



**IP Live Sports Production**

**APPLICATION NOTE**

**Version 2**

**Application ideally suited for:**

**Broadcasters**

- Transport impeccable quality content for the highest profile, mission critical sporting events with guaranteed service delivery, reliability and resiliency.

**Franchise owners**

- Support all media needs with one common ecosystem providing the agility, flexibility and scalability to accommodate evolving media demands, higher video and data bandwidths, and workflows.

**Remote Production Teams**

- Control distant sports venue media equipment remotely from the studio and send its content across one common network in one common ecosystem, all with minimal latency and bandwidth efficiency.

**Amateur/Niche/Local Sports Venues**

- Move content economically over dark fiber metropolitan networks using low cost, compact IP Media Gateways supporting today's higher resolution video formats along with bidirectional data feeds

**Features & Benefits**

- Evolutionary, not revolutionary soft-step IP migration
- Support for all video/media types including 4K UHD and 10G Data
- Scalable bandwidth capacity to 100G and beyond
- Integral Network Management software for remote equipment and service assurance, activation & orchestration

**Related Products**

*MDP3020 MAX compact IP Media Gateway*  
*MD8000SX, MD8000, MD8000EX and MD8000-100G IP Media Gateways*  
*MDX Series of Core/Aggregation Switches*  
*ProMD-EMS 2.0 Software*

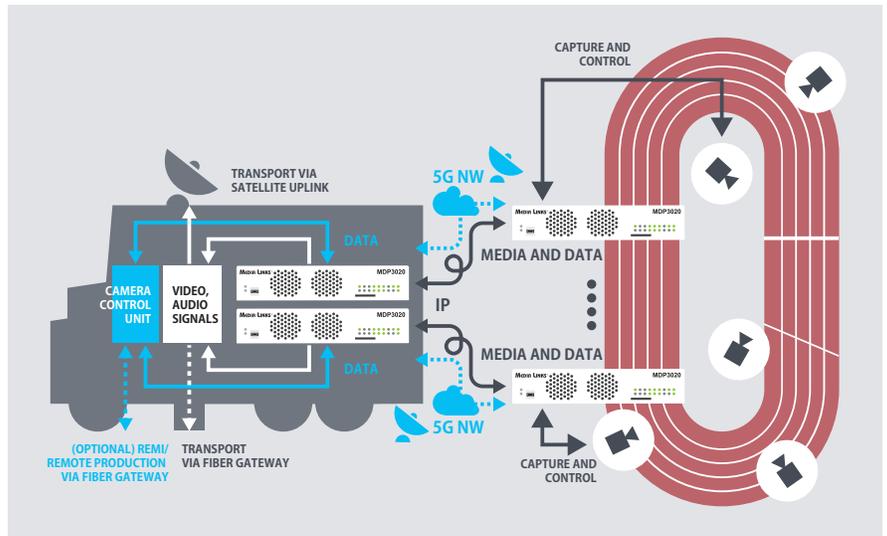
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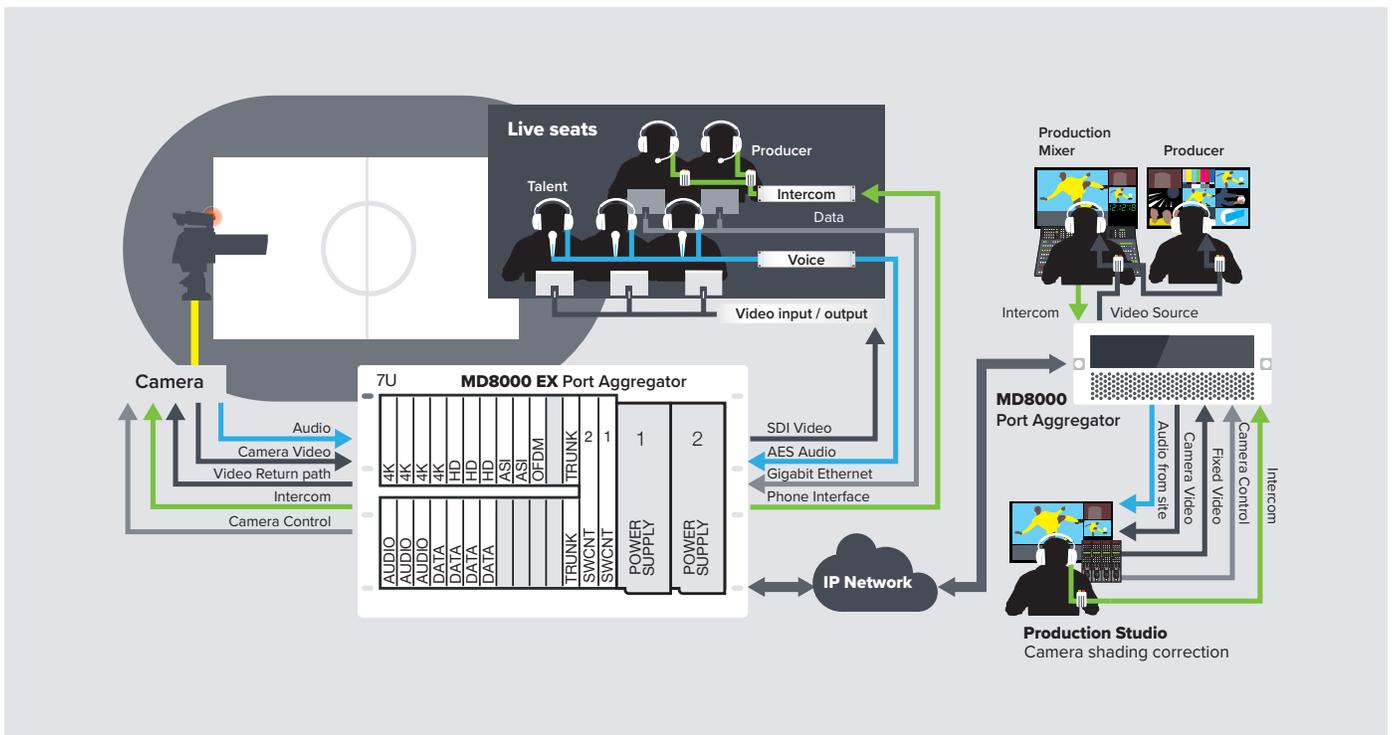
# Unifying Live Sports with IP Production

