Cisco APIC M4/L4 Server Installation and Service Guide

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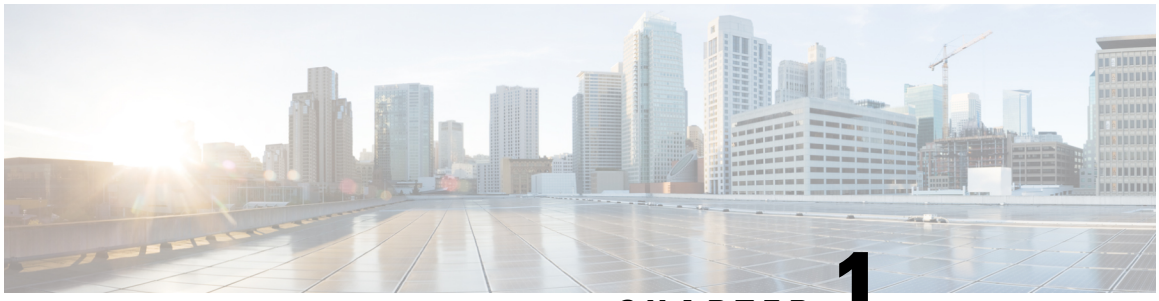


CHAPTER 1

New and Changed

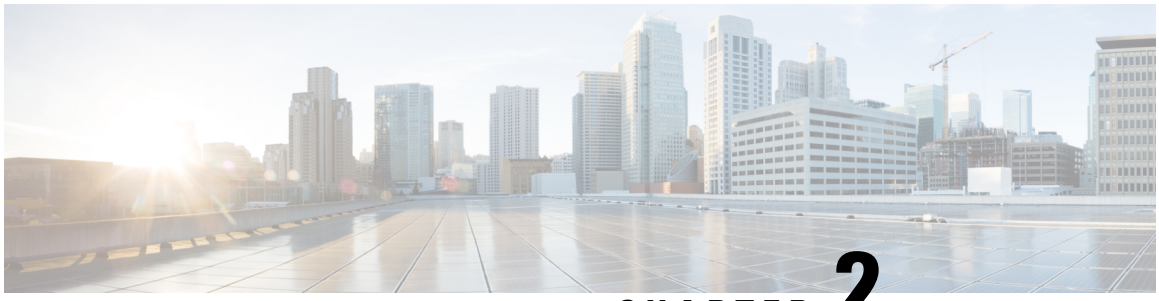
• New and Changed Information, on page 1

New and Changed Information

The table provides an overview of the significant changes up to this current release. The table does not provide an exhaustive list of all changes or of the new features up to this release.

Table 1: New Features and Changed Information for Cisco APIC M4/L4

Cisco APIC Release Version	Feature	Description
5.3(1)	Support for Cisco Application Policy Infrastructure Controller (APIC) server M4 and L4.	The Cisco Application Policy Infrastructure Controller (APIC) release 5.3(1) added support for the Cisco APIC M4/L4 server.



CHAPTER 2

Overview

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- Considerations and Restrictions, on page 3
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- Serviceable Component Locations, on page 11
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Overview

Cisco Application Policy Infrastructure Controller (APIC) release 5.3(1) added support for the Cisco APIC Server M4 and L4.

Cisco APIC Server M4 and L4 (APIC-SERVER-M4 and APIC-SERVER-L4)—Small form-factor (SFF) drives, with 10-drive HD back-plane front panel configuration.

- Front-loading drive bays 1—10 support 2.5-inch SAS/SATA drives.
- Optionally, front-loading drive bays 1 to 4 support 2.5-inch NVMe SSDs (with optional front NVMe cables.)

Considerations and Restrictions

The Cisco Application Policy Infrastructure Controller (APIC) Server M4 and L4 (APIC-SERVER-M4 and APIC-SERVER-L4) has these considerations and restrictions:

- The role of the Dual 1-Gb/10-Gb Ethernet ports (LAN1 and LAN2) in previous Cisco APIC Generations is now moved to the mLOM card and Ports available on that card.
- The mLom numbering doesn't matter; APIC software creates a bond interface automatically.

Note There is also an internal 240G SSD boot disk.

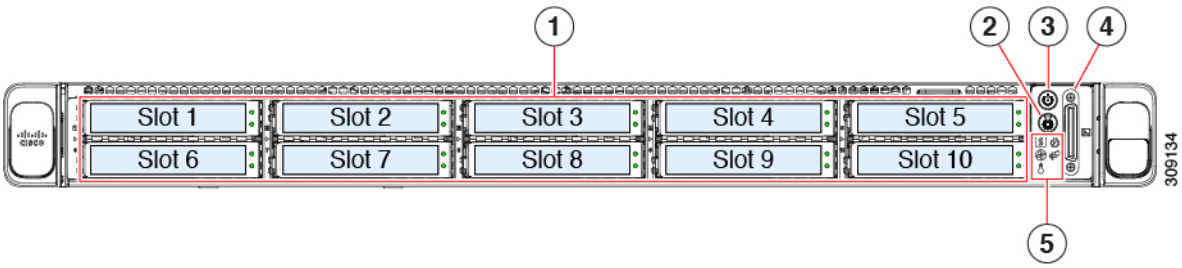
External Features

This topic shows the external features of the server versions.

Cisco APIC M4 and L4 Server (SFF Drives) Front Panel Features

The following figure shows the front panel features of the small form-factor drive versions of the server.

Figure 1: Cisco APIC M4 and L4 Server (SFF Drives) Front Panel

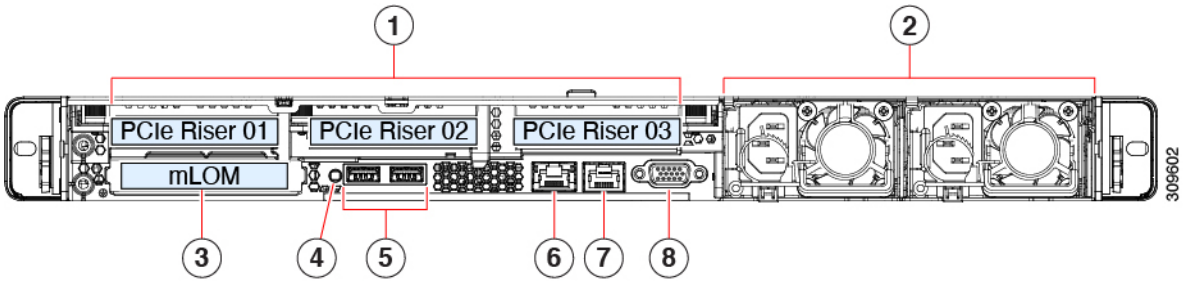


1	Drive bays 1-10 support SAS/SATA hard disk drives (HDDs) and solid state drives (SSDs). As an option, drive bays 1-4 can contain up to 4 NVMe drives in any number up to 4. Drive bays 5 through 10 support only SAS/SATA HDDs or SSDs. APIC Server-M4 and L4 — Drive bays 1-10 supports 2.5-inch NVMe-only SSDs. APIC-Server-M4 and L4: Drive bays 1 and 2 support NVMe PCIe SSDs.	**2**	Unit identification button/LED
3	Power button/power status LED	**4**	KVM connector (used with KVM cable that provides one DB-15 VGA, one DB-9 serial, and two USB 2.0 connectors)
5	System LED cluster: • Fan status LED • System Status LED • Power supply status LED • Network link activity LED • Temperature status LED		

Cisco APIC M4 and L4 Server Rear Panel Features

The rear panel features are the same for all versions of the server.

Figure 2: Cisco APIC M4 and L4 Server Rear Panel



1	PCIe slots This is used for fabric connectivity. Following PCIe Riser combinations are available: • One half-height riser card in PCIe Riser 1 One of the following network interface cards should be installed in PCIe slot 1: • APIC-P-I8D25GF • APIC-P-ID10GC • APIC-PCIE-C25Q-04 (same Cisco VIC 1455)		
2	Power supply units (PSUs), two which can be redundant when configured in 1+1 power mode.	**3**	Modular LAN-on-motherboard (mLOM) card bay (x16 PCIe lane). This is used for OOB management. Dual 1-Gb/10-Gb Ethernet ports (LAN1 and LAN2) The dual LAN ports can support 1 Gbps and 10 Gbps, depending on the link partner capability
4	System identification button/LED	**5**	USB 3.0 ports (two)
6	Dedicated 1 GB Ethernet management port. This is used for CIMC management.	**7**	COM port (RJ-45 connector)
8	VGA video port (DB-15 connector)		

- 10/25GbE ports on APIC-P-I8D25GF can be used as either 10G or 25G ports. All ports must have the same speed.
- 25G connectivity between Cisco Application Centric Infrastructure (ACI) leaf and Cisco APIC M4/L4 must use copper cable when APIC-P-I8D25GF network interface cards are used. For example, Cisco SFP-H25G-CU1M.

