



# **Cisco UCS X410c M8 Compute Node Hardware Installation and Service Guide**

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## Preface

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- [Bias-free Doc Disclaimer, on page vii](#)
- [Full Cisco Trademarks with Hardware License, on page vii](#)
- [Communications, Services, and Additional Information, on page ix](#)

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# CHAPTER 1

## Overview

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This chapter contains the following topics:

- [Cisco UCS X410c M8 Compute Node Overview, on page 1](#)
- [Local Console, on page 8](#)
- [Front Mezzanine Options, on page 9](#)
- [mLOM and Rear Mezzanine Slot Support, on page 10](#)
- [System Health States, on page 11](#)
- [Interpreting LEDs, on page 12](#)

## Cisco UCS X410c M8 Compute Node Overview

The Cisco UCS X410c M8 Compute Node (UCSX-410C-M8) is a two-slot compute node that supports four CPU sockets for 6th Generation Intel® Xeon® Scalable Processors. Each compute node is exactly four CPUs.

The overall compute node consists of two distinct subnodes, a primary and a secondary.

- The primary contains two CPUs (1 and 2), two heatsinks, and half of the DIMMs. All additional hardware components and supported functionality are supported through the primary, including the front and rear mezzanine hardware options, rear mezzanine bridge card, front panel, KVM, management console, and status LEDs.
- The secondary contains two additional CPUs (3 and 4), two heatsinks, and the other half of the DIMMs. The secondary also contains a power adapter, which ensures that the electrical power is shared and distributed between the primary and secondary. The power adapter is not a customer-serviceable part.

Each Cisco UCS X410c M8 compute node supports the following:

- Up to 16 TB of system memory using 64 DDR5 DIMMs. The DIMMs operate up to 6400 MHz with 1 DPC, and up to 5200 MHz with 2 DPC. Thirty-two DDR5 DIMMs are supported on the primary, and 32 DIMMs are supported on the secondary.
- Supports 16 DIMMs per CPU, 8 channels per CPU socket, 2 DIMMs per channel. Memory Mirroring and RAS is supported.
- Supported memory can be populated as 64 GB, 96 GB, 128 GB, or 256 GB DDR5 DIMMs.
- One front mezzanine module which can support any of the following:
  - A front storage module, which supports multiple different storage device configurations:

- Compute Pass Through Controller (UCSX-X10C-PT4F-D)
  - All NVMe configuration consisting of up to six U.3 NVMe Gen4 (x4 PCIe) SSDs in slots 1 through 6.
- 24G Tri-mode M1 RAID controller (UCSX-RAID-M1L6)
  - A storage configuration consisting of up to six SAS/SATA or U3 NVMe drives is supported in slot 1 through 6. Mixture of RAID creation between SAS and SATA, SAS and U3 NVMe, SATA and U3 NVMe are not allowed. U.3 NVMe drives are also supported with an integrated RAID mode as well as Direct attach mode for slot 5 and 6.
    - SAS: 12G, 24G in a x1 config
    - SATA: 6G in a x1 config
    - NVMe: Gen 4 in a x2 config
- Pass Through Controller for E3.S drives (UCSX-X10C-PTE3), which supports up to nine hot-pluggable EDSFF E3.S NVMe drives.
- The Compute Node front panel has a flexible configuration through the front mezzanine module option you ordered. The following options are supported: as documented in
  - Compute Node front panel with SAS/SATA/NVMe Drives
  - Compute Node front panel with U.3 NVMe Drives
  - Compute Node Font Panel with E3.S NVMe Drives.

For additional information, see [Drive Front Panels, on page 6](#).

For additional information, see [Front Mezzanine Options, on page 9](#).

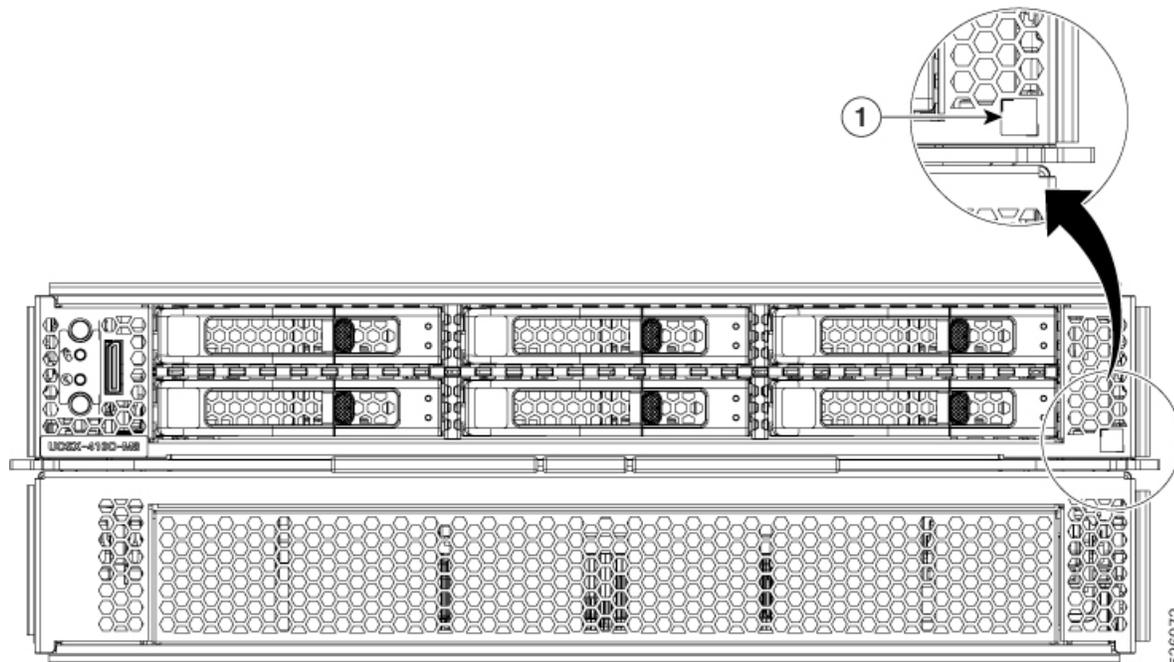
- 1 modular LAN on motherboard (mLOM) module or virtual interface card (VIC) supporting a maximum of 200G of aggregate traffic, 100G to each fabric, through a Cisco 5th Gen 100G mLOM/VIC. For more information, see [mLOM and Rear Mezzanine Slot Support, on page 10](#).
- A boot-optimized mini-storage module. Two versions of mini-storage exist:
  - One version supports up to two M.2 SATA drives of up to 960GB each. This version supports an optional hardware RAID controller (RAID1).
  - One version supports up to two M.2 NVMe drives of up to 960GB each that are directly attached to CPU 1. This version does not support an optional RAID controller.

Two options of mini-storage exist, one supporting up to two M.2 SATA drives with a MSTOR-RAID controller (UCSX-M2I-HWRD-FPS), and one supporting up to two M.2 NVMe drives direct attached to CPU1 through a Passthrough controller (UCSX-M2-PT-FPN).

- Local console connectivity through a USB Type-C connector.
- Up to 4 UCS X410c M8 compute nodes can be installed in a Cisco UCS X9508 modular system.

## Compute Node Identification

Each Cisco UCS X410c M8 compute node features a node identification tag at the lower right corner of the primary node.



The node identification tag is a QR code that contains information that uniquely identifies the product, such as:

- The Cisco product identifier (PID) or virtual identifier (VID)
- The product serial number

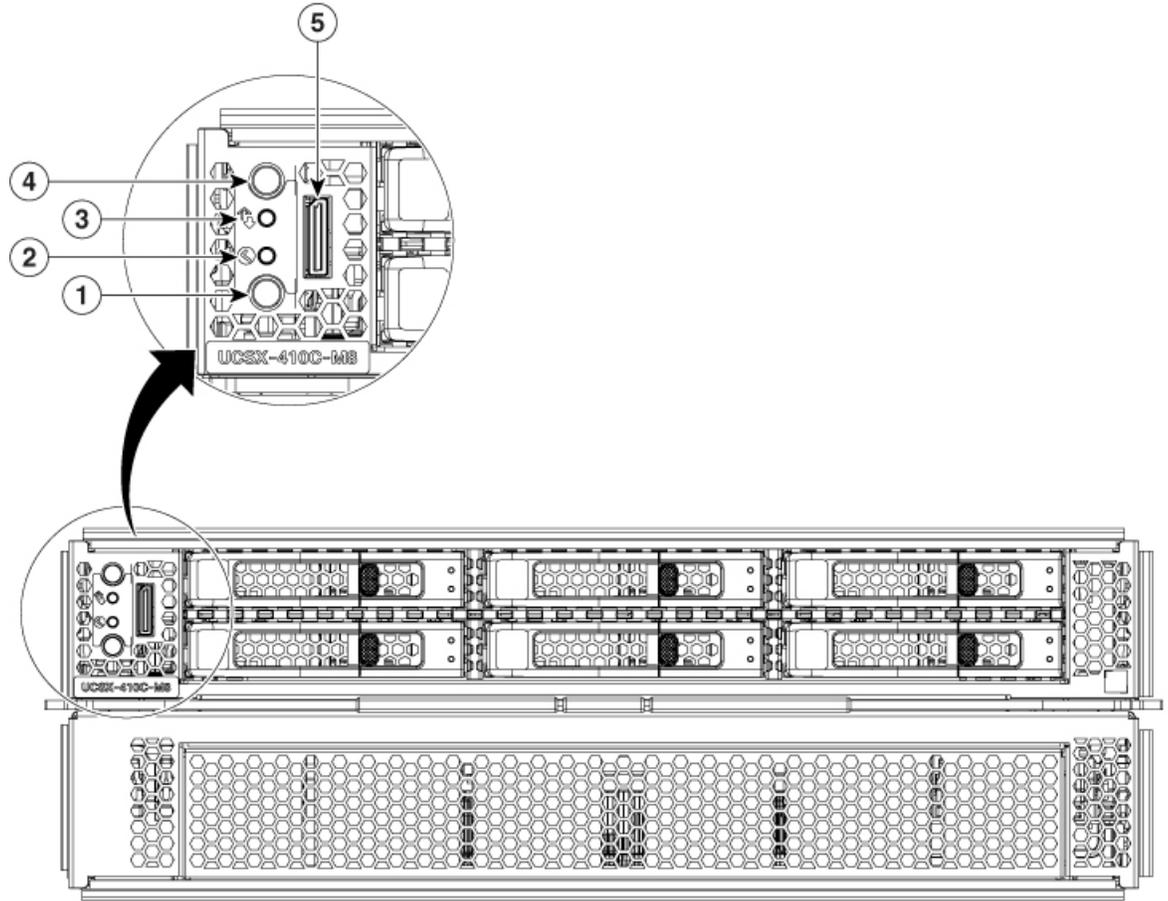
The product identification tag applies to the entire compute node, both the primary and secondary.

You will find it helpful to scan the QR code so that the information is available if you need to contact Cisco personnel.

## Compute Node Front Panel

The Cisco UCS X410c M8 front panel contains system LEDs that provide visual indicators for how the overall compute node is operating. An external connector is also supported.

Compute Node Front Panel



<p><b>1</b></p>	<p><b>Power LED and Power Switch</b></p> <p>The LED provides a visual indicator about whether the compute node is on or off.</p> <ul style="list-style-type: none"> <li>• Steady green indicates the compute node is on.</li> <li>• Steady Amber indicates the compute node is in Standby power mode.</li> <li>• Off or dark indicates that the compute node is not powered on.</li> </ul> <p>The switch is a push button that can power off or power on the compute node. See <a href="#">Front Panel Buttons, on page 5</a>.</p>	<p><b>2</b></p>	<p><b>System Health LED</b></p> <p>A multifunction LED that indicates the state of the compute node.</p> <ul style="list-style-type: none"> <li>• Steady green indicates the compute node successfully booted to runtime and is in normal operating state.</li> <li>• Steady amber indicates that the compute node successfully booted but is in a degraded runtime state.</li> <li>• Blinking amber indicates that the compute node is in a critical state, which requires attention.</li> </ul>
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3	<p>System Activity LED</p> <p>The LED blinks to show whether data or network traffic is written to or read from the compute node. If no traffic is detected, the LED is dark.</p> <p>The LED is updated every 10 seconds.</p>	4	<p>Locator LED/Switch</p> <p>The LED provides a visual indicator that glows solid blue to identify a specific compute node.</p> <p>The switch is a push button that toggles the Indicator LED on or off. See <a href="#">Front Panel Buttons, on page 5</a>.</p>
5	<p>External Connector (Oculink) that supports local console functionality.</p>		

## Front Panel Buttons

The front panel has some buttons that are also LEDs. See [Compute Node Front Panel, on page 3](#).

- The front panel Power button is a multi-function button that controls system power for the compute node.
  - Immediate power up: Quickly pressing and releasing the button, but not holding it down, causes a powered down compute node to power up.
  - Immediate power down: Pressing the button and holding it down 7 seconds or longer before releasing it causes a powered-up compute node to immediately power down.
  - Graceful power down: Quickly pressing and releasing the button, but not holding it down, causes a powered-up compute node to power down in an orderly fashion.
- The front panel Locator button is a toggle that controls the Locator LED. Quickly pressing the button, but not holding it down, toggles the locator LED on (when it glows a steady blue) or off (when it is dark). The LED can also be dark if the compute node is not receiving power.

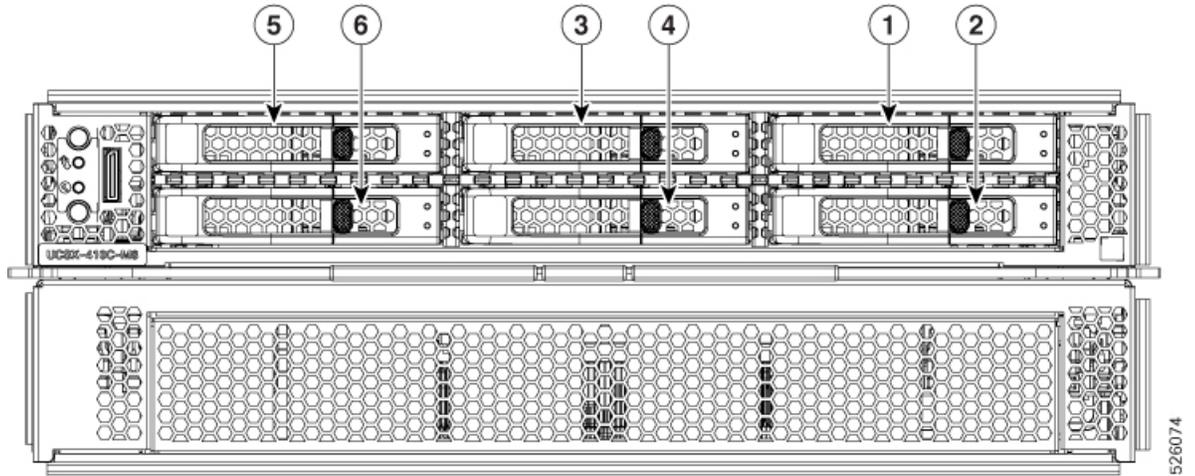
For more information, see [Interpreting LEDs, on page 12](#).

## Drive Bays

Each Cisco UCS X410c M8 compute node has a front mezzanine slot that can support local storage drives of different types and quantities of 2.5-inch SAS, SATA, or U.3 drives and E3.S drives. Drive blank panels (UCSC-BBLKD-M8 or UCSC-E3SIT-F=) must cover all empty drive bays as appropriate.

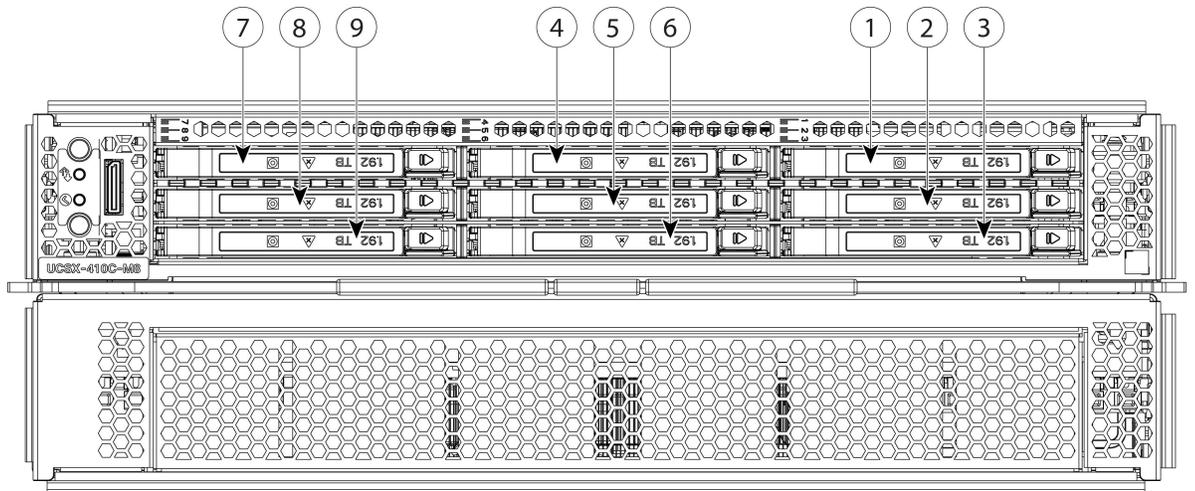
For front a mezzanine module that supports SAS, SATA, or U.3 drives, the drive bays are numbered sequentially from 1 through 6 as shown.

Figure 1: Front Loading Drives, SAS/SATA/U.3 NVMe



For front a mezzanine module that supports E3.S EDSFF NVMe drives, the drive bays are numbered sequentially from 1 through 9 as shown.

Figure 2: Front-Loading Drives, E3.S NVMe



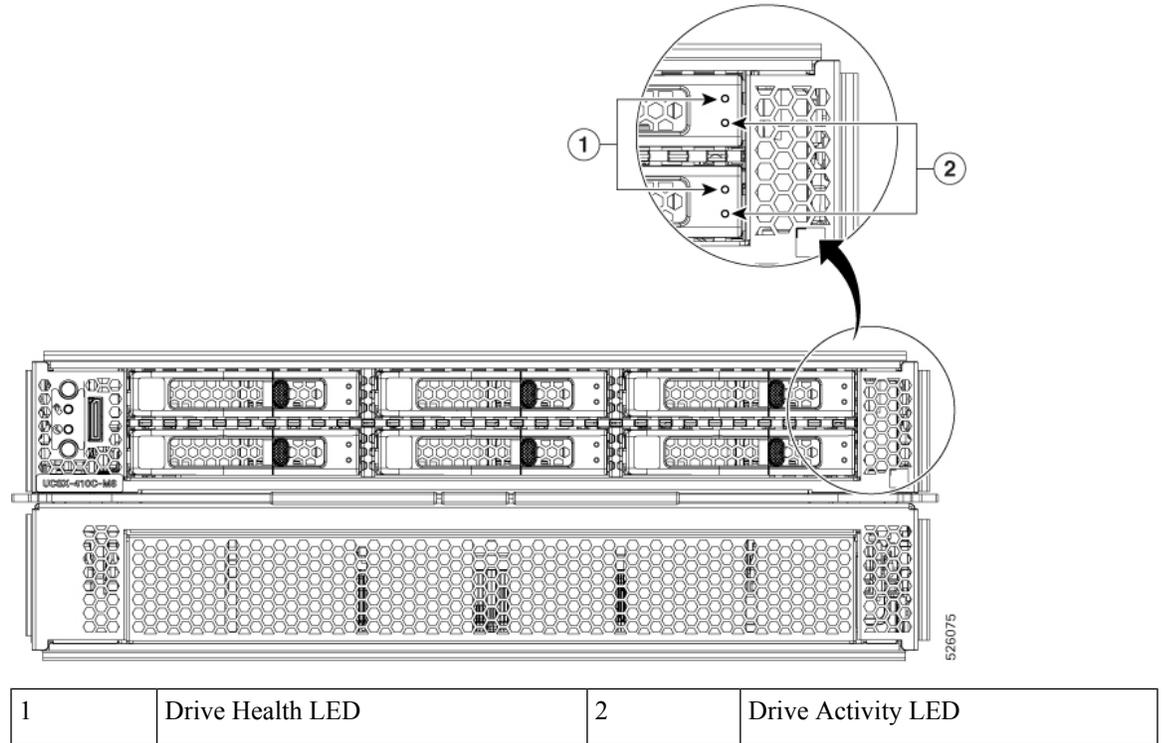
## Drive Front Panels

The front drives are installed in the front mezzanine slot of the compute node. SAS/SATA and NVMe drives are supported.

### Compute Node Front Panel with SAS/SATA/NVMe Drives

The compute node front panel contains the front mezzanine module, which can support a maximum of six SAS/SATA or U.3 NVMe drives. The drives have additional LEDs that provide visual indicators about each drive's status.

**Figure 3: Drive LED Locations**

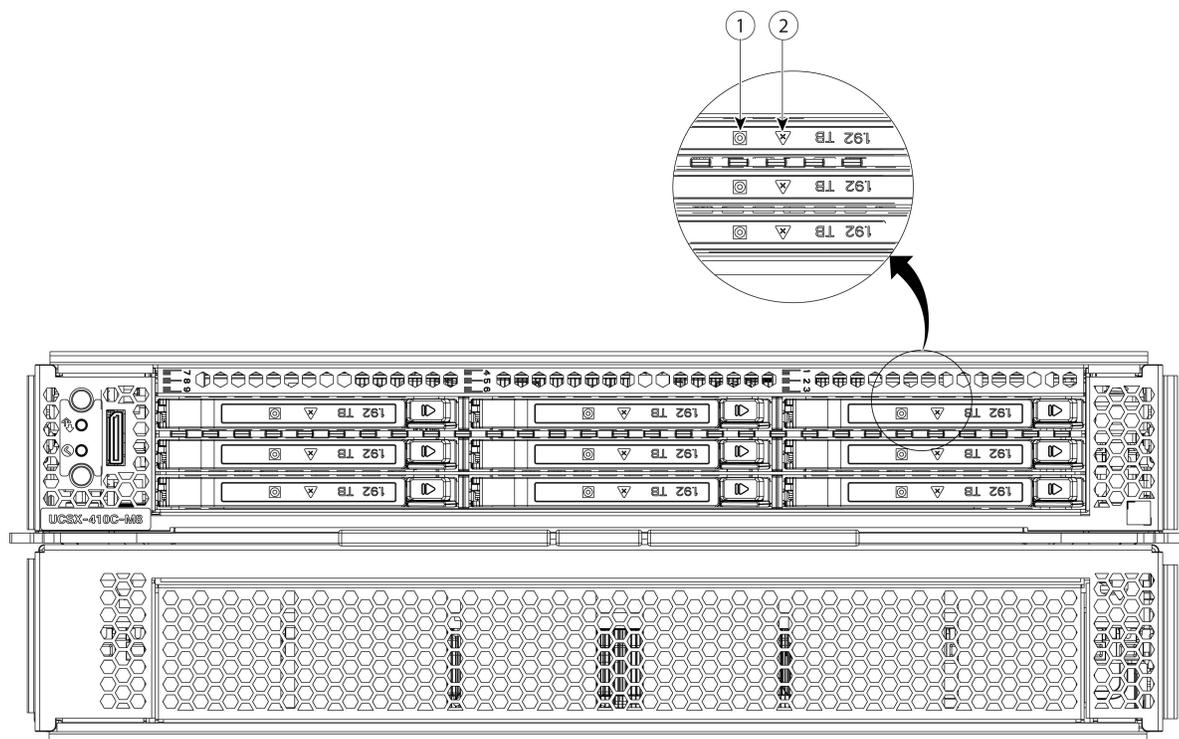


### Compute Node Front Panel with U.3 NVMe Drives

The compute node front panel contains the front mezzanine module, which can support a maximum of six U.3 NVMe drives.

### Compute Node Front Panel with E3.S NVMe Drives

The compute node front panel contains the front mezzanine module, which can support a maximum of nine E3.S NVMe PCIe Gen 5 1.92 TB drives in pass-through mode.



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1	Drive Activity LED	2	Drive Health LED
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## Local Console

The local console connector is a horizontal oriented OcuLink on the compute node faceplate.

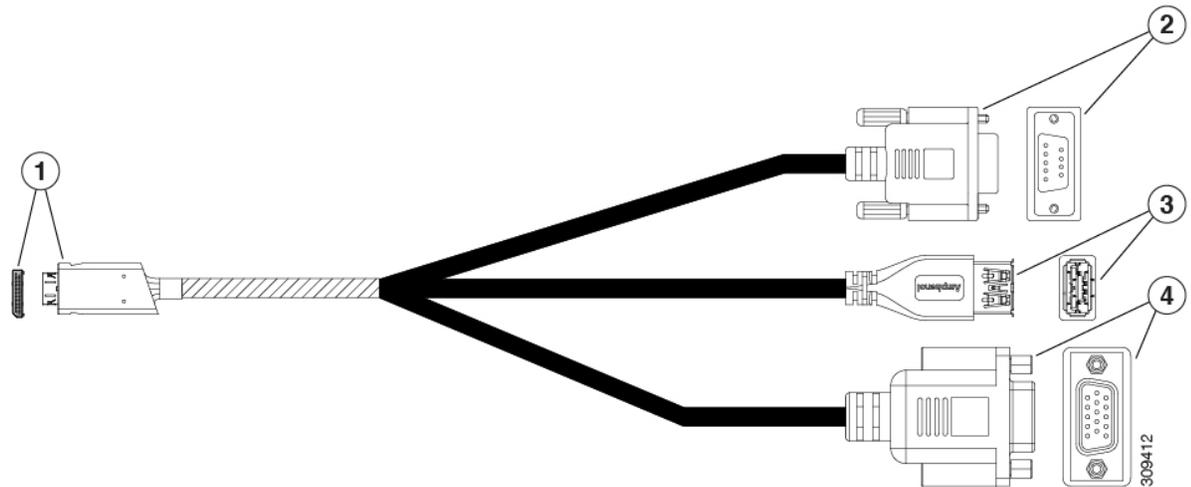
The connector allows a direct connection to a compute node to allow operating system installation directly rather than remotely.

The connector terminates to a KVM dongle cable (UCSX-C-DEBUGCBL) that provides a connection into a Cisco UCS compute node. The cable provides connection to the following:

- VGA connector for a monitor
- Host Serial Port
- USB port connector for a keyboard and mouse

With this cable, you can create a direct connection to the operating system and the BIOS running on a compute node. A KVM cable can be ordered separately. The cable doesn't come with compute node's accessory kit.

Figure 4: KVM Cable for Compute Nodes



1	Oculink connector to compute node	2	Host Serial Port
3	USB connector to connect to single USB 3.0 port (keyboard or mouse)	4	VGA connector for a monitor

## Front Mezzanine Options

The Cisco UCS X410c M8 Compute Node supports front mezzanine module storage through SAS/SATA or NVMe SSDs. For more information, see [Storage Options, on page 9](#).

## Storage Options

The compute node supports the following local storage options in the front mezzanine module.

### Cisco UCS X10c Passthrough Module

The compute node supports the Cisco FlexStorage NVMe passthrough controller, which is a passthrough controller for NVMe drives only. This module supports:

- Support up to six NVMe U.3 SSDs in slots 1 through 6
- PCIe Gen3 and Gen4, x24 total lanes, partitioned as six x4 lanes
- Drive hot plug is supported
- Virtual RAID on CPU (VROC) is not supported, so RAID across NVMe SSDs is not supported

### Cisco UCS X10c E3.S Drive Front Mezzanine Module

As an option, the compute node can support a E3.S- drive based front mezzanine module, the Cisco UCS X10c E3.S Front Mezzanine Module.

Each Cisco UCS X10c front mezzanine drives module consists of the following components:

- Up to nine E3.S 1T PCIe drives.
- PCIe Gen5, x36 total lanes, partitioned as nine x4 lanes.



**Note** Drive hot plug is supported.

For information about this hardware option, see the [Cisco UCS X10c Pass Through Controller for E3.S Installation and Service Guide](#).

### Cisco UCS 24G Tri-Mode M1 RAID Controller Module

This storage option:

- Support up to six SAS/SATA/U.3 NVMe SSDs drives in slots 1 to 6 connected to the RAID controller at PCIe Gen4 and configurable with HW RAID.
- PCIe Gen3 and Gen4, x8 lanes
- Drive hot plug is supported
- RAID support depends on the type of drives and how they are configured.
  - RAID is not supported in a mixture of SAS and SATA, SAS and U.3 NVMe drives, SATA and U.3 NVMe drives in the same RAID group.
  - The following RAID levels are supported across SAS/SATA and U.3 NVMe SSDs when the RAID group is either all SAS or all SATA drives or all U.3 NVMe drives: RAID 0, 1, 5, 6, 00, 10, and 50.
- Support for drive slot 5 and 6 can be either Controller attached mode or direct attached mode. Only NVMe U.3 drives in drive slot 5 and 6 will become CPU attached in direct attach mode.

### Storage-Free Option

If no front storage drives are required, Cisco offers a storage-free configuration consisting of a blank front mezzanine faceplate for the primary.

## mLOM and Rear Mezzanine Slot Support

The following rear mezzanine and modular LAN on motherboard (mLOM) modules and virtual interface cards (VICs) are supported.

The following mLOM VICs are supported.

- Cisco UCS VIC 15420 mLOM (UCSX- ML-V5Q50G) which supports:
  - Quad-Port 25G mLOM.
  - Occupies the compute node's modular LAN on motherboard (mLOM) slot.
  - Enables up to 50 Gbps of unified fabric connectivity to each of the chassis intelligent fabric modules (IFMs) for 100 Gbps connectivity per compute node.

- Cisco UCS VIC 15230 mLOM (UCSX-ML-V5D200GV2), which supports:
  - x16 PCIe Gen 4 host interface to UCS X410c M8 compute node
  - Two or four KR interfaces that connect to Cisco UCS X Series Intelligent Fabric Modules (IFMs):
    - Two 100G KR interfaces connecting to the UCSX 100G Intelligent Fabric Module (UCSX-I-9108-100G)
    - Four 25G KR interfaces connecting to the Cisco UCSX 9108 25G Intelligent Fabric Module (UCSX-I-9108-25G)

The following modular network mezzanine cards are supported.

- Cisco UCS VIC 15422 (UCSX-ME-V5Q50G) which supports:
  - Four 25G KR interfaces.
  - Can occupy the compute node's mezzanine slot at the bottom rear of the chassis.
  - An included bridge card extends this VIC's 2x 50 Gbps of network connections through IFM connectors, bringing the total bandwidth to 100 Gbps per fabric (for a total of 200 Gbps per compute node).



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**Note** Although not an mLOM or rear mezzanine card, the UCS VIC 15000 bridge connector (UCSX-V5-BRIDGE-D) is required to connect the Cisco VIC 15420 mLOM and Cisco VIC 15422 rear mezzanine card on the compute node.

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## System Health States

The compute node's front panel has a System Health LED, which is a visual indicator that shows whether the compute node is operating in a normal runtime state (the LED glows steady green). If the System Health LED shows anything other than solid green, the compute node is not operating normally, and it requires attention.

The following System Health LED states indicate that the compute node is not operating normally.

System Health LED Color	Compute Node State	Conditions
Solid Amber	Degraded	<ul style="list-style-type: none"> <li>• Power supply redundancy lost</li> <li>• Intelligent Fabric Module (IFM) redundancy lost</li> <li>• Mismatched processors in the system. This condition might prevent the system from booting.</li> <li>• Faulty processor in a dual processor system. This condition might prevent the system from booting.</li> <li>• Memory RAS failure if memory is configured for RAS</li> <li>• Failed drive in a compute node configured for RAID</li> </ul>
Blinking Amber	Critical	<ul style="list-style-type: none"> <li>• Boot failure</li> <li>• Fatal processor or bus errors detected</li> <li>• Fatal uncorrectable memory error detected</li> <li>• Lost both IFMs</li> <li>• Lost both drives</li> <li>• Excessive thermal conditions</li> </ul>

## Interpreting LEDs

*Table 1: Compute Node LEDs*

LED	Color	Description
Compute Node Power (callout 1 on the Chassis Front Panel) 	Off	Power off.
	Green	Normal operation.
	Amber	Standby.

LED	Color	Description
Compute Node Activity (callout 2 on the Chassis Front Panel) 	Off	None of the network links are up.
	Green	At least one network link is up.
Compute Node Health (callout 3 on the Chassis Front Panel) 	Off	Power off.
	Green	Normal operation.
	Amber	Degraded operation.
	Blinking Amber	Critical error.
Compute Node Locator LED and button (callout 4 on the Chassis Front Panel) 	Off	Locator not enabled.
	Blinking Blue 1 Hz	Locates a selected compute node—If the LED is not blinking, the compute node is not selected.  You can initiate the LED in UCS Intersight or by pressing the button, which toggles the LED on and off.

Table 2: Drive LEDs, SAS/SATA

Activity/Presence LED 	Status/Fault LED 	Description
Off	Off	Drive not present or drive powered off
On (glowing solid green)	Off	Drive present, but no activity or drive is a hot spare
Blinking green, 4HZ	Off	Drive present and drive activity
Blinking green, 4HZ	Blinking amber, 4HZ	Drive Locator Indicator
On (glowing solid green)	On (glowing solid amber)	Failed or faulty drive
Blinking green, 1HZ	Blinking amber, 1HZ	Drive rebuild or copyback operation in progress
On (glowing solid green)	Two 4HZ amber blinks with a ½ second pause	Predict Failure Analysis (PFA)

Table 3: Drive LEDs, NVMe (VMD Disabled)

Activity/Presence LED 	Status/Fault LED 	Description
Off	Off	Drive not present or drive powered off
On (glowing solid green)	Off	Drive present, but no activity
Blinking green, 4Hz	Off	Drive present and drive activity
Blinking green, 4Hz	Blinking amber, 4Hz	Drive Locator Indicator
N/A	N/A	Failed or faulty drive
N/A	N/A	Drive Rebuild

Table 4: Drive LEDs, NVMe (VMD Enabled)

Activity/Presence LED 	Status/Fault LED 	Description
Off	Off	Drive not present or drive powered off
On (glowing solid green)	Off	Drive present, but no activity
Blinking green, 4HZ	Off	Drive present and drive activity
Blinking green, 4HZ	Blinking amber, 4HZ	Drive Locate indicator or drive prepared for physical removal
N/A	N/A	Failed or faulty drive
N/A	N/A	Drive Rebuild



## CHAPTER 2

# Installing the Compute Node

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This chapter contains the following topics:

- [Removing a Compute Node Blank, on page 15](#)
- [Installing a Compute Node Blank, on page 16](#)
- [Compute Node Installation Guidelines and Limitations, on page 18](#)
- [Removing a Compute Node, on page 20](#)
- [Installing a Compute Node, on page 21](#)
- [Compute Node Configuration, on page 23](#)

## Removing a Compute Node Blank

Do not operate the Cisco UCS X9508 chassis with an empty compute node slot. Fill any empty compute node slots with either a blank or a compute node.

