Overview of the Cisco 5400 Enterprise Network Compute System

## About the Cisco 5400 Enterprise Network Compute System

Note The documentation set for this product strives to use bias-free language. For purposes of this documentation set, bias-free is defined as language that does not imply discrimination based on age, disability, gender, racial identity, ethnic identity, sexual orientation, socioeconomic status, and intersectionality. Exceptions may be present in the documentation due to language that is hardcoded in the user interfaces of the product software, language used based on standards documentation, or language that is used by a referenced third-party product.

The Cisco 5400 Enterprise Network Compute System (ENCS) combines routing, switching, storage, processing, and a host of other computing and networking activities into a compact one Rack Unit (RU) box. This high-performance unit achieves this goal by providing the infrastructure to deploy virtualized network functions while at the same time acting as a server that addresses processing, workload, and storage challenges.

Cisco 5400 Series Enterprise Network Compute System Chassis

Chassis - Front Panel

Figure 1: Front Panel of the Cisco 5400 ENCS
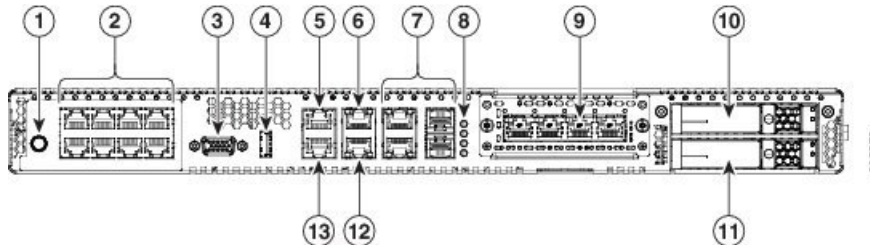
| 1.	Power on/off switch	2	Integrated LAN ports - optional PoE support is available for some models
3	VGA connector	4	USB port
5	Serial console port for CPU	6	Ethernet management port for CPU
7	Front panel Gigabit Ethernet WAN ports	8	LEDs for front panel Gigabit Ethernet WAN ports
9	Network Interface Module (NIM)	10	Drive bay 0
11	Drive bay 1	12	Ethernet management port for CIMC
13	Serial console port for CIMC		

Note   WAN ports must only be used for WAN functions, and LAN ports must only be used for LAN functions. If you require any additional LAN or WAN connectivity with Cisco ISRv or Catalyst 8000v, install the Cisco Network Interface Modules (NIMs).

Chassis - Bezel Side

Figure 2: Bezel View of the Cisco 5400 ENCS
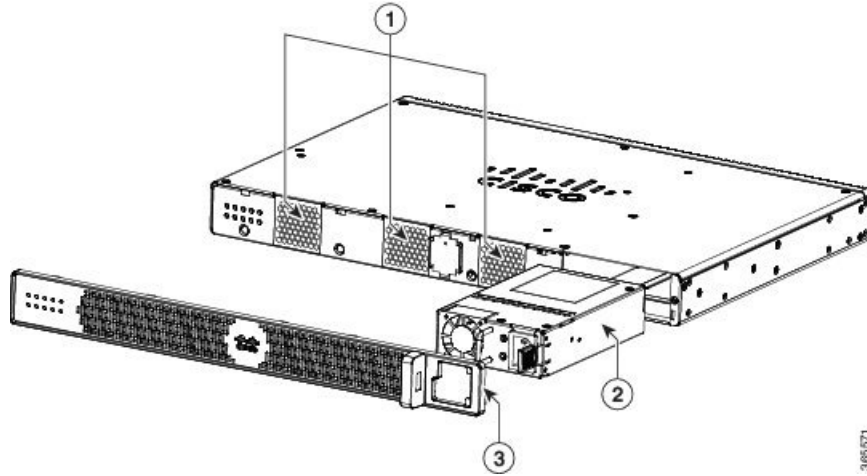
1	Fan vents	2	Modular power supply
3	Removable bezel		

