SPARC M5-32 and SPARC M6-32 Servers

Installation Guide

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Using This Documentation

This document provides site planning information and installation instructions 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 ix
- "Related Documentation" on page x
- "Feedback" on page x
- "Access to Oracle Support" on page x

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 Server

These topics list the installation tasks, provide an overview of the server, and highlight the key components.

Description	Links
Review the tasks required to install the server.	"Installation Task Overview" on page 1
Review the main server features.	"Server Overview" on page 3
Understand the status indicators required for the installation.	"System Status LEDs" on page 4
Identify the key external server components. Understand the hardware architecture and software environment.	"Front Components" on page 6 "Rear Components" on page 8 "Understanding the Hardware Architecture" on page 9 "Understanding the Firmware and Software Environment" on page 14

Related Information

- "Preparing the Site" on page 19
- "Installing the Server" on page 73
- *Server Administration*
- *Server Service*

Installation Task Overview

Perform the following tasks to install and configure the server.

Step	Description	Documents or Links
1	Review the product notes for any late-breaking news about the server.	*SPARC M5-32 and SPARC M6-32 Servers Product Notes*
2	Review the important safety and security notices.	*SPARC M5-32 and SPARC M6-32 Servers Safety and Compliance Guide* *SPARC M5-32 and SPARC M6-32 Servers Security Guide* *Important Safety Information for Oracle's Sun Hardware Systems*
3	Familiarize yourself with the server features, main components, and LEDs required for installation.	"Server Overview" on page 3 "System Status LEDs" on page 4 "Front Components" on page 6 "Rear Components" on page 8
4	Prepare the installation site for the server installation by reviewing the server specifications and site requirements.	"Preparing the Site" on page 19
5	Take ESD and safety precautions, and assemble the required tools.	"Preparing for Installation" on page 67
6	Confirm the site is ready for the server. Receive and unpack the server.	"Confirm the Site Preparation" on page 73 "Receive the Server" on page 75 "Unpack the Server" on page 76
7	Move the server to the installation site and secure it to the floor.	"Moving the Server" on page 78 "Stabilizing the Server" on page 87
8	Install any optional components.	"Optional Component Installation" on page 95
9	Install and manage data cables and power cords to the server.	"Connecting the Front SP Cables" on page 97 "Connecting the Rear Power Cords and Data Cables" on page 119
10	Make a serial connection to the SP, power on, and configure the server for the first time.	"Powering On the Server for the First Time" on page 141

Related Information

- *Server Administration*

Server Overview

The SPARC M5-32 and SPARC M6-32 enterprise-class servers are designed for mission-critical applications.

Feature	Description
Processor	**SPARC M5-32 server:** 8 to 32 SPARC M5 processors, each with 6 cores and 8 threads per core **SPARC M6-32 server:** 8 to 32 SPARC M6 processors, each with 12 cores and 8 threads per core
Memory	32 DIMM slots per processor
I/O expansion	64 low-profile PCIe Generation 3 card slots
Hard drive storage	32 drive slots supporting 2.5-inch HDDs or SSDs
Service processors	2 redundant SPs with 4 SPPs to monitor and control the server remotely

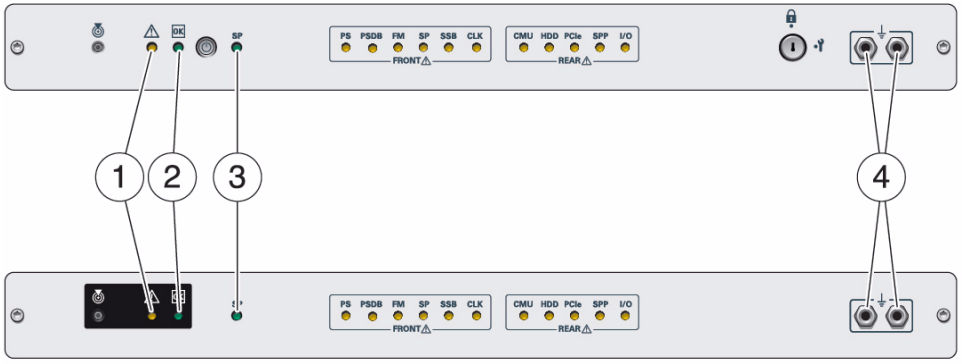
Related Information

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

System Status LEDs

The server has two LED panels containing system status indicators, one located at the front of the server and one at the rear. This topic describes the LEDs that are required for the server installation.

Note – For complete information about all of the server LEDs, refer to the *Server Service*, front and rear LED panel LEDs and controls.



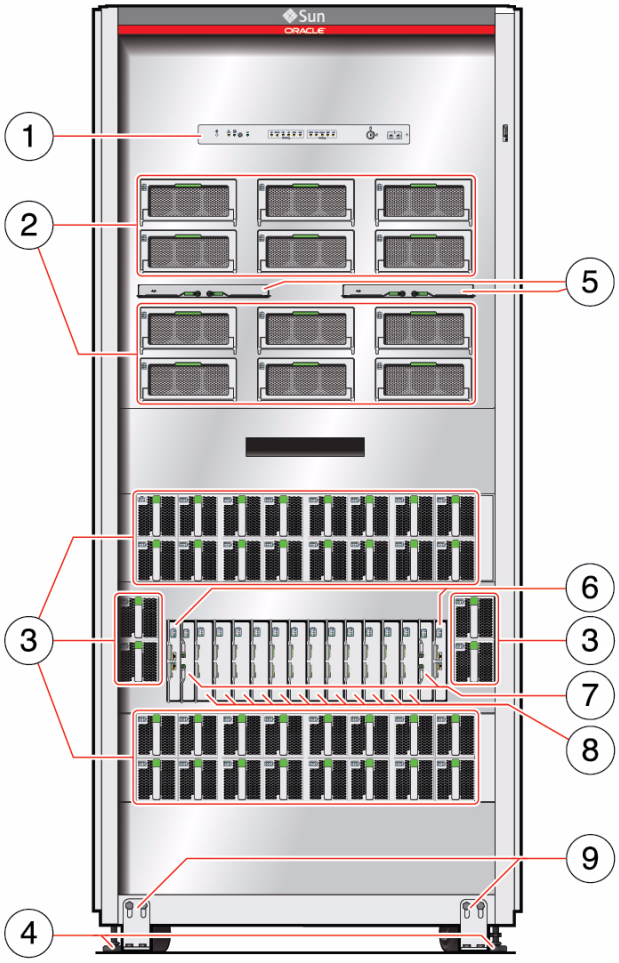
No.	LED	Description
1	Fault LED (amber)	Indicates that a service action is required. Refer to the *Server Service*, detecting and managing faults, for instructions if this LED lights.
2	System OK LED (green)	Indicates the following conditions: • Off – System is not running in its normal state. System power might be off. The SPs might still be running. • Steady on – System is powered on and is running in its normal operating state. No service actions are required. • Short blink every three seconds – System is running in standby mode and can be quickly returned to full function. • Slow blink – A normal but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running or that the system is booting.

No.	LED	Description
3	SP LED	Indicates the following conditions: • Off – The server is not receiving power. For example, either the power cords are not connected or the facility power grid circuit breakers are switched off. • Steady on, green – One or both of the SPs have initialized and can be accessed through the Oracle ILOM CLI or web interface. • Blink, green – SPs are initializing the Oracle ILOM firmware.
4	ESD grounding jacks	The server has four 4-mm ESD grounding jacks (two on each panel) where you can attach antistatic wrist straps prior to installing the server (see "Attach an Antistatic Wrist Strap" on page 70).

Related Information

- "Attach an Antistatic Wrist Strap" on page 70
- "Switch On the Facility Circuit Breakers" on page 145
- "Power On the Server" on page 154

Front Components

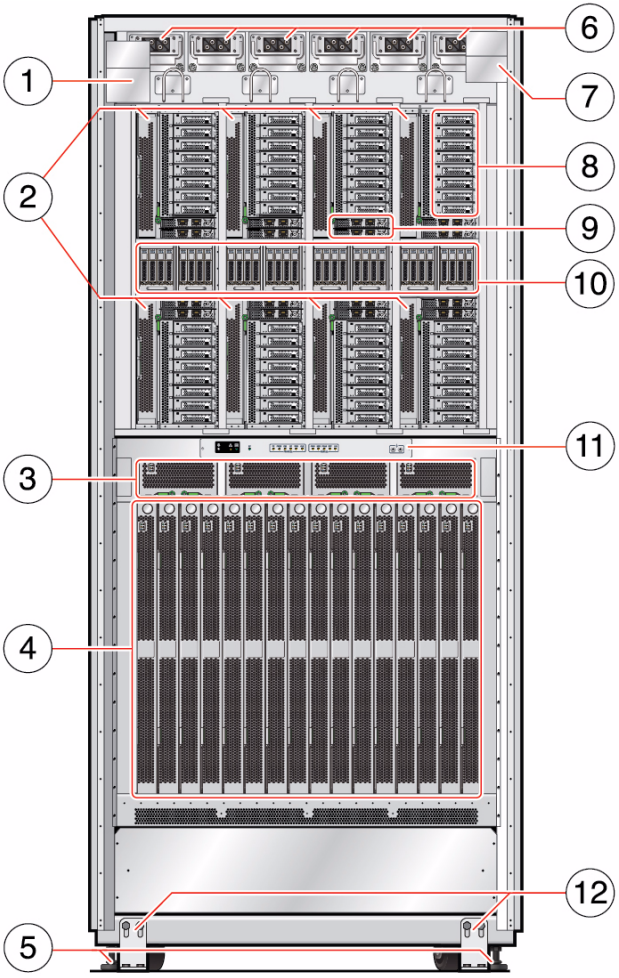


No.	Description
1	Front LED panel, containing LEDs, key switch, and ESD grounding jacks
2	Power supply
3	Fan module (FM)
4	Leveling feet
5	Power system distribution board (PSDB)
6	Service processors (SP)
7	Clock board
8	Scalability switch boards (SSB)
9	Mounting brackets

Related Information

- "Rear Components" on page 8
- "Planning Network Addresses" on page 59
- "Connecting the Front SP Cables" on page 97

Rear Components



No.	Description
1	Left cable management bracket
2	I/O boards
3	Service processor proxies (SPP)
4	CPU memory units (CMU)
5	Leveling feet
6	AC input filters (power cord connectors)
7	Right cable management bracket
8	PCIe hot-plug carrier for low-profile PCIe cards
9	Express module SAS (EMS)
10	Hard drives
11	Rear LED board, containing LEDs and ESD grounding jacks
12	Mounting brackets

Related Information

- "Front Components" on page 6
- "Connecting the Rear Power Cords and Data Cables" on page 119
- "Inspect the Power Cords" on page 142
- "Switch On the Facility Circuit Breakers" on page 145

Understanding the Hardware Architecture

The server can contain up to 32 processors, 32 drives, and 64 PCIe cards. The hardware architecture enables you to divide these hardware resources into smaller units called *PDomains* to address the demands of your applications.

- "SPs and SPPs" on page 10
- "Domain Configurable Units" on page 10
- "Physical Domains" on page 13

Related Information

- "Understanding the Firmware and Software Environment" on page 14
- "Planning Network Addresses" on page 59
- *Server Administration*, understanding the system architecture

SPs and SPPs

The two redundant SPs enable you to actively manage and monitor the components in the server independent of the Oracle Solaris OS. The four SPPs off-load some of the work from the two SPs. The SPs and SPPs work together to provide a single management environment to all of the server components.

See "Front Components" on page 6 for the location of the SPs, and see "Rear Components" on page 8 for the location of the SPPs.

Related Information

- "Planning Network Addresses" on page 59
- "Connecting the Front SP Cables" on page 97
- "Connect Terminals or Emulators to the SP SER MGT Ports" on page 144
- "Log In to the Active SP" on page 148
- "Set Oracle ILOM Network Addresses" on page 150
- "Power On the Server" on page 154

Domain Configurable Units

Domain configurable units (DCUs) are the hardware building blocks of PDomains. A DCU includes one IOU, which contains internal drives, network connections through the EMS modules, and 16 PCIe expansion slots. A DCU also contains 2 or 4 CMUs, and each CMU contains 2 processors and 2 memory boards. The following illustrations display the locations and components of DCUs.

FIGURE: DCU Locations (Rear of Server)

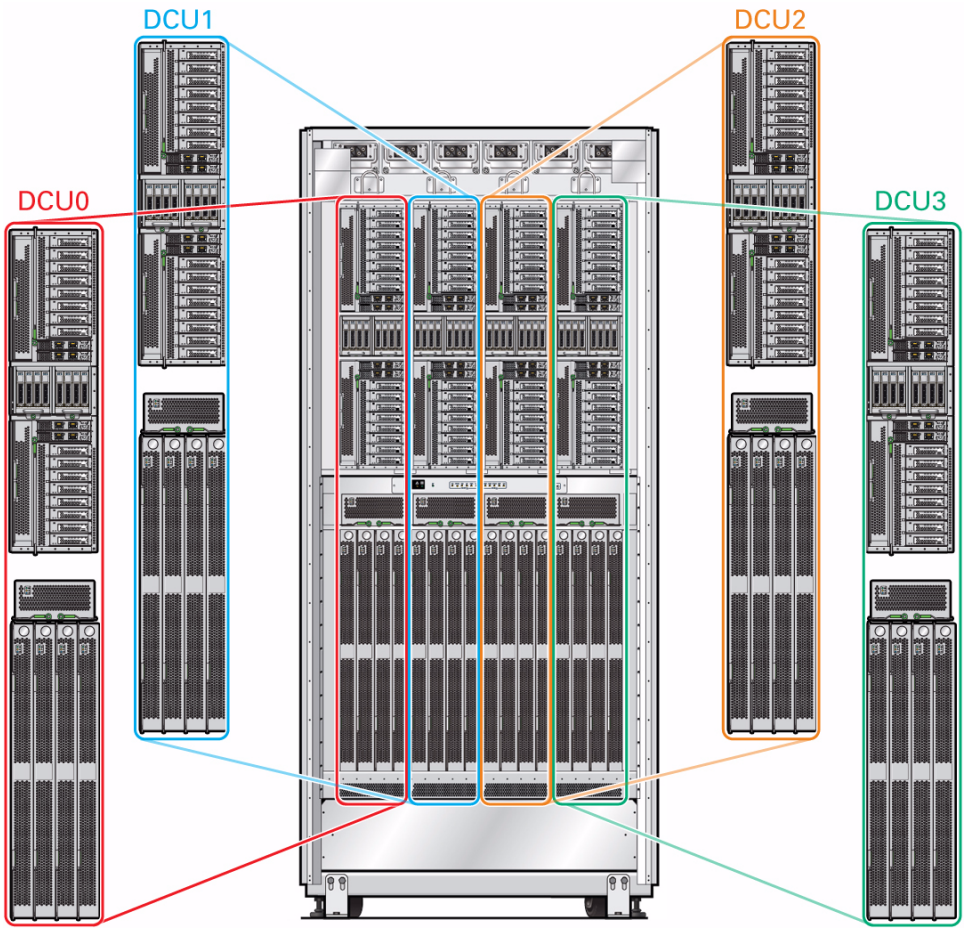
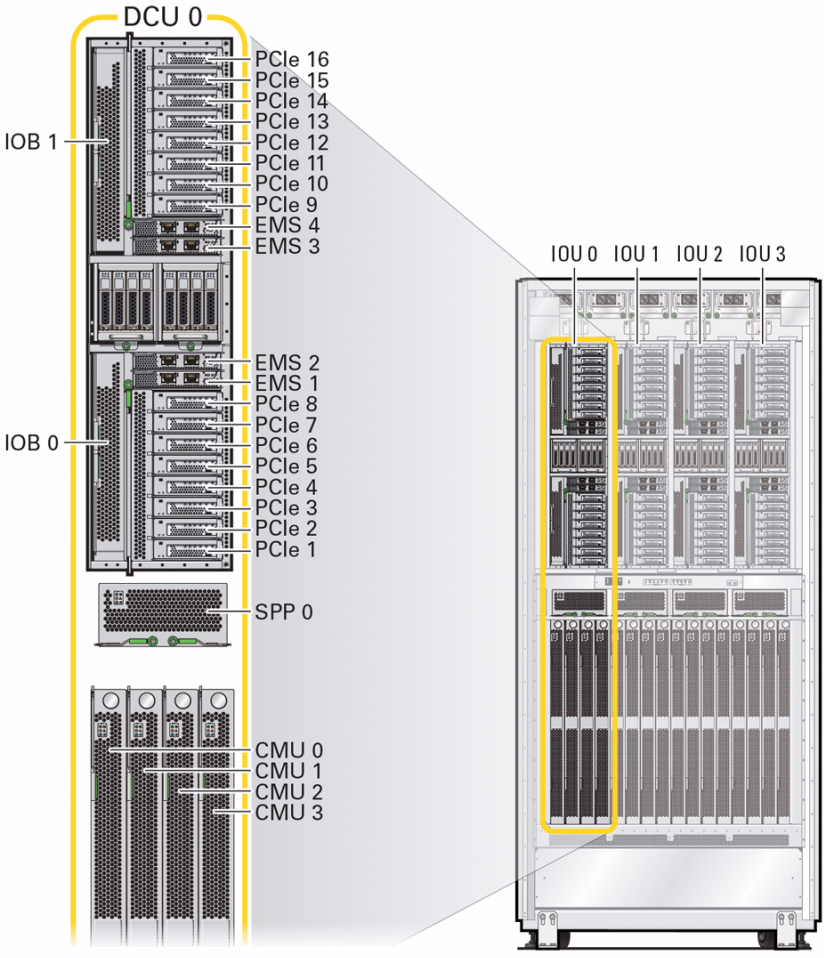


FIGURE: DCU Components



Note – Depending on the configuration you ordered, a server can contain fewer than four DCUs, and each DCU can contain less than the maximum number of CMUs, EMS modules, and drives. Contact your Oracle Sales representative for specific ordering details.

A fully-populated DCU contains four CMUs, and a half-populated DCU contains two CMUs. Each DCU can contain the following components.

DCU	Components
DCU 0	• Fully-populated: CMU 0, CMU 1, CMU 2, CMU3 • Half-populated: CMU 0 and CMU 3 • SPP 0 • IOU 0
DCU 1	• Fully-populated: CMU 4, CMU 5, CMU 6, CMU7 • Half-populated: CMU 4 and CMU 7 • SPP 1 • IOU 1
DCU 2	• Fully-populated: CMU 8, CMU 9, CMU 10, CMU 11 • Half-populated: CMU 8 and CMU 11 • SPP 2 • IOU 2
DCU 3	• Fully-populated: CMU 12, CMU 13, CMU 14, CMU 15 • Half-populated: CMU 12 and CMU 15 • SPP 3 • IOU 3

A PDomain can contain one to four DCUs. Using Oracle ILOM commands, you can combine DCUs into PDomains. Refer to the administration guide for instructions on creating and administering PDomains.

Related Information

- "Rear Components" on page 8
- "SPs and SPPs" on page 10
- "Physical Domains" on page 13
- *Server Administration*, understanding configuration guidelines
- *Server Service*, identifying components

Physical Domains

A physical domain (PDomain) operates like an independent server that has full hardware isolation from other PDomains in the server. A hardware or software failure on one PDomain does not affect the other PDomains on a server.

You can divide the server into one to four PDomains, depending on your application requirements. For example, you can divide the server into four PDomains, each running its own applications. Or, you can configure the server into one PDomain to provide all of the hardware resources to a single set of applications.

The server comes preconfigured as one PDomain (not bounded), containing all of the hardware resources.

There are two types of PDomains:

PDomain Type	Description
Bounded PDomain	A Bounded PDomain contains only one DCU and has total hardware isolation from other PDomains in the server. Bounded PDomains performance might be better when compared to PDomains.
PDomain	A PDomain can contain one to four DCUs. In a multiple DCU PDomain, processor data traffic between the DCUs is routed through the SSBs, so PDomains might have lower performance compared to a Bounded PDomain.

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 animation (http://youtu.be/VkFu6-PezHM)

Related Information

- "Domain Configurable Units" on page 10
- "Physical Domains" on page 13
- *Server Administration,* PDomain types
- *Physical Domains and Multilayered Virtualization in Oracle's SPARC M5-32 and SPARC M6-32 Servers* animation

Understanding the Firmware and Software Environment

The server is preinstalled with the following software and firmware.

- "OpenBoot" on page 15
- "Oracle ILOM" on page 15

- "Oracle Solaris OS" on page 16
- "Oracle VM Server for SPARC" on page 17
- "Oracle Enterprise Manager Ops Center" on page 17

Related Information

- "Understanding the Hardware Architecture" on page 9
- "Planning Network Addresses" on page 59
- *Server Administration*, understanding the system administration resources

OpenBoot

Upon powering on a PDomain, the OpenBoot firmware validates the server hardware and starts the operating system. You can use the OpenBoot firmware to perform a number of administrated tasks outside of the operating system.

For more information about OpenBoot tasks, refer to the *Server Administration* and the *OpenBoot 4.x Command Reference Manual*.

Related Information

- OpenBoot 4.x Command Reference Manual (`http://docs.oracle.com/cd/E23824_01/`)
- "Physical Domains" on page 13
- "Power On the Server" on page 154
- *Server Administration*, accessing the `ok` prompt

Oracle ILOM

Oracle ILOM is the system management firmware that is preinstalled on the server's SPs. Oracle ILOM enables you to manage and monitor the components in the server through either a web-based or command-line interface.

The Oracle ILOM firmware runs independently of the PDomains, even when PDomains are not powered-on and actively running an operating system. As long as the power cords are connected to the server, and the facility circuit breakers are switched on, the Oracle ILOM firmware is available to use.

When powering on the server for the first time, use the Oracle ILOM firmware command-line interface to configure the server. After the initial configuration, use the Oracle ILOM command-line or web interface for all additional maintenance and administration tasks.

For information about the server-specific Oracle ILOM tasks, refer to *Server Administration*. For information about Oracle ILOM tasks that are common to all platforms managed by the firmware, refer to the Oracle ILOM documentation:

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

Related Information

- "SPs and SPPs" on page 10
- "Physical Domains" on page 13
- "Powering On the Server for the First Time" on page 141
- Oracle ILOM documentation `(http://www.oracle.com/goto/ILOM/docs)`

Oracle Solaris OS

The server is preinstalled with the Oracle Solaris OS. The Oracle Solaris OS provides many utilities to help install and administer your applications.

Find information about the features of the OS, as well as links to technical reports and training courses, at:

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

For information on installing and administering the OS, refer to the Oracle Solaris 11.1 documentation:

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

Related Information

- Oracle Solaris 11.1 documentation `(http://docs.oracle.com/cd/E23824_01/)`
- Oracle University `(http://education.oracle.com)`
- "Power On the Server" on page 154
- "Oracle Solaris OS Configuration Parameters" on page 156
- "Additional Software Configuration and Testing" on page 157

Oracle VM Server for SPARC

The server is preinstalled with Oracle VM Server for SPARC software. Use this software to create virtual servers called *logical domains*, which run their own independent operating systems and use a defined portion of the available server resources. Each logical domain can be created, destroyed, reconfigured, and rebooted independently. You can virtualize resources and define network, storage, and other I/O devices as services that can be shared between domains.

For additional information about the Oracle VM Server for SPARC software, refer to:

- Oracle VM Server for SPARC product page (http://www.oracle.com/us/technologies/virtualization/oraclevm/oracle-vm-server-for-sparc-068923.html)
- Oracle VM Server for SPARC documentation (http://www.oracle.com/goto/VM-SPARC/docs)
- Oracle VM Server for SPARC wiki (https://wikis.oracle.com/display/oraclevm/Oracle+VM+Server+for+SPARC)

Related Information

- "Planning Network Addresses" on page 59
- "Additional Software Configuration and Testing" on page 157
- *Server Administration*, Oracle VM Server for SPARC overview
- Oracle University (http://education.oracle.com)

Oracle Enterprise Manager Ops Center

Oracle Enterprise Manager Ops Center is a comprehensive system management solution for managing physical and virtual systems and devices. 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 user interface.

For more information about the Oracle Enterprise Manager Ops Center software, 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 deploying and managing the server using the software, refer to the *Discovering and Managing Oracle SPARC M5 and M6 Server* guide. Find this guide, as well as guides for deploying Oracle VM Server for SPARC logical domains and Oracle Solaris Zones, by selecting the Deploy How To tab on the documentation library. For example, you can 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

Preparing the Site

Prepare to install the server at the installation site.

No.	Task	Link
1	Review the high-level site preparation checklist and installation site guidelines before you begin.	"Site Preparation Checklist" on page 19 "General Installation Site Guidelines" on page 22
2	Confirm that the physical site is ready to receive the server.	"Reviewing the Physical Specifications" on page 23
3	Ensure that the power requirements are met.	"Reviewing the Power Requirements" on page 30
4	Understand the environmental requirements and ensure that the cooling system can maintain the server within the ideal operating range.	"Preparing for Cooling" on page 43
5	Plan how the server will get from the loading ramp to the installation site.	"Preparing the Unloading Route and Unpacking Area" on page 53
6	Prepare the network server addresses and serial connections.	"Planning Network Addresses" on page 59

Related Information

- "Understanding the Server" on page 1
- "Preparing for Installation" on page 67

Site Preparation Checklist

Before installing the server, ensure that the following requirements are satisfied.

Requirement	Question	Check

Training	Have the administrators and installers reviewed the documentation and completed the necessary training courses?
	The server documentation pages, which include links to Oracle University training courses, are at:
	`http://www.oracle.com/goto/M5-32/docs`
	`http://www.oracle.com/goto/M6-32/docs`
		☐

Configurations	Have you determined the server components and configuration?	☐
	Have you determined the total number of servers to be installed?	☐
Access route	Have you inspected and prepared the entire access route from the loading dock to the server's final installation site? See: • "Shipping Container Dimensions" on page 54 • "Loading Dock and Receiving Area Requirements" on page 55 • "Access Route Guidelines" on page 55 • "Unpacking Area" on page 57	☐
	Does the access route provide sufficient space for transporting a packaged server?	☐
	Have you protected the access route by covering it with fiberboard or similar material?	☐
Installation site	Does the server's installation location meet all space requirements? See "Reviewing the Physical Specifications" on page 23.	☐
	Is the data center or server room located in a secured location? Refer to the *SPARC M5-32 and SPARC M6-32 Servers Security Guide* for more information.	☐
	If necessary, have you prepared the installation site floor for sub-floor cabling? See "Mounting Holes and Cable Routing Floor Cutout Specifications" on page 28.	☐
Power	Do you understand the operating voltages and electrical current levels required to power the server and its peripherals? See: • "Power Supply Specifications" on page 30 • "Server Power Consumption" on page 31 • "Power Cord Specifications" on page 32	☐

Requirement	Question	Check
	Are there enough power outlets available to power the server and peripherals? See "Facility Power Receptacles" on page 36 and your peripheral documentation.	❑
	Have you prepared two facility power grids to power the server? See: • "Facility Power Requirements" on page 37 • "Power Cord-to-Power Supply Relationship" on page 40	❑
	Have you prepared the appropriate facility power outlets for the power cords? Are all of these outlets grounded? See: • "Power Cord Specifications" on page 32 • "Grounding Requirements" on page 42	❑
	Are there circuit breakers for each power cord and do they meet the capacity requirements? See "Circuit Breaker Capacity Requirements" on page 43.	❑
Operating environment and cooling	Does the data center meet the temperature and humidity requirements? See "Environmental Requirements" on page 44.	❑
	Does the installation site environment provide adequate ventilation and airflow to cool an operating server? See: • "Heat Dissipation and Airflow Requirements" on page 47 • "Cooling Airflow From Ceiling Vents" on page 49 • "Cooling Airflow From Perforated Floor Tiles" on page 50	❑
	Have you taken measures to prevent airborne contaminates from entering the installation site? See "Airborne Contaminates" on page 45.	❑
Unpacking	Have you acclimated the packaged server to the data center environment prior to unpacking it? See "Loading Dock and Receiving Area Requirements" on page 55.	❑

Requirement	Question	Check
	Have you set aside an area, away from the installation location, where you can safely unpack the server? See "Unpacking Area" on page 57.	❑
Data connections	Do you clearly understand the data connections required for setting up the server and connecting it to the network? See "Planning Network Addresses" on page 59.	❑
	Have you prepared network addresses for all data connections? See: • "Mandatory Cable Connections and Network Addresses" on page 59 • "SP Network Addresses" on page 64 • "PDomain Cables and Network Addresses" on page 65	❑

Related Information

- "General Installation Site Guidelines" on page 22
- "Preparing for Installation" on page 67

General Installation Site Guidelines

Follow these guidelines when selecting a location for the server.

- Do not install the server in a location that is exposed to:
  - Direct sunlight
  - Excessive dust
  - Corrosive gases
  - Air with high salt concentrations
  - Frequent vibrations
  - Sources of strong radio frequency interference
  - Static electricity
- Use power outlets that provide proper grounding
  - A qualified electrical engineer must perform any grounding work
  - Verify the grounding method for the building
- Observe the precautions, warnings, and notes about handling that appear on labels on the equipment

Related Information

- “Airborne Contaminates” on page 45
- “Handling Precautions” on page 67
- “ESD Precautions” on page 68
- “Site Preparation Checklist” on page 19

Reviewing the Physical Specifications

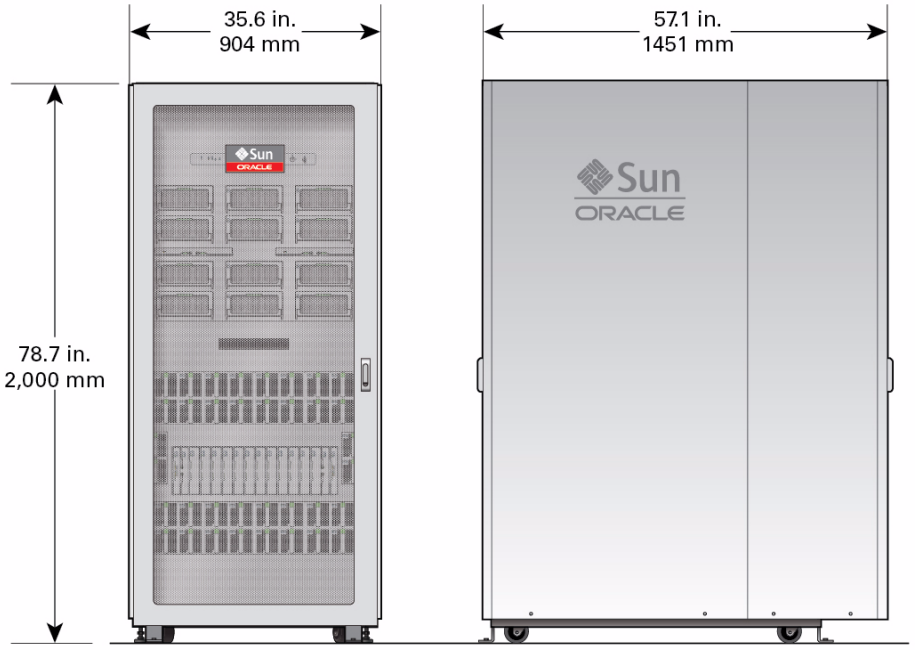
Ensure that the installation site can properly accommodate the server by reviewing its physical specifications and space requirements.

- “Physical Dimensions” on page 24
- “Installation and Service Area” on page 25
- “Leveling Feet and Caster Dimensions” on page 26
- “Raised Floor Weight Considerations” on page 28
- “Mounting Holes and Cable Routing Floor Cutout Specifications” on page 28

Related Information

- “Understanding the Server” on page 1
- “Preparing the Unloading Route and Unpacking Area” on page 53

Physical Dimensions



Server Dimension	English	Metric
Height	78.7 in.	2000 mm
Width	35.6 in.	904 mm
Width without removable side panels	34.5 in.	876 mm
Depth (with doors)	57.1 in.	1451 mm
Depth (with doors removed)	53.6 in.	1362 mm
Depth (front door handle to rear door handle)	58.3 in.	1482 mm
Maximum weight (varies by configuration)	Approx. 3700 lbs	Approx. 1678 kg

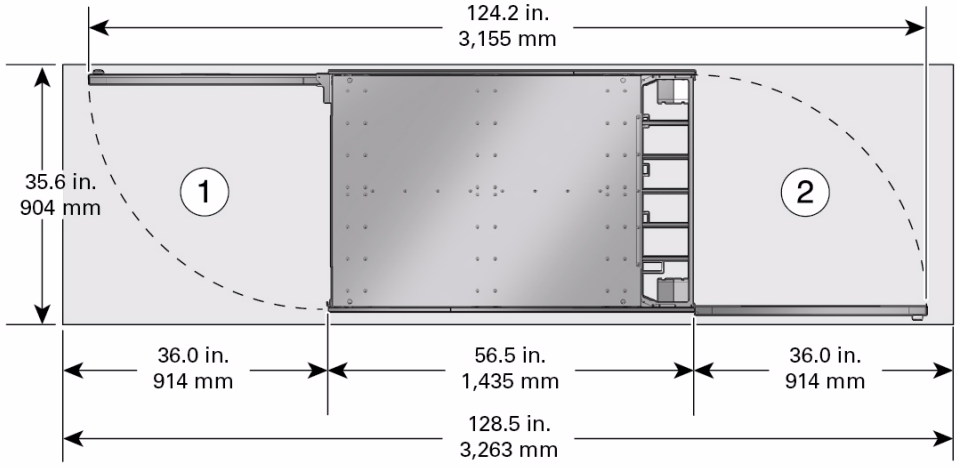
Related Information

- "Leveling Feet and Caster Dimensions" on page 26
- "Mounting Holes and Cable Routing Floor Cutout Specifications" on page 28
- "Shipping Container Dimensions" on page 54
- "Access Route Guidelines" on page 55

Installation and Service Area

Prior to installing the server, prepare a service area that provides enough room to install and service the server.

