Special Report
Business Resilience

Covering a wide range of technologies and activities across security, business protection, data protection, technology choices and business continuity.

Also Featuring :-
Diversity & Inclusion
Connect, Store and Support segments of the BaM Content Chain®

iabm

Knowledge, support and leadership for the Broadcast and Media technology industry

Index

IABM PLATINUM MEMBERS

Times are tough – but we are resilient

Peter White
CEO, IABM

Welcome to the Q2 2022 edition of the IABM Journal, which I think is one of our best yet. Its three main themes are Business Resilience, Diversity & Inclusion and the Connect, Store and Support segments of the BaM Content Chain®, and there are superb articles under all the headings; more of this in a moment.

As I write this in late June, I know many members are getting their IBC preparations into full swing. There is a palpable sense of anticipation and no little excitement among all the IABM members I talk with at the prospect of at last getting together in Amsterdam again for the first time for three years. While no one is expecting attendance this year to be at pre-pandemic levels, if the evidence of returning shows over the last few months is anything to go by, IBC will be well-attended by tech buyers keen to meet up with the recently reported (by IBC) 850 exhibitors already confirmed across 12 halls and the outside exhibits area.

With the combined impacts of Covid, high inflation, steeply rising fuel prices, component shortages, exchange rates, trade barriers, skills deficits, a generally difficult macro-economic environment and, of course, the war in Ukraine, Business Resilience has shot to the top of most businesses' lists of concerns. This is very much the case in the Broadcast, Media and Entertainment sector too, but yet again our great industry is proving its resilience and is – so far – managing to pull through. The key thing in our favor is that in troubled times, consumers turn to entertainment to escape – at least temporarily - from the harsh realities all around them.

The Business Resilience chapter in this issue focuses on what broadcast and media technology users can do to protect their operations and valuable assets. It covers a wide gamut of subjects, ranging across workplace culture, cyber security strategies including zero trust, content protection technologies, protecting against data loss, true redundancy, protection against ransomware attacks, digital content governance, caching and defensive coding, and secure synchronization.

In our feature in the Q4 2021 edition, Carrie Wootten, MD of Rise, revealed how the organization has helped to promote diversity and inclusion with a host of important initiatives. For the Diversity & Inclusion chapter in this issue, we asked IABM members to let us know what they are doing to promote diversity and inclusion in their own workplaces. The resulting articles show not only how seriously they are getting behind D&I, but also the immense benefits to their businesses from doing so. They are a motivating read and a source of inspiration, and show that, while our industry still has a long way to go, we are making very positive strides forward.

In the Content Chain chapter, we are highlighting IABM members who operate in the Connect, Store and Support segments of the BaM Content Chain®, covering the latest developments in the activities that underpin it – moving/ delivering content;

storing content throughout its lifecycle; monitoring, testing, communicating and running facilities.

We also have three thought-provoking Opinion pieces this issue. ETL Systems asks if broadcasters will go fully digital in 2022, MediaKind argues that media companies need to deliver a higher level of interactivity and personalization into the consumer experience and explains why sports rights holders are going full-tilt to build DTC experiences, and Wildmoka contends that media companies need to make responsive video a core part of their offering to cater to the majority of consumers who watch content 'vertically' on their mobile devices.

Rounding out this issue, we also have a number of articles focusing on other areas of interest – media localization, XR, streaming, cloud, OTT, esports audio, live event comms, and whether hiding all major sports behind subscriptions is good for their long-term health.

I am very much looking forward to meeting with many members at IBC in September. IABM has a raft of activities at the show, including the show-opening Industry Trends event on Friday morning, and the BaM Live™ stage running continuous presentations throughout the four days of the show on key industry topics and trends. And of course our members' lounge above Hall 4 offers members a chance to get away from the exhibition floor throughout the show.

Peter White
CEO, IABM

Telcos and media companies must now ask themselves what these growth blueprints look like and how can they ensure they're making the most of their investment opportunities.

Damien Montessuit
*SVP Global Sales,
MediaKind*

Growth Roadmaps within Telecom, Media and Entertainment

The telecom, media and entertainment industry has witnessed more transformation and growth in the past three years than in the previous decade, mainly due to the rapid evolution of audience consumption habits towards on-demand highlights and replays on social media, and streaming to smart devices.

Damien Montessuit
SVP Global Sales, MediaKind

With new technologies emerging in tandem that enable these flexible, interactive content experiences, consolidation and investment among media companies is rife. As a result, they must re-consider where their growth strategies lie in the digital age.

In the past year alone, we've seen the Saudi Arabian firm Savvy Gaming acquire a whole host of media assets, including the gaming and esports powerhouse ESL and the English Premier League team Newcastle United. France's Groupe Bouygues and RTL Group merged the leading French commercial broadcasters, TF1 and M6, in a $4 billion deal to form a new European TV giant and subsequent streaming service. And not least, Microsoft sent shockwaves across the media landscape when it acquired games studio, Activision Blizzard, in a $70 billion deal, in a move that equipped it with the "building blocks for the metaverse", according to its CEO, Satya Nadella.

The market continues to evolve and adapt everywhere you look, bringing immense growth opportunities for all parties. One common thread runs through every acquisition and partnership happening in sports, esports, and entertainment programming today – and that's streaming. With each movement comes exciting opportunities for growth and transformation across the media value chain. Telcos and media companies must now ask themselves what these growth blueprints look like and how can they ensure they're making the most of their investment opportunities.

Opinion

Capitalising on the hot sports ticket for streaming success

The transformation happening within our industry can be contextualised when you consider the changes some of the big broadcasters and production companies have experienced in the past few decades. The English Premier League, for example, was heralded as a major sports asset 30 years ago by Sky Sports for bringing in an audience of 1 million fans. This audience number pales compared to the league's viewership today – it brings in an incredible 3.2 billion broadcast viewers globally and contributes £7.6 billion to the UK economy, according to a recent analysis by EY financial services. This enormous growth trajectory is now being replicated across many parts of the broader media landscape.

There has always been a close alignment between the broadcast and sports industries. As sports broadcasters, TV operators, and content owners look to evolve their operations and embrace new technologies and platforms, there is limitless scope to grow services and transcend their traditional roles. With investments in streaming technology accelerating, broadcasters and TV operators are finding themselves rapidly evolving from being channel aggregators to service aggregators. This trend is perhaps better known to TV operators and telcos, who started their transformation to the cloud years ago and are more mature than broadcasters or content owners. Regardless, this transformation is happening at every level in all three market segments, each with a different level of maturity.

And this transformation would not be possible in the first instance without the infrastructure and technologies driven by telcos over the past decade. The broadband and mobile networks they have established make live streaming at scale feasible. And the super aggregation of media services by telcos puts even niche streaming channels on consumers' radars, where they might not have been before. This migration from channel aggregation to service aggregation is setting the bedrock of the future media landscape.

Taking your content 'direct-to-consumer'

Content owners are starting to develop media platforms and direct-to-consumer (D2C) streaming services of their own. So urgent is this need to transform that almost all the 40 sports rights-holders surveyed in the MediaKind 2021 Sports D2C Forecast understood the importance of going D2C to reach their fanbase directly. D2C propositions enable all sports service providers and operators to become orchestrators of their

services and open the possibilities of new two-way transparent dialogues between brands and consumers. They enable traditional sports to replicate many elements from esports, particularly regarding blending interactivity and bringing virtual effects into the viewing experience.

Building and running a successful D2C service is certainly no easy feat. The recent abrupt closure of Warner Bros/Discovery's CNN+ – just one month after launching – encouraged many to speculate what might have caused this services' demise. CNN+'s experience makes it clear that media companies must have their entire rollout strategy down to a tee – including device compatibility, subscription options, content line-up, and brand clarity.

By investing in tools and technologies designed for D2C video streaming, new market segments – like sports content owners and other primary rights-holders – can become TV operators themselves by owning a platform and creating a billing system while managing fans and accounts. They can solve the

challenges content owners, broadcasters, and media brands face as the pace of cloud adoption and D2C streaming increases. This level of growth calls for a renewed outlook on the tools and technologies media companies can adopt to propel themselves into the digital future.

One of the most valuable transitions telcos and media companies can capitalise on to grow their business is moving from one-time capital expenditure (CAPEX) deals to recurring revenue subscription-type deals (OPEX)

Embracing a streaming-first future

One of the most valuable transitions telcos and media companies can capitalise on to grow their business is moving from one-time capital expenditure (CAPEX) deals to recurring revenue subscription-type deals (OPEX). When looking at growth trends in a company's financial reports or analyst charts, this shift can sometimes appear to be an overall flattening of the market. However, that change in revenue type has huge potential to boost the valuation of media businesses. In other words, if you read between the lines, there can often be a lot of hidden growth.

The transition to the cloud within media workflows enables this type of growth, and it is already well underway. Contribution and primary distribution methods are progressively moving towards the public cloud, with playout and streaming following close behind. Once these workflows become fully cloud-native, we'll also see content and live production move to the cloud. This means contribution will become much more focussed on moving content from the stadium or arena into the public cloud, and a lot more primary distribution will happen inside or from the public cloud.

Advertising insertion is also growing in line with dynamic ad-insertion. Existing broadcast channels are already adding streaming versions of their broadcast channels and new D2C channels, increasing the global channel count and requiring a greater number of aggregator services. This will accelerate the move towards the cloud for all players in the ecosystem. We're increasingly seeing TV operators face a crunch with growing content costs and subscriber declines, particularly in the US. Those TV operators will start to look at overall video strategies for new operational models, with big growth expected in the D2C market through subscription or ad-funded subscribers.

Making the most of your media service

As media companies continue to launch new channels and aggregate their services under the streaming umbrella, there are many exciting opportunities for all media companies to drive innovation. The media and entertainment world is at a pivotal moment in this regard. The pandemic accentuated how important an internet connection was to people, often being the only link to the physical world outside of our four walls. This laid the foundations for the mass adoption of technologies that have enabled the first step toward the metaverse. Many companies, including Meta, Microsoft, Epic Games, Roblox, and Disney, are heavily investing in this future.

As media companies tee up their growth strategies in line with technology innovation, it's clear the future is about delivering a higher level of interactivity and personalization into the consumer experience. By doing so, companies can place themselves front-and-centre in the emerging new media universe. The actions media companies take in the coming months will determine how we all communicate, inform, engage and play in the digital world of tomorrow.

Will broadcasters go fully digital in 2022?

Thirty years ago, viewers had a very limited choice when it came to TV – only able to access a handful of channels transmitted via an analogue signal directly into their homes. Just a small selection of live sporting events was broadcast..

Satellite television currently offers faster delivery and a more efficient operational process than terrestrial networks for broadcasters, hence its popularity.
Credit: Yuri Snegur/Shutterstock.com

Andrew Bond
Sales and marketing director at ETL Systems.

Times have changed; take the Winter Olympics in Beijing as an example – held across 13 different locations and spanning three regions. While this is nothing compared to the broadcasting scale of the recent Summer Olympics in Japan, it still presented a number of challenges for broadcasters.

So what are the challenges broadcasters will face in 2022 and where can new technology help?

Doing more with the same or less
During mega-events like the Olympics, broadcasters will be getting a feed from the event organiser, but they will also want their own piece-to-camera shots and to get their own take on the action, live. Yet covering the ever-increasing variety of locations is a growing challenge both practically and financially.

In the 2022 Winter Olympics, there were seven more events in the calendar compared to the previous Winter Olympics. As demand and connectivity grow, there is a seemingly non-stop escalator whereby crews have to cover more without exceeding their existing finite resources.

Away from these global events, once niche sports like cycling are becoming more popular. This too is generating demand for news crews to be sent to a greater variety of locations, but without the expanding budgets to mirror the expanding event footprint, particularly in light of recent world events that have had a significant impact on broadcasters.

The need for speed and control
Ensuring minimal delays in the transmission chain and full control of the signal is high priority for broadcasters. There are four main transmission links we can think about:
1: The camera to the control room
2: Control room to a local hub
3: International transit
4: To viewers in the broadcasters' territory

At each of these links in the terrestrial network the transmission is routed via switches, which each cause milliseconds of delay. The cumulative impact can result in latency and a poorer experience for viewers – especially those relying on a real-time link.

For this reason, broadcasters continue to choose to skip many of these transmission links by using the satellite network, speeding up delivery and retaining control by not relying on networks operated by third-party countries.

Meeting customer expectations
Meanwhile, customers want and expect the same experience and service from their broadcasters that they get digitally down their gigabit-per-second broadband lines and 5G subscriptions.

Many broadcasters are moving to digital as far as possible as a result. The challenge is that delivering this level of service for customers living in remote locations is just not possible.

In 2020, the US Government's Federal Communications Commission provided $16bn to its rural diversity fund to get more people connected online. Then, as part of Biden's spending package in 2021, he added a further $16bn. This gives an indication of the scale of the digital divide in the US, let alone the rest of the world. In the UK, around 1.5 million homes are still not connected to the Internet. This limits broadcasters' ability to reach the poorly connected or disconnected without RF.

Will analogue ever die?
Satellite links will continue to be relied upon by broadcasters to deliver content to and from a significant number of locations.

A recent article by Eurisy highlighted how satellites and terrestrial networks are working together, with video travelling via satellite and then distributed over fibre to be delivered to the viewer. This mix of

Broadcasting technology for coverage of events like the Winter Olympics is evolving as demand and connectivity increase.
Credit: Paolo Bona/Shutterstock.com

analogue and digital is applied elsewhere too, even in the most advanced digital networks like 5G, where signals are still sent over the air to your phone.

The big questions being asked by network architects now relate to how these signals are being converted from analogue to digital and vice versa.

ETL Systems has been collaborating with a working group of experts who are creating an industry standard with the goal of digitizing the RF spectrum. As part of the Digital IF Interoperability (DIFI) consortium, we are working towards creating a standardised interoperable digital interface/Radio Frequency (IF/RF) based on the widely adopted VITA 49.2.

It will enable broadcasters to move an analogue signal from one place to another using a digital network. This exciting breakthrough technology will decouple the network operation centre from the antenna, leading to many benefits for broadcasters.

In 2022, we expect to see this new digital technology providing even better link availability and RF signal quality, plus greater operational flexibility in switching and routing. Over time, operational and capital costs will be reduced, making it accessible to broadcasters with smaller budgets. At the same time, it will be possible to offer stronger digital encryption of analogue signals.

From the conversations we are having with some of the world's largest broadcasters, the sector is adopting digital technologies wherever it makes sense. But it's also clear that they will always need satellites and RF signals, with a hybrid of both becoming the new norm.

Even a digitized RF spectrum is really about moving an analogue signal over a digital network. Regardless of the digital and analogue question, technology moves forward at pace to assist broadcasters in 2022 as they continue to strive to do more with the same or less.

The Digital IF Interoperability consortium is a working group of experts developing an industry standard for a digital/RF interface. Digitisation will allow broadcasters to move an analogue signal via a digital network.

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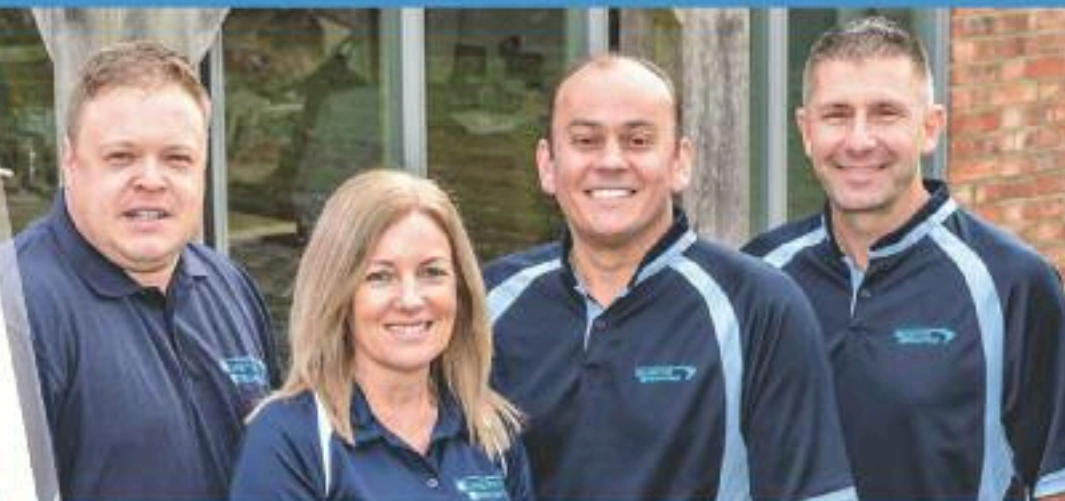
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Ship with confidence and experience to IBC!

Why Responsive Video is becoming the industry standard

Broadcasters have long been tempted to push their linear TV content to digital platforms in an unchanged format. But we would argue that it is now high time to end this copy-paste approach.

Over the last few years, social media platforms offering new content formats such as Instagram and TikTok have cemented their place in the digital landscape. And, with content delivered primarily via mobile, creators are left with no choice but to offer vertical video to stay on trend.

Catherine Cywinska
Marketing Manager, Wildmoka

At the same time, broadcasters' OTT offerings have evolved from the secondary products of linear programming, and have become the focal point of their strategies. More often than not, they surpass linear TV in terms of the amount and variety of content offered to viewers. Take major sports events like the Olympics or Grand Slam tennis tournaments as examples. In some of our customers' cases, where only 2 or 3 linear channels could be dedicated to the event's coverage, they started to use digital to get rid of such TV broadcasting limitations. They are now able to offer up to ten times more concurrent live streams on their OTT platforms, streaming all the games taking place at the same time. And if the fans are not available at the time of the event? Digitally advanced broadcasters can also make clips of key moments, game summaries or even entire game replays available. The immediate benefits are significantly higher user satisfaction levels and better content monetization.

But are broadcasters really ready to cater to the mobile-first audience for whom it's natural to grab their phone to watch videos - rather than to switch on the TV in the living room (if they are even at home)? These mobile-first audiences deserve content optimized for their devices and the way they naturally hold them while viewing it – and that means vertically!

Delivering vertical content doesn't mean that broadcasters should now invest in dedicated live production chains for formats like 9:16, 1:1 or 4:5, in parallel to the native 16:9 live format production workflows. It would most certainly be editorially challenging and financially unsustainable. And this is where Wildmoka's Responsive Video comes into play – using AI/ML engines to automatically transform live broadcast feeds into mobile-first and social media friendly content – in real time.

In order to best respond to different complexity levels in broadcast content, Wildmoka's Digital Media Factory offers two distinct levels of Responsive Video. An image is worth a thousand words, so let's demonstrate the power of Responsive Video and the differences between its two levels. We'll use the following fictional sports news broadcast as an example of the original 16:9 linear TV program.

Opinion

Responsive Video LEVEL 1

LEVEL 1 Responsive Video is ideal for relatively simple content, which contains graphics and written information that would become unreadable if the frame was simply cropped to the targeted aspect ratio. Instead, the solution crops the best zone of interest from a clean feed and automatically reapplies all subtitles, lower-thirds, bugs or other graphical elements in the best possible positions and at optimized proportions. This way, multiple variations of the original content can be obtained, all while making sure that the editorial style and the broadcaster's branding are consistent across all desired aspect ratios (1:1, 4:5, 4:3, 9:16, 2:3, etc.).

Responsive Video LEVEL 2

Suited to more complex broadcast content, LEVEL 2 Responsive Video (Wildmoka's award-winning Auto ReZone solution) uses AI/ML to identify all zones of interest in each frame of the live feed in order to rearrange them in real time to best fit the new targeted aspect ratio. This way, the broadcaster can be sure that no information is lost during the transformation of their content. In order to match the broadcaster's editorial requirements, the outcome is fitted into the most adequate layout among a large selection of templates pre-defined in cooperation with editors.

In the following example, the Picture-in-Picture from the original feed gets automatically extracted and placed at the top of the rearranged verticalized stream – the outcome is more sophisticated than that obtained with LEVEL 1 Responsive Video.

Looking forward - new opportunities for Responsive Video

The ability to rearrange different zones of the original feed into a new layout keeps the door wide open to the broadcaster's creativity. With growing interest in incorporating interactive features such as polls, live chats and gamification into live content on one hand, and the incessant search for new monetization capabilities on the other, Responsive Video could soon incorporate digital-exclusive, contextual features to broadcast content.

A new industry standard?

Responsive Video has proven to be a huge success for several of Wildmoka's major customers – in both the realm of news and live sports – allowing them to keep raising the bar in digital broadcasting. Recognized for its ability to drive mobile and social viewership across diverse markets in Europe, the US and the Middle East, Responsive Video is a trend that can be expected to become the industry standard in the coming years, as broadcasters strive to attract and retain digital-first audiences.

We may be biased, but at Wildmoka, we believe that once you have tried Responsive Video, you'll never want to go back to that old school experience of watching a tiny horizontal video strip lost in the middle of a much bigger, useless black surface. So, which experience do you prefer?

Diversity and Inclusion

72%
of women in tech agreed they have experienced an ambivalent and obnoxious 'bro culture' behavior, and **78%** *feel they must work harder to prove their value in the workplace*

Anna Nilsson
Global Head of HR at Vizrt Group

Diversity and Inclusion

How is our industry supporting the drive to increase workplace diversity and inclusion? In our feature in the Q4 2021 edition, Carrie Wootten, MD of Rise, revealed how the organization has helped to promote diversity and inclusion with a host of important initiatives. We asked IABM members to let us know what they are doing to promote diversity and inclusion in their own workplaces.

The resulting articles show not only how seriously they are getting behind D&I, but also the immense benefits to their businesses from doing so. They are a motivating read and a source of inspiration, and show that, while our industry still has a long way to go, we are making very positive strides forward.

Vizrt Group: **If diversity drives innovation – Why is our industry so far behind?**

It's undeniable that the demographic of people in the tech industry is not reflective of the diverse world we live in. According to a 2022 report by Tech Nation, 23% of tech director roles are fulfilled by women, which is lower than the already low 29% in the wider economy. Looking at the overall tech workforce, the numbers become even more depressing. Women make up only 19% of the workforce.

Anna Nilsson
*Global Head of HR
at Vizrt Group*

Reading these numbers, it's evident that we have a long way to go, and one can't help but ask oneself why we haven't come further. Diversity should be a top priority for business leaders and investors, as a diverse workforce has proven to be good for business. In fact, Tech Nation found that internationally diverse boards, on average, raise 453% more investment than non-internationally diverse boards.

What criteria are investors looking at when determining what companies to invest in? I think it is fair to say that they look at the innovations created by the company. But what does that have to do with diversity? Everything.

Innovation is tied heavily to diversity, meaning the more diverse, the better technologies and solutions created. The question becomes then, why is an industry that heavily relies on innovation so behind on diversity? So much potential is being lost. Any company that is conforming to the norm and employing mostly homogeneous employees is suffering from diminished creativity and innovation. Many factors have impeded different people from being in the room, having their ideas shared and voices heard. This has

been a problem for decades. Therefore, the true cost of where we could be in our industry, and society, is near impossible to quantify.

In the tech world, yes, much has changed in the past several years to diversify the industry. But there is so much further to go and a powerful place to start is in the office. There are many ways in which companies can focus on amplifying a multitude of voices and diversifying teams.

Internal changes can make a difference

In The Wall Street Journal's first corporate ranking, diversity and inclusion in S&P 500 companies were evaluated, and it found that companies with a higher number of diverse employees performed better. The research concluded that culturally diverse offices are more productive and inventive than culturally similar ones.

Cultivating an appreciation for ideas allows the best solutions to arrive, because every approach brings something different to the table. Our President and General Manager of NewTek, Barbara Spicek, said it best: "*The more variety, the better off you are, and the more powerful your solutions will be.*"

Unsure how to start driving diversity? Try starting with the recruitment process. At Vizrt Group, we changed the way we work with recruiters and showcase our job descriptions as studies have shown that women are more inclined to apply to a different wording than men.

We've also added in a diversity statement in job ads encouraging everyone to apply regardless of background or location.

Furthermore, we encourage recruiters to present a 50/50 gender split in the shortlisted candidates presented to us. This is not to 'tick a box' but to encourage diverse experiences and perspectives throughout the recruitment process.

Diversity and Inclusion

Fostering a positive work environment where diversity can thrive

72% of women in tech agreed they have experienced an ambivalent and obnoxious "bro culture" behavior, and 78% feel they must work harder to prove their value in the workplace.

The work environment affects the work experience directly, and knowing how much disempowering office cultures make women feel discouraged and overlooked, investing in maintaining a positive work environment is crucial to encourage and maintain a diverse space.

This year, we have launched a few initiatives at Vizrt Group that have been successful in fostering a positive work environment. In January we adopted a global recognition and appreciation platform for peers and co-workers that collaborate across our regions. We implemented this program to celebrate the big and the small stuff, the successful projects, and the people that live our values of Collaboration, Balance, and Respect every day. Our program had a user rate of over 88% globally.

We also believe that development is key to us at Vizrt Group, so we recently gave all our employees access to LinkedIn Learning which has thousands and thousands of opportunities for certification, to grow new skills and to hone in on existing ones. Since it launched, over 85% of staff have utilized it. On top of LinkedIn Learning, all employees have access to Vizrt Group University to learn about our industry and products, where we host regular

courses to sharpen skills for success ranging from cybersecurity hygiene to Microsoft Office skills and more. Skill development is crucial to career development, and that is important to ensure employees – especially those typically less represented in senior roles – see that their potential won't be ignored. We don't want that to be the case with any of our 630 employees from 63 nationalities despite their gender, ethnicity, or sexual orientation, which is why we provide them the same opportunities for development and success.

To move the needle, we all need to commit to change

Enacting real change in shifting to a more diverse industry starts with dialogue, but changes with action. 83% of corporate directors believe more should be done so company numbers show greater ethnic and gender diversity, and for that to happen, uplifting and encouraging diverse candidates and voices needs to become a practice for all of us.

Organizations like Rise, a champion in global advocacy of gender diversity across the media technology sector, are doing crucial work to draw

attention and inspire change. Part of our effort in committing to progress is in our work with them; we have paired up to discuss how to move forward, with plans to develop long-term projects that shift the narrative we see about women in tech today.

Being aware of implicit bias at the beginning stages of hiring practices is integral for diversity, but it is also crucial to create a welcoming atmosphere to retain the diverse talent an organization brings in. We must champion all employees' strengths and create a space that allows people to feel encouraged to speak up, always.

Building cultural diversity, continuing positive work environments, and supporting initiatives and organizations that are doing incredible work to help bridge the gap in tech, are proven to be good for innovation and good for business, but it also makes us better people. More welcoming, inclusive, open people change society and promise a brighter future. Are you going to wait for others to make a difference? Or take action to change the world yourself?

Genelec: **We must see ourselves in our neighbour**

It's delightful to see the growing awareness of diversity and inclusion in recent years, both in society and the corporate world. What should be a natural and self-evident way of acting can often be difficult for us human beings. Yet we are all equal and have the same dignity, irrespective of background, education, skills, gender or position. So how do we increase workplace diversity and inclusion - and why should we do it?

Maria Martikainen
Genelec co-owner and Enterprise Culture Developer

At Genelec everything starts from our values: belief, enthusiasm, honesty, respect and justice. These values represent the world view and human perception we have as a company and working community, giving us basic guidelines on how to treat each other in our daily work, and be true to ourselves.

Building a safe space

A company's success is often measured by its turnover and other financial numbers. They're of course an integral part of the longevity and continuity of a company. Another angle, and for us at Genelec a very important one, is how diverse we are as individuals. With all the diversity in the company, we must also consider how we can build a safe space for us all to contribute to the shared goals. We know that we have succeeded as a community and company when our people want to stay with us for years, even decades. The deeper value comes from how we treat and take care of each other, and what kind of possibilities we can offer different people to grow as professionals and as human beings.

Our people may have different backgrounds and abilities, but they have the same opportunities to develop their general and professional skills. It's not only about what people can offer us, but also what we can offer them as a workplace. We encourage and support our people in developing their professional skills and developing and influencing the whole company, its practices and innovations. We have learned to understand that people can have different talents and capabilities that affect their work: we all have our strengths and weaknesses. Some may also have certain restrictions and disabilities. This doesn´t mean their contribution is less valuable. On the contrary, they will have their own strengths. Finding the right ways for people to be able to work and contribute, whether it means working part time, having a personal assistant to help them move around, or a sign language interpreter, is a matter of practicalities that can be solved.

Cultural differences

Anonymous recruitment is one very practical tool. It might not increase your diversity at the end of the process, but you become more aware of the mindset and prejudices that might affect your recruitment practices, and you can develop it further to treat the candidates equally. Anonymous recruitment helps to concentrate on the substance with a subjective-free mindset.

Diversity and inclusion aren't only about taking account of differences between countries and their cultures or language or gender. Sometimes it might be very difficult to be a neighbour to the colleague who might look the same, but act very differently. Here at Genelec in Finland, there can be major cultural differences between families, or between Western and Eastern Finns. Diversity is about accepting the fact that we are all different individuals, and inclusion is about accepting the fact that we should all be treated and respected equally, no matter how different we are.

Increasing diversity and inclusion in our industry starts with us, our attitudes, and our beliefs. It starts with looking at people, their professional capabilities and their potential instead of their gender, colour or origin. What can this person bring to our community? How can we become part of their life? What can we contribute to each other? It's also about taking account of different phases of life, such as

Diversity and Inclusion

becoming a parent or aging. Finding ways to adapt and finding flexible ways for people to do their work brings experience and silent wisdom to the organisation. To have a community of people with different ages, background, experience and cultural knowledge makes the working community richer and more resilient. Diversity and inclusive thinking create a solid ground for people to give their best.

The wider society

On a larger scale we need to think how we raise our children, as parents, kindergarten teachers, schoolteachers, coaches and idols. How do we build a society where children can reach for the things they are drawn to, and not the things they are expected to do based on their gender or background? This means supporting children and seeing their potential, encouraging them to find the path that is right for them and building a society where people have as much equal opportunity as possible.

