



The Future of Production in the Age of Media Choice

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Introduction

It is easy to regurgitate the same message about how the TV industry is going through a massive period of change. It is a theme that has been well covered and generally agreed. However, the less acknowledged fact is that the TV production world has struggled to keep pace with the intertwined drivers of technological advancement and evolving consumer behavior. Granted, there has been significant innovation, especially over the last decade with the move towards IP and software-defined systems, but the fundamental processes for many top-tier broadcasters are broadly the same as they were in the TV golden era of the 1960s and '70s.

The foundations of the TV industry were built on successful engineering: the development of a consistently reliable platform to enable creativity and ultimately deliver a sustainable business model. In 1969, NASA put a man on the moon, and the TV industry was there to show the world. Engineering excellence in broadcasting has marched in lockstep with technology right up to the internet revolution – which has proven the biggest disruptor event in our industry's hundred-year history. Innovation has been at the industry's very core – as long as it has not put the business model at risk.

The industry has reached a point, however, where bolder innovations are necessary to keep up with rapid fragmentation. We are seeing more platforms, devices, markets, audiences, and versions of content than at any point in media history. It's not the volume of content that is transforming the marketplace but the sheer variety being demanded – and met. We live in the age of media choice and it is making the complexity of producing programs of all types – especially live TV – more challenging than ever. The COVID-19 crisis and lockdown have massively accelerated this process. Content producers have had to set aside familiar ways of doing things – once seen by many in the industry as sacred cows – to ensure safety, social distancing and greater cost efficiency in the face of ongoing economic uncertainty.



Underlying market challenges

To put into context just how dramatically the industry has shifted – and its likely direction – you can look at three sets of statistics:

- 1) **Fragmentation:** In 1985, five years before commercial internet services, [the three largest TV networks in the United States accounted for 45% of American household audiences](#) in primetime. By 2009, the share of the big four – even with the addition of Fox – had dropped to barely 30%. Based on [Nielsen data](#), in primetime the big four linear broadcasters have a combined single-digit share of total potential TV viewers today. The fact is **traditional linear TV is no longer the unquestionable dominant medium, so broadcasters must learn new creation and delivery methods to thrive in the more diversified media landscape.**
- 2) **Revenue decline:** In 1965, the big three networks commanded around [\\$50,000 for a “primetime minute” of TV advertising](#). Adjusted for inflation, this equates to around \$440,000 in today's money. In 2019, the average national 30-second US TV spot-ad cost \$115,000 – a drop of roughly half for a minute of advertising. At a time when a recent survey found that [60% of viewers download or record shows so they can skip commercials](#), **the historic monetization model of traditional live TV is facing an existential threat.**

- 3) **Escalation in production costs:** In 1973, the average daytime TV soap opera in the US, such as the 'Young and the Restless' or the 'Days of our Lives,' cost around \$60,000 a week to produce – or the equivalent of \$360,000 today. [In 2010 a 'Days of our Lives' producer disclosed that the show cost \\$750,000](#) a week to make (the 2020 equivalent of nearly \$900,000 per week). With daily soap operas seen as the most cost-conscious end of the production spectrum, it is clear that **controlling production costs for programs of all types is fundamental to the continued success of broadcasters – and also their online competitors.**

Shifting demand and rising costs

The 'Days of our Lives' stat is particularly noteworthy. The fact that the longest continuously running show in the US produces five episodes of scripted drama a week for less than a million dollars – compared to the \$6 million-an-episode price tag for the admittedly more complex and cinematic 'Game of Thrones' – is a testament to the efficiency of its production process. The trouble is not every production will be that streamlined – and for many primetime programs, the quality required is at an entirely different level.

