



Cisco UCS C3160 Rack Server Installation and Service Guide

March 12, 2015

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

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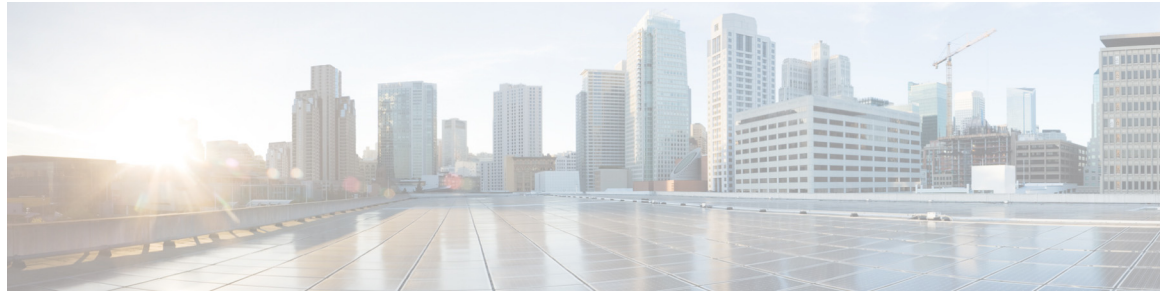
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Preface

This preface describes the audience, and conventions of the *Cisco UCS C3160 Rack Server Installation and Service Guide*. It also provides information about how to obtain related documentation.

Audience

This guide is for experienced network administrators who configure and maintain Cisco servers.

Conventions

This document uses the following conventions for notes, cautions, and safety warnings. Notes and cautions contain important information that you should know.



Note

Means *reader take note*. Notes contain helpful suggestions or references to material that are not covered in the publication.



Caution

Means *reader be careful*. Cautions contain information about something you might do that could result in equipment damage or loss of data.

Safety warnings appear throughout this guide in procedures that, if performed incorrectly, can cause physical injuries. A warning symbol precedes each warning statement.



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

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus

TÄRKEITÄ TURVALLISUUSOHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung

WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Opozorilo FONTOS BIZTONSÁGI ELOÍRÁSOK

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejte helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

的标准工作程序。详 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

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Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES

Advarsel VIGTIGE SIKKERHEDSANVISNINGER

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemeskadedigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

تحذير

إرشادات الأمان الهامة

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض للإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في آخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز. قم بحفظ هذه الإرشادات

Upozorenje VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

הרהר

הוראות בטיחות חשובות

סימן הזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כדי לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Opomena

ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА

Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.

ЧУВАЈТЕ ГИ ОБИЕ НАПАТСТВИЈА

Ostrzeżenie

WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie

DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Opozorilo POMEMBNI VARNOSTNI NAPOTKI

Ta opozorilni simbol pomeni nevarnost. Nahajate se v situaciji, kjer lahko pride do telesnih poškodb. Preden pričnete z delom na napravi, se morate zavedati nevarnosti udara električnega toka, ter tudi poznati preventivne ukrepe za preprečevanje takšnih nevarnosti. Uporabite obrazložitevno številko na koncu posameznega opozorila, da najdete opis nevarnosti v priloženem varnostnem priročniku.

SHRANITE TE NAPOTKE!

警告

重要安全性指示

此警告符號代表危險，表示可能造成人身傷害。使用任何設備前，請留心電路相關危險，並熟悉避免意外的標準作法。您可以使用每項警告後的聲明編號，查詢本裝置隨附之安全性警告譯文中的翻譯。請妥善保留此指示

Related Documentation

The documentation set for the Cisco Unified Computing System (UCS) C-Series rack-mount servers is described in the roadmap document at the following link:

[Cisco UCS C-Series Documentation Roadmap](#)

Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to ucs-docfeedback@external.cisco.com. We appreciate your feedback.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: <http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html>.

Subscribe to *What's New in Cisco Product Documentation*, which lists all new and revised Cisco technical documentation as an RSS feed and delivers content directly to your desktop using a reader application. The RSS feeds are a free service.



Overview

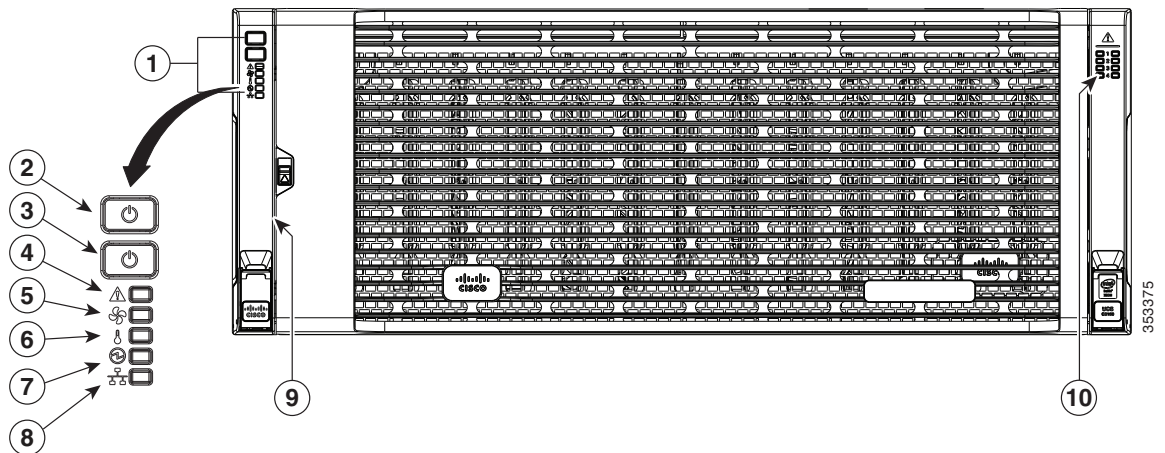
This chapter provides an overview of the Cisco UCS C3160 high-density storage server.

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



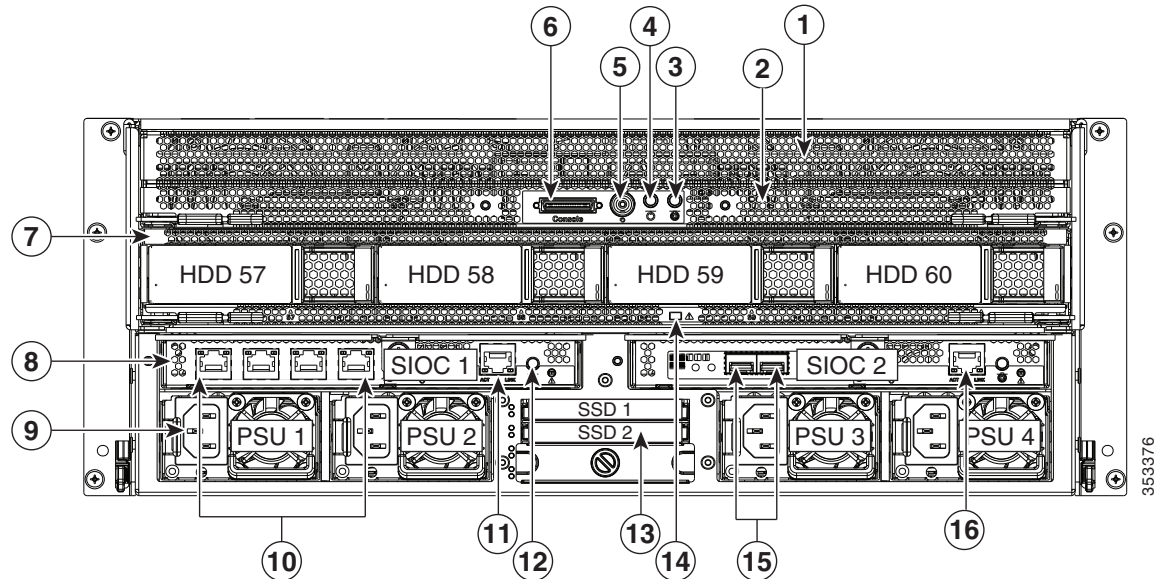
1	Operations panel	6	Temperature status LED
2	System Power button/LED (power shutdown for the entire system)	7	Power supply status LED
3	System unit identification button/LED	8	Network link activity LED
4	System status LED	9	Pull-out asset tag (not visible under front bezel)
5	Fan status LED	10	Internal-drive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

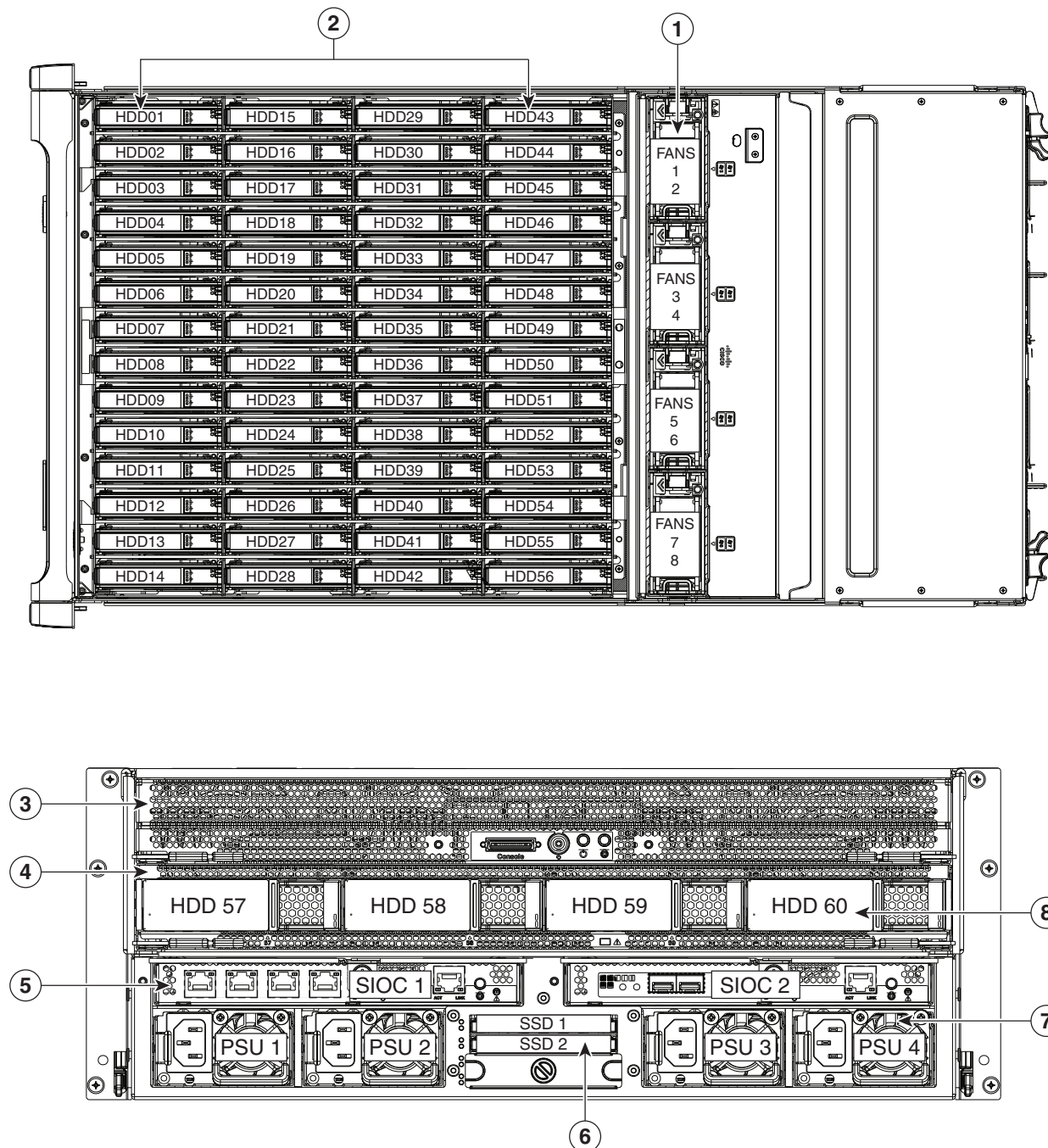
- [Replaceable Components Inside the Main Chassis, page 1-3](#)
- [Components Inside the Server Node, page 1-5](#)
- [Components Inside the System I/O Controller, page 1-6](#)

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.

