

Application ideally suited for:

Global Sport and Live Content Franchises
Telecoms Operators
Broadcasters

Features & Benefits

Scalable, high performance bandwidth to accommodate video signals at increasing bit rates (as with 4K and 8K Video Resolutions)

- A common, shared network infrastructure that can transport video, audio, and data signals in all widely used formats
- Adherence to standards, ensuring longer product lifecycles, improved vendor support, true interoperability, and future product enhancements
- Intelligent network transport, including low latency, traffic prioritization, QoS assurances, lossless transmission, error control/correction, bandwidth management, and route failover options. Varied network connectivity options, such as point-to-point, point-to-multipoint, easy access to secondary distribution networks, multi-homing, and signal aggregation.
- A rich set of standards-based network management and diagnostic tools to speed provisioning and troubleshooting
- A future-proof network architecture that supports emerging network-centric applications, including the greater use of data and reverse channels, remote production, live-to-file conversions, and streamlined workflows

Related Products

MD8000SX, MD8000, MD8000EX and MD8000-100G IP Media Gateways

MDX-100G Series of Core/Aggregation Switches

MDP3020 MAX compact IP Media Gateway

ProMD-EMS 2.0 Software

APPLICATION NOTE

Wide Area Network (WAN) over IP

Television, event, and sports broadcasters have long relied on a diverse array of legacy and newer network technologies to deliver critical video, audio, and data signals from venue to destination. This varied mix of legacy and current WAN transport methods includes satellite and microwave feeds, TDM networks, dark fiber, MPLS networks, metro Ethernet, and ATM, DTM, and DWDM transmission systems.

While each of these technologies offers users benefits in terms of rate, reach, and cost, their continued use has left broadcasters with a disjointed set of networks that are expensive to operate, hard to provision, and difficult to troubleshoot. Due to network fragmentation and isolation (islands of connectivity), critical items such as Quality of Service (QoS) guarantees, end-to-end circuit visibility, multipoint connectivity, and error protection are often lacking in these solutions.

Over the past decade, however, the old rules surrounding broadcast video networks have shifted, with next generation WAN IP networks emerging as the clear winner among transport technologies. Popular applications using next generation IP networks are numerous and include live sports, live event contribution, stadium-to-studio and studio-to-studio connectivity, remote production, and mobile studios. Broadcaster adoption rates have been high; the reasons behind the success of IP WANs are compelling.