Chassis - Internal View

Figure 3: Internal View of the Cisco 5400 ENCS
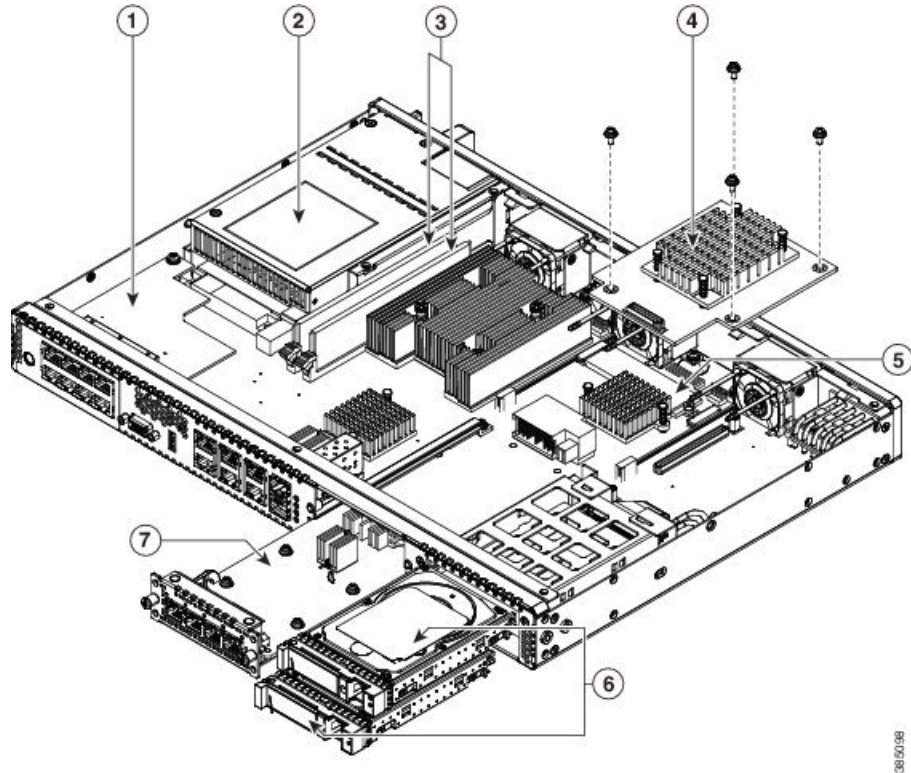
Table 1:

1	PoE daughter card	2	Modular power supply
3	DDR4 DIMM slots on motherboard - 2	4	RAID card
5	M.2 storage module on motherboard	6	Drive bays for hard drives and solid-state drives (SSDs).
7	Network Interface Module		

Safety Warnings

Danger IMPORTANT SAFETY INSTRUCTIONSThis 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 1071SAVE THESE INSTRUCTIONS

Danger Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040

Danger Only trained and **qualified personnel should be allowed** to install, replace, or service this equipment. Statement 1030

Warning Read the installation instructions before you connect the system to its power source. Statement 1004

Warning Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040

Warning Installation of the equipment must comply with local and national electrical codes. Statement 1074

Warning To comply with the Class A emissions requirements shielded twisted pair T1/E1 cables must be used for SPA-8-Port Channelized T1/E1 SPA (SPA-8XCHT1/E1) on the router. EN55022/CISPR22 Statement

Warning   To comply with Class A emissions requirements- shielded management Ethernet, CON, and AUX cables on the router must be used.

Warning   Power cable and AC adapter - When installing the product, please use the provided or designated connection cables/power cables/AC adaptors. Using any other cables or adapters could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of certified cables (that have the 'UL' shown on the code) for any other electrical devices than products designated by Cisco. The use of cables that are certified by Electrical Appliance and Material Safety Law (that have 'PSE' shown on the code) is not limited to Cisco-designated products. Statement 371

Warning   This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: AC power supplies for the Cisco 4451-X ISR. Statement 1005

Warning   This unit may have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028

Warning   This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024

Warning   Class 1 LED product. Statement 1027

Warning   Class I(CDRH) and Class 1M (IEC) laser products. Statement 1055

⚠ **Warning** Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. Statement 1056

Fiber type and Core diameter (μm)	Wavelength (nm)	Max. Power (mW)	E
SM 11	1200 - 1400	39 - 50	
MM 62.5	1200 - 1400	150	
MM 50	1200 - 1400	135	
SM 11	1400 - 1600	112 - 145	

⚠ **Warning** There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Statement 1015

⚠ **Warning** To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 40 degrees C. Statement 1047

⚠ **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

⚠ **Warning** This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028

Warning Hazardous network voltages are present in WAN ports regardless of whether power to the unit is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the unit first. Statement 1026

Warning Before opening the unit, disconnect the telephone-network cables to avoid contact with telephone-network voltages. Statement 1041

Warning Do not use this product near water; for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool. Statement 1035

