Oracle® ZFS Storage ZS5-ES Installation Guide, Release OS8.6.x

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Contents

Installation Procedure Overview

The following table lists the Oracle ZFS Storage ZS5-ES installation tasks. The ZS5-ES is based on the Oracle X5-2 Server.

Review the entire installation procedure and find links to more information about each step.

Step	Description	Links
1	Review the release notes for late-breaking information about the software version installed on ZS5-ES.	Oracle ZFS Storage Appliance: Software Updates (Doc ID 2021771.1) (`https://support.oracle.com/epmos/faces/DocumentDisplay?id=2021771.1`)
2	Review the site requirements, specifications, components and confirm that you have received all of the items you ordered. Familiarize yourself with ESD and safety precautions; and assemble the required tools and equipment.	"Preparing for Installation" on page 11
3	Review the appliance features.	"About Controller Features and Components" on page 23
4	Install any separately shipped optional components.	*Oracle ZFS Storage ZS5-ES Service Manual*
5	Install the disk shelves and controller into a rack.	"Installing the Appliance Into a Rack" on page 27
6	Connect network and cluster cables to the controller.	"Cabling the Appliance" on page 55
7	Connect cables to Oracle disk shelves.	"Connect the Controller to Oracle Disk Shelves" on page 58
8	Power on and initially configure the appliance.	"Powering On and Initially Configuring the Appliance" on page 61
9	(Optional) Update the appliance software and firmware.	"Downloading and Installing Appliance Software Updates" on page 73
12	Troubleshoot installation issues.	"Troubleshooting Installation Issues" on page 75

Preparing for Installation

This section provides the information you need to prepare for installation.

Description	Links
Review the controller physical specifications.	"Controller Physical Specifications" on page 11
Prepare the space for rackmounting the controller into the rack.	"Space Requirements" on page 12
Review the site electrical requirements and controller power requirements.	"Electrical Power Requirements" on page 13
Review temperature, humidity, and other environmental requirements for the controller.	"Environmental Requirements" on page 15
Review ventilation and cooling requirements.	"Ventilation and Cooling" on page 17
Review Agency Compliance specifications for the controller.	"Agency Compliance" on page 18
Unpack the controller and verify the ship kit contents.	"Shipping Inventory" on page 19
Assemble the tools required for installation.	"Tools and Equipment Needed for Installation" on page 19
Review ESD requirements and take safety precautions.	"ESD and Safety Precautions" on page 20

Controller Physical Specifications

The following table lists the physical specifications for the Oracle ZFS Storage ZS5-ES controller.

TABLE 1   Oracle ZFS Storage ZS5-ES Controller Physical Specifications

Dimension	Controller Specification	Measurements
Width	With bezel	48.24 cm (18.99 inches)
	Chassis	43.65 cm (17.19 inches)
Depth	Maximum overall	73.70 cm (29.02 inches)
Height	1-rack unit (1U) nominal	4.26 cm (1.68 inches)
Weight	Fully populated controller	18.14 kg (40 lbs)

Space Requirements

The Oracle ZFS Storage ZS5-ES is a one rack unit (1U) controller. For physical dimensions, see "Controller Physical Specifications" on page 11.

The controller can be installed into a four-post rack cabinet that conforms to ANSI/EIA 310-D-1992 or IEC 60927 standards, such as Oracle's Sun Rack II. All Oracle racks have the same space requirements. The specifications for Oracle's Sun Rack II are listed in the following table.

TABLE 2   Sun Rack II Models 1242 and 1042 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 (front door handle to rear door handle)	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)

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) is 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.

The following sections provide additional space requirements:

- "Receiving and Unpacking Guidelines" on page 12
- "Maintenance Space Guidelines" on page 13

Receiving and Unpacking Guidelines

The following table lists the dimensions and weights for the Oracle ZFS Storage ZS5-ES controller shipping carton. The clustered controllers are shipped in separate cartons.

TABLE 3   Controller Shipping Carton Specifications

Requirement	Specification
Shipping carton height	26.0 cm (10.24 inches)
Shipping carton width	60.65 cm (23.88 inches)
Shipping carton length	99.0 cm (38.98 inches)
Shipping carton weight	5.65 kg (12.46 lbs)

When the controller is unloaded at your site, leave the controller in its shipping carton until it arrives in its installation location. Use a separate area to remove the packaging material to reduce particle contamination before entering the data center. Ensure that there are clear pathways and enough clearance for moving the controller from the unpacking area to the installation location. The entire access route to the installation site should be free of raised-pattern flooring that can cause vibration.

Maintenance Space Guidelines

The maintenance area for the rackmounted Oracle ZFS Storage ZS5-ES must have the required access space. The following table lists the maintenance access requirements for the controller when it is installed in a rack.

TABLE 4   Maintenance Access Requirements

Location	Maintenance Access Requirement
Rear of the controller	91.4 cm (36 inches)
Area above the rack	91.4 cm (36 inches)
Front of the controller	123.2 cm (48.5 inches)

Electrical Power Requirements

The Oracle ZFS Storage ZS5-ES controller uses AC power. The following table lists the power supply specifications for the controller.

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

TABLE 5   Power Supply Specifications

Parameter	Specification
Voltage (nominal)	100 to 127 VAC; 200 to 240 VAC
Input current (maximum)	7.2 A @ 100-127 VAC; 3.4 A @ 200-240 VAC
Frequency (nominal)	50/60 Hz (47 to 63 Hz range)

The controller can operate effectively over a range of voltages and frequencies. However, it must have a reliable power source. Damage to the controller might occur if the ranges are exceeded. 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 controller from such disturbances, you should have a dedicated power distribution system, power-conditioning equipment, as well as lightning arresters or power cables to protect from electrical storms.

See the following sections for additional power specifications.

- "Facility Power Guidelines" on page 14
- "Circuit Breaker and UPS Guidelines" on page 15
- "Grounding Guidelines" on page 15

Facility Power Guidelines

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

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 overall system AC input current load does not exceed 80 percent of the branch circuit AC current rating.

For example, PDU power cords for the Oracle's 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 within 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, the design of your power system must ensure that adequate power is provided to the controller. Use dedicated AC breaker panels for all power circuits that supply power to the controller. Electrical work and installations must comply with applicable local, state, or national electrical codes. The controller requires electrical circuits to be grounded to the Earth.

Note - Circuit breakers are supplied by the customer. One circuit breaker is required for each controller power cord.

In addition to circuit breakers, 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

The rack must use grounding-type power cords. For example, Oracle's Sun Rack II has three-wire, grounding-type power cords. Always connect the cords to grounded power outlets. Because different grounding methods are used, depending on location, check the grounding type, and refer to documentation, such as local electrical codes, for the correct grounding method. Ensure that the facility administrator or qualified electrical engineer who verifies the grounding method for the building performs the grounding work.

Environmental Requirements

The following table lists the temperature, humidity, and altitude specifications, as well as acoustic noise, vibration, and shock specifications.

TABLE 6 Environmental Specifications

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) ■ Optimal: 69.8°F to 73.4°F (21°C to 23°C)	–40°F to 154°F (–40°C to 68°C)

Specification	Operating	Nonoperating
	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.	
Relative humidity	■ 10% to 90% noncondensing, short term 23°F to 113°F (–5°C to 55°C) ■ 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) **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: 7.1 Bels A weighted ■ Idle condition: 7.0 Bels A weighted	Not applicable
Vibration	0.15 G (z-axis), 0.10 G (x-, y-axes), 5-500Hz swept sine IEC 60068-2-6 Test FC	0.5 G (z-axis), 0.25 G (x-, y-axes), 5-500Hz swept sine IEC 60068-2-6 Test FC
Shock	3.5 G, 11 ms half-sine IEC 60068-2-27 Test Ea	Roll-off: 1.25-inch roll-off free fall, front to back rolling directions Threshold: 13-mm threshold height at 0.65 m/s impact velocity ETE-1010-02 Rev A

Set conditions to the optimal temperature and humidity ranges to minimize the chance of downtime due to component failure. Operating the Oracle ZFS Storage ZS5-ES for extended periods at or near the operating range limits, or installing it in an environment when it remains at or near nonoperating range limits could significantly increase hardware component failure.

Temperature Guidelines

An ambient temperature range of 21° to 23° Celsius (70° to 74° Fahrenheit) is optimal for controller reliability and operator comfort. Most computer equipment can operate in a wide temperature range, but near 22° Celsius (72° Fahrenheit) is desirable 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 goes down for a period of time.

Humidity Guidelines

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

- Optimal range helps protect computer systems from corrosion problems associated with high humidity levels.
- Optimal range provides the greatest operating time buffer in the event of air conditioner control failure.
- This range helps to avoid failures or temporary malfunctions caused by intermittent interference from static discharges that may occur when relative humidity is too low. Electrostatic discharge (ESD) is easily generated and less easily dissipated in areas where the relative humidity level is below 35 percent. ESD risk becomes critical when levels drop below 30 percent.

Ventilation and Cooling

Always provide adequate space in front of and behind the rack to allow for proper ventilation of the rackmounted controllers. Do not obstruct the front or rear of the rack with equipment or objects that might prevent air from flowing through the rack. Rackmountable controllers and equipment, including the Oracle ZFS Storage ZS5-ES, typically draw cool air in through the front of the rack and let warm air out the rear 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, then cover the empty sections will filler panels. Gaps between components can adversely affect airflow and cooling within the rack.

Ventilation Guidelines

The Oracle ZFS Storage ZS5-ES controller is designed to function while installed in a natural convection airflow. The following requirements must be followed to meet the environmental specification:

- Ensure that air intake is at the front of the system, and the air outlet is at the rear of the system. Take care to prevent recirculation of exhaust air within a rack or cabinet.
- Allow a minimum clearance of 123.2 cm (48.5 inches) at the front of the system, and 91.4 cm (36 inches) at the rear of the system for ventilation.
- Ensure unobstructed airflow through the chassis. The controller uses internal fans that can achieve a total airflow of 100 CFM over the specified range of operating conditions.

- Ensure that ventilation openings such as cabinet doors, for both the inlet and exhaust of the controller are not obstructed. For example, Oracle's Sun Rack II has been optimized for cooling. Both the front and rear doors have 80 percent perforations that provide a high level of airflow through the rack.

- Ensure that front and rear clearance of the controller with respect to cabinet doors is at minimum of 1 inch (2.5 mm) at the front of the controller and 3.15 inches (80 mm) at the rear of the controller when mounted. These clearance values are based on the inlet and exhaust impedance (available open area) stated above and assume a uniform distribution of the open area across the inlet and exhaust areas. These values also improve cooling performance.

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

- Manage cables to minimize interference with the controller exhaust vent.

Agency Compliance

The controller 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 - EMC - Emissions: FCC CFR 47 Part 15, ICES-003, EN55022, EN61000-3-2, EN61000-3-3 - Immunity: EN55024
Certifications[‡]	- North America (NRTL) - European Union (EU) - International CB Scheme - BIS (India) - BSMI (Taiwan) - RCM (Australia) - CCC (PRC) - MSIP (Korea) - VCCI (Japan) - Customs Union EAC

Category	Relevant Standards
European Union Directives	■ 2006/95/EC Low Voltage Directive ■ 2004/108/EC EMC Directive ■ 2011/65/EU RoHS Directive ■ 2012/19/EU WEEE Directive

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

[‡]Other country regulations/certifications may apply.

Related Information

■ *Oracle Server X5-2 Safety and Compliance Guide*
■ *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's agent be present when the carton is opened. Keep all contents and packing material for the agent's inspection.

The ship kit for the controller includes the following items:

■ Power cords, packaged separately with country kit
■ Rackmount kit containing rack rails and installation instructions
■ Miscellaneous hardware, cables, and connectors
■ Legal and safety documents

Tools and Equipment Needed for Installation

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

■ 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

- "Installing the Appliance Into a Rack" on page 27

ESD and Safety Precautions

Electronic equipment is susceptible to damage by static electricity. Use a grounded antistatic wriststrap, footstrap, or equivalent safety equipment to prevent electrostatic discharge (ESD) when you install or service the controller.

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.

Read the safety information in the *Oracle Server X5-2 Safety and Compliance Guide* and in the *Important Safety Information for Oracle's Hardware Systems* before installing the controller.

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

Caution - The controller weighs approximately 18.0 kg (40.0 pounds). Two people are required to lift and mount this 1 rack unit (1U) controller 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

-

About Controller Features and Components

This section describes the components, status indicators (LEDs), and connectors for the controller.

Description	Links
Review controller features and components.	"Controller Components" on page 23
Locate status indicators, connectors, and storage drives on the controller front and back panels.	"Front Panel Status Indicators, Connectors, and Drives" on page 24
	"Back Panel Status Indicators, Connectors, and PCIe Slots" on page 25

Controller Components

TABLE 7   Controller Components

Feature	Description
Processor	Two Intel 2.3 GHz, 18-core, 145W processors
Memory	384 GB of memory using 24 16-GB DIMMs (12 DIMMs per CPU)
Drives (Internal)	■ Two 2.5" (SFF) SAS-3 system hard disk drives (HDDs) ■ Two 2.5" read-optimized cache solid-state drives (SSDs) ■ Permanent slot filler panel in remaining slots
PCI Express (PCIe) I/O slots	Four PCIe Gen3 slots (three external and one internal) that accommodate low-profile PCIe cards. ■ Slot 1: InfiniBand CX3 HCA ■ Slot 2: SAS-3 4-port (4x4) HBA ■ Slot 3: Cluster interface card Version 3 ■ Slot 4 (internal): SAS-3 HBA
Ethernet ports	Four 10GBASE-T Copper RJ-45 Gigabit Ethernet (10GbE) ports on the rear panel.
USB 2.0 ports	Two front (USB 0, USB 1), two rear (USB 0, USB 1). (Internal USB ports are not used.)
Service processor (SP)	An integrated service processor (SP) that provides IPMI 2.0-compliant remote management capabilities. The SP features:

Feature	Description
	■ Oracle Integrated Lights Out Manager (ILOM) version 3.2.x
	■ Local Oracle ILOM command-line access using a serial connection
	■ Support for SP access through the Ethernet NET 0 port (remapped for sideband management)
	■ Support for remote KVMS (keyboard, video, mouse, and storage) over IP
Power supplies	Two hot-swappable and highly-redundant 600W power supplies.
Cooling fans	Four 40-mm, hot-swappable fan modules for chassis cooling. Each fan module contains two counter-rotating fan pairs (four rotors total). Each power supply has its own cooling fans.

