

ScreenPlays

End-to-End Video Quality Assurance Fortifies Bottom Line in Tough Times

Advanced Monitoring and Reporting Platform Saves Money Now and Insulates Operators From Surges In Operations Costs of New Digital Services

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As video service providers look for ways to soften the impact of the global recession they have more reason than ever to pursue the major operations costs savings that can be realized through deployment of a state-of-the-art video quality management platform.

Significant costs associated with calls to customer service centers, trouble shooting and repairs are cutting into bottom lines at a moment when competitive pressures leave network operators little choice but to forge ahead with new digital video services and applications that are essential to maintaining a market edge. As such services add to operations complexities and cost, the need for video quality management technology that accurately assesses performance in terms of actual user experience intensifies.

Simultaneously, service providers' efforts to cut costs through consolidation across regional and national service footprints pose a scaling challenge that

requires new approaches to analytics and reporting. Not only must network operators implement processing methods suited to very large scale operations; they must ensure that centralized solutions provide operations managers the tools they need to maximize maintenance efficiencies at the local level.

Fortunately, all of these requirements are fully addressed by the monitoring and reporting processes comprising the Mixed Signals product portfolio. This end-to-end video quality management platform probes deeply enough to identify impairments in the audio/visual stream as well as problems with transport and service management functions. It then analyzes that data to determine instances where such issues are having an unacceptable impact on actual viewing and listening experiences. The platform thus provides network operators precisely the information they need, as determined by them, to manage video service performance without over-burdening them with inconsequential data.

The techniques developed by Mixed Signals serve not only to prevent new service initiatives from adding to operations costs; they actually produce reductions in op ex even as the service complexities mount. This has been borne out in field studies which consistently show that an advanced video quality management platform will pay for itself within one year of deployment.

The Cost-Cutting Imperative in Digital Video

After years of applying advanced monitoring and reporting processes to drive down the

costs of provisioning and maintaining voice and broadband services, network service providers are discovering they must implement similar capabilities on the video side as well. Simply put, the costs of old, man-power intensive approaches to maintaining video services are not sustainable in the digital age.

There are many reasons for this change.

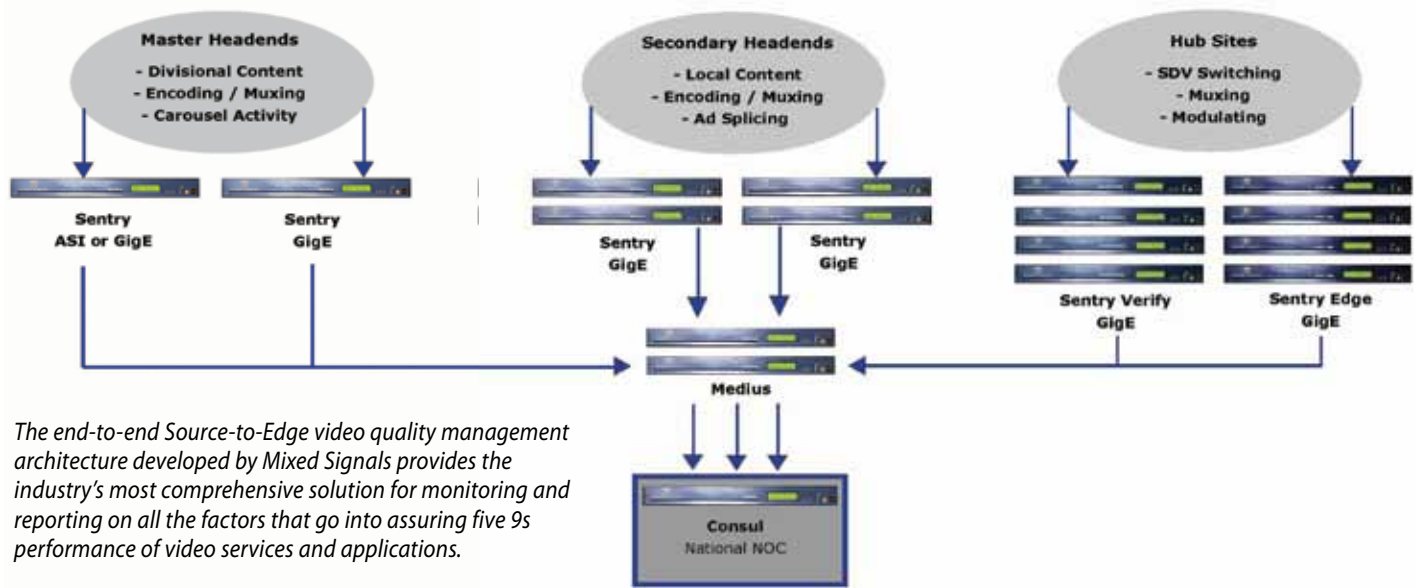
The fact that consumers have multiple alternatives to choose from means there is lower market tolerance for poor video performance, with the result that providers are setting "five 9s" performance goals for video. As Comcast COO Steve Burke noted last summer, the old benchmark of 98 percent service reliability is no longer viable.

