



Cisco UCS C220 M7 Server Installation and Service Guide

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Preface

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- [Full Cisco Trademarks with Hardware License](#), on page ix
- [Communications, Services, and Additional Information](#), on page xi

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CHAPTER 1

System Overview

This chapter contains the following topics:

- [Overview, on page 1](#)
- [External Features, on page 3](#)
- [Serviceable Component Locations, on page 6](#)
- [Summary of Server Features, on page 10](#)

Overview

The Cisco UCS C220 M7 server is a one-rack unit server that can be used standalone, or as part of the Cisco Unified Computing System, which unifies computing, networking, management, virtualization, and storage access into a single integrated architecture. Cisco UCS also enables end-to-end server visibility, management, and control in both bare metal and virtualized environments. Each Cisco UCS C220 M7 has two CPU sockets that can support the following Intel® Xeon® Scalable Processors:

- Fourth Generation Intel Xeon Scalable Server Processors
- Fifth Generation Intel Xeon Scalable Server Processors

Additionally, the server supports the following features with one CPU or two identical CPUs:

- 32 DDR5 DIMMs (RDIMM), 4400 MHz (2 DPC), up to 5600 MHz (1DPC) support for RDIMMs.
16 DIMMs are supported per CPU for a total system memory of 4 TB (up to 128 GB DDR5 DIMMs)
- DDR5 DIMM capacities vary based on the CPU type for the compute node:
 - Intel Fourth Generation Xeon Scalable Processors support 16, 32, 64, and 128 GB DDR5 DIMMs
 - Intel Fifth Generation Xeon Scalable Processors support 16, 32, 64, 96, and 128 GB DDR5 DIMMs
- The server's DIMM configuration differs depending on which generation of CPU is populated on the server:
 - With Fourth Generation Intel Xeon Scalable Server Processors, the compute node supports DDR5 DIMMs up to 4800 MT/s with 1DPC, and up to 4400 MT/s with 2DPC
 - With Fifth Generation Intel Xeon Scalable Server Processors, the compute node supports DDR5 DIMMs up to 5600 MT/s with 1 DPC, and up to 4400 MT/s with 2DPC

- 3 PCI Express riser connectors, which provide slots for full-height and half-height PCIe adapters in rear mezzanine slots.
- Two power supplies (PSUs) with support for 1+1 and cold redundancy power redundancy modes. For supported PSUs, see [Power Specifications, on page 185](#).
- One 1 Gigabit Ethernet dedicated management port.
- Internal storage consisting of one M.2 daughter slot.
- Rear mezzanine connectivity options include:
 - One mLOM card provides 2 100 Gig Ethernet ports.
 - An optional Intel X710 OCP 3.0 card is supported in the mLOM slot through the use of an interposer card.
- One mLOM/VIC slot provides 10G/25G/40G/50G/100G/200G connectivity. Supported cards are:
 - Cisco UCS VIC 15428 mLOM with four 10G/25G/50G SFP+/SFP28/SFP56/QSFP56 ports that support Ethernet or Fibre Channel over Ethernet (FCoE).
 - Cisco UCS VIC 15427 Quad Port CNA MLOM (UCSC-M-V5Q50GV2) supports:
 - a x16 PCIe Gen4 Host Interface to the rack server
 - four 10G/25G/50G SFP+/SFP28/SFP56 ports
 - 4GB DDR4 Memory, 3200 MHz
 - Integrated blower for optimal ventilation
 - Secure boot support
 - Cisco UCS VIC 15425 Quad Port 10G/25G/50G SFP56 CNA PCIe (UCSC-P-V5Q50G-D)
 - a x16 PCIe Gen4 Host Interface to the rack server
 - Four 10G/25G/50G QSFP56 ports
 - 4GB DDR4 Memory, 3200MHz
 - Integrated blower for optimal ventilation
 - Cisco UCS VIC 15237 Dual Port 40G/100G/200G QSFP56 mLOM (UCSC-M-V5D200GV2) supports:
 - a x16 PCIe Gen4 Host Interface to the rack server
 - two 40G/100G/200G QSFP/QSFP28/QSFP56 ports
 - 4GB DDR4 Memory, 3200 MHz
 - Integrated blower for optimal ventilation
 - Secure boot support
 - Cisco VIC 15238 mLOM with two 40G/100G/200G QSFP/QSFP28 ports that support Ethernet or Fibre Channel over Ethernet (FCoE).

- Cisco UCS VIC 15235 Dual Port 40G/100G/200G QSFP56 CNA PCIe (UCSC-P-V5D200G-D)
 - a x16 PCIe Gen4 Host Interface to the rack server
 - two 40G/100G/200G QSFP56 ports
 - 4GB DDR4 Memory, 3200MHz
 - Integrated blower for optimal ventilation
- Two KVM ports, one on the front of the server and on the rear
- Modular Trusted Platform Module (TPM 2.0)
- Two different front-loading hardware configurations are available:
 - The Cisco UCS C220 M7 SFF (UCSC-C220-M7S): This model supports only small form-factor (SFF) drives and has a 10-drive backplane. Supports up to 10 front-loading 2.5-inch SAS/SATA drives, and up to 4 of the drives can be NVMe.

When this model is configured with the Cisco 24G Tri-Mode RAID controller (UCSC-RAID-HP), up to 10 NVMe drives are supported.
 - The Cisco UCS C220 M7 NVMe (UCSC-C220-M7N): This model supports only small form-factor (SFF) drives and has a 10-drive backplane. Supports up to 10 front-loading 2.5-inch NVMe-only SSDs.
- Rear PCI risers are supported as one to three half-height half-length (HHHL) PCIe risers, or one to two full-height $\frac{3}{4}$ length PCIe risers.
- The server provides an internal slot for one of the following:
 - SATA Interposer to control SATA drives from the PCH (AHCI), or
 - Cisco 12G RAID controller with cache backup to control SAS/SATA drives, or
 - Cisco 12G SAS pass-through HBA to control SAS/SATA drives
 - Cisco 24G Tri-Mode Raid Controller with cache backup to control SAS/SATA/NVMe drives

External Features

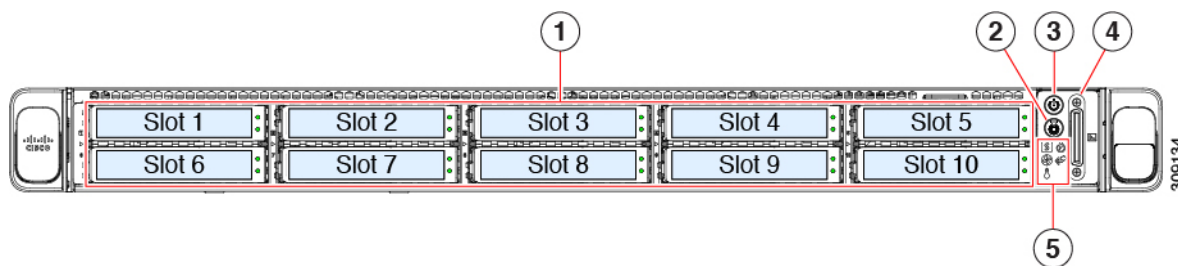
This topic shows the external features of the server versions.

Cisco UCS C220 M7 Server Front Panel Features

The following figure shows the front panel features of the small form-factor drive versions of the server.

For definitions of LED states, see [Front-Panel LEDs, on page 33](#).

Figure 1: Cisco UCS C220 M7 Server Front Panel



1	Drive bays 1 – 10 support SAS/SATA hard disk drives (HDDs) and solid-state drives (SSDs). As an option, drive bays 1-4 can contain up to 4 NVMe drives in any number up to 4. Drive bays 5 through 10 support only SAS/SATA HDDs or SSDs. NVMe drives are supported in a dual CPU server only.	2	Unit identification button/LED
3	Power button/power status LED	4	KVM connector (used with KVM cable that provides one DB-15 VGA, one DB-9 serial, and two USB 2.0 connectors)
5	System LED cluster: <ul style="list-style-type: none"> • Fan status LED • System status LED • Power supply status LED • Network link activity LED • Temperature status LED For definitions of LED states, see Status LEDs and Buttons, on page 33 .		-

Cisco UCS C220 M7 Server Rear Panel Features

The rear panel features can be different depending on the number and type of PCIe cards in the server.

You must choose the risers you want for your server configuration. Rear PCIe risers can be one of the following configurations:

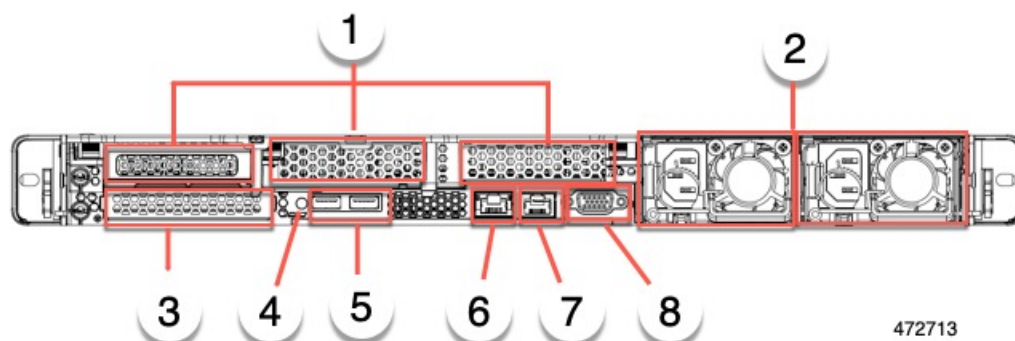
- Half-height risers:
 - one half-height, $\frac{3}{4}$ length riser (not shown). With this configuration, PCIe slot (slot 1) supports one half-height, $\frac{3}{4}$ length, x16 lanes PCIe card and is controlled by CPU 1.
 - three half-height, $\frac{3}{4}$ length risers. See "UCS C220 M7 Server Rear Panel, Half Height, $\frac{3}{4}$ Length PCIe Cards" below.
- A server with 1 CPU supports up to two half-height, $\frac{3}{4}$ length risers in slot 1 and slot 2, or up to 1 full-height, full length riser in slot 1.

- Full-height risers: Two full height, 3/4 length risers. See "Cisco UCS C220 M7 Server Rear Panel, Full Height, 3/4 Length PCIe Cards" below.
- A server with 2 CPUs supports these riser options plus the previous options.



Note For definitions of LED states, see [Rear-Panel LEDs](#), on page 36.

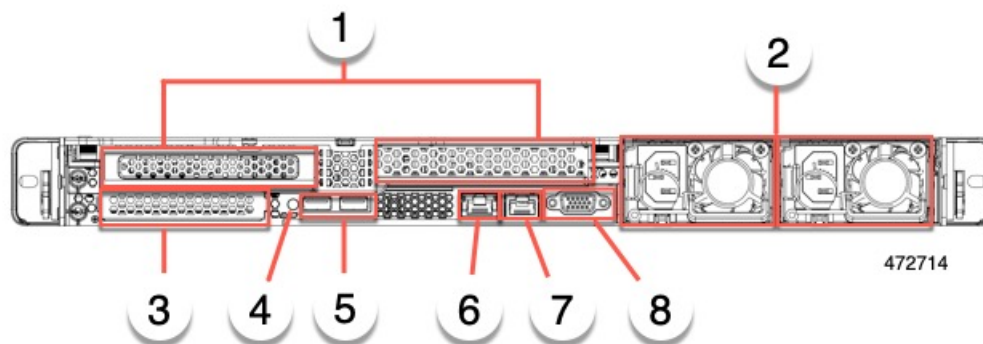
Figure 2: Cisco UCS C220 M7 Server Rear Panel, Half Height, 3/4 Length PCIe Cards



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<p>1</p>	<p>PCIe slots, three</p> <p>This configuration accepts three card in riser slots 1, 2, and 3 as follows:</p> <ul style="list-style-type: none"> • Riser 1, which is controlled by CPU 1: <ul style="list-style-type: none"> • Supports one PCIe slot (slot 1) • Slot 1 is half-height, 3/4 length, x16 • Riser 2, which is controlled by CPU 1: <ul style="list-style-type: none"> • Supports one PCIe slot (slot 2) • Slot 2 is half-height, 3/4 length, x16 • Riser 3, which is controlled by CPU 2: <ul style="list-style-type: none"> • Supports one PCIe slot (slot 3) • Slot 3 is half-height, 3/4 length, x16 	<p>2</p> <p>Power supply units (PSUs), two which can be redundant when configured in 1+1 power mode.</p>
<p>3</p>	<p>Modular LAN-on-motherboard (mLOM) card or OCP card bay (x16 PCIe lane) for an Intel X710 OCP 3.0 card.</p>	<p>4</p> <p>System identification button/LED</p>
<p>5</p>	<p>USB 3.0 ports (two)</p>	<p>6</p> <p>1-Gb Ethernet dedicated management port</p>
<p>7</p>	<p>COM port (RJ-45 connector)</p>	<p>8</p> <p>VGA video port (DB-15 connector)</p>

Figure 3: Cisco UCS C220 M7 Server Rear Panel, Full Height, 3/4 Length PCIe Cards

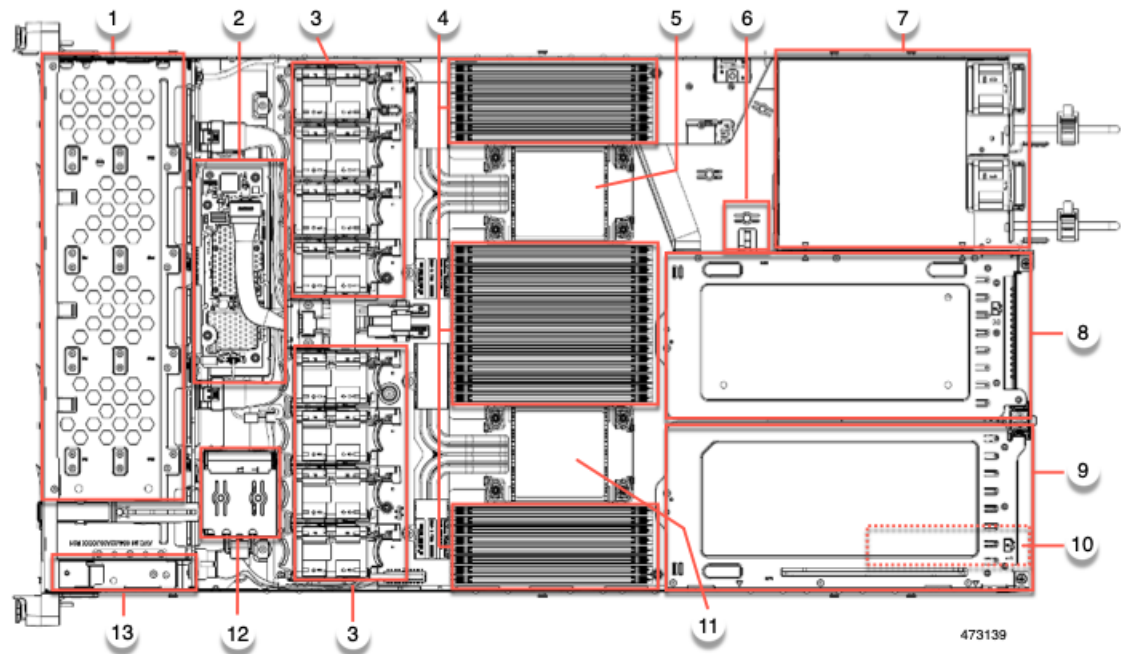


1	<p>PCIe slots, two</p> <p>This configuration accepts two cards in riser slots 1 and 2 as follows:</p> <ul style="list-style-type: none"> • Riser 1, which is controlled by CPU 1: <ul style="list-style-type: none"> • Plugs into riser 1 motherboard connector • Supports one full-height, 3/4 length, x16 PCIe card • Riser 2, which is controlled by CPU 2: <ul style="list-style-type: none"> • Plugs into riser 3 motherboard connector • Supports one full-height, 3/4 length, x16 PCIe card 	2	<p>Power supply units (PSUs), two which can be redundant when configured in 1+1 power mode.</p>
3	<p>Modular LAN-on-motherboard (mLOM) card or OCP card bay (x16 PCIe lane) for an Intel X710 OCP 3.0 card</p>	4	<p>Unit identification button/LED</p>
5	<p>USB 3.0 ports (two)</p>	6	<p>1-Gb Ethernet dedicated management port</p>
7	<p>COM port (RJ-45 connector)</p>	8	<p>VGA video port (DB-15 connector)</p>

Serviceable Component Locations

This topic shows the locations of the field-replaceable components and service-related items. The view in the following figure shows the server with the top cover removed.

Figure 4: Cisco UCS C220 M7 Server, Full Height, ¾ Length PCIe Cards, Serviceable Component Locations



1	Front-loading drive bays 1–10 support SAS/SATA drives.	2	M7 modular RAID card or SATA Interposer card
3	Cooling fan modules, eight. Each fan is hot-swappable	4	DIMM sockets on motherboard, 32 total, 16 per CPU Eight DIMM sockets are placed between the CPUs and the server sidewall, and 16 DIMM sockets are placed between the two CPUs.
5	Motherboard CPU socket two (CPU2)	6	M.2 module connector Supports a boot-optimized RAID controller with connectors for up to two SATA M.2 SSDs
7	Power Supply Units (PSUs), two	8	PCIe riser slot 2 Accepts 1 full height, ¾ length PCIe riser card.
9	PCIe riser slot 1 Accepts 1 full height, ¾ length (x16 lane) PCIe riser card	10	Modular LOM (mLOM) card bay or Intel X710 OCP 3.0 card on chassis floor (x16 PCIe lane) The mLOM/OCP card bay sits below PCIe riser slot 1.
11	Motherboard CPU socket one (CPU1)	12	SuperCap module mounting bracket The SuperCap module (not shown) that mounts into this location provides RAID write-cache backup.
13	Front Panel Controller board	-	

The view in the following figure shows the individual component locations and numbering, including the FH ¾ length PCIe cards.

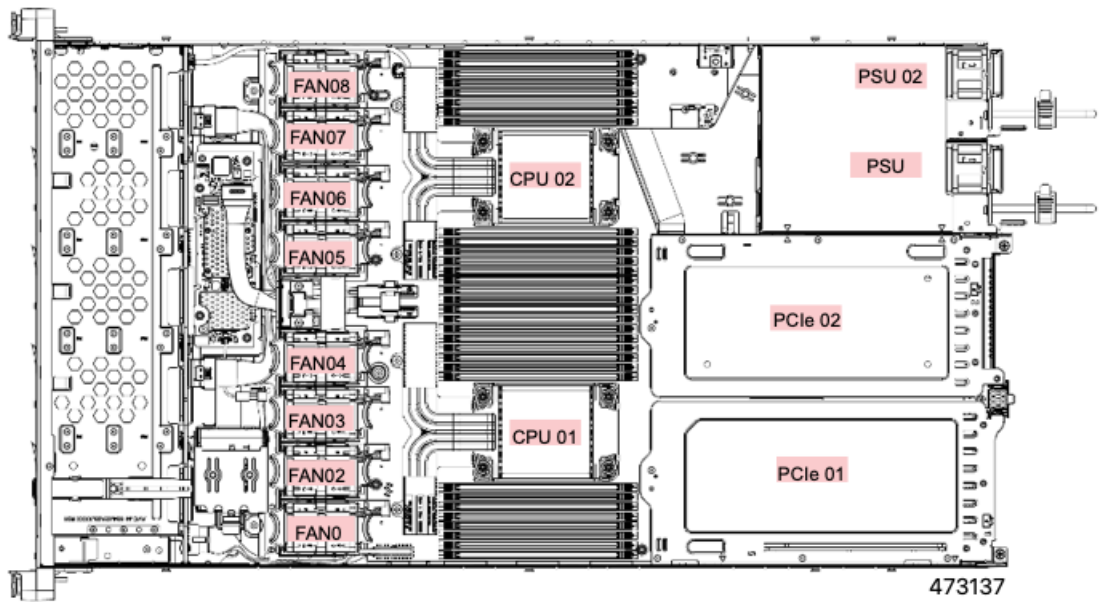
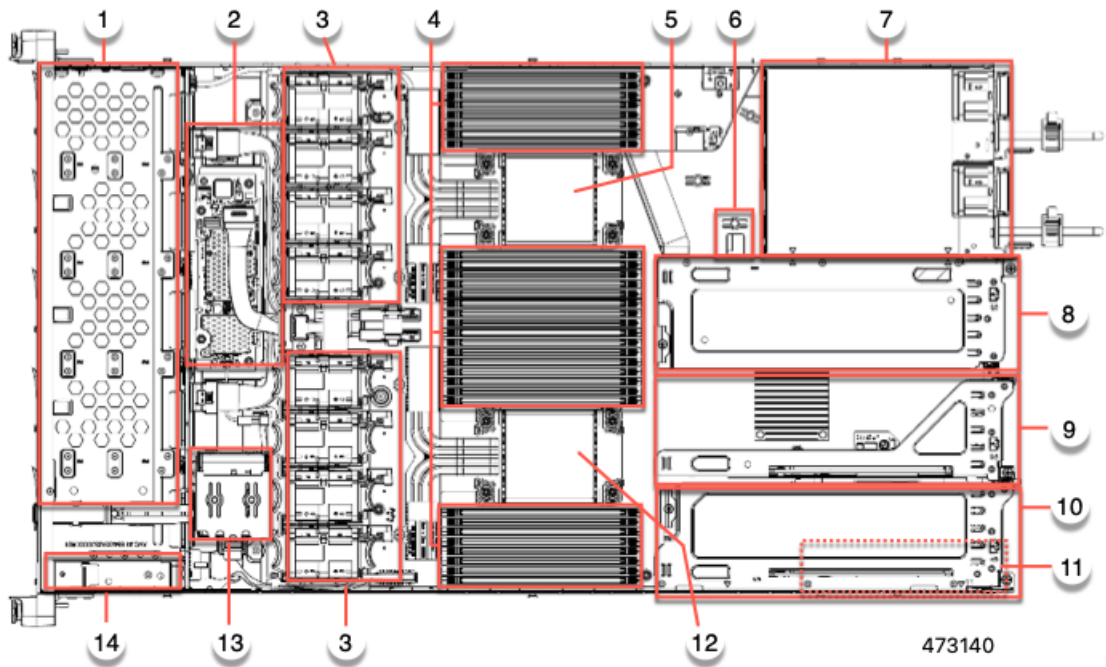


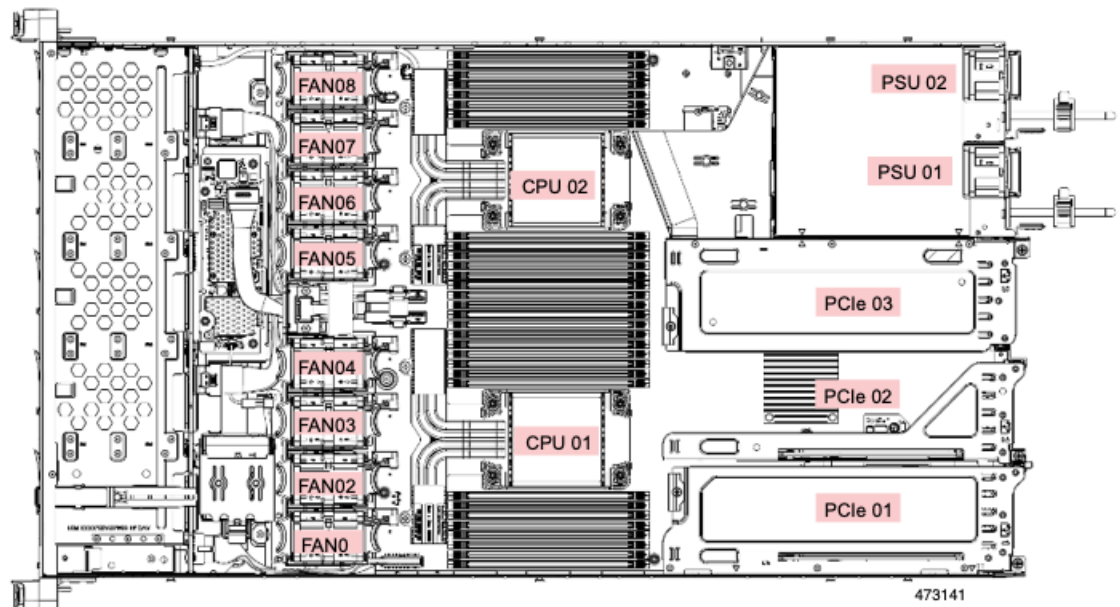
Figure 5: Cisco UCS C220 M7 Server, Half Height, Half Length PCIe Cards, Serviceable Component Locations



1	Front-loading drive bays 1–10 support SAS/SATA drives.	2	M7 modular RAID card or SATA Interposer card
---	--	---	--

3	Cooling fan modules, eight. Each fan is hot-swappable	4	DIMM sockets on motherboard, 32 total, 16 per CPU Eight DIMM sockets are placed between the CPUs and the server sidewall, and 16 DIMM sockets are placed between the two CPUs.
5	Motherboard CPU socket CPU2 is the top socket.	6	M.2 module connector Supports a boot-optimized RAID controller with connectors for up to two SATA M.2 SSDs
7	Power Supply Units (PSUs), two	8	PCIe riser slot 3 Accepts 1 half height, half width PCIe riser card.
9	PCIe riser slot 2 Accepts 1 half height, half width PCIe riser card.	10	PCIe riser slot 1 Accepts 1 half height, half width PCIe riser card
11	Modular LOM (mLOM) or Intel X710 OCP 3.0 card bay on chassis floor (x16 PCIe lane) The mLOM/OCP card bay sits below PCIe riser slot 1.	12	Motherboard CPU socket CPU1 is the bottom socket.
13	SuperCap module mounting bracket The SuperCap module (not shown) that mounts into this location provides RAID write-cache backup.	14	Front Panel Controller board

The view in the following figure shows the individual component locations and numbering, including the HHLH PCIe slots.



The Technical Specifications Sheets for all versions of this server, which include supported component part numbers, are at [Cisco UCS Servers Technical Specifications Sheets](#) (scroll down to *Technical Specifications*).

Summary of Server Features

The following table lists a summary of server features.

Feature	Description
Chassis	One rack-unit (1RU) chassis
Central Processor	Up to two 4th Generation Intel Xeon Scalable Processors
Memory	32 slots for registered DIMMs (RDIMMs), DDR5 DIMMs, 4400 MHz (2 DPC), 4800 MHz (1 DPC).
Multi-bit error protection	This server supports multi-bit error protection.
Video	<p>The Cisco Integrated Management Controller (CIMC) provides video using the Aspeed AST2600 VGA video/graphics controller:</p> <ul style="list-style-type: none"> • Integrated 2D graphics core with hardware acceleration • DDR3 memory interface supports up to 512 MB of addressable memory (8 MB is allocated by default to video memory) • Supports display resolutions up to 1920 x 1200 16bpp @ 60Hz • High-speed integrated 24-bit RAMDAC • Single lane PCI-Express host interface running at Gen 2 speed
Network and management I/O	<p>Rear panel:</p> <ul style="list-style-type: none"> • One 1-Gb Ethernet dedicated management port (RJ-45 connector) • One RS-232 serial port (RJ-45 connector) • One VGA video connector port (DB-15 connector) • Two USB 3.0 ports <p>Front panel:</p> <ul style="list-style-type: none"> • One front-panel keyboard/video/mouse (KVM) connector that is used with the KVM breakout cable. The breakout cable provides two USB 2.0, one VGA, and one DB-9 serial connector.
Modular LOM	<p>One dedicated socket (x16 PCIe lane) that can be used to add an mLOM card for additional rear-panel connectivity. As an optional hardware configuration, the Cisco CNIC mLOM module supports up to four 1G/10G ports with RJ45 connectors or SFP+ interfaces.</p> <p>An optional Intel X710 OCP 3.0 NIC is supported in the mLOM slot.</p>

Feature	Description
Power	<p>Up to two of the following hot-swappable power supplies:</p> <ul style="list-style-type: none"> • 770 W (AC). <p>The 770W power supply is supported in a single CPU configuration, but dual 770 W PSUs are required. A single 770W PSU is not a supported configuration.</p> <ul style="list-style-type: none"> • 1050 W (DC) • 1200 W (AC) • 1600 W (AC) • 2300 W (AC) <p>One power supply is mandatory; one more can be added for 1 + 1 redundancy.</p>
ACPI	The advanced configuration and power interface (ACPI) 4.0 standard is supported.
Front Panel	The front panel provides status indicators and control buttons
Cooling	Eight hot-swappable fan modules for front-to-rear cooling.
InfiniBand	In addition to Fibre Channel, Ethernet and other industry-standards, the PCI slots in this server support the InfiniBand architecture up HDR IB (200Gbps).
Expansion Slots	<p>Three half-height riser slots:</p> <ul style="list-style-type: none"> • Riser 1 (controlled by CPU 1): One x16 PCIe Gen4/Gen5 Slot, (Cisco VIC), HHHL length PCI card, NCSI support, hot plug not supported. • Riser 2 (controlled by CPU 1): One x16 PCIe Gen4/Gen5 Slot, HHHL card only, no NCSI support, hot plug not supported. Only used in a 3 HHHL riser configuration • Riser 3 (controlled by CPU 2): One x16 PCIe Gen4 Slot, (Cisco VIC), HHHL length PCI card, NCSI support, hot plug not supported. <p>Two full-height riser slots</p> <ul style="list-style-type: none"> • Riser 1 (controlled by CPU 1): One x16 PCIe Gen4/Gen5 Slot, full-height, 3/4 length, NCSI support, hot plug not supported. • Riser 3 (controlled by CPU 2): One x16 PCIe Gen4/Gen5 Slot, full-height, 3/4 length, NCSI support, hot plug not supported.

Feature	Description
Interfaces	<p>Rear panel:</p> <ul style="list-style-type: none"> • One 1Gbase-T RJ-45 management port • One RS-232 serial port (RJ45 connector) • One DB15 VGA connector • Two USB 3.0 port connectors • One flexible modular LAN on motherboard (mLOM) slot that can accommodate an optional Intel X710 OCP 3.0 card <p>Front panel:</p> <ul style="list-style-type: none"> • One KVM console connector, which supplies the pins for a KVM break out cable that supports the following: <ul style="list-style-type: none"> • Two USB 2.0 connectors • One VGA DB15 video connector • One serial port (RS232) RJ45 connector
Integrated Management Processor	<p>Baseboard Management Controller (BMC) running Cisco Integrated Management Controller (CIMC) firmware.</p> <p>Depending on your CIMC settings, the CIMC can be accessed through the 1GE dedicated management port, the 1GE/10GE LOM ports, or a Cisco virtual interface card (VIC).</p> <p>CIMC supports managing the entire server platform, as well providing management capabilities for various individual subsystems and components, such as PSUs, Cisco VIC, GPUs, MRAID and HBA storage controllers, and so on.</p>

Feature	Description
Storage Controllers	<p>The SATA Interposer board, Cisco 12G SAS RAID Controller with 4GB FBWC, Cisco 12G SAS HBA, or Cisco 24G Tri-Mode RAID Controller. Only one of these at a time can be used.</p> <p>A Cisco 9500-8e 12G SAS HBA can be plugged into available PCIe risers for external JBOD attach. This HBA can be used at the same time as one of the other storage controllers.</p> <ul style="list-style-type: none"> • SATA Interposer board: AHCI support of up to eight SATA-only drives (slots 1-4 and 6-9 only) • Cisco 12G RAID controller <ul style="list-style-type: none"> • RAID support (RAID 0, 1, 5, 6, 10) and SRAID0 • Supports up to 10 front-loading SFF drives • Cisco 12G SAS HBA <ul style="list-style-type: none"> • No RAID support • JBOD/Pass-through Mode support • Supports up to 10 SFF front-loading SAS/SATA drives • Cisco 12G 9500-8e SAS HBA <ul style="list-style-type: none"> • No RAID support • Supports external JBOD attach (supports up to 1024 SAS/SATA devices) • Plugs into an appropriate PCIe riser slot (up to two supported) • Cisco 24G Tri-Mode RAID Controller with 4GB cache (UCSC-RAID-HP): <ul style="list-style-type: none"> • Supports up to 10 front-loading SFF SAS/SATA or U.3 NVMe drives • Provides RAID 0/1/5/6/10/50/60 • Supports RAID for U.3 NVMe drives only • Drives behind this controller are hot swappable regardless of media type <p>Drive slots 1 through 4 support NVMe drives through direct attach to CPU 2.</p> <p>For a detailed list of storage controller options, see Supported Storage Controllers and Cables, on page 195.</p>
Modular LAN over Motherboard (mLOM) or OCP slot	<p>The dedicated mLOM slot on the motherboard can flexibly accommodate the following cards:</p> <ul style="list-style-type: none"> • Cisco UCS VIC 15428 mLOM with four 10G/25G/50G SFP+/SFP28/SFP56 ports that support Ethernet or Fibre Channel over Ethernet (FCoE). • Cisco VIC 15238 mLOM with two 40G/100G/200G QSFP/QSFP28/QSFP56 ports that support Ethernet or Fibre Channel over Ethernet (FCoE). • Intel Ethernet Network Adapter X710 Open Compute Project (OCP) 3.0 card

Feature	Description
UCSM	Unified Computing System Manager (UCSM) runs in the Fabric Interconnect and automatically discovers and provisions some of the server components.



CHAPTER 2

Installing the Server

This chapter contains the following topics:

- [Preparing for Installation, on page 15](#)
- [Installing the Server in a Rack, on page 18](#)
- [Initial Server Setup, on page 22](#)
- [NIC Mode and NIC Redundancy Settings, on page 27](#)
- [Updating the BIOS and Cisco IMC Firmware, on page 29](#)
- [Accessing the System BIOS, on page 29](#)
- [Smart Access Serial, on page 29](#)
- [Smart Access USB, on page 30](#)

Preparing for Installation

This section contains the following topics:

Installation Warnings and Guidelines



Note

Before you install, operate, or service a server, review the [Regulatory Compliance and Safety Information for Cisco UCS C-Series Servers](#) for important safety information.



Warning**IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

Statement 1071



Warning To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 35° C (95° F).

Statement 1047



Warning The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.

Statement 1019



Warning This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 250 V, 15 A.

Statement 1005



Warning Installation of the equipment must comply with local and national electrical codes.

Statement 1074



Warning This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock, and key, or other means of security.

Statement 1017



Caution To ensure proper airflow it is necessary to rack the servers using rail kits. Physically placing the units on top of one another or “stacking” without the use of the rail kits blocks the air vents on top of the servers, which could result in overheating, higher fan speeds, and higher power consumption. We recommend that you mount your servers on rail kits when you are installing them into the rack because these rails provide the minimal spacing required between the servers. No additional spacing between the servers is required when you mount the units using rail kits.



Caution Avoid uninterruptible power supply (UPS) types that use ferroresonant technology. These UPS types can become unstable with systems such as the Cisco UCS, which can have substantial current draw fluctuations from fluctuating data traffic patterns.

When you are installing a server, use the following guidelines:

- Plan your site configuration and prepare the site before installing the server. See the [Cisco UCS Site Preparation Guide](#) for the recommended site planning tasks.

- Ensure that there is adequate space around the server to allow for accessing the server and for adequate airflow. The airflow in this server is from front to back.
- Ensure that the air-conditioning meets the thermal requirements listed in the [Environmental Specifications, on page 184](#).
- Ensure that the cabinet or rack meets the requirements listed in the [Rack Requirements, on page 17](#).
- Ensure that the site power meets the power requirements listed in the [Power Specifications, on page 185](#). If available, you can use an uninterruptible power supply (UPS) to protect against power failures.

Rack Requirements

The rack must be of the following type:

- A standard 19-in. (48.3-cm) wide, four-post EIA rack, with mounting posts that conform to English universal hole spacing, per section 1 of ANSI/EIA-310-D-1992.
- The rack-post holes can be square 0.38-inch (9.6 mm), round 0.28-inch (7.1 mm), #12-24 UNC, or #10-32 UNC when you use the Cisco-supplied slide rails.
- The minimum vertical rack space per server must be one rack unit (RU), equal to 1.75 in. (44.45 mm).

Supported Cisco Slide Rail Kits

The server supports the following rail kit options:

- Cisco part UCSC-RAIL-D (ball-bearing slide rail kit)
- Cisco part UCSC-CMA-C220-D= (cable management arm)

Rack Installation Tools Required

The slide rails sold by Cisco Systems for this server do not require tools for installation.

Slide Rail and Cable Management Arm Dimensions

The slide rails for this server have an adjustment range of 24 to 36 inches (610 to 914 mm).

The optional cable management arm (CMA) adds additional length requirements:

- The additional distance from the rear of the server to the rear of the CMA is 5.4 inches (137.4 mm).
- The total length of the server including the CMA is 35.2 inches (894 mm).

Front Bezel

An optional locking front bezel (UCSC-BZL-C220-D) is available to provide additional security by preventing unauthorized access to the front-loading SFF drives. The same bezel is used for M5, M6, and M7 versions of the UCS C220 server.

Installing the Server in a Rack

This section describes how to install the server in a rack using the supported rail kit (UCSC-RAIL-D) that is sold by Cisco.



Warning To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

This unit should be mounted at the bottom of the rack if it is the only unit in the rack.

When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.

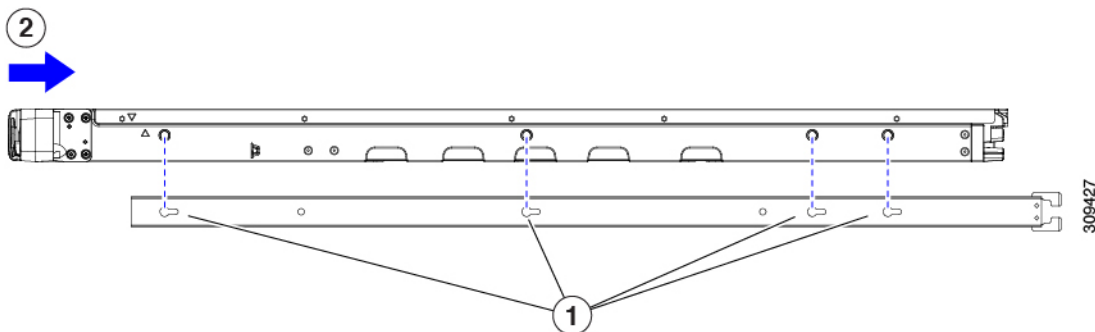
If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

Statement 1006

Step 1 Attach the inner rails to the sides of the server:

- Align an inner rail with one side of the server so that the three keyed slots in the rail align with the three pegs on the side of the server.
- Set the keyed slots over the pegs, and then slide the rail toward the front to lock it in place on the pegs.
- Install the second inner rail to the opposite side of the server.

Figure 6: Attaching the Inner Rail to the Side of the Server

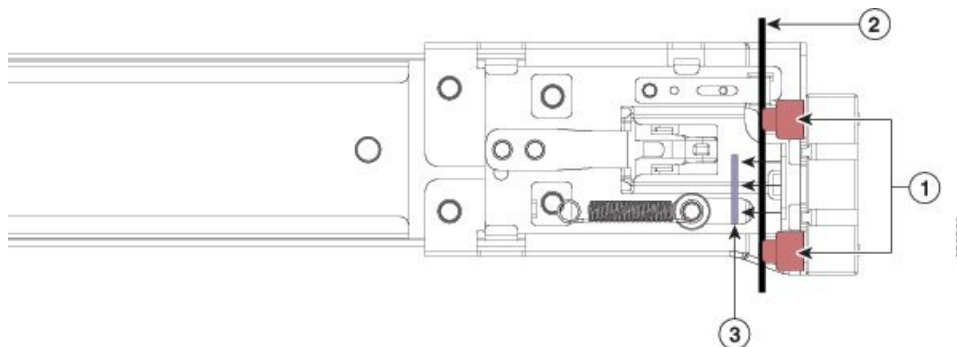


1	Keyed slots in rail	2	Front of server slides into keyed slots
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Step 2 Open the front securing plate on both slide-rail assemblies. The front end of the slide-rail assembly has a spring-loaded securing plate that must be open before you can insert the mounting pegs into the rack-post holes.

On the *outside* of the assembly, push the green-arrow button toward the rear to open the securing plate.

Figure 7: Front Securing Mechanism, Inside of Front End



1	Front mounting pegs	3	Securing plate shown pulled back to the open position
2	Rack post between mounting pegs and opened securing plate	-	

Step 3

Install the outer slide rails into the rack:

- a) Align one slide-rail assembly front end with the front rack-post holes that you want to use.

The slide rail front-end wraps around the outside of the rack post and the mounting pegs enter the rack-post holes from the outside-front.

Note The rack post must be between the mounting pegs and the *open* securing plate.

- b) Push the mounting pegs into the rack-post holes from the outside-front.
 c) Press the securing plate release button, marked PUSH. The spring-loaded securing plate closes to lock the pegs in place.
 d) Adjust the slide-rail length, and then push the rear mounting pegs into the corresponding rear rack-post holes. The slide rail must be level front-to-rear.

The rear mounting pegs enter the rear rack-post holes from the *inside* of the rack post.

- e) Attach the second slide-rail assembly to the opposite side of the rack. Ensure that the two slide-rail assemblies are at the same height and are level front-to-back.
 f) Pull the inner slide rails on each assembly out toward the rack front until they hit the internal stops and lock in place.

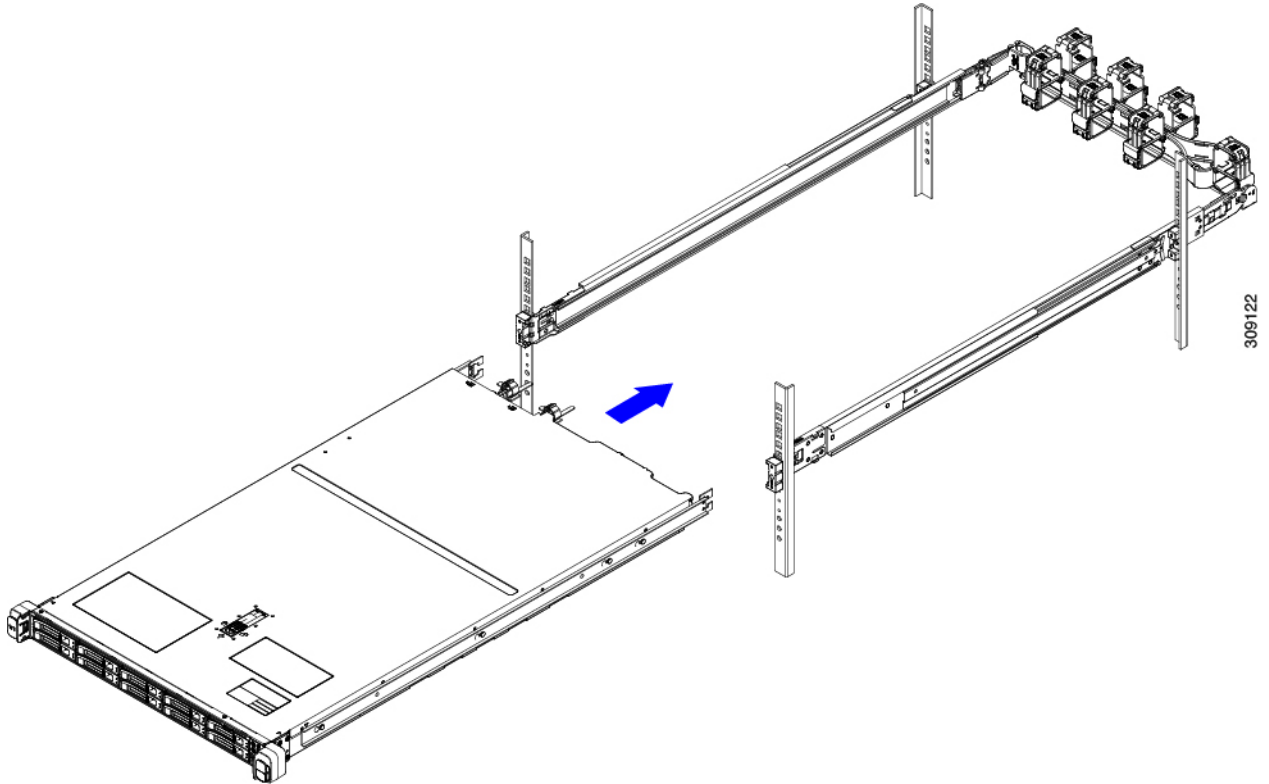
Step 4

Insert the server into the slide rails:

Caution This server can weigh up to 60 pounds (27 kilograms) when fully loaded with components. We recommend that you use a minimum of two people or a mechanical lift when lifting the server. Attempting this procedure alone could result in personal injury or equipment damage.

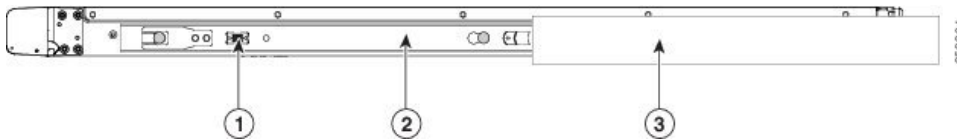
- a) Align the rear ends of the inner rails that are attached to the server sides with the front ends of the empty slide rails on the rack.

b) Push the inner rails into the slide rails on the rack until they stop at the internal



c) Slide the inner-rail release clip toward the rear on both inner rails, and then continue pushing the server into the rack until its front slam-latches engage with the rack posts.

Figure 8: Inner-Rail Release Clip



1	Inner-rail release clip	3	Outer slide rail attached to rack post
2	Inner rail attached to server and inserted into outer slide rail	-	

Step 5 (Optional) Secure the server in the rack more permanently by using the two screws that are provided with the slide rails. Perform this step if you plan to move the rack with servers installed.

With the server fully pushed into the slide rails, open a hinged slam latch lever on the front of the server and insert a screw through the hole that is under the lever. The screw threads into the static part of the rail on the rack post and prevents the server from being pulled out. Repeat for the opposite slam latch.

Step 6 (Optional) If applicable, do the following:

a) Attach the cable management arm. Go to [Installing the Cable Management Arm \(Optional\)](#), on page 21 or [Reversing the Cable Management Arm \(Optional\)](#), on page 22.

- b) Attach the locking bezel.

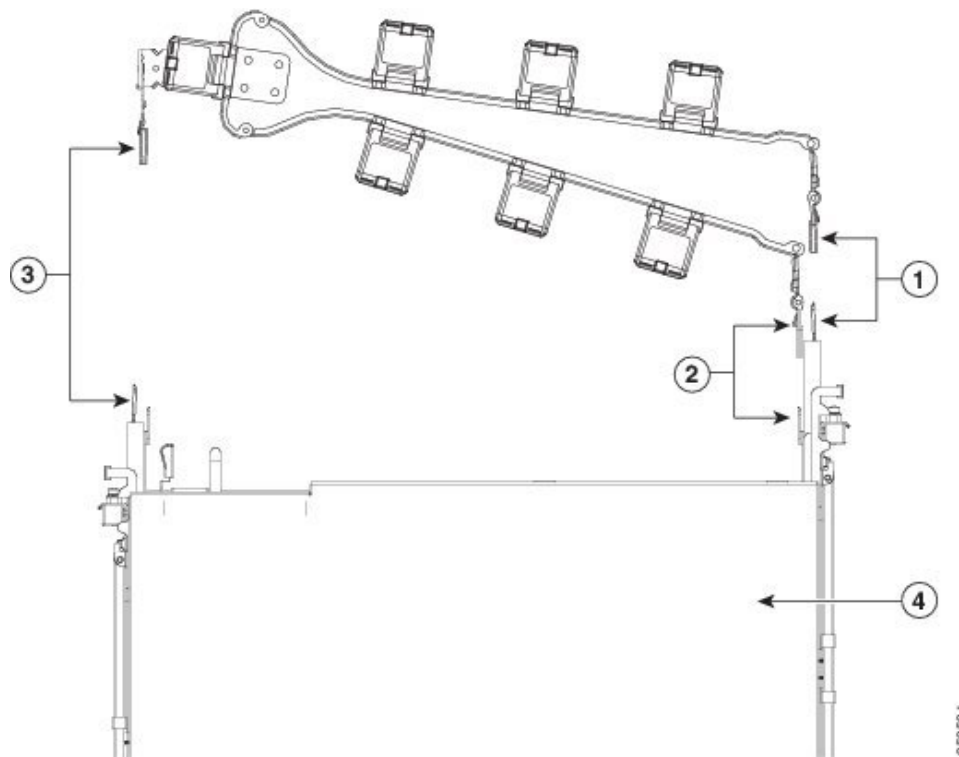
Installing the Cable Management Arm (Optional)



Note The cable management arm (CMA, UCSC-CMA-C220-D) is reversible left-to-right. To reverse the CMA, see [Reversing the Cable Management Arm \(Optional\)](#), on page 22 before installation.

- Step 1** With the server pushed fully into the rack, slide the CMA tab of the CMA arm that is farthest from the server onto the end of the stationary slide rail that is attached to the rack post. Slide the tab over the end of the rail until it clicks and locks.

Figure 9: Attaching the CMA to the Rear Ends of the Slide Rails



1	CMA tab on arm farthest from server attaches to end of stationary outer slide rail.	3	CMA tab on width-adjustment slider attaches to end of stationary outer slide rail.
2	CMA tab on arm closest to the server attaches to end of inner slide rail attached to server.	4	Rear of server

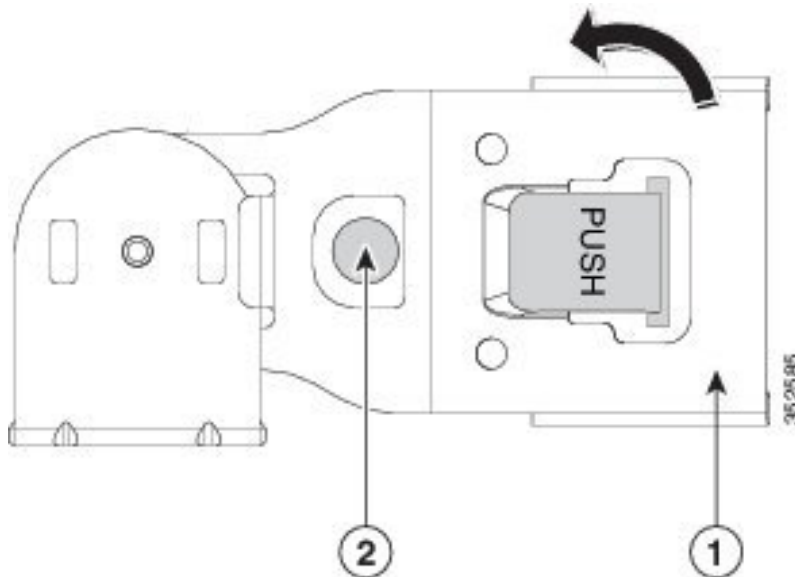
- Step 2** Slide the CMA tab that is closest to the server over the end of the inner rail that is attached to the server. Slide the tab over the end of the rail until it clicks and locks

- Step 3** Pull out the width-adjustment slider that is at the opposite end of the CMA assembly until it matches the width of your rack.
- Step 4** Slide the CMA tab that is at the end of the width-adjustment slider onto the end of the stationary slide rail that is attached to the rack post. Slide the tab over the end of the rail until it clicks and locks.
- Step 5** Open the hinged flap at the top of each plastic cable guide and route your cables through the cable guides as desired.

Reversing the Cable Management Arm (Optional)

- Step 1** Rotate the entire CMA assembly 180 degrees, left-to-right. The plastic cable guides must remain pointing upward.
- Step 2** Flip the tabs at the ends of the CMA arms so that they point toward the rear of the server.
- Step 3** Pivot the tab that is at the end of the width-adjustment slider. Depress and hold the metal button on the outside of the tab and pivot the tab 180 degrees so that it points toward the rear of the server.

Figure 10: Reversing the CMA



1	CMA tab on end of width-adjustment slider	2	Metal button on outside of tab
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Initial Server Setup



Note This section describes how to power on the server, assign an IP address, and connect to server management when using the server in standalone mode.

Server Default Settings

The server is shipped with these default settings:

- The NIC mode is *Shared OCP Extended*.

In this mode, DHCP replies are returned to the OCP adapter card (Intel X710 OCP 3.0 card) and the Cisco virtual interface card (VIC) ports. If the system determines that the Cisco VIC connection is not getting its IP address from a Cisco UCS Manager system because the server is in standalone mode, further DHCP requests from the Cisco VIC are disabled. If you want to use the 10/100/1000 dedicated management ports to access Cisco IMC, you can connect to the server and change the NIC mode as described in [Setting Up the System With the Cisco IMC Configuration Utility, on page 25](#).

- The NIC redundancy is *Active-Active*. All Ethernet ports are utilized simultaneously.
- DHCP is enabled.
- IPv4 is enabled.

Connection Methods

There are two methods for connecting to the system for initial setup:

- Local setup—Use this procedure if you want to connect a keyboard and monitor directly to the system for setup. This procedure can use a KVM cable (Cisco PID N20-BKVM-D) or the ports on the rear of the server.
- Remote setup—Use this procedure if you want to perform setup through your dedicated management LAN.



Note To configure the system remotely, you must have a DHCP server on the same network as the system. Your DHCP server must be preconfigured with the range of MAC addresses for this server node. The MAC address is printed on a label that is on the pull-out asset tag on the front panel. This server node has a range of six MAC addresses assigned to the Cisco IMC. The MAC address printed on the label is the beginning of the range of six contiguous MAC addresses.

This section contains the following topics:

Connecting to the Server Locally For Setup

This procedure requires the following equipment:

- VGA monitor
- USB keyboard
- Either the supported Cisco KVM cable (Cisco PID N20-BKVM-D); or a USB cable and VGA DB-15 cable

Step 1 Attach a power cord to each power supply in your server, and then attach each power cord to a grounded power outlet.

Wait for approximately two minutes to let the server boot to standby power during the first bootup. You can verify system power status by looking at the system Power Status LED on the front panel. The system is in standby power mode when the LED is amber.

Step 2 Connect a USB keyboard and VGA monitor to the server using one of the following methods:

- Connect an optional KVM cable (Cisco PID N20-BKVM-D) to the KVM connector on the front panel. Connect your USB keyboard and VGA monitor to the KVM cable.
- Connect a USB keyboard and VGA monitor to the corresponding connectors on the rear panel.

Step 3 Open the Cisco IMC Configuration Utility:

- a) Press and hold the front panel power button for four seconds to boot the server.
- b) During bootup, press **F8** when prompted to open the Cisco IMC Configuration Utility.

Note The first time that you enter the Cisco IMC Configuration Utility, you are prompted to change the default password. The default password is *password*. The Strong Password feature is enabled.

The following are the requirements for Strong Password:

- The password can have a minimum of 8 characters and a maximum of 14 characters.
- The password must not contain the user's name.
- The password must contain characters from three of the following four categories:
 - English uppercase letters (A through Z)
 - English lowercase letters (a through z)
 - Base 10 digits (0 through 9)
 - Non-alphabetic characters !, @, #, \$, %, ^, &, *, -, _, =, “

Step 4 Continue with [Setting Up the System With the Cisco IMC Configuration Utility, on page 25](#).

Connecting to the Server Remotely For Setup

This procedure requires the following equipment:

- One RJ-45 Ethernet cable that is connected to your management LAN.

Before you begin



Note To configure the system remotely, you must have a DHCP server on the same network as the system. Your DHCP server must be preconfigured with the range of MAC addresses for this server node. The MAC address is printed on a label that is on the pull-out asset tag on the front panel. This server node has a range of six MAC addresses assigned to the Cisco IMC. The MAC address printed on the label is the beginning of the range of six contiguous MAC addresses.

-
- Step 1** Attach a power cord to each power supply in your server, and then attach each power cord to a grounded power outlet.
- Wait for approximately two minutes to let the server boot to standby power during the first bootup. You can verify system power status by looking at the system Power Status LED on the front panel. The system is in standby power mode when the LED is amber.
- Step 2** Plug your management Ethernet cable into the dedicated management port on the rear panel.
- Step 3** Allow your preconfigured DHCP server to assign an IP address to the server node.
- Step 4** Use the assigned IP address to access and log in to the Cisco IMC for the server node. Consult with your DHCP server administrator to determine the IP address.
- Note** The default username for the server is *admin*. The default password is *password*.
- Step 5** From the Cisco IMC Server Summary page, click **Launch KVM Console**. A separate KVM console window opens.
- Step 6** From the Cisco IMC Summary page, click **Power Cycle Server**. The system reboots.
- Step 7** Select the KVM console window.
- Note** The KVM console window must be the active window for the following keyboard actions to work.
- Step 8** When prompted, press **F8** to enter the Cisco IMC Configuration Utility. This utility opens in the KVM console window.
- Note** The first time that you enter the Cisco IMC Configuration Utility, you are prompted to change the default password. The default password is *password*. The Strong Password feature is enabled.
- The following are the requirements for Strong Password:
- The password can have a minimum of 8 characters and a maximum of 14 characters.
 - The password must not contain the user's name.
 - The password must contain characters from three of the following four categories:
 - English uppercase letters (A through Z)
 - English lowercase letters (a through z)
 - Base 10 digits (0 through 9)
 - Non-alphabetic characters !, @, #, \$, %, ^, &, *, -, _, =, “
- Step 9** Continue with [Setting Up the System With the Cisco IMC Configuration Utility, on page 25](#).
-

Setting Up the System With the Cisco IMC Configuration Utility

Before you begin

The following procedure is performed after you connect to the system and open the Cisco IMC Configuration Utility.

- Step 1** Set the NIC mode to choose which ports to use to access Cisco IMC for server management:

- *Shared OCP Extended*—In this NIC mode, DHCP replies are returned to the OCP adapter card (Intel X710 OCP 3.0 card) and the Cisco virtual interface card (VIC) ports. If the system determines that the Cisco VIC connection is not getting its IP address from a Cisco UCS Manager system because the server is in standalone mode, further DHCP requests from the Cisco VIC are disabled.
- *Shared OCP*—The OCP adapter card is used to access Cisco IMC. You must select either the Active-Active or Active-standby NIC redundancy setting in the following step.
- *Dedicated*—The dedicated management port is used to access Cisco IMC. You must select the *None* NIC redundancy setting in the following step.
- *Cisco Card*—The ports on an installed Cisco UCS Virtual Interface Card (VIC) are used to access the Cisco IMC. You must select either the *Active-Active* or *Active-standby* NIC redundancy setting in the following step.

See also the required VIC Slot setting below.

- *VIC Slot*—Only if you use the Cisco Card NIC mode, you must select this setting to match where your VIC is installed. The choices are Riser1, Riser2, or MLOM (the mLOM slot).
 - If you select Riser1, you must install the VIC in slot 1.
 - If you select Riser2, you must install the VIC in slot 2.
 - If you select MLOM, you must install an mLOM-style VIC in the mLOM slot.

Step 2 Set the NIC redundancy to your preference. This server has three possible NIC redundancy settings:

- *None*—The Ethernet ports operate independently and do not fail over if there is a problem. This setting can be used only with the Dedicated NIC mode.
- *Active-standby*—If an active Ethernet port fails, traffic fails over to a standby port. Shared OCP and Cisco Card modes can each use either Active-standby or Active-active settings.
- *Active-active* (default)—All Ethernet ports are utilized simultaneously. The Shared OCPEXT mode must use only this NIC redundancy setting. Shared OCP and Cisco Card modes can each use either Active-standby or Active-active settings.

Step 3 Choose whether to enable DHCP for dynamic network settings, or to enter static network settings.

Note Before you enable DHCP, you must preconfigure your DHCP server with the range of MAC addresses for this server. The MAC address is printed on a label on the rear of the server. This server has a range of six MAC addresses assigned to Cisco IMC. The MAC address printed on the label is the beginning of the range of six contiguous MAC addresses.

The *static* IPv4 and IPv6 settings include the following:

- The Cisco IMC IP address.
For IPv6, valid values are 1 - 127.
- The gateway.
For IPv6, if you do not know the gateway, you can set it as none by entering :: (two colons).
- The preferred DNS server address.
For IPv6, you can set this as none by entering :: (two colons).

- Step 4** (Optional) Make VLAN settings.
- Step 5** Press **F1** to go to the second settings window, then continue with the next step.
From the second window, you can press **F2** to switch back to the first window.
- Step 6** (Optional) Set a hostname for the server.
- Step 7** (Optional) Enable dynamic DNS and set a dynamic DNS (DDNS) domain.
- Step 8** (Optional) If you check the Factory Default check box, the server reverts to the factory defaults.
- Step 9** (Optional) Set a default user password.
- Note** The factory default username for the server is *admin*. The default password is *password*.
- Step 10** (Optional) Enable auto-negotiation of port settings or set the port speed and duplex mode manually.
- Note** Auto-negotiation is applicable only when you use the Dedicated NIC mode. Auto-negotiation sets the port speed and duplex mode automatically based on the switch port to which the server is connected. If you disable auto-negotiation, you must set the port speed and duplex mode manually.
- Step 11** (Optional) Reset port profiles and the port name.
- Step 12** Press **F5** to refresh the settings that you made. You might have to wait about 45 seconds until the new settings appear and the message, “Network settings configured” is displayed before you reboot the server in the next step.
- Step 13** Press **F10** to save your settings and reboot the server.
- Note** If you chose to enable DHCP, the dynamically assigned IP and MAC addresses are displayed on the console screen during bootup.

What to do next

Use a browser and the IP address of the Cisco IMC to connect to the Cisco IMC management interface. The IP address is based upon the settings that you made (either a static address or the address assigned by your DHCP server).



Note The factory default username for the server is *admin*. The default password is *password*.

To manage the server, see the *Cisco UCS C-Series Rack-Mount Server Configuration Guide* or the *Cisco UCS C-Series Rack-Mount Server CLI Configuration Guide* for instructions on using those interfaces for your Cisco IMC release. The links to the configuration guides are in the [Cisco UCS C-Series Documentation Roadmap](#).

NIC Mode and NIC Redundancy Settings

Table 1: Valid NIC Redundancy Settings For Each NIC Mode

NIC Mode	Valid NIC Redundancy Settings
Shared OCP Extended	Active-active

Dedicated	None
Shared OCP	Active-active Active-standby
Cisco Card	Active-active Active-standby

This server has the following NIC mode settings that you can choose from:

- *Shared OCP Extended*—In this NIC mode, DHCP replies are returned to the OCP adapter card (Intel X710 OCP 3.0 card) and the Cisco virtual interface card (VIC) ports. If the system determines that the Cisco VIC connection is not getting its IP address from a Cisco UCS Manager system because the server is in standalone mode, further DHCP requests from the Cisco VIC are disabled.
- *Shared OCP*—The OCP adapter card is used to access Cisco IMC. You must select either the Active-Active or Active-standby NIC redundancy setting in the following step.
- *Dedicated*—The dedicated management port is used to access Cisco IMC. You must select the *None* NIC redundancy setting in the following step.
- *Cisco Card*—The ports on an installed Cisco UCS Virtual Interface Card (VIC) are used to access the Cisco IMC. You must select either the *Active-Active* or *Active-standby* NIC redundancy setting in the following step.

See also the required VIC Slot setting below.

- *VIC Slot*—Only if you use the Cisco Card NIC mode, you must select this setting to match where your VIC is installed. The choices are Riser1, Riser2, or MLOM (the mLOM slot).
 - If you select Riser1, you must install the VIC in slot 1.
 - If you select Riser2, you must install the VIC in slot 2.
 - If you select MLOM, you must install an mLOM-style VIC in the mLOM slot.

This server has the following NIC redundancy settings that you can choose from:

- *None*—The Ethernet ports operate independently and do not fail over if there is a problem. This setting can be used only with the Dedicated NIC mode.
- *Active-standby*—If an active Ethernet port fails, traffic fails over to a standby port. Shared OCP and Cisco Card modes can each use either Active-standby or Active-active settings.
- *Active-active* (default)—All Ethernet ports are utilized simultaneously. The Shared OCP Extended mode must use only this NIC redundancy setting. Shared OCP and Cisco Card modes can each use either Active-standby or Active-active settings.

Updating the BIOS and Cisco IMC Firmware



Caution When you upgrade the BIOS firmware, you must also upgrade the Cisco IMC firmware to the same version, or the server does not boot. Do not power off the server until the BIOS and Cisco IMC firmware are matching or the server does not boot.

Cisco provides the *Cisco Host Upgrade Utility* to assist with simultaneously upgrading the BIOS, Cisco IMC, and other firmware to compatible levels.

The server uses firmware obtained from and certified by Cisco. Cisco provides release notes with each firmware image. There are several possible methods for updating the firmware:

- **Recommended method for firmware update:** Use the Cisco Host Upgrade Utility to simultaneously upgrade the Cisco IMC, BIOS, and component firmware to compatible levels.
See the *Cisco Host Upgrade Utility Quick Reference Guide* for your firmware release at the documentation roadmap link below.
- You can upgrade the Cisco IMC and BIOS firmware by using the Cisco IMC GUI interface.
See the *Cisco UCS C-Series Rack-Mount Server Configuration Guide*.
- You can upgrade the Cisco IMC and BIOS firmware by using the Cisco IMC CLI interface.
See the *Cisco UCS C-Series Rack-Mount Server CLI Configuration Guide*.

For links to the documents listed above, see the [Cisco UCS C-Series Documentation Roadmap](#).

Accessing the System BIOS

Step 1 Enter the BIOS Setup Utility by pressing the **F2** key when prompted during bootup.

Note The version and build of the current BIOS are displayed on the Main page of the utility.

Step 2 Use the arrow keys to select the BIOS menu page.

Step 3 Highlight the field to be modified by using the arrow keys.

Step 4 Press **Enter** to select the field that you want to change, and then modify the value in the field.

Step 5 Press the right arrow key until the Exit menu screen is displayed.

