Getting Ahead in Managing VoIP and Videoconferencing Performance and Quality

The Coming Wave of IP-based Live Videoconferencing

The future of all telecommunications is undoubtedly IP-based. Voice over IP (VoIP) is now considered mainstream within enterprise organizations, and a growing number are embracing the next phase of this evolutionary track by deploying IP-based live video communications. IP videoconferencing has strong appeal – it can effectively deliver ever-important direct and interactive human communications that typically occur only during face-to-face meetings, but without the requirement that one (or both) parties be in the same physical location at the same time. This can translate into significant travel cost savings as well as reduced disruption to productivity – a compelling business case that can rapidly return investments.

Can this be just another simple technology transition? For end users, this should be precisely the case, with new IP-based communications expected to look, act and behave just as their non-IP predecessors. But for network planners, managers, and operators it brings very real, new requirements. In particular, networks must be optimized for preferred delivery of these new communication streams, which require low latency, congestion mitigation, and minimal packet loss. If not properly addressed, performance and experience quality issues can easily render these communications technologies unusable.

Organizations embracing videoconferencing are finding that although it is similar to VoIP in terms of how to prepare the network, there are some distinct differences in total impact. In particular, the volume of traffic that videoconferencing can drive is substantially greater than simple VoIP, meaning that network Quality of Service (QoS) class definitions and bandwidth allocations must be reevaluated. Organizations often find that setting aside 10% of bandwidth for VoIP is sufficient, but to accommodate even moderate rates of concurrent videoconferencing sessions will require 30% or more. The potential negative implications extend well beyond bandwidth consumption – providing latency-sensitive video traffic with increased precedence raises the likelihood of contention among other applications for remaining network resources. Given that the network "pipe" is of finite capacity, all traffic must be closely monitored to reasonably assure quality end-user experiences. ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) research indicates that those rolling out IP videoconferencing have often encountered quality problems stemming from both network latency and congestion issues. Interestingly this was the case not only in the WAN, a naturally expected barrier and stress point, but also in the LAN, at nearly equal rates of occurrence in terms of confirmed IP videoconferencing performance issue root causes.

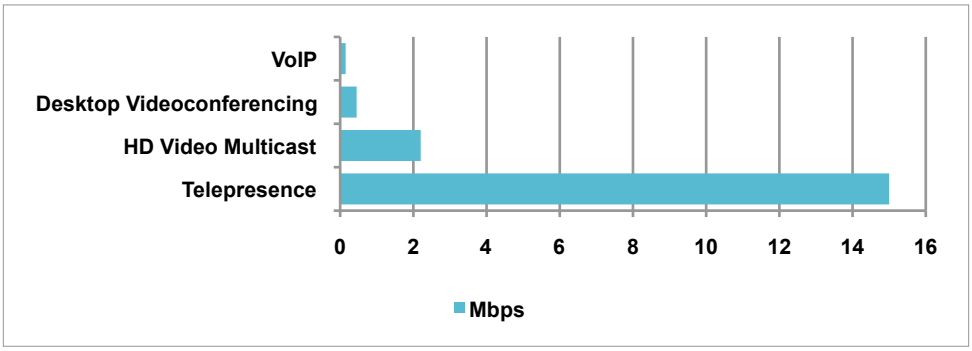

Figure 1. Network Usage Per Session Instance

Performance Management for Videoconferencing

What is challenging about managing the performance of videoconferencing, primarily, is that this is a real-time service and that quality issues can be incredibly disruptive, even to the point of rendering the technology non-functional. As a result, every effort must be made to ensure that the network is "clean" and ready to support live IP communications sessions whenever they are invoked, which means concerted efforts to test/characterize and pre-qualify the network as "videoconferencing ready." It also means finding ways to recognize problems as they happen, not merely the next day or a week later. Efforts to identify and, even more importantly, troubleshoot performance quality issues will also require the ability to reconstruct and study incidents in detail.

As mentioned above, the use of differentiated network traffic delivery policies, commonly known as network QoS class definitions, is an essential aspect of successful deployment of real-time communications such as IP videoconferencing. Consequently, direct monitoring of adherence to and compliance with these policies must also be part of any performance management strategy. Most important here is making sure that high priority delivery queues set aside for real-time communications are not compromised or contaminated with non-real-time traffic types, such as file transfers, Web traffic, or streaming media.

