# Oracle® Exadata Storage Server X7-2 EF and HC Installation Guide

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# Contents

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# Using This Documentation

- **Overview** – Provides specifications and describes how to install and power on Oracle Exadata Storage Server X7-2L for the first time.
- **Audience** – Technicians, administrators, developers, and authorized service providers who need to perform the tasks or learn about the concepts in this document.
- **Required knowledge** – Advanced experience troubleshooting hardware installations and configuring preinstalled operating systems.

## Product Documentation Library

Documentation and resources for this product and related products are available at `http://www.oracle.com/goto/x7-2l/docs`.

## Feedback

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

# Installation Procedure

This section provides an overview of the installation procedure. Review the entire installation procedure and find links to more information about each step.

## Installation Procedure Overview

The following table lists the tasks you need to complete to install Oracle Exadata Storage Server X7-2L.

| Step | Description | Links |
|---|---|---|
| 1 | Review the Oracle Server X7-2L Product Notes and the Oracle Exadata Database Machine Release Notes for any late-breaking information about the servers. | ■ `http://www.oracle.com/goto/x7-2l/docs`<br>■ `https://docs.oracle.com/cd/E80920_01/index.htm` |
| 2 | ■ Review the server site requirements, specifications, and components<br>■ Confirm that you received all the items you ordered<br>■ Familiarize yourself with electrostatic discharge (ESD) and safety precautions<br>■ Assemble the required tools and equipment | |
| 3 | Prepare to install the server. | ■ "Preparing for Server Installation" on page 13<br>■ "Site Planning Checklists" on page 81 |
| 4 | Review the server features. | "Storage Server Features and Components" on page 25 |
| 5 | Install any separately shipped optional components. | "System Components" in *Oracle Exadata Storage Server X7-2 EF and HC Service Manual* |
| 6 | Install the server into a rack. | "Installing the Storage Server Into a Rack" on page 33 |
| 7 | Attach cables and power cords to the server. | "Cabling the Storage Server" on page 67 |

| Step | Description | Links |
|------|-------------|-------|
| 8 | Troubleshoot installation issues. | "Troubleshooting Installation Issues" on page 75 |

# Preparing for Server Installation

This section provides the specifications for the Oracle Exadata Storage Server X7-2L installation.

## Storage Server Physical Specifications

The following table lists the physical specifications for the Oracle Exadata Storage Server X7-2L Extreme Flash (EF) and High Capacity (HC) systems.

| Dimension | Server Specification | Measurements |
|---|---|---|
| Width | Server chassis | 48.2 cm ( 18.9 inches) |
| Depth | Maximum overall | 75.9 cm (29.9 inches) |
| Height | 2-rack unit (2U) nominal | 8.69 cm (3.42 inches) |
| Weight | Fully populated server | ■ EF — 22.8 kg (50.2 lbs)<br>■ HC — 30.5 kg (67.1 lbs) |

# Receiving and Unpacking Requirements

When the server is unloaded at your site:

- Leave the server in its shipping carton until it arrives at its installation location.
- Use a separate area to remove the packaging material to reduce particle contamination before the server is taken to the data center.
- Ensure that there is enough clearance and clear pathways to move the server from the unpacking area to the installation location.
- Ensure that the entire access route to the installation site is free of raised-pattern flooring that causes vibration.

# Rack Space Requirements

The Oracle Exadata Storage Server X7-2L is a 2U server. For physical dimensions, see "Storage Server Physical Specifications" on page 13.

You can install the server into a four-post rack cabinet that conforms to ANSI/EIA 310-D-1992 or IEC 60297 standards, such as Oracle Rack Cabinet 1242 or Sun Rack II 1242. See "Rack Compatibility" on page 36.

The minimum ceiling height for the cabinet is 230 cm (90 inches), measured from the true floor or raised floor, whichever is higher. An additional 91.4 cm (36 inches) of ceiling height is required for top clearance. The space above the cabinet and its surroundings must not restrict the movement of cool air between the air conditioner and the cabinet, or the movement of hot air coming out of the top of the cabinet.

# Maintenance Space Requirements

The maintenance area for the rackmounted Oracle Exadata Storage Server X7-2L must have the required access space. The following table lists the maintenance access requirements for the server when it is installed in a rack.

| Location | Server Specification |
|---|---|
| Back of the server | 91.4 cm (36 inches) |
| Area above the rack | 91.4 cm (36 inches) |

| Location | Server Specification |
|---|---|
| Front of the server | 123.2 cm (48.5 inches) |

# Environmental Requirements

The following table describes the environmental requirements for the servers.

⚠ **Caution -** Set conditions to the optimal temperature and humidity ranges to minimize the chance of downtime due to component failure. Operating the servers for extended periods at or near the operating range limits, or installing them in an environment where they remain at or near nonoperating range limits could significantly increase hardware component failure.

| Specification | Operating | Nonoperating |
|---|---|---|
| Ambient temperature (Does not apply to removable media) | ■ Maximum range: 41°F to 95°F (5°C to 35°C) up to 2,953 feet (900 meters)<br>■ Optimal: 69.8°F to 73.4°F (21°C to 23°C)<br><br>**Note -** Maximum ambient operating temperature is derated by 1 degree C per 300 meters of elevation beyond 900 meters, up to a maximum altitude of 3,000 meters. | –40°F to 154°F (–40°C to 68°C) |
| Relative humidity | ■ 10% to 90% noncondensing, short term 23°F to 113°F (–5°C to 55°C)<br>■ 5% to 90% noncondensing, but not to exceed 0.024 kg of water per kg of dry air (0.053 lbs water/2.205 lbs dry air) | Up to 93% noncondensing 95°F (35°C) maximum wet bulb |
| Altitude | Up to 9,840 feet (3,000 meters)<br>**Note -** In China markets, regulations may limit installations to a maximum altitude of 6,562 feet (2,000 meters). | Maximum 39,370 feet (12,000 meters) |
| Acoustic noise | ■ Maximum condition: 8.1 Bels<br>■ Idle condition: 5.8 Bels | Not applicable |
| Vibration | ■ 0.15 G (z-axis)<br>■ 0.10 G (x-, y-axes), 5-500Hz swept sine<br><br>IEC 60068-2-6 Test FC | ■ 0.5 G (z-axis),<br>■ 0.25 G (x-, y-axes), 5-500Hz swept sine<br><br>IEC 60068-2-6 Test FC |

| Specification | Operating | Nonoperating |
|---|---|---|
| Shock | 3 Gs, 11 ms half-sine<br><br>IEC 60068-2-27 Test Ea | ■ Roll-off: 1.25-inch roll-off free fall, front to back rolling directions<br>■ Threshold: 13 mm threshold height at 0.65 m/s impact velocity<br><br>ETE-1010-02 Rev A |

### Related Information

- "Temperature Guidelines" on page 16
- "Humidity Guidelines" on page 16
- "Ventilation and Cooling Requirements" on page 17

# Temperature Guidelines

An ambient temperature range of 21° to 23° Celsius (70° to 74° Fahrenheit) is optimal for server reliability and operator comfort. Most computer equipment can operate in a wide temperature range, but approximately 22° Celsius (72° Fahrenheit) is recommended because it is easier to maintain safe humidity levels. Operating in this temperature range provides a safety buffer in the event that the air conditioning system is not running for a period of time.

# Humidity Guidelines

The ambient relative humidity range of 45 to 50 percent is acceptable for safe data processing operations. Most computer equipment can operate in a wide range (20 to 80 percent), but 45 to 50 percent is the recommended optimal range for the following reasons:

- Helps protect computer systems from corrosion problems associated with high humidity levels.
- Provides the greatest operating time buffer in the event of air conditioner control failure.
- Reduces or eliminates failures or temporary malfunctions caused by intermittent interference from static discharges, which might occur when relative humidity is too low. Electrostatic discharge (ESD) is easily generated and not easily dissipated in areas where the relative humidity level is below 35 percent.

**Caution -** ESD risk becomes critical when levels drop below 30 percent.

# Ventilation and Cooling Requirements

Always provide adequate space in front of and behind the rack to allow for proper ventilation of rackmounted servers. Do not obstruct the front or back of the rack with equipment or objects that might prevent air from flowing through the rack. Rackmountable servers and equipment, including Oracle Exadata Storage Server X7-2L, draw cool air in through the front of the rack and release warm air out the back of the rack. There is no airflow requirement for the left and right sides due to front-to-back cooling.

If the rack is not completely filled with components, cover the empty sections with filler panels. Gaps between components can adversely affect airflow and cooling in the rack.

The servers function while installed in a natural convection airflow. Follow these environmental specifications for optimal ventilation:

- Ensure that air intake is in the front of the system, and the air outlet is in the back. Take care to prevent recirculation of exhaust air in a rack or cabinet.
- Allow minimum clearance of 123.2 cm (48.5 inches) in the front of the system, and 91.4 cm (36 inches) in the back.
- Ensure unobstructed airflow through the chassis. The Oracle Exadata Storage Server X7-2L uses internal fans that can achieve 140 CFM, within the specified range of operating conditions.
- Ensure that ventilation openings, such as cabinet doors for both the inlet and exhaust of the server, are unobstructed. For example, Oracle Rack Cabinet 1242 and Sun Rack II cabinets are optimized for cooling. Both the front and back doors have 80 percent perforations that provide a high level of airflow through the rack.
- Ensure that front and back clearances between the cabinet doors is a minimum of 2.5 cm (1 inch) at the front of the server and 8 cm (3.15 inches) at the back of the server when mounted. These clearance values are based on the inlet and exhaust impedance (available open area) and assume a uniform distribution of the open area across the inlet and exhaust areas, which improve cooling performance.

**Note -** The combination of inlet and exhaust restrictions, such as cabinet doors and the distance of the server from the doors, can affect the cooling performance of the server. You must evaluate these restrictions. Server placement is particularly important for high-temperature environments.

■ Manage cables to minimize interference with the server exhaust vent.

# Electrical Requirements

The servers use AC power. The following table contains the power supply specifications for the servers.

**Note -** The power dissipation numbers listed in the following table are the maximum rated power numbers for the power supply used in the server. The numbers are not a rating of the actual power consumption of the server.

The servers can operate effectively over a range of voltages and frequencies.

| Parameter | Specification |
| --- | --- |
| Voltage (nominal) | 100-240 VAC |
| Input current (maximum) | 100-127 VAC 7.2 A and 200-240 VAC 3.4 A |
| Frequency (nominal) | 50/60 Hz (47 to 63 Hz range) |
| Maximum power consumption | 2400 W |
| Maximum heat output | 11600 BTU/Hr |

**Caution -** Servers must have a reliable power source. If the system exceeds the ranges, damage to the server might occur. Electrical disturbances, such as the following, might damage the system:

■ Fluctuations caused by brownouts
■ Wide and rapid variations in input voltage levels or in input power frequency
■ Electrical storms
■ Faults in the distribution system, such as defective wiring

To protect your server from such disturbances, use a dedicated power distribution system, power-conditioning equipment, and lightning arresters or power cables for protection from electrical storms.

See the following additional power specifications.

■ "Facility Power Guidelines" on page 19
■ "Circuit Breaker and UPS Guidelines" on page 19
■ "Grounding Guidelines" on page 19

# Facility Power Guidelines

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

To prevent failures:

- Design the input power sources to ensure adequate power is provided to the power distribution units (PDUs).
- Use dedicated AC breaker panels for all power circuits that supply power to the PDU.
- When planning for power distribution requirements, balance the power load between available AC supply branch circuits.
- In the United States and Canada, ensure that the current load of the overall system AC input does not exceed 80 percent of the branch circuit AC current rating.

PDU power cords for the Oracle Rack Cabinet 1242 and Sun Rack II are 4 meters (13.12 feet) long, and 1 to 1.5 meters (3.3 to 4.9 feet) of the cord might be routed in the rack cabinet. The installation site AC power receptacle must be within 2 meters (6.6 feet) of the rack.

# Circuit Breaker and UPS Guidelines

To prevent failures:

- Ensure that the design of your power system provides adequate power to the server.
- Use dedicated AC breaker panels for all power circuits that supply power to the server.
- Ensure that electrical work and installations comply with applicable local, state, or national electrical codes.

  Ensure that the electrical circuits for the server are grounded.
- Provide a stable power source, such as an uninterruptable power supply (UPS) to reduce the possibility of component failures. If computer equipment is subjected to repeated power interruptions and fluctuations, then it is susceptible to a higher rate of component failure.

# Grounding Guidelines

Use the following guidelines for grounding the server:

- Always connect the cords to grounded power outlets.

- Because different grounding methods are used, depending on location, verify the grounding type. For the correct grounding method, refer to local electrical codes.
- Ensure that a facility administrator or qualified electrical engineer verifies the grounding method for the building and performs the grounding work.

# Agency Compliance

The server complies with the following specifications.

| Category | Relevant Standards |
|---|---|
| Regulations[†,‡] | ■ Product Safety: UL/CSA 60950-1, EN 60950-1, IEC 60950-1 CB Scheme with all country differences<br>■ EMC<br>  ■ EMC: Emissions: FCC 47 CFR 15, ICES-003, EN55022, EN55032, KN32, EN61000-3-2, EN61000-3-3<br>  ■ Immunity: EN 55024, KN35 |
| Certifications[‡] | ■ North America Safety (NRTL)<br>■ European Union (EU)<br>■ International CB Scheme<br>■ BIS (India)<br>■ BSMI (Taiwan)<br>■ RCM (Australia)<br>■ CCC (PRC)<br>■ MSIP (Korea)<br>■ VCCI (Japan)<br>■ Morocco<br>■ Republic of Srpska |
| European Union Directives | ■ Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU<br>■ Low Voltage Directive 2014/35/EU<br>■ EMC Directive 2014/30/EU<br>■ WEEE Directive 2012/19/EU |

[†]All standards and certifications referenced are to the latest official version. For additional detail, contact your sales representative.

