

Cisco UCS X410c M7 Compute Node Installation and Service Guide

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Preface

This chapter contains the following topics:

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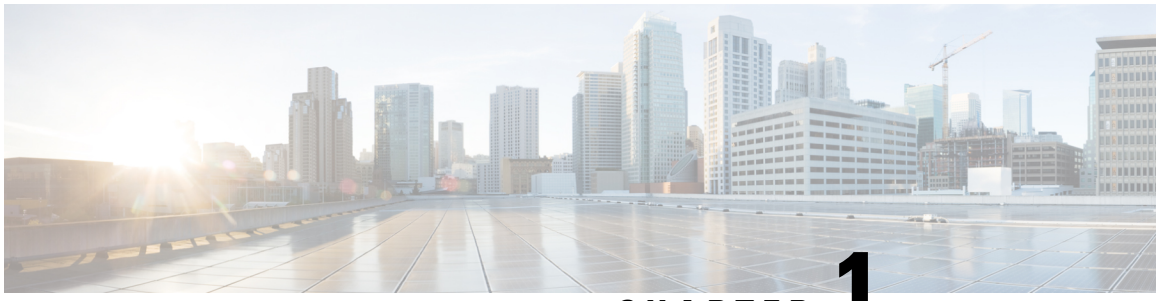
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CHAPTER 1

Compute Node Overview

This chapter contains the following topics:

- Cisco UCS X410c M7 Compute Node Overview, on page 1
- Local Console, on page 6
- Front Mezzanine Options, on page 7
- mLOM and Rear Mezzanine Slot Support, on page 8
- System Health States, on page 9
- Interpreting LEDs, on page 10
- Optional Hardware Configuration, on page 12

Cisco UCS X410c M7 Compute Node Overview

The Cisco UCS X410c M7 Compute Node (UCSX-410C-M7) is a two-slot compute node that supports four CPU sockets for 4th Generation Intel® Xeon® Scalable Processors. Each compute node is exactly four CPUs. Less than four CPUs is an unsupported configuration.

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 M7 compute node supports the following:

- Up to 16 T of system memory as 64 DDR5 DIMMs, up to 4800 MHz with 1DPC, 4400 MHz with 2DPC. Thirty-two DDR5 DIMMs are supported on the primary, and 32 DIMMs are supported on the secondary.
- 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 16 GB, 32 GB, 64 GB, 128 GB, or 256 GB DDR5 DIMMs.
- One front mezzanine module which can support any of the following:

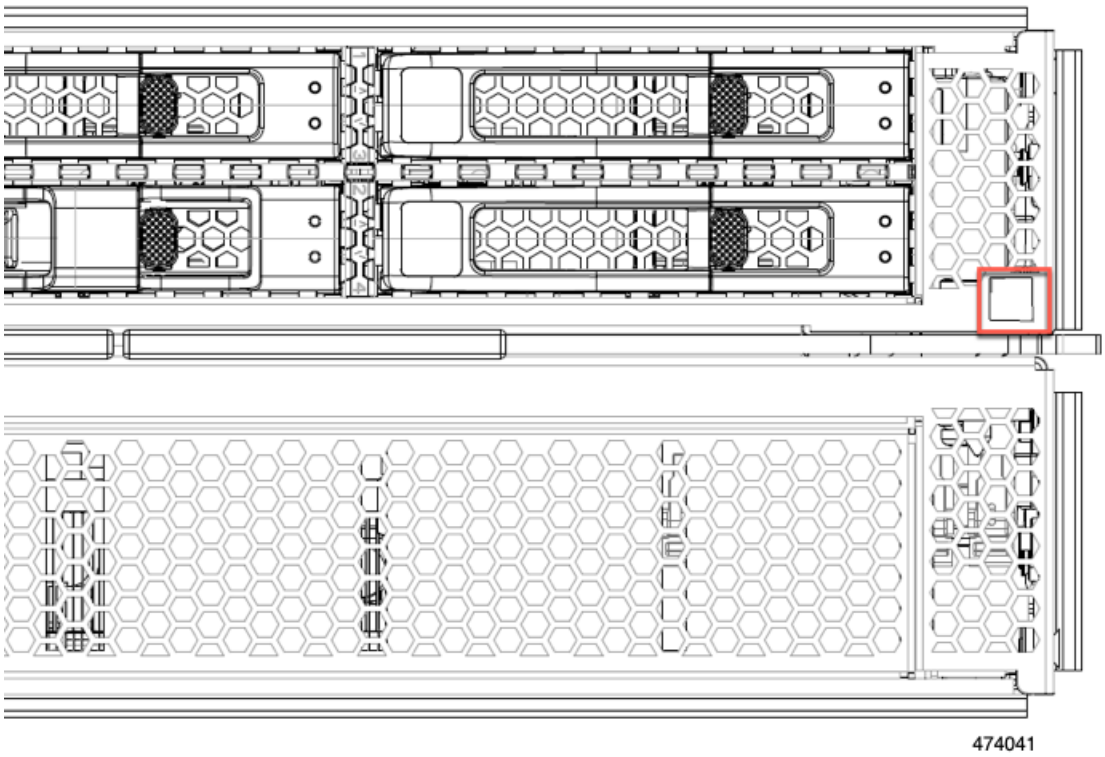
- A front storage module, which supports multiple different storage device configurations:
  - All SAS/SATA configuration consisting of up to six SAS/SATA SSDs with an integrated RAID controller (HWRAID) in slots 1 through 6.
  - All NVMe configuration consisting of up to six U.2 NVMe Gen4 (x4 PCIe) SSDs in slots 1 through 6.
  - A mixed storage configuration consisting of up to six SAS/SATA or up to four NVMe drives is supported. In this configuration, U.2 NVMe drives are supported in slots 1 through 4 only. U.3 NVMe drives can be used in slots 1 through 6.

  For additional information, see Front Mezzanine Options, on page 7.
- 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 8.
- 1 rear mezzanine module (UCSX-V4-PCIME or UCSX-ME-V5Q50G).
- 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. This option will be available after initial release of the compute node.

  Two options of mini-storage exist, one supporting up to two M.2 SATA drives with a RAID controller (UCSX-M2-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.
- Connection with a paired UCS PCIe module, such as the Cisco UCS X440p PCIe node, to support GPU offload and acceleration. For more information, see the Optional Hardware Configuration, on page 12.
- Up to 4 UCS X410c M7 compute nodes can be installed in a Cisco UCS X9508 modular system.

Compute Node Identification

Each Cisco UCS X410c M7 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

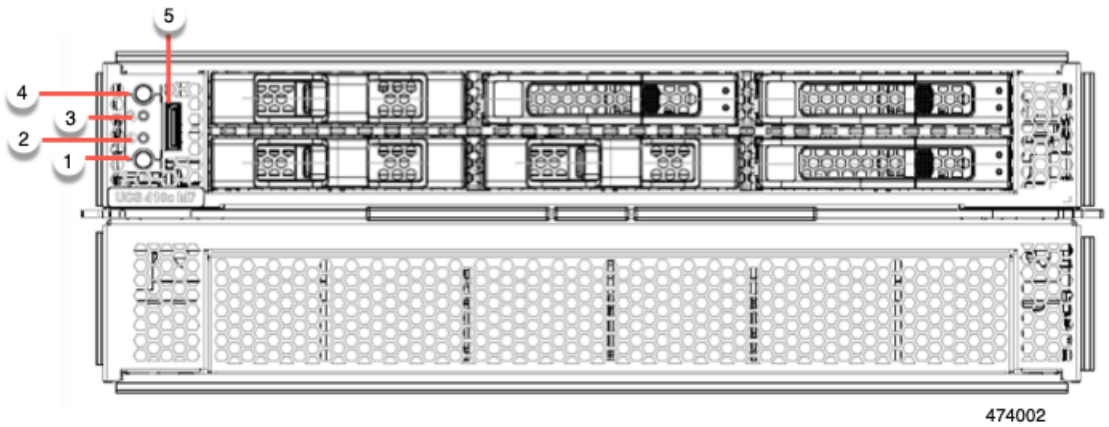
The product identification tag applies to the entire compute node, both the primary and secondary.

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 M7 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



1	Power LED and Power Switch The LED provides a visual indicator about whether the compute node is on or off. • Steady green indicates the compute node is on. • Steady Amber indicates the compute node is in Standby power mode. • Off or dark indicates that the compute node is not powered on. The switch is a push button that can power off or power on the compute node. See Front Panel Buttons, on page 5.	**2**	System Activity LED 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. The LED is updated every 10 seconds.
3	System Health LED A multifunction LED that indicates the state of the compute node. • Steady green indicates the compute node successfully booted to runtime and is in normal operating state. • Steady amber indicates that the compute node successfully booted but is in a degraded runtime state. • Blinking amber indicates that the compute node is in a critical state, which requires attention.	**4**	Locator LED/Switch The LED provides a visual indicator that glows solid blue to identify a specific compute node. The switch is a push button that toggles the Indicator LED on or off. See Front Panel Buttons, on page 5.

5	External Optical Connector (Oculink) that supports local console functionality.		

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.

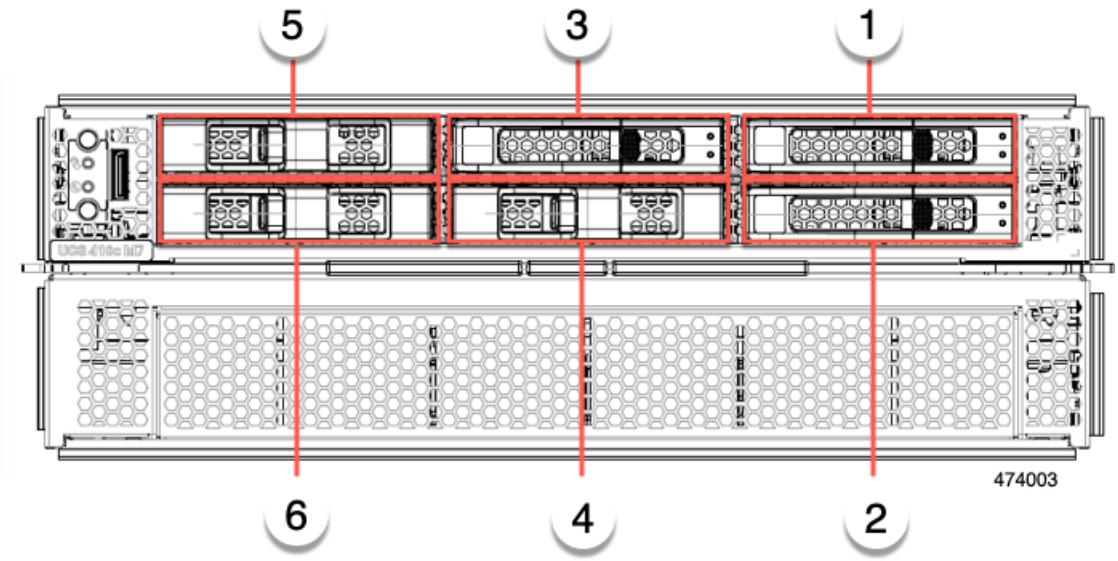
For more information, see Interpreting LEDs, on page 10.

Drive Bays

Each Cisco UCS X410c M7 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 NVMe drives. A drive blank panel (UCSC-BBLKD-M7) must cover all empty drive bays.

Drive bays are numbered sequentially from 1 through 6 as shown.

Figure 1: Front Loading Drives



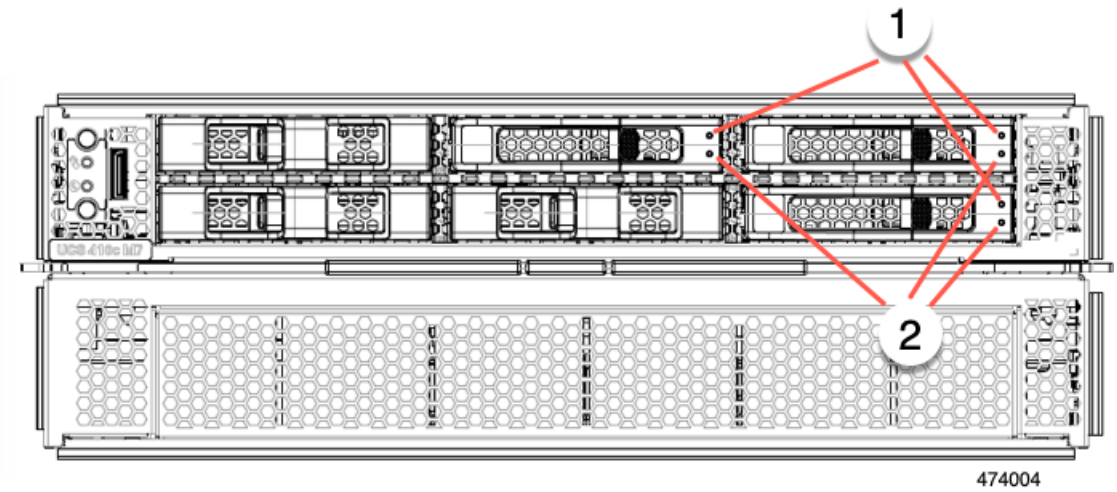
Drive Front Panels

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 Drives

The compute node front panel contains the front mezzanine module, which can support a maximum of 6 SAS/SATA drives. The drives have additional LEDs that provide visual indicators about each drive's status.

Figure 2: Drive LEDs



1	Drive Health LED	2	Drive Activity LED

Compute Node Front Panel with NVMe Drives

The compute node front panel contains the front mezzanine module, which can support a maximum of six 2.5-inch NVMe drives.

Local Console

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

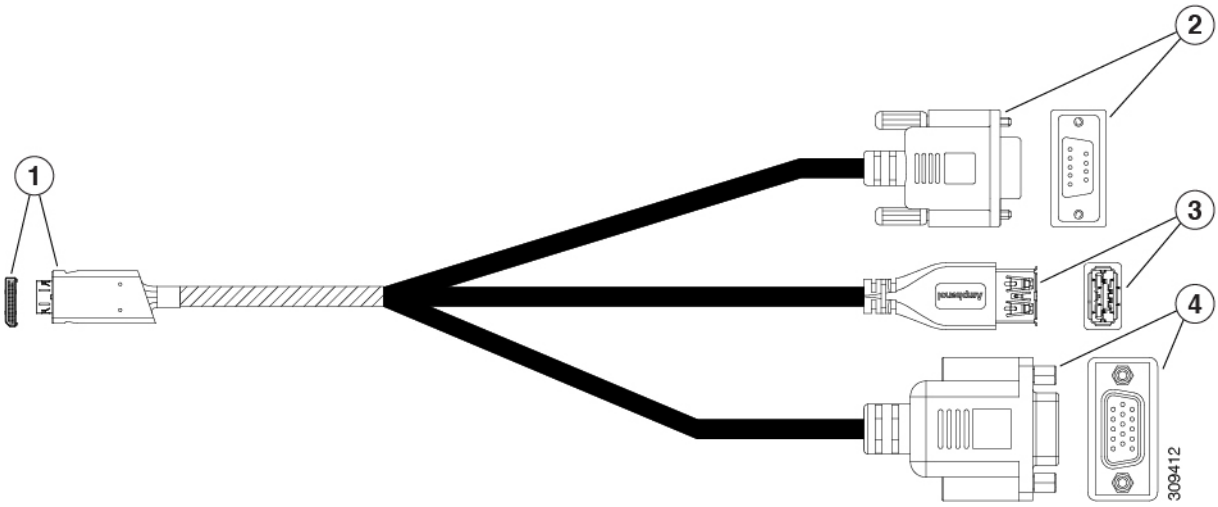
The connector allows a direct connection to a compute node to allow operating system installation directly rather than remotely.

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 in separately and it doesn't come with compute node's accessary kit.

Figure 3: 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 M7 Compute Node supports front mezzanine module storage through SAS/SATA or NVMe SSDs. For more information, see Storage Options, on page 7.

Storage Options

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

Cisco UCS X410c 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 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 X410c RAID Module

This storage option supports:

- Support up to six 6 SAS/SATA SSDs, or
- Up to four or sixNVME SSDs as:
  - U.2 NVMe in slots 1 through 4, direct connected to CPU1 at PCIe Gen4 x4
  - U.3 NVMe drives in slots 1 to 6 connected to the RAID controller at PCIe Gen4 x 1 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 in the RAID:
  - RAID across U.2 NVME SSDs is not supported.
  - RAID is not supported in a mixture of SAS/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/SATA drives or all U.3 NVMe drives: RAID0, 1, 5, 6, 00, 10, 50, and 60.

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 15231 mLOM (UCSX-ML-V5D200G), which supports:
  - x16 PCIE Gen 4 host interface to UCS X410c M7 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).
- Cisco UCS PCI Mezz card for X-Fabric (UCSX-V4-PCIME) provides connectivity for Cisco UCS PCIe Nodes, such as the Cisco UCS X440p PCIe Node, which supports GPU offload and acceleration when a compute node is paired with the PCIe node.



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.

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	• Power supply redundancy lost • Intelligent Fabric Module (IFM) redundancy lost • Mismatched processors in the system. This condition might prevent the system from booting. • Faulty processor in a dual processor system. This condition might prevent the system from booting. • Memory RAS failure if memory is configured for RAS • Failed drive in a compute node configured for RAID

System Health LED Color	Compute Node State	Conditions
Blinking Amber	Critical	• Boot failure • Fatal processor or bus errors detected • Fatal uncorrectable memory error detected • Lost both IFMs • Lost both drives • Excessive thermal conditions

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.
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.

LED	Color	Description
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 Locate indicator or drive prepared for physical removal
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
N/A	N/A	Drive Locate indicator or drive prepared for physical removal
N/A	N/A	Failed or faulty drive

Activity/Presence LED	Status/Fault LED	Description
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

Optional Hardware Configuration

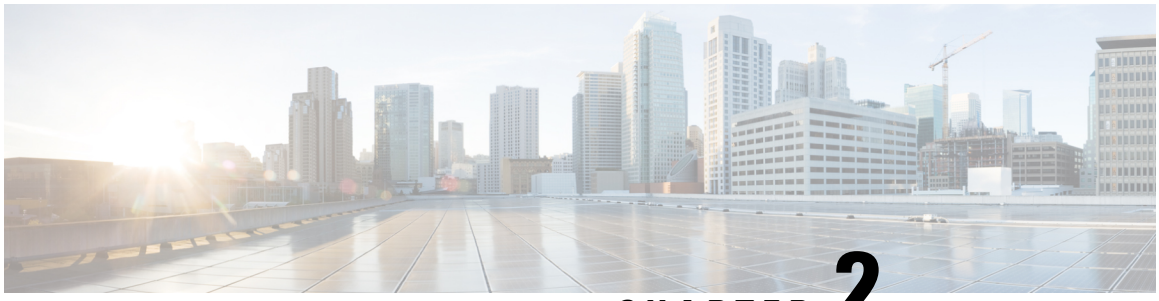
The Cisco UCS X410c M7 compute node can be installed in a Cisco UCS X9508 Server Chassis either as a standalone compute node or with the following optional hardware configuration.

Cisco UCS X440p PCIe Node

As an option, the compute node can be paired with a full-slot GPU acceleration hardware module in the Cisco UCS X9508 Server Chassis. This option is supported through the Cisco X440p PCIe node. For information about this option, see the Cisco UCS X440p PCIe Node Installation and Service Guide.

Note When the compute node is paired with the Cisco UCS X440p PCIe node, the Cisco UCS PCI Mezz card for X-Fabric Connectivity (UCSX-V4-PCIME-D) is required. The UCS VIC bridge connector is required with the mezzanine card to connect the UCS X-Series compute nodes to Cisco UCS X Series IFMs. The bridge connector card installs on the compute node.

Caution When the compute node is installed in the same Cisco UCS X9508 chassis as the Cisco UCS X440p PCIe node, the compute node must be installed to the slots immediately to the right of the PCIe node. For more information, see Compute Node Installation Guidelines and Limitations, on page 22.



CHAPTER 2

Cover, DIMM, and CPU Installation Instructions

This chapter contains the following topic:

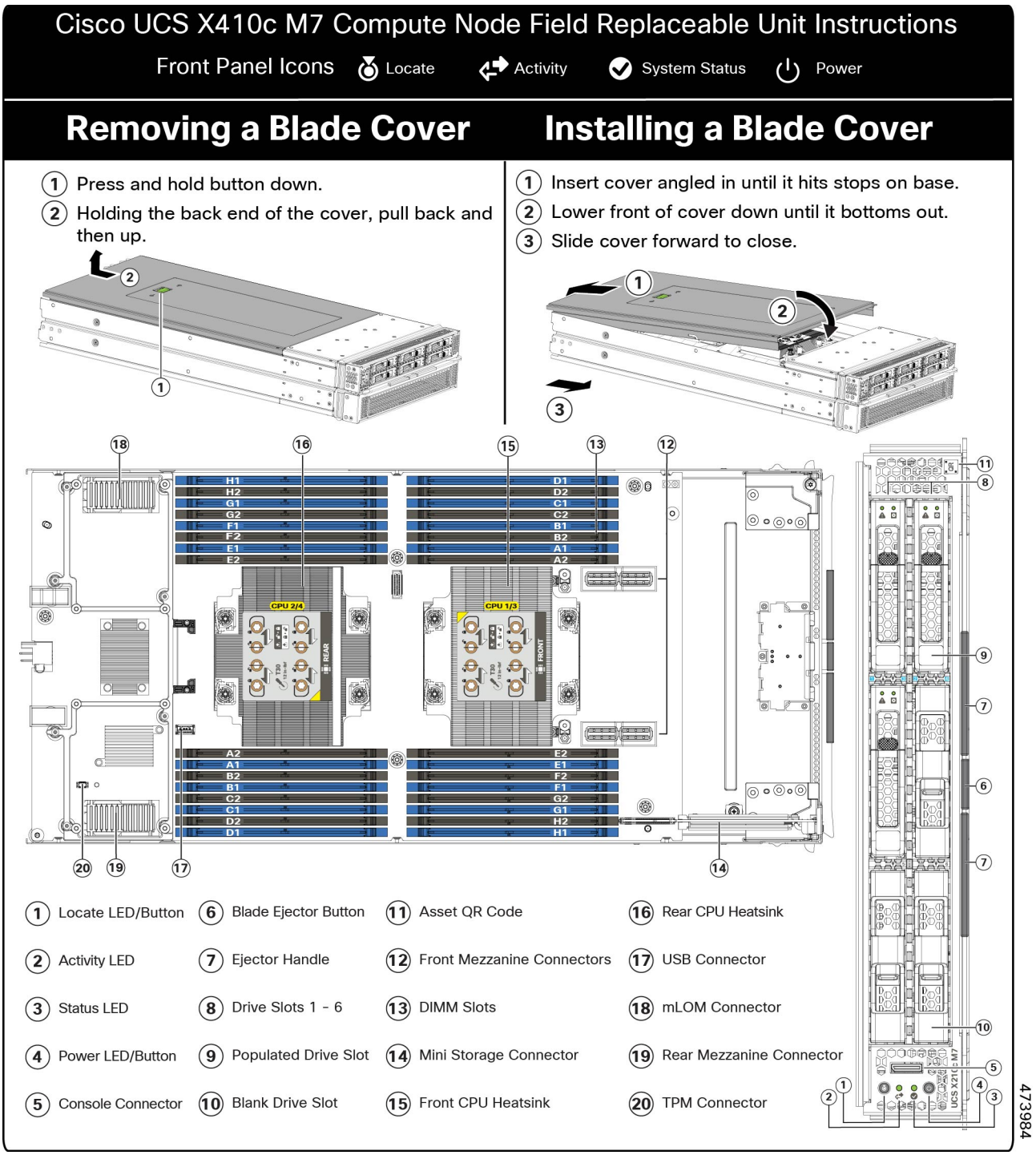
- Cover, DIMM, and CPU Installation Instructions, on page 13

Cover, DIMM, and CPU Installation Instructions

The following illustrations show the compute node's FRU service labels.

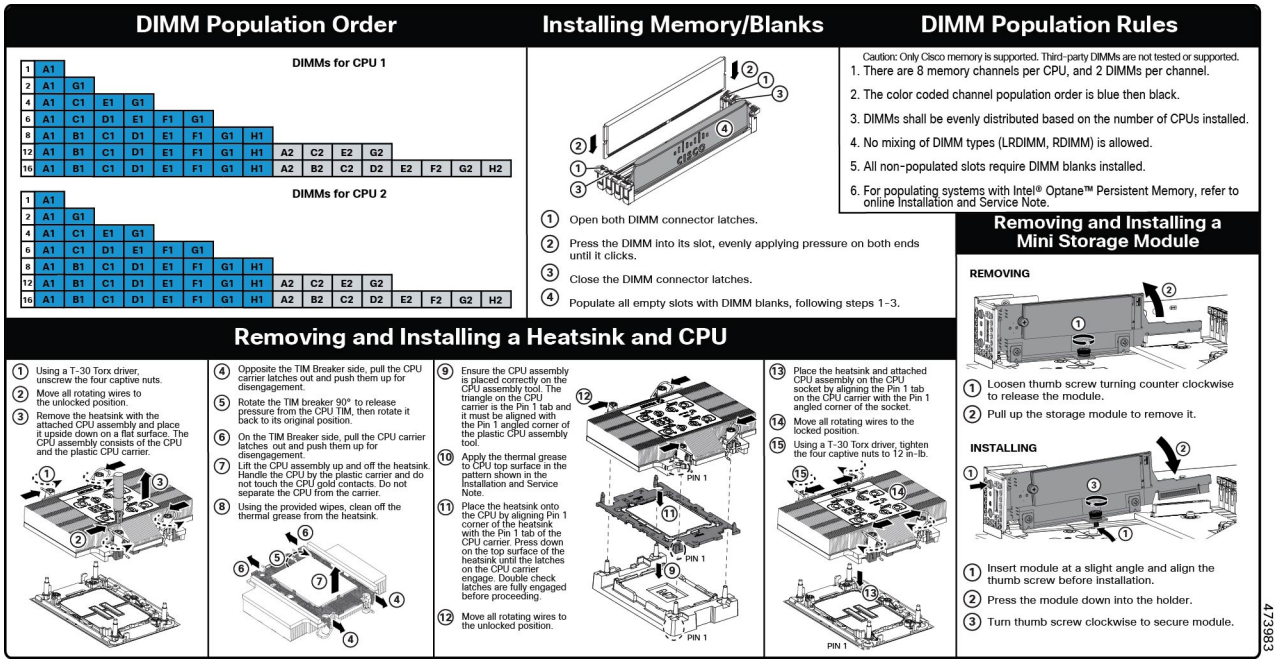
Cover, DIMM, and CPU Installation Instructions

Figure 4: Cover Removal and Component Identification

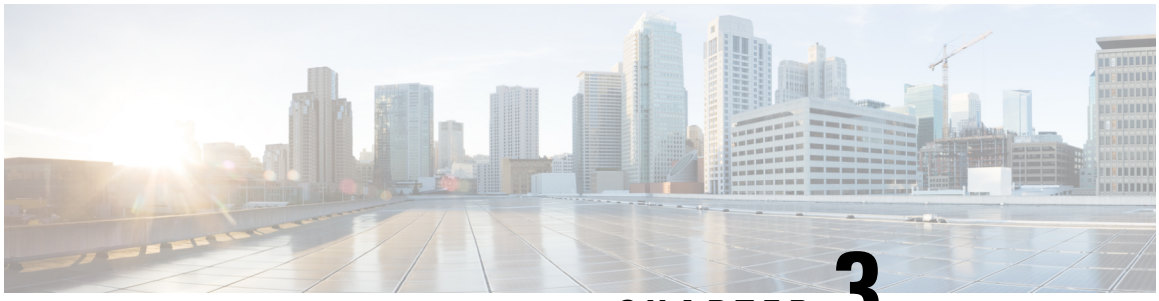


Cover, DIMM, and CPU Installation Instructions

Figure 5: DIMM, CPU, and Mini Storage Replacement Instructions



Cover, DIMM, and CPU Installation Instructions



CHAPTER 3

Installing the Compute Node

This chapter contains the following topics:

- Removing a Compute Node Blank, on page 17
- Installing a Compute Node Blank, on page 18
- Removing a Compute Node, on page 20
- Compute Node Installation Guidelines and Limitations, on page 22
- Installing a Compute Node, on page 22
- Compute Node Configuration, on page 24

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.

