

Towards Media 2030
Building a 100G Uncompressed Media
Backbone for the Future





The Road to 100G

Research reveals that there were around 2.4 billion Internet users in 2014. By June 2019, that number doubled to 4.4 billion. That's an 83% increase in the Internet user base in a span of just five years. For the media and telecommunications sector, this raises an all-important question: How far can current underlying networks scale to accommodate the growing traffic on the Internet?

Currently 2.5 quintillion bytes of data are generated every day. By the end of 2020, the entire digital world is expected to grow to 44 zettabytes. Which means that there will be 40 times more bytes on our planet than there are stars in the entire observable universe.

While the good news is that no one single network will need to support this burgeoning traffic, there remains some scepticism around existing networks and their ability to keep pace with the bandwidth demands of next-generation connected devices.

Businesses across various industries have already started upgrading to a networking speed of 10 gigabytes per second (GB/s). However, even 40-channel wavelength-division multiplexing (WDM) systems operating on a 10 GB/s wavelength are fast reaching capacity across channels.

Fuelling the next generation's bandwidth requirements

To cope with growing bandwidth demands, vendors are increasingly developing 40 GB/s muxponders and transponders that can be implemented within the existing WDM networks. While this offers immediate benefits, ever-increasing traffic necessitates the deployment of WDMs with even higher data transmission rates, such as 100GB/s, utilized in each wavelength.

Thankfully, the transition towards 100GB/s network technology is in motion and is poised to outsell 10 GB/s networks soon. In fact, [market forecasts see both 2019 and 2020 as strong growth years](#) for coarse wavelength division multiplexing (CWDM) systems in particular, with the potential for 100G unit demand double from 2019 to 2020. Some experts even predict that the adoption rates of 100G CWDM systems will increase until the year 2022. The primary drivers of this trend are miniaturization, standardization, and the reduction in the cost of long-haul networks that demand higher upload and download speeds.

This new networking technology is set to transform how consumers stream their favourite content from the device and location of their choice, and also how that content is delivered to millions of streaming devices from a remote location - a veritable backbone of the media and entertainment industry of the future.

The high bandwidth capacity of the 100G media network opens up virtually unlimited opportunities in a typical data centre environment, and its relevance and applications in the media and entertainment industry are far reaching.



The Future of Super-Fast Fibre Channel Transmission in Media and Entertainment

The move to newer digital video formats, along with the advent of special effects and advanced CGI in everything from movies, gaming and TV shows, calls for a robust networking infrastructure capable of supporting multiple UHD video streams, either live or recorded.

According to forecasts, videos will make up a staggering 82% of all traffic in 2021. This is unsurprising given that the adoption of 4K and Ultra High-Definition (UHD) standards for videos is at an all-time high. Already, over-the-top (OTT) streaming media giants like Amazon and Netflix are making 4K content accessible to consumers. As file sizes increase to meet the demand for UHD videos, both content creators and providers will need high network bandwidth with lightning fast throughput.

In a typical live production or post-production environment, project deadlines are stiff, and every second counts. Content creators need to ensure that they are adhering to the right production workflows and infrastructure aligned to 4k and UHD video production.

The industry also faces a lot of network pressure from millions of mobile devices that demand seamless access to live media file streaming and high-speed downloads of rich media content. And this isn't a problem that's going away any time soon. In fact, as mobile devices evolve and establish newer high-definition standards for content, network pressure is set to grow exponentially. In addition, new and complex communication formats such as extended reality are fast becoming mainstream. Augmented reality (AR) and virtual reality (VR) video formats come with highly challenging delivery requirements, especially when it comes to enabling remote production workflows and transmitting uncompressed video (especially in the sports and eSports domain).

Creating an ecosystem for hybrid media transmission with 100G

For a media project to be successful, it's important to ensure content creators and distributors have secure and dedicated network bandwidth. In fact, in live and post-production environments, a robust fibre channel media framework that can provide increased throughput and maximum bandwidth availability is critical. 100G WDMs deployed over a fibre channel network can allow broadcasters, OTT content providers, sports organizations and eSports enterprises to handle remote production with ease while enabling them to give their customers seamless and immersive experiences.

