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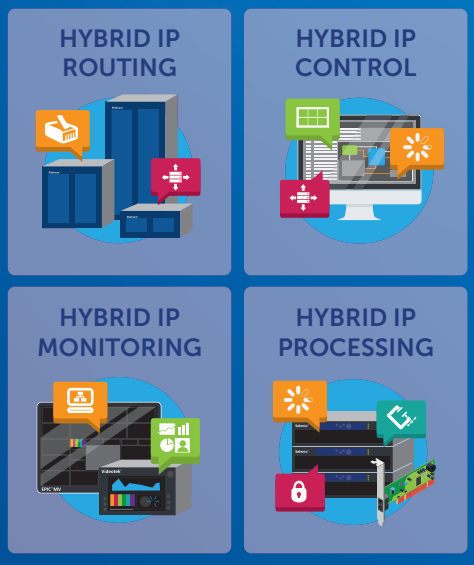

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As Tokyo prepares to host the 2020 Summer Olympics, 8K took centre stage at Inter BEE 2017 while visitors were also checking out 4K/Ultra HD, HDR and IP.

Emerging technologies form bedrock for re-invention of broadcast industry

The broadcast industry is undergoing profound changes on a scale never experienced before. How content is being consumed has changed irrevocably, while innovative technologies continue to emerge. What exactly can these emerging technologies bring to broadcasters, and how can they allow broadcasters to re-invent themselves and stay alive? **SHAWN LIEW** reports …

The Land of the Rising Sun is gearing up for what could be the biggest Summer Olympic Games in history, when Tokyo hosts the 2020 Olympics Games.

In technological parlance, the 2020 Olympics will indeed be historical — it will be the first major sporting event to be broadcast in 8K, or Super Hi-Vision, as termed by Japanese public broadcaster NHK.

While last month's InterBEE 2017 highlighted a myriad of technologies, including 4K/Ultra HD (UHD), high dynamic range (HDR), HEVC/H.265, virtual reality (VR) and IP, 8K certainly captured the imagination of trade visitors, particularly when NHK announced that it will begin to broadcast in 8K by end-2018.

Before the 2020 Olympics Games come around, however, a number of high-profile sporting events are now on the horizon, and in all probability, will cement the role sports is playing as a test bed for emerging technologies. The Fédération Internationale de Football Association (FIFA), the governing body of football, for instance, has announced that all 64 matches of the 2018 FIFA World Cup will be shot in 4K/UHD + HDR.

The role emerging technologies will play in the race for eyeballs

The emergence in recent years of the likes of Netflix and Amazon Prime Video has fundamentally disrupted how content is being consumed. And as more like-minded regional video-on-demand (VoD) services continue to join the fray, the deviation of content consumption away from traditional platforms is likely to continue.

As Peter Schut, CTO of Axon, pointed out, Netflix and Amazon Prime Video are already making 4K/UHD a primary specification for their programming, and are delivering it to homes as standard, rather than offering it as a special feature or test channel. He added: "In order to compete, broadcasters must now provide the viewer with an 'absolutely stunning' picture, regardless of the platform."

The answer, Axon believes, can be found with more pixels, more colours and HDR. Schut, however, cautioned: "We need to provide better pixels and do it right the first time. We have one chance, and if we get it wrong, the audience will switch off."

For Adder Technologies, a keyboard, video and mouse (KVM) solutions provider, 4K/UHD represents "another major step" forward for broadcasting.

But where does KVM play in the 4K/UHD equation?

"4K/UHD-enabled, IP-based KVM systems work in the same way as regular IP-based, high-performance KVM systems," Loki Ong, VP sales, APAC, Adder Technologies, explained. "They

Early last month, APB and Ideal Systems held a series of seminars in Hong Kong and Singapore. Entitled *Professional Media over IP: Building a future-proof media facility*, the seminars brought together broadcasters from the region to discuss the transition to IP, and how they can start planning for their own transition today for tomorrow.

allow operators to remotely access numerous computers and workstations with a single keyboard and mouse, that are also capable of delivering amazing 4K/UHD image quality, as well as SD and HD."

When executed properly, there is no doubt that 4K/UHD + HDR can add a compelling dimension to the viewing experience. However, as *APB* recently reported, 4K/UHD may be a step too far for broadcasters in the Asia-Pacific region in the near term. For starters, many broadcasters in the region have yet to complete the analogue switchover and it is hard to see any country leapfrogging directly from SD to 4K/UHD.

Meanwhile, it is interesting to note that the DVB Project, even as it continues to work on its specifications for 4K/UHD, which includes features such as HDR, high frame rate (HFR) and wide colour gamut (WCG), is urging broadcasters to give due consideration to the possibility of HD+HDR.

Dr Peter Siebert, executive director of the DVB Project, told *APB* that 4K/UHD is currently more expensive to implement, and terrestrial networks currently do not have the capacity to support a large number of 4K/UHD services.

However, Dr Sibert also pointed out that broadcasters are free to use either 4K/UHD or HD resolutions in combination with HDR, HFR and WCG, depending on their requirements and, perhaps more importantly, where they are in terms of technology life cycles.

One technology where the jury is firmly still out is VR. Perhaps, wary of the relative demise of 3DTV since its omnipresence at major trade shows as recently as 2010, broadcasters are asking themselves: "Will viewers really embrace a technology that requires the donning of headgear in the home? How long can viewers watch content in VR before viewing fatigue or sensorial sickness sets in?"

VR and, indeed, augmented reality (AR) are hardly new technologies, but it is only now that broadcasters are beginning to explore how to bring these technologies into their operations, said Olivier Cohen, hybrid virtual solution, product manager, ChyronHego.

"VR and AR offer the perfect solution for broadcasters who are looking to create large volumes of eye-catching content using fewer resources," he elaborated. "From a simple virtual set for presenting a variety of branded content with compelling 3D-augmented graphics elements, a new breed of compelling tools is offering broadcasters a chance to push their creative and physical boundaries to lure younger and more distracted audiences."

Much like 4K/UHD, VR and AR can potentially can grow to be a companion to TV. However, unlike 4K/UHD, more work needs to be done, particularly for VR, in order to create the necessary want in viewers.

For other technologies, however, it may be a question of need for many broadcasters.

IP is here to stay

We have heard this argument many times: For IP to work, interoperability and open standards will be key determinants.

If that is the case, then there should be no more barriers for broadcasters to begin their journey to IP. Earlier this year, the Society of Motion Picture and Television Engineers (SMPTE) announced the approval of the first standards within SMPTE ST 2110, considered by many to be the *de facto* standard platform for broadcast IP.