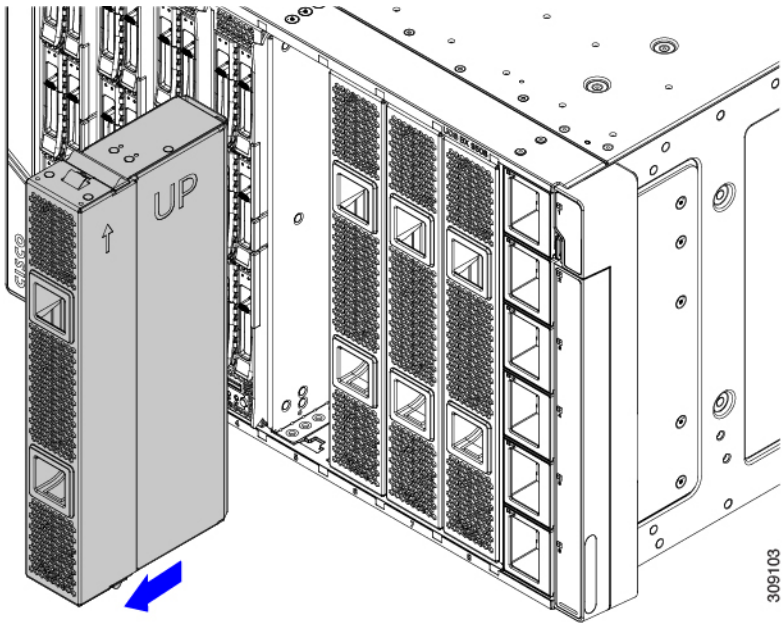
Procedure

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 6: 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.

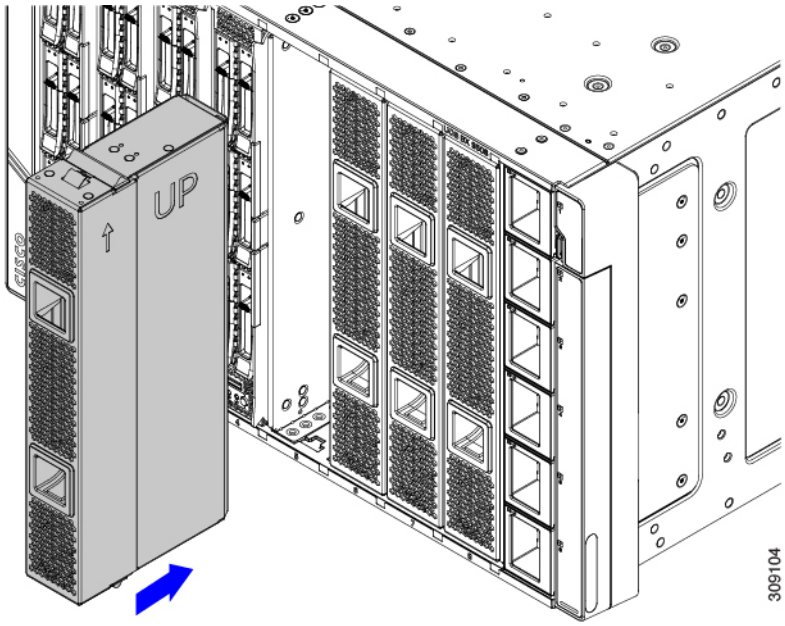
Use this task to install a compute node blank

Procedure

Step 1 Grasp the blank by the finger holds.

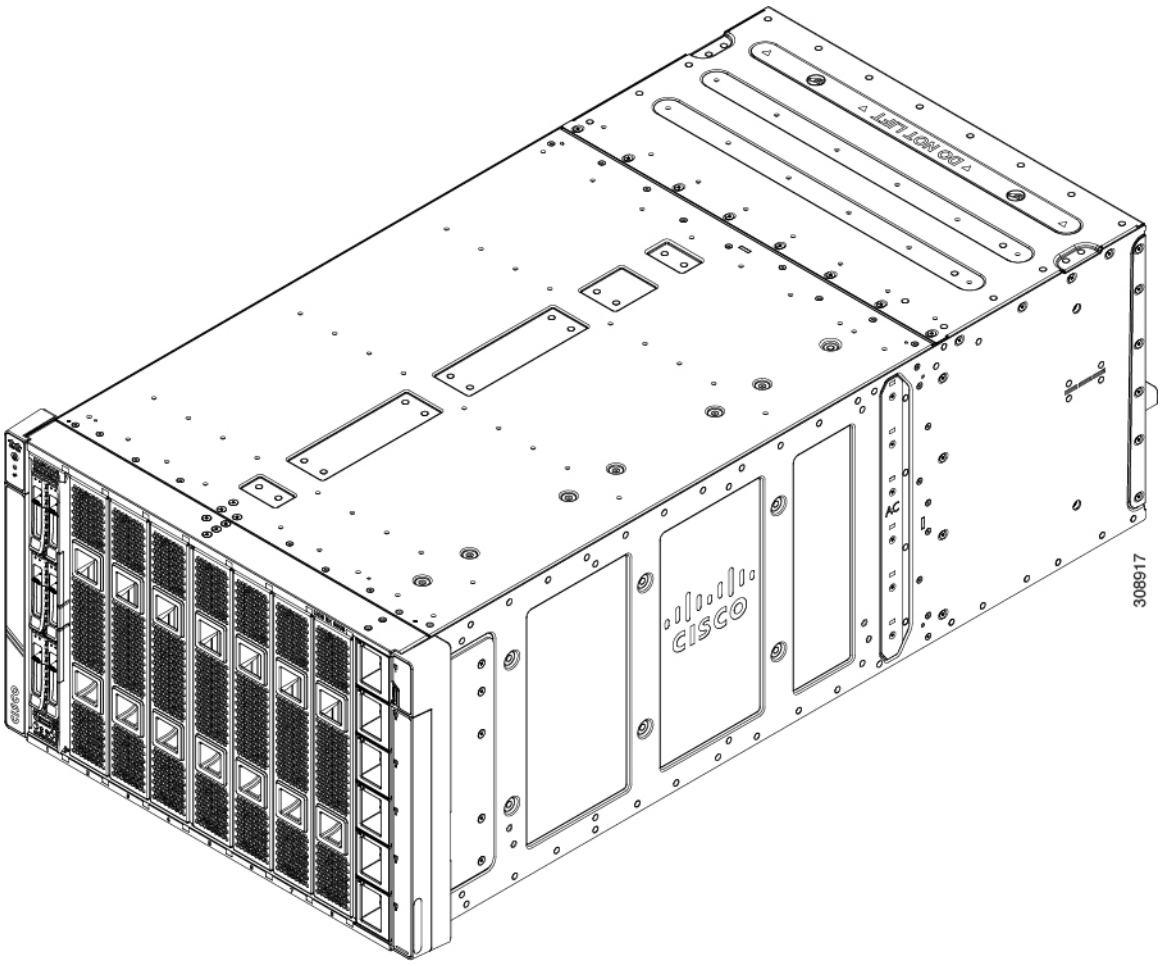
Step 2 Hold the module blank vertically and align the module blank with the slot.

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 7: Installing a Compute Node Blank



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 42 lb (19.05 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.

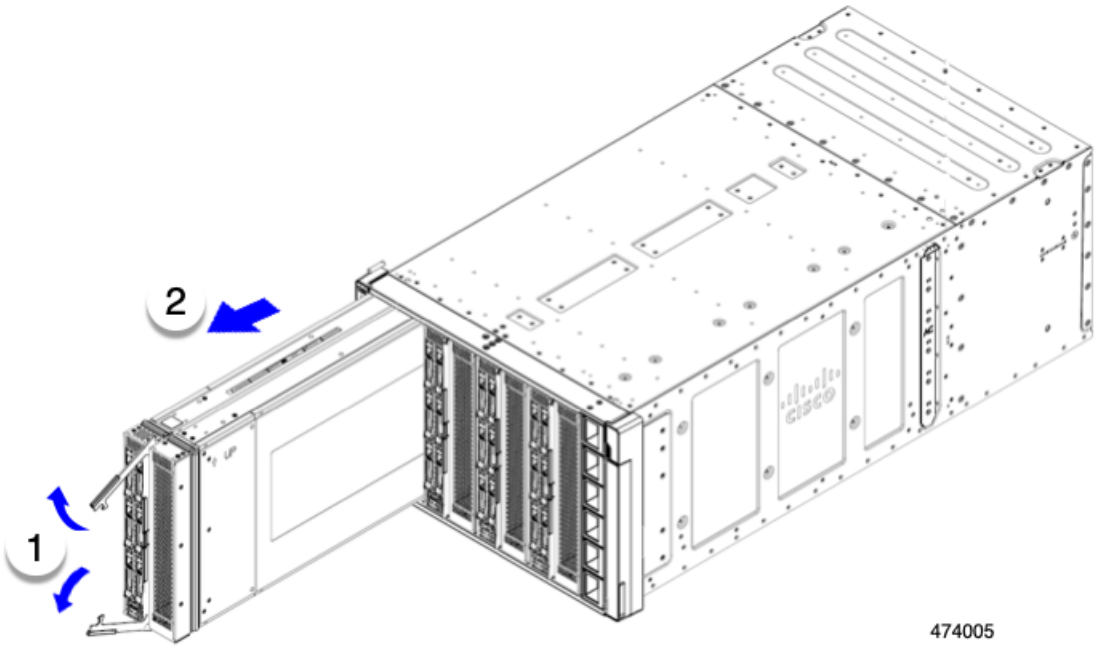
While moving the compute node handles, you might feel some resistance. This resistance is normal. It occurs because the connectors at the rear of the compute node are unseating from the corresponding sockets in the chassis.

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 8: Removing a Cisco UCS x410c M7 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:

a) If you will be installing another compute node, see Installing a Compute Node, on page 22.

b) 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.

Compute Node Installation Guidelines and Limitations

Be aware of the following limitations when installing the Cisco UCS X410c M7 compute node into the Cisco UCS X9508 chassis:

- Because the compute node is double-height, it occupies two slots in the UCS X9508 chassis.
- At initial release of the compute node, when the compute node is installed into a chassis that also contains Cisco UCS X440p PCIe Nodes, there are limitations for which modules can be installed in which slots.
  - The Cisco UCS X440 PCIe Node is only supported in slots 1 and 5, with the Cisco UCS X410c M7 compute node supported in the slots immediately to the right (slots 2/3 and 6/7, respectively).
  - No Cisco UCS X410c M7 compute nodes are supported in slots 4 and 8, but those slots can support other single-slot nodes, such as the Cisco UCS X210c M7 or Cisco UCS X210c M6 compute nodes.

These slot allocations ensure that the compute node(s) are installed in the correct locations in 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 42 lb (19.05 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.

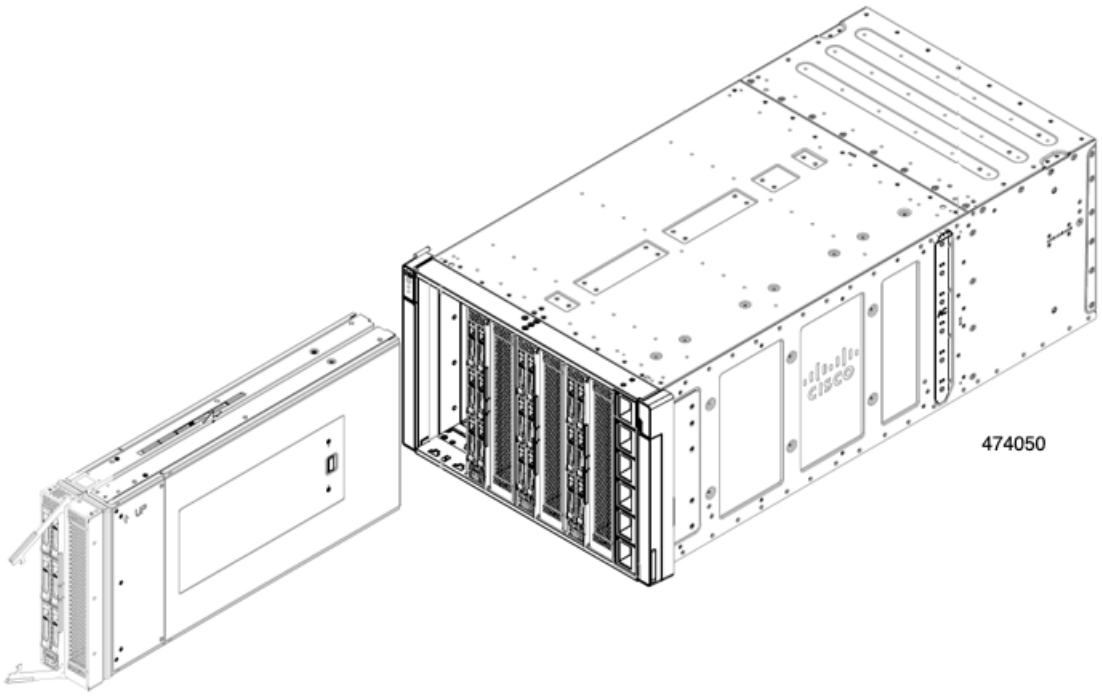
Step 3 Holding the compute node with both hands supporting the bottom, align the compute node vertically with the empty module bay in the chassis.

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 sheetmetal of the chassis.

Figure 9: Aligning a Cisco UCS X410c M7 Compute Node



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

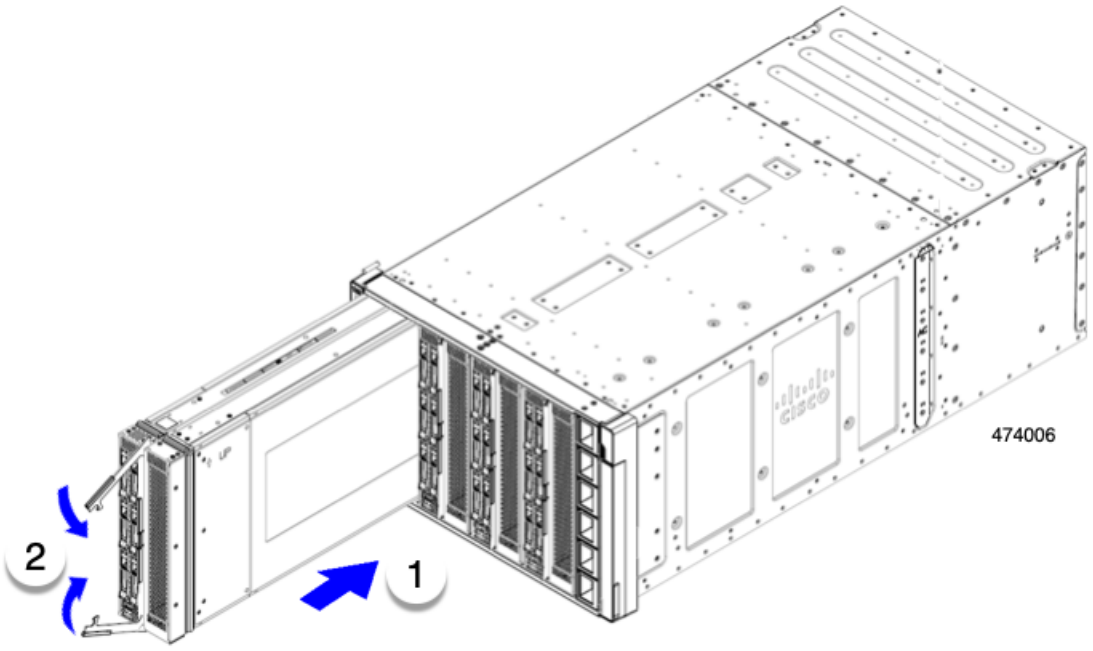
Step 5 When the compute node is almost completely installed, grasp the ejector handles and arc them toward each other.

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 10: Installing a Cisco UCS X410c M7 Compute Node

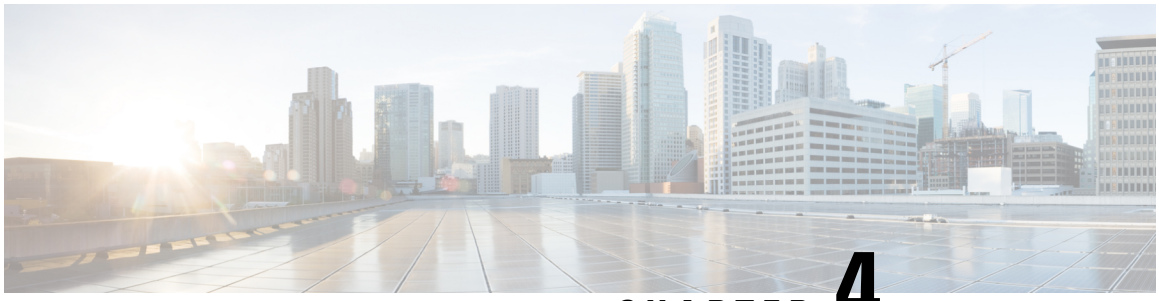


Step 7 Configure the compute node as needed through Cisco Intersight.

See Compute Node Configuration, on page 24.

Compute Node Configuration

Cisco UCS M7 compute nodes, such as the Cisco UCS X410c M7, 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 4

Servicing the Compute Node

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 36
- Servicing the Mini Storage Module, on page 41
- Replacing an M.2 SATA or NVMe SSD, on page 45
- Replacing the SuperCap Module, on page 48
- Replacing CPUs and Heatsinks, on page 56
- Replacing Memory DIMMs, on page 69
- Servicing the Bridge Card, on page 74
- Servicing the mLOM, on page 77
- Servicing the VIC, on page 80
- Servicing the Trusted Platform Module (TPM), on page 83

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 sheetmetal 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.

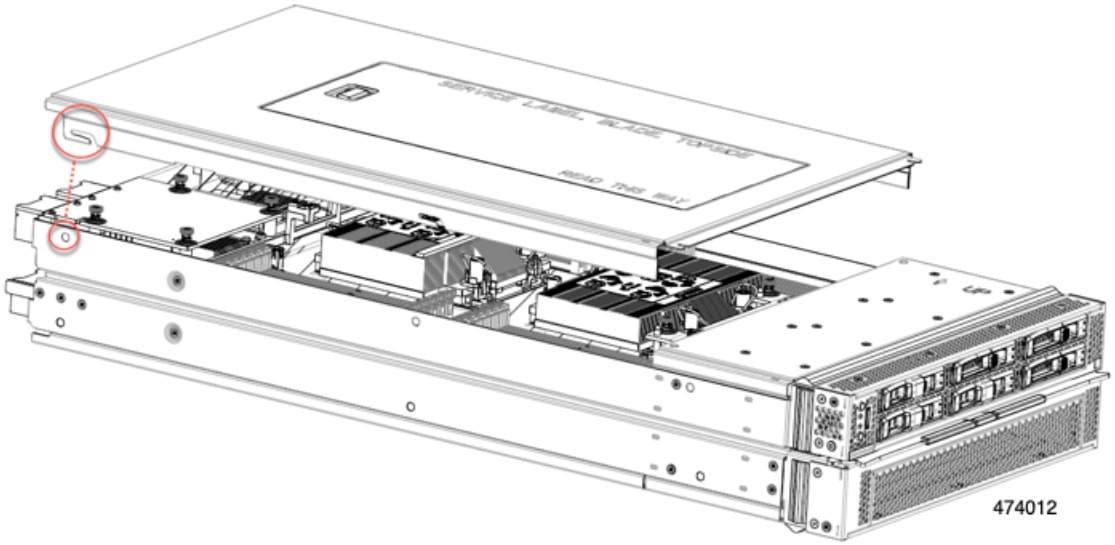
- Removing a Compute Node Cover, on page 27
- Installing a Compute Node Cover , on page 26

Installing a Compute Node Cover

Use this task to install a removed top cover for the UCS X410c M7 compute node.

Procedure

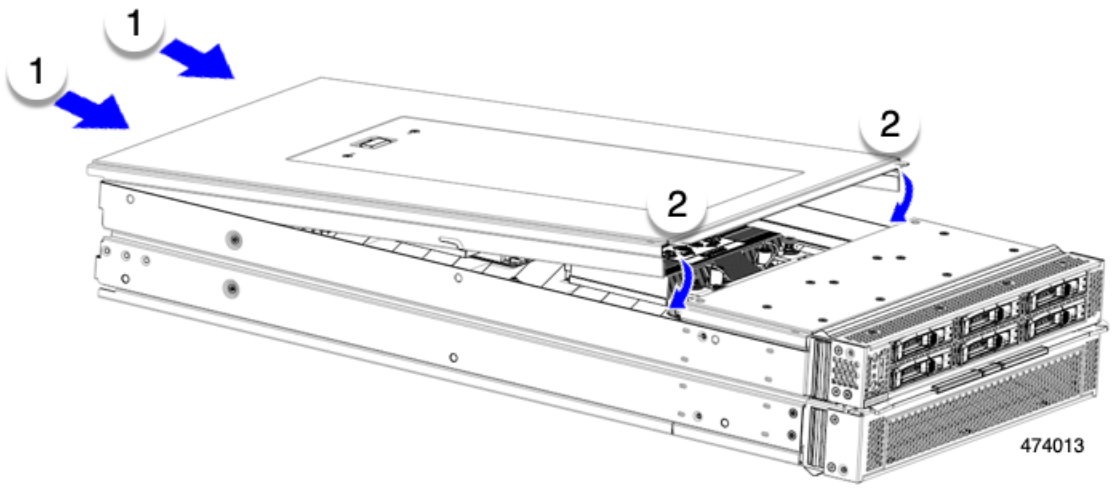
Step 1 When you install the top cover, the groves on the top cover must catch the stopper pins on the inside of the compute node's sidewalls.



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.

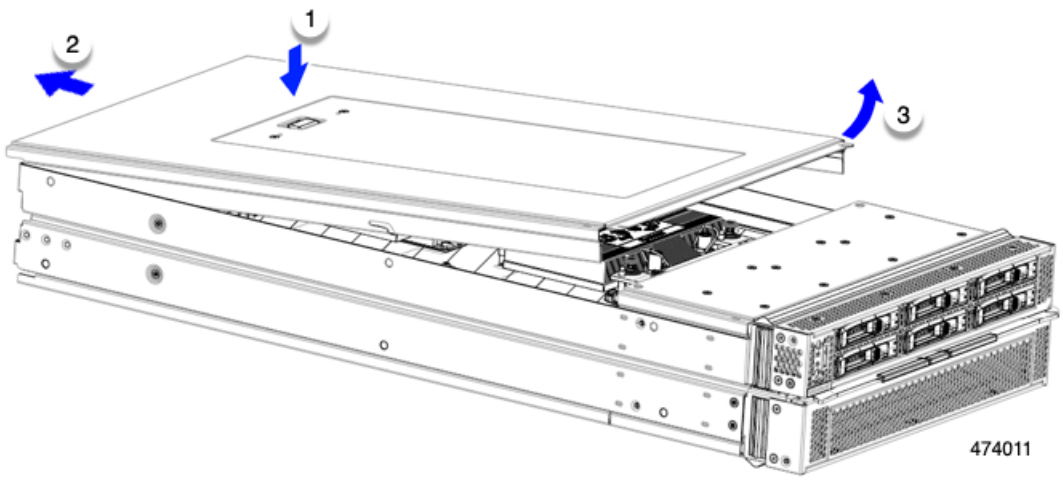
To remove the cover of the UCS X410c M7 compute node, follow these steps:

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.

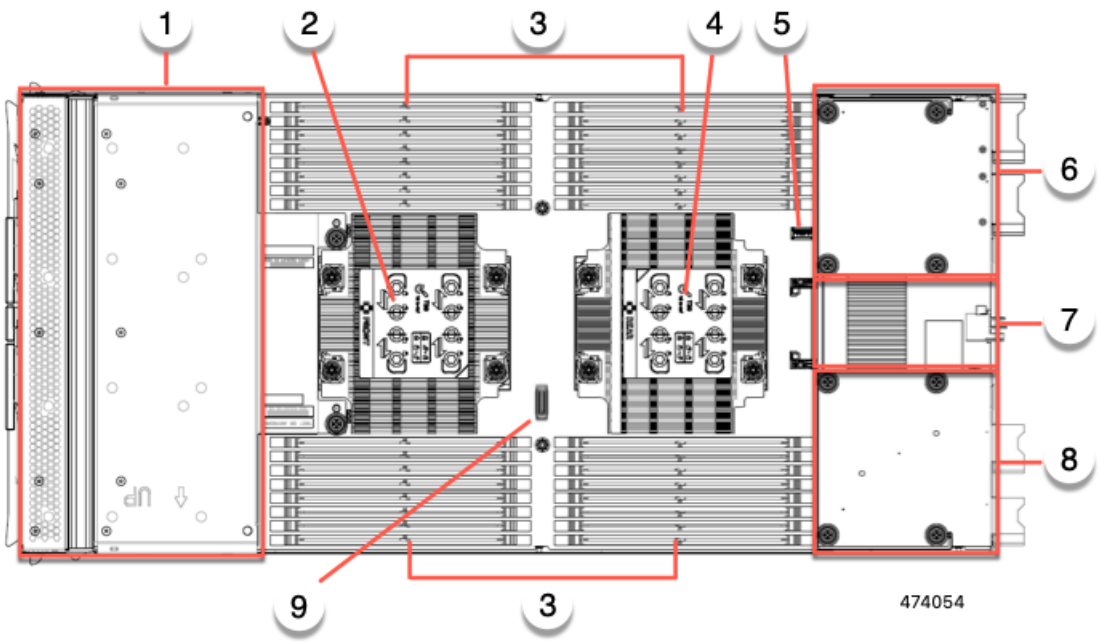


Internal Components

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.

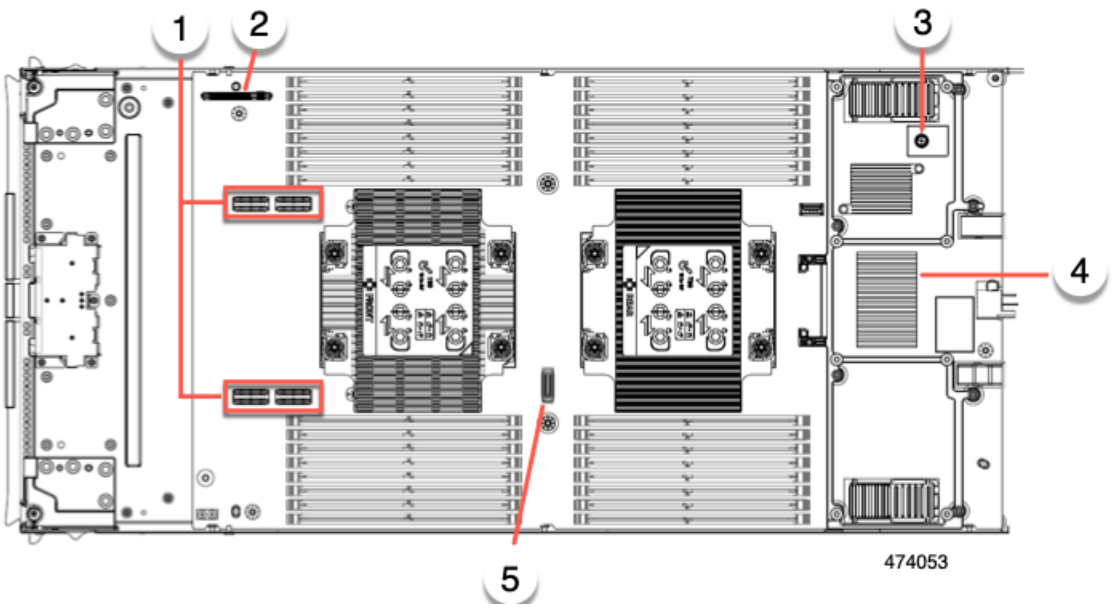
Figure 11: Cisco UCS X410c M7 Compute Node, Primary, Top Layer



1	Front mezzanine module slot	**2**	CPU 1
3	DIMM Slots	**4**	CPU 2
5	Motherboard USB connector	**6**	Rear mezzanine slot, which supports X-Series mezzanine cards, such as VIC 15422.
7	Bridge Card slot, which connects rear mezzanine slot and the mLOM/VIC slot	**8**	mLOM/VIC slot that supports zero or one Cisco VIC or Cisco X-Series 100 Gbps mLOM
9	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.

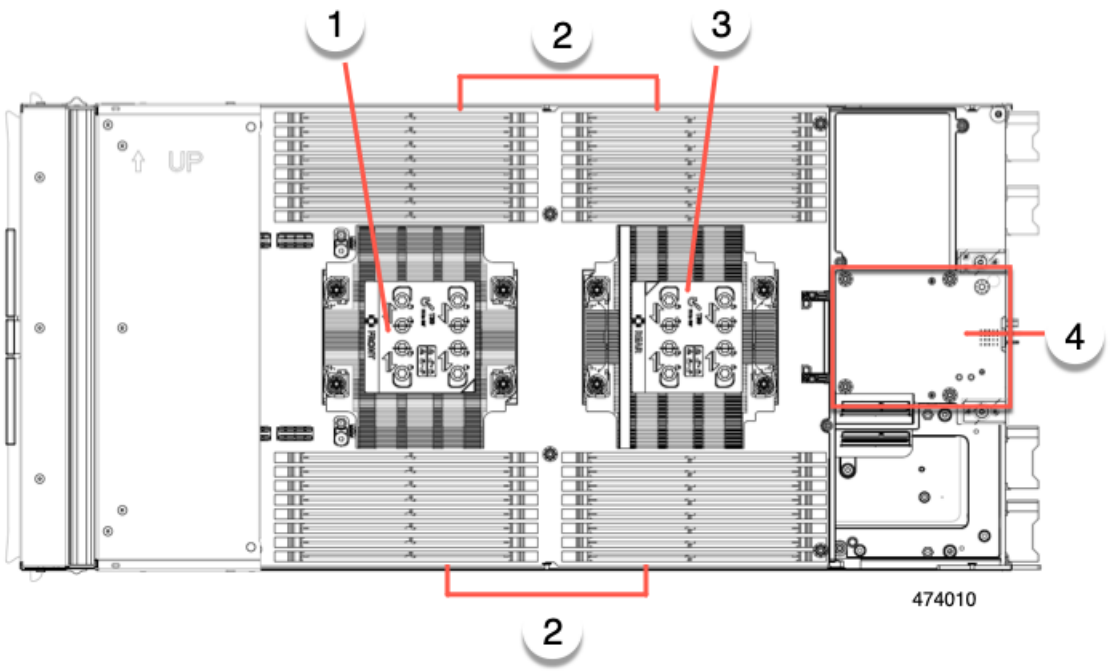
Figure 12: Cisco UCS X410c M7 Compute Node, Primary, Lower Layer



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**	Rear mezzanine 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 13: Cisco UCS X410c M7 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.

