



JDSU NetComplete® Service Assurance for Digital Video

Comprehensive Solution to Ensure Service Quality

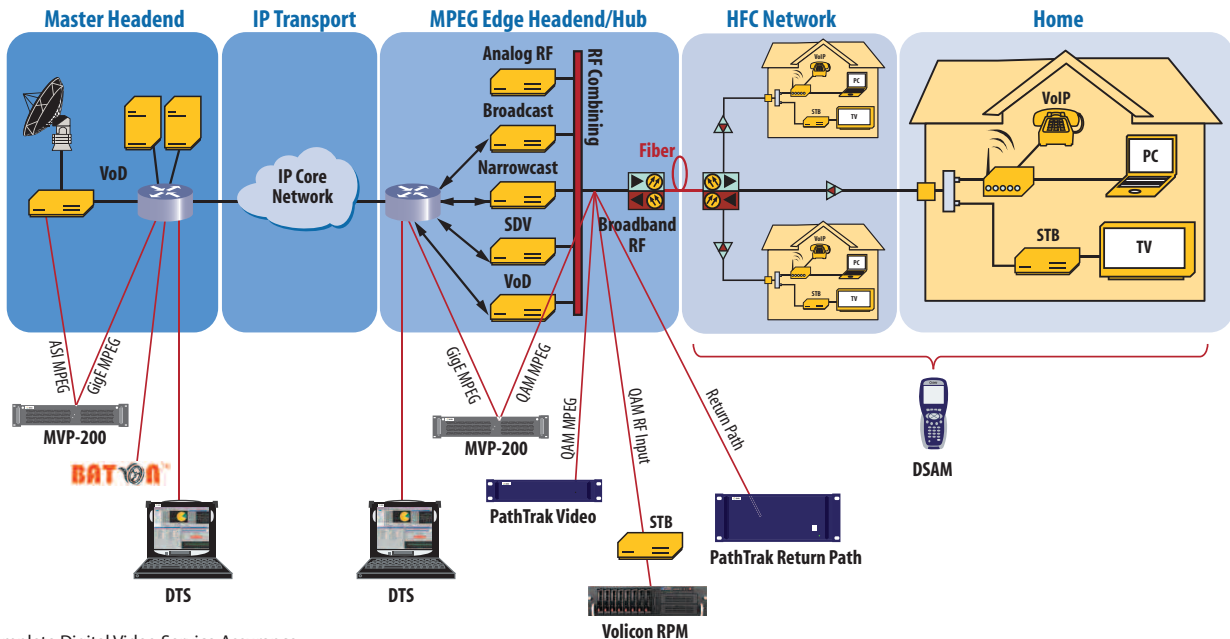
NetComplete Service Assurance for Digital Video



For telecommunications providers, cable and satellite operators around the world, the race to deliver quad-play (voice, video, and data, including wireless technologies) is under way—and the competitive pressures to deliver quality have never been more intense. A critical differentiator in this competitive landscape is the ability to increase revenue per user. Capturing customer interest with attractive service packages has become imperative to gain this precious revenue—and offering digital video is among the most attractive services of the “bundle” in demand today.

However, providers must address significant operation challenges before they can expect to deliver high-quality digital video service meeting the increasingly uncompromising standards of today’s consumers. For one, the digital video service delivery chain is complex with the potential for introducing and compounding errors that can affect quality at every point along the chain. Such points include: at the video source, in the transport network, at the edge where the majority of the video equipment resides, and in the distribution through the Hybrid Fiber Coax (HFC) network. Second, coupling the high sensitivity to packet loss and excessive jitter with the very low tolerance of subscribers for service disruptions translates into tighter quality controls and higher customer service demands. Lost packets can cause highly noticeable and disruptive impairments to the subscriber. Finally, adding another layer of complexity is the required affirmation of constant availability and impeccable delivery of premium channels to third-party suppliers. Because of these complexities, providers must not delay capturing more revenue per user and delivering excellent quality digital video if they want to be successful. They must act now to implement a comprehensive service assurance solution that proactively monitors quality continuously through the network that can:

- rapidly and accurately segment the network for fault isolation and troubleshooting
- intelligently correlate and aggregate quality metrics and alarms into actionable information



NetComplete Service Assurance for Digital Video

NetComplete Digital Video Service Assurance Solution Overview

To cost-effectively address the high-quality standards and expectations for perfection from customers enjoying digital video services, providers must have visibility of the subscriber's quality of experience (QoE). This visibility includes a clear view into digital video quality as it traverses the network from the master headend through to their customers. The NetComplete Digital Video Service Assurance solution combines powerful MPEG Video Monitoring (MVP) probes, and Pathtrak™ Video and Reverse Path Monitoring probes positioned at key points along the service delivery chain with industry-proven operation support system (OSS) software. Together, this service assurance system delivers the necessary applications and tools across all work groups enhancing real-time problem correlation reporting on quality through the video delivery chain, including:

- Entering/exiting the master headend
- MPEG edge and video manipulations
- RF combining stage with distribution through the HFC network

Performing these capabilities together under NetComplete, these applications form the complete toolset needed for service providers to rapidly isolate and correct faults and to proactively identify service degradations before they impact customers—reducing customer churn and operational costs, making digital video service profitable.