Warning Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Statement 1036

Warning No user-serviceable parts inside. Do not open. Statement 1073

Warning Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Statement 1037

Warning Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning. Statement 1038

Warning To report a gas leak, do not use a telephone in the vicinity of the leak. Statement 1039

Hardware Features - Standard

- **Integrated LAN ports:** There are eight integrated LAN ports. These ports can provide Power over Ethernet (PoE) if you have purchased a model that supports PoE power supply. These ports must only be used for LAN functions.
- **Integrated WAN ports:** There are 2 to 4 Gigabit Ethernet (GE) WAN ports (dual-mode RJ-45 and SFP). These ports must only be used for WAN functions.
- **USB 3.0 port:** You can use this port to connect a mouse, keyboard, or any other USB device. Using a USB hub, you can connect more than one USB device to this port. Because this port is backward compatible, you can also use an older version of USB devices on this port.

- **VGA connector:** You can use this port to connect a monitor to the device. It supports a display resolution of up to 1600 x 1200 16bpp @ 60Hz.

- **Ethernet management port for CIMC:** Cisco Integrated Management Controller (CIMC) is the component in the device that monitors the health of the entire system.

- **Ethernet management port for CPU:** Use this port to connect to the CPU in your device.

- **Front panel Gigabit Ethernet ports:** This is a set of two dual ports. For each RJ45 port, there is a corresponding fiber optic port. At a given time, the user can use either the RJ45 connection or the corresponding fiber optic port.

- **Serial console port for CPU:** This serial port provides a connection to initially configure the main system's CPU, including the NFVIS software that runs there, using a traditional serial terminal. The terminal should be configured for 9600 8-N-1.

- **Serial Console port for CIMC:** This serial port provides a connection to initially configure the CIMC using a traditional serial terminal. The terminal should be configured for 9600 8-N-1.

Note The speed and duplex configurations are dependent on the peer configuration. If the peer is set at a certain speed and duplex, NFVIS port is set to match that speed. Not all ports on ENCS 5000 series hardware devices support Automatic medium-dependent interface crossover (auto-MDIX) feature. Based on the port connected to the ENCS device, the cable type used to connect to the peer and the speed or duplex settings on the peer, you can try straight through and cross over cable.

LEDs for Gigabit Ethernet WAN Ports

The front panel Gigabit Ethernet WAN ports GE0-0 and GE0-1 (numbered 7 in Figure 1) are a set of two dual ports: for every RJ45 port, there is a corresponding fiber optic port. There are four LEDs for the front panel Gigabit Ethernet ports (numbered 8 in Figure 1). The first two LEDs are for the first set of ports and the last two LEDs are for the second set of ports. If both RJ45 and fiber optic ports are enabled when the system boots, the fiber optic port is used and the RJ45 port is disabled.

Figure 4: LEDs for Gigabit Ethernet WAN Ports
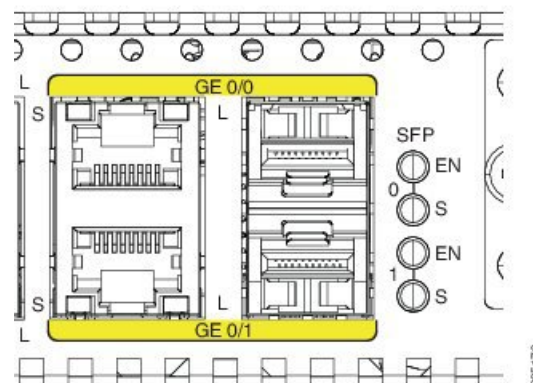
The LEDs labeled **EN** indicates whether the corresponding ports are enabled.

The frequency of the blinks of the LEDs labeled **S** shows the speed of the corresponding ports. This table maps the blink frequency of a LED to the speed of the corresponding port.

Blink Frequency	Speed
No blink	No link
1 blink	10Mbps
2 blinks	100Mbps
3 blinks	1000Mbps