- 25G connectivity between the Cisco ACI leaf and Cisco APIC M4/L4 can use either copper or fiber cables when APIC-PCIE-C25Q-04/Cisco VIC 1455 network interface cards are used.

  Please see the list of transceiver options: https://www.cisco.com/c/en/us/products/collateral/interfaces-modules/transceiver-modules/datasheet-c78-736950.html.

- APIC-P-ID10GC supports 10G Base-T connectivity to Cisco ACI leaf nodes.

Status LEDS and Buttons

Front-Panel LEDs

Figure 3: Front Panel LEDs

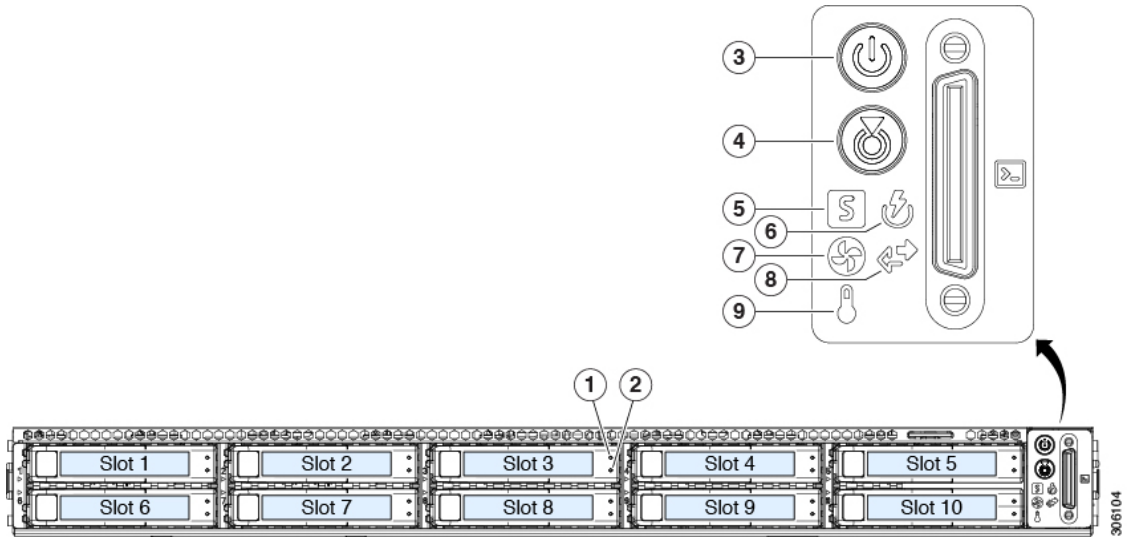


Table 2: Front Panel LEDs, Definition of States

	LED Name	States
1 **SAS**	SAS/SATA drive fault **Note** NVMe solid state drive (SSD) drive tray LEDs have different behavior than SAS/SATA drive trays.	• Off—The hard drive is operating properly. • Amber—Drive fault detected. • Amber, blinking—The device is rebuilding. • Amber, blinking with one-second interval—Drive locate function activated in the software.

2 **SAS**	SAS/SATA drive activity LED	• Off—There is no hard drive in the hard drive tray (no access, no fault). • Green—The hard drive is ready. • Green, blinking—The hard drive is reading or writing data.
1 **NVMe**	NVMe SSD drive fault **Note** NVMe solid state drive (SSD) drive tray LEDs have different behavior than SAS/SATA drive trays.	• Off—The drive is not in use and can be safely removed. • Green—The drive is in use and functioning properly. • Green, blinking—the driver is initializing following insertion or the driver is unloading following an eject command. • Amber—The drive has failed. • Amber, blinking—A drive Locate command has been issued in the software.
2 **NVMe**	NVMe SSD activity	• Off—No drive activity. • Green, blinking—There is drive activity.
3	Power button/LED	• Off—There is no AC power to the server. • Amber—The server is in standby power mode. Power is supplied only to the Cisco IMC and some motherboard functions. • Green—The server is in main power mode. Power is supplied to all server components.
4	Unit identification	• Off—The unit identification function is not in use. • Blue, blinking—The unit identification function is activated.

5	System health	• Green—The server is running in normal operating condition.
		• Green, blinking—The server is performing system initialization and memory check.
		• Amber, steady—The server is in a degraded operational state (minor fault). For example:
		  • 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, 2 blinks—There is a major fault with the system board.
		• Amber, 3 blinks—There is a major fault with the memory DIMMs.
		• Amber, 4 blinks—There is a major fault with the CPUs.

6	Power supply status	• 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	Fan status	• Green—All fan modules are operating properly. • Amber, blinking—One or more fan modules breached the non-recoverable threshold.

8	Network link activity	• Off—The Ethernet LOM port link is idle. • Green—One or more Ethernet LOM ports are link-active, but there is no activity. • Green, blinking—One or more Ethernet LOM ports are link-active, with activity. **Note** Intel NIC may display the following LED status: • Green—10Gbps • Yellow—10G speed with 10Gbase-SR-S transceiver • Yellow—5/2.5/1Gbps • Blinking green—transmitting or receiving data • Off—no link
9	Temperature status	• Green—The server is operating at normal temperature. • Amber, steady—One or more temperature sensors breached the critical threshold. • Amber, blinking—One or more temperature sensors breached the non-recoverable threshold.