> Differentiated network traffic delivery policies (QoS classes) are an essential aspect of successful IP videoconferencing deployments.

Key Performance Indicators (KPIs) for IP videoconferencing quality can be defined and followed using many metrics that are identical to those used for monitoring performance of VoIP, plus a few that are different. EMA research indicates that more than half of IT teams look to traditional network performance metrics such as latency, packet loss, and jitter as important indicators of the network's ability to support quality IP videoconferencing – the same commonly used for VoIP. Specific to videoconferencing are metrics designed to reflect aggregate audio/video experiential quality, such as Video MOS, or V-MOS. While not based on an industry standard (as is MOS, used with VoIP monitoring), such ad hoc approaches are being used by a majority of those directly monitoring IP videoconferencing performance, and can be of great value if applied consistently to videoconferencing traffic within any defined environment.

While most IP videoconferencing equipment providers offer products for configuring (and sometimes monitoring their own systems, few offer credible multi-vendor solutions. Pilot deployments are almost always single-vendor in nature, long-term deployment of any technology tends to bring along a mix of supplier vendors. Consequently, it is important to have monitoring and troubleshooting systems that can accommodate a mix of equipment manufacturers and models and providing consistent performance intelligence as well as a common troubleshooting platform.

Finally, and perhaps most importantly, any approach to performance management and monitoring must recognize that IP communications traverse a common delivery medium – the IP network – and thus everything else that is transiting that shared delivery substrate can and may play a role in ultimate service quality. This includes not only the main content-bearing traffic, but also the essential signaling/control protocols that allow sessions to be established in the first place.

The Network Instruments Approach

Finding such capabilities within a performance management solution can be difficult, requiring a balance of measures that can both proactively anticipate quality-impacting operational situations as well as deliver detailed forensic analysis for those events that cannot be anticipated and prevented. The Network Instruments® methodology leverages deep packet inspection combined with detailed expert analysis and complementary infrastructure viewpoints. The information is aggregated and available

real-time with dashboards, or over time via reports. The Network Instruments Observer® platform is thus designed to provide the combined real-time and historical/forensic capabilities necessary to support IP-based communications performance.

- Comprehensive network and application analysis tools like Observer include dozens of expert analyses for fast and definitive recognition of VoIP and IP videoconferencing control protocol and session quality issues, plus IPTV analytics to quantify streaming video health.
- Long-term capture and storage appliances like the GigaStor™ provides direct long-term capture of all network packets, including IP communications, so both control and content traffic can be inspected as part of forensic analysis, at speeds up to and including 10Gbps.
- Advanced device and network monitoring systems such as Observer Infrastructure allows the collection and presentation of infrastructure element health metrics, including NetFlow and other flow records, as well as IP SLA for proactive network capacity and deliverability testing.
- In-depth reporting functionality such as that provided by Observer and the Observer Reporting Server offer the ability to measure, track, display, and generate reports on MOS for VoIP and MOS Video for videoconferencing session quality, as well as in-context views and reports to reveal environmental and shared-medium factors that may be causing problems.
- As an independent, equipment-agnostic solution, the Observer platform is designed to accommodate environments where VoIP, IPTV, and IP videoconferencing products and systems have been procured from multiple vendors, including specific support for Microsoft, Cisco, and Avaya.
- Collectively the Network Instruments solution covers the majority of requirements outlined here for monitoring, analyzing, and troubleshooting VoIP and IP videoconferencing traffic on converged enterprise networks.

EMA Perspective

As a long-time advocate for integrated management architectures and practices, EMA recommends that network engineering and operations professionals seek out management tools that not only deliver the depth of features necessary for each particular network-enabled technology, such as IP Videoconferencing and VoIP, but that also provide capabilities for recognizing the surrounding operational context. While integration of such capabilities is often difficult when dealing with truly new technologies, the adoption of IP Videoconferencing is growing rapidly and VoIP essentially considered mainstream. Consequently, networking pros should look to integrated solutions such as that offered by Network Instruments to assure they are adequately equipped to respond to and correct performance issues quickly and successfully.

EMA recommends VoIP and IP Video management solutions with deep features specific to these technologies together with full visibility into surrounding operational context.

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