Front Panel LED Status
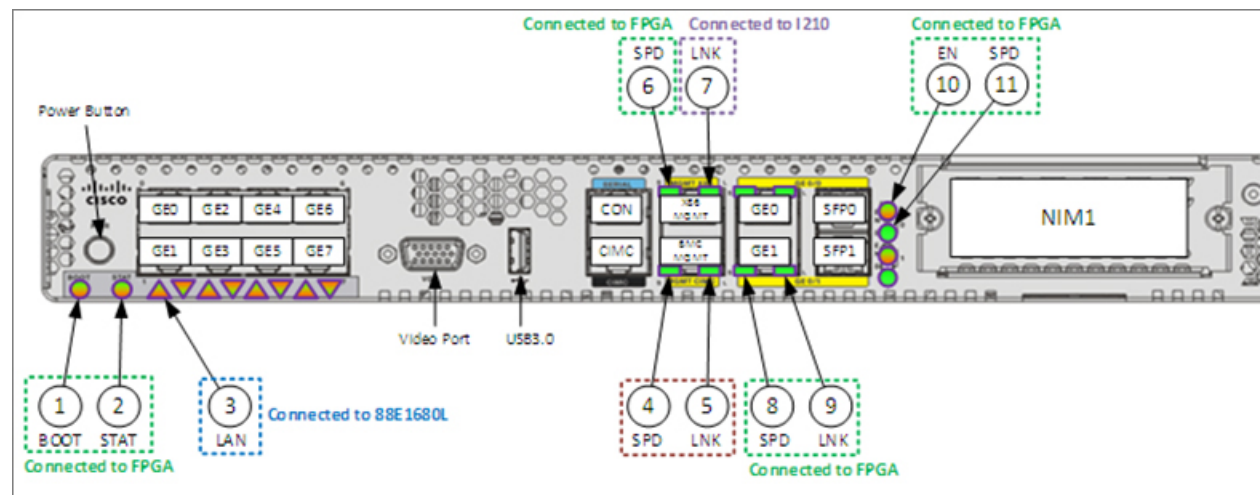
Table 2: Front Panel LED Status

No.	LED Label	Color	Behavior
1	System boot LED	Amber	BMC boot complete, Intel powered down
		Blinking amber	BMC booting, Intel powered down
		Green	BMC boot complete, Intel powered up
		Blinking green	BMC rebooting, Intel powered up
2	System status LED	Amber	A fault is detected in the system.
		Green	Normal system operation.

No.	LED Label	Color	Behavior
3	LAN port	Blinking green	TXD/RXD data.
		Amber	POE fault, implies no link.
4	BMC management port speed LED	Blinking green	Blink frequency indicates port speed: 1 blink - 10 Mbps link speed 2 blink - 100 Mbps link speed 3 blink - 1000 Mbps link speed
5	BMC management port link LED	Green	Ethernet cable present and link established
6	Management port speed LED	Blinking green	Blink frequency indicates port speed: 1 blink - 10 Mbps link speed 2 blink - 100 Mbps link speed 3 blink - 1000 Mbps link speed
7	Management port link LED	Green	Ethernet cable present and link established
8	WAN port speed LED	Blinking green	Blink frequency indicates port speed: 1 blink - 10 Mbps link speed 2 blink - 100 Mbps link speed 3 blink - 1000 Mbps link speed
9	WAN port link LED	Green	Ethernet cable present and link established
10	WAN port SFP enable LED	Green	Indicates SFP module detected
		Amber	Indicates SFP is not detected or at fault

No.	LED Label	Color	Behavior
11	WAN port SFP speed LED	Blinking green	Blink frequency indicates port speed: 3 blink - 1000 Mbps link speed
12	HDD status LED	Green	HDD present
		Blinking green	HDD is in rebuilt state.
		Amber	HDD is in a fault state
		Blinking amber	HDD is in a PFA alert state
13	HDD activity LED	Blinking green	The hard drive is reading or writing data.

Bazel Side LED Status
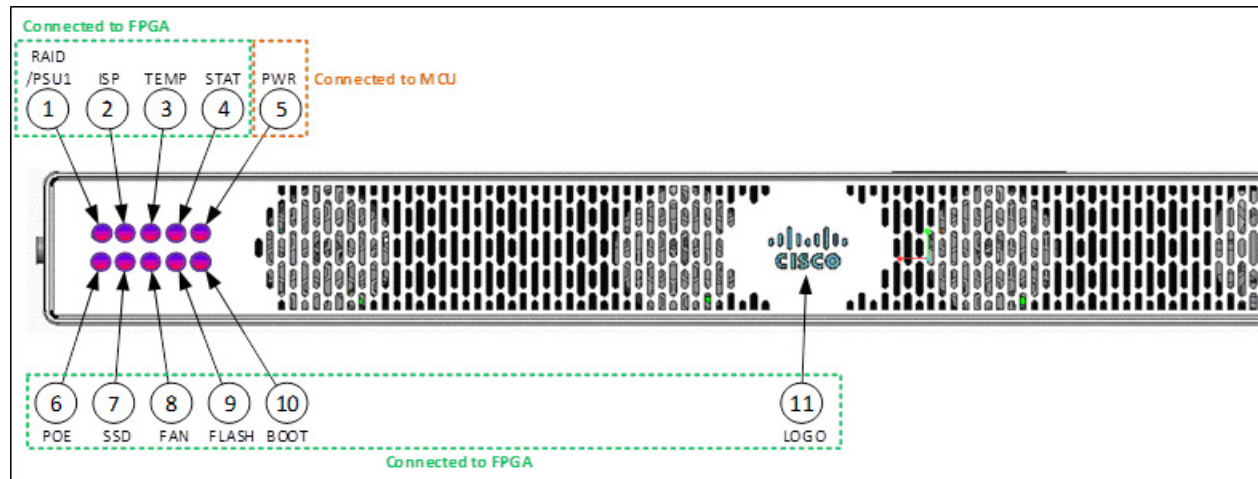
Table 3: Bazel Side LED Status