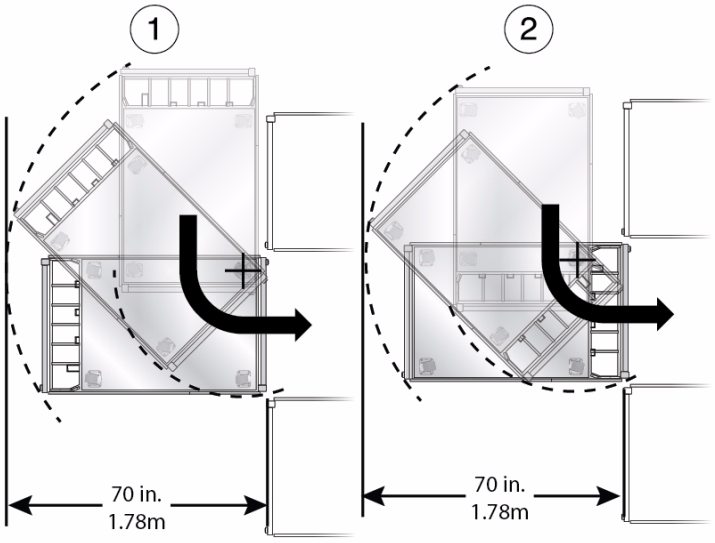
Caution – You must provide the following service area for the server. Do not attempt to operate the server in a smaller service area.



1	Front of server
2	Rear of server

Note – The length between the two door pivot points is 56.5 in (1435 mm). The depth of the server without doors is 53.6 in. (1362 mm).

When turning the server, temporarily provide additional space in front or rear of the installation site beyond the minimum aisle width. The server requires at least 70 in. (1.78m) of space to turn.



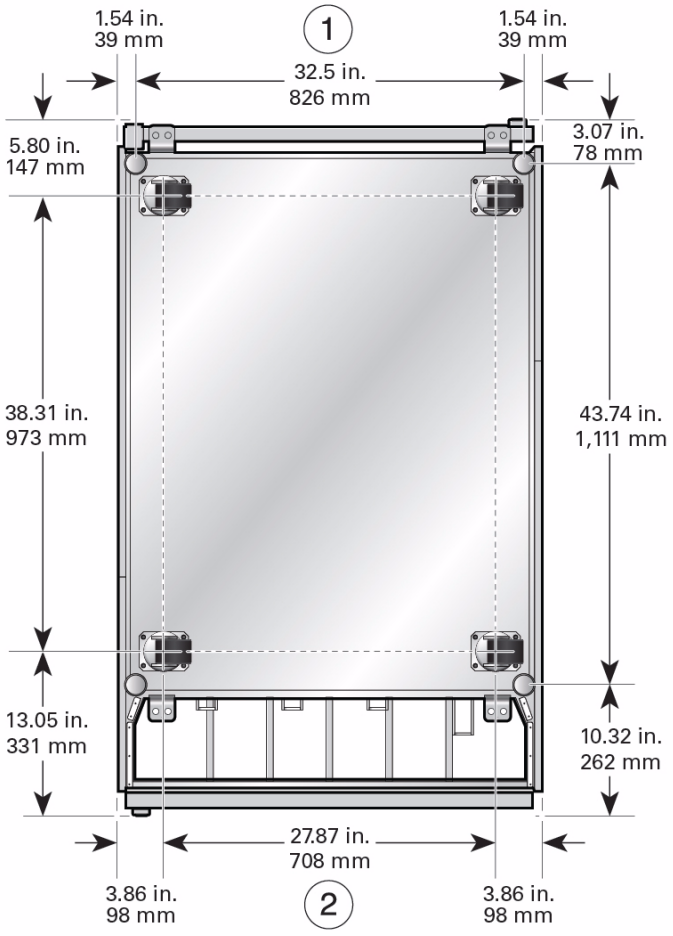
1	Turning the front of the server into the installation site
2	Turning the rear of server into the installation site

Related Information

- "Physical Dimensions" on page 24
- "Installing the Server" on page 73

Leveling Feet and Caster Dimensions

The illustration shows the bottom view of the server.



1	Front of server
2	Rear of server

Related Information

- "Physical Dimensions" on page 24
- "Mounting Holes and Cable Routing Floor Cutout Specifications" on page 28
- "Stabilizing the Server" on page 87

Raised Floor Weight Considerations

A fully configured server weighs nearly of 3700 lbs (1678 kg), and it could weigh more depending on how you cable the server. While the loading is over an area of around 2.75 ft x 3.75 ft (838 mm x 1143 mm), the true stress of the server weight is over the four casters and four leveling feet.

The server has a caster and an adjacent leveling foot at each corner of the server, so each corner of the bears almost 1000 lbs (454 kg) of the server's weight. If a caster and leveling foot are located in the center of a raised floor tile, that tile bears this nearly 1000 lbs (454 kg) load. The floor tile and underlying supports must be able to accommodate this load.

Related Information

- "Physical Dimensions" on page 24
- "Installation and Service Area" on page 25
- "Leveling Feet and Caster Dimensions" on page 26
- "Stabilizing the Server" on page 87

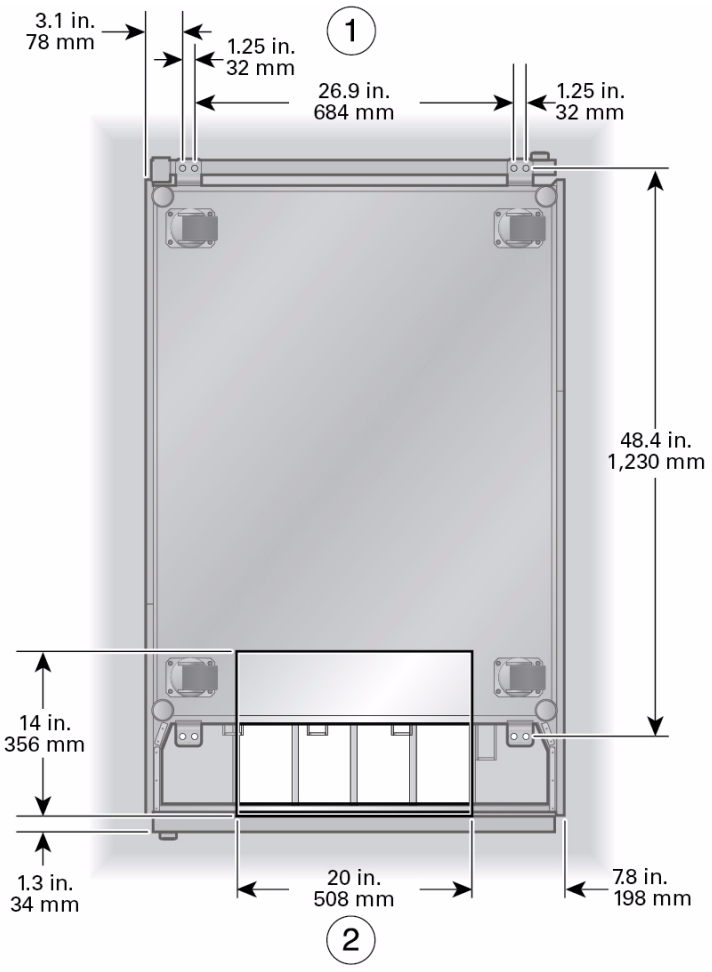
Mounting Holes and Cable Routing Floor Cutout Specifications

The illustration shows the bottom view of the server with an *example* floor cutout. This example cutout extends under the server to provide a generous bend radius for the cables and power cords. Depending on your raised-floor cabling requirements, your data center might require a different cutout. Contact your facilities manager for more information.

The mounting hole dimensions are for optional mounting brackets. See "Install the Mounting Brackets" on page 91 for instructions.

Caution – If your floor cutout is near the leveling feet or mounting brackets, ensure that the surrounding floor tiles can support the weight of the server. See "Raised Floor Weight Considerations" on page 28 for more information.

Caution – Be careful when moving the server near floor cutouts. If the server's casters fall into a floor cutout, the floor and the server could be severely damaged.



1	Front of server
2	Rear of server

Related Information

- "Leveling Feet and Caster Dimensions" on page 26
- "Access Route Guidelines" on page 55
- "Moving the Server" on page 78

Reviewing the Power Requirements

Description	Link
Review the power supply specifications.	"Power Supply Specifications" on page 30
Understand the server's total power consumption.	"Server Power Consumption" on page 31
Identify the power cords and review their specifications. Understand the facility power receptacle requirements.	"Power Cord Specifications" on page 32 "Facility Power Receptacles" on page 36
Ensure that the facility meets these power requirements.	"Facility Power Requirements" on page 37
Power the server using two facility power grids. Understand the relationship between the power cords and the power supplies.	"Power Cord-to-Power Supply Relationship" on page 40
Ensure that each power cord has a circuit breaker that meets these capacity requirements.	"Circuit Breaker Capacity Requirements" on page 43
Understand the server grounding requirements.	"Grounding Requirements" on page 42

Related Information

- "Connect the Power Cords" on page 126
- "Secure the Power Cords" on page 131
- "Switch On the Facility Circuit Breakers" on page 145

Power Supply Specifications

The server has 12 hot-swappable and redundant power supplies. One power cord feeds two power supplies. These specifications are for each power supply and not for the entire server.

Note – All 12 power supplies must be installed and all 6 power cords must be connected to power the server.

Use these power supply specifications only as a planning aid. For more precise power values, use the online power calculator to determine the power consumption of the server with your configuration. To locate the appropriate power calculator, go to the following web site and navigate to the SPARC M5-32 server or the SPARC M6-32 server page:

http://www.oracle.com/goto/powercalculators/

Specification	Measurement
Rated power supply output capacity	7.0 KW
Nominal AC operating voltage range	200–480 VAC
Phase	Three-phase delta
Nominal frequencies	50–60 Hz input
Output rating	+12.2V @ 583A output
Efficiency	90% efficient (20% to 100% load)
Maximum AC RMS input current per *power supply*	• 24A @ 200–240 VAC • 12A @ 380–415 VAC • 10A @ 480 VAC
Maximum AC RMS input current per *power cord*	• 48A @ 200–240 VAC • 24A @ 380–415 VAC • 20A @ 480 VAC
Inrush current	• 88A peak (excluding EMI filter charging) • Less than 48A RMS over one cycle
Protective earth current (measured at 480 VAC)	• Less than 2 mA per power cord • Less than 12 mA per server

Related Information

- "Server Power Consumption" on page 31
- "Facility Power Requirements" on page 37
- "Circuit Breaker Capacity Requirements" on page 43

Server Power Consumption

The combined server power ratings are between 20 kVA and 30 kVA for a fully configured server.

Use the online power calculator to determine the power consumption of the server with your configuration. To locate the appropriate power calculator, go to the following web site and navigate to the SPARC M5-32 server or the SPARC M6-32 server page:

`http://www.oracle.com/goto/powercalculators/`

Note – All 12 power supplies must be installed and all 6 power cords must be connected to power the server.

Related Information

- "Power Supply Specifications" on page 30
- "Power Cord Specifications" on page 32
- "Facility Power Requirements" on page 37

Power Cord Specifications

Six power cords deliver power to the server. Two types of AC power cords are available to support regional power source connections.

Note – All six power cords must be connected to power the server.

FIGURE: 4-Wire Power Cord AC Plug (460P9W)

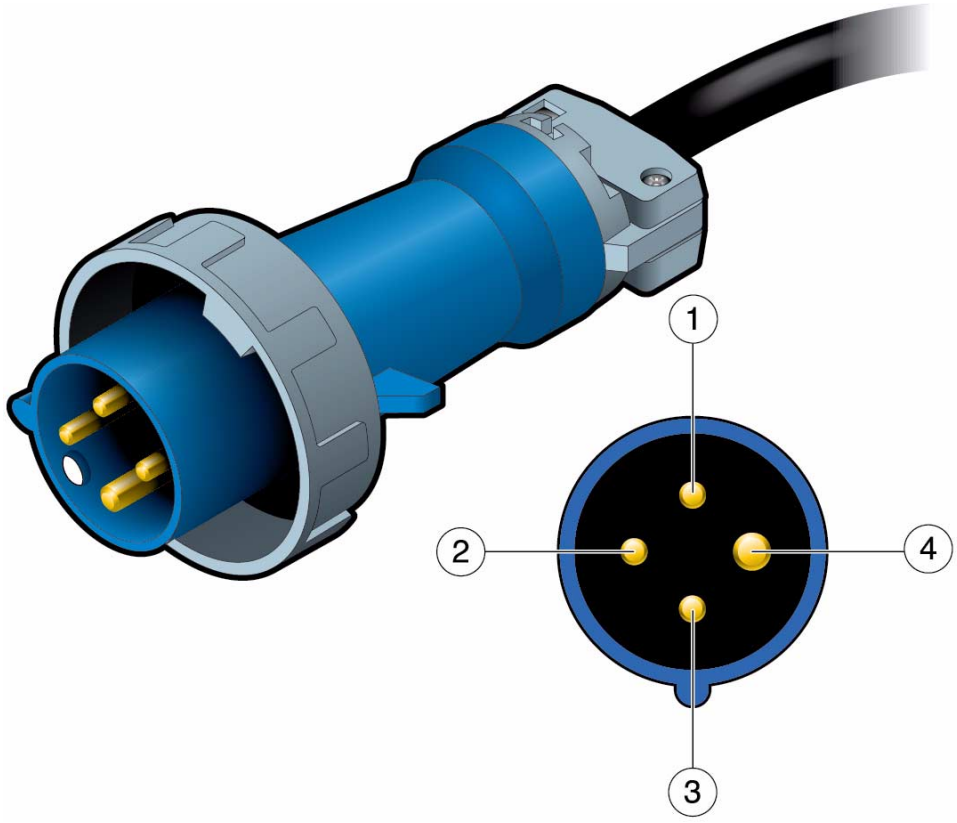


Figure Legend

1	L1
2	L2
3	L3
4	Ground

FIGURE: 5-Wire Power Cord AC Plug (532P6W)

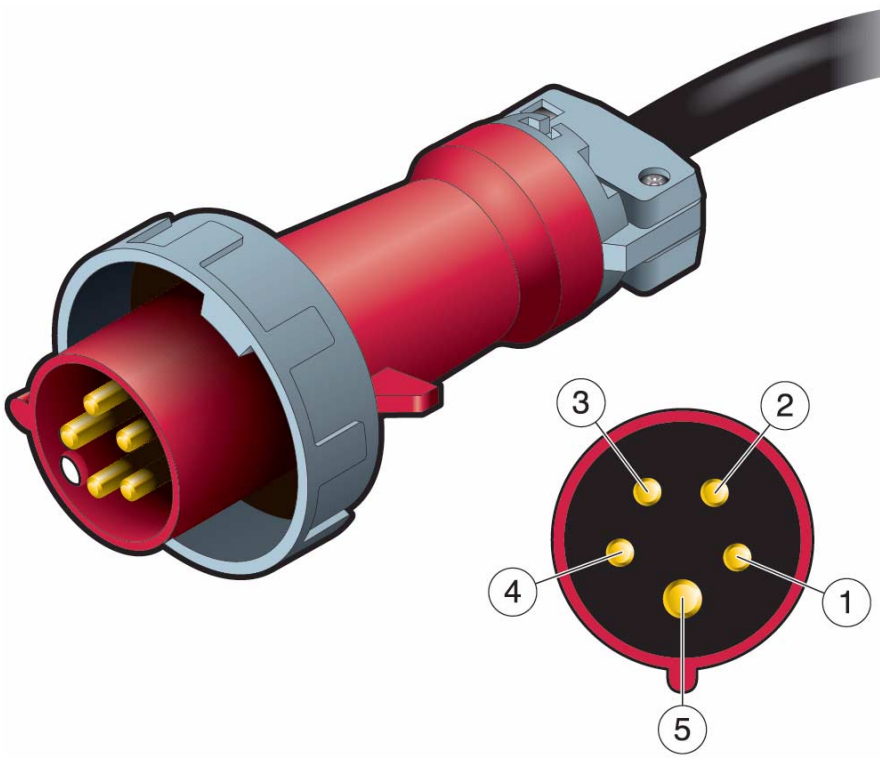


Figure Legend

1	L1
2	L2
3	L3
4	Neutral – not connected to cable
5	Ground

Note – When using the 5-wire power cord, the neutral wire is not connected. Only the three live wires and the ground wire are connected.

Region	Length	Facility AC Outlet Plug
North America, Japan, and Taiwan	4.4m (14 ft, 5.25 in.)	60A, 250V, 3-phase, IEC 60309 IP67 (460P9W) 4-wire plug
Europe, Middle East, Africa, and the rest of the world	4.4m (14 ft, 5.25 in.)	32A, 380V / 415V, 3-phase, IEC 60309 IP67 (532P6W) 5-wire plug

Note – The power cords attach at the top of the server. Routing the power cords through the bottom of the server uses 115 in. (2.92m) of the cord length, leaving only 4 ft 10 in. (1.48m) available to connect to the AC power receptacles. Therefore, when routing power cords under the server, ensure that the power receptacles are within 4 ft. (1.22m) of the server.

Caution – The installation site must have a local power disconnect (for example, circuit breakers) between the power source and the power cords. You will use this local disconnect to supply or remove AC power from the server. See "Circuit Breaker Capacity Requirements" on page 43 for more information.

Caution – Ensure that you install the server near your power grid's electrical outlets, and ensure that these outlets are easily accessible in case you must detach the power cords in an emergency.

Note – Electrical work and installations must comply with applicable local, state, or national electrical codes. Your facility manager or a qualified electrician must connect these power cords to the facility power grids.

Related Information

- "Power Cord-to-Power Supply Relationship" on page 40
- "Circuit Breaker Capacity Requirements" on page 43
- "Connect the Power Cords" on page 126

Facility Power Receptacles

You must provide six ISO 60309 power connectors or receptacles to connect to the server's AC power cords. The following illustrations show the pin layout of the appropriate female connectors or receptacles.

FIGURE: 4-Wire Power Cord AC Receptacle

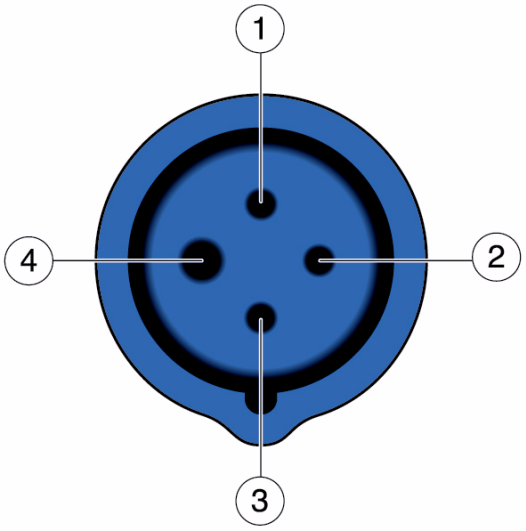


Figure Legend

1	L1
2	L2
3	L3
4	Ground

FIGURE: 5-Wire Power Cord AC Receptacle

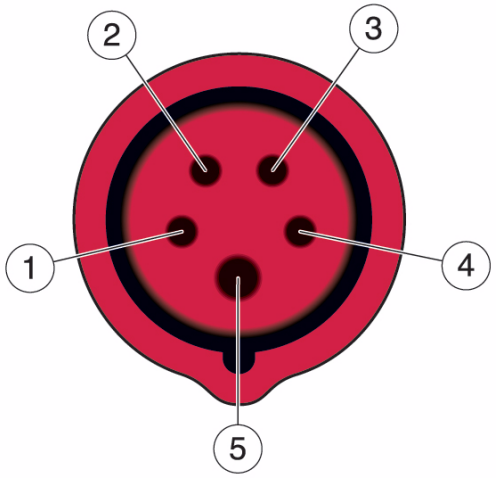


Figure Legend

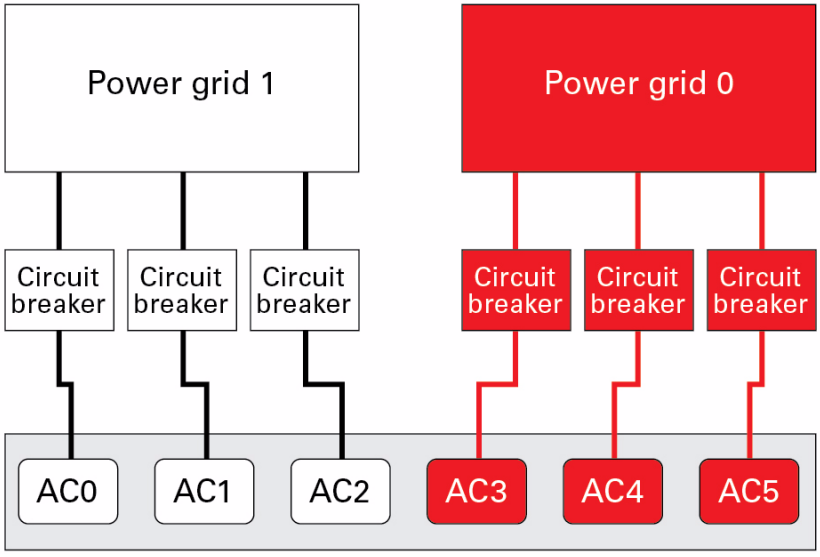
1	L1
2	L2
3	L3
4	Neutral
5	Ground

Related Information

- "Power Cord Specifications" on page 32
- "Facility Power Requirements" on page 37
- "Power Cord-to-Power Supply Relationship" on page 40

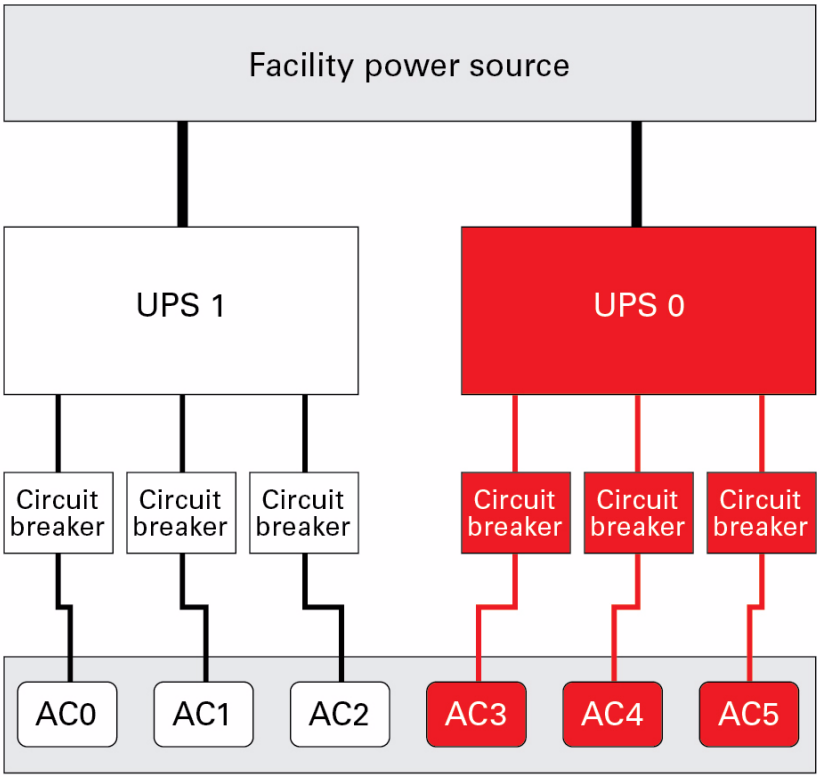
Facility Power Requirements

The server is designed to be powered by two utility power grids. Connect three power cords (AC0, AC1, and AC2) to one power grid, and connect the remaining three power cords to a second power grid (AC3, AC4, and AC5). All six power cords must be connected when operating the server.



Note – With this dual-power feed setup, every power cord connected to the server is used to supply power, and the power load is balanced. When power loads are greater than 5% of the power supply capacity, the power loads are balanced at ±10%.

Using 3-phase, sine-wave uninterruptible power supplies, you can create two separate power grids from one facility power source.

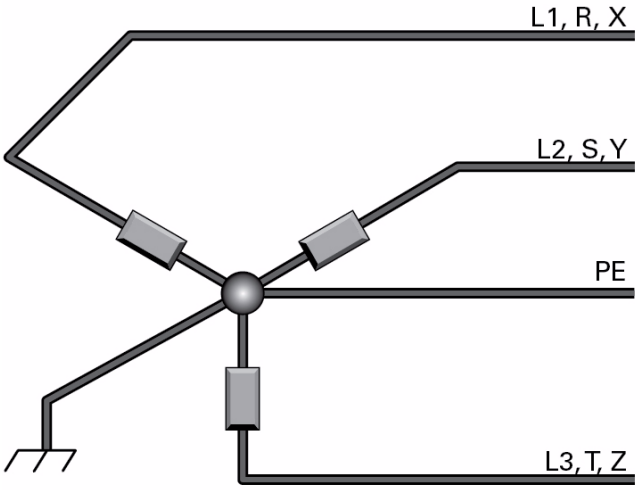


To prevent catastrophic failures, design your input power sources to ensure that adequate power is provided to the server. Use dedicated circuit breakers for all power circuits that supply power to the server.

Electrical work and installations must comply with applicable local, state, or national electrical codes. Contact your facilities manager or a qualified electrician to determine what type of power is supplied to your building.

Caution – To protect your server from electrical fluctuations and interruptions, use a dedicated power distribution system, uninterruptible power supplies, power conditioning equipment, and lightning arresters.

The three-phase AC power source must be a center-point grounded star configuration (type TN-C per IEC 60950). The server operates phase-to-phase, so the neutral line of the 5-wire power cord is not connected. Only the three phase wires and the ground wire connect to the AC power distribution.



Related Information

- "Power Supply Specifications" on page 30
- "Server Power Consumption" on page 31
- "Power Cord Specifications" on page 32
- "Power Cord-to-Power Supply Relationship" on page 40
- "Grounding Requirements" on page 42
- "Circuit Breaker Capacity Requirements" on page 43

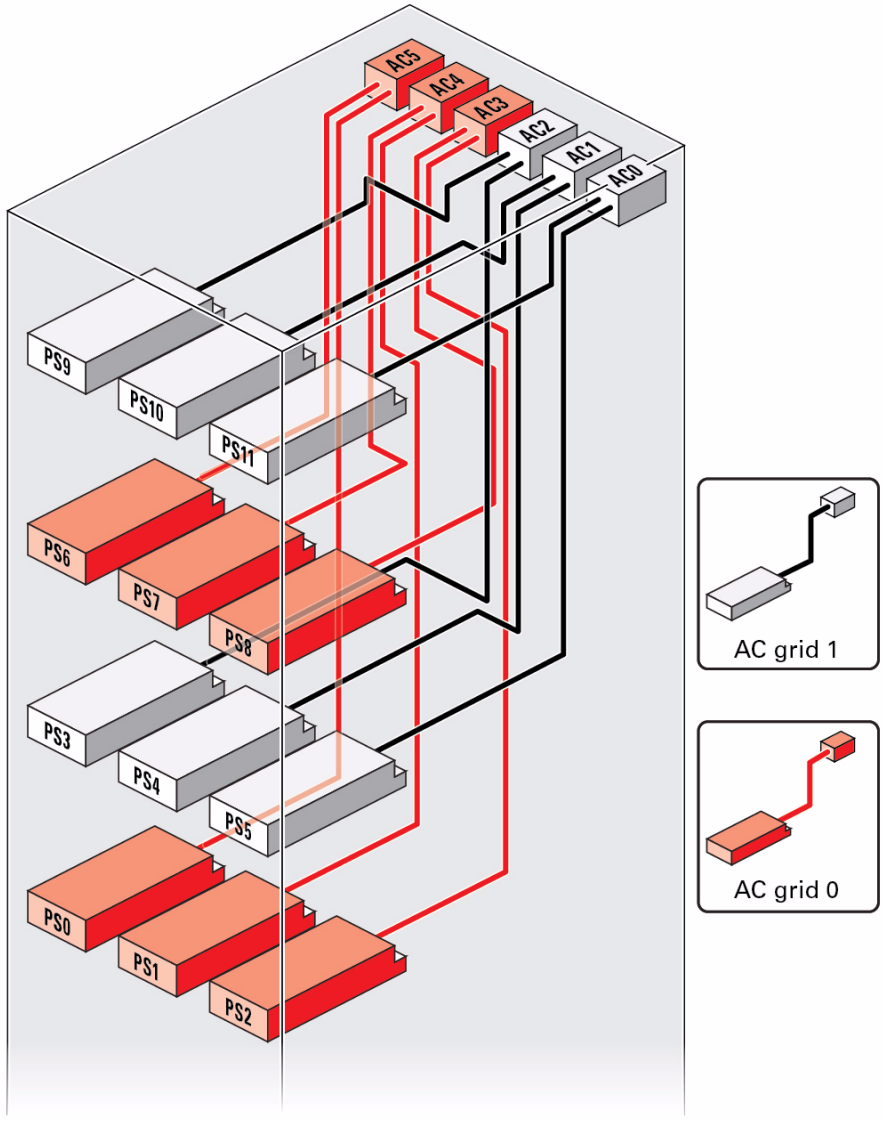
Power Cord-to-Power Supply Relationship

Six power cords connected to the rear of the server provide power to the 12 power supplies in the server. Each power cord supplies power to two power supplies.

To ensure the redundant operation of the power supplies, connect the left three power cords to one AC power grid, and the right three power cords to another AC power grid (see "Facility Power Requirements" on page 37 for more information). All 12 power supplies provide 1+1 (2N) redundancy in case of a power failure to a single AC power grid.

The server uses 48A at 208V, 24A at 400V, and 20A at 480V of power from each AC power cord. When both AC power grid sources are connected through six power cords, each power grid runs at half the rated current per power cord.

The power cord-to-power supply connections are as follows.


AC5
AC4
AC3
AC2
AC1
AC0
PS9
PS10
PS11
PS6
PS7
PS8
PS3
PS4
PS5
PS0
PS1
PS2
AC grid 1
AC grid 0

Power Supply No.	AC Power Filter No.	AC Power Grid No.
PS0	AC5	AC grid 0
PS1	AC4	AC grid 0
PS2	AC3	AC grid 0
PS3	AC2	AC grid 1
PS4	AC1	AC grid 1
PS5	AC0	AC grid 1
PS6	AC5	AC grid 0
PS7	AC4	AC grid 0
PS8	AC3	AC grid 0
PS9	AC2	AC grid 1
PS10	AC1	AC grid 1
PS11	AC0	AC grid 1

Related Information

- "Power Supply Specifications" on page 30
- "Power Cord Specifications" on page 32
- "Facility Power Requirements" on page 37
- "Connect the Power Cords" on page 126

Grounding Requirements

Always connect the cords to grounded power outlets. Computer equipment requires electrical circuits to be grounded to Earth ground, and connecting the power cords to grounded outlets completes the server grounding. No additional cabinet grounding is required.

Because different grounding methods vary by locality, refer to documentation such as IEC documents for the correct grounding method. Ensure that the facility administrator or qualified electrical engineer verifies the grounding method for the building and performs the grounding work.

Related Information

- "Power Cord Specifications" on page 32
- "Power Cord-to-Power Supply Relationship" on page 40

- "Circuit Breaker Capacity Requirements" on page 43
- "Connect the Power Cords" on page 126

Circuit Breaker Capacity Requirements

Provide a separate circuit breaker for each power cord connected to the server. Each power cord supplies power to two power supplies. These circuit breakers must accommodate the facility fault current ratings for the power infrastructure. Standard 3-pole circuit breakers are acceptable. The server has no specific time-to-trip requirements.

Contact your facilities manager or a qualified electrician to determine what type of circuit breakers accommodate your facility power infrastructure.

TABLE: Circuit Breaker Capacity for Each Supported Power Supply Voltage

Power Supply Voltage Input	Circuit Breaker Capacity
200–240 VAC line-to-line (L-L) 3-pole	60A
380–415 VAC line-to-line (L-L) 3-pole	30A (USA and Japan) 32A (Europe and the rest of the world)
480 VAC line-to-line (L-L) 3-pole	20A

Related Information

- "Server Power Consumption" on page 31
- "Power Cord Specifications" on page 32
- "Facility Power Requirements" on page 37
- "Connect the Power Cords" on page 126
- "Switch On the Facility Circuit Breakers" on page 145

Preparing for Cooling

Review the environmental requirements and ensure that the installation site provides adequate cooling.

