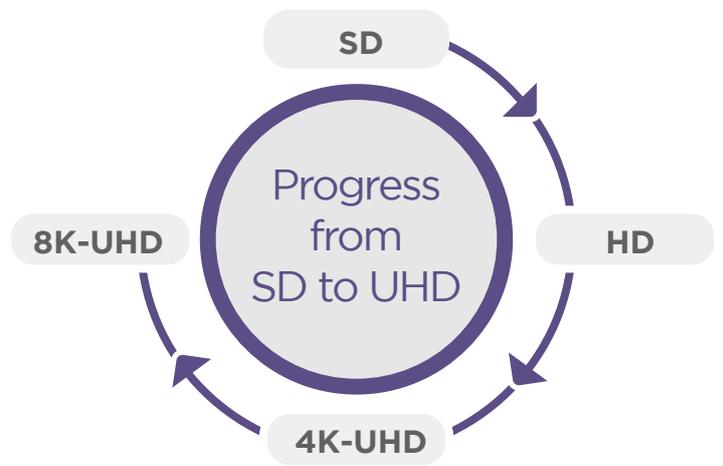# EVOLUTION
OF THE LIVE VIDEO PRODUCTION VALUE CHAIN

DAWN OF A NEW NORMAL

The Rise
and Commoditization of
Live Production Technology

In the last decade alone, live video experience has made huge strides with the introduction of ultra-high definition (UHD) TV in 2012 and its subsequent progress to 8K. Apart from the proliferation of camera technology, advancements in digital video imaging have had a major role to play in the evolution of video capture resolutions. With UHD content fast becoming a mainstay among consumers, broadcasters and production houses are looking to enhance other critical aspects of the live video streaming experience such as greater dynamic ranges, broader color gamut, and faster picture capture rates.

SD

HD

4K-UHD

8K-UHD

Progress from SD to UHD

Content creators are even taking live video broadcasting a step beyond the resolution race and introducing experiences like extended reality and live 360-degree capture.

As viewership preferences tend towards advanced live video streaming experiences, the UHD TV display market is expected to grow at a CAGR of 21.1% to reach over USD 380 billion by 2025.[1]

Asset-light, virtualized production through SaaS-based tools, editorial solutions, and workflow automation and orchestration have also played a significant role in enhancing live video production capabilities. There have been several real-world instances where various components of a production workflow, such as ingestion, encoding, and format-conversion have been orchestrated through cloud-based production-as-a-service frameworks. This has helped democratize the sports broadcasting indusrty. Cloud-based frameworks are being leveraged by tier-1 and tier-2 sporting leagues to reach a global audience.

Traditional production and distribution of sporting events require executing sizeable broadcasting operation which can prove to be a commercial overkill for tier-1 and tier-2 sporting events.

This shows how cloud-based production and automation has become a critical factor in the democratization of sports broadcasting.

Moreover, broadcasters have been steadily moving towards more flexible and scalable post-production frameworks such as customized cloud-based multi-user collaborative workflows, live cloud-based editing, and live publishing to social media. This transition has been fueled by the commoditization and ease-of-availability of automation and orchestration technology like Open Networking Automation Platform (ONAP).

At the distribution end of the value chain, hybrid delivery mechanisms such as a combination of IP- and fiber-based distribution have grown in popularity, as a result of many countries allocating C-band spectrum in favor of accelerating 5G adoption. Playout automation, multiplatform distribution, and the rise of over-the-top (OTT) live streaming services like Netflix, Amazon, and Disney+ have been definitive factors in driving these trends.[2]

Here again, consumer habits have played a role in the emergence of modern distribution models. Besides the rising demand for OTT streaming experiences, there has been a growth in demand for tier-2 and tier-3 sporting events. The live sports on-air vacuum had accelerated consumer preferences for streaming, with the new stay-at-home society accessing more streamed content than ever. As a result, the live video streaming (LVS) platform market is witnessing a growth spurt. The estimated global LVS market size is expected to grow at a CAGR of 22.8% reaching USD 22.09 billion in valuation by 2022.[3]

The Changing Face of the Production Industry:

A New Normal

Like most other sectors, the media and production industry suffered a severe operational and economic blow with the COVID-19 outbreak. However, it is also one of the few sectors that has witnessed a sudden massive growth in consumption during the pandemic. With a captive audience of stay-at-home consumers, media usage has expectedly witnessed an immense growth rate during the pandemic.[4]

In order to deal with this new status quo and maintain business continuity, broadcaster and production companies are transitioning towards remote production models that are less resource intensive. This trend has, in turn, fast-tracked the widespread adoption of technology that was charted for popularization in the next few years.

