Servicing the Server

This chapter contains the following topics:

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 1: Front Panel LEDs

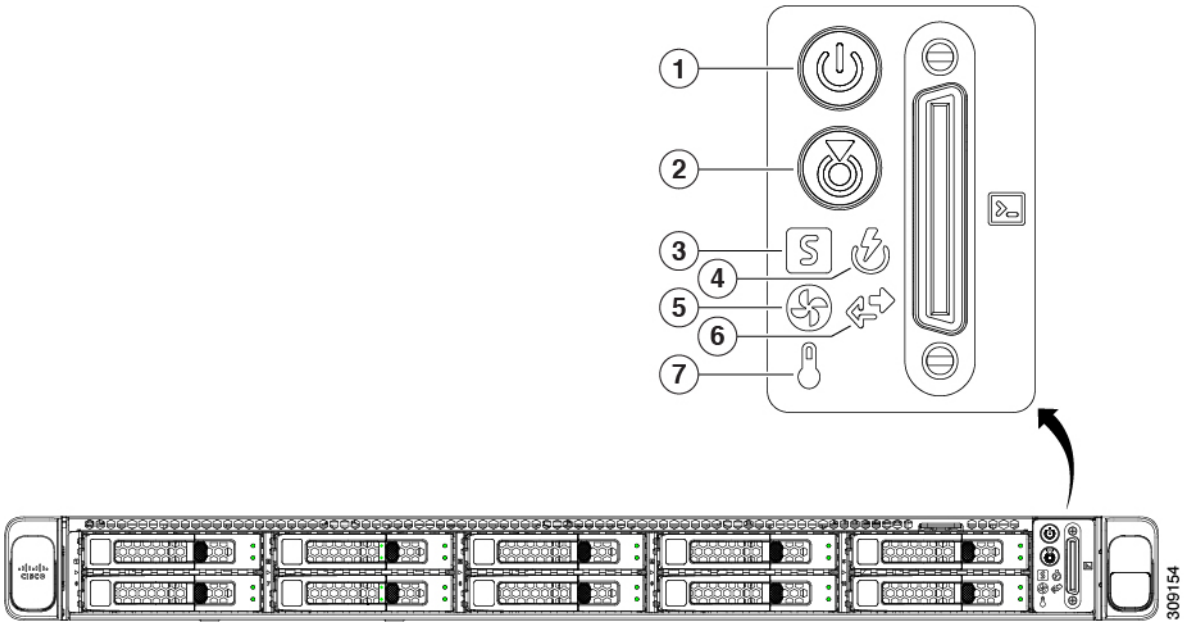


Table 1: Front Panel LEDs, Definition of States

	LED Name	States
1	Power button/LED ( )	• 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 ( )	• Off—The unit identification function is not in use. • Blue, blinking—The unit identification function is activated.

3	System health ()	• 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:
		  • 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.

4	Power supply status ()	• 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.
5	Fan status ()	• Green—All fan modules are operating properly. • Amber, blinking—One or more fan modules breached the non-recoverable threshold.
6	Network link activity ()	• 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.
7	Temperature status ()	• 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 2: Rear Panel LEDs

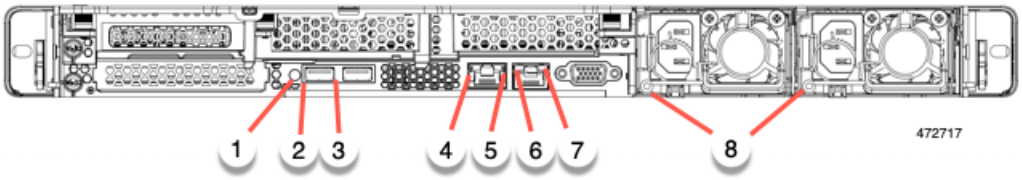


Table 2: Rear Panel LEDs, Definition of States

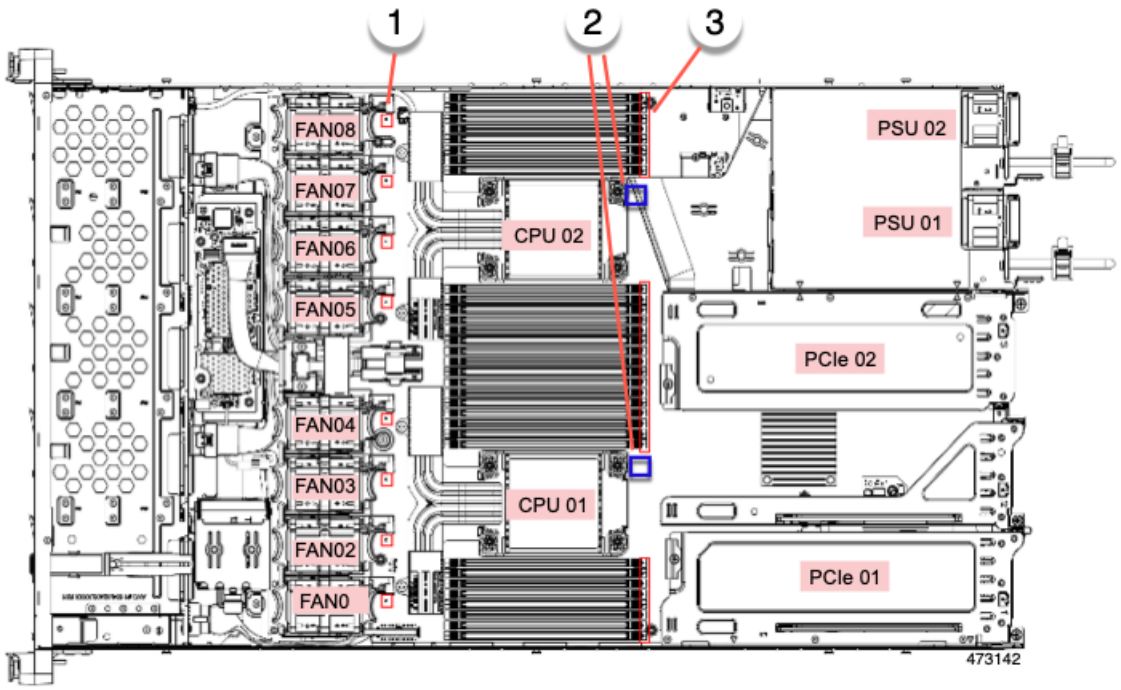
	LED Name	States
1	Rear Unit Identification	• Off—The unit identification function is not in use. • Blue, blinking—The unit identification function is activated.
2	USB 3.0	
3	USB 3.0	
4	1-Gb Ethernet dedicated management link speed	• Off—Link speed is 10 Mbps. • Amber—Link speed is 100 Mbps. • Green—Link speed is 1 Gbps.
5	1-Gb Ethernet dedicated management link status	• 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)	**AC power supplies:** • 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). **DC power supplies:** • 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).

Internal Diagnostic LEDs

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

Figure 3: Internal Diagnostic LED Locations



1	Fan module fault LEDs (one behind each fan connector on the motherboard) • Amber—Fan has a fault or is not fully seated. • Green—Fan is OK.	**3**	DIMM fault LEDs (one behind each DIMM socket on the motherboard) These LEDs operate only when the server is in standby power mode. • Amber—DIMM has a fault. • Off—DIMM is OK.
2	CPU fault LEDs (one behind each CPU socket on the motherboard). These LEDs operate only when the server is in standby power mode. • Amber—CPU has a fault. • Off—CPU is OK.	-	

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 7.

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.

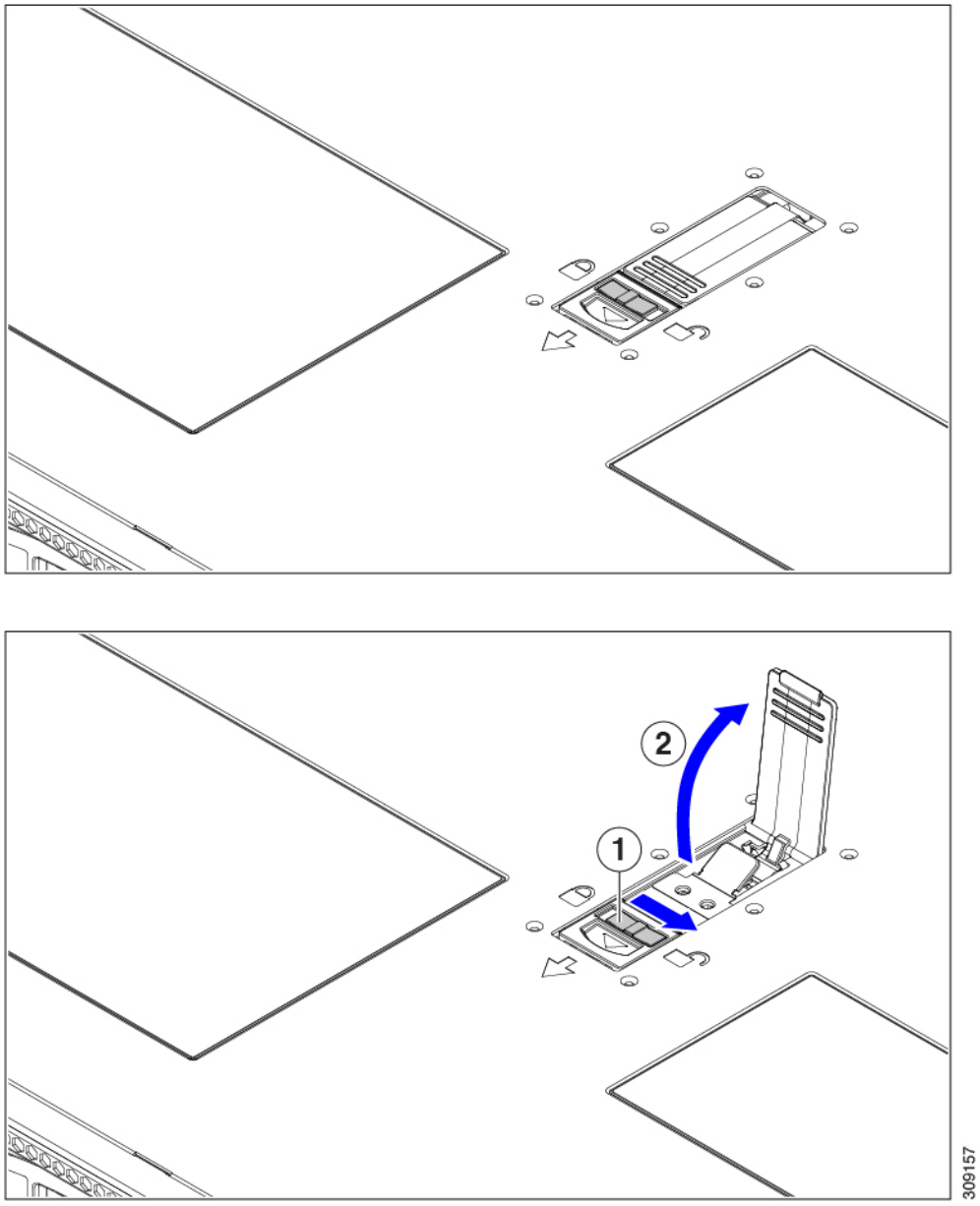
b) Slide the cover forward until the latch makes contact.

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 4: Removing the Top Cover



1	Cover lock	**2**	Cover latch handle

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 5: Existing Air Duct (Intel Fourth Generation Scalable Processors)

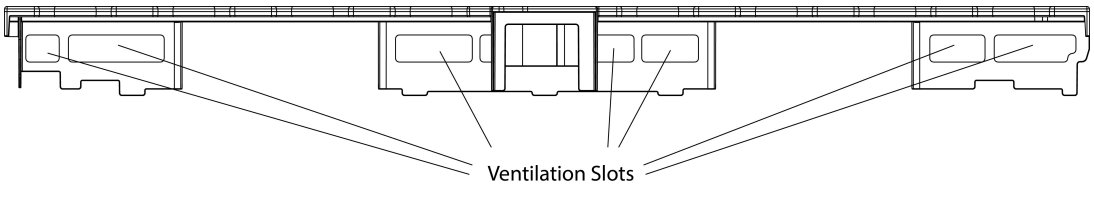
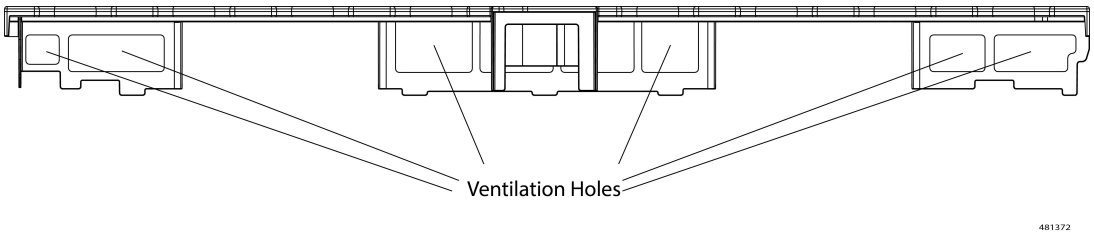


Figure 6: New Air Duct (UCSC-AD-C220M7= for Intel Fifth Generation Scalable Processors)



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

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

- Removing the Air Duct, on page 9
- Installing the Air Duct, on page 10

Removing the Air Duct

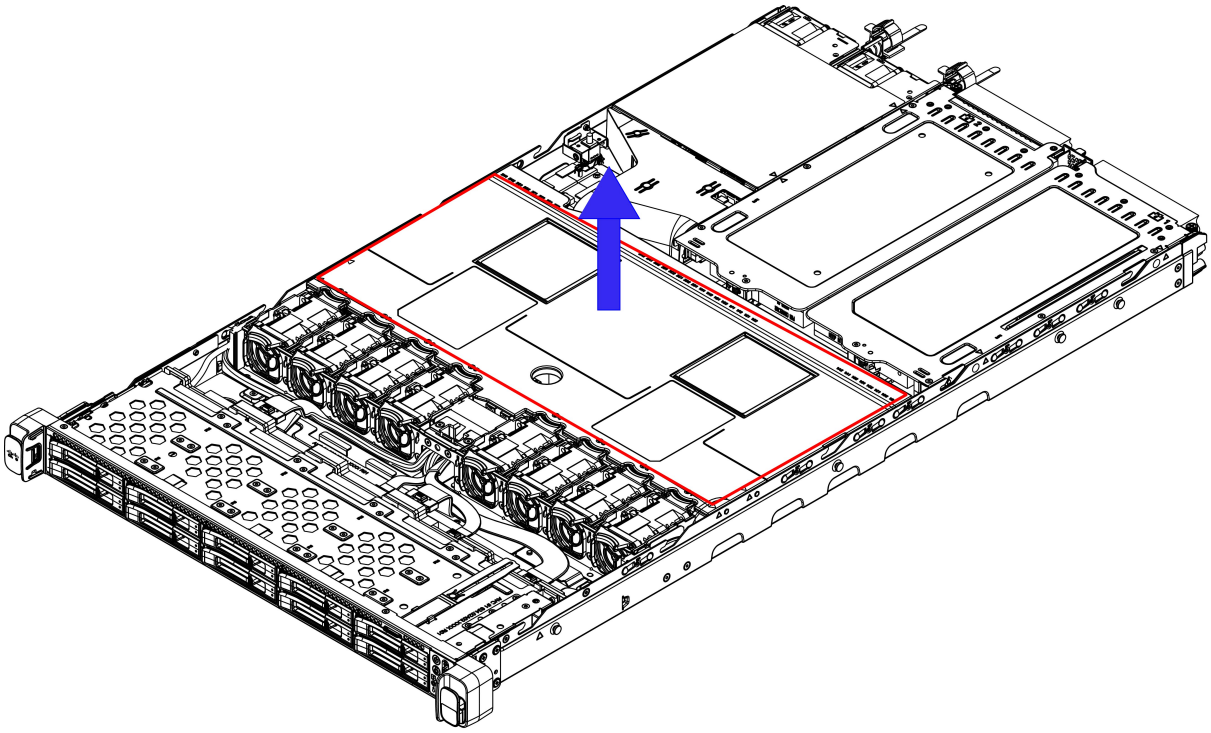
Use this procedure to remove the air duct when needed.

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.



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What to do next

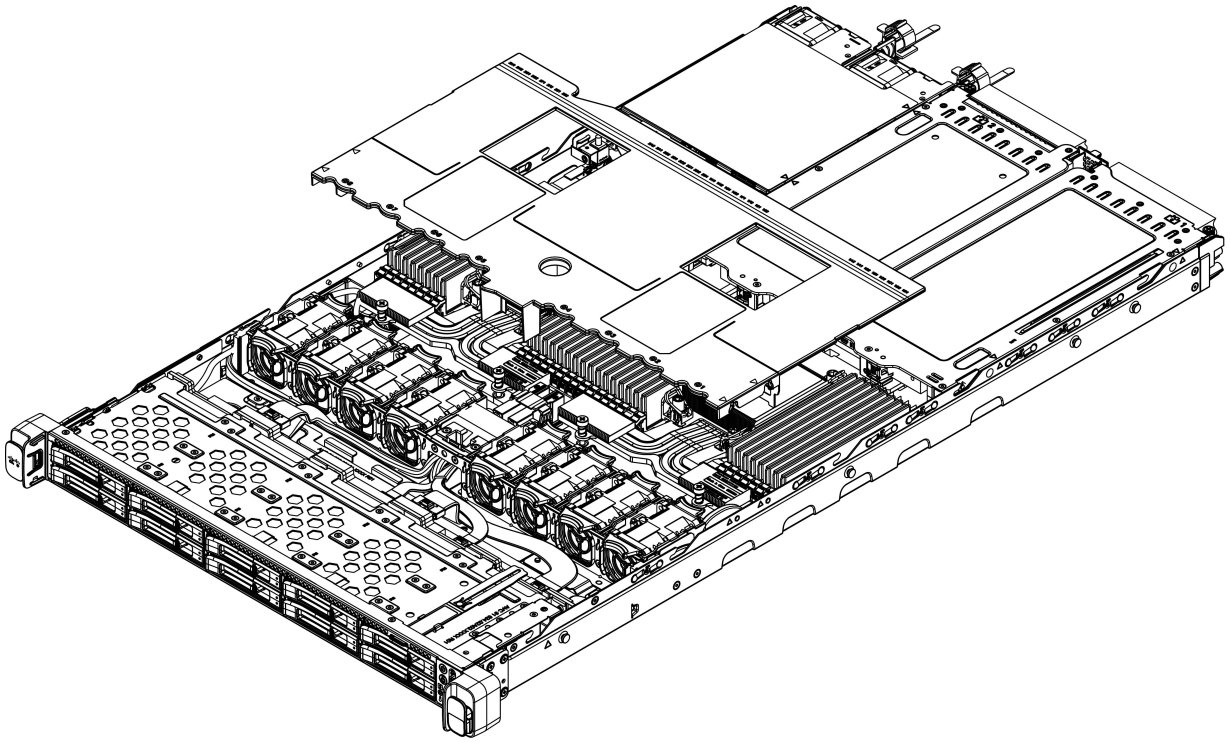
When you are done servicing the server, install the air duct. See Installing the Air Duct, on page 10.

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.



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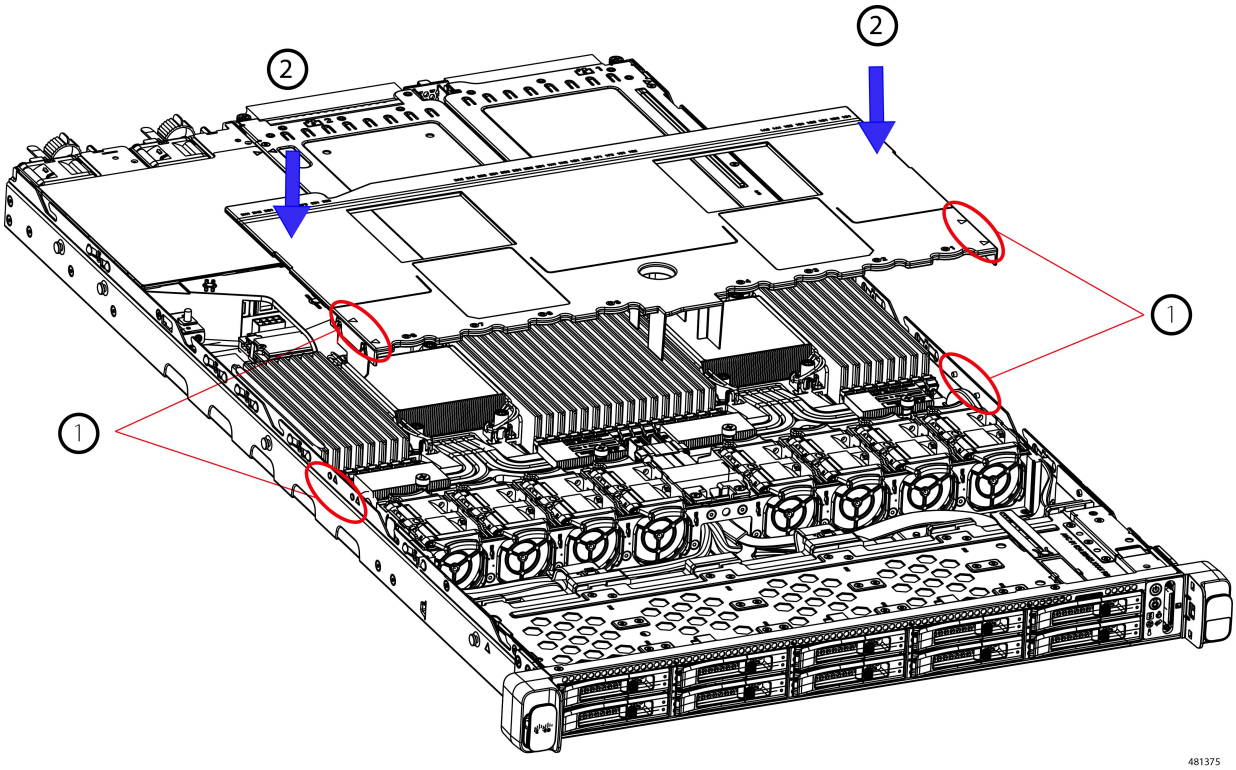
Step 2 Install the air duct.

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.



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.**

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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.

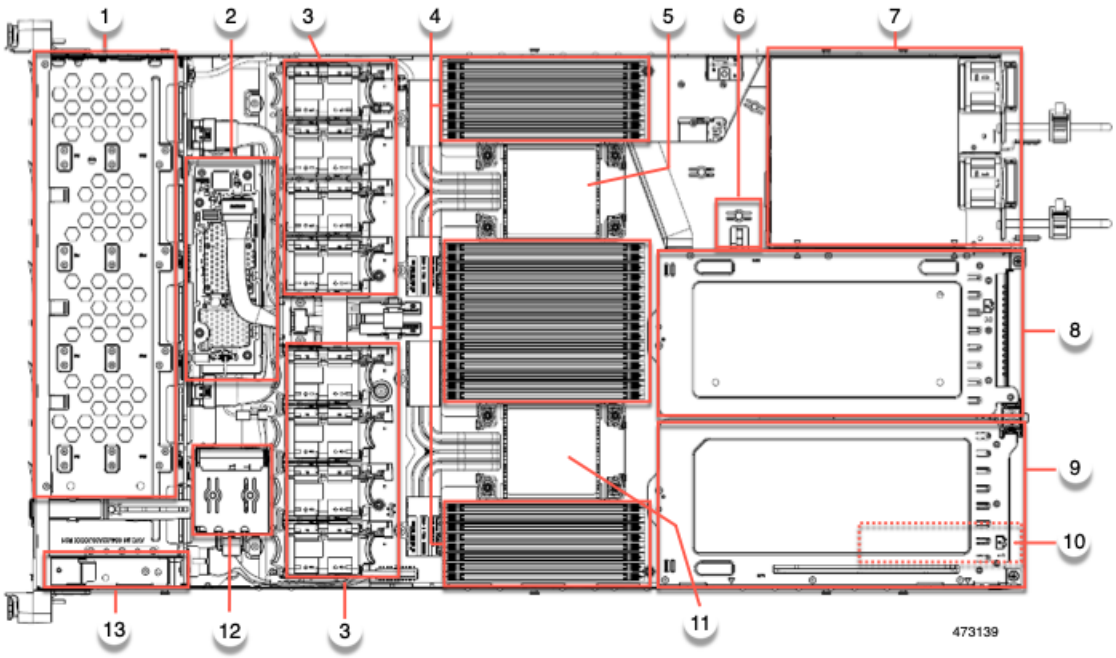
Tip You can press the unit identification button on the front panel or rear panel to turn on a flashing, blue unit identification LED on both the front and rear panels of the server. This button allows you to locate the specific server that you are servicing when you go to the opposite side of the rack. 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 7: 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.

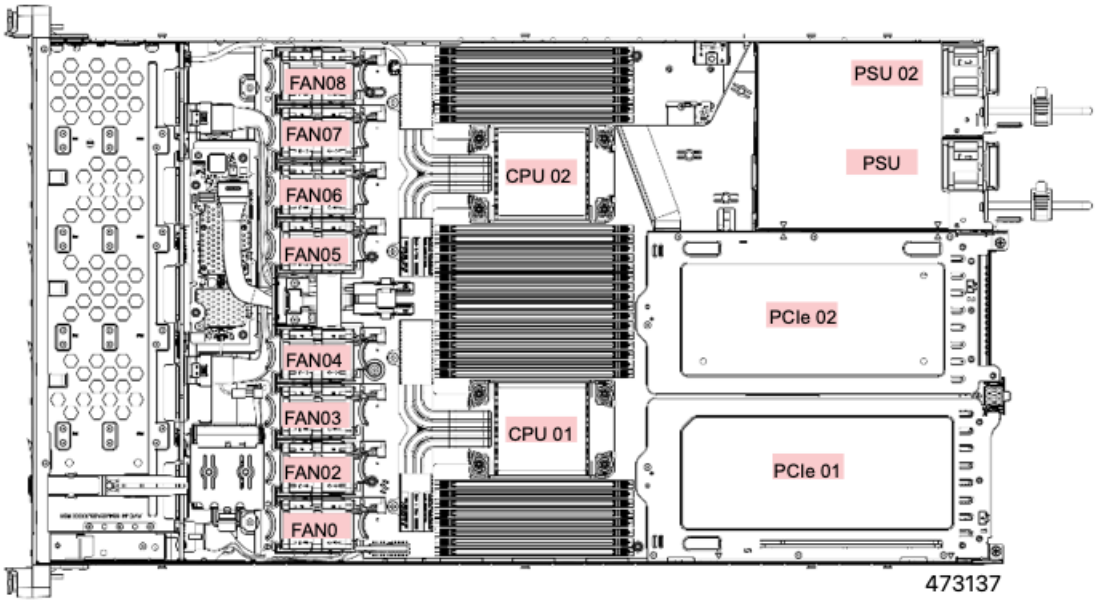
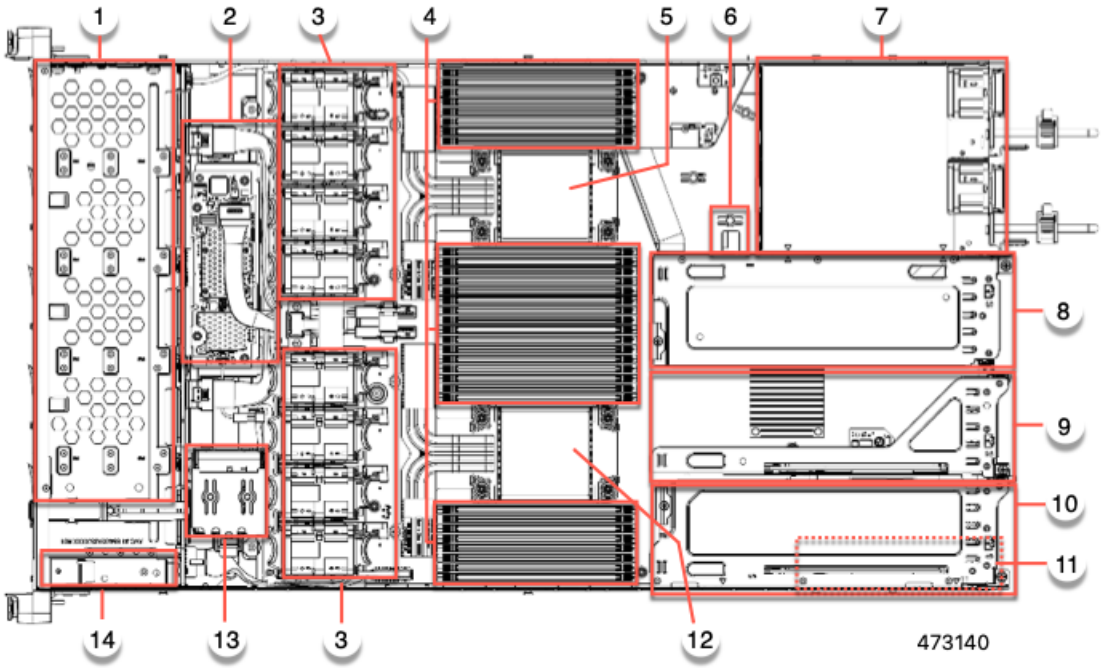
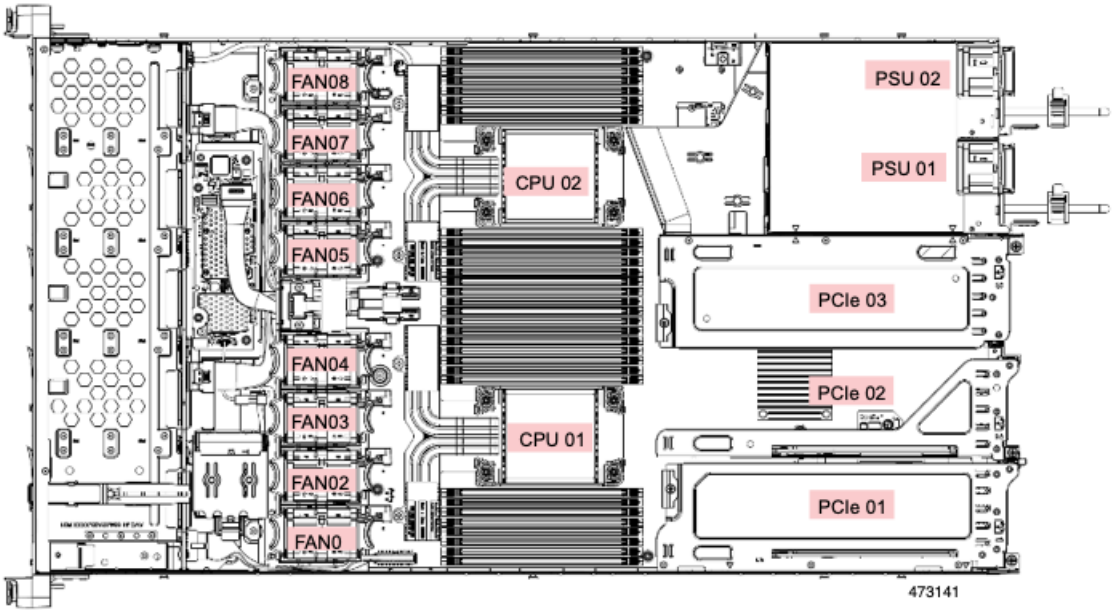


Figure 8: Cisco UCS C220 M7 Server, Half Height, Half Length PCIe Cards, Serviceable Component Locations



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 22.

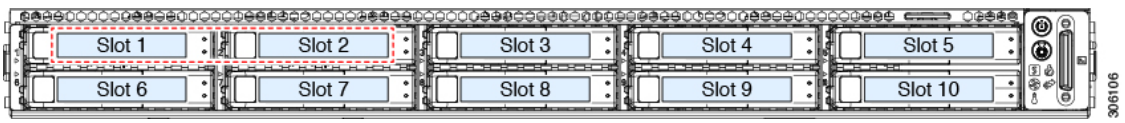
SAS/SATA Drive Population Guidelines

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 9: 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

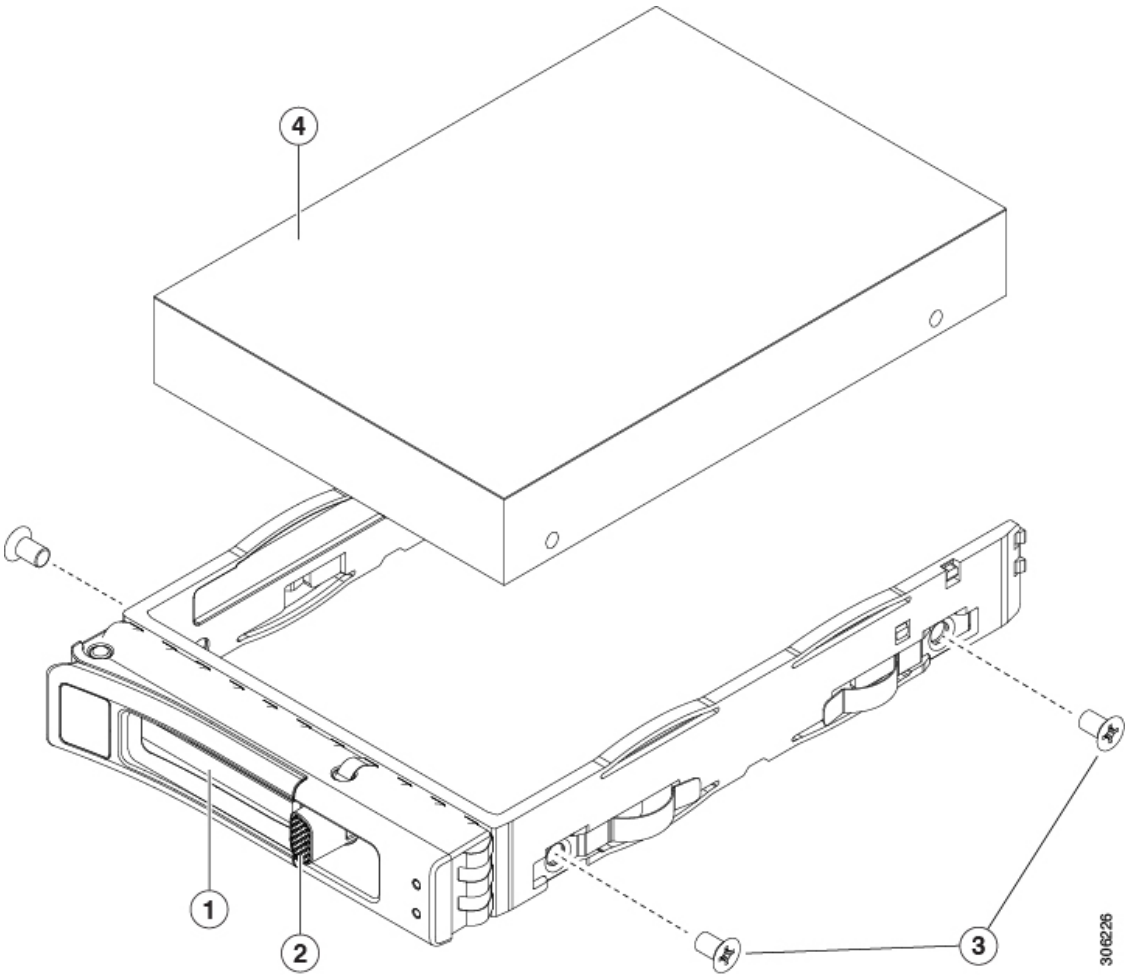
Step 1 Remove the drive that you are replacing or remove a blank drive tray from the bay:

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 10: 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 21.