Front Panel Status Indicators, Connectors, and Drives

The following figure shows the status indicators (LEDs), connectors, and drive slots on the Oracle ZFS Storage ZS5-ES front panel.

FIGURE 1   Oracle ZFS Storage ZS5-ES Controller Front Panel
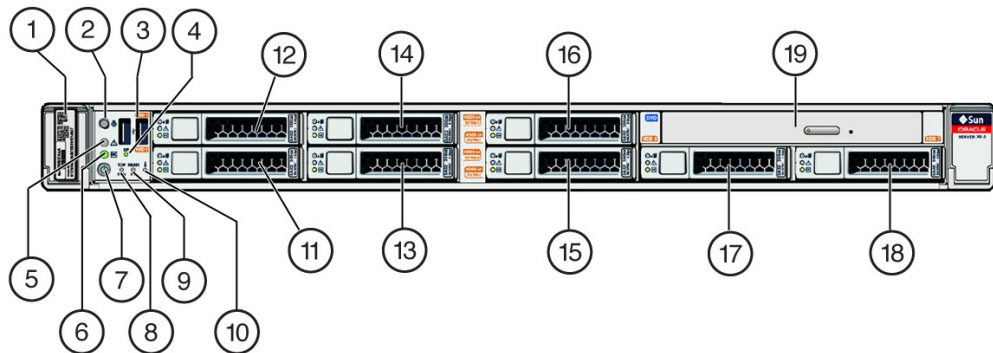
Callout	Description	Callout	Description
1	Product Serial Number (PSN) label and Radio Frequency Identification (RFID) tag	8	Service Required LED: Top: Fan Module (amber)
2	Locator LED/button: white	9	Service Required LED: Rear: Power Supply (amber)
3	USB 2.0 connectors (2)	10	Service Required LED: Overtemp Icon: System Over Temperature Warning (amber)
4	SP OK LED: green	11	Boot drive 0

Callout	Description	Callout	Description
5	Service Required LED: amber	12	Boot drive 1
6	Power/OK LED: green	13 - 14	Read cache devices
7	Power button	15 - 19	Permanent filler panels

Back Panel Status Indicators, Connectors, and PCIe Slots

The following figure shows the Oracle ZFS Storage ZS5-ES back panel and the location of status indicators (LEDs), connectors, and PCIe slots.

FIGURE   2   Oracle ZFS Storage ZS5-ES Controller Back Panel
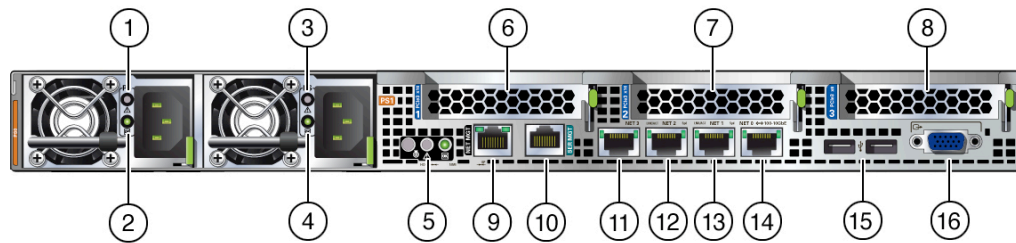
Callout	Description	Callout	Description
1	Power Supply (PS) 0	9	NET MGT This port is deactivated on ZS5-ES. Use Ethernet NET 0 port to access Oracle Integrated Lights Out Manager (ILOM) service processor (SP).
2	Power Supply (PS) 0 status indicators: Service Required LED: amber AC OK LED: green	10	Serial management (SER MGT)/RJ-45 serial port
3	Power Supply (PS) 1	11	Network (NET) 100/1000/10000 port: NET 3
4	Power Supply (PS) 1 status indicators: Service Required LED: amber AC OK LED: green	12	Network (NET) 100/1000/10000 port: NET 2

Callout	Description	Callout	Description
5	System status indicators: Locator LED: white; Service Required LED: amber; Power/OK LED: green	13	Network (NET) 100/1000/10000 port: NET 1
6	InfiniBand CX3 HCA	14	Network (NET) 100/1000/10000 port: NET 0 for access to Oracle ILOM service processor
7	External SAS-3 4-port (4x4) HBA	15	USB 2.0 connectors (2)
8	Cluster interface card Version 3	16	DB-15 video connector

Related Information

- "Front Panel Status Indicators, Connectors, and Drives" on page 24
- "Controller Components" on page 23

Installing the Appliance Into a Rack

This section describes how to install the controller into a rack using the rail assembly in the rackmount kit.

Description	Links
Complete all installation prerequisite tasks.	"Installation Prerequisites" on page 27
Check that your rack meets the requirements for installation of this controller.	"Rack Requirements" on page 28
Review safety precautions.	"Safety Precautions When Rackmounting the Controller" on page 28
Verify that you have received all components of the rackmount kit.	"Rackmount Kit Contents" on page 30
Stabilize the rack.	"Stabilize the Rack for Installation" on page 30
Install Oracle Disk Shelves into the rack.	"Install Oracle Disk Shelves" on page 39
Install mounting brackets onto the controller.	"Install Mounting Brackets" on page 31
Mark the rackmount location.	"Mark the Rackmount Location" on page 33
Attach the tool-less slide-rail assembly to the rack.	"Attach Tool-less Slide-Rail Assemblies" on page 34
Install the controller into the slide-rail assembly.	"Install the Controllers Into the Slide-Rail Assemblies" on page 37
(Optional) Install the cable management arm for routing controller cables.	■ "(Optional) Install the Cable Management Arm" on page 40 ■ "Remove the Cable Management Arm" on page 50

Related Information

- "Installation Procedure Overview" on page 9
- "Preparing for Installation" on page 11

Installation Prerequisites

Ensure that the following tasks are complete before you start the rackmount procedures:

- Ensure that your site meets the required electrical and environmental requirements. See "Preparing for Installation" on page 11.

Rack Requirements

The rack into which you install the Oracle ZFS Storage ZS5-ES must meet the requirements listed in the following table. Oracle's Sun Rack II is compatible with the Oracle ZFS Storage ZS5-ES. For information about Oracle's Sun Rack II, see "Preparing for Installation" on page 11.

TABLE 8   Rack Requirements

Item	Requirement
Structure	Four-post rack (mounting at both front and rear). Supported rack types: square hole (9.5 mm) and round hole (M6 or 1/4-20 threaded only.
	Two-post racks are not compatible.
Rack horizontal opening and unit vertical pitch	Conforms to ANSI/EIA 310-D-1992 or IEC 60927 standards.
Distance between front and rear 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 rear 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 rear 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 controller: 123.2 cm (48.5 inches) - Clearance, rear of controller: 91.4 cm (36 inches)

Related Information

- "Preparing for Installation" on page 11

Safety Precautions When Rackmounting the Controller

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

Caution - Stabilize rack: Deploy the anti-tilt bar or legs on the equipment rack before beginning an installation.

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

Caution - Elevated operating ambient temperature: If the controller 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, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified for the controller. For controller environmental requirements, see "Environmental Requirements" on page 15.

Caution - Reduced airflow: Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.

Caution - Mechanical loading: Mounting of the equipment in the rack should be such that a hazardous condition is not created due to uneven mechanical loading.

Caution - Circuit overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate power ratings should be used when addressing this concern.

Caution - Reliable earthing: Reliable earthing of rackmounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (for example, use of power strips).

Caution - Mounted equipment: Slide-rail-mounted equipment is not to be used as a shelf or a work space.

Related Information

- "ESD and Safety Precautions" on page 20

Rackmount Kit Contents

The rackmount kit contains two slide-rails, two mounting brackets, and optional securing screws.

Note - Refer to the rackmount kit installation card for instructions on how to install your controller into a four-post rack, using the slide-rail and cable management arm options.
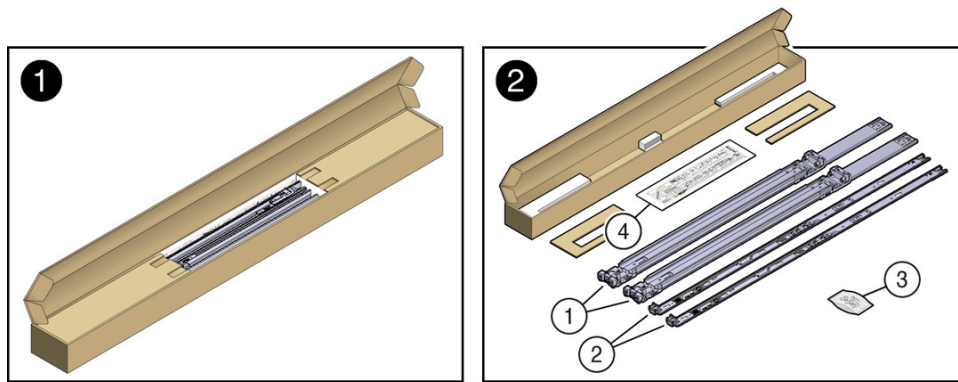
Figure Legend	
1	Slide-rails
2	Mounting brackets
3	Four M4 x 5 fine-pitch mounting bracket securing screws (optional)
4	Installation card

Related Information

- "Attach Tool-less Slide-Rail Assemblies" on page 34

▼ Stabilize the Rack for Installation

⚠ **Caution -** To reduce the risk of personal injury, stabilize the rack cabinet, and extend all anti-tilt devices before installing the controller.

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

1. **Open and remove the front and rear doors from the rack cabinet.**

    Note - The front and rear doors need to be removed only if they impinge on the mounting bay.

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

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

    Related Information

    - "Safety Precautions When Rackmounting the Controller" on page 28
    - "Preparing for Installation" on page 11
    - Your rack cabinet documentation
    - *Oracle Server X5-2 Safety and Compliance Guide*

▼ **Install Mounting Brackets**

To install the mounting brackets onto the sides of the controller:

1. **Position a mounting bracket against the chassis so that the slide-rail lock is at the controller front, and the five keyhole openings on the mounting bracket are aligned with the five locating pins on the side of the chassis.**
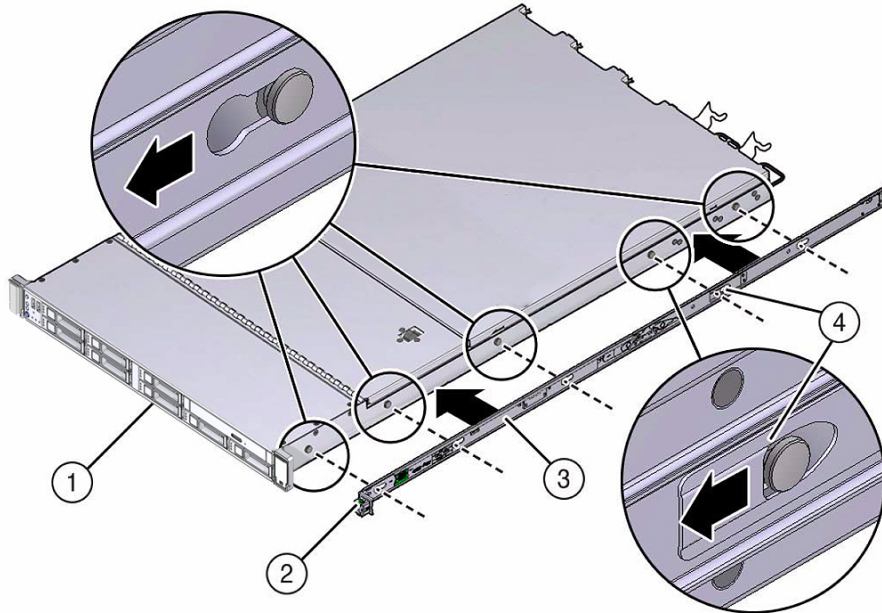
Figure Legend	
1	Chassis front
2	Slide-rail lock
3	Mounting bracket
4	Mounting bracket clip

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

4. **Repeat the previous steps to install the remaining mounting bracket on the other side of the controller.**

   Related Information

   -
   -

▼ Mark the Rackmount Location

Use the rackmount installation card to identify the correct mounting holes for the slide-rails.

Note - Load the rack from bottom to top.

---

1. **Ensure that there is at least 1 rack unit (1U) of vertical space in the rack cabinet to install the controller.**

   See .