The shift is expected to have long-term impacts that will extend to a post-COVID-19 world. With the pandemic restricting the movement of personnel and equipment, it could prove to be the gateway towards the development of cleaner, more efficient, and sustainable production and delivery models of live content.

The Rise of
Remote Production

One of the most promising long-term impacts of the pandemic on the media and broadcasting industry has been the widespread adoption of remote production, also referred to as at-home production or REMI (remote integration). This revolutionary concept leverages technology to decouple large parts of the outside broadcasting (OB) model and re-edit or mix feeds at a location away from the site. It has been executed before for Tier 1 sporting events, with one of the earliest examples being the 2014 FIFA World Cup held in Brazil.[5]

The rise of remote production has been a direct result of a growing need for content owners to produce tier-1 and tier-2 content, while simultaneously improving operational margins and digital user lifetime engagement rates. Traditional live production workflows are often not capable of facilitating these goals. Their dependency on legacy OB vans and technical personnel combined with a high set-up configuration cost makes it an expensive affair.

Transportation of equipment and production crew across locations further increases the overhead expenses and logistical complexity of traditional production processes. Besides being a cost intensive approach, traditional live production also requires dedicated deployment of skilled resources at any given location. This imposes a geographical restriction on the number of events that a dedicated crew can support. These factors make traditional production workflows an inefficient option to cater to the evolving needs of modern content consumerism.

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The Advantages of REMI

Remote production, on the other hand, allows broadcasters to leverage a scalable and efficient live production process. REMI provides broadcasters and production crews with the potential for optimizing live production while cutting back on traveling headcount and complex equipment transport.

Reduces the cost of production

Working on a REMI workflow does not require live content providers to have dedicated on-site technical crews, skilled production resources, and large OB vans. Instead, it only requires video capture equipment and camera crew to be present at the venue. This facilitates a significant improvement in efficient utilization of onsite production equipment and centralized production studio infrastructure.

Allows flexibility

By reducing the number of resources required in a single venue, the central production crew creates the opportunity to cover more content from various venues. This was exhibited by a Swedish broadcasting company during the London 2012 Olympics. By utilizing a remote production workflow, they were able to deploy more reporters and camera crews to the venue. This resulted in producing nearly double the amount of content compared to previous Olympics.

Enables the production of enriched content

By designating the central broadcast facility for production purposes, broadcasters can gain direct access to central archives and other in-house resources enabling production of richer content. Leveraging uncompressed or lightweight compression production methodologies, REMI can help significantly improve the quality of the final production. Moreover, access to raw, unproduced content at the central studio can facilitate the efficient production and live publishing of multi-platform content creation.

Drives corporate sustainability goals

REMI's reduced need for travel and shipping of equipment makes it more environment-friendly, reduces carbon footprint, and increases green credentials. The broadcast and media industry has been often been dubbed one of the worst when it comes to being eco-friendly. However, with remote production reducing the transport burden, the future looks sustainable. Sporting organizations, too, have expressed their commitment to reduce their carbon footprint in the near future. For instance, Formula 1 announced a sustainability plan that targets a net-zero carbon footprint by 2030.[6] Similarly, FIFA has announced a carbon neutral 2022 World Cup tournament and the Bundesliga club Hoffenheim has committed to go carbon neutral.[7,8] One of the ways FIFA plans to cut back on their carbon load is by leveraging energy-efficient equipment and offsetting emissions.

Use Cases:
Remote Production in Action

The London 2012 Olympics and the Brazil 2014 FIFA World Cup are only a few instances where REMI has been successfully used. Here are a few more real-world applications of remote production in the live production value chain.

The Indian Premier League (IPL)

Ever since its launch in 2008, the IPL has gained prominence across the cricketing community. Today, the Twenty-20 league style tournament features 60 matches played over a span of less than 50 days. The IPL's 2018 season marked the beginning of remote production for the international-scale tournament. The tight schedule between consecutive matches spread across the length and bread of the country can be a difficult challenge to overcome. However, using a remote production ecosystem, the broadcasters were able to seamlessly cover the tournament while significantly cutting down on costs.