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 19.

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 1.

Step 3 If the error persists, cold reseat the drive, which requires a server power down. Choose the appropriate option:

a) Use your server management software to gracefully power down the server.

See the appropriate Cisco management software documentation.

b) 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 1.

c) Reseat the drive as documented in Step 1.

d) 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:

a) Contact Cisco Systems for assistance with troubleshooting.

b) 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 24.

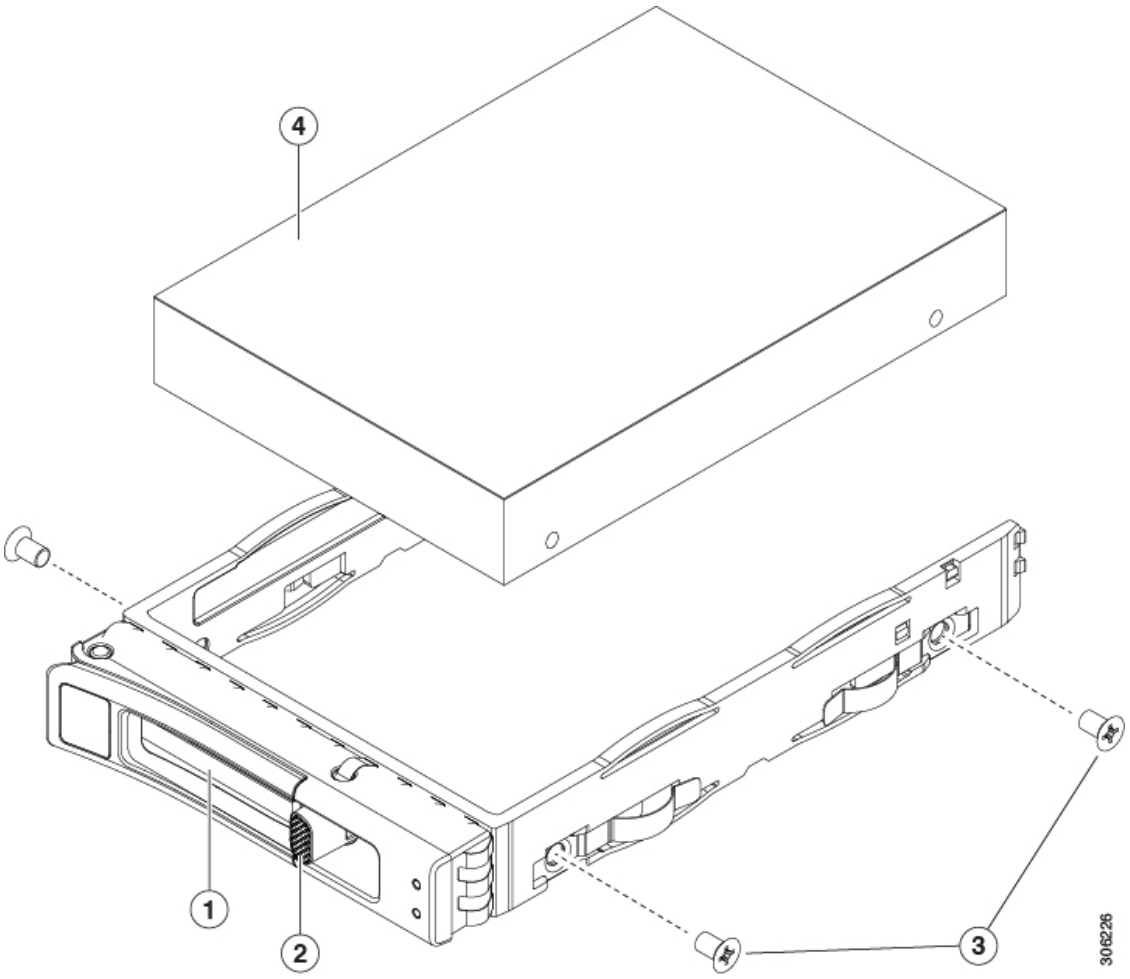
Step 2 Install a new front-loading NVMe SSD:

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

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:

a) 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.

b) Remove the top cover from the server as described in Removing Top Cover, on page 7.

c) 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:

a) 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.

b) Press down gently on the fan module to fully engage it with the connector on the motherboard.

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 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 78.

If you need to remove the OCP card to install riser cages, see Replacing an OCP Card, on page 91.

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 27
- Installing Half Height Riser Cages, on page 30
- Removing Full Height Riser Cages, on page 34
- Installing Full Height Riser Cages, on page 39

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 27
- Installing Full Height Riser Cages, on page 39
- Removing Full Height Riser Cages, on page 34
- Installing Half Height Riser Cages, on page 30

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, ¾ 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, ¾ 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, ¾ 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, ¾ 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, ¾ 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, ¾ 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, ¾ 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 26.

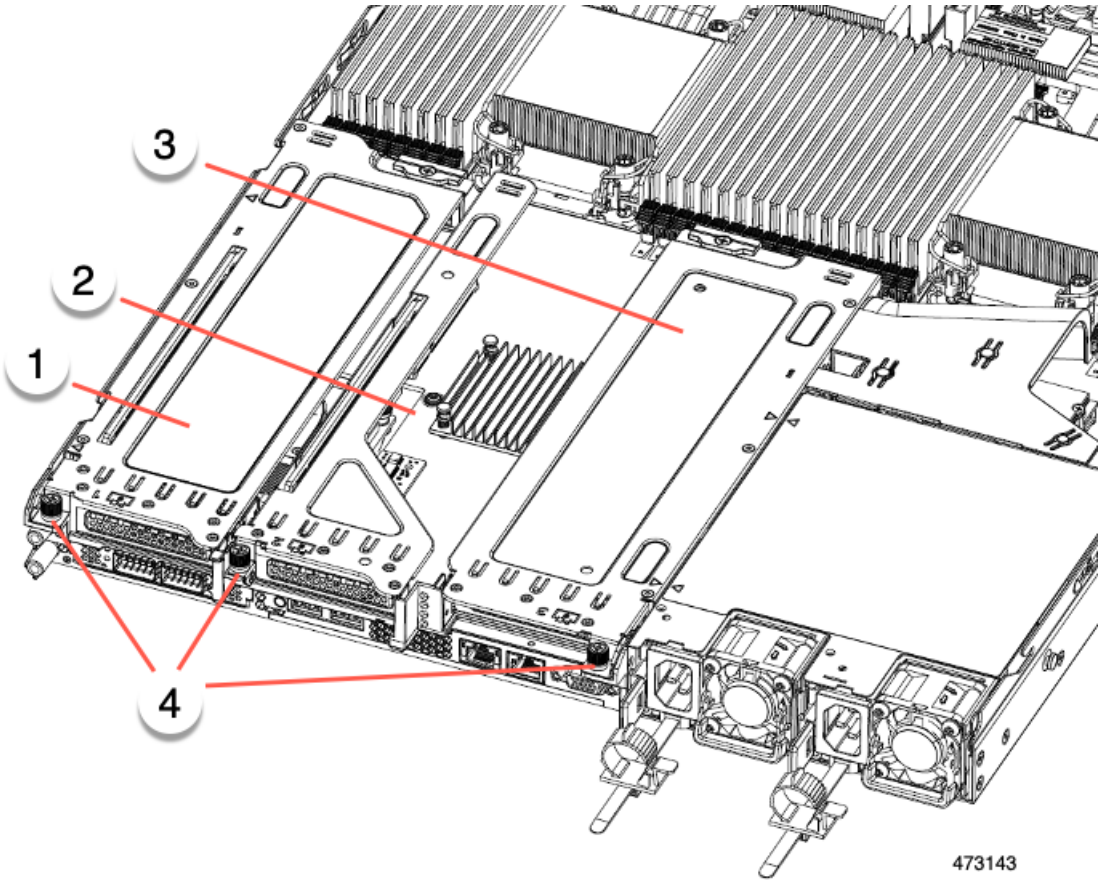
Step 1 Remove the server top cover to gain access to the PCIe riser cages.

See Removing Top Cover, on page 7.

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.



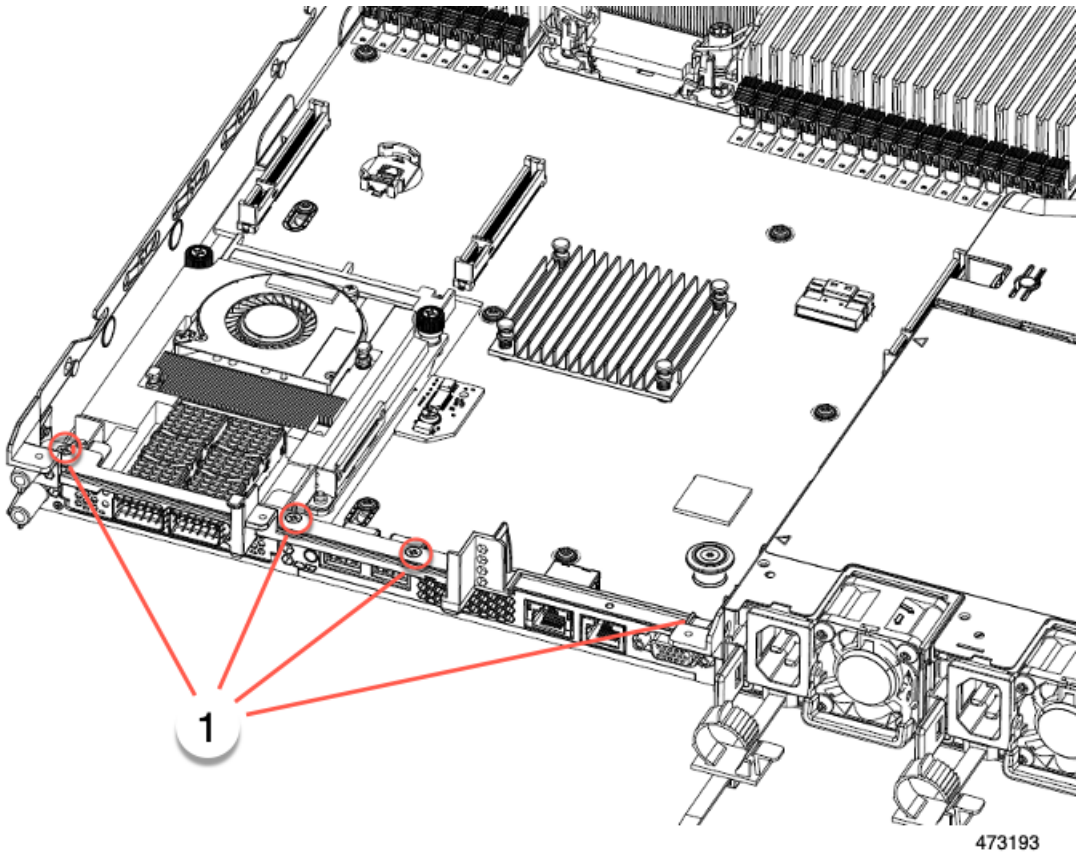
1	Rear Riser Cage 1	**2**	Rear Riser Cage 2
3	Rear Riser cage 3	**4**	Riser Cage Thumbscrews, three total (one per riser cage)

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.

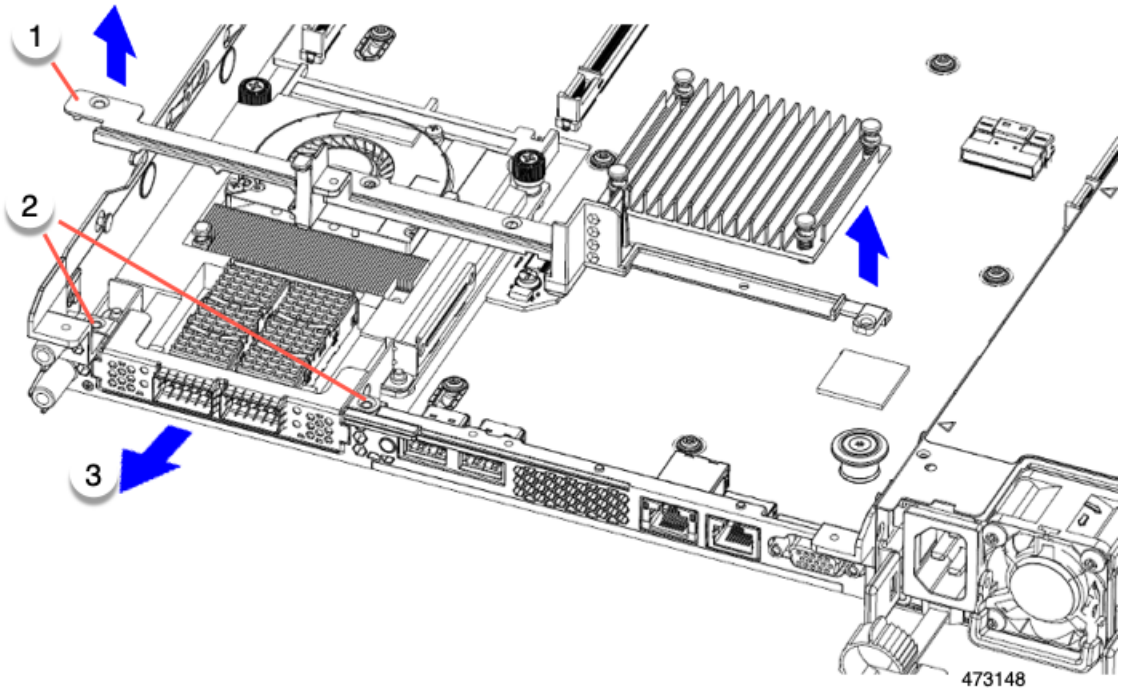
Figure 12: Locations of Securing Screws, Facing Rear Riser Slots



Step 4 Remove the half height rear wall and mLOM/OCP card bracket.

a) Grasp each end of the half height rear wall and remove it.

b) 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

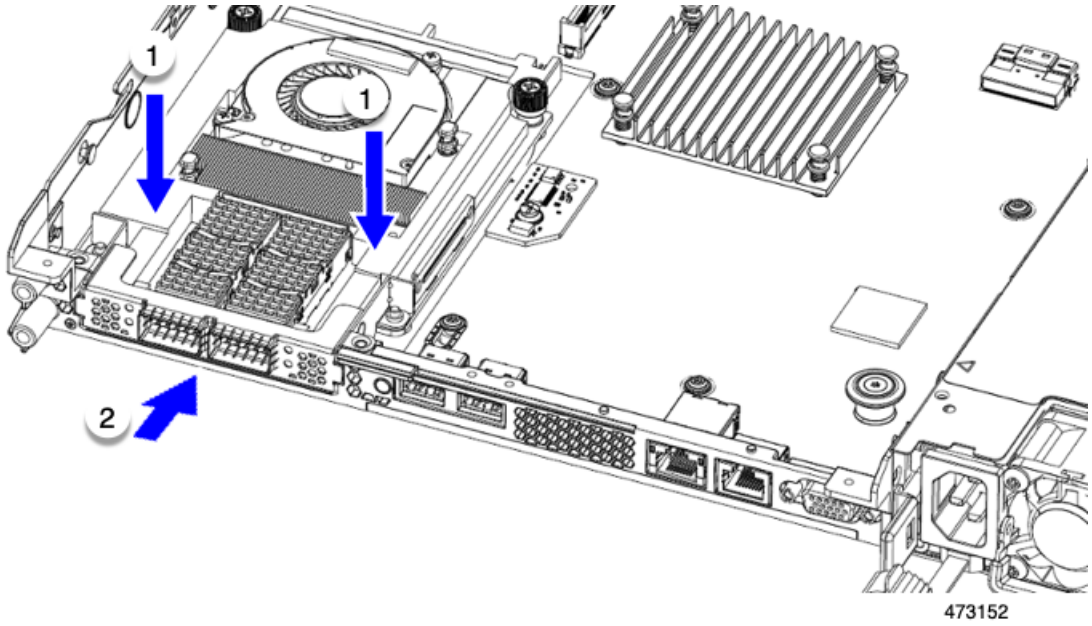
Install the two full-height riser cages. See Installing Full Height Riser Cages, on page 39.

Installing Half Height Riser Cages

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

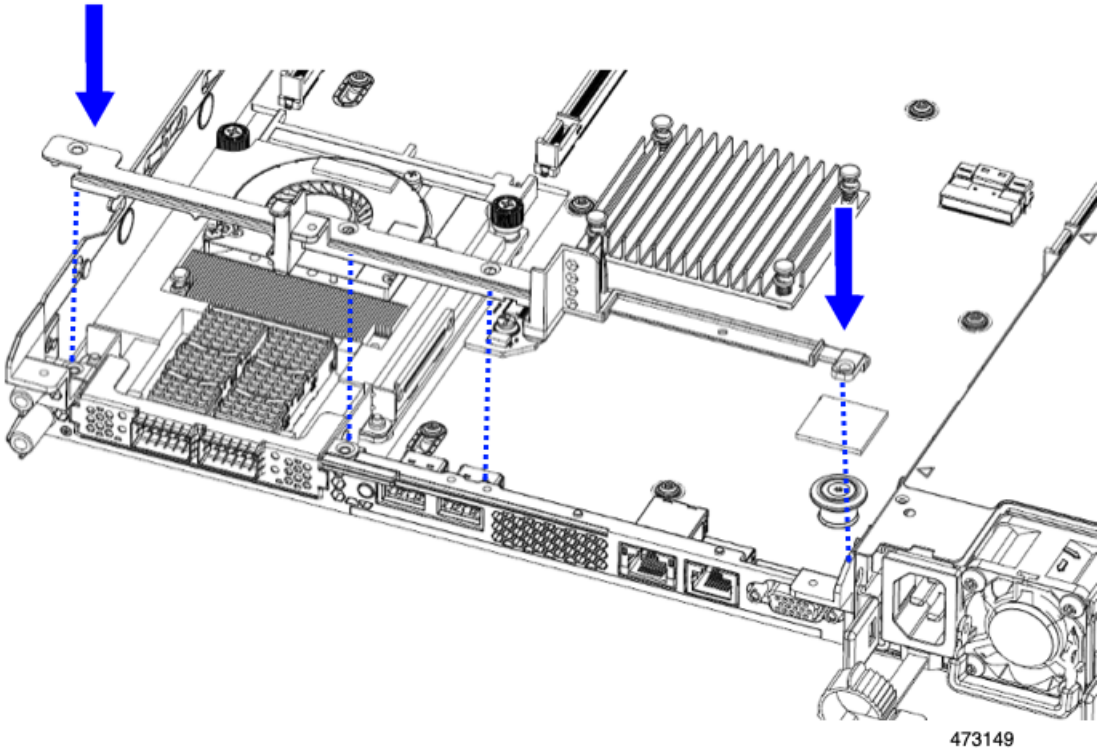
Before beginning this procedure, see Required Equipment for Replacing Riser Cages, on page 26.

Step 1 Install the mLOM/OCP card bracket.



Step 2 Install the half-height rear wall.

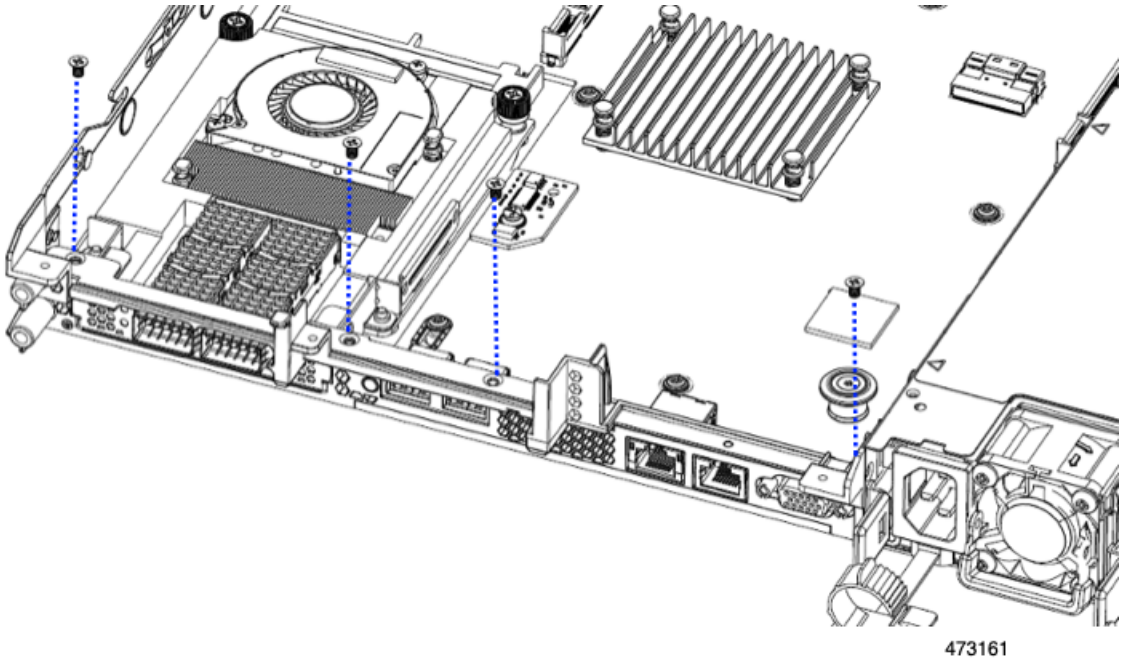
a) Orient the half-height rear wall as shown, making sure the folded metal tab is facing up.
b) Align the screw holes in the HH rear wall with the screw holes in the server sheet metal.
c) Holding the rear wall level, seat onto the server sheet metal, making sure that the screw holes line up.



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!

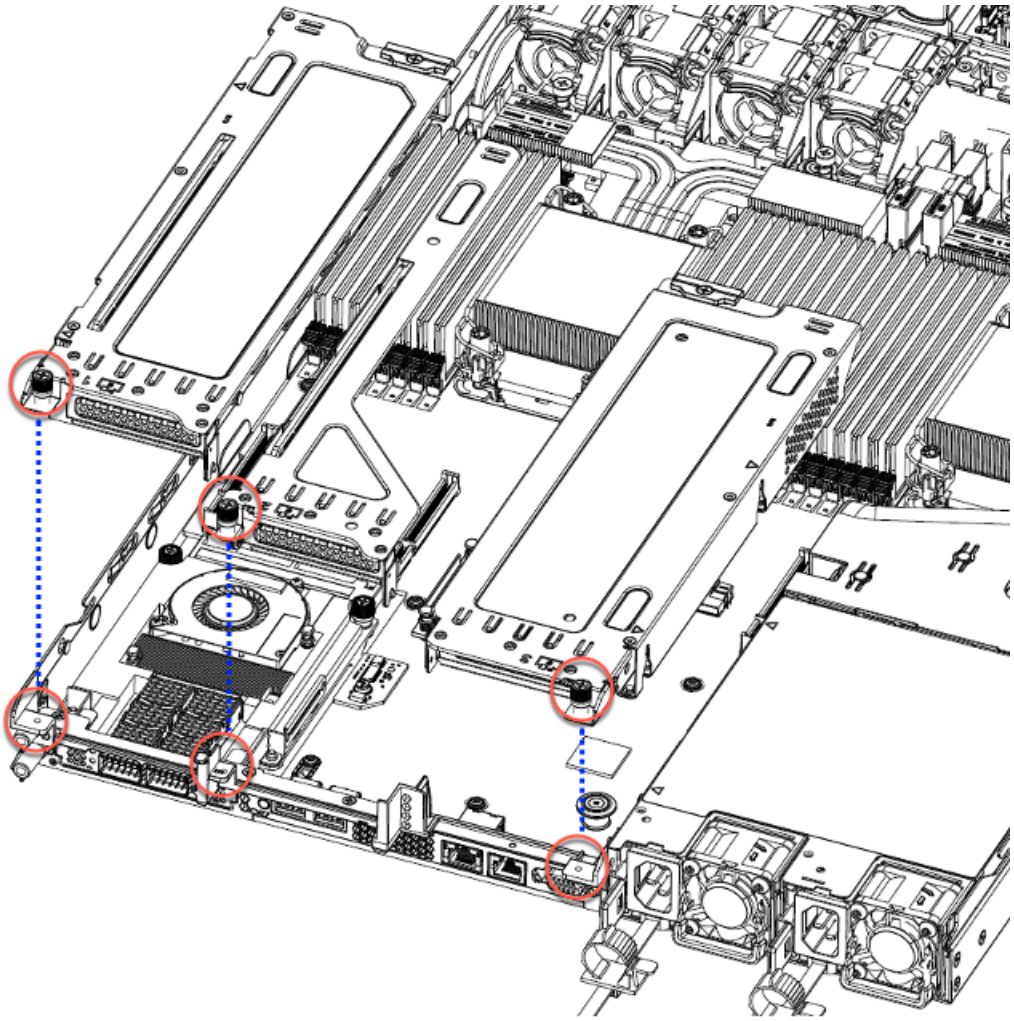
Figure 13: Installing Securing Screws, Facing Rear Riser Slots



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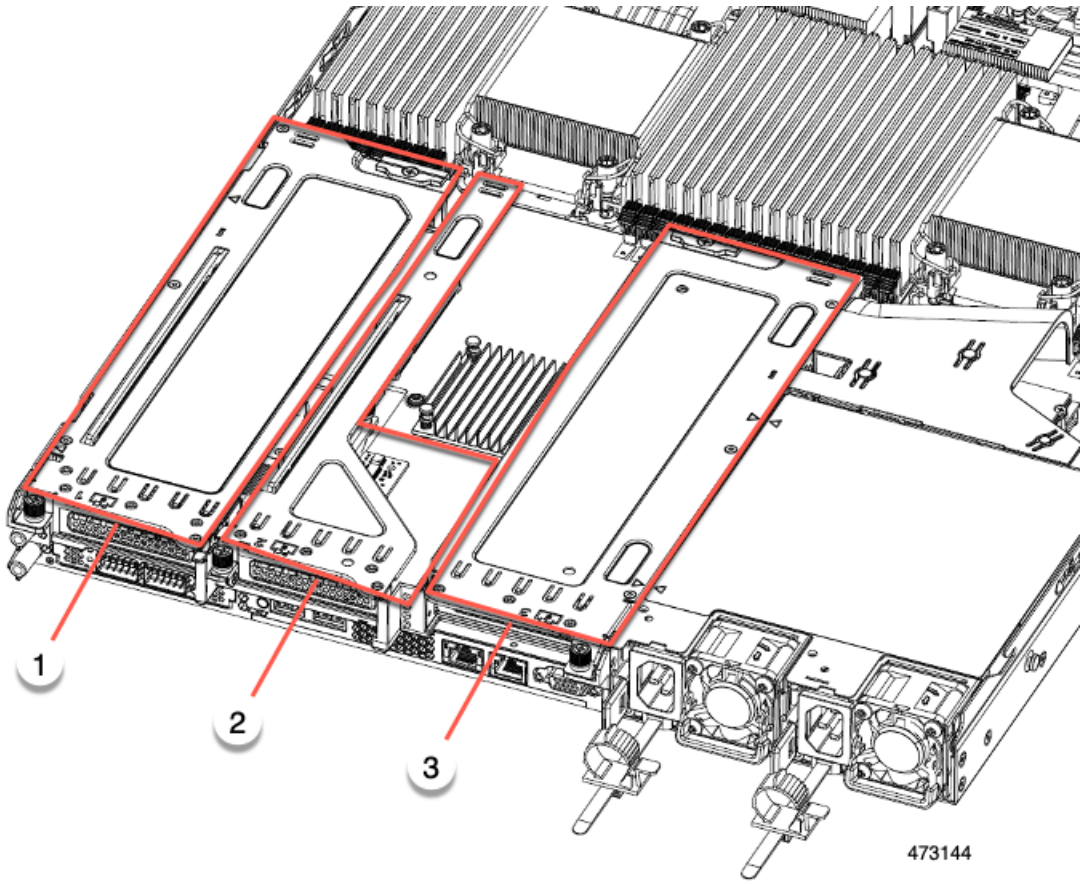
Step 5 Ensure the three riser cages are securely seated on the motherboard.



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 26.

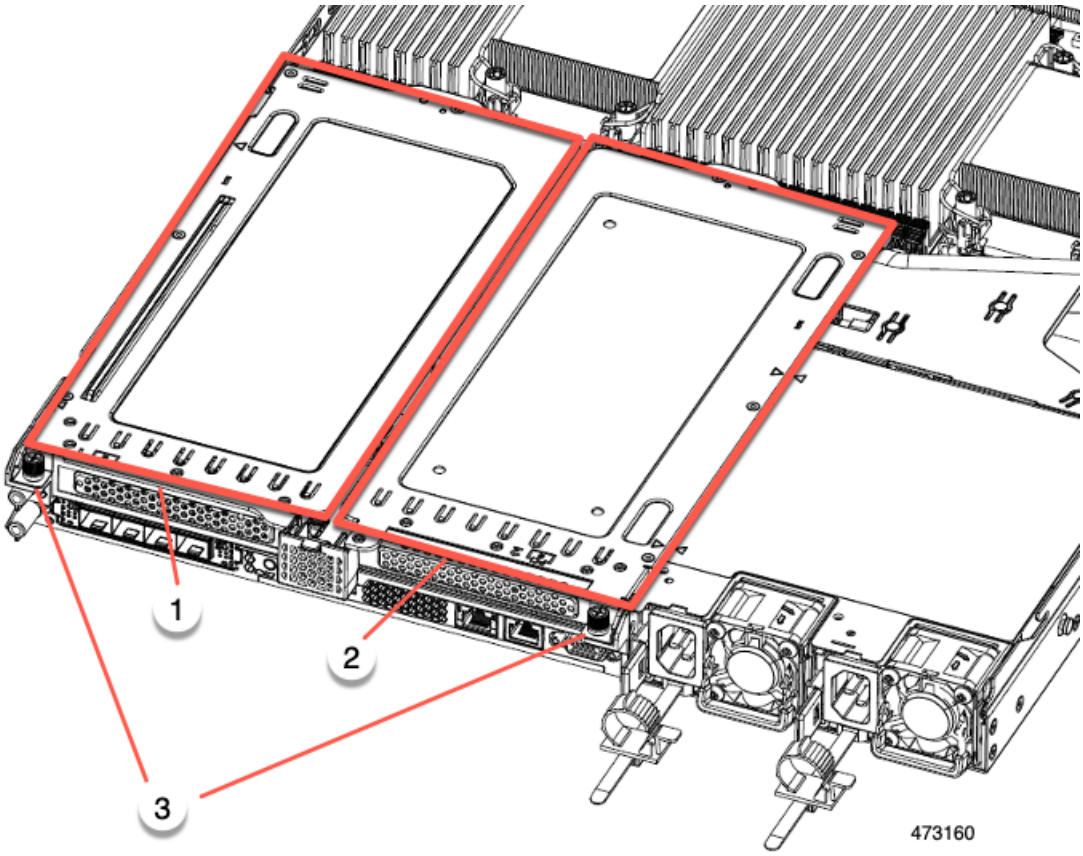
Step 1 Remove the server top cover to gain access to the PCIe riser cages.

See Removing Top Cover, on page 7.

Step 2 Remove the two rear PCIe riser cages.