As we are part of the wider society, it's also important to do our fair share in contributing to that society. At Genelec, this means supporting organisations like The Music Works and Screencraft Works in the UK, working with people with different kind of barriers in life, or launching our own initiatives like G SongLab, where we've collaborated with experienced music educators to give young people an opportunity to develop their songwriting skills. Being able to create places where young people can try different things, and find ways to express themselves through the power of music – sometimes even finding their passion – is very valuable for us.

At the end of the day, diversity and inclusion means seeing ourselves in our neighbour!

Sustainability - Genelec staff at work

G Songlab - One of Genelec's G SongLab songwriting workshops for young people

Fire - Genelec people around the fire outside the factory

Easel TV: **Streaming as a force for diversity and inclusion**

Not unexpectedly, if you lock everyone up in their houses for a while you get some noticeably accelerated expansion of the streaming market, and, if we let everyone out again, a drop.

In fact, it's been far from a corresponding drop but more recent discussion, triggered by Netflix results amongst other factors, has brought a focus as to whether the streaming market might be slowing or saturating.

Joe Foster
CEO, Easel TV

Whilst it has certainly become harder for most of the big mainstream subscription streaming providers (Netflix, Amazon Prime Video and Hulu) to add more users (each added minimal or no share in 2021 according to BCG), there was growth with the introduction of another tier of general-entertainment SVOD services (such as HBO Max, Apple TV+, Peacock, Paramount+, and Discovery+). That too, may have its consequences, as consumers will reach a limit of what they are willing to pay for traditional mainstream TV and film type content.

So at a time when strategies need to change and new approaches perhaps need to be considered, can we learn anything from the period of Covid-enforced virtual entertainment?

Living in a virtual world
The pandemic created a period where we were all forced to live remotely for a while. And it also forced many businesses offering entertainment events (theatre, shows, events, concerts, festivals, exhibitions…) to rapidly adapt and innovate. For those businesses streaming quickly became a valuable tool.

Besides introducing new players, new business, new thinking, new requirements and new opportunity – which in itself is great for the industry, this turn of events also led to something positive, because there have always been multiple communities who were excluded from these entertainment events: aging population, people with disabilities or health issues, intimidation, affordability, distance etc.

The streaming of virtual events democratises this; it levels the playing field for these communities, providing a positive outcome for inclusion across a wide spectrum of people and communities.

Responding to the market
In March 2020, during the first pandemic lockdown, Soho Theatre published Fleabag Live on its streaming video service. Run on Easel TV's streaming Platform-as-a-Service (PaaS), available globally, the show was organised to help fund Covid-19 charities and proved a great success.

As a result, Easel TV were contacted by theatres, event organisers and performing artists looking for a similar way to adopt streaming activities. We knew we could help; we operate our PaaS across web, mobile and multiple TV devices for the likes of NBCUniversal and Sky, among others. However, the challenge for many performing arts entities and event organisers, who were losing their core business revenue during lockdown, was how to introduce a non-core service to their business with no money coming in.

Our response was to create a common or shared streaming service, in this case one centred on live and recorded arts events: a Netflix for the performing arts.

We teamed up with PlayerPlus (a managed operator to administer the service) to provide a service that is supported on all device types including big screen TV devices. Consumers can simply buy a ticket and start watching on a multitude of devices.
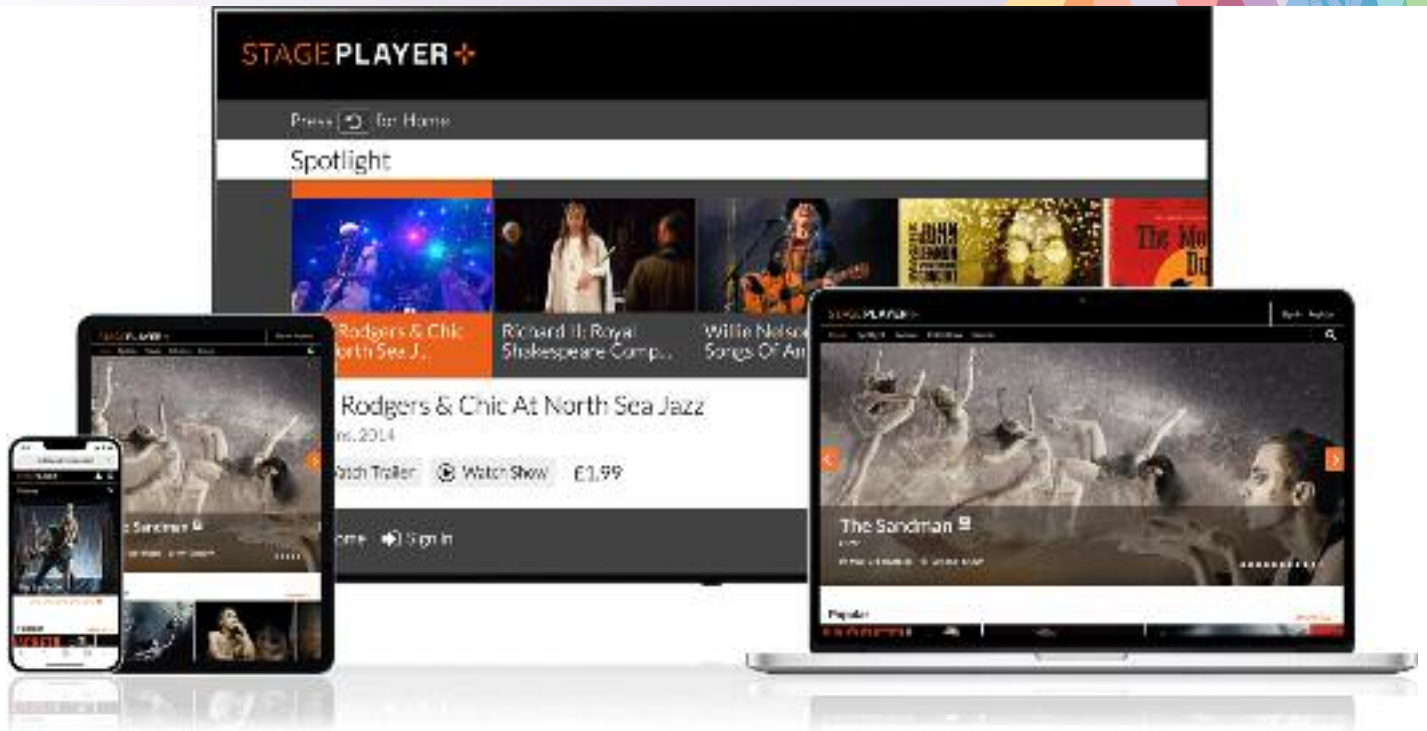
There are no complicated set-up activities, payment is included not just for debit and credit cards, but also via in-app purchases on Amazon and Apple and, for those event providers who use a Spektrix ticketing system, it includes the option to buy tickets to virtual/digital events as an integral part of their business-as-usual product sales – just with a new 'digital' line of business.

The future direction

This sort of positive response leads to innovation and progress; this is now all part of our PaaS service. Besides providing a virtual/digital alternative for many industries, this has become a lifeline for the multiple communities who were once excluded from these entertainment events: aging population, health, intimidation, affordability, distance etc.

Yet this may be just the start of even more compelling benefits, as virtual entertainment is almost certainly going to have to help in playing a big part in many of these event industries, and others, in addressing their carbon footprint responsibilities over the coming months and years.

Necessity is the mother of invention, or so they say; it is also good see that in this case it can also potentially be a force for good.

Email: contact@easeltv.com

EMS Broadcast:
Recruitment evolution and the skills gap

Dermot Casey, Managing Director at EMS Broadcast, specialist recruitment agency for the technical, operational and creative areas of the media and broadcast industry, shares his thoughts on how 2022 is shaping up and his vision for the future.

Dermot Casey
Managing Director, EMS Broadcast

Diversity and Inclusion

Fundamentally there is a shortage of quality candidates and, post Covid, people are re-evaluating what makes a 'good' job. They're looking for, and selecting from, roles with the best salaries/rates, location, corporate sustainability and more importantly than ever, the best lifestyle options for them and their families, in a way not seen before.

Market forces and inflation rates mean rates are needing to rise to be competitive – especially as the competition from other big players, looking for candidates with those same specific skills, is increasing not only from within the industry but from other industries with the same base line of requirements.

Essentially quality candidates do often need to come at a premium, but the total package is key!

Elements such as location, job title, salary and opportunities for progression still do play a major part in the decision-making process for candidates, but we have found more and more are prioritising other factors too. For example, 'how will this role fit in with the lifestyle I lead?', 'is it flexible enough to work around childcare and other commitments?', 'can I work remotely as and when I want to?' and 'what are this company's ESG credentials?'.

The best candidates are asking these questions and doing this research before committing to a role, knowing that – if they hear the answers they're looking for – it's a role that's worth investing their time and effort in. And the most forward-thinking companies are accommodating this.

But the result is a candidate-led, very cautious and competitive recruitment landscape.

This is especially the case when the number of people looking for candidates with those same specific skills is increasing – not only from within the media and broadcast industry, but from other industries with the same base line of requirements as well, such as gaming, aeronautics, manufacturing, and IT.

We are particularly seeing a high demand in Broadcast for talented and multi-skilled/agile candidates, especially in fields within the industry relating to Technology, IT, Production and Creative. The effects of this demand that myself and my team are already seeing include:

■ Good candidates feeling more empowered to choose exactly where and how they want to work, as well as who they want to work for, and are often making the call on taking roles after pushing multiple other opportunities to the final stages

■ Clients are offering more incentives to attract the best talent, including flexible working, childcare options, bonuses, and much more – and those who do not embrace these new post-pandemic ways of working will lose out

■ Salaries and contract/freelance rates have increased, as quality candidates do often need to come at a premium!

We can only see this demand increasing over the rest of this year, made even more certain by the UK's recent investment in content – especially via reasonably new entrants to the market, like Amazon, Apple, Comcast, Google, Netflix, Warner Bros/Discovery and more.

For example, Amazon recently revealed that it has invested more than £1 billion on TV, movie, and live sport content in the UK in recent years, with plans to increase spending even further and make it a must-have streaming service for all households.

The big question then is; where do we find this new talent and how can we attract them to our industry and plug the widening talent gap?

This is a dilemma, one which the whole industry needs to give serious thought to. But it isn't just the companies themselves that can make impactful changes.

Yes, broadcasters will need to be open to attracting talent from other sectors, such as banking, pure I.T. the M.O.D., aviation, and more, as well as being willing to help support them through this career transition and equip them with all the tools and training they need to thrive.
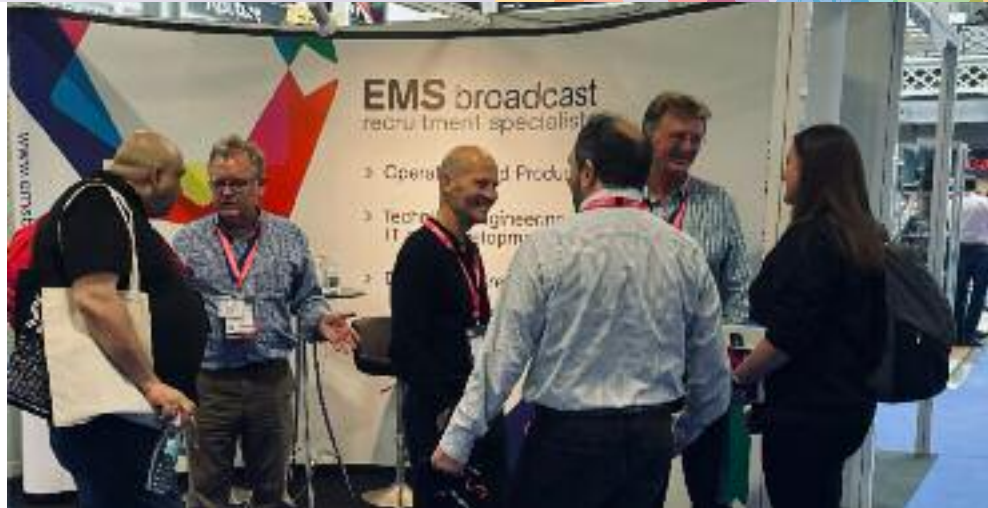
But it is also the responsibility of our government which needs to make it easier for us to attract talented people from other countries, through supporting the right to work, making the sponsorship process simpler and reviewing the impact of IR35 legislation changes.

And finally, it's down to our parental and cultural influences. Schools, universities, and training schemes can all play a vital role in getting young people excited about a career in broadcasting – but it often isn't talked about enough day-to-day, so it's easy for young people to have an outdated idea of what it is or get confused by all the different areas of it that they could get involved in.

These issues are being addressed through the setting up of organisations like RISE, which EMS Broadcast is proud to be a 2022/23 sponsor of.

RISE is an extraordinary membership group that supports gender diversity across the media technology sector and also runs Rise Up Academy – an outreach programme delivering broadcast engineering and technical workshops to primary and secondary school children aged 9 through to 18 years old.

But support and guidance at all levels is crucial to see more companies looking to not only take on more graduates but trainees, apprentices and entry level people and offer them training and support to create the talent base.

While the above outlines the main causes and some potential solutions, it really only scratches the surface of what is a crucially important issue within the industry and one that we all need to put action and energy into solving sooner rather than later as the skills gap continues to widen.

We're so pleased to announce that EMS Broadcast will be exhibiting in Hall 1 B09 at IBC 2022 in Amsterdam later this year, in what will be our twenty-fifth year exhibiting at this prestigious industry event.

So do please drop by or get in touch if you would like to discuss this topic in more detail or to go through your specific broadcast recruitment requirements with us.

I will be there with my colleagues, please find our email addresses below:

- **Dermot Casey**
  dermot@emsbroadcast.com
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About EMS:

EMS Broadcast is a leading specialist recruitment agency for the technical, operational and creative areas of the media and broadcast industry – but it's also so much more, each of its recruitment specialists has experienced a career in the media, broadcasting and production industry before moving into recruitment, so know the processes and the skill sets that are needed to take any operation to the next level.

Working with the most progressive broadcasting companies of all sizes to help them find the best talent for their departments and working with candidates to help them build exciting careers.

EMS also prides itself on providing a completely end-to-end recruitment journey – taking care of everything from sourcing and interview preparation to compliance and payroll.

The company headquarters are in West London, we work with clients and candidates across all areas of the UK, Europe, Scandinavia and the Middle East.

Cerberus Tech:
Delivering Wider Reach for Women's Sport

Women's sport has enjoyed a great start to 2022, with the Women's Super League (WSL), Six Nations, and Women's Cricket World Cup, proving key to record UK television audiences. The Women's Sport Trust found that "UK women's sport viewership increased 140% from 1st January to 15th May" and Sports Pro Media recently highlighted that WSL broadcast consumption was up 285% in the first year of the Sky-BBC rights deal, based on data from the same study.

Vicky Callister
Head of Global Business Development, Cerberus Tech

However, to build on this momentum, the broadcast industry needs to do more to maximise growth in all tiers of women's live sport. In recent years, media content delivery has become more diverse from a technical perspective. Sports broadcast organisations can capitalise on this to become more diverse in their approach to content creation. By exploring different content formats they can expand reach and take a wide variety of sports to new audiences.

The Next Generation of Fans
Before the pandemic, Nielsen Sports noted some key challenges with Gen Z's engagement with live sports. "They have higher expectations for entertainment experiences than their elders, and new ways to discover and consume content." The data from the Nielsen Fan Insights study across eight different markets (China, France, Germany, Italy, Japan, Spain, the UK and the US) revealed that 16–24-year-olds prefer "shorter, 'snackable' content and, from a sporting standpoint, are less inclined to watch entire games."

Some commentators have dismissed the generational shift away from traditional consumption habits, as an issue with the Gen Z attention span.

Many in the industry have implied that Gen Z are simply too distracted and demanding, to sit through a full sporting event at an allotted time. But as Nielsen highlighted, "if the content is sufficiently engaging and provides regular opportunities to interact, they (Gen Z) are still prepared to invest meaningful time". Fans of watching online video gaming in the US provide a case in point – 29% under the age of 25 state that they watch continuously for one to two hours, whilst 14% watch for three to four hours at a time."

It's also important to remember that the Nielsen figures were shared prior to the pandemic. Since then, social watching and online interaction has expanded exponentially. Many consumers have integrated second-screening and virtual connection into their viewing habits. Statista data revealed that the share of people using other devices while watching TV in the UK was 69% in 2021. It's important that content owners think creatively to optimise evolving viewer behaviour. If a fan's attention is split, then it provides opportunities to consolidate the viewing and engagement experience across different platforms.

There is an increasing demand for new types of content to consume,

which touches all areas of media, as well as new ways to engage with it. At the same time, audiences expect to feel closer to clubs than ever and connect directly with players, as barriers are brought down through social media. Women's sport must already contend with fewer opportunities for coverage and less lucrative sponsorship deals. So, by responding to an evolving landscape, clubs and federations are in the best position to maximise future growth potential.

Every Moment Makes Content
In the age of interactive media, everything is content. The commentary and speculation, behind the scenes footage, and supplementary stories can often be as engaging as the main event. These content formats can help build a compelling new narrative for sports rights owners and engage new audiences. Women's sports clubs and federations can explore the potential of additional content to deliver wider reach and expand revenue opportunities. The rights for extra content could be sold to additional takers and broadcast outlets, delivering one main world feed supported by multiple supplementary feeds. Content could also be used to increase awareness

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around women's sport and build links with audiences in new regions.

To ensure a benchmark of video quality for women's sport, the broadcaster still needs to receive supplementary content at as high a quality and bitrate as possible, if the assets are to be leveraged effectively. Additional content has an appeal, but unlike a main feed, the diversity of this content means potential revenue generation is divided across a large number of media assets. From an investment perspective, satellite isn't the right method for this content model, but this is where broadcast-grade IP is the perfect fit. A sports content owner does not need to allocate satellite capacity to multiple supplementary feeds; content can simply be made available in the cloud so that takers can access it in accordance with demand.

Maintaining Momentum

This agile, cloud-based model of content delivery will give audiences a chance to set the viewing agenda. There is clearly an interest in women's sports content when it's made available to view. A recent prediction suggests that the "value of women's sport could treble by

2030" and that "broadcasters and brands have a significant role to play in helping the sector achieve its £1bn goal". To facilitate this, content owners need to think beyond a traditional 'main feed as the only feed' approach and a linear, fixed schedule consumption strategy. In addition, an over reliance on traditional satellite infrastructure, as the sole delivery method, means missing out on a host of on-demand content opportunities.

As with other sectors of content production, audiences will soon start to define the supplementary viewing formats of sports coverage. The future of women's sport is closely tied to grassroots engagement and getting the next generation of

female fans invested in watching and playing it. The opportunities that cloud-based content delivery offers, as well as the accessibility that next-generation technologies provide, will help level the playing field for those fans.

The tools are in place for some exciting few years ahead but the industry needs to see the potential and act. Gen Z are changing long established patterns of video consumption. So, it's important that women's sport moves in a direction that supports emerging trends, rather than being restricted. With an innovative outlook, content owners can expand the event footage available and move women's sport into exciting new areas.

BT Sport United – a co-ordinated, company-wide commitment to Diversity, Inclusion and Sustainability

BT Sport won the IABM Award for the Most Inclusive Company in December 2021. The sports broadcaster collected the award in recognition of a wide range of action across its operation to promote Diversity and Inclusion – see the judges' summary of its achievements here. We followed up with BT Sport COO*, Jamie Hindhaugh, to uncover he story behind his inspiring BT Sport United initiative, dive deeper into the programme, discover what's coming next – and also talk about BT Sport's sustainability push, which is delivering astonishing results.

Jamie Hindhaugh
Head of BT Sport

What's the genesis of BT Sport United?

I launched BT Sport United as an initiative on 1st August 2020 – just as we went deep into the pandemic. It was driven by our aspiration for the BT Sport community to have a purpose. And when I say the community, I mean all the people we work with. We've done many initiatives in the past around working with local communities, focusing on inclusion and looking at sustainability. But it was all very piecemeal. What I wanted to do was to bring a programme together which drove engagement and gave opportunity to people working in BT Sport around the three pillars of diversity/inclusion, community and sustainability.

My absolute belief is that, whoever you work for, it isn't just about how much you get paid, and what the brand is, it's what brand stands for that matters – the principles within that organization. Especially amongst the younger people coming through, it is clear that they want to work for a company that has a purpose, that cares, and that uses its voice for good.

So initially the job was to pull those programmes together, putting it all into one brand – BT Sport United – and then take that onto our screens. So it's not only an internal engagement mechanism, it's also an editorial strand that now sits across our channels. It means we're not preaching, but we're talking to our audiences about the things that matter to us and we think matter to them. And using that voice also to showcase the internal projects and opportunities that we get involved with, demonstrating an absolute commitment to making our industry and our network a better place –

whether it's around inclusion, whether it's around sustainability, or whether it's how we integrate and connect with our community.

Practically speaking, how did you bring it all together?

Two factors drove the genesis of BT Sport United. The first was that we were already doing so much good stuff, but even some of our own teams weren't aware of it. So we tried to think of a vehicle – how can we raise awareness that drives engagement? And how do we celebrate the great stuff we do? So that was the key part of BT Sport United. My first step was to create a BT United team talk. We do a live TV show that goes out every two weeks to all of our teams, where we interview people, focus on the projects we're involved in, and we also talk about our output. This was critical during Covid, because we were all dispersed all over the place. And what I'm really proud of is the sense of community at BT Sport is stronger coming out of Covid than it was before, even though the community became more virtual.

But the other thing driving this, and this is a very personal aspect, was that I'm in one of the best jobs there is in broadcast.

Has your personal background played any role in this?

Yes – but perhaps not how you'd expect. I left home at 16. I didn't go to university, I had various different jobs.

I joined the BBC in 1994, on the lowest grade booking cabs in a call centre. I left the BBC 18 years later, as the head of production for the London 2012 Olympics across TV, radio and online. I joined BT and set up BT Sport, built this

infrastructure. I'm responsible for the day-to-day running and creation of the BT Sport team. And we've built a brilliant team.

And I'm not qualified for any of that. But what I do know is that I'm a hard worker, and I've learned on relationships, but I'm also very conscious of the privilege I've had, because of who I am, my background, etc. Now, I don't come from a posh family or anything like that, but it was very clear to me that the opportunities I got in the BBC were because the networks I was allowed to move in. So it's always been a passion of mine. And especially since having kids, and when I look at our industry as a whole, I think a lot about how we can become more open and attractive to bring people in who, with the right aptitude, support mechanism, and care, can be brilliant.

Our industry is one of those industries that can do that, but it has suffered in the past from lack of inclusion in particular – especially around ethnicity and gender – as being not open for business. So all the initiatives we do – whether it's apprenticeship schemes in the local boroughs, whether it's takeover days, being open, helping people understand what our industry is, and the opportunity that's there – are aimed at opening it all up if you want to be part of it.

When we set up BT Sport, we based ourselves here in Stratford in the poorest borough in London, which has a really diverse community. But I did not want to create an organisation where everyone passed through the community to come to work; that's not good enough for me. For us to truly be successful, we need to be part of the community,

we need to feel part of the community. And the beauty of that is our community then gets into our DNA. If you don't have a diverse team, if you don't have that right approach, it is very hard to get that across on air and therefore talk with those communities in a way that they understand. So that's quite a long-winded answer, but in short, Stratford is now the home of exclusive Champions League broadcasting coming from this neighbourhood.

And the worst scenario would be for us to be in our ivory towers and not reflecting the neighbourhood we're in. So with things like Takeover, we are engaged in supporting our local community. Some of the people who've been on Takeover are moving into employment in the industry, some of the people just got their confidence, and some just enjoyed it. And that's what it should be about – work should be fun. People should feel part of something, and people should feel wanted and that for me is the ethos that we've created. The thing I'm most proud of in BT Sport is not the fantastic coverage we do, it's not our fantastic leadership and innovation, it's in here, because the people inside the building are BT Sport; BT Sport is not Stratford studios, BT Sport is the community within. And that's the thing I'm most proud of, and things like BT Sport United helped galvanise that, and help hold us to account to make sure that what we preach, we do.

What's coming next?

Well, a lot of it is building on what we already do. So now we're back in the workplace, we're doing some more mentoring and work experience opportunities through structured programmes with local colleges and schools. And working with Rise Up of which we are a founding member and key sponsor, which is around targeting kids of school age, who are looking at their pathways. We need more equality around gender within broadcasting, but especially within sport broadcasting, and Rise Up helps us with that.

But it's about people seeing what engineering really is, because broadcasting is engineering. Enabling them to create a studio, to work as a team, and to see the output of what they're created is really powerful. And it's something I'm really proud of. And it's about opportunities because, when it comes down to it, it's all about how you work, and how you integrate into a team. I'm not solely responsible for the success of BT Sport – I'm just one of the wheels on the car. And without people around me, I would fail. And that's what we want people to understand. We want them to get an insight that actually broadcast it isn't just about standing in front of the camera or holding the camera. Every single business skill is somewhere in the chain within a broadcast operation, and it's getting people to understand that and feel like it could be a career for them.

So we're always looking at how we can attract people in, but also how we can then support them to build their careers. I'm really proud of our BT Sport apprenticeship programmes. We've done two, and we targeted the six boroughs impacted by the Olympics, because that's where we are. So it's very targeted; every single person on the programmes ended up in full time jobs. Two of them now work for other broadcasters, one of them has just left and is now a presenter, and all of these people came in and just got involved, learnt and have made a brilliant career for themselves. And that's really fulfilling.

Sustainability – the third pillar

We are always looking at sustainability. We're part of the albert BAFTA, and again we work cross-industry there to share best practice to look at how we can become greener and more efficient. We spent a lot of time navel gazing and a lot of time thinking if you live in glass houses, you can't throw stones. But then there was a realisation within our organisation when they that we're doing a lot of good and while we're not perfect, we could still talk about this with our audiences and drive more engagement. There's not much good come out of Covid, but forcing us to move to remote production and completely change how we work reduced our carbon footprint by about 50% because we're not sending people all over. Changing from normal fossil fuel to green fuel has a massive impact, and the fact that our studio is already the biggest LED-lit facility in the world, which use less energy and need less cooling, is another example.

So what we've started to say is we're doing some really good stuff here, so let's celebrate that. And even little things like taking beef off the menu, all of those little things have an impact when you add them all together. And it's something that people are really passionate about. When you look at the scare stories out there around the impact on the world, and especially for us who have kids, we want them to inherit something that's almost like what we have as regards ways of life, etc. So that's what we're committed to.

Diversity and Inclusion

And remote production also is a massive enabler around inclusion and diversity as well. All of our galleries, for instance, at Stratford that support remote production are also accessible. With the best will in the world in the old days of giant OB trucks, it's very hard to get a wheelchair in. And now we're looking at transitioning our remote production that one step further to cloud production, which also improves sustainability, but also means people can work anywhere, but still be part of a gallery team. What that means is you're no longer selecting people to work for you just on their geographical place of being; you can be more open and more people can get involved.

When we went completely remote here at Stratford, we were able to carry out our main control room operations remotely. People at home are able to bring the feeds into the building, divert them, route them all, etc, which you'd never have thought would be possible. And that means you can start looking at people who have caring responsibilities, or people who are part time. Because the big challenge, as we all know, around that sort of area is around travel and being away. So all of those things are what we're looking at that not only drive our inclusivity agenda, but also absolutely drive down our footprint as regards carbon emissions. And we're talking about this much, much more on air.

And the impact is huge – internally we have about halved our carbon footprint on average. And where we do have to create emissions, we look at how we can offset to get ourselves to net neutrality as soon as we can. But our primary objective is about changing how you behave to reduce emissions, rather than just offsetting.

My absolute belief is that, whoever you work for, it isn't just about how much you get paid, and what the brand is, it's what brand stands for that matters – the principles within that organization. Especially amongst the younger people coming through, it is clear that they want to work for a company that has a purpose, that cares, and that uses its voice for good.

Jamie Hindhaugh
Head of BT Sport

*Jamie Hindhaugh was promoted to Head of BT Sport shortly after this interview took place in March

Diversity and Inclusion

Business Resilience

Our business theme for this issue in these turbulent times is the ever more important subject of Business Resilience. This covers a wide range of technologies and activities across security, business protection, data protection, technology choices and business continuity.

IABM UK Members'
Council debates Cyber Security

> The issue of cyber security hits on many levels – corporate, product, system and individual. All of these are apparent within the Broadcast Industry with attitudes as well as actions to cyber security increasingly changing, driven in no small part by the rapid adoption of new cloud-based workflows and 'direct to consumer' strategies. Below the UK Members' Council have been given 30 minutes to 'debate' two opposing statements around cyber security and what it means for the Broadcast industry.

UK council chairman, **Simon Haywood** (Dell Technologies), kicked off the debate by positing two very different scenarios:

1. Most broadcasters have cyber security covered, and the threat of so-called cyber-attack is considerably over-exaggerated. All that's required is a decent firewall, and anti-virus on machines that people use. Backups aren't needed – because everything's archived. And in any case, broadcasters are not the target of any of these attacks – they're more aimed at extorting money from commercial organisations.

2. Every touchpoint that a broadcaster has with a viewer or any other organisation is a potential attack vector – and the consequences of malicious activity go far beyond any immediate impact. Broadcasters must adopt a 'zero trust' security policy – and secure their systems and workflows across all levels of their organisations.

Tim Felstead (Sony Professional Solutions Europe) cited a recent example of a tender for a public broadcaster as clear evidence that cyber security is a central consideration. The tender required full compliance at every level of the EBU's Technology Pyramid for Media Nodes and its various cyber security recommendations. "There were two components

– the company security: how do you as a company comply with all these security requirements and also how do your products comply with the security requirements?" Felstead explained. "And also, can you demonstrate test results that you comply? This gets down to really detailed levels – does this product respond to a certain action over an IP network in a certain period of time? So it's not just about 2110 and the standards compliance of transport – it's also down in the minute detail about tests for cyber security and responses to various kinds of attack etc. It's very onerous."

Martin Paskin (Techex) also had a recent similar experience with a large broadcaster specifying that they needed to clear levels 1 and 2 of OWASP (Open Web Application Security Project) and a significant proportion of level 3 too. "That costs a lot of money and time to achieve but it was the only way we could get our products on their site," he said. "And the Russian war on Ukraine has caused a lot of people to be very concerned about security, including broadcasters, some of whom have severed all remote connections to all of their systems, which has become a blocker to trying to deploy systems or even support systems now."

