



## **Cisco UCS C3160 Rack Server Installation and Service Guide**

Updated November 07, 2018

### **Americas Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
<http://www.cisco.com>  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

Text Part Number: OL-32062-01

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The following information is for FCC compliance of Class A devices: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

The following information is for FCC compliance of Class B devices: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment causes interference to radio or television reception, which can be determined by turning the equipment off and on, users are encouraged to try to correct the interference by using one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications to this product not authorized by Cisco could void the FCC approval and negate your authority to operate the product.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: [www.cisco.com/go/trademarks](http://www.cisco.com/go/trademarks). Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

*Cisco UCS C3160 Rack Server Installation and Service Guide*  
© 2018 Cisco Systems, Inc. All rights reserved.



---

**CHAPTER 1****Overview 1-1**

- Front Panel Features 1-1
- Rear Panel Features 1-2
- Replaceable Component Locations 1-3
  - Replaceable Components Inside the Main Chassis 1-3
  - Components Inside the Server Node 1-5
  - Components Inside the System I/O Controller 1-6
- System Features Overview 1-7

---

**CHAPTER 2****Installing the Server 2-1**

- Unpacking and Inspecting the Server 2-2
- Preparing for Server Installation 2-2
  - Installation Guidelines 2-2
  - Rack Requirements 2-4
  - Equipment Requirements 2-4
  - Slide Rail Adjustment Range 2-4
- Installing the Server In a Rack 2-5
  - Installing the Slide Rails 2-5
  - Installing the Cable Management Arm (Optional) 2-9
  - Reversing the Cable Management Arm (Optional) 2-11
- Initial Server Setup 2-12
  - Connecting and Powering On the System (Standalone Mode) 2-12
    - Local Connection Procedure 2-12
    - Remote Connection Procedure 2-13
    - Cisco IMC Configuration Utility Setup 2-14
- NIC Modes and NIC Redundancy Settings 2-16
  - NIC Modes 2-16
  - NIC Redundancy 2-16
- System BIOS and Cisco IMC Firmware 2-17
  - Updating the BIOS and Cisco IMC Firmware 2-17
  - Accessing the System BIOS 2-18

**CHAPTER 3**

**Maintaining the System 3-1**

- Status LEDs and Buttons 3-1
  - Front-Panel LEDs 3-2
  - Rear-Panel LEDs and Buttons 3-4
  - Internal Diagnostic LEDs 3-7
    - Diagnostic LEDs in the Main Chassis 3-7
    - Diagnostic LEDs in the Server Node 3-8
- Preparing for System Component Installation or Replacement 3-9
  - Required Equipment 3-9
  - Powering On the System 3-9
  - Shutting Down and Powering Off the System Chassis 3-9
  - Shutting Down an Individual Server Node 3-10
    - Shutting Down a Server Node By Using the Cisco IMC GUI 3-10
    - Shutting Down a Server Node By Using the Power Button on the Server Node 3-10
  - Opening the Main Chassis Top Covers 3-11
  - Removing the Server Node Cover 3-13
  - Removing the System I/O Controller Cover 3-15
- Installing or Replacing System Components 3-17
  - Replacing Hard Drives or Solid State Drives 3-18
    - 4K Sector Format Drives Considerations 3-18
    - Replacing Hard Drives in the Internal Drive Compartment 3-20
    - Replacing Hard Drives in the Optional Drive Expander Module 3-24
    - Replacing Solid State Drives in the Rear Panel Solid State Drive Bays 3-25
    - Selecting SATA Mode in the BIOS for SSDs 3-27
  - Replacing Fan Modules 3-28
  - Replacing a Server Node 3-30
    - Exporting Cisco IMC Configuration From a Server Node 3-31
    - Importing Cisco IMC Configuration To a Server Node 3-32
  - Replacing a Drive Expander Module 3-33
  - Replacing a System I/O Controller 3-34
  - Replacing a Power Supply 3-35
  - Replacing DIMMs Inside the Server Node 3-36
    - DIMM Performance Guidelines and Population Rules 3-36
    - DIMM Replacement Procedure 3-39
  - Replacing CPUs and Heatsinks Inside the Server Node 3-40
    - CPU Configuration Rules 3-40
    - CPU Replacement Procedure 3-40
    - Additional CPU-Related Parts To Order With RMA Replacement Server Nodes 3-45
  - Replacing a RAID Controller Card Inside the Server Node 3-46



RAID Card Firmware Compatibility	3-46
Replacement Procedure	3-46
Replacing an RTC Battery Inside the Server Node	3-48
Replacing an Internal USB Drive Inside the Server Node	3-50
Internal USB Drive Replacement Procedure	3-50
Enabling or Disabling the Internal USB Port	3-51
Installing a Trusted Platform Module (TPM) Inside the Server Node	3-51
Installing the TPM Hardware	3-51
Enabling TPM Support in the BIOS	3-53
Enabling the Intel TXT Feature in the BIOS	3-53
Replacing an Adapter Card Inside the SIOC	3-55
Special Considerations for Cisco UCS Virtual Interface Cards	3-57
Replacing an RTC Battery Inside the SIOC	3-58
Service Headers on the Server Node Board	3-60
Service Header Locations on the Server Node Board	3-60
Using the Clear Password Header P11	3-61
Using the Clear CMOS Header P13	3-62

**APPENDIX A****Server Specifications A-1**

Physical Specifications	A-1
Environmental Specifications	A-2
Power Specifications	A-2

**APPENDIX B****Power Cable Specifications B-1**

Supported Power Cables and Plugs	B-1
----------------------------------	-----

**APPENDIX C****RAID Controller Considerations C-1**

Supported RAID Controllers and Required Cables	C-1
Cisco UCS C3X60 12G SAS RAID Controller Specifications	C-2
Best Practices For Configuring RAID Controllers	C-2
RAID Card Firmware Compatibility	C-2
Choosing Between RAID 0 and JBOD	C-2
RAID 5/RAID 6 Volume Creation	C-2
Choosing I/O Policy	C-3
Background Operations (BGOPs)	C-3
Supercap Power Module (RAID Backup Unit)	C-3
Restoring RAID Configuration After Replacing a RAID Controller	C-4
For More Information	C-4

---

**APPENDIX D**      **Installation for Cisco UCS Integration**      **D-1**



# Overview

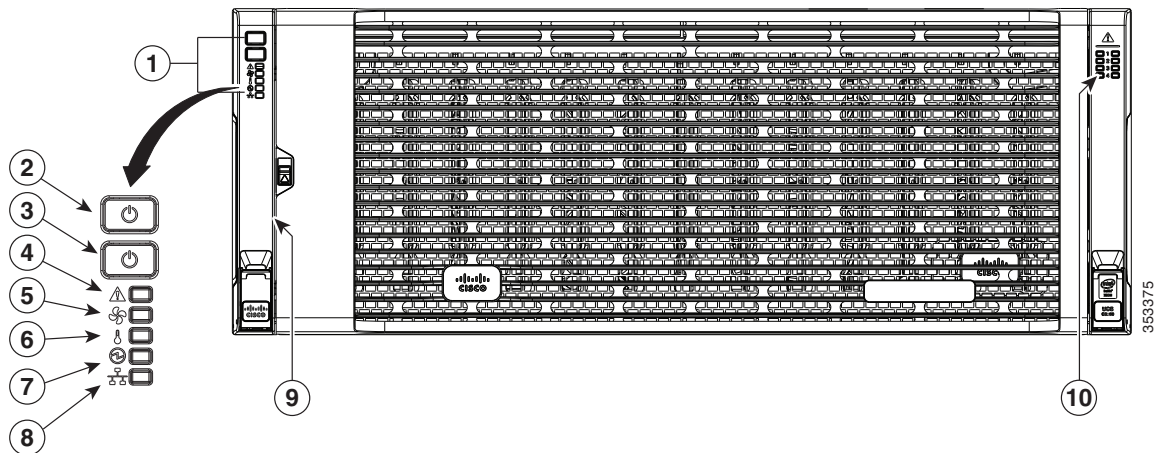
This chapter provides an overview of the Cisco UCS C3160 high-density storage server.

## Front Panel Features

Figure 1-1 shows the front panel features of the system. The system is shown with the removable front bezel installed.

See [Status LEDs and Buttons](#), page 3-1 for explanations of LED states.

**Figure 1-1** Front Panel Features



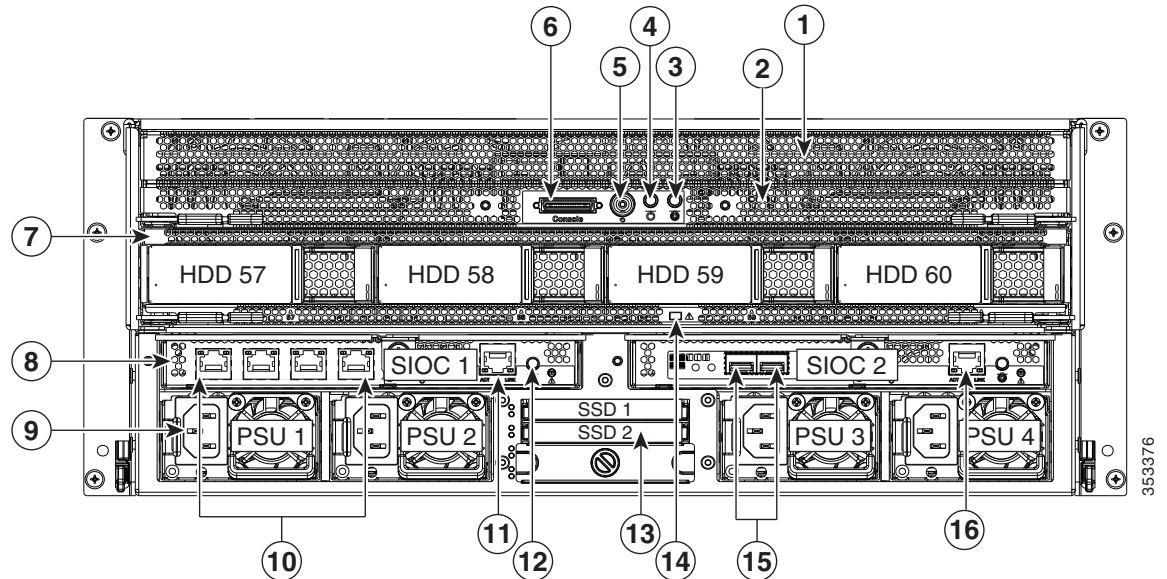
1	Operations panel	6	Temperature status LED
2	System Power button/LED (power shutdown for the entire system)	7	Power supply status LED
3	System unit identification button/LED	8	Network link activity LED
4	System status LED	9	Pull-out asset tag (not visible under front bezel)
5	Fan status LED	10	Internal-drive status LEDs

# Rear Panel Features

Figure 1-2 shows the rear panel features of the system.

See [Status LEDs and Buttons](#), page 3-1 for explanations of LED states.

**Figure 1-2** Rear Panel Features



1	Server node (the server node must be installed in the top bay as shown)	9	Power supplies (four, redundant as 2+2)
2	Server node health LED (behind mesh, on server node board)	10	Optional: 1-Gb BASE-T Ethernet ports, RJ-45 (four on each SIOC that contains a quad-port adapter card)
3	Server node unit identification button/LED	11	SIOC 1, 1-Gb Ethernet dedicated management port. Use only this SIOC 1 management port; do not use the SIOC 2 management port.
4	Server node Power button/LED	12	Not used at this time
5	Server node reset button (resets processor chipset in server node)	13	Solid state drive 2.5-inch drive bays (only the top two bays are supported)
6	KVM console connector on server node Used with a KVM cable that provides two USB, one VGA, and one serial connector	14	Drive expander module status LED
7	(Optional) Drive expander module with up to four 3.5-inch drive bays	15	Optional: 10-Gb SFP+ ports (two on each SIOC that contains a dual-port SFP+ adapter card)
8	System I/O controller (SIOC), one or two. Port types vary, depending on the type of adapter card installed.	16	Do not use this SIOC 2 port. Use the management port on SIOC 1.

# Replaceable Component Locations

This section contains the following topics:

- [Replaceable Components Inside the Main Chassis, page 1-3](#)
- [Components Inside the Server Node, page 1-5](#)
- [Components Inside the System I/O Controller, page 1-6](#)

## Replaceable Components Inside the Main Chassis

This section shows the locations of the replaceable components that are inside the main chassis. Some components are accessible from the rear panel and others are accessible by opening the top covers.

The top view of the system in [Figure 1-3](#) shows the top covers open.

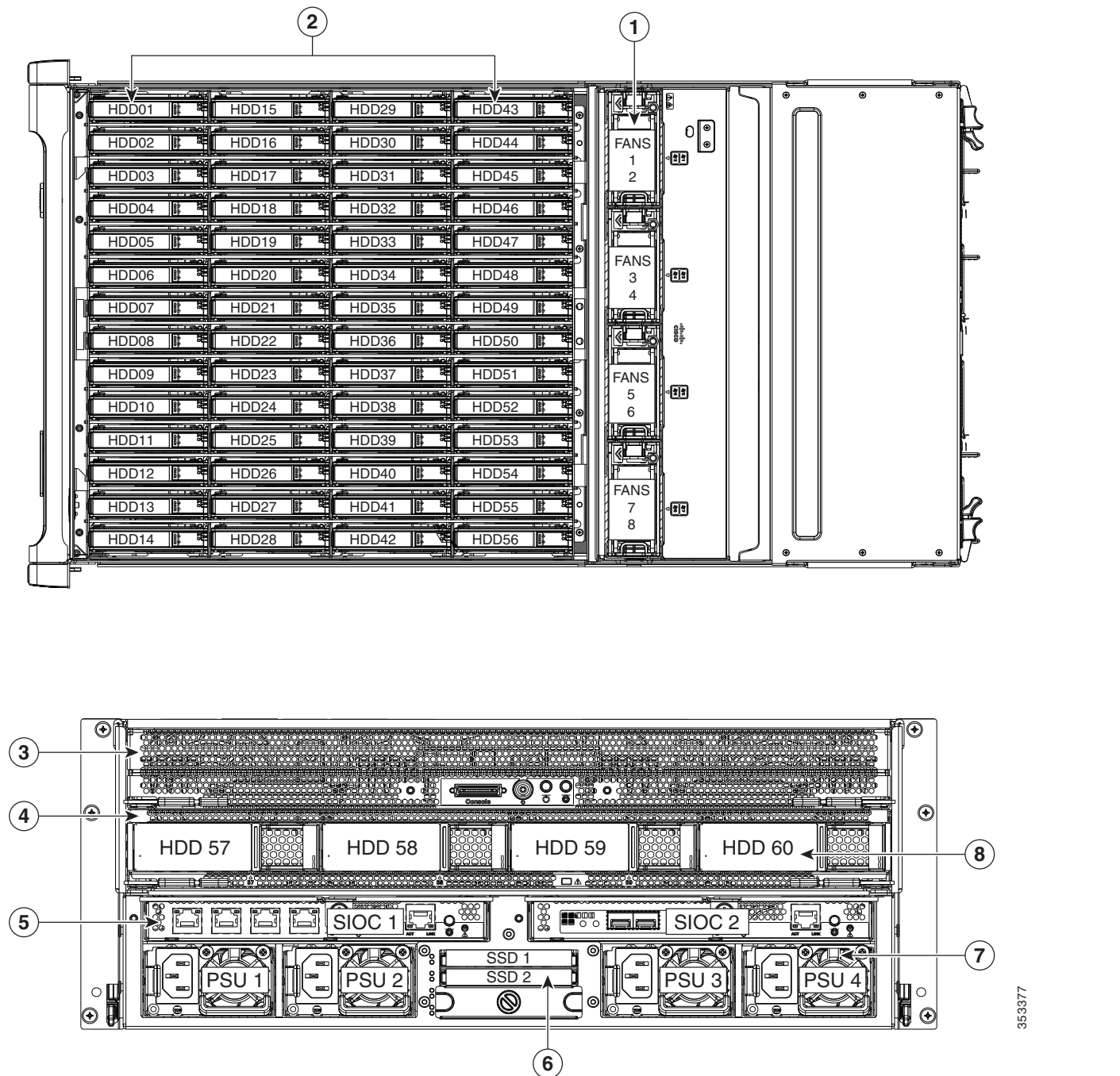
**Note**

---

The internal drives and cooling fans in the system are hot-swappable and are accessed by opening the top covers. When you rack and cable the system, be sure to allow enough slack in the power and other cables so that the system can be pulled out on the slide rails far enough to allow clearance for opening the top covers.

---

Figure 1-3 Replaceable Components Inside the Main Chassis (Top View and Rear View)

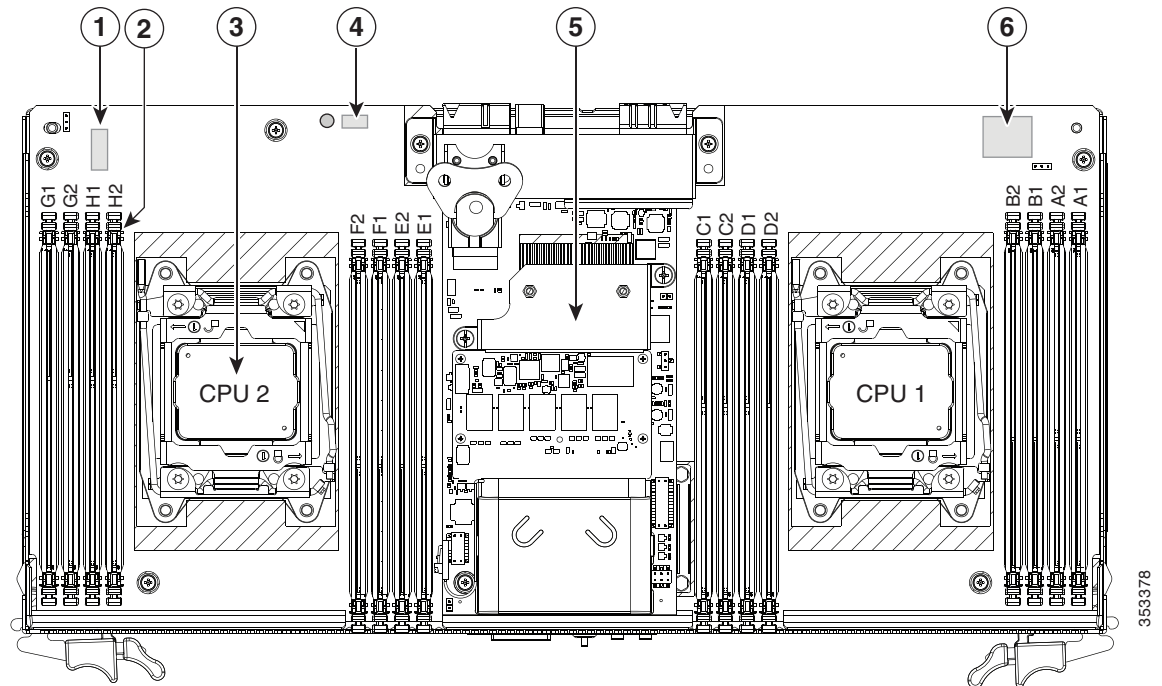


<b>1</b> Fan modules (four, hot-swappable) Each fan module contains two fans. Even numbers are upper fans, odd numbers are lower fans.	<b>5</b> System I/O controller (SIOC) (one or two) See also <a href="#">Components Inside the System I/O Controller, page 1-6</a> .
<b>2</b> Internal drive bays (up to 56 3.5-inch drives, hot-swappable)	<b>6</b> 2.5-inch solid state drives (up to two)
<b>3</b> Server node See also <a href="#">Components Inside the Server Node, page 1-5</a> .	<b>7</b> Power supplies (four, redundant as 2+2)
<b>4</b> Drive expander module	<b>8</b> 3.5-inch drives (up to four in the optional drive expander module)

## Components Inside the Server Node

This section shows the locations of the replaceable components that are inside the server node, which is accessible from the rear of the chassis. The view shown is with the server node removed from the system and with the cover of the server node removed.

**Figure 1-4** Replaceable Components Inside the Server Node



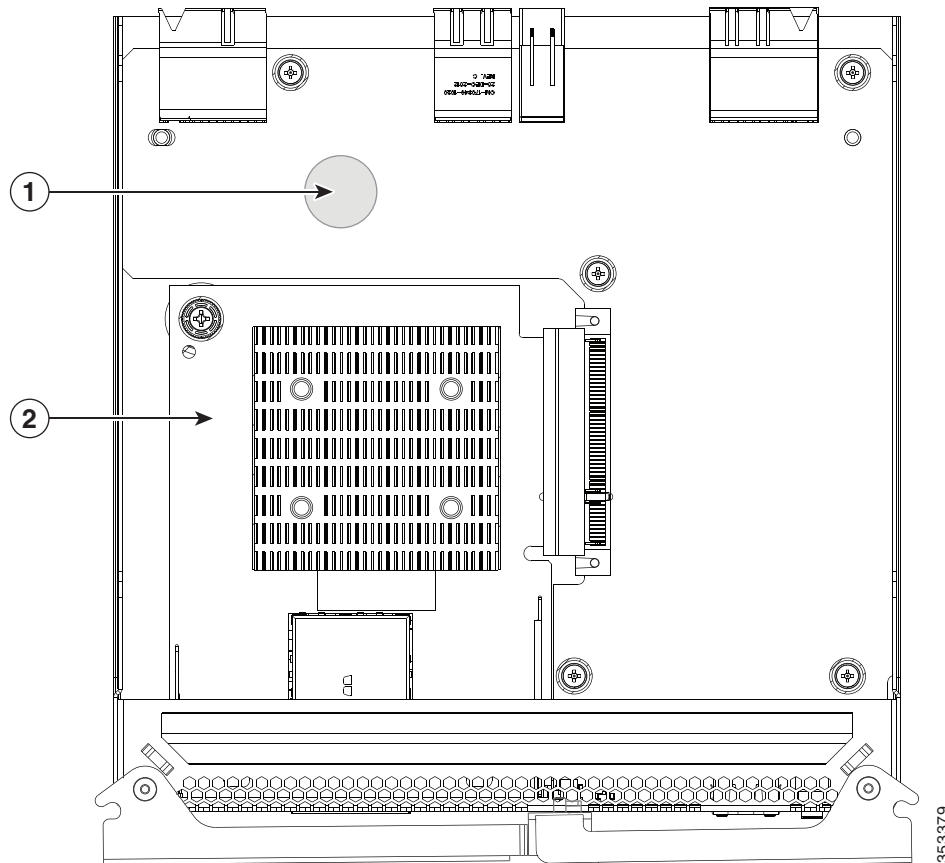
<b>1</b>	RTC battery CR 2032 (accessible with the node cover on)	<b>4</b>	Trusted platform module socket
<b>2</b>	DIMMs (8 sockets for each CPU, 16 total)	<b>5</b>	Cisco modular RAID controller card with SuperCap power module (backup) attached
<b>3</b>	CPUs and heat sinks (two)	<b>6</b>	Internal USB port for USB thumb-drive (accessible with the node cover on)



## Components Inside the System I/O Controller

This section shows the locations of the replaceable components that are inside the system I/O controller, which is accessible from the rear of the chassis. The view shown is with the cover of the module removed.

**Figure 1-5** Replaceable Components Inside the System I/O Controller



1	RTC battery CR 1632	2	Adapter card (either dual-port 10 Gb SFP+ or quad-port 1 Gb RJ-45)
---	---------------------	---	--

# System Features Overview

Table 1-1 lists the features of the system.