Rear-Panel LEDs

Figure 4: Rear Panel LEDs

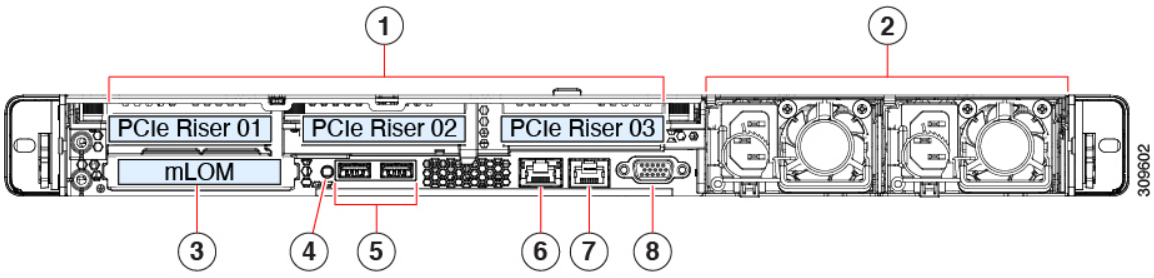


Table 3: Rear Panel LEDs, Definition of States

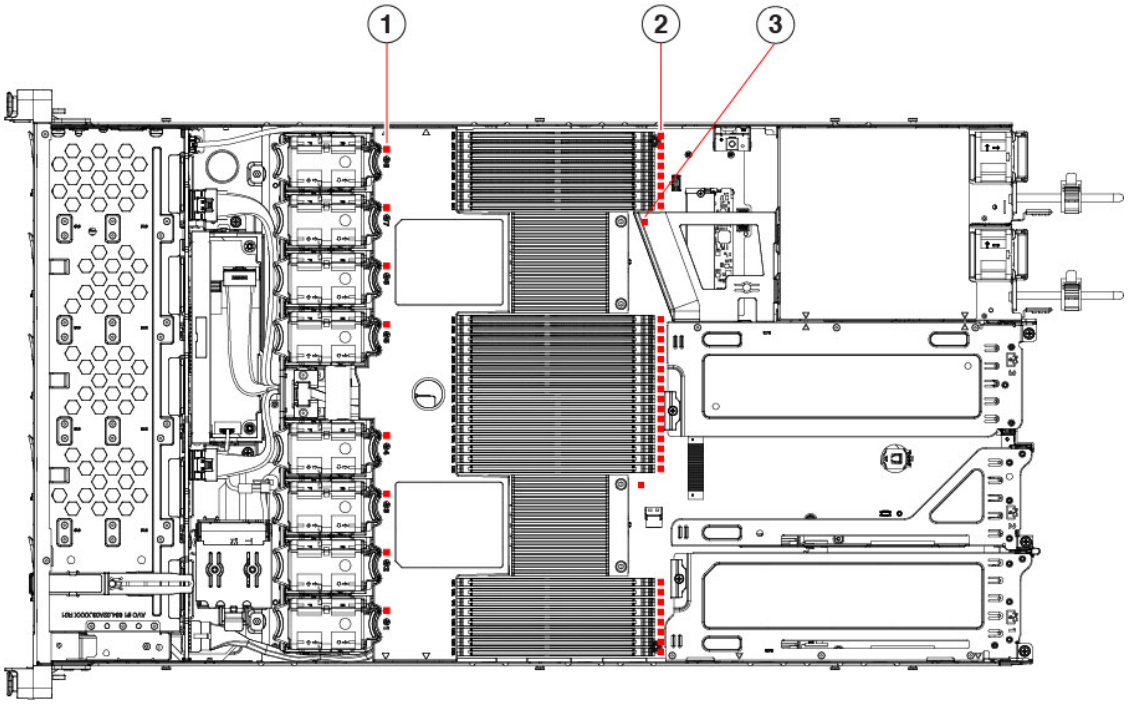
	LED Name	States
4	System Identification LED	• Off— system is not operational. • Amber— critical error detected. • Green— system is operating normally.

	LED Name	States
	Power supply status (one LED each power supply unit)	**AC power supplies:** • Off—No AC input (12 V main power off, 12 V standby power off). • Green, blinking—12 V main power off; 12 V standby power on. • Green, solid—12 V main power on; 12 V standby power on. • Amber, blinking—Warning threshold detected but 12 V main power on. • Amber, solid—Critical error detected; 12 V main power off (for example, over-current, over-voltage, or over-temperature failure). **DC power supplies:** • Off—No DC input (12 V main power off, 12 V standby power off). • Green, blinking—12 V main power off; 12 V standby power on. • Green, solid—12 V main power on; 12 V standby power on. • Amber, blinking—Warning threshold detected but 12 V main power on. • Amber, solid—Critical error detected; 12 V main power off (for example, over-current, over-voltage, or over-temperature failure).

Internal Diagnostic LEDs

The server has internal fault LEDs for CPUs, DIMMs, and fan modules.

Figure 5: Internal Diagnostic LED Locations

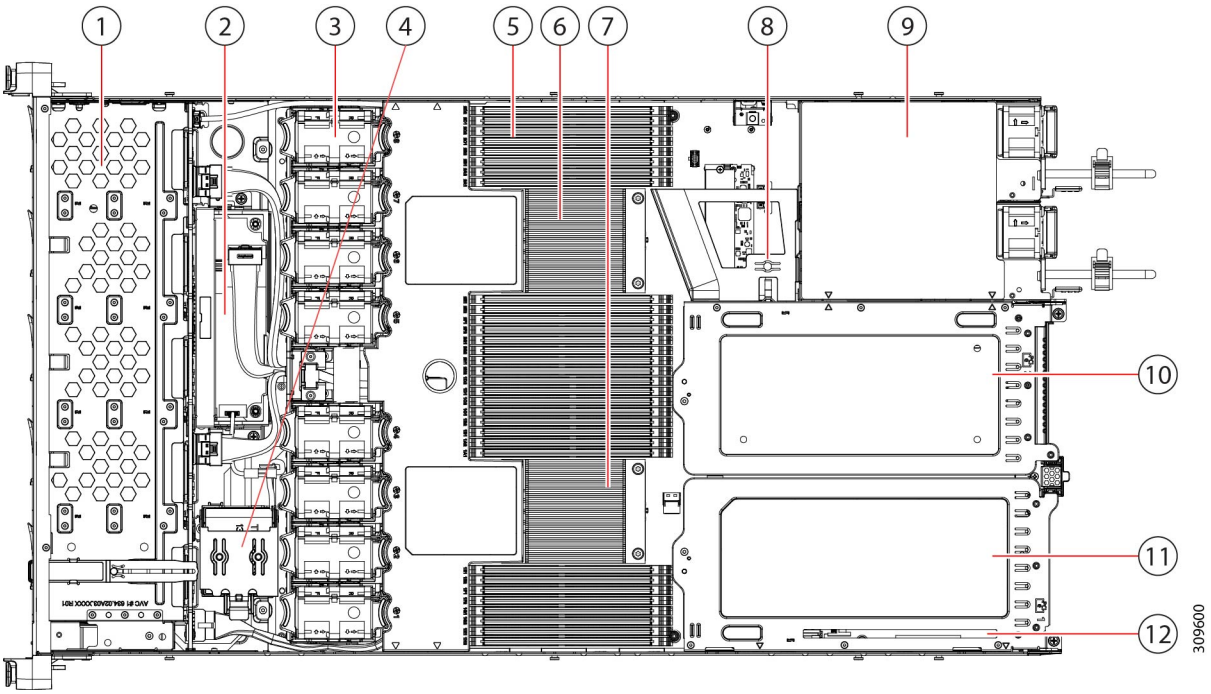


Callout	Description
1	Fan module fault LEDs (one behind each fan connector on the motherboard) • Amber—Fan has a fault or is not fully seated. • Green—Fan is OK.
2	DIMM fault LEDs (one behind each DIMM socket on the motherboard) These LEDs operate only when the server is in standby power mode. • Amber—DIMM has a fault. • Off—DIMM is OK.
3	CPU fault LEDs (one behind each CPU socket on the motherboard). These LEDs operate only when the server is in standby power mode. • Amber—CPU has a fault. • Off—CPU is OK.

Serviceable Component Locations

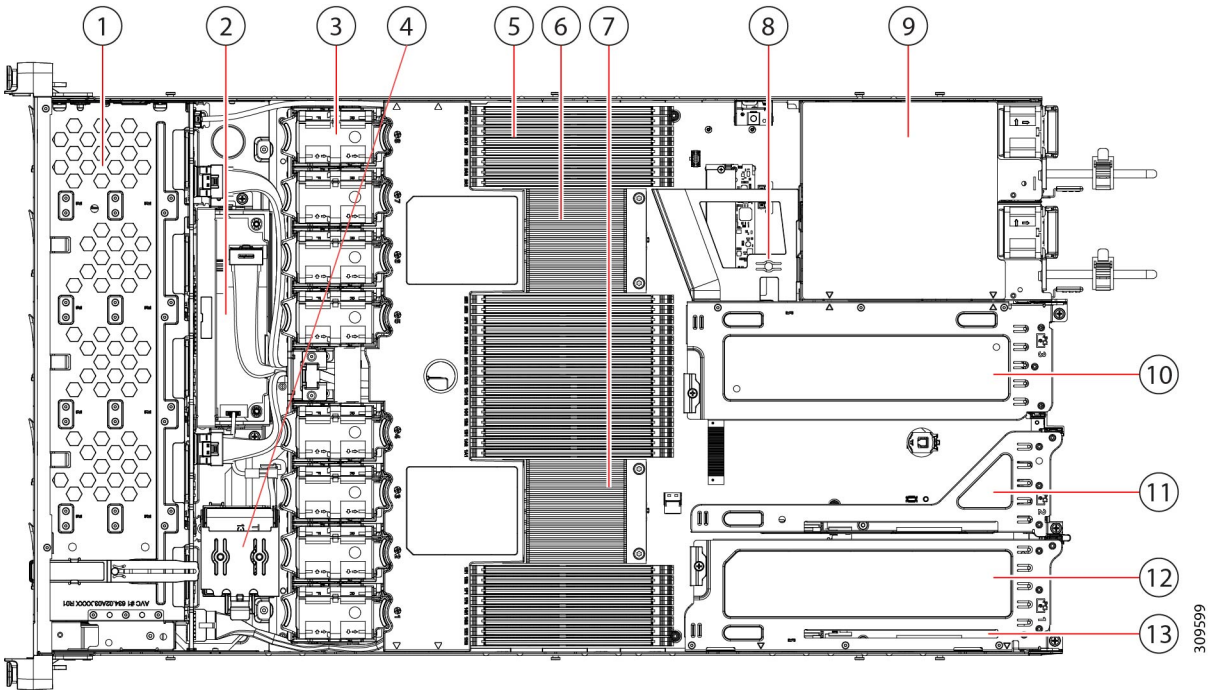
This topic shows the locations of the field-replaceable components and service-related items. The view in the following figure shows the server with the top cover removed.