No.	LED Label	Color	Behavior
1	RAID status	Blue	RAID card is present and working
		Amber	RAID card is present and not operating
2	Integrated services processor status	Blue	Present and functioning
		Amber	Present and not functioning or faulted

No.	LED Label	Color	Behavior
3	Temperature status	Blue	All temperature sensors in the system are working
		Amber	One or two temperature sensors are not working
4	System status	Blue	Normal system operations
		Amber	A fault has been detected in the system.
5	System power	Blue	System power is ok.
		Blinking amber	System is powering up.
6	Power supply with PoE status	Blue	PSU on and providing power.
		Amber	PSU is on but in power failure condition
7	SSD slot status	Blue	Present.
		Amber	Present with failure.
8	Fan status	Blue	All fans are operating.
		Amber	One fan has stopped working.
		Blinking amber	Two or more fans have stopped.
9	eMMC/SD flash status	Blinking blue	Present and currently being used
		Amber	Fault detected
10	eMMC/SD flash status	Blue	BMC boot is complete, intel is powered up
		Blinking Blue	BMC is rebooting, intel is powered up
		Amber	BMC boot is complete, intel powered down.
		Blinking amber	BMC is booting, intel powered down.
11	Cisco logo	Blue	System is powered on.
12	PSU failure	Amber	PSU in failure mode.

Hardware Features - Replaceable and Upgradable Units

The replaceable and upgradable units of the Cisco 5400 ENCS are:

- **Power supply:** The power supply provides AC power. The ENCS5406/K9 device supports only the non-PoE power supply option. This means the LAN ports of this device cannot provide Power over Ethernet (PoE). The ENCS5408/K9 and ENCS5412/K9 devices support both the PoE and non-PoE power supply options. If you want to upgrade from a non-POE power supply to a POE power supply, you can do that by replacing the power supply unit. The reverse is also possible - replacing a POE power supply with a non-POE power supply. The power supply can supply a total of 250 watts of inline power across the 8 PoE capable ports in the system; a maximum of 30 watts of PoE power per port and 60 watts of UPoE power per port.

- **Network Interface Module (NIM):** You can install a NIM in the NIM slot. Similarly when not needed, you can remove the NIM from the NIM module. The device supports only one NIM at a time. The following NIMs are currently supported:

Table 4: Supported NIMs

NIM	Product Module	Minimum Software
LTE	NIM-4G-LTE-VZ	NFVIS 3.6.1 ISRv 16.6.1
	NIM-4G-LTE-ST	
	NIM-4G-LTE-NA	
	NIM-4G-LTE-GA	
	NIM-4G-LTE-LA	
	NIM-LTEA-EA	
	NIM-LTEA-LA	
T1/E1 Data	NIM-1MFT-T1/E1	NFVIS 3.6.1 ISRv 16.6.1
	NIM-2MFT-T1/E1	
	NIM-4MFT-T1/E1	
	NIM-8MFT-T1/E1	
	NIM-1CE1T1-PRI	
	NIM-2CE1T1-PRI	
	NIM-8CE1T1-PRI	
Asynchronous	NIM-16A	NFVIS 3.8.1 ISRv 16.8.1
	NIM-24A	

NIM	Product Module	Minimum Software
T1/E1 Voice	Same as T1/E1 Data PID List	NFVIS 3.9.1 ISRv 16.9.1
DSL	NIM-VA-B	NFVIS 3.9.1 ISRv 16.10.1
	NIM-VAB-A	
	NIM-VAB-M	
GE	NIM-1GE-CU-SFP	NFVIS 3.9.1 ISRv 16.9.1
	NIM-2GE-CU-SFP	

For more information on how to configure the voice module NIMs, refer Configuring the Cisco Fourth-Generation T1/E1 Voice and WAN Network Interface Module

- **Drive bays:** There are two drive bays. You can choose to use one of them, both of them, or none of them. The types of storage modules that each of these bays can currently hold are:

    - 480GB 2.5" SATA SSD

    - 960GB 2.5" SATA SSD

    - 1TB 2.5" SATA HDD

    - 2TB 2.5" SATA HDD

> **Note** This list shows the storage modules that are currently supported. More types of storage modules may be supported in the future.

