

vEdge 5000 Router

The vEdge 5000 router delivers highly secure site-to-site data connectivity to large enterprises, offers interface modularity, and provides the following features:

- 1RU, standard rack mountable in a 19-inch rack
- Support for AC input power
- Four pluggable Network Interface Module (NIM) slots that support three types of NIMs:
  - 8x1-Gigabit Ethernet SFP NIM (Model: NIM-8-1GE-SFP)
  - 8x1-Gigabit Ethernet Copper Rj45 NIM (Model: NIM-8-1GE-RJ45)
  - 4x10-Gigabit Ethernet SFP+ NIM (Model: NIM-4-10GE-SFPP)
- Encryption and QoS support
- Secure identification chip for anti-counterfeit and secure authentication
- Redundant hot-swappable fan tray modules
- Dual redundant hot-swappable power supply slots
- Front-to-back cooling

Chassis Views

The following figures show the front and back panels of the vEdge 5000 router, indicating the location of the power interfaces, module slots, status indicators, and chassis identification labels.

Figure 1: Front Panel of the vEdge 5000 Router

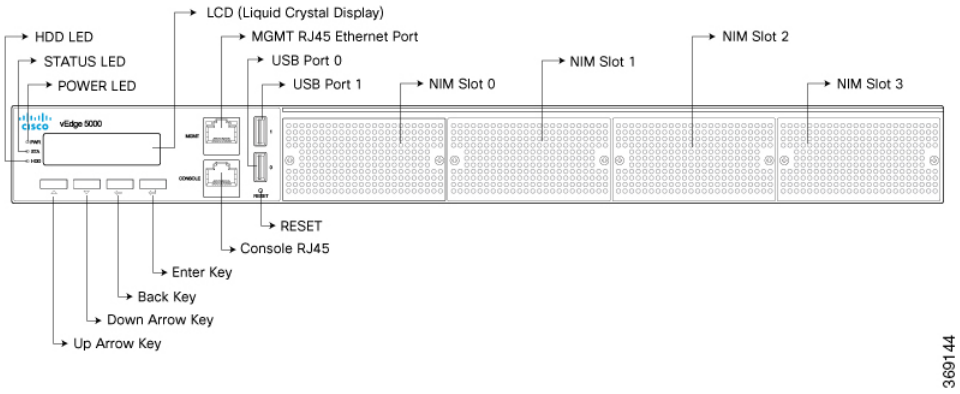
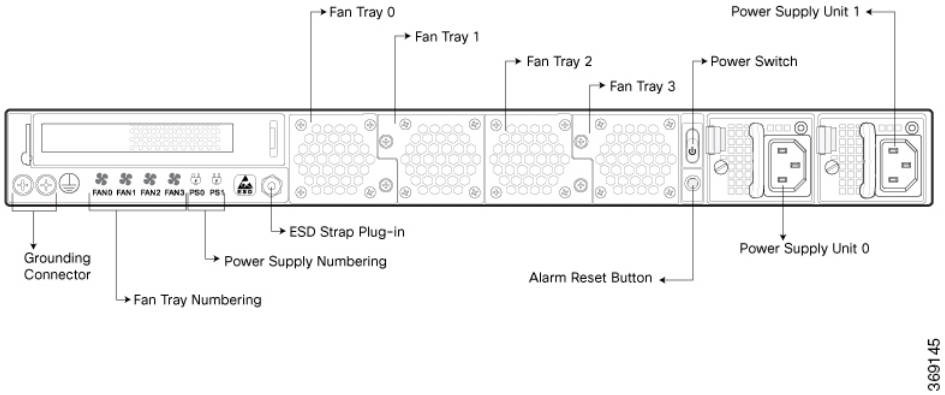


Figure 2: Back Panel Slots and Connectors of the vEdge 5000 Router



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- Maintenance and Troubleshooting, on page 41

Declaration of Conformity

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Components and Specifications

This article provides the chassis specifications of the vEdge 5000 router and lists the other router components.

Chassis Specifications

The following table lists the specifications for the vEdge 5000 router chassis.

Table 1: vEdge 5000 Router Chassis Specifications

Item	Specification
Services and Slot Density	
Fixed traffic ports	None
Network Interface Module (NIM) slots	4
Embedded hardware-based crypto acceleration (IPSec)	Yes
Memory DDR4 ECC DRAM	32 GB
SATA SSD flash storage (internal)	128 GB
External USB Ports (Type A USB 2.0)	2
Serial console port (RJ-45 default 115.2 Kbps)	1
Management Ethernet port (RJ-45 10/100/1000 Mbps)	1
LCD panel with keypad	1
Power supply option	Hot-swappable Power Supply Units (PSUs)
Redundant power supply support	Active–Active redundancy
Power Specifications	
AC input voltage	100-240 Volts

Item	Specification
AC input line frequency	50-60 Hz
Maximum power consumption	285 Watts
Physical Specifications	
Chassis height	1.73 in. (4.4 cm)
Chassis width	Chassis only: 17.2 in. (43.8 cm) Chassis with mounting brackets attached: 19 in. (48.2 cm)
Chassis depth	22.83 in. (58 cm)
Rack height	1 RU
Rack-mount accessory kit 19 in (48.3 cm)	Provided with the unit
Weight	Chassis only: 36.3 lb (16.5 kg) Chassis with packaging: 40 lb (18 kg)
Airflow	Front to back
Packaging Specifications	
Package height	9 in. (22.86 cm)
Package width	24 in. (60.96 cm)
Package depth	31 in. (78.74 cm)
Operating Condition	
Temperature	0 to 40°C (32 to 104°F) at sea level (temperature de-rating of 1.5 deg C per 1000 feet of altitude applicable up to max of 10000 feet or 3000 m)
Altitude	Max 3000 m (10000 ft)
Humidity	10 to 85% RH
Transportation/Storage Condition	
Temperature	-40 to 70°C (-40 to 158°F)
Humidity	5 to 95%RH
Altitude	4570 m (15000 ft)
Reliability	
MTBF	178K hours

Item	Specification
Regulatory Compliance	
Safety	CE Marketing CAN/CSA C22.2 No. 60905-1-07 UL60950-1
EMC	EN 550332: 2012+AC: 2013 Class A AS/NZS CISPR 32: 2015 CISPR32: 2015 EN55024: 2012 +A1: 2015 EN61000-3-2: 2014 CLASS A EN61000-3-3: 2013 FCC PART 15, SUBPART B ANSI C63, 4-2014 ICES-003 ISSUE 6: 2016 CISPR 22: 2008 CAN/CSA-CISPR 22-10
Environmental	ROHS

Front and Rear Panel Components

This article describes the components on the front and rear panels of the vEdge 5000 router. For the exact location of these components on the router, see At a Glance.

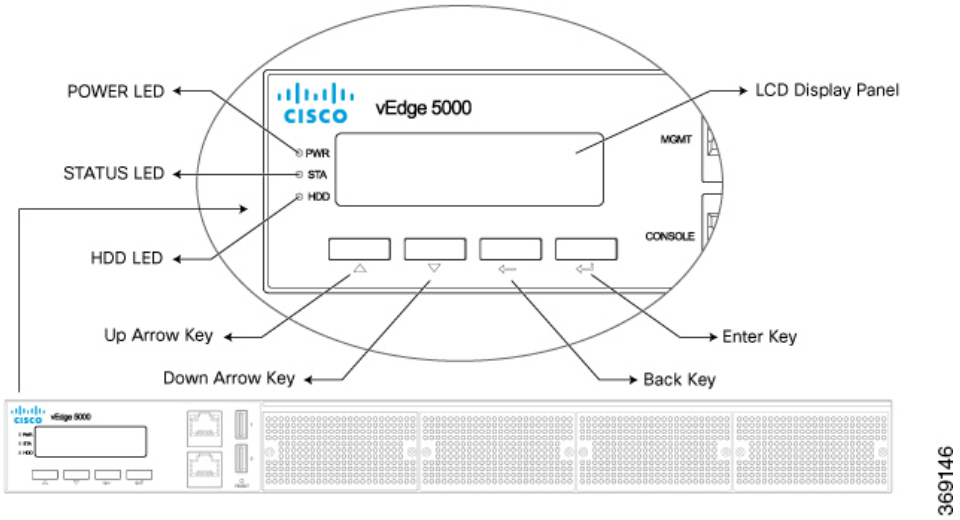
Front Panel

The front panel of the vEdge 5000 router has three status LEDs, a reset button, and the LCD panel and keypad.

LEDs

The vEdge 5000 router has three chassis status LEDs located in the left-hand corner of the front panel.

Figure 3: Chassis Status LEDs in a vEdge 5000 Router



The following table describes the LEDs , their color and states, and the status they indicate.

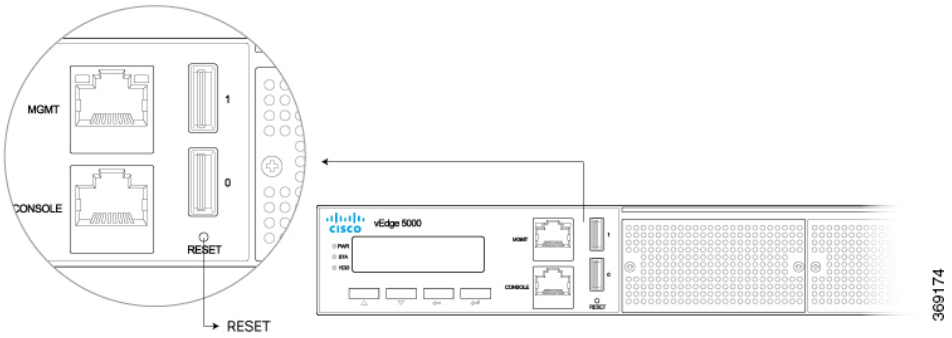
Table 2:

LED	Color	Description
STA	Green/Amber	• Off: System is not powered on • Blinking Amber: System is booting up • Blinking Green: System has booted but OMP is down • Solid green: System is up and running and OMP is up • Solid Amber: System software is down or an alarm is present
PWR	Green	• Off: System is not powered on • Green: System is powered on
HDD	Green	• Off: System is not powered on or there is no HDD activity • Blinking Green: SSD disk activity is ongoing

Reset Button

The front panel of the vEdge 5000 router has a reset button. The reset button is recessed to avoid accidentally pressing it while the router is operational.

Figure 4: Reset Button on the vEdge 5000 Router



To press the reset button, use a sharp narrow tool. The following table describes the effects of pressing the reset button.

Table 3:

Press Duration	Behavior
Short press	Pressing for two seconds resets and reboots the router.
Long press	Pressing for 10 seconds resets the router and reboots it with factory default configuration.

LCD Panel and Key Pad

The LCD panel displays status information about the state of the system. It also provides some boot control options while the system is booting up. The key pad consists of the following buttons:

- Up arrow
- Down arrow
- Back
- Enter

Rear Panel

The rear panel of the vEdge 5000 router has a power button and an alarm reset button.

Power Button

To gracefully shutdown the vEdge 5000 router, briefly press the power button on the rear panel. If pressed for 5 seconds, the router will be forced to shutdown ungracefully.

Alarm Button

The alarm button is located directly beneath the power button. If a power supply in the vEdge 5000 router fails or is not plugged in, the router raises an alarm. To cancel the alarm until the next reboot, press the alarm button.

NIM and Transceiver Modules

This article describes the Network Interface Modules (NIMs) for the vEdge 5000 router as well as the SFP and SFP+ transceivers for those NIMs.

NIMs for the vEdge 5000 Router

The vEdge 5000 router offers interface modularity, providing four NIM slots that support three types of NIMs:

- 8x1-Gigabit Ethernet SFP NIM (Model: NIM-8-1GE-SFP)
- 8x1-Gigabit Ethernet Copper Rj45 NIM (Model: NIM-8-1GE-RJ45)
- 4x10-Gigabit Ethernet SFP+ NIM (Model: NIM-4-10GE-SFPP)

The four NIM slots are labeled NIM Slot 0 to NIM Slot 3. You can install any combination of the above three NIM types in the four available NIM slots.

The following figures show the front panel of the 8x1-Gigabit Ethernet SFP NIM, 8x1-Gigabit Ethernet Copper Rj45 NIM, and 4x10-Gigabit Ethernet SFP+ NIM, respectively.

