

Why Is Media Distribution So Complicated (And Expensive)?



Many media and entertainment organizations struggle with the challenges of content storage, transformation, and distribution. As production standards rise from HD to UHD/4K, 8K, and beyond, the amount of data associated with any given project grows exponentially. Adding to these concerns are the rapidly changing methods of bringing media content to consumers. Broadcast over a limited number of channels has given way to hundreds of ways to consume media via over-the-air, cable, satellite and Internet connections, using broadcast, on-demand, and streaming models.

The ability to manage this unprecedented growth of content, data volume, and accessibility is critical to building a media business with the technical underpinnings to support future growth. It must be cost-effective to deploy, with a clear direction for upgrades and expansion. It must be built with the needs of media companies in mind and be able to scale and adapt to new technologies that haven't yet been implemented or invented.

This whitepaper outlines the drivers behind this challenge and explores the advantages of an IP-based media center solution. Finally, it discusses Cisco's Media Data Center platform. This powerful new approach to the delivery of streamlined media storage, transformation, and distribution offers a future-proof design for cost-effective adaptation to a rapidly changing media distribution environment.

Introduction

It should be simple: Store video content. Transform it to support multiple current and future formats. Send it where it needs to go, either for production, broadcast, on-demand, or streaming.

And yet, media distribution remains a difficult, expensive challenge.

It begins with proprietary systems, appliances, and highly specialized networking infrastructures. This outdated architecture isolates content, whether digital or analog, making it difficult to move media into a cohesive, centralized distribution system—and distribute that content in a reliable, efficient manner.

Unfortunately, too many organizations haven't adequately planned for future technological innovations, which are inevitable within the broadcast industry. As a result, adding new applications or storage capacity becomes a costly, disruptive exercise that cannot keep pace with rapidly evolving business needs.

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 changes played out over years, even decades. Today, however, 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.

If these challenges sound familiar, then you understand the urgent need for a better way to store, transform, and distribute video content. Racks of tape and banks of hard drives are already obsolete and a truly effective, affordable media distribution system now dictates key requirements:

- Content must now be accessible for production, broadcast, on-demand, and streaming channels, without duplicating content or the infrastructure.
- Next-generation media storage and distribution must support geometric increases in data volume without requiring wholesale system upgrades (4K/UHD will require much greater storage and transmission capacity than HD, and 8K's requirements will be an order of magnitude higher still).
- Capital expenditures on infrastructure must be able to be managed, if not recouped, before the next wave of innovation can be addressed—despite the increasing pace of technological change. In the “good old days of broadcasting” a ten-year refresh and depreciation schedule were applicable. Today, those refresh and depreciation cycles are vastly accelerated.

Content producers and broadcasters need a practical, cost-efficient means to replace outmoded storage, transformation, and distribution technologies. And they need this solution to be as useful and expandable for tomorrow's urgent needs as it is for today's.

A Change of Perspective – Moving Media Storage, Transformation, and Distribution 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, as evidenced by the rapid success and expansion of platforms such as Amazon Web Services, and similar offerings by IBM, Microsoft, Google, and others. It is now the Media and Entertainment (M&E) industry's turn to do the same.

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

In short, the M&E industry is moving away from dedicated devices, in which specific functions take place on a single piece of equipment, and content is moved from device to device as it is being transformed and readied for distribution. Instead, a virtual environment will enable content to be stored anywhere in the Cloud—whether that cloud implementation is on- or off-premises. This change will finally give the M&E industry the benefits of Cloud-based computing, in which Cloud-based storage and applications deployed on a powerful, rapid, standards-based converged infrastructure 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.

Fortunately, the need for this new approach has converged with the availability of standards and infrastructures that can deliver it. Upgrades to capabilities no longer require disruptive 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, media distribution can take place without staff having to master the infrastructure-level intricacies of moving data to and fro. IT specialists, in turn, can concentrate on keeping the networks running without having to master arcane and proprietary broadcast standards.

