Maintaining the Server

This chapter contains the following topics:

Status LEDs and Buttons

This section contains information for interpreting LED states.
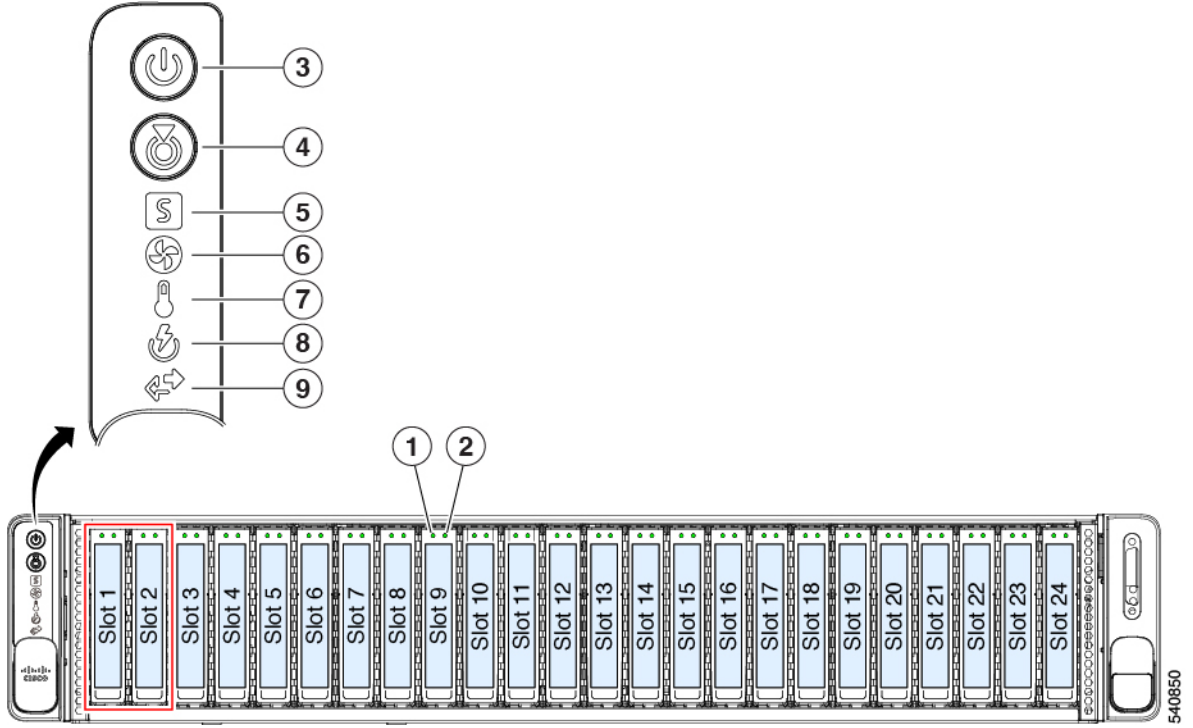
Front-Panel LEDs

Figure 1: Front Panel LEDs

Table 1: Front Panel LEDs, Definition of States

	LED Name	States
1 **SAS**	SAS/SATA drive fault **Note** NVMe solid state drive (SSD) drive tray LEDs have different behavior than SAS/SATA drive trays.	• Off—The hard drive is operating properly (no fault). • Amber—Drive fault detected. • Amber, blinking—The device is rebuilding. • Amber, blinking with one-second interval—Drive locate function activated in the software.
2 **SAS**	SAS/SATA drive activity LED	• Off—There is no hard drive in the hard drive tray (no access, no fault). • Green—The hard drive is ready. • Green, blinking—The hard drive is reading or writing data.

1 NVMe	NVMe SSD drive fault **Note** NVMe solid state drive (SSD) drive tray LEDs have different behavior than SAS/SATA drive trays.	• Off—The drive is not in use and can be safely removed. • Green—The drive is in use and functioning properly. • Green, blinking—the driver is initializing following insertion, or the driver is unloading following an eject command. • Amber—The drive has failed. • Amber, blinking—A drive Locate command has been issued in the software.
2 NVMe	NVMe SSD activity	• Off—No drive activity. • Green, blinking—There is drive activity.
3	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.
4	Unit identification	• Off—The unit identification function is not in use. • Blue—The unit identification function is activated.

5	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, Blinking—The server is experiencing a critical fault. For example:
		
		    • Boot Failure
		
		    • Fatal Processor and/or bus error detected
		
		    • Loss of I/O
		
		    • Over Temperature Condition

6	Fan status	• Green—All fan modules are operating properly. • Amber—Fans are operating in a degraded state. For example, one of the fans has a fault. • Amber, blinking—Two or more fan modules have a fault.
7	Temperature status	• Green—The server is operating at normal temperature, or the temperature sensor detects no error conditions. • Amber, steady—One or more temperature sensors breached a warning threshold. • Amber, blinking—One or more temperature sensors breached a critical threshold.
8	Power supply status	• Green—All power supplies are operating normally, and no error condition is detected. • 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.

9	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 on any of the links. • Green, blinking—One or more Ethernet LOM ports are link-active, with activity.

Rear-Panel LEDs

Figure 2: Rear Panel LEDs
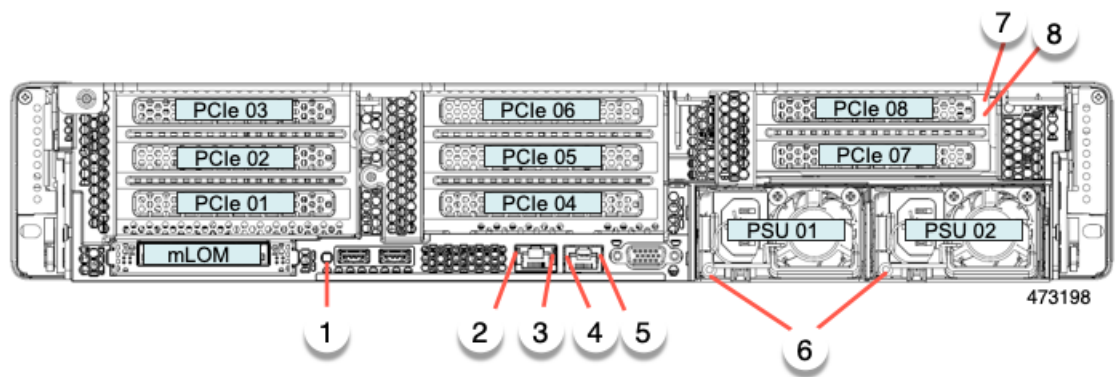
Table 2: Rear Panel LEDs, Definition of States

	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 up. • Green, blinking—Link us up, and traffic is present on the link.

6	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 supply (UCSC-PSUV2-1050DC):** • 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).
7 **SAS**	SAS/SATA drive fault **Note** NVMe solid state drive (SSD) drive tray LEDs have different behavior than SAS/SATA drive trays.	• Off—The hard drive is operating properly. • Amber—Drive fault detected. • Amber, blinking—The device is rebuilding. • Amber, blinking with one-second interval—Drive locate function activated in the software.
8 **SAS**	SAS/SATA drive activity LED	• Off—There is no hard drive in the hard drive tray (no access, no fault). • Green—The hard drive is ready. • Green, blinking—The hard drive is reading or writing data.

7 NVMe	NVMe SSD drive fault	• Off—The drive is not in use and can be safely removed.
	Note NVMe solid state drive (SSD) drive tray LEDs have different behavior than SAS/SATA drive trays.	• Green—The drive is in use and functioning properly.
		• Green, blinking—the driver is initializing following insertion, or the driver is unloading following an eject command.
		• Amber—The drive has failed.
		• Amber, blinking—A drive Locate command has been issued in the software.
8 NVMe	NVMe SSD activity	• Off—No drive activity.
		• Green, blinking—There is drive activity.

Internal Diagnostic LEDs

The server has internal fault LEDs for CPUs, DIMMs, and fan modules at the base of the CPUs, DIMMs, and fan modules.

1	Fan module fault LEDs (one on the top of each fan module)
	
	 • 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.
		-	

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 (used during CPU or heatsink replacement)

- #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, you must disconnect all power cords from the power supplies in the server, as directed in the service procedures.

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 the Server 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 about one-half inch (1.27 cm) 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 3: Removing the Top Cover
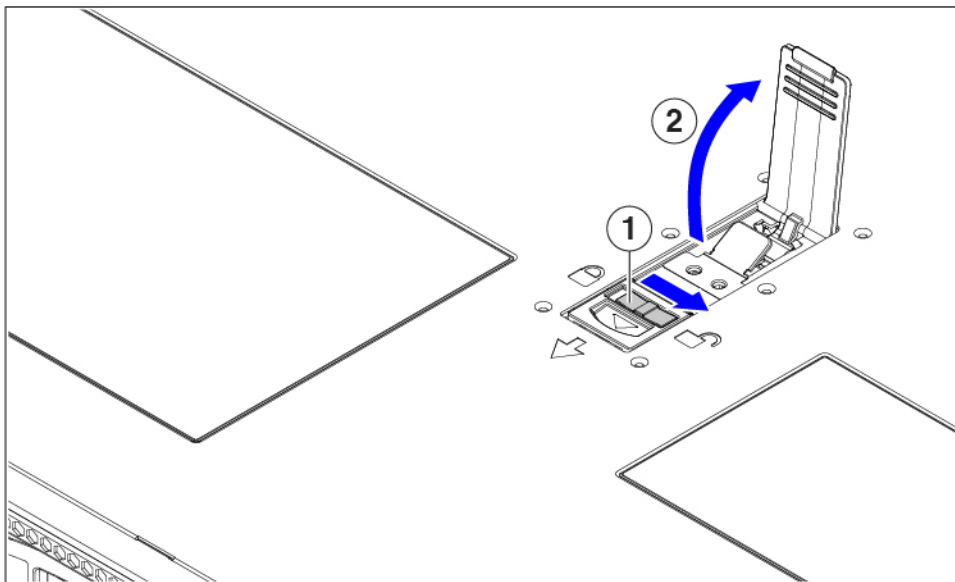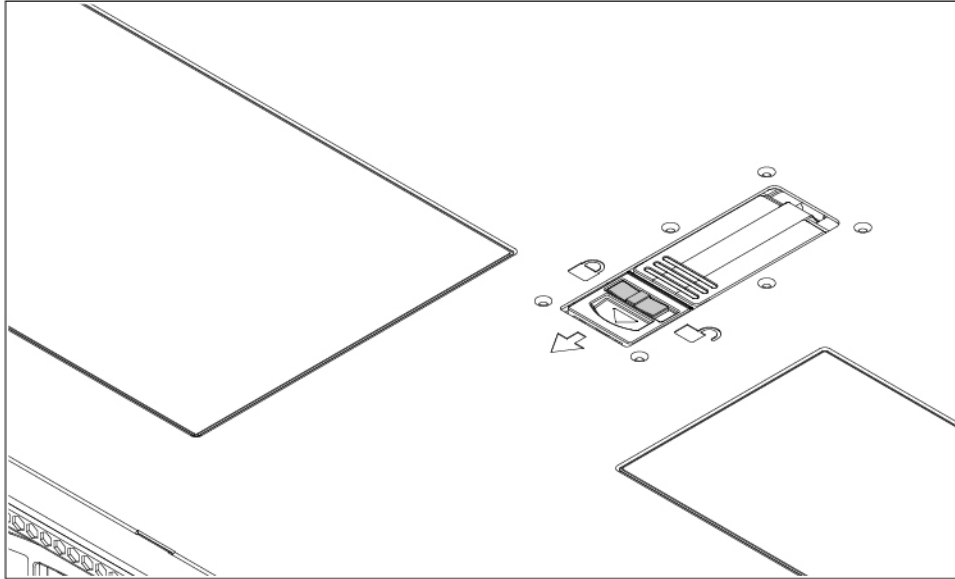
1	Cover lock	2	Cover latch handle

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 the Server Top Cover, on page 9.

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

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.

The server has two different revisions of airduct (A0 and B0) with subtle differences.

Note   You might be able to find the revision on packaging, such as an ESD bag, or on a label on the air duct (if present).

To help you identify each revision of air duct, compare the illustrations that follow.

- One air duct (UCSC-GPUAD-C240M7= Rev A0) is used for servers populated with Intel Fourth Generation Xeon Scalable Processors. In the following illustrations, notice the lower mesh on the front of the air duct and the legs at the rear of the air duct, which are different from the Rev B0 air duct. Also, the front wall (not pictured) is different from the Rev B0 air duct.

Note   The A0 air duct will be phased out so that only the B0 air duct will be available.

Figure 4: Air Duct for Intel Fourth Generation Xeon Scalable Processors (Rev A0), Front View

481367

Figure 5: Air Duct for Intel Fourth Generation Xeon Scalable Processors (Rev A0), Rear View

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- One air duct UCSC-GPUAD-C240M7= Rev B0 is required for servers that have Intel Fifth Generation Xeon Scalable Processors.

  - By default, this air duct is pre-installed at the factory for new servers with Intel Fifth Generation Xeon Scalable Processors.

  - This air duct is required if you will be upgrading your server from Intel Fourth Generation Xeon Scalable Processors to Intel Fifth Generation Xeon Scalable Processors.

  - When upgrading to Intel Fifth Generation Xeon Scalable Processors, you must order the Rev B0 air duct from Cisco.

In the following illustrations, notice the lower mesh on the front of the air duct and the legs at the rear of the air duct, which are different from the Rev A0 air duct. Also, the front wall (not pictured) is different from the Rev A0 air duct.
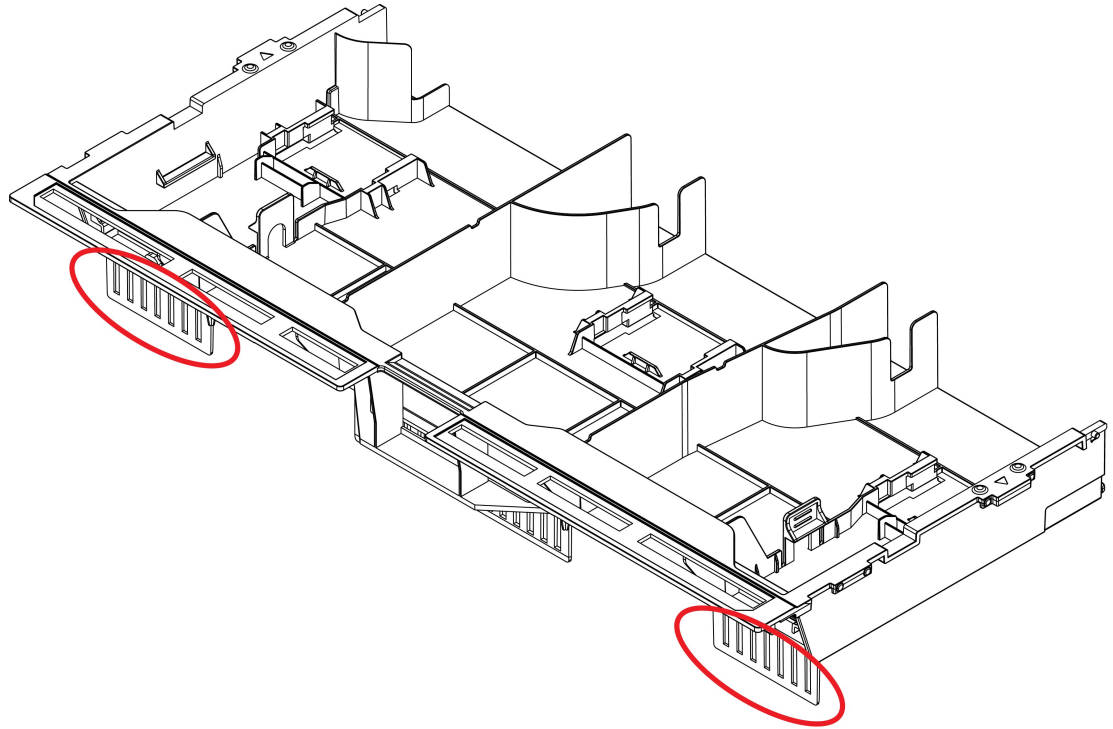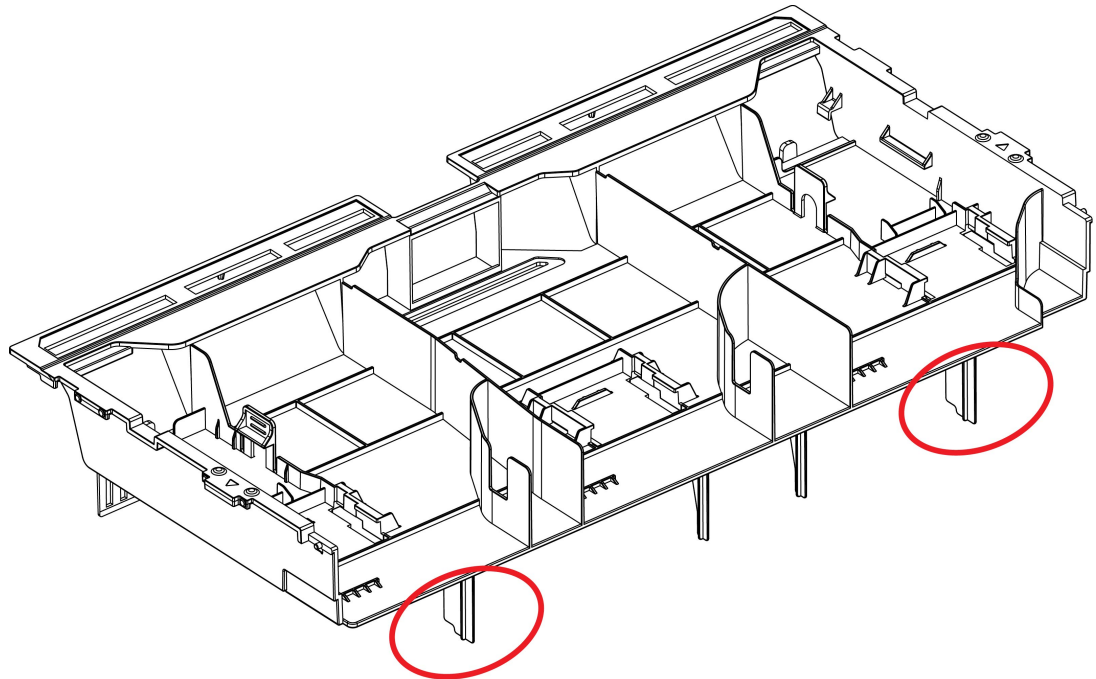
Figure 6: Air Duct for Intel Fifth Generation Xeon Scalable Processors, Front View

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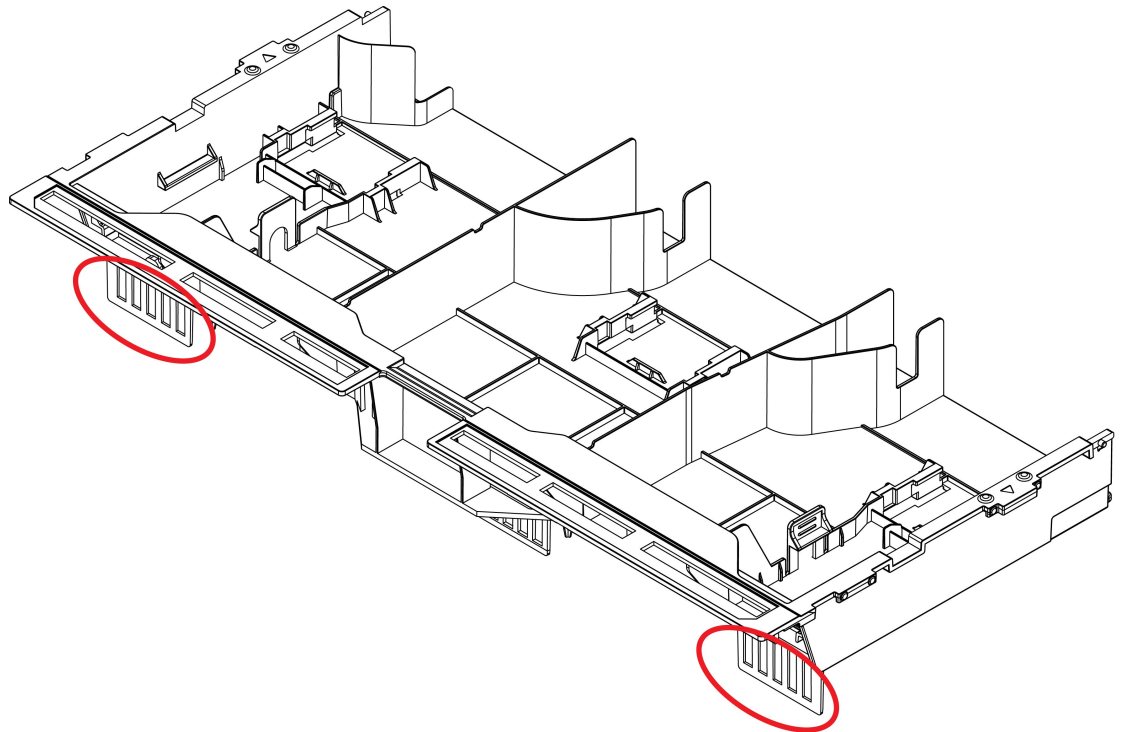*Figure 7: Air Duct for Intel Fifth Generation Xeon Scalable Processors, Rear View*
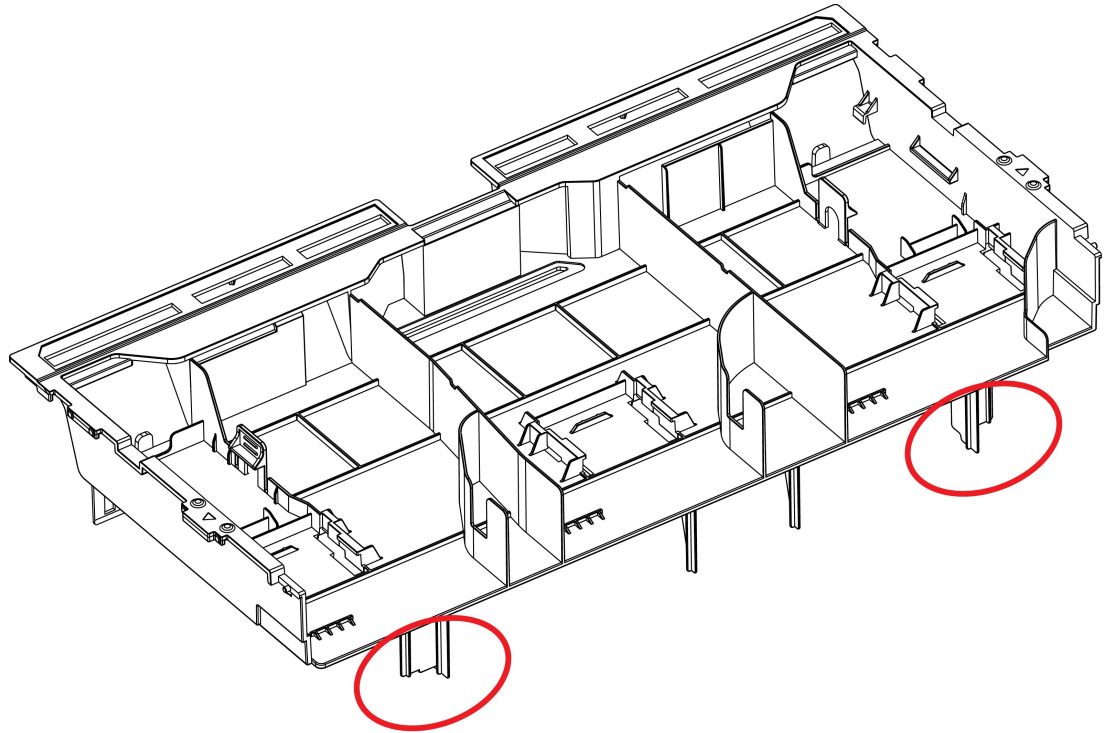
481368

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

Removing the Air Duct

Use this procedure to remove the air duct when needed.

Note   Your air duct might be somewhat different than shown in this topic based on its revision level (A0 or B0), but the overall procedure is applicable.

Before you begin

The air duct has triangular alignment features that match with similar features on the sidewall of the server. Notice their locations. You will use them to aid reinstalling the air duct.

Step 1   Remove the server top cover.

Step 2   Locate the detents for the air duct.

The following illustration shows the locations of the detents. You can use them to grasp the air duct. When removing the air duct, always grasp the detents closest to the chassis sidewalls (left and right).
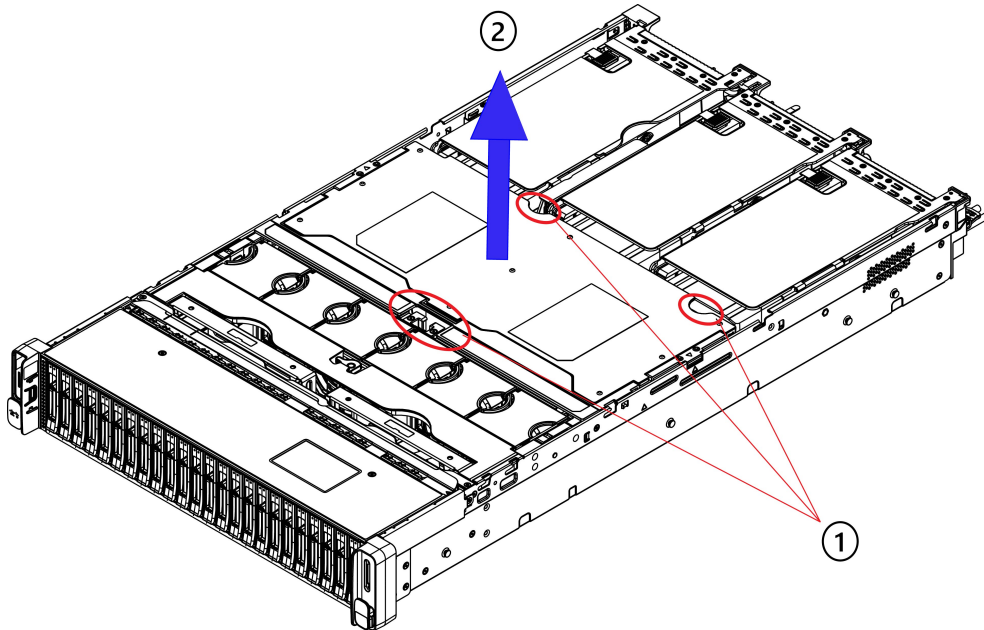
Step 3   Grasp the left and right detent then lift the air duct out of the chassis.

