

A View from the Top

A White Paper from Dimetis GmbH

Abstract

Video-centric networks have evolved to new configurations and forms when compared to traditional broadcast models of the last century. As the video revolution continues, the need to gain visibility into and management of the operation and performance of the entire video network is critical for achieving centralized control with commensurate operating efficiencies, quality of service parameters, and lower costs. This network management function needs to be established at regional or even national tiers with the ability to reach down into local detailed equipment levels.

This paper describes the traits, advantages and application for utilizing a unified digital broadcast monitoring / management system, providing these types of capabilities across the entire network in an organized, structured hierarchy.

Introduction

As video services continue to be deployed on a massive scale, consolidation and mergers of their associated networks are occurring at breakneck pace.

In order to properly manage signal flow, a centralized means is required to monitor and oversee all components across the video signal flow chain, from points of content origination to final customer distribution.

As part of emerging Broadcast-oriented Operations Support Systems (Broadcast OSS), these monitoring management modules provide visibility into all video components of a network, enabling the integration of devices and element managers from various manufacturers into one comprehensive system.

Ideally the Broadcast OSS monitoring system should work across the following entities:

- Multiplex and Playout Centers (DVB-T, -S, -C, ATSC and IPTV)
- Broadcast networks (contribution as well as distribution)
- Terrestrial TV distribution networks, from the Head-End to the final POPs (Points of Presence), including the transmitter, the Cable RF converters or the DSLAM locations

The whole transmission network is typically shown in an easy-to-use user interface (GUI) where all faults and alarms are logged and collated at centralized management locations. Alarm filtering / correlation on defective equipment and/or out-of-specification signal parameters can next be performed, typically color-coded on overview screens / maps to highlight the source location of a problem. This ensures simple error recognition and fault isolation. Any operation to resolve the fault can subsequently be executed either automatically or manually.

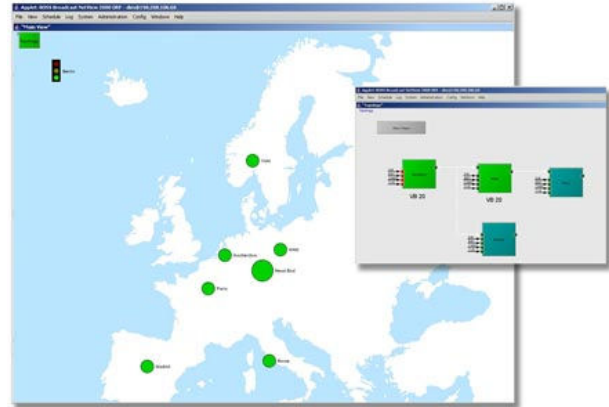


Figure 1: Network visibility on a regional / country-wide level as well as site-specific detail

The Big Picture View with Drill-Down Detail

Traditional broadcast networks are composed of a variety of segments that essentially form a linked chain. Video signals (services) are transmitted from one link to the other, working their way through this distribution channel.

In the event of an error, a problem can progress through several downstream segments and trigger "cascaded" alarms in various other downstream locations.

An effective Broadcast OSS monitoring system must reliably inform the operator about the root cause of the error along with all resultant consequential errors. Sophisticated alarm correlation techniques are therefore an important component of this type of system to assist in quick fault isolation / identification while filtering / screening secondary effects.

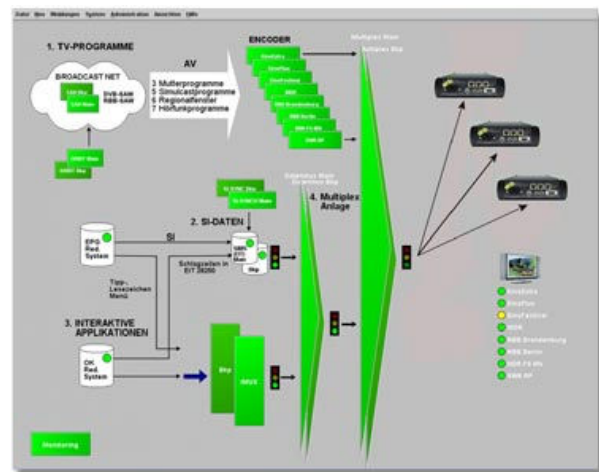


Figure 2: Umbrella alarm management across various types of broadcast equipment from numerous manufacturers