Simon Haywood suggested a lot of industries could learn from Hollywood, "which has been all over content security for years; they take it much more seriously than – for example – the medical

guys. But in the broadcast industry, we all know of broadcast systems from big vendors where the vendor name is both the username and password, which is the execution user for the entire system!" This comment brought smiles all round. "We can't do that anymore." Haywood pointed out that Dell products get used in many other verticals – enterprise and government for example – "which dealt with this stuff years ago, so maybe we don't need to reinvent the wheel. What Tim Felstead was being asked to do has been done before in these other verticals. You could find someone from a totally different sector who might just mop it all up in an afternoon."

Felstead responded by pointing out that, while software-centric companies may have the skills in house, "if you're a company making say pedestals for cameras, then I bet you have a LAN, but you've got far more mechanical engineering resources in the company than you have IT engineers. Companies need to change their approach to accommodate the changing norms in the industry."

Russian war on Ukraine has caused a lot of people to be very concerned about security, including broadcasters, some of whom have severed all remote connections to all of their systems, which has become a blocker to trying to deploy systems or even support systems now."

Peter Blatchford (Starfish Technologies) reported that when he tried to renew his company's public liability insurance recently, he was forced to implement "a whole bunch new things because the company said our cyber security wasn't up to scratch. It came from nowhere – we've never

been asked to do it or prove it in the past. It isn't a bad thing in itself but, as Martin Paskin said, these things cost money and time, which is a really precious commodity irrespective of cost. We don't have people to sit around and look at this stuff – we're trying to deliver a product, so any distraction is incredibly unwelcome and it basically involves us setting aside two of our top software developers to implement.

"The implication is that insurance companies are now expecting anyone involved in any high-tech industry to implement these standards internally. We didn't want to challenge them; they allocated a couple of people at their end who are now responsible for ensuring companies implement these standards; we had a conference call that went on for many hours with our software developers and they told us what we needed to implement. The implication is that any company that wants any form of liability insurance will have to implement these kinds of standards, including one-time passwords and two-factor authentication. We've had to implement these internally when we VPN into our own systems."

"Our customers have been protecting their systems for years. For example with Sky, you obtain a token and you're given access to the system for a very short period of time. You have to justify why you need that token and that's totally reasonable – I have no issue with that," Blatchford added.

John Sparrow (Clear-Com) concurred. "We've been doing this for a long time when connecting to our servers in the US. We've just changed to meet California laws, which say you can't have the same password, so the first time someone logs into the product, they are forced to change the password – so we lose the general ability to get into the system."

Ilona Valent (Riedel Communications and Solent University) expressed her surprise at how unprepared some companies are when it

comes to cyber security. "One aspect is protecting content – 'Hollywood syndrome' – piracy is a major concern, and the other is confidentiality and data protection – personal and employee data protection. Most of our clients are focusing on these. Recently we were trialing a new power system at one of our clients to enable them to control and monitor remotely. We were trying to remotely turn on lights in the studio and instead took down the whole gallery. It was just a test or it would have been mission-critical! Hackers these days do it just for fun – recently one of the world's most prolific hackers was caught and he was just a 16-year-old autistic boy who just enjoyed doing it. But if a broadcaster goes down on air to a hacker – maybe carrying a major live event – that's an incredible amount of money and reputation lost."

Jonathan Morgan (Object Matrix) added "Broadcasters get hit by everyone – by these kinds of people having fun, by opportunists, by government-sponsored hackers. The big thing that's happened over the last few years is that there seems to be an industry of companies that exist to hack and make money out if it. In the past, we used to think of individuals or loose collectives but now it seems like there are actually companies set up do this. It has changed dramatically."

"Now we're seeing people move away from direct satellite feeds or A to B telecommunications towards using IP, we're seeing a lot more people asking for rotating keys," Martin Paskin said.

Mark Davies (TSL Professional Products) has seen this go one stage further – or maybe that should be backwards: "We have had a customer request to do one totally IP installation where they seriously took all their outgoing lines back to SDI then IP before going out of the building."

Micky Edwards (TAG VS) added: "As a software-only company, we regularly get asked about penetration testing. Third parties carry this out and each individual broadcaster wants to keep their results secret. But it's the same type of test being done by these companies, and if there were a method of sharing this between them, they may be able to save themselves an absolute fortune in hiring these third parties to come out and do each individual test. That's maybe something to think about where there are standards."

Darren Whitehead (IABM) has seen an example of sharing at a recent BT seminar. "They deal with major threat attacks on the network through collaboration. They'll pick up the phone to their competitors and tell them about an attack, helping to minimize its impact. It's in everyone's best interests to have the most secure possible network for their clients. I don't see this happening in broadcast."

Rounding out the discussion, Whitehead concluded: "If we don't do something about it as an industry ourselves, then other people such as the insurance industry will force it on us."

So it is clear the UK Members' Council believes approaches to cyber security in the broadcast industry are getting more sophisticated and certainly more prioritized throughout the planning, purchasing and implementation stages of a project. However, by working with other vertical industries, broadcasters may be able to learn a lot as well as save time and money! The message from the UK Members' Council then is for more collaboration between vendors and customers and more transparency around what works!
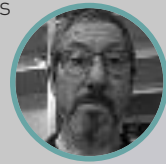
The Argosy family

Argosy was founded in 1984, originally to supply broadcasters and systems integrators with cables and connectors. Today we are known as infrastructure solutions specialist and have rapidly expanded our portfolio in recent years, with an extensive range of products and services, including racks, power management, conversion devices and KVM technology – and we serve a number of industries alongside broadcast - such as Pro-AV and IT.
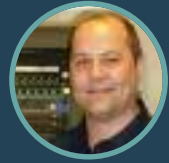
Chris Smeeton
CEO, Argosy

But the guiding principle of the company is still the same: we aim to be very responsive to our customers by predicting their needs and having what they need in stock, so we can deliver it when they need it. To meet that goal defines the shape of our business and it's always been the people we employ that has been key to our success.

The 'founding fathers' of Argosy, Ken Eckardt and Mike Purnell, wanted the company to have a family feel, to be one team all pulling in the right direction and three years after the company was acquired by IEWC, in 2018 our MBO meant that Josh Simons and I could resurrect this original work ethic.

One initiative that Ken and Mike had – and which I re-introduced when I took the business over with Josh – was the group bonus system. We do not give our sales staff commission, but everyone gets a share of the profits.

My first grown-up job was in the kitchen of a restaurant, and I remember feeling aggrieved that I never saw any of the tips. This is the same thinking: a picker in the warehouse is just as important to our success in business as someone in sales or accounts, so everyone benefits in exactly the same way.

We are a relatively small company, but we still try to do things in the right way. We are an ISO9000 accredited company and we have a comprehensive online procedures manual. Like all businesses, we are in continual improvement: we are currently introducing a new CRM system, and have pledged a number of sustainability goals.

We also want everyone to recognise that we are proud to be a part of the broadcast and media industry. All the staff are aware of our involvement in organisations like the IABM and RTS. For this year's Media Production and Technology Show we registered all our internal sales and technical teams and encourage them to attend, to see what is happening in the industry and to get a chance to meet the customers.

Our staff tends to be very loyal: we average more than 10 years retention, which is great. And it is changing...we are now about 60/40 male and female.

But even with very low staff churn, growth means that we have to recruit. My feeling is that generally you can teach people about the products and the job: it is identifying those with the right attitude that is hard. We start by talking to our existing team and asking them if they know of anyone who might fit in – they know who they want to work with.

We also have close relationships with our suppliers, so we can be sure they can give us what we know our customers will want. Companies like Draka-Prysmian make cables to our specification, because we know that will do the job.

Then we need to be sure we have the right level of stock, in our main warehouse in rural Buckinghamshire, our Middle Eastern office in Dubai, and our joint venture in Kuala Lumpur. And of course we need internal sales people to take and process orders, and people on the road to keep an ear to the ground. By being close to our market means we know what is coming, which means we know the technical demands so we get our suppliers to create even more appropriate products, and so it goes around.

How does all this translate into a corporate culture and how did the pandemic change how we work as

an organisation? Most obviously, we are limited in how much working from home we can do: pickers have to be in the warehouse; you cannot splice and polish fibre camera cables on your kitchen table. But sales, accounts, and other back office people – including me – can work remotely and that is what we did when we had to.

Today there is a mixed response to how we work. Some staff found it difficult to go back to being in the office. Others found that, after a couple of weeks of being back at their desks and interacting directly with colleagues, they fought back when I tried to send them home over a recent uptick in covid rates!

We have a long-established practice of a Monday morning meeting across the departments, so everybody knows what is in the diary, where the pinch points are going to be, and where we might need to all pitch in to get a job out.

During the worst of the pandemic these Monday morning meetings were on Zoom. Now we are all keen to do them face-to-face, and while we have a general rule that staff can be away from the building can work from home as they need to, we encourage everyone to be in on a Monday as a routine.

The real benefit of these weekly chats is that it eliminates the silo problem. Every department understands what is going on, how the business is performing, and where the threats lie. Everyone appreciates knowing what is going on, and it has a real positive impact on productivity and understanding.

My other big concern about working from home is that you lose sight of the people in the job. Everyone can be cheerful and positive on a weekly Zoom call, but if you are in the same office, day after day, you get to know when someone is not right, when they might be having problems or feeling unwell.

When you are together, if someone spots something it is much easier to have a friendly word. If we know there is a problem then we can find a way to ease it.

It is a bit of cliché in our industry, but I really believe that we are in a people business. We promote from within the business, and most members of our management team – including me – have come through the ranks. We have a board member who has been a customer and a supplier in the past.

Add in the partnerships with our vendors, some of which stretch back 20 years or more, and I think we must be doing something right.

Zero Trust; the new security paradigm for a multi-connected world

Media companies are connecting across more platforms, services, and networks all the time and securing content or broadcast / streaming data has never been more important... and more difficult.

Gartner's report, '7 Top Trends in Cybersecurity for 2022,' predicts that by 2025, 45% of organizations worldwide will have experienced attacks on their software supply chains, a three-fold increase from 2021.

Jérôme Athias
Chief Information Security Officer, Dalet

That means you don't just need good security practices, but security done better than the most damaging cyberthreat making its way towards you.

We're going to need a whole new approach to security at the corporate network boundary, and at Dalet we embrace the principle of **Zero Trust** as the best path forward.

Under a Zero Trust framework, nothing is considered safe. Every incoming signal or connection is by default untrustworthy until it's rigorously tested through various security checks to ensure legitimacy or authority to connect.

Evolving threats

The assets produced by the media sector have always been highly sensitive, subject to very strict public release dates or IP legislation. But here's what's changed: more of us are working remotely than ever. Gartner states that currently, 60% of knowledge workers are remote, and at least 18% will not return to the office. These changes in the way we work, together with greater use of public cloud, highly connected supply chains and use of cyber-physical systems have exposed new

and challenging attack 'surfaces.' Simply put, the multiple platforms and devices we use to connect with workplaces only give the bad guys more ways in.

These bad actors have changed too. Cybercrime is about organized data gathering rather than just underground bragging rights. They're coordinated, efficient, and getting harder to stop at the border of your organization.

As an industry, we have to work hard to keep up and need to ensure that every input or connection request complies with internal security policies, that they're running on reputable platforms or that authorized agents are using them. Otherwise, every VPN, smartphone operating system, marketing platform account or video call client is a potential threat vector.

The Zero Trust strategy

Under a Zero Trust security framework, nothing is considered safe. As a new signal or connection comes in from outside your network or organization, it's initially blocked by default. It's then interrogated based on any possible data point you can program for – identity, location,

the operating system or security profile of the device, the workload the input requests and more.

After scrutinizing every resource, any changes in configuration and network or traffic activity are continually logged, monitored, and rigorously questioned for anything suspicious.

There's also a continual standard of access based on least privilege. That means the user is given the minimum resources or access needed to do their job and no more. If they need it, any further access request is subject to the same interrogation.

Both device/access architecture and management have to evolve to adhere to Zero Trust principles, and that will involve training, awareness and the ushering in of a new security culture. Methods like password-less access and physical devices like security keys are going to become more important.

The Zero Trust practice

Imagine an editor receives an email from her production manager or the VFX supervisor asking for access to a sensitive file and happily complies.

What she doesn't know is that a specialized group has done the social engineering – figuring out who she is and a boss or senior company officer she's likely to respond to. Another has done the corporate hacking into the company's email server and sent the request from her boss' email.

Another group has written the malware to install on the network when she emails the link or credentials back, and yet another harvests her networks for sensitive information it can hold to ransom.

In a traditional network – where the editor has sent the link using approved credentials – the server would simply grant access. Under a Zero Trust model, the device used by the hacker, its location and the workload usually performed after such a request aren't known to the network even though the login credentials were cleared, so access is immediately blocked and the attempt logged.

But it's about far more than stealing sensitive files. Imagine you're a broadcaster streaming content that's interrupted or taken down through a distributed denial of service (DDoS) attack by a hacker group with a political or misinformation agenda. When online services combine live betting with real-time sport events, the liability alone could be crippling if your network or stream goes dark.

Evolving vigilance

At Dalet, security has always been a cornerstone of everything we do. We consider it like the brakes of a car. You need to stay on the road and keep up the pace, and security isn't there to block that but help achieve it by spotting dangers and letting you circumnavigate them quickly and efficiently. Thus, security needs a three-pronged approach:

- **People –** Your own staff, as well as customers, need to have awareness and need to receive security training.

- **Processes –** To better respond to incidents, you need to improve processes constantly

- **Technology –** As technology has increasingly shifted from on-premise to cloud and external systems and providers, security must remain the most critical part of the transition.

The media business is truly global with countless different legal jurisdictions. And because data privacy law differs in each territory, different users have different regulatory requirements.

But as well as evolving along with local standards and regulations wherever they are, you need to make a practice of applying the strictest regulatory frameworks you work with (including your own).

Zero Trust is securing your borders no matter what cloud services, internet of things (IoT) or bring your own device (BYOD) policies are used to interact with your organization.

You can't take any risks with valuable media assets, but you have to expand your access rights to more players and collaborators than ever. Zero Trust provides the balance between the two you're going to need in the near future.

Content Protection – more things to consider

Summary of Report
Roger Thornton, IABM

Overall, the prioritization of business and consumer trends over pirate-driven ones was consistent across different types of media businesses. However, while pirate-driven trends were ranked as less important, most of them were classified as high priority, with cross-border illegal access to content and security breaches leading to content leakages identified as more important due to the Covid pandemic.

With most businesses predicting their original content investment will increase significantly over the next few years, it seems counter-intuitive that content protection solutions are not a primary business priority given the increase in piracy activity in all its various forms. One of the reasons behind this is the complexity of the advanced content protection landscape, which constantly needs to counter pirate-driven innovation.

This means high budgets for content protection and a struggle to keep up with fast-paced developments effectively. In summary, the effects of complexity on technology understanding and pricing are important factors determining media businesses' deprioritization of content protection technology.

Response to data and analysis circulated in IABM Report sponsored by Axinom

Nik Forman
Marketing Director, Friend MTS

The recent IABM report on content security trends in conjunction with our good friends at Axinom made for some interesting reading. As Roger Thornton mentions in his summary article, perhaps the most surprising takeaway is the discrepancy between a stated intention to invest in content, and a far lower priority in investment in content security technology to safeguard against the theft of that content, especially given the financial, operational and potentially creative resources that will be required to produce or acquire it. As Roger summarises, this seems counterintuitive, but budgets are finite and it could be argued that prioritizing content over business processes is where dutiful media providers should concentrate their majority resource.

However, with 80% of respondents indicating the high importance of DRM, and 55% already implementing watermarking technology, it's clear that using technology to prevent unlawful acquisition and redistribution of content is seen as a critical business driver.

The excellent analysis provided towards the end of the report informs a list of positive and negative drivers of investment in content protection solutions, and as a provider of such products and services, these are the elements that drive the conversations that we have with our customers around the world.

- Content protection systems that are technically flexible and facilitate integration attract investment
- Content protection systems that are commercially flexible attract investment
- Real-time sports broadcasting attracts investment in content protection tech
- High-end scripted productions attract investment in content protection tech
- Content protection systems that are digitally flexible attract investment

First to the positive drivers:

Content security is no different to other media technologies – the most attractive solutions are those that offer both technical and commercial flexibility. Additionally, the ability to provide digital flexibility without impacting quality of product is key, and with the evolution of technologies such as client-composited watermarking, which is deployed at point of delivery, this flexibility has come a long way and continues to evolve. Crucially, this flexible architecture not only benefits the user operationally, but also enables providers such as Friend MTS to more easily keep pace with ever-evolving piracy technology.

It's no surprise that the other positive drivers all reflect the near-lockstep relationship between content value and the requirement to protect it, with sports and scripted content at the top of this pyramid, and lower-cost, niche programming appearing as a negative driver of investment. The world of video is ever-expanding, however, and the proliferation of unique content across non-traditional environments (for example content creators, corporate and other enterprise users) is already driving

an increased requirement for video content security services in these non-traditional sectors.

The negative drivers of investment in content security are, if anything, of greater interest to providers such as Friend MTS; these represent areas of concern to users, and are the issues around which we need to continue to engage with our audiences, to provide greater clarity, if required, and guidance on the most efficient and cost-effective content security solution for every customer's specific content types and distribution models.

The primary issue to address is at the top of the table, thus stated in the report analysis: "The effects of complexity on technology understanding and pricing are important factors determining media businesses' deprioritization of content protection technology."

Again, it's not surprising that a perceived lack of transparency of technology, convoluted pricing structures and a potentially bewildering array of solutions from which to choose are off-putting to buyers. Simple questions such as "Which is the best DRM solution for my organisation?" or "How much should I budget for a watermarking solution?" often don't have easy answers, and although this is never for reason of deliberate complexity, or to create an aura of mystique, it's clear that these are areas that can, should and are being addressed by technology providers to help customers arrive at the solution that best fits their requirements as painlessly as possible. As an industry we're improving, but obviously work remains to be done.

The good news is that, as pointed out by respondents, there continues to be a noticeable move away from previous levels of complexity around security solutions, driven primarily by new technology and deployment models.

In the field of watermarking, for example, extremely lightweight, client-composited watermarking can now be deployed in as little as two weeks, with minimal impact on existing infrastructure.

This type of watermarking is now amongst the most widely deployed in the world, bringing the obvious commensurate business benefits, and is a direct result of the drive to provide simpler solutions and less complex deployment. Of course, there are different types of watermarking, and some may be more suitable for certain content types and distribution models; likewise with DRM, CAS management, and other content security services such as monitoring and enforcement. The key is understanding how this potentially complex environment fits together, and which components will do the right job for each individual customer's content model and distribution environments – and communicating this to them clearly and effectively. The mission-critical foundation that underpins this entire process is independent, agnostic advice based on expertise, operational environment analysis and business intelligence. In short, when looking to implement a content security environment, make sure you consult a proven expert who won't just sell you what's on their particular van.

Finally, the report touches on platforms and providers, and the role that they can play in anti-piracy efforts; this importance cannot be overstated, and the efforts that large-scale platforms such as YouTube already undertake are to be applauded. Each dedicates significant resources to anti-piracy measures, and the ability to engage and collaborate with them is vital to the monitoring and enforcement services operated by companies such as Friend MTS. As before, work remains to be done, but increased collaboration between platforms, ISPs and other service providers continues to reap rewards. As an example, a recent program of close data collaboration between a major ISP and Friend MTS led to a 90% reduction in illegal streaming of certain content on their platform, and it is this type of collaboration and business analysis that continues to be the way forward in the fight against content piracy.

The IABM and Axinom report has some obvious takeaways for content security providers, and I'd like to thank both for their work in producing it. The research defines some clear goals – most notably greater flexibility and a drive to reduce complexity – and although we know that we've some way to go, I am happy to say that we've already come a long way towards achieving them.

- The complexity of content protection tech leads to a struggle in understanding its developments
- The complexity of content protection tech leads to excessive pricing for some users
- Minor content leakages are being increasingly viewed as a promotional tool in a fragmented landscape
- The presence of niche programming in content portfolios deters content protection investment
- Content protection tech that disproportionately affects digital experience features deters investment

Why Your Cybersecurity Resilience Strategy is Not Good Enough

Even with the global cost of online crime reaching $6 trillion by 2021.

Even with 50% more cyber-attacks per week on corporate networks in 2021.

Even with the world's most influential technology leaders claiming cybercrime to be the greatest threat to every company in the world.

Davide Del Vecchio
Group Cyber Security Senior Director, Deltatre

...the fact of the matter is most broadcasters are woefully underprepared when it comes to protecting their businesses from cyber-attacks. And this is a big problem.

First, some scene-setting. What is the current status quo? Most broadcast entities approach online security in an equivalent manner – preventing the disruption of service. If an attacker gets through the door, keeping the lights, camera and action rolling is the number one priority.

In practice this has meant an expensive mixture of temporary, secondary, or tertiary systems or locations, multiple backups/routes, auto failover, automation, move to cloud-based platforms, and so on. Re-routing or restarting from a broken or compromised system/location/feed to another with the audience none the wiser might have worked in the past but may not with be enough to deter today's cyber bad actors.

Consider this. Many well-developed cyber-attacks today are not designed to break anything – at least permanently. The objective is frequently to delay, interrupt, interfere or subdue. And to do so temporarily or frequently in short periods, so that broadcaster's ability to detect and respond is limited, but the impact, on content availability, monetization or performance quality is high.

If you are an attacker your aim is to create a window that you can exploit.

This is made easier by the fact that most broadcasters simply do not have a handle on what assets they have or how these can potentially be compromised when used in the field. The rapid move to automation, particularly with systems and applications deployed in cloud-based platforms, means that gains broadcasters can make through speed and flexibility are often offset by the loss of skilled intervention ability. Cyber security defence processes are often outdated and not aligned with the fast-moving threat vectors that attackers seek to exploit in broadcast environments.

It would not take an attacker too much effort to deploy a rouge wi-fi access point or APN (access point name) near frequently used broadcast locations or locations in remote areas to potentially access location staff devices.

Multiply this across hundreds of reporters, using thousands of pieces of equipment that are used for years and never retired. It is a hacker's dream.

Why does all of this happen?

The reality is that most executive teams are focused on improving content impact and viewer consumption and – while they are keenly aware of increasing the resilience of their business against cyberattacks – the proliferation of attacks and breaches (according to the Digital Shadows Research Team there are 24.6 billion stolen credential pairs available for sale on the dark web, most of which were exposed in the past year) has led many to become 'cyber-fatigued.'

This can often result in the view that cyber-attacks are a necessary cost of doing business in the modern broadcast age, and they should just stay focused on outperforming their competitors.

This is slowly starting to change but the industry has a long way still to go.

So – what is the solution to building a modern-day cybersecurity strategy? Our recommended approach is broken down into five steps.

First, accept that the default of secondary or tertiary systems/applications/routes/feed, etc is no longer by itself fit for purpose in establishing business resilience. As the sophistication of attacks evolve, so too does the mindset of broadcasters around how to prepare for them.

Second, conduct a robust threat modelling activity. During this process, it is important to identify what kind of cyber threats are a realistic risk, how well-equipped the business is to handle them, and where gaps exist in your response plan.

Third, audit your equipment. Catalogue the technology used to run your business, what it is connected to, whether it is patched and when it needs to be retired. Banks do this incredibly well.

Fourth, introduce a level of monitoring that can differentiate between the noise and the signals. Most of the clients we work with start with just focussing on the former with a single monitoring tool. But the key to a successful cyber security response plan is being able to connect the breadcrumbs across internal platforms, the dark web, external intelligence services and SOCs to identify what may be coming around the corner.

Fifth, develop an agile response plan around a security team that sits outside of the typical organisational structure. We have seen many instances of cyber-attack where the impact has been made more severe simply by an inability to move quickly. The traditional response mechanism – build a war room, figure out what is going on, assign responsibility – just does not match the agility of a would-be hacker. Instead, broadcasters need a Tiger Team of video engineering, specialist application developers

and security professionals who are running regular training scenarios throughout the year and stand ready to respond to attacks immediately.

However this team is placed within the organisation, it should have a reporting line into the CEO/COO. This is important as it allows executive decisions to be made quickly against accurate available information. Lack of this is what former TalkTalk CEO, Dido Harding, cited as being the most significant issue in dealing with the 2015 security breach at the telecommunications company.

Success in cybersecurity requires a fundamental shift in mindset on what the modern-day threat profile looks like and investing appropriately to address what are widespread vulnerabilities in the broadcast space. Addressing these five points is a necessary first step in building business resiliency.

Protecting Media Assets – Risk and Resilience

The sudden shift to remote working within the media industry saw an incredible turnaround, with workflows being instated quickly to ensure that quality content creation could continue. Existing media tools were adapted to enable workers from around the globe to access content and contribute to production, all whilst the industry came to terms with wider logistical challenges.

Jonathan Morgan
CEO, Object Matrix

A quick rollout of infrastructure saw big changes in how the industry managed their assets; suddenly, data that would have been very difficult to access needed to be available to workers from their homes.

As time has progressed, cybersecurity issues started being noted within the industry. Hackers realised that there was an opportunity to exploit the quick changes that had happened within networks; both online media systems and communications channels were an obvious target. According to ThoughtLab, the average number of cyberattacks and data breaches increased by 15.1% in 2021 from the previous year. Ransomware has been one of the most documented cyber threats in recent years; so how can media companies reduce the risk of cyber-attacks on their media assets?

Understanding the Challenge

It's important to get to grips with how hackers attack media companies and their assets. Media assets are hugely valuable, and both gaining and restricting access to this data is extremely beneficial for hackers. The well-documented 2014 Sony hack is an example of the magnitude of damage that hackers can cause; unreleased films were leaked online, security threats were made, and emails amongst employees were shared to the press.

Ransomware centres around encrypting data to prevent access; this method became efficient in recent years, with hackers choosing to cause maximum disruption through only encrypting parts of files. This can include encryption of file system names and metadata indexes. This does not take long and can render data completely inaccessible. Spyware and viruses are also other common methods of causing upheaval within organisations and must also be considered when focusing on cybersecurity. With high-value media assets at stake, the industry is an attractive opportunity for hackers and, therefore, it is important to review networks and assess any potential access points.

Who is at Risk?

It's important to acknowledge that every media company must review how content is being stored and how it is accessed; cybersecurity attacks should be expected, and organisations must be prepared. Security should be integrated within media networks and entire infrastructures should be centred around safeguarding content. The entire network must communicate securely, regardless of workflow requirements or integrated applications, and it is important not to make assumptions regarding the levels of security being provided.

Some adopted cheaper NAS services during the quick setup of remote working systems and moved entire libraries of content to them; in these instances, it is important to check the levels of security being delivered by the provider. Legacy platforms can also be left exposed to attacks and can often be overlooked when upgrading solutions. The value of content, both new content and old archives, is huge for broadcasters. Cybercriminals are looking to exploit this through routes into media storage systems that might not be immediately obvious. So, what can organisations do to enhance security within their networks?

Steps to Creating a Secure Media Network

There are several methods which can reduce the business' susceptibility to the effects of a cyber-attack:

- Immutability is possibly the most important tool to utilise when managing content and data. It can completely protect data from being changed or deleted by ransomware, as the ransomware never has access to the O/S.
- Disaster recovery methods ensure that copies of content are saved securely, often off-premises, to prevent hackers from having sole access to data.
- Auditing is a simple and quick way of monitoring all access to content and is especially valuable when remote access is factored in. A full protected audit of actions on the cluster, can ensure that you have a visual on every read and update within the file.
- Ensuring your media library is accessed only by API is hugely important as it restricts access from common protocols and protects the route to media for only those users with the correct credentials.

Digital Content Governance (DCG) utilises a mixture of these steps and is fundamental in providing layers of security, as well as auditing, to ensure that security is integrated throughout each layer of the system. Exposing all of your content via a file-based system leaves it vulnerable and, therefore, employing a purpose-built storage system that adheres to high standards of DCG can mitigate the damage caused in the event of a hack.

Integrating Security at Every Level

With hackers approaching cyberattacks with increasingly sophisticated and intelligent tools, media organisations who leave security as an 'add-on' are at risk of losing control of their assets. The inherent value of media is a highly coveted prize, and the reward has been clear for those hackers who have attacked major players within the industry.

Global working has opened-up the way we access content remotely and systems must have an integrated, multi-layer approach to security to circumvent the loss of data in the event of an attack. A single layer of security is not enough; criminals are experts in finding routes around seemingly robust methods. Building a system from scratch which utilises good DCG practices from its foundations, including its interactions with interoperable apps, will provide the best level of protection possible.

Every media business should anticipate a cyber hack and, with the correct tools, feel confident that they have enough mitigation techniques in place to stay in control of their assets. To future-proof the media industry for long-term remote and hybrid working, we need to manage risk effectively by building resilience from the ground up.

Mitigating the effects of ransomware on television post-production

Unlike a car crash, a ransomware attack is most likely uninsurable. So, the effects on a major media enterprise, production company or post facility can be totally devastating. Here's why we should all be concerned, however big or small an organisation.

We have seen very successful attacks on major broadcasters in the Americas, Asia, and EMEA – high profile events, which on occasions have caused irrecoverable loss or significant outage.

Paul Glasgow
Managing Director,
Marquis

These major organisations are well resourced and have large IT departments, with smart people and yet they have still succumbed to a ransomware attack. The only reason we knew these enterprise attacks were successful was because the effects were public facing through impaired service.

However, the prevalence of successful ransomware attacks in SMEs is as high – and probably higher – than the big enterprises. The SMEs don't get or indeed want any publicity but the impact is just as painful.