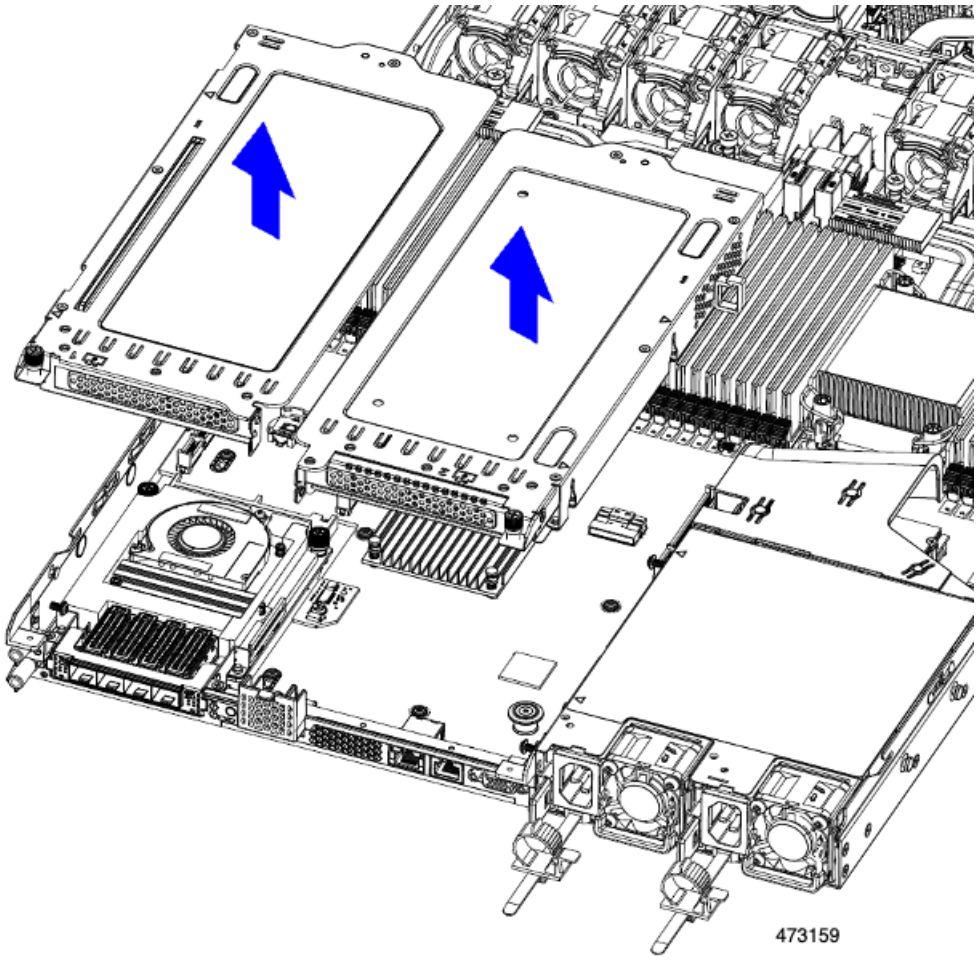
a) Locate the riser cages.

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)	-	

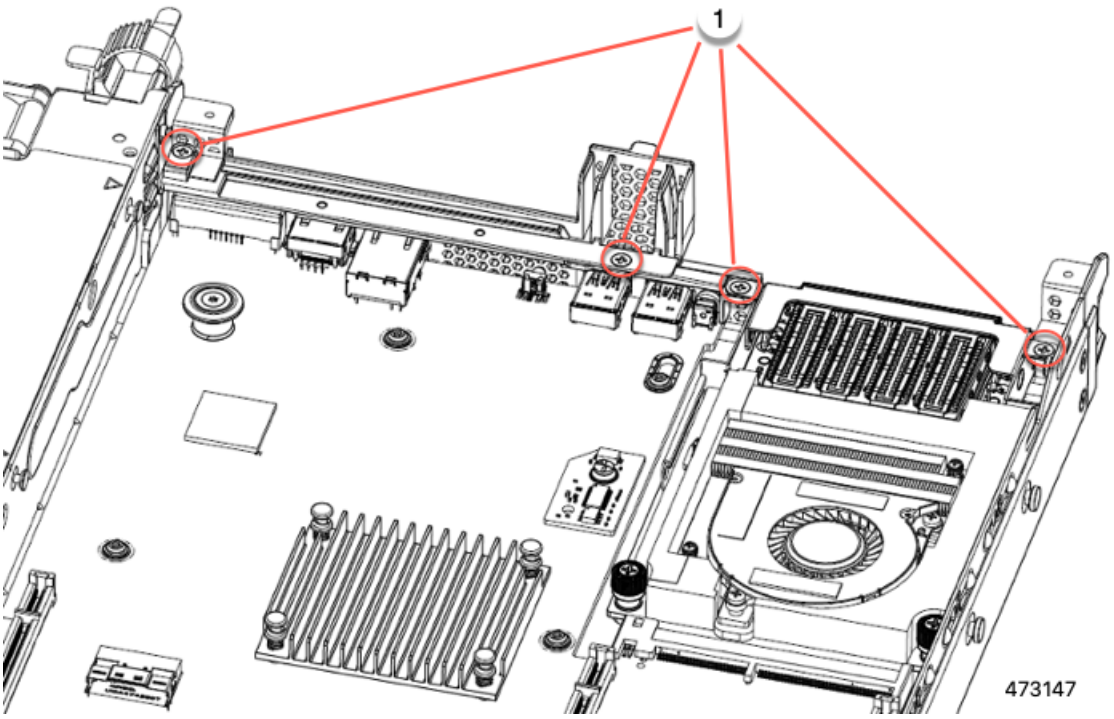
c) Lift the riser cages off of the server.



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.

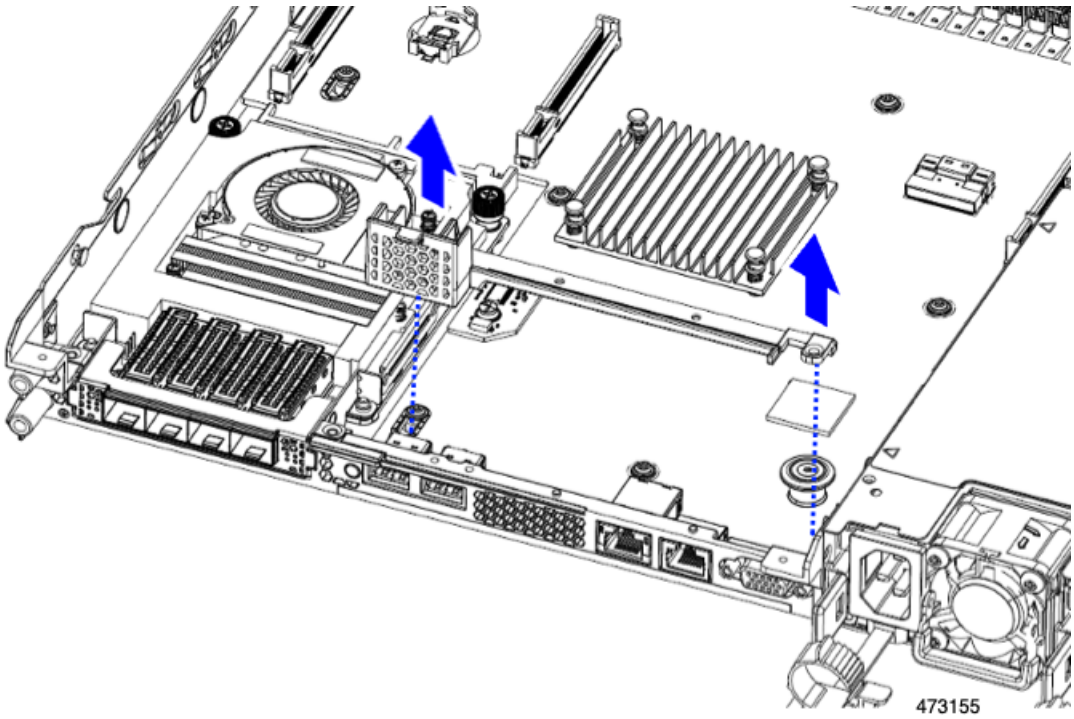
Figure 14: Locations of Securing Screws



Step 4 Remove the rear wall and mLOM/OCP card bracket.

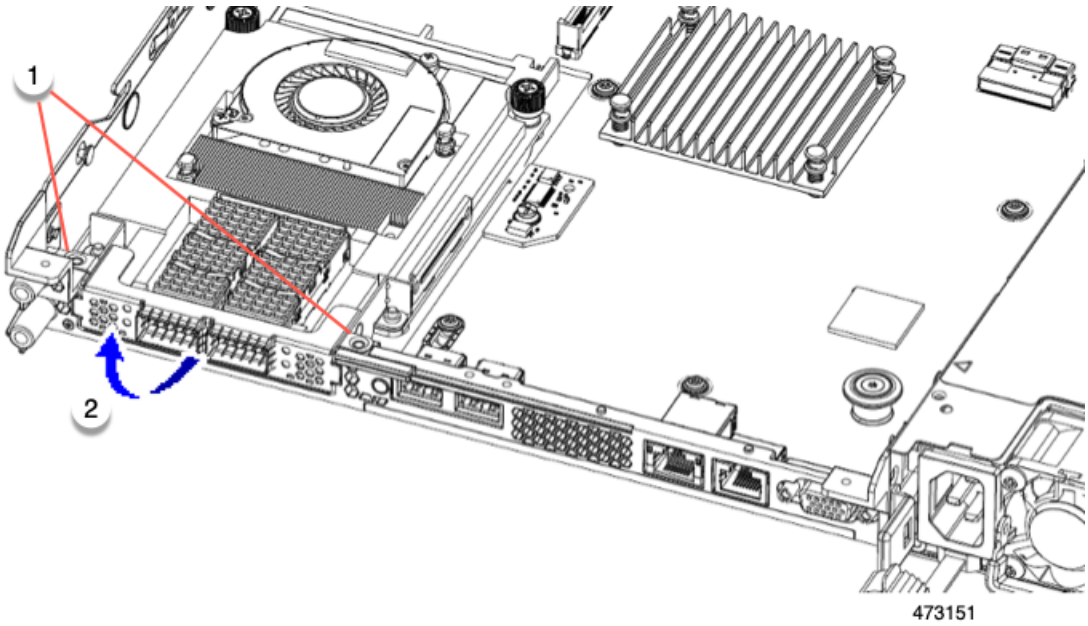
a) Grasp each end of the full height rear wall and remove it.

Figure 15: Removing the Full Height Rear Wall



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

Figure 16: Removing mLOM/OCP Card Bracket



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

What to do next

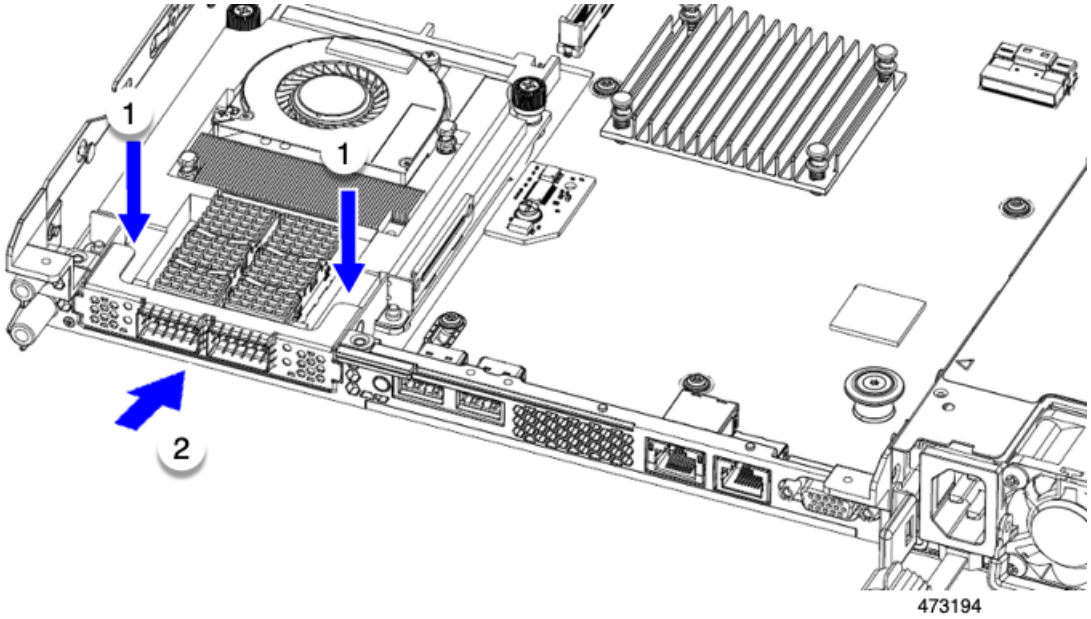
Install the two half-height riser cages. See Installing Half Height Riser Cages, on page 30 .

Installing Full Height Riser Cages

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

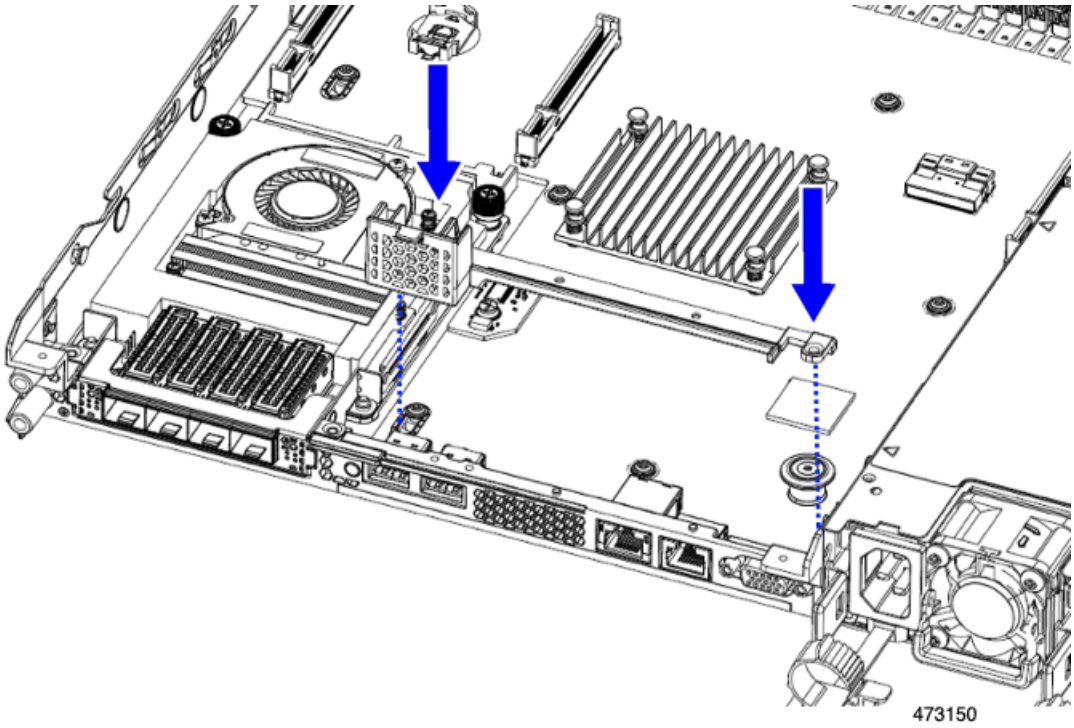
Before beginning this procedure, see Required Equipment for Replacing Riser Cages, on page 26.

Step 1 Install the mLOM/OCP card bracket.



Step 2 Install the full-height rear wall.

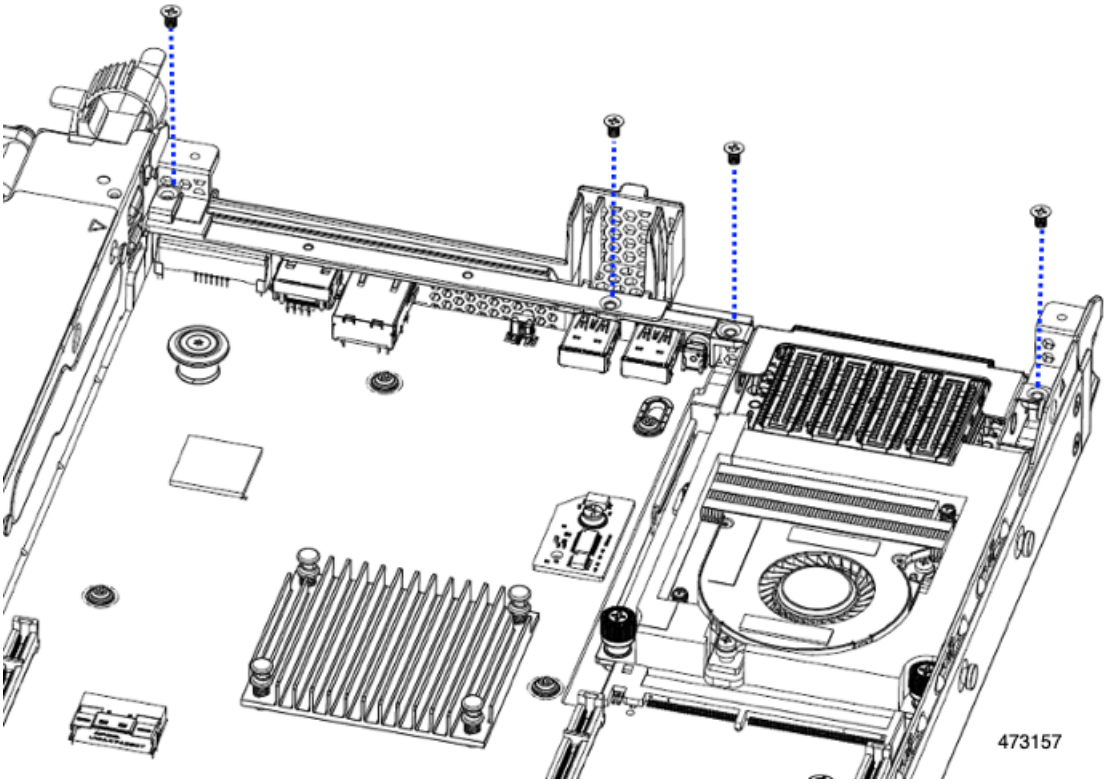
a) Orient the full-height rear wall as shown, making sure the folded metal tab is facing up.
b) Align the screw holes in the FH rear wall with the screw holes in the server sheet metal.
c) Holding the rear wall level, seat onto the server sheet metal, making sure that the screw holes line up.



Step 3 Using a #2 Phillips screwdriver, install the four screws the 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 17: Installing Securing Screws

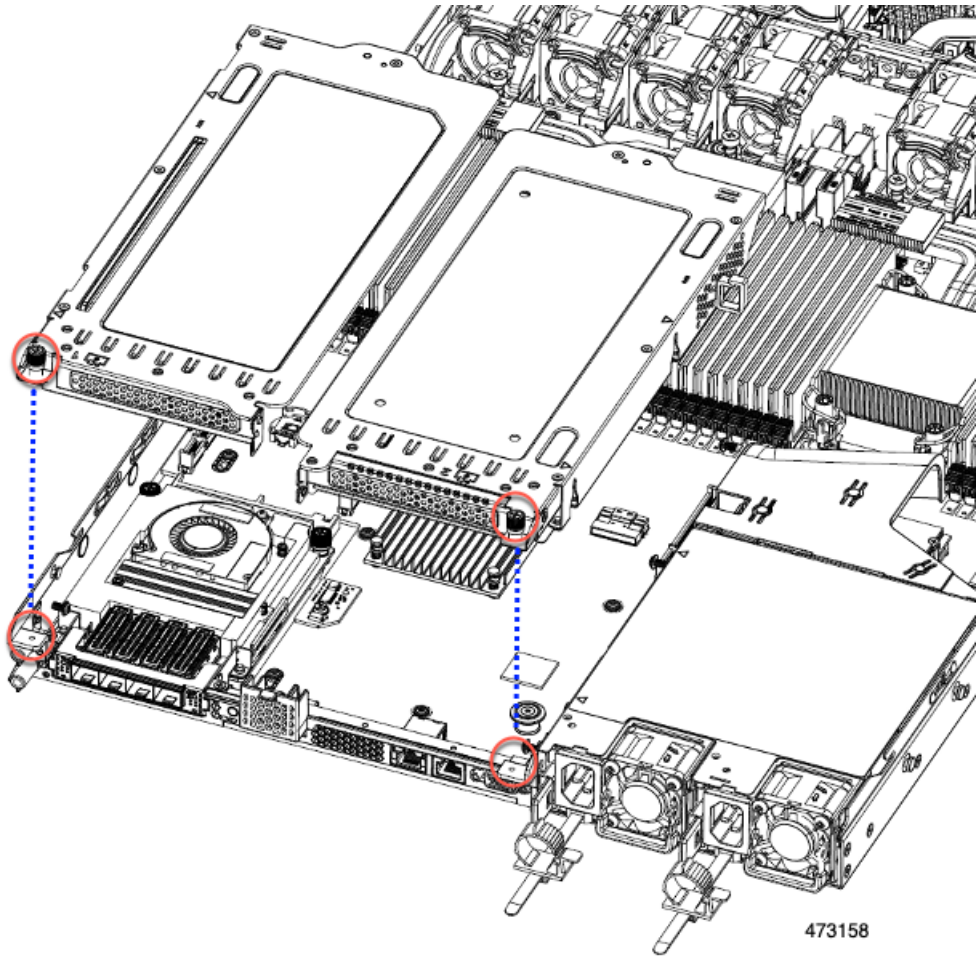


Step 4 Install the two full height riser cages.

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.

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 26.

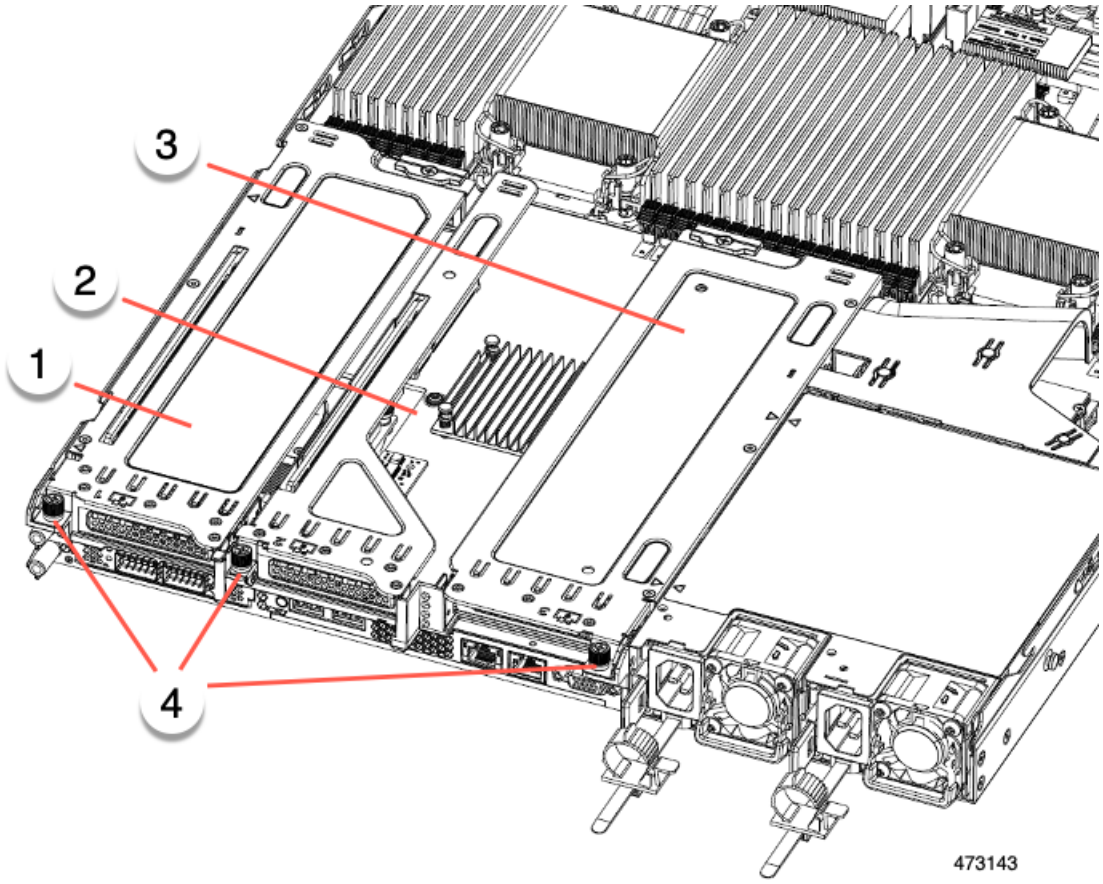
Step 1 Remove the server top cover to gain access to the PCIe riser cages.

See Removing Top Cover, on page 7.

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.



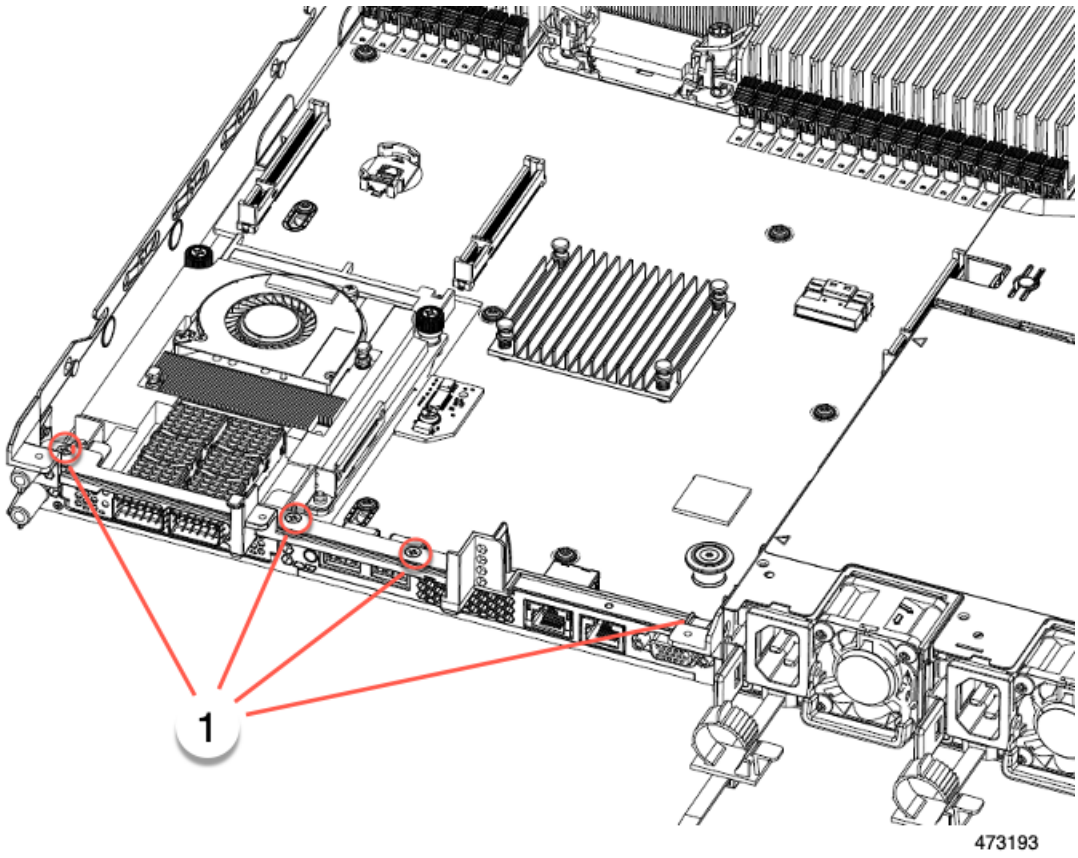
1	Rear Riser Cage 1	**2**	Rear Riser Cage 2
3	Rear Riser cage 3	**4**	Riser Cage Thumbscrews, three total (one per riser cage)

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.

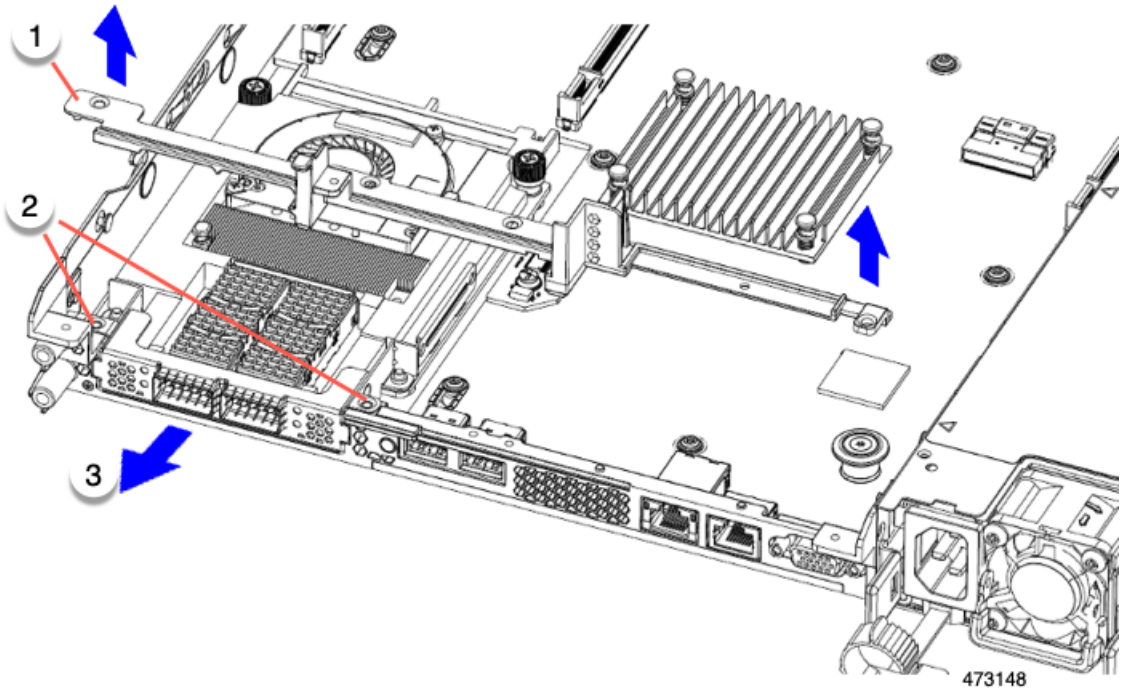
Figure 18: Locations of Securing Screws, Facing Rear Riser Slots



Step 4 Remove the half height rear wall and mLOM/OCP card bracket.

a) Grasp each end of the half height rear wall and remove it.

b) 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

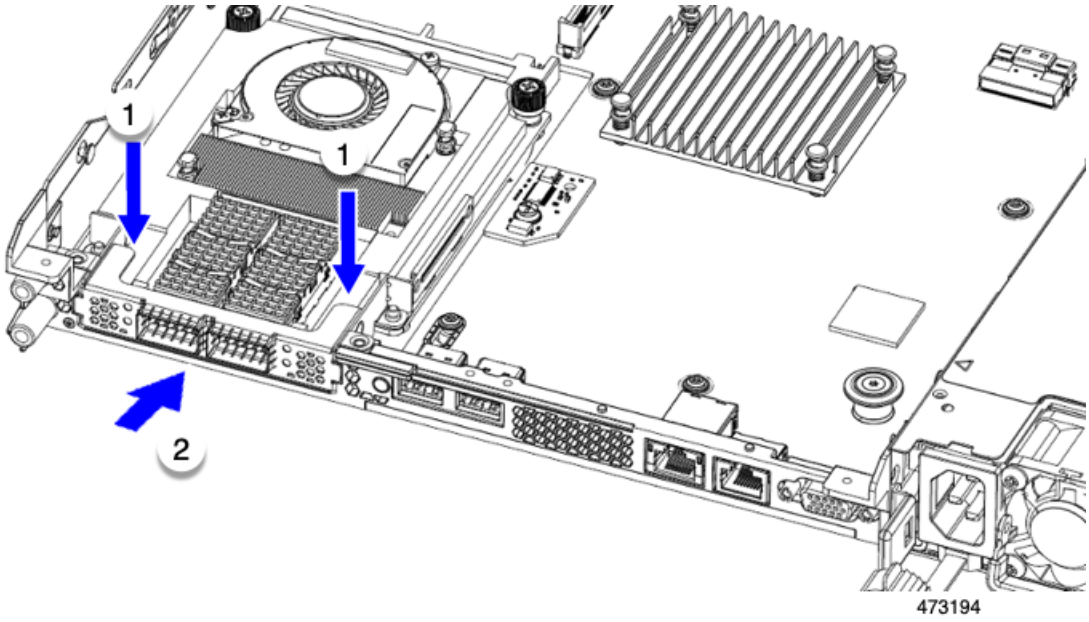
Install the two full-height riser cages. See Installing Full Height Riser Cages, on page 39.

