Cisco VG420 Voice Gateway Hardware Installation Guide

First Published: 2021-12-06

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Preface

This preface describes the audience, organization, and conventions of this document. It also provides information on how to obtain other documentation.

This preface includes the following sections:

Audience and Scope

This document is designed for the person who is responsible for configuring your Cisco Enterprise router. This document is intended primarily for the following audiences:

- Customers with technical networking background and experience.

- System administrators familiar with the fundamentals of router-based internetworking but who might not be familiar with Cisco IOS software.

- System administrators who are responsible for installing and configuring internetworking equipment, and who are familiar with Cisco IOS software.

Feature Compatibility

For more information about the Cisco IOS XE software, including features available on your device as described in the configuration guides, see the respective router documentation set.

To verify support for specific features, use the Cisco Feature Navigator tool. This tool enables you to determine the Cisco IOS XE software images that support a specific software release, feature set, or a platform.

Document Conventions

This documentation uses the following conventions:

Convention	Description
^ or **Ctrl**	The **^** and **Ctrl** symbols represent the Control key. For example, the key combination **^D** or **Ctrl-D** means hold down the **Control** key while you press the **D** key. Keys are indicated in capital letters but are not case sensitive.
string	A string is a nonquoted set of characters shown in italics. For example, when setting an SNMP community string to public, do not use quotation marks around the string or the string will include the quotation marks.

The command syntax descriptions use the following conventions:

Convention	Description
bold	Bold text indicates commands and keywords that you enter exactly as shown.
italics	Italic text indicates arguments for which you supply values.
[x]	Square brackets enclose an optional element (keyword or argument).
		A vertical line indicates a choice within an optional or required set of keywords or arguments.
[x	y]	Square brackets enclosing keywords or arguments separated by a vertical line indicate an optional choice.
{x	y}	Braces enclosing keywords or arguments separated by a vertical line indicate a required choice.

Nested sets of square brackets or braces indicate optional or required choices within optional or required elements. For example, see the following table.

Convention	Description
[x {y	z}]	Braces and a vertical line within square brackets indicate a required choice within an optional element.

Examples use the following conventions:

Convention	Description
screen	Examples of information displayed on the screen are set in Courier font.
bold screen	Examples of text that you must enter are set in Courier bold font.
< >	Angle brackets enclose text that is not printed to the screen, such as passwords.
!	An exclamation point at the beginning of a line indicates a comment line. Exclamation points are also displayed by the Cisco IOS XE software for certain processes.
[ ]	Square brackets enclose default responses to system prompts.

⚠

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

✎

Note Means *reader take note*. Notes contain helpful suggestions or references to materials that may not be contained in this manual.

Communications, Services, and Additional Information

- To receive timely, relevant information from Cisco, sign up at Cisco Profile Manager.

- To get the business impact you're looking for with the technologies that matter, visit Cisco Services.

- To submit a service request, visit Cisco Support.

- To discover and browse secure, validated enterprise-class apps, products, solutions and services, visit Cisco Marketplace.

- To obtain general networking, training, and certification titles, visit Cisco Press.

- To find warranty information for a specific product or product family, access Cisco Warranty Finder.

Cisco Bug Search Tool

Cisco Bug Search Tool (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.

Documentation Feedback

To provide feedback about Cisco technical documentation, use the feedback form available in the right pane of every online document.

Troubleshooting

For the most up-to-date, detailed troubleshooting information, see the Cisco TAC website at https://www.cisco.com/en/US/support/index.html.

Go to **Products by Category** and choose your product from the list, or enter the name of your product. Look under **Troubleshoot and Alerts** to find information for the issue that you are experiencing.

CHAPTER 2

Overview of Cisco VG420 Voice Gateway

Cisco High-Density Analog Voice Gateways provide enterprises, managed services providers, and service providers the ability to directly connect public-switched telephone networks (PSTNs) and existing telephony equipment to Cisco Enterprise Routers.

The fixed-port (FXS and FXO) modules in the voice gateway provide Dual-Tone Multifrequency (DTMF) detection, voice compression and decompression, call progress tone generation, Voice Activity Detection (VAD), echo cancellation, and adaptive jitter buffering.

This guide specifies the installation of Cisco VG420 Voice Gateway, a high-density analog voice gateway. This voice gateway is an intermediate path that enables TDM to IP transition.

The Cisco VG420 Voice Gateway supports the following interfaces:

- Gigabit Ethernet (GE)
- Micro USB Console Port
- RJ45 Console Port
- FXS Ports
- FXO Ports
- Network Interface Module (NIM)

Features and Benefits

The Cisco Voice Gateway provides VoIP connectivity to analog devices such as analog desk phones, analog conference room phones, fax machines, and modems. This voice gateway provides several improvements from the previous high-density analog and digital extension modules (EVMs) in the following ways:

- **On-board Digital Signal Processor (DSP)**: The FXO and FXS service modules contain an onboard DSP and don't require the router to have a dedicated packet voice DSP module (PVDM) on the motherboard. The DSP on the voice module is necessary for the voice features. It also provides for echo cancellation of up to 128-ms echo-tail length for demanding network conditions.

- **Support for Online Insertion and Removal (OIR)**: The FXS and FXO service modules support Online Insertion and Removal (OIR), reducing the downtime required for new or replacement modules. The service modules can be inserted into the NIM slot on the device without powering off the voice gateway.

- **FXS-E (extended loops) support**: FXS ports on the new modules support FXS-E with the following details:

  - Higher loop current (35 mA) to accommodate specialty phones

  - Longer loop length for loops with 26 AWG wire, up to 11,000 feet (3400 meters)

  - Higher ringing voltage (65 Vrms, no load)

In addition to these features, the following are also supported:

- Caller line ID

- G.711, G.729a, and G.726

- G722, iLBC

- Fax detection, pass-through, and relay (T.38)

- Modem pass-through

- DTMF detection

- Echo cancellation

- Voice activity detection

- Comfort noise generation

- Real-Time Control Protocol (RTCP)

- Acoustic shock protection

- Real-Time Transport Protocol (RTP)

- RFC 4733 Digit Relay

- Noise reduction

The FXS features include:

- Support for either FXS or DID functionality

- Message-Waiting Indicator (MWI)

- Cable detection: GR909 line test

The FXO features include:

- Support for both ground-start and loop-start modes

- Call Detail Record (CDR) information

- Support for interworking with Cisco Unified Communications Manager (Skinny Client Control Protocol [SCCP]), Session Initiation Protocol (SIP), and Media Gateway Control Protocol (MGCP) 0.1

- Cable detection

- Overload protection

- Analog phone connectivity

- Fax and modem connectivity

Protocols Supported

The Cisco VG420 Voice Gateway supports the following protocols:

- SCCP

- MGCP

- SIP

- Real-Time Transport Protocol (RTP)

- Secure Real-Time Transport Protocol (SRTP)

- Trivial File Transfer Protocol (TFTP)

- HTTP Server

- Simple Network Management Protocol (SNMP)

- Telnet

- Dynamic Host Configuration Protocol (DHCP)

- DNS

- T.38 fax relay and modem pass-through

- RADIUS and TACACS+ for Telnet and authorization

Cisco VG420 Voice Gateway Chassis

The following images show the I/O and side panel views of the Cisco VG420 Voice Gateway chassis:

Figure 1: VG420-144FXS I/O Panel View
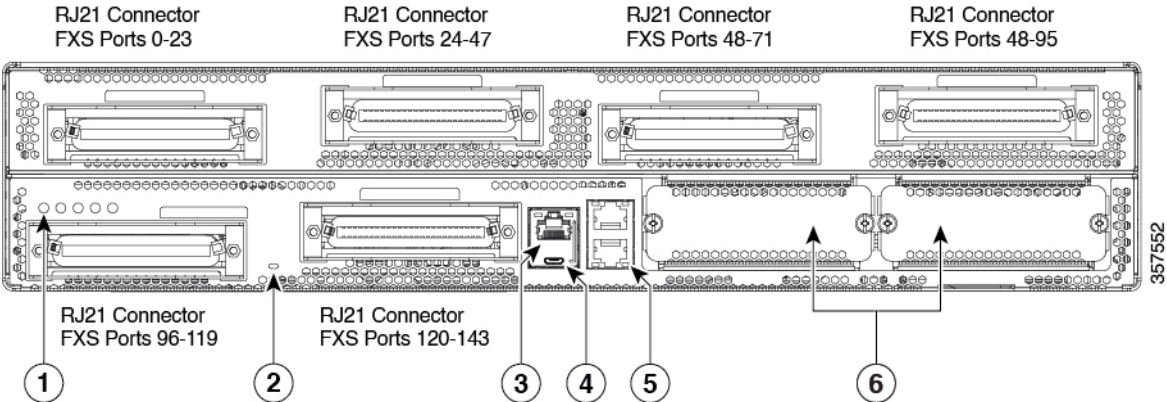
1	Status LEDs
2	FXS LED
3	Serial Console
4	Mini USB Console
5	Ethernet Ports
6	NIM Modules