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



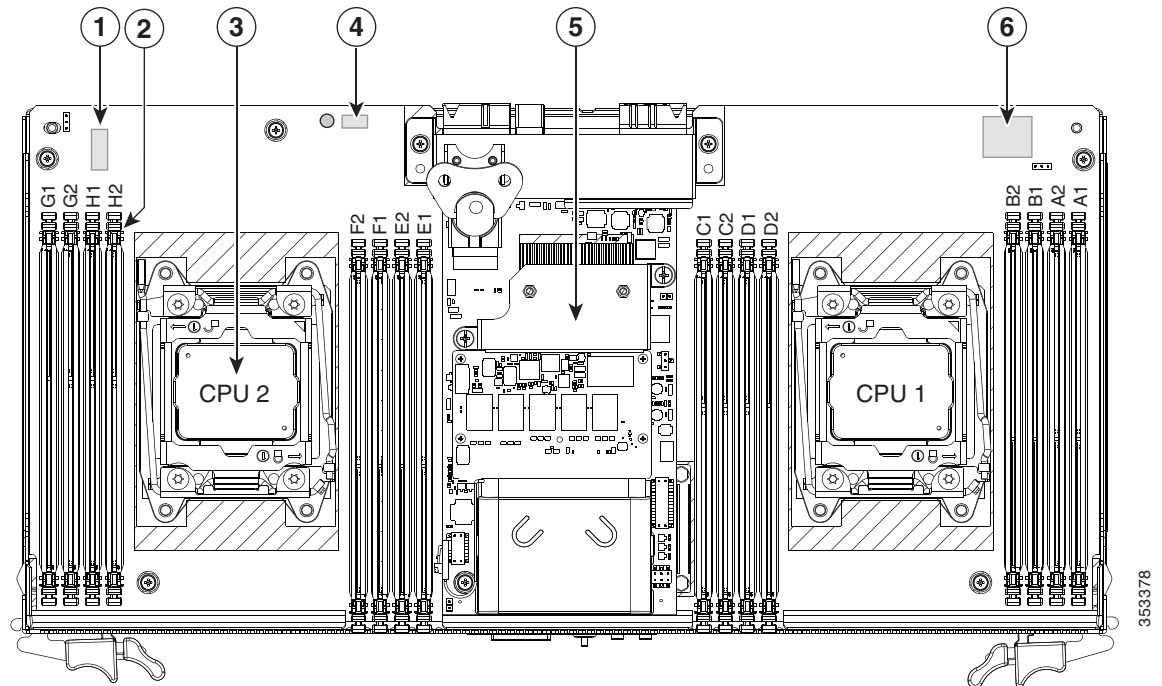
353377

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

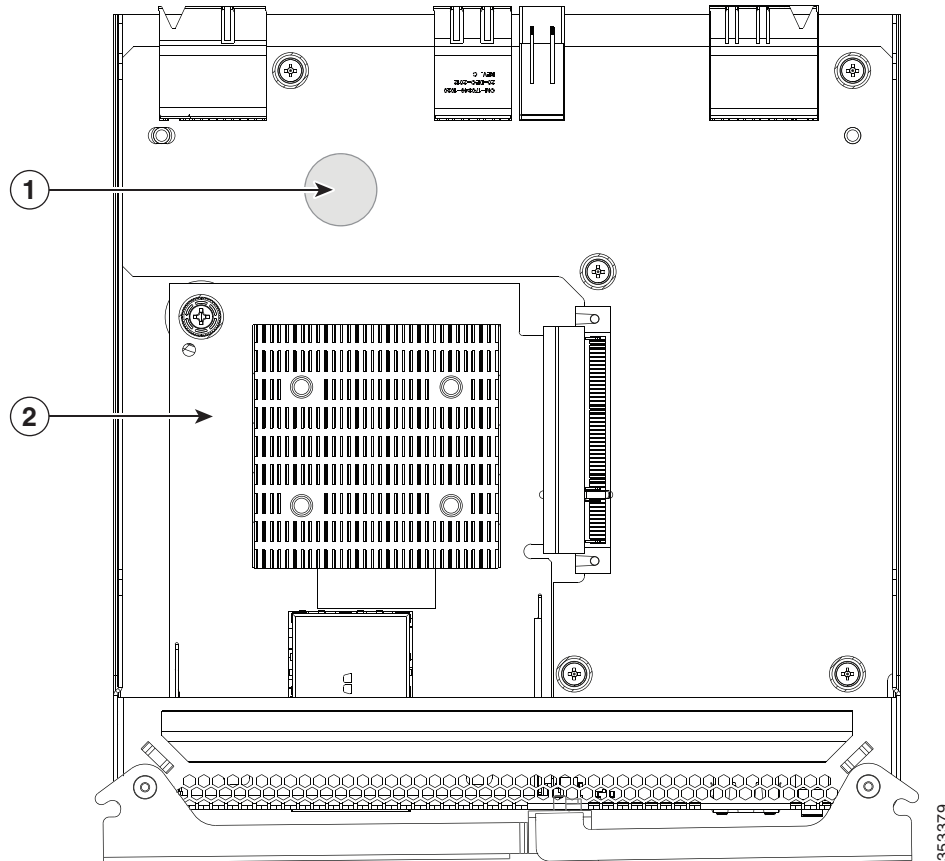


1	RTC battery CR 2032 (accessible with the node cover on)	4	Trusted platform module socket
2	DIMMs (8 sockets for each CPU, 16 total)	5	Cisco modular RAID controller card with SuperCap power module (backup) attached
3	CPUs and heat sinks (two)	6	Internal USB port for USB thumb-drive (accessible with 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"> • Up to 56 internally accessible 3.5-inch drives • Up to four 3.5-inch drives in the optional drive expander module, accessible from the rear panel • Up to two 2.5-inch solid state drives, accessible from the rear-panel <p>All drives are hot-swappable¹.</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 RAID Controller Considerations, page C-1.</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"> • If the quad-port 1-Gb RJ-45 adapter card is in the SIOC: <ul style="list-style-type: none"> – Four 1-Gb BASE-T Ethernet ports (RJ-45) – One 1-Gb dedicated management Ethernet port • If the dual-port 10-Gb SFP+ adapter card is in the SIOC: <ul style="list-style-type: none"> – Two 10-Gb SFP+ ports – One 1-Gb dedicated management Ethernet port <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 2-11](#)
- [NIC Modes and NIC Redundancy Settings, page 2-15](#)
- [System BIOS and Cisco IMC Firmware, page 2-16](#)



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 2-10](#)



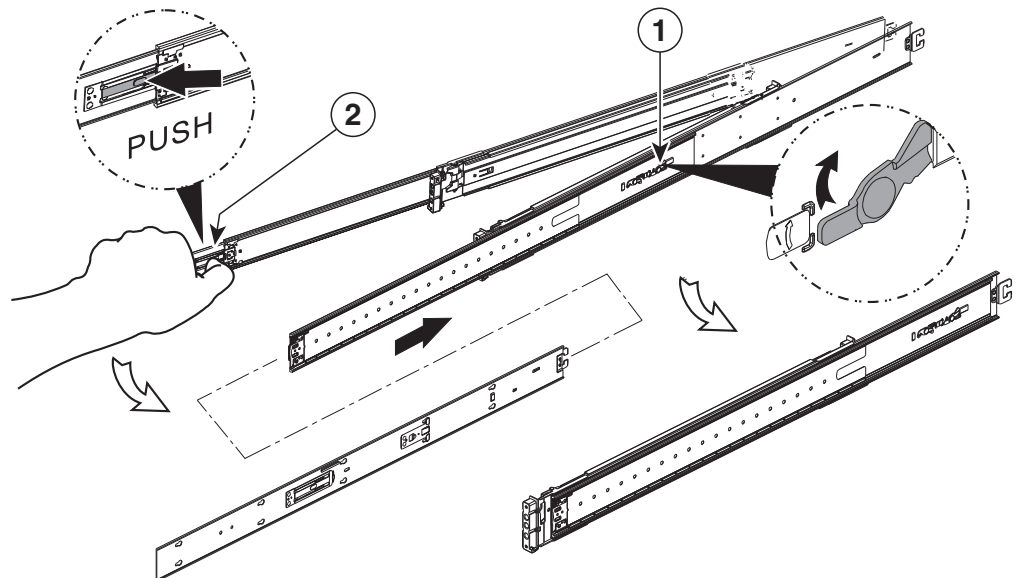
Warning

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

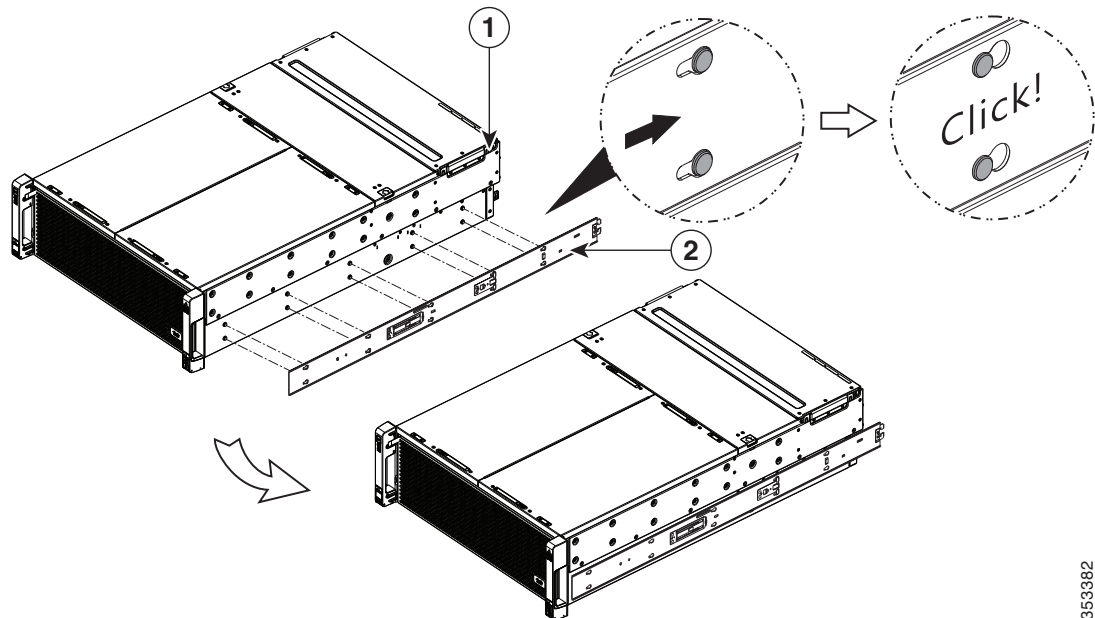


1	Rail release latch (close-up view)	2	Inner rail release clip
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- Step 2** Attach the inner rails to the sides of the server (see [Figure 2-2](#)):
- Align an inner rail with one side of the server so that the 10 keyed slots in the rail align with the 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

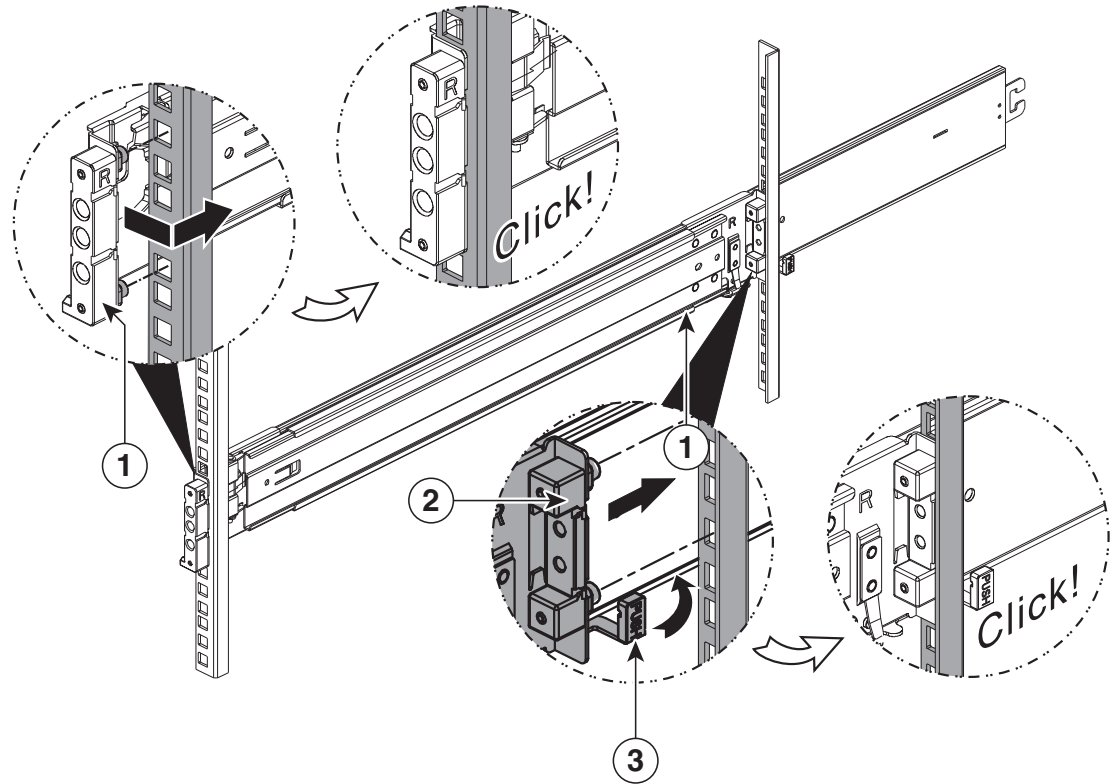


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1	Rear of server	2	Inner rail
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- Step 3** Install the slide rails into the rack (see [Figure 2-3](#)):
- Align one slide-rail assembly front end with the front rack-post holes that you want to use.
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.