SMPTE ST 2110 is also supported by organisations such as the Alliance for IP Media Solutions (AIMS), an independent trade alliance advocating for open standards and interoperability in broadcast IP.

AIMS' membership also includes a large number of key broadcast equipment manufacturers — which means that broadcasters can largely be assured that the equipment and solutions they purchase from different vendors can all work within a unified IP ecosystem.

In reality, however, there remain many challenges in the transition to IP, as it does for any technology transition that challenges traditional ways of working.

What IP can potentially offer include increased flexibility and agility, as well as reduced cabling and infrastructure. IP also allows broadcasters to build future-ready and format-agnostic facilities while leveraging IT innovation and scale, said Michel Proulx, media consultant and former CTO of Miranda Technologies.

Speaking as the keynote presenter at a series of seminars *APB* and systems integrator Ideal Systems held last month in Hong Kong and Singapore entitled *Professional Media over IP: Building a future-proof media facility*, Proulx also highlighted how IP could enable the transition to 100% software-based, virtualised and software-defined functions.

"Converting to IP is not just about replacing SDI, because there is a bigger transition at play," he emphasised. "Inside a TV facility, for instance, there are two key transitions taking place — replacing SDI infrastructure with IP and replacing dedicated hardware devices with software and virtualisation."

And while Proulx welcomed the full rectification of SMPTE ST 2110, he pointed out that as of today, standards are not complete and vendor solutions not mature. IP, he added, also entails higher system complexity and higher cost, while there is still a gap in knowledge and skillsets that need to be filled.

However, Proulx maintained that the transition to IP is inevitable, as it brings important benefits as software-based devices become more common.

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Technologies are but key enablers as the media landscape continues to change. Broadcasters also need to recognise how viewing habits are still evolving, and re-invent themselves to better connect with their audiences.

He did, however, advises: "As the technology is not fully matured, I would highly recommend that you wait a year or two, although you should start planning for your transition to IP now."

By and large, the broadcast industry agrees on the benefits offered by IP, and broadcast facilities are getting ready for the migration from baseband to IP-based infrastructures, said Sebastian Schaffrath, CTIO of Lynx Technik. However, neglecting to focus on the true benefits that comes with IP can lead to improperly designed IP infrastructures, which in turn can incur higher costs than conventional SDI baseband systems, he cautioned.

Lynx Technik advocates an app-based signal processing approach. Moving away from dedicated hardware signal processing boards provides numerous advantages, according to Schaffrath, and will provide the scalability for broadcasters to grow with evolving video and audio standards

And Asia-Pacific may well be the region that leads the way in IP innovation, suggested Simon Clark, APAC and EMEA sales development manager for Autoscript, a Vitec Group brand. Describing IP as the "wave of the future", he explained: "Some of our APAC customers are leading the way in the IP transition, taking their cues from other industries and recognising that it is much easier to build a greenfield IP facility than to replace existing infrastructure."

The transition to IP should be conducted at a pace that best suits each broadcaster's needs, argues Imagine Communications, which continues to offer live production infrastructure that is characterised by the ability to support SDI or hybrid SDI/IP environments.

However, it is already technically feasible to run virtually a complete live production environment using software-defined tools, running on standard commercial-off-the-shelf hardware, and connected to an all-IP environment, said Joe Khodeir, senior vice-president APAC, Imagine Communications.

Another important aspect that should not be neglected in the transition to IP is security, urged Steve Christian, senior vice-president of marketing, Verimatrix. "Revenue security has become intimately interwoven with critical aspects of service delivery and personalisation, especially analytics, as well as with infrastructure components such as the headend," he added. Another area that Verimatrix is increasing its sphere of influence is the Internet of Things (IoT), where the company is working to ensure that operators can respond quickly and effectively when cyber attacks succeed in penetrating perimeter defences.

Technologies are but enablers as the broadcast landscape continues to evolve

As broadcasters prepare to usher in the new year, many of the technologies discussed above are likely to feature prominently in their thoughts.

How can broadcasters integrate these new technologies into their broadcast infrastructures in order to gain cost and operational efficiencies, and how can they take advantage of new technologies to win the increasingly competitive race to retain eyeballs?

The latter, perhaps, will present the greatest challenge as viewing habits continue to evolve towards multiple-connected devices. And indeed, the very definition of a "broadcaster" is being challenged, not only by the Netflixs and Amazons of the world, but also by social media platforms such as Twitter and Facebook. The former has already acquired streaming rights to sports such as basketball and American football, while the latter has announced its intention to spend up to US$1 billion on original content in 2018.

And what about viewers morphing into 'broadcasters' themselves, with a number of free downloadable apps allowing them to broadcast their daily lives to a curious audience of millions.

There should be little doubt that the definition of a broadcaster is changing, concurred Peter MacAvock, chairman of the DVB Steering Board. With over-the-top (OTT) providers investing billions in commissioning, producing, aggregating and delivering their own content, does that not make them broadcasters, he asked.

As the OTT market continues to grow, broadcasters need to solve the conundrum of how to make OTT economically viable.

Adapt or die, is MacAvock's blunt assessment.

Broadcasting is now just a cliché reverting to its old dictionary meaning of "blasting" content to everyone, which is what the streaming sites do, said Amitabh Kumar, director of technology, Essel Group.

To exacerbate the issue, original content from the likes of Netflix can be produced and streamed in 4K/UHD, meaning that traditional TV and networks are finding it increasingly difficult to match the online experience, he added.

This is not to suggest that terrestrial TV is heading for an imminent demise, because it will continue to play a key role in society for many more years to come.

However, traditional broadcasters do need to re-think how they interact with their audiences and how they can offer content that suits niched audiences. The increasingly discerning viewer will not care who provides the content, as long as it is content that they want.

This is where broadcasters can plausibly take advantage of technologies as key enablers to engage and connect with their audiences, by better understanding what they want and to re-invent themselves as the service provider audiences turn to for trusted source of information and entertainment. APB

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The future of live production

BY JOE KHODEIR

With traditional TV viewing under full-scale attack by subscription video-on-demand (SVoD) and other video-on-demand (VoD) services, live programming is emerging as a critical weapon in broadcasters' war to retain consumer eyeballs. With so much on the line, traditional media companies are becoming increasingly aware of the strategic importance of their live production operations and the need to evolve those facilities in lockstep with consumer demand.

One way broadcasters are enhancing their live programming, which includes sports and, increasingly, appointment-to-view shows — many of them live — is through social engagement, providing audiences with the ability to share their feelings and theories in real time. A social media element to live programming encourages viewers to tune into popular TV shows, say, *The Voice* or *Dancing with the Stars*, at the moment of transmission to be able to participate in the virtual discussion that runs concurrent with the show.