Additional features of importance in an effective broadcast network monitoring system are:

- Configuration of the entire network via a GUI interface with graphical elements
- Element manager support across multiple equipment manufacturers (i.e. performing as an “umbrella” management system for multiple pieces of dissimilar equipment)
- SNMP monitoring and control capability of all devices in the entire system
- Visualization of system status
- Centralized fault management with:
 - fault recognition / alarm processing
 - error correlation
 - user error messages (SMS, fax, e-mail, etc.)
 - redundancy switching (manual or automatic)
- Disaster recovery
- Event logging of all events (alarms, user and system actions, etc.)
- Archiving / housekeeping
- User administration

IPTV and DVB / ATSC Monitoring

In monitoring any type of complex broadcast network, a structured design and implementation approach is an absolute necessity in order to achieve overall system quality and efficiency.

As faults and errors occur, targeted actions (initiated either automatically or manually upon alarm trigger) can be performed to eliminate and / or mitigate them.

A structured and robust monitoring system will allow:

- all network devices to be defined and configured in a database.
- the recording of all performance information and alarms from devices / element managers, allowing a comprehensive overview of network status.
- provisions for n+1 back-up / recovery switching (for both video signals as well as equipment service profiles) based on error severity as defined through the correlation engine.

In the case of IPTV deployments, monitoring at the DVB / IPTV layer of the whole distribution network from Head-end to DSLAMs is important for complete system visibility. All Single Program Transport Streams (SPTS) across the entire network should be collectable and capable of having all data thoroughly analyzed via strategically placed IPTV probes and / or Transport Stream Analyzers / Recorders (Figure 3 and Figure 4).

For DVB / ATSC networks, localized monitoring and control of remote site equipment reporting upward to a higher level monitoring authority best suites the characteristics of this environment. Monitoring and control can include everything from playout devices to tower transmitters to entry door security.

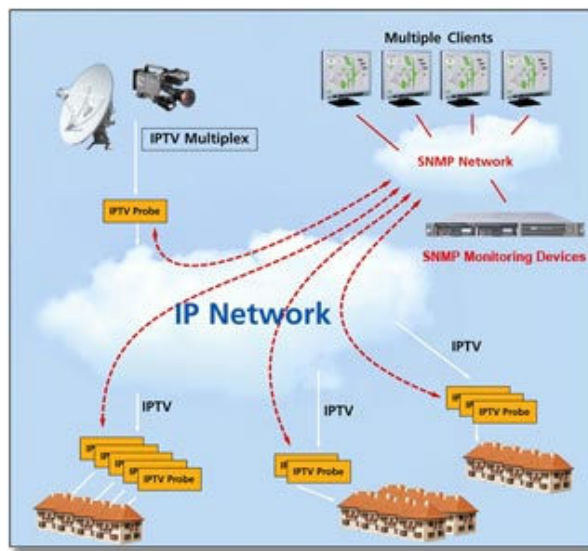


Figure 3: IPTV Network Monitoring

Conclusion

Broadcast Monitoring Systems combine the supervisory, management and control functions of devices and element managers from various equipment manufacturers into one integrated system.

- Their overall benefits are numerous and noteworthy:
- Centralizes and Automates QoS alarms
- Lowers both capital and operational expenses
- Provides fast fault location and service protection through both global and local service visibility
- Vendor independent monitoring system with easy device integration via SNMP
- One intuitive operational GUI

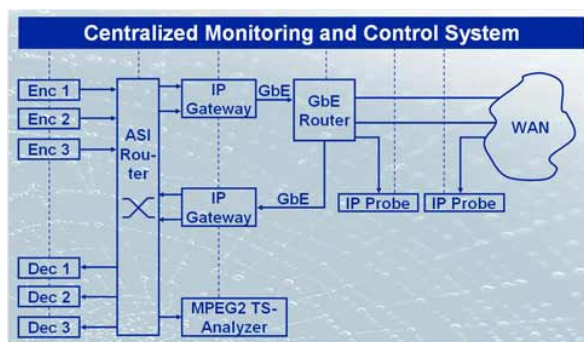


Figure 4: Centralized DVB / IPTV Monitoring and Control

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