The biggest mistakes are assuming a pre-existing business continuity strategy will protect against ransomware, plus the assumption is that data tape libraries are safe. This is also compounded by the widespread use of virtualised and often remote infrastructure. A business continuity (BC) strategy usually has some form of mirroring and or replication of business-critical components and often the concept of an automatic live fail-over in the event of fire or flood, etc. Ransomware, by virtue of its design, does not result in a single point failure. It will destroy the redundant

system just as quickly as the primary system as they are usually network-connected. So, a conventional business continuity strategy is not a fit form of mitigation. Let us consider some examples of successful attacks:

- A major US media enterprise succumbed to a ransomware attack which encrypted databases. In normal operation, their BC strategy required primary databases to be sync'd to back up databases. Unfortunately, one of the first databases to be encrypted and irrecoverably lost was the single sign on (SSO) database and its backup. So, no system admins could login to access any systems as the ransomware propagated through the infrastructure thus wreaking havoc.

- A major Americas media enterprise succumbed to an attack which was encrypting storage. Unfortunately, it penetrated the production networks and encrypted several Avid Nexis systems and their back-ups, totalling 1.5PB of data. The loss was total and unrecoverable.

- A major European broadcaster

suffered a ransomware attack, again encrypting databases. The on-air service was severely compromised. However, the data tape-based archive irrecoverably lost the primary and backup databases. All references to tape IDs, slots, indexes, etc., were lost. The totally inaccessible library held around 2PB of data.

- A specialist documentary production company suffered a ransomware attack in the final pre-delivery days of post-production. Fortunately, the ransomware attack was only partially successful and they were able to deliver the production according to the contract. However, the owners of the business found that their insurance policy only covered reinstatement of affected equipment. Consequential loss was excluded in the case of a successful ransomware attack.

- A North American VFX company had their facility irrecoverably encrypted. They paid an undisclosed sum to the extortionists, thought to have been in the $M range.

Conventional disaster recovery systems may not work

Organisations usually have some form of protection using firewalls, anti-virus, anti-spam and ever-more sophisticated AI-based services to protect IT infrastructure. However, it's the human factors which probably represent the biggest risk. Ranging from good old-fashioned incompetence and wilful ignorance, through random and malicious targeted attacks.

Malicious attacks could be via current or former disaffected staff; the lone wolf approach. In this case there may be behavioural methods of detection. Also concerning is malign recruitment, whereby the extortionists actively target and recruit system admins via platforms like LinkedIn, with the reward being a percentage of the extortion. And just when you thought it couldn't get worse: allegedly on the dark web, malign employees advertise access to otherwise secure corporate networks to insert ransomware for a fee.

So, from the above, we can conclude that the modes of ransomware attack are increasingly diverse. We naturally underestimate the number of on-going attacks as often they are hidden from public view. Of course, there's a lot of stigma regarding payment of ransoms. To compound the situation, there is also a real risk that the decryption key may also not work.

Identifying the highest risk assets

At this point, it's worthwhile considering which are the highest risk assets in the media production chain. Strangely enough, it's not the finished masters, since these will be replicated in multiple libraries, but actually the unconformed project with all its media – in the worst case the day before the master is created.

A single project could represent months or years of work. If it is indeed encrypted the day before delivery, it could be an irrecoverable loss to the business, as well as an uninsurable contractual default. So, time to pay up, get your bitcoins ready!

In some regards we can't assume anything within a facility is safe from attack. However, if there is one thing we should protect, it's the work in progress – we can't assume traditional business continuity policies, such as mirroring or tape back-ups, will help.

Mitigating total loss

So, let's assume a worse case attack and everything within a facility is encrypted – a total loss. How can we avoid paying a $1m ransom? Marquis offers a different approach, which provides ransomware mitigation and the ability to easily recover business-critical work-in-progress.

In this example, we'll consider the total loss of an Avid NEXIS system and its mirror, through encryption. Unfortunately, a conventional backup of a NEXIS system will back up data in its native unintelligible form, making it impossible to quickly recover a business-critical project. Here, the facility has been encrypted, however the S3 back-up is fully recoverable because of the way it has been created by Marquis.

The Marquis approach features:

- Detailed analytics of the NEXIS workspaces
- Visualisation and management of the workspaces to ensure duplicates and orphans don't get backed up
- Will not add encrypted media files into the backup

- Automatic backup of projects with version control to allow direct recovery at a project or bin level
- Independent recovery tools
- Blind project recovery from the back-up
- An extensive storage connection library including on prem and cloud storage
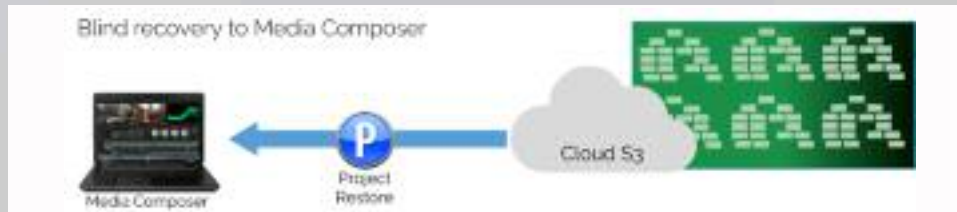
Recovery

In the above example of a total facility loss, Marquis tools can be used to recover a business-critical project remotely and securely (from cloud backup, for example) to another facility or even a single Media Composer. A video of this ransomware recovery process working with Wasabi cloud storage is here.

A blind recovery to a free-standing Media Composer, so no reference to the original facility, is the ultimate 'acid test' recovery and unique to Marquis. Using this unique approach, recovery can be achieved in minutes (not days, weeks or months using conventional tools).

Conclusions

There are many vectors of ransomware attack; unfortunately human factors are extremely difficult to mitigate. Don't assume a conventional disaster recovery or business continuity plan will work. Plan for the worst case attack, e.g., ransomware inserted into the production network. How will the business continue? How will you meet contractual commitments? Are you prepared to pay a ransom?

Marquis Workspace Tools provides effective mitigation against conventional disasters and ransomware. This software is used by some of the largest media enterprises using Avid NEXIS to provide effective recovery from a ransomware attack.

For further information, please visit marquisbroadcast.com/workspacetools.

Business Resilience

The Path to Business Resilience and The Cloud. From Sonic Boom & Crispy Chips to Kubernetes & Culture Change.

John O'Loan is CEO at iOMedia Group LNS. After launching Sky News, he assisted in the launch and operations of more than 40 other news, sport and documentary channels around the world. He holds an Executive Masters Degree in Culture Change at HEC Paris and The University of Oxford. In this article, he discusses how companies can best protect themselves from cyber threats.

John O'Loan
CEO, iOMedia Group LNS

On September 25, 2021 an incident at a broadcast service centre run by Red Bee Media in West London caused significant disruption to several broadcasters' operations. Just before 6.30pm a fire alarm system was triggered. It was designed to quickly reduce the oxygen level in a technical area through the rapid release of nitrogen gas stored under high pressure. No human would survive, but the technical infrastructure should have remained intact and undamaged. Unfortunately, on this occasion, the gas was released with such speed and force that it created a sonic boom, damaging many computer server components beyond repair.

What was designed in the mainframe age to create efficient and timely resiliency had instead created massive failure.

Of the Reb Bee clients at that facility, Channel 4 was the worst affected. It was not fully resolved until mid-November. In the subsequent investigation by the regulator Ofcom, which took another 7 months to compile and release, Channel 4 said its own disaster recovery facility had not been ready to provide subtitling and audio description services.

The regulator further found that Channel 4 had breached another of its licence requirements, by failing to effectively communicate with affected audiences after the incident. Ofcom has now called on broadcasters to improve their disaster recovery plans, warning that it will be reviewing its 'TV Technical Codes' later this year.

No Fried Chips

At 8.30am on April 4, 2022 staff at ITN production headquarters in London received an email telling them there'd been "significant power outage" at their building on Gray's Inn Road and 'some things' wouldn't be accessible at their desks, or on their laptops at home.

45 minutes later the regularly scheduled morning live talk show produced in that building was replaced by taped programmes, and when the power problem had still not been fixed, lunch time and then evening news programmes had to be relocated. In the case of Channel 4 News, that was 200 miles away to the North of England.

The primary generator for that part of London had failed, as had the backup generator.

The bigger problem for ITN, as it had been in the past when news programmes had to decamp from Grays Inn Road to be produced across town at their Westminster bureau, was not so much the power, but their air conditioning. Without adequate power, they couldn't run enough of the air conditioning and without cool air, the computer chips would fry, and their mother boards would melt in the rack rooms in the basement. The racks would then become useless, and as with the Red Bee situation in West London 6 months earlier, it would have taken weeks if not months to clear out the old equipment and get in the new.

The lessons from both incidents, at Red Bee and ITN are clear – and quite simply point towards The Cloud. Never again would we build the same power hungry, demanding, manpower intensive systems using up premium floor space, designed for an earlier era.

Resilience and Security
On October 17, 2021 TV broadcasts for Sinclair-owned channels went down across the United States. Originally described as "technical issues" multiple sources later confirmed it was a ransomware attack. The Sinclair Broadcast Group is one of the largest media groups in the US, controlling 294 television stations in 89 markets.

The incident occurred in the early hours, taking down the Sinclair internal corporate network, email servers, phone services, and the broadcasting systems of their local TV stations. The incident came just after Sinclair performed a company-wide password reset for IT shared by its stations, following what was described as a "potentially serious network security issue."

As a result of the attack, many local channels weren't able to broadcast lucrative morning shows, news segments, and scheduled NFL games. However, the attack did not reach the part of the Sinclair group broadcast system master control, which allowed the company to replace the scheduled local programming on the affected channels, with a national feed. This allowed at least some channels to remain on the air, but loosing potentially millions of local advertising dollars, which is Sinclair's life blood.

Over the past 3 and a half years, several other TV operators have been hit by cyber-attacks, including France's M6 in October 2019; The Weather Channel in April 2019; the Cox Media Group also in the States, just prior to Scripps, in June 2021; Portugal's SIC in January 2021; Iran's IRIB in February 2021. There are likely to be others who have not reported being held for ransom.

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Resilience and Sustainability

Such examples given here are likely to increase. It's a growing problem, upon which billions of dollars are balanced. It's also clear that demand for video is also increasing.

Clearly cyber-attacks are a big issue for media organisations for resilience and sustainability, but so is aging, rack based technology, requiring expensive floor space, machine age manpower levels and massive amounts of electric power.

International research organisation Statista estimates that we're heading for 500 Billion hours of video to be live streamed globally over the next 12 to 18 months. The Carbon Trust's calculates the emissions caused by the current level of global production and B2C streaming will result in the loss of an area of sea ice the size of Scotland – annually.

We won't reduce demand driven consumption, so the only way to provide the content, security and the power needed, within increasing requirements to reduce the energy used, is to change our technology, which firstly requires a change of culture.

Culture Change and Security

Before any kind of systemic change needed in these industries can take place, to adopt new levels of security, sustainability and reliability, there needs to be general acceptance that change is in fact necessary. Without that acceptance, change will fizzle out.

The examples above have certainly proved the need for change, and the Covid pandemic provided the confidence to adopt that change. It proved the value of using cloud technology for production and distribution/transmission.
Subsequent developments in system cyber security, such as the proper deployment of Kubernetes has proved the cloud's ability to resist outside interference.

Limiting the lateral spread of any attack is arguably the best shield against ransomware attacks. This practice, known as zero trust, limits admins or users' access privilege to a range of APIs while restricting access to more sensitive and mission-critical data stores that might include direct object storage components.

One such access limiting system is Kubernetes. Also known at K8, it provides several concepts and mechanisms that can help secure clusters, in the cloud.

To The Cloud – and Beyond

At the iOMedia Group Limited we can see the culture change required – and the safe technology to allow it to happen.

Our cloud native live news and sports system – LNS Cloud 9 – is an entirely cloud enclosed workflow system, from planning and post ingest to editing, production, sequencing, graphics control and multi-platform playout, all working within cloud native technologies which are engineered specifically for the cloud – not just retro-fitted from an outdated idea.

Cloud enclosed solutions require less bandwidth; run off any web browser; consume much less power; resulting in more sustainable workflows. Saving on emissions will save business costs, as found in an independent study of cloud native video editing, which can alone reduce total cost of ownership by 35%, on top of the gains in staff efficiency and multi-platform distribution.

For us, all of these advantages are important. But the reason we did it was to produce a system that made story telling more efficient and communication easier to build and understand; to make story telling more reliable and resilient – along with the technology.

At iOMedia Group it's all about the story.

How Resilient is Redundancy?

Christian Struck
*Senior Product Manager
Audio Production,
Lawo*

Redundancy has always been a major topic for broadcast operations to ensure that the show goes on despite a defective power supply or other failure. While all eggs were in one basket – i.e. in one place and close to one another – this approach was certainly helpful. Calling such a setup resilient would nevertheless be a stretch.

Axel Kern
*Senior Director
Cloud and Infrastructure
Solutions, Lawo*

Conventional solutions launched before open-standards-based IP came along may be redundant up to a point, but that doesn't make the operation as a whole resilient. Most are able to exchange control, audio and/or video data over an on-prem network, but connectivity to a wide-area network (WAN) spanning several cities or continents is not on the cards for them.

Widen the Area

While a WAN-based infrastructure has enabled operators to leverage processing resources in off-premise data centers – of which there may be two, for redundancy, as in Eurosport's and many other cases – and while accessing these resources from just about anywhere are indisputable assets of an IP setup, a lot more is required to make an operation resilient.

Separating the mixing console from the processing unit and the I/O stageboxes was an important step. Building WAN-communication into all of these devices through ST2110 and RAVENNA/AES67 compliance led to pinpointed expectations regarding resilience, as a recently conducted trial confirms. The aim was to show the prospective client that immersive audio mixing remains possible even if one of the two processing cores is down. It involved one A – UHD Core in a sporting arena in Hamburg, and a second near Frankfurt, at the production facility.

The team successfully demonstrated that if the preferred core in Hamburg, controlled from an mc² console near Frankfurt for the live broadcast mix, becomes unavailable, the core closer to the console immediately takes over. The physical location of the second core is irrelevant, by the way, as long as it is connected to the same network. WAN-based redundancy is an important element of a solid resilience strategy, even though the unavailability of a processing core is only the seventh likeliest incident in a series of plausible failures from which operators can recover automatically, according to Lawo's customer service. This degree of redundancy involves so-called "air gapped units", i.e. hardware in two separate locations, to ensure continuity if the "red" data center is flooded or subject to a fire: the redundant, "blue" data center automatically takes over.

Strictly speaking, the five likeliest glitches – control connection loss, routing failure, media connection failure, control system failure, and power supply failure – require no hardware redundancy when the audio infrastructure is built around an A – UHD Core. That said, having a spare unit online somewhere is always a good idea. It is also required as fail-over for incident number six, DSP/FPGA failure.

Explode to Reinforce

A second important aspect is to decentralize what used to be in one box. Even some IP-savvy solutions are still supplied as a single unit that handles both control and processing. For maximum resilience, one device should do processing, while a COTS server or dockerized container transmits the control commands it receives from a mixing console to the processing core, and a switch fabric does the routing. Separating control, processing and routing, and making all three redundant minimizes the risk of downtimes. Plus, except for at least one switch close to each required component, all devices or CPU services can be in different geographic locations.

It doesn't stop there. A redundant IP network with red and blue lines is built around a switch fabric. Without going into too much detail, certain management protocols (PIM and IGMP) may cause issues that could seriously affect broadcast workflows or even make them impossible. The first is related to situations where the red and blue lines are routed to the same spine switch. An issue with that switch means that this part of the network not only ceases to be redundant but may also stop working altogether: it is a single point of failure. The second issue is related to how switches distribute multicast streams over the available number of ports when they are not bandwidth-aware. In a non-SDN network, this may lead to situations where one port is oversubscribed, i.e. asked to transmit more gigabits per second than it can muster, which causes errors at the receiving end.

These and other topics are being addressed by companies like Arista and Lawo via a Multi Control Service routine and direct influence of the VSM studio manager software on traffic shaping. The goal is to avoid

failures, oversubscription of network ports, and to allow operators of large installations to immediately confirm the status of their switching and routing operations.

Combining the above with the HOME management platform for IP infrastructures adds yet another building block. HOME not only assists operators with automatic discovery and registration, but also with controlling processing cores by hosting the MCX control software for mc² consoles either on networked COTS servers or directly in a virtualized environment – and to dynamically switch from one processing core to the other, one console surface to the next, or one MCX control instance to another if the need arises.

Stay in Control

Resilience necessarily includes control. VSM achieves seamless control redundancy with two pairs of COTS servers stationed in two different locations and automatic fail-over routines. Hardware control panels are not forgotten: if one stops working, connecting a spare, or firing up a software panel, and assigning it the

same ID – which takes less than a minute – restores interactive control. (The control processes as such are not affected by control hardware failures, by the way.)

As installs migrate towards a private cloud/data center infrastructure, provisioning two (or in HOME's case, three) geographically distanced COTS servers with permanent status updates between the main and redundant units allows users to remain in control. If the underlying software architecture is cloud-ready, those who wish can ultimately move from hardware servers to service-based infrastructures in the cloud. Technologies like Kubernetes and AWS Load Balancer can then be solicited to provide elastic compute capacity that instantly grows and shrinks in line with changing workflow requirements. A welcome side effect is that no new hardware servers need to be purchased to achieve this kind of instant, high-level resilience.

After experiencing the benefits of resilient, elastic control, some operators may wonder whether a similar strategy is also possible for audio and video processing. The short answer is: "If you like." Quite a few operators are wary of the "intangible cloud" and may be relieved to learn that the ability to architect private data centers in a redundant configuration already allows them to achieve a high degree of resilience.

One Leap Closer

A genuinely resilient broadcast or AV network is a self-healing architecture that always finds a way to get essences from A to B in a secure way. Users may not know – or care – where those locations are, but the tools they use to control them do. And they quickly find alternatives to keep the infrastructure humming. The only remaining snag was to provide operators with an almost failsafe infrastructure. A lot has been achieved to make broadcast and AV infrastructures resilient by design while keeping them intuitive to operate.

Flexibly Distributed/Decentralized Setups Based on A__UHD Core

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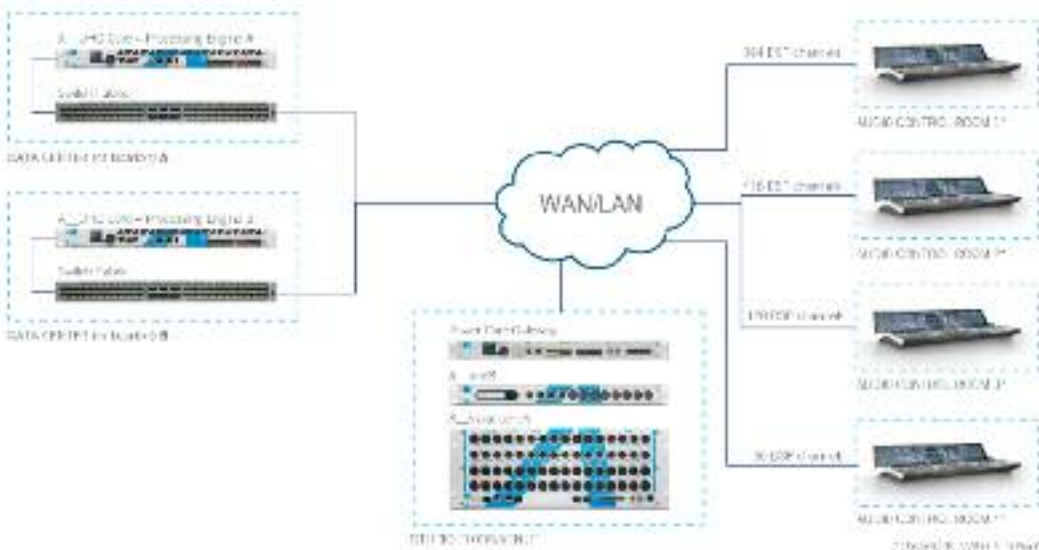
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ViaLite Communications: Securing broadcast synchronization against malicious attack

Synchronization is a fundamental requirement in all content generation and broadcast; used extensively both in SDI / HDI formats and in IP packet based systems. Synchronization signals are typically generated from equipment including sync pulse generators, master sync references, and for the IP format, Precision Timing Protocol (PTP) grandmaster clock generators.

Most sync generators encapsulate a very accurate internal clock which is synchronised to an external reference, which for the vast majority of manufacturers is a GPS & GNSS satellite timing signal. Consequently sync generators are connected to an outside GNSS antenna via coaxial cable or fibre optic cable, like those supplied by ViaLite Communications.

Sadly however there are individuals around the world (including bad actors and cyber threat actors) that want to disrupt the GNSS users, including those in the Broadcast industry, for a wide range of malicious purposes. Security is not just in the domain of IP based internet traffic, preventative and protective measures also need to be taken in the non-IP world including radio, timing and synchronization type signals.

Most timing and sync generators will operate in a "locked" mode to the GNSS signal; when the GNSS signal is lost the generator will move into a "holdover" mode, where the internal clock will maintain an accurate sync for a set period of time. The accuracy of the holdover clock and the time for which it maintains this accuracy is dependent on the technology and quality of the oscillator. For example, a rubidium oscillator will have much greater accuracy and far less drift than a crystal based oscillator. At some point, however, the holdover period will end and the timing sync signal will no longer be in specification or aligned with other timing signals in a larger system.

In most countries around the world, producing and using a device which interferes with the radio spectrum and disrupts communication services in GNSS or indeed other services like satcom, cellular, broadcast television and radio is illegal. Authorities like the FCC in the USA and Ofcom in the United Kingdom, have capabilities to detect GNSS jamming events, locate the perpetrators and potentially prosecute them.

What are GPS Jammers?

GPS jammers are freely available on internet auction sites and typically quite simple devices from an electronics design perspective. Many of them are built from the humble 'NE555 timer IC' which is used to drive a Voltage Controller Oscillator (VCO) and antenna. This in turn creates a broadband radio interference. Other crude jammers are produced by filtering the harmonic of a fast rising clock edge oscillator coincident with the GNSS signal band, which is typically around 1.575 GHz for GPS L1 band. This type of interferer is more continuous wave-type and creates a single strong in-band interferer.

Figure 1. NE555 timer IC; a really good device sadly used for a bad purpose!

Accurate Timing for Broadcast

Since 1994 ViaLite Communications has been helping many broadcast customers design and install GNSS signal routing solutions across fibre optic-based systems. These systems start at the antenna which is located outside. The RF signal from the antenna is connected to a ViaLite RF over fibre (RFoF) transmitter which is an electrical to optical converter. From the transmitter a fibre is then extended into the facility and distributed as required to a single or multiple end-point. At each end-point a ViaLite RF over fibre receiver then converts the optical signal back into electrical RF, and is then connected to a device such as a PTP Time Server or Sync Pulse Generator (SPG).

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Figure 2. A typical GNSS based sync & timing layout using RFoF

The advantages of using RFoF for GNSS signal extension and distribution include: very low loss connectivity, electrical isolation, optical splitting capability, and (very important for cyber security) RFoF by design is a unidirectional technology. Furthermore, the GNSS signal is not converted into any other modulation or digital data stream and so very difficult to tamper with or damage the signal integrity.

How to protect Broadcast sync systems from GPS Jamming?

When a "jamming event" occurs, the broadcaster needs to try and prevent the harmful signal impacting their timing based service and ideally, they also need to know it's happening so they can take action or inform the authorities. Avoiding harmful signals can be done in a variety of ways from specially designed RF antennas through to very sophisticated signal processor based firewalls.

ViaLite has teamed up with the GPS and timing experts at Focus Telecom Ltd to distribute and integrate their family of GPS Resilient and OtoSphere™ jamming protection products into ViaLite's offering. Contained within the Focus Telecom products is a unique and patent protected interference filtering algorithm which combines the patterns from two omni-directional antennas. It can analyze the direction of the interferer and nullify it from the wanted signal. In addition, Focus Telecom can provide a cloud-based service for providing data and analytics around jamming attacks, when used in conjunction with the company's GPS Sensor device.

ViaLite and Focus Telecom Integrated GPS Jamming Protection Solutions

The Focus Telecom GPS Resilient Kit and OtoSphere products can be integrated with all of the ViaLiteHD GPS RFoF product range. In a system, the GPS Resilient and GPS OtoSphere products are placed between the antenna and RFoF transmitter. They are powered from the ViaLiteHD transmitter through a DC feed on the RF antenna port, so there is no need for additional power supplies and the Focus Telecom solutions have DC pass-through to the antenna. If customers want additional RF signal gain, the OtoSphere can be used in combination with an additional external in-line amplifier.
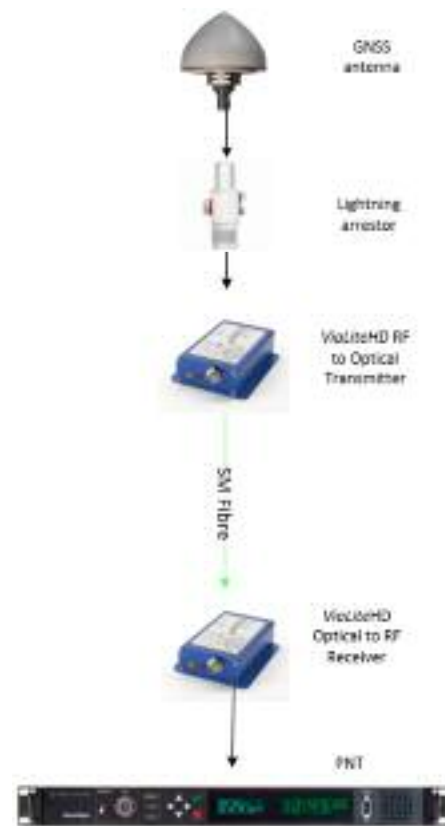

Figure 3. Integrated ViaLite and Focus Telecom jamming protection solution

These integrated solutions have already been deployed to users and are now providing them with additional protection from unwanted jamming events. Contact ViaLite for more information at sales@vialite.com or visit www.vialite.com.

The data domino effect

When designing a storage system for a production or post facility, it is easy to concentrate on capacity and throughput, and think that is all you need. However, a very real issue is data safety and how to guard against it. That is a particular problem in our industry of media production. Once you start considering the issues around data loss, the potential problems start to escalate: a real domino effect.

Duncan Beattie
GB Labs

Media production companies are faced with significant challenges: perhaps an order of magnitude larger than other industries. First, we tend to deal with large files, and therefore very large storage requirements. If you are shooting with today's digital cinematography cameras you are generating many terabytes a day of raw content. If you are a busy post house with a number of edit suites, grading rooms and audio dubbing theatres, then you will have multiple simultaneous projects on the go. This will create a significant number of files with some being very large.

In parallel, and compounding the challenge, there are significant time pressures. Often you only get paid for a production once it is delivered. There are few things more disastrous in the production industry than failing to deliver a project on time: at best there is the risk of significant reputational damage, and there may well be a financial penalty too.

So we start out with data which has already had a significant investment. The costs of a shoot including cameras, crew, actors, locations and more. That data has to be secured to the highest standards: the loss of data requiring the recreation of an event is almost unthinkable. The cost of restaging a shoot will spiral: actors and key crew may be unavailable, and it may even be impossible to do it again. (Think live sport).

The next domino to drop is that while you are working out how to recover the lost data, you are not making any progress on current projects. Editors and others are standing idle and the delivery deadline looms.

In truth, few would think of any production set-up – even one based on a single edit workstation and its internal disk drives – that did not back up the data on ingest. But backing up takes a finite time, especially when dealing with large files, which means that there are inherent delays in the system.

Larger facilities will have central storage systems, serving multiple creative rooms. Here is another domino: a single storage system supporting multiple projects means that any data failure has the potential to delay many clients. And that enterprise-level data failure means there will be many editors, colourists and others standing idle, costing money and earning no revenue. Completed work will have to be remade, taking time and costing money.

RAID

Using a RAID-protected server gives some insurance against drive failures, although the performance of the server will be impacted while the RAID is rebuilt once the dead drive is replaced. But the whole server also needs to be regarded as a potential single point of failure, with consequent data loss or at least loss of productivity.

Again, you do not need me to tell you that you should be backing up your server. But now we are working in tens or hundreds of terabytes, so backing up is no trivial matter. And even if a good incremental backup system is implemented so there is relatively little overhead as backups are created, there will certainly be a long delay while the repaired server is rebuilt.

Some will choose to back up to LTO tape, which is simple and efficient, but very slow to rebuild: maybe a week to restore all the data. Tape archives should be stored off-site, so there is a physical time to locate and retrieve the tapes before restoration can start.

Others will prefer to back up to the cloud, but downloading many terabytes of data taxes even the fastest internet connections, not to mention the significant egress

charges raised by the cloud provider. In either case, again you are facing expensive downtime.

You also need to consider how long it takes to write the data to the backup storage in the first place. In a production or a post house dealing in many terabytes of new data a day, the time to ingest the original material and to write the backups begins to represent a very significant overhead.

You may decide to run backups overnight when there is little other traffic on the server, but that risks losing a full day's work on multiple projects. And when the facility gets busy there may be a temptation to stop backups to keep everyone working, which means you are back in the completely unsafe zone again, and running into a spiral of inaction from which you may never recover.

Nearline
An option which will reduce risk significantly is to have a second online storage pool that backs up the live work server. Sometimes this is called a nearline server, as it is designed to support as closely as possible the online server.

The advantage of a nearline storage pool duplicating all the data on the primary server is that should any sort of failure occur, there is a complete copy of all media available on the same network with no need to download or restore from tape. You can also arrange another layer of security – to the cloud or to tape – from this second server, without impacting the performance of the primary source.

At GB Labs we specialise in high performance, high security storage systems, particularly for media applications. Our very strong recommendation would be that the minimum you should consider is a second storage pool within the

production environment. Ideally you should be able to work directly from it if necessary. This means a structure very similar to the primary server, but the benefit is in the secure knowledge of minimal downtime and delays in production deliverables.

Further, there should be the third level of security, either disk to disk to tape or disk to disk to cloud. With well-designed archive software, you will be able to incrementally add to the cloud or tape backup at any time over the 24-hour period, ensuring this third level of storage remains as close to synchronisation as possible.

A subtle point in the system design is that you might choose the second storage pool as your point of ingest, with automation pushing it to the live server. This gives production teams the security of knowing that if they can see it, there is already at least one backup.

