

# SPARC T5-2 Server Installation Guide

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## Using This Documentation

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- **Overview** – Provides specifications and describes how to install and power on the SPARC T5-2 server from Oracle.
- **Audience** – Technicians, system administrators, and authorized service providers.
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware.

## Product Documentation Library

Documentation and resources for this product and related products are available at <http://www.oracle.com/goto/t5-2/docs>.

## Feedback

Provide feedback about this documentation at <http://www.oracle.com/goto/docfeedback>.



# Understanding the Server

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

- [“Installation Task Overview” on page 9](#)
- [“Server Overview” on page 10](#)
- [“Front Panel Components \(Installation\)” on page 12](#)
- [“Rear Panel Components \(Installation\)” on page 13](#)

## Related Information

- [“Installing the Server” on page 25](#)
- [“Connecting the Server Cables” on page 43](#)
- [“Powering On the Server for the First Time” on page 57](#)

## Installation Task Overview

These are the tasks you will perform to install and configure the server.

Step	Description	Links
1.	Review the <i>SPARC T5-2 Server Product Notes</i> for any late-breaking news about the server.	<a href="#">SPARC T5-2 Server Product Notes</a>
2.	Review the server features, specifications, and site requirements.	<a href="#">“Server Overview” on page 10</a> <a href="#">“Confirming Specifications” on page 15</a>
3.	Confirm that you received all of the items you ordered.	<a href="#">“Shipping Kit” on page 21</a>
4.	Learn the server features, controls, and LEDs required for installation.	<a href="#">“Front Panel Components (Installation)” on page 12</a> <a href="#">“Rear Panel Components (Installation)” on page 13</a>
5.	Take safety and ESD precautions and assemble the required tools.	<a href="#">“Handling Precautions” on page 22</a> <a href="#">“ESD Precautions” on page 23</a>

Step	Description	Links
6.	Install any optional components into the server.	<a href="#">“Tools Needed for Installation” on page 23</a>
7.	Install the server into a rack.	<a href="#">“Optional Components” on page 25</a>
8.	Attach data and management cables to the server.	<a href="#">“Installing the Server” on page 25</a>
9.	Attach data and management cables to the server.	<a href="#">“Connecting the Server Cables” on page 43</a>
9.	Connect the power cords to the server, configure the Oracle ILOM on the SP, power on the server for the first time, and set up the operating system.	<a href="#">“Powering On the Server for the First Time” on page 57</a>

### Related Information

- *SPARC T5-2 Server Product Notes*
- *SPARC T5-2 Server Safety and Compliance Guide*
- *Server Administration*
- *Server Service*

## Server Overview

This topic provides a high-level introduction to the main components and capabilities of the server.



**TABLE 1** 1-Processor Server

Component	Description
Chassis	Rack-mountable server.
CPU	One processor installed on the motherboard assembly.
Memory	Four memory riser modules are supported: <ul style="list-style-type: none"> <li>■ Each riser module supports 4 DIMMs for a total of 16 DIMMs.</li> <li>■ A server using four riser modules fully populated with 32-GB DIMMs supports a maximum of 512 GB of system memory.</li> </ul>
I/O expansion	Eight PCIe Gen3 slots. All slots support x8 PCIe cards.
Storage devices	For internal storage, the server provides: <ul style="list-style-type: none"> <li>■ Six 2.5-inch drive bays, accessible through the front panel.</li> <li>■ A slot-loading DVD+/-RW drive on the front of the server, below the drive bays.</li> </ul>
USB ports	<ul style="list-style-type: none"> <li>■ Two external USB 3.0 ports (rear panel).</li> <li>■ Two external USB 2.0 ports (front panel).</li> <li>■ One internal USB 2.0 port (on the motherboard).</li> </ul>
Video ports	Two HD-15 video ports (1 front, 1 rear)
Ethernet ports	Four 10GbE 100/1000/10000 Mbps, RJ-45-based ports on the rear panel.
Power supplies	Two hot-swappable AC 2060W (N+1).
Cooling fans	Six hot-swappable, redundant fans at chassis front (top-loading). Redundant fans in each power supply.
SP	Oracle Integrated Lights Out Manager (Oracle ILOM).

**TABLE 2** 2-Processor Server

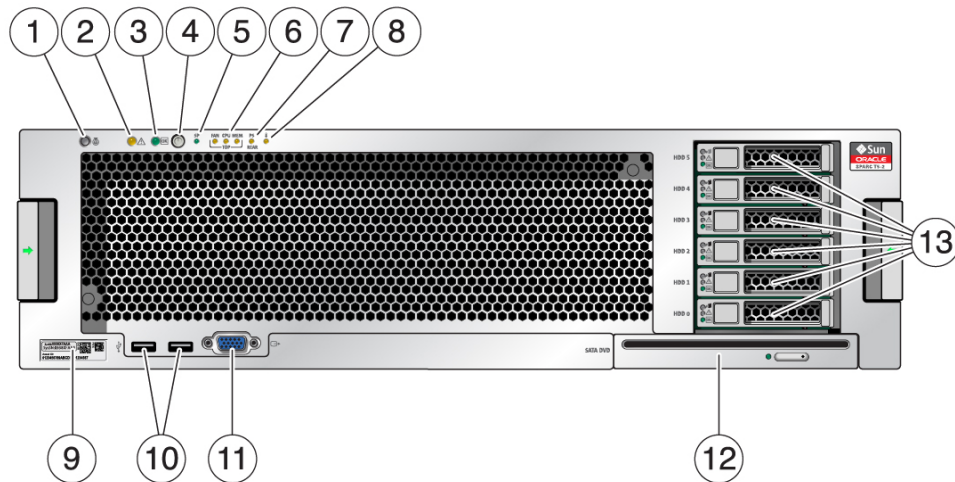
Component	Description
Chassis	Rack-mountable server.
CPU	Two processors installed on the motherboard assembly.
Memory	Eight memory riser modules are supported. <ul style="list-style-type: none"> <li>■ Each riser module supports 4 DIMMs for a total of 16 DIMMs per processor.</li> <li>■ A server using eight riser modules fully populated with 32-GB DIMMs supports a maximum of 1 TB of system memory.</li> </ul>
I/O expansion	Eight PCIe Gen3 slots. All slots support x8 PCIe cards.
Storage devices	For internal storage, the server provides: <ul style="list-style-type: none"> <li>■ Six 2.5-inch drive bays, accessible through the front panel.</li> <li>■ A slot-loading DVD+/-RW drive on the front of the server, below the drive bays.</li> </ul>
USB ports	<ul style="list-style-type: none"> <li>■ Two external USB 3.0 ports (rear panel).</li> <li>■ Two external USB 2.0 ports (front panel).</li> <li>■ One internal USB 2.0 port (on the motherboard).</li> </ul>
Video ports	Two HD-15 video ports (1 front, 1 rear).
Ethernet ports	Four 10GbE 100/1000/10000 Mbps, RJ-45-based ports on rear panel.
Power supplies	Two hot-swappable AC 2060W (N+1).

Component	Description
Cooling fans	Six hot-swappable, redundant fans at chassis front (top-loading). Redundant fans in each power supply.
SP	Oracle Integrated Lights Out Manager (Oracle ILOM).

### Related Information

- *Server Service*
- Oracle ILOM documentation
- [“Front Panel Components \(Installation\)” on page 12](#)
- [“Rear Panel Components \(Installation\)” on page 13](#)

## Front Panel Components (Installation)



No.	Description	No.	Description
1	Locator LED/Locator button: white	8	Overtemperature LED: amber
2	Service Required LED: amber	9	Serial number
3	Main Power/OK LED: green	10	USB 2.0 connectors (2)
4	Power button	11	HD-15 video connector
5	SP OK/Fault LED: green/amber	12	SATA DVD drive
6	Service Required LEDs (3) for Fan Module (FAN), Processor (CPU) and Memory: amber	13	Drive 0-5 (bottom to top)

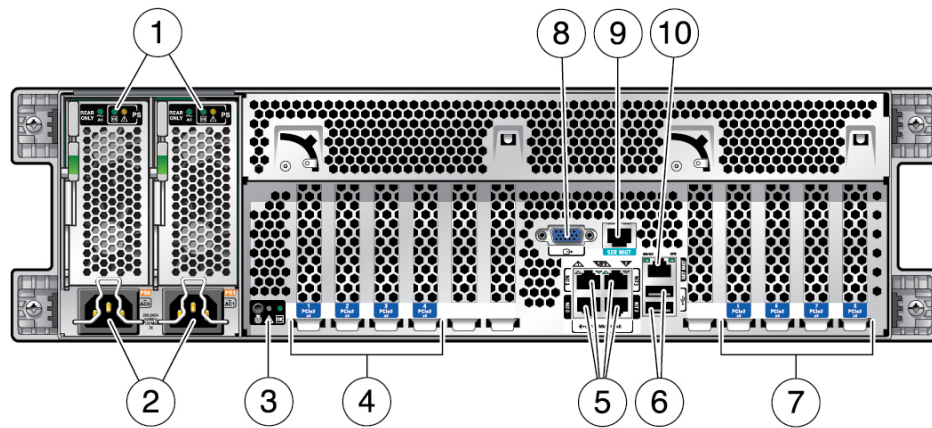
No.	Description	No.	Description
7	Power Supply (PS) Fault (Service Required) LED: amber		

### Related Information

- [“Server Overview” on page 10](#)
- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“Cabling Requirements” on page 43](#)

## Rear Panel Components (Installation)

**Note** - You must follow the proper sequence when connecting cables to the server. Do not connect the power cords until all data cables have been connected.



No.	Description	No.	Description
1	Power supply unit 0 and 1 (from left to right) status indicator LEDs: <ul style="list-style-type: none"> <li>■ Service Required: amber</li> <li>■ AC OK: green or amber</li> </ul>	6	USB 3.0 connectors (2)
2	Power supply unit 0 and 1 (from left to right) AC inlet	7	PCIe slots 5–8
3	System status LEDs: <ul style="list-style-type: none"> <li>■ Power/OK: green</li> </ul>	8	HD-15 video connector

No.	Description	No.	Description
	■ Attention: amber		
	■ Locator LED/Locator button: white		
4	PCIe slots 1–4	9	SP SER MGT RJ-45 serial port
5	10GbE Network 100/1000/10000 Mbps ports: NET 0 to NET 3	10	SP NET MGT RJ-45 network port

### Related Information

- [“Front Panel Components \(Installation\)” on page 12](#)
- [“Cabling Requirements” on page 43](#)
- [“Install the CMA” on page 37](#)
- [“Secure Cables to the CMA” on page 55](#)

## Confirming Specifications

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These topics provide the technical information and airflow precautions you need to install the server.

- [“Physical Specifications” on page 15](#)
- [“Electrical Specifications” on page 16](#)
- [“Environmental Specifications” on page 18](#)
- [“Airflow Precautions” on page 19](#)

### Related Information

- [“Server Overview” on page 10](#)
- [“Shipping Kit” on page 21](#)
- [“Identifying Ports” on page 44](#)

## Physical Specifications

**TABLE 3** 1-Processor Server

Description	Metric	U.S.
Rack units	3U	3U
Height	129.8 mm	5.11 in.
Width	436.5 mm	17.185 in.
Depth	732 mm	28.82 in.
Weight (without rackmount kit)	32.88 kg	76.6 lb
Minimum service clearance (front)	914.4 mm	36 in.
Minimum service clearance (rear)	914.4 mm	36 in.
Minimum airflow clearance (front)	50.8 mm	2 in
Minimum airflow clearance (rear)	76.2 mm	3 in

**TABLE 4** 2-Processor Server

Description	Metric	U.S.
Rack units	3U	3U
Height	129.8 mm	5.11 in.
Width	436.5 mm	17.185 in.
Depth	732 mm	28.82 in.
Weight (without rackmount kit)	36.28 kg	80 lb
Minimum service clearance (front)	914.4 mm	36 in.
Minimum service clearance (rear)	914.4 mm	36 in.
Minimum airflow clearance (front)	50.8 mm	2 in.
Minimum airflow clearance (rear)	76.2 mm	3 in.

**Related Information**

- [“Server Overview” on page 10](#)
- [“Handling Precautions” on page 22](#)
- [“Installing the Server” on page 25](#)
- [“Electrical Specifications” on page 16](#)
- [“Environmental Specifications” on page 18](#)
- [“Airflow Precautions” on page 19](#)

## Electrical Specifications

**TABLE 5** 1-Processor Server

Description	Value	Notes
Voltage	200 to 240VAC	
Frequency	50 to 60 Hz	
Maximum operating input current at 200 VAC (all inputs) <sup>†</sup>	4.7A	
Maximum operating input power at 200 VAC	898.7W	
Maximum standby power	36W	
Idle input power (maximum configuration) <sup>‡</sup>	673W	
Idle input power (minimum configuration) <sup>*</sup>	470.4W	
Peak AC power (maximum configuration) <sup>‡</sup>	898.7W	Conforms to SpecJBB.
Peak AC power (minimum configuration) <sup>*</sup>	635.4W	Conforms to SpecJBB.
Maximum heat dissipation	3066.4 BTU/hr	

Description	Value	Notes
	3235.2 KJ/hr	

†The maximum operating input current values are based on  $P / (V * 0.90)$ , where P = max. operating input power, V= input voltage. Example:  $620W / (120 * 0.90) = 6.89A$  You can use this equation to calculate your maximum operating current at your input voltage.