Figure 6: Cisco APIC M4 and L4 Server, Serviceable Component Locations



1	Front-loading drive bays 1–10 support SAS/SATA/NVMe drives.	**2**	Cisco M6 12G SAS RAID card or Cisco M6 12G SAS HBA Controller
3	Cooling fan modules, eight. Each fan is hot-swappable	**4**	SuperCap module mounting bracket The SuperCap module (not shown) that mounts into this location provides RAID write-cache backup.
5	DIMM sockets on motherboard, 32 total, 16 per CPU CPUs are arranged in groups of eight sockets above the top CPU and below the bottom CPU, and 16 sockets between the CPUs.	**6**	Motherboard CPU socket two (CPU2)
7	Motherboard CPU socket one (CPU1)	**8**	M.2 module connector Supports a boot-optimized RAID controller with connectors for up to two SATA M.2 SSDs
9	Power Supply Units (PSUs), two	**10**	PCIe riser slot 2
11	PCIe riser slot 1	**12**	Modular LOM (mLOM) card bay on chassis floor (x16 PCIe lane)

Figure 7: Three Riser Configuration Serviceable Component Locations



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7	Motherboard CPU socket one (CPU1)	**8**	M.2 module connector Supports a boot-optimized RAID controller with connectors for up to two SATA M.2 SSDs
9	Power Supply Units (PSUs), two	**10**	PCIe riser slot 3
11	PCIe riser slot 2	**12**	Modular LOM (mLOM) card bay on chassis floor (x16 PCIe lane)
13	Modular LOM (mLOM) card bay on chassis floor (x16 PCIe lane)		

Summary of Server Features

The following table lists a summary of server features.

Feature	Description
Chassis	One rack-unit (1RU) chassis
Central Processor	Up to two Socket AMD Zen2/3 Architecture supporting Rome/Milan processors
Memory	32 DDR4 DIMMs, up to 3200 MHz(1DPC), 2933 MHz (2DPC), with support for RDIMMs, LRDIMMs
Multi-bit error protection	Multi-bit error protection is supported
Video	The Cisco Integrated Management Controller (CIMC) provides video using the Matrox G200e video/graphics controller: • Integrated 2D graphics core with hardware acceleration • Embedded DDR memory interface supports up to 512 MB of addressable memory (8 MB is allocated by default to video memory) • Supports display resolutions up to 1920 x 1200 16bpp @ 60Hz • High-speed integrated 24-bit RAMDAC • Single lane PCI-Express host interface running at Gen 1 speed
Baseboard management	BMC, running Cisco Integrated Management Controller (Cisco IMC) firmware. Depending on your Cisco IMC settings, Cisco IMC can be accessed through the 1-Gb dedicated management port, the 1-Gb/10-Gb Ethernet LAN ports, or a Cisco virtual interface card.
Network and management I/O	Rear panel: • One 1-Gb Ethernet dedicated management port (RJ-45 connector) • One RS-232 serial port (RJ-45 connector) • One VGA video connector port (DB-15 connector) • Two USB 3.0 ports • One flexible modular LAN on motherboard (mLOM)/OCP 3.0 slot that can accommodate various interface cards • One KVM console connector (supplies two USB 2.0 connectors, one VGA DB15 video connector, and one serial port (RS232) RJ45 connector) Front panel: • One KVM console connector (supplies two USB 2.0 connectors, one VGA DB15 video connector, and one serial port (RS232) RJ45 connector)

Feature	Description
Modular LAN on Motherboard (mLOM)/ OCP3 3.0 slot	The dedicated mLOM/OCP 3.0 slot on the motherboard can flexibly accommodate these cards: • Cisco Virtual Interface Cards • OCP 3.0 network interface card (APIC-O-ID10GC)
WoL	The two 1-Gb/10-Gb BASE-T Ethernet LAN ports support the wake-on-LAN (WoL) standard.
Power	Up to two of the following hot-swappable power supplies: • 770 W (AC) • 1050 W (AC) • 1050 W (DC) • 1600 W (AC) • 2300 W (AC) One power supply is mandatory; one more can be added for 1 + 1 redundancy.
ACPI	The advanced configuration and power interface (ACPI) 4.0 standard is supported.
Front Panel	The front panel controller provides status indications and control buttons
Cooling	Eight hot-swappable fan modules for front-to-rear cooling.
PCIe I/O	Horizontal PCIe expansion slots are supported by PCIe riser assemblies. The server supports either of the following configurations: • One half-height riser card in PCIe Riser 1 • Three half-height riser cards in PCIe Riser 1, 2, 3 • Two full-height riser cards
InfiniBand	The PCIe bus slots in this server support the InfiniBand architecture.

Feature	Description
Expansion Slots	Three half-height riser slots • Riser 1 (controlled by CPU 1): One x16 PCIe Gen4 Slot, (Cisco VIC), half-height, 3/4 length • Riser 2 (controlled by CPU 1): One x16 PCIe Gen4 Slot, electrical x8, half-height, 3/4 length • Riser 3 (controlled by CPU 1): One x16 PCIe Gen4 Slot, (Cisco VIC), half-height, 3/4 length Two full-height riser slots • Riser 1 (controlled by CPU 1): One x16 PCIe Gen4 Slot, (Cisco VIC), full-height, 3/4 length • Riser 3 (controlled by CPU 1): One x16 PCIe Gen4 Slot, (Cisco VIC), full-height, 3/4 length
Interfaces	Rear panel: • One 1Gbase-T RJ-45 management port • One RS-232 serial port (RJ45 connector) • One DB15 VGA connector • Two USB 3.0 port connectors • One flexible modular LAN on motherboard (mLOM) slot that can accommodate various interface cards Front panel: • One KVM console connector (supplies two USB 2.0 connectors, one • VGA DB15 video connector, and one serial port (RS232) RJ45 connector)
Storage, front-panel	Cisco APIC M4 and L4 (APIC-SERVER-M4 and APIC-SERVER-L4)—The server is orderable in two different versions, each with a different front panel/drive-backplane configuration.

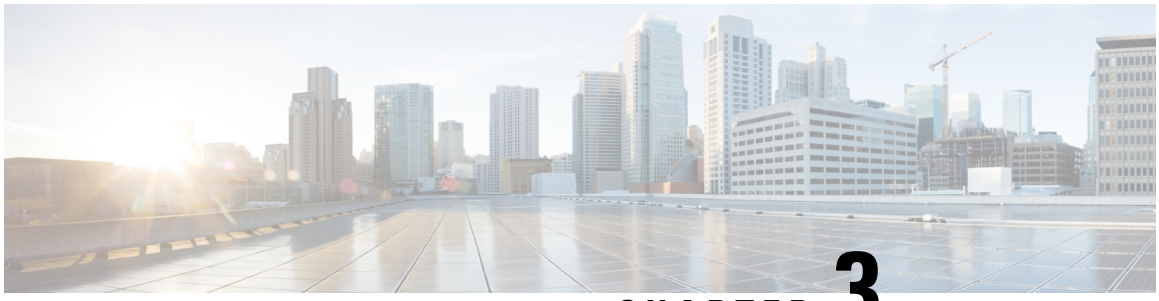
Feature	Description

Storage, internal	The server has these internal storage options:
	• One USB port on the motherboard.
	• Mini-storage module socket, optionally with either:
	  • SD card module. Supports up to two SD cards.
	  • M.2 SSD module. Supports either two SATA M.2 SSDs or two NVMe M.2 SSDs.
	• One micro-SD card socket on PCIe riser 1.
	• Mixing different capacity SATA M.2 SSDs is not supported.
	• It also supports USB3.0 TypeA connector.

Integrated Management Processor	Baseboard Management Controller (BMC) running Cisco Integrated Management Controller (CIMC) firmware. Depending on your CIMC settings, the CIMC can be accessed through the 1GE dedicated management port, the 1GE/10GE LOM ports, or a Cisco virtual interface card (VIC). CIMC manages certain components within the server, such as the Cisco 12G SAS HBA.