**Table 1-1 Cisco UCS C3160 System Features**

Chassis	Four rack-unit (4RU) chassis.
Processors	Two Intel Xeon E5-2600 v2 Series processors inside the server node.
Memory	Up to 16 DIMMs inside the server node.
Multi-bit error protection	This system supports multi-bit error protection.
Storage	<p>The system has the following storage options:</p> <ul style="list-style-type: none"> <li>• Up to 56 internally accessible 3.5-inch drives</li> <li>• Up to four 3.5-inch drives in the optional drive expander module, accessible from the rear panel</li> <li>• Up to two 2.5-inch solid state drives, accessible from the rear-panel</li> </ul> <p>All drives are hot-swappable<sup>1</sup>.</p>
Disk Management	<p>There is one dedicated mezzanine-style socket for a RAID controller with a 1-GB or 4-GB cache inside the server node.</p> <p>For a list of supported RAID controller options, see <a href="#">RAID Controller Considerations, page C-1</a>.</p>
RAID Backup	The optional supercap power module (SCPM) mounts to the RAID controller card that is inside the server node.
PCIe I/O	This system has no PCIe expansion slots.
Network and management I/O	<p>The system can have one or two system I/O controllers (SIOC). These each provide rear-panel connectivity. The ports differ, depending on which adapter card is installed in the SIOC:</p> <ul style="list-style-type: none"> <li>• If the quad-port 1-Gb RJ-45 adapter card is in the SIOC: <ul style="list-style-type: none"> <li>– Four 1-Gb BASE-T Ethernet ports (RJ-45)</li> <li>– One 1-Gb dedicated management Ethernet port</li> </ul> </li> <li>• If the dual-port 10-Gb SFP+ adapter card is in the SIOC: <ul style="list-style-type: none"> <li>– Two 10-Gb SFP+ ports</li> <li>– One 1-Gb dedicated management Ethernet port</li> </ul> </li> </ul> <p>The server node also has one rear-panel KVM connector that can be used with a KVM cable, which provides two USB, one VGA, and one serial connector.</p>
Internal USB	The system includes one internal USB 2.0 slot inside the server node.
Power	Two or four power supplies, 1050 W each (hot-swappable and redundant as 2+2).

**Table 1-1 Cisco UCS C3160 System Features (continued)**

Cooling	Four internal fan modules that pull front-to-rear cooling, hot-swappable. Each fan module contains two fans. In addition, there is one fan in each power supply.
Baseboard management	Cisco Integrated Management Controller (Cisco IMC) firmware. Depending on your NIC mode settings, the Cisco IMC can be accessed through the dedicated management port, the 1-Gb LOM ports, or the 10-Gb LOM ports.

1. Hot-swappable = No preconditioning of the component is required before removal while the system is powered on.



## Installing the Server

---

This chapter describes how to install the server, and it includes the following sections:

- [Unpacking and Inspecting the Server, page 2-2](#)
- [Preparing for Server Installation, page 2-2](#)
- [Installing the Server In a Rack, page 2-5](#)
- [Initial Server Setup, page 2-12](#)
- [NIC Modes and NIC Redundancy Settings, page 2-16](#)
- [System BIOS and Cisco IMC Firmware, page 2-17](#)



### Note

---

Before you install, operate, or service a server, review the [Regulatory Compliance and Safety Information for Cisco UCS C-Series Servers](#) for important safety information.

---



### Warning

#### IMPORTANT SAFETY INSTRUCTIONS

**This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.**  
Statement 1071

---

SAVE THESE INSTRUCTIONS

# Unpacking and Inspecting the Server


**Caution**

When handling internal server components, wear an ESD strap and handle modules by the carrier edges only.


**Note**

The chassis is thoroughly inspected before shipment. If any damage occurred during transportation or any items are missing, contact your customer service representative immediately.

- 
- Step 1** Remove the system from its cardboard container and save all packaging material.
- Step 2** Compare the shipment to the equipment list provided by your customer service representative. Verify that you have all items.
- Step 3** Check for damage and report any discrepancies or damage to your customer service representative. Have the following information ready:
- Invoice number of shipper (see the packing slip)
  - Model and serial number of the damaged unit
  - Description of damage
  - Effect of damage on the installation
- 

## Preparing for Server Installation

This section provides information about preparing for server installation, and it includes the following topics:

- [Installation Guidelines, page 2-2](#)
- [Rack Requirements, page 2-4](#)
- [Equipment Requirements, page 2-4](#)
- [Slide Rail Adjustment Range, page 2-4](#)

## Installation Guidelines


**Warning**

**To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 35° C (95° F).**

Statement 1047


**Warning**

**The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.**

Statement 1019

**Warning**

---

**This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 250 V, 15 A.**

Statement 1005

---

**Warning**

---

**Installation of the equipment must comply with local and national electrical codes.**

Statement 1074

---

When you are installing a server, use the following guidelines:

- Plan your site configuration and prepare the site before installing the server. See the [Cisco UCS Site Preparation Guide](#) for the recommended site planning tasks.
- Ensure that there is adequate space around the server to allow for servicing the server and for adequate airflow. The airflow in this server is from front to back.
- Ensure that the air-conditioning meets the thermal requirements listed in the [Server Specifications, page A-1](#).
- Ensure that the cabinet or rack meets the requirements listed in the [Rack Requirements, page 2-4](#).
- Ensure that the site power meets the power requirements listed in the [Server Specifications, page A-1](#). If available, you can use an uninterruptible power supply (UPS) to protect against power failures.

## Rack Requirements

This section provides the requirements for the standard open racks, assuming an external ambient air temperature range of 41°F to 95°F (5°C to 35°C).

The rack must be of the following type:

- A standard 19-in. (48.3-cm) wide, four-post EIA rack, with mounting posts that conform to English universal hole spacing, per section 1 of ANSI/EIA-310-D-1992.
- The rack post holes can be square 0.38-inch (9.6 mm), round 0.28-inch (7.1 mm), #12-24 UNC, or #10-32 UNC when you use the supplied slide rails.
- The minimum vertical rack space per server must be four RUs, equal to 7 in. (17.78 cm).

## Equipment Requirements

The slide rails supplied by Cisco Systems for this server do not require tools for installation if you install them in a rack that has square 0.38-inch (9.6 mm), round 0.28-inch (7.1 mm), or #12-24 UNC threaded holes.

## Slide Rail Adjustment Range

The slide rails for this server have an adjustment range of 26 to 36 inches (660 to 914 mm).



# Installing the Server In a Rack

This section contains the following topics:

- [Installing the Slide Rails, page 2-5](#)
- [Installing the Cable Management Arm \(Optional\), page 2-9](#)
- [Reversing the Cable Management Arm \(Optional\), page 2-11](#)



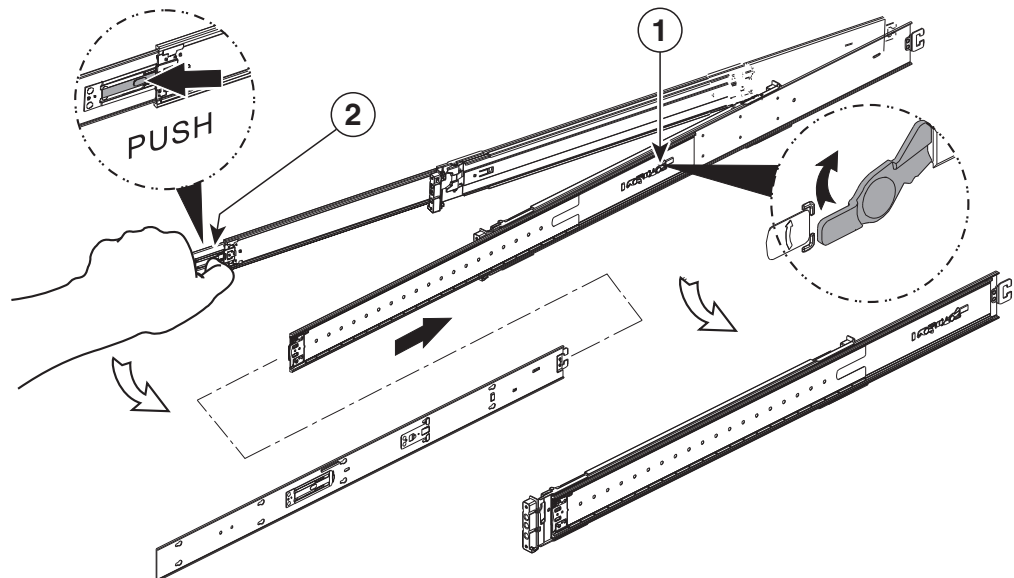
**Warning**

**To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety: This unit should be mounted at the bottom of the rack if it is the only unit in the rack. When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack. If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

## Installing the Slide Rails

- Step 1** Remove the inner rail from the slide-rail assembly (see [Figure 2-1](#)):
- Push down on the rear end of the rail release latch and pull out the inner rail until it stops.
  - Hold down the inner rail release clip and at the same time, pull the inner rail free from the rail assembly.

**Figure 2-1** Removing the Inner Rail From the Assembly

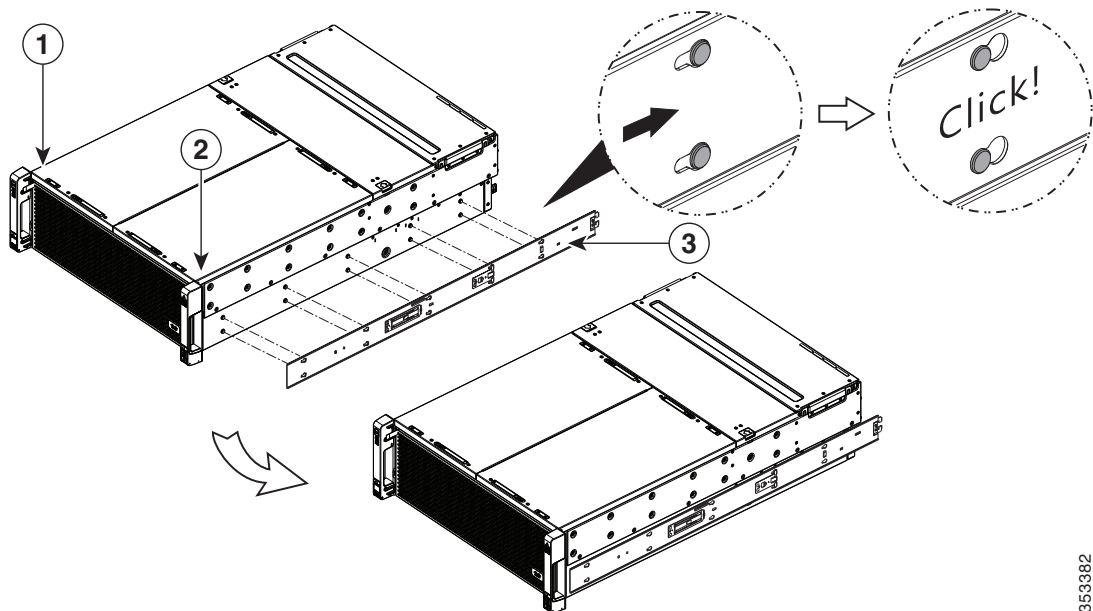


1	Rail release latch (close-up view)	2	Inner rail release clip
---	------------------------------------	---	-------------------------

953381

- Step 2** Attach the inner rails to the sides of the server (see [Figure 2-2](#)):
- Align an inner rail with one side of the server so that the 10 keyed slots in the rail align with the 10 pegs on the side of the server.
  - Set the keyed slots over the pegs, then slide the rail toward the rear to lock it in place on the pegs.
  - Install the second inner rail to the opposite side of the server.

**Figure 2-2** Attaching Inner Rail to Side of Server

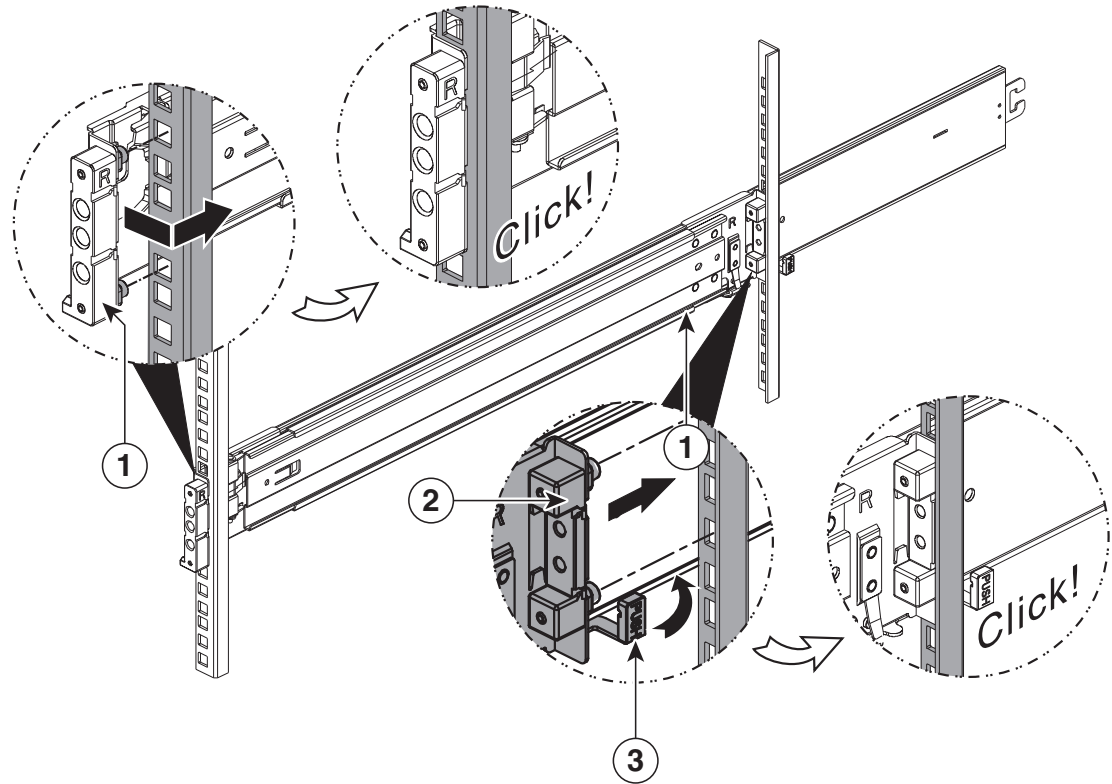


353382

1	Rear of server	2	Inner rail
---	----------------	---	------------

- Step 3** Install the slide rails into the rack (see [Figure 2-3](#)):
- Align one slide-rail assembly front end with the front rack-post holes that you want to use.  
The slide rail front-end wraps around the outside of the rack post and the mounting pegs enter the rack-post holes from the outside-front.
  - Push the front mounting pegs into the rack-post holes until you hear them click and lock.
  - Adjust the slide-rail length until it reaches the rear rack post perfectly level.
  - Hold open the rear-peg spring latch, then push the rear mounting pegs into the rear rack-post-holes.  
The rear mounting pegs enter the rear rack-post holes from the inside of the rack post.
  - Release the rear-peg spring latch to lock the rear pegs in place.
  - Attach the second slide-rail assembly to the opposite side of the rack. Ensure that the two slide-rail assemblies at the same height with each other and level front-to-back.

**Figure 2-3 Attaching Rail Assembly to the Rack Post**



353383

1	Front mounting pegs, entering rack-post holes from the outside front	3	Rear peg spring-latch
2	Rear mounting pegs, entering rack post-holes from inside rear		

**Step 4** Pull the intermediate slide rails on each assembly out toward the rack front until they hit the internal stops and lock in place (see [Figure 2-4](#)).

**Step 5** Insert the server with inner rails into the intermediate rails:



**Caution**

This server weighs approximately 190 pounds (86 kilograms) when fully loaded with components. We recommend that you use a minimum of two people or a mechanical lift when lifting the server. Attempting this procedure alone could result in personal injury or equipment damage.

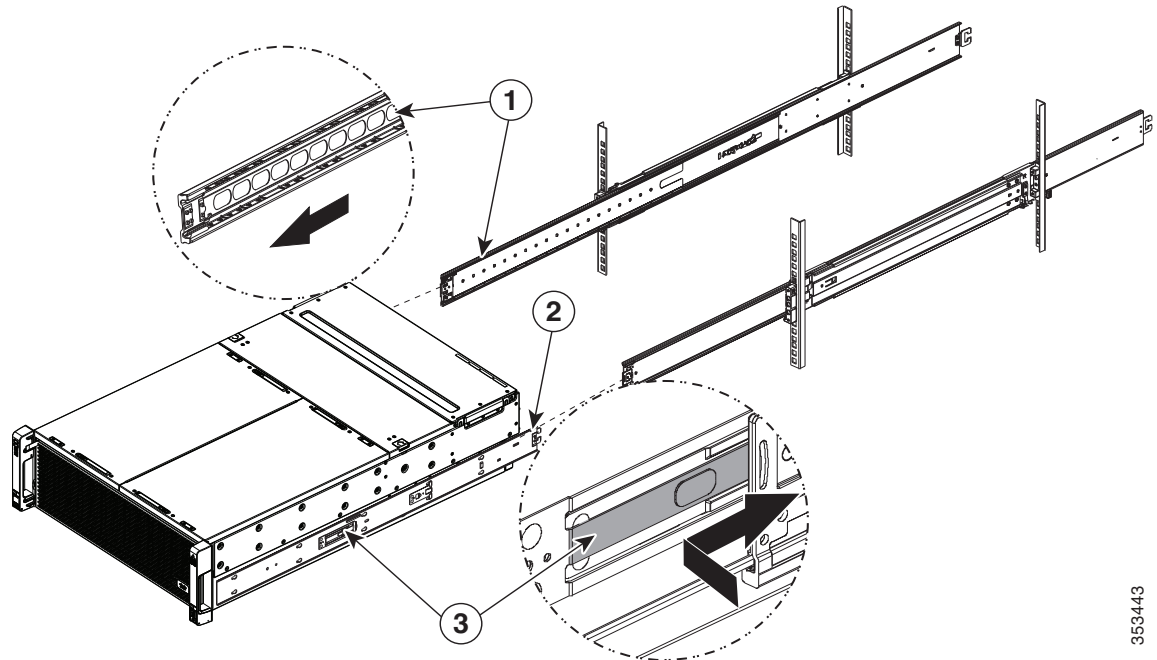
- a. Align the rear of the inner rails that are attached to the server sides with the front ends of the empty intermediate rails on the rack.
- b. Push the server into the intermediate rails until it stops at the internal stops.
- c. Depress the release clip on each inner rail inward, and then continue pushing the server into the rack until its front slam-latches engage with the rack posts (see [Figure 2-4](#)).



**Caution**

Ensure that both release clips are disengaged before pushing the system into the rack. Push the server into the rails slowly to avoid damaging the rails.

Figure 2-4 Attaching Rail Assembly to the Rack Post



353443

1	Intermediate rail pulled out from outer rail	3	Inner rail release clip
2	Inner rail mounted on server		

**Step 6** (Optional) Secure the server in the rack more permanently by using the two screws provided with the slide rails. For example, you can install these screws if you plan to move the rack with servers installed. With the server fully pushed into the slide rails, open a hinged slam-latch lever on the front of the server and insert the screw through the hole that is under the lever. The screw threads into the static part of the rail on the rack post and prevents the server from being pulled out. Repeat for the opposite slam latch.

**Caution**

When you pull the server outward from the rack, it stops at internal locking stops. Do not depress the release clips on the inner rails (see [Figure 2-4](#)) unless you intend to remove the server from the rack. Depressing the release clips on the inner rails allows the server to slide all the way out of the intermediate rails and could result in injury or equipment damage.

## Installing the Cable Management Arm (Optional)

**Note**

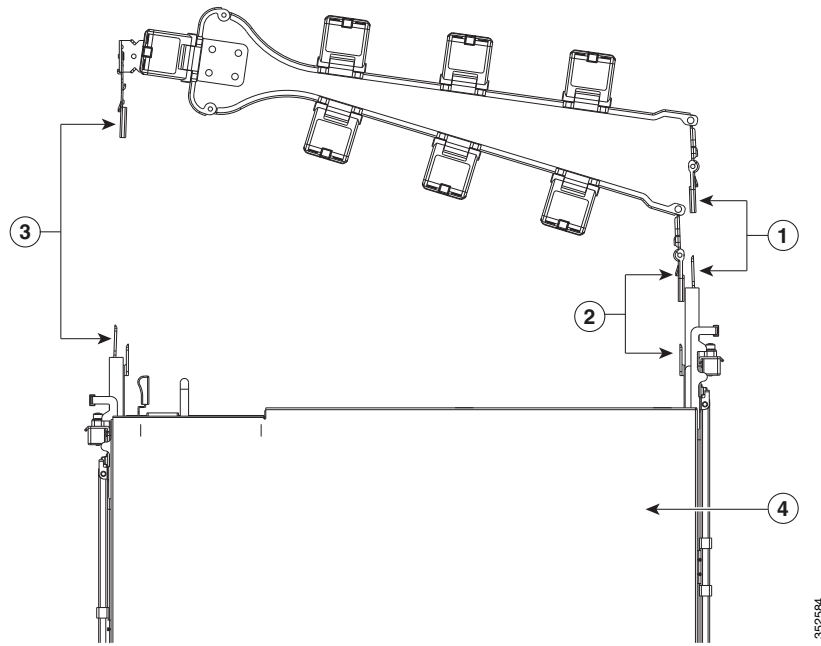
The internal drives and cooling fans in the system are hot-swappable and are accessed by opening the top covers. When you rack and cable the system, be sure to allow enough slack in the power and other cables so that the system can be pulled out on the slide rails far enough to allow clearance for opening the top covers.

**Note**

The CMA is reversible left to right. To reverse the CMA, see [Reversing the Cable Management Arm \(Optional\)](#), page 2-11 before installation.

- Step 1** With the server pushed fully into the rack, slide the CMA tab of the CMA arm that is farthest from the server onto the end of the stationary slide rail that is attached to the rack post (see [Figure 2-5](#)). Slide the tab over the end of the rail until it clicks and locks.
- Step 2** Slide the CMA tab that is closest to the server over the end of the inner rail that is attached to the server (see [Figure 2-5](#)). Slide the tab over the end of the rail until it clicks and locks.
- Step 3** Pull out the width-adjustment slider that is at the opposite end of the CMA assembly until it matches the width of your rack (see [Figure 2-5](#)).
- Step 4** Slide the CMA tab that is at the end of the width-adjustment slider onto the end of the stationary slide rail that is attached to the rack post (see [Figure 2-5](#)). Slide the tab over the end of the rail until it clicks and locks.
- Step 5** Open the hinged flap at the top of each plastic cable guide and route your cables through the cable guides as desired.