Installing Full Height Riser Cages

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

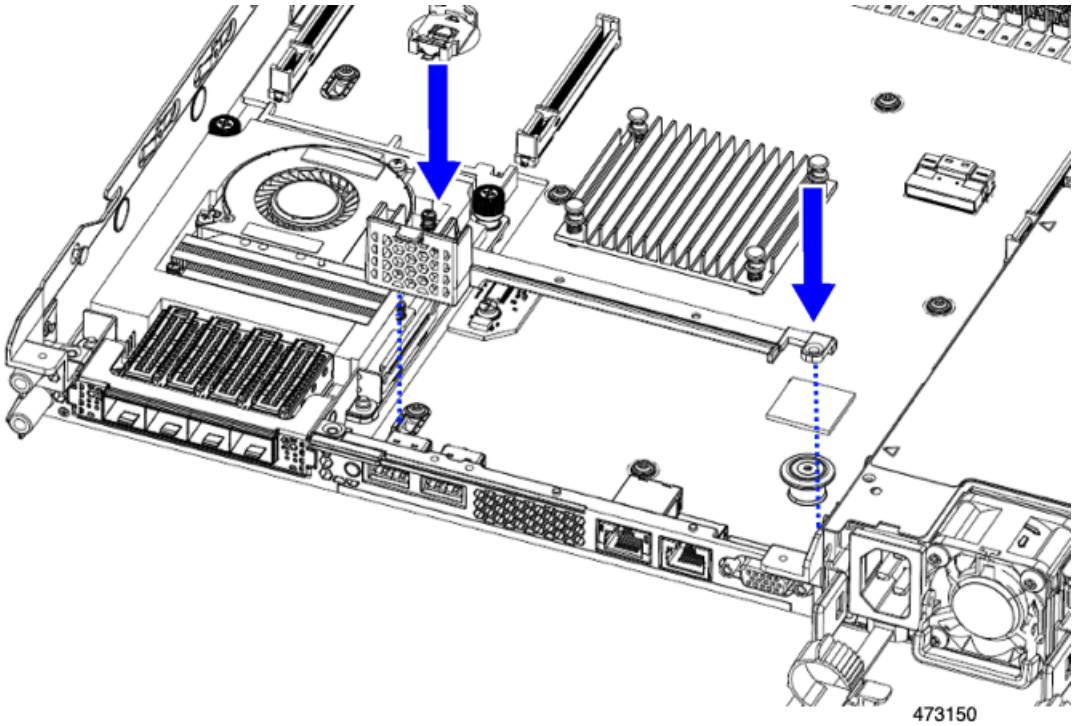
Before beginning this procedure, see Required Equipment for Replacing Riser Cages, on page 26.

Step 1 Install the mLOM/OCP card bracket.



Step 2 Install the full-height rear wall.

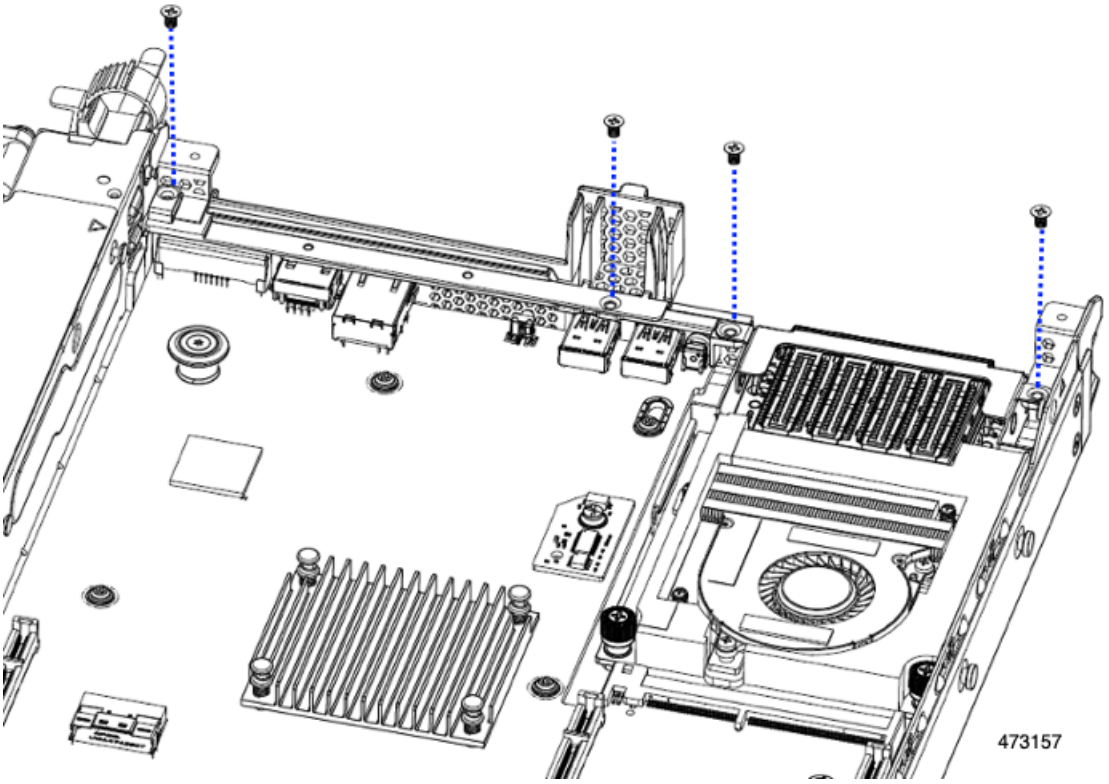
a) Orient the full-height rear wall as shown, making sure the folded metal tab is facing up.
b) Align the screw holes in the FH rear wall with the screw holes in the server sheet metal.
c) Holding the rear wall level, seat onto the server sheet metal, making sure that the screw holes line up.



Step 3 Using a #2 Phillips screwdriver, install the four screws the 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 19: Installing Securing Screws

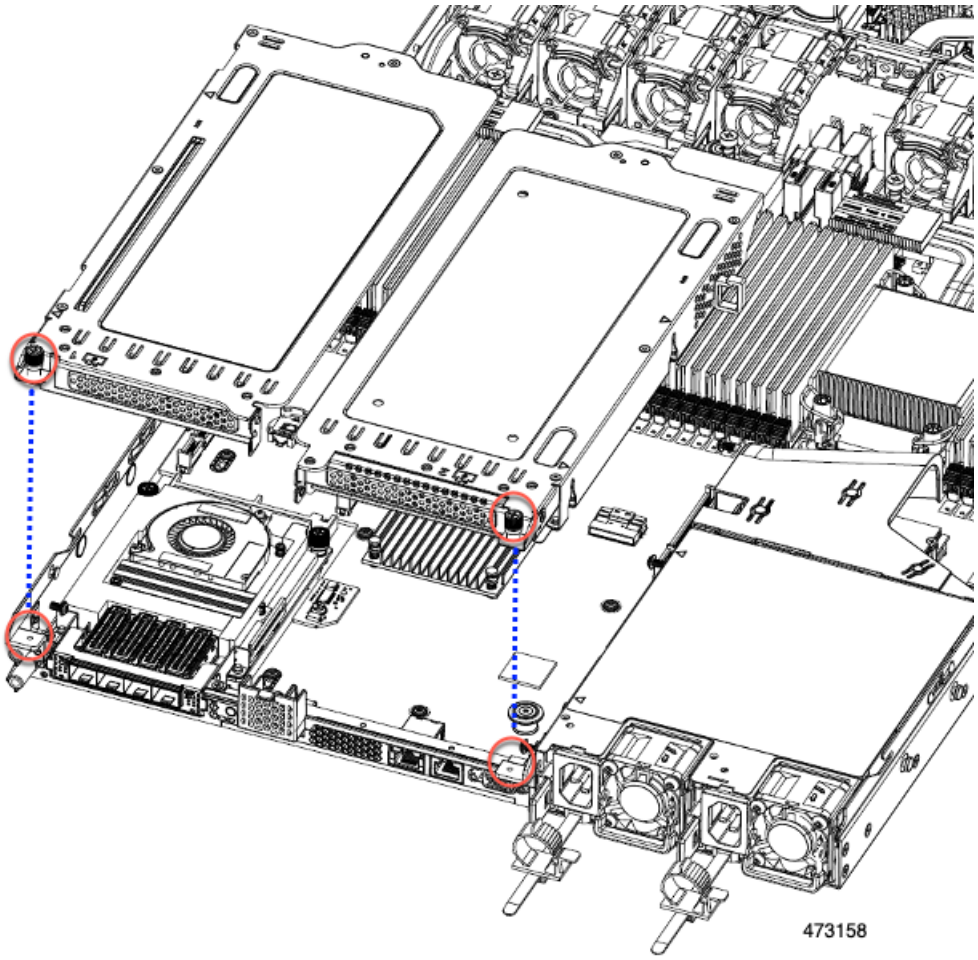


Step 4 Install the two full height riser cages.

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 26.

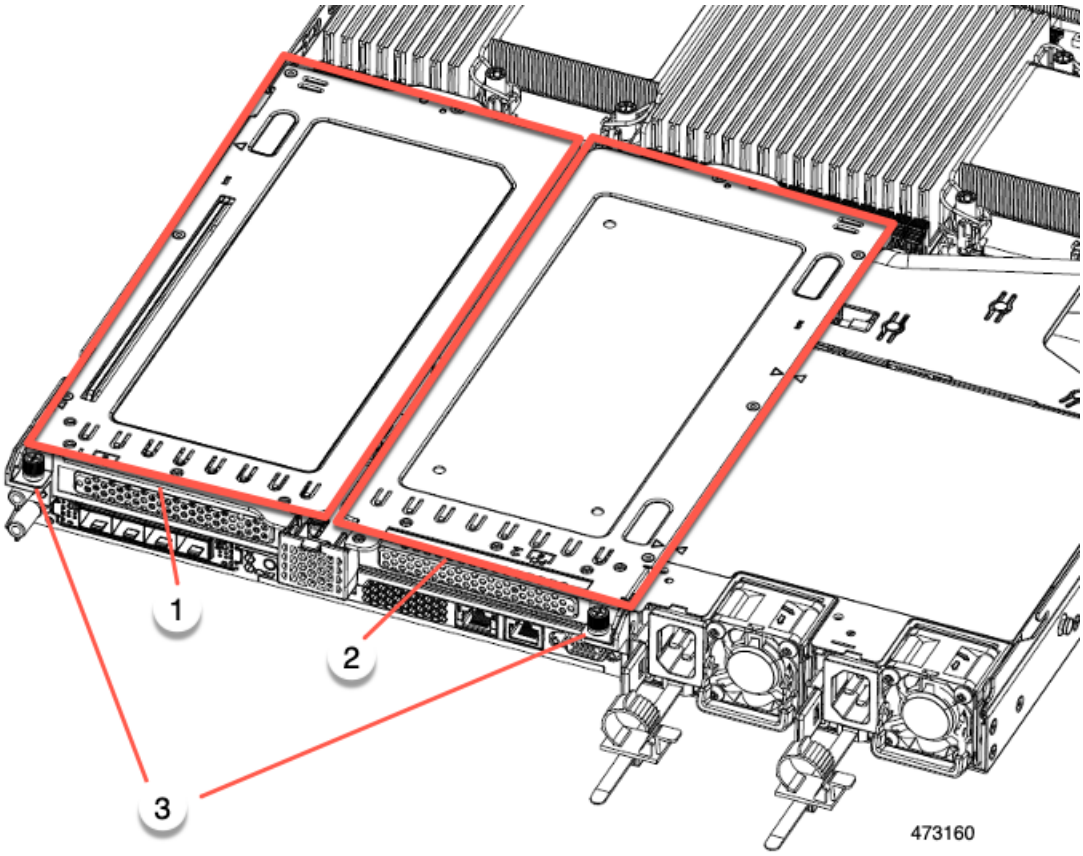
Step 1 Remove the server top cover to gain access to the PCIe riser cages.

See Removing Top Cover, on page 7.

Step 2 Remove the two rear PCIe riser cages.

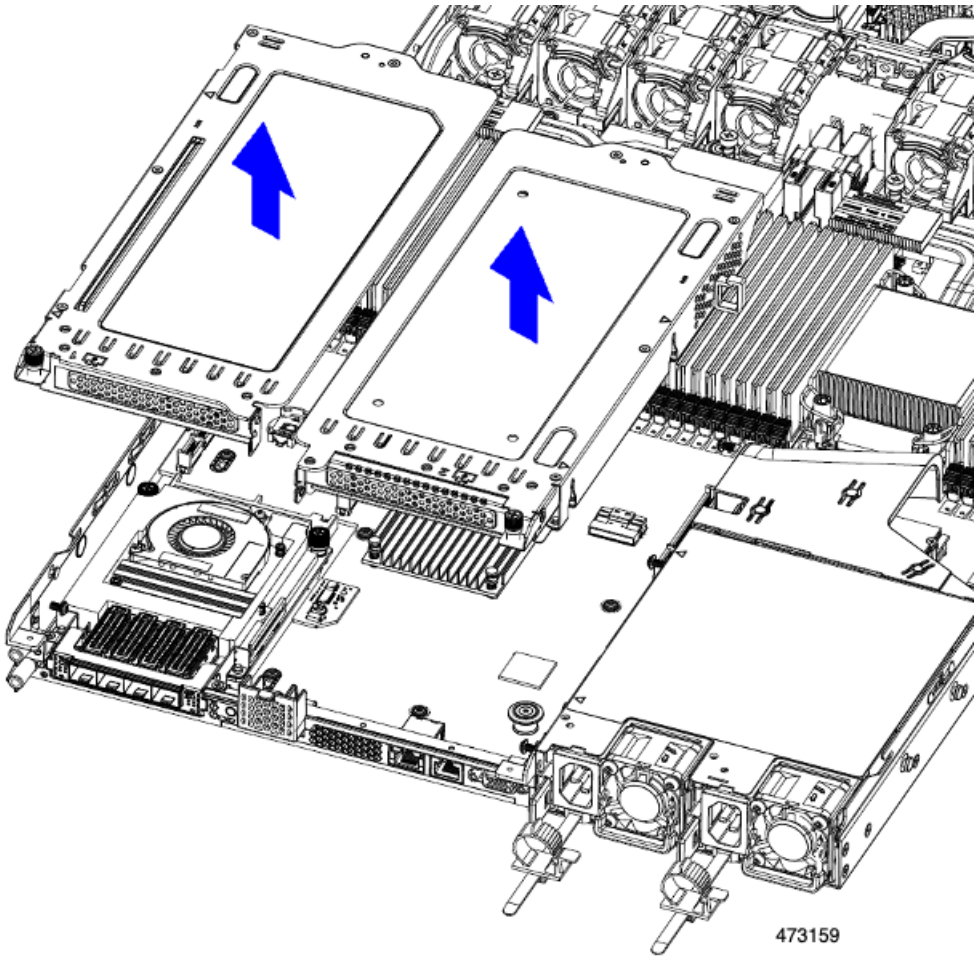
a) Locate the riser cages.

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)	-	

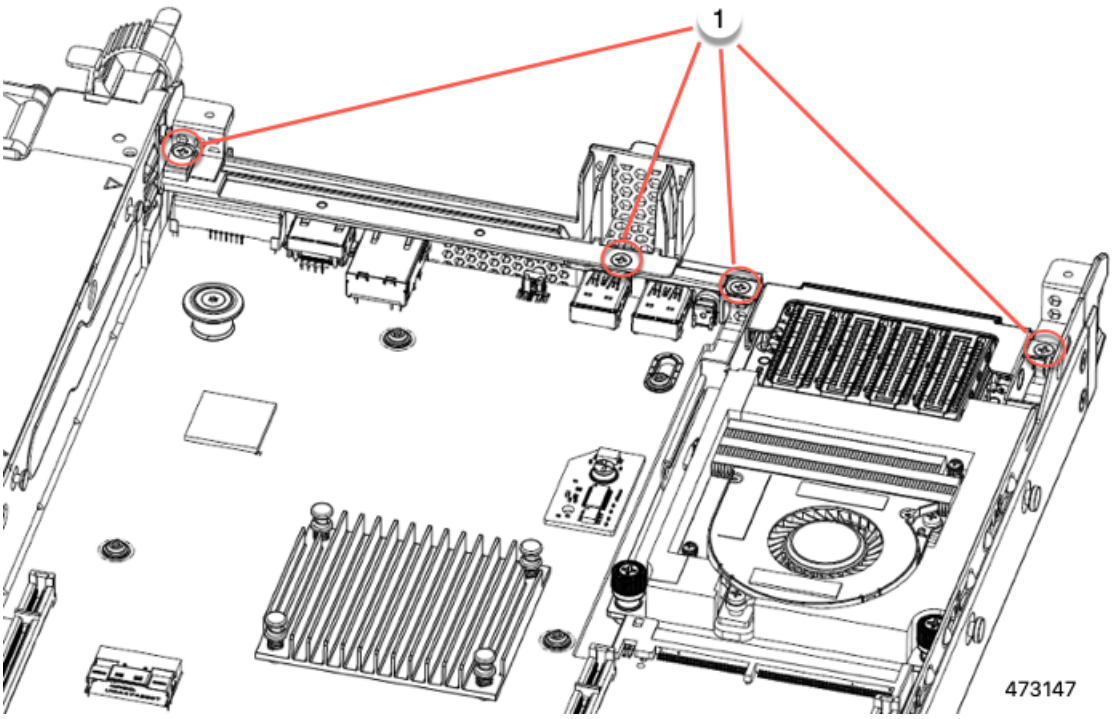
c) Lift the riser cages off of the server.



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.

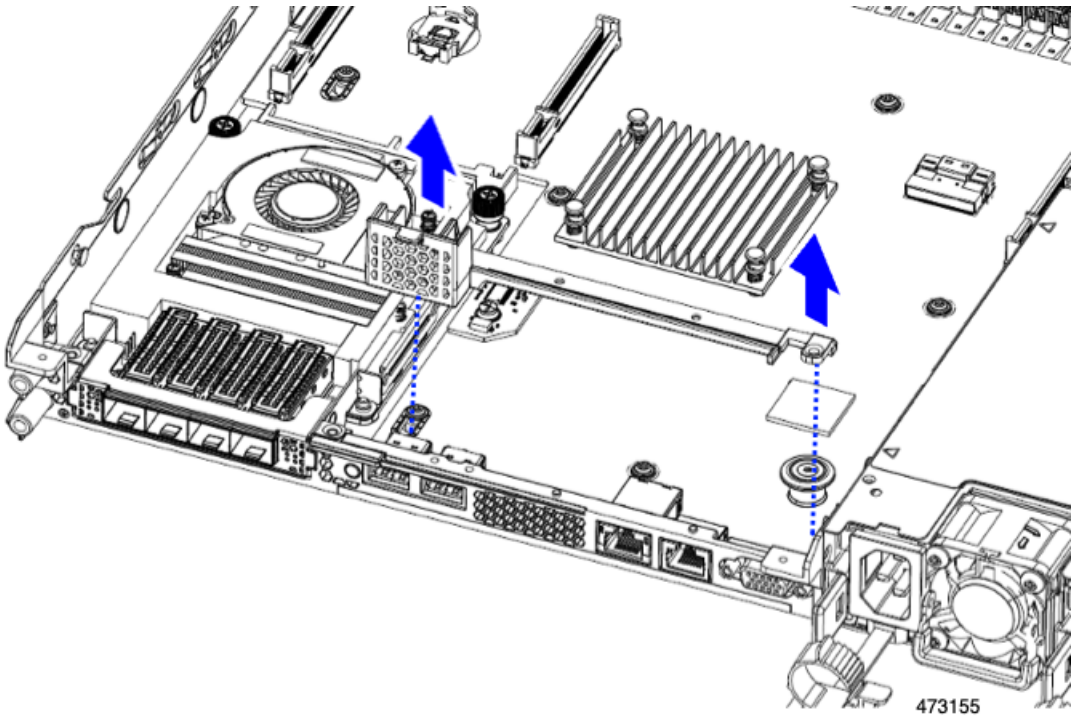
Figure 20: Locations of Securing Screws



Step 4 Remove the rear wall and mLOM/OCP card bracket.

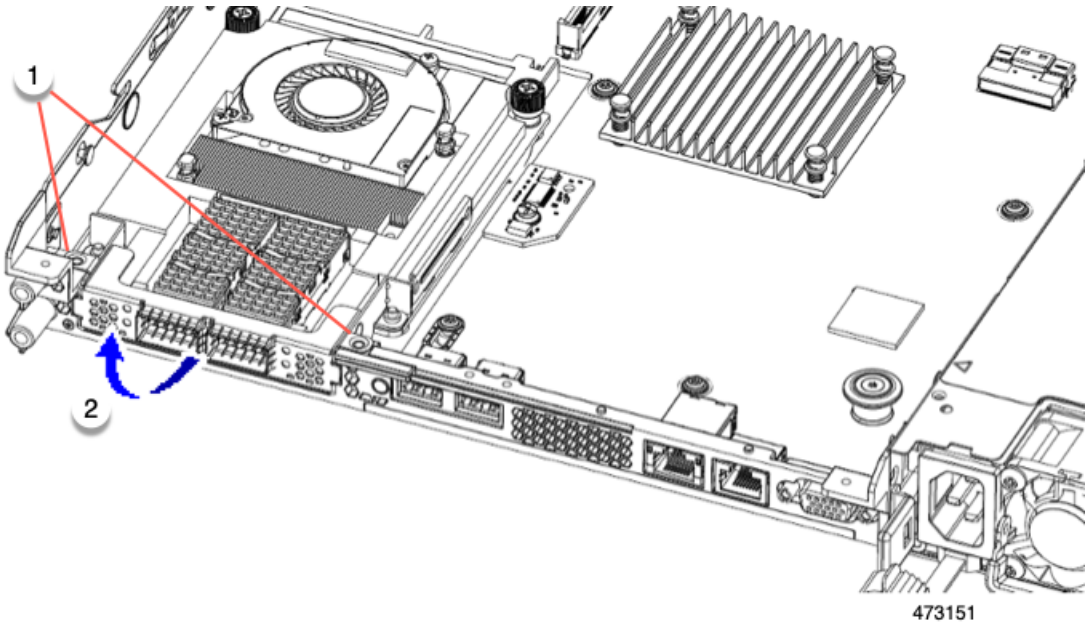
a) Grasp each end of the full height rear wall and remove it.

Figure 21: Removing the Full Height Rear Wall



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

Figure 22: Removing mLOM/OCP Card Bracket



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

What to do next

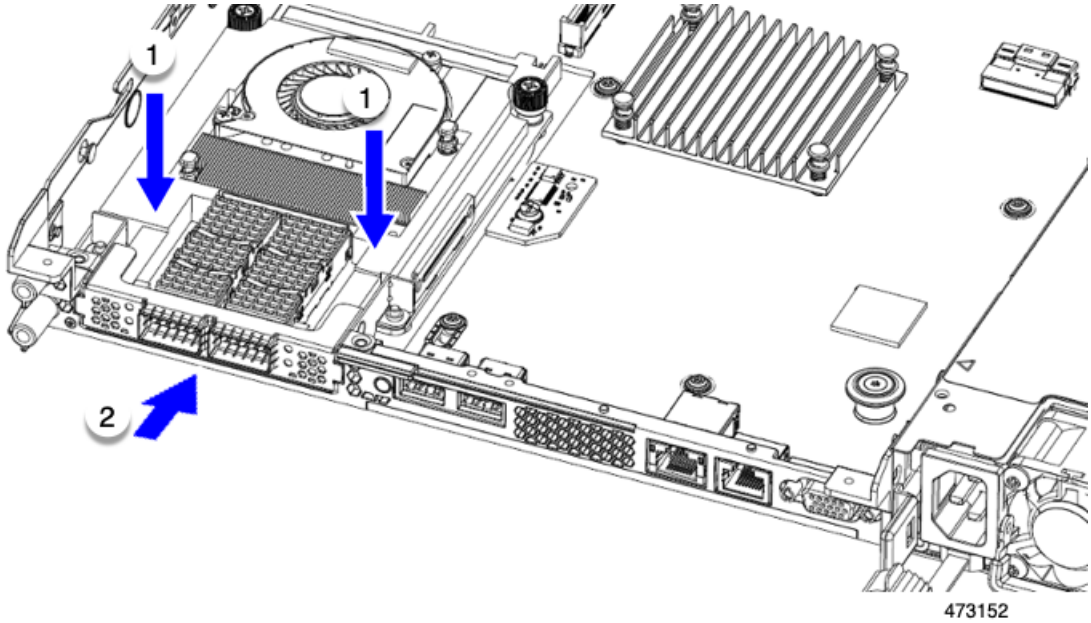
Install the two half-height riser cages. See Installing Half Height Riser Cages, on page 30 .

Installing Half Height Riser Cages

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

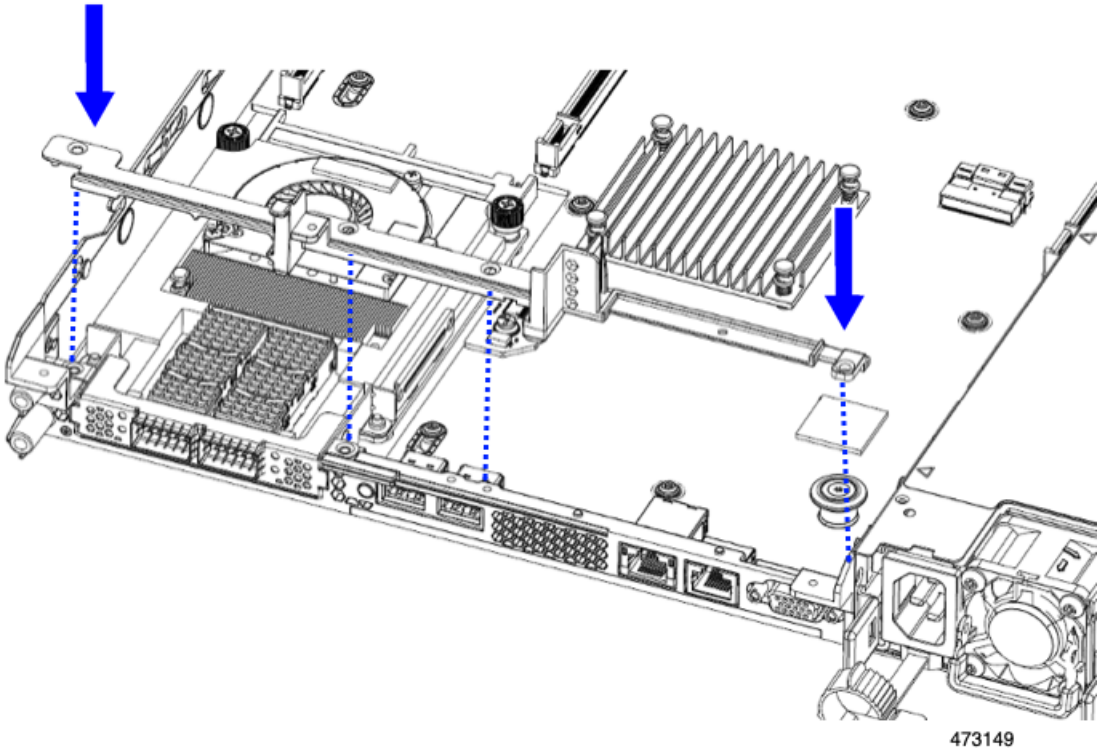
Before beginning this procedure, see Required Equipment for Replacing Riser Cages, on page 26.

Step 1 Install the mLOM/OCP card bracket.



Step 2 Install the half-height rear wall.

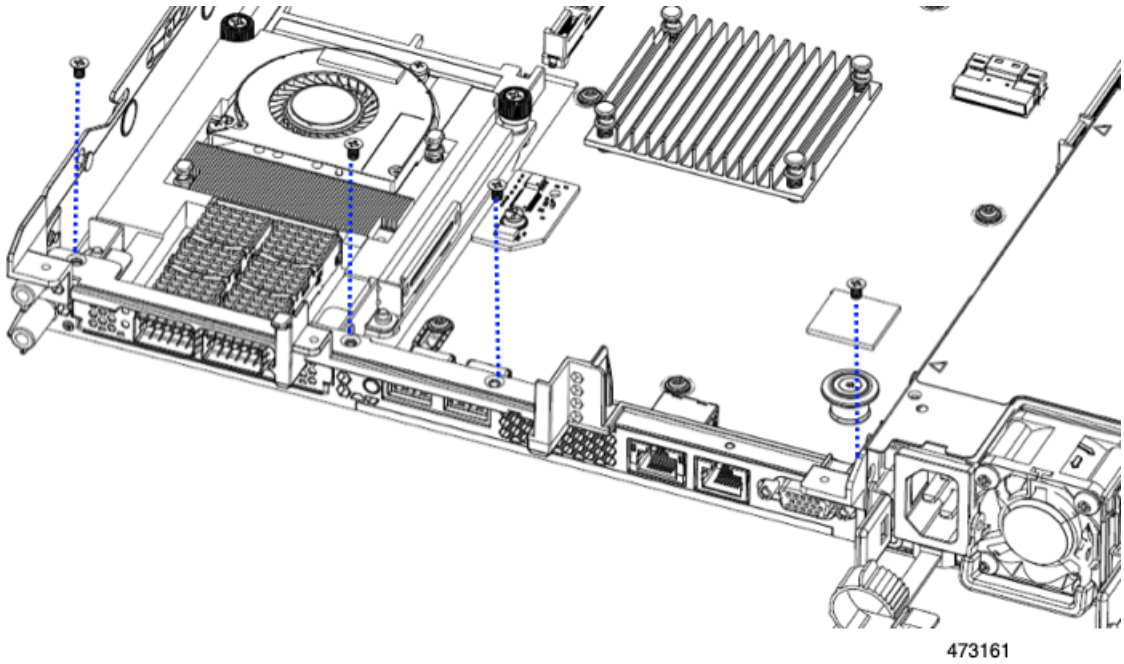
a) Orient the half-height rear wall as shown, making sure the folded metal tab is facing up.
b) Align the screw holes in the HH rear wall with the screw holes in the server sheet metal.
c) Holding the rear wall level, seat onto the server sheet metal, making sure that the screw holes line up.



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!

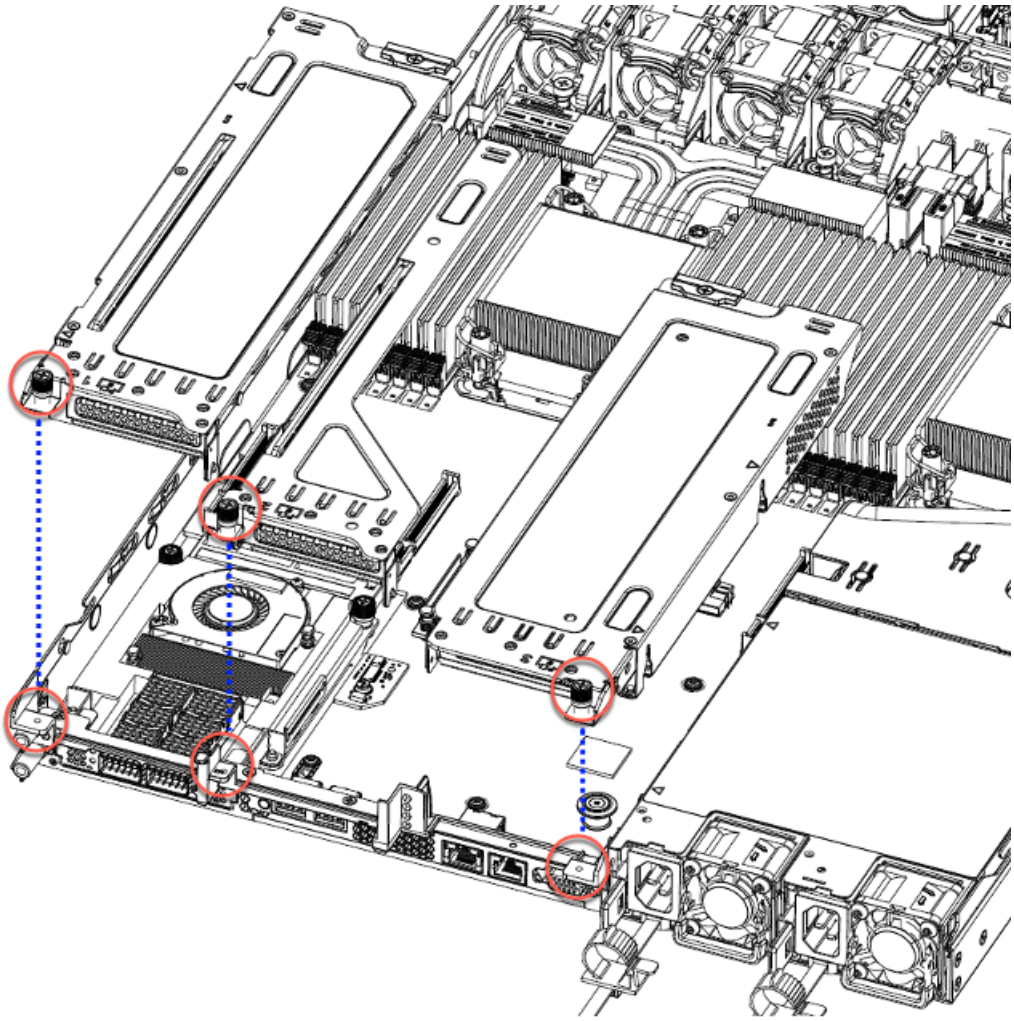
Figure 23: Installing Securing Screws, Facing Rear Riser Slots



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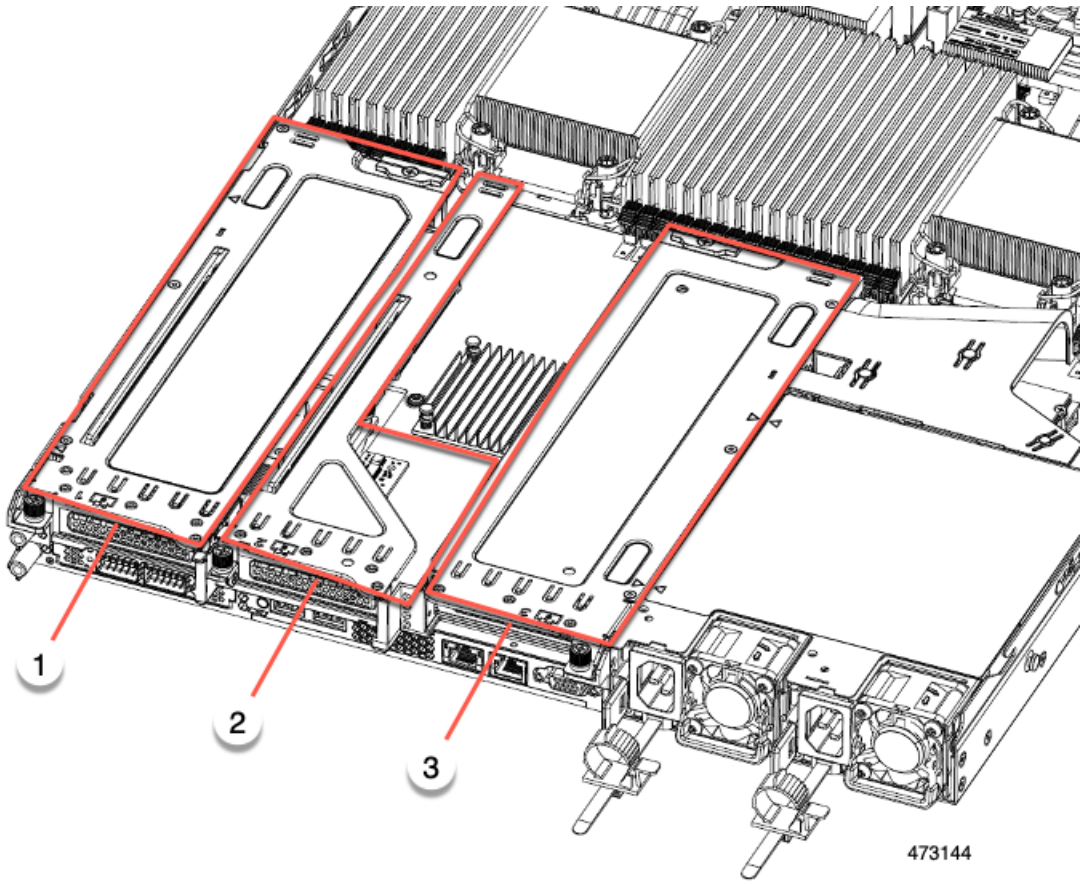
Step 5 Ensure the three riser cages are securely seated on the motherboard.