NVMe SSD Requirements and Restrictions

For 2.5-inch NVMe SSDs, be aware of the following:

- NVMe 2.5 SSDs support booting only in UEFI mode. Legacy boot is not supported.

UEFI boot mode can be configured through the Boot Order Policy setting in the Server Policy supported by Cisco Intersight Managed Mode (IMM). For instructions about setting up UEFI boot mode through Cisco IMM, go to:

https://www.cisco.com/c/en/us/td/docs/unified_computing/Intersight/b_Intersight_Managed_Mode_Configuration_Guide/b_intersight_managed_mode_guide_chapter_0110.html

- NVMe U.2 PCIe SSDs cannot be controlled with a SAS RAID controller because NVMe SSDs interface with the compute node via the PCIe bus.
- NVME U.3 SSDs connect to the RAID controller so RAID is supported for these drives.
- UEFI boot is supported in all supported operating systems.

Enabling Hot Plug Support

Surprise and OS-informed hotplug is supported with the following conditions:

- VMD must be enabled to support hotplug.
- VMD must be enabled before installing an OS on the drive.
- If VMD is not enabled, surprise hotplug is not supported, and you must do OS-informed hotplug instead.
- VMD is required for both surprise hotplug and drive LED support.

Removing a Drive

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

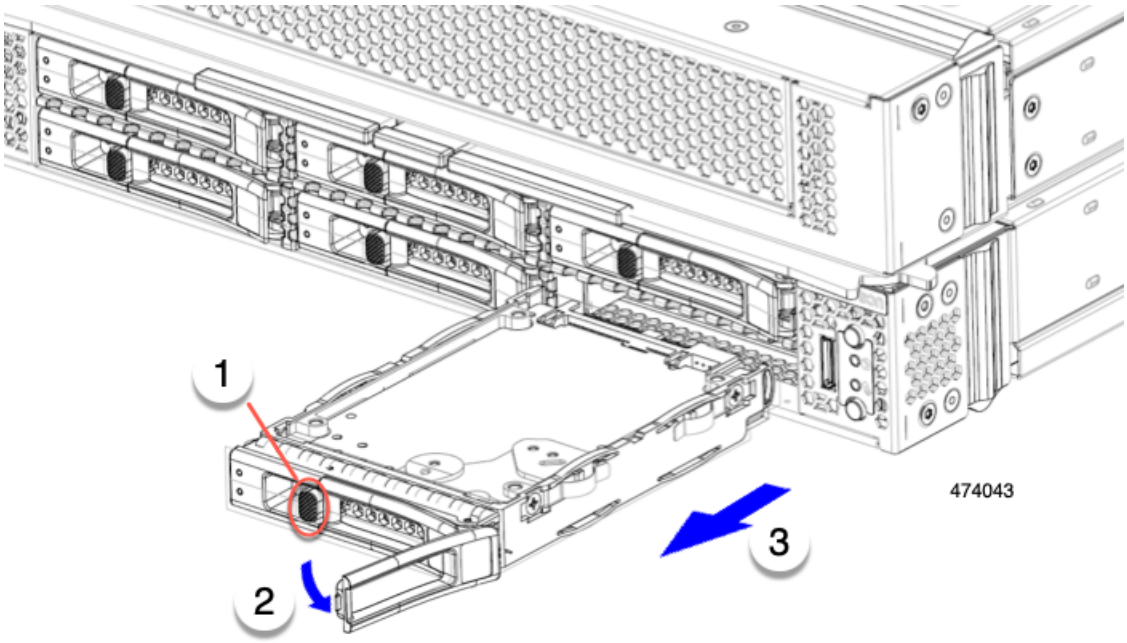


Caution Do not operate the system with an empty drive bay. If you remove a drive, you must reinsert a drive or cover the empty drive bay with a drive blank.

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 36

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 drive in the compute node, follow this procedure:

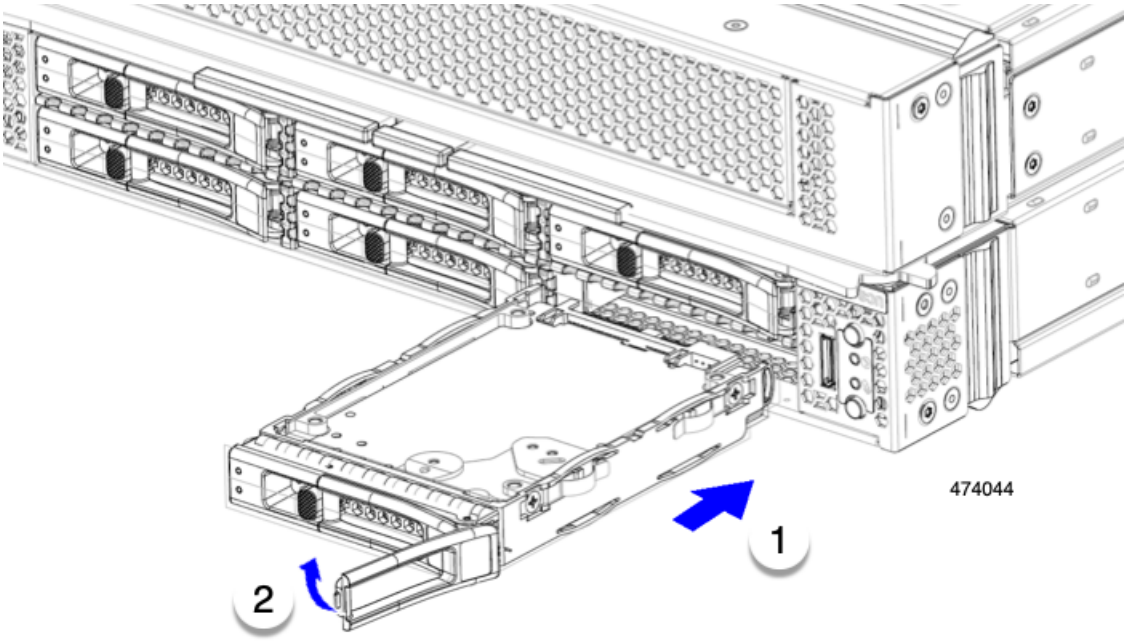
Procedure

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.



Basic Troubleshooting: Reseating a SAS/SATA Drive

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

- Only drives that are managed by the UCS MegaRAID controller are affected.
- Small form factor (SFF) drives can be affected.
- Drives can be affected regardless of whether they are configured for hotplug or not.
- The UBAD error is not always terminal, so the drive is not always defective or in need of repair or replacement. However, it is also possible that the error is terminal, and the drive will need replacement.

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

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

To reseat the drive, see Reseating a SAS/SATA Drive, on page 34.

Reseating a SAS/SATA Drive

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

Use the following procedure to reseat the drive.

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

Before you begin

Before attempting this procedure, be aware of the following:

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

Procedure

Step 1 Attempt a hot reseat of the affected drive(s).

For a front-loading drive, see Removing a Drive, on page 31.

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

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

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

See Interpreting LEDs, on page 10.

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

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

See the appropriate Cisco management software documentation.

b) If compute node power down through software is not available, you can power down the compute node by pressing the power button.

See Compute Node Front Panel, on page 3.

c) Reseat the drive as documented in Step 1.
d) When the drive is correctly reseated, restart the compute node, and check the drive LEDs for correct operation as documented in Step 2.

Step 4 If hot and cold reseating the drive (if necessary) does not clear the `UBAD` error, choose the appropriate option:

a) Contact Cisco Systems for assistance with troubleshooting.
b) Begin an RMA of the errored drive.

Removing a Drive Blank

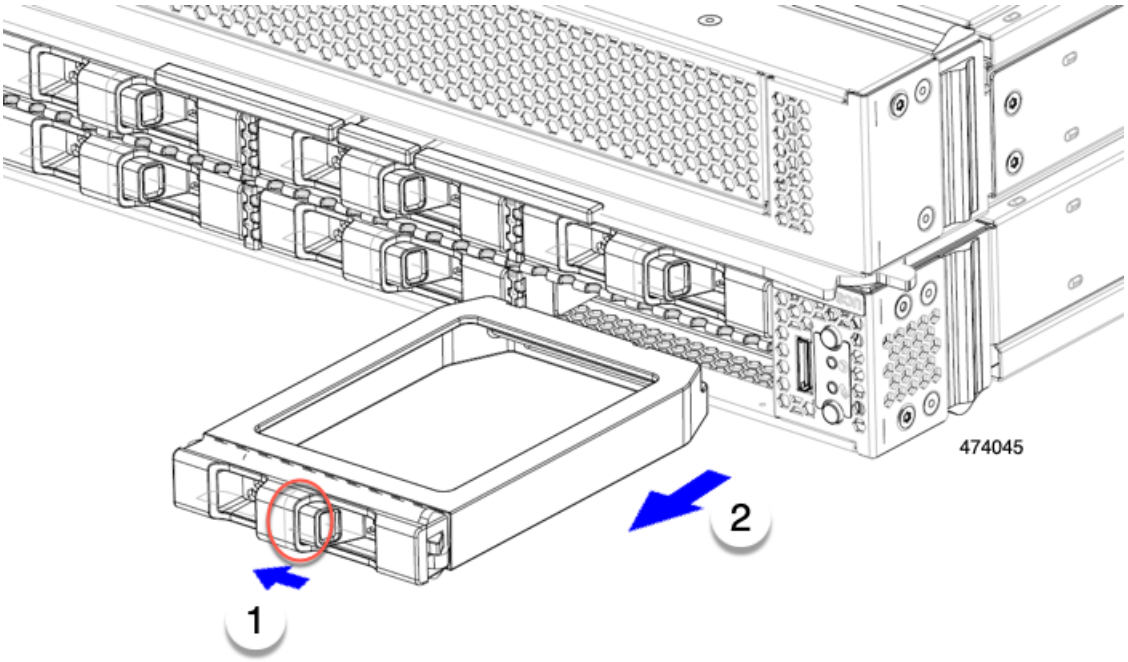
A maximum of six SAS/SATA or NVMe drives are contained in the front mezzanine storage module as part of the drive housing. The drives are front facing, so removing them does not require any disassembly.

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 36

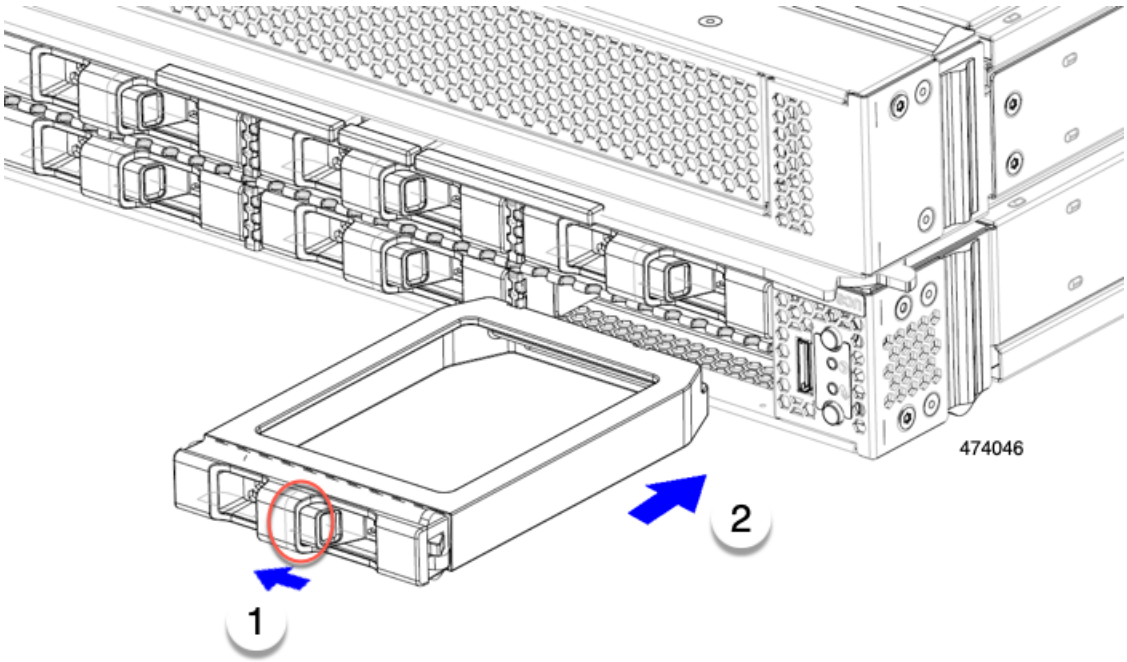
Installing a Drive Blank

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:

- NVMe drives
- SAS/SATA drives

In the primary's front mezzanine slot, the compute node can use one of the following options:

- A front mezzanine blank (UCSX-X10C-FMBK) for systems without local disk requirements.

- Compute Pass Through Controller (UCSX-X10C-PT4F): supports up to six hot pluggable 2.5-inch NVMe drives directly connected to CPU 1.
- MRAID Storage Controller Module (UCSX-X10C-RAIDF):
  - Supports a mixed drive configuration of up to six SAS, SATA, and NVMe (maximum of four) drives. With a mix of SAS/SATA and NVMe, NVMe drives are supported in slots one through four only.
  - Provides HW RAID support for SAS/SATA drives in multiple RAID groups and levels.
- The front mezzanine module also contains the SuperCap module. For information about replacing the SuperCap module, see Replacing the SuperCap Module, on page 48.



Note The SuperCap module is only needed when the MRAID Storage Controller module (UCSX-X10C-RAIDF) is installed.

In the secondary's front mezzanine module slot, only a front mezzanine blank is supported. This blank is different from the primary's front mezzanine blank. The secondary front mezzanine blank is not separately orderable.

Each front mezzanine module can be removed and installed as a whole unit. On the primary, this option gives 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 37
- Installing the Front Mezzanine Module, on page 39

Front Mezzanine Module Guidelines

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

- For MRAID Storage Controller Module (UCSX-X10C-RAIDF), M.2 Mini Storage, and NVMe storage, only UEFI boot mode is supported.

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-X10C-FMBK)
- Compute Pass Through Controller (UCSX-X10C-PT4F)
- MRAID Storage Controller Module (UCSX-X10C-RAIDF)

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.

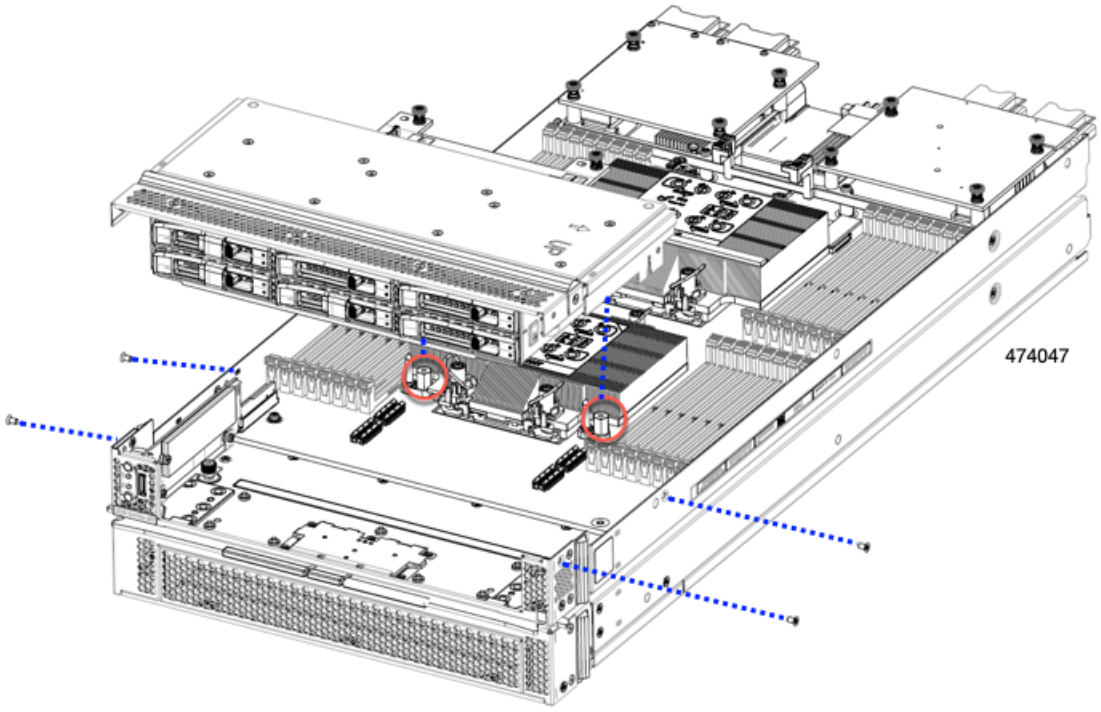
See Removing a Compute Node Cover, on page 27.

Step 2 Remove the securing screws:

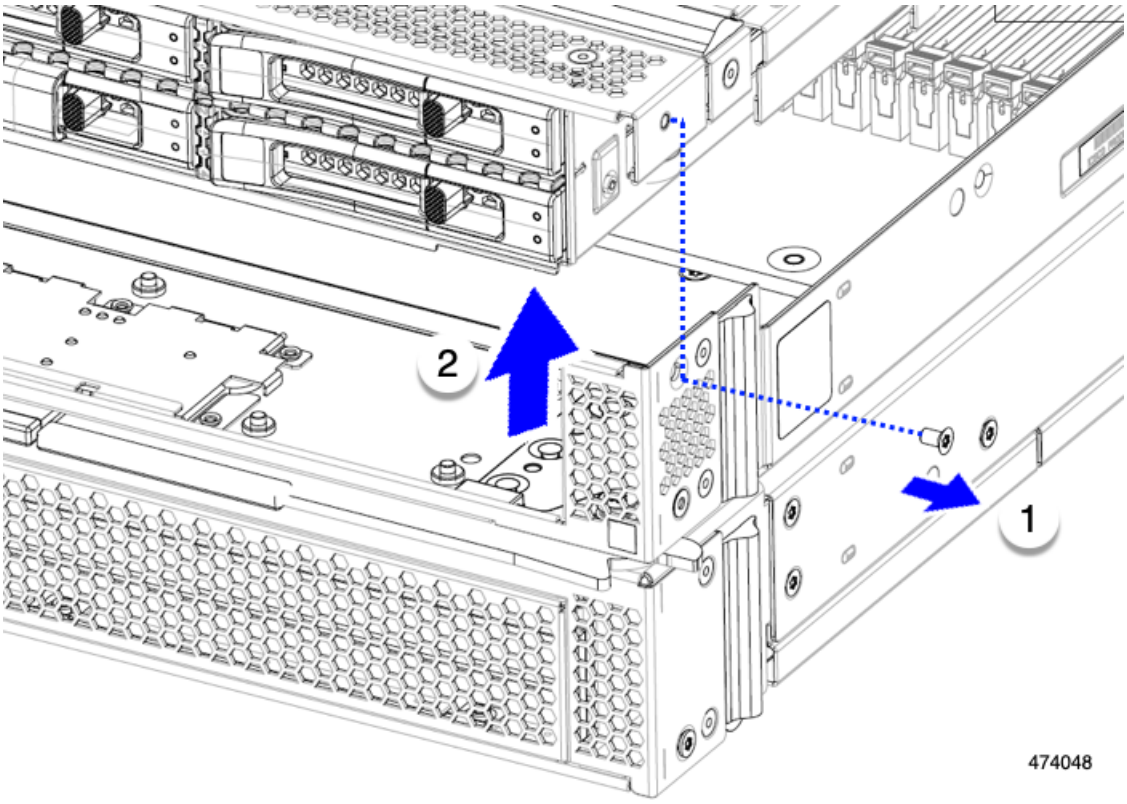
a) Using a #2 Phillips screwdriver, loosen the two captive screws on the top of the front mezzanine module.

Note
This step may be skipped if removing the front mezzanine blank (UCSX-X10C-FMBK).

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.



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 39

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-X10C-FMBK)
- Compute Pass Through Controller (UCSX-X10C-PT4F)
- MRAID Storage Controller Module (UCSX-X10C-RAIDF)

Before you begin

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

Procedure

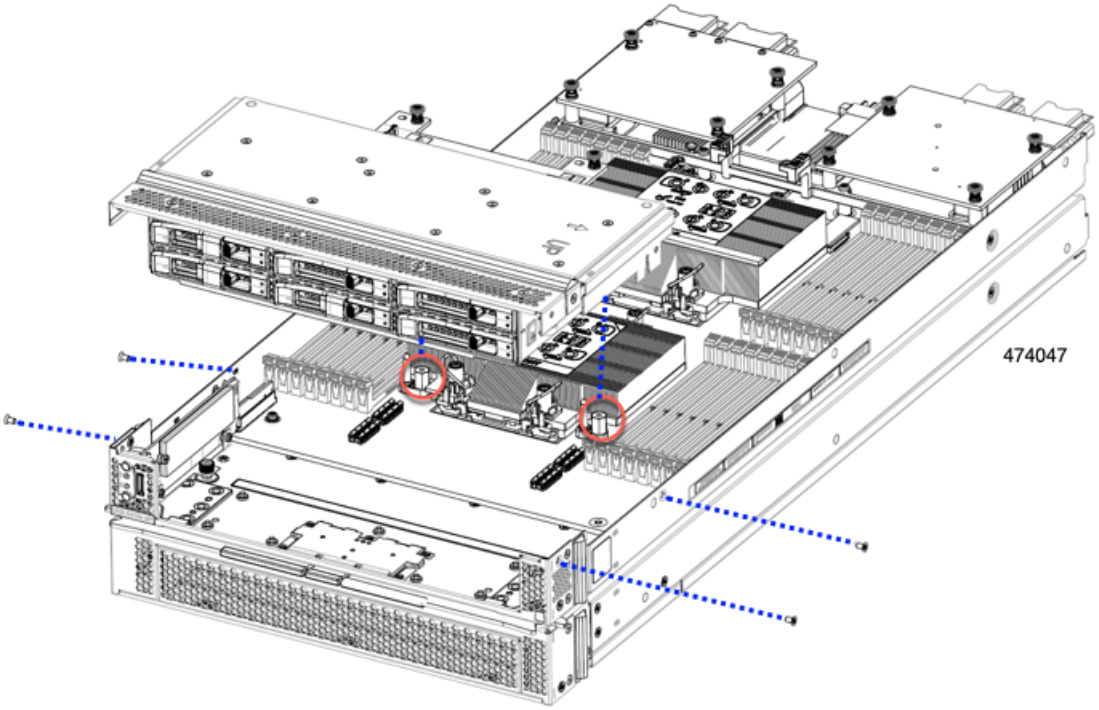
Step 1 Align the front mezzanine module with its slot on the compute node.

Step 2 Lower the front mezzanine module onto the compute node, making sure that the screws and screwholes line up.

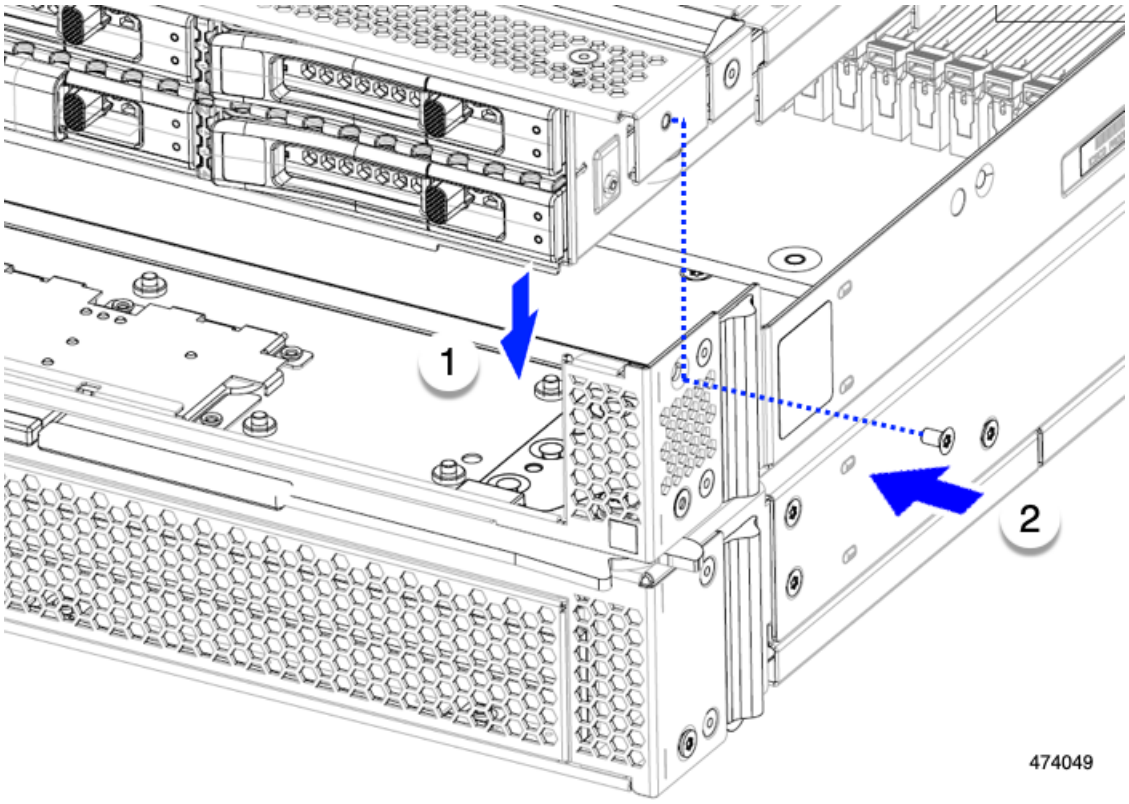
Step 3 Secure the front mezzanine module to the compute node.

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-X10C-FMBK).



b) Using a T8 screwdriver, insert and tighten the four screws, two on each side of the sever 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:

a) Decommission, power off, and remove the compute node from the chassis.

b) 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 37.

Step 3 Remove the controller.

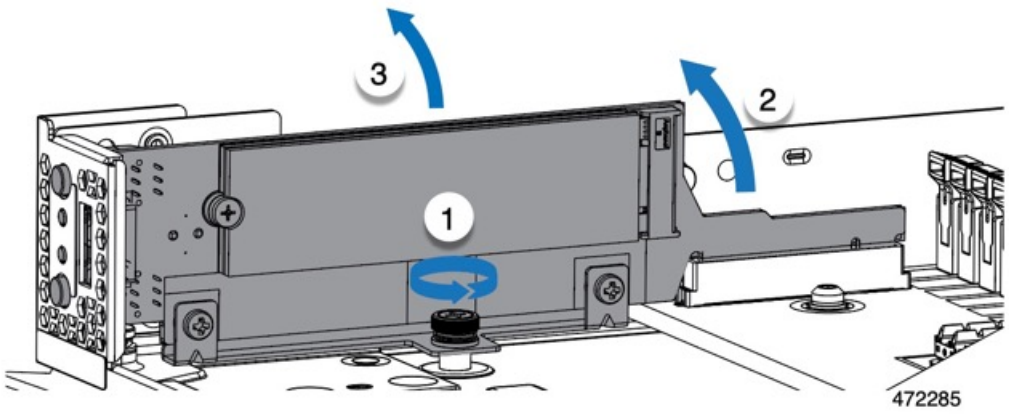
a) Locate the controller in the front corner of the compute node along the sidewall.

b) Using a #2 Phillips screwdriver, loosen the captive screw that secures the module to the motherboard.

c) At the end opposite the front panel, grasp the module and pull up in an arc to disconnect the controller from its motherboard socket.

d) 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:

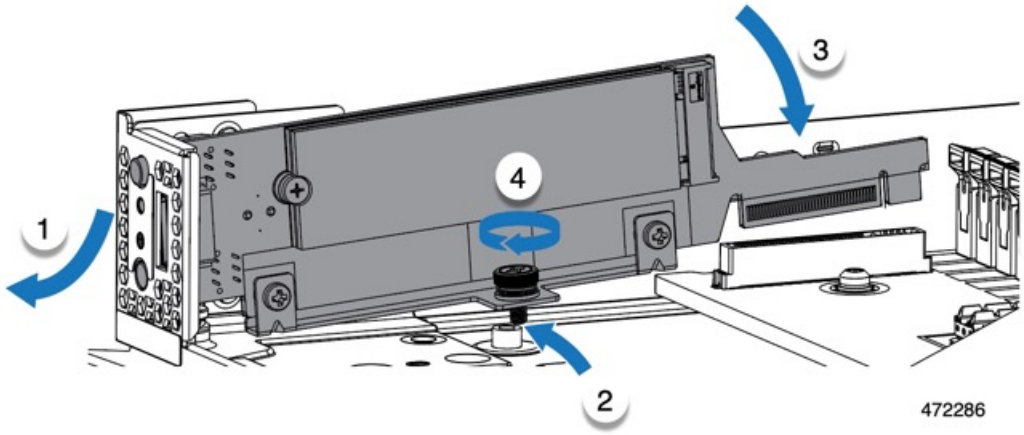
- The Cisco UCSX Front panel with M.2 RAID controller for SATA drives (UCSX-M2-HWRD-FPS).
- The Cisco UCSX Front panel with M.2 Pass-Through module for NVME drives (UCSX-M2-PT-FPN).

