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

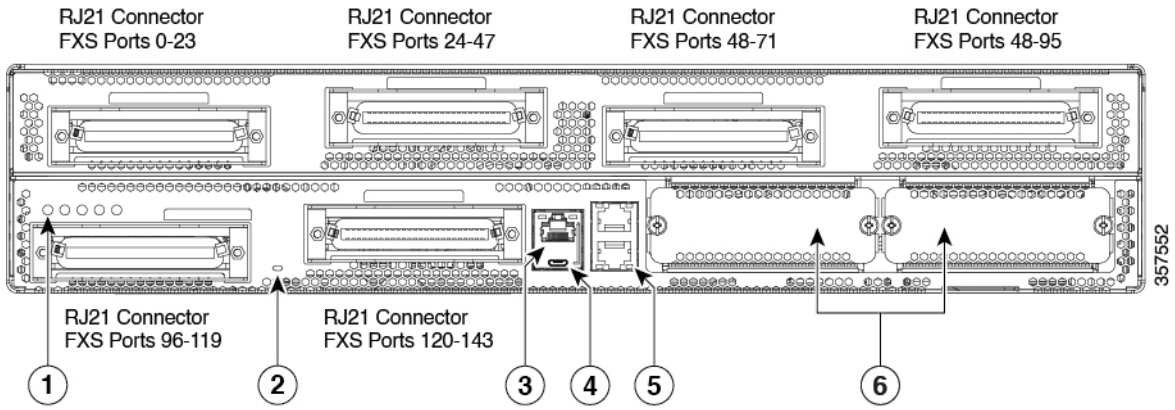
The Cisco VG420 Voice Gateway supports the following protocols:

- 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

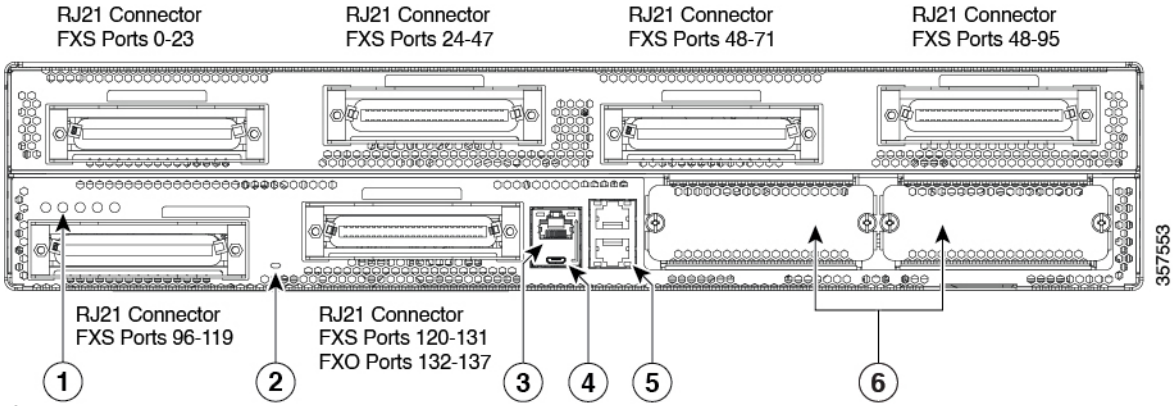
The following images show the I/O and side panel views of the Cisco VG420 Voice Gateway chassis:

Figure 1: VG420-144FXS I/O Panel View



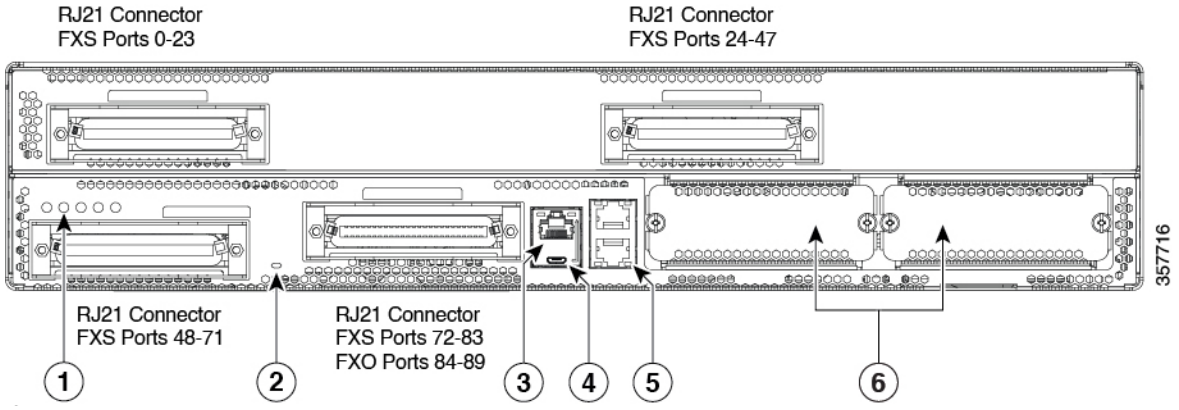
1	Status LEDs
2	FXS LED
3	Serial Console
4	Mini USB Console
5	Ethernet Ports
6	NIM Modules