Figure 5: Front Panel of 8x1-Gigabit Ethernet SFP NIM

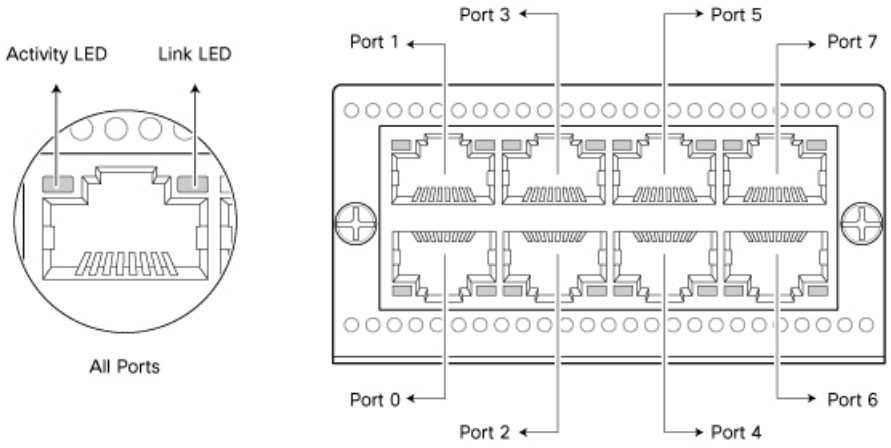


Figure 6: Front Panel of 8x1-Gigabit Ethernet Copper Rj45 NIM

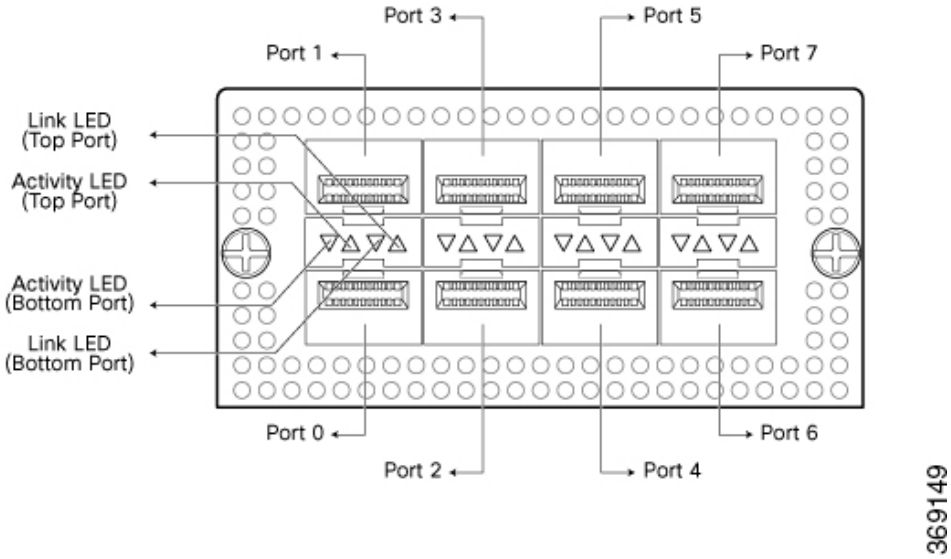
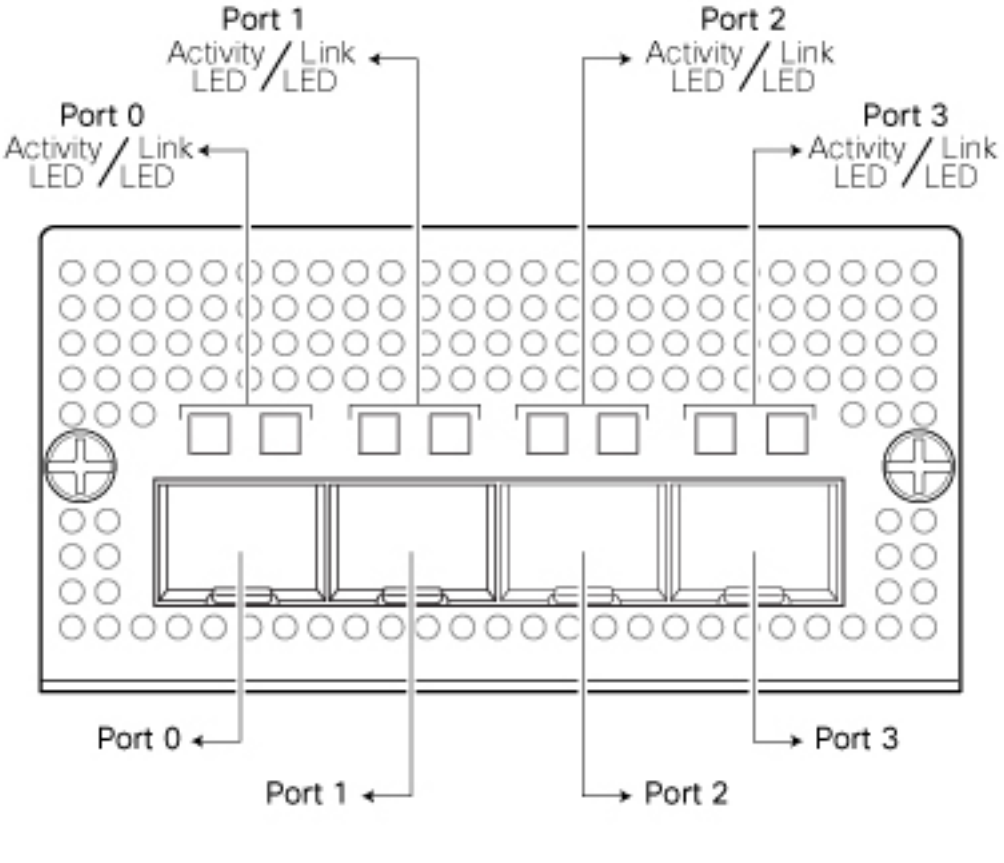


Figure 7: Front Panel of 4x10-Gigabit Ethernet SFP+ NIM



Supported Transceiver Modules

The network ports on the 8x1-Gigabit Ethernet SFP NIM support SFP transceivers. The 10-Gigabit Ethernet ports on the 4x10-Gigabit Ethernet SFP+ NIM support SFP+ transceivers.

This section describes the optical interfaces supported for the SFP and SFP+ transceivers and the copper interfaces supported for the SFP transceivers.

Note It is recommended that you use the optical transceivers and optical connectors purchased from Cisco for your vEdge routers.

The tables below describe the optical interface support over single-mode fiber-optic (SMF) and multimode fiber-optic (MMF) cables for SFP and SFP+ transceivers and over the copper interface for SFP transceivers.

Table 4:

Ethernet Standard	Specification	Value
1000 BASE-T	Model Number	SFP-1GE-Base-T
	Rate	10/100/1000 Mbps
Connector Type	RJ-45	
Fiber Count	N/A	
Transmitter Wavelength	N/A	
Minimum Launch Power	N/A	
Maximum Launch Power	N/A	
Minimum Receiver Sensitivity	N/A	
Maximum Input Power	N/A	
Cable Type	Copper	
Distance	100 m (328 ft)	
DOM Support	Not available	
1000 BASE-SX	Model Number	SFP-1GE-SX
	Rate	1000 Mbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	850 nm	
Minimum Launch Power	-9.5 dBm	
Maximum Launch Power	-3 dBm	
Minimum Receiver Sensitivity	-21 dBm	
Maximum Input Power	0 dBm	
Fiber Type	MMF	
Distance	220 m (721 ft) to 550 m (1804 ft) depending on fiber core size/modal bandwidth specification	
DOM Support	Available	
1000 BASE-LX	Model Number	SFP-1GE-LX

Ethernet Standard	Specification	Value
	Rate	1000 Mbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	1310 nm	
Minimum Launch Power	-9.5 dBm	
Maximum Launch Power	-3 dBm	
Minimum Receiver Sensitivity	-25 dBm	
Maximum Input Power	-3 dBm	
Fiber Type	SMF	
Distance	10 km (6.2 miles)	
DOM Support	Available	
1000 BASE-EX	Model Number	SFP-1GE-EX
	Rate	1000 Mbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	1310 nm	
Minimum Launch Power	-14 dBm	
Maximum Launch Power	-8 dBm	
Minimum Receiver Sensitivity	-45 dBm	
Maximum Input Power	-3 dBm	
Fiber Type	SMF	
Distance	40 km (24.8 miles)	
DOM Support	Available	

Table 5:

Ethernet Standard	Specification	Value
10G BASE-SR	Model Number	SFP+-1GE-SR

Ethernet Standard	Specification	Value
	Rate	10 Gbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	850 nm	
Minimum Launch Power	-7.3 dBm	
Maximum Launch Power	-1 dBm	
Minimum Receiver Sensitivity	-9.9 dBm	
Maximum Input Power	-1 dBm	
Fiber Type	MMF	
Distance	26 m (85 ft) to 300 m (984 ft) depending on fiber core size/modal bandwidth specification	
DOM Support	Available	
10G BASE-LR	Model Number	SFP+-1GE-LR
	Rate	10 Gbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	1310 nm	
Minimum Launch Power	-8.2 dBm	
Maximum Launch Power	0.5 dBm	
Minimum Receiver Sensitivity	-18 dBm	
Maximum Input Power	0.5 dBm	
Fiber Type	SMF	
Distance	10 km (6.2 miles)	
DOM Support	Available	

Supported Transceivers

This article provides a list of copper and fiber transceivers that have been tested and qualified for use in vEdge 1000 and vEdge 2000 routers. You can order the transceivers that have a Viptela part number in the tables below directly from Viptela.

Table 6:

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge 5000 Router	Description
Finisar FCLF-8521-3	SFP-1GE-Base-T	X	X	X	• Small form-factor pluggable (SFP) transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Finisar FCLF8521P2BTL	SFP-1GE-Base-T	X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Cisco-Avago SFBR-5766PZ-CS2		X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Bel-Fuse 1GBT-SFP05		X	X		• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Avago ABCU-5710RZ		X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Cisco GLC-T1000BASE-T		X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet

Table 7:

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge5000 Router	Description
Avago AFBR-5710PZ		X	X	X	• Small form-factor pluggable (SFP) transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 1-Gbps applications
Avago AFCT-5710PZ		X	X	X	• SFP transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 1-Gbps applications
Finisar FTLF1318P3BTL	SFP-1GE-LX	X	X	X	• SFP transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 1-Gbps applications
Cisco-Finisar FTLF8519P2BCL-C4		X	X	X	• SFP transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 1-Gbps applications
Finisar FTLF8519P3BNL	SFP-1GE-SX	X	X	X	• SFP transceiver • LC-type connector • Short-reach 850-nm optics for multi-mode fiber for 1-Gbps applications
Finisar FTLX8574D3BCL	SFP+-10GE-SR		X	X	• SFP+ transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 10-Gbps applications

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge 5000 Router	Description
Finisar FTLX8571D3BCV			X	X	• SFP+ transceiver • LC-type transceiver • Short-reach 850-nm optics for multi-mode fiber for dual-rate 1 Gbps/10 Gbps applications **Note** : The SFP+ ports of the 10-Gigabit Ethernet PIM support a rate of 10 Gbps only. 1 Gbps is not supported.
Finisar FTLX1471D3BCV			X	X	• SFP+ transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for dual-rate 1 Gbps/10 Gbps applications **Note**: The SFP+ ports on the 10-Gigabit Ethernet PIM support a rate of 10 Gbps only. 1 Gbps is not supported.
Finisar FTLX1471D3BCL	SFP+-10GE-LR		X	X	• SFP+ transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 10-Gbps applications

Ports and Connectors

The vEdge 5000 router supports three types of ports: network ports, management port, and console port.

Network Ports (SFP Ports)

The 8x1-Gigabit Ethernet SFP NIM module support 1-Gbps SFP module. The 4x10-Gigabit Ethernet SFP+ NIM module supports 10-Gbps SFP+ module.

The following table provides the pinout information for the NIM SFP/SFP+ port connector. The SFP/SFP+ ports comply with the SFP/SFP+ MSA standards.