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 screwhole 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 sheetmetal 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.

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

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

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 sheetmetal 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.

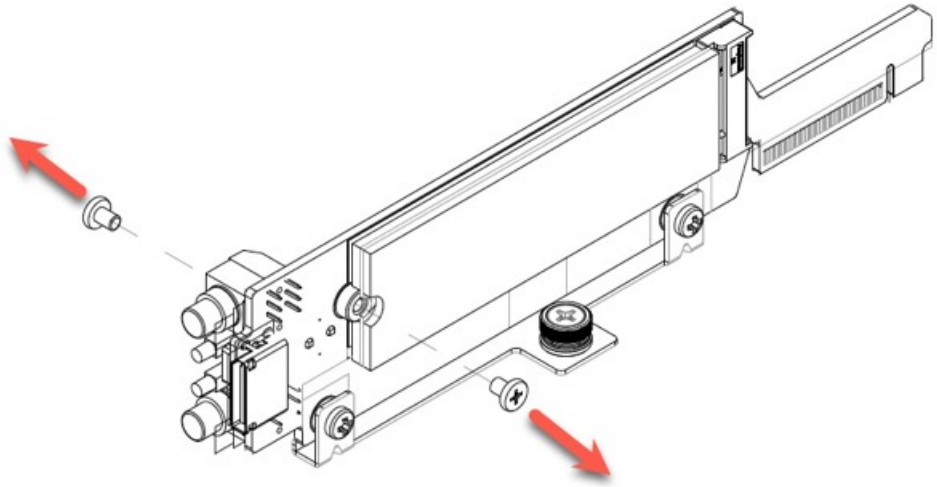
Use the following procedure for any type of mini-storage module carrier.

Procedure

Step 1 Remove the controller.

See Removing the M.2 RAID Controller Module or NVMe Pass-Through Module, on page 42.

Step 2 Using a #1 Phillips screwdriver, remove the screws that secure the M.2 SATA or NVMe SSD to the carrier.



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.

What to do next

Installing an M.2 SATA or NVMe SSD, on page 47

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

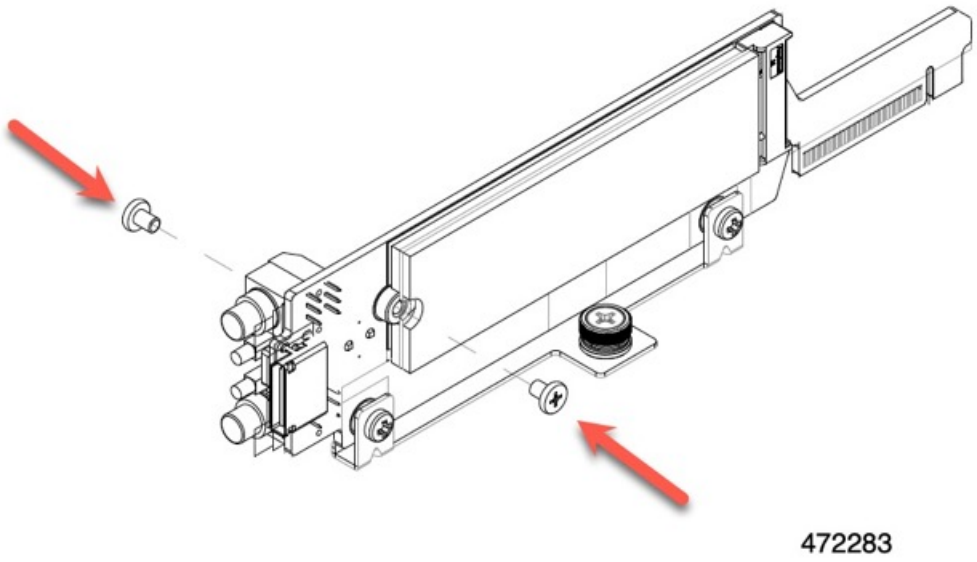
Procedure

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.



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 44.

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. The front mezzanine with the SuperCap module installed is UCSX-X10C-RAIDF.

Note The SuperCap module is only needed when the MRAID Storage Controller module (UCSX-X10C-RAIDF) is installed.

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

To replace the SuperCap module, use the following topics:

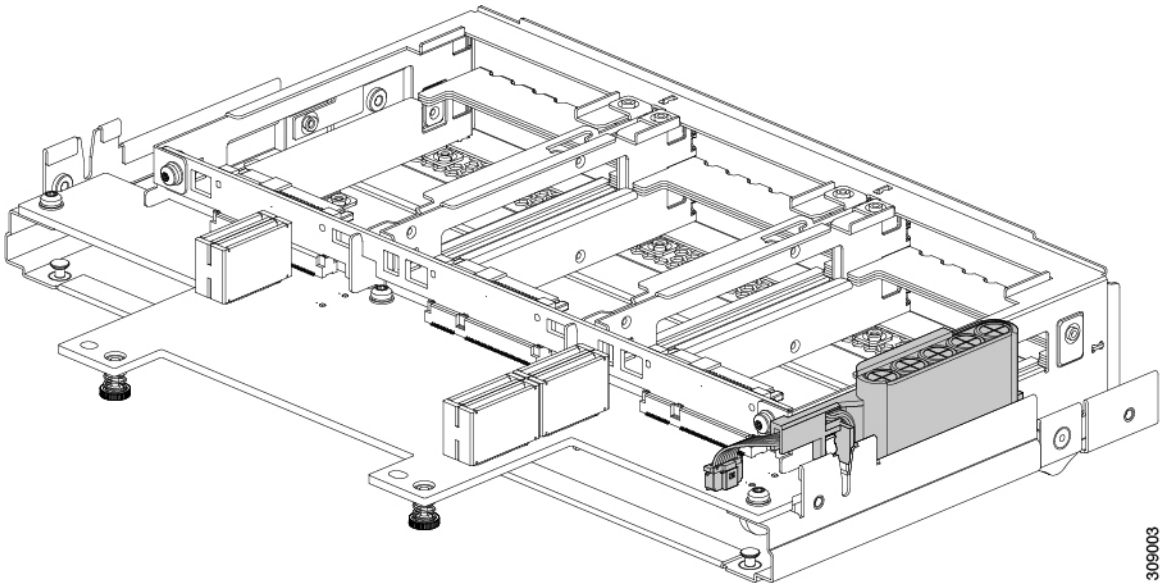
- Removing the SuperCap Module, on page 49
- Installing the SuperCap Module, on page 53

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 14: Location of the SuperCap Module on the Front Mezzanine Module



To replace the SuperCap module, follow these steps:

Procedure

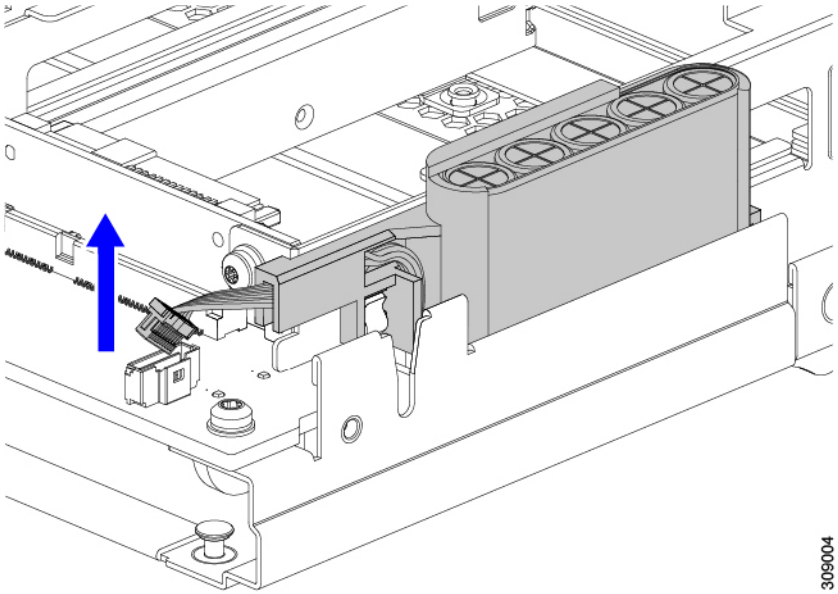
Step 1 If you have not already removed the Front Mezzanine module, do so now.

See Removing the Front Mezzanine Module, on page 37.

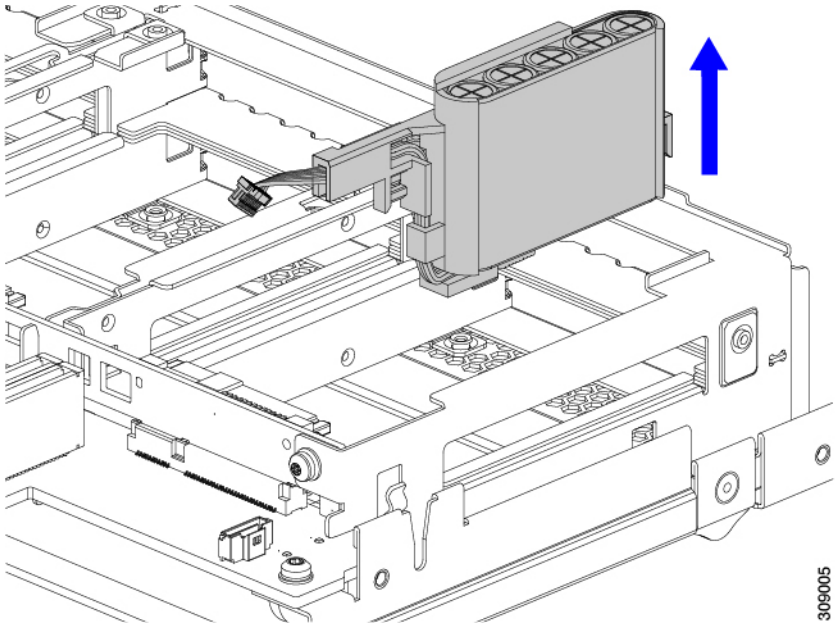
Step 2 Before removing the SuperCap module, note its orientation in the tray as shown in the previous image.

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.



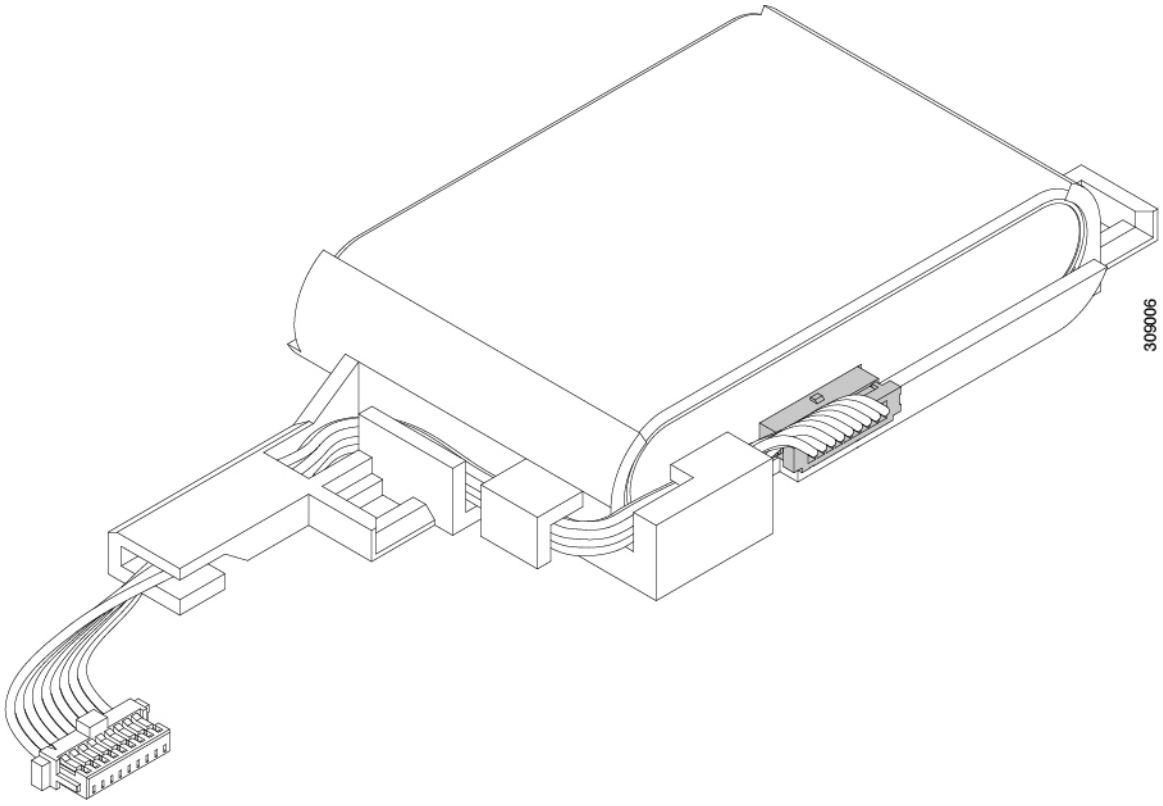
Step 4 Grasp the sides of the SuperCap module, but not the connector, and lift the SuperCap module out of the tray.



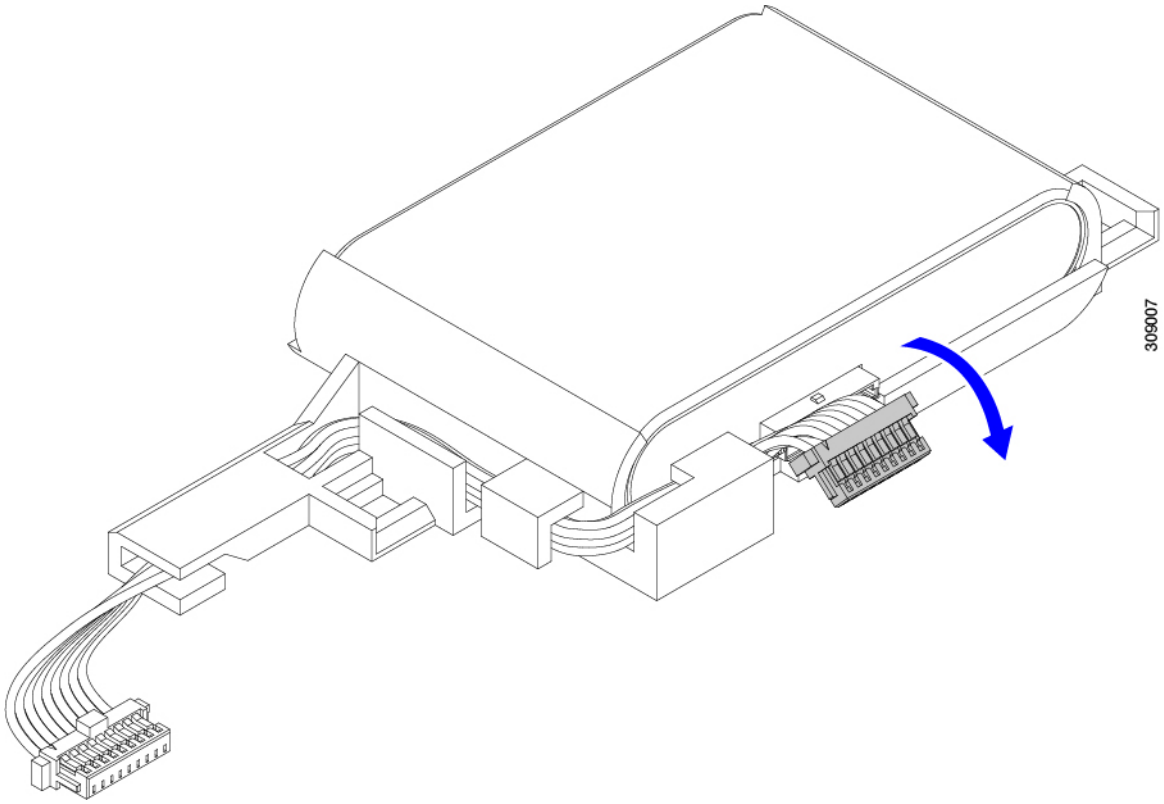
You might feel some resistance because the tray is curved to secure the module.

Step 5 Disconnect the ribbon cable from the SuperCap module:

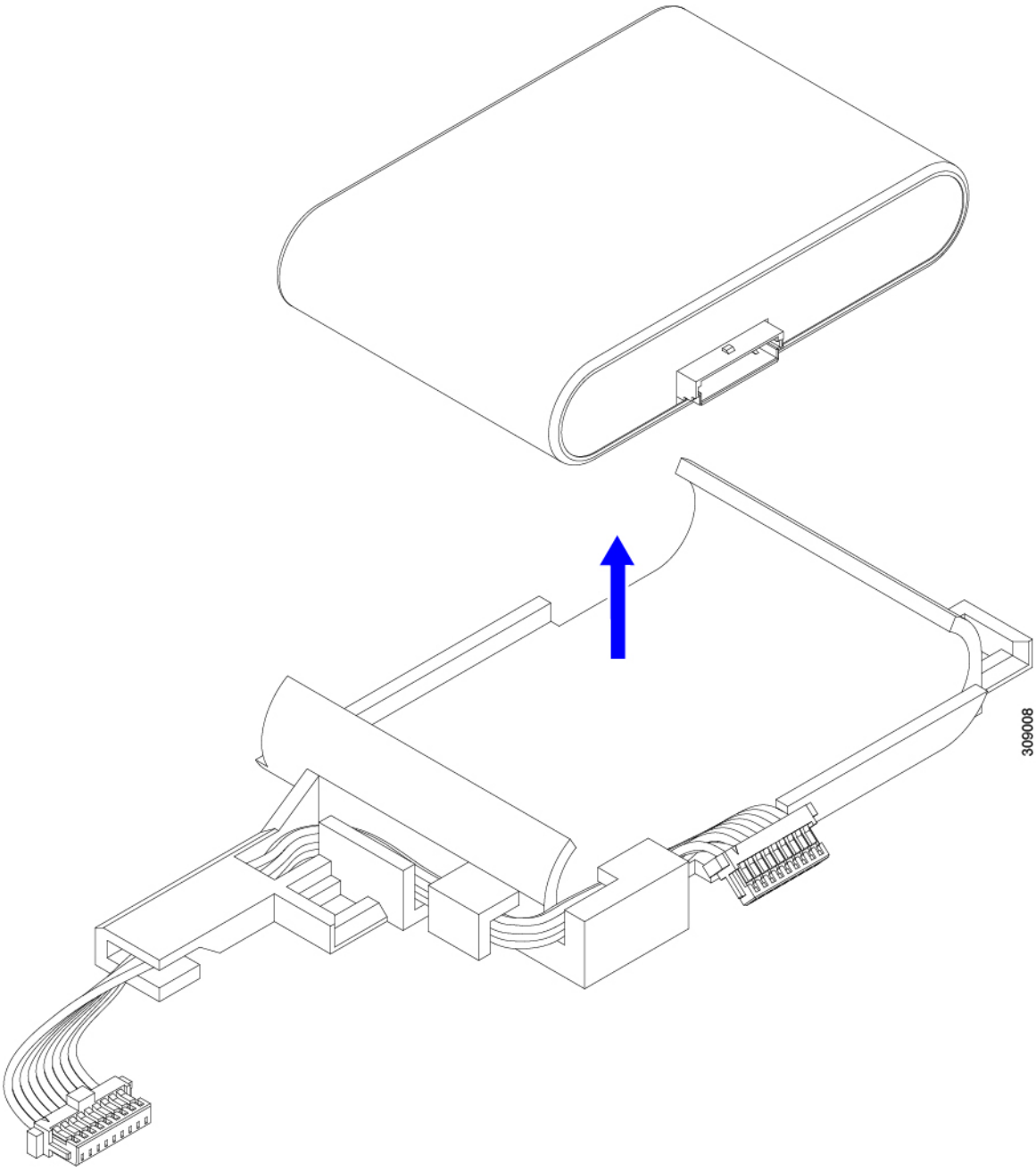
a) On the SuperCap module, locate the lever that secures the ribbon cable to the battery pack.


309006

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 53

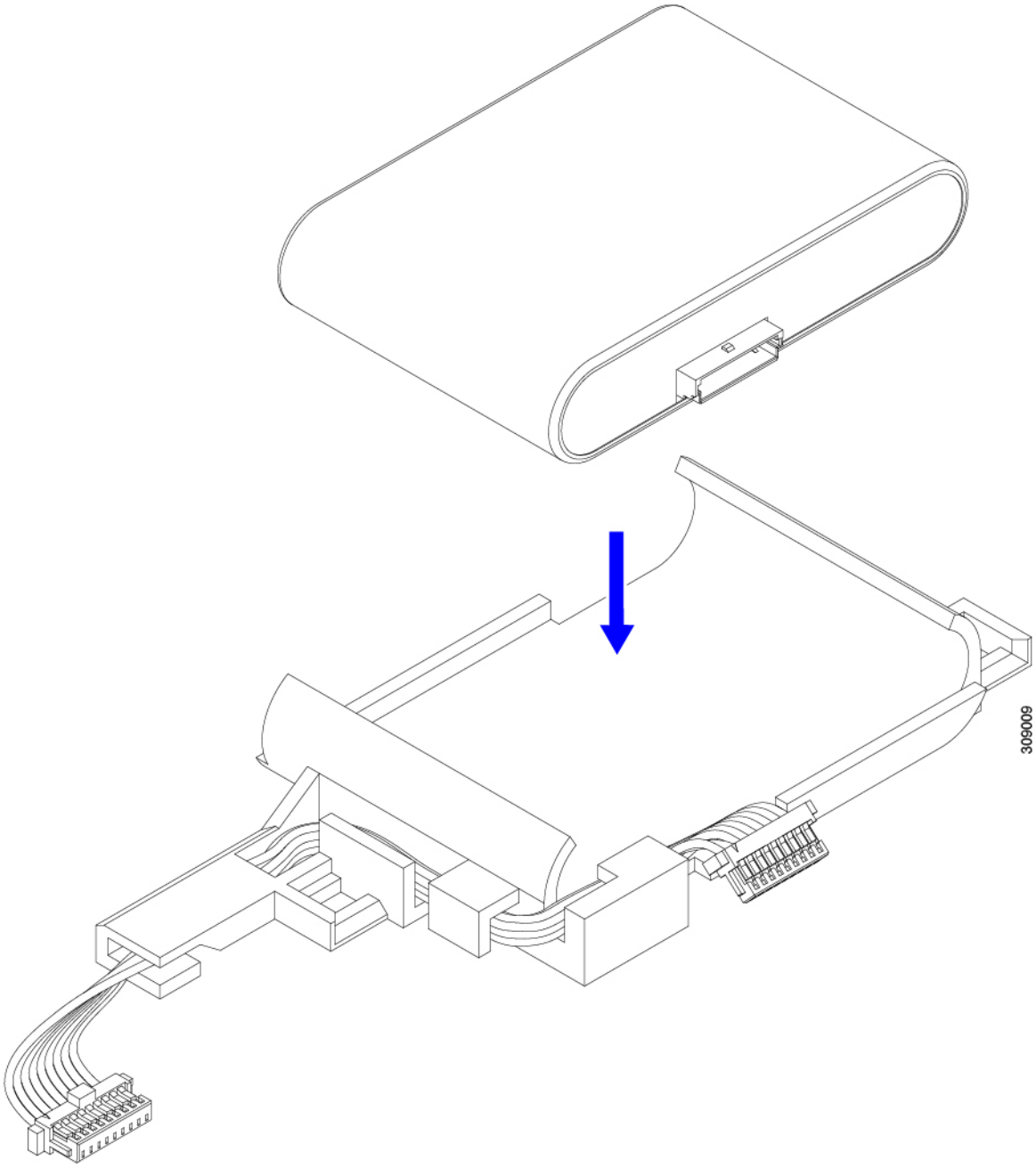
Installing the SuperCap Module

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.

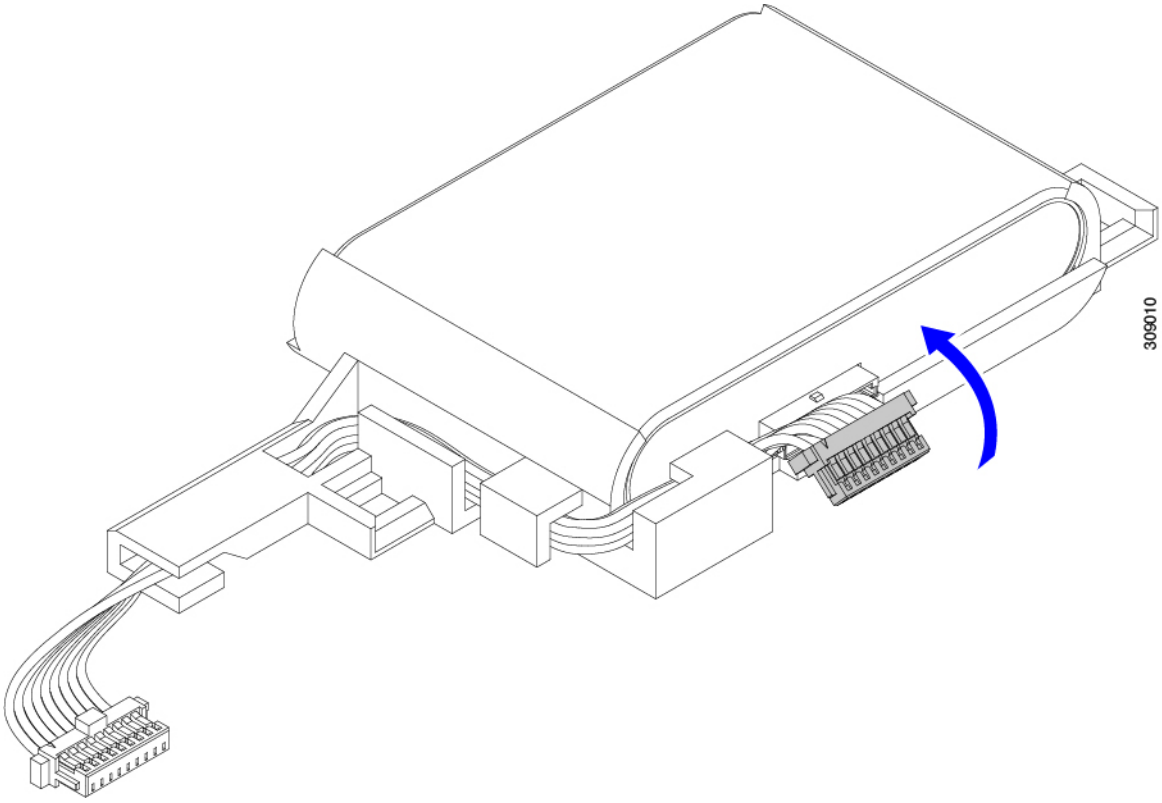


b) Before seating the SuperCap module, make sure that the ribbon cable is not in the way. You do not want to pinch the ribbon cable when you install the SuperCap.

c) When the ribbon cables are clear of the case, press the SuperCap module until it is seated in the case.

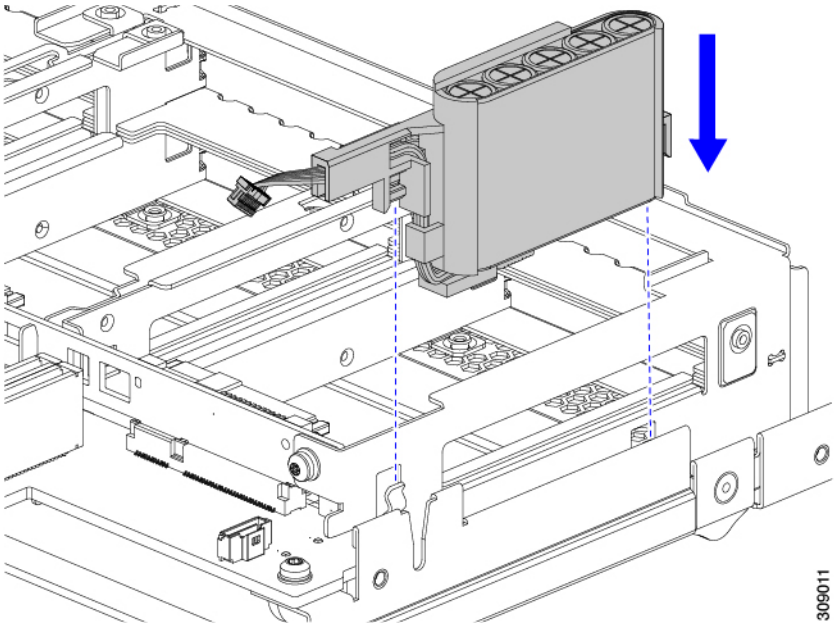
You might feel some resistance as the SuperCap snaps into place.

