Cisco Wide Area Application Services (WAAS) Mobile: Optimize Cisco IP Communicator Soft Phone Voice Quality

What You Will Learn

Organizations are replacing physical phones with soft phones at increasing rates to reduce phone bills and support costs and to enhance productivity by extending the benefits of enterprise unified communications to remote workers.

Cisco® IP Communicator is a Microsoft Windows–based soft-phone application that delivers enhanced telephony support through personal computers. It is designed to meet diverse customer needs by serving as a supplemental telephone for travel, a telecommuting device, or as a primary desktop telephone. When using Cisco IP Communicator remotely, users do not just take their office extension with them; they also enjoy access to the same familiar phone services that they have in the office.

Challenge

Like all PC-based soft-phone applications, Cisco IP Communicator shares the computer's bandwidth with other applications such as email and file transfers that are running in the background. When these applications transfer large amounts of data, voice quality is degraded and becomes "choppy" as the applications consume the available bandwidth.

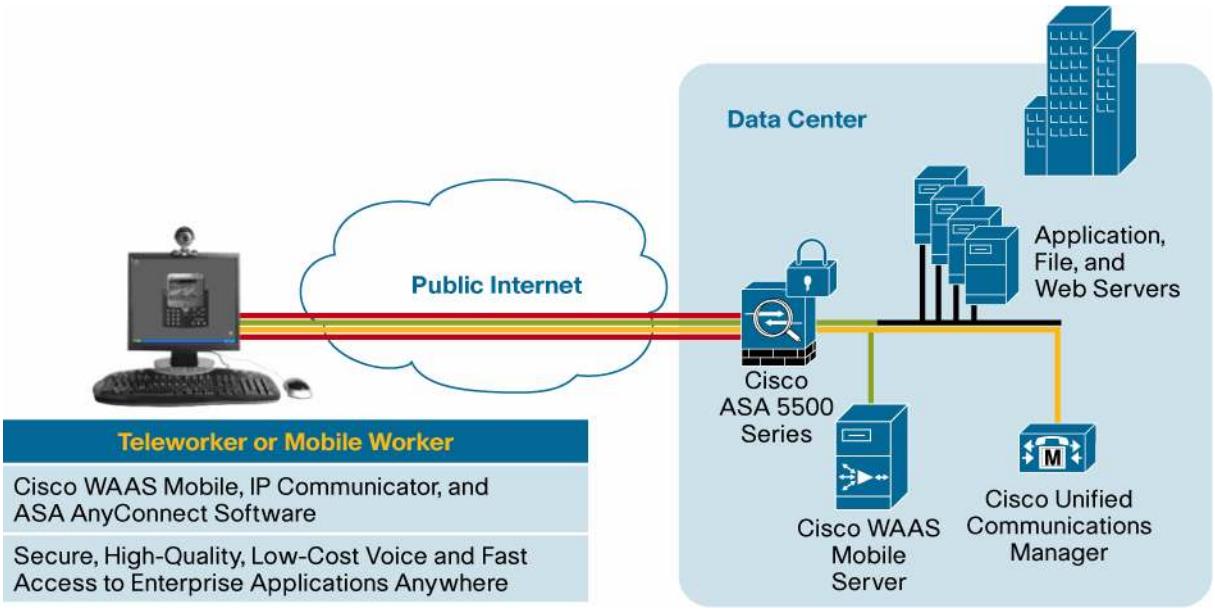
Network-based quality-of-service (QoS) approaches do not solve this problem because the bottleneck results from competition by multiple applications for bandwidth on the PC, not the network.

To work productively, workers need to maintain a high-quality voice connection while they simultaneously send and receive email, download software patches and updates, etc.

Solution

Cisco Wide Area Application Services (WAAS) Mobile, deployed with a Cisco IP Communicator client, eliminates the voice degradation and choppiness caused by background data transfers, while dramatically improving enterprise application responsiveness across the network (Figure 1).

Figure 1. High-Quality, Secure Voice and Fast Access to Applications for Remote Workers



Although the primary benefit of Cisco WAAS Mobile is acceleration of enterprise applications such as remote file shares, email, and web applications across a WAN, the software also provides an advanced capability that improves voice quality by detecting the presence of a Cisco IP Communicator voice data stream and dynamically reserving bandwidth for voice while limiting the bandwidth allocated to other data flows. The data applications continue to be accelerated, but in a controlled fashion that does not jeopardize the voice call quality.

To test the effectiveness of Cisco WAAS Mobile, voice quality was measured over a simulated home network link (400-Kbps upload and 6-Mbps download, with a round-trip latency of 30 milliseconds [ms]) while transmitting a large email message.

Voice quality was measured by R-Factor and Mean Opinion Score (MOS). User satisfaction correlates with these measurements as shown in Table 1; an MOS above 4.0 and an R-Factor above 80 indicates toll-quality voice.

