Video Signal Path Management and Monitoring For Multiservice Operators

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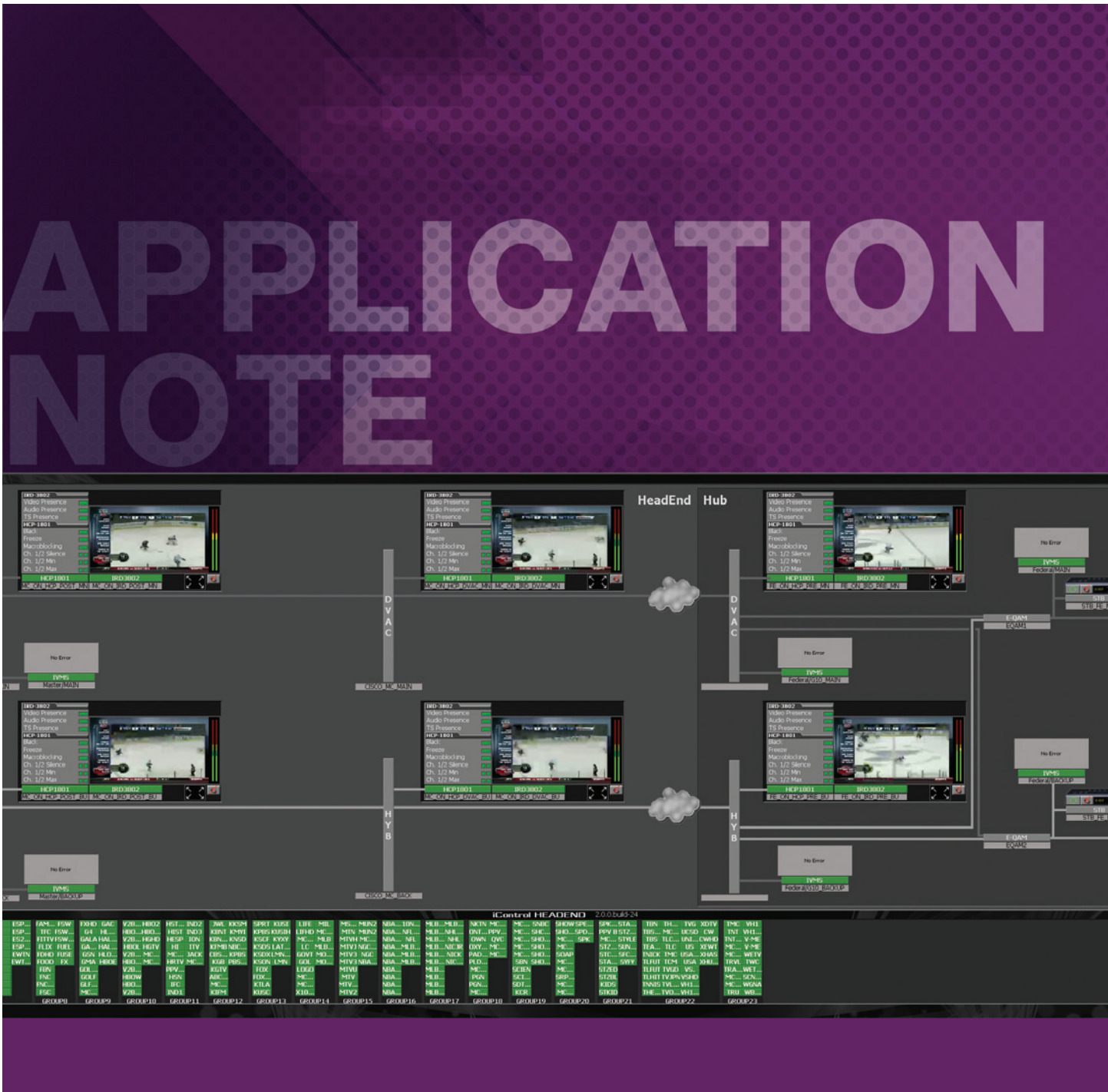


In the US, large cable operators and Telcos deploy sophisticated delivery systems in order to ensure a high level of customer satisfaction. These markets are highly competitive and subscribers, and the operators, are keenly aware that freedom of choice is the rule. To help reduce subscriber churn, operators are obligated to install intricate network monitoring and management systems to maintain Quality of Experience for viewers and to reduce the operational expense associated with local service calls.