Table 8:

Pin	Signal	Description
1	VeeT	Module transmitter ground

Pin	Signal	Description
2	TX_Fault	Module transmitter fault
3	TX_Disable	Transmitter disable
4	SDA	Two-wire serial interface data line
5	SCL	Two-wire serial interface clock
6	MOD_ABS	Module absent
7	RS0	Rate select 0; optionally controls SFP+ module receiver
8	RX_LOS	Receiver loss of signal indication
9	RS1	Rate select 1; optionally controls SFP+ transmitter
10	VeeR	Module receiver ground
11	VeeR	Module receiver ground
12	RD-	Receiver inverted data output
13	RD+	Receiver non-inverted data output
14	VeeR	Module receiver ground
15	VccR	Module receiver 3.3-V supply
16	VccT	Module transmitter 3.3-V supply
17	VeeT	Module transmitter ground
18	TD+	Transmitter non inverted data input
19	TD-	Transmitter inverted data input
20	VeeT	Module transmitter ground

Network Port LEDs

Each network port on the vEdge 5000 router has two LEDs—the activity LED and the link LED. See the following figures.

Figure 8: LEDs on the 8x1GE Copper Rj45 NIM

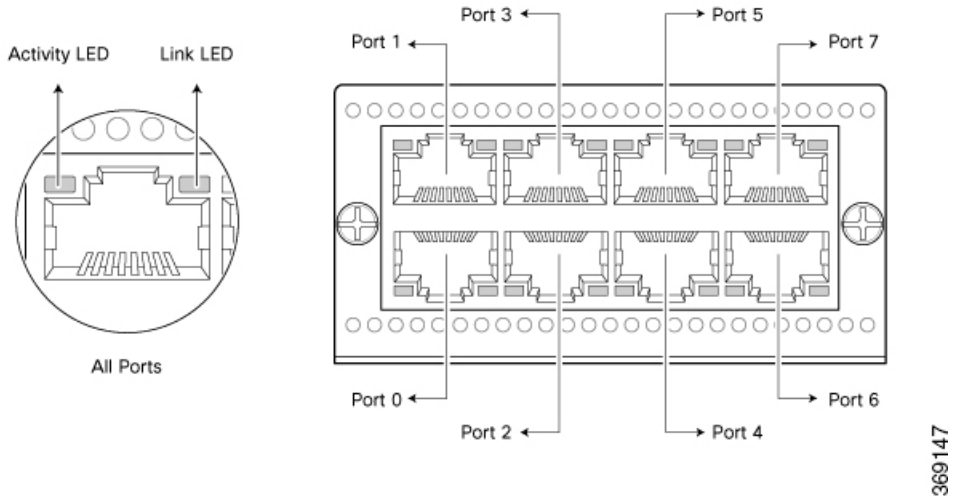


Figure 9: LEDs on the Network Ports on an 8x1GE SFP NIM

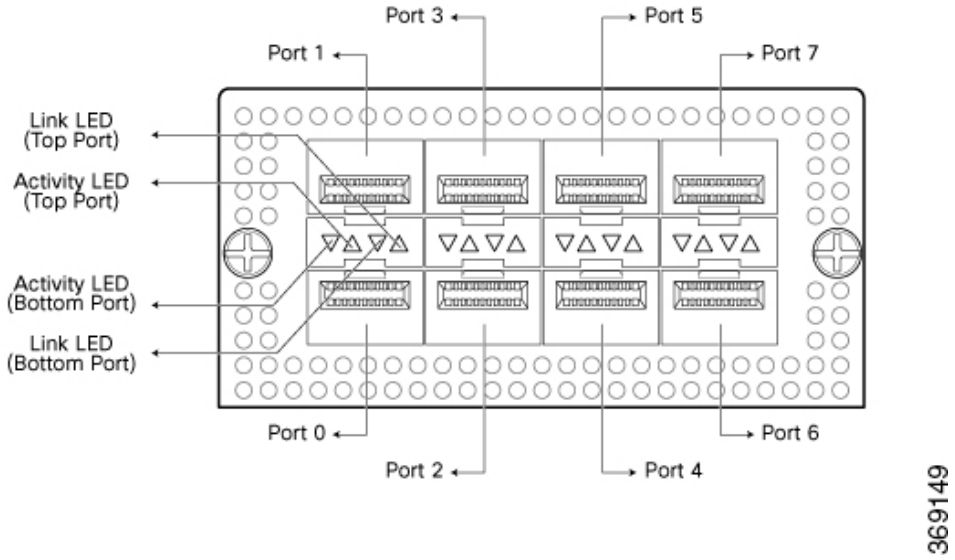


Figure 10: LEDs on the Network Ports on a 4x10GE SFP+ NIM

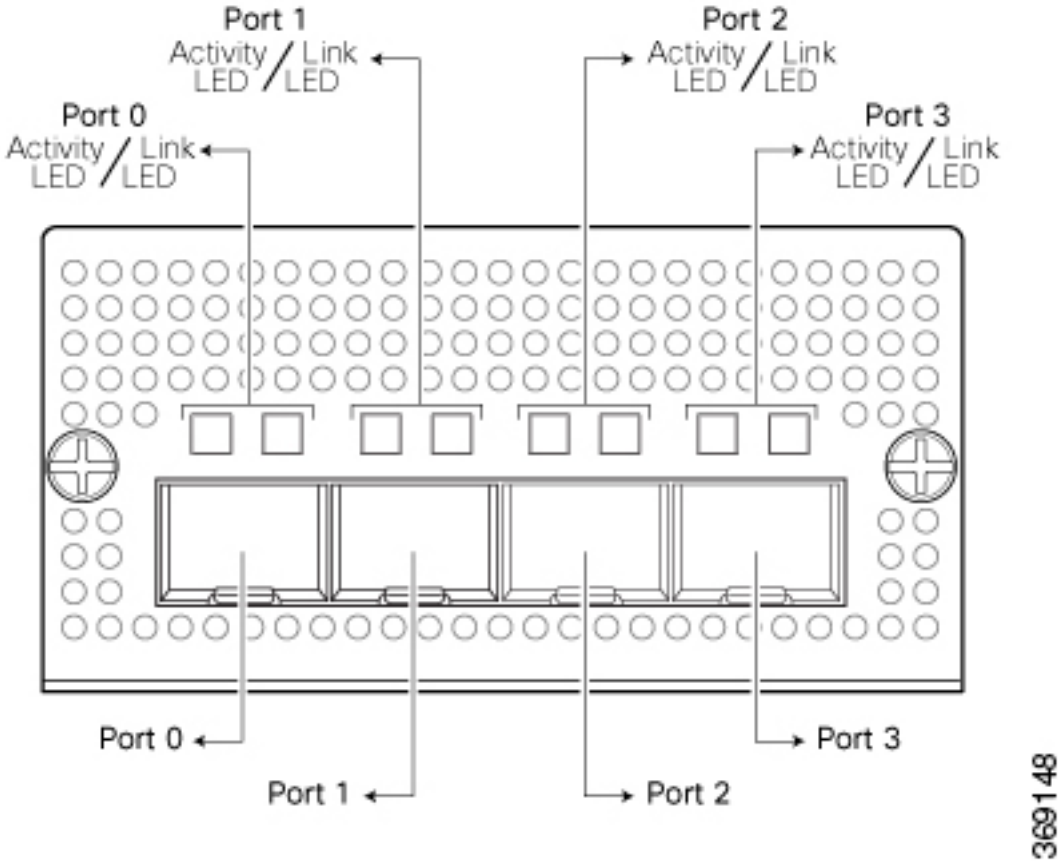


Table 9:

Color	State & Description
Amber	• Blinking—There is link activity. • Off—There is no link activity.

The following table describes the Link LED on the network ports.

Table 10:

NIM Type	Color	State & Description
8x1-Gigabit Ethernet Copper Rj45 NIM	Amber	Link is up at the rate of 1,000 Mbps.
	Green	Link is up at the rate of 100 Mbps.
	Off	Link is down or is up at the rate of 10 Mbps.

NIM Type	Color	State & Description
8x1GE SFP NIM	Amber Off	Link is up at the rate of 1,000 Mbps. Link is down.
4x10GE SFP+ NIM	Green Off	Link is up at the rate of 10 Gbps. Link is down.

Management Port

The management port on a vEdge 5000 router uses an RJ-45 connector to connect to a management device for out-of-band management.

The management port uses an autosensing RJ-45 connector to support a 10/100/1000Base-T connection. The two LEDs on the port indicate link/activity on the port and the administrative status of the port. See Management Port LEDs below.

The following table provides the pinout information for the RJ-45 connector for the management port.

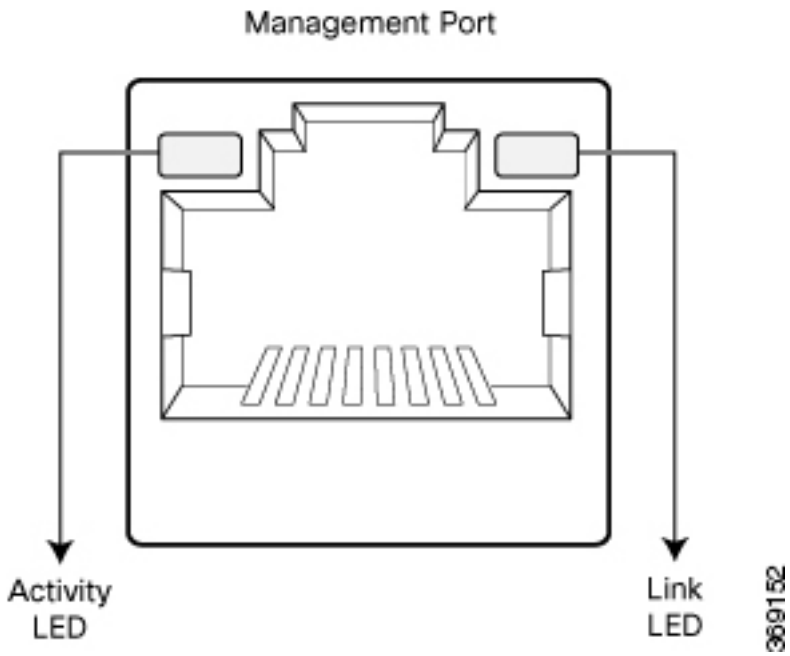
Table 11:

Pin	Signal	Description
1	TRP1+	Transmit/receive data pair 1
2	TRP1-	Transmit/receive data pair 1
3	TRP2+	Transmit/receive data pair 2
4	TRP3+	Transmit/receive data pair 3
5	TRP3-	Transmit/receive data pair 3
6	TRP2-	Transmit/receive data pair 2
7	TRP4+	Transmit/receive data pair 4
8	TRP4-	Transmit/receive data pair 4

Management Port LEDs

The management port on the vEdge 5000 router has two LEDs that indicate link/activity and port status. See the following figure.

Figure 11: LEDs on the Management Port on a vEdge 5000 Router



The following table describes the LEDs on the management port.

Table 12:

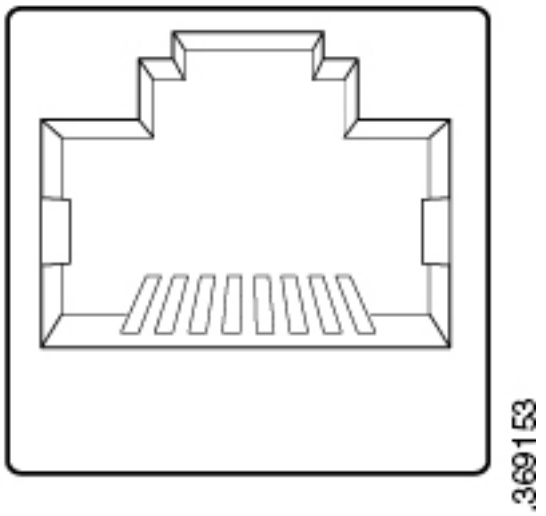
LED	Color	State and Description
Activity	Amber	• Blinking—There is link activity. • Off—There is no link activity.
Link	Amber Green Off	Link is up at the rate of 1,000 Mbps. Link is up at the rate of 100 Mbps. Link is down or is up at the rate of 10 Mbps.

Console Port

The console port on a vEdge 5000 router is accessible via the following external interface:

- An RS-232 serial interface that uses an RJ-45 connector to connect to a console management device. See the following figure.

Figure 12: RJ-45 Connector



Note

- The default baud rate for the console port is 115,200 baud.
- When you connect a device such as a PC or a terminal server to the console serial port of a vEdge router, ensure that the PC or terminal serial port is configured to disable flow control.

The following table provides the pinout information for the RJ-45 console port connector.