    Note   You might need to slide the air duct towards the 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

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

Step 1   Orient the air duct as shown.

Step 2   Match the alignment features on each side of the air duct with their corresponding feature on the chassis sidewall.

    Note   Also, notice that the sheetmetal of the chassis wall has notches that accept the tabs on the air duct.

Step 3   Lower the air duct into place and gently press down to ensure that all of its edges sit flush.

If the air duct is not seated correctly, it can obstruct installing the server's top cover.
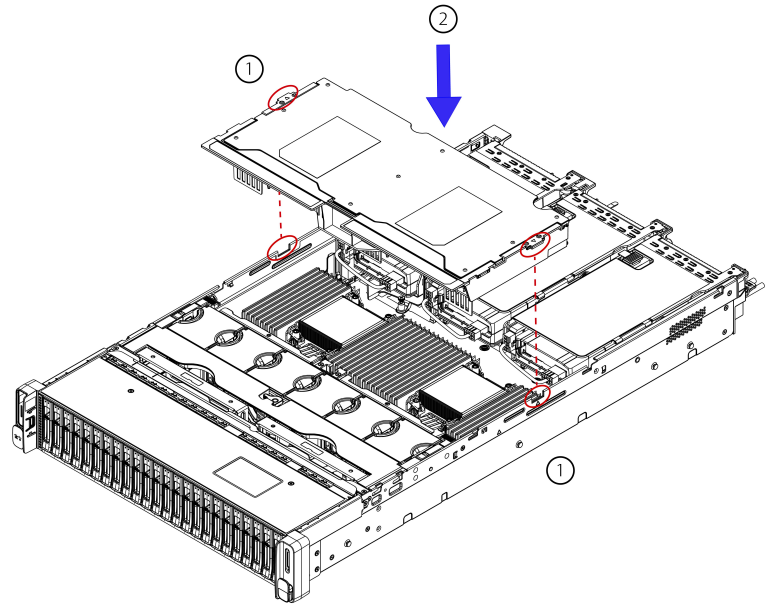
481377

Step 4 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.

Removing and Replacing Components

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

Statement 1029

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

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

This section describes how to install and replace server components.

Serviceable Component Locations

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

Figure 8: Cisco UCS C240 M7 Server, Serviceable Component Locations

1	Front-loading drive bays.	2	Cooling fan modules (six, hot-swappable)
3	DIMM sockets on motherboard (16 per CPU) See DIMM Population Rules and Memory Performance Guidelines , on page 52 for DIMM slot numbering. **Note** An air baffle rests on top of the DIMM and CPUs when the server is operating. The air baffle is not displayed in this illustration.	4	CPU socket 2
5	CPU socket 1	6	M.2 RAID Controller

7	PCIe riser 3 (PCIe slots 7 and 8 numbered from bottom to top), with the following options: • 3A (Default Option)—Slot 7 (x24 mechanical, x8 electrical, Gen 4) Slot 8 (x16 mechanical, x8 electrical, Gen 4) • 3B (Storage Option)—Slots 7 and 8, both support x4 electrical, Gen 4. Both slots can accept universal SFF HDDs or NVMe SSDs. • 3C (GPU Option)—Slot 7 (x24 mechanical, x16 electrical). Slot 7 can support a full height, full length GPU card.	8	PCIe riser 2 (PCIe slots 4, 5, 6 numbered from bottom to top), with the following options: • 2A (Default Option)—Slot 4 (x24 mechanical, x8 electrical, Gen 4. NCSI is supported on one slot at a time. Supports a full height, ¾ length card. Slot 5 (x24 mechanical, x16 electrical, Gen 4). NCSI is supported on one slot at a time. Supports one full height, full length card. Slot 6 (x16 mechanical, x8 electrical, Gen 4). Supports a full height, full length card. • 2C— Slots 4 (x24 mechanical, x16 electrical, Gen 5) NCSI supported on one slot at a time. Supports a full-height, full-length card. Slot 5 (x24 mechanical, x16 electrical Gen 5) Supports full-height, full-length drive.
9	PCIe riser 1 (PCIe slot 1, 2, 3 numbered bottom to top), with the following options: • 1A (Default Option)—Slot 1 (x24 mechanical, x8 electrical, Gen 4) NCSI is supported on one slot at a time. Supports full height, ¾ length card. Slot 2 (x24 mechanical, x16 electrical, Gen 4). NCSI is supported on one slot at a time. Supports full height, full length GPU card. Slot 3 (x16 mechanical, x8 electrical, Gen 4) Supports full height, full length card. • 1B (Storage Option)—Slot 1 supports an M.2 NVMe RAID card Slot 2 (x4 electrical), supports universal 2.5-inch HDD NVMe drive Slot 3 (x4 electrical), supports universal 2.5-inch HDD NVMe drive • 1C — (x24 mechanical, x16 electrical, Gen 5) NCSI supported on one slot at a time. Supports a full-height, ¾-length card. Slot 2 (x24 mechanical, x16 electrical, Gen 5) Supports a full-height, full-length card.	-	

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 Front-Loading SAS/SATA 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 rear-loading SAS/SATA drives, see Replacing Rear-Loading SAS/SATA Drives, on page 23.

Front-Loading SAS/SATA Drive Population Guidelines

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

- Cisco UCS C240 M7 24 SAS/SATA—Small form-factor (SFF) drives, with 24-drive backplane.

  - Front-loading drive bays 1—24 support 2.5-inch SAS/SATA/U.3 drives.

  - Optionally, front-loading drive bays 1 through 4 can support 2.5-inch NVMe SSDs.

- Cisco UCS C240 M7 24 NVMe—SFF drives, with 24-drive backplane.

  - Front-loading drive bays 1—24 support 2.5-inch NVMe PCIe SSDs *only*.

Drive bay numbering is shown in the following figures.

Figure 9: Small Form-Factor Drive (24-Drive) Versions, Drive Bay Numbering
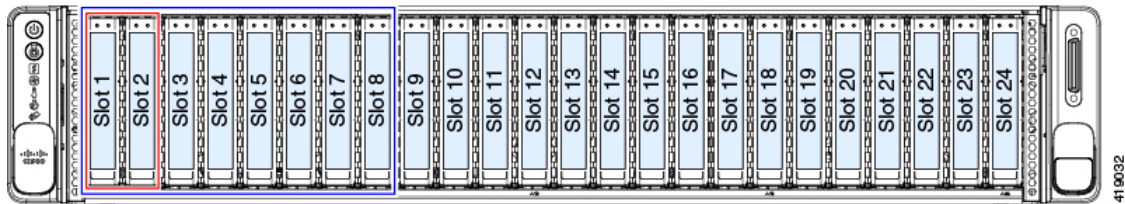
Observe these drive population guidelines for optimum performance:

- When populating drives, add drives to the lowest-numbered bays first.

> ✎ **Note** For diagrams of which drive bays are controlled by particular controller cables on the backplane, see Storage Controller Cable Connectors and Backplanes.

- Front-loading drives are hot pluggable, but each drive requires a 10 second delay between hot removal and hot insertion.

- 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.

4K Sector Format SAS/SATA Drives Considerations

- You must boot 4K sector format drives in UEFI mode, not legacy mode. See the procedures in this section.

- Do not configure 4K sector format and 512-byte sector format drives as part of the same RAID volume.

- For operating system support on 4K sector drives, see the interoperability matrix tool for your server: Hardware and Software Interoperability Matrix Tools

Setting Up UEFI Mode Booting in the BIOS Setup Utility

Step 1 Enter the BIOS setup utility by pressing the **F2** key when prompted during bootup.

Step 2 Go to the **Boot Options** tab.

Step 3 Set **UEFI Boot Options** to **Enabled**.

Step 4 Under **Boot Option Priorities**, set your OS installation media (such as a virtual DVD) as your **Boot Option #1**.

Step 5 Go to the **Advanced** tab.

Step 6 Select **LOM** and **PCIe Slot Configuration**.

Step 7 Set the **PCIe Slot ID: HBA Option ROM** to **UEFI Only**.

Step 8 Press **F10** to save changes and exit the BIOS setup utility. Allow the server to reboot.

Step 9 After the OS installs, verify the installation:

   a) Enter the BIOS setup utility by pressing the **F2** key when prompted during bootup.
   b) Go to the Boot Options tab.
   c) Under **Boot Option Priorities**, verify that the OS you installed is listed as your **Boot Option #1**.

Setting Up UEFI Mode Booting in the Cisco IMC GUI

Step 1 Use a web browser and the IP address of the server to log into the Cisco IMC GUI management interface.

Step 2 Navigate to **Server > BIOS**.

Step 3 Under Actions, click **Configure BIOS**.

Step 4 In the Configure BIOS Parameters dialog, select the **Advanced** tab.

Step 5 Go to the **LOM** and **PCIe Slot Configuration** section.

Step 6 Set the **PCIe Slot: HBA Option ROM** to **UEFI Only**.

Step 7 Click **Save Changes**. The dialog closes.

Step 8 Under BIOS Properties, set **Configured Boot Order** to **UEFI**.

Step 9 Under Actions, click **Configure Boot Order**.

Step 10 In the Configure Boot Order dialog, click **Add Local HDD**.

Step 11 In the Add Local HDD dialog, enter the information for the 4K sector format drive and make it first in the boot order.

Step 12   Save changes and reboot the server. The changes you made will be visible after the system reboots.

Replacing a Front-Loading SAS/SATA Drive

✎

| **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. |

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

Replacing Rear-Loading SAS/SATA 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.
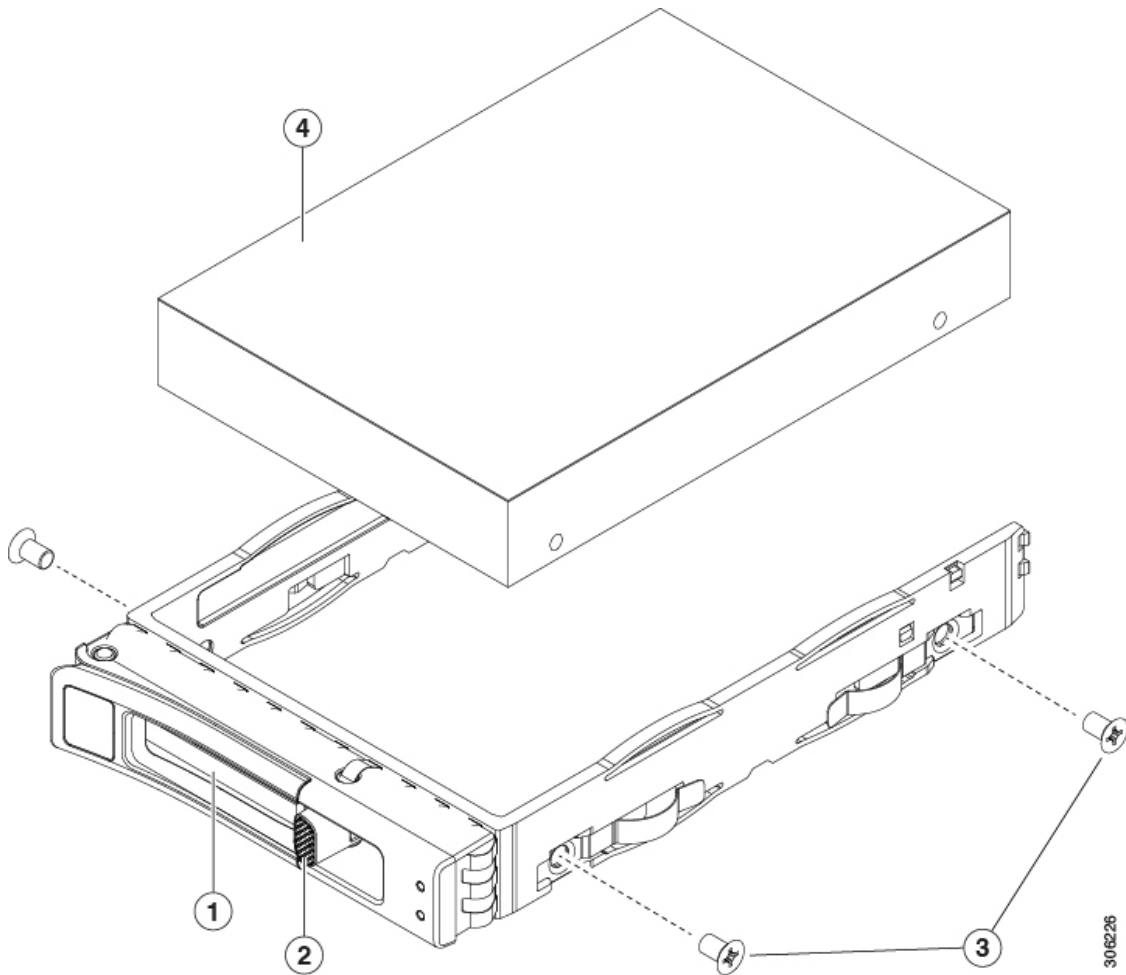
Rear-Loading SAS/SATA Drive Population Guidelines

The rear drive bay support differs by server PID and which type of RAID controller is used in the server:

- UCS C240 M7 24 SAS/SATA—Small form-factor (SFF) drives, with 24-drive backplane.

    - Hardware RAID—Rear drive bays support SAS or NVMe drives

    - Intel® Virtual RAID on CPU—Rear drive bays support NVMe drives only.

- UCSC240 M7 24 NVMe—SFF drives, with 24-drive backplane.

    - Rear drive bays support only NVMe SSDs.

- Rear bays are numbered bays 25 through 28. Drives are numbered 101 to 104 with drive 101 at the left bottom, 102 at the left top, drive 103 at the right bottom, and 104 at the right top positions.

- 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 Rear-Loading SAS/SATA Drive

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.

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 11: Replacing a Drive in a Drive Tray
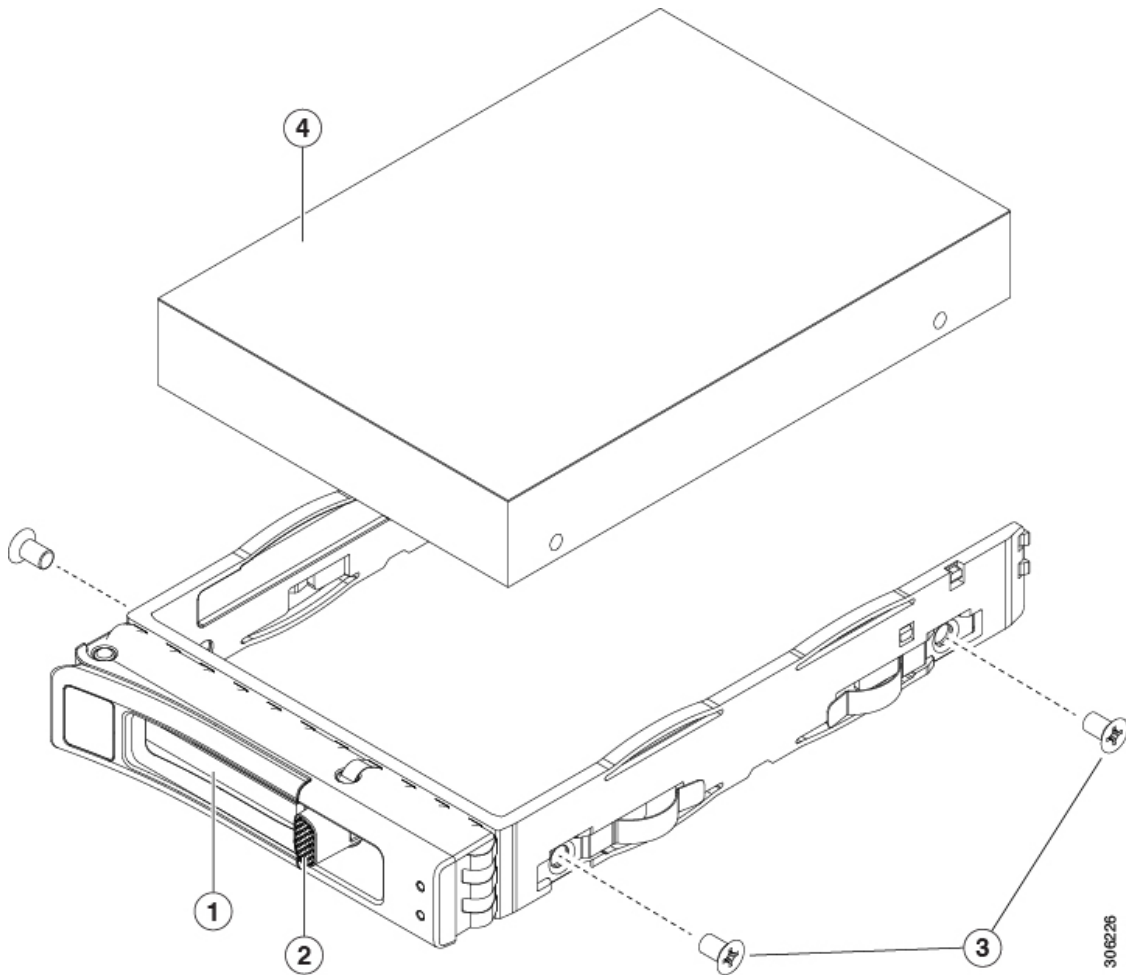
1	Ejector lever	**3**	Drive tray screws (two on each side)
2	Release button	**4**	Drive removed from drive tray

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 hotplug 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 26.

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:
a) For a front-loading drive, see Replacing a Front-Loading SAS/SATA Drive, on page 22
b) For a rear-loading drive, see Replacing a Rear-Loading SAS/SATA Drive, on page 24

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 Front-Loading NVMe SSDs

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 front drive bay support for 2.5-inch NVMe SSDs differs by server PID:

- UCS C240 M7 SFF 24 SAS/SATA—Small form-factor (SFF) drives, with 24-drive backplane. Drive bays 1 and 4 support 2.5-inch U.3 NVMe SSDs.

- UCS C240 M7 24 NVMe—SFF drives, with 24-drive backplane. Drive bay 1 - 24 support *only* 2.5-inch U.3 NVMe SSDs.

Front-Loading NVME SSD Requirements and Restrictions

Observe these requirements:

- The server must have two CPUs. PCIe riser 2 is not available in a single-CPU system.

- PCIe cable. This is the cable that carries the PCIe signal from the front-panel drive backplane to PCIe riser 1B or 3B. For small form factor (SFF) drive versions of the server, use CBL-NVME-C240SFF

- 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.

Observe these restrictions:

- NVMe 2.5 SSDs support booting only in UEFI mode. Legacy boot is not supported. For instructions on setting up UEFI boot, see Setting Up UEFI Mode Booting in the BIOS Setup Utility, on page 21 or Setting Up UEFI Mode Booting in the Cisco IMC GUI, on page 21.

- You cannot control NVMe PCIe SSDs with a SAS RAID controller because NVMe SSDs interface with the server via the PCIe bus.

- You can combine NVMe SSDs in the same system, but the same partner brand must be used. For example, two *Intel* NVMe SFF 2.5-inch SSDs and two *HGST* SSDs is an invalid configuration.

- UEFI boot is supported in all supported operating systems. Hot-insertion and hot-removal are supported in all supported operating systems except VMWare ESXi.

Enabling Hot-Plug Support in the System BIOS

Hot-plug (OS-informed hot-insertion and hot-removal) is disabled in the system BIOS by default.

- If the system was ordered with NVMe PCIe SSDs, the setting was enabled at the factory. No action is required.

- If you are adding NVMe PCIe SSDs after-factory, you must enable hot-plug support in the BIOS. See the following procedures.

Enabling Hot-Plug Support Using the BIOS Setup Utility

Step 1   Enter the BIOS setup utility by pressing the **F2** key when prompted during bootup.

Step 2   Navigate to **Advanced > PCI Subsystem Settings > NVMe SSD Hot-Plug Support**.

Step 3   Set the value to **Enabled**.

Step 4   Save your changes and exit the utility.

Enabling Hot-Plug Support Using the Cisco IMC GUI

Step 1   Use a browser to log in to the Cisco IMC GUI for the server.

Step 2   Navigate to **Compute > BIOS > Advanced > PCI Configuration**.

Step 3   Set NVME SSD Hot-Plug Support to **Enabled**.

Step 4   Save your changes.

Replacing a Front-Loading NVMe SSD

This topic describes how to replace 2.5- or 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.

Note   OS-informed hot-insertion and hot-removal must be enabled in the system BIOS. See Enabling Hot-Plug Support in the System BIOS, on page 28.

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 a PCIe cable with PCIe riser 2C. See Serviceable Component Locations.

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 12: Replacing a Drive in a Drive Tray
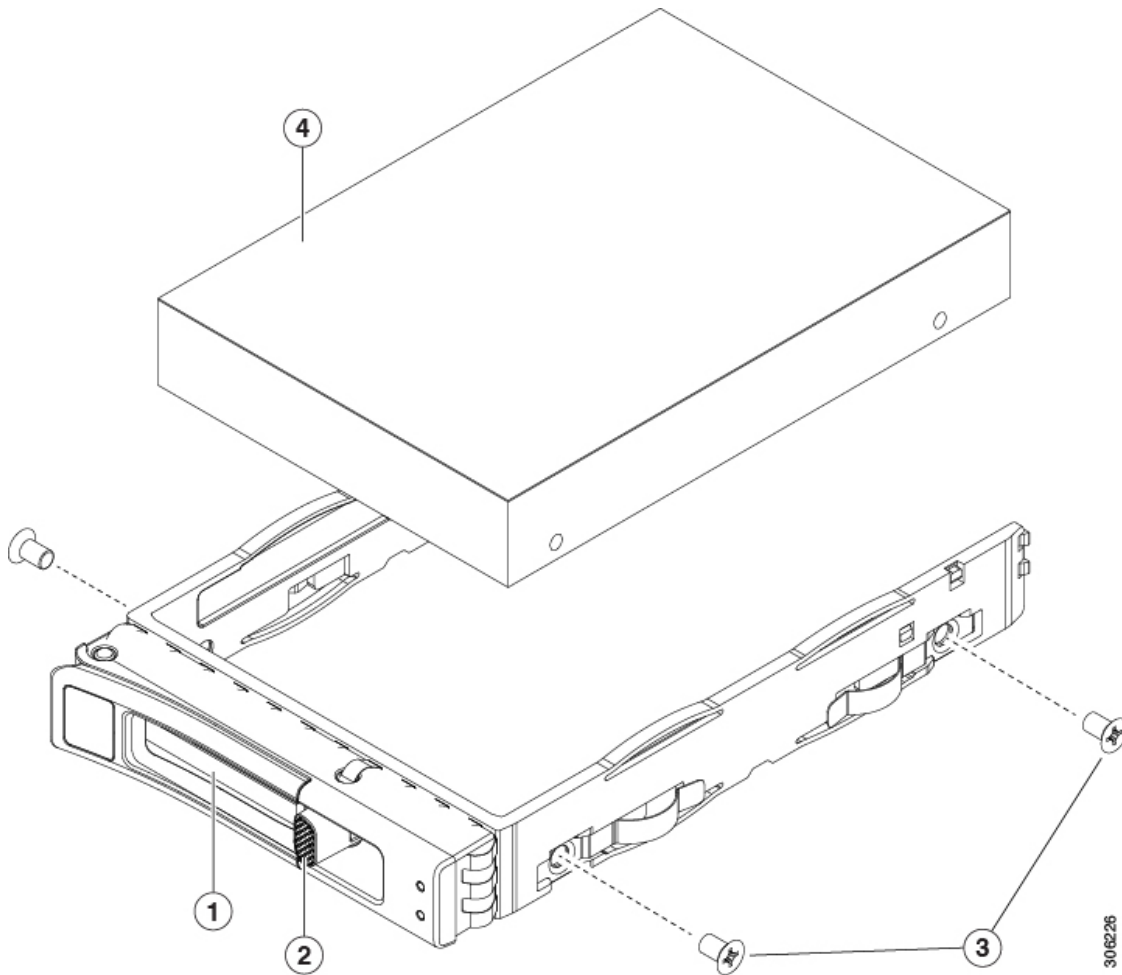
| 1 | Ejector lever | 3 | Drive tray screws (two on each side) |
| 2 | Release button | 4 | Drive removed from drive tray |

Replacing Rear-Loading NVMe SSDs

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

Rear-Loading NVMe SSD Population Guidelines

The rear drive bay support differs by server PID and which type of RAID controller is used in the server for non-NVMe drives:

- UCS C240 M7 24 SAS/SATA—Small form-factor (SFF) drives, with 24-drive backplane.