Step 6 Replace the server's top cover.

Replacing CPUs and Heatsinks

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

CPU Configuration Rules

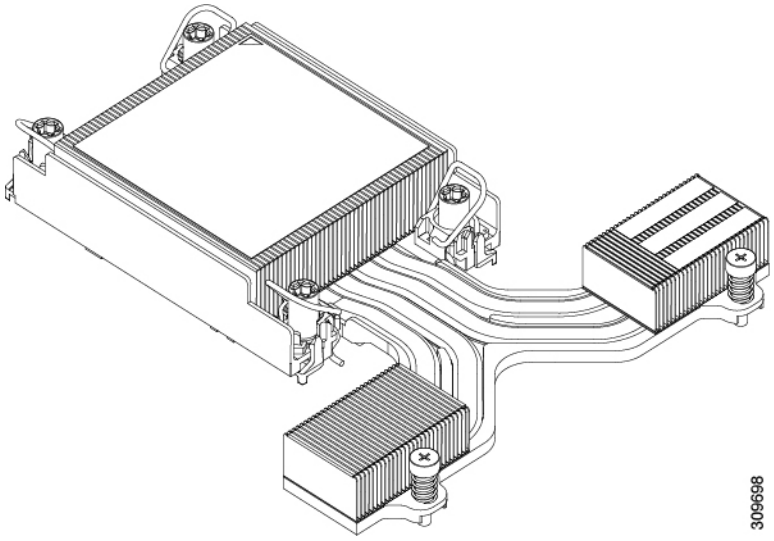
This server has two CPU sockets on the motherboard. Each CPU supports eight DIMM channels (16 DIMM slots). See DIMM Slot Numbering, on page 68.

- 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 Processorss, 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 65.

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.

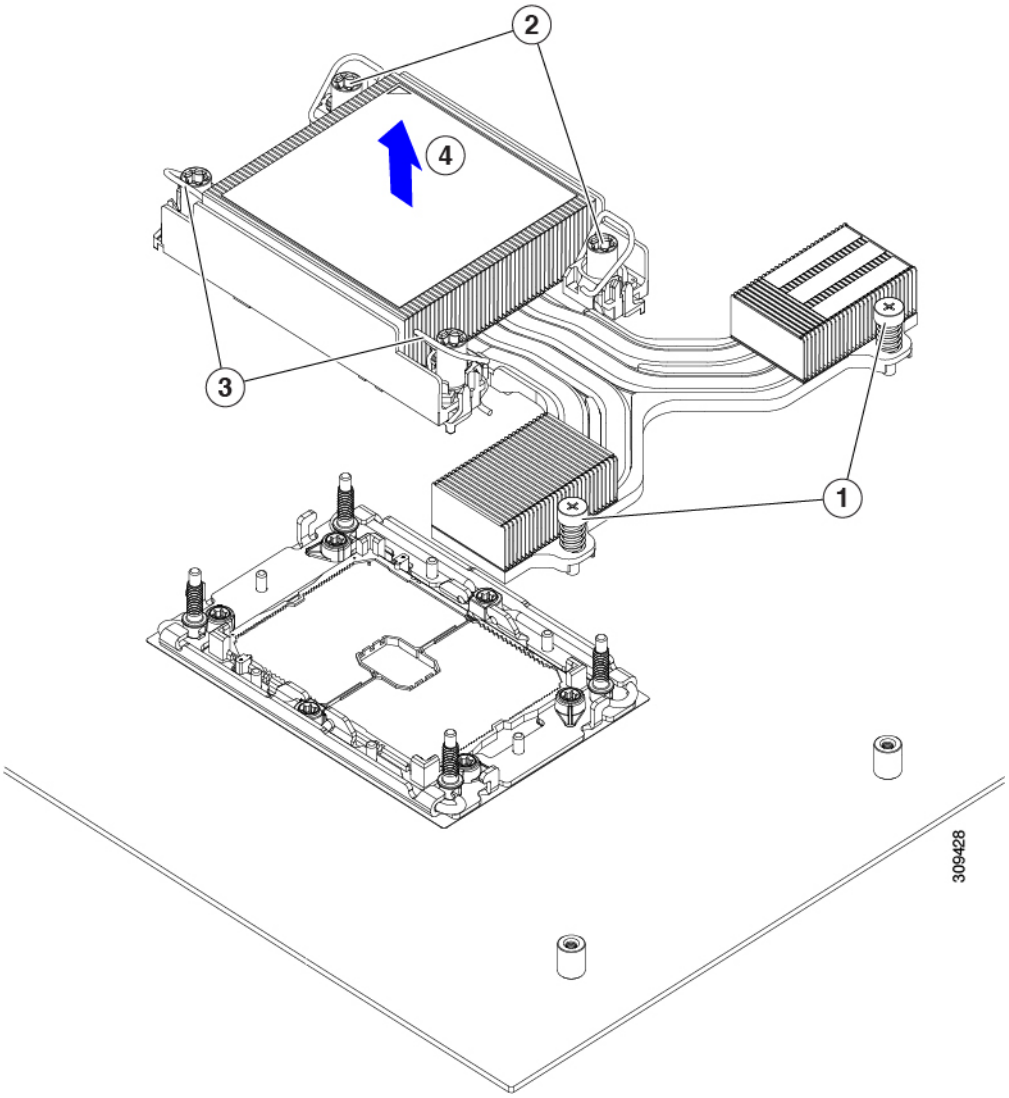
b) Using a T30 Torx driver, loosen all the securing nuts.

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.

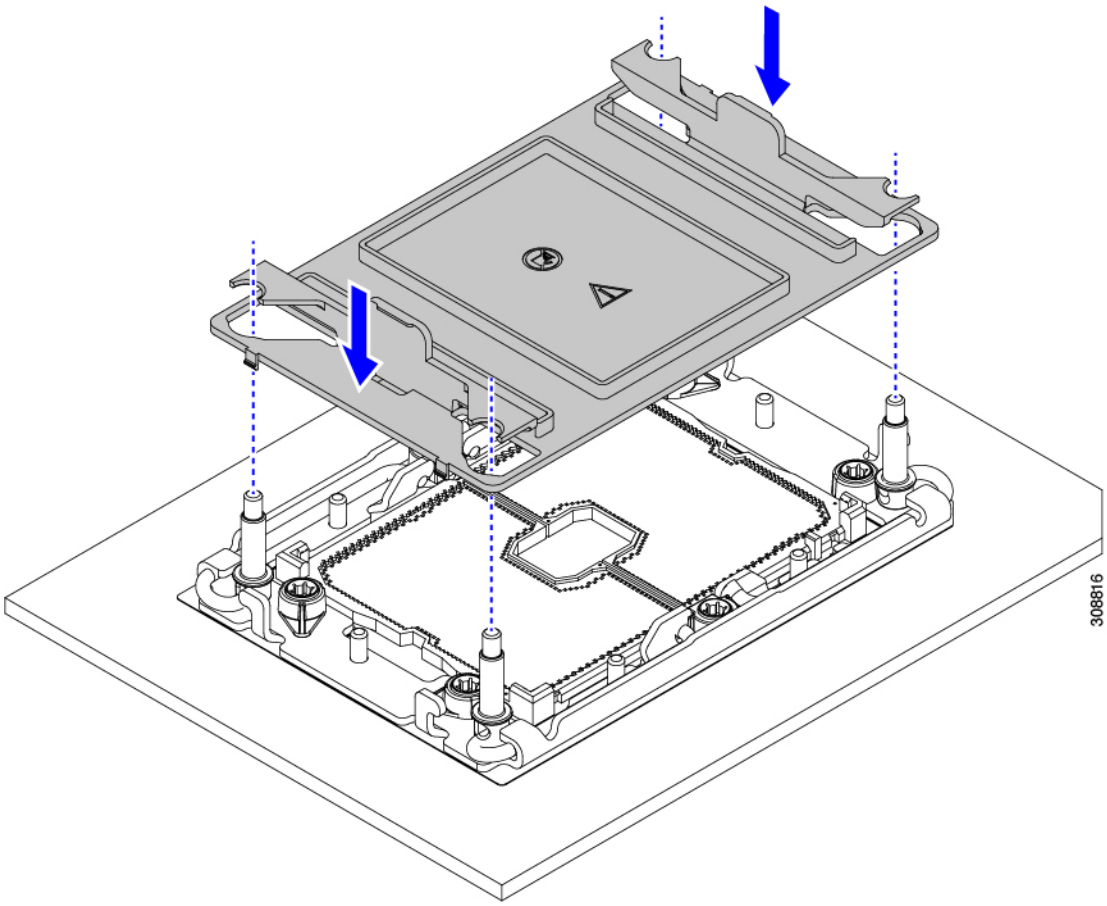
Ensure that the heatsink sits level on the work surface.

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

a) Align the posts on the CPU bolstering plate with the cutouts at the corners of the dust cover.

b) 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.

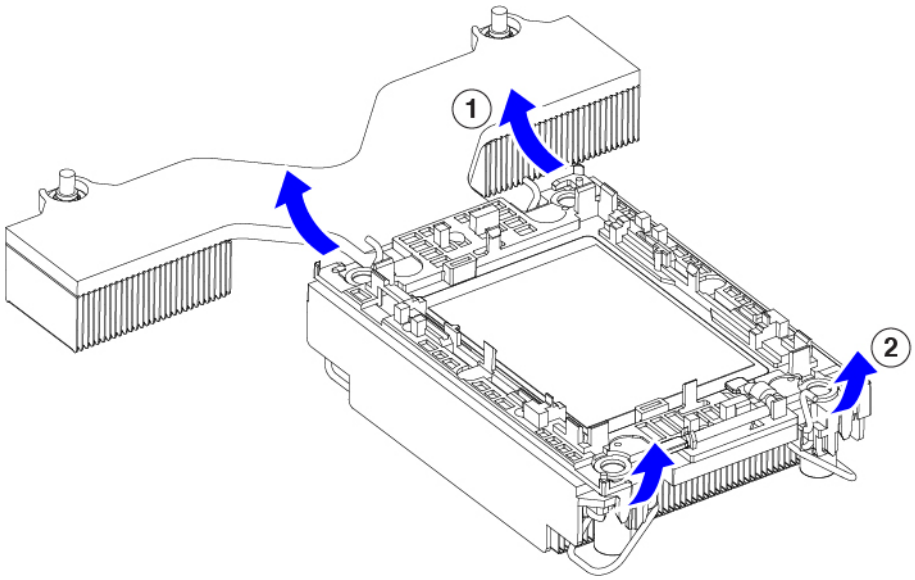
c) Lower the TIM breaker into the u-shaped securing clip to allow easier access to the CPU carrier.

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 62.
- 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.

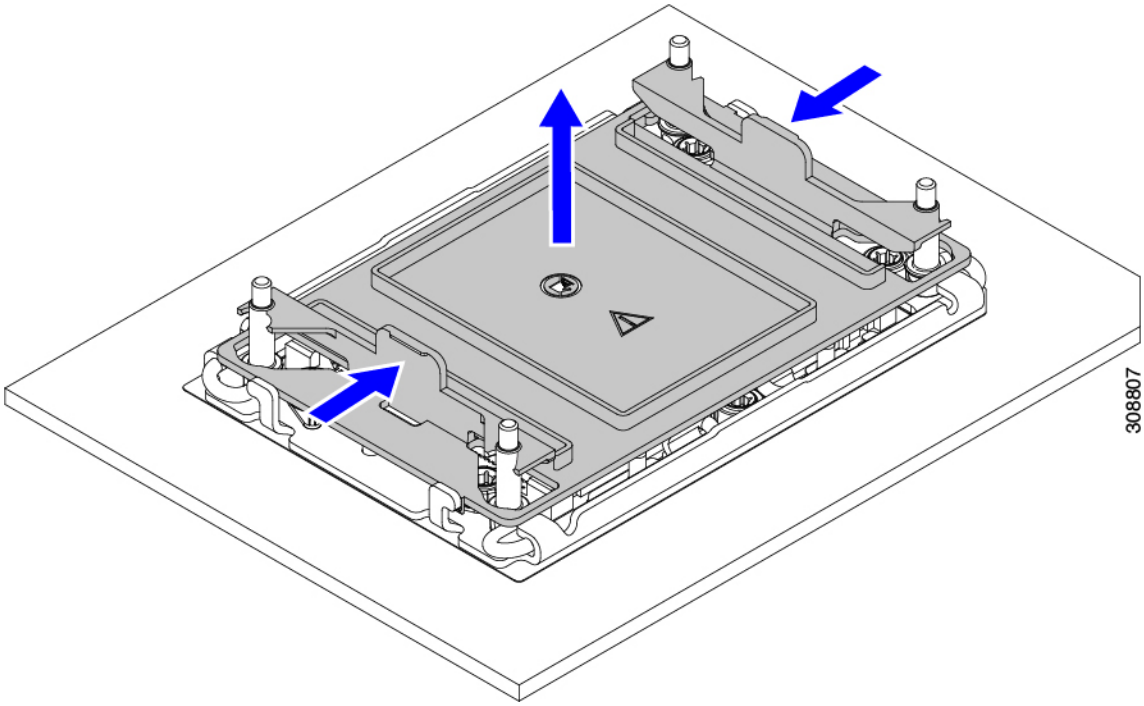
Installing the CPUs and Heatsinks

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.

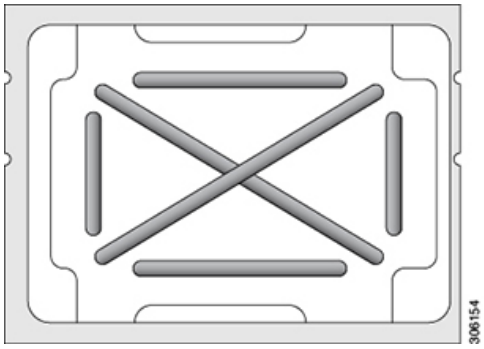
a) Apply the Bottle #1 cleaning solution that is included with the heatsink cleaning kit (UCSX-HSCK=), as well as the spare CPU package, to the old TIM on the heatsink and let it soak for a least 15 seconds.

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 24: Thermal Interface Material Application Pattern



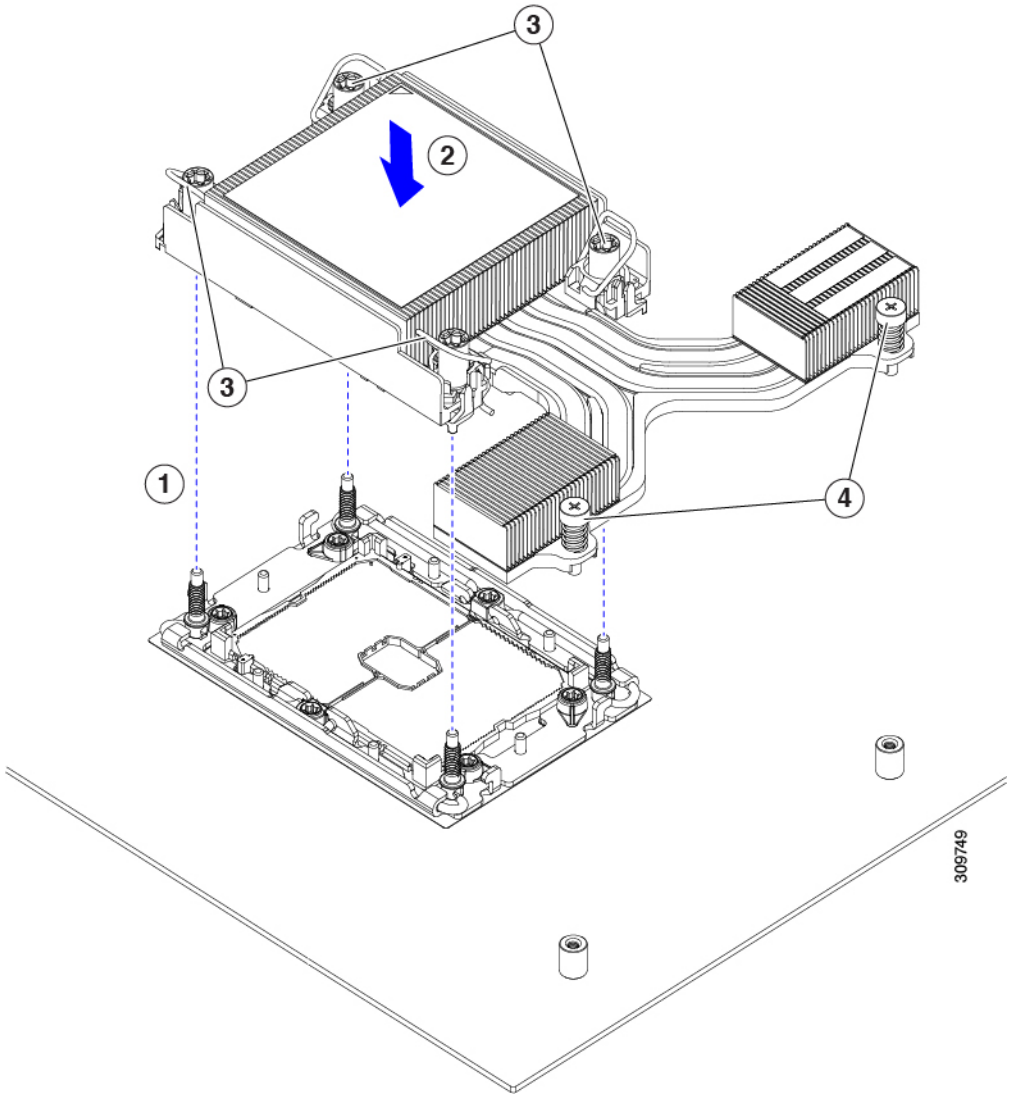
Caution Use only the correct heatsink for your CPU (UCSC-HSLP-C220M7).

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.

Upgrading to Intel Xeon Fifth Generation Scalable Server Processors

Use this task to uprade 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 58.

Step 1 If you have not done so already, review the CPU Configuration Rules, on page 57.

Step 2 Remove the server's top cover.

See Removing Top Cover, on page 7.

Step 3 Remove the air duct.

See Removing the Air Duct, on page 9.

Step 4 Remove the existing Intel Xeon Fourth Generation Scalable Processor(s).

See Removing CPUs and Heat Sinks, on page 59.

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 62.

Step 7 Replace the air duct.

See Installing the Air Duct, on page 10.

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 Scalale Server Processors.

Table 3: 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

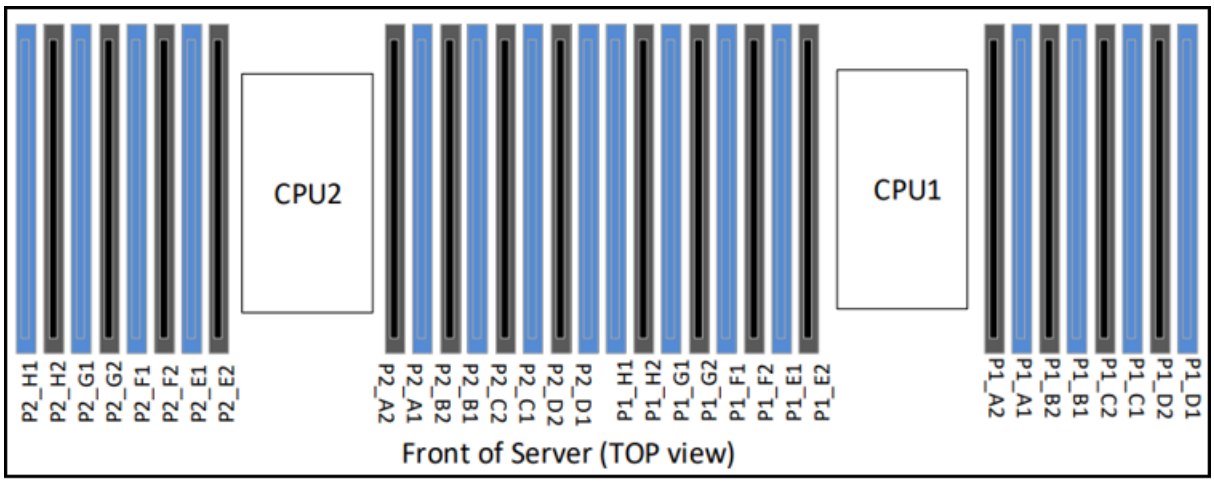
The following table shows the DIMMs supported by Intel Fifth Generation Xeon Scalale Server Processors.

Table 4: 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 5: 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 5 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:

a) Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 12.

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 7
d) Remove the air baffle that covers the front ends of the DIMM slots to provide clearance.
e) 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 67.

a) 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 for more information about the power supplies.
- See also Rear-Panel LEDs, on page 4 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 72
- Replacing DC Power Supplies, on page 73

- Installing DC Power Supplies (First Time Installation), on page 74
- Grounding for DC Power Supplies, on page 75

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 12.
- 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.

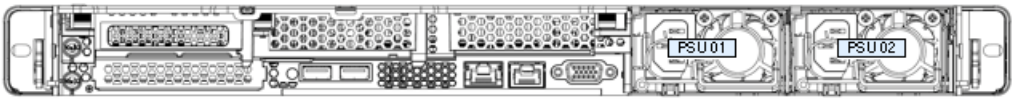
Step 2 Install a new power supply:

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

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 74.

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 12.
- 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.

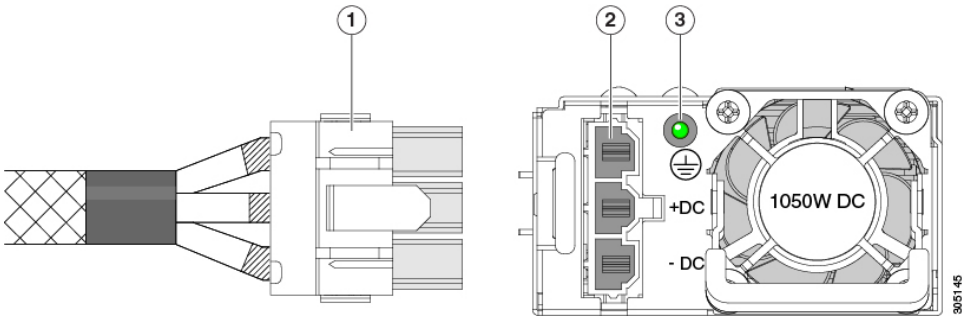
c) Grasp the power supply handle while pinching the release lever toward the handle.

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 25: 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 73.

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.

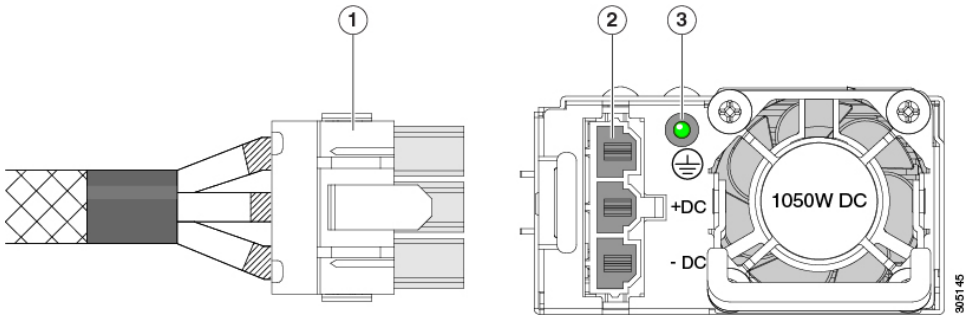
Step 2 Wire the non-terminated end of the cable to your facility's DC power input source.

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 26: 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 77.

Note RAID controller cards install into a separate mRAID riser. See Replacing a SAS Storage Controller Card (RAID or HBA), on page 103.

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 12.

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 7.

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.

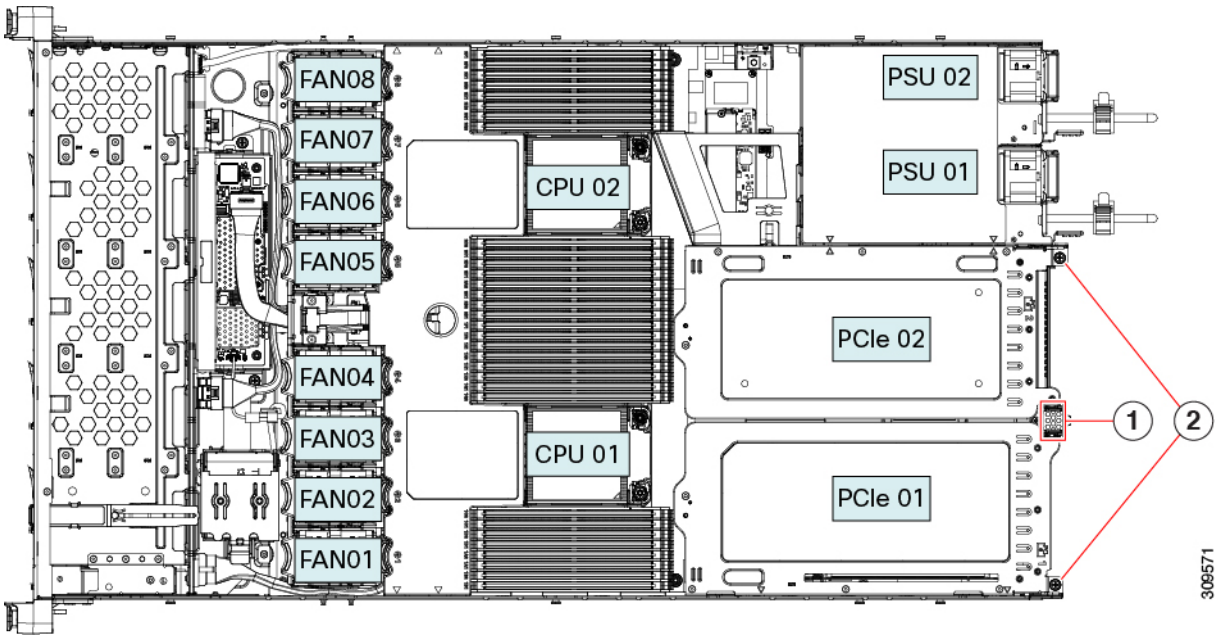
PCIe riser 1/slot 1 has a long-card guide at the front end of the riser. Use the slot in the long-card guide to help support a full-length card.

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 27: PCIe Riser Alignment Features



1	Blue riser handle	**2**	Riser alignment features in chassis

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 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 6: 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 *Cisco Card* 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 91. 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 78
- Installing an mLOM Card (2FH Riser Cages), on page 81
- Removing an mLOM Card (3HH Riser Cages), on page 84
- Installing an mLOM Card (3HH Riser Cages), on page 87

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 12.

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.

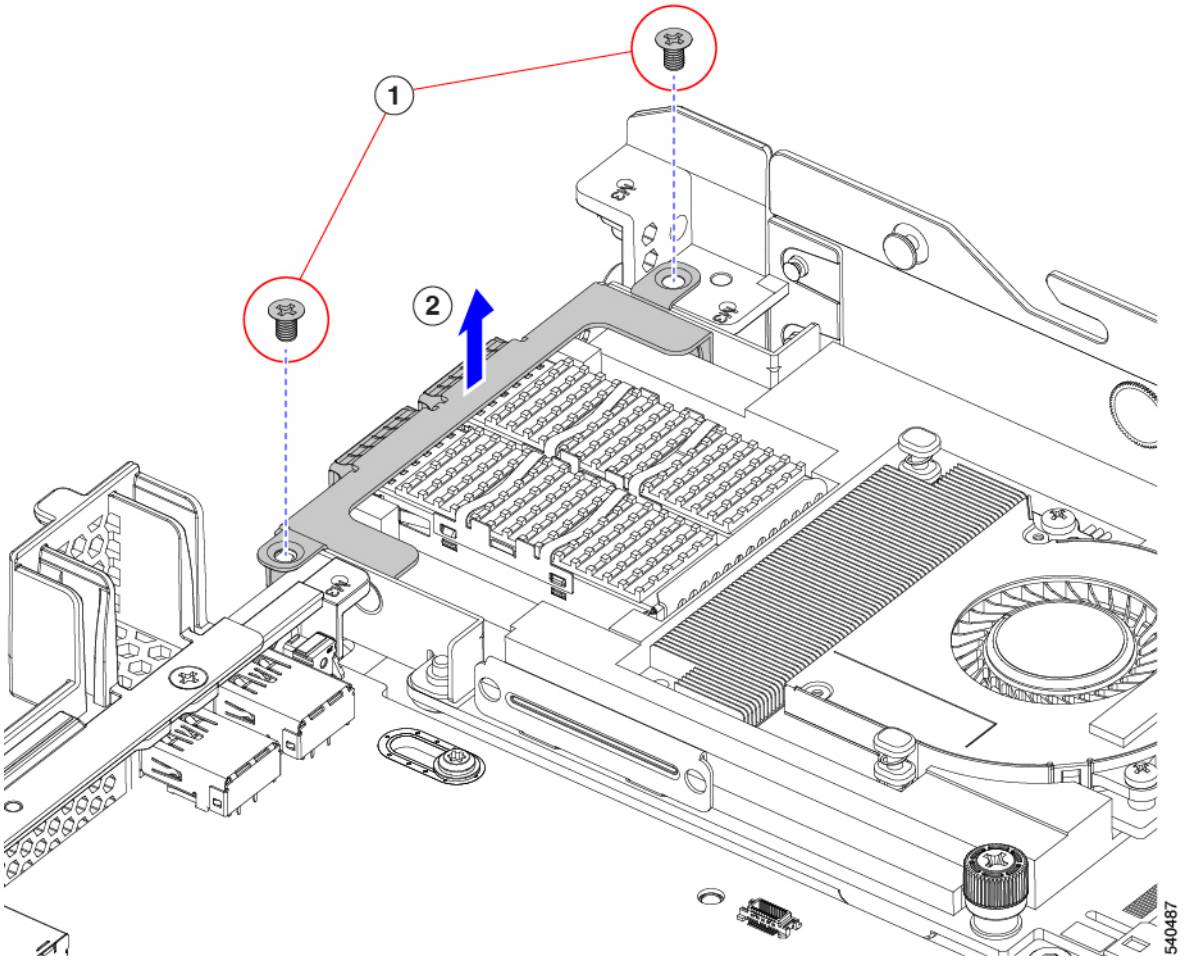
Step 3 If full height riser cages are present, remove them now.

See Removing Full Height Riser Cages, on page 34.

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.