Use this task to remove a compute node blank.

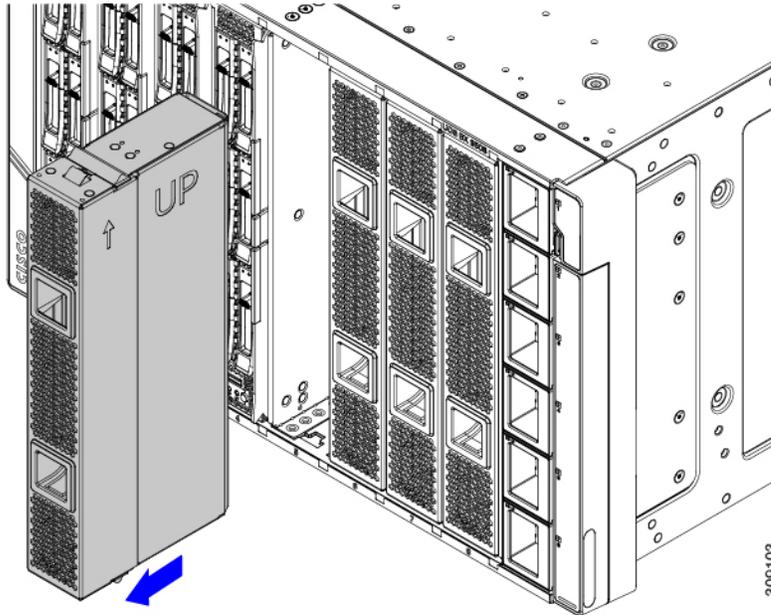
### Procedure

---

**Step 1** Grasp the compute node blank by the finger holds.

**Step 2** Pull the blank towards you until it is completely removed from the chassis.

Notice that the module blank has indicators that show how to orient the blank. You will use this information when you install a blank.

**Figure 5: Removing a Compute Node Blank**

## Installing a Compute Node Blank

If you remove a compute node, and you will not be installing another compute node, you must install a node blank (UCSX-9508-FSBK). Do not operate the UCS X9508 chassis with an empty compute node slot. The minimum configuration is 1 installed compute node, so in this configuration you need 7 module blanks installed.

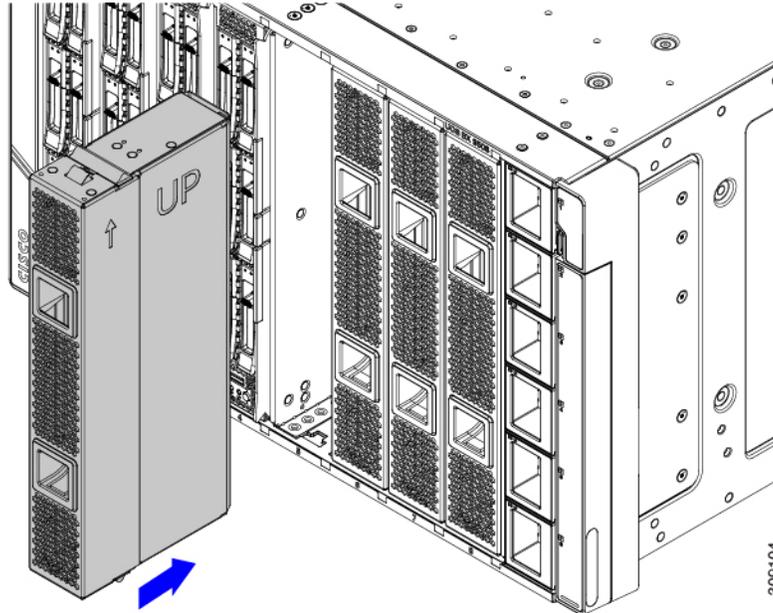
Compute node blanks are interchangeable within the same chassis or other Cisco UCS X9508 chassis.

Use this task to install a compute node blank

### Procedure

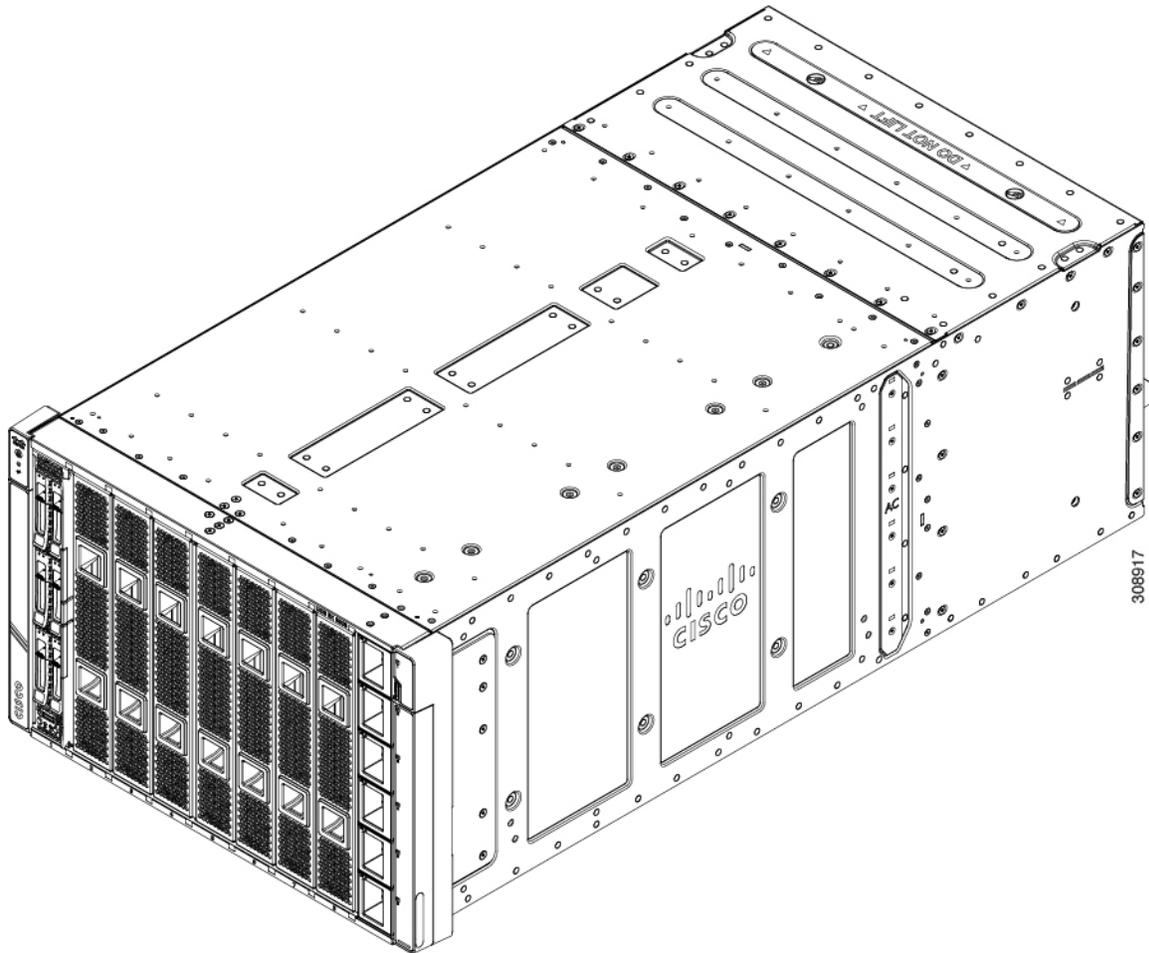
- Step 1** Grasp the blank by the finger holds.
- Step 2** Hold the module blank vertically and align the module blank with the slot.

The module blank has indicators that show how to orient the blank.



**Step 3** Keeping the compute node blank vertical, slide it into the slot until the blank is flush with the face of the chassis.

Figure 6: Installing a Compute Node Blank

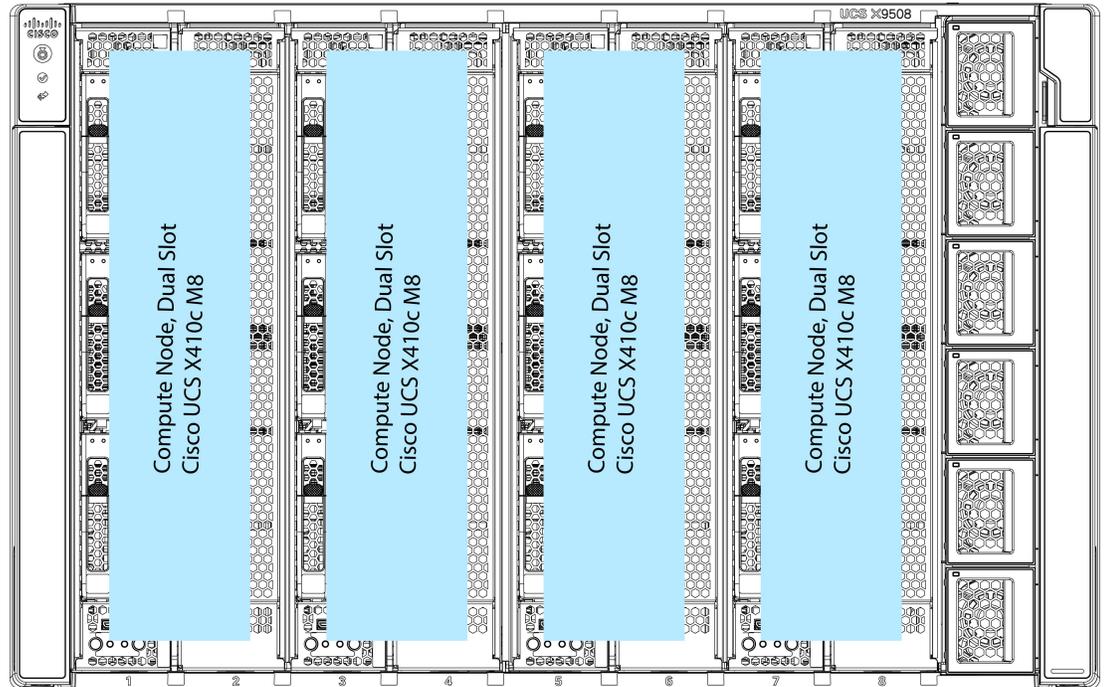


## Compute Node Installation Guidelines and Limitations

Be aware of the following limitations when installing the Cisco UCS X410c M8 compute node into the Cisco UCS X9508 chassis:

- Because the compute node is double-wide, it occupies two slots in the UCS X9508 chassis.
- No Cisco UCS X410c M8 compute nodes are supported in slots 4 and 8. Slot 4/5 has a sheetmetal wall that prevents physical installation, and slot 8 is the last single slot, so it cannot accept the double-wide node.
- The UCS X410c M8 Compute Node is designed for pure high-volume compute. The node has no on-board PCIe connectivity to support additional GPUs either on the node itself or through connectivity to additional GPU/PCIe nodes, such as the Cisco UCS X580p PCIe Node or the Cisco UCS X440p PCIe Node, that are in the same Cisco UCS X9508 chassis.

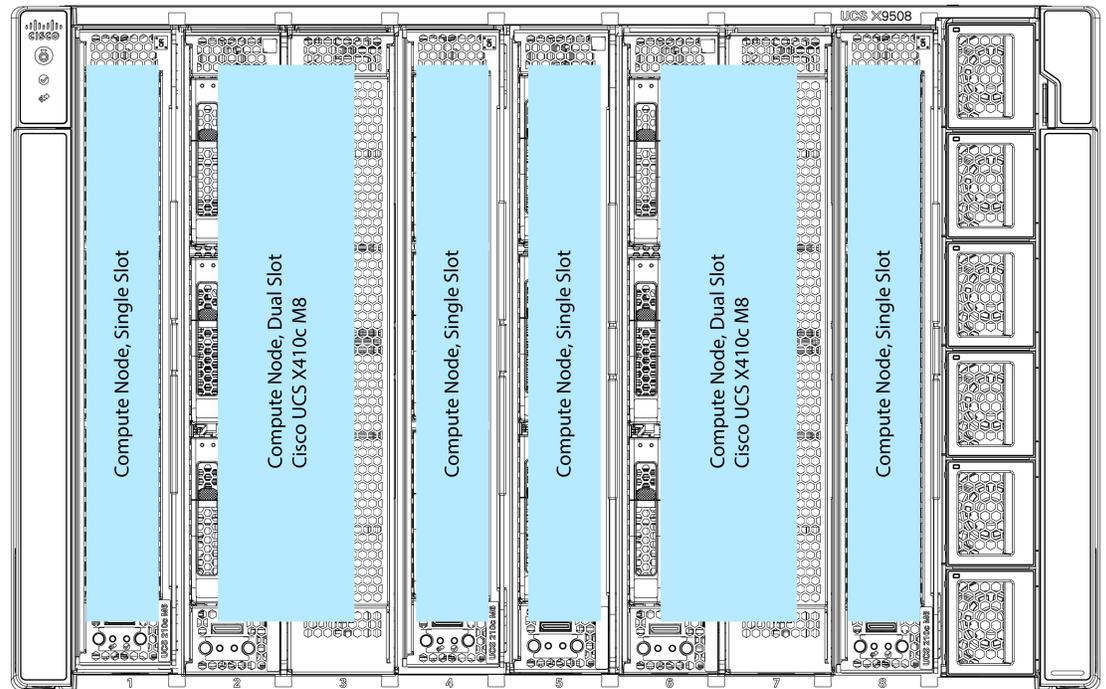
- With the exception of the previously documented restrictions, the compute node can be installed in any two adjacent slots in the Cisco UCS X9508 Chassis:
  - For chassis fully populated with X410c M8 Compute Nodes: Slots 1 / 2, 3 / 4, 5 / 6, and 7 / 8 can accept the X410c compute node. Due to a metal wall between slots 4 and 5, the dual-slot compute node cannot be physically installed to span those slots.



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- For a chassis populated with a mix of different types of compute nodes: Any mix of two adjacent slots (1 / 2, 3 / 4, 5 / 6, and 7 / 8 can accept the X410c compute node, with the exception of slots 4/5 which cannot accept the dual-width compute node because of a sheetmetal wall. Any of the remaining slots can accept single-slot nodes, such as the Cisco UCS X215c M8, Cisco UCS X210c M8, Cisco UCS X210c M7, and Cisco UCS X210c M6 compute nodes.

The following example shows the X410c M8 Compute Node installed in slot 2/3 and 6/7 with single-slot compute nodes installed in slots 1, 4, 5, and 8.



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## Removing a Compute Node

You must decommission the compute node using Cisco Intersight before physically removing the compute node.

Do not operate the chassis with an empty compute node slot. If you will not be installing a compute node in an empty slot, install a compute node blank (UCSX-9508-FSBK) to cover the empty slot.



### Caution

A fully populated compute node is heavy! Full populated, the compute node weighs 36 lb (16.3 kg). Always take appropriate care and use safe lifting procedures when handling the compute node. While sliding the compute node out of the chassis, use both hands to support the bottom of the node.

### Procedure

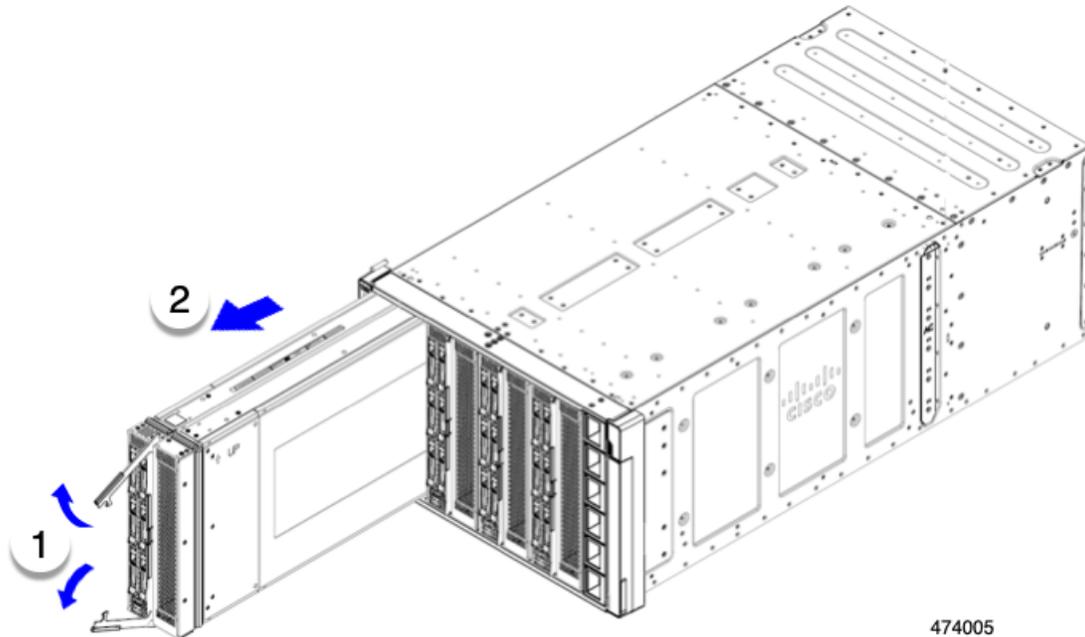
- Step 1** Turn off the compute node by using Cisco Intersight.
- Step 2** Press the release button at the center of the compute node's faceplate to disengage the ejector handles.
- Step 3** Grasp the ejector handles and pull them outward so that they arc vertically away from each other.

While moving the compute node handles, you might feel some resistance. This resistance is normal. It occurs because the connectors at the rear of the compute node are unseating from the corresponding sockets in the chassis.

Also, when the compute node disconnects from the midplane, the compute node powers off.

- Step 4** Grasp the compute node handles and slide the node partially out of the chassis.  
Make sure to keep the compute node vertical while removing it.

*Figure 7: Removing a Cisco UCS x410c M8 Compute Node*



- Step 5** Place your other hand underneath the compute node to support it and slide the compute node completely out of the chassis.
- Step 6** Once removed, place the compute node on an antistatic mat or antistatic foam if you are not immediately reinstalling it.
- Step 7** Do one of the following:
- If you will be installing another compute node, see [Installing a Compute Node, on page 21](#).
  - If the compute node slot is to remain empty, reinstall the compute node blank panels (UCSX-9508-FSBK) to maintain proper thermal temperatures and to keep dust out of the chassis.

## Installing a Compute Node

### Before you begin

The compute node must have its cover installed before installing it into the chassis to ensure adequate airflow.



### Caution

A fully populated compute node is heavy! Full populated, the compute node weighs 36 lb (16.3 kg). Always take appropriate care and use safe lifting procedures when handling the compute node. While sliding the compute node out of the chassis, use both hands to support the bottom of the node.

## Procedure

**Step 1** Remove two compute node blanks.

See [Removing a Compute Node, on page 20](#).

**Step 2** Press the release button at the center of the compute node faceplate to release the ejectors.

### Note

While you are inserting the compute node, keep the ejectors open.

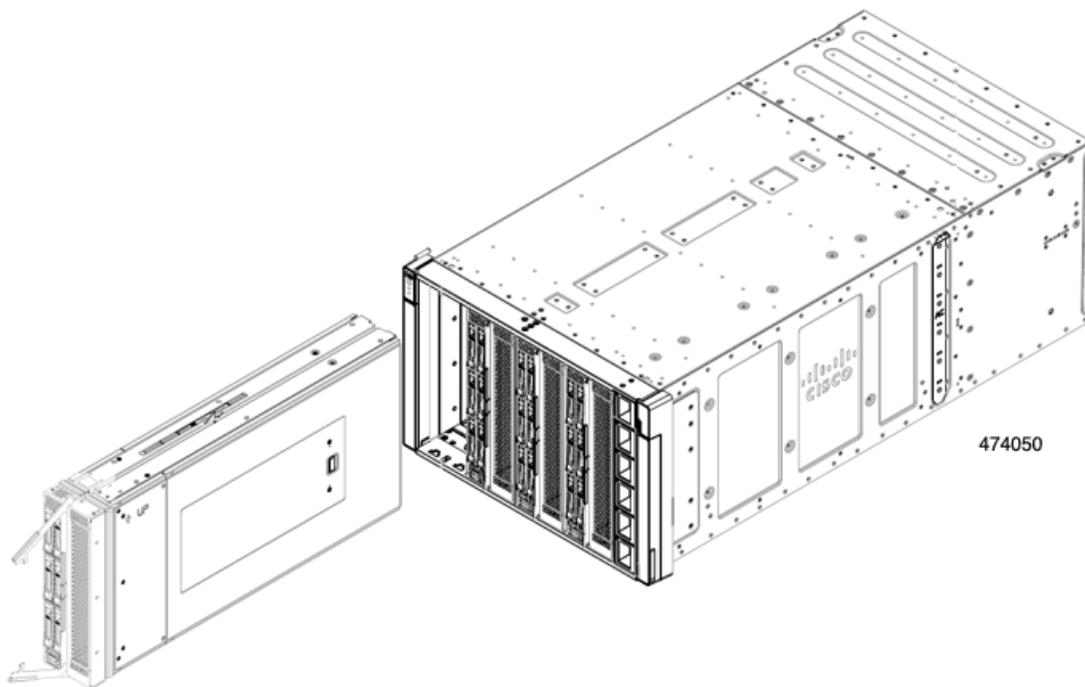
**Step 3** Holding the compute node with both hands supporting the bottom, align the compute node vertically with the empty module bay in the chassis.

The compute node is correctly aligned when the primary is pointing to the left. Also, check for an upward pointing arrow which is stamped onto the compute node to indicate correct orientation.

### Caution

Before inserting the compute node make sure the ejector handles are not flush with the faceplate. The ejector handles must be open so that the ends can catch the sheet metal of the chassis.

**Figure 8: Aligning a Cisco UCS X410c M8 Compute Node**



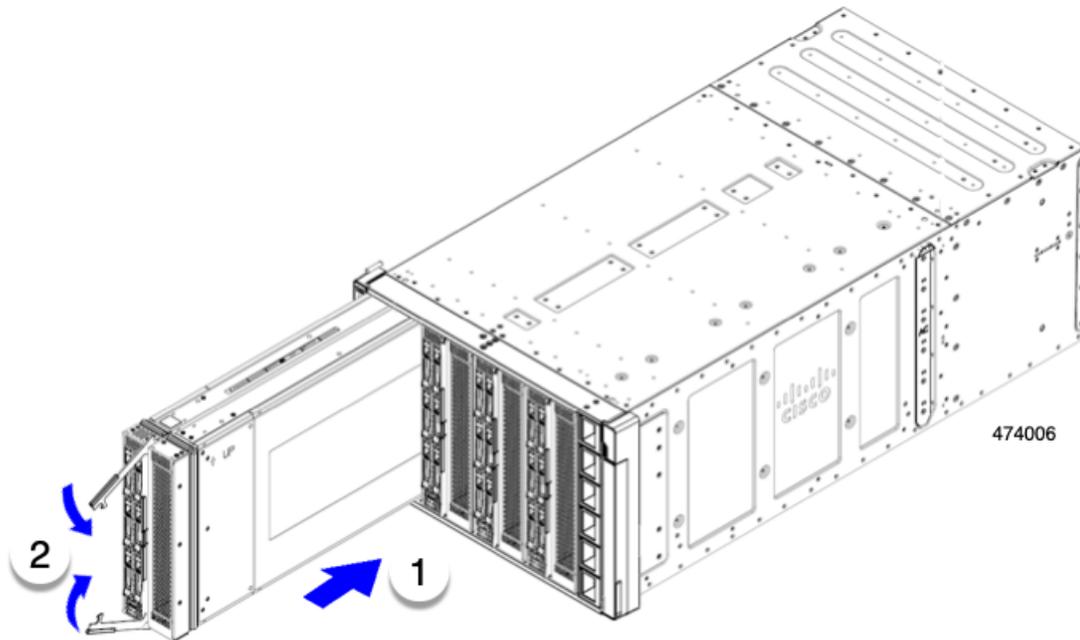
**Step 4** Keeping the compute node level, slide it into the chassis.

**Step 5** When the compute node is almost completely installed, grasp the ejector handles and arc them toward each other. This step seats the compute node into the connector. The compute node should power up.

**Step 6** Push the ejectors until they are flush with the face of the compute node.

When the compute node is completely installed, the retention latches at the end of each handle click into place.

**Figure 9: Installing a Cisco UCS X410c M8 Compute Node**



- Step 7** Configure the compute node as needed through Cisco Intersight.  
See [Compute Node Configuration](#), on page 23.

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## Compute Node Configuration

Cisco UCS M8 compute nodes, such as the Cisco UCS X410c M8, can be configured and managed using the Cisco Intersight management platform in Intersight Managed Mode (Cisco Intersight Managed Mode). For details, see the *Cisco Intersight Managed Mode Configuration Guide*, which is available at the following URL: [Cisco Intersight Managed Mode Configuration Guide](#).





## CHAPTER 3

# Servicing the Compute Node

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This chapter contains the following topics:

- [Removing and Installing the Compute Node Covers, on page 25](#)
- [Internal Components, on page 27](#)
- [Replacing a Drive, on page 30](#)
- [Replacing the Front Mezzanine Module, on page 34](#)
- [Servicing the Mini Storage Module, on page 39](#)
- [Replacing an M.2 SATA or NVMe SSD, on page 43](#)
- [Replacing the SuperCap Module, on page 46](#)
- [Replacing CPUs and Heatsinks, on page 54](#)
- [Replacing Memory DIMMs, on page 68](#)
- [Servicing the Bridge Card, on page 73](#)
- [Servicing the mLOM, on page 76](#)
- [Servicing the VIC, on page 78](#)
- [Servicing the Trusted Platform Module \(TPM\), on page 81](#)

## Removing and Installing the Compute Node Covers

The top covers for both the primary and secondary can be removed to allow access to internal components, some of which are field-replaceable. The green button on the top cover releases the cover so that it can be removed from the chassis.

The top cover for the primary and secondary are not interchangeable, so you must replace the primary's cover on the primary, and the secondary's cover on the secondary. The top covers cannot be installed the wrong way.

Both the primary and secondary have sheet metal top covers to protect the compute node's components. Both covers are removed the same way, but the primary contains additional labels that the secondary does not.

The procedure to replace the top cover is the same regardless of which one you are removing or installing.

To replace the top cover, use the following procedures.

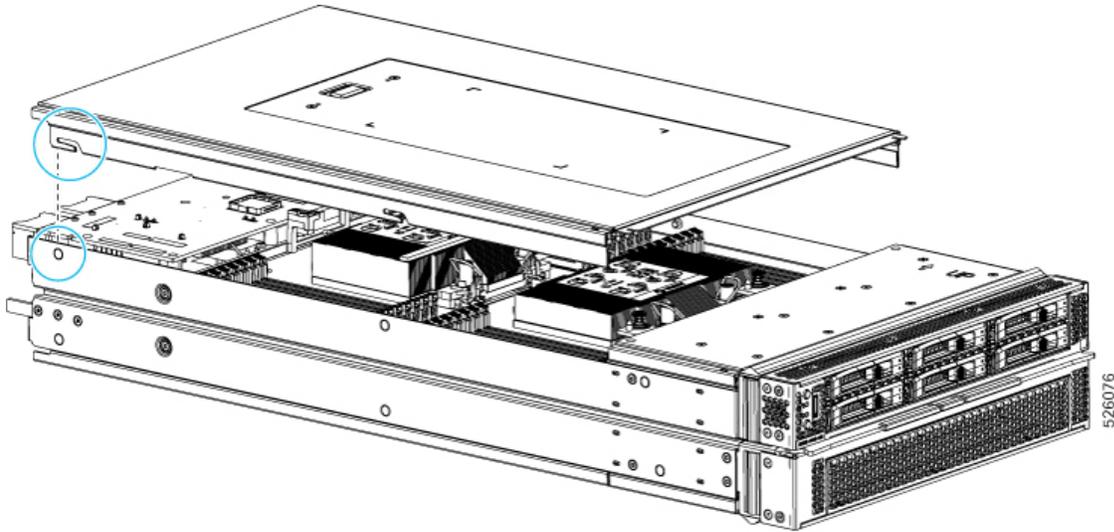
- [Removing a Compute Node Cover, on page 27](#)
- [Installing a Compute Node Cover , on page 26](#)

## Installing a Compute Node Cover

Use this task to install a removed top cover for the UCS X410c M8 compute node.

### Procedure

- Step 1** When you install the top cover, the grooves on the top cover must catch the stopper pins on the inside of the compute node's sidewalls.

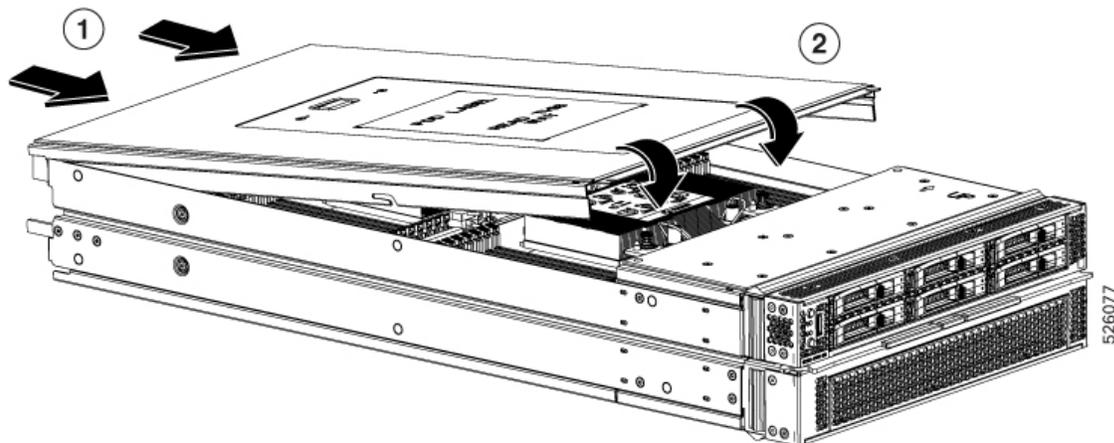


- Step 2** Insert the cover at an angle so that the rear of the cover contacts the stopper pins on the compute node.

- Step 3** Lower the cover's front edge and keep it flat while you slide it forward.

### Note

Make sure that the front edge of the top cover slides under the lip of the front mezzanine module cover



When the top cover is correctly installed, the release button clicks and the top cover sits flush on the compute node.

## Removing a Compute Node Cover

When removing and installing the top covers, make sure to replace the primary's top cover on the primary, and the secondary's top cover on the secondary.

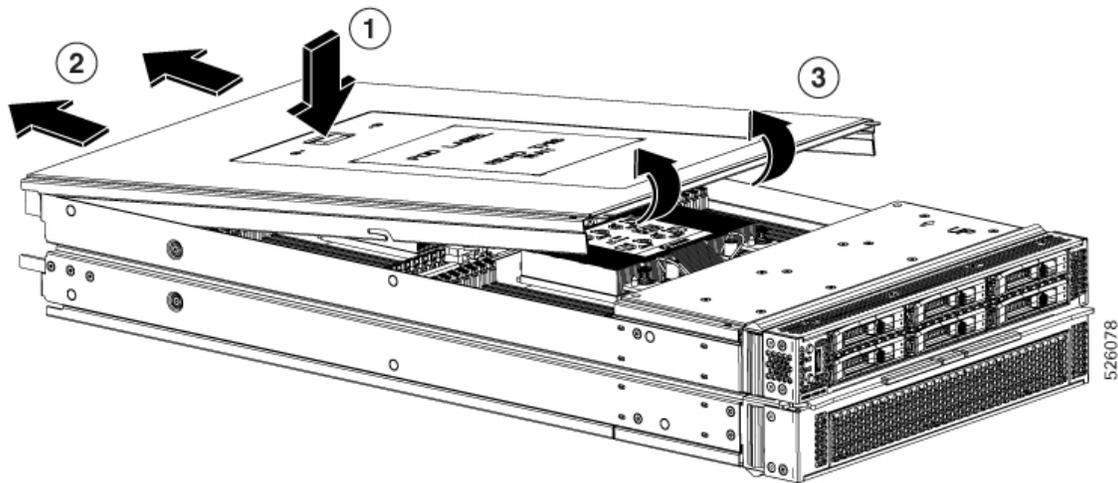
To remove the cover of the UCS X410c M8 compute node, follow these steps:

### Procedure

**Step 1** Press and hold the release button down.

**Step 2** Simultaneously lift the front edge and slide the rear end off of the compute node.

By sliding the cover back, you enable the front edge to clear the metal lip on the rear of the front mezzanine module.

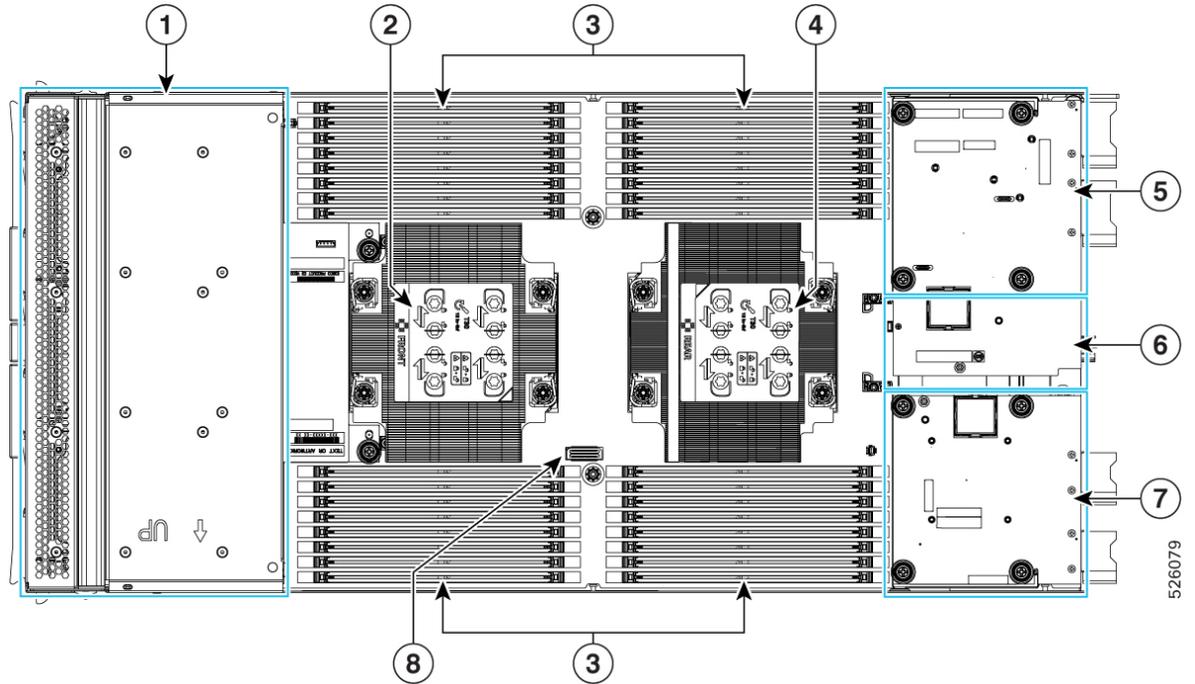


## Internal Components

The following illustration shows the location of internal components on the compute node.