Whether it is sports or entertainment TV, production values are central to creating a must-see experience. Audiences now expect a football game to be covered by 20 or 30 cameras, with multiple replays and slow motion available to involve viewers by explaining the action in detail. They also expect these action-packed events to be delivered at the highest available resolution and picture quality.

Whether it is more pixels — 4K/Ultra HD (UHD) resolution and soon 8K, better pixels — high dynamic range (HDR), wider colour gamut (WCG), or both — content providers must remain on the cutting-edge when it comes to quality standards and technology breakthroughs.

With high production values and high technical quality, however, come soaring costs. The growing expense of producing live TV is putting a strain on traditional budgets.

Fortunately, relief is in sight. Imagine Communications is at the forefront of an evolutionary phase in live production infrastructure that is characterised by the ability to support SDI or hybrid SDI/IP environments during a transitionary, but self-paced, shift to an all-IP environment. This enables live production organisations, no matter their starting point, to build state-of-the-art studios or vehicles that are capable of seamlessly assimilating tomorrow's technology breakthroughs, while providing a path to lower Capex and lower Opex costs.

It is already technically feasible to run virtually a complete live production environment using software-defined tools, running on standard commercial-off-the-shelf (COTS) hardware, and connected over IP. The resulting benefits of moving to an all-IP environment are substantial.

First, it offers a seismic shift in costs. When the broadcast industry had to create bespoke hardware to process audio and video, it was inevitably expensive because the media industry, compared to the IT market, is relatively small. A small market means the design cost has to be amortised over fewer units, driving up costs.

That is not the case in the IT industry, which is several magnitudes larger than the broadcast industry. Economies-of-scale forces in the IT industry drive down the amortisation costs of R&D, so hardware costs are low.

Imagine Communications is at the forefront of an evolutionary phase in live production infrastructure that is characterised by the ability to support SDI or hybrid SDI/IP environments during a transitionary, but self-paced, shift to an all-IP environment.

Moving to software also opens up the prospect of a shift from the traditional, capital-based systems acquisition towards a software licencing model. In financial terms, that means a move from Capex to Opex. Closely tying the cost of production or service delivery to resulting revenue, makes for more secure decision-making.

Another great benefit of a software environment is flexibility and the ability to seamlessly incorporate new functionality. If you need functionality you do not currently have — say, 4K/UHD — there is no need to redesign your core infrastructure. Simply add the software licences and the added functionality is already there.

In the live production market, companies such as NEP in Australia, TVB in Hong Kong and Sony are taking this approach, supported by Imagine Communications. They, and others, are taking a measured approach to the transition. Existing hardware has been bought on a capital forecast, and it should not be thrown out just because something new has come along. But a managed transition to software tools on standard hardware — virtualised or in the cloud where practical — is definitely the route to the future.

Live production needs to be agile. You need to be able to tailor your facilities to match each production. There is no future in building the perfect truck for football, if it is going to spend half the year doing cricket, with odd days covering opera or ballroom dancing.

Today's investments have got to deliver more content, and make it more engaging. The facilities have to be ready to jump to new formats such as 4K/UHD at a moment's notice. And it has to be able to do this in a secure and cost-effective way. The smart production companies are already moving through the transition to the technologies of the future. ATB

"A managed transition to software tools on standard hardware — virtualised or in the cloud where practical — is definitely the route to the future."

— **Joe Khodeir**
Senior Vice-President APAC,
Imagine Communications

Broadcasting redefined

BY AMITABH KUMAR

The US Federal Communications Commission's (FCC) decision to eliminate the "Local Studio" rule on Oct 24 Oct this year came as no surprise. Comments by the FCC chairman that "communities can interact with stations and access their files online", however, shows how broadcasting has moved over the past 80 years, when the original rules were enacted.

It was also an ominous pointer towards the very existence of "television stations", which have traditionally meant TV being transmitted terrestrially using ATSC or DVB-T standards, themselves achieved after a painful process of "digitalisation". In an ominous coincidence, the very same day saw an announcement of eight TV stations in Western Pennsylvania shutting down.

The tipping point was achieved around five years back with smartphones far outnumbering any other device where content could be consumed. But it did require technical evangelists — including the likes of CEO of T-Mobile John Legere, who ushered in the "Mobile Video Binge" in November 2015 — announcing that streams from HBO, Hulu, Netflix, SHOWTIME, Sling TV, STARZ and other online streaming services (with 480p resolution) would not be counted towards consuming data on a mobile network. Large legacy mobile networks thriving on absurd data pricing tried to throttle it by blocking video traffic passing through their networks but the regulators quickly stemmed it. Video viewing boomed in the US, something which no carrier factored in its business plan.

The fact that content can be produced and streamed in 4K/ UHD has meant that traditional TV networks ... cannot match the experience online.

In India, in less than two years, Reliance Jio went a step ahead by offering not only 400-plus free TV channels via live streaming, but also free movies and video-on-demand (VoD) within a data package of US$3 per month. This enabled customers, for the first time, to make a final transition to online TV viewing and having ready access to Netflix, Hooq, Amazon Prime Video and others.

The only distinction that remained between the "broadcasters" and the Internet streaming sites was the production of original content. However, this barrier was broken with Netflix producing *House of Cards*, which has since been followed by similar original productions by dozens of such

8

7

sites. Within a year, Netflix's "original productions" soared to more than 40, with the likes of *Daredevil, Orange Is the New Black* and *Stranger Things*, which have been very successful in matching, or exceeding, the ratings of the best TV shows.

The fact that these can be produced and streamed in 4K/Ultra HD (UHD) has meant that the traditional TV networks, whether on terrestrial or satellite delivery, cannot match the experience online. Over-the-top (OTT) services, as these are commonly called, are equally accessible on large-screen connected TVs.

Cord-cutting, a phenomenon which resulted initially as merely a compulsion to save cable or direct-to-home (DTH) subscriptions, quickly turned to "by choice". As data packages offered climbed to 200GB+ a month, there was really no compulsive need to watch linear channels from "broadcasters". It was estimated that in India alone, where there are over 600 million smartphones, more than 50 million were used for viewing online content. As the population moves to Gen Z, the legacy is set to become irrelevant in a time frame shorter than anyone has envisaged.

Traditional TV stations have been unable to pay their licence fees and many are shutting down as content moves via social networking, individualised streaming and original content production and streaming sites. Regulators like the FCC are keen to auction the spectrum for 5G and LTE. Radio stations, not to be left behind, are more easily available on the Web — without being plagued by signal reception problems.