2. **Place the rackmount installation card against the front rails.**

The bottom edge of the card corresponds to the bottom edge of the controller. Measure up from the bottom of the installation card.
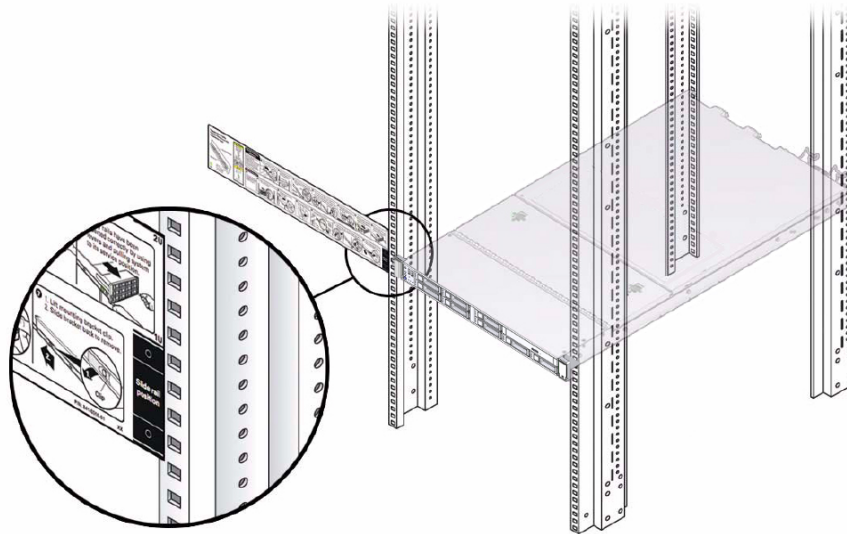
3.   **Mark the mounting holes for the front slide-rails.**

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

   Related Information

   ■
   ■
   ■

▼   Attach Tool-less Slide-Rail Assemblies

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

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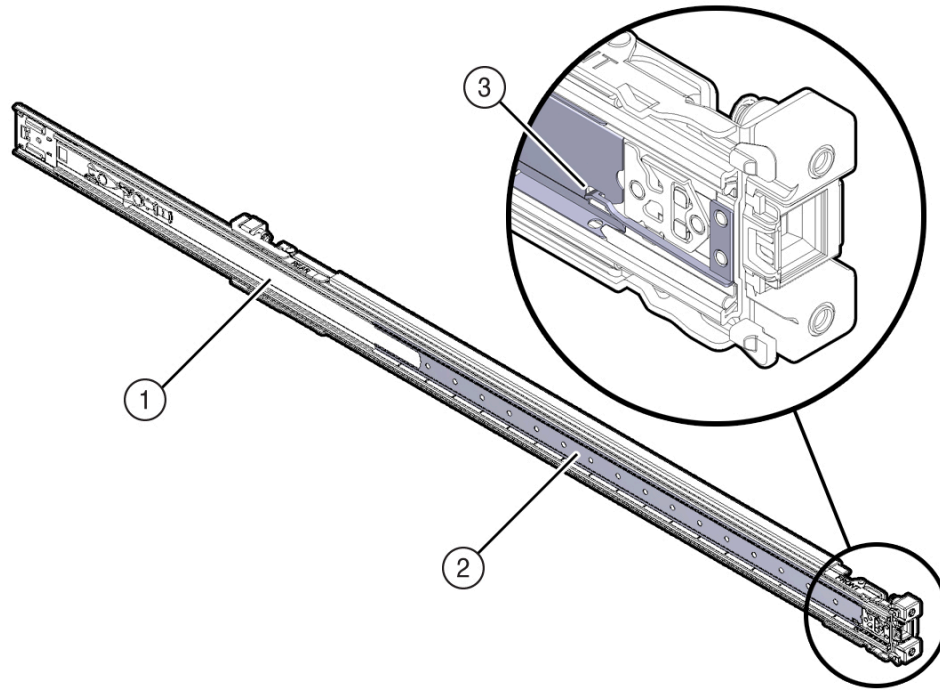
Figure Legend	
1	Slide-rail
2	Ball-bearing track
3	Locking mechanism

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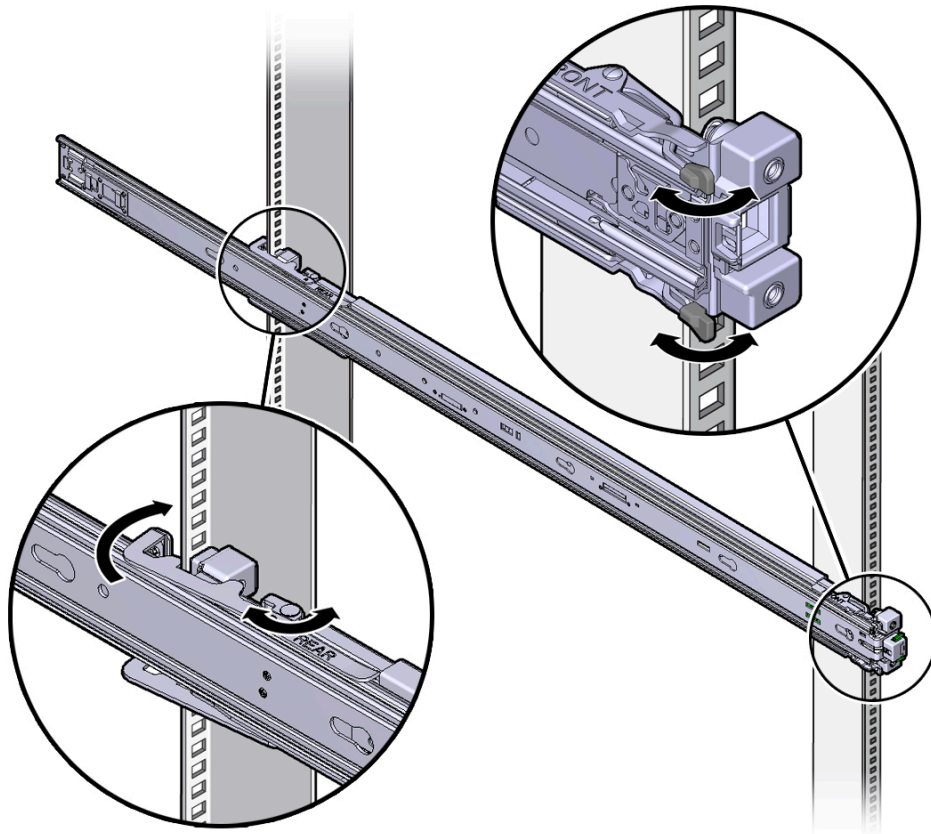
3. **Align the front of the slide-rail assembly against the outside of the front rack rail, and push until the assembly locks into place with an audible click.**

4. **Repeat the previous steps to attach the slide-rail assembly to the other side of the rack.**

Related Information

- "Install Mounting Brackets" on page 31

-
-

▼ Install the Controllers Into the Slide-Rail Assemblies

Use this procedure to install each controller 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 controller. 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 your rack's anti-tilt bar to prevent the rack from tipping during equipment installation.

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

2. **Position the controller 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 controller into the rack until the mounting brackets encounter the slide-rail stops (approximately 30 cm, or 12 inches).**
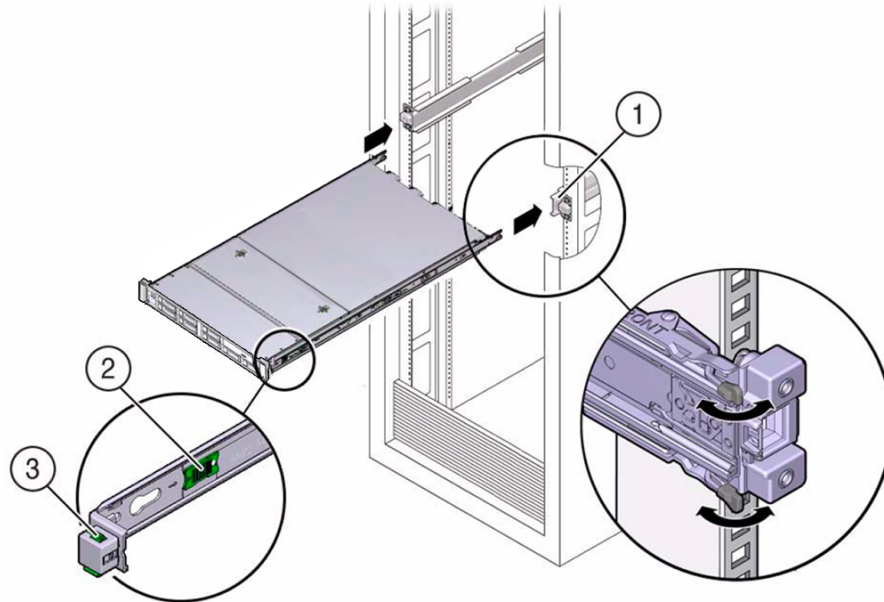
Figure Legend	
1	Inserting mounting bracket into slide-rail
2	Slide-rail release button
3	Slide-rail lock

4. **Simultaneously push and hold the green slide-rail release buttons on each mounting bracket while you push the controller into the rack. Continue pushing the controller into the rack until the slide-rail locks (on the front of the mounting brackets) engage the slide-rail assemblies.**

You will hear an audible click.
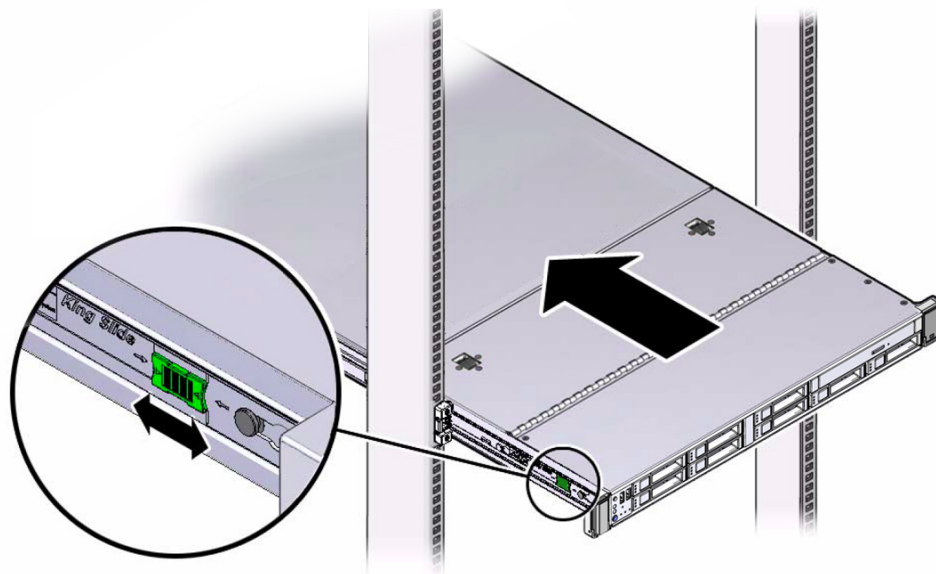
> ⚠️ **Caution -** Verify that the controller is securely mounted in the rack and that the slide-rail locks are engaged with the mounting brackets before you install the optional cable management arm.

Install Oracle Disk Shelves

Oracle ZFS Storage ZS5-ES supports one of the following disk shelf configurations:

- One Oracle Storage Drive Enclosure DE3-24C connected to a SAS-3 HBA
- Two Oracle Storage Drive Enclosures DE3-24P connected to a SAS-3 HBA

For Oracle disk shelf installation instructions, see the *Oracle ZFS Storage Appliance Installation Guide* for the appropriate software release. Oracle ZFS Storage Appliance documentation combines both hardware and software information, and documentation sets are differentiated by the software release number at `http://docs.oracle.com/en/storage/`.

For updated Oracle ZFS Storage Appliance software information, see Oracle ZFS Storage Appliance: Software Updates (Doc ID 2021771.1) (`https://support.oracle.com/epmos/faces/DocumentDisplay?id=2021771.1`).

▼ (Optional) Install the Cable Management Arm

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

1. **Unpack the CMA.**

   The following figure shows the CMA components.
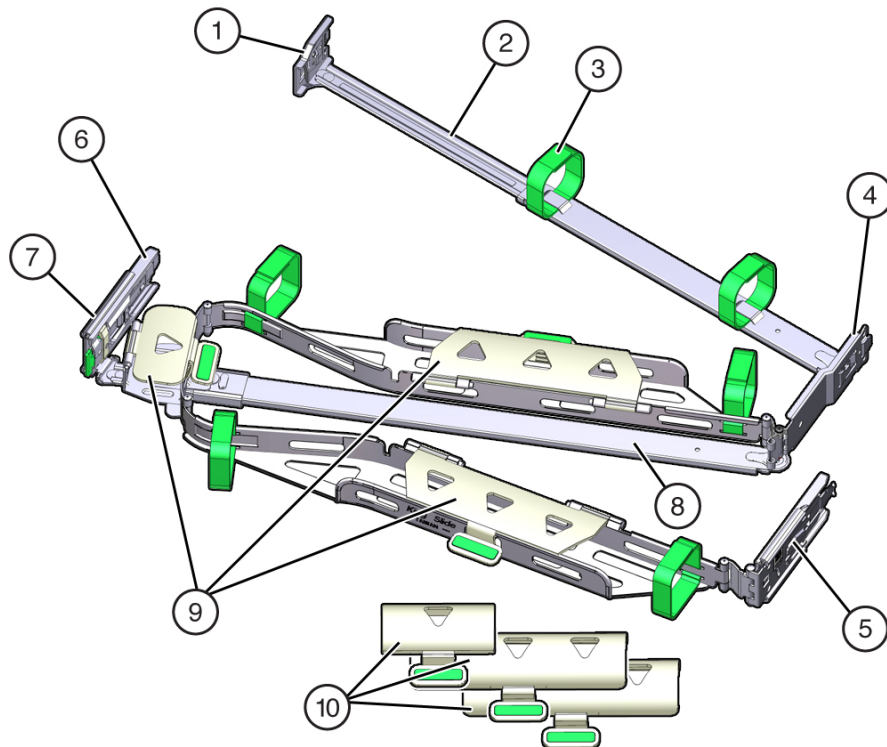
Figure Legend			
1	Connector A	6	Connector D
2	Front slide bar	7	Slide-rail latching bracket (used with connector D)
3	Velcro straps (6)	8	Rear slide bar
4	Connector B	9	1U cable covers
5	Connector C	10	2U cable covers

2. **Ensure that the correct cable covers for your controller are installed on the CMA.**

   - The Oracle ZFS Storage ZS5-ES 1U controller uses the flat cable covers.

   Note - The CMA ships with three, flat cable covers installed.

3. **Ensure that the six Velcro straps are threaded into the CMA as shown in the figure above.**

   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 controller is extended out of the rack and returned into the rack.