Figure 2: VG420-132FXS/6FXO I/O Panel
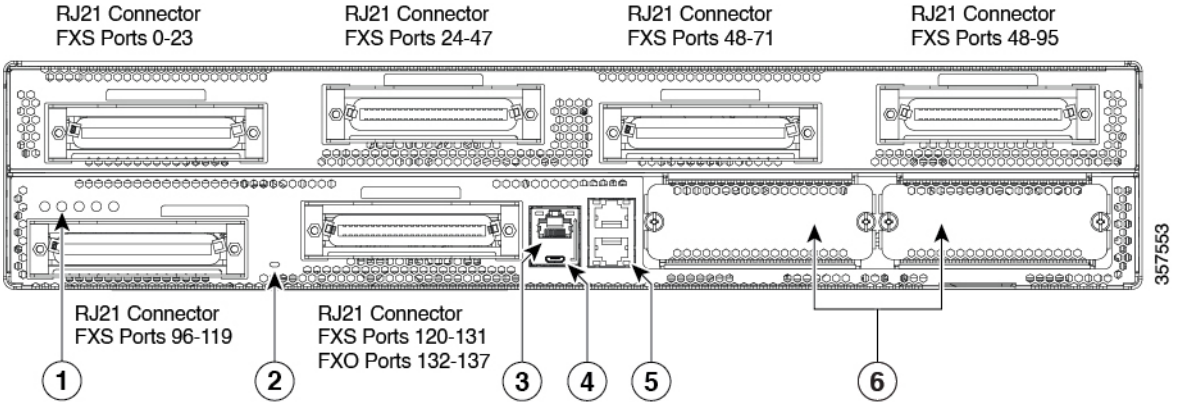
1	Status LEDs
2	FXS LED
3	Serial Console
4	Mini USB Console
5	Ethernet Ports
6	NIM Modules

Figure 3: VG420-84FXS/6FXO I/O Panel
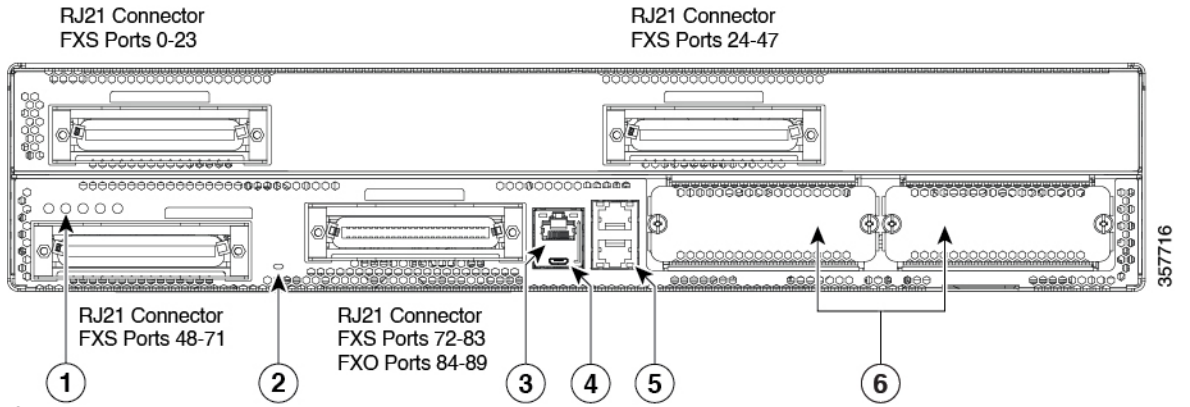
1	Status LEDs
2	FXS/FXO LED
3	Serial Console
4	Mini USB Console
5	Ethernet Ports
6	NIM Modules

Figure 4: Fan/Tray Side of the
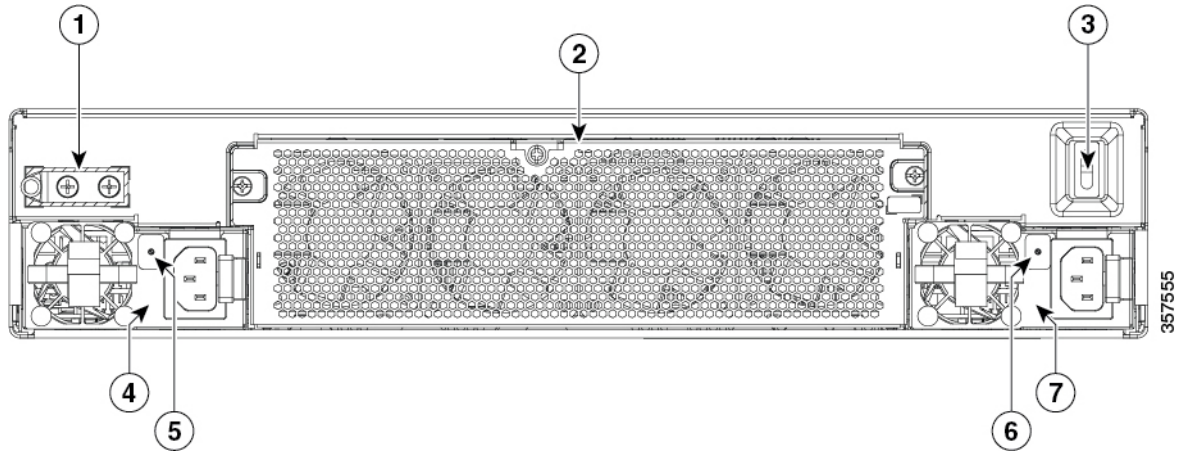
1	Ground Lug
2	Removable Fan Tray
3	Power Switch
4	PSU1
5	PSU1 (Power LED)

6	PSU0 (Power LED)
7	PSU0

SKU Information

The following table specifies the Cisco VG420 Voice Gateway SKU information. All the SKUs support the following external interfaces:

Front	Details
WAN Port	Two GE RJ-45 copper interface ports support 10BASE-T, 100BASE-TX, and 1000Base-T
Console port	One RJ45 serial console port and one USB console port
NIM slot	Two NIM slots to host supported NIM voice modules
Back	
PSU	Support one or two, hot swappable, redundant PSUs
Fans	Removable fan tray

Table 1: Supported Voice Ports for SKUs

SKUs	VG420-144FXS	VG420-132FXS/6FXO	VG420-84FXS/6FXO
FXS Ports	144	132	84
FXO Ports	0	6	6
Number of Failed Over Ports	N/A	6	6
Number of Failed Over Ports	108 (0-107)	108 (0-107)	84 (0-83)
Maximum REN	80	80	80
RJ21 Connectors	6	6	4

Removable or Interchangeable Modules and Cards

The following are the NIM models that are supported by Cisco VG420 Voice Gateway:

NIM-1MFT-T1/E1

NIM-2MFT-T1/E1

NIM-4MFT-T1/E1

NIM-8MFT-T1/E1

NIM-4E/M

NIM-2FXO

NIM-4FXO

NIM-2FXSP

NIM-4FXSP

NIM-2FXS/4FXOP

NIM-2BRI-NT/TE

NIM-4BRI-NT/TE

The following image represents the NIM slots:

Figure 5: NIM Slot Representation
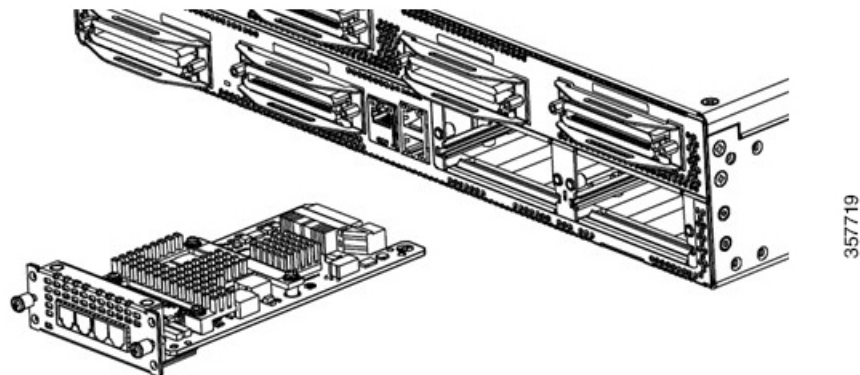
Locate the Labels

Use the Cisco Product Identification (CPI) tool to find labels on the platform. The tool provides detailed illustrations and descriptions of where labels are located on Cisco products. It includes the following features:

- A search option that allows browsing for models by using a tree-structured product hierarchy.

- A search field on the final results page that makes it easier to look up multiple products.

- End-of-sale products clearly identified in results lists.

The tool streamlines the process of locating the serial number labels and identifying products. Serial number information expedites the entitlement process and is required to access support services.

The following image shows the location of the labels on the voice gateway.

The Serial number (SN), Common language equipment identifier (CLEI), Top Assembly Number (TAN), Product ID (PID), PID version ID (VID), and Quick response (QR) code are printed on a label at the bottom of the hardware or on a label tray located on the chassis.