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.



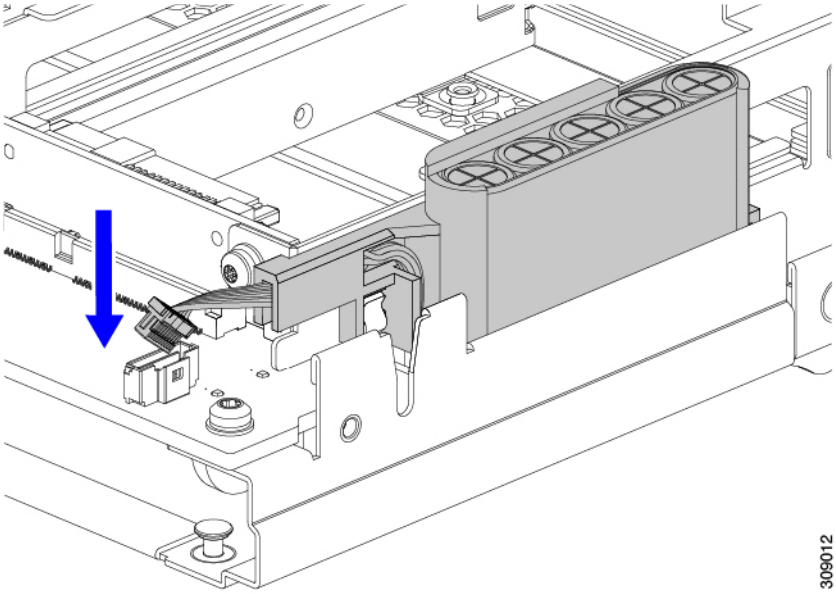
Step 3 Align the SuperCap module with its slot on the module and seat the module into the slot.

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



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.



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 compute node has for CPU sockets, two sockets on each motherboard. Each CPU supports 8 DIMM channels (16 DIMM slots). See Memory Population Guidelines, on page 69.

- CPU 1 is on the primary and closest to the front panel.
- CPU 2 is on the primary and closest to the rear of the compute node.
- CPU 3 is on the secondary and closest to the front panel.
- CPU 4 is on the secondary and closest to the rear of the compute node.

Follow these rules for CPU configuration and population.

- The compute node must operate with four identical CPUs installed.
- The only supported configuration is four identical CPUs installed.

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 M7 processors—Supplied with replacement CPU. The assembly tool can be ordered separately as Cisco PID UCS-CPUATI-5=.
- Heatsink cleaning kit—Supplied with replacement CPU. Can be ordered separately for the front or rear heatsink:
  - Front heatsink kit: UCSX-C-M7-HS-F. These heatsinks are used on CPUs 1 and 3.
  - Rear heatsink kit: UCSX-C-M7-HS-R. These heatsinks are used on CPUs 2 and 4.

  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).

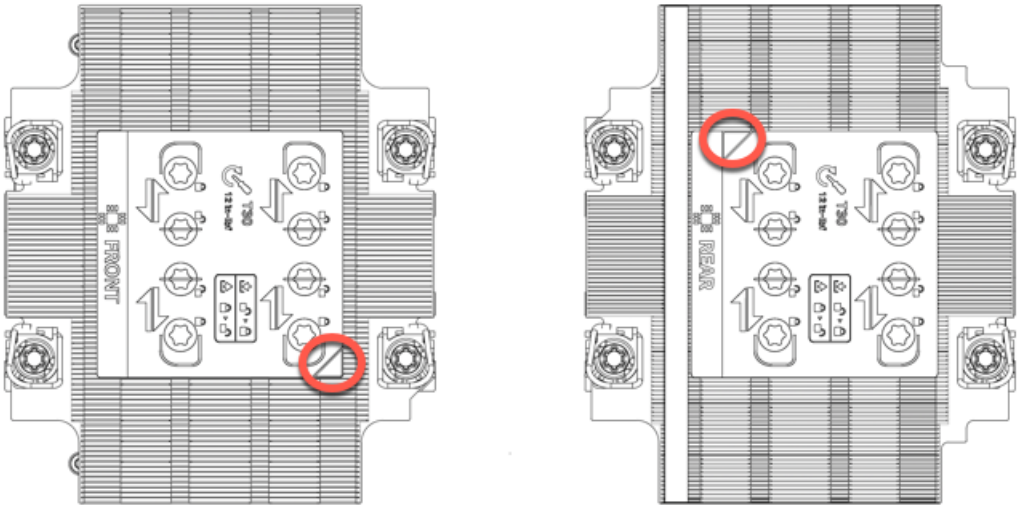
CPU and Heatsink Alignment Features

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

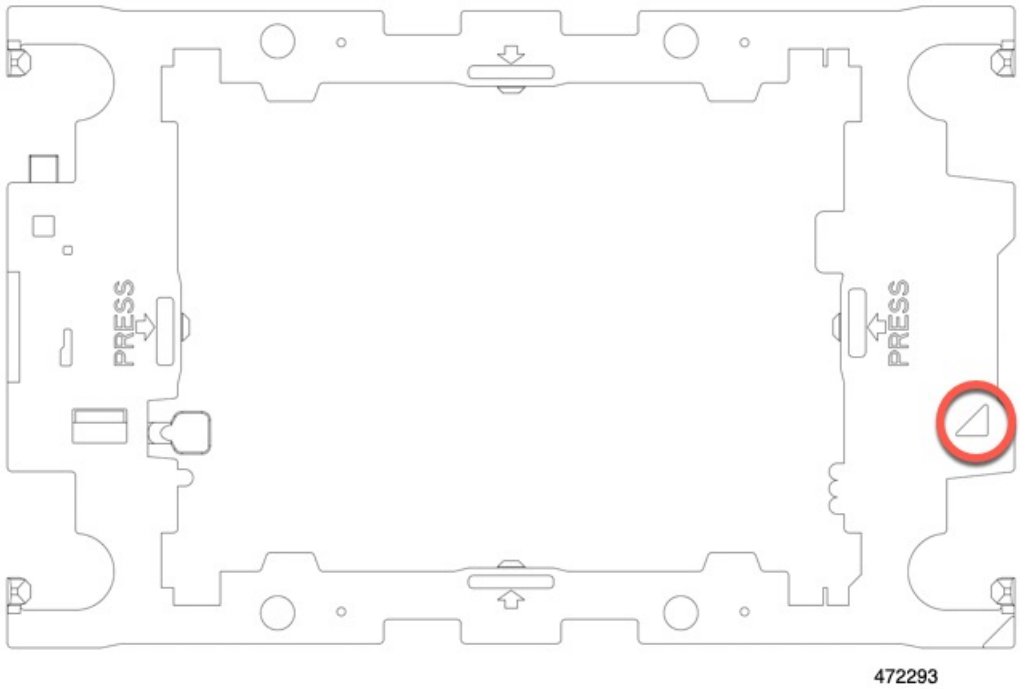
Each heatsink has a yellow triangle labeled on one corner. The tip of the triangle points to the pin 1 location on the heatsink. Use the triangle to align the heatsink with the pin 1 location on other parts, such as the CPU carrier and CPU socket.



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.

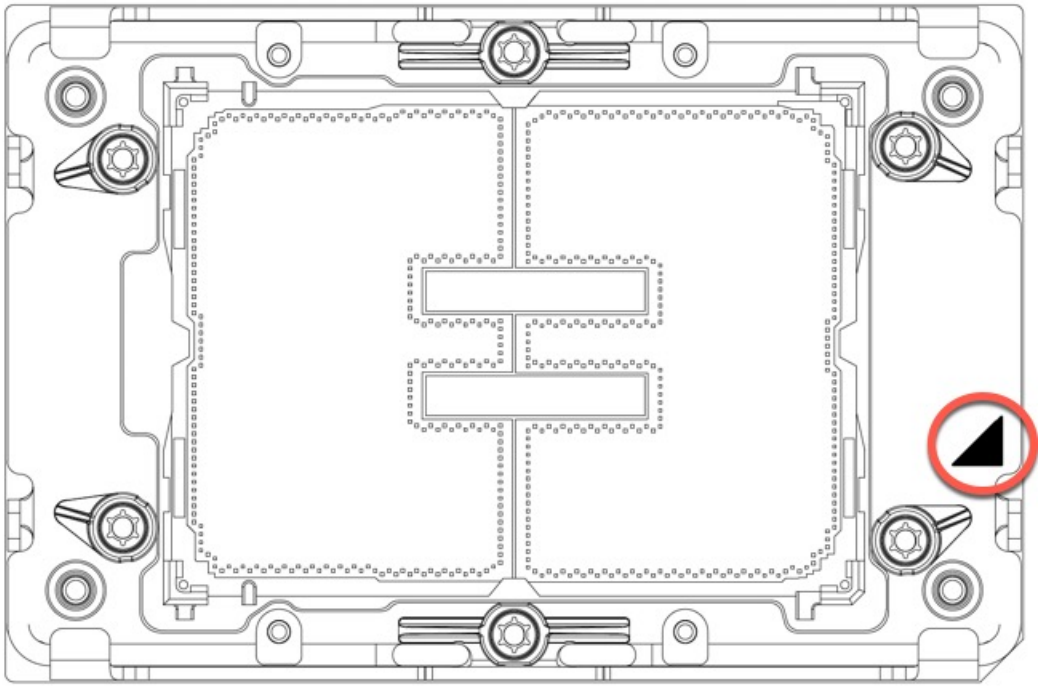
CPU Carrier Alignment Feature

Each CPU carrier has a triangular cutout in the carrier's plastic. The tip of the triangle points to the pin1 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.



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.



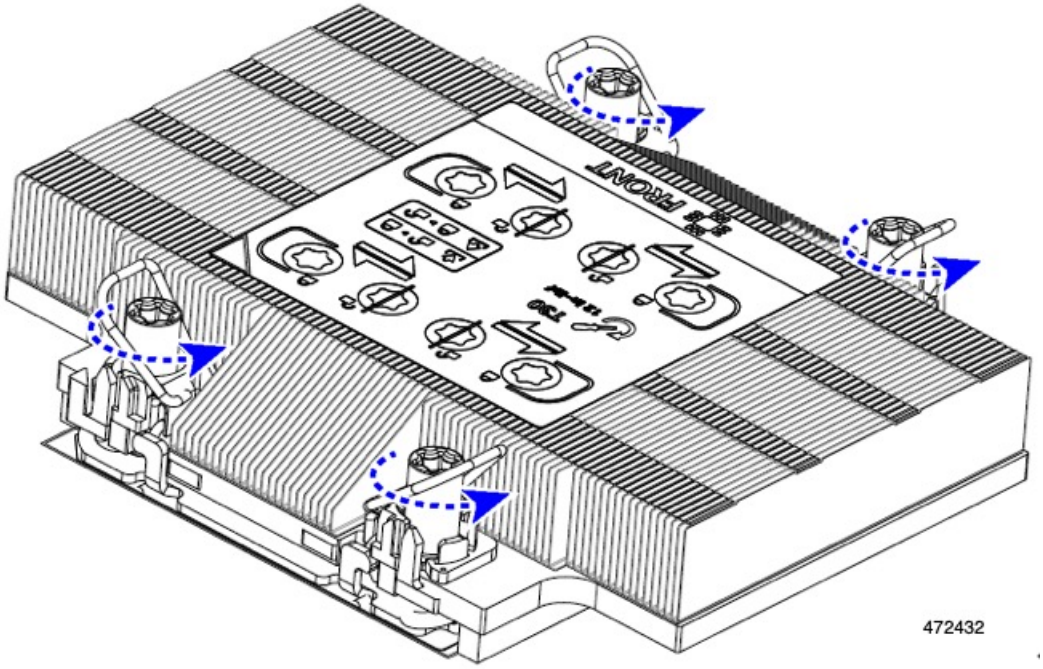
Removing the CPU and Heatsink

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.

Procedure

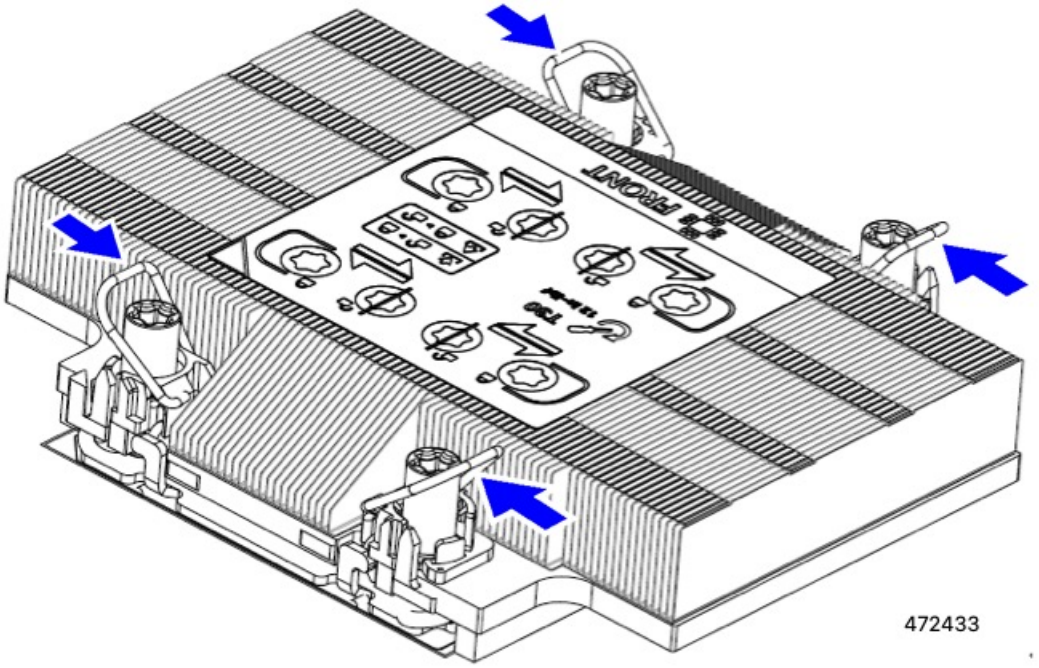
Step 1 Detach the CPU and heatsink (the CPU assembly) from the CPU socket.

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.

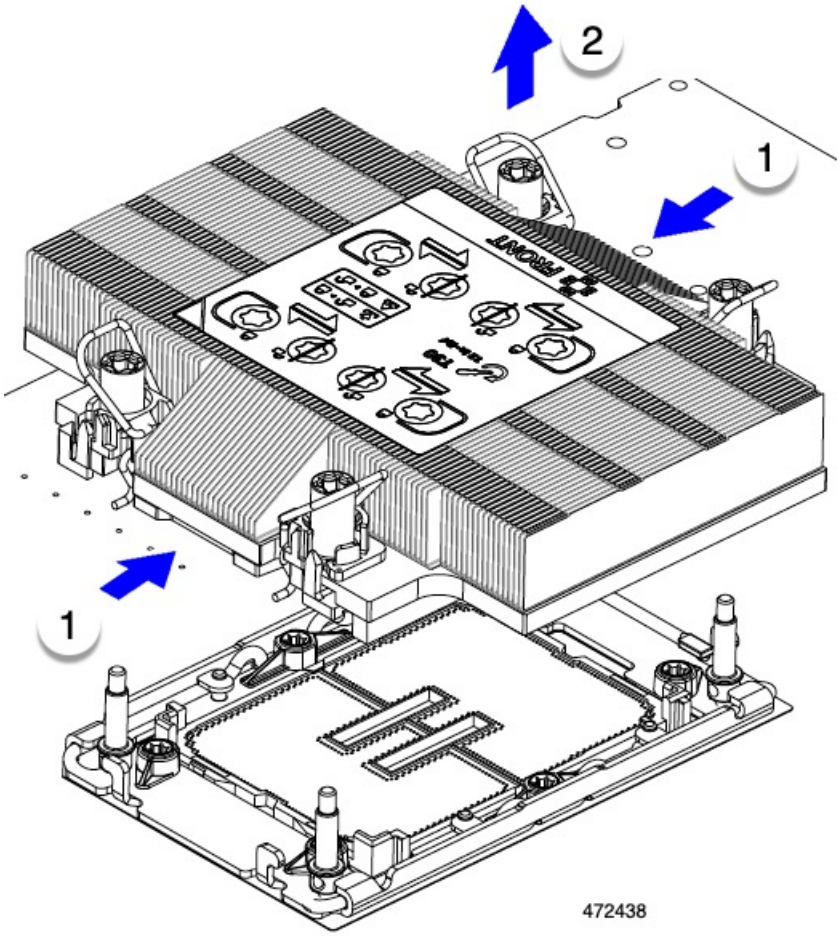
Caution
Make sure that the rotating wires are as far inward as possible. When fully unlocked, the bottom of the rotating wire disengages and allows the removal of the CPU assembly. If the rotating wires are not fully in the unlocked position, you can feel resistance when attempting to remove the CPU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

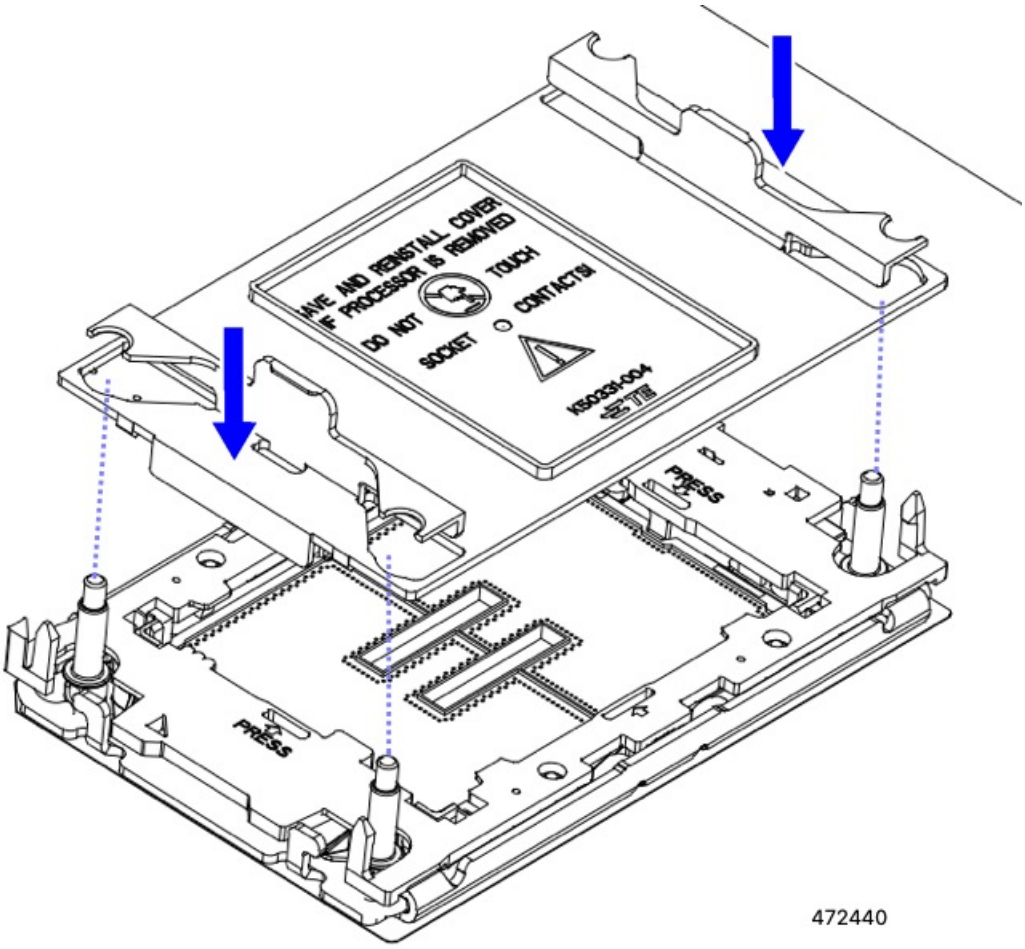
c) Ensure that the CPU assembly sits level on the work surface.

Step 3 Attach a CPU dust cover (UCS-CPU-M7-CVR) to the CPU socket.

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

b) Lower the dust cover and simultaneously press down on the edges until it snaps into place over the CPU socket.

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



Step 4 Detach the heatsink from the CPU carrier by disengaging the CPU clips and using the TIM breaker.

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

This step enables access to the CPU securing clips.

b) Gently rotate up on the outer edge of the CPU carrier (1 in the following illustration) at the edge opposite the TIM breaker.

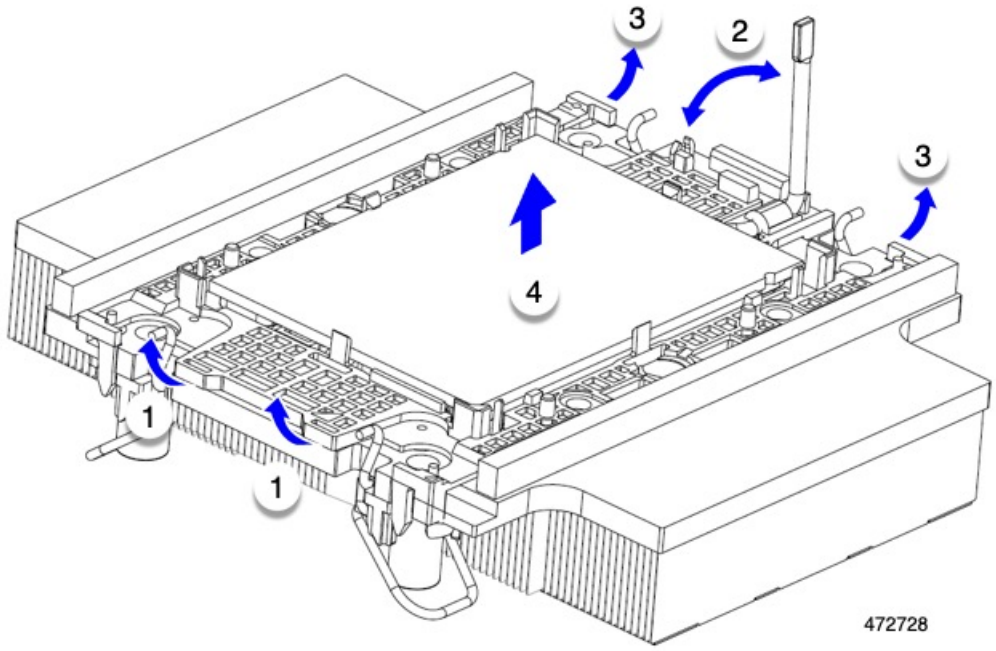
Caution
Be careful when flexing the CPU carrier! If you apply too much force you can damage the CPU carrier. Flex the carrier only enough to release the CPU clips. Make sure to watch the clips while performing this step so that you can see when they disengage from the CPU carrier.

c) Gently lift the TIM breaker (2) in a 90-degree upward arc to partially disengage the CPU clips on this end of the CPU carrier.

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

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

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.

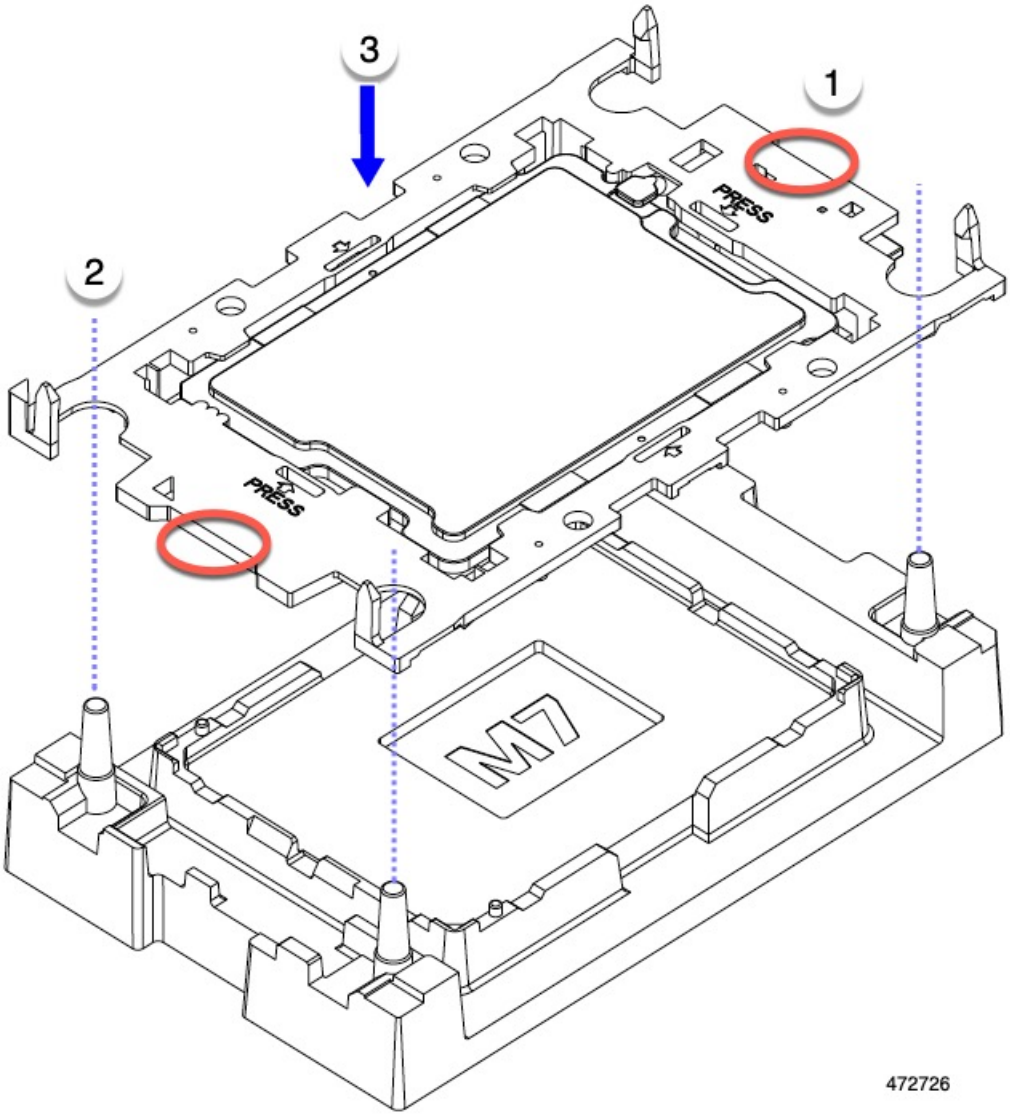
b) Use the provided cleaning kit (UCSX-HSCK) to remove all of the thermal interface barrier (thermal grease) from the CPU, CPU carrier, and heatsink.

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 words PRESS are 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.

Before you begin

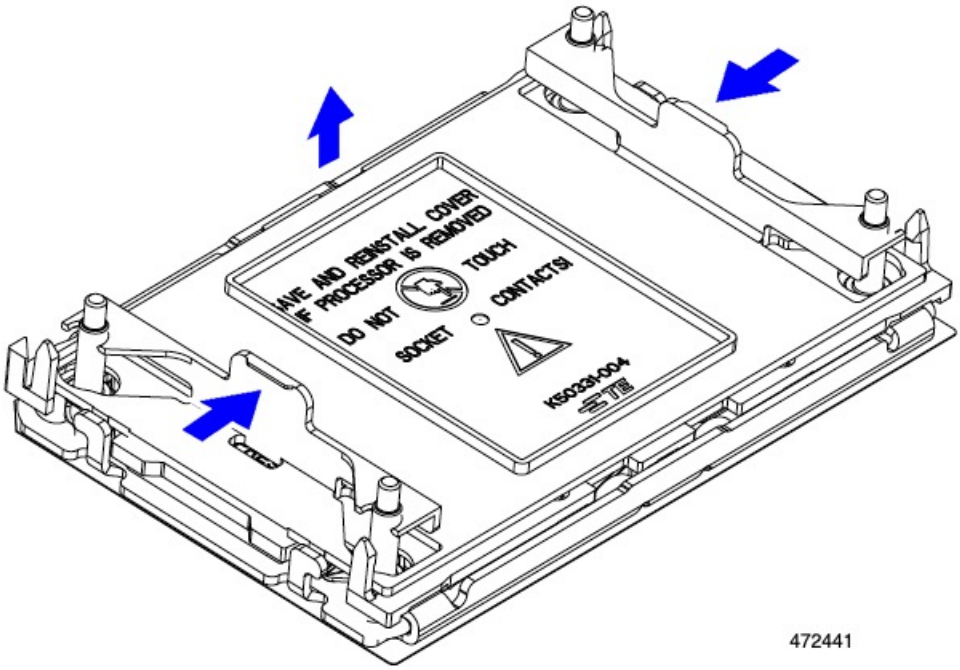
The CPU socket, CPU carrier, and heatsink must be correctly aligned to be installed. For information about the alignment features of these parts, see CPU and Heatsink Alignment Features, on page 57.