Step 6 Follow the instructions on the Exit menu screen to save your changes and exit the setup utility (or press **F10**). You can exit without saving changes by pressing **Esc**.

Smart Access Serial

This server supports the Smart Access Serial feature. This feature allows you to switch between host serial and Cisco IMC CLI.

- This feature has the following requirements:
 - A serial cable connection, which can use either the RJ-45 serial connector on the server rear panel, or a DB-9 connection when using the KVM cable (Cisco PID N20-BKVM-D) on the front-panel KVM console connector.
 - Console redirection must be enabled in the server BIOS.
 - Terminal type must be set to VT100+ or VTUFT8.
 - Serial-over-LAN (SOL) must be disabled (SOL is disabled by default).
- To switch from host serial to Cisco IMC CLI, press **Esc+9**.
You must enter your Cisco IMC credentials to authenticate the connection.
- To switch from Cisco IMC CLI to host serial, press **Esc+8**.



Note You cannot switch to Cisco IMC CLI if the serial-over-LAN (SOL) feature is enabled.

- After a session is created, it is shown in the CLI or web GUI by the name `serial`.

Smart Access USB

This server supports the Smart Access USB feature. The board management controller (BMC) in this server can accept a USB mass storage device and access the data on it. This feature allows you to use the front-panel USB device as a medium to transfer data between the BMC and the user without need for network connectivity. This can be useful, for example, when remote BMC interfaces are not yet available, or are not accessible due to network misconfiguration.

- This feature has the following requirements:
 - The KVM cable (Cisco PID N20-BKVM) connected to the front panel KVM console connector.
 - A USB storage device connected to one of the USB 2.0 connectors on the KVM cable. The USB device must draw less than 500 mA to avoid disconnect by the current-protection circuit.



Note Any mouse or keyboard that is connected to the KVM cable is disconnected when you enable Smart Access USB.

- You can use USB 3.0-based devices, but they will operate at USB 2.0 speed.
 - We recommend that the USB device have only one partition.
 - The file system formats supported are: FAT16, FAT32, MSDOS, EXT2, EXT3, and EXT4. NTFS is not supported.
- The front-panel KVM connector has been designed to switch the USB port between Host OS and BMC.

- Smart Access USB can be enabled or disabled using any of the BMC user interfaces. For example, you can use the Cisco IMC Configuration Utility that is accessed by pressing **F8** when prompted during bootup.
 - Enabled: the front-panel USB device is connected to the BMC.
 - Disabled: the front-panel USB device is connected to the host.
- In a case where no management network is available to connect remotely to Cisco IMC, a Device Firmware Update (DFU) shell over serial cable can be used to generate and download technical support files to the USB device that is attached to front panel USB port.



CHAPTER 3

Servicing the Server

This chapter contains the following topics:

- [Status LEDs and Buttons, on page 33](#)
- [Serial Number Location, on page 38](#)
- [Hot Swap vs Hot Plug, on page 39](#)
- [Removing Top Cover, on page 39](#)
- [Replacing the Air Duct, on page 41](#)
- [Preparing For Component Installation, on page 44](#)
- [Removing and Replacing Components, on page 46](#)
- [Service Headers and Jumpers, on page 168](#)

Status LEDs and Buttons

This section contains information for interpreting front, rear, and internal LED states.

Front-Panel LEDs

Front-Panel LEDs

The following illustration shows the LEDs on the server's front panel.

Figure 11: Front Panel LEDs

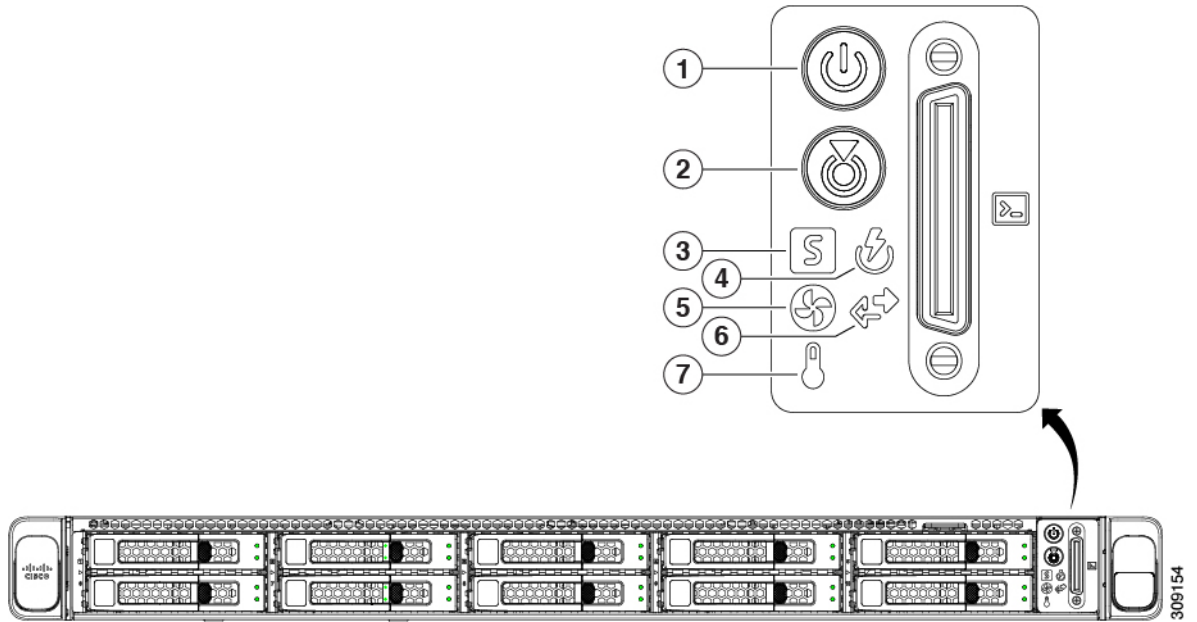







Table 2: Front Panel LEDs, Definition of States

	LED Name	States
1	Power button/LED (⏻)	<ul style="list-style-type: none"> • Off—There is no AC power to the server. • Amber—The server is in standby power mode. Power is supplied only to the Cisco IMC and some motherboard functions. • Green—The server is in main power mode. Power is supplied to all server components.
2	Unit identification (🔄)	<ul style="list-style-type: none"> • Off—The unit identification function is not in use. • Blue, blinking—The unit identification function is activated.

<p>3</p>	<p>System health ()</p>	<ul style="list-style-type: none"> • Green—The server is running in normal operating condition. • Green, blinking—The server is performing system initialization and memory check. • Amber, steady—The server is in a degraded operational state (minor fault). For example: <ul style="list-style-type: none"> • Power supply redundancy is lost. • CPUs are mismatched. • At least one CPU is faulty. • At least one DIMM is faulty. • At least one drive in a RAID configuration failed. • Amber, 2 blinks—There is a major fault with the system board. • Amber, 3 blinks—There is a major fault with the memory DIMMs. • Amber, 4 blinks—There is a major fault with the CPUs.
<p>4</p>	<p>Power supply status ()</p>	<ul style="list-style-type: none"> • Green—All power supplies are operating normally. • Amber, steady—One or more power supplies are in a degraded operational state. • Amber, blinking—One or more power supplies are in a critical fault state.
<p>5</p>	<p>Fan status ()</p>	<ul style="list-style-type: none"> • Green—All fan modules are operating properly. • Amber, blinking—One or more fan modules breached the non-recoverable threshold.
<p>6</p>	<p>Network link activity ()</p>	<ul style="list-style-type: none"> • Off—The Ethernet LOM port link is idle. • Green—One or more Ethernet LOM ports are link-active, but there is no activity. • Green, blinking—One or more Ethernet LOM ports are link-active, with activity.
<p>7</p>	<p>Temperature status ()</p>	<ul style="list-style-type: none"> • Green—The server is operating at normal temperature. • Amber, steady—One or more temperature sensors breached the critical threshold. • Amber, blinking—One or more temperature sensors breached the non-recoverable threshold.

Rear-Panel LEDs

Figure 12: Rear Panel LEDs

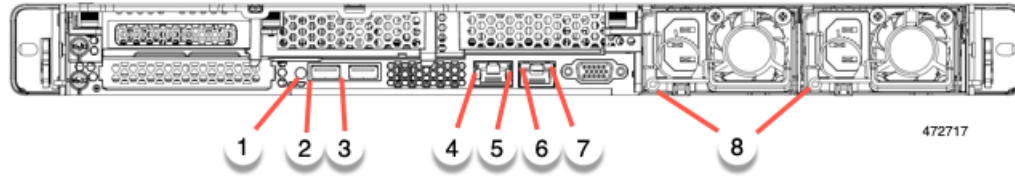


Table 3: Rear Panel LEDs, Definition of States

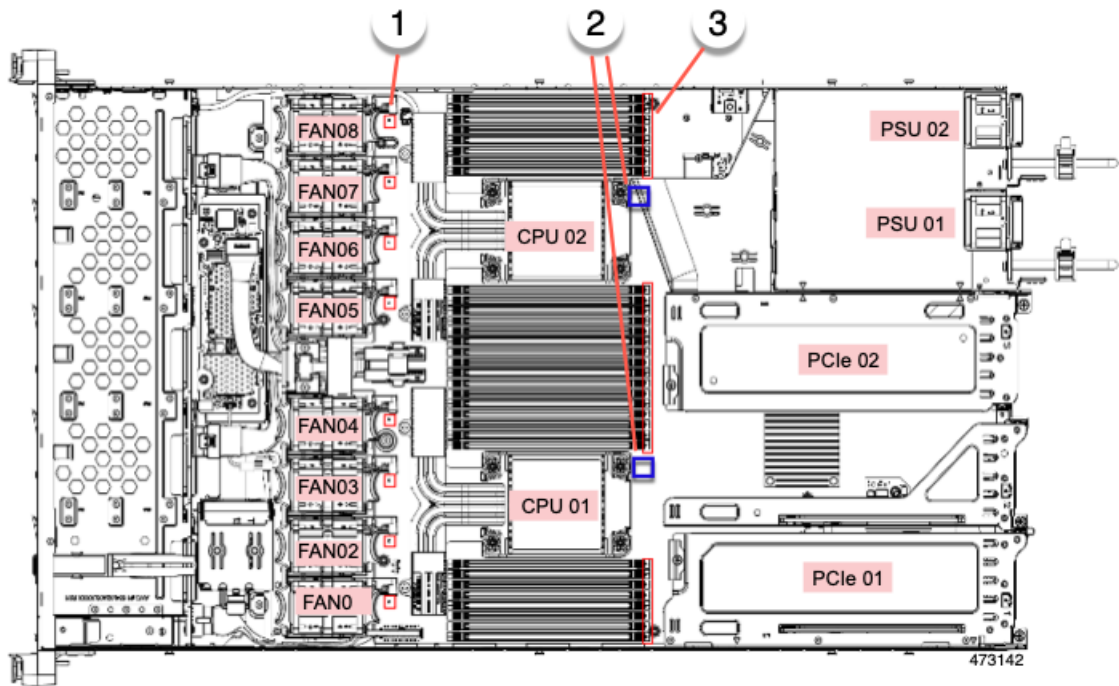
	LED Name	States
1	Rear Unit Identification	<ul style="list-style-type: none"> • Off—The unit identification function is not in use. • Blue, blinking—The unit identification function is activated.
2	USB 3.0	
3	USB 3.0	
4	1-Gb Ethernet dedicated management link speed	<ul style="list-style-type: none"> • Off—Link speed is 10 Mbps. • Amber—Link speed is 100 Mbps. • Green—Link speed is 1 Gbps.
5	1-Gb Ethernet dedicated management link status	<ul style="list-style-type: none"> • Off—No link is present. • Green—Link is active. • Green, blinking—Traffic is present on the active link.
6	RJ-45 COM port	
7	RJ -45 COM port	

8	Power supply status (one LED each power supply unit)	<p>AC power supplies:</p> <ul style="list-style-type: none"> • Off—No AC input (12 V main power off, 12 V standby power off). • Green, blinking—12 V main power off; 12 V standby power on. • Green, solid—12 V main power on; 12 V standby power on. • Amber, blinking—Warning threshold detected but 12 V main power on. • Amber, solid—Critical error detected; 12 V main power off (for example, over-current, over-voltage, or over-temperature failure). <p>DC power supplies:</p> <ul style="list-style-type: none"> • Off—No DC input (12 V main power off, 12 V standby power off). • Green, blinking—12 V main power off; 12 V standby power on. • Green, solid—12 V main power on; 12 V standby power on. • Amber, blinking—Warning threshold detected but 12 V main power on. • Amber, solid—Critical error detected; 12 V main power off (for example, over-current, over-voltage, or over-temperature failure).
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Internal Diagnostic LEDs

The server has internal fault LEDs for CPUs, DIMMs, and fan modules.

Figure 13: Internal Diagnostic LED Locations



<p>1</p>	<p>Fan module fault LEDs (one behind each fan connector on the motherboard)</p> <ul style="list-style-type: none"> • Amber—Fan has a fault or is not fully seated. • Green—Fan is OK. 	<p>3</p>	<p>DIMM fault LEDs (one behind each DIMM socket on the motherboard)</p> <p>These LEDs operate only when the server is in standby power mode.</p> <ul style="list-style-type: none"> • Amber—DIMM has a fault. • Off—DIMM is OK.
<p>2</p>	<p>CPU fault LEDs (one behind each CPU socket on the motherboard).</p> <p>These LEDs operate only when the server is in standby power mode.</p> <ul style="list-style-type: none"> • Amber—CPU has a fault. • Off—CPU is OK. 	<p>-</p>	

Serial Number Location

The serial number for the server is printed on a label on the top of the server, near the front. See [Removing Top Cover, on page 39](#).

Hot Swap vs Hot Plug

Some components can be removed and replaced without shutting down and removing power from the server. This type of replacement has two varieties: hot-swap and hot-plug.

- Hot-swap replacement—You do not have to shut down the component in the software or operating system. This applies to the following components:
 - SAS/SATA hard drives
 - SAS/SATA solid state drives
 - Cooling fan modules
 - Power supplies (when redundant as 1+1)
- Hot-plug replacement—You must take the component offline before removing it for the following component:
 - NVMe PCIe solid state drives

Removing Top Cover

Step 1 Remove the top cover:

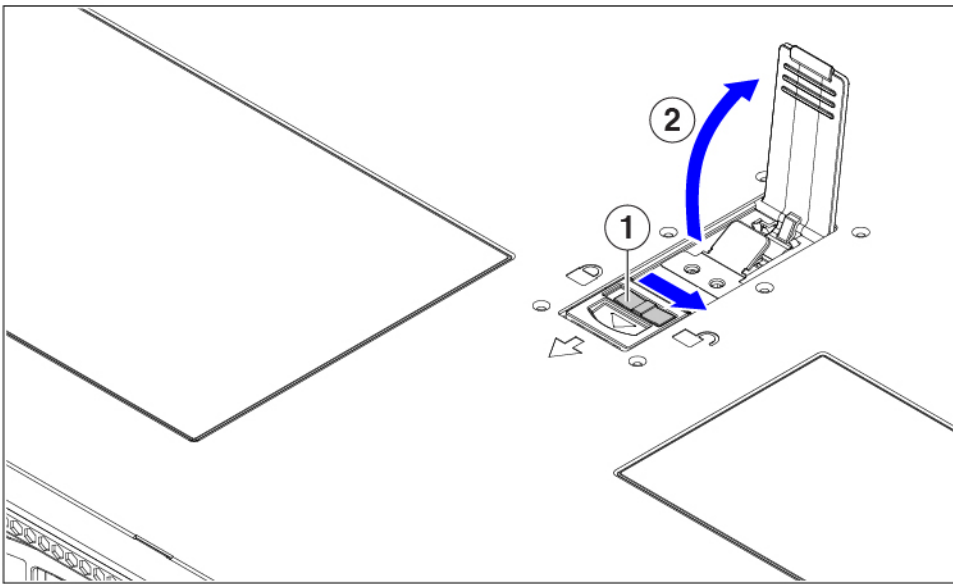
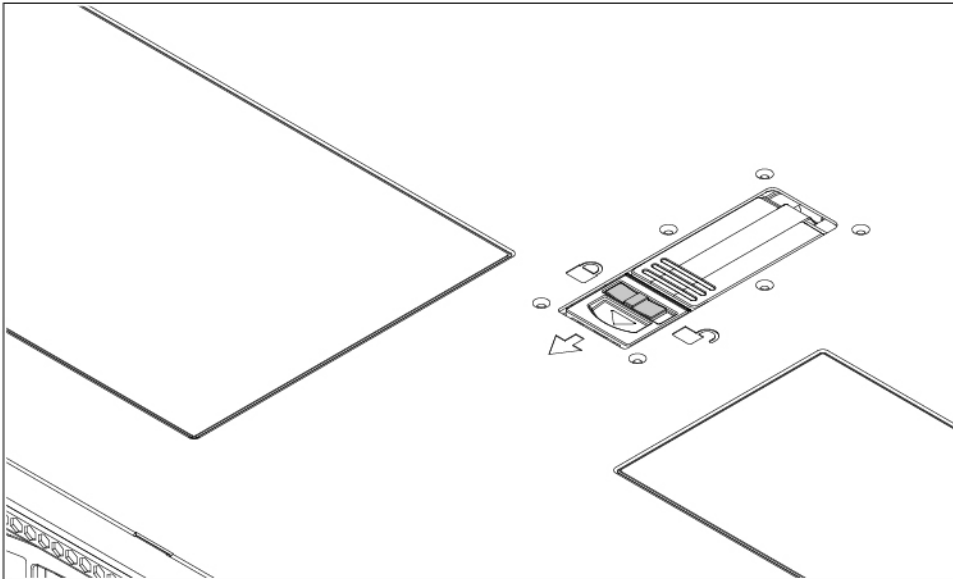
- a) If the cover latch is locked, slide the lock sideways to unlock it.
When the latch is unlocked, the handle pops up so that you can grasp it.
- b) Lift on the end of the latch so that it pivots vertically to 90 degrees.
- c) Simultaneously, slide the cover back and lift the top cover straight up from the server and set it aside.

Step 2 Replace the top cover:

- a) With the latch in the fully open position, place the cover on top of the server a few inches behind the lip of the front cover panel.
- b) Slide the cover forward until the latch makes contact.
- c) Press the latch down to the closed position. The cover is pushed forward to the closed position as you push down the latch.
- d) Lock the latch by sliding the lock button to sideways to the left.

Locking the latch ensures that the server latch handle does not protrude when you install the blade.

Figure 14: Removing the Top Cover



1	Cover lock	2	Cover latch handle
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Replacing the Air Duct

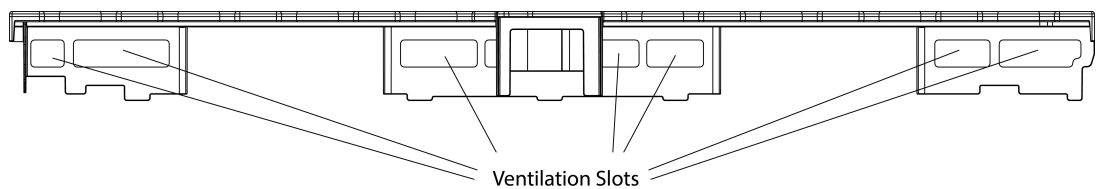
The server has an air duct under the top sheet metal cover. The air duct ensures proper cooling and air flow across the server from intake (the cool aisle of the data center) to exhaust (the hot aisle in the data center). The air duct is in the middle of the server and covers the CPU and DIMMs.

Two versions of air duct exist for the server.

- For servers with Intel Xeon Fourth Generation Scalable Processors, the existing air duct can be used.
- For servers that have Intel Xeon Fifth Generation Scalable Processors, a new air duct is required (UCSC-AD-C220M7=). For new Intel Fifth Generation servers, the new air duct is preinstalled. For existing Intel Fourth Generation servers that will upgrade to Intel Fifth Generation Xeon Processors, you will need to purchase the new air duct and install it after the CPUs are upgraded. The new air duct is available from Cisco.

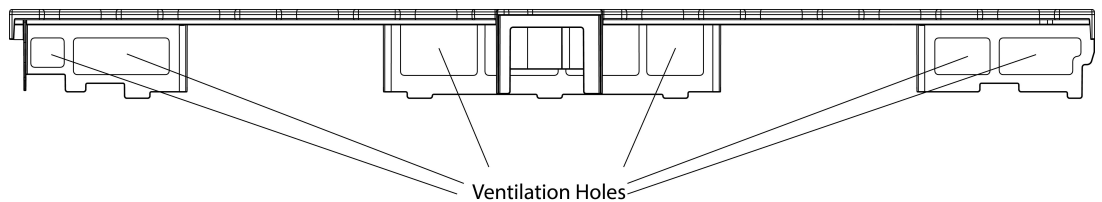
The identifiable difference between the two air ducts is the different dimensions of the ventilation holes. Compare the following illustrations.

Figure 15: Existing Air Duct (Intel Fourth Generation Scalable Processors)



481371

Figure 16: New Air Duct (UCSC-AD-C220M7= for Intel Fifth Generation Scalable Processors)



481372

If you remove the air duct, make sure to use the correct one.

To replace the server's air duct, use the following procedures:

- [Removing the Air Duct, on page 41](#)
- [Installing the Air Duct, on page 42](#)

Removing the Air Duct

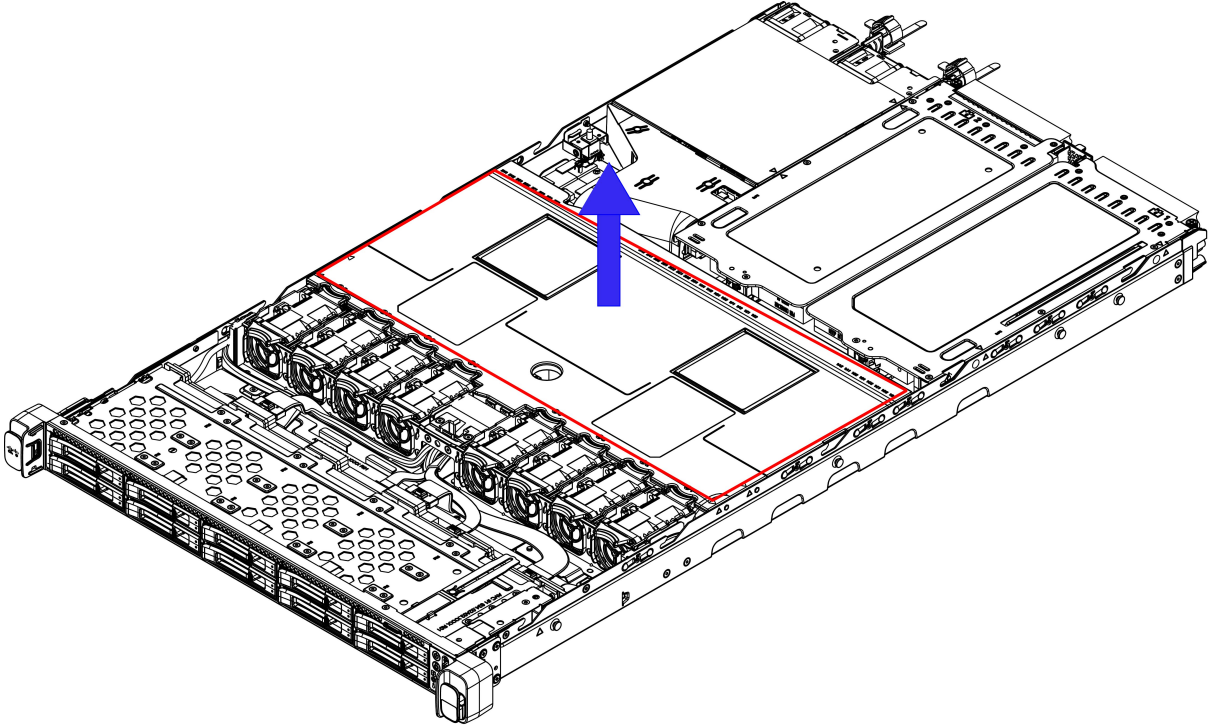
Use this procedure to remove the air duct when needed.

Step 1 Remove the server top cover.

Step 2 Insert your finger in the finger hole and grasp the air duct.

Step 3 Lift the air duct off of the server.

Note You might need to slide the air duct towards the front or back of the server while lifting the air duct up.



481373

What to do next

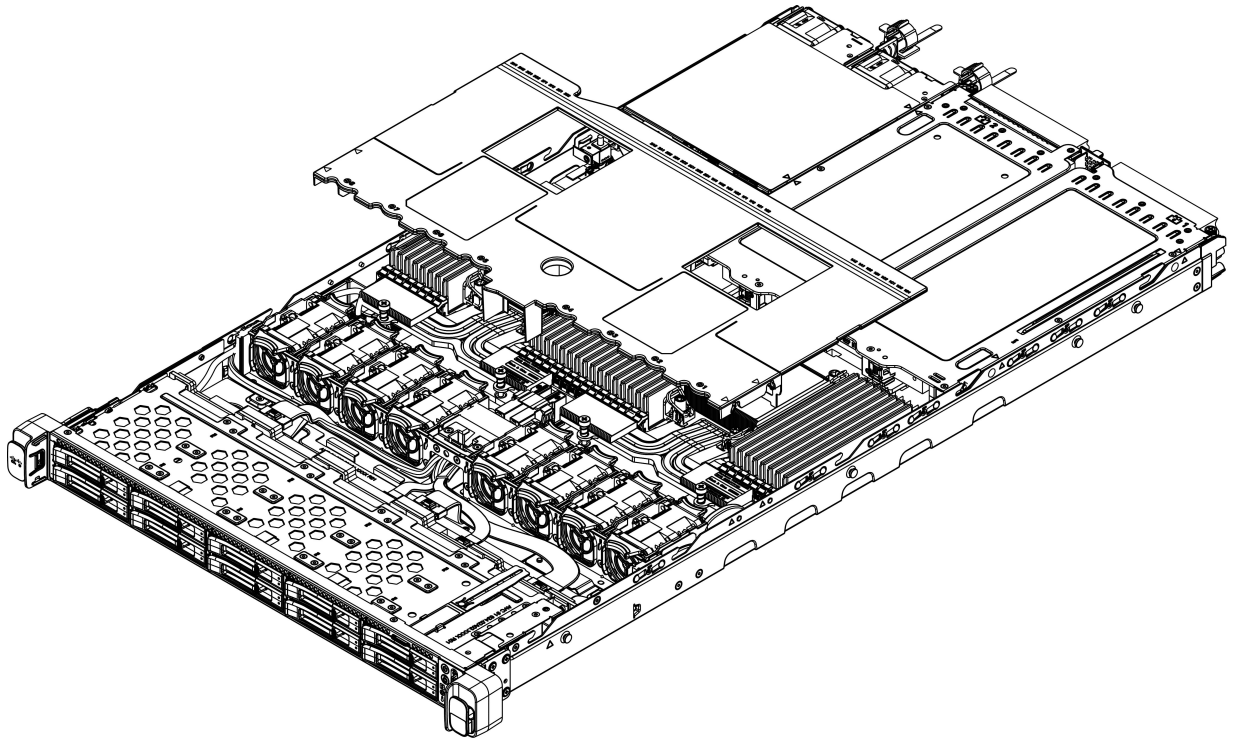
When you are done servicing the server, install the air duct. See [Installing the Air Duct, on page 42](#).

Installing the Air Duct

The air duct sits behind the front-loading drive cage and covers the CPU and DIMMs in the middle of the server.

The existing airflow baffle and the new airflow baffle (UCSC-AD-C220M7=) are similar enough that you can use this procedure for both.

Step 1 Orient the air duct.



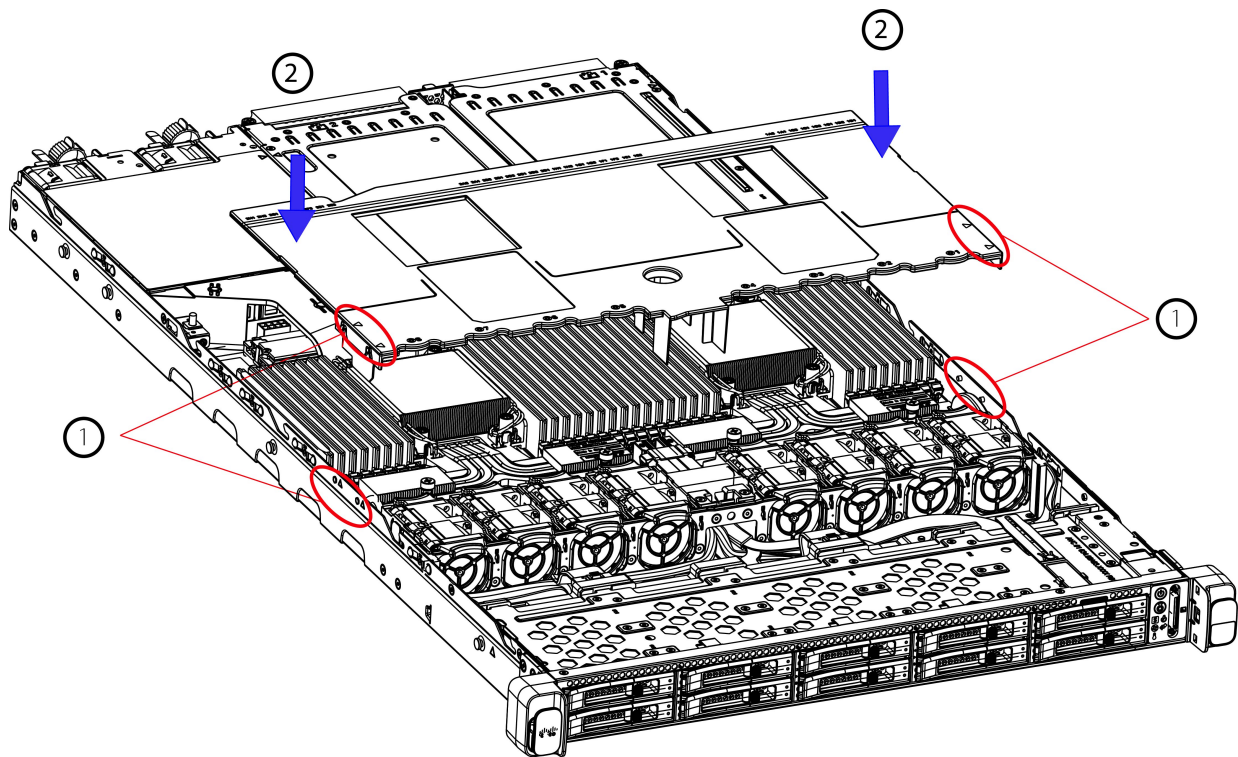
481374

Step 2 Install the air duct.

- a) Align the detents and alignment features on the air duct with the alignment features on the chassis wall.
- b) Holding the air duct level, lower it onto the chassis, making sure that the detents match with their receiving parts on the chassis sheetmetal walls.
- c) When the air duct is correctly positioned, gently press down to ensure that all of its edges sit flush.

Note If the air duct is not seated correctly, it can obstruct installing the server's top cover.

For the existing air duct, install it as shown.



481375

Step 3 When the air duct is correctly seated, attach the server's top cover.

The server top cover should sit flush so that the metal tabs on the top cover match the indents in the top edges of the air duct.

Preparing For Component Installation

This section includes information and tasks that help prepare the server for component installation.

Required Equipment For Service Procedures

The following tools and equipment are used to perform the procedures in this chapter:

- T-30 Torx driver (supplied with replacement CPUs for heatsink removal)
- #1 flat-head screwdriver (supplied with replacement CPUs for heatsink removal)
- #1 Phillips-head screwdriver (for M.2 SSD and intrusion switch replacement)
- Electrostatic discharge (ESD) strap or other grounding equipment such as a grounded mat

Shutting Down and Removing Power From the Server

The server can run in either of two power modes:

- Main power mode—Power is supplied to all server components and any operating system on your drives can run.
- Standby power mode—Power is supplied only to the service processor and certain components. It is safe for the operating system and data to remove power cords from the server in this mode.



Caution After a server is shut down to standby power, electric current is still present in the server. To completely remove power as directed in some service procedures, you must disconnect all power cords from all power supplies in the server.

You can shut down the server by using the front-panel power button or the software management interfaces.

Shutting Down Using the Power Button

Step 1 Check the color of the Power button/LED:

- Amber—The server is already in standby mode, and you can safely remove power.
- Green—The server is in main power mode and must be shut down before you can safely remove power.

Step 2 Invoke either a graceful shutdown or a hard shutdown:

Caution To avoid data loss or damage to your operating system, you should always invoke a graceful shutdown of the operating system.

- Graceful shutdown—Press and release the **Power** button. The operating system performs a graceful shutdown, and the server goes to standby mode, which is indicated by an amber Power button/LED.
- Emergency shutdown—Press and hold the **Power** button for 4 seconds to force the main power off and immediately enter standby mode.

Step 3 If a service procedure instructs you to completely remove power from the server, disconnect all power cords from the power supplies in the server.

Shutting Down Using The Cisco IMC CLI

You must log in with user or admin privileges to perform this task.

Step 1 At the server prompt, enter:

Example:

```
server# scope chassis
```

Step 2 At the chassis prompt, enter:

Example:

```
server/chassis# power shutdown
```

The operating system performs a graceful shutdown, and the server goes to standby mode, which is indicated by an amber Power button/LED.

- Step 3** If a service procedure instructs you to completely remove power from the server, disconnect all power cords from the power supplies in the server.

Shutting Down Using The Cisco IMC GUI

You must log in with user or admin privileges to perform this task.

- Step 1** In the Navigation pane, click the **Server** tab.

- Step 2** On the Server tab, click **Summary**.

- Step 3** In the Actions area, click **Power Off Server**.

- Step 4** Click **OK**.

The operating system performs a graceful shutdown, and the server goes to standby mode, which is indicated by an amber Power button/LED.

- Step 5** If a service procedure instructs you to completely remove power from the server, disconnect all power cords from the power supplies in the server.

Removing and Replacing Components



Warning Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.

Statement 1029



Caution When handling server components, handle them only by carrier edges and use an electrostatic discharge (ESD) wrist-strap or other grounding device to avoid damage.



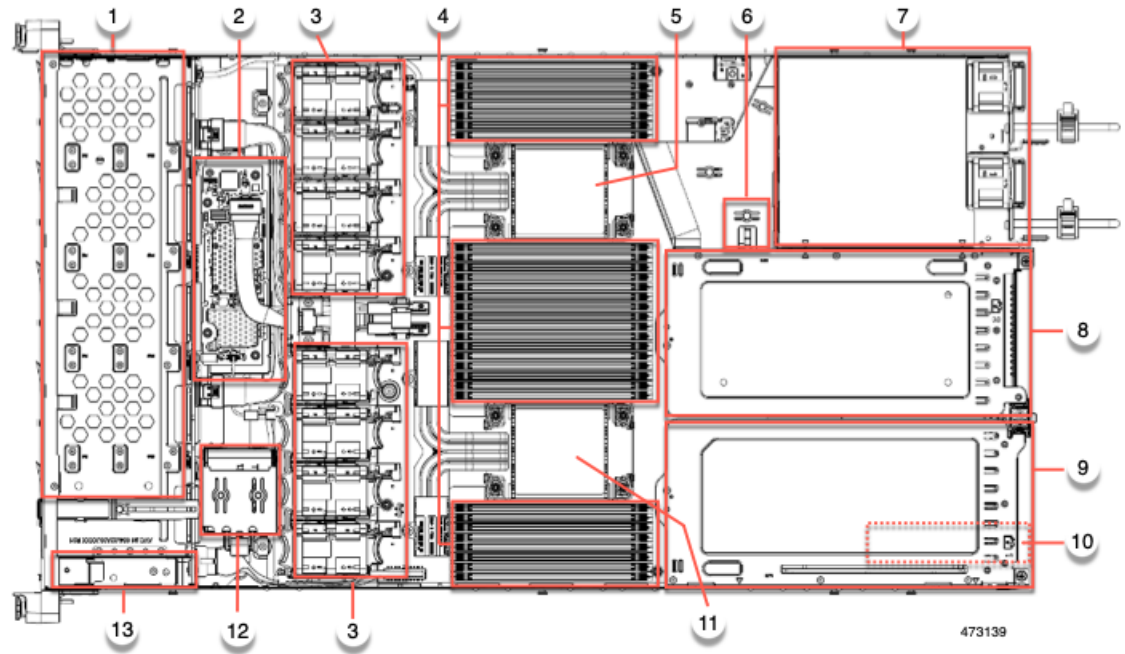
Tip You can press the unit identification button on the front panel or rear panel to turn on a flashing, blue unit identification LED on both the front and rear panels of the server. This button allows you to locate the specific server that you are servicing when you go to the opposite side of the rack. You can also activate these LEDs remotely by using the Cisco IMC interface.

This section describes how to install and replace server components.

Serviceable Component Locations

This topic shows the locations of the field-replaceable components and service-related items. The view in the following figure shows the server with the top cover removed.

Figure 17: Cisco UCS C220 M7 Server, Full Height, 3/4 Length PCIe Cards, Serviceable Component Locations



1	Front-loading drive bays 1–10 support SAS/SATA drives.	2	M7 modular RAID card or SATA Interposer card
3	Cooling fan modules, eight. Each fan is hot-swappable	4	DIMM sockets on motherboard, 32 total, 16 per CPU Eight DIMM sockets are placed between the CPUs and the server sidewall, and 16 DIMM sockets are placed between the two CPUs.
5	Motherboard CPU socket two (CPU2)	6	M.2 module connector Supports a boot-optimized RAID controller with connectors for up to two SATA M.2 SSDs
7	Power Supply Units (PSUs), two	8	PCIe riser slot 2 Accepts 1 full height, 3/4 length PCIe riser card.
9	PCIe riser slot 1 Accepts 1 full height, 3/4 length (x16 lane) PCIe riser card	10	Modular LOM (mLOM) card bay or Intel X710 OCP 3.0 card on chassis floor (x16 PCIe lane) The mLOM/OCP card bay sits below PCIe riser slot 1.

Serviceable Component Locations

11	Motherboard CPU socket one (CPU1)	12	SuperCap module mounting bracket The SuperCap module (not shown) that mounts into this location provides RAID write-cache backup.
13	Front Panel Controller board	-	

The view in the following figure shows the individual component locations and numbering, including the FH ¾ length PCIe cards.

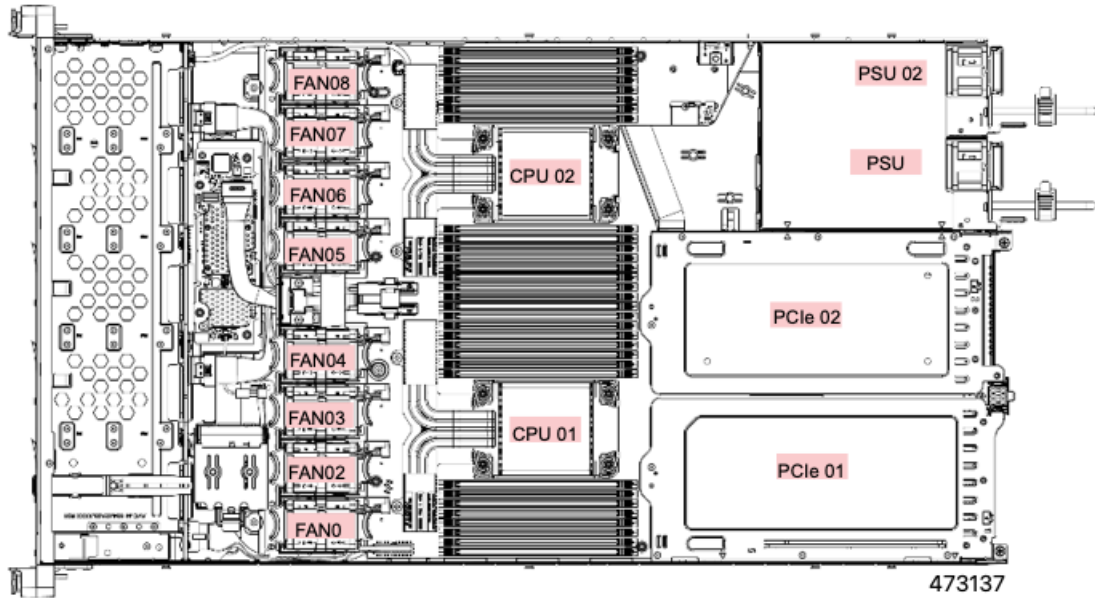
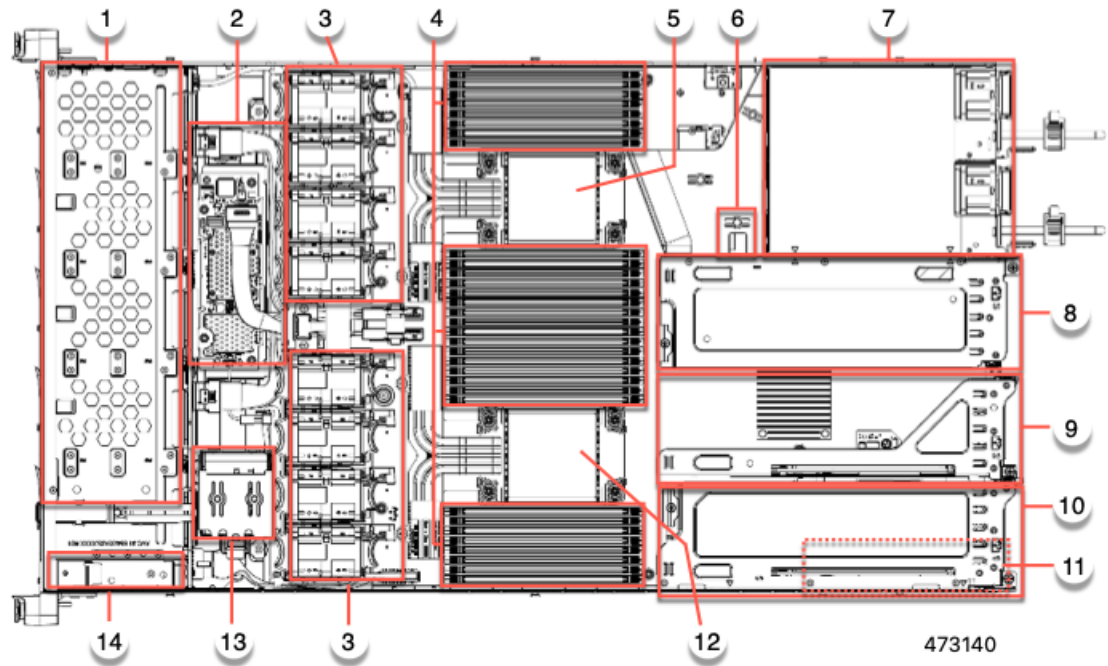
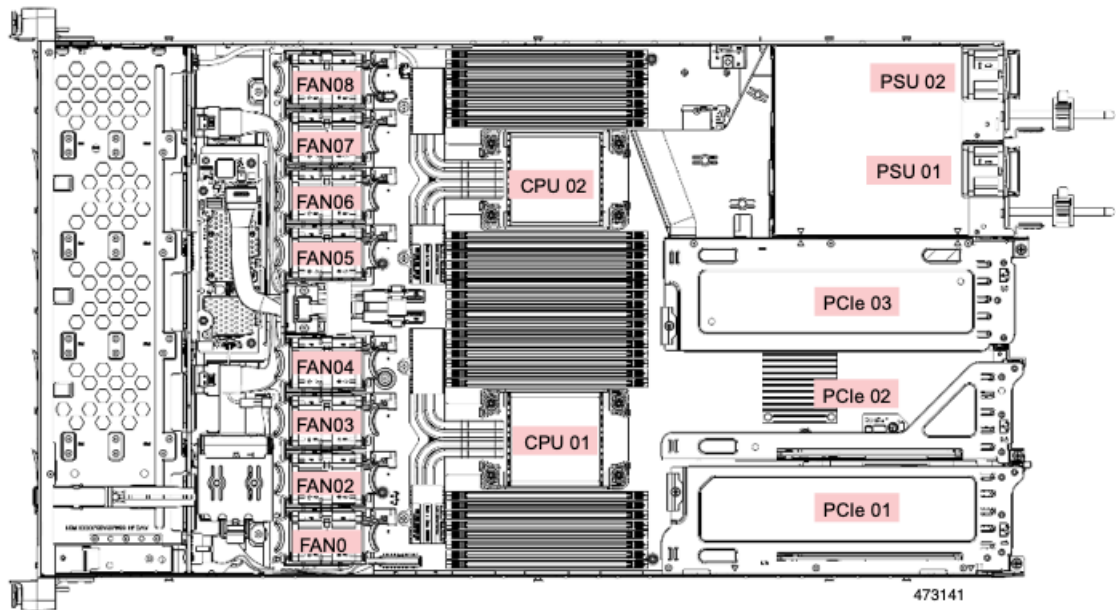


Figure 18: Cisco UCS C220 M7 Server, Half Height, Half Length PCIe Cards, Serviceable Component Locations



1	Front-loading drive bays 1–10 support SAS/SATA drives.	2	M7 modular RAID card or SATA Interposer card
3	Cooling fan modules, eight. Each fan is hot-swappable	4	DIMM sockets on motherboard, 32 total, 16 per CPU Eight DIMM sockets are placed between the CPUs and the server sidewall, and 16 DIMM sockets are placed between the two CPUs.
5	Motherboard CPU socket CPU2 is the top socket.	6	M.2 module connector Supports a boot-optimized RAID controller with connectors for up to two SATA M.2 SSDs
7	Power Supply Units (PSUs), two	8	PCIe riser slot 3 Accepts 1 half height, half width PCIe riser card.
9	PCIe riser slot 2 Accepts 1 half height, half width PCIe riser card.	10	PCIe riser slot 1 Accepts 1 half height, half width PCIe riser card
11	Modular LOM (mLOM) or Intel X710 OCP 3.0 card bay on chassis floor (x16 PCIe lane) The mLOM/OCP card bay sits below PCIe riser slot 1.	12	Motherboard CPU socket CPU1 is the bottom socket.
13	SuperCap module mounting bracket The SuperCap module (not shown) that mounts into this location provides RAID write-cache backup.	14	Front Panel Controller board

The view in the following figure shows the individual component locations and numbering, including the HHHL PCIe slots.



The Technical Specifications Sheets for all versions of this server, which include supported component part numbers, are at [Cisco UCS Servers Technical Specifications Sheets](#) (scroll down to *Technical Specifications*).

Replacing SAS/SATA Hard Drives or Solid-State Drives



Note You do not have to shut down the server or drive to replace SAS/SATA hard drives or SSDs because they are hot-swappable. To replace an NVMe PCIe SSD drive, which must be shut down before removal, see [Replacing a Front-Loading NVMe SSD, on page 54](#).

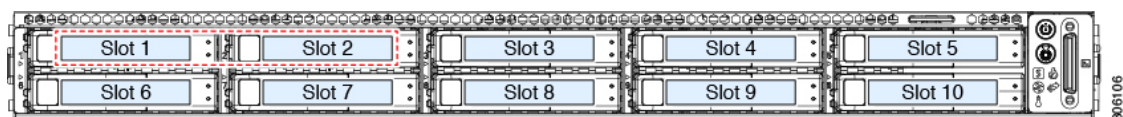
SAS/SATA Drive Population Guidelines

The server is orderable in two different versions, each with a different front panel/drive-backplane configuration.

- Cisco UCS C220 M7 SAS/SATA—Small form-factor (SFF) drives, with 10-drive backplane. Supports up to 10 2.5-inch SAS/SATA drives.
- Cisco UCS C220 M7 NVMe—SFF drives, with 10-drive backplane. Supports up to 10 2.5-inch NVMe-only SSDs. A maximum of 10 NVMe SSDs is supported only when the Cisco 24G Tri-Mode RAID Controller (UCSC-RAID-HP) is configured in the server.

Drive bay numbering is shown in the following figures.

Figure 19: Small Form-Factor Drive Versions, Drive Bay Numbering



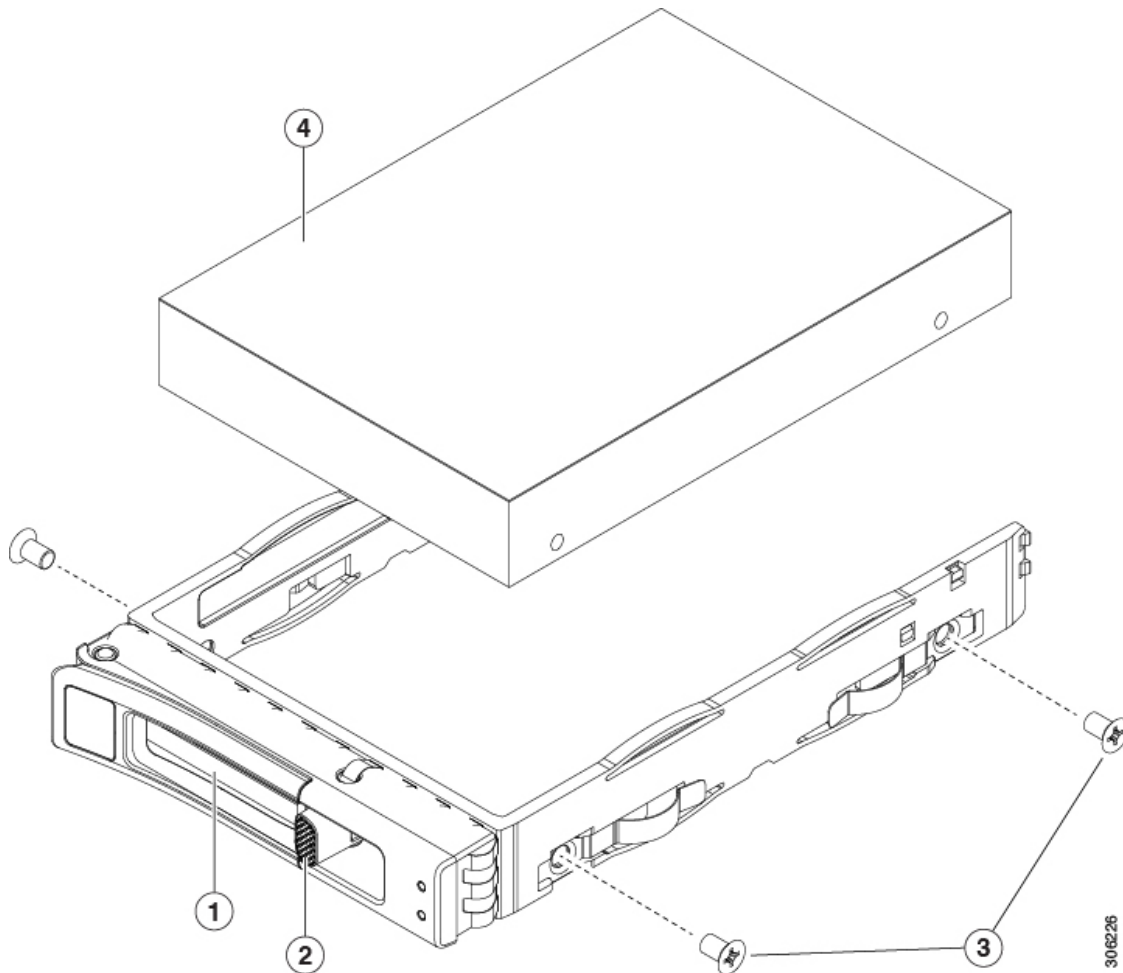
Observe these drive population guidelines for optimum performance:

- When populating drives, add drives to the lowest-numbered bays first.
- Keep an empty drive blanking tray in any unused bays to ensure proper airflow.
- You can mix SAS/SATA hard drives and SAS/SATA SSDs in the same server. However, you cannot configure a logical volume (virtual drive) that contains a mix of hard drives and SSDs. That is, when you create a logical volume, it must contain all SAS/SATA hard drives or all SAS/SATA SSDs.

Replacing a SAS/SATA Drive

- Step 1** Remove the drive that you are replacing or remove a blank drive tray from the bay:
- a) Press the release button on the face of the drive tray.
 - b) Grasp and open the ejector lever and then pull the drive tray out of the slot.
 - c) If you are replacing an existing drive, remove the four drive-tray screws that secure the drive to the tray and then lift the drive out of the tray.
- Step 2** Install a new drive:
- a) Place a new drive in the empty drive tray and install the four drive-tray screws.
 - b) With the ejector lever on the drive tray open, insert the drive tray into the empty drive bay.
 - c) Push the tray into the slot until it touches the backplane, and then close the ejector lever to lock the drive in place.

Figure 20: Replacing a Drive in a Drive Tray



1	Ejector lever	3	Drive tray screws (two on each side)
2	Release button	4	Drive removed from drive tray

Basic Troubleshooting: Reseating a SAS/SATA Drive

Sometimes it is possible for a false positive UBAD error to occur on SAS/SATA HDDs installed in the server.

- Only drives that are managed by the UCS MegaRAID controller are affected.
- Drives can be affected regardless of where they are installed in the server (front-loaded, rear-loaded, and so on).
- Both SFF and LFF form factor drives can be affected.
- Drives installed in all Cisco UCS C-Series servers with M3 processors and later can be affected.
- Drives can be affected regardless of whether they are configured for hot plug or not.

- The UBAD error is not always terminal, so the drive is not always defective or in need of repair or replacement. However, it is also possible that the error is terminal, and the drive will need replacement.

Before submitting the drive to the RMA process, it is a best practice to reseat the drive. If the false UBAD error exists, reseating the drive can clear it. If successful, reseating the drive reduces inconvenience, cost, and service interruption, and optimizes your server uptime.



Note Reseat the drive only if a UBAD error occurs. Other errors are transient, and you should not attempt diagnostics and troubleshooting without the assistance of Cisco personnel. Contact Cisco TAC for assistance with other drive errors.

To reseat the drive, see [Reseating a SAS/SATA Drive, on page 53](#).

Reseating a SAS/SATA Drive

Sometimes, SAS/SATA drives can throw a false UBAD error, and reseating the drive can clear the error.

Use the following procedure to reseat the drive.



Caution This procedure might require powering down the server. Powering down the server will cause a service interruption.

Before you begin

Before attempting this procedure, be aware of the following:

- Before reseating the drive, it is a best practice to back up any data on it.
- When reseating the drive, make sure to reuse the same drive bay.
 - Do not move the drive to a different slot.
 - Do not move the drive to a different server.
 - If you do not reuse the same slot, the Cisco management software (for example, Cisco IMM) might require a rescan/rediscovery of the server.
- When reseating the drive, allow 20 seconds between removal and reinsertion.

Step 1 Attempt a hot reseat of the affected drive(s). Choose the appropriate option:

See [Replacing a SAS/SATA Drive, on page 51](#).

Note While the drive is removed, it is a best practice to perform a visual inspection. Check the drive bay to ensure that no dust or debris is present. Also, check the connector on the back of the drive and the connector on the inside of the server for any obstructions or damage.

Also, when reseating the drive, allow 20 seconds between removal and reinsertion.

Step 2 During boot up, watch the drive's LEDs to verify correct operation.

See [Status LEDs and Buttons, on page 33](#).

- Step 3** If the error persists, cold reseal the drive, which requires a server power down. Choose the appropriate option:
- Use your server management software to gracefully power down the server.
See the appropriate Cisco management software documentation.
 - If server power down through software is not available, you can power down the server by pressing the power button.
See [Status LEDs and Buttons, on page 33](#).
 - Reseat the drive as documented in Step 1.
 - When the drive is correctly reseated, restart the server, and check the drive LEDs for correct operation as documented in Step 2.
- Step 4** If hot and cold reseating the drive (if necessary) does not clear the `UBAD` error, choose the appropriate option:
- Contact Cisco Systems for assistance with troubleshooting.
 - Begin an RMA of the errored drive.
-

Replacing a Front-Loading NVMe SSD

This section is for replacing 2.5-inch form-factor NVMe solid-state drives (SSDs) in front-panel drive bays.

Front-Loading NVMe SSD Population Guidelines

The server supports the following front drive bay configurations with 2.5-inch NVMe SSDs:

- UCS C220 M7 with SFF drives, a 10-drive backplane. Drive bay 1 - 10 support 2.5-inch NVMe-only SSDs.

Front-Loading NVMe SSD Requirements and Restrictions

Observe these requirements:

- As a best practice, the server should have two CPUs.
- In a single CPU server, Riser 2 is not available depending on the type of risers installed.
 - In a single-CPU configuration with 3 HHHL risers, Riser 1 and Riser 2 are direct connected to CPU 1, so for this config Riser 1 and Riser 2 are supported.
 - In a single-CPU config with 2 FHFL risers, only Riser 1 is supported.

PCIe riser 2 is not available in a single-CPU system. PCIe riser 2 has connectors for the cable that connects to the front-panel drive backplane.

- PCIe cable CBL-FNVME-C220M7. This is the cable that carries the PCIe signal from the front-panel drive backplane to the motherboard. This cable is for all versions of this server.
- Hot-plug support must be enabled in the system BIOS. If you ordered the system with NVMe drives, hot-plug support is enabled at the factory.
- The NVMe-optimized, SFF 10-drive version, supports NVMe drives only. All drives are directly-attached to the CPU root complex.

Observe these restrictions:

- NVMe SFF 2.5-inch SSDs support booting only in UEFI mode. Legacy boot is not supported.
- You cannot control NVMe PCIe SSDs with a SAS RAID controller because NVMe SSDs interface with the server via the PCIe bus.
- UEFI boot is supported in all supported operating systems. Hot-insertion and hot-removal are supported in all supported operating systems except VMWare ESXi.

Replacing a Front-Loading NVMe SSD

This topic describes how to replace 2.5-inch form-factor NVMe SSDs in the front-panel drive bays.



Note OS-surprise removal is not supported. OS-informed hot-insertion and hot-removal are supported on all supported operating systems except VMware ESXi.

Step 1 Remove an existing front-loading NVMe SSD:

- a) Shut down the NVMe SSD to initiate an OS-informed removal. Use your operating system interface to shut down the drive, and then observe the drive-tray LED:
 - Green—The drive is in use and functioning properly. Do not remove.
 - Green, blinking—the driver is unloading following a shutdown command. Do not remove.
 - Off—The drive is not in use and can be safely removed.
- b) Press the release button on the face of the drive tray.
- c) Grasp and open the ejector lever and then pull the drive tray out of the slot.
- d) Remove the four drive tray screws that secure the SSD to the tray and then lift the SSD out of the tray.

Note If this is the first time that front-loading NVMe SSDs are being installed in the server, you must install PCIe cable CBL-NVME-C220FF before installing the drive. See [Installing a PCIe Cable For Front-Loading NVMe SSDs, on page 56](#).

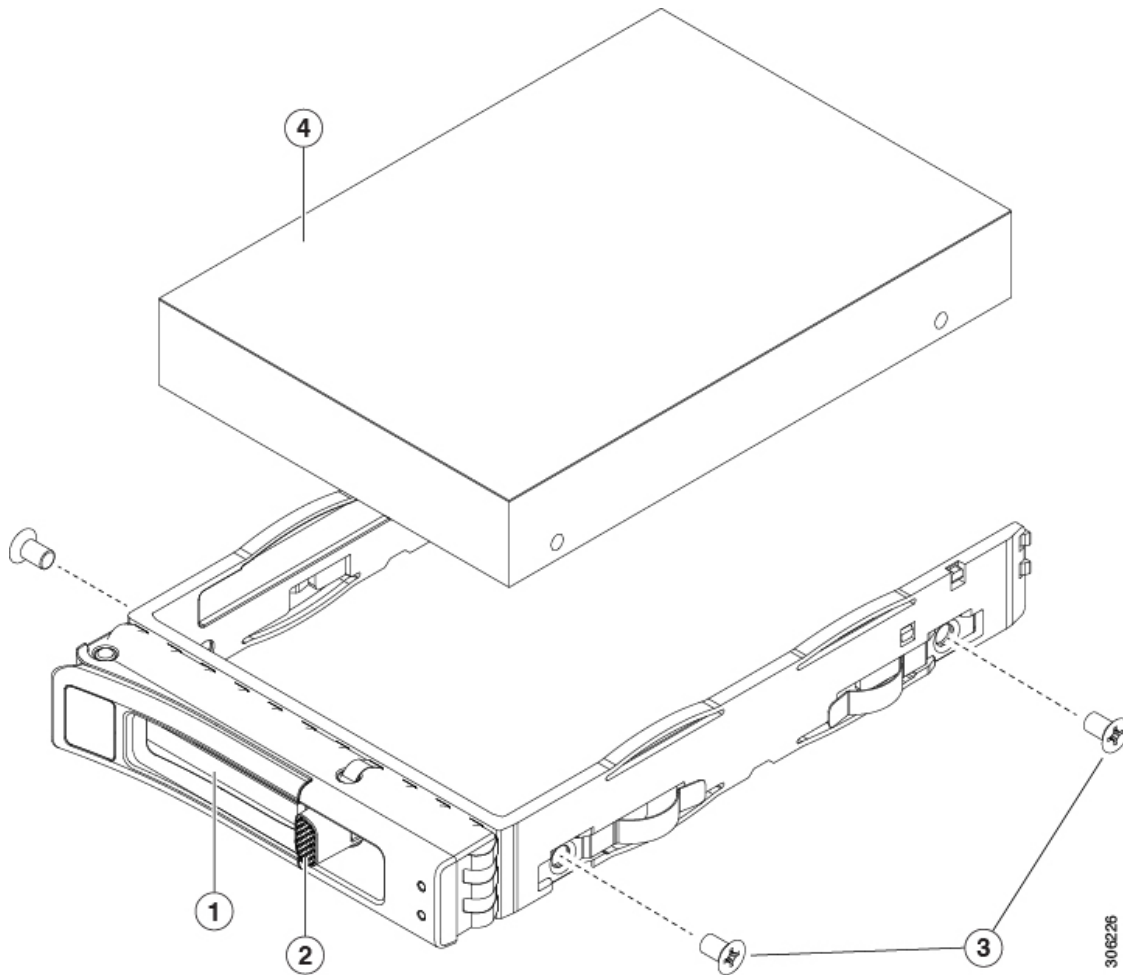
Step 2 Install a new front-loading NVMe SSD:

- a) Place a new SSD in the empty drive tray and install the four drive-tray screws.
- b) With the ejector lever on the drive tray open, insert the drive tray into the empty drive bay.
- c) Push the tray into the slot until it touches the backplane, and then close the ejector lever to lock the drive in place.

Step 3 Observe the drive-tray LED and wait until it returns to solid green before accessing the drive:

- Off—The drive is not in use.
- Green, blinking—the driver is initializing following hot-plug insertion.
- Green—The drive is in use and functioning properly.

Figure 21: Replacing a Drive in a Drive Tray



1	Ejector lever	3	Drive tray screws (two on each side)
2	Release button	4	Drive removed from drive tray

Installing a PCIe Cable For Front-Loading NVMe SSDs

The front-loading NVMe SSDs interface with the server via the PCIe bus. Cable CBL-FNVME-C220M7 connects the front-panel drive backplane to the motherboard.

- If the server was ordered with 2.5-inch form-factor NVMe SSDs, this cable was preinstalled at the factory. No action is required.
- If you are adding 2.5-inch form-factor NVMe SSDs for the first time, you must order and install the cable as described in the following procedure.

Step 1 Connect the two connectors on one end of the cable to the PCIE-A1 and PCIE-A2 connectors on the drive backplane.

- Step 2** Route the cables through the chassis cable guides to the rear of the server as shown below.
- Step 3** Connect the single connector on the other end of the cable to the PCIE-FRONT connector on the motherboard.
-

Replacing Fan Modules

The eight fan modules in the server are numbered as shown in [Figure 4: Cisco UCS C220 M7 Server, Full Height, ¾ Length PCIe Cards, Serviceable Component Locations, on page 7](#).



Tip Each fan module has a fault LED next to the fan connector on the motherboard. This LED lights green when the fan is correctly seated and is operating OK. The LED lights amber when the fan has a fault or is not correctly seated.



Caution You do not have to shut down or remove power from the server to replace fan modules because they are hot-swappable. However, to maintain proper cooling, do not operate the server for more than one minute with any fan module removed.

- Step 1** Remove an existing fan module:
- Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).
 - Grasp the fan module at its front and rear finger-grips. Lift straight up to disengage its connector from the motherboard.

- Step 2** Install a new fan module:
- Set the new fan module in place. The arrow printed on the top of the fan module should point toward the rear of the server.
 - Press down gently on the fan module to fully engage it with the connector on the motherboard.
 - Replace the top cover to the server.
 - Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.
-

Replacing Riser Cages

The server can support either three half-height PCIe riser cages or two full-height PCIe riser cages in the rear PCIe slots. Cisco offers individual rear risers, which you can order by their PIDs.



Note If you need to remove the mLOM to install riser cages, see [Replacing an mLOM Card, on page 123](#).
If you need to remove the OCP card to install riser cages, see [Replacing an OCP Card, on page 136](#).

Replacing the Same Riser Type

You can replace full-height risers with other full-height risers, or you can replace half-height risers with other half-height risers. To replace the same type of riser, see the following topics:

- [Removing Half Height Riser Cages, on page 59](#)
- [Installing Half Height Riser Cages, on page 62](#)
- [Removing Full Height Riser Cages, on page 66](#)
- [Installing Full Height Riser Cages, on page 71](#)

Switching Between Riser Types

You can change the riser types in your server as needed. If you want to change from HH risers to FH risers, or change from FH risers to HH risers, order the correct PIDs for this riser type change.



Note You cannot mix riser types in the same server. The server must contain either all full-height risers or all half-height risers.

To switch riser types, see the following topics:

- [Removing Half Height Riser Cages, on page 59](#)
- [Installing Full Height Riser Cages, on page 71](#)
- [Removing Full Height Riser Cages, on page 66](#)
- [Installing Half Height Riser Cages, on page 62](#)

Required Equipment for Replacing Riser Cages

To replace the server's three half-height (HH) rear PCIe riser cages with two full-height (FH) rear PCIe riser cages, you will need to order the appropriate riser cage kits.