Figure 6: Label Tray
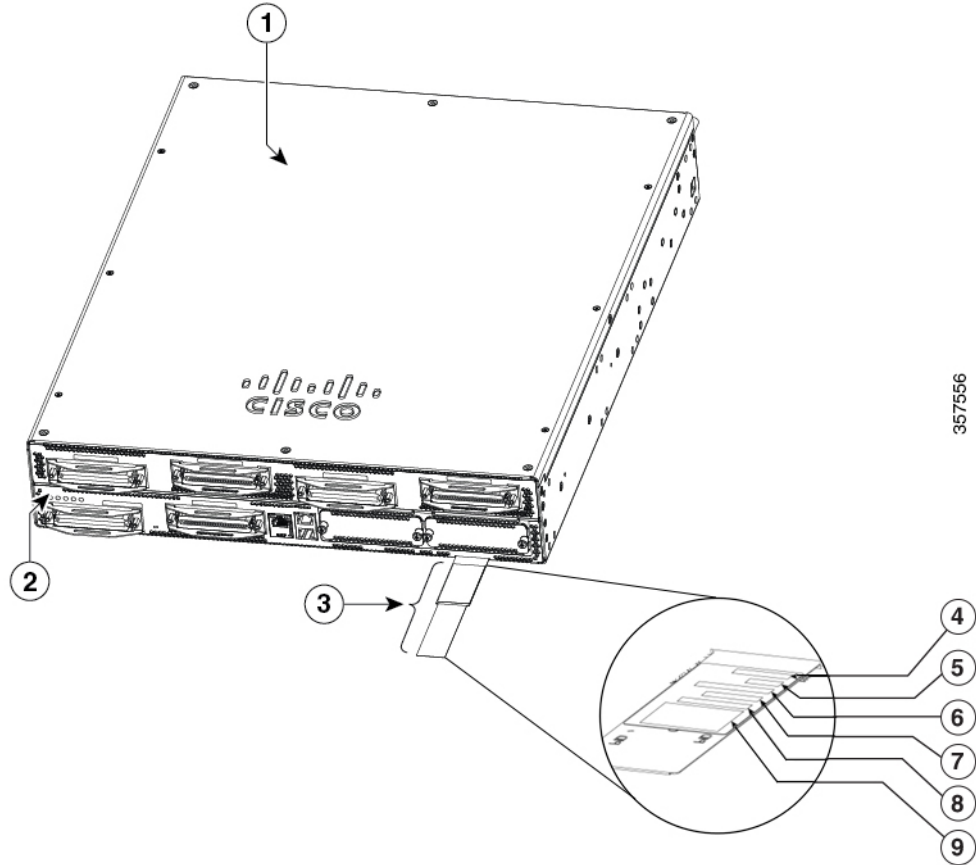
1	Top Cover
2	PID
3	Label Tray
4	SN
5	CLEI
6	TAN
7	MAC
8	PIDVID
9	QR Code

LED Information

Table 2: LED Information for Cisco Voice Gateway 400 Series

LED	Colour	Description
PSU	Green/Off	**Power Supply Unit** Off: The system is powered off. Green: All installed PSUs are operating correctly.
PWR	Green/Amber	**Power Supply Status** Off: The system is powered off. Yellow: A Power Supply in the system is not functioning correctly. Green: All installed PSUs are operating correctly.
STAT (Status)	Green/Amber/Red	**System Status** Red: The system is booting Red Blinking Red: The system has failed a hardware integrity error. Yellow: Rommon has completed booting and system is at Rommon prompt or booting platform software. Green: Indicates normal System Operation.
USB CON/SERIAL CON	Green/Yellow	**Console Active** Green indicates that the console port is active.
RJ-45 CON	Green/Yellow	**Serial Console Active** Green indicates that the RJ-45 is the active console port.

LED	Colour	Description
TEMP	Green/Yellow/Red	Off: Monitor is not active. Red: The system has detected a critical overcurrent event and may shut down. Blinking Yellow: One or more temperature sensors in the system are outside the acceptable range. Green: All the temperature sensors in the system are within acceptable range.
FAN	Yellow/Green	Yellow: One or more fans in the system are outside the acceptable range. Green: All temperature sensors and fans in the system are within acceptable range.
FXS/FXO (Voice Port Status)	Green/Off	Green: There is at least one active call on the onboard analog FXS/FXO module. Off: There is no active call on the onboard analog FXS/FXO module.

Technical Specifications

To access the Cisco VG420 Voice Gateway technical specifications, see the *Cisco VG420 Voice Gateway Datasheet*.

Planning the Installation

This chapter provides preinstallation information such as recommendations and requirements that must be met before you begin installing the voice gateway. Before you begin, inspect all the items for shipping damage. If anything appears to be damaged or if you encounter problems while installing or configuring your hardware, contact customer service.

Standard Warning Statements

This section describes the warning definition and then lists the core safety warnings for the Cisco VG420 Voice Gateway.

General Safety Recommendations

Follow these guidelines to ensure general safety:

- Never attempt to lift an object that might be too heavy for you to lift by yourself.

- Keep the chassis area clear and dust-free during and after installation.

- If you remove the chassis cover, place it in a safe place.

- Keep tools and chassis components away from walk areas.

- Do not wear loose clothing that could get caught in the chassis. Fasten any tie or scarf and roll up sleeves.

- Wear safety glasses when working under conditions that might be hazardous to your eyes.

- Do not perform any action that may create a hazard to people, or which makes the equipment unsafe.

Safety With Electricity

Follow these guidelines when working on the equipment powered by electricity:

- Locate the emergency power-off switch in the room in which you are working. If an electrical accident occurs, you can quickly turn off the power.

- Disconnect all the power source before you install or remove a chassis and before you work near power supplies.

- Look carefully for possible hazards in your work area such as moist floors, ungrounded power extension cables, frayed power cords, and missing safety grounds.

- Do not work alone if hazardous conditions exist.

- Never assume that the power is disconnected from a circuit. Always check.

- Never open the enclosure of the internal power supply.

- If an electrical accident occurs to another person, proceed as follows:

    - Use caution; do not become a victim yourself.

    - Turn off the power supply to the device.

    - If possible, send another person to get medical aid. Otherwise, assess the condition of the victim and then call for help.

    - Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate actions.

In addition, use the following guidelines when working with any equipment that is disconnected from a power source but has telephone wiring or other network cabling connections:

- Never install a telephone wiring during a lightning storm.

- Never install telephone jacks in wet locations unless the jack is specifically designed for it.

- Never touch uninsulated telephone wires or terminals unless the telephone line is disconnected at the network interface.

- Use caution when installing or modifying telephone lines.

- Remove all the power cables from all the installed power supplies before opening the chassis.

Prevent Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It can occur if electronic printed circuit cards are improperly handled and can cause complete or intermittent failures. Always follow these ESD prevention procedures when removing and replacing modules:

- Ensure that the router chassis is electrically connected to the ground.

> - Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to channel unwanted ESD voltages safely to the ground. To guard against ESD damage and shocks, the wrist strap and cord must operate effectively.
>
> - If no wrist strap is available, ground yourself by touching a metal part of the chassis.

General Site Requirements

This section describes the requirements your site must meet for the safe installation and operation of your router. Ensure that the site is properly prepared before beginning installation. If you are experiencing shutdowns or unusually high errors with your existing equipment, the guidelines provided in this section can also help you isolate the cause of failures and prevent future problems.

General Precautions

Observe the following general precautions when using and working with your hardware:

- Keep your system components away from radiators and heat sources, and do not block cooling vents.

- Do not spill food or liquids on your system components, and never operate the product in a wet environment.

- Do not push any objects into the openings of your system components. Doing that can cause fire or electric shock by shorting out interior components.

- Position system cables and power supply cables carefully. Route system cables and the power supply cable and plug so that they cannot be stepped on or tripped over. Ensure that nothing else rests on your system component cables or power cable.

- Do not modify the power cables or plugs. Consult a licensed electrician or your power company for electrical modifications at your site. Always follow your local and national wiring rules.

- If you turn off your system, wait at least 30 seconds before turning it on again to avoid system component damage.

Site Selection Guidelines

The Cisco VG420 Voice Gateway requires specific environmental operating conditions. Temperature, humidity, altitude, and vibration can affect the performance and reliability of the router.

The installation location (room, closet, or cabinet) for the Cisco VG420 Voice Gateway should always be well ventilated and provide adequate air circulation to ensure proper cooling. The room temperature should be maintained between 32 to 122°F (0 to 50°C).

Site Environmental Requirements

Environmental monitoring in the router protects the system and components from damage caused by excessive voltage and temperature conditions. To ensure normal operation and avoid unnecessary maintenance, plan and prepare your site configuration before installation. After installation, ensure the site maintains the required environmental characteristics.

Environment	Specification
Steady state operating	32℉ to 104℉ (0℃ to 40℃)
Storage	-40℉ to 158℉ (-40℃ to 70℃)
Humidity operating (noncondensing)	5 to 85%
Humidity non-operating (noncondensing)	5 to 95%
Altitude operating over allowable temperature range	0 to 10,000 feet (0 to 3050 meters)
Altitude non-operating; over allowable temperature range	0 to 15,000 ft (0 to 4572 meters)
Thermal shock non-operating	30℃/ hr

Rack Requirements

The Cisco VG420 Voice Gateway includes brackets for use with a 19-inch equipment frame rack or, if specified in your order, optional larger brackets for use with a 23-inch equipment frame rack.

The following information can help you plan your equipment rack configuration:

- Allow clearance around the rack for maintenance.

- Enclosed racks must have adequate ventilation. Ensure that the rack is not congested, because each device generates heat. An enclosed rack should have louvered sides and a fan to provide cooling air. Heat generated by equipment at the bottom of the rack can be drawn upward into the intake ports of the equipment above it.

- If you have installed the chassis using slide rails, check for blocked ventilation ports when it is in position in the rack or cabinet. Ensure that the ventilation ports of the Cisco VG420 Voice Gateway are not blocked.

- Baffles can help isolate exhaust air from intake air. Baffles also help draw cooling air through the cabinet. The best location for the baffles depends on the airflow patterns in the rack. You can test the airflow by experimenting with different equipment arrangements.

Warning **Statement 1076—** Clearance Around the Ventilation Openings

To prevent airflow restriction, allow clearance around the ventilation openings to be at least:1 in (25.4mm).

Environmental Requirements

The location of your hardware and the layout of your equipment rack or wiring room are extremely important considerations for proper operation. Equipment placed too close together, inadequate ventilation, and

inaccessible panels can cause malfunctions and shutdowns, and can make maintenance difficult. Plan for access to both front and rear panels of the hardware.

When planning your site layout and equipment locations, refer to the General Site Requirements section. If you are currently experiencing shutdowns or an unusually high number of errors with your existing equipment, these precautions and recommendations may help you to isolate the cause of failure and prevent future problems.

- Ensure that the room where your voice gateway operates has adequate air circulation. Electrical equipment generates heat. Without adequate air circulation, ambient air temperature may not cool equipment to acceptable operating temperatures.

- Always follow the ESD-prevention procedures to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.