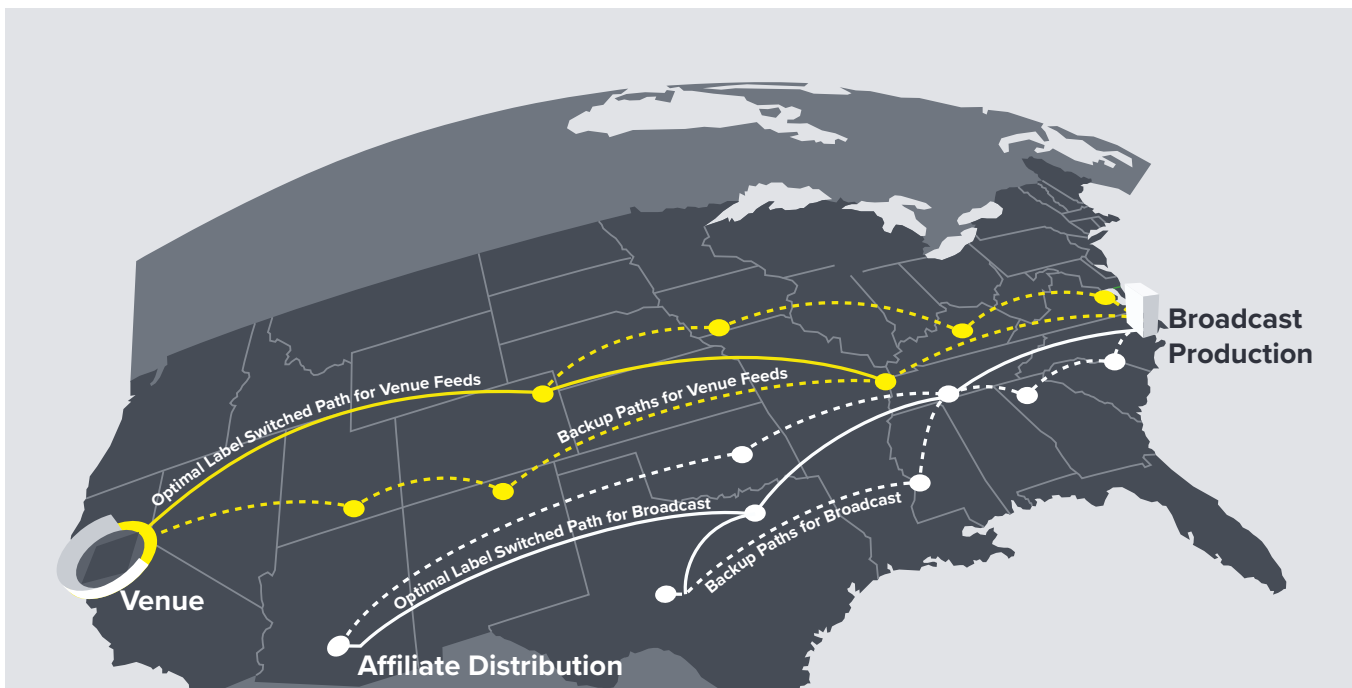
Balancing Efficient Bandwidth Usage with Smooth Network Scalability and Expandability

One of the keys to increased network revenues and a better ROI on network equipment investments is the efficient use of network bandwidth. Legacy time-division multiplexing (TDM) technologies allocate bandwidth in discrete channels or bands. But broadcast video and data sometimes don't fit neatly into these boundaries, so even if trunk or backbone bandwidth is still available, it may not be large enough to fit an uncompressed or moderately compressed video signal. The result: stranded bandwidth on an existing TDM trunk and a new monthly bill for an additional trunk circuit.

Newer carrier-based WAN technologies such as metro Ethernet and Ethernet Metropolitan Area Networks (MANs) avoid some of legacy TDM drawbacks and come with a number of other advantages. On a per gigabit basis, monthly circuit charges are typically much less expensive.

10Gbps Ethernet links can be provisioned over a variety of transport technologies, including Multiprotocol Label Switching (MPLS), and Dense Wavelength Division Multiplexing (DWDM) networks, so availability is nearly universal. Different priority classes can be assigned to video, audio, and data signals traversing the same network path, so that statistical multiplexing gains are achieved. Data circuits can also be provisioned with an upper limit on bandwidth usage; if input bandwidth is exceeded, those data packets are buffered up to a point and then eventually dropped without any effect on video or audio traffic. Finally, Ethernet bit rates, now speeding along at 10Gbps, 40Gbps, and 100Gbps, continue to increase, with 400Gbps and Terabit speeds around the corner.

When additional trunk or network backbone capacity is needed in a WAN IP network, new circuits can be ordered in the size that fits best, there is no need to over provision in locations where bandwidth isn't needed. There are software, hardware, or logical limitations on network expansion, an unlimited number of nodes and circuits can be added to the network, all the while maintaining network management visibility that is edge-to-edge. And year after year, service providers can continue to ride the downward price curve for IP-based network equipment and circuits.





Large viewership national or international television broadcasts and high profile sporting events represent some of the most technically demanding applications in all of broadcast television. Dropping a video or audio signal at the wrong time may represent hundreds of thousands of dollars or more of lost revenue to the service provider and broadcaster. Furthermore, network outages in these high profile events tarnish service providers' reputations in a very public way and may jeopardize future customer contract and revenue possibilities.