NetComplete Applications

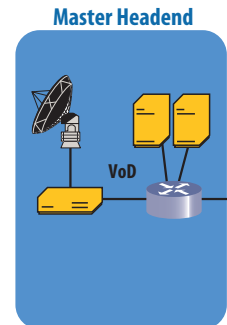
Video and Audio Content Monitoring at the Master Headend

Video is prone to “native” quality defects—issues not caused by the IP transport network, RF, or MPEG manipulations. To address these, cable operators require a method for proactively assuring that video content is available without impairment prior to being injected into the network. On-demand test tools are also a major component to rapidly troubleshoot content quality issues that are uncovered or not easily detectable.

Helping to address these delicate areas of digital video, our own JDSU digital video test expertise is strengthened by close partnerships with leading companies that provide best-in-class video content analysis toolsets.

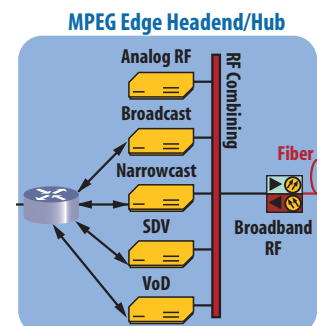
- Volicon's Observer Remote Program Monitor (RPM) gives JDSU the ability to monitor video and audio post set top box (STB)—mimicking a customer's QoE. Additionally, the RPM can capture programming for offline analysis.
- Interra Systems Baton™ product provides cable operators with automated content verification capabilities by monitoring advertisements and Video on Demand (VoD) file-based content.

These complementary product partnerships provide NetComplete with the most comprehensive service assurance solution stretching from the master headend through to the HFC network.



MPEG Troubleshooting and Monitoring Across the Edge

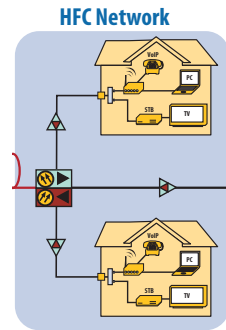
The cable edge is the most crucial aspect of the digital video architecture and the area where the most complicated MPEG manipulations occur. These manipulations include Digital Program Insertion (DPI), locals insertion, multiplexing, encryption, and modulation. With such a high volume of MPEG processing, problems occurring at the edge will result in picture distortions and significant quality problems. In order to effectively troubleshoot these problems at the edge, providing deep MPEG visibility at both sides of the edge becomes imperative. By “wrapping” the edge, NetComplete provides invaluable visibility by covering all sides of the edge, which enables monitoring of the same programs at multiple GigE and/or RF points at ingest and along the manipulation path, thus allowing easy identification and isolation of quality issues.



NetComplete Applications

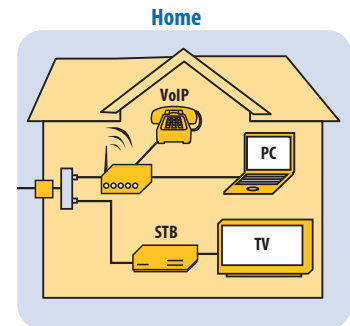
HFC Field Network Troubleshooting

The HFC plant and RF network continues to be the source of many quality issues. Field technicians must rely on the ability to quickly identify and isolate the source of these quality issues to rapidly route trouble tickets to the appropriate work group, ultimately reducing Mean Time to Repair (MTTR). By monitoring nodes' RF and MPEG performance, allows for the quick segregation of problems between the inside and outside plant in minutes instead of hours.



Home Network Troubleshooting

The JDSU Digital Service Activation Meter (DSAM) triple-play tool tests digital and analog video performance from installations to fiber nodes. Impairments affecting video quality are easily detected and segmented using tools such as Data Quality Index (DQI), Error Vector Magnitude (EVM), and Modulation Error Rate (MER). Installers use these tools to verify that a service is working within defined tolerances. Maintenance technicians ensure appropriate levels through-out a node using patented sweep technology.



NetComplete Digital Video Product Portfolio

The NetComplete Digital Video Service Assurance solution from JDSU provides industry-leading test and monitoring functionality that responds to the number one concern among competitive providers today—that customers want quality. With capabilities including the most comprehensive service assurance coverage, rapid fault isolation, and in-depth drill-down analysis, cable providers can roll out, scale, and maintain efficient digital video service that reliably performs to high QoE expectations. Contact a JDSU sales engineer or visit www.jdsu.com for complete information on JDSU NetComplete Service Assurance solutions and products.



DTS



DSAM, PathTrak Video, and PathTrak Reverse Path Monitoring



Automated Content Verification System



MVP-200 MPEG Analyzer



Volicon Observer Remote Program Monitor (RPM)



Test & Measurement Regional Sales

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