- Ensure that the chassis cover and the module rear panels are secure. All empty network module slots, interface card slots, and power supply bays must have filler panels installed. The chassis is designed to allow cooling air to flow within it, through specially designed cooling slots. A chassis with uncovered openings permits air leaks, which may interrupt and reduce the flow of air across internal components.

- Baffles can help isolate exhaust air from intake air. Baffles also help to draw cooling air through the chassis. The best placement of the baffles depends on the airflow patterns in the rack. Find the best placement by experimenting with different configurations.

- If an equipment installed in a rack (particularly in an enclosed rack) fails, try operating the equipment individually. Power off other equipment in the rack (and in the adjacent racks) to allow the hardware maximum cooling air and clean power.

Power Guidelines and Requirements

Check the power at your site to ensure that you are receiving clean power (free of spikes and noise). Install a power conditioner, if necessary.

To handle power failure conditions, an uninterrupted power supply (UPS) is needed. A separate UPS for Cisco VG420 Voice Gateway is a viable option when the ISR/UPS is not co-located with it.

The Cisco VG420 Voice Gateway supports both AC and DC power supply. For more information on power supply, see *Power Supplies* chapter in this guide.

For additional information on the power requirements, see the *Cisco VG420 Voice Gateway Datasheet*.

Warning   **Statement 1005—** Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. To reduce risk of electric shock or fire, ensure that the protective device is rated not greater than 20A.

Warning   **Statement 1022—**Disconnect Device

To reduce the risk of electric shock and fire, a readily accessible disconnect device must be incorporated in the fixed wiring.

Warning   **Statement 1033**—Safety Extra-Low Voltage (SELV)—IEC 60950/ES1–IEC 62368 DC Power Supply

To reduce the risk of electric shock, connect the unit to a DC power source that complies with the SELV requirements in IEC 60950-based safety standards or ES1 and PS1 requirements in IEC 62368-based safety standards or to a Class 2 power supply.

Network Cabling and Interface Considerations

Network Cabling Considerations

The cable types that are used are dependent on the Cisco VG420 Voice Gateway that you are using. The following are the cable types that are used in the Cisco VG420 Voice Gateway:

- GE cables (RJ-45 to RJ-45 straight-through cables)
- Analog voice cables (RJ-21)

Interface Considerations

When you run cables for any significant distance in an electromagnetic field, interference can occur between the electromagnetic field and the signals on the cables. This has two implications for the installation of terminal plant cabling:

- Unshielded plant cabling can emit radio interference.
- Strong electromagnetic interference (EMI), especially as caused by lightning or radio transmitters, can destroy the EIA/TIA-232 drivers and receivers in the Cisco VG420 Voice Gateway.

If you use twisted-pair cables with a good distribution of grounding conductors in your plant cabling, emitted radio interference is unlikely.

If you have cables exceeding recommended distances, or if you have cables that pass between buildings, give special consideration to the effect of lightning strikes or ground loops. If your site has these characteristics, consult experts in lightning suppression and shielding. The electromagnetic pulse caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to destroy electronic devices.

Most data centres cannot resolve such infrequent but potentially catastrophic problems without pulse meters and other special equipment. Take precautions to avoid these problems by providing a properly grounded and shielded environment and by installing electrical surge suppression.

If you remove any module, you must either install a module in its place or install a cover plate over the opening. All module openings must be either occupied or covered to prevent electromagnetic interference.

For advice on the prevention of electromagnetic interference, consult experts in radio-frequency interference (RFI).

Tools and Equipment Required for Installation

You need the following tools and equipment to install and upgrade the voice gateway and its components:

- Standard flat-blade screwdriver as required for attaching the brackets for rack mounting.

- Phillips screwdriver for attaching the brackets to the voice gateway.

- Mounting brackets and screws for the 19 or the 23 inches rack, if required.

- Four telco machine screws, for installing the chassis in a rack (use the screw size required by the rack).

- An ESD-preventive wrist strap.

- A modem for remote configuration.

In addition, you might also need the following external equipment:

- A Console terminal or PC with terminal emulation software

- A PC running terminal emulation software for administrative access

- A modem for remote access

- Analog voice RJ-21 and RJ-11 cables

- An ethernet switch

Site Log

We recommend that you maintain a site log to record all actions relevant to the system. A site log typically includes:

- Installation - Print a copy of the installation checklist and insert it into the site log.

- Upgrades and maintenance - Use the site log to record ongoing maintenance and expansion history. Update the site log to reflect the following:

  - Configuration changes

  - Maintenance schedules, requirements, and procedures performed

  - Comments, notes, and problems

  - Changes and updates to Cisco IOS software

Installation Checklist

The following installation checklist lists the tasks for installing a Cisco VG420 Voice Gateway. Print a copy of this checklist and mark the entries as you complete each task. For each Cisco VG420 Voice Gateway, include a copy of the checklist in your site log.

- Installation checklist for site : —————--

- Cisco voice gateway name/serial number : —————-

Task	Verified By	Date
Background information placed in Site Log		
Environmental specifications verified		
Site power voltages verified		
Installation site prepower check completed		
Required tools available		
Additional equipment available		
Cisco voice gateway received		
Installation guide received		
Information packet, warranty card, and Cisco.com card received		
Software version verified		
Rack, or desktop mounting of chassis completed		
Initial electrical connections established		
ASCII terminal attached to console port		
Modem attached to console port (for remote configuration)		
Signal distance limits verified		
Startup sequence steps completed		

Installing the Cisco VG420 Voice Gateway

This chapter provides the prerequisites and the procedure for installing the Cisco VG420 Voice Gateway in an equipment rack.

Prerequisites for the Installation

Before installing the device, read the safety warnings and gather the required tools and equipment. For more information about the required tools and equipment, see the *Tools and Equipment* section in this hardware installation guide.

Safety Recommendations

Note   **Statement 407**—Japanese Safety Instruction

You are strongly advised to read the safety instruction before using the product.

https://www.cisco.com/web/JP/techdoc/pldoc/pldoc.html

When installing the product, use the provided or designated connection cables/power cables/AC adapters.

〈製品仕様における安全上の注意〉
www.cisco.com/web/JP/techdoc/index.html

接続ケーブル、電源コードセット、ACアダプタ、バッテリなどの部品は、必ず添付品または
指定品をご使用ください。添付品・指定品以外をご使用になると故障や動作不良、火災の
原因となります。また、電源コードセットは弊社が指定する製品以外の電気機器には使用
できないためご注意ください。

Warning   **Statement 1028**—More Than One Power Supply

This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit.

Unpack the Device

Do not unpack the device until you are ready to install it. If the final installation site will not be ready for some time, keep the chassis in its shipping container to prevent accidental damage. When you are ready to install the chassis, proceed with unpacking it.

The chassis, accessory kit, publications, and any optional equipment you ordered may be shipped in more than one container. When you unpack the containers, check the packing list to ensure that you received all of the items on the list.

If anything appears damaged, or if you encounter problems when installing or configuring your system, contact a customer service representative.

Mounting the Voice Gateway in Rack

You can install the Cisco VG420 Voice Gateway in 19-inch (48.26-cm) EIA and 23-inch (58.42-cm) Southwestern Bell Corporation (SBC) racks. You can also mount the voice gateway in a 600-mm ETSI rack. Use the standard brackets shipped with the hardware for mounting the chassis in a 19-inch EIA rack; you can order optional larger brackets for mounting the chassis in a 23-inch SBC rack.

You can mount the voice gateway in the following ways:

- Center-front mounting: Brackets attached in the center front of the chassis with only the front panel facing forward.

- Center-back mounting: Brackets attached in the center back of the chassis with only the back panel facing forward.

- Front mounting: Brackets attached at the front of the chassis with the front panel facing forward.

- Back mounting: Brackets attached at the back of the chassis with the back panel facing forward.

Perform the following steps to mount the device on the rack:

Step 1   Attach the mounting brackets to the chassis as shown in the following images, using the screws provided.

Caution   Do not over-torque the screws. The recommended torque is 15 to 18 inch-lb (1.7 to 2.0 N-m).

Figure 7: Attaching the Brackets to the Chassis
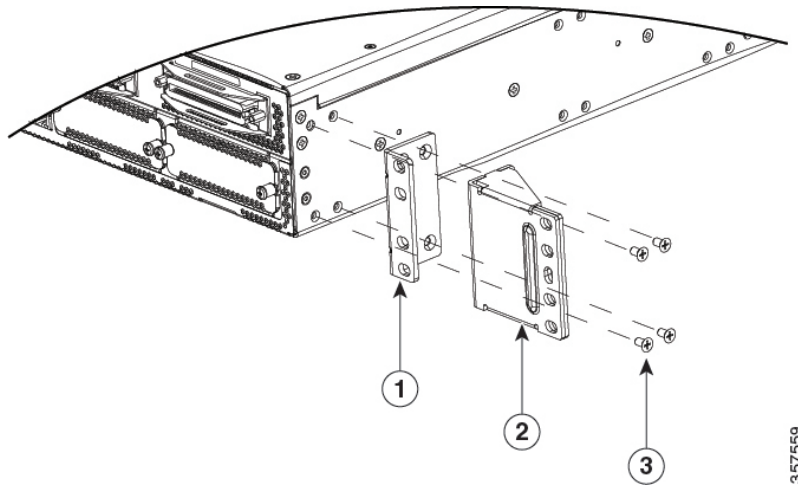
| 1	19-inch Rack Mount Bracket
2	23-inch Rack Mount Bracket
3	#6-32 Screws

Step 2   Attach the second bracket to the opposite side of the chassis. Use a number-2 Phillips screwdriver to install the number-8 bracket screws.

Attention   Your chassis installation must allow unrestricted airflow for chassis cooling.