Riser	Kit	Contents
Riser 1	UCSC-RIS1C-22XM7=	Includes riser cage, rear wall, and screws
Riser 2	UCSC-RIS2C-22XM7=	Includes riser cage, rear wall, and screws
Riser 3	UCSC-RIS3C-22XM7=	Includes riser cage and screws Does not include rear wall



Note To remove and install screws, you also need a #2 Phillips screwdriver, which is not provided by Cisco.

PCIe Riser Options

The Cisco UCS C220 M7 has riser slots 1 through 3 to support different storage options.

Riser 1

- Riser 1A has a 200-pin standard SMT x24 PCIe connector that includes NCSI port and 12V Standby power support.
Slot 1 is x16 width, Gen4 PCIe, and supports half-height, $\frac{3}{4}$ length PCIe cards
- Riser 1B has a 200-pin standard SMT x24 PCIe connector that includes NCSI port and 12V Standby power support.
Slot 1 is x16 width, Gen5 PCIe, and supports half-height, $\frac{3}{4}$ length PCIe cards
- Riser 1C has a 200-pin standard SMT x24 PCIe connector that includes NCSI port and 12V Standby power support.
Slot 1 is x16 width, Gen5 PCIe, and supports full-height, $\frac{3}{4}$ length PCIe cards

Riser 2

- Riser 2A has a 164-pin standard SMT x16 PCIe connector
Slot 2 is x16 width, Gen4 PCIe, and supports half-height, $\frac{3}{4}$ length PCIe cards. This riser is used only in a server that is configured with 3 HHHL slots.
- Riser 2B has a 164-pin standard SMT x24 PCIe connector
Slot 1 is x16 width, Gen5 PCIe, and supports half-height, $\frac{3}{4}$ length PCIe cards

Riser 3

- Riser 3A has a 200-pin standard SMT x24 PCIe MB connector that includes NCSI port and 12V Standby power support.
Slot 3 is x16 width, Gen4 PCIe, and supports half-height, $\frac{3}{4}$ length PCIe cards.
- Riser 3C has a 200-pin standard SMT x24 PCIe MB connector that includes NCSI port and 12V Standby power support.
Slot 3 is x16 width, Gen5 PCIe, and supports full-height, $\frac{3}{4}$ length PCIe cards

Replacing the Same Riser Types

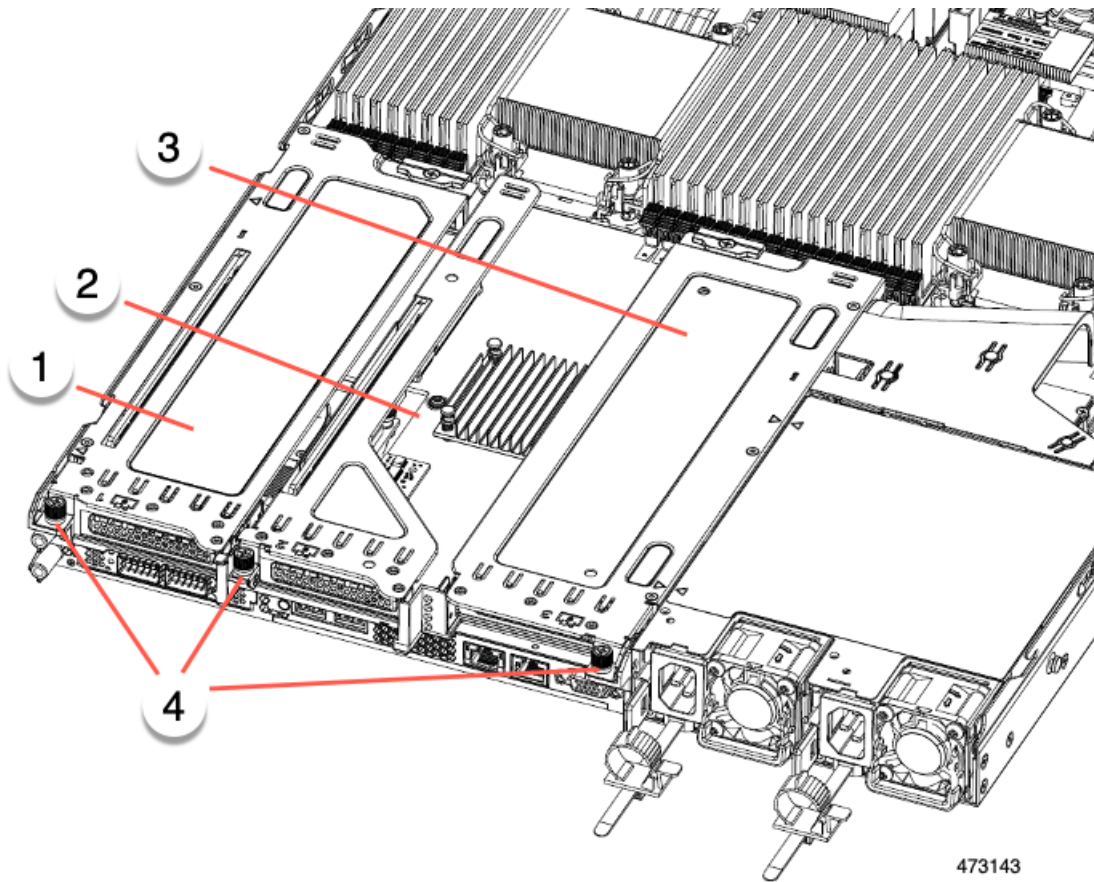
Removing Half Height Riser Cages

This task enables switching from 3 FH rear PCIe cages to 2 HH rear PCIe cages. To complete this procedure, make sure that you have the required equipment. See [Required Equipment for Replacing Riser Cages, on page 58](#).

-
- Step 1** Remove the server top cover to gain access to the PCIe riser cages.
See [Removing Top Cover, on page 39](#).

Step 2 Remove the three rear PCIe riser cages.

- a) Locate the riser cages.
- b) Using a #2 Phillips screwdriver or your fingers, for each riser cage, loosen its captive thumbscrew.



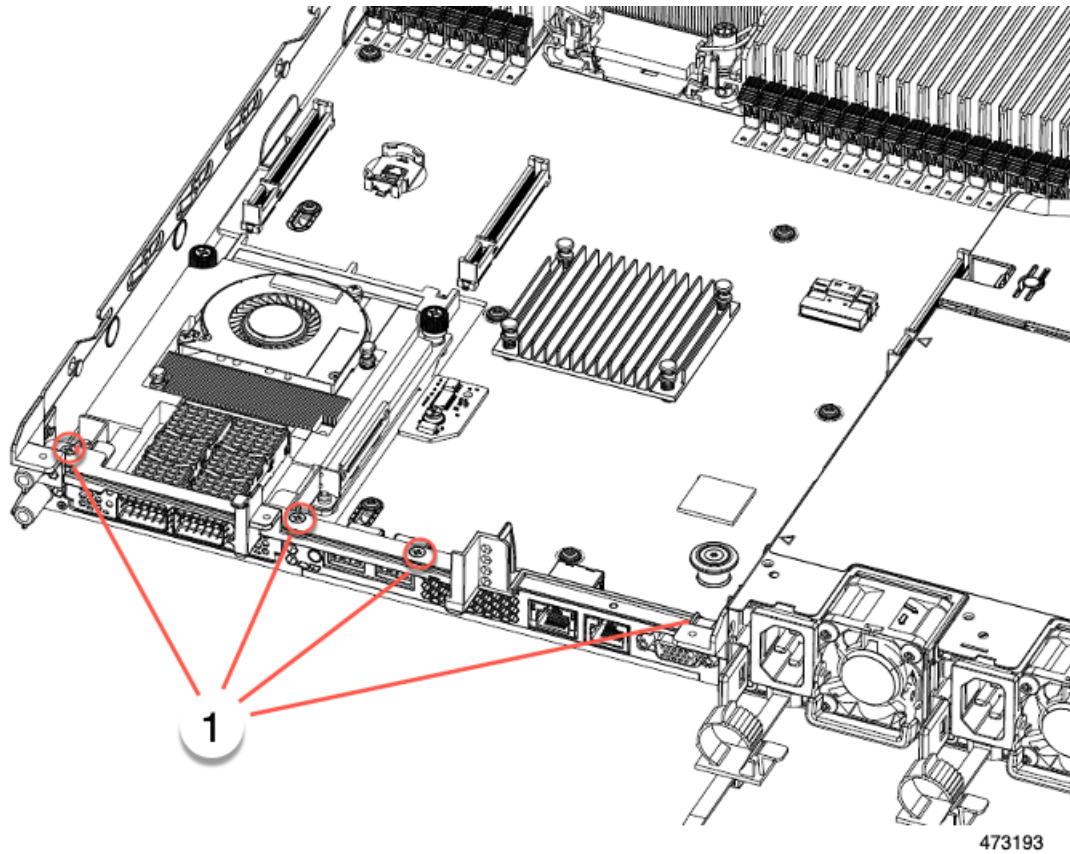
1	Rear Riser Cage 1	2	Rear Riser Cage 2
3	Rear Riser cage 3	4	Riser Cage Thumbscrews, three total (one per riser cage)

- c) Lift the risers off of the server.

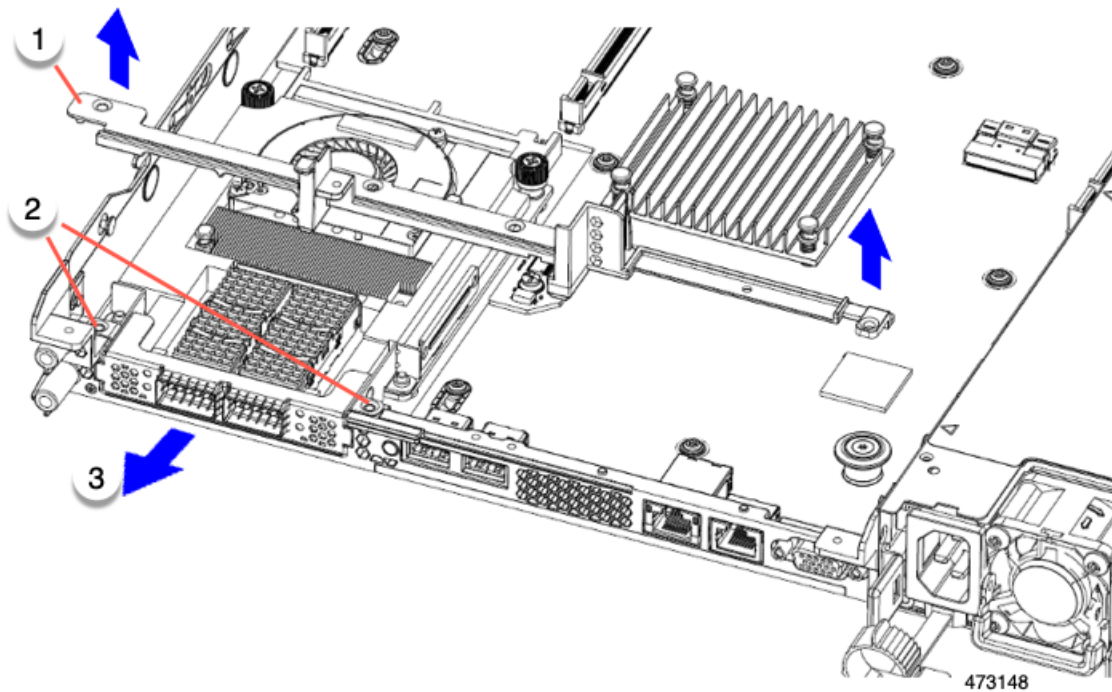
Step 3 Using a #2 Phillips screwdriver, remove the four screws that secure the half height rear wall and mLOM/OCP card bracket to the chassis sheet metal.

Note One of the screws is located behind the rear wall so it might be difficult to see. when you are facing the server's rear riser slots.

Figure 22: Locations of Securing Screws, Facing Rear Riser Slots



- Step 4** Remove the half height rear wall and mLOM/OCP card bracket.
- Grasp each end of the half height rear wall and remove it.
 - Grasp each end of the mLOM/OCP bracket and remove it.



Step 5 Save the three HH riser cages and the half height rear wall.

What to do next

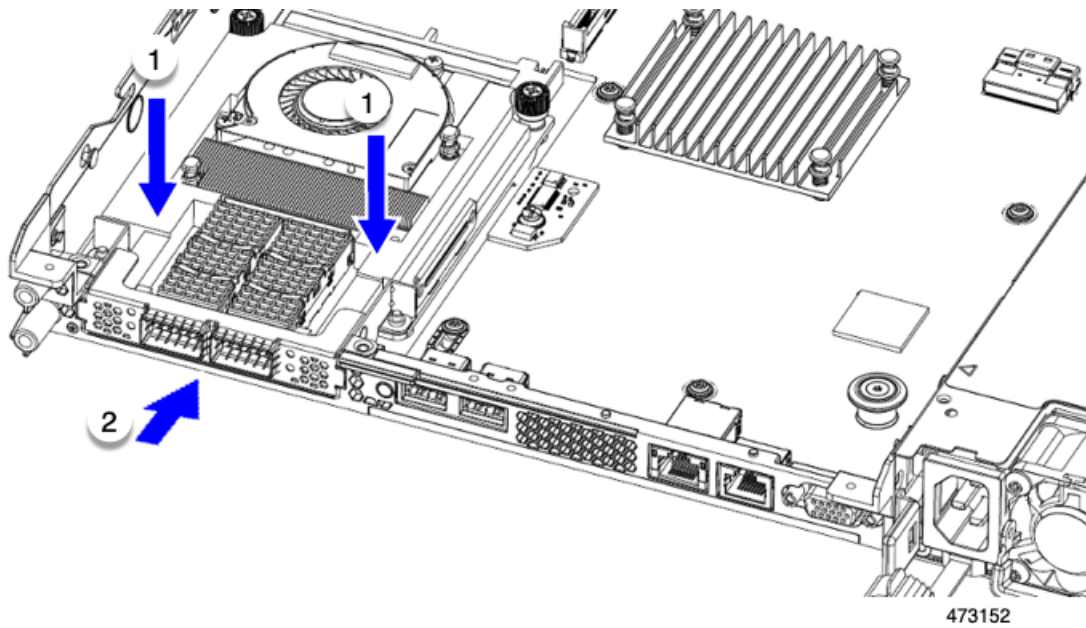
Install the two full-height riser cages. See [Installing Full Height Riser Cages, on page 71](#).

Installing Half Height Riser Cages

Use this task to install 3 HH rear riser cages after 2 FH rear riser cages are removed.

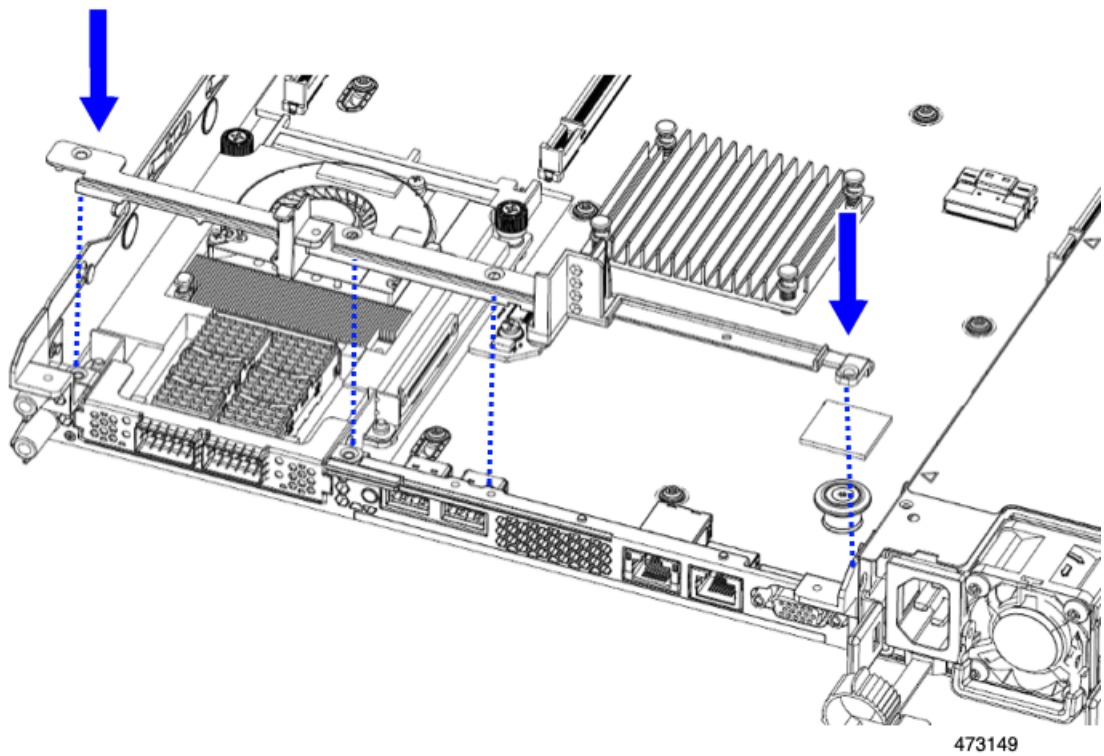
Before beginning this procedure, see [Required Equipment for Replacing Riser Cages, on page 58](#).

Step 1 Install the mLOM/OCP card bracket.



Step 2 Install the half-height rear wall.

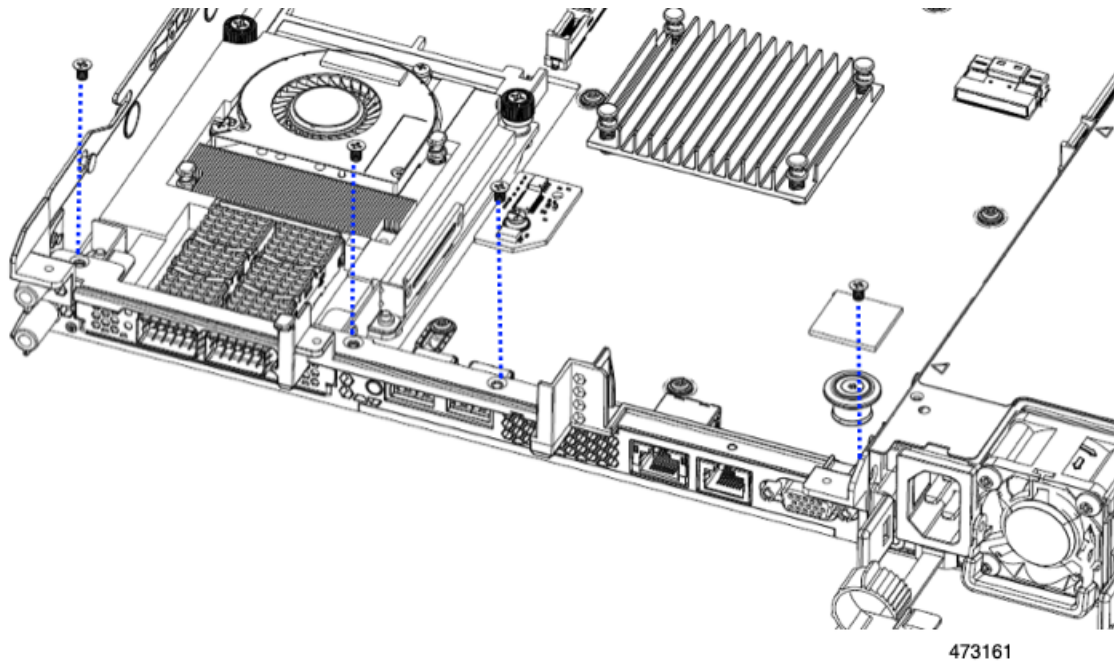
- a) Orient the half-height rear wall as shown, making sure the folded metal tab is facing up.
- b) Align the screw holes in the HH rear wall with the screw holes in the server sheet metal.
- c) Holding the rear wall level, seat onto the server sheet metal, making sure that the screw holes line up.



Step 3 Using a #2 Phillips screwdriver, install the four screws that secure the mLOM/OCP card bracket and the half-height rear wall to the server sheet metal.

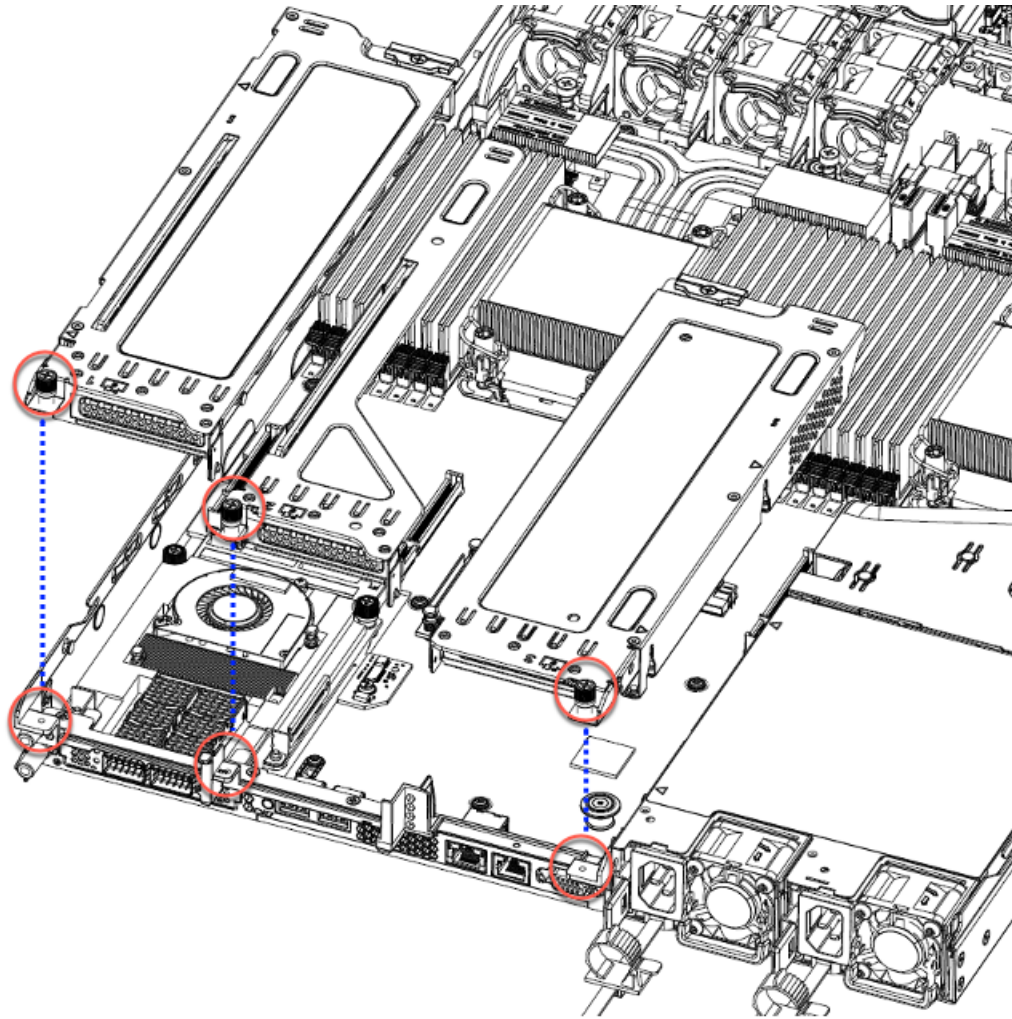
Caution Tighten screws to 4 lbs-in. Do not over-tighten screws or you risk stripping them!

Figure 23: Installing Securing Screws, Facing Rear Riser Slots



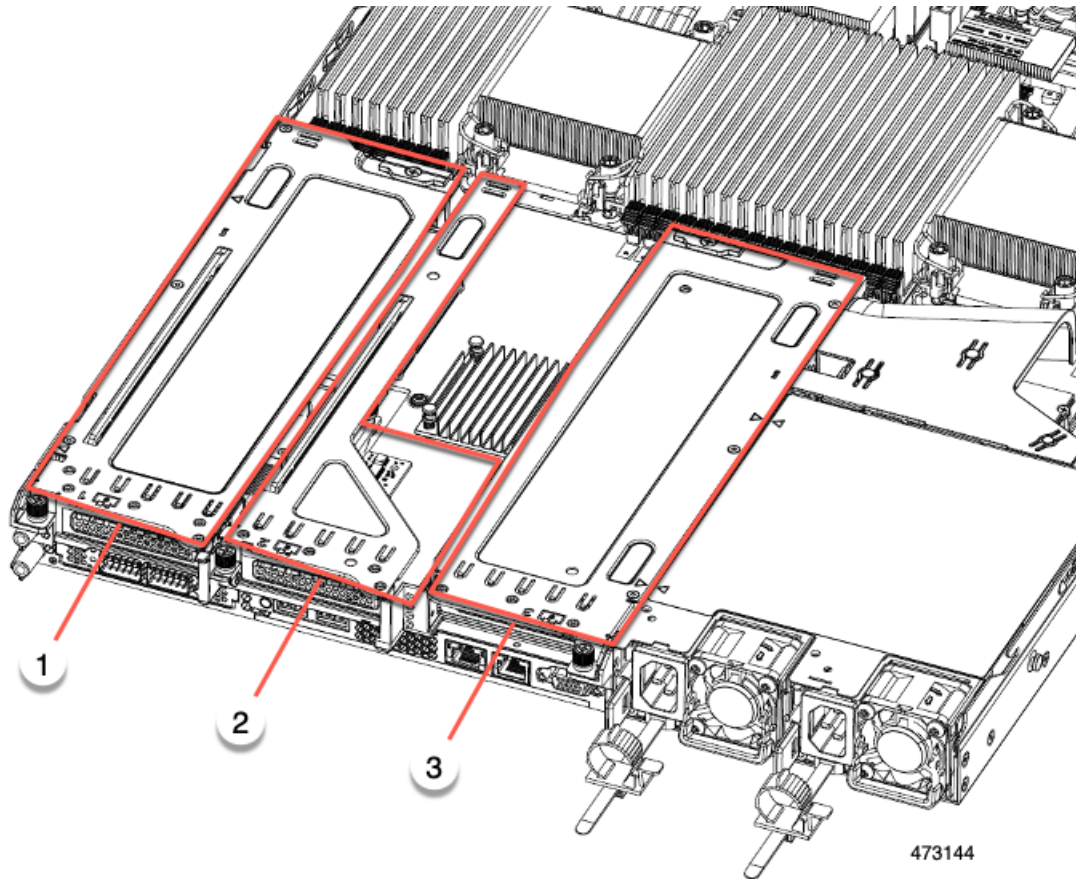
Step 4 Install the three half-height riser cages.

- a) Align riser cages 1, 2, and 3 over their PCIe slots, making sure that the captive thumbscrews are aligned with their screw holes.
- b) Holding each riser cage level, lower it into its PCIe slot, then tighten the thumbscrew by using a #2 Phillips screwdriver or your fingers.



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Step 5 Ensure the three riser cages are securely seated on the motherboard.



Step 6 Replace the server's top cover.

Removing Full Height Riser Cages

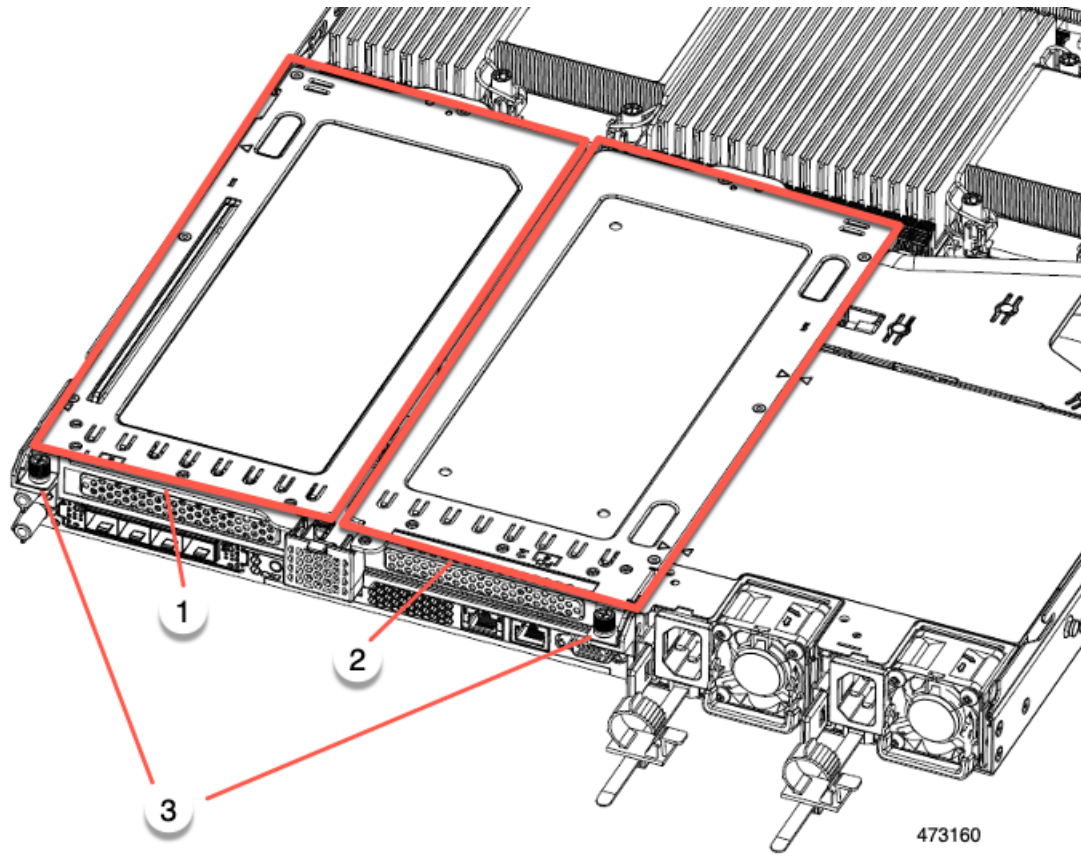
This task enables switching from 2 FH rear PCIe cages to 3 HH rear PCIe cages. To complete this procedure, make sure that you have the required equipment. See [Required Equipment for Replacing Riser Cages, on page 58](#).

Step 1 Remove the server top cover to gain access to the PCIe riser cages.

See [Removing Top Cover, on page 39](#).

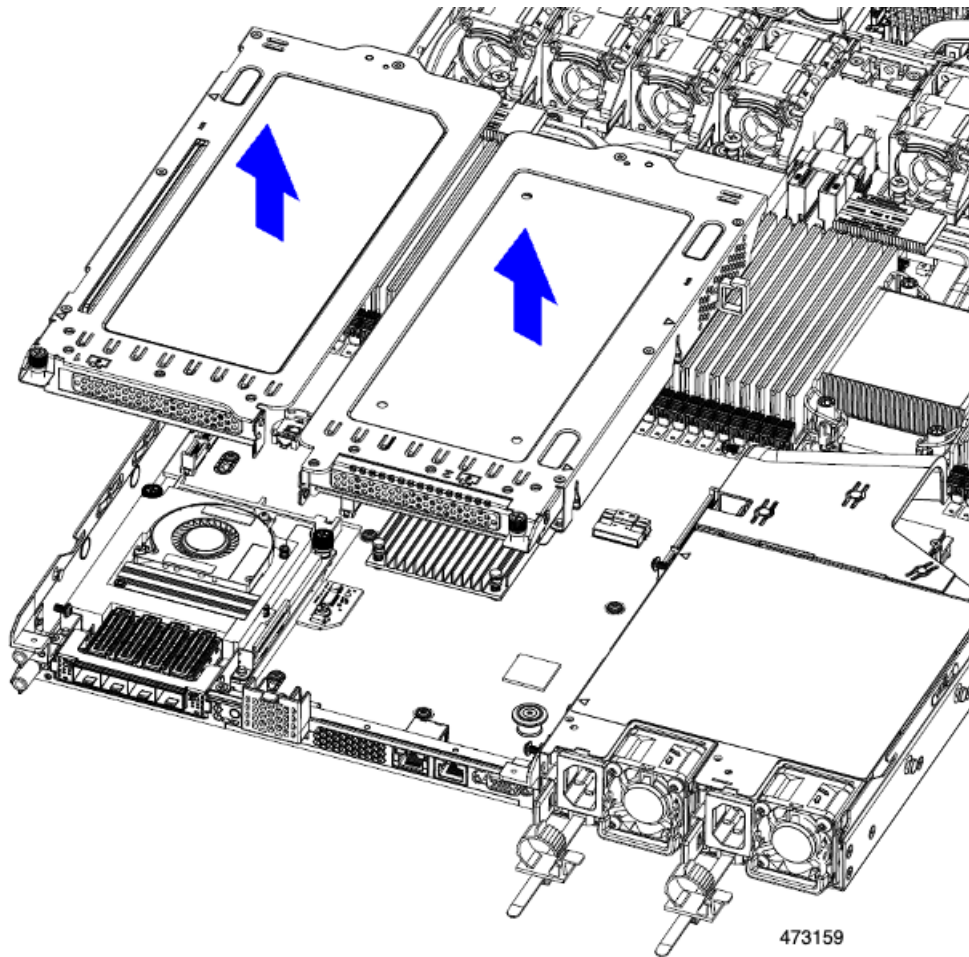
Step 2 Remove the two rear PCIe riser cages.

- a) Locate the riser cages.
- b) Using a #2 Phillips screwdriver or your fingers, for each riser cage, loosen its captive thumbscrew.



1	Rear Riser Cage 1	2	Rear Riser Cage 2
3	Riser Cage Thumbscrews, two total (one per riser cage)	-	

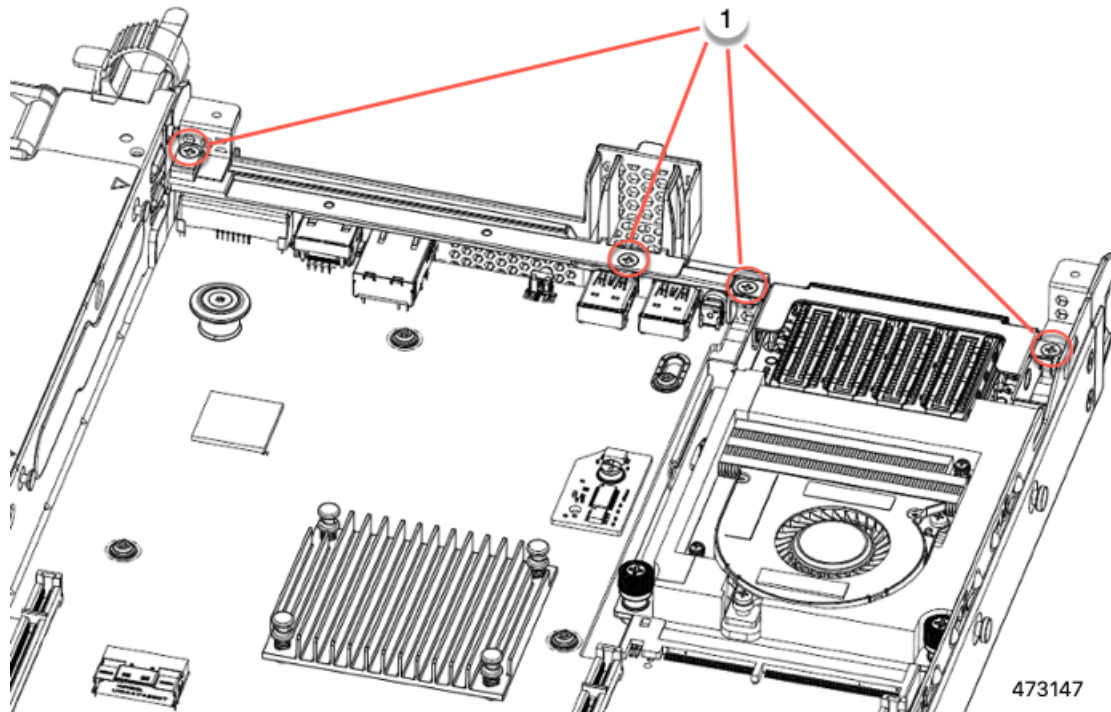
c) Lift the riser cages off of the server.



Step 3 Using a #2 Phillips screwdriver, remove the four screws that secure the full-height rear wall and mLOM/OCP card bracket to the chassis sheet metal.

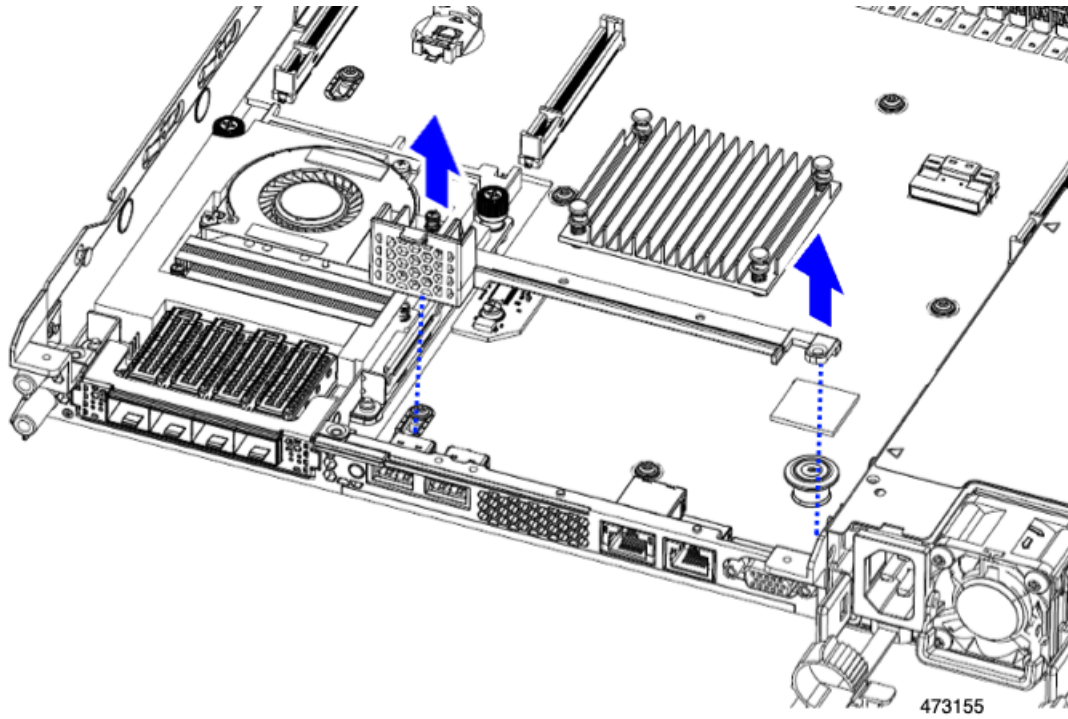
Note One of the screws is located behind the rear wall so it might be difficult to see when you are facing the server's rear riser slots.

Figure 24: Locations of Securing Screws



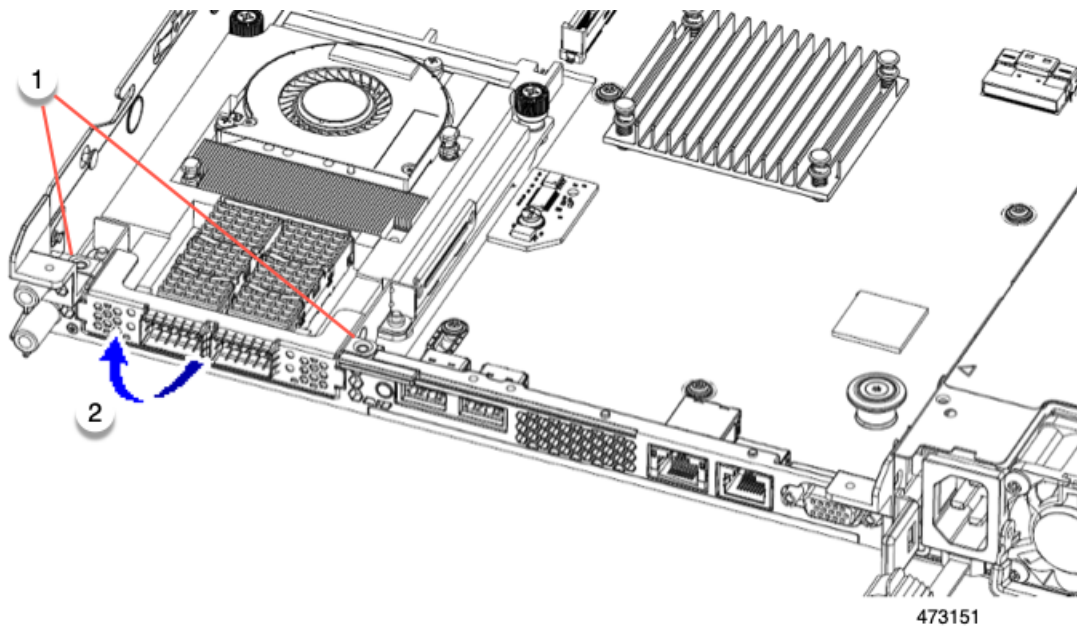
- Step 4** Remove the rear wall and mLOM/OCP card bracket.
- Grasp each end of the full height rear wall and remove it.

Figure 25: Removing the Full Height Rear Wall



b) Grasp each end of the mLOM/OCP card bracket and remove it.

Figure 26: Removing mLOM/OCP Card Bracket



Step 5 Save the FH riser cages and the full height rear wall.

What to do next

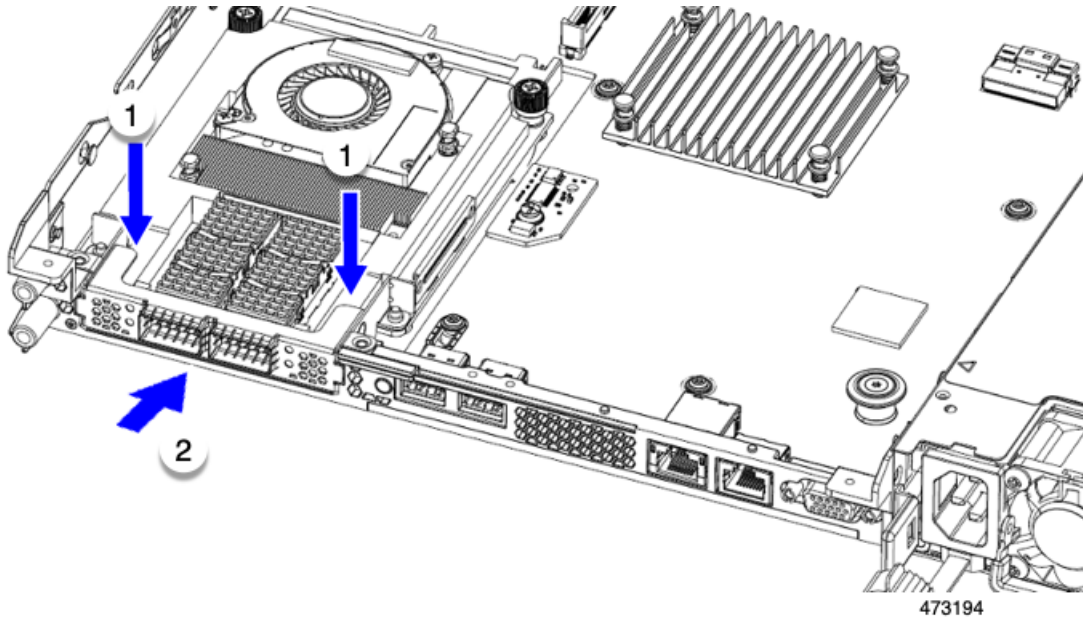
Install the two half-height riser cages. See [Installing Half Height Riser Cages, on page 62](#).

Installing Full Height Riser Cages

Use this task to install 2 FH rear riser cages after 3 HH rear riser cages are removed.

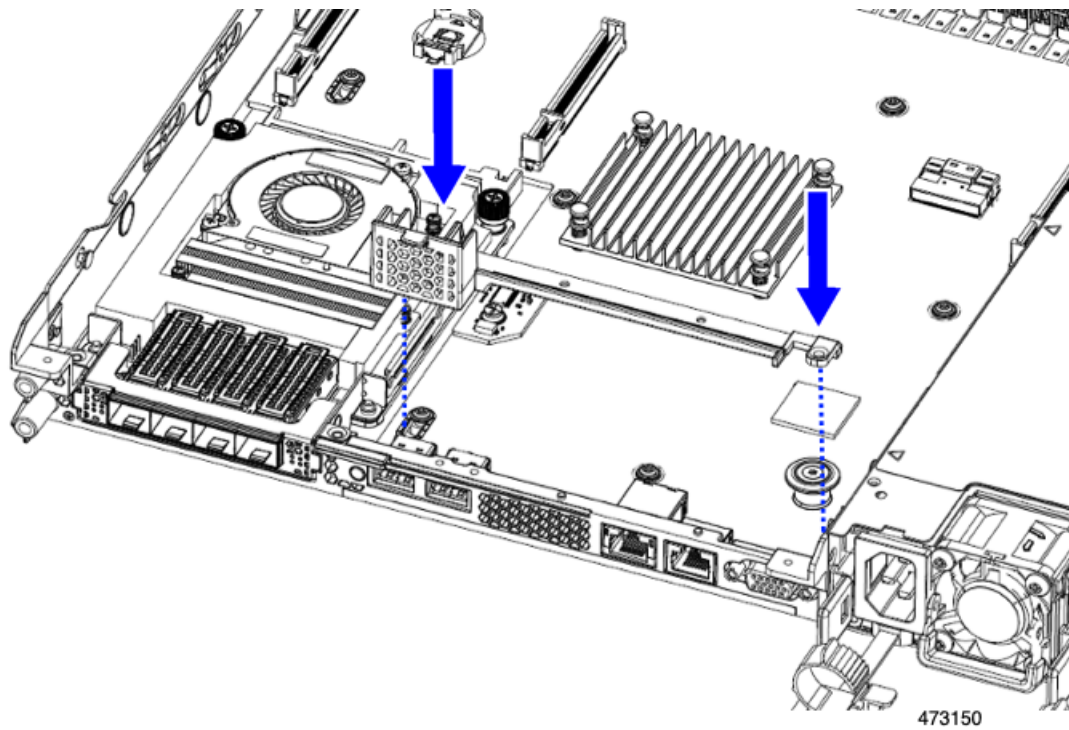
Before beginning this procedure, see [Required Equipment for Replacing Riser Cages, on page 58](#).

Step 1 Install the mLOM/OCP card bracket.



Step 2 Install the full-height rear wall.

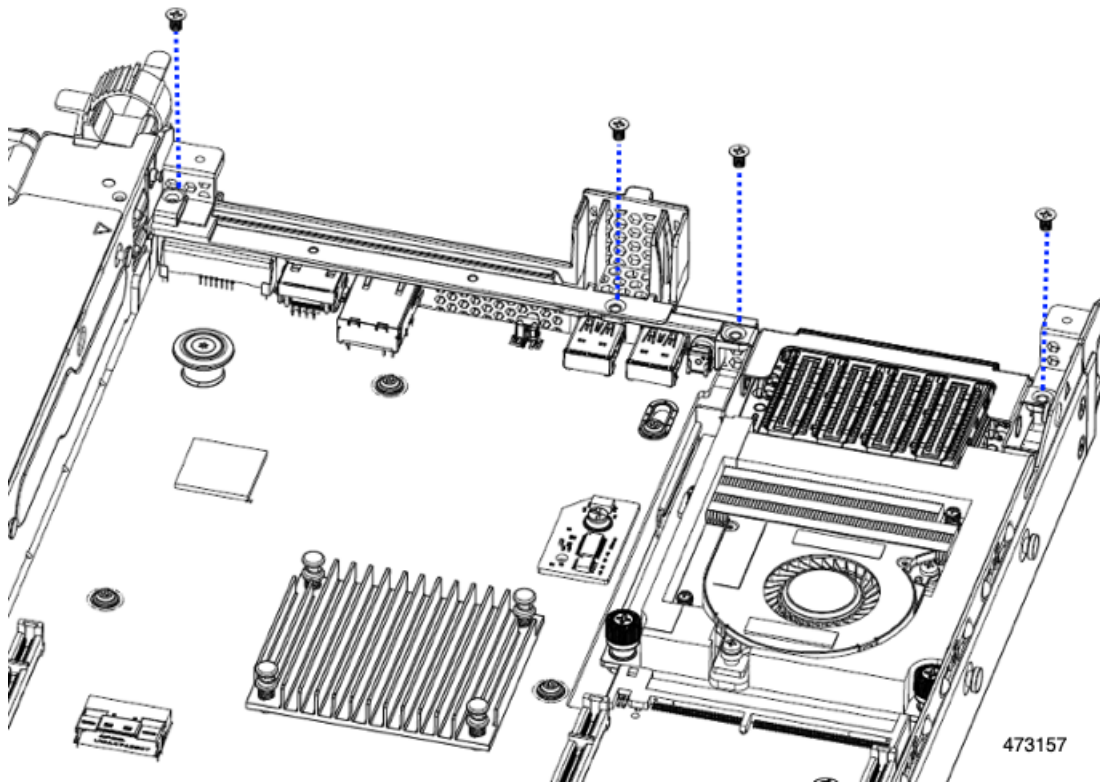
- Orient the full-height rear wall as shown, making sure the folded metal tab is facing up.
- Align the screw holes in the FH rear wall with the screw holes in the server sheet metal.
- Holding the rear wall level, seat onto the server sheet metal, making sure that the screw holes line up.



Step 3 Using a #2 Phillips screwdriver, install the four screws that secure the mLOM/OCP card bracket and the FH rear wall to the server sheet metal.

Caution Tighten the screws to 4 lbs-in of torque. Do not over-tighten the screws or you risk stripping them.

Figure 27: Installing Securing Screws

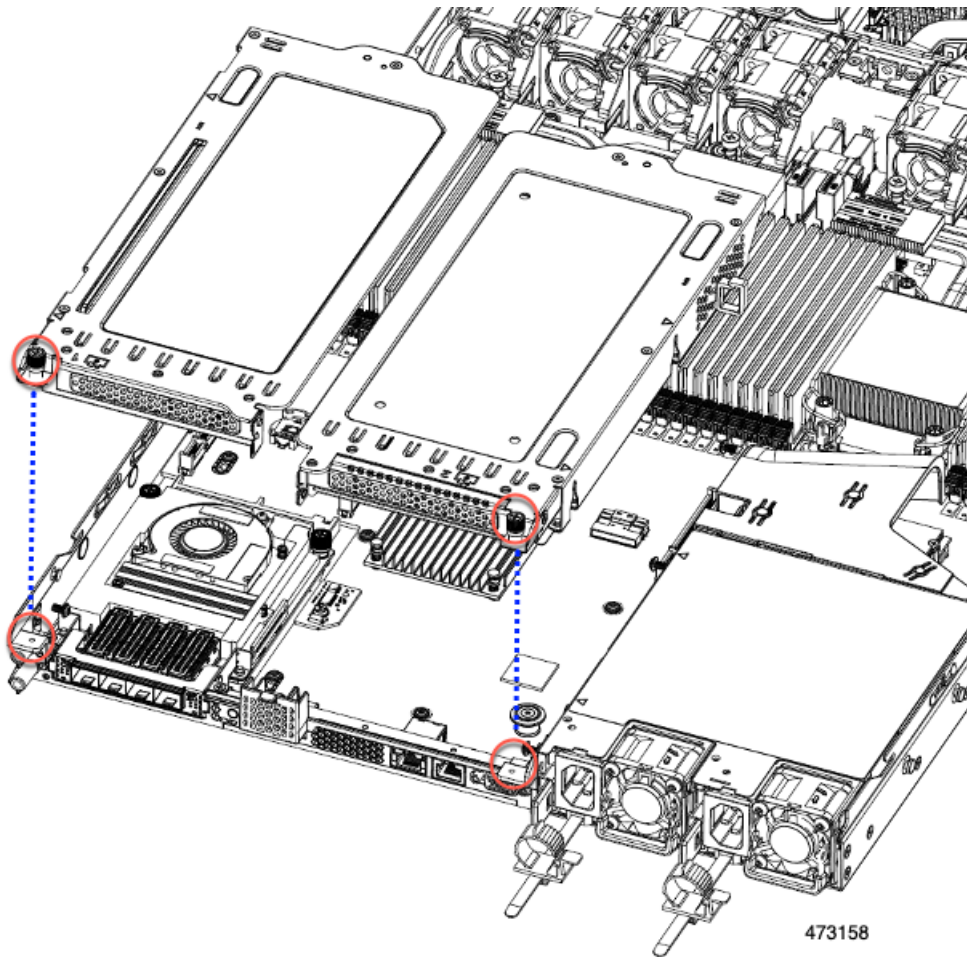


Step 4

Install the two full height riser cages.

- Align riser cages 1 and 2 over their PCIe slots, making sure that the captive thumbscrews are aligned with their screw holes.
- Holding each riser cage level, lower it into its PCIe slot, then tighten the thumbscrew by using a #2 Phillips screwdriver or your fingers.

Caution Tighten the screws to 4 lbs-in of torque. Do not over tighten the screws or you risk stripping them.



Step 5 Replace the server's top cover.

Switching Between Full-Height and Half-Height Risers

Removing Half Height Riser Cages

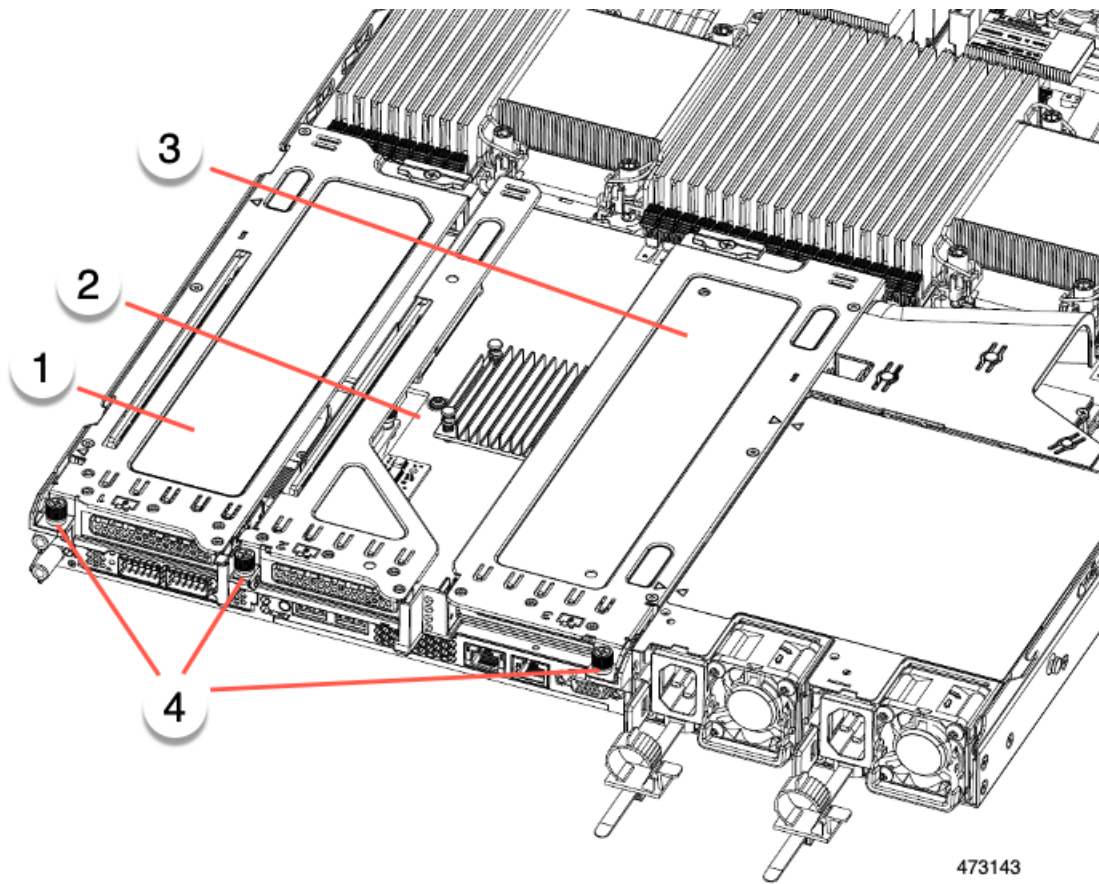
This task enables switching from 3 FH rear PCIe cages to 2 HH rear PCIe cages. To complete this procedure, make sure that you have the required equipment. See [Required Equipment for Replacing Riser Cages](#), on page 58.

Step 1 Remove the server top cover to gain access to the PCIe riser cages.

See [Removing Top Cover](#), on page 39.

Step 2 Remove the three rear PCIe riser cages.

- a) Locate the riser cages.
- b) Using a #2 Phillips screwdriver or your fingers, for each riser cage, loosen its captive thumbscrew.



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1	Rear Riser Cage 1	2	Rear Riser Cage 2
3	Rear Riser cage 3	4	Riser Cage Thumbscrews, three total (one per riser cage)

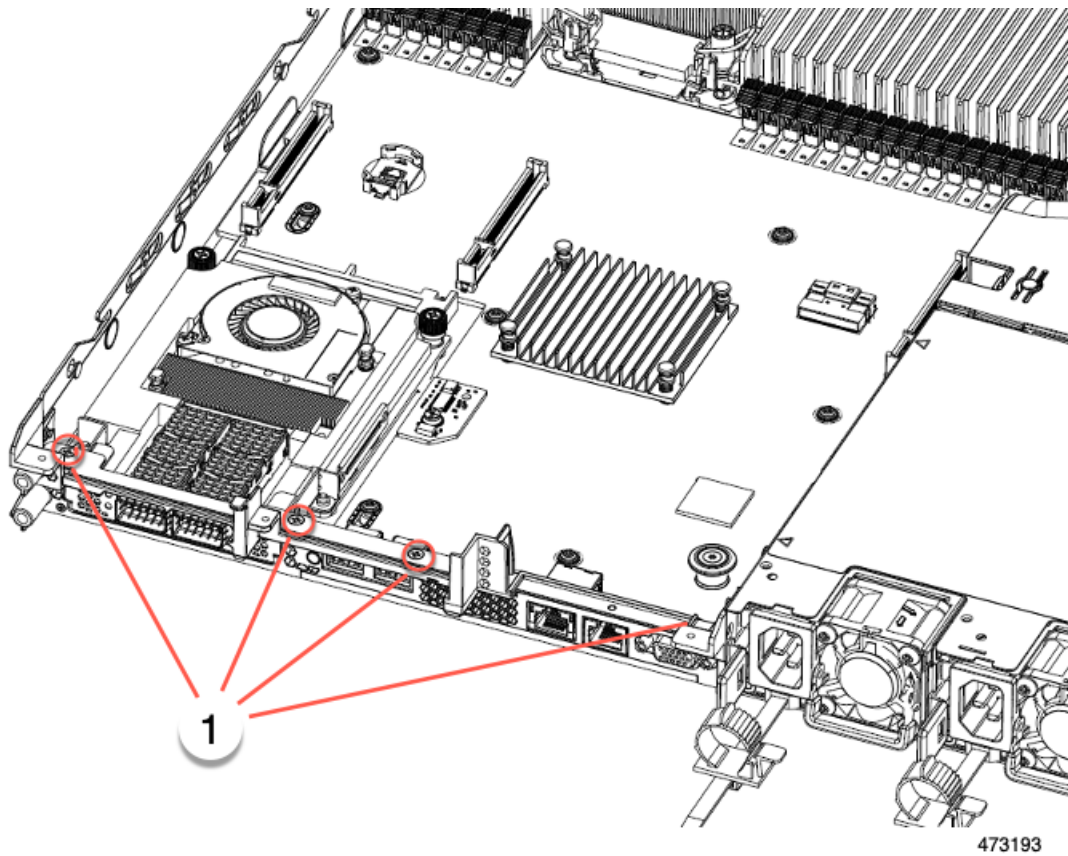
c) Lift the risers off of the server.

Step 3

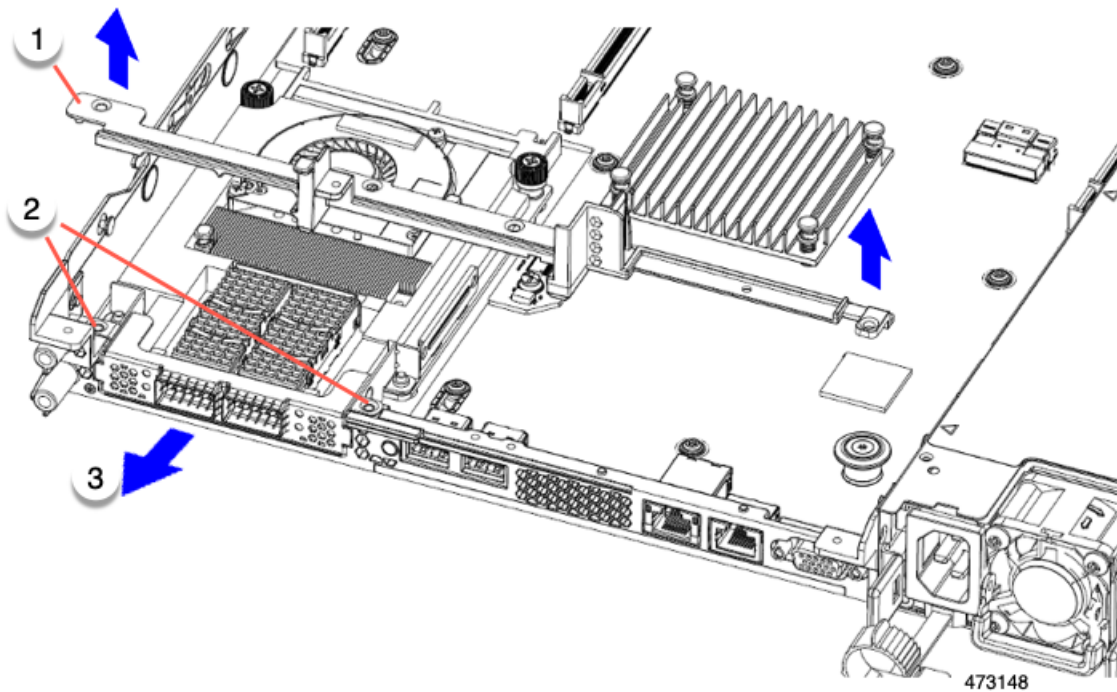
Using a #2 Phillips screwdriver, remove the four screws that secure the half height rear wall and mLOM/OCP card bracket to the chassis sheet metal.

Note One of the screws is located behind the rear wall so it might be difficult to see. when you are facing the server's rear riser slots.

Figure 28: Locations of Securing Screws, Facing Rear Riser Slots



- Step 4** Remove the half height rear wall and mLOM/OCP card bracket.
- Grasp each end of the half height rear wall and remove it.
 - Grasp each end of the mLOM/OCP bracket and remove it.



Step 5 Save the three HH riser cages and the half height rear wall.

What to do next

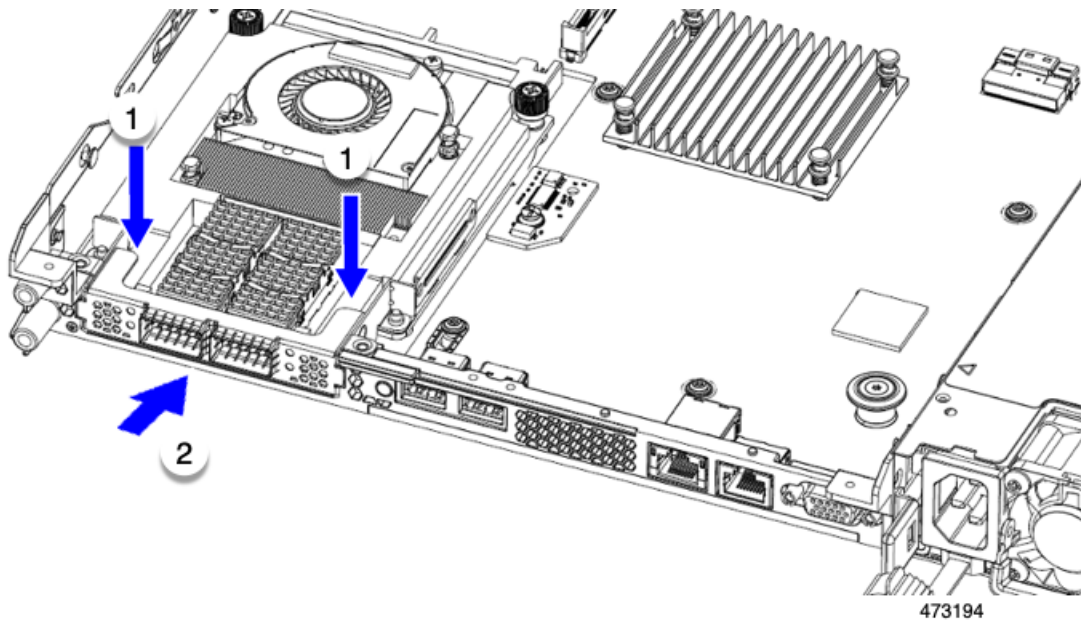
Install the two full-height riser cages. See [Installing Full Height Riser Cages, on page 71](#).

Installing Full Height Riser Cages

Use this task to install 2 FH rear riser cages after 3 HH rear riser cages are removed.