The primary has components at the top layer, which are visible after you remove the primary's top cover.

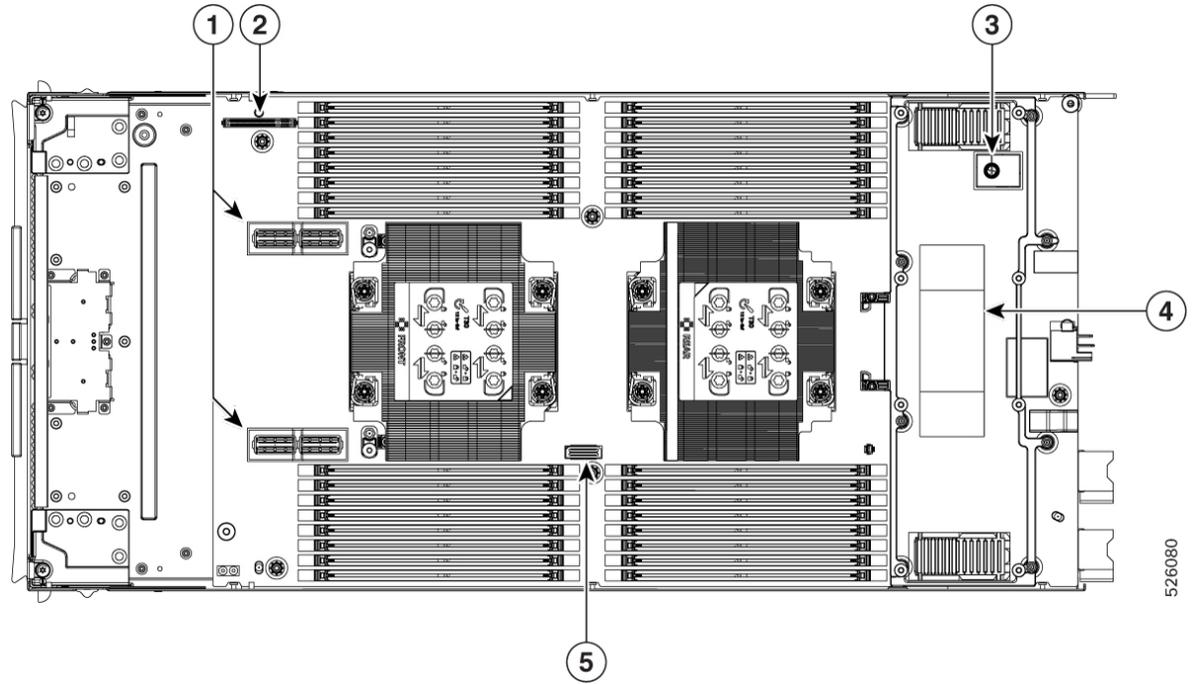
Figure 10: Cisco UCS X410c M8 Compute Node, Primary, Top Layer



1	Front mezzanine module slot	2	CPU 1
3	DIMM Slots	4	CPU 2
5	Rear mezzanine slot, which supports X-Series mezzanine cards, such as VIC 15422.	6	Bridge Card slot, which connects rear mezzanine slot and the mLOM/VIC slot
7	mLOM/VIC slot that supports zero or one Cisco VIC or Cisco X-Series 100 Gbps mLOM	8	Debug connector (not for customer use)

The primary also has some components and connectors at a lower layer, which are available after removing some of the top-layer components.

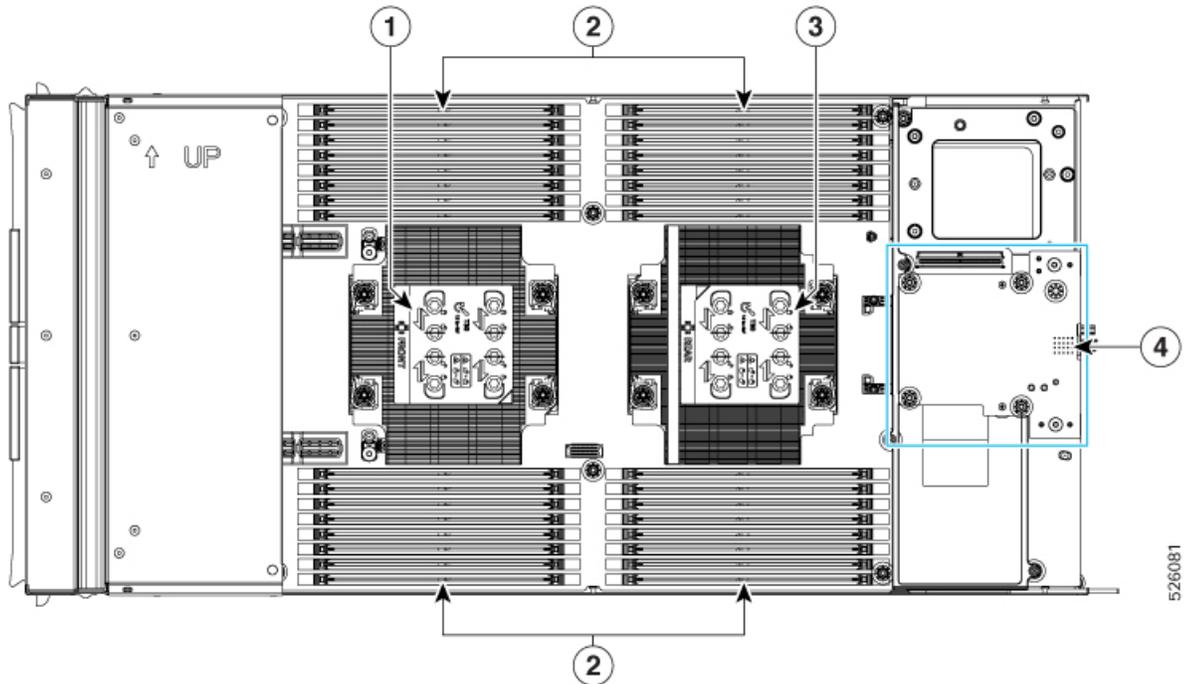
Figure 11: Cisco UCS X410c M8 Compute Node, Primary, Lower Layer



1	Front mezzanine module motherboard connectors	2	Boot Optimized M.2 RAID Controller connector. This connector accepts one mini-storage module with up to two M.2 SATA or M.2 NVMe SSDs.
3	Trusted Platform Module (TPM) connector	4	Power brick with heat sink (not a replaceable part)
5	Debug connector (not for customer use)	-	

The secondary has components at the top layer, which are visible after you remove the secondary's top cover. The secondary has no pertinent components at lower layer.

Figure 12: Cisco UCS X410c M8 Compute Node, Secondary, Top Layer



1	CPU 3	2	DIMMs
3	CPU 4	4	Power Adapter (not a FRU)

## Replacing a Drive

You can remove and install some drives without removing the compute node from the chassis. All drives have front-facing access, and they can be removed and inserted by using the ejector handles.

The SAS/SATA or NVMe drives supported in this compute node come with the drive sled attached. Spare drive sleds are not available.

Before upgrading or adding a drive to a running compute node, check the service profile in Cisco UCS Intersight and make sure the new hardware configuration will be within the parameters allowed by the server profile.



**Caution** To prevent ESD damage, wear grounding wrist straps during these procedures.

## Enabling Hot Plug Support for NVMe Drives

Surprise and OS-informed hotplug is supported. For hotplug of NVMe drives, the compute node supports both native hotplug (VMD disabled mode) and VMD enabled hotplug.

## Removing a Drive

Use this task to remove a SAS/SATA or NVMe drive from the compute node.



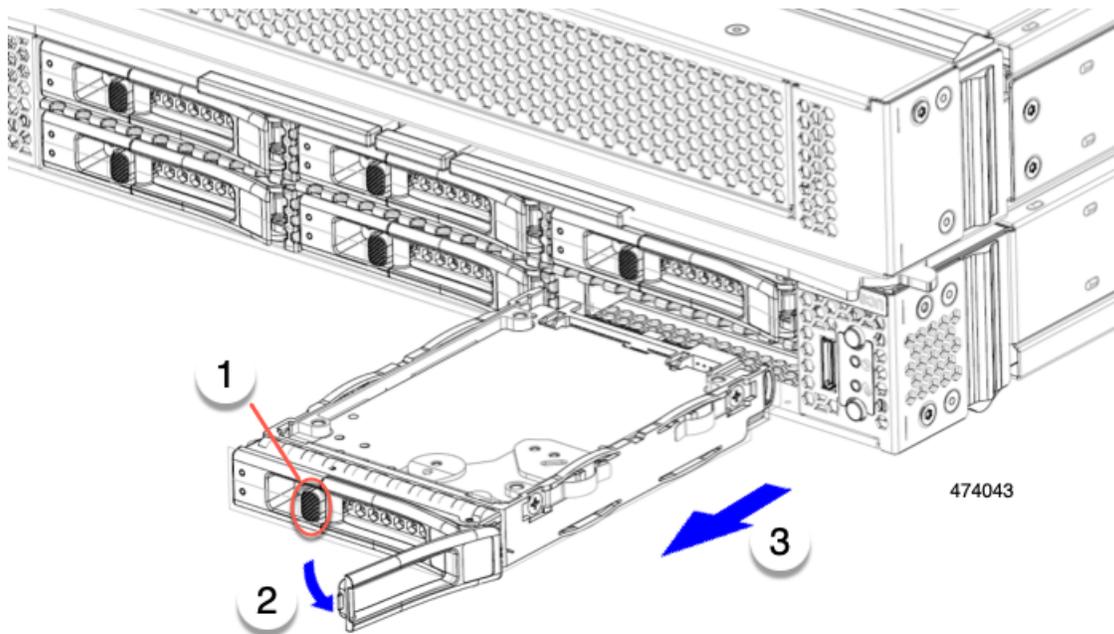
**Caution** Do not operate the system with an empty drive bay. If you remove a drive, you must reinsert a drive or cover the empty drive bay with a drive blank.

### Procedure

**Step 1** Push the release button to open the ejector, and then pull the drive from its slot.

**Caution**

To prevent data loss, make sure that you know the state of the system before removing a drive.



**Step 2** Place the drive on an antistatic mat or antistatic foam if you are not immediately reinstalling it in another compute node.

**Step 3** Install a drive blanking panel to maintain proper airflow and keep dust out of the drive bay if it will remain empty.

### What to do next

Cover the empty drive bay. Choose the appropriate option:

- [Installing a Drive, on page 32](#)
- [Installing a Drive Blank, on page 33](#)

## Installing a Drive



**Caution** For hot installation of drives, after the original drive is removed, you must wait for 20 seconds before installing a drive. Failure to allow this 20-second wait period causes the management software to display incorrect drive inventory information. If incorrect drive information is displayed, remove the affected drive(s), wait for 20 seconds, then reinstall them.

To install a SAS/SATA or NVMe U.2/U.3 drive in the compute node, follow this procedure:

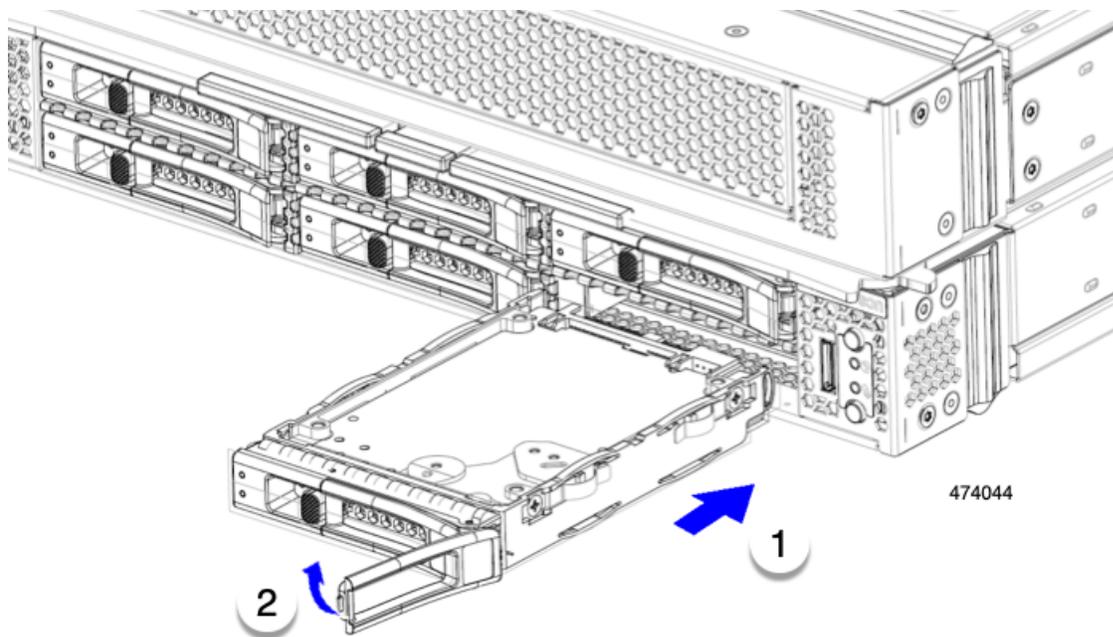
### Procedure

**Step 1** Place the drive ejector into the open position by pushing the release button.

**Step 2** Gently slide the drive into the empty drive bay until it seats into place.

**Step 3** Push the drive ejector into the closed position.

You should feel the ejector click into place when it is in the closed position.



### Note

To install NVMe E3.S drive in the compute node, see [Cisco UCS X10c Pass Through Controller for E3.S Installation and Service Guide](#).

## Removing a Drive Blank

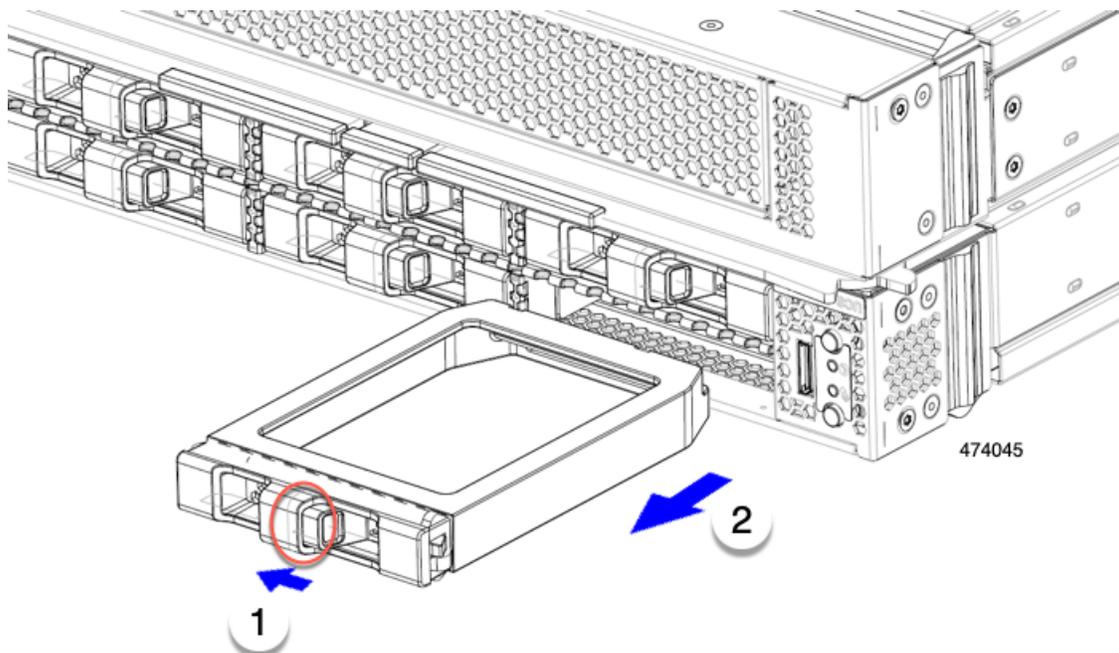
A maximum of six SAS/SATA or NVMe drives are contained in the front mezzanine storage module as part of the drive housing. The drives are front facing, so removing them does not require any disassembly.

Use this procedure to remove a drive blank from the compute node.

### Procedure

**Step 1** Grasp the drive blank handle.

**Step 2** Slide the drive blank out of the slot.



### What to do next

Cover the empty drive bay. Choose the appropriate option:

- [Installing a Drive, on page 32](#)
- [Installing a Drive Blank, on page 33](#)

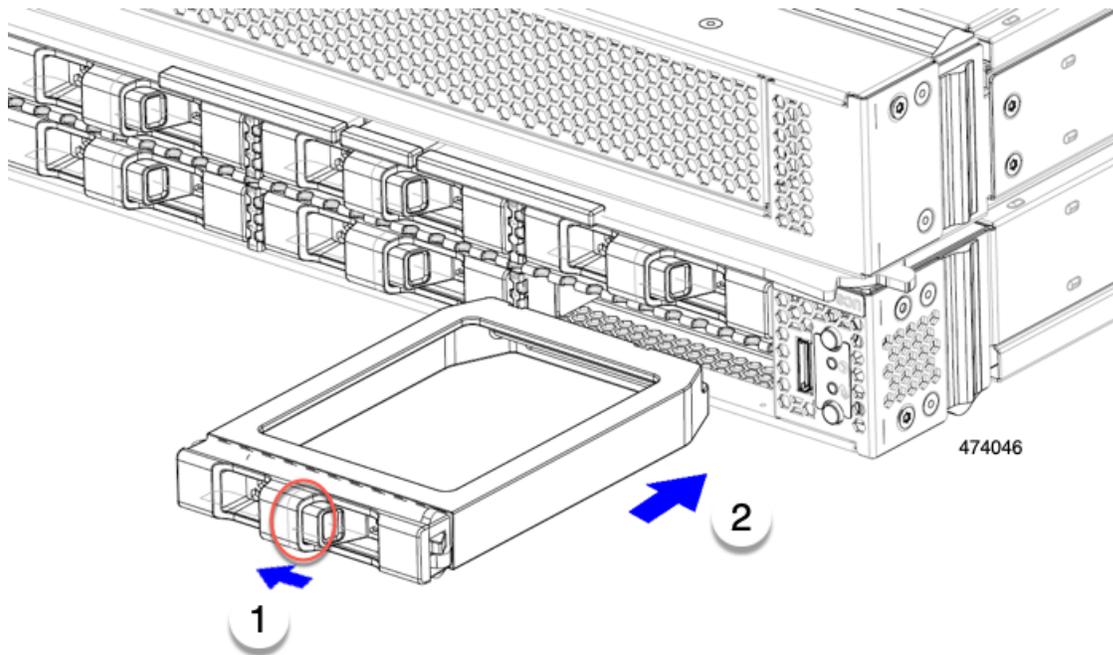
## Installing a Drive Blank

Use this task to install a drive blank.

## Procedure

**Step 1** Align the drive blank so that the sheet metal is facing down.

**Step 2** Holding the blank level, slide it into the empty drive bay.



## Replacing the Front Mezzanine Module

The front mezzanine module is a steel cage that contains the compute node's storage devices. The front mezzanine storage module can contain any of the following storage configurations:

- U.3 NVMe drives
- SAS/SATA drives
- E3.S NVMe drives

In the front mezzanine slot, the compute node can use one of the following front storage module options:

- A front mezzanine blank (UCSX-M8A-FMEZZBLK) for systems without local disk requirements.
- Compute Pass Through Controller (UCSX-X10C-PT4F-D): supports up to six hot pluggable 15mm NVMe drives directly connected to CPU 1.
- A Tri-Mode M1 front mezzanine RAID module (UCSX-RAID-M1L6) consists of the following components:

- Up to six (6) SAS/SATA/NVMe SSD drives. Each drive slot supports either SAS, SATA or NVMe U.3 SSDs (RAID Controller)
- An integrated SuperCap module that provides battery backup for the RAID controller. For information about replacing the SuperCap module, see [Replacing the SuperCap Module, on page 46](#).
- A Front Mezzanine Pass Through Controller for E3.S drives (UCSX-X10C-PTE3).
  - The front mezzanine E3.S module supports up to nine E3.S PCIe drives.

The front mezzanine module can be removed and installed as a whole unit to give easier access to the storage drives that it holds. Or, you can leave the front mezzanine module installed because SAS/SATA and the NVMe drives are accessible directly through the front of the front mezzanine panel and are hot pluggable.

To replace the front mezzanine module, use the following topics:

- [Removing the Front Mezzanine Module, on page 35](#)
- [Installing the Front Mezzanine Module, on page 37](#)

## Front Mezzanine Module Guidelines

Be aware of the following guidelines for the front mezzanine slot:

- UEFI boot mode is only supported for all storage options.
- (UCSX-RAID-M1L6) front mezzanine that supports up to six (6) SAS/SATA/NVMe SSD drives.
  - Each drive slot supports either SAS, SATA or NVMe U.3 SSDs (RAID Controller). For more information about RAID controller based front mezzanine option, see the [Cisco UCS X24g Trimode M1 Installation and Service Guide](#).
- (UCSX-X10C-PTE3) front mezzanine that supports up to nine (9) E3.S 1T PCIe5 drives. For more information about E3.S drives-based front mezzanine option, see the [Cisco UCS X10c Pass Through Controller for E3.S Installation and Service Guide](#).
- (UCSX-X10C-PT4F) Computer Pass Through Controller. This front mezzanine option supports up to six (6) 2.5-inch NVMe PCIe drives.

## Removing the Front Mezzanine Module

Use the following procedure to remove the front mezzanine module. This procedure applies to the following modules:

- Front mezzanine blank (UCSX-M8A-FMEZZBLK)
- Compute Pass Through Controller (UCSX-X10C-PT4F)
- Compute Pass Through Controller for E3.S (UCSX-X10C-PTE3)
- 24G Tri-Mode M1 RAID Controller (UCSX-RAID-M1L6)

**Before you begin**

To remove the front mezzanine module, you need a T8 screwdriver and a #2 Phillips screwdriver.

**Procedure**

**Step 1** If the compute node's cover is not already removed, remove it now. Remove the compute node cover.

See [Removing a Compute Node Cover, on page 27](#).

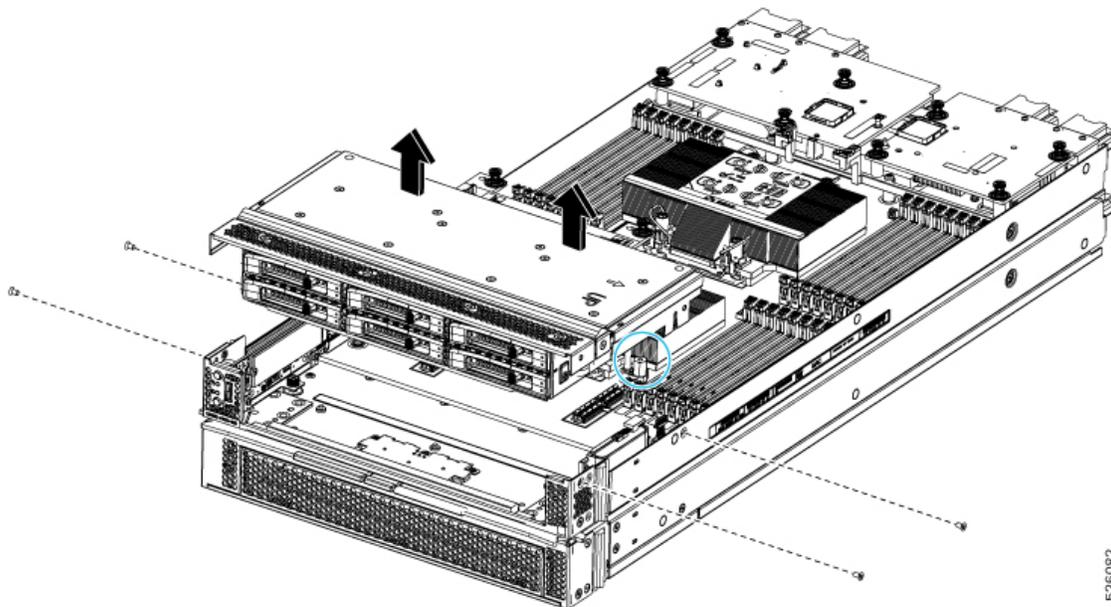
**Step 2** Remove the securing screws:

a) Using a #2 Phillips screwdriver, loosen the two captive screws on the top of the front mezzanine module.

**Note**

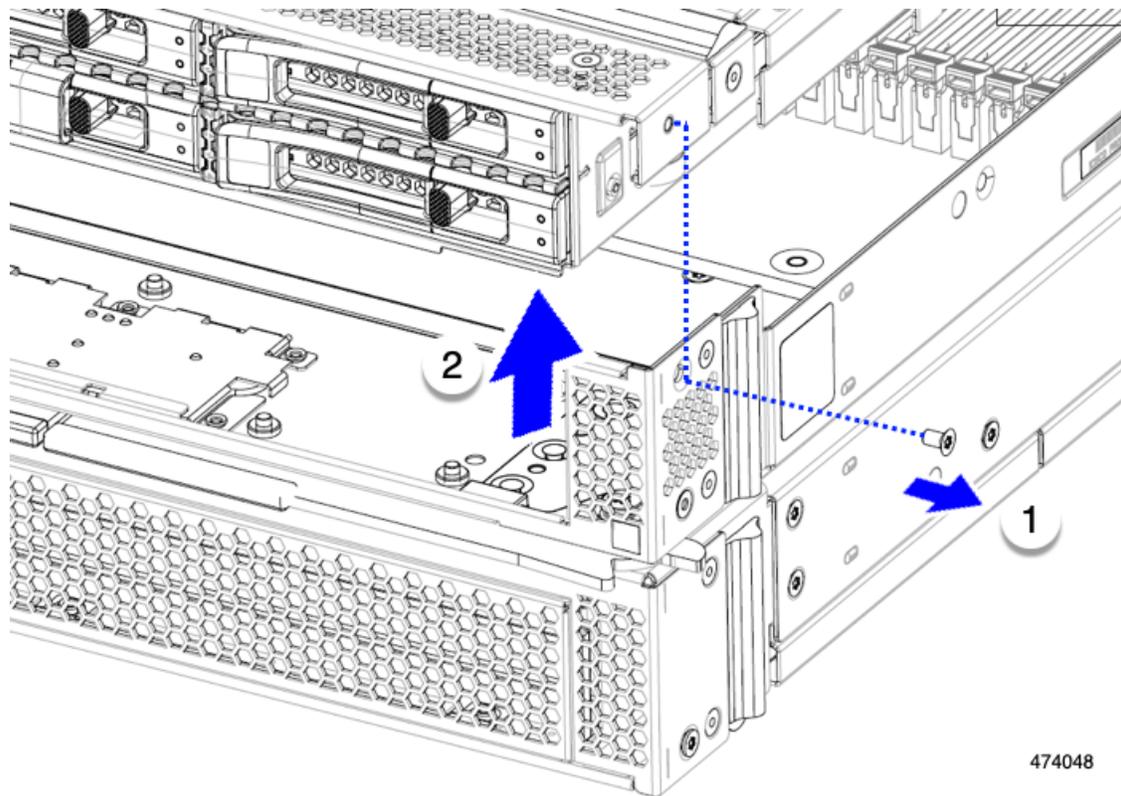
This step may be skipped if removing the front mezzanine blank (UCSX-M8A-FMEZZBLK).

b) Using a T8 screwdriver, remove the two screws on each side of the compute node that secure the front mezzanine module to the sheet metal.



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**Step 3** Making sure that all the screws are removed, lift the front mezzanine module to remove it from the compute node.

**What to do next**

To install the front mezzanine module, see [Installing the Front Mezzanine Module, on page 37](#)

## Installing the Front Mezzanine Module

Use the following procedure to install the front mezzanine module.

This procedure applies to the following modules:

- Front mezzanine blank (UCSX-M8A-FMEZZBLK)
- Compute Pass Through Controller (UCSX-X10C-PT4F-D)
- Tri-mode RAID Controller (UCSX-RAID-M1L6)
- E3.S Pass Through Controller (UCSX-X10C-PTE3)

**Before you begin**

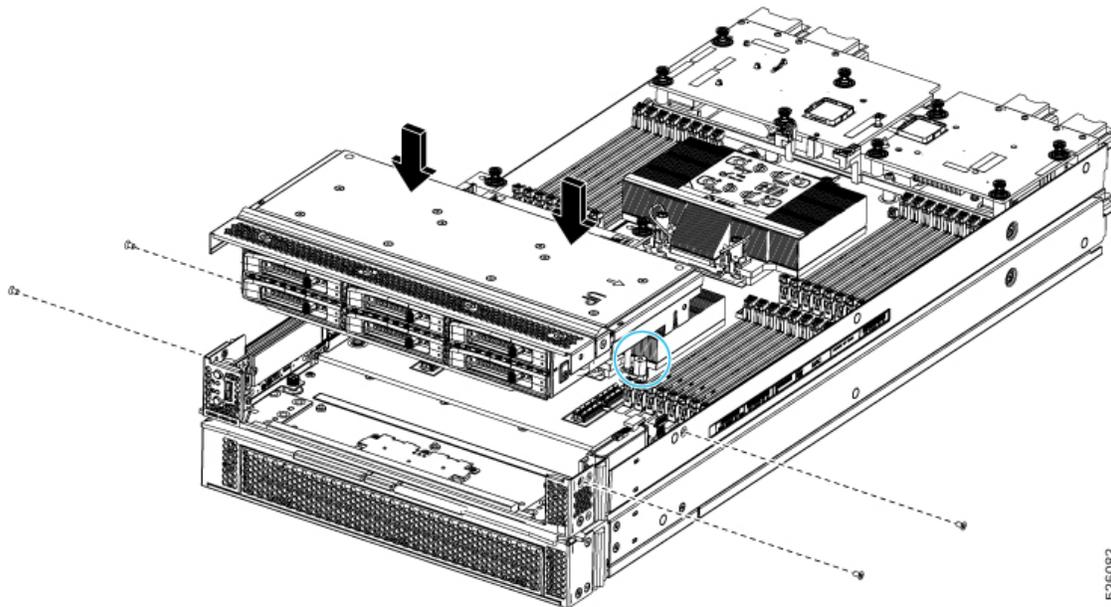
To install the front mezzanine module, you need a T8 screwdriver and a #2 Phillips screwdriver.

## Procedure

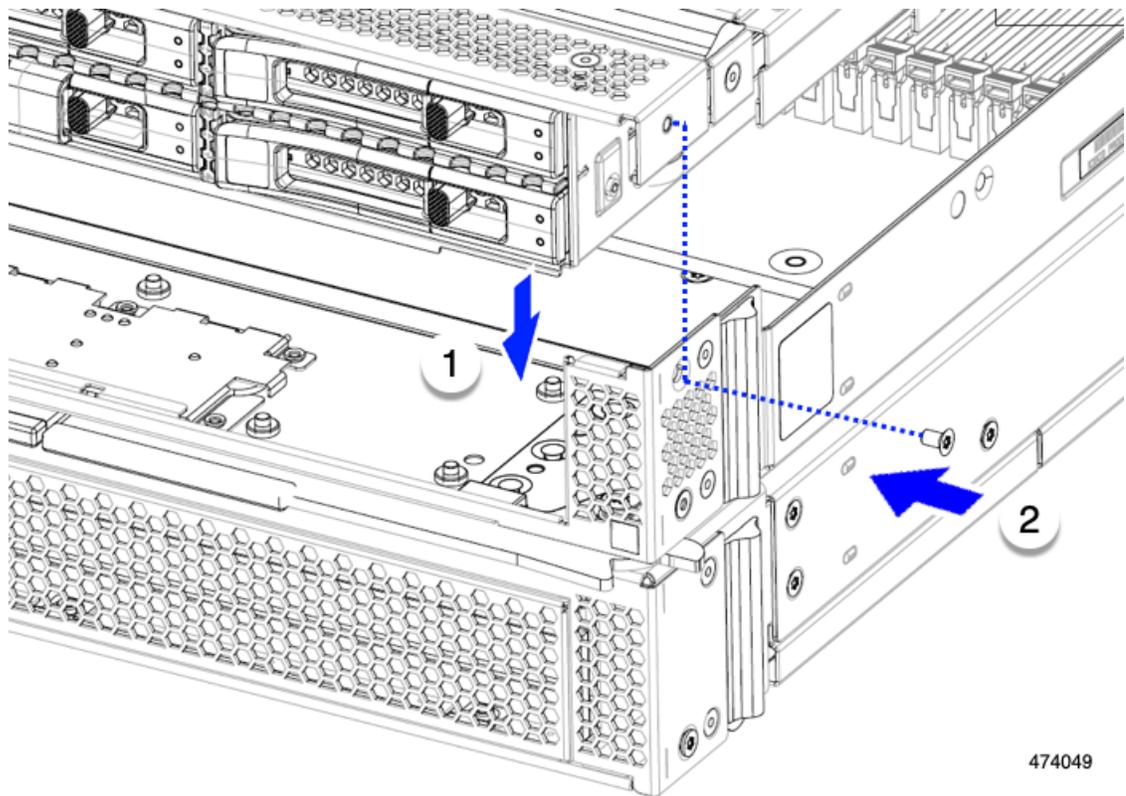
- Step 1** Align the front mezzanine module with its slot on the compute node.
- Step 2** Lower the front mezzanine module onto the compute node, making sure that the screws and screw holes line up.
- Step 3** Secure the front mezzanine module to the compute node.
- a) Using a #2 Phillips screwdriver, tighten the captive screws on the top of the front mezzanine module.

### Note

This step may be skipped if installing the front mezzanine blank (UCSX-M8A-FMEZZBLK).



- b) Using a T8 screwdriver, insert and tighten the four screws, two on each side of the server node.



### What to do next

If you removed the drives from the front mezzanine module, reinstall them now. See [Installing a Drive](#), on page 32.

## Servicing the Mini Storage Module

The compute node has a mini-storage module option that plugs into a motherboard socket to provide additional internal storage. The module sits vertically behind the left side front panel. See [Internal Components](#), on page 27.

Two configurations of mini storage module are supported, one with an integrated RAID controller card, and one without.

## Replacing a Boot-Optimized M.2 RAID Controller Module or NVMe Pass-Through Module

The Cisco Boot-Optimized M.2 RAID Controller module connects to the mini-storage module socket on the motherboard. The module 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 or an NVMe Pass-Through Module. Each of the following components contains two module slots for M.2 drives:

- The Cisco UCSX Front panel with M.2 RAID controller for SATA drives (UCSX-M2-HWRD-FPS). This component has an integrated 6-Gbps SATA RAID controller that can control the SATA M.2 drives in a RAID 1 array.
- The Cisco UCSX Front panel with M.2 Pass Through controller for NVME drives (UCSX-M2-PT-FPN). The M.2 NVMe drives are not configurable in a RAID group.