Step 3   Use the screws provided with the rack to install the chassis in the rack. For both the 19-inch EIA brackets and the 23-inch SBC brackets, start the lower pair of screws first, and rest the brackets on the lower screws while you insert the upper pair of screws.

*Figure 8: I/O Side Mounting*
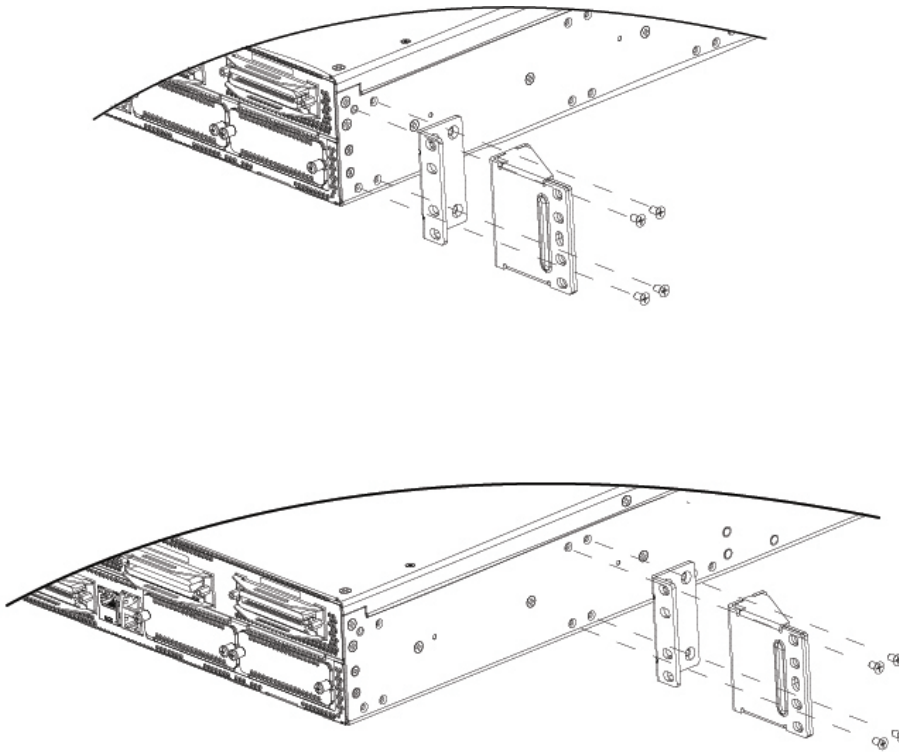
357560

Figure 9: PS and Middle Side Mounting
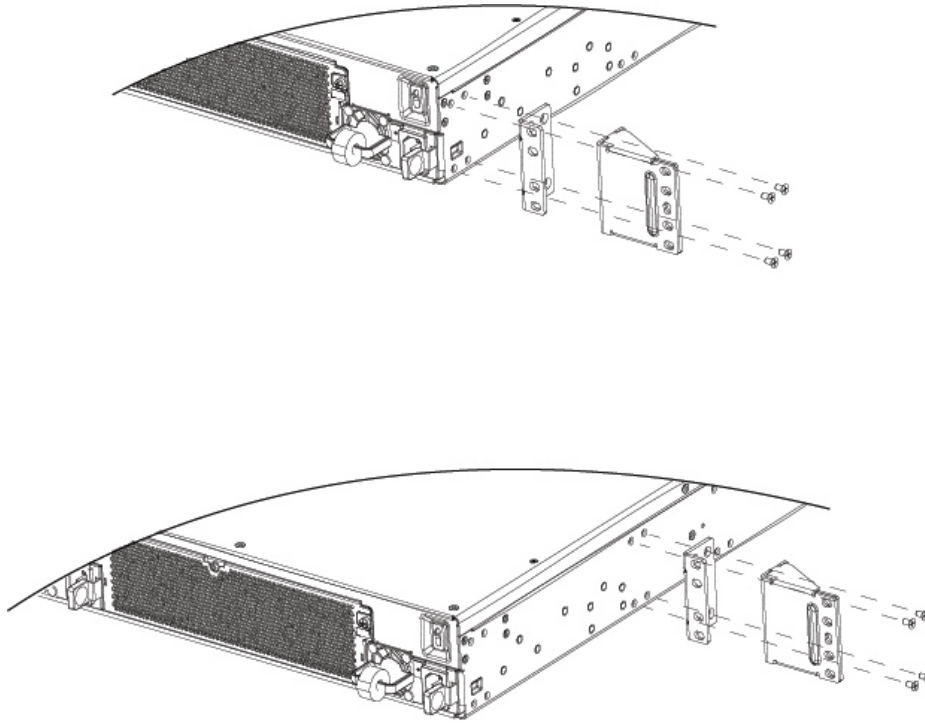
357561

The screw slots in the brackets are spaced to line up with every second pair of screw holes in the rack. When the correct screw holes are used, the small, threaded holes in the brackets line up with unused screw holes in the rack. If the small holes do not line up with the rack holes, you must raise or lower the brackets to the next rack hole.
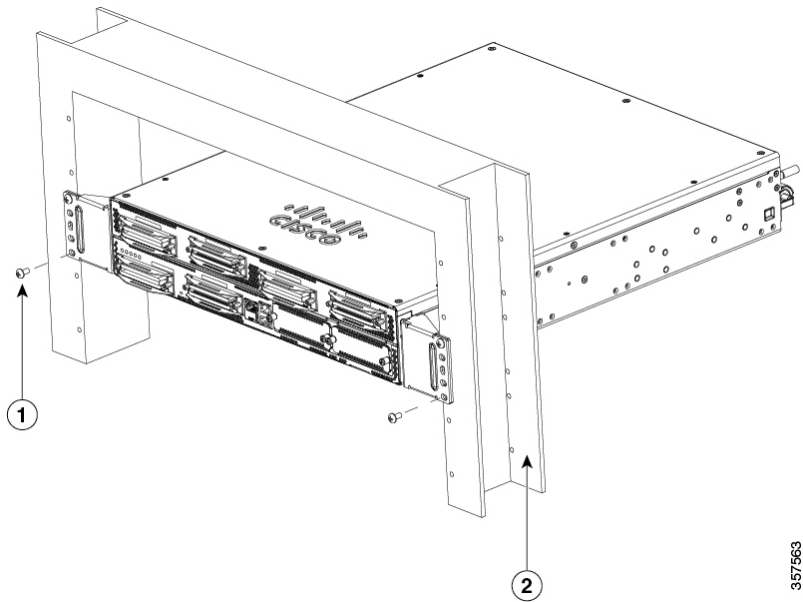
The following images represent rack mounting for the Cisco VG420 Voice Gateway:

Figure 10: Rack Mounting
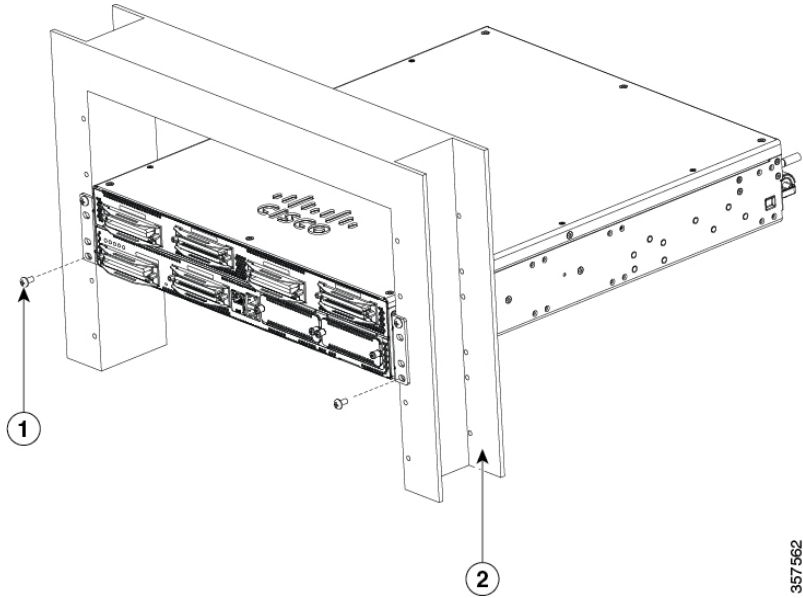
1	Rack Mount Screw
2	23-inch Rack

Figure 11: Rack Mounting

1	Rack Mount Screw
2	23-inch Rack

Warning **Statement 1047**—Overheating Prevention

To reduce the risk of fire or bodily injury, do not operate the unit in an area that exceeds the maximum recommended ambient temperature of: 40 degrees C.

What to do next

After you install the voice gateway, you must connect the chassis to a reliable earth ground. For the chassis ground connection procedures, see the *Chassis Grounding* section in this hardware installation guide.

Chassis Grounding

To install the ground connection for your router, perform the following steps:

Before you begin

Use a size 10 AWG (4 mm2) or larger copper wire and an appropriate user-supplied ring terminal with an inner diameter of 1/4 in. (5–7 mm).

Step 1   Strip one end of the ground wire to the length required for the ring terminal.

Step 2   Crimp the ground wire to the ring terminal, using a crimp tool of the appropriate size.

Step 3   Attach the ground lug or ring terminal to the chassis as shown in the following image. Use one of the screws provided. Tighten the screws to a torque of 8 to 10 in-lb (0.9 to 1.1 N-m).

Step 4   Connect the other end of the ground wire to a known reliable earth ground point at your site.