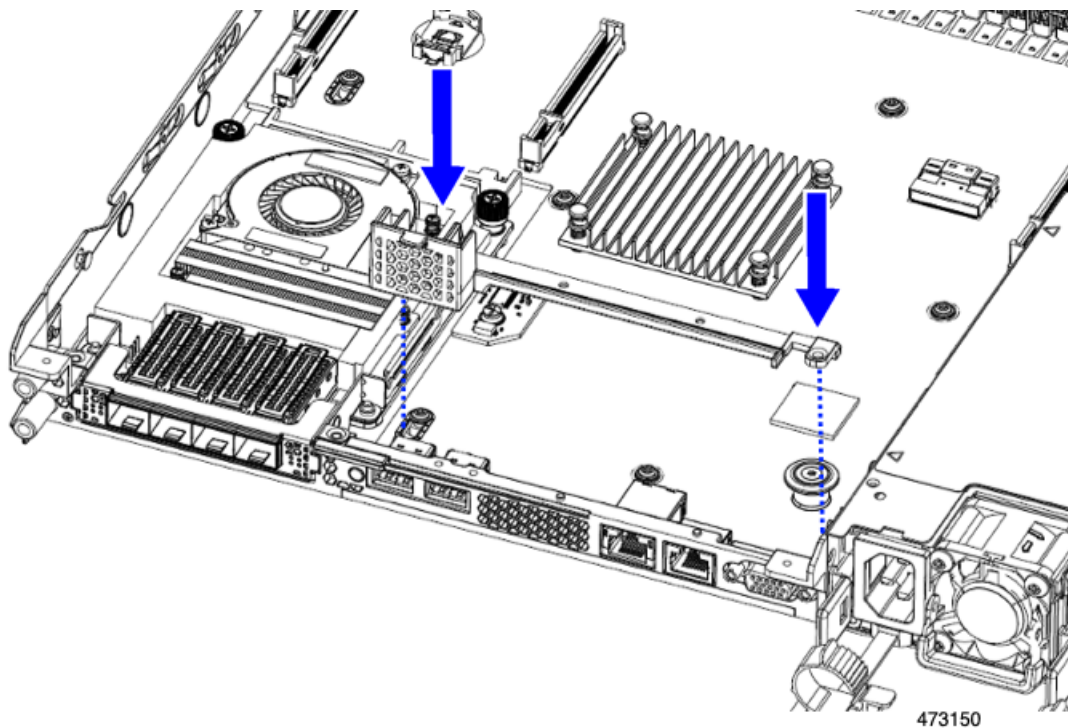
Before beginning this procedure, see [Required Equipment for Replacing Riser Cages, on page 58](#).

Step 1 Install the mLOM/OCP card bracket.



Step 2 Install the full-height rear wall.

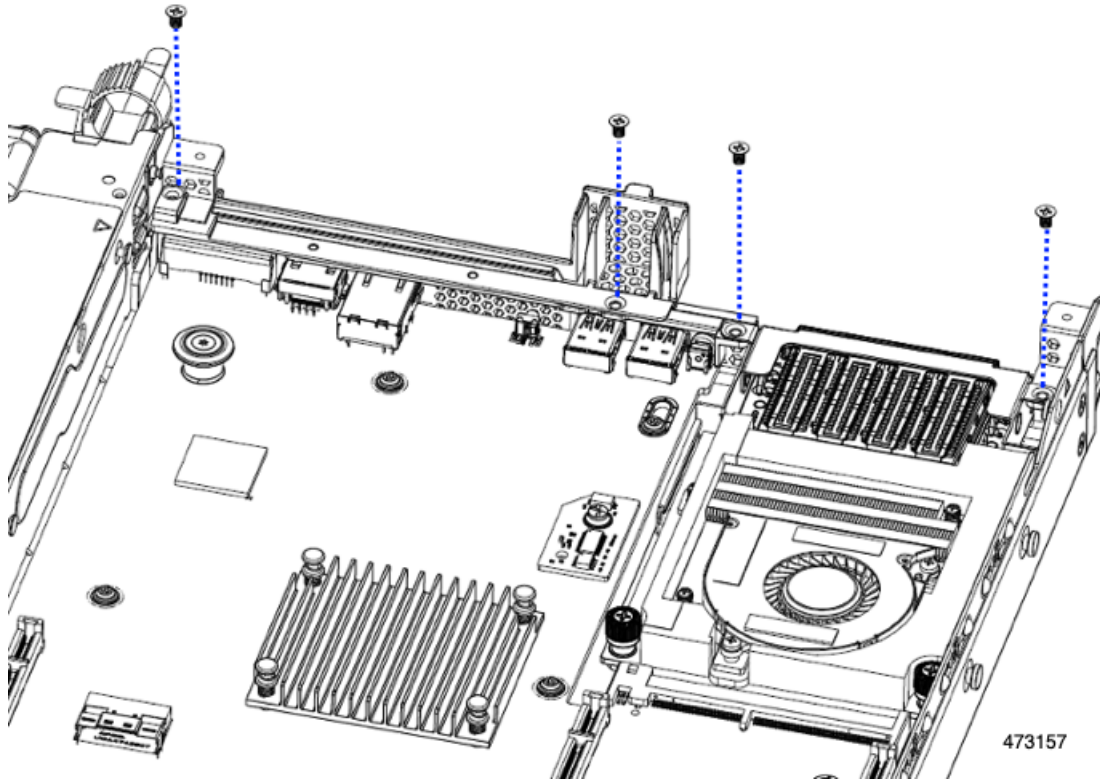
- Orient the full-height rear wall as shown, making sure the folded metal tab is facing up.
- Align the screw holes in the FH rear wall with the screw holes in the server sheet metal.
- Holding the rear wall level, seat onto the server sheet metal, making sure that the screw holes line up.



- Step 3** Using a #2 Phillips screwdriver, install the four screws that secure the mLOM/OCP card bracket and the FH rear wall to the server sheet metal.

Caution Tighten the screws to 4 lbs-in of torque. Do not over-tighten the screws or you risk stripping them.

Figure 29: Installing Securing Screws

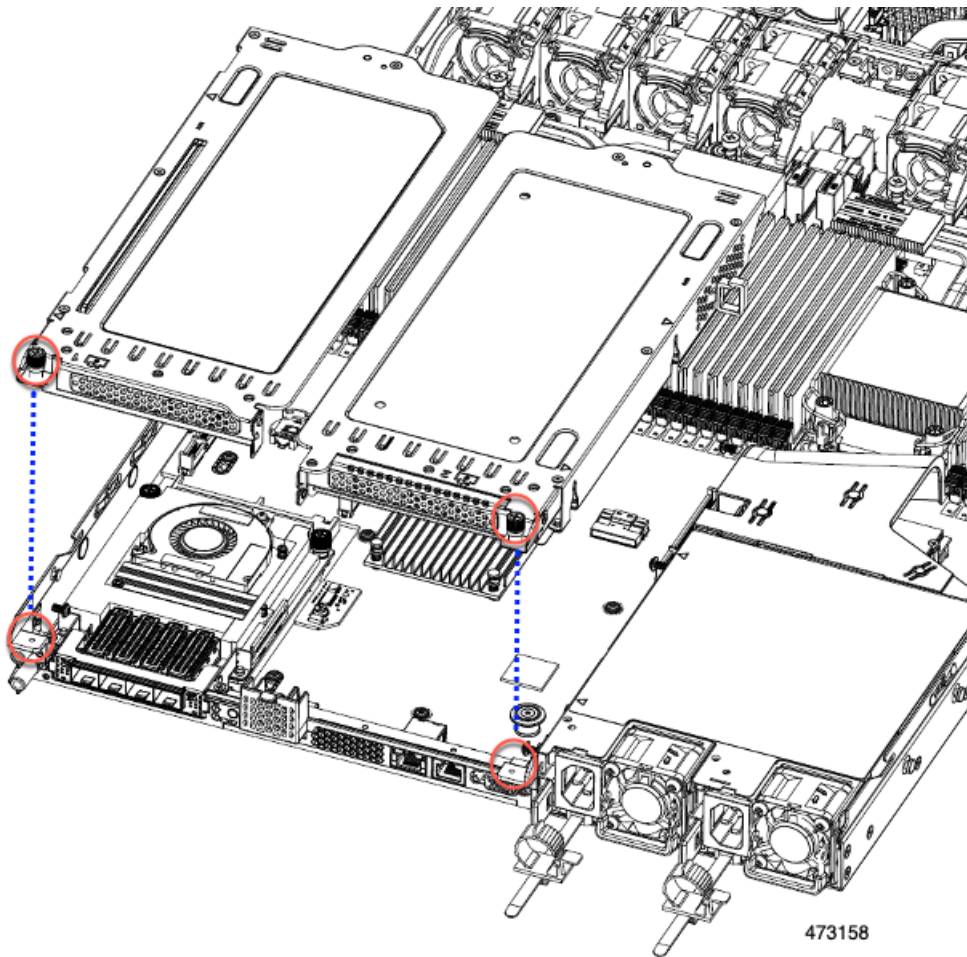


Step 4

Install the two full height riser cages.

- a) Align riser cages 1 and 2 over their PCIe slots, making sure that the captive thumbscrews are aligned with their screw holes.
- b) Holding each riser cage level, lower it into its PCIe slot, then tighten the thumbscrew by using a #2 Phillips screwdriver or your fingers.

Caution Tighten the screws to 4 lbs-in of torque. Do not over tighten the screws or you risk stripping them.



Step 5 Replace the server's top cover.

Removing Full Height Riser Cages

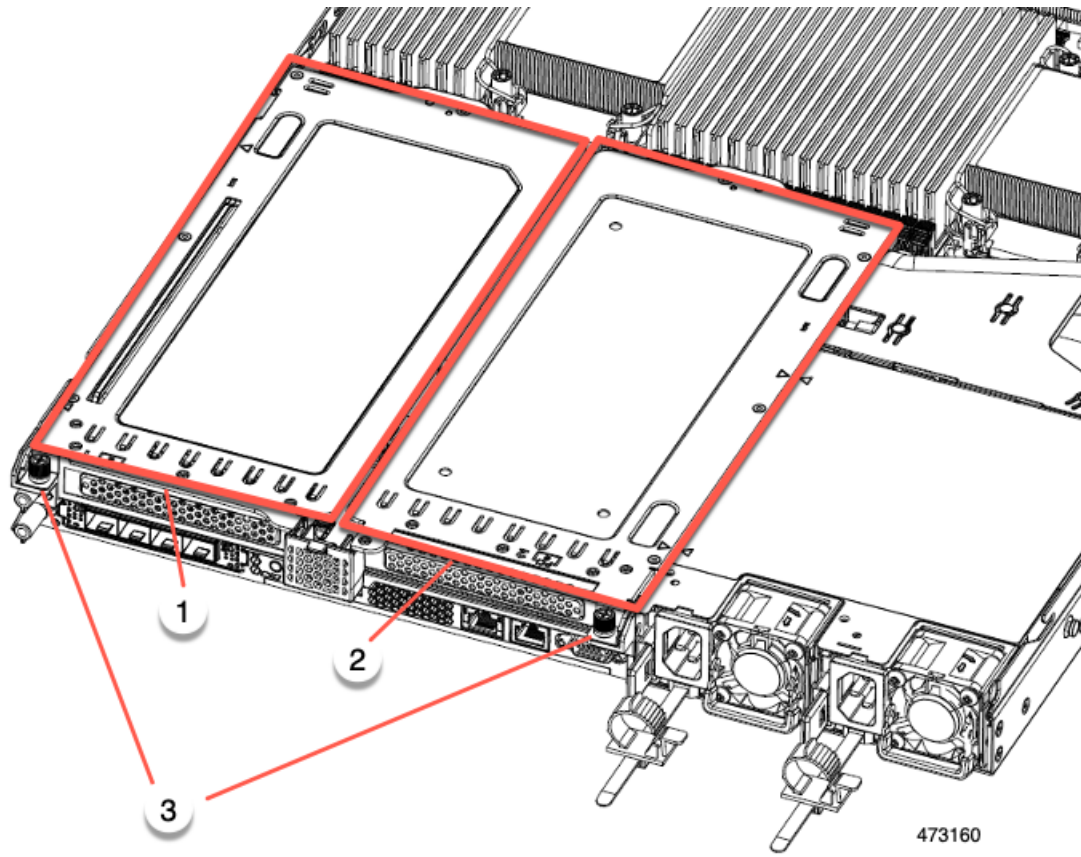
This task enables switching from 2 FH rear PCIe cages to 3 HH rear PCIe cages. To complete this procedure, make sure that you have the required equipment. See [Required Equipment for Replacing Riser Cages, on page 58](#).

Step 1 Remove the server top cover to gain access to the PCIe riser cages.

See [Removing Top Cover, on page 39](#).

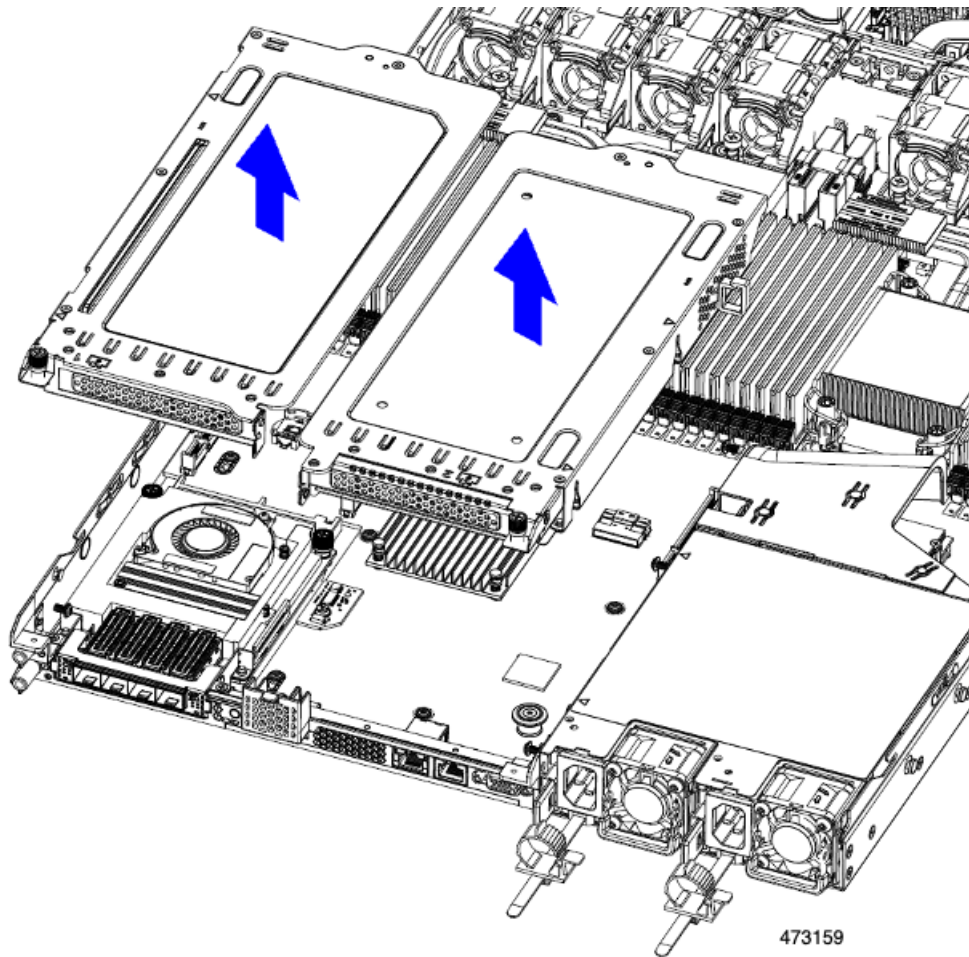
Step 2 Remove the two rear PCIe riser cages.

- a) Locate the riser cages.
- b) Using a #2 Phillips screwdriver or your fingers, for each riser cage, loosen its captive thumbscrew.



1	Rear Riser Cage 1	2	Rear Riser Cage 2
3	Riser Cage Thumbscrews, two total (one per riser cage)	-	

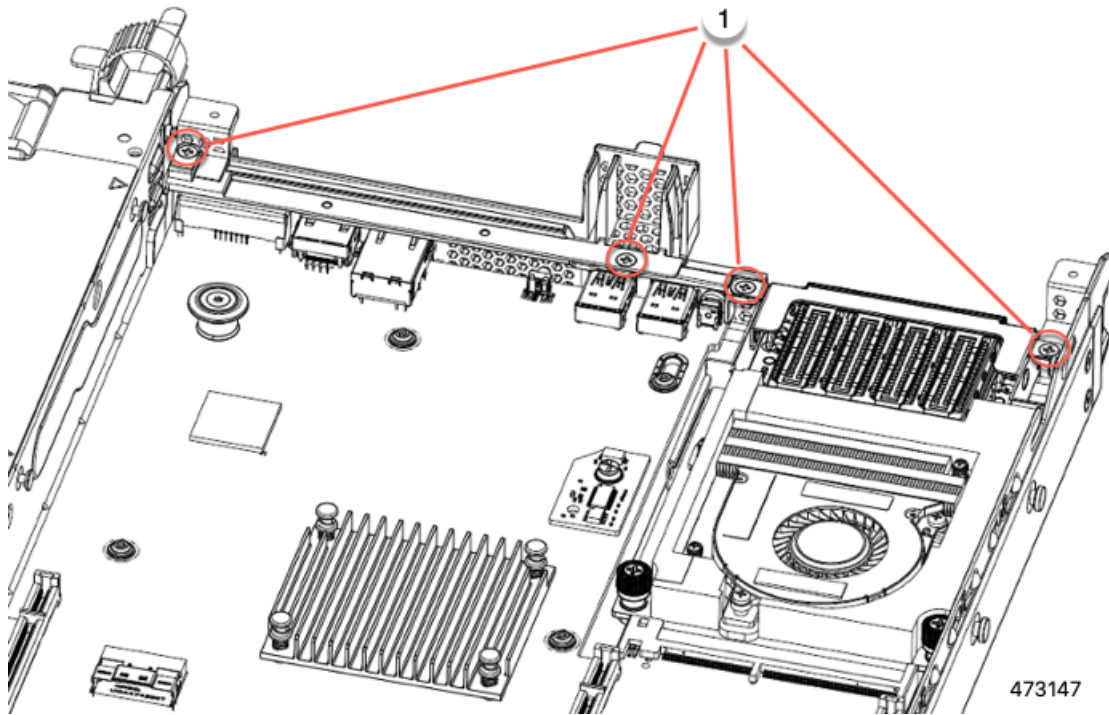
c) Lift the riser cages off of the server.



Step 3 Using a #2 Phillips screwdriver, remove the four screws that secure the full-height rear wall and mLOM/OCP card bracket to the chassis sheet metal.

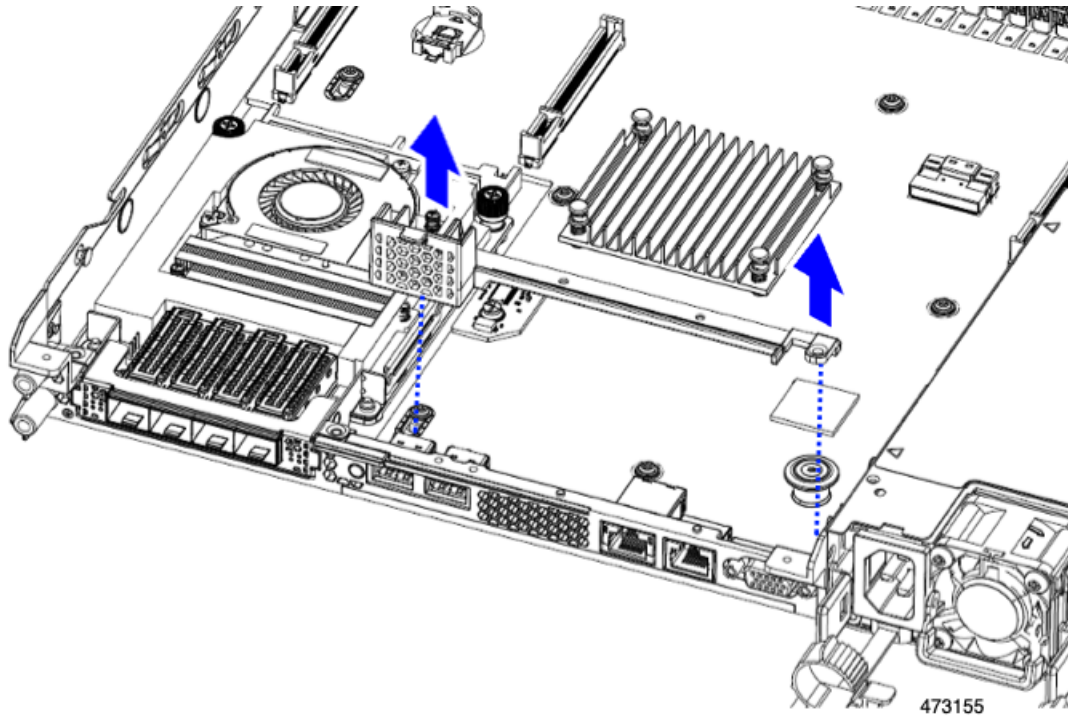
Note One of the screws is located behind the rear wall so it might be difficult to see when you are facing the server's rear riser slots.

Figure 30: Locations of Securing Screws



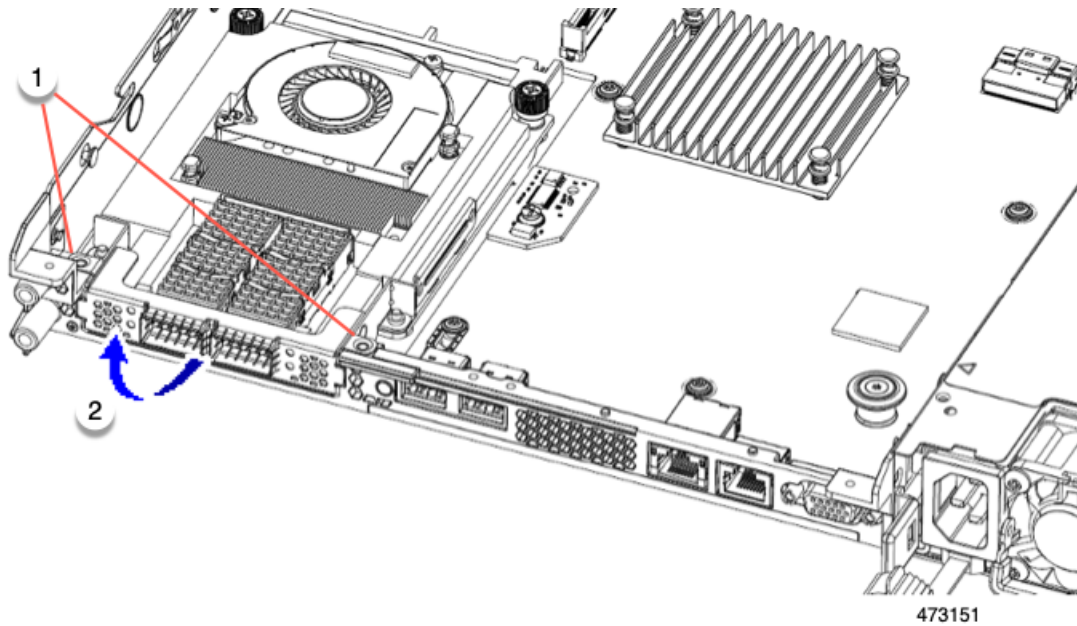
- Step 4** Remove the rear wall and mLOM/OCP card bracket.
- Grasp each end of the full height rear wall and remove it.

Figure 31: Removing the Full Height Rear Wall



b) Grasp each end of the mLOM/OCP card bracket and remove it.

Figure 32: Removing mLOM/OCP Card Bracket



Step 5 Save the FH riser cages and the full height rear wall.

What to do next

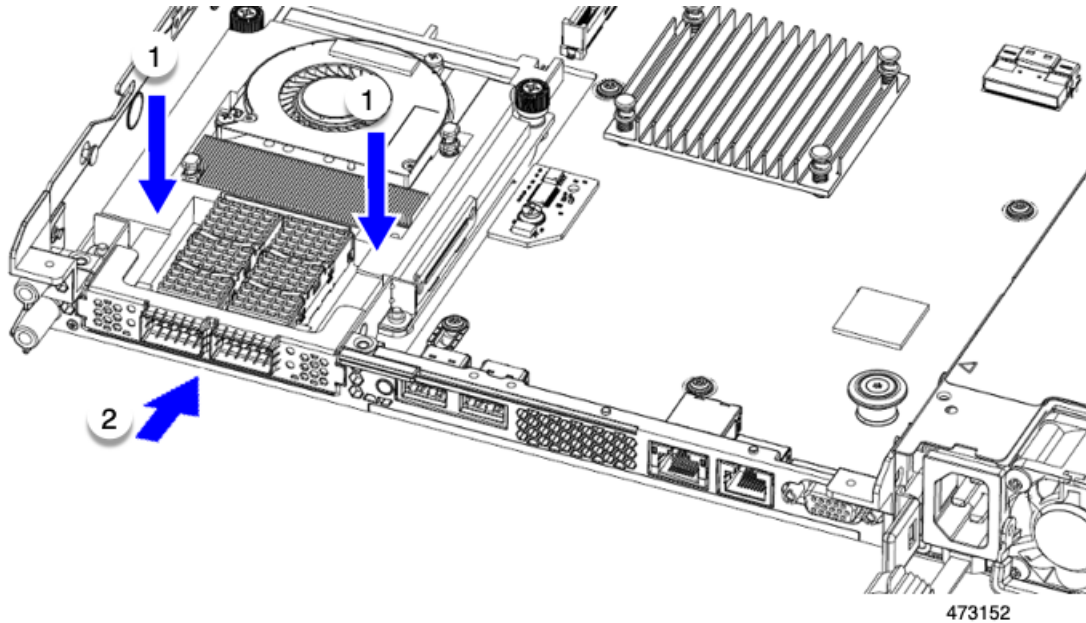
Install the two half-height riser cages. See [Installing Half Height Riser Cages, on page 62](#) .

Installing Half Height Riser Cages

Use this task to install 3 HH rear riser cages after 2 FH rear riser cages are removed.

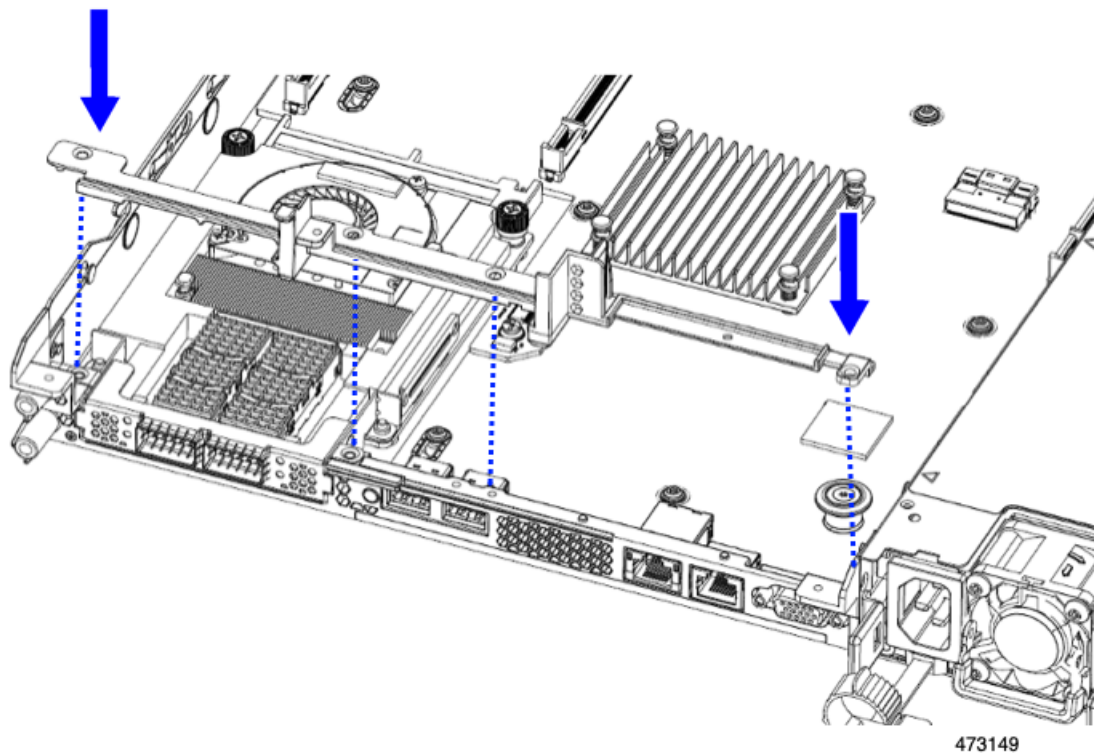
Before beginning this procedure, see [Required Equipment for Replacing Riser Cages, on page 58](#).

Step 1 Install the mLOM/OCP card bracket.



Step 2 Install the half-height rear wall.

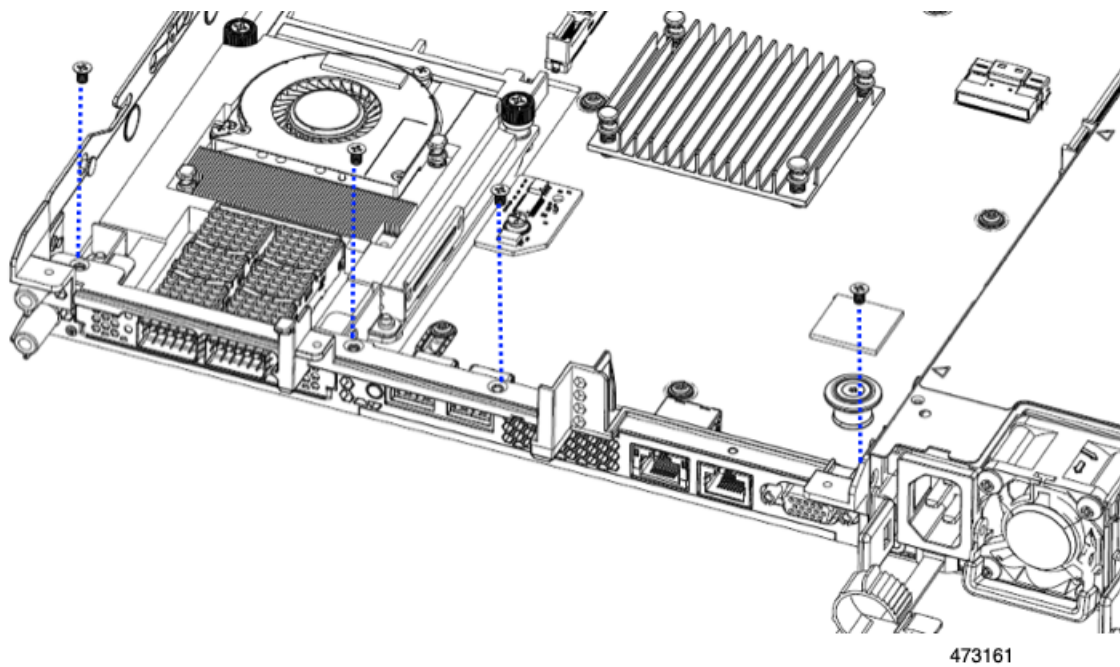
- Orient the half-height rear wall as shown, making sure the folded metal tab is facing up.
- Align the screw holes in the HH rear wall with the screw holes in the server sheet metal.
- Holding the rear wall level, seat onto the server sheet metal, making sure that the screw holes line up.



Step 3 Using a #2 Phillips screwdriver, install the four screws that secure the mLOM/OCP card bracket and the half-height rear wall to the server sheet metal.

Caution Tighten screws to 4 lbs-in. Do not over-tighten screws or you risk stripping them!

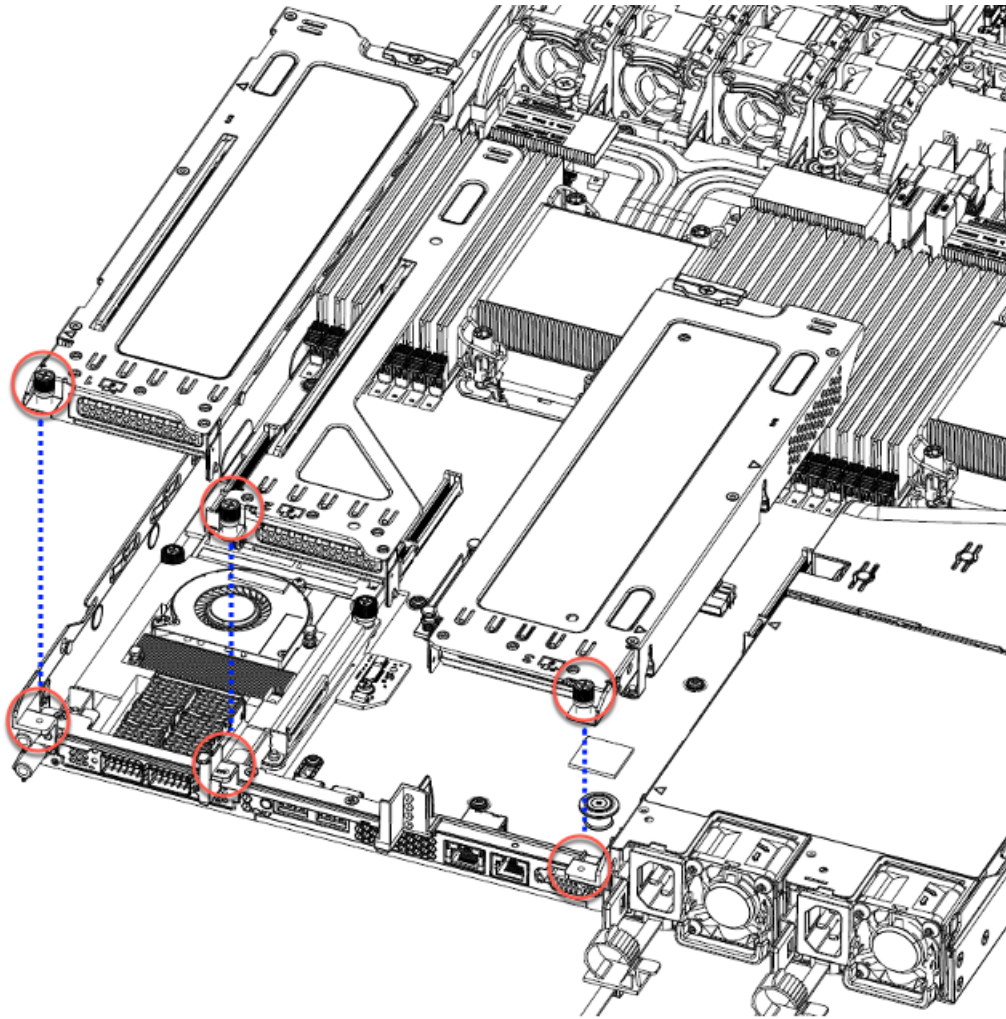
Figure 33: Installing Securing Screws, Facing Rear Riser Slots



Step 4

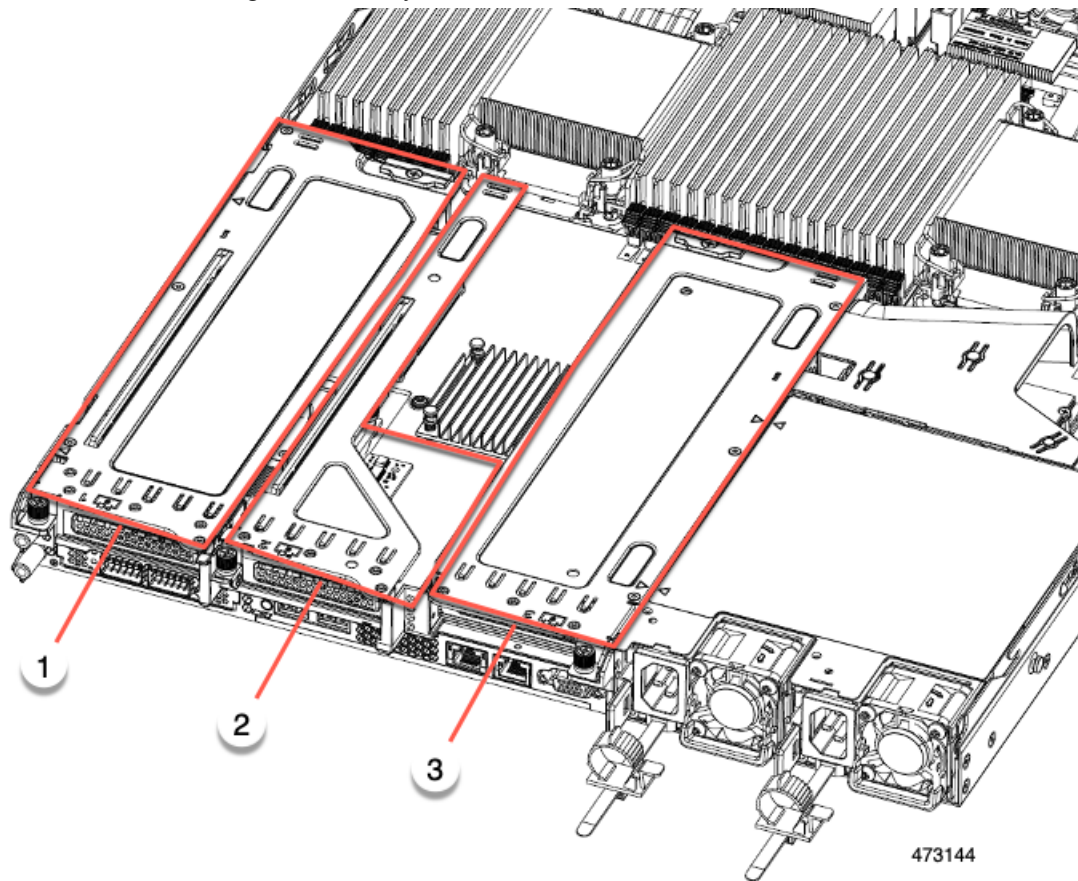
Install the three half-height riser cages.

- a) Align riser cages 1, 2, and 3 over their PCIe slots, making sure that the captive thumbscrews are aligned with their screw holes.
- b) Holding each riser cage level, lower it into its PCIe slot, then tighten the thumbscrew by using a #2 Phillips screwdriver or your fingers.



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Step 5 Ensure the three riser cages are securely seated on the motherboard.



Step 6 Replace the server's top cover.

Replacing CPUs and Heatsinks

This section contains CPU configuration rules and the procedure for replacing CPUs and heatsinks:

CPU Configuration Rules

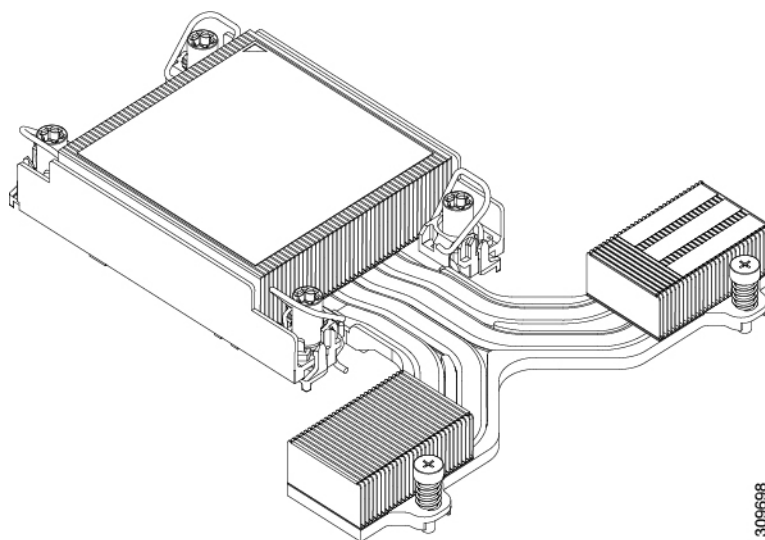
This server has two CPU sockets on the motherboard. Each CPU supports eight DIMM channels (16 DIMM slots). See [DIMM Slot Numbering](#), on page 113.

- The server can be configured with either Intel Xeon Fourth Generation Xeon Scalable Processors or Intel Fifth Generation Xeon Scalable Processors.

If your server is configured with, or if you will be upgrading to, Intel Fifth Generation Xeon Scalable Processors, an airflow baffle is required for optimal airflow (UCSC-AD-C220M7=). The baffle is orderable through Cisco.

- The server can operate with one CPU or two identical CPUs installed.
- The minimum configuration is that the server must have at least CPU 1 installed. Install CPU 1 first, and then CPU 2.

- The following restrictions apply when using a single-CPU configuration:
 - Any unused CPU socket must have the protective dust cover from the factory in place.
 - The maximum number of DIMMs is 16 (only CPU 1 channels A, B, C, D, E, F, G, and H).
 - In a single CPU server, up to 2HHHL or 1FHFL riser are supported. Riser 3 is not available.
 - Front-loading NVME drives are unavailable (they require CPU 2).
- One type of CPU heatsink is available for this server, the low profile heatsink (UCSC-HSLP-C220M7). This heatsink has four T30 Torx screws on the main heatsink, and 2 Phillips-head screws on the extended heatsink.



Tools Required For CPU Replacement

CPU Upgrade

If you are upgrading from Intel Fourth Generation Xeon Processors to Intel Fifth Generation Xeon Processors, a new air baffle is required to ensure optimal airflow. To upgrade the CPUs, you must order the baffle separately (UCSC-AD-C220M7=) and replace the existing baffle with the new one (UCSC-AD-C220M7=).

However, if you will continue to use Intel Fourth Generation Xeon Processors, you do not need to order the new airflow baffle. You must use the existing airflow baffle.

To upgrade the server's CPU(s), you also need the standard set of tools in CPU Replacement below.

CPU Replacement

For all CPU replacement, installation, or upgrades, the following tools are required:

- T-30 Torx driver—Supplied with replacement CPU.
- #1 flat-head screwdriver—Supplied with replacement CPU.
- #2 Phillips screwdriver.
- CPU assembly tool—Supplied with replacement CPU. Orderable separately as Cisco PID UCS-CPUAT=.

- Heatsink cleaning kit—Supplied with replacement CPU. Orderable separately as Cisco PID UCSX-HSCK=.

One cleaning kit can clean up to four CPUs.

- Thermal interface material (TIM)—Syringe supplied with replacement CPU. Use only if you are reusing your existing heatsink (new heatsinks have a pre-applied pad of TIM). Orderable separately as Cisco PID UCS-CPU-TIM=.

One TIM kit covers one CPU.

See also [Additional CPU-Related Parts to Order with RMA Replacement CPUs, on page 97](#).

Removing CPUs and Heat Sinks

Use the following procedure to remove an installed CPU and heatsink from the server. With this procedure, you will remove the CPU from the motherboard, disassemble individual components, then place the CPU and heatsink into the fixture that came with the CPU.

Step 1 Remove any airflow baffle to expose the components.

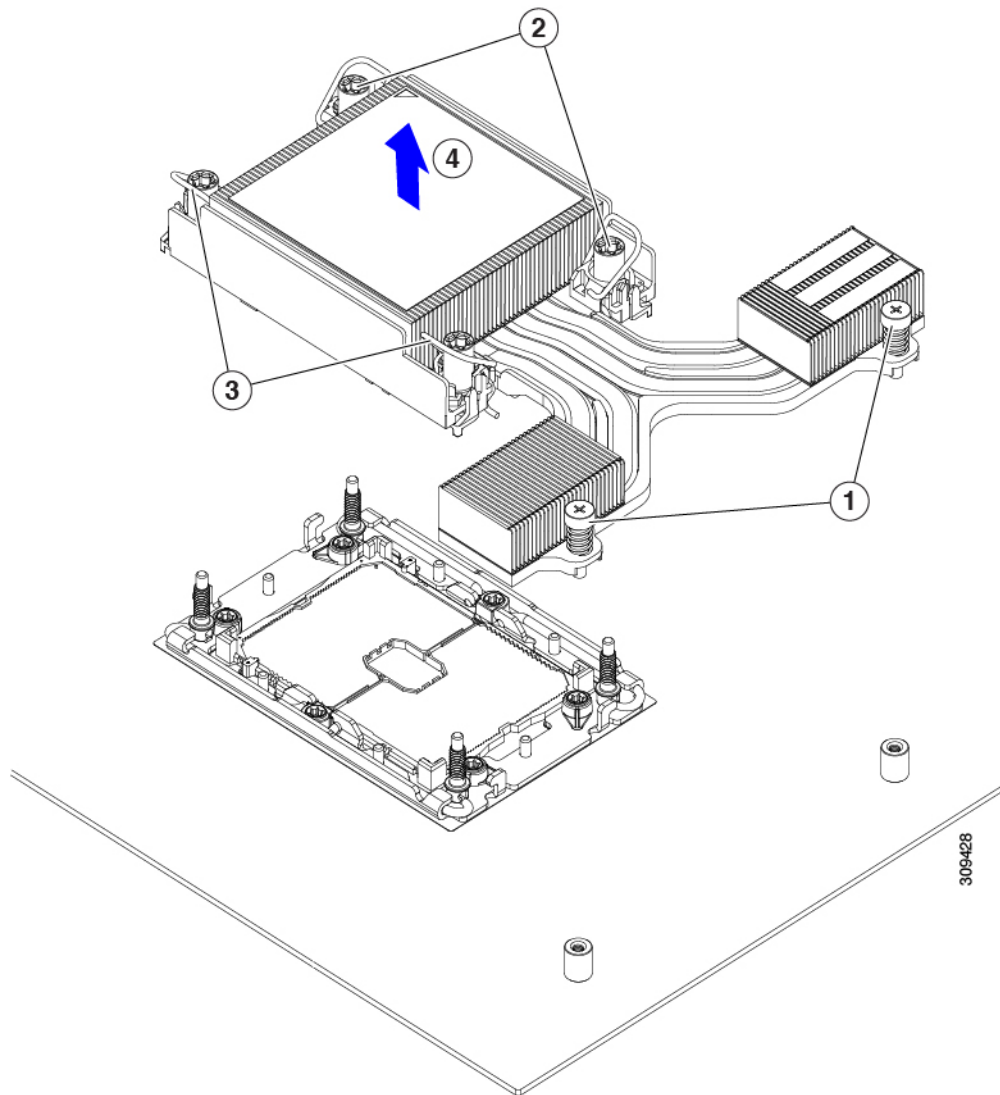
Step 2 Detach the CPU and heatsink (the CPU assembly) from the CPU socket.

- a) Using a #2 Phillips screwdriver, loosen the two captive screws at the far end of the heatsink.
- b) Using a T30 Torx driver, loosen all the securing nuts.
- c) Push the rotating wires towards each other to move them to the unlocked position. The rotating wire locked and unlocked positions are labeled on the top of the heatsink.

Caution Make sure that the rotating wires are as far inward as possible. When fully unlocked, the bottom of the rotating wire disengages and allows the removal of the CPU assembly. If the rotating wires are not fully in the unlocked position, you can feel resistance when attempting to remove the CPU assembly.

- d) Grasp the heatsink along the edge of the fins and lift the CPU assembly off of the motherboard.

Caution While lifting the CPU assembly, make sure not to bend the heatsink fins. Also, if you feel any resistance when lifting the CPU assembly, verify that the rotating wires are completely in the unlocked position.



Step 3 Put the CPU assembly on a rubberized mat or other ESD-safe work surface.

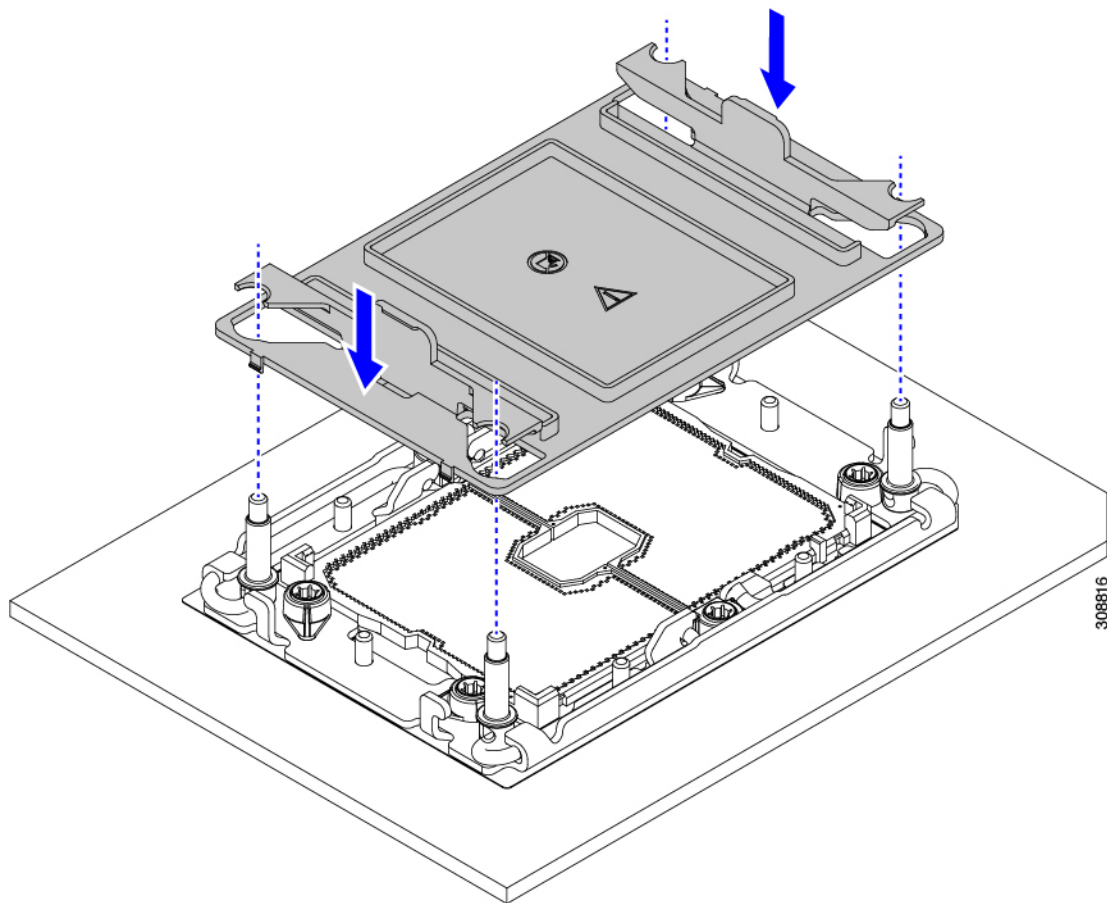
When placing the CPU on the work surface, the heatsink label should be facing up. Do not rotate the CPU assembly upside down.

Ensure that the heatsink sits level on the work surface.

Step 4 Attach a CPU dust cover to the CPU socket.

- Align the posts on the CPU bolstering plate with the cutouts at the corners of the dust cover.
- Lower the dust cover and simultaneously press down on the edges until it snaps into place over the CPU socket.

Caution Do not press down in the center of the dust cover!



Step 5 Detach the CPU from the CPU carrier.

- a) Turn the CPU assembly upside down, so that the heatsink is pointing down.

This step enables access to the CPU securing clips.

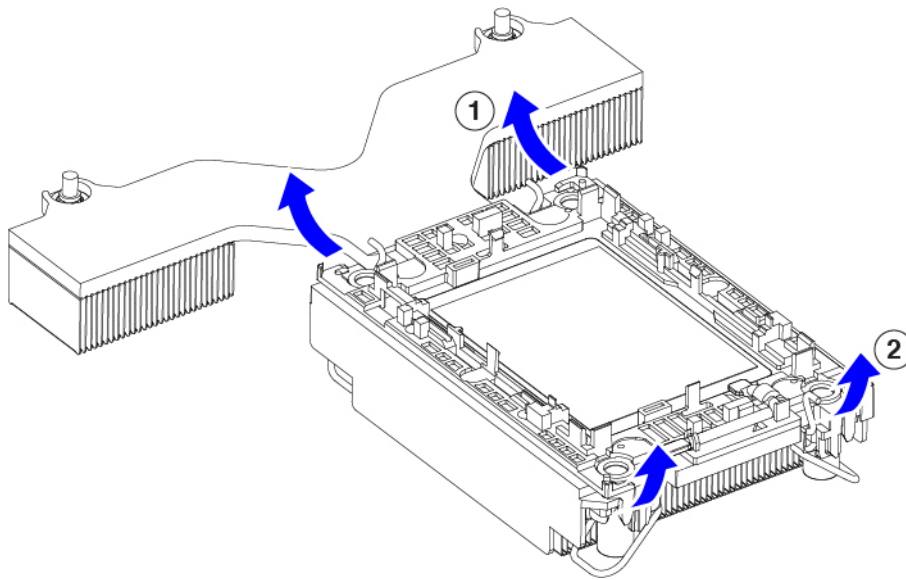
- b) Gently lift the TIM breaker (1 in the following illustration) in a 90-degree upward arc to partially disengage the CPU clips on this end of the CPU carrier.
- c) Lower the TIM breaker into the u-shaped securing clip to allow easier access to the CPU carrier.

Note Make sure that the TIM breaker is completely seated in the securing clip.

- d) Gently pull up on the extended edge of the CPU carrier (1) so that you can disengage the second pair of CPU clips near both ends of the TIM breaker.

Caution Be careful when flexing the CPU carrier! If you apply too much force you can damage the CPU carrier. Flex the carrier only enough to release the CPU clips. Make sure to watch the clips while performing this step so that you can see when they disengage from the CPU carrier.

- e) Gently pull up on the opposite edge of the CPU carrier (2) so that you can disengage the pair of CPU clips.



Step 6 When all the CPU clips are disengaged, grasp the carrier, and lift it and the CPU to detach them from the heatsink.

Note If the carrier and CPU do not lift off of the heatsink, attempt to disengage the CPU clips again.

Step 7 Use the provided cleaning kit (UCSX-HSCK) to remove all of the thermal interface barrier (thermal grease) from the CPU, CPU carrier, and heatsink.

Important Make sure to use only the Cisco-provided cleaning kit, and make sure that no thermal grease is left on any surfaces, corners, or crevices. The CPU, CPU carrier, and heatsink must be completely clean.

Step 8 Transfer the CPU and carrier to the fixture.

- a) Flip the CPU and carrier right-side up.
- b) Align the CPU and carrier with the fixture.
- c) Lower the CPU and CPU carrier onto the fixture.

What to do next

Choose the appropriate option:

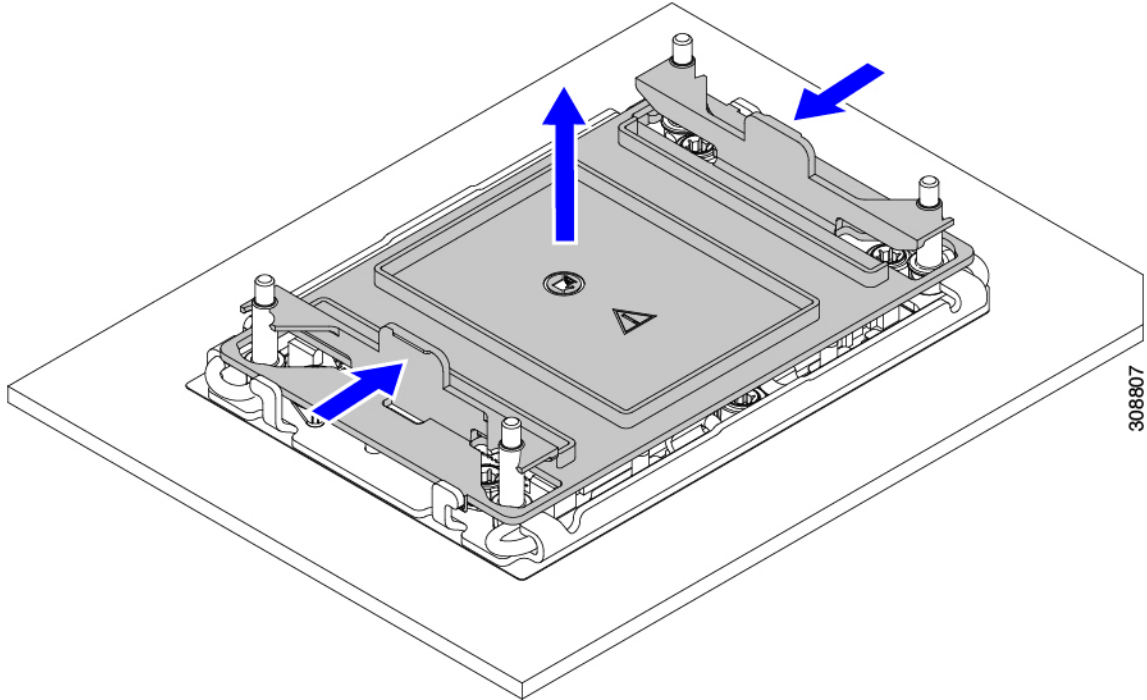
- If you will be installing a CPU, go to [Installing the CPUs and Heatsinks, on page 94](#).
- If you will not be installing a CPU, verify that a CPU socket cover is installed. This option is valid only for CPU socket 2 because CPU socket 1 must always be populated in a runtime deployment.

Installing the CPUs and Heatsinks

Use this procedure to install a CPU if you have removed one, or if you are installing a CPU in an empty CPU socket. To install the CPU, you will move the CPU to the fixture, then attach the CPU assembly to the CPU socket on the server mother board.

Step 1 Remove the CPU socket dust cover on the server motherboard.

- a) Push the two vertical tabs inward to disengage the dust cover.
- b) While holding the tabs in, lift the dust cover up to remove it.



- c) Store the dust cover for future use.

Caution Do not leave an empty CPU socket uncovered. If a CPU socket does not contain a CPU, you must install a CPU dust cover.

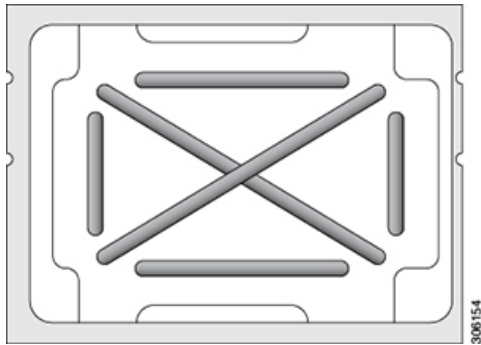
Step 2 Grasp the CPU fixture on the edges labeled PRESS, lift it out of the tray, and place the CPU assembly on an ESD-safe work surface.

Step 3 Apply new TIM.

Note The heatsink must have new TIM on the heatsink-to-CPU surface to ensure proper cooling and performance.

- If you are installing a new heatsink, it is shipped with a pre-applied pad of TIM. Go to step 4.
 - If you are reusing a heatsink, you must remove the old TIM from the heatsink and then apply new TIM to the CPU surface from the supplied syringe. Continue with step a below.
- a) Apply the Bottle #1 cleaning solution that is included with the heatsink cleaning kit (UCSX-HSCK=), as well as the spare CPU package, to the old TIM on the heatsink and let it soak for at least 15 seconds.
 - b) Wipe all of the TIM off the heatsink using the soft cloth that is included with the heatsink cleaning kit. Be careful to avoid scratching the heatsink surface.
 - c) Completely clean the bottom surface of the heatsink using Bottle #2 to prepare the heatsink for installation.
 - d) Using the syringe of TIM provided with the new CPU (UCS-CPU-TIM=), apply 1.5 cubic centimeters (1.5 ml) of thermal interface material to the top of the CPU. Use the pattern shown in the following figure to ensure even coverage.

Figure 34: Thermal Interface Material Application Pattern



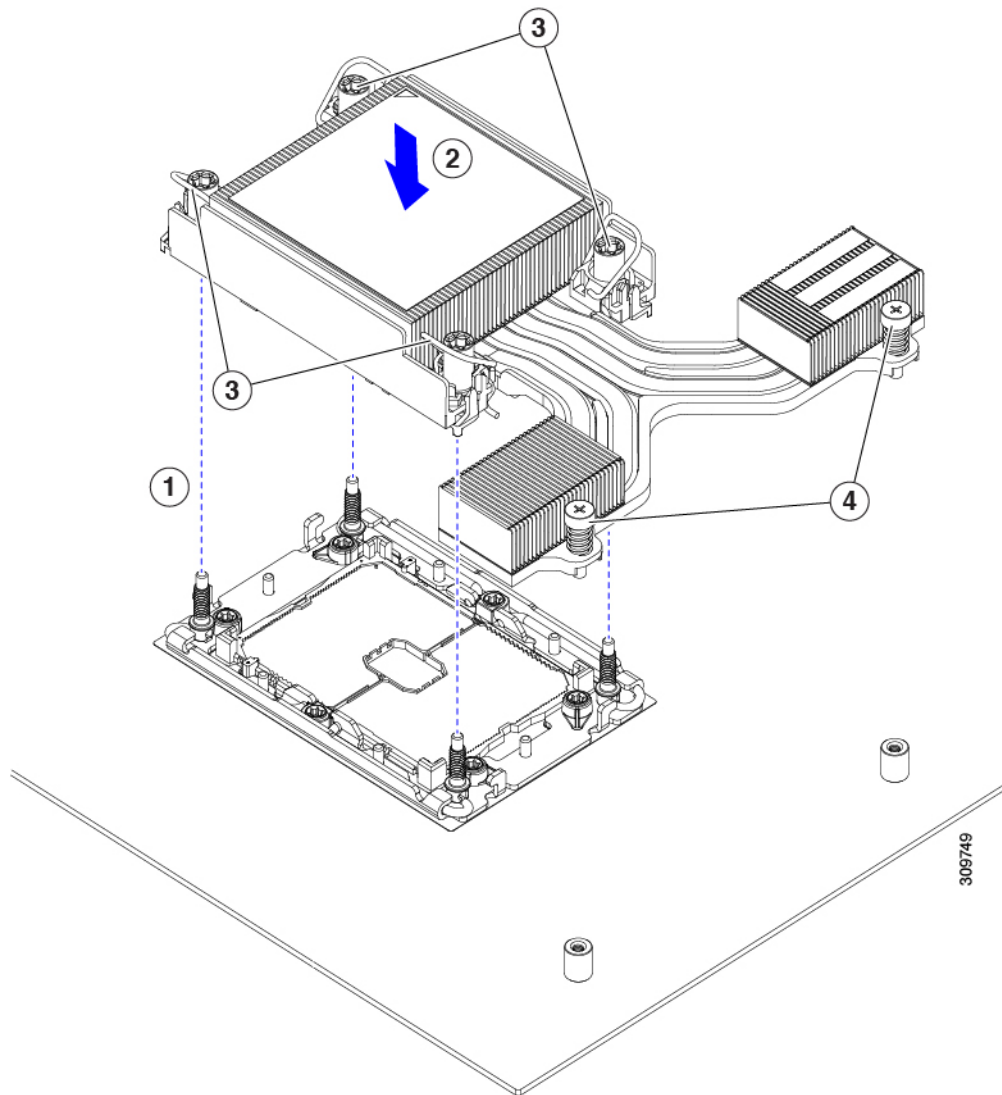
Caution Use only the correct heatsink for your CPU (UCSC-HSLP-C220M7).

Step 4 Attach the heatsink to the socket.

- a) Align the CPU and heatsink.
- b) Lower the heatsink onto the CPU.
- c) Close the rotating wires to lock the heatsink into place on the TIM grease.

Step 5 Install the CPU to the motherboard.

- a) Push the rotating wires to the unlocked position so that they do not obstruct installation.
- b) Holding the CPU by the fins, align it with the posts on the socket.
- c) Lower the CPU onto the motherboard socket.
- d) Set the T30 Torx driver to 12 in-lb of torque and tighten the 4 securing nuts to secure the CPU to the motherboard (3) first. Then, set the torque driver to 6 in-lb of torque and tighten the two Phillips head screws for the extended heatsink (4).



Step 6 For servers that have Intel Fifth Generation Xeon Scalable Processors, install the new air duct (UCSC-AD-C220M7=).

Additional CPU-Related Parts to Order with RMA Replacement CPUs

When a return material authorization (RMA) of the CPU is done on a Cisco UCS C-Series server, additional parts might not be included with the CPU spare. The TAC engineer might need to add the additional parts to the RMA to help ensure a successful replacement.



Note The following items apply to CPU *replacement* scenarios. If you are replacing a system chassis and *moving* existing CPUs to the new motherboard, you do not have to separate the heatsink from the CPU.

- Scenario 1—You are reusing the existing heatsinks:

- Heatsink cleaning kit (UCSX-HSCK=)
One cleaning kit can clean up to four CPUs.
- Thermal interface material (TIM) kit for M7 servers (UCS-CPU-TIM=)
One TIM kit covers one CPU.

- Scenario 2—You are replacing the existing heatsink:
 - Heatsink: UCSC-HSLP-C220M7
New heatsinks have a pre-applied pad of TIM.
 - Heatsink cleaning kit (UCSX-HSCK=)
One cleaning kit can clean up to four CPUs.

- Scenario 3—You have a damaged CPU carrier (the plastic frame around the CPU):
 - CPU Carrier
 - #1 flat-head screwdriver (for separating the CPU from the heatsink)
 - Heatsink cleaning kit (UCSX-HSCK=)
One cleaning kit can clean up to four CPUs.
 - Thermal interface material (TIM) kit (UCS-CPU-TIM=)
One TIM kit covers one CPU.

A CPU heatsink cleaning kit is good for up to four CPU and heatsink cleanings. The cleaning kit contains two bottles of solution, one to clean the CPU and heatsink of old TIM and the other to prepare the surface of the heatsink.

New heatsink spares come with a pre-applied pad of TIM. It is important to clean any old TIM off of the CPU surface prior to installing the heatsinks. Therefore, even when you are ordering new heatsinks, you must order the heatsink cleaning kit.