As performance requirements rise, the costs of truck rolls at hundreds of dollars per incident and the costs of handling customer service calls, at about \$10 per call, will prove ever more damaging to bottom-line performance. This is why it's essential that network operators be in a position to evaluate video performance across all parameters. A thoroughgoing view of what's happening with respect to 15 percent of quality-impacting factors while ignoring the rest won't cut it.

This means that, along with monitoring the core IP network and MPEG transport layers, the video quality management platform must be able to look into the audio/video streams frame-by-frame, in real time to identify significant impairments before they begin to generate service calls. The platform must be able to detect video tilting, black screen and frozen screen errors and determine to what extent, if any, these errors are creating perceptible impacts on viewing experience. And the platform must look at all the added components in the

VIDEO QUALITY MARKET INTELLIGENCE

Five 9s Video Quality Architecture



stream, including locally inserted advertising, closed captioning and other data feeds, to determine whether everything in the video channel is precisely synched and operating at required viewing quality levels.

The system must also deal with the nuances of audio quality impairments which are especially hard to resolve when they don't relate to the quality of the stream. For example, operators want to avoid having to handle subscriber complaints about variations in volume across channels and between commercials and programming within a channel. Proactive monitoring of decibel levels can provide the operator the information it needs to ensure that program originators are keeping their levels balanced.

All the raw data reflecting impairments across all these video and audio parameters must be aggregated, analyzed and filtered into real-time quality-of-experience (QoE) scores. The analytics behind this real-time scoring process must be sophisticated enough to prioritize incidents so that operations managers can quickly react to the problems that are likely to have the most immediate impact on subscribers. Also, the platform processing engines must be powerful enough to deliver real-time QoE reports covering end-to-end performance across the largest regional and national footprints as well as at the individual system level.

Along with identifying immediate, subscriber-impacting issues, the reporting

system must also support trending analysis suited to each operator's needs. By compiling day-to-day QoE scoring data into customized long-term reports pertaining to specific geographic areas, specific programs or any other parameters of interest, operators can be assured they will be alerted to troublesome trends that merit proactive action.

Addressing New Cost Factors at the Edge

Compounding the video quality management challenge is the fact that the complexities of digital technology expand the potential fault lines across the network. Consider, for example, the impact of the growing volumes of video-on-demand content, including HDTV content, on usage patterns.

As viewers use VOD to access time-shifted TV content as well as movies and premium pay services, the volume of streams increases as do viewer expectations for service performance that matches the performance of broadcast SD and HD channels. The service provider not only must be able to see into the video streams to ensure the content quality is consistently high; he must be certain the network switching and set-top channel access processes are performing as required.

In cable, MSOs are implementing capabilities in their distribution hubs associated with advanced QAMs (quadrature amplitude modulators) to support switched digital video (SDV) and, eventually, functionalities associated with modular CMTS (cable modem termination system) and targeted advertis-

ing placements at the network edge. SDV requires accurate responses to commands from the Service Resource Manager that sets up the programming mix to be delivered over the SDV channels. And the SDV process must assure fast channel access at the set-top so as to avoid disruptions to the user experience as subscribers go from the broadcast channels to the switched channels.