- "Environmental Requirements" on page 44
- "Airborne Contaminates" on page 45

- "Heat Dissipation and Airflow Requirements" on page 47
- "Cooling Airflow From Ceiling Vents" on page 49
- "Cooling Airflow From Perforated Floor Tiles" on page 50
- "Measure the Ambient Temperature and Humidity" on page 52

Related Information

- "Reviewing the Physical Specifications" on page 23
- "Preparing for Installation" on page 67
- "Confirm the Site Preparation" on page 73

Environmental Requirements

Requirement	Operating Range	Nonoperating Range	Optimum Range
Ambient temperature	5° to 35°C (41° to 95°F) **Note -** Temperature ramp rate must not exceed 15°C (27°F) per hour.	In shipping container: -40° to 65°C (-40° to 149°F) Unpacked: 0° to 50°C (32° to 122°F) **Note -** Temperature ramp rate must not exceed 20°C (36°F) per hour.	21° to 23°C (70° to 74°F)
Relative humidity	20% to 80%, 27°C (81°F) max wet bulb temperature, noncondensing. **Note -** Humidity ramp rate must not exceed 30% per hour.	Up to 93%, 38°C (100.4°F) max wet bulb temperature, noncondensing. **Note -** Humidity ramp rate must not exceed 20% per hour.	45% to 50%
Altitude	Up to 3000m (10000 ft) **Note -** Except in China markets where regulations might limit installations to a maximum altitude of 2 km (6560 ft.).	Up to 12000m (40000 ft)	
Temperature ranges	5° to 35°C (41° to 95°F) at 0 to 500m (0 to 1640 ft) 5° to 33°C (41° to 93.2°F) at 501 to 1000m (1664 to 3281 ft) 5° to 31°C (41° to 87.7°F) at 1001 to 1500m (3284 ft to 4921 ft) 5° to 29°C (41° to 84.2°F) at 1501 to 3000m (4924 to 10000 ft) **Note -** Except in China markets where regulations might limit installations to a maximum altitude of 2km (6560 ft.).		

Requirement	Operating Range	Nonoperating Range	Optimum Range
Vibration	0.15G (vertical), 0.10G (horizontal), 5 to 500 Hz, swept-sine	0.5G (vertical), 0.25G (horizontal), 5 to 500 Hz, swept-sine	
Shock	3.0G, 11 ms, half-sine	**Roll-off:** 1-inch roll-off free fall, front-to-back rolling directions **Threshold:** 25 mm threshold height at 0.75m/s impact velocity	
Incline	5 degrees max. (9% grade max.)	5 degrees max. (9% grade max.)	

Related Information

- "Airborne Contaminates" on page 45
- "Heat Dissipation and Airflow Requirements" on page 47
- "Cooling Airflow From Ceiling Vents" on page 49
- "Cooling Airflow From Perforated Floor Tiles" on page 50
- "Measure the Ambient Temperature and Humidity" on page 52

Airborne Contaminates

Excessive concentrations of certain airborne contaminants can cause the server's electronic components to corrode and fail. Take measures to prevent contaminants such as metal particles, atmospheric dust, solvent vapors, corrosive gasses, soot, airborne fibers, or salts from entering, or being generated within, the data center.

Avoid locating the data center near print rooms, machine shops, wood shops, loading docks, and areas that involve the use of chemicals or generate toxic vapors or dust. Ensure the exhaust from generators or other sources of exhaust do not enter the intakes of air conditioning systems serving the data center. If the data center must be located near these hazardous locations, add and regularly maintain adequate filtering systems.

Note – To avoid introducing airborne contaminates to the data center, unpack the server outside of the data center and then move the server to its final location.

TABLE: Maximum Allowable Contaminate Levels

Contaminate	Tolerable Limit
Hydrogen sulfide (H_2S)	Up to 7.1 ppb
Sulfur dioxide (sulfur oxide) (SO_2)	Up to 37 ppb
Hydrogen chloride (HCI)	Up to 6.6 ppb
Chlorine (CI_2)	Up to 3.4 ppb
Hydrogen fluoride (HF)	Up to 3.6 ppb
Nitrogen dioxide (nitrogen oxide) (NO_2)	Up to 52 ppb
Ammonia (NH_3)	Up to 420 ppb
Ozone (O_3)	Up to 5 ppb
Oil vapor	Up to 0.2 mg/m3
Dust	Up to 0.15 mg/m3
Seawater (salt damage)	Do not install the server within 0.5 km (0.31 miles) of the ocean or coastal areas, unless the computer room uses air conditioners to filter out airborne sea salt particles from the outside air.

TABLE: Maximum Gaseous Contaminate Severity Levels for Copper and Silver

Reactivity Rate	Maximum Gaseous Contamination Severity Level
Copper (Cu) reactivity rate	Less than 30 nm/month
Silver (Ag) reactivity rate	Less than 20 nm/month

For more information, refer to the ASHRAE Technical Committee 9.9 document, *Gaseous and Particulate Contamination Guidelines for Data Centers* and the *iNEMI Position Statement on the Limits of Temperature, Humidity and Gaseous Contamination in Data Centers and Telecommunication Rooms to Avoid Creep Corrosion on Printed Circuit Boards* (April 20, 2012).

Related Information

- "Environmental Requirements" on page 44
- "Loading Dock and Receiving Area Requirements" on page 55
- "Unpack the Server" on page 76

Heat Dissipation and Airflow Requirements

The maximum rate of heat released from a fully configured server is 90,000 BTUs/hr (94,955 kJ/hr). To cool the server properly, ensure that adequate airflow travels through the server.

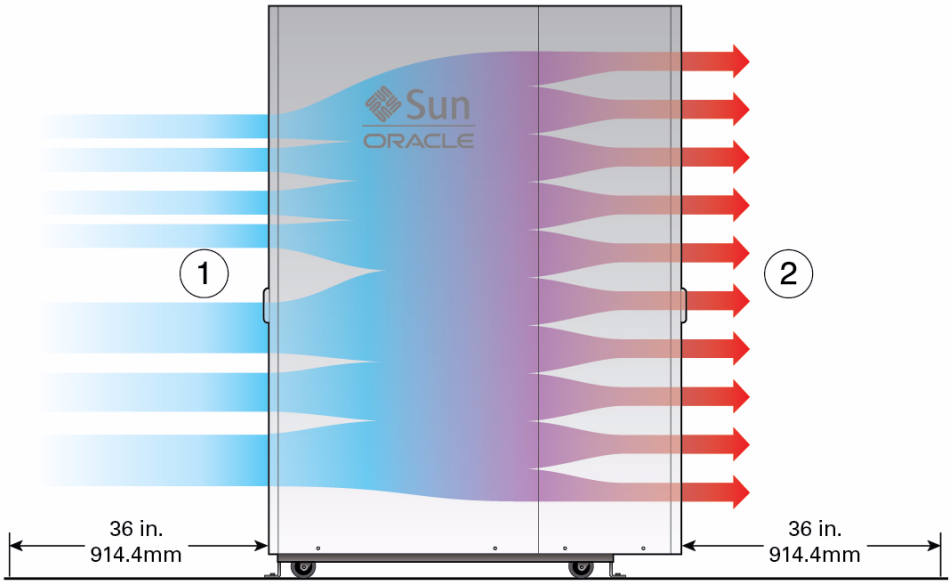
The direction of the airflow is from the front to the back of the server. The approximate server airflow is:

- Maximum: 4200 CFM
- Typical: 2500 CFM

To ensure adequate airflow:

- Allow a minimum clearance of 36 inches (914 mm) at the front and the rear of the server for ventilation.
- If the server is not completely populated with components, cover the empty slots with filler panels.
- Manage cables to minimize interference with the server exhaust.

Note – There are no airflow requirements for the left and right sides or the top and bottom of the server.



1 Front of server

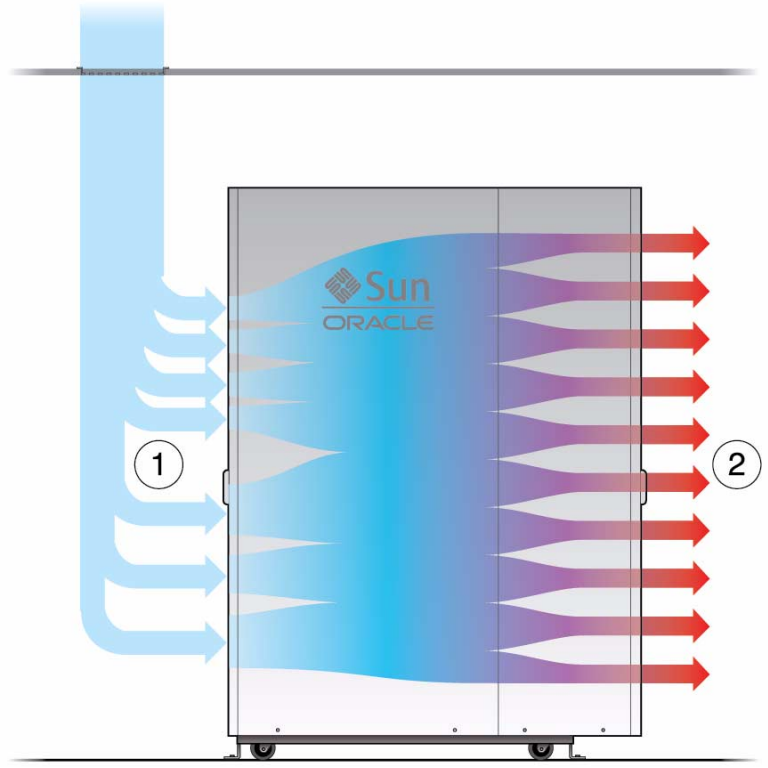
2 Rear of server

Related Information

- "Cooling Airflow From Ceiling Vents" on page 49
- "Cooling Airflow From Perforated Floor Tiles" on page 50
- "Measure the Ambient Temperature and Humidity" on page 52

Cooling Airflow From Ceiling Vents

When cooling the data center using ceiling vents, install the vents in front of the server so that conditioned air flows through the server. To provide maximum cooling, the airflow should be approximately 4200 CFM.



1	Front of server
2	Rear of server

Related Information

- "Heat Dissipation and Airflow Requirements" on page 47
- "Cooling Airflow From Perforated Floor Tiles" on page 50
- "Measure the Ambient Temperature and Humidity" on page 52

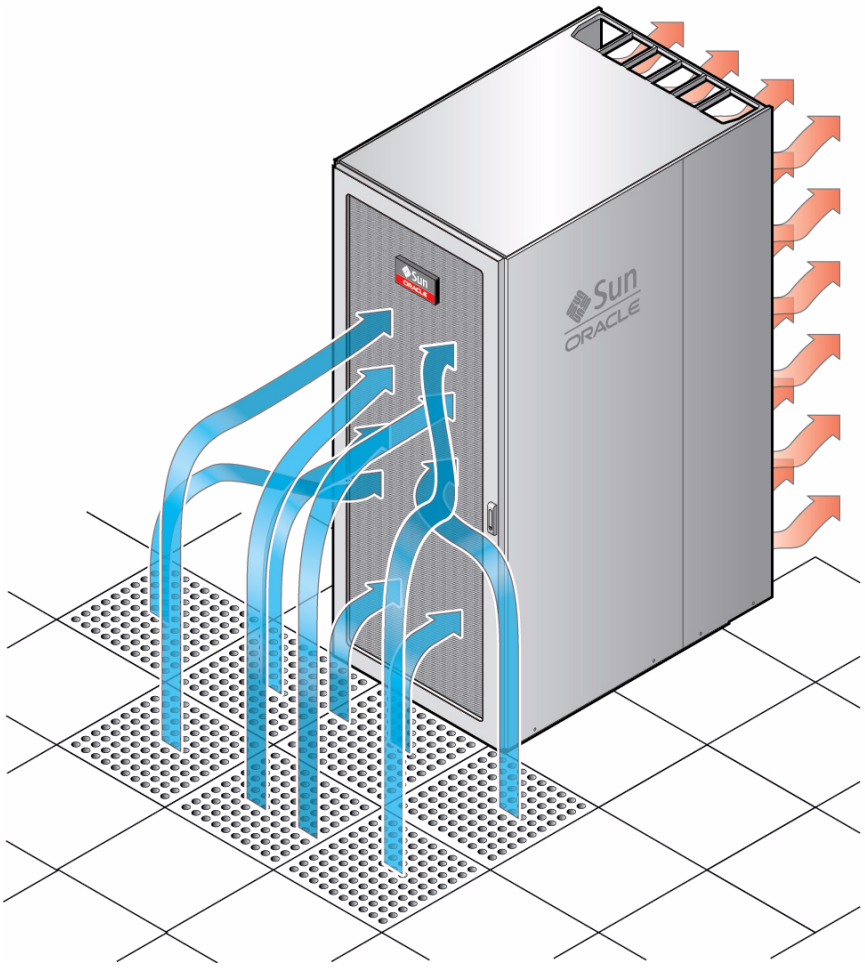
Cooling Airflow From Perforated Floor Tiles

If you install the server on a raised floor and you provide underfloor cooling, install perforated tiles in front of the server to cool it.

The following illustration shows an example arrangement of seven perforated floor tiles providing cooling air to the server. In this example, each perforated tile provides 600 CFM of cooling air in order to provide the 4200 CFM maximum total cooling airflow.

If your perforated floor tiles provide cooling air greater than 600 CFM, you can use fewer tiles to cool the server. For example, if the perforated floor tiles produce 700 CFM of cooling air, install six floor tiles in front of the server.

Note – The exact arrangement of these floor tiles depends on the space available in front of your server. Contact your facility manager for information about the proper arrangement of these tiles for your facility.



Related Information

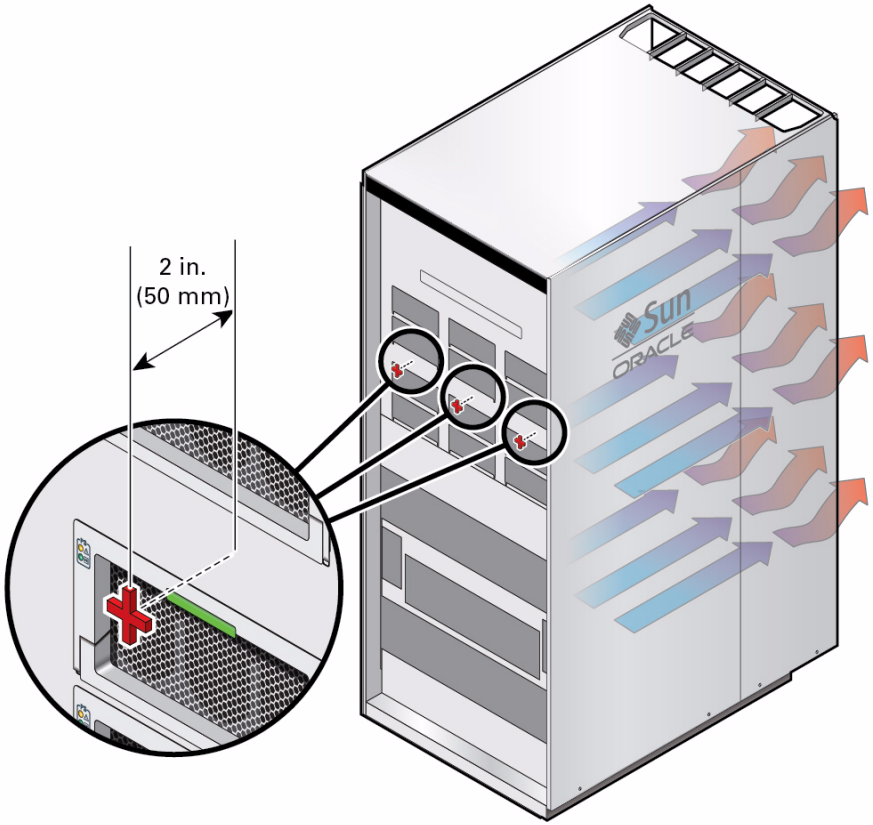
- "Heat Dissipation and Airflow Requirements" on page 47
- "Cooling Airflow From Ceiling Vents" on page 49

▼ Measure the Ambient Temperature and Humidity

Since the server exhausts heat out the rear of the server, always measure the ambient temperature and humidity in front of the server.

- **Measure the ambient airflow temperature and humidity 2 inches in front of the server and between the power supplies.**

  See "Environmental Requirements" on page 44 for the ambient temperature and humidity ranges.



Related Information

- "Environmental Requirements" on page 44
- "Cooling Airflow From Ceiling Vents" on page 49
- "Cooling Airflow From Perforated Floor Tiles" on page 50

Preparing the Unloading Route and Unpacking Area

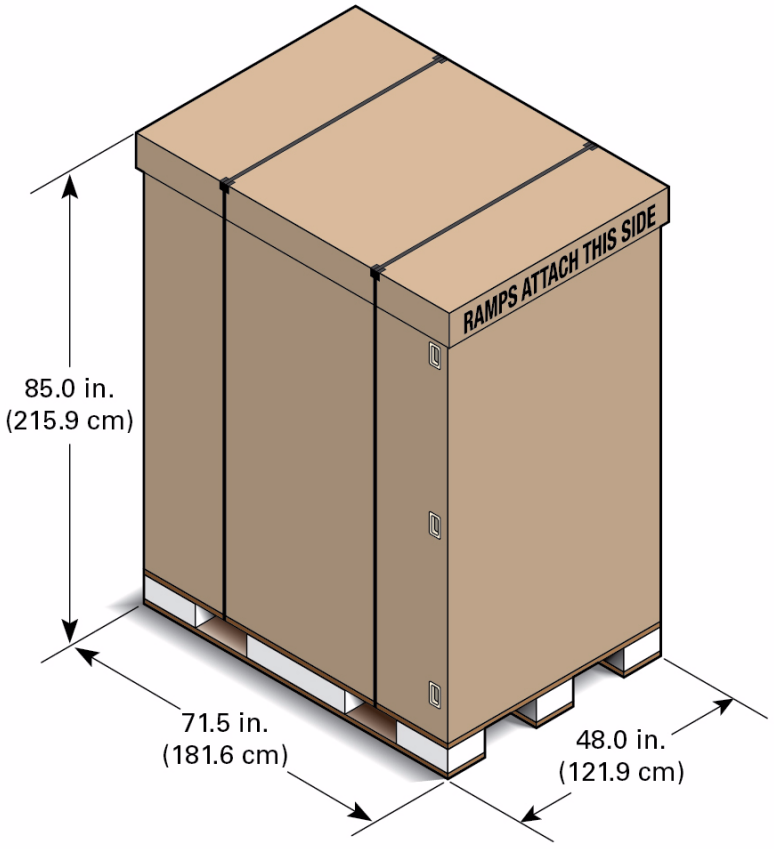
Use the information in these topics to plan how the server will get from the loading ramp to the installation site.

- "Shipping Container Dimensions" on page 54
- "Loading Dock and Receiving Area Requirements" on page 55
- "Access Route Guidelines" on page 55
- "Unpacking Area" on page 57

Related Information

- "Reviewing the Physical Specifications" on page 23
- "Preparing for Installation" on page 67
- "Installing the Server" on page 73

Shipping Container Dimensions



Shipping Container Dimension	U.S.	Metric
Shipping height	85 in.	2159 mm
Shipping width	48.0 in.	1219 mm
Shipping depth	71.5 in.	1816 mm
Shipping weight (varies by configuration)	Approx. 4015 lbs (maximum)	Approx. 1821 kg (maximum)
Weight of shipping container alone	315 lbs	143 kg

Note – The power cords ship in a separate containers. The six power cords weigh a total of 136 lbs (62 kg).

Related Information

- "Physical Dimensions" on page 24
- "Loading Dock and Receiving Area Requirements" on page 55
- "Access Route Guidelines" on page 55
- "Unpacking Area" on page 57
- "Moving the Server" on page 78

Loading Dock and Receiving Area Requirements

Before the server arrives, ensure that the receiving area is large enough for the shipping package.

If your loading dock meets the height and ramp requirements for a standard freight carrier truck, you can use a pallet jack to unload the server. If the loading dock does not meet the requirements, provide a standard forklift or other means to unload the server. Alternatively, you can request that the server be shipped in a truck with a lift gate.

When the server arrives, leave the server in its shipping container until it arrives at suitable area to unpack it. To avoid introducing airborne contaminates to the data center, unpack the server outside of the data center and then move the server to its final location.

Note – Acclimatization: If the shipping container is very cold or hot, place the unopened container in an environment similar to the data center overnight, or as long as 24 hours, until the container reaches the same temperature of the data center. Never place the unopened shipping container inside the data center.

Related Information

- "Access Route Guidelines" on page 55
- "Unpacking Area" on page 57

Access Route Guidelines

Carefully plan the access route from the loading dock to the location where you will unpack the server, and then to its final installation site. Check for any gaps, obstructions, or irregularities in the floor throughout the access route. The entire access route should be free of raised patterns that can cause vibration.

Use a pallet jack or forklift to move the server from the loading dock to an appropriate unpacking area. The unpacking area should be a conditioned space away from the final installation site to reduce airborne particles entering the data center.

After unpacking the server, use four or more people to push the server to its final installation site. For more information, see "Moving the Server" on page 78.

Note – Select an access route free of perforated tiles, as they can damaged by the server's wheels. Whenever possible, protect the entire access route with heavy fiberboard or another material that is strong enough to support the nearly 4015 lbs (1821 kg) maximum weight.

Note – Always use a 3/16-inch (4.8-mm) thick A36 metal plate with beveled edges as a bridge over holes and gaps in the access route. Otherwise the server's wheels might get stuck in the gap. For example, always use a metal plate when entering or exiting an elevator.

The following access route dimensions are the minimum space required to pass through doors or around obstacles. Add additional space for people or equipment required to move the server. These dimensions are for flat surfaces only. If the doorway is located at the top or bottom of an incline, increase the doorway clearance to 88 inches (2235 mm) for packaged servers and 80 inches (2032 mm) for unpacked servers.

Dimension	In Shipping Container	Unpacked
Minimum door height	87 in. (2210 mm)	79 in. (2007 mm)
Minimum door width	49 in. (1245 mm)	36 in. (915 mm)
Minimum passage width	49 in. (1245 mm)	36 in. (915 mm)
Maximum incline	15 degrees (26% grade max.)	5 degrees (9% grade max.)
Minimum elevator depth	72.5 in. (1842 mm)	59 in. (1499 mm)
Minimum elevator, shipping container, and floor loading capacity (maximum weight)	The maximum weight of a fully-configured, packaged server is nearly 4015 lbs (1821 kg). Verify the weight capacities of elevators and shipping equipment before using them to transport server.	

Related Information

- "Physical Dimensions" on page 24
- "Loading Dock and Receiving Area Requirements" on page 55
- "Unpacking Area" on page 57

- "Handling Precautions" on page 67
- "Moving the Server" on page 78

Unpacking Area

Prior to unpacking the server from its shipping container, ensure that you have provided enough space to unpack the server. Refer to the *Unpacking Guide*, which is attached to the shipping carton, for the unpacking instructions.

Caution – You must provide 10 ft (3 m) as a stopping zone to slow and stop the server after it rolls down the shipping pallet ramps. Failure to provide this stopping zone could lead to equipment damage or serious physical injury.

Note – Remove the shipping container in a conditioned space away from the final installation site to reduce airborne particles entering the data center.

FIGURE: Unloading Area Dimensions

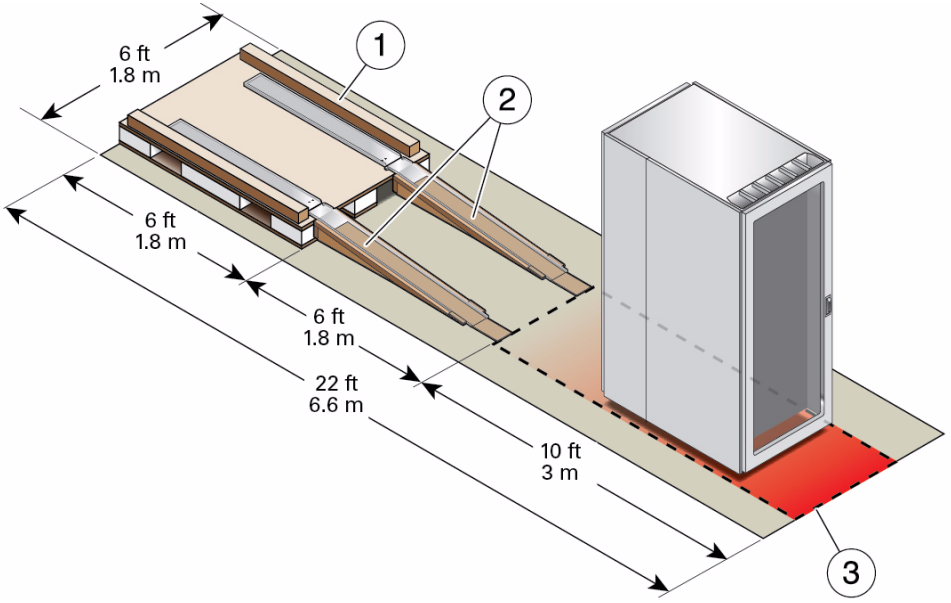


Figure Legend

1	Shipping pallet
2	Ramps
3	Stopping zone

Related Information

- "Shipping Container Dimensions" on page 54
- "Loading Dock and Receiving Area Requirements" on page 55
- "Access Route Guidelines" on page 55

Planning Network Addresses

Description	Link
Review the list of cable connections and network addresses required during the initial installation.	"Mandatory Cable Connections and Network Addresses" on page 59
Provide network addresses to the service processor components.	"SP Cables" on page 60 "SP Network Addresses" on page 64
Provide network addresses to the network cables connected to each PDomain in the server.	"PDomain Cables and Network Addresses" on page 65 "PCIe Network Interface Cards" on page 65
Provide network addresses to the Oracle VM Server for SPARC logical domains.	"Oracle VM Server for SPARC Network Addresses" on page 66

Related Information

- "Connecting the Front SP Cables" on page 97
- "Connect the EMS Network Cables" on page 134
- "Log In to the Active SP" on page 148

Mandatory Cable Connections and Network Addresses

These cable connections and network addresses are required when first installing the server. Depending on your hardware and software configuration, the server might require additional cable connections and network addresses.

Type	Description	Link
Network addresses	At least one network cable and network address for each PDomain.	"PDomain Cables and Network Addresses" on page 65
	(Optional) Network cables and addresses for each installed network interface PCIe card.	"PCIe Network Interface Cards" on page 65
SPs	Required cables: • Two CAT5, or better, serial cables • Two CAT6, or better, network cables Required network addresses: • Three network addresses • One network address per PDomain	"SP Cables" on page 60 "SP Network Addresses" on page 64
Oracle VM Server for SPARC logical domains	At least one network address for each logical domain.	"Oracle VM Server for SPARC Network Addresses" on page 66

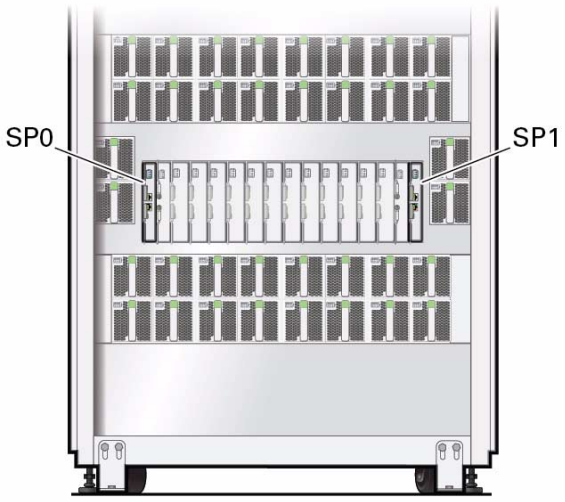
Related Information

- "Connecting the Front SP Cables" on page 97
- "Connecting the Rear Power Cords and Data Cables" on page 119
- "Powering On the Server for the First Time" on page 141

SP Cables

The server contains two dual-redundant SPs (SP0 and SP1) on the front of the server. One of the SPs functions as the Active SP to manage the server, and the other one acts as a Standby SP that will assume the Active SP role in the event of an SP failure.

Note – Either SP (SP0 or SP1) can take the Active SP role. Do not assume that SP0 will take the Active SP role and that SP1 will take the Standby SP role.

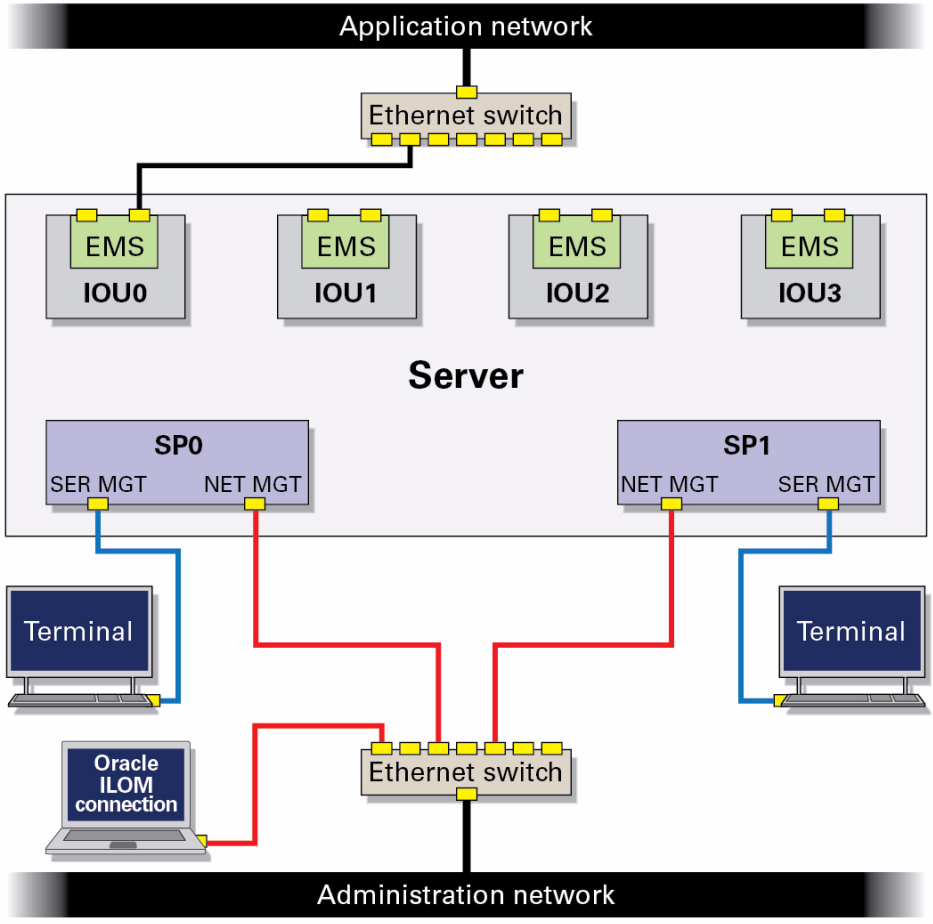


Each SP contains two ports:

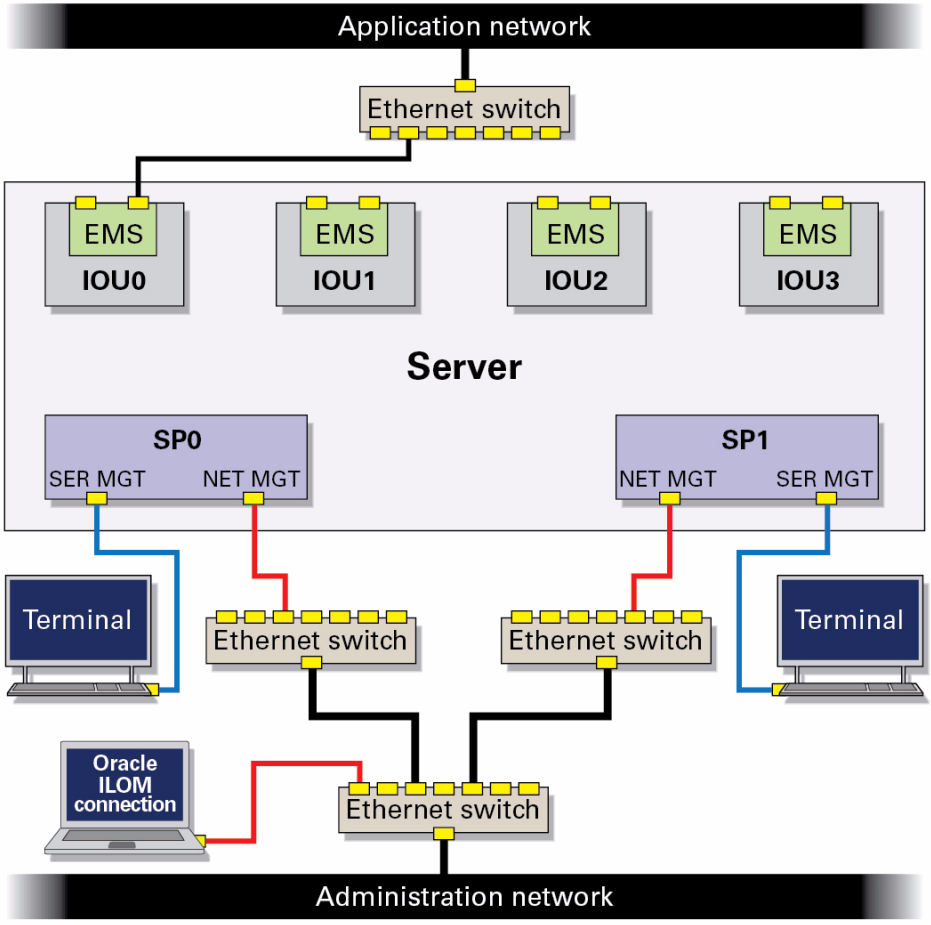
- SER MGT port – Connect a Category 5 or better serial cable from this port to a terminal device. During the initial server power on, use this serial connection to monitor the boot process and perform the initial Oracle ILOM configuration.
- NET MGT port – Connect a Category 6 or better cable to this 1-GbE port. After the initial server configuration, use this Ethernet connection to monitor and administer the server through the Oracle ILOM console.