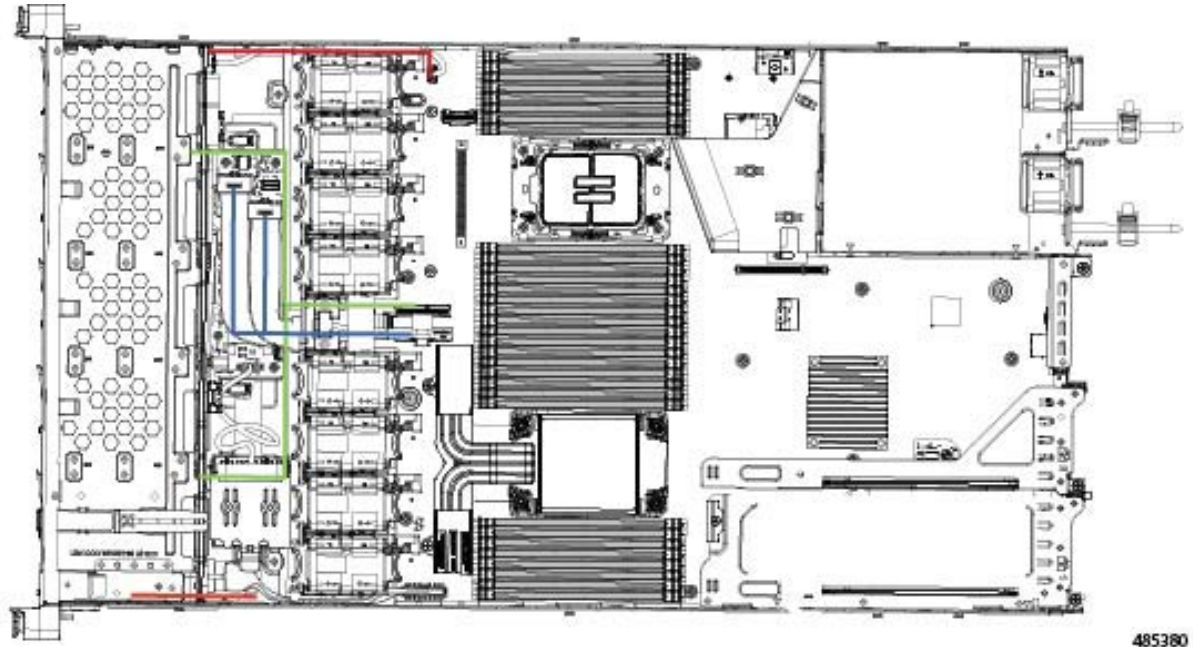
Cabling For Raid Cards

The server has single and dual controllers for RAID cards. The following topics show cabling diagrams for supported RAID card configuration.

Cisco Trimode M1 24G RAID Controller W/4G FBWC (16 Drives)

The following diagram shows cabling pertinent to a Cisco Trimode M1 24G RAID Controller W/4G FBWC (16 Drives) (UCS-RAID-M1L16) configuration with front-loading SAS drives, four front-loading x4 NVMe drives.

Figure 35: Cisco Trimode M1 24G RAID Controller W/4G FBWC (16 Drives) - Cabling Diagram



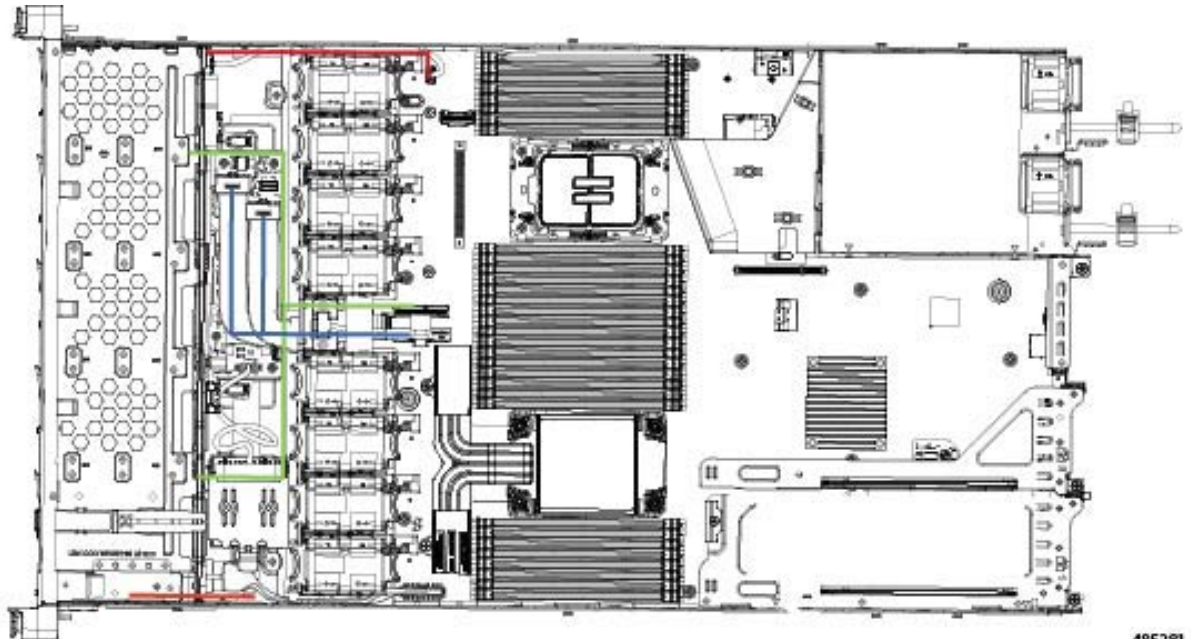
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Cable	Color	Cisco Part Number	Notes
MCIO cable (Y cable x16 to x8 + x8)	Light Green		The single-connector end of the cable connects to the P-2 motherboard connector near rear riser 3. The dual-connector end of the cable connects to the NVME-B and NVME-D connectors on the HDD backplane.
MCIO cable (Y cable x16 to x8 + x8)	Blue		The single-connector end of the cable connects to the P2 connector on the motherboard near the rear riser. The dual-connector end of the cable connects to RAID controller2/HBA2.
HDD backplane CFG cable	Ruby Red		Connects motherboard to HDD backplane
HDD Backplane Power cable	Red		

Cisco Trimode M1 24G HBA Controller (16 Drives)

The following diagram shows cabling pertinent to a Cisco Trimode M1 24G HBA Controller (16 Drives) (UCS-HBA-M1L16) configuration with front-loading drives.

Figure 36: Cisco Trimode M1 24G HBA Controller (16 Drives) - Cabling Diagram



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Cable	Color	Cisco Part Number	Notes
MCIO cable (Y cable x16 to x8 + x8)	Light Green		The single-connector end of the cable connects to the P-2 motherboard connector near rear riser 3. The dual-connector end of the cable connects to the NVME-B and NVME-D connectors on the HDD backplane.
MCIO cable (Y cable x16 to x8 + x8)	Blue		The single-connector end of the cable connects to the P2 connector on the motherboard near the rear riser. The dual-connector end of the cable connects to RAID controller2/HBA2.
HDD backplane CFG cable	Ruby Red		Connects motherboard to HDD backplane

Cable	Color	Cisco Part Number	Notes
HDD Backplane Power cable	Red		

Replacing RAID Cards and Cables

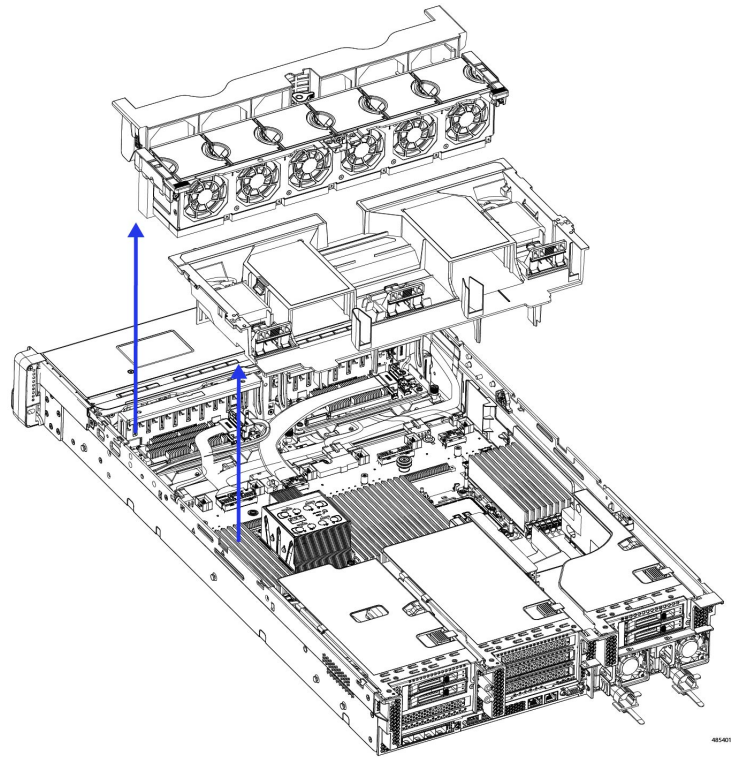
Cisco Trimode M1 24G RAID Controller W/4G FBWC (16 Drives)

Replacing Cisco Trimode M1 24G RAID Controller W/4GB FBWC 16 Drives

The RAID card is located in the front of the server. This process requires you to disconnect the RAID cables from the card and motherboard before removing the RAID card.

Step 1 Remove Fan Module from the server.

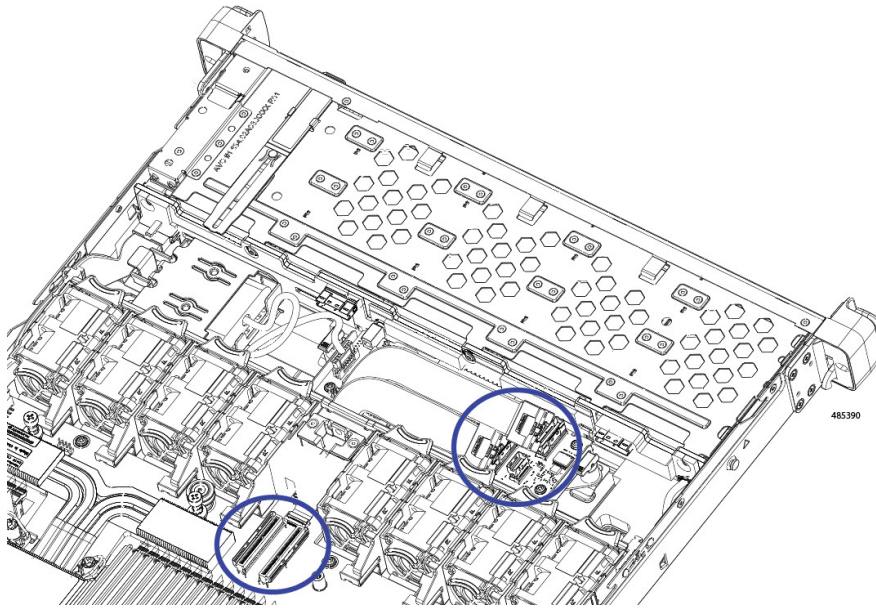
Figure 37: Remove Fan Module AND Air Baffle



Step 2 Release cables from RAID card.

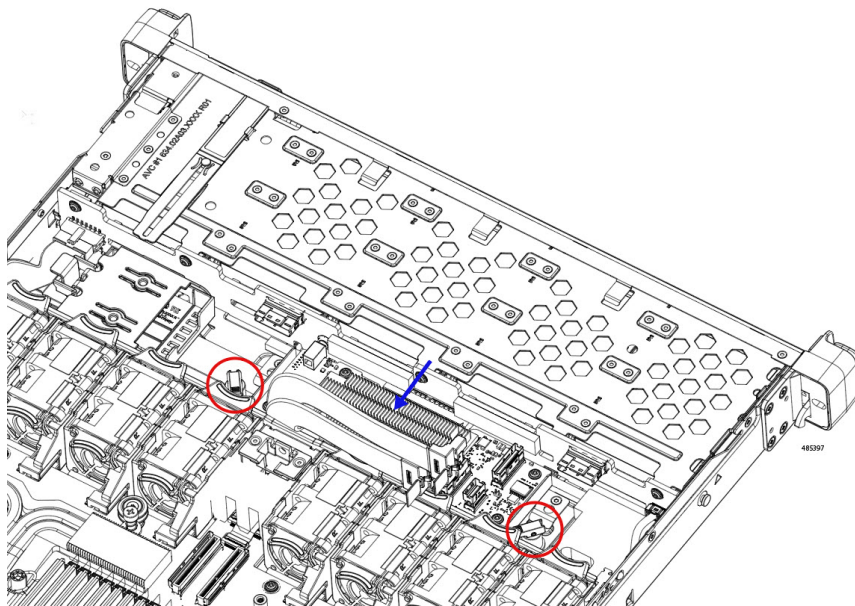
- a) Locate the RAID card cables connected to the RAID card.
- b) Unclip the connector cables from the RAID card.

Figure 38: Disconnect RAID Card Cables



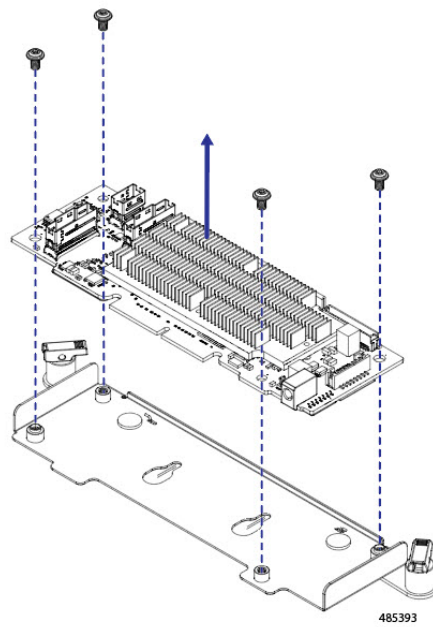
Step 3 Rotate the ejector handles counter-clock wise and lift. You can now remove the RAID module.

Figure 39: Disconnect RAID Card from Motherboard



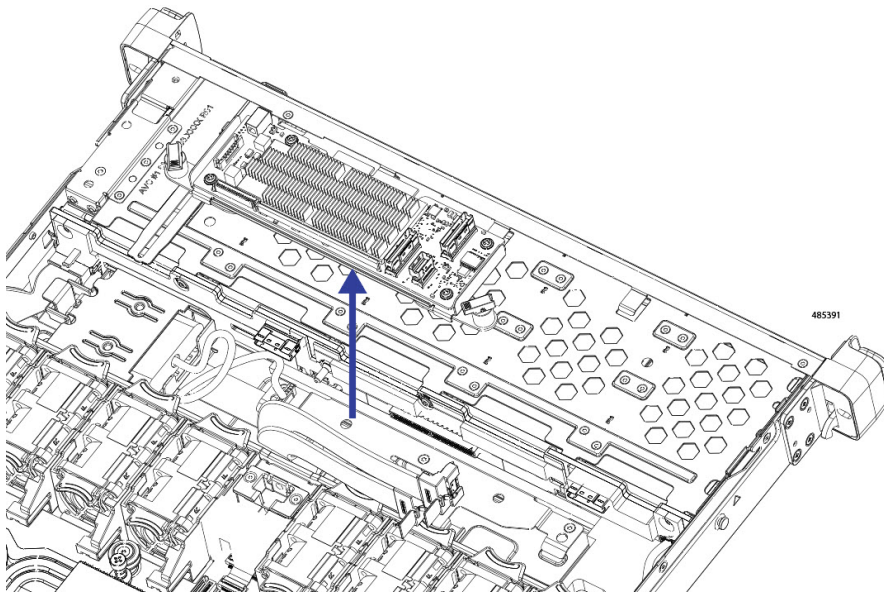
a) Remove the screws that connects to the RAID from the card chassis.

Figure 40: Remove RAID Card from chassis



Step 4 Remove the RAID module from the server motherboard.

Figure 41: RAID Card Removed from Server Motherboard



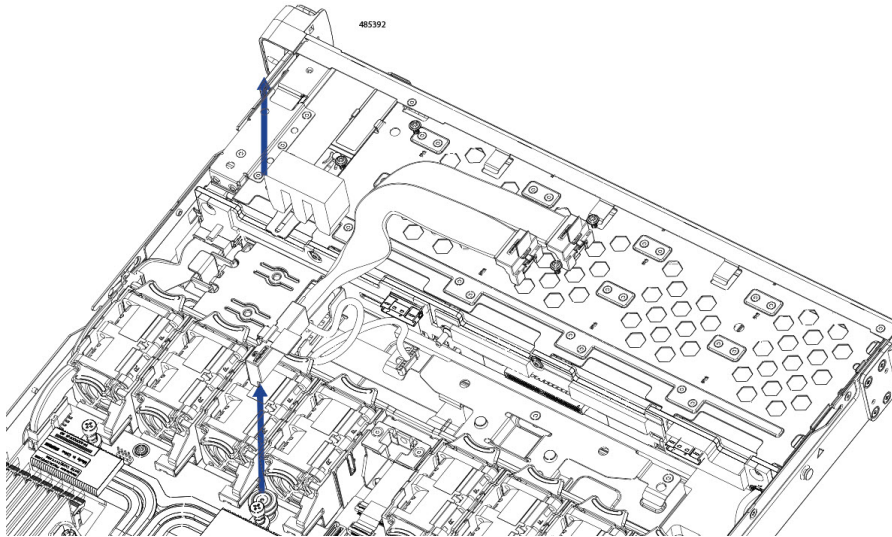
Step 5 Remove Sponge from the server.

- a) Lift the sponge holding the connector cables out of the way.

Step 6 Release the connector cables.

- a) Unclip the connector cables from the server motherboard.

Figure 42: Removing RAID Card Connector Cables



What to do next

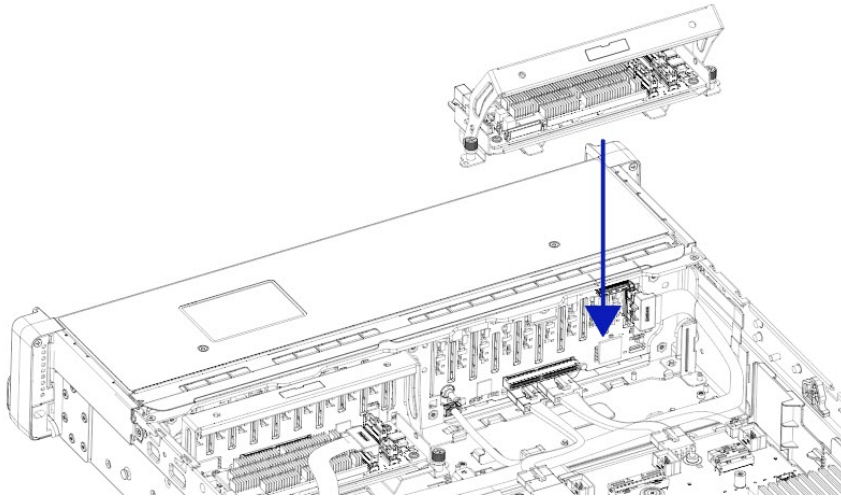
Replace RAID Modules and Cables if needed.

Installing Cisco Trimode M1 24G RAID Controller W/4GB FBWC (16 Drives)

Make sure you have the RAID Cards and connector cables.

-
- Step 1** Install the right-side RAID module from the motherboard.
- Open RAID card tray module handle.
 - Insert RAID card.
 - Tighten the thumb screws from each side of the module.

Figure 43: Install Right-Side RAID Card Module



- Step 2** Attach RAID module cables.
- Step 3** Install the left-side RAID module from the server.
- a) Open RAID card tray module handle.
 - b) Insert RAID card.
 - c) Tighten the thumb screws from each side of the module.
- Step 4** Attach RAID module cables.

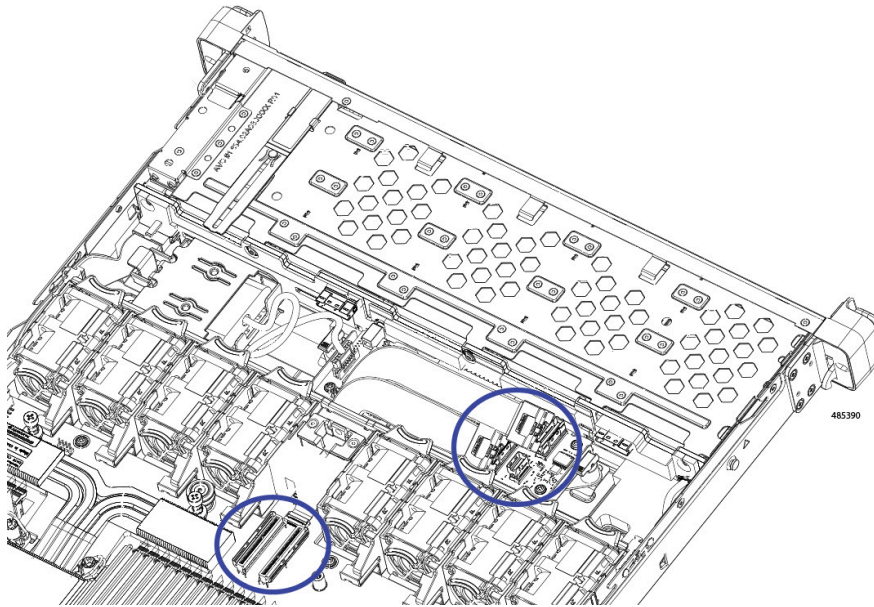
What to do next

Make sure all cables and connections are secure.

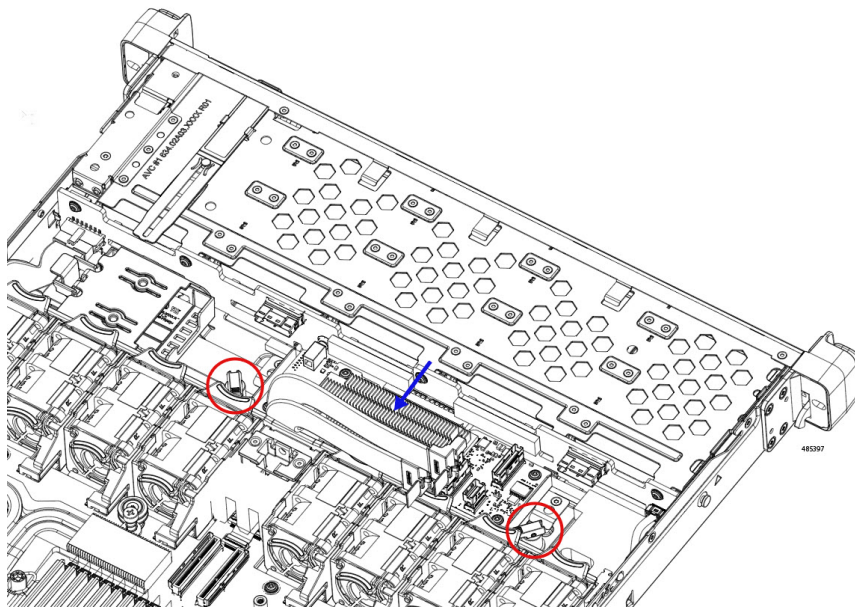
Cisco Trimode M1 24G HBA Controller (16 Drives)

Removing Cisco Trimode M1 24G HBA Controller (16 Drives)

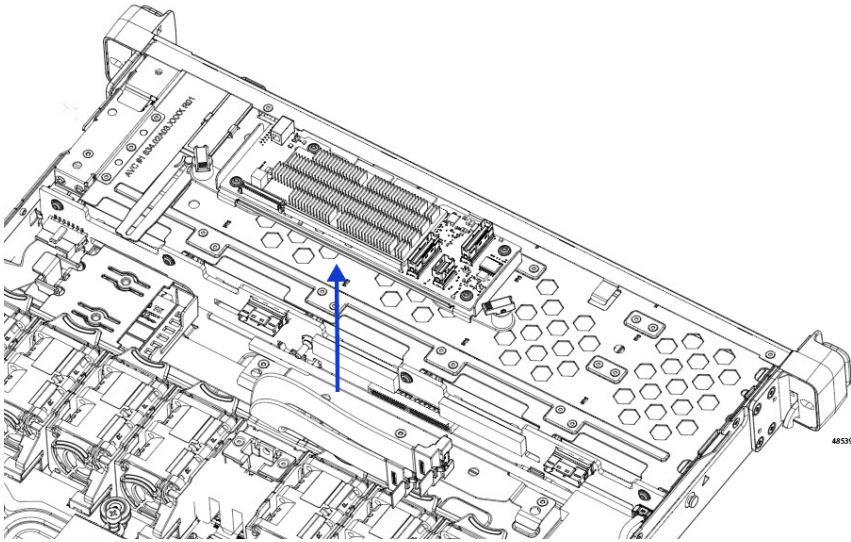
- Step 1** Disconnect the cable connector from the motherboard.



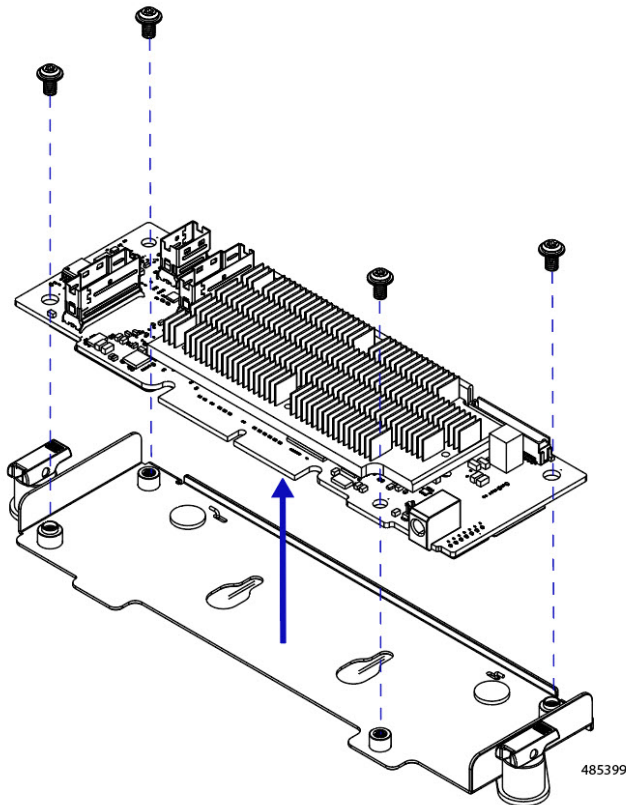
Step 2 Turn the ejector handle to release the RAID module and remove the tray from the mother board.



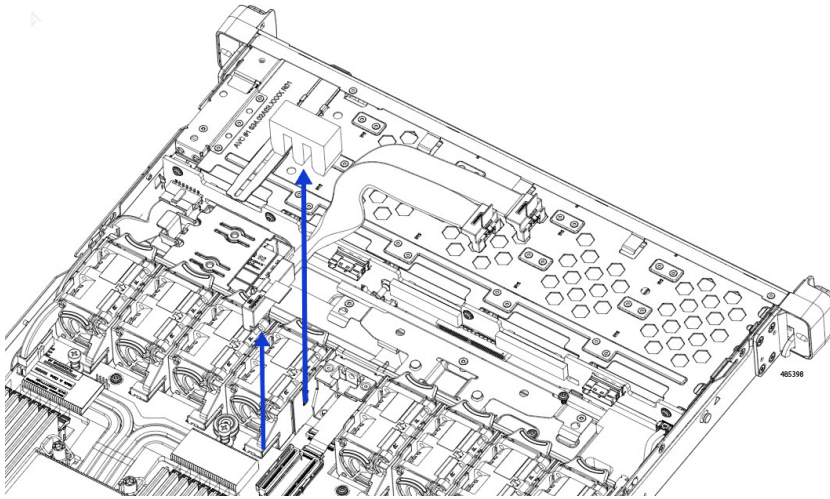
Step 3 Lift the controller module along with the tray from the motherboard.



Step 4 Remove the screws to detach the controller from the tray.

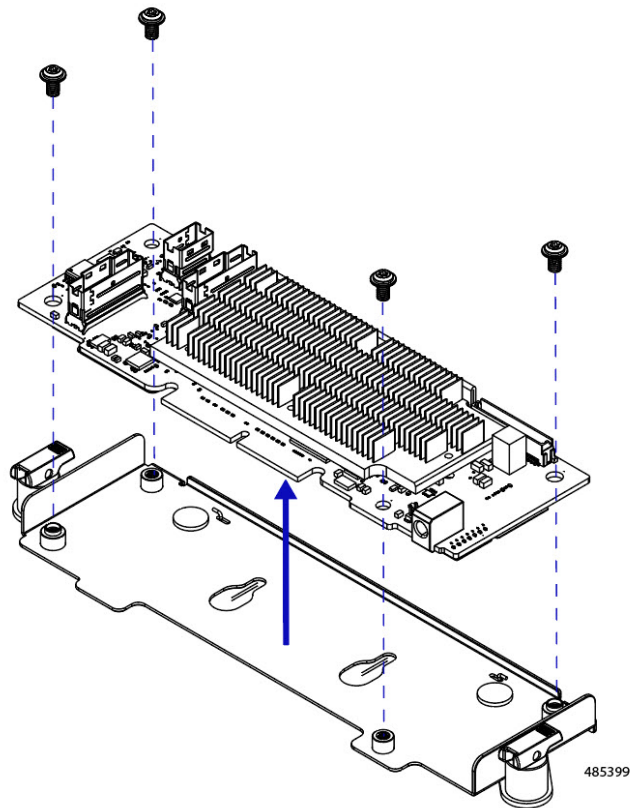


Step 5 (Optional) Remove the sponge from the motherboard to detach the cable.

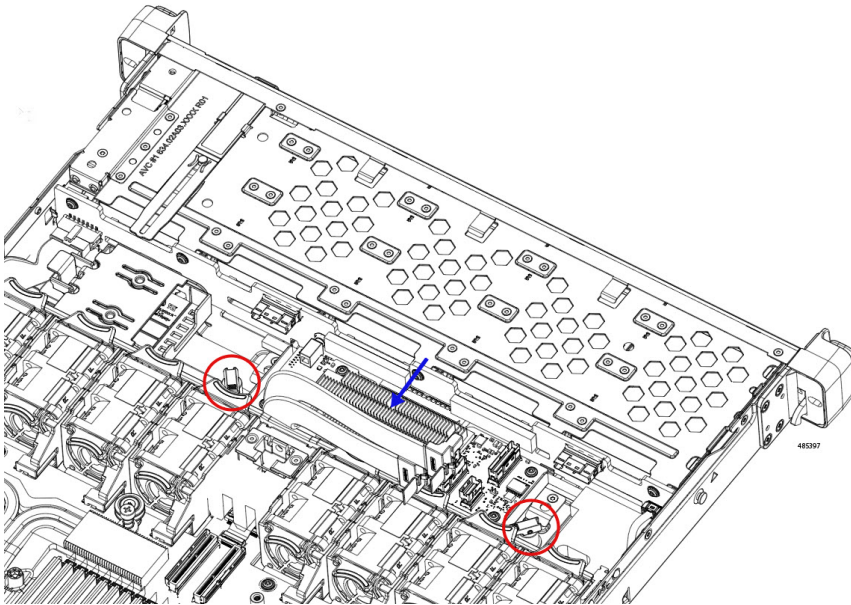


Installing Cisco Trimode M1 24G HBA Controller (16 Drives)

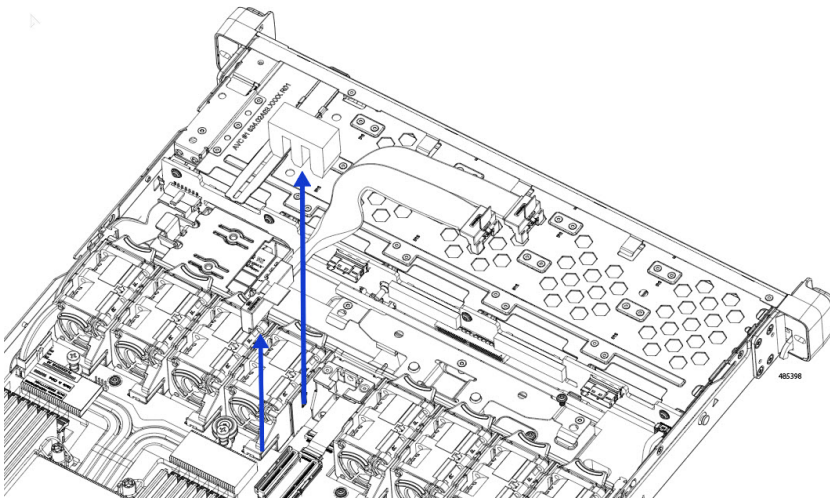
Step 1 Attach the controller to the tray.



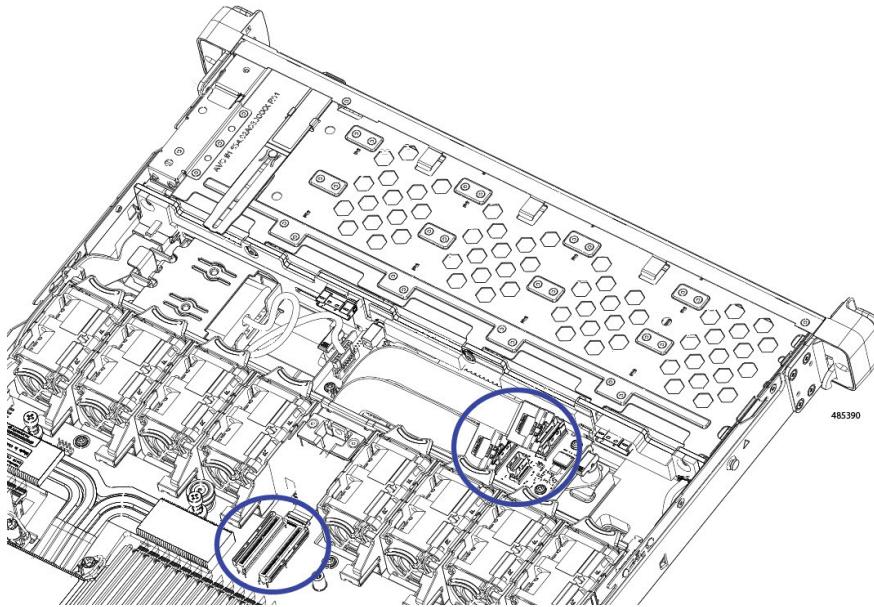
Step 2 Align the controller tray on the mother board as shown in figure and turn the ejector handle to secure the module.



Step 3 Align the cable as shown in the image and replace the sponge.



Step 4 Fasten the cable connector.



Upgrading to Intel Xeon Fifth Generation Scalable Server Processors

Use this task to upgrade to Intel Fifth Generation Scalable Server processors.

Before you begin

To upgrade CPUs, you will need to power off the server, so be aware that this task will cause a service interruption.

Also, you will need some tools to perform this task. See [Tools Required For CPU Replacement, on page 90](#).

-
- Step 1** If you have not done so already, review the [CPU Configuration Rules, on page 89](#).
 - Step 2** Remove the server's top cover.
See [Removing Top Cover, on page 39](#).
 - Step 3** Remove the air duct.
See [Removing the Air Duct, on page 41](#).
 - Step 4** Remove the existing Intel Xeon Fourth Generation Scalable Processor(s).
See [Removing CPUs and Heat Sinks, on page 91](#).
 - Step 5** Store the removed CPUs in an ESD-safe bag.
 - Step 6** Install the new Intel Xeon Fifth Generation Scalable Processor(s).
See [Installing the CPUs and Heatsinks, on page 94](#).
 - Step 7** Replace the air duct.

See [Installing the Air Duct, on page 42](#).

- Step 8** Replace the server's top cover.
- Step 9** Reapply power and return the server to operation.

Replacing Memory DIMMs



Caution DIMMs and their sockets are fragile and must be handled with care to avoid damage during installation.



Note DIMMs and their slots are keyed to insert only one way. Make sure to align the notch on the bottom of the DIMM with the key in the DIMM slot. If you are seating a DIMM in a slot and feel resistance, remove the DIMM and verify that its notch is properly aligned with the slot's key.



Caution Cisco does not support third-party DIMMs. Using non-Cisco DIMMs in the server might result in system problems or damage to the motherboard.



Note To ensure the best server performance, it is important that you are familiar with memory performance guidelines and population rules before you install or replace DIMMs.

DIMM Population Rules and Memory Performance Guidelines

The following sections provide partial information for memory usage, mixing, and population guidelines. For detailed information about memory usage and population, download the PDF of the [Cisco UCS/UCSX M7 Memory Guide](#).

DIMMs Supported By Intel Fourth Generation Xeon Scalable Server Processors

The following table shows the DIMMs supported by Intel Fourth Generation Xeon Scalable Server Processors.

Table 4: Available DDR5 4800 MT/s DIMMs

PID (Product ID)	PID Description
UCS-MRX16G1RE1	16GB DDR5-4800 RDIMM 1Rx8 (16 Gb)
UCS-MRX32G1RE1	32GB DDR5-4800 RDIMM 1Rx4 (16 Gb)
UCS-MRX64G2RE1	64GB DDR5-4800 RDIMM 2Rx4 (16 Gb)
UCS-MR128G4RE1	128GB DDR5-4800 RDIMM 4Rx4 (16 Gb)

DIMMs Supported By Intel Fifth Generation Xeon Scalable Server Processors

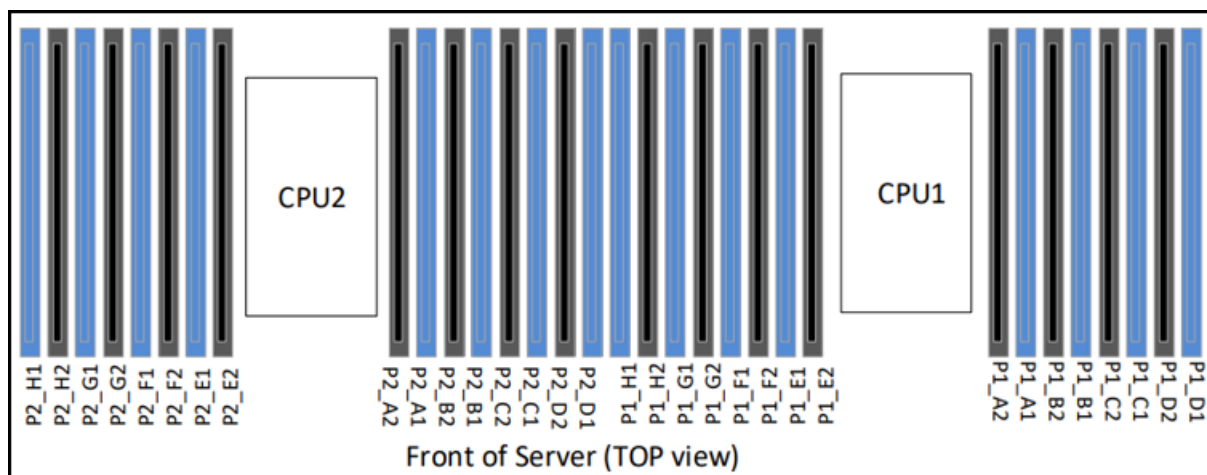
The following table shows the DIMMs supported by Intel Fifth Generation Xeon Scalable Server Processors.

Table 5: Available DDR5 5600 MT/s DIMMs

PID (Product ID)	PID Description
UCS-MRX16G1RE3	16GB DDR5-5600 RDIMM 1Rx8 (16 Gb)
UCS-MRX32G1RE3	32GB DDR5-5600 RDIMM 1Rx4 (16 Gb)
UCS-MRX64G2RE3	64GB DDR5-5600 RDIMM 2Rx4 (16 Gb)
UCS-MRX96G2RF3	96GB DDR5-5600 RDIMM 2Rx4 (24 Gb)
UCS-MR128G4RE3	128GB DDR5-5600 RDIMM 4Rx4 (16 Gb)

DIMM Slot Numbering

The following figure shows the numbering of the DIMM slots on the motherboard.



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DIMM Population Rules

Observe the following guidelines when installing or replacing DIMMs for maximum performance:

- The Cisco UCS C220 M7 supports DIMMs (RDIMMs).
- Each CPU supports eight memory channels, A through H.
 - CPU 1 supports channels P1 A1, P1 A2, P1 B1, P1 B2, P1 C1, P1 C2, P1 D1, P1 D2, P1 E1, P1 E2, P1 F1, P1 F2, P1 G1, P1 G2, P1 H1, and P1 H2.
 - CPU 2 supports channels P2 A1, P2 A2, P2 B1, P2 B2, P2 C1, P2 C2, P2 D1, P2 D2, P2 E1, P2 E2, P2 F1, P2 F2, P2 G1, P2 G2, P2 H1, and P2 H2.

- When one DIMM is used, it must be populated in DIMM slot 1 (farthest away from the CPU) of a given channel.
- Rank mixing is not allowed on a channel except for 1 Rank + 2 Rank combination when a processor socket is populated with all 16 DIMMs.
- Each channel has two DIMM sockets (for example, channel A = slots A1, A2).
- In a single-CPU configuration, populate the channels for CPU1 only (P1 A1 through P1 H2).
- For optimal performance, populate DIMMs in the order shown in the following table, depending on the number of CPUs and the number of DIMMs per CPU. If your server has two CPUs, balance DIMMs evenly across the two CPUs as shown in the table. DIMMs for CPU 1 and CPU 2 (when populated) must always be configured identically.



Note The section below lists recommended configurations. Using 5, 7, 9, 10, or 11 DIMMs per CPU is not recommended.

- Cisco memory from previous generation servers (DDR3 and DDR4) is not compatible with the server.
- Memory can be configured in any number of DIMMs as pairs, although for optimal performance, see the following document: [Cisco UCS/UCSX M7 Memory Guide](#).
- Mixing of non-3DS and 3DS RDIMMs is not allowed in the same channel, across different channels, and across different sockets.
 - All DDR5 DIMM must be in the same speed per processor socket or the processor will run at the lowest DIMM/CPU speed
 - x8 DIMMs and x4 DIMMs cannot be mixed in the same channel or same processor socket
 - Mixing DIMMs from different vendors is allowed for RDIMMs, but not for 3DS RDIMM.
- DIMMs are keyed. To properly install them, make sure that the notch on the bottom of the DIMM lines up with the key in slot.
- Populate all slots with a DIMM or DIMM blank. A DIMM slot cannot be empty.

Memory Population Order

The Cisco UCS C220 M7 server has two memory options, DIMMs only or DIMMs plus Intel Optane PMem 200 series memory.

Memory slots are color-coded, blue and black. The color-coded channel population order is blue slots first, then black. DIMMs for CPU 1 and CPU 2 (when populated) must always be configured identically.

The following tables show the memory population order for each memory option.

Table 6: DIMMs Population Order

Number of DDR5 DIMMs per CPU (Recommended Configurations)	Populate CPU 1 Slot		Populate CPU2 Slots	
	P1 Blue #1 Slots	P1 Black #2 Slots	P2 Blue #1 Slots	P2 Black #2 Slots

1	A1	-	A1	
2	A1, G1	-	A1, G1	
4	A1, C1, E1, G1	-	A1, C1, E1, G1	
6	A1, C1, D1, E1, F1, G1	-	A1, C1, D1, E1, F1, G1	
8	A1, C1, D1, E1, G1, H1, B1, F1	-	A1, C1, D1, E1, G1, H1, B1, F1	
12	A1, B1, C1, D1, E1, F1, G1, H1	A2, C2, E2, G2	A1, B1, C1, D1, E1, F1, G1, H1	A2, C2, E2, G2
16	All populated (A1 through H1)	All populated (A2 through H2)	All populated (A1 through H1)	All populated (A2 through H2)

Memory Mirroring

The CPUs in the server support memory mirroring only when an even number of channels are populated with DIMMs. If one or three channels are populated with DIMMs, memory mirroring is automatically disabled.

Memory mirroring reduces the amount of memory available by 50 percent because only one of the two populated channels provides data. The second, duplicate channel provides redundancy.

Replacing DIMMs

Identifying a Faulty DIMM

Each DIMM socket has a corresponding DIMM fault LED, directly in front of the DIMM socket. See [Internal Diagnostic LEDs, on page 37](#) for the locations of these LEDs. When the server is in standby power mode, these LEDs light amber to indicate a faulty DIMM.

Step 1

Remove an existing DIMM:

- Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
- Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.

- Remove the top cover from the server as described in [Removing Top Cover, on page 39](#)
- Remove the air baffle that covers the front ends of the DIMM slots to provide clearance.
- Locate the DIMM that you are removing, and then open the ejector levers at each end of its DIMM slot.

Step 2

Install a new DIMM:

Note Before installing DIMMs, see the memory population rules for this server: [DIMM Population Rules and Memory Performance Guidelines, on page 112](#).

- Align the new DIMM with the empty slot on the motherboard. Use the alignment feature in the DIMM slot to correctly orient the DIMM.

- b) Push down evenly on the top corners of the DIMM until it is fully seated and the ejector levers on both ends lock into place.
 - c) Replace the top cover to the server.
 - d) Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.
-

Replacing Power Supplies

The server can have one or two Titanium 80PLUS rated power supplies. When two power supplies are installed they are redundant as 1+1 by default, but they also support cold redundancy mode. Cold redundancy (CR) suspends power delivery on one or more power supplies and forces the remainder of the load to be supplied by the active PSU(s). As a result, total power efficiency is improved by best utilizing the PSU efficiency when compared to load characteristics.

The server supports up to two of the following hot-swappable power supplies:

- 770 W (AC), Cisco PID UCSC-PSU1-770W-D
- 1050 W V2 (DC), Cisco PID UCSC-PSUV21050D-D
- 1200 W (AC), Cisco PID UCSC-PSU1-1200W-D
- 1600 W (AC), Cisco PID UCSC-PSU1-1600W-D
- 2300 W (AC), Cisco PID UCSC-PSU1-2300W-D

One power supply is mandatory, and one more can be added for 1 + 1 redundancy. You cannot mix AC and DC power supplies in the same server.

- See also [Power Specifications, on page 185](#) for more information about the power supplies.
- See also [Rear-Panel LEDs, on page 36](#) for information about the power supply LEDs.

This section includes procedures for replacing AC and DC power supply units.

See the following.

- [Replacing AC Power Supplies, on page 116](#)
- [Replacing DC Power Supplies, on page 117](#)
- [Installing DC Power Supplies \(First Time Installation\), on page 119](#)
- [Grounding for DC Power Supplies, on page 120](#)

Replacing AC Power Supplies



Note If you have ordered a server with power supply redundancy (two power supplies), you do not have to power off the server to replace a power supply because they are redundant as 1+1.



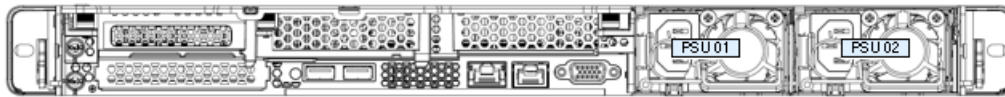
Note Do not mix power supply types or wattages in the server. Both power supplies must be identical.

Step 1 Remove the power supply that you are replacing or a blank panel from an empty bay:

- a) Perform one of the following actions:
 - If your server has only one power supply, shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server](#), on page 44.
 - If your server has two power supplies, you do not have to shut down the server.
- b) Remove the power cord from the power supply that you are replacing.
- c) Grasp the power supply handle while pinching the release lever toward the handle.
- d) Pull the power supply out of the bay.

Step 2 Install a new power supply:

- a) Grasp the power supply handle and insert the new power supply into the empty bay.
- b) Push the power supply into the bay until the release lever locks.
- c) Connect the power cord to the new power supply.
- d) Only if you shut down the server, press the Power button to boot the server to main power mode.



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1	Power supply release lever	2	Power supply handle
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Replacing DC Power Supplies



Note This procedure is for replacing DC power supplies in a server that already has DC power supplies installed. If you are installing DC power supplies to the server for the first time, see [Installing DC Power Supplies \(First Time Installation\)](#), on page 119.



Warning A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.

Statement 1022



Warning This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.

Statement 1045



Warning Installation of the equipment must comply with local and national electrical codes.

Statement 1074



Note If you are replacing DC power supplies in a server with power supply redundancy (two power supplies), you do not have to power off the server to replace a power supply because they are redundant as 1+1.



Note Do not mix power supply types or wattages in the server. Both power supplies must be identical.

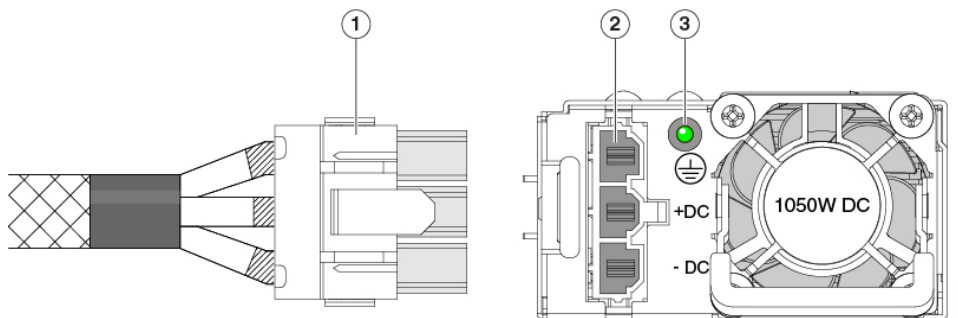
Step 1 Remove the DC power supply that you are replacing or a blank panel from an empty bay:

- a) Perform one of the following actions:
 - If you are replacing a power supply in a server that has only one DC power supply, shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
 - If you are replacing a power supply in a server that has two DC power supplies, you do not have to shut down the server.
- b) Remove the power cord from the power supply that you are replacing. Lift the connector securing clip slightly and then pull the connector from the socket on the power supply.
- c) Grasp the power supply handle while pinching the release lever toward the handle.
- d) Pull the power supply out of the bay.

Step 2 Install a new DC power supply:

- a) Grasp the power supply handle and insert the new power supply into the empty bay.
- b) Push the power supply into the bay until the release lever locks.
- c) Connect the power cord to the new power supply. Press the connector into the socket until the securing clip clicks into place.
- d) Only if you shut down the server, press the Power button to boot the server to main power mode.

Figure 44: Replacing DC Power Supplies



1	Keyed cable connector (CAB-48DC-40A-8AWG)	3	PSU status LED
2	Keyed DC input socket	-	

Installing DC Power Supplies (First Time Installation)



Note This procedure is for installing DC power supplies to the server for the first time. If you are replacing DC power supplies in a server that already has DC power supplies installed, see [Replacing DC Power Supplies, on page 117](#).



Warning A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.
Statement 1022



Warning This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.
Statement 1045



Warning Installation of the equipment must comply with local and national electrical codes.
Statement 1074



Note Do not mix power supply types or wattages in the server. Both power supplies must be identical.



Caution As instructed in the first step of this wiring procedure, turn off the DC power source from your facility’s circuit breaker to avoid electric shock hazard.

Step 1 Turn off the DC power source from your facility’s circuit breaker to avoid electric shock hazard.

Note The required DC input cable is Cisco part CAB-48DC-40A-8AWG. This 3-meter cable has a 3-pin connector on one end that is keyed to the DC input socket on the power supply. The other end of the cable has no connector so that you can wire it to your facility’s DC power.

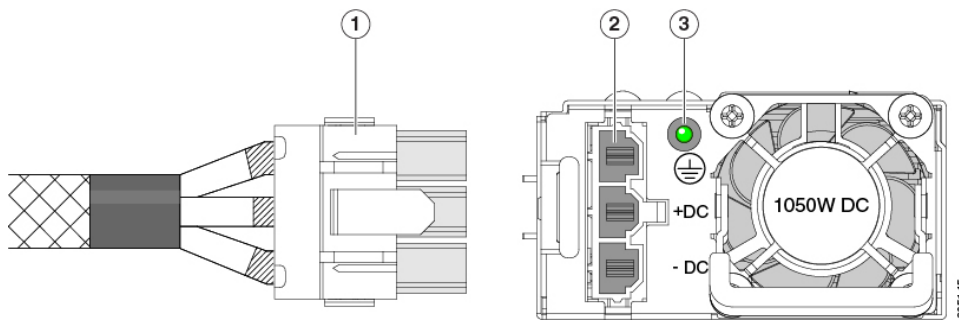
Step 2 Wire the non-terminated end of the cable to your facility’s DC power input source.

Step 3 Connect the terminated end of the cable to the socket on the power supply. The connector is keyed so that the wires align for correct polarity and ground.

Step 4 Return DC power from your facility’s circuit breaker.

Step 5 Press the Power button to boot the server to main power mode.

Figure 45: Installing DC Power Supplies



1	Keyed cable connector (CAB-48DC-40A-8AWG)	3	PSU status LED
2	Keyed DC input socket	-	

Step 6 See Installation Grounding, page 3-66 for information about additional chassis grounding.

Grounding for DC Power Supplies

AC power supplies have internal grounding and so no additional grounding is required when the supported AC power cords are used.

When using a DC power supply, additional grounding of the server chassis to the earth ground of the rack is available. Two screw holes for use with your dual-hole grounding lug and grounding wire are supplied on the chassis rear panel.



Note The grounding points on the chassis are sized for 10-32 screws. You must provide your own screws, grounding lug, and grounding wire. The grounding lug must be dual-hole lug that fits 10-32 screws. The grounding cable that you provide must be 14 AWG (2 mm), minimum 60° C wire, or as permitted by the local code.

Replacing a PCIe Card



Note If you are installing a Cisco UCS Virtual Interface Card, there are prerequisite considerations. See [Cisco Virtual Interface Card \(VIC\) Considerations, on page 122](#).



Note RAID controller cards install into a separate mRAID riser. See [Replacing a SAS Storage Controller Card \(RAID or HBA\), on page 148](#).

Step 1

Remove an existing PCIe card (or a blank filler panel) from the PCIe riser:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).
- d) Remove any cables from the ports of the PCIe card that you are replacing.
- e) Use two hands to grasp the external riser handle and the blue area at the front of the riser.
- f) Lift straight up to disengage the riser's connectors from the two sockets on the motherboard. Set the riser upside-down on an antistatic surface.
- g) Open the hinged plastic retainer that secures the rear-panel tab of the card.
- h) Pull evenly on both ends of the PCIe card to remove it from the socket on the PCIe riser.

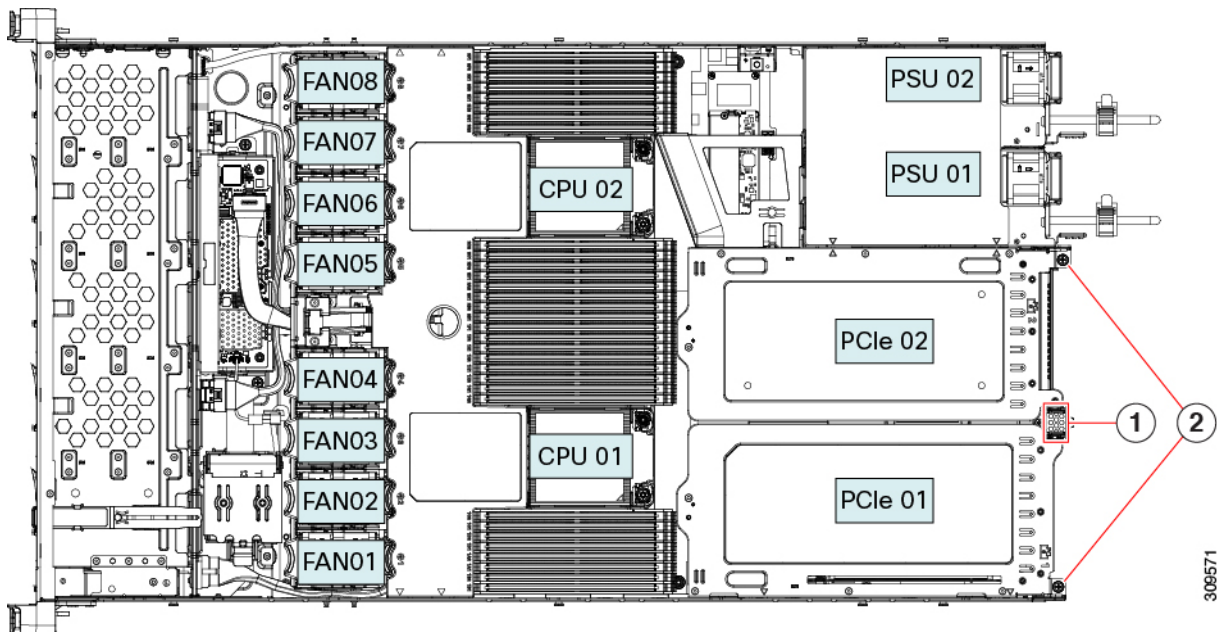
If the riser has no card, remove the blanking panel from the rear opening of the riser.

Step 2

Install a new PCIe card:

- a) With the hinged tab retainer open, align the new PCIe card with the empty socket on the PCIe riser.
PCIe riser 1/slot 1 has a long-card guide at the front end of the riser. Use the slot in the long-card guide to help support a full-length card.
- b) Push down evenly on both ends of the card until it is fully seated in the socket.
- c) Ensure that the card's rear panel tab sits flat against the riser rear-panel opening and then close the hinged tab retainer over the card's rear-panel tab.
- d) Position the PCIe riser over its two sockets on the motherboard and over the two chassis alignment channels.

Figure 46: PCIe Riser Alignment Features



1	Blue riser handle	2	Riser alignment features in chassis
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- e) Carefully push down on both ends of the PCIe riser to fully engage its two connectors with the two sockets on the motherboard.
- f) Replace the top cover to the server.
- g) Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Cisco Virtual Interface Card (VIC) Considerations

This section describes VIC card support and special considerations for this server.



Note If you use the *Cisco Card* NIC mode, you must also make a *VIC Slot* setting that matches where your VIC is installed. The options are Riser1, Riser2, and MLOM. See [NIC Mode and NIC Redundancy Settings, on page 27](#) for more information about NIC modes.

If you want to use the Cisco UCS VIC card for Cisco UCS Manager integration, see also the [Cisco UCS C-Series Server Integration with Cisco UCS Manager Guides](#) for details about supported configurations, cabling, and other requirements.

Table 7: VIC Support and Considerations in This Server

VIC	How Many Supported in Server	Slots That Support VICs	Primary Slot For Cisco UCS Manager Integration	Primary Slot For <i>Cisco Card</i> NIC Mode	Minimum Cisco IMC Firmware

Cisco UCS VIC 15425 UCSCP-V5Q50G-D	2 PCIe	PCIe 2 PCIe 5	PCIe 2	PCIe 2	4.0(1)
Cisco UCS VIC 15235 UCSC-P-V5D200G-D	2 PCIe	PCIe 2 PCIe 5	PCIe 2	PCIe 2	4.0(2)
Cisco UCS VIC 15428 UCSC-M-V5Q50G-D	1 mLOM	mLOM	mLOM	mLOM	4.0(1)
Cisco UCS VIC 15238 UCSC-M-V5D200G-D	1 mLOM	mLOM	mLOM	mLOM	4.0(2)

Replacing an mLOM Card

The server supports a modular LOM (mLOM) card to provide additional rear-panel connectivity. The horizontal mLOM socket is on the motherboard, under a PCIe riser.



Note In addition to a Cisco mLOM, the rear mezzanine mLOM slot can also support an Intel Ethernet Network Adapter X710 Open Compute Project (OCP) 3.0 card. For OCP card replacement procedures, see [Replacing an OCP Card, on page 136](#). The server can accept either an mLOM or an OCP card, but not both in the same slot.

The mLOM socket provides a Gen-4 x16 PCIe lane. The socket remains powered when the server is in 12 V standby power mode, and it supports the network communications services interface (NCSI) protocol.

The mLOM replacement procedure differs slightly depending on whether your server has 2 full-height (FH) or 3 half-height (HH) riser cages. Use the following procedures to replace an mLOM:

- [Removing an mLOM Card \(2FH Riser Cages\), on page 123](#)
- [Installing an mLOM Card \(2FH Riser Cages\), on page 126](#)
- [Removing an mLOM Card \(3HH Riser Cages\), on page 129](#)
- [Installing an mLOM Card \(3HH Riser Cages\), on page 132](#)

Removing an mLOM Card (2FH Riser Cages)

Use the following task to remove an mLOM card from a server with 2 full height riser cages.

Before you begin

You will find it helpful to have a #2 Phillips screwdriver for this task.

Step 1 Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).

Step 2 Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

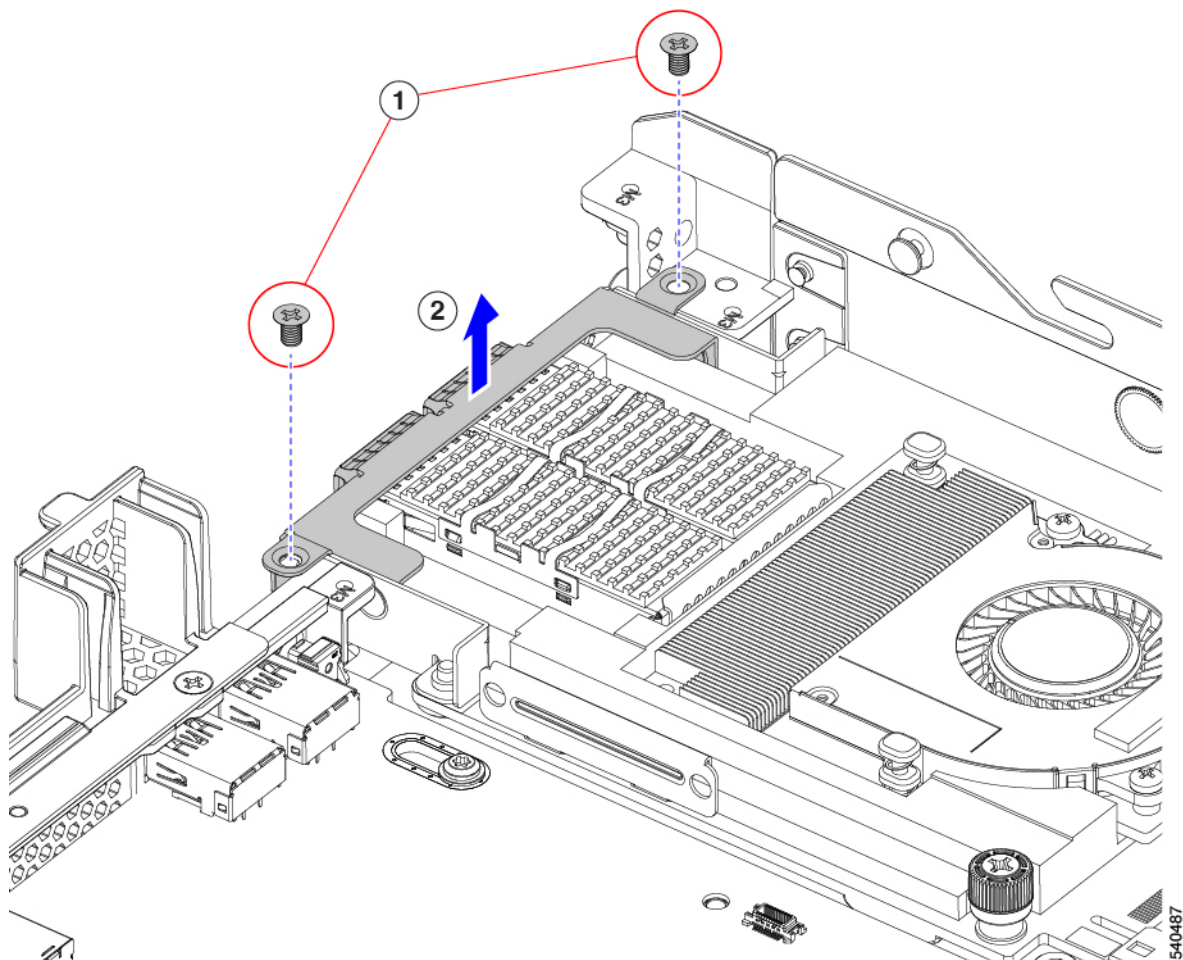
Caution If you cannot safely view and access the component, remove the server from the rack.

Step 3 If full height riser cages are present, remove them now.

See [Removing Full Height Riser Cages, on page 66](#).

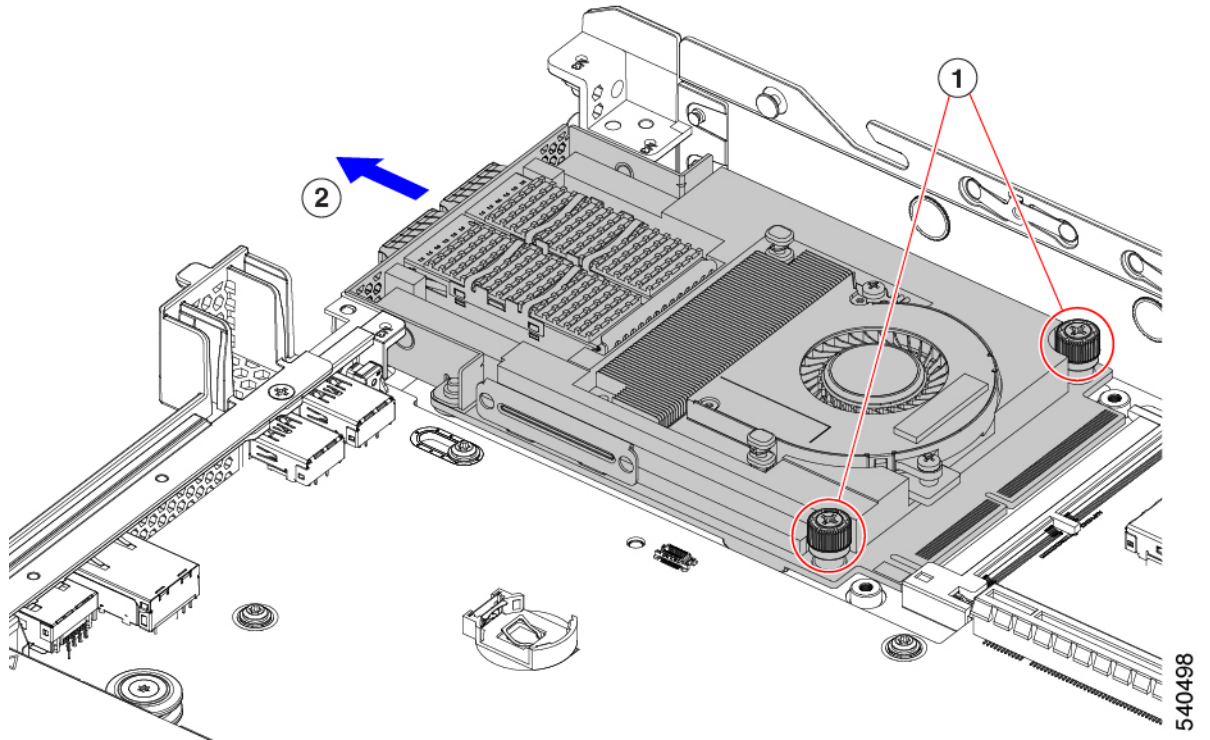
Step 4 If you have not removed the existing mLOM bracket, remove it now.

