



Cisco UCS C3X60 M4 Server Node For Cisco UCS S3260 Storage Server Service Note

This document covers server node installation and replacement of internal server node components.

- [Cisco UCS C3X60 M4 Software/Firmware Requirements, page 1](#)
- [Cisco UCS C3X60 M4 Server Node Overview, page 2](#)
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Cisco UCS C3X60 M4 Software/Firmware Requirements

The Cisco UCS S3260 system firmware and software requirements for using the Cisco UCS C3X60 M4 server nodes are listed in [Table 1](#).

Table 1 S3260 System Minimum Levels for C3X60 M4 Server Nodes

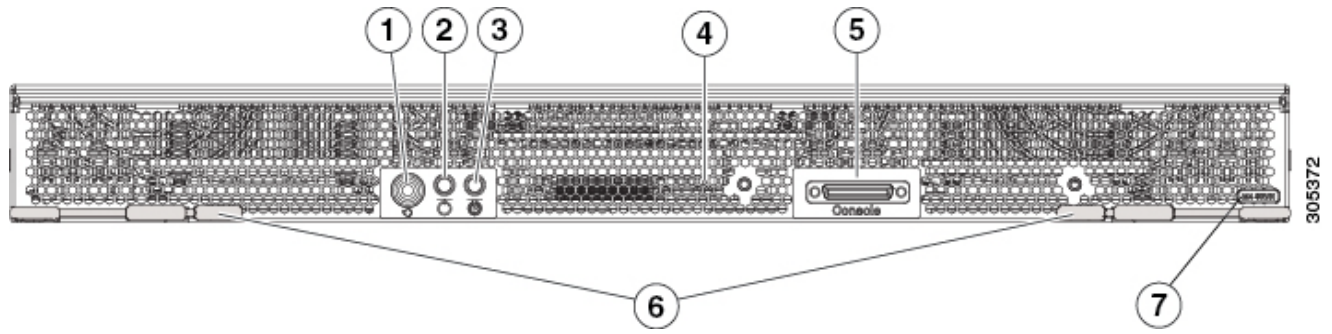
Software or Firmware	Minimum Version
Server Cisco IMC	2.0(13)
Server BIOS	2.0(13)
Cisco UCS Manager (UCSM-managed system only)	3.1(2)

Cisco UCS C3X60 M4 Server Node Overview

- [External Features, page 2](#)
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- [KVM Cable Connector, page 4](#)
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External Features

Figure 1 Cisco UCS C3X60 M4 Server Node Rear-Panel Features



1	Reset button	5	KVM cable connector
2	Server node power button/LED	6	Ejector levers (two)
3	Unit identification button/LED	7	C3X60 M4 server node label (M4 SVRN)
4	Server node health LED (CR22 on server node board, viewable 3 inches inside mesh screen)		

Externally Viewable LEDs

Table 2 Cisco UCS C3X60 M4 Server Node Externally Viewable LEDs

LED	Definition of States
Server node power	<ul style="list-style-type: none"> ■ Off—There is no AC power to the server node. ■ Amber—The server node is in standby power mode. Power is supplied only to the Cisco IMC. ■ Green—The server node is in main power mode. Power is supplied to all server node components.
Unit identification	<ul style="list-style-type: none"> ■ Off—The Identification LED is not in use. ■ Blue, blinking—The Identification LED is activated.
<p>Server node health LED</p> <p>This LED is on the server node board, but is viewable about 3 inches behind the rear-panel mesh screen.</p>	<ul style="list-style-type: none"> ■ Green—The server node is operating normally. ■ Green, blinking—The server is in standby mode or sleep state. ■ Amber—The server node is in a degraded condition. Degraded condition is defined as one or more of the following: <ul style="list-style-type: none"> — Power supply redundancy lost (power supply unplugged or failed) — SIOC redundancy lost — Faulty or mismatched CPUs — DIMM failure — Failed drive in a RAID configuration ■ Amber, blinking—The server node is in a critical condition. Critical condition is defined as the following: <ul style="list-style-type: none"> — Boot failure — Fatal CPU and/or bus errors detected — Fatal uncorrectable memory error detected — Both SIOCs failed — Both drives in a RAID configuration failed — Excessive thermal conditions

KVM Cable Connector

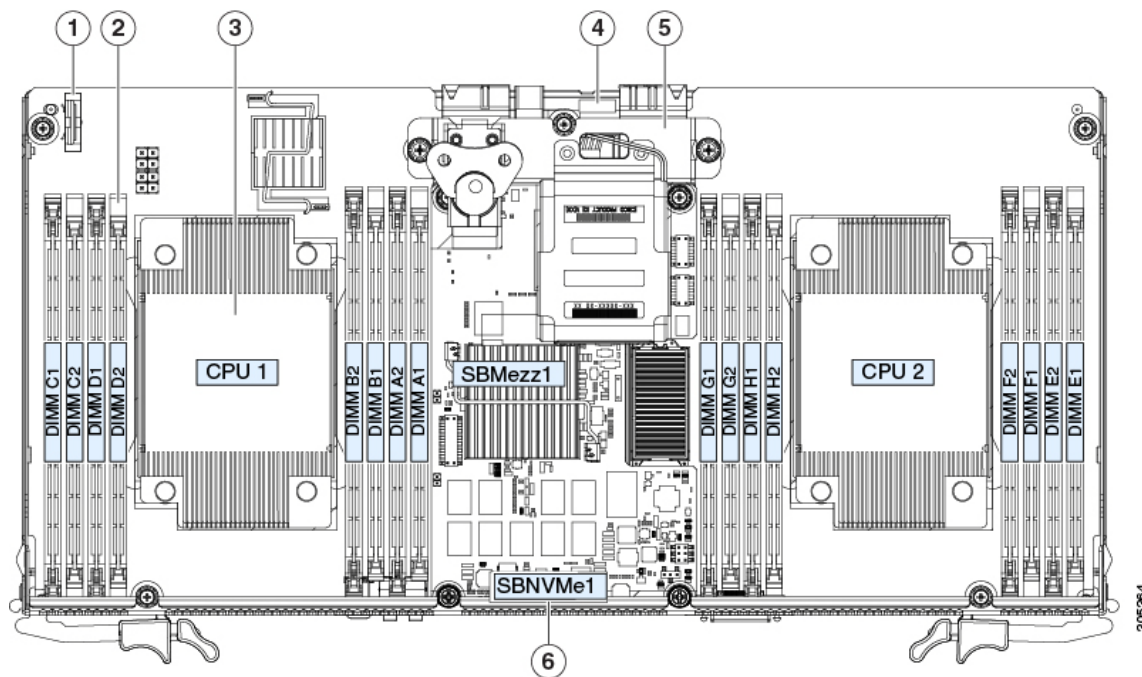
This connector allows you to connect a local keyboard, video, and mouse (KVM) cable if you want to perform setup and management tasks locally rather than remotely.

Buttons

- Reset button—You can hold this button down for 5 seconds and then release it to restart the server node controller chipset if other methods of restarting do not work.
- Server node power button/LED—You can press this button to put the server node in a standby power state or return it to full power instead of shutting down the entire system. See also [Externally Viewable LEDs](#), page 3.
- Unit identification button/LED—This LED can be activated by pressing the button or by activating it from the software interface. This helps to locate a specific server node. See also [Externally Viewable LEDs](#), page 3.

C3X60 M4 Server Node Internal Component Locations

Figure 2 Cisco UCS C3X60 M4 Server Node Internal Components

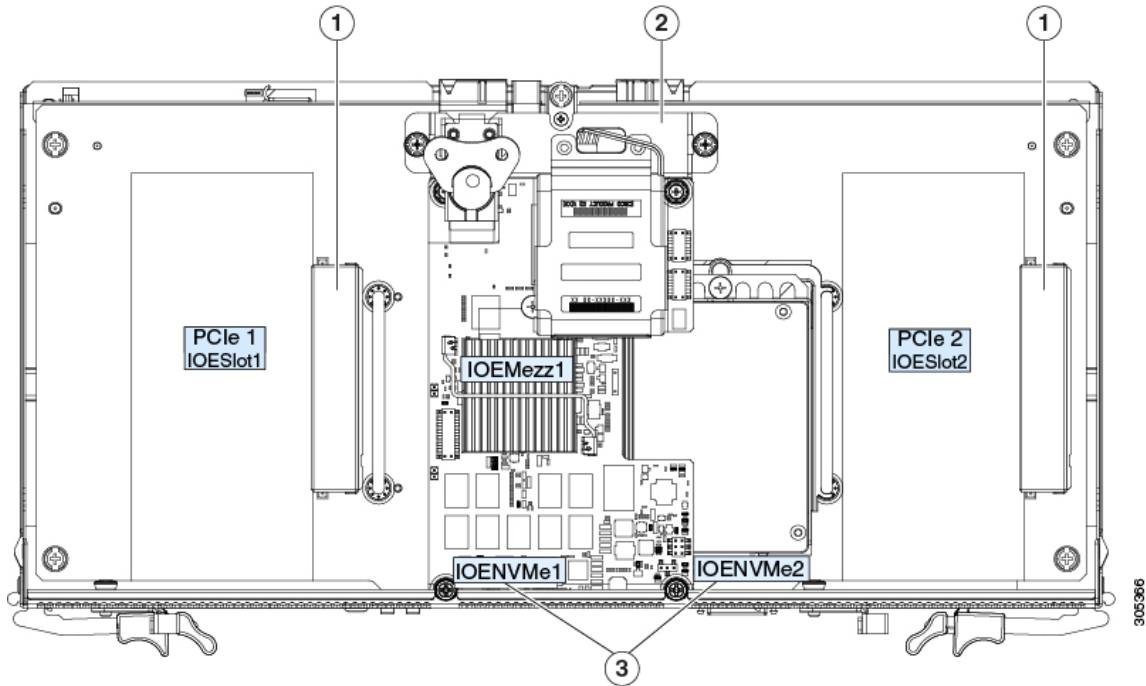


1	RTC battery CR2032 (accessible with the server node cover on)	4	Trusted platform module (TPM) socket on server board
2	DIMM sockets (8 sockets for each CPU, 16 total)	5	Cisco storage controller card with supercap power module attached (software designation SBMezz1)
3	CPUs and heatsinks (two)	6	SSD socket location, on server board under controller card (software designation SBNVMe1) This socket supports one NVMe PCIe SSD.

I/O Expander Internal Component Locations

The C3X60 M4 server node might include an optional I/O expander that attaches to the top of the server node.

Figure 3 I/O Expander Internal Components



1	PCIe card sockets (software designations IOESlot1 and IOESlot2) x8 electrical lane, 16x physical socket	3	NVMe PCIe SSD sockets, two on-board under the RAID controller card (software designations IOENVMe1 and IOENVMe2)
2	Cisco storage controller card with supercap power module attached (software designation IOEMezz1)		

Removing or Installing a C3X60 M4 Server Node

- [Shutting Down a C3X60 M4 Server Node, page 6](#)
- [C3X60 M4 Server Node Population Rules, page 7](#)
- [Replacing a C3X60 M4 Server Node, page 8](#)

Shutting Down a C3X60 M4 Server Node

You can invoke a graceful shutdown or a hard shutdown of a server node by using either the Cisco Integrated Management Controller (Cisco IMC) interface, or the power button that is on the face of the server node.

Shutting Down a Server Node By Using the Cisco IMC GUI

To use the Cisco IMC GUI to shut down the server node, follow these steps:

1. Use a browser and the management IP address of the system to log in to the Cisco IMC GUI.
2. In the **Navigation** pane, click the **Chassis** menu.
3. In the **Chassis** menu, click **Summary**.
4. In the toolbar above the work pane, click the **Host Power** link.

The Server Power Management dialog opens. This dialog lists all servers that are present in the system.

5. In the **Server Power Management** dialog, select one of the following buttons for the server that you want to shut down:

CAUTION: To avoid data loss or damage to your operating system, you should always invoke a graceful shutdown of the operating system. Do not power off a server if any firmware or BIOS updates are in progress.

- **Shut Down**—Performs a graceful shutdown of the operating system.
- **Power Off**—Powers off the chosen server, even if tasks are running on that server.

It is safe to remove the server node from the chassis when the Chassis Status pane shows the Power State as Off for the server node that you are removing.

The physical power button on the server node face also turns amber when it is safe to remove the server node from the chassis.

Shutting Down a Server Node By Using the Power Button on the Server Node

To use the physical server node power button to shut down the server node only, follow these steps:

1. Check the color of the server node power status LED (see [Figure 1](#)):
 - **Green**—The server node is powered on. Go to step 2.
 - **Amber**—the server node is powered off. It is safe to remove the server node from the chassis.
2. Invoke either a graceful shutdown or a hard shutdown:

CAUTION: To avoid data loss or damage to your operating system, you should always invoke a graceful shutdown of the operating system. Do not power off a server if any firmware or BIOS updates are in progress.

- **Graceful shutdown**—Press and release the **Power** button. The software performs a graceful shutdown of the server node.
- **Emergency shutdown**—Press and hold the **Power** button for 4 seconds to force the power off the server node.

When the server node power button turns amber, it is safe to remove the server node from the chassis.

C3X60 M4 Server Node Population Rules

Observe the following rules:

- Do not mix a C3X60 M4 server node and a C3X60 M3 server node in the same Cisco UCS S3260 system. An M4 server node can be identified by the “M4 SVRN” label on the rear panel (see [Figure 1](#)).
- Single-node systems:
 - Cisco IMC releases earlier than 2.0(13): If your S3260 system has only one server node, it must be installed in bay 1.
 - Cisco IMC releases 2.0(13) and later: If your S3260 system has only one server node, it can be installed in either server bay.

NOTE: Whichever bay a server node is installed to, it must have a corresponding SIOC. That is, a server node in bay 1 must be paired with a SIOC in SIOC slot 1; a server node in bay 2 must be paired with a SIOC in SIOC bay 2.

Replacing a C3X60 M4 Server Node

The server node is accessed from the rear of the system, so you do not have to pull the system out from the rack.

CAUTION: Before you replace a server node, export and save the Cisco IMC configuration from the node if you want that same configuration on the new node. You can import the saved configuration to the new replacement node after you install it.

1. Optional—Export the Cisco IMC configuration from the server node that you are replacing so that you can import it to the replacement server node. If you choose to do this, use the procedure in [Exporting Cisco IMC Configuration From a Server Node, page 9](#), then return to the next step.

You do not have to power off the chassis in the next step. Replacement with chassis powered on is supported if you shut down the server node before removal.

2. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
3. Remove the server node from the system:
 - a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 1](#)).
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node straight out from the system.
4. If the server node has an I/O expander attached, use the procedure in [Removing an I/O Expander From a C3X60 M4 Server Node, page 14](#) to remove it and then install it on the new server node before you continue with the next step.

If there is no I/O expander, continue with the next step.

5. Install a new server node:
 - a. With the two ejector levers open, align the new server node with the empty bay. Note these configuration rules:
 - Cisco IMC releases earlier than 2.0(13): If your S3260 system has only one server node, it must be installed in bay 1
 - Cisco IMC releases 2.0(13) and later: If your S3260 system has only one server node, it can be installed in either server bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
6. Power on the server node.
7. Perform initial setup on the new server node to assign an IP address and your other preferred network settings. See Initial System Setup in the [Cisco UCS S3260 Storage Server Installation and Service Guide](#).
8. Optional—Import the Cisco IMC configuration that you saved in step 1. If you choose to do this, use the procedure in [Importing Cisco IMC Configuration to a Server Node, page 9](#).

Exporting Cisco IMC Configuration From a Server Node

This operation can be performed using either the GUI or CLI interface of the Cisco IMC. The example in this procedure uses the CLI commands. For more information see *Exporting a Cisco IMC Configuration* in the CLI and GUI guides here: [Configuration Guides](#).

1. Log in to the IP address and CLI interface of the server node that you are replacing.
2. Enter the following commands as you are prompted:

```
Server# scope cimc
Server /cimc# scope import-export
Server /cimc/import-export# export-config <protocol> <ip-address> <path-and-filename>
```

3. Enter the user name, password, and pass phrase.

This sets the user name password, and pass phrase for the file that you are exporting. The export operation begins after you enter a pass phrase, which can be anything that you choose.

To determine whether the export operation has completed successfully, use the show detail command. To abort the operation, type CTRL+C.

The following is an example of an export operation. In this example, the TFTP protocol is used to export the configuration to IP address 192.0.2.34, in file /ucs/backups/cimc5.xml.

```
Server# scope cimc
Server /cimc # scope import-export
Server /cimc/import-export # export-config tftp 192.0.2.34 /ucs/backups/cimc5.xml
Username:xxxxx
Password:****
Passphrase:***
Export config started. Please check the status using "show detail".
Server /cimc/import-export # show detail
Import Export:
Operation: EXPORT
Status: COMPLETED
Error Code: 100 (No Error)
Diagnostic Message: NONE
```

Importing Cisco IMC Configuration to a Server Node

This operation can be performed using either the GUI or CLI interface of the Cisco IMC. The example in this procedure uses the CLI commands. For more information see *Importing a Cisco IMC Configuration* in the CLI and GUI guides here: [Configuration Guides](#).

1. SSH into the CLI interface of the new server node.
2. Enter the following commands as you are prompted:

```
Server# scope cimc
Server /cimc# scope import-export
Server /cimc/import-export# import-config <protocol> <ip-address> <path-and-filename>
```

3. Enter the user name, password, and pass phrase.

This should be the user name, password, and pass phrase that you used during the export operation. The import operation begins after you enter the pass phrase.

Removing or Installing a C3X60 M4 Server Node

The following is an example of an import operation. In this example, the TFTP protocol is used to import the configuration to the server node from IP address 192.0.2.34, from file /ucs/backups/cimc5.xml.

```
Server# scope cimc
Server /cimc # scope import-export
Server /cimc/import-export # import-config tftp 192.0.2.34 /ucs/backups/cimc5.xml
Username:****
Password:****
Passphrase:***
Export config started. Please check the status using "show detail".
Server /cimc/import-export # show detail
Import Export:
Operation: Import
Status: COMPLETED
Error Code: 100 (No Error)
Diagnostic Message: NONE
```

Replacing C3X60 M4 Server Node and I/O Expander Components

- [Removing a C3X60 M4 Server Node or I/O Expander Top Cover, page 12](#)
- [Removing an I/O Expander From a C3X60 M4 Server Node, page 14](#)
- [C3X60 M4 Internal Diagnostic LEDs, page 19](#)

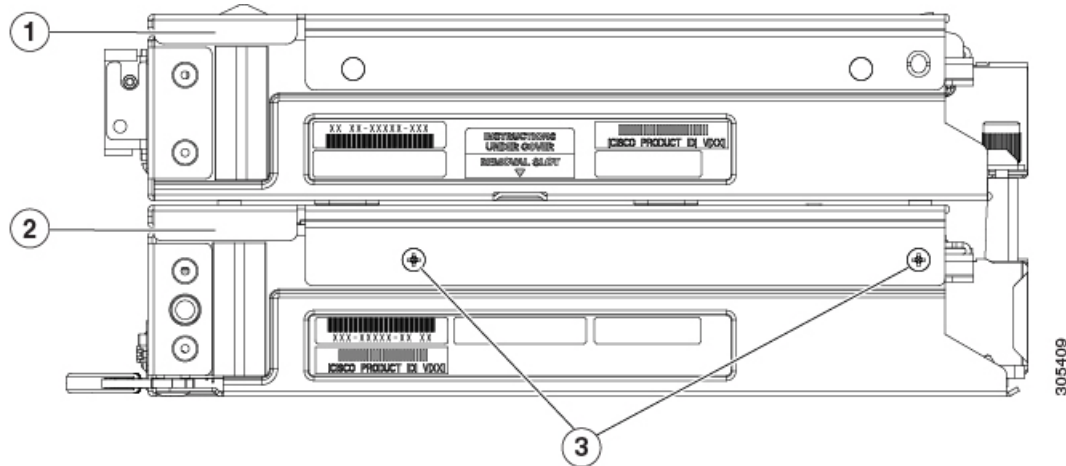
- [Replacing DIMMs Inside the C3X60 M4 Server Node, page 20](#)
- [Replacing CPUs and Heatsinks Inside the C3X60 M4 Server Node, page 23](#)
- [Replacing an RTC Battery Inside the Server Node, page 28](#)
- [Replacing an NVMe SSD Inside the C3X60 M4 Server Node, page 29](#)
- [Installing a Trusted Platform Module \(TPM\) Inside the C3X60 M4 Server Node, page 31](#)
- [Replacing a Storage Controller Card Inside the C3X60 M4 Server Node, page 34](#)
- [Replacing a Supercap \(RAID Backup\) on a RAID Controller, page 37](#)

- [Replacing an I/O Expander, page 39](#)
- [Adding an I/O Expander After-Factory, page 43](#)
- [Replacing a PCIe Card Inside an I/O Expander, page 49](#)
- [Replacing a Storage Controller Card Inside the I/O Expander, page 51](#)
- [Replacing a Supercap \(RAID Backup\) in an I/O Expander, page 52](#)
- [Replacing an NVMe SSD Inside the I/O Expander, page 53](#)

Removing a C3X60 M4 Server Node or I/O Expander Top Cover

The optional I/O expander and the server node use the same top cover. If an I/O expander is attached to the top of the server node, the top cover is on the I/O expander, as shown in the side view in [Figure 4](#). In this case, there is also an intermediate cover between the server node and the I/O expander.