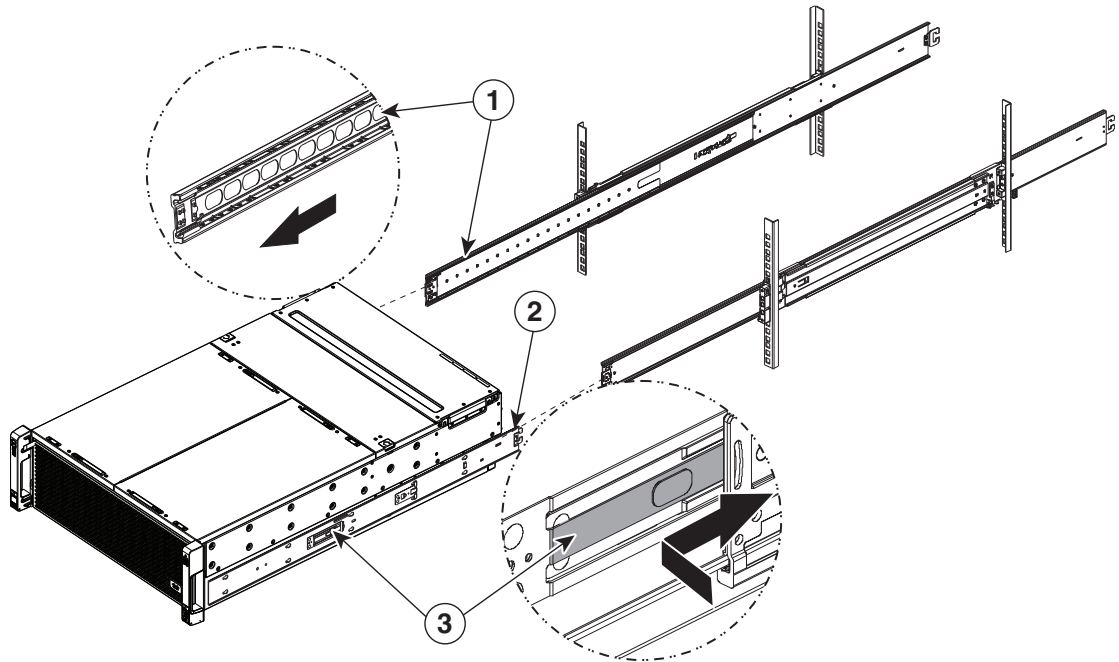
- a. Align the rear of the inner rails that are attached to the server sides with the front ends of the empty intermediate rails on the rack.
- b. Push the server into the intermediate rails until it stops at the internal stops.
- c. Depress the release clip on each inner rail inward, and then continue 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.

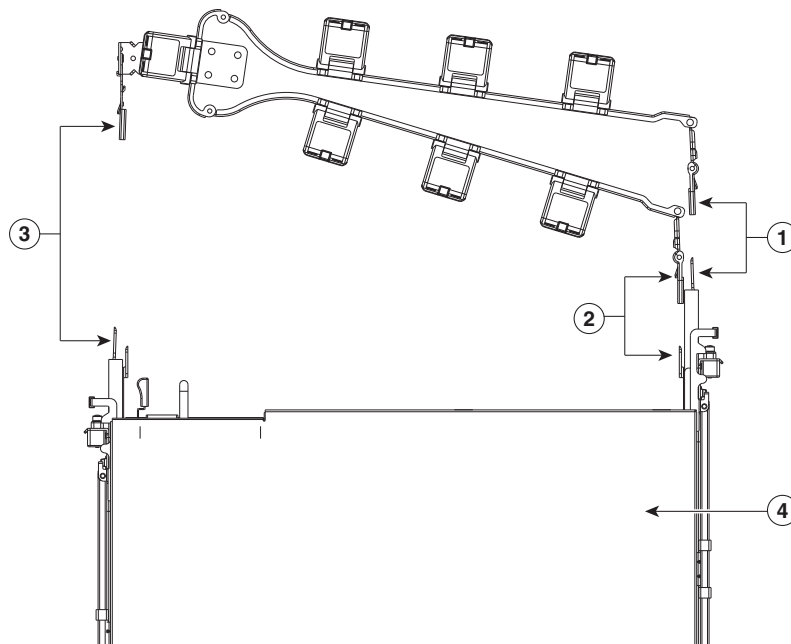
Installing the Cable Management Arm (Optional)



Note The CMA is reversible left to right. To reverse the CMA, see [Reversing the Cable Management Arm \(Optional\)](#), page 2-10 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

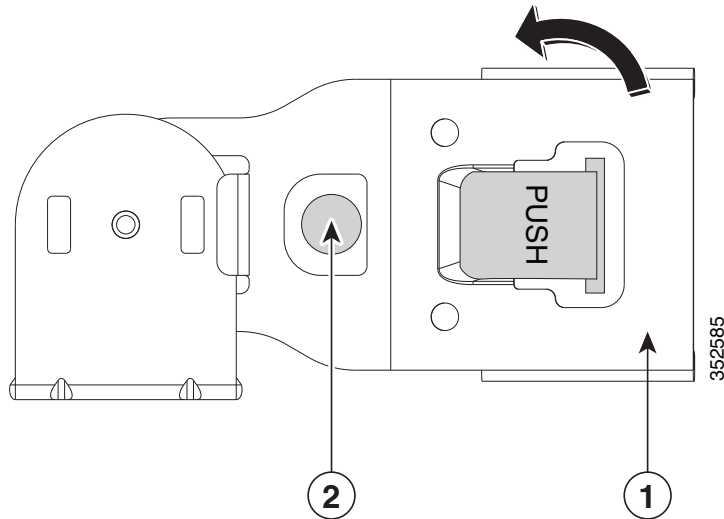


1	CMA tab on arm farthest from server and end of stationary outer slide rail	3	CMA tab on width-adjustment slider and end of stationary outer slide rail
2	CMA tab on arm closest to the server and end of inner slide rail attached to server	4	Rear of server

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



1	CMA tab on end of width-adjustment slider	2	Metal button for rotating
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Initial Server Setup

This section includes the following topics:

- [Connecting and Powering On the System \(Standalone Mode\)](#), page 2-11
- [NIC Modes and NIC Redundancy Settings](#), page 2-15

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 2-11.
- Remote setup—Use this procedure if you want to perform setup through your dedicated management LAN. See [Remote Connection Procedure](#), page 2-12.

**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 bootstrap. 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.
- Step 5** Continue with [Cisco IMC Configuration Utility Setup, page 2-13](#).
-

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.

- Step 9** Continue with [Cisco IMC Configuration Utility Setup, page 2-13](#).
-

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 2-16](#)
- [Accessing the System BIOS, page 2-17](#)

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 3-16](#)
- [Service Headers on the Server Node Board, page 3-52](#)

Status LEDs and Buttons

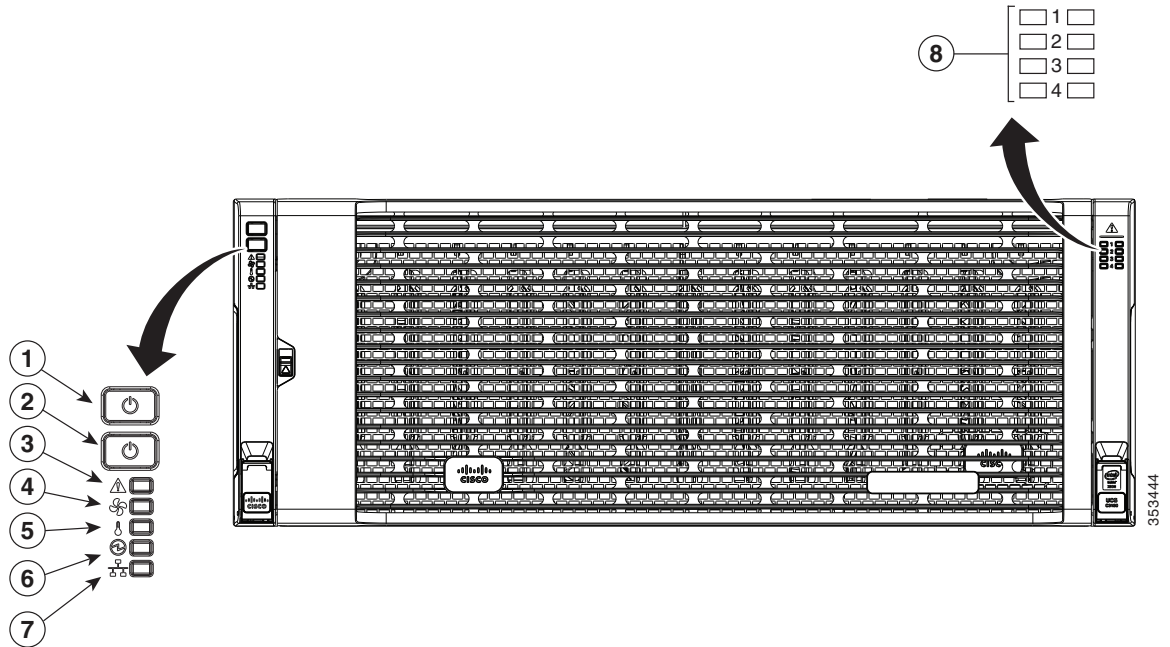
This section describes the location and meaning of LEDs and buttons and includes the following topics:

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

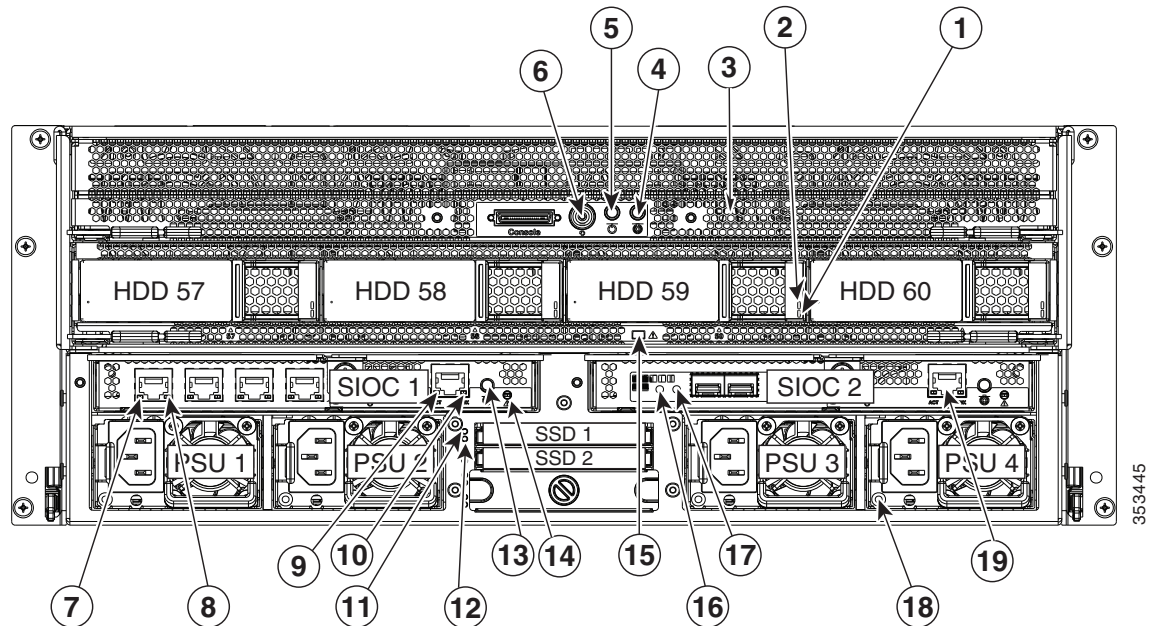
Table 3-1 Front-Panel LEDs States (continued)

	LED Name	State
3	System status	<ul style="list-style-type: none"> • Green—The system is running in normal operating condition. • Green, blinking—The system is performing system initialization and memory check. • Amber, steady—The system is in a degraded operational state. For example: <ul style="list-style-type: none"> – Power supply redundancy is lost. – CPUs are mismatched. – At least one CPU is faulty. – At least one DIMM is faulty. – At least one drive in a RAID configuration failed. • Amber, blinking—The system is in a critical fault state. For example: <ul style="list-style-type: none"> – Boot failed. – Fatal CPU and/or bus error is detected. – System is in an over-temperature condition.
4	Fan status	<ul style="list-style-type: none"> • Green—All fan modules are operating properly. • Amber, steady—One fan module has failed. • Amber, blinking—Critical fault; two or more fan modules have failed.
5	Temperature status	<ul style="list-style-type: none"> • Green—The system is operating at normal temperature. • Amber, steady—One or more temperature sensors have exceeded a warning threshold. • Amber, blinking—One or more temperature sensors have exceeded a critical threshold.
6	Power supply status	<ul style="list-style-type: none"> • Green—All power supplies are operating normally. • Amber, steady—One or more power supplies are in a degraded operational state. • Amber, blinking—One or more power supplies are in a critical fault state.
7	Network link activity	<ul style="list-style-type: none"> • Off—The Ethernet link is idle. • Green—One or more Ethernet LOM ports are link-active. • Green, blinking—One or more Ethernet LOM ports are traffic-active.
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"> • 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). <p>See Figure 3-9 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

