

## The Need for a New Approach to Broadcast Production



Technological change is forcing broadcast, media and entertainment production professionals to take a new approach to how they deploy applications and infrastructure. Past transitions from black-and-white to color and from standard definition to high definition took place over years, allowing broadcasters ample time to evolve from one form of infrastructure to another. By contrast, today's move from high definition to 4K/UHD, as well as future moves to 8K and HDR/wide gamut, will take place at a much more rapid pace.

Broadcasters need a new approach to building essential production applications, networks and storage systems. This new infrastructure will have to be easy to expand and upgrade, as well as extremely cost-effective to deploy. In short, it will need to be based on Internet Protocol (IP).

This white paper outlines this challenge, and then briefly examines the advantages of an IP-based broadcast production infrastructure, including an exploration of Cisco's innovative, cost-effective Professional Media Network platform.

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## Introduction

Today, broadcast, media and entertainment industry professionals should be asking themselves three simple questions:

- Are you ready—today—to move to 4K/ultra high definition (UHD) broadcasting? What about 8K or high dynamic range (HDR)/wide gamut?
- Can you quickly add new applications or capacity, simply by expanding your network infrastructure?
- Do you know how to future-proof your infrastructure against even more radical technologies that haven't yet been invented?

If the answer to any of these questions is “no,” you're far from alone. At the same time, learning how to address these challenges in a direct, affordable manner is critical for any media production organization—especially those seeking to embrace the future while minimizing frequent and costly technology upgrades as the industry inevitably changes.

To put the need for a new approach into perspective, consider previous broadcast production transitions. The most significant was when black-and-white moved to color. Next came analog to digital, in part to enable the shift from standard definition (SD) to high definition (HD). Each adjustment required a redundant and/or duplicative infrastructure for a significant period of time. Building and maintaining these systems was expensive, difficult to support, and confusing for customers and advertisers alike.

Both of these evolutions played out over years, even decades. Today, however, that buffer no longer exists. The rate of change in the broadcast industry is faster than it has ever been—and it will continue to accelerate for the foreseeable future.

Existing production technology is not prepared to adapt to the future. It's possible to “solve” the HD to 4K/UHD transition by quadrupling current infrastructure, but doing so also means quadrupling the capital investment in current systems—as well as quadrupling complexity and support costs.

The quadruple approach clearly is not sustainable. Even worse, it will become nearly impossible once 8K becomes an essential part of the broadcast production landscape, or when HDR/wide gamut color spaces become a standard production requirement.

The answer must involve a new approach to broadcast and media production infrastructure. Producers need a way to replace 30-year-old technology with something that meets immediate challenges such as 4K/UHD, while also enabling rapid adoption of additional new technologies—quickly, pragmatically and affordably.

## A Change of Perspective – Moving Production from Systems to the Cloud

Common sense indicates that older centralized systems will have to give way to a distributed infrastructure that enables fast, affordable expansion and adoption of new technologies. It's happened in many other industries. Now, it's broadcast and media production's turn.

As part of this updating process, dedicated application transport mechanisms will need to be replaced by a converged IP-based infrastructure. Media organizations need to plan—today—if they are to make this transition in a planned, affordable manner.

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In short, broadcast, media and entertainment production is moving from dedicated equipment, in which specific functions take place on a single piece of equipment and content is moved from device to device, to a virtual environment, in which production can take place anywhere and content can be stored anywhere. In doing so, the broadcast industry will finally gain the benefits of Cloud-based computing, in which the power of rapid, standards-based network infrastructure and Cloud-based storage and applications increase productivity and agility while dramatically lessening capital expenditure costs.

Three key drivers have made this transition inevitable:

- **Ever-increasing video bit rate requirements.** A single uncompressed HD video streaming is the limit of the current SDI technology connection. UltraHD (4K, 8K) bit rates far exceed this capacity, and cannot be carried by existing infrastructure.
- **New standards that break down reliance on proprietary (and expensive) techniques and platforms.** Compliance with industry standards, such as the Society of Motion Picture and Television Engineers (SMPTE)-2022 suite, and other standards and recommended practices in the works from SMPTE, Video Services Forum (VSF), and the European Broadcasting Union (EBU), allows all parts of the system developed by different vendors to interoperate, and assures that the system will meet quality of service and scale requirements.
- **10 Gigabit Ethernet maturity.** High-speed Ethernet infrastructure is now widely available at commodity pricing, making it possible to move and retrieve huge amounts of video data instantly and inexpensively – in effect, moving broadcast into the Cloud, just like retail, Big Data or any other business entity or initiative. An ecosystem of compatible equipment exists, and Ethernet is already integrated into a wide range of devices. Further, IP-based networking at 40-Gigabit-per-second (Gbps) and 100-Gbps is already available. 400Gbps is in the works, and 1-Terabit-per-second (Tbps) is being discussed, ensuring a long future for this technology.

The need for this new approach has converged with the standards and the infrastructure to deliver it. Upgrades to capabilities no longer require infrastructure upgrades. Access to, and distribution of, content is as simple as connecting the appropriate level of storage and computing capability to the network.

Equally important, broadcast and media professionals can focus on production tasks without having to master the intricacies of moving data about. IT specialists, in turn, can concentrate on keeping the networks running without having to master arcane and proprietary broadcast standards.