Figure 4 Side View, Server Node With Attached I/O Expander



1	Top cover In this view, the top cover is on the attached I/O expander.	3	Cover securing screws on sides of the intermediate cover (two on each side)
2	Intermediate cover In this view, the intermediate cover is attached to the server node.	-	

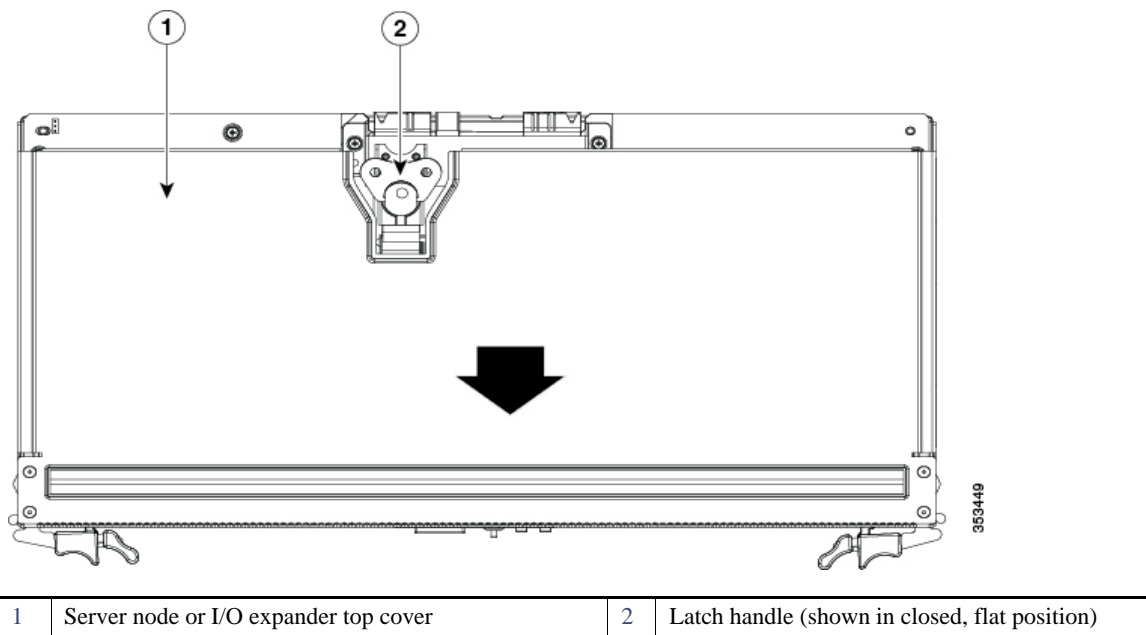
NOTE: You do not have to slide the system out of the rack to remove the server node from the rear of the system.

1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
2. Remove the server node from the system (or server node with attached I/O expander, if present):
 - a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 1](#)).
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node straight out from the system.
3. Remove the top cover from the server node or the I/O expander (if present).
 - a. Lift the latch handle to an upright position (see [Figure 5](#)).
 - b. Turn the latch handle 90 degrees to release the lock.
 - c. Slide the cover toward the rear (toward the rear-panel buttons) and then lift it from the server node or I/O expander (if present).

Replacing C3X60 M4 Server Node and I/O Expander Components

4. Reinstall the top cover:
 - a. Set the cover in place on the server node or I/O expander (if present), offset about one inch toward the rear. Pegs on the inside of the cover must engage the tracks on the server node or I/O expander base.
 - b. Push the cover forward until it stops.
 - c. Turn the latch handle 90 degrees to close the lock.
 - d. Fold the latch handle flat.
5. Reinstall a server node (or server node with attached I/O expander, if present):
 - a. With the two ejector levers open, align the new server node with the empty bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
6. Power on the server node.

Figure 5 Cisco UCS C3X60 M4 Server Node or I/O Expander Top Cover



Removing an I/O Expander From a C3X60 M4 Server Node

This sections in this topic describes how to remove an I/O expander and intermediate cover from a C3X60 M4 server node so that you can access the components inside the server node.

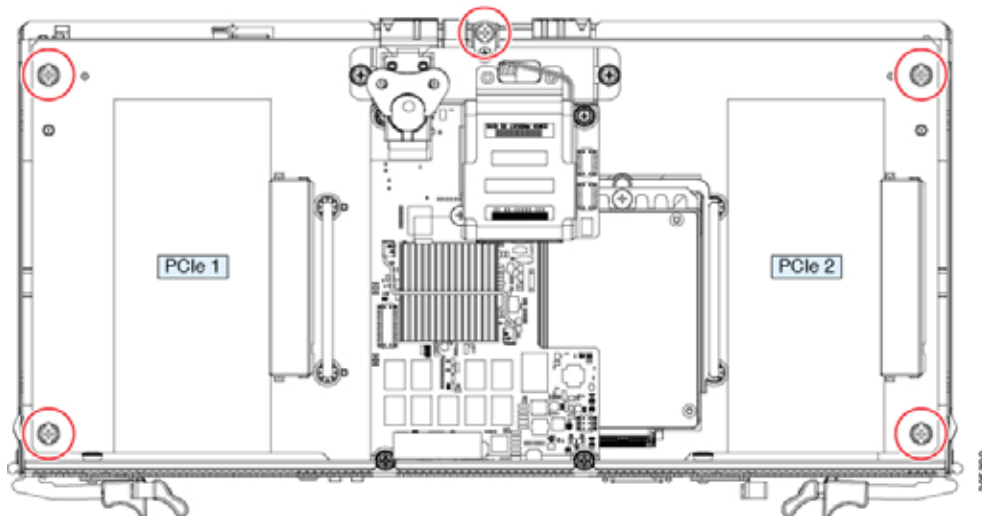
- [Disassembling the Server Node/ I/O Expander Assembly, page 14](#)
- [Reassembling the Server Node/ I/O Expander Assembly, page 16](#)

NOTE: You do not have to power off the chassis in the next step. Replacement with the chassis powered on is supported if you shut down the server node before removal.

Disassembling the Server Node/ I/O Expander Assembly

1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
2. Remove the server node with attached I/O expander from the system:
 - a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 1](#)).
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node with attached I/O expander straight out from the system.
3. Remove the top cover from the I/O expander:
 - a. Lift the latch handle to an upright position (see [Figure 5](#)).
 - b. Turn the latch handle 90 degrees to release the lock.
 - c. Slide the cover toward the rear (toward the rear-panel buttons) and then lift it from the I/O expander.
4. Remove the I/O expander from the server node:
 - a. Remove the five screws that secure the I/O expander to the top of the server node (see [Figure 6](#)).

Figure 6 I/O Expander Securing Screws (Five)



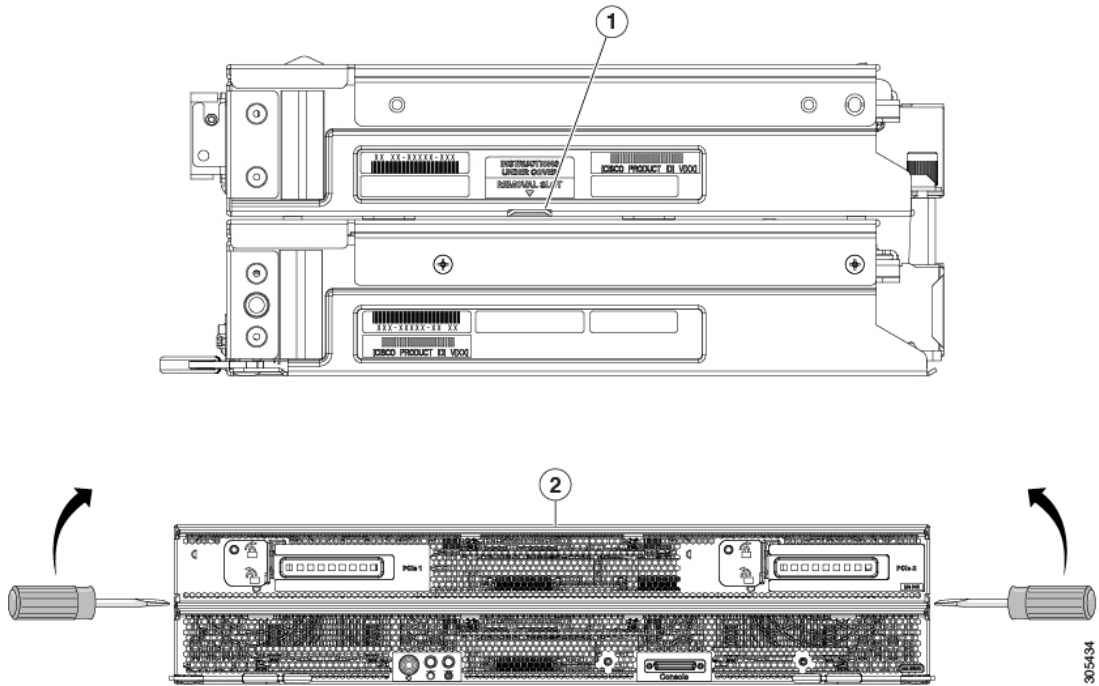
- b. Use two small flat-head screwdrivers (1/4-inch or equivalent) to help separate the connector on the underside of the I/O expander from the socket on the server node board.

Replacing C3X60 M4 Server Node and I/O Expander Components

Insert a screwdriver about 1/2-inch into the “REMOVAL SLOT” that is marked with an arrow on each side of the I/O expander (see [Figure 7](#)). Then *lift up* evenly on both screwdrivers at the same time to separate the connectors and lift the I/O expander about 1/2-inch.

- c. Grasp the two handles on the I/O expander board and lift it straight up.

Figure 7 Separating the I/O Expander From the C3X60 M4 Server Node



1	Side view showing removal slot for screwdriver insertion (one each side of I/O expander)	2	Rear view of server node with I/O expander
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5. Remove the intermediate cover from the server node:

- a. Remove the four screws that secure the intermediate cover and set them aside. There are two screws on each side of the intermediate cover (see [Figure 4](#)).
- b. Slide the intermediate cover toward the rear (toward the rear-panel buttons) and then lift it from the server node.

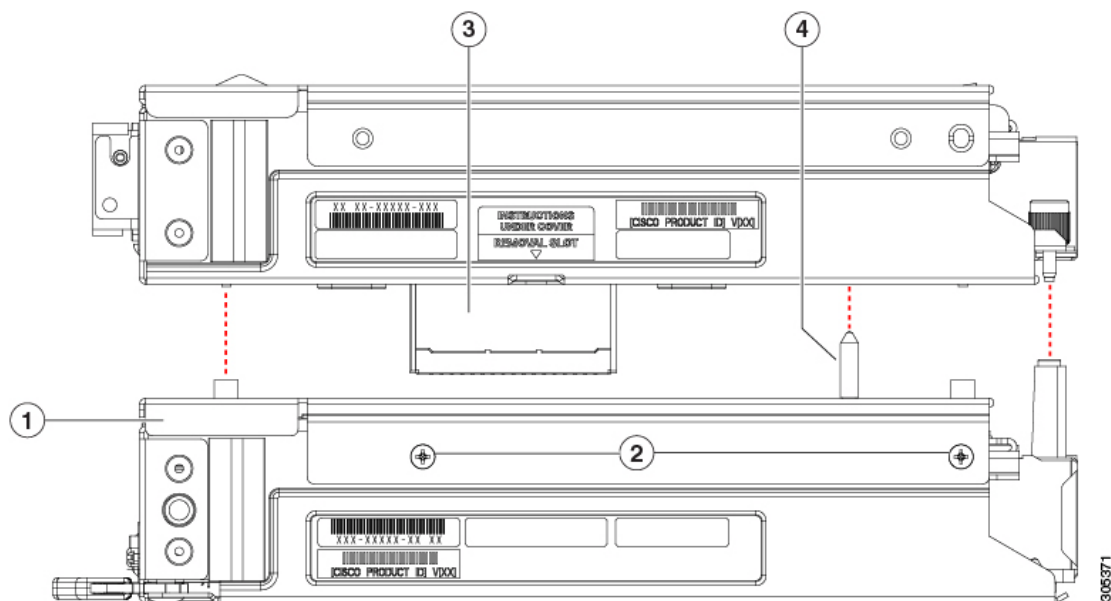
Reassembling the Server Node/ I/O Expander Assembly

1. Reinstall the intermediate cover to the server node:
 - a. Set the intermediate cover in place on the server node, offset about one inch toward the rear. Pegs on the inside of the cover must engage the tracks on the server node base.
 - b. Push the cover forward until it stops.
 - c. Reinstall the four screws that secure the intermediate cover.
2. Reinstall the I/O expander to the server node:

CAUTION: Use caution to align all features of the I/O expander with the intermediate cover and server node before mating the connector on the underside of the expander with the socket on the server board. The connector can be damaged if correct alignment is not used.

- a. Carefully align the I/O expander with the alignment pegs on the top of the intermediate cover (see [Figure 8](#)).
- b. Set the I/O expander down on the intermediate cover and lower it gently to mate the mezzanine connector and the socket on the server board.

Figure 8 Replacing the I/O Expander to the M4 Server Node



1	Intermediate cover on server node	3	I/O expander mezzanine connector
2	Intermediate cover securing screws (two on each side of cover)	4	Alignment pegs on intermediate cover

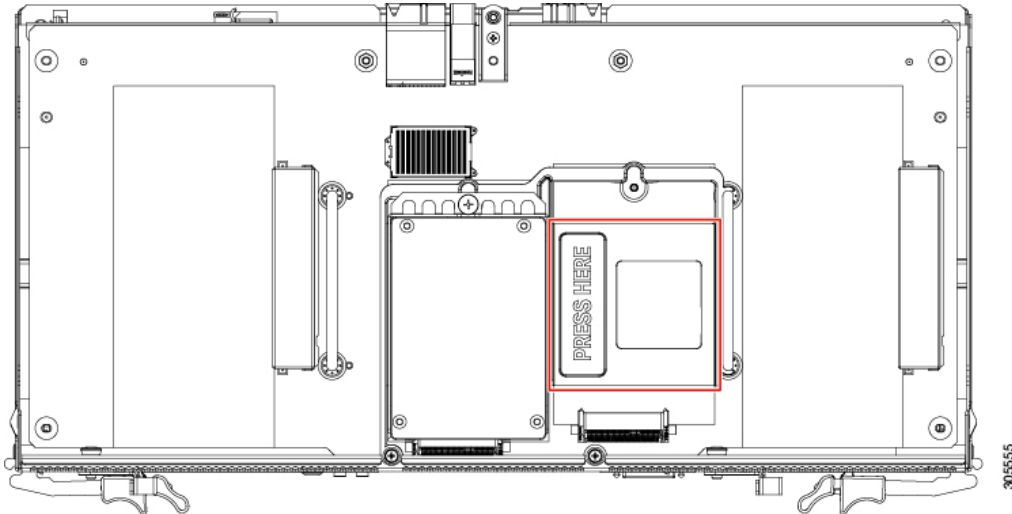
Replacing C3X60 M4 Server Node and I/O Expander Components

- c. If a RAID controller is present or an NVMe SSD is present in the right-hand socket (IOENVMe2) of the I/O expander, you must remove them to access the PRESS HERE plate in the next step.

See [Replacing a Storage Controller Card Inside the I/O Expander, page 51](#) and [Replacing an NVMe SSD Inside the I/O Expander, page 53](#) to remove them, then return to the next step.

- d. Press down firmly on the plastic plate marked “PRESS HERE” to fully seat the connectors (see [Figure 9](#)).

Figure 9 I/O Expander, Showing “PRESS HERE” Plate



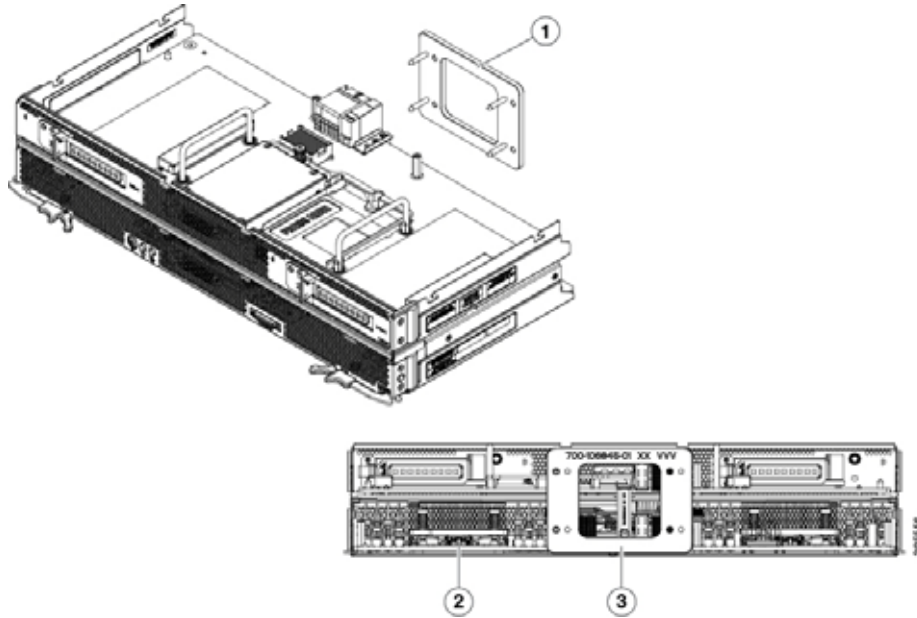
- e. If you removed a RAID controller or an NVMe SSD to access the PRESS HERE plate, reinstall them now.

See [Replacing a Storage Controller Card Inside the I/O Expander, page 51](#) and [Replacing an NVMe SSD Inside the I/O Expander, page 53](#).

CAUTION: Before you reinstall the I/O expander securing screws, you must use the supplied alignment tool (UCSC-C3K-M4IOTOOL) in the next step to ensure alignment of the connectors that plug into the internal chassis backplane. Failure to ensure alignment might damage the sockets on the backplane.

3. Insert the four pegs of the alignment tool into the holes that are built into the connector side of the server node and I/O expander. Ensure that the alignment tool fits into all four holes and lies flat (see [Figure 10](#)).

The alignment tool is shipped with systems that are ordered with an I/O expander. It is also shipped with I/O expander replacement spares. You can order the tool using Cisco PID UCSC-C3K-M4IOTOOL.

Figure 10 Using the I/O Expander Alignment Tool

1	Alignment tool	3	Alignment tool installed
2	Connector side of server node and I/O expander		

4. Reinstall and tighten the five screws that secure the I/O expander to the top of the server node (see [Figure 6](#)).
5. Remove the alignment tool.
6. Reinstall the I/O expander top cover:
 - a. Set the cover in place on the I/O expander, offset about one inch toward the rear. Pegs on the inside of the cover must engage the tracks on the I/O expander base.
 - b. Push the cover forward until it stops.
 - c. Turn the latch handle 90 degrees to close the lock.
 - d. Fold the latch handle flat.
7. Install a server node with attached I/O expander to the chassis:
 - a. With the two ejector levers open, align the server node and I/O expander with the two empty bays.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
8. Power on the server node.

C3X60 M4 Internal Diagnostic LEDs

There are internal diagnostic LEDs on the edge of the server node board. These LEDs can be viewed while the server node is removed from the chassis, up to 30 seconds after AC power is removed.