**Figure 2-5** Attaching the Cable Management Arm to the Rear of the Slide Rails



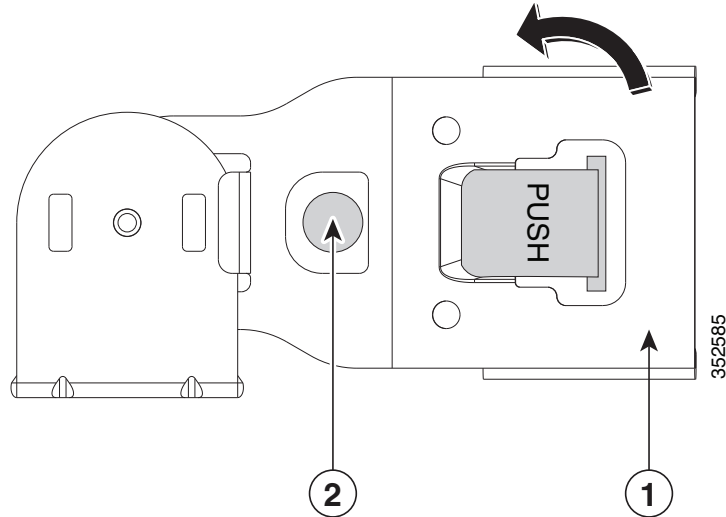
<b>1</b>	CMA tab on arm farthest from server and end of stationary outer slide rail	<b>3</b>	CMA tab on width-adjustment slider and end of stationary outer slide rail
<b>2</b>	CMA tab on arm closest to the server and end of inner slide rail attached to server	<b>4</b>	Rear of server

3523694

## Reversing the Cable Management Arm (Optional)

- Step 1** Rotate the entire CMA assembly 180 degrees. The plastic cable guides must remain pointing upward.
- Step 2** Flip the tabs at the end of each CMA arm so that they point toward the rear of the server.
- Step 3** Pivot the tab that is at the end of the width-adjustment slider. Depress and hold the metal button on the outside of the tab and pivot the tab 180 degrees so that it points toward the rear of the server.

**Figure 2-6** Reversing the CMA



<b>1</b>	CMA tab on end of width-adjustment slider	<b>2</b>	Metal button for rotating
----------	---	----------	---------------------------



# Initial Server Setup

This section includes the following topics:

- [Connecting and Powering On the System \(Standalone Mode\)](#), page 2-12
- [NIC Modes and NIC Redundancy Settings](#), page 2-16

## Connecting and Powering On the System (Standalone Mode)

This section describes how to power on the system, assign an IP address, and connect to server management when using the server in standalone mode.

The server is shipped with these default settings:

- The NIC mode is Dedicated.

With the Dedicated mode, the dedicated management port on the system I/O controller (SIOC) is used to access the Cisco IMC. You must select a NIC redundancy and IP setting. If you want to use a different port to access the Cisco IMC, you can connect to the server and change the NIC mode as described in [Step 1](#) of the following procedure.

- The NIC redundancy is None.
- DHCP is enabled.
- IPv4 is enabled.

There are two methods for connecting to the system for initial setup:

- Local setup—Use this procedure if you want to connect a keyboard and monitor to the system for setup. This procedure requires a KVM cable (Cisco PID N20-BKVM). See [Local Connection Procedure](#), page 2-12.
- Remote setup—Use this procedure if you want to perform setup through your dedicated management LAN. See [Remote Connection Procedure](#), page 2-13.




---

**Note** To configure the system remotely, you must have a DHCP server on the same network as the system. Your DHCP server must be preconfigured with the range of MAC addresses for this server node. The MAC address is printed on a label on the rear of the server node. This server node has a range of six MAC addresses assigned to the Cisco IMC. The MAC address printed on the label is the beginning of the range of six contiguous MAC addresses.

---

## Local Connection Procedure

- 
- Step 1** Attach a power cord to each power supply in your server, and then attach each power cord to a grounded AC power outlet. See [Power Specifications](#), page A-2 for power specifications.
- Wait for approximately two minutes to let the server boot in standby power during the first bootup.
- You can verify system power status by looking at the system Power Status LED on the front panel (see [Figure 1-1 on page 1-1](#)). The system is in standby power mode when the LED is amber.
- Step 2** Connect a KVM cable (Cisco PID N20-BKVM) to the KVM connector on the server node at the rear of the system (see [Figure 1-2 on page 1-2](#) for the connector location).
- Step 3** Connect a USB keyboard and a VGA monitor to the KVM cable.

- Step 4** Open the Cisco IMC Configuration Utility:
- Press and hold the front panel power button for four seconds to boot the server.
  - During bootup, press **F8** when prompted to open the Cisco IMC Configuration Utility.  
This utility has two windows that you can switch between by pressing F1 or F2.

**Note**

The first time that you enter the Cisco IMC Configuration Utility, you are prompted to change the default password. The default password is *password*. The Strong Password feature is enabled.

The following are the requirements for Strong Password:

- The password can have minimum 8 characters; maximum 14 characters.
- The password must not contain the user's name.
- The password must contain characters from three of the following four categories:
  - English uppercase letters (A through Z).
  - English lowercase letters (a through z).
  - Base 10 digits (0 through 9).
  - Non-alphabetic characters !, @, #, \$, %, ^, &, \*, -, \_, =, “

- Step 5** Continue with [Cisco IMC Configuration Utility Setup, page 2-14](#).

## Remote Connection Procedure

- Step 1** Attach a power cord to each power supply in your server, and then attach each power cord to a grounded AC power outlet. See the [Power Specifications, page A-2](#) for power specifications.  
Wait for approximately two minutes to let the server boot in standby power during the first bootup.  
You can verify system power status by looking at the system Power Status LED on the front panel (see [Figure 1-1](#)). The system is in standby power mode when the LED is amber.
- Step 2** Plug your management Ethernet cable into the system I/O controller (SIOC) 1 dedicated management port. SIOC 1 is on the left side as you look at the server rear (see [Figure 1-2 on page 1-2](#)).

**Note**

Always use SIOC 1 for the management port connection, even if you have two SIOCs.

- Step 3** Allow your preconfigured DHCP server to assign an IP address to the server node.
- Step 4** Use the assigned IP address to access and log in to the Cisco IMC for the server node. Consult with your DHCP server administrator to determine the IP address.

**Note**

The default user name for the server is *admin*. The default password is *password*.

- Step 5** From the Cisco IMC Server Summary page, click **Launch KVM Console**. A separate KVM console window opens.
- Step 6** From the Cisco IMC Summary page, click **Power Cycle Server**. The system reboots.
- Step 7** Select the KVM console window.



**Note** The KVM console window must be the active window for the following keyboard actions to work.

**Step 8** When prompted, press **F8** to enter the Cisco IMC Configuration Utility. This utility opens in the KVM console window.

This utility has two windows that you can switch between by pressing F1 or F2.



**Note** The first time that you enter the Cisco IMC Configuration Utility, you are prompted to change the default password. The default password is *password*. The Strong Password feature is enabled.

The following are the requirements for Strong Password:

- The password can have minimum 8 characters; maximum 14 characters.
- The password must not contain the user's name.
- The password must contain characters from three of the following four categories:
  - English uppercase letters (A through Z).
  - English lowercase letters (a through z).
  - Base 10 digits (0 through 9).
  - Non-alphabetic characters !, @, #, \$, %, ^, &, \*, -, \_, =, “

**Step 9** Continue with [Cisco IMC Configuration Utility Setup, page 2-14](#).

## Cisco IMC Configuration Utility Setup

The following procedure is performed after you connect to the system and open the Cisco IMC Configuration Utility.

**Step 1** Set NIC mode and NIC redundancy:

- a. Set the NIC mode to your choice for which ports to use to access the Cisco IMC for server management (see [Figure 1-2](#) for identification of the ports):
  - Dedicated—This is the default NIC mode. The dedicated management port on SIOC 1 is used to access the Cisco IMC. You must select a NIC redundancy and IP setting.
  - Shared LOM—Not supported at this time.
  - Cisco Card—The ports on an installed network adapter card are used to access the Cisco IMC. You must select a NIC redundancy and IP setting.
  - SIOC Slot—This is set as slot 1 and cannot be changed.
- b. Use this utility to change the NIC redundancy to your preference. This server has three possible NIC redundancy settings:
  - None—The Ethernet ports operate independently and do not fail over if there is a problem. This setting can be used only with the *Dedicated* NIC mode.
  - Active-standby—If an active Ethernet port fails, traffic fails over to a standby port.
  - Active-active—All Ethernet ports are utilized simultaneously. This setting can be used only with the Cisco Card NIC mode.

**Step 2** Choose whether to enable DHCP for dynamic network settings, or to enter static network settings.



---

**Note** Before you enable DHCP, your DHCP server must be preconfigured with the range of MAC addresses for this server. The MAC address is printed on a label on the rear of the server. This server has a range of six MAC addresses assigned to the Cisco IMC. The MAC address printed on the label is the beginning of the range of six contiguous MAC addresses.

---

The static IPv4 and IPv6 settings include:

- The Cisco IMC IP address.
- The prefix/subnet.  
For IPv6, valid values are 1–127.
- The gateway.  
For IPv6, if you do not know the gateway, you can set it as none by typing :: (two colons).
- The preferred DNS server address.  
For IPv6, you can set this as none by typing :: (two colons).

**Step 3** Optional: Use this utility to make VLAN settings.

**Step 4** Press **F1** to go to the second settings window, then continue with the next step.

From the second window, you can press F2 to switch back to the first window.



---

**Note** Save your changes before switching windows.

---

**Step 5** Optional: Set a host name for the server.

**Step 6** Optional: Enable dynamic DNS and set a dynamic DNS (DDNS) domain.

**Step 7** Optional: If you select the Factory Default check box, the server will be set back to the factory defaults.

**Step 8** Optional: Set a default user password.

**Step 9** Optional: Reset port profiles and the port name.

**Step 10** Press **F5** to refresh the settings you made. You might have to wait about 45 seconds until the new settings appear and the message, *Network settings configured* is displayed before you reboot the server in the next step.

**Step 11** Press **F10** to save your settings and reboot the server.



---

**Note** If you chose to enable DHCP, the dynamically assigned IP and MAC addresses are displayed on the console screen during bootup.

---

Use a browser and the IP address of the Cisco IMC to connect to the Cisco IMC management interface. The IP address is based upon the settings that you made (either a static address or the address assigned by your DHCP server).



---

**Note** The default user name for the server is *admin*. The default password is *password*.

---

To manage the server, see the *Cisco UCS C-Series Rack-Mount Server Configuration Guide* or the *Cisco UCS C-Series Rack-Mount Server CLI Configuration Guide* for instructions on using those interfaces. The links to these documents are in the C-Series documentation roadmap:

<http://www.cisco.com/go/unifiedcomputing/c-series-doc>

# NIC Modes and NIC Redundancy Settings

## NIC Modes

This server has the following NIC mode settings that you can choose from:

- **Dedicated**—The dedicated management port on system I/O controller 1 (SIOC 1) is used to access the Cisco IMC. You must select a NIC redundancy and IP setting. This is the factory-default setting.
- **Shared LOM**—Not supported at this time.
- **Cisco Card**—The ports on an installed network adapter card are used to access the Cisco IMC. You must select a NIC redundancy and IP setting.

## NIC Redundancy

This server has the following NIC redundancy settings that you can choose from:

- **None**—The Ethernet ports operate independently and do not fail over if there is a problem. This setting can be used only with the *Dedicated* NIC mode.
- **Active-standby**—If an active Ethernet port fails, traffic fails over to a standby port.
- **Active-active**—All Ethernet ports are utilized simultaneously. This setting can be used only with the Cisco Card NIC mode.

The active-active setting uses Mode 5 or Balance-TLB (adaptive transmit load balancing). This is channel bonding that does not require any special switch support. The outgoing traffic is distributed according to the current load (computed relative to the speed) on each slave. Incoming traffic is received by the current slave. If the receiving slave fails, another slave takes over the MAC address of the failed receiving slave.

# System BIOS and Cisco IMC Firmware

This section includes information about the system BIOS and it includes the following topics:

- [Updating the BIOS and Cisco IMC Firmware, page 2-17](#)
- [Accessing the System BIOS, page 2-18](#)

## Updating the BIOS and Cisco IMC Firmware



### Caution

---

When you upgrade the BIOS firmware, you must also upgrade the Cisco IMC firmware to the same version or the server does not boot. Do not power on the server until the BIOS and Cisco IMC firmware match or the server does not boot.

---

The server uses firmware that is obtained from and certified by Cisco. Cisco provides release notes with each firmware image. There are several methods for updating the firmware:

- Recommended method—Use the Cisco Host Upgrade Utility to simultaneously upgrade the Cisco IMC, BIOS, and other component firmware to compatible levels.

See the *Cisco Host Upgrade Utility Quick Reference Guide* for your firmware level at the documentation roadmap link below.

- You can upgrade the BIOS using the EFI interface, or upgrade from a Windows or Linux platform. See the *Cisco UCS C-Series Rack-Mount Server BIOS Upgrade Guide*.
- You can upgrade the Cisco IMC and BIOS firmware by using the Cisco IMC GUI interface. See the *Cisco UCS C-Series Rack-Mount Server Configuration Guide*.
- You can upgrade the Cisco IMC and BIOS firmware by using the Cisco IMC CLI interface. See the *Cisco UCS C-Series Rack-Mount Server CLI Configuration Guide*.

For links to the documents listed above, see the documentation roadmap at the following URL:

<http://www.cisco.com/go/unifiedcomputing/c-series-doc>

## Accessing the System BIOS



---

**Note** Details about the BIOS settings are displayed on the BIOS windows.

---

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



---

**Note** The version and build of the current BIOS are displayed on the Main page of the utility.

---

**Step 2** Use the arrow keys to select the BIOS menu page.

**Step 3** Highlight the field to be modified by using the arrow keys.

**Step 4** Press **Enter** to select the field that you want to change, and then modify the value in the field.

**Step 5** Press the right arrow key until the Exit menu screen is displayed.

**Step 6** Follow the instructions on the Exit menu screen to save your changes and exit the setup utility (or press **F10**). You can exit without saving changes by pressing **Esc**.

---





## Maintaining the System

---

This chapter describes how to diagnose system problems using LEDs. It also provides information about how to install or replace hardware components, and it includes the following sections:

- [Status LEDs and Buttons, page 3-1](#)
- [Preparing for System Component Installation or Replacement, page 3-9](#)
- [Installing or Replacing System Components, page 3-17](#)
- [Service Headers on the Server Node Board, page 3-60](#)

### Status LEDs and Buttons

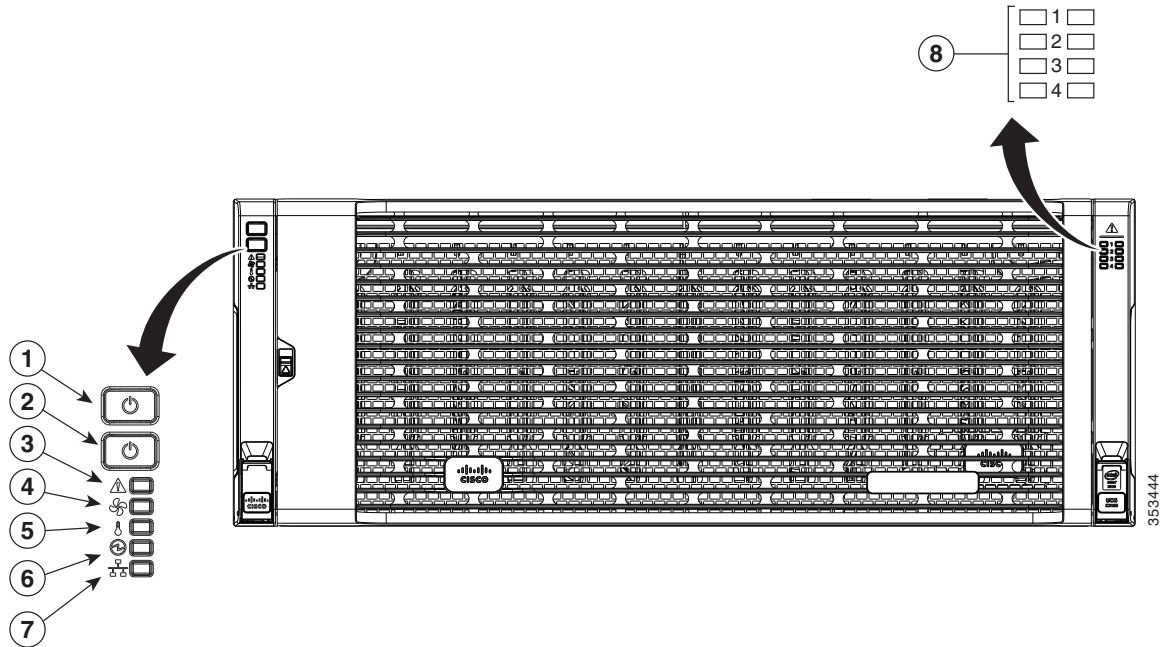
This section describes the location and meaning of LEDs and buttons and includes the following topics:

- [Front-Panel LEDs, page 3-2](#)
- [Rear-Panel LEDs and Buttons, page 3-4](#)
- [Internal Diagnostic LEDs, page 3-7](#)

## Front-Panel LEDs

Figure 3-1 shows the front-panel LEDs. Table 3-1 on page 3-2 defines the front-panel LED states.

Figure 3-1 Front-Panel LEDs



1	System Power button and power status LED	5	Temperature status LED
2	System unit identification button and LED	6	Power supply status LED
3	System status LED	7	Network link activity LED
4	Fan status LED	8	Internal-drive status LEDs

Table 3-1 Front-Panel LEDs States

LED Name	State
1 System Power button/power status LED	<ul style="list-style-type: none"> <li>Off—There is no AC power to the system.</li> <li>Amber—The system is in standby power mode.</li> <li>Green—The system is in main power mode. Power is supplied to all components.</li> </ul>
2 System unit identification	<ul style="list-style-type: none"> <li>Off—The unit identification LED is not in use.</li> <li>Blue, blinking—The unit identification LED is activated.</li> </ul>

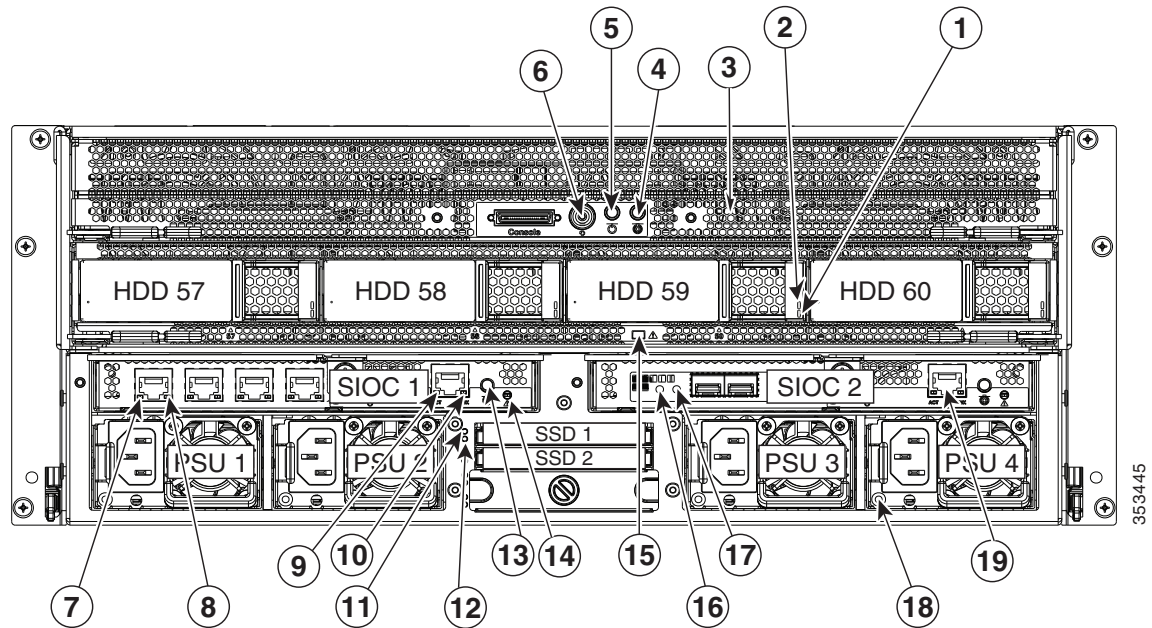
Table 3-1 Front-Panel LEDs States (continued)

	LED Name	State
3	System status	<ul style="list-style-type: none"> <li>• Green—The system is running in normal operating condition.</li> <li>• Green, blinking—The system is performing system initialization and memory check.</li> <li>• Amber, steady—The system is in a degraded operational state. For example:               <ul style="list-style-type: none"> <li>– Power supply redundancy is lost.</li> <li>– CPUs are mismatched.</li> <li>– At least one CPU is faulty.</li> <li>– At least one DIMM is faulty.</li> <li>– At least one drive in a RAID configuration failed.</li> </ul> </li> <li>• Amber, blinking—The system is in a critical fault state. For example:               <ul style="list-style-type: none"> <li>– Boot failed.</li> <li>– Fatal CPU and/or bus error is detected.</li> <li>– System is in an over-temperature condition.</li> </ul> </li> </ul>
4	Fan status	<ul style="list-style-type: none"> <li>• Green—All fan modules are operating properly.</li> <li>• Amber, steady—One fan module has failed.</li> <li>• Amber, blinking—Critical fault; two or more fan modules have failed.</li> </ul>
5	Temperature status	<ul style="list-style-type: none"> <li>• Green—The system is operating at normal temperature.</li> <li>• Amber, steady—One or more temperature sensors have exceeded a warning threshold.</li> <li>• Amber, blinking—One or more temperature sensors have exceeded a critical threshold.</li> </ul>
6	Power supply status	<ul style="list-style-type: none"> <li>• Green—All power supplies are operating normally.</li> <li>• Amber, steady—One or more power supplies are in a degraded operational state.</li> <li>• Amber, blinking—One or more power supplies are in a critical fault state.</li> </ul>
7	Network link activity	<ul style="list-style-type: none"> <li>• Off—The Ethernet link is idle.</li> <li>• Green—One or more Ethernet LOM ports are link-active.</li> <li>• Green, blinking—One or more Ethernet LOM ports are traffic-active.</li> </ul>
8	Internal-drive status LEDs	<p>Use these LEDs to indicate the location of a failing drive. Then open the system cover to find exactly which drive is failing by looking at the LEDs on the drive trays.</p> <ul style="list-style-type: none"> <li>• The two columns of LEDs correspond to the two halves of the internal drive compartment (under either the right- or left-side top cover).</li> <li>• The four numbered rows of LEDs correspond to the four horizontal rows of drive bays (14 drive bays in each row).</li> </ul> <p>See <a href="#">Figure 3-9</a> for an example. In this example, the red LED indicates that the failing drive is in the right half of the internal drive compartment, in row 3.</p>

## Rear-Panel LEDs and Buttons

Figure 3-2 shows the rear-panel LEDs and buttons. Table 3-2 on page 3-5 defines the rear-panel LED states.