- a) Using a #2 Phillips screwdriver, remove the two countersink screws that hold the mLOM bracket in place.
- b) Lift the mLOM bracket straight up to remove it from the server.



Step 5 Remove the mLOM card.

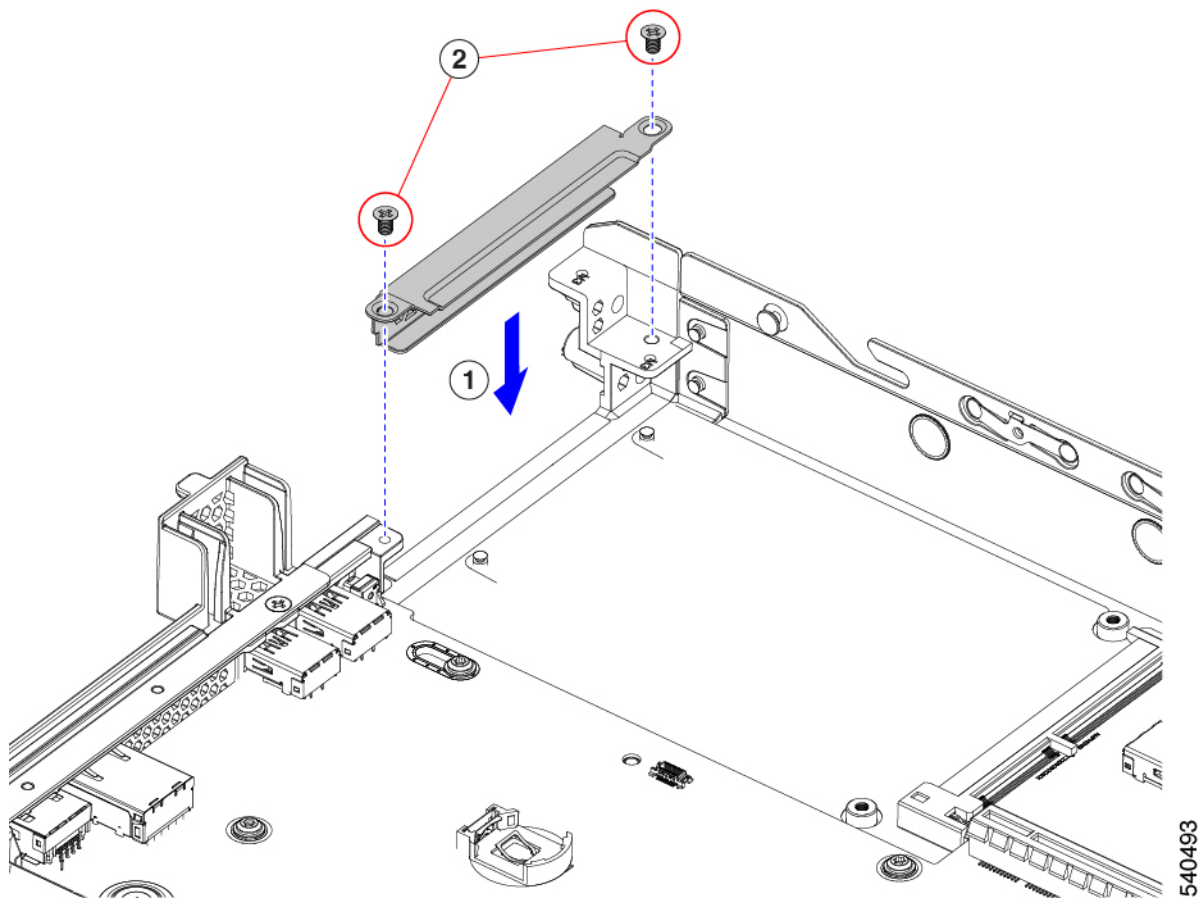
- a) Loosen the two captive thumbscrews that secure the mLOM card to the threaded standoff on the chassis floor.
- b) Slide the mLOM card horizontally to disconnect it from the socket, then lift it out of the server.



Step 6 If you are not installing an mLOM, install the filler panel in the mLOM slot as shown below. Otherwise, go to [Installing an mLOM Card \(2FH Riser Cages\)](#), on page 126.

- Lower the filler panel onto the server, aligning the screwholes.
- Using a #2 Phillips screwdriver, insert and tighten the screws.

Caution Tighten screws to 4 lbs-in. Do not over-tighten screws or you risk stripping them!



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Installing an mLOM Card (2FH Riser Cages)

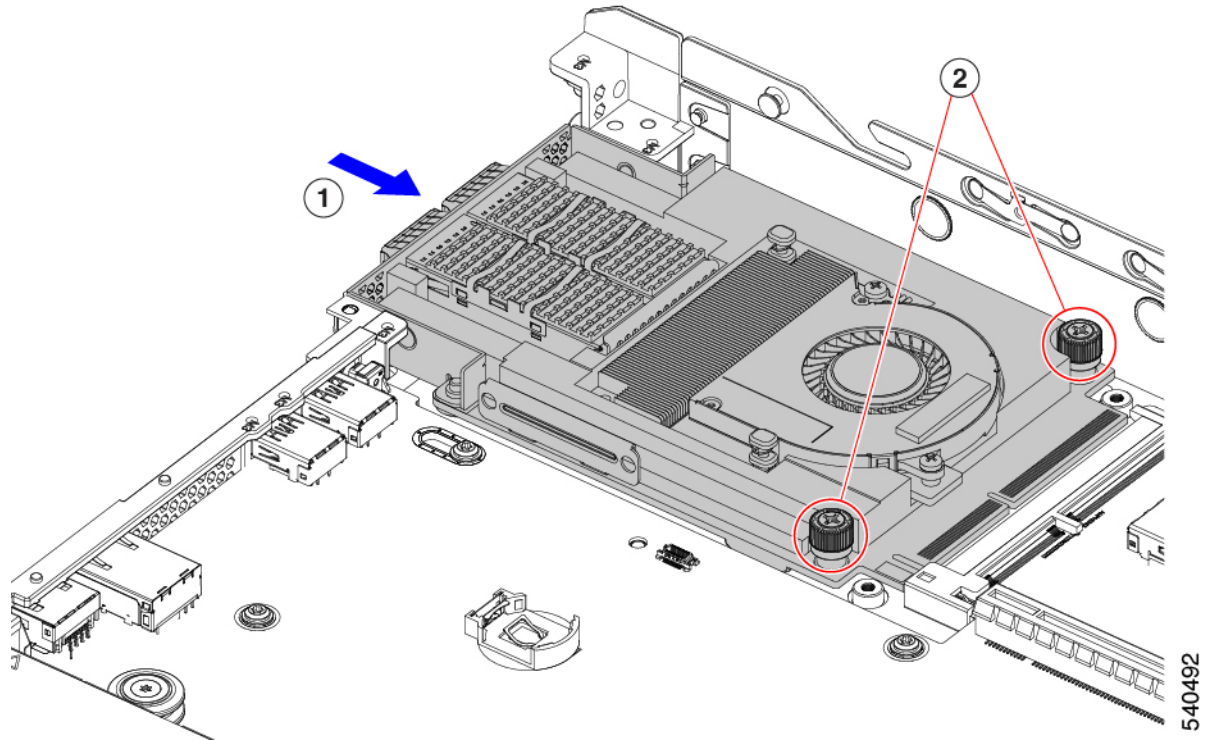
Use the following task to install an mLOM card in a server with 2 full height riser cages.

Before you begin

You will find it helpful to have a #2 Phillips screwdriver for this task.

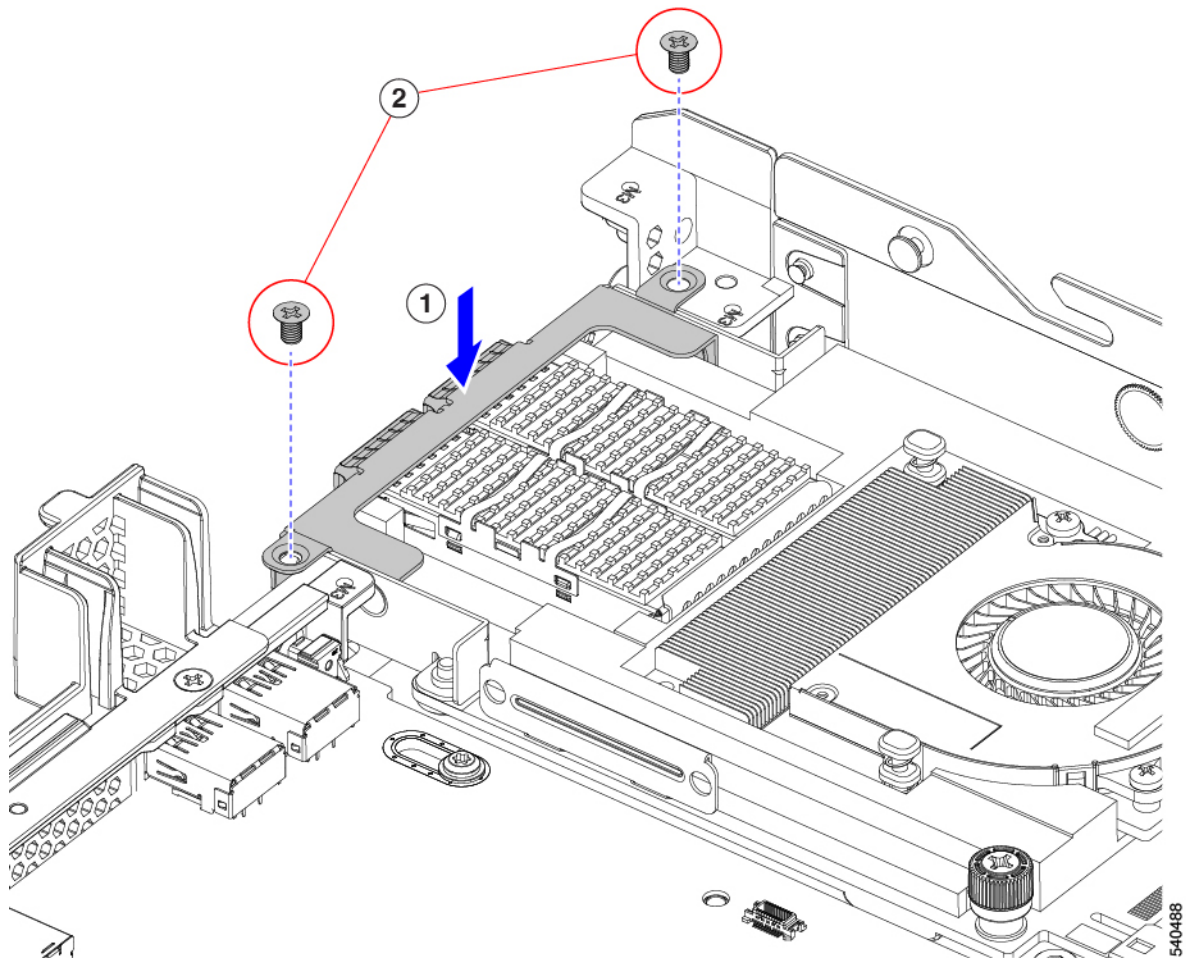
Step 1 Install the mLOM card into the mLOM slot.

- a) Holding the mLOM level, slide it into the slot until it seats into the PCI connector.
- b) Using a #2 Phillips screwdriver, tighten the captive screws to secure the mLOM to the server.

**Step 2** Install the mLOM bracket.

- a) Lower the mLOM bracket onto the mLOM, aligning the screwholes.
- b) Using a #2 Phillips screwdriver, insert and tighten the screws.

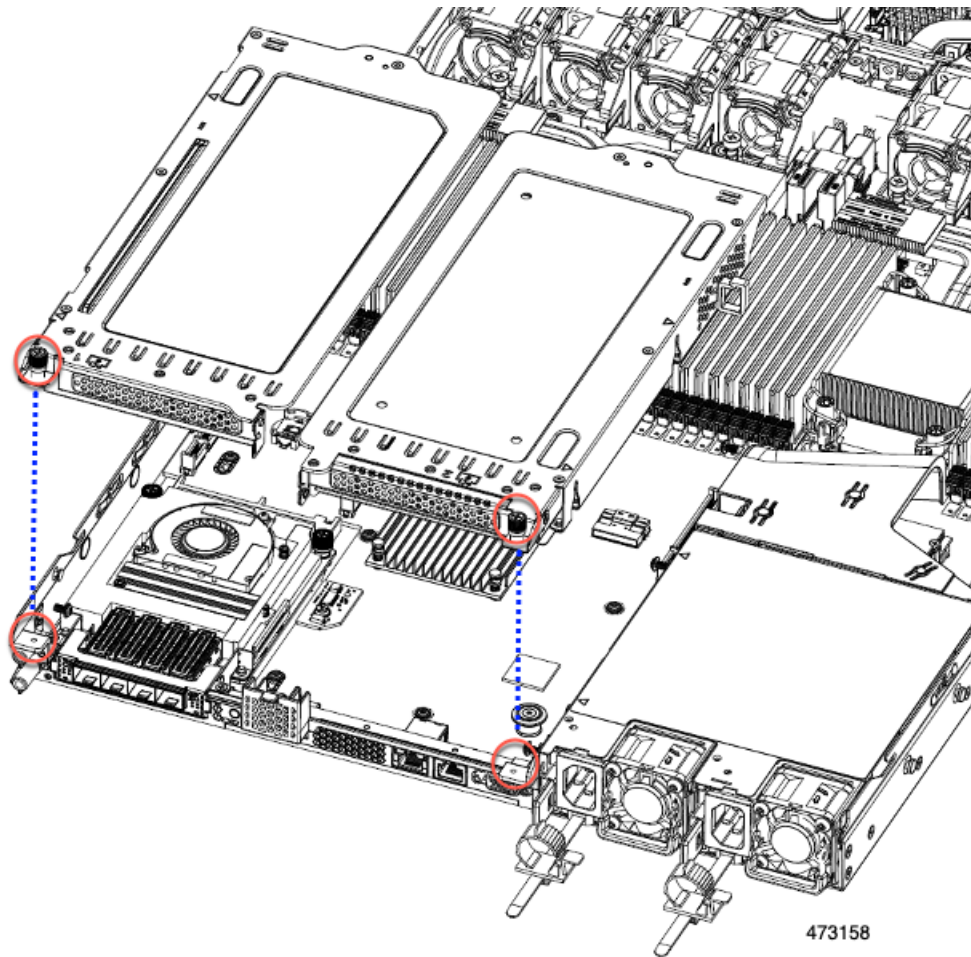
Caution Tighten the screws to 4 lbs-in of torque. Do not overtighten the screws or you risk stripping them.



Step 3 Install the two full height riser cages.

- Align riser cages 1 and 2 over their PCIe slots, making sure that the captive thumbscrews are aligned with their screw holes.
- Holding each riser cage level, lower it into its PCIe slot, then tighten the thumbscrew by using a #2 Phillips screwdriver or your fingers.

Caution Tighten the screws to 4 lbs-in of torque. Do not overtighten the screws or you risk stripping them.



- Step 4** Reinstall the server.
- Replace the server's top cover.
 - If needed, reinstall the server in the rack.
 - If needed, reconnect any cables.

Removing an mLOM Card (3HH Riser Cages)

Use the following task to install an mLOM card in a server with 3 half-height riser cages.

Before you begin

You will find it helpful to have a #2 Phillips screwdriver for this task.

- Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server](#), on page 44.
- Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

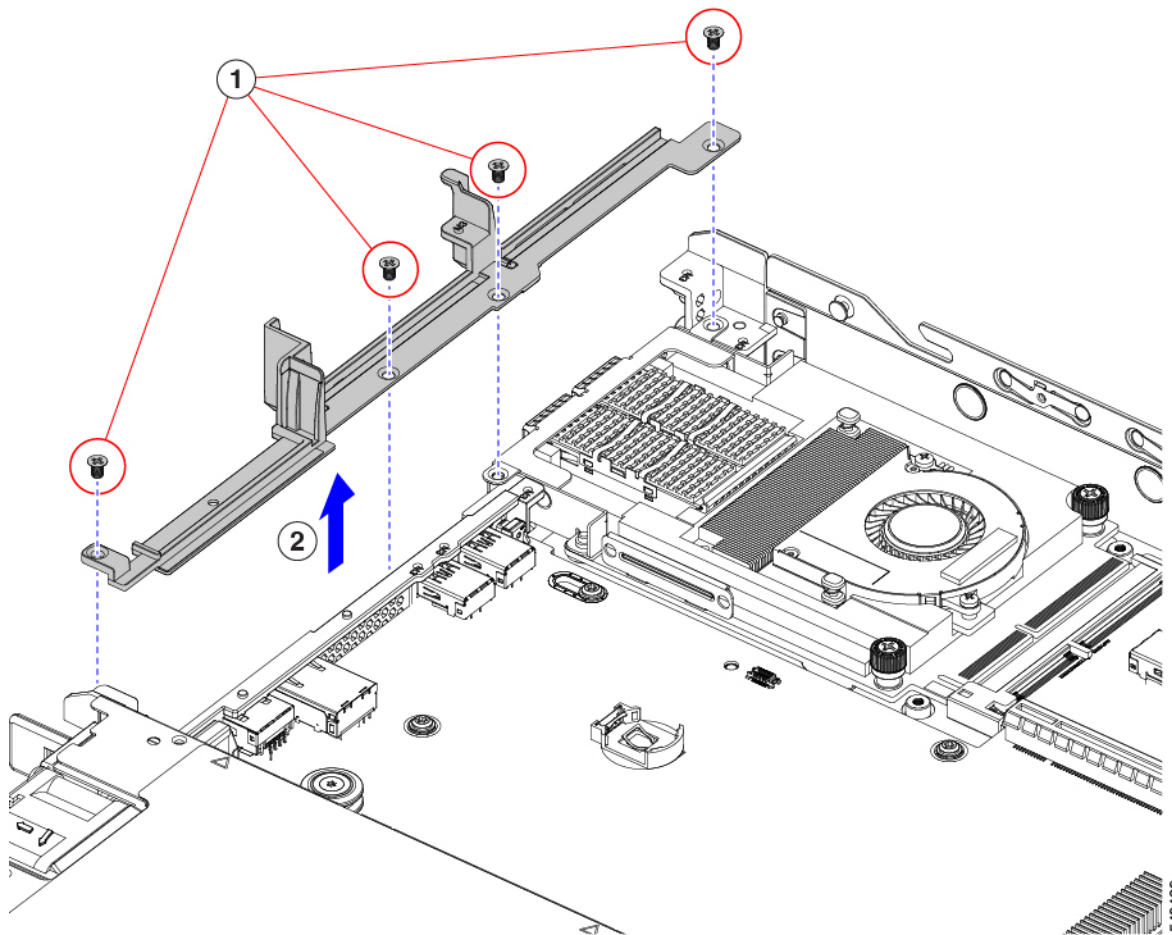
Caution If you cannot safely view and access the component, remove the server from the rack.

Step 3 If half-height riser cages are present, remove them now.

See [Removing Half Height Riser Cages](#), on page 59.

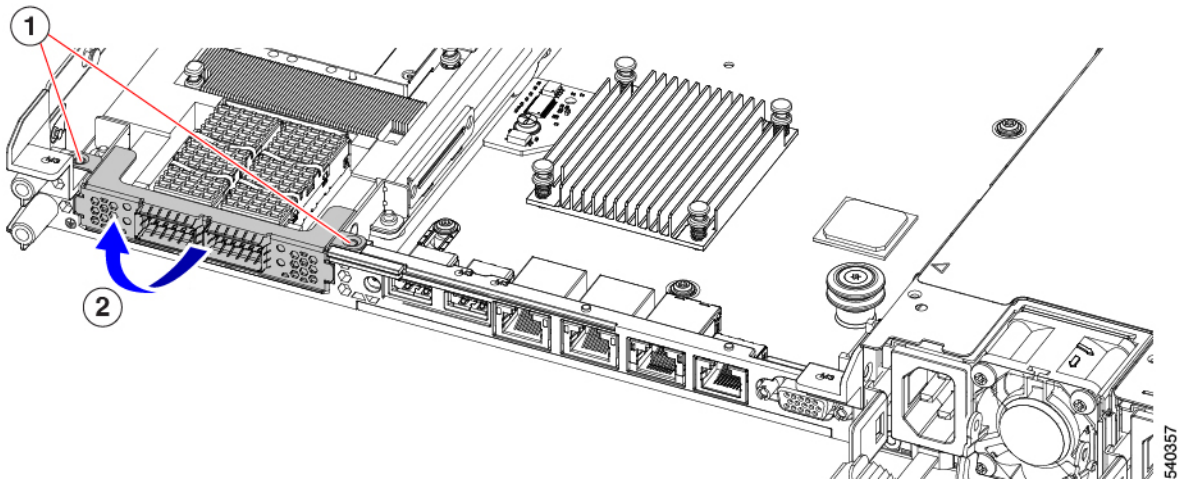
Step 4 If you have not already removed the half-height rear wall, remove it now.

- a) Using a #2 Phillips screwdriver, remove the four countersink screws.
- b) Grasp each end of the half-height rear wall and lift it off of the server.



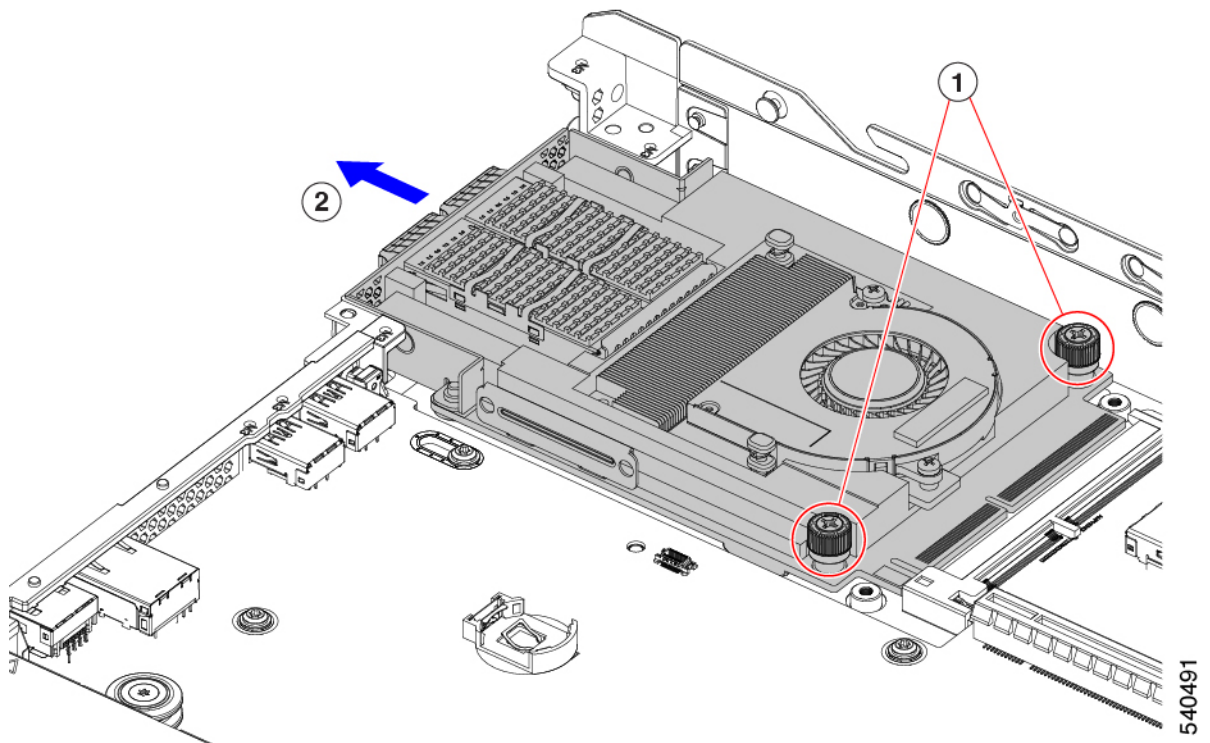
Step 5 If you have not removed the existing mLOM bracket, remove it now.

- a) Using a #2 Phillips screwdriver, remove the two countersink screws that hold the mLOM bracket in place.
- b) Lift the mLOM bracket to remove it from the server.



Step 6 Remove the mLOM card.

- a) Loosen the two captive thumbscrews that secure the mLOM card to the threaded standoff on the chassis floor.
- b) Slide the mLOM card horizontally to disconnect it from the socket, then lift it out of the server.

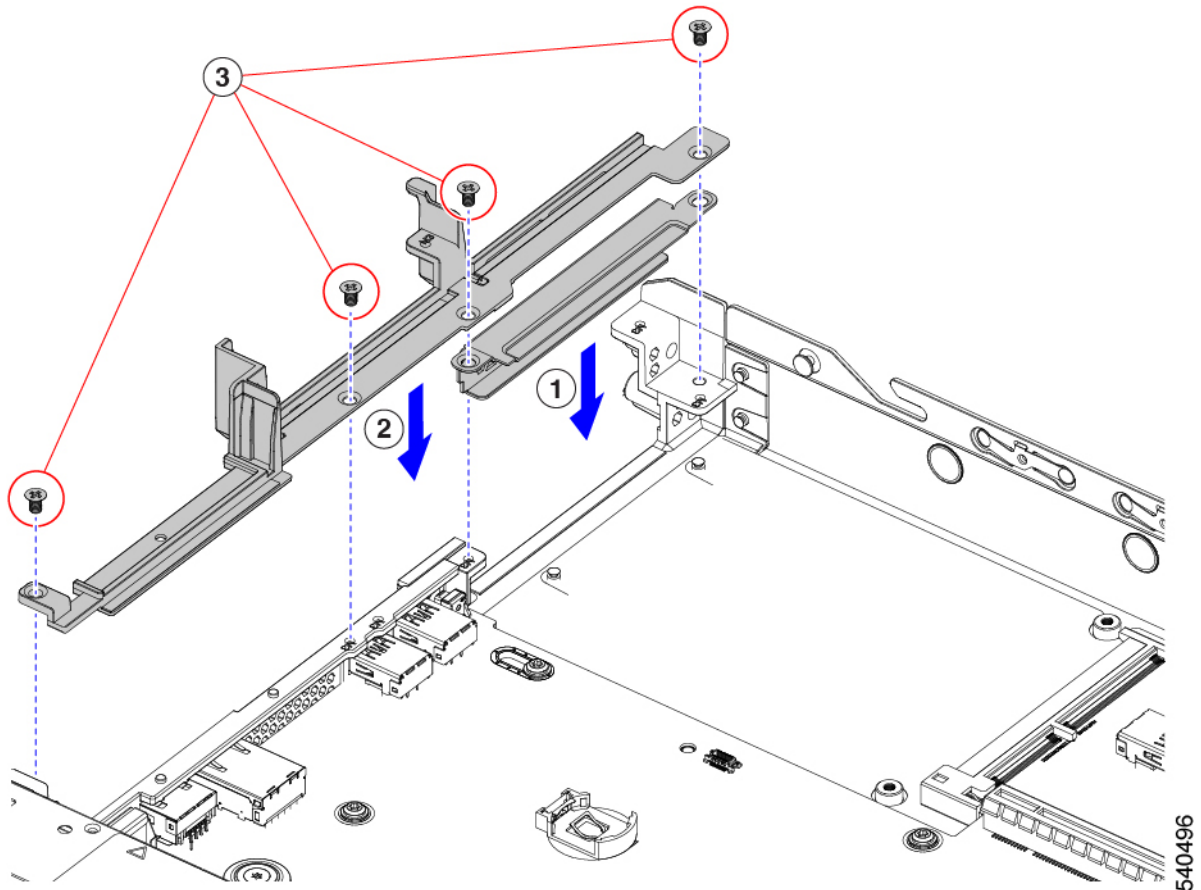


Step 7 If you are not installing an mLOM, install the filler panel in the mLOM slot as shown below. Otherwise, go to [Installing an mLOM Card \(3HH Riser Cages\)](#), on page 132.

- a) Lower the filler panel onto the server, aligning the screwholes.
- b) Lower the half-height rear wall onto the server, aligning the screwholes.
- c) Using a #2 Phillips screwdriver, insert and tighten the four countersink screws.

Note Two screwholes overlap on the rear wall and the filler panel. When installing the screws, make sure that the screws sink through both parts and tightens into sheetmetal.

Caution Tighten screws to 4 lbs-in. Do not over-tighten screws or you risk stripping them!



Installing an mLOM Card (3HH Riser Cages)

Use this task to install and mLOM card in a server that has 3 half-height risers.

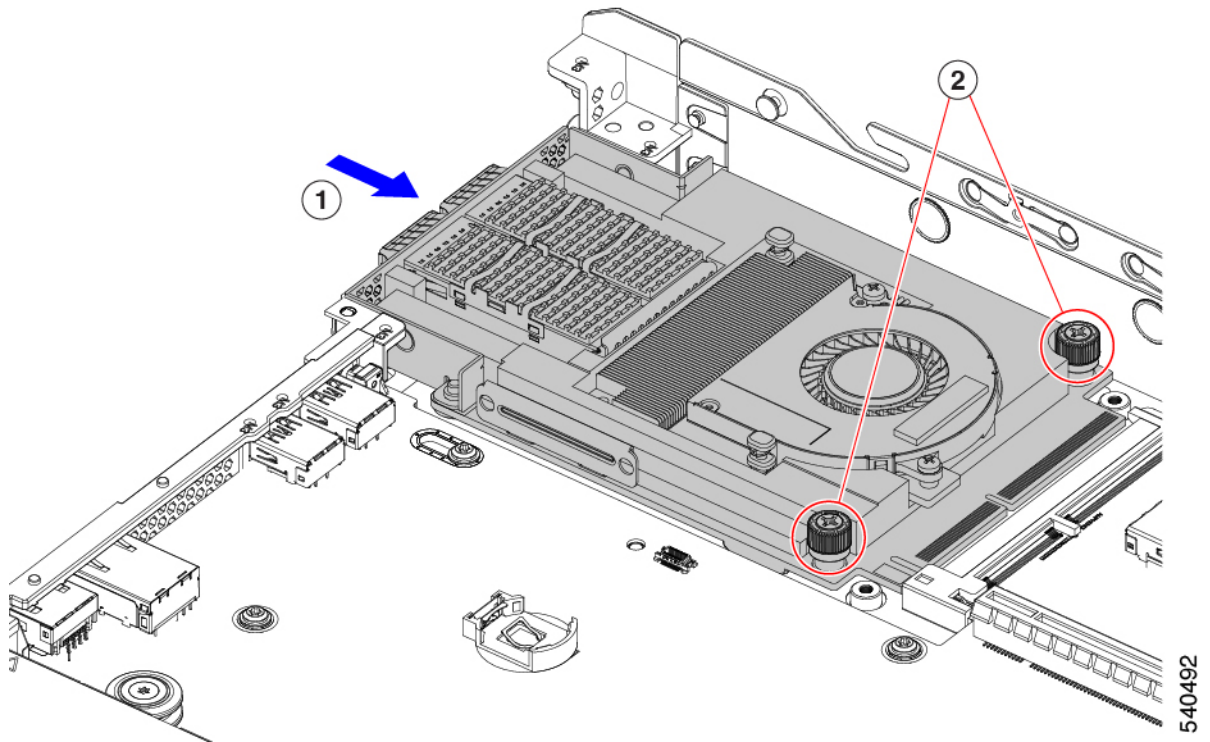
Before you begin

You will find it helpful to have a #2 Phillips screwdriver for this task.

Step 1 Install the mLOM card into the mLOM slot.

- a) Holding the mLOM level, slide it into the slot until it seats into the PCI connector.

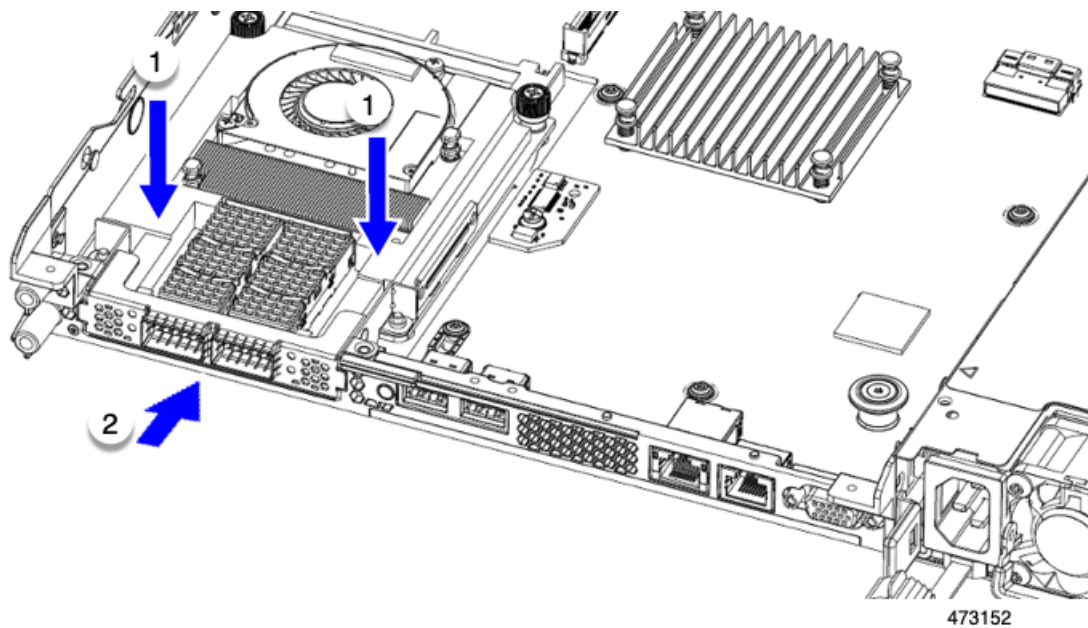
- b) Using a #2 Phillips screwdriver, tighten the captive screws to secure the mLOM to the server.



Step 2 Install the mLOM bracket.

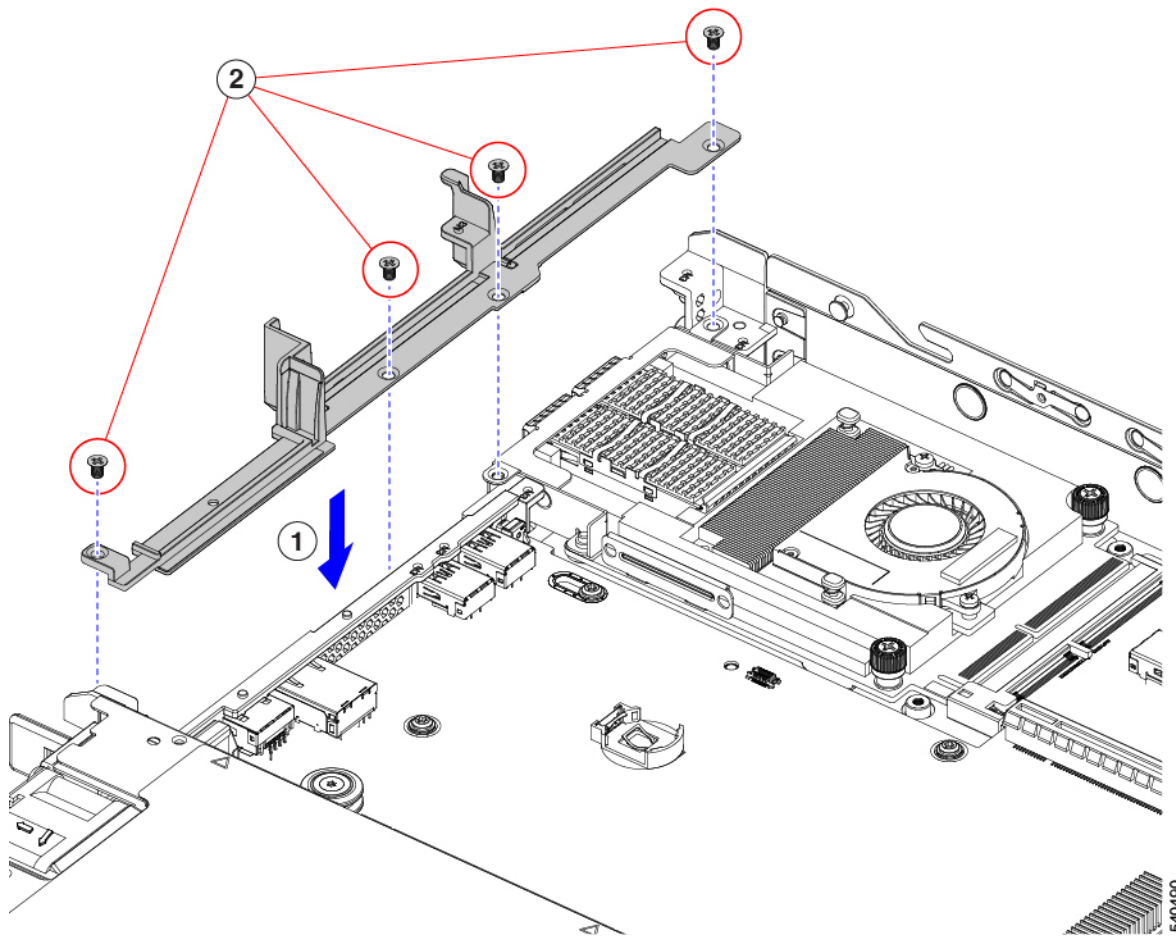
- a) Lower the mLOM bracket onto the mLOM, aligning the screw holes.
b) Using a #2 Phillips screwdriver, insert and tighten the screws.

Caution Tighten the screws to 4 lbs-in of torque. Do not over tighten the screws or you risk stripping them.

**Step 3** Install the half-height rear wall.

- a) Orient the half-height rear wall as shown.
- b) Align the screw holes in the FH rear wall with the screw holes in the server sheet metal.
- c) Holding the rear wall level, seat it onto the server sheet metal, making sure that the screw holes line up.
- d) Using a #2 Phillips screwdriver, insert and tighten the countersink screws.

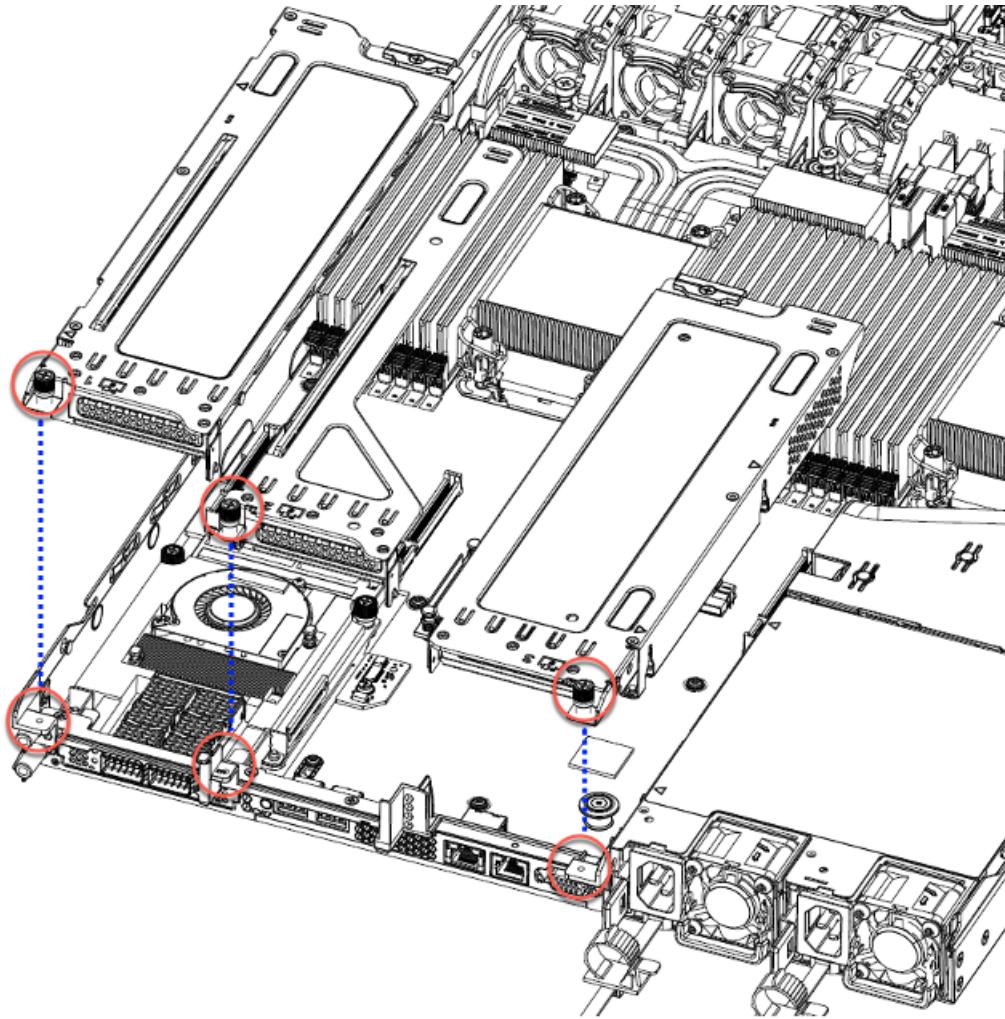
Caution Tighten the screws to 4 lbs-in of torque. Do not over tighten the screws or you risk stripping them.

**Step 4**

Install the two full height riser cages.

- Align riser cages 1 and 2 over their PCIe slots, making sure that the captive thumbscrews are aligned with their screw holes.
- Holding each riser cage level, lower it into its PCIe slot, then tighten the thumbscrew by using a #2 Phillips screwdriver or your fingers.

Caution Tighten the screws to 4 lbs-in of torque. Do not overtighten the screws or you risk stripping them.



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Step 5 Reinstall the server.

- a) Replace the server' top cover.
- b) If needed, reinstall the server in the rack.
- c) If needed, reconnect any cables.

Replacing an OCP Card

As a hardware option, the server can be configured with an Open Compute Project (OCP) 3.0 NIC in the rear mezzanine mLOM slot. To support this option, the server requires the Intel Ethernet Network Adapter X710 OCP 3.0 card (UCSC-O-ID10GC).



Note In addition to an OCP card, the server can support a Cisco mLOM in the rear mezzanine mLOM slot. The server can support either an OCP card or an mLOM, but not both. For information about replacing an mLOM, see [Replacing an mLOM Card, on page 123](#).

See the following topics.

- [Cisco VIC mLOM and OCP Card Replacement Considerations, on page 137](#)
- [Removing an OCP Card, 2FH Riser Cages, on page 138](#)
- [Installing an OCP Card, 2FH Riser Cages, on page 140](#)
- [Removing an OCP Card, 3HH Riser Cages, on page 142](#)
- [Installing an OCP Card, 3 HH Riser Cages, on page 145](#)

Cisco VIC mLOM and OCP Card Replacement Considerations

In Cisco UCS C220 M7 servers, Cisco IMC network connection may be lost in the following situations, while replacing Cisco VIC mLOM and OCP cards:

- If an OCP card is replaced by a Cisco VIC card in the mLOM Slot and the NIC mode is set to **Shared OCP** or **Shared OCP Extended**.
- If a Cisco VIC Card in the mLOM Slot is replaced by an OCP Card and the NIC mode is set to **Cisco-card MLOM**.

Follow these recommendations while replacing Cisco VIC mLOM or OCP cards in Cisco UCS C220 M7 servers to avoid loss of connectivity:

- Before replacing the card, configure any of the NIC modes that has network connected, other than **Cisco card MLOM**, **Shared OCP**, or **Shared OCP Extended**. After replacing the card, configure the appropriate NIC mode.

To set the NIC mode, refer *Server NIC Configuration* section in [Configuration Guides](#) for your Cisco IMC release.

- Or, after replacing the card, configure the appropriate NIC mode using Cisco IMC Configuration Utility/F8.

See [Connecting to the Server Remotely For Setup, on page 24](#).

- Or, after replacing the card, perform factory default settings using Cisco IMC Configuration Utility/F8 then perform the following steps:

1. Once the server is rebooted, boot the system to Cisco IMC Configuration Utility/F8 then change the default password.
2. Configure the appropriate NIC mode settings.

Table 8: Factory Default Settings

VIC in mLOM slot	Intel OCP 3.0 NIC (Intel X710) in mLOM Slot	VIC in Riser Slot	Dedicated Management Port	NIC Mode for CIMC Access
Yes	No	No	Yes	Cisco Card mode with the card in mLOM Slot
No	Yes	No	Yes	Shared OCP Extended
No	Yes	Yes	Yes	Shared OCP Extended
No	No	Yes	Yes	Cisco Card with VIC SLOT based on precedence: For C220 M7: 1. Riser 1 - Slot 1 2. Riser 3 - Slot 3 For C240 M7: 1. Riser 1 - Slot 2 2. Riser 2 - Slot 5 3. Riser 1 - Slot 1 4. Riser 2 - Slot 4
No	No	No	Yes	Dedicated

Removing an OCP Card, 2FH Riser Cages

The OCP card (UCSC-O-ID10GC) mounts into the rear mezzanine mLOM slot. You will need to open the server top cover to remove or install the OCP card.

Use the following procedure to remove the OCP card from a server with full-height risers.

Before you begin

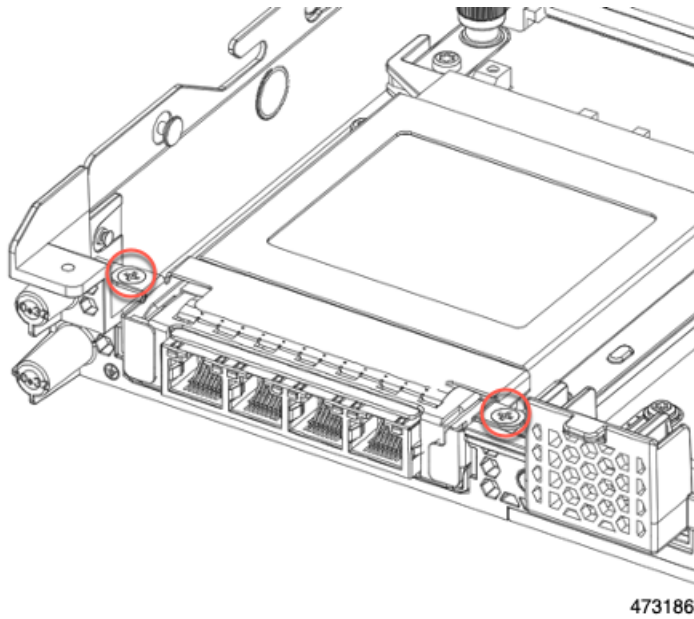
Gather a #2 Phillips screwdriver.

Step 1 If you have not removed the server's top cover, do so now.

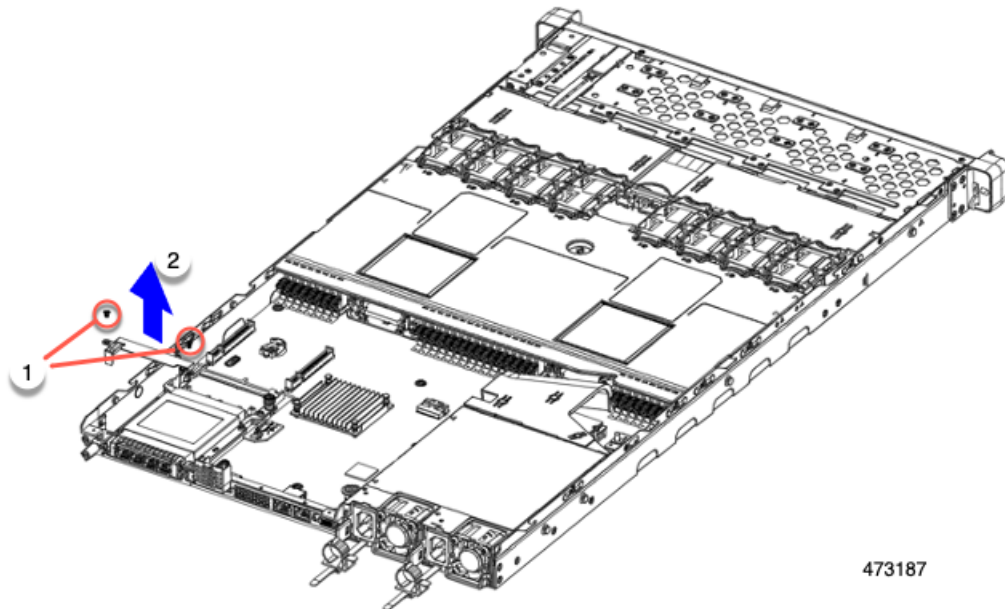
See [Removing Top Cover, on page 39](#).

Step 2 Remove the OCP bracket.

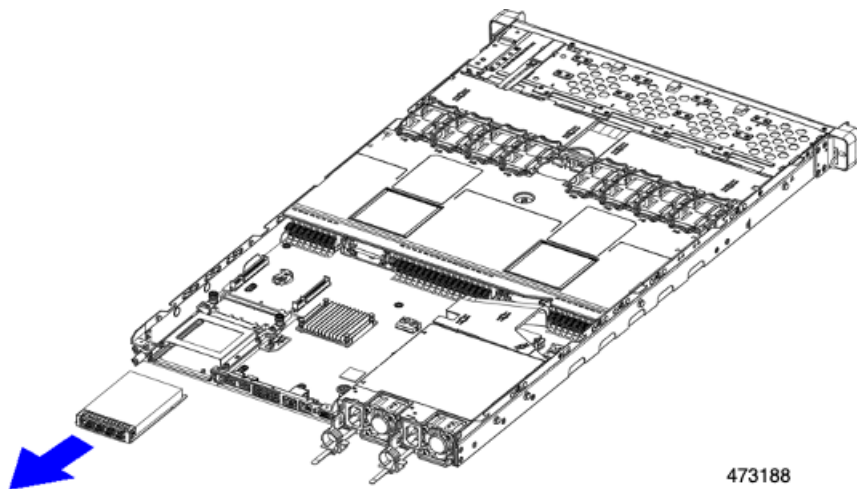
a) Locate the four screws that secure the rear wall to the server sheetmetal.



- b) Using a #2 Phillips screwdriver, remove the screws and lift the bracket off of the server.



- c) Holding the OCP card level, slide it out of the server.

**Step 3** Choose the appropriate option:

- Reinstall an OCP Card. See [Installing an OCP Card, 2FH Riser Cages, on page 140](#) or [Installing an OCP Card, 3 HH Riser Cages, on page 145](#)
- Install an mLOM. See [Installing an mLOM Card \(2FH Riser Cages\), on page 126](#) or [Installing an mLOM Card \(3HH Riser Cages\), on page 132](#).
- Replace the top cover and return the server to operation.

Installing an OCP Card, 2FH Riser Cages

The OCP 3.0 card (UCSC-O-ID10GC) installs into the rear mezzanine mLOM slot and connects to an adapter, not directly to the motherboard. To install the OCP card, the server's top cover must be opened to gain access to screws that secure the OCP card in place.

Use the following task to install an OCP 3.0 card in a server with full-height risers.

Before you begin

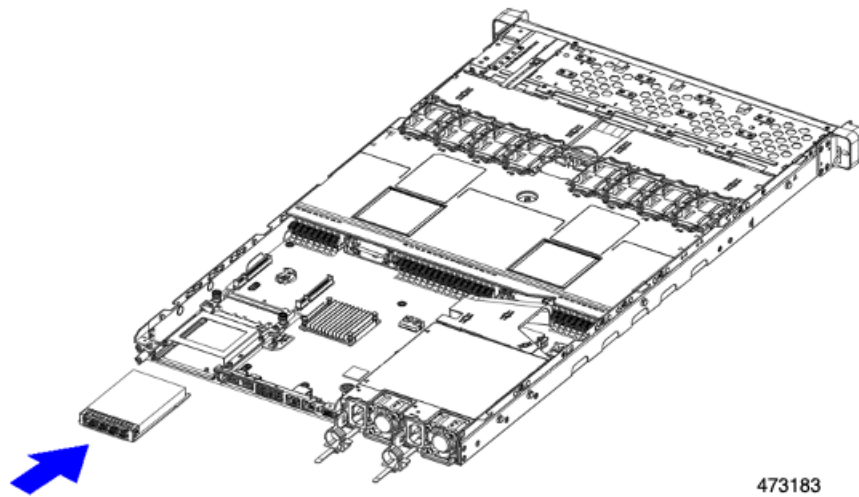
Gather a #2 Phillips screwdriver.

Step 1 If you have not removed the server's top cover, do so now.

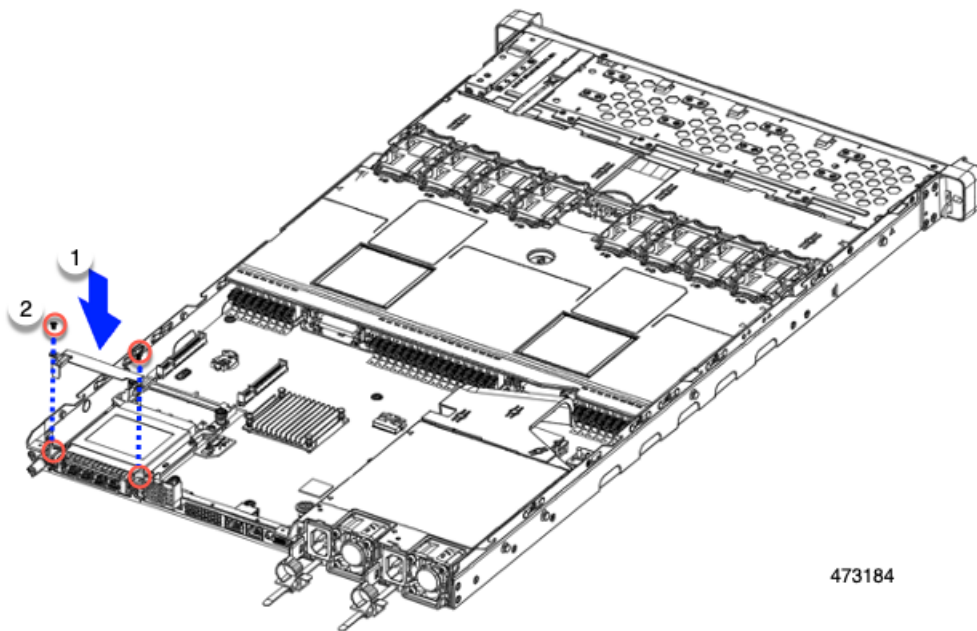
[Removing Top Cover, on page 39](#).

Step 2 Install the OCP card.

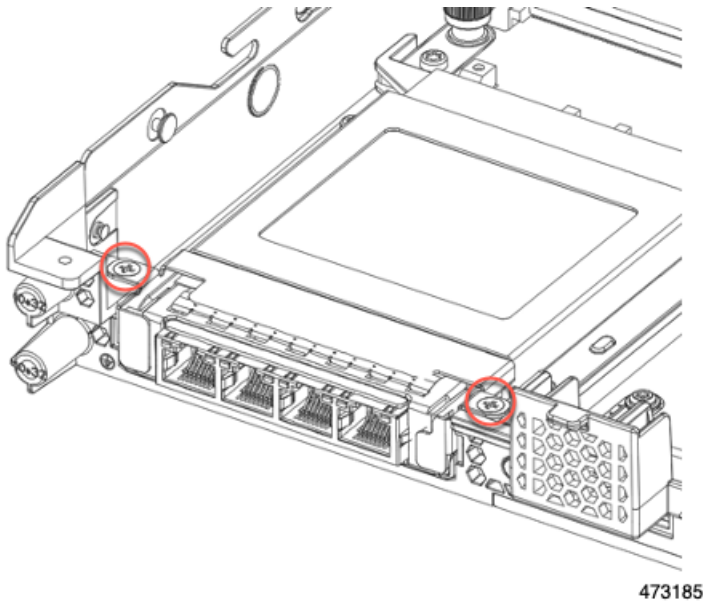
a) Holding the OCP card level, slide it into the slot on the rear of the server.



- b) Install the OCP bracket, making sure to align the screwholes at each end with the screwholes on the OCP/mLOM slot.



Step 3 Using a #2 Phillips screwdriver, tighten the screws to secure the OCP bracket and OCP card to the server.



What to do next

Replace the server top cover.

Removing an OCP Card, 3HH Riser Cages

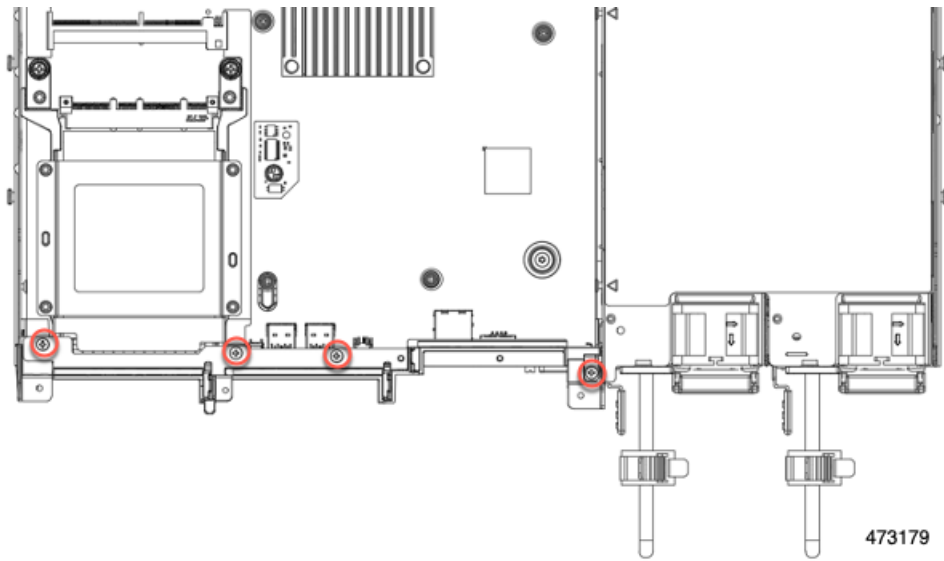
The OCP card (UCSC-O-ID10GC) mounts into the rear mezzanine mLOM slot. You will need to open the server top cover to remove or install the OCP card.

Use the following procedure to remove the OCP card from a server with half-height risers.

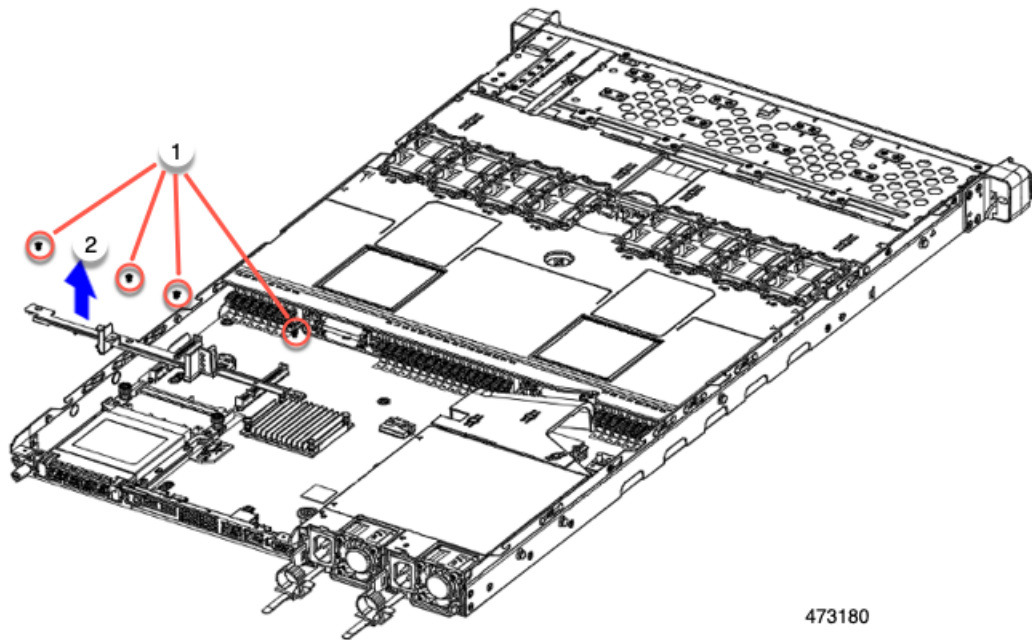
Before you begin

Gather a #2 Phillips screwdriver.

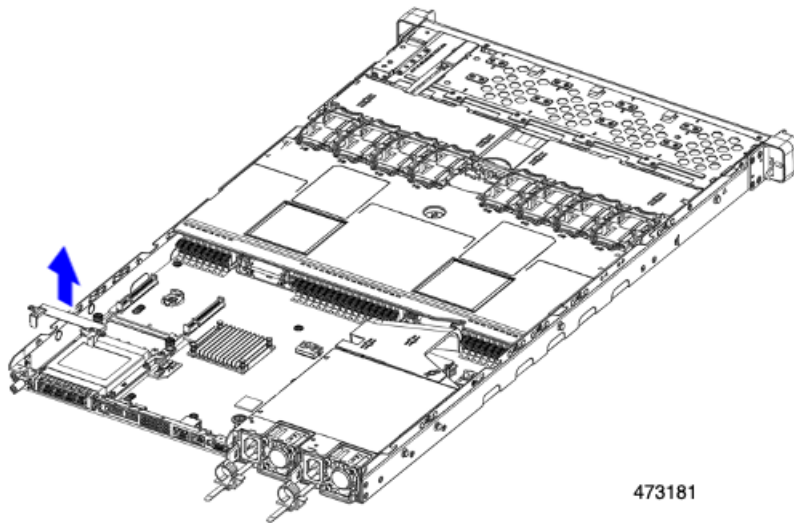
- Step 1** If you have not removed the server's top cover, do so now.
See [Removing Top Cover, on page 39](#).
- Step 2** Remove the OCP bracket.
- a) Locate the four screws that secure the rear wall to the server sheetmetal.



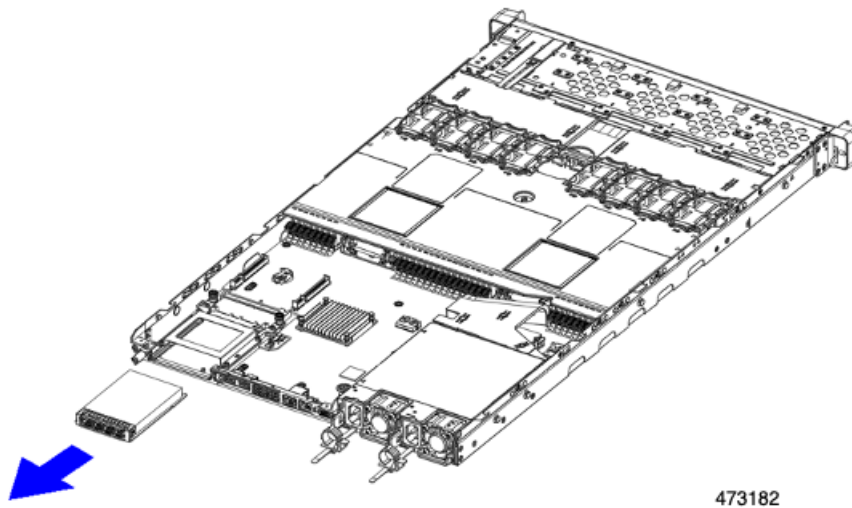
b) Using a #2 Phillips screwdriver, remove the screws and lift the rear wall off of the server.



c) Remove the OCP card bracket.



d) Holding the OCP card level, slide it out of the server.



Step 3 Choose the appropriate option:

- Reinstall an OCP Card. See [Installing an OCP Card, 2FH Riser Cages, on page 140](#) or [Installing an OCP Card, 3 HH Riser Cages, on page 145](#)
- Install an mLOM. See [Installing an mLOM Card \(2FH Riser Cages\), on page 126](#) or [Installing an mLOM Card \(3HH Riser Cages\), on page 132](#).
- Replace the top cover and return the server to operation.

Installing an OCP Card, 3 HH Riser Cages

The OCP 3.0 card (UCSC-O-ID10GC) installs into the rear mezzanine mLOM slot and connects to an adapter, not directly to the motherboard. To install the OCP card, the server's top cover must be opened to gain access to screws that secure the OCP card in place.

Use the following task to install an OCP 3.0 card in a server with half-height risers.

