

Support HD & 3D TV video with high performance transport networks



The demands for new High Resolution(HD) and 3D video capabilities are growing rapidly, creating new challenges in transport networks.

Transmode's Switched Video Transport solution offers a cost effective, innovative approach to help service providers and network providers deliver HD and 3D content over their current packet based transport network.

Transmode's Switched Video Transport integrates features typically found in high end routers into the transport network. This new capability, based on Transmode's Native Packet Optical architecture is yet another example of Transmode's ability to deliver technologies that simplify operation and increase network capacity.

Benefits:

- Cost effective distribution of HD and 3D content
- Standards based
- Leverage packet based network
- Ultra low latency and zero jitter
- Unified service platform
- Simplified operation and management

"Network operators, and MSOs in particular, are dealing with a rapid rise in both streamed and on demand video content within their networks," stated Michael Howard, principal analyst at Infonetics Research.

"Streamed multicast IPTV traffic creates even harsher challenges as these operators move to High Definition and 3D services, with bandwidth demands increasing enormously while service revenues do not.

Network operators are today assessing how best to optimize this traffic to simplify network operations—and at the same time reduce costs as they make the move to HD and 3D services."

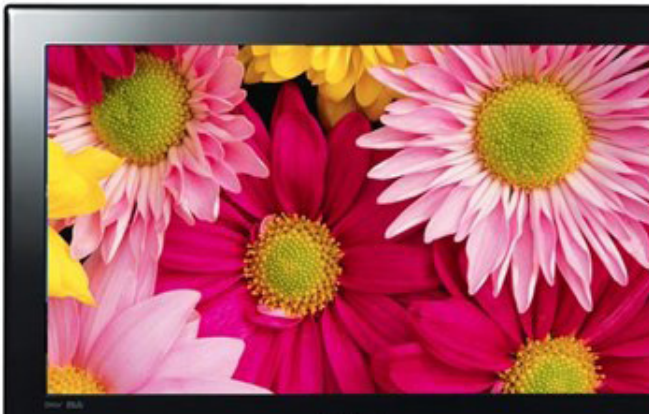
Video Delivery Challenges

There is an explosive demand for high capacity packet based services driven by residential usage such as standard, HD and 3D video streaming, voice over IP and gaming, coupled with business requirements for flexible VPN's and high capacity backhaul services. Cable TV/MSO providers must offer new services to retain existing customers and expand their customer base.

Network operators feel the need to radically lower the cost of their transport networks if they are to be profitable in the future, and that requires optimizing the costs without compromising on scalability, efficiency, manageability, or the ability to offer differentiated services.

To meet these demands, network providers are going through a conversion from analog to digital distribution technologies and packet optical networks. Packet optical networks have been the industry consensus answer to meet future needs, with the convergence of legacy and next-generation services onto Ethernet.

The competition is particularly fierce for residential services, with alternatives such as FTTH access becoming available. Higher resolution technologies, such as HD and 3D video use higher bit rates, increasing capacity demands. More effective technologies are needed to distribute TV/video, which are cost effective and compatible with packet based transport.



The HD & 3D TV demand is putting new requirements on service providers' network

The Transmode Solution – Switched Video Transport

The Transmode Switched Video Transport solution is based on Transmode's Native Packet Optical architecture and Transport Ethernet capabilities. These capabilities support Ethernet networking in metro and regional networks. The integration of selected functionality into the transport network equipment enables cost efficient capacity increases and the service differentiation capabilities typically found in Ethernet networks.

Transmode's Ethernet Muxponder family, which is part of the TM-Series of carrier-class packet-optical transport products, allows operators the use of features that are unique for demarcation, aggregation and transport of Ethernet services. Enabling cost efficient increase of metro network capacity, the Ethernet Muxponders use packet optical technology in an innovative standards based way for the best transport network economics.

Standards Based

Transmode's Switched Video Transport implements IGMPv3 features to listen to the IGMP network traffic between Edge QAMs and multicast routers. By participating in the IGMP conversation and switching the individual channels, Transmode radically reduces the cost of the network. The IGMPv3 features, IGMP Snooping and Source-Specific Multicast, allow network traffic to be highly optimized, as a destination only receives the traffic intended for it.

- IGMP Snooping prevents Edge QAMs on the network from receiving traffic for a multicast channels they have not explicitly joined. A switch that is not aware of the multicast traffic will, by default, flood multicast traffic to all the ports.
- Source-Specific Multicast (SSM) provides the ability to deliver Internet broadcast services without the need for unique IP multicast addresses. SSM eases the installation and operation for network operators because it does not require the network to maintain information about which active sources are sending into multicast groups.

Unique, Innovative Design

Transmode's Switched Video Transport implementation offers unique features. The IGMPv3 standards are widely used, but typically available only in high performance Layer 3 devices/routers used in the network core. These products are not viable for distributing HD/3D video, as the cost and complexity to put high performance routers at many locations is too high. Alternatively, these IGMPv3 features are not typically supported in optical transport equipment, which instead support an earlier version of IGMP, if at all.

Packet Optical Networks

Transmode's Native Packet Optical architecture is enabling network operators to develop cost effective strategies that service the growing demand for wavelength and packet based services, while maintaining support for profitable TDM based SDH & SONET services. Flattening the network to a single layer simplifies the network, resulting in a reduced cost of delivering traffic across the network, thus significantly reducing the total cost of ownership.