Ratings agencies have also helped the flow of advertising dollars to the online sites with online ratings of original content, as well as other streamed content. Moreover, the advertising can be personalised. And what about subscriptions? The *Nielson Video 360 2017* report shows that 41% of viewers purchased videos online. Viewers apparently are happy to pay for services such as Netflix or Amazon Prime. The number of online viewers doubled in just one year, and over a quarter of the audience streamed shows, news, games and events.

With "TV Anywhere", there are no "traditional televisions" to deliver content. Nor are there any traditional "TV broadcasters" whose content alone can be watched. Broadcasting is now just a cliché reverting to its old dictionary meaning of "blasting" content to everyone, which is what the streaming sites do. Regulatory authorities worldwide are aware of it, but deserve their share of time.

"Broadcasting is now just a cliché reverting to its old dictionary meaning of 'blasting' content to everyone, which is what the streaming sites do."

— **Amitabh Kumar**
Director of Technology,
Essel Group and APB Panellist

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Comprehensive security solutions safeguard companies' digital assets

Steve Christian, senior vice-president of marketing at Verimatrix, tells ***APB*** why securing digital content assets is key in facing the rapid change of technologies in the media and entertainment industry.

The ongoing transition to IP represents many shifts for broadcasters, including the adoption of software-based services that run on virtualised infrastructure in the cloud. This means that broadcasters are also having to re-look at how they protect and secure their content. What advice would you offer where this is concerned?

Steve Christian: It is not so much the transition to IP itself but all the associated changes and opportunities that have significant implications for revenue security. These include migration to cloud-based software infrastructures, deployment of over-the-top (OTT) services, big data analytics, much greater interactivity and new services around the Internet of Things (IoT). The trend towards IP has brought security onto centre stage in all these areas as software-based and cardless security, anchored by hardware roots of trust in IP connected devices, become the standard.

A key point is that video service providers are migrating towards IP and the cloud at different rates, which reflect their diverse strategies and legacies. Yet in all cases, revenue security has become intimately interwoven with critical aspects of service delivery and personalisation, especially analytics, as well as with infrastructure components such as the headend. We therefore have ensured that our cloud strategy is as flexible as possible, culminating in the recent launch of the Verimatrix Secure Cloud. This offers a cloud-based alternative deployment option to on-premises systems and helps operators seek the migration path to IP that best suits their own aims and objectives.

Besides securing their digital content assets, the transition to IP also represents an opportunity to gain a deeper level of insights into their viewers. How can operators best take advantage of the multiple points of data across the organisation?

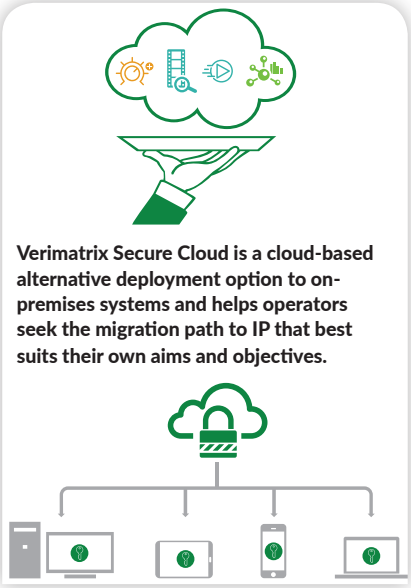
Christian: The IP transition is giving operators access to a vast amount of data from an array of sources, bringing great potential for valuable customer insights, cost savings and operational efficiencies. The challenge lies in collecting, storing and analysing this data within a single coherent analytics platform.

Security has become a major enabler for analytics as a source of data by virtue of its position in the headend and through management of entitlements, as well as in protecting data, whatever its provenance. This second role of protecting privacy and ensuring confidentiality is crucial for encouraging users to make sensitive data available.

It is paramount to choose technology partners who not only provide data security and analytics capabilities to enable data monetisation, but also are aware that customers' trust is everything.

One technology that has seen varying degrees of implementation in Asia-Pacific is 4K/Ultra HD (UHD). What do you think are some of the remaining challenges in securing 4K/UHD content, for both linear and OTT platforms?

Christian: 4K/UHD does not bring fundamentally new content security challenges, but does raise the bar by increasing quality and desirability of the product while making content easier to capture for illicit re-distribution. 4K/UHD, combined with the rise of online distribution over the Internet and IP networks, is driving demand from content owners for forensic watermarking, because this is a critical component for tracing illicit streams back to their source.



Verimatrix Secure Cloud is a cloud-based alternative deployment option to on-premises systems and helps operators seek the migration path to IP that best suits their own aims and objectives.

However, watermarking is just one of three essential components, or pillars, of 4K/UHD security. The other two pillars are hardware-based security and trusted software security. Each constitutes a different layer of defence, with the hardware pillar providing security inside the System on Chip (SoC) for credentials such as keys. The second pillar, sometimes described as hardened software, ensures that only privileged logic components can be executed by the system, as protection against infiltration.

The key point is that these three pillars are interdependent and reinforce each other to provide a solid overall defence against piracy.

Another area that Verimatrix is increasing its sphere of influence is IoT, which may deviate from the customers you traditionally serve. Can you elaborate on your IoT strategy, and the relevance it provides in a continuously changing media landscape?

Christian: We recognised that although IoT would introduce new security challenges, these could largely be addressed by modifying existing, well-proven security technologies. Where new methods would be required, for example defending against large-scale Distributed Denial of Service (DDoS) attacks, the relevant technologies were already being developed because these same threats were emerging in traditional domains.

Two other key points have emerged from investigation of actual or potential IoT breaches at different levels. First, security must be at the forefront when planning and deploying IoT services, incorporated at the specification stage rather than bolted on afterwards. Second and most important, security must be continually upgraded throughout the lifetime of a service to counter emerging threats as they arise.

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A time for reflection

BY DR AHMAD ZAKI MOHD SALLEH

Everyone is talking about staying relevant nowadays. Traditional broadcasters are constantly being bombarded with questions as to what their plans are, with regard to current challenges to their business by what we refer to today as 'disruptors'. Hundreds of articles, seminars and forums have been written and organised to discuss and share ideas on the way forward. Regardless, we still see traditional broadcasters going out of business due to financial stress and an inability to compete in the ever-changing industry.

I shall make no attempts to offer a solution, as I do not have one. The organisation I am working for is going through the same challenges and we are also groping for answers to the same questions. However, I would like to share some of my thoughts on these matters.

Sometimes, I do ask myself: What is broadcasting today? What is it that separates us from those using various social media platforms? The famous 'self-styled' Korean singer and songwriter, PSY, had more than a billion viewers for his famous *Gang-nam Style* music video. In this context, he has more viewership compared to any TV station in this part of the world and he does not even own a TV station! Does that make him a broadcaster? By definition, yes. So is broadcasting the act of making signals available for viewers, or is it the act of viewers consuming the content?