‡Maximum server configuration specification under nominal temperature and voltage conditions (one 3.6-GHz T5 processor with sixteen 32-GB DDR3 DIMMs, 6 HDDs, and 8 I/O cards).

\*Minimum server configuration specification under nominal temperature and voltage conditions (one 3.6-GHz T5 processor with sixteen 8-GB DDR3 DIMMs, no HDD, and no I/O cards).

**TABLE 6** 2-Processor Server

Description	Value	Notes
Voltage	200 to 240VAC	
Frequency	50 to 60 Hz	
Maximum operating input current at 200 VAC (all inputs)†	9.8A	
Maximum operating input power at 200 VAC	1927W	
Maximum standby power	36W	
Idle input power (maximum configuration)‡	849W	
Idle input power (minimum configuration)*	522W	
Peak AC power (maximum configuration)‡	1941W	Conforms to SpecJBB.
Peak AC power (minimum configuration)*	1618W	Conforms to SpecJBB.
Maximum heat dissipation	6623 BTU/hr 6988 KJ/hr	

†The maximum operating input current values are based on  $P / (V * 0.90)$ , where P = max. operating input power, V= input voltage. Example:  $620W / (120 * 0.90) = 6.89A$  You can use this equation to calculate your maximum operating current at your input voltage.

‡Maximum server configuration specification under nominal temperature and voltage conditions (two 3.6-GHz T5 processors with thirty-two 32-GB DDR3 DIMMs, 6 HDDs, and 8 I/O cards).

\*Minimum server configuration specification under nominal temperature and voltage conditions (two 3.6-GHz T5 processors with thirty-two 8-GB DDR3 DIMMs, no HDD, and no I/O cards).

For information on power specifications, use the power calculator at:

<http://www.oracle.com/us/products/servers-storage/sun-power-calculators>

## Related Information

- “Powering On the Server for the First Time” on page 57
- “Physical Specifications” on page 15
- “Environmental Specifications” on page 18
- “Airflow Precautions” on page 19

## Environmental Specifications

This topic includes these specifications that apply to both server configurations:

- Temperature, humidity, and elevation
- Shock and vibration
- Acoustic

**TABLE 7** Temperature, Humidity, and Elevation Specifications

Description	Operating		Nonoperating		Notes
	U.S.	Metric	U.S.	Metric	
<b>Temperature</b> (maximum)	41 to 95°F at 0 to 3000 ft	5 to 35°C at 900m	-40 to 149°F at 0 to 3000 ft	-40 to 65°C at 900m	Decrease in maximum temperature: above 3000 ft. (900m), 1.8°F/1000 ft (1°C/300m)
<b>Relative humidity</b>	10 to 90% at 81°F	10 to 90% at 27°C	Up to 93% at 100°F	Up to 93% at 38°C	Maximum wet bulb noncondensing
<b>Altitude</b>	0 to 9840 ft at 95°F <sup>†</sup>	0 m to 3000m at 40°C <sup>†</sup>	Up to 39,370 ft	Up to 12,000m	

<sup>†</sup>Except in China markets where regulations might limit installations to a maximum altitude of 2km.

**TABLE 8** Shock and Vibration Specifications

Description	Operating	Notes
Shock	3G, 11 ms	Half-sine
Vibration (vertical)	0.15G	5 to 500 HZ swept-sine
Vibration (horizontal)	0.10G	

**TABLE 9** Acoustic Specifications

Description	Min Fan Speed LwAd	Max Fan Speed LpAm
Sound Power Level - LwAd (1 B=10 dB)	7.7 B	8.9 B
Sound Pressure Level - LpAm (energy average of four bystander positions)	67.8 dBA	80.4 dBA

### Related Information

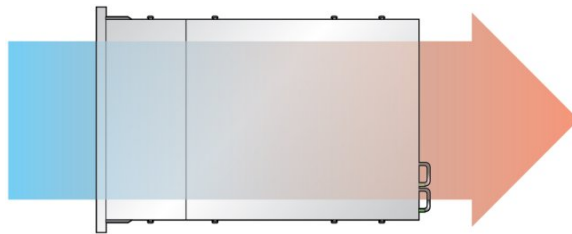
- [SPARC T5-2 Server Safety and Compliance Guide](#)
- [“Physical Specifications” on page 15](#)
- [“Electrical Specifications” on page 16](#)
- [“Environmental Specifications” on page 18](#)
- [“Airflow Precautions” on page 19](#)

## Airflow Precautions



**Caution** - Proper airflow is essential for keeping the server's internal temperatures within a safe operating range.

Air flows from the front to the rear of the server.



Follow these guidelines to ensure unrestricted airflow in the server:

- Adhere to the minimum airflow clearance specifications. See [“Physical Specifications” on page 15](#).
- Install the server so the front faces the cool aisle and the rear faces the warm aisle.
- Do not direct warm air into the server.
- Prevent recirculation of air within a rack or cabinet.
- When servicing server internal components, ensure that air ducts, baffles, and filler panels are properly installed.
- Route cables so they do not interfere with airflow.

### Related Information

- [“Rack Cautions” on page 27](#)
- [“Physical Specifications” on page 15](#)
- [“Electrical Specifications” on page 16](#)
- [“Environmental Specifications” on page 18](#)



# Preparing for Installation

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

Step	Description	Links
1.	Confirm that you received all the items you ordered.	<a href="#">“Shipping Kit” on page 21</a>
2.	Review safety and ESD precautions	<a href="#">“Handling Precautions” on page 22</a> <a href="#">“ESD Precautions” on page 23</a>
3.	Verify that you have the correct tools.	<a href="#">“Tools Needed for Installation” on page 23</a>

## Related Information

- [“Installing the Server” on page 25](#)
- [“Connecting the Server Cables” on page 43](#)
- [“Powering On the Server for the First Time” on page 57](#)

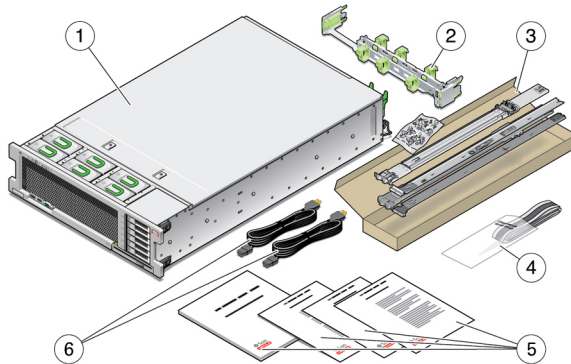
## Shipping Kit

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**Note** - When you receive your server, place it in the environment where you will install it. Leave it in its shipping crate at its final destination for 24 hours. This resting period prevents thermal shock and condensation.

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Verify that you have received all of the components that ship with your server.



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No.	Description
1.	Server
2.	Cable management assembly
3.	Rackmount kit
4.	Antistatic wrist strap
5.	Printed documents
6.	2 AC power cords

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**Note** - The shipping kit might also contain PCIe slot fillers that were removed from the server when PCIe cards were installed in the factory. Save these fillers and use them to cover PCIe slots when cards are removed from the server.

---

### Related Information

- [“Server Overview” on page 10](#)
- [“Preparing for Installation” on page 21](#)

## Handling Precautions



---

**Caution** - Deploy the anti-tilt bar on the equipment rack before beginning an installation.

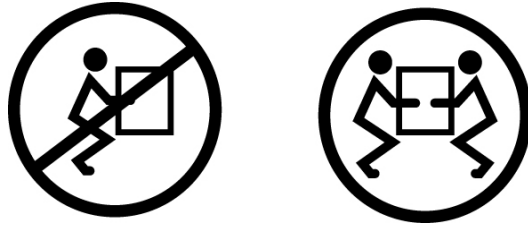
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---

**Caution** - The server weighs approximately 80 lb (36.28 kg) with two processors or 76.6 lb (32.88 kg) with one processor. Two people are required to lift and mount this 3U server into a rack enclosure when using the procedures in this document.

---



---

**Caution** - When completing a two-person procedure, always communicate your intentions clearly before, during, and after each step to minimize confusion.

---

#### Related Information

- [“Physical Specifications” on page 15](#)
- [“Installing the Server” on page 25](#)
- *SPARC T5-2 Server Getting Started Guide*

## 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 damage when you install or service the servers.



---

**Caution** - To protect electronic components from electrostatic damage, 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.

---

#### Related Information

- [“Handling Precautions” on page 22](#)

## Tools Needed for Installation

- No. 2 Phillips screwdriver
- ESD mat and grounding strap

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

- ASCII terminal
- Workstation
- Terminal server
- Patch panel connected to a terminal server

### **Related Information**

- [“Handling Precautions” on page 22](#)
- [“ESD Precautions” on page 23](#)
- *Server Service*

# Installing the Server

---

These topics describe how to install the server into a rack using the rail assembly in the rackmount kit. Perform these procedures if you purchased the rail assembly.

---

**Note** - In this guide, the term rack means either an open rack or a closed cabinet.

---

Step	Description	Links
1.	Install optional components.	<a href="#">“Optional Components” on page 25</a>
2.	Ensure that your rack is compatible with the server requirements.	<a href="#">“Rack Compatibility” on page 26</a>
3.	Review the cautions for working with racks.	<a href="#">“Rack Cautions” on page 27</a>
4.	Use anti-tilt mechanisms to ensure that the rack does not tip when the server is installed.	<a href="#">“Stabilize the Rack” on page 28</a>
5.	Prepare the slide rails, mounting brackets, and slide rail assemblies for server installation.	<a href="#">“Disassemble Slide Rails” on page 29</a> <a href="#">“Install the Rackmount Hardware” on page 30</a> <a href="#">“Attach Slide Rail Assemblies to the Rack” on page 32</a>
6.	Install the server in the rack.	<a href="#">“Install the Server” on page 35</a>
7.	(Optional) Install the CMA.	<a href="#">“Install the CMA” on page 37</a>
8.	Review cabling requirements and port information. Attach data and management cables to the server.	<a href="#">“Connecting the Server Cables” on page 43</a>
9.	Prepare to power on the server for the first time.	<a href="#">“Powering On the Server for the First Time” on page 57</a>

## Related Information

- [“Preparing for Installation” on page 21](#)
- [“Connecting the Server Cables” on page 43](#)

## Optional Components

Optional components, such as additional memory or PCIe cards that were ordered as part of the system, are installed in the server at the factory before the server is shipped. Any options not

ordered with the system are shipped separately. If possible, install these components prior to installing the server in a rack.

Except for the rackmount kits, if you ordered any options that are not factory-installed, refer to the service manual for the server and the component's documentation for installation instructions.

---

**Note** - The list of optional components can be updated without notice. Refer to the product web pages for the most current list of components supported in the server.

---

### Related Information

- Optional component documentation
- *Server Service*

## Rack Compatibility

Check that your rack is compatible with the slide rail and cable management assembly options. The optional slide rails are compatible with a wide range of equipment racks that meet the following standards.

Item	Requirement
Structure	Four-post rack (mounting at both front and rear). Two-post racks are not compatible.
Rack horizontal opening and unit vertical pitch	Conforms to ANSI/EIA 310-D-1992 or IEC 60927 standards.
Rack rail mounting hole sizes	Only 9.5-mm square hole and M6 round mounting holes are supported. All other sizes, including 7.2-mm, M5, or 10-32 mounting holes, are <i>not</i> supported.
Distance between front and rear mounting planes	Minimum: 24.5 in. (622 mm) Maximum: 35.25 in. (895 mm)
Clearance depth in front of front mounting plane	Distance to front cabinet door is at least 1.06 in. (27 mm).
Clearance depth behind front mounting plane	Distance to rear cabinet door is at least 35.5 in. (900 mm) with the CMA, or 30.4 in. (770 mm) without the cable management assembly.
Clearance width between front and rear mounting planes	Distance between structural supports and cable troughs is at least 18 in. (456 mm).
Server dimensions	Depth: 28.82 in. (732 mm) Width: 17.185 in. (436.5 mm)

Item	Requirement
	Height: 5.11 in. (129.8 mm)

### Related Information

- [“Physical Specifications” on page 15](#)
- [“Handling Precautions” on page 22](#)
- [“Rack Cautions” on page 27](#)

## Rack Cautions



**Caution - Equipment Loading:** Always load equipment into a rack from the bottom up so that the rack does not become top-heavy and tip over. Deploy the rack's anti-tilt bar to prevent the rack from tipping during equipment installation.