## Cisco Boot-Optimized M.2 RAID Controller Considerations

Review the following considerations:

Review the following considerations:

- This controller supports RAID 1 (single volume) and JBOD mode.
- A SATA M.2 drive in slot 1 is located on the right side, or front, of the module when installed. This drive faces the interior of the compute node. This drive is the first SATA device.
- A SATA M.2 drive in slot 2 is located on the left side, or back, of the module when installed. This drive faces the compute node's sheet metal wall. This drive 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 compute node must be powered off.
- Monitoring of the controller and installed SATA M.2 drives can be done using Cisco Intersight. They can also be monitored using other utilities such as UEFI HII, and Redfish.
- 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 compute node. The configuration utility in the compute node BIOS includes a SATA secure-erase function.

## Removing the M.2 RAID Controller Module or NVMe Pass-Through Module

This topic describes how to remove a Cisco Boot-Optimized M.2 RAID Controller or a Cisco NVMe Pass-Through Controller:

- The Cisco UCSX Front panel with M.2 RAID controller for SATA drives (UCSX-M2-HWRD-FPS).
- The Cisco UCSX Front panel with M.2 Pass-Through module for NVME drives (UCSX-M2-PT-FPN).

Both types of controller board have two slots, one for each M.2 drive:

- one M.2 slot (Slot 1) for either a SATA drive (in UCSX-M2-HWRD-FPS) or an NVMe drive (in UCSX-M2-PT-FPN). The drive in this slot faces the interior of the compute node.
- one M.2 slot (Slot 2) for either a SATA drive (in UCSX-M2-HWRD-FPS) or an NVMe drive (in UCSX-M2-PT-FPN). The drive in this slot faces the chassis sheetmetal wall.
- Drive slot numbering differs depending on which Cisco management tool you are using and which component is being managed.

Component	Cisco Management Tool	
	Intersight (IMM)	UCS Manager (UCSM)
RAID Controller	Slot 1 contains Drive 253 Slot 2 contains Drive 254	Slot 1 contains Drive 253 Slot 2 contains Drive 254
NVMe Pass-Through Controller	Slot 1 contains Drive 253 Slot 2 contains Drive 254	Slot 1 contains Drive 32 Slot 2 contains Drive 33

Each controller can be populated with up to two M.2 drives of the correct type, either SATA for the RAID controller or NVMe for the Pass-Through module. Single M.2 SATA or NVMe drives are supported. You cannot mix M.2 drive types in the same controller.

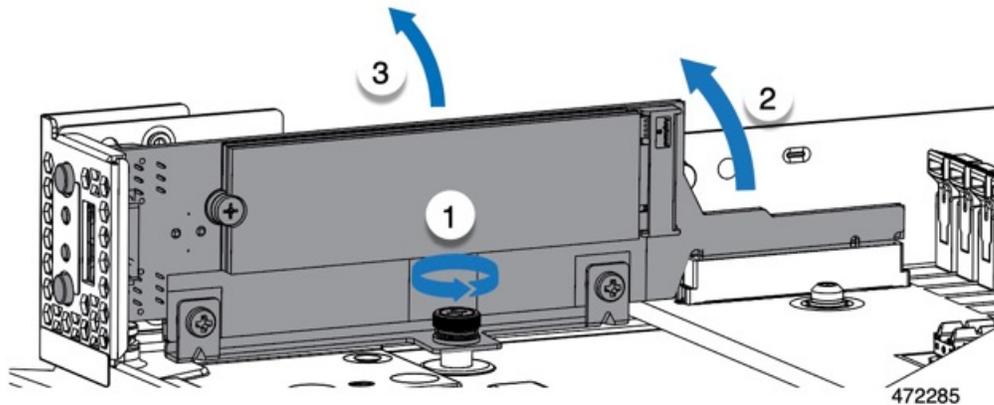
To remove the M.2 RAID controller or the M.2 SSD modules, the front mezzanine module must be removed.

**Procedure**

- 
- Step 1** Remove the controller from the compute node:
- Decommission, power off, and remove the compute node from the chassis.
  - Remove the top cover from the compute node as described in [Removing and Installing the Compute Node Covers, on page 25](#).
- Step 2** If you have not already done so, remove the front mezzanine module.  
See [Removing the Front Mezzanine Module, on page 35](#).
- Step 3** Remove the controller.
- Locate the controller in the front corner of the compute node along the sidewall.
  - Using a #2 Phillips screwdriver, loosen the captive screw that secures the module to the motherboard.
  - At the end opposite the front panel, grasp the module and pull up in an arc to disconnect the controller from its motherboard socket.
  - Holding the controller at an angle, slide it away from the front panel and lift it up to disengage the LEDs and buttons from their cutouts in the front panel.

**Caution**

If you feel resistance while lifting the controller, make sure that the LEDs and buttons are not still seated in the front panel.



**Step 4** 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 slot on the carrier.
- c) Position the replacement M.2 drive over the slot on the controller board.
- d) Angle the M.2 drive downward and insert the connector-end into the slot 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.

## Installing the M.2 RAID Controller Module or NVMe Pass-Through Module

Use this task to install the RAID controller module or NVMe Pass-Through Module.

**Before you begin**

This topic describes how to remove a Cisco Boot-Optimized M.2 RAID Controller or a Cisco NVMe Pass-Through Module:

- The Cisco UCSX Front panel with M.2 RAID controller for SATA drives (UCSX-M2-HWRD-FPS).
- The Cisco UCSX Front panel with M.2 Pass-Through module for NVME drives (UCSX-M2-PT-FPN).

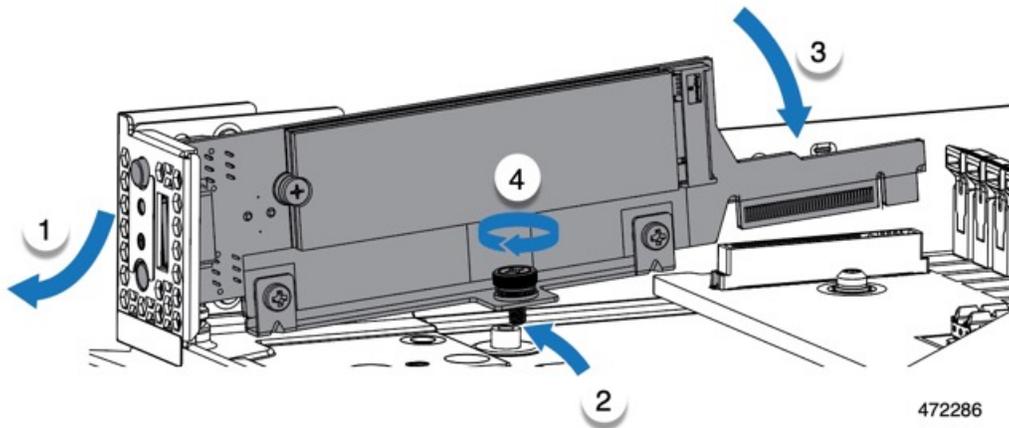
Each mounts vertically on the motherboard, and the M.2 drive sockets are positioned vertically on the controller.

## Procedure

### Step 1

Install the module to its socket on the motherboard:

- a) Position the module over the socket, making sure the golden fingers on the connector are facing down.
- b) Lower the module into the chassis at an angle and insert the LEDs and buttons into their cutouts on the front panel.
- c) Holding the module level, align the captive screw with its screw hole and the golden fingers with their socket on the motherboard.
- d) Carefully push down on the controller to seat the golden fingers into the socket.
- e) Use a #2 Phillips screwdriver to tighten the module onto the threaded standoff.



### Step 2

Reinstall the front mezzanine module.

### Step 3

Return the compute node to service:

- a) Replace the top cover on the compute node.
- b) Reinstall the compute node and allow it to power up and be automatically reacknowledged, reassociated, and recommissioned.

## Replacing an M.2 SATA or NVMe SSD

M.2 SATA and NVMe SSD cards can be installed in vertical drive bays. One drive bay, or slot, is on each side of the M.2 module carrier.

There are some specific rules for populating mini-storage M.2 SSD cards:

- Each carrier supports a maximum of two M.2 cards. Do not mix SATA and NVMe SSD cards in the same mini-storage module. Replacement cards are available from Cisco as pairs.
- When installed in the compute node, the M.2 SSDs are mounted vertically.
  - M.2 slot 1 is located on the right side, or front, of the module when installed. This drive faces inward towards the interior the compute node.

- M.2 slot 2 is located on the left side, or back, of the module when installed. This drive faces outward towards the compute node sheet metal wall.
- Drive slot numbering depends on the M.2 SSD type and which Cisco Management tool you are using.
  - **M.2 SATA SSD:** Slot 1 contains Drive 253 in both Intersight (IMM) and UCS Manager (UCSM).
  - **M.2 SATA SSD:** Slot 2 contains Drive 254 in both IMM and UCSM.
  - **M.2 NVMe SSD:** Slot 1 contains Drive 253 in IMM, but Slot 1 contains Drive 32 in UCSM.
  - **M.2 NVMe SSD:** Slot 2 contains Drive 254 in IMM, but Slot 2 contains Drive 33 in UCSM.
- If your compute node contains only one M.2 SATA or NVMe SSD, it can be installed in either slot.
- Dual SATA M.2 SSDs can be configured in a RAID 1 array through the BIOS Setup Utility's embedded SATA RAID interface and configured through IMM.




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**Note** The M.2 SSDs are managed by the MSTOR-RAID controller.

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**Note** The embedded SATA RAID controller requires that the compute node is set to boot in UEFI mode rather than Legacy mode.

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## Removing an M.2 SATA or NVMe SSD

Each M.2 SATA or NVMe SSD plugs into a slot on the carrier, which mounts vertically to the motherboard.

- One slot is on the front of the carrier, which faces inwards towards the rest of the compute node.
- One slot is on the back of the carrier, which faces towards the compute node sheet metal wall.

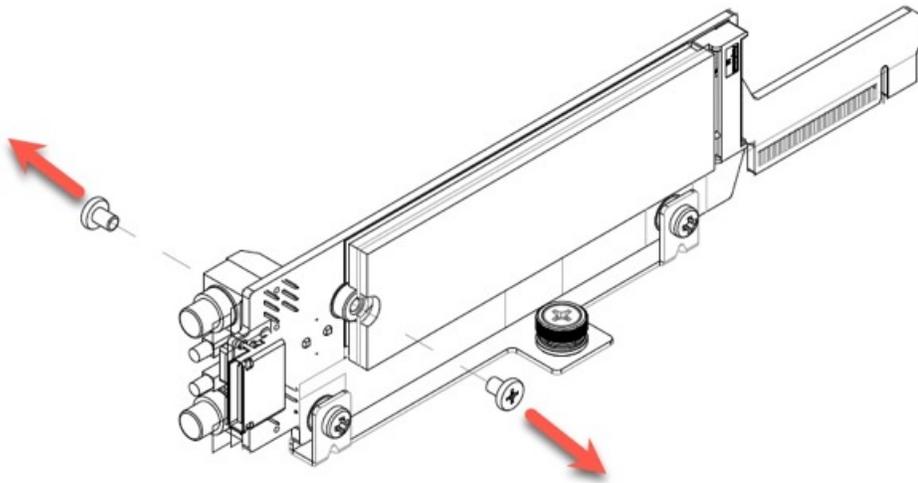
Each M.2 SSD is secured to the carrier by the slot at one end, and a small retaining screw at the other end. The carrier is installed on the same component that has the compute node LEDs and buttons on the node's front panel.

Use the following procedure for any type of mini-storage module carrier.

### Procedure

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- Step 1** Remove the controller.  
See [Removing the M.2 RAID Controller Module or NVMe Pass-Through Module, on page 40](#).
- Step 2** Using a #1 Phillips screwdriver, remove the screws that secure the M.2 SATA or NVMe SSD to the carrier.



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**Step 3** Grasping the SSD by its edges, gently lift the end that held the screws at an angle, then slide the card out of its connector.

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**What to do next**

[Installing an M.2 SATA or NVMe SSD, on page 45](#)

## Installing an M.2 SATA or NVMe SSD

Each M.2 SATA or NVMe SSD plugs into a slot on the carrier and is held in place by a retaining screw for each SSD.

Use the following procedure to install the M.2 SSD onto the carrier

**Procedure**

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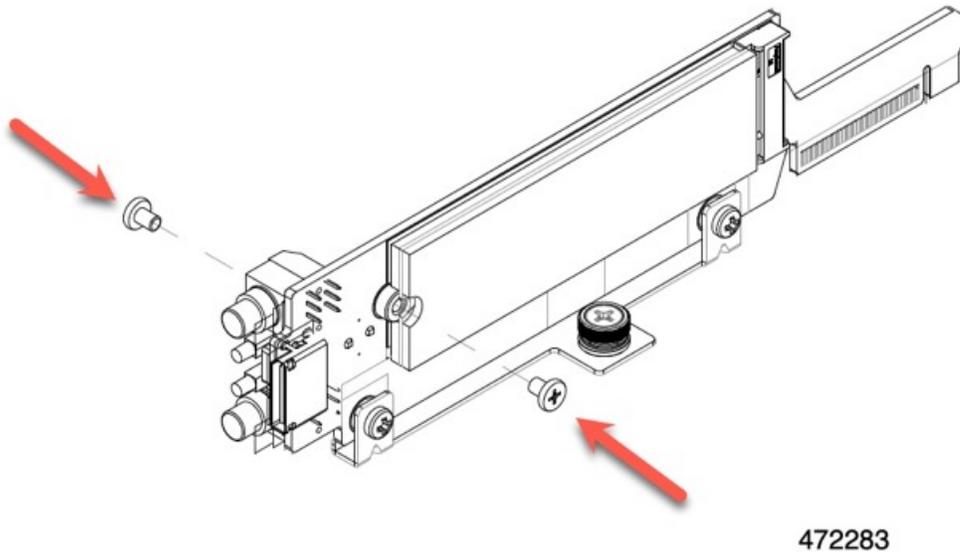
**Step 1** Install the M.2 SATA or M.2 NVMe SSD.

- a) Orient the SSD correctly.

**Note**

When correctly oriented, the end of the SSD with two alignment holes lines up with the two alignment pins on the carrier.

- b) Angle the end opposite the screw into the connector
- c) Press down on the end of the SSD that holds the screws until the SSD snaps into place.
- d) Reinsert and tighten the retaining screw to secure the M.2 module to the carrier.



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- Step 2** When you are ready, reinstall the controller onto the motherboard.  
[Installing the M.2 RAID Controller Module or NVMe Pass-Through Module, on page 42.](#)
- Step 3** Reinstall the compute node cover
- Step 4** Reapply power and return the compute node to service.

## Replacing the SuperCap Module

The SuperCap module (UCSX-MRAID-SC) is a battery bank which connects to the front mezzanine storage module board and provides power to the RAID controller if facility power is interrupted.



**Note** To remove the SuperCap Module you must remove the front mezzanine module.

To replace the SuperCap module, use the following topics:

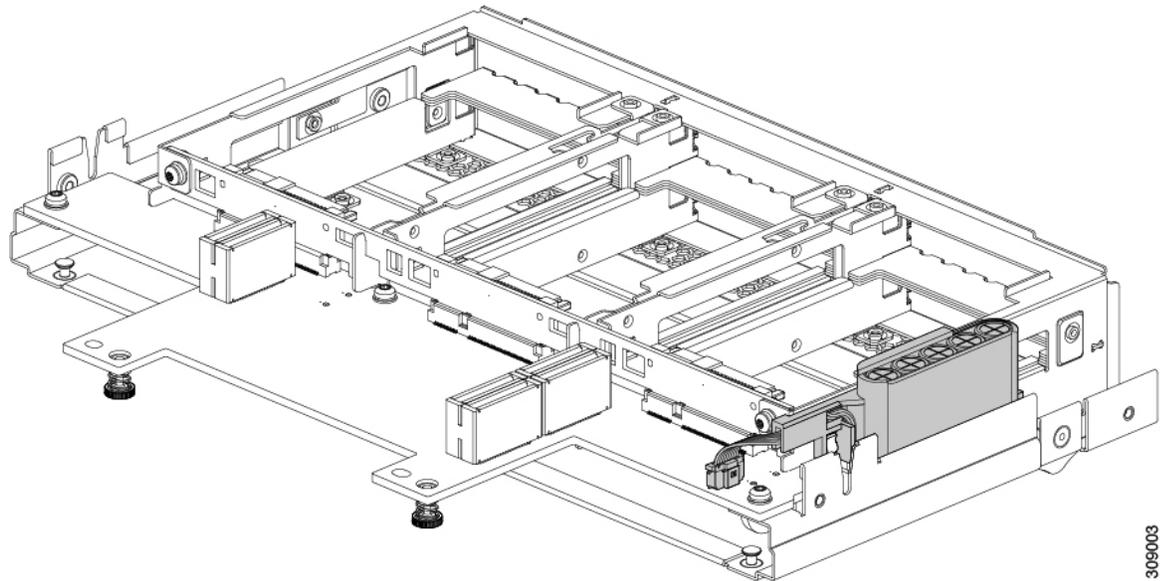
- [Removing the SuperCap Module, on page 46](#)
- [Installing the SuperCap Module, on page 51](#)

## Removing the SuperCap Module

The SuperCap module is part of the Front Mezzanine Module, so the Front Mezzanine Module must be removed from the compute node to provide access to the SuperCap module.

The SuperCap module sits in a plastic tray on the underside of the front mezzanine module. The SuperCap module connects to the board through a ribbon cable with one connector to the module.

*Figure 13: Location of the SuperCap Module on the Front Mezzanine Module*

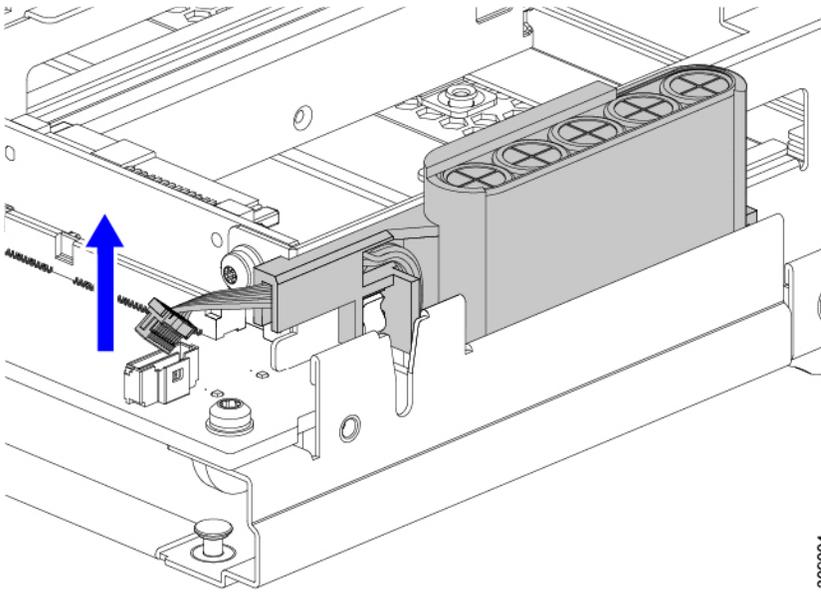


To replace the SuperCap module, follow these steps:

### Procedure

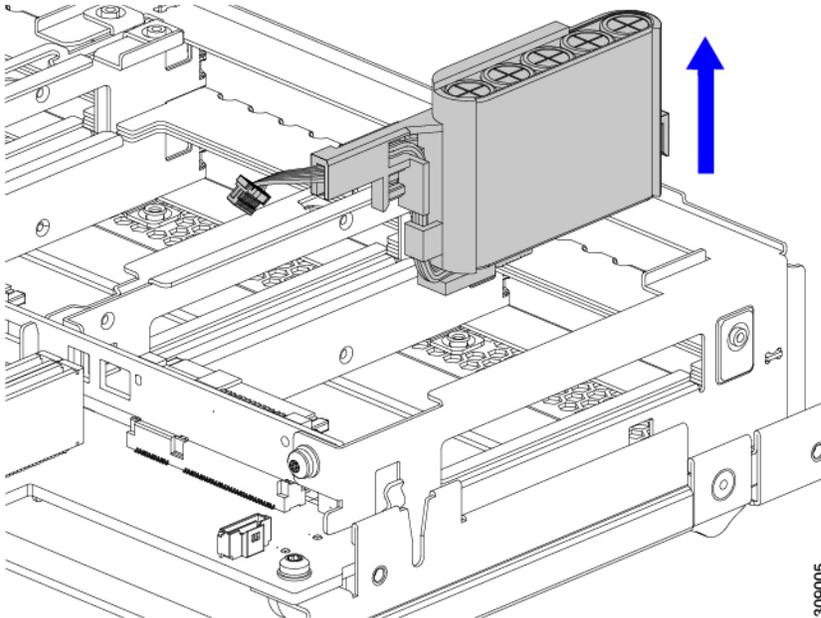
- 
- Step 1** If you have not already removed the Front Mezzanine module, do so now.  
See [Removing the Front Mezzanine Module, on page 35](#).
- Step 2** Before removing the SuperCap module, note its orientation in the tray as shown in the previous image.  
When correctly oriented, the SuperCap connection faces downward so that it easily plugs into the socket on the board.  
You will need to install the new SuperCap module with the same orientation.
- Step 3** Grasp the cable connector at the board and gently pull to disconnect the connector.

## Removing the SuperCap Module



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**Step 4** Grasp the sides of the SuperCap module, but not the connector, and lift the SuperCap module out of the tray.

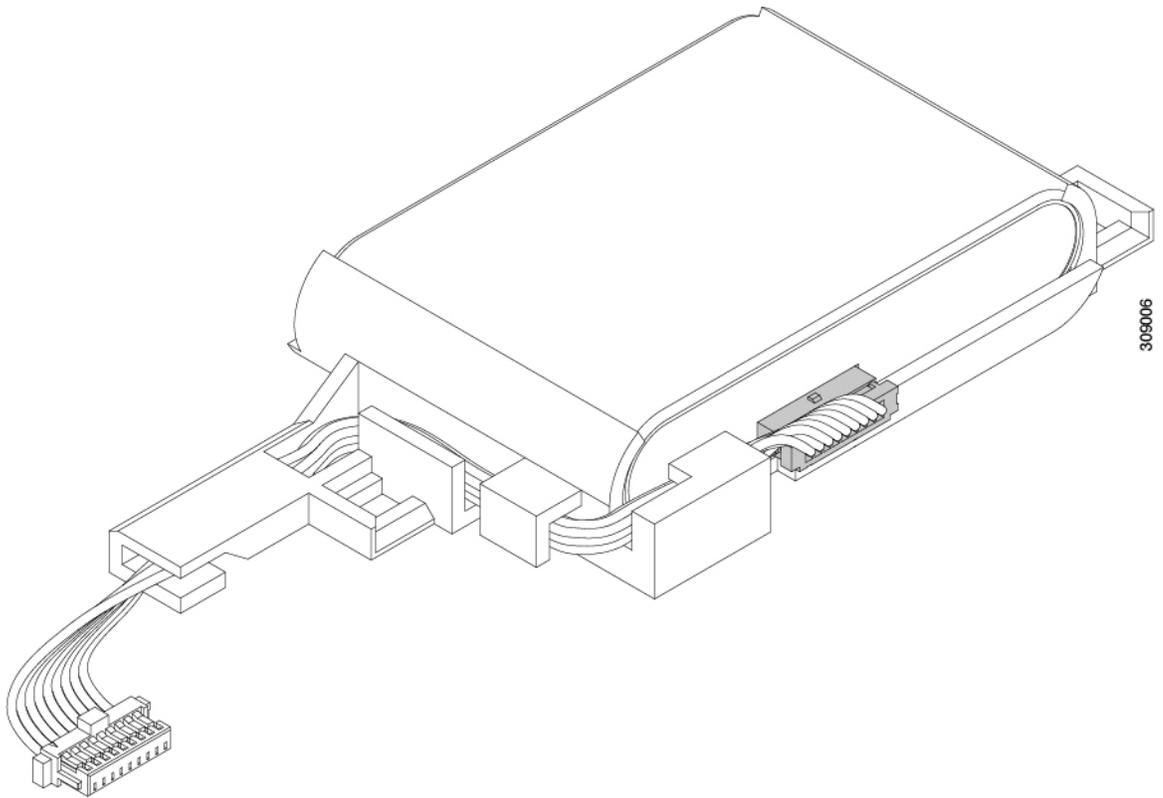


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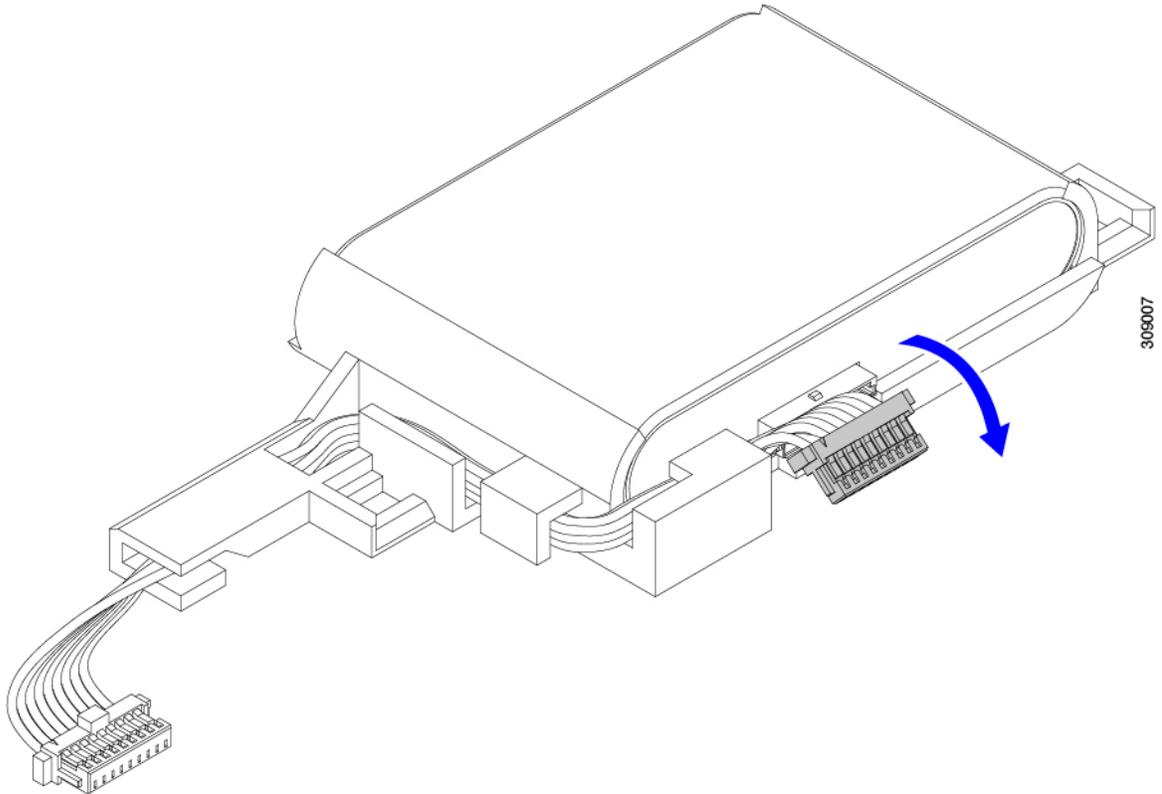
You might feel some resistance because the tray is curved to secure the module.

**Step 5** Disconnect the ribbon cable from the SuperCap module:

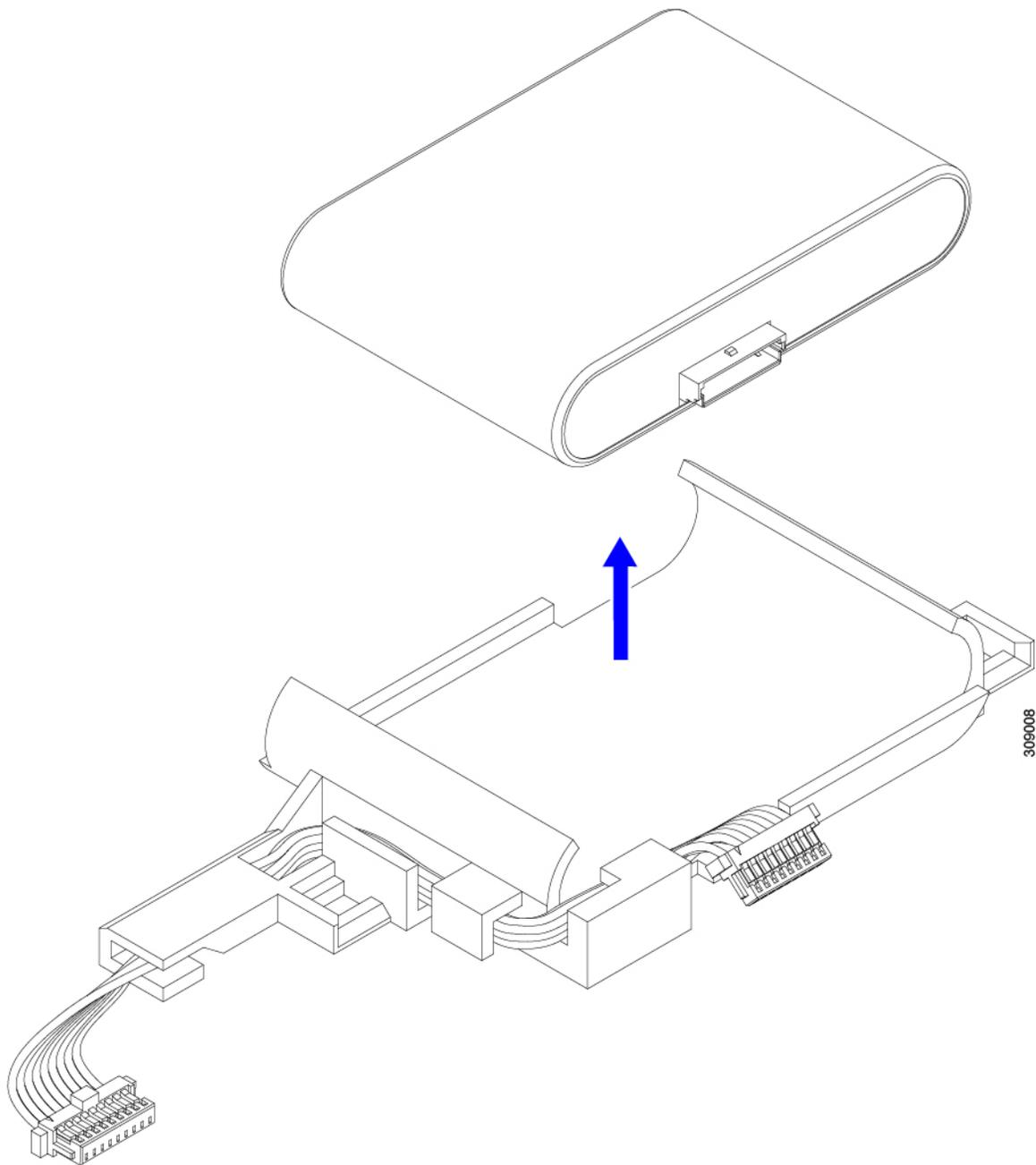
- a) On the SuperCap module, locate the lever that secures the ribbon cable to the battery pack.



- b) Gently pivot the securing lever downward to release the ribbon cable connection from the SuperCap module.



- Step 6** Remove the existing battery pack from its case, and insert a new one, making sure to align the new battery pack so that the connector aligns with the ribbon cable.

**What to do next**

[Installing the SuperCap Module, on page 51](#)

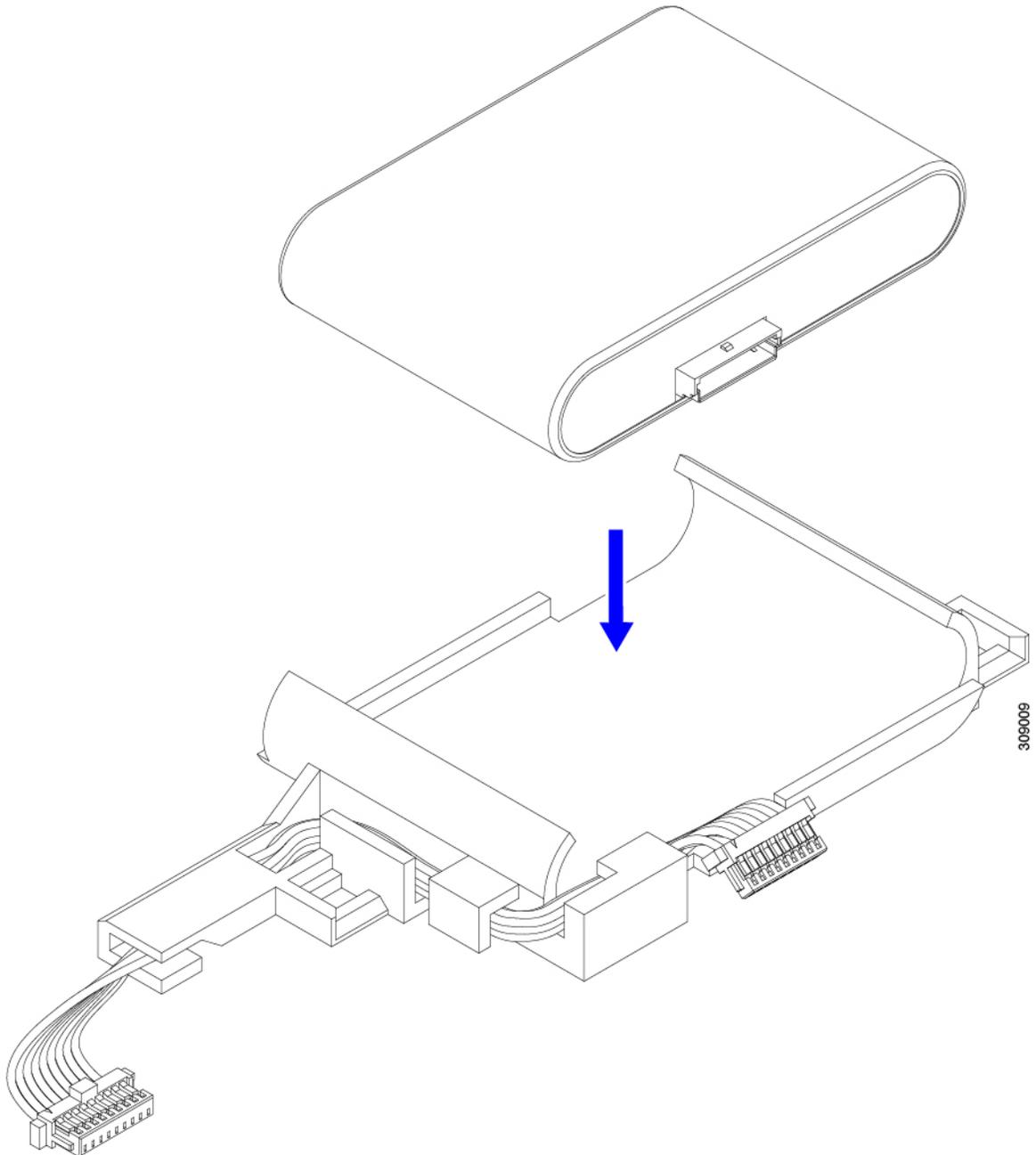
## Installing the SuperCap Module

If you removed the SuperCap module, use this procedure to reinstall and reconnect it.