For many years, traditional broadcasters have been offering something very fundamental to the human race, which is news, entertainment, general information and various items related to commerce. People had no choice. Other than print, traditional TV broadcast is the only other means of getting these materials in a 'multimedia' manner. Then came the Internet. And the Internet brought something important with it — choice. An Internet user can browse and choose whatever content he or she wishes to consume at whatever time suitable for them.

Before I answer the question, let us ask ourselves what is 'broadcast'. As usual, if you are unsure of anything, Google it.

"Broadcasting is the distribution of audio or video content to a dispersed audience via any electronic mass communications medium, but typically one using the electromagnetic spectrum (radio waves), in a one-to-many model." [1]

A pretty straightforward and well-understood definition, I guess. But the definition now extends beyond TV and radio stations. Using the Internet, anyone can be a broadcaster today. Social media platforms such as Facebook, Twitter and Instagram are effective broadcast tools, and they allow the possibility of live broadcast as well.

Therefore, the Internet, radio spectrum, microwave, cable and so forth are merely platforms which we use to broadcast.

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1 https://en.wikipedia.org/wiki/Broadcasting

"Broadcasting will never be the same again. Disruptions to the traditional industry is aplenty. As for the word 'broadcast', I am not sure if it is relevant anymore."

— **Dr Ahmad Zaki Mohd Salleh**
Group General Manager, Engineering,
Media Prima
and APB Panellist

Video, audio, data and so on are merely applications which run over the platform. For instance, TV is video and audio over radio spectrum, radio is audio over radio spectrum and we have hundreds of different applications that run over the Internet carrying video, audio and data in various combinations. The same goes for publications. Print material is sent over the radio spectrum as well as the Internet, and is as effective (if not more) as compared to the traditional physical media.

The purist would argue that a broadcast medium should be obtained by tuning into the medium. This means that the signal is ever-present, and you can tune into it with the right device. In this context, broadcast signals are in the form of radio frequency. There is no bandwidth limitations and there are no limits to the number of devices that can be used. Other than this, signals are not broadcast but it is either narrow-cast, multi-cast or uni-cast.

Whatever the case may be, you may now ask yourself whether you are a broadcaster. If you work in a TV station like me, the answer is yes. If you are an Internet blogger, the answer is still yes.

The broadcast industry is also getting younger. Recently, I attended the Asia-Pacific Broadcast Union (ABU) General Assembly and associated meeting in Chengdu, China. During the plenary session, I looked around and realised how many representatives looked half my age. I almost felt out of place. The presentations are exciting; the contents are new, vibrant and fresh; and the technology is advanced, highly digitised and over multiple platforms. When I spoke to them, most of them are not even involved in the broadcast TV industry. Sometimes I ask myself whether these people are broadcasters. The answer is: I do not know, but they are members of the broadcast industry.

For the traditional broadcaster, it is time to reflect. Broadcasting will never be the same again. Disruptions to the traditional industry is aplenty. As for the word 'broadcast', I am not sure if it is relevant anymore.

The stage is set, and the rules have changed. Media practitioners must be able to create new opportunities in the midst of these trying times. Attitudes and outlook must change, because efficiency is the new name of the game.

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Outstanding 4K/UHD broadcasting requires 4K/UHD-enabled KVM system

BY LOKI ONG

There is no denying the popularity of 4K/Ultra HD (UHD) technology. Although consumer access to 4K/UHD content is still limited at this stage, broadcasters and home electronics manufacturers have been aware of the potential of 4K/UHD for years now. It was only shortly after the peak of HD popularity that the phrase 4K/UHD was first uttered by industry insiders, but it has come a long way since then.

It was not long ago that the major broadcasters had finished working on making sure they were all HD-capable, and so it seemed unlikely that they would suddenly have to do the whole thing over again for 4K/UHD. But once TV manufacturers started building 4K/UHD-ready screens, and forward-thinking over-the-top (OTT) providers such as Netflix started offering choice selections of their catalogue to stream in 4K/UHD quality, it became clear that this was more than a fad. This was set to be another major step forward for broadcasting.

Fast forward to today, and while it is still the minority of us who enjoy regular 4K/UHD content at home, the wheels are firmly in motion. The majority of films and TV shows are now shot in native 4K/UHD quality, and major broadcasters are starting to get far more ambitious in ramping up their plans. In October this year, it was confirmed that all of the 64 matches in next year's FIFA World Cup will be filmed in 4K/UHD, with 37 cameras dotted around each stadium.

The main benefit of 4K/UHD, and a reason why it is such a captivating technology for consumers, is that it offers a stunning level of image quality — roughly double that of HD with twice as many pixels in the horizontal to approximately 3480 x 2160 as a standard for TVs and monitors. This level of detail has the potential to change how we view television for good, and in the case of the World Cup, it means we will be able to see every fan in the stands, every blade of grass on the pitch and every goal that ends up in the back of the net with stunning clarity.

To preserve this image quality, operators sitting in outside broadcast (OB) trucks, post-production studios and similar environments need to be able to see an exact representation of the image that has been filmed, and so they require 4K/UHD monitors. Without this, they are not seeing the image that was intended, and so could make poor, costly decisions when it comes to editing or processing. Broadcasters also need to ensure they have a suitable network infrastructure in place that can deal with the bandwidth demands of transmitting and distributing 4K/UHD, as well as a means to store all of this footage once it has been captured.

The need for native 4K/UHD quality across the board is therefore clear, but this is tricky when producers, editors, cameramen and other crew members are out on location so often. Fitting a 4K/UHD-ready monitor and infrastructure into a post-production studio is one thing, but delivering the same quality to an OB truck, for example, is another thing entirely. Broadcasters need to be able to rely on a 4K/UHD solution that will be relevant to each and every broadcast function.

This is where 4K/UHD-enabled, IP-based KVM (keyboard, video, mouse) systems can be incredibly useful. These work in the same way as regular IP-based, high-performance KVM systems — allowing operators to remotely access numerous computers and applications from a single workstation with a single keyboard and mouse — which are also capable of delivering amazing 4K/UHD image quality, as well as SD and HD.

This gives crew members the confidence and reassurance of knowing that, no matter what the video is they are looking at on-screen, every single pixel is identical to how the original camera operator saw the scene, and this in turn gives viewers the satisfaction of knowing that what they are watching at home is true-to-life.