  - Hardware RAID—Rear drive bays support SAS or NVMe drives

- UCS C240 M7 24 NVMe—SFF drives, with 24-drive backplane.

    - Hardware RAID—Rear drive bays support \NVMe drives only

- For 24-drive servers, rear bays are numbered bays 101 through 104

- When populating drives, add drives to the lowest-numbered bays first.

- Drives are hot pluggable, but each drive requires a 10-second delay between hot removal and hot insertion.

- Keep an empty drive blanking tray in any unused bays to ensure proper airflow.

Rear-Loading NVME SSD Requirements and Restrictions

Observe these requirements:

- The server must have two CPUs. PCIe riser 2 is not available in a single-CPU system.

- PCIe riser 1B and 3B support NVMe rear drives.

- Rear PCIe cable and rear drive backplane.

- 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.

Observe these restrictions:

- NVMe SSDs support booting only in UEFI mode. Legacy boot is not supported. For instructions on setting up UEFI boot, see Setting Up UEFI Mode Booting in the BIOS Setup Utility, on page 21 or Setting Up UEFI Mode Booting in the Cisco IMC GUI, on page 21.

- You cannot control NVMe PCIe SSDs with a SAS RAID controller because NVMe SSDs interface with the server via the PCIe bus.

- You can combine NVMe 2.5-inch SSDs in the same system, but the same partner brand must be used. For example, two *Intel* NVMe SFF 2.5-inch SSDs and two *HGST* SSDs is an invalid configuration.

- 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 Rear-Loading NVMe SSD

This topic describes how to replace 2.5-inch form-factor NVMe SSDs in the rear-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.

Note OS-informed hot-insertion and hot-removal must be enabled in the system BIOS. See Enabling Hot-Plug Support in the System BIOS, on page 28.

Step 1 Remove an existing rear-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 rear-loading NVMe SSDs are being installed in the server, you must install PCIe riser 2B or 2C and a rear NVMe cable kit.

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 13: Replacing a Drive in a Drive Tray
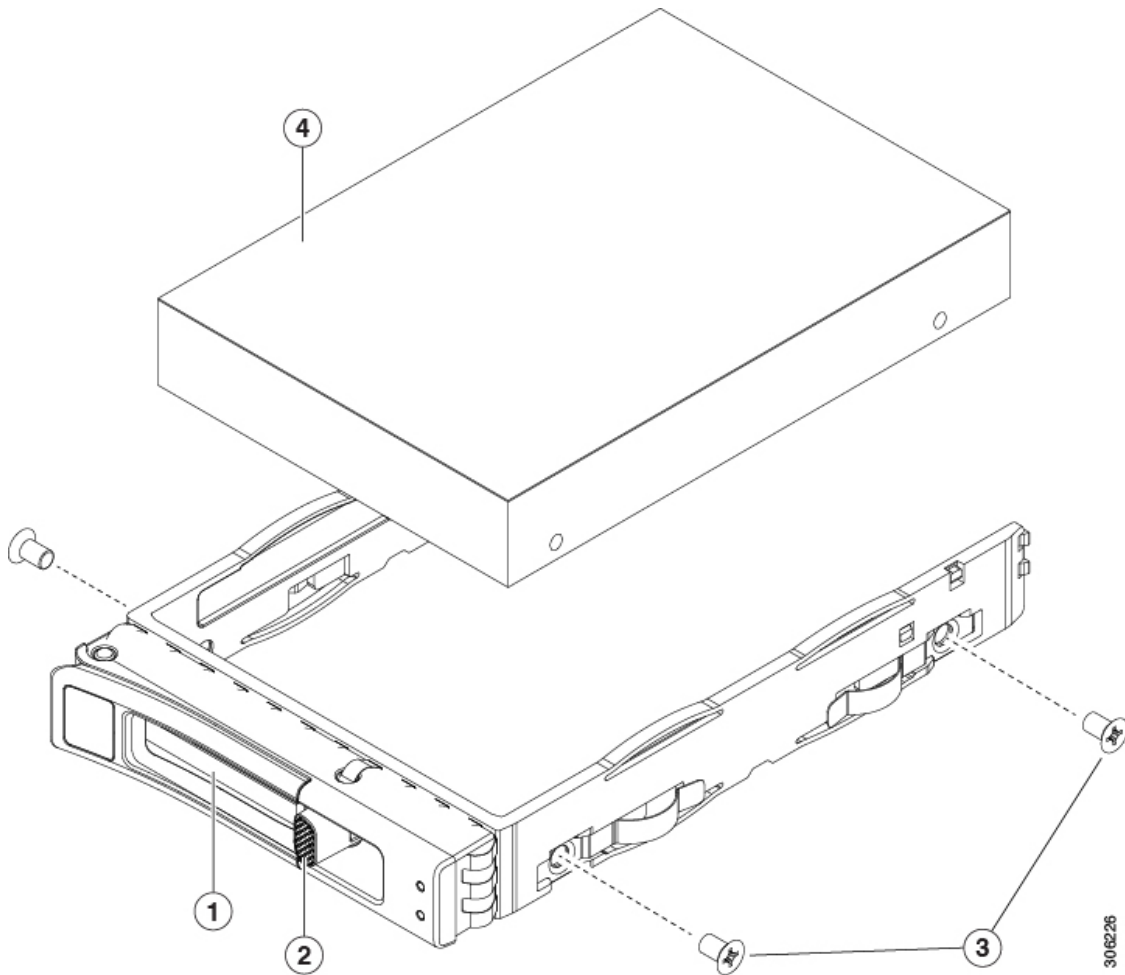
1	Ejector lever	3	Drive tray screws (two on each side)
2	Release button	4	Drive removed from drive tray

Replacing Fan Modules

The six fan modules in the server are numbered as shown in Serviceable Component Locations.

Tip There is a fault LED on the top of each fan module. 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 the Server Top Cover, on page 9.

c) Grasp and squeeze the fan module release latches on its top. 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.

Figure 14: Top View of Fan Module
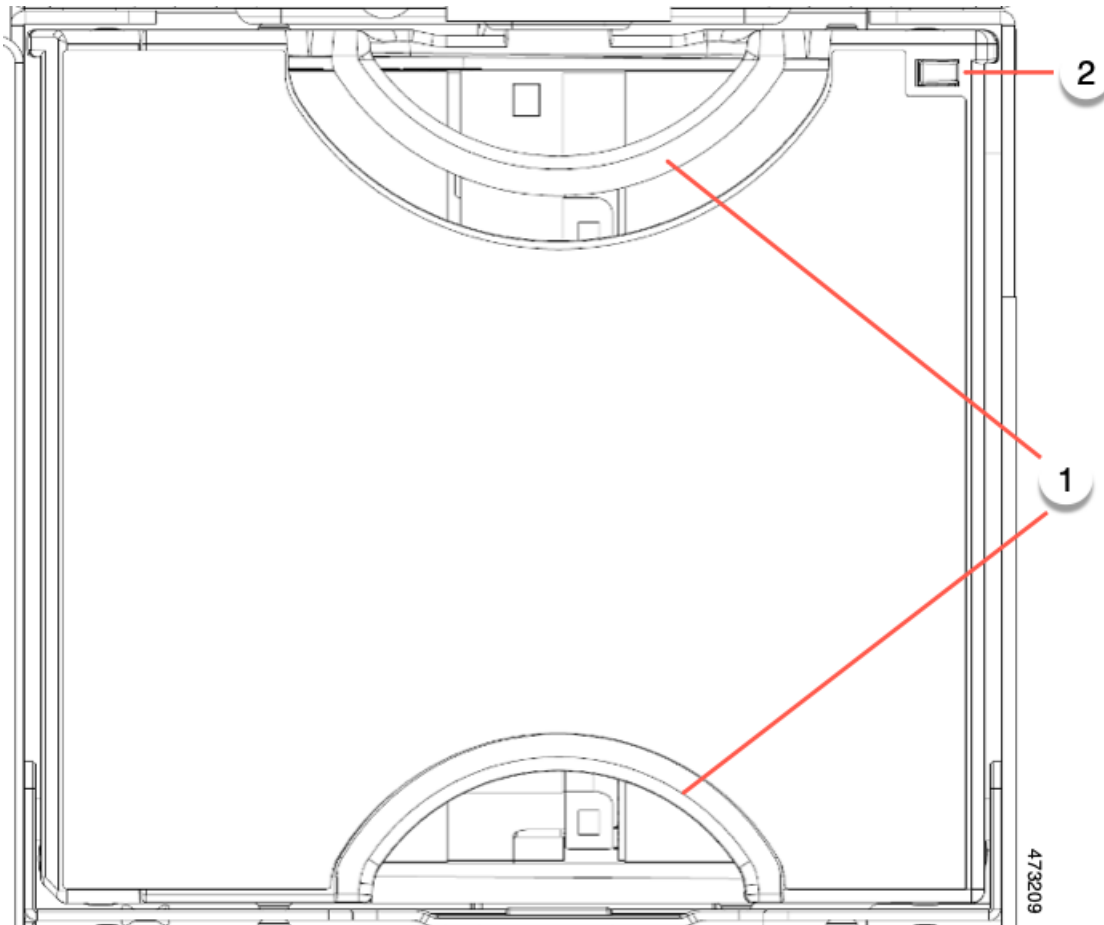
1	Fan module release latches	2	Fan module fault LED
			• Green—All fan modules are operating properly.
			• Amber—Fans are operating in a degraded state. For example, one or more of the fans has a fault.

Replacing the Fan Tray

The server has a fan tray that contains the 5 individual fans modules. Individual fan modules can be replaced, and the fan tray can also be completely removed if needed.

To remove individual fans, see Replacing Fan Modules, on page 33
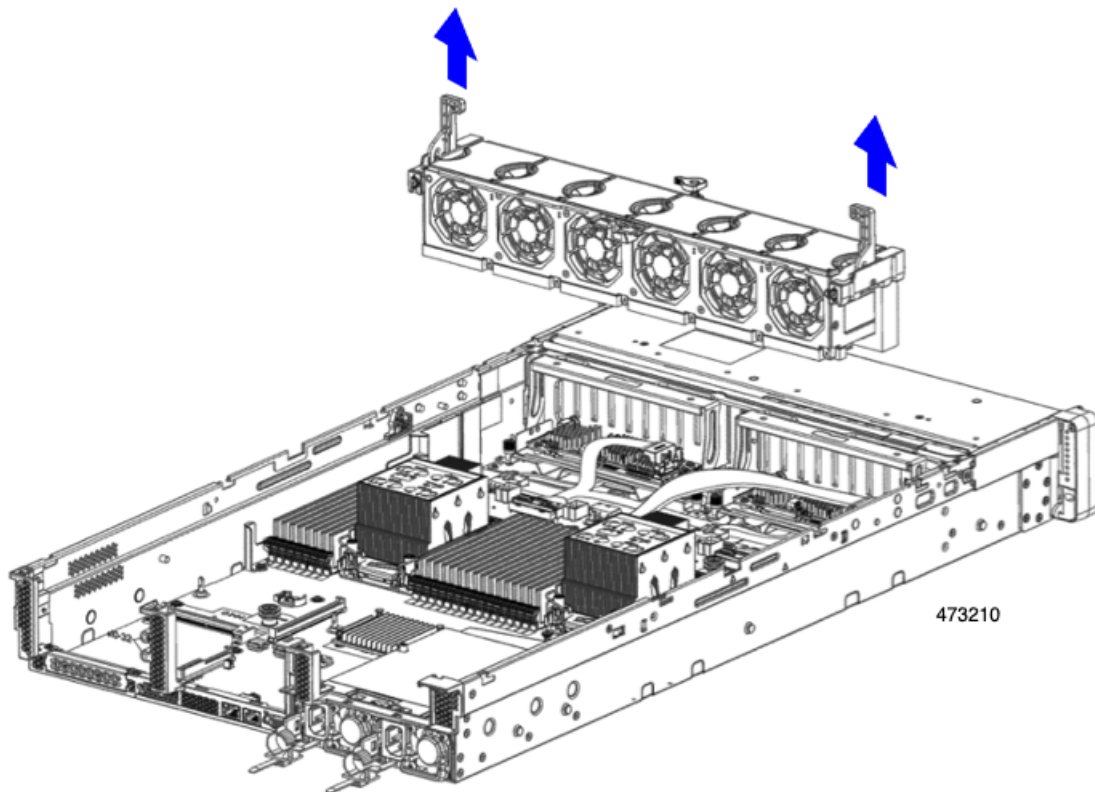
Use the following procedure to replace the fan tray.

　　• Removing the Fan Tray, on page 36

Removing the Fan Tray

The fan tray can be removed either with all fan modules in place, or when some, or all, of the fan modules have been removed.

Step 1   Rotate the tool-less middle lockdown screws that secure the fan tray to the chassis.

    a)   Locate the lockdown screws that secure the fan tray to the server.

    b)   Grasp the screws and rotate them a quarter of a turn (90 degrees) to loosen the screws.

Step 2   Unhinge the handle on both sides of the fan tray.

Step 3   Remove the fan tray from the server.

    a)   Grasp the handles at the top of the fan tray.

    b)   Holding the fan tray level, lift the fan tray up until it is removed from the chassis.

473210

What to do next

Reinsert the fan tray into the chassis. See Installing the Fan Tray, on page 37.

Installing the Fan Tray

You can install the fan tray with or without fans installed. Use the following procedure to install the fan tray.

Step 1 Install the fan tray.

a) Align the fan tray with the guides on the inside of the chassis.

b) Make sure that the system cable is organized on both sides and will not obstruct installation.

c) Holding the fan tray by the handles, slide it into place in the chassis.
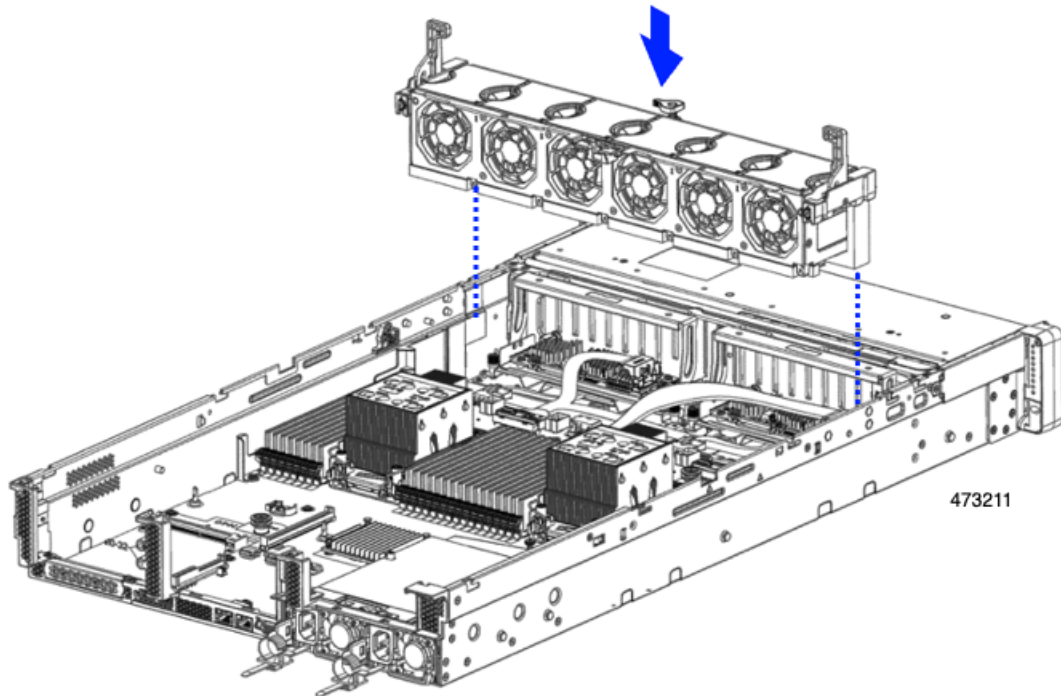
d) Push down and rotate the middle lockdown screw clockwise to lock the fan tray into the chassis receiving bracket.

Step 2 Close the top cover, or perform additional procedures, if needed.

Replacing CPUs and Heatsinks

This section contains the following topics:

CPU Configuration Rules

This server has two CPU sockets on the motherboard. Each CPU supports 8 DIMM channels (16 DIMM slots). See DIMM Population Rules and Memory Performance Guidelines , on page 52.

- Depending on the GPU installed in your server, a new GPU airduct (UCSC-GPUAD-C240M7=) might be required when you upgrade from Intel Xeon Fourth Generation CPUs (Sapphire Rapids) to Intel Xeon Fifth Generation CPUs (Emerald Rapids).

  - If the server has no GPU(s) that are >75W installed in the Sappire Rapids system, you can upgrade to Emerald Rapids CPUs and still use the existing GPU airduct.

    If the server has at least one GPU that is >75W installed in the Sapphrire Rapids system, you must install the new GPU airduct (UCSC-GPUAD-C240M7=) to upgrade to Sapphire Rapids CPUs.

- Fourth and Fifth Generation Intel Xeon Scalable Processors (Sapphire Rapids and Emerald Rapids CPUs, respectively) have the same physical dimensions, CPU alignment features, and use the same heatsinks, so field-replacement procedures are the same regardless of which generation of CPU is installed.

- 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 socket dust cover from the factory in place.

  - The maximum number of DIMMs is 16 (only CPU 1 channels A through H).

- Two different form factors exist for heatsinks, a low profile and a high profile. The server can be ordered with either, but you cannot mix high- and low-profile CPUs and heatsinks in the same server. A single server must have all of one type.

  The CPU and heatsink installation procedure is different depending on the type of heatsink used in your server.
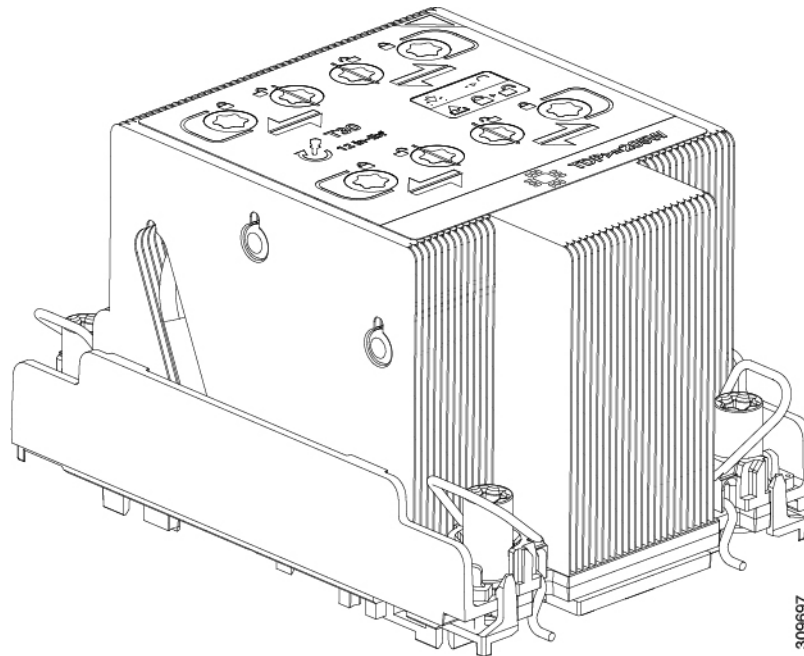
  - Low profile (UCSC-HSLP-C220M7), which has 4 T30 Torx screws on the main heatsink, and 2 Phillips-head screws on the extended heatsink.

    This heat sink is required for servers that contain one or more GPUs.
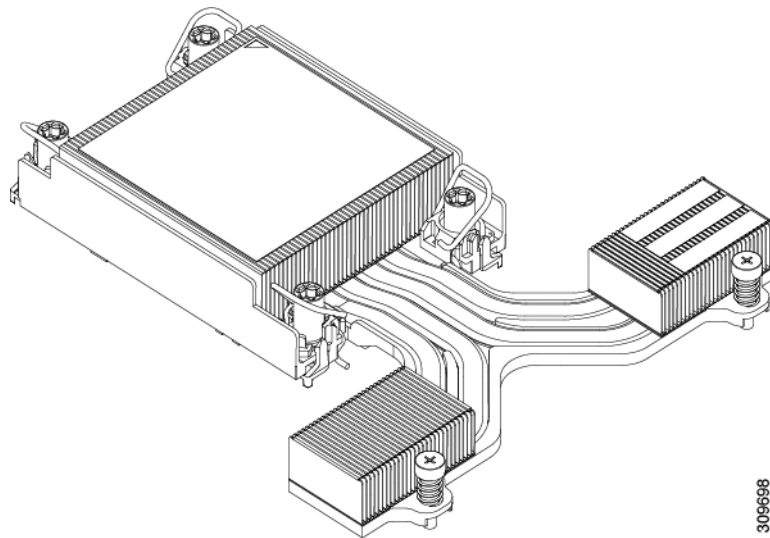
• High profile (UCSC-HSHP-240M7), which has 4 T30 Torx screws.

Tools Required For CPU Replacement

You need the following tools and equipment for this procedure:

• T-30 Torx driver—Supplied with replacement CPU.

• #1 flat-head screwdriver—Supplied with replacement CPU.

• 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

Removing CPUs and Heat Sinks

Use the following procedure to remove an installed CPU and heatsink from the blade 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 Choose the appropriate method to loosen the securing screws, based on the whether the CPU has a high-profile or low-profile heatsink.

- For a CPU with a high-profile heatsink, proceed to step a.

- For a CPU with a low-profile heatsink, skip to step 2.

a) Using a T30 Torx driver, loosen all the securing nuts.
b) Push the rotating wires towards each other to move them to the unlocked position.

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.

c) Grasp the CPU and heatsink along the edge of the carrier and lift the CPU and heatsink 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.

309415
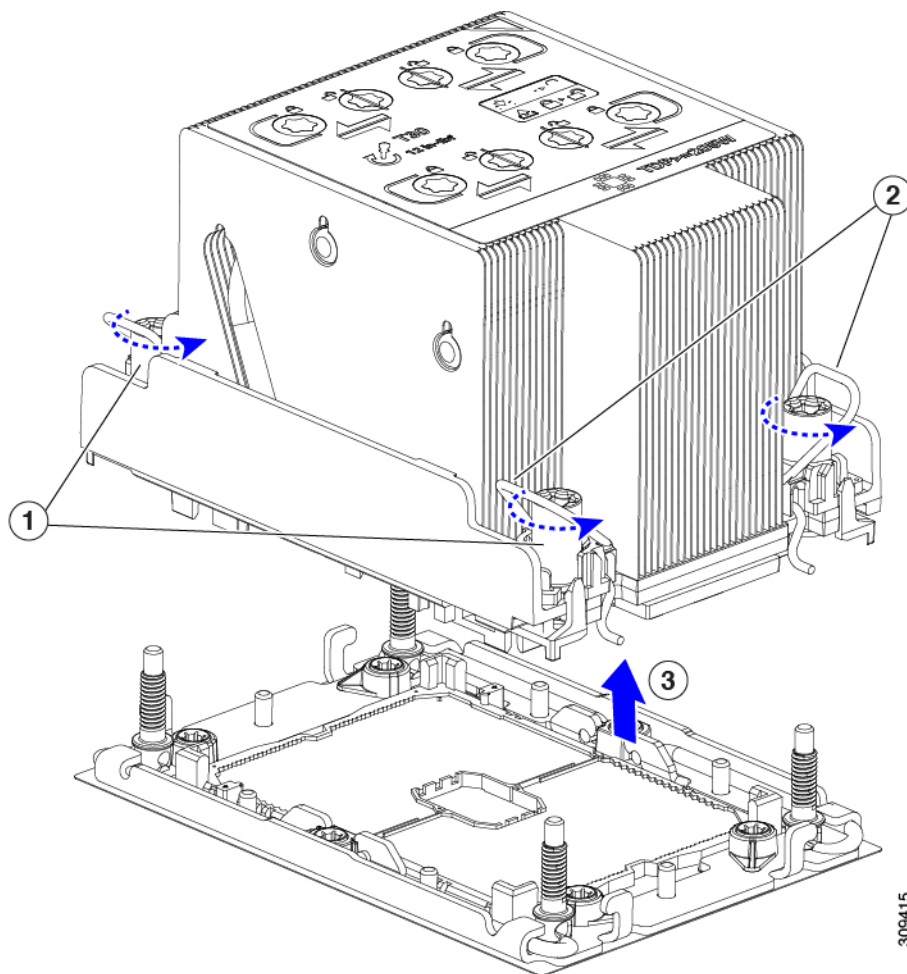
d) Go to step 3.

Step 2 Remove the CPU.

a) Using a #2 Phillips screwdriver, loosen the two Phillips head screws for the extended heatsink.

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

c) Push the rotating wires towards each other to move them to the unlocked position.

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 CPU and heatsink along the edge of the carrier and lift the CPU and heatsink 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.

e) Go to step 3.

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.

