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The Future of IP Technology

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This article will address the future of IP technology and need-to-know enterprise IP technology information as it relates to IP migration and achieving optimal quality of experience (QoE) levels across IP services.

Lack of attention to end-user quality of experience (QoE) across the service provider, mobile operator and enterprise communities could be the downfall to mass IP service adoption. If heightened attention on service price cuts, neglected advancements in test and measurement technology and poor QoE management capabilities continue, the big promises around reduced costs and improved productivity will never come to light.

End-users have historically steered clear of IP networks and VoIP deployment because landlines seem to do the job better – despite enticing price points. While service providers are, to their credit, attempting to improve the quality of services like VoIP and, more recently, IPTV, they may be using the wrong methods. This article sheds light on the value of QoE capabilities and its critical impact on the maturation and saturation of IP services.

Quality Measurement

The key to measurement is using the most cost effective and time efficient approach, enabled by the right technology. By utilizing the latest technologies for rating QoE, service providers can move away from outdated subjective test methods and toward objective measurement of customer experience. QoE enables service providers to identify and track in real-time metrics that correlate with end-user experience, and then execute one step further by adjusting services accordingly. To better understand objective testing methods as related to IP-based services like VoIP and IPTV, we must first come to grips with the shortcomings of subjective testing.

Subjective Measurement Shortcomings

Subjectively testing speech quality in voice and video calls requires service providers to select a panel of "typical" end-users and play a set of voice or video samples for each of them. The service providers then ask each user to rate the quality of the voice and video samples by employing a Mean Opinion Score (MOS) from one to five. To obtain a valid measurement the users must experience each sample under different testing environments to simulate real-world scenarios. Once the tests are complete the service providers compile the subjective test data and analyze it to rate the performance in terms of real-world service quality. Service providers, as well as equipment vendors, continue to rely on subjective testing to validate perceived service or product quality.

While subjective testing provides valuable information, its methodological drawbacks are too numerous to reliably shape an enhanced IP technology future. Subjective testing is extremely

time consuming to perform and must be designed and executed with the highest regard to variables that could alter the perception of quality. This form of testing is also very expensive because it requires a specially designed testing facility, purpose-built to conduct subjective quality tests.

Objective Measurement Benefits

A cost-effective alternative to subjective testing for voice and video quality assessment is objective measurement. Unlike subjective tests, objective methods do not require a panel of human testers to analyze performance impairments and network parameters to produce a final MOS. Objective measurements are repeatable, efficient and fast. There are two main classes: intrusive and non-intrusive.

Intrusive, or "active," testing techniques require service providers to inject sample voice or video signals into a network. These sample signals are then captured at another point in the network and compared for degradation in voice or video quality in regard to the reference sample.

Non-intrusive, or "passive," testing techniques conserve network capacity by monitoring live network traffic to determine the perceived quality. Through this passive method, the service provider assesses the network and simultaneously gathers data to directly reflect actual end-user experience.

INDUSTY PARTNER

What Quality Measurement Really Means

Service providers' ability to effectively generate a measurable metric for end-user quality of experience has direct impact on the services end-user's purchase. Voice quality and QoE management are not the same as quality of service (QoS). While QoS is based on the technical performance of a network (e.g., signal strength), QoE is reflective of what is actually heard (e.g., call static).

In addition to acting as a quality determinant for packaged IP services, QoE is proving its worth within the enterprise. As businesses continue to explore the new world of VoIP and unified communications, QoE management technology is being leveraged to maximize the enterprise VoIP investment and deliver enhanced user experience.

The network manager view of service such as VoIP is fundamentally changing from a technical perspective to a business-user perspective, with the ultimate concern on acceptable performance. The consensus with VoIP is that without improved voice quality and service experience, the cost-cuts are irrelevant. By investing in QoE businesses and service providers are empowered to confidently transition to VoIP and unified communications without the fear of voice quality shortcomings.