Indeed, in other areas of TV production, costs have seen much more significant rises – even as technology has attempted to aid in reducing costs. Gameshows, dramas and documentaries have each seen a cost increase alongside a viewership decline and corresponding ad revenue erosion, as fragmentation has given viewers and advertisers alike more options than ever. One bright spot is live sports – which for many broadcasters has been the anchor for their sustainability for several decades. Although production costs have gone up, so have the production values. And there are still significant events and major paydays: take the [Super Bowl, where a 30-second ad spot can command as much as \\$5 million – or more than 40 times the typical US average.](#)

Many of these statistics reference the US market. However, the same trends are mirrored across the globe – and even more magnified in some markets. In Japan, for example, primetime linear TV viewing rose to [more than 71% of households before the millennium](#) – a figure that has since slid below 60% and is declining rapidly. In the UK, the average amount of [broadcast TV watched has fallen by 25% over the last eight years](#) and among 16-24-year-olds, it has dropped by a whopping 50%.

The counterpoint to this slightly gloomy outlook is that overall viewing has risen. In response, we as an industry are producing more video content than at any point in history across a significantly broader and growing range of distribution platforms. The audiences are not as big, but there are more of them – with overall video content consumption across both TV and digital combined rising by 6.6% between 2014 and 2019, according to eMarketer research. Entertainment industry analyst Variety Business Intelligence estimates that, [in 2002, there were 138 movies and TV shows produced by the US TV industry. By 2019, that number had reached 1,178](#) – a figure eclipsed in India, where TV and film productions have passed the 2,000 mark.

Specialty programs are finding their niche on subscription-based over-the-top (OTT) services with very targeted audiences. Alternative and smaller sports and events that once struggled to get on TV because they could not deliver the mass audiences the major TV networks demanded in their glory days are now finding themselves in demand – often globally. Throughout the world, broadcasters and streaming services are dramatically ramping up their content production along with the price they will pay for rights – and the content owners are more than happy to adjust their rates accordingly.

Across the globe, the media industry is seeing several powerful, interconnected dynamics at work. Falling viewership on traditional TV, combined with rising consumption of on-demand content, means that many giants of the TV world have needed to rethink their business model. This has led to some owners of national broadcasters shifting their strategy to become more video-on-demand (VoD) centric – as we have seen with the introduction of services such as CBS All Access, Pluto TV, and Disney+. At the same time, these owners have looked for ways to offset stagnant or lower advertising revenue.

Despite the changes the industry has seen in the last decade, production costs have remained high – or in some cases have continued to rise. When it comes to producing TV content, yield per asset – which has dramatically come down amid the on-demand and online streaming revolution – has become an area of intense focus for forward-looking media organizations. As a result, reaching new levels of production efficiency – and flexibility – is rapidly becoming the name of the game today.

The evolution of production technology and processes

The challenge of rising production costs is, in part, due to the need to deliver content across many more platforms than traditional linear broadcast. Production must now scale vertically and horizontally across formats, versions, language, device types, and platforms to meet an increasingly diverse audience footprint. However, there is no quick fix for rising production costs, and revenues are certainly not increasing to counteract the additional expense.

Some may argue that throwing everything into the cloud is the solution. Remote production via the cloud has many advantages, including more flexibility and the ability to scale up (and down) quickly within an OPEX model. However, it is still technically unfeasible for specific use cases. It is also not always financially sensible when considering that the existing investment made in broadcast TV technology runs into the hundreds of billions – and many broadcasters can sweat these assets for a significant amount of time. Besides, certain processes are still more efficient, faster, cheaper, and more reliable via local, highly specialized hardware.

Some may suggest that traditional TV is dead and that OTT/VoD is the future. It may be at some point, but the average US person still watches [more than four hours of linear and time-shifted broadcast TV](#) every day – within [the nearly six hours of total daily video viewing](#). Live sports and news, plus mass-media events, such as World Cups, Oscars, Royal Weddings, Super Bowls, elections, and culturally transcendent TV moments (e.g. Game of Thrones final episode simulcast to tens of millions of viewers across 170 countries) are shared experiences that are now often worldwide in scale. TV still accounts for [one-third of the global ad spending and is worth \\$166bn annually](#). Although wounded by streaming and social media, broadcast TV is very much alive and kicking.