In addition to the two SPs, the server contains up to four SPPs. Each SPP manages one DCU in the server. The Active SP and the SPPs communicate with each other over an internal VLAN. For each PDomain, one SPP takes the role of the PDomain-SPP, which manages tasks for the PDomain and provides rKVMS service for that PDomain.

To isolate the Oracle ILOM administration network, you can connect the SP NET MGT cables to a network separate from networks used for server applications. By connecting the NET MGT ports to an Ethernet switch, you can make an Oracle ILOM network connection to either SP.



To add redundancy, connect each SP to a different Ethernet switch. Connect these two switches to a third switch, and connect that third switch to the Oracle ILOM console.



Related Information

- "Mandatory Cable Connections and Network Addresses" on page 59
- "SP Network Addresses" on page 64
- "Connecting the Front SP Cables" on page 97
- "Dual-Redundant SPs" on page 143
- "Log In to the Active SP" on page 148

SP Network Addresses

During the initial Oracle ILOM configuration, you must provide network addresses for the following SP components:

- SP0 NET MGT port
- SP1 NET MGT port
- Active-SP
- PDomain0-SPP
- PDomain1-SPP (if your configuration includes 2 or more PDomains)
- PDomain2-SPP (if your configuration includes 3 or more PDomains)
- PDomain3-SPP (if your configuration includes 4 PDomains)

Note – The Oracle ILOM SPs do not support DHCP. You must assign static network addresses to these components.

For the preceding SP components, provide the following network address information:

- Host name (optional)
- IP address
- Network domain
- Netmask
- IP address of the network gateway
- IP address of the network name server

Note – The SPs, Active-SP, and all PDomain#-SPPs should share the same IP network, with unique IP addresses assigned to each.

Related Information

- "Mandatory Cable Connections and Network Addresses" on page 59
- "SP Cables" on page 60
- "Dual-Redundant SPs" on page 143
- "Log In to the Active SP" on page 148
- "Set Oracle ILOM Network Addresses" on page 150

PDomain Cables and Network Addresses

You must connect at least one network cable and assign at least one IP address to each PDomain on the system.

The server can be divided into one to four PDomains. Each PDomain operates like an independent server that has full hardware isolation from other PDomains on the server. A hardware or software failure on one PDomain does not affect the other PDomains on a server.

DCUs contain their own CPUs, memory, storage, network connections, and PCIe expansion slots. Using Oracle ILOM commands, you can combine these DCUs to create PDomains.

The PDomain cabling varies depending on your application and networking environment. However, plan to connect at least one networking cable to each PDomain.

Each DCU contains four EMS modules, and each EMS contains two 10-GbE (10GBase-T) ports (a total of eight available 10-GbE ports per DCU). By attaching Category 6A or better network cables from your network to these 10-GbE ports, you can create multiple, redundant networking connections to each PDomain.

During the Oracle Solaris OS configuration, you will be prompted to supply the following networking information for each network connection:

- Host name
- IP address
- Network domain
- Netmask
- IP address of the network gateway
- IP address of the network name server

Related Information

- "Mandatory Cable Connections and Network Addresses" on page 59
- "Maximum Cable Connections" on page 121
- "Connect the EMS Network Cables" on page 134

PCIe Network Interface Cards

If you install optional PCIe network interface cards, you must provide the additional networking addresses for those cards. Refer to the PCIe card documentation for instructions.

Related Information

- "Maximum Cable Connections" on page 121
- "Connect Other Data Cables" on page 135
- PCIe card documentation

Oracle VM Server for SPARC Network Addresses

The Oracle VM Server for SPARC server enables you to create and administer multiple virtual servers, called *logical domains*, on each PDomain. Every logical domain can run its own independent operating system.

Provide *at least* one IP address for each logical domain you create using the Oracle VM Server for SPARC software.

For additional information about the Oracle VM Server for SPARC software, refer to:

- Oracle VM Server for SPARC product page (http://www.oracle.com/us/technologies/virtualization/oraclevm/oracle-vm-server-for-sparc-068923.html)
- Oracle VM Server for SPARC wiki (https://wikis.oracle.com/display/oraclevm/Oracle+VM+Server+for+SPARC)

Related Information

- "Oracle VM Server for SPARC" on page 17
- Oracle VM Server for SPARC documentation (http://www.oracle.com/goto/VM-SPARC/docs)
- *Server Administration*, Oracle VM Server for SPARC overview

Preparing for Installation

These topics detail the precautions to follow and the tools to assemble prior to installing the server.

Description	Link
Prevent equipment damage and personal injury by understanding the server handling cautions.	"Handling Precautions" on page 67
Prevent damage to components by taking the ESD precautions.	"ESD Precautions" on page 68
Observe all of the Oracle safety and security warnings.	"Oracle Safety Information" on page 69
Assemble all of the tools and equipment required for the server installation.	"Equipment Needed for Installation" on page 69
Attach an antistatic wrist strap when installing and cabling the server.	"Attach an Antistatic Wrist Strap" on page 70

Related Information

- "Preparing the Site" on page 19
- "Installing the Server" on page 73

Handling Precautions

Caution – The server weighs approximately 3700 lbs (1678 kg) installed and 4015 lbs (1821 kg) in its shipping container. A minimum of four people are required to move the server to the installation site. More people will be required to push the server up ramps or over rough surfaces.

Caution – Do not remove FRUs from the chassis to reduce the weight of the server during transportation or installation.

Caution – To minimize the potential risk of equipment damage or personal injury, consider using professional movers when moving or relocating the server.

Caution – Avoid tipping or rocking the server, as the server can fall over, causing equipment damage and serious personal injury.

Caution – At the installation site, secure the server to the floor using the leveling feet. For added stability, use the mounting brackets that secured the server to the shipping pallet to mount the server permanently.

Related Information

- "Physical Dimensions" on page 24
- "Shipping Container Dimensions" on page 54
- "ESD Precautions" on page 68
- "Oracle Safety Information" on page 69
- "Moving the Server" on page 78
- "Stabilizing the Server" on page 87

ESD Precautions

Electronic equipment is susceptible to damage by static electricity. Use a grounded antistatic wrist strap, foot strap, or equivalent safety equipment to prevent electrostatic discharge damage when you install or service the server.

Caution – To protect electronic components from ESD, which can permanently disable the system or require repair by service technicians, place components on an antistatic surface, such as an antistatic discharge mat, an antistatic bag, or a disposable antistatic mat. Wear an antistatic grounding strap connected to a metal surface on the chassis when you work on system components.

Caution – ESD is easily generated and less easily dissipated in areas where the relative humidity is below 35%, and becomes critical when levels drop below 30%.

Related Information

- "Oracle Safety Information" on page 69
- "Attach an Antistatic Wrist Strap" on page 70

Oracle Safety Information

Become familiar with Oracle's safety information before installing any Oracle server or equipment:

- Read the safety notices printed on the product shipping container.
- Read the *Important Safety Information for Oracle's Sun Hardware Systems* document that is included with the server.
- Read all safety notices in the *SPARC M5-32 and SPARC M6-32 Servers Safety and Compliance Guide*.
- Read the security information in the *SPARC M5-32 and SPARC M6-32 Servers Security Guide*.
- Read the safety labels that are on the equipment.

Related Information

- "General Installation Site Guidelines" on page 22
- "Handling Precautions" on page 67
- "ESD Precautions" on page 68

Equipment Needed for Installation

Assemble the following tools and equipment before installing the server:

- Four or more people to move the server
- Antistatic wrist strap

- No. 2 Phillips screwdriver
- T20 Torx screwdriver
- 13-mm wrench
- 17-mm wrench
- 19-mm wrench
- Plastic tie-downs to secure cables
- A tool to cut plastic strapping tape on the shipping container
- Forklift, pallet jack, or trolley to move server to the unpacking area
- 3/16-inch (4.8-mm) A36 metal plate with beveled edges that is large enough to bridge gaps in the floor
- Eight 17-mm bolts and washers to secure the server to the floor (optional)

In addition, you must provide a system console device, such as one of the following:

- ASCII terminal, workstation, or laptop
- Terminal server
- Patch panel connected to a terminal server

Related Information

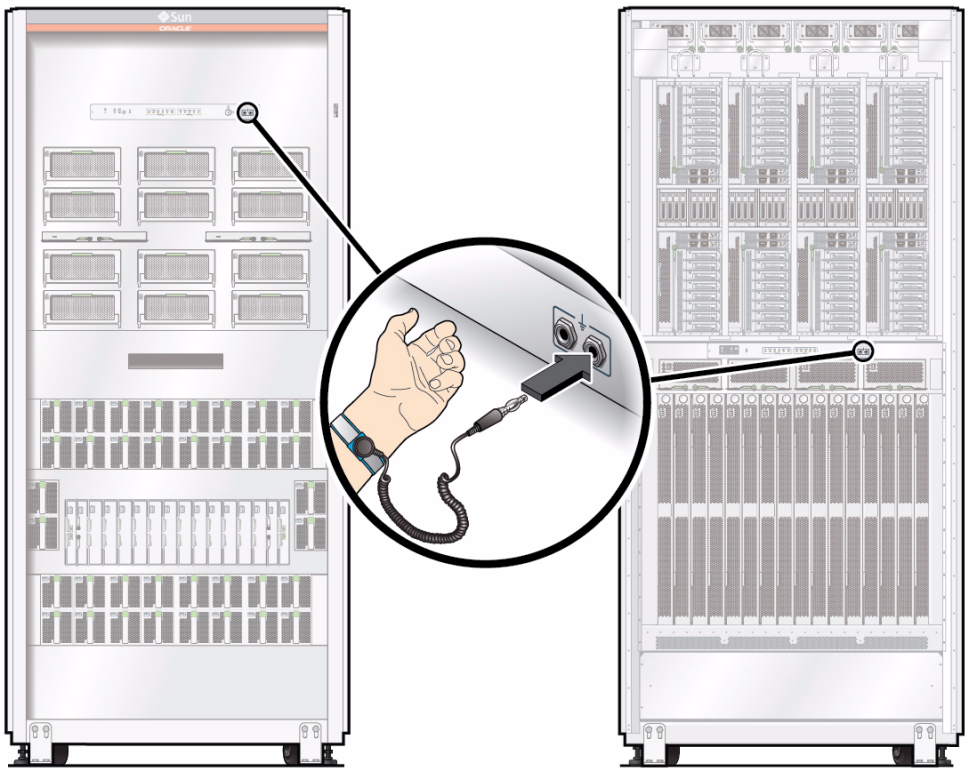
- "Installing the Server" on page 73
- "Connecting the Front SP Cables" on page 97
- "Connecting the Rear Power Cords and Data Cables" on page 119
- "Powering On the Server for the First Time" on page 141

▼ Attach an Antistatic Wrist Strap

Always wear an antistatic wrist strap connected to a metal surface on the chassis when you work on system components.

- **Attach an antistatic wrist strap to one of the ESD grounding jacks on the server.**

  There are four 4-mm ESD grounding jacks on the server, two on the front panel and another on the rear panel.



Related Information

- “ESD Precautions” on page 68
- “Installing the Server” on page 73
- “Connecting the Front SP Cables” on page 97
- “Connecting the Rear Power Cords and Data Cables” on page 119
- “Powering On the Server for the First Time” on page 141

Installing the Server

Follow these procedures to prepare and secure the server at the installation site.

Step	Description	Link
1	Inspect the installation site and prepare it for the server installation.	"Confirm the Site Preparation" on page 73
2	Receive and unload the server from the delivery truck.	"Receive the Server" on page 75
3	Unpack the server from the shipping container.	"Unpack the Server" on page 76
4	Safely move the server to the installation site.	"Moving the Server" on page 78
5	Stabilize the server to the installation site's floor using the leveling feet and (optionally) using mounting brackets.	"Stabilizing the Server" on page 87
6	Install any optional hardware like PCIe cards.	"Optional Component Installation" on page 95

Related Information

- "Preparing the Site" on page 19
- "Preparing for Installation" on page 67
- "Connecting the Front SP Cables" on page 97
- "Connecting the Rear Power Cords and Data Cables" on page 119

▼ Confirm the Site Preparation

1. **Review the safety guidelines.**

   See "Oracle Safety Information" on page 69 for more information.

2. **Note problems or peculiarities at the site that require special equipment.**

   For example, ensure that the doors are tall enough and wide enough for the server.

   See "Shipping Container Dimensions" on page 54 and "Physical Dimensions" on page 24 for more information.

3. **Install all necessary electrical equipment, and ensure that sufficient power is provided for the server.**

   See "Facility Power Requirements" on page 37.

4. **If you will be routing power cords or data cables down through the floor, prepare a floor cutout for these cables.**

   See "Mounting Holes and Cable Routing Floor Cutout Specifications" on page 28 for the floor cutout dimensions.

5. **Ensure that the installation site provides adequate air conditioning.**

   See "Heat Dissipation and Airflow Requirements" on page 47 for more information.

6. **Prepare the entire route from the loading dock to the installation site.**

   See "Access Route Guidelines" on page 55.

7. **Prepare a 3/16-inch (4.8-mm) thick A36 metal plate with beveled edges that is large enough to support the server when it rolls over gaps or holes in the floor.**

   See "Use a Metal Plate to Cross Gaps in the Floor" on page 82 for more information.

8. **If necessary, prepare a metal ramp to go up or down minor elevation changes.**

   See "Move Server Up or Down a Ramp" on page 84 for more information.

9. **Operate the air conditioning system for 48 hours to bring the room temperature to the appropriate level.**

10. **Clean and vacuum the area thoroughly in preparation for installation.**

Related Information

- "Preparing the Site" on page 19
- "Preparing for Installation" on page 67

▼ Receive the Server

1. **Before the server arrives, ensure that the receiving area is large enough for the shipping package.**

   For more information, see:

   - "Shipping Container Dimensions" on page 54
   - "Loading Dock and Receiving Area Requirements" on page 55
   - "Access Route Guidelines" on page 55

2. **Unload the packaged server from the delivery truck.**

   - If your loading dock meets the height and ramp requirements for a standard freight carrier truck, you can use a pallet jack to unload the server.
   - If the loading dock does not meet the requirements, provide a standard forklift or other means to unload the server.
   - Alternatively, you can request that the server be shipped in a truck with a lift gate.

3. **When the server arrives, leave the server in its shipping container and move it to a location where it can acclimate to the same temperature as the data center.**

Note – Acclimatization time: If the shipping package is very cold or hot, allow the shipping container to stand unopened in the computer room or a similar environment to come to the same temperature as the computer room. Acclimatization might require up to 24 hours.

Related Information

- "Physical Dimensions" on page 24
- "Shipping Container Dimensions" on page 54
- "Access Route Guidelines" on page 55

▼ Unpack the Server

Note – Remove the shipping container materials in a conditioned space away from the final installation site to reduce the amount of airborne particles from entering the data center.

1. **Ensure that you have enough space to unpack the server safely.**

   See "Unpacking Area" on page 57 for more information.

2. **Locate the unpacking instructions.**

   The unpacking instructions are attached to the outside of the shipping package.

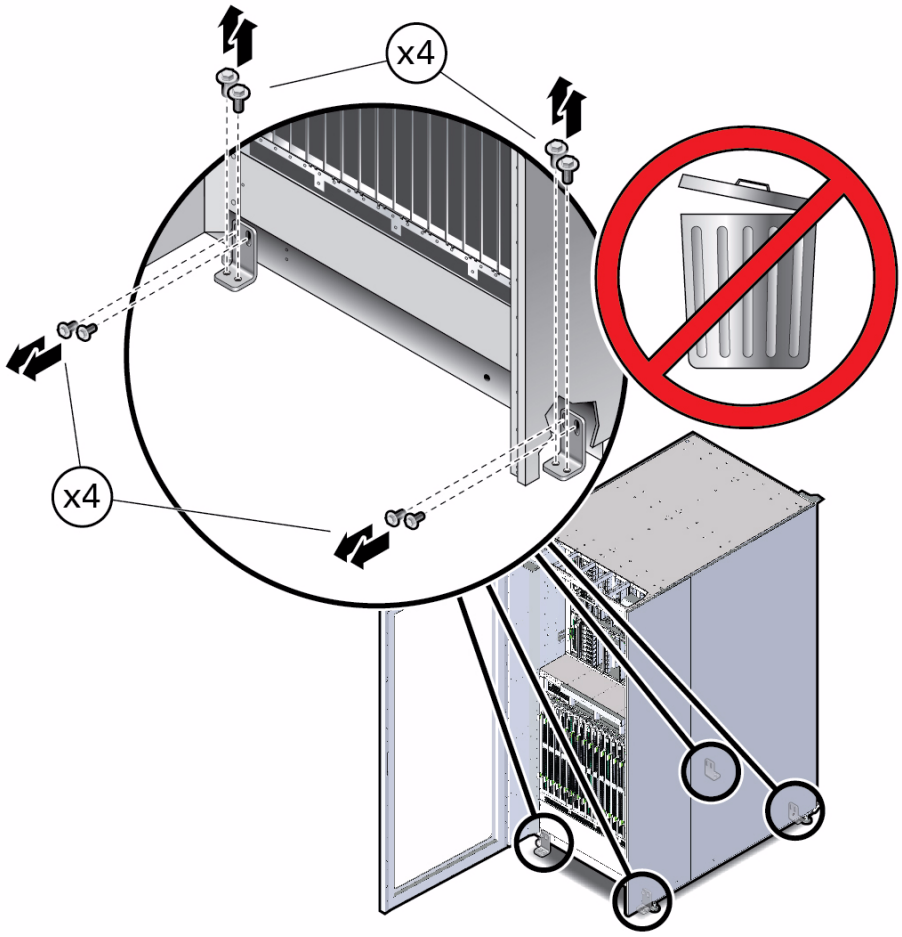
3. **Follow the unpacking instructions to unpack the server.**

4. **Save the mounting brackets and the 13-mm bolts that secured the server to the shipping pallet.**

   You can use these mounting brackets, the eight 13-mm bolts that secured these brackets to the server, and eight 17-mm bolts (which you supply) to secure the server to the installation site floor.

Note – When unpacking the server, remove the kick plate to access the front mounting brackets. Use a T20 Torx screwdriver to loosen the three captive screws securing the kick plate to the server and then remove the kick plate.

Note – Before rolling the server down the ramps, make sure that the leveling feet are raised completely. See "Raise the Leveling Feet" on page 89 for instructions.



Related Information

- *Unpacking Guide*
- "Leveling Feet and Caster Dimensions" on page 26
- "Unpacking Area" on page 57
- "Install the Mounting Brackets" on page 91

Moving the Server

The server can weigh nearly 3700 lbs (1678 kg), so take extra precautions when moving the server to the installation site.

Caution – To minimize the potential risk of equipment damage or personal injury, consider using professional movers when moving or relocating the server.

Caution – Do not remove FRUs from the chassis to reduce the weight of the server during transportation or installation.

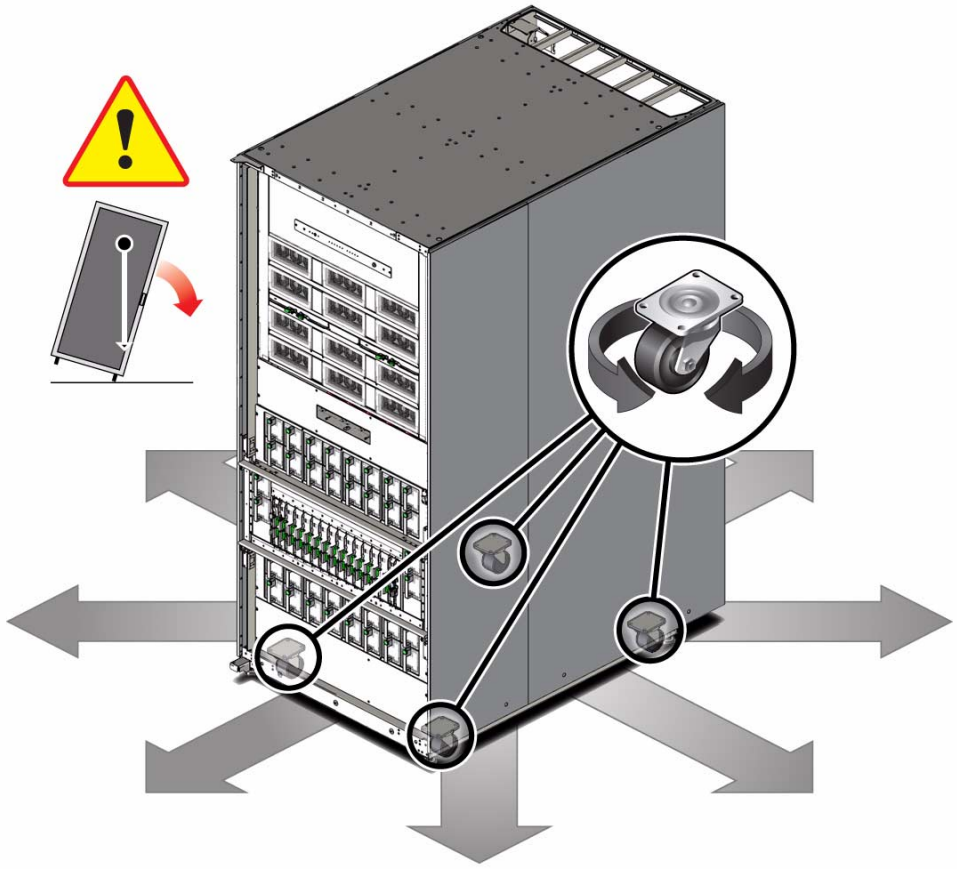
- "Server Moves in Every Direction" on page 78
- "Move the Server to the Installation Site" on page 79
- "Use a Metal Plate to Cross Gaps in the Floor" on page 82
- "Move Server Up or Down a Ramp" on page 84

Server Moves in Every Direction

All four casters swivel and enable you to roll the server in every direction. While these four swiveling castors help position the server at the installation site, the server can roll off course if you do not follow the guidelines in "Move the Server to the Installation Site" on page 79.

When moving the server, position a person at each corner of server in order to maneuver it carefully around corners and obstacles.

Caution – Avoid rolling the server over metal plates that contain tear drop or diamond patterns. These patterns can cause the castors to spin and force the server to move off course.



Related Information

- “Move the Server to the Installation Site” on page 79
- “Use a Metal Plate to Cross Gaps in the Floor” on page 82
- “Move Server Up or Down a Ramp” on page 84

▼ Move the Server to the Installation Site

Caution – A fully-configured, unpackaged server weighs nearly 3700 lbs (1678 kg). Ensure that the route to the installation site is free of obstacles, and always use four or more people to move the server.

1. **Plan and prepare the entire route to the installation site.**

   Walk the entire route and note any obstacles that must be avoided. Ensure that all floors along the route can support the full weight of the server.

   Cover raised data center flooring with fiberboard to protect it, prepare a metal sheet to cross any gaps in the floor (for example, when entering an elevator), and prepare a metal ramp to go up or down minor floor elevations.

   For more information, see:

   - "Access Route Guidelines" on page 55
   - "Use a Metal Plate to Cross Gaps in the Floor" on page 82
   - "Move Server Up or Down a Ramp" on page 84

2. **Ensure that the server doors are closed and secured.**

   Alternatively, remove both doors and take them separately to the installation site. For instructions on removing a door, see "Remove the Door" on page 100.

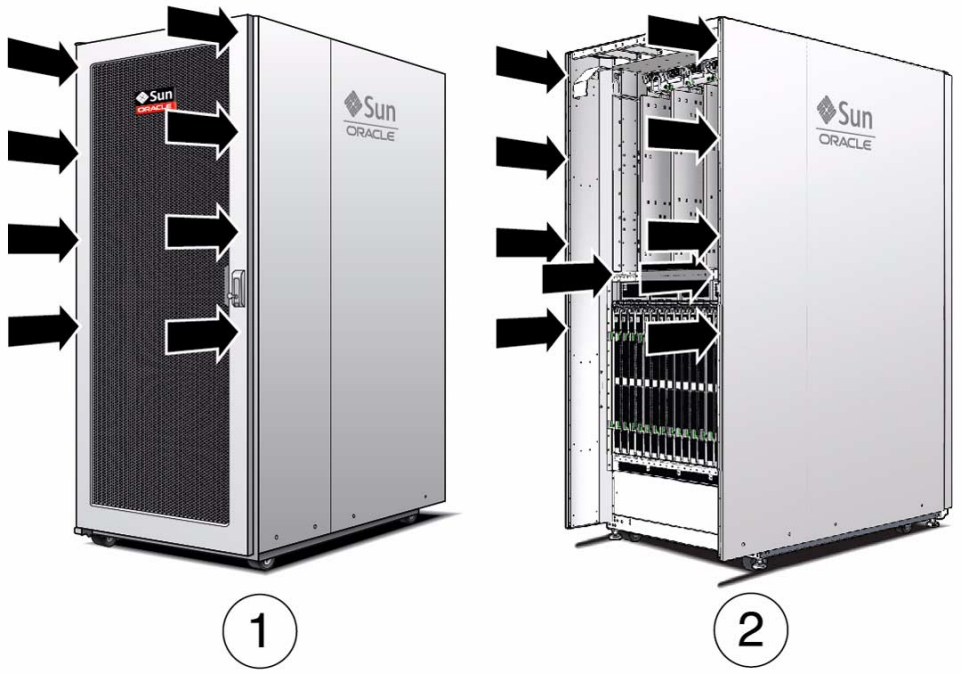
3. **Ensure that all four leveling feet on the bottom of the server are raised and out of the way.**

   See "Raise the Leveling Feet" on page 89 for instructions.

4. **Using four or more people, push the server to the installation site.**

   Always push the server along its edges. Move the server slowly, at approximately two feet per second (0.65 meters per second) or slower. Position people at each corner of the server to help guide it.

   For extra leverage, remove the rear door and push the server on either side of the rear LED panel. For instructions of removing the door, see "Remove the Door" on page 100.



No.	Description
1	Push the front of the server along the edges.
2	Push the rear of the server along the edges and on either side of the rear LED panel.

5. Avoid damaging the server when moving it.

Caution – Never tip or rock the server. Tipping or rocking the server, or pushing on the side panels can tip the server over.

Caution – Never push the server by pressing in the center of a door. The door might bend under the pressure. If necessary, remove the doors before moving the server. See "Remove the Door" on page 100 for instructions.

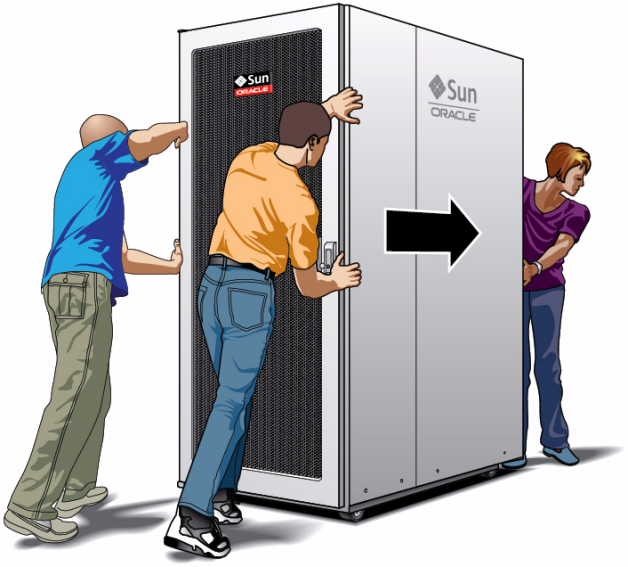
Caution – Be careful when moving the server near floor cutouts. If the server's castors fall into a floor cutout, the floor and the server could be severely damaged.

Caution – When maneuvering around corners, always turn the server gradually.

6. **Avoid all obstacles on the floor when moving the server.**

   When necessary, use a metal plate to cross gaps on the floor and use a metal ramp to cross slight bumps on the floor or stairs. For more information, see:

   - "Use a Metal Plate to Cross Gaps in the Floor" on page 82
   - "Move Server Up or Down a Ramp" on page 84



Related Information

- "Loading Dock and Receiving Area Requirements" on page 55
- "Access Route Guidelines" on page 55
- "Handling Precautions" on page 67

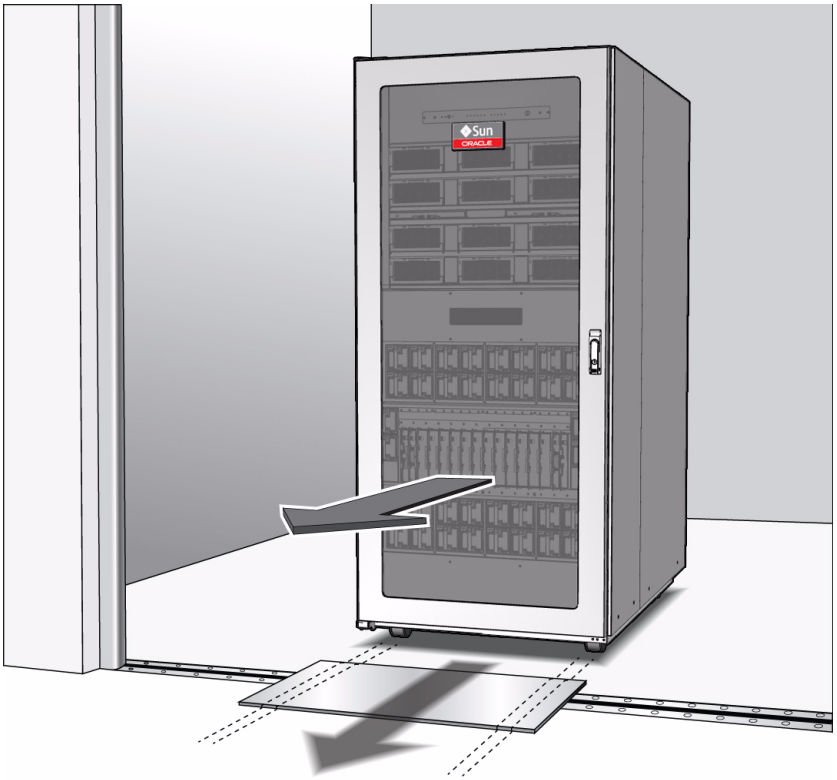
▼ Use a Metal Plate to Cross Gaps in the Floor

To prevent the server wheels from falling into holes or gaps in the floor, always use a 3/16-inch (4.8-mm) thick A36 metal plate with beveled edges to cross these gaps. The plate must be wide enough to bridge the gap in the floor.

Caution – A metal plate thinner than 3/16 inches (4.8-mm) will not support the weight of the server. A fully-configured server can weigh around 3700 lbs (1678 kg).

Caution – If the gap the server must cross is wider than 2 inches (51 mm), or has an elevation of greater than 1 inch (25.4 mm), consult with you facilities manager to design and use a metal plate that will bridge the gap while supporting the full weight of the server.

- **Use a 3/16-inch (4.6-mm) thick A36 metal plate with beveled edges when crossing gaps in the floor.**



Related Information

- "Physical Dimensions" on page 24
- "Access Route Guidelines" on page 55
- "Move the Server to the Installation Site" on page 79

▼ Move Server Up or Down a Ramp

Caution – A fully-configured, unpackaged server weighs nearly 3700 lbs (1678 kg). Use six people to push the server up or down a ramp.

Create a metal ramp long enough to cross small changes in elevation and strong enough to support the weight of the server.

Note – The maximum allowable incline of an unpackaged server is 5 degrees (9% grade). Design a ramp long enough to achieve this incline level and strong enough to support the weight of the server. If you cannot achieve this 5 degree incline level, consider an alternate route to the installation site.

1. **Design a ramp that supports the weight of the server.**

   Consult with you facilities manager to design and create a ramp with the following characteristics:

   - Strong enough to support the nearly 3700 lbs (1678 kg) weight of the server over the entire span of the ramp.
   - Be at least 48-inches (1220 mm) wide, or as wide as the passageway.
   - Long enough to extend over the elevation and remain under the 5 degree (9% grade) maximum incline.
   - Designed to ensure that the server does not fall over the sides of the ramp (for example, add railings, stops, or bend the edges of the ramp upward 90 degrees).

Note – If the ramp has railings, cover these railings with heavy fabric to avoid scratching the surfaces of the server.

Caution – Never use metal plates that contain tear drop or diamond patterns. These patterns can cause the castors to spin and make the server to move off course.

Avoid using wooden ramps as they cannot support the weight of the server.

The castors can have difficulty rolling over ramps coated with sticky or rubberized surfaces. Use additional people to push the server up or down ramps with these surfaces.

2. **Ensure that all four leveling feet on the bottom of the server are raised and out of the way.**

   See "Raise the Leveling Feet" on page 89.