- **M.2 storage module:** This is a high capacity storage component on the motherboard. The OS is installable in this module. The storage capacity of this module is upgradeable. The different storage capacities that are currently available for this module are 64GB, 100GB, 200GB, and 400GB. Other storage capacities might be made available in the future.

- **DDR4 DIMM Slots:** There are two DDR4 dual in-line memory module (DIMM) slots on the motherboard. Each slot can hold 8 GB, 16 GB, or 32 GB memory module. The memory module in each of the slots can be upgraded to a maximum of 32 GB. As a result, you can have a maximum capacity of 64 GB DIMM.

- **RAID Card:** The RAID card improves the performance of the hard drive. The RAID card is installed in the Internal Service Processor (ISP) module of the motherboard.

- **RMA:** Return Material Authorization (RMA) Support allows you to move M.2 SSD, memory, disk drives, RAID card, NIM, and power supply from one system to another system while keeping the configuration and data. This feature is supported of like-to-like systems and the two systems must have the same versions of firmware. In case the two systems do not have the same versions of firmware, you can upgrade the firmware after swapping the hardware components. The following firmware versions are supported in RMA:

Table 5:

	firmware compatible case		firmware incompatible case	
	original system	new system	original system	new system
FPGA	1.6	1.6	1.6	1.4
BIOS	2.4	2.4	2.4	1.2
CIMC	3.2.3	3.2.3	3.2.3	3.1.4

Models

The Cisco 5400 ENCS is available in these models:

Product ID	Description
ENCS5406/K9	This device has a 6 core CPU. This system does not support a PoE power supply.
ENCS5408/K9	This device has an 8 core CPU.
ENCS5412/K9	This device has a 12 core CPU.

Note With the exception of the CPU capacity and the power supply unit, all other hardware features (standard, replaceable and upgradable) are common across all models.

Table 6: Service Spares

Product ID
ENCS5406P/K9
ENCS5408P/K9
ENCS5412P/K9

Note Service spares are chassis with no memory or disk.

SFP Modules

This section provides information on Cisco Small Form-Factor Pluggable (SFP) Modules in Cisco ENCS 5400. The switch Gigabit Ethernet SFP and SFP+ modules provide copper or optical connections to other

devices. These modules are hot-swappable and provide the uplink interfaces. The SFP modules have fiber-optic LC connectors or RJ-45 copper connectors.

Use only supported SFP modules on the switch. Each module has an internal serial EEPROM that is encoded with security information.

Note If non-supported SFP is plugged into the system, you need to reboot the system after removing the non-supported SFP for other SFPs to work normally.

Caution Pluggable optical modules comply with IEC 60825-1 Ed. 3 and 21 CFR 1040.10 and 1040.11 with or without exception for conformance with IEC 60825-1 Ed. 3 as described in Laser Notice No. 56, dated May 8, 2019. Statement 1255

The Cisco ENCS 5400 supports the following SFP modules:

Part Number	Description
GLC-LH-SMD	Cisco 1000BASE-LX/LH SFP module for MMF [1] and SMF, 1300-nm wavelength, commercial operating temperature range.
GLC-SX-MMD	Cisco 1000BASE-SX SFP module for MMF, 850-nm wavelength, extended operating temperature range.
SFP-GE-S	Cisco 1000BASE-SX SFP module for MMF, 850-nm wavelength, extended operating temperature range.

1 A mode-conditioning patch cord, as specified by the IEEE standard, is required. Using an ordinary patch cord with MMF, 1000BASE-LX/LH SFP transceivers, and a short link distance can cause transceiver saturation, resulting in an elevated bit error rate (BER). When using the LX/LH SFP transceiver with 62.5-micron diameter MMF, you must also install a mode-conditioning patch cord between the SFP transceiver and the MMF cable on both the sending and receiving ends of the link. The mode-conditioning patch cord is required for link distances greater than 984 feet (300 m).