[‡]Other country regulations/certifications may apply.

## Related Information

- *Oracle Engineered System Safety and Compliance Guide, Compliance Model No.: ESY27*

■  *Important Safety Information for Oracle's Hardware Systems*

# Shipping Inventory

Inspect the shipping cartons for evidence of physical damage. If a shipping carton appears damaged, request that the carrier agent be present when the carton is opened. Keep all contents and packing material for the agent inspection.

The carton contains these components:

■  Oracle server
■  Country kit includes power cords
■  Rackmount kit includes rack rails, mounting brackets, screws, and Rackmounting Template
■  Legal and safety documents

# Tools and Equipment

To install the servers, you must have the following tools:

■  Antistatic wrist strap
■  Antistatic mat

You must provide a system console device, such as one of the following:

■  ASCII terminal
■  Workstation
■  Terminal server
■  Laptop running terminal emulation software

### Related Information

■  "Installing the Storage Server Into a Rack" on page 33

# Optional Component Installation

Standard system components are installed at the factory. Optional components that you purchased independently of the standard configuration are shipped separately, and in most cases can be installed before you install the server in a rack.

You can order and purchase the following optional components separately:

- PCIe cards
- DDR4 DIMM memory kits

If you ordered replaceable units, refer to the service label on the top cover of the server, or the component removal and installation procedures in the related *Oracle Exadata Storage Server X7-2 EF and HC Service Manual*.

Supported components and their part numbers are subject to change over time and without notice. For the most up-to-date list, review the Oracle System Handbook, which is available from the My Oracle Support web site.

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**Note -** You must have an Oracle Service contract to access the Oracle System Handbook from My Oracle Support. Customers with service contracts can also access the Oracle System Handbook at: `https://support.oracle.com/handbook_private/`.

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To access the handbook, follow these steps:

1. Log in to My Oracle Support at `https://support.oracle.com`.
2. Click the **Knowledge** tab.
3. In the knowledge links, click **Oracle System Handbook**.
4. In the handbook, click **Current Systems**, and then click the name and model of your server.
5. On the product page that opens for the server, click **Full Components List** for a list of components.

### Related Information

- "Storage Server Components" on page 25
- "System Components" in *Oracle Exadata Storage Server X7-2 EF and HC Service Manual*

# PCIe Cards

The Oracle Exadata Storage Server X7-2L EF and HC servers each have eleven PCIe slots. These can contain cards installed at the factory, or ordered from Oracle and installed on site. All PCIe cards must be of a type supported for your server. On only the HC server, one PCIe slot can accommodate only an internal HBA card.

Some PCIe cards require configuration, either when you install the server, or when you add or change them. For a list of PCIe cards, refer to the Product Notes for the related Oracle Server X7-2L at `http://www.oracle.com/goto/x7-2l/docs`.

# Storage Server Features and Components

This section describes the components, status indicators (LEDs), connectors, and disk management options for the storage server.

## Storage Server Components

The Oracle Exadata Storage Server X7-2L is an enterprise-class, two rack unit (2U) server that is available in two configurations: Extreme Flash (EF) and High Capacity (HC). They both use the same server but they are provisioned differently, as described in the following table.

| EF | HC |
|---|---|
| Two Intel Xeon 4114, 10-core, 2.2 GHz, 85W processors | Two Intel Xeon 4114, 10-core, 2.2 GHz, 85W processors |
| Twelve 16 GB 2666 DDR4 DIMMs | Twelve 16 GB 2666 DDR4 DIMMs |
| Eleven PCIe Gen3 slots<br><br>■ Eight Oracle Flash Accelerator F640 6.4 TB NVMe SSD cards | Eleven PCIe Gen3 slots<br><br>■ Four Oracle Flash Accelerator F640 6.4 TB NVMe SSD cards |
| Twelve storage drive slots with 12 drive slot fillers. | Twelve storage slots with twelve 3.5-inch 10 TB HDDs. |
| Oracle Dual Port QDR InfiniBand Adapter M4. | Oracle Dual Port QDR InfiniBand Adapter M4. |
| SAS is not available. | Oracle Storage 12Gb SAS PCIe RAID HBA, Internal card. |
| Two hot-pluggable, redundant 1200 W power supplies. | Two hot-pluggable, redundant 1200 W power supplies. |
| On-board Oracle Integrated Lights Out Manager (Oracle ILOM) service processor (SP) based on the ASPEED Pilot 4 chip. | On-board Oracle Integrated Lights Out Manager (Oracle ILOM) service processor (SP) based on the ASPEED Pilot 4 chip. |

### Related Information

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# EF Front Panel Features

The following figure shows the status indicators (LEDs), connectors, and storage drives located on the front panel of Oracle Exadata Storage Server X7-2L EF with twelve storage drive slots with 12 drive slot fillers.

For information about how to interpret the status indicators (LEDs), refer to the *Oracle Exadata Storage Server X7-2 EF and HC Service Manual*.
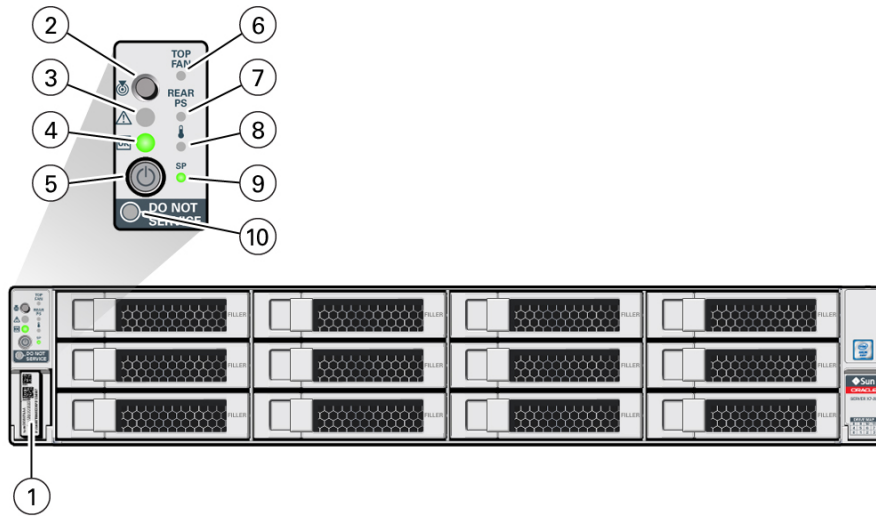


| Call Out | Description |
|----------|-------------|
| 1 | Product Serial Number (PSN) label and Radio Frequency Identification (RFID) tag |

| Call Out | Description |
| --- | --- |
| 2 | Locate Button/LED: white |
| 3 | Fault-Service Action Required LED: amber |
| 4 | System OK LED: green |
| 5 | On/Standby button |
| 6 | Fault-Service Required LED: Top: Fan Module (amber) |
| 7 | Fault-Service Required LED: Back: Power Supply (amber) |
| 8 | Fault-Service Required LED: Overtemp Icon: System Over Temperature Warning (amber) |
| 9 | SP OK LED: green |
| 10 | DO NOT SERVICE LED: white |

### Related Information

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# EF Back Panel Features

The following figure shows the Oracle Exadata Storage Server X7-2L EF back panel and the location of status indicators (LEDs), connectors, and PCIe slots.

For information about how to interpret the status indicators (LEDs), refer to the *Oracle Exadata Storage Server X7-2 EF and HC Service Manual*.

| Call Out | Description |
|----------|-------------|
| 1 | Power supply (PS 1) |
| 2 | Power Supply (PS) 1 status indicators: Fault-Service Required LED: amber; AC OK LED: green |
| 3 | Power supply (PS 0) |
| 4 | Power Supply (PS) 0 status indicators: Fault-Service Required LED: amber; AC OK LED: green |
| 5 | PCIe slot 1 |
| 6 | PCIe slot 2 |
| 7 | PCIe slot 3 |
| 8 | PCIe slot 4 |
| 9 | PCIe slot 5 |
| 10 | PCIe slot 6 |
| 11 | Serial management (SER MGT) RJ-45 serial port |
| 12 | Oracle Integrated Lights Out Manager (ILOM) service processor (SP) network management (NET MGT) RJ-45 10/100/1000BASE-T port |
| 13 | Network (NET) 100/1000BASE-T RJ-45 Gigabit Ethernet (GbE) port: NET 0 |
| 14 | USB 3.0 connector |
| 15 | System status LEDs: Locate Button/LED: white; Fault-Service Required: amber; System OK: green |
| 16 | PCIe slot 7 |
| 17 | PCIe slot 8 |
| 18 | PCIe slot 9 |
| 19 | PCIe slot 10 |
| 20 | PCIe slot 11 |

### Related Information

- "EF Front Panel Features" on page 26
- "Storage Server Components" on page 25

# HC Front Panel Features

The following figure shows the status indicators (LEDs), connectors, and drives located on the front panel of Oracle Exadata Storage Server X7-2L HC with twelve 3.5-inch storage drives.

For information about how to interpret the status indicators (LEDs), refer to the *Oracle Exadata Storage Server X7-2 EF and HC Service Manual*.
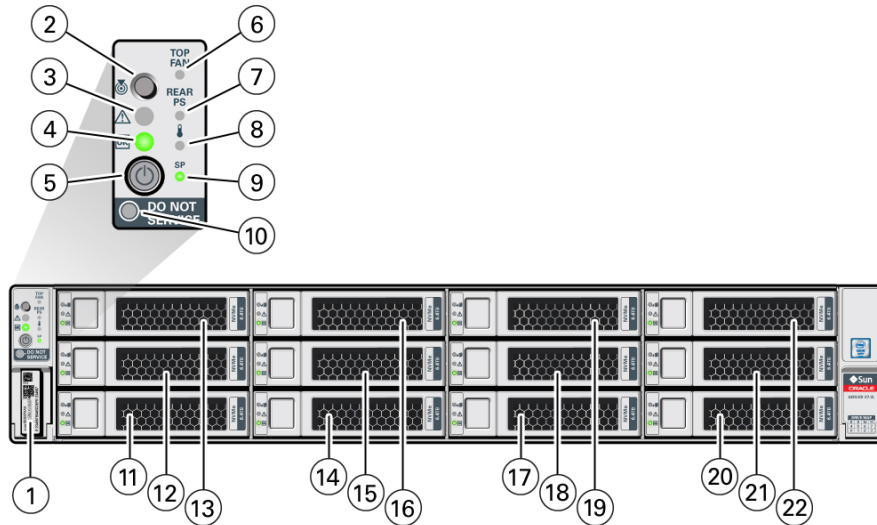
| Call Out | Description |
|----------|-------------|
| 1 | Product Serial Number (PSN) label and Radio Frequency Identification (RFID) tag |
| 2 | Locate Button/LED: white |
| 3 | Fault-Service Action Required LED: amber |
| 4 | System OK LED: green |
| 5 | On/Standby button |
| 6 | Fault-Service Required LED: Top: Fan Module (amber) |
| 7 | Fault-Service Required LED: Back: Power Supply (amber) |
| 8 | Fault-Service Required LED: Overtemp Icon: System Over Temperature Warning (amber) |
| 9 | SP OK LED: green |
| 10 | DO NOT SERVICE LED: white |
| 11 | Storage drive 0 HDD |
| 12 | Storage drive 1 HDD |
| 13 | Storage drive 2 HDD |
| 14 | Storage drive 3 HDD |
| 15 | Storage drive 4 HDD |
| 16 | Storage drive 5 HDD |
| 17 | Storage drive 6 HDD |
| 18 | Storage drive 7 HDD |
| 19 | Storage drive 8 HDD |

| Call Out | Description |
|---|---|
| 20 | Storage drive 9 HDD |
| 21 | Storage drive 10 HDD |
| 22 | Storage drive 11 HDD |

### Related Information

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# HC Back Panel Features

The following figure shows the Oracle Exadata Storage Server X7-2L HC back panel and the location of status indicators (LEDs), connectors, and PCIe slots.

For information about how to interpret the status indicators (LEDs), refer to the *Oracle Exadata Storage Server X7-2 EF and HC Service Manual*.
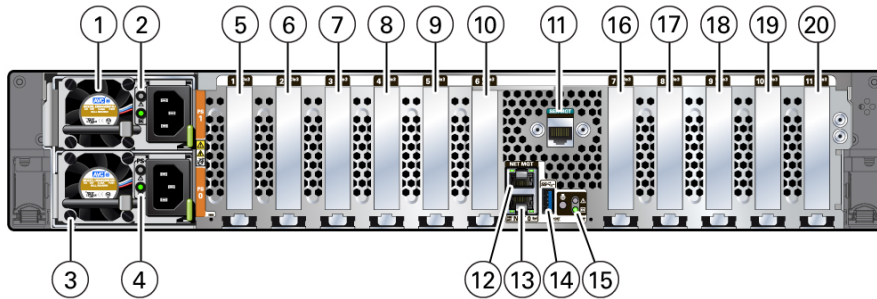


| Call Out | Description |
|---|---|
| 1 | Power supply (PS 1) |
| 2 | Power Supply (PS) 1 status indicators: Fault-Service Required LED: amber; AC OK LED: green |
| 3 | Power supply (PS 0) |
| 4 | Power Supply (PS) 0 status indicators: Fault-Service Required LED: amber; AC OK LED: green |

| Call Out | Description |
|---|---|
| 5 | PCIe slot 1 |
| 6 | PCIe slot 2 |
| 7 | PCIe slot 3 |
| 8 | PCIe slot 4 |
| 9 | PCIe slot 5 |
| 10 | PCIe slot 6 |
| 11 | Serial management (SER MGT) RJ-45 serial port |
| 12 | Oracle Integrated Lights Out Manager (ILOM) service processor (SP) network management (NET MGT) RJ-45 10/100/1000BASE-T port |
| 13 | Network (NET) 100/1000BASE-T RJ-45 Gigabit Ethernet (GbE) port: NET 0 |
| 14 | USB 3.0 connector |
| 15 | System status LEDs: Locate Button/LED: white; Fault-Service Required: amber; System OK: green |
| 16 | PCIe slot 7 |
| 17 | PCIe slot 8 |
| 18 | PCIe slot 9 |
| 19 | PCIe slot 10 |
| 20 | PCIe slot 11: Internal HB card |

## Related Information

- "HC Front Panel Features" on page 28
- "Storage Server Components" on page 25

# Installing the Storage Server Into a Rack

This section describes how to install the storage server into Sun Rack II cabinet using the slide-rail assembly in the Rackmount Kit. Figures for the rackmounting procedures depict the EF server. The procedures are the same for the HC server. Perform these procedures if you are inserting additional storage servers into your Exadata Database Machine configuration.