Figure 12: Chassis Grounding
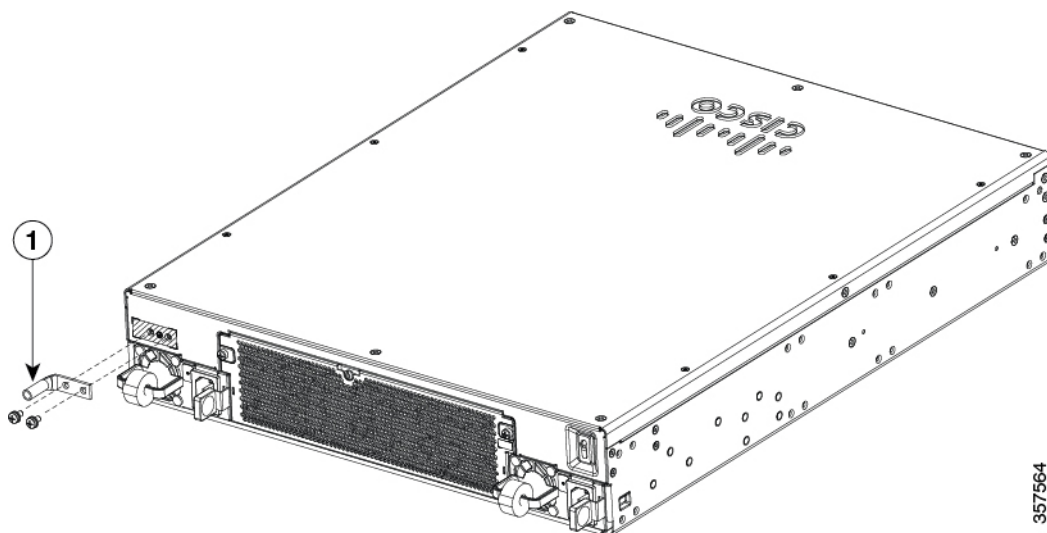
In the above image, 1 indicates Ground Lug.
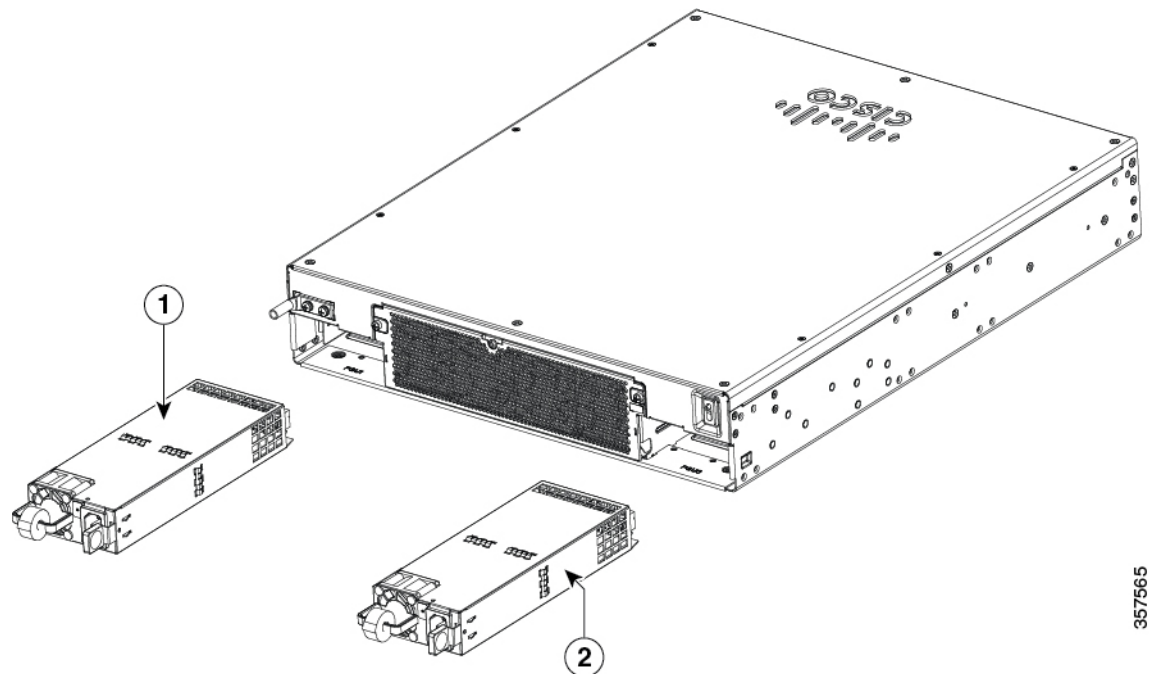
Setting up the Power Supplies

The following chapter describes the AC and DC power supplies for Cisco VG420 Voice Gateway, and how to set up the power supply for your voice gateway.

AC Power Supply

The Cisco VG420 Voice Gateway supports a PWR-VG420-650WAC AC power supply. The following image displays the AC power supply.

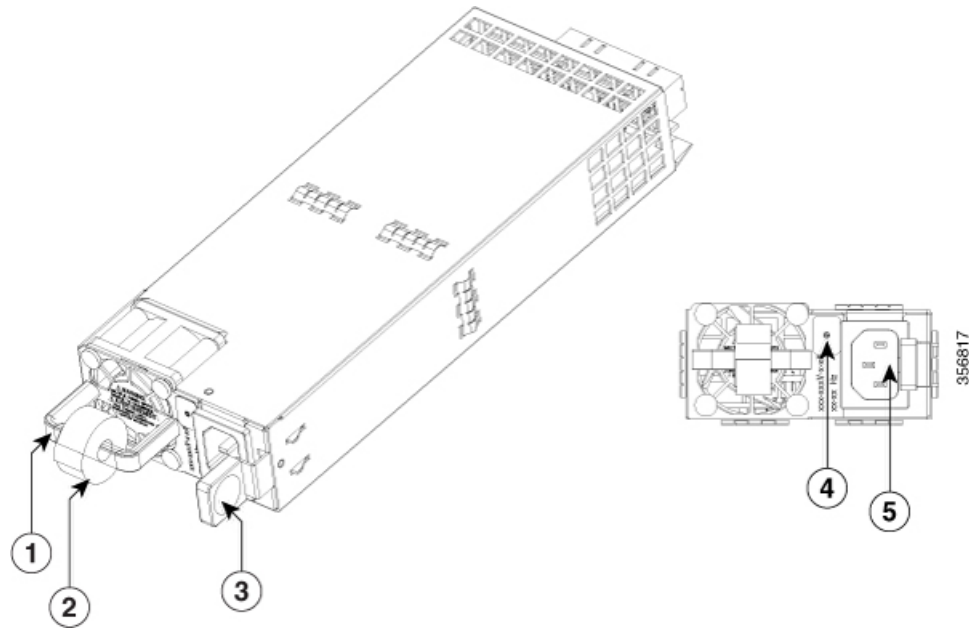**Figure 13: 650WAC AC Power Supply**

Figure 14: 650WAC AC Power Supply

Table 3:

1	Handle
2	Strain Relief
3	Latch
4	Status LED
5	Power Socket

Removing and Replacing the AC Power Supply

To remove an AC power supply from the voice gateway, perform these steps:

Step 1   Read the safety warnings section of this document.

Step 2   If there is only one power supply in the system, shut down the device before removing the power supply.

Step 3   If there are redundant power supplies in use, you do not have to shut down the device prior to replacing the power supply. You can replace the power supply while the device is in service.

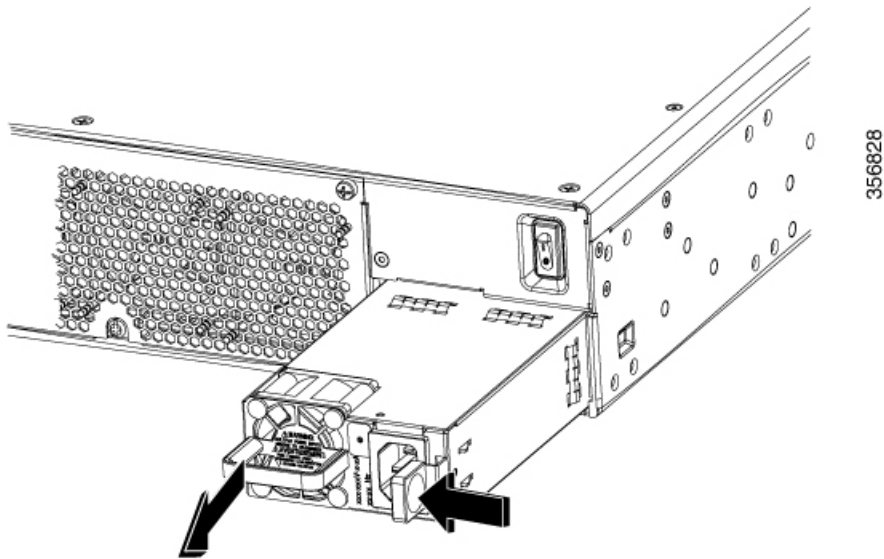**Step 4**   If in use, remove the strain relief securing the power supply cable to the power supply latch.
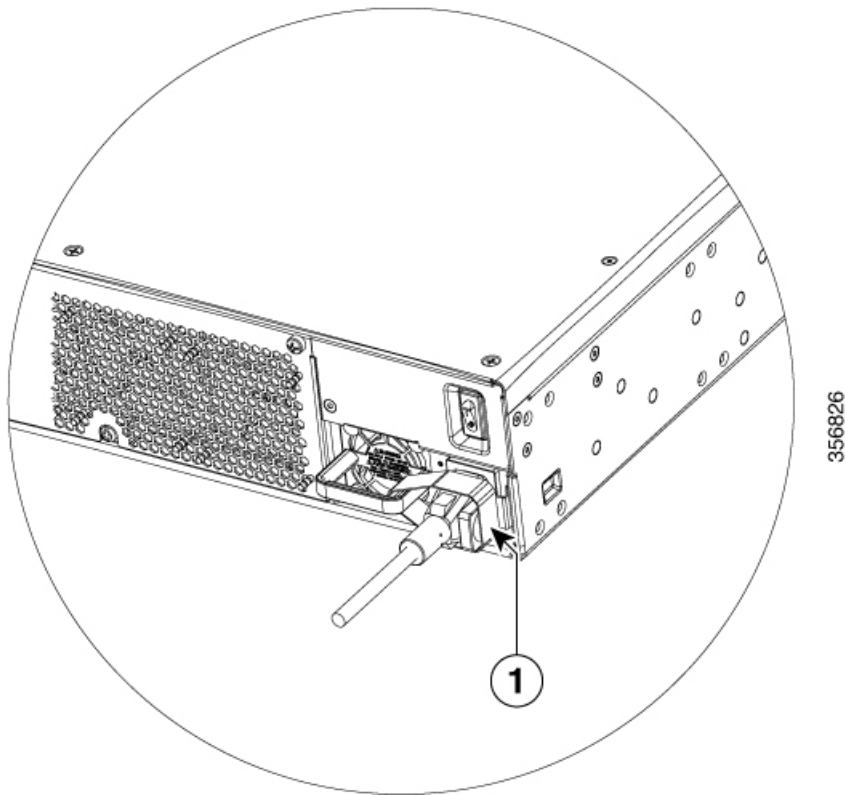
356826