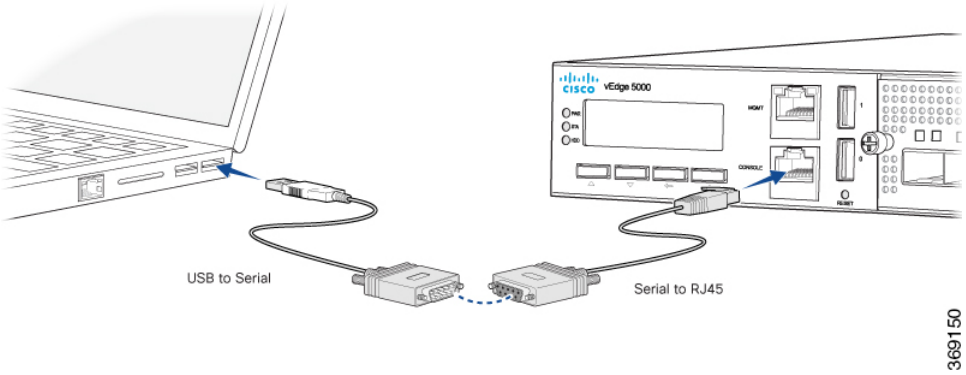
Table 13:

Pin	Signal	Description
1	RTS Output	Request to send
2	NC	No connect
3	TxD Output	Transmit data
4	Signal Ground	Signal ground
5	Signal Ground	Signal ground
6	RxD Input	Receive data
7	NC	No connect
8	CTS Input	Clear to send

RJ-45-to-DB-9 Serial Port Adapter Pinout

The console port on a vEdge 5000 router is an RS-232 serial interface that uses an RJ-45 connector to connect to a management device such as a PC or a laptop. If your PC or laptop does not have a DB-9 male connector pin and you want to connect your PC or laptop to a vEdge 5000 router, use a combination of the RJ-45-to-DB-9 female adapter along with a USB-to-DB-9 male adapter. See the following figure.

Figure 13: vEdge 5000 Router Connected to a Laptop via RJ-45-to-DB-9 Cable



The following table provides the wiring and pinout information for the RJ-45-to-DB-9 serial port adapter cable.

Table 14:

RJ-45 Pin	Signal	DB9 Pin	Signal
1	RTS	8	CTS
3	TXD	2	RXD
4	GND	5	GND
6	RXD	3	TXD
8	CTS	7	RTS

Field-Replaceable Units

The vEdge 5000 router is a stiff sheet-metal structure that houses the hardware components. Field-replaceable units (FRUs) are hardware components that you can remove and replace at your site. The following table lists the FRUs in the vEdge routers.

The power supply, transceivers, and fan tray are hot-removable and hot-insertable. You can remove and replace these components without powering off the router or disrupting router functions.

Table 15:

FRU	Cisco FRU PID required for RMA	Part ID as per "show hardware inventory"
AC power supply	• VEDGE-5000-PWR=	
8-Port RJ-45 Copper Gigabit Ethernet NIM	• NIM-8-1GE-RJ45=	NCS2-IGM806B-VV1
4-Port 10-Gigabit Ethernet SFP+ NIM	• NIM-4-10GE-SFPP=	NCS2-IXM407A-VV1
8-Port Gigabit Ethernet SFP NIM	• NIM-8-1GE-SFP=	NCS2-ISM802A-VV1
Gigabit Ethernet transceivers	• VIP-SFP-1GE-SX= • VIP-SFP-1GE-LX= • VIP-SFP-1GE-BASET=	
10-Gigabit Ethernet transceivers	• VIP-SFP+-10GE-SR= • VIP-SFP+-10GE-LR=	
Fan tray	• VEDGE-5000-FAN=	

Power Supply and Cooling in Cisco vEdge 5000 Routers

The vEdge 5000 router ships with two AC power supplies installed. Read this article to learn more about the AC power supply in the router as well as about the cooling system and airflow through the router chassis.

AC Power Supply in vEdge 5000 Router

The vEdge 5000 router ships with two AC power supplies installed. The second power supply is for redundancy and load-balancing. If one of the AC power supplies fails due to device failure or input power line failure, a single unit is sufficient to power the entire router.

The AC power supply in a vEdge 5000 router is a hot-insertable and hot-removable field replacement unit (FRU). You can remove and replace the power supply in the rear of the chassis without powering off the router or disrupting normal functioning.

The following table describes the AC power supply specifications for the vEdge 5000 router.

Table 16:

Item	Specification
AC input voltage	110/230 Vrms
AC input line frequency	60/50 Hz
Maximum output power	300 Watts

Item	Specification
Maximum power consumption	285 Watts

AC Power Supply LEDs

The vEdge 5000 AC power supply has an LED faceplate that displays information about the status of the power supply. The following table describes the LEDs on an AC power supply in a vEdge 5000 router.

Table 17:

LED State	Description
OFF	No AC power to all or any Power Supply Unit (PSU) in the system
0.5Hz Flashing Red	No AC power to this PSU only
1Hz Flashing Green	AC present but only standby output on
Green	Power supply DC output ON and OK
Red	Power supply has failed
0.5Hz Flashing Red*/Green*	Power supply warning

*Flashing frequency: 1Hz (0.5 seconds Red/0.5 seconds Green)

AC Power Cord Specifications

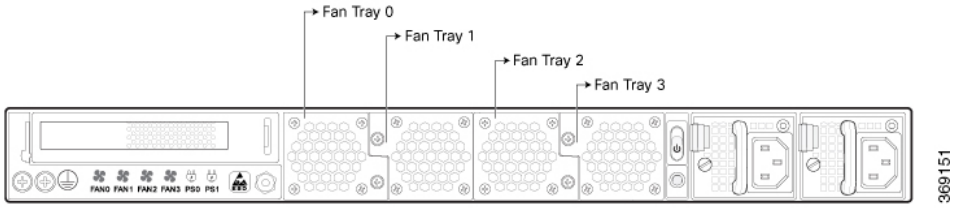
The vEdge 5000 router ships with a detachable AC power cord. The power cord has a C13 connector at one end and the other end is specific to the country/locality to which the product is shipped.

Cooling System and Airflow in a vEdge 5000 Router

The cooling system in a vEdge 5000 router consists of four individual fan trays, each comprising a double-stacked fan module. The fan trays cool the router itself, except the power supply units, which have their own fans for cooling.

The fan tray is a hot-insertable and hot-removable field-replaceable unit (FRU). The fan trays provide front-to-back cooling. If one of the fans in a fan tray fails, you can remove the specific fan tray and replace it with a spare fan tray module without powering off the router or disrupting normal functions. Also, if one of the fans fails, the rest of the working fans will keep the system running indefinitely.

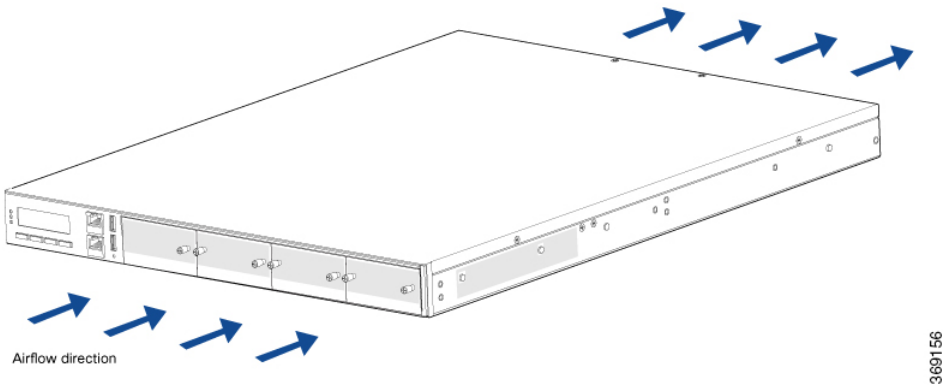
Figure 14: Fan Tray in a vEdge 5000 Router



The fan tray installs horizontally in the rear of the chassis. It has two thumbscrews that serve as handles and also as a mechanism to secure the fan tray to the main chassis.

The air intake to cool the chassis flows through the perforations in the front of the chassis. Hot air exits from the rear of the chassis via the vents provided near the fans.

Figure 15: vEdge 5000 Router Airflow



Temperature sensors in the chassis monitor the internal chassis temperature. When a single fan/fan tray fails at room temperature, the system can still provide sufficient cooling.

If a fan/fan tray fails or if the ambient temperature inside the chassis rises above the acceptable range, the router raises an alarm. If the temperature inside the chassis rises above the maximum threshold temperature, the router shuts down automatically.

Planning and Installation

This article provides general safety standards to adhere to when installing or connecting a vEdge 5000 router or its components.

General Safety Standards

- Install your vEdge router in compliance with the following local, national, and international electrical codes:
  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.

  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.
  - Evaluated to the TN power system.
  - Canada—Canadian Electrical Code, Part 1, CSA C22.1.

- Permit only trained and qualified personnel to install or replace switch components.
- Locate the emergency power-off switch in the room in which you are working. In case of an electrical accident, quickly turn off the power.
- Disconnect power before installing or removing the vEdge router.
- If an electrical accident occurs, use caution and immediately turn off power to the router.
- Make sure that grounding surfaces are thoroughly cleaned and well-finished before grounding connections are made.
- Do not work alone if hazardous conditions exist.
- Always check that power is disconnected from a circuit. Never assume that it is disconnected.
- Carefully inspect your work area for possible hazards, such as moist floors, worn-out power cords, ungrounded power extension cords, and missing safety grounds.
- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the router and the FRUs function safely and correctly, use the specified cables and connectors, and make certain they are in good condition.

Caution Before removing or installing router modules and components, ensure that the router chassis is electrically connected to ground. Ensure that you attach an ESD grounding strap to an ESD point and place the other end of the strap around your bare wrist making good skin contact. Failure to use an ESD grounding strap could result in damage to the router.

Note Some router components are hot-swappable and hot-insertable. You can remove and replace them without powering off or disconnecting power to the router. Do not, however, install the router or any of its component if they appear to be damaged.

Prepare for Router Installation

This article provide guidelines and requirements for preparing your site to install the vEdge 5000 router.

Site Preparation Guidelines

Efficient operation of your vEdge 5000 router requires proper site planning and proper layout of your equipment rack or wiring closet:

- Ensure that the area around the router is kept free of dust and conductive material.

- Follow appropriate airflow guidelines so that the cooling system functions normally.
- Follow ESD prevention procedures to avoid any damage to the router.
- Install the router in an enclosed, secure area allowing only authorized personnel to access the device.

Environmental Requirements

Install the vEdge 5000 router in a dry, clean, temperature-controlled, and well-ventilated environment:

- Maintain ambient airflow for the router to operate normally. The ambient intake air temperature should be in the range 0°C to 40°C (32°F to 104°F). If the airflow is blocked or if the air intake is too warm, the router can get overheated.
- Avoid temperature extremes. Ensure that the router is operating at an ambient temperature not more that 40°C (104°F) at sea level. For higher altitudes, a derating of 1.50°C per 1,000 feet applies.
- High humidity conditions can cause moisture to penetrate into the chassis. The device supports 10% to 85% humidity levels, non-condensing.

Rack Requirements

You can mount the vEdge 5000 router in a four-post rack using slide rails. The following table provides the rack requirements for the router.

Table 18:

Rack Requirement	Guidelines
Rack type	Use a four-post rack that meets the size requirements for the router, provides bracket holes or hole patterns spaced at 1 U (1.75 in. or 4.45 cm) increments, and is strong enough to support the weight of the router.
Mounting brackets	Ensure that the holes in the mounting brackets are spaced at 1 U (1.75 in. or 4.45 cm). This allows you to mount the router in any location in the rack.
Rack size	It is recommended that the rack comply with the size and strength standards of a 19-inch rack as defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310–D), published by the Electronics Industry Association (http://www.eia.org). Ensure that the rack rails are spaced widely enough to accommodate the external dimensions of the chassis and that the outer edges of the front mount brackets extend the width of the chassis to 19 in. (48.2 cm). You must also ensure that the spacing of rails and adjacent racks allows for the proper clearance around the router and rack.
Rack secured to building structure	For maximum stability, secure the rack to ceiling brackets and to floor brackets.

Airflow Requirements

When planning your site for installing the vEdge 5000 router, allow enough clearance around the installed router. Since the router works with a front-to-back airflow there are no clearance requirements for the sides, but it is recommended that you provide at least 3 in. of clearance at the back.

Install the vEdge 5000 Router

Once you have prepared your site for router installation, follow the instructions below to unpack the vEdge 5000 router and install it on four posts in a 19-inch rack.