Copy protection
You can also consider immediate copy protection within the primary storage. This is often achieved through clustered storage systems.

A cluster is a collection of servers with a management layer to spread the data across the pool. Should one node within the cluster fail, the way the data is copy protected means that there is no immediate loss of content and work can continue. Although as an entity a cluster is resilient, an entire cluster can fail, resulting in the same data loss as if you had just a single server.

The alternative is a failover server, a completely identical server maintained with precisely the same data at the same time. Should the primary fail for any reason, all the clients can be switched to the secondary storage without any interruption to service. This has the benefit of zero downtime and zero data loss due to primary failure. The two servers can be in different locations, although for optimum performance they have to be on the same network.

Adding it all together, we have an online or primary server delivering content across very high-performance networks to your team of creative artists. There is an exact copy of the primary server on a duplicate, with an automatic failover switch should there be a problem with the primary.

The secondary server also handles all ingest, ensuring that all data is backed up at least to another server before it is released for use. It is also responsible for off-site backups, to the cloud or to tape, scheduled to meet the practical data demands of the operation.

The storage management layer will also provide a dashboard of system health and escalating notifications should any problems arise.

GB Labs has developed the range of tools needed to implement the storage capacity, performance and resilience of your business needs, helping you to deliver on time every time, safe from the domino effect of data loss.

Relying on the cloud for revenue

As an industry, we talk a lot about 'business continuity' or 'disaster recovery.' But what we actually mean is 'revenue protection.'

If you are a broadcaster and cannot transmit the commercials you're contracted to transmit, you cannot invoice for them, and you've lost money. For a mid-market station, you might expect to bill around $10,000 dollars for a single commercial break in general programming. Going off air for a break during a live weekend football game might cost $400k or more in lost advertising revenue. This is likely to be a seven-figure sum for a 30-second spot in a major sport event. Can you afford to risk that loss of income?

Ignacio Revuelto Rosello
Product Marketing Manager, Imagine Communications

Outages also affect brand value. You work to ensure a premium viewing experience for your viewers, because going off-air negatively impacts your brand. This has the potential to impact your ratings and market share, as audiences switch to more reliable competitor channels.

Threats to revenue can come from anywhere, and we're tracking more every day. Natural disasters, human error and now pandemics are all legitimate threats to the bottom line. A new and growing risk now comes in the form of cybercrime. According to Cybersecurity Ventures, global cybercrime costs are set to reach $10.5 trillion a year by 2025.

Cybercrooks attack any size business, large or small. Researcher Sophos says that the average ransomware attack costs the victim $1.85 million. And even if you pay the ransom, typically you see only two-thirds of your data restored.

Can your business sustain a seven-figure loss through cybercrime? Very

few could. So, along with all the other threats to your business driving us towards increasingly decentralized, remote working architectures, protection against cybercrime must be at the top of the list. It is vital to build the tightest security into everything you do, and the cloud can play a pivotal and practical role in doing just this.

Availability in the cloud

Broadcast engineers have been brought up with on-premises, hardware solutions. They know from experience and knowledge how to deploy and architect this hardware to achieve the reliability and touchpoint-level control they want. More so, because these legacy systems are isolated both physically and connectedly, content and control security is easy to impose.

It is important to understand, first and foremost, that business continuity in the cloud provides the scrutinizing levels of security you demand. With the right supplier, the cloud delivers the necessary reliability, resilience and security to

meet your revenue protection needs. Let's talk about playout. For premium channels at least, broadcasters expect very high availability. A channel that is off air is not making money. Engineers have always seen 'five nines' – 99.999% up time – as a minimum requirement. That sounds like very high availability, but arithmetic tells us that 0.001% equates to about 5 ¼ minutes of dead air a year – potentially an entire lost break and more.

A cloud provider's entire business model is to deliver computing services for its clients the instant it's needed. In broadcast terms this means unimagined availability – maybe nine nines, or a fraction of a second of downtime a year, assuming, of course, that you have designed a robust solution. And this high availability also comes with value-add features. Routine maintenance, upgrades and replacements are someone else's job! Someone entirely focused on those tasks.

Business Resilience

A broadcaster never needs to check the SMART status of disk drives in servers, or clean the air conditioning, or manage load transfers to allow for software upgrades. The cloud provider will also handle business continuity with geographically diverse server farms, each with multiple power feeds.

Just as broadcasters can leverage the cloud's effectively infinite scalability to spin up pop-up channels for special events, it can also be used to spin up a disaster recovery channel. The channel remains cost-effectively dormant – not consuming resources – waiting to be initialized should a crisis arise.

The cloud is also an ideal environment for remote working. Indeed, every connection is a remote connection, even if it is in your machine room, because the storage and processing are somewhere else. Given a reasonable internet connection, your master control operator could be anywhere in the world and still have exactly the same capabilities, response and user experience as if they were on site. A channel controller can monitor and manage playout from home as easily as from the network operations center (NOC).

Despite the common misconception, this also applies to live channels. All the playout requirements – including the unpredictable interventions associated with fitting commercial breaks into live sports programming – can be hosted in the cloud, with operators sitting wherever it's convenient and safe.

Outsourcing security

Just as it is the cloud provider's business to ensure very high availability without intervention from the client, so too is security. With cyberattacks now an all too familiar headline, no broadcaster wants to risk the output due to incursions and ransom demands leading to loss of revenue and brand reputation, as well as the direct and indirect costs of mitigating the attack and the potential loss of critical assets.

This is all part of the broadening of scope in broadcast business continuity and revenue protection. We used to think a disaster recovery system was there in case of fire or flood. Now we have to add to the list pandemics keeping staff at home and cyberattacks robbing you of control of your own assets.

Building your own data security team means recruiting and managing a whole new category of workforce. That is a business and financial overhead you do not need.

But this is part of the core offering of a cloud provider: no business, in any sector, should trust their data and processing if they can't be sure it's completely secure. Big cloud providers have a win-win: they can afford to put together the best possible team, and software security experts will want to work for a big cloud provider because that is where the challenges are.

Moving to the cloud requires investment and careful decision-making on the part of the broadcaster. Relying on the right technology partners will help. But get your architecture right and the cloud will deliver processing power and storage that always flexes to your demands, gives you unimagined reliability, and provides data security that's even good enough for the U.S. Secret Service. As we move to decentralized platforms and remote access, the cloud can comfortably provide the level of service the media industry expects.

Defense by Design:
How Caching Enables Resilience

Business resilience depends on reliable cybersecurity, but relying only on traditional security tools can leave aspects of your business vulnerable. *Resilience* for digital business starts with high availability and scalability – guaranteeing performance and uptime for websites and apps, no matter what levels of traffic are thrown at them. This can be achieved with caching technologies.
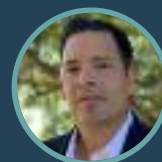
Adrian Herrera
*Chief Marketing Officer,
Varnish Software*

Securing your platform for high-performance content delivery with secure-by-design principles is one layer of a complete resilience strategy. An additional layer, of course, is your specific approach to cybersecurity and data privacy.

Technology drives business resilience and continuity

Digital performance is tied directly to business resilience, even if the connection is not immediately obvious. While there are many types of disruption that can interfere with business continuity – pandemics,

unpredictable supply chains, and so on – there are aspects you can control. Technology and operational resilience, according to consulting firm PwC, for example, drive stable core business functions in the face of uncertainty.

During COVID, as an example, the

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transformation has helped to reduce the complexity of infrastructure. Yet, even the most modern solutions and security tools do not keep every threat at bay.

Multiple security layers and cache-related mitigation techniques ensure that you have more control over traffic management and caching policy in addition to your more comprehensive security measures.

Standard resilience solutions: First line of defense

A standard cybersecurity strategy is your actual first line of defense, but cache-based solutions should play a key role as part in securing digital business stability. What kinds of solutions are these?

Front and backend TLS transport: Secure traffic

TLS is the standard for private, safe traffic transport and enables two key advantages:

- TLS ensures that you can trust that the server you're reaching is authentic
- TLS connections are private, so that your details, such as a credit card number, cannot be stolen if a bad actor attempts to intercept traffic between you and the server you're communicating with.

Another extension of TLS is mTLS, which simply means "mutual TLS". mTLS authentication ensures that traffic moving in both directions (client and server) is secure and trusted, which is more secure than regular TLS (which only requires the server to prove its identity, but it will accept connections from anyone). With mTLS, only trusted clients can even connect to the server, which is necessary for zero-trust security models, which are becoming increasingly common.

Web application firewall (WAF): Put out the fire before it starts

Most websites employ WAF technology to ensure that incoming requests are genuine and not malicious, working with up-to-date security rules to detect and stop bad traffic from ever hitting the origin server.

Total cache encryption: Render stolen data useless

Data breaches have become more common and difficult, and data privacy laws and regulations (such as GDPR and CCPA) are coming under stricter enforcement. Encrypting cached data is a clever way to keep attackers from being able to use or read stolen or leaked data. Total cache encryption enables secure business resilience in terms of both regulatory compliance and in being able to avoid steep financial penalties associated with non-compliance when data leaks and breaches do occur.

DDoS and cache poisoning: Limit the damage

Hackers and bad actors have a lot to work with if you're not defending your operations. In particularly challenging or unstable times organizations have seen their sites and apps flooded by traffic – some of it legitimate, but just as often, floods come in the form of DDoS attacks and botnets. It's during these overload periods when mistakes are made, security is compromised, and data privacy gets breached.

The consequences to business can be expensive:

- An average DDoS attack for a large business costs an average of $2 million USD; for an SMB it's about $120,000 USD.
- An average data breach costs $3.9 million USD.

sudden shift to remote work, a boom in e-commerce, and a streaming-entertainment tsunami, taxed the very foundations of the internet (and it proved resilient). Businesses that invested in the availability of key technology found themselves able to handle shifting demands. Many of these investments included cache-management strategies, which secured origin shielding and uptime, enabling business-continuity and security.

Reducing the complexity of resilience and security

As the traffic challenges posed by COVID have faded (or become the norm), different challenges to business resilience have arisen. The most pressing challenges are cyber threats in the form of malware, data hijacking, DDoS and ransomware attacks. Business continuity rests on technical foundations, and IT-related

■ The loss of trust, loss of business, and downtime can tarnish a brand and lead to lost revenue and tarnish a brand for year to come

With rate limiting, request inspection, and throttling, DDoS attacks can be stopped in their tracks, or at the very least, limited in the damage they can do. By using the right caching technology your website can stay operational during an attack.

Beyond security tools: Mitigation techniques as a second defense layer

Cybersecurity requires more than just a single action or approach because threats exist on many levels. Some of the biggest threats, in fact, can be those that seem innocuous. You may be so busy preventing attacks at the perimeter of your network and guarding against other vulnerabilities that you fail to see that some of the biggest threats are based on social engineering or human error. Employees who aren't fully aware of cybersecurity threats like phishing are a risk. Incorrect configurations within your infrastructure can bring your website down, (in fact, configuration errors can bring down half the internet). And, a

spike in the popularity of an item in your online store, the release of breaking news or an in-demand streaming title can all bring your site down. Yes, even your success can bring you down!

This is why security from a business resilience perspective requires big-picture thinking and planning for performance regardless of the disruption you face.

Origin shield: Protect your servers

Bad things happen when your origin server becomes unavailable, so you want to protect it at all costs. Using additional layers of caching in front of your origin as a protective shield, you can ensure uptime/high availability, reduce outages, and make your content delivery more efficient – and thwart the kinds of downtime that are becoming more common as content delivery has become more centralized.

Access control: Customize your authentication and authorization policies

Not everyone needs access to everything in your system, just as not every external visitor to a website needs access to all the content in your CMS.

Customizable authentication and authorization policies for access control and paywalls are one way to secure your assets.

Good code: Code defensively

The vast majority of security vulnerabilities come from human-created configuration errors and bugs, which open the door to denial of service attacks, code injections, or data leakage. Well-written, well-tested, high-quality code is a good place to start in fortifying yourself and becoming less vulnerable to common classes of cyberattack.

These are just a few of the reasons how caching technology can be utilized to protect you from the myriad of issues that can impact business resilience. The good news is that this type of protection can be seamlessly added to your existing operations whether in cloud, on-premises or hybrid. If security and business resilience is critical to you and your company and you haven't employed caching technology you should ask your reliability and IT staff why and send them our way if they have any questions. We are happy to help.

Network — DNS Routing — Transport Hijacking — Access Control — Remote Access — Applications

Business Resilience

Gartner's report,
'7 Top Trends in
Cybersecurity for 2022,'
predicts that by 2025, 45%
of organizations worldwide
will have experienced
attacks on their software
supply chains, a three-fold
increase from 2021.

Business Resilience

Connect,
Store, Support

In this issue we are featuring articles from IABM members who operate in the Connect, Store and Support segments of the BaM Content Chain®, covering the latest developments in the activities that underpin it – moving/ delivering content; storing content throughout its lifecycle; monitoring, testing, communicating and running facilities.

THE **BaM** CONTENT CHAIN®
from **Creator** to **Consumer**
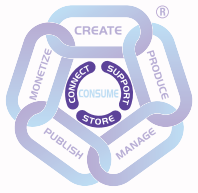
Network Media Service Supply Chain

With the emergence of cloud applications and services, changes in business and technology in the M&E market are accelerating. The multitude of streaming formats and platforms has pushed the technology used up to now, to implement the media supply chain to the limit, revealing its limitations and overwhelmed by the complexity of localization, UHD/HDR production and content distribution, among others. A successful media supply chain requires an efficient multiplatform reception, production and distribution of contents.

Emilio L. Zapata
founder Tedial

Optimising the media supply chain is no longer just about making media operations more efficient and agile within a media company, it must also take into account its distributed networked nature, incorporating partners. In this new scenario, the digital transformation demanded by the M&E market requires a network media service supply chain made up of content producers, media companies and delivery platforms. All interconnected in an intelligent way, moving and processing content between them in an efficient and agile manner in a distributed (multisite) environment.

The M&E market is expecting an expanded media supply chain with advanced out-of-the-box services, and technology companies are rethinking their integration strategy to create new products, deliver personalized interactions, and improve the application experience. To achieve this, data, applications, and systems are exposed as reusable modules that can be composed and recomposed into business capabilities and services.

With this approach, reusable modules and services become the foundation of an agile and flexible technology infrastructure. The interoperability, compatibility and resilience necessary to coordinate the set of participating actors, applications and systems resides in a cloud media integration platform (no-code iPaaS for media), which also provides the flexibility and elasticity necessary to adapt and /or change the business processes of the network media service supply chain.

Packaged Business Capabilities
Since the early days of programming, there has been a constant evolution in the way software is written, packaged and consumed to increase efficiency and reusability. Advances in software technologies have been dramatic, facilitating the development of applications using libraries of composable modules. Libraries that allow applications to be built visually, using simple drag and drop operations.

If we can quickly create business ready applications and solutions then we can design and adapt new services on demand, combining the technological capabilities of a media application integration platform, partner integrations and key customisations. These are the pre-composed solutions.

Packaged Business Capabilities (PBC) are software components that represent a well-defined business capability, functionally recognisable as such by a business user and reusable in the design of custom assembled products, applications and services. Examples are social networks delivery and UHD/HDR cameras management, among others.

The native modularity of PBCs transforms them into building blocks for applications or solutions and can be considered as aggregations of microservices. Microservices are the way we design, build and deploy modular applications, organised into well-defined services.

PBCs abstract the complexity of all the underlying technology allowing the customer to choose the components they need to create their network media service supply chain and the systems they need to integrate.

Today's user interface technology, coupled with the composability of PBCs, enhances the application experience through simple plug-n-play actions. It is the no-code approach to software development,

which allows applications to be created without any prior knowledge of traditional programming languages. Citizen developers or less experienced programmers can create applications by assembling PBCs and using graphic workflow designers.

To ensure the business continuity of the M&E organisation, it is necessary to have a strategy for integrating legacy applications. This is the case for many MAM, PAM, DAM and CMS systems.

Immediately, the question arises: Can a monolithic application be a PBC? The answer is yes, as long as the application offers an API organised in blocks of functionality. Each block of functionality would correspond to a different PBC, easily identifiable by a business user. It must be understood that this is a temporary solution to facilitate the digital transition to a composable architecture of the organisation.

Cloud Media Service Platform

The digital transformation demanded by the M&E market requires a network media service supply chain consisting of content producers, media companies and delivery platforms. This requires a reconfigurable architecture and forces software vendors to think about the flexibility, configurability and composability of the application stack. The efficiency and scalability of a network media service supply chain requires an efficient hybrid cloud media services platform, which includes the following components:

- Media integration platform
- Media metadata management
- Media storage management
- PBC based composable media services
- No-code media workflow designer
- Business intelligence & cost reporting

With the myriad of applications, data and devices that enterprises need to connect, and the incredible amount of time and resources enterprises spend trying to tie it all together, the media integration platform brings the interoperability, compatibility and one-to-many connectivity needed, providing the

speed and agility that enterprises require. The media integration platform creates an integrated application and system network, which is critical to accelerating digital transformation in a hybrid, multi-cloud environment. It also ensures global security for the multiple stakeholders and business processes deployed.

Every network media service supply chain is organised around media assets and their components, requiring intelligent management of their multiple associated metadata: editorial, collections, relations, strata (timeline annotation), technical, versions, rights, among others. In addition, all metadata associated with the operation must be recorded, including processing times, cost and the participation of people and partners.

The network media service supply chain requires the efficient management of distributed storage of media files in a multi-site environment. The media storage management system provides a common workspace, making it easier for applications to go to the media and not having to send the media to the applications, which is key. To do this, the software defined storage adds a layer of media abstraction, through a unique identifier for each media file, making workflows independent of physical locations (on-premises or in the cloud), which provides an additional layer of security. In addition, it is essential that the media storage

management system provides an aggregation service for the multiple media files belonging to each asset.

The applications and systems of the network media service supply chain dialogue and exchange metadata and files through the media integration platform. PBCs are the building blocks of a composable enterprise and represent a well-defined, functionally recognisable and reusable business capability in the design of media services. With applications, systems and PBCs we can create composable media services, designing workflows and processes that adapt to changing customer needs.

With a network of integrated applications and systems and well-defined composable media services, improving the customer experience becomes much easier with a user-friendly media workflow designer. This component of the media services platform allows anyone in an organisation to quickly create a useful application or service for customers or to create a particular customer experience, following the no-code paradigm.

The more components are involved in a network media service supply chain, the more important it is to have specific business intelligence and detailed cost reporting services at the component level. These services are essential to identify critical points or failures in the supply chain, manage service elasticity, decision making and make the necessary changes to the workflows associated with the services.

The M&E market needs an efficient and flexible network media service supply chain, easily adaptable to changing business needs. The solution is a hybrid cloud media service platform that facilitates a composable business and is built with the pillars we have

mentioned: Media integration platform, distributed media storage and metadata management, PBC based media services, a no-code media workflow designer usable by citizen developers (business users) and an analysis and monitoring system that helps us to optimise and permanently update the network media service supply chain, as well as reporting the cost of services.

The challenge is, how do we create technology that addresses these needs and makes a difference in the marketplace, helping people and businesses to do things they would not otherwise be able to do? We need to make products and solutions that make a difference and improve the customer experience and autonomy. The goal and the challenge is to implement a hybrid cloud media service platform that is flexible, scalable, resilient and secure. We are talking about composable business, architecture and technology for a flexible and future proof network media service supply chain.

The media service platform, based on the PBCs is future proof as business processes can be changed easily and new systems can be swapped in a few clicks to meet the future business needs.
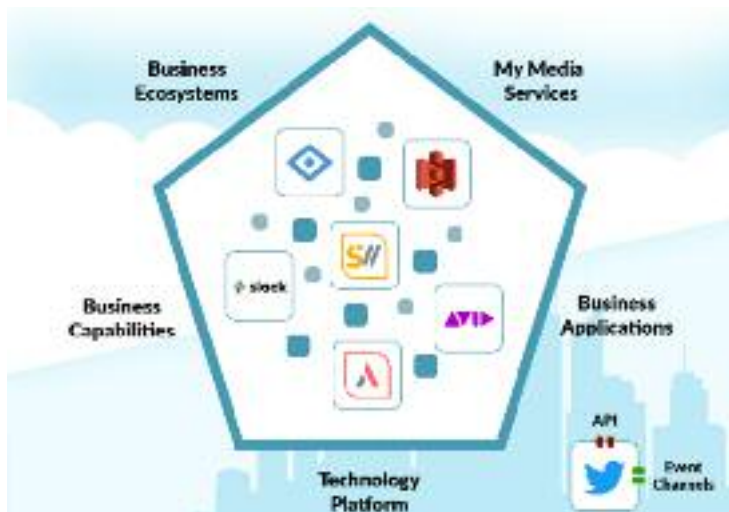
Challenging The Cloud with Linear TV Workflows

Like many powerful technologies, the list of benefits from moving to the cloud is long and varied. It starts with the familiar cries of scalability, flexibility and cost reduction but continues with advantages that not all companies need such as moving to remote production workflows or reduced time to market.

Russell Trafford-Jones
Technology Evangelist, Techex

The total list may be more than 20 entries long and to newcomers can seem vague and overwhelming. As an open and honest partner, it's our role at Techex to ensure everyone we work with understands exactly how they will benefit and, most importantly, the ways in which they won't.

Moving linear TV into the cloud is a great example of the need to fearlessly cross out some advantages and underline others. The oft-touted reasons to move to cloud like 'cost reduction' can seem like keystone benefits which, if not realised, mean you've done something wrong. Of course, this is not the case, so as a cloud specialist, we look at each design and emphasise the real benefits. You can think of it like this: is a trip abroad full of sight-seeing a bad holiday just because you feel exhausted as you relax in the hotel bar paying for an overpriced drink? The move to cloud, as the Opex pricing implies, is a move to the long term and some of those benefits it brings, like the photographs, relationships, and timeless memories of your trip to Vienna, will be with you long into the future and are more valuable than your financial outlay.

At first blush, linear TV seems to be the enemy of cloud workflows. The channel count is fixed, so there is no need for scalability. Data needs to be delivered every few milliseconds so there is no time for any fancy processing. With a static 24x7 line-up, flexibility is not needed. The cheapest compute option known as 'spot instances' is ephemeral so can't be used and reducing the cost by reserving a cloud server for a year or more can evoke inconvenient memories in some stakeholders of on-premise installations. Perhaps most importantly, broadcasters who need to get their channel down to the ground for transmission need to contend with egress fees on top of the connectivity

required, such as AWS' Direct Connect. Things are looking a bit bleak now that we've struck four big-ticket items off the list. However, looking below the surface we start to see the real value and value that's worth paying for.

At Techex, we help many broadcasters get video into, out of, and around the cloud. These are top tier broadcasters who pride themselves on deep understanding and are on a multi-year journey to maximise their use of the cloud, an endeavour which was well underway before the pandemic. Developed in-house, MWEdge is a software gateway for live broadcast content which is designed for tier-one broadcasters to provide resilience and protection to any media streams. Having spent so much money on rights and producing programmes, broadcasters need cloud workflows to be just as reliable as those on-premise which is where MWEdge highly integrated use of SRT, RIST and ST 2022-7 is foundational to the systems we deploy.

The terms 'reliability' and 'resilience' aren't softened by the move to the cloud but they do change. With SDI systems you know exactly which cables were carrying content at any time in the past, as long as you have telemetry from your switching and routing fabric. You can still do root cause analysis down to the connector in the cloud, but only when you understand how the system is abstracted. When delivering over the internet or between cloud data centre server, things can go wrong: a switch can be overloaded or an RJ45 can go faulty. But just as we have let the cloud provider manage the physical layer and its security, we must content ourselves with treating all of that infrastructure as a single cable. If an SDI cable is damaged, at the BNC or even inside the coax cable

itself there is little more to do than swap the cable. Similarly in the cloud, our hunt for a problem ends when we discover this virtual cable was broken.

Post-event analysis is hugely important for any serious broadcaster as it feeds into the iterative designs and drives continual service improvements. MWEdge delivers constant telemetry both in the GUI and externally to Dataminer, Grafana, and InfluxDB, for a full understanding of the state of the system in real time and perform root cause analysis after the fact when necessary. Moreover, we took the step of integrating ETSI TR 101-290 measurements and thumbnailing on all inputs as well as inter-packet arrival time (IAT) monitoring. These measurements are vital to track the health of streams through the system and when handing off between companies or departments. Being able to know that there were know ETR 290 errors at the time of a problem being found allows any investigation into the cause to be focused at the right place and a straightforward set of metrics to monitor for any hand-off point.

Infrastructure as Code (IaC) comes baked-in to the concept of reliability when we talk about the cloud. Due to the fact that creating cloud infrastructure demands no physical actions, every part of your system design can be created by a click of the mouse or, more importantly, an API call. Scripting your API calls means that every time a part of your workflow is either created or torn down it will happen the same way.

Removing engineer error or oversight is an important part of increasing reliability in operational workflows and automation becomes essential when working at scale due to the sheer quantity of actions required.

Many Linear TV workflows start or end outside of the cloud as part of delivery from production or distribution. Fortunately, Infrastructure as Code is not limited to the cloud and while it can't move a network cable for you, it can configure a server in the cloud A, cloud B or on-prem. When it comes to resilience, broadcasters face a challenge deploying in multiple geographies as inter-region data transfer fees quickly mount.

Core to the values of broadcasters is high uptime so we expect to see an increasing desire to deploy infrastructure in multiple clouds, preparing for the day that cloud provider has a major incident.

Although fully cloud-diverse deployments in the contribution space are few and far between, partly driven, again, by data costs, we've seen first-hand this demand for MWEdge to be fully cloud agnostic and is frequently deployed on-premise as one end of a cloud-ground or ground-cloud link.

We are proud, at Techex, to be working with some of the brightest brains in the industry who are clear on the benefits they enjoy from their cloud or hybrid workflows. IaC is just a part of a culture of deployment and development which goes hand in hand with cloud workflows. We've learnt that flexibility in our software and the way we work with our broadcast partners is essential for the continued success of cloud deployments.
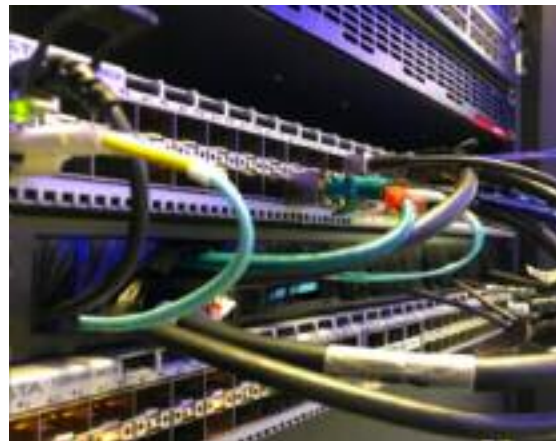
Adapting Media Supply Chains to Content Demand

Consumers are spending more time streaming video content than ever before. The video on demand market was already valued at $53.96 billion in 2019 and a recent report projects that it will grow to $159.62 billion by 2027. Content producers and media companies are faced with the challenge of producing enough high-quality content to meet this ever-increasing demand.

Gregory Cox
SVP of Business Solutions - Americas, Codemill

Just as manufacturers have used 'lean principles' to ensure they remain competitive in their respective markets, content producers and media companies can employ similar principles to meet this growing demand for new content. Lean manufacturing principles centre around eliminating or reducing waste and unnecessary expenses, improving quality, and reducing lead time. By working in an efficient and cost-effective way, media companies can optimise their performance and speed-up the pace of content creation.

Rethinking traditional content supply chain

In the last decade and particularly over the last few years, traditional media workflows have undergone a sea-change, both in terms of technological advancement and ways of working. Cloud technology has shaken up the industry and enabled media companies to move their processes and supply chains away from the traditional on-premises CapEx approach, which involved labour intensive and time-consuming processes, towards an agile, efficient, cloud based OpEx model.

The thought of developing and implementing web-based workflows that integrate seamlessly into existing infrastructure is daunting for any large media company. But with the right support and customizable tools in place, the infrastructure, workflows, and people, can be managed in a much more effective and efficient way.

Next-generation cloud workflows

Technological advancement, namely cloud technology, has given media companies everything they need to optimise content preparation and streamline workflows. Migrating to cloud-based and hybrid solutions has enabled production and post-production teams to store, share, and work remotely. Individuals and teams can access content, from anywhere, when they need to, and this hugely improves efficiency.

As well as helping companies to better utilise existing resources, remote production also makes it easier for companies to access the right talent, wherever that is.

However, it is not just the fact that workflows can be decentralised, with teams operating remotely, that enables media businesses to streamline supply chains. Cloud-based production tools are fast and effective and this makes it easier to seamlessly join up processes and automate tasks. Migrating asset management and storage to the cloud has also meant that media companies can leverage and monetise vast archives.

Management tools

In order for media supply chains to be agile enough to manage the seemingly ever-increasing demand for content, media companies need powerful content tools to gain the insights needed for quick decision making. A cloud-native approach incorporates intelligent management of media, seamlessly connecting processes and leveraging metadata for maximum efficiency.

In terms of future-proofing, moving to the cloud allows media companies to work flexibly and scale operations as business needs evolve. Being able to adapt quickly and scale post-production up or down, means internal teams can easily respond to fluctuations in demand. This ability to control variables is particularly useful for fast-paced media verticals such as news and live sporting events.

Connect, Store and Support

The power of automation and AI/ML

Automation of manual, repetitive processes, avoids human error and saves valuable time for large media organisations. Media operations teams can then work smarter, and with greater autonomy, spending their time focusing on the tasks that need their skill and experience, so that throughput can be maximised.

AI and ML technology can be leveraged to automate manual, labour-intensive processes such as validation and QC. AI also makes it possible to automate the process of analysing video content, adding information that can be used to streamline the content's journey throughout the media supply chain. By adding more useful information which accurately describes video footage, content is enriched and value can be added. Not only does rich metadata make it easier to process content for new productions, but it also makes it easier for broadcasters to retrieve and monetize existing content.