Step 5   Remove the AC power cord from the power socket.
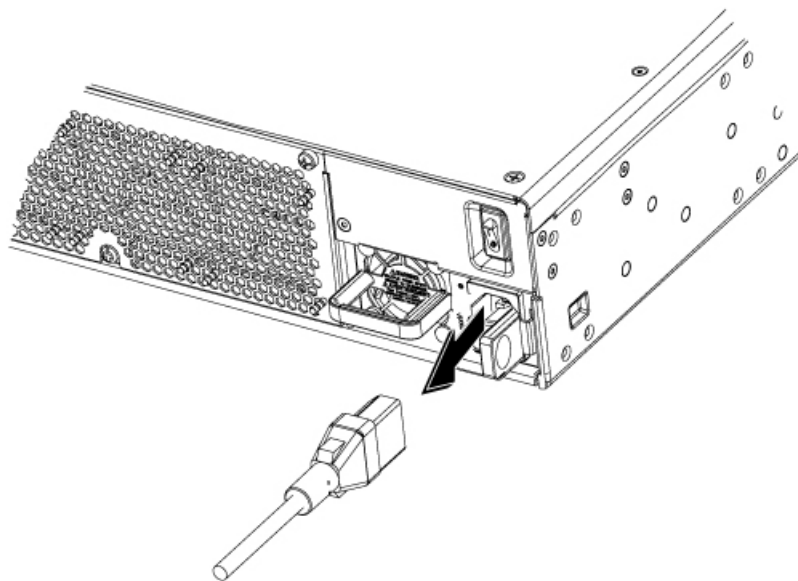
356827

Step 6   Depress the power supply latch and use the handle to pull the supply out of the device.

Step 7   To replace or install an AC power supply into the device, perform these steps:

a)   Use the handle to push the power supply into the router. The power supply latch should provide an audible click when the supply is fully seated.

b)   Install the AC power cord into the power socket on the power supply.

c)   If used, reapply the strain relief strap around the power cord and the power supply latch.

d)   If the device was turned off, turn the power back on to the device.

DC Power Supply

The Cisco VG420 Voice GatewayCisco VG420 Voice Gateway supports the PWR-VG420-650WDC DC power supply type. The DC power supply for this device is shown in the following image:
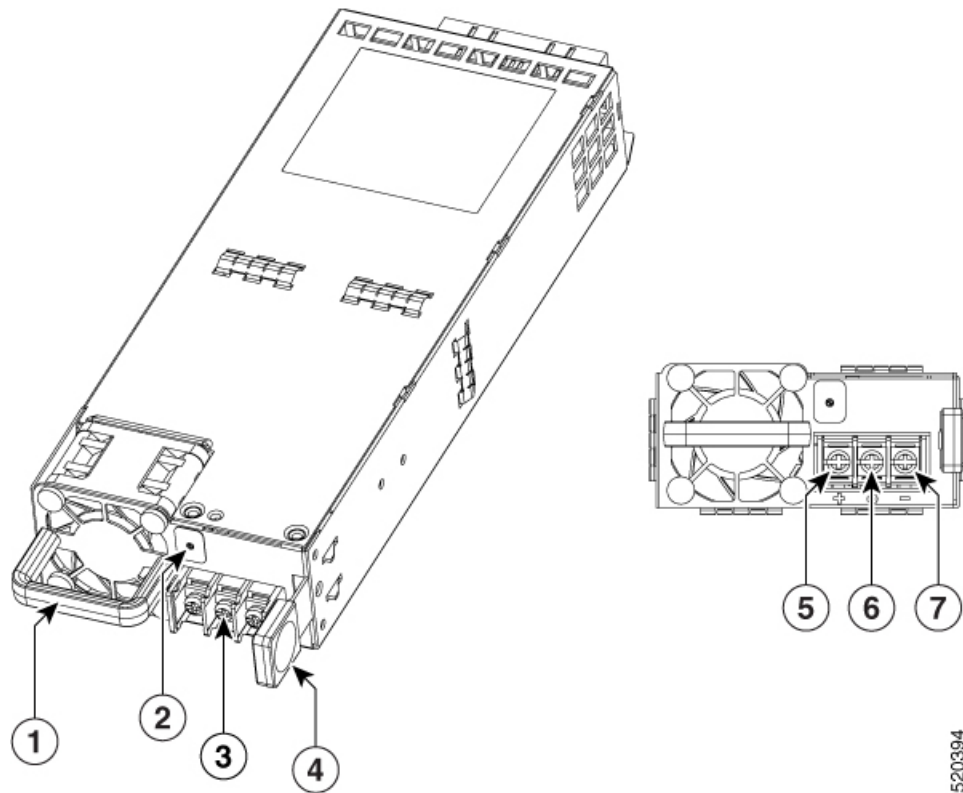
1	Handle
2	Status LED
3	Ground lead wire
4	Latch
5	Positive (+) lead wire
6	Ground lead wire
7	Negative (-) lead wire

Preparing the Wire for Connecting to the DC Power Supply

In the device, the DC power supply has a terminal block that is installed into the power supply terminal block header.

Step 1   Turn off the circuit breaker from the power source to be connected to the power source. Ensure the wires to be attached to the power supply are not energized.

The wires connecting to the power supply can be stripped back and terminated directly to the power supply terminal block. Alternately a crimp style spade terminal lug can be attached to the end of the wire. If using a terminal lug, follow

the manufacturer's instructions for terminating the lug to the wire. If terminating directly to the terminal block using bare wire, following the directions shown below.

Step 2   Use a wire-stripping tool to strip each of the two wires coming from the DC input power source to approximately 0.39 inch (10 mm) +/- 0.02 inch (0.5 mm).

It is recommended that 14 AWG insulated wire be used. Do not strip more than the recommended length of wire because doing so could leave the wire exposed from the terminal block and shows a stripped DC input power source wire.

Figure 15: DC Power Supply
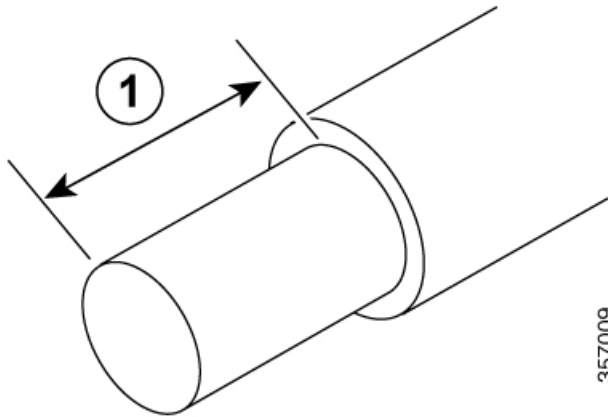
Step 3   Identify the positive and negative feed positions for the terminal block connection of the voice gateway:

   • Positive (+) lead wire (right)

   • Negative (–) lead wire (left)
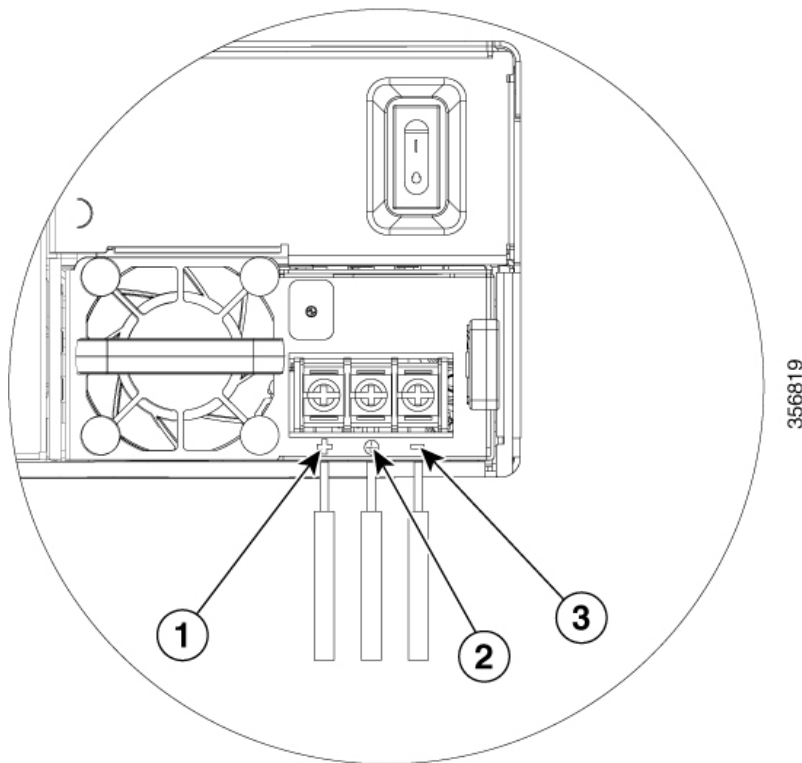
Step 4   Identify the positive, ground, and negative feed positions for the terminal block connection of the device:

- Positive (+) lead wire(left)

- Ground Lead wire (middle)

- Negative (−) lead wire(right)

Installing the DC Input Power

Before you begin

This section describes how to install the DC power supply input power leads to DC input power supply. Before you begin, read these important notices:

- The color coding of the DC input power supply leads depends on the color coding of the DC power source at your site. Ensure that the lead color coding you choose for the DC input power supply matches the lead color coding used at the DC power source and verify that the power source is connected to the negative (−) terminal and to the positive (+) terminal on the power supply.