**Caution - Elevated Operating Ambient Temperature:** If the server is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment might be greater than room ambient temperature. Therefore, install the equipment only in an environment compatible with the maximum ambient temperature (T<sub>ma</sub>) specified for the server.



**Caution - Reduced Air Flow:** Install the equipment in a rack so that the amount of air flow is adequate for the safe operation of the equipment.



**Caution - Mechanical Loading:** Mount the equipment in the rack so that the weight is distributed evenly. A hazardous condition can exist with uneven mechanical loading.



**Caution - Circuit Overloading:** Do not overload the power supply circuits. Before connecting the server to the supply circuit, review the equipment nameplate power ratings and consider the effect that circuit overloading might have on overcurrent protection and supply wiring.



**Caution - Reliable Grounding:** Maintain reliable grounding of rackmounted equipment. Give particular attention to supply connections other than direct connections to the branch circuit (for example, use of power strips).



**Caution -** Do not use slide rail mounted equipment as a shelf or a work space.



---

**Caution** - The server weighs approximately 80 lb (36.28 kg) with two processors and 76.6 lb (32.88 kg) with one processor. Two people are required to lift and mount this 3U server into a rack enclosure when using the procedures in this document.

---



#### Related Information

- [“Physical Specifications” on page 15](#)
- [“Handling Precautions” on page 22](#)
- [“Stabilize the Rack” on page 28](#)

## ▼ Stabilize the Rack



---

**Caution** - To reduce the risk of personal injury, stabilize the rack by extending all anti-tilt devices before installing the server.

---

Refer to the rack documentation for detailed instructions for the following steps.

1. **Read the rack cautions and stabilize the rack.**  
See [“Rack Cautions” on page 27](#).
2. **Open and remove the front and rear doors from the rack.**
3. **To prevent the rack cabinet from tipping during the installation, stabilize the cabinet using all antitilt mechanisms provided.**
4. **If there are leveling feet beneath the rack to prevent it from rolling, extend these leveling feet fully downward to the floor.**

#### Related Information

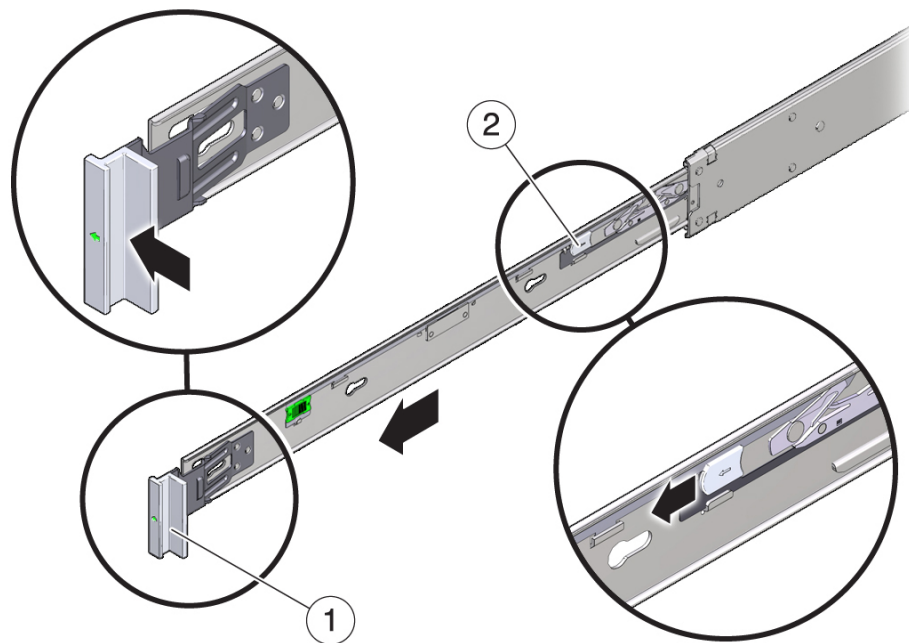
- Rack documentation
- *SPARC T5-2 Server Safety and Compliance Guide*

- [“Rack Compatibility” on page 26](#)
- [“Rack Cautions” on page 27](#)

## ▼ Disassemble Slide Rails

Complete the following task to remove the mounting brackets from the slide rail assemblies before installation.

1. **Unpack the slide rails.**
2. **Locate the slide rail lock at the front of one of the slide rail assemblies.**



No.	Description
1	Slide rail lock
2	Mounting bracket release button

3. **Press and hold the slide rail lock toward the direction of the arrow while you pull the mounting bracket out of the slide rail assembly until it reaches the stop.**

4. **Push the mounting bracket release button toward the front of the mounting bracket, and simultaneously withdraw the mounting bracket from the slide rail assembly.**
5. **Repeat for the remaining slide rail assembly.**

#### **Related Information**

- [“Install the Rackmount Hardware” on page 30](#)
- [“Attach Slide Rail Assemblies to the Rack” on page 32](#)
- [“Install the Server” on page 35](#)

## **▼ Install the Rackmount Hardware**

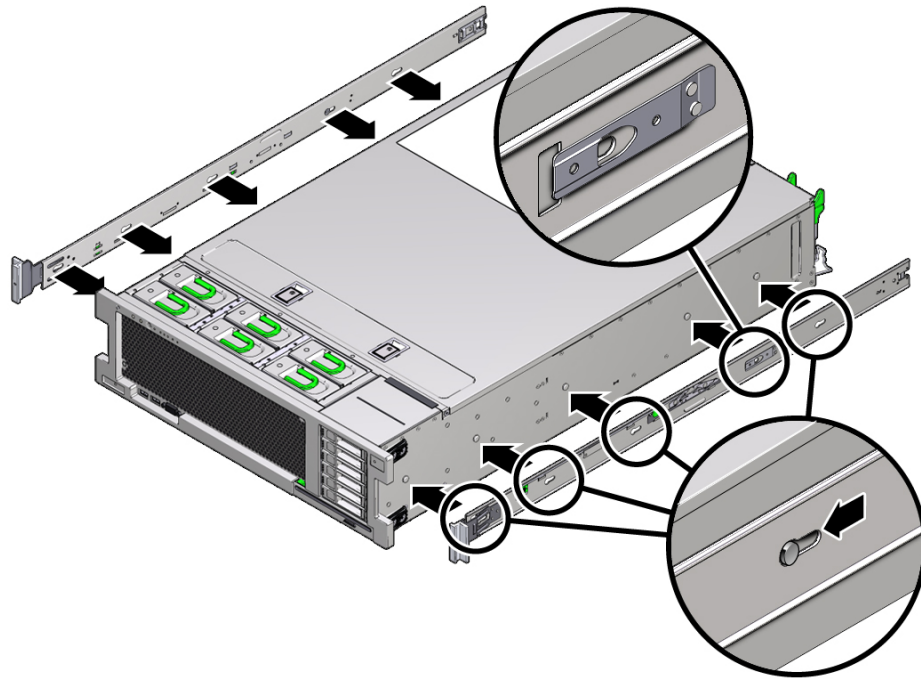
This procedure describes how to attach the mounting brackets to the server so you can rackmount the server.

1. **Position a mounting bracket against the chassis so that the slide rail lock is at the server front, and the five keyhole openings on the mounting bracket are aligned with the five locating pins on the side of the chassis.**

---

**Note** - The mounting brackets are identical and can be installed on either side of the chassis.

---



2. With the heads of the five chassis locating pins protruding through the five keyhole openings in the mounting bracket, pull the mounting bracket toward the front of the chassis until the mounting bracket clip locks into place with an audible click.
3. Verify that the rear locating pin has engaged the mounting bracket clip.
4. Repeat to install the remaining mounting bracket on the other side of the server.

### Related Information

- [“Disassemble Slide Rails” on page 29](#)
- [“Attach Slide Rail Assemblies to the Rack” on page 32](#)
- [“Install the Server” on page 35](#)

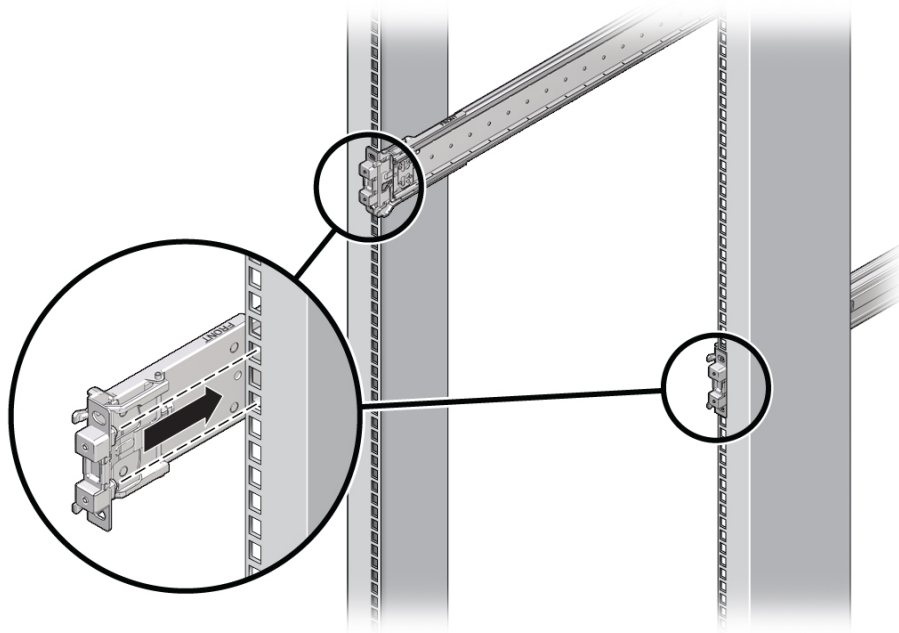
## ▼ Attach Slide Rail Assemblies to the Rack

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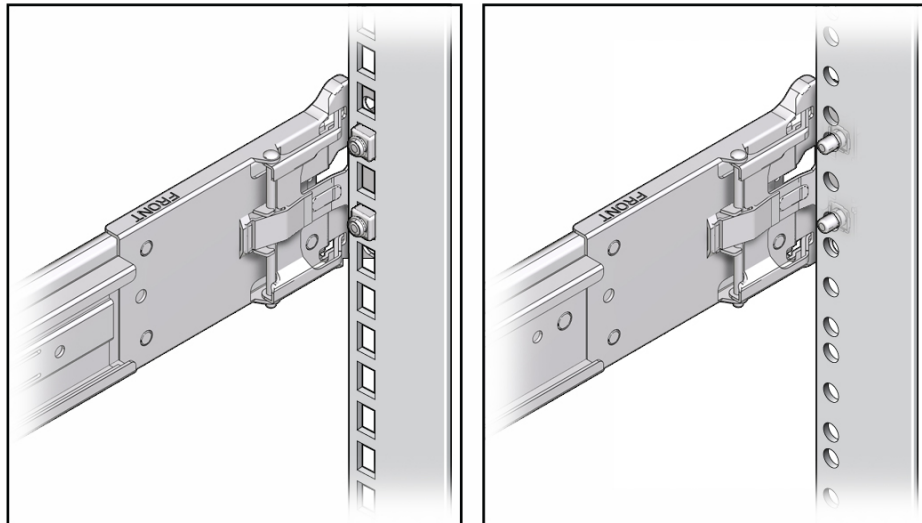
**Note** - The slide rail assemblies support only racks with 9.5-mm square holes and M6 round holes. All other racks, including those racks with 7.2-mm, M5, or 10-32 mounting holes, are *not* supported. Refer to the documentation for your rack for information about the size of its rail holes.

---

1. **(Optional) If you must move the rack with the server installed, secure the slide rail assemblies to the rack with mounting screws and cage nuts.**  
Insert the cage nuts prior to performing the next steps. Refer to the *Rail Rackmount Kit Overview and Information* card for instructions on inserting these cage nuts. This card is included with the rack kit.
2. **Position a slide rail assembly in your rack so that the slide rail assembly front bracket is on the outside of the front rack post and the slide rail assembly rear bracket is on the inside of the rear rack post.**
3. **Align the slide rail assembly mounting pins with the front and rear rack post mounting holes, and then lock the assembly into place by pushing the assembly toward the rear of the rack until the mounting pins engage the rack.**  
You will hear an audible click when the mounting pins engage the rack.

