



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 Cisco customer service.

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Standard Warning Statements

This section describes the warning definition and then lists the core safety warnings for the Cisco VG410 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.



Warning **Statement 1046**—Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

If your unit has modules, secure them with the provided screws.

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.

General Safety Warnings



Warning **Statement 9001**—Product Disposal

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



Warning Statement 1074—Comply with Local and National Electrical Codes

To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes.

Site Selection Guidelines

The Cisco VG410 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 VG410 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 104°F (0 to 40°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°F to 104°F (0°C to 40°C)
Storage	-40°F to 158°F (-40°C to 70°C)
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°C/ hr

Rack Requirements

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 VG410 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.
- 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 uninterruptible power supply (UPS) is needed. A separate UPS for Cisco VG410 Voice Gateway is a viable option when the ISR/UPS is not co-located with it.

The Cisco VG410 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 VG410 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.

Network Cabling and Interface Considerations

Network Cabling Considerations

The following are the cable types that are used in the Cisco VG410 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 VG410 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.

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