Media Links' advanced IP Media Transport solutions use a variety of different transport assurance mechanisms to ensure that outages never happen or, in those rare cases where they do, that switching occurs seamlessly without signal disruption. At its most fundamental level, power supply, switch fabric, and trunk redundancy is built into all Media Links IP Transport equipment.

Sometimes referred to as Spatial Redundancy, Hitless Switching allows users to accept a single input signal and send it as two separate streams across diverse transmission paths in the network. Both streams arrive at the same destination line card but are typically out of time with each other due to the diverse paths taken. On the destination card, these signals are then realigned and synced with each other to assure precise video timing. Should the primary signal be lost or interrupted, the destination card automatically switches over to the secondary signal without any signal disruption (lossless switching). In contrast to Hitless Switching, the Auto Protection Switching option monitors the primary channel but does not send traffic on the secondary channel unless the primary channel goes down.

Another option for improved network resiliency is Forward Error Correction (FEC), a coding technique applied to video/audio frames that can correct a limited number of errored frames on the fly without retransmission. FEC is particularly effective in cases where burst errors occur. Other broadcast specific transport features include QoS (Quality of Service) monitoring and control of network impairments such as jitter, latency, and packet loss.

Leading the Industry in Standards-Based IP Video Transport

For many decades, both the broadcast television and telecommunications industries have relied heavily on standards organizations such as the Society of Motion Picture Engineers (SMPTE) and the International Telecommunication Union (ITU) to define standards-based approaches to complex technical challenges in the areas of encoding, video transport, compression, encapsulation, and more. Media Links Technologists have been at the forefront of many of these activities, especially in the area of high bit rate media transport over IP (HBRMT) and image compression interoperability.

IP-based approaches are now past the 'critical mass' stage with basically universal customer and vendor buy-in, thereby securing their long term adoption and commercial success.

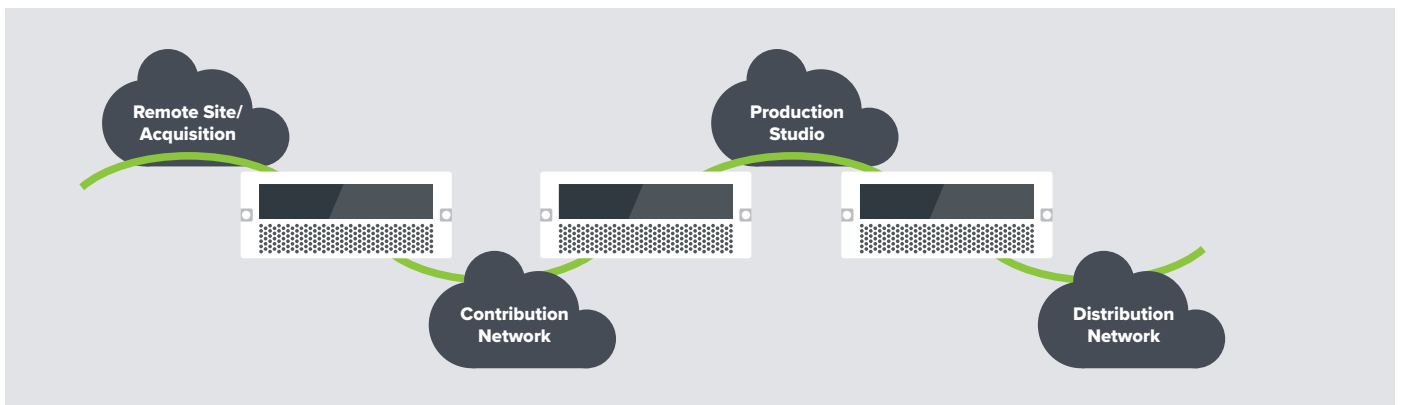
Options in Network Connectivity

The types of services (video, audio, and data) transported over IP networks have grown significantly in recent years. Customer's network connectivity needs have also been on a step function rise, moving from basic uni-directional point-to-point circuits to quite complex multi-service, multi-point ones.