MotoGP

The year 2018 also saw the MotoGP right holder, Dorna Sports, expand their remote production model to increase the reach of the high-octane motorsports event. Unlike cricket, the MotoGP grand prix is a much more fast-paced sport with action unravelling in the blink of an eye. Each week the track location shifts to a new country. Traditional production architecture requires the crew to dismantle and replicate the infrastructure for each race in a new location within days. By moving to a remote production framework, the sport was able to significantly cut back on the costs. In order to maintain a seamless exhilarating viewing performance, each MotoGP race leverages superfast connectivity to their central production hub in Barcelona.[9]

The German Bundesliga

In 2020, the German Bundesliga broadcasters, BT Sport, broadcasted a live coverage of five live concurrent games using remote production workflows. As a result, they were able to centralize their operations and limit the size of crew required for events. Today they require less than ten people in the studio without compromising on QoS.[10]

The World Rally Championship (FIA WRC)

The FIA (Fédération Internationale de l' Automobile) WRC has recently announced it will be leveraging remote production workflows, based out of its compound remote production center in London. WRC race productions involve transporting and set-ting up physical assets and equipment in remote race locations to cover off-road events in perilous terrains like mountains, forests, and deserts. This proves to be a logistical and financial burden for tradition-al production crews. By moving to a remote production workflow, broadcasters will be able to overcome this challenge and redirect the bulk of the infrastructural requirement to the facility in London.

The Era of
Virtual Production and
Cloud-based Workflows

The benefits of remote production are being crystallized considering the current confined production environment. No wonder, the adoption of remote production workflows has also increased across the sports broadcasting sector.

Full Onsite		Partial Remote		Virtualized Production		Full Remote Production

Spectrum of Production Type

One of the most recent prominent applications of cloud-based production is Tokyo 2020 (now 2021) Olympic Games. As a result, broadcast engineers will have the liberty of choosing from a range of remote broadcasting services supported by the cloud to enable their activities at the venue. This allows them to bypass the cost and effort-intensive practice of building customized temporary physical production infrastructure that would eventually need to be dismantled. The cloud support not only provides broadcasters with the necessary infrastructure but also improves the production value and productivity for innovative OTT as well as linear production teams.
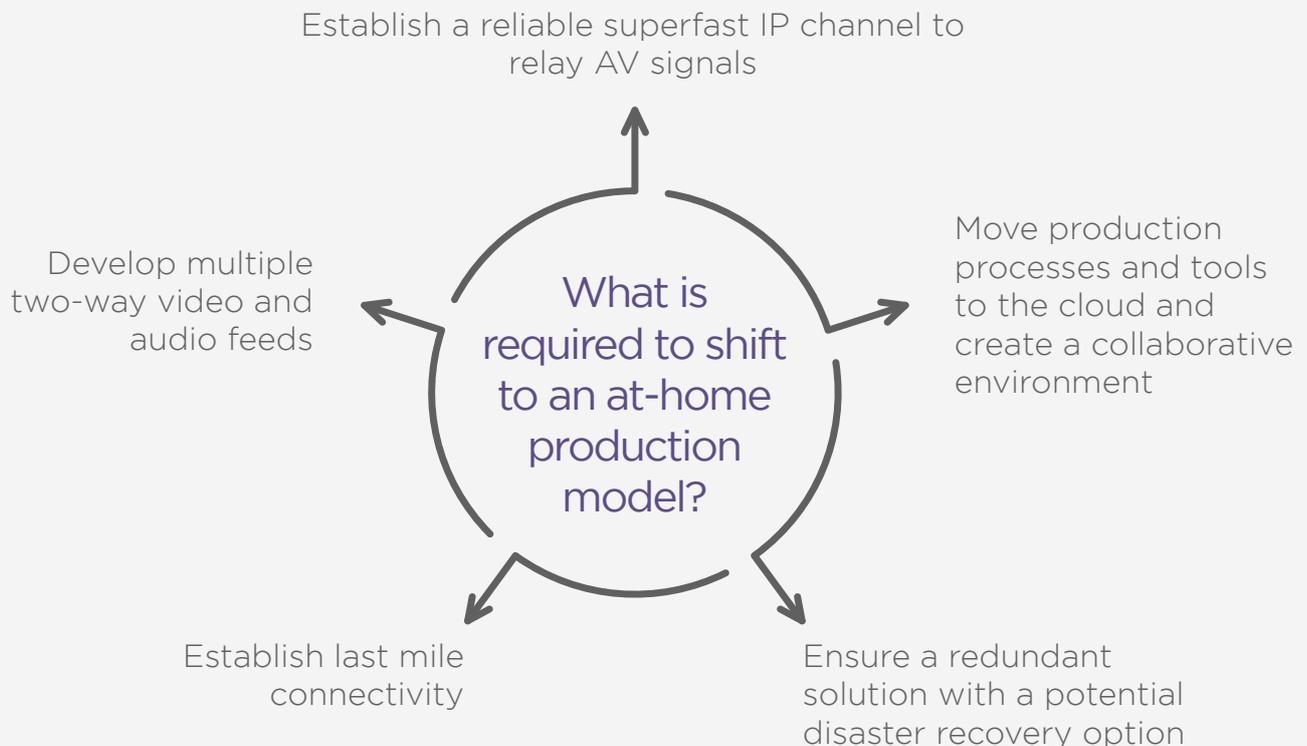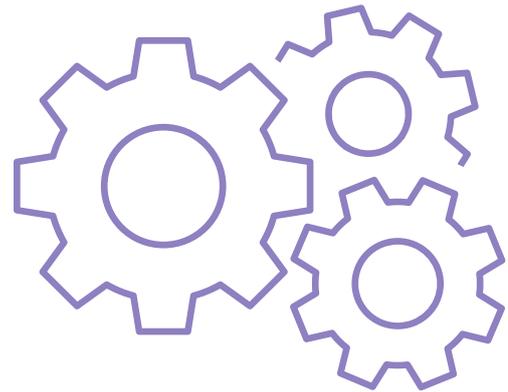
This is an example of how moving video editing and distribution workflows to the cloud can help broadcasters significantly lower the costs of developing high-quality video content.