## Procedure

**Step 1** Insert the Super Cap module into its case.

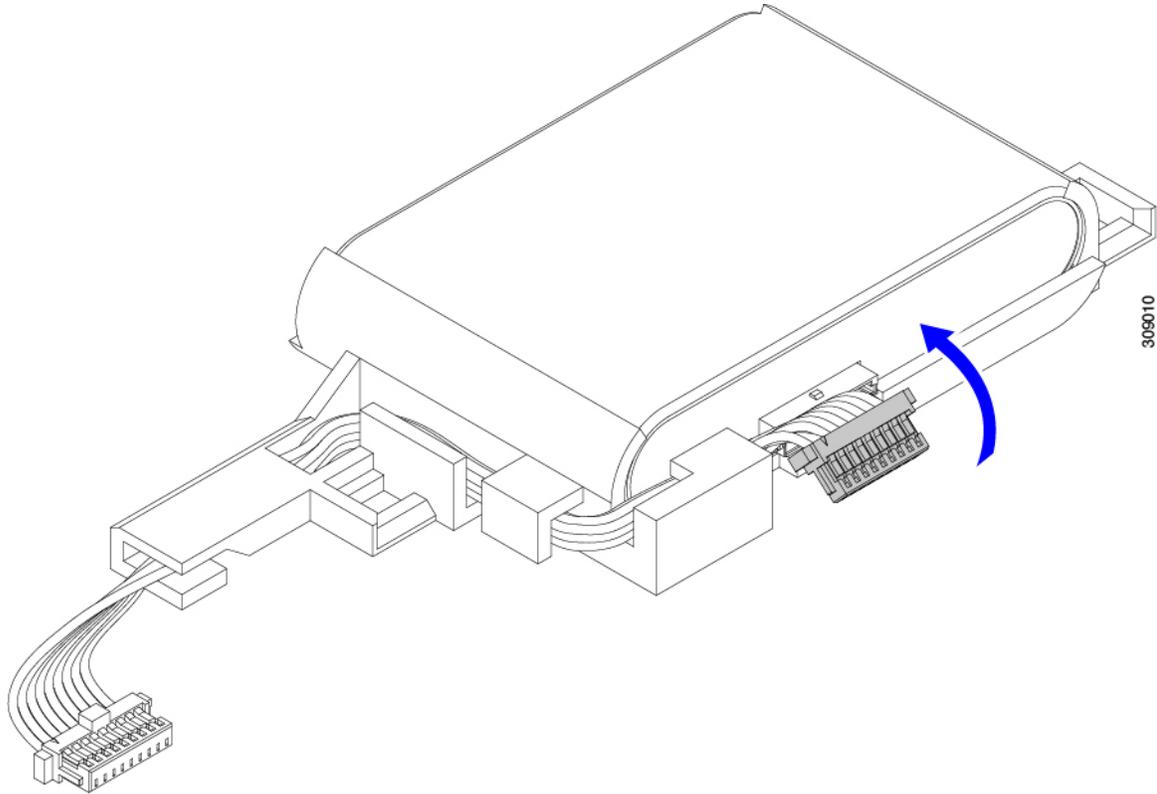
- a) Align the SuperCap module so that the connector will meet the connector.



- b) Before seating the SuperCap module, make sure that the ribbon cable is not in the way. You do not want to pinch the ribbon cable when you install the SuperCap.
- c) When the ribbon cables are clear of the case, press the SuperCap module until it is seated in the case.

You might feel some resistance as the SuperCap snaps into place.

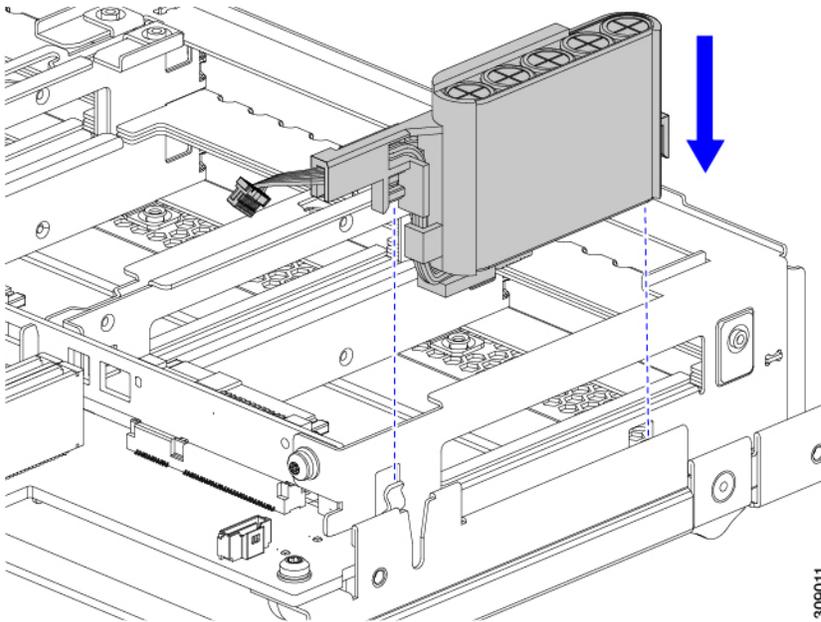
- Step 2** When the SuperCap module is completely seated in its plastic case, pivot the securing lever to connect the ribbon cable to the SuperCap module.



- Step 3** Align the SuperCap module with its slot on the module and seat the module into the slot.

**Caution**

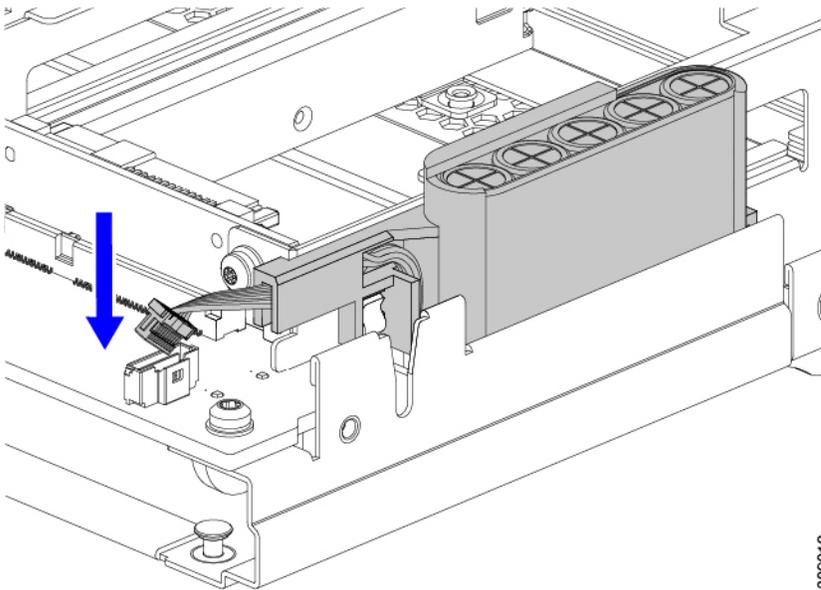
Make sure not to pinch the ribbon cable while inserting the SuperCap module into the slot.



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When the SuperCap is securely seated in the slot, the module does not rock or twist.

**Step 4** After the SuperCap module is seated, reconnect the ribbon cable to the board.



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## Replacing CPUs and Heatsinks

This topic describes the configuration rules and procedure for replacing CPUs 1 through 4 and their heatsinks.

## CPU Configuration Rules

This server has four CPU sockets on the motherboard. Each CPU supports 8 DIMM channels (16 DIMM slots). See [Memory Population Guidelines, on page 68](#).

- The server can operate with four CPUs installed.
- The following restriction apply when using a four-CPU configuration:
  - The maximum number of DIMMs per CPU is 16 (installed in slots A through H).

## 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 for M8 processors—Supplied with replacement CPU. The assembly tool can be ordered separately as Cisco PID UCS-CPUATI-6=.
- Heatsink cleaning kit—Supplied with replacement CPU for the front or rear heatsink: "UCSX-HSCK="



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**Note** If you want to order a Spare CPU Heatsink, you need the spare PIDs with the "=": UCSX-M8I-HS-F= and UCSX-M8I-HS-R=.

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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 pre-applied TIM). Can be ordered separately as Cisco PID UCS-CPU-TIM=.

One TIM kit covers one CPU.

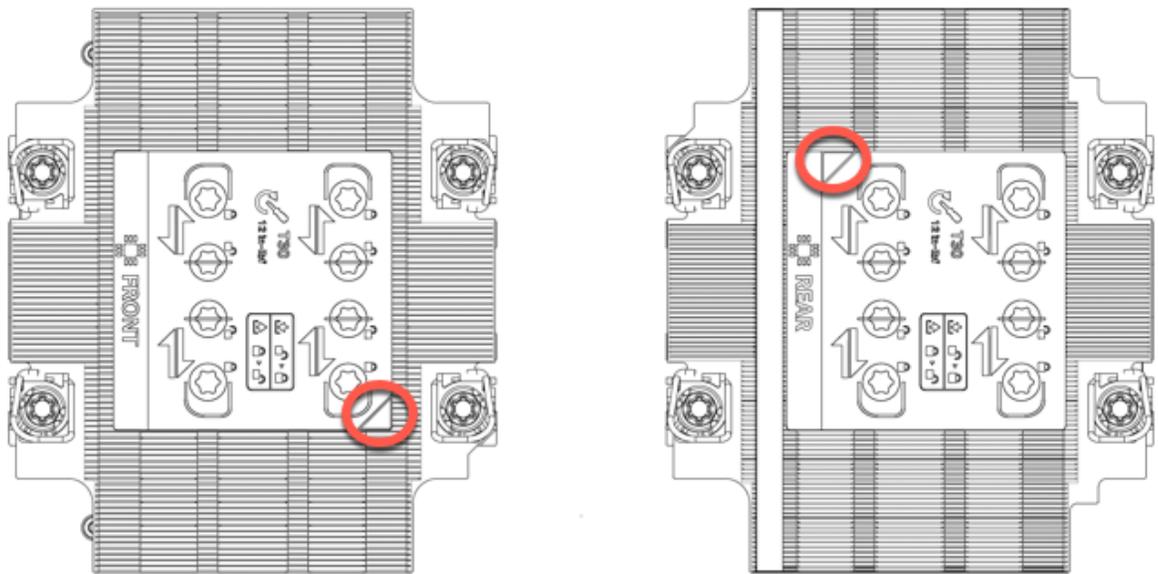
## CPU and Heatsink Alignment Features

For installation and field-replacement procedures, the heatsink, the CPU carrier, and the CPU motherboard socket must all be properly aligned to the pin 1 location.

Each of these parts has a visual indicator to ensure they are properly aligned.

### Heatsink Alignment Feature

Each heatsink has a yellow triangle labeled on one corner. The tip of the triangle points to the pin 1 location on the heatsink. Use the triangle to align the heatsink with the pin 1 location on other parts, such as the CPU carrier and CPU socket.

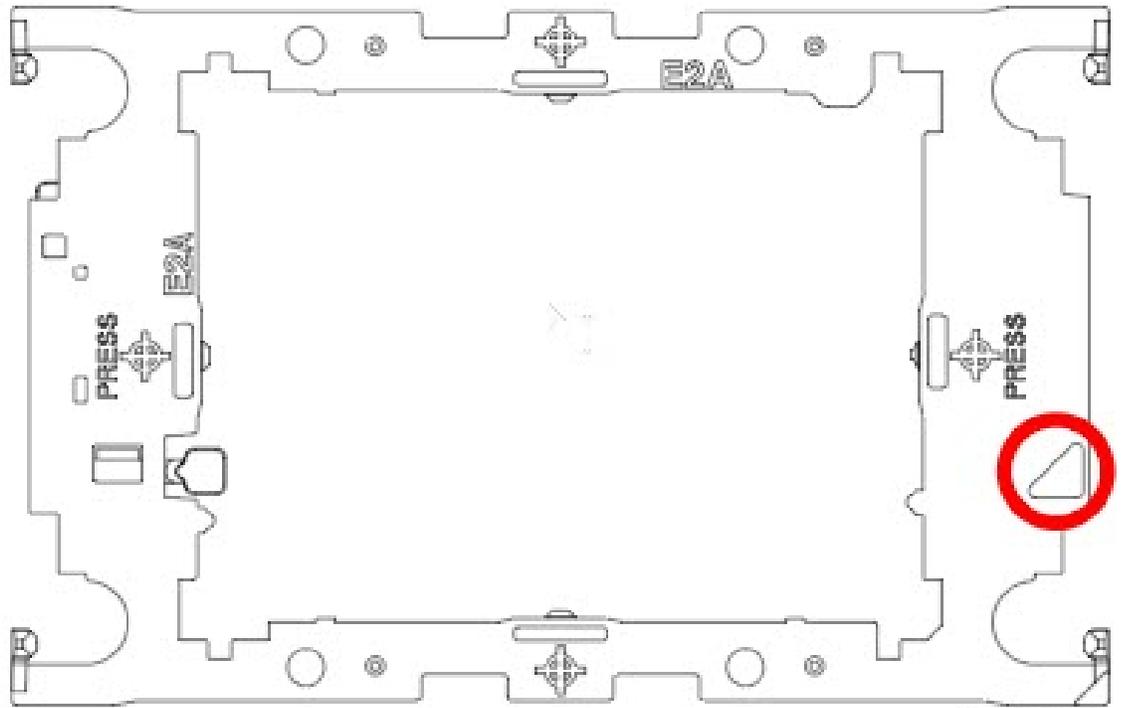


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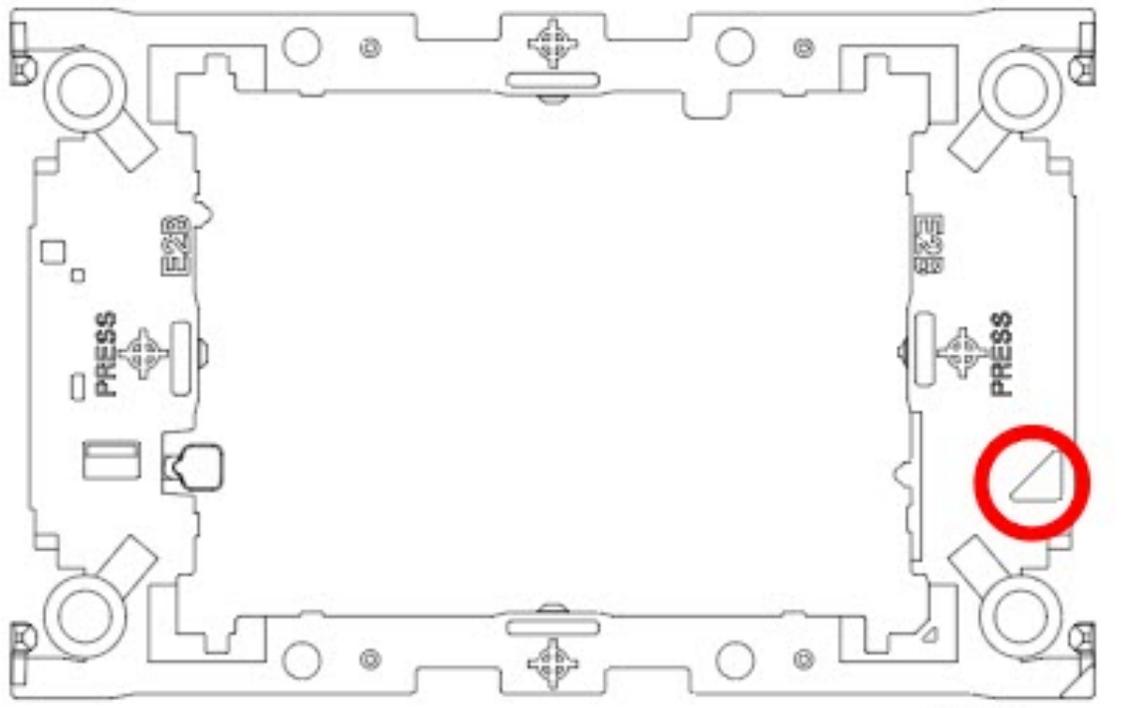
Also note that the orientation of each CPU is different between CPU socket 1 and CPU socket 2, as indicated by the different position of the alignment feature on each heatsink.

### CPU Carrier Alignment Feature

Each CPU carrier has a triangular cutout in the carrier's plastic. The tip of the triangle points to the pin 1 location on the carrier. Use the triangular cutout to align the CPU carrier with the pin 1 location on other parts, such as the heatsink and the CPU socket. The X410c M8 compute node supports two CPU carriers, E2A and E2B. Carrier E2A is shown in the illustration in this guide.



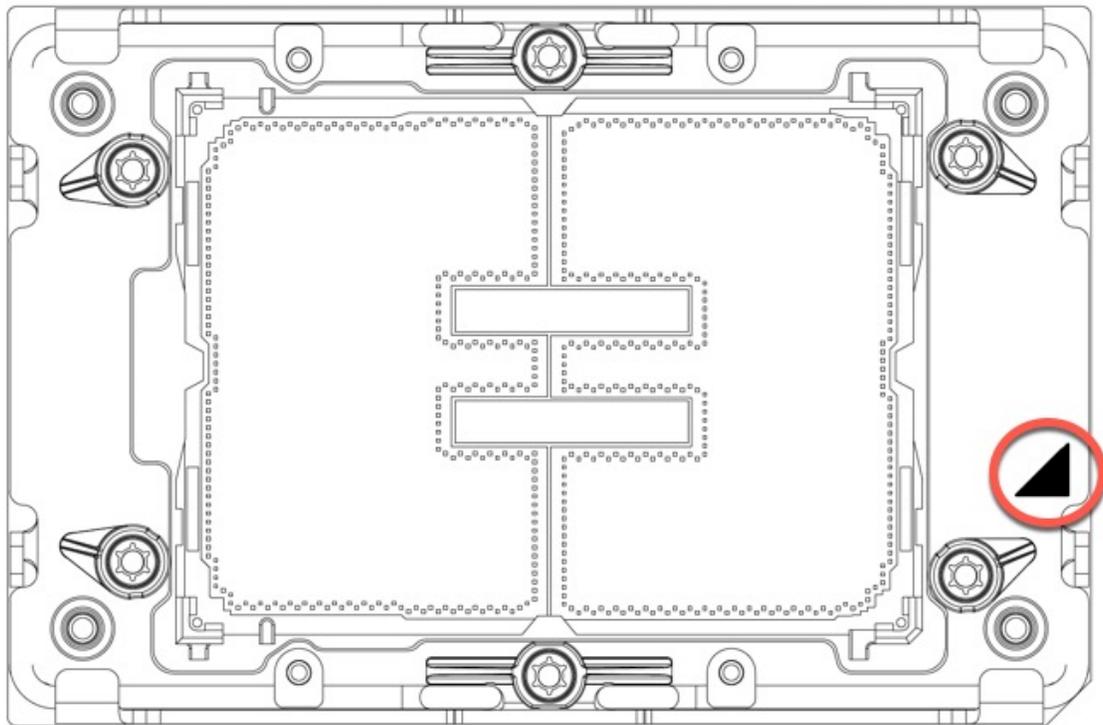
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### CPU Socket Alignment Feature

Each CPU socket has a triangle on the rectangular bolster plate around the CPU socket. The tip of the triangle points to the pin 1 location on the motherboard socket. Use the triangular cutout to align the CPU carrier with the pin 1 location on other parts, such as the heatsink and the CPU carrier.



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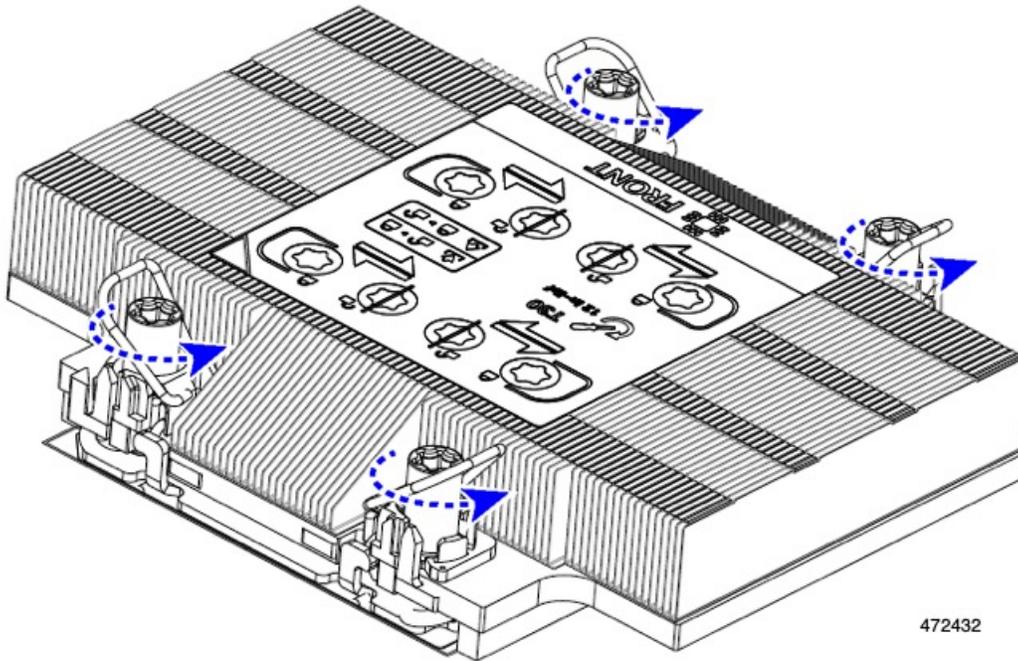
## Removing the CPU and Heatsink

Use the following procedure to remove an installed CPU and heatsink from the compute node. 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.

Sixth Generation Intel Xeon Scalable Processors have the same dimensions, CPU alignment features, and use the same heatsinks. Replacement procedures are the same regardless of which processor generation is installed, and the same heatsink(s) can be reused wherever possible.

### Procedure

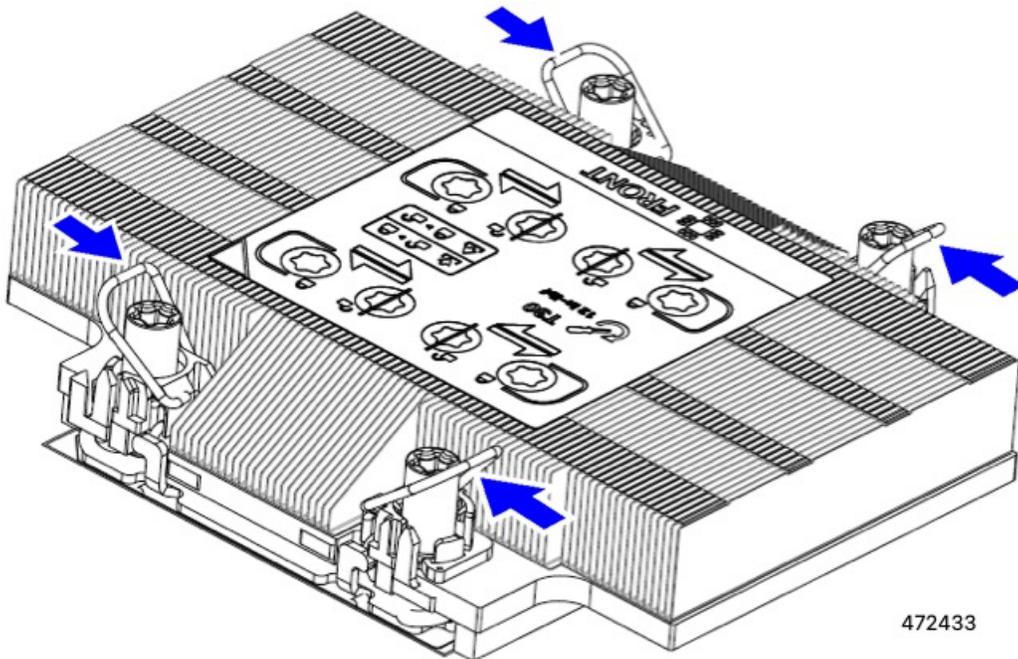
- Step 1** Detach the CPU and heatsink (the CPU assembly) from the CPU socket.
- a) Using the T30 Torx driver, loosen all the securing nuts in a diagonal pattern, you can start at any nut.



- b) Using your fingers, 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.

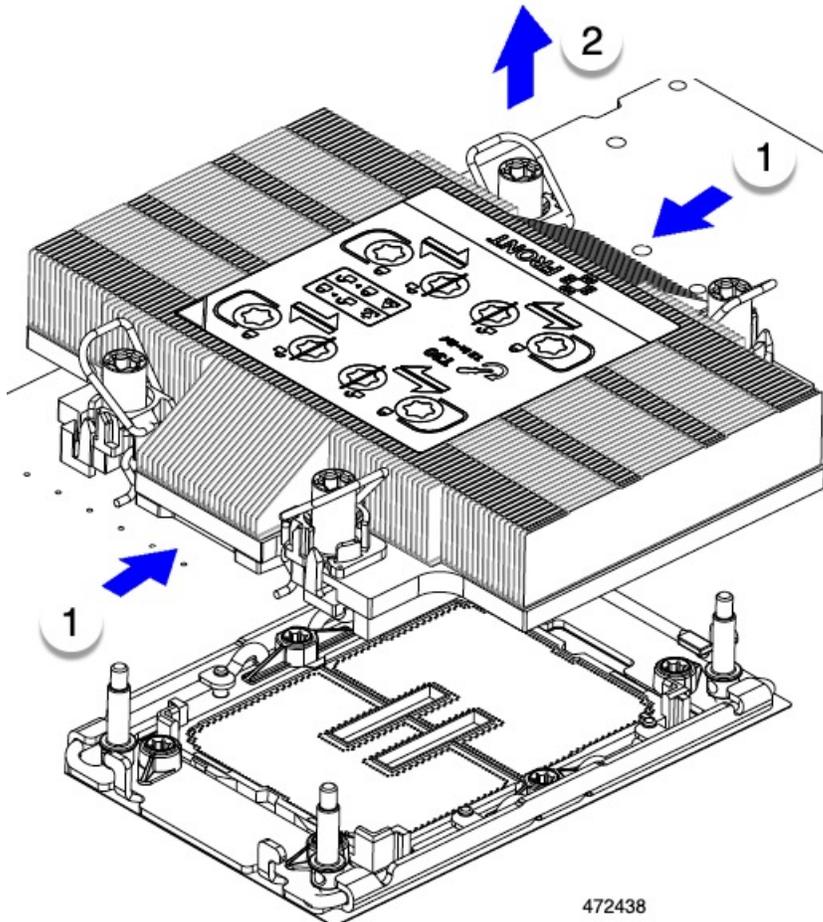


**Step 2** Remove the CPU assembly from the motherboard.

- a) Grasp the heatsink along the edge of the carrier and lift the CPU assembly off of the motherboard.

**Caution**

Do not grasp the heatsink by its fins. Only handle the carrier! Also, if you feel any resistance when lifting the CPU assembly, verify that the rotating wires are completely in the unlocked position.



- b) 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.

- c) Ensure that the CPU assembly sits level on the work surface.

**Step 3** Attach a CPU dust cover to the CPU socket.

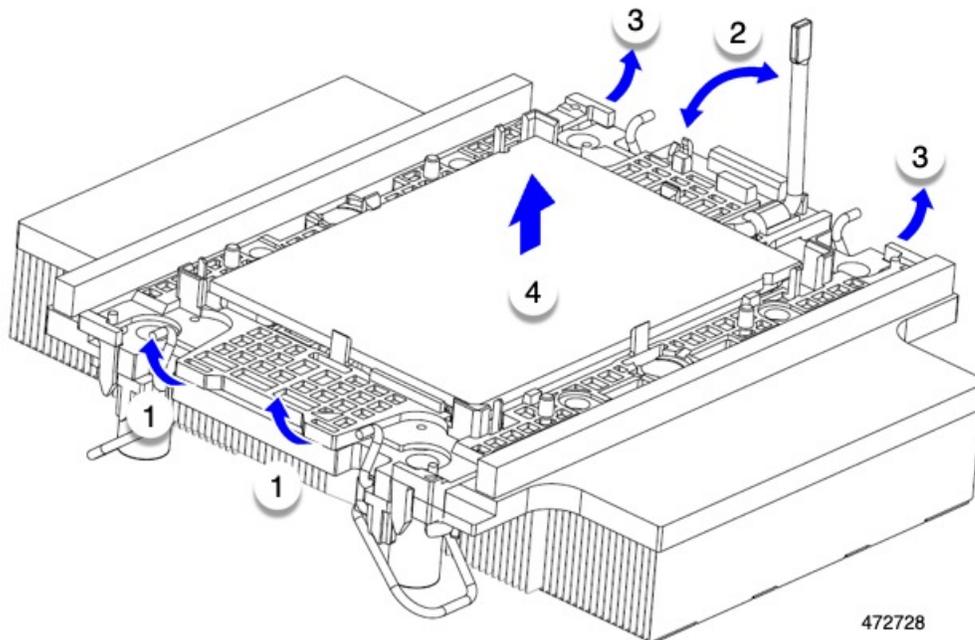
- a) Align the posts on the CPU bolster plate with the cutouts at the corners of the dust cover.  
 b) Lower the dust cover and simultaneously press down on the edges until it snaps into place over the CPU socket.

**Caution**

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



- e) Gently pull up on the outer edge of the CPU carrier nearest to the TIM breaker so that you can disengage the pair of CPU clips (3 in the following illustration).
- f) Grasp the CPU carrier along the short edges and lift it straight up to remove it from the heatsink.



**Step 5** 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.

**Caution**

Handle the carrier only! Do not touch the CPU gold contacts. Do not separate the CPU from the carrier.

**Note**

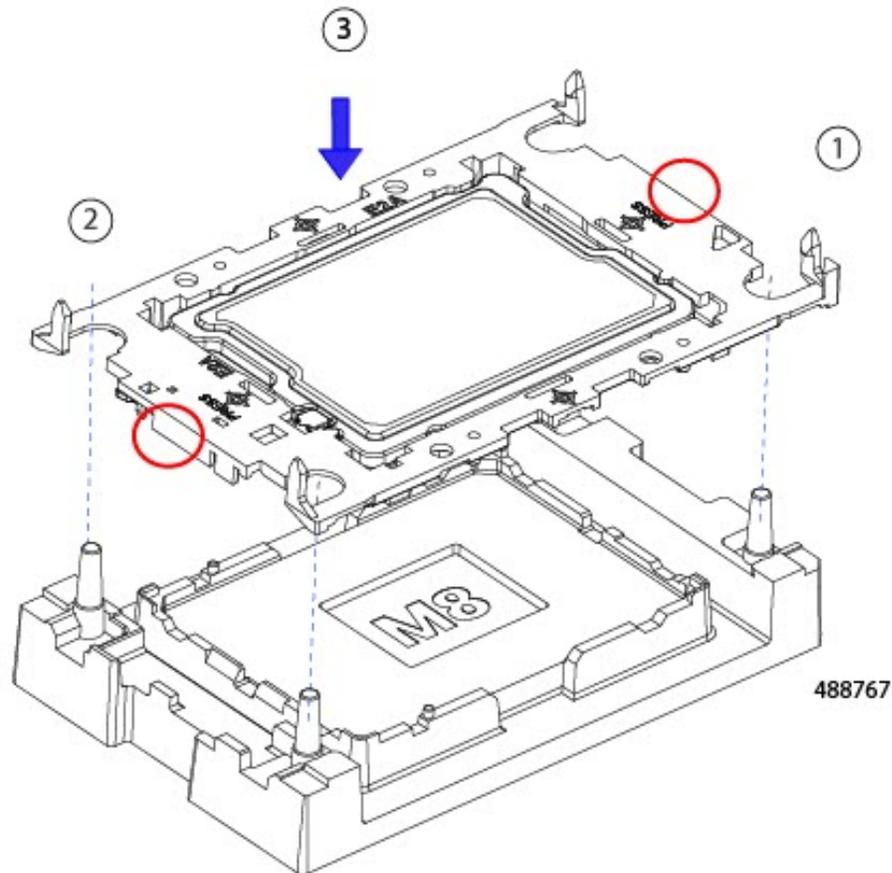
If the carrier and CPU do not lift off of the heatsink, attempt to disengage the CPU clips again.

- b) 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.

- c) Flip the CPU and carrier right-side up so that the word PRESS is visible.
- d) Align the posts on the fixture, and the pin 1 locations on the CPU carrier and the fixture.  
The pin 1 location on the CPU is indicated by the triangle, and the pin 1 location on the fixture is the angled corner.
- e) Lower the CPU and carrier onto the fixture.



### What to do next

- 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 CPU and Heatsink

Use this procedure to install a CPU if you have removed one, or if you are installing a CPU in an empty CPU socket.

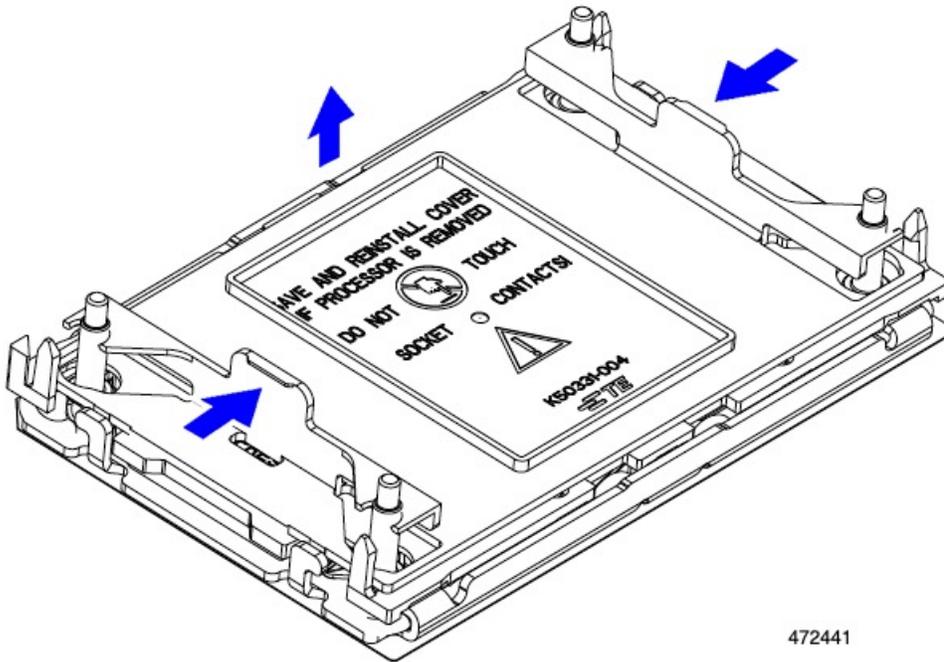
If you are installing or adding a new CPU to a single-CPU compute node, make sure that the new CPU is identical to the existing CPU. If you are replacing a CPU, reuse the existing heatsink.