4. **To make it easier to install the CMA, extend the controller 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 controller.**

   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's connector A into the left slide rail:**

   a. **Insert the CMA's 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 (callout 1) goes into the slide-rail's front slot (callout 2).

b. **Gently tug on the left side of the front slide bar to verify that connector A is properly seated.**
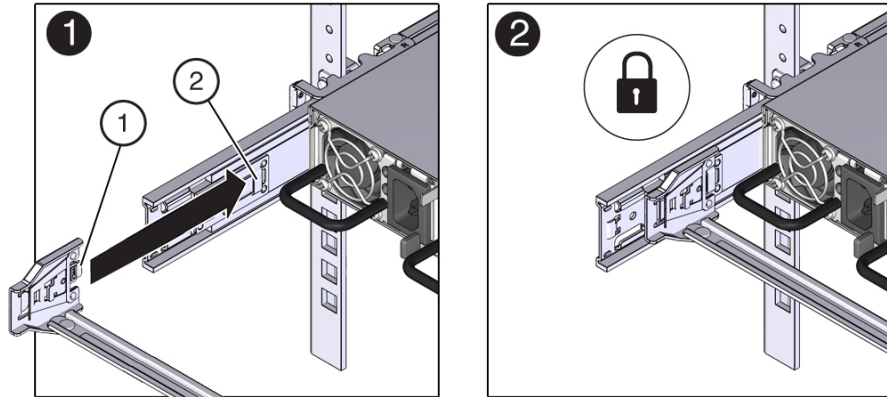
Figure Legend	
1	Connector A tab
2	Left slide-rail front slot

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

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

The connector B tab (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.**
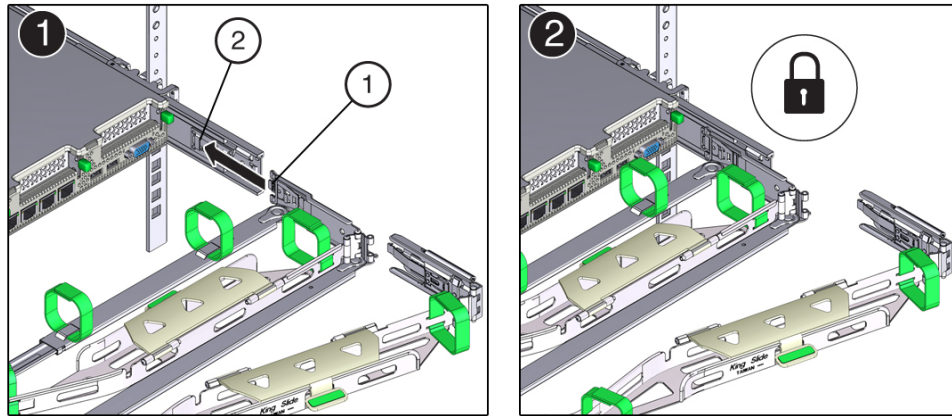
Figure Legend	
1	Connector B tab
2	Right slide-rail front slot

8. **To install the CMA's 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 (controller side) of the right slide-rail [frame 1].**
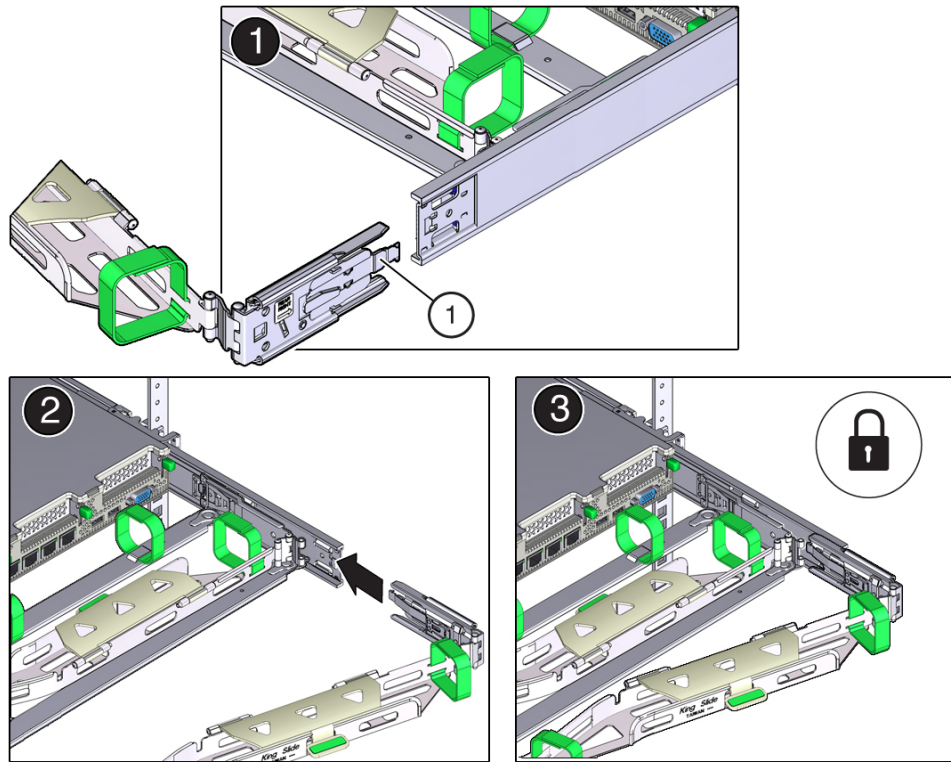
Figure Legend	
1	Connector C locking spring

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's rear slide bar to verify that connector C is properly seated.**

9. **To prepare the CMA's 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. You must remove the tape before you install this connector.
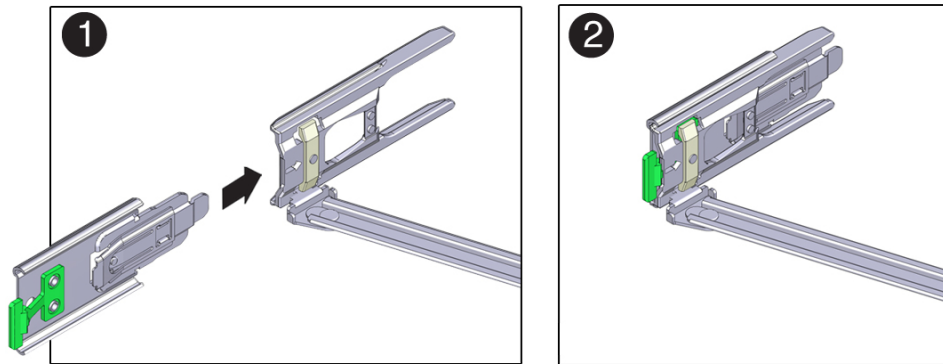
10. **To install the CMA's connector D into the left slide-rail:**

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's rear slide bar to verify that connector D is properly seated.**

> **Note -** The slide-rail latching bracket has a green release tab. This tab is used to release and remove the latching bracket so that you can remove connector D.
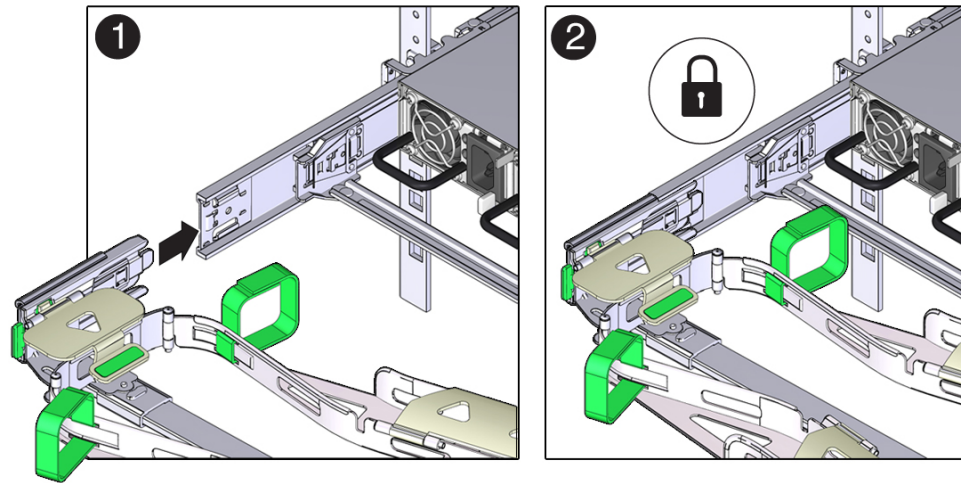
11. **Gently tug on the four CMA connection points to ensure that the CMA connectors are fully seated before you allow the CMA to hang by its own weight.**

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

    a. **Extend all rack anti-tilt devices to prevent the rack from tipping forward when the controller is extended.**

    > ⚠ **Caution -** To reduce the risk of personal injury, stabilize the expansion rack cabinet and extend all anti-tilt devices before extending the controller from the rack.

    For instructions for stabilizing the rack, see "Stabilize the Rack for Installation" on page 30.

    b. **Slowly pull the controller 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.
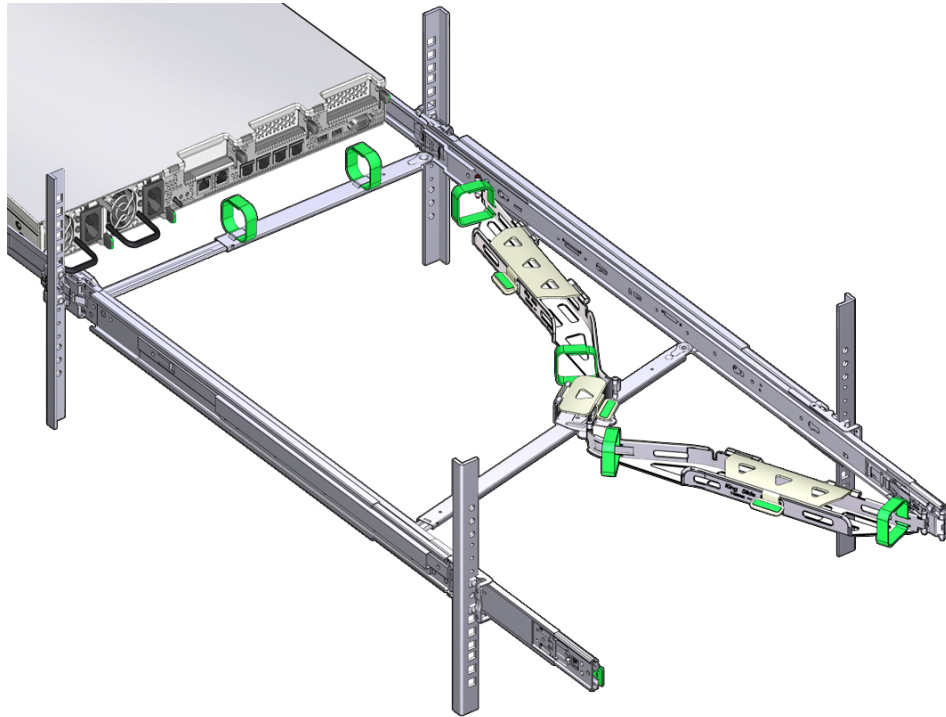
13. To return the controller to the rack:

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

Note - 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 controller.

---
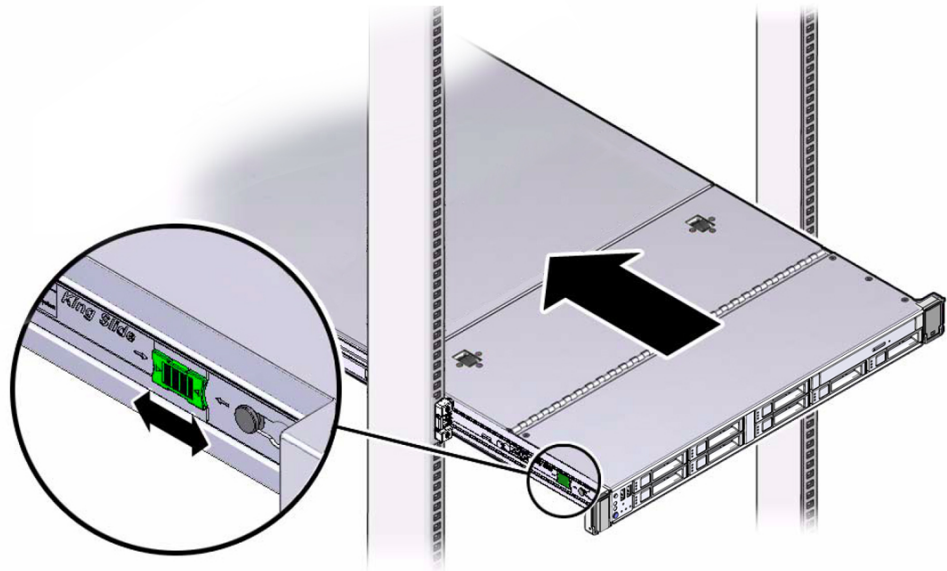
b. Continue pushing the controller into the rack until the slide-rail locks (on the front of the controller) engage the slide-rail assemblies.

You will hear an audible click when the controller is in the normal rack position.

14. Connect cables to the controller, as required.

Instructions for connecting the controller cables are provided in "Connect the Controller to Oracle Disk Shelves" on page 58.