Storage Controllers	The Cisco 12G SAS RAID controller or Cisco 12G SAS HBA plugs into a dedicated slot. Only one of these at a time can be used at a time.
	• Cisco 12G SAS RAID controller
	  • RAID support (RAID 0, 1, 5, 6, 10, 50, 60, SRAID0, and JBOD mode)
	  • Supports up to 10 internal SAS/SATA drives
	  • Plugs into drive backplane
	• Cisco 12G SAS HBA
	  • No RAID support
	  JBOD/Pass-through Mode support
	  Supports up to 10 SAS/SATA internal drives
	  Plugs into drive backplane

RAID backup	The server has a mounting bracket near the cooling fans for the supercap unit that is used with the Cisco modular RAID controller card.
Integrated video	Integrated VGA video.
Intersight	Intersight provides server management capabilities



CHAPTER 3

Installing the Server

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- Smart Access Serial, on page 32
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Preparing for Installation

This section contains the following topics:

Installation Warnings and Guidelines

Note Before you install, operate, or service a server, review the Regulatory Compliance and Safety Information 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

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

Statement 1074

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock, and key, or other means of security.**

Statement 1017

Warning **This product relies on the building's installation for short-circuit (over current) protection. Ensure that the protective devices is rated not greater than 20A (North America), 16A (Europe),and 13A (UK).**

Statement 1005

Caution To ensure proper airflow it is necessary to rack the servers using rail kits. Physically placing the units on top of one another or “stacking” without the use of the rail kits blocks the air vents on top of the servers, which could result in overheating, higher fan speeds, and higher power consumption. We recommend that you mount your servers on rail kits when you are installing them into the rack because these rails provide the minimal spacing required between the servers. No additional spacing between the servers is required when you mount the units using rail kits.

Caution Avoid uninterruptible power supply (UPS) types that use ferroresonant technology. These UPS types can become unstable with systems such as the Cisco UCS, which can have substantial current draw fluctuations from fluctuating data traffic patterns.

Caution To prevent loss of input power, ensure the total maximum loads on the circuits supplying power to the switch are within the current ratings for the wiring and breakers.

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

- Plan your site configuration and prepare the site before installing the server.
- Ensure that there is adequate space around the server to allow for accessing 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 Environmental Specifications, on page 35.
- Ensure that the cabinet or rack meets the requirements listed in the Rack Requirements, on page 21.
- Ensure that the site power meets the power requirements listed in the Power Specifications, on page 38. If available, you can use an uninterruptible power supply (UPS) to protect against power failures.

Grounding Requirements

The switch is sensitive to variations in voltage supplied by the power sources. Overvoltage, undervoltage, and transients (or spikes) can erase data from memory or cause components to fail. To protect against these types of problems, ensure that there is an earth-ground connection for the switch. You can connect the grounding pad on the switch either directly to the earth-ground connection or to a fully bonded and grounded rack.

When you properly install the chassis in a grounded rack, the switch is grounded because it has a metal-to-metal connection to the rack. Alternatively, you can ground the chassis by using a customer-supplied grounding cable that meets your local and national installation requirements (we recommend 6-AWG wire for U.S. installations) connected to the chassis with a grounding lug (provided in the switch accessory kit) and to the facility ground.

Note You automatically ground AC power supplies when you connect them to AC power sources. For DC power supplies, you must connect a grounding wire when wiring the power supply to the DC power source.

Rack Requirements

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 Cisco-supplied slide rails.
- The minimum vertical rack space per server must be one rack unit (RU), equal to 1.75 in. (44.45 mm).

Supported Cisco Slide Rail Kits

The server supports the following rail kit options:

- Cisco part UCSC-RAIL-M6= (ball-bearing slide rail kit)
- Cisco part UCSC-CMA-C220M6= (cable management arm)

Rack Installation Tools Required

The slide rails sold by Cisco Systems for this server do not require tools for installation.

Slide Rail and Cable Management Arm Dimensions

The slide rails for this server have an adjustment range of 24 to 36 inches (610 to 914 mm).

The optional cable management arm (CMA) adds additional length requirements:

- The additional distance from the rear of the server to the rear of the CMA is 5.4 inches (137.4 mm).
- The total length of the server including the CMA is 35.2 inches (894 mm).

Installing the Server in a Rack

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

Procedure

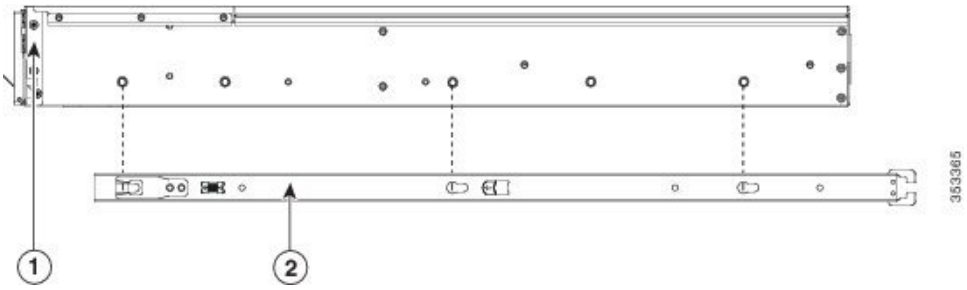
Step 1 Attach the inner rails to the sides of the server:

a) Align an inner rail with one side of the server so that the three keyed slots in the rail align with the three pegs on the side of the server.

b) Set the keyed slots over the pegs, and then slide the rail toward the front to lock it in place on the pegs. The front slot has a metal clip that locks over the front peg.

c) Install the second inner rail to the opposite side of the server.

Figure 8: Attaching the Inner Rail to the Side of the Server

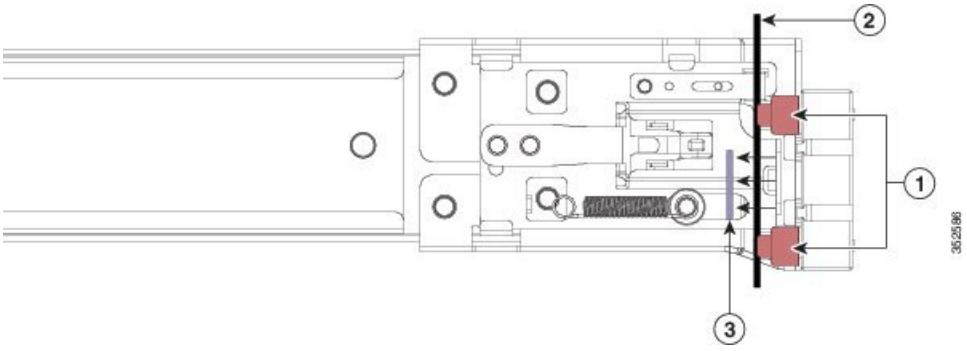


1	Front of server	**2**	Inner rail

Step 2 Open the front securing plate on both slide-rail assemblies. The front end of the slide-rail assembly has a spring-loaded securing plate that must be open before you can insert the mounting pegs into the rack-post holes.

On the *outside* of the assembly, push the green-arrow button toward the rear to open the securing plate.

Figure 9: Front Securing Mechanism, Inside of Front End



1	Front mounting pegs	**3**	Securing plate shown pulled back to the open position
2	Rack post between mounting pegs and opened securing plate	-	

Step 3 Install the outer slide rails into the rack:

a) 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.

Note
The rack post must be between the mounting pegs and the *open* securing plate.

b) Push the mounting pegs into the rack-post holes from the outside-front.
c) Press the securing plate release button, marked PUSH. The spring-loaded securing plate closes to lock the pegs in place.
d) Adjust the slide-rail length, and then push the rear mounting pegs into the corresponding rear rack-post holes. The slide rail must be level front-to-rear.

The rear mounting pegs enter the rear rack-post holes from the *inside* of the rack post.

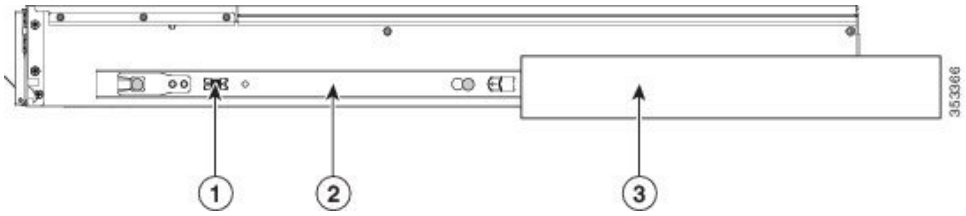
e) Attach the second slide-rail assembly to the opposite side of the rack. Ensure that the two slide-rail assemblies are at the same height and are level front-to-back.
f) Pull the inner slide rails on each assembly out toward the rack front until they hit the internal stops and lock in place.