Inside the factory

Part of the solution to the rising costs and complexity of modern TV production can be found in lessons learned from other industries, especially manufacturing. Although TV puts a lot more creativity into an intangible ‘product’, content production shares some of a factory’s traits – from the automotive industry, for instance. As it has evolved, the auto sector has seen periods of major competitive disruption that have forced companies to embrace methods that allow workers to produce both a greater variety and quantity of vehicles with fewer staff. Take General Motors (GM), today a top-five car brand globally that in the [1970s was the world’s largest private company, employing nearly 350,000 staff in North America](#) and producing roughly three million cars each year. After reinventing itself at several points, today [GM makes approximately 7.7 million cars while only employing 164,000 staff](#), even as the number of models has grown considerably – along with far greater factory customization options.

Over the intervening years, GM, in common with the wider manufacturing world, has adopted more lean production methods, automated its factories, and used advanced software to streamline its production workflow through design, logistics, quality and test, and many other areas. Similar trends are happening across a broad range of manufacturing sectors as business leaders strive to deliver products faster, with broader choice, and for a lower cost.

More with less

The parallels with TV production are clear, as broadcasters strive to meet consumer demands for greater immediacy, choice, and quality. We see examples of the drive to do more with less in live sports events. Take, for instance, the FIS Alpine World Ski Championships, the largest winter sports event outside of the Winter Olympics. Traditionally, SVT, the Swedish National Broadcaster, would need to build a complete production “factory” at the ski resort town of Åre to cover the 12-day event. However, for the 2019 Championships, SVT leveraged extensive remote production capabilities instead, with up to 80 camera positions and a largely IP-based workflow across video, audio and data — transmitted to SVT’s production facility in Stockholm, over 600 km away, for production and playout.

Broadcasters such as SVT are not alone. Across the industry, we see an ongoing shift towards technologies and workflows that are designed to enable more remote production and achieve more while limiting or even reducing costs. This shift includes the widespread adoption of IP as a greater flexible and scalable replacement for SDI and more use of software rather than dedicated hardware to not only reduce cost but to enable more automation.



Charting the right direction

To understand why this shift is so vital requires a candid view of where we are as an industry and where we are going. The way viewers – particularly those in younger demographic groups – mix and match platforms and devices is having a fundamental impact on production needs and will continue to do so. Fragmentation and demand for choice will also drive change, with remote production supported by cloud technologies playing an increasingly important role.

Beyond the Golden Age

The architecture that was designed for the pioneers of TV of the 1960s was built for mass market linear broadcast. And it does the job to incredible levels of resiliency.

Engineers built production centers that can scale to provide live coverage of vast and complex events like the Olympics or national elections. Outside broadcasting (OB) workflows bring live sport into the living room with visceral impact. Contributors power 24-hour news coverage by feeding live from across the globe via satellite – instantly.

All these engineering feats are as valuable today as they were decades ago. However, many are overkill or unnecessary for producing reality TV and complementary content around events, which now accounts for a significant proportion of TV programming. In an era where more people are watching the top 100 YouTubers than the entire primetime TV line-up, media industry players must look to realign production resources to match monetization and viewership.

Enabling record breaking innovation

Grass Valley’s unique DirectIP capability was central to SVT’s workflow for the 2019 FIS Alpine World Ski Championships, enabling the XCU base stations to be situated in the central equipment room in Stockholm, while the cameras were in the snowy hills of Åre. DirectIP hugely simplifies the interconnections that need to be made, allowing all the camera signals to connect straight into the XCU. This enabled the shaders to match the cameras, without any delay – with fewer people traveling and instead working in the comfort of a Stockholm master control room.

This hybrid workflow also allowed SVT to leverage Grass Valley hardware assets it already had at its Stockholm facility, including SDI routers, multiviewers, and signal processors, to deliver a high-quality production while reducing costs. In total, SVT delivered content from 60 remote cameras simultaneously: setting a record for the largest ever remotely produced event. Over the 12 days of the competition, SVT transferred over 8,000 TB of data and roughly 10,000 hours of HD video without failure.

The future: a journey, not a destination

Grass Valley's position in the TV industry – six decades of building relationships with over 4,000 broadcasters across 230 countries – gives us a unique insight into the media industry. We see the future of production not as a destination but an ongoing journey.