Procedure

Step 1 Remove the CPU socket dust cover (UCS-CPU-M7-CVR) on the server motherboard.

a) Push the two vertical tabs inward to disengage the dust cover.

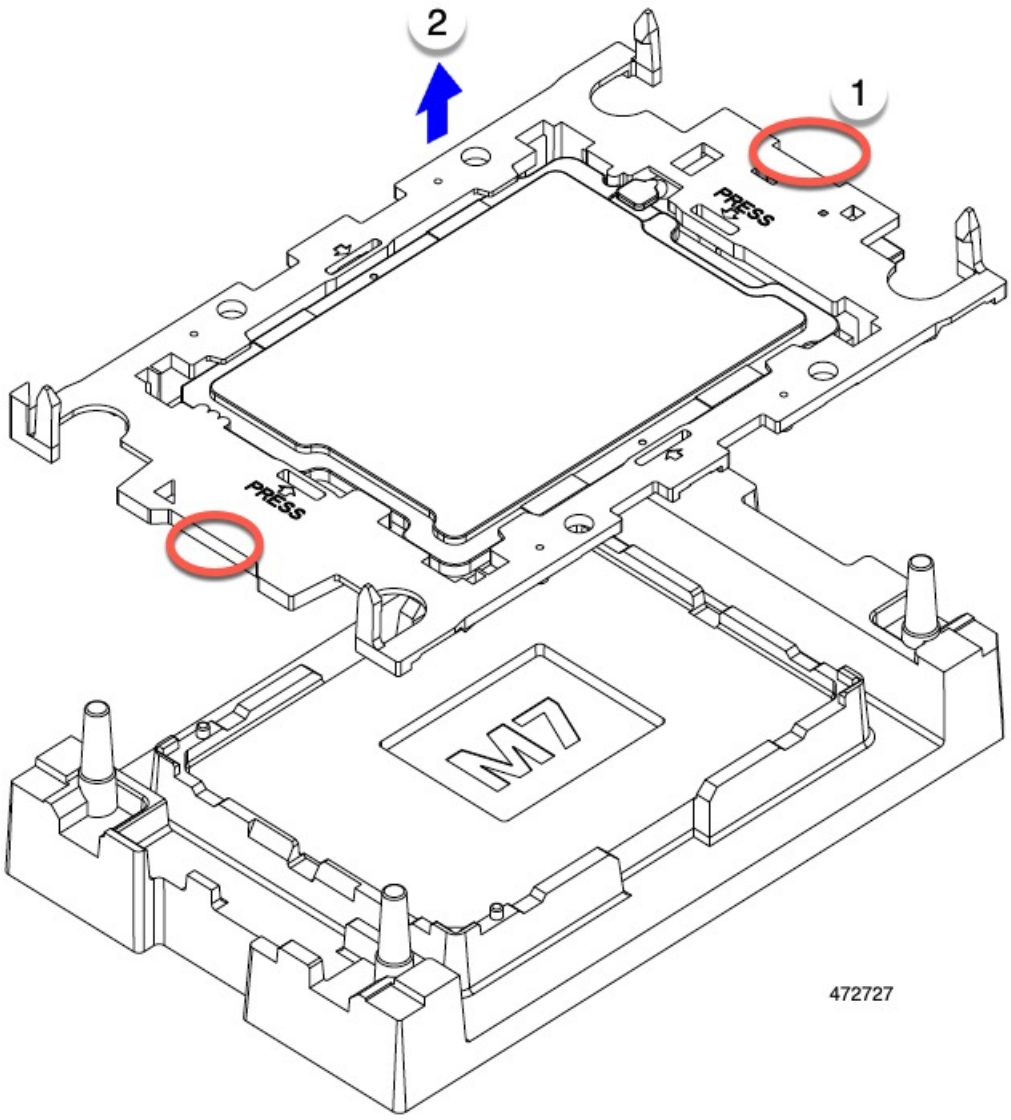
b) While holding the tabs in, lift the dust cover up to remove it.



c) Store the dust cover for future use.

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

Step 2 Grasp the CPU 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.

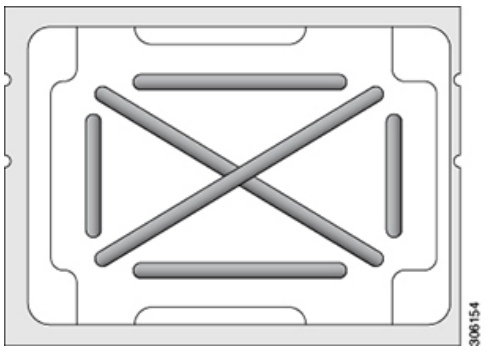
Note
The heatsink must have new TIM on the heatsink-to-CPU surface to ensure proper cooling and performance.

- 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 15: Thermal Interface Material Application Pattern



Caution
Use only the correct heatsink for your CPU. CPU 1 uses heatsink UCSX-C-M7-F and CPU 2 uses heatsink UCSX-C-M7-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.

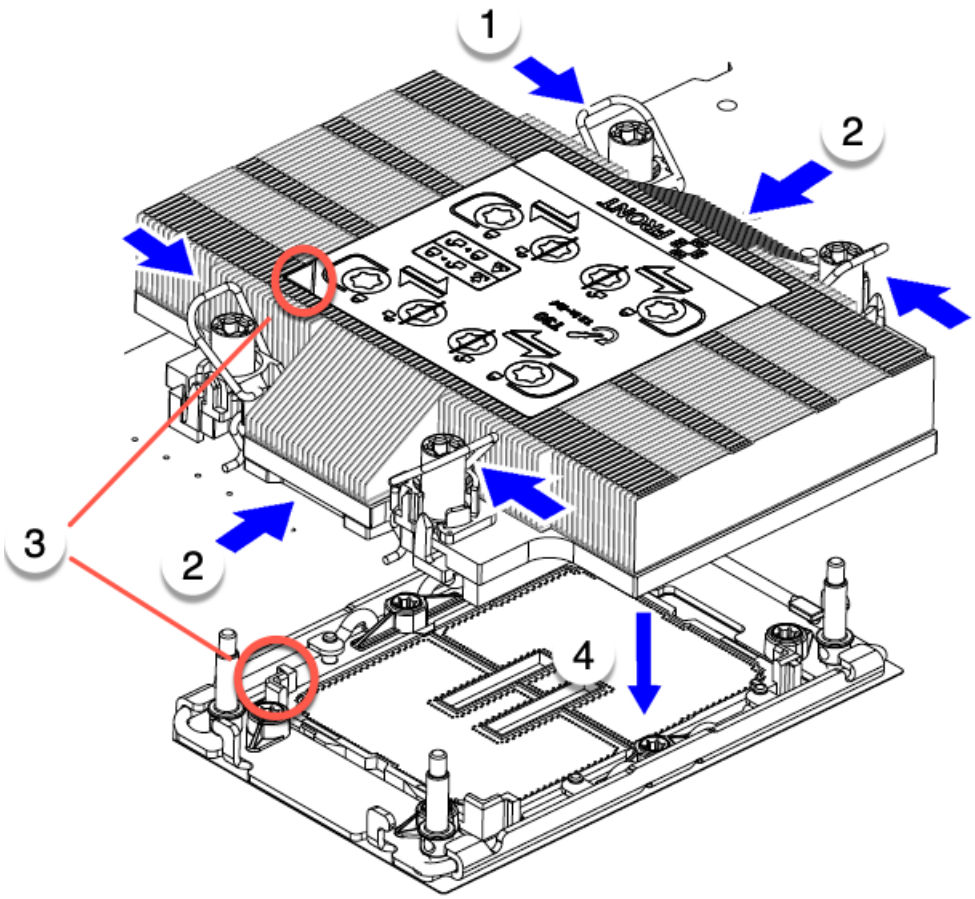
The heatsink is correctly oriented when the embossed triangle points to the CPU pin 1 location.

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.



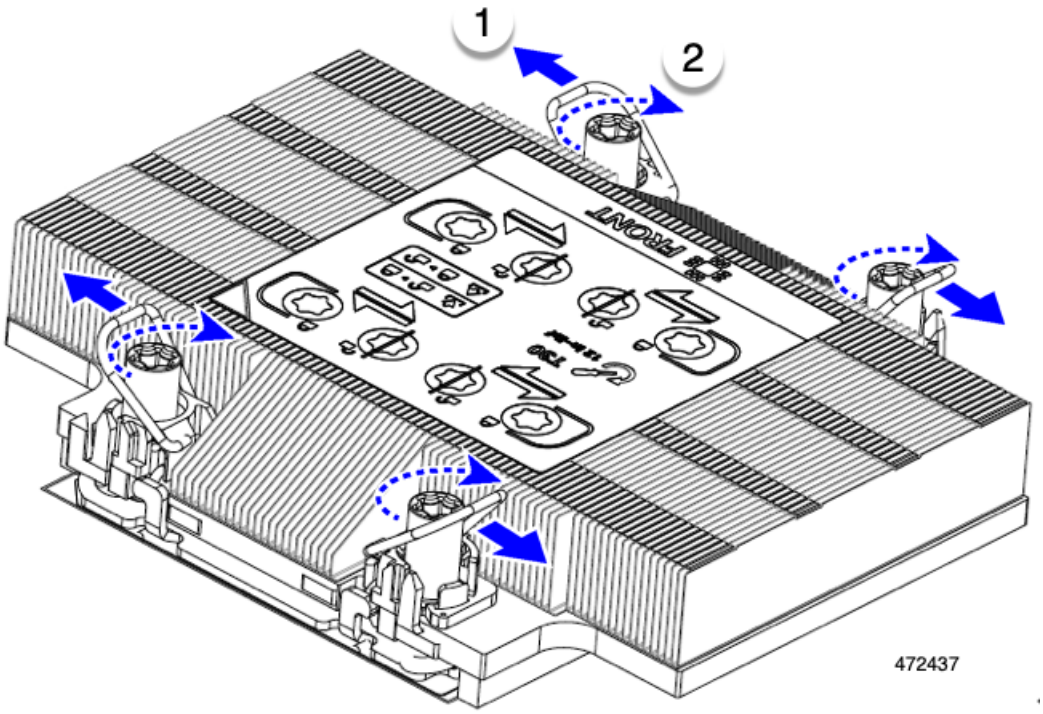
472439

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 M7 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 M7 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:

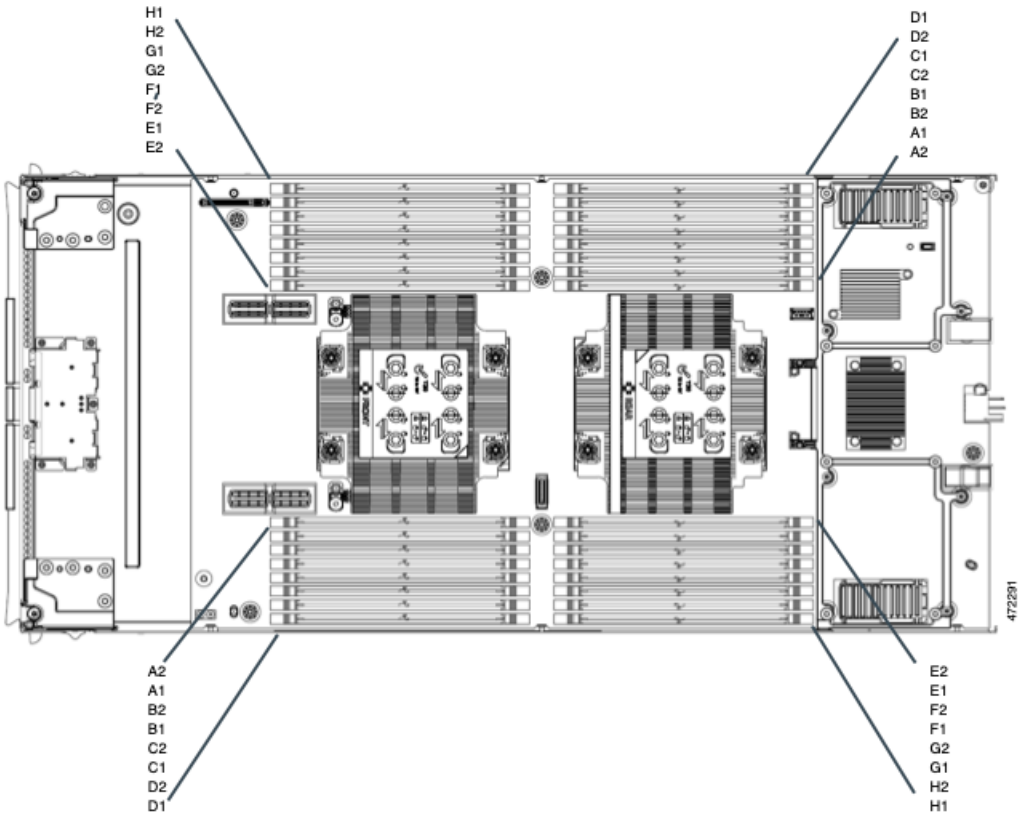
- All DIMM slots on the left, above and below CPU 1 and CPU 3 are connected to CPU 1 and CPU 3, respectively.

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

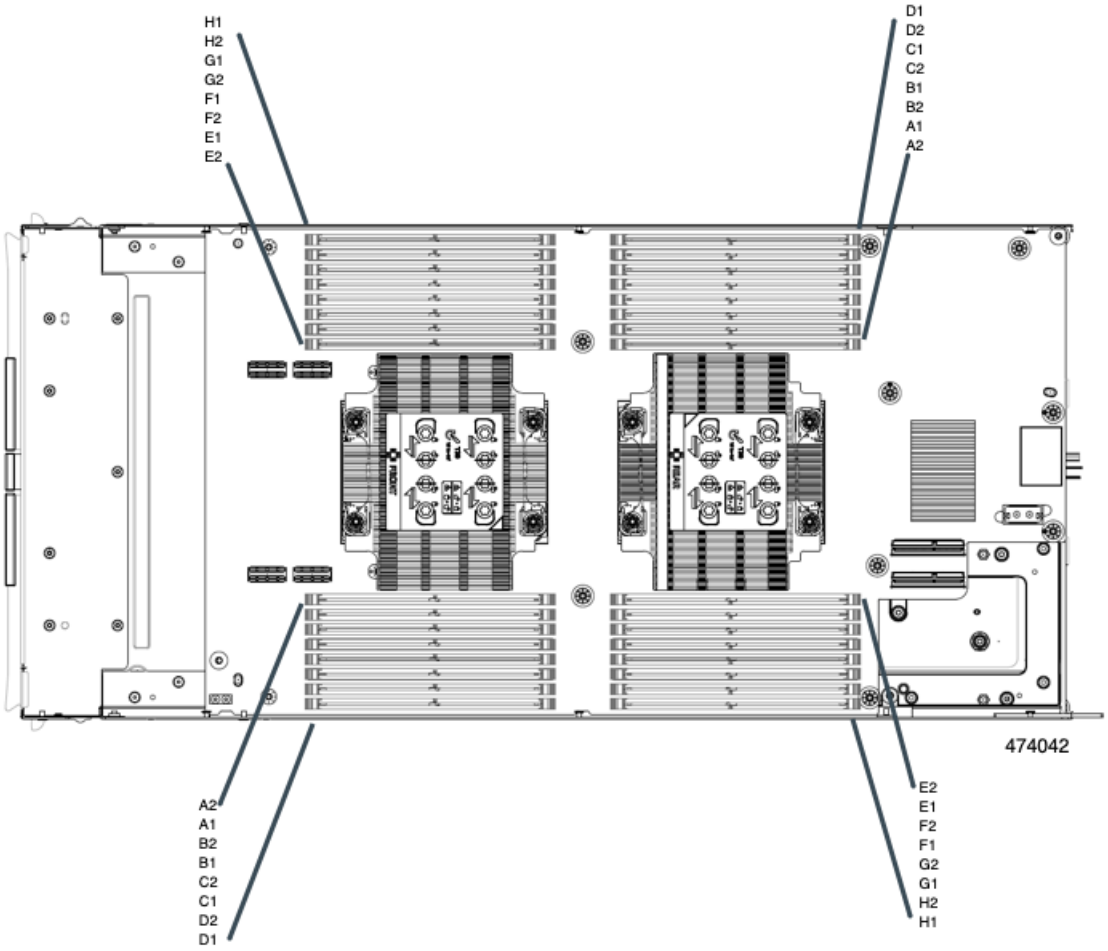
For each CPU, each set of 16 DIMMs is arranged into 8 channels, where each channel has two DIMMs. Each DIMM slot is numbered 1 or 2, and each DIMM slot 1 is blue and each DIMM slot 2 is black. Each channel is identified by two pairs of letters and numbers where the first pair indicates the processor, 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 optimal performance, populate DIMMs in the order shown in the following table, depending on the number of CPUs and the number of DIMMs per CPU.

Be aware of the following DIMM population rules:

- There should be at least one DDR5 DIMM per socket.

  If only one DIMM is populated in a channel, then populate it in the slot furthest away from CPU of that channel

  Always populate DIMMs with a higher electrical loading in DIMM0 followed by DIMM1.

Note The table below lists supported configurations. Other configurations result in reduced performance.

The following table shows the memory population order for DDR5 DIMMs.

Table 5: DIMMs Population Order

					DIMM Placement for Each CPU	
Total Number of DIMMs	**Number of DIMMs (CPU 1)**	**Number of DIMMs (CPU 2)**	**Number of DIMMs (CPU 3)**	**Number of DIMMs (CPU 4)**	**Blue**	**Black**
4	1	1	1	1	A1	
8	2	2	2	2	A1, G1	
16	4	4	4	4	A1, C1, E1, G1	
24	6	6	6	6	A1, C1, D1, E1, F1, G1	
32	8	8	8	8	A1, B1, C1, D1, E1, F1, G1, H1	
48	12	12	12	12	A1, B1, C1, D1, E1, F1, G1, H1	A2, C2, E2, G2
64	16	16	16	16	All A1, B1, C1, D1, E1, F1, G1, H1	All A2, B2, C2, D2, E2, F2, G2, H2

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 DIMM 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.

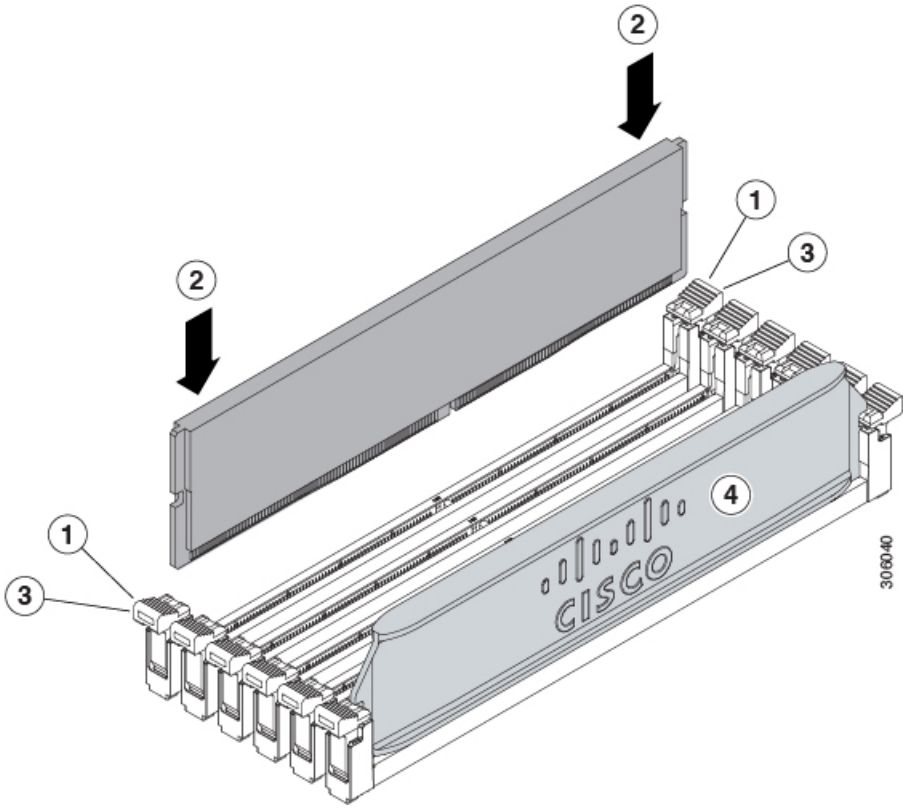
Step 2 Press evenly on both ends of the DIMM until it clicks into place in its slot.

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 16: 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 M7 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 75
- Installing a Bridge Card, on page 76

Removing the Bridge Card

Use the following procedure to remove the bridge card.

Procedure

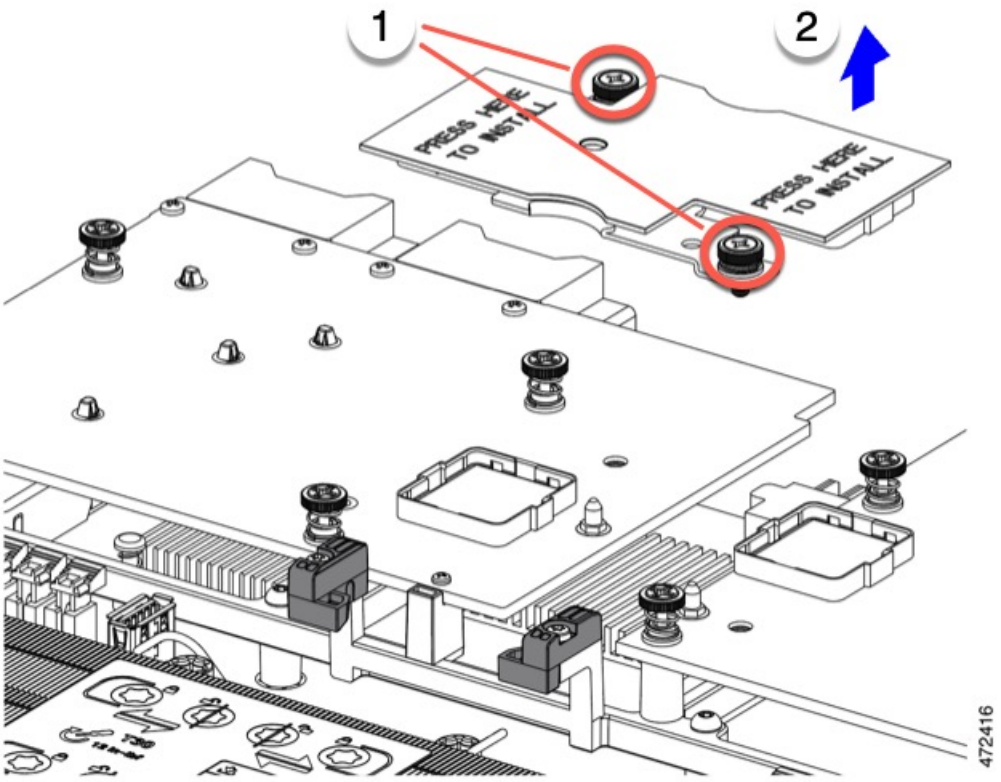
Step 1 Remove the compute node.

a) Shut down and remove power from the compute node.
b) Remove the compute node from the chassis. You might have to detach cables from the rear panel to provide clearance.
c) 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.

a) Using a #2 Phillips screwdriver, loosen the two captive screws.
b) 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 77.
- Perform service on the VIC. See Servicing the VIC, on page 80.
- 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 82

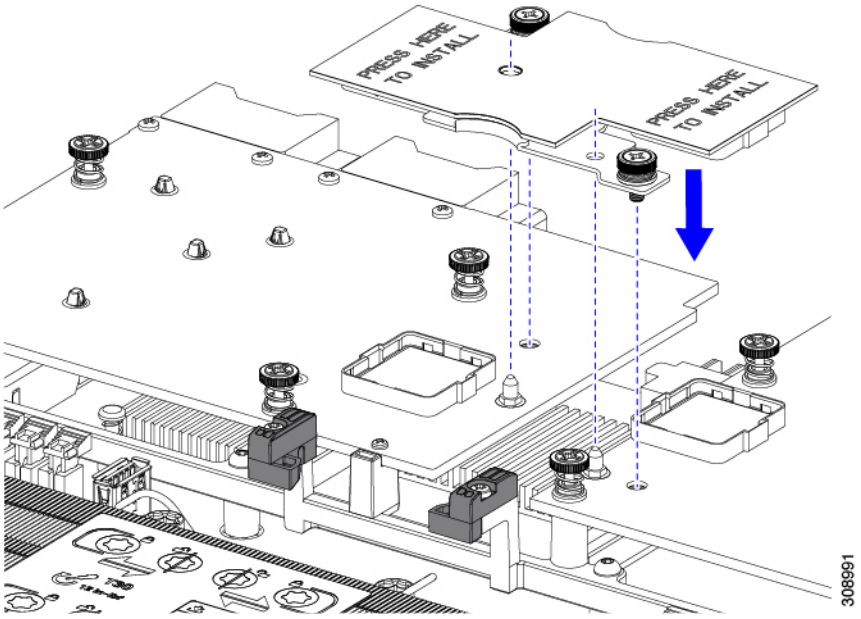
Procedure

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 M7 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 79
- Removing the mLOM, on page 78

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.

a) Shut down and remove power from the compute node.
b) Remove the compute node from the chassis. You might have to detach cables from the rear panel to provide clearance.
c) Remove the top cover from the compute node. See Removing a Compute Node Cover, on page 27.

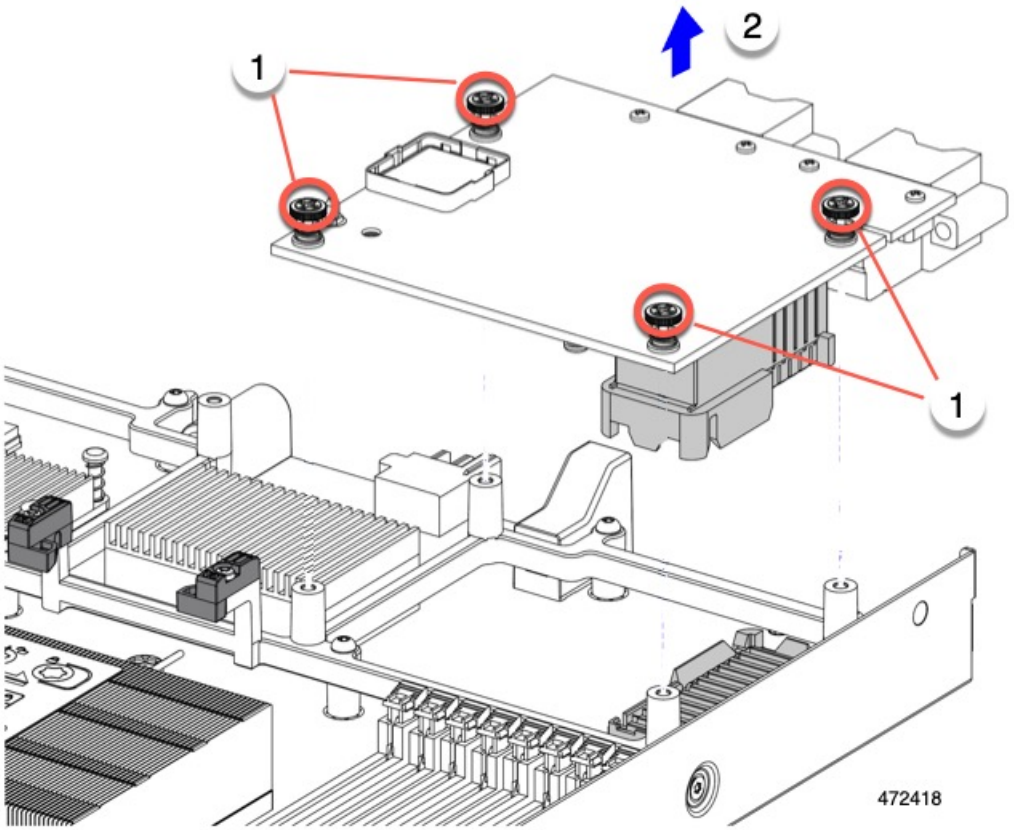
Step 2 If the compute node has a UCS VIC 15000 Series Bridge Card, remove the card.

See Removing the Bridge Card, on page 75.

Step 3 Remove the MLOM.

a) Using a #2 Phillips head screwdriver, loosen the two captive thumbscrews.
b) 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 82.

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.