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!
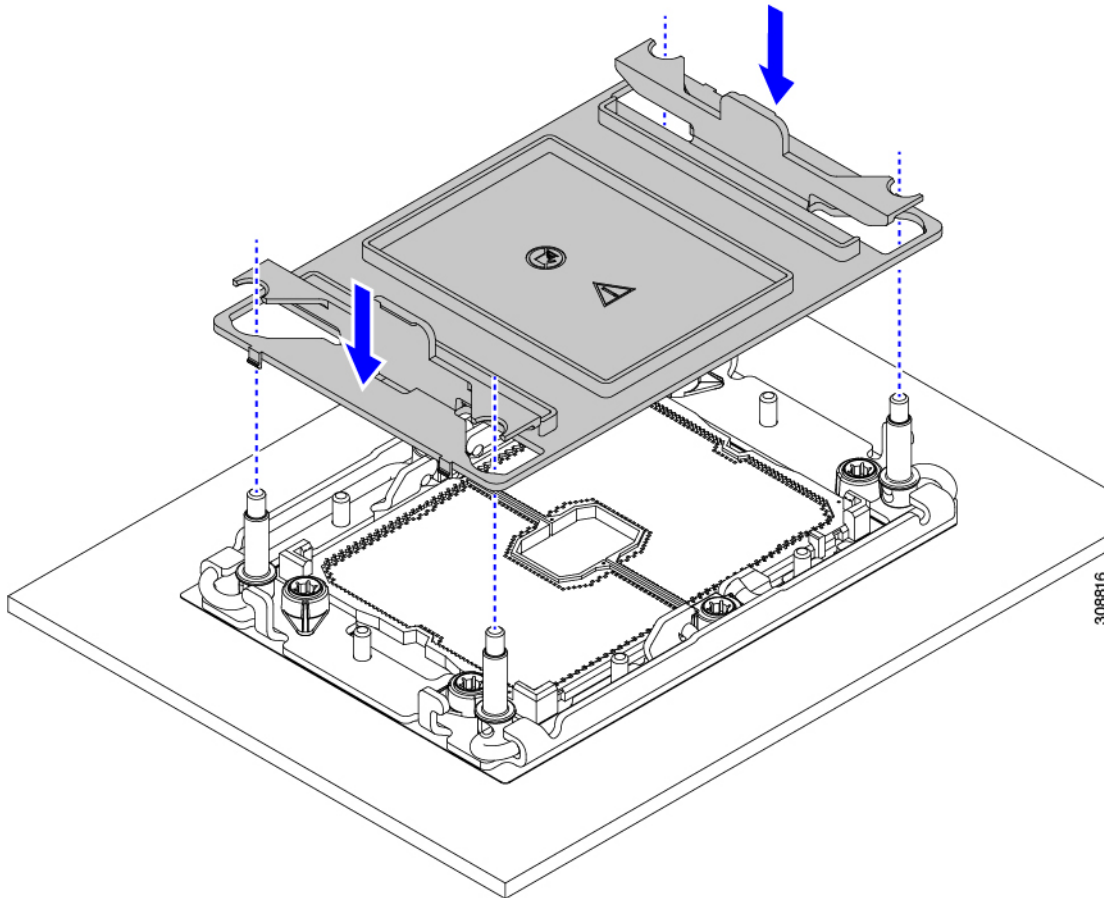
Step 5 Detach the CPU from the CPU carrier by disengaging CPU clips and using the TIM breaker.

    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 in a 90-degree upward arc to partially disengage the CPU clips on this end of the CPU carrier.

309562
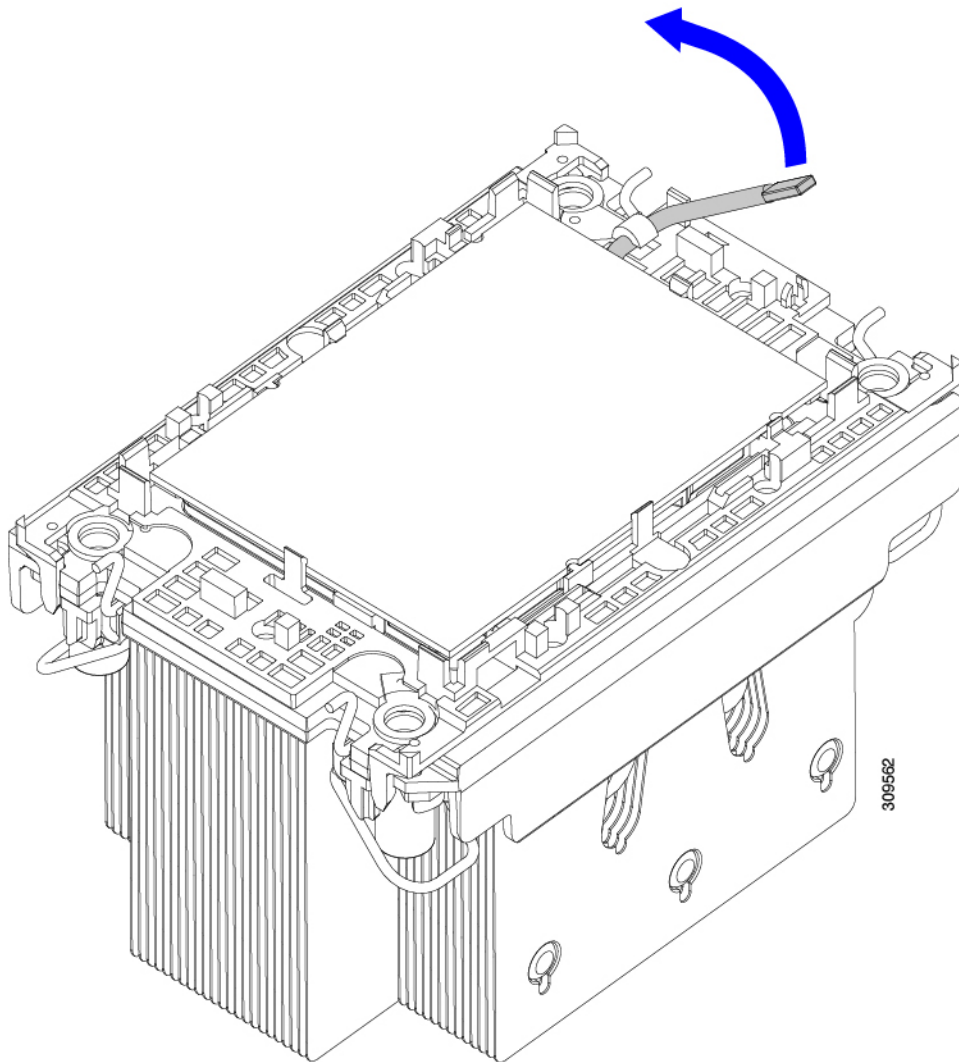
c) Lower the TIM breaker into the u-shaped securing clip to allow easier access to the CPU carrier.

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

d) Gently pull up on the outer edge of the CPU carrier (2) 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 outer edge of the CPU carrier so that you can disengage the pair of CPU clips (3 in the following illustration) which are opposite the TIM breaker.

f) Grasp the CPU carrier along the short edges and lift it straight up to remove it from the heatsink.
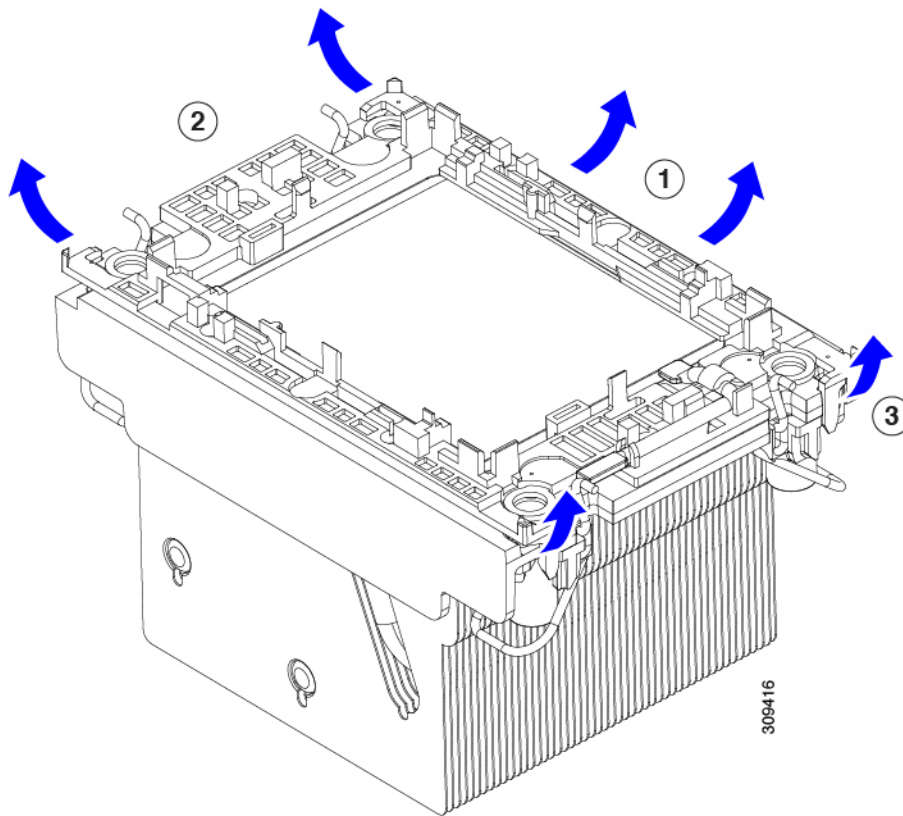
Step 6   Transfer the CPU and carrier to the fixture.

a) 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.

b) Flip the CPU and carrier right-side up so that the words PRESS are visible.
c) Align the posts on the fixture and the pin 1 locations on the CPU carrier and the fixture (1 in the following illustration).
d) Lower the CPU and CPU carrier onto the fixture.
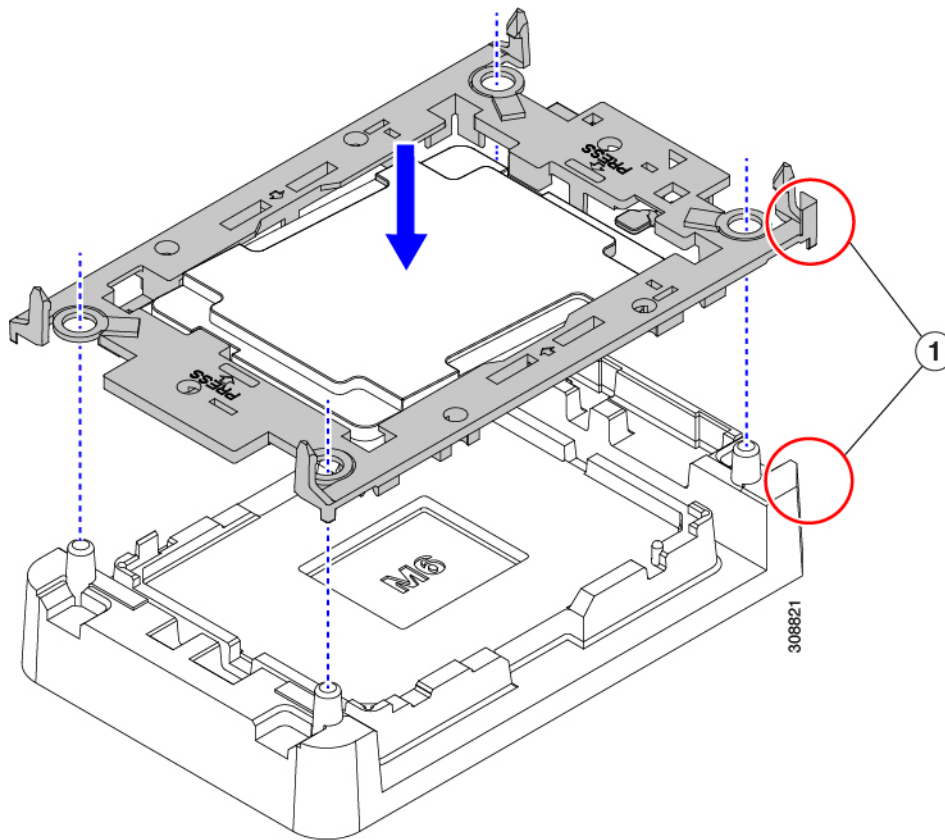
Step 7 Use the provided cleaning kit (UCSX-HSCK) to remove all of the thermal interface barrier (thermal grease) from the CPU, CPU carrier, and heatsink.

> **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.

What to do next

Choose the appropriate option:

- If you will be installing a CPU, go to Installing the CPUs and Heatsinks, on page 45.

- 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.
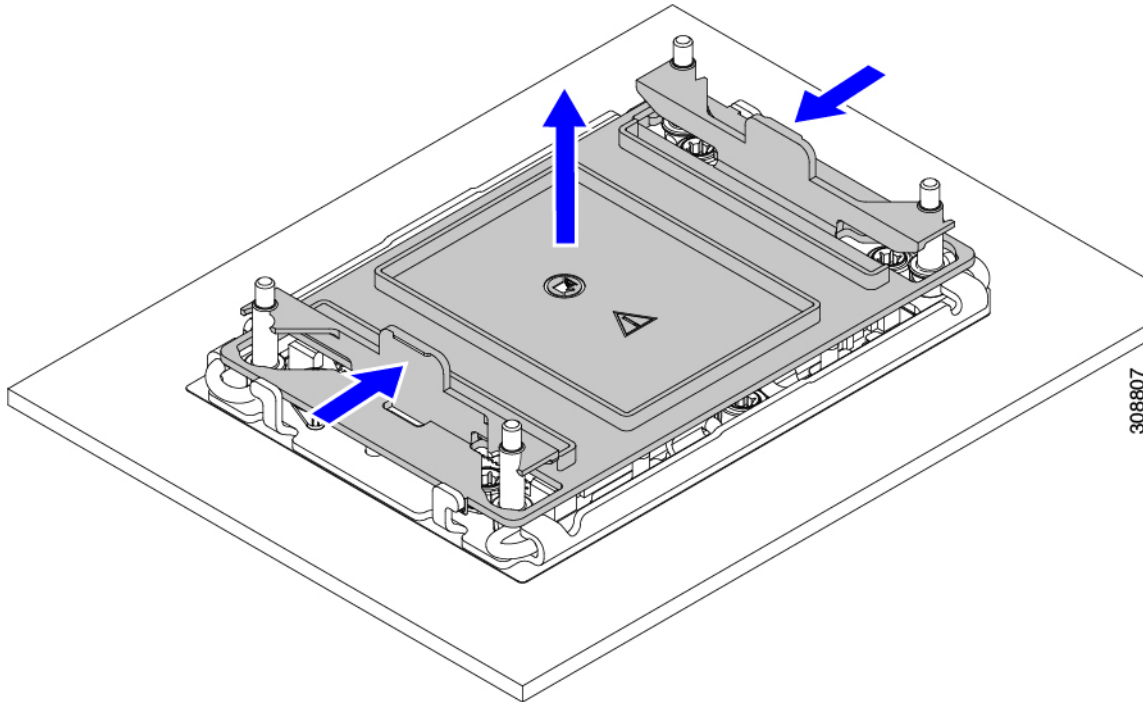
c) Store the dust cover for future use.

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 15: Thermal Interface Material Application Pattern
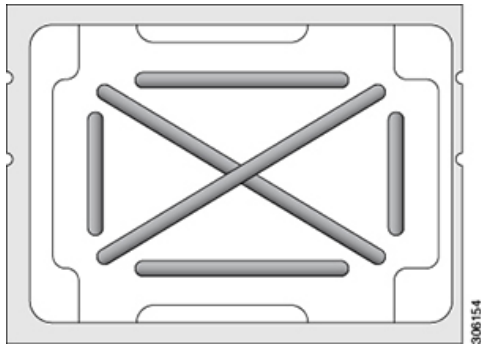
| Caution | Use only the correct heatsink for your CPU. CPUs use the same heatsink based on your server configuration. For non-GPU servers, use UCSC-HSHP-C240M7. For a GPU, or GPU-ready configuration, use UCSC-HSLP-C220M7. |

**Step 4**   Attach the heatsink to the CPU fixture.

    a) Make sure the rotating wires are in the unlocked position so that the feet of the wires do not impede installing the heatsink.

    b) Grasp the heatsink by the fins and align the pin 1 location of the heatsink with the pin 1 location on the CPU fixture, then lower the heatsink onto the CPU fixture.

Step 5   Install the CPU assembly onto the CPU motherboard socket.

    a) Push the rotating wires (1 in the following image) to the unlocked position so that they do not obstruct installation.

    b) Grasp the heatsink by the fins, align the pin 1 location on the heatsink with the pin 1 location on the CPU socket (2 in the following image), then seat the heatsink onto the CPU socket.

    c) Holding the CPU assembly level, lower it onto the CPU socket.

    d) Push the rotating wires away from each other to lock the CPU assembly into the CPU socket.

| Caution | Make sure that you close the rotating wires completely before using the Torx driver to tighten the securing nuts. |

    e) Choose the appropriate option to secure the CPU to the socket.

        • For a CPU with a high-profile heatsink, set the T30 Torx driver to 12 in-lb of torque and tighten the 4 securing nuts to secure the CPU to the motherboard (4).
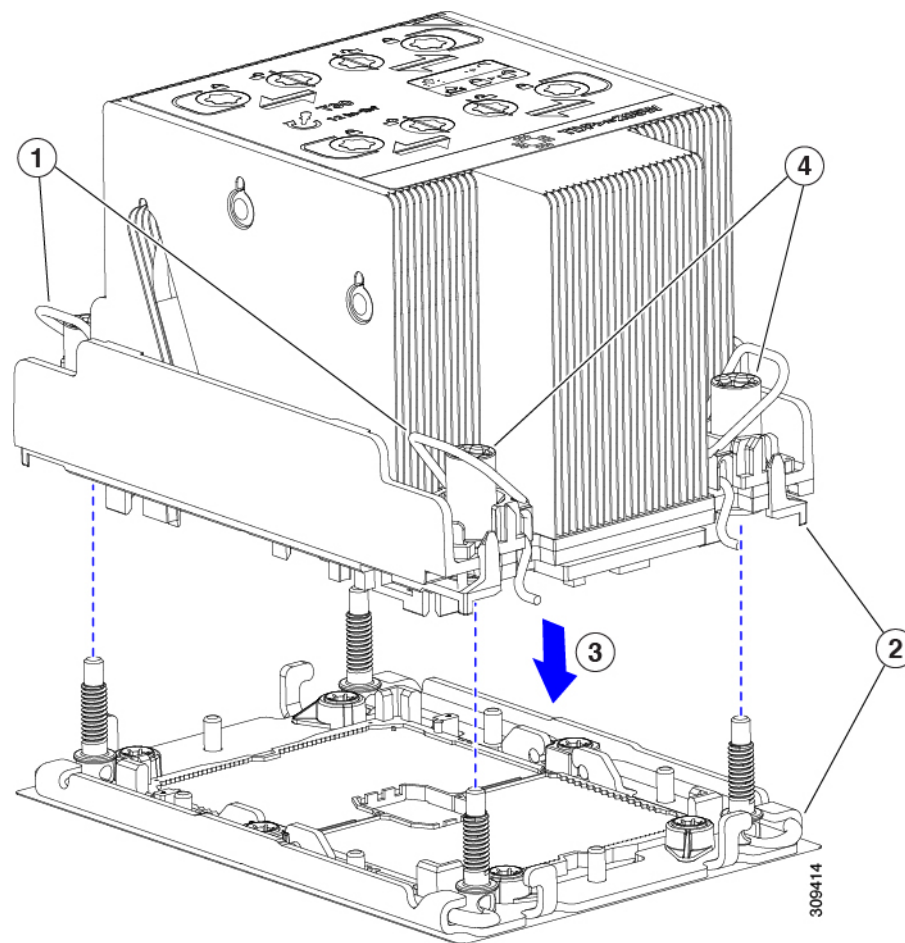
- For a CPU with a low-profile heatsink, set the T30 Torx driver to 12 in-lb of torque and tighten the 4 securing nuts to secure the CPU to the motherboard (3) first. Then, set the torque driver to 6 in-lb of torque and tighten the two Phillips head screws for the extended heatsink (4).
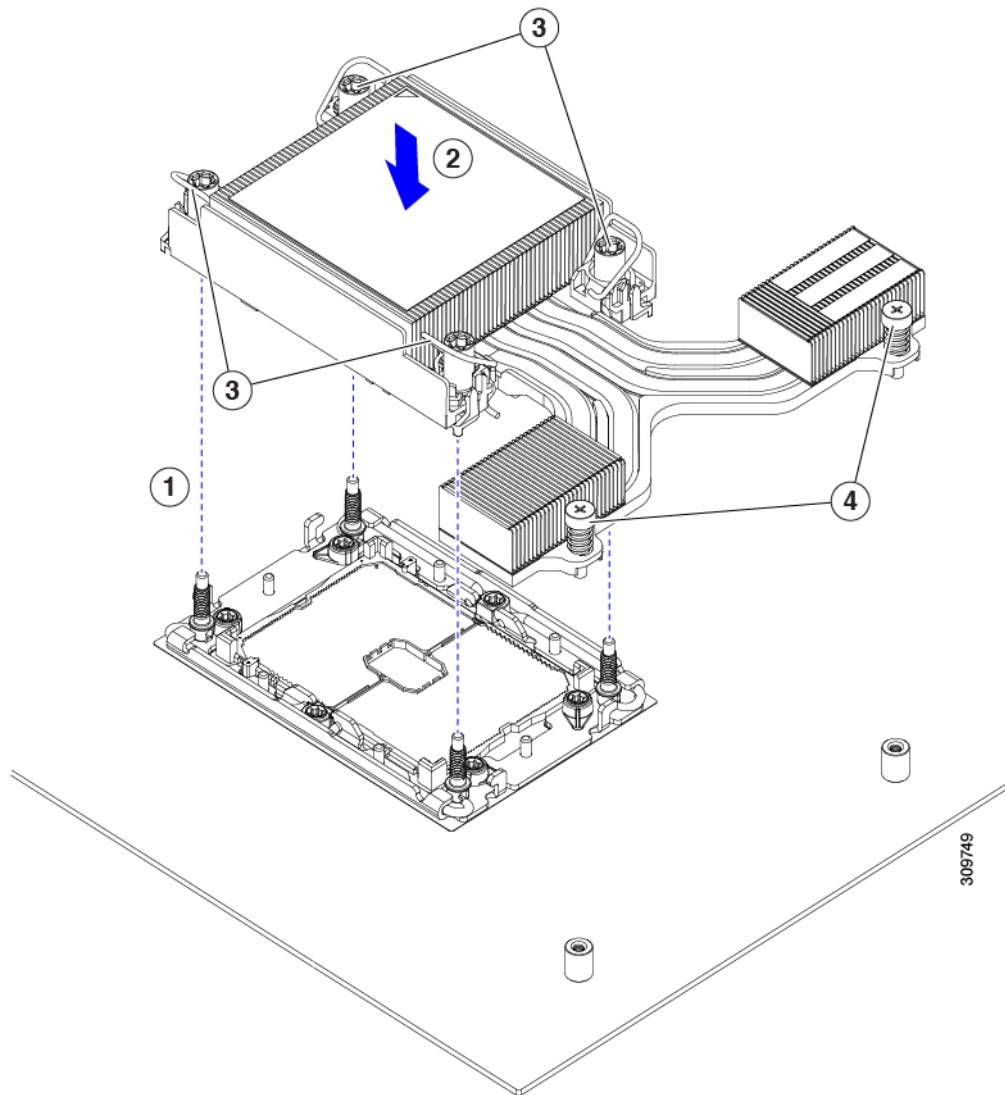
Upgrading to Intel Xeon Fifth Generation CPUs

Use this task to uprade to Emerald Rapids CPUs.

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 39.

Step 1   If you have not done so already, review the CPU Configuration Rules, on page 38.

Step 2   Remove the server's top cover.

See Removing the Server Top Cover, on page 9

Step 3   Remove the air duct.

See Removing the Air Duct, on page 14.

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

See Removing CPUs and Heat Sinks, on page 40.

Step 5   Store the removed CPUs in an ESD-safe bag.

Step 6   Install the new Intel Xeon Fifth Generation Scalable Server Processor(s).

See Installing the CPUs and Heatsinks, on page 45.

Step 7   Replace the air duct.

See Installing the Air Duct, on page 15.

Step 8   Replace the server's top cover.

Step 9   Reapply power and return the server to operation.

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 chassis, you do not have to separate the heatsink from the CPU. See Additional CPU-Related Parts to Order with RMA Replacement System Chassis, on page 51.

- Scenario 1—You are reusing the existing heatsinks:

  - Heat sink 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 heatsinks:

Caution   Use only the correct heatsink for your CPUs to ensure proper cooling. There are two different heatsinks, a low profile (UCSC-HSLP-C220M7) which is used with GPUs, or a GPU-ready server, and a high-profile (UCSC-HSHP-C240M7) which is used with a non-GPU configuration.

  - New heatsinks have a pre-applied pad of TIM.

- Heat sink 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 for M7 servers (UCS-CPU-TIM=)

    One TIM kit covers one CPU.

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

New heat sink 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 heat sinks. Therefore, even when you are ordering new heat sinks, you must order the heat sink cleaning kit.

Additional CPU-Related Parts to Order with RMA Replacement System Chassis

When a return material authorization (RMA) of the system chassis is done on a Cisco UCS C-Series server, you move existing CPUs to the new chassis.

Note Unlike previous generation CPUs, the M7 server CPUs do not require you to separate the heatsink from the CPU when you *move* the CPU-heatsink assembly. Therefore, no

additional heatsink cleaning kit or thermal-interface material items are required.

The only tool required for moving a CPU/heatsink assembly is a T-30 Torx driver.

Replacing Memory DIMMs

The server supports R-DIMM, DDR5 288 pin DIMM modules. Eight memory channels per socket are supported with 2 DIMMs per channel, for a total of 32 memory slots on the motherboard.

When installing or replacing DIMMs, be aware of the following:

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

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)
UCS-MR256G8RE1	256GB DDR5-4800 RDIMM 8Rx4 (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.