### Before you begin

The CPU socket, CPU carrier, and heatsink must be correctly aligned to be installed. For information about the alignment features of these parts, see [CPU and Heatsink Alignment Features](#), on page 55.

## Procedure

- Step 1** Remove the CPU socket dust cover on the server motherboard.
- Push the two vertical tabs inward to disengage the dust cover.
  - While holding the tabs in, lift the dust cover up to remove it.



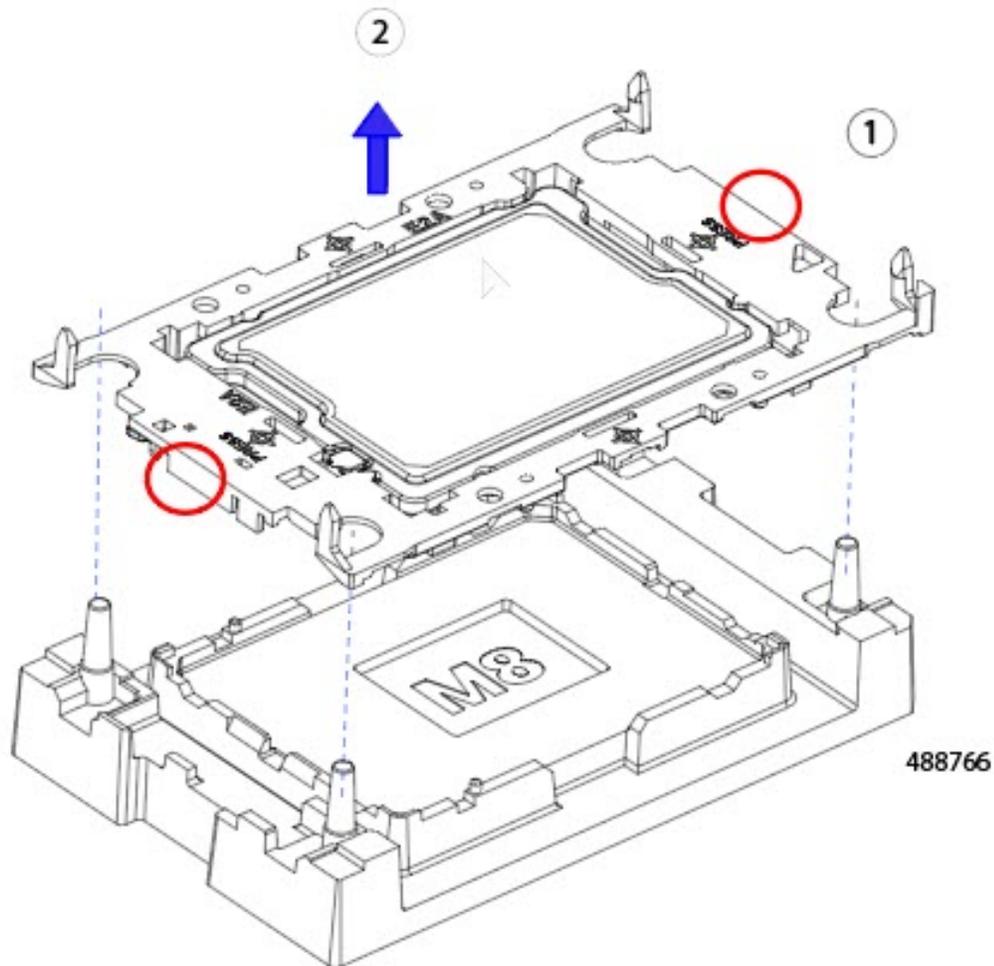
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- Store the dust cover for future use.

**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 carrier on the edges, lift it out of the tray, and place the CPU carrier on an ESD-safe work



surface.

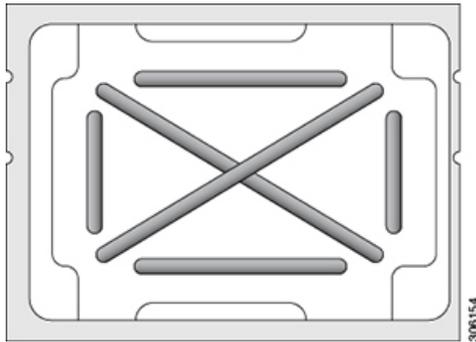
**Step 3** Apply new TIM.

**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, 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 14: Thermal Interface Material Application Pattern**



**Caution**

- CPU 1 and CPU 3 use the front heatsink UCSX-C-M8-F.
- CPU 2 and CPU 4 use the front heatsink UCSX-C-M8-R.

**Step 4** Attach the heatsink to the CPU and carrier.

- a) Using your finger, push the retaining wires to the unlocked position to prevent obstruction when seating the CPU.
- b) Grasp the heatsink by the short edges.
- c) Align the pin 1 location of the heatsink with the pin 1 location on the CPU carrier, then lower the heatsink onto the CPU carrier.

The heatsink is correctly oriented when the embossed triangle points to the CPU pin 1 location.

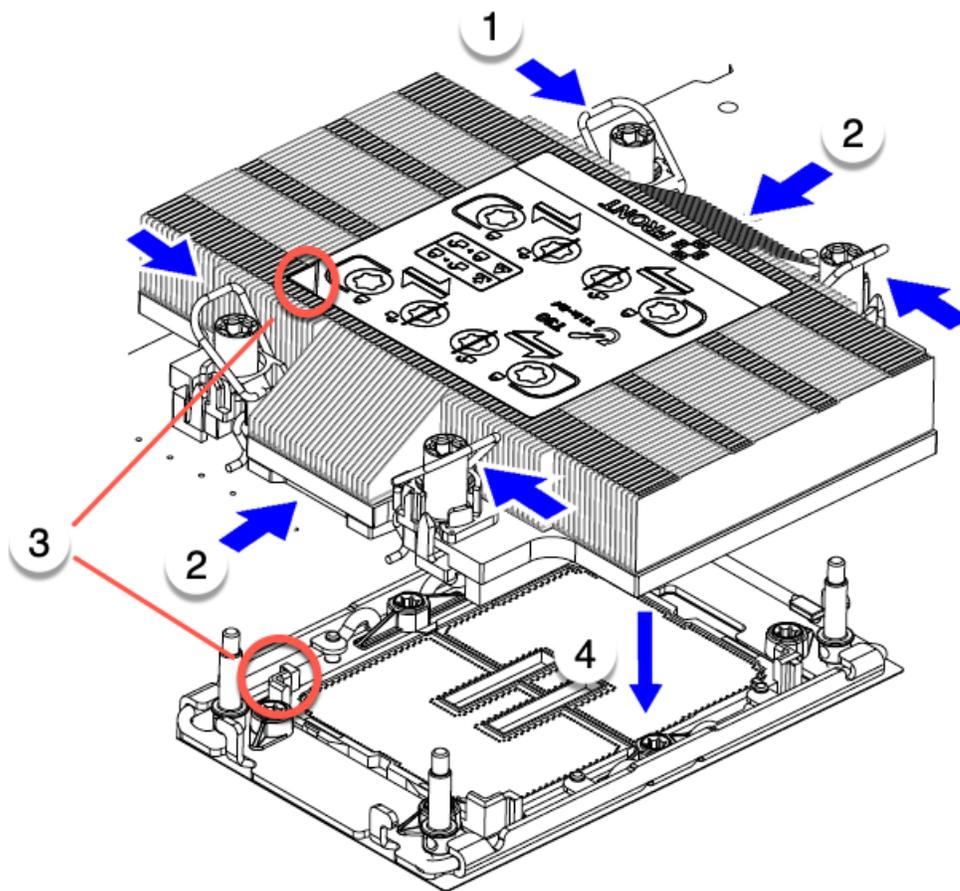
**Step 5** Install the CPU assembly onto the CPU motherboard socket.

- a) Push the rotating wires inward to the unlocked position so that they do not obstruct installation.
- b) Grasp the heatsink by the carrier, align the pin 1 location on the heatsink with the pin 1 location on the CPU socket, then seat the heatsink onto the CPU socket.

The heatsink is correctly oriented when the embossed triangle points to the CPU pin 1 location, as shown.

**Caution**

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



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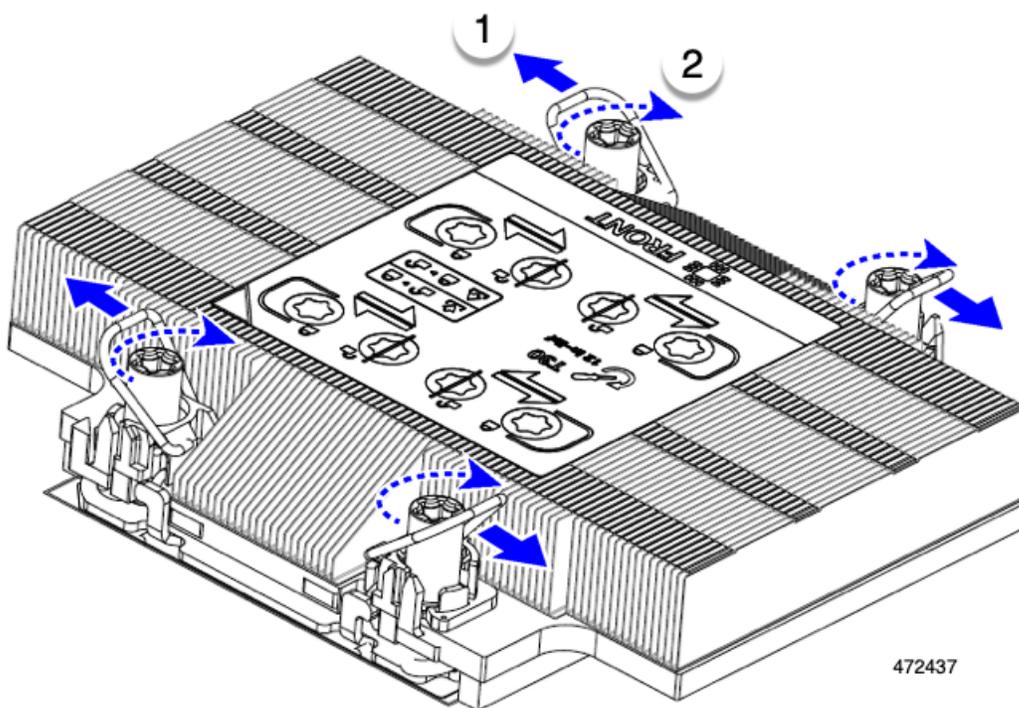
**Step 6** Secure the CPU and heatsink to the socket.

- a) 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.

- b) Set the T30 Torx driver to 12 in-lb of torque and tighten the 4 securing nuts to secure the CPU to the motherboard. You can start with any nut, but make sure to tighten the securing nuts in a diagonal pattern.



## Replacing Memory DIMMs

The DIMMs that this compute node supports are updated frequently. A list of supported and available DIMMs is in Cisco UCS X410c M8 Specification Sheet.

Do not use any DIMMs other than those listed in the specification sheet. Doing so may irreparably damage the compute node and result in down time.

## Memory Population Guidelines

For detailed information about supported memory, memory population guidelines, and configuration and performance, download the PDF of the [Cisco UCS/UCSX M8 Memory Guide](#).

### DIMM Identification

To assist with identification, each DIMM slot displays its memory processor and slot ID on the motherboard. The entire enumeration string consists of <Processor-ID>\_<channel> <DIMM slot-ID>.

For example, P1 A1 indicates CPU 1, DIMM channel A, Slot 1.

Also, you can further identify which DIMM slot connects to which CPU by dividing the blade in half vertically. With the compute node front panel facing left:

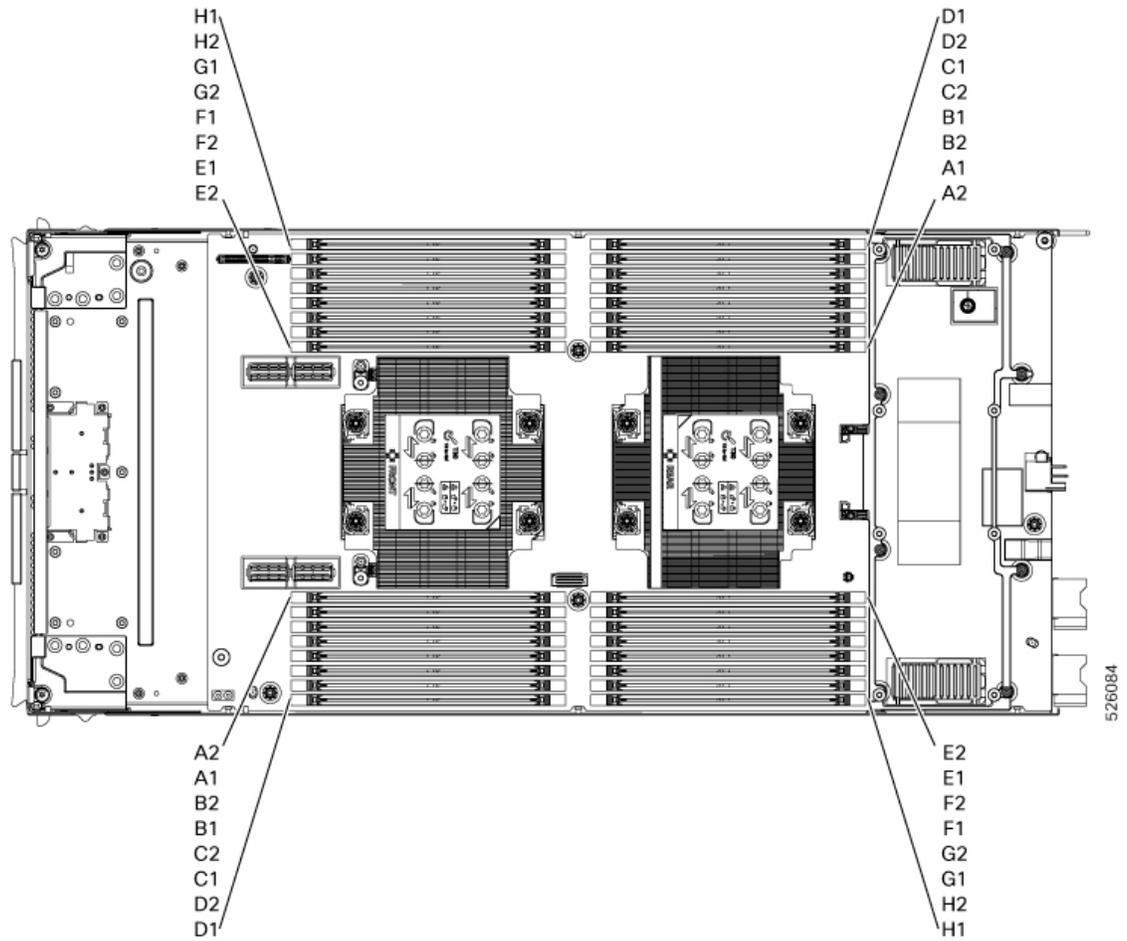
- All DIMM slots on the left, above and below CPU 1 and CPU 3 are connected to CPU 1 and CPU 3, respectively.

- All DIMM slots on the right, above and below CPU 2 and CPU 4 are connected to CPU 2 and CPU 4, respectively.

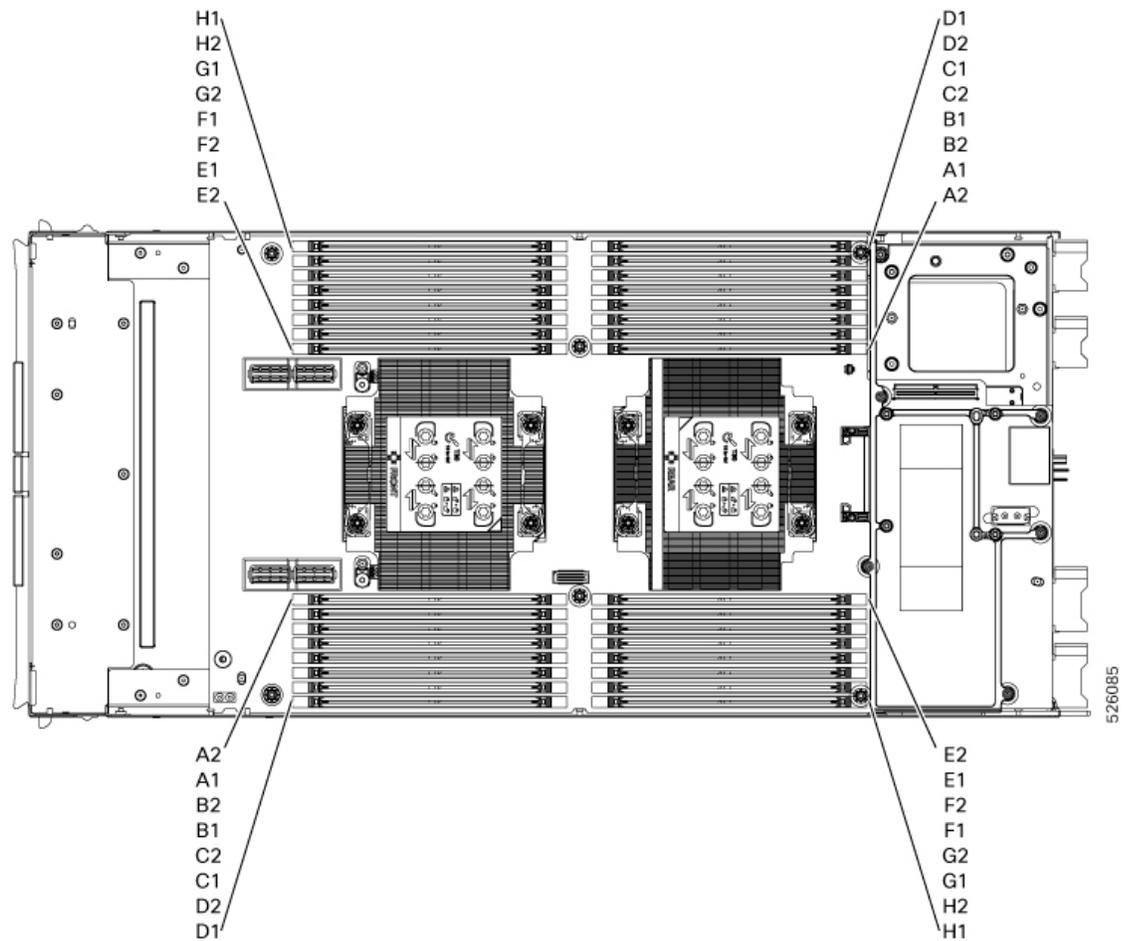
For each CPU, each set of 16 DIMMs is arranged into 8 channels, where each channel has two DIMMs. Each DIMM slot is numbered 1 or 2, and each DIMM slot 1 is blue and each DIMM slot 2 is black. Each channel is identified by two pairs of letters and numbers where the first pair indicates the processor, and the second pair indicates the memory channel and slot in the channel.

- Each DIMM is assigned to a CPU, either CPU 1 (P1) or CPU 2 (P2) on the primary, or CPU 3 (P3) or CPU 4 (P4) on the secondary.
- Each CPU has memory channels A through H.
- Each memory channel has two slots 1 and 2.
- DIMM slot identifiers for CPU1 and CPU2 are on the primary.
  - For CPU 1, they are P1 A1 and A2, P1 B1 and B2, P1 C1 and C2, P1 D1 and D2, P1 E1 and E2, P1 F1 and F2, P1 G1 and G2, P1 H1 and H2.
  - For CPU2, they are P2 A1 and A2, P2 B1 and B2, P2 C1 and C2, P2 D1 and D2, P2 E1 and E2, P2 F1 and F2, P2 G1 and G2, P2 H1 and H2.
- DIMM slot identifiers for CPU3 and CPU4 are on the secondary.
  - For CPU 3, they are P3 A1 and A2, P3 B1 and B2, P3 C1 and C2, P3 D1 and D2, P3 E1 and E2, P3 F1 and F2, P3 G1 and G2, P3 H1 and H2.
  - For CPU4, they are P4 A1 and A2, P4 B1 and B2, P4 C1 and C2, P4 D1 and D2, P4 E1 and E2, P4 F1 and F2, P4 G1 and G2, P4 H1 and H2.

The following illustration shows the memory slot and channel IDs on the primary.



The following illustration shows the memory slot IDs on the secondary. The memory slots and channels on the secondary are identical except the slots and channels are connected to CPU 3 (the left CPU) and CPU 4 (the right CPU).



### Memory Population Order

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

For detailed information about supported memory, memory population guidelines, and configuration and performance, download the PDF of the [Cisco UCS/UCSX M8 Memory Guide](#).

### DIMM Slot Keying Consideration

DIMM slots that connect to each CPU socket are oriented 180 degrees from each other. So, when you compare the DIMM slots for CPU 1 and the DIMM slots for CPU 2, or the DIMM slots for CPU 3 and CPU 4, the DIMMs do not install the same way. Instead, when you install DIMMs attached to both CPUs 1 and 3 compared to CPUs 2 and 4, the DIMM orientation must change 180 degrees.

To facilitate installation, DIMMs are keyed to ensure correct installation. When you install a DIMM, always make sure that the key in the DIMM slot lines up with the notch in the DIMM.



---

**Caution** If you feel resistance while seating a DIMM into its socket, do not force the DIMM or you risk damaging the DIMM or the slot. Check the keying on the slot and verify it against the keying on the bottom of the DIMM. When the slot's key and the DIMM's notch are aligned, reinstall the DIMM.

---

## Installing a DIMM or DIMM Blank

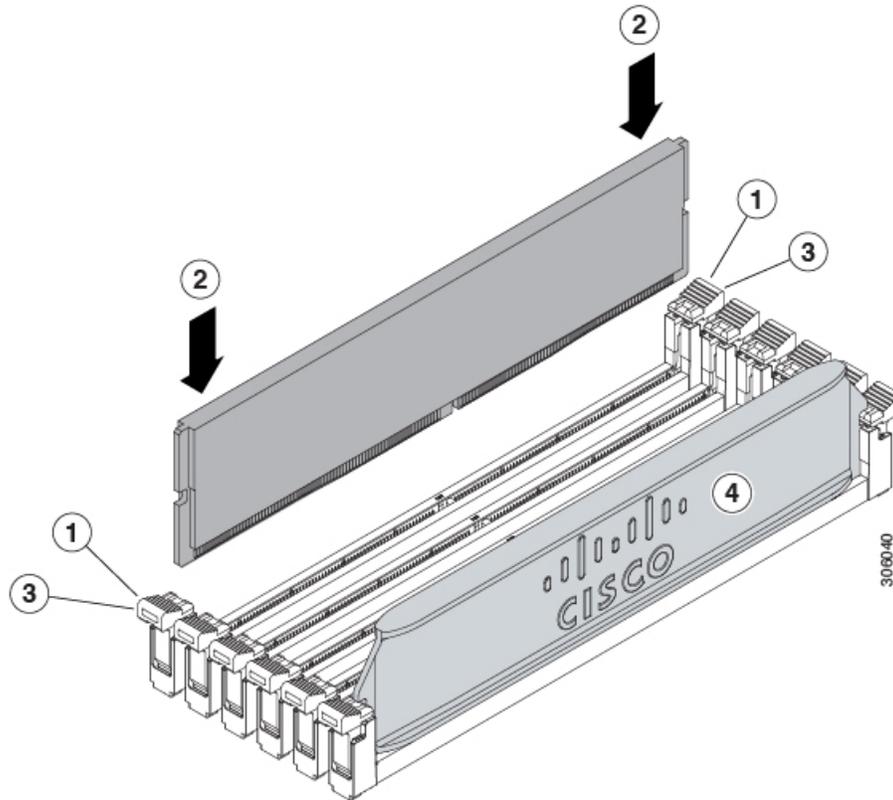
To install a DIMM or a DIMM blank (UCS-DDR5-BLK=) into a slot on the compute node, follow these steps:

### Procedure

---

- Step 1** Open both DIMM connector latches.
- Step 2** Press evenly on both ends of the DIMM until it clicks into place in its slot.
- Note** Ensure that the notch in the DIMM aligns with the slot. If the notch is misaligned, it is possible to damage the DIMM, the slot, or both.
- Step 3** Press the DIMM connector latches inward slightly to seat them fully.
- Step 4** Populate all slots with a DIMM or DIMM blank. A slot cannot be empty.

Figure 15: Installing Memory



## Servicing the Bridge Card

The compute node supports a Cisco UCS Series 15000 Bridge Card (UCSX-V5-BRIDGE-D) that spans between the rear mezzanine MLOM slot and the VIC slot. The bridge card connects a UCS X-Series Compute Node, such as the Cisco X410c M8 Compute Node, to the following Intelligent Fabric Modules (IFMs) in the server chassis that contains the compute nodes:

- Cisco UCS X9108 25G Intelligent Fabric Module (UCSX-I-9108-25G)
- Cisco UCS X9108 100G Intelligent Fabric Module (UCSX-I-9108-100G)

See the following topics:

- [Removing the Bridge Card, on page 73](#)
- [Installing a Bridge Card, on page 75](#)

## Removing the Bridge Card

Use the following procedure to remove the bridge card.

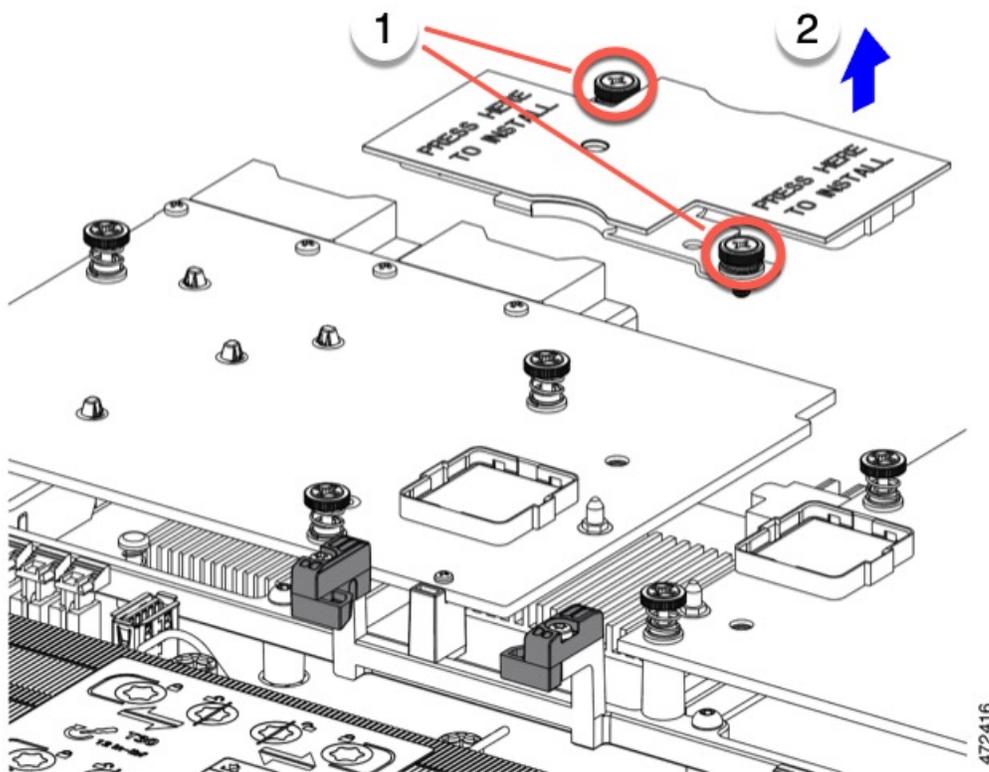
## Procedure

- Step 1** Remove the compute node.
- Shut down and remove power from the compute node.
  - Remove the compute node from the chassis. You might have to detach cables from the rear panel to provide clearance.
  - Remove the top cover from the compute node. See [Removing a Compute Node Cover, on page 27](#).

- Step 2** Remove the bridge card from the motherboard.
- Using a #2 Phillips screwdriver, loosen the two captive screws.
  - Lift the bridge card off of the socket.

### Note

You might need to gently rock the bridge card to disconnect it.



### What to do next

Choose the appropriate option:

- Perform service on the MLOM. See [Servicing the mLOM, on page 76](#).
- Perform service on the VIC. See [Servicing the VIC, on page 78](#).

- Reinstall the bridge card. See [Install the Bridge card](#).

## Installing a Bridge Card

The Cisco UCS VIC 14000 Series Bridge is a physical card that provides data connection between the mLOM and VIC. Use this procedure to install the bridge card.



**Note** The bridge card installs upside down so that the connectors meet with the sockets on the MLOM and VIC.

### Before you begin

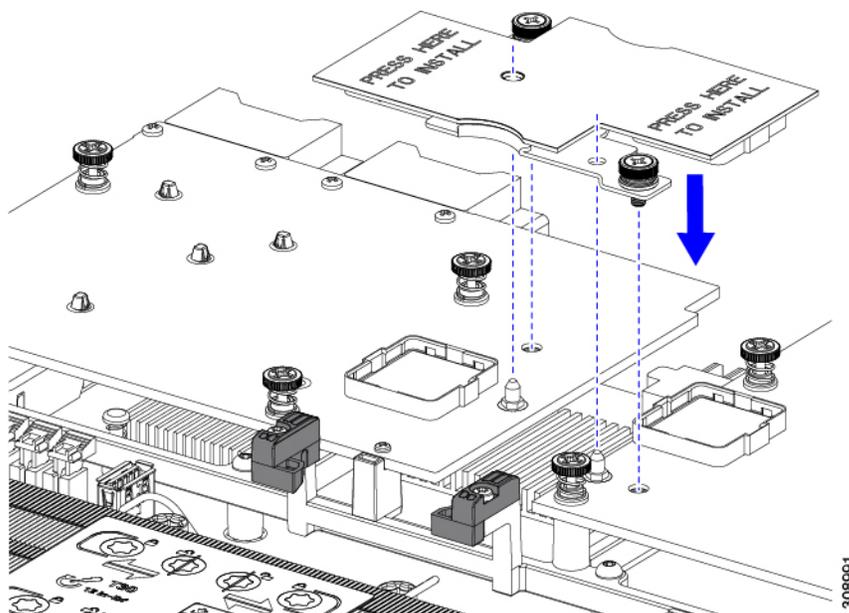
To install the bridge card, the compute node must have an mLOM and a VIC installed. The bridge card ties these two cards together to enable communication between them.

If these components are not already installed, install them now. See:

- [Installing a Rear Mezzanine Card in Addition to the mLOM VIC, on page 80](#)

### Procedure

- Step 1** Orient the bridge card so that the Press Here to Install text is facing you.
- Step 2** Align the bridge card so that the connectors line up with the sockets on the MLOM and VIC.
- When the bridge card is correctly oriented, the hole in the part's sheet metal lines up with the alignment pin on the VIC.
- Step 3** Keeping the bridge card level lower it onto the MLOM and VIC cards and press evenly on the part where the Press Here to Install text is.



**Step 4** When the bridge card is correctly seated, use a #2 Phillips screwdriver to secure the captive screws.

**Caution**

Make sure the captive screws are snug, but do not overdrive them or you risk stripping the screw.

---

## Servicing the mLOM

The UCS X410c M8 compute node supports a modular LOM (mLOM) card to provide additional rear-panel connectivity. The mLOM socket is on the rear corner of the motherboard.

The mLOM socket provides a Gen-3 x16 PCIe lane. The socket remains powered when the compute node is in 12 V standby power mode, and it supports the network communications services interface (NCSI) protocol.

To service the mLOM card, use the following procedures:

- [Installing an mLOM Card, on page 77](#)
- [Removing the mLOM, on page 76](#)

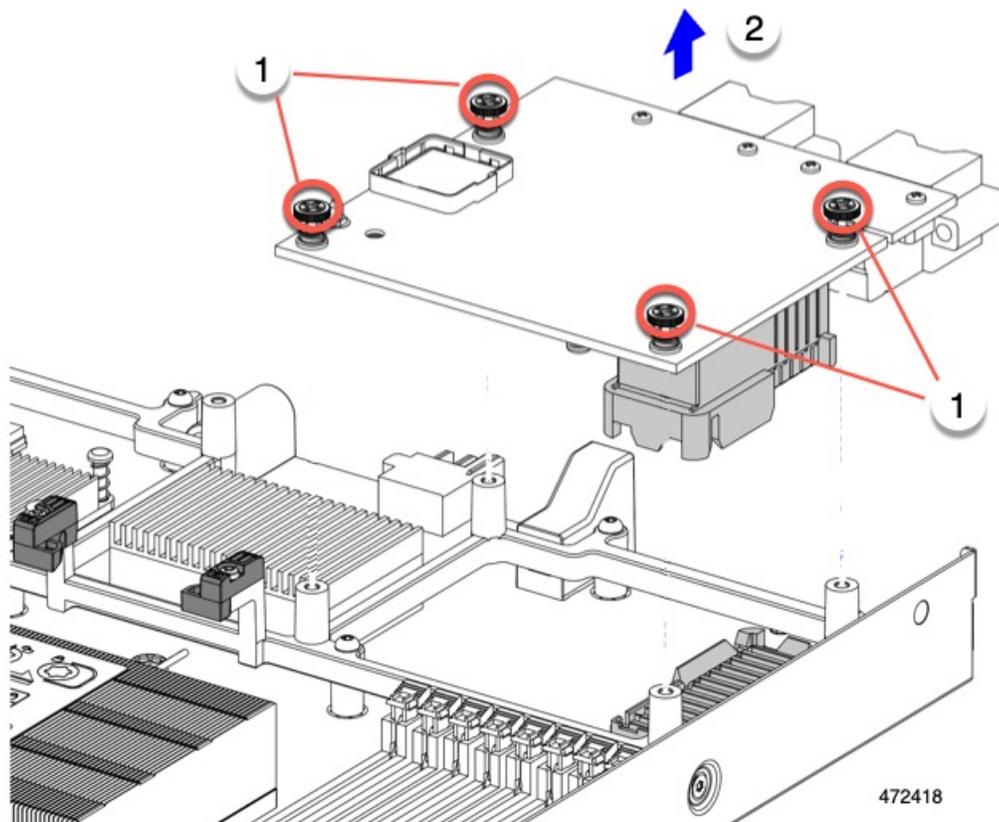
## Removing the mLOM

The compute node supports an mLOM in the rear mezzanine slot. Use this procedure to remove an mLOM.

### Procedure

---

- Step 1** Remove the compute node.
- Shut down and remove power from the compute node.
  - Remove the compute node from the chassis. You might have to detach cables from the rear panel to provide clearance.
  - Remove the top cover from the compute node. See [Removing a Compute Node Cover, on page 27](#).
- Step 2** If the compute node has a UCS VIC 15000 Series Bridge Card, remove the card.  
See [Removing the Bridge Card, on page 73](#).
- Step 3** Remove the MLOM.
- Using a #2 Phillips head screwdriver, loosen the two captive thumbscrews.
  - Lift the MLOM off of its socket.
- You might need to gently rock the mLOM card while lifting it to disengage it from the socket.