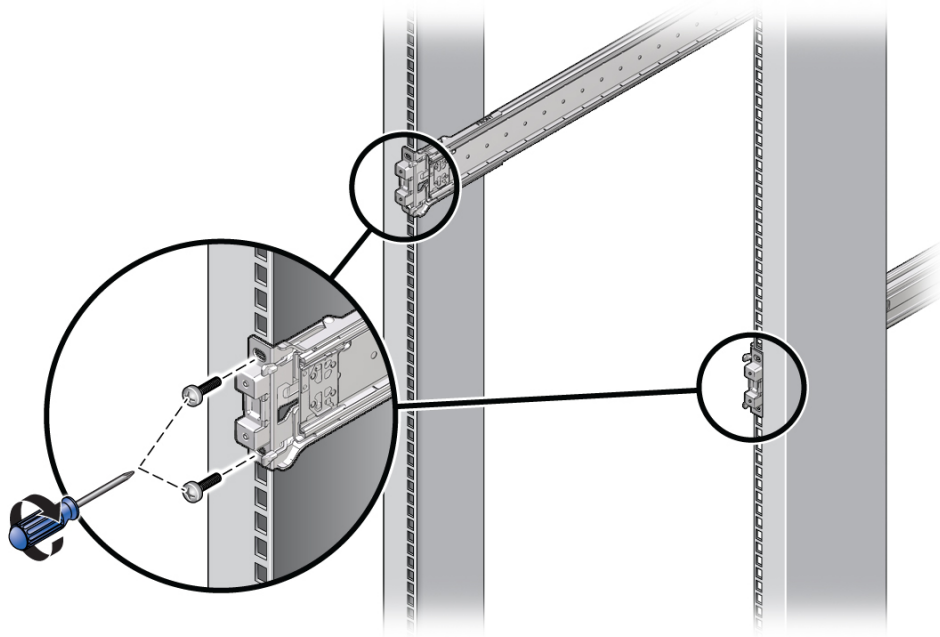


The slide assembly mounting pins accommodate either 9.5 mm square mounting holes or M6 round mounting holes. No other mounting hole sizes are supported.



4. **(Optional)** If you chose to secure the slide rail assembly to the rack with screws, insert the M6 mounting screws through both front and rear slide rail brackets

and rack posts, and then secure the screws to the rack posts with the caged nuts.



5. Repeat [Step 2](#) through [Step 4](#) for the remaining slide rail assembly.



**Caution** - If your rack does not have an anti-tip device, the rack could tip over when installing the server.

---

6. **If available, extend the anti-tip legs or anti-tilt bar at the bottom of the rack.**  
Refer to the documentation for the rack for instructions. For more information, see [“Stabilize the Rack”](#) on page 28.

### Related Information

- [“Rack Compatibility”](#) on page 26
- [“Disassemble Slide Rails”](#) on page 29
- [“Install the Rackmount Hardware”](#) on page 30
- [“Install the Server”](#) on page 35

## ▼ Install the Server

Use this procedure to install the server chassis, with mounting brackets, into the slide rail assemblies that are mounted to the rack.

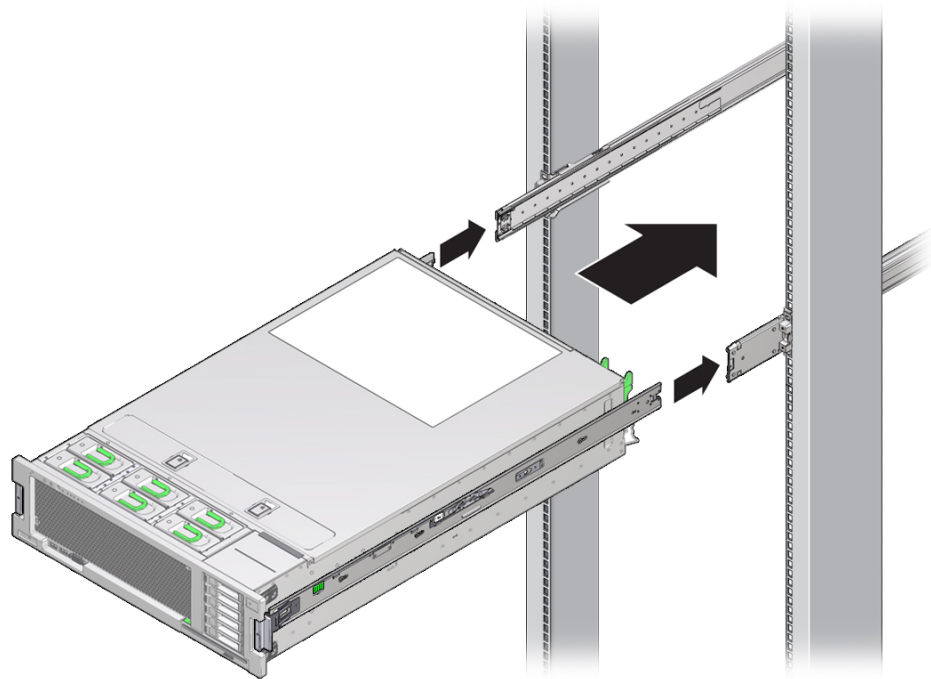


**Caution** - This procedure requires a minimum of two people because of the weight of the server. Attempting this procedure alone could result in equipment damage or personal injury.



**Caution** - Always load equipment into a rack from the bottom up so that the rack will not become top-heavy and tip over. Extend the rack's anti-tip bar or anti-tilt legs to prevent the rack from tipping during equipment installation. See [“Stabilize the Rack” on page 28](#) for more information.

1. **Push the slide rails into the slide rail assemblies in the rack as far as possible.**
2. **Raise the server so that the rear ends of the mounting brackets are aligned with the slide rail assemblies that are mounted in the rack.**



3. **Insert the mounting brackets into the slide rails, and then push the server into the rack until the mounting brackets encounter the slide rail stops (approximately 12 inches, or 30 cm).**



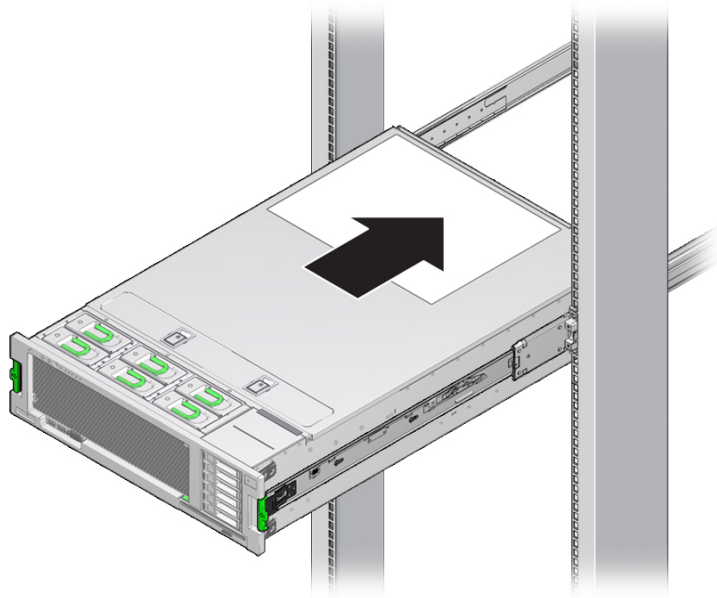
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**Caution** - When inserting the server into the slide rail, ensure that both the top and bottom mounting lips of the mounting brackets are inserted into the slide rail. The server should slide forward and backward easily if correctly installed. If the unit does not slide easily, ensure that each mounting lip is inserted properly. If the mounting brackets are not inserted properly, the unit might fall when it is removed from the rack.

---

4. **Simultaneously push and hold the green slide rail release buttons on each mounting bracket while you push the server into the rack.**

Continue pushing until the slide rail locks (on the front of the mounting brackets) engage the slide rail assemblies. You will hear an audible click.



---

**Caution** - Verify that the server is securely mounted in the rack and that the slide rail locks are engaged with the mounting brackets before continuing.

---

### Related Information

- [“Disassemble Slide Rails” on page 29](#)
- [“Install the Rackmount Hardware” on page 30](#)

- [“Attach Slide Rail Assemblies to the Rack” on page 32](#)
- [“Install the CMA” on page 37](#)
- [“Verify Operation of Slide Rails and CMA” on page 41](#)

## ▼ Install the CMA

The cable management assembly is an optional assembly that you can use to route the server cables in the rack.

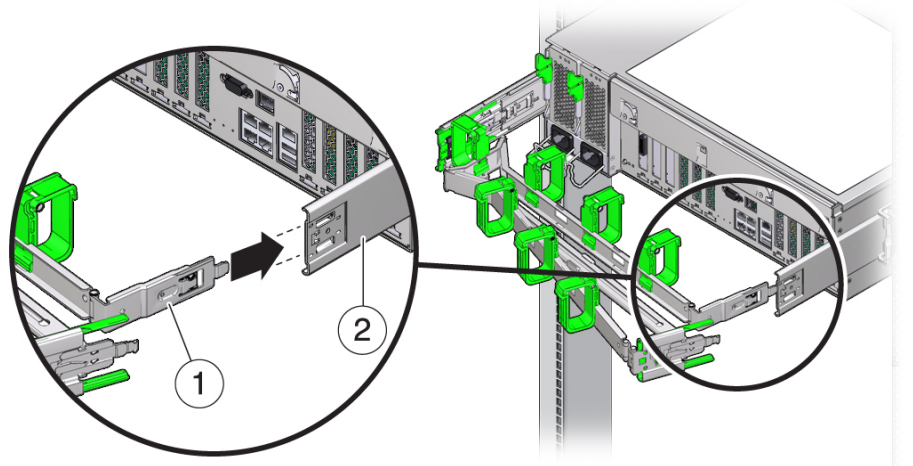
1. **Unpack the CMA parts.**
2. **Take the CMA to the back of the equipment rack and ensure that you have adequate room to work around the back of the server.**

---

**Note** - References to left or right in this procedure assume that you are facing the back of the equipment rack.

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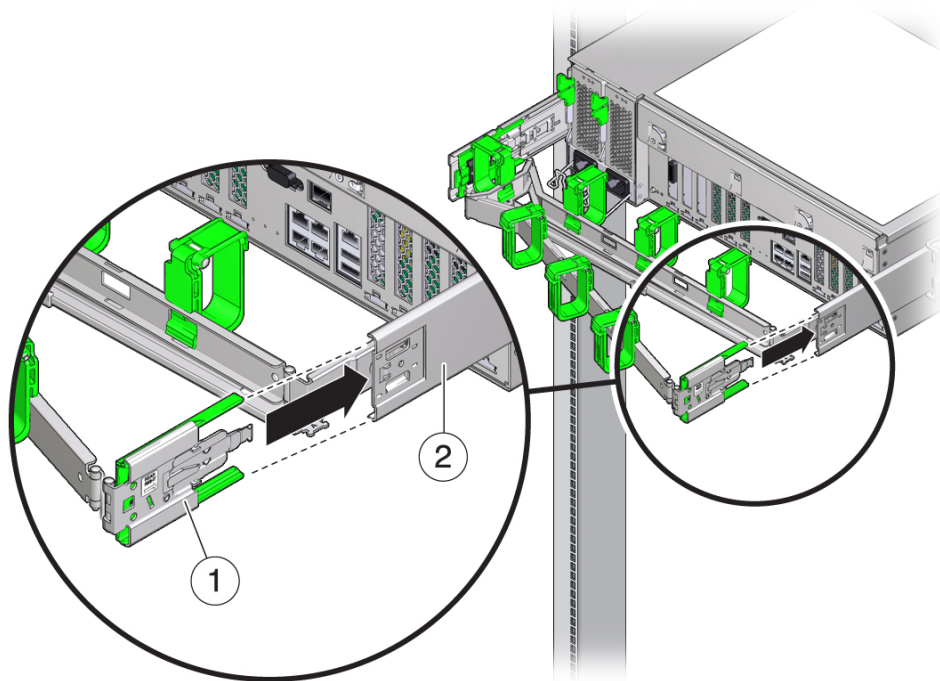
3. **Remove tape to separate the parts of the CMA.**
4. **Insert the CMA mounting bracket connector into the right slide rail until the connector locks into place with an audible click.**



No.	Description
1	CMA mounting bracket

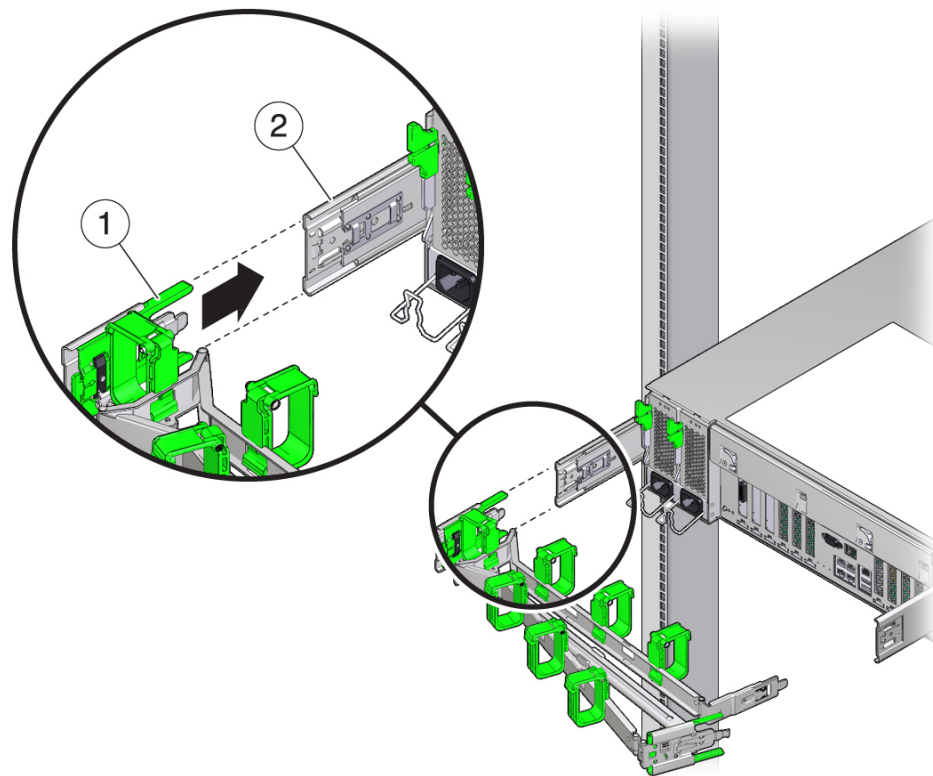
No.	Description
2	Right slide rail

5. Insert the right CMA slide rail connector into the right slide rail assembly until the connector locks into place with an audible click.