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

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

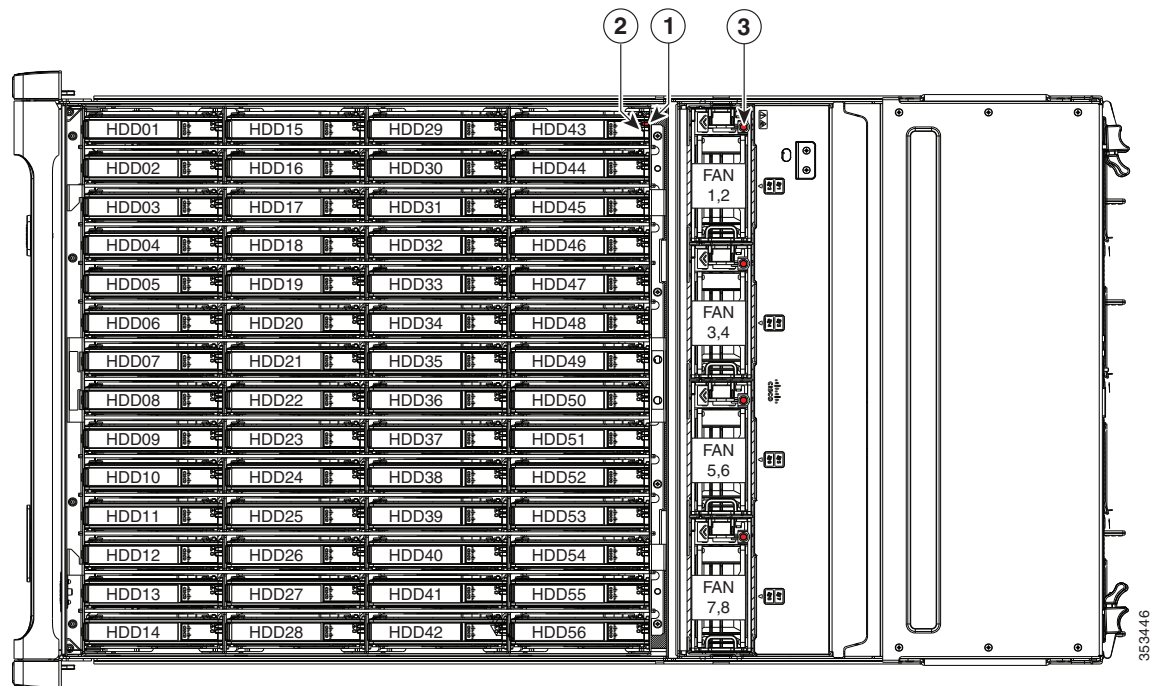
This section contains the following topics:

- [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



1	Drive fault (on each drive carrier)	3	Fan module fault (on each fan module)
2	Drive activity (on each drive carrier)		

Table 3-4 Internal Diagnostic LED States

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

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:

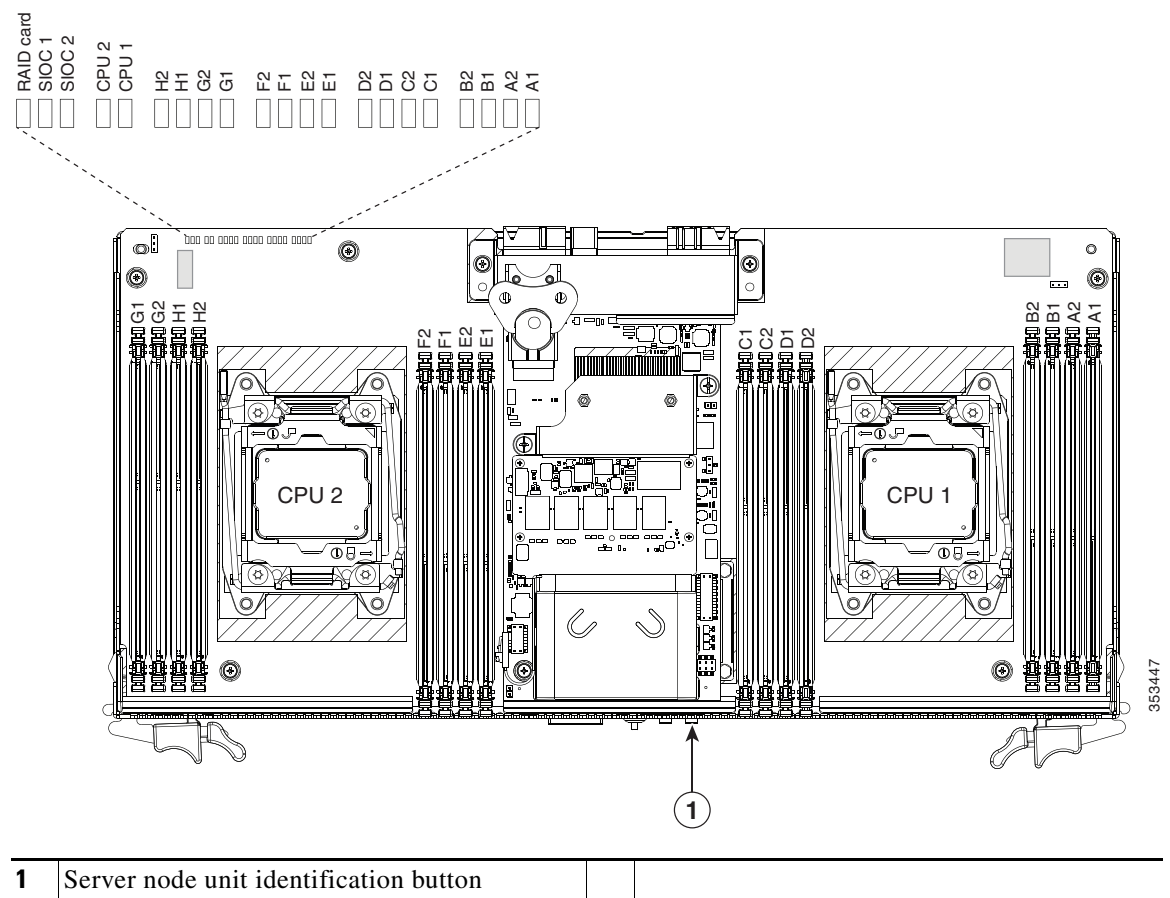
- Step 1** Shut down and remove the server node from the system as described in [Removing the Server Node Cover](#), page 3-12.

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, page 3-9](#)
- [Opening the Main Chassis Top Covers, page 3-10](#)
- [Removing the Server Node Cover, page 3-12](#)
- [Removing the System I/O Controller Cover, page 3-14](#)

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

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.

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.

See also:

- [Removing the Server Node Cover, page 3-12](#)
- [Removing the System I/O Controller Cover, page 3-14](#)

Step 1

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

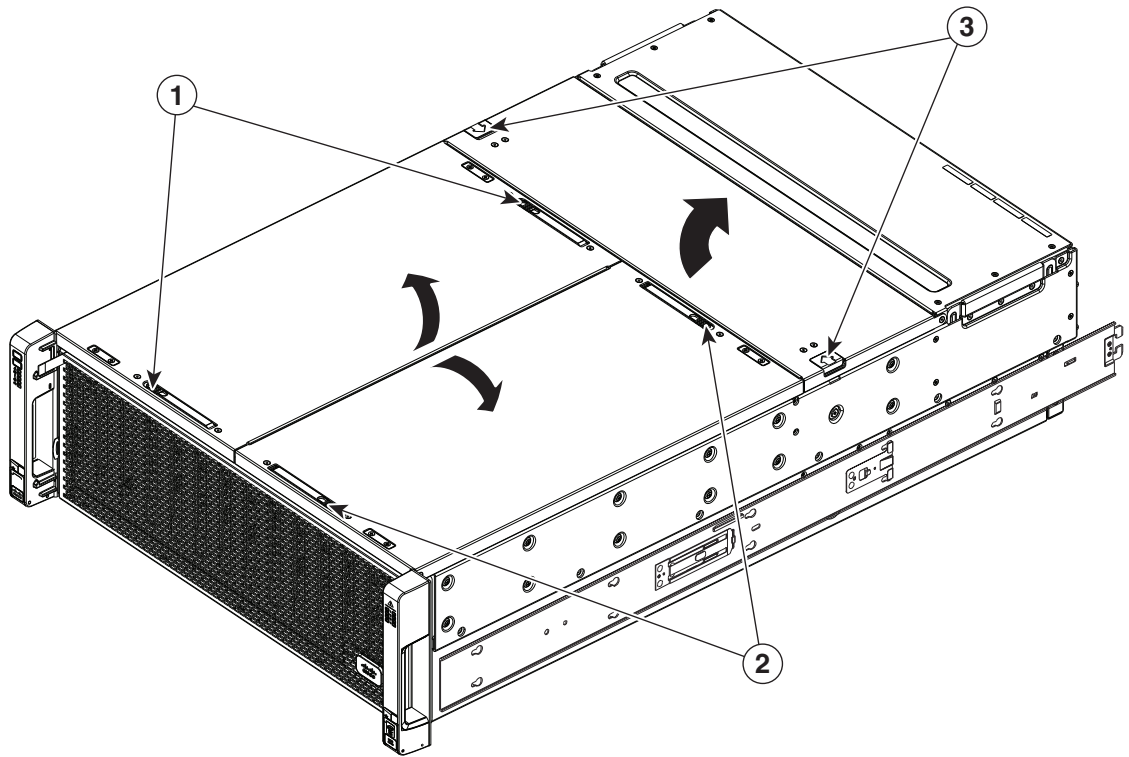
- a. For either the right or left side cover, pull the latch release buttons on both latches toward the outer edges of the chassis. This causes the spring-loaded latches to pop up.
- b. With both latches open, swing open the hinged cover from the center toward the outside.
- c. To secure the cover, close 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:

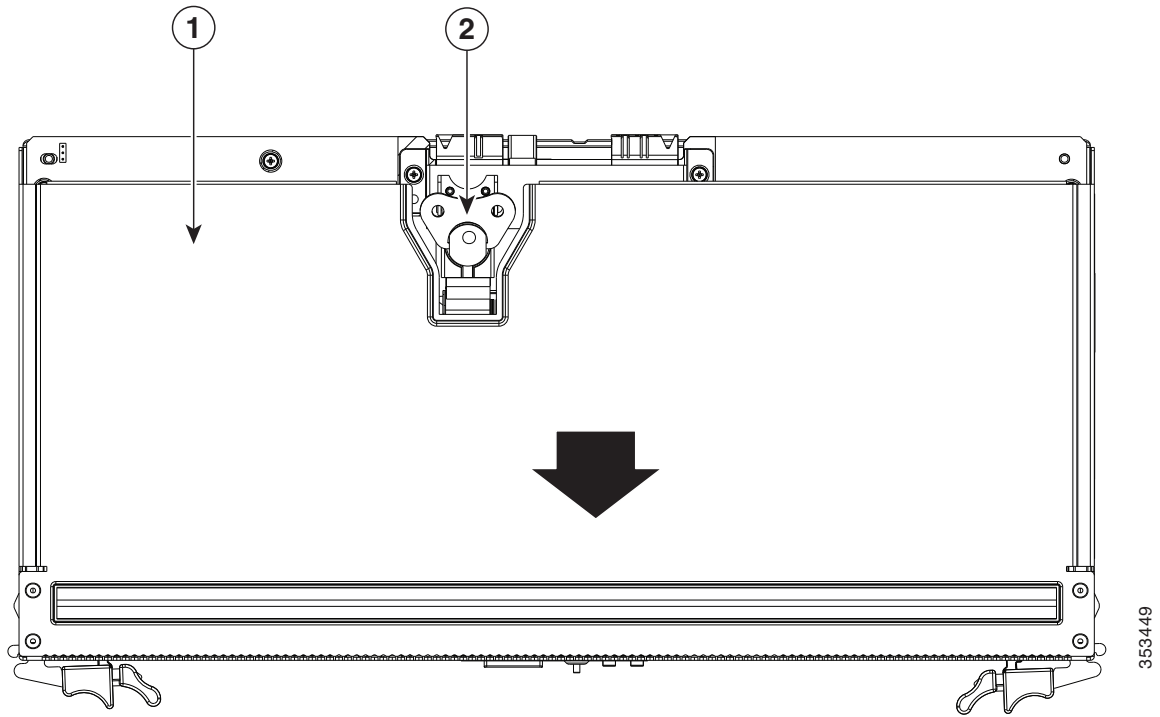
- [Opening the Main Chassis Top Covers, page 3-10](#)
- [Removing the System I/O Controller Cover, page 3-14](#)

**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, 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



353449

1	Server node cover	2	Latch handle (shown in flat, closed position)
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Removing the System I/O Controller Cover

See also:

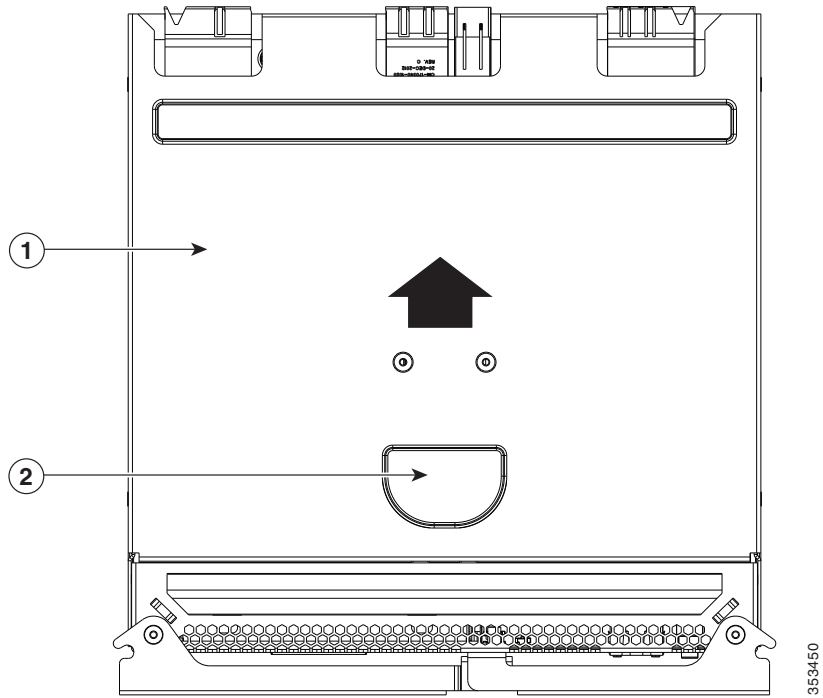
- [Opening the Main Chassis Top Covers, page 3-10](#)
- [Removing the Server Node Cover, page 3-12](#)