Having a 4K/UHD-enabled infrastructure and environment means broadcasters can simplify workflows while continuing to deliver the true-to-life viewing experience that customers expect from a 4K/UHD broadcast. Take next year's World Cup, for example: the native 4K/UHD video that is being captured by each of the 37 stadium cameras will be transmitted to an OB truck situated just outside the stadium. Editors and producers inside the truck will then be able to take advantage of their 4K/UHD-enabled equipment to make better and more accurate decisions through being able to see the footage in all its detailed, 4K/UHD glory, whether it's deciding which camera is delivering the most attractive image at any one time or finding the perfect slow-motion footage to replay.

Conclusion

From a visual perspective, 4K/UHD quality is miles ahead of the likes of HD, capable of delivering an extraordinary level of detail that would have simply gone amiss beforehand. However, if we want viewers to be truly wowed by the potential of this format, broadcasters must ensure they are able to handle the content at all stages of the broadcast process, and a 4K-enabled, IP-based KVM system is a viable and incredibly flexible solution for doing so.

"This is where 4K/UHD-enabled, IP-based KVM (keyboard, video, mouse) systems can be incredibly useful. These work in the same way as regular IP-based, high-performance KVM systems."

— Loki Ong
VP Sales APAC, Adder Technology

Teleprompting for the IP age

Simon Clark, APAC and EMEA sales development manager for the Vitec Group's Autoscript brand, explains to ***APB*** how his company is rewriting the rules for teleprompting systems as broadcast customers continue to migrate to all-IP infrastructures.

"With the IP revolution, our media customers are re-thinking their approach to virtually every aspect of production."

— Simon Clark
APAC and EMEA Sales Development Manager, Autoscript, Vitec Group

It has been a big year for Autoscript, headlined by the launch of Intelligent Prompting — an all-IP-based prompting system. What led Autoscript to develop that solution?

Simon Clark: With the IP revolution, our media customers are re-thinking their approach to virtually every aspect of production. They are sold on the potential benefits of migrating to IP, but they know it is only going to succeed if all production elements can work together in a tightly integrated and seamless way. And that goes right down to the prompting systems.

Until now, prompting systems have relied on USB, video and serial cables to connect the controller to the prompting engine and deliver prompting output to the monitor. With Intelligent Prompting, we were looking to re-think that approach and re-design each component around an IP-enabled workflow that takes advantage of the new world of packet-based signal distribution.

Can you tell us more about Intelligent Prompting and how it supports IP workflows?

Clark: We are really proud to say that it is the broadcast industry's first fully IP-enabled teleprompting solution, designed to take maximum advantage of IP's connectivity, flexibility, ease-of-use and cost-efficiencies.

With Intelligent Prompting, we realised that IP-based prompting requires a systematic approach, with the ability to fit seamlessly into the fully networked and geographically disperse IP production facilities that are now under development in many parts of the world.

To meet this requirement, we built a significant amount of intelligence into the new EVO-IP and EPIC-IP prompting monitors. This allows them to be identified on the IP network and controlled both locally and remotely by the operator. The operator can access multiple prompters and determine, at a glance, whether each is functioning properly. This set-up also makes it easy for the operator to upload new scripts from the production facility's in-house newsroom system and then queue the scripts up on the correct monitors.

With intelligent scroll technology built in, each monitor can generate video output from small unicast data packets sent from the WinPlus-IP prompting software. In this manner, Intelligent Prompting can avoid sending video over IP and all the drawbacks that go with it. With much less data sent over the IP network, every monitor can remain in constant communication with the master application to ensure reliable synchronisation and easier operation.

How does Intelligent Prompter support global workflows?

Clark: An IP-enabled prompting workflow creates endless opportunities for broadcast operations to collaborate across geographies and allocate resources cost-effectively.

One operator can control the script, speed and other prompting attributes in multiple locations, and instantly switch control to another operator anywhere in the world when necessary. For instance, an operator in Sydney can control a prompter in Perth and then, from the same workstation, begins operating a prompter in Melbourne. Likewise, IP connectivity provides powerful redundancy, as a second master WinPlus-IP software application can be installed and then take over control seamlessly as required.

How has Intelligent Prompting been received in the APAC region?

Clark: Autoscript is a highly trusted brand and the market leader for prompting throughout Asia; in fact, the state broadcasters in China, India and Singapore are all customers of our prompting solutions. APAC broadcasters are leading the way in IP innovation and setting an example for the rest of the world. A case in point is our long-time customer, Singapore's Mediacorp, one of the first customers in the world to approach us about building a facility that was IP-based from the ground up. Now that Intelligent Prompting systems are shipping, we have customers throughout APAC, including The Voice of Vietnam.

What about customers who are not yet ready to move to IP operations?

Clark: Many of our APAC customers are taking a more gradual approach to the IP migration, adding components as their budgets allow. For those customers, we want to emphasise that we are still actively developing leading-edge features to benefit traditional video prompting workflows.

For instance, the EVO-IP and EPIC-IP monitors are slimmer and brighter, with a new carbon-fibre hood, and have HD-SDI and composite inputs alongside their IP connectivity. These types of hybrid solutions will be a critical stepping stone for many broadcasters who lack the budget, or who are too invested in their current facilities, to make an overnight transition to IP operations. APB

Applications of system control

BY DAN BAILEY

A coherent system control in broadcast brings a number of real operational and commercial advantages. By grouping multi-level actions into a single, simple control surface, you can do things which are much richer, making your production more engaging.

At the same time you reduce errors: by defining the controls you offer the operator, you define what each individual can do. If you want someone to switch cameras but no more, then just give them the direct camera controls: cut or mix; maybe pan, tilt and zoom. Hide more sophisticated control, like black and white balances, ensuring the operator cannot get distracted or make unrequired changes.

In a well-designed system which is founded on logic, you should be able to define very complex operations and workflows, yet ensure they are implemented safely and without errors. That reduces training and improves the on-air performance.

Once you get a feel for what can be achieved with a coherent control system, more and more applications suggest themselves. A simple system might configure a router and monitor wall. Sources could be identified in under-monitor displays, and outputs fed to lines, servers and loggers. Selection of incoming lines could also steer satellite downlinks.

Imagine a playout centre that needs regular reconfiguration, perhaps with a night shift taking on more channels from the same room. Build the configurations and all you need is a single button press at shift change. The duty engineer would have the ability to drill down to look at the details of the configuration and make any changes that might be necessary.

Perhaps you are a news broadcaster, and want to put studios in regional centres, or even in a hostile environment. Economics or staff welfare means that these studios need to be unmanned but available whenever a reporter needs to do a piece to camera, or an interviewee cannot travel to the main newsroom.

"Once you get a feel for what can be achieved with a coherent control system, more and more applications suggest themselves."