Figure 16: DIMM Slot Numbering
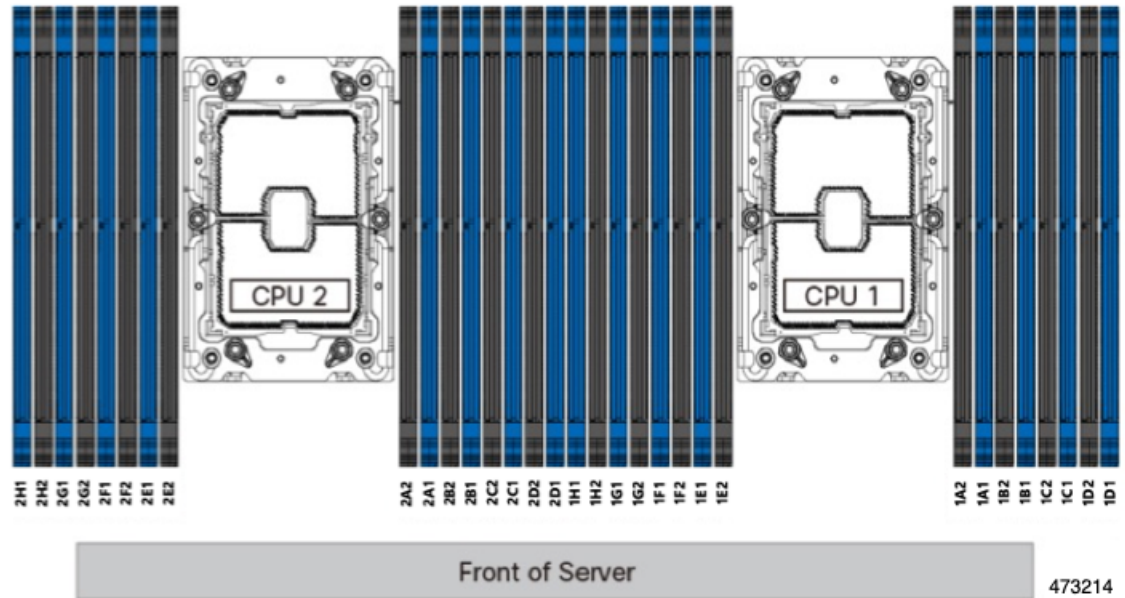
DIMM Population Rules

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

- 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.

- 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.

✎

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

Memory Population Order

The Cisco UCS C240 M7 server supports RDIMM memory modules.

Memory slots are color coded, blue and black. The color-coded channel population order is blue slots first, then black.

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 7 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 8.

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 the Server Top Cover, on page 9.

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 52.

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 a Mini-Storage Module

The mini-storage module plugs into a vertical riser card that attaches to motherboard by two captive screws to provide additional internal storage. The module is an M.2 SSD Carrier which provides two M.2 form-factor SSD sockets. See also Replacing a Boot-Optimized M.2 RAID Controller Module, on page 93.

> **Note** The Cisco IMC firmware does not include an out-of-band management interface for the M.2 drives installed in the M.2 version of this mini-storage module (UCS-M2-HWRAID-D). The M.2 drives are not listed in Cisco IMC inventory, nor can they be managed by Cisco IMC. This is expected behavior.

Replacing a Mini-Storage Module Carrier

This topic describes how to remove and replace a mini-storage module carrier. The carrier sits in an M.2 vertical riser card that is attached to the motherboard by two captive screws.

The carrier has one vertical media socket on its front side (the side that faces PCI riser 3) and one socket on its rear side (which faces PCI riser 2) . Use the following procedure for an M.2 SSD mini-storage module carrier.

Step 1 Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 8.
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 the Server Top Cover, on page 9.
Step 4 Locate the mini-storage module carrier in its socket between PCIe riser 2 and 3.
Step 5 Using a Phillips screwdriver, loosen each of the captive screws and lift the M.2 riser out of the server.
Step 6 Remove a carrier from its socket:

a) Using a Phillips screwdriver, loosen the screw that holds the module to the carrier.
b) Push outward on the securing clips that holds each end of the carrier.

c) Lift both ends of the carrier to disengage it from the socket on the motherboard.

d) Set the carrier on an anti-static surface.

Step 7 Install a carrier to its socket:

a) Position carrier over socket, with the carrier's connector facing down. Two alignment pegs must match with two holes on the carrier.

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

c) Push down on the carrier 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 an M.2 SSD in a Mini-Storage Carrier For M.2

This topic describes how to remove and replace an M.2 SATA or NVMe SSD in a mini-storage carrier for M.2 (PID UCS-HWRAID-M2-D). The carrier is mounted vertically on the riser, and has one M.2 SSD socket on either side (front or back) of the vertical riser.

Population Rules For Mini-Storage M.2 SSDs

• Both M.2 SSDs must be either SATA or NVMe; do not mix types in the carrier.

• You can use one or two M.2 SSDs in the carrier. It is a best practice to use two SSDs.

• M.2 socket 1 is on the front side of the carrier, which faces PCI riser 3; M.2 socket 2 is on the back of the carrier, which faces PCI riser 2.

Step 1 Power off the server and then remove the mini-storage module carrier from the server as described in Replacing a Mini-Storage Module Carrier, on page 55.

Step 2 Remove an M.2 SSD:

a) Use a #1 Phillips-head screwdriver to remove the single screw that secures the M.2 SSD to the carrier.

b) Remove the M.2 SSD from its socket on the carrier.

Step 3 Install a new M.2 SSD:

a) Insert the new M.2 SSD connector-end into the socket on the carrier with its label side facing up.

b) Press the M.2 SSD flat against the carrier.

c) Install the single screw that secures the end of the M.2 SSD to the carrier.

Step 4 Install the mini-storage module carrier back into the server and then power it on as described in Replacing a Mini-Storage Module Carrier, on page 55.

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 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 8.

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 the Server Top Cover, on page 9.

d) Remove PCIe riser 1 from the server to provide clearance to the RTC battery socket that is on the motherboard. See Replacing a PCIe Riser, on page 62.

e) Locate the horizontal RTC battery socket.

f) Remove the battery from the socket on the motherboard. Gently pry the securing clip to the side to provide clearance, then lift up on the battery.

Step 2   Install a new RTC battery:

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

Note   The positive side of the battery marked "3V+" should face up.

b) Replace PCIe riser 1 to the server. See Replacing a PCIe Riser, on page 62.

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

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.

- See also Power Specifications

- See also Rear-Panel LEDs, on page 5 for information about the power supply LEDs.

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

Supported Power Supplies

The Cisco UCS C240 M7 supports the following power supplies.

⚠️ **Caution** Do not mix PSU types in the same server. PSU must be the same type and wattage.

For detailed information, see Power Specifications.

PSU Type	Supported In	Notes
1050 W DC	All UCS C240 M7 models	One power supply is mandatory; one more can be added for 1 + 1 redundancy as long power supplies are the same.
1200 W AC	All UCS C240 M7 models	One power supply is mandatory; one more can be added for 1 + 1 redundancy as long power supplies are the same.
1600 W AC	All UCS C240 M7 models	One power supply is mandatory; one more can be added for 1 + 1 redundancy as long power supplies are the same.
2300 W AC	All UCS C240 M7 models	One power supply is mandatory; one more can be added for 1 + 1 redundancy as long power supplies are the same.

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.

⚠️ **Caution** DO NOT interchange power supplies of any earlier Cisco UCS servers (for example, any Cisco UCS C240 M6 server power supplies) with the Cisco UCS C240 M7 server.

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 8.

• 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.

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 60.

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 8.

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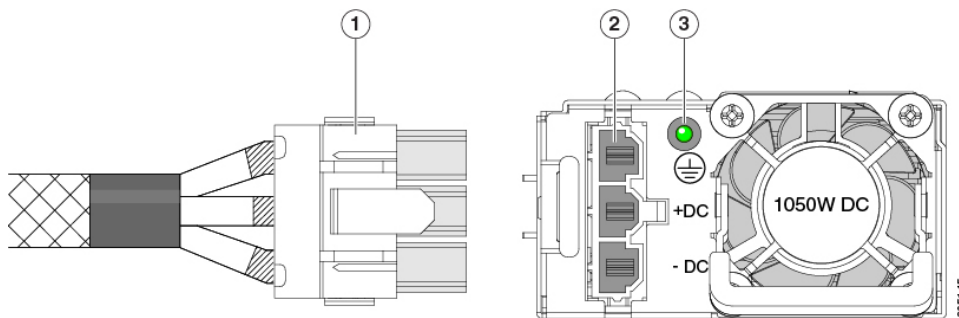
1	Keyed cable connector (CAB-48DC-40A-8AWG)	3	PSU status LED
2	Keyed DC input socket	-	

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 59.

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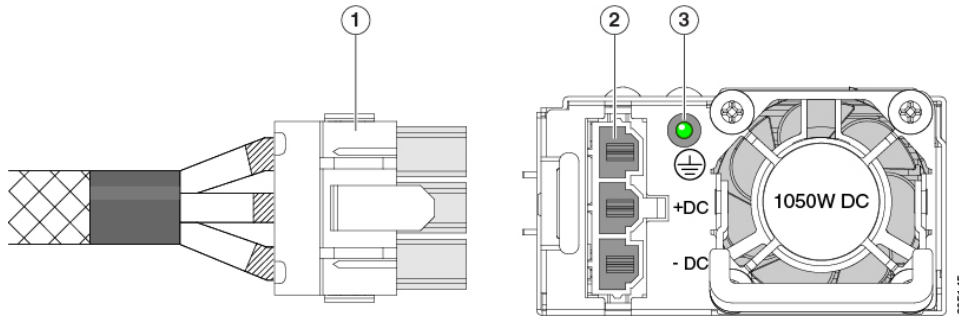
1	Keyed cable connector (CAB-48DC-40A-8AWG)	3	PSU status LED
2	Keyed DC input socket	-	

Step 6   See Grounding for DC Power Supplies, on page 62 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 Riser

This server has two toolless PCIe risers for horizontal installation of PCIe cards. Each riser is available in multiple versions. See PCIe Slot Specifications, on page 63 for detailed descriptions of the slots and features in each riser version.

Step 1   Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 8.

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 the Server Top Cover, on page 9.

Step 4   Remove the PCIe riser that you are replacing:

a) Grasp the flip-up handle on the riser and the blue forward edge, and then lift up evenly to disengage its circuit board from the socket on the motherboard. Set the riser on an antistatic surface.

b) If the riser has a card installed, remove the card from the riser. See .

Step 5 Install a new PCIe riser:

> **Note** The PCIe risers are not interchangeable. If you plug a PCIe riser into the wrong socket, the server will not boot. Riser 1 must plug into the motherboard socket labeled "RISER1." Riser 2 must plug into the motherboard socket labeled "RISER2."

a) If you removed a card from the old PCIe riser, install the card to the new riser. See .

b) Position the PCIe riser over its socket on the motherboard and over its alignment slots in the chassis.

c) Carefully push down on both ends of the PCIe riser to fully engage its circuit board connector with the socket on the motherboard.

Step 6 Replace the top cover to the server.

Step 7 Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Replacing a PCIe Card

> **Note** Cisco supports all PCIe cards qualified and sold by Cisco. PCIe cards not qualified or sold by Cisco are the responsibility of the customer. Although Cisco will always stand behind and support the C-Series rack-mount servers, customers using standard, off-the-shelf, third-party cards must go to the third-party card vendor for support if any issue with that particular card occurs.

PCIe Slot Specifications

The server contains three toolless PCIe risers for horizontal installation of PCIe cards. Each riser is orderable in multiple versions.

- Riser 1 contains PCIe slots 1, 2, and 3. Riser 1 is available with the following different options:

    - SFF and NVMe server, IO-Centric, PCIe Gen4 Riser— Slot 1 (x8 Gen 4), 2 (x16 Gen 4), 3 (x8 Gen 4). All slots are controlled by CPU 1

    - SFF and NVMe server, IO-Centric, PCIe Gen5 Riser— Slot 1 (x16 Gen 5), 2 (x16 Gen 5). All slots are controlled by CPU 1

    - SFF server and NVMe server, Storage Centric—Slots 1 (Reserved), 2 (x4 Gen4), and 3 (x4 Gen 4) for drive bays of both SFF SAS/SATA models and NVMe models. All slots are controlled by CPU 1.

- Riser 2 contains PCIe slots 4, 5, and 6 and is available with the following different options:

    - SFF and NVMe server, I/O-Centric, PCIe Gen 4 Riser—Slots 4 (x8 Gen 4), 5 (x16 Gen 4), and 6 (x8 Gen 4). All slots are controlled by CPU 2.

    - SFF and NVMe server, I/O-Centric, PCIe Gen5 Riser— Slot 4 (x16 Gen5), 5 (x16 Gen 5). All slots are controlled by CPU 2

• Riser 3 contains PCIe slots 7 and 8 and is available in the following different options:

   • SFF and NVMe server, I/O-Centric, PCIe Gen 4 Riser—Slots 7 (x8 Gen 4) and 8 (x8 Gen 4). Slots 7 and 8 are controlled by CPU 2.

   • SFF and NVMe server, Storage Centric, PCIe Gen 4 Riser—Slots 7 (x4 Gen 4) and 8 (x4 Gen 4). All slots are controlled by CPU 2.

   • SFF and NVMe server, GPU-capable or GPU-ready PCIe Gen 4 Riser—Slot 7 (x16 Gen 4), full-height, full length supports double-wide GPU.

The following illustration shows the PCIe slot numbering.

Figure 19: Rear Panel, Showing PCIe Slot Numbering
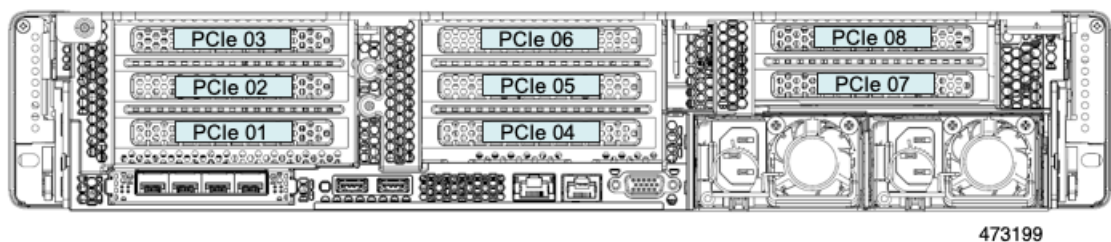
Replacing a PCIe Card

> **Note** If you are installing a Cisco UCS Virtual Interface Card, there are prerequisite considerations. See Cisco Virtual Interface Card (VIC) Considerations, on page 66.

> **Note** RAID controller cards install into a dedicated motherboard socket. See Replacing a SAS Storage Controller Card (RAID or HBA), on page 74.

Step 1   Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 8.

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 the Server Top Cover, on page 9.

Step 4   Remove the PCIe card that you are replacing:

a) Remove any cables from the ports of the PCIe card that you are replacing.

b) Use two hands to flip up and grasp the blue riser handle and the blue finger grip area on the front edge of the riser, and then lift straight up.

c) On the bottom of the riser, push the release latch that holds the securing plate, and then swing the hinged securing plate open.

    d)   Open the hinged card-tab retainer that secures the rear-panel tab of the card.

    e)   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 5   Install a new PCIe card:

    a)   With the hinged card-tab retainer open, align the new PCIe card with the empty socket on the PCIe riser.

    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 card-tab retainer over the card's rear-panel tab.

    d)   Swing the hinged securing plate closed on the bottom of the riser. Ensure that the clip on the plate clicks into the locked position.

    e)   Position the PCIe riser over its socket on the motherboard and over the chassis alignment channels.

    f)   Carefully push down on both ends of the PCIe riser to fully engage its connector with the sockets on the motherboard.

Step 6   Replace the top cover to the server.

Step 7   Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Figure 20: PCIe Riser Card Securing Mechanisms

473215
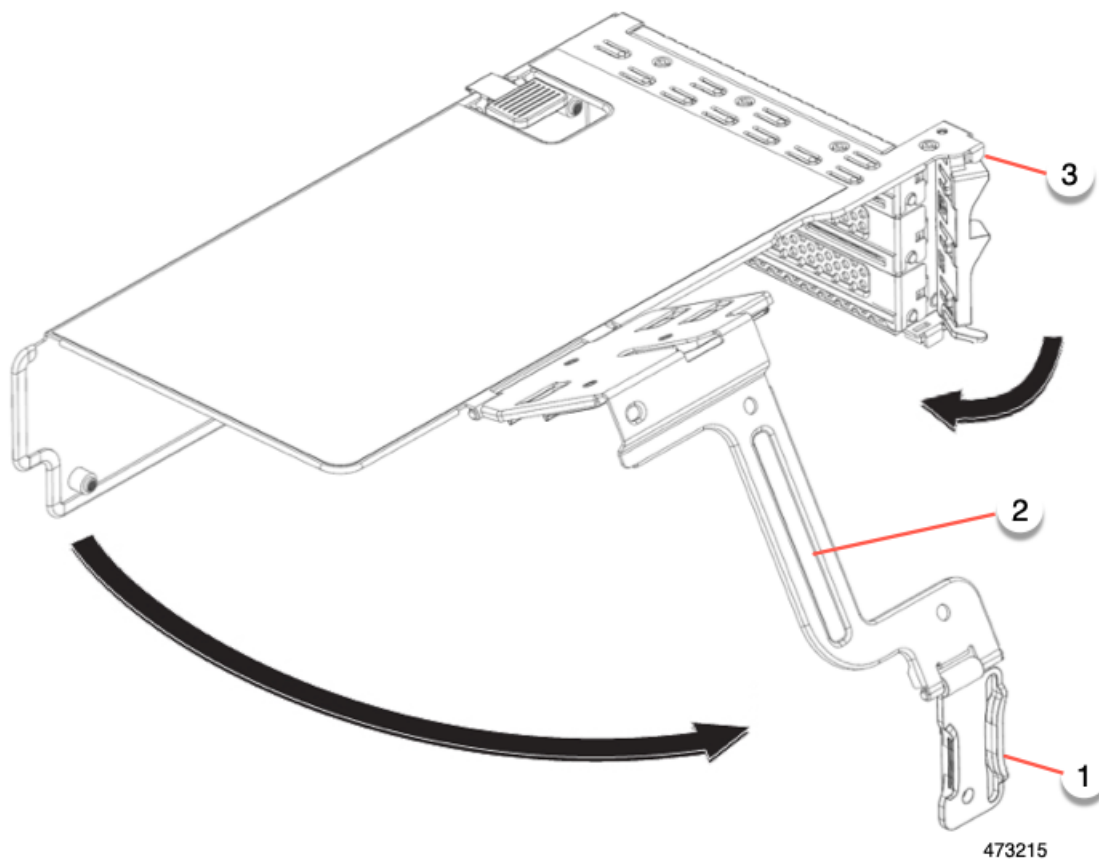
1	Release latch on hinged securing plate	3	Hinged card-tab retainer

2	Hinged securing plate	-	

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 Flex-LOM. 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 UCSC-P-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	1 mLOM	mLOM	mLOM	mLOM	4.0(1)
Cisco UCS VIC 15238 UCSC-M-V5D200G	1 mLOM	mLOM	mLOM	mLOM	4.0(2)

• A total of 3 VICs are supported in the server: 2 PCIe style, and 1 mLOM style.

Note Single wire management is supported on only one VIC at a time. If multiple VICs are installed on a server, only one slot has NCSI enabled at a time. For single wire management, priority goes to the MLOM slot, then slot 2, then slot 5 for NCSI management traffic. When multiple cards are installed, connect the single-wire management cables in the priority order mentioned above.

• The primary slot for a VIC card in PCIe riser 1 is slot 2. The secondary slot for a VIC card in PCIe riser 1 is slot 1.

Note The NCSI protocol is supported in only one slot at a time in each riser. If a GPU card is present in slot 2, NCSI automatically shifts from slot 2 to slot 1.

- The primary slot for a VIC card in PCIe riser 2 is slot 5. The secondary slot for a VIC card in PCIe riser 2 is slot 4.

Note The NCSI protocol is supported in only one slot at a time in each riser. If a GPU card is present in slot 5, NCSI automatically shifts from slot 5 to slot 4.

Note PCIe riser 2 is not available in a single-CPU system.

Replacing an mLOM Card

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

The mLOM socket provides a Gen-3 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.

Note If your mLOM card is a Cisco UCS Virtual Interface Card (VIC), see Cisco Virtual Interface Card (VIC) Considerations, on page 66 for more information and support details.

Step 1 Remove any existing mLOM card (or a blanking panel):

a) Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 8.

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 the Server Top Cover, on page 9.

d) Remove any storage controller (RAID or HBA card) to provide clearance to the mLOM socket on the motherboard. See Replacing a SAS Storage Controller Card (RAID or HBA), on page 74.

e) Loosen the single captive thumbscrew that secures the mLOM card to the threaded standoff on the chassis floor.

f) Slide the mLOM card horizontally to free it from the socket, then lift it out of the server.

Step 2 Install a new mLOM card:

a) Set the mLOM card on the chassis floor so that its connector is aligned with the motherboard socket.

b) Push the card horizontally to fully engage the card's edge connector with the socket.

c) Tighten the captive thumbscrew to secure the card to the chassis floor.

d) Return the storage controller card to the server. See Replacing a SAS Storage Controller Card (RAID or HBA), on page 74.

e) Replace the top cover to the server.

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

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 67.

See the following topics.

- Cisco VIC mLOM and OCP Card Replacement Considerations, on page 68

- Removing an OCP Card, on page 69

- Installing an OCP Card, on page 72

Cisco VIC mLOM and OCP Card Replacement Considerations

In Cisco UCS C240 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 C240 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

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 the Server Top Cover, on page 9.

Step 2   Remove the OCP bracket.

     a)   Locate the two screws that secure the bracket to the server sheetmetal.