**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, 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
---	------------	---	----------------

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 3-17](#)
- [Replacing Fan Modules, page 3-24](#)
- [Replacing a Server Node, page 3-25](#)
- [Replacing a Drive Expander Module, page 3-26](#)
- [Replacing a System I/O Controller, page 3-27](#)
- [Replacing a Power Supply, page 3-28](#)
- [Replacing DIMMs Inside the Server Node, page 3-29](#)
- [Replacing CPUs and Heatsinks Inside the Server Node, page 3-33](#)
- [Replacing a RAID Controller Card Inside the Server Node, page 3-39](#)
- [Replacing an RTC Battery Inside the Server Node, page 3-41](#)
- [Replacing an Internal USB Drive Inside the Server Node, page 3-43](#)
- [Replacing an Adapter Card Inside the SIOC, page 3-48](#)
- [Replacing an RTC Battery Inside the SIOC, page 3-50](#)
- [Service Headers on the Server Node Board, page 3-52](#)

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

Replacing Hard Drives or Solid State Drives

This section includes the following topics:

- [Replacing Hard Drives in the Internal Drive Compartment, page 3-17](#)
- [Replacing Hard Drives in the Optional Drive Expander Module, page 3-21](#)
- [Replacing Solid State Drives in the Rear Panel Solid State Drive Bays, page 3-22](#)

Replacing Hard Drives in the Internal Drive Compartment

This section contains the following topics:

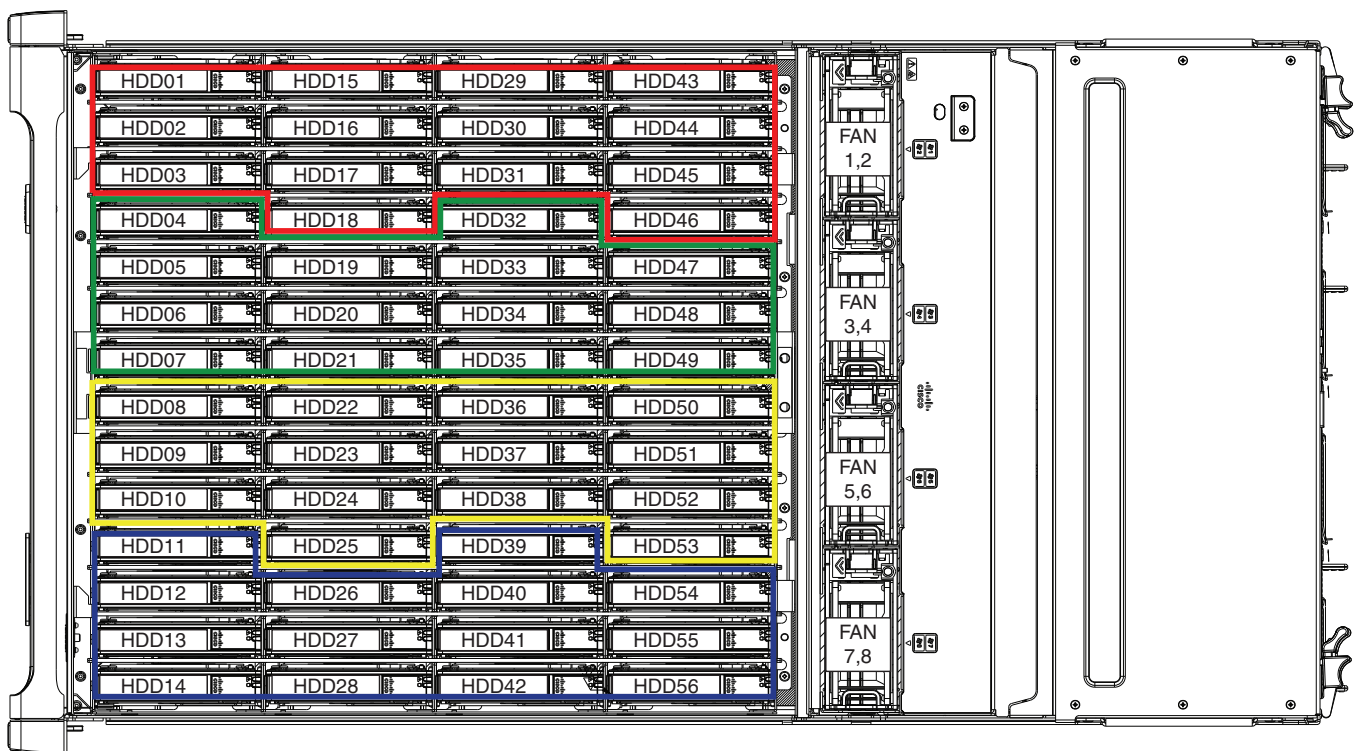
- [Internal Drive Population Guidelines, page 3-17](#)
- [Identifying a Faulty Internal Drive, page 3-18](#)
- [Replacing Internal Drives, page 3-20](#)

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.

Figure 3-8 Internal Drive Bay Numbering



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Identifying a Faulty Internal Drive

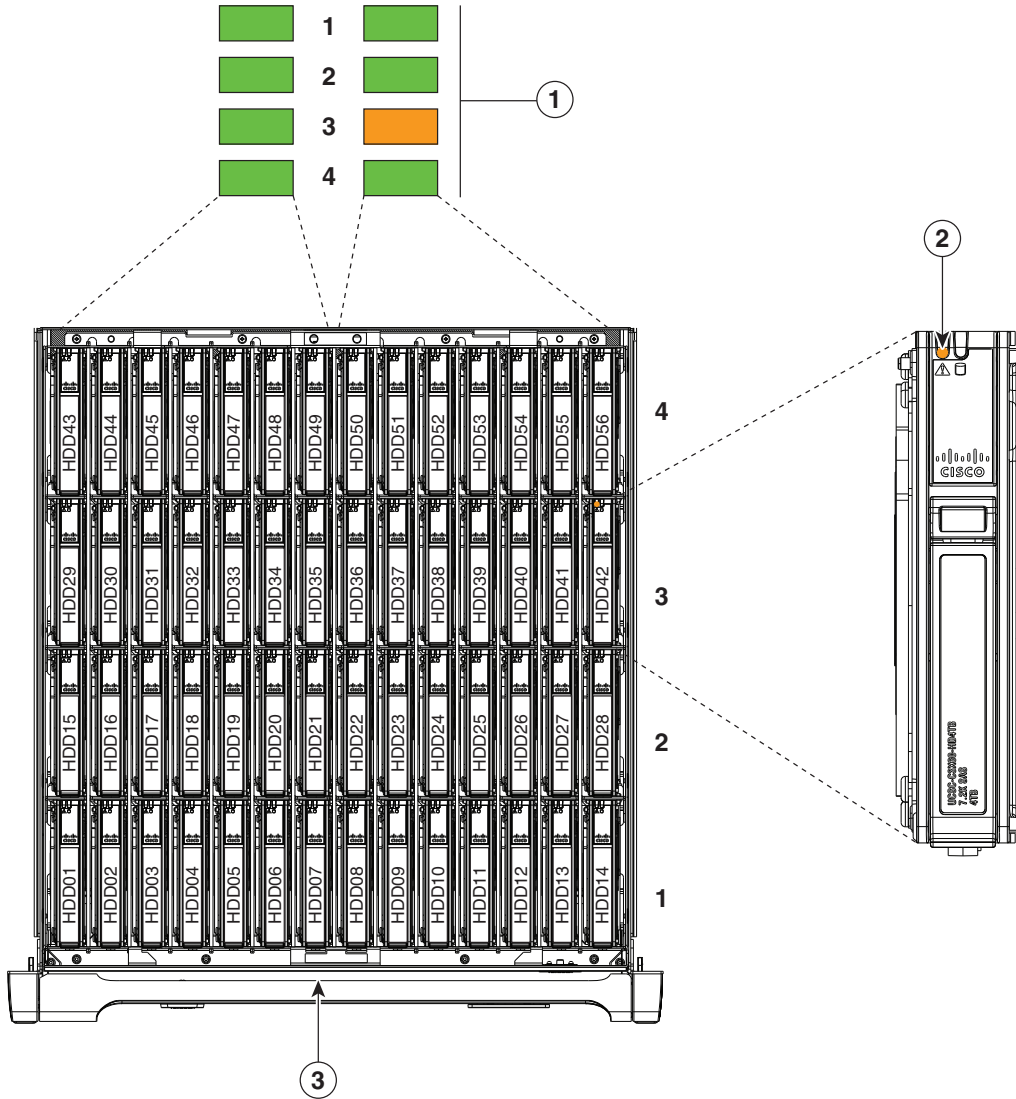
The system has internal-drive fault LEDs on the right-front handle (see [Figure 3-1](#)). Use these LEDs to get an indication of the location of a failing drive.

-
- 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



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		

353452

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 3-21](#)

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:

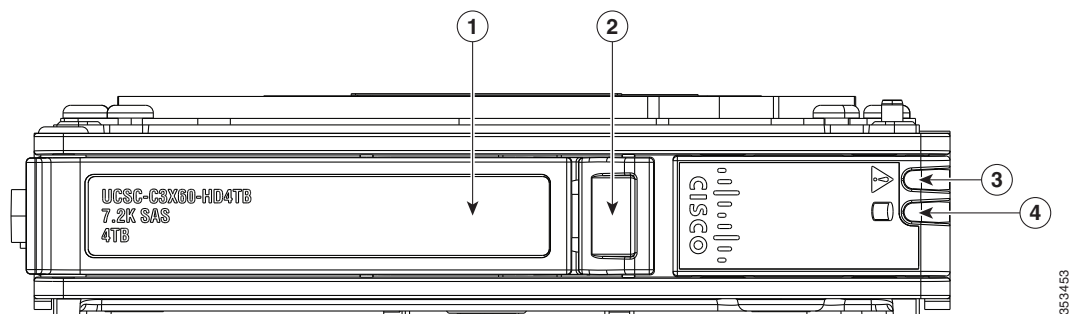


Note Observe the drive population guidelines in [Internal Drive Population Guidelines, page 3-17](#).

- 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



1	Drive lever	3	Drive fault LED
2	Release button	4	Drive activity LED

Replacing Hard Drives in the Optional Drive Expander Module

This section contains the following topics:

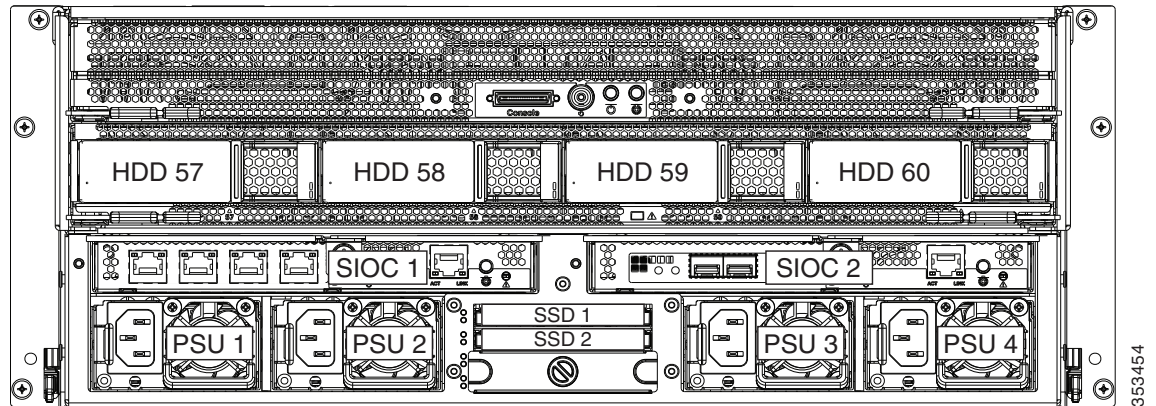
- [Drive Expander Module Drives Population Guidelines](#), page 3-21
- [Identifying a Faulty Drive Expander Module Drive](#), page 3-21
- [Replacing Drive Expander Module Drives](#), page 3-21

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.

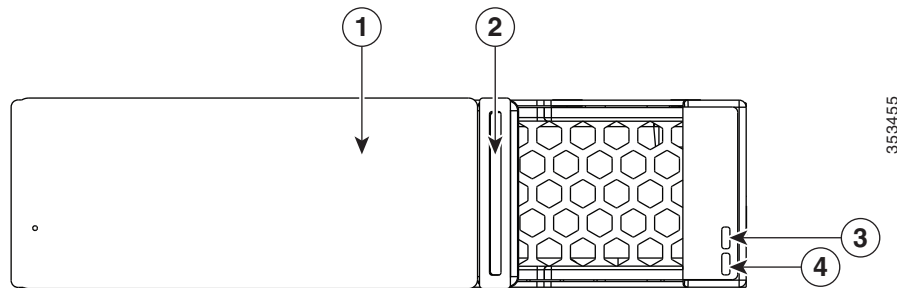
- Step 1** Identify a failing drive as described in [Identifying a Faulty Drive Expander Module Drive](#), page 3-21.
- Step 2** Remove a faulty drive:
- Press the release button on the drive carrier. The drive lever pops up.
 - Lift the drive lever to the fully open position, then pull the drive straight 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 3-21.