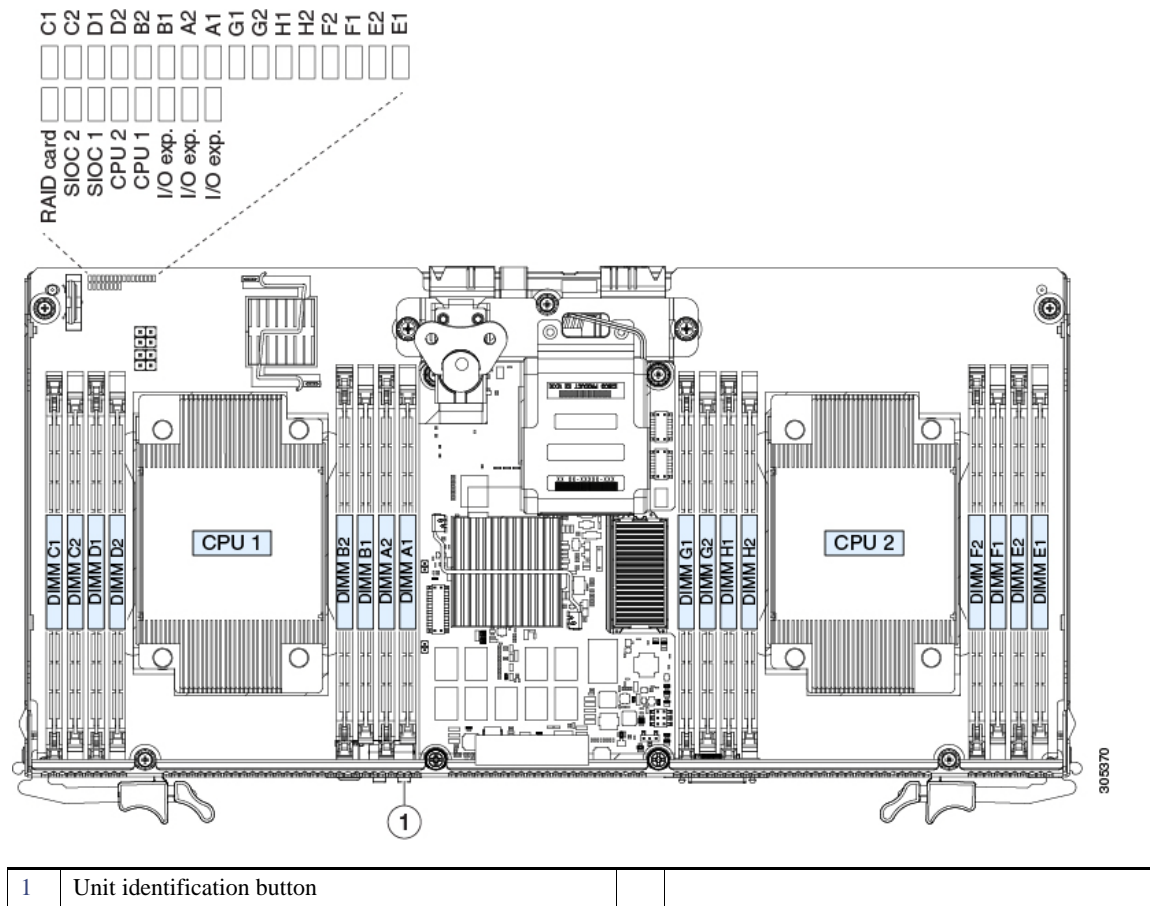
1. Shut down and remove the server node from the system as described in [Shutting Down a C3X60 M4 Server Node](#), page 6.

NOTE: You do not have to remove the server node cover to view the LEDs on the edge of the board.

2. Press and hold the server node unit identification button (see [Figure 11](#)) within 30 seconds of removing the server node from the system.

A fault LED that lights amber indicates a faulty component.

Figure 11 Cisco UCS C3X60 M4 Server Node Internal Diagnostic LEDs



Replacing DIMMs Inside the C3X60 M4 Server Node

There are 16 DIMM sockets on the server node board.

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

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

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

For additional information about troubleshooting DIMM memory issues, see the document [Troubleshoot DIMM Memory in UCS](#).

DIMM Performance Guidelines and Population Rules

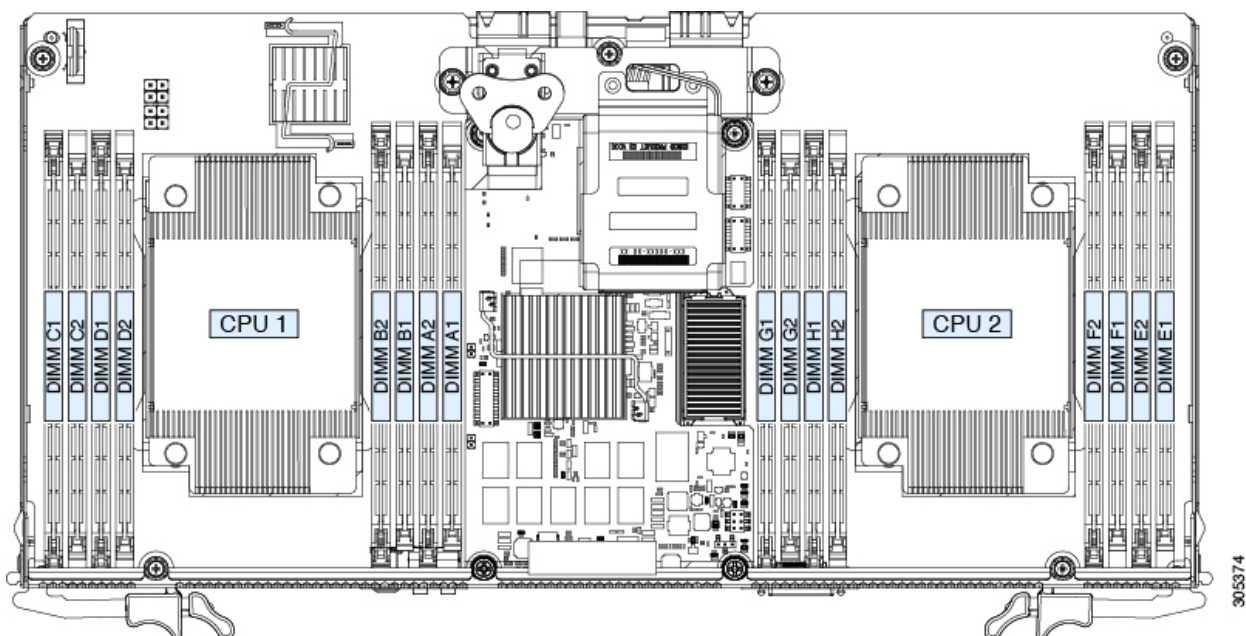
- [DIMM Sockets, page 20](#)
- [DIMM Population Rules, page 21](#)
- [Memory Mirroring Mode, page 21](#)
- [Lockstep Channel Mode, page 21](#)

DIMM Sockets

Figure 12 shows the DIMM sockets and how they are numbered on a C3X60 M4 server node board.

- A server node has 16 DIMM sockets (8 for each CPU).
- Channels are labeled with letters as shown in Figure 12.
For example, channel A = DIMM sockets A1, A2.
- Each channel has two DIMM sockets. The blue socket in a channel is always socket 1.

Figure 12 Cisco UCS C3X60 M4 DIMM and CPU Numbering



305374

DIMM Population Rules

Observe the following guidelines when installing or replacing DIMMs:

- For optimal performance, spread DIMMs evenly across both CPUs and all channels.
- Populate the DIMM sockets of each CPU identically. Populate the blue DIMM 1 sockets first, then the black DIMM 2 slots. For example, populate the DIMM slots in this order:
 1. A1, E1, B1, F1, C1, G1, D1, H1
 2. A2, E2, B2, F2, C2, G2, D2, H2
- Observe the DIMM mixing rules shown in [Table 3](#).

Table 3 DIMM Mixing Rules

DIMM Parameter	DIMMs in the Same Channel	DIMMs in the Same Bank
DIMM Capacity: RDIMM = 16 or 32 GB	You can mix different capacity DIMMs in the same channel (for example, A1, A2).	You can mix different capacity DIMMs in the same bank. However, for optimal performance DIMMs in the same bank (for example, A1, B1, C1, D1) should have the same capacity.
DIMM Speed: 2133- or 2400-MHz	You can mix speeds, but DIMMs will run at the speed of the slowest DIMMs/CPU installed in the channel.	You can mix speeds, but DIMMs will run at the speed of the slowest DIMMs/CPU installed in the bank.
DIMM Type: RDIMMs	You cannot mix DIMM types in a channel.	You cannot mix DIMM types in a bank.

Memory Mirroring Mode

When you enable memory mirroring mode, the memory subsystem simultaneously writes identical data to two channels. If a memory read from one of the channels returns incorrect data due to an uncorrectable memory error, the system automatically retrieves the data from the other channel. A transient or soft error in one channel does not affect the mirrored data, and operation continues.

Memory mirroring reduces the amount of memory available to the operating system by 50 percent because only one of the two populated channels provides data.

Lockstep Channel Mode

When you enable lockstep channel mode, each memory access is a 128-bit data access that spans four channels.

Lockstep channel mode requires that all four memory channels on a CPU must be populated identically with regards to size and organization. DIMM socket populations within a channel do not have to be identical but the same DIMM slot location across all four channels must be populated the same.

For example, DIMMs in sockets A1, B1, C1, and D1 must be identical. DIMMs in sockets A2, B2, C2, and D2 must be identical. However, the A1-B1-C1-D1 DIMMs do not have to be identical with the A2-B2-C2-D2 DIMMs.

Replacing DIMMs

1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node](#), page 6.
2. Remove a server node from the system:
 - a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 1](#)).
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node straight out from the system.
3. Do one of the following to access the component inside the server node:
 - If the server node does not have an I/O expander attached—Remove the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover](#), page 12 before continuing with the next step.
 - If the server node has an I/O expander attached—Remove the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node](#), page 14 before you continue with the next step.
4. Locate the faulty DIMM and remove it from the socket on the riser by opening the ejector levers at both ends of the DIMM socket.
5. Install a new DIMM:

NOTE: Before installing DIMMs, refer to the population guidelines. See [DIMM Performance Guidelines and Population Rules](#), page 20.

- a. Align the new DIMM with the socket on the riser. Use the alignment key in the DIMM socket to correctly orient the DIMM.
 - b. Push the DIMM into the socket until it is fully seated and the ejector levers on either side of the socket lock into place.
6. Do one of the following:
 - If the server node did not have an I/O expander attached—Reinstall the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover](#), page 12 before continuing with the next step.
 - If the server node had an I/O expander attached—Reinstall the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node](#), page 14 before you continue with the next step.
 7. Install a server node to the chassis:
 - a. With the two ejector levers open, align the new server node with the empty bay.
 - Cisco IMC releases earlier than 2.0(13): If your S3260 system has only one server node, it must be installed in bay 1
 - Cisco IMC releases 2.0(13) and later: If your S3260 system has only one server node, it can be installed in either server bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
 8. Power on the server node.

Replacing CPUs and Heatsinks Inside the C3X60 M4 Server Node

Two CPUs are inside each server node. Although CPUs are not spared separately for this server node, you might need to move your CPUs from a faulty server node to a new server node.

CPU Configuration Rules

- A server node must have two CPUs to operate. See [Figure 12](#) for the C3X60 M4 server node CPU numbering.

Replacing CPUs and Heatsinks

CAUTION: CPUs and their motherboard sockets are fragile and must be handled with care to avoid damaging pins during installation. The CPUs must be installed with heatsinks and their thermal pads to ensure proper cooling. Failure to install a CPU correctly might result in damage to the system.

NOTE: This server uses the new independent loading mechanism (ILM) CPU sockets, so no Pick-and-Place tools are required for CPU handling or installation. Always grasp the plastic frame on the CPU when handling.

1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node](#), page 6.
2. Remove a server node from the system:
 - a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 1](#)).
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node straight out from the system.
3. Do one of the following to access the component inside the server node:
 - If the server node does not have an I/O expander attached—Remove the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover](#), page 12 before continuing with the next step.
 - If the server node has an I/O expander attached—Remove the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node](#), page 14 before you continue with the next step.
4. Use a Number 2 Phillips-head screwdriver to loosen the four captive screws that secure the heatsink, and then lift it off of the CPU.



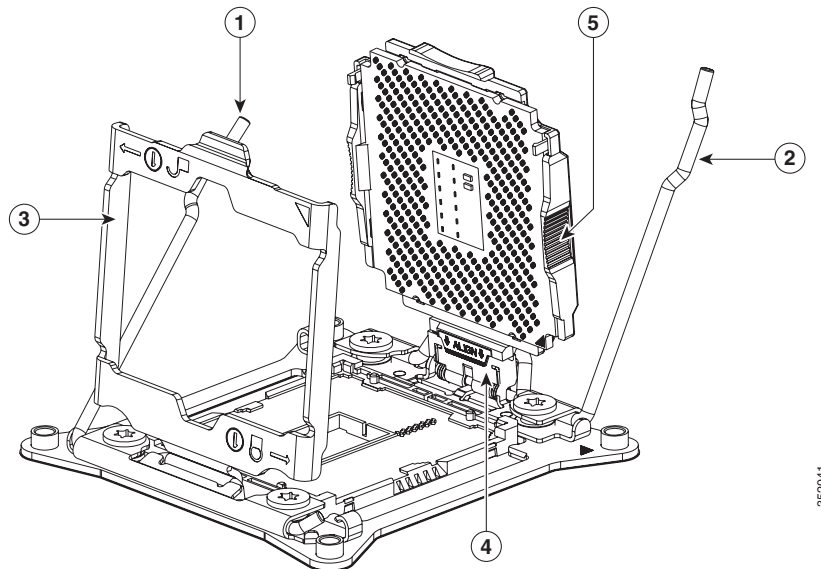


NOTE: Alternate loosening each screw evenly to avoid damaging the heatsink or CPU.
5. Open the CPU retaining mechanism:
 - a. Unclip the first retaining latch labeled with the  icon, and then unclip the second retaining latch labeled with the  icon. See [Figure 13](#).
 - b. Open the hinged CPU cover plate.

Figure 13 CPU Socket

1	CPU retaining latch 	4	Hinged CPU seat
2	CPU retaining latch 	5	Finger-grips on plastic CPU frame
3	Hinged CPU cover plate		

6. Remove any existing CPU:

- a. With the latches and hinged CPU cover plate open, swing the CPU in its hinged seat up to the open position, as shown in [Figure 13](#).
- b. Grasp the CPU by the finger-grips on its plastic frame and lift it up and out of the hinged CPU seat.
- c. Set the CPU aside on an antistatic surface.

7. Install a new CPU:

- a. Grasp the new CPU by the finger-grips on its plastic frame and align the tab on the frame that is labeled “ALIGN” with the hinged seat, as shown in [Figure 14](#).
- b. Insert the tab on the CPU frame into the seat until it stops and is held firmly.

The line below the word “ALIGN” should be level with the edge of the seat, as shown in [Figure 14](#).



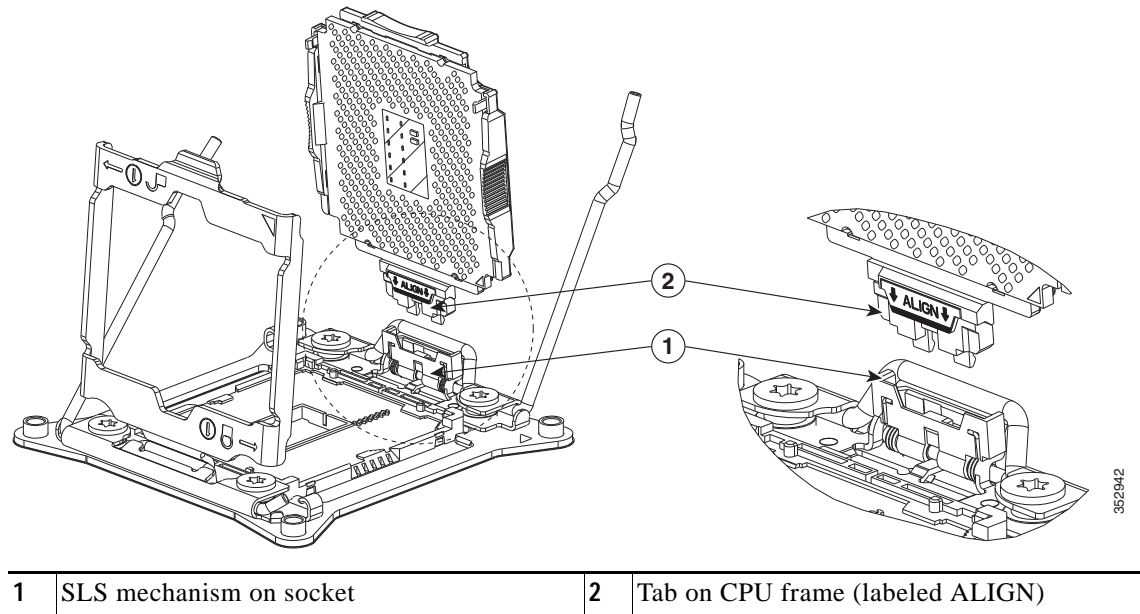
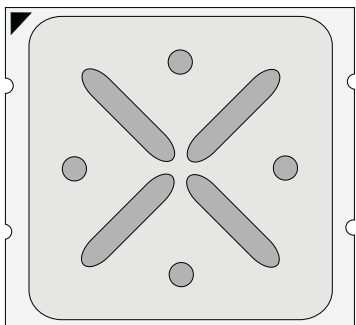
- c. Swing the hinged seat with the CPU down until the CPU frame clicks in place and holds flat in the socket.
- d. Close the hinged CPU cover plate.
- e. Clip down the CPU retaining latch with the  icon, and then clip down the CPU retaining latch with the  icon. See [Figure 13](#).

Figure 14 CPU and Socket Alignment Features**8. Install a heatsink:**

CAUTION: The heatsink must have a new thermal grease on the heatsink-to-CPU surface to ensure proper cooling. New heatsinks have a pre-applied pad of grease. If you are reusing a heatsink, you must remove the old thermal grease and apply grease from a syringe.

- a. Do one of the following:
 - If you are installing a new heatsink, remove the protective film from the pre-applied pad of thermal grease on the bottom of the new heatsink. Then continue with step 9.
 - If you are reusing a heatsink, continue with step b.
- b. Apply an alcohol-based cleaning solution to the old thermal grease and let it soak for a least 15 seconds.
- c. Wipe all of the old thermal grease off the old heatsink using a soft cloth that will not scratch the heatsink surface.
- d. Apply thermal grease from the syringe that is included with the new CPU to the top of the CPU. Apply about half the syringe contents to the top of the CPU in the pattern that is shown in [Figure 15](#).

NOTE: If you do not have a syringe of thermal grease, you can order a spare (Cisco PID UCS-CPU-GREASE3).

Figure 15 CPU Thermal Grease Application Pattern

Replacing C3X60 M4 Server Node and I/O Expander Components

9. Align the heatsink captive screws with the motherboard standoffs, and then use a Number 2 Phillips-head screwdriver to tighten the captive screws evenly.

CAUTION: Alternate tightening each screw evenly to avoid damaging the heatsink or CPU.

10. Do one of the following:

- If the server node did not have an I/O expander attached—Reinstall the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover, page 12](#) before continuing with the next step.
- If the server node had an I/O expander attached—Reinstall the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node, page 14](#) before you continue with the next step.

11. Install a server node:

- a. With the two ejector levers open, align the new server node with the empty bay.
 - Cisco IMC releases earlier than 2.0(13): If your S3260 system has only one server node, it must be installed in bay 1
 - Cisco IMC releases 2.0(13) and later: If your S3260 system has only one server node, it can be installed in either server bay.
- b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
- c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.

12. Power on the server node.

Additional CPU-Related Parts To Order With RMA Replacement Server Nodes

When a return material authorization (RMA) of the server node or CPU is done on a system, there are additional parts that might not be included with the CPU or motherboard spare bill of materials (BOM). The TAC engineer might need to add the additional parts to the RMA to help ensure a successful replacement.

- Scenario 1—You are re-using the existing heatsinks:
 - Heat sink cleaning kit (UCSX-HSCK=)
 - Thermal grease kit for S3260 server nodes (UCS-CPU-GREASE3=)
 - Intel CPU Pick-n-Place tool for EP CPUs (UCS-CPU-EP-PNP=)
- Scenario 2—You are replacing the existing heatsinks:
 - Heat sink (UCSB-HS-01-EP=)
 - Heat sink cleaning kit (UCSX-HSCK=)
 - Intel CPU Pick-n-Place tool for EP CPUs (UCS-CPU-EP-PNP=)

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

It is important to clean the old thermal interface material off of the CPU prior to installing the heatsinks. Therefore, when ordering new heatsinks it is still necessary to order the heatsink cleaning kit at a minimum.

Replacing an RTC Battery Inside the Server Node

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

NOTE: When the RTC battery is removed or it completely loses power, settings that were stored in the BMC of the server node are lost. You must reconfigure the BMC settings after installing a new battery.