15. Open the CMA cable covers, route controller cables through the CMA's 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 rear-most cable trough

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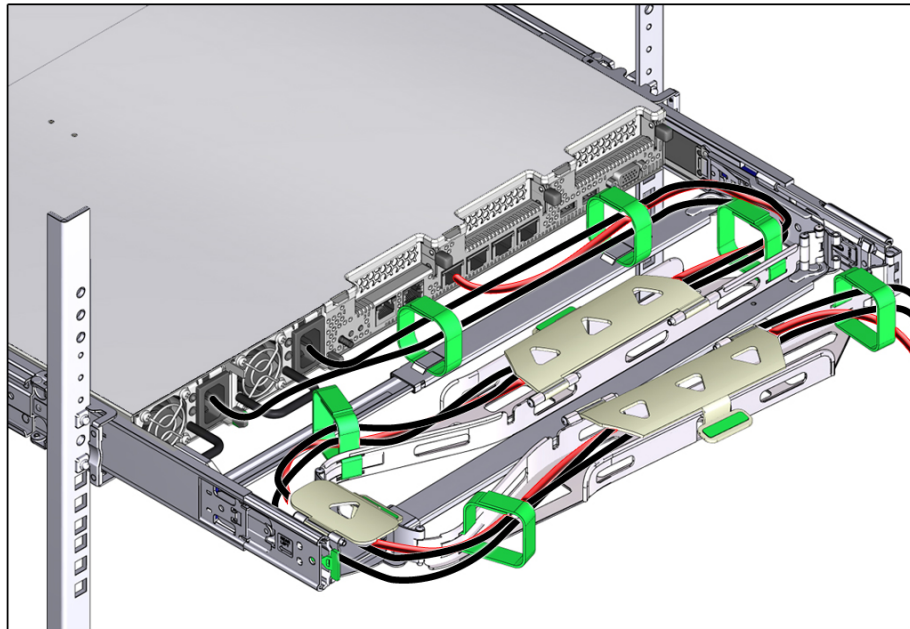
16. **Ensure that the secured cables do no extend above the top or below the bottom of the controller to which they are attached; otherwise, the cables might snag on other equipment installed in the rack when the controller is extended from the rack or returned to the rack.**

Note - 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 controller is extended from the rack and returned to the rack.

▼ Remove the Cable Management Arm

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

Before you begin this procedure, refer to the CMA component illustration in "(Optional) Install the Cable Management Arm" on page 40 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, once you disconnect any of the CMA's 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 controller 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 controller from the rack.

For instructions for stabilizing the rack, see "Stabilize the Rack for Installation" on page 30.

2. **To make it easier to remove the CMA, extend the controller 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 rear of the controller.**

   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 - Once you have disconnected connector D, you must 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.
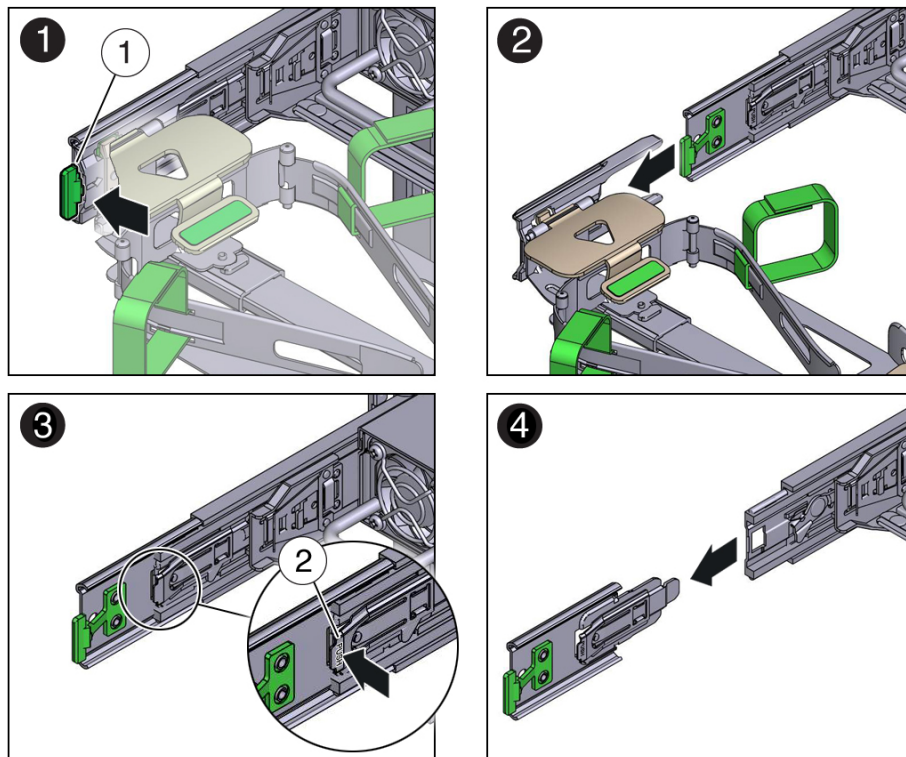
Figure Legend	
1	Connector D release tab (green)

Figure Legend	
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 [frame 1 and 2].**
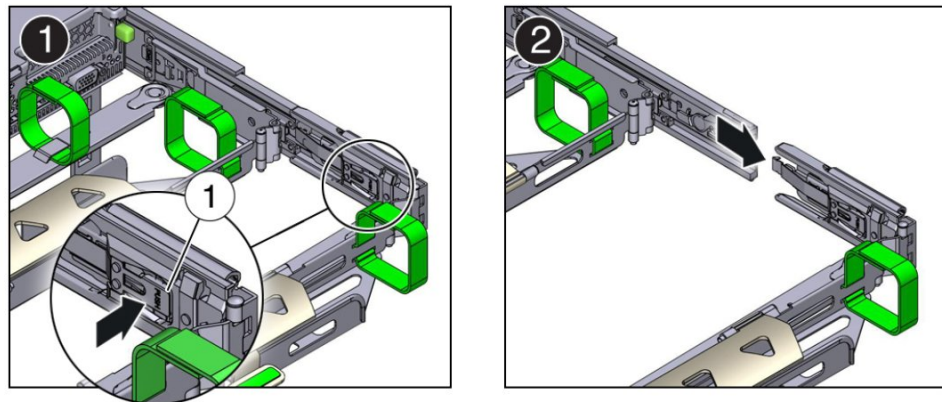
Figure Legend	
1	Connector C release tab (labeled PUSH)

6. **To disconnect connector B:**

    a. **Place your right arm under the CMA to support it and grasp the rear 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].**
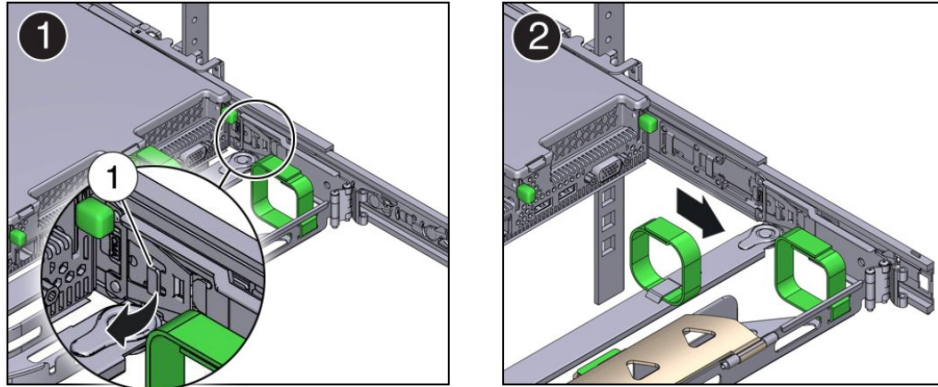
Figure Legend

1	Connector B release lever

7. **To disconnect connector A:**

a. **Place your left arm under the CMA to support it and grasp the rear 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].
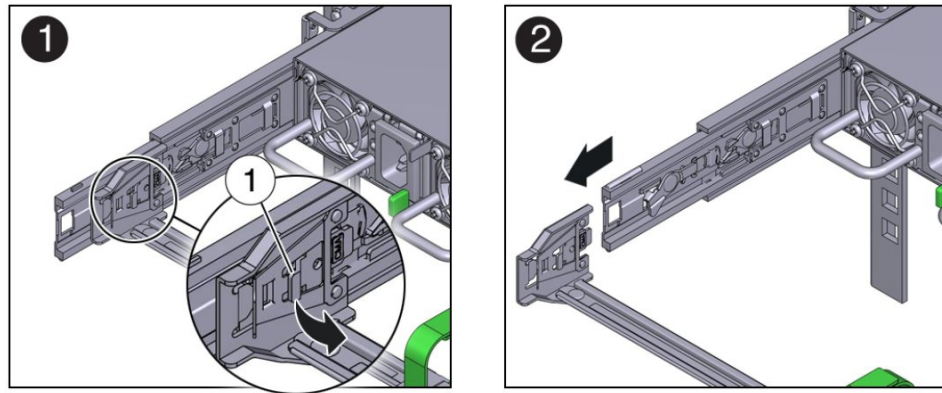
Figure Legend

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 controller and push it back into the rack.

Related Information

- "(Optional) Install the Cable Management Arm" on page 40

Cabling the Appliance

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

Description	Links
Review connector port locations	"Controller Rear Cable Connections and Ports" on page 55
Learn about controller Ethernet ports	"Ethernet Ports" on page 57
Connect data cables to the controller	"Connect the Data Cables" on page 57
Connect Oracle disk shelves	"Connect the Controller to Oracle Disk Shelves" on page 58

Related Information

- "Installation Procedure Overview" on page 9
- "Powering On and Initially Configuring the Appliance" on page 61

Controller Rear Cable Connections and Ports

The following figure shows the locations of cable connectors and ports on the back of the Oracle ZFS Storage ZS5-ES controller and the cables and devices that you would typically connect to them.

FIGURE   3   Controller Rear Panel Cabling Reference

No.	Cable Port or Expansion Slot	Description
1	Power supply 0 input power	The controller has two power supply connectors, one for each power supply.
	Power supply 1 input power	Do not attach power cables to any installed power supplies until you have finished connecting the data cables to the controller. The controller 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 controller is not connected to a terminal, PC, or workstation. **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	Serial management port (SER MGT)	The service processor SER MGT port uses an RJ-45 cable and is the default connection to the Oracle ILOM service processor. This port supports local connections to the controller and only recognizes Oracle ILOM command-line interface (CLI) commands. Typically you connect a terminal or a terminal emulator to this port. **Note -** This port does not support network connections.
3	Ethernet ports NET 3, NET 2, and NET 1	The 10-Gigabit Ethernet ports connect the appliance to the network. See "Ethernet Ports" on page 57 for more information.
4	Ethernet port NET 0	Connect to the Oracle ILOM service processor using the Ethernet in-band port NET 0 (remapped from the NET MGT port). The Oracle ILOM sideband management feature enables you to use NET 0 to send and receive Oracle ILOM commands to and from the SP.

No.	Cable Port or Expansion Slot	Description
		Note - The ZS5-ES NET MGT port is deactivated at the factory.

Related Information

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Ethernet Ports

The controller has four RJ-45, 10-Gigabit Ethernet (10GbE) network connectors, labeled NET 3, NET 2, NET 1, and NET 0 from left to right on the controller rear panel. Use ports NET 3, NET 2, and NET 1 to connect the network. NET 0 is reserved for connecting to the service processor and Oracle ILOM.

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

Related Information

-
-

▼ Connect the Data Cables

To locate the controller cable connections, see .

1. **Connect an Ethernet cable from your network to an available 10-Gigabit Ethernet NETx port on the back panel of the controller. Repeat for the second controller.**

   To locate the port, see .

2. **Connect other cables as necessary for your Engineered System.**

The following sections describe how to connect the cluster cables and disk shelf cables. Connect cables other than these as needed for your Engineered System.

Caution - Do not connect power cords at this time; neither to the controllers nor the disk shelves. The power-on sequence must be followed to ensure proper configuration.

Related Information

- "Controller Rear Cable Connections and Ports" on page 55
- "Ethernet Ports" on page 57

▼ Connect the Cluster Cables

The cluster interface card provides three redundant links that enable two controllers to communicate with each other. The cluster I/O ports consist of two serial links (0,1) and an Ethernet link. Cluster cabling must be done before powering on either controller, and all three links must be established before configuration can proceed.

1. **Locate the 3-port cluster interface card in PCIe slot 3.**

2. **Identify the three cluster cables provided for your engineered system.**

These are straight-through Cat-5-or-better Ethernet cables, and are typically 7 ft (2.15 m) in length.

3. **Connect the cluster serial ports of each controller to form a crossover pattern:**

   a. **Connect one Ethernet cable between serial port 0 of one controller and serial port 1 of the other controller.**

   b. **Connect another Ethernet cable between serial port 1 of one controller and serial port 0 of the other controller.**

   The cables between the serial ports form a crossover pattern.

4. **Connect one Ethernet cable between the Ethernet ports of each controller.**

▼ Connect the Controller to Oracle Disk Shelves

This section describes connecting the controllers to Oracle DE3-24 disk shelves.

Note - Do not connect the controllers to Sun Disk Shelves.

Before You Begin Observe the following guidelines:

- If connecting to more than one disk shelf, balance the number of disk shelves across the disk chains in your system.
- Disks with different capacities or rotation speeds cannot be mixed within a single disk shelf.
- Maximize the number of disk chains before adding disk shelves to an individual chain.
- DE3-24 disk shelves require SFF-8644 (iPASS mini-SAS HD) connectors at each end of the cable to connect to ZS5-ES controllers.