For instructions on how to install the storage server into the Oracle Rack Cabinet 1242, refer to the *Oracle Rack Cabinet 1242 User's Guide* at `http://www.oracle.com/goto/oraclerack1242/docs`.

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

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- "Installation Prerequisites" on page 33
- "Safety Precautions" on page 34
- "ESD Precautions" on page 35
- "Rack Compatibility" on page 36
- "Rackmount Kit Contents" on page 37
- "Rackmounting the Server" on page 38

### Related Information

- "Installation Procedure" on page 11
- "Preparing for Server Installation" on page 13

## Installation Prerequisites

Before you start the rackmount procedures, ensure that your site meets the required electrical and environmental requirements. See "Preparing for Server Installation" on page 13.

# Safety Precautions

This section describes safety precautions you must follow when installing the server into a rack.

**Caution - Leveling feet position**: When unpacking at the installation site, or when repackaging and moving the rack to a new location, verify that the leveling feet are up before moving the rack.

**Caution - Stabilize rack**: Deploy the anti-tilt bar on the equipment rack before starting an installation.

**Caution -** The rack shipping brackets are not for use for bracing or anchoring the rack during seismic events.

**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 your rack anti-tilt bar to prevent the rack from tipping during equipment installation.

**Caution - Lifting equipment**: The EF server weighs 22.8 kg (50.2 lbs) and the HC server weighs 30.5 kg (67.1 lbs). Two people are needed to mount either server into the rack enclosure.

**Caution - Communicate instructions**: When performing a two-person procedure, communicate your intentions clearly to the other person before, during, and after each step to minimize confusion.

**Caution - Elevated operating ambient temperature**: If you install the server in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment might be higher than the room ambient temperature. Install the equipment in an environment compatible with the maximum ambient temperature (Tma) specified for the server. For server environmental requirements, see "Environmental Requirements" on page 15.

**Caution - Reduced airflow**: Install the equipment in a rack so that it does not compromise the amount of airflow required for safe operation of the equipment.

**Caution - Mechanical loading**: Mount the equipment in the rack so that it does not cause a hazardous condition due to uneven mechanical loading.

**Caution - Circuit overloading**: Consider the connection of the equipment to the supply circuit and the effect that overloading the circuits might have on over-current protection and supply wiring. Also consider the equipment nameplate power ratings used when you address this concern.

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

**Caution - Mounted equipment**: Do not use slide-rail-mounted equipment as a shelf or a workspace.

## ESD Precautions

Electronic equipment is susceptible to damage by static electricity. To prevent electrostatic discharge (ESD) when you install or service the server:

- Use a grounded antistatic wrist strap, foot strap, or equivalent safety equipment
- Place components on an antistatic surface, such as an antistatic discharge mat or an antistatic bag
- Wear an antistatic grounding wrist strap connected to a metal surface on the chassis when you work on system components

**Caution - Equipment damage**: Electrostatic damage can permanently disable the system or require repair by authorized service technicians.

Before installing the server, read the safety information in the *Oracle Engineered System Safety and Compliance Guide, Compliance Model No.: ESY27* and in the *Important Safety Information for Oracle's Hardware Systems*.

# Rack Compatibility

The rack into which you install Oracle Exadata Storage Server X7-2L must meet the requirements listed in the following table. Oracle Rack Cabinet 1242 and Sun Rack II are compatible with both servers. For information about the racks, see "Preparing for Server Installation" on page 13.

| Item | Requirement |
|---|---|
| Structure | ■ Four-post rack (mounting at both front and back). Supported rack types: square hole (9.5 mm) and round hole (M6 or 1/4-20 threaded only).<br>■ Two-post racks are not compatible. |
| Rack horizontal opening and unit vertical pitch | Conforms to ANSI/EIA 310-D-1992 or IEC 60297 standards. |
| Distance between front and back mounting planes | Minimum 61 cm and maximum 91.5 cm (24 inches to 36 inches). |
| Clearance depth in front of front mounting plane | Distance to front cabinet door is at least 2.54 cm (1 inch). |
| Clearance depth behind front mounting plane | Distance to back cabinet door is at least 90 cm (35.43 inches) with the cable management arm, or 80 cm (31.5 inches) without the cable management arm. |
| Clearance width between front and back mounting planes | Distance between structural supports and cable troughs is at least 45.6 cm (18 inches). |
| Minimum clearance for service access | ■ Clearance, front of server: 123.2 cm (48.5 inches)<br>■ Clearance, back of server: 91.4 cm (36 inches) |

The following table contains Sun Rack II Model 1242 and Sun Rack II Model 1042 rack specifications.

| Requirement | Specification |
|---|---|
| Usable rack units | 42 |
| Height | 199.8 cm (78.66 inches) |
| Width (with side panels) | 60 cm (23.62 inches) |
| Depth Model 1242[†] | 120 cm (47.24 inches) |
| Depth Model 1042[‡] | 105.8 cm (41.66 inches) |
| Weight Model 1242 | 150.6 kg (332 lbs) |
| Weight Model 1042 | 123.4 kg (272 lbs) |
| Maximum dynamic load | 1005 kg (2215 lbs) |

[†]Depth is measured from front door handle to back door handle.

‡Depth is measured from front door handle to back door handle.

The following table contains the Oracle Rack Cabinet 1242 rack specifications:

| Requirement | Specification |
|---|---|
| Usable rack units | 42 |
| Height | 199.8 cm (78.66 inches) |
| Width (with side panels) | 60 cm (23.62 inches) |
| Depth Model 1242† | 120 cm (47.24 inches) |
| Weight Model 1242 | 150.6 kg (332 lbs) |
| Maximum dynamic load | 2215 kg (1004.7 lbs) |

†Depth is measured from front door handle to back door handle.

### Related Information

-

# Rackmount Kit Contents

The following figure shows the Rackmount Kit contents. For instructions on how to install your server in a four-post rack using the slide-rail and cable management arm options, refer to the Rackmounting Template.
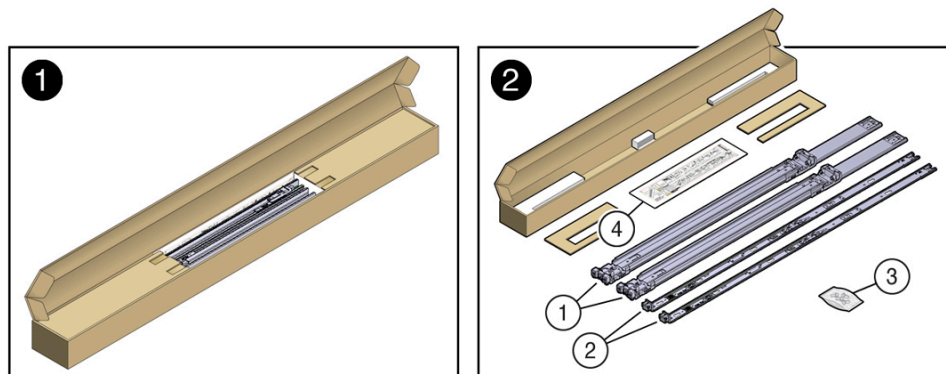
| Call Out | Description |
|---|---|
| 1 | Slide-rails |
| 2 | Mounting brackets |
| 3 | Four M4 x 5 fine-pitch mounting bracket securing screws (not used) |
| 4 | Rackmounting Template |

### Related Information

- "Rack Compatibility" on page 36

## Rackmounting the Server

To rackmount the server, stabilize the rack, and install the slide rails and mounting brackets. Then, install the server into the rack.

## ▼ Stabilize the Rack

⚠ **Caution -** To reduce the risk of personal injury, stabilize the rack cabinet, and extend the anti-tilt bar before you install the server.

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

1. **Open and remove the front and back doors from the rack cabinet, only if they impinge on the mounting bay.**

2. **To prevent the rack cabinet from tipping during the installation, fully extend the rack cabinet anti-tilt bar, which is located at the bottom front of the rack cabinet.**

3. **If the rack includes leveling feet beneath the rack cabinet to prevent it from rolling, extend these leveling feet fully downward to the floor.**

⚠ **Caution -** When moving the rack to a new location, including repacking, verify that the leveling feet are up before moving the rack.

### Related Information

- "Safety Precautions" on page 34

-
- Rack cabinet documentation

# ▼ Install Mounting Brackets on the Server

To install the mounting brackets onto the sides of the storage server:

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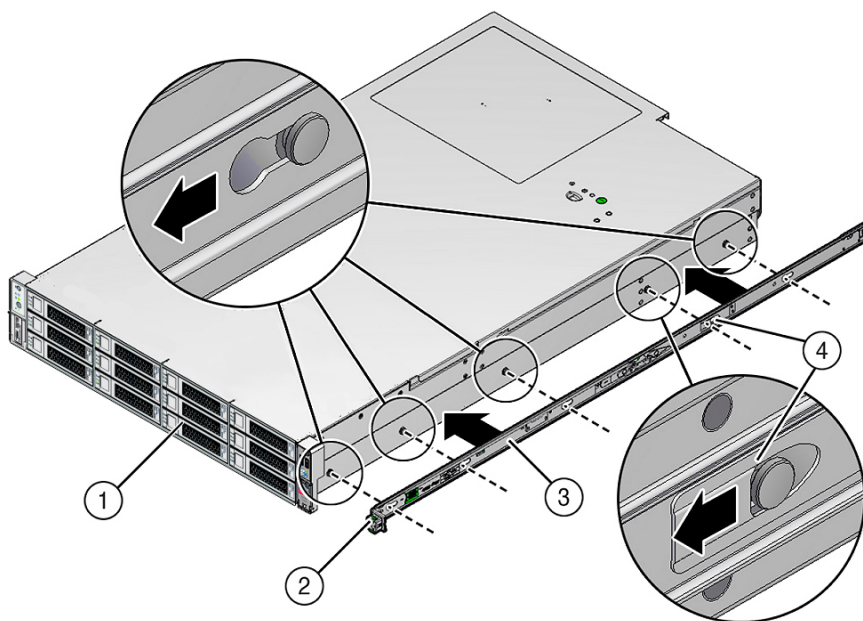


| Call Out | Description |
|---|---|
| 1 | Chassis front |
| 2 | Slide-rail lock |
| 3 | Mounting bracket |
| 4 | Mounting bracket clip |

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 back locating pin has engaged the mounting bracket clip.**

4. **Repeat Step 1 through Step 3 to install the remaining mounting bracket on the other side of the storage server.**

   **Related Information**

   -
   -

## ▼ Mark the Rackmount Location

Use the Rackmounting Template to identify the correct mounting holes for the slide-rails.

**Note -** Load the rack from bottom to top.

1. **Ensure that there is enough vertical space in the cabinet to install the storage server.**
   See .

2.   **Place the Rackmounting Template against the front rails, aligning the bottom edge of the card with the bottom edge of the storage server, and measure up from the bottom of the Rackmounting Template.**
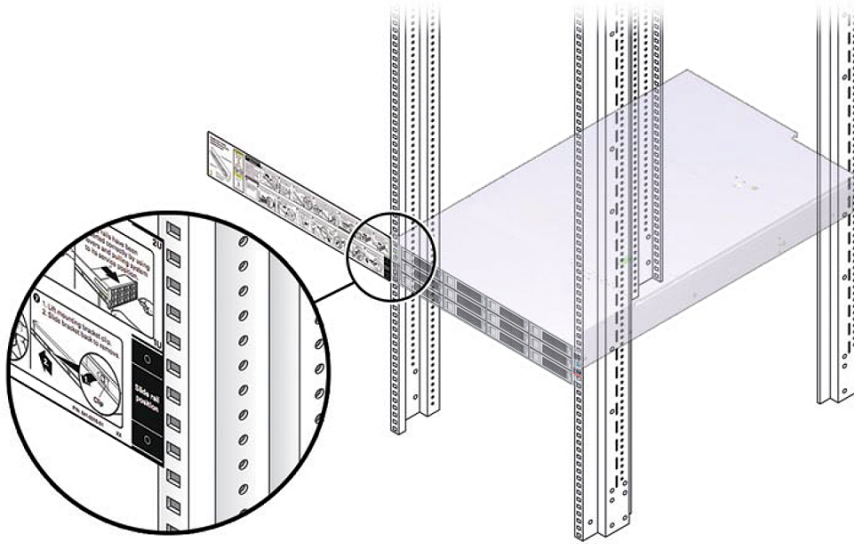


3.   **Mark the mounting holes for the front slide-rails.**

4.   **Mark the mounting holes for the back slide-rails.**

     **Related Information**

     ■   "Rack Compatibility" on page 36
     ■   "Install Mounting Brackets on the Server" on page 39
     ■   "Attach the Slide-Rails" on page 43

## ▼ Install AC Power Cables and Slide-Rails

1.   **Before you install the slide-rails into the rack, install right-angle AC power cables into the left-side and right-side PDU electrical sockets.**

     Use the following 2-meter right-angle AC power cable for this procedure:

■ 7079727 - Pwrcord, Jmpr, Bulk, SR2, 2m, C14RA, 10A, C13



2. **Install the slide-rails into the rack.**
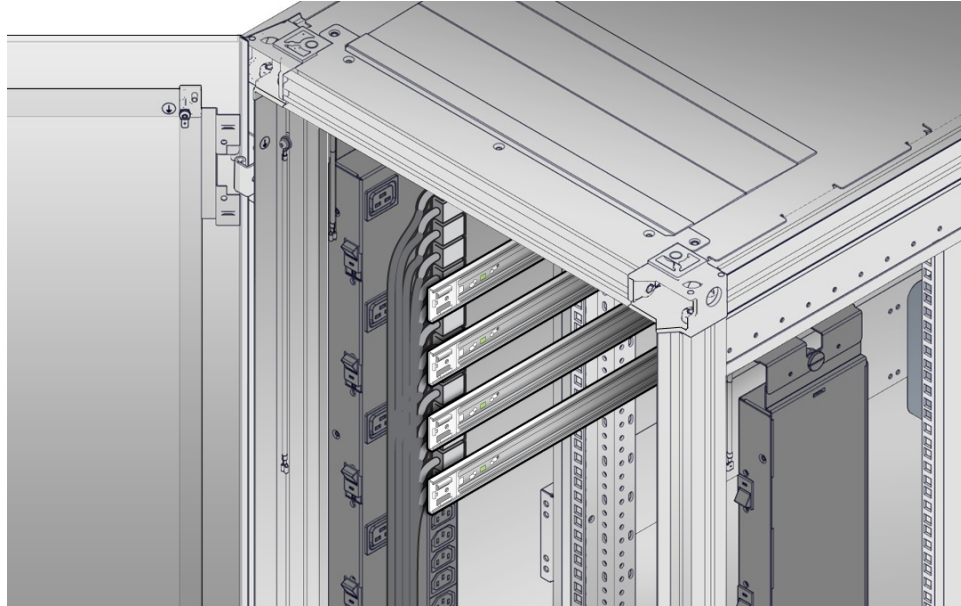
## ▼ Attach the Slide-Rails

Use this procedure to attach slide-rail assemblies to the rack.

**Note -** Before you install the slide-rails, be sure to install right-angle AC power cables (part number 7079727 - Pwrcord, Jmpr, Bulk, SR2, 2m, C14RA, 10A, C13). In the 1000 mm rack, the standard rail kit slide-rails obstruct access to the front of the 15kVA and 22kVA Power Distribution Unit (PDU) electrical sockets. If you use the standard AC power cables, first plug them in, and then install the slide-rails into the rack. After you install the slide-rails, you cannot disconnect or remove the standard AC power cables from the PDU but you can remove them from the system.

1.  **Orient the slide-rail assembly so that the ball-bearing track is forward and locked in place.**
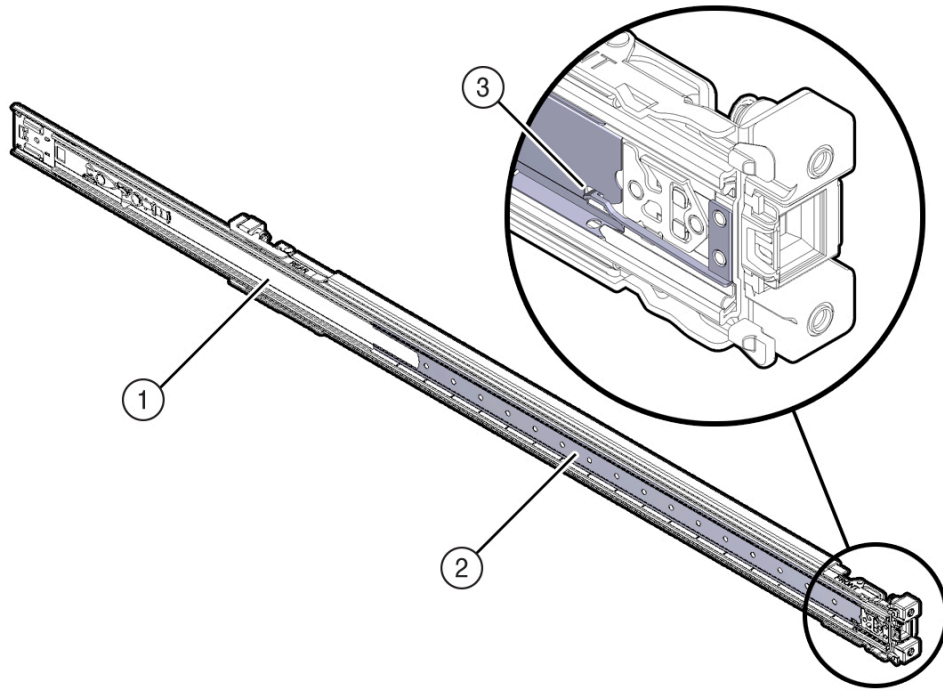
| Callout | Description |
| --- | --- |
| 1 | Slide-rail |
| 2 | Ball-bearing track |
| 3 | Locking mechanism |

**2. Starting with either the left or right side of the rack, align the back of the slide-rail assembly against the inside of the back rack rail, and push until the assembly locks into place with an audible click.**
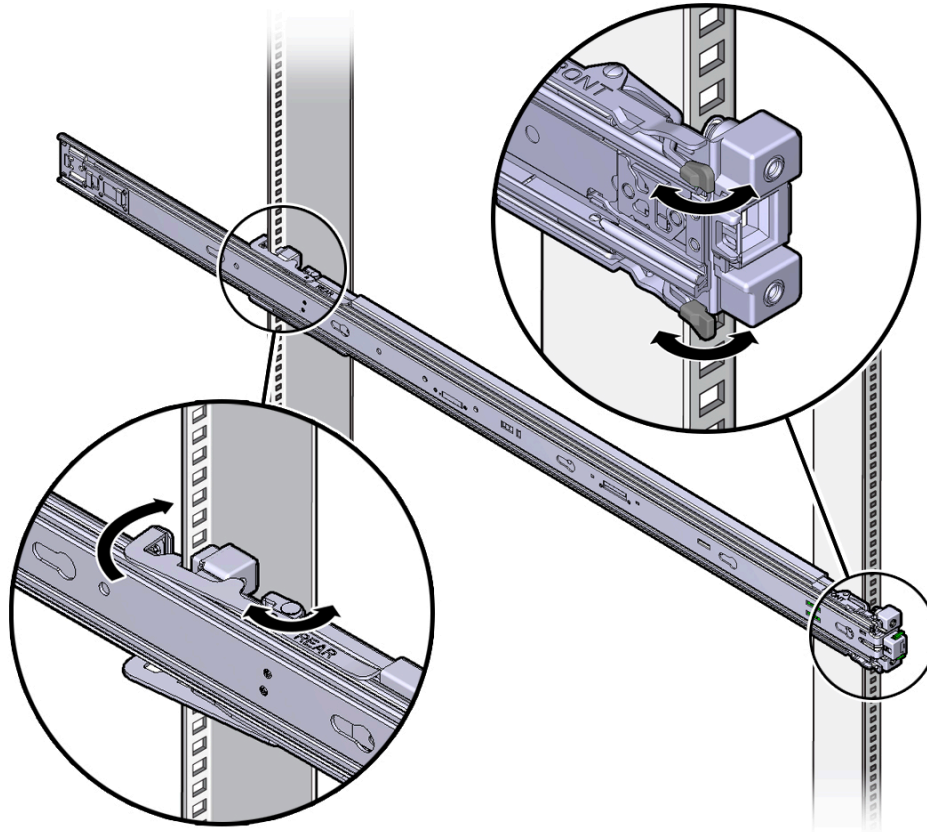


**3. Align the front of the slide-rail assembly against the outside of the front rack rail, and push until the assembly locks into place with an audible click.**

**4. Repeat Step 1 through Step 3 to attach the slide-rail assembly to the other side of the rack.**

### Related Information

- "Install Mounting Brackets on the Server" on page 39

## ▼ Install the Storage Server Into the Slide-Rail Assemblies

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

⚠️ **Caution - Personal Injury or Equipment Damage**: This procedure requires a minimum of two people because of the weight of the storage server.

⚠️ **Caution - Personal Injury or Equipment Damage**: Always load equipment into a rack from the bottom up so that the rack will not become top-heavy and tip over. To prevent the rack from tipping during equipment installation, extend the rack anti-tilt bar.

1. **Push the slide-rails as far as possible into the slide-rail assemblies in the rack.**

2. **Position the storage server so that the back 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 storage server into the rack until the mounting brackets are flush with the slide-rail stops (approximately 30 cm, or 12 inches).**
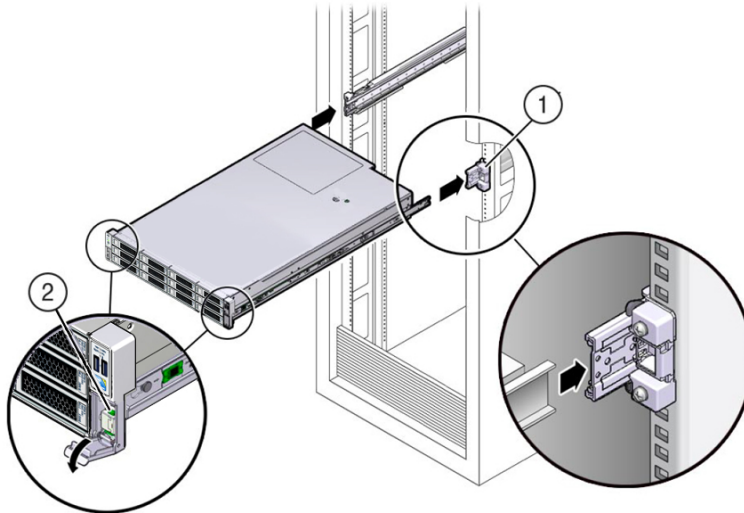


| Call Out | Description |
|----------|-------------|
| 1 | Inserting mounting bracket into slide-rail |
| 2 | Slide-rail release lever |

**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**

**the server into the rack until the slide-rail locks (on the front of the mounting brackets) engage the slide-rail assemblies with an audible click.**
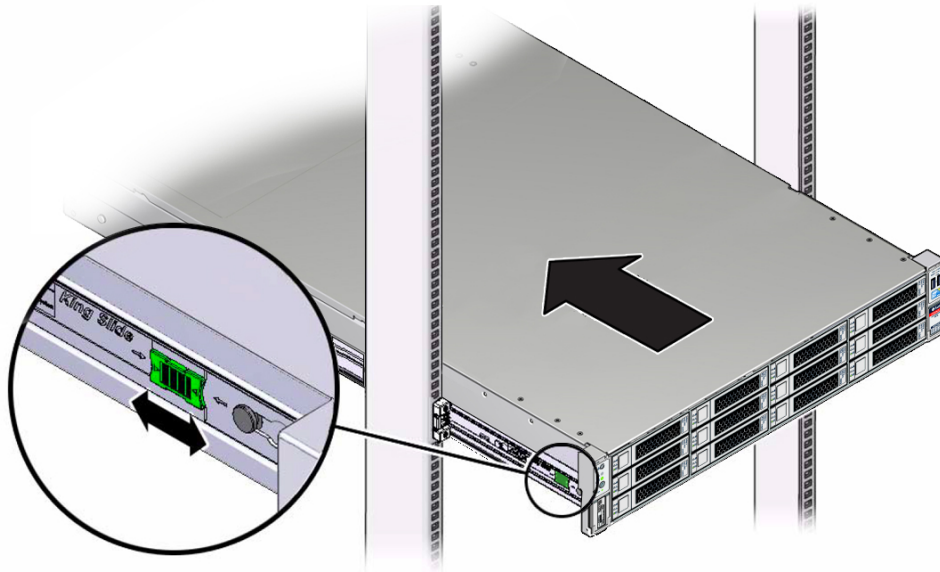


⚠️ **Caution -** Before you install the optional cable management arm, verify that the storage server is securely mounted in the rack and that the slide-rail locks are engaged with the mounting brackets.

### Related Information

■

## ▼ Install the Cable Management Arm (Optional)

Follow this procedure to install the cable management arm (CMA), which you can use to manage cables connected to the back of the storage server.

**Note -** Before you install the CMA, ensure that the right-angle AC power cables are long enough to connect to the rackmounted servers when routed through the CMA.