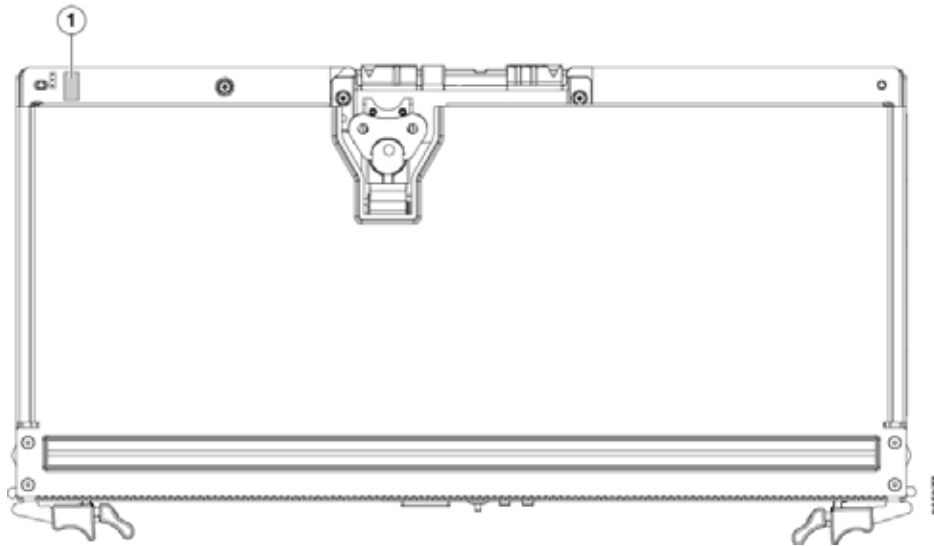
1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
2. Remove a server node from the system:
 - a. Grasp the two ejector levers on the node and pinch their latches to release the levers.
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node straight out from the system.

NOTE: You do not have to remove the server node cover or an I/O expander to access the RTC battery.

3. Remove the server node RTC battery:
 - a. Locate the RTC battery. See [Figure 16](#).
 - b. Pull the battery retaining clip away from the battery and pull the battery from the socket.
4. Install the new RTC battery:
 - a. Pull the retaining clip away from the battery socket and insert the battery in the socket.

NOTE: The flat, positive side of the battery marked “+” should face the retaining clip.

- b. Push the battery into the socket until it is fully seated and the retaining clip clicks over the top of the battery.
5. Install a server node:
 - a. With the two ejector levers open, align the new server node with the empty bay.
 - Cisco IMC releases earlier than 2.0(13): If your S3260 system has only one server node, it must be installed in bay 1
 - Cisco IMC releases 2.0(13) and later: If your S3260 system has only one server node, it can be installed in either server bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
6. Power on the server node.
7. Reconfigure the BMC settings for this node.

Figure 16 RTC Battery Inside the C3X60 M4 Server Node

1	Server node RTC battery on board, below edge of cover	
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Replacing an NVMe SSD Inside the C3X60 M4 Server Node

The SBNVMe1 socket inside each C3X60 M4 server node can support a single NVMe PCIe SSD. The SSD might be under a storage controller card, if one is installed in the server node.

The software designation of the SSD socket inside the server node is SBNVMe1.

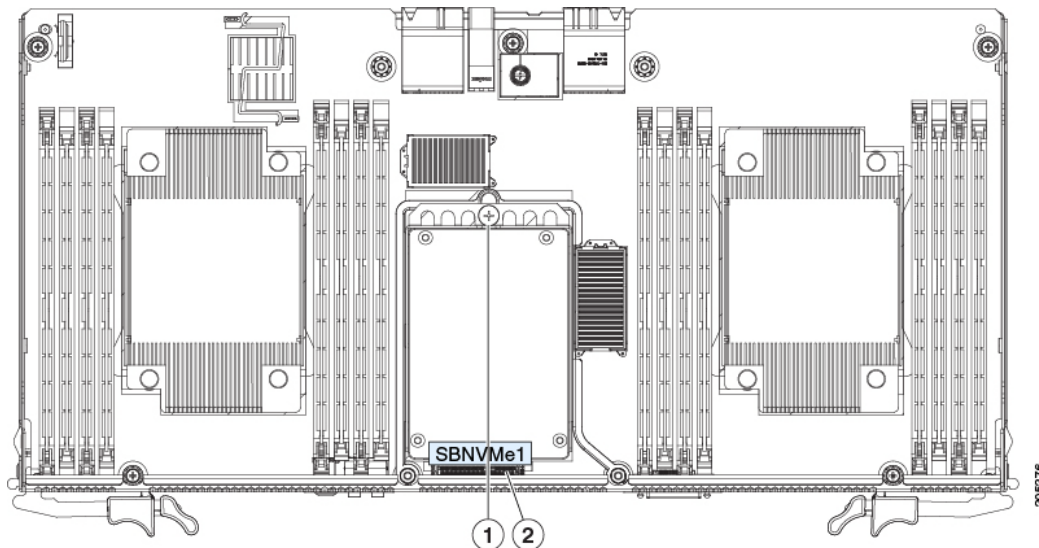
NOTE: 2.5-inch form-factor NVMe SSDs are bootable in UEFI mode; legacy booting is not supported.

1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node](#), page 6.
2. Remove a server node from the system:
 - a. Grasp the two ejector levers and pinch their latches to release the levers.
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node straight out from the system.
3. Do one of the following to access the component inside the server node:
 - If the server node does not have an I/O expander attached—Remove the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover](#), page 12 before continuing with the next step.
 - If the server node has an I/O expander attached—Remove the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node](#), page 14 before you continue with the next step.
4. If a storage controller is present in the server node, remove it to provide clearance:
 - a. Loosen the captive thumbscrews that secure the card to the server node (see [Figure 19](#) or [Figure 20](#)).
 - b. Grasp the card at both ends and lift it evenly to disengage the connector on the underside of the card from the mezzanine socket.
5. Remove the SSD:

Replacing C3X60 M4 Server Node and I/O Expander Components

- a. Remove the single screw that secures the drive to its bracket (see [Figure 17](#)).
 - b. Slide the drive to disengage it from its horizontal socket, then lift it from the server node.
6. Install a new SSD:
- a. Set the drive in its bracket on the server board, then slide it forward to engage its connector with the socket.
 - b. Install the single screw that secures the drive to the bracket.
7. If you removed a storage controller card, reinstall it:
- a. Align the card with bracket over the mezzanine socket and the four standoffs.
 - b. Press down on both ends of the card to engage the connector on the underside of the card with the mezzanine socket.
 - c. Tighten the four captive thumbscrews that secure the card to the server node.
8. Do one of the following:
- If the server node did not have an I/O expander attached—Reinstall the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover](#), page 12 before continuing with the next step.
 - If the server node had an I/O expander attached—Reinstall the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node](#), page 14 before you continue with the next step.
9. Install a server node:
- a. With the two ejector levers open, align the new server node with the empty bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
10. Power on the server node.

Figure 17 SSD Inside the C3X60 M4 Server Node



1	Single securing screw	2	SSD socket SBNVMe1
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Installing a Trusted Platform Module (TPM) Inside the C3X60 M4 Server Node

The trusted platform module (TPM) is a small circuit board that attaches to a socket on the server node board.

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

1. [Installing the TPM Hardware, page 31](#)
2. [Enabling TPM Support in the BIOS, page 32](#)
3. [Enabling the Intel TXT Feature in the BIOS, page 33](#)

TPM 2.0 Considerations

If there is no existing TPM in the server, you can install TPM 2.0. TPM 2.0 requires Intel v4 code or later.

CAUTION: If your M4 server node Intel v4 system is currently supported and protected by TPM version 2.0, a potential security exposure might occur if you downgrade the system software and BIOS to an earlier version.

NOTE: If the TPM 2.0 becomes unresponsive, reboot the server.

Installing the TPM Hardware

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

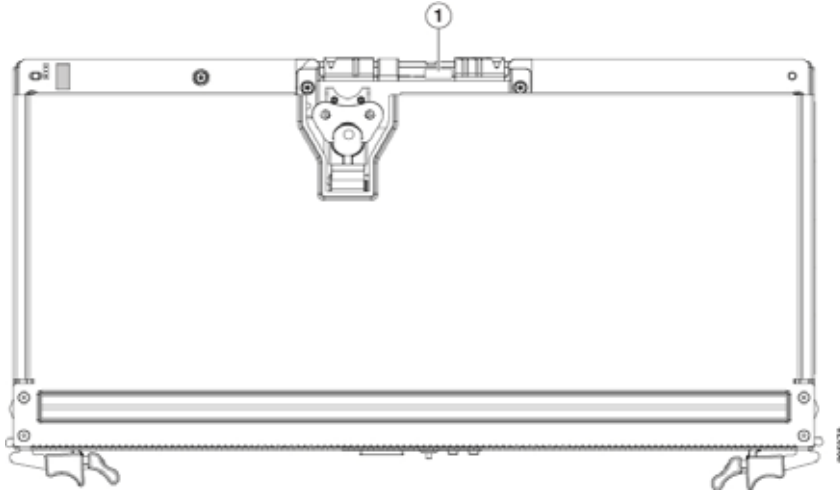
1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
2. Remove a server node from the system:
 - a. Grasp the two ejector levers on the node and pinch their latches to release the levers.
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node straight out from the system.

NOTE: You do not have to remove the server node cover or an I/O expander to access the TPM socket.

3. Install a TPM:
 - a. Locate the TPM socket on the server node board, as shown in [Figure 18](#).
 - b. Align the connector that is on the bottom of the TPM circuit board with the TPM socket. Align the screw hole on the TPM board with the screw hole adjacent to the TPM socket.
 - c. Push down evenly on the TPM to seat it in the motherboard socket.
 - d. Install the single one-way screw that secures the TPM to the motherboard.
4. Install a server node:
 - a. With the two ejector levers open, align the new server node with the empty bay.
 - Cisco IMC releases earlier than 2.0(13): If your S3260 system has only one server node, it must be installed in bay 1
 - Cisco IMC releases 2.0(13) and later: If your S3260 system has only one server node, it can be installed in either server bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.

Replacing C3X60 M4 Server Node and I/O Expander Components

5. Power on the server node.
6. Continue with [Enabling TPM Support in the BIOS, page 32](#).

Figure 18 TPM Location Inside the C3X60 M4 Server Node

1	TPM socket location on server board	
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Enabling TPM Support in the BIOS

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

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

1. Enable TPM support:
 - d. Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.
 - e. Log in to the BIOS Setup Utility with your BIOS Administrator password.
 - f. On the BIOS Setup Utility window, choose the **Advanced** tab.
 - g. Choose **Trusted Computing** to open the TPM Security Device Configuration window.
 - h. Change TPM SUPPORT to **Enabled**.
 - i. Press **F10** to save your settings and reboot the server node.
2. Verify that TPM support is now enabled:
 - a. Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.
 - b. Log into the BIOS Setup utility with your BIOS Administrator password.
 - c. Choose the **Advanced** tab.
 - d. Choose **Trusted Computing** to open the TPM Security Device Configuration window.
 - e. Verify that TPM SUPPORT and TPM State are Enabled.
3. Continue with [Enabling the Intel TXT Feature in the BIOS, page 33](#).

Enabling the Intel TXT Feature in the BIOS

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

1. Reboot the server node and watch for the prompt to press F2.
2. When prompted, press **F2** to enter the BIOS Setup utility.
3. Verify that the prerequisite BIOS values are enabled:
 - a. Choose the **Advanced** tab.
 - b. Choose **Intel TXT(LT-SX) Configuration** to open the Intel TXT(LT-SX) Hardware Support window.
 - c. Verify that the following items are listed as Enabled:
 - VT-d Support (default is Enabled)
 - VT Support (default is Enabled)
 - TPM Support
 - TPM State
- If VT-d Support and VT Support are already enabled, skip to 4..
- If VT-d Support and VT Support are not enabled, continue with the next steps to enable them.
 - a. Press **Escape** to return to the BIOS Setup utility **Advanced** tab.
 - b. On the Advanced tab, choose **Processor Configuration** to open the Processor Configuration window.
 - c. Set Intel (R) VT and Intel (R) VT-d to **Enabled**.
4. Enable the Intel Trusted Execution Technology (TXT) feature:
 - a. Return to the Intel TXT(LT-SX) Hardware Support window if you are not already there.
 - b. Set TXT Support to **Enabled**.
5. Press **F10** to save your changes and exit the BIOS Setup utility.

Replacing a Storage Controller Card Inside the C3X60 M4 Server Node

The Cisco storage controller card connects to a mezzanine-style socket inside the server node.

To replace a supercap power module (RAID backup), see [Replacing a Supercap \(RAID Backup\) on a RAID Controller, page 37](#).

Note the following population rules for storage controllers:

- If the server node has UCS-S3260-DHBA, then no controller is allowed in the I/O expander.
- If the server node has UCS-C3K-M4RAID, then the I/O expander can also have UCS-C3K-M4RAID (but not UCS-S3260-DHBA).
- If the server node has no storage controller, then the I/O expander can have UCS-C3K-M4RAID or UCS-S3260-DHBA.

NOTE: If you move a controller from the server node to the I/O expander, or move it from the I/O expander to the server node, you must run the Cisco Host Upgrade Utility (HUU) on the server node to update the sub-OEMID to the correct values. If you do not do this, the server node Cisco IMC returns an Invalid Hardware Configuration error. [HUU Guides](#).

NOTE: Do not mix different storage controllers in the same system. If the system has two server nodes, they must both contain the same controller.

NOTE: See [Supported Storage Controllers and Required Cables, page 58](#) for information about the controllers supported in the C3X60 M4 server node.

1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
2. Remove a server node from the system:
 - a. Grasp the two ejector levers on the node and pinch their latches to release the levers.
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node straight out from the system.
3. Do one of the following to access the component inside the server node:
 - If the server node does not have an I/O expander attached—Remove the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover, page 12](#) before continuing with the next step.
 - If the server node has an I/O expander attached—Remove the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node, page 14](#) before you continue with the next step.
4. Remove a storage controller card:
 - a. Loosen the captive thumbscrews that secure the card to the board (see [Figure 19](#) for RAID card UCS-C3K-M4RAID or [Figure 20](#) for HBA card UCS-C3K-M4DHBA).
 - b. Grasp the card at both ends and lift it evenly to disengage the connector on the underside of the card from the mezzanine socket.
5. Install a storage controller card:

NOTE: If you are installing Cisco UCS S3260 Dual Pass-Through Controller (UCS-C3K-M4DHBA), it is supported in an M4 server node only; it is not supported in M3 server nodes.

NOTE: If you are installing Cisco UCS S3260 Dual Pass-Through Controller (UCS-C3K-M4DHBA), it requires chassis part number 68-5286-06 or later. The chassis motherboard in earlier chassis versions does not support this controller. You can determine the chassis part number by looking on the part-number label on the top-front of the chassis, or by using the **inventory-all** command, as shown in the following example using the Cisco IMC CLI:

```
Server# scope chassis
```

Replacing C3X60 M4 Server Node and I/O Expander Components

```
Server/chassis# inventory-refresh
Server/chassis# inventory-all

CHS_FRU(ID1)
Board Mfg           : Cisco Systems Inc
Board Product       : N/A
Board Serial        : FCH20317RVA
Board Part Number   : 73-16125-03
Board Extra         : A12V02
Board Extra         : 0000000000
Product Manufacturer : Cisco Systems Inc
Product Name        : N/A
Product Part Number : 68-5286-07
Product Serial      : FCH20317RVA
```

- a. Align the card over the mezzanine socket and the three standoffs.
 - b. Press down on both ends of the card to engage the connector on the underside of the card with the mezzanine socket.
 - c. Tighten the captive screws that secure the card to the board (see [Figure 19](#) or [Figure 20](#)).
6. Do one of the following:
- If the server node did not have an I/O expander attached—Reinstall the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover, page 12](#) before continuing with the next step.
 - If the server node had an I/O expander attached—Reinstall the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node, page 14](#) before you continue with the next step.
7. Install a server node:
- a. With the two ejector levers open, align the new server node with the empty bay.
 - Cisco IMC releases earlier than 2.0(13): If your S3260 system has only one server node, it must be installed in bay 1
 - Cisco IMC releases 2.0(13) and later: If your S3260 system has only one server node, it can be installed in either server bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
8. Power on the server node.
9. See [Restoring RAID Configuration After Replacing a RAID Controller, page 60](#) to restore your RAID configuration.

Figure 19 RAID Controller Card (UCS-C3K-M4RAID) Thumbscrews Inside the C3X60 M4 Server Node

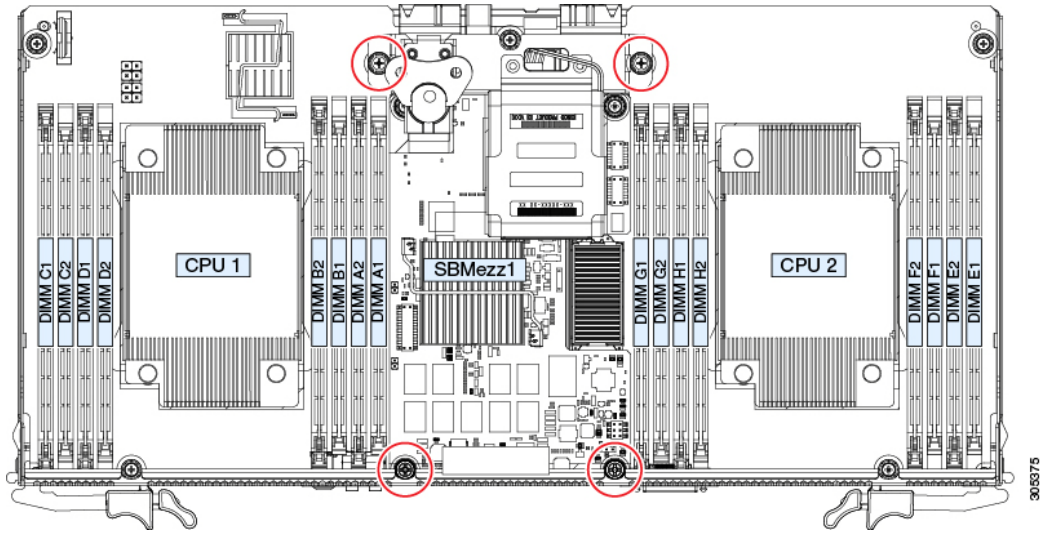
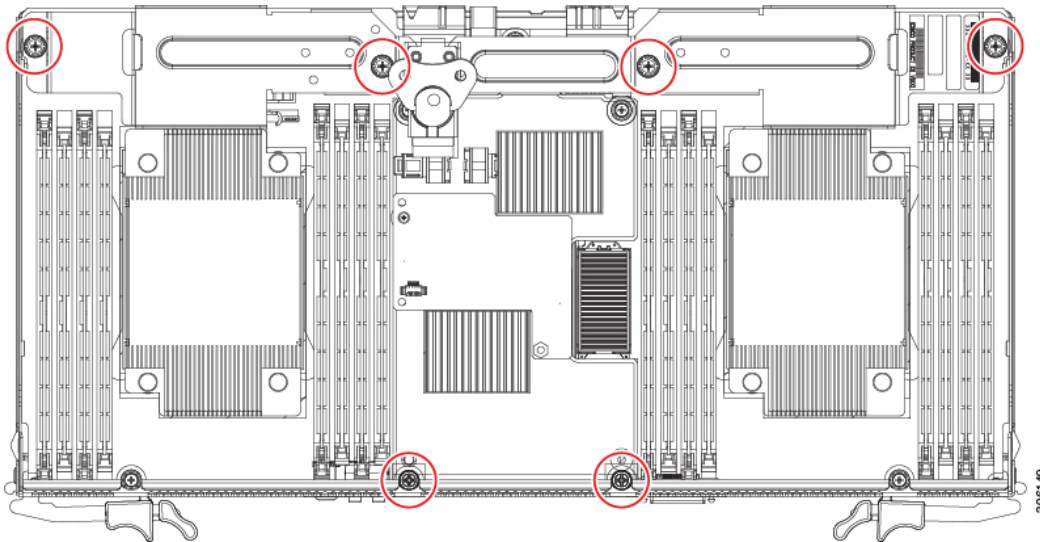


Figure 20 HBA Controller Card (UCS-C3K-M4DHBA) Thumbscrews Inside the C3X60 M4 Server Node



Replacing a Supercap (RAID Backup) on a RAID Controller

The SCPM mounts directly to the RAID controller.

The SCPM provides approximately 3 years of backup for the disk write-back cache DRAM in the case of sudden power loss by offloading the cache to the NAND flash.

The PID for the spare SCPM is UCSC-SCAP-M5=.