No.	Description
1	CMA slide rail connector
2	Right slide rail

6. Insert the left CMA slide rail connector into the left slide rail assembly until the connector locks into place with an audible click.



No.	Description
1	CMA slide rail connector
2	Left slide rail

7. Install and route cables to your server, as required.

**Note** - Instructions for installing the server cables are provided in [“Connecting the Server Cables” on page 43.](#)

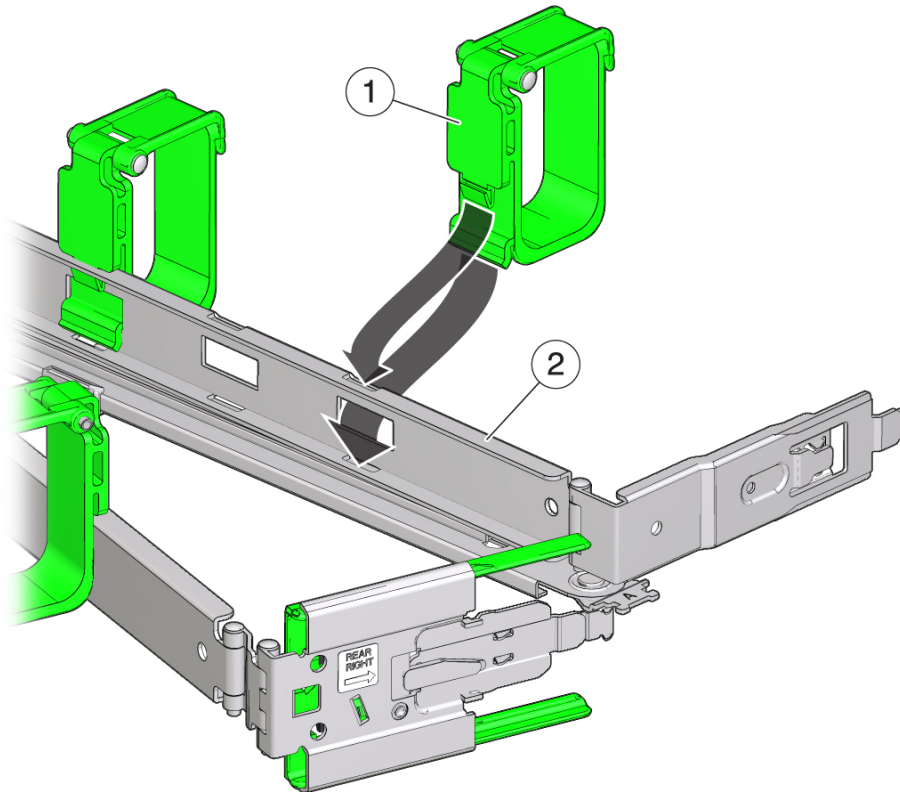
8. If required, attach the cable hooks and loop straps to the CMA, and press the hooks and straps into place to secure the cables.

---

**Note** - Cable hooks and loop straps are preinstalled on the CMA. Perform the procedure in this step if you need to reinstall cable hooks and straps on the CMA.

---

For best results, place three cable straps, evenly spaced, on the rear-facing side of the CMA, and three cable straps on the side of the CMA nearest the server.



---

No.	Description
1	CMA cable strap
2	CMA arm

---

### Related Information

- [“Verify Operation of Slide Rails and CMA” on page 41](#)
- [“Secure Cables to the CMA” on page 55](#)

## ▼ Verify Operation of Slide Rails and CMA

---

**Note** - Two people are recommended for this procedure: one to move the server in and out of the rack, and one to observe the cables and CMA.

---

1. **Slowly pull the server out of the rack until the slide rails reach their stops.**
2. **Inspect the attached cables for any binding or kinks.**
3. **Verify that the CMA extends fully from the slide rails.**
4. **Push the server back into the rack.**

When the server is fully extended, you must release two sets of slide rail stops to return the server to the rack.

- a. **The first set of stops are levers, located on the inside of each slide rail, just behind the rear panel of the server. Push in both green levers simultaneously and slide the server toward the rack.**

The server will slide in approximately 18 inches (46 cm) and stop.

Verify that the cables and the CMA retract without binding before you continue.

- b. **The second set of stops are the slide rail release buttons, located near the front of each mounting bracket. Simultaneously push both of the green slide rail release buttons, and push the server completely into the rack until both slide rail locks engage.**

5. **Adjust the cable straps and CMA, as required.**

### Related Information

- [“Install the CMA” on page 37](#)
- [“Secure Cables to the CMA” on page 55](#)



# Connecting the Server Cables

---

These tasks describe how to connect and configure the network and serial ports before you attempt to boot the server.

Step	Description	Links
1.	Review the cabling requirements.	<a href="#">“Cabling Requirements” on page 43</a>
2.	Review the front and rear panel connectors and ports.	<a href="#">“Front Panel Components (Installation)” on page 12</a> <a href="#">“Rear Panel Components (Installation)” on page 13</a> <a href="#">“Identifying Ports” on page 44</a>
3.	Connect the management and data cables.	<a href="#">“Connecting Data and Management Cables” on page 51</a>
4.	Secure the cables to the CMA.	<a href="#">“Secure Cables to the CMA” on page 55</a> <a href="#">“Verify Operation of Slide Rails and CMA” on page 41</a>

## Related Information

- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“Installing the Server” on page 25](#)
- [“Powering On the Server for the First Time” on page 57](#)

## Cabling Requirements

Prior to cabling and powering-on the server, gather the following network information:

- Netmask
- IP address for the SP
- Gateway IP address

At a minimum, you must connect cables to these ports before powering-on the server for the first time:

- SP SER MGT port
- SP NET MGT port

- At least one system on-board Ethernet network port
- Power cables to the power supply inlet ports

### Related Information

- [“Connect the SER MGT Cable” on page 52](#)
- [“Connect the NET MGT Cable” on page 53](#)
- [“Connect Ethernet Network Cables” on page 53](#)
- [“Prepare the Power Cords” on page 57](#)

## Identifying Ports

These topics provide the pin descriptions of the ports.

- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“USB Ports” on page 44](#)
- [“SER MGT Port” on page 45](#)
- [“NET MGT Port” on page 47](#)
- [“Gigabit Ethernet Ports” on page 48](#)
- [“VGA Port” on page 49](#)
- [“SAS Ports” on page 50](#)

### Related Information

- [“Server Overview” on page 10](#)
- [“Front Panel Components \(Installation\)” on page 12](#)
- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“Cabling Requirements” on page 43](#)

## USB Ports

Two USB 3.0 ports can be accessed from the rear of the server and two USB 2.0 ports from the front. See the location of the USB ports at [“Front Panel Components \(Installation\)” on page 12](#) and [“Rear Panel Components \(Installation\)” on page 13](#). The USB ports support hot-plugging. You can connect and disconnect USB cables and peripheral devices while the server is running, without affecting server operations.

Each USB port supplies 5V output at 500 mA.

---

**Note** - You can connect up to 126 devices to each of the four USB controllers (two ports in front, two ports in the rear), for a total of 504 USB devices per server.

---



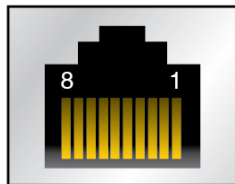
No.	Description
1	+5V supply
2	Data -
3	Data +
4	Ground

### Related Information

- [“Server Overview” on page 10](#)
- [“Front Panel Components \(Installation\)” on page 12](#)
- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“Cabling Requirements” on page 43](#)

## SER MGT Port

The SER MGT RJ-45 port, located on the rear panel, provides an TIA/EIA-232 serial Oracle/ Cisco standard connection to the SP. This port is the default connection to the Oracle ILOM system controller. For DTE to DTE communications, use an RJ-45 cable that is set up for a null modem configuration, in which the transmit and receive signals cross over. You can use a crossover adapter with a standard RJ-45 cable to achieve the required null modem configuration. See [“Rear Panel Components \(Installation\)” on page 13](#).

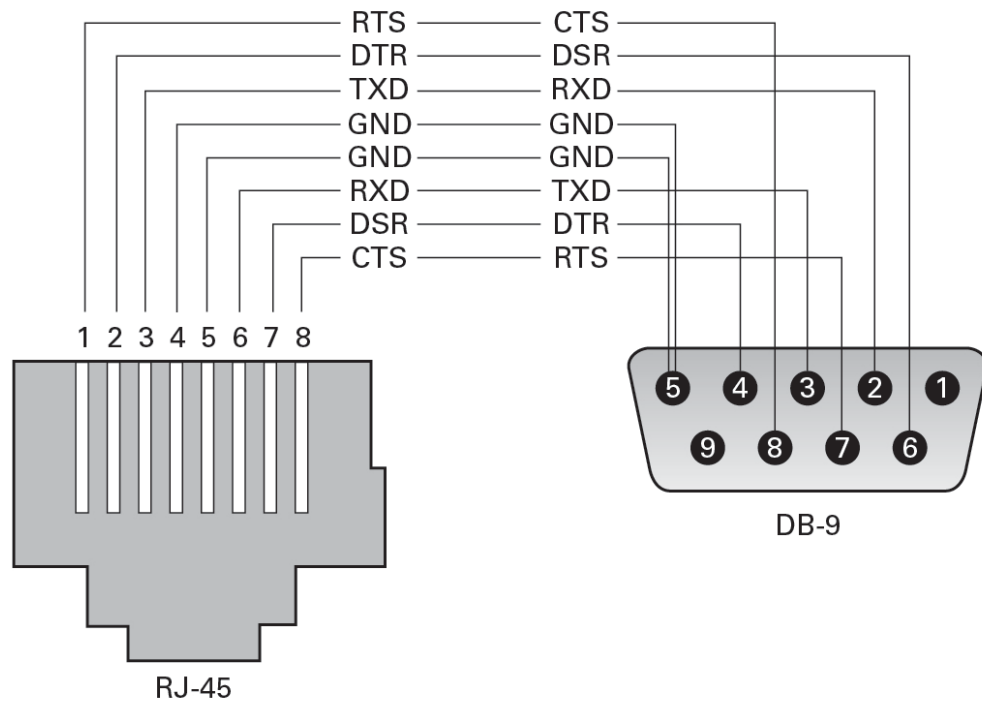


## RJ-45 Crossover Pinouts

Use this table to identify the appropriate crossover cable or adapter. In this table, the RJ-45 column represents the connector on the system and the DB-9 and DB-25 columns refer to the connector on the terminal side.

	Server Side		Terminal Side		
Signal	Console Port (DTE) RJ-45	Adapter DB-9 Pin	Adapter DB-25 Pin	Signal	
RTS	1	8	5	CTS	
DTR	2	6	6	DSR	
TxD	3	2	3	RxD	
Ground	4	5	7	Ground	
Ground	5	5	7	Ground	
RxD	6	3	2	TxD	
DSR	7	4	20	DTR	
CTS	8	7	4	RTS	

This example shows a diagram of an RJ-45 to DB-9 conversion.