Cisco's IP-Based Media Data Center Is the Solution

Cisco® Media Data Center (MDC) solutions represent a powerful new approach to media storage and distribution. MDC creates a Media Cloud—an IP-based data center optimized for media. This dedicated combination of networking, storage and computing infrastructure directly supports media collection, storage, and distribution, with standards-based interoperability across a wide range of industry applications.

Cisco MDC's virtualized, Cloud-based environment isolates infrastructure from functionality. Media can be accessed from anywhere—the “heavy lifting” takes place at centralized server farms. Distribution applications can be installed, upgraded or deactivated in a matter of moments at the click of a mouse. With Ethernet and IP as the common linkage between all aspects of the broadcast environment, organizations can dramatically streamline the process by which content moves from raw material to in-process production to on-air, on-demand, or streaming distribution.

MDC deployments replace isolated proprietary storage and distribution systems with plug-and-play simplicity. Whether additional capacity or a new application, if it's certified, it's supported and it works. This network-centric approach delivers immediate and sustainable benefits in five key areas:

- Scalability
- Operational efficiency
- Cost
- Flexibility
- Future upgrades/modernization

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 media storage, transformation, and distribution 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.

The Cisco MDC IP-based infrastructure also enables 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 throughout the organization. As a result, unique non-broadcast opportunities also become possible for the first time. For example, media 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 MDC uses the same physical architecture that the Internet runs on, the MDC itself can operate as a private Cloud, 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. Centralized storage and network-based computing means that remote content creators using laptops, tablets, and smartphones can perform extremely sophisticated work that extends far beyond the limited capabilities of a single device in the field.

The keys to Cisco's MDC solutions are their flexibility and scalability. Since all content is stored centrally, there are no islands of inaccessible media. Advanced virtualization technology means that fewer dedicated servers are necessary to deliver essential services. MDC also supports complex business models, in which the "host" organization can securely extend parts of the solution to other organizations, with each having its own properties, channels, and outlets. More importantly, a single piece of content can be accessible via different channels without requiring that the content itself be duplicated.

This ability to share network, storage, applications, and content enables significant economies of scale and enables new forms of business opportunity. In effect, each deployment becomes the functional equivalent of Amazon Web Services or similar Cloud-based business platform, except directed specifically at branded media distribution.

Cisco MDC solutions give media distribution organizations a powerful new tool for resource allocation. Peak demands and unexpected surges in demand can easily be handled by bringing new instances of virtual machines applications online, rather than deploying physical devices. The network infrastructure itself has built-in intelligence to handle network load and storage access without impacting access or quality of service. Streamlined workflow comes from defining capabilities by access privilege, rather than physical location.

MDC and The Cisco Advantage

There are companies who claim to be networking and storage specialists. There are companies who claim to be expert at media distribution. 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 media solutions, Cisco is the intelligent content distribution choice for organizations seeking to balance maximum flexibility, highest performance, and reasonable cost.

Cisco's MDC 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 MDC infrastructure handles complex video flows across production, broadcast, on-demand, and streaming without requiring specialized equipment. As far as 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.

Cisco's MDC solutions also reflect the company's deep and ongoing commitment to open standards. The goal is to give media organizations maximum interoperability across a wide variety of needs, with no proprietary lock in. Content producers and distributors receive the broadest range of essential capabilities, certified to run within the MDC environment. Complete turnkey solutions have been partnered with these major vendors, among others:

- EVS
- Imagine Communications
- Miranda/Grass Valley

- Snell
- Sony

Conclusion - Expand Capabilities, Control Costs and Succeed Amidst Change

Cisco's MDC solutions ease the transition for content providers who recognize the importance of a centralized content storage, transformation, and distribution system. By creating a Media Cloud, organizations gain a powerful combination of flexibility, ease-of-use and cost-effective scalability that addresses both today's media distribution needs, as well as provides a streamlined path for future growth and enhancement.

The Cisco MDC 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 MDC directly supports a wide range of production applications from the top vendors in the broadcast industry.

Media organizations know the advantages that come from staying ahead of dramatically increasing volumes of media content. Cisco's MDC is the smart solution for media professionals seeking to expand and streamline content storage and distribution, create new business opportunities, control costs, and manage the broadcast industry's ever-increasing rate of technological change.

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 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.



Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

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