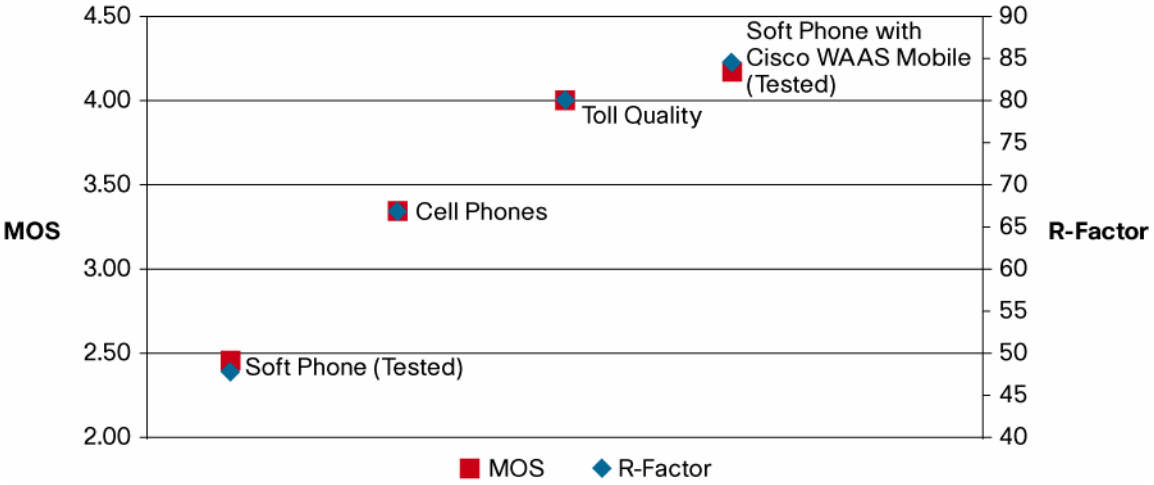
Table 1. Effect of MOS and R-Factor Ratings on User Satisfaction

User Opinion	R-Factor	MOS
Voice Quality		
Very Satisfied	90 to 100	4.1 to 5.0
Satisfied	80 to 90	3.7 to 4.1
Some Users Satisfied	70 to 80	3.4 to 3.7
Many Users Dissatisfied	60 to 70	2.9 to 3.4
Nearly All Users Dissatisfied	50 to 60	2.4 to 2.9
Not Recommended	0 to 50	1.0 to 2.4

Figure 2 shows the following results of the Cisco WAAS Mobile testing and demonstrates how soft-phone voice quality with Cisco WAAS Mobile surpasses even toll quality:

- **Before Cisco WAAS Mobile:** MOS = 2.46, and R-Factor = 48
- **After Cisco WAAS Mobile:** MOS = 4.17 and R-Factor = 84

Figure 2. Cisco WAAS Mobile Helps Ensure Toll-Quality Voice in the Presence of Data Transfers



Cisco WAAS Mobile Enterprise Application Acceleration

Cisco WAAS Mobile is part of the Cisco WAAS family of WAN optimization and application acceleration solutions. Cisco WAAS Mobile extends Cisco WAAS benefits to small-office and mobile employees and is purpose-built to run on end-user PCs.

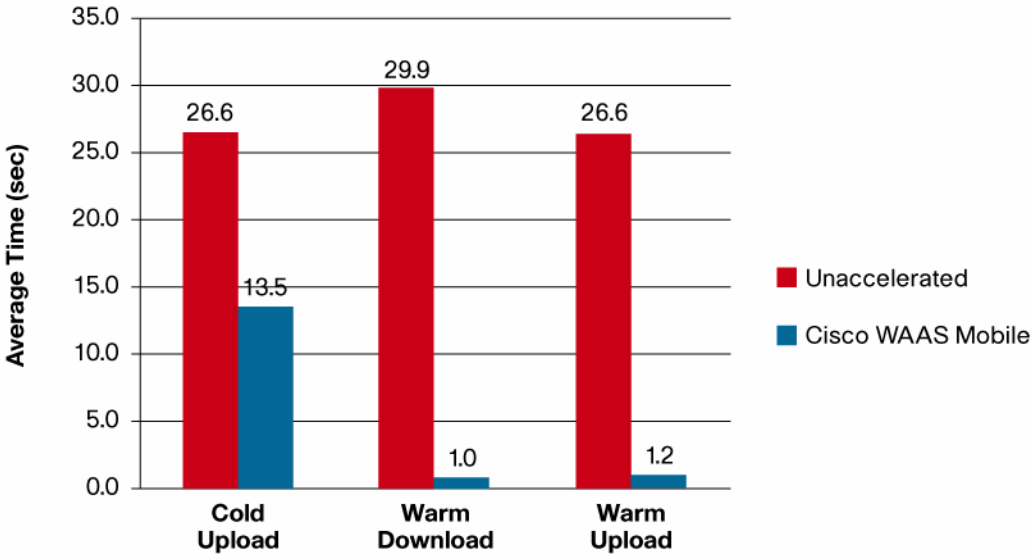
In addition to helping ensure Cisco IP Communicator voice quality, Cisco WAAS Mobile improves application response times by three to 30 times, as shown in Figure 3. Cisco WAAS Mobile achieves these application response time improvements by:

- **Mitigating latency:** Application protocol optimizations for chatty protocols such as Common Internet File System (CIFS), Messaging API (MAPI), and HTTP and HTTPS enable file transfers, email, and web-based applications to perform nearly as well over moderate-to-high latency connections as they do over the LAN.
- **Sending less data:** Bidirectional, byte-level delta compression and caching eliminates the transmission of redundant data and transmits only compressed differences across the WAN.
- **Increasing link throughput:** Transport optimizations increase the effective information rate across the link and substantially improve performance over VPN connections.