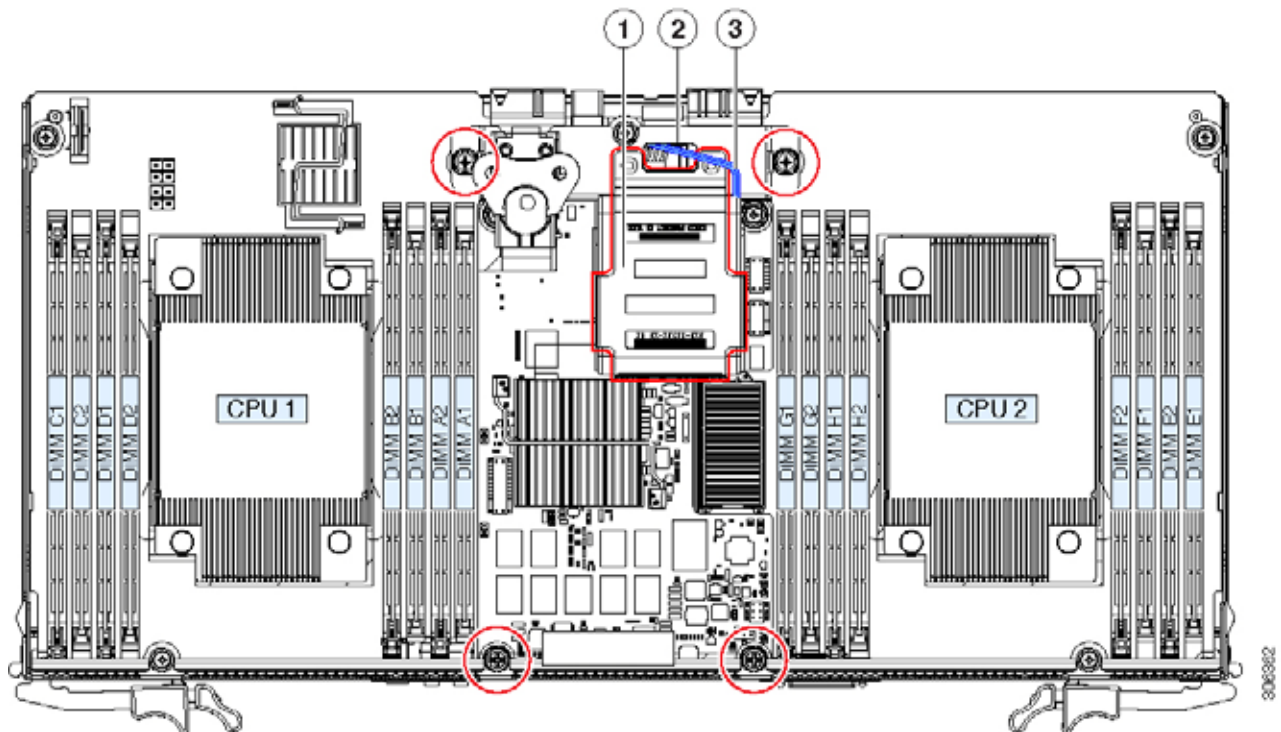
1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node](#), page 6.
2. Remove a server node from the system:
 - a. Grasp the two ejector levers on the node and pinch their latches to release the levers.
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node straight out from the system.
3. Do one of the following to access the SCPM on a RAID controller in a server node or I/O expander:
 - If the RAID controller is in an I/O expander or in a server node that does not have an I/O expander attached—Remove the top cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover](#), page 12 before continuing with the next step.
 - If the RAID controller is in a server node that has an I/O expander attached—Remove the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node](#), page 14 before you continue with the next step.

NOTE: The connector for the supercap cable is on the underside of the RAID controller card, so you must remove the card to access the connector.

4. Remove a storage controller card:
 - a. Loosen the four captive thumbscrews that secure the card to the board (see screws circled in red in [Figure 21](#)).
 - b. Grasp the card at both ends and lift it evenly to disengage the connector on the underside of the card from the mezzanine socket.
 - c. Set the card on an anti-static surface.
5. Remove an SCPM from the controller card:
 - a. Gently lift the free end of the metal plate that secures the SCPM, but only enough so that you can slide the SCPM free.
 - b. Disconnect the SCPM cable from the connector that is on the underside of the controller card.
6. Install a new SCPM to the controller card:
 - a. Orient the SCPM so that its corner with the cable is positioned as in [Figure 21](#).
 - b. Gently lift the securing metal plate enough so that you can slide the SCPM under it, then release the plate.
 - c. Run the SCPM cable through the opening in the bracket and then plug its connector into the connector on the underside of the card.
7. Install the storage controller card:
 - a. Align the card over the mezzanine socket and the standoffs.
 - b. Press down on both ends of the card to engage the connector on the underside of the card with the mezzanine socket.
 - c. Tighten the four captive screws that secure the card to the board.

Replacing C3X60 M4 Server Node and I/O Expander Components

8. Do one of the following:
 - If the RAID controller is in an I/O expander or in a server node that does not have an I/O expander attached—Reinstall the top cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover, page 12](#) before continuing with the next step.
 - If the RAID controller is in a server node that had an I/O expander attached—Reinstall the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node, page 14](#) before you continue with the next step.
9. Install a server node:
 - a. With the two ejector levers open, align the new server node with the empty bay.
 - Cisco IMC releases earlier than 2.0(13): If your S3260 system has only one server node, it must be installed in bay 1
 - Cisco IMC releases 2.0(13) and later: If your S3260 system has only one server node, it can be installed in either server bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
10. Power on the server node.

Figure 21 SCPM on RAID Controller

1	Securing metal plate covering SCPM	3	SCPM cable This cable runs through the opening in the bracket to plug into the connector on the underside of the card.
2	Opening in bracket		

Replacing an I/O Expander

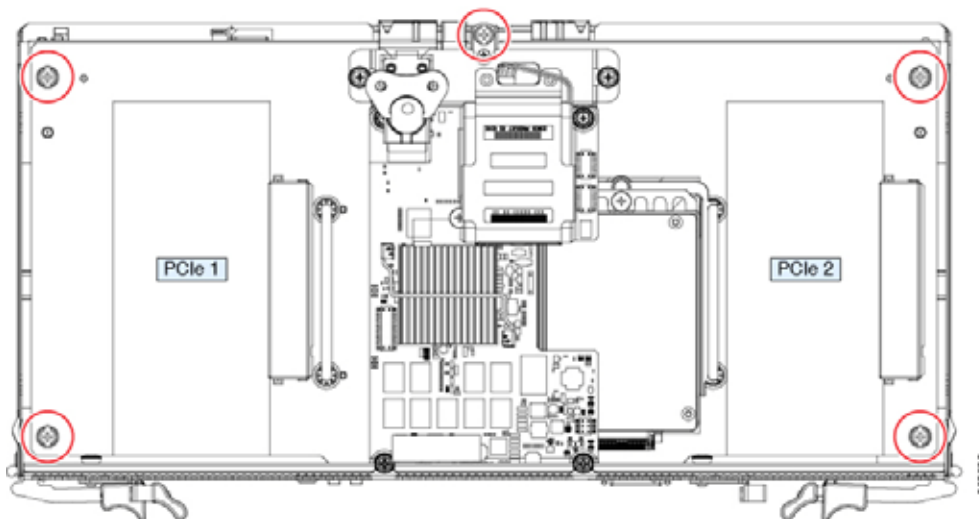
This procedure is for removing and replacing an I/O expander. If you are adding an I/O expander for the first time, a special kit is required. See [Adding an I/O Expander After-Factory](#), page 43.

The server node with optional I/O expander is accessed from the rear of the system, so you do not have to pull the system out from the rack.

NOTE: You do not have to power off the chassis in the next step. Replacement with the chassis powered on is supported if you shut down the server node before removal.

1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node](#), page 6.
2. Remove the server node with attached I/O expander from the system:
 - a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 1](#)).
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node with I/O expander straight out from the system.
3. Remove the top cover from the I/O expander:
 - a. Lift the latch handle to an upright position (see [Figure 5](#)).
 - b. Turn the latch handle 90 degrees to release the lock.
 - c. Slide the cover toward the rear (toward the rear-panel buttons) and then lift it from the I/O expander.
4. Remove the I/O expander from the server node:
 - a. Remove the five screws that secure the I/O expander to the top of the server node (see [Figure 22](#)).

Figure 22 I/O Expander Securing Screws (Five)



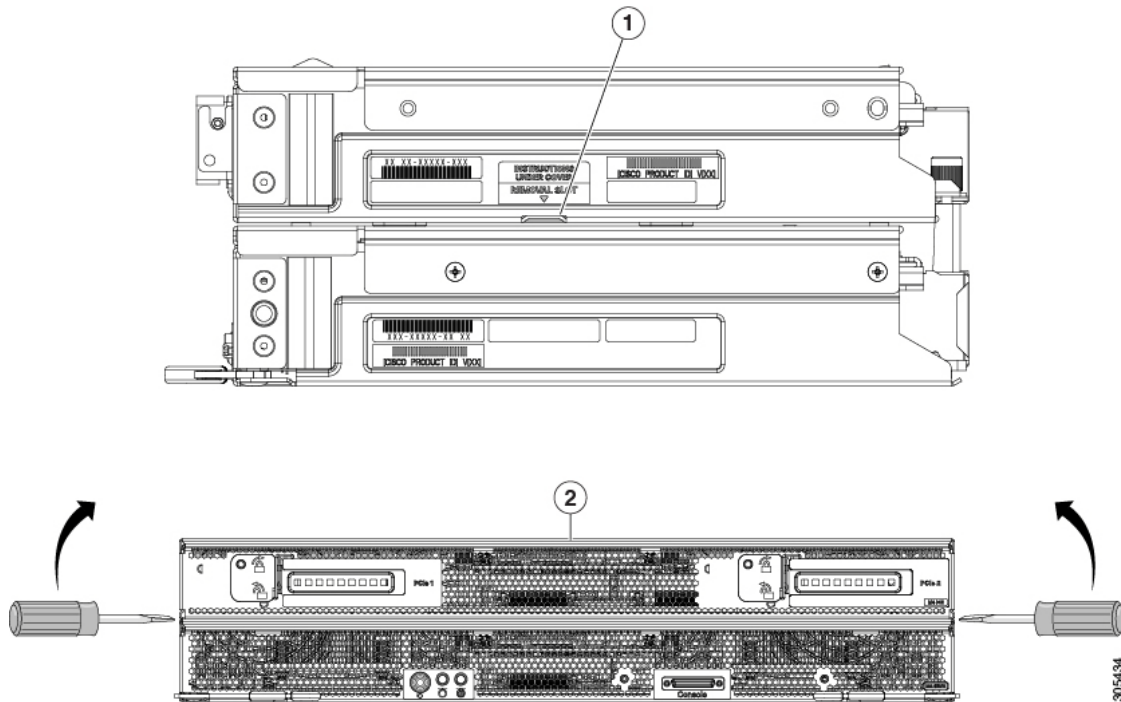
Replacing C3X60 M4 Server Node and I/O Expander Components

- b. Use two small flat-head screwdrivers (1/4-inch or equivalent) to help separate the connector on the underside of the I/O expander from the socket on the server node board.

Insert a screwdriver about 1/2-inch into the “REMOVAL SLOT” that is marked with an arrow on each side of the I/O expander (see [Figure 23](#)). Then *lift up* evenly on both screwdrivers at the same time to separate the connectors and lift the I/O expander about 1/2-inch.

- c. Grasp the two handles on the I/O expander board and lift it straight up.

Figure 23 Separating the I/O Expander From the M4 Server Node



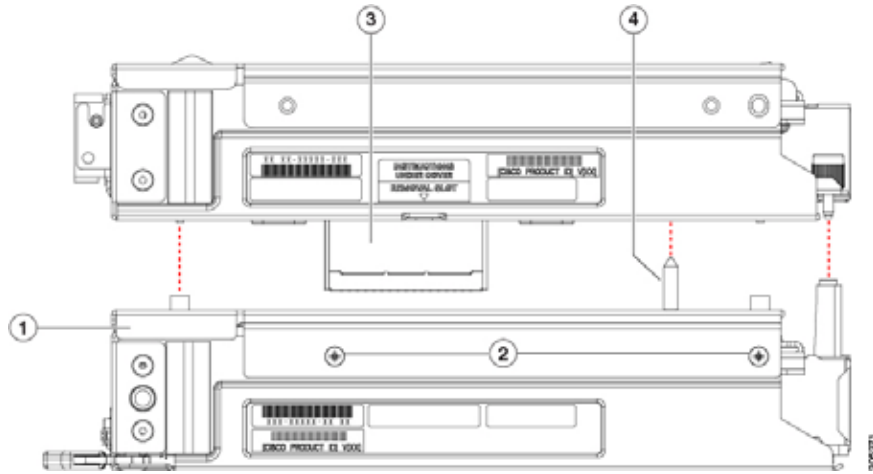
1	Side view showing removal slot for screwdriver insertion (one each side of I/O expander)	2	Rear view of server node with I/O expander
---	--	---	--

5. Reinstall the I/O expander to the server node:

CAUTION: Use caution to align all features of the I/O expander with the server node before mating the connector on the underside of the expander with the socket on the server board. The connector can be damaged if correct alignment is not used.

- a. Carefully align the I/O expander with the alignment pegs on the top of the intermediate cover (see [Figure 24](#)).
- b. Set the I/O expander down on the server node intermediate cover and push down gently to mate the connectors.

Figure 24 Replacing the I/O Expander to the M4 Server Node



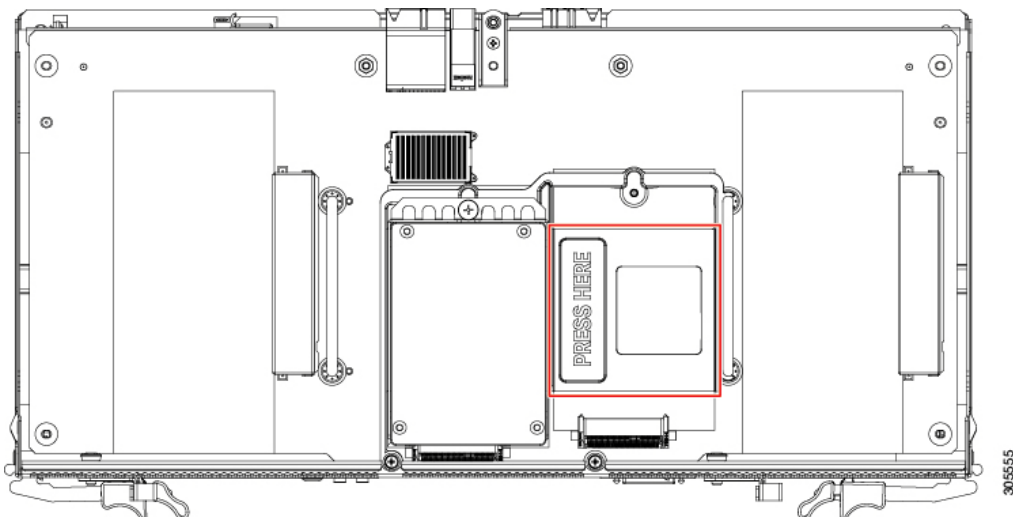
1	Intermediate cover attached to server node	3	I/O expander mezzanine connector
2	Intermediate cover screws (two on each side)	4	Alignment pegs on intermediate cover

- c. If a RAID controller is present or an NVMe SSD is present in the right-hand socket (IOENVMe2) of the I/O expander, you must remove them to access the PRESS HERE plate in the next step.

See [Replacing a Storage Controller Card Inside the I/O Expander, page 51](#) and [Replacing an NVMe SSD Inside the I/O Expander, page 53](#) to remove them, then return to the next step.

- d. Press down firmly on the plastic plate marked “PRESS HERE” to fully seat the connectors (see [Figure 25](#)).

Figure 25 I/O Expander, Showing “PRESS HERE” Plate



- e. If you removed a RAID controller or an NVMe SSD to access the PRESS HERE plate, reinstall them now.

See [Replacing a Storage Controller Card Inside the I/O Expander, page 51](#) and [Replacing an NVMe SSD Inside the I/O Expander, page 53](#).

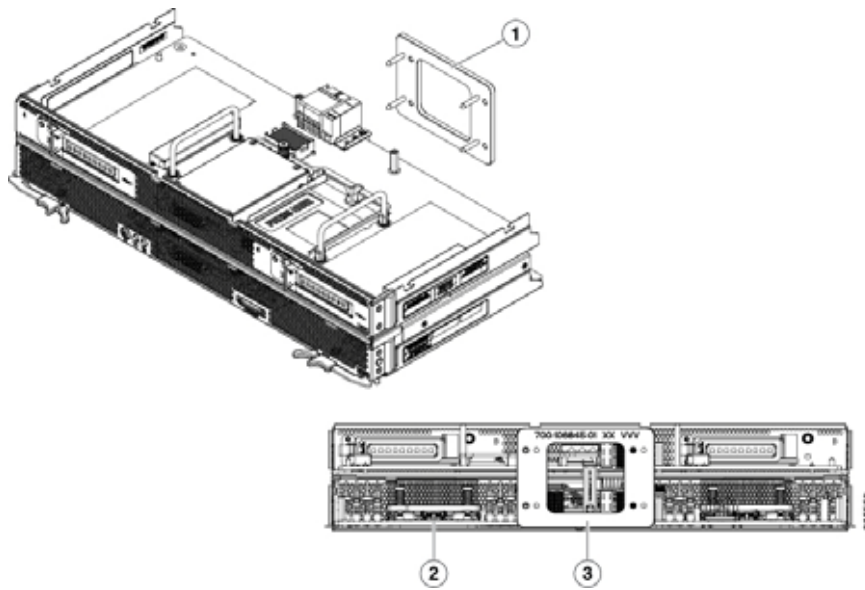
Replacing C3X60 M4 Server Node and I/O Expander Components

CAUTION: Before you reinstall the securing screws, you must use the supplied alignment tool (UCSC-C3K-M4IOTOOL) in the next step to ensure alignment of the connectors that connect to the internal chassis backplane. Failure to ensure alignment might damage the sockets on the backplane.

6. Insert the four pegs of the alignment tool into the holes that are built into the forward-connector side of the server node and I/O expander. Ensure that the alignment tool fits into all four holes and lies flat (see [Figure 26](#)).

NOTE: The alignment tool is shipped with systems that are ordered with an I/O expander. It is also shipped with I/O expander replacement spares. You can order the tool using Cisco PID UCSC-C3K-M4IOTOOL.

Figure 26 Using the I/O Expander Alignment Tool



1	Alignment tool	3	Alignment tool installed
2	Forward-connector side of server node and I/O expander		

7. Reinstall and tighten the five screws that secure the I/O expander to the top of the server node (see [Figure 22](#)).
8. Remove the alignment tool.
9. Reinstall the I/O expander top cover:
 - a. Set the cover in place on the I/O expander, offset about one inch toward the rear. Pegs on the inside of the cover must set into the tracks on the I/O expander base.
 - b. Push the cover forward until it stops.
 - c. Turn the latch handle 90 degrees to close the lock.
 - d. Fold the latch handle flat.
10. Install the server node with I/O expander to the chassis:
 - a. With the two ejector levers open, align the server node and I/O expander with the two empty bays.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
11. Power on the server node.

Adding an I/O Expander After-Factory

NOTE: This procedure is for adding an I/O expander to a C3X60 M4 server node. If you are replacing an existing I/O expander, see [Replacing an I/O Expander, page 39](#).

Tools Required

This procedure requires:

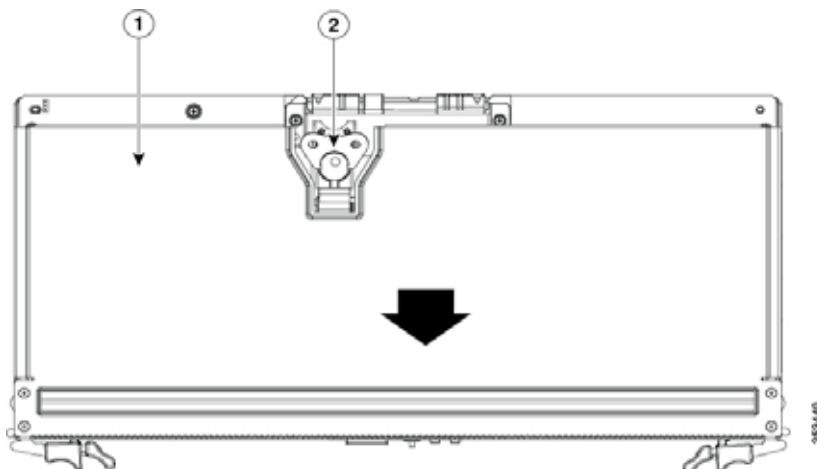
- I/O expander alignment tool UCSC-C3K-M4IOTOOL. This tool is included with the I/O expander spare.
- I/O expander kit UCS-S3260-IOLID. This kit includes:
 - One intermediate cover for the server node, including 4 cover screws
 - One threaded support post, with screw

Procedure

When an I/O expander is installed, the server node must occupy lower server bay 1. The I/O expander occupies upper server bay 2.