3. **Remove the server doors.**

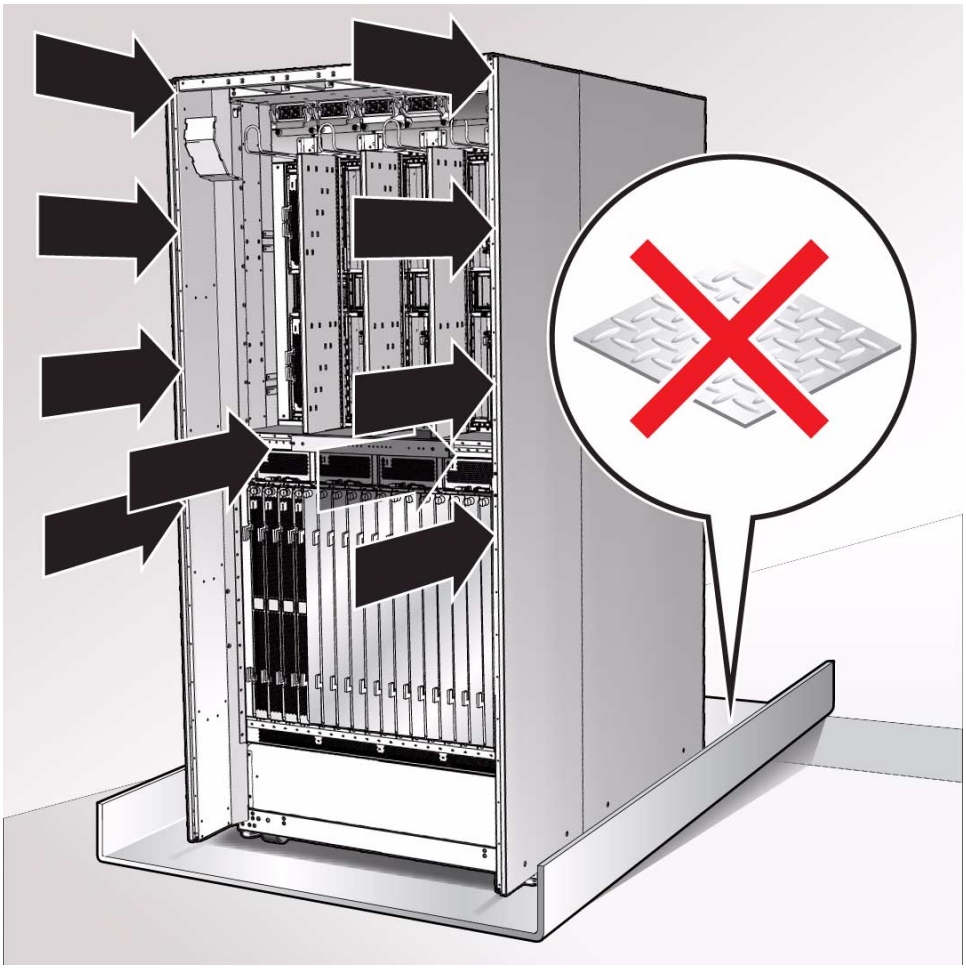
   For instructions on removing a door, see "Remove the Door" on page 100.

4. **Position the ramp so that the server can successfully go up or down the elevation.**

5. **Use six or more people either to push the server up the ramp or to slow the server rolling down the ramp.**

   Push or slow the server along the edges of the server. With the rear door removed, one of the six people can move the server by pushing on either side of the rear LED panel.

Caution – Ensure that the server remains on the ramp. If a castor falls off a side of the ramp, the server can tip over and damage the equipment and cause serious physical injury.



6. **After rolling up or down the ramp, remove the ramp and replace the server doors.**

   For instructions on installing a door, see "Install the Door" on page 115.

Related Information

- "Access Route Guidelines" on page 55
- "Server Moves in Every Direction" on page 78
- "Move the Server to the Installation Site" on page 79
- "Use a Metal Plate to Cross Gaps in the Floor" on page 82

Stabilizing the Server

These topics describe how to stabilize the server using the leveling feet and (optionally) using mounting brackets.

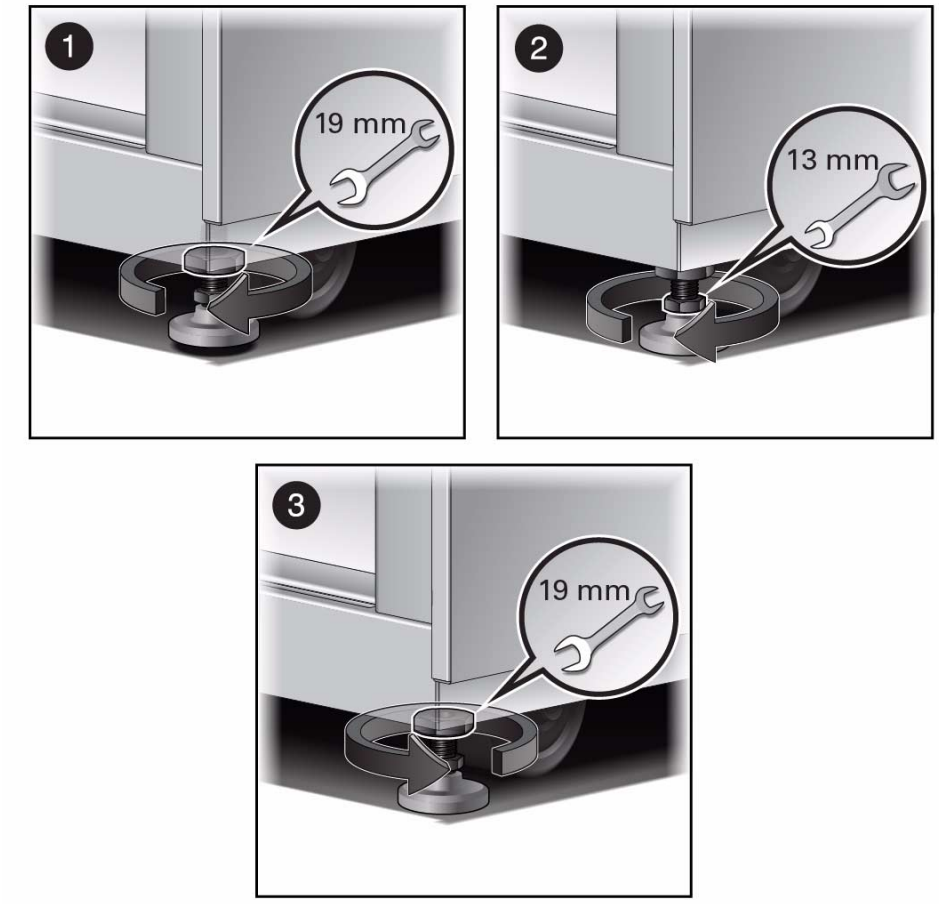
Task	Link
Lower the leveling feet to stabilize the server at the installation site. Raise the leveling feet before moving the server to another site.	"Lower the Leveling Feet" on page 87 "Raise the Leveling Feet" on page 89
Optionally bolt the server to the floor using mounting brackets.	"Install the Mounting Brackets" on page 91

▼ Lower the Leveling Feet

Use leveling feet at the four corners of the server to stabilize the server to the floor.

1. **Open the server doors.**
2. **Use a 19-mm wrench to loosen the 19-mm locking nuts located at the top of each leveling foot.**

   Turn the wrench clockwise to loosen the 19-mm locking nuts. When tightened, these locking nuts prevent the leveling feet from being raised or lowered, so loosen these nuts before lowering the leveling feet.



3. **Use a 13-mm wrench to lower each leveling foot to the floor.**

   Turn the wrench clockwise to lower each leveling foot. When correctly lowered, the four leveling feet will support the full weight of the server.

4. **After lowering each leveling foot, use a 19-mm wrench to secure the 19-mm locking nut to the server.**

   Turn the wrench counter-clockwise to secure the locking nut.

Note – If the leveling foot begins to rotate and move upward, use a 13-mm wrench to hold the leveling foot in place while you tighten the 19-mm locking nut.

Related Information

- "Leveling Feet and Caster Dimensions" on page 26
- "Install the Mounting Brackets" on page 91

▼ Raise the Leveling Feet

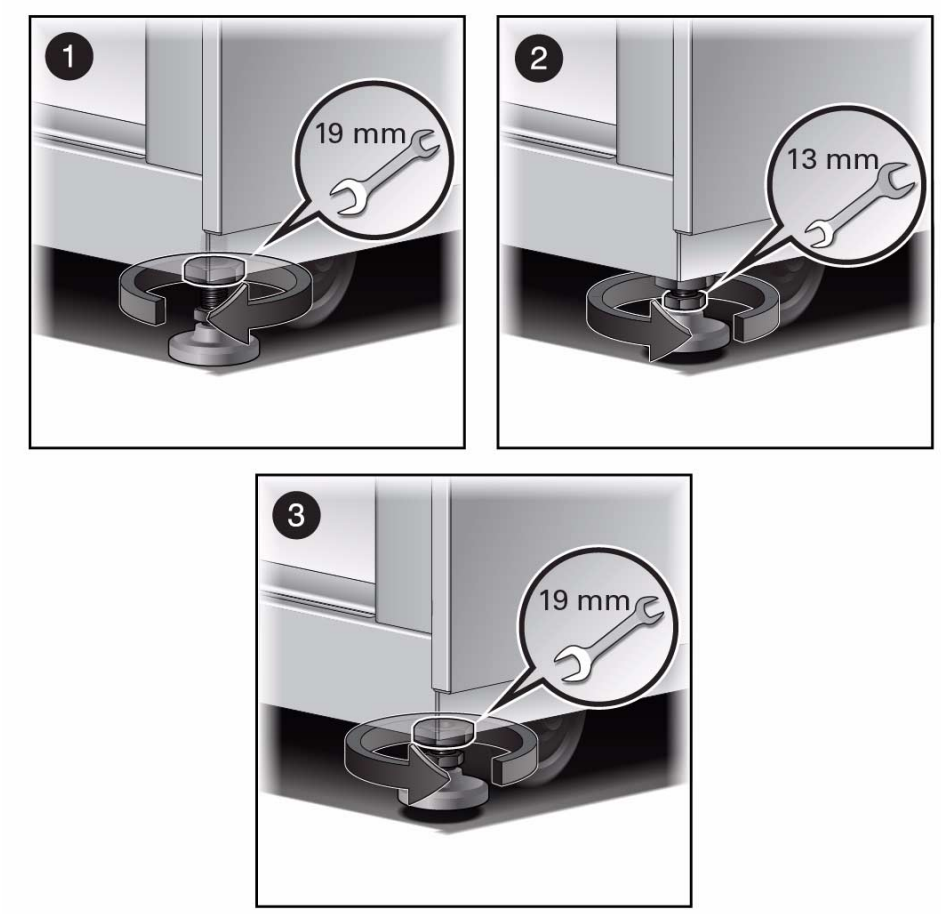
Before moving or repositioning the server, make sure that you raise all four leveling feet.

Note – The leveling feet must remain securely down on the floor at the installation site. Only raise the leveling feet before moving the server.

---

1. **Open the server doors.**
2. **Use a 19-mm wrench to loosen the 19-mm locking nuts located at the top of each leveling foot.**

   Turn the wrench clockwise to loosen the 19-mm locking nuts.



3. **Use a 13-mm wrench to raise each leveling foot.**

   Turn the wrench counter-clockwise to raise the leveling feet up to the bottom of the server.

4. **After raising each leveling foot, use a 19-mm wrench to secure the 19-mm locking nuts to the server.**

   Turn the wrench counter-clockwise to secure the locking nuts. When tightened, these locking nuts prevent the leveling feet from being raised or lowered.

Related Information

- "Moving the Server" on page 78
- "Lower the Leveling Feet" on page 87

▼ Install the Mounting Brackets

You can optionally mount the server to the floor using the same mounting brackets that secured the server to the shipping pallet.

Note – You must supply your own 17-mm bolts, nuts, washers, and any other mounting hardware required to secure the server at your location.

---

1. **Obtain the four mounting brackets and the eight 13-mm bolts that secured the brackets to the server.**
2. **Obtain eight 17-mm bolts and washers that will be used to mount the server to floor.**

Note – Select bolts that are appropriate for your location. These mounting bolts are not included with the server.

---

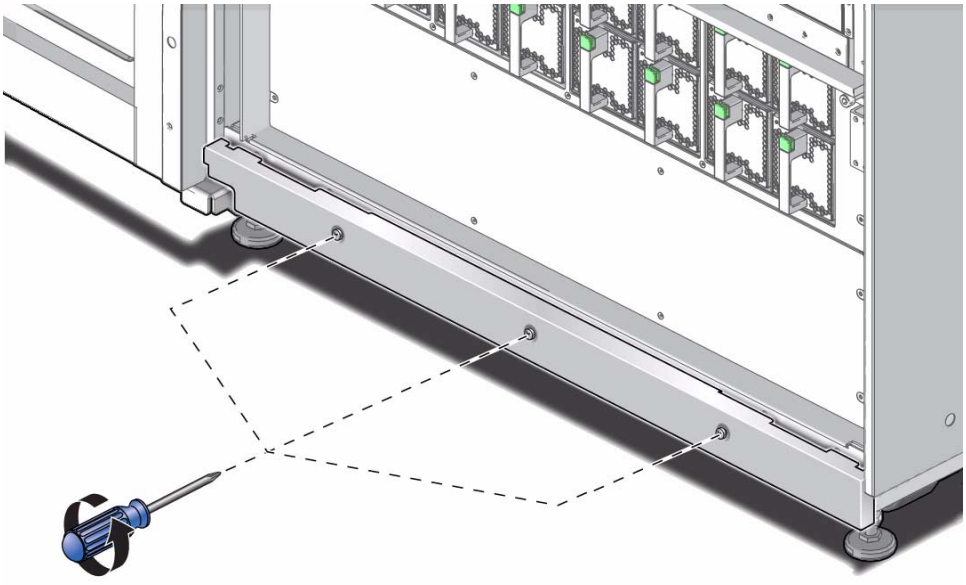
3. **Drill eight 17-mm holes in the floor for the mounting brackets.**

   See "Mounting Holes and Cable Routing Floor Cutout Specifications" on page 28 for the dimensions of these holes.

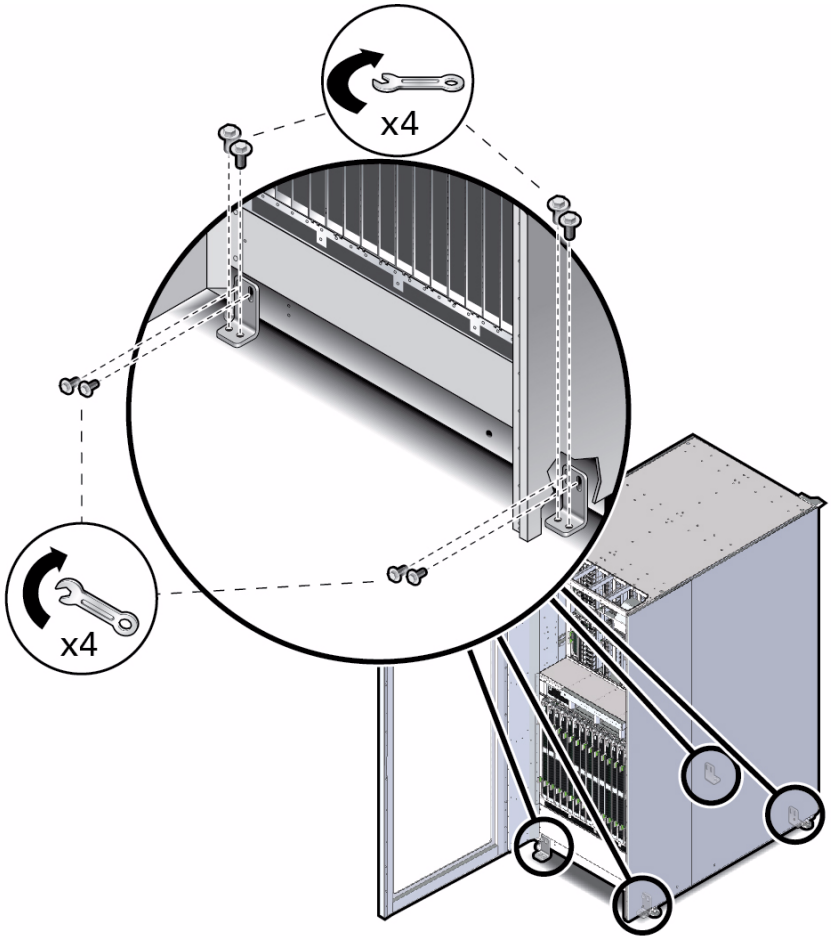
Caution – Be careful when moving the server near floor cutouts. If the server's castors fall into a floor cutout, the floor and the server could be severely damaged.

---

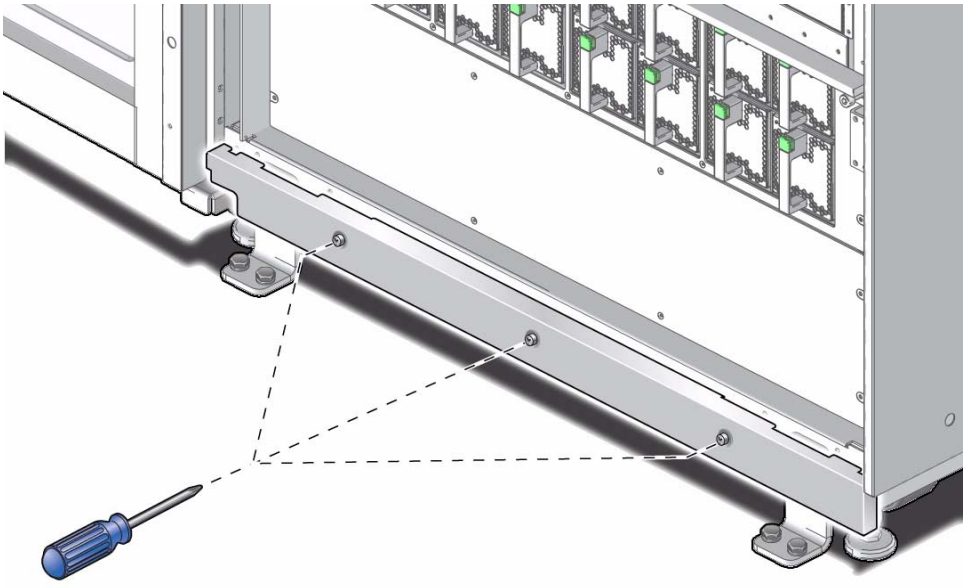
4. **Position the server over the holes.**
5. **Open the server doors.**
6. **At the front of the server, use a T20 Torx screwdriver to loosen the three M4 captive screws securing the kick plate to the server.**



7. **Remove the kick plate from the server and set it aside in a safe location.**
8. **Using a 13-mm wrench, attach the four mounting brackets to the server using 13-mm bolts.**
9. **Using a 17-mm wrench, mount the server to the floor using the eight 17-mm bolts and washers.**



10. **Using a T20 Torx screwdriver, secure the kick plate to the server using the three M4 captive screws.**



11. **Lower the four leveling feet.**

    Lowering the leveling feet will further stabilize the server. See "Lower the Leveling Feet" on page 87.

12. **Close the server doors.**

Related Information

- "Installation and Service Area" on page 25
- "Mounting Holes and Cable Routing Floor Cutout Specifications" on page 28
- "Unpack the Server" on page 76
- "Lower the Leveling Feet" on page 87

Optional Component Installation

The standard server components are installed at the factory. Any additional components you order, such as additional drives or PCIe cards, are shipped separately. Refer to the *Server Service* for specific component installation instructions.

The available optional components are at:

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

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

Related Information

- "Rear Components" on page 8

Connecting the Front SP Cables

These topics describe how to connect and secure the serial and network cables to the two SPs located in the front of the server.

Task	Link
Connect the serial and network cables to the two SPs located in the front of the server.	"Connect the SP Cables" on page 97
Route and secure the SP cables through the front trim panels.	"Securing the SP Cables" on page 99

Related Information

- "Front Components" on page 6
- "SPs and SPPs" on page 10
- "Planning Network Addresses" on page 59
- "Connecting the Rear Power Cords and Data Cables" on page 119

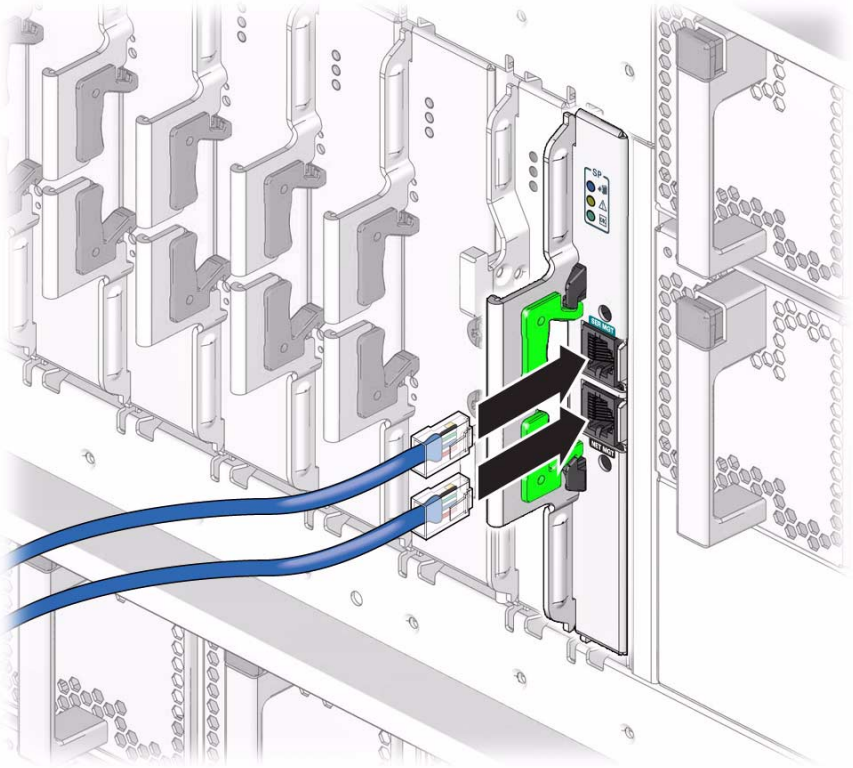
▼ Connect the SP Cables

1. **Open the front door and locate the two SPs at the front of the server.**

   See "Front Components" on page 6 for the location of the two SPs, labeled SP0 and SP1.

2. **Connect Category 5 (or better) cables from the SP0 and SP1 SER MGT RJ-45 ports to separate terminal devices.**

   Connecting each serial cable to different terminal devices provides redundancy in case one terminal device fails.



3. **Connect Category 6 (or better) cables from the SP0 and SP1 NET MGT RJ-45 ports to separate network switches of hubs.**

   To achieve 1-GbE network speeds, use Category 6 (or better) cables and network devices that support 1000BASE-T networks. These 10/100/1000 Mbps NET MGT ports will autonegotiate to the speed of your network.

4. **Continue with the installation.**

   To secure the SP cables through the front panels, see "Securing the SP Cables" on page 99.

Related Information

- "Front Components" on page 6
- "SPs and SPPs" on page 10
- "Oracle ILOM" on page 15
- "SP Cables" on page 60
- "SP Network Addresses" on page 64
- "Securing the SP Cables" on page 99

Securing the SP Cables

After connecting the SP cables, route and secure the cables through the front trim panels and kick plate.

Description	Link
Remove the front door to provide access to the front trim panels and kick plate.	"Remove the Door" on page 100
Either route the cables down through a raised floor in your data center or up through the top of the server to cable trays.	"Route the SP Cables Down" on page 102 "Route the SP Cables Up" on page 107
After securing the SP cables, install the front door.	"Install the Door" on page 115

Related Information

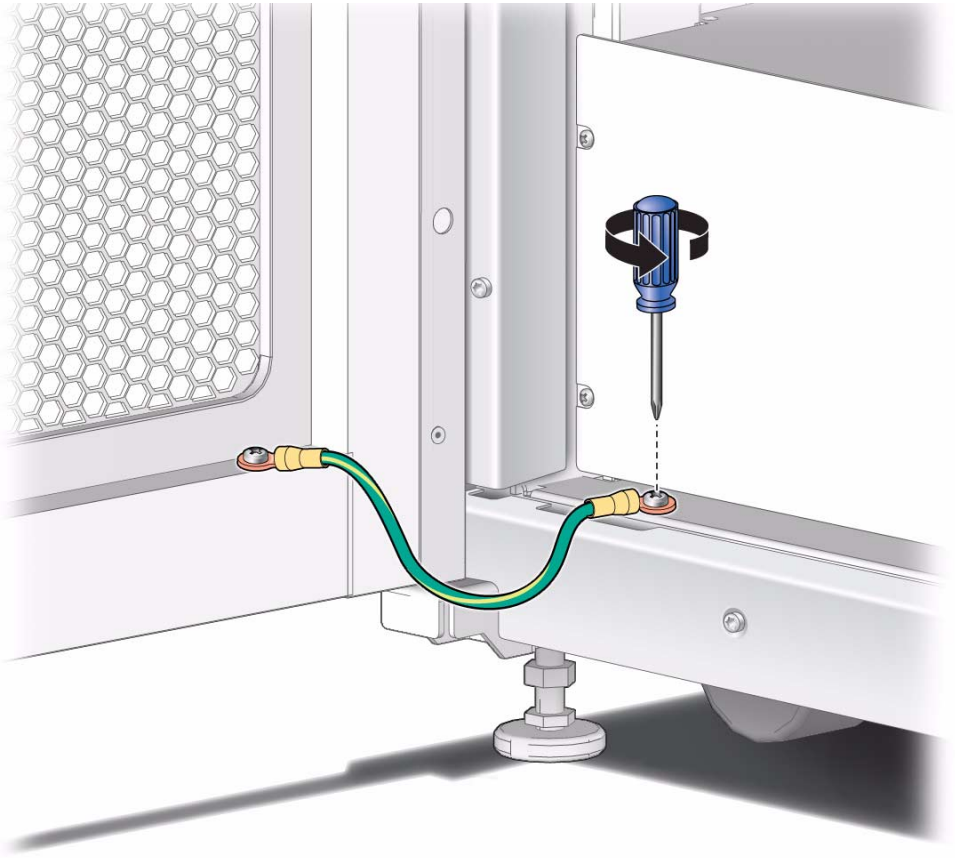
- "SP Cables" on page 60
- "Connect the SP Cables" on page 97

▼ Remove the Door

Remove the front door to access the front trim and kick plate. You can follow these same steps to remove the rear door.

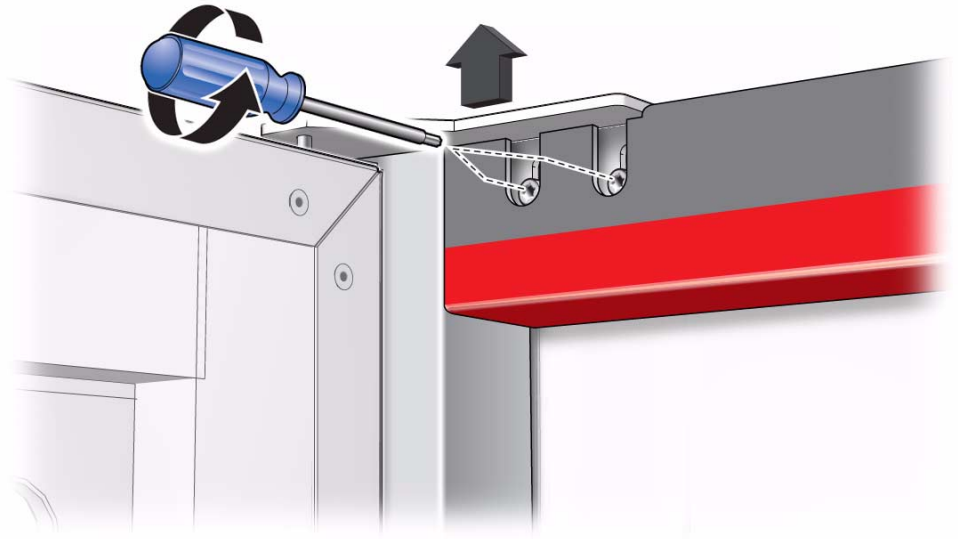
1. **Open the front door and use a T20 screwdriver to remove the M4 screw securing the ground cable connected to the server frame.**

   Save the M4 screw in a safe location.



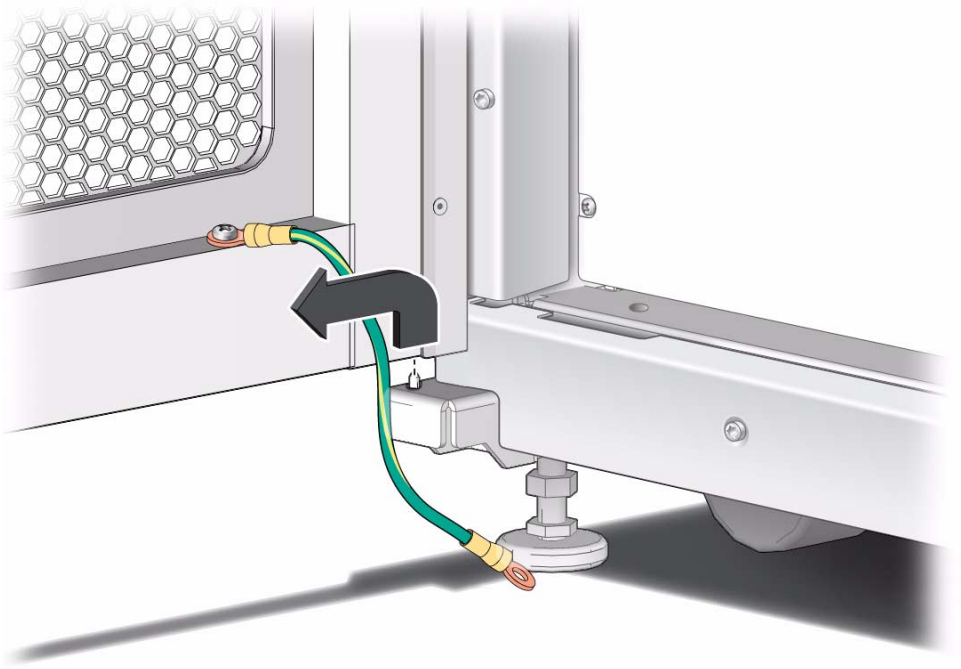
2. **Use a Torx T20 screwdriver to loosen the two M4 screws securing the upper hinge bracket to the server.**

   Loosen, but do not remove these screws. Leave the upper hinge bracket loosely attached to the server.



3. **Hold the door to keep it from falling, and then lift the upper hinge bracket to release the door.**

4. **Lift the door off the lower hinge pin and set the door aside.**



Note – If you removed the rear door to complete another task, return to that task. Otherwise, continue to the next step.

---

5. **Continue to one of the following procedures based on whether you will be routing the SP cables down through the floor or up to cable trays above the server:**
   - "Route the SP Cables Down" on page 102
   - "Route the SP Cables Up" on page 107

Related Information

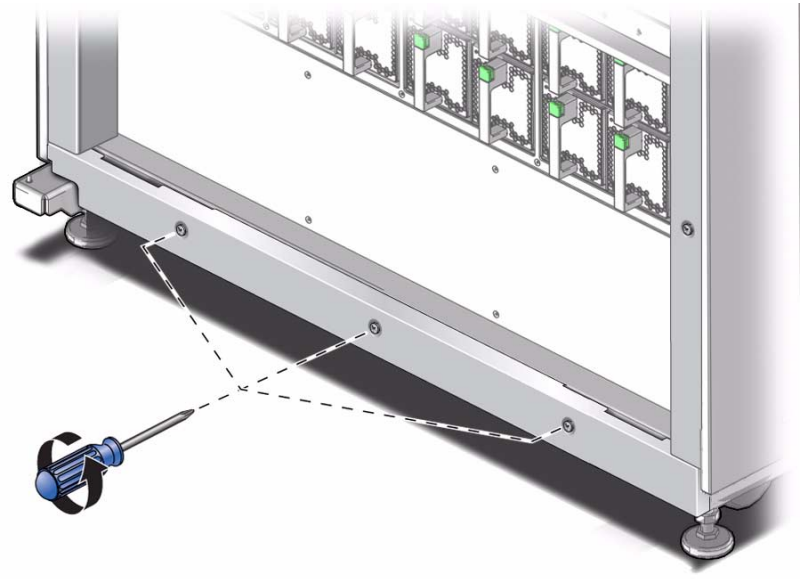
- "Move the Server to the Installation Site" on page 79
- "Install the Door" on page 115

▼ Route the SP Cables Down

When routing the SP cables down through the floor, you must route them through the front kick plate.