### Cisco's IP-Based Professional Media Network Platform Makes It Happen

Cisco® Professional Media Network (PMN) solutions are designed specifically to ease the transition for broadcast, media and entertainment leaders who recognize the urgency of replacing serial digital interface (SDI) infrastructure and other older architectures with a future-looking, IP-based Ethernet alternative. With IP as the common linkage between all aspects of the broadcast environment, organizations can recognize immediate and sustainable benefits in five key areas:

- Scalability
- Operational efficiency
- Cost

- Flexibility
- Future upgrades/modernization

The IP-based Cisco PMN infrastructure also enables deep integration with business-based systems elsewhere in the organization, which in turn saves even more money by utilizing common infrastructure and a standardized approach to IT maintenance for the whole of the organization.

The PMN creates a virtualized, Cloud-based environment for broadcast and media production, one in which infrastructure is isolated from functionality. Production can be done from anywhere—the “heavy lifting” of the digital production takes place at centralized server farms. Production applications can be installed, upgraded or deactivated in a matter of moments at the click of a mouse.

As a result, upgrades are as easy as deploying a new virtual machine rather than physical equipment. Increasing capacity is as simple as connecting new storage devices to the network. Once broadcast applications and data are centralized, integration of legacy systems (typically as the result of mergers and acquisitions) becomes uncomplicated. Maintenance costs are lower, too, since support staff do not need to be physically on site.

Unique non-broadcast opportunities also become possible for the first time. For example, business and broadcast data resources can be examined using Big Data techniques to uncover potentially useful relationships that are not visible when data is located on isolated proprietary devices.

Past objections to IP-based solutions suggest that broadcast production should not be part of the Internet—that Cloud-based technology is inherently too risky when working with valuable intellectual property. While the Cisco PMN uses the same physical architecture that the Internet runs on, the PMN itself is as separate and secure as the broadcaster needs it to be. Using proven, off-the-shelf technology to build a robust, reliable and high-speed solution carries a number of advantages:

- **Extremely high data rates.** Current HD data streams easily fit within its capabilities, as well as upcoming 4K/UHD and 8K requirements.
- **Automatic optimization and prioritization of network traffic to ensure quality of service (QoS).** Operators enjoy low latency and jitter, little or no packet loss, precision timing and synchronization, fast/clean stream switching, high availability and top-tier protection against malicious attacks and misuse.
- **Off-the-shelf hardware and virtualized applications save time and money.** Broadcasters can add or upgrade without requiring proprietary hardware, networks or storage.
- **High-end production driven from multiple types of devices (laptops, tablets, smartphones), not just mobile broadcast centers.** Remote functionality becomes dependent on the speed of the network connection, rather than what can be packed into a truck or trailer.

In short, PMN is how smart broadcasters integrate production, master control, video editing, contribution networks, file transfer and remote production—all while managing costs and protecting their investment against future technological disruption.

### PMN and The Cisco Advantage

There are companies who claim to be networking and storage specialists. There are companies who claim to be expert at broadcast production equipment. Cisco is the rare organization that is recognized as a world leader and trusted advisor in these areas. In fact, when it comes to IP-based broadcast production solutions, Cisco is the

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intelligent choice for broadcasters seeking to balance maximum flexibility, highest performance and reasonable cost.

Cisco's PMN solutions operate at the switch layer, deep within the network itself, using Cisco's advanced network and storage solutions to support broadcast applications. The Cisco PMN infrastructure handles complex video flows without requiring specialized equipment. As far as production staff are concerned, applications simply work, from wherever staff need to access them. This intuitive approach functions across owned, branded and leased applications, services, and content.

PMN solutions also reflect Cisco's deep and ongoing commitment to open standards. The goal is to give broadcasters interoperability across a wide variety of production applications, with no proprietary lock in. Broadcasters using PMN receive the broadest range of essential production applications, certified to run within the PMN environment. Complete turnkey solutions have been partnered with these major vendors, among others:

- EVS
- Imagine Communications
- Miranda/Grass Valley
- Snell
- Sony

## Conclusion

It takes a unique combination of network and storage expertise, as well as deep experience with broadcast production, to deliver the full functionality and manageability of SDI with a scalable, cost-effective solution that delivers the upgradability, features and services that SDI cannot deliver. That platform is Cisco's PMN.

PMN applies Cisco network infrastructure and powerful APIs to deliver essential IP-based broadcast production capabilities that meet any broadcaster's needs and goals. PMN solutions come as turnkey solutions, as well as streamlined upgrade paths for organizations seeking to replace legacy equipment in a controlled, phased manner. No other platform provides an equal level of performance, scalability, upgradability, and affordability.

PMN gives broadcasters the confidence that comes from working with Cisco, the world's leader in intelligent networks that automatically handle complex load-balancing and Quality of Service challenges, such as those that are typical within the broadcast industry. Better yet, Cisco's commitment to open standards ensures that PMN directly supports a wide range of production applications from the top vendors in the broadcast industry.

Broadcasters need a better, smarter way to manage the ongoing waves of technological innovation that continue to reshape the industry. Cisco's PMN is the answer.

## Introducing Cisco IP Broadcast and Media Distribution System

Cisco's Broadcast and Media Distribution system is a tightly integrated family of applications, network infrastructure, data transport, content distribution and storage solutions for broadcast professionals. This single-source approach to broadcast production and media distribution enables on-demand and streaming transmission, as well as traditional broadcast capabilities.

The Broadcast and Media Distribution system saves time and money and establishes extremely high reliability by using market-leading Cisco networking and storage equipment. Cisco's streamlined command-and-control for the

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high-speed/high-volume data demands of the broadcast industry mean that every Broadcast and Media Distribution solution is designed to be easy to implement, support and expand. This powerful combination of Cisco technology and real-world broadcast experience helps content creators, content distributors and IT staff work smarter and more efficiently.



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