A live broadcast covering a sporting event is one of the most technically challenging assignments for any production crew. Large, demanding global audiences (like those viewing the Olympics and World Cup events) with ever increasing quality expectations create even more pressure to produce a well-choreographed, real-time production. Multiple signals in a wide variety of formats need to be transmitted around and from the sporting venue, as well as being seamlessly integrated with feeds from a studio or other locations to form a complete broadcast stream.

Increasingly, broadcasters are turning to IP technology in order to simplify their networks by consolidating all their media traffic on a common platform, and to take advantage of the increasing array of video devices that natively support IP.

Managing all of the different signal types and locations can be a daunting task without advanced transport technology. Most media signals need to be encapsulated or adapted to work efficiently over a backbone that carries multiple signals. The Media Links IP Ecosystem has proven itself as an ultra-reliable, high-performance transport solution for all types of signals used in live sports or any other form of media networking.





To understand the magnitude of the challenge facing live sports production teams, consider the types of services that need to be provided by a signal transport system, including:

**Live video and audio feeds that capture the actual competition.**

Today these signals are commonly 720p and 1080i that run at 1.5 Gbps, as well as 1080p that uses 3 Gbps. For major events, 4K/ UHD cameras running at 12 Gbps or higher are increasingly being used as the market for delivering this content to subscribers grows. The number of video, audio, as well as data feeds typically transmitted from a venue has also been increasing. Broadcasters are adding more cameras and producing more website content, while simultaneously relocating production from expensive venue-based personnel and equipment towards centralized, less costly studio-based or even home/remote-based production teams.

**Live video and audio feeds from announcers/reporters/analysts located at the sports venue.**

These feeds are often (but not always) delivered in the same format as the event feeds, but may require special configuration to minimize round trip delay (i.e. latency) to permit conversations and interviews to be conducted between studio and venue personnel.

**Live data feeds that carry statistics, results and other information about the event.**

These data feeds can include scores, details about specific plays and players, in-game statistics, and a host of other pertinent information. Such data are becoming increasingly valuable to broadcasters and sports leagues, because they can be used to enhance viewer engagement and also to produce alternative offerings to consumers such as mobile data feeds and statistical archives that create additional revenue streams.

**Two-way voice intercom/VOIP system that provides communications among the production team members.**

These links can be used for many functions, not the least of which is allowing a director to talk with camera operators to create the shots used in the live production.

**Data links using multiple formats and bit rates are deployed for many different production equipment control and monitoring functions.**

These can include camera shading controls, tally lights, camera PTZ control links, lighting control systems, etc. In addition, many other data connections are used to support broadcast operations and communications, including file transfers for AR graphics, animations and video clips; live-to-file recording systems, employee e-mail and internet access, social media feeds from venue-based commentators, and other functions.