The importance of metadata

The role of metadata in automating workflows and improving efficiency cannot be overstated. Metadata-driven workflows allow content producers to efficiently manage large volumes of content. The use of time-based metadata in essential edit segmentation, versioning, QC, compliance, and localization can significantly speed up manual processes, and allow media organisations to efficiently manage content at scale.

As the broadcast industry evolves and consumer appetite for content continues to grow, the need to streamline processes and work faster and smarter is only going to increase. Broadcasters will need to leverage tools to ensure that web-based workflows integrate well with existing workflows and established infrastructure. In doing this, media businesses will be able to make sure their content moves seamlessly through the supply chain so that workflows are more efficient, and move the pace of content creation up a gear.

IP KVM in media and broadcast

This is the age of multi-tasking and multi-production. Behind the scenes of every news, sport and live broadcast channel is a team of people who make the content come to life, and here in 2022, almost every aspect is driven by computer technology. These live production environments rely on multi-server, multi-PC and multi-monitor infrastructure, where people take control through our default peripherals; the keyboard and mouse.

Jamie Adkin
VP Sales EMEA, Adder Technology

Keyboard, video, and mouse switches (KVM) are a critical technology to enable users to access all the computers they need, instantly. The creation, production and management of content requires seamless collaboration between individuals, and across teams and departments. KVM seeks to support the content chain by facilitating these needs.

The role of KVM in broadcast

If we ask what the role of KVM is within the broadcast and media industries, there's a straightforward answer: it instantly connects people with the computer access and control they need to perform their job, whilst meeting organisational needs of flexibility, space optimization and bolstered security. Compared to alternative approaches, it saves time, increases productivity, and reduces costs.

The seamless nature of KVM is a major attraction for both user and engineer. Fast, reliable switching breeds much-needed confidence in the middle of live programming. But the 'Connected Experience' is equally valuable. The defining sign of successful implementation is that once a computer is selected, the KVM is hardly noticed.

KVM has become such a staple of the broadcast and media operating model, that it has not just changed the way production teams operate, but has enabled the industry to keep pace with the changing demands of the consumer, while remaining flexible to fit around those doing the hard graft.

Built around the individual – and the team

An individual within a production team needs to work across a variety of studios in a broadcast facility. Equally, they need to collaborate with others using computers that must physically sit in a different location, like an apparatus room – a space dedicated to maintaining computer security, performance, and longevity.

As such, the ability for a KVM system to be designed as a footprint, not a floorplan, means agility and remote integration is put at the centre. In this model, the computers figuratively follow the user to where they need to work – not the other way around.

Workstation design has endless possibilities. Whether opting for multiple displays, or an adaptable multi-view setup on a single, high-resolution display, the workstation should retain one ergonomic feature – all computers should be controllable with a single keyboard and mouse.

Flexing to the modern workforce

The media and broadcast industries have – and always will have – a high proportion of freelancers and contractors across operations. The need for such flexibility has been exacerbated in recent years, and complicated further by the default nature of hybrid models as a way of working – employees aren't only performing their jobs in their employer's physical building; they're doing so remotely too. This requires access management to protect high value content, and the right infrastructure to adapt to evolving requirements.

With the breadth of Adder's KVM portfolio, it is possible to apply a uniform approach to the framework, together with customizable system access across a facility. This gives users familiarity and confidence, with increased reliability, the flexibility to grow and adapt the system to suit needs, and assured compatibility both now and in the future.

Connect, Store and Support

No compromise on quality

Media companies live and die on the material they deliver. Inadequate quality content is not an option. The technology backbone of any production house is critical to the commercial success of the business.

As such, VFX and post-production teams need pixel-perfect video. It is here where a high-performance IP KVM system comes into its own; companies can optimize their working environment for their artists while drastically increasing the efficiency and productivity of their facilities.

When we consider how media consumption has changed in the last decade, with hundreds of channels and VOD platforms competing for attention, then it is evident why rapid turnaround, where required, can be the difference between success and failure. The nature of KVM immediately flips this model. It allows companies to maximise usage of their edit suites and expensive computer resources. It reduces downtime. It makes operations concurrent, rather than subsequent.

The products for success

No two broadcast or media facilities are the same, and neither are their technology stacks. One of KVM's greatest values for engineering departments is its ability to connect users to both the legacy and the leading edge. Recent innovations in IP KVM, such as the introduction of virtual machine access, or the ability to connect with broadcast control systems via APIs, provide engineers with even tighter integrations.

For users, new products such as ADDERLink INFINITY® (ALIF) 4000 series, mean video delivery of up to 5K resolution at 60 Hz across two screens is not an issue. Advances in technology have also enabled the use of extended color gamut via HDR10 – mandatory in all post-production environments.

When asked about the ALIF4000 series, John Stevens, director of engineering at leading Los-Angeles post-production house, The Foundation, said, "As a business, we have seen significant demand to supply HDR content to our customers.

Many of our editors are now working outside of the studio, for example in mobile set-ups or home production, so a flexible workflow that supports the creation of both UHD and HDR10 content is more important than ever. Ever since we installed the ADDERLink INFINITY range, it has continued to be an IT stalwart. It has given us the flexibility to grow our business, and Adder's continuous innovation has allowed us to adapt our set up to meet our everchanging technology needs. The fact that we can now benefit from HDR10 support and 10-bit color will help us continue to meet the needs of our customers."

The Adder Ingredient

Overall, we have established that KVM is a versatile solution that can be used across the content chain. The evolution of IP KVM from the datacentre to broadcast control rooms and post-production facilities is driven by a desire to be flexible and efficient. As IP KVM has become the core of connectivity, customers are seeking platforms that are robust, resilient, and future-proofed. With 12 years of development and thousands of installations, Adder's ADDERLink INFINITY® range continues to be just the answer.
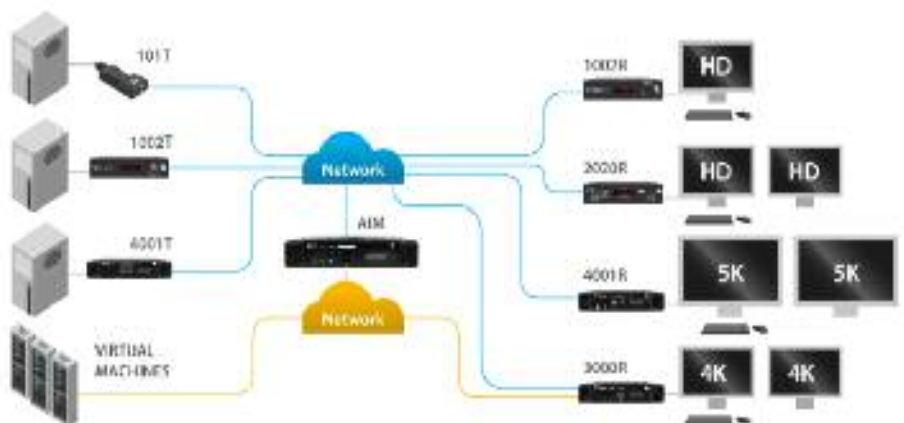
Etere:
How to Choose the Right Production Asset Management (PAM) for Results-Driven Success

> While the demand for content shows no signs of slowing, the wide range of production and workflow tools combined with interoperability issues can add to workflow complexity and preventable errors in the media workflow. How can PAM users select the right asset management strategy and leverage PAM to transform their workflows effectively?

More than just a buzzword or a file management tool, Production Asset Management (PAM) is a complex suite of applications that works together to deliver a revolutionary business and media transformation. PAM is a vital part of a media management strategy that empowers users to tap on the most suitable tools for the fast delivery of quality content and media monetization opportunities for their business.

Broaden your Strategic Focus with Flexibility
Every selection process starts with defining the requirements of a business or system. While there is no one size fits all solution, the misalignment of expectations often starts from the beginning during the definition stage. While it is essential to consider the current business scope and objectives, it is equally important to evaluate how the system manages potential changes to these in the future. In the media cycle, changes are an essential part of any project. Workflow design, media output, or deadlines – changes happen for numerous reasons. When choosing a PAM, it is crucial to consider how changes would affect an implementation plan and how effectively a system can navigate around changes. For example, how easy would it be to customize metadata schemas within the PAM without the help of the system integrator? In today's fast-changing environment, system flexibility is an important consideration.

Future-proof and Go Beyond the Present
Future-proofing technology is more than picking the most technologically advanced features or specifications. As businesses evolve, requirements change, and the software should adapt. While it is not possible to predict every new trend in the industry, your PAM system must be able to expand beyond present business and technological demands. Some of the questions to ask include: Is it easy to add users? How can we integrate new data without changing the foundation of the system? How can we implement integration with new tools and services without a disruptive interruption to the production process? Can we expand our storage to match changing needs? Can we migrate to the cloud in the future? Can our PAM system support a switch to a remote working environment? How easily can we upgrade the features or specifications of our PAM to match the industry's developments? While industry developments and demands may be evolving faster than we can anticipate, having a system that can adapt to these changes is a more cost-efficient and less painful choice in the long run.

What it takes to Deliver Great Content
While there may be an (almost) infinite volume of content out there, there is a limited number of resources we have to work with, including human resources. Every labor-intensive task takes an operator's focus off another. Sometimes we cannot choose one over another. With the right PAM, users can orchestrate workflows to automate repetitive tasks and leverage the benefit of better accuracy, speed, and convenience. This advantage easily translates into battles won at the business level, with businesses being able to fulfill more complex deliveries to meet demanding challenges. For example, with the array of formats available, content delivery in multi-formats is no longer a daunting task with automated transcoding workflows that can deliver large volumes of files with a simple prompt.

Connect, Store and Support
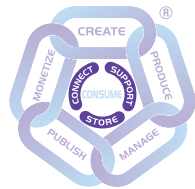
The Potential of Metadata

The use of metadata in file-based delivery opens up possibilities for content producers and distributors. The vast amount of metadata that accompanies media enables the repurposing, redistribution, and monetization of media files in different ways and across various content delivery platforms. In one scenario, the same media file can be delivered concurrently to multiple platforms with multiple advertisements and subtitles to cater to audiences in different markets. With an effective PAM, the media can be easily identified, categorized, enriched, and re-distributed in a streamlined manner.

360 Degrees Analytics

With the right tools, PAM also provides a log of all processes in the system to provide 360 degrees analytics of the business flow. It is vital not only when things go wrong but also to evaluate how to improve the process. When the audio has failed, the logs can identify which stage things went wrong and alert an operator. Not only that, a PAM integrated with an automated quality check system can identify faults automatically and inform the relevant people about them promptly. With enough crucial information from the logs, they can make an informed decision or come to a resolution quickly to resolve the issue.

Even when things are going well, PAM can help businesses improve their workflows, optimize resources and stay on top of the flow. An integrated PAM system can generate audience and viewership reports on demand to empower the business to make informed decisions. Does this program have a consistently higher primetime viewership over the other? With relevant data, users can make informed decisions and deliver what the viewer or customer needs. There is no more guessing work to get the results-driven success you want.

In addition, with integrated scheduling and task management features, distributed teams working from different locations can collaborate on the same tasks in real-time, simplify approvals and create a unified environment where distributed teams can work together effectively. Now, you have a seamless process to make the decisions that matter together.

Make an Informed Decision

In every decision, knowledge is the key. When selecting a PAM for your business, you can make an informed decision to help you to get the best returns on your investments through:

- Defining what you need
- Preparing for the future
- Understanding how to leverage the benefits of the system effectively
- Measuring your success accurately

While there is no one size fits all solution, considering the key issues that could affect your business is the first step you can take to unlock that results-driven success that you want. More than just a good-to-have, PAM is the key to strategizing for greater returns today and in the future.

Take the first step and chat with us at info@etere.com

Imagine Products®
ASC MHL: How standardizing the media transfer process helps

Mark Hudgins
COO and Principal Engineer, Imagine Products

Recently, the American Society of Cinematographers (ASC) released its Media Hash List (MHL) specification to bring standardization to the media transfer process. The raw amount of data produced in the media and entertainment industry has never been greater than it is today, and will continue to grow well into the future. Similarly, there are now more data transfer points than ever before.

Manveer Kaur
Marketing, Imagine Products

Purpose

Through the entirety of the production cycle, data files will be transferred numerous times and store a variety of media. It is not uncommon for a single file to have passed through several hard drives, gone up to the cloud and back again, and archived to tape for long-term storage. All of these transfer points have made ensuring the data chain of custody more difficult than ever. The ASC MHL specification was developed specifically to combat these problems through standardization and intelligent media management procedures.

Currently, most organizations have implemented their own internal data integrity and chain of custody processes. While this may work well enough for intra-organization data transfer, complications and confusion often arise once data goes beyond the bounds of the organization. For the data chain of custody to be truly maintained, each organization in the data transfer process must have procedural agreements. This is where standardization is essential. The ASC decided that implementing a form of standardization to MHL would be beneficial in helping decrease the amount of time and number of complications that occur when transferring media.

How Does it Work?

The innovative products and updates created as a result of the new MHL protocols will be more powerful than ever before. But how does it work? Files will be tracked over time and integrity snapshots taken at every transfer point. These snapshots are then added to the list of previous transfer snapshots. Collectively, these snapshots provide a complete chain of custody history for the data set and greatly reduces the possibility for data loss. Should a problem occur at some point in the media transfer process, the chain of custody can be inspected to determine the exact point at which the problem occurred, and provide context on how to remedy the problem.

Now that it has been established that snapshots can be used to ensure data integrity, the question that must be answered is how they ensure data integrity. Data integrity is ensured through the use of hashes. Simply put, hashes are a unique representation of a collection of bytes. Since files are nothing more than a collection of bytes, hash values are an appropriate representation of a file. If two files have the same hash values, they can be considered to be identical. There are many algorithms that can be used to generate hash values, which will be discussed in greater detail in a subsequent section.

ASC MHL Format

ASC MHL is intended to be used for media production workflows and establishes how and where the integrity information is stored. Hashes for the media are recorded and converted into a human and machine-readable XML format. Through this, a chain of custody is instituted, which allows the easy tracking of damaged or duplicated files.

The application of these guidelines involves documenting hash records in an ASC MHL manifest file. This manifest file contains hash records for one or

more files or directories within its scope. The scope of an ASC MHL manifest is the directory containing the files and directories of the manifest's managed data set. Once an ASC MHL manifest file is created, it should be considered read-only and cannot be altered in any way. Hash records in an ASC MHL manifest's files utilize file system paths that are relative to its scope. This means that an ASC MHL manifest cannot contain hashes for files or directories that are not within a Manifest's defined scope. These manifests can also contain sections that have information about the creator of the file and details of the process the creator used to create it. Hashes that are recorded within an ASC MHL manifest at a given moment represent a snapshot of the corresponding data set at that same moment.

Each file or directory can have hash values generated using various algorithms. Every hash value that is entered is labeled as one of three options: original, verified or failed. A hash value that is classified as "original" means that this particular hash is the first of a specific file or directory. Hash values defined as "verified" are hashes extracted from the current copy of the ASCMHL manifest file and have been verified against hashes recorded in previous versions of the file. Finally, a hash value labeled as "failed" is a hash that was not able to be verified against hashes recorded in the previous versions of the file. In a broader perspective, a failed hash value signifies that the current file copy is not identical to the previous copy of the original. This guarantees media professionals can quickly recognize when their file has been damaged or when it is not complete, which will reassure the users that their data is being tracked accurately.

This is essential when storing media and offloading it onto other platforms because previously, there was no standardized technique to confirm that data had not been lost in the storage or offloading process.

An ASC MHL chain is a file that serves as a Table of Contents for an MHL history. This means that an ASC MHL chain contains paths and file hashes for all ASC MHL Manifests within the ASC MHL history,
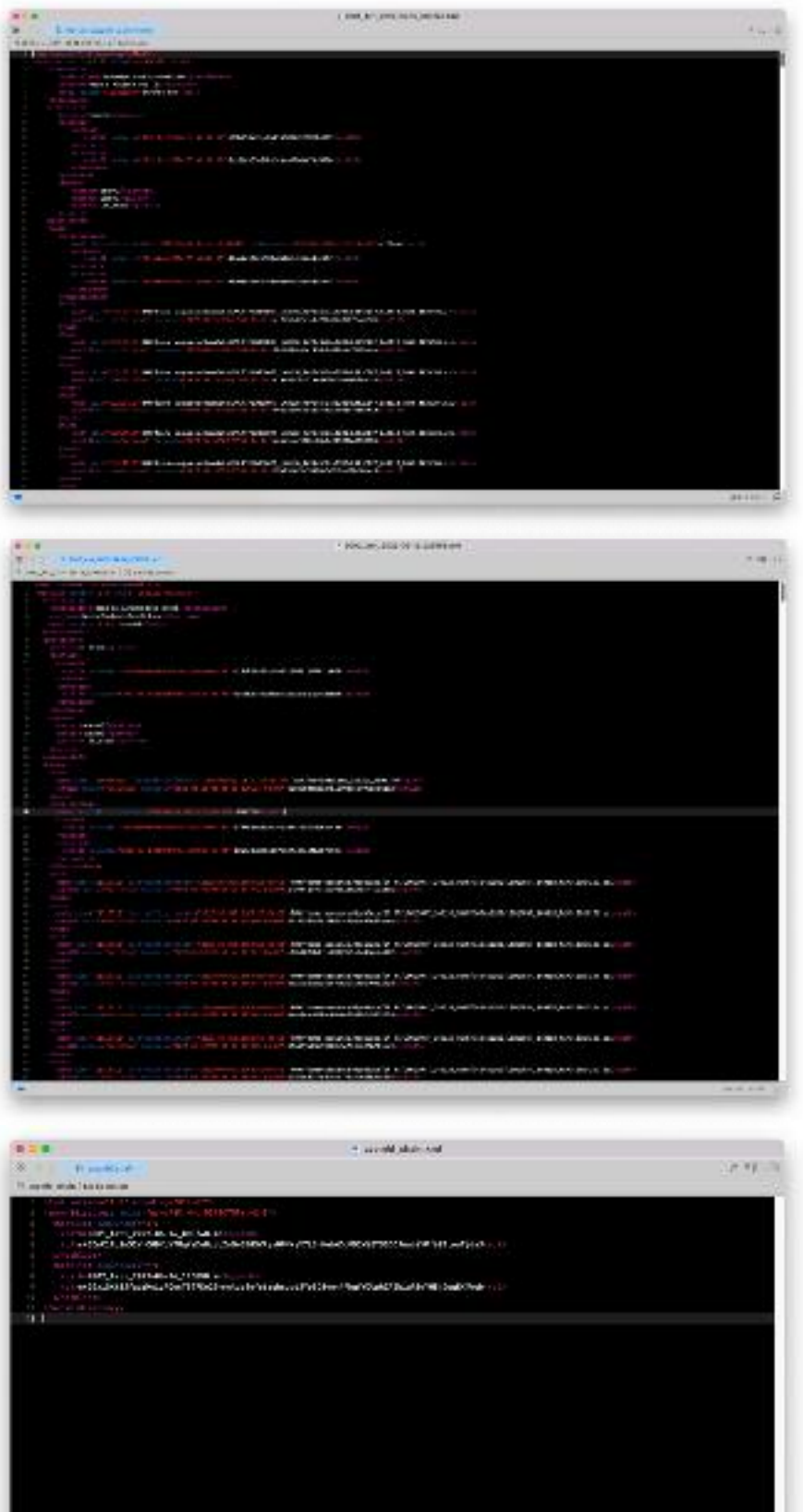
ensuring that the integrity of the files can be verified. All ASC MHL manifests within an ASC MHL chain have the same scope. An ASC MHL history is an ASC MHL chain that all ASC MHL manifests are referenced from. This directory is named "ascmhl". The "ascmhl" directory is created at the top level of a media directory so that an ASC MHL history can be automatically transferred when the media directory is moved or copied. The managed data set is the files and other directories that are stored within the "ascmhl" directory. All ASC MHL manifests that are a part of the same ASC MHL history must cover the same scope. This means that all record paths across the various manifests will be relative to the same location in the file system. This ensures the ability to track the data and corroborate that it is all secured in a singular space.

ASC MHL Manifests, and therefore an ASC MHL History, can contain hash records that use multiple types of hash algorithms. Multiple types of hash algorithms can be used because requirements may be different depending on the management system. The MHL guidelines are being put in place because there needs to be standardization when it comes to elements such as the type of checksum being utilized. The following hash algorithms are supported under the new ASC MHL guidelines: MD5, SHA1, C4, XXH64, XXH3, and XXH128. While agencies may have specific hash types they prefer to utilize, each of the different types of checksums has its pros and cons.

Types of Checksum Verification

The XXH algorithms are generally the fastest and are the preferred options for many organizations. The xxHash family of algorithms are all non-cryptographic hash algorithms working at speeds close to RAM limits. Non-cryptographic functions aim to avoid collisions for nonmalicious input and are typically much faster as a result. Of the 4 types of xxHash algorithms, there are 3 that software usually implements: xxHash-64, xxHash3-64, and xxHash-128. Each of these has different speeds and collision spaces.

The MD5 hash type was considered the standard for years before xxHash-64 arrived. Although MD5 is significantly slower than the xxHash algorithms, it is still a very viable option and many industry professionals are very familiar with it. For specifics on xxHash performance metrics against other formats such as MD5, this information is available on the xxHash GitHub repository.

The SHA versions of checksums are generally used to keep continuity in workflows. They are rigorous checksums but are outdated when compared to xxHash-64 because SHA versions of checksums are generally slower than most other verification methods. Another verification type is C4. C4, like SHA formats, is slow but very robust. A distinctive advantage of using C4 is the production of URL safe output, which means that if a file was renamed to its C4 value, it can be posted on the web.

Conclusion

Overall, the goal of the new ASC MHL guidelines is to reassure media professionals that their data is secure and stored safely and completely. Avoiding data loss is critical during media transfer processes and has been difficult to track in the past. Hopefully using the standardization these guidelines create, media professionals can avoid data loss and verify the integrity of their files efficiently and consistently.

The ASC may give the outline to follow, but companies like ours are in charge of modifying our products to abide by those guidelines. Imagine Products helped develop these guidelines but their creation would not have been possible without extensive efforts from others such as Netflix, and Pomfort, the creators of SilverStack. In collaboration with our partners, the team worked to code the command line interface, which led to the application of the new protocols and the creation of adjusted products. The newly improved result of these guidelines can be seen through our newly revealed ShotPut Pro® version 2022 for Mac, as well as in TrueCheck® and myLTO®.

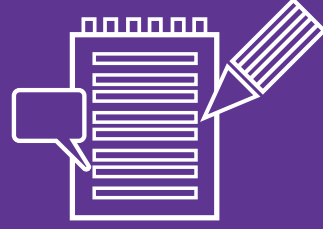# IABM Members have access to a wide range of benefits

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Today, most media businesses have at least some elements of their operations in the cloud and many new services are also being born this way

Cloud Acceleration and the Business Model for Experimentation

The video industry has undergone rapid growth over the last decade and is continuing to expand at an incredible rate. The global video streaming market was valued at $69.55 billion in 2021 and according to a recent report, is projected to reach a staggering $257.79 billion by 2029.

Bleuenn LeGoffic
VP Strategy and Business Development, Accedo

This enormous growth in the market is being largely driven by unprecedented consumer demand for streamed video content. The pandemic has accelerated shifts in viewing behavior that were already underway prior to 2020, with more and more consumers switching from linear TV to video on demand. With the return of macroeconomic health, advertising spend (which saw an unprecedented fall in 2020) has returned to normality. This will improve the business case for new video services, attracting more well-funded entrants to the market.

In addition to driving impressive industry growth, the pandemic has served to speed up the transition to a cloud-based way of working. Today, most media businesses have at least some elements of their operations in the cloud and many new services are also being born this way.

Cloud-based operations: impact on consumers

The cloud has transformed the broadcast industry, and this transformation has had a positive impact on consumers, resulting in more choice and a better viewing experience.

It is now easier than ever for video service providers to create, produce and distribute content entirely in the cloud. A cloud-based way of working means that there is no longer a need to develop your own infrastructure and hardware, making it possible even for smaller players to successfully enter the market. And all of this eventually results in more choice for consumers in terms of available streaming services.

As market competition tightens, it has become more important than ever to provide viewers with a streamlined route to content discovery. Cloud technology makes it possible for service providers to collect and manage huge amounts of user data, and this is of course vital in providing customers with a personalized viewing experience. In addition to helping users find what they want to watch, the proper use of data can also help make targeted advertising more effective.

All in all, the inherent flexibility brought by cloud-based working has made it easier for video services to quickly respond to consumer needs. Video companies are better able to experiment effectively and this in turn leads to a better service for the end user.

Cloud

Why experimentation is more important than ever

Most viewers have come to expect an intuitive user interface and a high quality, personalized service so video service providers can't afford to be complacent. In order to remain competitive and relevant, they need to continually evolve and improve their offering, so it is critical that the platform and any associated tools allow them the flexibility to experiment. This is not just true for the larger multinational media corporations. Experimentation is important for every size and type of company that is distributing video content.

In order to construct an effective strategy for experimentation, companies are wise to remember three key points:

1. Never underestimate the importance of a good user experience.
2. Always beta test on small, selected groups
3. It all starts with intelligent data collection that can be turned into actionable insights.

Experimentation needs to be viewed as absolutely critical and should be built into fundamental business requirements. Video providers need to build a culture of experimentation, ensuring each part of the business has the ability to fail and succeed rapidly, sharing insights to all stakeholders that can be used to adapt quickly. That fast experimentation is much easier to do in the cloud than with traditional broadcast on-premises systems.

Final thoughts: cloud acceleration set to continue

The industry remains strong, and growth is expected to continue for the foreseeable future. New entrants to the market will need to be smart about which audiences they want to invest in, as well as making sure their chosen platforms allow them to experiment to continually improve the service.

Growth in the video industry has greatly increased consumer choice, making niche video services easily accessible alongside mass market services. However, viewers don't just want more choice, they also want to consume media in different formats across multiple platforms and devices. The cloud is helping video service providers to deliver on that front, in order to meet consumer needs. The transition to cloud-based structures is certainly set to continue and this will continue to benefit both video-centric businesses, and consumers.

The new 'content continuum': meeting the demand for a wider spectrum of live and near-live programming through the cloud

The way we consume content has evolved tremendously over the years – from the TV set to the laptop all the way to the smartphone, the way people use media has taken tremendous leaps along the way.

Robert Szabo-Rowe
SVP Engineering and Product Management, The Switch

Since the birth of social media, traditional media is no longer a one-way stream of communication as consumers embrace always-on, interactive means of learning from and engaging with one another. Younger consumers in particular are shifting away from the conventional habit of watching full-length award ceremonies or sports games, instead preferring to catch up on the latest news, big plays and viral moments via short, snappy, on-demand highlights.

This shift in viewing habits is evident when you look at recent data on where younger viewers spend their time. Findings from the analytical firm The Maru Group, which partnered with VIP for the "Sports' New TV Formula" report, found that almost half of young NFL, NBA and MLB fans prefer watching highlights over a complete game. This means rightsholders must now be able to get their live content onto social, catch-up, streaming and other video-on-demand (VoD) platforms as quickly as possible, or risk losing eyeballs.

Capitalizing on new types of programming

Scheduled TV programming is now just part of the viewing mix as a new emerging 'content continuum' that spans live, social, replay, shoulder and on-demand elements of sports and entertainment assets – reaching consumers across a range of devices and platforms. The result is, content owners, broadcasters and other rightsholders are increasingly looking to cloud-based services to power exclusive and engaging live and complementary content.

The immediacy and reach of a video asset has been multiplied through these social elements, which allow consumers access to the content they want, when and how they want it. This is made easier by leveraging cloud-based production tools and workflows that rapidly accelerate the process and get their clips onto social media, streaming and VoD platforms almost instantaneously. Employing cloud tools for all or any of these functions, is simply a matter of having an internet connection and a laptop. It is now clear that a shift to a cloud-first approach can empower broadcasters, streaming services

and other rightsholders to enhance the viewing experience across today's broad viewing landscape.

Accelerated by the pandemic, the adoption of cloud video techniques became widespread and proven. Fast forward to today, and the industry-wide acceptance and excitement around cloud production, transmission, and clipping and editing are beyond the most ambitious pre-pandemic predictions. The outcome is greater efficiency, flexibility, scalability, and cost-effectiveness across more live sports and entertainment than ever. There is no doubt that the cloud is now critical to producing a range of broadcast-quality content that appeals to a variety of audiences – from the traditional arm-chair sports viewer watching the game on the living room TV, to modern anytime anywhere smartphone web surfers, to content consumers whose habits sit somewhere in between.

A new way to deliver live sports

The transmission capabilities of the cloud bring added flexibility and opportunities for broadcasters and rightsholders, offering IP delivery of

Cloud

feeds from any location to multiple – up to hundreds – of destinations via the internet. They can also tap into cloud and private delivery networks spanning the globe, such as The Switch's, and often combine these with public internet access.

One of the reasons broadcasters and rightsholders look to the cloud to deliver their feeds is that it enables cost-effective, high-quality transmission of live feeds of more than 20mbps, which can enable HD and 1080p broadcasts. For events in remote locations with no or limited internet – such as a news team in a far-flung location covering a breaking story – cloud-based transmission with bonded cellular services can accommodate either the primary feed or a backup, leveraging 5G connectivity where possible.

Cloud capabilities can also act as the glue between elaborate

distributed production workflows, enabling talent and production personnel in separate locations to communicate and produce content in real time. The Switch did just this for the 2021 NHL Playoffs and Stanley Cup Finals, launching a new type of pre-game programming for the league. The project enabled the NHL to tailor highly interactive and fun live content for its fans on Twitter, airing 30 minutes before each game with re-caps of previous games, quizzes, and player stats for the upcoming game.

The Switch curated and powered the entire schedule of NHL Twitter programming, deploying a comprehensive suite of live video production and delivery services through MIMiC, its cloud video services platform, to support a virtualized production for 21 pre-game shows. MIMiC provided low-latency cloud-based

communications to connect the remote announcers, producers, graphics operators and others on the production team, in locations across the US, including Long Island, Burbank, New York, Chicago and Brooklyn.