1. Shut down all server nodes in the chassis by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
2. Remove any server node (or disk expansion tray) from upper server bay 2 and set it on an antistatic work surface.
3. Remove any server node (or disk expansion tray) from lower server bay 1 and set it on an antistatic work surface.
4. Remove the top cover from the server node to which you will install an I/O expander:
 - a. Lift the latch handle to an upright position, and then turn the latch handle 90 degrees to release the lock.
 - b. Slide the cover toward the rear (toward the rear-panel buttons) and then lift it from the server node.

Figure 27 Cisco UCS C3X60 M4 Server Node Top Cover



1	Server node top cover	2	Latch handle (shown in closed, flat position)
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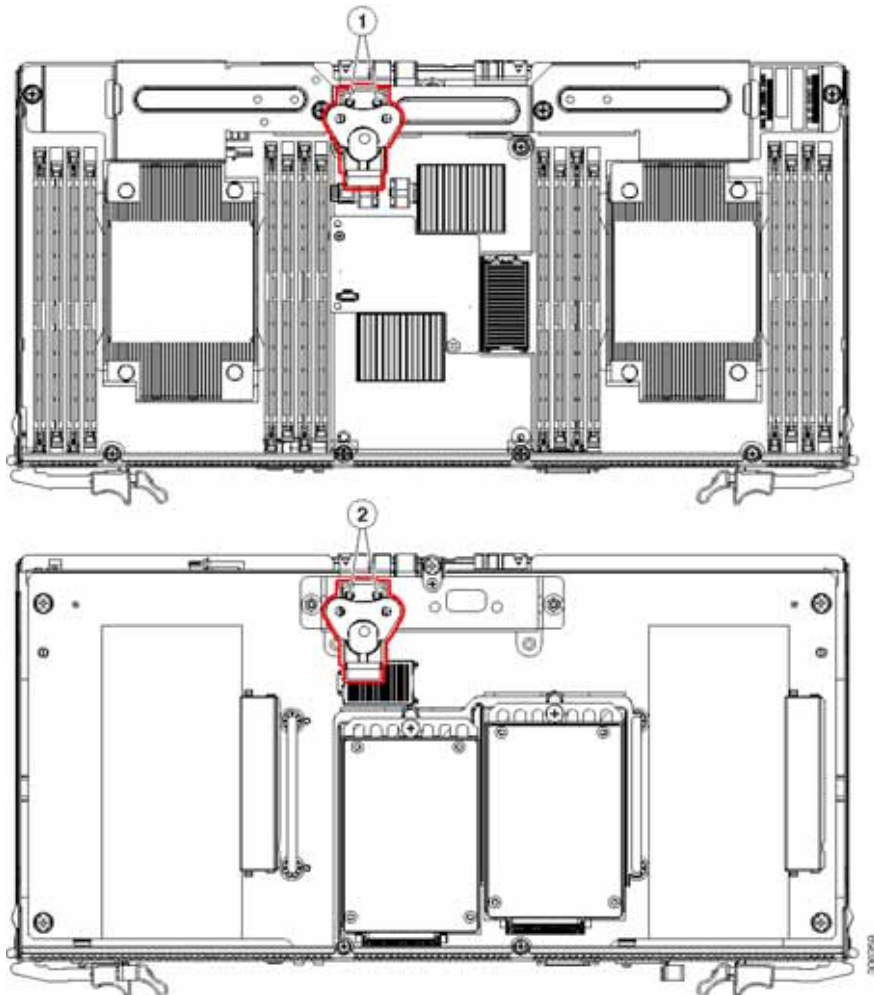
Replacing C3X60 M4 Server Node and I/O Expander Components

5. If there is a storage controller card installed in the server node, remove it to provide clearance in the next step. (If there is no storage controller, continue with step 6.)
 - a. Loosen the captive thumbscrews that secure the controller card to the board.
 - b. Grasp the card at both ends and lift it evenly to disengage the connector on the underside of the card from the mezzanine socket.
6. Move the cover latch assembly from the controller-card bracket to a bracket in the IO expander. You will install the top cover to the I/O expander at the end of this procedure and so it requires the cover latch.

Remove the two Phillips-head screws that secure the cover latch assembly to the controller card. See the following figure.

- If your I/O expander has a storage controller card, use the two Phillips-head screws that you just removed to install the cover latch assembly to the bracket of that controller card.
- If your I/O expander does not have a storage controller card, use the two Phillips-head screws to install the cover latch assembly to the bracket on the I/O expander board. See the following figure.

Figure 28 Cover Latch Assembly Screws in Server Node and I/O Expander



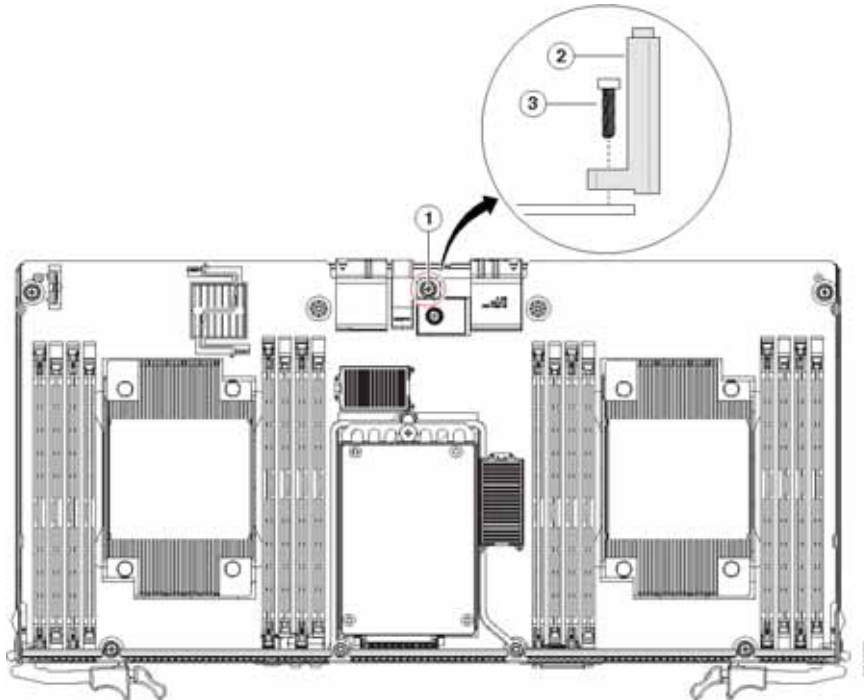
1	Two securing screws on cover latch assembly in server node (shown installed on controller card bracket)	2	Two securing screws on cover latch assembly in I/O expander (shown installed to bracket on I/O expander board)
---	---	---	--

7. Remove one Phillips-head screw from the server node board. See the following figure for the screw location.
8. Install the threaded metal support post from the kit, using one screw.

Replacing C3X60 M4 Server Node and I/O Expander Components

Set the post against the edge of the server board where you removed the screw in the prior step. The flange with the screw hole must sit flat on top of the board. See the following figure.

Figure 29 Support Post and Screw, C3X60 M4 Server Node

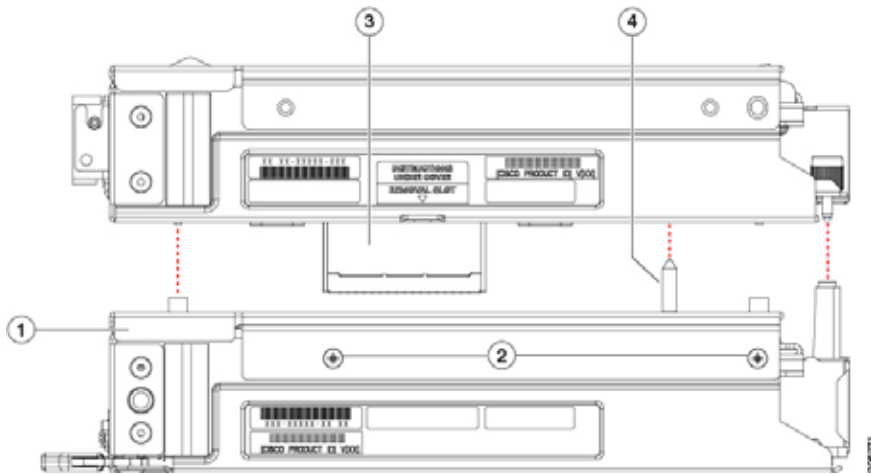


1	Phillips-head screw location (remove this screw)	3	Support post screw
2	Side view of support post, showing installation position on edge of server board		

9. If you removed a storage controller card, install it back to the server node now.
 - a. Align the card over the mezzanine socket and the three standoffs.
 - b. Press down on both ends of the card to engage the connector on the underside of the card with the mezzanine socket.
 - c. Tighten the captive screws that secure the card to the board.
10. Install the intermediate cover from the kit to the server node. Set the intermediate cover in place and then install its four securing screws (two on each side).
11. Install the I/O expander to the server node:

CAUTION: Use caution to align all features of the I/O expander with the server node before mating the connector on the underside of the expander with the socket on the server board. The connector can be damaged if correct alignment is not used.

- a. Carefully align the I/O expander with the alignment pegs on the top of the intermediate cover (see the following figure).
- b. Set the I/O expander down on the server node intermediate cover and push down gently to mate the connectors.

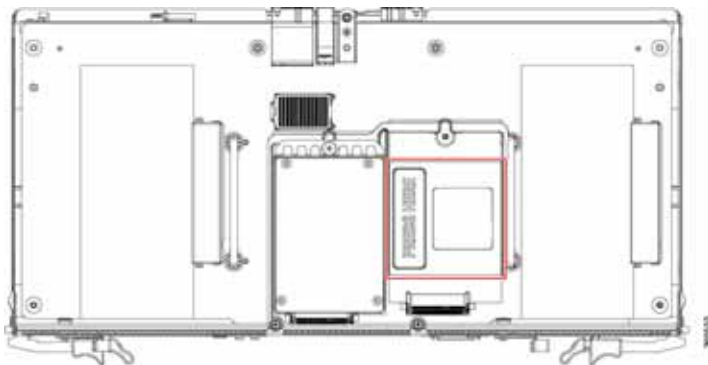
Figure 30 Replacing the I/O Expander to the M4 Server Node

1	Intermediate cover attached to server node	3	I/O expander mezzanine connector
2	Intermediate cover screws (two on each side of cover)	4	Alignment pegs on intermediate cover

- c. If a RAID controller is present or an NVMe SSD is present in the right-hand socket (IOENVMe2) of the I/O expander, you must remove them to access the PRESS HERE plate in the next step.

See [Replacing a Storage Controller Card Inside the I/O Expander, page 51](#) and [Replacing an NVMe SSD Inside the I/O Expander, page 53](#) to remove them, then return to the next step.

- d. Press down firmly on the plastic plate marked “PRESS HERE” to fully seat the connectors.

Figure 31 I/O Expander, Showing “PRESS HERE” Plate

- e. If you removed a RAID controller or an NVMe SSD to access the PRESS HERE plate, reinstall them now.

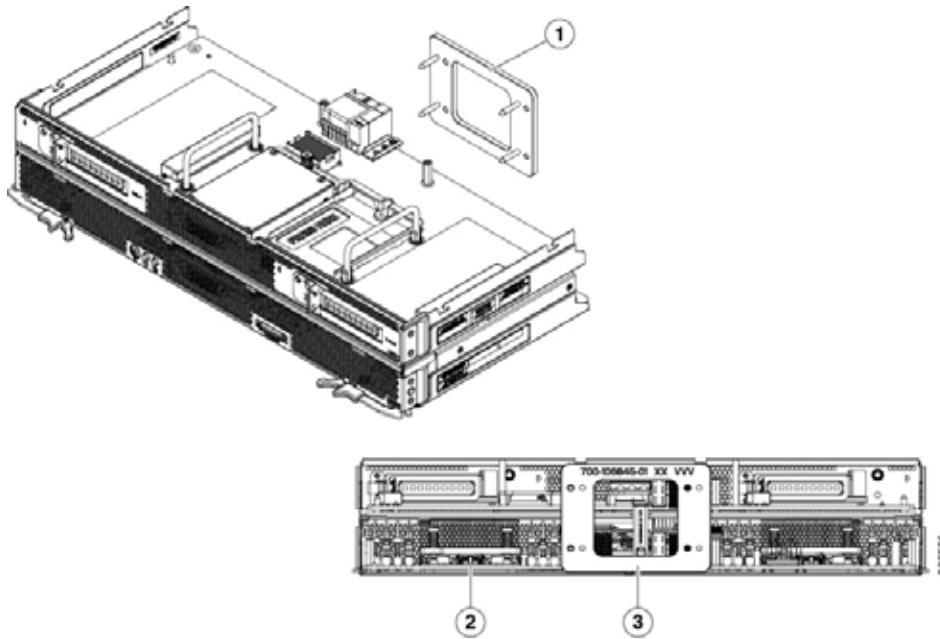
See [Replacing a Storage Controller Card Inside the I/O Expander, page 51](#) and [Replacing an NVMe SSD Inside the I/O Expander, page 53](#).

CAUTION: Before you install the I/O expander securing screws, you must use the supplied alignment tool (UCSC-C3K-M4IOTOOL) in the next step to ensure alignment of the connectors that connect to the internal chassis backplane. Failure to ensure alignment might damage the sockets on the backplane.

12. Insert the four pegs of the alignment tool into the holes that are built into the forward-connector side of the server node and I/O expander. Ensure that the alignment tool fits into all four holes and lies flat (see the following figure).

NOTE: The alignment tool is shipped with I/O expander spares. You can order the tool using Cisco PID UCSC-C3K-M4IOTOOL.

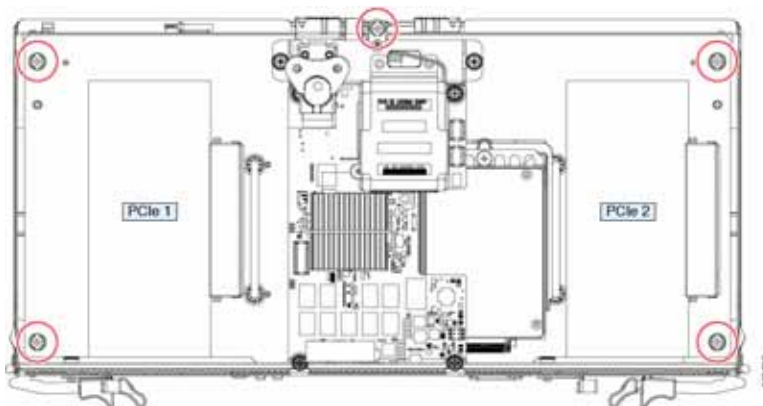
Figure 32 Using the I/O Expander Alignment Tool



1	Alignment tool	3	Alignment tool installed
2	Forward-connector side of server node and I/O expander		

13. Install and tighten the five screws that secure the I/O expander to the top of the server node (see [Figure 33](#)). The screw at the center of the board edge screws into the support post that you installed earlier in this procedure.

Figure 33 I/O Expander Securing Screws (Five)



14. Remove the alignment tool.

15. Install the top cover that you removed from the server node to the I/O expander:

- a. Set the cover in place on the I/O expander, offset about one inch toward the rear. Pegs on the inside of the cover must set into the tracks on the I/O expander base.

Replacing C3X60 M4 Server Node and I/O Expander Components

- b.** Push the cover forward until it stops.
 - c.** Turn the latch handle 90 degrees to close the lock and then fold the latch handle flat.
- 16.** Install the server node with attached I/O expander to the chassis:
 - a.** With the two ejector levers open, align the server node and I/O expander with the two empty bays.
 - b.** Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c.** Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
- 17.** Power on the server node.

Replacing a PCIe Card Inside an I/O Expander

The optional I/O expander has two horizontal PCIe sockets.

Table 4 PCIe Expansion Slots in I/O Expander

Slot Number	Electrical Lane Width	Socket Length	Supported Card Length ¹	Supported Card Height ²	NCSI Support
PCIe 1 (IOESlot1)	Gen-3 x8	x16 connector	3/4 length	1/2 height	No
PCIe 2 (IOESlot2)	Gen-3 x8	x16 connector	3/4 length	1/2 height	No

1. This is the supported length because of internal clearance.

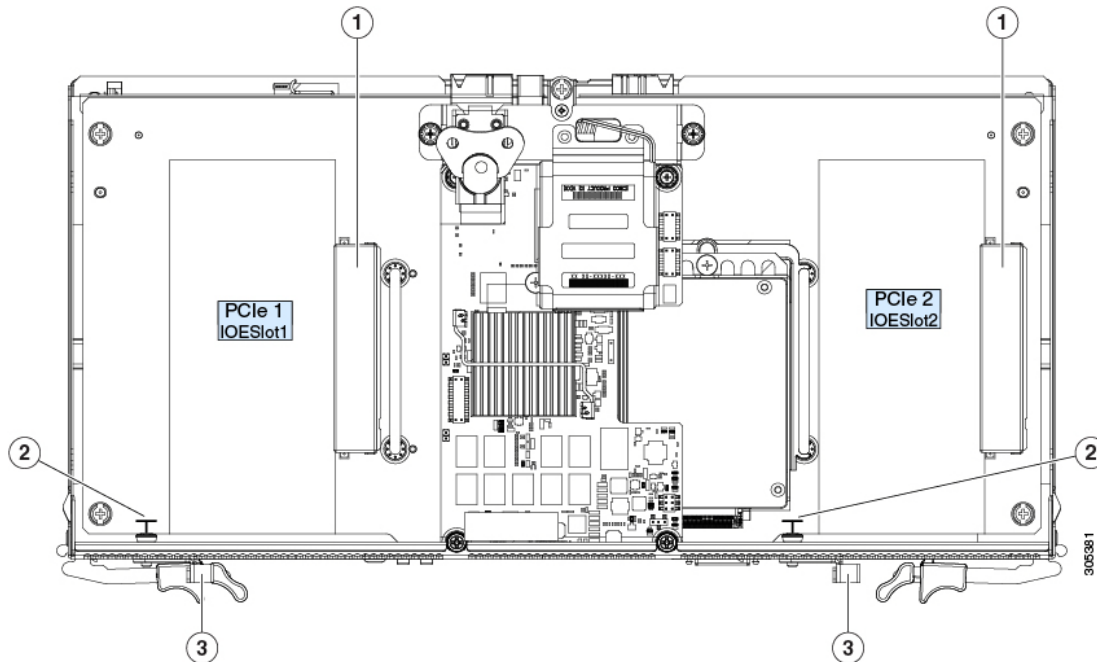
2. This is the size of the rear panel opening.

1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node](#), page 6.
2. Remove a server node with attached I/O expander from the system:
 - a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 1](#)).
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node with attached I/O expander straight out from the system.
3. Remove the top cover from the I/O expander:
 - a. Lift the latch handle to an upright position (see [Figure 5](#)).
 - b. Turn the latch handle 90 degrees to release the lock.
 - c. Slide the cover toward the rear (toward the rear-panel buttons) and then lift it from the I/O expander.
4. Remove an existing PCIe card (or a filler panel if no card is present):
 - a. Release the card-tab retainer. On the inside of the I/O expander, pull the spring-loaded plunger on the card-tab retainer inward and then rotate the card-tab retainer 90 degrees to the open position (see [Figure 34](#)).
 - b. Slide the PCIe card horizontally to free its edge connector from the socket, and then lift the card out from the I/O expander.

If no card is present, remove the filler panel from the slot.
5. Install a new PCIe card:
 - a. With the card-tab retainer in the open position, set the card in the I/O expander and align its edge connector with the socket.
 - b. Slide the card horizontally to fully engage the edge connector with the socket. The card's tab should sit flat against the rear-panel opening.
 - c. Close the card-tab retainer. Rotate the retainer 90 degrees until it clicks and locks.
6. Replace the I/O expander cover:
 - a. Set the cover in place on the I/O expander, offset about one inch toward the rear. Pegs on the inside of the cover must engage the tracks on the I/O expander base.
 - b. Push the cover forward until it stops.
 - c. Turn the latch handle 90 degrees to close the lock.

Replacing C3X60 M4 Server Node and I/O Expander Components

- d. Fold the latch handle flat.
7. Install a server node with I/O expander to the chassis:
 - a. With the two ejector levers open, align the server node and I/O expander with the two empty bays.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
 8. Power on the server node.

Figure 34 PCIe Card Sockets Inside the I/O Expander

1	PCIe card sockets (software designations IOESlot1 and IOESlot2)	3	Card-tab retainer (outside the I/O expander)
2	Spring-loaded peg on card-tab retainer (inside the I/O expander)		

Replacing a Storage Controller Card Inside the I/O Expander

The software designation of the controller card socket inside the I/O expander is IOEMezz1.