Moreover, in response to rising demand for time-shifted on-demand programming, operators are planning to expand the proportion of dedicated bandwidth available to each household, which requires an increase in the number of service groups and QAMs per hub and therefore the number of potential trouble spots in the network. The only way to accommodate these changes in video distribution over cable within tolerable maintenance cost parameters is to implement edge switch monitoring that can track multicast and unicast video service performance on a per-QAM, per-stream basis. This means the monitoring system must work with multiple types of SDV and QAM devices and that it must scale efficiently as more QAMs are added.

The emergence of new edge-based functionalities, such as interactive applications and advanced advertising, bring still more factors into play that could significantly increase operations costs without deployment of an advanced performance management system. In choosing how to enhance their proactive approaches to cutting op ex, operators should make sure the video quality platform

they choose has the capabilities required to identify root causes of errors in applications carousels and streamers based on actual digital output.

This means the platform not only must compile performance information at the component outputs; it must be able to interact with third-party vendors' component management systems to access data generated to control edge QAMs, applications carousels and advertising servers. All of this information must be tied together by the video quality management platform so that it can comprehensively report on whether all components are performing as intended.

Facilitating the Cost-Savings Impact of Consolidation

When it comes to slashing operations costs through network consolidation, there's nothing more vital to meeting cost containment goals than a video quality management platform that supports the scaling and reporting requirements of centralized operations. Once the tools are in place to deliver the holistic view of video quality performance across the operating footprint, as discussed above, the system must also be able to generate multiple types of reports customized to management requirements at all levels, from the front office to the network operations center to technicians in the local markets. The platform must be able to monitor video from all the headends and master sources out to the hubs and edges and roll up all that data to let operations managers across entire regions or the entire

country see what has happened everywhere over the last 24 hours, week or month and to identify any trending away from five 9s performance.

Equally important, the system must be able to analyze and filter raw data so that it reports the information that operators consider essential to identifying significant problems or trends. This not only eliminates time consuming perusal of unimportant information; it also provides NOC personnel guidance as to what events are important enough to merit a call to action at the local level. Operationalizing the alerting scheme takes the guess work out of decision making at the NOC.

The system must be able to deliver reports customized for the needs of senior management as well. By providing them a recurring snapshot of problem areas that are significantly affecting viewers and costs, the system helps them to ensure that overall policies pertaining to sustained levels of quality of experience are being adhered to and that resources are being allocated appropriately. The system also lets management know what price they might be paying by not spending the time to fix weak links in the network.

A Lesson from the Field

The recent experience of a major U.S. MSO provides a vivid illustration of why a state-of-the-art video quality management platform is so vital to the bottom line. Over a period of four weeks the cable operations team in a top tier market serving over one million

subscribers had labored fruitlessly to find the sources of a steady, growing stream of subscriber complaints about recurring audio and video impairments.

Daily conference calls involving senior management, technicians and several vendors were of no avail as the company burned through the equivalent of \$60,000 in employee time and far more in costs accrued through distractions of senior management from performing revenue-generating work. Another \$170,000 in costs was racked up by the volume of calls to customer service, and unaccounted but significant amounts were also lost in broken ads and truck rolls.

Finally, with just two weeks to go before the Super Bowl, the MSO turned to Mixed Signals for assistance. Very quickly the operator determined the underlying cause of the errors and took the necessary remedial action to prevent further damage.

Service providers can ill afford many such \$300,000+ lessons on the advisability of implementing advanced video quality management solutions that are suited to today's service requirements. The tools are now available to significantly reduce the costs of current operations, contributing directly to the bottom line at a time when cutting expenses is a top priority. Equally important, by implementing these solutions to meet immediate cost savings goals, service providers will establish a framework for ongoing cost-savings and high quality of user experience through the migration to an ever more operationally complex video service environment. ■