On the technology side, we see software, IP, cloud, managed services, virtualization, commodity, and bespoke hardware – even artificial intelligence – all forming part of the direction of travel for broadcasters and other content creators.

However, when we talk to media technology business leaders regularly through our GVX customer council and other forums where we engage with clients, they all convey that they are at different stages in their journey. And most are proposing different routes that suit their business model, country dynamic, and overarching strategic vision.

Those outside of the world of TV may assume a uniform picture between broadcasters, but when you look deeper, it becomes abundantly clear that almost every organization is moving along a unique trajectory. Any “solution” that aims to improve production efficiency must have the flexibility to adapt to each organization's own tempo and this realization is at the heart of the GV Media Universe philosophy.

The GV Media Universe is an ecosystem that recognizes the trends and challenges faced by the industry and strives toward a future where much of the physical plant that exists today – like that within a studio or OB truck – could be offered as a software equivalent.

At the heart of the Media Universe ecosystem is our cloud-based Agile Media Processing Platform (GV AMPP), where we are creating a family of virtualized applications including multi-viewers, router panels, test-signal generators, switchers, graphics renderers, clip players, and audio mixers and processors. All of these virtualized applications can be deployed quickly to support a wide range of workflows. Built on a microservices architecture based on five core technologies — fabric, timing, connectivity, identity, and streaming — GV AMPP enables elastic media services and directly addresses many of the issues that complicate common IP and cloud deployments. GV AMPP delivers seamless network connectivity, timing and ultra-low latency, with the overriding goal of “doing more with less”.



Broadcaster diversity

It is crucial to keep in mind, however, that each broadcaster or content producer is at a different point and dealing with its own unique circumstances. At one extreme are national broadcasters such as PBS and the BBC, which must maintain an extensive live news broadcasting capability but, in some cases, limited scope to generate additional revenue due to their public service charters or state-funded status. In the middle are independent TV broadcasters, such as Canal+, ITV, and Globo, which rely on advertising revenue to thrive in a highly competitive market. Many are now exploring multiplatform distribution, including subscription video on demand, while balancing lower advertising revenue. Further along the spectrum are multichannel video programming distributors (MVPDs) such as Comcast, DirecTV, and Sky, which own cable and satellite delivery and have also built significant content offerings – with live sports across multiplatform as a major driver.

At the far end are the specialists that focus purely on distributed and OTT live sports content, such as DAZN and BEIN, with a focus on multiplatform and direct to consumer business model. With a major investment in rights, production costs need to be trimmed to deliver profitability. Joining this group are major sports brands such as NFL, NBA, Indian Premier League Cricket and Formula E, which are all exploring direct to consumer subscription OTT options. These innovators vary from those with very traditional, broadcaster-centric infrastructure to a few that have embraced a largely managed services provider model with little hands-on involvement.

These are just a few archetypes. If you can think of a combination of different audience segment, distribution and monetization approaches, there is probably a media organization testing that model somewhere in the world. However, they are all embracing IP, software, automation, and remote production to create more content, faster, and at a lower cost per hour.

Benefits of a production innovation

We must, nonetheless, recognize that broadcasters and other content producers still face an engineering challenge. Content production at its most basic equates to: we film it, we edit it, we deliver it. It sounds simple but finding ways to carry out these tasks more efficiently and, potentially, for less CAPEX and/or OPEX, requires shifting the technology stack towards a more software-centric position.

At a fundamental level, traditional TV technology has been built around integrating discrete and highly bespoke hardware elements – and, more recently, software parts – to accommodate a specific workflow. Several common standards, such as SDI and ASI, have acted as the glue, and the focus has been on absolute reliability and peak scale. The need to deliver more channels or increases in quality requirements, such as the transition to HD and UHD, has helped prompt each refresh cycle. The rationale for this approach was that bespoke hardware offered a guaranteed level of performance and suited the CAPEX heavy buy-cycle that broadcasters are traditionally geared around.