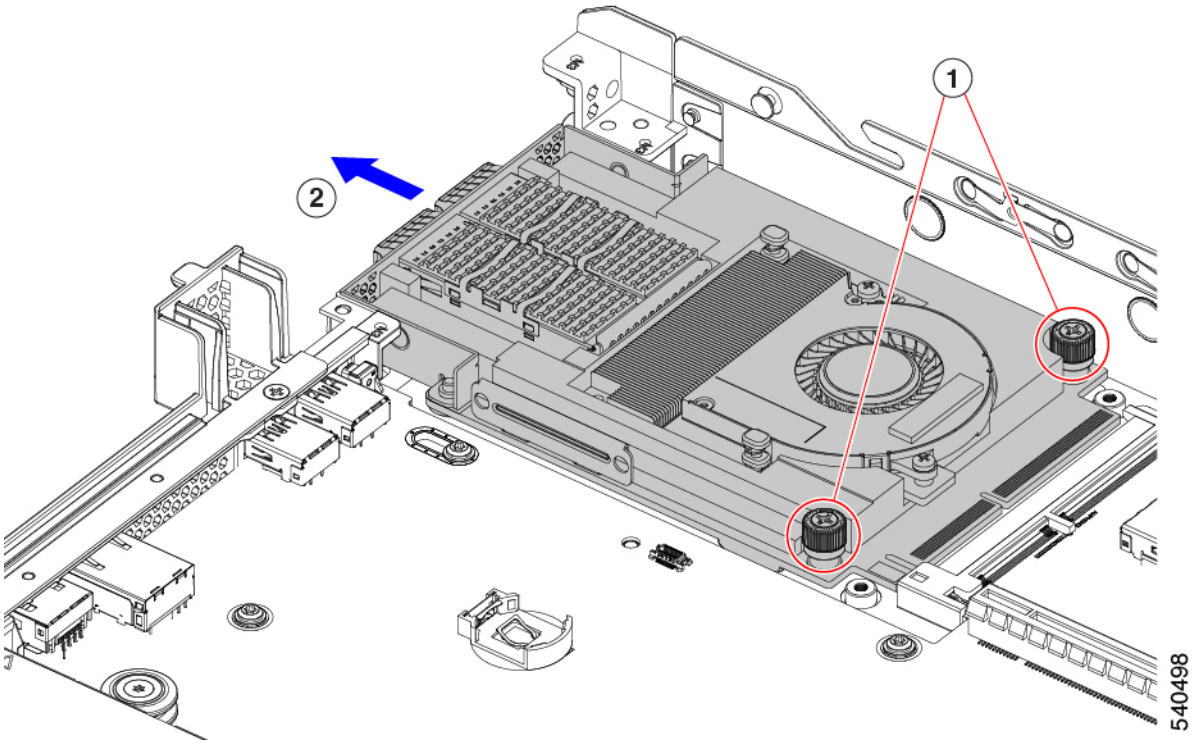
b) Lift the mLOM bracket straight up to remove it from the server.



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.

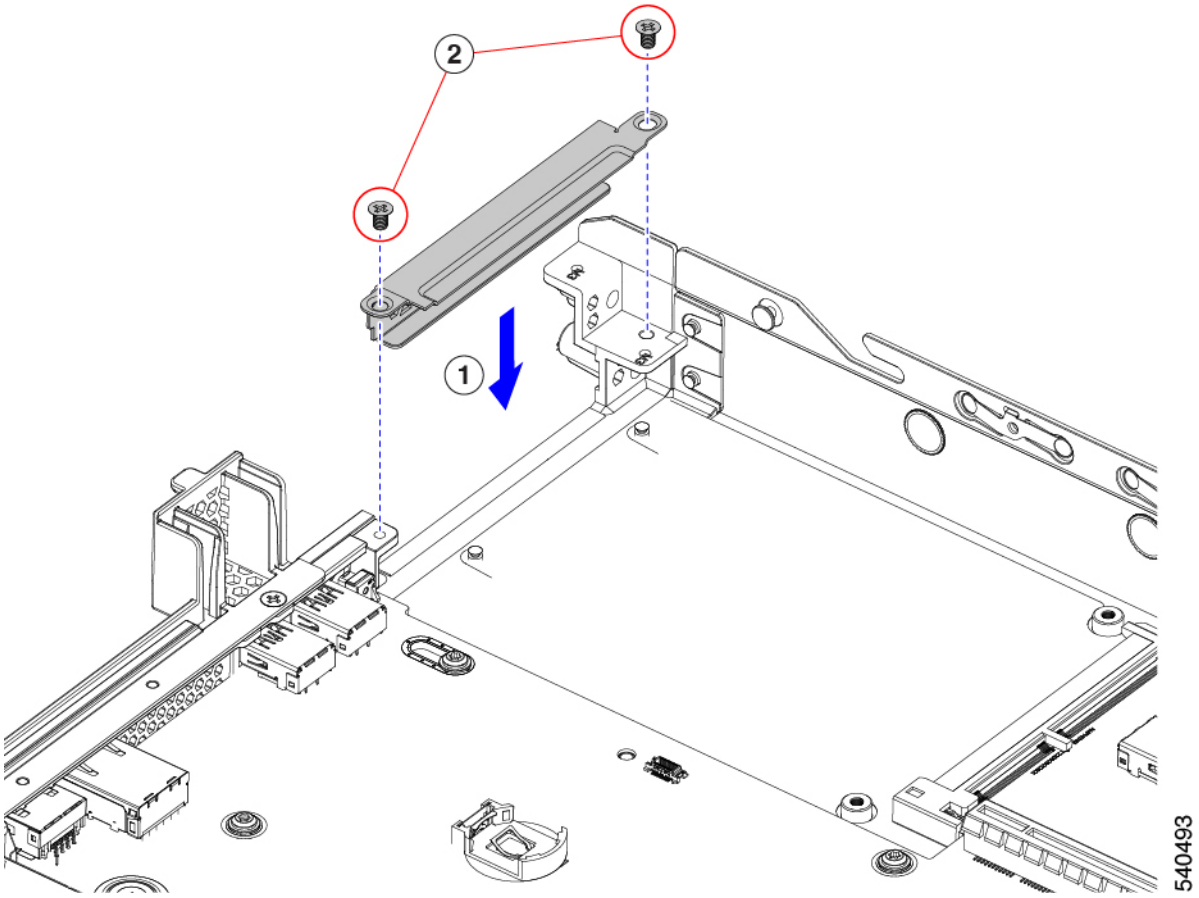


Step 6 If you are not installing an mLOM, install the filler panel in the mLOM slot as shown below. Otherwise, go to Installing an mLOM Card (2FH Riser Cages), on page 81.

a) Lower the filler panel onto the server, aligning the screwholes.

b) 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!



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.

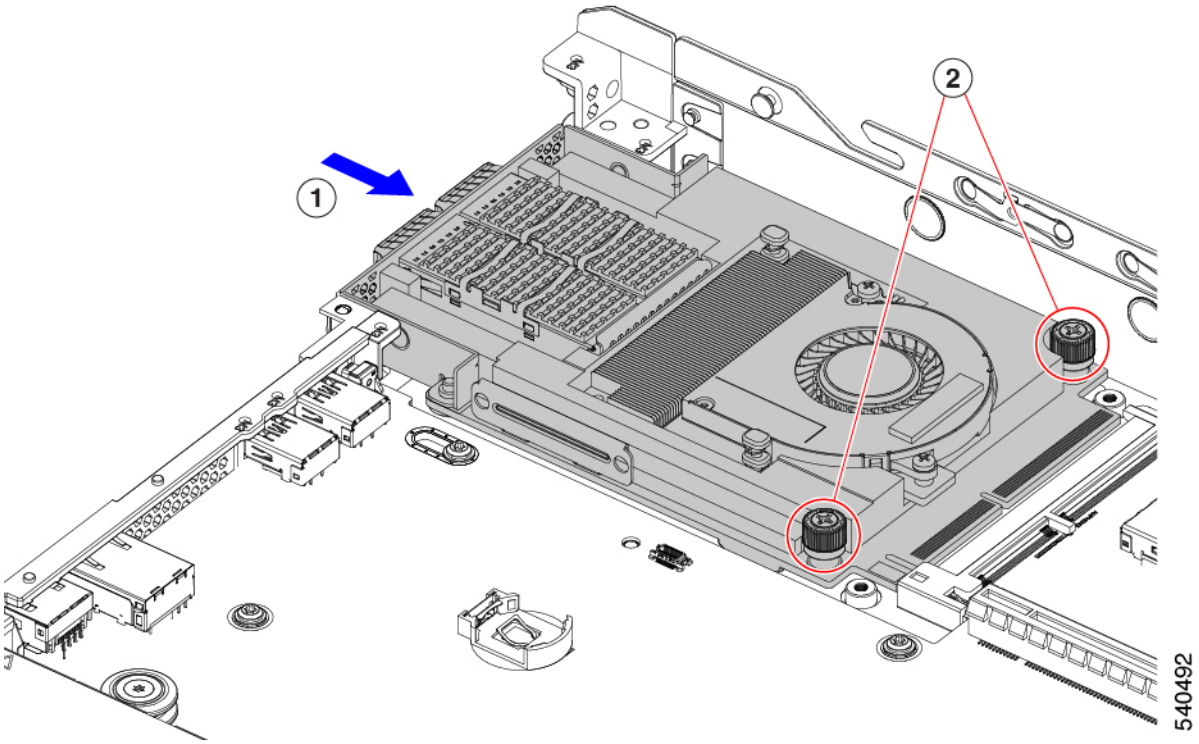
Before you begin

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.

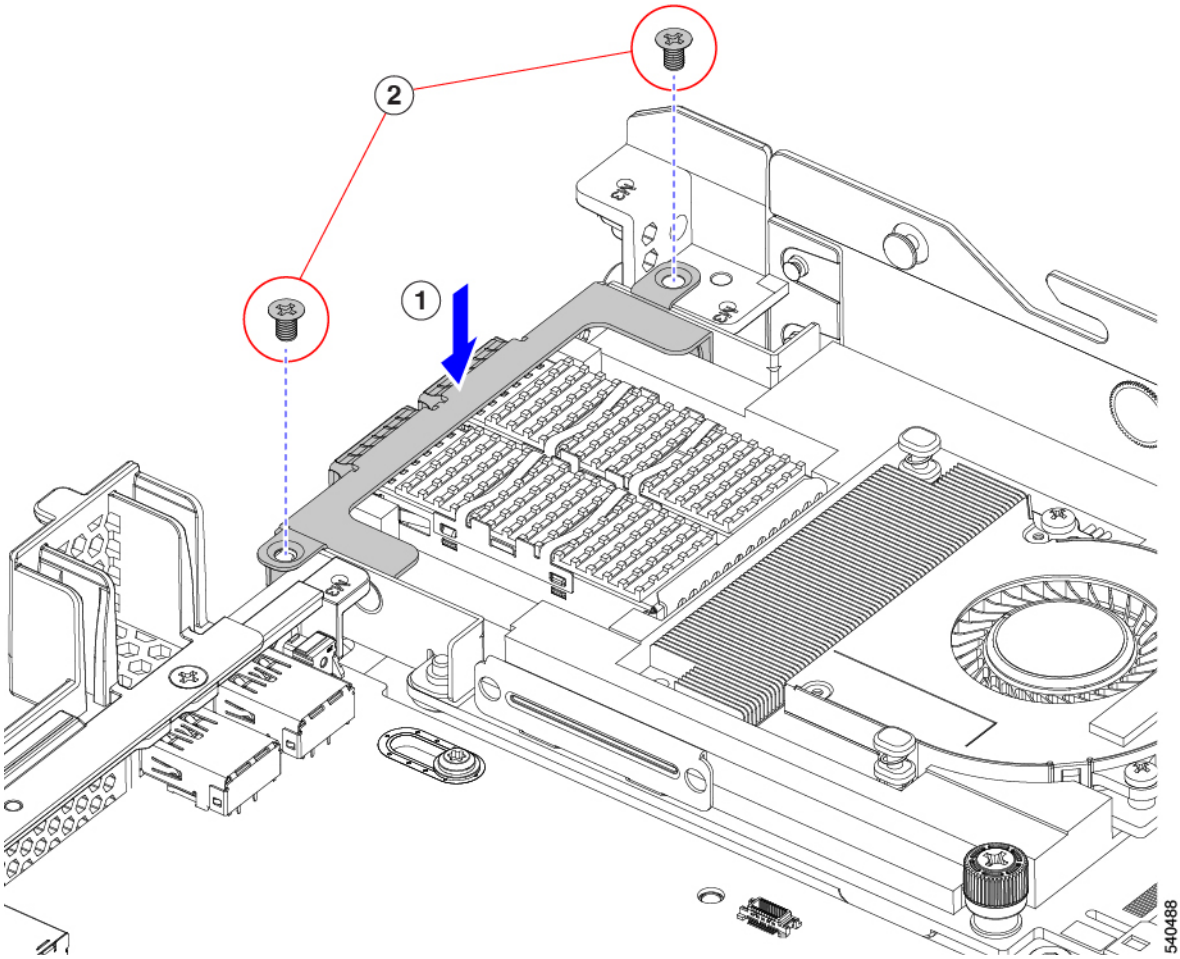


Step 2 Install the mLOM bracket.

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.

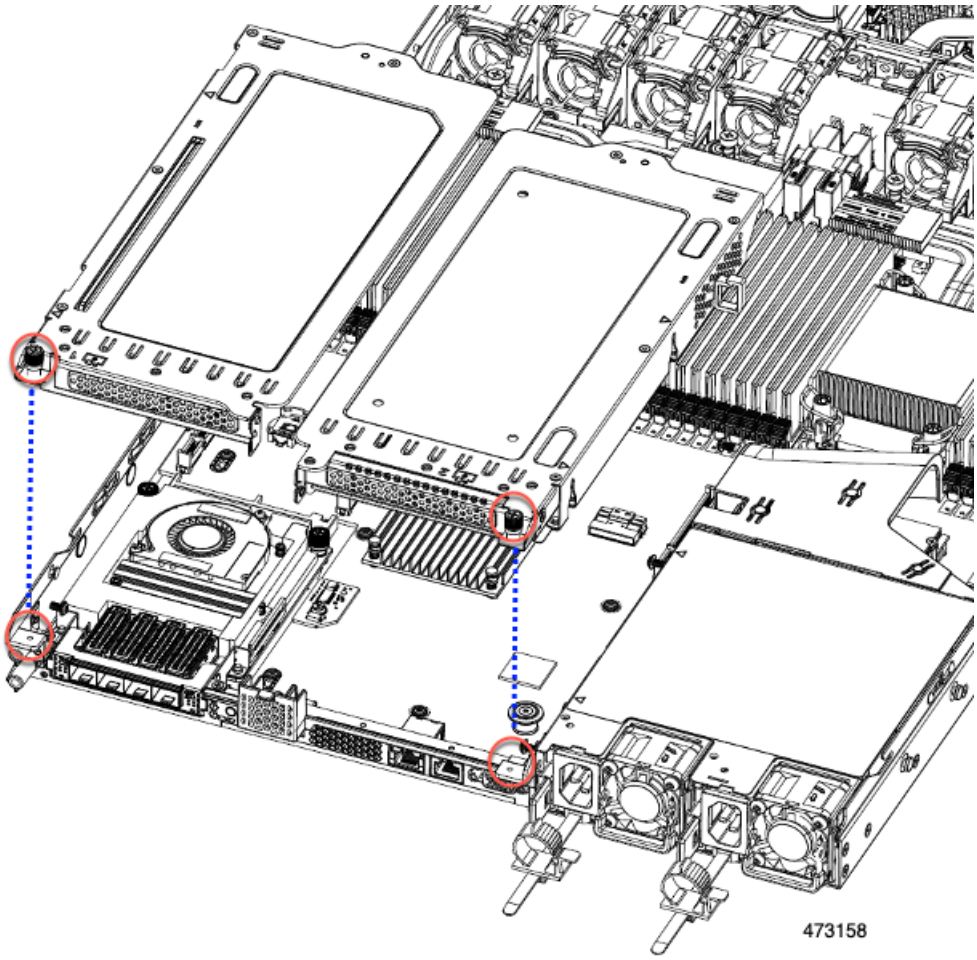


Step 3 Install the two full height riser cages.

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 overtighten the screws or you risk stripping them.



Step 4 Reinstall the server.

a) Replace the server' top cover.
b) If needed, reinstall the server in the rack.
c) 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 12.

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.

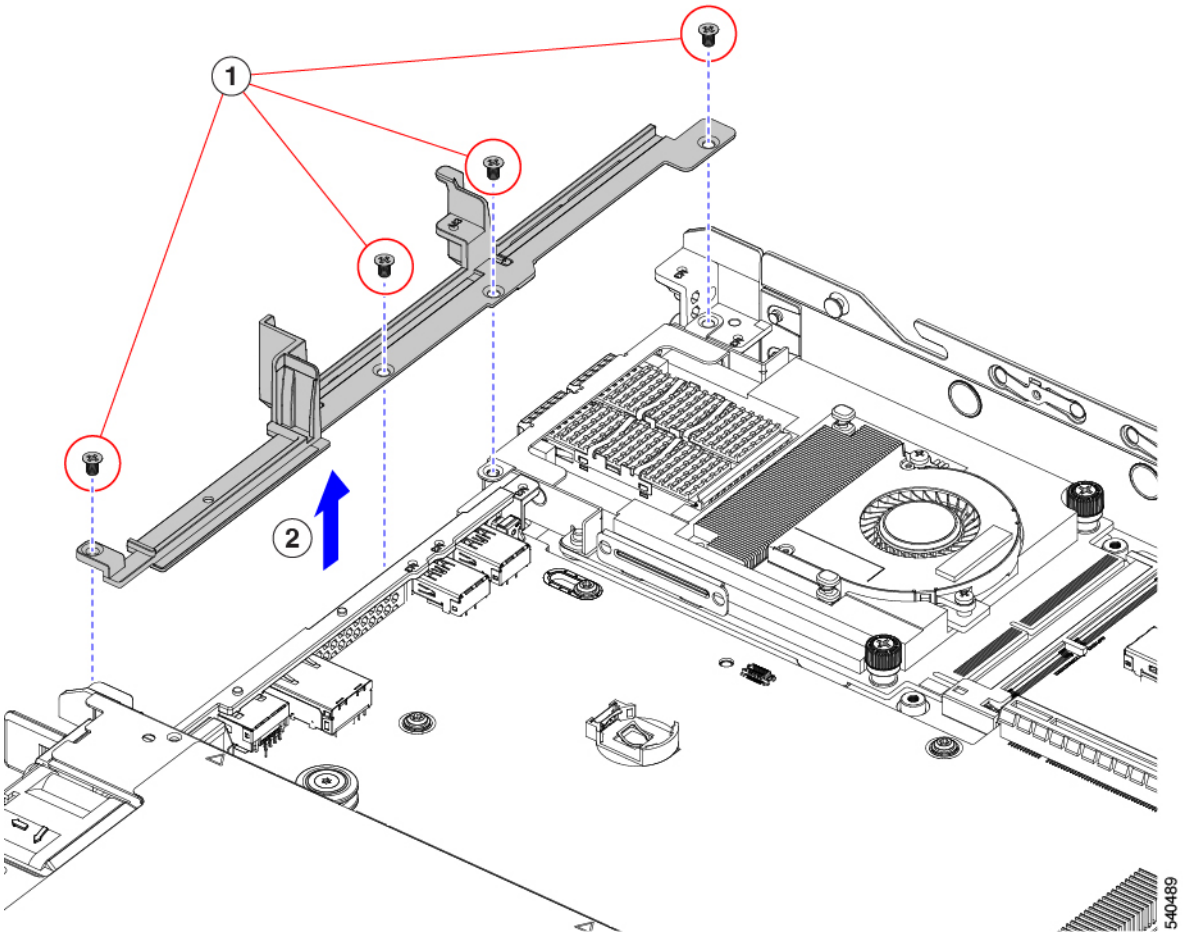
Step 3 If half-height riser cages are present, remove them now.

See Removing Half Height Riser Cages, on page 27.

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.

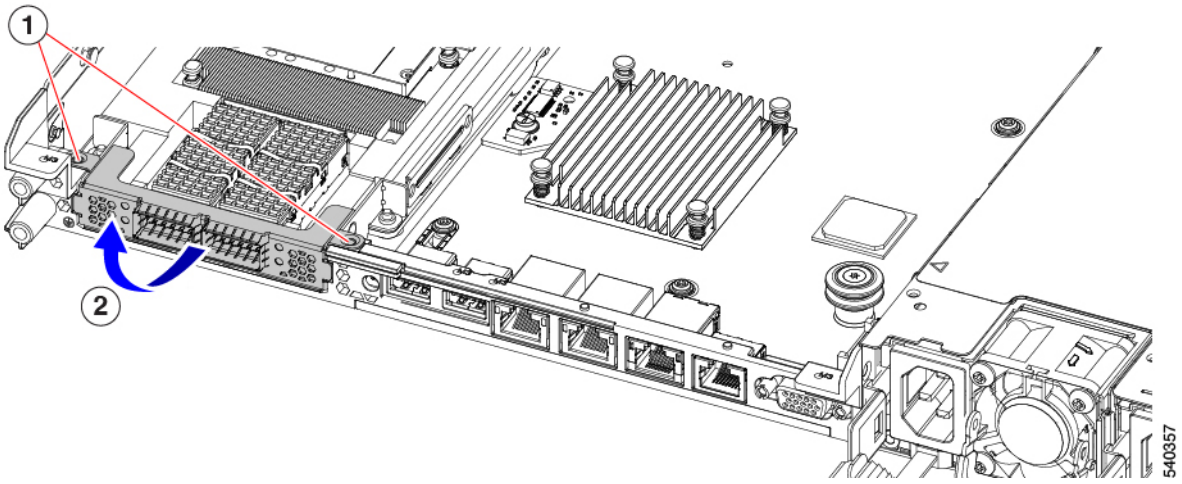
b) Grasp each end of the half-height rear wall and lift it off of the server.



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.

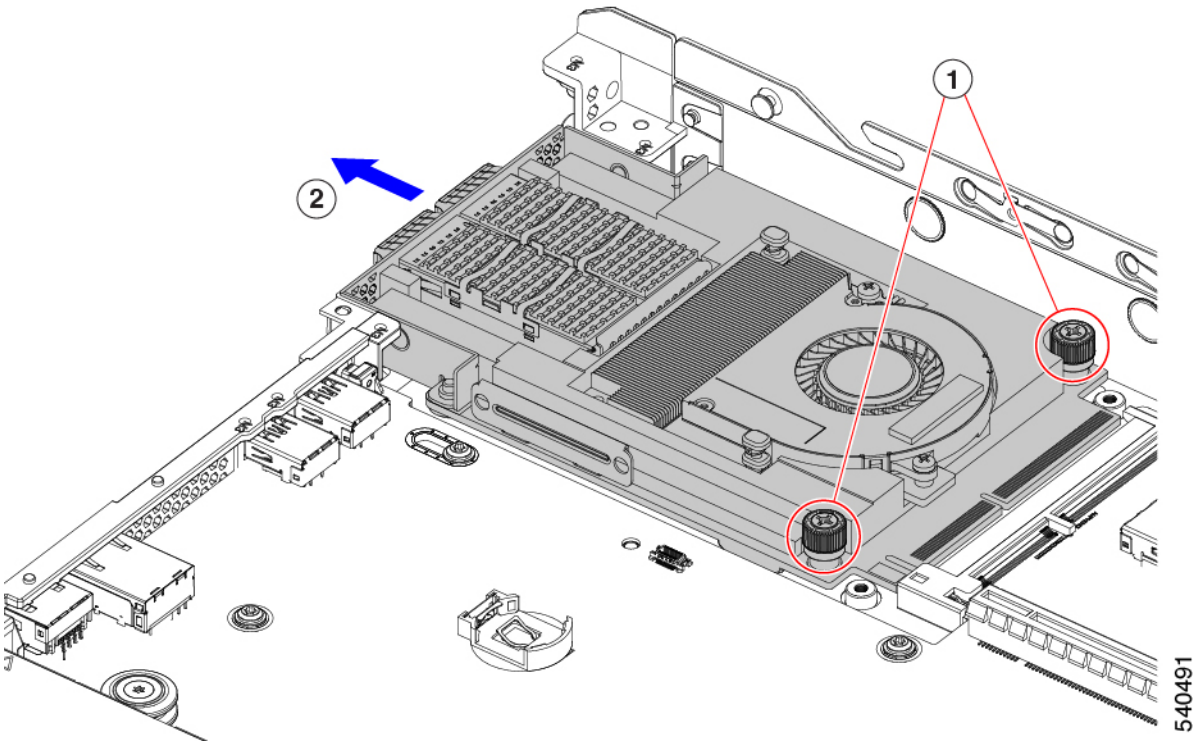
b) Lift the mLOM bracket to remove it from the server.



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.

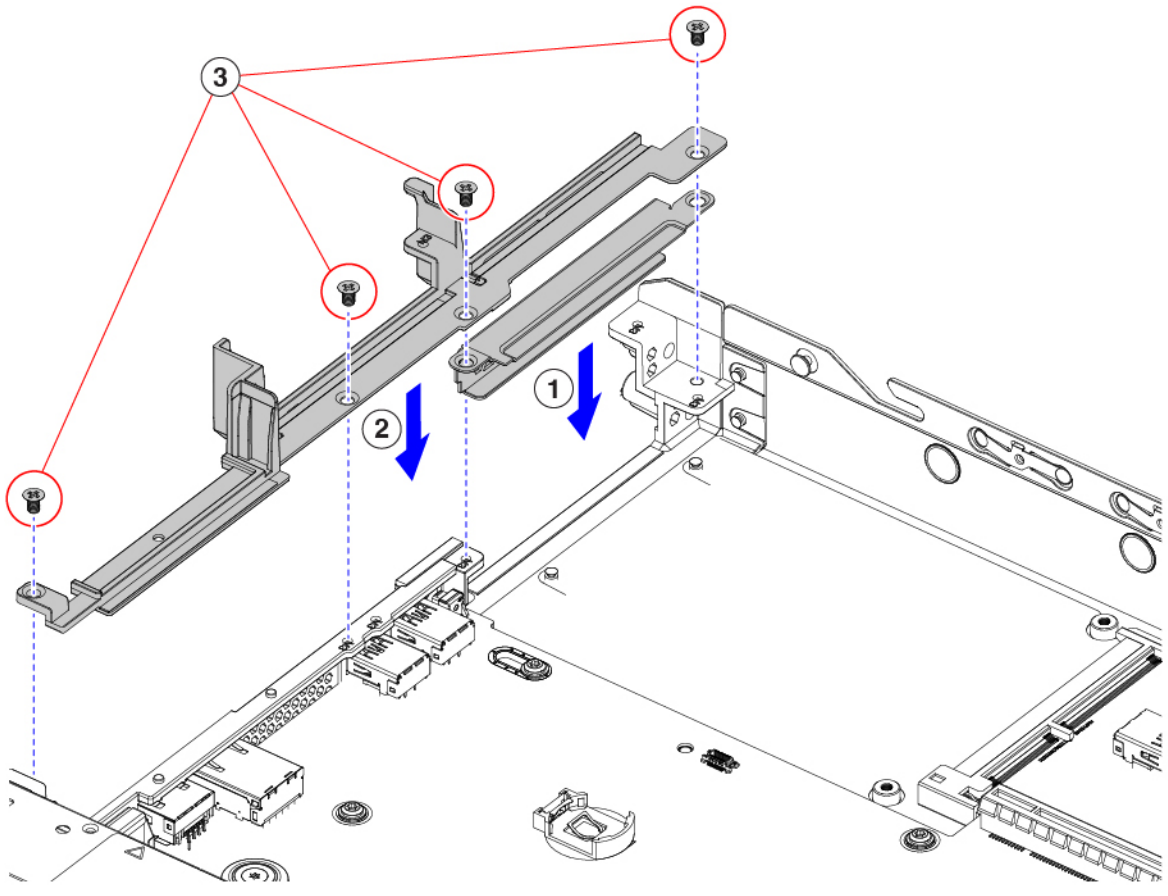


Step 7 If you are not installing an mLOM, install the filler panel in the mLOM slot as shown below. Otherwise, go to Installing an mLOM Card (3HH Riser Cages), on page 87.

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)

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

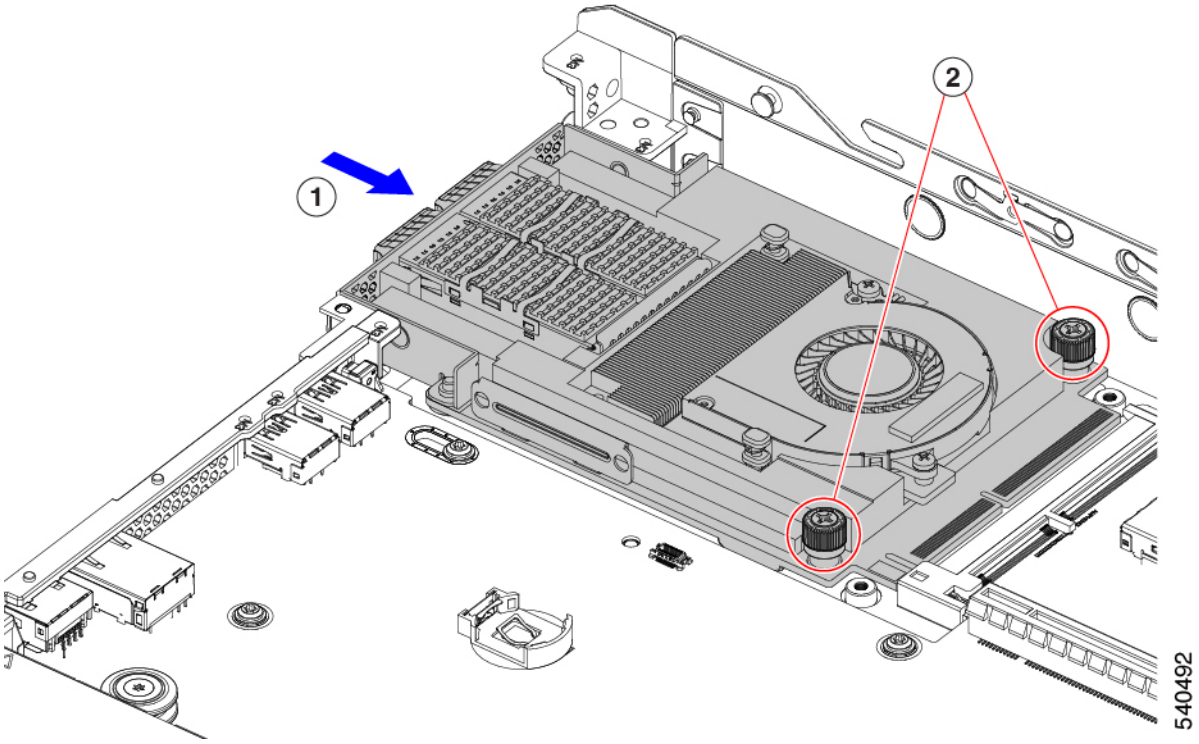
Before you begin

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.

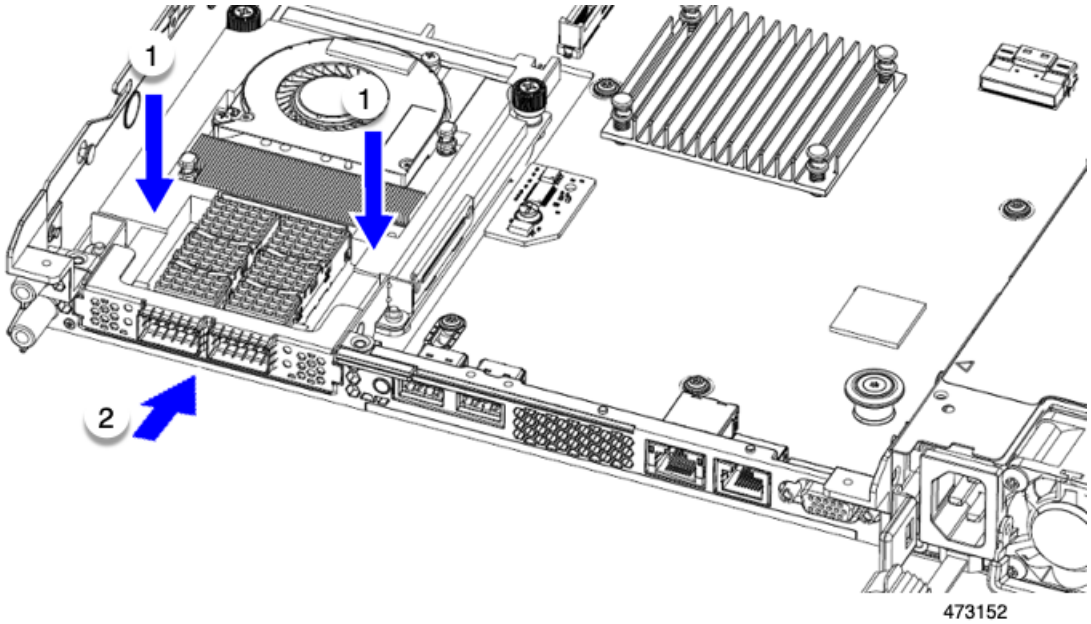


Step 2 Install the mLOM bracket.

a) Lower the mLOM bracket onto the mLOM, aligning the screw holes.

b) Using a #2 Phillips screwdriver, insert and tighten the screws.