Figure 3-2 Rear-Panel LEDs and Buttons



1	Drive fault (on each drive tray)	11	Not used at this time
2	Drive activity (on each drive tray)	12	Not used at this time
3	Server node health LED (behind mesh, on server node board)	13	Not used at this time
4	Server node unit identification button/LED	14	Cisco IMC (service processor) status
5	Server node Power button/LED	15	Drive expander module status LED
6	Server node reset button (resets controller chipset for this node)	16	10-Gb SFP+ port link activity (dual-port 10-Gb SFP+ adapter card only)
7	1-Gb Ethernet link speed (quad-port 1-Gb RJ-45 adapter card only)	17	10-Gb SFP+ port link status (dual-port 10-Gb SFP+ adapter card only)
8	1-Gb Ethernet link status (quad-port 1-Gb RJ-45 adapter card only)	18	Power supply status LED (each power supply)
9	1-Gb dedicated management Ethernet link speed	19	Port not used at this time. Use the management port on SIOC 1.
10	1-Gb dedicated management Ethernet link status		

**Table 3-2 Rear-Panel LED States**

	<b>LED Name</b>	<b>State</b>
<b>1</b>	Drive fault (only when drives are installed in drive expander module)	<ul style="list-style-type: none"> <li>• Off—The drive is operating normally.</li> <li>• Amber—This drive has failed.</li> <li>• Amber, blinking—The device is rebuilding.</li> </ul>
<b>2</b>	Drive activity (only when drives are installed in drive expander module)	<ul style="list-style-type: none"> <li>• Off—There is no drive in the drive tray (no access, no fault).</li> <li>• Green—The drive is ready.</li> <li>• Green, blinking—The drive is reading or writing data.</li> </ul>
<b>3</b>	Server node health	<ul style="list-style-type: none"> <li>• Green—The server node is operating normally.</li> <li>• Amber—The server node is in a degraded condition. Degraded condition is defined as the following: <ul style="list-style-type: none"> <li>– Power supply redundancy lost</li> <li>– SIOC redundancy lost</li> <li>– Faulty or mismatched CPUs</li> <li>– DIMM failure</li> <li>– Failed drive in a RAID configuration</li> </ul> </li> <li>• Amber, blinking—The server node is in a critical condition. Critical condition is defined as the following: <ul style="list-style-type: none"> <li>– Boot failure</li> <li>– Fatal CPU and/or bus errors detected</li> <li>– Fatal uncorrectable memory error detected</li> <li>– Both SIOCs failed</li> <li>– Both drives in a RAID configuration failed</li> <li>– Excessive thermal conditions</li> </ul> </li> </ul>
<b>4</b>	Server node unit identification button/LED	<ul style="list-style-type: none"> <li>• Off—The Identification LED is not in use.</li> <li>• Blue—The Identification LED is activated.</li> </ul>
<b>5</b>	Server node power button/LED	<ul style="list-style-type: none"> <li>• Off—There is no AC power to the server node.</li> <li>• Amber—The server node is in standby power mode. Power is supplied only to the Cisco IMC.</li> <li>• Green—The server node is in main power mode. Power is supplied to all server node components.</li> </ul>
<b>7</b>	1-Gb Ethernet link speed (only when quad 1 Gb adapter card is installed)	<ul style="list-style-type: none"> <li>• Off—Link speed is 10 Mbps.</li> <li>• Amber—Link speed is 100 Mbps.</li> <li>• Green—Link speed is 1 Gbps.</li> </ul>
<b>8</b>	1-Gb Ethernet link status (only when quad 1 Gb adapter card is installed)	<ul style="list-style-type: none"> <li>• Off—No link is present.</li> <li>• Green—Link is active.</li> <li>• Green, blinking—Traffic is present on the active link.</li> </ul>

Table 3-2 Rear-Panel LED States (continued)

	LED Name	State
9	1-Gb (dedicated management) Ethernet link speed	<ul style="list-style-type: none"> <li>Off—Link speed is 10/100 Mbps.</li> <li>Green—Link speed is 1 Gbps.</li> </ul>
10	1-Gb (dedicated management) Ethernet link status	<ul style="list-style-type: none"> <li>Off—No link is present.</li> <li>Green—Link is active.</li> <li>Green, blinking—Traffic is present on the active link.</li> </ul>
11	Not used at this time	•
12	Not used at this time	•
13	Not used at this time	•
14	Cisco IMC (service processor) status	<ul style="list-style-type: none"> <li>Off—Cisco IMC is not ready (booting).</li> <li>Green—Cisco IMC is ready.</li> </ul>
15	Drive expander module status LED	This LED can indicate failure of an installed drive or a failure of the module. See <a href="#">Table 3-3</a> for LED interpretations.
16	10-Gb Ethernet link speed (only when dual 10 Gb adapter card is installed)	<ul style="list-style-type: none"> <li>Off—Link speed is 10/100 Mbps.</li> <li>Amber—Link speed is 1 Gbps.</li> <li>Green—Link speed is 10 Gbps.</li> </ul>
17	10-Gb Ethernet link status (only when dual 10 Gb adapter card is installed)	<ul style="list-style-type: none"> <li>Off—No link is present.</li> <li>Green—Link is active.</li> <li>Green, blinking—Traffic is present on the active link.</li> </ul>
18	Power supply status	<ul style="list-style-type: none"> <li>Off—No AC power input.</li> <li>Green, steady—The power supply is operating normally and supplying DC power to the system.</li> <li>Green, blinking—AC power is OK, DC output not enabled (sleep mode).</li> <li>Amber, blinking—An event warning threshold has been reached, but the power supply continues to operate.</li> <li>Amber, steady—A critical fault threshold has been reached, causing the power supply to shut down.</li> </ul>
19	Port not used at this time	•

Table 3-3 Drive Expander Module Status LED

P3V3	P5V	HDD Present	HDD Status	LED Status
Off	None	None	None	Off
On	On	No plug-in	None	Amber
On	Fail	No plug-in	None	Amber
On	On	Plug-in	Good	Green
On	On	Plug-in	Fail	Amber

## Internal Diagnostic LEDs

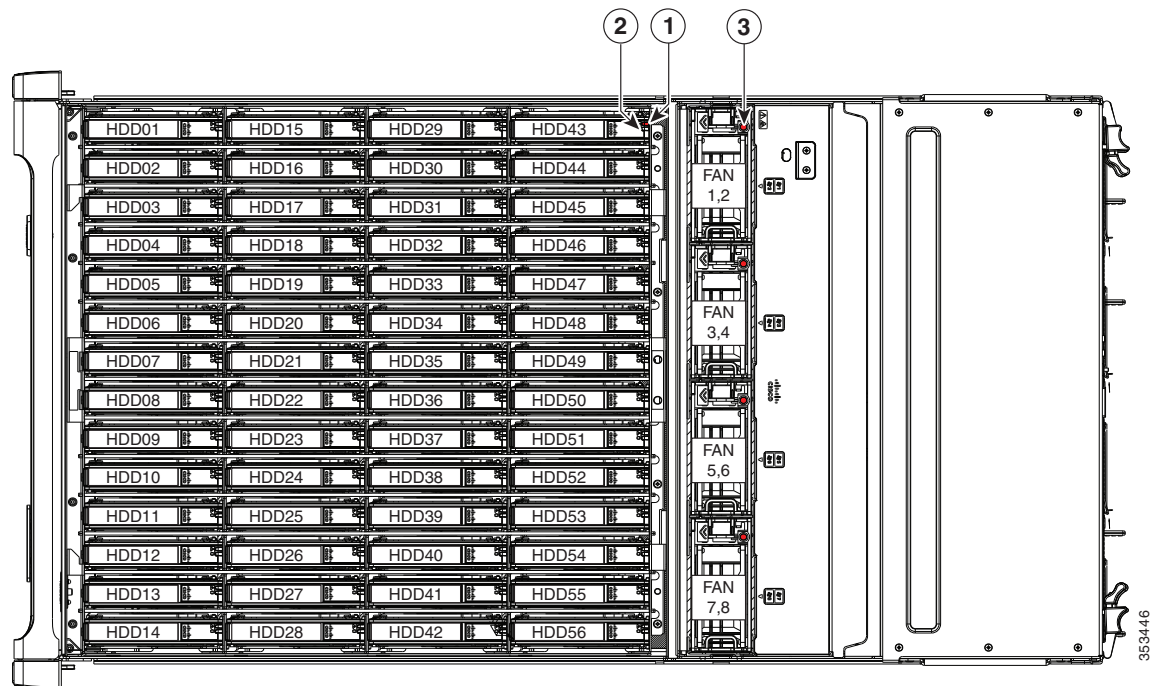
This section contains the following topics:

- [Diagnostic LEDs in the Main Chassis, page 3-7](#)
- [Diagnostic LEDs in the Server Node, page 3-8](#)

### Diagnostic LEDs in the Main Chassis

The diagnostic LEDs inside the main chassis compartments can be viewed while the system is powered on. See [Figure 3-3](#) for the locations of these internal LEDs.

**Figure 3-3** Internal Diagnostic LED Locations in the Main Chassis



<b>1</b>	Drive fault (on each drive carrier)	<b>3</b>	Fan module fault (on each fan module)
<b>2</b>	Drive activity (on each drive carrier)		

**Table 3-4** Internal Diagnostic LED States

LED Name	State
<b>1</b> SAS/SATA drive fault	<ul style="list-style-type: none"> <li>• Off—The drive is operating properly.</li> <li>• Amber—This drive has failed.</li> <li>• Amber, blinking—The device is rebuilding.</li> </ul>
<b>2</b> SAS/SATA drive activity	<ul style="list-style-type: none"> <li>• Off—There is no drive in the drive tray (no access, no fault).</li> <li>• Green—The drive is ready.</li> <li>• Green, blinking—The drive is reading or writing data.</li> </ul>
<b>3</b> Fan fault LEDs	<ul style="list-style-type: none"> <li>• Off—Component is functioning normally.</li> <li>• Amber—Component has failed.</li> </ul>

## Diagnostic LEDs in the Server Node

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 minutes after AC power is removed.

There are fault LEDs for each DIMM, each CPU, the RAID card, and each system I/O controller (SIOC).

To use these LEDs to identify a failed component:

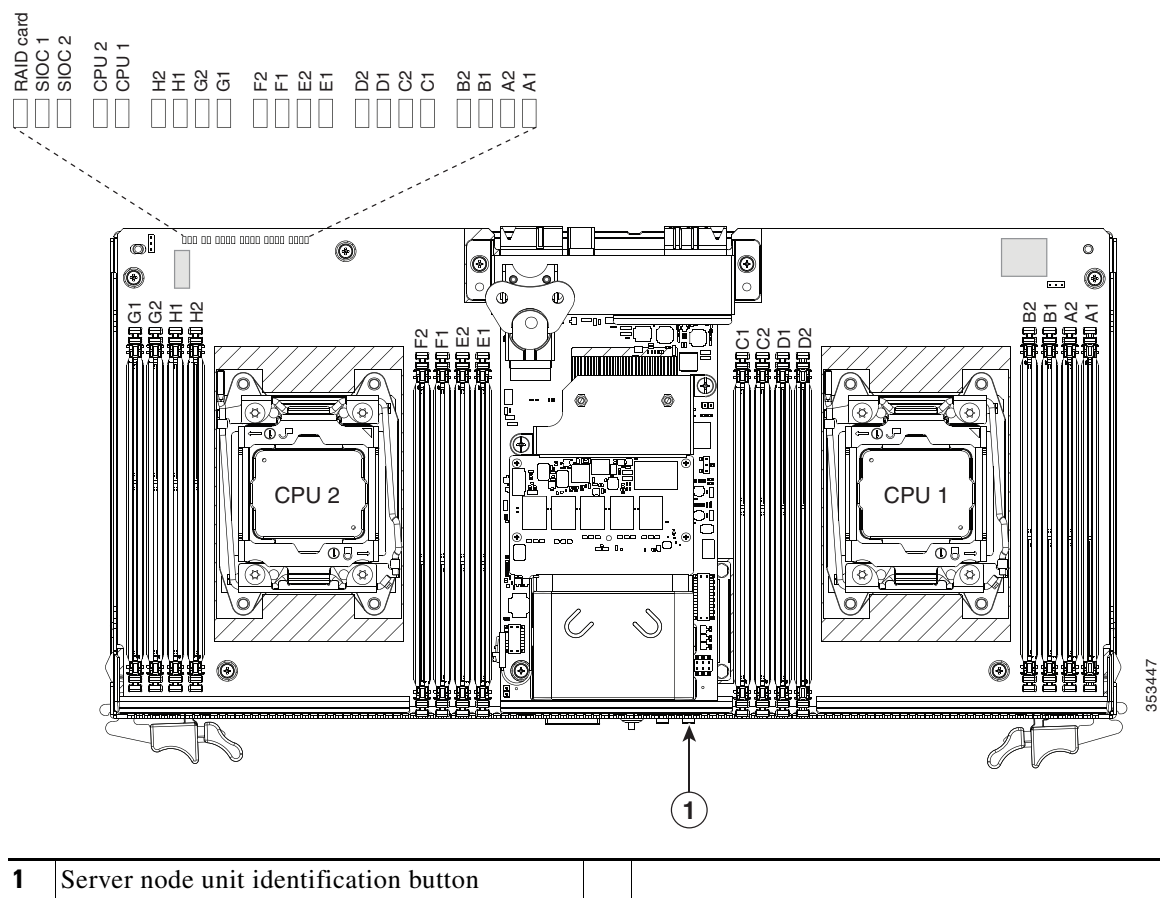
- Step 1** Shut down and remove the server node from the system as described in [Removing the Server Node Cover](#), page 3-13.

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

- Step 2** Press and hold the server node unit identification button within 30 minutes of removing the server node from the system.

A fault LED that lights amber indicates a faulty component.

**Figure 3-4** Internal Diagnostic LEDs on the Server Node Board





# Preparing for System Component Installation or Replacement

This section describes how to prepare for component installation, and it includes the following topics:

- [Required Equipment, page 3-9](#)
- [Shutting Down and Powering Off the System Chassis, page 3-9](#)
- [Shutting Down an Individual Server Node, page 3-10](#)
- [Opening the Main Chassis Top Covers, page 3-11](#)
- [Removing the Server Node Cover, page 3-13](#)
- [Removing the System I/O Controller Cover, page 3-15](#)

## Required Equipment

The following equipment is used to perform the procedures in this chapter:

- Number 2 Phillips-head screwdriver (for CPU heat sink screws)
- Electrostatic discharge (ESD) strap or other grounding equipment such as a grounded mat

## Powering On the System

The system has two power states: standby power mode and main power mode.

- Standby power mode—When you plug power cords into the power supplies and connect to power, the system powers on to standby power mode. The front panel power button/LED lights amber. Power is supplied only to the server node service processor and the cooling fans.
- Main power mode—To power the system to main power mode, press and hold the front panel power button/LED and hold it for four seconds. The front panel power button/LED lights green. Power is supplied to all system components and any operating system on your drives can run.

## Shutting Down and Powering Off the System Chassis

You can invoke a graceful shutdown or a hard shutdown by using either the Cisco Integrated Management Controller (Cisco IMC) interface or the system power button on the front panel.

To use the system power button, follow these steps:

- 
- Step 1** Check the color of the System Power Status LED (see the [“Front-Panel LEDs” section on page 3-2](#)).
- Green—The system is in main power mode and must be shut down before it can be safely powered off. Go to [Step 2](#).
  - Amber—The system is already in standby mode and can be safely powered off. Go to [Step 3](#).

- Step 2** Invoke either a graceful shutdown or a hard shutdown:



**Caution**

To avoid data loss or damage to your operating system, you should always invoke a graceful shutdown of the operating system.

- Graceful shutdown—Press and release the **Power** button. The operating system performs a graceful shutdown and the system goes to standby mode, which is indicated by an amber Power Status LED.
- Emergency shutdown—Press and hold the **Power** button for 4 seconds to force the main power off and immediately enter standby mode.

**Caution**


---

To completely remove all power from the system, you must disconnect all power cords from all power supplies.

---

**Step 3**

Disconnect the power cords from the power supplies in your system to completely remove AC power and power off the system.

---

## Shutting Down an Individual 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:

---

**Step 1** Use a browser and the management IP address of the system to log in to the Cisco IMC GUI.

**Step 2** In the **Navigation** pane, click the **Chassis** menu.

**Step 3** In the **Chassis** menu, click **Summary**.

**Step 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.

**Step 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:

---

**Step 1** Check the color of the server node power status LED:

- **Green**—The server node is powered on. Go to step [Step 2](#)
- **Amber**—the server node is powered off. It is safe to remove the server node from the chassis.

**Step 2** Invoke either a graceful shutdown or a hard shutdown:

**Caution**

To avoid data loss or damage to your operating system, you should always invoke a graceful shutdown of the operating system. 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.

## Opening the Main Chassis Top Covers

This system has three hinged top covers on the main chassis. Opening these covers gives access to the internal-drives compartment and the fan module compartment.

**Note**

The internal drives and cooling fans in the system are hot-swappable and are accessed by opening the top covers. When you rack and cable the system, be sure to allow enough slack in the power and other cables so that the system can be pulled out on the slide rails far enough to allow clearance for opening the top covers.

See also:

- [Removing the Server Node Cover, page 3-13](#)
- [Removing the System I/O Controller Cover, page 3-15](#)

**Step 1**

Open the left or right internal-drive compartment cover to access the hot-swappable internal drives:

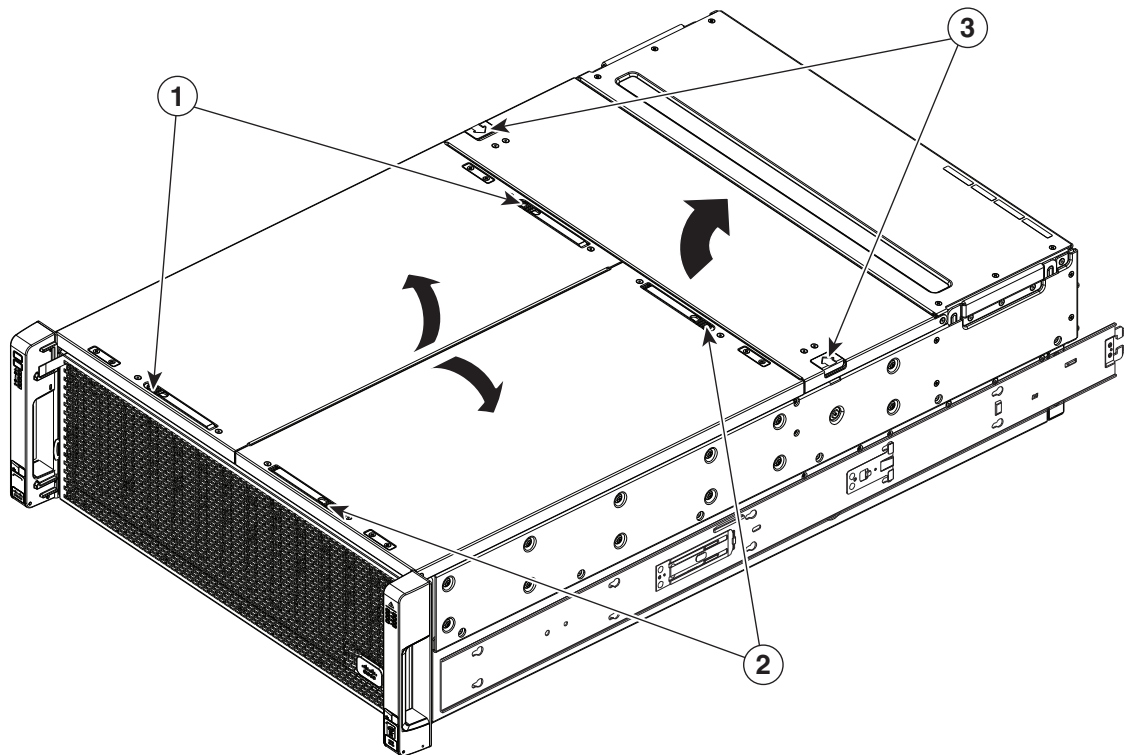
- a. For either the right or left side cover, pull the latch release buttons on both latches toward the outer edges of the chassis. This causes the spring-loaded latches to pop up.
- b. With both latches open, swing open the hinged cover from the center toward the outside.
- c. To secure the cover, close it down flat and then push both latches flat until they click and lock.

**Step 2**

Open the fan compartment cover to access the hot-swappable fan modules:

- a. Push both latch-buttons toward the center.
- b. While holding in both latch-buttons, open the hinged cover from the center toward the rear of the system.
- c. To secure the cover, hold in both latch-buttons while you close the cover flat. Release the latch-buttons.

**Figure 3-5**      **Opening the Top Covers**



353448

1	Latch-release buttons for left internal-drives compartment	3	Latch-release buttons for fan compartment
2	Latch-release buttons for right internal-drives compartment		

## Removing the Server Node Cover

See also:

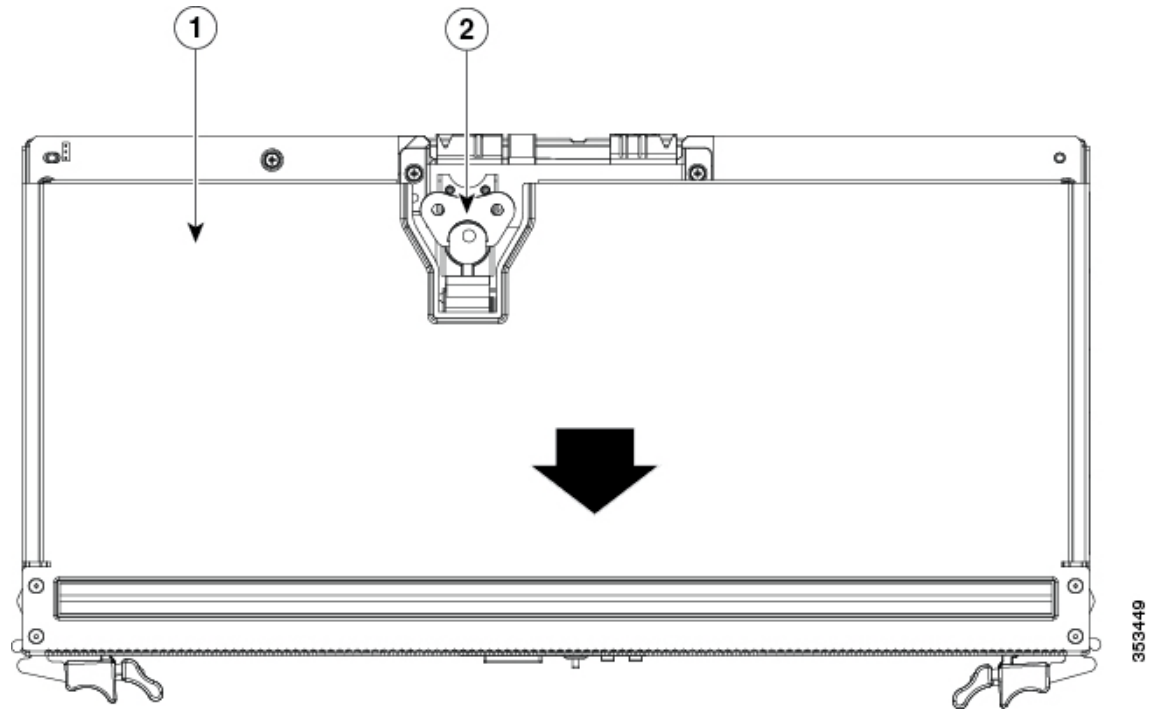
- [Opening the Main Chassis Top Covers, page 3-11](#)
- [Removing the System I/O Controller Cover, page 3-15](#)

**Note**

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

- 
- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System Chassis, page 3-9](#).
- Step 2** Remove a server node from the system:
- Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 3-15](#)).
  - Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
  - Pull the server node straight out from the system.
- Step 3** Remove the cover from the server node:
- Lift the latch handle to an upright position (see [Figure 3-6](#)).
  - Turn the latch handle 90-degrees to release the lock.
  - Slide the cover toward the rear (toward the rear-panel buttons) and then lift it from the server node.
- Step 4** Replace the server node cover:
- Set the cover in place on the server node, offset about one inch toward the rear. Pegs on the inside of the cover must set into the tracks on the server node base.
  - Push the cover forward until it stops.
  - Turn the latch handle 90-degrees to close the lock.
  - Fold the latch handle flat.
- Step 5** Install a server node:
- With the two ejector levers open, align the new server node with the empty bay.
  - Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
  - Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.
- Step 6** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.

