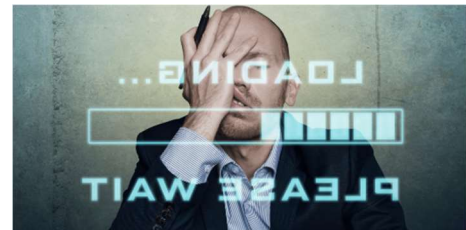


## Unified Communications & VoIP: Identifying Sources for Quality Issues

With VoIP today, deployment problems many times show themselves as “quality of voice” issues. There is plenty of information on the web, including articles which offer advice on solving VoIP voice quality problems like jitter, latency and MOS scores. Some of the ways in which we recognize voice quality problems are distorted voice, or choppy voice. In most cases, all the words can still be understood, though you may have broken words, or dead air. Sometimes broken words may have to be repeated. The most severe problems are demonstrated by very distorted and choppy voice, lost sentences, extended silence, and even dropped calls. If you are experiencing any of these problems, here is a short list of common causes:

**Poor Internet Service:** VoIP is sensitive to problems on the Internet and many ISPs do not take care that they provide a reliable circuit. These networks consist of myriad routers that connect and handoff traffic. Each hop has some potential for creating congestion which may be fine for normal data traffic but will cause problems for VoIP, as delays tend to manifest with poor voice quality. The more circuitous the route, the greater potential for problems. Many times, you may have a faulty cable modem, possibly an outside connection that needs upgrade, an overloaded node, or other causes. Internet service faults should be investigated for speed, ping times, packet loss, and in many cases, the network equipment (modem) needs upgrade.



**Voice Priority:** Most Internet connections run over Cable today. These connections typically offer more bandwidth from the Internet (download) than to it (upload). Because the upload speed is smaller, voice packets usually need to be prioritized going out to the Internet. Setting up voice prioritization for outbound calls is a great way to ensure these packets take priority over normal data transmission. Most routers include this capability, so it is recommended that it be implemented if possible. In Spectrum areas, the use of Wi-Fi over the cable modem has also been known to interfere with VoIP traffic, so it is recommended that clients use separate Wi-Fi access point(s) for wireless.

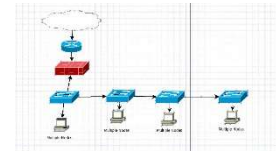
**Inadequate Bandwidth for VoIP Traffic:** We like to recommend that you allow 100Kbps for a single voice call. While the actual bandwidth required is lower, this will account for overhead in the network. Insufficient bandwidth will impact your performance. With the cost for bandwidth continuing to decline, it may make sense for a separate Internet connection for voice traffic.





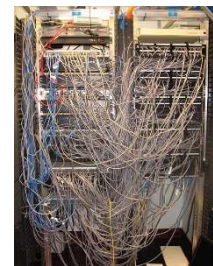
**Hubs and Switches:** Switches and hubs tie data cable connections for your data devices in the network. It is strongly advised that any hubs be removed from an internal network. Today, Gigabit POE switches provide the most reliable transmission for connecting VoIP, and in shared cable environments, they represent optimal outcomes since you will have greater data capacity. A good rule of thumb is to keep it simple, don't overload your network with intermediate devices – run cable “end to end” whenever possible.

**Daisy Chained Ethernet Switches:** Locations that have older wiring may use multiple Ethernet switches at desks, rooms and blocks of cubicles to share single wiring drops back to the main network Ethernet switch. Passing VoIP through multiple Ethernet switches to reach the Internet is a definite culprit in voice quality, especially if multiple devices on one switch, then connect to another switch, essentially sharing a port. The traffic handling capacity of each switch, and the connections between switches should be evaluated to ensure you are not setting up unintentional bottlenecks. Eliminating extra devices in favor of new cabling and/or new switches with home run cabling is strongly recommended.



**Office Apps:** We discuss the concept of prioritizing voice, but any application can use prioritization flags in their packets. Examples include video, IM/chat tools, and other services. Be careful with utilization of such services as they can impact your voice quality very easily. In addition, there are “bandwidth hogs” that chew up bandwidth, impeding a quality voice experience and creating lots of congestion along the way. These include use of Dropbox and other similar services, music streaming, social media, YouTube, etc.

**Poor Inside Wiring:** We recommend Cat 5E or Cat 6 today, with Cat 5 at minimum. Still, some clients try and use Cat 3, and tend to encounter quality issues. The use of proper termination equipment and an organized infrastructure is made possible with patch panels, and quality connectors, faceplates. Wire that is cut, stretched, or part of a daisy chain environment can inevitably lead to issues. These are just a few examples of many common problems that may cause jitter, latency, poor MOS scores or just plain poor voice quality. Following common sense ideas should keep your issues to a minimum, but in the event you run into a problem, these “culprits” may be the reason. Getting top performance for your VoIP service requires a clear view of potential impacts and taking action to correct any items that may cause issues.



For a discussion on your network, or implementation ideas for VoIP, please contact us at [sales@aisbuffalo.com](mailto:sales@aisbuffalo.com).