Note the following population rules for storage controllers:

- If the server node has UCS-S3260-DHBA, then no controller is allowed in the I/O expander.
- If the server node has UCS-C3K-M4RAID, then the I/O expander can also have UCS-C3K-M4RAID (but not UCS-S3260-DHBA).
- If the server node has no storage controller, then the I/O expander can have UCS-C3K-M4RAID or UCS-S3260-DHBA.

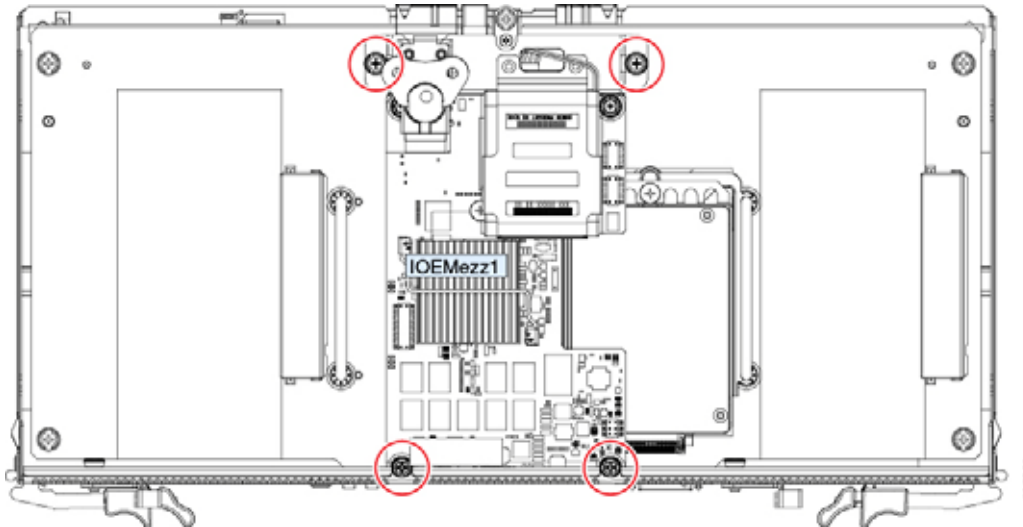
NOTE: If you move a controller from the server node to the I/O expander, or move it from the I/O expander to the server node, you must run the Cisco Host Upgrade Utility (HUU) on the server node to update the sub-OEMID to the correct values. If you do not do this, the server node Cisco IMC returns an Invalid Hardware Configuration error. [HUU Guides](#).

1. Shut down and power off the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
2. Remove a server node with attached I/O expander from the system:
 - a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 1](#)).
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node with attached I/O expander straight out from the system.
3. Remove the cover from the I/O expander:
 - a. Lift the latch handle to an upright position (see [Figure 5](#)).
 - b. Turn the latch handle 90-degrees to release the lock.
 - c. Slide the cover toward the rear (toward the rear-panel buttons) and then lift it from the I/O expander.
4. Remove a Cisco modular RAID controller card:
 - a. Loosen the four captive thumbscrews that secure the card to the I/O expander (see [Figure 35](#)).
 - b. Grasp the card at both ends and lift it evenly to disengage the connector on the underside of the card from the mezzanine socket.
5. Install a Cisco modular RAID controller card:
 - a. Align the card with bracket over the mezzanine socket and the four standoffs.
 - b. Press down on both ends of the card to engage the connector on the underside of the card with the mezzanine socket.
 - c. Tighten the four captive thumbscrews that secure the card to the server node.
6. Replace the I/O expander cover:
 - a. Set the cover in place on the I/O expander, offset about one inch toward the rear. Pegs on the inside of the cover must set into the tracks on the I/O expander base.
 - b. Push the cover forward until it stops.
 - c. Turn the latch handle 90-degrees to close the lock.
 - d. Fold the latch handle flat.

Replacing C3X60 M4 Server Node and I/O Expander Components

7. Install a server node with attached I/O expander to the chassis:
 - a. With the two ejector levers open, align the new server node with the empty bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
8. Power on the server node.

Figure 35 Storage Controller Card Thumbscrews Inside the I/O Expander



Replacing a Supercap (RAID Backup) in an I/O Expander

To replace a supercap power module (SCPM) that is on a RAID controller inside an I/O expander, use the procedure in [Replacing a Supercap \(RAID Backup\) on a RAID Controller, page 37](#).

Replacing an NVMe SSD Inside the I/O Expander

The I/O expander has two sockets for NVMe SSDs.

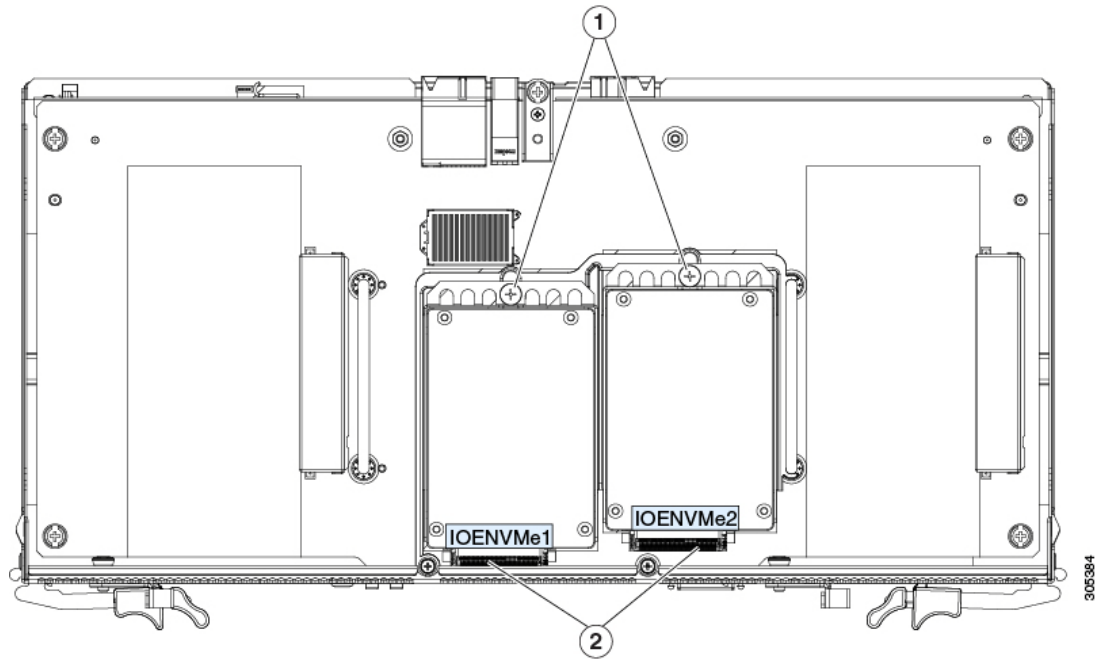
The software designations of the NVMe PCIe SSD sockets inside the I/O expander are IOENVMe1 and IOENVMe2 (see [Figure 36](#)).

1. Shut down and power off the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
2. Remove a server node with attached I/O expander from the system:
 - a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 1](#)).
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node straight out from the system.
3. Remove the cover from the I/O expander:
 - a. Lift the latch handle to an upright position (see [Figure 5](#)).
 - b. Turn the latch handle 90-degrees to release the lock.
 - c. Slide the cover toward the rear (toward the rear-panel buttons) and then lift it from the I/O expander.
4. If a RAID controller is present, remove it from the I/O expander to provide clearance:
 - a. Loosen the four captive thumbscrews that secure the card (see [Figure 35](#)).
 - b. Grasp the card at both ends and lift it evenly to disengage the connector on the underside of the card from the mezzanine socket.
5. Remove the NVMe PCIe SSD:
 - a. Remove the single screw that secures the drive to its bracket (see [Figure 36](#)).
 - b. Slide the drive to disengage it from its horizontal socket, then lift it from the I/O expander.
6. Install a new NVMe PCIe SSD:
 - a. Set the drive in its bracket, then slide it forward to engage its connector with the socket.
 - b. Install the single screw that secures the drive to the bracket.
7. If you removed a RAID controller, reinstall it:
 - a. Align the card with bracket over the mezzanine socket and the four standoffs.
 - b. Press down on both ends of the card to engage the connector on the underside of the card with the mezzanine socket.
 - c. Tighten the four captive thumbscrews that secure the card.
8. Replace the I/O expander cover:
 - a. Set the cover in place on the I/O expander, offset about one inch toward the rear. Pegs on the inside of the cover must set into the tracks on the I/O expander base.
 - b. Push the cover forward until it stops.
 - c. Turn the latch handle 90-degrees to close the lock.
 - d. Fold the latch handle flat.
9. Install a server node with attached I/O expander to the chassis:

Replacing C3X60 M4 Server Node and I/O Expander Components

- a. With the two ejector levers open, align the new server node with the empty bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
10. Power on the server node.

Figure 36 NVMe PCIe SSDs Inside the I/O Expander



1	Single securing screw (one each SSD)	2	NVMe PCIe SSD sockets IOENVMe1 and IOENVMe2
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Service Headers on the Server Node Board

The server node board includes headers that you can jumper for certain service functions. This section includes the following topics:

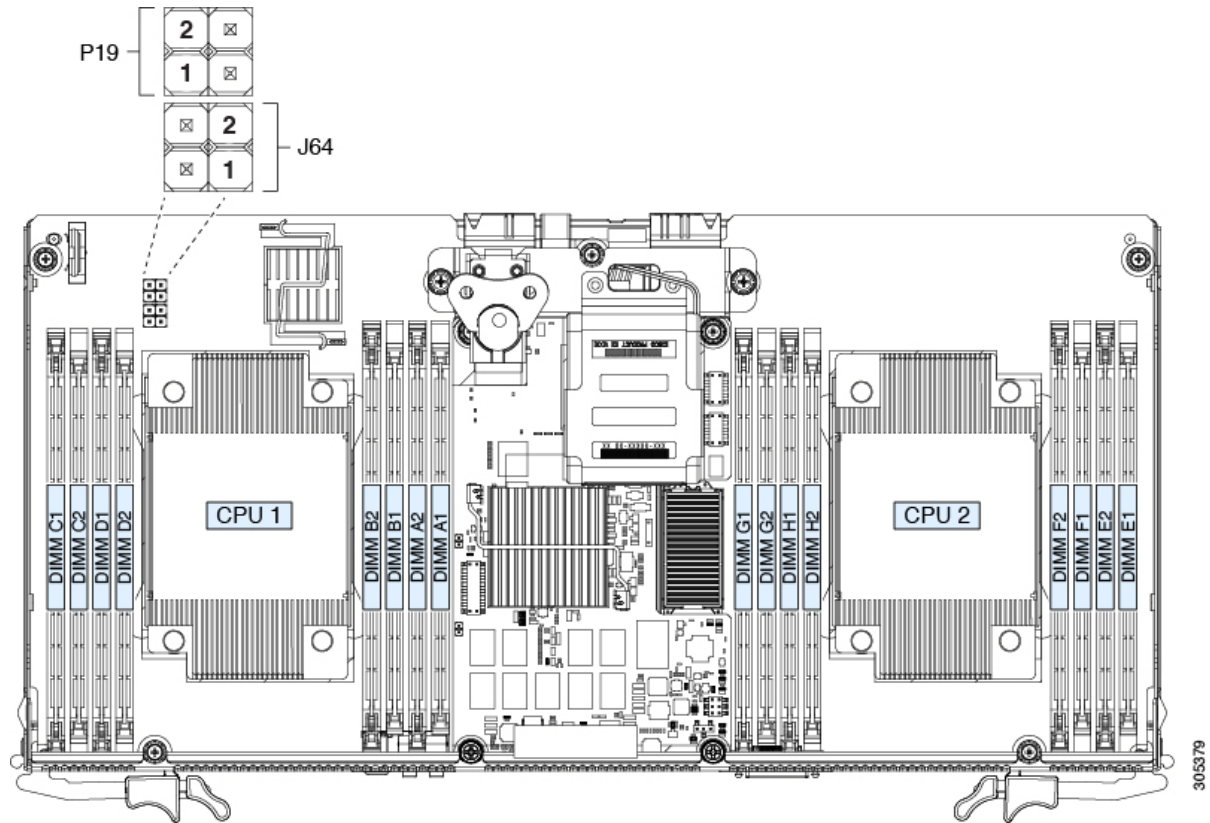
- [Service Header Locations on the C3X60 M4 Server Node Board, page 55](#)
- [Using the Clear Password Header J64, page 56](#)
- [Using the Clear CMOS Header P19, page 56](#)

Service Header Locations on the C3X60 M4 Server Node Board

There are two 2-pin service headers on the server node board that are supported for use. See [Figure 37](#) for the locations.

- Header J64 = Password clear
- Header P19 = CMOS clear

Figure 37 Service Headers on the C3X60 M4 Server Node Board



1	Header J64 = Password clear	2	Header P19 = CMOS clear
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Using the Clear Password Header J64

You can use a jumper on header J64 to clear the administrator password.

1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
2. Remove a server node from the system:
 - a. Grasp the two ejector levers and pinch their latches to release the levers.
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node straight out from the system.
3. Do one of the following to access the component inside the server node:
 - If the server node does not have an I/O expander attached—Remove the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover, page 12](#) before continuing with the next step.
 - If the server node has an I/O expander attached—Remove the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node, page 14](#) before you continue with the next step.
4. Locate header J64 (see [Figure 37](#)).
5. Install a jumper to pins 1 and 2 of the header.
6. Install the server node:
 - a. With the two ejector levers open, align the server node with the empty bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
7. Power on the server node.
8. After the server node has fully booted, shut it down again, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
9. Remove the server node from the system, and then remove the server node cover.
10. Remove the jumper from pins 1 and 2.

NOTE: If you do not remove the jumper, the Cisco IMC clears the password each time that you boot the server node.

11. Do one of the following:
 - If the server node did not have an I/O expander attached—Reinstall the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover, page 12](#) before continuing with the next step.
 - If the server node had an I/O expander attached—Reinstall the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node, page 14](#) before you continue with the next step.
12. Power on the server node.

Using the Clear CMOS Header P19

You can install a jumper to header P19 to clear the CMOS settings.

1. Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).

Service Headers on the Server Node Board

2. Remove a server node chassis from the system:
 - a. Grasp the two ejector levers and pinch their latches to release the levers.
 - b. Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
 - c. Pull the server node chassis straight out from the system.
 3. Do one of the following to access the component inside the server node:
 - If the server node does not have an I/O expander attached—Remove the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover, page 12](#) before continuing with the next step.
 - If the server node has an I/O expander attached—Remove the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node, page 14](#) before you continue with the next step.
 4. Locate header P19 (see [Figure 37](#)).
 5. Install a jumper to pins 1 and 2 of the header.
 6. Install the server node to the system:
 - a. With the two ejector levers open, align the server node with the empty bay.
 - b. Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
 - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
 7. Power on the server node.
 8. After the server node has fully booted, shut it down again, as described in [Shutting Down a C3X60 M4 Server Node, page 6](#).
 9. Remove the server node from the system, and then remove the server node cover.
 10. Remove the jumper from pins 1 and 2.
- NOTE:** If you do not remove the jumper, the Cisco IMC clears the CMOS settings each time that you boot the server node.
11. Do one of the following:
 - If the server node did not have an I/O expander attached—Reinstall the server node cover as described in [Removing a C3X60 M4 Server Node or I/O Expander Top Cover, page 12](#) before continuing with the next step.
 - If the server node had an I/O expander attached—Reinstall the I/O expander and intermediate cover as described in [Removing an I/O Expander From a C3X60 M4 Server Node, page 14](#) before you continue with the next step.
 12. Power on the server node.

Storage Controller Considerations

- [Supported Storage Controllers and Required Cables, page 58](#)
- [Cisco UCS C3X60 12G SAS RAID Controller Information, page 59](#)
- [Cisco UCS S3260 12G Dual Pass-Through Controller Information, page 59](#)
- [Best Practices For Configuring RAID Controllers, page 59](#)
- [Restoring RAID Configuration After Replacing a RAID Controller, page 60](#)
- [Embedded Software RAID, page 62](#)
- [For More Information on Using Storage Controllers, page 70](#)

Supported Storage Controllers and Required Cables

[Table 5](#) lists the supported storage controller cards for the C3X60 M4 server node.

Table 5 Cisco UCS C3X60 M4 Supported Storage Controller Options

Controller	Style	Maximum Drives	RAID Levels	Required Cables
Cisco UCS C3X60 12G SAS RAID Controller for M4 Server Nodes (with 4 GB cache) UCS-C3K-M4RAID	Mezzanine connector	60 internal	0, 1, 5, 6, 10, 50, 60	None. Card installs to mezzanine socket inside the server node or I/O expander.
Cisco UCS S3260 Dual Pass-Through Controller UCS-S3260-DHBA NOTE: This controller is supported in an M4 server node only; it is not supported in M3 server nodes. NOTE: This controller requires chassis part number 68-5286-06 or later. The chassis motherboard in earlier chassis versions does not support this controller.	Mezzanine connector	60 internal	Non-RAID	None. Card installs to mezzanine socket inside the server node.

Storage Controller Population Rules for C3X60 M4 and I/O Expander

- If the server has UCS-S3260-DHBA, then no controller is allowed in the I/O expander.
- If the server node has UCS-C3K-M4RAID, then the I/O expander can also have UCS-C3K-M4RAID (but not UCS-S3260-DHBA).
- If the server node has no storage controller, then the I/O expander can have UCS-C3K-M4RAID or UCS-S3260-DHBA.

NOTE: If you move a controller from the server node to the I/O expander, or move it from the I/O expander to the server node, you must run the Cisco Host Upgrade Utility (HUU) on the server node to update the sub-OEMID to the correct values. If you do not do this, the server node Cisco IMC returns an Invalid Hardware Configuration error. [HUU Guides](#).

Cisco UCS C3X60 12G SAS RAID Controller Information

The Cisco UCS C3X60 12G SAS RAID Controller for M4 server nodes is based on the Broadcom 3316 SAS/SATA, 16-port RAID-on-chip (RoC).

The controller can be used in JBOD mode (non-RAID) or in MegaRAID hardware RAID mode with a choice of RAID levels 0,1,5,6,10, 50, or 60.

- Maximum drives controllable—64 (the server has maximum 60 internal drives)
- Maximum drives per span—32
- Maximum spans—8

Cisco UCS S3260 12G Dual Pass-Through Controller Information

The Cisco UCS S3260 Dual Pass-Through Controller is based on the Broadcom 3316 SAS/SATA, 16-port RAID-on-chip (RoC). This controller is divided into two boards: a base board and a power board. The power board supplies power to the base board.

This pass-through controller has the following features:

- Dual Broadcom SAS3316-based subsystems.
- Dual 8x SAS-3 lanes (12G, 6G, 3G, and SATA), one for each subsystem.
- Dual 8x PCIe Gen-3 lanes via the server-board mezzanine connector, one for each subsystem.
- Maximum 50 W power consumption.

Best Practices For Configuring RAID Controllers

- [4K Sector Format Drives, page 59](#)
- [RAID Card Firmware Compatibility, page 59](#)
- [Choosing Between RAID 0 and JBOD, page 60](#)
- [RAID 5/RAID 6 Volume Creation, page 60](#)
- [Choosing I/O Policy, page 60](#)
- [Background Operations \(BGOPs\), page 60](#)

4K Sector Format Drives

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

RAID Card Firmware Compatibility

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

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

Choosing Between RAID 0 and JBOD

The RAID controller supports JBOD mode (non-RAID) on physical drives that are in pass-through mode and directly exposed to the OS. We recommend that you use JBOD mode instead of individual RAID 0 volumes when possible.

RAID 5/RAID 6 Volume Creation

The RAID controller allows you to create a large RAID 5 or 6 volume by including all the drives in the system in a spanned array configuration (RAID 5/RAID 6). Where possible, we recommend you create multiple, smaller RAID 5/6 volumes with fewer drives per RAID array. This provides redundancy and reduces the operations time for initialization, RAID rebuilds, and other operations.

Choosing I/O Policy

The I/O policy applies to reads on a specific virtual drive. It does not affect the read-ahead cache. RAID volumes can be configured in two types of I/O policies. These are:

- **Cached I/O**—In this mode, all reads are buffered in cache memory. Cached I/O provides faster processing.
- **Direct I/O**—In this mode, reads are not buffered in cache memory. Data is transferred to the cache and the host concurrently. If the same data block is read again, it comes from cache memory. Direct I/O makes sure that the cache and the host contain the same data.