**Figure 3-6** Removing the Server Node Cover



<b>1</b>	Server node cover	<b>2</b>	Latch handle (shown in flat, closed position)
----------	-------------------	----------	---

## Removing the System I/O Controller Cover

See also:

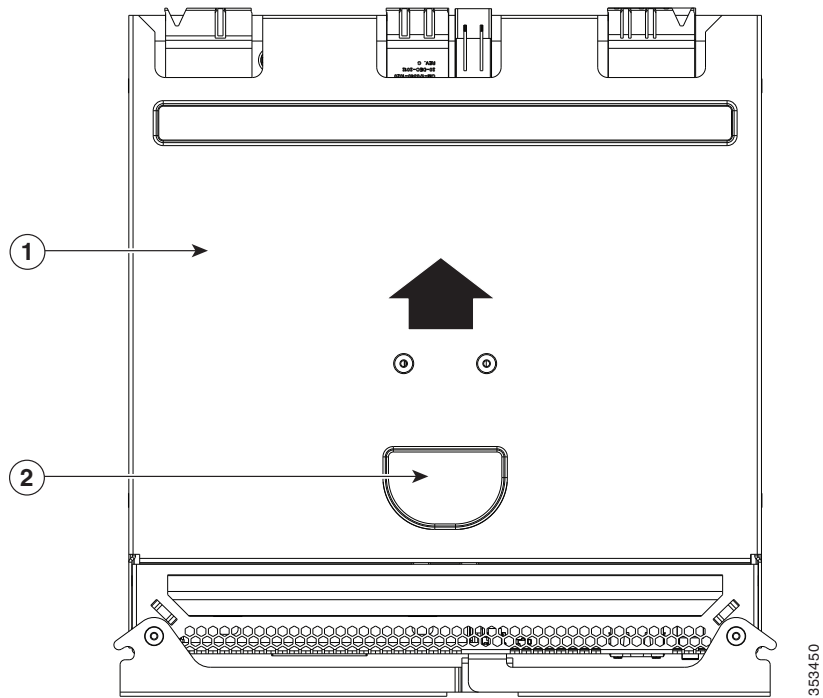
- [Opening the Main Chassis Top Covers, page 3-11](#)
- [Removing the Server Node Cover, page 3-13](#)

**Note**

You do not have to slide the system out of the rack to remove the SIOC from the rear of the system.

- 
- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System Chassis, page 3-9](#).
- Step 2** Remove the SIOC from the system:
- Loosen the single captive thumbscrew on the SIOC and then open its two hinged levers to evenly disengage the SIOC from its backplane connector.
  - Pull the SIOC from the system and set it on an antistatic work surface.
- Step 3** Remove the SIOC cover:
- Press the release button on the cover. See [Figure 3-7](#).
  - Push the cover forward (toward the Molex connectors).
  - Lift the cover straight up off the SIOC.
- Step 4** Replace the SIOC cover:
- Set the cover back in place.
  - Slide the cover toward the rear (toward the rear panel buttons) until it stops and the release button clicks and locks.
- Step 5** Replace the SIOC to the system:
- Push the SIOC into its bay until it stops against the internal midplane.
  - Close the two levers on the SIOC to fully engage the SIOC connector with its midplane.
  - Tighten the thumbscrew on the SIOC levers.
- Step 6** Replace power cables and then power on the system by pressing and holding the power button on the front handle for four seconds.

**Figure 3-7** Removing the SIOC Cover



**1** SIOC cover

**2** Release button

353450



# Installing or Replacing System Components

**Warning**

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

Statement 1029

**Caution**

When handling system components, wear an ESD strap to avoid electrostatic damage.

**Caution**

This system weighs approximately 190 pounds (86 kilograms) when fully loaded with components. We recommend that you use a minimum of two people when lifting the system. Attempting to lift the system alone could result in personal injury or equipment damage.

This section describes how to install and replace system components, and it includes the following topics:

- [Replacing Hard Drives or Solid State Drives, page 3-18](#)
- [Replacing Fan Modules, page 3-28](#)
- [Replacing a Server Node, page 3-30](#)
- [Replacing a Drive Expander Module, page 3-33](#)
- [Replacing a System I/O Controller, page 3-34](#)
- [Replacing a Power Supply, page 3-35](#)
- [Replacing DIMMs Inside the Server Node, page 3-36](#)
- [Replacing CPUs and Heatsinks Inside the Server Node, page 3-40](#)
- [Replacing a RAID Controller Card Inside the Server Node, page 3-46](#)
- [Replacing an RTC Battery Inside the Server Node, page 3-48](#)
- [Replacing an Internal USB Drive Inside the Server Node, page 3-50](#)
- [Installing a Trusted Platform Module \(TPM\) Inside the Server Node, page 3-51](#)
- [Replacing an Adapter Card Inside the SIOC, page 3-55](#)
- [Replacing an RTC Battery Inside the SIOC, page 3-58](#)
- [Service Headers on the Server Node Board, page 3-60](#)

See also [Replaceable Component Locations, page 1-3](#).

## Replacing Hard Drives or Solid State Drives

This section includes the following topics:

- [4K Sector Format Drives Considerations, page 3-18](#)
- [Replacing Hard Drives in the Internal Drive Compartment, page 3-20](#)
- [Replacing Hard Drives in the Optional Drive Expander Module, page 3-24](#)
- [Replacing Solid State Drives in the Rear Panel Solid State Drive Bays, page 3-25](#)

### 4K Sector Format Drives Considerations

- You must boot 4K sector format drives in UEFI mode, not legacy mode. See [Setting Up Booting in UEFI Mode in the BIOS Setup Utility, page 3-18](#) or [Setting Up Booting in UEFI Mode in the Cisco IMC GUI, page 3-19](#).
- Do not configure 4K sector format and 512-byte sector format drives as part of the same RAID volume.
- Operating system support on 4K sector drives is as follows: Windows: Win2012 and Win2012R2; Linux: RHEL 6.5, 6.6, 6.7, 7.0, 7.2; SLES 11 SP3, and SLES 12. ESXi/Vmware is not supported.

### Setting Up Booting in UEFI Mode in the BIOS Setup Utility

- 
- Step 1** Use a web browser and the management IP address of the system to log into the Cisco IMC GUI management interface.
  - Step 2** Select **Compute** and then **Server 1**.
  - Step 3** Click **Launch KVM** to open a virtual KVM window for the server node.
  - Step 4** In the Launch KVM dialog, select **Server 1** and click **Launch**.
  - Step 5** Reboot server node 1. Watch the KVM window for the prompt to press F2.
  - Step 6** Enter the BIOS setup utility by pressing the **F2** key when prompted during bootup.
  - Step 7** Go to the **Boot Options** tab.
  - Step 8** Set **UEFI Boot Options** to **Enabled**.
  - Step 9** Under **Boot Option Priorities**, set your OS installation media (such as a virtual DVD) as your **Boot Option #1**.
  - Step 10** Go to the **Advanced** tab.
  - Step 11** Select **LOM and PCIe Slot Configuration**.
  - Step 12** Set the **PCIe Slot ID: HBA Option ROM** to **UEFI Only**.
  - Step 13** Press **F10** to save changes and exit the BIOS setup utility. Allow the server to reboot.
  - Step 14** After the server reboots and the OS installs, verify the installation:
    - a. Enter the BIOS setup utility by pressing the **F2** key when prompted during bootup.
    - b. Go to the **Boot Options** tab.
    - c. Under **Boot Option Priorities**, verify that the OS you installed is listed as your **Boot Option #1**.
-

## Setting Up Booting in UEFI Mode in the Cisco IMC GUI

- 
- Step 1** Use a web browser and the management IP address of the system to log into the Cisco IMC GUI management interface.
  - Step 2** Select **Compute** and then **Server 1**.
  - Step 3** Select the **BIOS** tab.
  - Step 4** Under **BIOS Properties**, set **Configured Boot Order** to **UEFI**.
  - Step 5** Click **Save Changes**.
  - Step 6** Click **Configure Boot Order**.
  - Step 7** Select the **Advanced** tab.
  - Step 8** Click **Add Local HDD**.
  - Step 9** In the Add Local Disk dialog, enter the information for the 4K sector format drive. Enter a name and specify Slot **M**.
  - Step 10** Click **Save Changes**.
  - Step 11** Click **Add Virtual Media**.
  - Step 12** In the Add Virtual Media dialog, enter a name for your OS installation virtual media.
  - Step 13** Click **Save Changes**.
  - Step 14** Click **Close**.
  - Step 15** Click **Launch KVM** to open a virtual KVM window for the server node.
  - Step 16** In the Launch KVM dialog, select **Server 1** and click **Launch**.
  - Step 17** Activate virtual media. Pull down the **Virtual Media** menu on the KVM window and select **Activate Virtual Devices**.
  - Step 18** Reboot the server node.
  - Step 19** Press **F6** during the boot to enter the boot device menu.
  - Step 20** Select **UEFI: Cisco vKVM-Mapped vDVD** and press **Enter**.
  - Step 21** Proceed with the installation of your OS.  
After the OS installs and the system reboots, your OS is listed as a boot option.
-

## Replacing Hard Drives in the Internal Drive Compartment

This section contains the following topics:

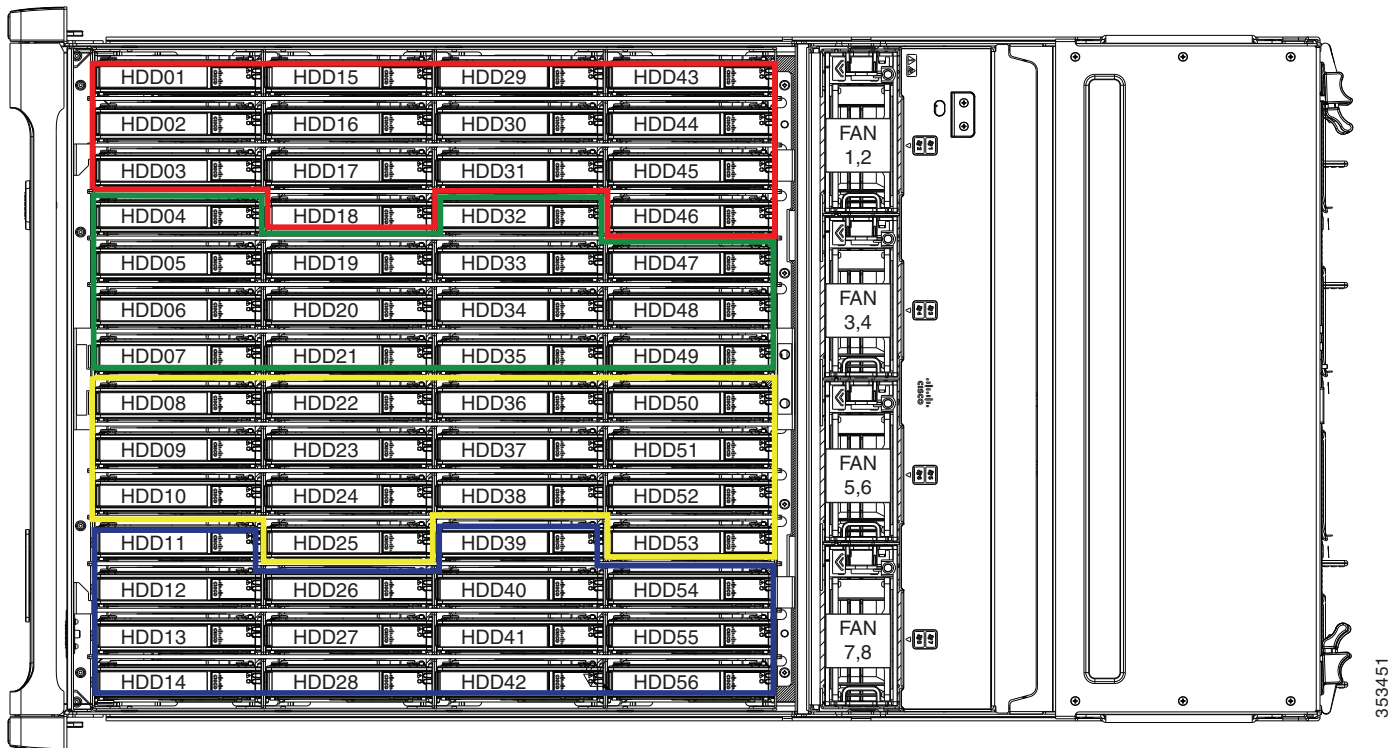
- [Internal Drive Population Guidelines, page 3-20](#)
- [Identifying a Faulty Internal Drive, page 3-21](#)
- [Replacing Internal Drives, page 3-23](#)

### Internal Drive Population Guidelines

The system has 56 internal drive bays in the main chassis. [Figure 3-8](#) shows the internal drive bay numbering. When populating internal drives, follow these guidelines:

- Populate drive bays starting from the lowest-numbered bays to the highest.
- The four colored boxes shown in [Figure 3-8](#) represent the four power groups in which power is distributed to the drive bays. This might be useful for troubleshooting power rail problems.
- When ordering the system, it is configurable with disk multipacks. The supported configurations of multipacks are listed below. See the [Cisco UCS C3160 Rack Server Spec Sheet](#) for hardware ordering and configuration information.
  - The UCSC-C3X60-14HD4, UCSC-C3X60-28HD4, and UCSC-C3X60-42HD4 multipacks can be selected along with the UCSC-C3X60-SSD4 multipack.
  - The UCSC-C3X60-56HD4 multipack cannot be selected with any other multipack.
  - The UCSC-C3X60-14HD6, UCSC-C3X60-28HD6, and UCSC-C3X60-42HD6 multipacks can be selected along with the UCSC-C3X60-SSD6 multipack.
  - The UCSC-C3X60-56HD6 multipack cannot be selected with any other multipack.
  - You cannot mix 4 TB SAS-2 multipacks with 6 TB SAS-3 multipacks.

Figure 3-8 Internal Drive Bay Numbering



### Identifying a Faulty Internal Drive

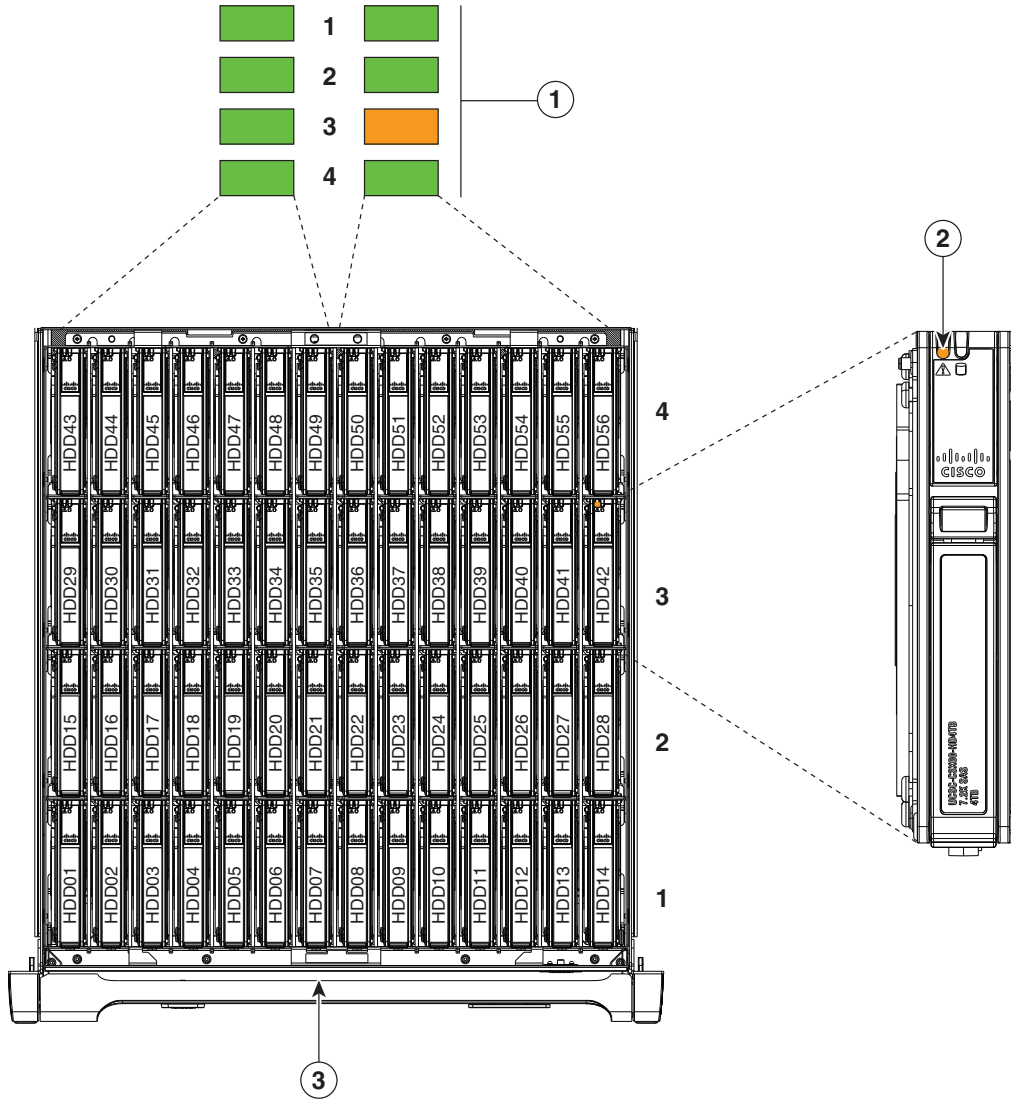
The system has internal-drive fault LEDs on the right-front handle (see [Figure 3-1](#)). Use these LEDs to get an indication of the location of a failing drive.

- Step 1** Observe the internal-drive fault LEDs on the right-front handle.
- The two columns of LEDs correspond to the two halves of the internal drive compartment (under either the right- or left-side top cover).
  - The four numbered rows of LEDs correspond to the four horizontal rows of drive bays (14 drive bays in each row).

See [Figure 3-9](#) for an example. In this example, the amber LED indicates that the failing drive is in the right half of the internal drive compartment, in row 3.

- Step 2** Open the right- or left-side cover and look at the fault LEDs on the drive trays.
- A solid amber fault LED indicates a failed drive.

Figure 3-9 Internal-Drive Status LED Example



353452

1	Internal-drive fault LEDs on right-front handle of system, indicating faulty drive in right side of row 3	3	Front of system
2	Fault LED on drive carrier		

## Replacing Internal Drives



**Note** SAS/SATA drives are hot-swappable and can be replaced without removing power from the system.

**Step 1** Slide the system out the front of the rack far enough so that you can open the top cover.



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

**Step 2** Identify a failing drive as described in [Identifying a Faulty Drive Expander Module Drive, page 3-24](#)

**Step 3** Open the internal-drive compartment cover.

**Step 4** Remove a faulty drive:

- a. Press the release button on the drive carrier. The drive lever pops up.
- b. Lift the drive lever to the fully open, 90-degree position, then lift the drive straight up out of its bay.  
Spare drives are already installed in a carrier, so it is not necessary to remove the old drive from its carrier.

**Step 5** Install a new drive:

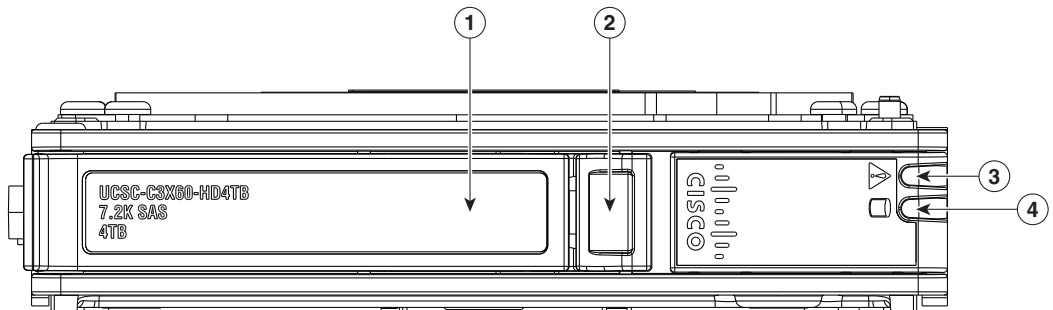


**Note** Observe the drive population guidelines in [Internal Drive Population Guidelines, page 3-20](#).

- a. Align the new drive with the empty bay. Orient the drive so that its connector aligns with the connector on the board.
- b. Lower the drive until it touches the board connector and the drive lever begins to close.
- c. Press the drive lever down flat until it clicks and locks.

**Step 6** Close the chassis cover and push the system back into the rack.

**Figure 3-10 Internal Drive Carrier Features**



<b>1</b>	Drive lever	<b>3</b>	Drive fault LED
<b>2</b>	Release button	<b>4</b>	Drive activity LED

## Replacing Hard Drives in the Optional Drive Expander Module

This section contains the following topics:

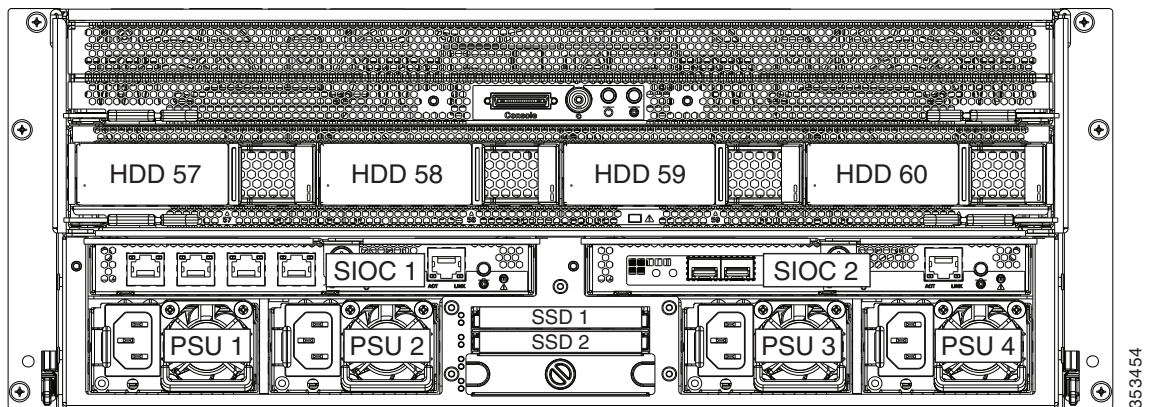
- [Drive Expander Module Drives Population Guidelines](#), page 3-24
- [Identifying a Faulty Drive Expander Module Drive](#), page 3-24
- [Replacing Drive Expander Module Drives](#), page 3-24

### Drive Expander Module Drives Population Guidelines

The optional drive expander module can hold up to four 3.5-inch drives. Drive numbering is shown in [Figure 3-11](#). When populating these drives, follow these guidelines.

- Populate drives starting with the lowest-numbered bay to the highest.

**Figure 3-11** Drive Expander Module and Solid State Drive Numbering



### Identifying a Faulty Drive Expander Module Drive

Each drive carrier has a fault LED that lights solid amber to indicate a failing drive.

### Replacing Drive Expander Module Drives



**Note**

SAS/SATA drives are hot-swappable and can be replaced without removing power from the system.