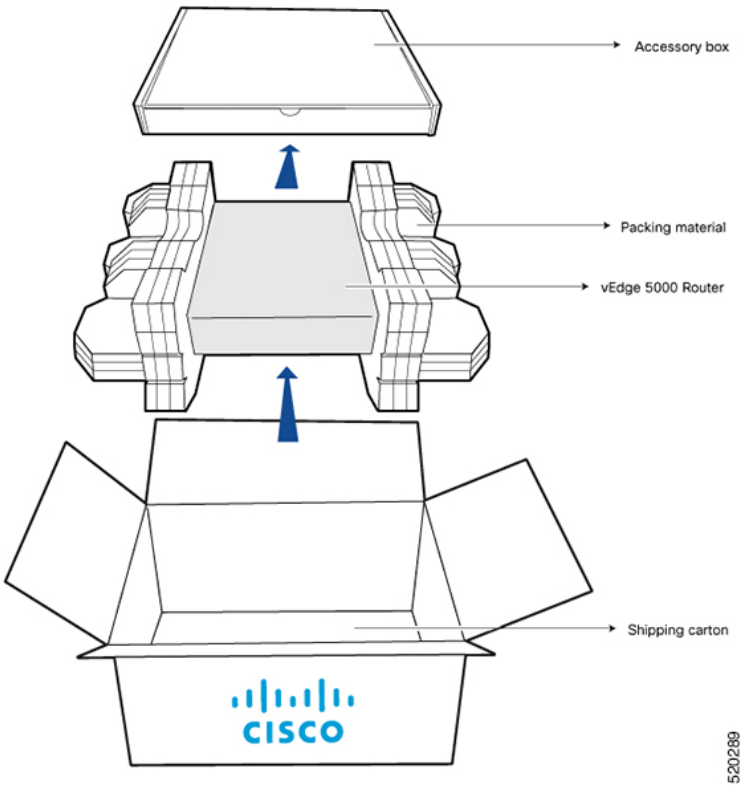
Unpack the vEdge 5000 Router

A vEdge 5000 router is shipped in a cardboard carton and secured firmly in place with foam packing material. The carton contains an accessory box with Quick Start instructions. It is recommended that you do not unpack the router until you are ready to install it.

To unpack the router:

1. Move the cardboard carton close to the installation site, making sure you have adequate space to remove all the contents of the box.
2. Open the top flaps of the carton. The router chassis and the accessories are packed together in the same box with partitions in the packing foam to accommodate the accessories.
3. Gradually remove the packing foam holding the router and the accessories in place.
4. Take out the router and each accessory.
5. Verify the router components against the packing list included in the box.

Figure 16: Unpacking the vEdge 5000 Router



Note It is recommended that you do not discard the shipping carton and packing material when you unpack the router. Flatten and store the box in case you need to move or return the router in the future. See Return Hardware.

Packing List for a vEdge 5000 Router

The cardboard carton in which the router is packed includes a packing list. Check the parts you receive with your router against the items on the packing list. The packing list specifies the name, part number, and quantity of each item in the carton and the accessory box.

The following table lists the parts shipped with the vEdge 5000 router and their quantities.

Table 19:

Component	Quantity
Router chassis	1
Fan tray (preinstalled)	4
AC power supply (preinstalled)	2
AC power cord appropriate for your geographical location (AC router models only)	2
Blanking cover panel for NIM slots (preinstalled)	4 (1 per NIM slot)
RJ-45 to DB-9 console cable	1
Rack-mounting ears	2
Slide rails	2
Screws/cage nuts for rack mount	6/6
Screws for inner rails	10
Screws for mounting ears	6
vEdge 5000 Router Quick Start	1

Mount the vEdge 5000 Router in a Rack

You can mount the vEdge 5000 router on four posts in a 19-inch rack.

In addition to the accessory box, you need the following tools to mount a vEdge 5000 router in a 19-inch rack:

- Number 2 Phillips (+) screwdriver
- Tape measure

The accessory box ships with two slide rails. Each slide rail has two parts: an inner rail that attaches to the router chassis and an outer rail that attaches to the 19-inch rack.

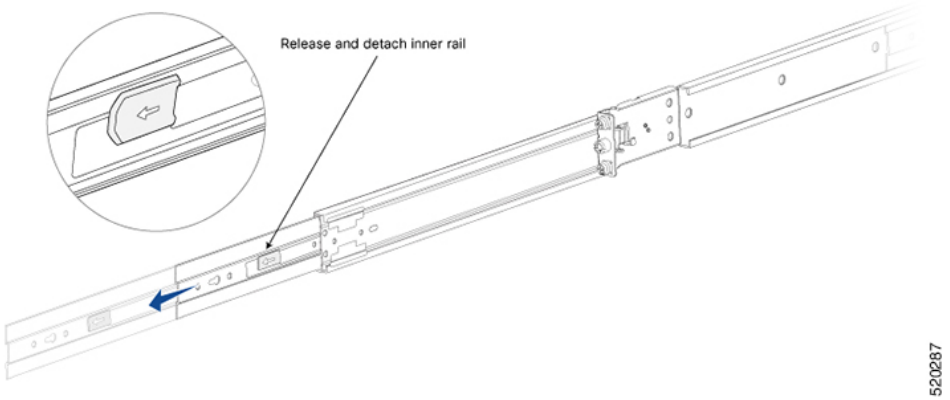
Warning Warning: To prevent bodily injury when mounting or servicing the vEdge 5000 router in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- If this is the only router in the rack, mount it at the bottom of the rack.
- If you are mounting the router in a partially filled rack, start to load the rack from the bottom, placing the heaviest component at the bottom of the rack.

To mount the vEdge 5000 router on all four posts in a 19-inch rack:

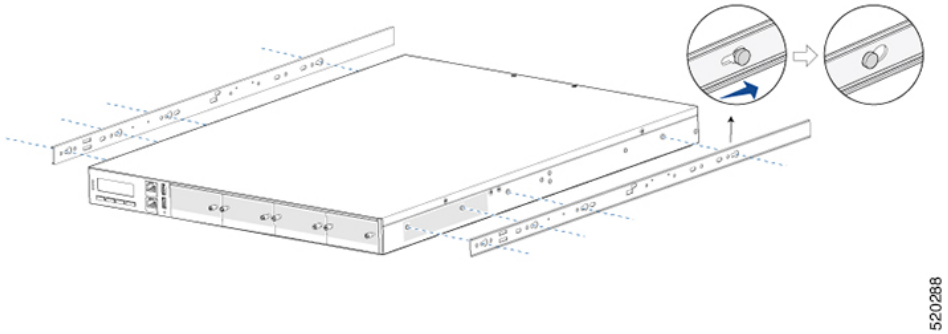
1. Place the router chassis on the floor or on a sturdy table near the rack.
2. Verify the internal dimensions of the rack with a tape measure. The chassis is 440 mm wide and must fit within the mounting posts.
3. Detach both inner rails from the two slide rails:
   a. Take one of the slide rails, and slide the inner bracket all the way up to the end of the slide rail until you hear a click.
   b. Push the slide rail lock outwards in the direction indicated by the arrow in Figure 2. Then pull the inner bracket out of the slide rail.
   c. Repeat Steps 3a and 3b to release the inner rail from the second slide rail.

Figure 17: Detaching the Inner Rail from the Slide Rail



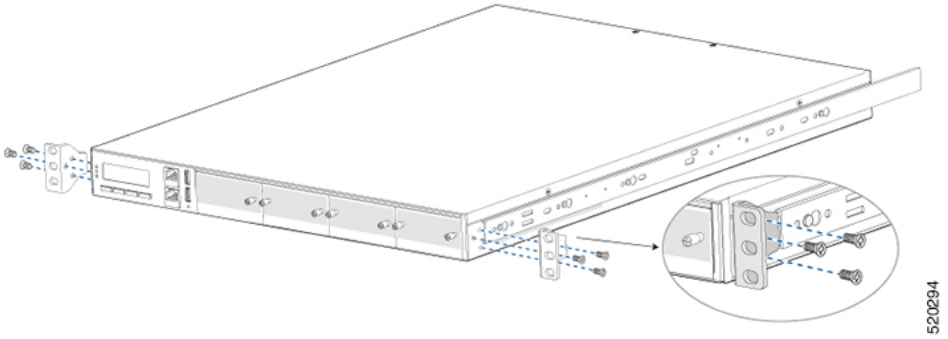
4. Attach the two inner rails to either side of the router chassis using the inner rail screws in the accessory box. Use five screws to secure each inner rail.

Figure 18: Attaching the Inner Rails to the vEdge 5000 Router Chassis



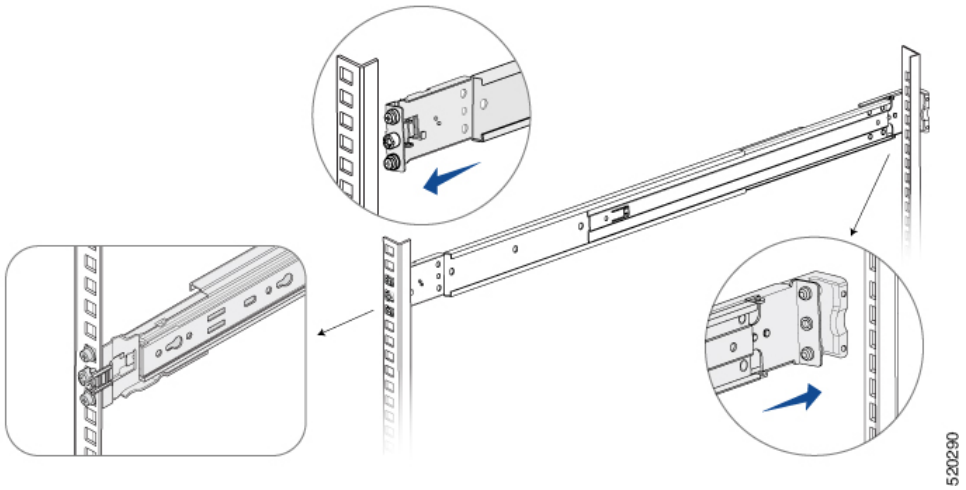
5. Attach the two mounting ears to either side of the router chassis using the mounting ear screws in the accessory box. Use three screws to attach each mounting ear.

Figure 19: Attaching the Mounting Ears to the vEdge 5000 Router Chassis



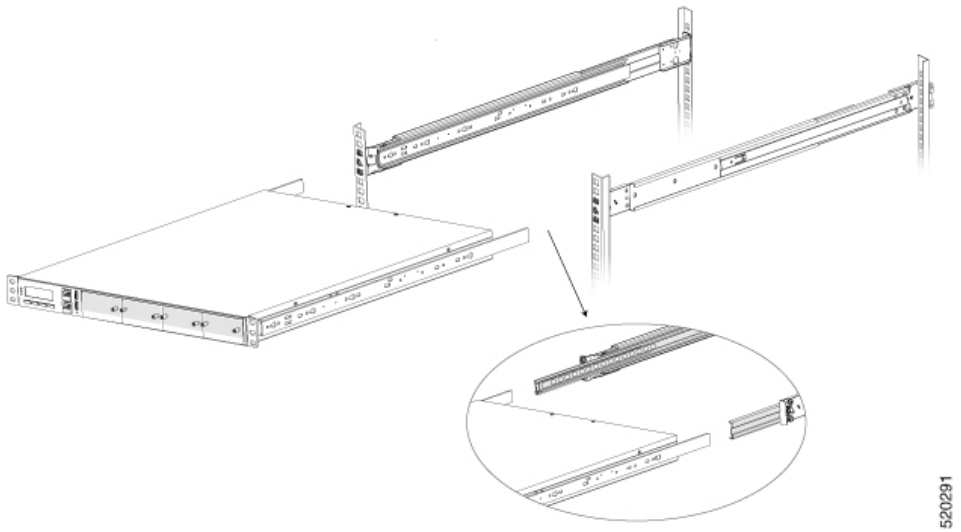
6. Install the two outer rails into the 19-inch rack:
   a. Clip the outer rail to the front of the rack, aligning the three holes on the outer rail with the threaded holes in the front post of the rack. You will hear a click once the outer rail is firmly attached.
   b. Clip the outer rail to the rear of the rack, aligning the three holes on the outer rail with the threaded holes in the rear post of the rack. You will hear a click once the rail is firmly attached.
   c. Repeat Steps 6a and 6b for the other slide rail.