1. **Unpack the CMA, which contains the following components.**
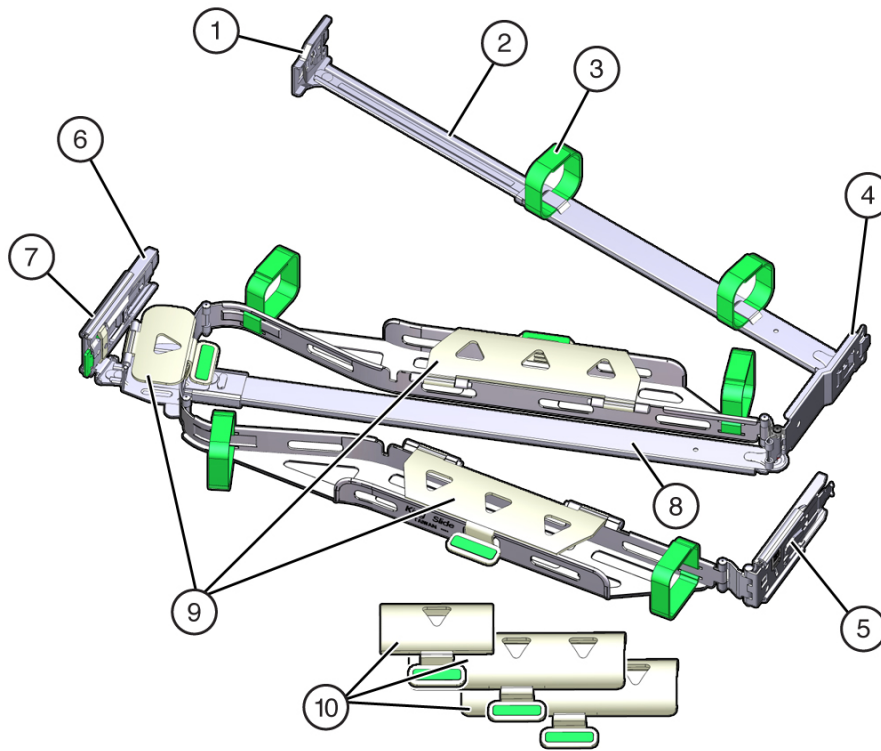


| Call Out | Description |
| --- | --- |
| 1 | Connector A |
| 2 | Front slide bar |
| 3 | Velcro straps (6) |
| 4 | Connector B |
| 5 | Connector C |
| 6 | Connector D |

| Call Out | Description |
|----------|-------------|
| 7 | Slide-rail latching bracket (used with connector D) |
| 8 | Back slide bar |
| 9 | Oracle Storage Server X7-2 (1U) flat cable covers |
| 10 | Oracle Storage Server X7-2L (2U) round cable covers |

2. **Remove the flat cable covers and install the round cable covers.**

   a. **Lift up on the cable cover handle (the handle is colored green) and open it 180 degrees to the horizontal position as shown in the following figure [frames 1 and 2].**

   **Note -** The CMA has three cable covers, two with two hinges (one of which is shown in the following figure), and one with a single hinge. All three cable covers are shown in the previous figure.
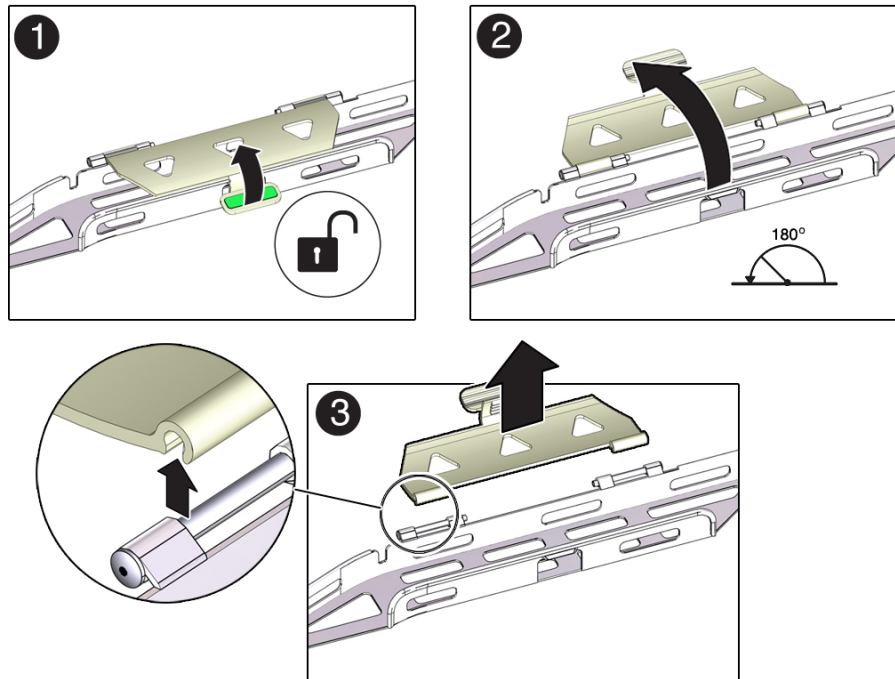
     b. **Apply upward pressure to the outside edge of each hinge connector until the hinge connector comes off the hinge [frame 3].**

     c. **Repeat Step 2a and Step 2b to remove all three cable covers.**

     d. **One at a time, position each round cable cover horizontally over the hinges, and align the hinge connectors with the hinges.**

     e. **Using your thumb, apply downward pressure on each hinge connector to snap the hinge connector into place.**

     f. **Swing the cable covers down and press down on the cable cover handle to lock them into the closed position.**

3. **Ensure that the six Velcro straps are threaded into the CMA as shown in the CMA Components figure at the beginning of this procedure.**

   **Note -** Ensure that the two Velcro straps located on the front slide bar are threaded through the opening in the top of the slide bar. This prevents the Velcro straps from interfering with the expansion and contraction of the slide bar when the storage server is extended out of the rack and returned into the rack.

4. **Extend the storage server approximately 13 cm (5 inches) out of the front of the rack.**

5. **Take the CMA to the back of the equipment rack, and ensure that you have adequate room to work at the back of the storage server.**

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

   **Note -** Throughout this installation procedure, support the CMA and do not allow it to hang under its own weight until it is secured at all four attachment points.

6. **To install the CMA connector A into the left slide-rail:**

     a. **Insert CMA connector A into the front slot on the left slide-rail until it locks into place with an audible click [frames 1 and 2].**

       The connector A tab (see callout 1) goes into the slide-rail front slot (callout 2).

**b.** **Gently tug on the left side of the front slide bar to verify that connector A is properly seated.**
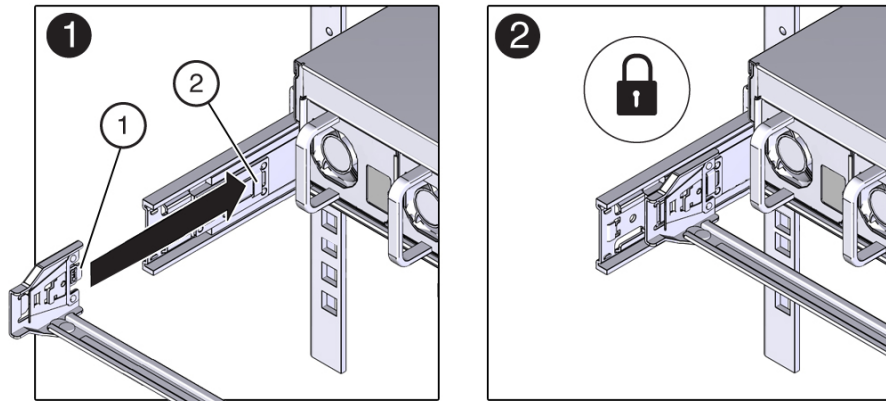


| Call Out | Description |
|----------|-------------|
| 1 | Connector A tab |
| 2 | Left slide-rail front slot |

**7.** **To install CMA connector B into the right slide-rail:**

**a.** **Insert CMA connector B into the front slot on the right slide-rail until it locks into place with an audible click [frames 1 and 2].**

The connector B tab (see callout 1) goes into the slide-rail front slot (callout 2).

b. **Gently tug on the right side of the front slide bar to verify that connector B is properly seated.**
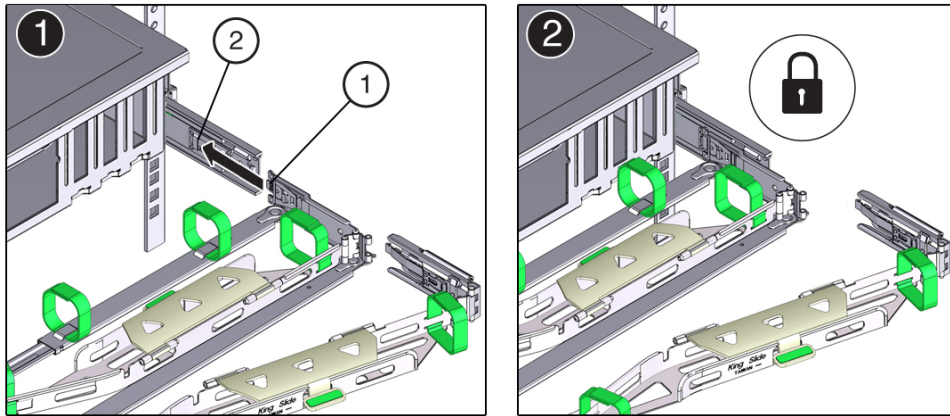


| Call Out | Description |
|----------|-------------|
| 1 | Connector B tab |
| 2 | Right slide-rail front slot |

8. **To install CMA connector C into the right slide-rail:**

a. **Align connector C with the slide-rail so that the locking spring (callout 1) is positioned inside (storage server side) of the right slide-rail [frame 1].**
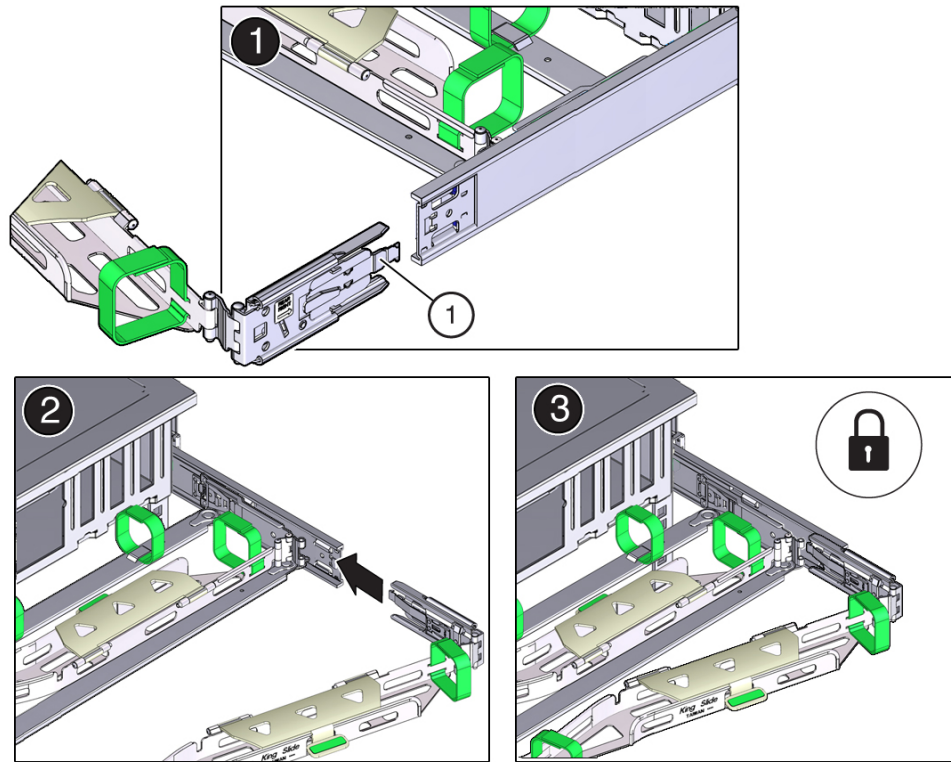


| Call Out | Description |
|----------|-------------|
| 1 | Connector C locking spring |

b. **Insert connector C into the right slide-rail until it locks into place with an audible click [frames 2 and 3].**

c. **Gently tug on the right side of the CMA back slide bar to verify that connector C is properly seated.**

9. **To prepare CMA connector D for installation, remove the tape that secures the slide-rail latching bracket to connector D and ensure that the latching bracket is properly aligned with connector D [frames 1 and 2].**

   **Note -** The CMA is shipped with the slide-rail latching bracket taped to connector D. Remove the tape before you install this connector.
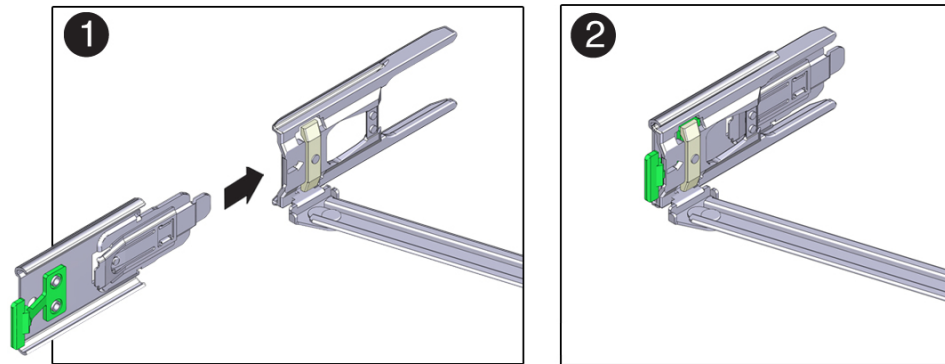


10. **To install CMA connector D into the left slide-rail:**

    a. **While holding the slide-rail latching bracket in place, insert connector D and its associated slide-rail latching bracket into the left slide-rail until connector D locks into place with an audible click [frames 1 and 2].**

    **Note -** When inserting connector D into the slide-rail, the preferred and easier method is to install connector D and the latching bracket as one assembly into the slide-rail.

    b. **Gently tug on the left side of the CMA slide bar to verify that connector D is properly seated.**

> **Note -** The slide-rail latching bracket has a green release tab. Use this tab to release and remove the latching bracket so that you can remove connector D.
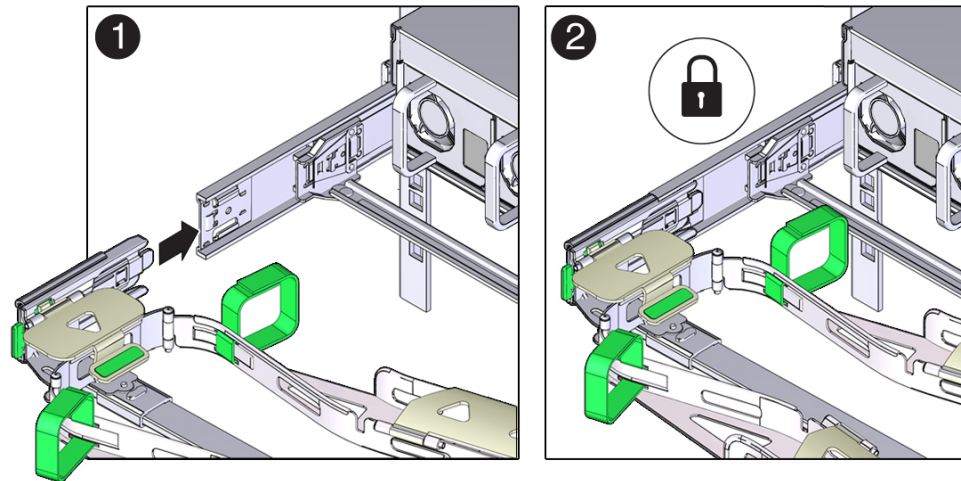