The Future of IP

If VoIP is perceived as a challenge, wait until video is added to the network. Video demands higher network bandwidths, different QoS requirements and is affected by varying types of packet loss and jitter. The reality is that video will enter the enterprise in one of two ways: either under the CIO's control, or outside of it.

In unified communications, video traffic over the network can cause congestion resulting in voice packet loss. As unified communications continues to emerge in the business environment, network managers need to manage it in a unified way. Siloed management of voice or video will result in ineffective network performance and user experience.

Today's CIO needs three things to be successful with unified communications and the new generation of converged networks and applications: network and systems management, to ensure that the network and applications are available, QoS, to ensure appropriate applications are prioritized and finally, QoE, to ensure users get the quality of experience needed for effective communication.

Converged networks allow more efficient and effective communications. The PSTN gave us any-to-any connectivity for voice conversations, the Internet gave us any-to-any connectivity for data exchange, convergence gives us any-to-any for communication. Users and applications can interact with each other in ways to dramatically improve productivity. However, if the VoIP conversations are too poor to have an effective conversation, or the video quality dips or drags just as a user is making a key point, communication efficiency drops below that of legacy network and systems.

The Must-Know for VoIP in Enterprise

Because the future of IP technology is still unclear, companies must adopt best practices to support IP migration and enhanced service quality. By combining IP and voice quality measures, QoE technology identifies all of the critical issues that affect voice quality, such as noise, echo and distortion as well as IP QoS, bridging the gap between legacy solutions and IP networks. Network managers are quickly learning that it is critical to employ tools that identify and isolate quality problems and speed VoIP deployment. An all-in-one QoE management platform that includes both voice and video capabilities supports a single QoE investment for maximized IP technology ROI.

In addition to improved productivity and cost effectiveness associated with VoIP, network managers are utilizing QoE capabilities to support service level agreement (SLA) monitoring, augment fault management and enable click-to-view VoIP diagnostics. Generating an SLA that is contingent not only on IP service metrics, but also on user quality metrics, safeguards VoIP investments and allows business to prioritize user needs. In addition, QoE capabilities can be used to obtain a snapshot of network voice quality performance as experienced by the end user. The results can be displayed graphically using preset thresholds and used to identify serious problems. The analysis capabilities arm network managers with the ability to spot common trends amongst low quality VoIP calls and make adjustments based on the cause. Network managers can even look at an individual call in more detail to identify at what point during the call the voice quality dropped; voice quality degradation is then clearly associated with its root cause.

It's All About the End User

User-centric service quality cannot be objectively assessed without using complementary voice, audio and video IP technology measurement methods. In a typical VoIP network, the "IP-bearer"

measurement determines if the packet is affected by quality altering variables, such as jitter. This helps to determine if end-user quality is degraded.

Objective testing (QoE) methods better account for the customer experience by combining measurements in addition to packet loss, jitter, delay, speech level, noise level, echo and therefore it comprehensively represents the customer experience.

Since IP data packets are transient by nature, the future maturation and saturation of IP technology hinges on the quality of the voice, audio, and visual experience delivered. Relying on conventional diagnostic measures to ensure high service levels will not prove effective. Service providers and network managers must be proactive about developing an automated system capable of reporting data that reflects human perception.

It's Got to be QoE

Reliance on Operation Support Systems (OSS) to manage service assurance on packet networks misses the mark for truly assessing end-user experience. Since OSS is designed to handle data services rather than real-time video and multimedia services, packet loss and delay is not flagged.

Network managers, don't be fooled. In quad-play services, including IPTV and VoIP, QoS metrics are only viable if they refer to the end-user experience. All other data that service providers compile becomes a string of meaningless figures that does not identify where and when the user is dissatisfied. It is critical to identify lags in QoE since these services hinge on human perception.

The prediction of customer experience through objective measurement metrics is invaluable to monitor networks and will prove crucial to the future success of IP technology.