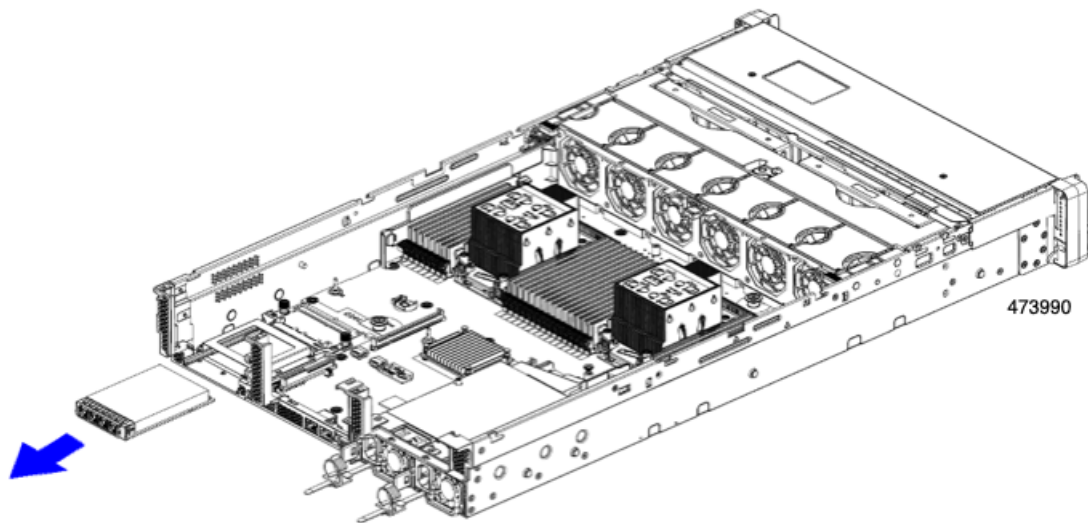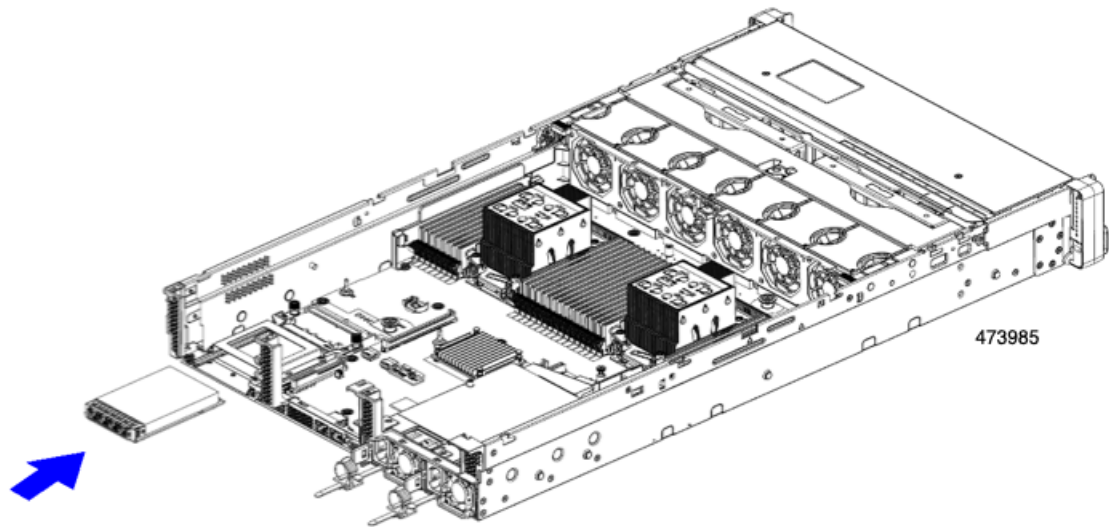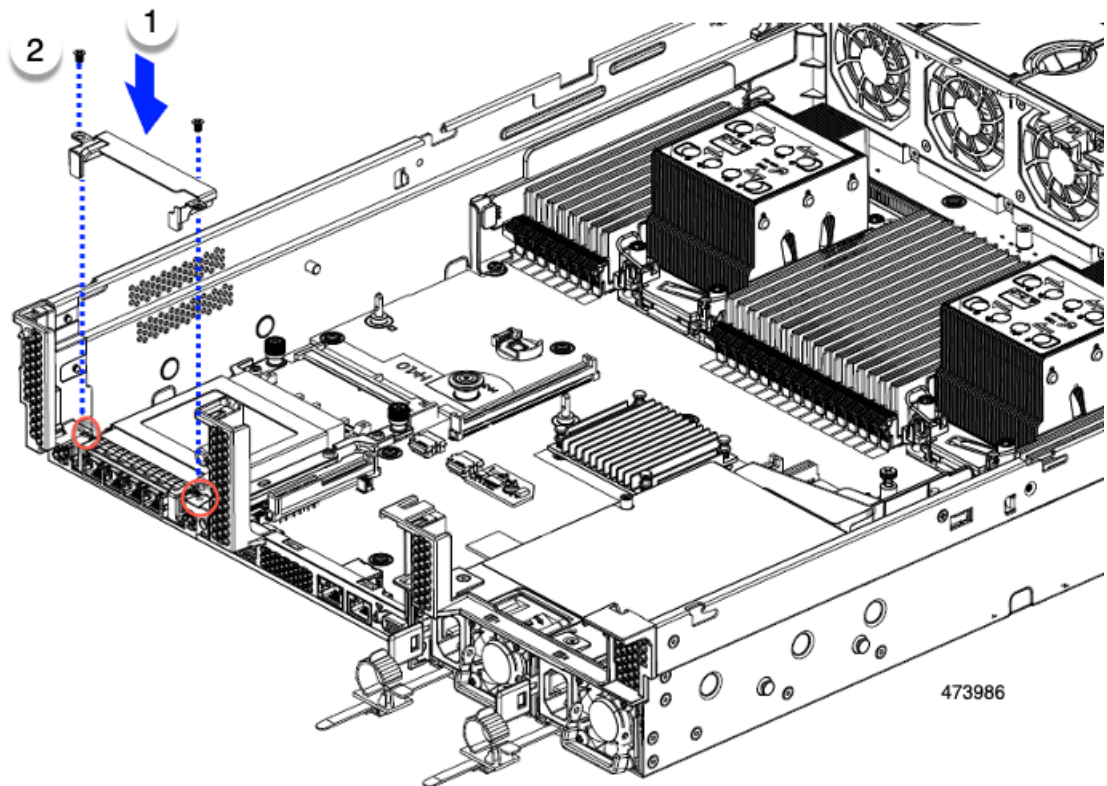   b)   Using a #2 Phillips screwdriver, loosen the screws.
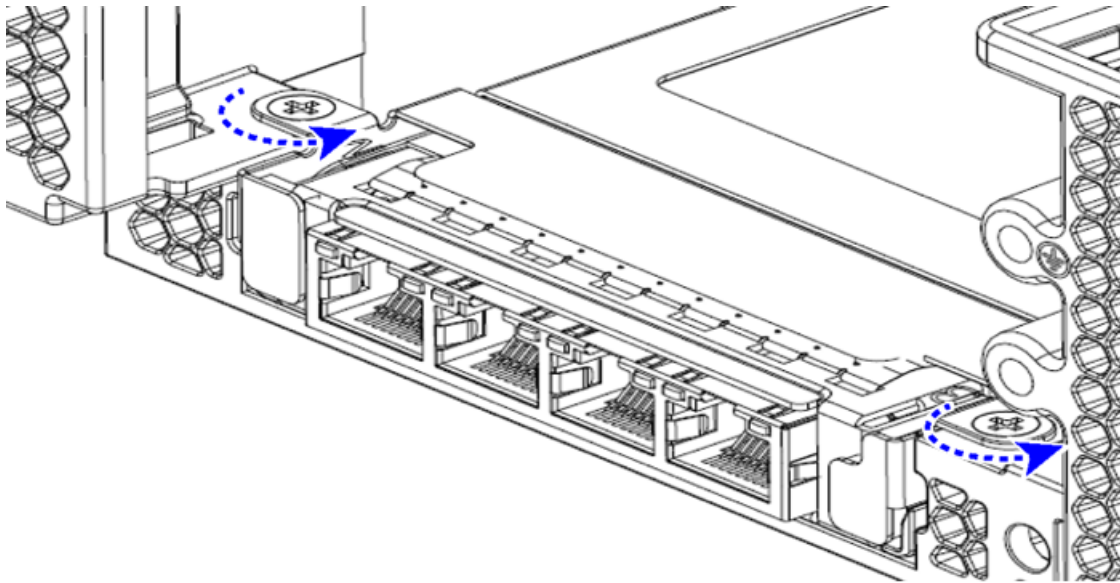
473988

     c)   Remove the screws and lift the bracket off of the server.

473989
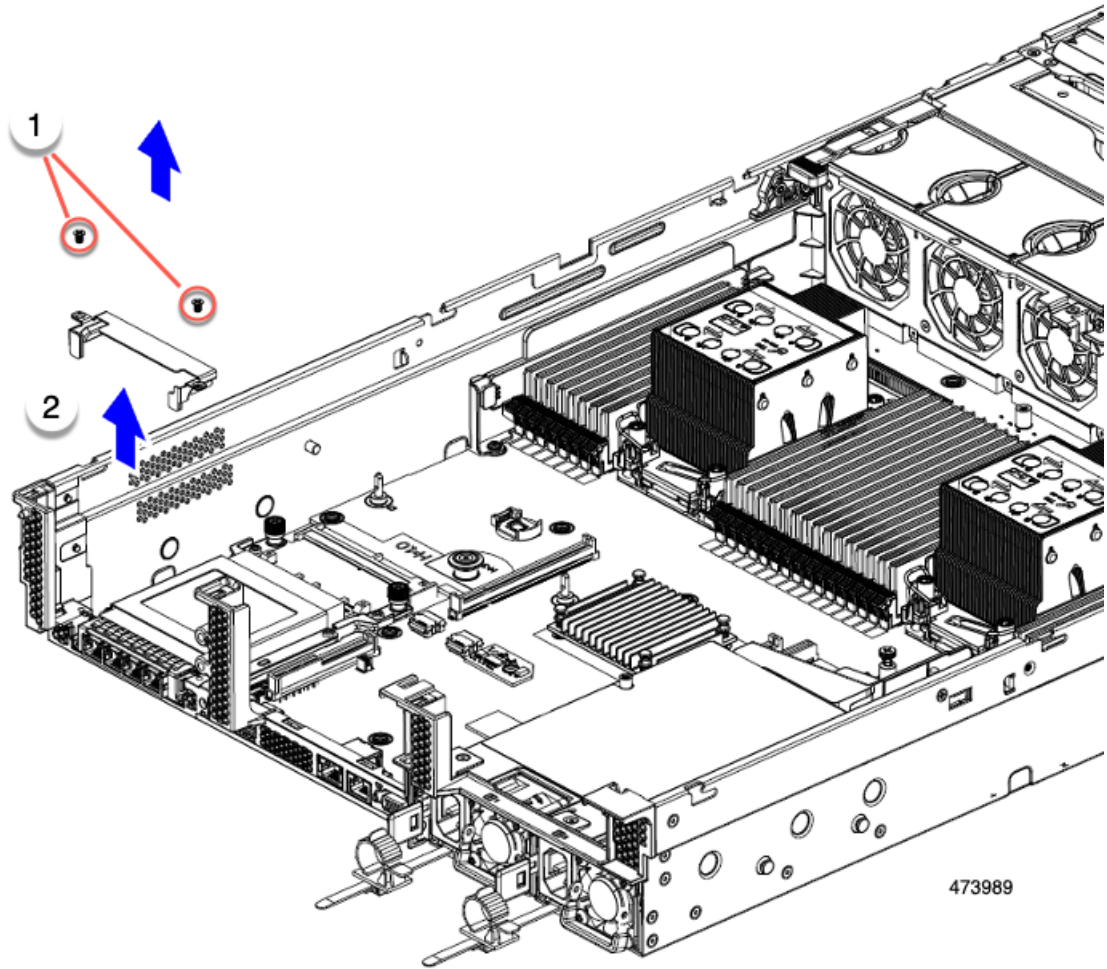
d) Holding the OCP card level, slide it out of the server.

Step 3   Choose the appropriate option:

  • Reinstall an OCP Card. See Installing an OCP Card, on page 72.

  • If you want to install an mLOM instead, see Replacing an mLOM Card, on page 67.

  • Replace the top cover and return the server to operation.

Installing an OCP Card

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.

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 the Server Top Cover, on page 9.

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 onto the server, making sure to align the screwholes at each end of the bracket 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.

473987
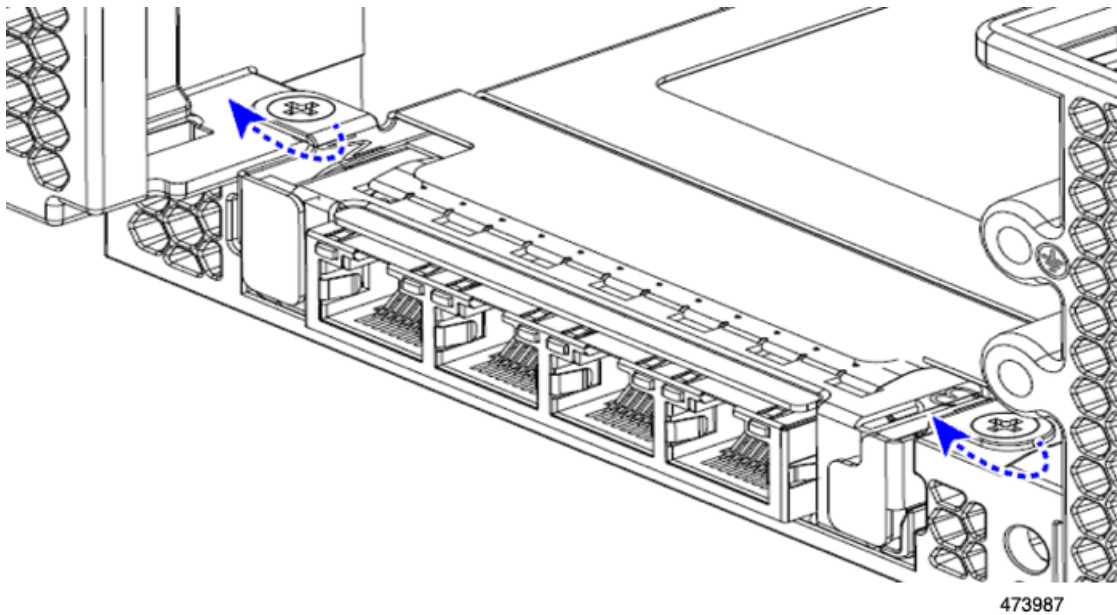
What to do next

Replace the server top cover.

Replacing a SAS Storage Controller Card (RAID or HBA)

For hardware-based storage control, the server can use a Cisco modular SAS RAID controller or SAS HBA that plugs into a dedicated, vertical socket on the motherboard.

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 Host Upgrade Utility (HUU) for your firmware release to bring it to a compatible level.

Note   **For servers running in standalone mode only:** After you replace controller hardware (UCSC-RAID-SD-D, UCSC-SAS-T-D, or UCSC-RAID-HP-D), 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. Running HUU is necessary to program any controller specific values to the storage controller for the specific server. If you do not run HUU, the storage controller may not be discovered..

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.

Removing the Dual Storage Controller Cards

The front RAID assembly can contain either a single Storage controller card in a single tray, or two Storage controller cards each in its own tray. Use this procedure to remove each of the Storage controller cards. This procedure assumes that you have removed power from the server and removed the top cover.

Step 1   Locate the dual Storage controller cards.
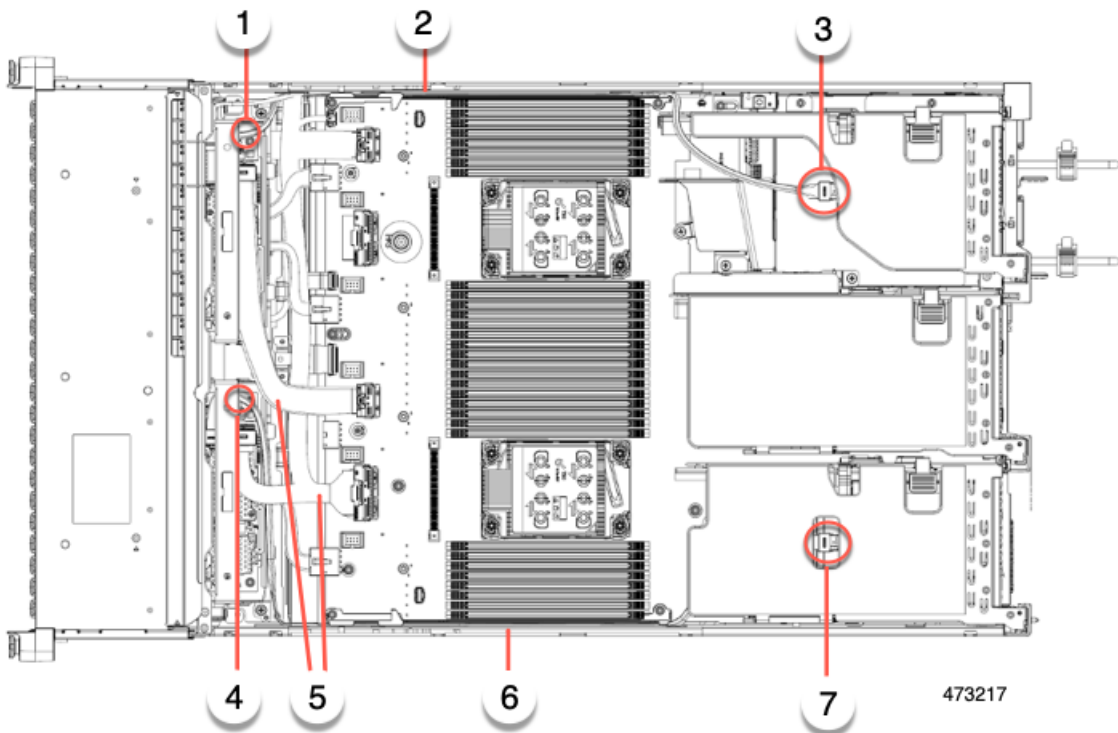
Each Storage controller card has its own tray, as shown.
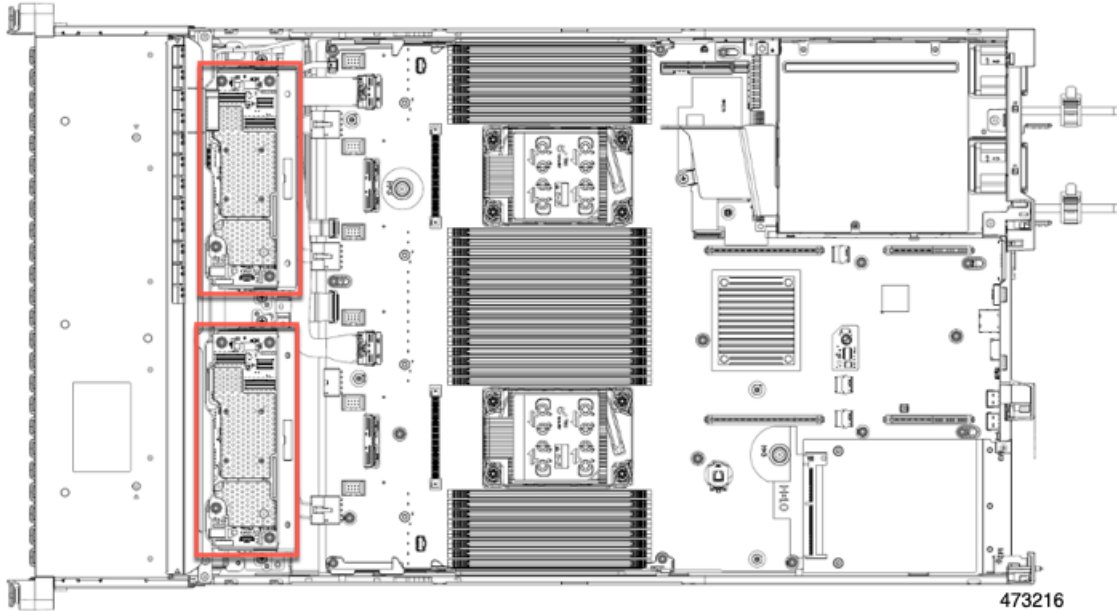
Step 2   Remove the fan tray.

For more information, see Removing the Fan Tray, on page 36.

473212
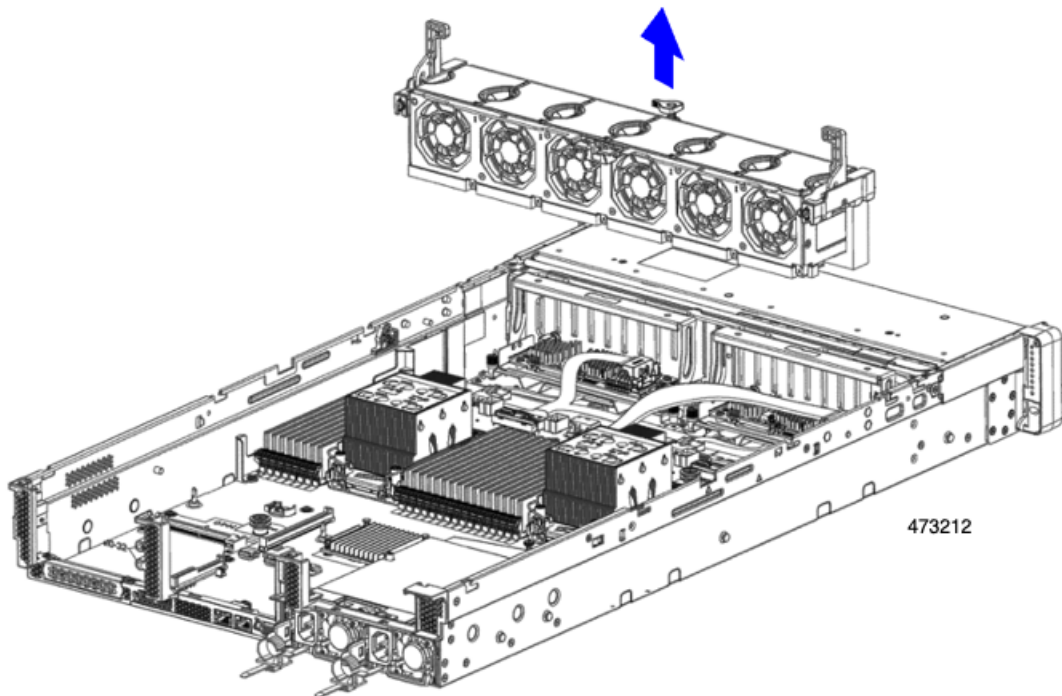
Step 3   Disconnect the cables.

    a) For each Storage controller card, grasp the ribbon cable connector and disconnect it from the RAID card.

        You can leave the other end of the ribbon cable attached to the motherboard.

    b) For each Storage controller card, grasp the connector for the rear-drive cable, and disconnect it from the card.

   You can leave the other end of the rear-drive cable attached.

| 1	SAS cable connection on Storage controller card.	2	SAS cable that connects to rear drives in Riser 3B
3	SAS cable connection on rear Riser 3B.	4	SAS cable connection on Storage controller card.
5	Ribbon cables connecting Storage controller cards to motherboard.	6	SAS cable that connects to rear drives in Riser 1B
7	SAS cable connection on rear Riser 1B.		

Step 4 Remove the Storage controller cards.

a) Grasp the cable that leads to the rear drives and disconnect it from each card.

b) Grasp the handle at the top of each card tray, and gently push it towards the rear of the server.

The handle should slide to the open position. This step disconnects the Storage controller card from a socket on an interior wall.

c) Using a #2 Phillips screwdriver, loosen the captive screws at the edges of the trays.

473218
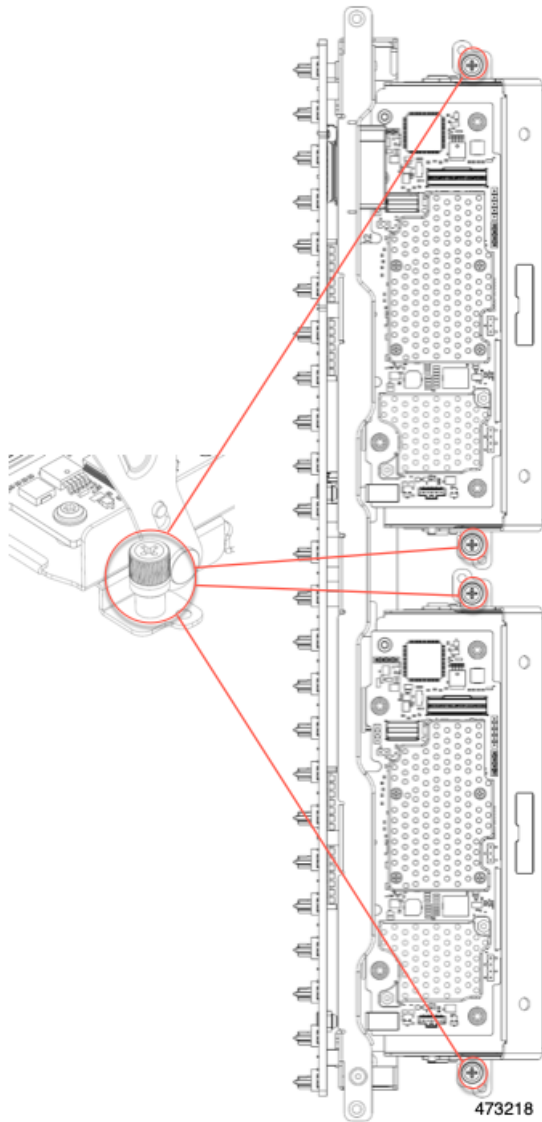
d)   Grasp each card tray by the handle and lift the Storage controller cards out of the chassis.

473219
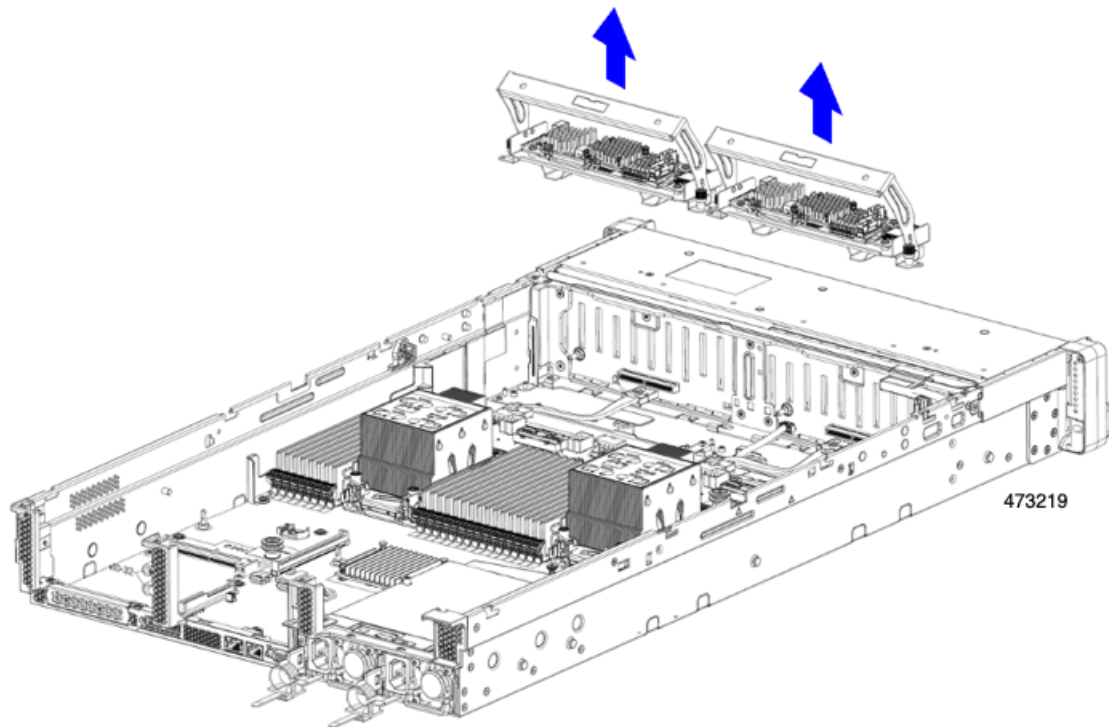
What to do next

Reinsert the dual Storage controller cards. Go to Installing the Dual Storage Controller Cards, on page 79.

Installing the Dual Storage Controller Cards

Use this procedure to install the dual Storage controller cards into the server. The Storage controller cards are contained in tray, which is replaceable.

Step 1   Grasp each card tray by the handle.

Step 2   Install the Storage controller cards.

    a)   Make sure that the handle of the tray is in the open position.

    b)   Make sure that the cables do not obstruct installing the Storage controller cards.

    c)   Orient the Storage controller card so that the thumbscrews align with their threaded standoffs on the motherboard.

    d)   Holding the card tray by the handle, keep the tray level and lower it into the server.