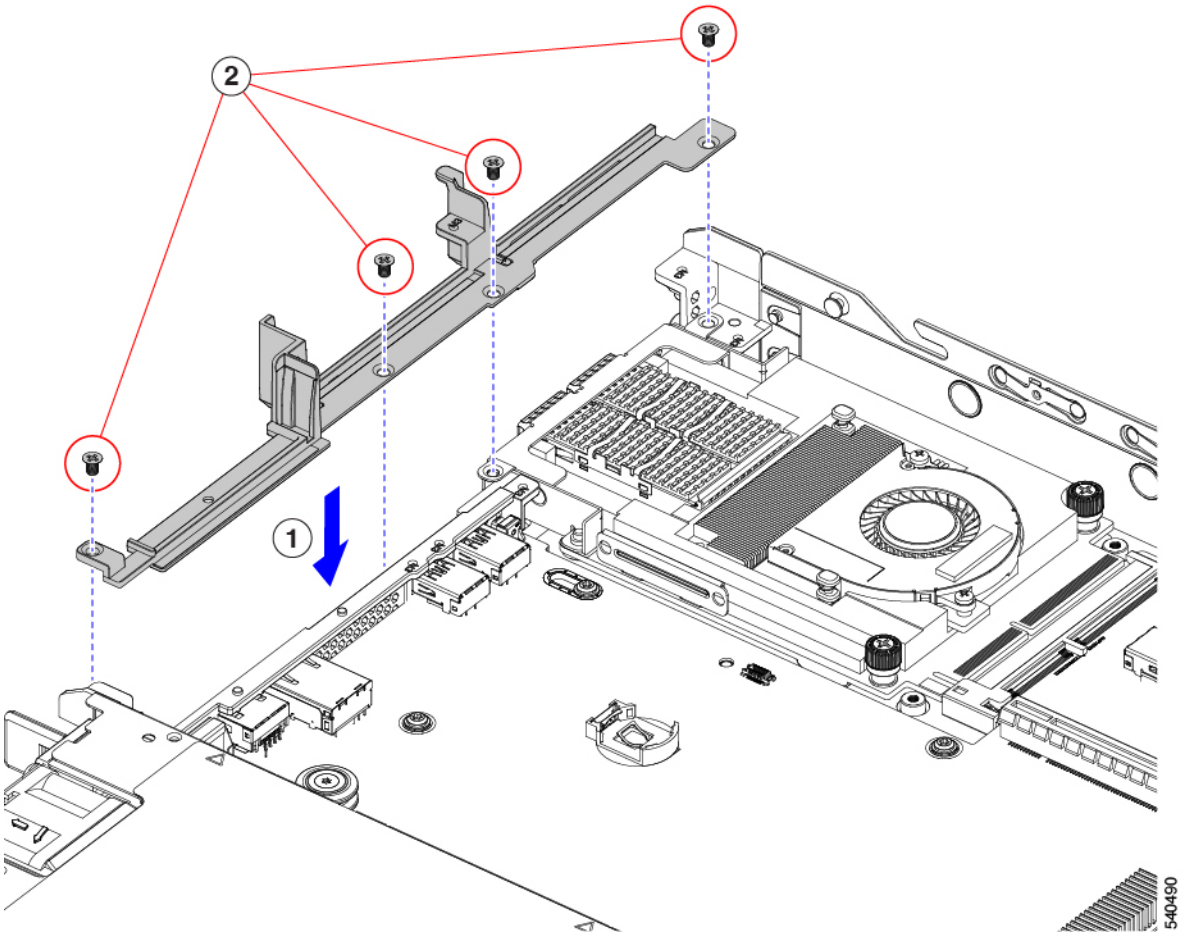
Caution Tighten the screws to 4 lbs-in of torque. Do not over tighten the screws or you risk stripping them.



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.

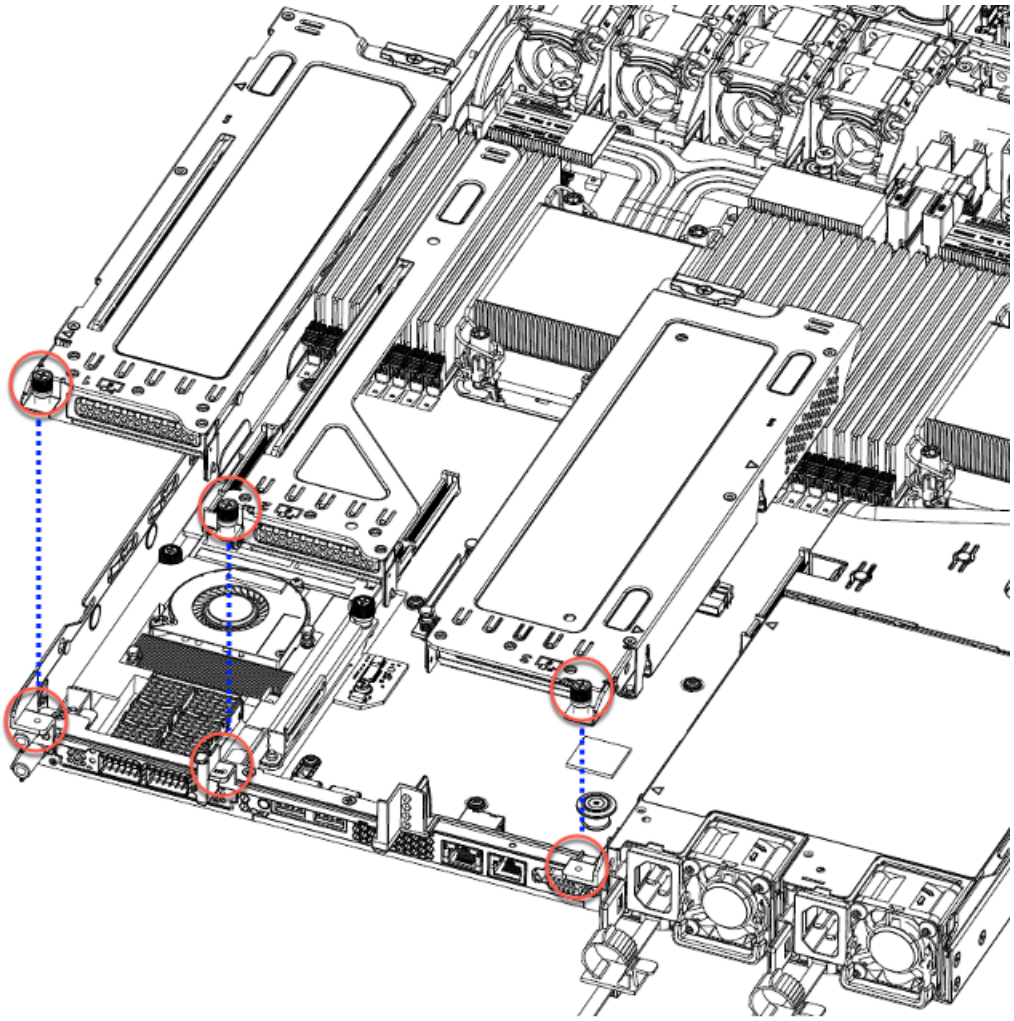


Step 4 Install the two full height riser cages.

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 overtighten the screws or you risk stripping them.



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 78.

See the following topics.

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.

- 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 7: 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

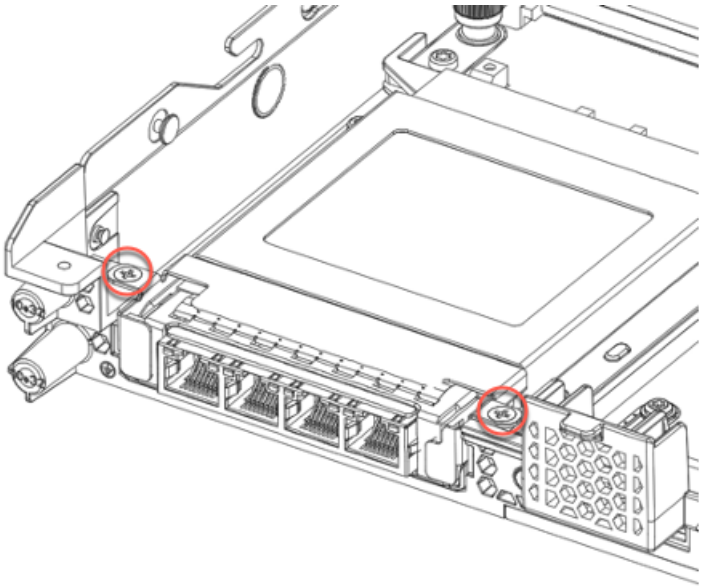
Gather a #2 Phillips screwdriver.

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

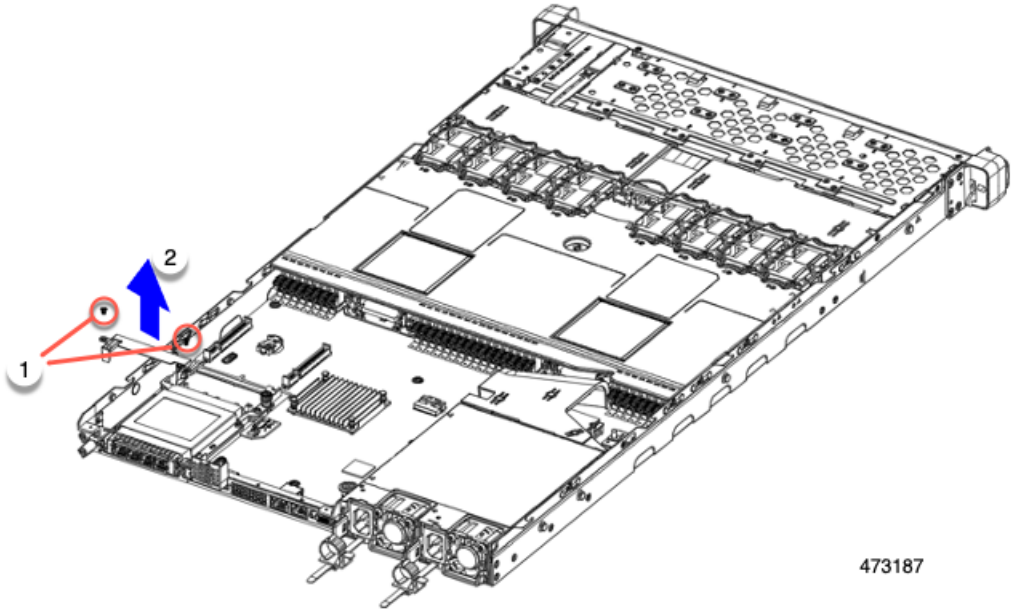
See Removing Top Cover, on page 7.

Step 2 Remove the OCP bracket.

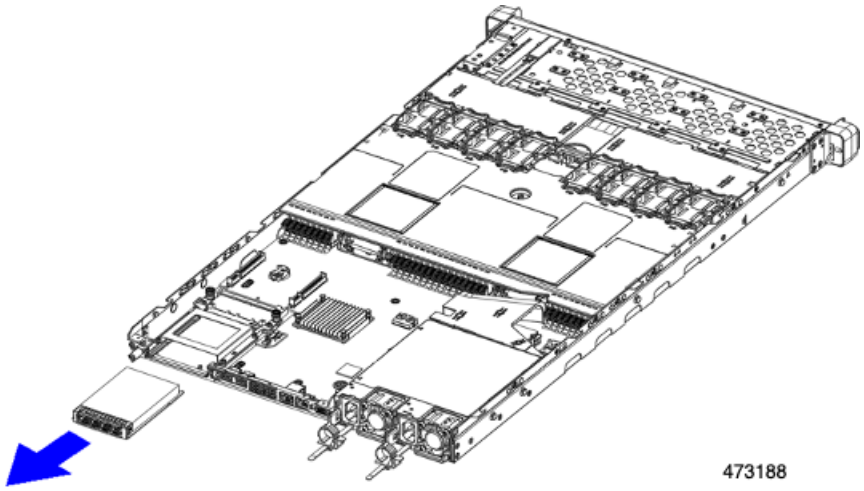
a) Locate the four screws that secure the rear wall to the server sheetmetal.



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 95 or Installing an OCP Card, 3 HH Riser Cages, on page 100
- Install an mLOM. See Installing an mLOM Card (2FH Riser Cages), on page 81 or Installing an mLOM Card (3HH Riser Cages), on page 87.
- 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

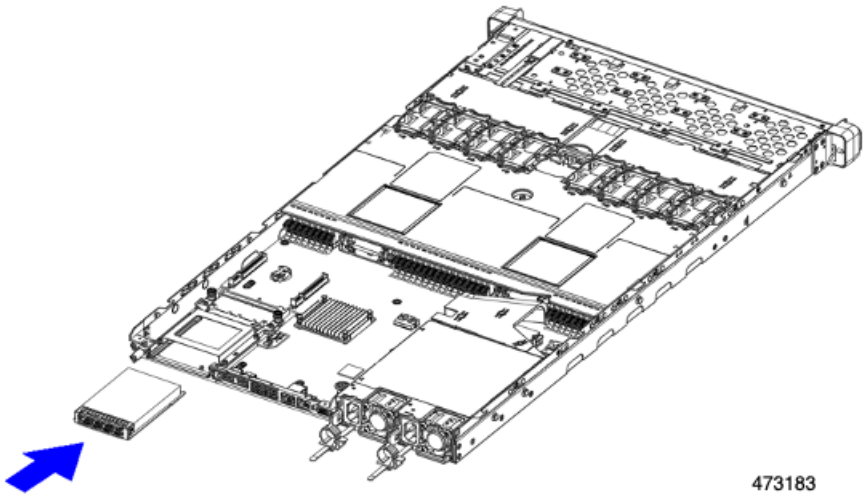
Gather a #2 Phillips screwdriver.

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

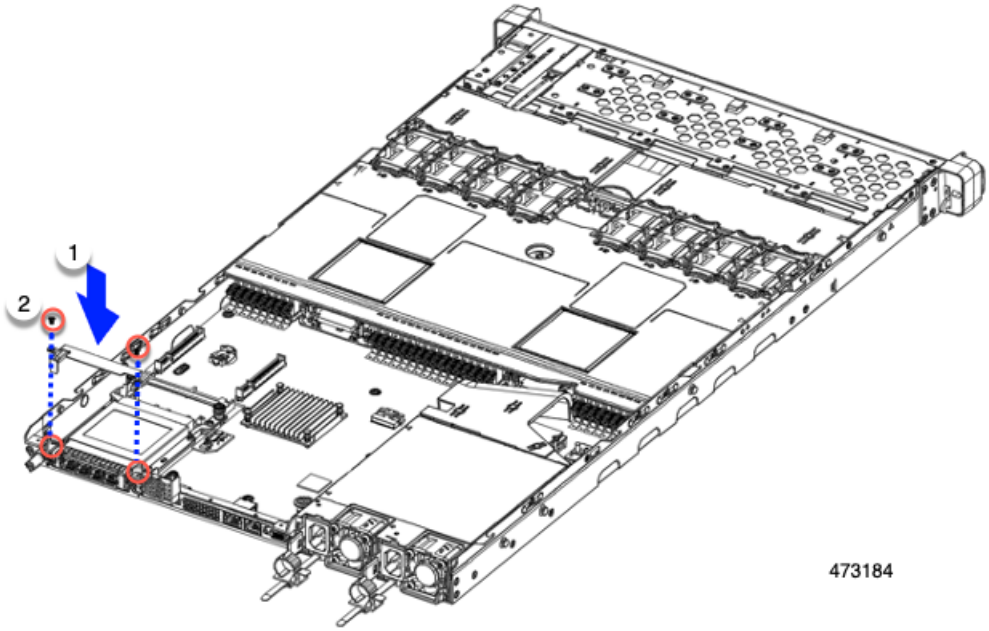
Removing Top Cover, on page 7.

Step 2 Install the OCP card.

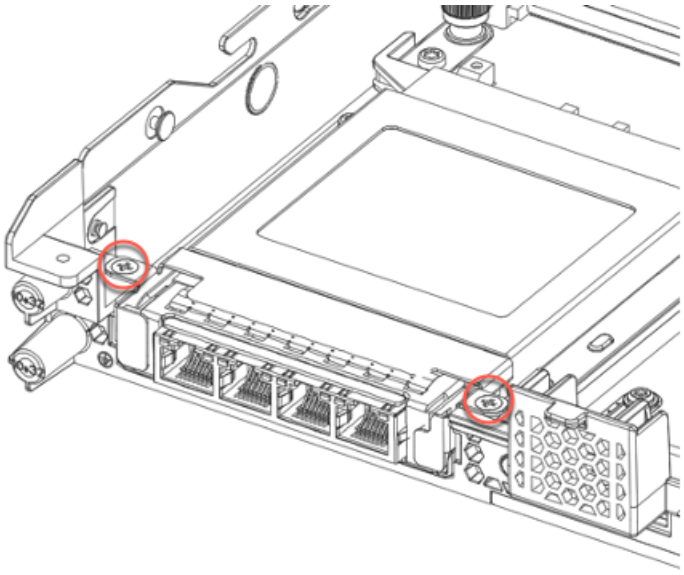
a) Holding the OCP card level, slide it into the slot on the rear of the server.



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

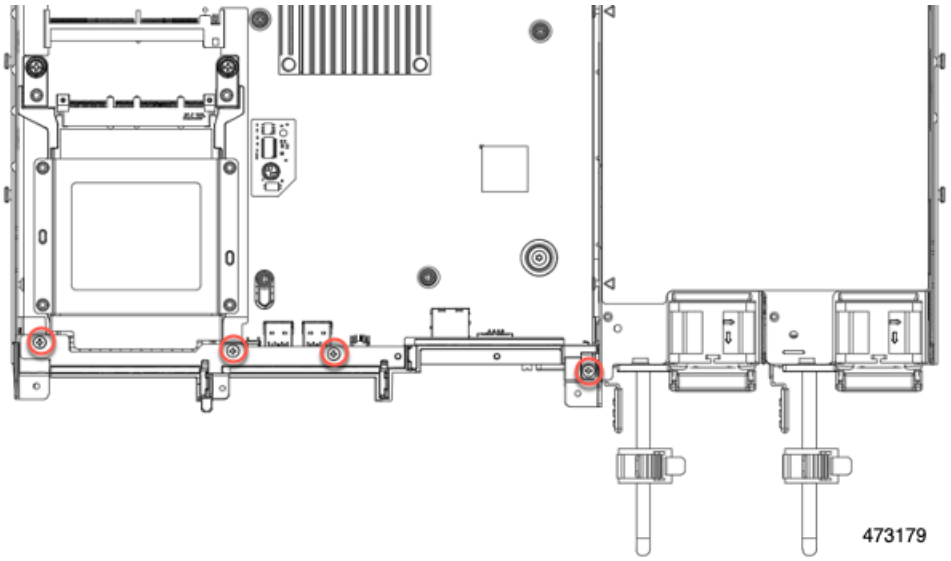
Gather a #2 Phillips screwdriver.

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

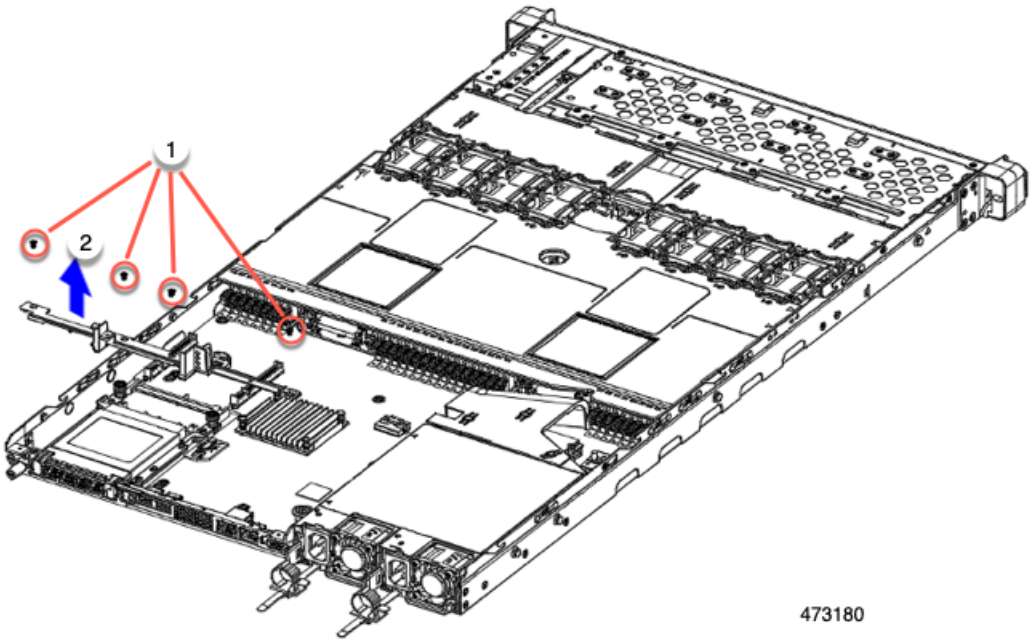
See Removing Top Cover, on page 7.

Step 2 Remove the OCP bracket.

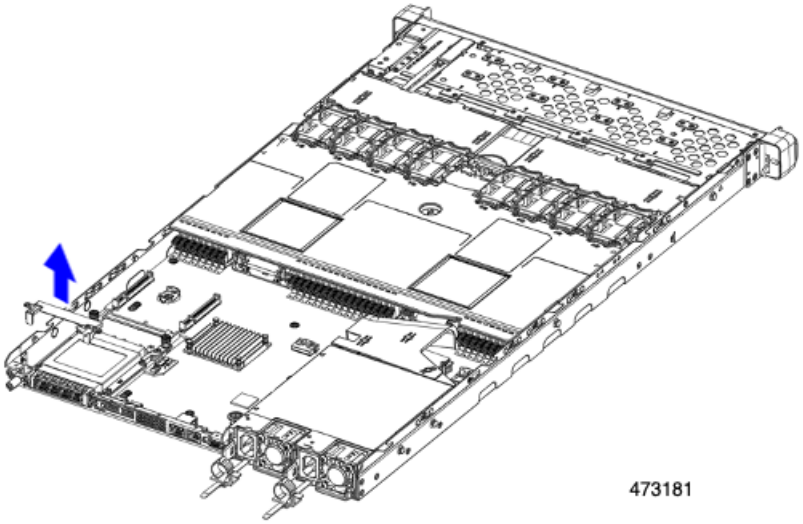
a) Locate the four screws that secure the rear wall to the server sheetmetal.



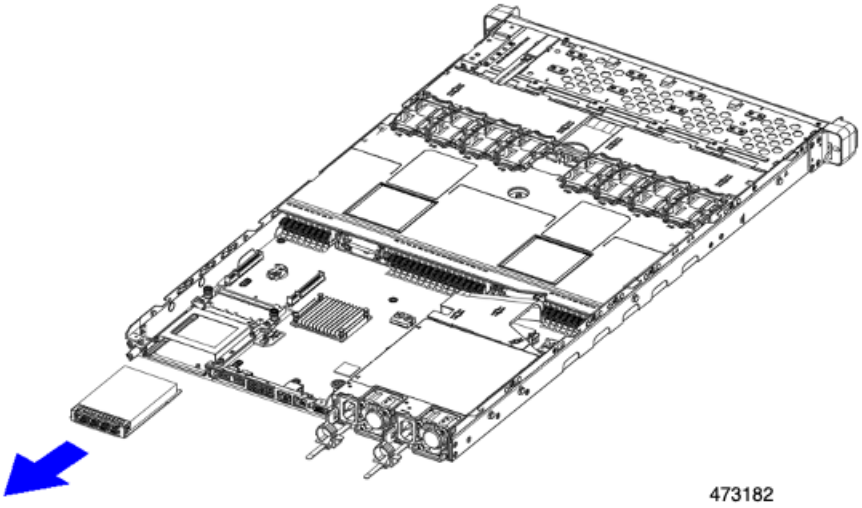
b) Using a #2 Phillips screwdriver, remove the screws and lift the rear wall off of the server.



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 95 or Installing an OCP Card, 3 HH Riser Cages, on page 100
- Install an mLOM. See Installing an mLOM Card (2FH Riser Cages), on page 81 or Installing an mLOM Card (3HH Riser Cages), on page 87.
- 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

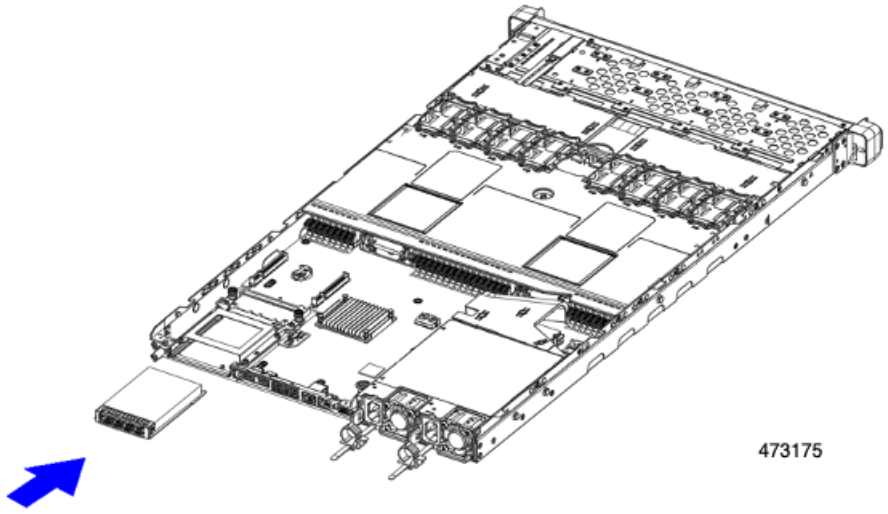
Gather a #2 Phillips screwdriver.

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

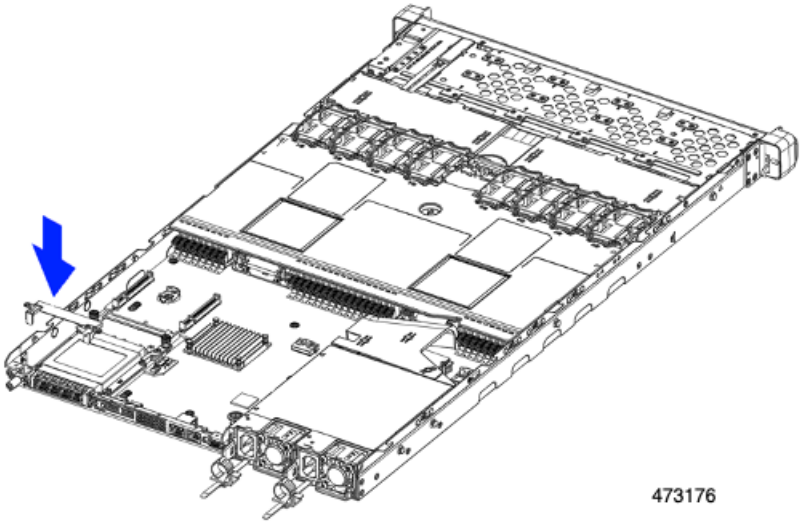
Removing Top Cover, on page 7.

Step 2 Install the OCP card.

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



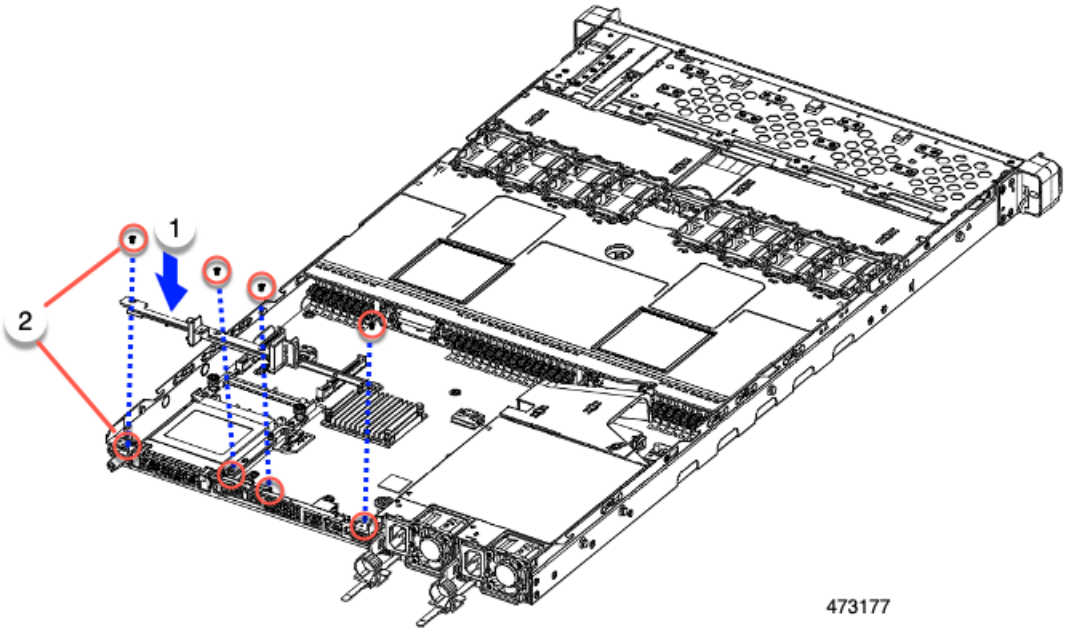
b) Install the OCP bracket, making sure to align the screwholes at each end with the screwholes on the OCP/mLOM slot.



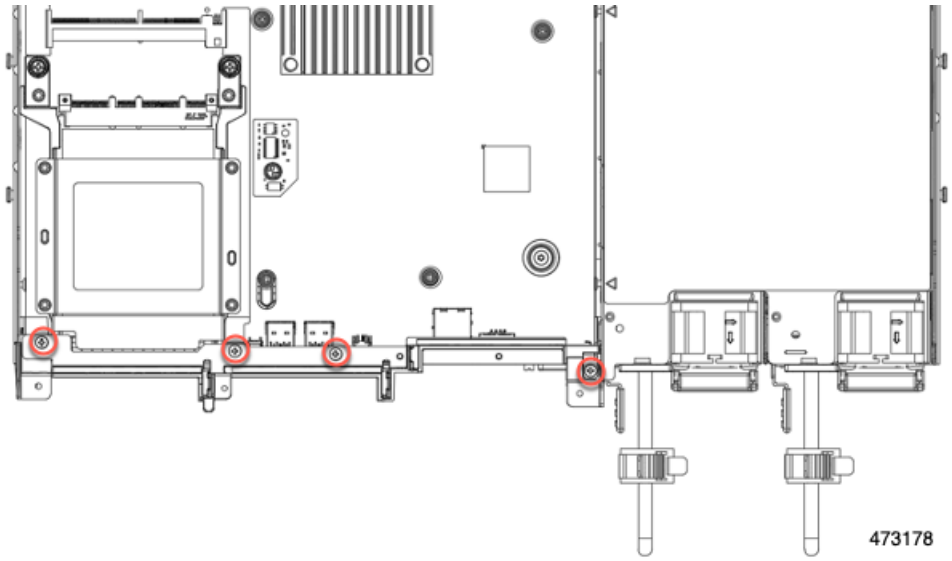
Step 3 Install the rear wall.

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.



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 12.

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 7.

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 socked 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.

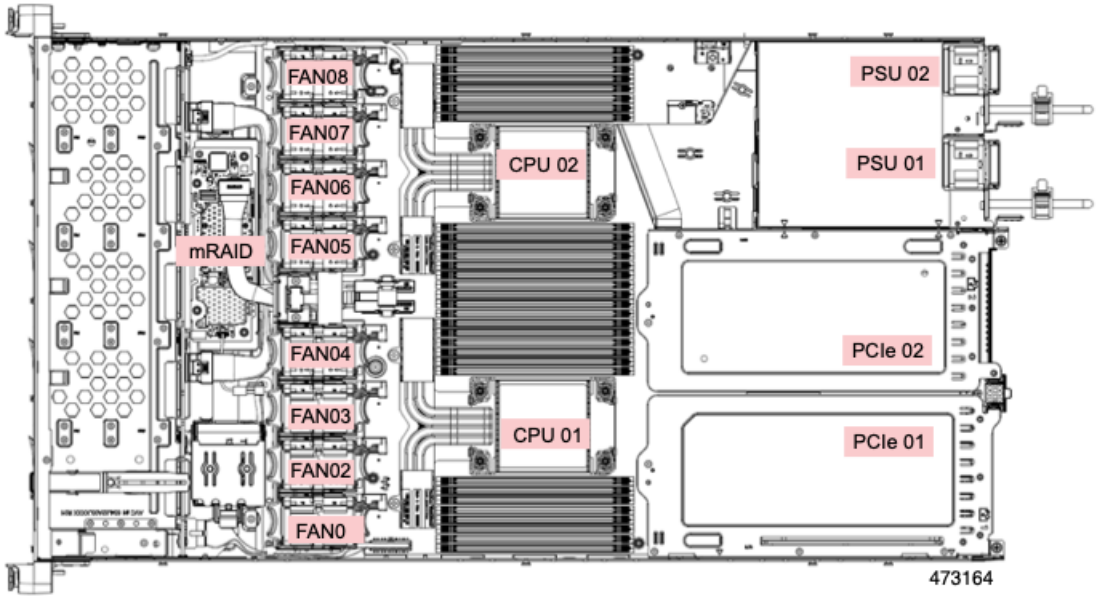
Step 3 Install a new card:

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 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 28: 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 12.

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 7.

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 socked 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).