Figure 2: VG420-132FXS/6FXO I/O Panel



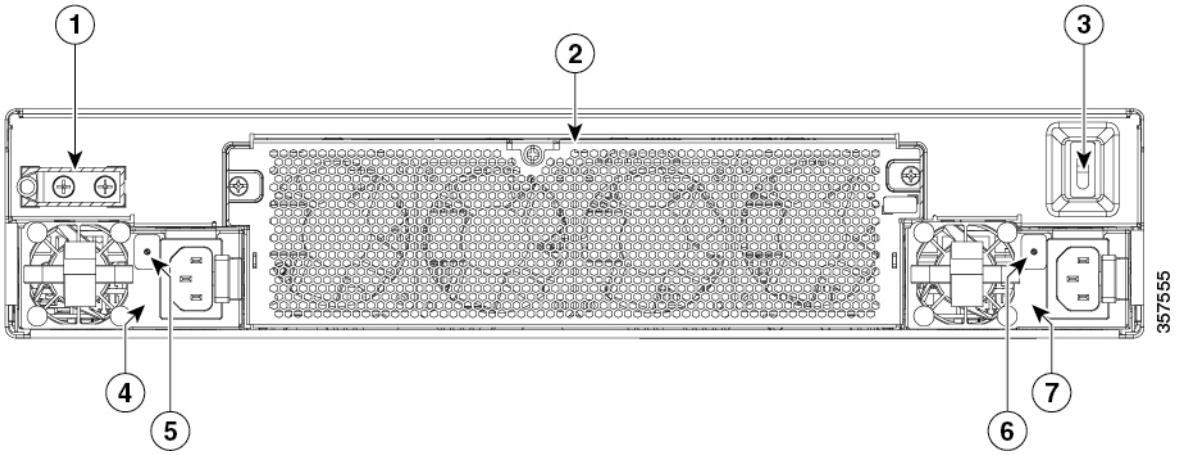
1	Status LEDs
2	FXS LED
3	Serial Console
4	Mini USB Console
5	Ethernet Ports
6	NIM Modules

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

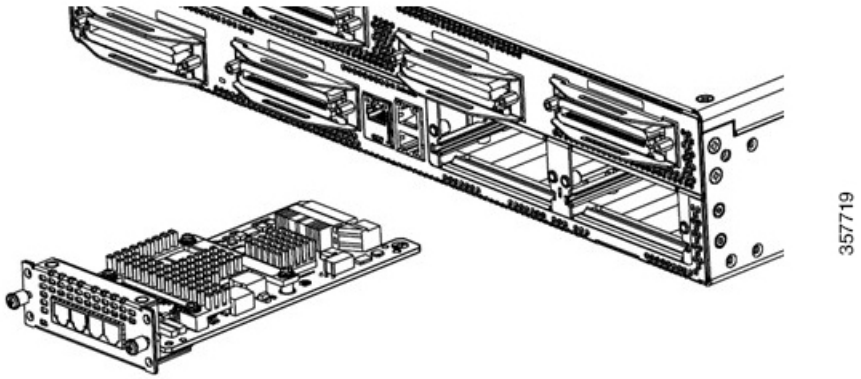
NIM-2FXS/4FXOP

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:

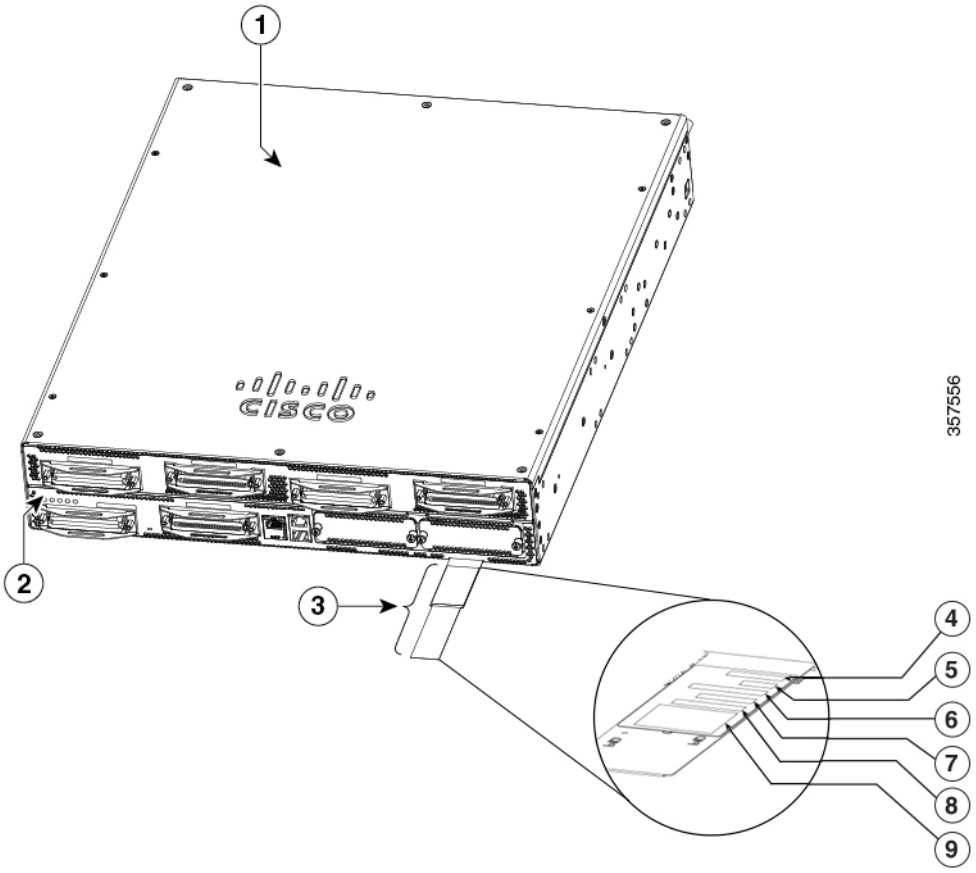
- A search option that allows browsing for models by using a tree-structured product hierarchy.
- A search field on the final results page that makes it easier to look up multiple products.
- End-of-sale products clearly identified in results lists.

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*.