Clearly, 100G networking is what the industry needs now. New networking technology promises lower latency and high-performance delivery for new cutting-edge media technologies such as 8K and 4K video, AR and VR formats and other visual enhancement technologies like wider colour gamut, high frame rate (HFR) and high dynamic range (HDR).

A 100G media backbone can simplify a content provider's journey towards deploying UHD 4K videos in real time, [which requires 12Gb/s bandwidth when uncompressed](#) - four times more than what is required for a HD video transmission. eSports enterprises and broadcasters can provide gamers and viewers with exceptional, ultra-immersive 4k viewing experiences without worrying about bandwidth issues.

The opportunities created by 100G is not just limited to 4k video transmission. Rather, it extends well beyond it. For instance, progressive enterprises in media and communications space have started testing live 360° video transmission in 8k UHD - the highest resolution available in digital TV, today. This can usher in endless possibilities when it comes to live video broadcasting and immersive viewing. For instance, such high-performance media infrastructure can allow sports lovers to use a VR headset and experience a golf tour right from the player's point-of-view or a watch a Formula 1® race from the circuit.

Additionally, a 100G media network can help content providers streamline the technical aspects of video production as well. For instance, every event in eSports involves multiple cameras, cutaways, commentary, real-time editing and real-time reactions. A high capacity transmission network can ensure that the data is transmitted in order, on time, and without any redundancies. Going forward, as the [total audience in the industry increases to over 645 million](#), the bandwidth boost provided by 100G will help fans worldwide enjoy unparalleled gaming experiences.

100G is poised to have a strong impact in other areas in remote production workflows such as:

Other Applications in Remote Production Workflows

Video Mastering and Finishing:

Colour corrections, checking for transitions, gaps, visual errors and broadcasting delays in real time

Video Ingesting:

Collating, transmitting or importing different types of image, audio or video files into an existing editing workflow

Digital Asset Management:

Protecting and utilizing rich media assets better with stringent permission allocation

Distribution and Playout:

Allocating no-fail commercial requirements for broadcasting servers

User Security with Data Retrieval:

Allowing users to retrieve content stored on SSDs, HDDs and tapes while transitioning to high-end storage array technology



In Conclusion

The fact that 100G is at the threshold of transforming the media and telecommunications landscape stands testament to how far the technology has evolved. 100G will soon open up new business opportunities for next-gen content creators. Those seeking to capitalize on this and gain a first-mover advantage need to start planning their approach today.

The future of media distribution will be dictated by a combination of dedicated media-grade fibre network and cutting-edge compressed video transfer over the Internet, supported to the last mile by traditional satellite distribution.

Internet Protocol (IP) technology promotes better flexibility, cost savings and scalability and this is the major reason why IP networks have been deployed almost everywhere including Antarctica and International Space Station. Until recently, media vendors have been contending to dominate IP while end-users have wanted the industry to one set of standard when it comes to media distribution over IP.