- Step 1** Identify a failing drive as described in [Identifying a Faulty Drive Expander Module Drive](#), page 3-24.
- Step 2** Remove a faulty drive:
- Press the release button on the drive carrier. The drive lever pops up.
  - Lift the drive lever to the fully open position, then pull the drive straight up out of its bay.
- Spare drives are already installed in a carrier, so it is not necessary to remove the old drive from its carrier.
- Step 3** Install a new drive:

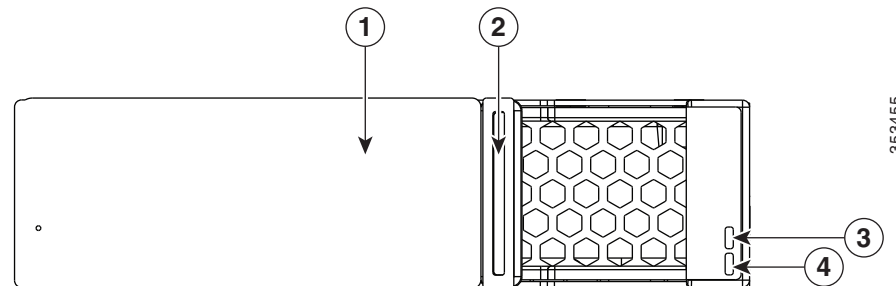




**Note** Observe the drive population guidelines in [Drive Expander Module Drives Population Guidelines](#), page 3-24.

- a. Align the new drive with the empty bay and then push the drive in until it touches the board connector and the drive lever begins to close.
- b. Press the drive lever down flat until it clicks and locks.

**Figure 3-12** Drive Expander Module Drive Carrier Features



<b>1</b>	Drive lever	<b>3</b>	Drive fault LED
<b>2</b>	Release button	<b>4</b>	Drive activity LED

## Replacing Solid State Drives in the Rear Panel Solid State Drive Bays

This section contains the following topics:

- [Solid State Drive Population Guidelines](#), page 3-25
- [Replacing Solid State Drives](#), page 3-26
- [Selecting SATA Mode in the BIOS for SSDs](#), page 3-27



**Note** The two SSDs can be mirrored in a RAID 1 configuration when managed in advanced host controller interface (AHCI) mode through your Windows or Linux operating system. The AHCI SATA mode must be enabled in the BIOS, as described in [Selecting SATA Mode in the BIOS for SSDs](#), page 3-27.

### Solid State Drive Population Guidelines

There are two supported bays for solid state drives in the rear panel. Drive numbering is shown in [Figure 3-11](#). When populating these drives, follow these guidelines.



**Note** At this time, only the top two solid state drive bays are supported (see [Figure 3-11](#)).

- Populate drives starting with the lowest-numbered bay to the highest.
- Keep the blanking panel in the lower two SSD bays to ensure proper air flow.

## Replacing Solid State Drives



**Note** Solid state drives are hot-swappable and can be replaced without removing power from the system.

- Step 1** Remove a faulty solid state drive:
- Grasp and pinch the release latch toward the center.
  - Pull the solid state drive straight out of the bay.

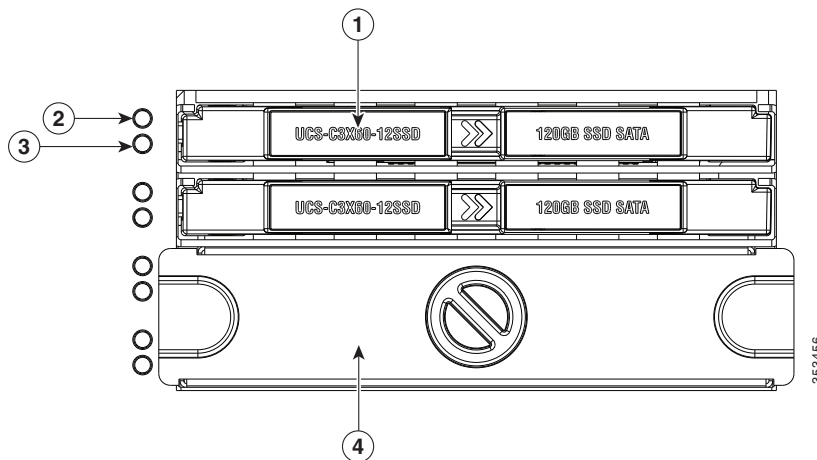
- Step 2** Install a new solid state drive:



**Note** Observe the drive population guidelines in [Solid State Drive Population Guidelines](#), page 3-25.

- Align the new drive with the empty bay (with the label facing up) and then push the drive in until it touches the board connector.
- Grasp and pinch the release latch toward the center while you push the drive fully into the bay, and then release the release latch.

**Figure 3-13 Solid State Drive Bay Features**



<b>1</b>	Release latch	<b>3</b>	Not used at this time
<b>2</b>	Not used at this time	<b>4</b>	Blanking panel over lower two bays, which are not used at this time

## Selecting SATA Mode in the BIOS for SSDs

The default SATA mode for controlling the SSDs is AHCI Mode. If you want to control the SSD pair in AHCI mode, no further steps are necessary.

- 
- Step 1** Boot the server node and press **F2** when prompted to enter the BIOS Setup utility for that server node.
- Step 2** In the utility, choose the **Advanced** tab, and then choose **SATA Configuration**.
- Step 3** Set **SATA Mode** to your choice:
- Disabled—The embedded RAID controller is disabled.
  - AHCI Mode [Default]—Advanced host controller interface. You can manage the SSD pair by using your operating system's storage management feature.
- Step 4** Press **F10** to save your changes and exit the utility.
-

## Replacing Fan Modules

Each fan module contains two fans. See [Figure 3-14](#) for the fan numbering. The odd-numbered fan is at the top of the fan module and the even-numbered fan is at the bottom of the fan module.

You do not have to shut down or power off the system to replace fan modules because they are hot-swappable.


**Tip**

Each fan module has a fault LED that lights amber if the fan module fails.

**Step 1**

Slide the system out the front of the rack far enough so that you can open the fan compartment cover.


**Caution**

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

**Step 2**

Open the fan compartment cover as described in [Opening the Main Chassis Top Covers, page 3-11](#).

**Step 3**

Remove a fan module:

- a. Grasp the two latches on the top of the fan and pinch them toward the center.
- b. Lift the fan module straight out of the bay.

**Step 4**

Install a new fan module:


**Note**

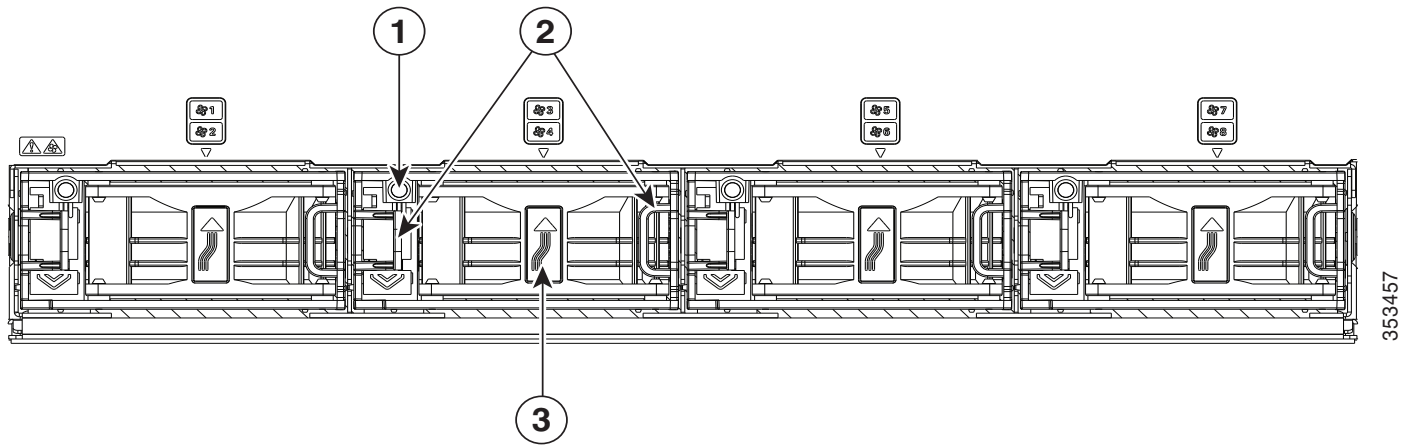
The arrow on the fan module that indicates the air flow direction should point to the rear of the server.

- a. Align the fan module with the bay so that the connector on the bottom of the fan module is aligned with the socket on the floor of the chassis.
- b. Lower the fan module until it touches the socket, then push down firmly until the latch locks.

**Step 5**

Close the fan compartment cover and then push the system back into the rack.

Figure 3-14 Fan Modules (Top View)

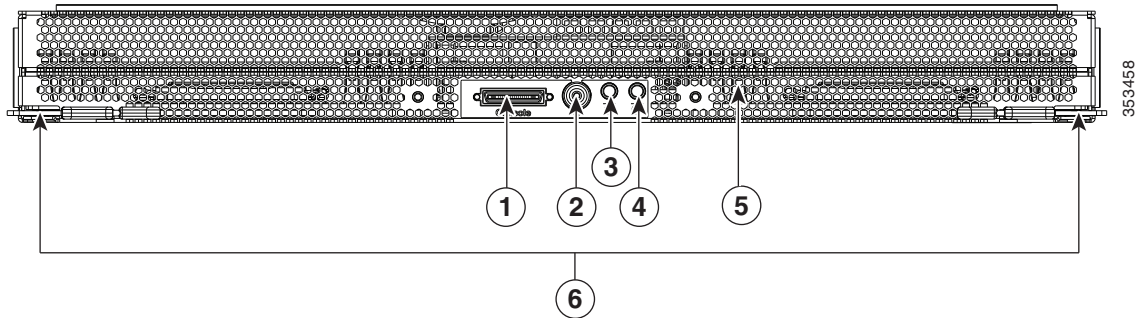


<b>1</b>	Fan module fault LED	<b>3</b>	Air flow direction arrow pointing toward rear of server
<b>2</b>	Fan module release latches		

## Replacing a Server Node

The system can support one server node. The server node must be in the uppermost bay of the system.

**Figure 3-15** Server Node External Features



1	KVM cable connector	4	Unit identification button/LED
2	Reset button (resets the controller chipset for this node)	5	Server node health LED (behind mesh on server node board)
3	Server node power button/LED	6	Ejector levers (two)

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.

### Step 1

Optional—Export the Cisco IMC configuration from the server 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 3-31](#), then return to the next step.



### Note

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.

### Step 2

Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down an Individual Server Node, page 3-10](#).

### Step 3

Remove a server node from the system:

- Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 3-15](#)).
- Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
- Pull the server node straight out from the system.

### Step 4

Install a server node:

- With the two ejector levers open, align the new server node with the empty bay.




---

**Note** The server node must be installed into the top bay, as shown in [Figure 1-2 on page 1-2](#).

---

- 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.
- Step 5** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.
- Step 6** Perform initial setup on the new server to assign an IP address and your other preferred network settings. See [Initial Server Setup, page 2-12](#).
- Step 7** 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 3-32](#).
- 

## 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](#).

---

**Step 1** Log in to the IP address and CLI interface of the server node that you are replacing.

**Step 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>
```

**Step 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:xxxx
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](#).

---

**Step 1** Log in to the IP address and CLI interface of the new server node.

**Step 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>
```

**Step 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.

The following is an example of an import operation. In this example, the TFTP protocol is used to import the configuration 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:xxxxx
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 a Drive Expander Module

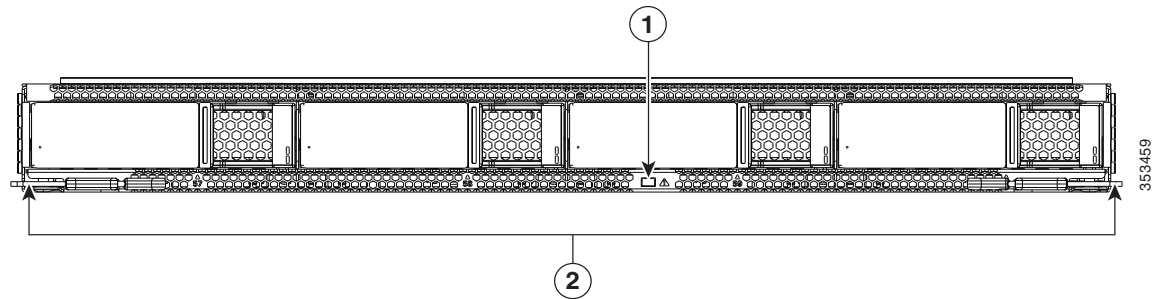
The system can support one optional drive expander module.



**Tip**

The module contains one fault LED that indicates when the module has failed (see [Figure 3-16](#)).

**Figure 3-16** Drive Expander Module External Features



<b>1</b>	Drive expander module fault LED	<b>2</b>	Drive expander module ejector levers (two)
----------	---------------------------------	----------	--



**Note**

The drive expander module is hot-swappable, which means that you can remove it without shutting down system power.

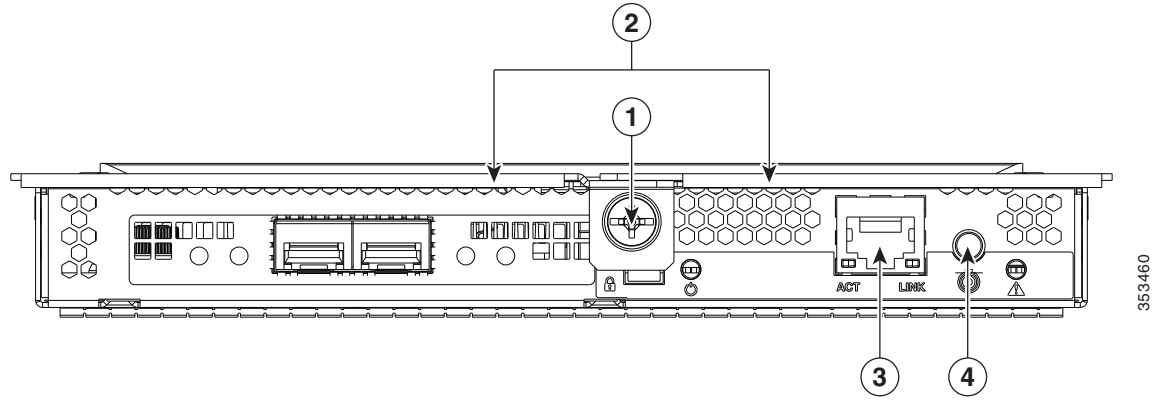
The drive expander module is accessed from the rear of the system, so you do not have to pull the system out from the rack.

- Step 1** Remove a drive expander module from the system:
- a. Grasp the two module ejector levers and pinch their latches to release the levers (see [Figure 3-16](#)).
  - b. Rotate both levers to the outside at the same time to evenly disengage the module from the midplane connectors.
  - c. Pull the module straight out from the system.
- Step 2** Remove any drives from the old module and move them to your new drive expander module. Install each drive to the same position that it occupied in the old module.
- Step 3** Install a new drive expander module:
- a. With the two ejector levers open, align the new module with the empty bay.
  - b. Push the module into the bay until it engages with the midplane connectors.
  - c. Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the module.

## Replacing a System I/O Controller

The system can support up to two system I/O controllers (SIOCs).

**Figure 3-17** SIOC External Features



<b>1</b>	Lever thumbscrew	<b>3</b>	1-Gb dedicated management port
<b>2</b>	Ejector levers	<b>4</b>	Not used at this time

You do not have to slide the system out of the rack to remove the SIOC from the rear of the system.

- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System Chassis, page 3-9](#).
- Step 2** Remove the SIOC from the system:
- Loosen the single captive thumbscrew on the SIOC and then open its two hinged ejector levers to evenly disengage the SIOC from its midplane connector.
  - Pull the SIOC from the system.
- Step 3** If you want to move an adapter card from the old SIOC to your replacement SIOC, use the procedure in [Replacing an Adapter Card Inside the SIOC, page 3-55](#).
- Step 4** Install the new SIOC:



**Note** If you have only one SIOC, it must be in SIOC bay 1 (see [Figure 1-2 on page 1-2](#)).

- Push the SIOC into its bay until it stops against the internal backplane.
  - Close the two ejector levers on the SIOC to fully engage the SIOC connector with the midplane connector.
  - Tighten the thumbscrew on the SIOC ejector levers.
- Step 5** Replace power cables, and then power on the system by pressing and holding the power button for four seconds.

## Replacing a Power Supply

The system can have two or four power supplies. When four power supplies are installed they are redundant as 2+2.

To replace or install a power supply, follow these steps:

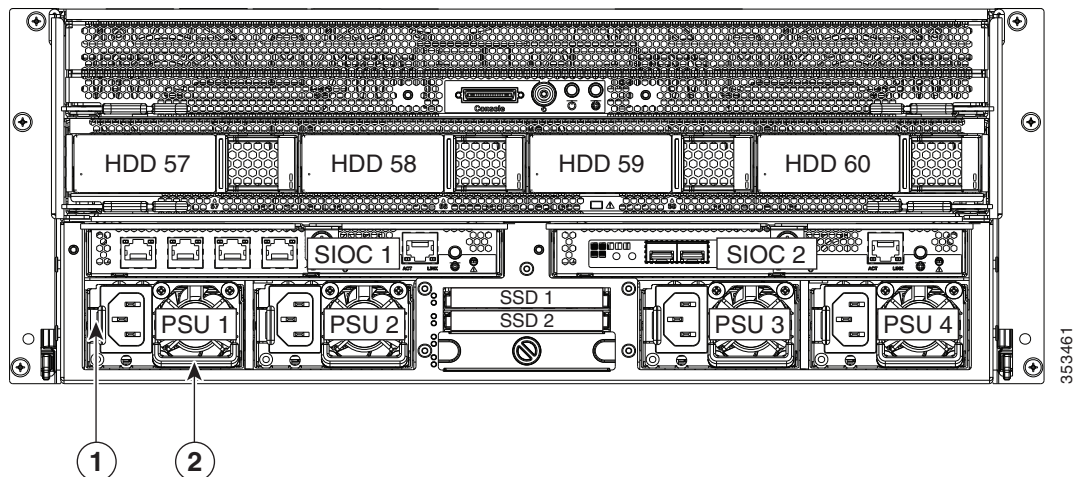


### Note

If you have ordered a system with power supply redundancy (four power supplies), you do not have to power off the system to replace up to two power supplies because they are redundant as 2+2.

- Step 1** Remove the power supply that you are replacing or a blank panel from an empty bay (see [Figure 3-18](#)):
- a. Perform one of the following actions:
    - If your system has only two power supplies, shut down and power off the system as described in the “[Shutting Down and Powering Off the System Chassis](#)” section on page 3-9.
    - If your system has four power supplies, you do not have to power off the system.
  - b. Remove the power cord from the power supply that you are replacing.
  - c. Grasp the power supply handle while pinching the release lever towards the handle.
  - d. Pull the power supply out of the bay.
- Step 2** Install a new power supply:
- a. Grasp the power supply handle and insert the new power supply into the empty bay.
  - b. Push the power supply into the bay until the release lever locks.
  - c. Connect the power cord to the new power supply.
  - d. If you powered off the system, press and hold the system Power button for four seconds to return the system to main power mode.

**Figure 3-18** Removing and Replacing Power Supplies



1	Power supply release lever	2	Power supply handle
---	----------------------------	---	---------------------

## Replacing DIMMs Inside the Server Node

The 16 DIMM sockets are inside the server node.

This section includes the following topics:

- [DIMM Performance Guidelines and Population Rules, page 3-36](#)
- [DIMM Replacement Procedure, page 3-39](#)

**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.

---

## DIMM Performance Guidelines and Population Rules

This section includes the following topics:

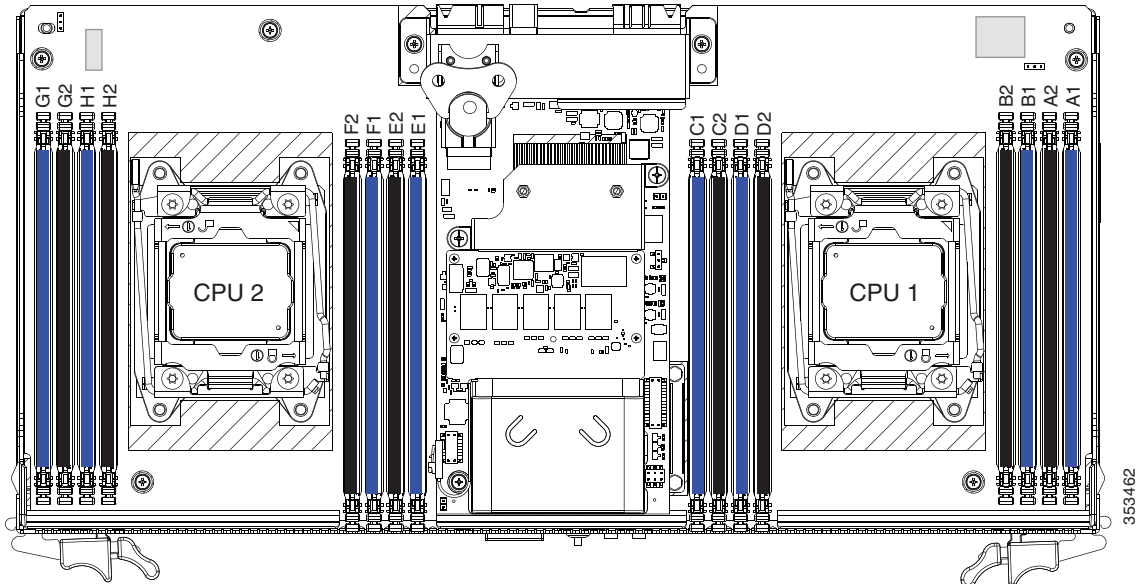
- [DIMM Sockets, page 3-37](#)
- [DIMM Population Rules, page 3-37](#)
- [Memory Mirroring Mode, page 3-38](#)
- [Lockstep Channel Mode, page 3-38](#)

## DIMM Sockets

Figure 3-19 shows the DIMM sockets and how they are numbered on a server node board.

- A server node has 16 DDR3 DIMM sockets (8 for each CPU).
- Channels are labeled with letters as shown in Figure 3-19. 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 3-19** DIMM Sockets and CPU Sockets on a Server Node Board



## 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 3-5.

**Table 3-5** DIMM Mixing Rules

DIMM Parameter	DIMMs in the Same Channel	DIMMs in the Same Bank
DIMM Capacity: RDIMM = 8 or 16 GB	You can mix different capacity DIMMs in the same channel (for example, A1, A2).	<ul style="list-style-type: none"> <li>• 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.</li> </ul>

**Table 3-5** DIMM Mixing Rules

DIMM Parameter	DIMMs in the Same Channel	DIMMs in the Same Bank
DIMM Speed: 1600- or 1866-MHz	You can mix speeds, but DIMMs will run at the speed of the slowest DIMMs/CPUs installed in the channel.	You can mix speeds, but DIMMs will run at the speed of the slowest DIMMs/CPUs 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.

## DIMM Replacement Procedure



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

- Step 1** Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down an Individual Server Node, page 3-10](#).
- Step 2** Remove a server node from the system:
- Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 3-15](#)).
  - Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
  - Pull the server node straight out from the system.
- Step 3** Remove the server node cover as described in [Removing the Server Node Cover, page 3-13](#).
- 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.
- Step 5** Install a new DIMM:



**Note** Before installing DIMMs, refer to the population guidelines. See [DIMM Performance Guidelines and Population Rules, page 3-36](#).