### What to do next

After completing service, reinstall the VIC. See [Installing a Rear Mezzanine Card in Addition to the mLOM VIC, on page 80](#).

## Installing an mLOM Card

Use this task to install an mLOM onto the compute node.

### Before you begin

If the compute node is not already removed from the chassis, power it down and remove it now. You might need to disconnect cables to remove the compute node.

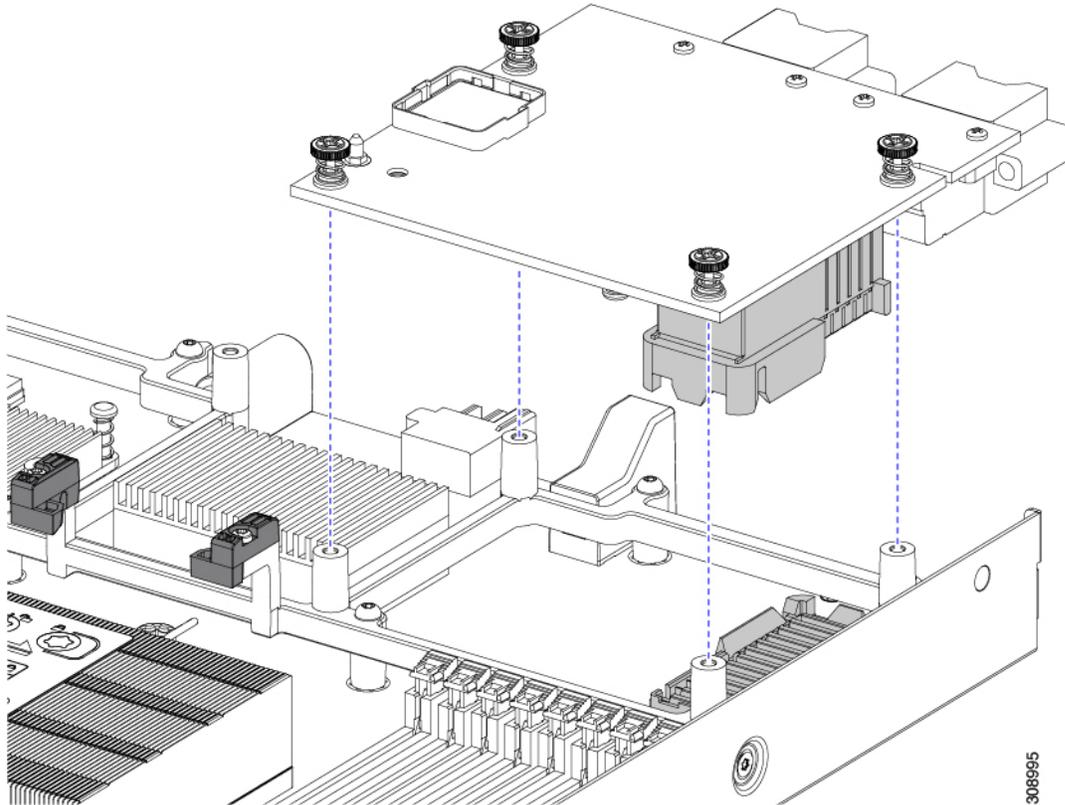
Gather a torque screwdriver.

### Procedure

**Step 1** Remove the top cover.

See [Removing a Compute Node Cover](#), on page 27.

- Step 2** Orient the mLOM card so that the socket is facing down.
- Step 3** Align the mLOM card with the motherboard socket so that the bridge connector is facing inward.



- Step 4** Keeping the card level, lower it and press firmly to seat the card into the socket.
- Step 5** Using a #2 Phillips torque screwdriver, tighten the captive thumbscrews to 4 in-lb of torque to secure the card.
- Step 6** If your compute node has a bridge card (Cisco UCS VIC 15000 Series Bridge), reattach the bridge card.  
See [Installing a Bridge Card](#), on page 75.
- Step 7** Replace the top cover of the compute node.
- Step 8** Reinsert the compute node into the chassis. replace cables, and then power on the compute node by pressing the Power button.

## Servicing the VIC

The UCS X410c M8 compute node supports a virtual interface card (VIC) in the rear mezzanine slot. The VIC can be either half-slot or full-slot in size.

The following VICs are supported on the compute node.

Table 5: Supported VICs on Cisco UCS x410c M8

VICs	Details
UCSX-ML-V5D200GV2	Cisco UCS Virtual Interface Card (VIC) 15230 modular LOM with Secure Boot for Blade Servers
UCSX-ML-V5Q50G	Cisco UCS Virtual Interface Card (VIC) 15420 modular LOM with Secure Boot for Blade Servers
UCSX-ME-V5Q50G	Cisco UCS Virtual Interface Card (VIC) 15422 mezzanine adapter with Secure Boot for Blade Servers  <b>Note</b> A blade with only one mezzanine card is an unsupported configuration. With this configuration, blade discovery does not occur through management software such as Intersight. No error is displayed.
UCSX-V5-BRIDGE	Cisco UCS Virtual Interface Card (VIC) 15000 bridge to connect mLOM and mezz for X Compute Node

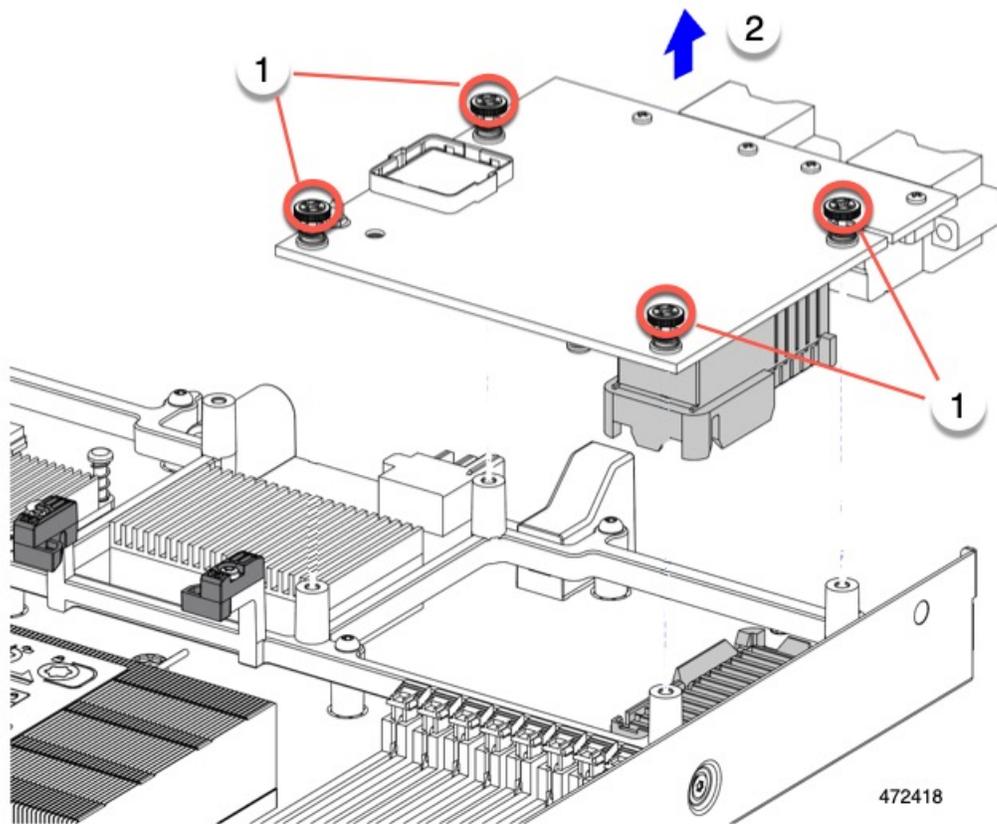
## Removing a VIC

The compute node supports a VIC in the rear of the compute node. Use this procedure to remove the VIC.

### Procedure

- 
- Step 1** Remove the compute node.
- Shut down and remove power from the compute node.
  - Remove the compute node from the chassis. You might have to detach cables from the rear panel to provide clearance.
  - Remove the top cover from the compute node. See [Installing a Compute Node Cover](#), on page 26.
- Step 2** If the compute node has a UCS VIC 15000 Series Bridge Card, remove the card.  
See [Removing the Bridge Card](#), on page 73.
- Step 3** Remove the VIC.
- Using a #2 Phillips head screwdriver, loosen the captive thumbscrews.
  - Lift the VIC off of its socket.

You might need to gently rock the mLOM card while lifting it to disengage it from the socket.

**What to do next**

Install a VIC. See [Installing a Rear Mezzanine Card in Addition to the mLOM VIC](#), on page 80

## Installing a Rear Mezzanine Card in Addition to the mLOM VIC

The compute node has a rear mezzanine slot which can accept a virtual interface card (VIC) unless the compute node has a full size mLOM. In the case of a separate mLOM and VIC, another component (the UCS VIC 15000 Series Bridge) is required to provide data connectivity between the mLOM and VIC. See [Installing a Bridge Card](#), on page 75.

Use this task to install a VIC in the rear mezzanine slot.



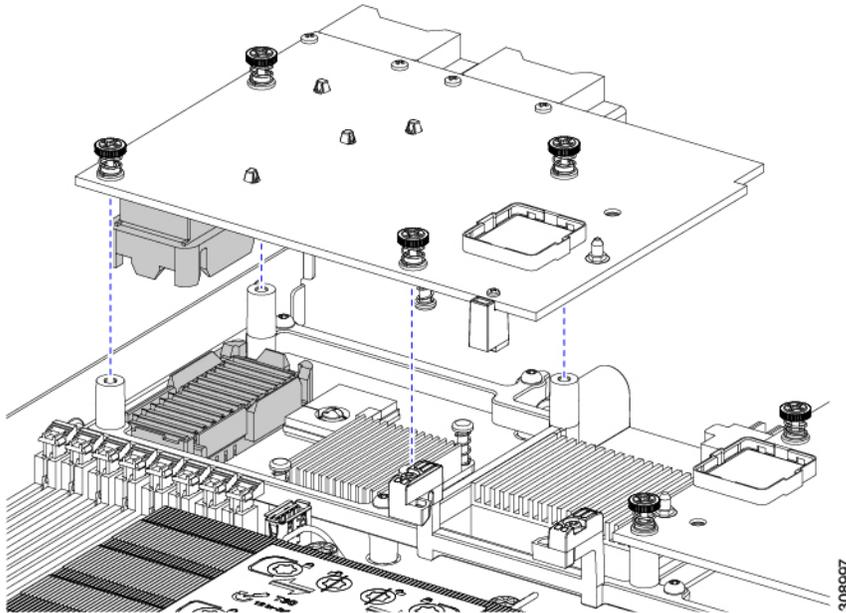
**Note** The VIC installs upside down so that the connectors meet with the sockets on the compute node.

**Before you begin**

Gather a torque screwdriver.

## Procedure

- Step 1** Orient the VIC with the captive screws facing up and the connectors facing down.
- Step 2** Align the VIC so that the captive screws line up with their threaded standoffs, and the connector for the bridge card is facing inward.
- Step 3** Holding the VIC level, lower it and press firmly to seat the connectors into the sockets.



- Step 4** Using a #2 Phillips torque screwdriver, tighten the captive screws to 4 in-lb of torque to secure the VIC to the compute node.

### What to do next

- If the mLOM card is already installed, install a bridge card. Go to [Installing a Bridge Card, on page 75](#).
- If not, install the mLOM, which must be installed before the bridge card can be attached. Go to [Installing an mLOM Card, on page 77](#).

## Servicing the Trusted Platform Module (TPM)

The Trusted Platform Module (TPM) is a component that can securely store artifacts used to authenticate the compute node. These artifacts can include passwords, certificates, or encryption keys. A TPM can also be used to store platform measurements that help ensure that the platform remains trustworthy. Authentication (ensuring that the platform can prove that it is what it claims to be) and attestation (a process helping to prove that a platform is trustworthy and has not been breached) are necessary steps to ensure safer computing in all environments. It is a requirement for the Intel Trusted Execution Technology (TXT) security feature, which must be enabled in the BIOS settings for a compute node equipped with a TPM.

The UCS X410c M8 Compute Node supports the Trusted Platform Module 2.0, which is FIPS140-2 compliant and CC EAL4+ certified (UCSX-TPM-002C=).

To install and enable the TPM, go to [Enabling the Trusted Platform Module, on page 82](#).



**Note** Removing the TPM is supported only for recycling and e-waste purposes. Removing the TPM will destroy the part so that it cannot be reinstalled.

## Enabling the Trusted Platform Module

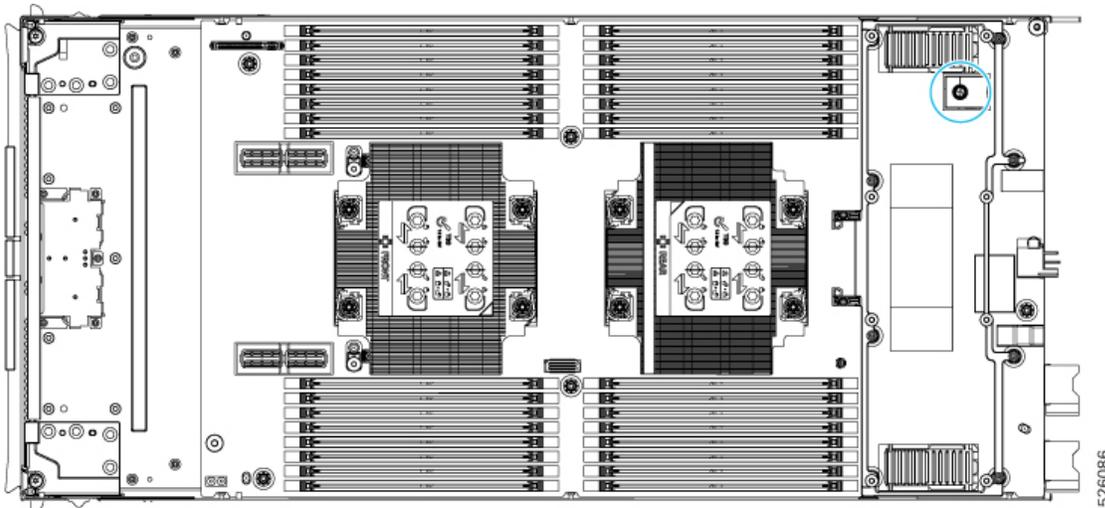
The Trusted Platform Module (TPM) is a component that can securely store artifacts used to authenticate the compute node. These artifacts can include passwords, certificates, or encryption keys. A TPM can also be used to store platform measurements that help ensure that the platform remains trustworthy.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

### Procedure

#### Step 1

Install the TPM hardware.

- Decommission, power off, and remove the compute node from the chassis.
- Remove the top cover from the compute node as described in [Installing a Compute Node Cover , on page 26](#).
- Install the TPM to the TPM socket on the compute node motherboard and secure it using the one-way screw that is provided. See the figure below for the location of the TPM socket.
- Return the compute node to the chassis and allow it to be automatically racknowledged, reassociated, and recommissioned.
- Continue with enabling TPM support in the compute node BIOS in the next step.



#### Step 2

Enable TPM Support in the BIOS.

- a) In the Cisco UCS Manager Navigation pane, click the **Servers** tab.
  - b) On the Servers tab, expand **Servers > Policies**.
  - c) Expand the node for the organization where you want to configure the TPM.
  - d) Expand BIOS Policies and select the BIOS policy for which you want to configure the TPM.
  - e) In the Work pane, click the **Advanced** tab.
  - f) Click the **Trusted Platform** sub-tab.
  - g) To enable TPM support, click **Enable** or **Platform Default**.
  - h) Click **Save Changes**.
  - i) Continue with the next step.
-





## CHAPTER 4

# Recycling Compute Node Components

This chapter contains the following topics:

- [Compute Node Recycling Overview](#), on page 85
- [Removing the Trusted Platform Module \(TPM\)](#), on page 85
- [Recycling the Component PCB Assemblies \(PCBAs\)](#), on page 87

## Compute Node Recycling Overview

This chapter documents the procedures to disassemble key compute node components for recycling and e-waste. When recycling your Cisco UCS hardware, always make sure to follow local e-waste and recycling regulations.



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**Note** **For Recyclers Only!** The procedures in this chapter are not standard field-service options. These procedures are for recyclers who will be reclaiming the electronics for proper disposal to comply with local eco design and e-waste regulations.

---

To disassemble compute node component parts, see the following topics:

- [Removing the Trusted Platform Module \(TPM\)](#), on page 85
- [Recycling the Primary Motherboard PCBA](#), on page 93

## Removing the Trusted Platform Module (TPM)

The TPM module is attached to the printed circuit board assembly (PCBA). You must disconnect the TPM module from the PCBA before recycling the PCBA. The TPM module is secured to a threaded standoff by a tamper-resistant screw. If you do not have the correct tool for the screw, you can use a pair of pliers to remove the screw.



---

**Caution** Removing the TPM destroys the part so that it cannot be reinstalled or reused!

---

**Before you begin**

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

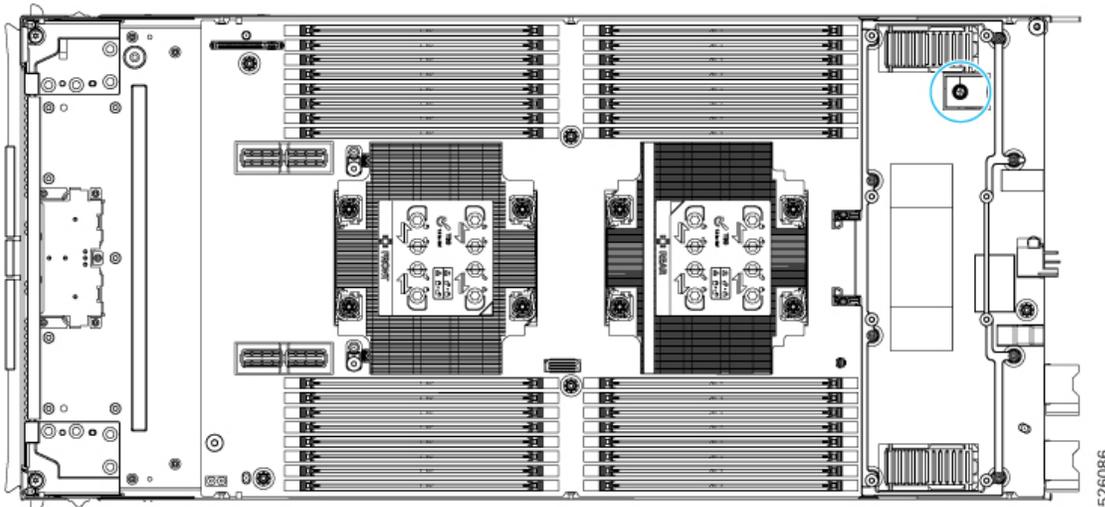
To remove the Trusted Platform Module (TPM), the following requirements must be met for the compute node:

- It must be disconnected from facility power.
- It must be removed from the equipment rack.
- The top cover must be removed. If the top cover is not removed, see [Removing and Installing the Compute Node Covers, on page 25](#).

**Procedure**

**Step 1** If the rear mezzanine card is installed, use a #2 screwdriver to remove the four captive screws, then remove the card.

**Step 2** Locate the TPM module.



**Step 3** Using the pliers, grip the head of the TPM and turn it counterclockwise until it releases.

**Step 4** Remove the TPM module and dispose of it properly.

**What to do next**

Remove and dispose of the PCB Assembly. See [Recycling the Primary Motherboard PCBA, on page 93](#).

# Recycling the Component PCB Assemblies (PCBAs)

The compute node has various printed circuit board assemblies (PCBAs) that must be recycled to comply with your local e-waste laws. The main motherboard PCB for both the primary and secondary as well as some smaller PCBs must be recycled.

Always comply with your local regulations governing recycling and e-waste.

Use the following procedures to disassemble the appropriate PCBAs.

- [Recycling the Primary Motherboard PCBA, on page 93](#)
- [Recycling the Front Mezzanine Module PCBA, on page 97](#)

## Recycling the Secondary Motherboard PCBA

The secondary has a PCBA that is connected to the compute node's faceplate and sheet metal tray. You must disconnect the PCBA from the faceplate and tray to recycle the PCBA. The secondary is attached to the sheet metal tray by the following:

- Nineteen T10 Torx screws
- Six T8 Torx screws
- Twelve T20 nuts

For this procedure you will need a T8, T10, and T20 screwdriver.

You will need to recycle both the secondary and primary to recycle the compute node.

### Before you begin



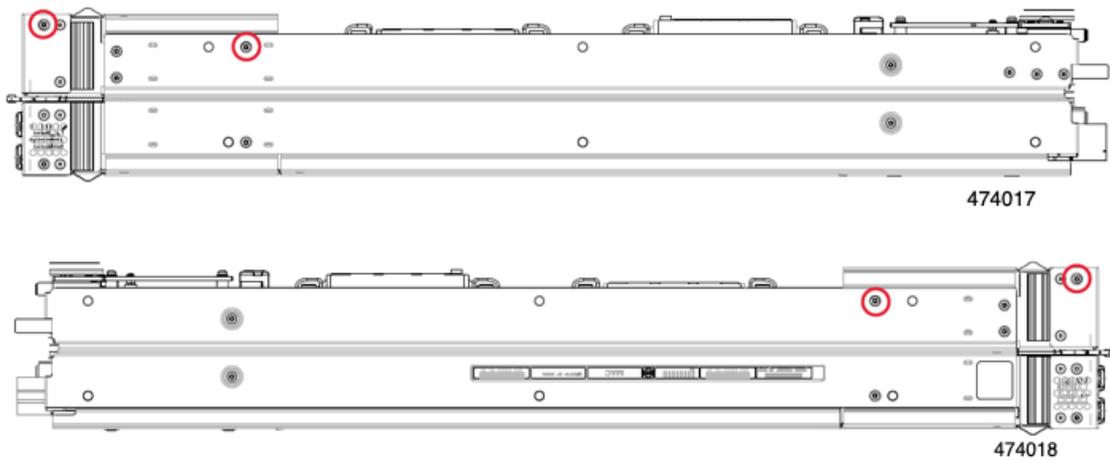
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**Note** **For Recyclers Only!** This procedure is not a standard field-service option. This procedure is for recyclers who will be reclaiming the electronics for proper disposal to comply with local eco design and e-waste regulations.

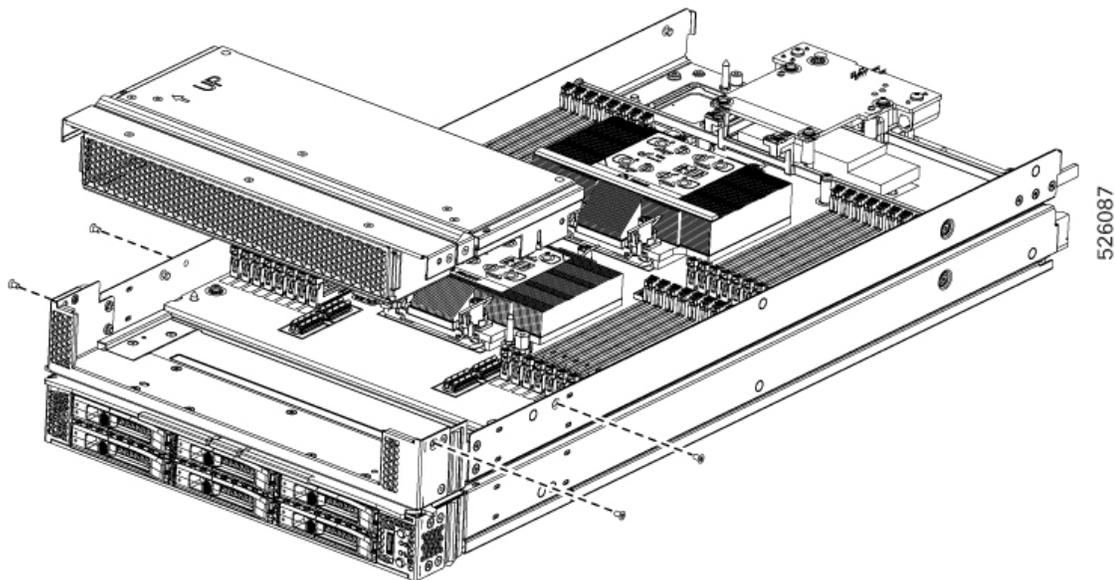
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### Procedure

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- Step 1** If you have not already removed the secondary's top cover, remove it now.  
See [Removing a Compute Node Cover, on page 27](#).
- Step 2** Remove the secondary's front mezzanine module.
- a) Using a T8 screwdriver, remove the screws on the sidewall.  
There are two screws per side.

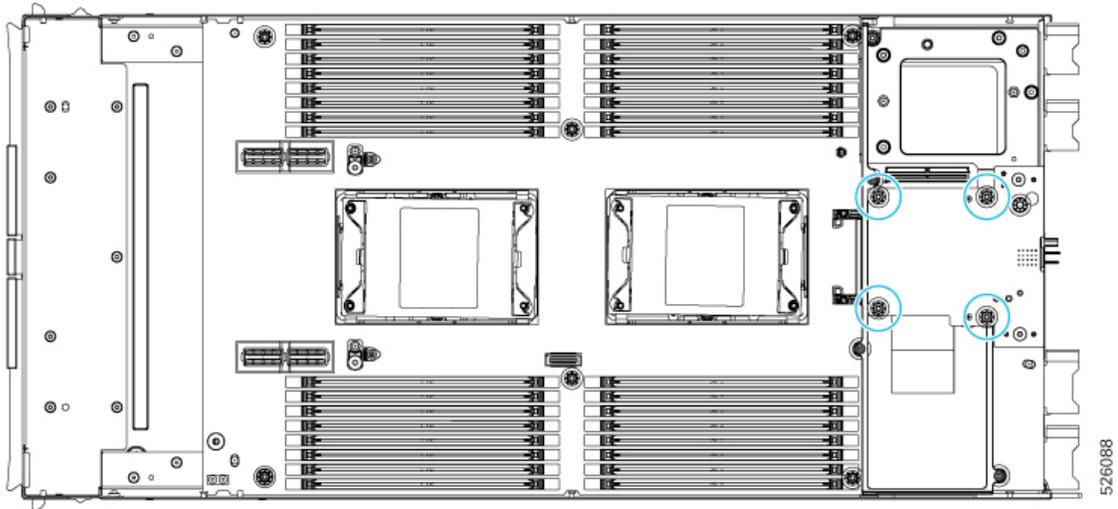


- b) When all four screws are removed, lift the secondary front mezzanine module to disconnect it from the motherboard.

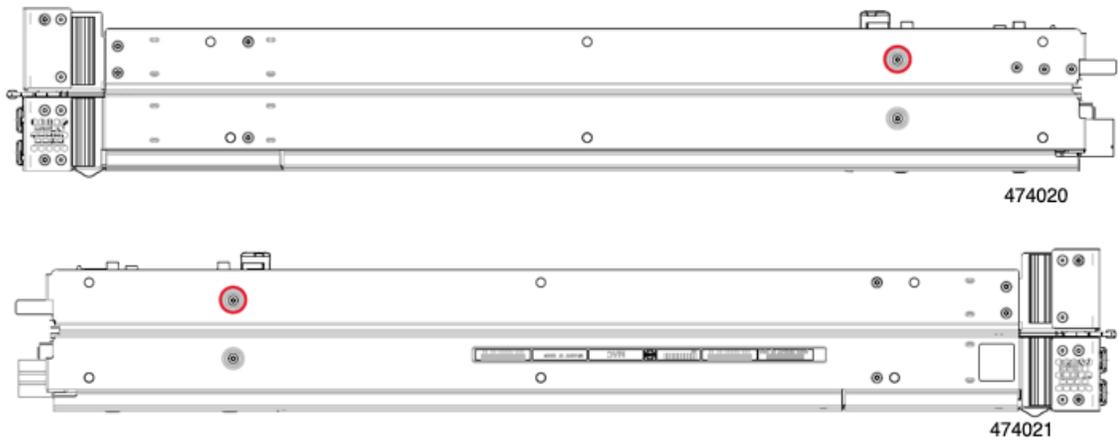


For additional information, see [Removing the Front Mezzanine Module, on page 35](#).

- Step 3** Remove the DIMMs or DIMM blanks, by pressing outward on the release buttons on each DIMM slot, and simultaneously lifting up on the DIMM.
- Step 4** Remove each CPU and its heatsink.  
See [Removing the CPU and Heatsink, on page 58](#).
- Step 5** Using a T10 screwdriver, remove the screws and power adapter.

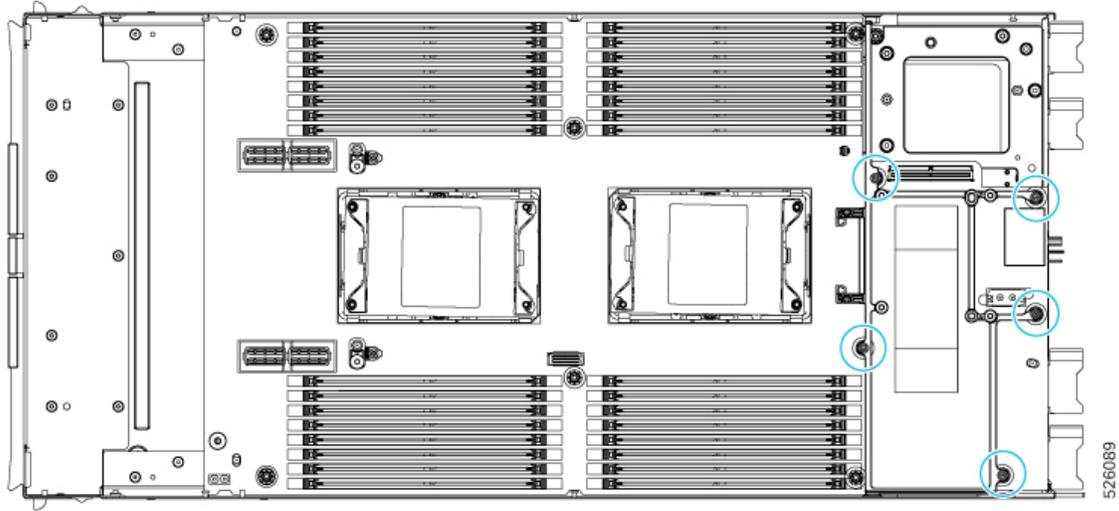


**Step 6** Using a T8 screwdriver, remove the screws on the sidewall.  
There is one screw per side.

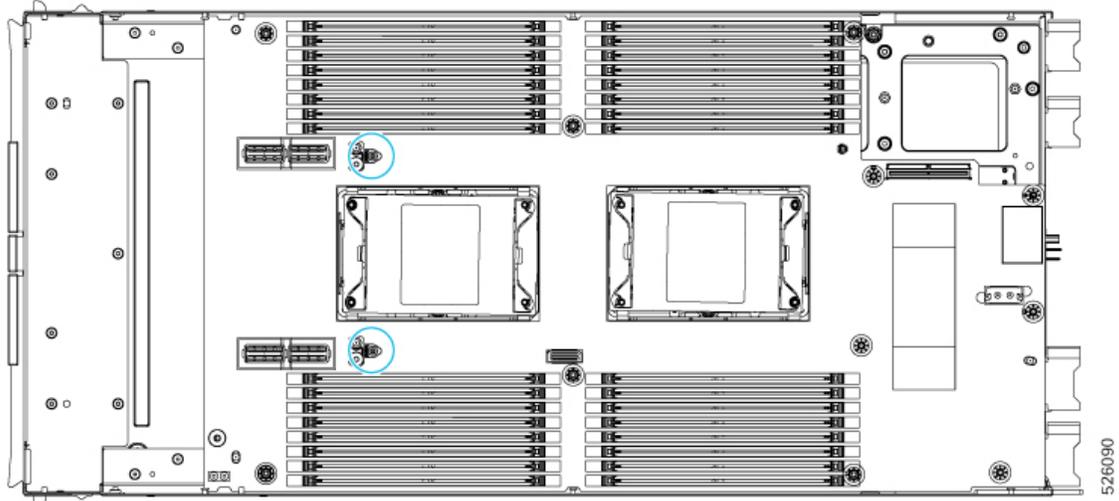


**Step 7** Using a T10 screwdriver, remove the Torx screw from the top of the rear mezzanine frame, then remove the rear mezzanine frame.

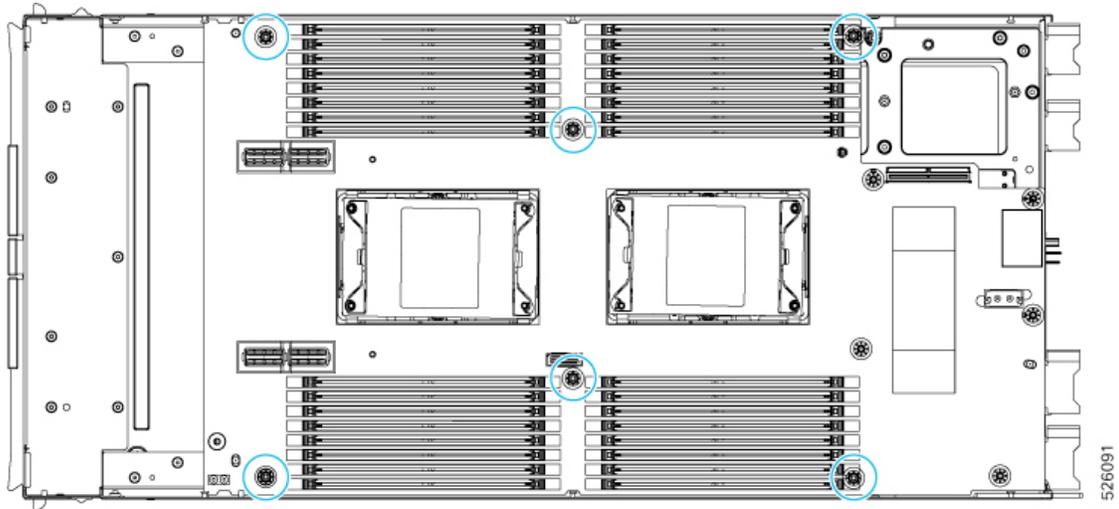
## Recycling the Secondary Motherboard PCBA



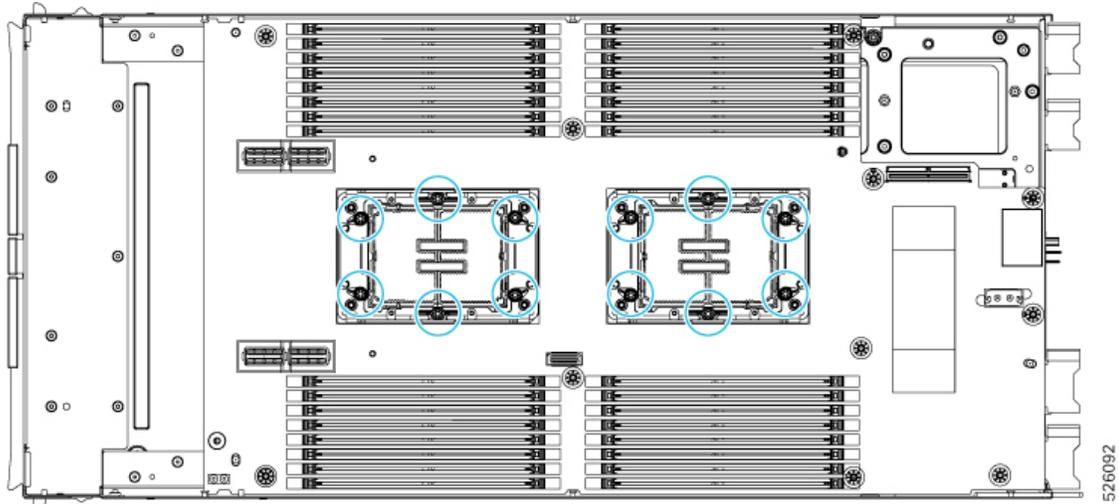
**Step 8** Using a T10 screwdriver, remove the two standoffs next to CPU 3, which is nearest to the front of the compute node.