Before you begin

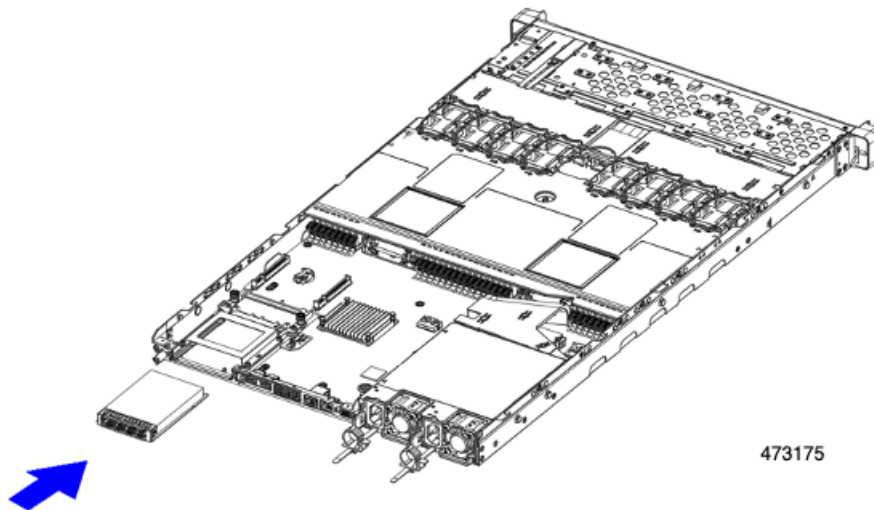
Gather a #2 Phillips screwdriver.

Step 1 If you have not removed the server's top cover, do so now.

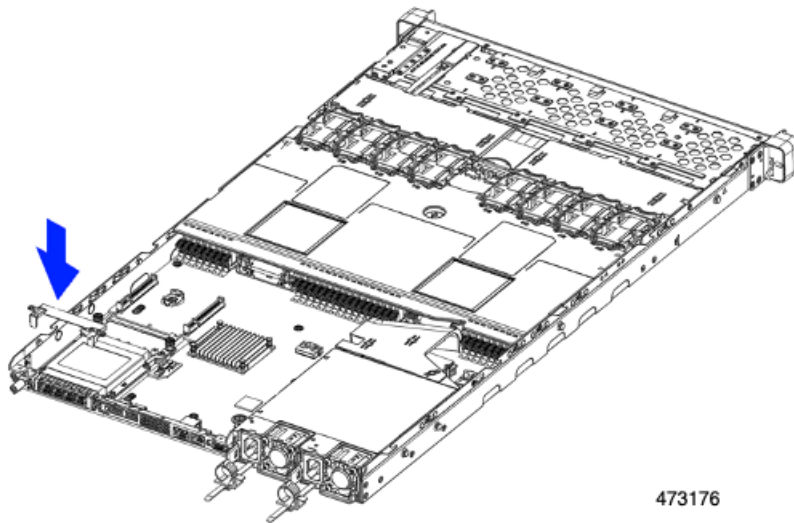
[Removing Top Cover, on page 39.](#)

Step 2 Install the OCP card.

a) Holding the OCP card level, slide it into the slot on the rear of the server.



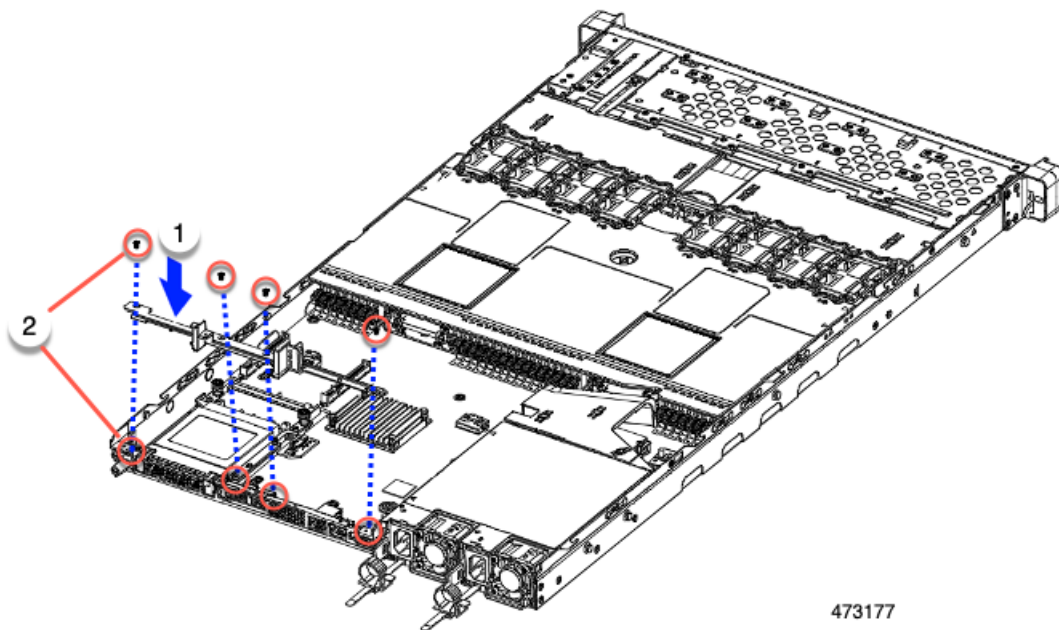
b) Install the OCP bracket, making sure to align the screwholes at each end with the screwholes on the OCP/mLOM slot.



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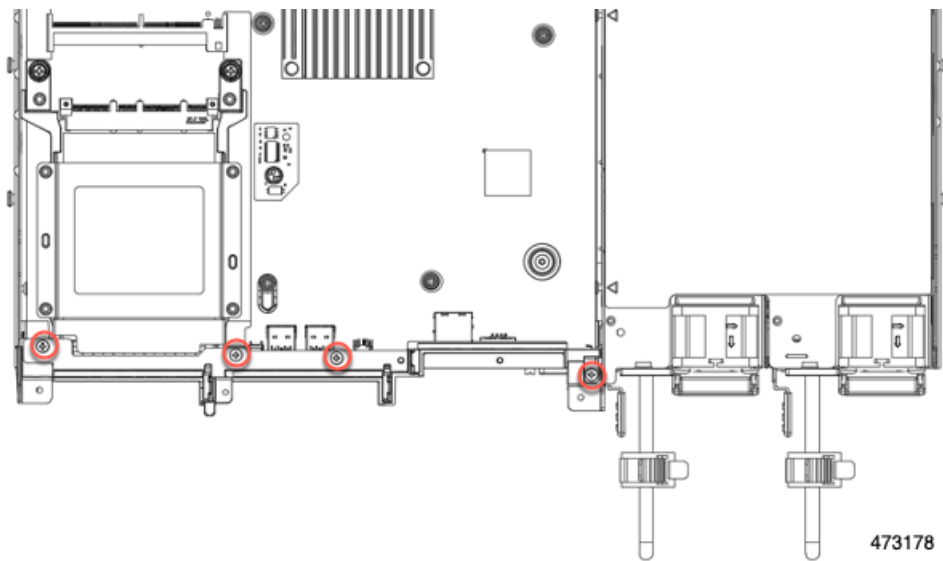
Step 3 Install the rear wall.

- a) Align the rear wall with the screwholes in the slot and bracket.
- b) Insert the four #2 Phillips screws through the screwholes in the rear wall and the OCP bracket.



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Step 4 Using a #2 Phillips screwdriver, tighten the screws to secure the rear wall, OCP bracket, and OCP card to the server.



What to do next

Replace the server top cover.

Replacing a RAID Card

The server has a dedicated Cisco modular storage controller card (RAID or HBA) for embedded software RAID. This card attaches to the motherboard and plugs into a horizontal socket on the back of the front mezzanine drive backplane.

Step 1 Prepare the server for component installation:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).

Step 2 Remove the existing RAID card:

- a) Disconnect the cable(s) that connect to the card.
- b) Using a #2 Phillips screwdriver, loosen the two captive screws that secure the card to the motherboard.
- c) Grasp the handle on the top of the card, and slowly pull the handle to towards the rear of the server.

Notice the handle has a label for both the unlocked or locked position. Moving the handle to the unlocked position disconnects the card's connector from its socket on the front mezzanine drive backplane.

- d) Remove the card from the server and place it on a rubberized mat or other ESD-safe workspace.

Notice the alignment features. The socket on the backplane has a guide pin to ensure correct installation, and the card itself has a receptacle to catch the guide pin.

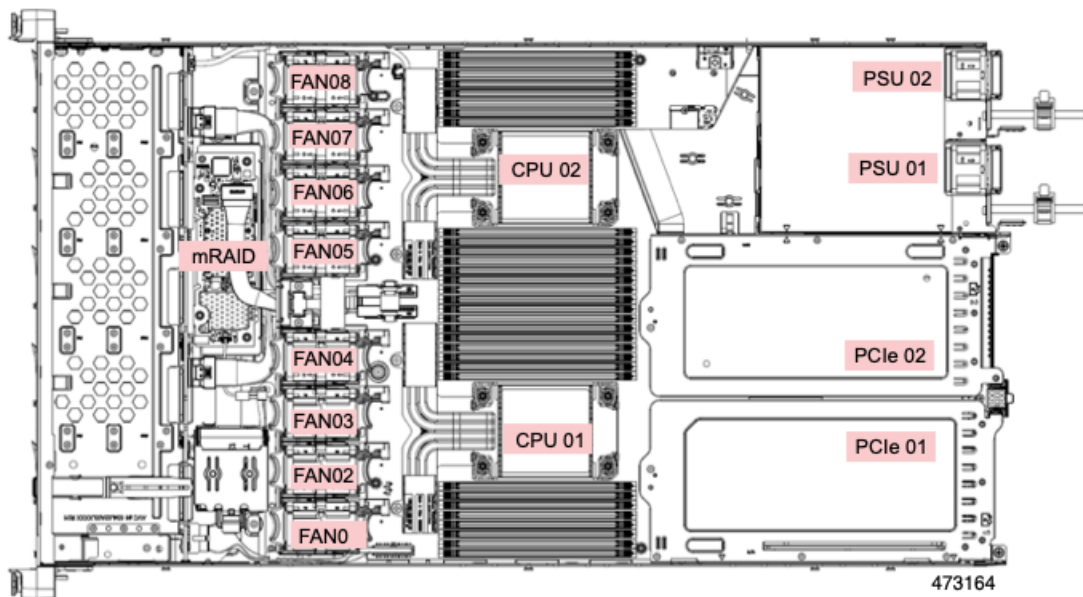
Step 3 Install a new card:

- Align the card with its location on the motherboard.
- Holding the card level, make sure that the receptacle catches the guide pin.
- Slowly pull the handle towards the front of the server to the locked position.
- When the card is seated into its drive backplane socket, use a #2 Phillips screwdriver to tighten the captive screws.

Step 4 Replace the top cover to the server.

Step 5 Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Figure 47: RAID Controller Location



Replacing a SAS Storage Controller Card (RAID or HBA)

For hardware-based storage control, the server can use a Cisco modular 12G SAS RAID controller or Cisco 12 G SAS HBA that plugs into a horizontal socket on the front mezzanine drive backplane.

- The Cisco 12G SAS RAID controller (UCSC-SAS-M6T) supports up to 16 SAS HDD or SAS/SATA SSD drives operating at 3 Gbs, 6 Gbs, and 12 Gbs.

It includes a SuperCap module (UCS-SCAP-M6) for write cache backup, a 4 GB flash-back write cache (FBWC), and supports RAID 0, 1, 5, 6, 10, 50, 60, JBOD mode, and SRAID0.

For all self-encrypting drives (SED), standalone Management (CIMC/UCSM) is supported for configuring and managing local keys. SED drives are managed with local key management only.

- The Cisco 12G SAS HBA (UCSC-9500-8e) supports up to 16 SAS HDD or SAS/ SATA SSD drives operating at 3 Gbs, 6 Gbs, and 12 Gbs. It supports JBOD or pass-through mode (not RAID).

- The Cisco 24G Tri-Mode RAID Controller (UCSC-RAID-HP) supports up to 16 SAS/SATA or NVMe SSDs operating at 3 Gbs, 6 Gbs, and 12 Gbs. Drives that are managed by this controller are hot-swappable regardless of the media type.

It includes a SuperCap module (UCS-SCAP-M6) for write cache backup, a 4 GB flash-back write cache (FBWC), and supports RAID 0, 1, 5, 6, 10, 50, and 60.

This controller will be supported after initial product release. For NVMe RAID, only U.3 NVM SSDs are supported.

Storage Controller Card Firmware Compatibility

Firmware on the storage controller (RAID or HBA) must be verified for compatibility with the current Cisco IMC and BIOS versions that are installed on the server. If not compatible, upgrade or downgrade the storage controller firmware using the Cisco Host Upgrade Utility (HUU) for your firmware release to bring it to a compatible level.

See the HUU guide for your Cisco IMC release for instructions on downloading and using the utility to bring server components to compatible levels: [HUU Guides](#).



Note **For servers running in standalone mode only:** After you replace controller hardware, you must run the Cisco Host Upgrade Utility (HUU) to update the controller firmware, even if the firmware Current Version is the same as the Update Version. This is necessary to program the controller's suboem-id to the correct value for the server SKU. If you do not do this, drive enumeration might not display correctly in the software. This issue does not affect servers controlled in UCSM mode.

Replacing a SAS Storage Controller Card (RAID or HBA)

Step 1

Prepare the server for component installation:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).

Step 2

Remove the controller from the server:

- a) Using both hands, grasp the external blue handle on the rear of the riser and the blue finger-grip on the front end of the riser.
- b) Lift the riser straight up to disengage it from the motherboard socket.
- c) Set the riser upside down on an antistatic surface.

Step 3

Remove the existing controller card:

- a) Disconnect the cable(s) that connect to the card.
- b) Using a #2 Phillips screwdriver, loosen the two captive screws that secure the card to the motherboard.
- c) Grasp the handle on the top of the card, and slowly pull the handle to towards the rear of the server.

Notice the handle has a label for both the unlocked or locked position. Moving the handle to the unlocked position disconnects the card's connector from its socket on the front mezzanine drive backplane.

- d) Remove the card from the server and place it on a rubberized mat or other ESD-safe workspace.

Notice the alignment features. The socket on the backplane has a guide pin to ensure correct installation, and the card itself has a receptacle to catch the guide pin.

Step 4 Install a new controller:

- a) Align the card with its location on the motherboard.
- b) Holding the card level, make sure that the receptacle catches the guide pin.
- c) Slowly pull the handle towards the front of the server to the locked position.
- d) When the card is seated into its drive backplane socket, use a #2 Phillips screwdriver to tighten the captive screws.

Step 5 Replace the top cover to the server.

Step 6 Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Step 7 If your server is running in standalone mode, use the Cisco UCS Host Upgrade Utility to update the controller firmware and program the correct suboem-id for the controller.

Note **For servers running in standalone mode only:** After you replace controller hardware, you must run the Cisco UCS Host Upgrade Utility (HUU) to update the controller firmware, even if the firmware Current Version is the same as the Update Version. This is necessary to program the controller's suboem-id to the correct value for the server SKU. If you do not do this, drive enumeration might not display correctly in the software. This issue does not affect servers controlled in UCSM mode.

See the HUU guide for your Cisco IMC release for instructions on downloading and using the utility to bring server components to compatible levels: [HUU Guides](#).

Replacing a Boot-Optimized M.2 RAID Controller Module

The Cisco Boot-Optimized M.2 RAID Controller module connects to the mini-storage module socket on the motherboard. It includes slots for two SATA M.2 drives, plus an integrated 6-Gbps SATA RAID controller that can control the SATA M.2 drives in a RAID 1 array. The Cisco Boot-Optimized M.2 RAID Controller module (UCS-M2-HWRAID-D) plugs into a connector on the motherboard and holds up to 2 M.2 SATA drives.

The server supports the following SATA M.2 drives are:

- 240 GB M.2 SATA SSD:
 - UCS-M2-240G-D
 - UCS-M2-240GB-D
 - UCS-M2-I240GB-D
- 480 GB M.2 SATA SSD:
 - UCS-M2-480G-D
 - UCS-M2-I480GB-D

- 960 GB M.2 SATA SSD:
 - UCS-M2-960G-D
 - UCSC-M2-960GB-D

Cisco Boot-Optimized M.2 RAID Controller Considerations

Review the following considerations:



Note The Cisco Boot-Optimized M.2 RAID Controller is not supported when the server is used as a compute-only node in Cisco HyperFlex configurations.

- The minimum version of Cisco IMC and Cisco UCS Manager that support this controller is 4.0(4) and later.
- This controller supports RAID 1 (single volume) and JBOD mode.



Note Do not use the server's embedded SW MegaRAID controller to configure RAID settings when using this controller module. Instead, you can use the following interfaces:

- Cisco IMC 4.2(1) and later
 - BIOS HII utility, BIOS 4.2(1) and later
 - Cisco UCS Manager 4.2(1) and later (UCS Manager-integrated servers)
-

The name of the controller in the software is MSTOR-RAID.

- The controller supports only 240 GB, 480 GB, and 960 GB M.2 SSDs. The M.2 SATA SSDs must be identical. You cannot mix M.2 drives with different capacities. For example, one 240 GB M.2 and one 960 GB M.2 is an unsupported configuration.
- The Boot-Optimized RAID controller supports VMWare, Windows, and Linux Operating Systems only.
- A SATA M.2 drive in slot 1 (the top) is the first SATA device; a SATA M.2 drive in slot 2 (the underside) is the second SATA device.
 - The name of the controller in the software is MSTOR-RAID.
 - A drive in Slot 1 is mapped as drive 253; a drive in slot 2 is mapped as drive 254.
- It is recommended that M.2 SATA SSDs be used as boot-only devices.
- When using RAID, we recommend that both SATA M.2 drives are the same capacity. If different capacities are used, the smaller capacity of the two drives is used to create a volume and the rest of the drive space is unusable.

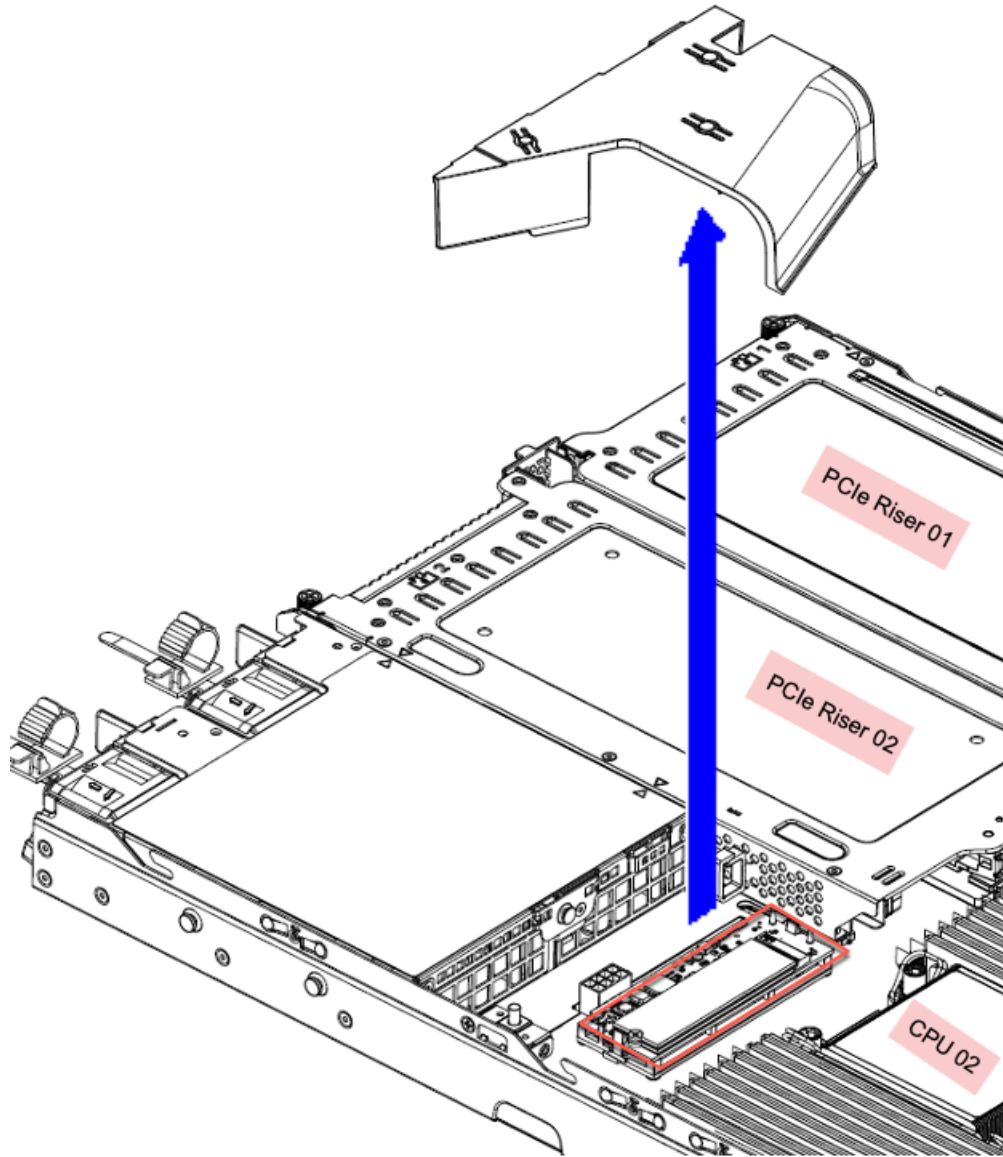
JBOD mode supports mixed capacity SATA M.2 drives.
- Hot-plug replacement is *not* supported. The server must be powered off.

- Monitoring of the controller and installed SATA M.2 drives can be done using Cisco IMC and Cisco UCS Manager. They can also be monitored using other utilities such as UEFI HII, PMCLI, XMLAPI, and Redfish.
- CIMC/UCSM is supported for configuring of volumes and monitoring of the controller and installed SATA M.2 drives.
- Updating firmware of the controller and the individual drives:
 - For standalone servers, use the Cisco Host Upgrade Utility (HUU). Refer to the [HUU Documentation](#).
 - For servers integrated with Cisco UCS Manager, refer to the [Cisco UCS Manager Firmware Management Guide](#).
- The SATA M.2 drives can boot in UEFI mode only. Legacy boot mode is not supported.
- If you replace a single SATA M.2 drive that was part of a RAID volume, rebuild of the volume is auto-initiated after the user accepts the prompt to import the configuration. If you replace both drives of a volume, you must create a RAID volume and manually reinstall any OS.
- We recommend that you erase drive contents before creating volumes on used drives from another server. The configuration utility in the server BIOS includes a SATA secure-erase function.
- The server BIOS includes a configuration utility specific to this controller that you can use to create and delete RAID volumes, view controller properties, and erase the physical drive contents. Access the utility by pressing **F2** when prompted during server boot. Then navigate to **Advanced > Cisco Boot Optimized M.2 RAID Controller**.
- The boot-optimized RAID controller is not supported when the server is used as a compute node in HyperFlex configurations.

Replacing a Cisco Boot-Optimized M.2 RAID Controller

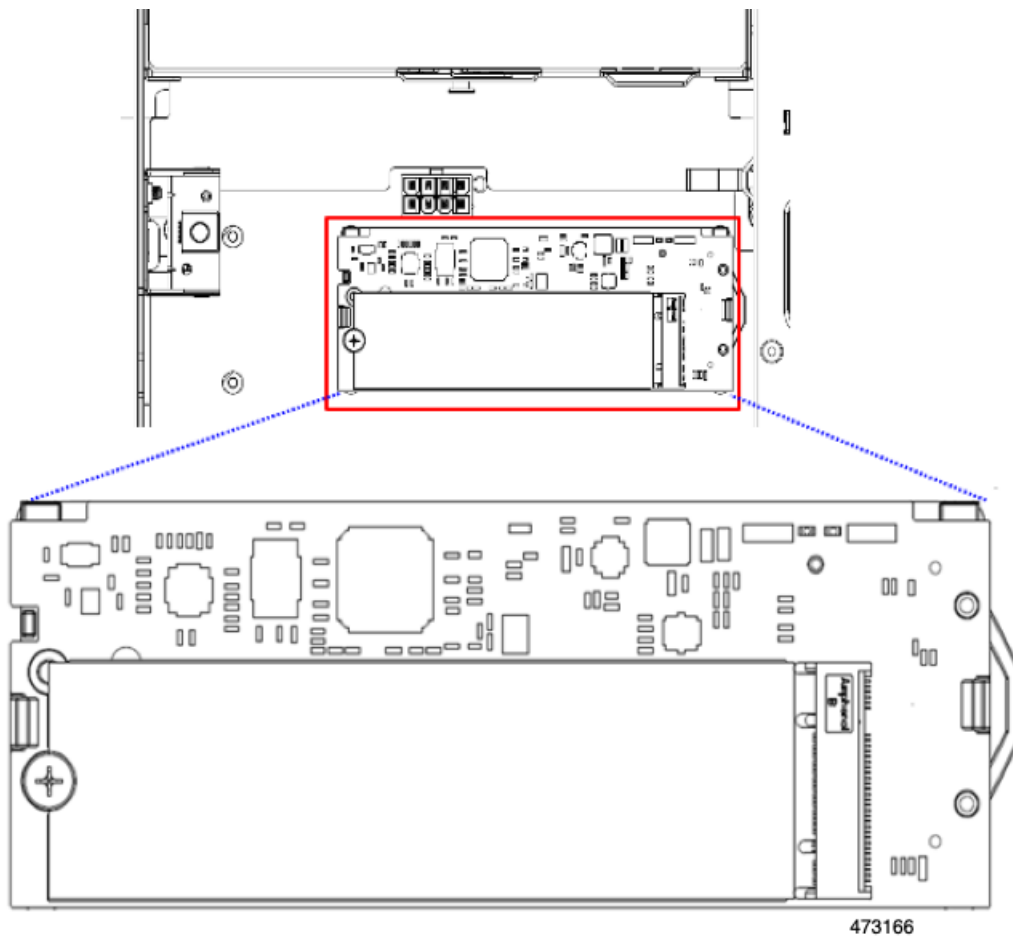
This topic describes how to remove and replace a Cisco Boot-Optimized M.2 RAID Controller. The controller board has one M.2 socket on its top (Slot 1) and one M.2 socket on its underside (Slot 2).

-
- Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
- Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Step 3** Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).
- Step 4** Grasp and remove the air baffle located between CPU 2 and PCIe Riser 3.



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- Step 5** Remove a controller from its motherboard socket:
- Locate the controller in its socket just behind CPU 2.



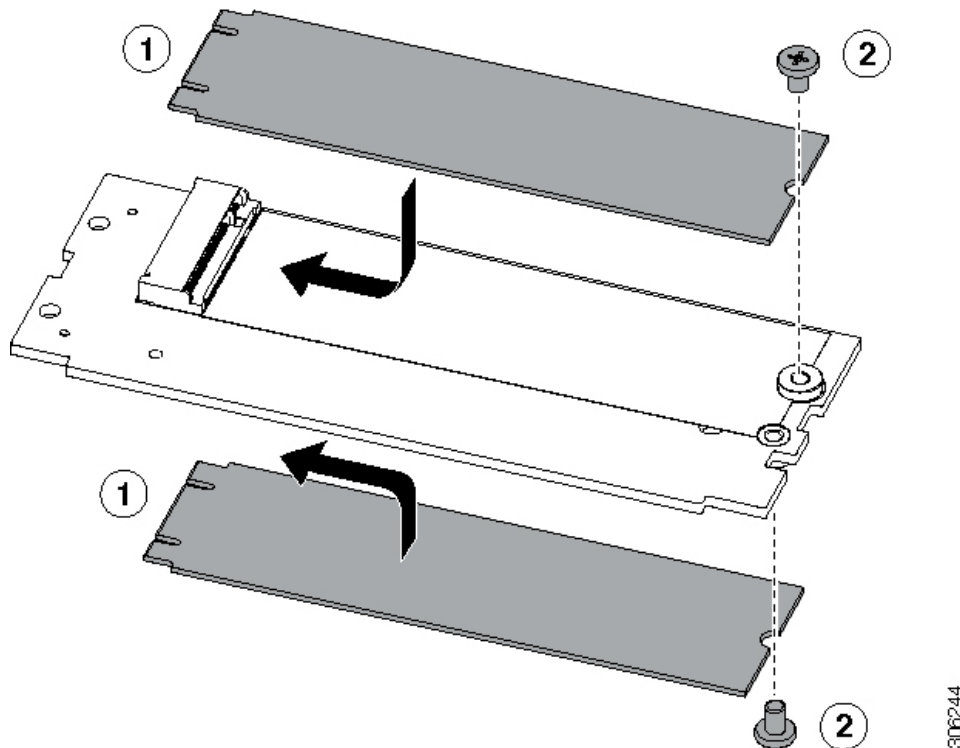
- b) At each end of the controller board, push outward on the clip that secures the carrier.
- c) Lift both ends of the controller to disengage it from the socket on the motherboard.
- d) Set the carrier on an anti-static surface.

Step 6 If you are transferring SATA M.2 drives from the old controller to the replacement controller, do that before installing the replacement controller:

Note Any previously configured volume and data on the drives are preserved when the M.2 drives are transferred to the new controller. The system will boot the existing OS that is installed on the drives.

- a) Use a #1 Phillips-head screwdriver to remove the single screw that secures the M.2 drive to the carrier.
- b) Lift the M.2 drive from its socket on the carrier.
- c) Position the replacement M.2 drive over the socket on the controller board.
- d) Angle the M.2 drive downward and insert the connector-end into the socket on the carrier. The M.2 drive's label must face up.
- e) Press the M.2 drive flat against the carrier.
- f) Install the single screw that secures the end of the M.2 SSD to the carrier.
- g) Turn the controller over and install the second M.2 drive.

Figure 48: Cisco Boot-Optimized M.2 RAID Controller, Showing M.2 Drive Installation



- Step 7** Install the controller to its socket on the motherboard:
- Position the controller over socket, with the controller's connector facing down and at the same end as the motherboard socket. Two alignment pegs must match with two holes on the controller.
 - Gently push down the socket end of the controller so that the two pegs go through the two holes on the controller.
 - Push down on the controller so that the securing clips click over it at both ends.
- Step 8** Replace the top cover to the server.
- Step 9** Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Replacing the Supercap (RAID Backup)

This server supports installation of one Supercap unit (UCS-SCAP-D). The unit mounts to a bracket and attaches through the Supercap cable (CBL-SCAP-C220-D).

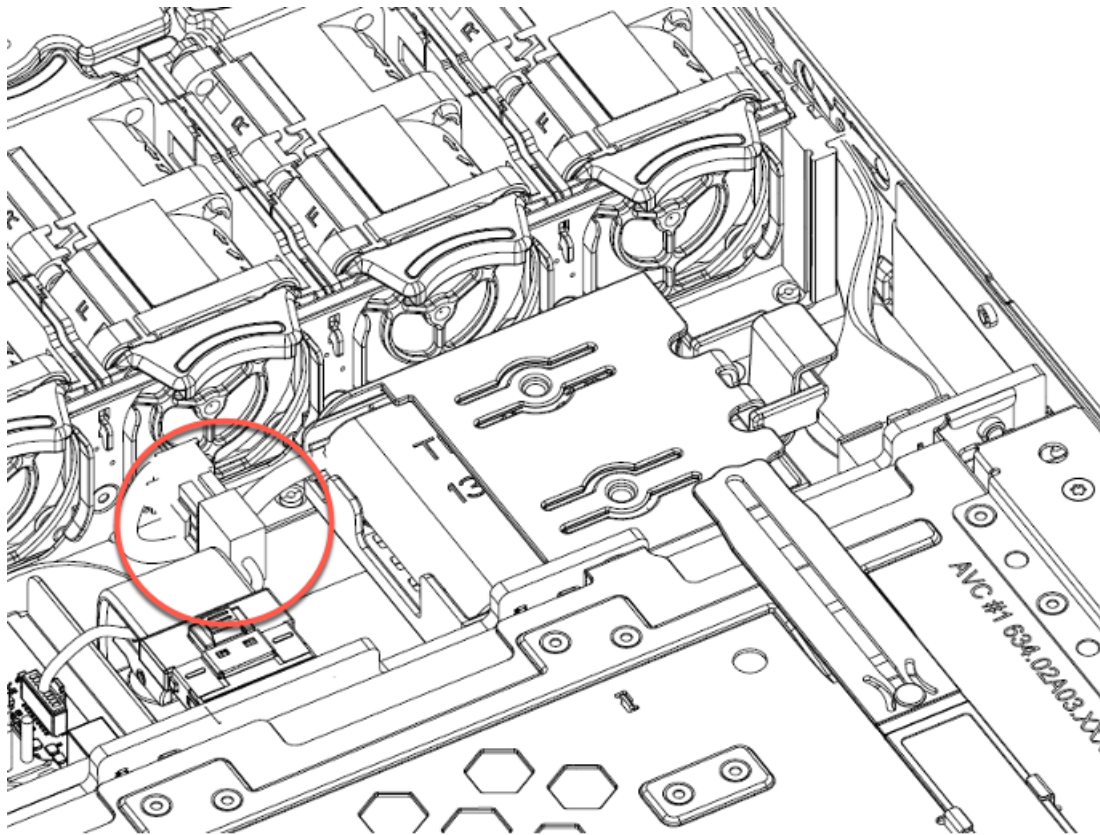
- Step 1** Prepare the server for component installation:
- Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
 - Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).

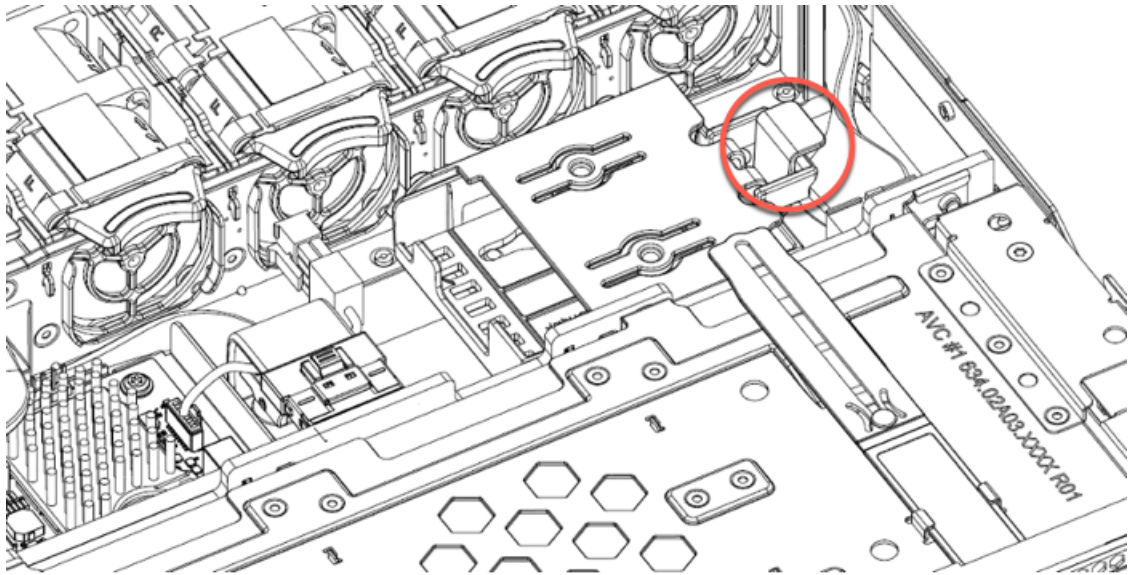
Step 2 Remove an existing Supercap:

- a) Locate the Supercap modules near the RAID card by the front-loading drives.
b) Disconnect the Supercap cable connector from the RAID cable connector.



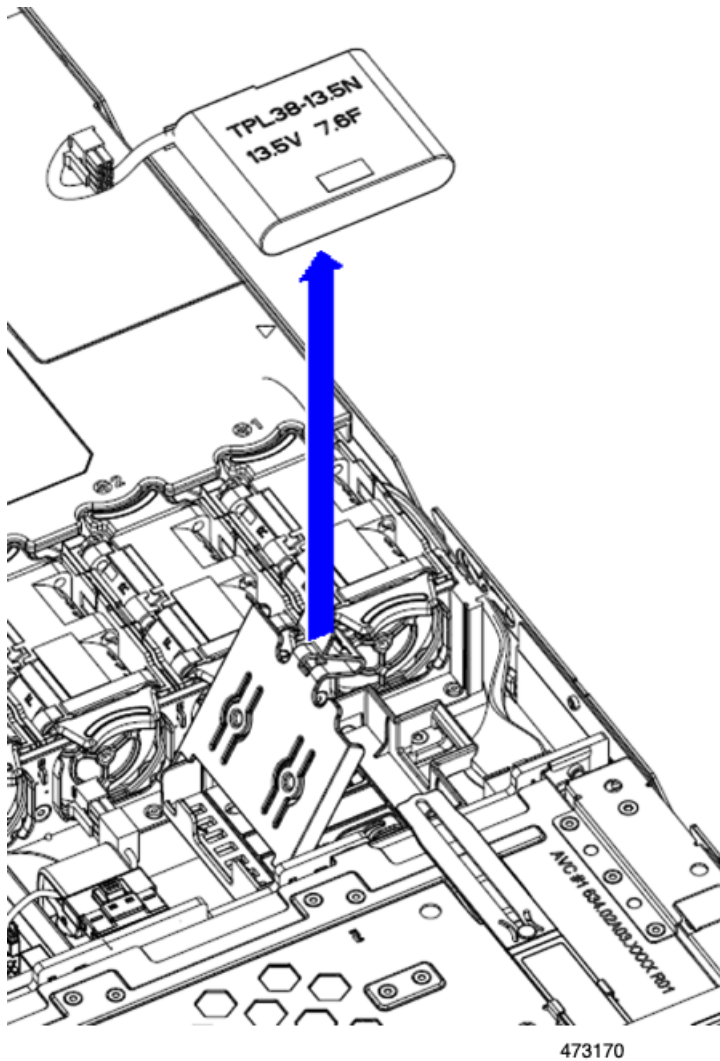
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- c) Push aside the securing tab and open the hinged door that secures the Supercap to its bracket.



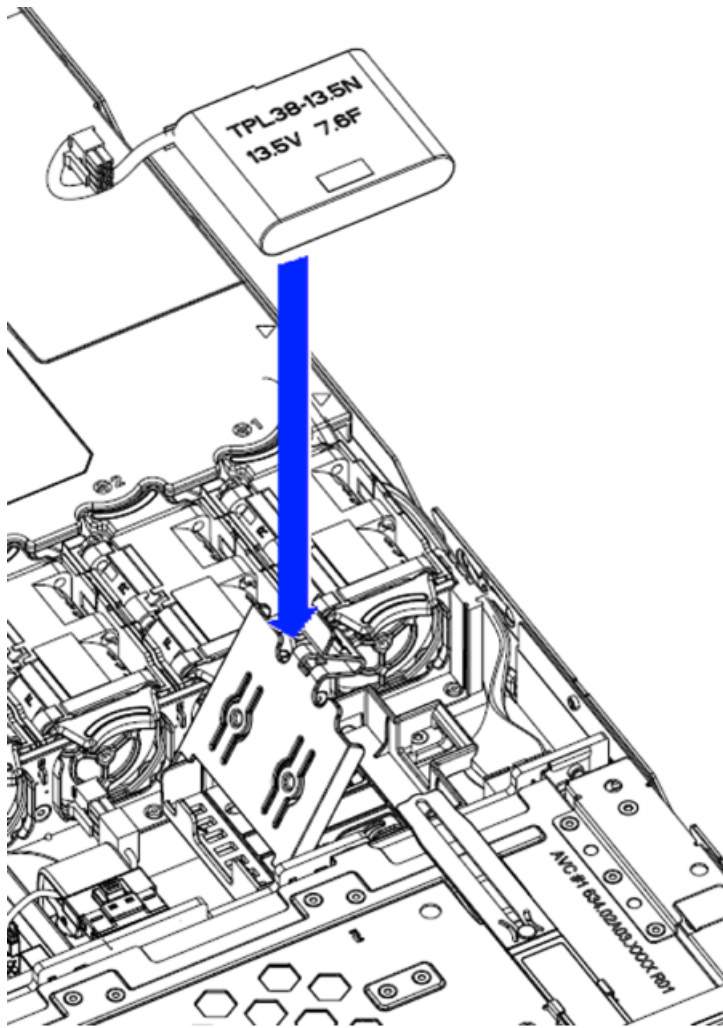
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- d) Lift the Supercap free of the bracket and set it aside.

**Step 3** Install a new Supercap:

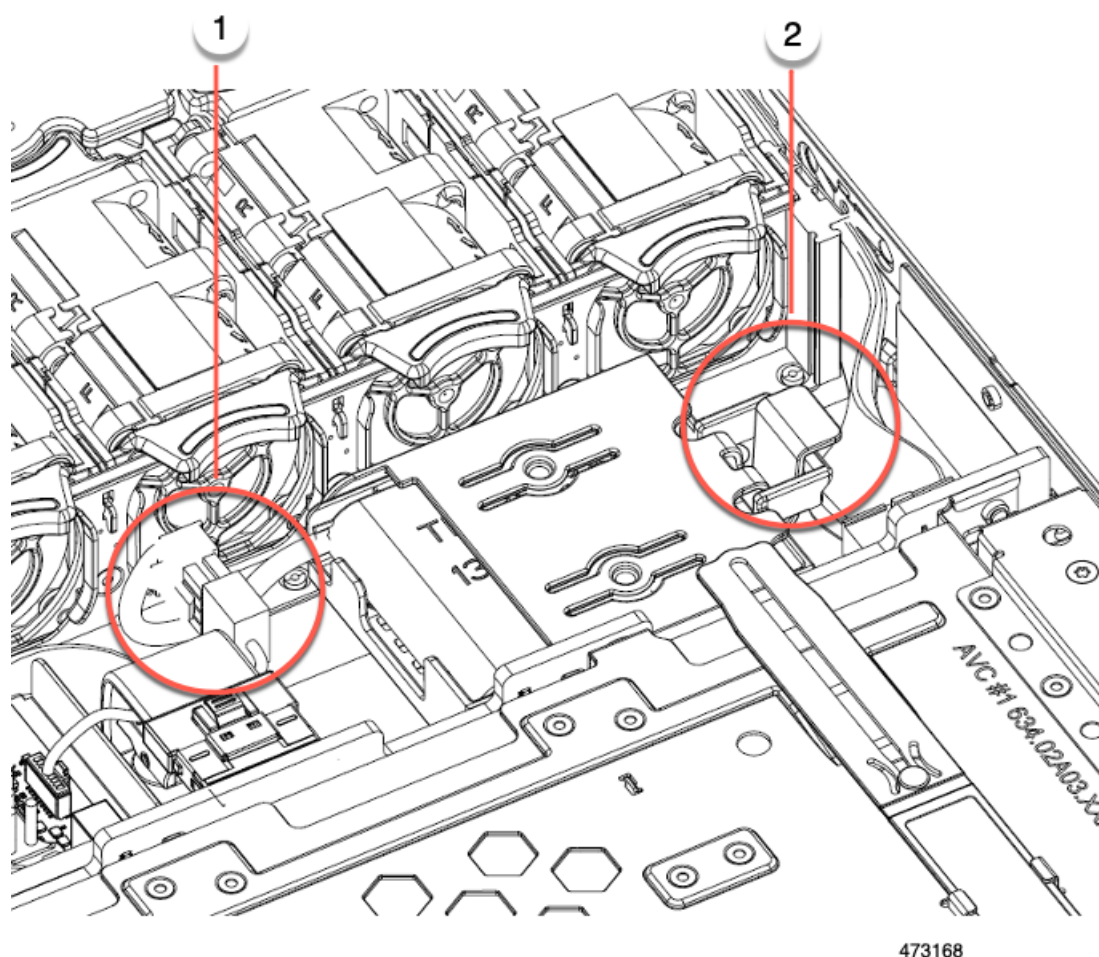
- Orient the Supercap so that its cable connector is facing the RAID cable connector.
- Make sure that the RAID cable will not obstruct installation, then insert the new Supercap into the mounting bracket.

Note You must feed the Supercap cable and connector through the open space in the tray so that the Supercap cable can connect to the RAID cable.



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- c) Connect the Supercap cable from the RAID controller card to the connector on the new Supercap cable.
- d) Close the hinged plastic bracket over the Supercap. Push down until the securing tab clicks.



Step 4 Replace the top cover to the server.

Step 5 Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Replacing a SATA Interposer Card

For software-based storage control that uses the server's embedded SATA controller, the server requires a SATA interposer card that attaches horizontally to the motherboard and plugs into a horizontal socket on the rear of the front mezzanine backplane.

The SATA Interposer card (UCSC-SATAIN-220M7) supports Advanced Host Control Interface (AHCI) by default. AHCI supports SATA-only drives. A maximum of 8 SATA drives is supported with AHCI, and this configuration requires a SATA interposer card, which plugs directly into the drive backplane. The SATA Interposer supports drives in slots 1-4 and 6-9.

Step 1 Prepare the server for component installation:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).

Step 2

Remove the existing card:

- a) Disconnect the cable(s) that connect to the card.
- b) Using a #2 Phillips screwdriver, loosen the two captive screws that secure the card to the motherboard.
- c) Grasp the handle on the top of the card, and slowly pull the handle to towards the rear of the server.

Notice the handle has a label for both the unlocked or locked position. Moving the handle to the unlocked position disconnects the card's connector from its socket on the front mezzanine drive backplane.

- d) Remove the card from the server and place it on a rubberized mat or other ESD-safe workspace.

Notice the alignment features. The socket on the backplane has a guide pin to ensure correct installation, and the card itself has a receptacle to catch the guide pin.

Step 3

Install a new card:

- a) Align the card with its location on the motherboard.
- b) Holding the card level, make sure that the receptacle catches the guide pin.
- c) Slowly pull the handle towards the front of the server to the locked position.
- d) When the card is seated into its drive backplane socket, use a #2 Phillips screwdriver to tighten the captive screws.

Step 4

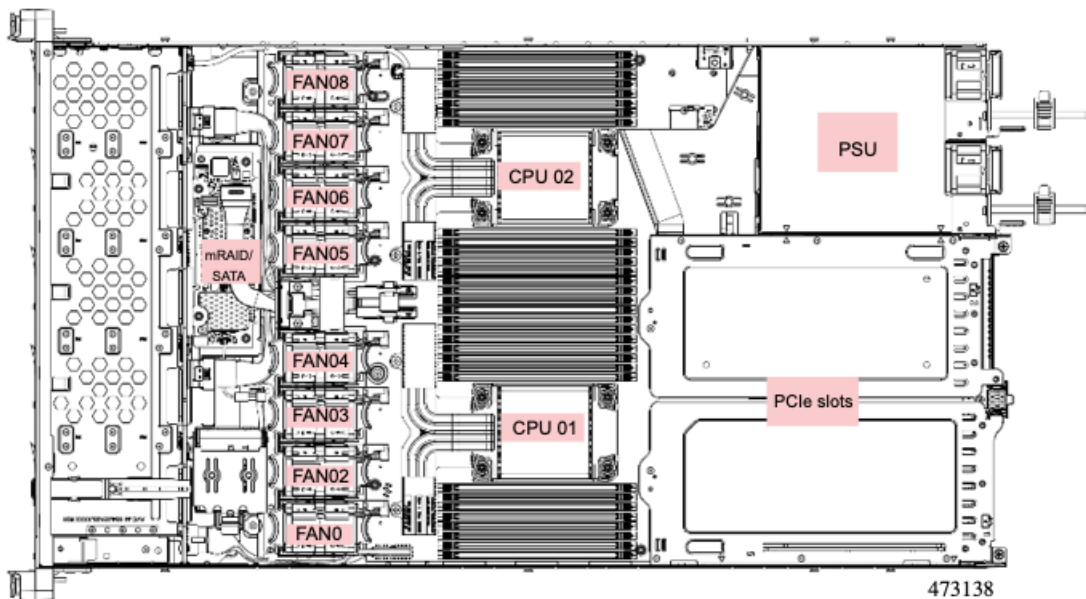
Reconnect the cables to their connectors on the new card.

Step 5

Replace the top cover to the server.

Step 6

Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.



1	External blue handle	3	Card-ejector lever
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2	Two pegs on inner chassis wall	-	
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Replacing a Chassis Intrusion Switch

The chassis intrusion switch is an optional security feature that logs an event in the system event log (SEL) whenever the cover is removed from the chassis.

- Step 1** Prepare the server for component installation:
- Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
 - Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.
 - Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).
- Step 2** Remove an existing intrusion switch:
- Disconnect the intrusion switch cable from the socket on the motherboard.
 - Use a #1 Phillips-head screwdriver to loosen and remove the single screw that holds the switch mechanism to the chassis wall.
 - Slide the switch mechanism straight up to disengage it from the clips on the chassis.
- Step 3** Install a new intrusion switch:
- Slide the switch mechanism down into the clips on the chassis wall so that the screw hole lines up.
 - Use a #1 Phillips-head screwdriver to install the single screw that secures the switch mechanism to the chassis wall.
 - Connect the switch cable to the socket on the motherboard.
- Step 4** Replace the cover to the server.
- Step 5** Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Replacing the RTC Battery



Warning There is danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

[Statement 1015]



Warning **Recyclers:** Do not shred the battery! Make sure you dispose of the battery according to appropriate regulations for your country or locale.

The real-time clock (RTC) battery retains system settings when the server is disconnected from power. The battery type is CR2032. Cisco supports the industry-standard CR2032 battery, which can be ordered from Cisco (PID N20-MBLIBATT) or purchased from most electronic stores.

Step 1 Remove the RTC battery:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.

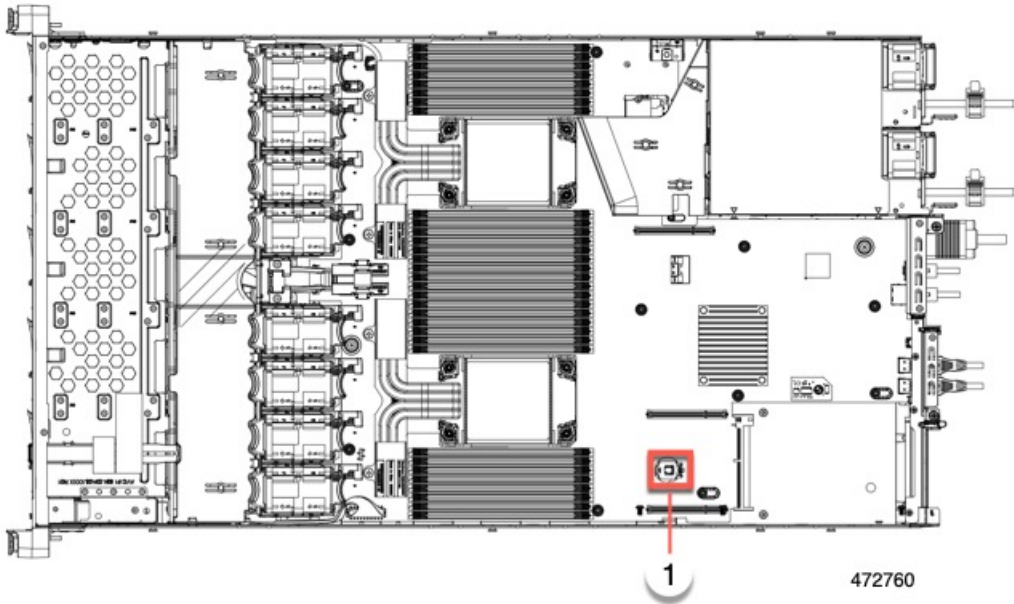
- c) Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).
- d) Locate the RTC battery. The vertical socket is directly in front of PCIe riser 1.
- e) Remove the battery from the socket on the motherboard. Gently pry the securing clip on one side open to provide clearance, then lift straight up on the battery.

Step 2 Install a new RTC battery:

- a) Insert the battery into its holder and press down until it clicks in place under the clip.

Note The flat, positive side of the battery marked “3V+” should face left as you face the server front.

- b) Replace the top cover to the server.
- c) Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.



1	RTC battery in socket	-	
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Installing a Trusted Platform Module (TPM)

A Trusted Platform Module (TPM) is a computer chip (microcontroller) that can securely store artifacts used to authenticate the platform (server). These artifacts can include passwords, certificates, or encryption keys. A TPM can also be used to store platform measurements that help ensure that the platform remains trustworthy. Authentication (ensuring that the platform can prove that it is what it claims to be) and attestation (a process helping to prove that a platform is trustworthy and has not been breached) are necessary steps to ensure safer computing in all environments.

The trusted platform module (TPM) plugs into a motherboard socket and is then permanently secured with a one-way screw.

TPM Considerations

- This server supports TPM version 2.0 (UCSX-TPM-002C) as defined by the Trusted Computing Group (TCG). The TPM is also SPI-based.
- Field replacement of a TPM is not supported; you can install a TPM after-factory only if the server does not already have a TPM installed.
- If there is no existing TPM in the server, you can install TPM 2.0. Upgrading from a previous version of TPM to TPM 2.0 is not supported.
- If a server with a TPM is returned, the replacement server must be ordered with a new TPM.
- If the TPM 2.0 becomes unresponsive, reboot the server.

Installing and Enabling a TPM



Note Field replacement of a TPM is not supported; you can install a TPM after-factory only if the server does not already have a TPM installed.

This topic contains the following procedures, which must be followed in this order when installing and enabling a TPM:

1. Installing the TPM Hardware
2. Enabling the TPM in the BIOS
3. Enabling the Intel TXT Feature in the BIOS

Installing TPM Hardware



Note For security purposes, the TPM is installed with a one-way screw. It cannot be removed with a standard screwdriver.

Step 1 Prepare the server for component installation:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).

Step 2 Check if there is a card installed in PCIe riser 2:

- If no card is installed in PCIe riser 2, you can access the TPM socket. Go to the next step.
- If a card is installed in PCIe riser 2, remove the PCIe riser assembly from the chassis to provide clearance before continuing with the next step. See [Replacing a PCIe Card, on page 121](#) for instructions on removing the PCIe riser.

Step 3 Install a TPM:

- a) Locate the TPM socket on the motherboard, as shown below.
- b) Align the connector that is on the bottom of the TPM circuit board with the motherboard TPM socket. Align the screw hole on the TPM board with the screw hole that is adjacent to the TPM socket.
- c) Push down evenly on the TPM to seat it in the motherboard socket.
- d) Install the single one-way screw that secures the TPM to the motherboard.
- e) If you removed the PCIe riser assembly to provide clearance, return it to the server now.

Step 4 Replace the cover to the server.

Step 5 Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Step 6 Continue with [Enabling the TPM in the BIOS, on page 165](#).

Enabling the TPM in the BIOS

After hardware installation, you must enable TPM support in the BIOS.



Note You must set a BIOS Administrator password before performing this procedure. To set this password, press the **F2** key when prompted during system boot to enter the BIOS Setup utility. Then navigate to **Security > Set Administrator Password** and enter the new password twice as prompted.

Step 1 Enable TPM Support:

- a) Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.
- b) Log in to the BIOS Setup Utility with your BIOS Administrator password.
- c) On the BIOS Setup Utility window, choose the **Advanced** tab.
- d) Choose **Trusted Computing** to open the TPM Security Device Configuration window.
- e) Change TPM SUPPORT to **Enabled**.
- f) Press **F10** to save your settings and reboot the server.

Step 2 Verify that TPM support is now enabled:

- a) Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.
- b) Log into the BIOS Setup utility with your BIOS Administrator password.

- c) Choose the **Advanced** tab.
- d) Choose **Trusted Computing** to open the TPM Security Device Configuration window.
- e) Verify that TPM SUPPORT and TPM State are Enabled.

Step 3 Continue with [Enabling the Intel TXT Feature in the BIOS, on page 166](#).

Enabling the Intel TXT Feature in the BIOS

Intel Trusted Execution Technology (TXT) provides greater protection for information that is used and stored on the business server. A key aspect of that protection is the provision of an isolated execution environment and associated sections of memory where operations can be conducted on sensitive data, invisibly to the rest of the system. Intel TXT provides for a sealed portion of storage where sensitive data such as encryption keys can be kept, helping to shield them from being compromised during an attack by malicious code.

Step 1 Reboot the server and watch for the prompt to press F2.

Step 2 When prompted, press **F2** to enter the BIOS Setup utility.

Step 3 Verify that the prerequisite BIOS values are enabled:

- a) Choose the **Advanced** tab.
- b) Choose **Intel TXT(LT-SX) Configuration** to open the Intel TXT(LT-SX) Hardware Support window.
- c) Verify that the following items are listed as Enabled:
 - VT-d Support (default is Enabled)
 - VT Support (default is Enabled)
 - TPM Support
 - TPM State
- d) Do one of the following:
 - If VT-d Support and VT Support are already enabled, skip to step 4.
 - If VT-d Support and VT Support are not enabled, continue with the next steps to enable them.
- e) Press **Escape** to return to the BIOS Setup utility **Advanced** tab.
- f) On the Advanced tab, choose **Processor Configuration** to open the Processor Configuration window.
- g) Set Intel (R) VT and Intel (R) VT-d to **Enabled**.

Step 4 Enable the Intel Trusted Execution Technology (TXT) feature:

- a) Return to the Intel TXT(LT-SX) Hardware Support window if you are not already there.
- b) Set TXT Support to **Enabled**.

Step 5 Press **F10** to save your changes and exit the BIOS Setup utility.

Removing the Trusted Platform Module (TPM)

The TPM module is attached to the printed circuit board assembly (PCBA). You must disconnect the TPM module from the PCBA before recycling the PCBA. The TPM module is secured to a threaded standoff by a

tamper resistant screw. If you do not have the correct tool for the screw, you can use a pair of pliers to remove the screw.

Before you begin



Note For Recyclers Only! This procedure is not a standard field-service option. This procedure is for recyclers who will be reclaiming the electronics for proper disposal to comply with local eco design and e-waste regulations.

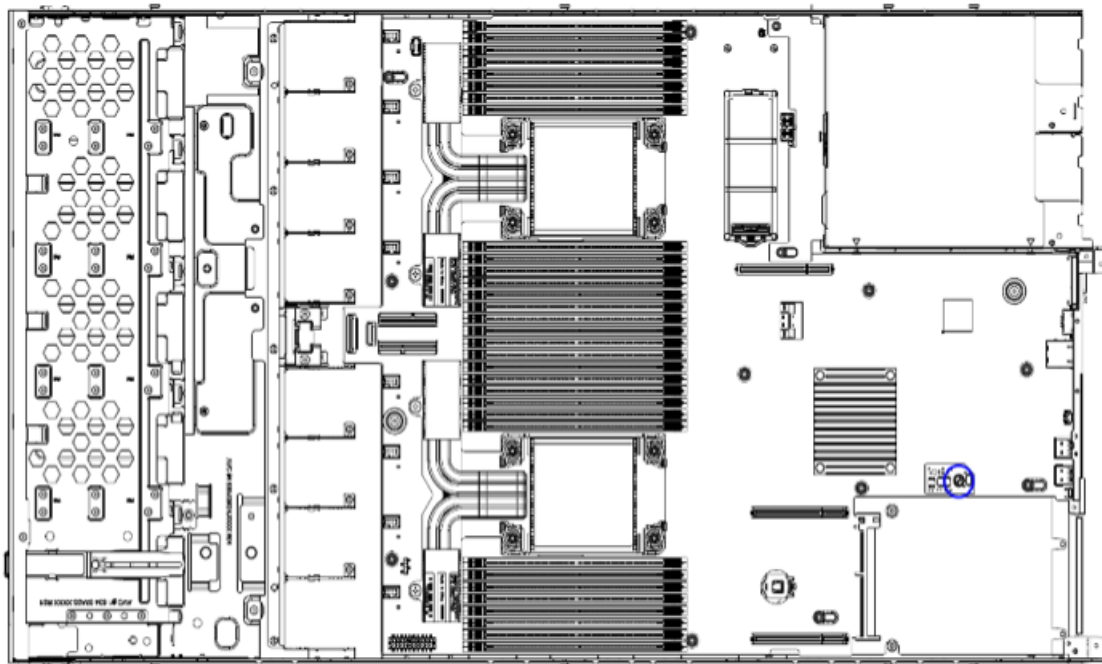
To remove the TPM, the following requirements must be met for the server:

- It must be disconnected from facility power.
- It must be removed from the equipment rack.
- The top cover must be removed. If the top cover is not removed, see [Removing Top Cover, on page 39](#).

Step 1 Locate the TPM module.

The following illustration shows the location of the TPM module's screw.

Figure 49: Screw Location for Removing the TPM Module



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Step 2 Using the pliers, grip the head of the screw and turn it counterclockwise until the screw releases.

Step 3 Remove the TPM module and dispose of it properly.

What to do next

Remove the PCBA. See [Recycling the Main Motherboard PCB Assembly \(PCBA\)](#), on page 173.

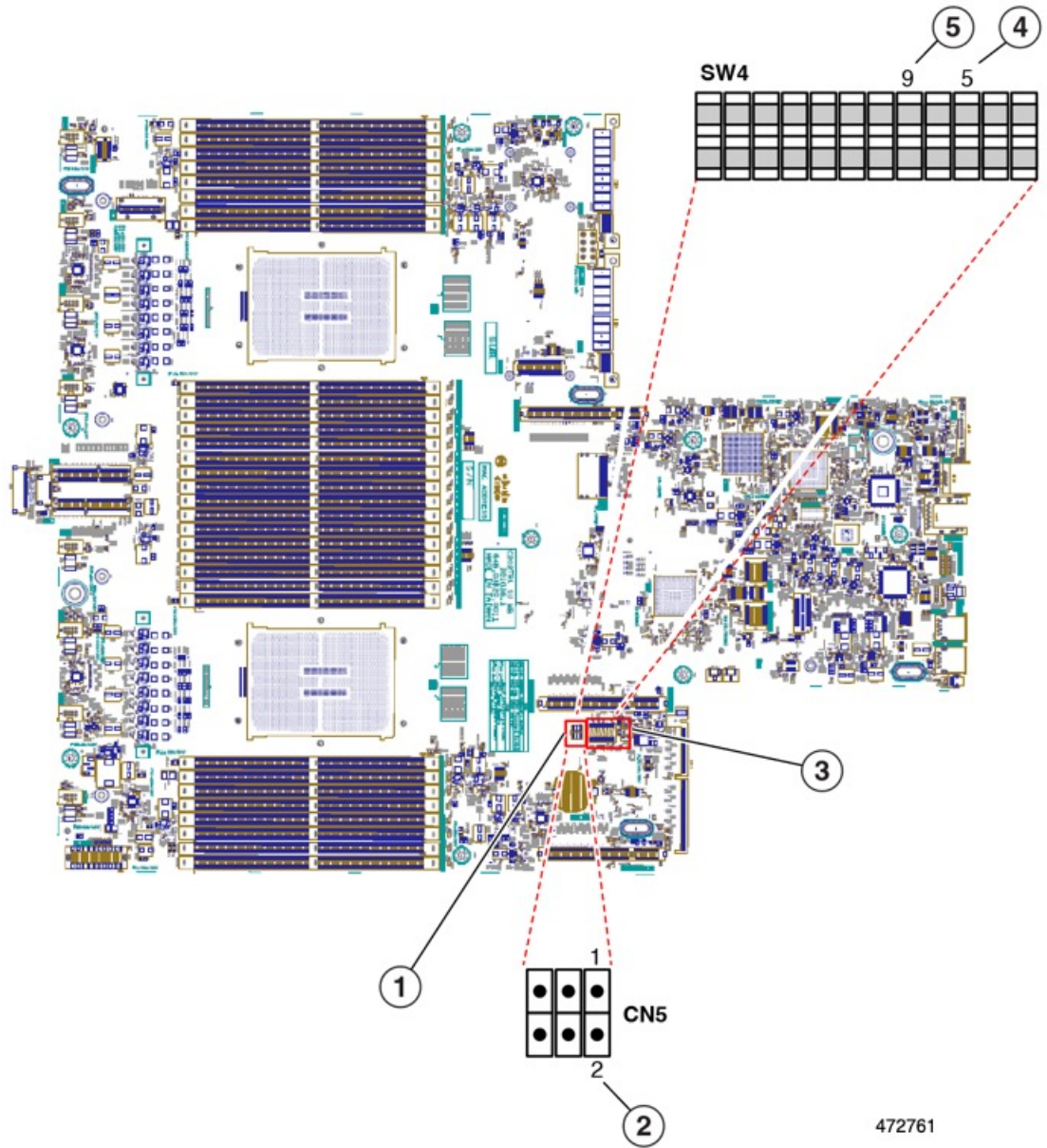
Service Headers and Jumpers

This server includes two blocks of headers that you can jumper for certain service and debug functions.

This section contains the following topics:

- [Using the Clear CMOS Switch \(SW4, Switch 9\)](#) , on page 170
- [Using the Clear BIOS Password Switch \(SW4, Switch 6\)](#), on page 170
- [Using the Boot Alternate Cisco IMC Image Header \(CN5, Pins 1-2\)](#), on page 171

Figure 50: Location of Service Header Blocks SW4 and CN5



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1	Location of header block CN5	4	Clear BIOS Password Switch (SW4 Switch 6) Clear CMOS Switch (SW4 Switch 9)
2	Boot Alternate Cisco IMC Header: CN5 pins 1 - 2	5	Clear CMOS Switch (SW4 Switch 9)
3	Location of SW4 DIP switches	-	

Using the Clear CMOS Switch (SW4, Switch 9)

You can use this switch to clear the server's CMOS settings in the case of a system hang. For example, if the server hangs because of incorrect settings and does not boot, use this switch to invalidate the settings and reboot with defaults.

You will find it helpful to refer to the location of the CN3 header. See [Service Headers and Jumpers, on page 168](#).



Caution Clearing the CMOS removes any customized settings and might result in data loss. Make a note of any necessary customized settings in the BIOS before you use this clear CMOS procedure.

- Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
- Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Step 3** Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).
- Step 4** Using your finger, gently push the SW4 switch 9 to the side marked ON.
- Step 5** Reinstall the top cover and reconnect AC power cords to the server. The server powers up to standby power mode, indicated when the Power LED on the front panel is amber.
- Step 6** Return the server to main power mode by pressing the Power button on the front panel. The server is in main power mode when the Power LED is green.
- Note** You must allow the entire server to reboot to main power mode to complete the reset. The state of the switch cannot be determined without the host CPU running.
- Step 7** Press the Power button to shut down the server to standby power mode, and then remove AC power cords from the server to remove all power.
- Step 8** Remove the top cover from the server.
- Step 9** Using your finger, gently push switch 9 to its original position (OFF).
- Note** If you do not reset the switch to its original position (OFF), the CMOS settings are reset to the defaults every time you power-cycle the server.
- Step 10** Replace the top cover, replace the server in the rack, replace power cords and any other cables, and then power on the server by pressing the Power button.
-

Using the Clear BIOS Password Switch (SW4, Switch 6)

You can use this switch to clear the BIOS password.