Software evolution

At the heart of all these hardware elements, however, is embedded software. And as technology has progressed, the computational power of COTS servers within cloud-based environments that utilize virtualization offers a viable alternative geared towards an on-demand and OPEX focused model. What's more, as the consumer has embraced on-demand content, so has TV technology – and many of the broadcast functions that were only really viable as highly specialized hardware can now be delivered as software-only implementation. The first wave initially provided these from on-premise appliances, but as global IP WAN connectivity has grown, the cloud now offers reliable delivery for many of these production use cases.

The production to playout workflow has tens of potential elements within its scope, along with many dependencies. But the benefits of a software-centric and cloud approach can be highlighted by looking at just a single example – and showing how the transition delivers a tangible set of benefits: Master control (MC), which is the technical hub of a broadcast operation. A master control room (MCR) is used to switch between feeds coming from different production control rooms (PCRs) and other pieces of content, such as clips and commercials. Moreover, master control's function may also include the insertion of other branding elements, such as logos and lower thirds, and the regionalization of content.

At the heart of the MCR are hardware elements such as our Masterpiece 12G-SDI master control switcher. Based on a 10x 12G-SDI inputs for single link UHD connectivity plus 40x 1080p/1080i/720p inputs, the unit works across multiple formats, includes flexible audio capabilities, channel branding, and multichannel video program distribution, as well as dynamic visual effects. Masterpiece units are highly regarded platforms, installed at thousands of locations around the world. However, organizations that have already moved to an IP-centric workflow can leverage many of the capabilities offered by a Masterpiece powered MCR cloud-based platform.

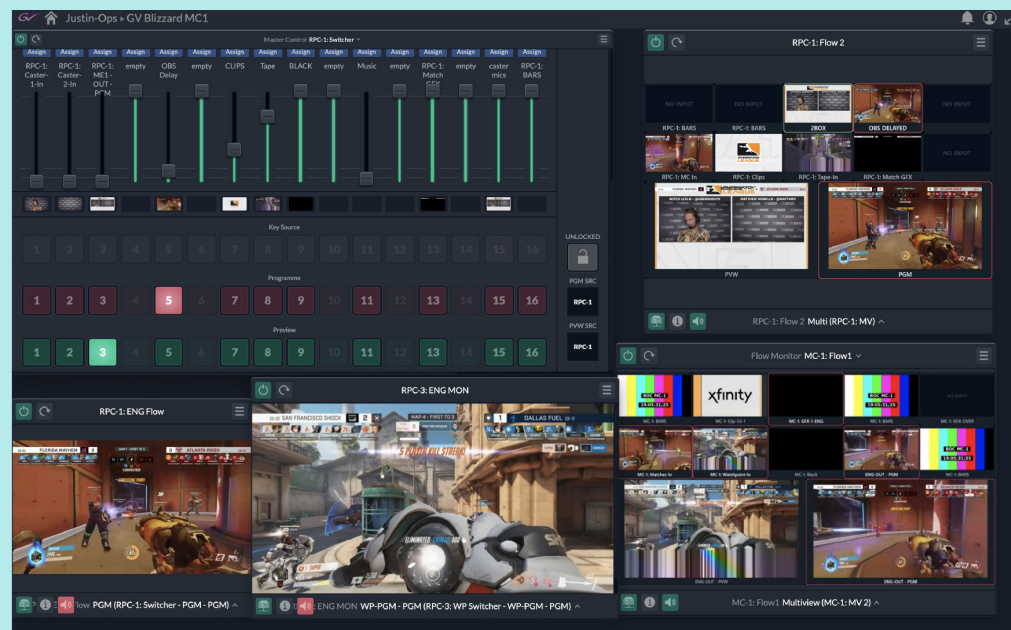
Blizzard: Master control in the cloud

An early adopter of this cloud MCR innovation is Blizzard Entertainment, an American video game developer and publisher that is also a broadcaster of global professional esports tournaments for the Overwatch League (OWL) and the Call of Duty League (CDL). Due to COVID health concerns, in March of 2020, Blizzard decided it needed to produce its broadcasts in an entirely remote fashion.

All necessary production and master control functions were virtualized via GV AMPP Master Control, allowing the entire production crew to manage these events from home, without any physical switchers or audio consoles.