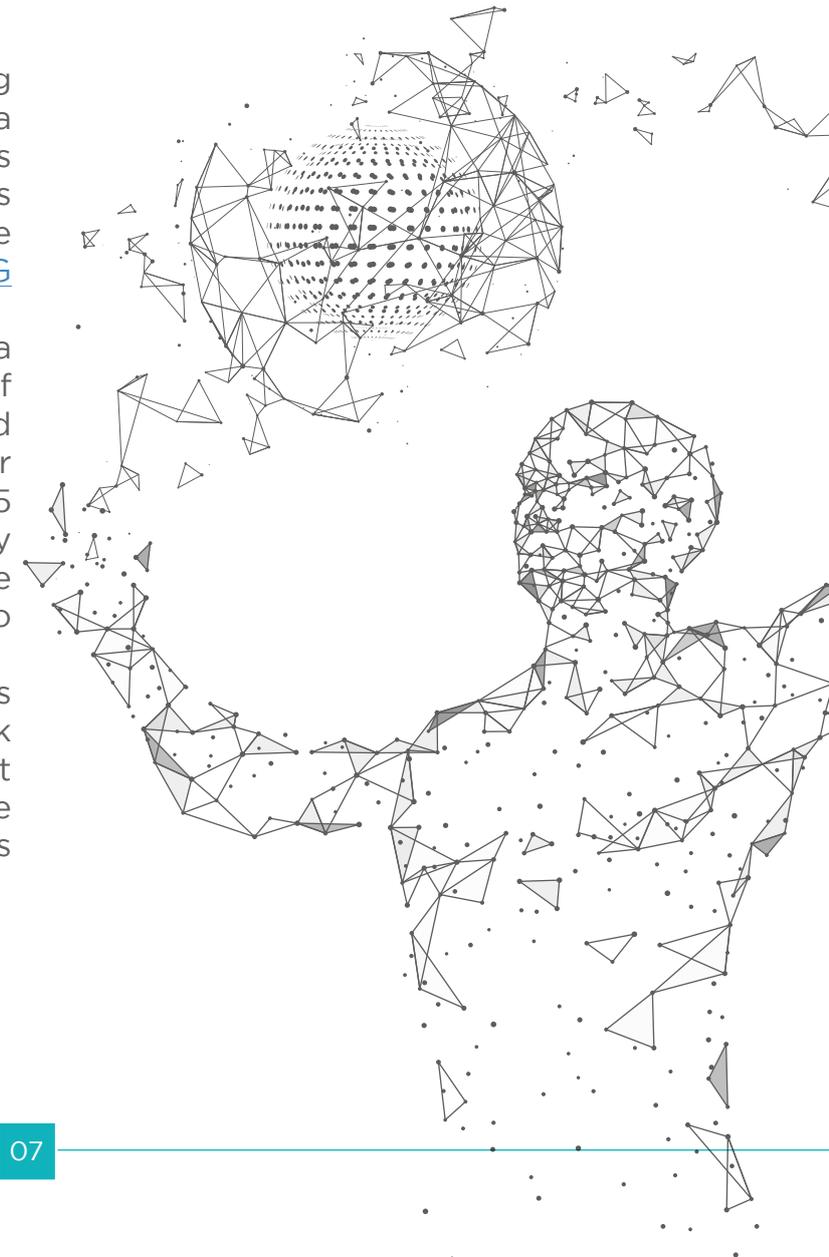
Thankfully, The Society of Motion Picture and Television Engineers (SMPTE®) has come up with the SMPTE ST 2110 Professional Media Over Managed IP Networks standards suite which promises to simplify broadcasters journey towards

leveraging a common IP-based distribution mechanism. The [best thing about SMPTE ST 2110](#) is that it offers seamless interoperability while providing a robust foundation needed to accelerate the adoption of IP-based video dissemination. Another aspect that differentiates SMPTE ST 2110 is timing. The standard allows broadcasters to separately route and divide audio, video and other data over IP networks in real time for live production, playout, media scheduling and so on. This feature helps broadcasters to simplify actions such as subtitles, teletext, captions and process multiple audio languages at the same time.

With its expertise across both traditional and new-age broadcasting methods, Tata Communications is a partner of choice for media, eSports and telecommunications customers looking to keep pace with new-age networking requirements. [The 100G Media backbone](#) enables uncompressed media transfer on a global scale. The core components of the solution include a fibre-based global media transport network for over 300 media hotspots across 125 cities that supports broadcast quality real-time video, a managed service suite backed by SLAs to deliver to deliver high quality and reliable delivery of compressed video services over a hybrid fibre/Internet network and a OTT delivery framework that promises real-time delivery of live action across multiple screens, devices and geographies.

To learn more, please visit ...

Going forward, a hybrid distribution strategy combining new IP standards like SMPTE ST 2110 will help broadcasters, OTT providers and eSports companies overcome regional distribution challenges and achieve the required network resilience and cost optimization.



About Tata Communications:

Tata Communications is a leading global digital and media infrastructure services provider, and works with some of the largest sporting federations, broadcasters, and content producers in the world. Through their network, cloud, mobility, security and media services, Tata Communications is enabling digital transformation for over 300 of the Fortune 500 companies.

As businesses deal with the Covid-19 crisis, circumstances demand adaptability at tailoring your video and digital infrastructure to enable better collaboration among your employees and sustain your audience's experience. Tata Communications can offer a range of video and digital infrastructure services that can transform your content distribution strategy, orchestrate cloud-based virtualized workflows and enable remote production from home, driving operational efficiencies for your business.