There are a number of ways, of course, to go about employing a network monitoring solution. While one size certainly doesn't fit all, there are important characteristics and behaviors that successful systems share. This paper presents a sample scenario which, when applied in a similar circumstance, can produce a network monitoring and management solution that guarantees the highest levels of signal quality delivered to subscribers and reduces the time it takes operators to respond to actionable system faults.

Background / the Problem

A large national provider of Telco services, with millions of subscribers, began deploying a fiber-to-the-home video delivery system to key metropolitan markets. Entering the highly competitive video market, the operator needed to ensure that the video experience it provided its customers was second to none so it could compete head-to-head with the incumbent cable operators. The Telco required that its video delivery infrastructure meet the 'five nines' availability and reliability it offered for its traditional telephone business. In other words, the system had to be available 99.999% of the time – system downtime was therefore completely unacceptable. So, manual rerouting of video signals in the event of a device failure or network problem wouldn't cut it.

This meant that the Telco's network needed to be designed with automated failover protection for all the subsystems that were part of the video signal path including processing of sources in its two (redundant) super headends (SHE); to RF equipment; and to the remote Video Hub Offices (VHOs), which placed the video signal onto the fiber network. Also, the Telco had to enable its operators in the Network Operations Center (NOC) to view, in real time, the status of the subsystems and equipment along the entire video signal path and to be notified when any failures occurred, so they could quickly be remedied. This notification element was a critical requirement of the system design, because it would help reduce overall Mean Time to Repair for the operator and reduce the opportunity for human error in evaluating system health.

The Telco was seeking a video network management and monitoring solution that could automate the failover scenarios to keep the video signals flowing without interruption and enable NOC operations located at 2 SHEs and 10 VHOs to monitor the entire video signal path and be quickly informed of any problems that could disrupt the quality of the video signal.

Other components in this system were third-party encoders and ad-insertion splicers. Any network monitoring solution would have to be fully compliant and interoperable with these components.

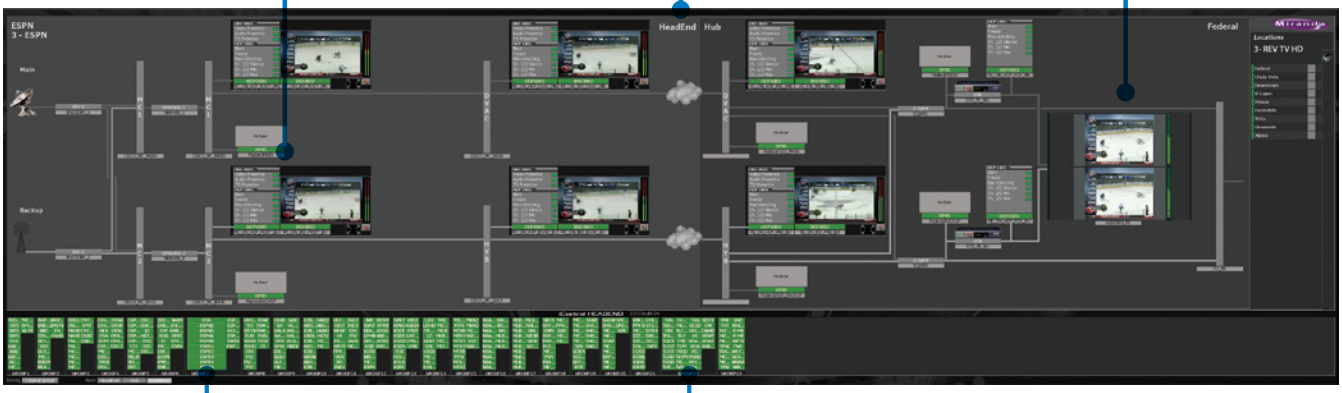
The Solution

The Telco engaged Grass Valley to develop an end-to-end monitoring and management platform that could meet their reliability objectives and launch their new video service on an aggressive schedule. Developed on Grass Valley's iControl monitoring and control platform, the management system included SNMP monitoring of all satellite receivers, distribution amplifiers, encoders, ad-insertion splicers, IP routers and QAMs within the signal path workflow. Grass Valley also developed complex failover scenarios to ensure full redundancy of the encoders and ad-insertion splicers so that there were no single points of failure along key points of the video signal path.