- Align the new DIMM with the socket on the riser. Use the alignment key in the DIMM socket to correctly orient the DIMM.
  - Push the DIMM into the socket until it is fully seated and the ejector levers on either side of the socket lock into place.
- Step 6** Replace the server node cover as described in [Removing the Server Node Cover, page 3-13](#).
- Step 7** Install a server node:
- With the two ejector levers open, align the new server node with the empty bay.



**Note** The server node must be in the top bay, as shown in [Figure 1-2 on page 1-2](#).

- Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
- Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.

- Step 8** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.

## Replacing CPUs and Heatsinks Inside the Server Node

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

This section contains the following topics:

- [CPU Configuration Rules, page 3-40](#)
- [CPU Replacement Procedure, page 3-40](#)
- [Additional CPU-Related Parts To Order With RMA Replacement Server Nodes, page 3-45](#)

### CPU Configuration Rules

See [Figure 3-19](#) for the CPU socket numbering.

- The server node must have two CPUs to operate.

### CPU Replacement Procedure



#### 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.



#### Caution

The Pick-and-Place tools used in this procedure are required to prevent damage to the contact pins between the motherboard and the CPU. Do not attempt this procedure without the required tools, which are included with each CPU option kit. If you do not have the tool, you can order a spare (Cisco PID UCS-CPU-EP-PNP).



#### Note

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



- Step 1** Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down an Individual Server Node, page 3-10](#).
- Step 2** Remove a server node from the system:
  - a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 3-15](#)).
  - 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.
- Step 3** Remove the server node cover as described in [Removing the Server Node Cover, page 3-13](#).
- 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

Loosen each screw evenly to avoid damaging the heatsink or CPU.



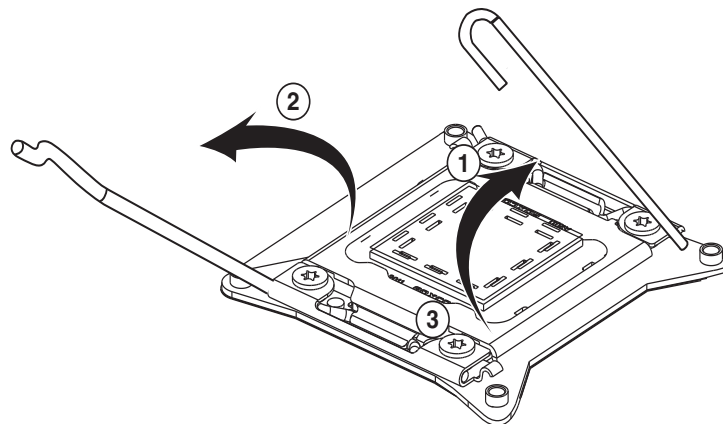
- Step 5** Unclip the first CPU retaining latch that is labeled with the  icon, and then unclip the second retaining latch that is labeled with the  icon. See [Figure 3-20](#).





**Note** You must hold the first retaining latch open before you can lift the second retaining latch.

- Step 6** Open the hinged CPU cover plate. See [Figure 3-20](#).

**Figure 3-20** CPU Socket Retaining Latches

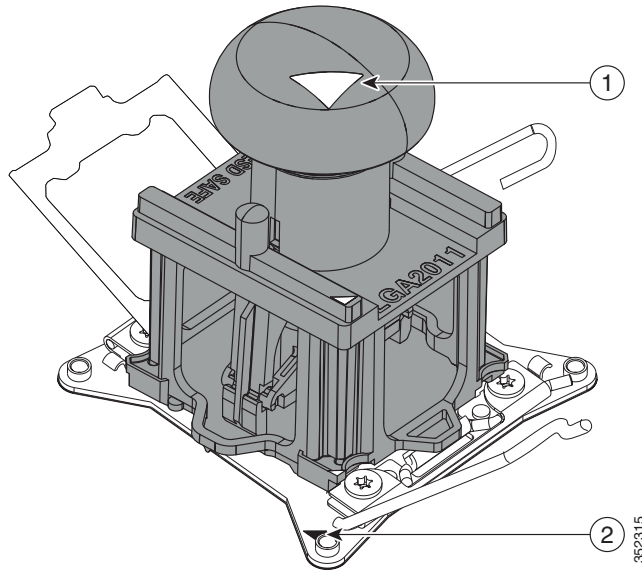


332093

<b>1</b>	CPU retaining latch, 	<b>3</b>	Hinged CPU cover plate
<b>2</b>	CPU retaining latch, 		

- Step 7** Remove the old CPU:
- Set the Pick-and-Place tool on the CPU in the socket, aligning the arrow on the tool with the registration mark on the socket (the small triangular mark). See [Figure 3-21](#).
  - Press the top button on the tool to grasp the installed CPU.
  - Lift the tool and CPU straight up.
  - Press the top button on the tool to release the old CPU on an antistatic surface.

Figure 3-21 Pick-and-Place Tool

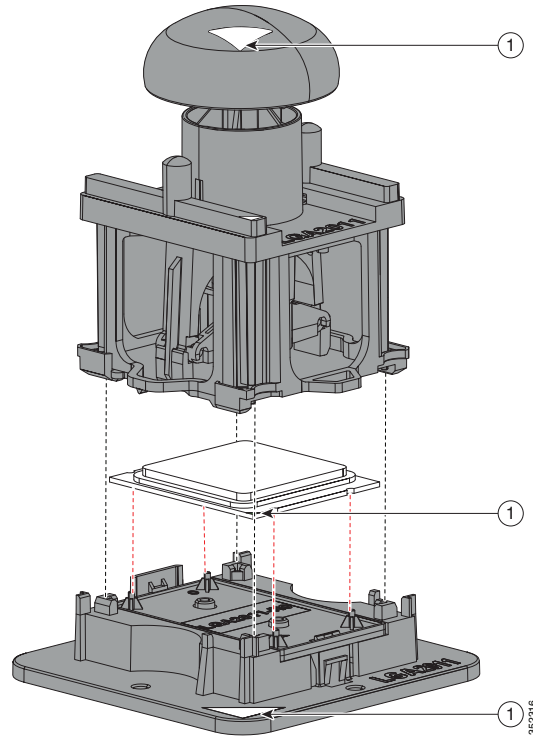


1	Arrow on tool	2	Registration mark on CPU socket
---	---------------	---	---------------------------------

**Step 8** Insert the new CPU into the Pick-and-Place tool:

- a. Remove the new CPU from the packaging and place it on the pedestal that is included in the kit. Align the registration mark on the corner of the CPU with the arrow on the corner of the pedestal (see [Figure 3-22](#)).
- b. Press down on the top button of the tool to lock it open.
- c. Set the Pick-and-Place tool on the CPU pedestal, aligning the arrow on the tool with the arrow on the corner of the pedestal. Make sure that the tabs on the tool are fully seated in the slots on the pedestal.
- d. Press the side lever on the tool to grasp and lock in the CPU.
- e. Lift the tool and CPU straight up off the pedestal.

Figure 3-22 CPU and Pick-and-Place Tool on Pedestal





<b>1</b>	Arrow marks for alignment
----------	---------------------------

**Step 9** Install a new CPU:

- a. Set the Pick-and-Place tool that is holding the CPU over the empty CPU socket on the motherboard.



**Note** Align the arrow on the top of the tool with the registration mark (small triangle) that is stamped on the metal of the CPU socket, as shown in [Figure 3-21](#) on page 3-42.

- b. Press the top button on the tool to set the CPU into the socket. Remove the empty tool.
- c. Close the hinged CPU cover plate.
- d. Clip down the CPU retaining latch with the  icon first, then clip down the CPU retaining latch with the  icon. See [Figure 3-20](#) on page 3-41.

**Step 10** Install a heatsink:**Caution**

The heatsink must have a new thermal grease on the heatsink-to-CPU surface to ensure proper cooling. If you are reusing a heatsink, you must remove the old thermal grease. If you are installing a new heatsink, skip to Step [c](#) below.

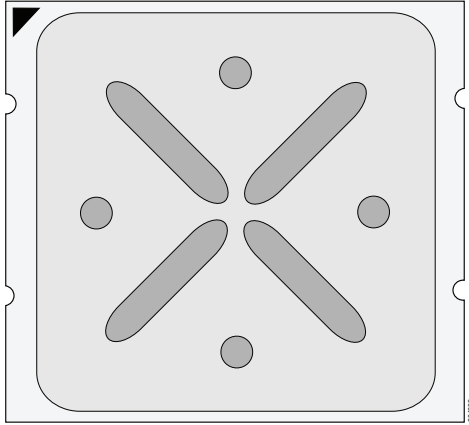
- a. Apply an alcohol-based cleaning solution to the old thermal grease and let it soak for a least 15 seconds.
- b. Wipe all of the old thermal grease off the old heatsink using a soft cloth that will not scratch the heatsink surface.

- c. 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 3-23](#).



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

**Figure 3-23 Thermal Grease Application Pattern**



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



**Note** Alternate tightening each screw evenly to avoid damaging the heatsink or CPU.

**Step 11** Replace the server node cover as described in [Removing the Server Node Cover, page 3-13](#).

**Step 12** Install a server node:

- a. With the two ejector levers open, align the new server node with the empty bay.



**Note** The server node must be in the top bay, as shown in [Figure 1-2 on page 1-2](#).

- 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.

**Step 13** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.

## 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 C3160 (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 a RAID Controller Card Inside the Server Node

The Cisco modular RAID controller card connects to a mezzanine-style socket inside the server node. The SuperCap power module (SCPM) comes already attached to a new card, so you do not have to remove that separately.

### 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](#)

### Replacement Procedure



#### Note

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

- 
- Step 1** Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down an Individual Server Node, page 3-10](#).
- Step 2** Remove a server node from the system:
- Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 3-15](#)).
  - Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
  - Pull the server node straight out from the system.
- Step 3** Remove the server node cover as described in [Removing the Server Node Cover, page 3-13](#).
- Step 4** Remove a Cisco modular RAID controller card:
- Loosen the two captive thumbscrews that secure the card to the board (see [Figure 3-24](#)).
  - Grasp the card at both ends and lift it evenly to disengage the connector on the underside of the card from the mezzanine socket.
- Step 5** Install a Cisco modular RAID controller card:
- Align the card and bracket over the mezzanine socket and the three standoffs.
  - Press down on both ends of the card to engage the connector on the underside of the card with the mezzanine socket.
  - Install the screw that passes through the supercap power module (backup battery) cover.
- Step 6** Install the heat sink assembly to the controller card:
- Remove the protective tape from the thermal interface that is on the underside of the heatsink.
  - Align the heat sink assembly and its two captive screws with the holes in the controller card.
  - Tighten the two captive screws to the two standoffs that are under the controller card.
- Step 7** Replace the server node cover as described in [Removing the Server Node Cover, page 3-13](#).

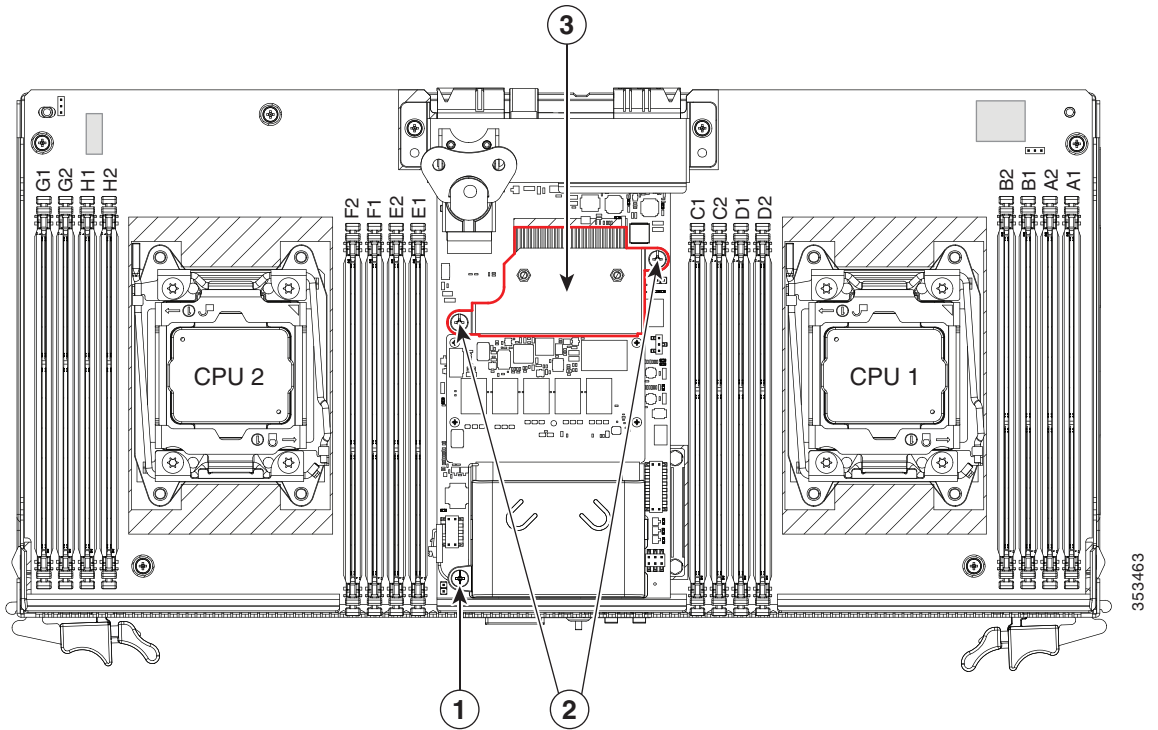
- Step 8** Install a server node:
- a. With the two ejector levers open, align the new server node with the empty bay.



**Note** The server node must be in the top bay, as shown in [Figure 1-2 on page 1-2](#).

- 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.
- Step 9** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.
- Step 10** See [Restoring RAID Configuration After Replacing a RAID Controller, page C-4](#) to restore your RAID configuration.

**Figure 3-24 Cisco Modular RAID Controller Card Inside the Server Node**



<b>1</b>	Screw that passes through supercap power module cover to standoff	<b>3</b>	Heatsink assembly
<b>2</b>	Two captive screws that pass through heatsink assembly to standoffs		

## 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.


**Note**

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

**Step 1** Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down an Individual Server Node, page 3-10](#).

**Step 2** Remove a server node from the system:

- a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 3-15](#)).
- 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 to access the RTC battery.

**Step 3** Remove the server node RTC battery:

- a. Locate the RTC battery. See [Figure 3-25](#).
- b. Bend the battery retaining clip away from the battery and pull the battery from the socket.

**Step 4** Install the RTC battery:

- a. Bend 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.

**Step 5** Install a server node:

- a. With the two ejector levers open, align the new server node with the empty bay.


**Note**

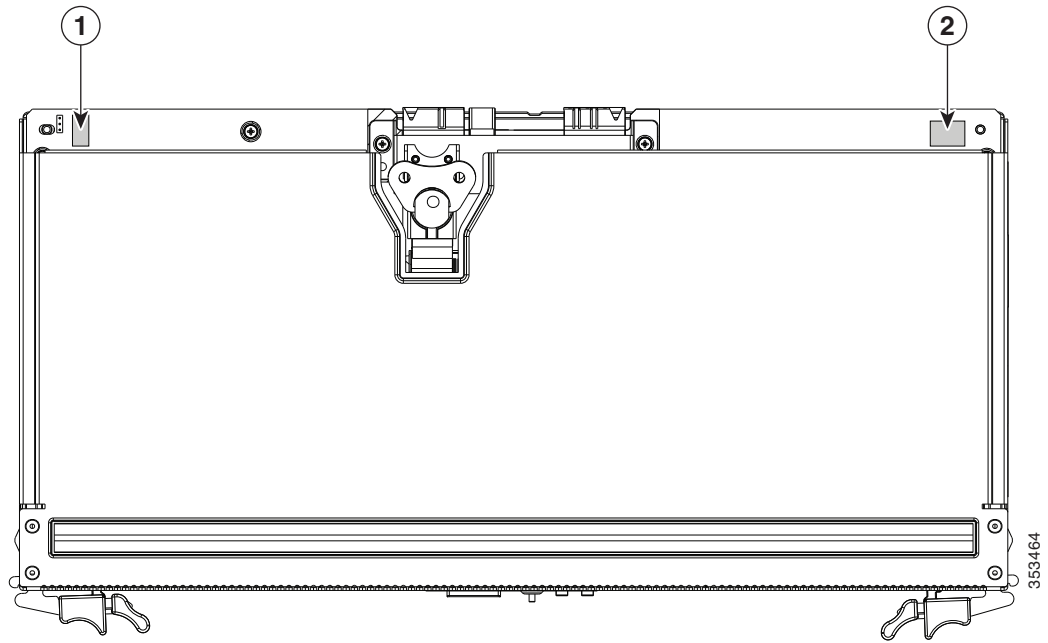
The server node must be in the top bay, as shown in [Figure 1-2 on page 1-2](#).

- 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.



- Step 6** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.
- Step 7** Reconfigure the settings in the BMC of this node.

**Figure 3-25** Location of the Server Node RTC Battery and USB Port



<b>1</b> Server node RTC battery on board, behind edge of cover	<b>2</b> Internal USB port on board, behind edge of cover
---	---

## Replacing an Internal USB Drive Inside the Server Node

This section contains the following topics:

- [Internal USB Drive Replacement Procedure, page 3-50](#)
- [Enabling or Disabling the Internal USB Port, page 3-51](#)

### Internal USB Drive Replacement Procedure



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

**Step 1** Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down an Individual Server Node, page 3-10](#).

**Step 2** Remove a server node from the system:

- Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 3-15](#)).
- Rotate both levers to the outside at the same time to evenly disengage the server node from its midplane connectors.
- Pull the server node straight out from the system.



**Note** You do not have to remove the server node cover to access the USB port.

**Step 3** Remove an existing USB flash drive from the port on the server node board. Pull the drive horizontally from the port.

**Step 4** Install a USB flash drive. Insert the new USB flash drive into the horizontal socket on the server node board.

**Step 5** Install a server node:

- With the two ejector levers open, align the new server node with the empty bay.



**Note** The server node must be in the top bay, as shown in [Figure 1-2 on page 1-2](#).

- Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.

- Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.

**Step 6** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.

## Enabling or Disabling the Internal USB Port

The factory default is for all USB ports on the system to be enabled. However, the internal USB port can be enabled or disabled in the system BIOS. To enable or disable the internal USB port, follow these steps:

- 
- Step 1** Enter the BIOS Setup utility by pressing the **F2** key when prompted during bootup.
  - Step 2** Navigate to the **Advanced** tab.
  - Step 3** On the Advanced tab, select **USB Configuration**.
  - Step 4** On the USB Configuration page, select **USB Ports Configuration**.
  - Step 5** Scroll to **USB Port: Internal**, press **Enter**, and then select either Enabled or Disabled from the menu.
  - Step 6** Press F10 to save and exit the utility.
- 

## Installing a Trusted Platform Module (TPM) Inside the 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 3-51](#)
2. [Enabling TPM Support in the BIOS, page 3-53](#)
3. [Enabling the Intel TXT Feature in the BIOS, page 3-53](#)

### 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.

---



---

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

---

- 
- Step 1** Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down an Individual Server Node, page 3-10](#).
  - Step 2** Remove a server node from the system:
    - a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 3-15](#)).
    - 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 to access the TPM socket.

---

- Step 3** Install a TPM:
- Locate the TPM socket on the server node board, as shown in [Figure 3-26](#).
  - 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.
  - Push down evenly on the TPM to seat it in the motherboard socket.
  - Install the single one-way screw that secures the TPM to the motherboard.

**Step 4** Install a server node:

- With the two ejector levers open, align the new server node with the empty bay.



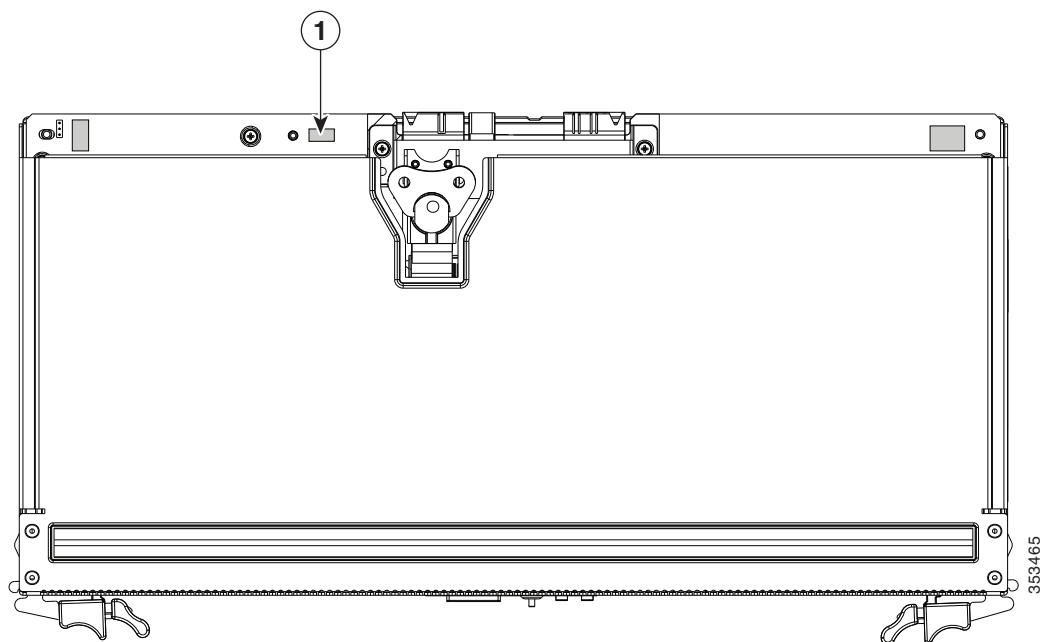
**Note** The server node must be in the top bay, as shown in [Figure 1-2 on page 1-2](#).

- Push the server node into the bay until it engages with the midplane connectors and is flush with the chassis.
- Rotate both ejector levers toward the center until they lay flat and their latches lock into the rear of the server node.

**Step 5** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.

**Step 6** Continue with [Enabling TPM Support in the BIOS, page 3-53](#).

**Figure 3-26** TPM Socket Location on the Server Node Board



<b>1</b>	TPM socket and screw hole on motherboard
----------	--

## Enabling TPM Support in the BIOS



**Note** After hardware installation, you must enable TPM support in the BIOS.



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

- Step 1** Enable TPM support:
- Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.
  - Log in to the BIOS Setup Utility with your BIOS Administrator password.
  - On the BIOS Setup Utility window, choose the **Advanced** tab.
  - Choose **Trusted Computing** to open the TPM Security Device Configuration window.
  - Change TPM SUPPORT to **Enabled**.
  - Press **F10** to save your settings and reboot the server.
- Step 2** Verify that TPM support is now enabled:
- Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.
  - Log into the BIOS Setup utility with your BIOS Administrator password.
  - Choose the **Advanced** tab.
  - Choose **Trusted Computing** to open the TPM Security Device Configuration window.
  - Verify that TPM SUPPORT and TPM State are Enabled.
- Step 3** Continue with [Enabling the Intel TXT Feature in the BIOS, page 3-53](#).