You will find it helpful to refer to the location of the CN3 header. See [Service Headers and Jumpers, on page 168](#).

-
- Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#). Disconnect power cords from all power supplies.
- Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Step 3** Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).
- Step 4** Using your finger, gently slide the SW4 switch 6 to the ON position.
- Step 5** Reinstall the top cover and reconnect AC power cords to the server. The server powers up to standby power mode, indicated when the Power LED on the front panel is amber.
- Step 6** Return the server to main power mode by pressing the Power button on the front panel. The server is in main power mode when the Power LED is green.
- Note** You must allow the entire server to reboot to main power mode to complete the reset. The state of the switch cannot be determined without the host CPU running.
- Step 7** Press the Power button to shut down the server to standby power mode, and then remove AC power cords from the server to remove all power.
- Step 8** Remove the top cover from the server.
- Step 9** Reset the switch to its original position (OFF).
- Note** If you do not remove the switch to its original position (OFF), the BIOS password is cleared every time you power-cycle the server.
- Step 10** Replace the top cover, replace the server in the rack, replace power cords and any other cables, and then power on the server by pressing the Power button.
-

Using the Boot Alternate Cisco IMC Image Header (CN5, Pins 1-2)

You can use this Cisco IMC debug header to force the system to boot from an alternate Cisco IMC image.

You will find it helpful to refer to the location of the CN5 header. See [Service Headers and Jumpers, on page 168](#).

-
- Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#). Disconnect power cords from all power supplies.
- Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Step 3** Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).
- Step 4** Install a two-pin jumper across CN5 pins 1 and 2.
- Step 5** Reinstall the top cover and reconnect AC power cords to the server. The server powers up to standby power mode, indicated when the Power LED on the front panel is amber.
- Step 6** Return the server to main power mode by pressing the Power button on the front panel. The server is in main power mode when the Power LED is green.

Note When you next log in to Cisco IMC, you see a message similar to the following:

```
'Boot from alternate image' debug functionality is enabled.  
CIMC will boot from alternate image on next reboot or input power cycle.
```

Note If you do not remove the jumper, the server will boot from an alternate Cisco IMC image every time that you power cycle the server or reboot Cisco IMC.

- Step 7** To remove the jumper, press the Power button to shut down the server to standby power mode, and then remove AC power cords from the server to remove all power.
- Step 8** Remove the top cover from the server.
- Step 9** Remove the jumper that you installed.
- Step 10** Replace the top cover, replace the server in the rack, replace power cords and any other cables, and then power on the server by pressing the Power button.
-



CHAPTER 4

Recycling Server Components

This chapter contains the following topics:

- [Server Recycling and E-Waste](#), on page 173
- [Battery Warning](#), on page 173
- [Recycling the Main Motherboard PCB Assembly \(PCBA\)](#), on page 173
- [Recycling the Front Mezzanine Module PCBA \(NVMe Backplane\)](#), on page 175
- [Recycling the Front Mezzanine Module PCBA \(SAS Backplane\)](#), on page 177
- [Recycling the Server Front Panel PCBA](#), on page 179

Server Recycling and E-Waste

The server has various components that can be recycled. When recycling the server and its components, always comply with your local laws governing recycling and e-waste.



Warning

The procedures in this chapter are destructive and can render the server unusable, so this content is not for standard use or FRU procedures! These procedures are for recyclers only.

Battery Warning

The server has a round button-style battery which is used for the real-time clock.



Warning

Recyclers: Do not shred the battery! Make sure you dispose of the battery according to appropriate regulations for your country or locale.

For information about removing the battery, see [Replacing the RTC Battery](#), on page 162.

Recycling the Main Motherboard PCB Assembly (PCBA)

The PCBA is secured to the server's sheet metal through the following:

- 13 M3.5x0.6mm Torx screws.
- 2 M3.5x0.6mm Torx thumb screws.

You must disconnect the PCBA from the tray before recycling the PCBA.

Before you begin



Note **For Recyclers Only!** This procedure is not a standard field-service option. This procedure is for recyclers who will be reclaiming the electronics for proper disposal to comply with local eco design and e-waste regulations.

To remove the printed circuit board assembly (PCBA), the following requirements must be met:

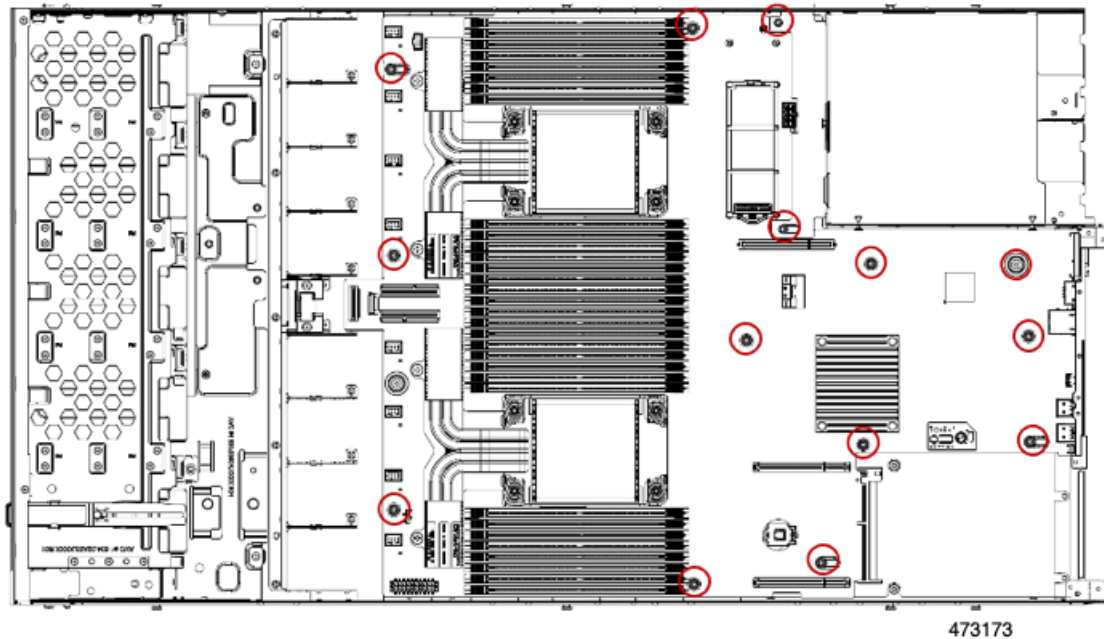
- The server must be disconnected from facility power.
- The server must be removed from the equipment rack.
- The server's top cover must be removed. See [Removing Top Cover, on page 39](#).

Gather the following tools before you start this procedure:

- Pliers
- T10 Torx screwdriver

-
- Step 1** If you have not removed the TPM module, do so now.
- Step 2** When the TPM module is detached, locate the PCBA's screws.
- The following figure shows the location of the screws.

Figure 51: Screw Locations for Removing the PCBA



- Step 3** Using a T10 Torx driver, remove all of the indicated screws.
- Step 4** Remove the PCBA and dispose of it properly.

Recycling the Front Mezzanine Module PCBA (NVMe Backplane)

The server's front mezzanine module contains one PCBA, which is the vertical PCB for the NVMe drive backplane. The PCBA is attached to the server's sheetmetal by ten T10 screws.

You must disconnect the PCBA from the sheetmetal before recycling the PCBA.

Before you begin



Note **For Recyclers Only!** This procedure is not a standard field-service option. This procedure is for recyclers who will be reclaiming the electronics for proper disposal to comply with local eco design and e-waste regulations.

To remove the printed circuit board assembly (PCBA), the following requirements must be met:

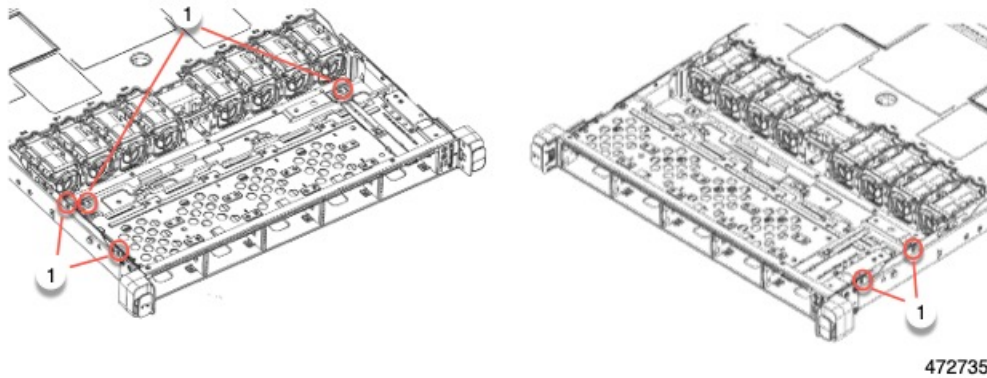
- The server must be disconnected from facility power.
- The server must be removed from the equipment rack.
- The server's top cover must be removed. See [Removing Top Cover, on page 39](#).

Gather a T10 Torx screwdriver.

Step 1 Using a T10 Torx driver, remove the screws that secure the front mezzanine module to the server chassis.

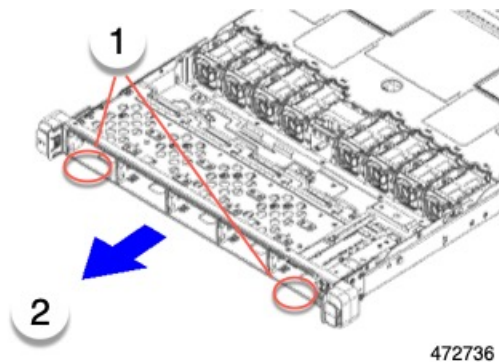
There are total of six T10 screws:

- Two on each exterior sidewall of the server chassis. These screws are on the sheetmetal crease for the top cover.
- Two on the interior of the front mezzanine module.



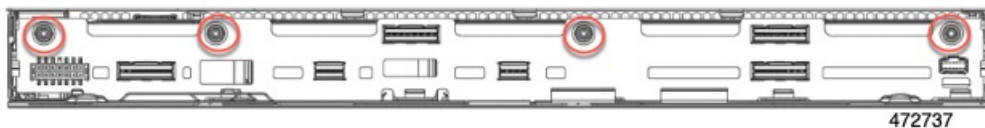
Step 2 Grasp the front mezzanine module and slide it out of the server chassis.

If the module does not slide out, verify that all of the T10 screws are removed.

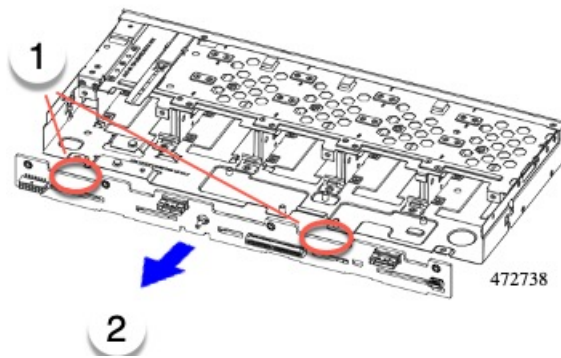


Step 3 Disconnect the vertical drive backplane.

a) Using a T10 Torx driver, remove the four screws on the vertical drive backplane.



b) Grasp the drive backplane and disconnect it from the module.



Step 4 Remove the PCBA and dispose of it properly in accordance with your local recycling and e-waste laws.

What to do next

Recycle the server front panel.

Recycling the Front Mezzanine Module PCBA (SAS Backplane)

The server's front mezzanine module contains one PCBA, which is the vertical PCB for the SAS drive backplane. The PCBA is attached to the server's sheetmetal by 15 T10 screws.

You must disconnect the PCBA from the sheetmetal before recycling the PCBA.

Before you begin



Note **For Recyclers Only!** This procedure is not a standard field-service option. This procedure is for recyclers who will be reclaiming the electronics for proper disposal to comply with local eco design and e-waste regulations.

To remove the printed circuit board assembly (PCBA), the following requirements must be met:

- The server must be disconnected from facility power.
- The server must be removed from the equipment rack.
- The server's top cover must be removed. See [Removing Top Cover, on page 39](#).

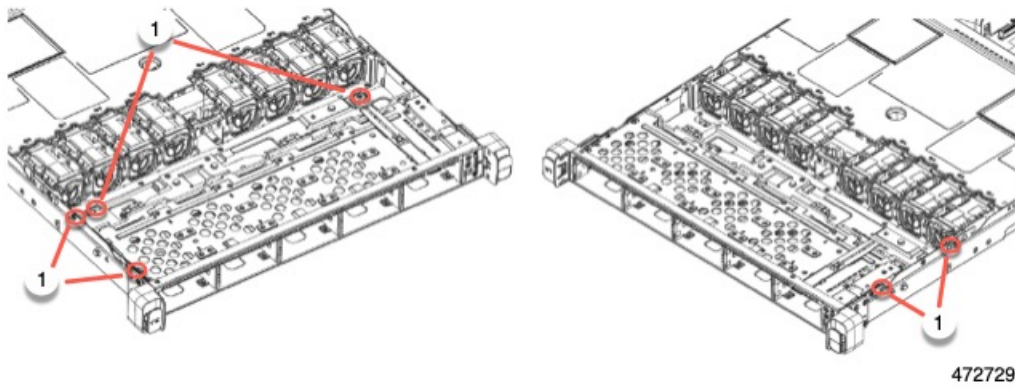
Gather a T10 Torx screwdriver.

Step 1 Using a T10 Torx driver, remove the screws that secure the front mezzanine module to the server chassis.

There are total of six T10 screws:

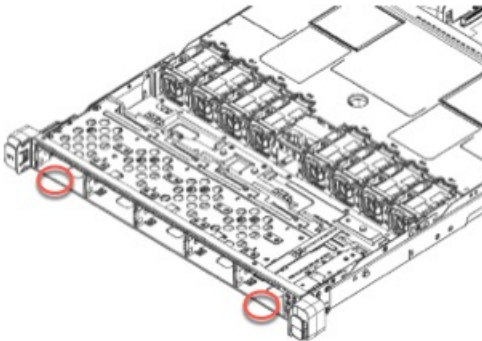
- Two on each exterior sidewall of the server chassis. These screws are on the sheetmetal crease for the top cover.
- Two on the interior of the front mezzanine module.

Recycling the Front Mezzanine Module PCBA (SAS Backplane)



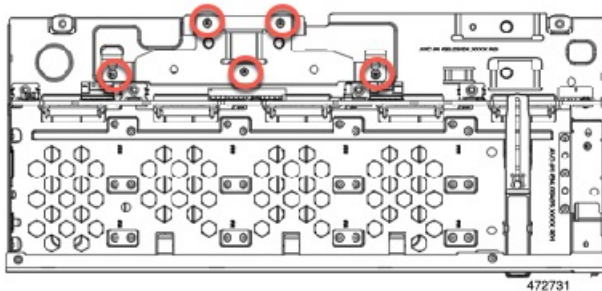
472729

- Step 2** Grasp the front mezzanine module and slide it out of the server chassis.
If the module does not slide out, verify that all of the T10 screws are removed.



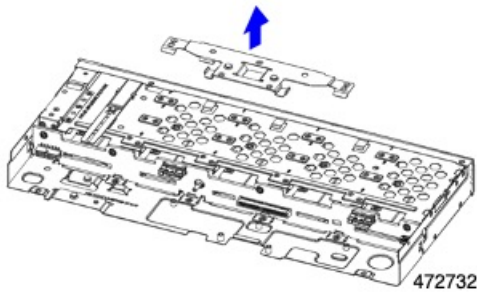
472730

- Step 3** Remove the bracket at the rear of the front mezzanine module.
a) Using the T10 screwdriver, remove the five screws that secure the bracket at the rear of the module.



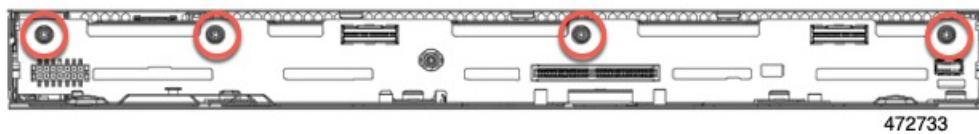
472731

- b) Grasp the bracket and lift it off of the module.

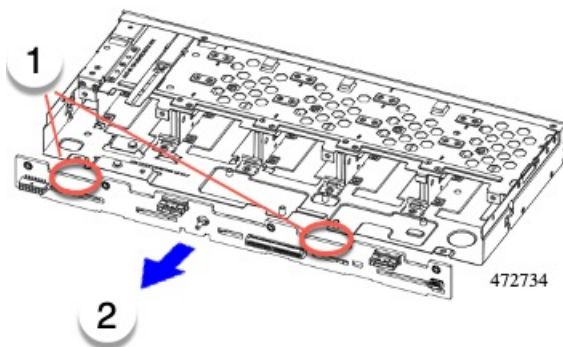


Step 4 Disconnect the vertical drive backplane.

a) Using a T10 Torx driver, remove the four screws on the vertical drive backplane.



b) Grasp the drive backplane and disconnect it from the module.



Step 5 Remove the PCBA and dispose of it properly in accordance with your local recycling and e-waste laws.

What to do next

Recycle the server front panel.

Recycling the Server Front Panel PCBA

The server's front panel contains one PCBA, which is horizontally mounted in a sheet metal tray. The front panel PCBA is attached to the tray's sheet metal by the following screws.

- Two size 2.5 slotted screws on the face of the tray.
- Two T10 Torx screws that secure the PCBA to the interior of the tray.

You must disconnect the PCBA from the tray before recycling the PCBA.

Before you begin

Note For Recyclers Only! This procedure is not a standard field-service option. This procedure is for recyclers who will be reclaiming the electronics for proper disposal to comply with local eco design and e-waste regulations.

To remove the printed circuit board assembly (PCBA), the following requirements must be met:

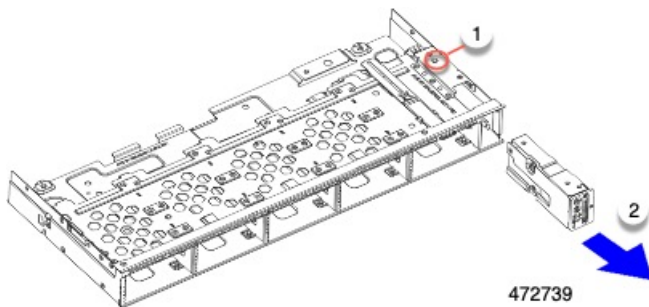
- The server must be disconnected from facility power.
- The server must be removed from the equipment rack.
- The server's top cover must be removed. See [Removing Top Cover, on page 39](#).

Gather the following tools:

- A size 2.5 slotted screwdriver.
- A T10 Torx screwdriver.

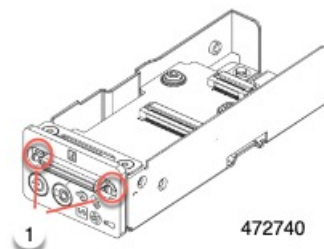
Step 1 Remove the front panel from the front mezzanine module.

- Using a T10 Torx screwdriver, remove the screw that secures the front panel to the front mezzanine module.
- Grasp the front panel module and slide it out of the front mezzanine module.

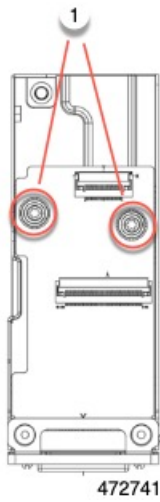


Step 2 Remove the front panel PCBA.

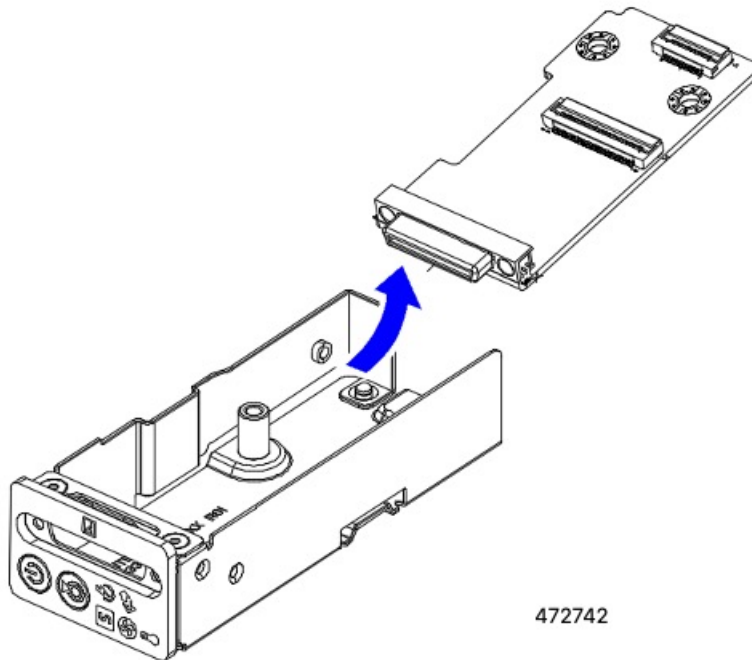
- Using a 2.5 slotted screwdriver, remove the two screws on the face of the front panel.



- Using a T10 screwdriver, remove the two screws that secure the PCBA to the sheet metal.



- c) Grasp the PCBA and simultaneously slide the PCBA upward to remove it.



Step 3 Remove the PCBA and dispose of it properly in accordance with your local recycling and e-waste laws.



CHAPTER 5

Server Specifications

This chapter contains the following topics:

- [Server Specifications, on page 183](#)

Server Specifications

This appendix lists the physical, environmental, and power specifications for the server.

- [Physical Specifications, on page 183](#)
- [Environmental Specifications, on page 184](#)
- [Power Specifications, on page 185](#)

Physical Specifications

The following table lists the physical specifications for the server.

Table 9: Physical Specifications

Description	Specification
Height	1.7 in. (43.2 mm)
Width	16.9 in. (429.0 mm)
Depth (length)	Server only: 30 in. (762 mm) Server with slide rail: 31.5 in (800.1 mm)
Weight	<ul style="list-style-type: none">• Maximum, fully configured with rail kit: 42.432 lb (19.25 kg)• Maximum, not configured, no rail kit: 22.32 lb (10.13 kg)

Environmental Specifications

As a Class A2 product, the server has the following environmental specifications.

Table 10: Environmental Specifications

Description	Specification
Temperature, Operating	Dry bulb temperature of 10°C to 35°C (50°F to 95°F) Maximum temperature change of 20°C (36°F) per hour (a temperature change within a specified period of time and not a rate of change) Humidity condition: Uncontrolled, not to exceed 50% RH starting condition Derate the maximum temperature by 1°C (33.8°F) per every 305 meters of altitude above 900m
Temperature, non-operating (when the server is stored or transported)	Dry bulb temperature of 40 °C to 65 °C (-40°F to 149 °F)
Humidity (RH), operating	10% to 90% and 28°C (82.4°F) maximum dew-point temperature, non-condensing environment Minimum to be higher (more moisture) of -12 °C (10.4 °F) dew point or 8% relative humidity Maximum to be 24 °C (75.2 °F) dew point or 90% relative humidity
Humidity (RH), non-operating (when the server is stored or transported)	5% to 93% relative humidity, non-condensing, with a maximum wet bulb temperature of 28 °C across the 20 °C to 40 °C dry bulb range.
Altitude, operating	A maximum elevation of 3050 meters (10,006 feet)
Altitude, non-operating (when the server is stored or transported)	An elevation of 0 to 12,000 meters (39,370 feet)
Maximum Operating Duration	Unlimited
Sound power level Measure A-weighted per ISO7779 LwAd (Bels) Operation at 73°F (23°C)	5.5
Sound pressure level Measure A-weighted per ISO7779 LpAm (dBA) Operation at 73°F (23°C)	40

Power Specifications



Note Do not mix power supply types or wattages in the server. Both power supplies must be identical.

You can get more specific power information for your exact server configuration by using the Cisco UCS Power Calculator:

<http://ucspowercalc.cisco.com>

The power specifications for the supported power supply options are listed in the following sections.

770 W AC Power Supply

This section lists the specifications for each 770 W AC power supply (Cisco part number UCSC-PSU1-770W-D). This power supply is Platinum rated.



Note For the 80PLUS platinum certification documented in the following table, you can find test results at <https://www.cleareresult.com/80plus/>.

Table 11: 770 W AC Specifications

Description	Specification
AC Input Voltage	Nominal range: 100–120 VAC, 200–240 VAC (Range: 90–132 VAC, 180–264 VAC)
AC Input Frequency	Nominal range: 50 to 60Hz (Range: 47–63 Hz)
Maximum AC Input current	9.5 A at 100 VAC 4.5 A at 208 VAC
Maximum input volt-amperes	950 VA at 100 VAC
Maximum inrush current	15 A (sub-cycle duration)
Maximum hold-up time	12 ms at 770 W
Maximum output power per PSU	770 W
Power supply output voltage	12 VDC
Power supply standby voltage	12 VDC
Efficiency rating	Climate Savers Platinum Efficiency (80Plus Platinum certified)
Form factor	RSP2
Input connector	IEC320 C14

1050 W V2 DC Power Supply

This section lists the specifications for each 1050 W DC power supply (Cisco part number UCSC-PSUV21050D-D). This power supply is Platinum rated.



Note For the 80PLUS platinum certification documented in the following table, you can find test results at <https://www.clearesult.com/80plus/>.

Parameter	Specification
Input Connector	Molex 42820
Input Voltage Range (V rms)	-48
Maximum Allowable Input Voltage Range (V rms)	-40 to -72
Frequency Range (Hz)	NA
Maximum Allowable Frequency Range (Hz)	NA
Maximum Rated Output (W)	1050
Maximum Rated Standby Output (W)	36
Nominal Input Voltage (V rms)	-48
Nominal Input Current (A rms)	24
Maximum Input at Nominal Input Voltage (W)	1154
Maximum Input at Nominal Input Voltage (VA)	1154
Maximum Rated Efficiency (%) Minimum rating required to achieve 80PLUS platinum certification.	91
Maximum Rated Power Factor Minimum rating required to achieve 80PLUS platinum certification.	NA
Maximum Inrush Current (peak A)	15
Maximum Inrush Current (ms)	0.2
Maximum Ride-Through Time This is the time output voltage remains within regulation limits at 100% load, during input voltage dropout	5

1200 W AC Power Supply

This section lists the specifications for each 1200 W AC power supply (Cisco part number UCSC-PSU1-1200W-D). This power supply is Titanium rated.

Parameter	Specification			
Input Connector	IEC320 C14			
Input Voltage Range (V rms)	100 to 240			
Maximum Allowable Input Voltage Range (V rms)	90 to 264			
Frequency Range (Hz)	50 to 60			
Maximum Allowable Frequency Range (Hz)	47 to 63			
Maximum Rated Output (W) Limited to 1100W when operating at low-line input voltage, 100-127 V	1100		1200	
Maximum Rated Standby Output (W)	48			
Nominal Input Voltage (V rms)	100	120	208	230
Nominal Input Current (A rms)	12.97	10.62	6.47	5.84
Maximum Input at Nominal Input Voltage (W)	1300	1264	1343	1340
Maximum Input at Nominal Input Voltage (VA)	1300	1266	1345	1342
Maximum Rated Efficiency (%) Minimum rating required to achieve 80PLUS platinum certification.	90	90	91	91
Maximum Rated Power Factor Minimum rating required to achieve 80PLUS platinum certification.	0.97	0.97	0.97	0.97
Maximum Inrush Current (peak A)	20			
Maximum Inrush Current (ms)	0.2			
Maximum Ride-Through Time The time that the output voltage remains within regulation limits at 100% load, during input voltage dropout	12			

1600 W AC Power Supply

This section lists the specifications for each 1600 W AC power supply (Cisco part number UCSC-PSU1-1600W-D). This power supply is Platinum rated.



Note For the 80PLUS platinum certification documented in the following table, you can find test results at <https://www.cleareresult.com/80plus/>.

Parameter	Specification			
Input Connector	IEC320 C14			
Input Voltage Range (V rms)	200 to 240			
Maximum Allowable Input Voltage Range (V rms)	180 to 264			
Frequency Range (Hz)	50 to 60			
Maximum Allowable Frequency Range (Hz)	47 to 63			
Maximum Rated Output (W)	1600			
Maximum Rated Standby Output (W)	36			
Nominal Input Voltage (V rms)	100	120	208	230
Nominal Input Current (A rms)	NA	NA	8.8	7.9
Maximum Input at Nominal Input Voltage (W)	NA	NA	1778	1758
Maximum Input at Nominal Input Voltage (VA)	NA	NA	1833	1813
Maximum Rated Efficiency (%)	NA	NA	90	91
Minimum rating required to achieve 80PLUS platinum certification.				
Maximum Rated Power Factor	NA	NA	0.97	0.97
Minimum rating required to achieve 80PLUS platinum certification.				
Maximum Inrush Current (peak A)	30			
Maximum Inrush Current (ms)	0.2			
Maximum Ride-Through Time	12			
The time that the output voltage remains within regulation limits at 100% load, during input voltage dropout				

2300 W AC Power Supply

This section lists the specifications for each 2300 W AC power supply (Cisco part number UCSC-PSU1-2300W-D). This power supply is Titanium rated.

Parameter	Specification			
Input Connector	IEC320 C20			
Input Voltage Range (V rms)	100 to 240			
Maximum Allowable Input Voltage Range (V rms)	90 to 264			
Frequency Range (Hz)	50 to 60			
Maximum Allowable Frequency Range (Hz)	47 to 63			
Maximum Rated Output (W) Limited to 1200W when operating at low-line input voltage, 100-127 V	2300			
Maximum Rated Standby Output (W)	36			
Nominal Input Voltage (V rms)	100	120	208	230
Nominal Input Current (A rms)	13	11	12	10.8
Maximum Input at Nominal Input Voltage (W)	1338	1330	2490	2480
Maximum Input at Nominal Input Voltage (VA)	1351	1343	2515	2505
Maximum Rated Efficiency (%) Minimum rating required to achieve 80PLUS platinum certification.	92	92	93	93
Maximum Rated Power Factor Minimum rating required to achieve 80PLUS platinum certification.	0.99	0.99	0.97	0.97
Maximum Inrush Current (peak A)	30			
Maximum Inrush Current (ms)	0.2			
Maximum Ride-Through Time Time output voltage remains within regulation limits at 100% load, during input voltage dropout	12			

Power Cord Specifications

Each power supply in the server has a power cord. Standard power cords or jumper power cords are available for connection to the server. The shorter jumper power cords, for use in racks, are available as an optional alternative to the standard power cords.



Note Only the approved power cords or jumper power cords listed below are supported.

The following tables show the supported power cords supported for less than 2300-Watt server PSUs, and more than 2300-Watt server PSUs.

Table 12: Supported Power Cords for Less than 2300 W Server PSUs

Description	Length (Feet)	Length (Meters)
CAB-48DC-40A-8AWG DC power cord, -48 VDC, 40 A, 8 AWG Three-socket Mini-Fit connector to three-wire	11.7	3.5
CAB-C13-C14-AC AC power cord, 10 A; C13 to C14, recessed receptacle	9.8	3.0
CAB-250V-10A-AR AC power cord, 250 V, 10 A Argentina	8.2	2.5
CAB-C13-C14-2M-JP AC Power Cord, C13 to C14 Japan PSE Mark	6.6	2.0
CAB-9K10A-EU AC Power Cord, 250 V, 10 A; CEE 7/7 Plug Europe	8.2	2.5
CAB-250V-10A-IS AC Power Cord, SFS, 250 V, 10 A Israel	8.2	2.5
CAB-250V-10A-CN AC power cord, 250 V, 10 A PR China	8.2	2.5
CAB-ACTW AC power cord, 250 V, 10 A, C13 EL302 Taiwan	7.5	2.3
CAB-C13-CBN AC cabinet jumper power cord, 250, 10 A, C13 to C14	2.2	0.68

CAB-C13-C14-2M AC cabinet jumper power cord, 250 V, 10 A, C13 to C14	6.6	2.0
CAB-9K10A-AU AC power cord, 250 V, 10 A, 3112 plug, Australia	8.2	2.5
CAB-N5K6A-NA AC power cord, 200/240 V, 6 A, North America	8.2	2.5
CAB-250V-10A-ID AC power Cord, 250 V, 10 A, India	8.2	2.5
CAB-9K10A-SW AC power cord, 250 V, 10 A, MP232 plug Switzerland	8.2	2.5
CAB-250V-10A-BR AC power Cord, 250 V, 10 A Brazil	8.2	2.5
CAB-9K10A-UK AC power cord, 250 V, 10 A (13 A fuse), BS1363 plug United Kingdom	8.2	2.5
CAB-9K12A-NA AC power cord, 125 V, 13 A, NEMA 5-15 plug North America	8.2	2.5
CAB-AC-L620-C13 AC power cord, NEMA L6-20 to C13 connectors	6.6	2.0
CAB-9K10A-IT AC power cord, 250 V, 10 A, CEI 23-16/VII plug Italy	8.2	2.5
CAB-C13-C14-3M-IN AC power cord jumper, C13 to C14 connector India	9.8	3.0

CAB-C13-C14-IN AC power cord jumper, C13 to C14 connector India	4.6	1.4
CAB-9K10A-KOR Power Cord, 125 V AC, 13 A, KSC8305 plug Korea	6	1.8
CAB-JPN-3PIN 90-125 V AC, 12 A, NEMA 5-15 plug Japan		2.4
R2XX-DMYMPWRCORD No power cord; PID option for ordering server with no power cord	NA	NA

Table 13: Supported Power Cords for More than 2300 W Server PSUs

Description	Length (Feet)	Length (Meters)
CAB-C19-CBN Cabinet Jumper Power Cord, 250 VAC, 16A, C20 to C19 connector		
CAB-S132-C19-ISRL S132 to IEC320 C19 connector Israel	14	
CAB-IR2073-C19-AR IRSM 2073 to IEC320 C19 connector Argentina	14	
CAB-BS1363-C19-UK BS-1363 to IEC 320 C19 connector UK	14	
CAB-SABS-C19-IND SABS 164-1 to IEC 320 C19 connector India		
CAB-C2316-C19-IT CEI 23-16 to IEC 320 C19 Italy	14	

CAB-L520P-C19-US NEMA L5-20 to IEC 320 C19 US	6	
CAB-US515P-C19-US NEMA 5-15 to IEC 320 C19 US	13	
CAB-US520-C19-US NEMA 5-20 to IEC 320 C19 US	14	
CAB-US620P-C19-US NEMA 6-20 to IEC-C19 US	13	
CAB-C19-C20-IND Power Cord C19 to C20 connector India		
UCSB-CABL-C19-BRZ AC power cord NBR 14136 to C19 connector Brazil	14	
CAB-9K16A-BRZ AC Power Cord, 250 V, 16 A, Source Plug EL224 to C19 connector Brazil		
CAB-ACS-16 AC Power Cord, 16A Switzerland		
CAB-AC-16A-AUS AC Power Cord, 250 V, 16 A, C19 connector Australia		
CAB-C19-C20-3M-JP AC Power Cord C19 to C20 connector, Japan PSE mark Japan	10	3

CAB-AC-C19-TW AC Power Cord, 250 V, 16 A, C19 connectors Taiwan		
CAB-AC-C6K-TWLK AC Power Cord, 250 V, 16 A, twist lock NEMA L6-20 plug US		
CAB-AC-2500W-EU AC Power Cord, 250 V, 16 A Europe		
CAB-AC-2500W-INT AC Power Cord, 250 V, 16A International		
CAB-9K16A-KOR AC Power Cord, 250 V, 16 A, Source Plug Korea		
CAB-AC-2500W-ISRL AC Power Cord, 250 V, 16 A Israel		
CAB-AC16A-CH AC Power Cord, 16 A China		
R2XX-DMYMPWRCORD No power cord; PID option for ordering server with no power cord	NA	NA



APPENDIX **A**

Storage Controller Considerations

This chapter contains the following topics:

- [Supported Storage Controllers and Cables, on page 195](#)
- [Storage Controller Card Firmware Compatibility, on page 196](#)
- [RAID Backup \(Supercap\), on page 197](#)
- [Write-Cache Policy for Cisco 12G SAS Modular RAID Controller, on page 197](#)
- [Mixing Drive Types in RAID Groups, on page 197](#)
- [RAID Controller Migration, on page 197](#)
- [Storage Controller and Backplane Connectors, on page 198](#)
- [For More RAID Utility Information, on page 199](#)

Supported Storage Controllers and Cables

This server supports a single, PCIe-style, SAS RAID or HBA controller that plugs into a dedicated internal riser.



Note Do not mix controller types in the server.



Note NVMe PCIe SSDs cannot be controlled by a SAS/SATA RAID controller.

This server supports the RAID and HBA controller options and cable requirements shown in the following table.

Storage Adapter (PID)	Product Name	Supported Server	Maximum Number of Drives Supported	Supported RAID Type	Cache Size (GB)
UCSC-RAID-HP	Cisco 24G Tri-Mode RAID controller with 4GB cache (16 Drives)	UCSC-C220-M7S	10	RAID	4
UCSC-RAID-M6T	Cisco 12G SAS RAID Controller with 4GB FBWC (16 Drives)	UCSC-C220-M7S	10 10 2.5-inch SFF front-loading drives Slots 1-10	RAID	4
UCSC-SAS-M6T	Cisco 12G SAS HBA (16 Drives)	UCSC-C220-M7S	10 10 2.5-inch SFF front-loading drives Slots 1-10	SAS HBA	NA
UCSC-9500-8E	Cisco 9500-8e 12G SAS HBA for external JBOD attach	All models of UCS C220 M7 and UCS C240 M7 server	NA	SAS HBA	NA

Storage Controller Card Firmware Compatibility

Firmware on the storage controller (RAID or HBA) must be verified for compatibility with the current Cisco IMC and BIOS versions that are installed on the server. If not compatible, upgrade or downgrade the storage controller firmware using the Cisco Host Upgrade Utility (HUU) for your firmware release to bring it to a compatible level.

See the HUU guide for your Cisco IMC release for instructions on downloading and using the utility to bring server components to compatible levels: [HUU Guides](#).



Note **For servers running in standalone mode only:** After you replace controller hardware, you must run the Cisco Host Upgrade Utility (HUU) to update the controller firmware, even if the firmware Current Version is the same as the Update Version. This is necessary to program the controller's suboem-id to the correct value for the server SKU. If you do not do this, drive enumeration might not display correctly in the software. This issue does not affect servers controlled in UCSM mode.

RAID Backup (Supercap)

This server supports installation of one Supercap unit (UCS-SCAP-D). The unit mounts to a bracket in-line with the fan modules and attaches through the Supercap cable (CBL-SCAP-C220-D).

The optional SCPM provides approximately three years of backup for the disk write-back cache DRAM in the case of a sudden power loss.

For Supercap unit replacement instructions, see [Replacing the Supercap \(RAID Backup\)](#), on page 155.

Write-Cache Policy for Cisco 12G SAS Modular RAID Controller

For this server, the default write-cache policy for the Cisco Modular RAID controller is *Write Through* (irrespective of the presence of a charged SuperCap or “good BBU”). This utilizes the optimal performance characteristics of the controller.

The write policy can be set to *Write Back*, if preferred. You can set the write policy using the following methods:

- For standalone servers, use the Cisco IMC interface to set Virtual Drive Properties > Write Policy. See the “Managing Storage Adapters” section in your Cisco IMC Configuration Guide.

[Cisco IMC GUI and CLI Configuration Guides](#)

- For Cisco UCS-integrated servers, use the Cisco UCS Manager interface to set the write-cache policy as part of virtual drive configuration in your storage profile.

[Cisco UCS Manager Configuration Guides](#)

- Use the LSI Option ROM Configuration Utility.

Mixing Drive Types in RAID Groups

For the best performance follow these guidelines:

- Use either all SAS or all SATA drives in a RAID group.
- Use the same capacity for each drive in the RAID group.
- Never mix HDDs and SSDs in the same RAID group.

RAID Controller Migration

This server supports SAS/SATA hardware RAID (controller card) and embedded software SATA RAID. You cannot use hardware RAID and software RAID at the same time. See the table below for which data migrations are allowed and a summary of migration steps.

Starting RAID Controller	Migrate to Hardware RAID Allowed?	Migrate to Software RAID Allowed?

None (no drives). Embedded RAID is disabled in the BIOS.	Allowed <ol style="list-style-type: none">1. Install RAID card.2. Install SAS cables.	Allowed <ol style="list-style-type: none">1. Install SATA interposer card.2. Install SATA cables.3. Enable embedded RAID in BIOS.
Embedded software RAID. Embedded RAID is enabled in the BIOS.	Caution Data migration from software RAID to hardware RAID is <i>not</i> supported and could result in data loss. Allowed only before there is data on the drives; data migration is not supported. <ol style="list-style-type: none">1. Disable embedded RAID in the BIOS.2. Install RAID card.3. Install SAS cables.	-
Hardware RAID. Embedded RAID is disabled in the BIOS.	-	Not allowed.

Storage Controller and Backplane Connectors

This section describes cabling connections for the storage controllers and the backplane. The SAS/SATA cables are factory-installed and are used for all supported internal controllers in the SFF 10-drive version of the server.

This section also contains diagrams that show the cable-to-drive mapping.



Note The SFF 10-drive version with NVMe drives only, and so does not use SAS or SATA RAID. This version of the server comes with a PCIe cable that directly connects the drives with the MB.

Embedded RAID

This SW RAID option can control up to 8 SATA drives in the SFF 10-drive version.

This embedded RAID option requires that you have a SATA interposer card installed in internal mRAID riser 3. Use the SAS/SATA cables that came with the server.

1. Connect SAS/SATA cable A1 from the A1 interposer connector to the A1 backplane connector.
2. Connect SAS/SATA cable A2 from the A2 interposer connector to the A2 backplane connector.



Note See the following figures that illustrate cable connections and which drives are controlled by each cable. In the SFF 10-drive version, drives 5 and 10 cannot be controlled by the embedded SATA RAID controller.

Cisco 12G Modular SAS RAID Controller or HBA

This HW RAID option can control up to 10 SAS/SATA drives in the SFF 10-drive version.

This option requires that you have a SAS RAID or HBA card installed in internal mRAID riser 3. Use the SAS/SATA cables that came with the server.

1. Connect SAS/SATA cable A1 from the A1 card connector to the A1 backplane connector.
2. Connect SAS/SATA cable A2 from the A2 card connector to the A2 backplane connector.
3. For SFF-10-drive servers only: Connect SAS/SATA cable B2 from the B2 card connector to the B2 backplane connector.



Note See the following figures that illustrate cable connections and which drives are controlled by each cable.

For More RAID Utility Information

The Broadcom utilities have help documentation for more information about using the utilities.

- For basic information about RAID and for using the utilities for the RAID controller cards that are supported in Cisco servers, see the [Cisco Servers RAID Guide](#).
- For hardware SAS MegaRAID configuration—[Broadcom 12Gb/s MegaRAID SAS Software User Guide, Version 2.8](#)
- For embedded software MegaRAID and the utility that is accessed via the server BIOS (refer to Chapter 4)—[Broadcom Embedded MegaRAID Software User Guide, March 2018](#).



APPENDIX **B**

GPU Card Installation

This chapter contains the following topics:

- [Server Firmware Requirements, on page 201](#)
- [GPU Card Configuration Rules, on page 201](#)
- [Requirement For All GPUs: Memory-Mapped I/O Greater Than 4 GB, on page 202](#)
- [Replacing a Single-Wide GPU Card, on page 203](#)
- [Installing Drivers to Support the GPU Cards, on page 208](#)

Server Firmware Requirements

The following table lists the minimum server firmware versions for the supported GPU cards.

GPU Card	Cisco IMC/BIOS Minimum Version Required
NVIDIA L4 PCIe, 72W, Gen 4 x8 (UCSC-GPU-L4)	4.1(3)
Intel GPU Flex 140 PCIe, 75W, Gen 4 x8 (UCSC-GPU-FLEX140)	4.1(3)

GPU Card Configuration Rules

Note the following rules when populating a server with GPU cards.

- The server supports the following GPUs:
 - NVIDIA L4 70W 24GB PCIe GPU (UCSC-GPU-L4), which is a half-height, half-length (HHHL) GPU single-wide GPU card. This GPU can be installed in either PCIe Gen 4 or PCIe Gen 5 half-height or full-height risers. Each server can support a maximum of 3 GPUs of the same type with half-height (HH risers) or a maximum of 2 GPUs of the same type with full-height (FH) risers.
 - Intel GPU Flex 140 Gen4x8 75W PCIe (UCSC-GPU-FLEX140), which is a half-height, half-length (HHHL) GPU single-wide GPU card. This GPU can be installed in either PCIe Gen4 or PCIe Gen5 half-height risers. Each server can support a maximum of 3 GPUs of the same type with half-height (HH risers) or a maximum of 2 GPUs of the same type with full-height (FH) risers.

- You can install up to three single-wide GPU cards in PCIe slots 1 and 2.
- You can install a GPU either full-height PCIe riser 1 or 2 (or both).
- Use the UCS power calculator at the following link to determine the power needed based on your server configuration: <http://ucspowercalc.cisco.com>
- You cannot mix GPU cards in the server. Mixing GPUs is not supported.
- All GPU cards must be procured from Cisco as there is a unique SBIOS ID required by Cisco management tools, such as CIMC and UCSM.
- To support one or more GPUs, the server must have two CPUs and two full-height rear risers.

Requirement For All GPUs: Memory-Mapped I/O Greater Than 4 GB

All supported GPU cards require enablement of the BIOS setting that allows greater than 4 GB of memory-mapped I/O (MMIO).

- **Standalone Server:** If the server is used in standalone mode, this BIOS setting is enabled by default:
`Advanced > PCI Configuration > Memory Mapped I/O Above 4 GB [Enabled]`
If you need to change this setting, enter the BIOS Setup Utility by pressing **F2** when prompted during bootup.
- If the server is integrated with Cisco UCS Manager and is controlled by a service profile, this setting is enabled by default in the service profile when a GPU is present.
To change this setting manually, use the following procedure.

-
- Step 1** Refer to the Cisco UCS Manager configuration guide (GUI or CLI) for your release for instructions on configuring service profiles:
[Cisco UCS Manager Configuration Guides](#)
- Step 2** Refer to the chapter on Configuring Server-Related Policies > Configuring BIOS Settings.
- Step 3** In the section of your profile for PCI Configuration BIOS Settings, set `Memory Mapped IO Above 4GB Config` to one of the following:
- **Disabled**—Does not map 64-bit PCI devices to 64 GB or greater address space.
 - **Enabled**—Maps I/O of 64-bit PCI devices to 64 GB or greater address space.
 - **Platform Default**—The policy uses the value for this attribute contained in the BIOS defaults for the server. Use this only if you know that the server BIOS is set to use the default enabled setting for this item.
- Step 4** Reboot the server.

Note Cisco UCS Manager pushes BIOS configuration changes through a BIOS policy or default BIOS settings to the Cisco Integrated Management Controller (CIMC) buffer. These changes remain in the buffer and do not take effect until the server is rebooted.

Replacing a Single-Wide GPU Card

A GPU kit (UCSC-GPURKIT-C220) is available from Cisco. The kit contains a GPU mounting bracket and the following risers (risers 1 and 2):

- One x16 PCIe Gen4 riser, standard PCIe, supports Cisco VIC, full-height, 3/4 length
- One x16 PCIe Gen4 riser, standard PCIe, full-height, 3/4 length

Step 1 Remove an existing GPU card from the PCIe riser:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 44](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing Top Cover, on page 39](#).
- d) Using a #2 Phillips screwdriver, loosen the captive screws.
- e) Lift straight up to disengage the riser from the motherboard. Set the riser upside-down on an antistatic surface.
- f) Pull evenly on both ends of the GPU card to disconnect the card from the socket.

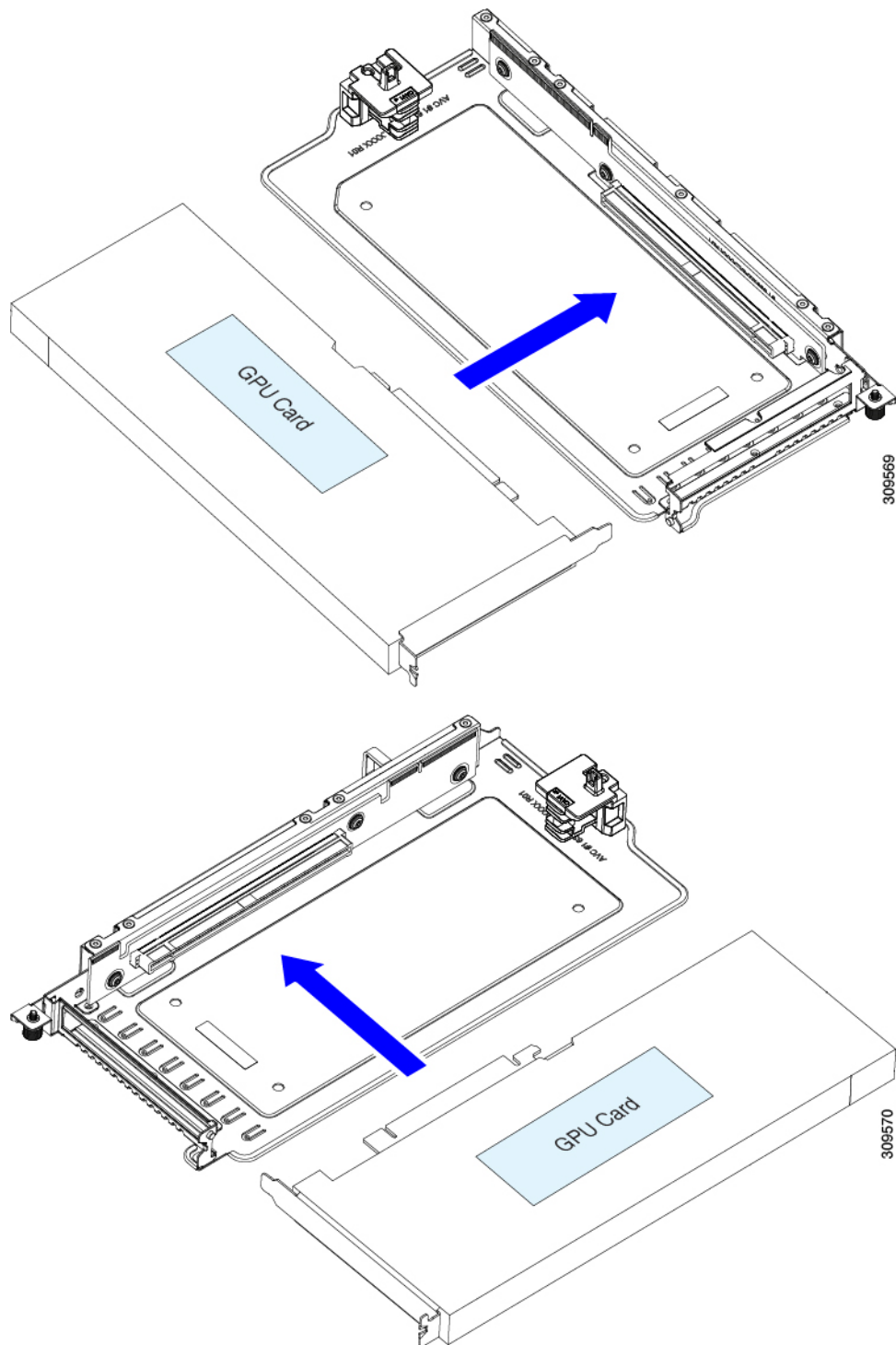
If the riser has no card, remove the blanking panel from the rear opening of the riser.

Step 2 Holding the GPU level, slide it out of the socket on the PCIe riser.

Step 3 Install a new GPU card:

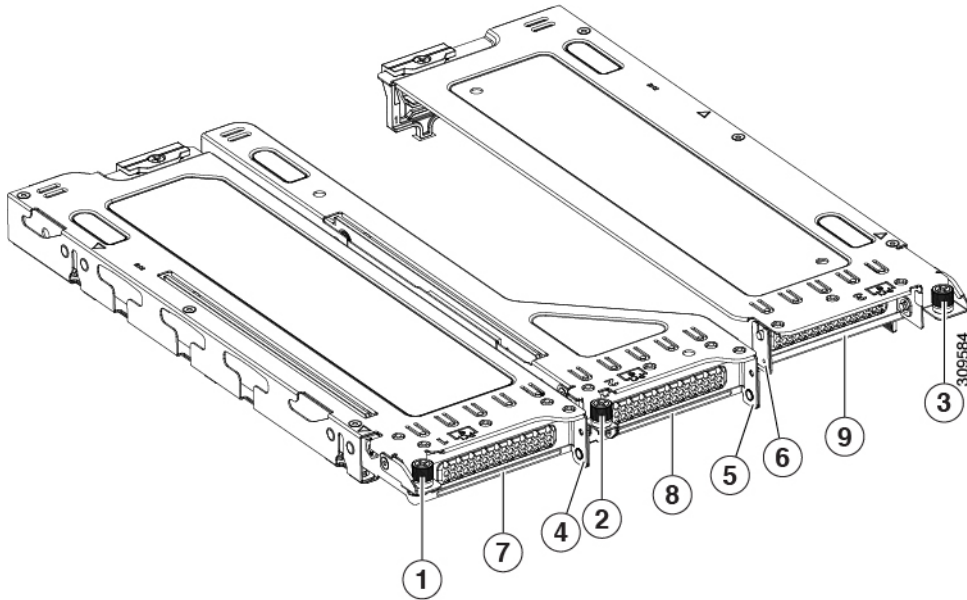
Note The Intel Flex 140 and Nvidia L4 are half-height, half-length cards. If one is installed in full-height PCIe slot 1, it requires a full-height rear-panel tab installed to the card.

- a) Align the new GPU card with the empty socket on the PCIe riser and slide each end into the retaining clip.



- b) Push evenly on both ends of the card until it is fully seated in the socket.
- c) Ensure that the card's rear panel tab sits flat against the riser rear-panel opening.

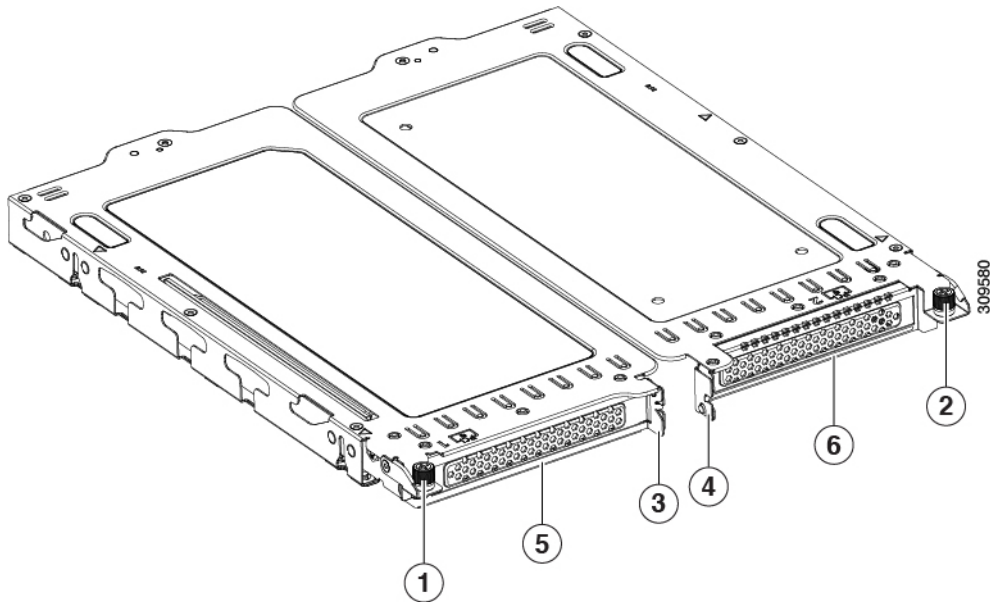
Figure 52: PCIe Riser Assembly, 3 HHHL



Note For easy identification, riser numbers are stamped into the sheet metal on the top of each riser cage.

1	Captive screw for PCIe slot 1 (alignment feature) PCIe slot 1 rear-panel opening	6	Handle for PCIe slot 3 riser
2	Captive screw for PCIe slot 2 (alignment feature)	7	Rear-panel opening for PCIe slot 1
3	Captive screw for PCIe slot 2 (alignment feature)	8	Rear-panel opening for PCIe slot 2
4	Handle for PCIe slot 1 riser	9	Rear-panel opening for PCIe slot 3
5	Handle for PCIe slot 2 riser	-	

Figure 53: PCIe Riser Assembly, 2 FHFL

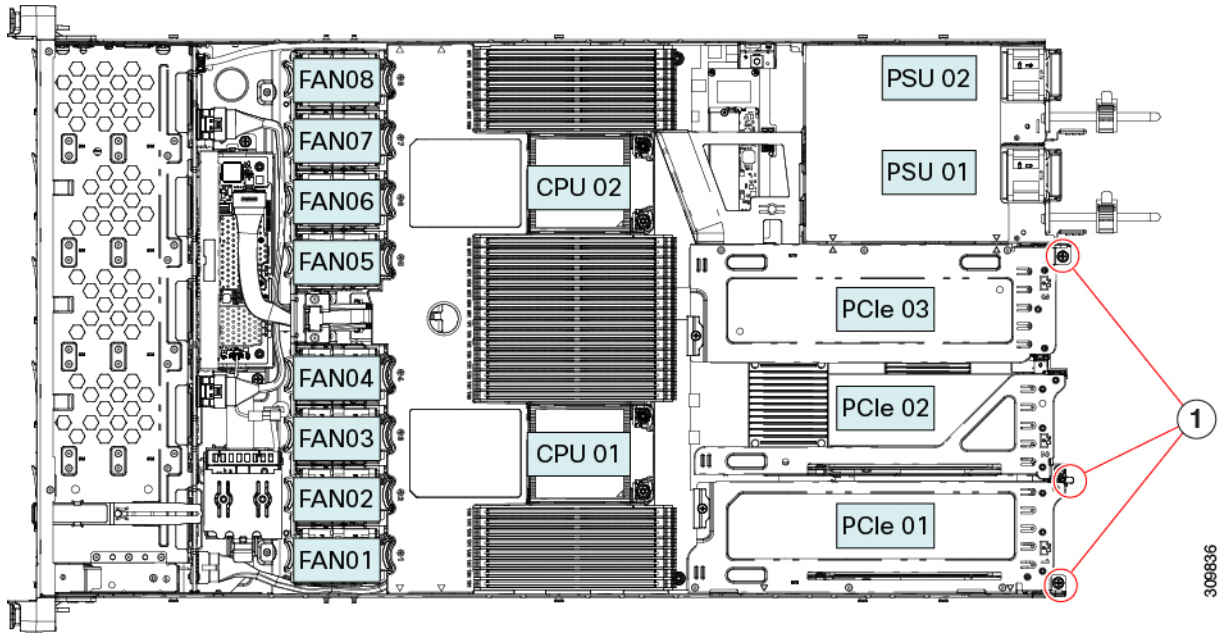


1	Captive screw for PCIe slot 1	4	Handle for PCIe slot 2 riser
2	Captive screw for PCIe slot 2	5	Rear-panel opening for PCIe slot 1
3	Handle for PCIe slot 1 riser	-	Rear-panel opening for PCIe slot 2

d) Position the PCIe riser over its sockets on the motherboard and over the chassis alignment channels.

Figure 54: PCIe Riser Alignment Features

- For a server with 3 HHHL risers, 3 sockets and 3 alignment features are available, as shown below.

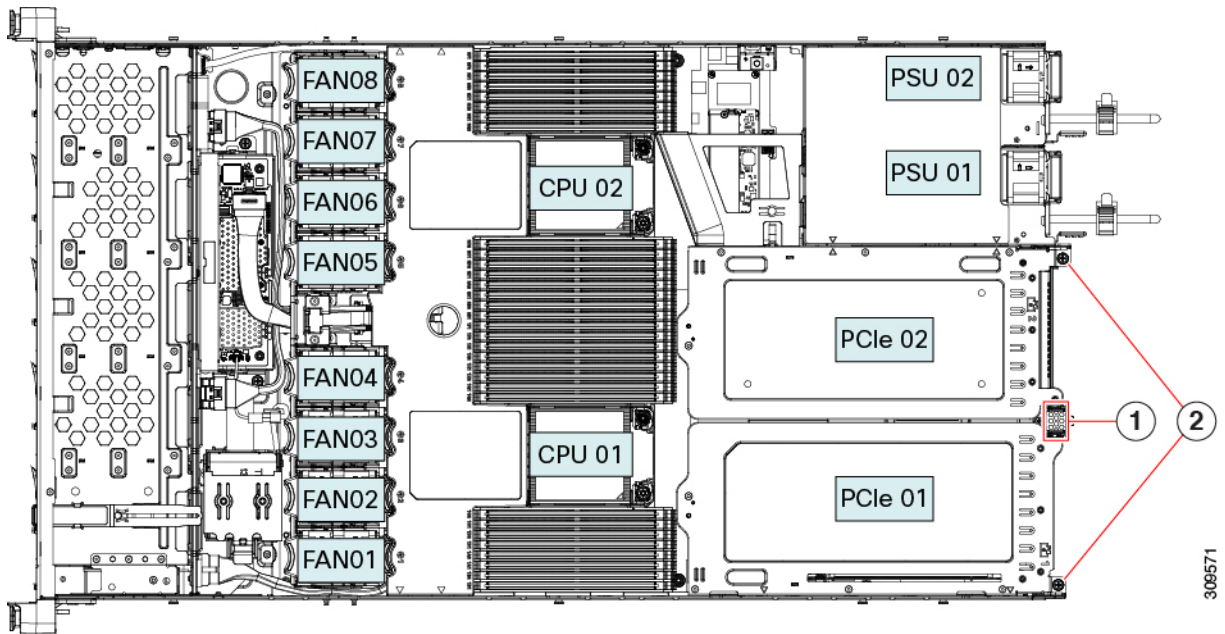


309836

Riser alignment features in chassis (captive screws)	Riser alignment features in chassis (captive screws)
--	--

- For a server with 2 FHFL risers, 2 sockets and 2 alignment features are available, as shown below.

Figure 55: PCIe Riser Alignment Features



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Riser handles	Riser alignment features in chassis (captive screws)
---------------	--

- e) Carefully push down on both ends of the PCIe riser to fully engage its two connectors with the two sockets on the motherboard.

- f) When the riser is level and fully seated, use a #2 Phillips screwdriver to secure the riser to the server chassis.
- g) Replace the top cover to the server.
- h) Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Step 4 Optional: Continue with [Installing Drivers to Support the GPU Cards, on page 208](#).

Installing Drivers to Support the GPU Cards

After you install the hardware, you must update to the correct level of server BIOS and then install GPU drivers and other software in this order:

1. Update the server BIOS.
2. Update the GPU drivers.

1. Updating the Server BIOS

Install the latest Cisco UCS C240 M4 server BIOS by using the Host Upgrade Utility for the Cisco UCS C240 M4 server.



Note You must do this procedure before you update the NVIDIA drivers.

- Step 1** Navigate to the following URL: <http://www.cisco.com/cisco/software/navigator.html>.
- Step 2** Click **Servers–Unified Computing** in the middle column.
- Step 3** Click **Cisco UCS C-Series Rack-Mount Standalone Server Software** in the right-hand column.
- Step 4** Click the name of your model of server in the right-hand column.
- Step 5** Click **Unified Computing System (UCS) Server Firmware**.
- Step 6** Click the release number.
- Step 7** Click **Download Now** to download the `ucs-server_platform-huu-version_number.iso` file.
- Step 8** Verify the information on the next page, and then click **Proceed With Download**.
- Step 9** Continue through the subsequent screens to accept the license agreement and browse to a location where you want to save the file.
- Step 10** Use the Host Upgrade Utility to update the server BIOS.
The user guides for the Host Upgrade Utility are at [Utility User Guides](#).

2. Updating the GPU Card Drivers

After you update the server BIOS, you can install GPU drivers to your hypervisor virtual machine.

-
- Step 1** Install your hypervisor software on a computer. Refer to your hypervisor documentation for the installation instructions.
- Step 2** Create a virtual machine in your hypervisor. Refer to your hypervisor documentation for instructions.
- Step 3** Install the GPU drivers to the virtual machine. Download the drivers from either:
- NVIDIA Enterprise Portal for GRID hypervisor downloads (requires NVIDIA login): <https://nvidia.flexnetoperations.com/>
 - NVIDIA public driver area: <http://www.nvidia.com/Download/index.aspx>
 - AMD: <http://support.amd.com/en-us/download>
- Step 4** Restart the server.
- Step 5** Check that the virtual machine is able to recognize the GPU card. In Windows, use the Device Manager and look under Display Adapters.
-



APPENDIX **C**

Installation for Cisco Software Management

This chapter contains the following topics:

- [Installation For Cisco UCS Manager Integration, on page 211](#)

Installation For Cisco UCS Manager Integration

The Cisco UCS Manager integration instructions are in the integration guides found here:

[Cisco UCS C-Series Server Integration with UCS Manager Configuration Guides](#)

Refer to the guide that is for the version of Cisco UCS Manager that you are using.

Also refer to the release notes for Cisco UCS Manager software and C-Series Cisco IMC software for any special considerations regarding integration in your release.

- [Cisco UCS Manager Release Notes](#)
- [Cisco C-Series Software Release Notes](#)



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