- Ensure that the chassis ground is connected on the chassis before you begin installing the DC power supply.

SUMMARY STEPS

    1. Follow the steps provided in the *Chassis Grounding* section in the same order for this procedure.

DETAILED STEPS

|	Command or Action	Purpose
Step 1	Follow the steps provided in the *Chassis Grounding* section in the same order for this procedure.	

Removing and Replacing the DC Power Supply

To remove the DC power supply, perform these steps:

Step 1   Read the safety warnings section of this document.

Step 2   If there is only one power supply in the system, shut down the device before removing the power supply.

Step 3   If there are redundant power supplies in use the device does not have to be shut down prior to replacing the power supply. The power supply may be replaced while the device is in service.

Step 4   At the power distribution panel or at the local circuit breaker, remove the power from the DC power leads (label **1**) attached to the power supply to be replaced.
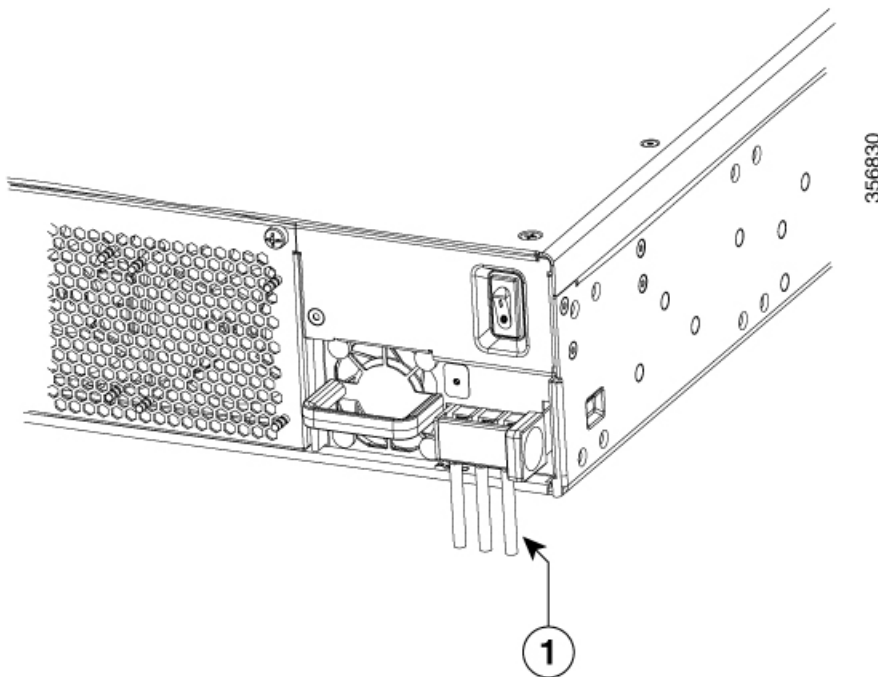
Step 5   Remove the terminal block cover and loosen the terminal screws (label **1**) securing the power cabling. Remove the power cabling from the terminal block.
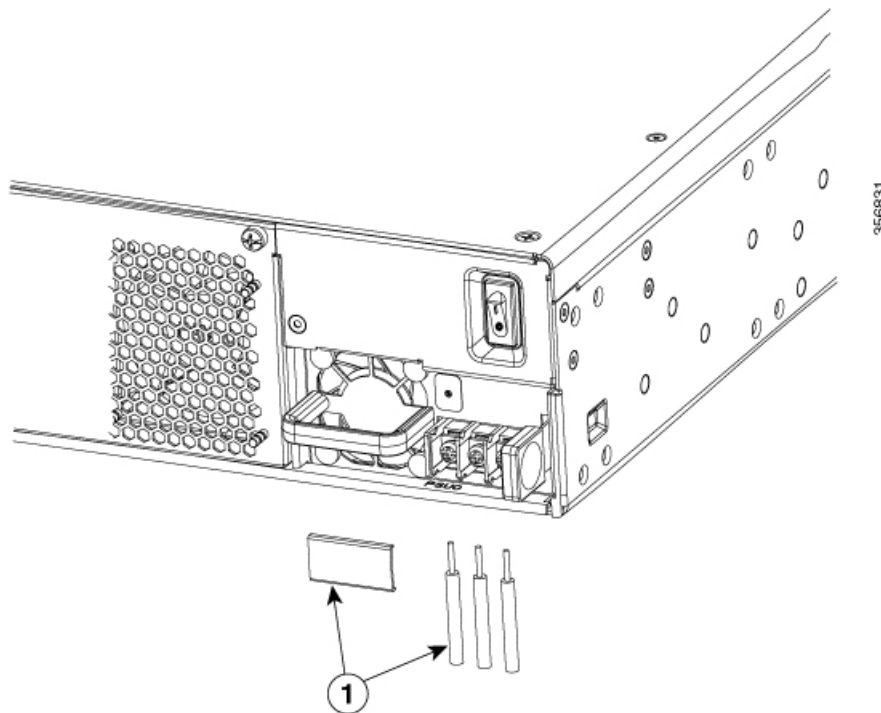
Step 6   Depress the power supply latch and use the handle to pull the supply out of the device.

Step 7   To replace or install a DC power supply from the device, perform these steps:

a) Use the handle to push the power supply into the router. The power supply latch should provide an audible click when the supply is fully seated.

b) If this is an initial installation, please see the section on preparing the DC power leads below.

c) Install the DC power leads into the terminal block and tighten the terminal block screws to secure the cables. For the PWR-VG420-650WDC power supply the negative lead installs into the left terminal position and the positive lead installs into the right terminal position. The polarity is marked on the faceplate of the power supply.

> **Caution**   Do not over torque the terminal block captive screws. Ensure that the connection is snug, but the wire is not crushed. Verify by tugging lightly on each wire to ensure that they do not move.

d) Reinstall the terminal block cover.

e) If the device was turned off, turn the power back on to the device.

Replacing a Fan Tray

To replace the fan tray, complete the following steps:

✎ **Note**   If you are hot-swapping the fan tray, it is recommended to complete the operation within two minutes to ensure that the device remains within operating temperature.

Step 1   Loosen the three captive fan tray screws.

Step 2   Pull the fan tray out.

Step 3   Insert the replacement fan tray and tighten the three captive screws.
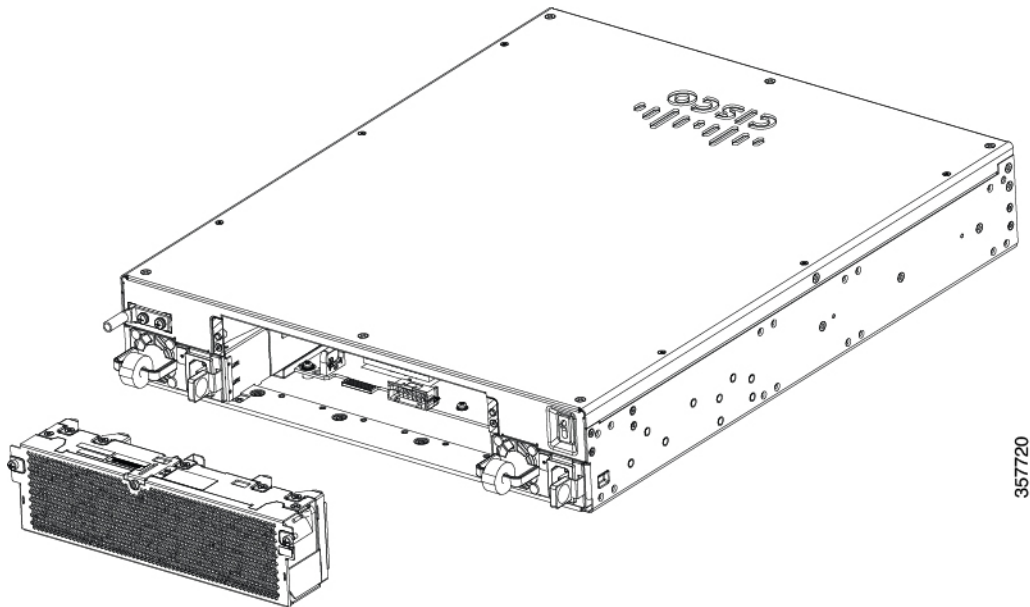
C H A P T E R 7

Configuring the Cisco VG420 Voice Gateway

After the Cisco VG420 Voice Gateway is operational, see the *Cisco VG420 Voice Gateway Software Configuration Guide* to configurethe voice gateway. This guide also specifies the configuration information for specific services and functions, and provides the information to make changes to an existing configuration.