VoIP QoS Frequently Asked Questions

Summary FREQUENTLY ASKED QUESTIONS

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Details

1. What are some of the factors affecting the VoIP Quality of Service (QoS)?

RingCentral's voice service is VoIP-based (voice over IP), where ALL calls traverse through your internet connection, to RingCentral (for call processing/management), then onto your destination caller's network/phone.

Because the sound of your voice (and others) is converted into thousands of packets, many factors can affect the packets, impacting call quality. The three (3) most common factors that affect call quality are Latency, Jitter, and Packet Loss.

• **Latency**
Latency (also known as delay) refers to the time it takes a voice packet to reach its destination. Latency is measured in milliseconds (ms) (or thousandths of a second). Latency of 150ms or less (one-way) is generally acceptable. Latency greater than 150ms (again, one way) adversely affects the call quality experience.

• **Jitter**
Jitter is the variation in delay of packet arrival times. Jitter is often caused by network congestion, timing drift, or route changes. Jitter is also measured in milliseconds (ms) (or thousandths of a second). Jitter greater than 30ms may result in packet drops thus impacting call-quality experiences.

• **Packet Loss (also known as data loss)**
Packets are sent over the Internet and reassembled at their destination. Packet loss occurs when some packets are dropped by congested network routers or switches, or discarded by the jitter buffer. The effects of this may be loss of syllables or even missing words during a conversation.

2. What are the top issues encountered with VoIP calls?

The top issues or call-quality affecting symptoms that you may encounter during a call:

• Choppy/Dropped/Delayed/Garbled
• Static/Echoing

3. What cause these issues?

For Choppy/Dropped/Delayed/Garbled:
• Network congestion/delay leading to dropped packets (Local Area Network (LAN) related issues)
• Lack of bandwidth/unable to support simultaneous calls (Internet Service Provider (ISP) related issues/ Internet connection issues)
• Inconsistent ISP/throughput performance (ISP/ Internet connection issues)

For Static/Echoing:
• (static) Loose interfacing connections (phone/handset/wall-jack).
• (static) Malfunctioning handset or phone-set.
• (static) EMI/Electromagnetic interferences such as non-LCD TV and monitors, light fixtures, etc.
• (echo) combination of delay/sound volume setting/ and/or use of speakerphone.

4. How do I resolve these issues?

For Choppy/Dropped/Delayed/Garbled:
• Are you the only one experiencing this or is it affecting most/all other phones also? Any changes and/or additions made to your local network (i.e. added a file server to the local network; added/change a network switch/router/firewall; using new, data services to/from the internet that may be a bit data intensive)? Either way, please see suggested steps below.

• Check the performance of your Internet connection. If your ability to connect to websites and/or data services is limited at the moment along with poor call-quality experiences, you may want to contact your IT Administrator, or your Internet Service Provider (ISP) to check on your internet connection. If you are able to connect to the internet fine (i.e. to websites and data services), run 3 to 4, consecutive speed tests via www.speedtest.net, to check the performance of your Internet connection. The performance may have been degraded to a point where it is contributing to 'packet loss' and/or 'jitter', which in turn will affect call-quality performance; voice traffic is highly sensitive to network performance degradations.

What to look for in the speed test results? To make use of the results, you will need to know what your contracted bandwidth/speed is; that is what bandwidth/speed are you paying for when you signed up with your ISP. That is your performance gauge. The speed test results will show the following 3 parameters… Ping (which reflects the overall delay in the network)/Download/Upload (bandwidth-speed).

The Ping results should be under 60ms; normal can range anywhere between 5ms to 48ms, as it depends on your connection with the ISP. 'Download/Upload' results should be no less than 75-80% of your contracted total. Perform 3 to 4, consecutive speed tests noting consistency in the result, and that performance is not fluctuating 20% (increase or decrease), as this degrades the effectiveness of the router's QoS handling ability. If this the case, you may need to contact your ISP to check the performance you are seeing vs what you are paying for. If possible, determine options to get a Business-level service agreement with your service. You may have to pay a bit more for the service, however it will ensure that they provide to the level of performance you are paying for consistently.

• Ensure that 'prioritization' is configured for the voice-related traffic AND that a 'minimum guaranteed bandwidth' for this prioritized traffic is set, on your router/firewall. In most Small Office Home Office (SOHO) routers, these QoS-related features are located in the QoS/Traffic Manager section of the router. Consult the manufacturer of your router for instruction on setting up the prioritization.

For Static/Echoing:
• First follow troubleshooting steps as listed in the above section ('For Choppy/Dropped/Delayed/Garbled'), to confirm that your router has been configured to **prioritize the voice traffic** and that a **minimum guaranteed bandwidth** for this prioritized traffic is set. Also that your Internet connection is performing as expected.

• If experiencing these symptoms while on your handset, put the call on speaker and see if the issue still persists and vice versa. This is to isolate the problem between a faulty handset and speaker. Desk phones provided by RingCentral are covered by warranty up to one year from the date of purchase.

• Echoing may be experienced if one or both parties in the call are on speakerphone, and the speaker volume is set to moderate or very load. This may also be caused by higher than normal delay relative to network performance. To resolve this, reduce the speaker volume or use the phone handset. If the delay is severe, run a set of speed tests through speedtest.net to confirm the Internet connection performance. If the delay if your ISP connection-related, please contact your ISP to resolve the performance matter.

• Check the physical connection of your handset to and from the base, as well as the Ethernet connection from that base to your network switch or wall-jack. Ensure that the cables are connected securely and that they are away from sources of electromagnetic interference (i.e. light fixtures, power supply and monitors)

5. What is the recommended bandwidth to support VoIP service?

An Internet connection that is stable and consistent in performance, is required to ensure good voice quality. It is recommended to have a high-speed DSL, cable or fiber connection with enough bandwidth to accommodate both your regular internet traffic and the number of simultaneous voice calls. A connection with a Business-level service agreement is preferable, though not required. RingCentral calls require 92Kbps per call (100Kbps/call, for ease of calculation; via G.711 or G.722). A speed test can be performed via www.speedtest.net to confirm your bandwidth.

NOTE: If the speed testing shows poor performance, i.e. expecting 1.5Mbps, but getting only 800Kbps, ping results are above 100ms or is dramatically inconsistent between pings (especially if in the US), please contact your Internet Service Provider (ISP) to improve your Internet connectivity.

See also:

Basic Troubleshooting Tips for Your IP Phones

Ranking