Figure 20: Clipping the Outer Rail to the Front and Rear of the Rack



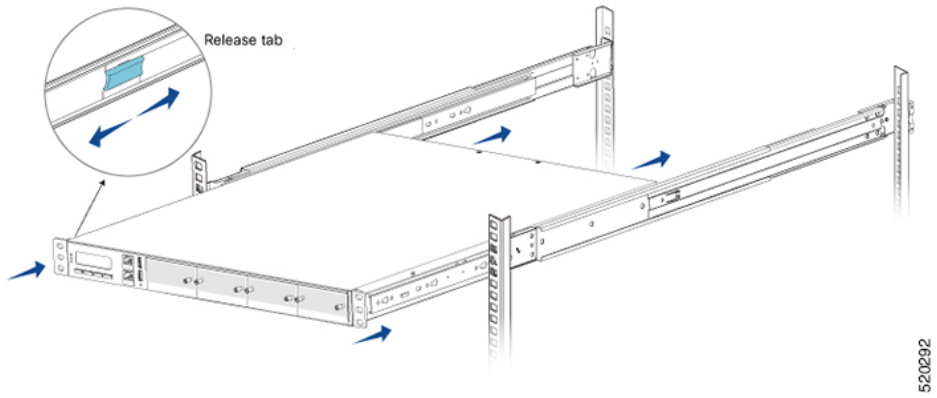
7. Grasp both sides of the router chassis, making sure that the front of the chassis is facing you.
8. Stand at the front of the rack, and lift the router to align it with the slide rails.
9. Gently insert the chassis into the outer rails on both sides of the rack, as shown in Figure X.

Figure 21: Inserting the Chassis Into the Outer Rails



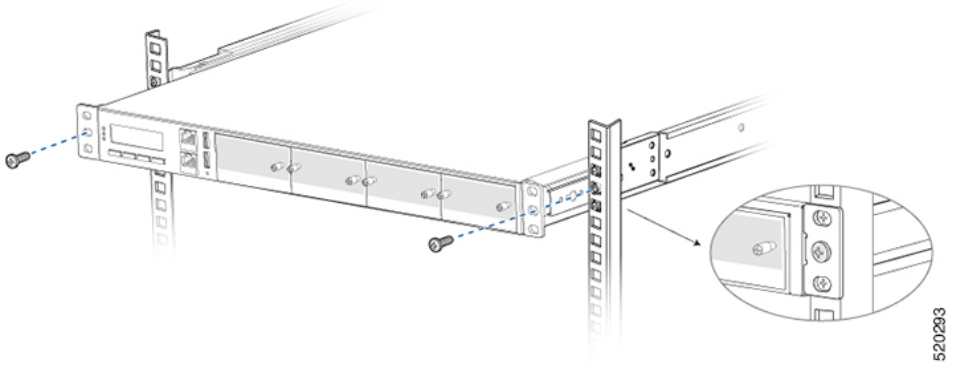
10. Slide the chassis as far back as possible until you hear a click. While sliding the chassis in, push the release tabs on both the inner rails in the direction of the arrow shown in Figure 11. If you do not push the release tabs, you will be able to slide the router in only halfway.

Figure 22: Pushing the Release Tabs on the Inner Rails



11. Secure the mounting ears to the front of the rack using the rack-mount screws in the accessory box. Use one screw in the center. Then, tighten the screws.

Figure 23: Securing the Mounting Ears to the Front of the Rack



12. To slide the router chassis out of the slide rails, gently pull it outwards. Then, press the blue slide rail locks on both sides and slide the chassis out.

Install vEdge 5000 Router Components

The vEdge 5000 router is a stiff sheet-metal structure that houses various hardware components. Some of these hardware components are field-replaceable units (FRUs) including:

- Power supplies
- Fan trays
- Network Interface Modules (NIMs)
- SFP and SFP+ transceivers

This article provides step-by-step procedures for installing these router components. For instructions on removing the components, see Remove Router Components.

Caution Before you install any components in the router chassis, make sure that you understand how to prevent electrostatic discharge (ESD) damage. See General Safety Standards .

Note Before you install any components in the router chassis, ensure that you have:

- An ESD grounding strap
- Number 2 Phillips (+) screwdriver

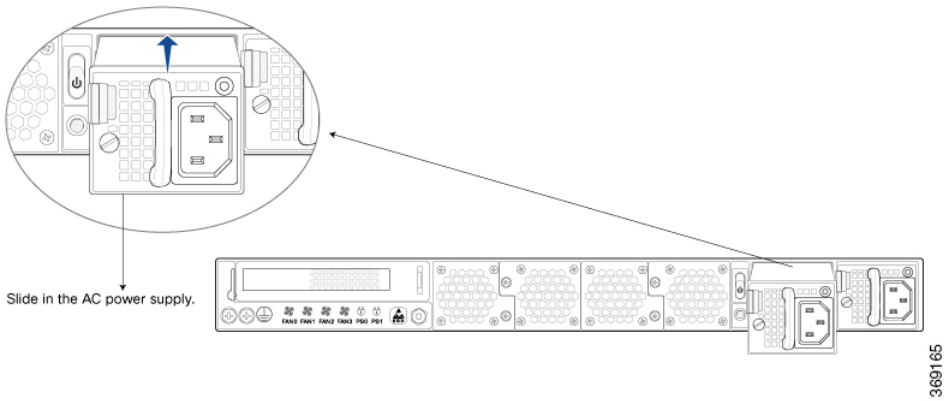
Install an AC Power Supply in a vEdge 5000 Router

The AC power supply in a vEdge 4000 router is a hot-insertable and hot-removable field replacement unit (FRU). You can remove and replace the power supply without powering off the router or disrupting normal functioning.

To install an AC power supply in a router:

1. Check the model number and ensure that you have the correct power supply.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Press the release latch to carefully remove the existing power supply from the power supply slot in the rear panel of the router chassis.
4. Remove the new power supply from the plastic bag in which it was shipped, taking care that you do not touch any of the power supply pins, leads, or solder connections.
5. With both hands, place the new power supply into the power supply slot in the rear panel of the router chassis and slide it in until it is firmly seated. You will hear a click sound when the power supply is firmly seated in the slot. See Figure 1.

Figure 24: Installing an AC Power Supply in a vEdge 5000 Router



Install a Fan Tray in a vEdge 5000 Router

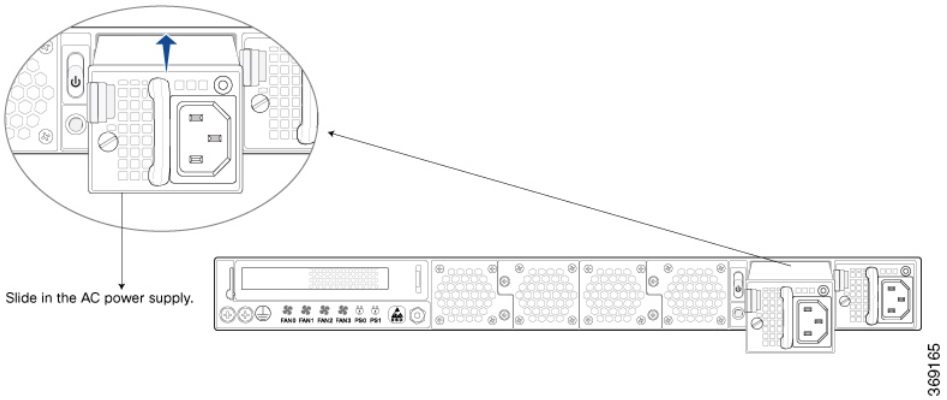
The vEdge 5000 router contains four individual fan trays, each comprising a double-stacked fan module. The fan tray is a hot-insertable and hot-removable field-replaceable unit (FRU). You can remove and replace an individual fan tray without powering off the router or disrupting normal functioning.

The fan tray installs horizontally in the rear of the router chassis. Handles on each side facilitate installing and removing of the fan tray.

To install a fan tray in a vEdge 5000 router:

1. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the router chassis.
2. Unscrew and carefully remove the existing fan tray from the fan tray slot in the rear of the chassis.
3. Gently remove the new fan tray from the plastic bag in which it was shipped.
4. With both hands, hold the thumb screws on each side of the fan tray and align the fan tray along the fan tray slot.
5. Slide in the fan tray until it is firmly seated in the router chassis and then tighten the screws. See Figure 2.

Figure 25: Installing a Fan Tray in a vEdge 5000 Router



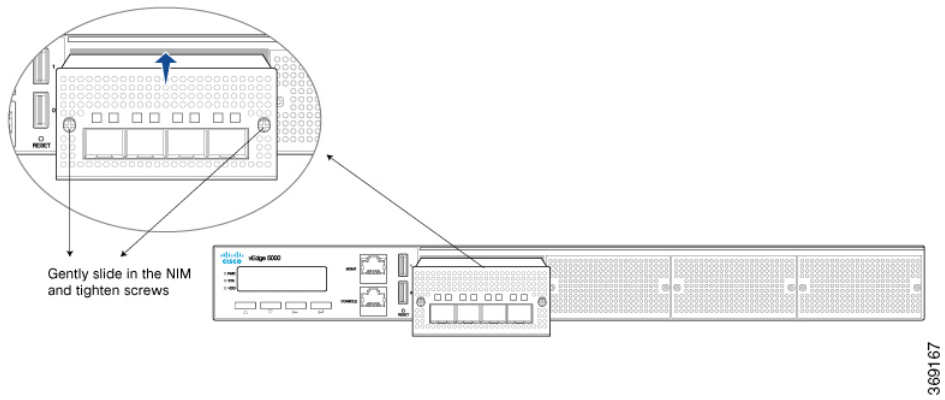
Install a NIM in a vEdge 5000 Router

The vEdge 5000 router supports two types of Network Interface Modules (NIMs).

To install a NIM in a vEdge 5000 router:

1. Remove the NIM from its bag, taking care not to touch module components, pins, leads, or solder connections.
2. Using both hands, place the NIM in the empty slot and slide it in gently until it is fully seated. See Figure 3.
3. Tighten the captive thumb screws using the number 2 Phillips (+) screwdriver.

Figure 26: Installing a NIM in a vEdge 5000 Router



Note To remove a NIM and replace it with a different type of NIM in a NIM slot, you must power down the router, replace the NIM, and then power up the router again.

Caution Before you slide the NIM into the slot in the router chassis, make sure that the NIM is aligned correctly. Misalignment might cause the pins to bend, making the NIM unusable.

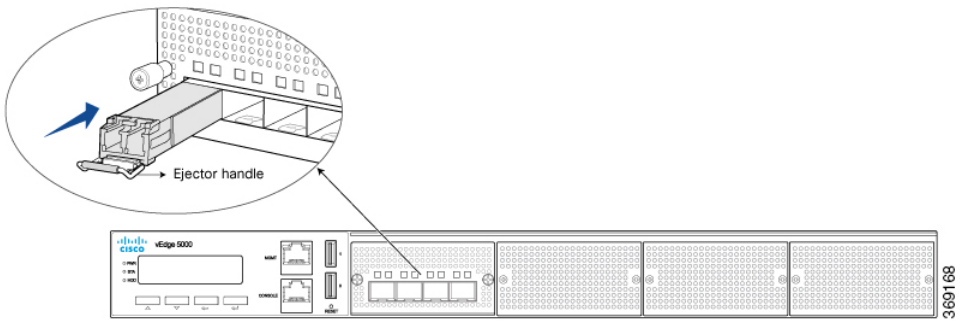
Install a Transceiver in a vEdge 5000 Router

The transceivers for the vEdge 5000 router are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace them without powering off the router or disrupting router functions.

To install any type of transceiver in a vEdge 5000 router:

1. Gently remove the new transceiver from the plastic bag in which it was shipped.
2. Cover the transceiver with a rubber safety cap, if it is not already covered.
3. If the port in which you plan to install the transceiver is covered with a dust cover, remove the cover, and save it for later use.
4. Carefully slide the transceiver in the empty port until it is firmly seated.
5. Remove the safety cap when you are ready to connect an optic fiber cable to the port.

Figure 27: Installing a Transceiver in a vEdge 5000 Router



Note It is recommended that you purchase the optical transceivers and optical connectors for your vEdge routers from Viptela.

Warning Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to a transceiver emit laser light that can damage your eyes.

Connect the vEdge 5000 Router

This article describes how to connect the vEdge 5000 router to system ground, an AC power source, a management console, and to a network for out-of-band-management.