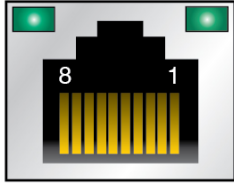
### Related Information

- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“Connect the SER MGT Cable” on page 52](#)
- [“Connect a Terminal or Emulator to the SER MGT Port” on page 58](#)

## NET MGT Port

The NET MGT RJ-45 port, located on the rear panel, provides an optional Ethernet connection to the SP. The NET MGT port is an optional connection to Oracle ILOM on the SP. The SP NET MGT port uses an RJ-45 cable for a 10/100BASE-T connection. If your network does not use a DHCP server, this port will not be available until you configure network settings through the SER MGT port.

This port does not support connections to Gigabit networks.



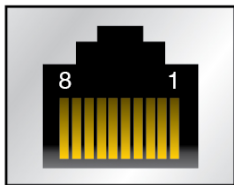
Pin	Signal Description	Pin	Signal Description
1	Transmit Data +	5	No Connect
2	Transmit Data –	6	Receive Data –
3	Receive Data +	7	No Connect
4	No Connect	8	No Connect

### Related Information

- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“Connect the NET MGT Cable” on page 53](#)
- [“Assign a Static IP Address to the NET MGT Port” on page 70](#)

## Gigabit Ethernet Ports

Four RJ-45 10GbE ports (NET 0, NET 1, NET 2, NET 3) can be accessed from the rear panel. See [“Rear Panel Components \(Installation\)” on page 13](#). The Ethernet interfaces operate at 100 Mbit/sec, 1000 Mbit/sec, and 10000 Mbit/sec.



Pin	Signal Description	Pin	Signal Description
1	Transmit/Receive Data 0 +	5	Transmit/Receive Data 2 –
2	Transmit/Receive Data 0 –	6	Transmit/Receive Data 1 –
3	Transmit/Receive Data 1 +	7	Transmit/Receive Data 3 +

Pin	Signal Description	Pin	Signal Description
4	Transmit/Receive Data 2 +	8	Transmit/Receive Data 3 –

## Related Information

- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“Connect Ethernet Network Cables” on page 53](#)

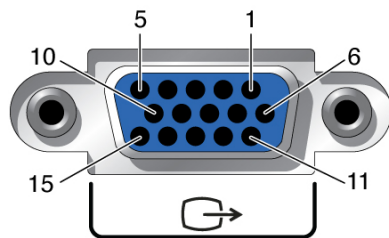
## VGA Port

The server has two VGA video ports, one port on the front and one on the rear panel. See [“Front Panel Components \(Installation\)” on page 12](#) and [“Rear Panel Components \(Installation\)” on page 13](#).

Each video port supports standard VGA and provides a female HD-15 video connector.

**Note** - Only one of the two ports can be used at a time. The rear VGA port is disabled by default. To enable the rear port and disable the front port, you must enable the Oracle ILOM `VGA_REAR_PORT` policy: -> `set /SP/policy VGA_REAR_PORT=enabled`.

**Note** - The cable length used to connect between the monitor and the VGA port should not be over 6 meters.



Pin	Signal Description	Pin	Signal Description
1	Red Video	9	[KEY]
2	Green Video	10	Sync Ground
3	Blue Video	11	Monitor ID - Bit 1
4	Monitor ID - Bit 2	12	VGA 12C Serial Data

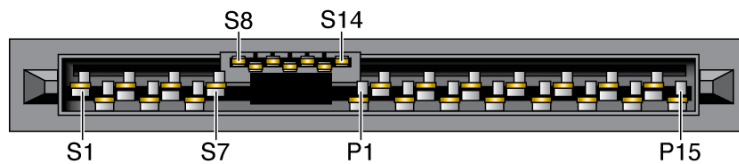
Pin	Signal Description	Pin	Signal Description
5	Ground	13	Horizontal Sync
6	Red Ground	14	Vertical Sync
7	Green Ground	15	VGA 12C Serial Clock
8	Blue Ground		

### Related Information

- [“Front Panel Components \(Installation\)” on page 12](#)
- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“Cabling Requirements” on page 43](#)

## SAS Ports

The six SAS connectors are located on the drive backplane inside the server.



The following table lists the pinouts for the SAS connector.

Segment	Pin	Signal	Note
Signal Segment (S1 to S7)	S1	Gnd	Second mate
	S2	TX+	Transmit from PHY to hard drive
	S3	TX-	
	S4	Gnd	Second mate
	S5	RX-	Receive from hard drive to PHY
	S6	RX+	
	S7	Gnd	Second mate
Back-side Signal (S8 to S14)	S8	Gnd	Second mate
	S9		
	S10		
	S11	Gnd	Second mate
	S12		

Segment	Pin	Signal	Note
	S13		
	S14	Gnd	Second mate
Power Segment	P1	3.3V	Not Supported
(P1 to P15)	P2	3.3V	Not Supported
	P3	3.3V	Not Supported
	P4	Gnd	First mate
	P5	Gnd	Second mate
	P6	Gnd	Second mate
	P7	5.0V	Pre-charge, second mate
	P8	5.0V	
	P9	5.0V	
	P10	Gnd	Second mate
	P11	Reserved	Should be grounded
	P12	Gnd	First mate
	P13	12.0V	Pre-charge, second mate
	P14	12.0V	
	P15	12.0V	

### Related Information

- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“Cabling Requirements” on page 43](#)
- [“Connecting Data and Management Cables” on page 51](#)

## Connecting Data and Management Cables

After you have connected these cables, see [“Powering On the Server for the First Time” on page 57](#) before connecting the AC power cords.

- [“Connect the SER MGT Cable” on page 52](#)
- [“Connect the NET MGT Cable” on page 53](#)
- [“Connect Ethernet Network Cables” on page 53](#)
- [“Connect Other Data Cables” on page 54](#)

### Related Information

- [“Front Panel Components \(Installation\)” on page 12](#)
- [“Rear Panel Components \(Installation\)” on page 13](#)

- [“Cabling Requirements” on page 43](#)
- [“Identifying Ports” on page 44](#)

## ▼ Connect the SER MGT Cable

The SP serial management port is labeled SER MGT. Use the SP SER MGT port *only* for server management. This port is the default connection between the SP and a terminal or a computer.



---

**Caution** - Do not attach a modem to this port.

---

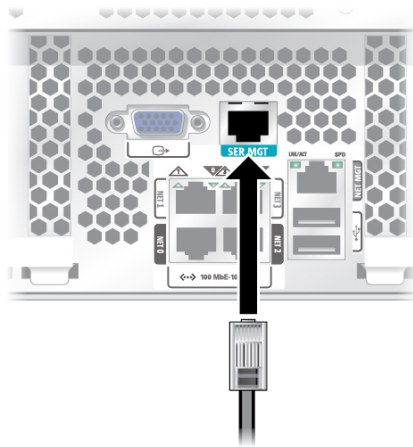
- **Connect an RJ-45 cable (Category 5 or better) from the SER MGT to a terminal device.**

When connecting a DB-9 cable, use an adapter to perform the crossovers given for each connector.

---

**Note** - To achieve 1-GbE network speeds, use Category 6 (or better) cables and network devices that support 1000BASE-T networks.

---



### Related Information

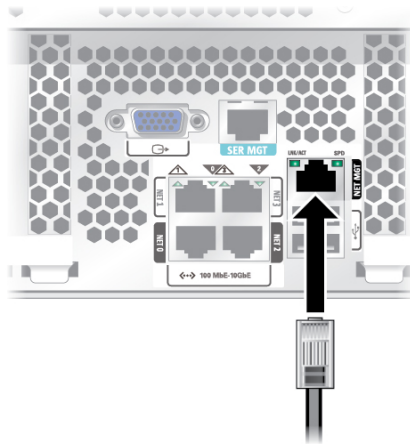
- [“Connect the NET MGT Cable” on page 53](#)
- [“Connect a Terminal or Emulator to the SER MGT Port” on page 58](#)
- [“SER MGT Port” on page 45](#)

## ▼ Connect the NET MGT Cable

The SP network management port is labeled NET MGT. After the initial server configuration, you can connect to the SP over an Ethernet network using this NET MGT port.

If your network uses a DHCP server to assign IP addresses, the DHCP server will assign an IP address to this NET MGT port. With this IP address, you can connect to the SP using an SSH connection. If your network does not use DHCP, this NET MGT port will not be accessible until you configure the network settings through the SER MGT port. For instructions, see [“Assign a Static IP Address to the NET MGT Port” on page 70](#).

- **Connect a Category 5 (or better) cable from the NET MGT port to your network switch or hub.**



### Related Information

- [“Connect Ethernet Network Cables” on page 53](#)
- [“Assign a Static IP Address to the NET MGT Port” on page 70](#)
- [“Connect the SER MGT Cable” on page 52](#)

## ▼ Connect Ethernet Network Cables

The server has four Gigabit Ethernet network connectors, marked NET 0, NET 1, NET 2, and NET 3. Use these ports to connect the server to the network. The Ethernet interfaces

operate at 100 Mbps, 1000 Mbps, and 10000 Mbps. See, [“Connect Ethernet Network Cables” on page 53.](#)

---

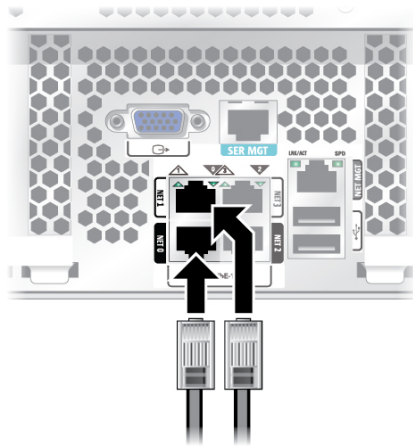
**Note** - The Oracle ILOM sideband management feature enables you to access the SP using one of these Ethernet ports. Refer to the Administration Guide for your server for instructions.

---

**Note** - To achieve 1-GbE network speeds, use Category 6 (or better) cables and network devices that support 1000BASE-T networks.

---

1. **Connect a Category 5 (or better) cable from your network switch or hub to Ethernet Port 0 (NET 0) on the rear of the chassis.**



2. **Connect Category 5 (or better) cables from your network switch or hub to the remaining Ethernet ports (NET 1, NET 2, NET 3), as needed.**

### Related Information

- *Server Administration*
- [“Powering On the Server for the First Time” on page 57](#)

## ▼ Connect Other Data Cables

- **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.

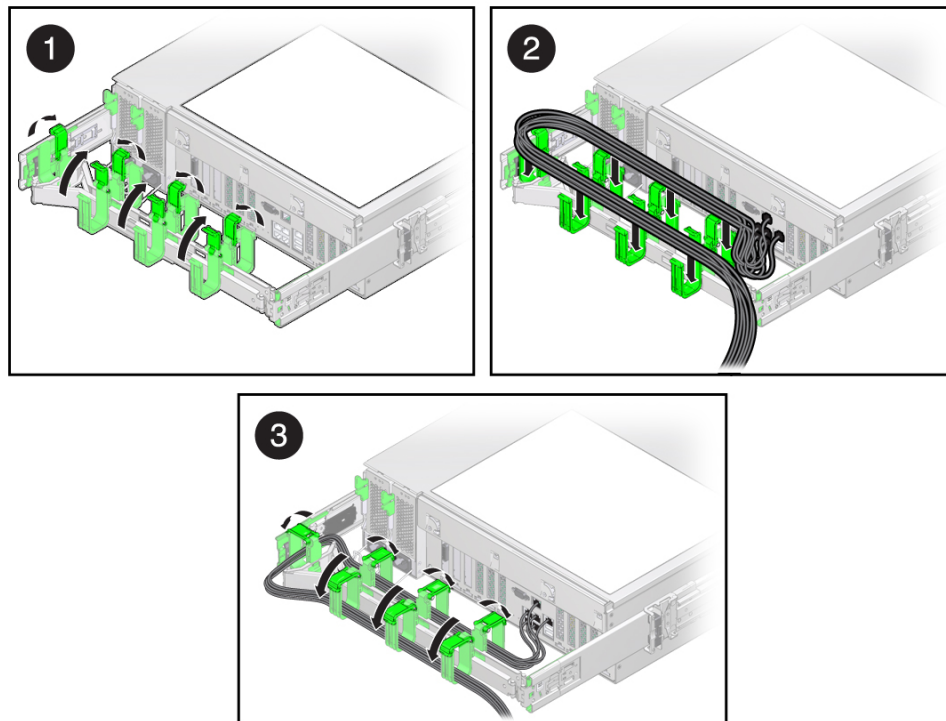
### Related Information

- The PCIe card documentation
- *Server Service*

## ▼ Secure Cables to the CMA

After connecting the server cables, secure them to the CMA if a CMA was installed.

1. **Open the cable hooks and loop straps on the CMA.**



2. **Route the server cables through the CMA cable hooks and straps.**
3. **Secure the cables to the CMA by closing the hooks and tightening the straps.**
4. **Verify the operation of the slide rails and CMA.**

See [“Verify Operation of Slide Rails and CMA”](#) on page 41.