Although Cached I/O provides faster processing, it is useful only when the RAID volume has a small number of slower drives. With the C3X60 4-TB SAS drives, Cached I/O has not shown any significant advantage over Direct I/O. Instead, Direct I/O has shown better results over Cached I/O in a majority of I/O patterns. We recommend you use Direct I/O (the default) in all cases.

Background Operations (BGOPS)

The RAID controller conducts different background operations like Consistency Check (CC), Background Initialization (BGI), Rebuild (RBLD), Volume Expansion & Reconstruction (RLM), and Patrol Real (PR).

While these BGOPS are expected to limit their impact to I/O operations, there have been cases of higher impact during some of the I/O operations such as Format. In these cases, both the I/O operation and the BGOPS may take more time to complete. In such cases, we recommend you limit concurrent BGOPS and other intensive I/O operations where possible.

Restoring RAID Configuration After Replacing a RAID Controller

When you replace a RAID controller, the RAID configuration that is stored in the controller is lost.

To restore your RAID configuration to your new RAID controller, follow these steps.

1. Replace your RAID controller. See [Replacing a Storage Controller Card Inside the C3X60 M4 Server Node, page 34](#).
2. If this was a full chassis swap, replace all drives into the drive bays, in the same order that they were installed in the old chassis.
3. Reboot the server node.
4. Press any key (other than C) to continue when you see the following onscreen prompt:

```
All of the disks from your previous configuration are gone. If this is
an unexpected message, then please power of your system and check your cables
to ensure all disks are present.
Press any key to continue, or 'C' to load the configuration utility.
```

5. Watch the subsequent screens for confirmation that your RAID configuration was imported correctly:
- If you see the following message, your configuration was successfully imported. The LSI virtual drive is also listed among the storage devices.

```
N Virtual Drive(s) found on host adapter.
```

Storage Controller Considerations

- If you see the following message, your configuration was not imported. In this case, reboot the server node and try the import operation again.

0 Virtual Drive(s) found on host adapter.

Embedded Software RAID

- [Launching the LSI Embedded MegaRAID Configuration Utility, page 62](#)
- [Installing LSI MegaSR Drivers For Windows and Linux, page 62](#)

Each server node includes an embedded MegaRAID controller that can control two rear-panel solid state drives (SSDs) in a RAID 0 or 1 configuration. This embedded software RAID is available only when the server node has the UCS S3260 12G Dual Pass-Through Controller (UCS-S3260-DHBA) installed. When this HBA is installed, the two rear-panel SSDs can be controlled through software RAID mode or AHCI mode, when selected in the server BIOS.

NOTE: Embedded software RAID is not available when the HW RAID Cisco UCS C3X60 12G SAS RAID Controller (UCS-C3K-M4RAID) is installed. In that case, the rear-panel SSDs are controlled by hardware RAID.

NOTE: VMware ESX/ESXi or any other virtualized environments are not supported for use with the embedded MegaRAID controller.

NOTE: The Microsoft Windows Server 2016 Hyper-V hypervisor is supported for use with the embedded MegaRAID controller. Other hypervisors such as Xen and KVM are not supported.

NOTE: The embedded RAID controller in server node 1 can control the upper two rear-panel SSDs; the embedded RAID controller in server node 2 can control the lower two rear-panel SSDs.

Launching the LSI Embedded MegaRAID Configuration Utility

1. When the server reboots, watch for the prompt to press Ctrl+M.
2. When you see the prompt, press **Ctrl+M** to launch the utility.

Installing LSI MegaSR Drivers For Windows and Linux

NOTE: The required drivers for this controller are already installed and ready to use with the LSI software RAID Configuration Utility. However, if you will use this controller with Windows or Linux, you must download and install additional drivers for those operating systems.

This section explains how to install the LSI MegaSR drivers for the following supported operating systems:

- Microsoft Windows Server
- Red Hat Enterprise Linux (RHEL)
- SUSE Linux Enterprise Server (SLES)

For the specific supported OS versions, see the [Hardware and Software Interoperability Matrix](#) for your server release.

This section contains the following topics:

- [Downloading the LSI MegaSR Drivers, page 62](#)
- [Microsoft Windows Driver Installation, page 63](#)
- [Linux Driver Installation, page 64](#)

Downloading the LSI MegaSR Drivers

The MegaSR drivers are included in the C-Series driver ISO for your server and OS. Download the drivers from Cisco.com.

1. Find the drivers ISO file download for your server online and download it to a temporary location on your workstation:
 - a. See the following URL: <http://www.cisco.com/cisco/software/navigator.html>

Storage Controller Considerations

- b. Type the name of your server in the **Select a Product** search field and then press **Enter**.
 - c. Click **Unified Computing System (UCS) Drivers**.
 - d. Click the release number that you are downloading.
 - e. Click the Download icon to download the drivers ISO file.
2. Continue through the subsequent screens to accept the license agreement and then browse to a location where you want to save the drivers' ISO file.

Microsoft Windows Driver Installation

This section describes how to install the LSI MegaSR driver in a Windows installation.

This section contains the following topics:

- [Windows Server 2008R2 Driver Installation, page 63](#)
- [Updating the Windows Driver, page 64](#)
- [Linux Driver Installation, page 64](#)

Windows Server 2008R2 Driver Installation

The Windows operating system automatically adds the driver to the registry and copies the driver to the appropriate directory.

1. Create a RAID drive group using the LSI Software RAID Configuration Utility before you install this driver for Windows. Launch this utility by pressing **Ctrl+M** when `LSI SWRAID` is shown during the BIOS POST.
2. Download the Cisco UCS C-Series drivers' ISO, as described in [Downloading the LSI MegaSR Drivers, page 62](#).
3. Prepare the drivers on a USB thumb drive:
 - a. Burn the ISO image to a disk.
 - b. Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:
`<OS>/Storage/Intel/C600/`
 - c. Expand the Zip file, which contains the folder with the MegaSR driver files.
 - d. Copy the expanded folder to a USB thumb drive.
4. Start the Windows driver installation using one of the following methods:
 - To install from local media, connect an external USB DVD drive to the server and then insert the first Windows installation disk into the drive. Skip to 6..
 - To install from remote ISO, log in to the server's Cisco IMC interface and continue with the next step.
5. Launch a Virtual KVM console window and click the **Virtual Media** tab.
 - a. Click **Add Image** and browse to select your remote Windows installation ISO file.
 - b. Check the check box in the Mapped column for the media that you just added, and then wait for mapping to complete.
6. Power cycle the server.
7. Press **F6** when you see the F6 prompt during bootup. The Boot Menu window opens.

Storage Controller Considerations

8. On the Boot Manager window, choose the physical disk or virtual DVD and press **Enter**. The Windows installation begins when the image is booted.
9. Press **Enter** when you see the prompt, “Press any key to boot from CD.”
10. Observe the Windows installation process and respond to prompts in the wizard as required for your preferences and company standards.
11. When Windows prompts you with “Where do you want to install Windows,” install the drivers for embedded MegaRAID:
 - a. Click **Load Driver**. You are prompted by a Load Driver dialog box to select the driver to be installed.
 - b. Connect the USB thumb drive that you prepared in 3. to the target server.
 - c. On the Windows Load Driver dialog that you opened in Step a, click **Browse**.
 - d. Use the dialog box to browse to the location of the drivers folder on the USB thumb drive, and then click **OK**.
Windows loads the drivers from the folder and when finished, the driver is listed under the prompt, “Select the driver to be installed.”
 - e. Click **Next** to install the drivers.

Updating the Windows Driver

1. Click **Start**, point to **Settings**, and then click **Control Panel**.
2. Double-click **System**, click the **Hardware** tab, and then click **Device Manager**. Device Manager starts.
3. In Device Manager, double-click **SCSI and RAID Controllers**, right-click the device for which you are installing the driver, and then click **Properties**.
4. On the Driver tab, click **Update Driver** to open the Update Device Driver wizard, and then follow the wizard instructions to update the driver.

Linux Driver Installation

This section explains the steps to install the embedded MegaRAID device driver in a Red Hat Enterprise Linux installation or a SUSE Linux Enterprise Server installation.

This section contains the following topics:

- [Obtaining the Driver Image File, page 64](#)
- [Preparing Physical Installation Disks For Linux, page 65](#)
- [Installing the Red Hat Linux Driver, page 66](#)
- [Installing the SUSE Linux Enterprise Server Driver, page 68](#)

Obtaining the Driver Image File

See [Downloading the LSI MegaSR Drivers, page 62](#) for instructions on obtaining the drivers. The Linux driver is offered in the form of `dud-[driver version].img`, which is the boot image for the embedded MegaRAID stack.

NOTE: The LSI MegaSR drivers that Cisco provides for Red Hat Linux and SUSE Linux are for the original GA versions of those distributions. The drivers do not support updates to those OS kernels.

Preparing Physical Installation Disks For Linux

This section describes how to prepare physical Linux installation disks from the driver image files, using either the Windows operating system or the Linux operating system.

NOTE: The driver image is too large for a floppy disk, so use a USB thumb drive instead.

NOTE: Alternatively, you can mount the dud.img file as a virtual floppy disk, as described in the installation procedures.

Preparing Physical Installation Disks For Linux With the Windows Operating System

Under Windows, you can use the RaWrite floppy image-writer utility to create disk images from image files.

1. Download the Cisco UCS C-Series drivers ISO, as described in [Downloading the LSI MegaSR Drivers, page 62](#) and save it to your Windows system that has a diskette drive.
2. Extract the dud.img file:
 - a. Burn the ISO image to a disc.
 - b. Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:
`<OS>/Storage/Intel/C600/`
 - c. Expand the Zip file, which contains the folder with the driver files.
3. Copy the driver update disk image dud-[driver version].img and your file raw write.exe to a directory.

NOTE: RaWrite is not included in the driver package.

4. If necessary, use this command to change the filename of the driver update disk to a name with fewer than eight characters: **copy dud-[driver version].img dud.img**
5. Open the DOS Command Prompt and navigate to the directory where raw write.exe is located.
6. Enter the following command to create the installation diskette: **raw write**
7. Press **Enter**.

You are prompted to enter the name of the boot image file.
8. Enter: **dud.img**
9. Press **Enter**.

You are prompted for the target disk.
10. Insert a floppy disk into the server and enter: **A:**
11. Press **Enter**.
12. Press **Enter** again to start copying the file to the diskette.
13. After the command prompt returns and the floppy disk drive LED goes out, remove the disk.
14. Label the diskette with the image name.

Preparing Installation Disks with a Linux Operating System

Under Red Hat Linux and SUSE Linux, you can use a driver disk utility to create disk images from image files.

Storage Controller Considerations

NOTE: The driver image is too large for a floppy disk, so use a USB thumb drive instead.

1. Download the Cisco UCS C-Series drivers ISO, as described in [Downloading the LSI MegaSR Drivers, page 62](#) and save it to your Linux system that has a disk drive.
2. Extract the dud.img file:
 - a. Burn the ISO image to a disc.
 - b. Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:
`/<OS>/Storage/Intel/C600/`
 - c. Expand the Zip file, which contains the folder with the driver files.
3. Copy the driver update disk image dud-[driver version].img to your Linux system.
4. Insert a blank USB thumb drive into a port on your Linux system.
5. Create a directory and mount the DUD image to that directory:
mkdir <destination_folder>
mount -oloop <driver_image> <destination_folder>
6. Copy the contents in the directory to your USB thumb drive.

Installing the Red Hat Linux Driver

For the specific supported OS versions, see the [Hardware and Software Interoperability Matrix](#) for your server release.

This section describes the fresh installation of the Red Hat Enterprise Linux device driver on systems with the embedded MegaRAID stack.

1. Create a RAID drive group using the LSI Software RAID Configuration utility before you install this driver for the OS. Launch this utility by pressing **Ctrl-M** when `LSI SWRAID` is shown during the BIOS POST.
2. Prepare the dud.img file using one of the following methods:
 - To install from a physical disk: Use one of the procedures in [Preparing Physical Installation Disks For Linux, page 65](#). Then return to 4. of this procedure.
 - To install from a virtual floppy disk: Download and save the Cisco UCS C-Series drivers' ISO, as described in [Downloading the LSI MegaSR Drivers, page 62](#). Then continue with the next step.
3. Extract the dud.img or dd.iso file:
 - a. Burn the Cisco UCS C-Series Drivers ISO image to a disc.
 - b. Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:
 - c. `/<OS>/Storage/Intel/C600/`
 - d. Copy the dud-<driver version>.img or dd.iso file to a temporary location on your workstation.
 - e. If you are using RHEL 7.x, rename the saved dd.iso to dd.img.

NOTE: If you are using RHEL 7.x, renaming the dd.iso file to dd.img simplifies this procedure and saves time. The Cisco UCS virtual drive mapper can map only one .iso at a time, and only as a virtual CD/DVD. Renaming the file to dd.img allows you to mount the RHEL installation ISO as a virtual CD/DVD and the renamed dd.img as a virtual floppy disk or removable disk at the same time. This avoids the steps of unmounting and remounting the RHEL ISO when the dd.iso driver file is prompted for.

Storage Controller Considerations

4. Start the Linux driver installation using one of the following methods:

- To install from local media, connect an external USB DVD drive to the server and then insert the first RHEL installation disk into the drive. Then continue with 5..
- To install from virtual disk, log in to the server's Cisco IMC interface. Then continue with the next step.

5. Launch a Virtual KVM console window and click the **Virtual Media** tab.

- a. Click **Add Image** and browse to select your remote RHEL installation ISO image.

NOTE: An .iso file can be mapped only as a virtual CD/DVD.

- b. Click **Add Image** again and browse to select your RHEL 6.x dud.img or the RHEL 7.x dd.img file that you renamed in 3..

NOTE: Map the .img file as a virtual floppy disk or removable disk.

- c. Check the check boxes in the Mapped column for the media that you just added, then wait for mapping to complete.

6. Power cycle the target server.

7. Press **F6** when you see the F6 prompt during bootup. The Boot Menu window opens.

NOTE: Do not press Enter in the next step to start the installation. Instead, press **e** to edit installation parameters.

8. On the Boot Menu, use the arrow keys to select **Install Red Hat Enterprise Linux** and then press **e** to edit installation parameters.

9. Append one of the following blacklist commands to the end of the line that begins with **linuxefi**:

- For RHEL 6.x (32- and 64-bit), enter:
linux dd blacklist=isci blacklist=ahci nodmraid noprobe=<atadrive number>

NOTE: The **noprobe** values depend on the number of drives. For example, to install RHEL 6.5 on a RAID 5 configuration with three drives, enter **Linux dd blacklist=isci blacklist=ahci nodmraid noprobe=ata1 noprobe=ata2**

- For RHEL 7.x (32- and 64-bit), enter:
linux dd modprobe.blacklist=ahci nodmraid

10. **Optional:** To see full, verbose installation status steps during installation, delete the **Quiet** parameter from the line.

11. On the Boot Manager window, press **Ctrl+x** to start the interactive installation.

12. Below **Driver disk device selection**, select the option to install your driver .img file. (Type **r** to refresh the list if it is not populated.)

NOTE: The installer recognizes the driver file as an .iso file, even though you renamed it to dd.img for mapping.

Type the number of the driver device ISO in the list. Do *not* select the RHEL ISO image. In the following example, type **6** to select device sdb:

```
5) sr0 iso9660 RHEL-7.6\x20Server.x
6) sdb iso9660 CDROM
# to select, 'r' - refresh, or 'c' -continue: 6
```

The installer reads the driver ISO and lists the drivers.

Storage Controller Considerations

13. Under **Select drivers to install**, type the number of the line that lists the megasr driver. For example, type **1** and press **Enter**:

```
1) [ ] /media/DD-1/rpms/x86_61/kmod-megasr-18.01.2010.1107_e17.6-1.x86_61.rpm
# to toggle selection, or 'c' -continue: 1
```

Your selection is displayed with an x in brackets.

```
1) [X] /media/DD-1/rpms/x86_61/kmod-megasr-18.01.2010.1107_e17.6-1.x86_61.rpm
```

14. Type **c** to continue.

15. Follow the Red Hat Linux installation wizard to complete the installation.

16. When the wizard's Installation Destination screen is displayed, ensure that **LSI MegaSR** is listed as the selection. If it is not listed, the driver did not load successfully. In that case, select **Rescan Disc**.

17. After installation completes, reboot the system.

Installing the SUSE Linux Enterprise Server Driver

For the specific supported OS versions, see the [Hardware and Software Interoperability Matrix](#) for your server release.

This section describes the installation of the SUSE Linux Enterprise Server (SLES) driver on a system with the embedded MegaRAID stack.

1. Create a RAID drive group using the LSI SWRAID Configuration utility before you install this driver for the OS. Launch this utility by pressing **Ctrl+M** when `LSI SWRAID` is shown during the BIOS POST.
2. Prepare the dud.img file using one of the following methods:
 - To install from a physical disk, use one of the procedures in [Preparing Physical Installation Disks For Linux](#), page 65. Then return to 4. of this procedure.
 - To install from a virtual floppy disk, download and save the Cisco UCS C-Series drivers' ISO, as described in [Downloading the LSI MegaSR Drivers](#), page 62. Then continue with the next step.
3. Extract the dud.img file that contains the driver:
 - a. Burn the Cisco UCS C-Series drivers ISO image to a disc.
 - b. Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:
 - c. `/<OS>/Storage/Intel/C600/`
 - d. Copy the dud-`<driver version>`.img file to a temporary location on your workstation.
4. Start the Linux driver installation using one of the following methods:
 - To install from local media, connect an external USB DVD drive to the server and then insert the first SLES install disc into the drive. Skip to 6..
 - To install from remote ISO, log in to the server's Cisco IMC interface and continue with the next step.
5. Launch a Virtual KVM console window and click the **Virtual Media** tab.
 - a. Click **Add Image** and browse to select your remote SLES installation ISO file.

NOTE: An .iso file can be mapped only as a virtual CD/DVD.

- b. Click **Add Image** again and browse to select your dud.img file.

NOTE: Map the .img file as a virtual floppy disk or removable disk.

Storage Controller Considerations

- c. Check the check box in the Mapped column for the media that you just added, and then wait for mapping to complete.
6. Power cycle the server.
7. Press **F6** when you see the F6 prompt during bootup. The Boot Menu window opens.
8. On the Boot Manager window, select the physical or virtual SLES installation ISO and press **Enter**.
The SLES installation begins when the image is booted.
9. When the first SLES screen appears, choose **Installation**.
10. Enter one of the following field:
 - For SLES 11 and SLES 11 SP1 (32- and 64-bit), in the **Boot Options** field enter: **brokenmodules=ahci**
 - For SLES 11 SP2 (32-and 64-bit), in the **Boot Options** field enter: **brokenmodules=ahci brokenmodules=iscsi**
 - For SLES 12, press **e** to edit installation parameters. Then append the following parameter to the end of the line that begins with **linuxefi: brokenmodules=ahci**
11. **Optional:** To see detailed status information during the installation, add the following parameter to the line that begins with **linuxefi: splash=verbose**
12. Do one of the following actions:
 - For SLES 11, press **F6** for the driver and choose **Yes**.
 - For SLES 12, press **Ctrl+x** to start the installation.The installation proceeds.
13. Do one of the following actions:
 - For SLES 11: If you prepared the dud.img file on a physical disk, insert the USB thumb drive to the target server and then insert the disk in the A:/ drive and press **Enter**.
 - For SLES 11: If you mapped the dud.img file as a virtual disk in 5. choose the location of the virtual disk. Press **Enter** to choose Installation.
 - For SLES 12: The installer finds the LSI driver automatically in the dud-<driver version>.img file that you provided. With verbose status messages, you see the driver being installed when LSI MegaRAID SW RAID Module is listed
14. Follow the SLES installation wizard to complete the installation. Verify installation of the driver when you reach the **Suggested Partitioning** screen:
 - a. On the **Suggested Partitioning** screen, select **Expert Partitioner**.
 - b. Navigate to **Linux > Hard disks** and verify that there is a device listed for the LSI - LSI MegaSR driver. The device might be listed as a type other than sda. For example:

```
dev/sdd: LSI - LSI MegaSR
```If no device is listed, the driver did not install properly. In that case, repeat the steps above.
15. When installation is complete, reboot the target server.

Related Documentation

For More Information on Using Storage Controllers

The LSI utilities have help documentation for more information about using the utilities.

Full Avago Technologies/LSI documentation is also available:

- For hardware SAS MegaRAID—[Avago Technologies/LSI 12 Gb/s MegaRAID SAS Software User's Guide, Rev. F](#)
- For embedded software MegaRAID—[LSI Embedded MegaRAID Software User Guide](#)

Related Documentation

- [Cisco UCS S3260 Storage Server Installation and Service Guide](#)
- [Regulatory Compliance and Safety Information For Cisco UCS S-Series Hardware](#)

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