**Step 9** Using a T10 screwdriver, remove the Torx screws that secure the secondary PCB to the midframe.



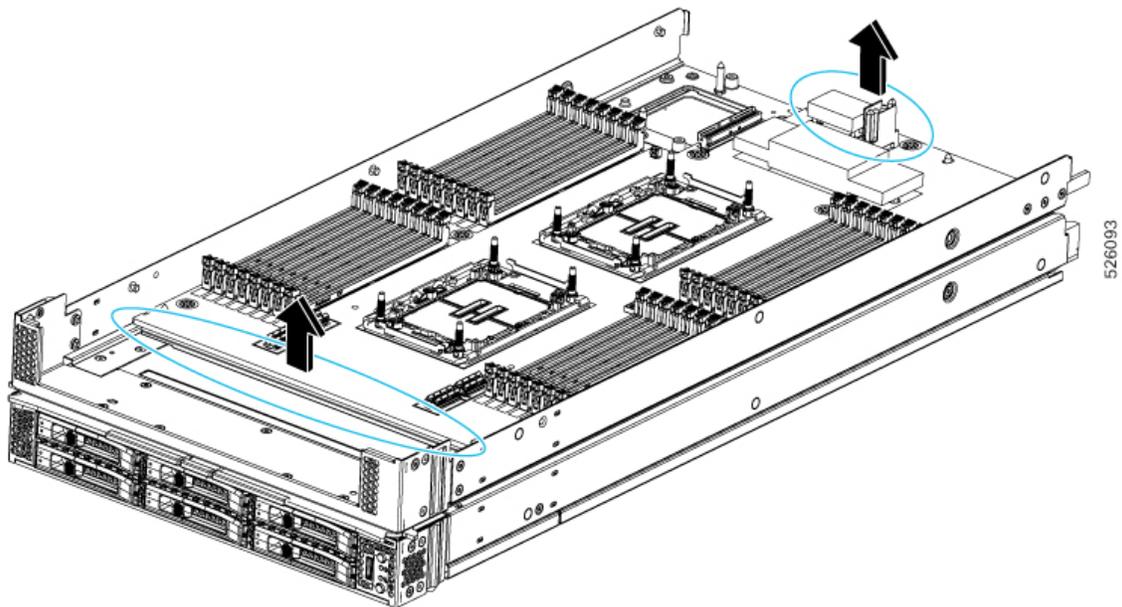
- Step 10** Using a T20 screwdriver, loosen the captive Torx screws that hold each CPU bolster plate, then remove the plates. There are six nuts for each plate.



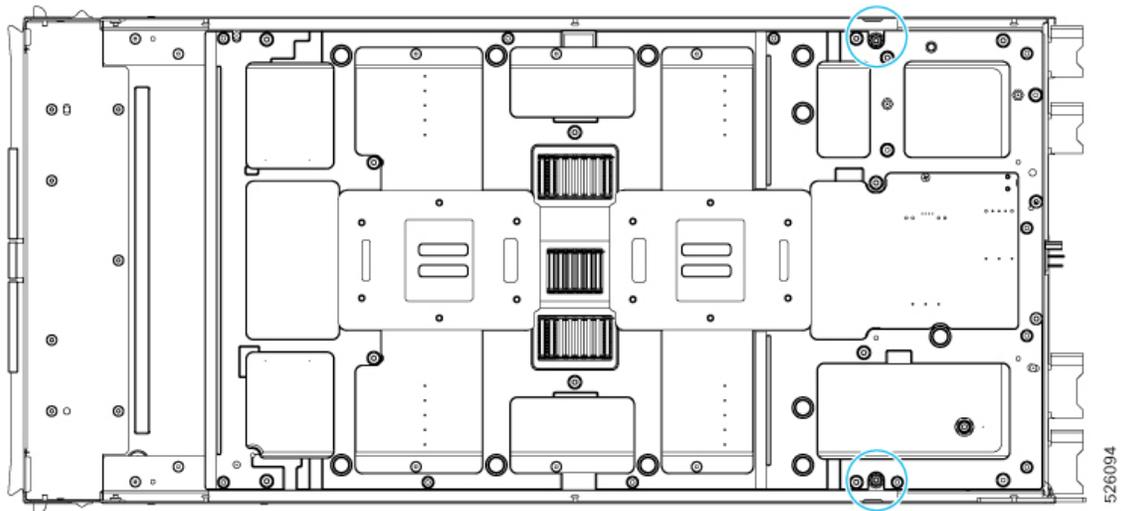
- Step 11** Grasp the secondary PCB along the edges and lift it up to disconnect it.

**Note**

You will feel some resistance when lifting the PCB, This resistance is normal. It occurs because you have to separate the board-to-board connectors that connect the primary and secondary PCBs.



- Step 12** Using a T10 screwdriver, remove the two screws that secure the primary's PCB to the midframe. Each screw is accessible through a hole in the midframe.



- Step 13** Recycle the sheet metal and motherboard in compliance with your local recycling and e-waste regulations.

### What to do next

Continue by [Recycling the Primary Motherboard PCBA, on page 93](#),

## Recycling the Primary Motherboard PCBA

The primary has a PCBA that is connected to the compute node's faceplate and sheet metal tray. You must disconnect the PCBA from the faceplate and tray to recycle the PCBA. Each primary is attached to the sheet metal tray by the following:

- Thirteen T10 screws
- Twelve T20 nuts
- Two T8 screws.

For this procedure you will need a T8, T10, and T20 screwdriver.

You will need to recycle both the secondary and primary to recycle the compute node.

### Before you begin



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

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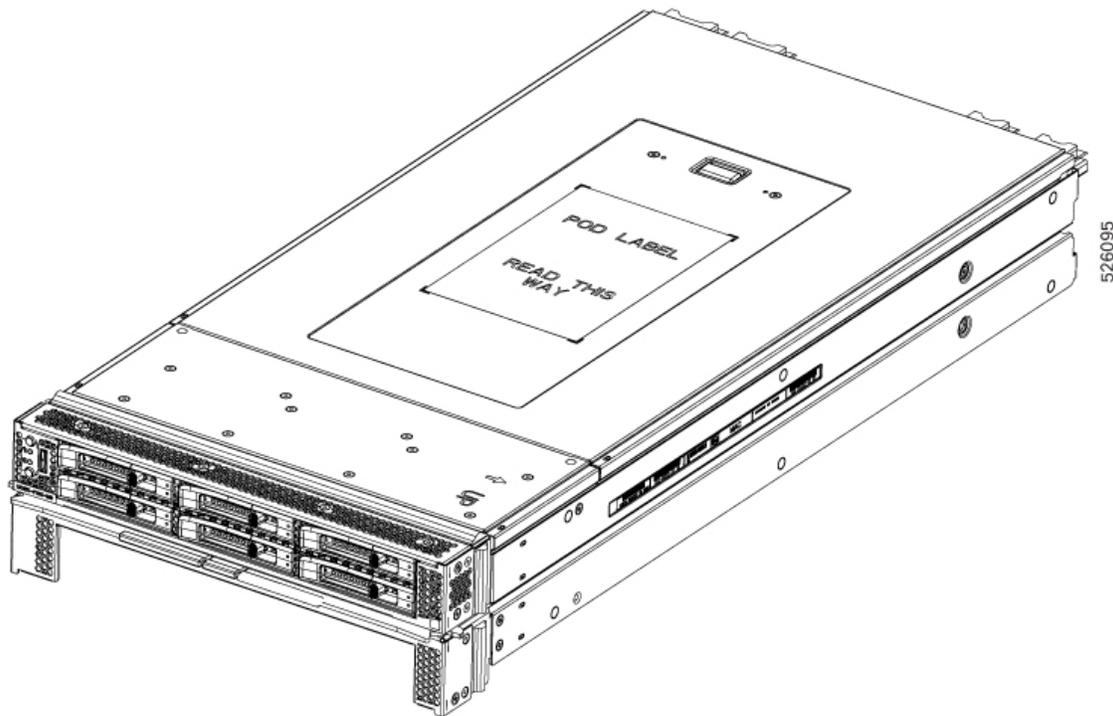
**Important** The secondary must already be disassembled and removed from the compute node before attempting this procedure. If you have not removed the secondary, remove it now. See [Recycling the Secondary Motherboard PCBA, on page 87](#).

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### Procedure

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**Step 1** Position the compute node so that the primary is facing up.



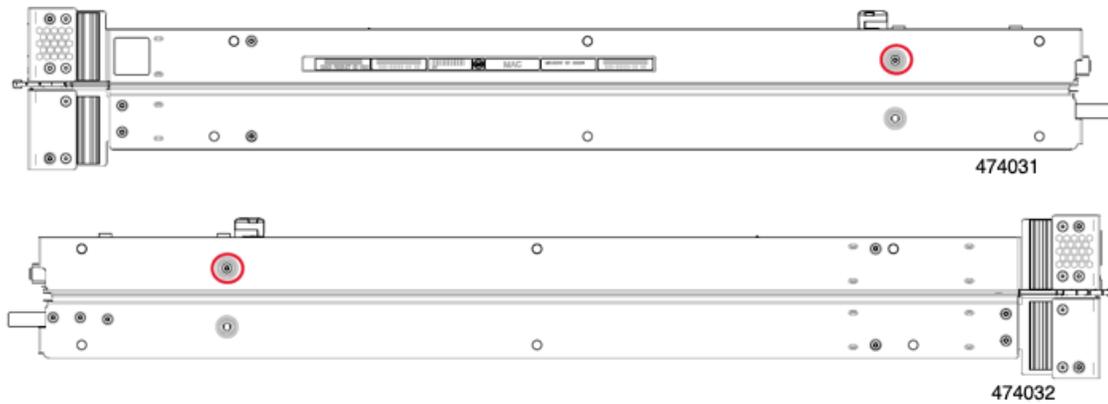
**Step 2** If you have not already removed the top cover, remove it now.

See [Removing a Compute Node Cover, on page 27](#).

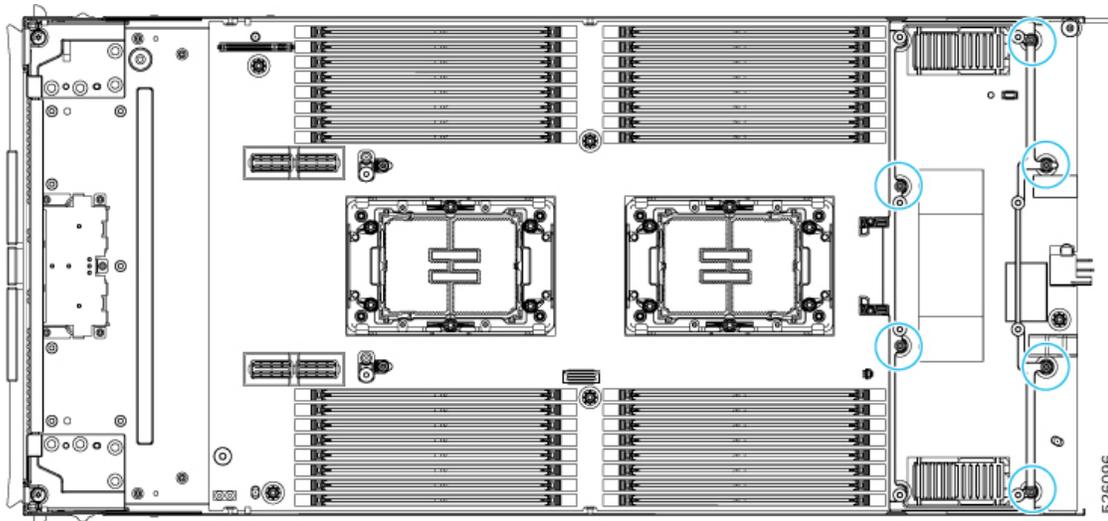
**Step 3** Remove the FRU components from the primary as needed.

- a) (Optional) Remove the front mezzanine module.  
See [Removing the Front Mezzanine Module, on page 35](#).
- b) (Optional) Remove the screws, then remove the M.2 RAID Controller.  
See [Removing the M.2 RAID Controller Module or NVMe Pass-Through Module, on page 40](#).
- c) (Optional) If the bridge card is installed, remove it.  
See [Removing the Bridge Card, on page 73](#).
- d) (Optional) If the rear mezzanine card is installed, use a #2 screwdriver to remove the four captive screws, then remove the card.
- e) (Optional) If the MLOM VIC is installed, remove it.  
See [Removing the mLOM, on page 76](#).
- f) Remove the DIMMs or DIMM blanks, by pressing outward on the release buttons on each DIMM slot, and simultaneously lifting up on the DIMM.
- g) (Optional) If the CPUs and heatsinks are installed, remove each CPU.  
See [Removing the CPU and Heatsink, on page 58](#).
- h) Remove the TPM.  
See [Removing the Trusted Platform Module \(TPM\), on page 85](#).

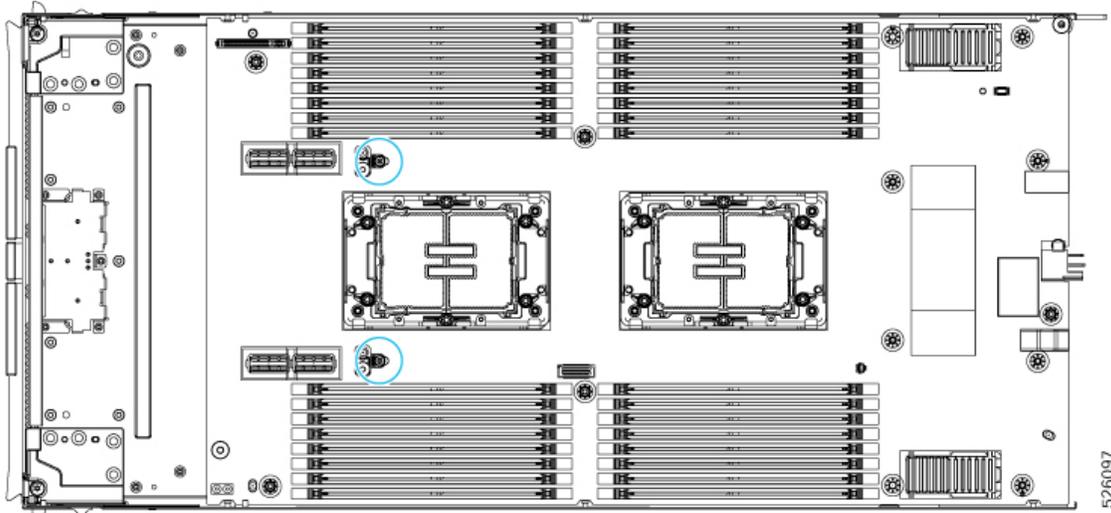
**Step 4** Using a T8 screwdriver, remove the screws on the sidewall.  
There is one screw per side.



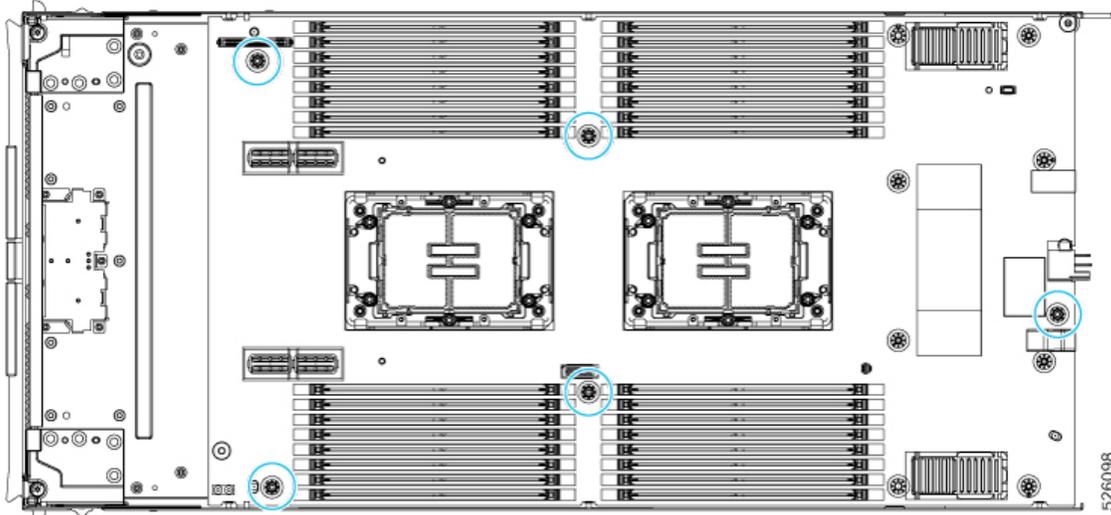
**Step 5** Using a T10 screwdriver, remove the Torx screws from the top of the rear mezzanine frame, then remove the primary's rear mezzanine frame.



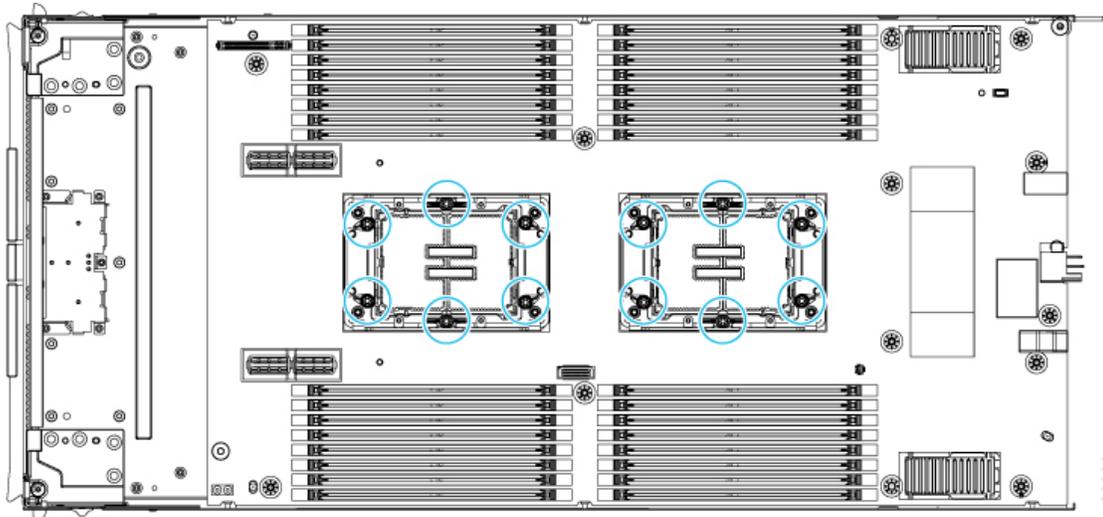
**Step 6** Using a T10 screwdriver, remove the two standoffs next to CPU 1, which is nearest to the front of the compute node.

**Step 7**

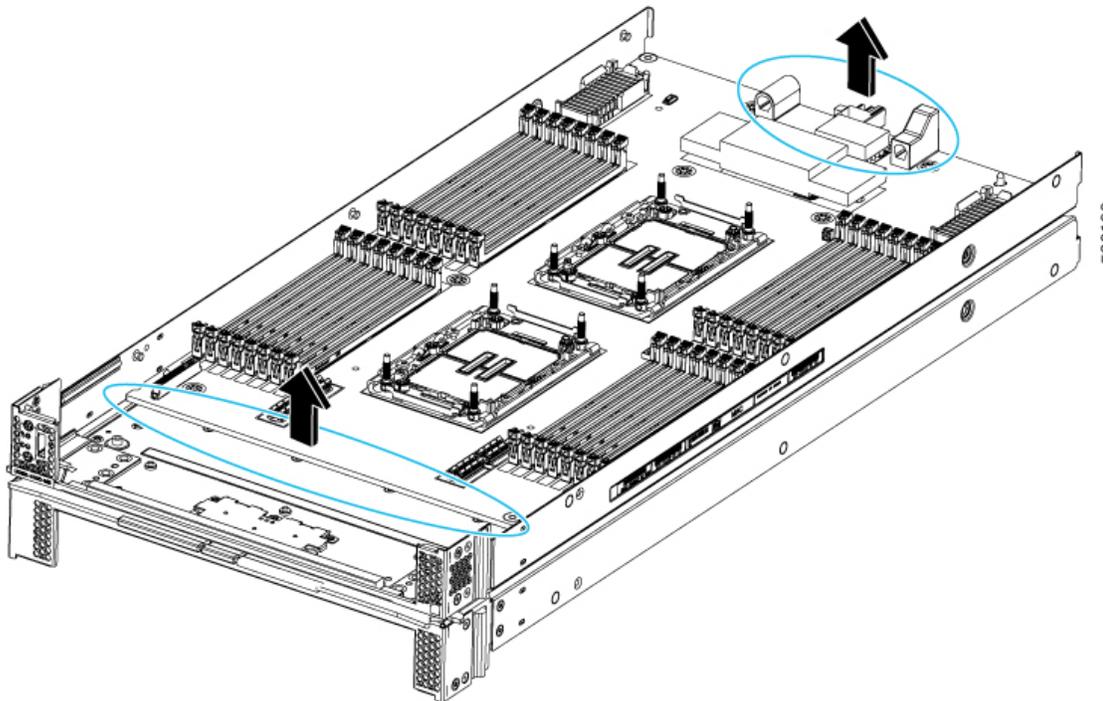
Using a T10 screwdriver, remove the Torx screws that secure the primary PCB to the midframe.

**Step 8**

Using a T20 screwdriver, loosen the captive Torx screws that hold each CPU bolster plate, then remove the plates. There are six nuts for each plate.



**Step 9** Grasp the primary PCB along the edges and lift it up to disconnect it.



**Step 10** Recycle the sheet metal and motherboard in compliance with your local recycling and e-waste regulations.

## Recycling the Front Mezzanine Module PCBA

The compute node's front mezzanine module contains one PCBA, which sits horizontally and connects the drive backplane to the main motherboard. The PCBA is attached to the front mezzanine module's sheet metal by four T8 screws.

You must disconnect the PCBA from the sheet metal before recycling the PCBA.

### Before you begin



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

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

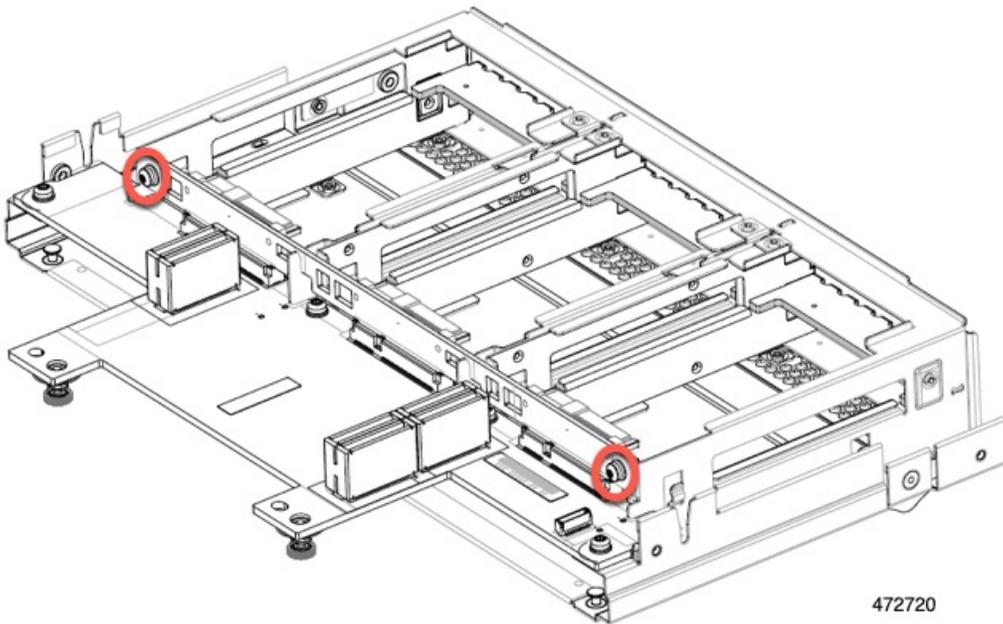
- The compute node must be removed from the chassis.
- The compute node's top cover must be removed. See [Removing a Compute Node Cover, on page 27](#).

Gather the following tools:

- A T8 Torx screwdriver
- A #2 Phillips screwdriver

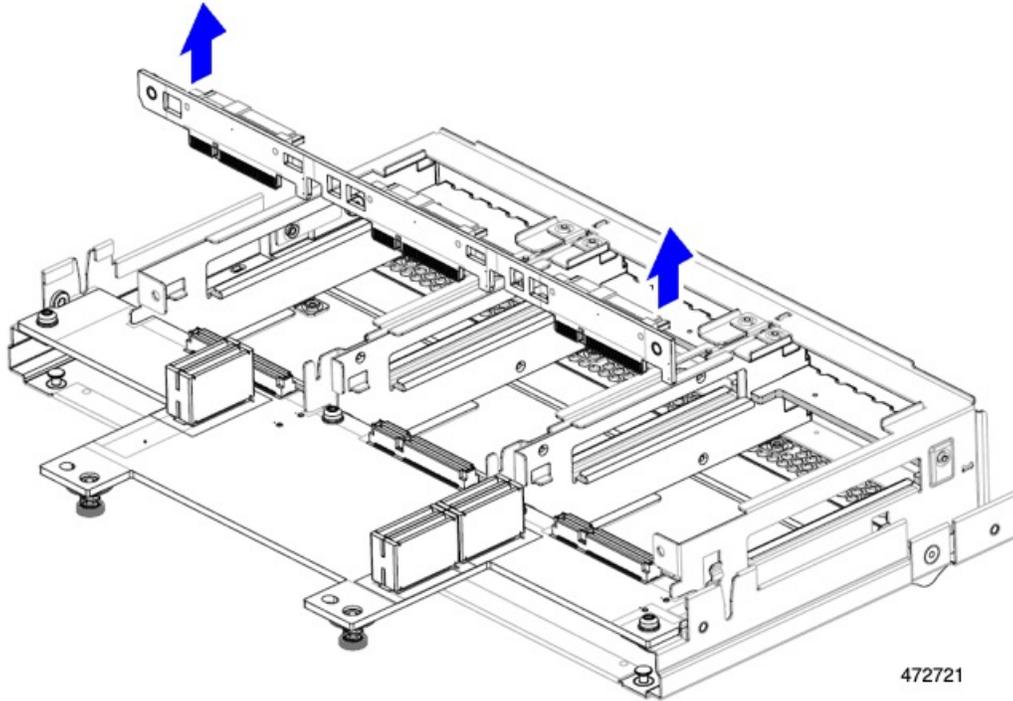
### Procedure

- Step 1** Remove the front mezzanine module from the compute node.
- Go to [Removing the Front Mezzanine Module, on page 35](#).
  - Place the front mezzanine module upside down on a rubberized mat or other ESD-safe work surface.
- Step 2** Disconnect the drive backplane.
- Using a #2 Phillips screwdriver, remove the two screws on the drive backplane.



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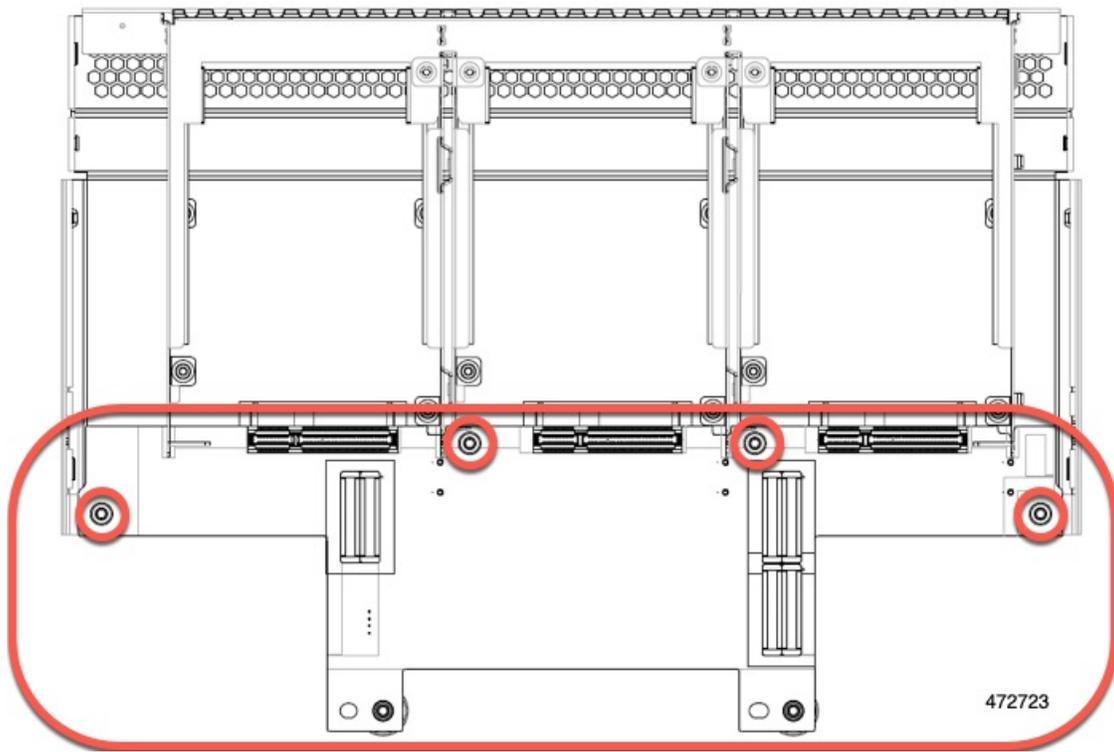
- b) Grasp the drive backplane and lift it off of the sheet metal frame.



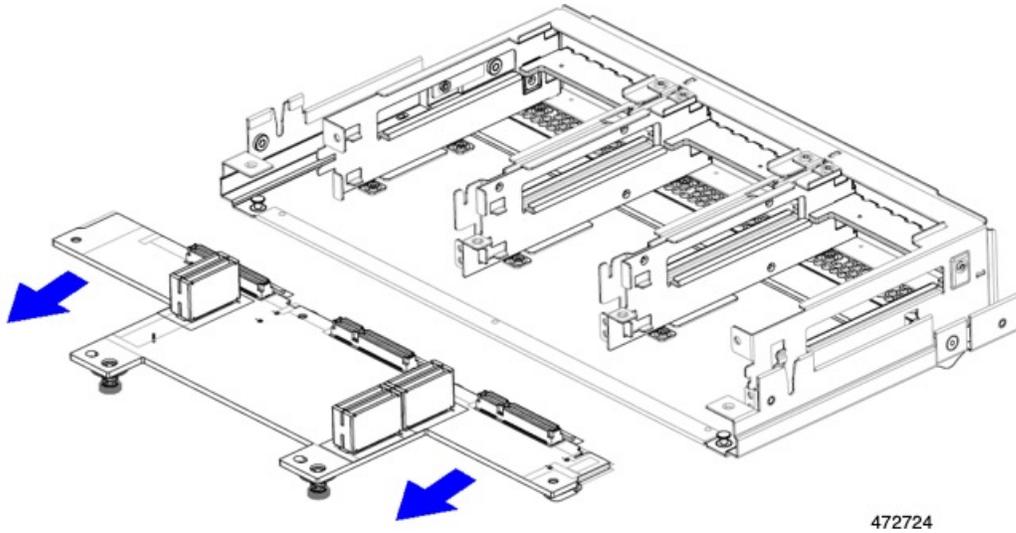
**Step 3** Disconnect the PCBA from the sheet metal frame.

- a) Locate the PCBA and use a T8 Torx screwdriver to remove the four screws that secure the PCBA to the sheet metal frame.

## Recycling the Front Mezzanine Module PCBA



b) Grasp the PCBA and detach it from the front mezzanine module.



**Step 4** Dispose of the PCBA properly in accordance with your local recycling and e-waste laws.



## APPENDIX **A**

# Compute Node Technical Specifications

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This appendix contains the following topics

- [Physical Specifications for the UCS X410c M8 Compute Node, on page 101](#)
- [Environmental Specifications, on page 102](#)

## Physical Specifications for the UCS X410c M8 Compute Node

Specification	Value
Height	3.67 inches (93.22 mm)
Width	11.28 inches (286.52 mm)
Depth	23.8 inches (604.52 mm)
Weight	The weight depends on the components installed. <ul style="list-style-type: none"><li>• Minimally configured compute node weight: 29 lb (13.1 kg)</li><li>• Fully configured compute node weight: 36 lb (16.32 kg)</li></ul>

## Environmental Specifications

Specification	Value
Temperature, Operating	<p>Supported operating temperatures depend on the compute node's configuration.</p> <ul style="list-style-type: none"> <li>• For 256 GB DDR5 DIMMs: 50° to 89.6° F (10° to 32° C) at 0 to 10,000 ft altitude</li> <li>• All other memory configurations: 50° to 95° F (10° to 35° C) at 0 to 10,000 ft altitude</li> <li>• For Granite Rapids CPUs <ul style="list-style-type: none"> <li>• With full HDDs installed, 50° to 95° F (10° to 35° C) all CPU SKUs, except for 330W and 350W XCC SKUs: 50° to 90° F (10° to 32° C)</li> <li>• With less than full HDDs installed, and for all CPU SKUs: 50° to 95° F (10° to 35° C)</li> </ul> </li> </ul>
Temperature, Non-Operating	-40° to 149° F (-40° to 65° C)
Humidity, Operating	5% to 93% noncondensing
Humidity, Non-Operating	5% to 93% noncondensing
Altitude, Operating	0 to 10,000 ft (0 to 3000m); maximum ambient temperature decreases by 1°C per 300m
Altitude, Non-Operating	40,000 ft (12,000m)



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