- 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



1	Drive lever	3	Drive fault LED
2	Release button	4	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 3-22
- [Replacing Solid State Drives](#), page 3-23
- [Enabling AHCI SATA Mode](#), page 3-23



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 [Enabling AHCI SATA Mode](#), page 3-23.

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:

- a. Grasp and pinch the release latch toward the center.
- b. Pull the solid state drive straight out of the bay.

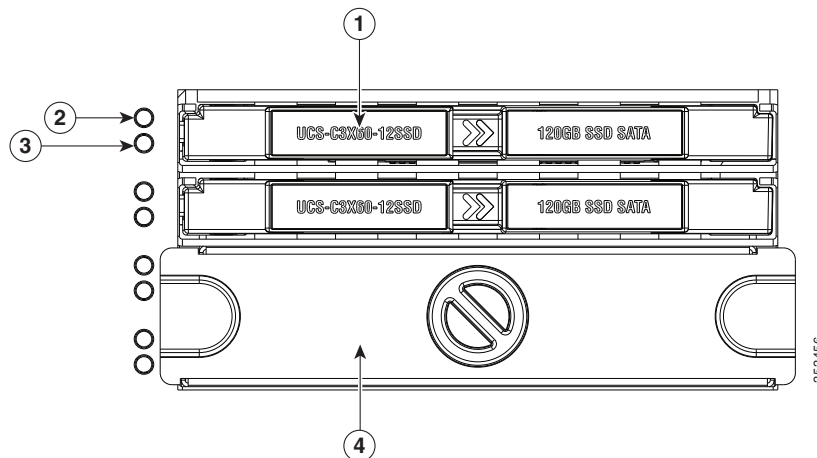
Step 2 Install a new solid state drive:


Note

Observe the drive population guidelines in [Solid State Drive Population Guidelines](#), page 3-22.

- a. 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.
- b. 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



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

Enabling AHCI SATA Mode

- Step 1** Boot the server and press **F2** when prompted to enter the BIOS Setup utility.
- Step 2** Choose the **Advanced** tab, and then choose **SATA Configuration**.
- Step 3** Set **SATA Mode** to **AHCI Mode**.
- 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 3-10.

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

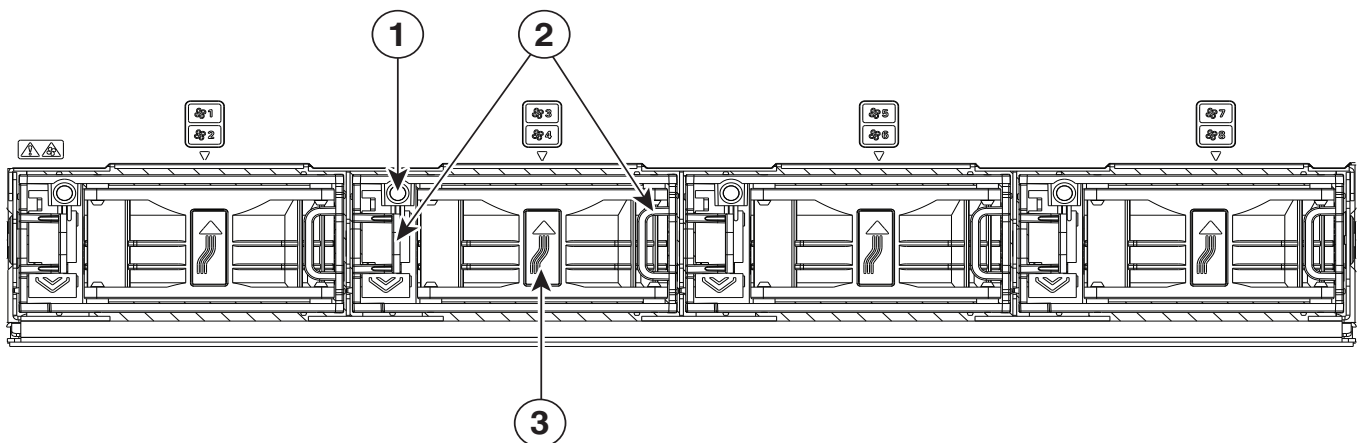
The arrow on the fan module that indicates the air flow direction should point to the rear of the server.

- 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)

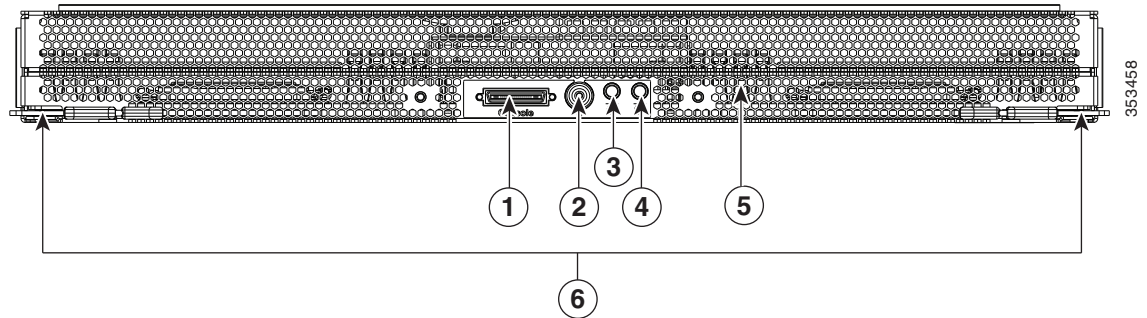


1	Fan module fault LED	3	Air flow direction arrow pointing toward rear of server
2	Fan module release latches		

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.

Step 1 Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System, page 3-9](#).

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

Replacing a Drive Expander Module

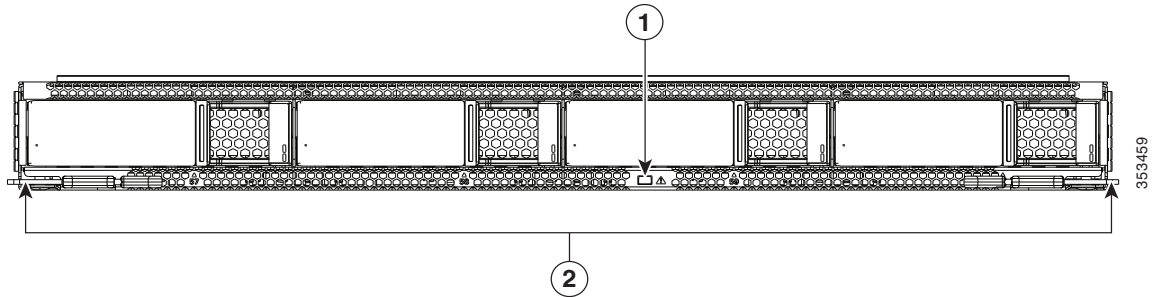
The system can support one optional drive expander module.



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



1	Drive expander module fault LED	2	Drive expander module ejector levers (two)
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Note

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

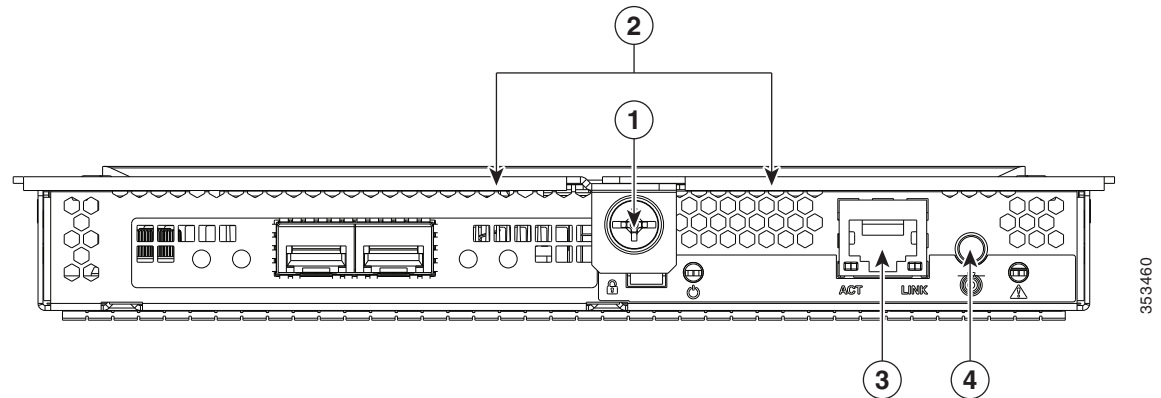
The drive expander module is accessed from the rear of the system, so you do not have to pull the system out from the rack.

- 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



1	Lever thumbscrew	3	1-Gb dedicated management port
2	Ejector levers	4	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](#), 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 3-48.
- 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:

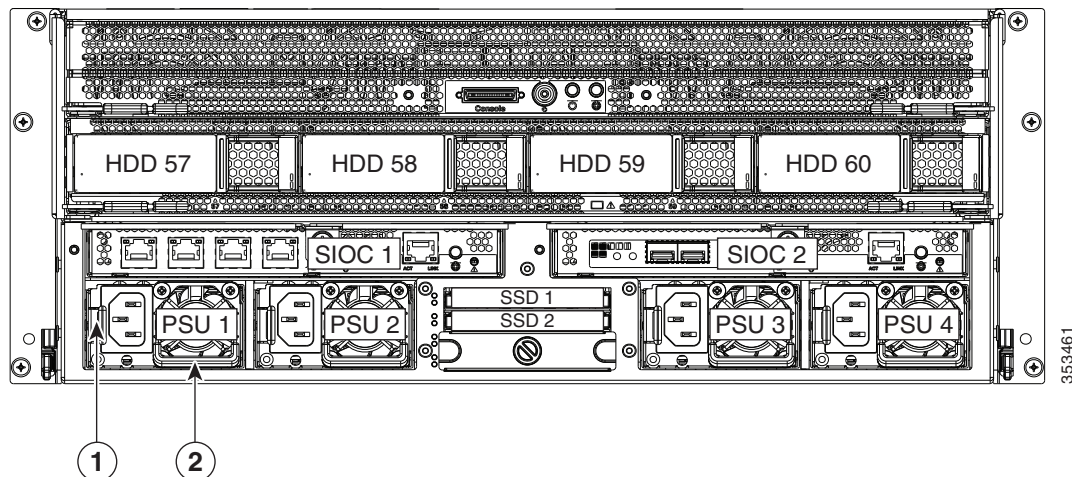


Note

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](#)” 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
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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 3-29](#)
- [DIMM Replacement Procedure, page 3-32](#)

**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:

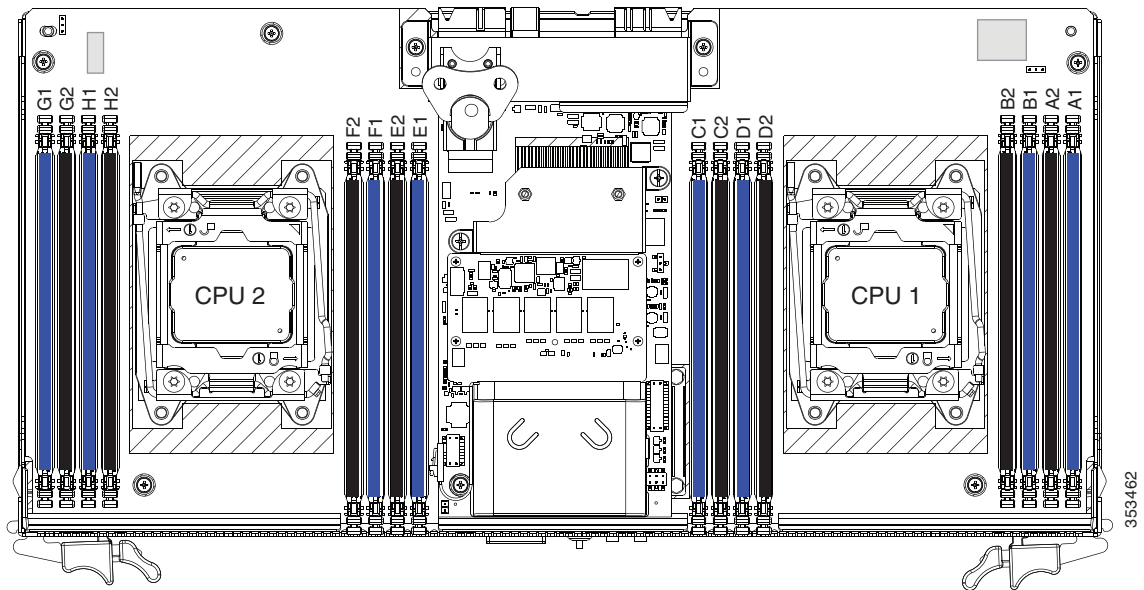
- [DIMM Sockets, page 3-30](#)
- [DIMM Population Rules, page 3-30](#)
- [Memory Mirroring Mode, page 3-31](#)
- [Lockstep Channel Mode, page 3-31](#)

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"> You can mix different capacity DIMMs in the same bank. However, for optimal performance DIMMs in the same bank (for example, A1, B1, C1, D1) should have the same capacity.
DIMM Speed: 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

-
- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System, 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 server node cover as described in [Removing the Server Node Cover, page 3-12](#).
- 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 3-29](#).
-
- 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 3-12](#).
- 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 3-33](#)
- [CPU Replacement Procedure, page 3-33](#)
- [Additional CPU-Related Parts To Order With RMA Replacement Server Nodes, page 3-38](#)

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).