1. **Use a T20 Torx driver to loosen the three M4 captive screws securing front kick plate.**

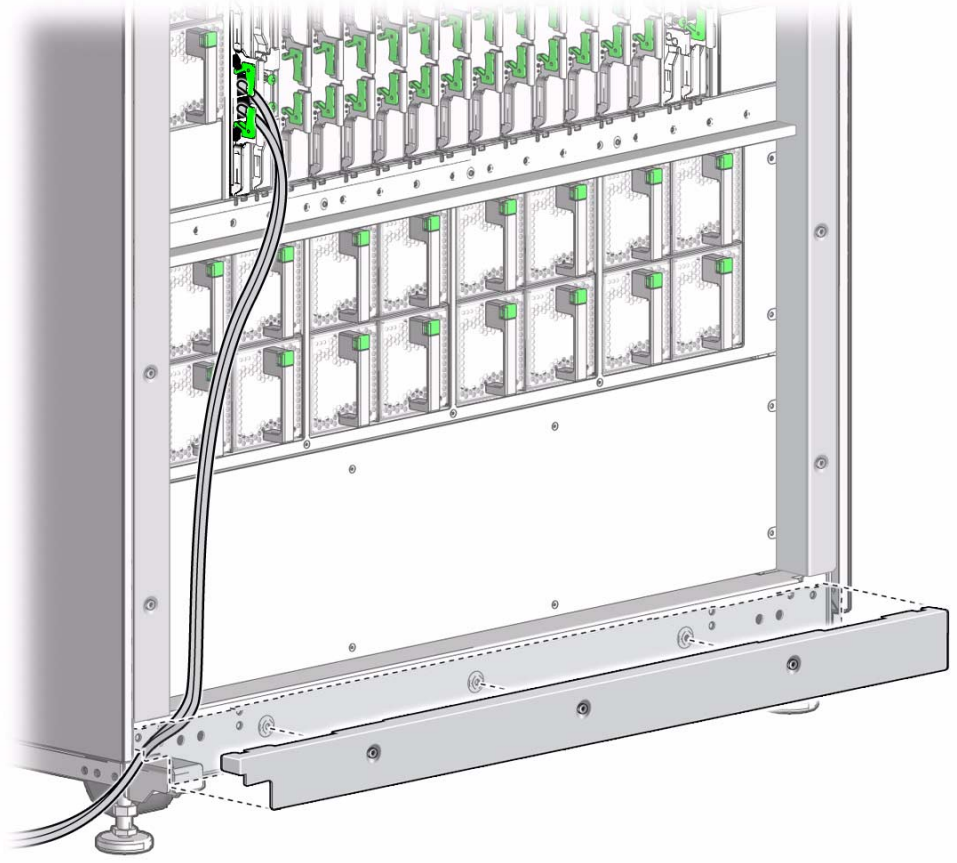
   Remove the kick plate and set it aside.



2. **Route the left two SP cables connected to SP0 down and out of the server. Route the cables over the lower door hinge and out the left side of the server.**

   When installed, the kick plate will secure these cables to the server. There are two slots in the kick plate, one on the top left of the kick plate and one on the far left edge, that enable the cables to exit the server.

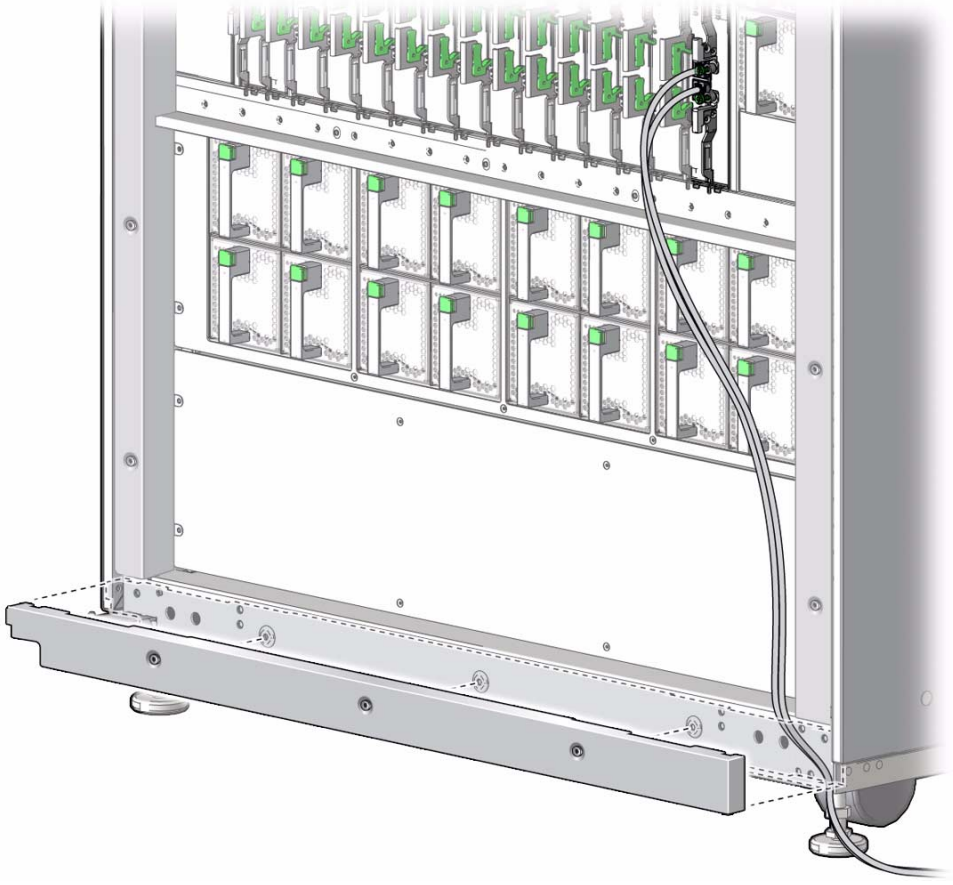
   The illustration shows how to route the left two SP cables of the server.



3. **Route the right two SP cables connected to SP1 down and out of the server.**

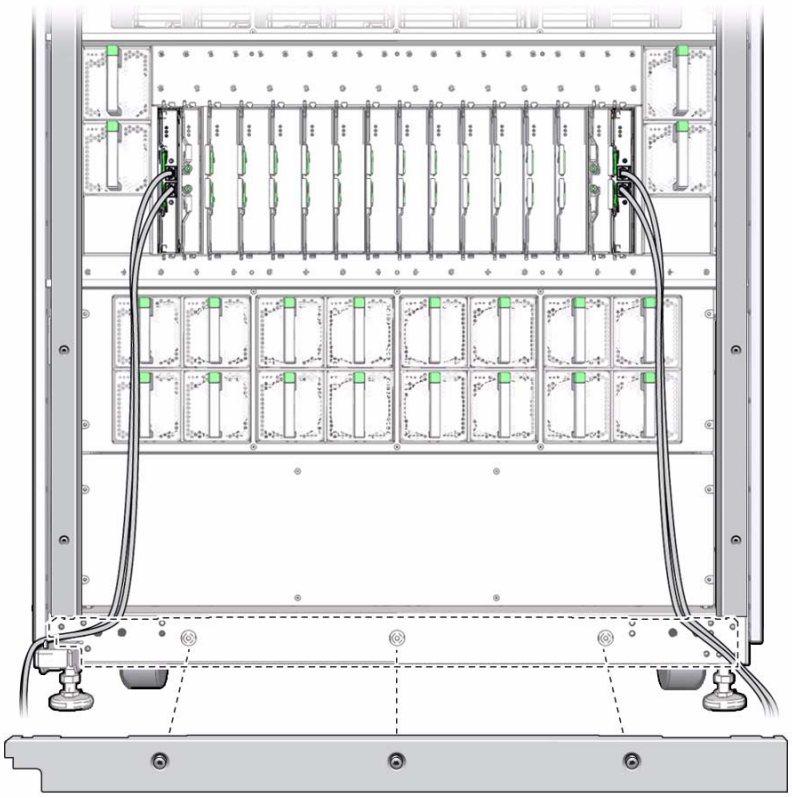
   When installed, the kick plate will secure these cables to the server. There are two slots in the kick plate, one on the top of the kick plate and one on the bottom, that enable the cables to exit the server.

   The illustration shows how to route the right two SP cables of the server.



4. **Use a T20 Torx screwdriver to secure the kick plate to the front of the server.**

   Do not pinch or bend the SP cables when installing the kick plate. The four SP cables should pass freely out of the server on the right and left sides.



5. **(Optional) Use tie wraps and adhesive cable-tie mounts to secure the SP cables to the inside edges of the left and right trim panels.**

   By securing the SP cables to the trim panels, the cables will not interfere with the front fan modules.

6. **In the crawl space under the server, secure the SP cables to your facility cable management devices.**

   Request instructions from your facility manager.

7. **Continue with the illustration by installing the front door.**

   See "Install the Door" on page 115.

Related Information

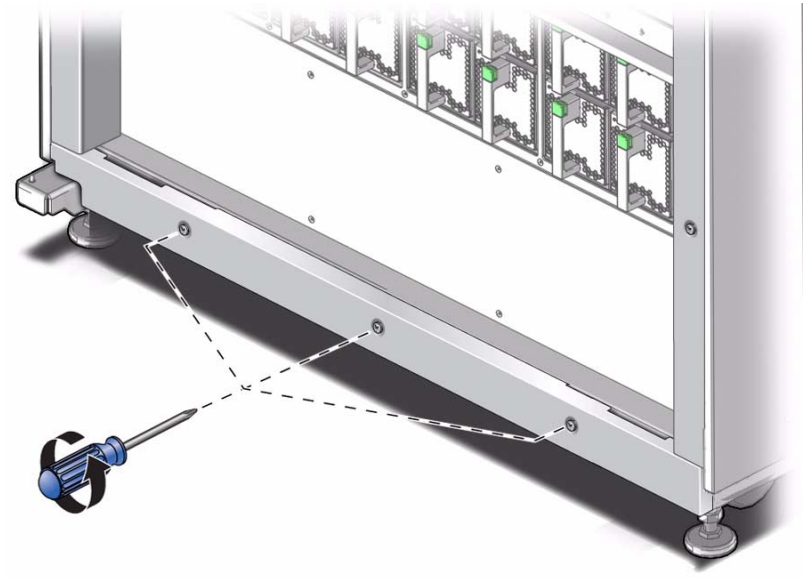
- "Connect the SP Cables" on page 97
- "Route the SP Cables Up" on page 107
- "Managing Data Cables" on page 136

▼ Route the SP Cables Up

When routing the SP cables up through the top of the server, you must route the cables through the front kick plate and up the right and left trim panels.

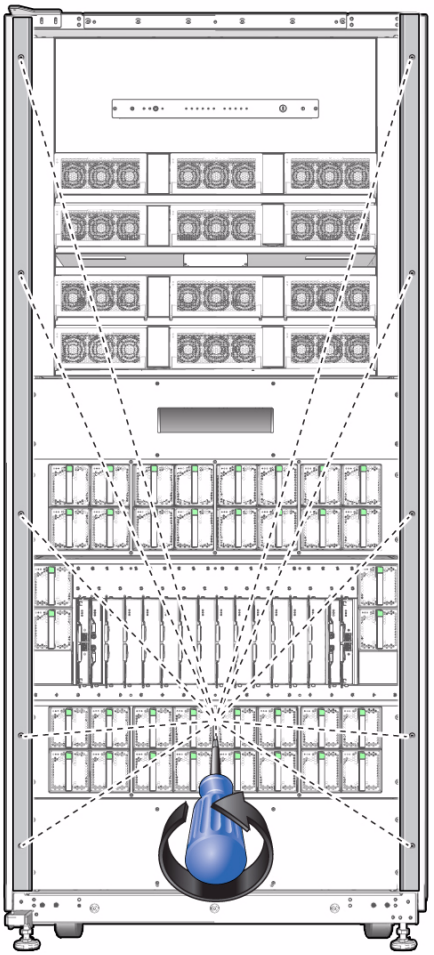
1. **Use a T20 Torx driver to loosen the three M4 captive screws securing the front kick plate.**

   Remove the kick plate and set it aside.



2. **Use a T20 Torx driver to loosen the 10 M4 captive screws securing the left and right trim panels.**

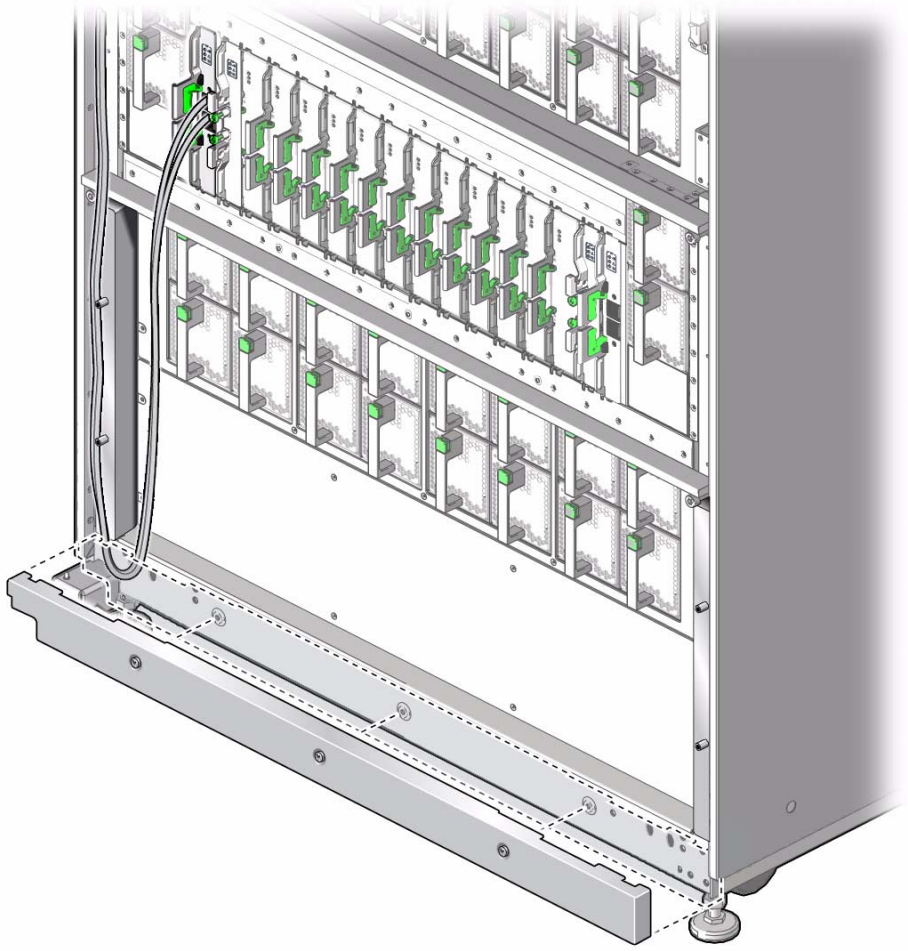
   Remove the trim panels and set them aside.



3. **Route the two left SP cables from SP0 down to the lower left corner of the server and then up the left channel.**

   There are two slots on the top left of the kick plate that enable you to route the cables down and then bend them up the channel secured by the left trim panel. When installed, the kick plate and the left trim panel will secure the SP cables to the server.

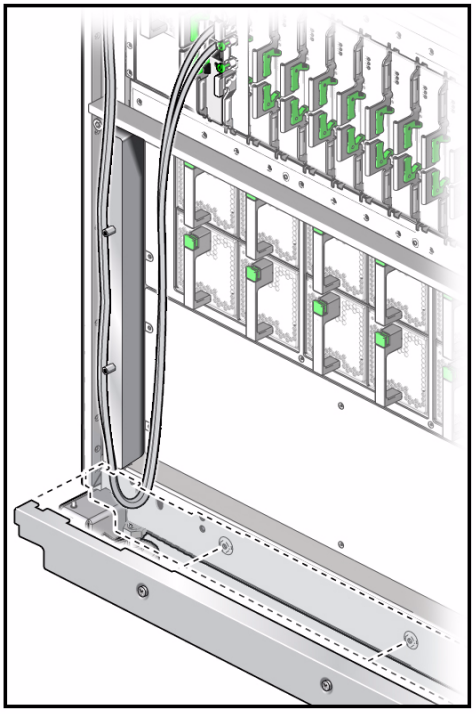
Note – Do not kink the cables when bending them up the left channel, and ensure that the cables are on the left side of the screw stand-offs.

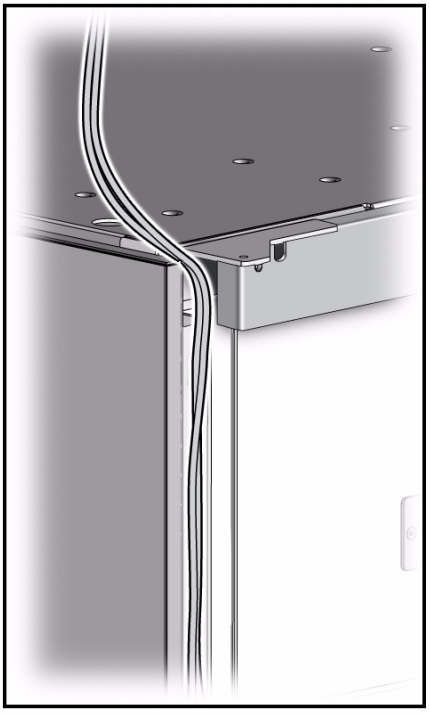


4. **Route the two left SP cables up the left channel and out of the top of the server through a notch to the left of the upper door hinge.**

   There is a small notch to the left of the upper door hinge that enables the cables to exit the server. The left trim panel will secure the left SP cables to the left channel.

Note – Route the SP cables to the left of the screw stand-offs.

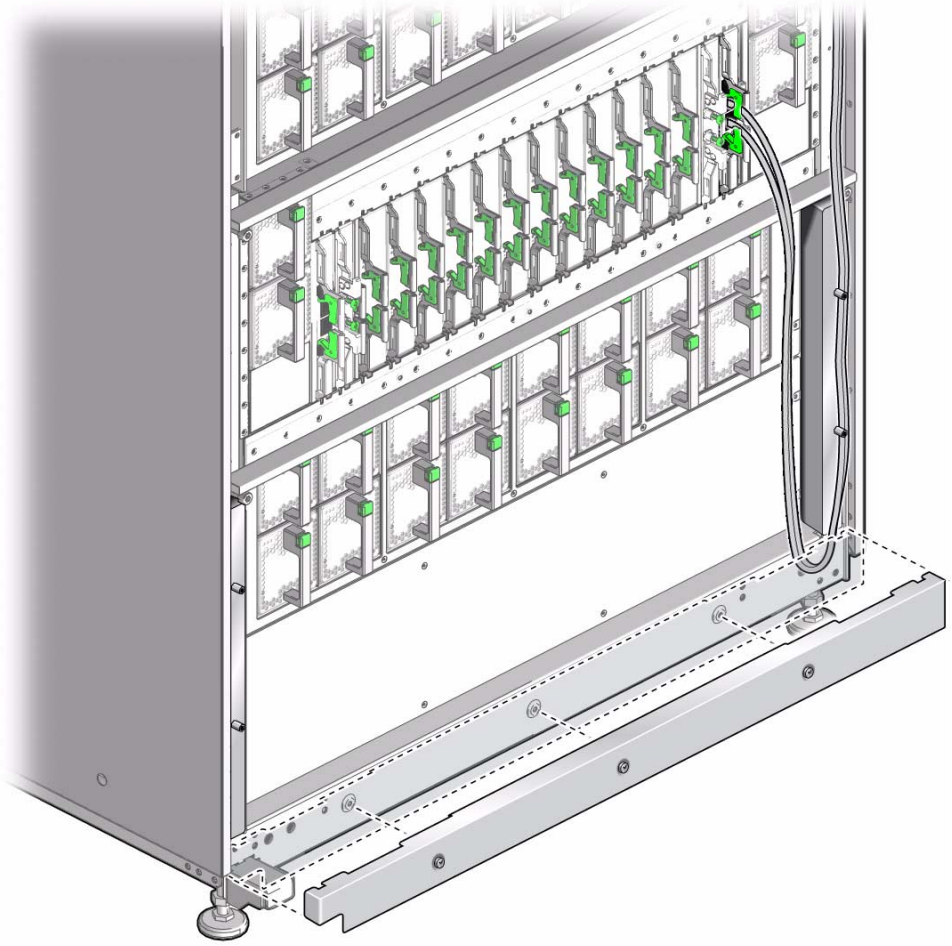




5. **Route the two right SP cables from SP1 down to the lower right corner of the server and then up the right channel.**

   There are two slots on the top right of the kick plate that enable you to route the cables down and then bend them up the channel secured by the right trim panel. When installed, the kick plate and the right trim panel will secure the SP cables to the server.

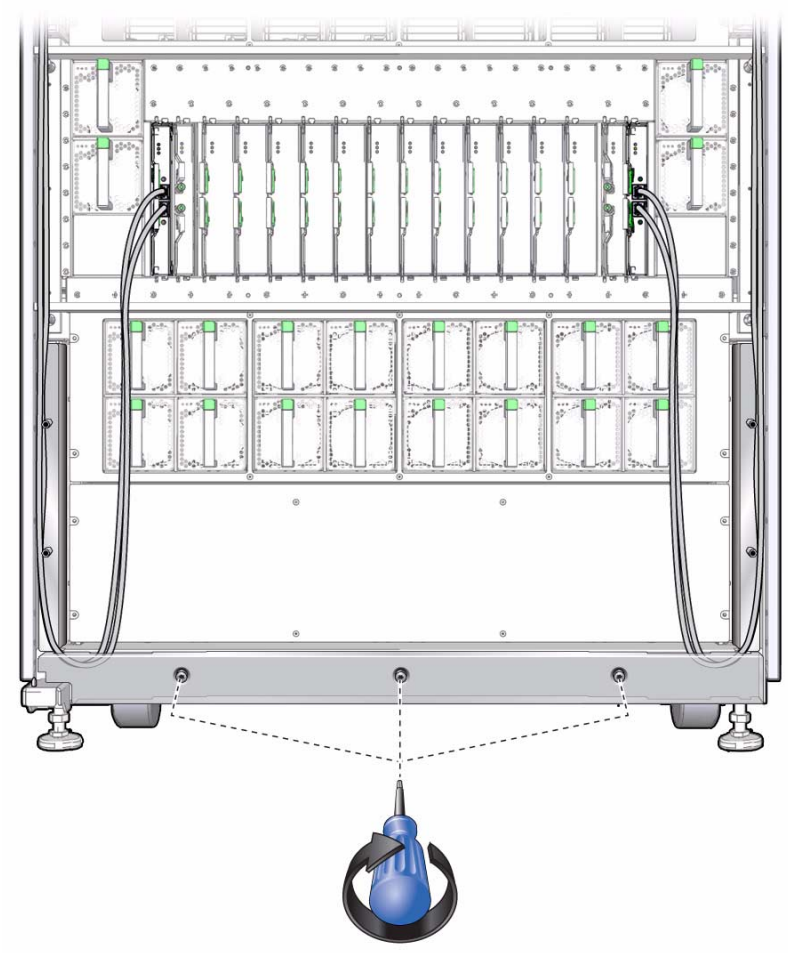
Note – Do not kink the cables when bending them up the right channel, and ensure that the cables are on the right side of the screw stand-offs and the door latches.



6. **Use a T20 Torx screwdriver to tighten the three captive M4 screws and secure the front kick plate to the server.**

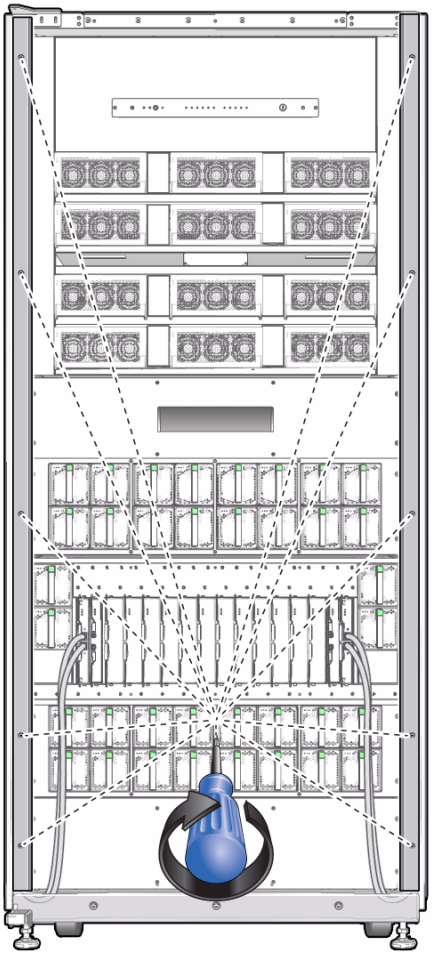
   Ensure that the SP cables pass through the kick plate slots, as shown in the following illustration.

Note – Do not pinch the SP cables when installing the kick plate.

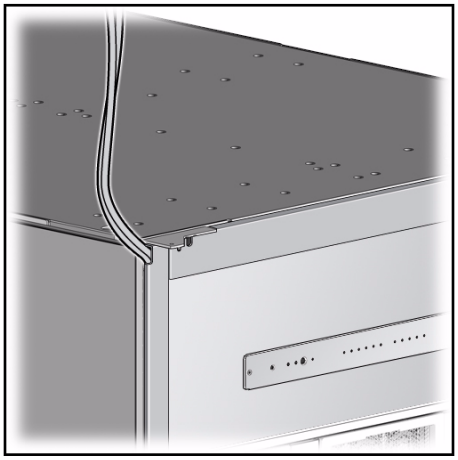


7. **Use a T20 Torx screwdriver to tighten the 10 screws securing the left and right trim panels to the server.**

Note – Do not pinch the SP cables when installing the trim panels.



8. **Route the SP cables out the top of the server, and secure the cables to a cable tray or a cable management device above the server.**



9. **(Optional) Use tie wraps and adhesive cable-tie mounts to secure the SP cables to the inside edges of the left and right trim panels.**

   By securing the SP cables to the trim panels, the cables will not interfere with the front fan modules.

10. **Continue with the installation by installing the front door.**

    See "Install the Door" on page 115.

Related Information

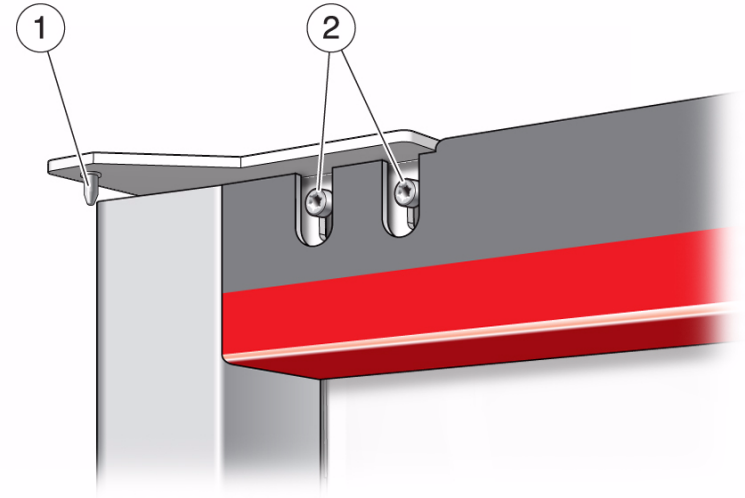
- "Connect the SP Cables" on page 97
- "Route the SP Cables Down" on page 102
- "Securing the SP Cables" on page 99

▼ Install the Door

After securing the SP cables, re-install the front door. You can follow these same steps to install either door.

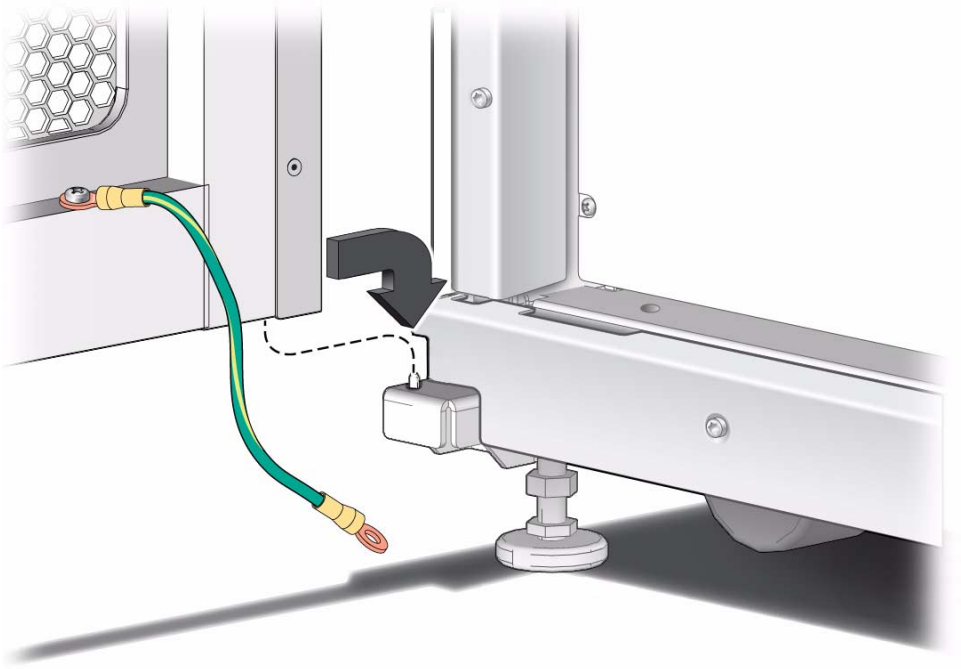
1. **Confirm that the upper hinge bracket is loosely attached to the server.**

   This bracket should have been loosened when you removed the door. If the hinge bracket is secured tightly to the server, use a T20 screwdriver to loosen the two M4 screws.



1	Upper hinge pin
2	M4 screws securing the upper hinge bracket

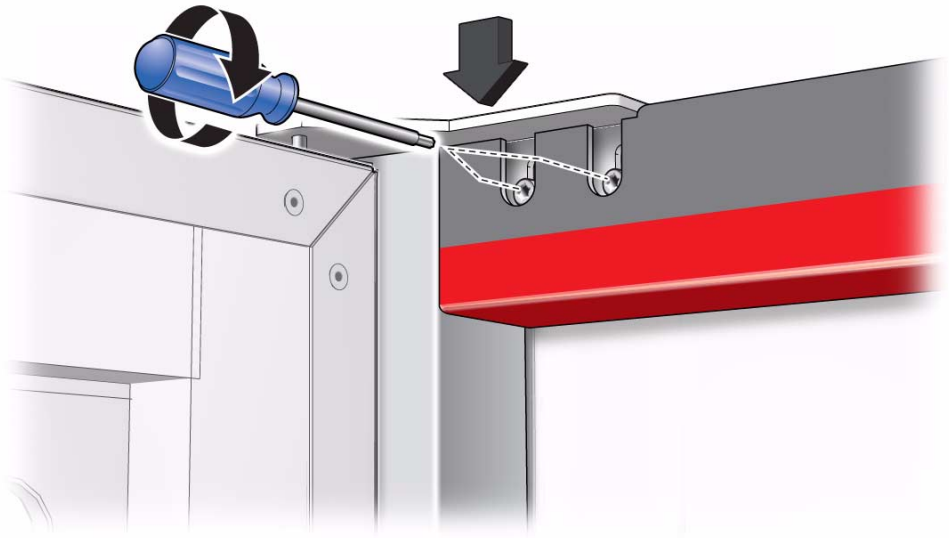
2. **Place the door on the lower hinge pin.**



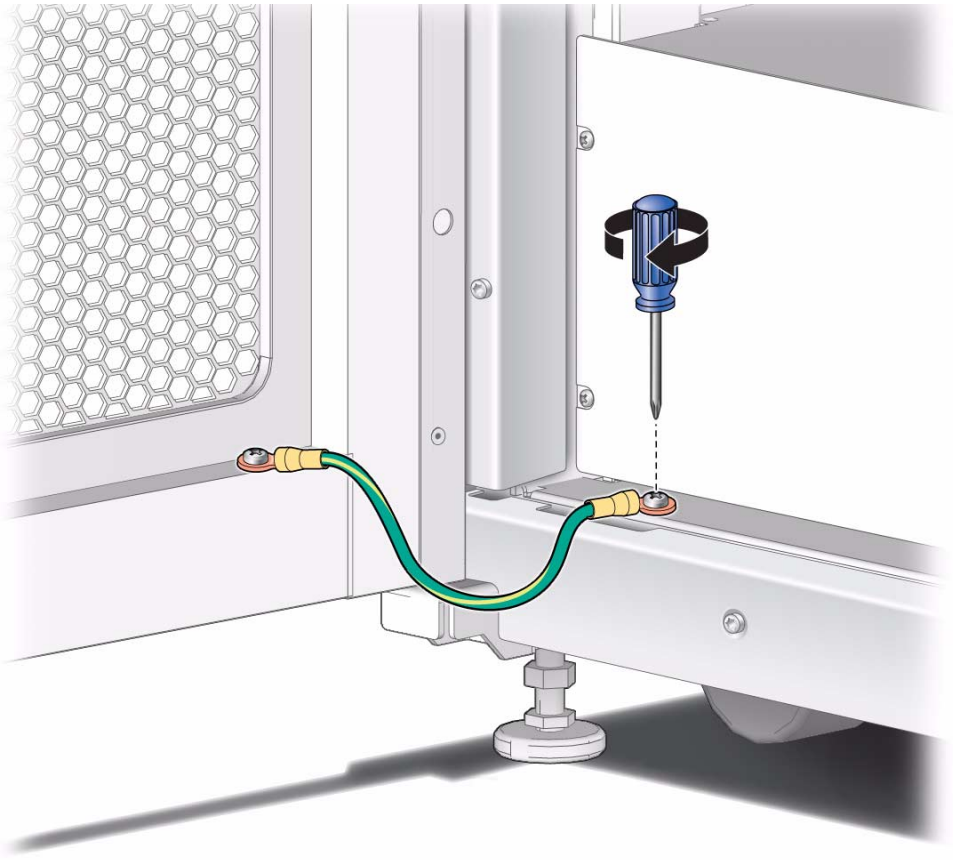
3. **Lift the upper hinge bracket, and then lower the upper hinge pin into the hole in the top of the door.**

4. **Use a T20 screwdriver to tighten the two M4 screws securing the upper hinge bracket to the server.**

   After securing the two screws, verify that the door can swing freely.



5. **Use a T20 Torx screwdriver to secure the ground cable to the server frame using an M4 screw.**



6. **Close the door.**
7. **Continue the installation by installing the power cords and data cables.**

   See "Connecting the Rear Power Cords and Data Cables" on page 119.