Due to the switching capability inherent in the IP protocol, IP networks are particularly adept at handling transport requirements more efficiently. One more common example is point-to-multipoint or multicast transmission, where a single input signal is replicated by the network and sent to multiple sites. To create multicast streams, Media Links' transport products efficiently replicate packets on the switch controller, then send these packets out to multiple trunk ports in the same chassis. If needed, the next downstream Media Links device can perform the same multicast replication, so that only a single stream's worth of bandwidth is consumed on each trunk.

Ethernet data connections are inherently bi-directional so that source and destination sites are capable of concurrently sending and receiving data. Remote production and mobile studios using live two-way interviews, remote camera controls, and back office applications are also well suited to the very low latency compressed and uncompressed IP connections made through the Media Links product portfolio. In addition, for remote production applications, JPEG2000 and JPEG-XS compression delivers visually lossless quality video with very low latency and supports transparent audio and ancillary data channels.

As IP proliferates, the islands of connectivity that have plagued service providers in the past are just about gone. As shown in the diagram below, IP networking delivers seamless end-to-end connectivity from originating Remote Sites/Access Networks, to Contribution and Distribution networks, and finally to destination production sites and studios. The use of a single common set of network protocols and equipment significantly lessens the workload placed on network managers and staff related to service provisioning, route diversity, network upgrades, capacity planning, fault isolation, and troubleshooting. The result: improved customer responsiveness, lower CAPEX and OPEX costs, and a faster rollout for new products and services.



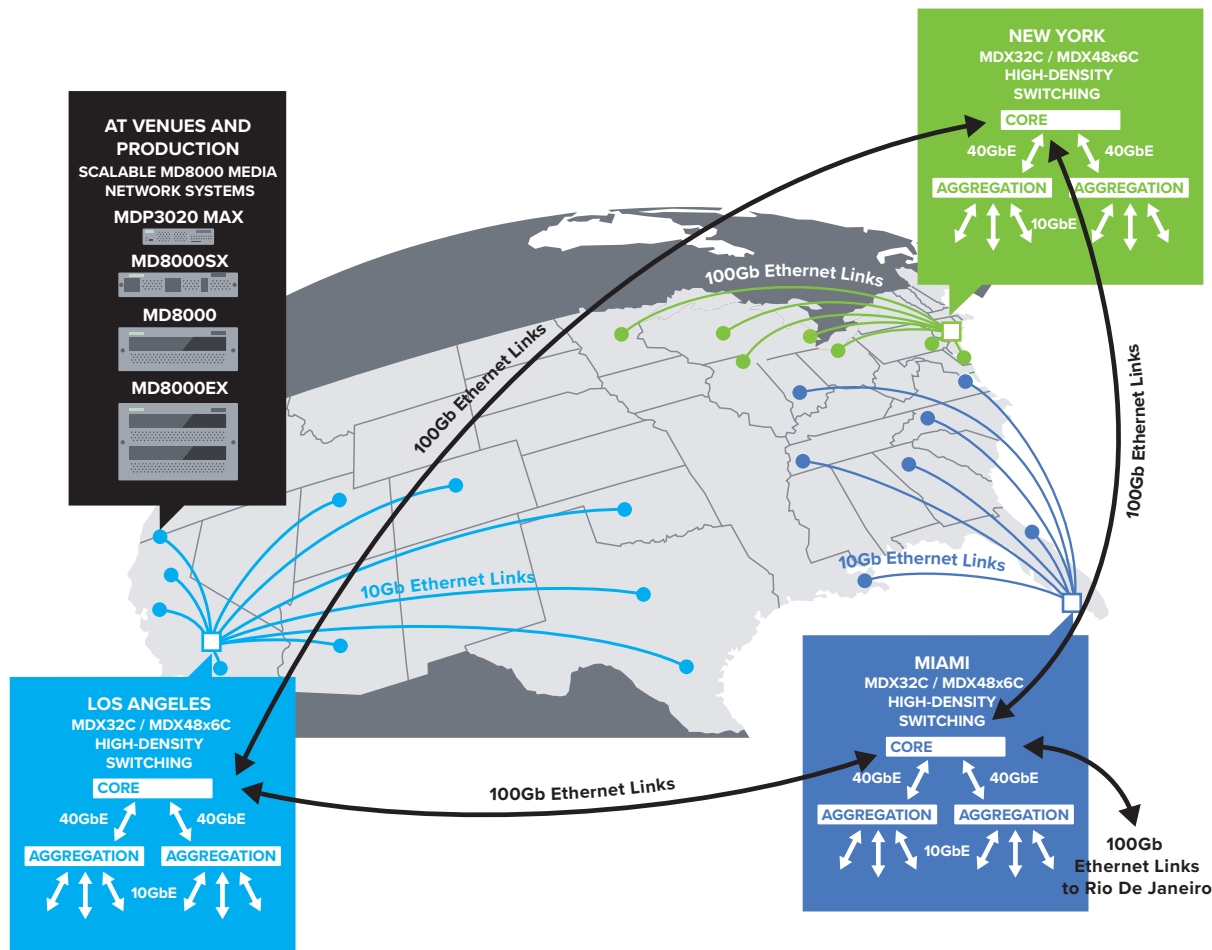
To ensure reliable 24x7 operations, broadcast-grade video transport equipment must be designed from the ground up with real-time statistics, on-board diagnostics, and hardware serviceability in mind. Media Links provides its customers with a full set of network management tools that give customers the ability to remotely poll, diagnose, troubleshoot, and upgrade remote systems in the field, regardless of location. Network management connectivity includes both out-of-band and in-band options. These same network management platforms have been used to manage some of the most highly visible television events in the world, including the Super Bowl, Olympics, and World Cup football tournaments.