Step 1: Connect Earth Ground to the Router

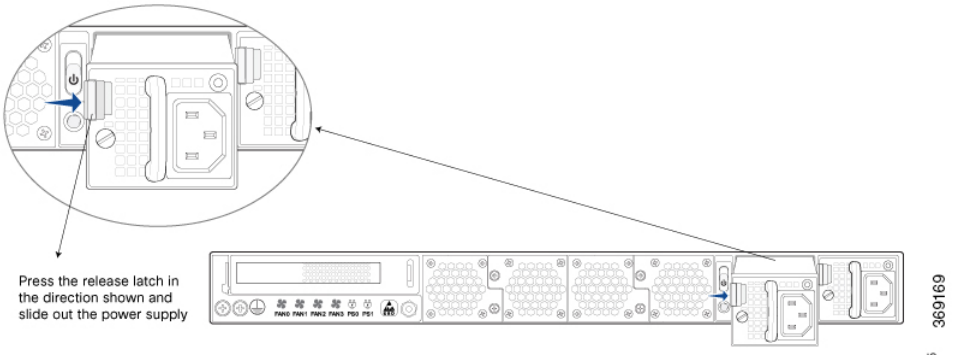
To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation of the vEdge 5000 router, connect the router to earth ground before you power it on. To do so, you need the following tools:

- Number 2 Phillips (+) screwdriver

To connect system ground to the vEdge 5000 router (see Figure 1):

1. Connect one end of the grounding cable to a proper earth ground, such as the rack in which the vEdge 5000 router is mounted.
2. Secure the grounding lug to the protective grounding terminal with the washers and screws.
3. Dress the grounding cable, and make sure that it does not touch or block access to other router components.

Figure 28: Connecting a Grounding Cable to a vEdge 5000 Router



Note Mount the vEdge 5000 router on a four-post rack before attaching the grounding lug to the router.

Step 2: Connect AC Power to the Router

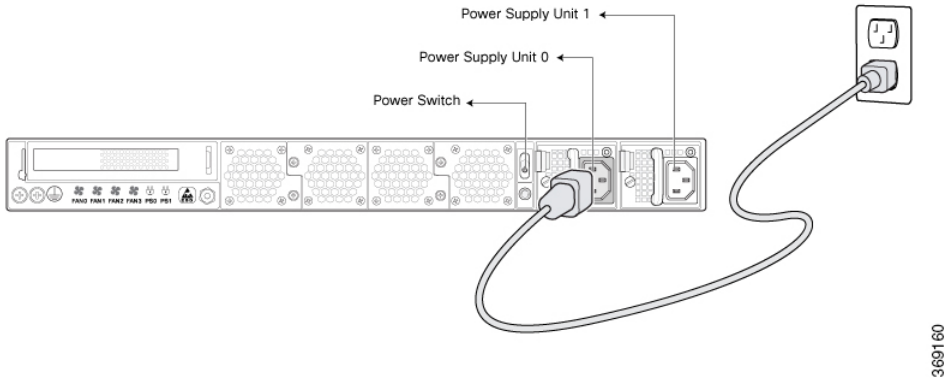
Once you have connected the vEdge 5000 router to system ground and at least one power supply is installed, you can connect AC power to the router. Before you connect power to the router, make sure you have:

- Electrostatic discharge (ESD) grounding strap
- Power cords appropriate for your geographical location. See AC Power Cord Specifications .

To connect the vEdge 5000 router to an AC power source:

1. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
2. Locate the AC power cord or cords shipped with the router. The AC power cords have plugs that are appropriate for your geographical location.
3. Insert the coupler end of the power cord into the AC appliance inlet.
4. If the AC power source outlet has a power switch, turn it to the OFF (0) position.
5. Insert the power cord plug into an AC power source outlet.
6. If the AC power source outlet has a power switch, turn it to the ON (|) position.
7. Turn the power switch at the back of the vEdge 4000 router chassis to the ON position.
8. Check that the LED on the power supply faceplate is lit and is on steadily.
9. Repeat Steps 2 through 7 for the second power supply.

Figure 29: Connecting AC Power Supply to a vEdge 5000 Router



Warning Only qualified personnel should be allowed to install and connect power to the vEdge router.

Note It is strongly recommended that you use the power cord supplied with the vEdge 5000 router.

Caution If you are connecting AC power to the router, it is recommended that the building have an external surge protective device installed.

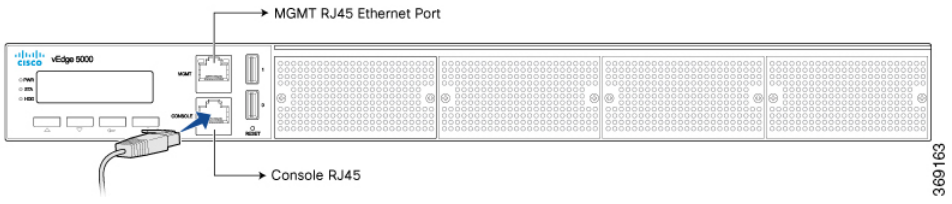
Step 3: Connect the Router to a Management Console

You can configure and manage a vEdge 5000 router using a management console. To connect the router to a management console, use the console port which accepts a cable with an RJ-45 connector. See Console Port.

To connect the vEdge 5000 router to a management console:

1. Connect one end of the console cable into the console port (labeled CONSOLE) on the vEdge 5000 router.
2. Connect the other end of the console cable into the console server or to a management console.

Figure 30: Connecting a vEdge 5000 Router to a Management Console



Warning Power over Ethernet (PoE) enabled cables can damage the console port. Do not accidentally connect these cables to the console port.

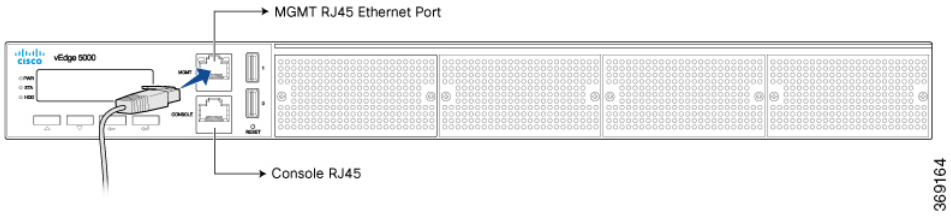
Step 4: Connect the Router to a Network for Out-of-Band Management

You can monitor and manage the vEdge 5000 router using a dedicated management channel.

To connect the vEdge 5000 router to a network for out-of-band management:

1. Connect one end of the Ethernet cable to the management port (labeled MGMT) on the vEdge 5000 router. The management Ethernet port is a 10/100/1000 Mbps port that supports autonegotiation.
2. Connect the other end of the Ethernet cable to the management device.

Figure 31: Connecting a vEdge 5000 Router to a Network for Out-of-Band Management



vEdge 5000 Router Default Configuration

If you install the 8x1-Gigabit Ethernet SFP NIM in NIM Slot 0, the default configuration file on the vEdge 5000 router looks like this:

```
vEdge5000# show running-config
system
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
   task routing read
   task security read
  !
  user admin
   password
$6$t.vzhbSwOUaaCnRu$<wbr/>AiJYG3VFRlNurXPY7YXSputMMv4hg3<wbr/>Bign362rj4IIWXm7uVfiReqv/<wbr/>4EhKG2QUUSaZnZZPveQYBfIozCioyE<wbr/>/

  !
 !
 logging
  disk
   enable
```

```
  !
 !
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
interface ge0/0
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  no shutdown
 !
!
vpn 512
interface mgmt0
  ip address 192.168.1.1/24
  no shutdown
!
```

Maintenance and Troubleshooting

Now that you have installed and connected the vEdge 5000 router, you can monitor and troubleshoot the various LEDs and system alarms on the router.

Alarm Severity Levels

The system alarms on the vEdge 5000 router have two types of severity levels:

- Critical (red)—Indicates a critical situation on the router resulting from one of two conditions:
  - One or more hardware components on the router has failed.
  - One or more hardware components on the router has exceeded the temperature threshold

A critical alarm condition requires immediate attention. If a temperature related major alarm persists for more than five minutes, the router will shut down.

- Major (yellow)—Indicates a warning on the router that, if left unattended, might result in an interruption in router operation or degradation in router performance. A yellow alarm condition requires further monitoring and/or maintenance.

Hardware Alarms

Hardware alarms on the vEdge 5000 router are predefined and are triggered by a physical condition on the router such as a power supply failure, excessive component temperature, or fan failure. The vEdge 5000 router triggers the following types of hardware alarms:

- Main board temperature alarm—The main board of the router has four temperature sensing points (board sensor 1 through 4). If the temperature of the sensor location crosses the predefined threshold level, the system triggers an alarm.
- CPU Junction temperature alarm—If the temperature of the system CPU crosses the predefined threshold level, the system triggers an alarm.
- PIM temperature alarm—If the temperature of the PIM modules crosses the predefined threshold level, the system triggers an alarm.
- Fan alarm—The router has modular fan trays for system cooling. The Viptela software maintains the fans at an optimal fan speed, raising the speed as the ambient temperature increases and decreasing the speed as the temperature decreases, to keep the router operating at the lowest possible temperature in the green temperature threshold. If a fan stops running, the system triggers an alarm. Also if a fan starts to run below a predefined RPM threshold, the system triggers an alarm.
- Power supply alarm—The router has two power supplies for redundancy reasons. If one of the power supplies is not plugged in or there is a failure on a power supply input, the system triggers an alarm

The following table lists the yellow and red alarm threshold for the nine temperature sensing points in the system—four board sensors spread across the board, one CPU junction temperature sensor, and two PIM temperature sensors. The lower threshold value (Bad Fan) applies if a fan failure condition is also detected; otherwise the higher threshold value applies (normal).

Table 20:

Item	Yellow Alarm (degrees C)		Red Alarm (degrees C)	
	Normal	Bad Fan	Normal	Bad Fan
Chassis board sensor0	50	45	70	65
Chassis board sensor1	50	45	70	65
CPU junction temperature	85	80	95	90

Checking Alarms and Notifications

To view the current chassis environment condition , enter the **show hardware environment** command at the system prompt. The system displays the power supply status, temperature sensor readings, fan speed, and related alarm status if any exists.

To view the severity of active alarms, enter the **show hardware alarms** command at the system prompt. The system displays the alarm severity and a brief description of the cause of each active alarm.

To view temperature thresholds at which green, yellow, and red alarms are generated, enter the **show hardware temperature-thresholds** command at the system prompt. The system displays the alarm temperature threshold information for a mother board in the router and for the router's CPU.

To view all other events on a Viptela device, enter the **show notification stream** command. The system displays notifications about events that have occurred on the Viptela device.

LEDs and LCD Panel

The chassis LED located on the front panel of the vEdge 5000 router indicates the status of the router. See Front Panel Components for details of the LEDs and the status they indicate.

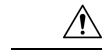
The LCD panel also displays information about the status and health of the router.

Remove vEdge 5000 Router Components

The vEdge 5000 router is a stiff sheet-metal structure that houses the hardware components. The field-replaceable units (FRUs) in the vEdge routers are:

- Power supply
- Fan tray
- Pluggable Interface Modules (PIM)
- SFP and SFP+ transceiver

This article provides step-by-step procedures for removing these router components. For instructions on installing the components, see Install vEdge 2000 Router Components.



Caution Before you install any components in the router chassis, make sure that you understand how to prevent Electrostatic discharge (ESD) damage. See General Safety Standards.

Remove an AC Power Supply from a vEdge 5000 Router

The AC power supply in a vEdge 5000 router is a hot-insertable and hot-removable field replacement unit (FRU). You can remove and replace the power supply without powering off the router or disrupting normal functioning.

To remove the power supply from the router chassis, you need the following parts and tools:

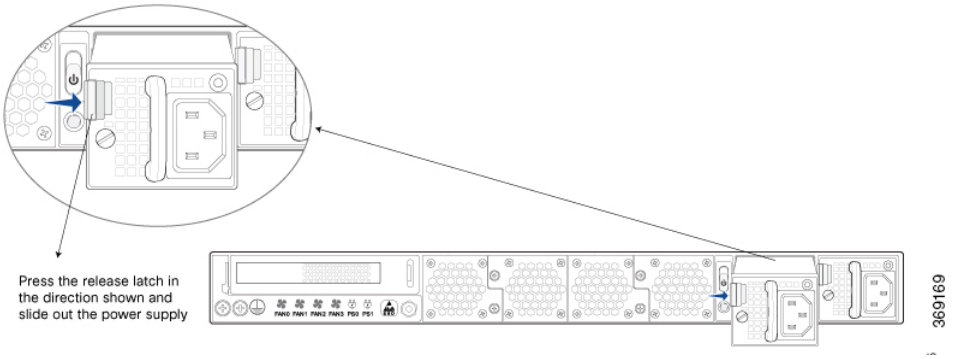
- An antistatic bag or an antistatic mat
- A replacement power supply or a cover panel for the power supply slot

To remove an AC power supply from the router:

1. Place the antistatic bag or the antistatic mat on a firm, flat surface.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Turn the power switch on the outlet (if one exists) to the OFF (0) position.
4. Disconnect the power cord from the power source.
5. Press the release latch on the right side of the power supply to disconnect the power supply from the chassis.
6. Grasp the power supply handle with one hand and slide the power supply firmly halfway out of the chassis.