— Dan Bailey
Product Manager, Control Systems, TSL Products

A keycode gives access to the studio, and sounds an alarm in the main control room. Simple keys on a touchscreen will allow the studio to be set for one or two guests, adjusting the lighting and positioning remote cameras as appropriate. Talkback routing would be automatically set, and production sound could be routed to earpieces as required.

A coherent system control in broadcast brings a number of real operational and commercial advantages, including making productions more engaging.

The Tallyman unified control system meets three key demands — providing high quality, high production values and cost control.

Again, using a simple touchscreen interface, an operator has control of the remote studio. Pan, tilt and zoom cameras can be adjusted to suit the guests. Video or graphics are sent to any in-vision monitors. Cameras are switched from buttons on the touchscreen, and rotary or linear faders control the microphone levels. A sophisticated multi-camera studio can be operated, entirely remotely, using intuitive controls on a panel designed for the application, minimising staff requirements while increasing production values.

Outside broadcast (OB) operators can configure their trucks. One key press sets all the routers, production mixers, monitor walls and video servers, putting the right names and tallies on the UMDs. For very large events requiring multiple trucks, for example, installations in each truck can talk to each other, passing routing information from truck to truck.

Every broadcast facility and operation is unique; every operational team will have its own way of working. The value of unified system control using devices is that you can build the configurations you need, and the logic underpinning them, and you can design the user interfaces you need, providing just the right level of control and intuitive operation.

TSL Products has developed Tallyman, an extremely powerful, extremely easy to use unified control system. It is built on three essentials: third-party integration; an intuitive user interface; and a control layer that is capable of anything from direct router control to the creative management of live remote productions, or configuring complete OB trucks at the touch of a button. Its user interface design toolkit is remarkably simple to use and allows you to customise virtual panels for every user.

However, regardless of infrastructure and the system used, it must meet three key demands of the industry today — seamless high quality, high production values and cost control.

APP-based processing in IP broadcast infrastructures

"LYNX Technik is committed to a software-based approach for processing and leading the way for efficient and future-ready solutions."

— **Sebastian Schaffrath**
Chief Technology Innovation Officer
LYNX Technik

This year's IBC convention in Amsterdam has sent a clear message to broadcast engineers and infrastructure designers: SMPTE 2110 is ready to go and functionally operating. Overall, the broadcast industry agrees on the benefits of IP and broadcast facilities are getting ready for the migration from baseband to IP-based infrastructures. Migrating to new technologies in general only makes sense if it adds sustainable value such as cost savings, flexible allocation of resources and reduction of operators' preparation time. Neglecting to focus on the true benefits coming with IP might lead to improperly designed IP infrastructures and thus radically higher costs than with conventional SDI baseband systems. This article describes the current and future applications of app-based signal processing in IP and SDI infrastructures. **BY SEBASTIAN SCHAFFRATH**

CHALLENGES

Flexibility

One of the most frequently mentioned benefits of IP-based infrastructures is flexibility. Flexibility can be defined in many ways. It can refer to the ability to make last-minute changes in formats arriving in the master control room, a director deciding to run a production in 4K/Ultra HD (UHD) instead of 3G, or the ability to react to equipment failure quickly.

In conventionally designed infrastructures, flexibility is often achieved by an abundance of glueware/interface cards leading to higher equipment overhead, higher Capex and Opex, all in combination with practical considerations such as rack space or cooling. Research by LYNX Technik engineers has found that signal processing equipment in TV studio systems run at an average usage of 15%-20%.

Scalability

Scalability in IP-based facilities means the ability to handle a growing number of video and audio formats. With the consumer display industry and sports productions driving new standards, IP technology is ideally suited as it is format-agnostic. However, operators will be tasked to handle the adoption of current and new signal formats in combination with signal processing. For example: A SMPTE 2110-compliant signal may still require adjustments of black level or format conversion to 720p.

Cost optimisation

With broadcast TV stations planning to work with uncompressed video and audio signals per the SMPTE 2110 standard, bandwidth consumption certainly is still an issue. Live video signals using gigabits of space on the network need to be considered and thus unnecessary switching and re-routing for processing purposes should be minimised. Each switch fabric and each port in the network adds to the costs of transporting the signal to the relevant processing device.

APPROACH

APP-based signal processing and conversion is a key factor to solving the challenges mentioned. For live uncompressed signals, the concept of software-defined processing yields many advantages: Instead of using fixed processing cards that are fed by a fixed wired router (applies for SDI as well as IP) and having to re-route/re-switch the signal to bring it to the card with the right functionality, activating the relevant APP on a generic hardware platform drives down the amount of bandwidth used and speeds up operations.

Furthermore, switching/routing complexity introduced by processing loops and operators stress is reduced, increasing operational safety and efficiency.

In terms of scalability, APP-based processing platforms offer a future-proof investment for broadcasters to grow with evolving video and audio standards. New standards and compatible devices no longer require a new piece of hardware, but simply an exchange or adding an updated or new APP.

Bandwidth for additional signal transport to dedicated processing cards is reduced to a minimum with a software-based approach. Signals remain on their respective IN and OUT positions while loading a different APP adds the functionality in between. Therefore, no additional switching/routing is necessary.

CONCLUSION

With the arrival of IP-based broadcast infrastructures, APP-based signal processing is a decisive factor for economic design of these systems. Moving away from dedicated hardware signal processing boards provides several advantages. These advantages not only apply in IP infrastructures but also in SDI systems and applications.

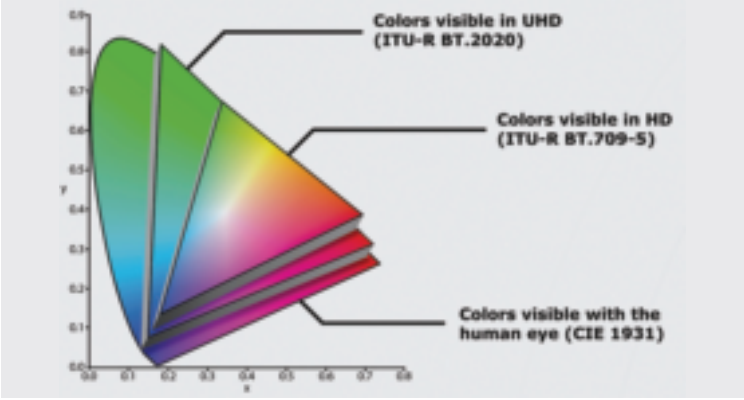
For several years, LYNX Technik has been pioneering the field of APP-based signal processing. greenMachine is the result of this expansive research and development with a clear focus on the challenges discussed in this article. The approach of having a software-defined platform that grows with the demands of broadcast production ensures a future-proof investment.