## Enabling the Intel TXT Feature in the BIOS


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

- Step 1** Reboot the server and watch for the prompt to press F2.
- Step 2** When prompted, press **F2** to enter the BIOS Setup utility.
- Step 3** Verify that the prerequisite BIOS values are enabled:
- Choose the **Advanced** tab.
  - Choose **Intel TXT(LT-SX) Configuration** to open the Intel TXT(LT-SX) Hardware Support window.
  - Verify that the following items are listed as Enabled:

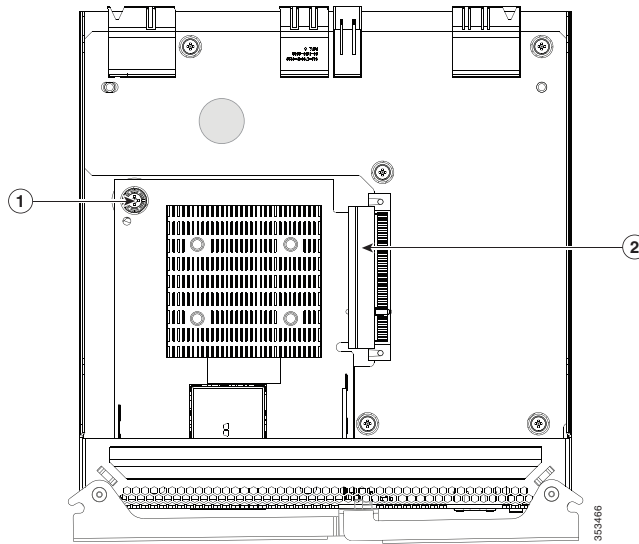
- VT-d Support (default is Enabled)
  - VT Support (default is Enabled)
  - TPM Support
  - TPM State
  - If VT-d Support and VT Support are already enabled, skip to [Step 4](#).
  - If VT-d Support and VT Support are not enabled, continue with the next steps to enable them.
  - d. Press **Escape** to return to the BIOS Setup utility **Advanced** tab.
  - e. On the Advanced tab, choose **Processor Configuration** to open the Processor Configuration window.
  - f. Set Intel (R) VT and Intel (R) VT-d to **Enabled**.
- Step 4** Enable the Intel Trusted Execution Technology (TXT) feature:
- a. Return to the Intel TXT(LT-SX) Hardware Support window if you are not already there.
  - b. Set TXT Support to **Enabled**.
- Step 5** Press **F10** to save your changes and exit the BIOS Setup utility.
-

## Replacing an Adapter Card Inside the SIOC

The adapter card inside the system I/O controller (SIOC) provides rear-panel connectivity to the system. You can have two different types of adapter card in the same system.

- 
- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System Chassis, page 3-9](#).
- Step 2** Remove the SIOC from the system:
- Loosen the single captive thumbscrew on the SIOC and then open its two hinged ejector levers to evenly disengage the SIOC from its midplane connector.
  - Pull the SIOC from the system.
- Step 3** Remove the SIOC cover as described in [Removing the System I/O Controller Cover, page 3-15](#).
- Step 4** Remove an existing adapter card:
- Loosen the single captive thumbscrew that secures the adapter card to the SIOC.
  - Slide the adapter card horizontally to disengage it from its socket on the SIOC board.
  - Lift the adapter card up and out of the SIOC.
- Step 5** Install a new adapter card:
- Set the new adapter card on the floor of the SIOC so that its connector edge is aligned with the socket and the thumbscrew is facing up.
  - Slide the adapter card horizontally to fully engage its connector edge with the socket.
  - Tighten the captive thumbscrew on the adapter card to secure it to the SIOC.
- Step 6** Replace the cover to the SIOC.
- Step 7** Replace the SIOC to the system:
-  **Note** If you have only one SIOC, it must be in SIOC bay 1 (see [Figure 1-2 on page 1-2](#)).
- Push the SIOC into its bay until it stops against the internal midplane.
  - Close the two levers on the SIOC to fully engage the SIOC connector with its backplane.
  - Tighten the thumbscrew on the SIOC levers.
- Step 8** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.

**Figure 3-27** Replacing an Adapter Card Inside the SIOC



**1** Thumbscrew on adapter card

**2** Horizontal socket on SIOC board



## Special Considerations for Cisco UCS Virtual Interface Cards

Table 3-6 describes the considerations for the supported Cisco UCS virtual interface cards (VICs) that install to the SIOC adapter card socket.

**Table 3-6** Cisco UCS C3160 Requirements for Supported VICs

Virtual Interface Card (VIC)	Number of This VIC Supported in System	Slots That Support VICs	Primary Slot for Cisco UCS Manager Integration	Primary Slot for Cisco Card NIC Mode	Minimum Cisco IMC Firmware	Minimum VIC Firmware
Cisco UCS VIC 1227 UCSC-MLOM-CSC-02	2 mLOM	Each SIOC includes one mLOM-style VIC	Not supported at this time	SIOC 1	2.0(2)	4.0(0)
Cisco UCS VIC 1227T UCSC-MLOM-C10T-02	2 mLOM		Not supported at this time	SIOC 1	2.0(4)	4.0(4b)
Cisco UCS VIC 1387 UCSC-MLOM-C40Q-03	2 mLOM		Not supported at this time	SIOC 1	2.0(9)	4.1(1d)



### Note

The Cisco UCS VIC 1227 (UCSC-MLOM-CSC-02) is not compatible to use in *Cisco Card* NIC mode with a certain Cisco SFP+ module. Do not use a Cisco SFP+ module part number 37-0961-01 that has a serial number in the range MOC1238xxxx to MOC1309xxxx. If you use the Cisco UCS VIC 1227 in *Cisco Card* NIC mode, use a different part number Cisco SFP+ module, or you can use this part number 37-0961-01 if the serial number is *not* included in the range above. See the data sheet for this adapter for other supported SFP+ modules: [Cisco UCS VIC 1227 Data Sheet](#)

## Replacing an RTC Battery Inside the SIOC

The real-time clock (RTC) battery retains settings when the SIOC is disconnected from power. The battery type in the SIOC is CR1632. Cisco supports the industry-standard CR1632 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 CMC of the SIOC are lost. You must reconfigure the CMC settings after installing a new battery.

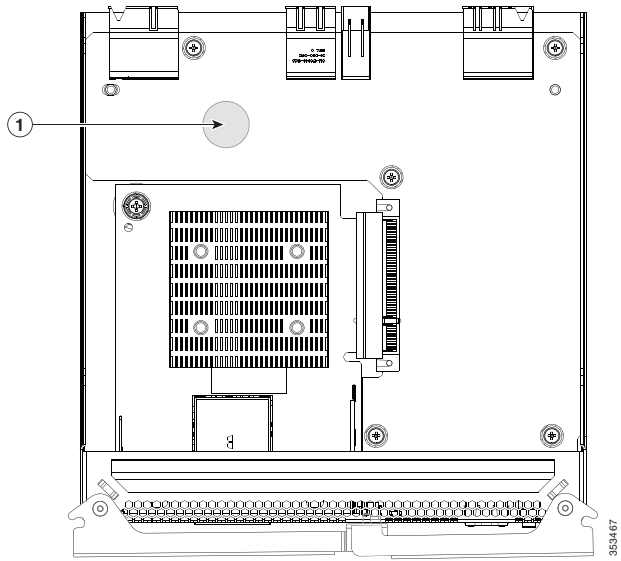
- 
- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System Chassis, page 3-9](#).
- Step 2** Remove the SIOC from the system:
- a. Loosen the single captive thumbscrew on the SIOC and then open its two hinged ejector levers to evenly disengage the SIOC from its midplane connector.
  - b. Pull the SIOC from the system.
- Step 3** Remove the SIOC cover as described in [Removing the System I/O Controller Cover, page 3-15](#).
- Step 4** Gently pry under the battery to lift it from its socket on the SIOC board.
- Step 5** Insert the new battery into the socket and then press down until it sits flat.
- Step 6** Replace the cover to the SIOC.
- Step 7** Replace the SIOC to the system:


**Note**

If you have only one SIOC, it must be in SIOC bay 1 (see [Figure 1-2 on page 1-2](#)).

- a. Push the SIOC into its bay until it stops against the internal midplane.
  - b. Close the two levers on the SIOC to fully engage the SIOC connector with its backplane.
  - c. Tighten the thumbscrew on the SIOC levers.
- Step 8** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.
- Step 9** Reconfigure the settings in the CMC for this SIOC.

Figure 3-28 Replacing an RTC Battery Inside the SIOC



- |          |                              |
|----------|------------------------------|
| <b>1</b> | Battery socket on SIOC board |
|----------|------------------------------|

# 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:

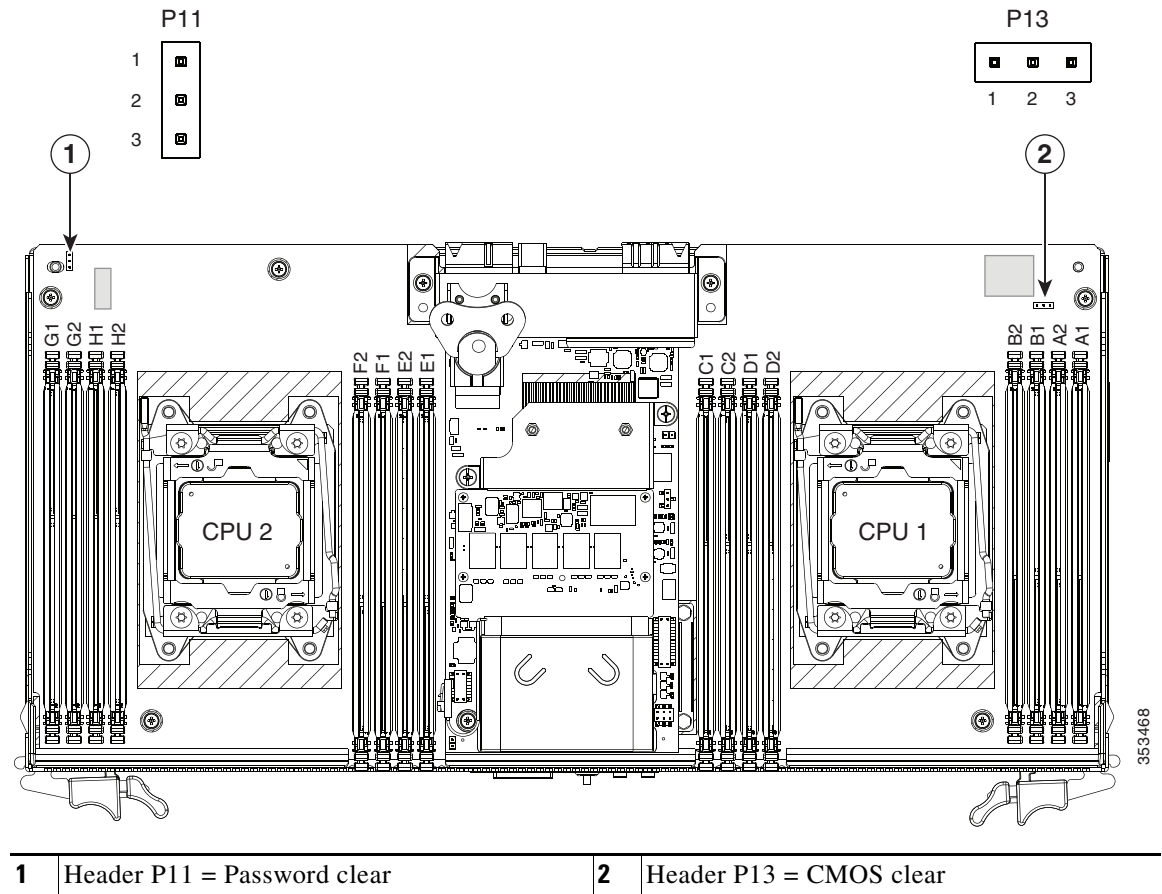
- [Service Header Locations on the Server Node Board, page 3-60](#)
- [Using the Clear Password Header P11, page 3-61](#)
- [Using the Clear CMOS Header P13, page 3-62](#)

## Service Header Locations on the Server Node Board

There are two supported, three-pin service headers on the server node board. See [Figure 3-29](#) for the locations.

- Header P11 = Password clear
- Header P13 = CMOS clear

**Figure 3-29** Service Headers on the Server Node Board



## Using the Clear Password Header P11

You can use a jumper on header P11 to clear the administrator password.

**Note**

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

**Step 1** Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down an Individual Server Node](#), page 3-10.

**Step 2** Remove a server node from the system:

- a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 3-15](#)).
- 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 to access the header.

**Step 3** Remove the server node cover as described in [Removing the Server Node Cover](#), page 3-13.

**Step 4** Locate header P11 (see [Figure 3-29](#)).

**Step 5** Install a jumper to pins 2 and 3 of the header.

**Step 6** Install the 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.

**Step 7** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.

**Step 8** After the system has fully booted, shut it down again, as described in [Shutting Down and Powering Off the System Chassis](#), page 3-9.

**Step 9** Remove the server node from the system, and then remove the server node cover.

**Step 10** Remove the jumper from pins 2 and 3.

**Note**

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

**Step 11** Install the server node cover, and then install server node back to the system.


**Step 12** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.

## Using the Clear CMOS Header P13

You can install a jumper to header P13 to clear the CMOS settings.


**Note**

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

- 
- Step 1** Shut down the server node by using the software interface or by pressing the node power button, as described in [Shutting Down an Individual Server Node, page 3-10](#).
- Step 2** Physically remove a server node chassis from the system:
- a. Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 3-15](#)).
  - 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.
- Step 3** Remove the server node cover as described in [Removing the Server Node Cover, page 3-13](#).
- Step 4** Locate header P13 (see [Figure 3-29](#)).
- Step 5** Install a jumper to pins 2 and 3 of the header.
- Step 6** Install the server node chassis to the system:
- 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.
- Step 7** After the system has fully booted, shut it down again, as described in [Shutting Down and Powering Off the System Chassis, page 3-9](#).
- Step 8** Remove the server node from the system, and then remove the server node cover.
- Step 9** Remove the jumper from pins 2 and 3.
-  **Note** If you do not remove the jumper, the Cisco IMC clears the CMOS settings each time that you boot the server node.
- 
- Step 10** Install the server node cover, and then install server node back to the system.
- Step 11** Replace power cords and then power on the system by pressing and holding the power button on the front handle for four seconds.
-



## Server Specifications

---

This appendix lists the technical specifications for the Cisco UCS C3160 Server and includes the following sections:

- [Physical Specifications, page A-1](#)
- [Environmental Specifications, page A-2](#)
- [Power Specifications, page A-2](#)

## Physical Specifications

[Table A-1](#) lists the physical specifications for the server.

**Table A-1**      *Physical Specifications*

<b>Description</b>	<b>Specification</b>
Height	6.88 in (174 mm)
Width	17.46 in (444 mm)
Length	32.00 in (813 mm)
Weight (maximum configuration)	195 lbs (88 kg)

# Environmental Specifications

Table A-2 lists the environmental specifications for the server.

**Table A-2** Environmental Specifications

Description	Specification
Temperature, operating	5°C to 35°C (41°F to 95°F)
Temperature, nonoperating	-40°C to 65°C (-40°F to 149°F)
Humidity, operating	10% to 90% non-condensing
Humidity, nonoperating	5% to 93% non-condensing
Altitude, operating	0 m to 3048 m (0 ft to 10,000 ft)
Derated 1°C for each 305 m	
Altitude, nonoperating	0 m to 12,192 m (0 ft to 40,000 ft)
Acoustic noise, operating	LWAd 5.4 Bel LpAm 38 dBA

## Power Specifications

Table A-3 lists the specifications for each 1050 W power supply (Cisco part number UCSC-C3X60-PSU).

**Table A-3** 1050 W Power Supply Specifications

Description	Specification
AC input voltage	Nominal range: 100–120 VAC, 200–240 VAC (Range: 90–132 VAC, 180–264 VAC)
AC input frequency	Nominal range: 50 to 60Hz (Range: 47–63 Hz)
Maximum AC input current	12.5 A at 100 VAC 6 A at 208 VAC
Maximum input volt-amperes	1250 VA at 100 VAC
Maximum output power per PSU	800 W at 100–120 VAC 1050 W at 200–240 VAC
Maximum inrush current	15 A (sub-cycle duration)
Maximum hold-up time	12 ms at 770 W
Power supply output voltage	12 VDC
Power supply standby voltage	12 VDC
Efficiency rating	Climate Savers Platinum Efficiency (80Plus Platinum certified)
Form factor	RSP2
Input connector	IEC320 C14

You can get more specific power information for your exact server configuration by using the Cisco UCS Power Calculator:

<http://ucspowercalc.cisco.com>





# Power Cable Specifications

This appendix provides supported power cable specifications.

## Supported Power Cables and Plugs

Each power supply has a separate power cable. Standard power cables or jumper power cables are available for connection to the server. The jumper power cables, for use in racks, are available as an optional alternative to the standard power cables.



**Note**

Only the approved power cables or jumper power cables provided with the server are supported.

[Table B-1](#) lists the power cables for the server power supplies.

**Table B-1** Supported Power Cables for the Server

Description	Length	
	Feet	Meters
CAB-250V-10A-BR Power cable, 250 VAC 10 A, Brazil	8.2	2.5
CAB-250V-10A-CN Power cable, 250 VAC 10 A, PRC	8.2	2.5
CAB-9K10A-AU N5000 power cable, 250 VAC 10 A, Australia	8.2	2.5
CAB-9K10A-EU N5000 power cable, 250 VAC 10 A, Europe	8.2	2.5
CAB-9K10A-IT N5000 power cable, 250 VAC 10 A, Italy	8.2	2.5
CAB-9K10A-SW N5000 power cable, 250 VAC 10 A, Switzerland	8.2	2.5
CAB-9K10A-UK N5000 power cable, 250 VAC 10 A, United Kingdom	8.2	2.5

**Table B-1 Supported Power Cables for the Server (continued)**

Description	Length	
	Feet	Meters
CAB-9K12A-NA N5000 power cable, 125 VAC, 15 A, NEMA 5-15 plug, North America	8.2	2.5
CAB-AC-L620-C13 Power cable, NEMA L6-20-C13 connector	6.6	2.0
CAB-C13-C14-2M Cabinet jumper power cable, 250 VAC 10 A, C13-C14 connectors	6.6	2.0
CAB-C13-C14-AC Cabinet jumper power cable, 250 VAC 10 A, C13-C14 connectors, recessed receptacle	9.8	3.0
CAB-C13-CBN Cabinet jumper power cable, 250 VAC 10 A, C13-C14 Connectors	2.2	0.68
CAB-C19-C20-3M-JP Power cable, C19-C20 connectors, Japan PSE mark	9.8	3.0
CAB-JPN-3PIN Power cable, 90-125 VAC, 12 A, NEMA 5-15, Japan	7.9	2.4
CAB-N5K6A-NA N5000 power cable, 250 VAC 6 A, North America	8.2	2.5
CAB-250V-10A-AR N5000 power cable, 250 VAC 10 A, Argentina	8.2	2.5
CAB-250V-10A-CN N5000 power cable, 250 VAC 10 A, China	8.2	2.5
CAB-250V-10A-ID N5000 power cable, 250 VAC 10A, India	8.2	2.5
CAB-250V-10A-IS N5000 power cable, 250 VAC 10 A, Israel	8.2	2.5



# RAID Controller Considerations

This appendix provides RAID controller information, and it includes the following sections:

- [Supported RAID Controllers and Required Cables, page C-1](#)
- [Cisco UCS C3X60 12G SAS RAID Controller Specifications, page C-2](#)
- [Best Practices For Configuring RAID Controllers, page C-2](#)
- [Supercap Power Module \(RAID Backup Unit\), page C-3](#)
- [Restoring RAID Configuration After Replacing a RAID Controller, page C-4](#)
- [For More Information, page C-4](#)

## Supported RAID Controllers and Required Cables

This server supports the RAID controller options and cable requirements shown in [Table C-1](#).

**Table C-1** Cisco UCS C3160 Server Supported RAID Options

Controller	Style	Maximum Drives	SCPM?	RAID Levels	Required Cables
Cisco UCS C3X60 12G SAS RAID UCSC-C3X60-R1GB UCSC-C3X60-R4GB (with 1-GB or 4-GB write cache)	Mezzanine	60 internal	Yes	0, 1, 5, 6, 10, 50, 60 JBOD is also supported.	None. Card installs to mezzanine socket inside the server node.
Cisco UCS 12G SAS HBA pass-through controller UCSC-C3X60-HBA	Mezzanine	60 internal	No	Non-RAID	None. Card installs to mezzanine socket inside the server node.

For instructions on installing a RAID controller card, see [Replacing a RAID Controller Card Inside the Server Node, page 3-46](#).

# Cisco UCS C3X60 12G SAS RAID Controller Specifications

The Cisco UCS C3X60 12G SAS RAID controller can be ordered with a 1-GB or a 4-GB write cache (UCSC-C3X60-R1GB or UCSC-C3X60-R4GB).

The controller can be used in JBOD mode (non-RAID) or in 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

## Best Practices For Configuring RAID Controllers

- [RAID Card Firmware Compatibility](#), page C-2
- [Choosing Between RAID 0 and JBOD](#), page C-2
- [RAID 5/RAID 6 Volume Creation](#), page C-2
- [Choosing I/O Policy](#), page C-3
- [Background Operations \(BGOPs\)](#), page C-3

## 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 Cisco UCS C3X60 12G SAS RAID controller supports JBOD mode (non-RAID) on physical drives that are in pass-through mode and directly exposed to the OS. We recommended that you use JBOD mode instead of individual RAID 0 volumes when possible.

## RAID 5/RAID 6 Volume Creation

The Cisco UCS C3X60 12G SAS RAID controller allows you to create of large RAID 5 or 6 volume by including all the drives in the system with a spanned array configuration (RAID 50/RAID 60). Where possible, we recommended 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 recommended you use Direct I/O (the default) in all cases and to use Cached I/O cautiously.

## Background Operations (BGOPS)

The Cisco UCS 12G SAS 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 operations like Format or similar I/O operations. 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.

BGOPS on large volumes can take an extended period of time to complete, presenting a situation where operations complete and begin with limited time between operations. Since BGOPS are intended to have a very low impact in most I/O operations, the system should function without any issues. If there are any issues that arise while running concurrent BGOPS and I/O operations, we recommend you to stop either activity to let the other complete before reusing and/or schedule the BGOPS at a later time when the I/O operations are low.

## Supercap Power Module (RAID Backup Unit)

This server supports installation of one supercap power module (SCPM) backup unit. The unit mounts directly to the Cisco modular RAID controller card inside the server node. The unit comes already attached to the card and is not sold as a separate component.

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.

# 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.

- 
- Step 1** Replace your RAID controller. See [Replacing a RAID Controller Card Inside the Server Node, page 3-46](#).
- Step 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.
- Step 3** Reboot the server node.
- Step 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.
```
- Step 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.
```
  - If you see the following message, your configuration was not imported. In this case, reboot the server and try the import operation again.  

```
0 Virtual Drive(s) found on host adapter.
```
- 

## For More Information

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

For basic information about RAID and for using the utilities for the RAID controller cards, see the [Cisco UCS Servers RAID Guide](#).

Full Avago Technologies/LSI documentation is also available:

[Avago Technologies/LSI 12 Gb/s MegaRAID SAS Software User's Guide, Rev. F](#)



■ For More Information





## Installation for Cisco UCS Integration

---

At this time, the Cisco UCS C3160 server operates in standalone mode only. Cisco UCS integration is not supported.