1. **Locate the four-port HBA in PCIe card slot 2.**

2. **Connect the HBA ports of each controller to disk shelf ports.**

- **To connect one DE3-24C disk shelf, use the following cabling pattern:**
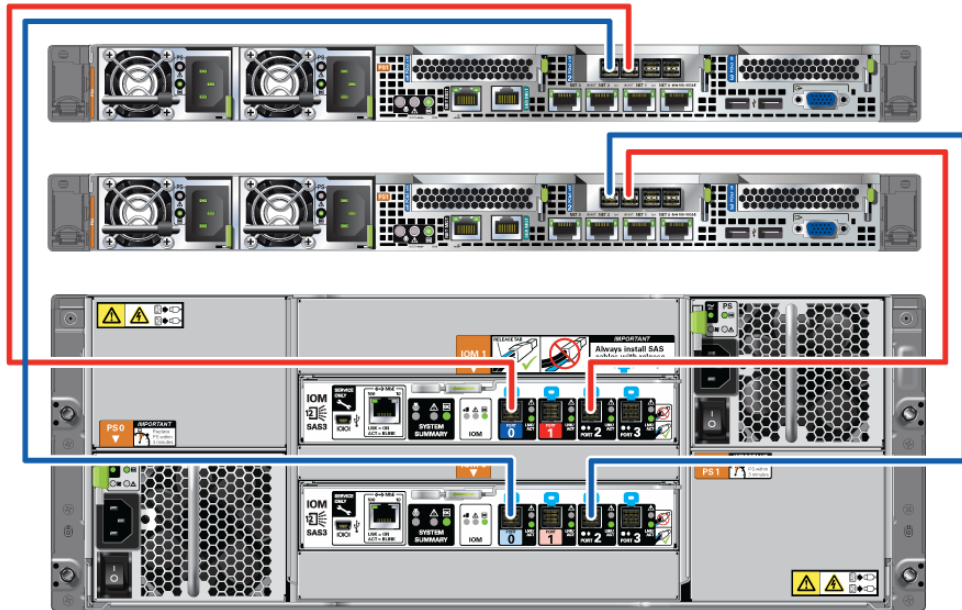
■ **To connect two DE3-24P disk shelves, use the following cabling pattern:**
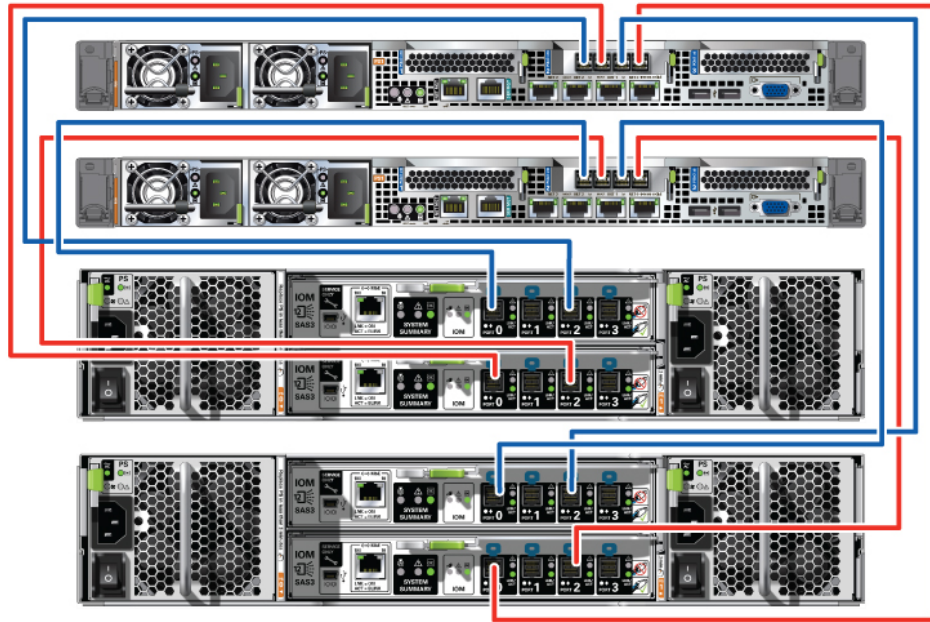
Powering On and Initially Configuring the Appliance

This section describes powering on the Oracle ZFS Storage ZS5-ES and configuring the primary network interface using the Oracle Integrated Lights Out Manager (ILOM) service processor (SP). Next configure the remaining initial system parameters and set up clustering using the browser user interface (BUI) from any client on the same network. Clustering guidelines are also provided to help ensure a successful clustered environment for the two controllers.

Description	Links
Read the prerequisites.	"Prerequisites" on page 61
Read the clustering guidelines to ensure a successful clustered environment.	"Clustering Guidelines" on page 64
Power on the Oracle Disk Shelves and the controllers.	"Power on the Oracle Disk Shelves and Controllers" on page 65
Configure the primary network interface.	"Configure the Primary Network Interface" on page 68
Perform the initial configuration.	"Initial Configuration" on page 69

Related Information

- "Installation Procedure Overview" on page 9
- Oracle Integrated Lights Out Manager (ILOM) 3.2.x Documentation Library at `http://www.oracle.com/goto/ILOM/docs`

Prerequisites

The controllers and disk shelves are configured and administered either directly using an administrative client (terminal or terminal emulator) connected to the serial management (SER MGT) port on the controller, or indirectly via your network and the NET 0 port.

Note - The NET MGT port is deactivated at the factory.

To access the controllers remotely, your network must have a Dynamic Host Configuration Protocol (DHCP) controller. Both methods use Oracle ILOM to access the service processor (SP) in the controller.

Note - Remote network access is preferred when connecting to Oracle ILOM because it allows better data collection than a direct serial connection. Per your environment, it might be preferable to make a serial connection for the initial configuration, and a network connection thereafter.

While you must make an Oracle ILOM connection to one controller in preparation for initial configuration, it is recommended that you make the connection for both controllers and keep them in place for future access to the SPs through Oracle ILOM.

When initially configuring the controllers, you connect to either one, but not both. The controller you connect to is referred to as the primary controller, and the other controller is the peer controller. It does not matter which controller you choose as the primary controller.

Each controller should be assigned a unique management interface so that it is not used as a cluster data interface. For example, the primary controller could use interface ixgbe0 (a typical name) and the peer controller could use interface ixgbe1 as the management interfaces. After the system is initially configured, you should lock the management interfaces as described in "Initial Configuration" on page 69.

To prepare for connecting to your network and configuring the primary network interface, gather the following information:

- Host name
- Default router IP address
- IP address/netmask for management interface on primary controller
- IP address/netmask for management interface on peer controller
- IP address/netmask for data interface on primary controller (InfiniBand IPMP interface #1)
- IP address/netmask for data interface on peer controller (InfiniBand IPMP interface #2)
- DNS parameters:
    - DNS IP address #1/#2
    - DNS IP address #3/#4
    - DNS/NIS/LDAP domain name
- NTP controller IP address
- LDAP parameters:
    - Use SSL/TLS? (Yes/No)
    - LDAP server IP address #1/#2 (port)
    - LDAP server IP address #3/#4 (port)

- LDAP base search DN
- LDAP search scope recursive? (Yes/No)
- LDAP authentication method: Simple, SASL/Digest MD5, or SASL/GSSAPI
- LDAP proxy DN (or anonymous)
- LDAP proxy DN password
- NIS server IP address #1/#2
- Administrator account password

Network interfaces configured via DHCP cannot be failed over between controllers and, therefore, cannot be used by clients to access storage. Be sure to assign **static** IP addresses to any network interfaces which will be used by clients to access storage, including, if applicable, the network interface used for configuration.

Note - This must be done before performing the configuration.

To prepare for a serial connection, configure an administrative client with the following settings:

- 8N1: eight data bits, no parity, one stop bit
- 9600 baud
- Disable hardware flow control (CTS/RTS)
- Disable software flow control (XON/XOFF)

Ensure you have met the power source requirements for the controllers as stated in "Electrical Power Requirements" on page 13.

Ensure you have met the power source requirements for Oracle DE3-24 disk shelves:

- Provide a suitable power source with electrical overload protection to meet the power supply input voltage range of 100-240 VAC, 50-60 Hz. The disk shelves are compatible with 100-120 VAC or 200-240 VAC sources. The power source must not be overloaded by the total number of disk shelves in the cabinet. Each DE3-24P draws 239.6W (452W maximum) and each DE3-24C draws 283.16W (455W maximum).
- The power source must provide a reliable earth connection for each disk shelf and the cabinet.
- Ensure that the power source is easily accessible because the power cord is the main disconnect device for the disk shelf.

Before applying power to the disk shelves or controllers, read the section "Power on the Oracle Disk Shelves and Controllers" on page 65. Also read how to configure storage in the *Oracle ZFS Storage Appliance Administration Guide* for the appropriate software release at http://www.oracle.com/goto/ZFSStorage/docs.

> **Note -** After power is applied, the system is ready for configuration. Therefore, ensure you are ready for configuration before applying power.

Clustering Guidelines

Use the following guidelines to ensure a successful clustered environment.

■ After the appliance is initially configured, you should lock the management interfaces, which makes them private network interfaces, to enable administration via either controller over the network (BUI or CLI) regardless of the cluster state. If interfaces are not locked and cluster takeover occurs,there is no way to access diagnostic information on the failed controller because interfaces are taken over by the other controller. A locked interface displays a lock icon next to its name in the BUI Configuration > Cluster screen. To lock interfaces, in the BUI, navigate to Configuration > Cluster. In the Resource list, choose the management interface for the controller and set it to a private, locked interface by clicking the unlock icon. The interface then displays a lock icon next to its name in the Resource list.

■ Important: If routes are needed, create a route on each interface that is assigned to a controller.

■ Each storage pool can be taken over, along with the network interfaces clients use to reach that storage pool, by the cluster peer when takeover occurs.

■ If you create two storage pools, each controller normally provides access to the pool assigned to it. If one of the controllers fails, the other controller provides clients with access to both pools.

■ If you create a single pool, the controller that is not assigned a pool provides service to clients only when its peer has failed.

■ Storage pools are assigned to controllers at the time of creation; the Storage configuration screen offers the option of creating a pool assigned to each controller independently.

■ If you create two pools, they do not have to be the same size. Any subdivision of storage is permitted.

■ After completing basic configuration, you can assign resources to each controller. Typically, you assign only network interfaces because storage pools are automatically assigned during the storage configuration step.

■ For more information, especially clustering considerations, see the *Oracle ZFS Storage Appliance Administration Guide* for the latest software release at `http://www.oracle.com/goto/zfsstorage/docs`.

▼ Power on the Oracle Disk Shelves and Controllers

Power on all Oracle disk shelves and both controllers. While you must make an Oracle ILOM connection to one controller in preparation for initial configuration, make the connection for both controllers and keep them in place for future access to the SPs through Oracle ILOM.

Note - Remote network access is preferred when connecting to Oracle ILOM because it allows better data collection than a direct serial connection. Per your environment, it might be preferable to make a serial connection for the initial configuration, and a network connection thereafter.

---

1. **If necessary, extend the controllers to the maintenance position so you can access the back of the controllers.**

2. **Ensure that each controller has an Ethernet cable connected from your network to the 10-Gigabit Ethernet NET 1 port on the back panel of the controller.**

   To locate the port, see "Back Panel Status Indicators, Connectors, and PCIe Slots" on page 25.

   This task should have been performed when attaching cables to the controllers as described in "Connect the Data Cables" on page 57.

3. **Connect to both controllers using Oracle ILOM.**

Note - It is recommended that you do not disconnect these cables after initial configuration, so there is readily available access to the SPs through Oracle ILOM. It is also recommended that you make a connection to each controller.

- For a network connection, connect an Ethernet cable from the NET 0 port on the back of the controller to your network. This is the preferred connection method to Oracle ILOM for data collection.
- For a serial connection, connect a serial cable from the SER MGT port on the back of the controller to the serial port on the administrative client. Use a DB9 to RJ45 adapter if necessary. Ensure that the client has been prepared as outlined in "Prerequisites" on page 61.

4. **If using the optional cable management arm (CMA), route all cables, except the controller cluster cables, through the CMA and secure with the Velcro straps.**

5. **Power on the disk shelf(ves) by plugging the two power cords into the power supply connectors, connecting the cords to the external power source, applying external power, and turning on the disk shelf power switch(es) (the "|" position).**

> **Note -** To guarantee redundancy, power cords must be connected to two separate and independent power sources.

Wait several minutes until the system power indicator on the front, and the power supply status indicator for each power supply on the back are lit a steady green.

6. **There are two power cords for each controller. Connect one end of each controller power cord to a grounded electrical outlet.**

> **Note -** To guarantee redundancy, power cords must be connected to two separate and independent power sources.

7. **Connect the controller power cords to the power supply AC connectors on the back panel of the controller and use the Velcro strap to secure them.**

   Shortly after power is applied to the system, the SP OK LED blinks as the service processor (SP) is booting. The SP OK LED is illuminated solid green after the SP has successfully booted. After the SP has booted, the Power/OK LED on the front panel begins flashing slowly,

indicating the host is in standby power mode. In standby power mode, the controller is not yet initialized or powered on.
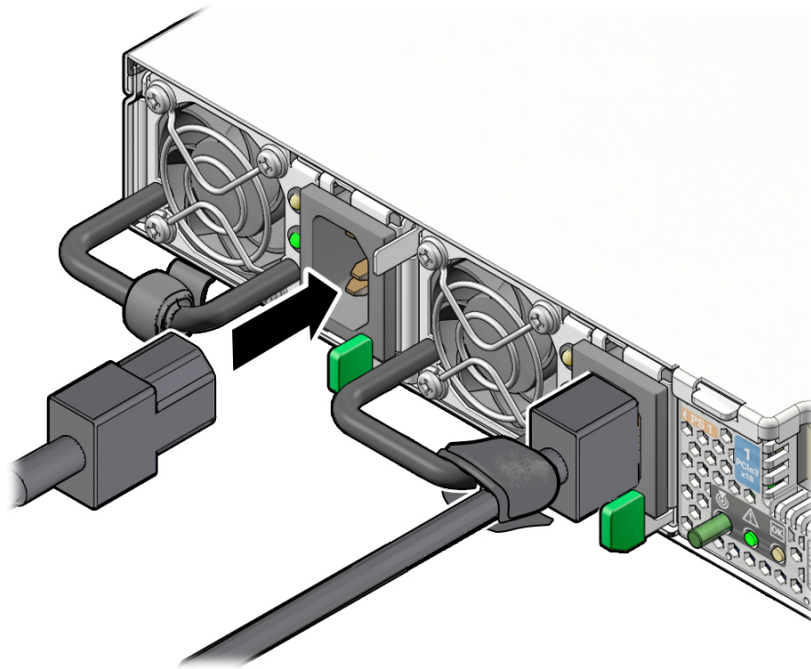
⚠️ **Caution -** Do not operate the controller unless all fans, component heatsinks, air baffles, and the top cover are installed. Damage to controller components can occur if the controller is operated without adequate cooling mechanisms.

Note - At this point, power is supplied only to the SP and the power supply fans. After the Power/OK LED is lit a steady green, the controller has full power and is ready for initial configuration.

