

G12 Communications

G12 Best Practice Network Guide



The purpose of this guide is to provide you with network information and suggestions to ensure that your network is properly configured to pass VoIP traffic from your G12 phones to the G12 servers and for G12 to be able to pass information from our servers to your LAN to forward to the phones properly to ensure the best possible voice quality and experience.



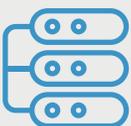
Internet Bandwidth Provider

Use a reliable bandwidth provider, not all providers are equal. Some bandwidth providers use VLANs and tagging to prioritize traffic through their network and others may use a first in first out technique which is not optimal for VoIP traffic.



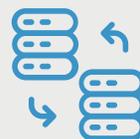
Fiber Service

This type of service usually the most reliable and highest bandwidth option and has better control for packet transmission than other bandwidth types.



Cable Modem Service

Generally can achieve higher bandwidth and provide good network connectivity.



DSL Service

DSL typically does not work the best for VoIP applications due to bandwidth limitations and issues with old copper transport more susceptible to errors and packet loss that create poor audio on VoIP calls.

Wireless Service

Wireless solutions such as cellular and fixed wireless are typically not very reliable due to low bandwidth limitations. The signal is also line of site and bandwidth can be affected based on weather (heavy clouds rain and other precipitation) decrease the endpoint from communicating to the cell tower which can create dropped packets calls or degraded calls due to low bandwidth and latency incurred. An additional downfall is with packets traveling through the air from endpoint to the communication tower the control of path is lost and can create delays with delivery of packets.

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DISABLE SIP ALG/H323

When configuring your network for VoIP prior to connecting your VoIP phones from G12, you will want to disable SIP ALG and H323 on your internet provider modem as well as your firewall, routers and any layer 3 switches on your LAN. SIP ALG H323 are often enabled by default on most layer 3 network and usually can be disabled via a shell with a command sequence or through a web GUI. If these settings are enabled, they can cause issues with call quality emulating a poor circuit taking packet loss. These settings being enabled can cause issues with endpoints registering or dropping registration as well as issues with presence features (such as lamps for voicemail notification lamps for monitored lines). This can also affect issues with phones not ringing correctly and still ringing after a call has been picked up.



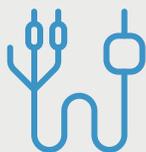
Cabling Configuration

When connecting a phone to your network it is always best to connect to your network with a physical network cable rather than using the wireless interface. This will allow for a more controlled flow and path for the audio packets to travel over reducing chances for latency or loss that will degrade audio quality.



Use Separate Cabling For PC's And Phones

Phones should ideally be run from separate VLAN on your network to be able to implement shaping and QoS to prioritize processing of voice traffic. Daisy chaining a PC to the phone is not preferred as this can degrade performance as the phone is also acting as a switch and processing phone traffic as well as pc and under heavy load can reduce phone resources (memory, CPU) which can ultimately delay forwarding of traffic and degrade audio



Use A Separate VLAN For Voice Traffic

Competing network traffic can cause congestion on local link and degrade two-way communication causing loss of packets or delayed packets. Implementing a separate VLAN for voice allows you to be able to set the VLAN as a priority to process phone traffic and ensure more precise control and highest priority traffic to reduce congestion and degraded quality of voice. Its best to use a naming scheme to ensure your VLAN's are identified as to what type of traffic is associated with that VLAN.



Implement QoS Policies

Create QoS policies that prioritize the voice traffic (VOICE VLAN) throughout your local network. A good VoIP router or firewall and configurable managed switches should include QoS settings that allow traffic to be given precedence across your network. Remember, QoS policies become easier to setup when you know where all the phones are.

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Use Traffic Shaping Techniques

Traffic shaping will work in conjunction with QoS and VLAN to allow the voice traffic to take precedence over other traffic types and allow you to delegate your available bandwidth to the phones to ensure that they have adequate bandwidth when your local and public link become congested to ensure the voice quality does not suffer.



Ports Devices Need Open to Reach G12 Phone and Config Servers

- UDP Port range 20,000 to 28,000 used for establishing RTP (Audio/Video)
- TCP/UDP Port 5060 used for sip signaling between G12's servers and Phones.
- Port 80 and port 443 TCP used for device to pull configuration.

G12 Server IP's to Whitelist

It is important to ensure that the below IP's are whitelisted so that your security device doesn't drop packets to these IP's from the physical phones or soft phones trying to reach out to G12 or receive a response from our IP's in order for your devices to be able to receive calls properly.

- 174.127.194.4 Phone Server
- 169.47.29.230 Phone Server
- 169.53.0.167 Phone Server
- 174.127.194.8 Phone Configuration Server
- 52.168.3.140 Teams Push Notification Server
- 35.197.16.246 G12 Enterprise Mobility Push Notification Server

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