Step 4 Insert the server into the slide rails:

Caution
This server can weigh up to 64 pounds (29 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 ends of the inner rails that are attached to the server sides with the front ends of the empty slide rails on the rack.
b) Push the inner rails into the slide rails on the rack until they stop at the internal stops.
c) Slide the inner-rail release clip toward the rear on both inner rails, and then continue pushing the server into the rack until its front slam-latches engage with the rack posts.

Figure 10: Inner-Rail Release Clip



1	Inner-rail release clip	**3**	Outer slide rail attached to rack post
2	Inner rail attached to server and inserted into outer slide rail	-	

Step 5 (Optional) Secure the server in the rack more permanently by using the two screws that are provided with the slide rails. Perform this step 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 a 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.

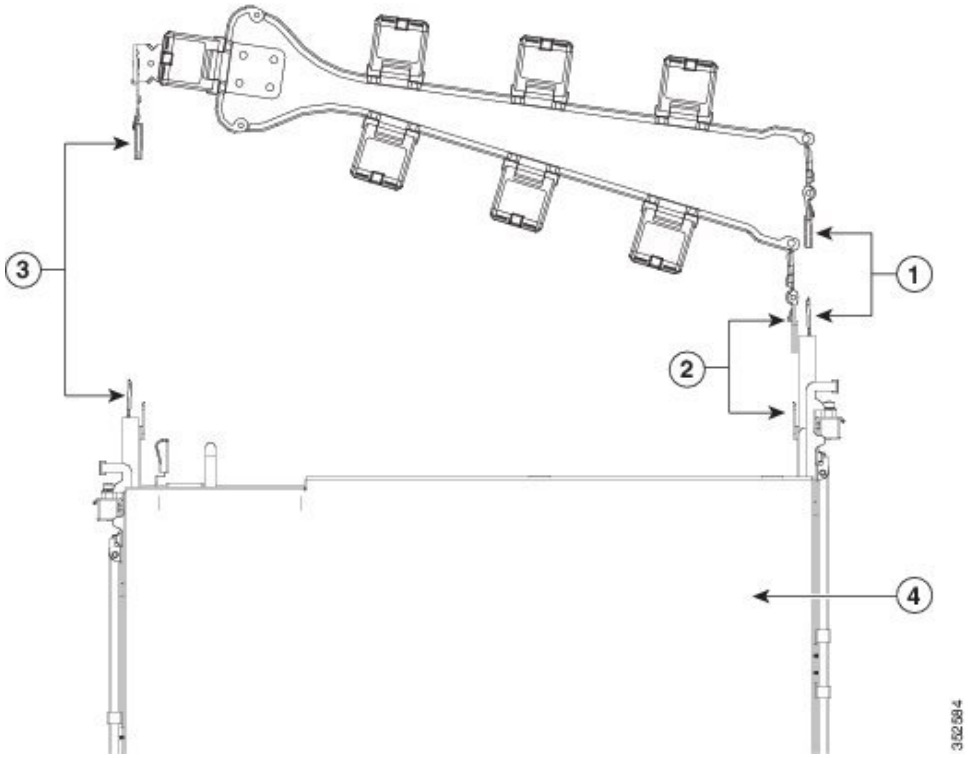
Installing the Cable Management Arm (Optional)

Note The cable management arm (CMA) is reversible left-to-right. To reverse the CMA, see Reversing the Cable Management Arm (Optional), on page 26 before installation.

Procedure

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. Slide the tab over the end of the rail until it clicks and locks.

Figure 11: Attaching the CMA to the Rear Ends of the Slide Rails



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

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. 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.

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. 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.

Reversing the Cable Management Arm (Optional)

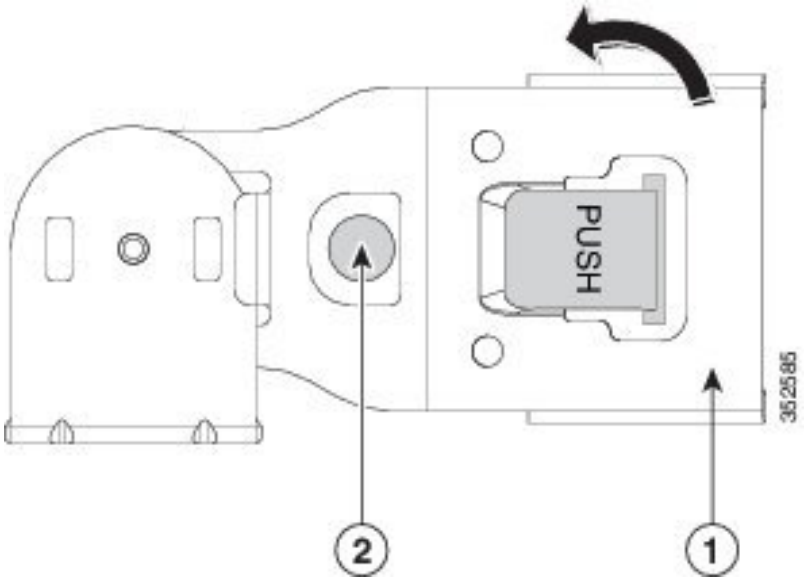
Procedure

Step 1 Rotate the entire CMA assembly 180 degrees, left-to-right. The plastic cable guides must remain pointing upward.

Step 2 Flip the tabs at the ends of the CMA arms 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 12: Reversing the CMA



1	CMA tab on end of width-adjustment slider	**2**	Metal button on outside of tab

Initial Server Setup

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

Server Default Settings

The server is shipped with these default settings:

- The NIC mode is *Dedicated* (the only supported option in Cisco APIC).

- The NIC redundancy is *None* for Dedicated NIC mode.
- DHCP is enabled.
- IPv4 is enabled.
- The Power Restore policy is set to *Power On*.

Connection Methods

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 directly to the system for setup. This procedure can use a KVM cable (Cisco PID N20-BKVM) or the ports on the rear of the server.
- Remote setup—Use this procedure if you want to perform setup through your dedicated management LAN.

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 that is on the pull-out asset tag on the front panel. 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.

This section contains the following topics:

Connecting to the Server Locally For Setup

This procedure requires the following equipment:

- VGA monitor
- USB keyboard
- Either the supported Cisco KVM cable (Cisco PID N20-BKVM); or a USB cable and VGA DB-15 cable

Procedure

Step 1 Attach a power cord to each power supply in your server, and then attach each power cord to a grounded power outlet.

Wait for approximately two minutes to let the server boot to standby power during the first bootup. You can verify system power status by looking at the system Power Status LED on the front panel. The system is in standby power mode when the LED is amber.

Step 2 Connect a USB keyboard and VGA monitor to the server using one of the following methods:

- Connect an optional KVM cable (Cisco PID N20-BKVM) to the KVM connector on the front panel. Connect your USB keyboard and VGA monitor to the KVM cable.

- Connect a USB keyboard and VGA monitor to the corresponding connectors on the rear panel.

Step 3 Open the Cisco IMC Configuration Utility:

a) Press and hold the front panel power button for four seconds to boot the server.

b) During bootup, press **F8** when prompted to open the Cisco IMC Configuration Utility.

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

The following are the requirements for Strong Password:

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

Step 4 Continue with Setting Up the System With the Cisco IMC Configuration Utility, on page 29.

Connecting to the Server Remotely For Setup

This procedure requires the following equipment:

- One RJ-45 Ethernet cable that is connected to your management LAN.

Before you begin

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 that is on the pull-out asset tag on the front panel. 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.

Procedure

Step 1 Attach a power cord to each power supply in your server, and then attach each power cord to a grounded power outlet.

Wait for approximately two minutes to let the server boot to standby power during the first bootup. You can verify system power status by looking at the system Power Status LED on the front panel. The system is in standby power mode when the LED is amber.

Step 2 Plug your management Ethernet cable into the dedicated management port on the rear panel.

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.

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

The following are the requirements for Strong Password:

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

Step 9 Continue with Setting Up the System With the Cisco IMC Configuration Utility, on page 29.

Setting Up the System With the Cisco IMC Configuration Utility

Before you begin

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

Procedure

Step 1 Set the NIC mode to choose which ports to use to access Cisco IMC for server management. Cisco IMC for APIC appliance only supports dedicated mode:

- *Dedicated*—The dedicated management port is used to access Cisco IMC. You must select the *None* NIC redundancy setting in the following step.