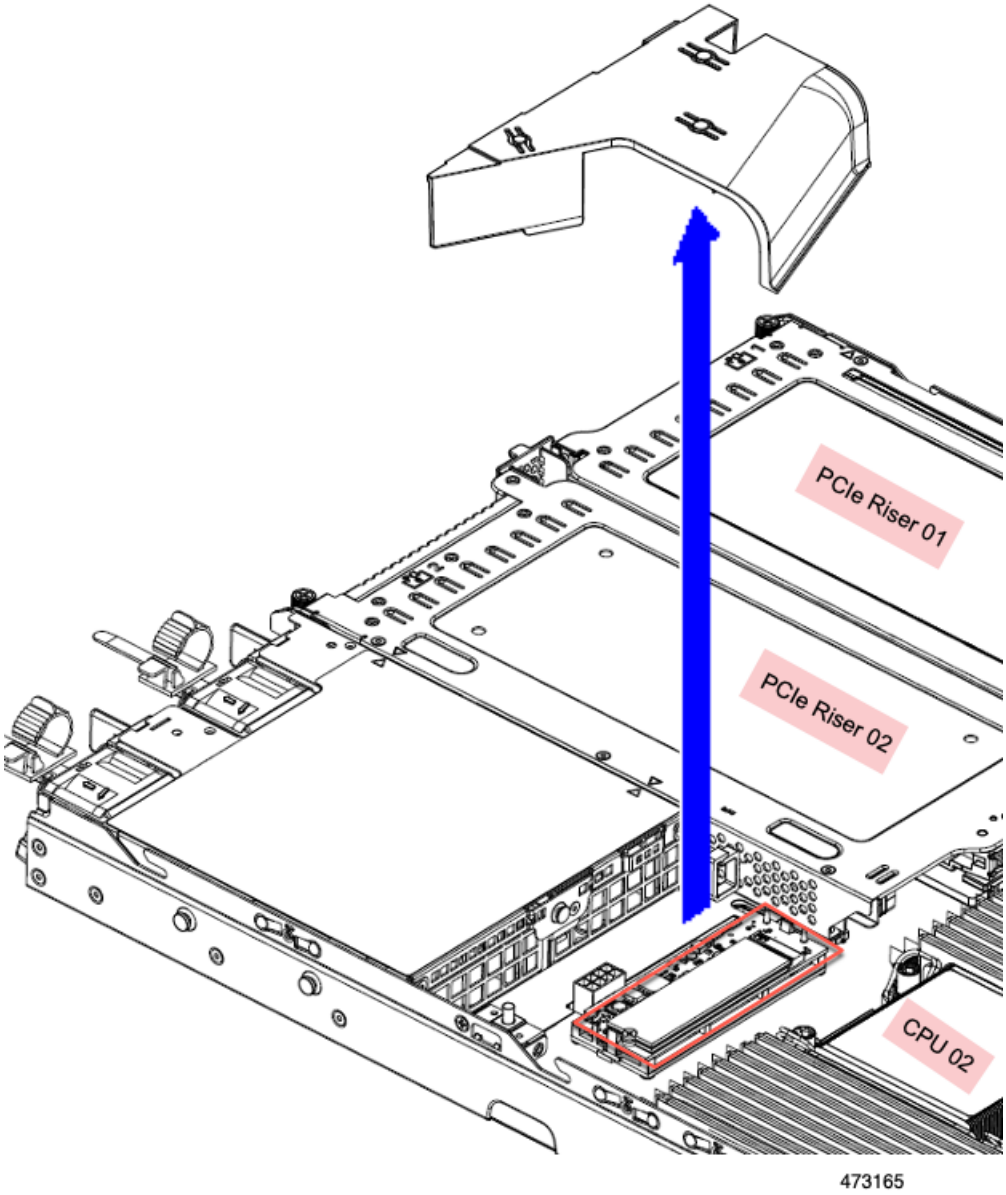
Step 1 Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 12.

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.

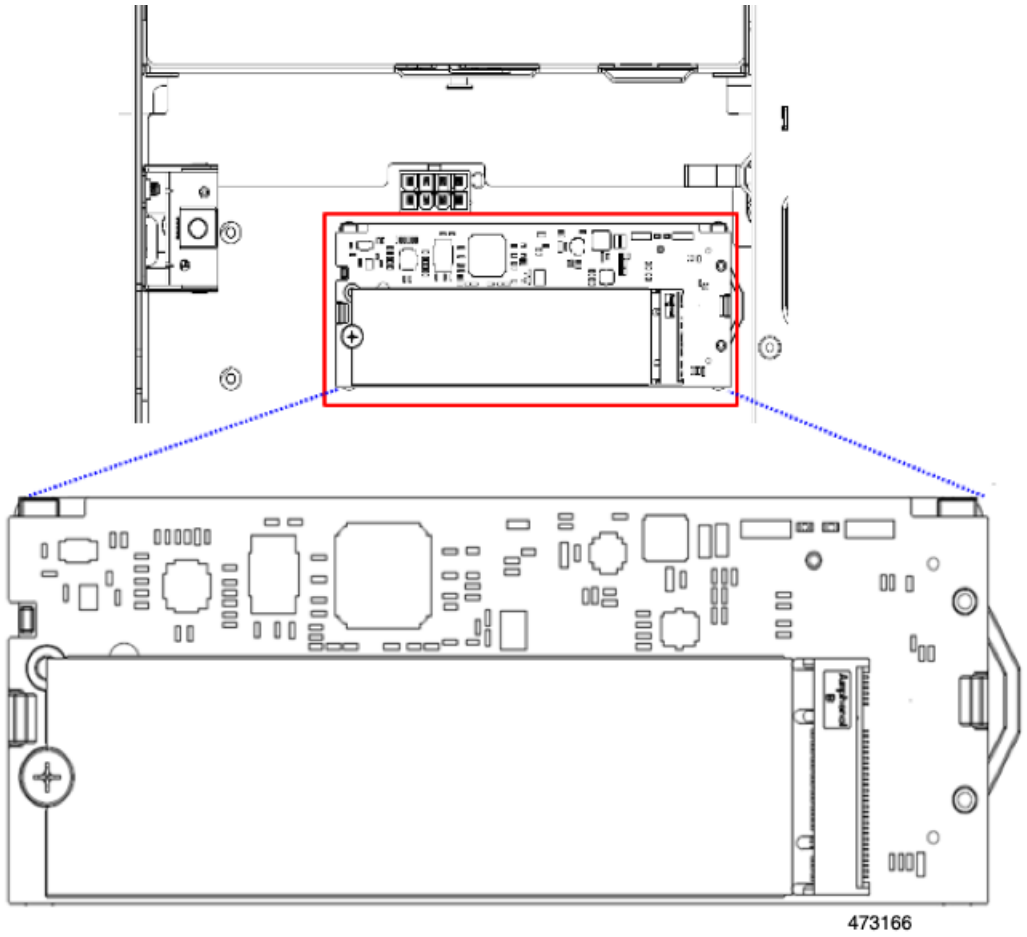
Step 3 Remove the top cover from the server as described in Removing Top Cover, on page 7.

Step 4 Grasp and remove the air baffle located between CPU 2 and PCIe Riser 3.



Step 5 Remove a controller from its motherboard socket:

a) Locate the controller in its socket just behind CPU 2.



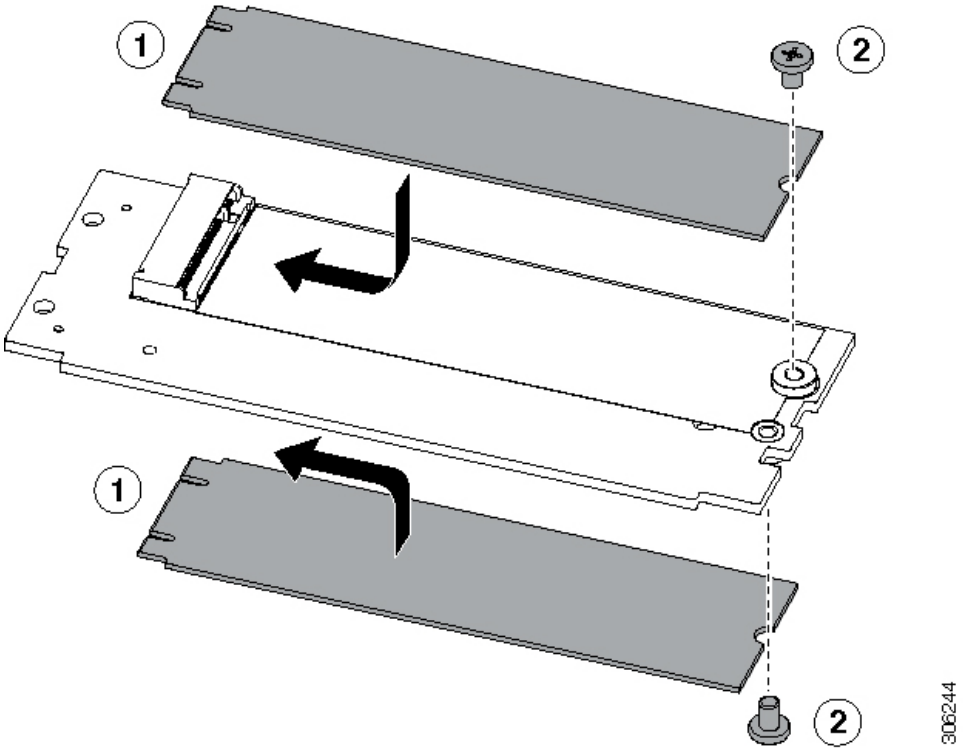
b) At each end of the controller board, push outward on the clip that secures the carrier.
c) Lift both ends of the controller to disengage it from the socket on the motherboard.
d) Set the carrier on an anti-static surface.

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



Step 7 Install the controller to its socket on the motherboard:

a) 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.

b) Gently push down the socket end of the controller so that the two pegs go through the two holes on the controller.

c) 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:

a) Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 12.

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.

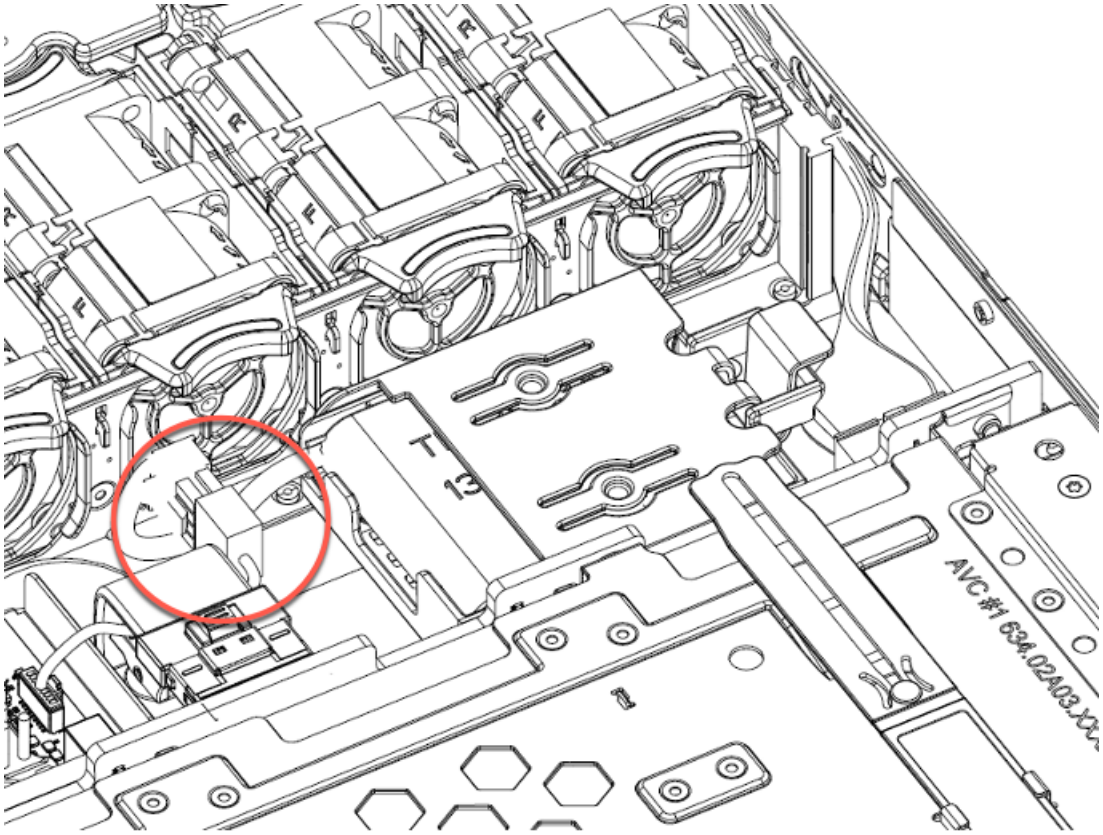
Caution If you cannot safely view and access the component, remove the server from the rack.

c) Remove the top cover from the server as described in Removing Top Cover, on page 7.

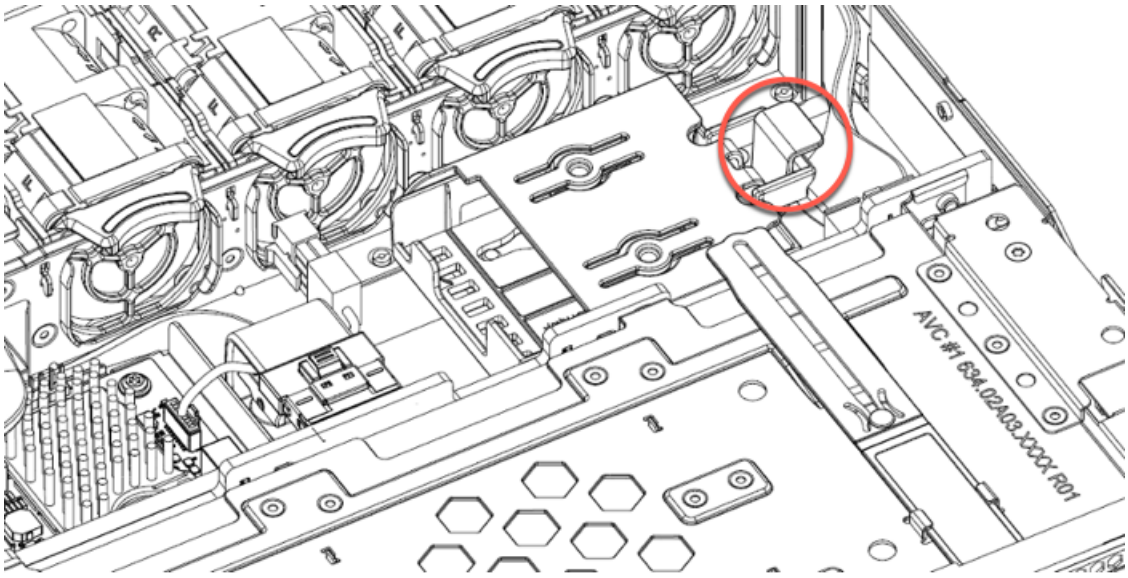
Step 2 Remove an existing Supercap:

a) Locate the Supercap modules near the RAID card by the front-loading drives.

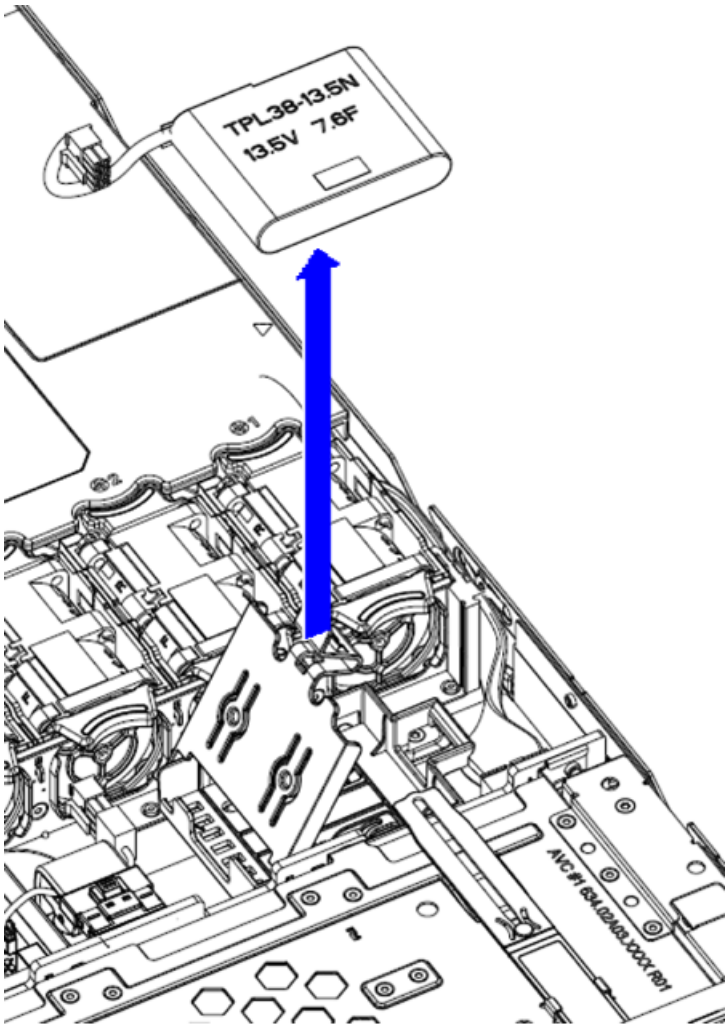
b) Disconnect the Supercap cable connector from the RAID cable connector.



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



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

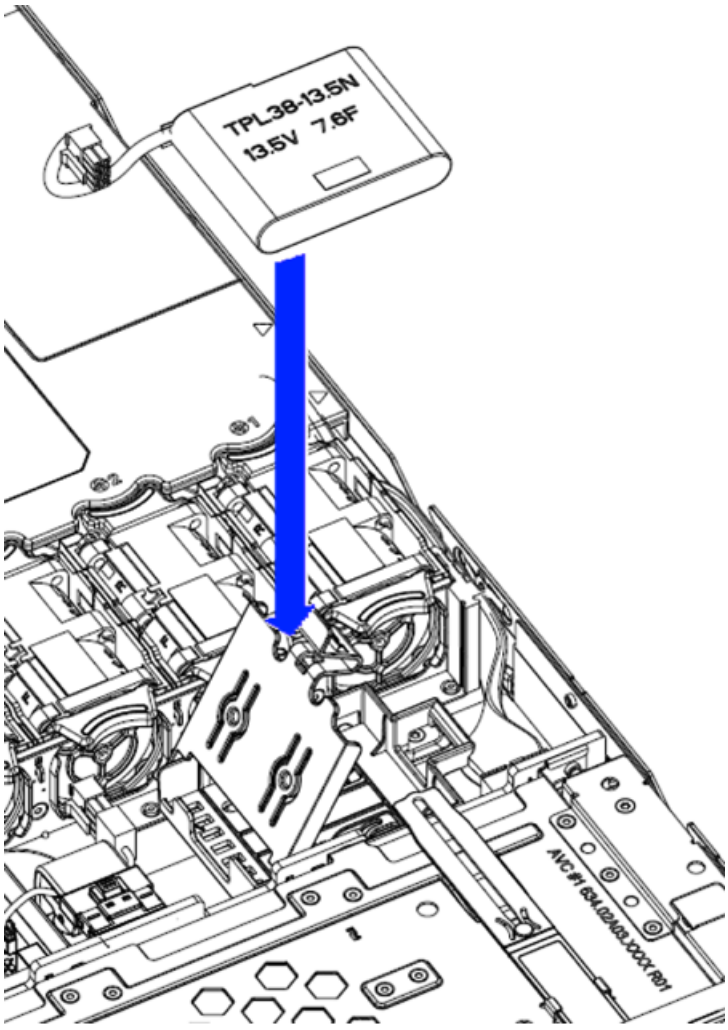


Step 3 Install a new Supercap:

a) Orient the Supercap so that its cable connector is facing the RAID cable connector.

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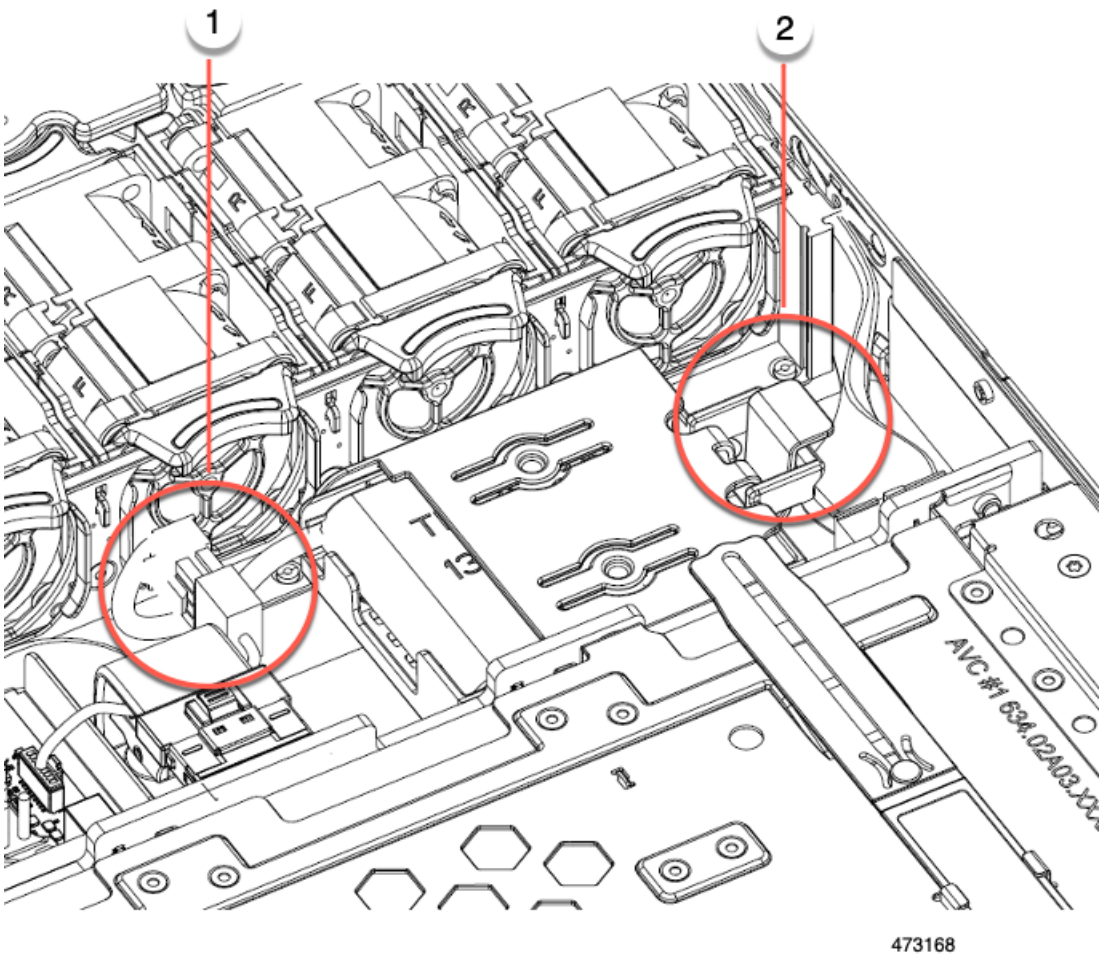
c) Connect the Supercap cable from the RAID controller card to the connector on the new Supercap cable.
d) Close the hinged plastic bracket over the Supercap. Push down until the securing tab clicks.



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 12.
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 7.

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 socked 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.

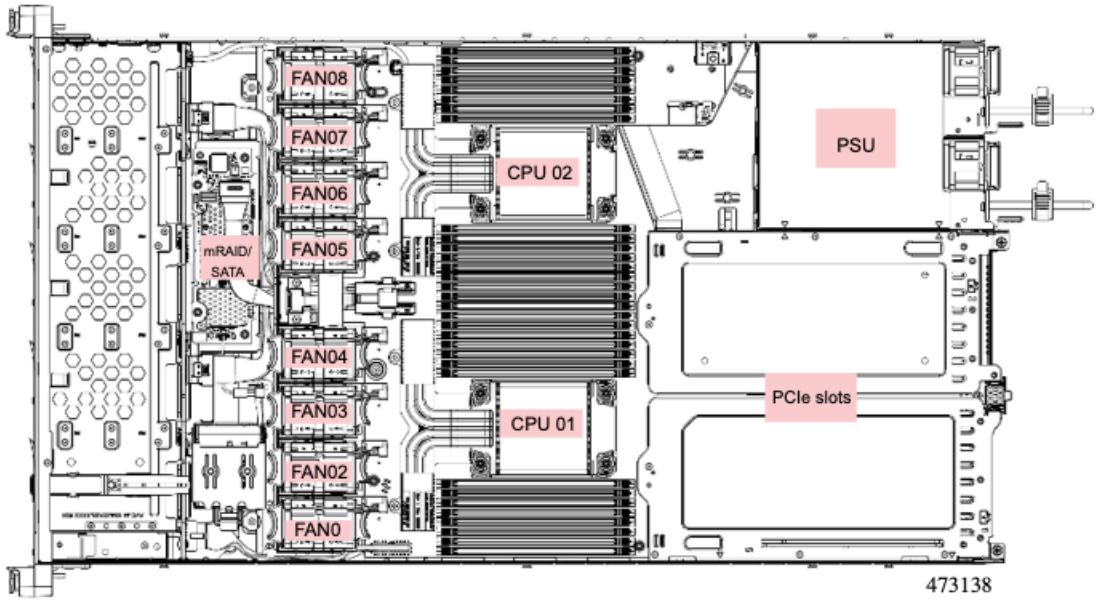
Step 3 Install a new card:

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

2	Two pegs on inner chassis wall	-	

Replacing a Chassis Intrusion Switch

The chassis intrusion switch in 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:

a) Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 12.

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 7.

Step 2 Remove an existing intrusion switch:

a) Disconnect the intrusion switch cable from the socket on the motherboard.

b) Use a #1 Phillips-head screwdriver to loosen and remove the single screw that holds the switch mechanism to the chassis wall.

c) Slide the switch mechanism straight up to disengage it from the clips on the chassis.

Step 3 Install a new intrusion switch:

a) Slide the switch mechanism down into the clips on the chassis wall so that the screwhole lines up.

b) Use a #1 Phillips-head screwdriver to install the single screw that secures the switch mechanism to the chassis wall.

c) 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 12.

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 7.

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.

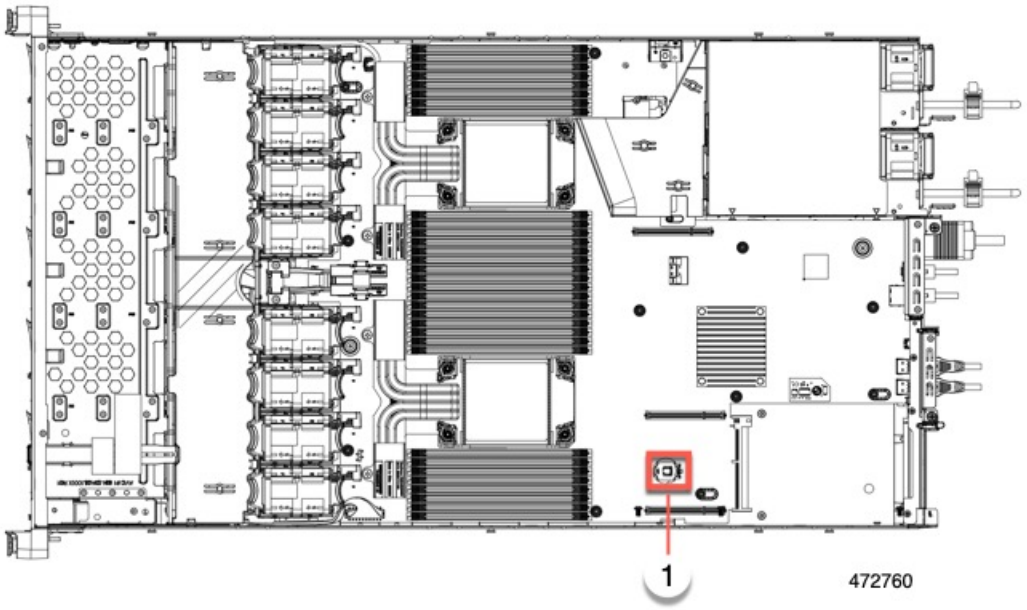
Step 2 Install a new RTC battery:

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	-	

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 12.
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 7.

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 76 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 120.

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 121.

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.

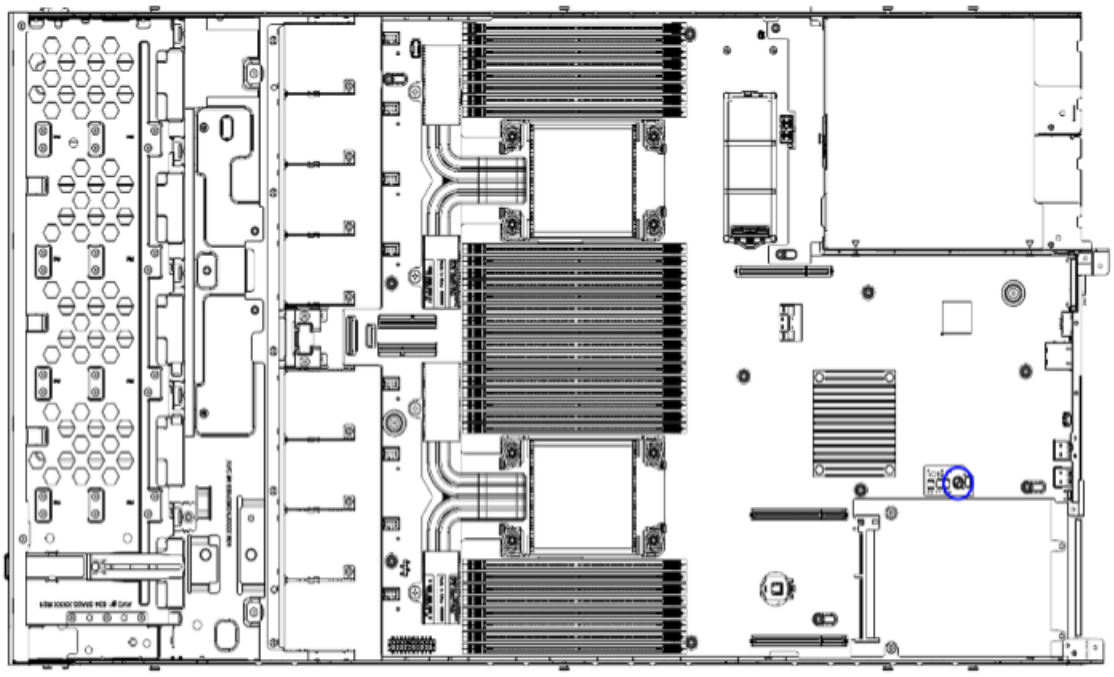
To remove the TPM, the following requirements must be met for the server:

- 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 7.

Step 1 Locate the TPM module.

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

Figure 30: Screw Location for Removing the TPM Module



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

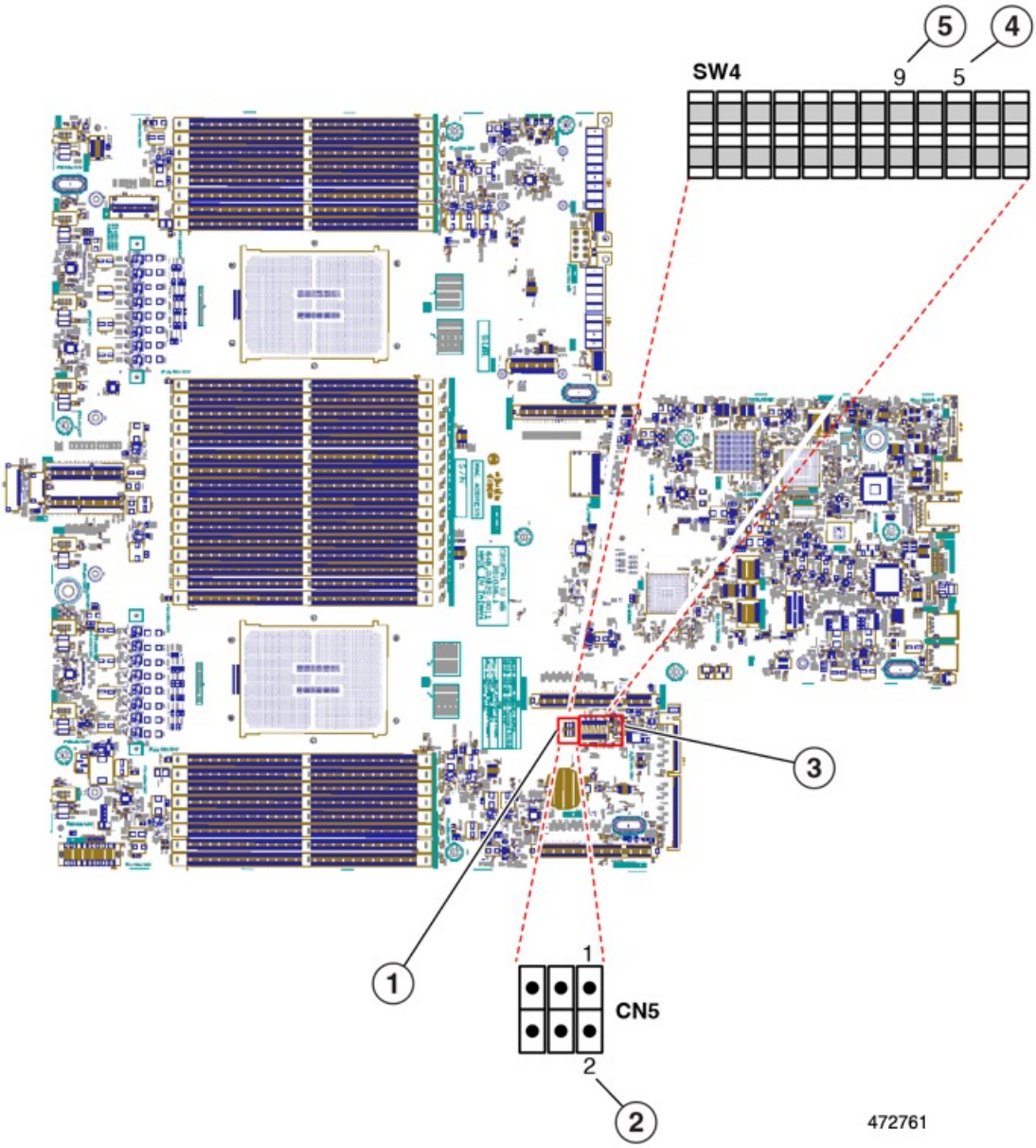
Remove the PCBA. See Recycling the Main Motherboard PCB Assembly (PCBA).

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:

Figure 31: Location of Service Header Blocks SW4 and CN5



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 123.

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 12.

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 7.

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 123.

Step 1 Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 12. 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 7.

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 123.

Step 1 Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 12. 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 7.

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.