To install or replace a CPU heatsink and CPU, follow these steps:

- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System, page 3-9](#).
- 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 3-12](#).
- 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.

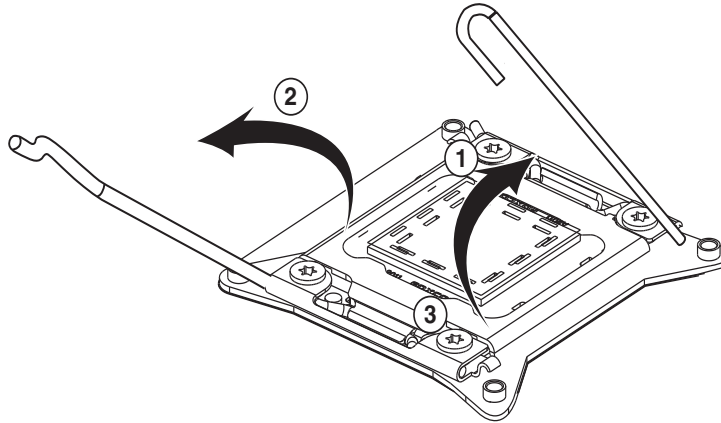
- Step 5** Unclip the first CPU retaining latch that is labeled with the  icon, and then unclip the second retaining latch that is labeled with the  icon. See [Figure 3-20](#).





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



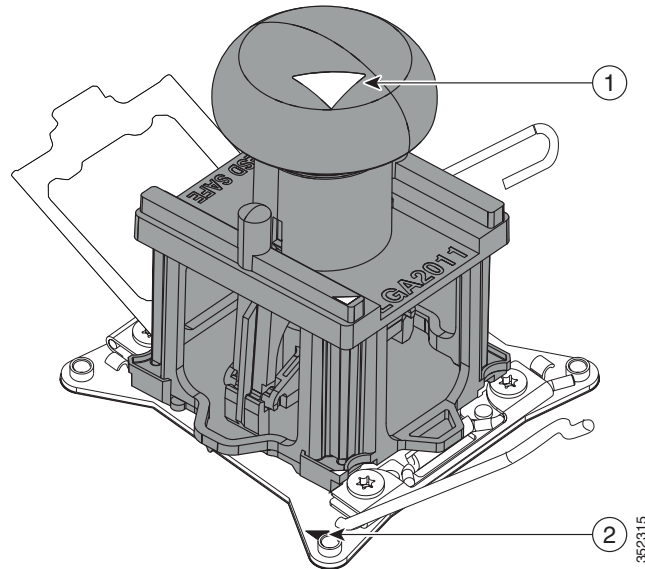
332093

1	CPU retaining latch, 	3	Hinged CPU cover plate
2	CPU retaining latch, 		

Step 7 Remove the old CPU:

- a. 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](#).
- b. Press the top button on the tool to grasp the installed CPU.
- c. Lift the tool and CPU straight up.
- d. Press the top button on the tool to release the old CPU on an antistatic surface.

Figure 3-21 Pick-and-Place Tool

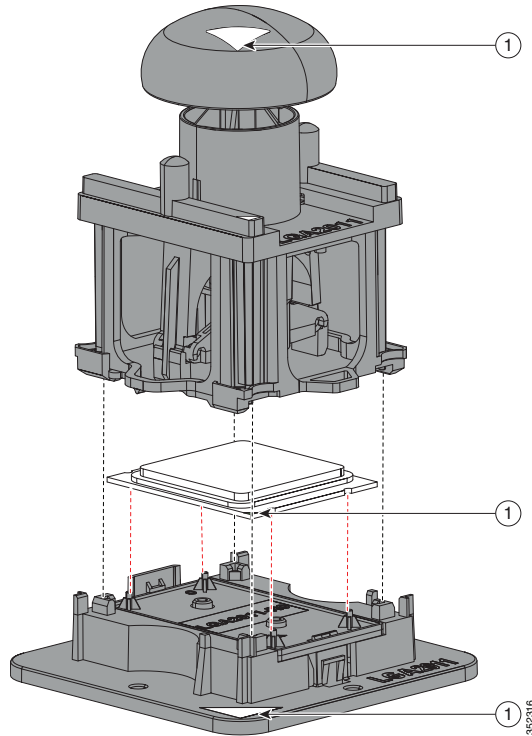


1	Arrow on tool	2	Registration mark on CPU socket
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Step 8 Insert the new CPU into the Pick-and-Place tool:

- 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





1	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 3-35](#).

- 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 3-34](#).

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.

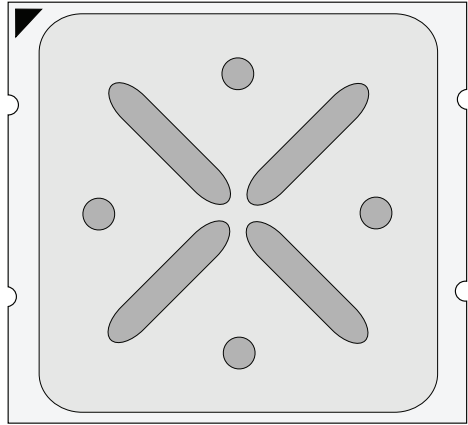
- a. Apply an alcohol-based cleaning solution to the old thermal grease and let it soak for a least 15 seconds.
- b. Wipe all of the old thermal grease off the old heatsink using a soft cloth that will not scratch the heatsink surface.

- 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 3-12](#).

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.


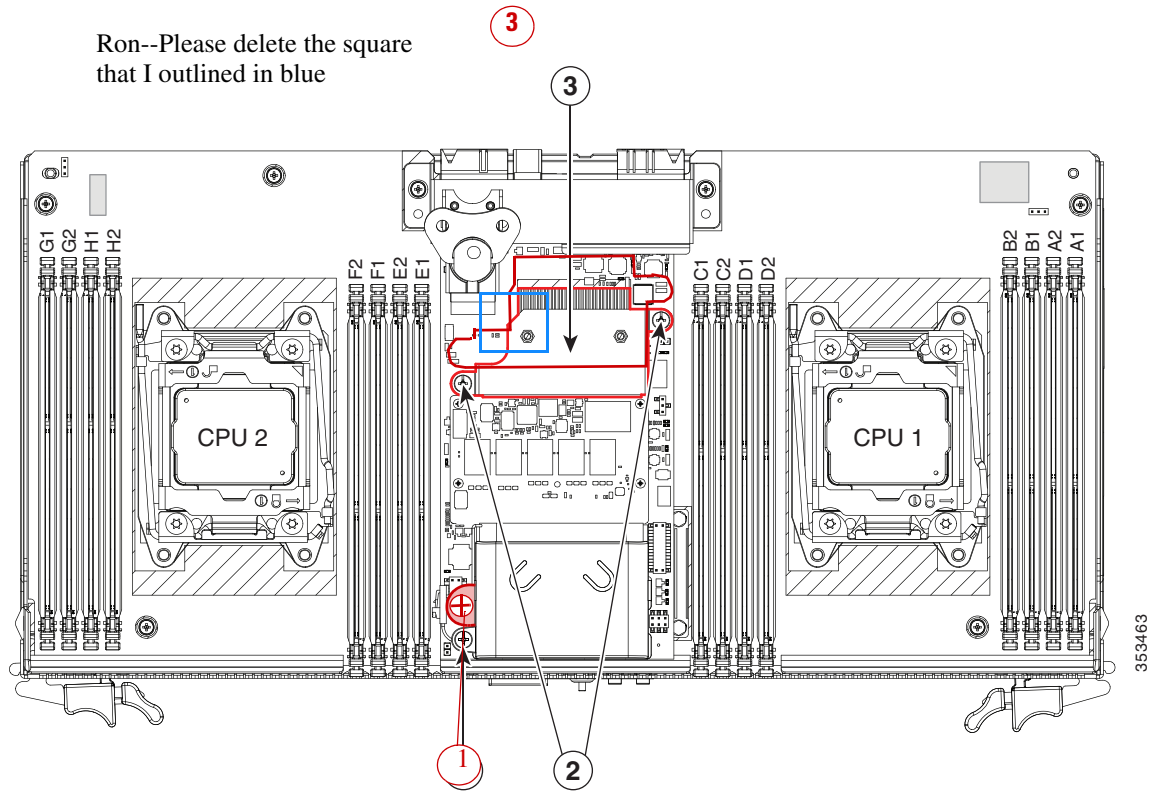
-
- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System, page 3-9](#).
- Step 2** Remove a server node from the system:
- Grasp the two ejector levers and pinch their latches to release the levers (see [Figure 3-15](#)).
 - Rotate both 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 server node cover as described in [Removing the Server Node Cover, page 3-12](#).
- 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 3-12](#).
- Step 8** 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 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-2](#) to restore your RAID configuration.

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



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

Replacing an RTC Battery Inside the Server Node

The battery type inside the server node is CR2032.

Step 1 Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System, page 3-9](#).

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.

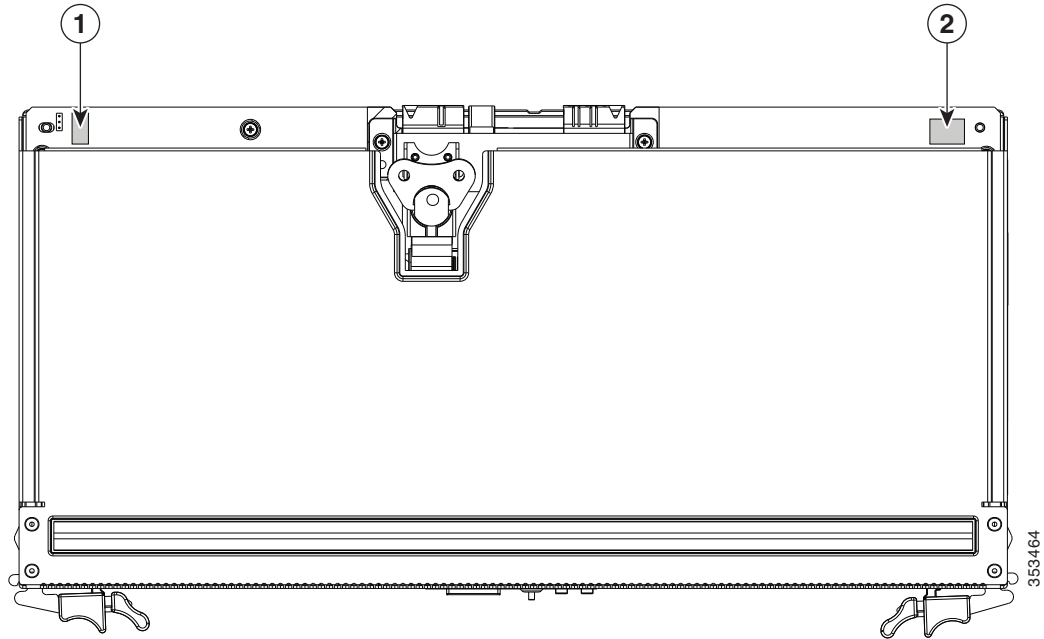


Note The server node must be in the top bay, as shown in [Figure 1-2 on page 1-2](#).

- 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.

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



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

Replacing an Internal USB Drive Inside the Server Node

This section contains the following topics:

- [Internal USB Drive Replacement Procedure, page 3-43](#)
- [Enabling or Disabling the Internal USB Port, page 3-43](#)

Internal USB Drive Replacement Procedure

To install or replace an internal Cisco USB Flash Drive, follow these steps:

-
- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System, 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.



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 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 3-44](#)
2. [Enabling TPM Support in the BIOS, page 3-45](#)
3. [Enabling the Intel TXT Feature in the BIOS, page 3-46](#)

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.

- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System, page 3-9](#).
- 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:
 - a. Locate the TPM socket on the server node board, as shown in [Figure 3-26](#).
 - b. Align the connector that is on the bottom of the TPM circuit board with the TPM socket. Align the screw hole on the TPM board with the screw hole adjacent to the TPM socket.
 - c. Push down evenly on the TPM to seat it in the motherboard socket.
 - d. Install the single one-way screw that secures the TPM to the motherboard.