IP camera feeds from the on-screen talent and the in-game video were sent straight to the cloud, where the production was performed for every match-up using GV AMPP for distributed remote production. Then, GV AMPP Master Control was used for master control switching and regionalization to English, French, Korean, and Chinese, with each broadcast containing localized commercials, branding and graphics. The job roles for Blizzard's at-home productions were the same as onsite with a truck, with one major difference: a single producer would take on the roles of director, producer, and technical director, as well as monitoring the audio levels within the GV AMPP interface. Each OWL and CDL production also featured one or two graphics operators, one or two replay operators, and an operator for the clip player (for playback of music or video clips). There was also a six-person observer team (five observers and one in-game director), along with casters and talent. Blizzard used GV AMPP for OWL matches in North America and Asia, and the operation ran around the clock.

The Blizzard use case provides an example of a new type of production model, and the master control is just one element of a radical shift. With the GV AMPP Master Control application, any customers can create configurable virtual master control rooms, accessible via a web-based interface from anywhere in the world. GV AMPP meters usage, and each tool — switcher,



audio mixer, multi-viewer, clip player — has a different metered rate associated with it. Broadcasters are charged only for the features activated and the amount of time each element is used. They utilize the resources they need and then incur no further costs. When an event is over, the user can take a snapshot of the configuration, thus retaining the ability to recall it before the next event.

Final thoughts

Production is heading towards a future where flexibility and efficiency will be as crucial as reliability. The option to change workflows, utilize on-demand resources, and move between OPEX and CAPEX business models will become essential options for both traditional broadcasters and new entrants to the market.

While the trend to remote production was already well underway among leading broadcasters, the coronavirus crisis has acted as a catalyst for employing technologies that enable it. There are technical challenges such as managing latency and timing, and delivering the orchestration needed to allow the physical world of studio facilities and OB trucks to merge with the ethereal world of a software-centric production model. Innovators such as Grass Valley are working within AIMS and SMPTE to ensure standards are adopted as required. These collaborations have

aided industry-wide efforts to standardize the SMPTE ST2110 Suite, and the same spirit has fueled Grass Valley's development of the cloud-based AMPP platform.

The outcome of this evolutionary journey in production will be the emergence of content “factories” that can handle a range of outputs across an array of live events, platforms, and geographies. In key live content areas such as news and less frequent live events such as sports, concerts, awards and elections, traditional broadcasters and newer players alike will look for partners and ecosystems to help them navigate the complexities of production. The aim for many is to address the fundamental Yield Per Asset issue by creating more content, more efficiently and more cost-effectively – while also achieving greater flexibility.

As a company with deep experience in broadcast technology across both traditional hardware and newer software platforms, Grass Valley is embracing the changing nature of production. Blizzard provides a glimpse of the many projects Grass Valley is working on with major broadcasters, sports leagues and service providers. These companies are all exploring new ways to get more value out of their production workflows, freeing them up to concentrate on developing more creative and engaging programming.

At Grass Valley, we also understand the need for technology partnerships that bring specialist expertise in certain key disciplines to drive success. Our vision is that we and other pioneers will exist within a broad universe of technologies that utilize core open standards along with proprietary systems to ensure that production can transition towards greater efficiency and scale with more options around CAPEX or OPEX. With the demand for content showing no signs of abating, only organizations that are ready to embrace innovation and systems that foster it can hope to thrive, as terms such as “remote production” and “cloud-based production” simply become “production”.



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As general manager of live production, Marco oversees all aspects of this critically important segment of the Grass Valley business. He is responsible for accelerating innovation across key strategic areas, such as remote production, IP-connected live workflows and virtualized media workflows as well as content creation solutions, such as cameras, production switchers and replay.

From 2018 to 2019, as CEO at ChyronHego, Marco guided the company's efforts to develop and launch tools that easily capture, search, aggregate, curate, and ultimately visualize live data to improve viewer enjoyment.

Prior to this, following the successful acquisition and integration of Grass Valley with Miranda, Marco held the role of president of Grass Valley from April 2014 to December 2017.

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