Related Information

- "Move the Server to the Installation Site" on page 79
- "Remove the Door" on page 100

Connecting the Rear Power Cords and Data Cables

Connect and secure the power cords and data cables located at the rear of the server.

No.	Task	Link
1	Review the cable routing and securing options to determine the best way to route the rear power cords and data cables for your site.	"Rear Cable Routing Options" on page 119 "Maximum Cable Connections" on page 121 "Cable Management Devices" on page 122
2	Prepare the cable routing brackets.	"Prepare the Cable Routing Brackets" on page 123
3	Connect and secure the power cords.	"Connect the Power Cords" on page 126 "Secure the Power Cords" on page 131
4	Connect and secure the network and data cables.	"Connect the EMS Network Cables" on page 134 "Connect Other Data Cables" on page 135 "Managing Data Cables" on page 136

Related Information

- "Rear Components" on page 8
- "Planning Network Addresses" on page 59
- "Connecting the Front SP Cables" on page 97

Rear Cable Routing Options

The data cables and power cords connected to the rear of the server can be routed up through the top of the server, down through a floor cutout, or both. Consult with your facility manager to determine the best method to route the cables and power cords at your site.

Note – The SP serial and network cables can also be routed up through the top of the server or down through the server floor. See "Securing the SP Cables" on page 99 for instructions.

FIGURE: Cable Routing Options

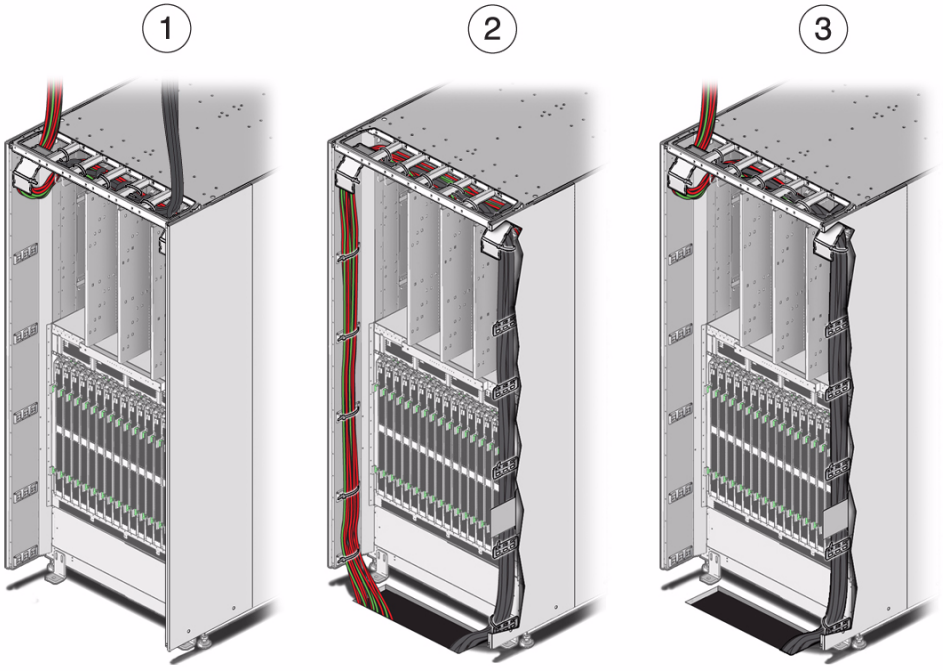


Figure Legend

1	Data cables and power cords routed up
2	Data cables and power cords routed down
3	Data cables routed upward and power cords routed down

Related Information

- "Maximum Cable Connections" on page 121
- "Cable Management Devices" on page 122
- "Managing Data Cables" on page 136

Maximum Cable Connections

The following table lists the maximum possible number of cable connections.

Type	Maximum Number	Description
SPs	Four cables required. • Two CAT5, or better, serial cables. • Two CAT6, or better, network cables.	These SP cables are installed in the front of the server, and all four SP cables are required.
EMS network cables	32 CAT6A, or better, network cables maximum. • Server can contain up to 16 EMS modules. • Each EMS module contains two 10-GbE ports.	At least one network cable is required for each PDomain.
Power cords	Six power cords required.	The server requires six power cords to operate.
PCIe expansion slots	Maximum number of cables varies by configuration.	There are 64 low-profile PCIe expansion slots available. The number and type of required cables depends on the installed PCIe cards.

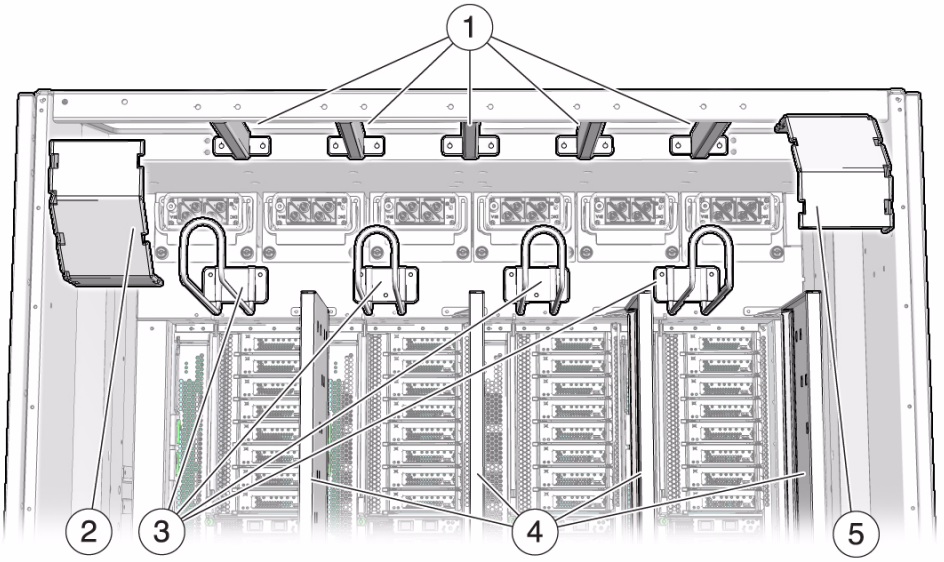
Related Information

- "Physical Domains" on page 13
- "Mandatory Cable Connections and Network Addresses" on page 59
- "Connecting the Front SP Cables" on page 97
- "Connect the Power Cords" on page 126
- "Connect the EMS Network Cables" on page 134
- "Connect Other Data Cables" on page 135

Cable Management Devices

Depending on your server configuration and the number of installed PCIe cards, you will route multiple cables and power cords either up to overhead cable trays or down under the floor.

The server provides various cable brackets, hooks, and supports that enable you to securely route the cables through the server.



No.	Management Device	Description
1	Power cord supports	Use tie-wraps to secure power cords to these supports.
2	Left cable bracket	Use this bracket to direct the data cables either upward or downward. This illustration shows the bracket installed upward to direct the cables up through the top of the server.
3	Cable hooks	Use these hooks to support the weight of the data cables.
4	Cable partitions	Use tie-wraps to secure the data cables to these partitions when routing the cables up to the cable hooks.
5	Right cable bracket	Use this bracket only when routing the power cords down through the bottom of the server. This bracket directs the power cords downward.

When routing the cables downward through the bottom of the server, use tie-wraps to secure the cables to stand-offs located in the rear cable channels.

Related Information

- "Securing the SP Cables" on page 99
- "Rear Cable Routing Options" on page 119
- "Managing Data Cables" on page 136

▼ Prepare the Cable Routing Brackets

Prior to cabling the server, prepare the cable routing brackets located at the top rear of the server. The left cable bracket secures the data cables, and the right cable bracket secures the power cords. Use these brackets to support and route the cables.

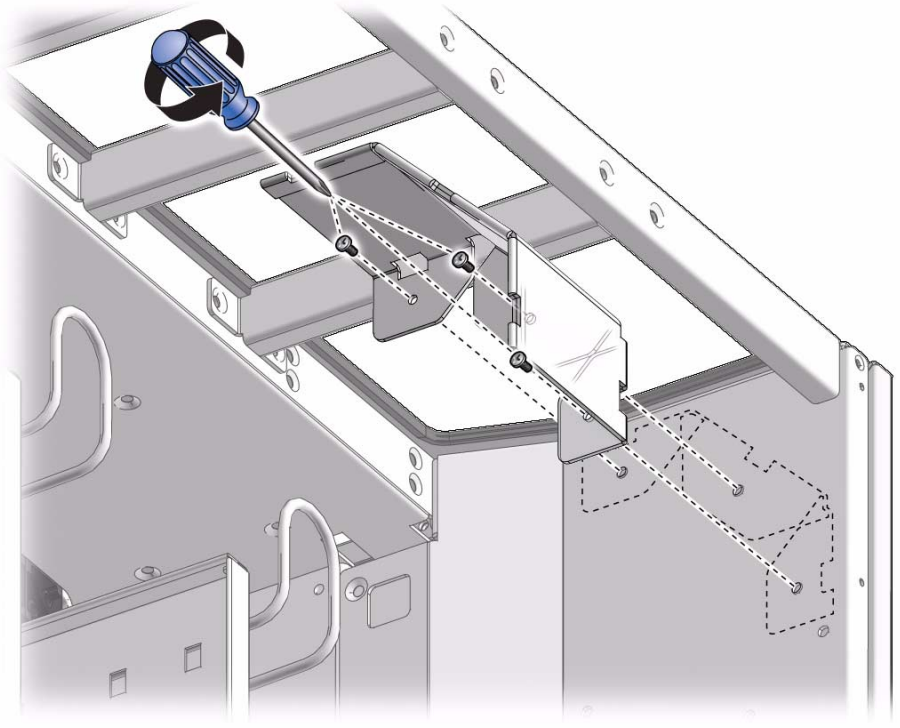
Note – The brackets have been installed at the factory with the left cable bracket facing upward and the right cable bracket facing downward. With this arrangement, the data cables out up through the top of the server and the power cords route down through the bottom of the server. You might need to reposition these brackets depending on how you plan to route the data cables and power cords.

---

1. Face the rear of the server and open the rear door.

2. **Determine if you will be routing the power cords up through the top of the server, or down through the floor.**
   - If routing the power cords downward, leave the right cable bracket as is. Skip to Step 5.
   - If routing the power cords upward, remove the right cable bracket as described in the following steps.
3. **Use a T20 Torx screwdriver to remove the three M4X10 screws securing the right cable bracket.**

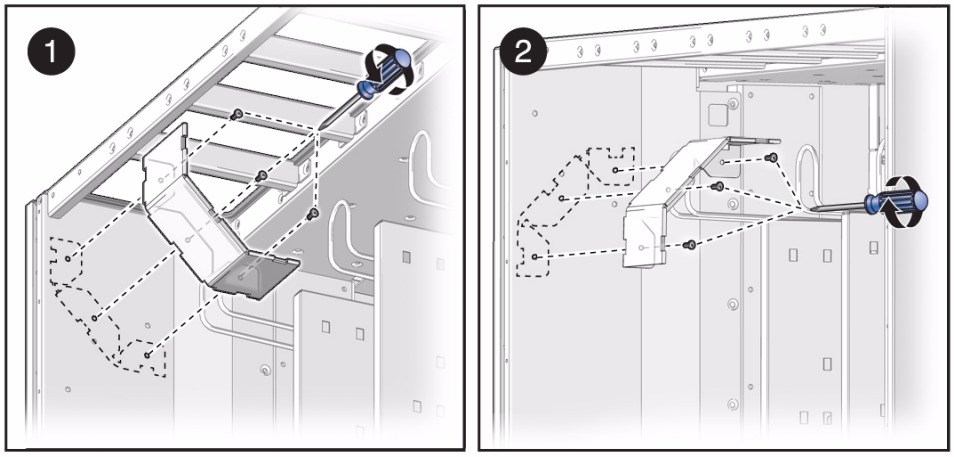
   Remove the right cable bracket from the server, and store the bracket and screws in a safe location.



4. **Determine if you will be routing the data cables up through the top of the server or down through the floor.**
   - If routing the data cables upward, leave the left cable bracket as is and skip to Step 8.
   - If routing the data cables downward, continue to the next step to reposition the left cable bracket.

5. **Use a T20 Torx screwdriver to remove the three M4X10 screws securing the left cable bracket.**

   Remove and save the bracket and screws for the next steps.



6. **Position the left cable bracket so that it faces downward in the left cable channel.**

7. **Use a T20 Torx screwdriver to secure the left cable bracket to the left cable channel with three M4X10 screws.**

8. **Continue with the installation by connecting the power cords.**

   See "Connect the Power Cords" on page 126.

Related Information

- "Rear Cable Routing Options" on page 119
- "Maximum Cable Connections" on page 121
- "Cable Management Devices" on page 122
- "Secure the Power Cords" on page 131
- "Managing Data Cables" on page 136

▼ Connect the Power Cords

Caution – Your site must have a local power disconnect (for example, circuit breakers) between the power source and the power cords. Ensure that these circuit breakers are set to off before connecting the power cords.

Caution – Ensure that you install the server near your power grid's electrical outlets, and ensure that these outlets are easily accessible in case you must detach the power cords in an emergency.

Caution – This safest and preferred way to supply power to the server is to install the power cords while the power source circuit breakers are set to off. If you do not have access to the circuit breakers and the facility power cannot be switched off, only connect the power cords to the AC input filters at this time. When you power on the server for the first time, connect the IEC 60309 power cord plugs to the live facility power grid sockets.

The server receives power from six power cords. The server is designed to receive power from two separate power grids, with three power cords receiving power from one power grid and the remaining three power cords receiving power from a second power grid. You must connect all six power cords.

Note – To aid installing and servicing the power cords, label both ends of the power cords with the number of the AC input filter (AC0, AC1, AC3, and so on) or with a number specific to your facility.

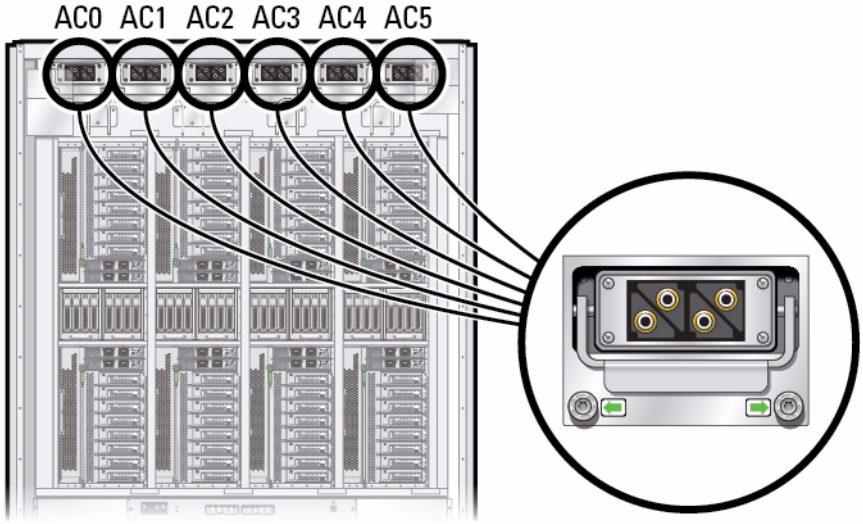
1. **Prepare to connect the power cords:**
   - Review the "Power Cord Specifications" on page 32 to ensure that you received the correct power cords for your facility.
   - Review the "Power Cord-to-Power Supply Relationship" on page 40 to understand which power cord supplies power to which power supply.
   - Review the "Facility Power Requirements" on page 37.
   - Review the "Circuit Breaker Capacity Requirements" on page 43 to ensure that the circuit breakers accommodate your facility power infrastructure.

2. **Confirm that all circuit breakers are set to the OFF position.**

   Consult with your facilities manager or a qualified electrician for the specific instructions on how to use the circuit breakers at your data center.

3. **Locate the six AC input filters at the top rear of the server.**

   You will be connecting three power cords from one power grid to the left three AC input filters (AC0, AC1, and AC2) and three power cords from the second power grid to the right three AC input filters (AC3, AC4, and AC5).



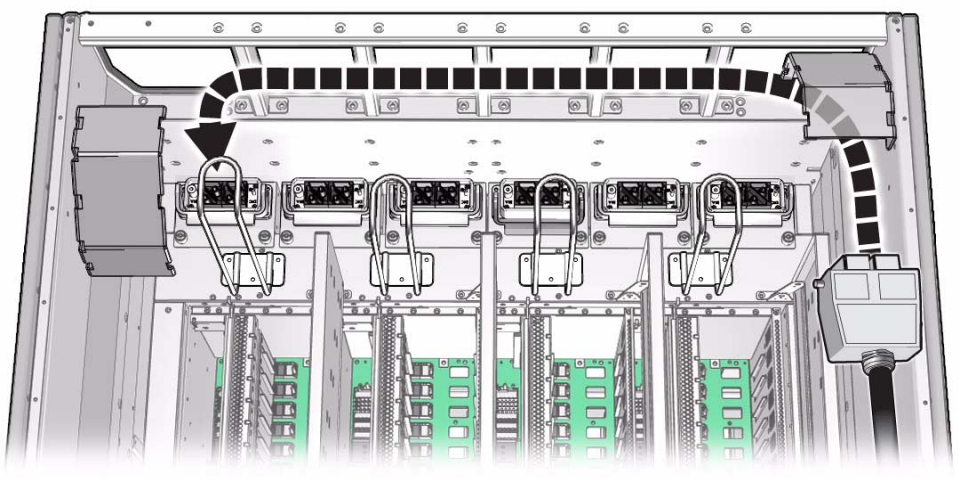
4. **Determine if you will be routing the power cords up through the top of the server or down through the bottom.**

   - If you are routing the power cords up, go to Step 6.
   - If you are routing the power cords down, continue to Step 5.

   For more information about routing power cords and data cables, see "Rear Cable Routing Options" on page 119.

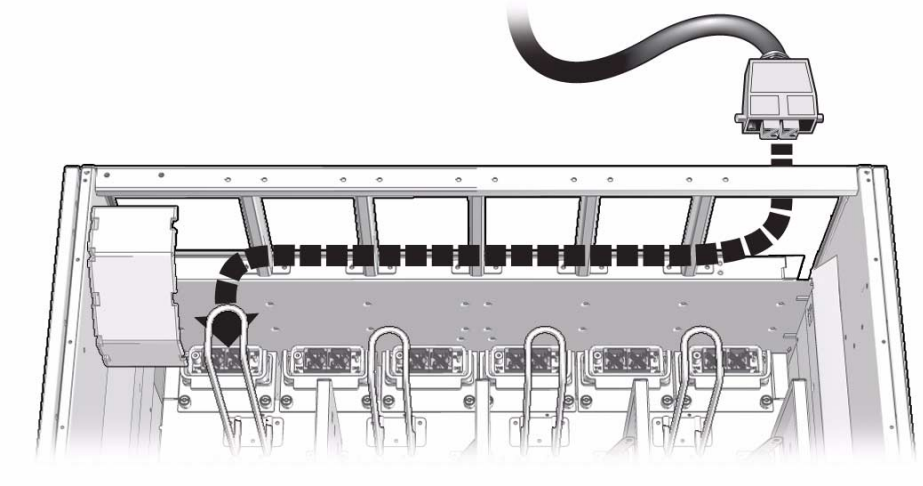
5. **Obtain a power cord and route the power cord up the right cable channel to the right cable bracket and then bend the cord to the left.**

   Route the power cord plug to the left-most AC input filter labeled AC0. Continue to Step 7.

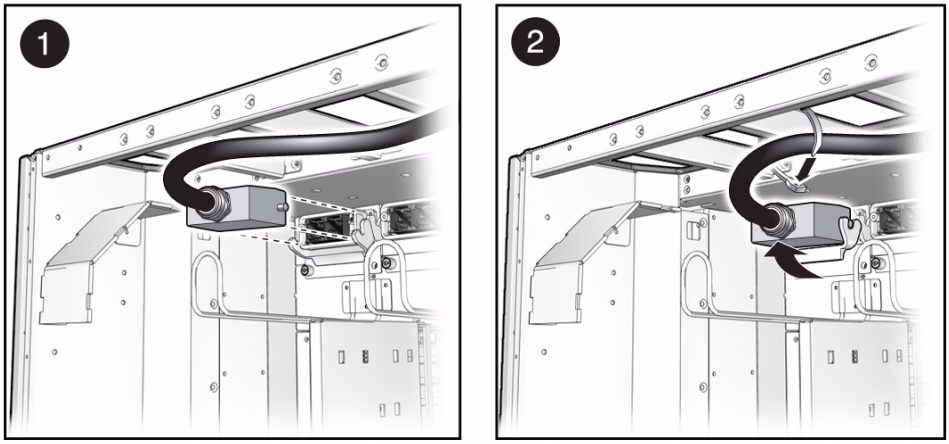


6. **Obtain a power cord and thread the power cord plug through the right-most opening at the top of the server.**

   Route the power cord plug to the left-most AC input filter labeled AC0.



7. **Press the power cord plug into the left-most AC input filter, and lift the locking handle up until it firmly secures the plug to the AC input filter.**



8. **Use a tie-wrap to secure the power cord to a support located above the AC input filter.**

Note – Do not overtighten the tie-wraps, and provide some slack in case you need to detach the power cord or replace the AC input filter. However, do not allow the power cord to lay on the cable management hooks below the AC input filters. These hooks cannot support the weight of the power cords.

---

9. **Route the power cord to the right and determine if you will be routing the cables up through the top of the server or down through the bottom.**
   - If you are routing the power cord upward, thread the power cord out through the top of the server.
   - If you are routing downward, lead the power cord to the right cable channel. Continue to lead the power cord down the right cable channel and then through the floor cutout underneath the server.

10. **Connect the power cord to the facility AC outlet.**

    Consult with your facilities manager or a qualified electrician for the specific instructions on how to connect the power cords at your data center.

11. **Label both ends of the power cords, the facility AC outlet, and the facility circuit breakers with the AC input filter number or with a unique facility number.**

    By labeling these components, you will be able to replace the power cords to the appropriate outlets after servicing the server. When powering on the server for the first time, you will switch on each circuit breaker in the order of the AC input filters.

Note – If you have numbered these components using a numbering sequence unique to your facility, ensure that you can still determine the AC input filter number associated with each component.

12. **Repeat** Step 4 **through** Step 11 **for the remaining power cords.**

    Connect the cables from the left to the right. Ensure that each power cord is connected to the correct facility AC power grid.

Note – You must connect all six power cords.

13. **Secure the power cords to the server.**

    See "Secure the Power Cords" on page 131 for instructions.

Related Information

- "Reviewing the Power Requirements" on page 30
- "Cable Management Devices" on page 122
- "Secure the Power Cords" on page 131

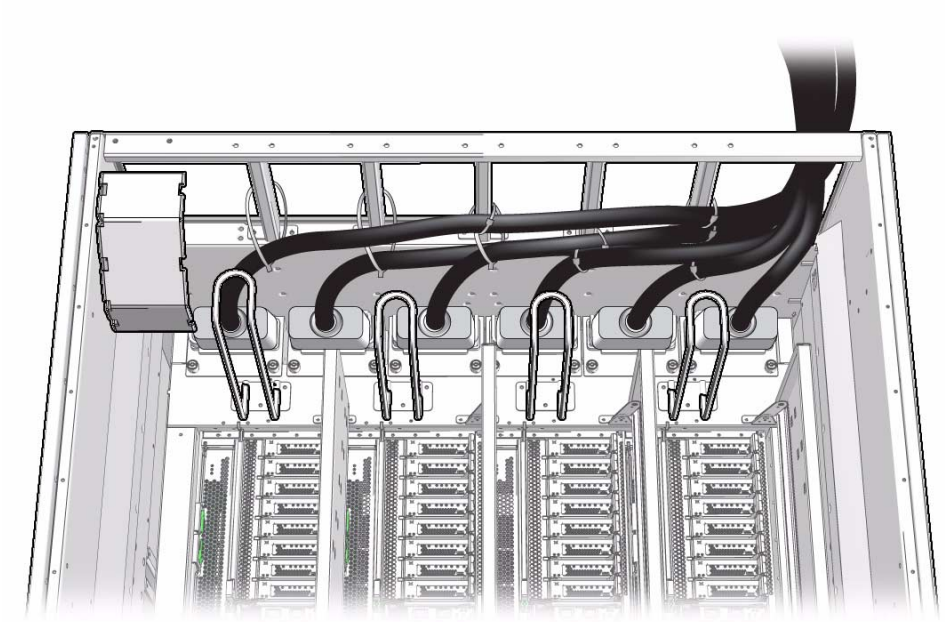
▼ Secure the Power Cords

Secure the power cords to the server and to cable management devices above or below the server.

1. **Use tie-wraps to secure the power cords to the supports located at the top of the server.**

   Use extra tie-wraps as necessary to secure the power cords to the server supports.

Note – Do not secure the power cords to the cable management hooks. These hooks are designed for data cables and cannot support the weight of the power cords.



2. **If you have routed the power cords down the right cable channel and through a floor cutout, skip to** Step 5**.**

   Otherwise, continue to the next step.

3. **Confirm that the power cords have been routed up through the right-most opening at the top rear of the server.**

4. **Secure the power cords to a cable tray or similar device above the server.**

   Refer to the cable tray documentation for instructions. Skip to Step 9.

5. **Confirm that the power cords are routed through the right cable channel and down through the bottom of the server.**

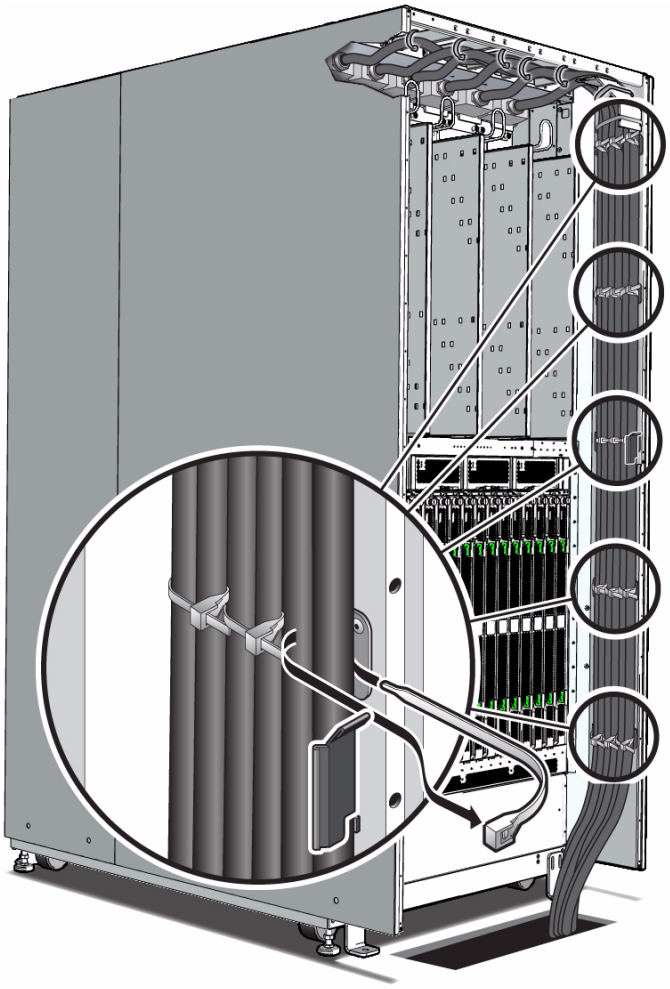
6. **Confirm that the right cable bracket is installed in the right cable channel.**

   See "Prepare the Cable Routing Brackets" on page 123 for instructions.

7. **Using tie-wraps, secure the power cords to the right cable bracket and right channel cable stand-offs.**

   Ensure that the power cords are routed to the left of the door latch bracket.

Note – When routing the power cords down the right cable channel, ensure that you provide enough space for the rear door latch to close without touching a power cord.



8. **In the crawl space under the server, secure the power cords to your facility cable management devices.**

   Request instructions from your facility manager.

9. **Continue the installation by connecting the EMS network cables.**

   See "Connect the EMS Network Cables" on page 134.

Related Information

- "Reviewing the Power Requirements" on page 30
- "Connect the Power Cords" on page 126

▼ Connect the EMS Network Cables

Each EMS contains two 10-GbE RJ-45 ports (10GBASE-T) that provide the network connection to the server.

Depending on your configuration, connect at least one Category 6A or 7 network cable to an EMS port on each PDomain. To provide redundancy, connect the two network cables from an EMS from one PDomain to two separate network switches or hubs on your network.

Note – To achieve 10-GbE network speeds, you must use Category 6A or Category 7 network cables, and your network switches or hubs must support the 10GBASE-T Ethernet standard. The network cable length must not exceed 328 ft (100 meters).

Caution – Only EMS modules are supported in the EMS slots. Installing other PCIe express modules in these slots is not supported and could damage the server and the express module.

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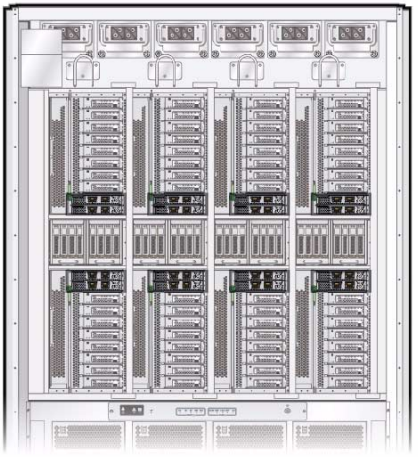
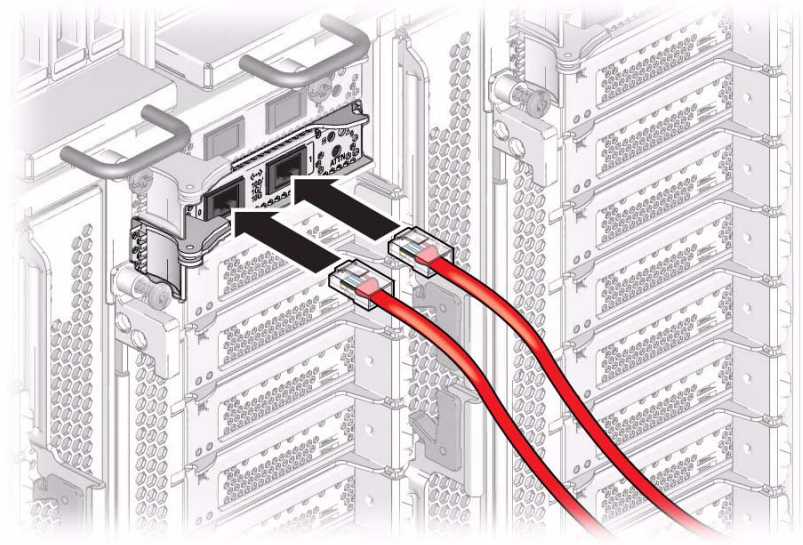
1. **Locate the EMS modules at the rear of the server.**

   The EMS modules are located in each IOU, above and below the hard drives.



2. **Connect a Category 6A (or better) cable from your network switch or hub to the 10-GbE port 0 on the EMS.**



3. **Connect additional Category 6A (or better) cables from your network switch or hub to the remaining 10-GbE ports on other EMS modules, as needed for your server configuration.**

4. **Secure the network cables to the server.**

   See "Managing Data Cables" on page 136.

Related Information

- "PDomain Cables and Network Addresses" on page 65
- "Maximum Cable Connections" on page 121
- "Managing Data Cables" on page 136

▼ Connect Other Data Cables

1. **If your server configuration includes optional PCIe cards, connect the appropriate I/O cables to their connectors.**

   Refer to the PCIe card documentation for specific instructions.

Note – For instructions on installing optional PCIe cards using the PCIe hot-plug carrier, refer to the *Server Service*, servicing I/O cards.

---

2. **If applicable, connect cables to any external expansion unit, storage product, or any other peripheral device.**

   Refer to the peripheral device documentation for the appropriate cabling instructions.

3. **Secure the cables to the server.**

   See "Managing Data Cables" on page 136.

Related Information

- "PCIe Network Interface Cards" on page 65
- "Maximum Cable Connections" on page 121
- "Managing Data Cables" on page 136
- Peripheral device documentation

Managing Data Cables

Determine if you will route the data cables up through the top of the server or down through a floor cutout under the server.