11. **Gently tug on the four CMA connection points to ensure that the CMA connectors are fully seated before you allow the CMA to hang by its own weight.**

12. **To verify that the slide-rails and the CMA are operating properly before routing cables through the CMA:**

    a. **Ensure that the rack anti-tilt bar is extended to prevent the rack from tipping forward when the server is extended.**

> ⚠ **Caution -** To reduce the risk of personal injury, stabilize the rack cabinet and extend the anti-tilt bar before extending the server from the rack. For instructions on stabilizing the rack, see "Stabilize the Rack" on page 38.

    b. **Slowly pull the server out of the rack until the slide-rails reach their stops.**

    c. **Inspect the attached cables for any binding or kinks.**

  **d.**   **Verify that the CMA extends fully with the slide-rails.**
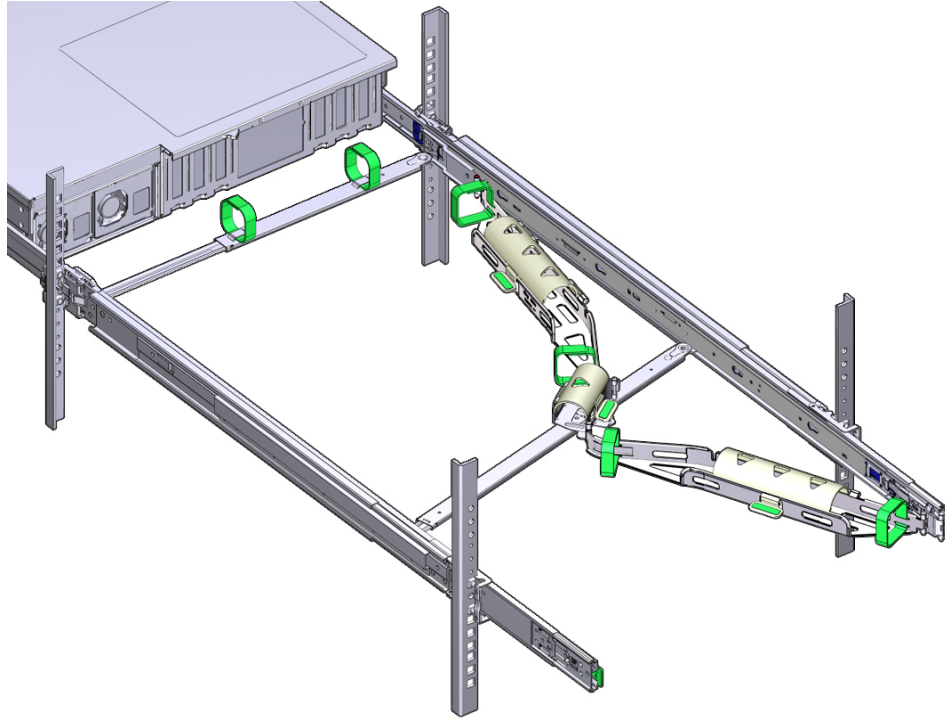


13.   **To return the storage server to the rack:**

  **a.**   **Simultaneously pull and hold the two green release tabs (one on each side of the storage server) toward the front of the storage server while you push the storage server into the rack. As you push the storage server into the rack, verify that the CMA retracts without binding.**

**b. To pull the green release tabs, place your finger in the center of each tab, not on the end, and apply pressure as you pull the tab toward the front of the server.**
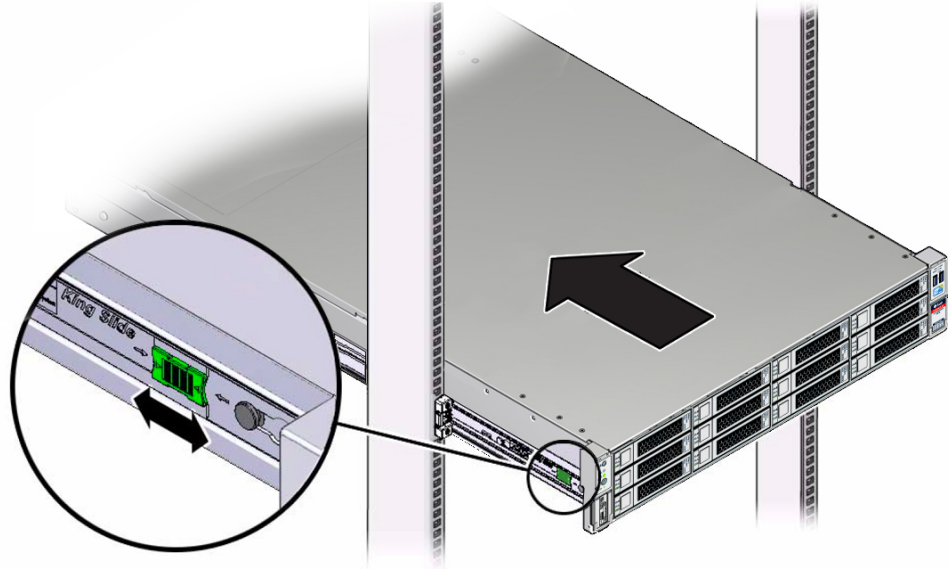


**c. Continue pushing the storage server into the rack until the slide-rail locks (located on the front of the storage server) engage the slide-rail assemblies.**

You hear an audible click when the storage server is in the normal rack position.

**14. Connect cables to the storage server, as required.**

Instructions for connecting the storage server cables are provided in "Cabling the Storage Server" on page 67.

**15. Open the CMA cable covers, route storage server cables through the CMA cable troughs, close the cable covers, and secure the cables with the six Velcro straps.**

Route the cables through the cable troughs in this order:

**a. First through the front-most cable trough.**

b. **Then through the small cable trough.**

c. **Then through the back-most cable trough**

⚠️ **Caution -** When securing the cables with the Velcro straps located on the front slide bar, ensure that the Velcro straps do not wrap around the bottom of the slide bar. Otherwise, expansion and contraction of the slide bar might be hindered when the server is extended from the rack and returned to the rack.
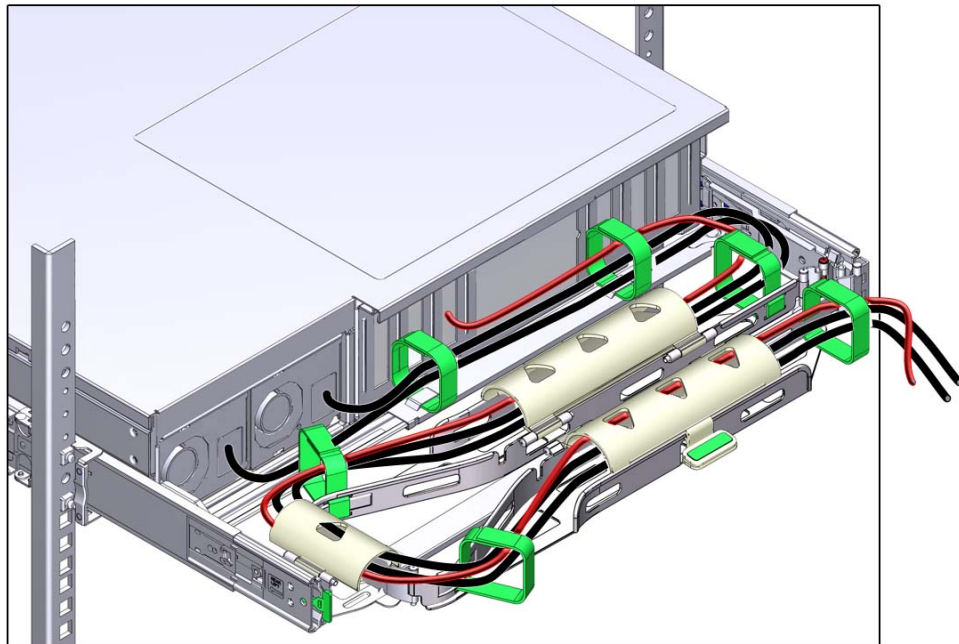


16. **Ensure that the secured cables do no extend above the top or below the bottom of the storage server to which they are attached; otherwise, the cables might snag on other equipment installed in the rack when the storage server is extended from the rack or returned to the rack.**

17. **If necessary, bundle the cables with additional Velcro straps to ensure that they stay clear of other equipment. If you need to install additional Velcro straps, wrap the straps around the cables only, not around any of the CMA components;**

**otherwise, expansion and contraction of the CMA slide bars might be hindered when the storage server is extended from the rack and returned to the rack.**

**Related Information**

- "Remove the Cable Management Arm" on page 60

## ▼ Remove the Cable Management Arm

Follow this procedure to remove the cable management arm (CMA).

Before you begin this procedure, refer to the figure of CMA components in "Install the Cable Management Arm (Optional)" on page 48 and identify CMA connectors A, B, C, and D. You should disconnect the CMA connectors in the reverse order in which you installed them, that is, disconnect connector D first, then C, then B, and finally A.

Throughout this procedure, after you disconnect any of the CMA four connectors, do not allow the CMA to hang under its own weight.

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

1. **To prevent the rack from tipping forward when the storage server is extended, extend all rack anti-tilt devices.**

   **Caution -** To reduce the risk of personal injury, stabilize the rack cabinet and extend all anti-tilt devices before extending the storage server from the rack. For instructions for stabilizing the rack, see "Stabilize the Rack" on page 38.

2. **To make it easier to remove the CMA, extend the server approximately 13 cm (5 inches) out of the front of the rack.**

3. **To remove the cables from the CMA:**

   a. **Disconnect all cables from the back of the server.**

   b. **If applicable, remove any additional Velcro straps that were installed to bundle the cables.**

   c. **Unwrap the six Velcro straps that are securing the cables.**

     **d.** **Open the three cable covers to the fully opened position.**

     **e.** **Remove the cables from the CMA and set them aside.**

**4.** **To disconnect connector D:**

     **a.** **Press the green release tab (callout 1) on the slide-rail latching bracket toward the left and slide the connector D out of the left slide-rail [frames 1 and 2].**

When you slide connector D out of the left slide-rail, the slide-rail latching bracket portion of the connector remains in place. You will disconnect it in the next step.

> **Note -** After you disconnect connector D, do not allow the CMA to hang under its own weight. Throughout the remainder of this procedure, the CMA must be supported until all the remaining connectors are disconnected and the CMA can be placed on a flat surface.
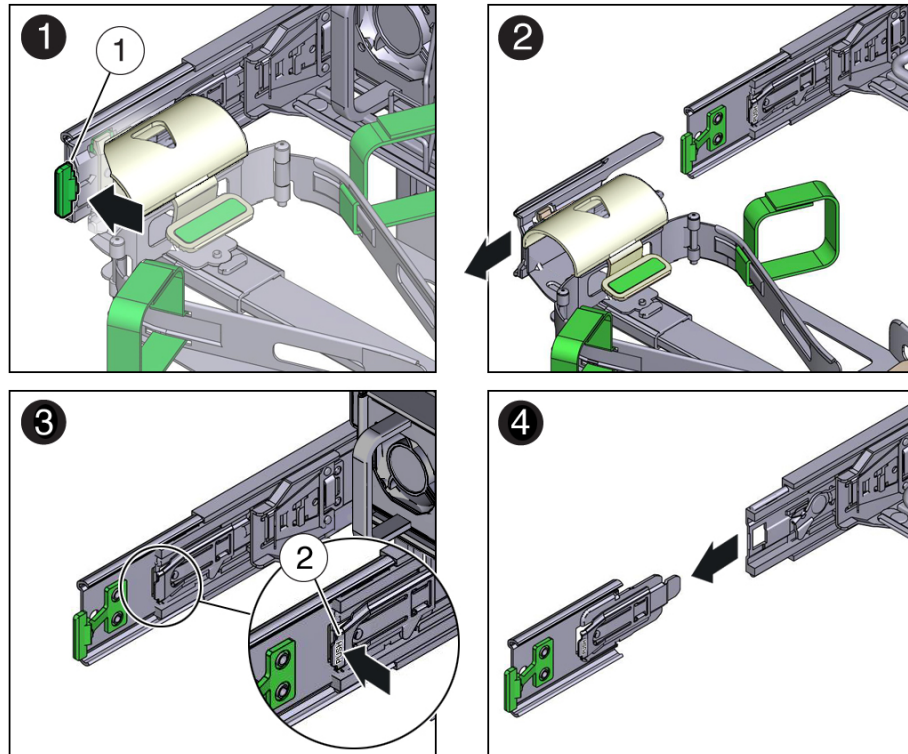


| Call Out | Description |
|---|---|
| 1 | Connector D release tab (green) |
| 2 | Slide-rail latching bracket release tab (labeled PUSH) |

b. **Use your right hand to support the CMA and use your left thumb to push in (toward the left) on the slide-rail latching bracket release tab labeled PUSH (callout 2), and pull the latching bracket out of the left slide-rail and put it aside [frames 3 and 4].**