### **Related Information**

- [“Install the CMA” on page 37](#)
- [“Verify Operation of Slide Rails and CMA” on page 41](#)
- [“Rear Panel Components \(Installation\)” on page 13](#)

# Powering On the Server for the First Time

---

These topics include instructions for powering on the server for the first time and configuring the Oracle Solaris OS.

Step	Description	Links
1.	Prepare the power cords.	<a href="#">“Prepare the Power Cords” on page 57</a>
2.	Connect a serial terminal device or terminal server to the SER MGT Port.	<a href="#">“Connect a Terminal or Emulator to the SER MGT Port” on page 58</a>
3.	Power on the server and start the Oracle ILOM system console.	<a href="#">“Power on the System for the First Time” on page 59</a> or <a href="#">“Configure the Preinstalled OS” on page 62</a>
4.	Configure the preinstalled OS, or install a fresh OS.	<a href="#">“Configure the Preinstalled OS” on page 62</a> or <a href="#">“Reach a State to Install a Fresh OS (Oracle ILOM Web Interface)” on page 65</a>
5.	Set the configuration parameters for the Oracle Solaris OS.	<a href="#">“Oracle Solaris OS Configuration Parameters” on page 67</a>
6. (Optional)	Configure the NET MGT port to use a static IP address.	<a href="#">“Assign a Static IP Address to the NET MGT Port” on page 70</a>

## Related Information

- [“Preparing for Installation” on page 21](#)
- [“Installing the Server” on page 25](#)
- [“Connecting the Server Cables” on page 43](#)

## ▼ Prepare the Power Cords

Prepare the power cords by routing them from the AC power source to the server.



---

**Caution** - Do not attach power cables to the power supplies until you have connected the server to a serial terminal or a terminal emulator (PC or workstation). The server goes into Standby mode and Oracle ILOM on the SP initializes as soon as a power cable connects a power supply to an external power source. System messages might be lost after 60 seconds if a terminal or terminal emulator is not connected to the SER MGT port before power is applied.

---

---

**Note** - Oracle ILOM will signal a fault if both power supplies are not cabled at the same time, since it will be a nonredundant condition. Do not be concerned with this fault in this situation.

---

- **Route the power cords from the AC power source to the rear of the server.**  
Do not attach the power cords to the power supplies at this time.

#### **Related Information**

- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“Powering On the Server for the First Time” on page 57](#)

## ▼ **Connect a Terminal or Emulator to the SER MGT Port**

Prior to powering on the server for the first time, make a serial connection to the SP. After making this serial connection, you will be able to view the system messages when you connect the power cords.

1. **Confirm that you have completed the following tasks:**
  - a. **Completed the preparation for installation.**  
See [“Preparing for Installation” on page 21](#).
  - b. **Completed the installation of the server in a rack.**  
See [“Installing the Server” on page 25](#).
  - c. **Connected the necessary cables.**  
See [“Connecting the Server Cables” on page 43](#).
2. **Connect a terminal or a terminal emulator (PC or workstation) to the server SER MGT port.**
3. **Configure a terminal or terminal emulator with these settings:**
  - **9600 baud**
  - **8 bits**
  - **No parity**
  - **1 Stop bit**

- **No handshake**

A null modem configuration is needed, meaning the transmit and receive signals are reversed (crossed over) for DTE to DTE communications. You can use an RJ-45 crossover adapter with a standard RJ-45 cable to achieve the null modem configuration, in which the transmit and receive signals cross over. See [“Connect the SER MGT Cable” on page 52](#).

---

**Note** - If you power on the server for the first time and do not have a terminal or terminal emulator (PC or workstation) connected to the SP SER MGT port, you will not see system messages.

---

4. **(Optional) Connect an Ethernet cable between the server's NET MGT port and the network to which future connections to the SP and host will be made.**  
Configure the system for the first time through the SER MGT port. After the initial configuration, you can set up communication between the SP and host through this Ethernet interface.
5. **Connect an Ethernet cable between one of the server's NET ports and the network to which the server will communicate.**
6. **Connect the power cords to the power supplies and to separate power sources.**  
When the power cords are connected, the SP initializes and the power supply LEDs illuminate. After a few minutes, the SP login prompt is displayed on the terminal device. At this time, the host is not initialized or powered on.
7. **Continue with the installation by powering on the server for the first time.**  
See [“Installing the OS” on page 62](#).

#### Related Information

- [“Connect the SER MGT Cable” on page 52](#)
- [“Configure the Preinstalled OS” on page 62](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM CLI\)” on page 63](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM Web Interface\)” on page 65](#)

## ▼ Power on the System for the First Time

1. **At the terminal device, log in to the SP as root with a password of changeme.**

```
login: root
Password: changeme
. . .
->
```

After a brief delay, the Oracle ILOM prompt is displayed (->).

---

**Note** - The server is provided with a default Administrator account (root) and a default password (changeme) to enable first-time login and access to Oracle ILOM. To build a secure environment, you must change the default password of the default Administrator account as soon as possible after your initial login to Oracle ILOM. If you find this default Administrator account has already been changed, contact your system administrator to obtain an Oracle ILOM user account with Administrator privileges.

---

For more information about the administration tasks such as changing passwords, adding accounts, and setting account privileges, refer to the Oracle ILOM documentation.

---

**Note** - By default, the SP is configured to use DHCP to obtain an IP address. If you plan to assign a static IP address to the SP, see [“Assign a Static IP Address to the NET MGT Port” on page 70](#) for more instructions.

---

**2. Power on the server using one of the following methods:**

- **Press the power button.**
- **At the Oracle ILOM prompt, type:**

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

The server initialization might take several minutes to complete.  
To cancel the initialization, press the #. (Hash+Dot) keys to return to the Oracle ILOM prompt.  
Then type: stop /System

---

**Note** - In Oracle ILOM 3.1, the name space for /SYS was replaced with /System. You can use the legacy name in a command at any time, but to expose the legacy name in the output, you must enable it with -> set /SP/cli legacy\_targets=enabled. For more information, see the Oracle ILOM documentation.

---

**3. (Optional) Redirect the host output to display on the serial terminal device.**

```
-> start /HOST/console
Are you sure you want to start /SP/console (y/n)? y
Serial console started.
. . .
```

**4. (Optional) You can execute other Oracle ILOM commands while the server initializes.**

- a. To display the Oracle ILOM prompt, press the #. (Hash+Dot) keys.
- b. To see information about available Oracle ILOM commands, type: `help`  
To see information about a specific command, type `help command-name`
- c. To return to displaying host output from the server initialization, type:

```
-> start /HOST/console
```

5. Continue with the installation by installing the OS.

See [“Configure the Preinstalled OS” on page 62.](#)

### Related Information

- [“Connect the SER MGT Cable” on page 52](#)
- [“Oracle ILOM System Console” on page 61](#)
- [“Configure the Preinstalled OS” on page 62](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM CLI\)” on page 63](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM Web Interface\)” on page 65](#)

## Oracle ILOM System Console

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 are run during system startup.

---

**Note** - To see these status and error messages, connect a terminal or terminal emulator to the SER MGT before applying power to the server.

---

After the system console finishes its low-level system diagnostics, the SP initializes and runs a suite of higher level diagnostics. When you access the SP using a device connected to the SER MGT port, you see the output of the Oracle ILOM diagnostics.

By default, the SP configures the NET MGT port automatically, retrieving network configuration settings using DHCP and allowing connections using SSH.

For a more detailed discussion on configuring the system console and connecting terminals, refer to the administration guide for your server.

### Related Information

- *Server Administration*
- Oracle ILOM documentation
- [“Configure the Preinstalled OS” on page 62](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM CLI\)” on page 63](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM Web Interface\)” on page 65](#)
- [“Assign a Static IP Address to the NET MGT Port” on page 70](#)

## Installing the OS

Use these topics to either configure the preinstalled OS or use an alternative OS.

- [“Configure the Preinstalled OS” on page 62](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM CLI\)” on page 63](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM Web Interface\)” on page 65](#)

### Related Information

- [“Oracle Solaris OS Configuration Parameters” on page 67](#)

## ▼ Configure the Preinstalled OS

1. **Determine which OS you will use.**
  - If you plan to use the preinstalled OS, proceed to step 2.
  - If you do not plan to use the preinstalled OS, go to [“Reach a State to Install a Fresh OS \(Oracle ILOM CLI\)” on page 63](#).
2. **When prompted, follow the onscreen instructions for configuring the Oracle Solaris OS on your host.**

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 67](#) for a description of the Oracle Solaris OS parameters you must provide during initial configuration.
3. **Log in to the server.**

You can now enter Oracle Solaris OS commands at the prompt. For more details, refer to the Oracle Solaris 11 or 10 OS man pages and documentation at:

<http://www.oracle.com/goto/Solaris11/docs>

<http://www.oracle.com/goto/Solaris10/docs>

### Related Information

- “Prepare the Power Cords” on page 57
- “Connect a Terminal or Emulator to the SER MGT Port” on page 58
- “Power on the System for the First Time” on page 59
- “Oracle Solaris OS Configuration Parameters” on page 67

## ▼ Reach a State to Install a Fresh OS (Oracle ILOM CLI)

If you do not plan to use the preinstalled OS, use this procedure to prevent the server from booting from the preinstalled OS.

### 1. Prepare the appropriate boot media according to your installation method.

There are many methods by which you can install the OS. For example, you can boot and install the OS from DVD media or from another server on the network.

For more information about the methods, refer to these Oracle Solaris document sections:

- *Installing Oracle Solaris 11 Systems*, comparing installation options at:  
<http://www.oracle.com/goto/Solaris11/docs>
- *Oracle Solaris 10 Installation Guide: Planning for Installation and Upgrade*, choosing an Oracle Solaris installation method at:  
<http://www.oracle.com/goto/Solaris10/docs>

### 2. From Oracle ILOM, set the OpenBoot `auto-boot?` parameter to `false`.

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

This setting prevents the server from booting from the preinstalled OS. When you use `bootmode`, the change applies only to a single boot and expires in 10 minutes if the power on the host is not reset.

### 3. When you are ready to initiate the OS installation, reset the host.

```
-> reset /System
Are you sure you want to reset /System (y/n)? y
Performing reset on /System
```

---

**Note** - In Oracle ILOM 3.1, the name space for /SYS was replaced with /System. You can use the legacy name in a command at any time, but to expose the legacy name in the output, you must enable it with -> **set /SP/cli legacy\_targets=enabled**. For more information, see the Oracle ILOM 3.1 documentation.

---

#### 4. Switch communication to the server host.

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

The server might take several minutes to complete POST, and then the OpenBoot prompt (ok) is displayed.

#### 5. Boot from the appropriate boot media for your installation method.

For more information, refer to the Oracle Solaris installation guide that corresponds to your desired release and installation method.

- *Installing Oracle Solaris 11 Systems*, comparing installation options at:  
<http://www.oracle.com/goto/Solaris11/docs>
- *Oracle Solaris 10 Installation Guide: Planning for Installation and Upgrade*, choosing an Oracle Solaris installation method at:  
<http://www.oracle.com/goto/Solaris10/docs>

For a list of valid boot commands that you can enter at the OpenBoot prompt, type:

```
{0} ok help boot
boot <specifier> ( -- ) boot kernel ( default ) or other file
Examples:
boot - boot kernel from default device.
      Factory default is to boot
      from DISK if present, otherwise from NET.
boot net - boot kernel from network
boot cdrom - boot kernel from CD-ROM
boot disk1:h - boot from disk1 partition h
boot tape - boot default file from tape
boot disk myunix -as - boot myunix from disk with flags "-as"
dload <filename> ( addr -- ) debug load of file over network at address
Examples:
4000 dload /export/root/foo/test
?go - if executable program, execute it
     or if Forth program, compile it
```

### Related Information

- [“Configure the Preinstalled OS” on page 62](#)

- “Reach a State to Install a Fresh OS (Oracle ILOM CLI)” on page 63
- “Reach a State to Install a Fresh OS (Oracle ILOM Web Interface)” on page 65
- “Assign a Static IP Address to the NET MGT Port” on page 70

## ▼ Reach a State to Install a Fresh OS (Oracle ILOM Web Interface)

If you do not plan to use the preinstalled OS, use this procedure to prevent the server from booting from the preinstalled OS.

### 1. Prepare the appropriate boot media according to your installation method.

There are many methods by which you can install the OS. For example, you can boot and install the OS from DVD media or from another server on the network.