In addition, Cisco WAAS Mobile:

- Increases productivity when mobile users transition between networks or through wireless dead spots by maintaining connections to applications through brief network outages
- Enables virtual desktop solutions (virtual desktop infrastructure [VDI] and Remote Desktop Protocol [RDP]) to be deployed successfully across WAN links

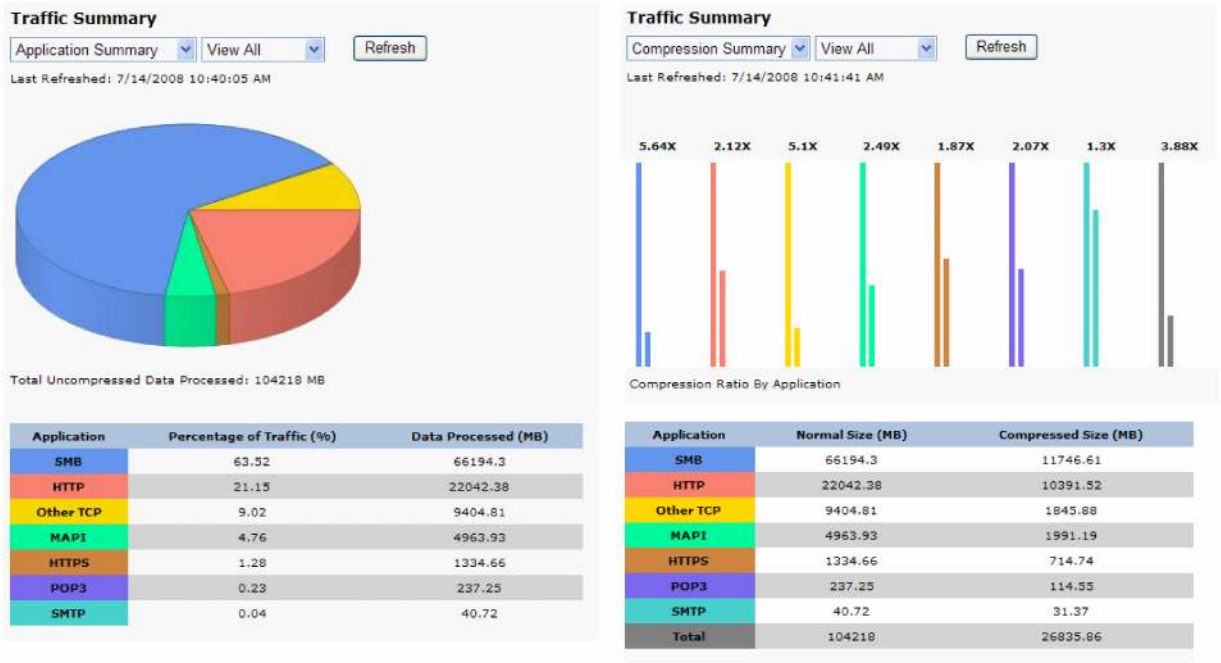
Figure 3. File Upload and Download Performance over a Home Network



Cisco WAAS Mobile Centralized Management and Performance Reporting

Cisco WAAS Mobile Manager analytics allow administrators to monitor performance and measure return on investment (ROI). The charts in Figure 4 provide a consolidated view of all users' performance. Administrators can navigate to find more detail to monitor performance for individual protocols and end users.

Figure 4. Cisco WAAS Mobile's Centralized View of Network and Protocol Performance



Application	Percentage of Traffic (%)	Data Processed (MB)
SMB	63.52	66194.3
HTTP	21.15	22042.38
Other TCP	9.02	9404.81
MAPI	4.76	4963.93
HTTPS	1.28	1334.66
POP3	0.23	237.25
SMTP	0.04	40.72

Application	Normal Size (MB)	Compressed Size (MB)
SMB	66194.3	11746.61
HTTP	22042.38	10391.52
Other TCP	9404.81	1845.88
MAPI	4963.93	1991.19
HTTPS	1334.66	714.74
POP3	237.25	114.55
SMTP	40.72	31.37
Total	104218	26835.86

Conclusion

Cisco WAAS Mobile should be considered as part of any Cisco IP Communicator deployment. With Cisco WAAS Mobile, voice degradation caused by email and other background data transfers is eliminated, providing a consistent toll-quality voice experience. At the same time, Cisco WAAS Mobile enables workers to work productively wherever they are, improving application response times for most applications by 3 to 30 times.

For More Information

For more information about Cisco WAAS Mobile, visit the product website at http://www.cisco.com/en/US/products/ps9523/index.html.

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