473220
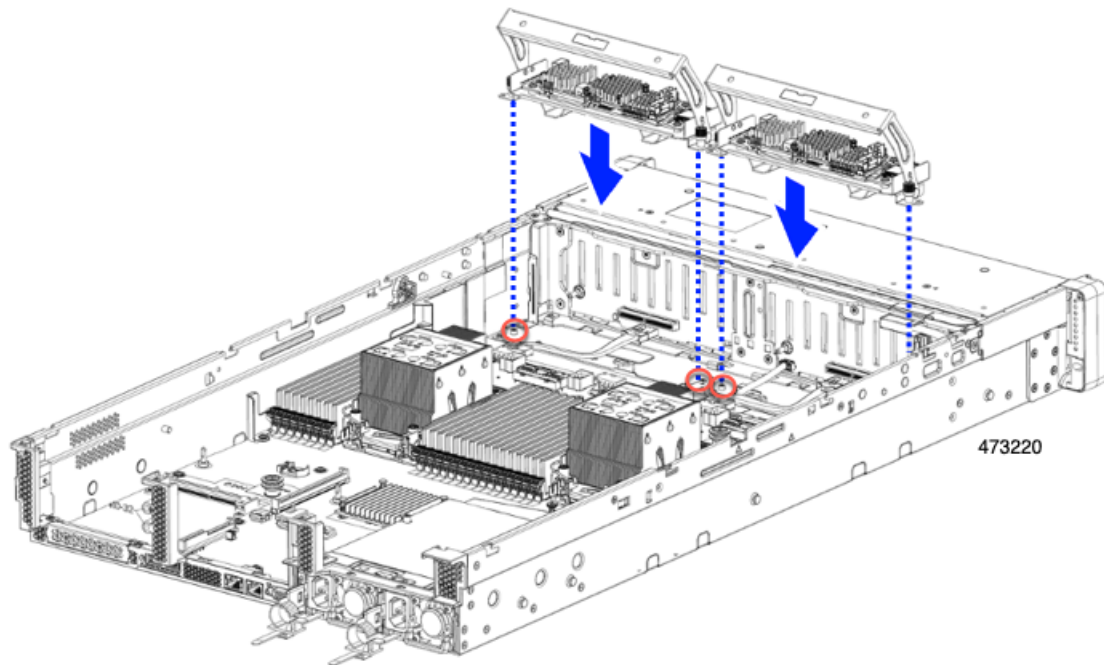
e) Using a #2 Phillips head screwdriver, tighten the screws at the edges of each tray.
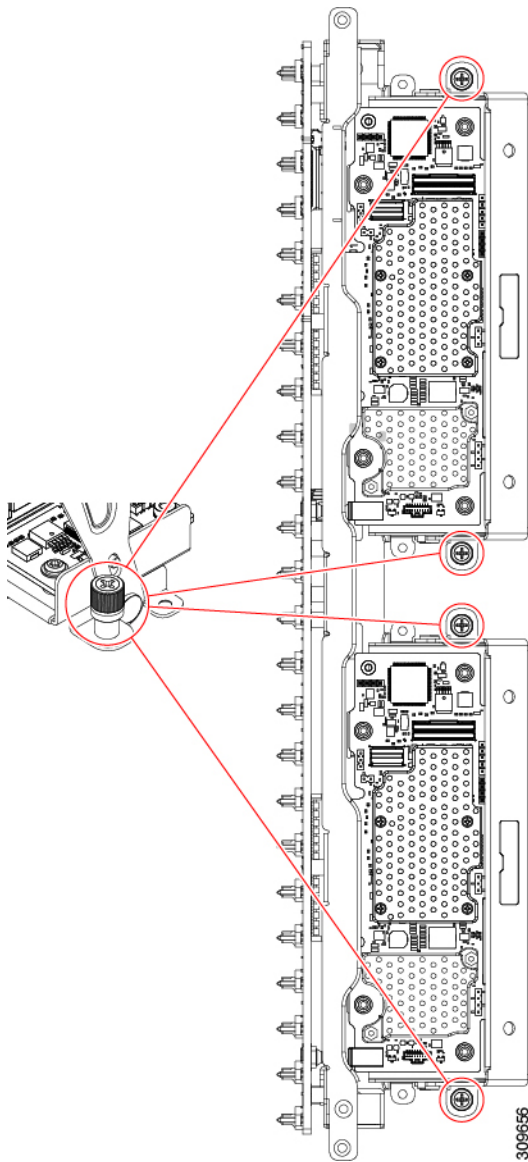
f) Gently push the handle of the tray towards the front of the server.

This step seats each Storage controller card into its socket on the interior wall. You might feel some resistance as the card meets the socket. This resistance is normal.

Step 3 Reconnect the cables.

Step 4 Reinsert the fan tray.

For more information, see Installing the Fan Tray, on page 37.

473213
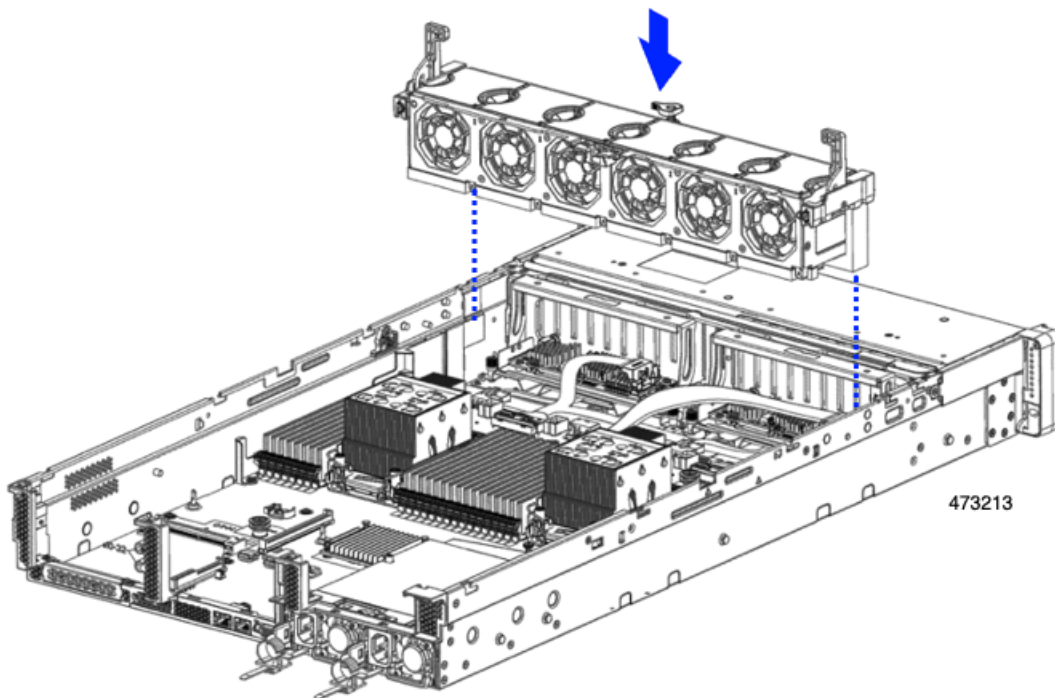
What to do next

Perform other maintenance tasks, if needed, or replace the top cover and restore facility power.
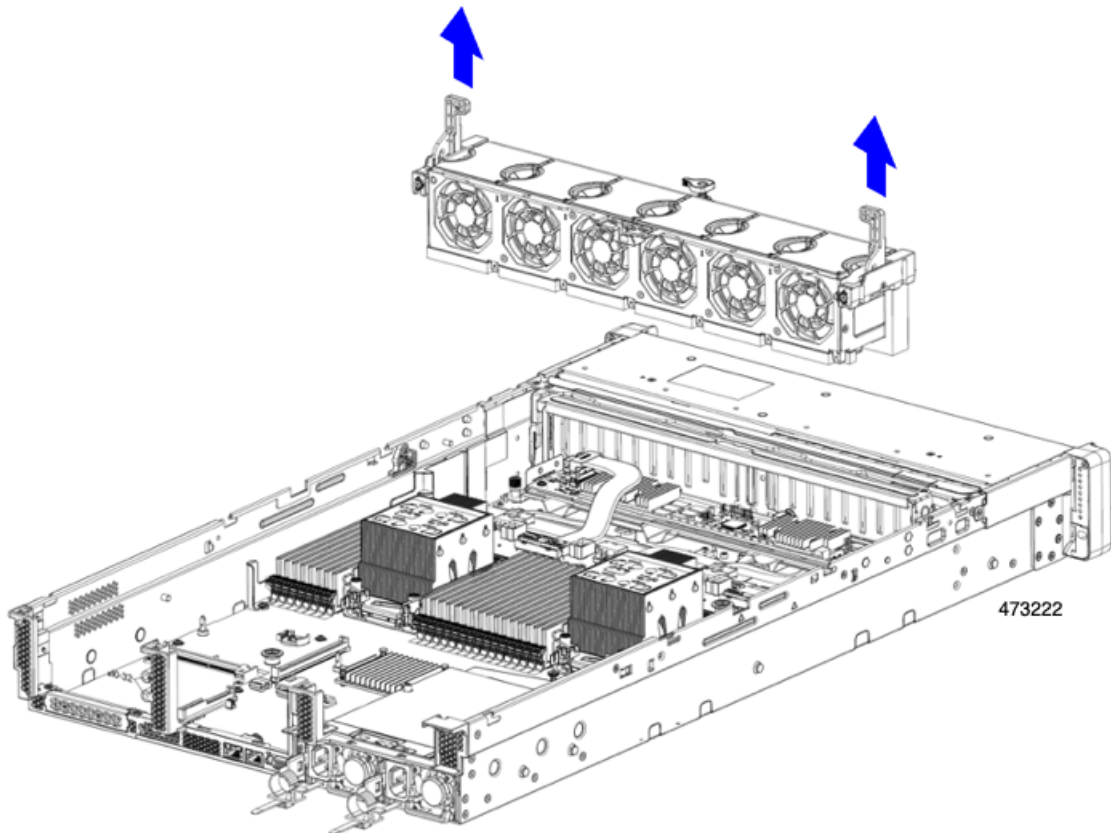
Removing the Storage Controller Card

The Storage controller can contain either a single controller card in a single tray, or two controller cards each in its own tray. Use this procedure to remove the single Storage controller card. This procedure assumes that you have removed power from the server and removed the top cover.

Step 1   Locate the Storage controller card.
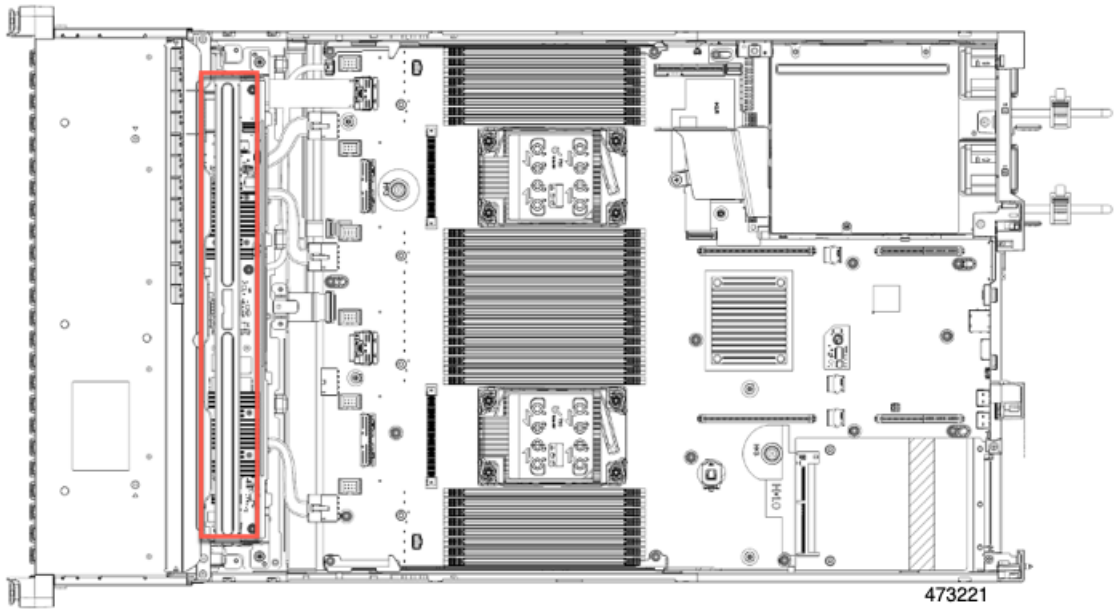
473221

Step 2   Remove the fan tray.

For more information, see Removing the Fan Tray, on page 36.

473222

Step 3   Disconnect the cables.

a) Grasp the ribbon cable connectors and disconnect them from the Storage controller card.

You can leave the other end of the ribbon cable attached to the motherboard.

b) Grasp the connector for the rear-drive cables (1 and 4) and disconnect them from the Storage controller card.

You can leave the other end of the rear-drive cable attached.
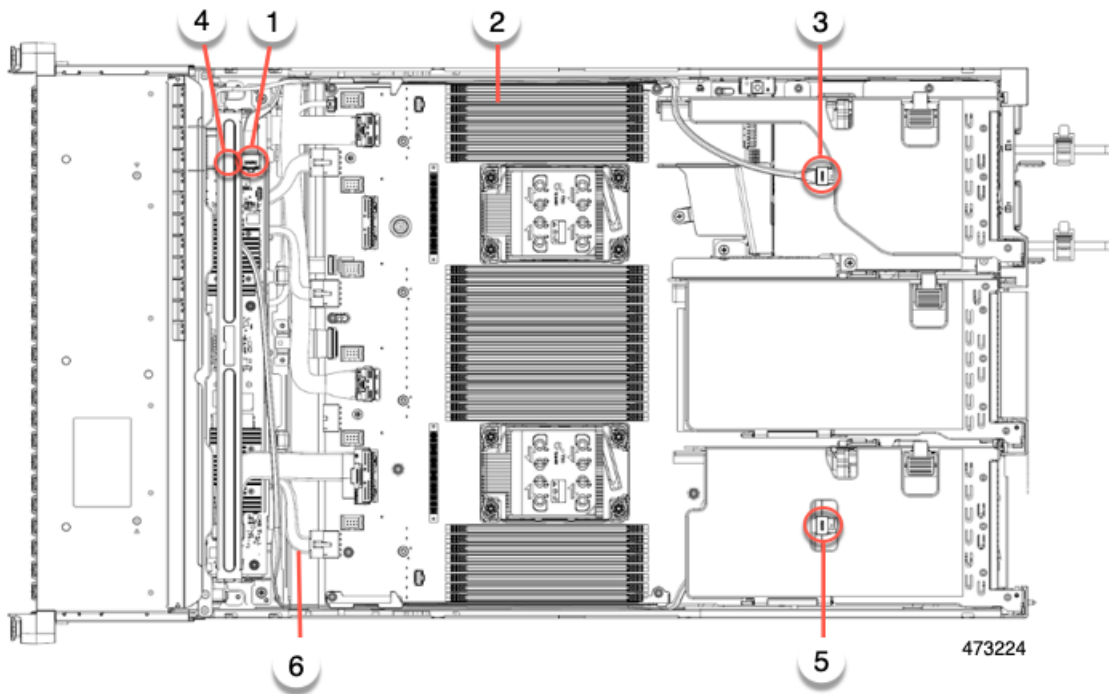
| 1	Storage controller card connector for rear drives (Riser 3B)	2	SAS/SATA cable for rear drives
3	Connector for PCI Riser 3	4	Storage controller card connector for rear drives (Riser 1B)
5	Connector for PCI Riser 1	6	SAS/SATA cable for rear drives

Step 4 Remove the Storage controller card.

a) Using both hands, grasp the handle at the top of the card tray, and gently push it towards the rear of the server.

The handle should slide to the open position. This step disconnects the Storage controller card from a socket on an interior wall.

b) Using a #2 Phillips screwdriver, loosen the captive screws at the edges of the tray.

473225
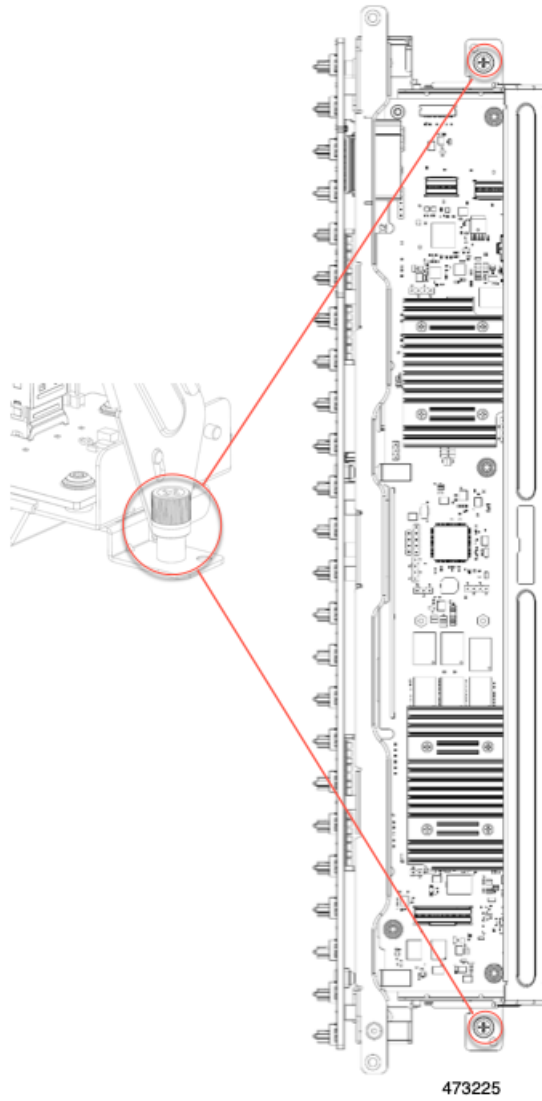
c) Using both hands, grasp the tray's handle, and keeping the Storage controller card tray level, lift it out of the chassis.

473226
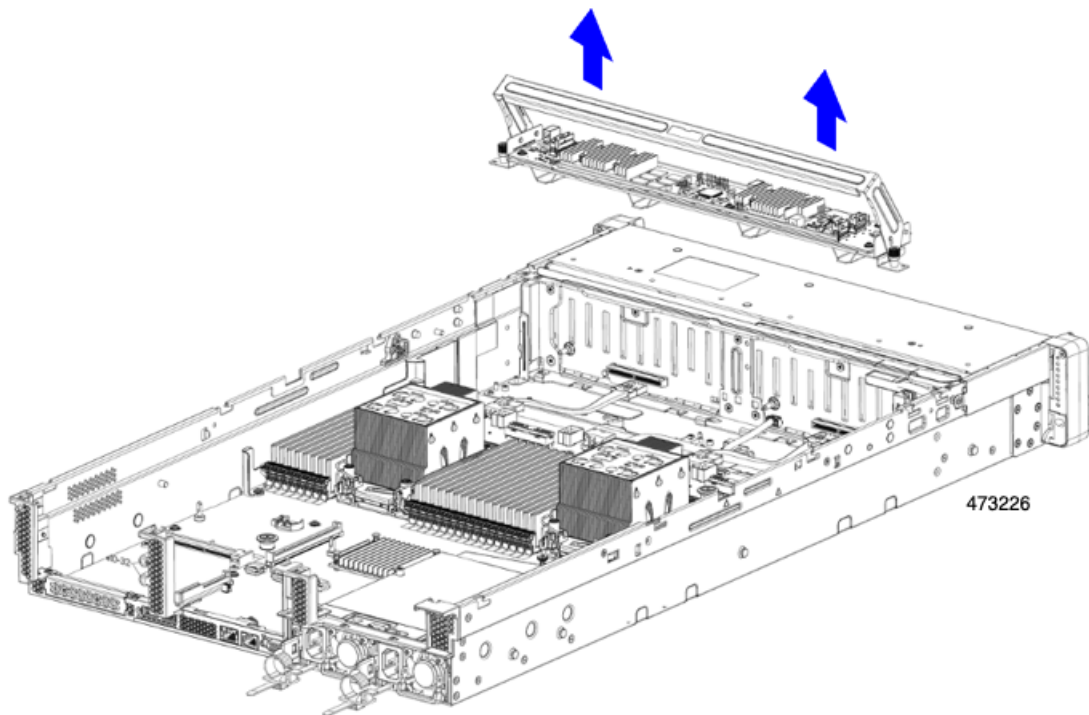
What to do next

Reinsert the Storage controller card. Go to .

# Installing the Storage Controller Card

Use this procedure to install the single Storage controller card into the server. The Storage controller card is contained in tray, which is replaceable.

Step 1   Grasp the card tray by the handle.

Step 2   Install the Storage controller card.

    a)   Make sure that the handle of the tray is in the open position.

    b)   Make sure that the cables do not obstruct installing the Storage controller card.

    c)   Orient the Storage controller card so that the thumbscrews align with their threaded standoffs on the motherboard.

    d)   Using both hands, hold the card tray by the handle, keep the tray level, and lower it into the server.
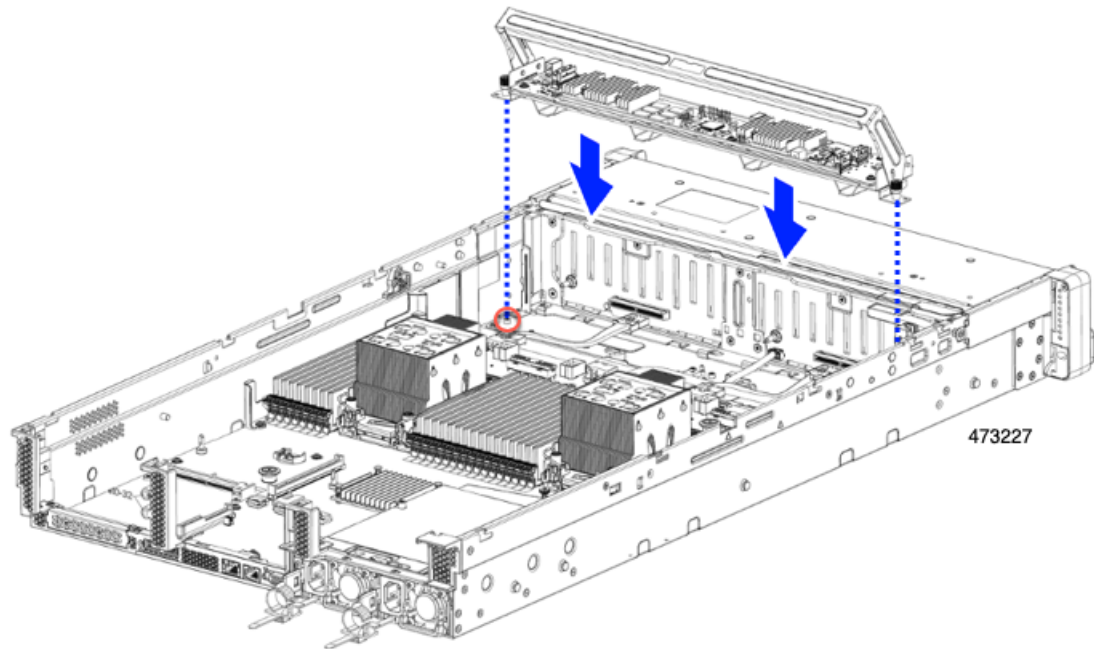
473227

e) Using a #2 Phillips head screwdriver, tighten the screws at the edges of the tray.

309662
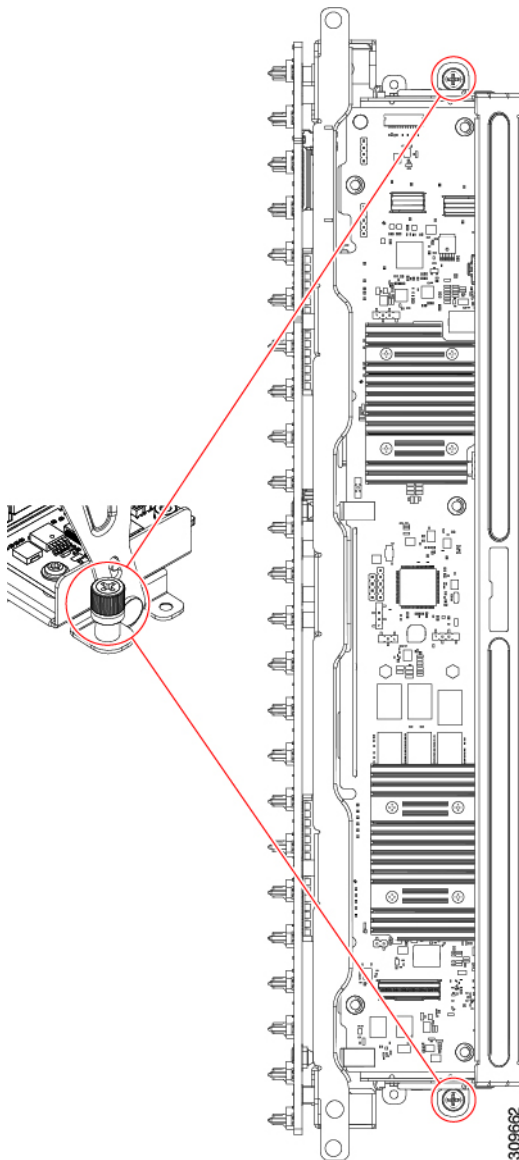
f) Using both hands, make sure to apply equal pressure to both sides of the handle, and gently push the handle of the tray towards the front of the server.

This step seats the Storage controller card into its sockets on the interior wall. You might feel some resistance as the card meets the socket. This resistance is normal.

Step 3   Reconnect the cables.

Step 4   Reinsert the fan tray.

For more information, see Installing the Fan Tray, on page 37.