Signal alarms correlated from multiple third party monitoring systems

Audio metering and selectable acoustic monitoring

High-quality streaming video/ audio from remote set-top boxes using EdgeVision



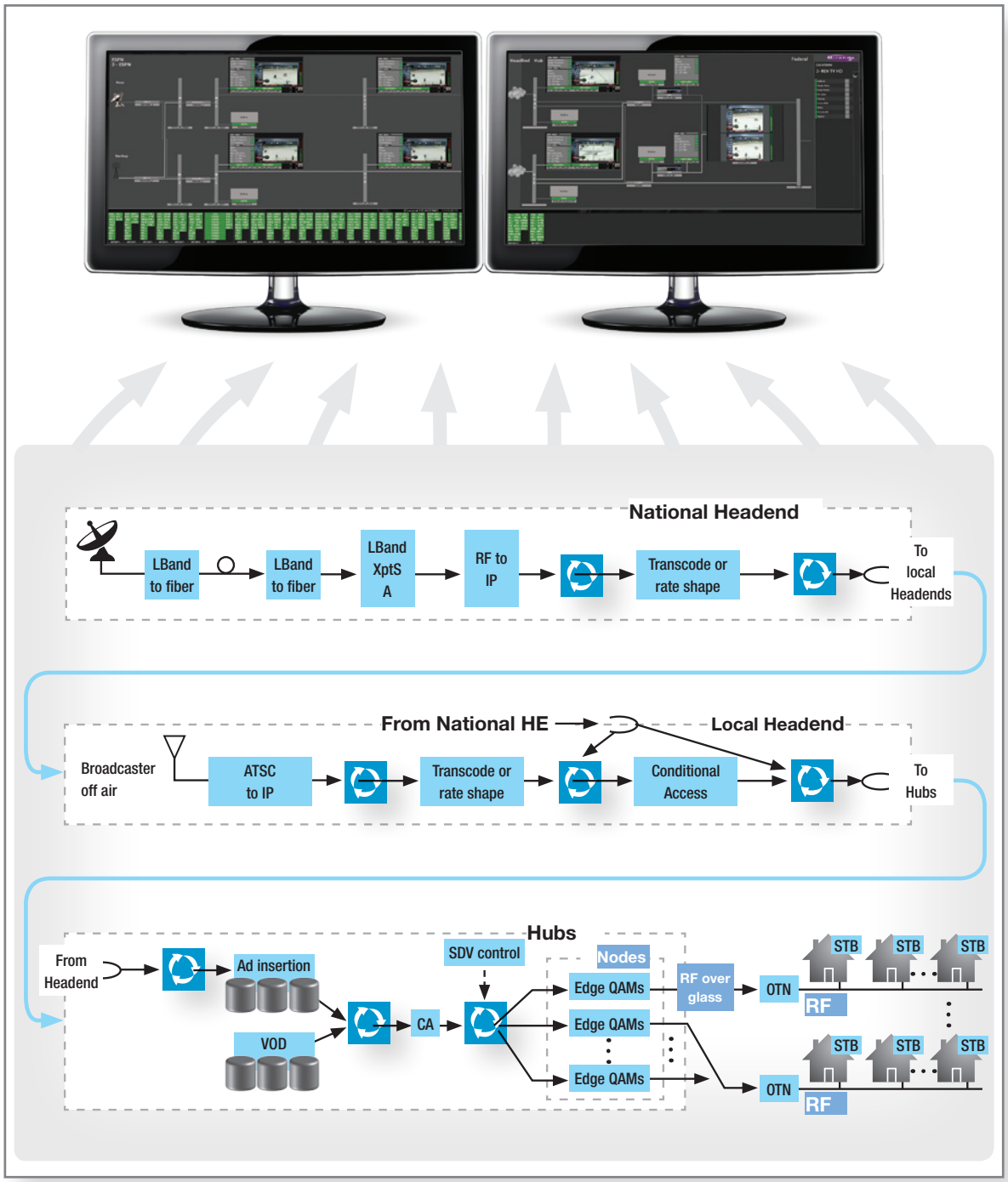
At-a-glance status of every service

Channels in dashboard can be sorted according to several criteria, helping operators correlate alarms

A sample system configuration using iControl as the central monitoring and management point for a complex headend.

For the SHE, user interfaces were customized, again using iControl, to display the full signal path in the SHE. The signal path view included connection points between the subsystems to allow the operators to visualize if the primary or backup path was active.

For the VHOs, screens where developed to display the full signal path of the VHOs, including the ad-insertion splicers. iControl also implemented fail-over logic to ensure full device redundancy.



The Outcome

iControl was successfully deployed to 2 SHEs and 10 VHOs to provide full management and monitoring of the video signal path.

Now the Telco operates under a single, consolidated video management and monitoring system, which enables them to quickly deploy new equipment, update their management rules consistently throughout their network and provide their NOC operations staff with a single GUI for management and monitoring.

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