Instantaneous social media clipping and editing
With the rapid global rise of social media users and fans following sports and entertainment events via

social media like never before, the cloud offers the clipping and editing tools needed to create event highlights as they happen. Whether it is for a big-league sports event, a concert festival, or even the unveiling of an exciting new tech product, social media operators can clip and edit in near real time within the cloud all the live highpoints as they happen. It can capture an array of unfolding content, such as the red carpet for an awards show, half-time sports commentary, real-time highlight clips from other games, and interviews with celebrities and athletes before, during and after a live event. The result is a content continuum extending far beyond the linear broadcast, reaching a breadth of social media and streaming platforms.

Although much of this content may start live, it all eventually becomes VoD with the help of rapid social media clipping and editing. Indeed, the blurring of lines between live broadcast, catch-up TV, special streaming feeds and near-real-time social media highlights is inherent to the multi-device, multi-platform world we now live in. The upshot is that what we define as VoD continues to broaden to include everything from Amazon Prime Video to YouTube Shorts to Twitter highlights and TikTok. This live-VoD content continuum raises exciting questions about how to maximize the value of media assets today.

No-trade off in quality

Speed is key. The cloud has several advantages but being able to deliver new and dynamic live content in close to real time without comprising the quality of the video is near the top of the list. As soon as the audience knows the game's results or who's won the award – either through already screened highlights or word of mouth – the value of the content begins to diminish. Being first counts. By leveraging live production in the cloud and its rapid clipping and editing capabilities, media companies and other live event producers can significantly extend the lifespan of their content while opening exciting new revenue streams.

Audiences today have access to – and demand – a much richer TV landscape that operates across a wider spectrum that includes: pre- and post-event shows; participant profiles; data-driven feeds; the social media back and forth of sports figures, performers and commentators; the backstage gossip and performances around entertainment events; and countless other examples of shoulder programming. The speed, flexibility, and efficiency of cloud-based tools now plays a critical role in ensuring that media organizations and other rightsholders get the most value out of their assets.

Removing barriers to creativity at A+E Networks UK

Faced with ageing infrastructure that was impacting the creative team's ability to deliver, A+E UK turned to Blue Lucy to provide a solution that put production needs first.

A+E Networks UK

A+E Networks® UK, a joint venture between Hearst and Sky, is a leading media network reaching millions of homes across 100 countries. With a portfolio of popular, high-performing, and creative brands like HISTORY®, Crime+Investigation®, HISTORY2® and UK free to air BLAZE® their award-winning factual and entertainment content includes global hit franchises such as 'Forged in Fire' and 'Born this Way', as well as original local commissions including Al Murray's 'Why Does Everyone Hate the English?'

The network's promo team is responsible for creating approximately 200 to 250 original pieces of content to promote these shows each month.

This number scales up to 350 to 400 versions for different territories, and increases by another 25 to 30% once special projects like teasers, sales reels and internal comms are factored in. But until recently, the relatively small team responsible for these big deliverables was being held back by ageing infrastructure that was negatively impacting their business efficiency and creativity.

Held back by technology

While the media network had modernised many other parts of their operational stack, the asset management environment didn't support the latest versions of Adobe Premiere Pro and they hadn't been able to integrate the post-production environment with their enterprise scheduling systems or distribution systems. The company recognised that their technology was inhibiting their creative capabilities and that they needed a dedicated platform that was best in class for content production and supply chain management. Matt Westrup, SVP Technology and Operations EMEA at A+E Networks UK said: "As a content and creative company, the creative platform is at the very heart of our business. We wanted to be able to have something flexible, intelligent and efficient, but that also had production and creativity at its heart in terms of a toolset and a platform."

Spending time on the front line

By the summer of 2020 A+E UK was focussed on the growing risks of an ageing system infrastructure. But while the network has all the complexity, legacy and challenges of a broadcaster many times their scale – they are only a company of 200 people. As Westrup points out, "We needed to find a partner to elegantly provide the solution we needed quickly and seamlessly."

Blue Lucy was partnered by 7FiveFive, a company who have provided engineering, network infrastructure and post-production support to the network for many years. A+E UK decided against a weighty RFP in favour of a lighter market evaluation saying, "What we liked about Blue Lucy is that they are a smart and ambitious team. We don't have a large in-house or specialised technology team, so having access to the talent at Blue Lucy instantly gave us an advantage. As with all technology-led change, there is huge complexity, but Blue Lucy absorbed a lot of that complexity on our behalf and created simplicity for us."

Blue Lucy takes a unique approach to project delivery. The company takes accountable ownership of the overall technology solution delivery, and their software development team works alongside the end-user stakeholder groups. In this case Blue Lucy's developers spent six months working with A+E UK's creative and technology teams to understand the issues. By being on the front line with the users and seeing first-hand the operational context, the Blue Lucy team were able to enhance the original requirement to maximise the creative and business benefits. William Piper, the Blue Lucy lead software engineer, explains, "Working alongside the creatives and business operators meant I was able to understand the technology and could propose enhancements, such as how contextual searches in workflows could help automatically find source material. This wasn't in their original scope, yet it's one of the valuable

features of the platform for the Creative teams." Dan Anscombe, A+E UK's head of technical operations concurs, "Automated matching of content to campaigns has been a game-changer, meaning less time spent by creatives searching and more time on producing," he says.

A solution with creativity at its heart

At the core of the solution provided by BLAM is the integration with MediaGenix WHATS'ON which A+E UK use to create their campaign plans and schedule promo production. BLAM imports this campaign data from WHATS'ON and uses it to automatically create a folder hierarchy for each campaign within the platform. It also creates placeholders for all the material that needs to be produced and gathers the source assets associated with the campaign (for example, the master programme for which a promo needs to be produced.

The result of this entirely automated process is that, when an editor opens the campaign in Premiere Pro, the media they need is already available and organised, and a sequence has already been created for them to begin working on. Piper elaborates, saying, 'An editor can walk into their suite and have all the tasks assigned to them in pre-populated files. All the materials are there. They don't need to go looking for the source material on the file-store. They don't have to scan a spreadsheet for expected deliverables. It's all there in front of them in Adobe Premiere."

Outside of Adobe, the BLAM WorkOrder capability orchestrates the entire post-production process: finishing, including audio mastering and colour grading, as well as the editorial approval process. The
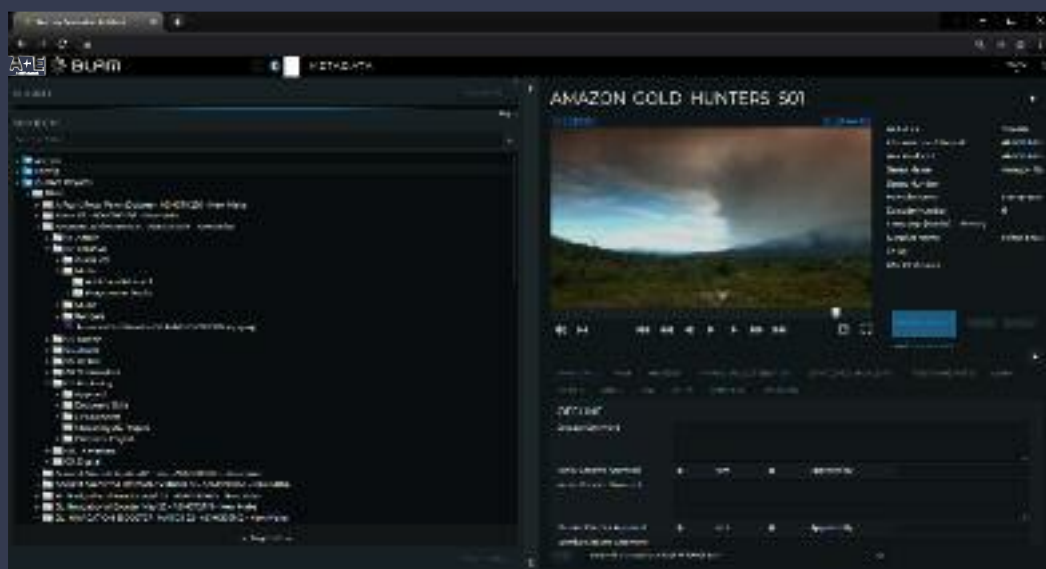
WorkOrders automation includes task management for technical operations as well as secure links and email notifications for the producer and compliance approval.

Aiden Hacket, Senior Creative at A+E UK says, "Blue Lucy has allowed us to work with the latest editing software whilst integrating with key systems like WHATS'ON, which means all our work is entirely managed in BLAM. This has given us the tools to swap manual workflows for automated ones such as creating projects and managing approvals for our creative work. With everything now available in one place, it makes for a far more cohesive, intuitive, and efficient process to work with."

Going forward

Implemented in the midst of the pandemic, the project was successfully completed in September of 2021 as Westrup explains, "If you'd said to me, you're going to put a system like this in, avoiding a heavy procurement process and get it right the first time, I would have been a bit scared. But that's what happened with Blue Lucy."

The next phase of development is to integrate the power of BLAM into A+E UK's digital social teams who are increasingly expanding their short form production for social networks such as Facebook, YouTube, and Tik Tok.

Westrup has been pleased with the result of the project. He adds, "This has been a smooth integration, and the outcome is more than we expected. The implementation of workflows and opportunities created by bringing media under management has improved our business efficiency and really allows our creatives to be just that, creative."

Forged in Fire© AETN. Why does everybody hate the English? © Avalon Television Ltd.

Building OTT Apps for Content Creators to become the next Netflix or Hulu

Creating a personalised OTT ecosystem is a great way for content creators to stand out in a heavily competitive environment that has a low barrier to entry. Through an OTT SaaS solution like Enveu's Experience Cloud, any content creator can create their branded OTT apps and go LIVE in weeks with zero coding!

Shalabh Agrawal
Co-Founder, Enveu (www.enveu.com)

With the recent global growth in OTT consumption (source), content creators today are embracing the promise of OTT and building seamless streaming apps across platforms like Android, iOS, Google TV, Apple TV, Roku, etc. to meet the consumer on their device of choice.

You might think it's just the usual suspects – the traditional TV channels and large broadcast media outlets – that are seeing success here. But OTT consumption is not limited to just those industries. Digital influencers, YouTubers, Social Media Stars, Sports Organisations and their participating teams, E-Sports, News outlets, Universities & Colleges, Health & Fitness brands, Kids Entertainment brands, etc. to name a few are building their OTT ecosystem to fully control the experience and content delivery to their fan base.

These institutions and individuals pour their blood, sweat and tears into building good and relevant content daily. Why then should they pay a major share of their hard-earned revenue back to a third-party platform? This is a question that hits almost every content creator at some stage of their businesses' growth.

The answer is usually either a) they do nothing about it and continue sharing revenue or b) create their own custom OTT Video Streaming platform. The latter is a 'no-brainer' answer but the hindrance is that most content creators don't have the right technology resources or means to get this done.

All Content Creators that are serious about growth hit this glass ceiling of figuring out whether to invest & build the technology in-house or buy a ready-made & reliable solution from the market.

The Build vs. Buy Decision

If you are a content creator that's in this conundrum, here's a simple set of questions that can help you decide if you need to build internally or outsource to a reliable tech partner like Enveu.

Note: If your answer to even one of these questions is a 'maybe', then outsourcing should be your priority, at least for the first few years of operations.

Is your business geared to overhaul and become a 'Media + Tech' organisation?

If your core business strength is content production and distribution on a select set of mediums, then to build your own technology you'll need to start from scratch in curating tech teams and development processes to get a viable product out there in the market. More than being expensive, skilled manpower is hard to source and along the way you'll need managerial decision makers that have experience in building OTT products too. It's a sound investment if you

have the patience, money and energy to be at it for 2-4 years before your customers see the final product.

Do you have the resources to fail, test and fail again?

Building an OTT isn't a straight yellow brick road. By the time you launch, your product might look like it was made with 3-4 year old tech. In that time, a competitor might use an out-of-the-box solution and would have captured critical market share. And there's no hiding away from the fact that every tech solution has bugs that need attention. You might spend time fixing things and not innovating new features.

### Does your tech need to be at par with competition and at the cutting edge of technology?

The rules of engagement in OTT today are dictated by a select set of industry leaders. Whether it's embracing new technology like VR / Metaverse or rolling out a feature like the 'Skip Intro' button for TV shows, if your OTT doesn't follow these new developments, it might be seen as a lacklustre offering.

Why Outsource OTT App Development?

Today, every business is looking to book higher revenues & profits in the current month / year and not build out a 3-5 year break-even strategy that won't appease today's stakeholders. Outsourcing then is a fast-track solution to get your OTT ecosystem up and running within weeks, with the least amount of resources and with a higher degree of confidence is success.

Here's a few key reasons you should outsource:
- Maintain solitary focus on your core business of creating content
- Avoid business disruptions and take the path of least risk to meet your business growth goals through technology
- Leverage an industry-standard OTT SaaS platform that will always ensure you are at the forefront of innovation. All you'll need to do is 'opt in' with a click for these upgrades
- Build a visually stunning ecosystem of apps that are 100% customizable to your brand and fanbase. Most providers should help you do this for free
- Create a custom environment that's unique to you and features any and all accessibility requirements you might have
- Forego offline content management solutions and manage every piece of your content through a CMS that's robust and flexible. (e.g. need to add custom metadata that's unique for your business, you'll be able to do it easily)
- Delegate all the headaches of fixing bugs and issues to the experts so you can focus on what you do best – creating content.
- Avoid incurring running costs for bandwidth, storage, power, management and connectivity; instead focus your dollars on promoting your content.
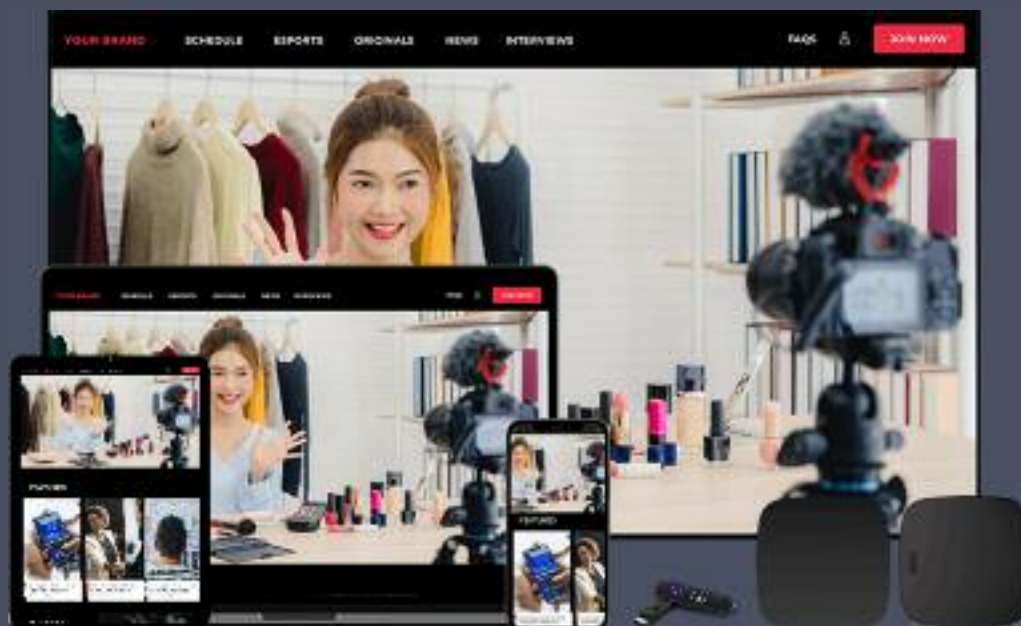
How can Enveu help you build better resilience?

Enveu offers a 360-degree OTT SaaS solution – the Experience Cloud – that helps you go live in 5-6 weeks across 12+ Platforms and at a fraction of the cost it would otherwise take to build an OTT ecosystem from scratch.

You'll get white-glove service right from understanding your requirements to building the OTT product of your dreams!

Here's a quick look at some of the benefits of the Experience Cloud:

- Create a custom & unique experience with your branding guidelines
- Upload unlimited content and publish at your leisure
- Easily create your ecosystem in any language of your choice with no extra development
- Make unlimited edits to your entire visual experience; for FREE
- Complete security & privacy of content; as per industry standards
- Access over 50+ integrations including analytics, payment gateways, etc. with the ability to integrate your own custom ones into the platform

- Seamless roll-out of changes and new features across all platforms in a processified manner
- Have a dedicated team that's at your service round the clock
- Work with a partner that's invested in your success

In Summary

With easy high-speed internet access, affordable mobile devices and growing number of platforms, it's clear that our content consumption habits will continue to grow exponentially. And with so many new content creators entering the fray, it is the need of the hour for serious players to build a unique positioning in the market through their own custom OTT ecosystem. It could be the difference between building a great revenue-generating business with your content or simply being remembered for a few pieces of 'viral' content.

Need help understanding more about setting up your OTT platform? We're here to help! Let's chat! www.enveu.com/

Go LIVE with OTT apps across 12+ platforms simultaneously!

Diving in to fill the vacuum in esports audio

Although still in its relative infancy, esports has gone from a niche sector to a global billion-dollar industry that is drawing huge investment and has a rapidly surging fan base around the world.

When we think of esports, it is the exciting action in the venue and on screen that first springs to mind, but audio plays a far more critical role than first meets the eye. The requirements of esports audio are quite specific compared to any other sporting event or competition, relying on various functions, that in turn require a range of products to support them.

Marc Wilson
*Managing Director,
Glensound*

Unique audio requirements

First, the gamer needs a physical interface to connect their headphones and microphones in to. That might be a three-pin mic input and a headphone jack or mini jack, sometimes it is a TRRS microphone with a multi-pin mini jack. Second, you need a way to get the game audio to the gamer. With multiple tournaments across different gaming platforms – PlayStation, Xbox, PCs, etc. – the source of that audio can come from a wide range of locations, from an analogue audio signal to USB audio or a network-based audio signal from a Dante/AES67 network. So, you need to be able to receive game audio in a wide range of formats depending on the tournament and the hardware being used.

Within a typical esports tournament, you have two teams of six players plus a coach, who need to be able to talk to each other. So, being able to generate and distribute that mix is imperative. It is not a particularly demanding thing to do, but it is just one more function that is required withing the context of esports.

There are some factors that are unique to esports, such as the need to manage white noise in between games; this is yet another aspect of audio that must be handled. Players generally have two pairs of headphones; one for game audio, and a pair for receiving white noise. White noise is pumped out to player headsets in between games to dampen crowd noise, and information from commentators and shoutcasters that could offer a competitive advantage. Having shoutcasters in the arena is another element of esports that sets it aside from most other sports. Their role

is to commentate during the action, break down the key points of the live action and act as a host between the matches, interviewing experts and players.

Supporting all these functions makes for a complex audio set up and longer configuration times as kit moves between different game and tournament formats. Unlike a traditional sports production environment that primarily remains the same across everything from football to ice hockey, no two esports events are the same; different games will continue to have different situations that have to be accommodated. Audio engineers and technicians have learned to work around the need for multiple boxes, but until now there has not been anything that approaches a perfect solution.

Traditionally, esports tournaments have been supported by multiple broadcast systems, and Glensound has provided solutions to several tournaments and events in recent years. Having worked across a few tournaments, we soon saw what the issues were.

Working with an experienced esports producer and consultant in the early days, we began to develop a solution that we felt would handle all the distinct functions of esports audio more effectively and efficiently than the existing approach.

Audio

Audio

Once the industry learnt what we were doing, we very rapidly began to get positive feedback along with suggestions on the real-world requirements of gaming companies and tournament producers. For example, we had requests for no player control over game audio feeds, support for de-embedding of SDI audio, and embedding of game audio into SDI audio streams, to name a few. Before we even got to the launch stage of the base product that we have, we had come up with a variation in response to a specific customer's request.

Glensound's heritage in commentary, where everyone likes to do things in their own way, means we have the know-how needed to provide our customers with different variations of our systems, so we have a good basis for accommodating the varied needs of esports.

The result of our own observations and the feedback we had from customers is GTM, which we launched at NAB Show 2022. Part of our Dante/AES67 audio over IP range, it is designed to manage the firewall challenges of esports audio.

One box to rule them all

With GTM we have removed the need for a separate product to generate all the required mixes for gamers, coaches, referees, and commentators. The system delivers a pre-defined multichannel 'team mix' bringing together all the players and coaches required in a group, with a dedicated mix generated for each team or user in a tournament. Separate modes allow referees/judges, shoutcasters and coaches to communicate as needed.

We have designed a solution that easily handles first-person game environments, where players need stereo sound for greater responsiveness, and require white (or pink) noise to be pumped in by sound engineers in off game periods. Isolating the different audio categories is a key challenge during gaming events and often involves the need for multiple systems and this is something we have now solved.

Furthermore, we have combined the multiple functions required to support interfacing and communication during an esports tournament into a single device. A simple to use panel with three level mixes allows players to control their own audio mix quickly and easily, while headsets and headphones plug directly into the panel to deliver game audio, team comms and the player's own voice. Fully remote controllable and configurable by tournament engineers, the system allows the game source audio to be picked up from

multiple sources (SPDIF, USB, network, analogue etc.) depending on the tournament format, and supports multi-channel mixing pre-configurable inputs from our Dante platform or de-embedded audio from an SDI connection.

In short, we have created a way to at least halve the hardware costs for a large tournament, plus delivered time savings. Creating a single box that can be used by all the participants means it is faster and easier to configure and set up.

The response from esports customers has been overwhelmingly positive. Glensound has been around since 1966 and we have never had such a response to a launched product as we have had to GTM. It is as if there was a vacuum in esports into which this solution has been sucked in gleefully.

The esports world is an exciting space for us to be involved in and learn from. We have provided an easier and smarter way to manage a complex issue and the industry has welcomed us with open arms. Glensound is now talking to a high proportion of the major games producers and gaming companies about projects and how we can tweak our designs to meet their specific needs.

Creating XR content

XR is one of the trendiest and most recent flavours of Virtual Reality, and many understand it as the usage of virtual backgrounds, displayed on large LED video walls, for movies, drama, or live events. However, the concept of XR (Extended Reality) goes far beyond these applications, which are often spectacular, but also do not take advantage of the many possibilities this technology can provide.

Miguel Churruca
Marketing and Communications DIrector, Brainstorm

As a form of Virtual Reality (VR), **Extended Reality (XR)** can be defined as the combination of real and virtual environments, if we assume the concept of Virtuality Continuum as defined by Migram and Kishino. According to these authors, between the 'real' reality as captured by the camera and the generation of completely synthetic images there is a wide range of combinations of real and virtual elements that generate what is called Mixed or Extended Reality (MR or XR). Therefore, contents such as 3D virtual sets, Augmented Reality (AR) or even Immersive Mixed Reality (IMR) will fit into the XR concept. And, in essence, we can consider the virtual scenes or backgrounds displayed on a videowall a virtual set, that is directly displayed on a physical medium (LED wall) rather than composed using a chroma set and viewed on a different screen.

There are many applications for **LED-based XR** production which outperform chroma set production, starting with live virtual sets displayed in the LED walls so not only the audience at home can see it, but also the live audience on a physical show or event can see it. Also, excluding the need for green sets or chroma keying can be quite interesting for **film and drama productions** when virtual environments are required rather than physical scenarios and props. On top of that, we can add in-screen **Augmented Reality (AR)** content that can be shown live, rather than using real-time renders and combine the scene on a separate screen.

However, it is important to point out that LED-based XR technology is not an answer to any possible VR requirement, as in some cases it shows several disadvantages compared to traditional chroma keying. Issues with focus, pitch, moiré, delays and many other should be considered before deciding which method (LEDs or chroma keying) is best for our virtual content production.

When using LEDs as background/floor, the camera captures the combined image of the background rendering and the characters. However, there is **no technical reason** why the LEDs can't be replaced by a chroma set and vice-versa so, using one method or the other will depend on the content requirements or user preferences. As we mentioned earlier, LED videowalls for XR do have significant advantages over the chroma sets, and the most obvious one is not needing any sort of chroma keying, so the talent integration in the scene becomes easier. Also, as LEDs are light emitters, they contribute to the illumination of the scene and the characters while providing realistic reflections and refractions.

On the other side, when LEDs are used in smaller sets or closer to the camera, the limitations of this technology may become significant. In broadcast, or sometimes drama environments, we are often short of space, and therefore we will find smaller, and closer to the camera, LED video walls, which can result in moiré artifacts when capturing the scene on camera, depth of field issues, or restrictions in the camera movements, for instance. These issues increase when using corner or shaped LED installations.

And when using LED floors, it becomes more complicated to realistically integrate the talent on the set, as the shadows may need to be included as a separated process, even using some kind of talent tracking to know where to place them – remember LEDs are light emitters, so talents and objects do not drop shadows or reflections on them as in a "standard" surface.

So, as said before, XR content can be created using both LED video walls and chroma sets, at the same time that it allows for combining both techniques to produce the final content. On top of that, users not only can include additional AR elements on top of the talents, but also tele-

LED videowalls can be used to display in-context AR in XR productions

transport characters shot in remote places, live, and insert them on the scene. Tele-transporting a talent to an XR scene implies considering the keyed talent an AR element, because, when working in a 3D environment, the talent must be inserted with correct size and perspective and eventually interact with virtual elements by dropping shadows over real or virtual elements or producing reflections, like Brainstorm's 3D Presenter technology allows for.

Including AR elements on XR content can be done in different ways, depending if it is required to display these synthetic elements behind or in front of the talent. This is irrelevant when using chroma sets, in which the character is keyed over a virtual background, and the AR objects are just additional elements in the scene, and in most cases, they can be rendered using the same workstation that composes the final scene. When using real scenarios, AR elements must be placed in front of the talent(s), but when using LED-based XR we have the option of adding the AR on top of the talent and/or display them, in-context, behind the talent, using the videowalls. As we see content with the perspective of the camera it is possible to project AR elements integrated with the background scene in the LEDs, and it will change perspective accordingly. And it is also possible to render these elements in front of the talent, for which they will be rendered using an additional workstation which received the same tracking data used to display the LED content. This will ensure performance and a correct perspective matching of the whole composition.

It is worth noting that the mentioned setups and workflows with AR require a careful management of delays and other issues like depth of field to ensure that the AR elements are correctly placed in the scene, and in accordance with the talents and the camera views. And, in order to ensure a

seamless integration between the AR elements and the background, they should be rendered using advanced rendering techniques. These include not only game engines like Unreal Engine, but also PBR (Physically Based Rendering) or even real-time ray tracing, which takes into account lighting, object interactions etc., if we need the final result to be indistinguishable from reality.

So, summarizing, XR is more than just placing virtual backgrounds on a large LED video wall, and provides a plethora of possibilities for live and virtual production, also in combination with chroma sets if required. Because of all the above and having been at the forefront of virtual technology for the last 30 years both with chroma and LED/projection environments, **Brainstorm** has produced the comprehensive **White Paper Brainstorm Guide to Understanding XR**, to clarify concepts about XR technology, its applications, workflows, advantages, and disadvantages.

The **Brainstorm Guide to Understanding XR** can be downloaded from here.
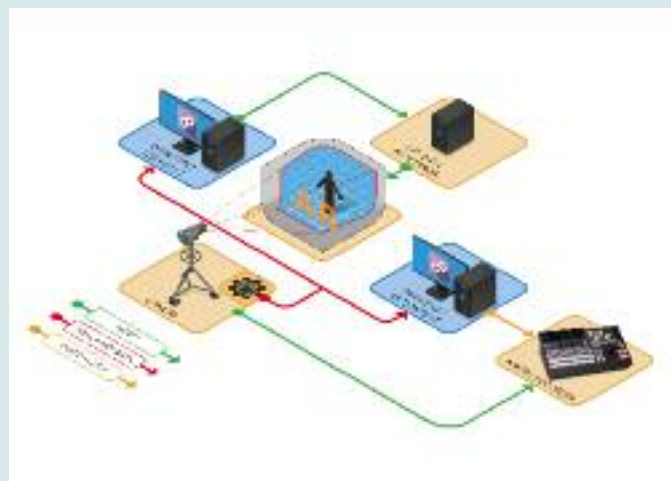
It aimed to be at the heart of the media localization
business and now leads the market in online tools,
servicing thousands of users in over 100 countries

OOONA: Media Localization Tools for the Future

Online subtitle editors first made their appearance approximately a decade ago. Originally elementary in functionality, they were introduced to the wider public through platforms such as Amara's as a means for anyone to easily add subtitles to online videos. They banked on ease of use and access from anywhere, on any machine, coupled with a free subscription model for the basic package. Digital nomads loved them, and such platforms quickly got a large fan base that allowed them to grow and eventually spin out professional packages. One could even say that such online platforms had a lot to do with democratizing subtitling.

Alex Yoffe
Product Manager, OOONA

Founded in 2012, OOONA was a pioneer in the online subtitling market and one of the few software providers that do not also offer language services. With a user-first culture, OOONA embarked on developing fully cloud-based professional subtitling solutions. It aimed to be at the heart of the media localization business and now leads the market in online tools, servicing thousands of users in over 100 countries.

Online subtitle editors have since been adopted by most top media localization providers, typically integrated into a translation management system. Work allocation and completion are thus managed and controlled more effectively and transparently with in-built communication tools that facilitate remote and collaborative work. Production can be scaled up easily as requirements change.

Primary factors for the selection of online subtitle editors by businesses have always been the data security and ease of deployment implicit in all cloud computing applications. These have been major selling points for the OOONA Integrated platform as many prospective clients look for secure solutions in which subtitlers can work with DRM-protected videos in a browser.

"Becoming a fully invested cloud facility has been at the core of our international growth plans so as to best manage security and complexity across our global offices," explains Eutdel Garcia, Vice President of Engineering & Facilities at The Kitchen International which recently partnered with OOONA to materialize this plan.

Despite the fast adoption of online editors by language service providers, subtitlers themselves had been holding on to their preference for desktop tools for many years stating two main reasons: functionality and internet connectivity. The latter may have been true ten years ago but 63% of the world population is now connected to the internet with the northern hemisphere enjoying much higher internet speeds than the southern. Sophisticated subtitling functionality such as audio scrubbing has become available in online editors and one can already note a discernible shift in user preferences which is expected to continue as internet penetrates the remaining part of the world and connectivity issues become sparser.