Step 4 Install a server node:

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



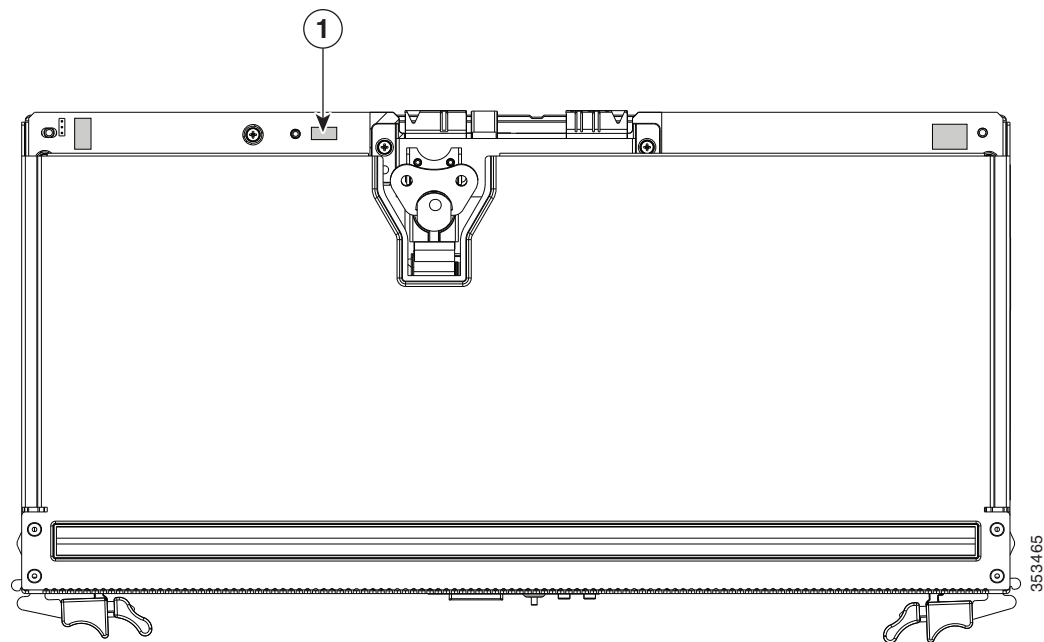
Note The server node must be in the top bay, as shown in [Figure 1-2 on page 1-2](#).

- 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 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 3-45](#).

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



1	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:

Step 1 Enable TPM support:

- a. Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.

- b. Log in to the BIOS Setup Utility with your BIOS Administrator password.
- c. On the BIOS Setup Utility window, choose the **Advanced** tab.
- d. Choose **Trusted Computing** to open the TPM Security Device Configuration window.
- e. Change TPM SUPPORT to **Enabled**.
- f. Press **F10** to save your settings and reboot the server.

Step 2 Verify that TPM support is now enabled:

- a. Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.
- b. Log into the BIOS Setup utility with your BIOS Administrator password.
- c. Choose the **Advanced** tab.
- d. Choose **Trusted Computing** to open the TPM Security Device Configuration window.
- e. Verify that TPM SUPPORT and TPM State are Enabled.

Step 3 Continue with [Enabling the Intel TXT Feature in the BIOS, page 3-46](#).

Enabling the Intel TXT Feature in the BIOS

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

Step 1 Reboot the server and watch for the prompt to press F2.

Step 2 When prompted, press **F2** to enter the BIOS Setup utility.

Step 3 Verify that the prerequisite BIOS values are enabled:

- a. Choose the **Advanced** tab.
- b. Choose **Intel TXT(LT-SX) Configuration** to open the Intel TXT(LT-SX) Hardware Support window.
- c. Verify that the following items are listed as Enabled:
 - VT-d Support (default is Enabled)
 - VT Support (default is Enabled)
 - TPM Support
 - TPM State
 - 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.


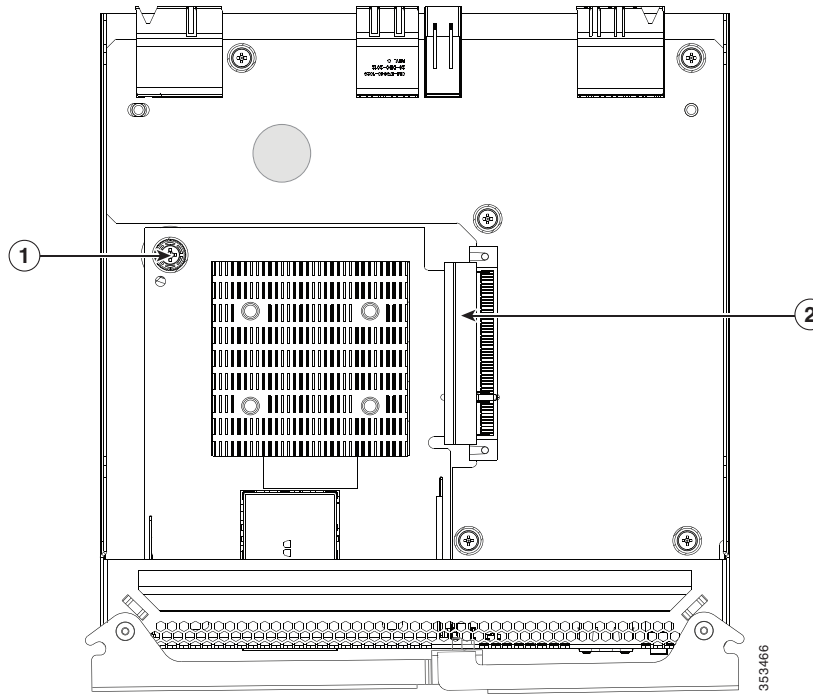
-
- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System, page 3-9](#).
- Step 2** Remove the SIOC from the system:
- Loosen the single captive thumbscrew on the SIOC and then open its two hinged ejector levers to evenly disengage the 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 3-14](#).
- 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 requirements 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 VICs Supported in System	Minimum Cisco IMC Firmware	Minimum VIC Firmware	Minimum Nexus OS on an Upstream Nexus Fabric Interconnect
Cisco UCS VIC 1227 UCSC-MLOM-CSC-02	2	2.0(2)	4.0(0)	5.0

**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 battery type inside the SIOC is CR1632.

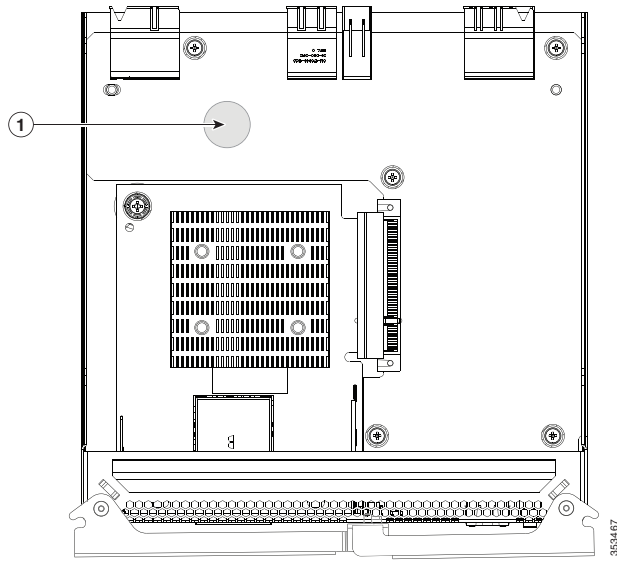
-
- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System, page 3-9](#).
- Step 2** Remove the SIOC from the system:
- Loosen the single captive thumbscrew on the SIOC and then open its two hinged ejector levers to evenly disengage the 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 3-14](#).
- 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](#)).

- 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 3-28 Replacing an RTC Battery Inside the SIOC



- | | |
|----------|------------------------------|
| 1 | 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:

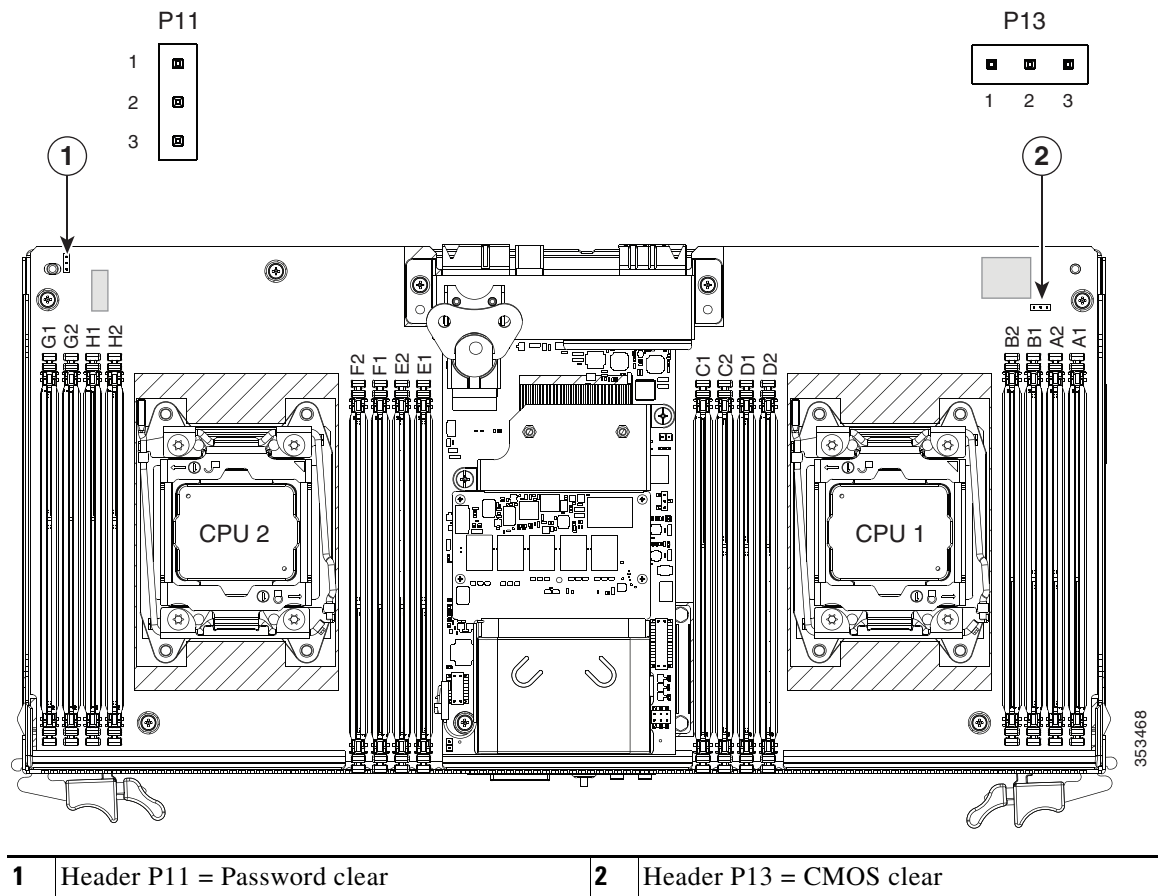
- [Service Header Locations on the Server Node Board](#), page 3-52
- [Using the Clear Password Header P11](#), page 3-53
- [Using the Clear CMOS Header P13](#), page 3-54

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.

-
- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System, 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.



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 3-12](#).
- 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:
- 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 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, 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.

-
- Step 1** Shut down and remove power from the entire system, as described in [Shutting Down and Powering Off the System, page 3-9](#).
- Step 2** Physically remove a server node chassis 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 chassis straight out from the system.
- Step 3** Remove the server node cover as described in [Removing the Server Node Cover, page 3-12](#).
- 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:
- 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 7** After the system has fully booted, shut it down again, as described in [Shutting Down and Powering Off the System, 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*

Description	Specification
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 Derated 1°C for each 305 m	0 m to 3048 m (0 ft to 10,000 ft)
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
Class	RSP2
AC input voltage	100 to 240 VAC nominal (Range: 90 to 264 VAC)
AC input frequency	47 to 63 Hz nominal (Range: 47 to 63 Hz)
AC line current (steady state)	12.5 A maximum at 100 VAC 6.0 A maximum at 208 VAC
AC line inrush current	15 A peak at 35°C, 208 VAC
Maximum output power for each power supply	1050 W on main power 30 W on standby power
Power supply output voltage	Main power: 12 VDC Standby power: 12 VDC
Rated output load	Main power: 87.5 DC Amps (at 180-264 VAC), 66.67 DC Amps (at 90-180 VAC) Standby power: 2.5 DC Amps

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

http://www.cisco.com/assets/cdc_content_elements/flash/dataCenter/cisco_ucs_power_calculator/



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
SFS-250V-10A-AR N5000 power cable, 250 VAC 10 A, Argentina	8.2	2.5
SFS-250V-10A-CN N5000 power cable, 250 VAC 10 A, China	8.2	2.5
SFS-250V-10A-ID N5000 power cable, 250 VAC 10A, India	8.2	2.5
SFS-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
- [Supercap Power Module \(RAID Backup Unit\)](#), page C-1
- [Restoring RAID Configuration After Replacing a RAID Controller](#), page C-2
- [For More Information](#), page C-2

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	Optional SCPM?	RAID Levels	Required Cables
LSI MegaRAID SAS 3108 (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.

For instructions on installing a RAID controller card, see [Replacing a RAID Controller Card Inside the Server Node](#), page 3-39.

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.

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- Step 1** Replace your RAID controller. See [Replacing a RAID Controller Card Inside the Server Node, page 3-39](#).
- 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 and watch for the prompt to press F.
- Step 4** Press **F** when you see the following onscreen prompt:
- ```
Foreign configuration(s) found on adapter.
Press any key to continue or 'C' load the configuration utility,
or 'F' to import foreign configuration(s) and continue.
```
- Step 5** 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 6** 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. This problem can occur if you do not press F quickly enough when prompted. In this case, reboot the server and try the import operation again when you are prompted to press F.

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