473223
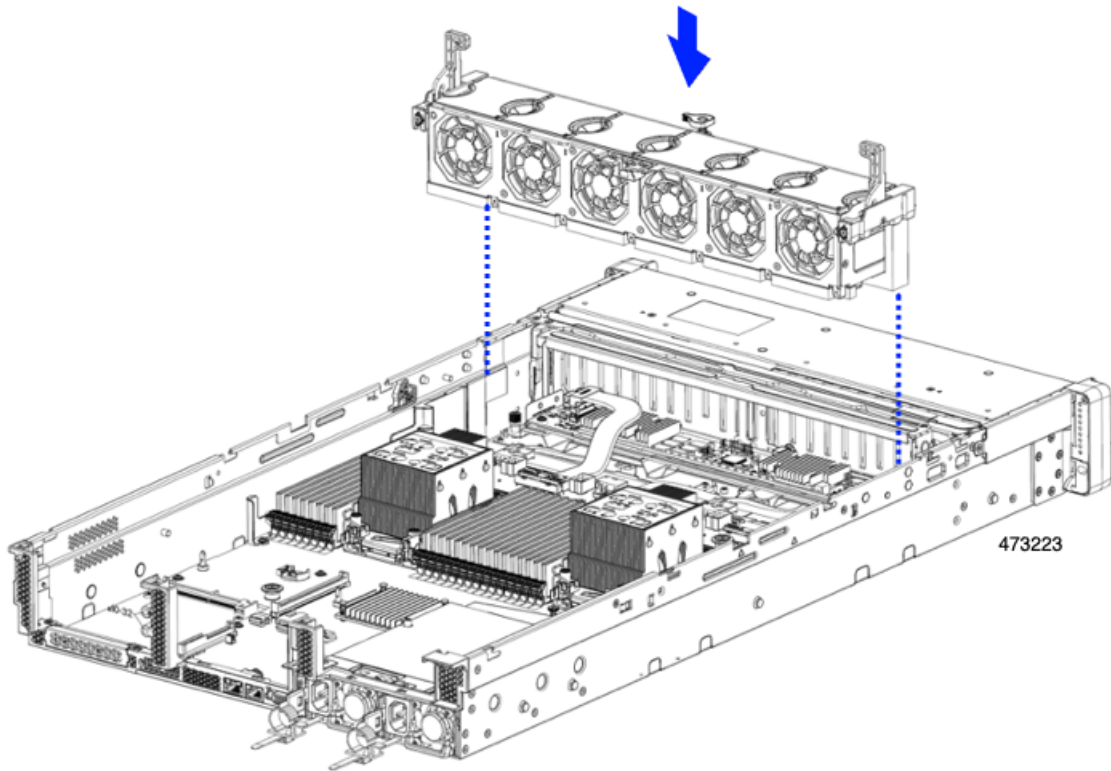
What to do next

Perform other maintenance tasks, if needed, or replace the top cover and restore facility power.

Verify Cabling

After installing a Storage controller card, the cabling between the card(s) and rear drives should be as follows.

- For a 24-drive server, verify the following:
    - the SAS/SATA cable is connected to the controller card and Riser 3B
    - the SAS/SATA cable is connected to the controller card and the Riser 1B
    - both ribbon cables are connected to the controller card and the motherboard

1	SAS cable connection on Storage controller card.	2	SAS cable that connects to rear drives in Riser 3B
3	SAS cable connection on rear Riser 3B.	4	SAS cable connection on Storage controller card.
5	Ribbon cables connecting Storage controller cards to motherboard.	6	SAS cable that connects to rear drives in Riser 1B
7	SAS cable connection on rear Riser 1B.		

Replacing the Supercap (RAID Backup)

This server supports installation of two Supercap units for 24 drive servers. The unit mounts to a bracket on the removable air baffle.

The Supercap provides approximately three years of backup for the disk write-back cache DRAM in the case of a sudden power loss by offloading the cache to the NAND flash.

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 8.

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 the Server Top Cover, on page 9.

d) Locate the SuperCap unit(s) as shown below.
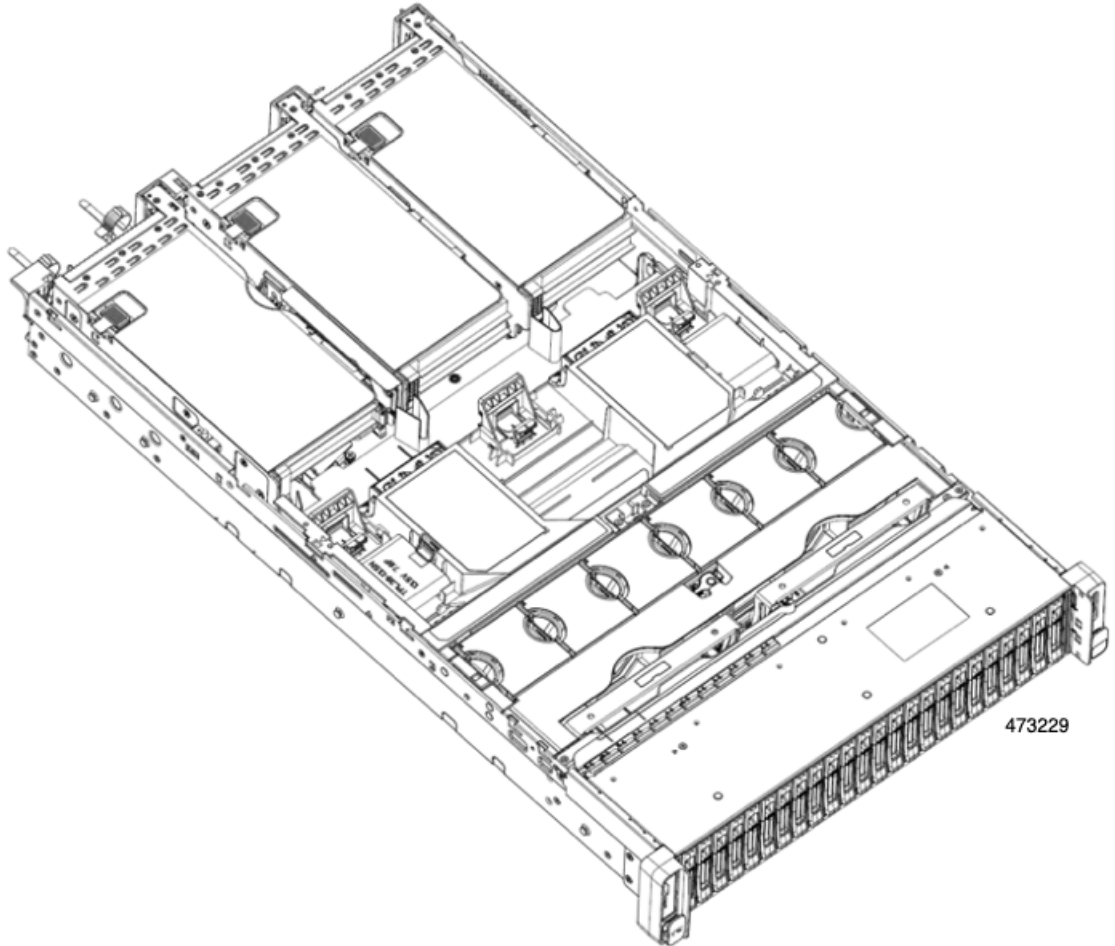
Step 2 Remove an existing Supercap:

a) Disconnect the Supercap cable from the RAID cable.

b) Push aside the securing tab that holds the Supercap to its bracket.

c) Lift the Supercap free of the bracket and set it aside.
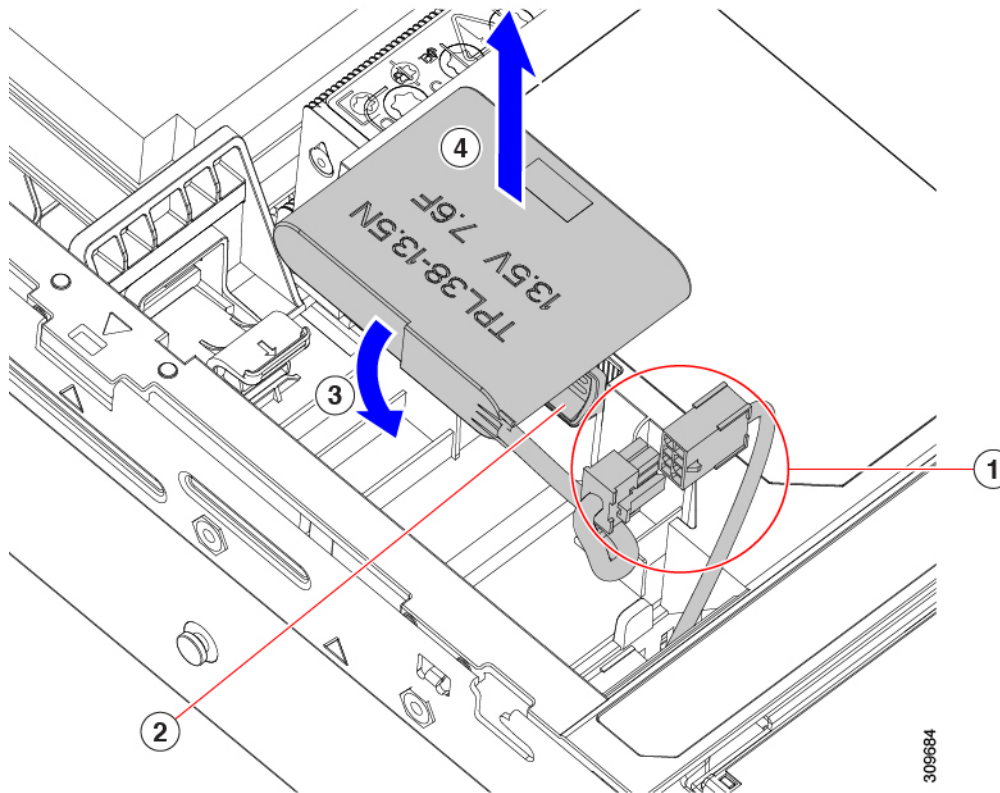
Step 3 Install a new Supercap:

a) Orient the SuperCap unit so that the SuperCap cable and the RAID cable connectors meet.

b) Make sure that the RAID cable does not obstruct the SuperCap when you install it, then insert the new Supercap into the mounting bracket.

Make that the SuperCap unit is securely inserted into it bracket.

c) Connect the Supercap cable from the RAID controller card to the connector on the Supercap cable.
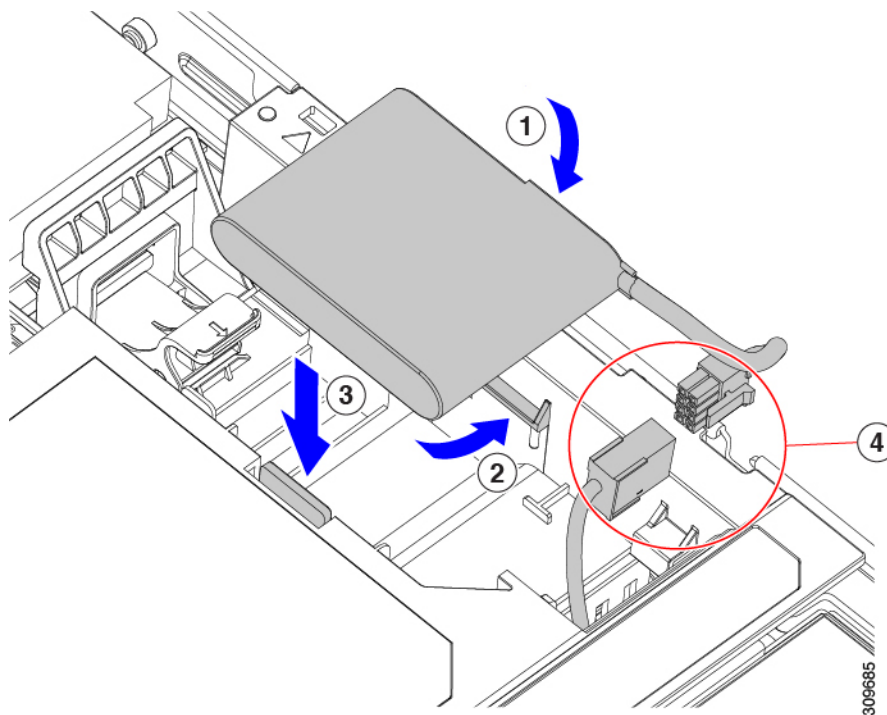
Step 4   Replace the top cover to the server.

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

Replacing a 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.

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)

- 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.

- 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.

- 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**.

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 8.

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 the Server Top Cover, on page 9.

Step 4   Remove a controller from its motherboard socket:

a) Locate the controller in its socket between PCIe Riser 2 and 3.

Figure 21: Cisco Boot-Optimized M.2 RAID Controller on Motherboard
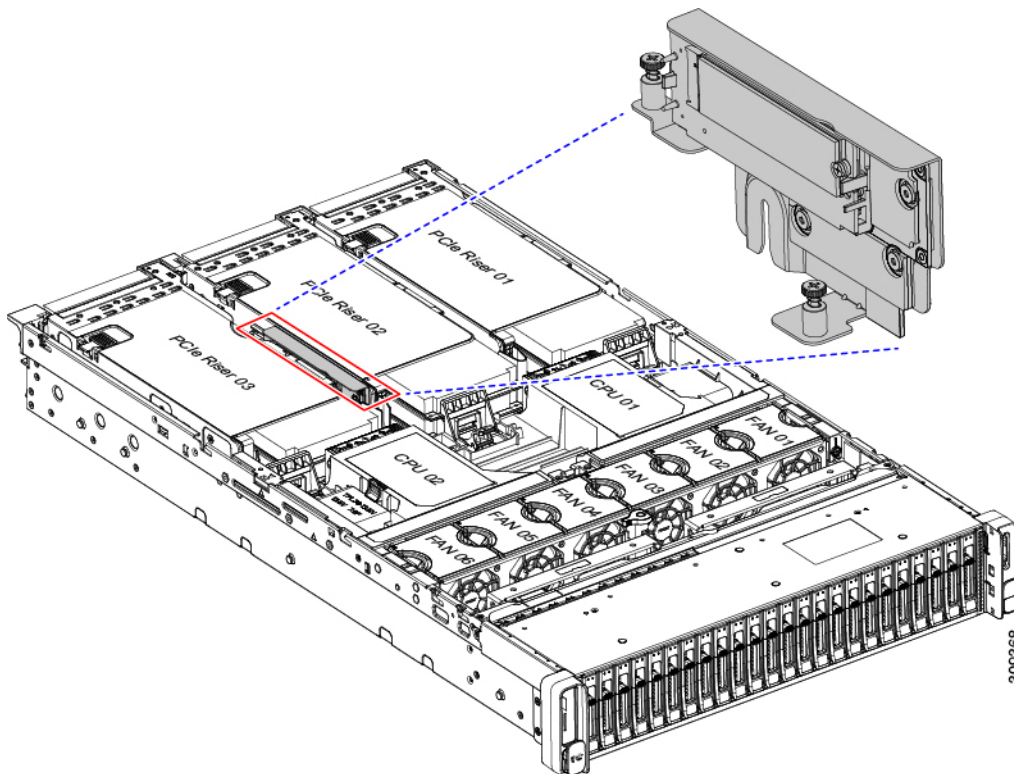
b) Using a #2 Phillips screwdriver, loosen the captive screws and remove the M.2 module.
c) At each end of the controller board, push outward on the clip that secures the carrier.
d) Lift both ends of the controller to disengage it from the carrier.
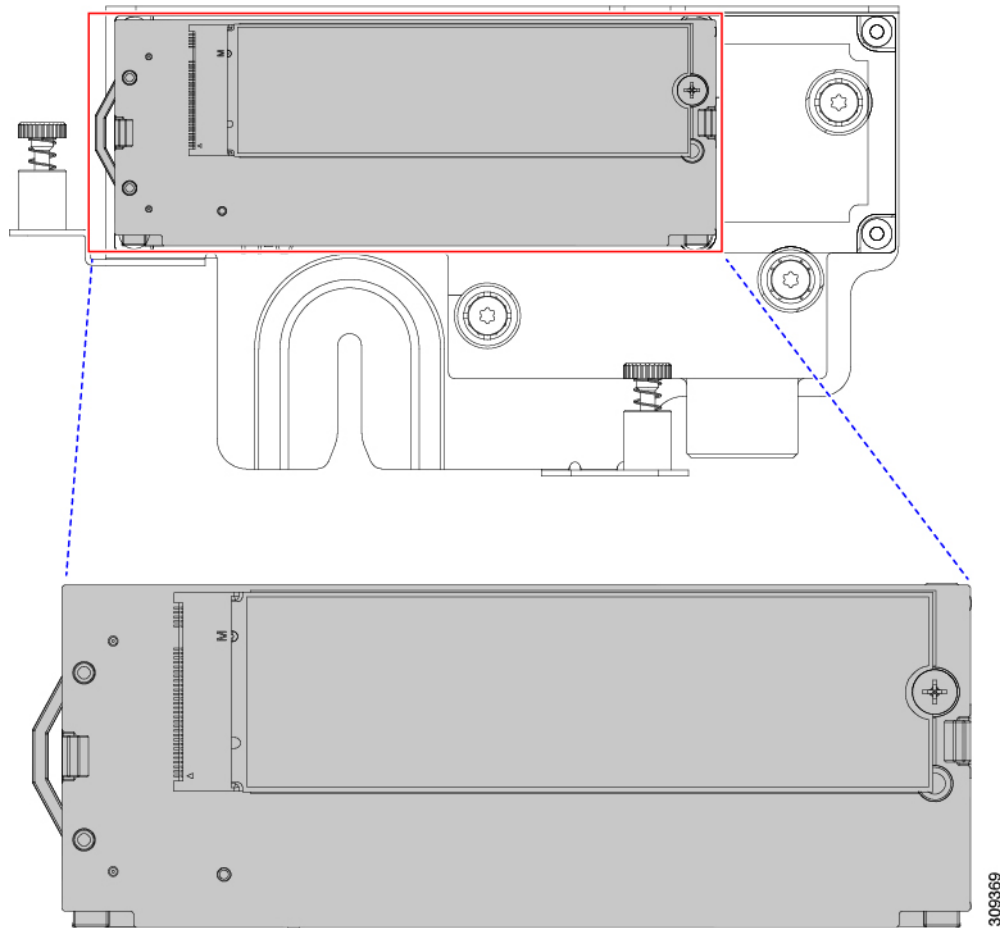
e) Set the carrier on an anti-static surface.

Step 5 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 22: Cisco Boot-Optimized M.2 RAID Controller, Showing M.2 Drive Installation
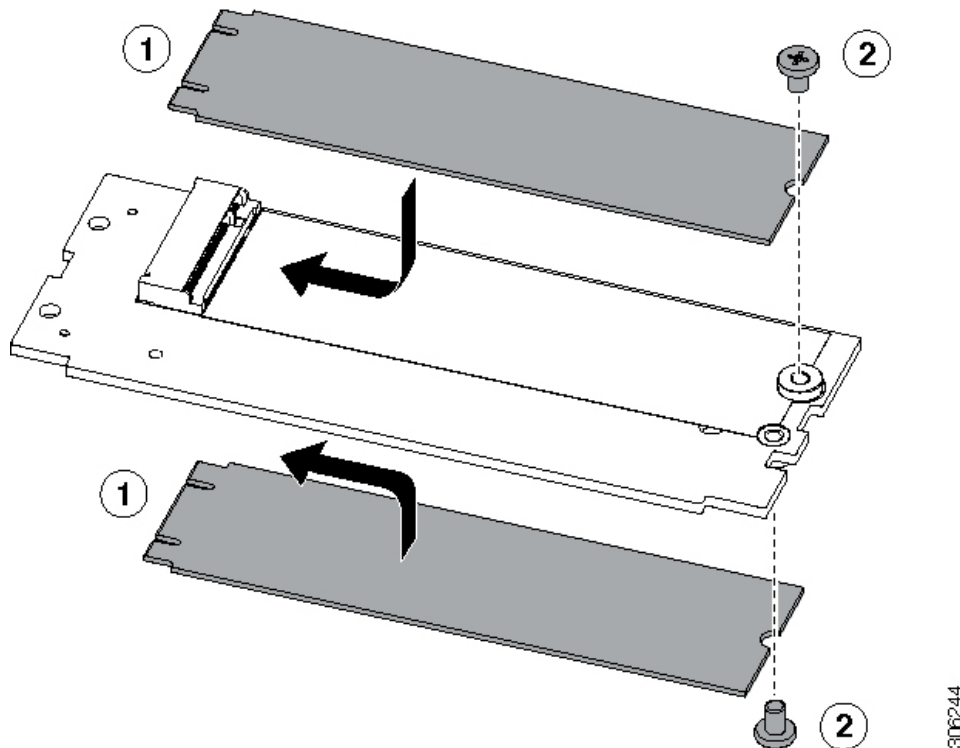
Step 6 Install the controller to its socket on the motherboard:

a) Position the controller over the 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 7 Replace the top cover to the server.

Step 8 Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

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 8.

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 the Server Top Cover, on page 9.

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 screwholes line 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.

Installing a Trusted Platform Module (TPM)

The trusted platform module (TPM) is a small circuit board that plugs into a motherboard socket and is then permanently secured with a one-way screw. The socket location is on the motherboard below PCIe riser 2.

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 an existing TPM 1.2 installed in the server, you cannot upgrade to TPM 2.0. If there is no existing TPM in the server, you can install TPM 2.0.

- If the TPM 2.0 becomes unresponsive, reboot the server.

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 8.

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 the Server Top Cover, on page 9.

Step 2   Remove PCIe riser 2 from the server to provide clearance to the TPM socket on the motherboard.

Step 3   Install a TPM:

a) Locate the TPM socket on the motherboard.

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.

Step 4   Replace PCIe riser 2 to the server. See Replacing a PCIe Riser, on page 62.

Step 5   Replace the 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   Continue with Enabling the TPM in the BIOS, on page 99.

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 99.

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**.

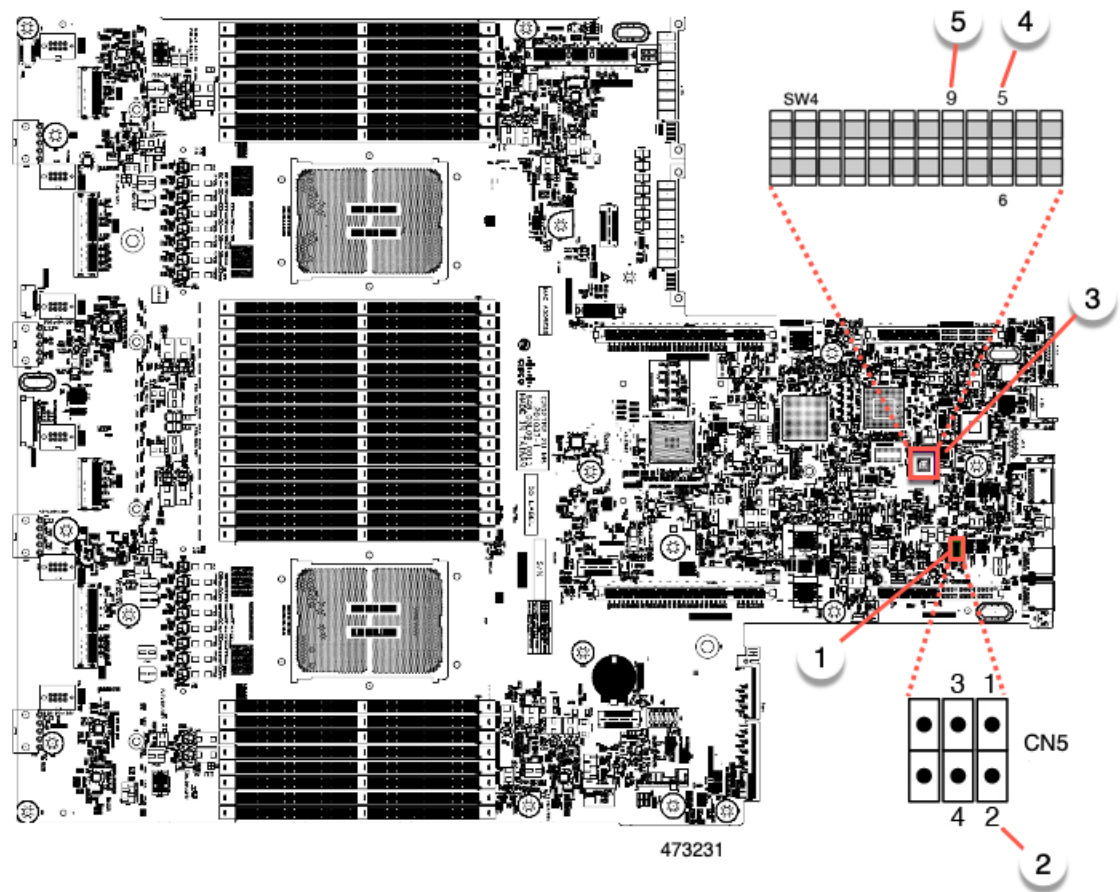**Step 5**   Press **F10** to save your changes and exit the BIOS Setup utility.

Service Headers and Jumpers

This server includes blocks of headers and switches (SW12, CN3) that you can use for certain service and debug functions.

This section contains the following topics:

473231

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 SW4 switch block. See .

⚠️

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 8.

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 the Server Top Cover, on page 9.

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 SW4 switch block. See Service Headers and Jumpers, on page 100.

Step 1   Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 8. 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 the Server Top Cover, on page 9.

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 100.

Step 1   Shut down and remove power from the server as described in Shutting Down and Removing Power From the Server, on page 8. 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 the Server Top Cover, on page 9.

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.