The thousands of unique OOONA users who log onto the platform on a monthly basis are testament to this. "Only last weekend we had a record number of users online simultaneously without a single helpdesk ticket raised," says Adam Tal, OOONA Software Architect. "You know the system is solid when this happens."

Media Localization

So what can users expect from online tools in the near future?

Translators have been vocal about the lack of translation aids in subtitle editors. Examples are concordance and termbase searches, predictive typing and dictation support, all of which are ideal for integration in online tools. Similar suggestions came up in the #OOONA2022 contest that we run among our users. More automation is certainly on the roadmap for OOONA Tools. We have already integrated a selection of ASR and MT engines, so clients have the option to select the right engine for each language they work in. A deeper integration of such tools can easily be envisaged, with support for customized solutions, toggles for the use of available metadata and quality estimation indicators, to assist users in reaping maximum benefits from language engines.

"One of the reasons we decided to use OOONA's platform is their responsiveness and their forward-thinking attitude," says Marcy Gilbert, founder and CEO at IDC Digital and IDC LA. "We have been looking for ways to not only streamline our work but also to increase our staff's productivity. OOONA was the right fit for us."

Another favorite functionality rolled out recently is the ability to display multiple subtitle tracks simultaneously. This is useful for Japanese where one of these layers is displayed vertically instead of horizontally to satisfy the specific requirements of the Japanese subtitling conventions. This new feature also facilitates multilanguage QC as well as being an integral part of our tools' scripting functionality where different speakers' dialogue needs to be represented simultaneously – as is common in voiceover and dubbing workflows – or simply to add audio description tracks to the same project.

"We are currently focusing intensively on developing our scripting tool further," says Wayne Garb, OOONA founder and CEO. "Our vision is to create an all-encompassing tool which can be used for any type of script, be it regular post-production, audio description, voiceover or dubbing script." This is related to the integration of synthetic voice technology which we have recently made in collaboration with Veritone. The latter can be used to voice such scripts automatically. A preliminary demo was given at the April 2022 NAB Show in Las Vegas and the next release is scheduled to include over 100 synthetic voices.

"We were looking for a partner to help us make our library of stock and custom voices available to our clients so they could streamline audio descriptions within a single localization platform," says Drew Hilles, senior vice president of Global Commercial Sales at Veritone. "OOONA's market reach and stellar dev team make them the ideal partner."

Such API integrations with state-of-the-art third-party tools and platforms are part of our core business strategy for the future in order to best serve our clients' interests and allow them to provide seamless media localization services. We strongly believe in secure workflows, so we provide a full API for OOONA Tools which have been integrated into multiple management platforms. One of our most popular products is the Convert API which allows easy conversion from and into over 50 subtitle and caption file formats. It can be purchased at a click of a button as a plug-and-play product straight from the OOONA Shop.

At the same time, we stay true to our philosophy of making our suite of state-of-the-art tools accessible to independent users as well as large enterprises so everyone can enjoy them for as little as a simple weekly subscription.

For more information on OOONA products, visit our shop at https://shop.ooona.net.

Woody Technology:
Supporting Discovery Sports to prepare its technical infrastructure for the Olympic Games

The challenge: Discovery Sports' activity revolves around its live and on-demand coverage of major international sports events, including Eurosport's multi-platform coverage of the Olympic Games Tokyo 2020. In order to best deliver this highly qualitative content to its viewers and subscribers, Discovery wanted to build greater usability and flexibility through a significant upgrade and centralization of their technical infrastructure.

Along with Grass Valley, Woody partnered with Discovery Sports to support the transformation of its scaled and complex production and broadcast infrastructure across Europe. This was a major tech transition for Discovery's sports programming and content, including streaming and Eurosport channels.

The vendors assignment was to provide all systems required for production – including media management, post-production and playout – and to make cloud deployment a priority.

The transition entailed a number of challenges:

- Every Discovery and Eurosport journalist had to be given access from anywhere in the world using Single Sign-On (SSO)
- Specific cloud safety norms had to be applied
- The infrastructure had to be fully compatible with PC, Mac, Android and iOS clients
- The Signiant solution had to be the File Transfer Acceleration technology
- Hard deadlines had to be fully prepared ahead of the Olympic Games

Implemented solution

In order to meet Discovery's unique requirements, Woody set up one 4-node IN2IT exchange farm in London and a similar one in Amsterdam to transcode files ingested from any location: media are redundantly ingested to both platforms and accessible via the new Grass Valley AMPP Asset Management (AMPP AM) deployed in AWS.

Another IN2IT exchange cluster allows access to all IN2IT ingest profiles from every client station, regardless of their operating system, and from everywhere in the world. Profiles are filtered for each user according to the rights granted by Discovery and Eurosport administrators. Discovery hosted the servers with its partner AWS.

Every time Discovery sets up a new profile, IN2IT access clients are automatically updated. The platform includes Single Sign-On: user authentication works via Okta integration, a provider that enables users to utilize their corporate credentials in Woody applications.

Emmanuel Jacky
Engineering Director MAM, Post Production and Playout at Discovery

Thanks to Woody's partnership we have the perfect tool to import content. In a cloud environment this is the gateway to our MAM with the security level expected

### Various client interfaces to meet remote user needs

Regarding IN2IT access, Discovery opted for floating licenses. More than 100 Discovery and Eurosport production staff and journalists across the world used the internet and local networks to connect during the Olympic Games. The solution demonstrated strength and reliability. Thanks to this success, the Woody system has been fully used for a second Olympic Games, during the Beijing 2022.

Woody also developed a light IN2IT exchange interface designed to enable fast and easy upload via a web browser. This cloud-based UI makes it possible to browse files locally, and to then upload and send them according to IN2IT profile workflow rules.

System administrators can deploy this agent on journalists' computers with a single click and in compliance with Discovery workflows. Users can additionally benefit from a dynamic integration with AMPP to populate metadata fields.

The UI gives journalists great flexibility and responsiveness to meet tight deadlines, especially when covering major sports events such as the Olympic Games.

And in order to make IN2IT exchange fully compatible with all operating systems, Woody Technologies created a macOS version of the new upload agent.
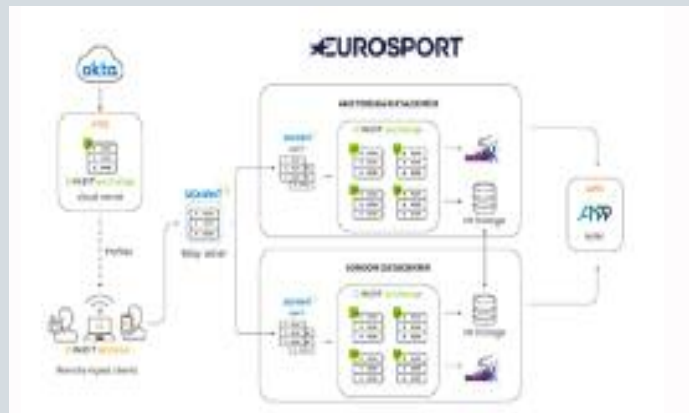
Smooth collaboration with Discovery and partners

Ahead of schedule, and to prepare Woody's intervention, Discovery acquired a staging platform and tested it at the Tour de France and Wimbledon events.

To meet Discovery's needs, Woody integrated the Signiant solution and developed a load balancing system on Signiant, so Discovery could easily scale up the number of Signiant agents. AWS S3 integration in IN2IT exchange was also widely used in Discovery workflows. Close collaboration with Discovery's project team in Paris allowed for seamless and timely adaptation to project changes.

The IN2IT platform

IN2IT solutions are designed to cover all ingest and publishing needs of media companies. They offer all users a high level of usability and intuitiveness. They are already adopted by numerous journalists, operators and editors from leading broadcasters and post companies all over the world.

The IN2IT platform relies on a flexible workflow engine specially designed to handle media processing tasks. The result of 10 years' development work, it includes multiple connectors and workers, enabling smooth integration with industry-leading solutions (MAM, NRCS, storage, transfer acceleration,…). IN2IT solutions are easy to configure and just as easy to use, empowering engineers to build complex workflows in a short period of time. They can be deployed in the cloud, on-premise or in hybrid architectures.

Spicy Mango:
Is sport becoming too commercial?

Sport as an entertainment genre like film or TV has been emerging for a couple of decades especially here in Europe. Once Sky started to pay big money for exclusive TV rights for Premier League football, the landscape changed. Sports like rugby turned professional for the first time and tried to compete, initially unsuccessfully, with football for a share of the cash and audience.

However, now private equity and other investors have spotted the underperformance in terms of commercial value for some sports, their investments are beginning to show the direction of travel to maximise that untapped value.

The question is though, is it all good for the sport and the fans?
A recent example of this is in rugby and specifically the English Premiership – although the United Rugby Championship could also be cited. Channel 5 was the home of the the English Premiership weekly highlights show, but their contract was not renewed for this current season, meaning that the only way to watch the Premiership was through BT Sport, the sole holder of the live rights and highlights. Then came an announcement in January 2022 that the Premiership Rugby will return to free-to-air on ITV with a new highlights show and they will show four live matches this season as well as the season final in June, live on ITV4.

Premiership Rugby chief executive Simon Massie-Taylor said: "Our ambition is to grow the game and make Gallagher Premiership Rugby available to as many people as possible. BT Sport have done an amazing job in building the core Premiership Rugby TV audience and the ITV partnership allows us to expand our reach into the households of millions of other rugby fans. This season our average match audience on BT Sport has risen 30% year on year, which shows the potential.'

"We also want to make the Gallagher Premiership Rugby Final 2022 the most-watched in our history and we believe we can achieve that with the match screened on both ITV4 and BT Sport. A phenomenal proposition for English club rugby's showpiece occasion."

Despite the good news that ITV is now bringing regular free-to-air coverage of top-level club rugby to viewers across its platforms, there are other aspects to consider about the future of rugby and sports in general.

What about other sports?
We can also consider the English and Wales Cricket Board's (ECB) new competition that rolled out in the summer of 2021: The Hundred – an even more quickfire version of the game than the Twenty20 format which was launched in 2003. The aim of this new format was to attract new audiences both attending live and by screening a number of matches on free to air broadcast TV via the BBC.

Why, if the revenue from selling media rights to subscription TV platforms has been so good for so long, do these major sports and their commercially focussed investors now feel the need to reach a wider audience on free to air TV?

The answer lies in the fact that whilst selling media rights to pay-TV has brought much needed investment and stability to these major sports, the viewing audiences are relatively small. The knock-on effect is that a whole generation of young people have missed out watching these mainstream sports and consequently have not had heroes to admire and imitate in their back gardens and on into local clubs and the development pathways.

It feels as though there has been an awakening that in the not-too-distant future unless a new audience can be engaged there will be no new TV money as subscriptions dry up and media values decrease.

Opinion

A welcome return to free to air

So it is with some optimism that more sports are now being made available on free-to- air platforms. For those fans who become more engaged they will have a choice to pay more if they'd like to watch more matches by taking out that pay-TV subscription.

When a fan is ready to pay more for this exclusive content then broadcasters will need a broader engagement strategy to deliver them what they want, where they want it and when they want it. Choice and flexibility are key to winning that fan's share of wallet when it comes to where they spend their subscription pounds or dollars.

In particular, cricket and rugby have already acknowledged that audience attention spans are shorter and have developed short format versions of their sports to address this.

"This is not just a millennial issue, all of our attention spans have changed to be shorter"

This is not just a millennial issue, all of our attention spans have changed to be shorter but across many more entertainment channels. We can so easily be drawn down the rabbit hole of Instagram, TikTok or YouTube watching short videos on our favourite topics for hours.

Broadcasters have to find a new ways to interrupt these random distractions and create a compelling narrative to entice fans in, for the initial short form and then into longer programming. However, it's all about the what, when and where. Content snacking on the move with short 3-5 min highlight reels linking to longer 10-15 mins packages all available online and a 60 min broadcast package for free to air TV.

The live experience can be made premium through subscription. F1 and Sky have done this well by providing a deeper fan engagement experience for subscribers with multiple camera angles, additional data not available to the casual viewer watching a shorter highlights show on free to air broadcast.

Evolution or revolution?

Fan engagement is a long-term play for sports and clubs. There has been a shift in fan attitudes towards watching sport on digital platforms that is unlikely to be reversed. The Covid pandemic has accelerated the adoption of streaming, and sports has historically been behind the curve in adapting to new trends and technology.

With the right technology, content management and delivery formats, fans – especially younger audiences – will be more engaged and now expect their world to be digital first and on their smartphone. Failure of the major sports governing bodies and broadcasters to adapt their offerings and methods of engagement will not bring in the new audience they crave regardless of the level of new investment from private equity.

Segmented subscriptions are likely to be the future of sports consumption for both broadcasters and governing bodies. If these governing bodies and broadcasters can add real value with their fan engagement choices by delivering timely, engaging content to the right channels then audiences will grow and long term loyalty can be built.

PlayBox OTT Stream:
Getting started in streaming

The idea of video streaming services as an added value offering for ISPs and telcos is naturally attractive. By winning regular users it makes the subscriber more likely to stay with the service provider so it is a double financial bonus, reducing churn as well as increasing fees.

Dick Hobbs
Independent consultant and commentator

Streaming

On the other hand, offering entertainment services is very different from the essentially technology-driven business of providing connectivity. Will managing the OTT streaming impose so much management overhead that it ceases to be financially attractive? What is required to establish the service, both in terms of management and in subscriber clients?

The solution lies in pre-built turnkey streaming video management solutions. PlayBox Technology recently gave me access to its OTT Stream product to investigate.

The first important point was that it "gave me access", rather than "lent me a system". OTT Stream is entirely cloud-hosted, and all actions, controls and management is via any web browser (I used Safari which is always a good test for sloppily-coded websites, and it worked perfectly).

The core of OTT Stream is the ability to store, manage and deliver very large amounts of content, in high-quality HD. PlayBox Technology specialises in playout automation for broadcasters and live streaming, and has ported those skills to the matter of delivering multiple concurrent streams.

Content management
It includes a content management system (CMS) to track the programmes and other material you offer your suppliers. Material can be uploaded individually or as batches, submitting video clips individually or in chunks with a single click or drag and drop.

There are tools to allow you to transfer a large library as an automated process. That applies wherever the original content is currently stored: on-premises, on a supplier's servers, or in a third-party cloud service like Amazon S3, Digital Ocean Containers or Backblaze. Once uploaded, content is

categorised, tagged and thumbnailed to help viewers find content. The structure of categories and sub-categories is defined by the user. This metadata also improves SEO, driving subscribers to the service as well as guiding content discovery.

The management system supports localised versions of the service, targeting geographic or demographic sub-sets of the audience. That includes multi-lingual support throughout the service.

Subtitle (closed caption) files are imported where available. In general, it is considered good practice, if not a legal requirement, to include access services for hearing impaired people.

The transfer process also automates all necessary transcoding to your chosen common format. OTT Stream handles multiple video file formats, like mp4, mov and avi. The platform also supports adaptive streams via HLS and DASH for low-latency live channel feeds. Streams can be embedded into custom pages in the platform to simplify channel setup.

PlayBox's broadcast heritage means that live streaming is part of the core software, so it is easy to add live programming alongside VoD. In turn, that means a telco or ISP could offer tailored services for customer bodies like communities, local government,

sports groups or houses of worship. If reaching a real-time audience is part of the service's remit, then building a playout schedule is a simple drag and drop exercise.

Applications

Alongside the central management layer, OTT Stream also includes a set of white-label applications, so you can design the user experience for subscribers on computers, tablets and phones (Apple and Android apps are included). Player apps include the ability to control the fonts and colours in subtitles, as well as turning them off if not needed.

These are well-developed applications, but offer large amounts of customisation, again through the simple web interface. You can add logos and typefaces, and build as many pages as you need. If you have a website designer they will find this a very simple and intuitive process. As well as simply discovering and playing content, consumers can build their own playlists as they are driven through the material on offer. So it seems easy to create a strong look and feel that matches your existing brand (or that of the customer for which you are hosting the service). At the same time, you do not need to worry about the mechanics: the online tools in OTT Stream allow you to make the service look the way you want without changing how the app works.

There is, incidentally, a hierarchical privilege structure in the admin side of the service. You determine who has the ability to modify any part of the service. So you could give one user the ability to add or remove content from the service, another only the ability to write SEO metadata, a separate group of users subscriber management, and of course keep a top level admin role for any major changes.

The core software has plenty of hooks to external systems. You will already have a subscriber management system which you can link into OTT Stream, to share some subscriber details. If you are launching a new service this could also be a useful way of marketing it.

Monetisation

While this could also be the route to manage subscriptions, it also has a full set of functionality for setting fees and managing subscriptions. These include links to credit card services and PayPal. Fees can be set by duration, and you can offer tiered services.

A central part of PlayBox's broadcast work is advertising insertion, so OTT Stream also supports advertising-funded VoD with campaign planning and advertiser billing. This allows commercials to be tied to customer demographics and date and time of streaming. You choose whether to offer AVoD, SVoD, or a hybrid service. Audience tracking and reaction is also vital to the success of a service, so OTT Stream includes integrations with Google Analytics, and the ability to log-in to social media services. You can process this data, for example to create your own ratings of each piece of content which can be displayed on the content discovery pages. You can choose to set up a reviews page for subscriber comments if you want, with the ability to moderate before publishing.

The content itself can be stored on your own local servers or in the cloud (there is tight integration with AWS). Obviously the intellectual property rights have to be closely protected, and appropriate DRM software can be attached, with the ability to return viewing numbers to the content owners.

OTT Stream is available either on a perpetual license or as software-as-a-service. The software is intuitive and comprehensive. It is clearly lightweight and tuned for performance, as it is very responsive and fast over a standard consumer internet connection.

In conclusion, it seems to me to be simple and intuitive to use, with the functionality you need to quickly set up and run a service. The ability to tailor the look and feel means you could also offer a complete streaming service to business users, giving them a painless way to offer their own content, including live streaming, bringing them closer to their own audiences and giving you new revenue opportunities and churn-resistance.

Telos Alliance:
Telos Infinity® Accelerates on Dirt!

Progressive American Flat Track saves money and time by streamline live event Comms using Telos Infinity IP Intercom Platform

Client:
Progressive American Flat Track

Problem:
Comms Were Difficult to Set Up, Integrate, and Troubleshoot

Solution:
Telos Infinity® IP Intercom Platform for IP-Based Live Event Comms

Benefit:
Telos Infinity for Live Event Comms Saves AFT Time and Money

Progressive American Flat Track (AFT) is the world's fast-growing motorsport and America's original extreme sport, with its roots dating back to the early 1900s. At its core, professional flat track racing is a hyper-competitive, adrenaline-fueled American motorcycle sport featuring custom-built and production-based motorcycles that reach top speeds of 140mph on the straights and 90mph in the corners, all piloted by world-class athletes.

Much has changed over the years, and AFT is now experiencing a rebirth with more than 300,000 viewers per event attending races or watching from afar via telecasts or live streams. In fact, as of the time of this writing, AFT has

joined forces with FOX Sports with an all-new multi-year agreement that will further expand the visibility of the world's premier dirt track motorcycle racing series, starting with the upcoming 2022 Progressive AFT season.

The Problem: Comms Were Difficult to Set Up, Integrate, and Troubleshoot

Reliable, simple, and efficient Live Event Comms are crucial for sophisticated live television productions. AFT's Comms, however, were consistently hard to set up, with an overcomplicated software interface.

Additionally, some device settings were only available on the hardware itself,

and there were multiple areas in the signal flow to set input and output gain. This made for extremely difficult troubleshooting. Integration into any of AFT's current equipment was also challenging. With AFT utilizing a rack full of Blackmagic Design ATEM hardware, they needed an Intercom system that could handle this sort of integration with enough play in levels to make Comms crystal clear in the control room, as well as in the field.Zach Prescott (pictured below) has eight seasons under his belt with AFT. He started working with American Flat Track back in 2014 as a Camera Operator when the series was known as AMA Pro Flat Track. He now works full time with the company as Production Manager.

He and his team started livestreaming the pro series on NASCAR's streaming platform, Fanschoice.TV, and now covers all rounds of the American Flat Track series on NBCSN and live on NBCSN's TrackPass from AFT's newly acquired full-sized television production trailer.
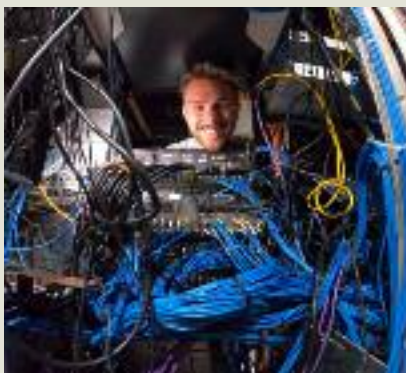
"We went from following the action in the paddock with a single wireless security camera, to building out a Featherlight Race Hauler with a small control room in the trailer's office. We then expanded to a 6+ camera show, utilizing wireless 5ghz

radios and Teradek H.264 encoders, using only UHF radios as Comms from the director to the camera operators," says Prescott.

In 2017, Prescott realized they had outgrown their Comms setup and purchased a digital Intercom system that they thought would be quite the upgrade, but instead were introduced to even more problems. "It was miserable because most settings in the software were not available on the actual devices; they were a nightmare to set up on our current network infrastructure; and they just did not play nice with our Blackmagic ATEM Talkback Converters."

The Solution: Telos Infinity® IP Intercom Platform for IP-Based Live

Event Comms Two years later, as Prescott was on his way out of the exhibit hall at NAB NY 2019, he stumbled across the Telos Alliance booth, and was "taken away with how awesome, easy and straightforward the Telos Infinity system was, and best of all...it could actually do everything it said it was going to do!"

Infinity was a game changer for me. I can now talk back to my producer, the audio engineer, and the color commentator with ease, which made it easier to focus on announcing.

Scottie Deubler,
The Voice of American Flat Track

AFT had the opportunity to provide its production services for a one-off event – a triathlon – and used Telos Infinity in a trial run. "We set Infinity up quickly and with very minimal help. When we did need help, however, Telos Alliance's support

team was absolutely amazing. In fact, their support is one of the main reasons we will vouch for Telos, anywhere and anytime," says Prescott.

Having had a positive experience with Infinity, now the trick was to convince management they had to get rid of the existing 2017 system, which was still relatively new, in favor of Infinity. "As soon as my boss, Gene Crouch – Chief Operating Officer and financial decision-maker at AFT – used it personally, he was immediately onboard for the purchase."

With the green light from above, AFT purchased an Infinity system and is now using six Telos Infinity Master Panels, two Telos Infinity Beltpacks, and Telos Alliance xNodes to tie in camera Comms with analog ins and outs for two-way radio intercoms. The Announcer's Booth, Pit Talent, and Race Control now have full communication from the field back to the production control room and can now ensure a smooth event.

"Our broadcast liaison to race control is always located in the grandstand tower, which is sometimes half a mile or more away from the control room in the production truck," says Prescott. "We run our own fiber optic network to the tops of the grandstands, and because Infinity is IP-based, I can piggyback off the camera's fiber network back to the SFP ports of the dedicated intercom network switch. All comms via UHF two-way radios, fiber partylines, and announcer consoles can now be tied into the Telos network." The Race Control Kit now has two fiber media converters in it.

One being an NDI to HDMI decoder for a Multiview video feed for the

Race Director, and another that is strictly for the Broadcast Liaison's Infinity Beltpack. When he keys up his Beltpack, it goes into the xNode out and into a UHF base station transmitter so anyone in the paddock, TV control room, or on track can hear him.

The Benefits: Telos Infinity for Live Event

Comms Saves Time and Money
AFT's A1, Tevin Pfifer, who handles all things audio on their show, took the initiative to begin pushing the capability of Infinity's Dashboard Software and created multiple partylines, IFB mixes, and really began to dial in the settings and features of the Infinity System.

The second round of the 2021 season was the Yamaha Atlanta Super TT at Atlanta Motor Speedway, and "one of the first "quick turnaround" live to tape events we had where we were able to save a significant amount of time in post-production thanks to the capability of Infinity's xNode and Link Licenses, which gave us the ability to communicate with the off-premises Control Room and Announce booth," says Prescott.

"Before, if we were producing our live streamed show on Saturday it would get sent to NASCAR Productions, where the recorded show would be VO'd and cut down to air on NBCSN the following week.

Now, we can go live to tape with less than a 24-hour delay for NBCSN with confidence in the Infinity system.

In Atlanta, we used two Telos Alliance xNodes talking to each other over public internet – one in the control tower in Charlotte, where they take in feeds and procure it live, and the other in the production trailer trackside in Atlanta Motor Speedway." Since they first began with Telos Infinity in 2019, AFT's needs have changed, partly due to the pandemic. During COVID, for example, Prescott was able to VPN into the production truck with the ability to control everything but the intercom.

When we are in the most mission critical times of our live broadcast, the Infinity system simply works, and it is now easier than ever to make changes on the fly.

Luckily, Telos Alliance was at the ready with a new solution for that in Telos Infinity VIP Virtual Intercom Platform. AFT has plans to implement the new Telos Infinity VIP Virtual Intercom panels next year. That way the AFT team cannot only have a virtual keypanel in its competition trailers, but also if a vital team member is not able to be at track, they can still communicate with the trackside team and help from home without requiring interconnectivity on the LAN.

"In terms of the service, training, and support I have received from Telos Alliance, I have saved countless hours of troubleshooting, configuring, and setting up the Infinity system over traditional Live Event Comms," says Prescott.

Case Study

"When we are in the most mission critical times of our live broadcast, the Infinity system simply works, and it is now easier than ever to make changes on the fly. Plus, I have the comfort and reliability that I am only a phone call away from some of the best technical support I have received in the industry.

The time saved with this system is constantly money back in our pockets, and I could not have made a better decision than to go with the Telos Infinity IP Intercom System for our Live Event Comms."
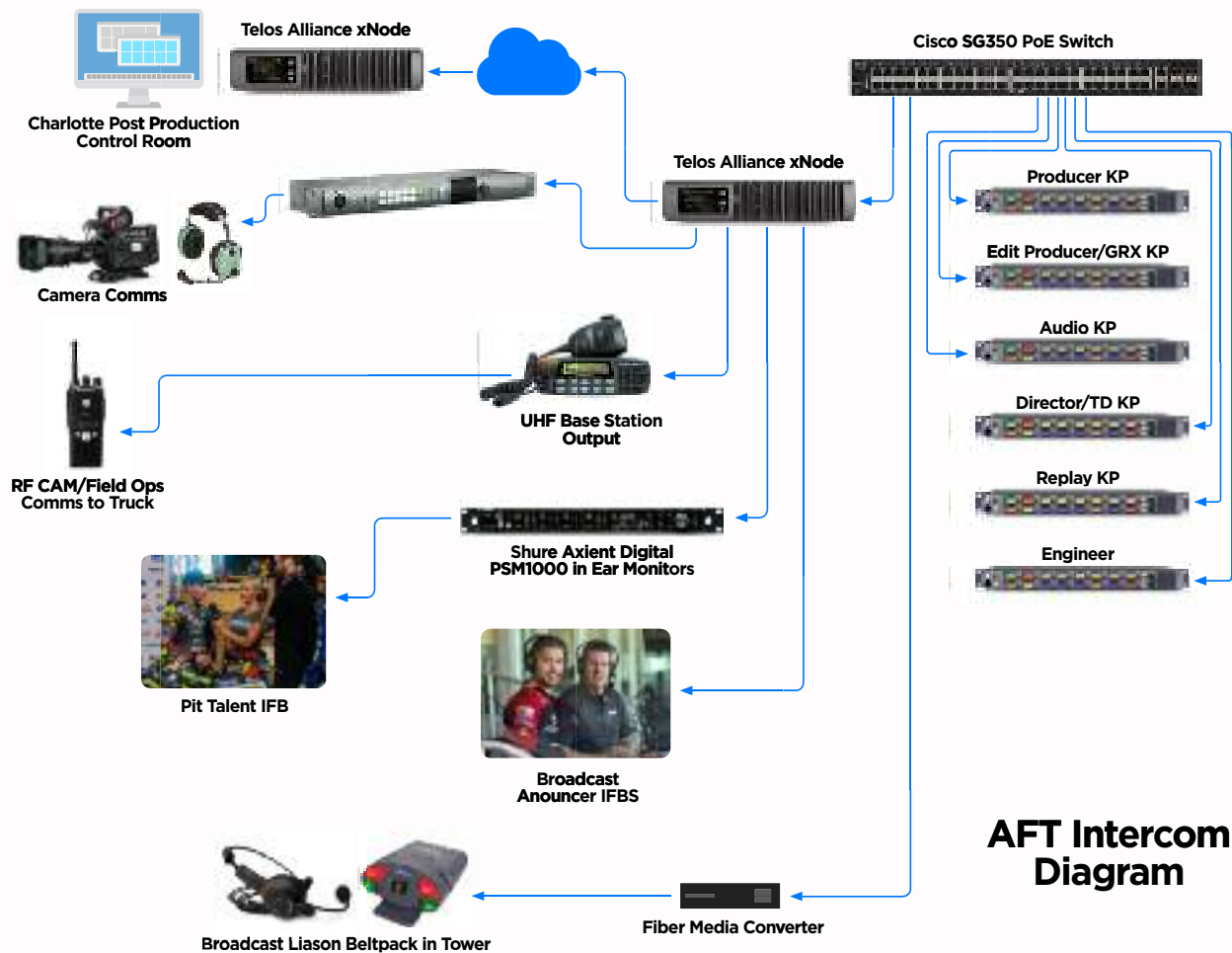
Improvements to AFT Live Event Comms

- Easy setup with the ability to chain quickly, on-the-fly, with the back end
- Keypads work close to industry standard so anyone can use the Infinity system with minimal learning curve
- Eliminating the big matrix rack in the production truck and associated cabling for huge space savings
- Always-on customer support for easy and fast answers to questions, saving time and money
- IP-based for plug-and-play connectivity
- Time and money saved due to ability to cut shows live with no need for off-premise editing

Are you ready to take your Comms to a new level of efficiency? We are ready to help with the most advanced intercom platform available, all on an IP backbone.

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