Other advantages of cloud-based virtual production are:

- Asset-light tools and techniques

- Reduced CAPEX

- Faster production turnarounds

- Regional, demographic, and device-specific customizations of feed

- Reduced carbon footprint

- Geo-agnostic access to talent

Transitioning to a
REMI Production Environment

Remote production is not a new concept. But its widespread implementation is still at a nascent stage, with most content owners only opting for REMI production environment solutions for large-scale live events such as the FIFA World Cup, Formula 1, Olympics, and Bundesliga. The current trend within the live video production sector demonstrates an inclination for a hybrid model approach that operates on a mix of on-site and remote production workflows.

Establish a reliable superfast IP channel to relay AV signals

Develop multiple two-way video and audio feeds

What is required to shift to an at-home production model?

Move production processes and tools to the cloud and create a collaborative environment

Establish last mile connectivity

Ensure a redundant solution with a potential disaster recovery option

The efforts to make a complete shift from on-site to remote production have been progressively explored during the past few years. The two most discernible stages of transitioning from a completely on-site production to a completely remote production model are outside broadcast (OB) vans and Portable broadcasting units (PBUs). While OB vans are an iconic feature of live production, they're still subject to some of the restrictions of an on-site production workflow such as the deployment of skilled production personnel to a specific location. PBUs, on the other hand, are an upgrade from the OB van architecture of remote live production. In contrast to OB vans, PBUs rely exclusively on fiber-based transmission. This eliminates the restrictions of satellite bandwidth and allows higher quality and quantity of data and AV feeds to be sent in real-time to a centralized production facility. However, fiber-based transmission also necessitates an encoding-decoding mechanism.

Encoders receive feeds from the venue and compress them into a smaller, encrypted format to be sent over both satellite and high-speed fiber internet to the central production facility.

REMI is the future of live production workflows. However, there are several challenges that broadcasters need to overcome in order to deliver high-quality content to viewers. For instance, broadcasters need to ensure minimal end-to-end latency for live broadcasts. This delay could arise due to network delay, video processing and coding delay, and latencies stemming from production switches and video routers.

Synchronization of audio and video feeds is a critical factor in maintaining a high quality of service (QoS).

Leveraging the services of a technology partner like Tata Communications can help broadcasters overcome these challenges. Tata Communications has been at the helm of some of the most intensive remote live video production projects like MotoGP, WRC and the IPL.

Explore our work in Remote Production and Live Event Services here.

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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.