



Cisco Accessibility - Designing for All

TTY & TTD Over VoIP: Dispelling the “Packet Loss” Myth

Overview

Reliable voice communication over IP (VoIP) networks is a reality. Enterprise networks are using it today and it will be the basis for advanced capabilities in the future. The fact that VoIP is a serious alternative to proprietary circuit-switched phone systems has a few traditional telephony suppliers grappling with marketing messages claiming incompatibilities. Their goal appears to be to preserve their legacy circuit markets while trying to play catch-up with the innovative leaders in IP Telephony; the result is confusion.

This document:

- Provides the facts about TTY and VoIP to address the confusion
- Explains packet loss as it pertains to VoIP
- Summarizes Cisco’s IP Quality of Service (QoS) technology, and how it mitigates packet loss in a VoIP network
- Ultimately dispels the myth that enterprise VoIP networks are incapable of supporting TTY and TDD devices

Independent test results and customer TTY and TDD deployments on Cisco VoIP networks support Cisco’s conviction that packet loss is not a problem in properly engineered and implemented IP networks. As a leader in IP QoS technology, Cisco delivers TTY and TDD applications¹ reliably over IP networks.

Packet Loss

Packet loss refers to the packets of data that are dropped by the network to manage congestion. Data applications are very tolerant to packet loss, as they are generally not time sensitive and can retransmit the packets that were dropped.

Applications in Telephony networks are, for example, speech over a phone or information transfer via a TTY device. Dropped packets in a VoIP network appear as noise in the conversation and may require the speaker to repeat or retype the last word or sentence, which is clearly undesirable. Properly engineered and implemented Voice over IP networks differentiate between data packets and voice packets and manage congestion to mitigate significantly voice/TTY packets loss; this Quality of Service (QoS) at work.

Cisco QoS - enables reliable Voice/TTY over IP.

Quality of Service (QoS) refers to the capability of a network to provide better service to important network traffic – in the case of VoIP this means providing reliable delivery of time-sensitive content such as voice and TTY traffic. Introduced in Cisco’s products as early as 1995, QoS is now generally available on IP equipment from nearly all manufacturers. For an in-depth technical discussion of QoS, please see the Cisco IP Telephony QoS Design Guide: <<http://www.cisco.com/univercd/cc/td/doc/product/voice/ip_tele/qoslink.htm>>

¹ Based on the internationally recognized ITU-T Recommendation G.711 digital voice encoding standard

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Dispelling the “Packet Loss” Myth

While a limited number of traditional PBX vendors claim that enterprise VoIP networks are incapable of supporting TTY and TDD devices due to ‘inevitable packets loss’ and ‘... failure of VoIP to deliver packet loss rates less than 0.12% to 0.5%’, Cisco and Cisco customers reliably operate TTY/TTD devices on Cisco VoIP networks. The facts speak for themselves.

Packet Loss Is Not Inevitable

Miercom <<(http://www.miercom.com)>>, a network consultancy group specializing in networking and communications-related product testing and analysis, evaluated the QoS performance of the Cisco 7206 router back in 1999. Miercom’s testing involved a deliberate, sustained overload of an IP route through a T1 line, and analysis of what happened with QoS turned off, vs. QoS turned on. Miercom found that there was **“no loss at all of the high-priority traffic with prioritization compared to heavy loss without it.”** (See attached, “miercom test.pdf”).

Cisco’s load testing of IP networks based on Cisco equipment with QoS implemented shows **0.00%** IP voice packet loss, *even under severe network overload conditions, with low priority IP data packets being discarded instead.* (See attached, “QoS Results 081402 mmontane.ppt”).

Public Carrier IP Backbones Deliver Packet Loss Rate Better Than .12%

As an example of how public carriers handle IP packet loss rates, AT&T’s U.S. IP backbone numbers for July 2002 show that **total IP packet loss was 0.02%**
<<(http://ipnetwork.bgtmo.ip.att.net/pws/network_loss.html)>>.

Twenty-five Times Better Than The Myth’s .5% Rate Six Times Better Than .12% a Rate Deemed Unachievable by Some PBXSuppliers

Other major IP carriers show similarly excellent performance for their IP backbones. For AT&T’s real-time IP backbone statistics please see:

<<(http://ipnetwork.bgtmo.ip.att.net/pws/current_network_performance.shtml)>>

In addition, CAIDA, the Cooperative Association for Internet Data Analysis, provides tools and analyses promoting the engineering and maintenance of a robust, scalable global Internet infrastructure. Their web page has links to major IP backbone service providers’ web pages where they track the performance of their IP networks:

<http://www.caida.org/outreach/info/>

As a global leader in IP communication systems, Cisco delivers innovative accessibility solutions in a range of product categories and is committed to providing end-users access to converging IP communications solutions. Cisco Systems is a successful and growing company with a solid foundation in all aspects of IP networking. As leader in VoIP and IP QoS technology, Cisco delivers reliable Voice and TTY/TDD services¹ over IP networks. .

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