Routing Direction	Link
Up through the top of the server	"Secure Cables Routed Up" on page 136
Down through the bottom of the server	"Secure Cables Routed Down" on page 138

Related Information

- "Rear Cable Routing Options" on page 119
- "Cable Management Devices" on page 122
- "Prepare the Cable Routing Brackets" on page 123
- "Securing the SP Cables" on page 99

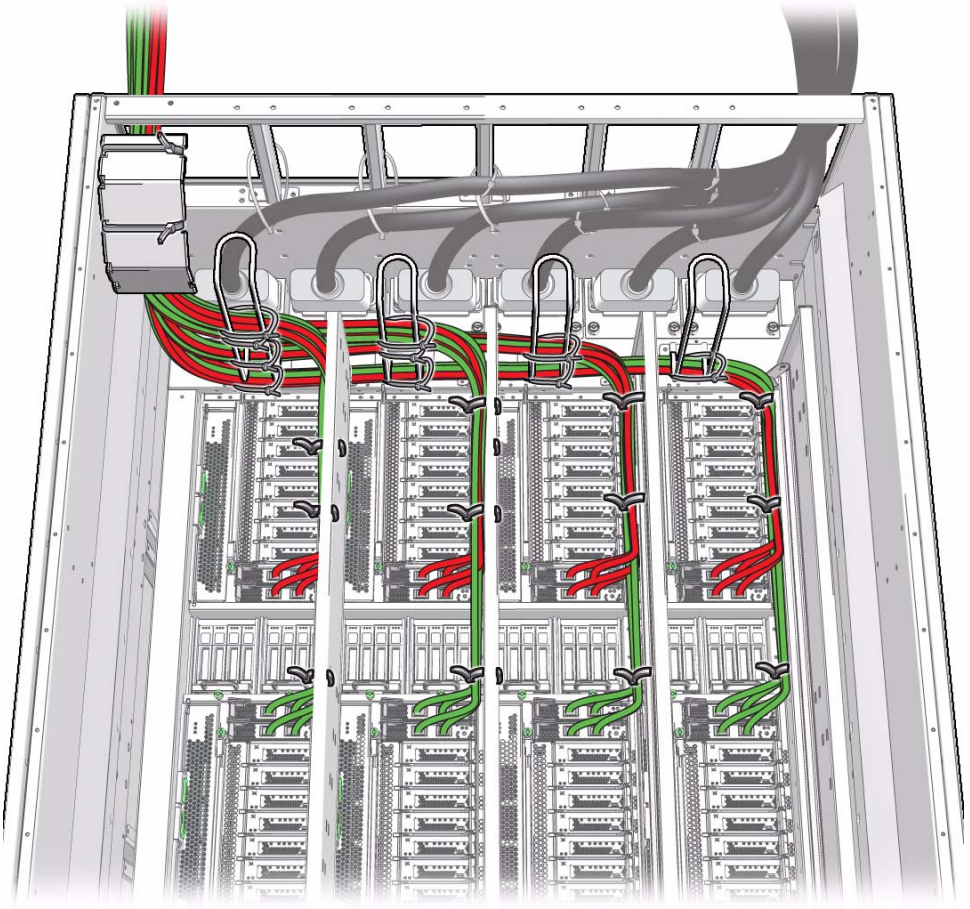
▼ Secure Cables Routed Up

Route the data cables up and out the top of the server.

1. **Confirm that you completed the following:**

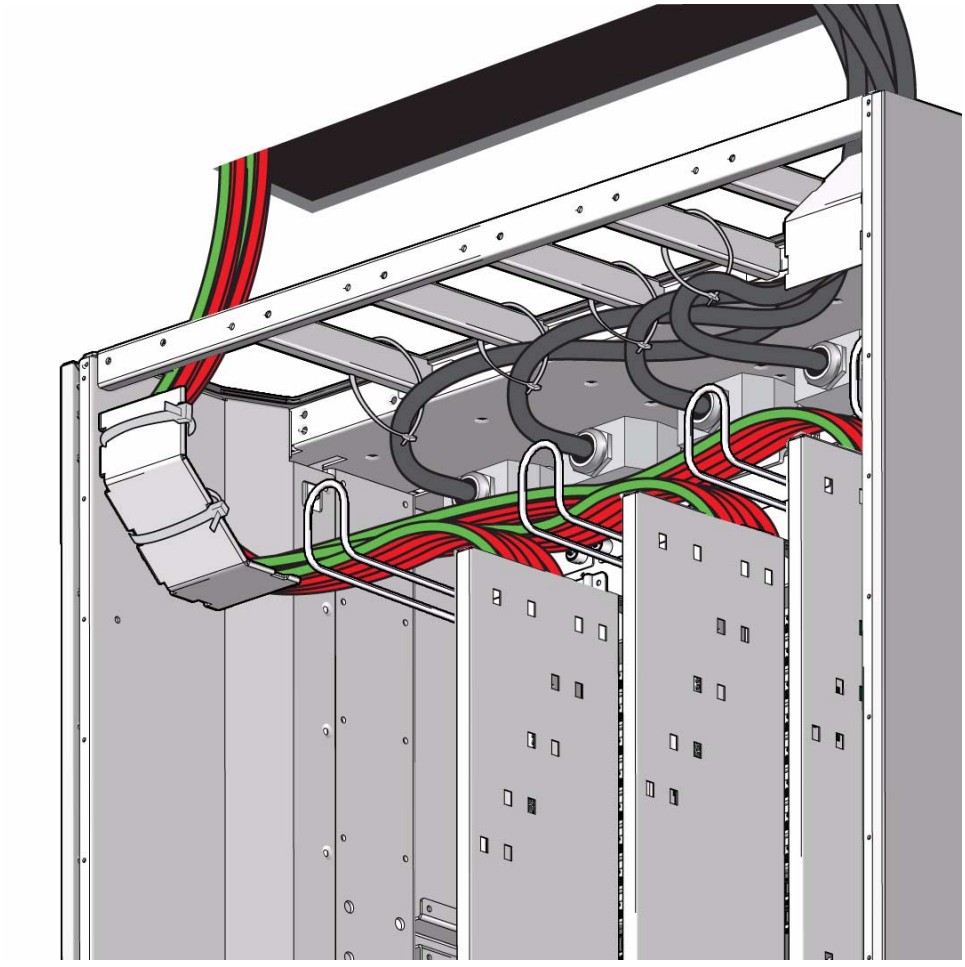
- Review the server's cable management devices – see "Cable Management Devices" on page 122.
- Stabilize the server to the installation site – see "Stabilizing the Server" on page 87.
- Confirm that the left cable bracket is installed in the upward position – see "Prepare the Cable Routing Brackets" on page 123.

2. **Route the data cables up the server to the cable hooks located above the IOUs.**



3. **Lead the data cables to the left cable bracket and then up and out the top of the server.**

4. **Using tie-wraps, secure the data cables to the cable partitions, cable hooks, and and the left cable bracket.**



5. **Secure the data cables to a cable tray or device installed above the server.**
   Refer to the cable tray documentation for instructions.

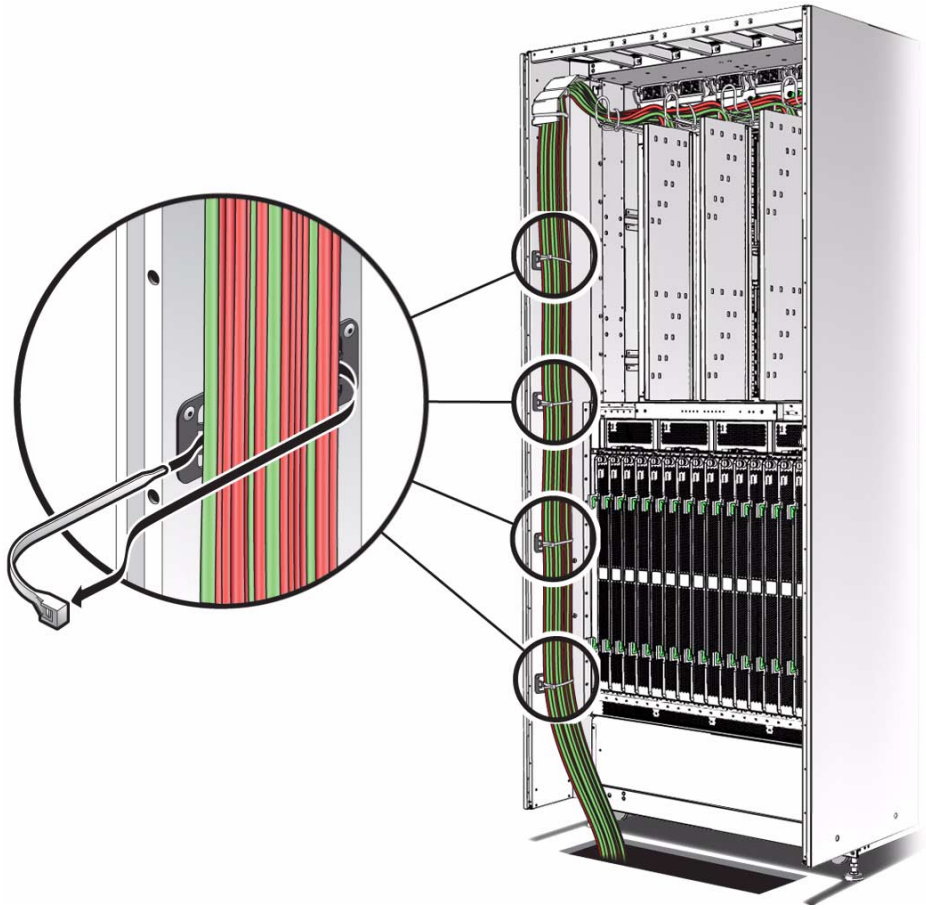
Related Information

- "Prepare the Cable Routing Brackets" on page 123
- "Connect the EMS Network Cables" on page 134
- "Connect Other Data Cables" on page 135

▼ Secure Cables Routed Down

Route and secure the data cables down through the bottom of the server.

1. **Confirm that you have completed the following:**
   - Cut a hole in the floor to route the power cords and data cables. For dimensions, see "Mounting Holes and Cable Routing Floor Cutout Specifications" on page 28.
   - Stabilized the server to the installation site – see "Stabilizing the Server" on page 87.
   - Review the server cable management devices – see "Cable Management Devices" on page 122.
   - Confirm that the left cable bracket is installed – see "Prepare the Cable Routing Brackets" on page 123.
2. **Route the data cables up the server to the cable hooks located above the IOUs.**
3. **Lead the data cables to the left cable bracket and then down the left cable channel and down through the bottom of the server.**



4. **Using tie-wraps, secure the data cables to the cable hooks and to the left cable bracket.**
5. **Using tie-wraps, secure the data cables to the left cable channel stand-offs.**
6. **In the crawl space under the server, secure the data cables to your facility cable management devices.**

   Request instructions from your facility manager.

Related Information

- "Planning Network Addresses" on page 59
- "Connect the EMS Network Cables" on page 134
- "Connect Other Data Cables" on page 135

Powering On the Server for the First Time

Step	Description	Link
1	Review the preinstalled software environment.	"Installed Software" on page 142
2	Check the power cords to ensure that they have been installed and secured correctly.	"Inspect the Power Cords" on page 142
3	Understand the dual-redundant SPs and make serial connections to the SER MGT ports on the two SPs.	"Dual-Redundant SPs" on page 143 "Connect Terminals or Emulators to the SP SER MGT Ports" on page 144
4	Switch on the facility circuit breakers to supply power to the server, which will go into standby power mode.	"Switch On the Facility Circuit Breakers" on page 145
5	Log in to the Active SP.	"Log In to the Active SP" on page 148
6	Assign the required network addresses for the Oracle ILOM software, and set the server altitude.	"Set Oracle ILOM Network Addresses" on page 150 "Set the Altitude of the Server" on page 153
7	Use Oracle ILOM commands to power on the server and configure the preinstalled Oracle Solaris OS.	"Power On the Server" on page 154 "Oracle Solaris OS Configuration Parameters" on page 156
8	Explore and test the software environment.	"Additional Software Configuration and Testing" on page 157

Related Information

- "Installation Task Overview" on page 1
- "Installing the Server" on page 73
- "Connecting the Front SP Cables" on page 97
- "Connecting the Rear Power Cords and Data Cables" on page 119

Installed Software

The server is configured as a single PDomain containing all four DCUs. This PDomain is preinstalled with the following software:

- Oracle Solaris 11.1 OS
- Oracle VM Server for SPARC software
- Oracle VTS software

The two SPs are preinstalled with the Oracle ILOM firmware.

Refer to the *SPARC M5-32 and SPARC M6-32 Servers Product Notes* for the list of the latest supported versions of the software and firmware.

Related Information

- "Understanding the Firmware and Software Environment" on page 14
- Oracle ILOM documentation (http://www.oracle.com/goto/ILOM/docs)
- Oracle Solaris 11.1 OS documentation (http://www.oracle.com/goto/Solaris11/docs)
- Oracle VTS documentation (http://www.oracle.com/goto/VTS/docs)
- Oracle VM Server for SPARC documentation (http://www.oracle.com/goto/VM-SPARC/docs)

▼ Inspect the Power Cords

Inspect the power cords to ensure that they have been properly cabled to the server.

Note – Do not turn the circuit breakers to on until you have connected the SPs to serial terminals or terminal emulators (PCs or workstations). If you power on the server without first connecting terminal devices to the SER MGT ports, you will not see the system power-on messages.

---

1. **Confirm that the six power cords are securely attached to the AC input filters located at the rear of the server and to the two facility power grids.**

   Each power cord must have its own circuit breaker between the server and the facility AC power source.

2. **Ensure that all circuit breakers are set to off on the AC power source.**

   Consult with your facilities manager or a qualified electrician for the specific instructions on how to use the circuit breakers at your data center.

3. **Confirm that the power cords are securely attached to the server and to the AC power grid sources.**

   For instructions, see:

   - "Connect the Power Cords" on page 126
   - "Secure the Power Cords" on page 131

Note – Confirm that you labeled both ends of the power cords and the facility power outlets with the numbers of the server AC input filters.

---

4. **Continue with the installation.**

   Review the Oracle ILOM software environment and make a serial connection to the two SPs.

   - "Dual-Redundant SPs" on page 143
   - "Connect Terminals or Emulators to the SP SER MGT Ports" on page 144

Related Information

- "Reviewing the Power Requirements" on page 30
- "Connect the Power Cords" on page 126
- "Secure the Power Cords" on page 131

Dual-Redundant SPs

The server has a pair of dual-redundant SPs (SP0 and SP1) located in the front of the server. One SP functions as the Active SP to manage the server, while the other acts as a Standby SP that assumes the Active SP role in the event of a failure.

When you power on the system, the boot process begins under the control of the Oracle ILOM system console. The system console displays status and error messages generated by firmware-based tests that run during the system startup.

Note – To see these status and error messages, connect a terminal or terminal emulator to the SER MGT ports on the two SPs prior to applying power to the server.

After the system console finishes its low-level system diagnostics, the Active SP initializes and runs a suite of higher level diagnostics. When you access the SP using a terminal device connected to the Active SP SER MGT port, you see the diagnostic and startup messages.

For a detailed discussion on configuring the system console, refer to the *Server Administration*, and the Oracle ILOM documentation.

Related Information

- *Server Administration*, SP and SPP guidelines
- "SPs and SPPs" on page 10
- "SP Cables" on page 60
- "SP Network Addresses" on page 64
- "Connecting the Front SP Cables" on page 97
- "Connect Terminals or Emulators to the SP SER MGT Ports" on page 144
- Oracle ILOM documentation (http://www.oracle.com/goto/ILOM/docs)

▼ Connect Terminals or Emulators to the SP SER MGT Ports

Prior to powering on the server for the first time, make a serial connections to the two SPs. By making these serial connections, you will be able to view the system status and error messages when you switch on the power grid circuit breakers.

Note – If you power on the server without first connecting terminals to the SER MGT port, you will not see the system power-on messages.

1. **Confirm that you have connected cables to the SER MGT ports on the two SPs located in the front of the server.**

   See "Connecting the Front SP Cables" on page 97.

2. **Connect terminals or a terminal emulators (PC or workstation) to the two serial connections.**

   Configure the terminal or terminal emulator with these settings:

   - 9600 baud
   - 8 bits
   - No parity
   - 1 stop bit
   - No handshake

Note – A null modem configuration is needed, meaning the transmit and receive signals are reversed (crossed-over) for DTE to DTE communications. You can use the supplied RJ-45 crossover adapters with a standard RJ-45 cable to achieve the null modem configuration.

---

3. **Press the Enter or Return key on the terminal devices connected to the SPs.**

   This action establishes the serial connections to the SER MGT ports on the server.

4. **Continue with the installation by switching on the facility circuit breakers for the first time.**

   See "Switch On the Facility Circuit Breakers" on page 145.

Related Information

- "SP Cables" on page 60
- "SP Network Addresses" on page 64
- "Connect the SP Cables" on page 97

▼ Switch On the Facility Circuit Breakers

Caution – This procedure provides the safest and preferred way of supplying facility power to the server by switching on the facility circuit breakers in sequential order. If you do not have access to the circuit breakers and the facility power grids are on, connect the power cord IEC 60309 plugs to the live facility power grid sockets in the order of the AC input filters.

---

1. **Confirm that you have properly installed and secured the server.**

   See "Installing the Server" on page 73.

2. **Confirm that you have properly attached the data cables to the server.**

   Ensure that you have connected the following cables:

   - Serial cables and network cables to the two SPs – "Connecting the Front SP Cables" on page 97
   - At least one network cable to each PDomain – "Connect the EMS Network Cables" on page 134
   - Any cable required for peripherals – "Connect Other Data Cables" on page 135

Note – If you power on the server without first connecting terminal devices to the SER MGT ports, you will not see the system power-on messages.

---

3. **Power on all storage devices, expansion boxes, or peripherals connected to the server.**

   Refer to the peripheral device documentation for instructions.

4. **Switch on the power grid circuit breaker that supplies power to the cord connected to the AC input filter labeled AC0.**

   Consult with your facilities manager or a qualified electrician for the specific instructions on how to use the circuit breakers at your data center.

Note – If you do not have access to the circuit breakers and the facility power grids are on, connect the power cord IEC 60309 plug labeled AC0 to the live facility power grid socket.

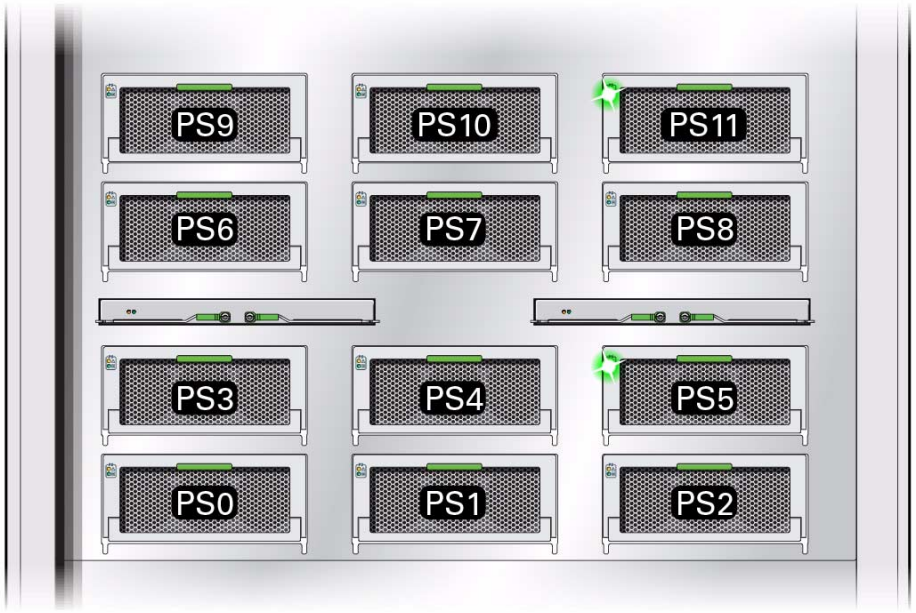
---

5. **At the front of the server, confirm that the power supplies labeled PS5 and PS11 are powered on and that their green OK LEDs are lit.**

   Do not proceed to the next step until you have confirmed that these two power supplies are operating normally.

Note – The green OK LEDs of the remaining power supplies will remain off until they receive AC power in Step 6.

Note – The server can operate with eleven power supplies if one has failed. (The server *must* contain eleven power supplies to cool the IOU components.) The server requires twelve power supplies for proper cooling and for power supply redundancy, so replace any failed power supply as soon as possible. Refer to the *Server Service*, servicing power supplies, for instructions.



6. **Continue to switch on each power grid circuit breaker in the order of the AC input filters, and verify the operation of each power supply after switching on each circuit breaker.**

   Confirm that the green OK LEDs on the appropriate power supplies are lit after switching on each circuit breaker. Use the following table to determine which AC input filter powers which power supplies. See "Power Cord-to-Power Supply Relationship" on page 40 for more information.

AC Input Filter	Power Supplies
AC0	PS5, PS11
AC1	PS4, PS10
AC2	PS3, PS9
AC3	PS2, PS8
AC4	PS1, PS7
AC5	PS0, PS6

Note – If you do not have access to the circuit breakers and the facility power grids are on, connect the power cord IEC 60309 plugs to the live facility power grid sockets in the order of the AC input filters.

7. **Monitor the status indicators on the front or rear LED panel.**

   Soon after you connect AC power to the server, one of the two SPs will assume the role of the Active SP. The front and rear panel SP LEDs blink as the Active SP powers on, runs diagnostics, and initializes the Oracle ILOM firmware. See "System Status LEDs" on page 4 for a description of these status indicators.

   After the Oracle ILOM firmware initializes, the front and rear panel SP LEDs remain lit (the preceding illustration shows the front panel SP LED) and the login prompt displays on the Active-SP terminal device. The host is not yet initialized or powered on.

8. **Continue with the installation by logging in to the Active SP.**

   See "Log In to the Active SP" on page 148.

Related Information

- "Reviewing the Power Requirements" on page 30
- "Connecting the Rear Power Cords and Data Cables" on page 119
- "Power On the Server" on page 154
- *Server Service*, interpreting LEDs

▼ Log In to the Active SP

After switching the facility circuit breakers on, one of the two SPs will assume the Active SP role, while the other SP assumes the Standby SP role. To continue with the installation, you must log in to the Oracle ILOM software through the Active SP through a local serial connection.

1. **Confirm that you have made serial connections to the two SPs and the server is running on standby power.**

   See:

   - "Connect Terminals or Emulators to the SP SER MGT Ports" on page 144
   - "Switch On the Facility Circuit Breakers" on page 145

2. **Determine which terminal or terminal emulator is connected to the Active SP.**

   The terminal connected to the Active SP displays the system status messages while the Oracle ILOM software initializes. This terminal also displays an Oracle ILOM login prompt:

```
XXXXXXXXXXXXXXXX login:
```

3. **Log in to the Active SP as root user with the `changeme` password.**

   The server includes a root user account that you use to log in to the Oracle ILOM software initially. This account has administrative privileges (read and write) for all Oracle ILOM features, functions, and commands.

Note – To prevent unauthorized access, change the root account password as soon as possible. Refer to the Oracle ILOM documentation for instructions.

```
xxxxxxxxxxxxxx login: root
Password: changeme
```

4. **Confirm that you are connected to the Active SP.**

```
-> show /SP/redundancy status
status = Active
```

   - If the command displays `status = Active`, you are logged in to the Active SP.
   - If the command displays `status = Standby`, you are logged in to the Standby SP.

     Type exit to log out of the Standby SP, and then log in to the Active SP using the other terminal or terminal emulator.
   - If the command displays `status = Standalone`, you are logged in to the Active SP, but the Standby SP has failed to respond or has failed to join the network.

     Refer to the *Server Service*, servicing SPs, for instructions on replacing the failed SP.

5. **Continue the installation by assigning IP addresses to the SP components.**

   See "Set Oracle ILOM Network Addresses" on page 150.

Related Information

- *Server Administration*, accessing the server
- "Dual-Redundant SPs" on page 143
- "SP Cables" on page 60
- "SP Network Addresses" on page 64
- Oracle ILOM documentation (`http://www.oracle.com/goto/ILOM/docs`)

▼ Set Oracle ILOM Network Addresses

The SPs do not support DHCP. You must assign static network addresses to the following components prior to powering on the server for the first time:

- SP0 – NET MGT port on SP0
- SP1 – NET MGT port on SP1
- Active_SP – Active SP. If the Active SP fails, the Standby SP is assigned this address.
- HOST0 – The IP address for PDomain0-SPP host. The server is configured as one PDomain, so only one host requires an address. If you reconfigure the server to have multiple PDomains, you must assign network addresses to these other hosts. Refer to the *Server Administration*, configuring the SP network, for instructions.

You must configure these network addresses before you can access the Oracle ILOM software over a network connection, either using the web interface or command line interface.

1. **Confirm that you are logged in to the Active SP.**

   See "Log In to the Active SP" on page 148.

2. **Set the gateway IP address for all SP addresses.**

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

3. **Set the netmask IP address for all SP addresses.**

```
-> 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.

4. **Assign the required IP addresses for the SP components.**
   - Active SP:

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

   - SP0:

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

   - SP1:

```
-> set /SP/network/SP1/ pendingipaddress=xxx.xxx.xxx.xxx
Set "pendingipaddress" to "xxx.xxx.xxx.xxx "
```

   - HOST0 (PDomain0-SPP):

```
-> set /SP/network/HOST0/ pendingipaddress=xxx.xxx.xxx.xxx
Set "pendingipaddress" to "xxx.xxx.xxx.xxx "
```

5. **Verify that you have set the network addresses correctly.**

   For brevity, this example shows only the output for the IP address property.

```
-> show /SP/network -level 2 -output table pendingipaddress pendingipnetmask
pendingipgateway
  /SP/network -level 2 -output table pendingipaddress pendingipnetmask
pendingipgateway
 Target               | Property               | Value
 ---------------------+------------------------+------------------
 /SP/network/         | pendingipaddress       | xxx.xxx.xxx.xxx
 ACTIVE_SP            |                        |
 /SP/network/HOST0    | pendingipaddress       | xxx.xxx.xxx.xxx
 /SP/network/HOST1    | pendingipaddress       | xxx.xxx.xxx.xxx
 /SP/network/HOST2    | pendingipaddress       | xxx.xxx.xxx.xxx
 /SP/network/HOST3    | pendingipaddress       | xxx.xxx.xxx.xxx
 /SP/network/SP0      | pendingipaddress       | xxx.xxx.xxx.xxx
 /SP/network/SP1      | pendingipaddress       | xxx.xxx.xxx.xxx
 . . . . . .
->
```

Note – After setting the IP addresses, you must type the `set /SP/network commitpending=true` command at the Oracle ILOM prompt before the new addresses to take affect.

6. **Display the IP addresses to confirm that they have been updated.**

```
-> show /SP/network -level 2 -output table ipaddress ipnetmask ipgateway
```

7. **Continue the installation by specifying the altitude of the server.**

   See "Set the Altitude of the Server" on page 153.

Related Information

- "Planning Network Addresses" on page 59
- Oracle ILOM documentation (`http://www.oracle.com/goto/ILOM/docs`)

▼ Set the Altitude of the Server

You must set the server altitude so that the server can adjust its fan speeds and monitor the surrounding environmental conditions required for its elevation.

Set the server altitude using the `SP system_altitude` property. This property is set to 200 meters by default.

Setting the `system_altitude` property causes the server to adjust the temperature thresholds so it can more accurately detect any abnormality in the air intake temperature. However, even if you do not set the system altitude, the server still detects and responds to any abnormality in the air temperature, such as the CMP temperature.

1. **Confirm that you are logged in to the Active SP.**

   See "Log In to the Active SP" on page 148.

2. **If you see the OpenBoot PROM (`ok`) prompt, type the `#.` key sequence to display the Oracle ILOM (`->`) prompt.**

```
ok #.
->
```

3. **Type the following command to set the server's altitude.**

```
-> set /SP system_altitude=altitude
```

   Replace *altitude* with the altitude of the data center in meters. The possible values are 0 to 3000 meters.

4. **Continue the installation by power on the server.**

   See "Power On the Server" on page 154.

Related Information

- "Log In to the Active SP" on page 148
- "Power On the Server" on page 154
- Oracle ILOM documentation (`http://www.oracle.com/goto/ILOM/docs`)

▼ Power On the Server

After configuring the network addresses for the SP components, power on the server for the first time at the Oracle ILOM prompt. This task requires two connections to the Active SP, one using a serial connection and another using a network connection.

1. **Confirm that you are logged in to the Active SP through a serial connection.**

   See "Log In to the Active SP" on page 148.

2. **If you see the OpenBoot PROM (`ok`) prompt, type the `#.` key sequence to display the Oracle ILOM (`->`) prompt.**

```
ok #.
->
```

3. **Using the serial connection, power on PDomain_0.**

```
-> start /Servers/PDomains/PDomain_0/HOST
Are you sure you want to start /Servers/PDomains/PDomain_0/HOST (y/n) y
```

4. **Log in to the Active SP as a root user through a network connection.**

```
$ ssh root@Active-SP-ip-address
```

   Replace *Active-SP-ip-address* with the Active SP IP address you set in "Set Oracle ILOM Network Addresses" on page 150. When prompted, type the default `changeme` root password to log in. Refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance*, configuring local user accounts, for more information.

5. **Using the network connection, connect to the PDomain_0 console to view the messages.**

```
-> start /Servers/PDomains/PDomain_0/HOST/console
Are you sure you want to start /Servers/PDomains/PDomain_0/HOST/console (y/n) y
```

   After connecting to the PDomain_0 console, the Oracle ILOM (`->`) prompt will not display.

   The PDomain0 initialization can take over 30 minutes to complete.

6. **(Optional) To display the status of the PDomain_0 initialization, type the following command.**

```
-> show /Servers/PDomains/PDomain_0/HOST status
```

You can type this command at regular intervals (for example, every 10 minutes) to check the status of the PDomain_0 initialization.

7. **When prompted, follow the onscreen instructions to configure the Oracle Solaris OS on PDomain_0.**

You will be prompted to confirm the configuration several times, enabling confirmation and changes. If you are not sure how to respond to a particular value, you can accept the default, and make future changes when the Oracle Solaris OS is running.

See "Oracle Solaris OS Configuration Parameters" on page 156, and refer to the *Installing Oracle Solaris 11.1 Systems* document for more information:

http://docs.oracle.com/cd/E26502_01/html/E28980

8. **After configuring the Oracle Solaris OS on PDomain0, explore other Oracle Solaris OS and Oracle ILOM features.**

See "Additional Software Configuration and Testing" on page 157.

Related Information

- "Oracle Solaris OS Configuration Parameters" on page 156
- *Server Administration*, controlling the server, domains, and devices
- Oracle ILOM documentation (http://www.oracle.com/goto/ILOM/docs)
- Oracle Solaris 11 OS documentation (http://www.oracle.com/goto/Solaris11/docs)

Oracle Solaris OS Configuration Parameters

When configuring the Oracle Solaris OS, you will be prompted for the following configuration parameters. For more information about these settings, refer to the Oracle Solaris documentation.

Parameter	Description
Language	Select a number from the displayed languages list.
Locale	Select a number from the displayed locale list.
Terminal Type	Select a terminal type that corresponds with your terminal device.
Network?	Select Yes.
Multiple Network Interfaces	Select the network interfaces that you plan to configure. If you are not sure, select the first one in the list.
DHCP?	Select Yes or No according to your network environment.
Host Name	Type the host name for the server.
IP Address	Type the IP address for this Ethernet interface.
Subnet?	Select Yes or No according to your network environment.
Subnet Netmask	If your answer to Subnet? was Yes, type the netmask for the subnet for your network environment.
IPv6?	Specify whether or not to use IPv6. If you are not sure, select No to configure the Ethernet interface for IPv4.
Security Policy	Select either standard UNIX security (no) or Kerberos Security (Yes). If you are not sure, select No.
Confirm	When prompted, review the onscreen information and change it if needed. Otherwise, continue.
Name Service	Select the name service according to your network environment. **Note -** If you select a name service other than None, you will be prompted for additional name service configuration information.
NFSv4 Domain Name	Select the type of domain name configuration according to your environment. If you are not sure, select `Use the NFSv4 domain derived by the system`.
Time Zone (Continent)	Select your continent.
Time Zone (Country or Region)	Select your country or region.

Parameter	Description
Time Zone	Select the time zone.
Date and Time	Accept the default date and time, or change the values.
`root` Password	Type the `root` password twice. This password is for the superuser account for the Oracle Solaris OS on this server. This password is not the SP password.

Related Information

- "Power On the Server" on page 154
- Oracle Solaris 11 OS documentation (http://www.oracle.com/goto/Solaris11/docs)

Additional Software Configuration and Testing

Refer to the following links for optional software testing, configuration, and administration tasks you can perform after powering on the server.

Task	Documentation Links
Verify the server hardware using the preinstalled Oracle VTS software. The Oracle VTS diagnostic tests verify the functionality of the hardware controllers and devices on the server. Performing a default run of the Oracle VTS software in exerciser mode will verify the server functionality. Refer to the Oracle VTS documentation for more information.	Oracle VTS documentation: http://www.oracle.com/goto/VTS/docs
Configure the Oracle ILOM software to: • Create and manage PDomains • Assign and manage Oracle ILOM users • Redirect KVMS devices • Power on and off the entire server or specific PDomains	*Server Administration* Oracle ILOM documentation: http://www.oracle.com/goto/ILOM/docs
Update the system firmware	*Server Administration*, updating the firmware

Task	Documentation Links
Explore and configure the Oracle Solaris 11.1 OS.	Oracle Solaris 11.1 OS documentation: http://www.oracle.com/goto/Solaris11/docs Refer to the preceding Oracle Solaris documentation link for information about specific topics like: • Oracle Solaris Release notes • Installation • Common administration tasks • Updating software • Security • Oracle Solaris Zones
Create and manage logical domains (virtual servers) using the Oracle VM Server for SPARC software. You can run a variety of applications in different logical domains and keep them separate for performance and security purposes.	Oracle VM Server for SPARC documentation: http://www.oracle.com/goto/VM-SPARC/docs
Use the Oracle Enterprise Manager Ops Center software to monitor, patch, provision, virtualize, and support operating systems, virtualization technologies, Oracle servers, storage, and networks from a single user interface.	Oracle Enterprise Manager Ops Center documentation: http://www.oracle.com/technetwork/documentation/index.html#em

Related Information

- "Planning Network Addresses" on page 59
- "Installed Software" on page 142
- "Power On the Server" on page 154
- "Oracle Solaris OS Configuration Parameters" on page 156

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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