Step 2 Set the NIC redundancy to none, which is the only supported option for dedicated NIC mode:

- *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.

Step 3 Choose whether to enable DHCP for dynamic network settings, or to enter static network settings.

Note
Before you enable DHCP, you must preconfigure your DHCP server 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 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 following:

- The Cisco IMC IP address.

  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 entering :: (two colons).

- The preferred DNS server address.

  For IPv6, you can set this as none by entering :: (two colons).

Step 4 (Optional) Make VLAN settings.

Step 5 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.

Step 6 (Optional) Set a hostname for the server.

Step 7 (Optional) Enable dynamic DNS and set a dynamic DNS (DDNS) domain.

Step 8 (Optional) If you check the Factory Default check box, the server reverts to the factory defaults.

Step 9 (Optional) Set a default user password.

Note
The factory default username for the server is *admin*. The default password is *password*.

Step 10 (Optional) Enable auto-negotiation of port settings or set the port speed and duplex mode manually.

Note
Auto-negotiation is applicable only when you use the Dedicated NIC mode. Auto-negotiation sets the port speed and duplex mode automatically based on the switch port to which the server is connected. If you disable auto-negotiation, you must set the port speed and duplex mode manually.

Step 11 (Optional) Reset port profiles and the port name.

Step 12 Press **F5** to refresh the settings that 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 13 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.

What to do next

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 factory default username for the server is *admin*. The default password is *password*.

NIC Mode and NIC Redundancy Settings

Table 4: Valid NIC Redundancy Settings For Each NIC Mode

NIC Mode	Valid NIC Redundancy Settings
Dedicated	None

Only dedicated mode is supported in Cisco IMC for APIC appliance.

Set the NIC mode to Dedicated, when setting up the CIMC, in the CIMC Configuration Utility. After the CIMC in configured, in the CIMC GUI, verify that you have the following parameters set.

Parameters	Settings
LLDP	Disabled on the VIC
TPM Support	Enabled on the BIOS
TPM Enabled Status	Enabled
Ownership	Owned

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 off the server until the BIOS and Cisco IMC firmware are matching or the server does not boot.

Cisco provides the *Cisco Host Upgrade Utility* to assist with simultaneously upgrading the BIOS, Cisco IMC, and other firmware to compatible levels.

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

- **Recommended method for firmware update:** Use the Cisco Host Upgrade Utility to simultaneously upgrade the Cisco IMC, BIOS, and component firmware to compatible levels.

  For the latest firmware release, see the Cisco Host Upgrade Utility Quick Reference Guide.
- You can upgrade the Cisco IMC and BIOS firmware by using the Cisco IMC GUI interface.
- You can upgrade the Cisco IMC and BIOS firmware by using the Cisco IMC CLI interface.

Accessing the System BIOS

Procedure

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**.

Smart Access Serial

This server supports the Smart Access Serial feature. This feature allows you to switch between host serial and Cisco IMC CLI.

- This feature has the following requirements:

- A serial cable connection, which can use either the RJ-45 serial connector on the server rear panel, or a DB-9 connection when using the KVM cable (Cisco PID N20-BKVM) on the front-panel KVM console connector.
- Console redirection must be enabled in the server BIOS.
- Terminal type must be set to VT100+ or VTUFT8.
- Serial-over-LAN (SOL) must be disabled (SOL is disabled by default).

- To switch from host serial to Cisco IMC CLI, press **Esc+9**.

  You must enter your Cisco IMC credentials to authenticate the connection.
- To switch from Cisco IMC CLI to host serial, press **Esc+8**.

Note You cannot switch to Cisco IMC CLI if the serial-over-LAN (SOL) feature is enabled.

- After a session is created, it is shown in the CLI or web GUI by the name `serial`.

Smart Access USB

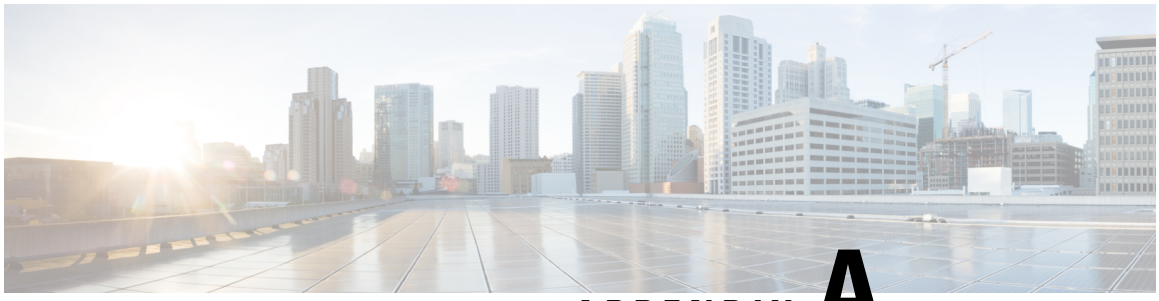
This server supports the Smart Access USB feature. The board management controller (BMC) in this server can accept a USB mass storage device and access the data on it. This feature allows you to use the front-panel USB device as a medium to transfer data between the BMC and the user without need for network connectivity. This can be useful, for example, when remote BMC interfaces are not yet available, or are not accessible due to network misconfiguration.

- This feature has the following requirements:
  - The KVM cable (Cisco PID N20-BKVM) connected to the front panel KVM console connector.
  - A USB storage device connected to one of the USB 2.0 connectors on the KVM cable. The USB device must draw less than 500 mA to avoid disconnect by the current-protection circuit.

Note Any mouse or keyboard that is connected to the KVM cable is disconnected when you enable Smart Access USB.

  - You can use USB 3.0-based devices, but they will operate at USB 2.0 speed.
  - We recommend that the USB device have only one partition.
  - The file system formats supported are: FAT16, FAT32, MSDOS, EXT2, EXT3, and EXT4. NTFS is not supported.
- The front-panel KVM connector has been designed to switch the USB port between Host OS and BMC.

- Smart Access USB can be enabled or disabled using any of the BMC user interfaces. For example, you can use the Cisco IMC Configuration Utility that is accessed by pressing **F8** when prompted during bootup.
  - Enabled: the front-panel USB device is connected to the BMC.
  - Disabled: the front-panel USB device is connected to the host.
- In a case where no management network is available to connect remotely to Cisco IMC, a Device Firmware Update (DFU) shell over serial cable can be used to generate and download technical support files to the USB device that is attached to front panel USB port.



APPENDIX A

Server Specifications

• Server Specifications, on page 35

Server Specifications

This appendix lists the physical, environmental, and power specifications for the server.

Physical Specifications

The following table lists the physical specifications for the server versions.

Table 5: Physical Specifications

Description	Specification
Height	1.7 in. (43.2 mm)
Width	16.9 in. (429.0 mm)
Depth (length)	Server only: 29.5 in. (740.3 mm) Server with slide rail: 31.0 in (787.4 mm)
Weight	Maximum: 37.5 lb. (17.0 Kg) Minimum: 29.0 lb. (13.2 Kg)

Environmental Specifications

The table lists the environmental requirements and specifications for the server.

Table 6: Physical Specifications

Description	Specification

Temperature, Operating	10° C to 35° C (50° F to 95° F) with no direct sunlight Derate the maximum temperature by 1°C per every 300 meters of altitude above sea level. **Note** Although the ASHRAE guidelines define multiple classes with different operating ranges, the *recommended* temperature and humidity operating range is the same for each class. The *recommended* temperature and humidity ranges are: • Operating Temperature: 64.4°F to 80.6°F (18°C to 27°C) For general information, see the Cisco Unified Computing System Site Planning Guide: Data Center Power and Cooling.
Temperature, non-operating (when the server is stored or transported)	Below -40° C or above 65° C (below -40° F or above 149° F) Maximum rate of change (operating and non-operating) 20° C/hr (36° F/hr)
Extended Operating Temperature	5° C to 40° C (41° F to 104° F) with no direct sunlight Maximum allowable operating temperature derated 1° C/175 m (1° F/319 ft) above 950 m (3117 ft) 5° C to 45° C (41° F to 113° F) with no direct sunlight Maximum allowable operating temperature derated 1° C/125 m (1° F/228 ft) above 950 m (3117 ft) System performance may be impacted when operating in the extended operating temperature range. Operation above 40° C is limited to less than 1% of annual operating hours. Hardware configuration limits apply to extended operating temperature range.
Humidity (RH), operating	8 to 90% and 24° C (75o F) maximum dew-point temperature, non-condensing environment
Humidity (RH), non-operating (when the server is stored or transported)	Below 5% or above 95% and 33o C (91o F) maximum dew-point temperature, non-condensing environment
Altitude, operating	0 to 10,000 feet
Altitude, non-operating (when the server is stored or transported)	0 to 40,000 feet
Sound power level Measure A-weighted per ISO7779 LwAd (Bels) Operation at 73°F (23°C)	5.8

Sound pressure level Measure A-weighted per ISO7779 LpAm (dBA) Operation at 73°F (23°C)	43

Network Interface Card Considerations

This section describes network interface card (NIC) support and considerations for Cisco Application Policy Infrastructure Controller (APIC) APIC M4/L4.