8. **If after a few minutes the Power/OK LED on the front panel is not lit a steady green, apply the remaining power manually by pressing the Power button on the controller front panel.**

9. **If you extended the controllers to the maintenance position, push the controllers into the rack until the slide-rail locks (on the front of the controllers) engage the slide-rail assemblies.**

You will hear an audible click when the controller is in the normal rack position.

▼ Configure the Primary Network Interface

On the primary controller, connect to the service processor (SP) and configure the primary network interface with the network parameters you gathered in .

1. **Open a terminal window or terminal emulator and issue the appropriate command, as follows:**

   ■ For a serial port concentrator (for example, using telnet), connect and use `root` as the user name, and replace *serial-concentrator portnumber* with the appropriate value, for example: `telnet` *serial-concentrator port number*

   ■ For a network connection, connect using SSH and use `root` as the user name, and determine the IP address by accessing your DHCP server for the address assigned to the service processor MAC address (see the label on the controller), for example: `ssh root@192.168.128.256`.

   a. **Type the password `changeme` when prompted.**

   b. **At the command prompt, enter `start /HOST/console`**

   c. **Type `y` to confirm that you want to start the console.**

2. **Press any key to begin configuring the primary network interface. The shell interface configuration screen is displayed. The "=" character is displayed next to NET-0 at the top of the screen. If "X" appears by NET-0, check that all cable connections are tight.**

   To exit the shell interface before completing configuration, enter `exit`.

3. **Verify the information on the screen, or enter values that do not appear.**

4. **After typing and re-typing a new Administrator account password, press Enter (or ESC-1 or the F1 key) to complete this stage of the configuration.**

   The final shell configuration screen appears, confirming that your system is ready for further configuration using the BUI.

▼ Initial Configuration

Configure the remaining system parameters and set up clustering on the primary controller through the BUI using a browser running on any client on the same network as the initial interface.

During cluster initialization, the software propagates the configuration from the primary controller to the peer controller. After the cluster is initialized, you can administer the system from either controller. However, do not attempt initial configuration on both controllers independently. Refer to the *Oracle ZFS Storage Appliance Administration Guide* for the appropriate software release at http://www.oracle.com/goto/ZFSStorage/docs for information about setting up a clustered environment. Also refer to the administration guide for detailed configuration information.

The management software is designed to be fully featured and functional on a variety of web browsers.

Note - Do not use Internet Explorer version 6 or earlier.

There are six steps for initially configuring the appliance:

- Network
- DNS
- Time
- Name Services (NIS, LDAP, Active Directory)
- Storage
- Registration and Support

Ensure that you have met all prerequisites, including reading the section "Clustering Guidelines" on page 64, and storage configuration considerations in the *Oracle ZFS Storage Appliance Administration Guide*.

1. **Direct your browser to the system using either the IP address or host name you assigned to the NET 0 port as follows: `https://`*ipaddress*`:215` or `https://`*hostname*`:215`. The login screen is displayed.**

   If the login screen does not appear and the message `Secure Connection Failed` is displayed, click the button to add an exception, download the certificate, and click `Confirm Security Exception`.

Note - Only perform this initial configuration on the primary controller.

---

2. **Type `root` into the Username field, your administrative password, and press the Enter key. The Welcome screen is displayed.**

3. **To begin configuring the system, click Start on the Welcome screen.**

   You are guided through the initial configuration, one step at a time.

4. **Click Cluster. When a diagram of the active cluster links is displayed, ensure that three solid blue lines are shown. If not, ensure that the three cluster cables connecting the two controllers together are properly connected and tight in their connectors.**

5. **When prompted for the peer controller information, enter its unique name and the default Administrator account password (`changeme`).**

6. **After completing each configuration step, click Commit to save your information and continue.**

   Arrows beneath the Commit button can be used to revisit previous steps and change the configuration, if desired.

7. **When the Network configuration screen is displayed, add four interfaces: one management interface for each controller (typically ixgbe0 and ixgbe1) and two InfiniBand interfaces (typically ibp0, ibp1).**

   To add an interface, drag a device from the Devices column to the Datalinks column. Then drag it from the Datalinks column to the Interfaces column and add the IP address, along with other configuration data. Lock the management interfaces to make them private network interfaces.

8. **When configuring the InfiniBand interfaces, use this IP address and mask: `0.0.0.0/8`. Select the checkbox `IB Partition`, enter the partition key `ffff`, and select `Connected Mode` for the link mode.**

9. **Click the Routing submenu and ensure that the default route is using the first interface, which is typically ixgbe0. Configure a second default gateway, which is typically igb1. All data interface routes must be configured manually; there are no default routes.**

10. **When the DNS configuration screen is displayed, verify the settings against the parameters you gathered in “Prerequisites” on page 61.**

    You must enter values for the DNS server. To enter additional DNS servers, click the "+" character and add them.

11. **When the NTP configuration screen is displayed, ensure that the correct server and client times are shown under the Clock heading, and enter the NTP server IP address.**

To synchronize the client time to the NTP server time, click `Sync`.

12. **When the Name Services configuration screen is displayed, click the Configure button next to the desired service to edit its settings. Enter the parameters you gathered in "Prerequisites" on page 61.**

   a. **For NIS, instead of entering the IP address for the two NIS servers, you may select `Search using broadcast` if this matches your network.**

   b. **For LDAP, select the checkbox to protect LDAP traffic with SSL/TLS, use the distinguished name (DN) in LDAP notation, select Anonymous or Proxy for the bind credential level, enter the DN and password of the account to be used if selecting Proxy, and add the certificate if configured and present. To add another LDAP server, click the "+" character next to Servers.**

   c. **For Active Directory, if selecting Join Workgroup, enter the workgroup name and click Apply. If selecting Join Domain and you have an AD site name or a preferred domain controller, add it to the CIFS configuration page. The user account to join the server to the domain must have sufficient privileges to do so. If the AD domain and the DNS domain do not match, enter the DNS domain in the field Additional DNS search path. Also ensure that the times on the system and the AD server match within five minutes.**

   d. **When the summary of settings is displayed, click Commit if all settings are correct. Otherwise, click Return to Services and correct the settings.**

13. **To complete the Storage configuration screen, refer to the *Oracle ZFS Storage Appliance Administration Guide*.**

14. **After completing the Registration and Support step, the configuration is then propagated to the peer controller, including the new administrative password.**

   Note - The initial configuration can be repeated at a later time by navigating to the Maintenance > System BUI screen and clicking the "INITIAL SETUP" button.

15. **To ensure that your system has the most up-to-date firmware and software, see "Downloading and Installing Appliance Software Updates" on page 73.**

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Downloading and Installing Appliance Software Updates

Software updates for Oracle ZFS Storage Appliances provide additional features, bug fixes, and occasionally security updates, thus allowing your storage environment to run at peak efficiency. A software update is a binary file, which is the same for all supported platforms, that contains new management software as well as new hardware firmware for your storage controllers and disk shelves.

▼ Downloading Appliance Software Updates

Software Updates for the Oracle ZFS Storage ZS5-ES are available from My Oracle Support (MOS).

For information about how to download and install a software update:

1. **Go to My Oracle Support Oracle ZFS Storage Appliance: Software Updates (Doc ID 2021771.1) (`https://support.oracle.com/epmos/faces/DocumentDisplay?id=2021771.1`).**

2. **Carefully review the appropriate release notes prior to upgrading.**

3. **Follow the steps in the section "Downloading and Installing a Software Update."**

Troubleshooting Installation Issues

This section describes how to connect to Oracle ILOM and power down the appliance. It also provides troubleshooting information, as well as a technical support worksheet and information on how to locate the appliance serial number.

Description	Links
Connect to Oracle ILOM to monitor and manage system components.	"Connecting to Oracle ILOM" on page 75
Power down the appliance if an error occurs.	"Powering Off the Appliance" on page 87
Review solutions to common problems.	"Installation Troubleshooting" on page 88
Gather information and contact technical support.	"Technical Support Information Worksheet" on page 89
Locate the system serial number.	"Locating the Chassis Serial Number" on page 90

Connecting to Oracle ILOM

Oracle Integrated Lights Out Manager (ILOM) is embedded on firmware in the Oracle Storage ZS5-ES. The Oracle ZFS Storage ZS5-ES supports Oracle ILOM version 3.2.x, which provides extensive management and monitoring capabilities for the appliance.

For complete information about Oracle ILOM, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.2.x Documentation Library at `http://www.oracle.com/goto/ILOM/docs`.

This section describes how to access and get started using Oracle ILOM.

Description	Links
Learn about Oracle ILOM hardware and interfaces.	"Oracle ILOM Hardware and Interfaces" on page 76
Learn about network ports.	"Network Defaults" on page 76
Log in directly to Oracle ILOM using a terminal connected to the serial port.	"Logging In to Oracle ILOM Using a Local Serial Connection" on page 77
Log in to Oracle ILOM over the network using an Ethernet connection.	"Logging In to Oracle ILOM Using a Remote Ethernet Connection" on page 78

Description	Links
Troubleshoot the service processor connection.	"Troubleshooting the Service Processor Connection" on page 85

Oracle ILOM Hardware and Interfaces

The following table lists the components and functions of Oracle ILOM. For complete information about Oracle ILOM, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.2.x Documentation Library at `http://www.oracle.com/goto/ILOM/docs`.

Component	Function
Hardware	- Embedded service processor (SP) chipset that monitors the status and configuration of components such as fans, storage drives, and power supplies. - Rear panel external connection SER MGT RJ-45 serial management port.
Interfaces	- Web browser interface - SSH command-line interface (CLI) - IPMI v2.0 CLI - SNMP v3 interface

With Oracle ILOM, you can monitor and manage the appliance components. Oracle ILOM lets you perform the following tasks:

- Configure network information
- View and edit hardware configurations for the SP
- Monitor vital system information and view logged events
- Manage Oracle ILOM user accounts

Network Defaults

The Oracle ZFS Storage ZS5-ES supports dual-stack IPv4 and IPv6 settings, which enable Oracle ILOM to fully operate in an IPv4 and IPv6 network environment. For IPv4 configurations, DHCP is enabled by default, allowing a DHCP server on the network to automatically assign network settings to the server. For IPv6 configurations, IPv6 stateless auto-configuration is enabled by default, allowing an IPv6 router on the network to assign the network settings. In a typical configuration, you will accept these settings assigned by the DHCP server or IPv6 router.

Note - To determine the IP address or host name assigned by the DHCP server, use the network tools provided with the DHCP server or IPv6 router.

The following procedures enable you to test that the assigned settings are working correctly and to establish a connection to Oracle ILOM locally and remotely.

■ To log in locally, see "Logging In to Oracle ILOM Using a Local Serial Connection" on page 77.

■ To log in remotely, use the IP address, host name, or IPv6 local link name assigned to the SP and follow the instructions in "Logging In to Oracle ILOM Using a Remote Ethernet Connection" on page 78.

Logging In to Oracle ILOM Using a Local Serial Connection

To log in to Oracle ILOM locally using a serial connection, you need to connect a serial null modem cable to the RJ-45 serial port labeled SER MGT and to a terminal or terminal emulator. Ensure that the following serial communication settings are configured:

■ 8N1: eight data bits, no parity, one stop bit

■ 9600 baud

■ Disable hardware flow control (CTS/RTS)

■ Disable software flow control (XON/XOFF)

This section includes the following procedure:

■ "Logging In to Oracle ILOM Using a Local Serial Connection" on page 77

▼ Log In to Oracle ILOM Using a Local Serial Connection

This procedure does not require that you know the IP address of the SP. It does require that you have an Oracle ILOM Administrator account. You must be present at the appliance to perform this procedure.

Note - The default Oracle ILOM Administrator account shipped with the server is `root` and its password is `changeme`. If this default Administrator account has since been changed, contact your system administrator for an Oracle ILOM user account with Administrator privileges.

---

1. **To ensure that your controller has the necessary connections for local access to Oracle ILOM, follow the instructions in "Connect the Data Cables" on page 57.**

2. **To establish a connection between your serial console and Oracle ILOM, press Enter on the terminal.**
   A login prompt to Oracle ILOM appears.

3. **Log in to the Oracle ILOM command-line interface (CLI) using an Administrator account.**
   Oracle ILOM displays a default command prompt (->), indicating that you have successfully logged in to Oracle ILOM.

   ### Related Topics

   - "Log In to Oracle ILOM Remotely Using the Web Interface" on page 79
   - "Log In to Oracle ILOM Remotely Using the Command-Line Interface" on page 80

Logging In to Oracle ILOM Using a Remote Ethernet Connection

To log in to Oracle ILOM remotely using either the command-line interface (CLI) or the web interface, you must know the IP address of the SP. The following sections describe how you can determine the IP address (if you do not know it), how to log in to Oracle ILOM, and how to view and modify the SP IP address:

- "Determining the IP Address of the Controller SP" on page 78
- "Log In to Oracle ILOM Remotely Using the Web Interface" on page 79
- "Log In to Oracle ILOM Remotely Using the Command-Line Interface" on page 80
- "View or Modify an SP IPv4 Address" on page 81
- "View or Modify an SP IPv6 Address" on page 82

Determining the IP Address of the Controller SP

If a DHCP server or IPv6 router cannot be reached after ten seconds, the SP requests will timeout. After the timeout, the SP then only periodically checks for a DHCP server or IPv6 router.

If you do not have a DHCP server or IPv6 router on your network, or you need to view or assign an IP address to the SP, follow the procedures in these sections:

- "View or Modify an SP IPv4 Address" on page 81
- "View or Modify an SP IPv6 Address" on page 82

▼ Log In to Oracle ILOM Remotely Using the Web Interface

Before You Begin   This procedure requires that you have an Oracle ILOM Administrator account and that you know the IP address or host name of the SP.

To improve response times, disable the web browser proxy server (if used).

1. **To ensure that your controller has the necessary connections for remote access to Oracle ILOM, follow the instructions in "Connect the Data Cables" on page 57.**

2. **Type the IP address of the appliance SP into your web browser address field.**

   For example: `https://172.16.82.26`

   The Oracle ILOM web interface login page appears.