WAN IP Networks: Merging Performance, Versatility, and Longevity

Service providers and customers living with legacy video transport networks are faced with three distinct choices: carry-on, upgrade, or replace. While calculating the cost of new replacement network hardware and software is a straightforward exercise, other “soft” factors merit careful scrutiny.

- Does the new network design improve network reliability and resiliency?
- Can I easily scale the network to add more sites, access and backbone bandwidth, and high bandwidth services?
- Is the new network design a true “Unified Services” platform?
- Can I rapidly provision, maintain, and troubleshoot true end-to-end services?
- Is the new solution standards-based only at the edge or throughout?
- Does the new design save on CAPEX and OPEX so I can improve service margins?

In the case of Media Links IP WAN products, the answer to all of the above questions is a resounding ‘Yes’. Since its inception in 1993, Media Links has never strayed from its commitment to video over IP broadcast network solutions. Decades later, the decision to base the company’s products and strategic direction on this choice now seems prophetic. WAN IP networking is now the defacto standard; switches continue to get faster, feature-sets continue to get richer, and circuits continue to get cheaper, year after year. Most importantly, its flexibility, converged architecture, and long list of proven successes means that WAN IP networking will continue to adapt to new technical challenges and market requirements for many years to come.

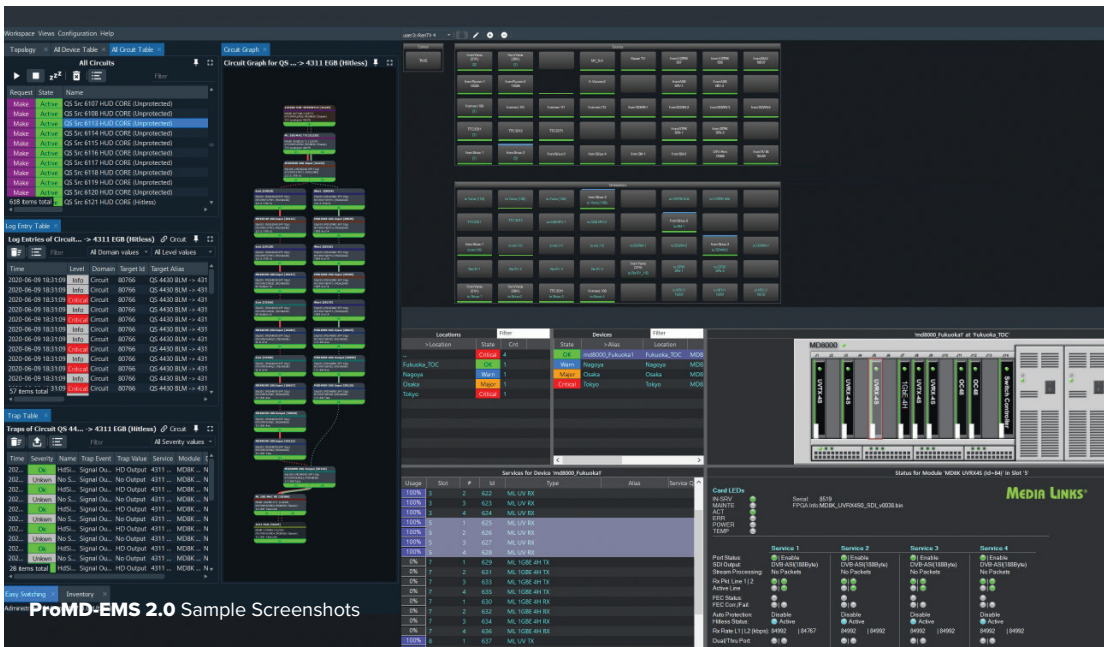


Media Links' Control Plane Management and Orchestration for Remote Production

The Media Links Enhanced Management Software (ProMD-EMS) ensures the central media hub has full visibility of all Remote Production locations over the entire network, and at all times. This powerful software application monitors the entire network, polling and receiving alerts and notifications in real-time to rapidly identify circuit and equipment issues before they become service affecting. The Media Links ProMD-EMS also provisions circuits, creates backup routes, and manages bandwidth.