The following supported network interface cards must be inserted to PCIe Riser 01 for Cisco APIC M4/L4.

- APIC-P-I8D25GF (2 x 10/25G SFP28)
- APIC-P-ID10GC (2 x 10GBase-T)
- APIC-PCIE-C25Q-04 (4 × 10/25G SFP28)

The following virtual interface cards are also supported:

- Cisco VIC 1455 (4 × 10/25G SFP28)

The supported network interface cards have following considerations:

- 10/25GbE ports on Cisco VIC 1455 and APIC-P-I8D25GF can be used as either 10G or 25G ports. All ports must have the same speed.
- 25G connectivity between Cisco Application Centric Infrastructure (ACI) leaf and Cisco APIC M4/L4 must use copper cable when APIC-P-I8D25GF network interface cards are used. For example, Cisco SFP-H25G-CU1M.
- 25G connectivity between the Cisco ACI leaf and Cisco APIC M4/L4 can use either copper or fiber cables when APIC-PCIE-C25Q-04/Cisco VIC 1455 network interface cards are used.

  Please see the list of transceiver options:
  https://www.cisco.com/c/en/us/products/collateral/interfaces-modules/transceiver-modules/datasheet-c78-736950.html.
- APIC-P-ID10GC supports 10G Base-T connectivity to Cisco APIC leaf nodes.
- The Cisco VIC 1455 has 4 ports: port-4, port-3, port-2, and port-1, from left to right.
  - Given that the port channel is enabled:
    - Only two vNICs and vHBAs are available for use.
    - Port 0 and 1 are bundled as one port channel and port 2 and 3 are bundled as the other port channel.
  - Port 1 and port 2 is one pair, corresponding to eth2-1 on Cisco APIC. Port 3 and port 4 is another pair, corresponding to eth2-2 on Cisco APIC. Only one connection is allowed for each pair. For example, you can connect one cable to either port 1 or port 2, and you can connect another one cable to either port 3 or port 4. **Do not connect two cables on any pair.**

See NIC Mode and NIC Redundancy Settings, on page 31 for additional considerations and more information on NIC modes.

Power Specifications

Table 7: M4 System Load Estimates

System Workload Factor	50%	75%	100%
Maximum Input Power	409.91 W	409.91 W	409.91 W
Input Power	268.24 W	338.59 W	409.91 W
Idle Input Power	129.18 W	129.18 W	129.18 W
Input Current	1.13 A	1.43 A	1.72 A
Air Flow	31.69 cfm	40 cfm	48.43 cfm
Cooling	915.28 BTU/hr.	1155.31 BTU/hr.	1398.68 BTU/hr.

Table 8: L4 System Load Estimates

System Workload Factor	50%	75%	100%
Maximum Input Power	429.85 W	429.85 W	429.85 W
Input Power	280.83 W	355 W	429.85 W
Idle Input Power	134.26 W	134.26 W	134.26 W
Input Current	1.19 A	1.5 A	1.81 A
Air Flow	33.18 cfm	41.94 cfm	50.78 cfm
Cooling	958.22 BTU/hr.	1211.31 BTU/hr.	1466.71 BTU/hr.

Note Do not mix power supply types or wattages in the server. Both power supplies must be identical.

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

http://ucspowercalc.cisco.com

The power specifications for the supported power supply options are listed in the following sections.

1600 W AC Power Supply

This section lists the specifications for each 1600 W AC power supply (Cisco part number APIC-PSU1-1600W).

Table 9: 1600 W AC Specifications

Description	Specification

AC Input Voltage	Nominal range: 200–240 VAC (Range: 180–264 VAC)
AC Input Frequency	Nominal range: 50 to 60Hz (Range: 47–63 Hz)
Maximum AC Input current	9.5 A at 200 VAC
Maximum input volt-amperes	1250 VA at 200 VAC
Maximum inrush current	30 A 35° C
Maximum hold-up time	80 ms at 1600 W
Maximum output power per PSU	1600 W at 200-240 VAC
Power supply output voltage	12 VDC
Power supply standby voltage	12 VDC
Efficiency rating	Climate Savers Platinum Efficiency (80Plus Platinum certified)
Form factor	RSP2
Input connector	IEC320 C14

1050 W DC Power Supply

This section lists the specifications for each 1050 W DC power supply (Cisco part number UCSC-PSUV2-1050DC).

Table 10: 1050 W DC Specifications

Description	Specification
DC Input Voltage	Nominal range: -48 to -60 VDC (Range: -40 to -72 VDC)
Maximum DC input current	32 A at -40 VDC
Maximum input wattage	1234 W
Maximum inrush current	35 A (sub-cycle duration)
Maximum hold-up time	5 ms at 100% load (1050 W main and 36 W standby)
Maximum output power per PSU	1050 W on 12 VDC main power 36 W on 12 VDC standby power
Power supply output voltage	12 VDC
Power supply standby voltage	12 VDC

Efficiency rating	≥ 92% at 50% load
Form factor	RSP2
Input connector	Fixed 3-wire block

Power Cord Specifications

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

Note Only the approved power cords or jumper power cords listed below are supported.

Table 11: Supported Power Cords

Description	Length (Feet)	Length (Meters)
CAB-48DC-40A-8AWG DC power cord, -48 VDC, 40 A, 8 AWG Three-socket Mini-Fit connector to three-wire	11.7	3.5
CAB-C13-C14-AC AC power cord, 10 A; C13 to C14, recessed receptacle	9.8	3.0
CAB-250V-10A-AR AC power cord, 250 V, 10 A Argentina	8.2	2.5
CAB-C13-C14-2M-JP AC Power Cord, C13 to C14 Japan PSE Mark	6.6	2.0
CAB-9K10A-EU AC Power Cord, 250 V, 10 A; CEE 7/7 Plug Europe	8.2	2.5
CAB-250V-10A-IS AC Power Cord, 250 V, 10 A Israel	8.2	2.5

CAB-250V-10A-CN AC power cord, 250 V, 10 A PR China	8.2	2.5
CAB-ACTW AC power cord, 250 V, 10 A Taiwan	7.5	2.3
CAB-C13-CBN AC cabinet jumper power cord, 250, 10 A, C13 to C14	2.2	0.68
CAB-C13-C14-2M AC cabinet jumper power cord, 250 V, 10 A, C13 to C14	6.6	2.0
CAB-9K10A-AU AC power cord, 250 V, 10 A, 3112 plug, Australia	8.2	2.5
CAB-N5K6A-NA AC power cord, 200/240 V, 6 A, North America	8.2	2.5
CAB-250V-10A-ID AC power Cord, 250 V, 10 A, India	8.2	2.5
CAB-9K10A-SW AC power cord, 250 V, 10 A, MP232 plug Switzerland	8.2	2.5
CAB-250V-10A-BR AC power Cord, 250 V, 10 A Brazil	8.2	2.5
CAB-9K10A-UK AC power cord, 250 V, 10 A (13 A fuse), BS1363 plug United Kingdom	8.2	2.5

CAB-9K12A-NA AC power cord, 125 V, 13 A, NEMA 5-15 plug North America	8.2	2.5
CAB-AC-L620-C13 AC power cord, NEMA L6-20 to C13 connectors	6.6	2.0
CAB-9K10A-IT AC power cord, 250 V, 10 A, CEI 23-16/VII plug Italy	8.2	2.5
R2XX-DMYMPWRCORD No power cord; PID option for ordering server with no power cord	NA	NA