In the past, many of these signals required separate, specialized transport networks. HD and SD video signals flowed as SDI signals over coaxial cables and were switched via video routers. Compressed versions of these signals commonly used DVB/ASI links which also used one-way SDI circuits within both production facilities and over long-haul terrestrial and satellite networks. Analog program audio and digital audio signals that were not embedded into SDI signals were transported over shielded cables inside the production facility and via T1/E1 telephone circuits for long-haul connections. Data signals were often sent as separate serial links using protocols such as RS-232, RS-422, and contact closures; in some cases multiplexing devices could be used to combine them over a single telecom circuit or data connection. Intercom and voice circuits require two-way audio connections, which were often transported between facilities using multiple circuits leased from telephone service providers.

Large files associated with graphics, animations or library clips often required physical media such as tapes or disk drives, although more recently the trend has been to install high-bandwidth IP networks and utilize advanced file acceleration applications to transport these as digital files. With all these different signal types and network configurations, broadcasters would often need days before each event to install, configure and test a diverse array of communication circuits.

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### **Media Links Media over IP Transport Platform Unifies all Signals**

Today, IP technology implemented across the entire Media Links Ecosystem allows all of the signals required for a live sports broadcast to be unified on a common transport platform. By using IP connections implemented over a high-reliability switched Ethernet fabric, all of the signals required for a modern sports broadcast can be delivered over a single backbone, greatly reducing system complexity, setup time and cost.

- Uncompressed video signals are converted from SDI into high-bandwidth IP packet streams, which can then be fed over the common backbone. Packetization allows FEC (Forward Error Correction) and hitless protection switching to be added to important (or all) streams to ensure high-quality video delivery even over physically lossy networks that experience bit errors and packet loss. To reduce bandwidth consumption, the Media Links IP solution portfolio can optionally provide industry standard JPEG-XS, JPEG2000 or other compression functions for any or all video feeds. These low-delay, high-quality media transport platform can be installed at any point in the network to optimize picture quality for almost any available bandwidth.
- Compressed video signals can be transported in their native IP format if that is the output generated by the compression codec, or they can be converted into IP streams from DVB/ASI encoder outputs. In either case, these signals can be reliably delivered using the advanced routing and bandwidth reservation systems provided by the Media Links IP Transport Ecosystem.
- Audio signals often require point-to-point and multicast delivery to multiple destinations for sports production.
- MADi digital audio channel (AES 10) support of 28, 56, 32 or 64 channels can also be accommodated, delivered to one or more production and/or monitoring destinations with superb fidelity.

### **Types of Signals that Need to be Provided by a single Transport Solution**

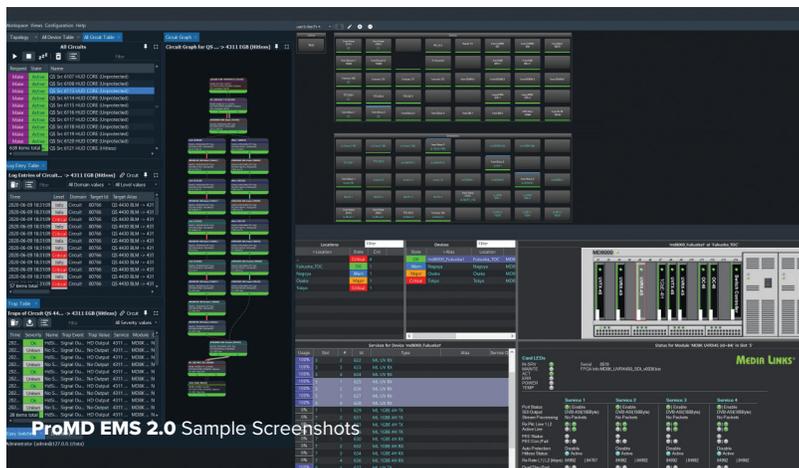
- Live video and audio feeds that capture the actual competition.
- Live video and audio feeds from announcers/reporters/analysts located at the sports venue.
- Live data feeds that carry statistics, results and other information about the event.
- Two-way voice intercom/VOIP system that provides communications among the production team members.
- Data links using multiple formats and bit rates are deployed for many different production functions, including graphic file transfers, equipment control, and network monitoring and management functions.

- Data signals and file transfers can easily be supported using low-speed and high-speed IP interfaces, which can be configured as separate networks or combined into larger LAN architectures within the Media Links IP Ecosystem network fabric. This versatility allows some data circuits to be configured as private links for high levels of security and to support unique addressing schemes, and other data circuits to be combined into larger fabrics to support shared access to valuable resources such as file servers and control/monitoring systems.
- Internet access for sports production, both for employee access to public web-based systems and for interaction with viewers using social media networks is also supported. The Media Links Ecosystem natively supports IP connections between private and public networks, and can be configured to provide dedicated access on some connections as well as shared access for other interfaces.

## 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 network platform.



Impeccable video quality with millisecond latency is achievable. A large variety of signal sources can be inserted into 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!

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