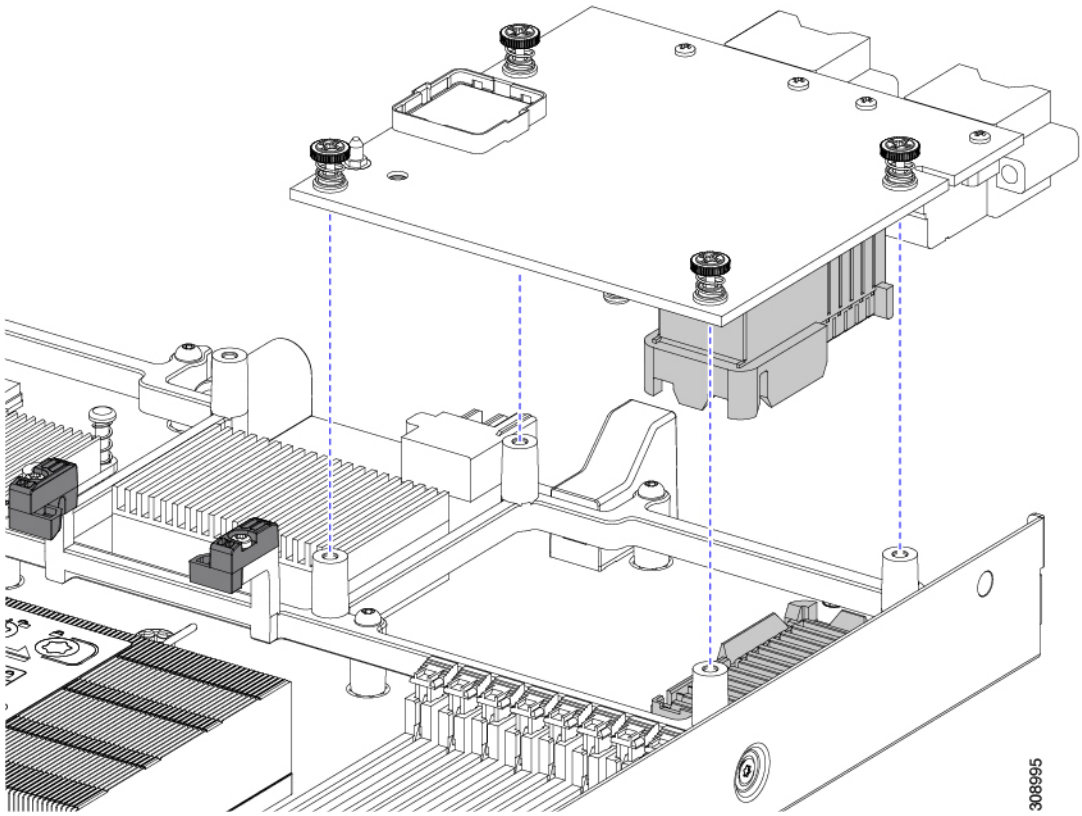
Procedure

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 76.

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 M7 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 6: Supported VICs on Cisco UCS X410c M7

UCSX-ME-V5Q50G-D	Cisco UCS Virtual Interface Card (VIC) 15422, Quad-Port 25G
UCSX-ML-V5Q50G-D	Cisco UCS Virtual Interface Card (VIC) 15420, Quad-Port 25G
UCSX-ML-V5D200G-D	Cisco UCS Virtual Interface Card (VIC) 15231, Dual-Port 100G
UCSX-V4-PCIME	UCS PCI Mezz card for X-Fabric Connectivity

Cisco Virtual Interface Card (VIC) Considerations

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

- 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.

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.

a) Shut down and remove power from the compute node.
b) Remove the compute node from the chassis. You might have to detach cables from the rear panel to provide clearance.
c) Remove the top cover from the compute node. See Removing a Compute Node Cover, on page 27.

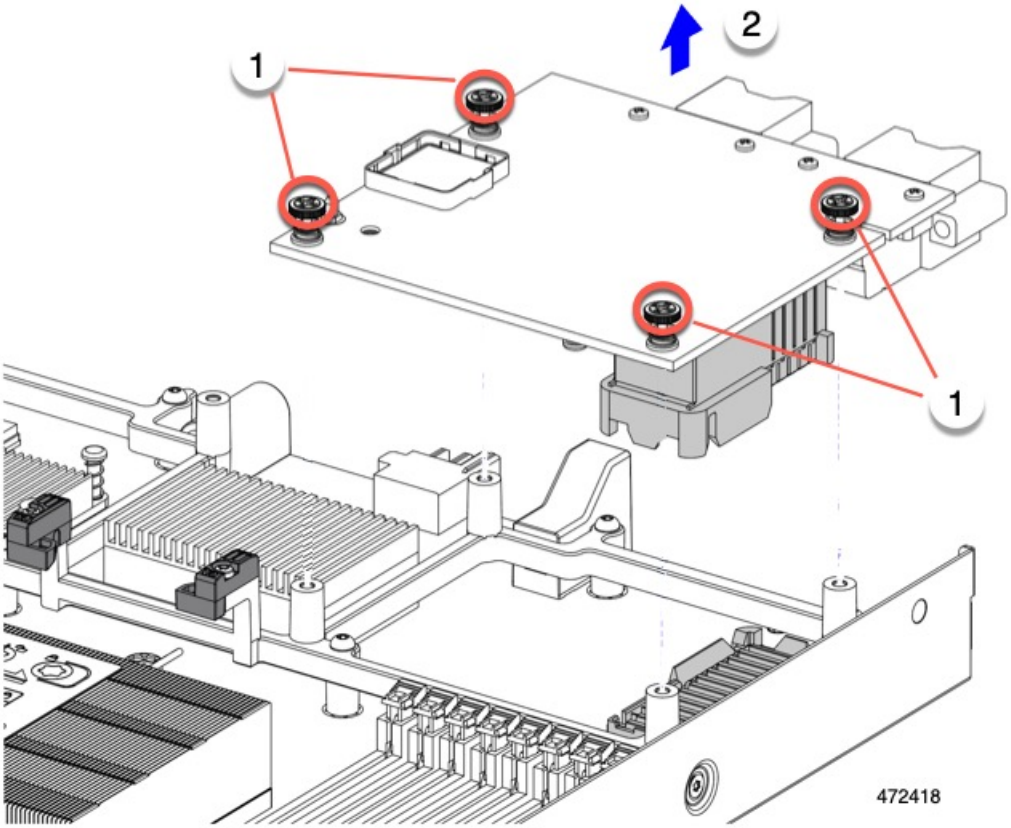
Step 2 If the compute node has a UCS VIC 15000 Series Bridge Card, remove the card.

See Removing the Bridge Card, on page 75.

Step 3 Remove the VIC.

a) Using a #2 Phillips head screwdriver, loosen the captive thumbscrews.
b) 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 82

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 76.

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

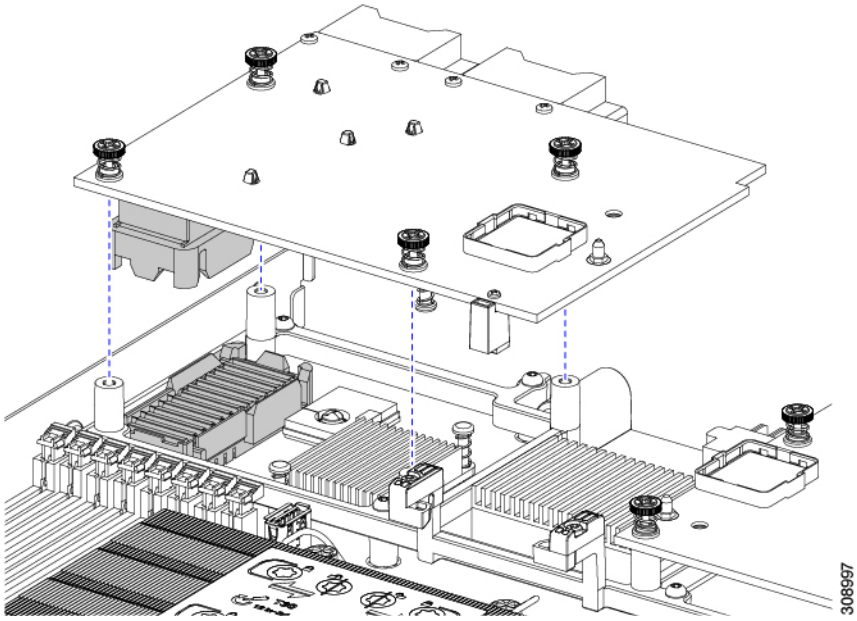
Gather a torque screwdriver.

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 76.
- If not, install the mLOM, which must be installed before the bridge card can be attached. Go to Installing an mLOM Card, on page 79.

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 M7 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 84.

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.

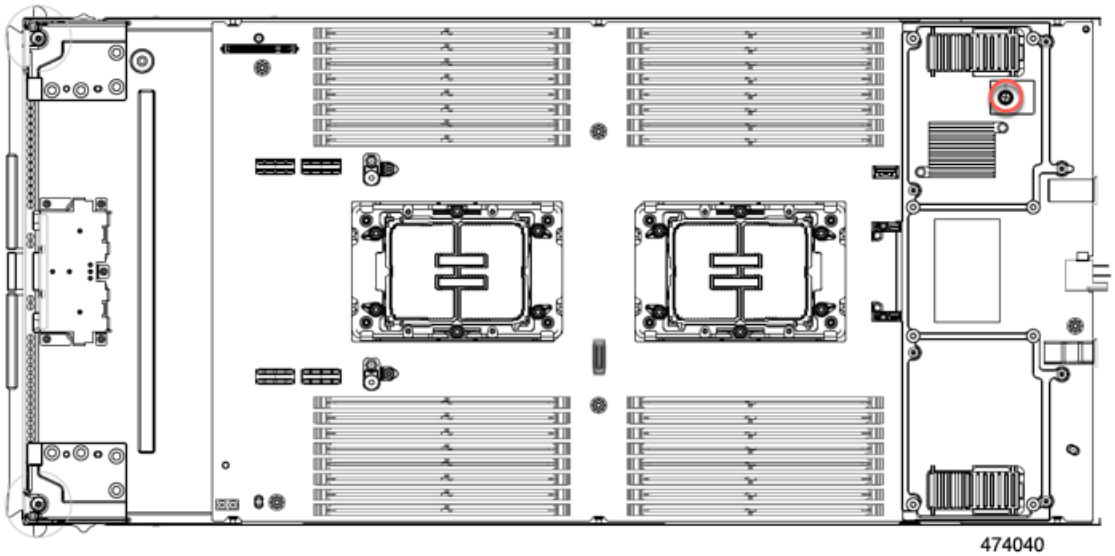
Enabling the Trusted Platform Module

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. 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.

Procedure

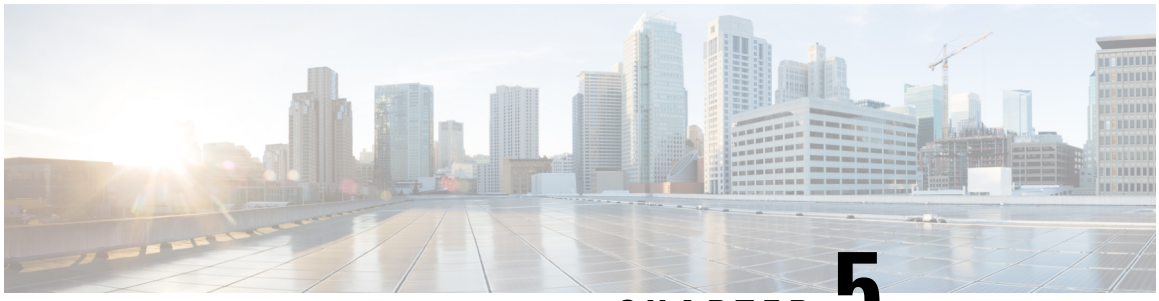
Step 1 Install the TPM hardware.

a) Decommission, power off, and remove the compute node from the chassis.
b) Remove the top cover from the compute node as described in Removing a Compute Node Cover, on page 27
c) 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.
d) Return the compute node to the chassis and allow it to be automatically reacknowledged, reassociated, and recommissioned.
e) 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 5

Recycling Compute Node Components

This chapter contains the following topics:

- Compute Node Recycling Overview, on page 87
- Removing the Trusted Platform Module (TPM), on page 87
- Recycling the Component PCB Assemblies (PCBAs), on page 89

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.

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 87
- Recycling the Primary Motherboard PCBA, on page 95

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.

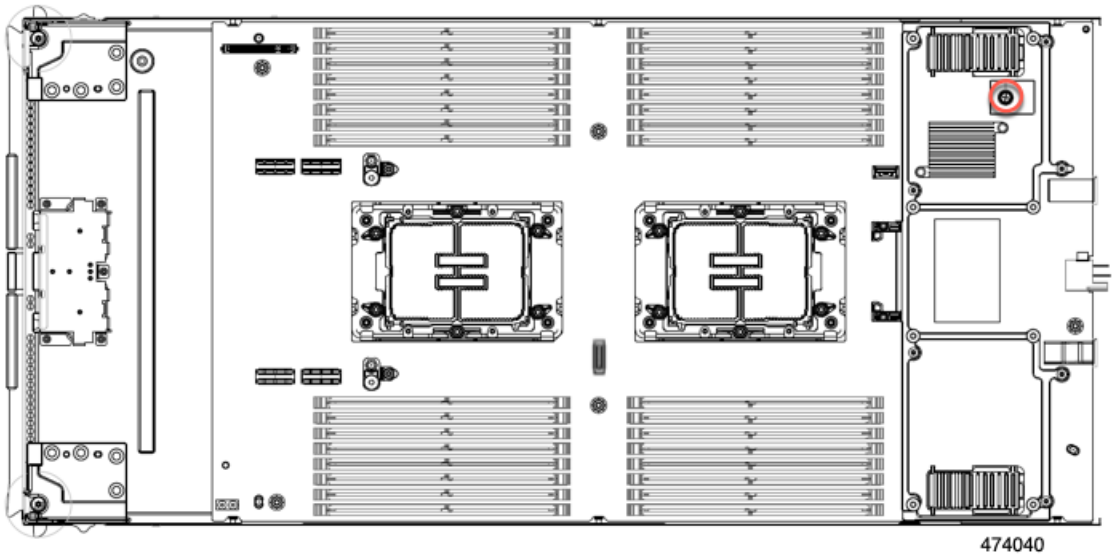
To remove the Trusted Platform Module (TPM), the following requirements must be met for the compute node:

- 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 95.

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 95
- Recycling the Front Mezzanine Module PCBA, on page 99

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 be 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

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.

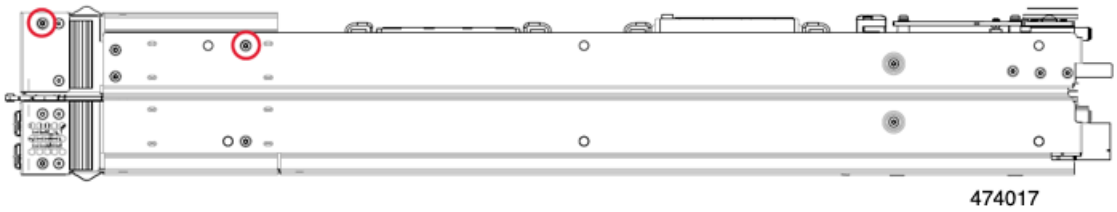
Procedure

Step 1 If you have not already removed the secondary's top cover, remove it now.

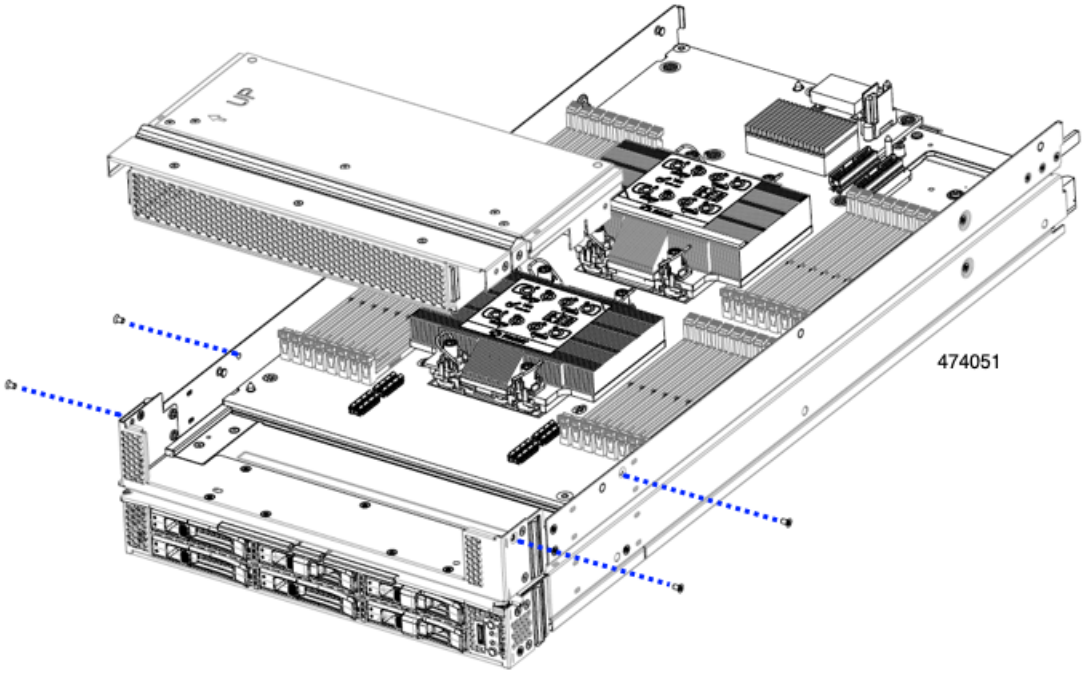
See Removing a Compute Node Cover, on page 27.

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.



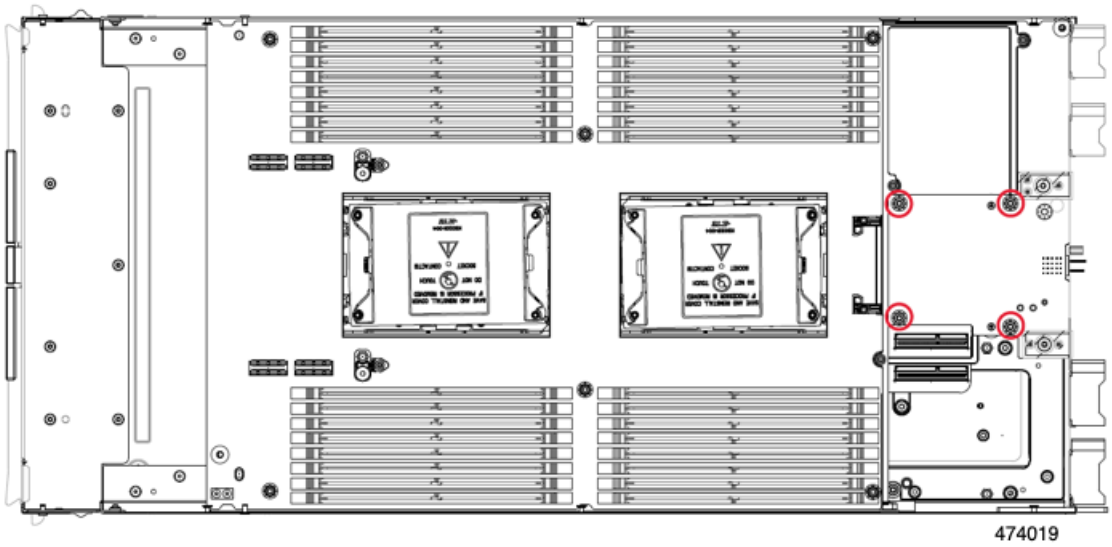
For additional information, see Removing the Front Mezzanine Module, on page 37.

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 59.

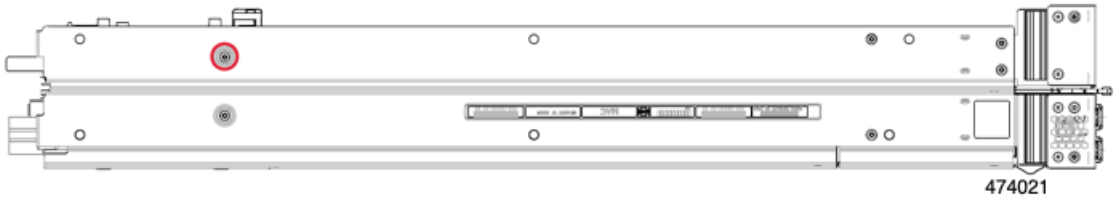
Step 5 Using a T10 screwdriver, remove the screws and power adapter.



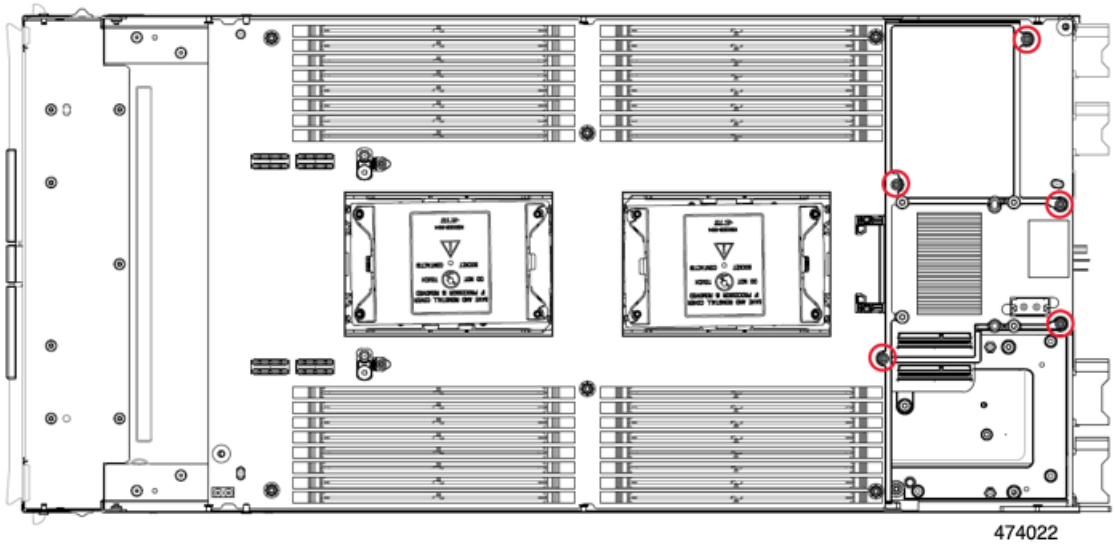
Step 6 Using a T8 screwdriver, remove the screws on the sidewall.

There is one screw per side.

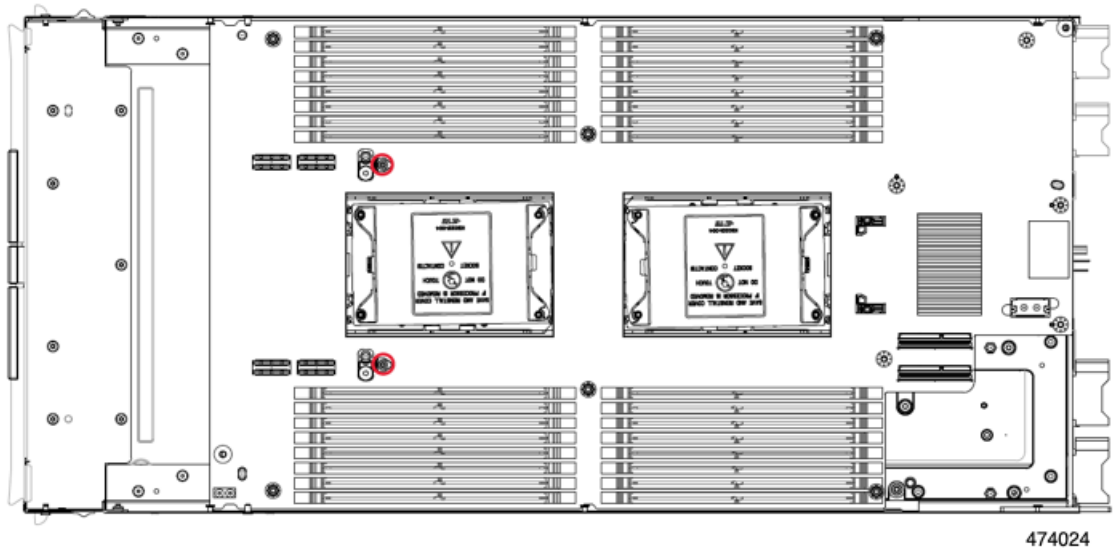




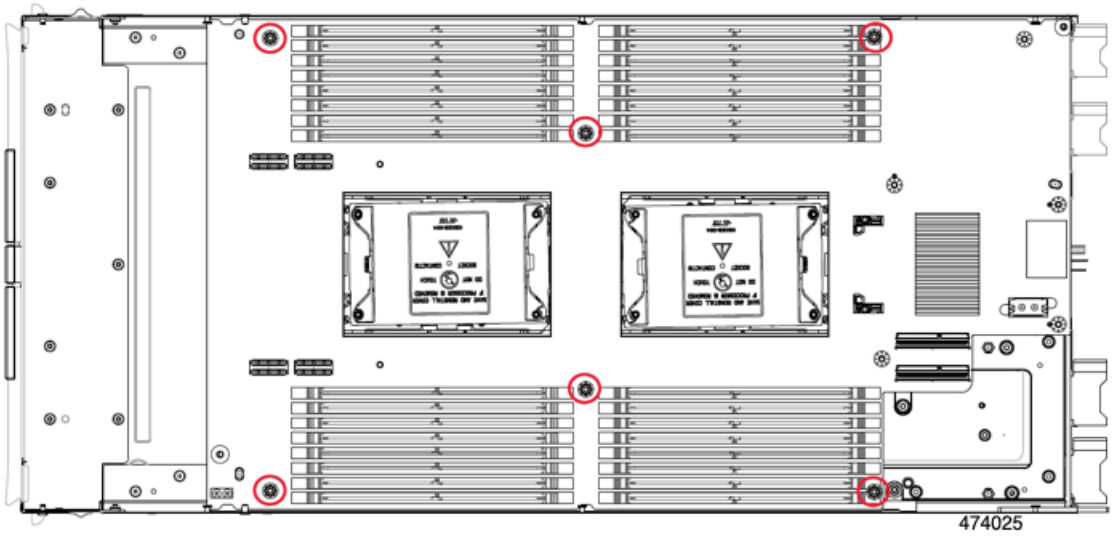
Step 7 Using a T10 screwdriver, remove the Torx nuts from the top of the rear mezzanine frame, then remove the rear mezzanine frame.



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

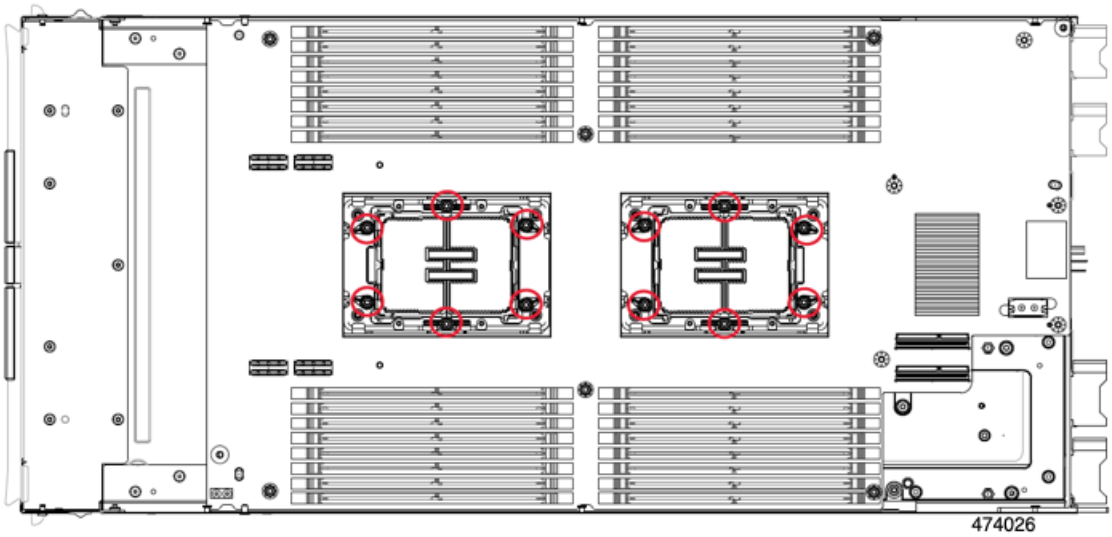


Step 9 Using a T10 screwdriver, remove the Torx screws that secure the secondary PCB to the midframe.