Benefits of Transmode's Switched Video Transport

Unified service platform

Transmode provides a unified service platform, which can be used for a broad range of applications, including:

- HDTV, 3D and Video on Demand
- Mobile Backhaul
- Broadband Backhaul
- Business Ethernet

With the HDTV/3D specific features provided in the Switched Video Transport solution, Transmode's Transport Ethernet capabilities offer ideal functionality for the transport of more and more types of services. The TM-Series Multi-Service Muxponders also allow easy migration of non-Ethernet traffic onto the same infrastructure.

Cost effective HDTV/3D distribution

Transmode's Switched Video Transport eliminates the need for a separate layer 3 video distribution network. This capability translates into tangible benefits for network

providers and provides the capabilities that are required for solving the demands of increased traffic with lower CAPEX and OPEX.

Reusing the packet based transport network for HD and 3D video distribution maximizes the value of the current infrastructure.

Performance

Transmode's Switched Video Transport is ideal for video distribution with industry leading latency and jitter performance.

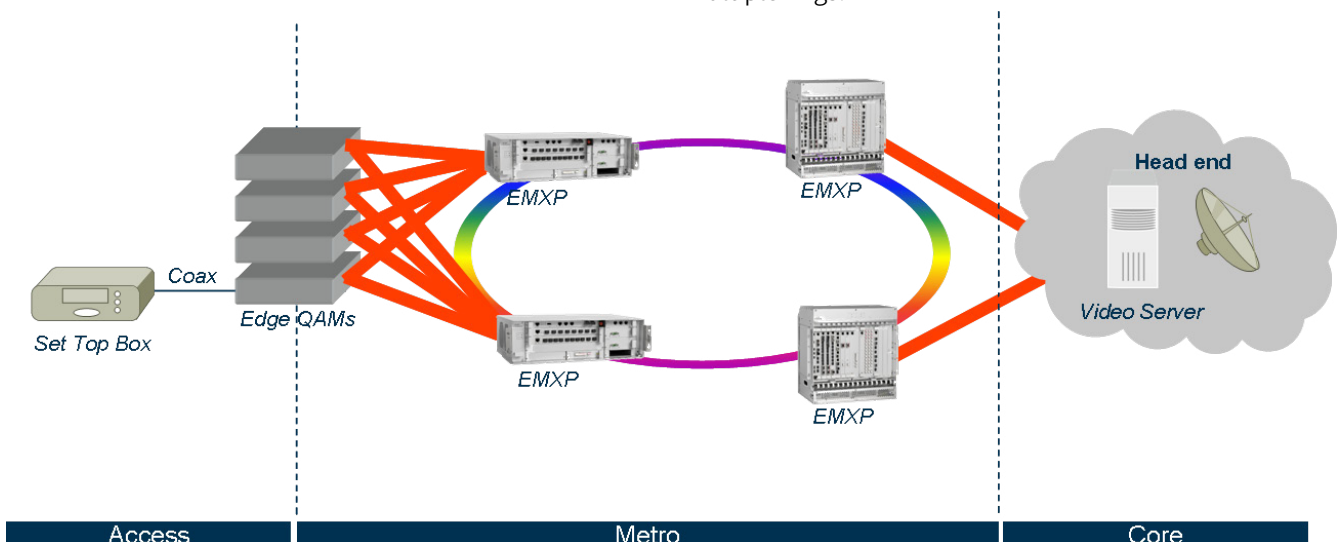
- The TM-Series Ethernet Muxponders have near zero jitter, and less than 2 microseconds latency, which is far better than a router based solution.
- The TM-Series 2.5G and 10G Multi-rate Transponders provide only 4 to 10 nanoseconds latency per Transponder pair.

Simplified Operation and Management

Transmode's approach provides greatly simplified operation and management, as one management system can be used for all services. Compliant with well known MEF standard services, the GUI or CLI based management service uses familiar concepts and terms. Finally, by implementing video distribution support at the transport level, Transmode allows simpler configuration, reducing the demands on administrators.

Flexible resilience

Using Transmode's Native Packet Optical architecture for video distribution provides a variety of options for delivering cost efficient service availability, including link aggregation, ring protection, equipment protection, and multiple rings.



Overview of Transmode's Switched Video Transport Solution

TM-Series Highlights

- Industry leading Low Latency and zero jitter for video distribution
- Intelligent WDM (iWDM™) concept for innovative optical networking
- Seamless mix of CWDM and DWDM on fiber pair or single-fiber configurations
- Flexible pluggable optics and configurable hardware including ROADMs for low total cost of ownership
- Efficient wavelength utilization via Layer 1 and Layer 2 aggregators
- Low Power Design architecture – 80% energy savings compared to similar solutions, compact with small footprint
- Multi dimensional scalability including distance (1-1500 km), number of wavelengths, services per wavelength, traffic formats, capacity and chassis options
- Ethernet aggregation with Carrier Ethernet capabilities, prioritization, classification, and bandwidth profiling
- Centralized, carrier-grade Network Management system with sophisticated provisioning, fault management and performance monitoring



Summary

Transmode has gained recognition from customer and independent analysts for its optical network knowledge, product reliability and technical innovations. Switched Video Transport is yet another creative solution to meet the evolving needs of Transmode customers. Switched Video Transport provides a cost effective approach for the delivery of high performance HD and 3D video.

The specifications and information within this document are subject to change without further notice. All statements, information and recommendations are believed to be accurate but are presented without warranty of any kind. Contact Transmode for more details.

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