7. Place the other hand underneath the power supply and slide it completely out of the chassis making sure not to touch any power supply pins, leads, or solder connection.
8. Place the removed power supply in the antistatic bag or on the antistatic mat.

Figure 32: Removing an AC Power Supply from a vEdge 5000 Router



Caution Make sure that you do not leave the power supply slot in the rear of the chassis empty for a long time while the router is operational. Once you remove the power supply, either replace it promptly or install a cover panel over the empty slot.

Remove a Fan Tray from a vEdge 5000 Router

The vEdge 5000 router contains four individual fan trays each comprising of a double-stacked fan module. The fan tray is a hot-insertable and hot-removable field-replaceable unit (FRU). You can remove and replace an individual fan tray without powering off the router or disrupting normal functioning.

The fan tray installs horizontally in the rear of the router chassis. Handles on each side facilitate installing and removing of the fan tray.

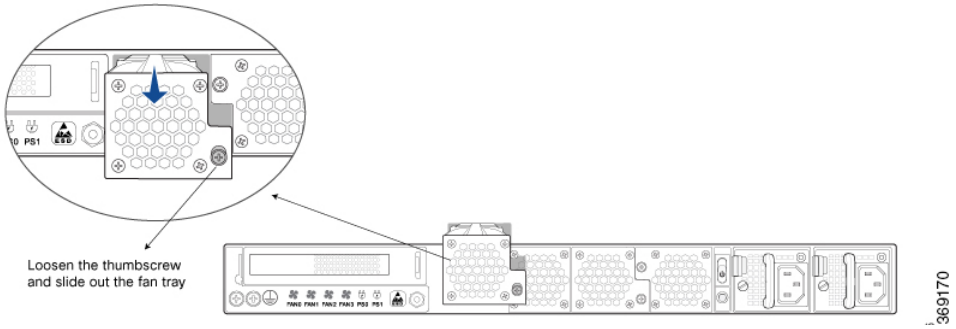
To remove the fan tray from the router chassis, you need the following parts and tools:

- An antistatic bag or an antistatic mat
- A replacement fan tray

To remove a fan tray from a vEdge 5000 router:

1. Place the antistatic bag or the antistatic mat on a firm, flat surface.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Unscrew the two thumb screws on the fan tray to release it from the router chassis. Then remove the fan tray.
4. Place the fan tray in the antistatic bag or the antistatic mat.

Figure 33: Removing a Fan Tray from a vEdge 5000 Router



Warning When removing the fan tray, keep your hands and finger away from the spinning fan blades as the fans might still be spinning.

Remove a NIM from a vEdge 5000 Router

The vEdge 5000 router supports two flavors of Network Interface Modules (NIMs). Both modules install horizontally on the front of the chassis. See Front Panel of the vEdge 5000 Router.

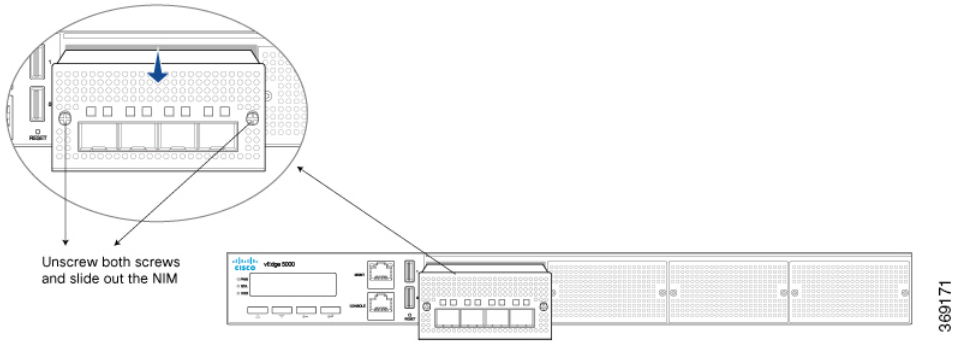
To remove a NIM from a NIM slot in a vEdge 5000 router, you need the following parts and tools:

- Number 2 Phillips (+) screwdriver
- A replacement NIM or cover panel
- An antistatic bag or antistatic mat

To remove a NIM from a NIM slot in a vEdge 5000 router:

1. Using a number 2 Phillips (+) screwdriver, loosen the captive screws.
2. Pull the NIM halfway out by holding on to the captive thumb screws.
3. Hold the front edge of the NIM with both hands and slide it completely out of the chassis.
4. Place the NIM in an antistatic bag or on an antistatic mat.

Figure 34: Removing a NIM from a vEdge 5000 Router



Note To remove a NIM and replace it with a different type of NIM in a NIM slot, you must power down the router, replace the NIM, and then power the router back again. Also, if there are any transceivers installed in the NIM, remove them before you remove the NIM. For instructions on removing a transceiver from a vEdge router, see below.

Caution Make sure that you do not leave the NIM slot in the front of the chassis empty for a long time while the router is operational. Once you remove the NIM, either replace it promptly or install a cover panel over the empty slot.

Remove a Transceiver from a vEdge 5000 Router

The transceivers for the vEdge router are hot-removable and hot-insertable field-replaceable units (FRUs): You can remove and replace them without powering off the router or disrupting router functions.

To remove any type of transceiver from a vEdge 5000 router, you need the following parts and tools:

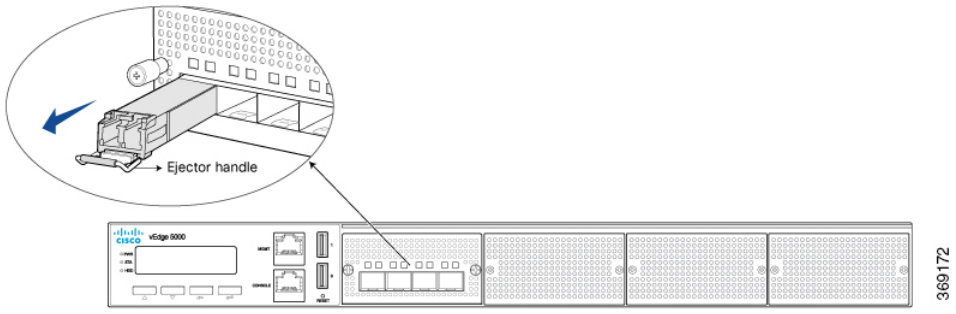
- A transceiver slot dust cover
- An antistatic mat or an electrostatic bag
- A rubber safety cap for the transceiver

To remove any type of from a vEdge router:

1. Place the antistatic mat or the electrostatic bag on a firm, flat surface.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Label the cables connected to the transceiver so that you can reconnect them correctly later.
4. Remove the cable connector from the transceiver.
5. Unlock the transceiver by pulling down the ejector handle from the transceiver.
6. Grasp the transceiver ejector handle and pull the transceiver approximately 0.5 in. out of the router.
7. Using your fingers, grasp the body of the transceiver and pull it out of the router completely.

8. Place a rubber safety cap over the transceiver.
9. Place the removed transceiver on the antistatic mat or in an electrostatic bag.
10. If you are not installing a new transceiver, place the transceiver slot dust cover over the empty port.

Figure 35: Removing a Transceiver from a vEdge 5000 Router



Note It is recommended that you purchase the optical transceivers and optical connectors for your vEdge routers from Viptela.

Warning Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to a transceiver emit laser light that can damage your eyes.

Restore a vEdge Router

This article explains how to revert the configuration for a vEdge router to the factory-default values. It also explains how to do a soft and hard reset of the router.

Reverting to the vEdge Router Factory-Default Configuration

After you set up and start the virtual machines (VMs) for the vEdge Cloud routers and set up and start the hardware vEdge routers in your overlay network, they come up with a factory-default configuration . When you make and commit changes to the default configuration, a new configuration file is created. This new configuration file then becomes the active configuration.

If desired, you can revert to the default factory configuration:

```
vEdge# request software reset
```

Reset the Router

You can reset the vEdge router by doing either a hard press or a soft press. To perform either type of press, locate the Reset button on the front panel of the router. The Reset button is recessed to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool.

Perform a Long Press Reset

A long press reset of the vEdge router erases passwords, keys, and most other configuration parameters, restoring the router to its factory-default configuration.

To perform a long press reset, press the Reset button for more than 10 seconds. After you release the Reset button, the router will reboot and resume normal operation.

Perform a Short Press Reset

A short press reset of the Edge router is equivalent to a graceful software reboot and is the same as entering the **reboot** command at the CLI prompt.

To perform a short press reset, press the Reset button for two seconds. The short press reset takes effect almost instantaneously and reboots the router.

Return Hardware

This article describes how to return a vEdge router or a hardware component to Viptela for repair or replacement.

Locate Serial and Model Number

To return a vEdge router or a hardware component to Viptela, you need the serial and model number of the router or the component being returned.

You can locate the serial and model number of a vEdge router in one of the following ways:

- In vManage NMS, select the Configuration ► Devices screen. The device table lists the serial and model numbers of the routers in the network.
- Enter the **show hardware inventory**command at the CLI prompt.
- The serial number is printed on a label on the right side of the router; the model number is printed on a label on the back of the router.

Figure 36: Sample Serial Number Label for a vEdge Router



Obtain an RMA Number

If you are returning a vEdge router or a hardware component to Viptela for repair or replacement, contact the Viptela Customer Support team to open a support case and obtain a Return Materials Authorization (RMA) number.

Before you open a case and request an RMA number, keep the following information ready:

- Your existing service contract number, if you have one
- Serial number of the router or component
- Model number of the router or component
- Physical location of the router

- Your name, organization name, telephone number, fax number, and shipping address
- Failure or problem description with details
- Type of activity being performed on the router when the problem occurred
- Configuration data displayed by one or more show commands

To obtain an RMA number:

1. Open a support case with Viptela in one of the following ways:
   - Log in to www.viptela.com/support
   - Send email to support@viptela.com
   - Call toll-free 800-525-5033
2. A Viptela Customer Support representative validates your request and issues an RMA number for returning the router or a hardware component.



Note Do not return the router or any component to Viptela before first obtaining an RMA number. Viptela reserves the right to refuse to take any shipment that does not have an RMA number.

Repack the Router

If you need to move or return the vEdge router, repack the router in its original packing. Before you repack the router follow these steps:

1. Shut down the vEdge router by issuing the **poweroff** command at the CLI prompt.
2. Disconnect power to the router.
3. Remove the cables and transceivers.

You will need the following tools to repack the router:

- Phillips Number 2 (+) screwdriver
- Cardboard carton and original packing in which you received the router

To repack the router in its original packing:

1. If you do not have a vEdge 1000 router, skip this step. Otherwise:
   a. If the router is installed in a rack using the rack-mount kit from Viptela, remove the front stopper screwed along the front side of the rack-mount tray.
   b. Then remove the rack-mount tray from the rack by having one person support the weight of the rack-mount tray while a second person unscrews the rack-mount screws.
   c. Place the rack-mount tray on a firm, flat surface.
   d. Slide out the vEdge 1000 router from the rack-mount tray.
2. Place the router chassis in the plastic packing bag.

3. Place the side packing foam on both sides of the router chassis.
4. Secure the chassis in the cardboard carton.
5. Secure the top of the chassis by placing the top packing foam over the top of the chassis.
6. Close the cardboard shipping box and seal it with packing tape.
7. Write the RMA number on top of the box for purposes of tracking.

If you are returning any field-replaceable units with the router, repack them as described in Repack Router Components below.

Repack Router Components

If you need to return any router components, follow these steps:

1. Ensure that you have the antistatic bag for each component and an ESD grounding strap.
2. Place each component in its antistatic bag.
3. Pack each component in its original packing material. If you do not have the original packing material, ensure that the component is packed adequately with packing material to prevent any damage in transit.
4. Place the component in the original cardboard box or another cardboard box if the original is not available.
5. Secure the box with tape.
6. Write the RMA number on top of the box for purposes of tracking.