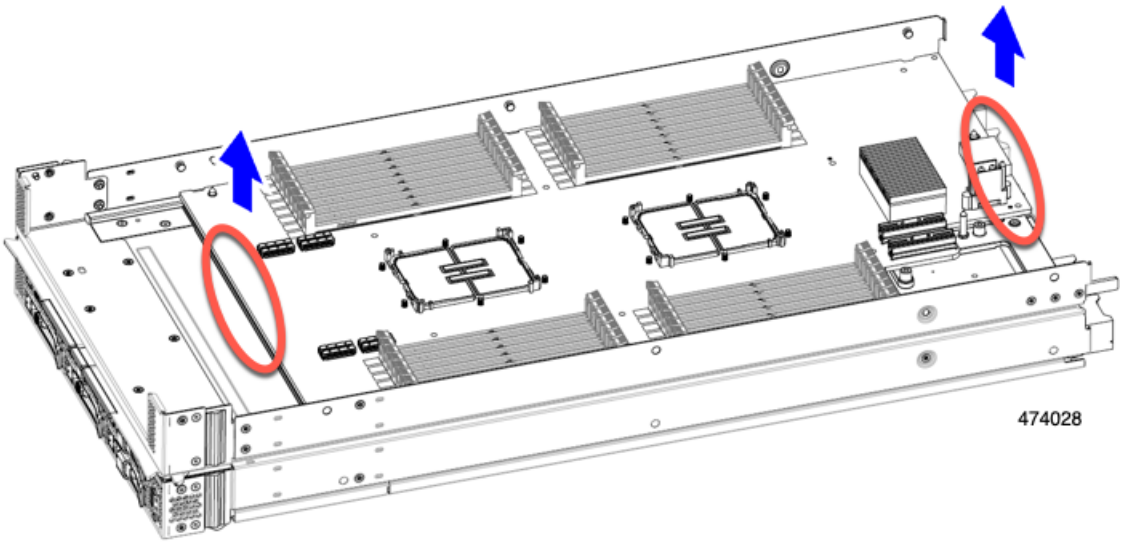
Step 10 Using a T20 screwdriver, loosen the captive Torx nuts that hold each CPU bolster plate, then remove the plates.

There are six nuts for each plate.



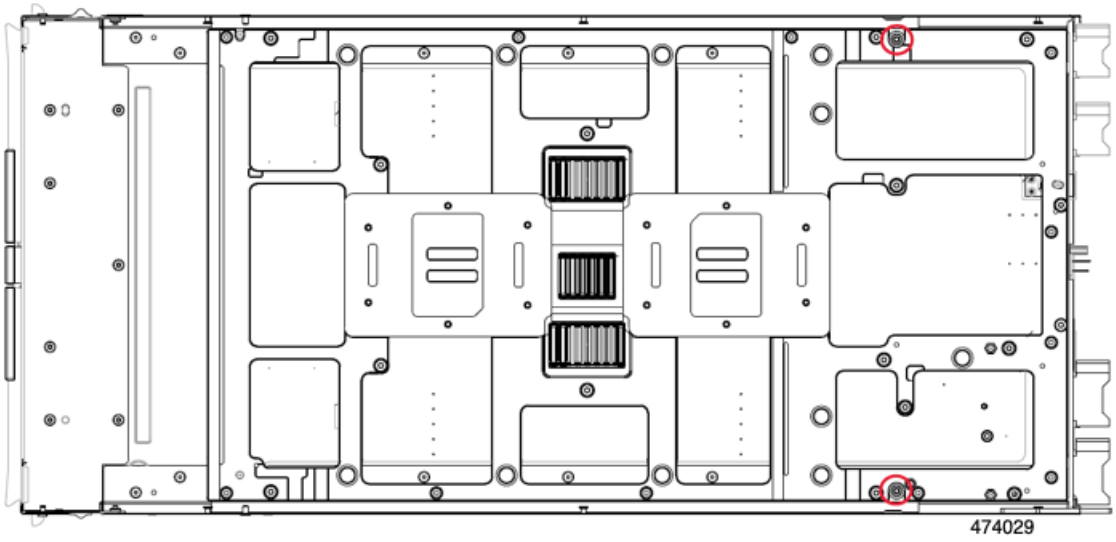
Step 11 Grasp the secondary PCB along the edges and lift it up to disconnect it.

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 95,

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.

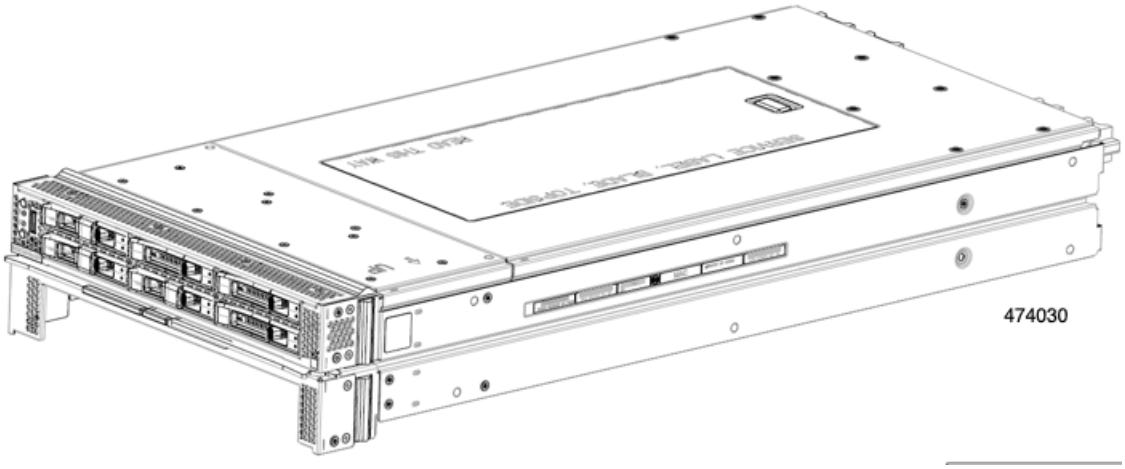
Before you begin

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.

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 89.

Procedure

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 37.

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 42.

c) (Optional) If the bridge card is installed, remove it.

See Removing the Bridge Card, on page 75.

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 78.

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.

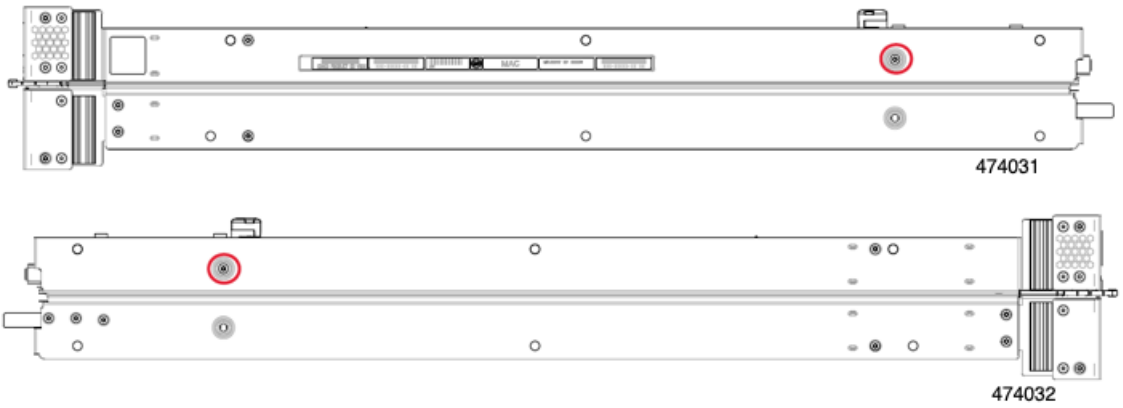
See Removing the CPU and Heatsink, on page 59.

h) Remove the TPM.

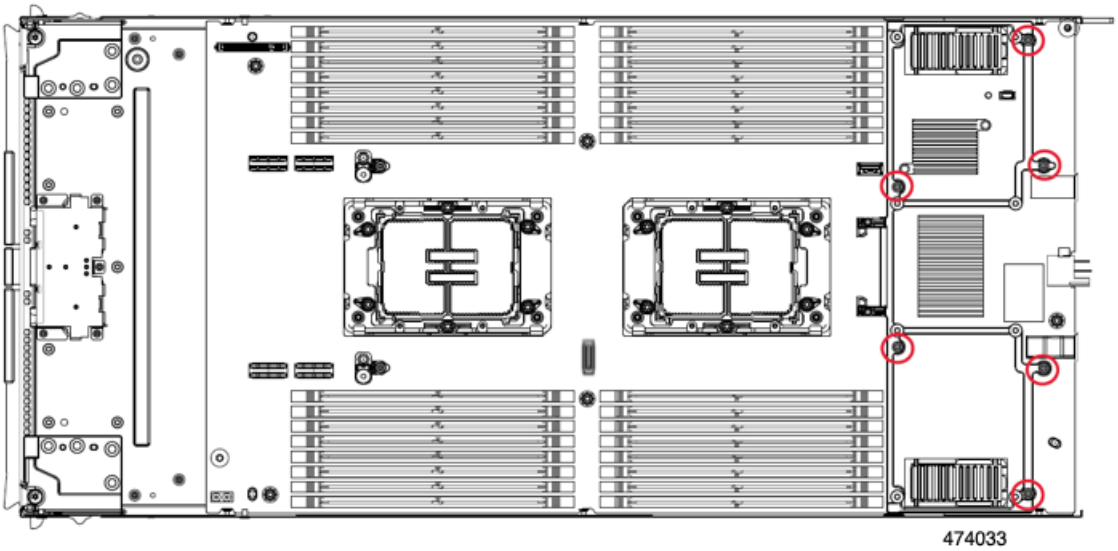
See Removing the Trusted Platform Module (TPM), on page 87.

Step 4 Using a T8 screwdriver, remove the screws on the sidewall.

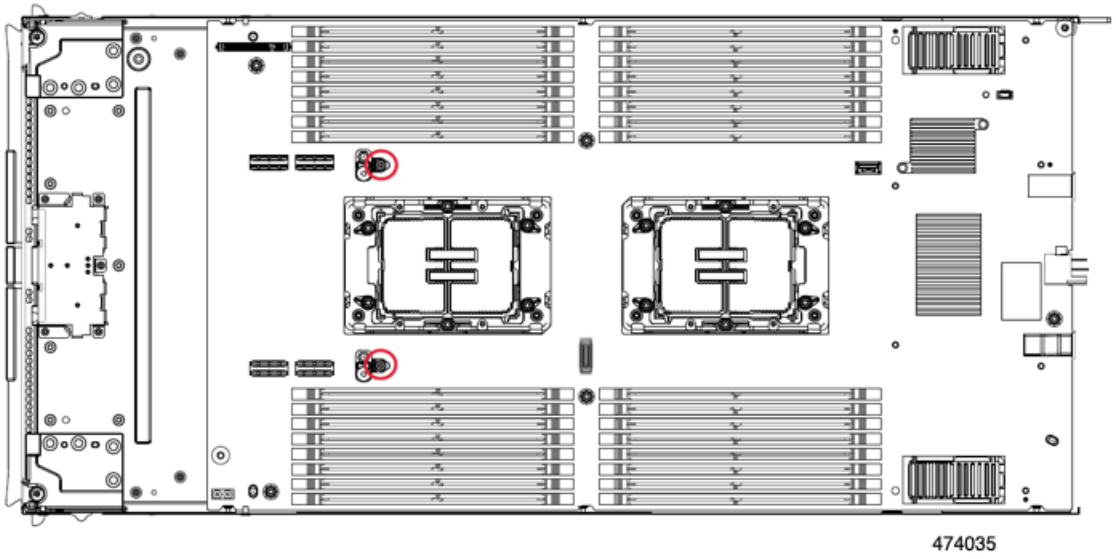
There is one screw per side.



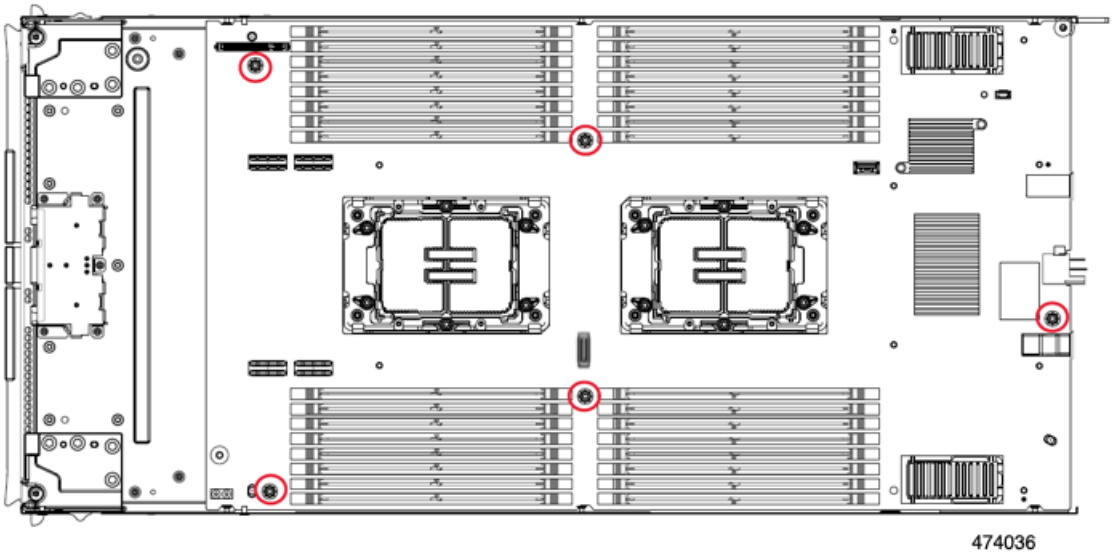
Step 5 Using a T10 screwdriver, remove the Torx nuts from the top of the rear mezzanine frame, then remove the primary's rear mezzanine frame.



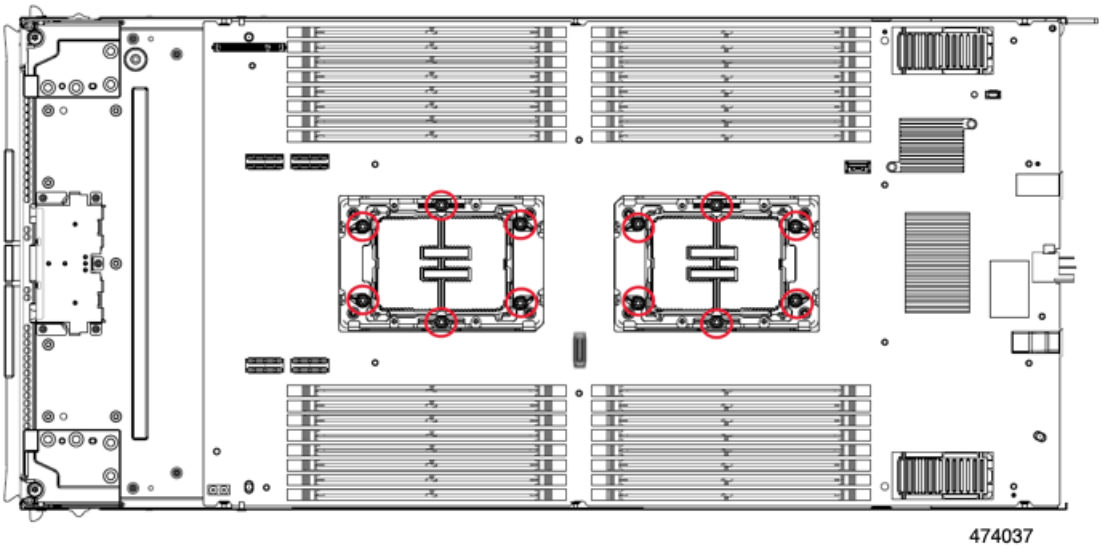
Step 6 Using a T10 screwdriver, remove the two standoffs next to CPU 1, which is nearest to the front of the compute node.



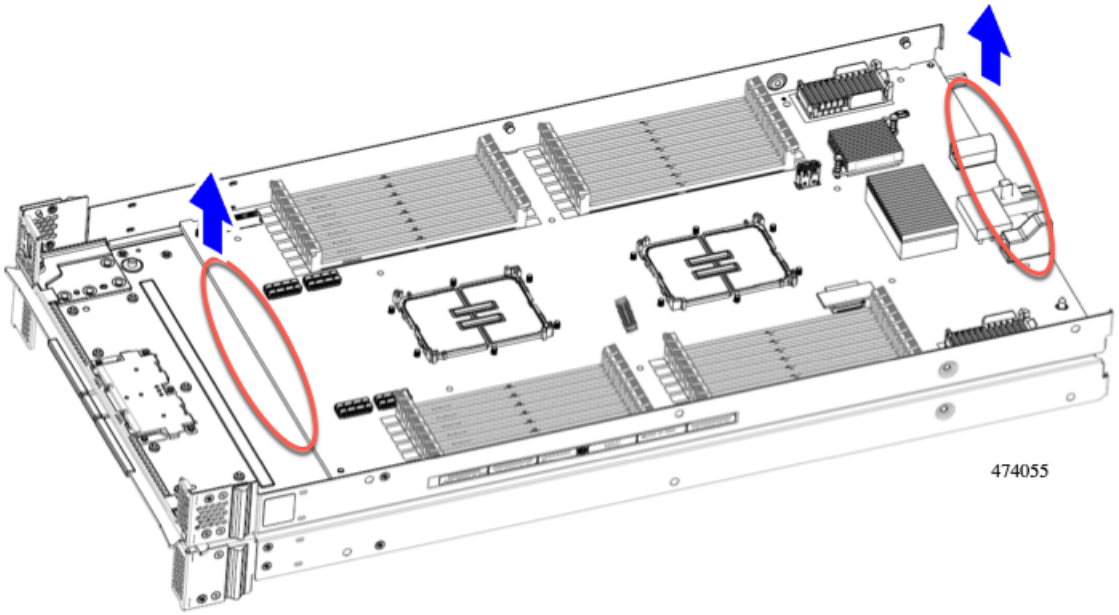
Step 7 Using a T10 screwdriver, remove the Torx screws that secure the primary PCB to the midframe.



Step 8 Using a T20 screwdriver, loosen the captive Torx nuts 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 sheetmetal by four T8 screws.

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

Before you begin

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

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

- The 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

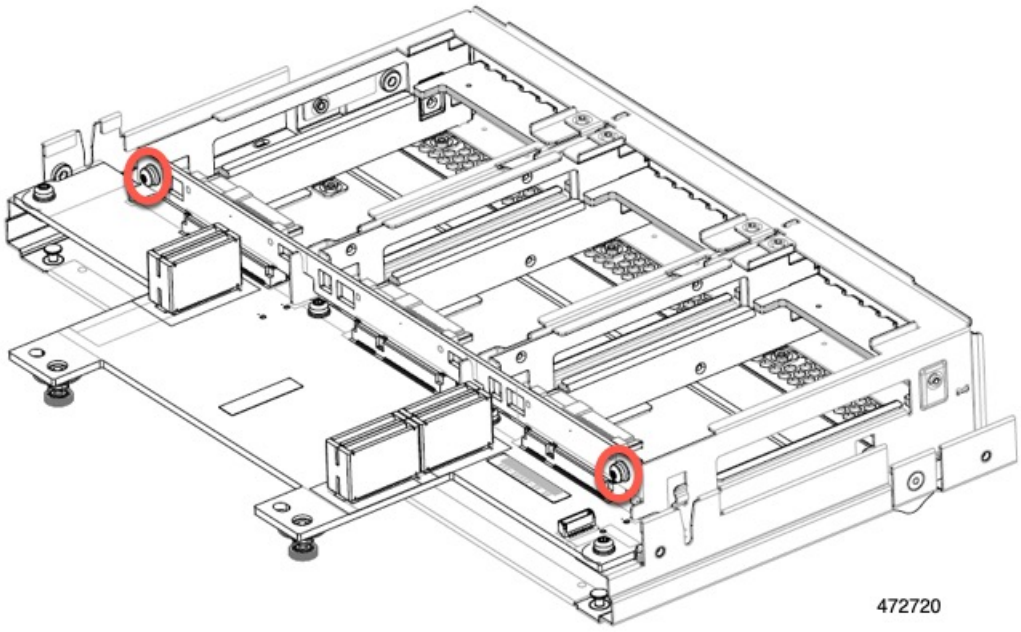
Step 1 Remove the front mezzanine module from the compute node.

a) Go to Removing the Front Mezzanine Module, on page 37.

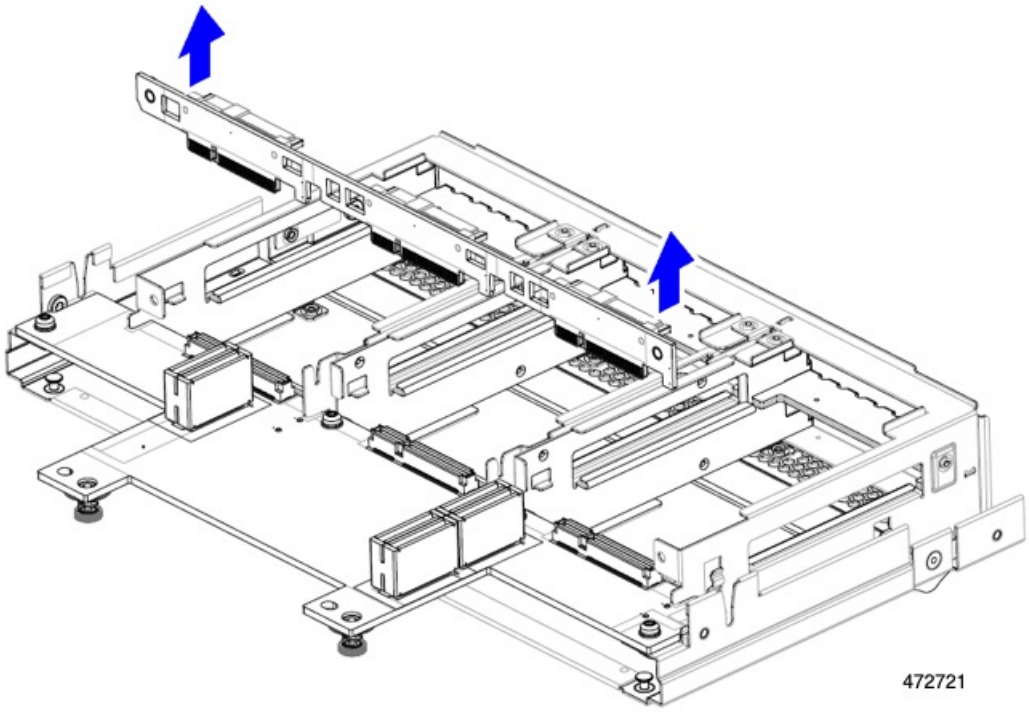
b) Place the front mezzanine module upside down on a rubberized mat or other ESD-safe work surface.

Step 2 Disconnect the drive backplane.

a) Using a #2 Phillips screwdriver, remove the two screws on the drive backplane.

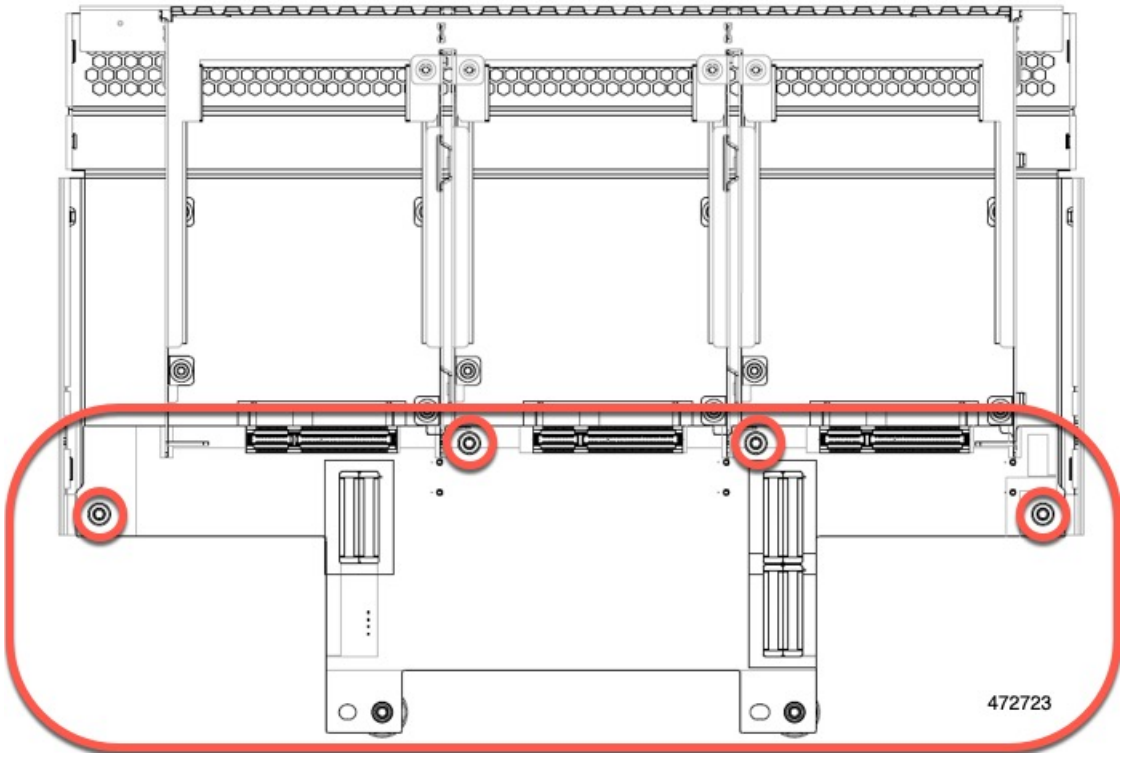


b) Grasp the drive backplane and lift it off of the sheetmetal frame.

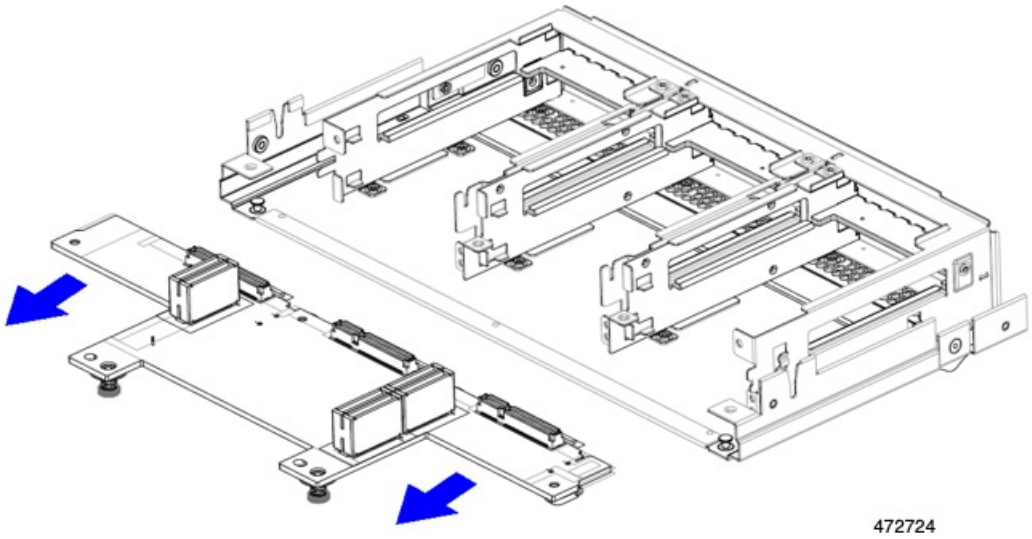


Step 3 Disconnect the PCBA from the sheetmetal frame.

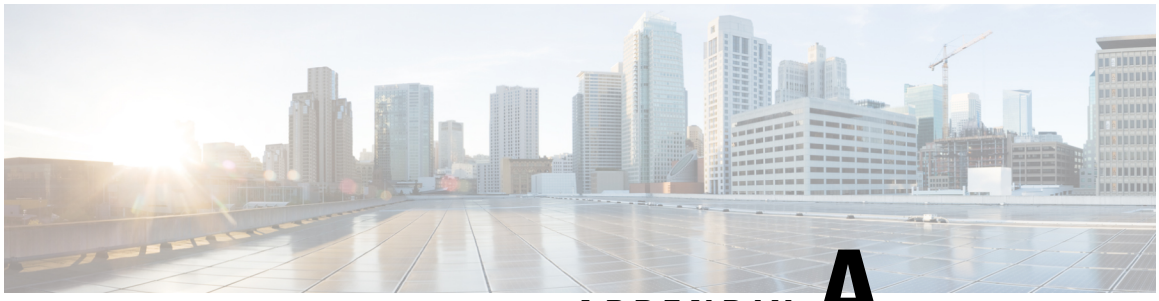
a) Locate the PCBA and use a T8 Torx screwdriver to remove the four screws that secure the PCBA to the sheetmetal frame.



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

Technical Specifications

This chapter contains the following topics:

- Physical Specifications for the UCS X410c M7 Compute Node, on page 103
- Environmental Specifications, on page 103

Physical Specifications for the UCS X410c M7 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. • Minimally configured compute node weight: 25 lb (11.34 kg) • Fully configured compute node weight: 42 lb (19.05 kg)

Environmental Specifications

Specification	Value
Temperature, Operating	50° to 95° F (10° to 35° C) at 0 to10,000 ft altitude
Temperature, Non-Operating	-40° to 149° F (–40° to 65° C)
Humidity, Operating	5% to 90% 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

Specification	Value
Altitude, Non-Operating	40,000 ft (12,000m)



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VIC, removing 81