For more information about the methods, refer to these Oracle Solaris document sections:

- *Installing Oracle Solaris 11 Systems*, comparing installation options at:  
<http://www.oracle.com/goto/Solaris11/docs>
- *Oracle Solaris 10 Installation Guide: Planning for Installation and Upgrade*, choosing an Oracle Solaris installation method at:  
<http://www.oracle.com/goto/Solaris10/docs>

### 2. If you have not done so, perform these tasks to access the Oracle ILOM web interface on the server:

- a. In a browser on the same network as the system, type the IP address.
- b. Log in to Oracle ILOM by typing your user name and password.

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

The Host Boot Mode page is displayed.

### 4. Apply these changes to the Host Boot Mode Settings:

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

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

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

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

**c. Click Save.**

---

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

---

**5. In the left navigation panel, click on Host Management > Power Control.**

**6. Select Reset from the pull-down menu, and click Save.**

**7. In the left navigation panel, click on Remote Control > Redirection.**

**8. Select Use Serial Redirection, and click Launch Remote Console.**

As the host resets, messages are displayed in the serial console. The reset activity takes a few minutes to complete. When the ok prompt is displayed, continue to the next step.

**9. At the ok prompt, boot from the appropriate boot media for your installation method.**

For more information, refer to the Oracle Solaris installation guide that corresponds to your desired release and installation method.

- *Installing Oracle Solaris 11 Systems*, comparing installation options at:

<http://www.oracle.com/goto/Solaris11/docs>

- *Oracle Solaris 10 Installation Guide: Planning for Installation and Upgrade*, choosing an Oracle Solaris installation method at:

<http://www.oracle.com/goto/Solaris10/docs>

For a list of valid boot commands that you can enter at the OpenBoot prompt, type:

```
{0} ok help boot
boot <specifier> ( -- ) boot kernel ( default ) or other file
Examples:
boot                - boot kernel from default device.
                    Factory default is to boot
                    from DISK if present, otherwise from NET.

boot net            - boot kernel from network
boot cdrom          - boot kernel from CD-ROM
boot disk1:h        - boot from disk1 partition h
boot tape           - boot default file from tape
boot disk myunix -as - boot myunix from disk with flags "-as"
dload <filename> ( addr -- ) debug load of file over network at address
Examples:
4000 dload /export/root/foo/test
```

```
?go      - if executable program, execute it
          or if Forth program, compile it
```

### Related Information

- [“Configure the Preinstalled OS” on page 62](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM CLI\)” on page 63](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM Web Interface\)” on page 65](#)
- [“Assign a Static IP Address to the NET MGT Port” on page 70](#)

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

Parameter	Description
<b>Date and Time</b>	Accept the default date and time, or change the values.
<b>root Password</b>	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

- Oracle Solaris OS documentation
- [“Configure the Preinstalled OS” on page 62](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM CLI\)” on page 63](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM Web Interface\)” on page 65](#)

## Assigning a Static IP Address to the SP

If your network does *not* use DHCP, the NET MGT port is not operational until you configure network settings for the service processor.

---

**Note** - If you are unable to use DHCP on your network, you must connect to the Oracle ILOM on the SP using the SER MGT port to configure the NET MGT port for your network. See [“Assign a Static IP Address to the NET MGT Port” on page 70](#).

---

- [“Log In to the SP \(SER MGT Port\)” on page 68](#)

### Related Information

- [“Oracle ILOM System Console” on page 61](#)
- [“Log In to the SP \(SER MGT Port\)” on page 68](#)
- [“Oracle Solaris OS Configuration Parameters” on page 67](#)
- [“Assign a Static IP Address to the NET MGT Port” on page 70](#)

## ▼ Log In to the SP (SER MGT Port)

After the SP boots, access the Oracle ILOM CLI to configure and manage the server. The Oracle ILOM CLI prompt (->) is displayed the first time the SP is booted. The default configuration provides an Oracle ILOM CLI root user account. The default root password is changeme. Change the password using the Oracle ILOM CLI password command.

---

**Note** - The server is provided with a default Administrator account (`root`) and a default password (`changeme`) to enable first-time login and access to Oracle ILOM. To build a secure environment, you must change the default password of the default Administrator account as soon as possible after your initial login to Oracle ILOM. If you find this default Administrator account has already been changed, contact your system administrator to obtain an Oracle ILOM user account with Administrator privileges.

---

1. **If this is the first time the server has been powered on, use the password command to change the root password.**

```
hostname login: root
Password:
Last login: Mon Feb 18 16:53:14 GMT 2013 on ttyS0
Detecting screen size; please wait...done

Oracle(R) Integrated Lights Out Manager

Version 3.2.1.2 rxxxxx

Copyright (c) 2013, Oracle and/or its affiliates. All rights reserved.
Warning: password is set to factory default.

-> set /SP/users/root password
Enter new password: *****
Enter new password again: *****

->
```

---

**Note** - After the root password has been set, on subsequent reboots, the Oracle ILOM CLI login prompt is displayed.

---

2. **Type root for the login name, followed by your password.**

```
...
hostname login: root
Password: password ( nothing
displayed)

Oracle(R) Integrated Lights Out Manager

Version 3.2.1.2

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->
```

### Related Information

- *Server Administration*
- [“Rear Panel Components \(Installation\)” on page 13](#)
- [“Cabling Requirements” on page 43](#)
- Oracle ILOM documentation

## ▼ Assign a Static IP Address to the NET MGT Port

If you plan to connect to the SP through its NET MGT port, the SP must have a valid IP address.

By default, the server is configured to obtain an IP address from DHCP services in your network. If the network your server is connected to does not support DHCP for IP addressing, perform this procedure.

---

**Note** - To configure the server to support DHCP, refer to the Oracle ILOM documentation.

---

### 1. Set the SP to accept a static IP address.

```
->set /SP/network pendingipdiscovery=static  
Set 'pendingipdiscovery' to 'static'
```

### 2. Set the IP address for the SP.

- To change the default IPv4 DHCP property and set property values for a static IPv4 address, type IPv4\_address.**
- To change the default IPv6 DHCP property and set property values for a static IPv6 address, type IPv6\_address.**

```
->set /SP/network pendingipaddress=service-processor-IPaddr  
Set 'pendingipaddress' to 'service-processor-IPaddr'
```

### 3. Set the IP address for the SP gateway.

```
-> set /SP/network pendingipgateway=gateway-IPaddr  
Set 'pendingipgateway' to 'gateway-IPaddr'
```

### 4. Set the netmask for the SP.

```
-> 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.

## 5. Verify that the parameters were set correctly.

This example shows parameters that have been set to convert a SP from a DHCP configuration to a static configuration.

```
-> show /SP/network -display properties
/SP/network
Targets:
Properties:
  commitpending = (Cannot show property)
  dhcp_clientid = xxx.xxx.xxx.xxx
  dhcp_server_ip = xxx.xxx.xxx.xxx
  ipaddress = xxx.xxx.xxx.xxx
  ipdiscovery = dhcp
  ipgateway = xxx.xxx.xxx.xxx
  ipnetmask = 255.255.255.0
  macaddress = xx:xx:xx:xx:xx:xx
  managementport = MGMT
  outofbandmacaddress = xx:xx:xx:xx:xx:xx
  pendingipaddress = service-processor-IPaddr
  pendingipdiscovery = static
  pendingipgateway = gateway-IPaddr
  pendingipnetmask = 255.255.255.0
  pendingmanagementport = MGMT
  sidebandmacaddress = xx:xx:xx:xx:xx:xx
  state = enabled
->
```

## 6. Set the changes to the SP network parameters.

```
-> set /SP/network commitpending=true
Set 'commitpending' to 'true'
```

---

**Note** - You can type the show /SP/network command again to verify that the parameters have been updated.

---

## 7. Set the static IP address when you configure the Oracle Solaris OS.

See [“Configure the Preinstalled OS” on page 62](#).

### Related Information

- *Server Administration*
- [“Configure the Preinstalled OS” on page 62](#)

- [“Reach a State to Install a Fresh OS \(Oracle ILOM CLI\)” on page 63](#)
- [“Reach a State to Install a Fresh OS \(Oracle ILOM Web Interface\)” on page 65](#)
- [“Oracle Solaris OS Configuration Parameters” on page 67](#)
- Oracle ILOM documentation

# Glossary

---

## A

- ANSI SIS** American National Standards Institute Status Indicator Standard.
- ASF** Alert standard format (Netra products only).
- AWG** American wire gauge.

## B

- blade** Generic term for server modules and storage modules. *See* [server module](#) and [storage module](#).
- blade server** Server module. *See* [server module](#).
- BMC** Baseboard management controller.
- BOB** Memory buffer on board.

## C

- chassis** For servers, refers to the server enclosure. For server modules, refers to the modular system enclosure.
- CMA** Cable management assembly.
- CMM** Chassis monitoring module (server modules only). The CMM is the service processor in the modular system that contains server modules. Oracle ILOM runs on the CMM, providing lights out management of the components in the modular system chassis. *See* [modular system](#) and [Oracle ILOM](#).
- CMP** Chip multiprocessor.

**D**

- DHCP** Dynamic Host Configuration Protocol.
- disk module or disk blade** Interchangeable terms for storage module. *See* [storage module](#).
- DTE** Data terminal equipment.

**E**

- EIA** Electronics Industries Alliance.
- ESD** Electrostatic discharge.

**F**

- FEM** Fabric expansion module (server modules only). FEMs enable server modules to use the 10GbE connections provided by certain NEMs. *See* [NEM](#).
- FRU** Field-replaceable unit.

**H**

- HBA** Host bus adapter.
- host** The part of the server or server module with the CPU and other hardware that runs the Oracle Solaris OS and other applications. The term *host* is used to distinguish the primary computer from the SP. *See* [SP](#).
- hot-pluggable** Describes a component that can be replaced with power applied, but the component must be prepared for removal.
- hot-swappable** Describes a component that can be replaced with power applied, and no preparation is required.

**I**

- ID PROM** Chip that contains system information for the server or server module.
- IP** Internet Protocol.

**K**

**KVM** Keyboard, video, mouse. Refers to using a switch to enable sharing of one keyboard, one display, and one mouse with more than one computer.

**L**

**LwA** Sound power level.

**M**

**MAC** Machine access code.

**MAC address** Media access controller address.

**modular system** The rackmountable chassis that holds server modules, storage modules, NEMs, and PCI EMs (server modules only). The modular system provides Oracle ILOM through its CMM.

**MSGID** Message identifier.

**N**

**name space** Top-level Oracle ILOM target.

**NEBS** Network Equipment-Building System (Netra products only).

**NEM** Network express module (server modules only). NEMs provide Ethernet and SAS connectivity to storage modules.

**NET MGT** Network management port. An Ethernet port on the server SP, the server module SP, and the CMM.

**NIC** Network interface card or controller.

**NMI** Nonmaskable interrupt.

**O**

**OBP** OpenBoot PROM. Sometimes OBP is used in file names and messages to indicate a relationship to OpenBoot.

**Oracle ILOM** Oracle Integrated Lights Out Manager. Oracle ILOM firmware is preinstalled on a variety of Oracle systems. Oracle ILOM enables you to remotely manage your Oracle servers regardless of the state of the host system.

**Oracle ILOM CMM** Oracle ILOM that runs on the CMM (server modules only). See [Oracle ILOM](#).

**Oracle Solaris OS** Oracle Solaris operating system.

## P

**PCI** Peripheral component interconnect.

**PEM** PCIe ExpressModule (server modules only). Modular components that are based on the PCI Express industry-standard form factor and offer I/O features such as Gigabit Ethernet and Fibre Channel.

**POST** Power-on self-test.

**PROM** Programmable read-only memory.

**PSH** Predictive self healing.

## R

**REM** RAID expansion module (server modules only). Sometimes referred to as an HBA See [HBA](#). Supports the creation of RAID volumes on drives.

## S

**SAS** Serial attached SCSI.

**SCC** System configuration chip.

**SER MGT** Serial management port. A serial port on the server SP, the server module SP, and the CMM.

**server module** Modular component that provides the main compute resources (CPU and memory) in a modular system. Server modules also might have on-board storage and connectors that hold FEMs.

**SP** Service processor. In the server or server module, the SP is a card with its own OS. The SP processes Oracle ILOM commands providing lights out management control of the host. See [host](#).

<b>SSD</b>	Solid-state drive.
<b>SSH</b>	Secure shell.
<b>storage module</b>	Modular component that provides computing storage to the server modules.
<b>T</b>	
<b>TIA</b>	Telecommunications Industry Association (Netra products only).
<b>Tma</b>	Maximum ambient temperature.
<b>U</b>	
<b>U.S. NEC</b>	United States National Electrical Code.
<b>UCP</b>	Universal connector port.
<b>UI</b>	User interface.
<b>UL</b>	Underwriters Laboratory Inc.
<b>UTC</b>	Coordinated Universal Time.
<b>UUID</b>	Universal unique identifier.
<b>W</b>	
<b>WWN</b>	World wide name. A unique number that identifies a SAS target.



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