3. **Type your user name and password.**

   The default Oracle ILOM Administrator account shipped with the server is `root` and its password is `changeme`. If this default Administrator account has since been changed, contact your system administrator for an Oracle ILOM user account with Administrator privileges.

4. **Click Log In.**

   The System Information Summary page appears.

   You are now logged in to Oracle ILOM. For information about using Oracle ILOM, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.2.x Documentation Library at `http://www.oracle.com/goto/ILOM/docs`.

Related Topics

- "Logging In to Oracle ILOM Using a Local Serial Connection" on page 77
- "View or Modify an SP IPv4 Address" on page 81
- "View or Modify an SP IPv6 Address" on page 82

▼ Log In to Oracle ILOM Remotely Using the Command-Line Interface

Before You Begin This procedure requires that you have an ILOM Administrator account and that you know the IP address or host name of the appliance SP.

1. **To ensure that your controller has the necessary connections for remote access to Oracle ILOM, follow the instructions in “Connect the Data Cables” on page 57.**

2. **Using a Secure Shell (SSH) session, log in to Oracle ILOM by specifying your Administrator account user name and the IP address or host name of the appliance SP.**

   The login command syntax can be either of the following:

   `ssh -l` *username host*

   or

   `ssh` *username@host*

   Where *host* is either the IP address or the host name of the SP (when using DNS).

   For example:

   `ssh root@172.16.82.26`

   The Oracle ILOM password prompt appears.

3. **Type a password for the Administrator account.**

   root@172.16.82.26's password: `changeme`

   Note - The default Oracle ILOM Administrator account shipped with the server is `root` and its password is `changeme`. If this default Administrator account has since been changed, contact your system administrator for an Oracle ILOM user account with Administrator privileges.

   Oracle ILOM displays a default command prompt (->), indicating that you have successfully logged in to Oracle ILOM. For information about using Oracle ILOM, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.2.x Documentation Library at `http://www.oracle.com/goto/ILOM/docs`.

   ### Related Topics

   - “Logging In to Oracle ILOM Using a Local Serial Connection” on page 77
   - “View or Modify an SP IPv4 Address” on page 81
   - “View or Modify an SP IPv6 Address” on page 82

▼ View or Modify an SP IPv4 Address

To view or modify the IPv4 address currently assigned to the Oracle ILOM SP:

Note - You can also change network settings using the BIOS Setup Utility.

---

1. **Log in to Oracle ILOM using one of the following procedures:**

   - "Logging In to Oracle ILOM Using a Local Serial Connection" on page 77
   - "Log In to Oracle ILOM Remotely Using the Command-Line Interface" on page 80

Note - If you log in to Oracle ILOM using an Ethernet connection, after you modify the network settings, your connection will be terminated, and you will have to log in again using the new settings.

---

2. **To navigate to the `/SP/network` directory, use the `cd` command:**

   ->`cd /SP/network`

3. **Do one of the following:**

   - **If you have a DHCP server on the network, to view the settings assigned to the server by the DHCP server, type the following command:**

     ->`show /SP/network`

   - **If there is no DHCP server, or if you want to assign settings, use the `set` command to assign values for the properties listed in the table in the following table. For example:**

     ->`set /SP/network/pendingipdiscovery=static`

     ->`set /SP/network/pendingipaddress=10.8.183.106`

     ->`set /SP/network/pendingipnetmask=10.255.255.255`

     ->`set /SP/network/pendingipgateway=10.8.183.254`

     ->`set /SP/network/commitpending=true`

Note - If you are logged in to Oracle ILOM using an Ethernet connection, when you set `commitpending` to `true` to commit the changes to the network settings, your Oracle ILOM connection will be terminated and you will have to log in again using the new settings.

---

4. **If you want to enable sideband management, type the following commands:**

->**set /SP/network/pendingmanagementport=/System/MB/NET**n

Where n equals 0, 1, 2, or 3.

Note - Ethernet ports NET2 and NET3 are nonfunctional in single-processor systems and, therefore, cannot be used for sideband management.

->**set /SP/network/commitpending=true**

The following table describes the network settings.

Property and Set Property Value	Description
Property: state **Set Property Value:** set state=enabled	The network state is enabled by default.
Property: pendingipdiscovery **Set Property Value:** set pendingipdiscovery=static	To enable a static network configuration, set pendingipdiscovery to static. By default, pendingipdiscovery is set to dhcp.
Property: pendingmanagement port **Set Property Value:** set pendingmanagementport=/System/SP/NET0	To enable sideband management, set pendingmanagementport to the NET 0 Ethernet port (/System/SP/NET0).
Property: pendingipaddress **Set Property Value:** set pendingipaddress=<*ip_address*> **Property:** pendingipnetmask **Set Property Value:** set pendingipnetmask=<*netmask*> **Property:** pendingipgateway **Set Property Value:** set pendingipgateway=<*gateway*>	To assign multiple static network settings, type the set command followed by the pending command for each property value (IP address, netmask, and gateway), then type the static value that you want to assign.

Related Topics

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-

▼ View or Modify an SP IPv6 Address

To view or modify the IPv6 address currently assigned to the Oracle ILOM SP:

Note - You can also change network settings using the BIOS Setup Utility.

---

1. **Log in to Oracle ILOM using one of the following procedures:**

   - "Logging In to Oracle ILOM Using a Local Serial Connection" on page 77
   - "Log In to Oracle ILOM Remotely Using the Command-Line Interface" on page 80

Note - If you log in to Oracle ILOM using an Ethernet connection, after you modify the network settings, your connection will be terminated, and you will have to log in again using the new settings.

---

2. **To navigate to the `/SP/network/ipv6` directory, use the `cd` command:**

   -> `cd /SP/network/ipv6`.

3. **To view the IPv6 network settings configured on the device, type the `show` command.**

   For example, see the following sample output values for the IPv6 properties on a server SP device.

   ```
   -> show
   /SP/network/ipv6
   Targets:

   Properties:
    state = enabled
    autoconfig = stateless
    dhcpv6_server_duid = (none)
    link_local_ipaddress = 2001:DB8:n:n
    static_ipaddress = ::/128
    ipgateway = 2001:DB8:n:n
    pending_static_ipaddress = ::/128
    dynamic_ipaddress_1 2001:DB8:n:n

   Commands:
    cd
    show
    set
   ```

4. **To configure an IPv6 auto-configuration option, use the `set` command to specify the following auto-configuration property values:**

Property	Set Property Value	Description
`state`	`set state=enabled`	The IPv6 network state is enabled by default. To enable an IPv6 auto-configuration option, set this state to `enabled`.
`autoconfig`	`set autoconfig=<value>`	Specify this command followed by the autoconfig value you want to set. Options include: ■ `stateless` (default setting) Automatically assigns IP address learned from IPv6 network router. ■ `dhcpv6_stateless` Automatically assigns DNS information learned from the DHCPv6 server. ■ `dhcpv6_stateful` Automatically assigns the IPv6 address learned from the DHCPv6 server. ■ `disabled` Disables all auto-configuration property values and sets the read-only property value for Link Local address.

Note - The IPv6 configuration options listed in the above table take effect after they are set, that is, you do not need to commit these changes under the `/network` target.

Note - You can enable the `stateless` auto-configuration option to run at the same time the option for `dhcpv6_stateless` is enabled or the option for `dhcpv6_stateful` is enabled. However, the auto-configuration options for `dhcpv6_stateless` and `dhcpv6_stateful` should not be enabled to run at the same time.

5. **To set a static IPv6 address, specify the following property types:**

Property and Set Property Value	Description
Property: `state` **Set Property Value:** `set state=enabled`	The IPv6 network state is enabled by default. To enable a static IP address set this state to `enabled`.
Property: `pending_static_ipaddress`	Type this command followed by the property value for the static IPv6 address and subnet netmask that you want to assign to the device. IPv6 address example: `2001:DB8:n:n`

Property and Set Property Value	Description
Set Property Value: set pending_static_ipaddress/<*subnet mask length_in_bits*>	
Property: commitpending	Type set commitpending=true to commit changes.
Set Property Value: set commitpending=true	

Note - Assigning a new static IP address to the device will end all active Oracle ILOM sessions to the device. To log in again to Oracle ILOM, you will need to create a new session using the newly assigned IP address.

Related Topics

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Troubleshooting the Service Processor Connection

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

- The Oracle ILOM SP is hung and needs to be reset.
- As the system administrator, you have forgotten the root account password and you need to recover it.

For instructions on how to handle each of these problems, see the following sections:

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Resetting the Service Processor Using Oracle ILOM

If the Oracle ILOM service processor (SP) is hung, Oracle ILOM provides two methods to reset it:

- From the Oracle ILOM command-line interface (CLI), type: 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. You must log in again to continue working in Oracle ILOM.

For more information about resetting the SP from the Oracle ILOM CLI or web interface, refer to the *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 3.2.x* at `http://docs.oracle.com/cd/E37444_01/index.html`.

▼ Reset the Service Processor From the 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 back panel of the controller.

● **Using a stylus, press the Reset SP pinhole button that is located on the back panel.**

The SP reboots. You must log in again to continue working in Oracle ILOM.

▼ Recover Root Account Password

If necessary, 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. In addition, if the Physical Presence State is enabled (the default) in Oracle ILOM, you must prove that you are physically present at the appliance.

The 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: `SUNSP-000000000 login:` **default**

   `Press and release the physical presence button`

   `Press return when this is completed...`

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

To prove physical presence at the appliance, press the Locator button on the front of the ZS5-ES controller.

For the exact location of the Locator button, see "Front Panel Status Indicators, Connectors, and Drives" on page 24.

3. Return to your serial console and press Enter.

You will be prompted for a password.

4. 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 the section on "Configuring Local User Accounts" in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 3.2.x* at `http://docs.oracle.com/cd/E37444_01/index.html`.

Powering Off the Appliance

This section contains power-off procedures for Oracle ZFS Storage Appliance disk shelves and storage controllers.

Use the following procedures to power off the appliance:

- "Powering Off the Disk Shelf" on page 87
- "Powering Off a Controller" on page 88

▼ Powering Off the Disk Shelf

Powering off or removing all SAS chains from a disk shelf will trigger a kernel panic on the controller(s) to prevent data loss, unless the shelf is part of an NSPF (no single point of failure) data pool. To avoid this, shut down the controller(s) before decommissioning the shelf. For details about NSPF profiles, see "Data Profiles for Storage Pools" in "Oracle ZFS Storage Appliance Administration Guide".

1. Stop all input and output to and from the disk shelf.

2. Wait approximately two minutes until all disk activity indicators have stopped flashing.

3. Place the power supply on/off switches to the "O" off position.

4. **Disconnect the power cords from the external power source for the cabinet.**

Note - All power cords must be disconnected to completely remove power from the disk shelf.

Powering Off a Controller

The recommended methods for powering off a controller depend on whether you have completed initial configuration. Use a power off method from one of the following two situations.

If you have completed initial configuration, power off the controller using one of the following methods:

- Log in to the BUI and click the power icon ⏻ on the left side under the masthead.
- SSH in to the appliance and enter the `maintenance system poweroff` command.
- Use a pen or non-conducting pointed object to press and release the Power button on the front panel.

If you have not completed the initial configuration steps, power off the controller using one of the following methods:

- Use a pen or non-conducting pointed object to press and release the Power button on the front panel.
- SSH or use a serial connection to log in to the service processor (SP), and then issue the command `stop /SYS`.
- To initiate an emergency shutdown during which all applications and files will be closed abruptly without saving, press and hold the Power button for at least four seconds until the Power/OK status indicator on the front panel flashes, indicating that the storage controller is in standby power mode. To completely remove power, disconnect the AC power cords from the rear panel of the storage controller.

Installation Troubleshooting

If you experience problems while setting up your appliance, see the troubleshooting information in the following table.

Problem	Possible Solution
Controller powers on, but the monitor does not.	■ Is the Power button for the monitor turned on? ■ Is the monitor power cord connected to a wall outlet?

Problem	Possible Solution
	■ Is the monitor power cord connected to the monitor?
	■ Does the wall outlet have power? Test by plugging in another device.
No video is displayed on the monitor screen.	■ Is the monitor cable attached to the video connector?
	■ Does the monitor work when connected to another system?
	■ If you have another monitor, does it work when connected to the original system?
	■ If, after POST and BIOS are complete, you no longer see video output on your monitor and see only a flashing cursor, check the configuration of the operating system to determine if it is configured to redirect its output exclusively over the serial line.
Controller does not power on when the front panel Power button is pressed.	Keep notes on the following situations in case you need to call Oracle Service Personnel:
	■ Is the Power/OK LED illuminated on the front of the system? (Ensure that the power cord is connected to the system and to a grounded power receptacle.)
	■ Does the wall outlet have power? Test by plugging in another device.
	■ Does the monitor sync within five minutes after power-on? (The green LED on the monitor stops flashing and remains illuminated.)
	■ Check Oracle ILOM fault management settings to ensure that there are no faulty components or incorrect power management settings that might be preventing the system from powering on.

Technical Support Information Worksheet

If the troubleshooting information fails to solve your problem, use the following table to collect information that you might need to communicate to the Oracle Service personnel.

System Configuration Information Needed	Your Information
Service contract number	
System model	
Operating system	
Chassis serial number (For instructions for locating this number, see "Locating the Chassis Serial Number" on page 90.)	
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	
IP address	

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

Related Topics

- *Oracle ZFS Storage ZS5-ES Service Manual*

Locating the Chassis Serial Number

To obtain support for your storage controller or to order new parts, you need your chassis serial number. There are several ways to locate the chassis serial number:

- On the front panel of the controller, look to the left of the status indicators.
- Another label is on the top of the storage controller.
- In the BUI, click the Oracle label in the masthead.
- In the CLI, issue the command `maintenance hardware show`
- From the Oracle ILOM web interface, go to the System Information > Summary page in the Oracle ILOM browser interface.
- From the Oracle ILOM CLI, type the `show /System` command.

Related Topics

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