomain_x/HOST keyswitch_state= [Normal|Standby|Diag|Locked]`
`showdomainmode`	Display the modes of operation for the specified PDomain.	`show -d properties /Servers/PDomains/PDomain_x/HOST`
`showboards`	Display the information for all boards/DCUs.	`show -l all -d properties /SYS/DCUs` `show /Servers/PDomains/PDomain_x/HOST dcus_available`

Related Information

- "Configuring Domain Components" on page 167
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

Domain Control Commands

XSCF Command	Description	Oracle ILOM Command
`poweroff`	Turn off the power to the specified domain.	`stop [-script/-force] /Servers/PDomains/PDomain_x/HOST`
`poweron`	Turn on the power to the specified domain.	`start [-script/-force] /Servers/PDomains/PDomain_x/HOST`
`console`	Connect to a domain console.	`start /HOSTx/console`
`showdomainstatus`	Display the current domain component list.	`show -d properties /Servers/PDomains/PDomain_x/HOST status status_detail`

Related Information

- "Controlling the Server, Domains, and Devices" on page 117
- "Host Power Commands" on page 185
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

Fault Management Commands

XSCF Command	Description	Oracle ILOM Command

`showlogs error`	Display error logs.	`show /System/Open_Problems`
		`show faulty`
		`show -l all -o table /SP/faultmgmt`

Related Information

- *Server Service*
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

Hardware Control Commands

XSCF Command	Description	Oracle ILOM Command
`showhardconf`	Display information about FRUs.	`show -l all -o table /System`
`showstatus`	Display the degraded FRUs.	`show /System health` `show /System health_details`

Related Information

- "Monitoring the Server" on page 197
- "PDomain Monitoring Commands" on page 193
- *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* at: `http://docs.oracle.com/cd/E19415-01`
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

Glossary

A

AC input filter A server power cord AC receptacle.

B

BoB Memory buffer on board. An ASIC on a CMU board that transfers data between a DIMM and a CMP.

Bounded PDomain A type of PDomain which is limited to one DCU. A Bounded PDomain will typically exhibit higher performance as all resources are local to the single DCU. Bounded PDomains are not subject to SSB failure. Bounded PDomains can contain up to eight CMPs.

See also *PDomain*, *CMP*, and *SSB*.

C

CAR Label of the *PCIe hot-plug carrier*.

CFM Cubic feet per minute.

CLK Label for a clock board. The sever contains two dual-redundant clock boards.

CMP Chip multiprocessing. Each CMU contains two CMP processors. The server can contain a maximum of 32 CMPs.

CMU CPU memory unit. Each CMU contains two CMPs and two sets of DIMM slots.

D

DCM Domain configuration management. DCM refers to the reconfiguration of boards in physical domains for Enterprise-class systems.

DCU Domain configurable unit. Each DCU contains two or four CMUs and one IOU. The smallest building block for physical domains.

DHCP Dynamic Host Configuration Protocol. Software that automatically assigns IP addresses to clients on a Transmission Control Protocol/Internet Protocol (TCP/IP) network.

DIMM Dual in-line memory module.

E

EMI Electromagnetic interference.

EMS Express module SAS. Each EMS contains two 10GBASE-T network connections and provides access to four hard drives on the server.

ESD Electrostatic discharge.

F

FMA Fault management architecture. Generates fault indictments from the *SP*. FMA provides three system activities: error handling, fault diagnosis, and response.

FRU Field-replaceable unit.

G

GB Gigabyte. 1 gigabyte = 1024 megabytes.

GbE Gigabit Ethernet.

H

HDD Hard disk drive. In Oracle Solaris OS output, HDD can refer to hard disk drives or solid state drives (SSDs).

I

ILOM See *Oracle ILOM*.

IOU I/O unit. The server contains up to four IOUs, one for each DCU. Each IOU supports up to 16 PCIe slots, 8 10GBASE-T ports on 4 EMS modules, and 8 hard drives.

K

KVMS Keyboard video mouse storage.

KW Kilowatt.

L

logical domain A virtual machine comprising a discrete logical grouping of resources that has its own operating system and identity within a single computer system.

L-L Line-to-line. Line-to-line voltage is the voltage between any two phases of an AC generator.

N

NET MGT The network management port on a SP.

O

OpenBoot Firmware that is installed on the server and provides an interface through which you can perform various diagnostic tasks.

Oracle ILOM Oracle Integrated Lights-Out Manager (Oracle ILOM) firmware.

Oracle Solaris OS Oracle Solaris operating system.

Oracle VTS Oracle Validation Test Suite. An application that exercises the system, provides hardware validation, and identifies possible faulty components.

P

PCIe Peripheral Component Interconnect Express.

PCIe hot-plug carrier An enclosure used to install and house PCIe cards in the server.

PDomain Physical domain. Each PDomain is an independently configurable and bootable entity with full hardware domain isolation for fault isolation and security purposes.

The maximum number of PDomains supported is four, which is equal to the number of DCUs. The minimum number of PDomains is one, which can be composed of all available DCUs within the system.

DCUs in a PDomain communicate with other DCUs in the server through the SSBs. If an SSB fails, the PDomain availability will be impacted. Bounded PDomains are limited to one DCU and are not affected by SSB failures.

See also *Bounded PDomain*, *DCU*, and *SSB*.

PDomain-SPP The lead SPP of a physical domain. The PDomain-SPP manages tasks and provides rKVMS service for that physical domain.

POST Power-on self test. A diagnostic that runs when the server boots.

PSDB Power system distribution board.

PSH Predictive self healing. An Oracle Solaris OS technology that continuously monitors the health of the server and works with Oracle ILOM to take a faulty component offline if needed.

R

rKVMS Remote keyboard video mouse and storage.

RMS Root mean square.

S

SAS Serial attached SCSI.

SATA Serial advance technology attachment.

scalability Scalability is the ability to increase (or *scale up*) processing power in a server by combining the server's physical configurable hardware (see *DCU*) into one or more logical groups (see *PDomain*).

SER MGT The serial management port on a SP.

SP Service processor. For redundancy, the server contains two service processors, one being active and one on standby.

SPP Service processor proxy. One SPP is assigned to manage each PDomain. SPPs monitor environmental sensors and manage the CMUs, memory controllers, and DIMMs within the DCU.

See *PDomain-SPP*.

SSB Scalability switch board.

SSD Solid state drive.

SSH Secure shell. A program for logging in and executing commands on a system or service processor.

T

TB Terabyte. 1 terabyte = 1024 gigabytes.

Torx A type of screw head characterized by a 6-point star-shaped pattern.

U

UPS Uninterruptible power supply.

V

VAC Voltage alternating current.

VLAN Virtual local area network.

VTS See *Oracle VTS*.

W

WWN World wide name.

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