**5.** **To disconnect connector C:**

    **a.** **Place your left arm under the CMA to support it.**

    **b.** **Use your right thumb to push in (toward the right) on the connector C release tab labeled PUSH (callout 1), and pull connector C out of the right slide-rail [frames 1 and 2].**
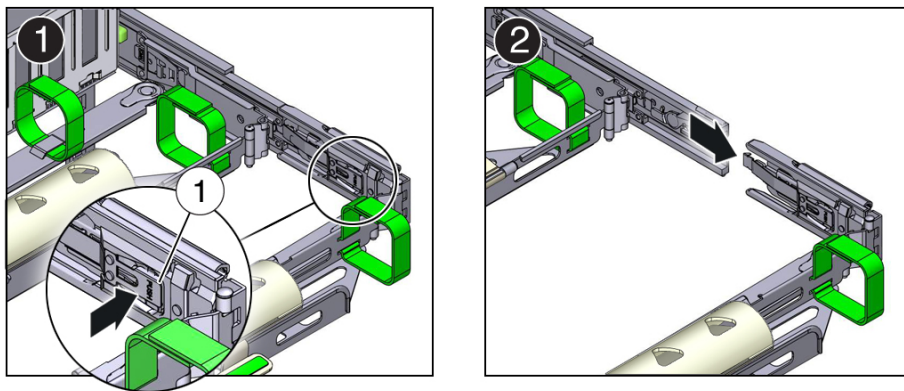


| Call Out | Description |
|---|---|
| 1 | Connector C release tab (labeled PUSH) |

**6.** **To disconnect connector B:**

    **a.** **Place your right arm under the CMA to support it and grasp the back end of connector B with your right hand.**

**b.** **Use your left thumb to pull the connector B release lever to the left away from the right slide-rail (callout 1) and use your right hand to pull the connector out of the slide-rail [frames 1 and 2].**
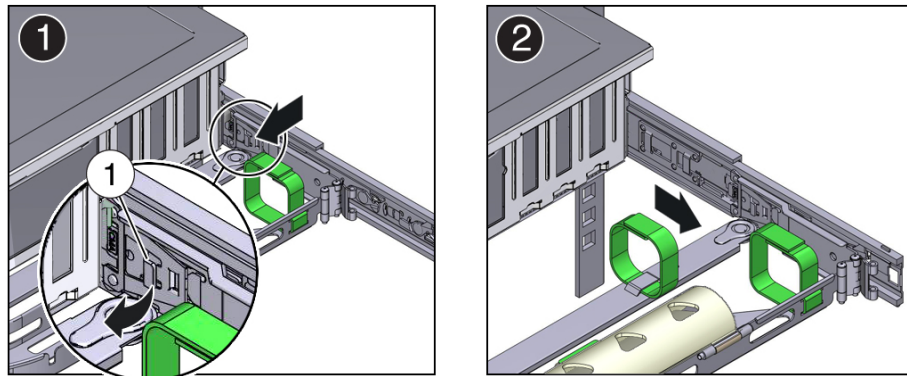


| Call Out | Description |
|----------|-------------|
| 1 | Connector B release lever |

**7.** **To disconnect connector A:**

**a.** **Place your left arm under the CMA to support it and grasp the back end of connector A with your left hand.**

     **b.** **Use your right thumb to pull the connector A release lever to the right away from the left slide-rail (callout 1), and use your left hand to pull the connector out of the slide-rail [frames 1 and 2].**
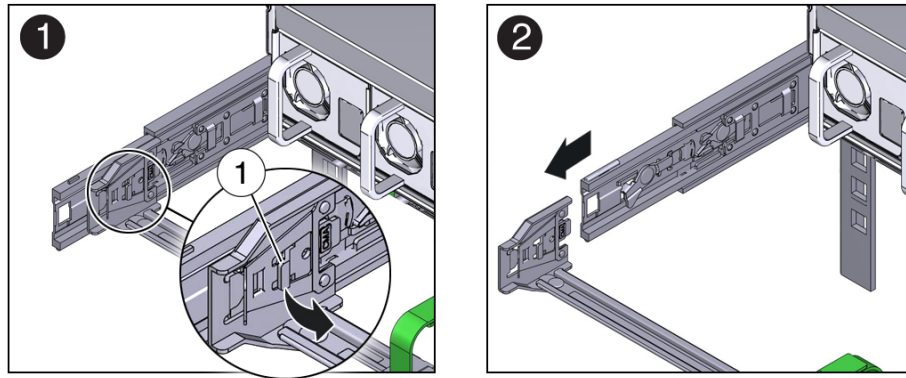


| Call Out | Description |
|----------|-------------|
| 1 | Connector A release lever |

**8.** **Remove the CMA from the rack and place it on a flat surface.**

**9.** **Go to the front of the storage server and push it back into the rack.**

### Related Information

- "Install the Cable Management Arm (Optional)" on page 48

# Cabling the Storage Server

This section contains procedures for connecting data and storage server management cables and power cords to the storage server.

- "Cabling Requirements" on page 67
- "Back Cable Connections and Ports" on page 68
- For detailed information about cabling the storage server in the Oracle Exadata Database Machine, refer to the *Oracle Exadata Database Machine System Overview* at `https://docs.oracle.com/cd/E80920_01/index.htm`.

**Related Information**

- "Installation Procedure Overview" on page 11
- "Install the Cable Management Arm (Optional)" on page 48

# Cabling Requirements

Read the following cable requirements for connecting the server.

- **Minimum cable connections for the storage server**
  - At least one server on-board Ethernet network connection (NET port)
  - Serial management port (SER MGT): Service Processor (SP) local connection for Oracle ILOM boot messages
  - Power cables for the server power supplies
- **SP management ports**
  - The SER MGT port uses an RJ-45 cable and is always available. This port is the default connection to the Oracle ILOM SP.
  - The network management port (NET MGT) is the optional connection to the Oracle ILOM SP. The NET MGT port is configured to use DHCP by default. The SP network management port uses an RJ-45 cable for a 10/100/1000 BASE-T connection.
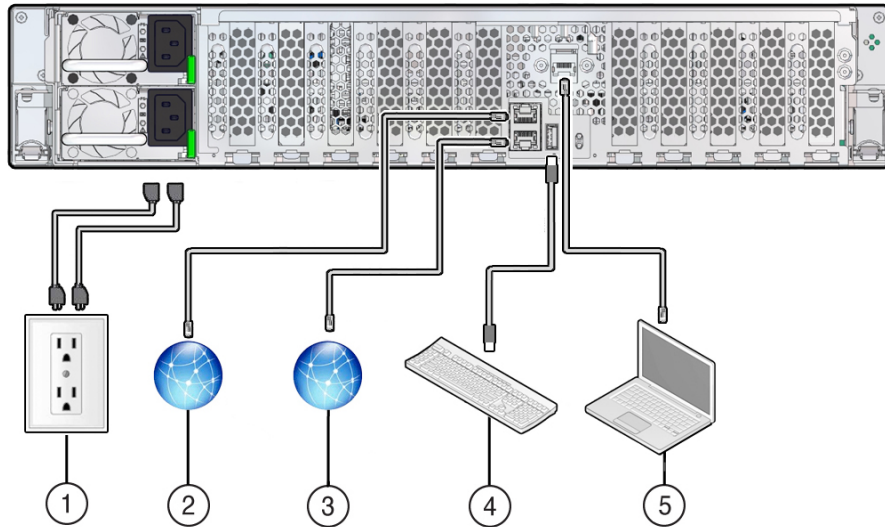
- **Ethernet port**
  - The Ethernet port, labeled NET 0, connects the server to the network.
  - The Ethernet interfaces operates at 100 Mbps, 1000 Mbps, and 10,000 Mbps.

- **USB Ports** You can connect and disconnect USB cables and peripheral devices while the server is running without affecting server operations.
- **Oracle Dual Port QDR InfiniBand Adapter M4** Use an InfiniBand cable to connect each adapter to each port InfiniBand switch on the back of the rack. For details on how to cable the adapters to the switches, refer to `https://docs.oracle.com/cd/E80920_01/DBMSO/exadata-cabling-tables-x7.htm#GUID-912E153E-7393-4852-9E4B-E18DAC7C8E11`.
- **AC power cables** Two power supply connectors, one for each power supply.

### Related Information

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# Back Cable Connections and Ports

The following figure shows the locations of cable connectors and ports on the back of the storage server and the cables and devices that you connect to them. For cabling assignments, refer to the Exadata Database Machine System Overview at: `http://docs.oracle.com/cd/E80920_01/index.htm`.

| No. | Cable Port or Expansion Slot | Description |
| --- | --- | --- |
| 1 | ■ Power supply 0 input power<br>■ Power supply 1 input power | ■ The server has two power supply connectors, one for each power supply.<br>■ Do not attach power cables to the power supplies until you have finished connecting the data cables to the server. The server goes into Standby power mode, and the Oracle ILOM service processor initializes when the AC power cables are connected to the power source. System messages might be lost after 60 seconds if the server is not connected to a terminal, PC, or workstation.<br><br>**Note -** Oracle ILOM will signal a fault on any installed power supply that is not connected to an AC power source, since it might indicate a loss of redundancy. |
| 2 | Network management port (NET MGT) | The service processor NET MGT port is the optional connection to the Oracle ILOM service processor. The NET MGT port is configured by default to use Dynamic Host |

| No. | Cable Port or Expansion Slot | Description |
|---|---|---|
|  |  | Configuration Protocol (DHCP). The service processor NET MGT port uses an RJ-45 cable for a 10/100/1000BASE-T connection. |
| 3 | Ethernet port (NET 0) | The Ethernet port enables you to connect the system to the network. The Ethernet port uses an RJ-45 cable for a 100/1000BASE-T connection. |
| 4 | USB port | The USB port support hot-plugging. You can connect and disconnect a USB cable or a peripheral device while the server is running without affecting system operations. |
| 5 | Serial management port (SER MGT) | The service processor SER MGT port uses an RJ-45 cable and terminal (or emulator) to provide access to the Oracle ILOM command-line interface (CLI). Using Oracle ILOM, you can configure it to connect to the system console. **Note -** This port does not support network connections. |

## USB Port

One USB 3.0 port is located at the back panel. See the location of the USB port at "Back Cable Connections and Ports" on page 68. The USB port supports hot-plugging. You can connect and disconnect a USB cable or a peripheral device while the server is running without affecting server operations.

Each USB port supplies 5V output at 2A.

## SER MGT Ports

The SER MGT RJ-45 port, located on the back panel, provides the default connection to the Oracle ILOM SP. For DTE to DTE communications, you can use a RJ-45 to DB-9 crossover adapter with a standard RJ-45 cable to achieve the required null modem configuration. See "Back Cable Connections and Ports" on page 68.

## NET MGT Port

The NET MGT port, located on the back panel, provides an optional Ethernet connection from Oracle ILOM to the SP. The NET MGT port uses an RJ-45 cable for a 10/100/1000 BASE-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. See "Back Cable Connections and Ports" on page 68.
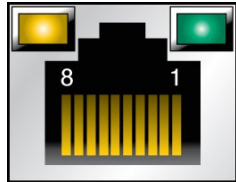


## Ethernet Ports

The storage server has one RJ-45, 1-Gigabit Ethernet (1GbE) network connector, labeled NET0. Use any of these ports to connect the server to the network.
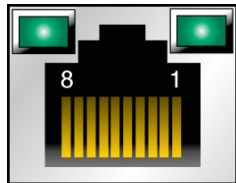
> **Note -** To achieve 10 GbE network speeds, use Category 6 (or better) cables and network devices that support 1000BASE-T networks.

The LEDs located above each NET port are Link/Activity (left) and Speed (right) indicators for each port. The following table lists the Ethernet transfer rates and the Speed LED color.

| Connection Type | IEEE Terminology | Speed LED Color | Transfer Rate |
|---|---|---|---|
| Fast Ethernet | 100BASE-TX | Off | 100 Mbits/sec |
| Gigabit Ethernet | 1000BASE-T | Amber | 1,000 Mbits/sec |
| 10 Gigabit Ethernet | 10GBASE-T | Green | 10,000 Mbits/sec |

# Powering On the Oracle Exadata Rack

For instructions on how to power on the Oracle Exadata Rack, refer to the *Oracle Exadata Database Machine Installation and Configuration Guide* at `https://docs.oracle.com/cd/E80920_01/index.htm`.

> **Caution -** Do not connect the power cords to the storage server until you have made the service processor (SP) and host networking cable connections. The storage server includes an SP that you use to configure and boot the host system. Connecting the SP and host networking cables first enables you to properly configure the host system and view SP messages.

## Server Boot Process and Normal Operating State Indicators

A normal server boot process involves two indicators, the service processor SP OK LED indicator and the System OK LED indicator.

When you connect AC power to the server, the server boots into standby power mode:

1. The SP OK LED blinks slowly (0.5 seconds on, 0.5 seconds off) while the SP is starting, and the main System OK LED remains off until the SP is ready.
2. After a few minutes, the main System OK LED slowly flashes the standby blink pattern (0.1 seconds on, 2.9 seconds off), indicating that the SP is ready for use. In Standby power mode, the server is not initialized or fully powered on at this point.

When powering on the server (either by the On/Standby button or Oracle ILOM), the server boots to Main power mode:

1. The System OK LED blinks slowly (0.5 seconds on, 0.5 seconds off), and the SP OK LED remains lit (no blinking).

2. When the server successfully boots, the System OK LED remains lit. When the System OK LED and the SP OK LED indicators remain lit, the server is in Main power mode.

**Note -** The green System OK LED indicator and the green SP OK indicator remain lit (no blinking) when the server is in a normal operating state.

## Related Information

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# Troubleshooting Installation Issues

This section provides information about troubleshooting resources, the technical support worksheet, and locating the system serial number.

## Troubleshooting Oracle ILOM

This section addresses two issues that might occur on the Oracle ILOM service processor (SP):

- You need to reset the Oracle ILOM SP to complete an upgrade or to clear an error.

  Resetting the server SP automatically disconnects any current Oracle ILOM sessions and renders the SP unmanageable until the reset process is complete.