Together, the Media Links hardware and software system components operate as a coherent and seamless ecosystem to both support a mixed-mode configuration, and allow network providers the advantage of transmitting and receiving different signals (4K/HD/3G/SD-SDI, audio, ASI and data) simultaneously. This technology allows for ultra-long transmission distances and serves as an extremely practical and cost-effective method to consolidate the highest quality video, audio and data content elements onto a single network. Media Links' IP Transport Products help service providers fully realize the vision of using IP/Ethernet as the preferred content distribution networking platform.

Impeccable video quality with millisecond latency is achievable and a large variety of signal sources can be inserted onto the IP platform at any given last mile / edge site and sent to the central media hub as well as all interconnected facilities across the country or across continents. This centralized solution also eliminates the need for providers to operate separate and technically diverse networks. Media Links provides a common ecosystem platform for all connected venues, broadcast centers, video distribution facilities, and more to accommodate all signal requirements whether 4K/3G/HD/SD-SDI, DVB-ASI, audio or data. It is the Gold standard for IP media transmission!



ProMD-EMS 2.0 Sample Screenshots

Media Links (Headquarters)
 Kawasaki Tech Center 18F
 580-16 Horikawa-cho,
 Saiwai-ku, Kawasaki-shi,
 Kanagawa 212-0013 Japan
 Phone: +81 44-589-3440
 query@medialinks.co.jp

Media Links Americas
 431-C Hayden Station Road
 Windsor, CT 06095
 USA
 Phone: +1 860-206-9163
 Fax: +1 860-206-9165
 info@medialinks.com

Media Links EMEA
 Suite 18242, PO Box 6945,
 London W1A 6US
 UK
 Phone: +44 207 096 9569
 emea_info@medialinks.com

Media Links Australia
 2-12 Rokeby Street,
 Collingwood, VIC 3066,
 Australia
 Phone: +61 3-9017-0175
 Fax: +61 3-8456-6339
 info@medialinksaustralia.com.au

www.medialinks.com

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