

Advanced **Networking**

Brave new world: Electronic video monitoring

An automated system streamlines operations, improves QoS

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Fine-tuning the network for optimal performance is no longer enough. In a competitive environment, quality of service (QoS) has become so important for retaining and growing the subscriber base that channel monitoring is now not only justifiable but necessary. Monitoring hundreds of channels, however, has become overwhelming for many broadcasters. New tools and techniques are available to address the issue.

Limitations of previous approaches

One approach is a rudimentary “manual” monitoring workflow process that usually requires one or more employees, via a remote control device, to step through each channel to evaluate signal quality several times per day.

It is thoroughly impractical to monitor hundreds of channels – in some instances more than 500. Manpower and operational constraints leave operators able to attend only to the most popular, high-viewership channels. That means relying upon paying customers to call and report problems, which if anything, is more unacceptable than ever.

While this labor-intensive manual ap-

proach may be less costly in terms of human and financial capital, it lacks accuracy and efficiency and falls short of the QoS standards to which discriminating operators aspire.

There have been many electronic approaches to monitoring the quality of content, including devices and systems that investigate the digital bit stream to probe for errors and conditions that can lead to quality problems. While these systems are quite robust in providing metrics on the health of the transport stream, an operator is still required to visually analyze the content at the end of the line.

A real solution

As operators establish tighter QoS mandates centered on content analysis, they are demanding a reliable, automated, enterprise solution that analyzes content at primary and secondary headends as well as remote hub sites. These requirements, coupled with the ever-growing presence of digital, file-based technologies in the production workflow, are driving the emergence of a new class of solutions for video logging and monitoring.

These systems provide a unique alternative that affords proactive monitoring capabilities at the point in the delivery chain that is most important: the output that viewers are actually seeing on their televisions.

This new class of monitoring and detection systems, exemplified by such products as Volicon’s RPM, now provides a practical way to monitor many channels or channel lineups by simultaneously scanning multiple inputs that are fed by set-top boxes (STBs). These post-STB monitoring devices continuously scan the entire channel lineup for faults that would be likely to disturb the customer’s viewing experience, such as black screen, frozen video, no video, no audio, or violations of audio thresholds.

An automated, digital monitoring workflow at cable headends or hub sites can leverage the company’s existing monitoring program to alert staff and, in turn, engineering to problems related to on-air signal transmission. Some monitoring systems, as determined by the operator, use SNMP protocol to communicate faults and alerts to the company’s network management system (NMS), which typically is under the constant surveillance of NOC/engineering staff. This feature can arguably negate the need for dedicated attention to the monitoring system.

In a typical configuration, the monitoring system is installed at an operator’s NOC or headend. In the case of a larger operation, multiple servers residing at different physical locations, such as headends or remote hubs, can be clustered together to provide a network-wide view of multiple channel lineups with 500-plus channels. In these instances, a central dashboard server located at the regional LMC, NOC or SOC can provide the reference point for network status from multiple remote locations.

Once composite audio and video output from an STB enters the system, the server uses IR commands to sequentially step through the channel lineup at five- to 15-second intervals. When the scanner

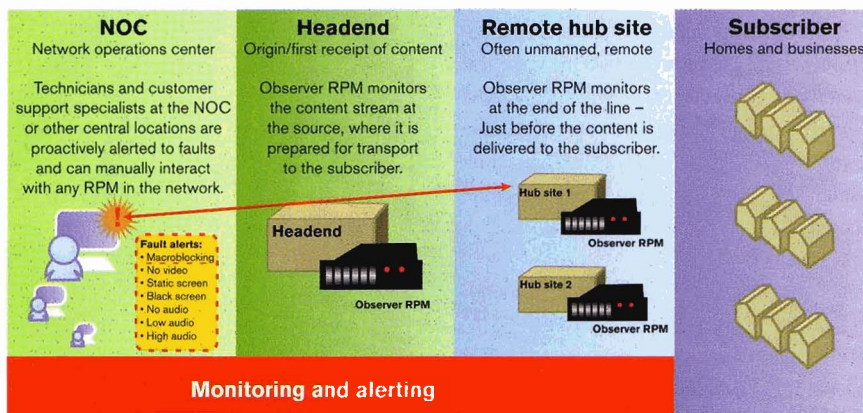


Figure 1: End-to-end monitoring and alerting.

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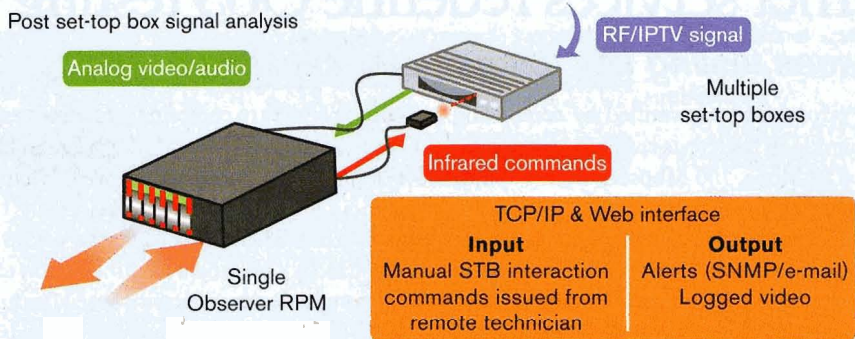


Figure 2: Set-top box to RPM signal and control.

confirms the presence of active video and audible audio, the system analyzes the signals for the presence of anomalies such as the absence of video sync, black video, static screen, or low audio levels.

Based on audio and video parameters or thresholds that were pre-defined by the operator, the system then generates a video clip of a confirmed fault and sends it, via e-mail alert, to the technician in charge or the NMS. If the monitoring server is interfaced with the NMS, the system can send an SNMP trap for a unified view of a network-wide failure.

Because the monitoring system is linked into the operator's existing IP network, the technician is able to access the server via any connected PC to analyze the clip and verify the fault. The technician may also export the fault clip to other staff members to collaborate on a solution. At this point, other tools such as digital transport stream analyzers and probes might be used to pinpoint the exact fault in the network's transport or IP layer.

Bit error ratio (BER) data which is captured by a transport analyzer, for instance, can be linked to the monitoring system, which simultaneously captures the "subscriber's experience" in the form of a 90-second recorded clip. This enables the operator to draw a correlation, or reference, between transport stream errors and what the viewer is actually experiencing.

The ability to monitor signals at different points in the network can be helpful in identifying the source of signal problems. Upon receipt of a complaint at a call center, for example, video from the suspect channel

can be fed from a "suspect" headend source to the call center or other network location for instant analysis and review. If no problem with the video is evident upstream, then it's more likely that the issue is localized within the caller's immediate network vicinity, or household. In either case, the call center operator is better equipped to determine the appropriate trouble ticket and response action.

Throughout the analysis and troubleshooting process, the system continues to monitor the faulty channel. Upon the channel's recovery, the system closes the loop by generating another clip and sends a secondary alert notifying the staff or NMS that the problem has been resolved.

Once in place, an automated monitoring solution quickly contributes to more streamlined operations and improved QoS. By replacing inaccurate and inefficient manual approaches with an end-of-the-line monitoring solution, an operator can comprehensively scan the entire channel lineup in a matter of minutes. With continuous, around-the-clock operation, the operator can realize cost savings in labor, call center traffic and unnecessary truck rolls.

While we've described a system that is specially designed for monitoring audio and video quality, similar systems offer different performance levels and enable video capture for such uses as providing proof of advertising to customers or recording and logging of aired content for verification to clients. Such systems also provide full-time scanning for individual channels, complemented by a robust set of media management capabilities. ■



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