- As the system administrator, you forgot the `root` account password and need to recover it.

For instructions to address each issue, see the following sections:

## ▼ Reset the Service Processor Using Oracle ILOM

● **If the Oracle ILOM service processor (SP) becomes unresponsive, use one of the following methods to reset it:**

■ **From the Oracle ILOM command-line interface (CLI), type the command:**
`reset /SP`

■ **From the Oracle ILOM web interface, click** `Administration` → `Maintenance` → `Reset SP.`

**Note -** Resetting the Oracle ILOM SP disconnects your current Oracle ILOM session. Log in again to resume working in Oracle ILOM.

## ▼ Reset the Service Processor From the Server Back Panel

If the Oracle ILOM SP is hung and you cannot reset it using the Oracle ILOM web interface or the Oracle ILOM CLI command, use the following procedure to reset the SP from the server back panel.

1. **Using a stylus, press the Reset SP pinhole button located on the server back panel.**

| Callout | Description |
|---------|-------------|
| 1 | SP Reset pinhole button |
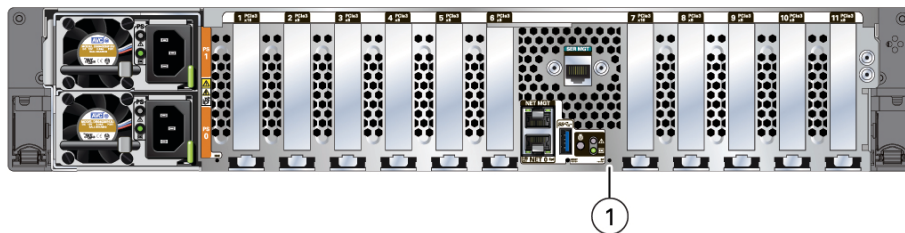


2. **After the SP reboots, log in again to continue working in Oracle ILOM.**

## ▼ Recover the Root Account Password

System administrators can recover the preconfigured Oracle ILOM local `root` account or the password for the local `root` account by using the preconfigured Oracle ILOM default password.

To recover the `root` account password you need a local serial management port (SER MGT) connection to Oracle ILOM. If the Physical Presence State is enabled (the default) in Oracle ILOM, you must prove that you are physically present at the server.

To recover the `root` account password, perform these steps:

1. **Establish a local serial management connection to Oracle ILOM and log in to Oracle ILOM using the `default` user account.**

   For example: *host-name* login: default

   Press and release the physical presence button

   Press return when this is completed...

2. **Prove physical presence at the server.**

   To prove physical presence at the server, press the Locate button on the front of the server.

3. **Return to your serial console and press `Enter`.**

4. **At the Oracle ILOM password prompt, type the password for the `default` user account: `defaultpassword`.**

5. **Reset the account password or re-create the `root` account.**

   For more information, refer to "Configuring Local User Accounts" in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance, Firmware Release 4.0.x* at `http://www.oracle.com/goto/ilom/docs`.

# Resources for Troubleshooting and Diagnostics

For server information about troubleshooting hardware faults, refer to "Troubleshooting and Diagnostics" in *Oracle Exadata Storage Server X7-2 EF and HC Service Manual*.

You can access knowledge articles, white papers, and product updates from the My Oracle Support web site at `https://support.oracle.com`.

The following table lists diagnostic and troubleshooting resources that can assist you with resolving server issues.

| Description | Reference Link |
|---|---|
| ■ x86 servers diagnostics<br>■ Runtime and firmware-based tests<br>■ Oracle ILOM procedures<br>■ UEFI diagnostics tests to exercise the system and isolate subtle and intermittent hardware-related problems | *Oracle x86 Servers Diagnostics and Troubleshooting Guide for Oracle x86 Servers With Oracle ILOM 4.0.x* at `http://www.oracle.com/goto/x86admindiag/docs` |
| ■ Administrative information for the Oracle X7 series servers<br>■ Oracle ILOM system event log (SEL) that identifies the possible source of a problem | *Oracle X7 Series Servers Administration Guide* at `http://www.oracle.com/goto/x86admindiag/docs` |
| ■ Troubleshooting front and back panel status indicators | "Troubleshooting and Diagnostics" in *Oracle Exadata Storage Server X7-2 EF and HC Service Manual* |
| ■ Managing server hardware faults using the Oracle ILOM Fault Management Shell | "Managing Server Hardware Faults Using the Oracle ILOM Fault Management Shell" in *Oracle Exadata Storage Server X7-2 EF and HC Service Manual* |

# Technical Support Information Worksheet

If the troubleshooting information does not solve your problem, use the following table to collect information that you need to communicate to Oracle Service.

| System Configuration Information Needed | Your Information |
|---|---|
| Service contract number | |
| System model | |
| Operating system | |
| System serial number (For instructions for locating this number, see "Locating the System Serial Number" on page 79.) | |
| Peripherals attached to the system | |
| Email address and phone number for you and a secondary contact | |
| Street address where the system is located | |
| Superuser password | |
| Summary of the problem and the work being done when the problem occurred | |

| System Configuration Information Needed | Your Information |
|---|---|
| IP address | |
| Server name (system host name) | |
| Network or Internet domain name | |
| Proxy server configuration | |

# Locating the System Serial Number

When you ask for service on your system, you might need to have your server serial number. Record this number for future use. Use one of the following methods to locate your server serial number:

- On the front panel of the server, look to the left side of the chassis and below the status LEDs.
- Locate the Customer Information Sheet (CIS) attached to your server packaging. This sheet includes the serial number.
- From the Oracle ILOM web interface, go to the `System Information` → `Summary Information` page in the Oracle ILOM web interface.
- From the Oracle ILOM CLI, type `show /System`.

# Locating the Exadata Database Machine Rack Serial Numbers and JobID Label

During a service call, you might need the serial numbers and the JobID label from the Exadata Database Machine rack. Record these numbers for future use. You can find the system serial numbers and JobID label in the following physical locations:

- Look for the Large System Serial Number label and JobID label on the front of the rack, inside the door, on the left vertical strut starting at rack unit 23 (U23) and going down.
- Look for the Small System Serial Number label on the top left portion of the cabinet from the rear above the power distribution unit (PDU).

### Related Information

- "EF Front Panel Features" on page 26
- "HC Front Panel Features" on page 28

# Site Planning Checklists

This section provides checklists for site preparation.

## Preparation Checklists

Complete the following checklists to ensure that your site meets the physical, electrical, and environmental requirements of the Oracle Exadata Storage Server X7-2L before you receive the server.

## Access Route and Data Center Checklist

Review the following facility requirements before you install the server.

| Data Center Room Considerations | Yes | No | N/A | Comment |
|---|---|---|---|---|
| Has the access route been checked for clearances of the packaged equipment? | | | | |
| Do all the doors and entryways conform to the width and height requirements for transportation, including the width of the unpacked unit? | | | | |
| Are there any ramps, stairs, or thresholds that are in the moving path for the new hardware? | | | | |

| Data Center Room Considerations | Yes | No | N/A | Comment |
|---|---|---|---|---|
| Have you confirmed that the access route is free of any obstacles that would expose the device to shock? | | | | |
| If there are stairs, then is a loading elevator accessible for moving the equipment? | | | | |
| Has the rack location been allocated? | | | | |
| Is there a vacant space in the rack for the new server? | | | | |
| Does the floor layout meet the equipment maintenance access requirements? | | | | |
| Have cabinet stabilization measures been implemented? | | | | |
| Will the hardware location require any non-standard cable lengths? | | | | |
| Is the floor to ceiling height a minimum of 2914 mm or 2.9 m (9.6 feet)? | | | | |

### Related Information

- "Rack Compatibility" on page 36

# Data Center Environment Checklist

Complete the following checklist to ensure that the data center environment requirements are met for the server.

| Data Center Environment Considerations | Yes | No | N/A | Comment |
|---|---|---|---|---|
| Does the computer room air handling meet temperature and humidity requirements? | | | | |
| Does the installation floor layout satisfy the ventilation requirements? | | | | |
| Will the equipment be positioned so that the exhaust air of one rack does not enter the air intake of another rack? | | | | |
| Are the perforated floor tiles each rated at 400 CFM or greater? | | | | |
| Do the data center air conditioners provide sufficient front to back airflow? | | | | |
| Is airflow adequate to prevent hot spots? | | | | |
| Can the data center continuously satisfy environmental requirements? | | | | |
| Can more vented floor tiles be obtained if required? | | | | |

**Related Information**

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# Facility Power Checklist

Complete the following checklist to ensure that the facility power requirements are met for the data center where the server is installed.

| Facility Power Considerations | Yes | No | N/A | Comment |
|---|---|---|---|---|
| Do you know the required operating voltage and electric current level of the server and peripherals? | | | | |
| Are enough power outlets provided within 2 meters (6.5 feet) for each rack? | | | | |
| Do the power outlets have appropriate socket receptacles? | | | | |
| Will optional ground cables be attached to the rack? | | | | |
| Are the circuit breakers for the equipment suitable for voltage and current-carrying capacities? | | | | |
| Does the power frequency meet the equipment specifications? | | | | |
| Will system power be delivered from two separate power grids? | | | | |
| Is there a UPS to power the equipment? | | | | |
| Do you have the minimum required power sources to support the power load for the new hardware? Use kilowatt (kW)/kilovolt (kVA) to express power load. | | | | |

**Related Information**

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# Rackmount Checklist

Complete the following checklist before you install the server into a rack.

| Rackmount Considerations | Yes | No | N/A | Comment |
|---|---|---|---|---|
| Is the distance between the front and back mounting planes between a minimum of 610 mm and a maximum 915 mm (24 inches to 36 inches)? | | | | |
| Is the clearance depth in the front of the front mounting plane (distance to the front cabinet door) at least 25.4 mm (1 inch)? | | | | |
| Does the target rack meet the following minimum load capacity:<br><br>■ 19 kg/rack unit<br>■ 785 kg total | | | | |
| Is the rack a four-post rack (mounting at both front and back)?<br><br>Two-post racks are not compatible. | | | | |
| Do the horizontal opening and unit vertical pitch of the rack conform to ANSI/EIA 310-D-1992 or IEC 60297 standards? | | | | |
| Does the rack have RETMA rail support? | | | | |
| Does the rack support Oracle cable management arms (CMAs)? | | | | |
| Does the rack support installation of Oracle vented and solid filler panels? | | | | |
| Is there sufficient space for cable harnesses and the power distribution units (PDUs) in the rack, if required? | | | | |
| Can a label with the server serial number be printed and attached to the target rack? | | | | |
| Did you label the network cables that will connect to the server? | | | | |
| Does the rack support installation of standard Oracle PDUs?<br><br>If not, then complete this checklist. | | | | |
| Can the customer provide an equivalent pair of PDUs? | | | | |
| Can the customer provide two PDUs with capacity of 110kVA per PDU? | | | | |
| Can the customer provide a single PDU and its circuits to support the power requirements in case a PDU fails? | | | | |
| Can the customer ensure power loads are evenly distributed across all circuits of a single PDU? | | | | |

**Related Information**

- "Rack Space Requirements" on page 14
- "Installing the Storage Server Into a Rack" on page 33

# Safety Checklist

Complete the following checklist to ensure that the safety requirements are met for the data center where the server will be installed.

| Safety Checklist Considerations | Yes | No | N/A | Comment |
|---|---|---|---|---|
| Is there an emergency power shutoff? | | | | |
| Is there a fire protection system in the data center room? | | | | |
| Is the computer room adequately equipped to extinguish a fire? | | | | |
| Is antistatic flooring installed? | | | | |
| Is the floor below the raised floor free of obstacles and blockage? | | | | |

**Related Information**

- "Electrical Requirements" on page 18
- *Oracle Engineered System Safety and Compliance Guide, Compliance Model No.: ESY27*

# Logistics Checklist

Complete the following checklist to ensure that the logistics requirements are met for the data center where the server will be installed.

| Logistics Checklist Considerations | Yes | No | N/A | Comment |
|---|---|---|---|---|
| Do you have contact information for the data center personnel? | | | | |
| Is there security or access control for the data center? | | | | |
| Are there any security background checks or security clearances required for vendor personnel to access the | | | | |

| Logistics Checklist Considerations | Yes | No | N/A | Comment |
|---|---|---|---|---|
| data center? If yes, then do you have a recommended agency? | | | | |
| Are there any additional security access issues? | | | | |
| Is computer room access available for installation personnel? | | | | |
| Are laptops, cell phones, and cameras allowed in the data center? | | | | |
| Does the building have a delivery dock? | | | | |
| Is there a delivery/unpacking/staging area, and is it protected from environmental elements? | | | | |
| Is the unpacking area air-conditioned to avoid thermal shock for various hardware components? | | | | |
| Will sufficient moving personnel be available to install the hardware? | | | | |
| Are you prepared for uncrating and trash removal? | | | | |
| Are there any restrictions on delivery truck length, width, or height? | | | | |
| Are cardboard boxes and other packing material allowed in the computer room? | | | | |
| Is there a time constraint on dock access? If yes, then provide the time constraints. | | | | |
| Is a tail lift required of the delivery carrier to unload the equipment at the delivery dock? | | | | |
| Will any of the following items be required to place equipment in the computer room?<br><br>■ Stair walkers<br>■ Lifters<br>■ Ramps<br>■ Steel plates<br>■ Floor covers | | | | |
| Does the delivery carrier require any special equipment, such as non-floor damaging rollers, transport dollies, pallet jacks, or fork lifts? | | | | |

## Related Information

- "Storage Server Physical Specifications" on page 13
- "Receiving and Unpacking Requirements" on page 14
- *Oracle Exadata Storage Server X7-2 EF and HC Service Manual*
- *Oracle Engineered System Safety and Compliance Guide, Compliance Model No.: ESY27*

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