APP-based signal processing will continue to expand as benefits of this concept are obvious, especially in IP-based infrastructures. LYNX Technik is committed to a software-based approach for processing and leading the way for efficient and future-ready solutions. AFB

HDR and UHD: The road to enhanced pictures

BY PETER SCHUT

The development of TV technology has been a continuing search for greater picture resolution. During the 21st century, the rate of innovation and research has increased, resulting in HD now being challenged by Ultra High Definition (UHD) and its 4K higher resolution. The pace has accelerated considerably over the past five years, as over-the-top (OTT) and streaming services have changed the broadcasting landscape, bringing a cinematic, immersive experience into the home.



HDR BT.2020 & BT.709 Colour Space.

While 4K/UHD itself is still in the very early stages of roll-out for both production and transmission, the new breed of entertainment distribution services, notably Netflix and Amazon Prime, have made 4K/UHD a primary specification for programming and are delivering it to homes as standard rather than being a special feature or test channel.

In order to compete, broadcasters and manufacturers must now provide the viewer with an absolutely stunning picture (regardless of platform). However, with broadcast image technology currently in a state of flux, with several formats and systems — both old and new — likely to co-exist for some time to come, the industry is still learning what all this means and what needs to be done.

4K/UHD has already brought us more pixels. The next logical step therefore is not additional pixels but better pixels that give a picture with more definition and, most important of all, improved colour reproduction and a higher dynamic range. Which is why the initials HDR (high dynamic range) and WCG (wide colour gamut) have been challenging those of 4K/UHD for prominence on booths at trade shows and in new TV set advertisements.

HDR is able to produce a dynamic range of 200,000:1 (or 17.6 stops in camera terms) when shown on a 2000 cd/m2 display with a bit depth of 10-bits per sample. This compares to the 64:1/approximately 6 stops from standard dynamic range (SDR) on a conventional gamma curve with a bit depth of 8-bits per sample. By extending the dynamic range, more information can be accommodated in an image, bringing with it more detail to an image. In a similar way, WCG allows more colours to be displayed because it can store a wider range of colour values than established RGB (Red Green Blue) colour spaces.

"The broadcast industry needs to move into more pixels, more colours and HDR."

— **Peter Schut**
CTO, Axon

Both HDR and WCG are being discussed in professional and consumer electronics circles but HDR is the more recognisable of the two terms. It has almost become a catch-all for improved image quality and greater definition — with the immersive feel of 4K/UHD creating a sense of reality — and life-like colour. As a result, many broadcasters and consumers are saying they will move to HDR but by that do they mean just that format on its own or a combination of HDR and WCG?

It is very likely it will mean both. HDR means a blacker black and a whiter white. If we go to WCG as well, the reds will be more red, the greens greener and the blues more blue, with everything else in between. The whole (image) space is bigger and more beautiful.

The broadcast industry needs to move into more pixels, more colours and HDR. We need to provide better pixels and do it right first time. We have one chance and if we get it wrong, the audience will switch off.

The technical challenge behind this is the move from the HDTV colour space (BT.709) to the colour space for 4K/UHD plus HDR and WCG (BT.2020). In doing this, we are going from a relatively small area (refer to diagram: *HDR BT.2020 & BT.709 Colour Space*) with a maximum brightness/luminance of 100 nits. Compared to BT.709, BT.2020 has a much larger colour space to work in, with luminescence measuring 1,000/10,000 nits. In effect, we are trying to put a square peg in a round hole. This is impossible without using brute force, but with the correct forms of conversion and compression, we can make it right.

The whole issue becomes more complicated if WCG is part of the equation. HDR with some sort of backwards-compatibility is only possible when everything is working in the 709 colour space. But because the broadcast market has to be part of the real world, services will have to include WCG, which will mean the whole issue of backwards-compatibility is down the drain.

The road to enhanced pictures: Axon's technical guide to HDR and WCG

In a new guide to High Dynamic Range (HDR) and Wide Colour Gamut (WCG), Axon's CTO, Peter Schut, sets out what he sees as the challenges broadcasters and manufacturers now face. He also explains the colour/imaging issues involved and how the broadcast sector might address these changes in the coming years. **To download the technical guide, visit www.axon.tv/knowledge/hdr-wcg/**

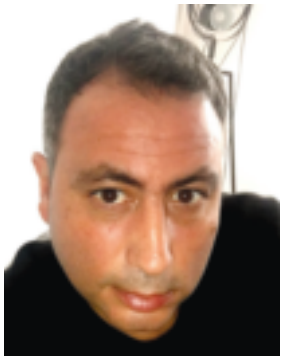
The time has come for virtual sets and augmented reality

BY OLIVIER COHEN

Virtual reality (VR) and augmented reality (AR) are two of the most talked-about concepts in broadcasting today. From the growth of AR applications for mobile phones to the latest headsets immersing people in real-time virtual worlds, these leading-edge technologies are becoming more accessible to consumers.

VR and AR have come a long way since their emergence 15 years or so ago, and broadcasters are now exploring how to bring these solutions into their operations. As graphics performance, workflow tools and camera motion tracking systems continue to mature, broadcasters are looking at VR and AR as alternatives to traditional approaches for capturing viewers and maintaining competitive advantage.

VR and AR offer the perfect solution for broadcasters who are looking to create larger volumes of eye-catching content using fewer resources. From a simple virtual set for presenting a variety of branded content to compelling 3D augmented graphics elements, a new breed of reliable tools is offering broadcasters a chance to push their creative and physical boundaries and lure on younger and more distracted audiences. APB



"VR and AR have come a long way since their emergence 15 years or so ago, and broadcasters are now exploring how to bring these solutions into their operations."

— Olivier Cohen
Hybrid Virtual Solution Product Manager
ChyronHego

Hong Kong's 611 Bread of Life Christian Church is deploying ChyronHego's Plutonium virtual set tracking solution to provide real-time, precise camera motion within the church's 2D or 3D computer-generated backgrounds.

ChyronHego's hybrid virtual set solution brings affordable realism to church production

The 611 Bread of Life Christian Church in Hong Kong is part of a global network of Bread of Life Christian churches ministering to congregations in cities around the world — from Taipei to Toronto, San Diego to Perth. Through numerous services and events scheduled throughout the week at its Tsuen Wan New Town campus — ministries aimed at kids, youth and the elderly, and a wide variety of other programmes — 611 Church supports the spiritual lives of more than 8,000 Hong Kong parishioners.

Internet broadcast and AV technology play a vital role in helping 611 Church spread its messages to their congregation. Parishioners can access live and on-demand Internet broadcasts of church services, testimonies and other programming via the church's website and through its 611 YouTube channel. The 611 Channel offers videos that cover Christian parenting, spiritual gift and art, power of ministry, church Q&As, musical drama, and more.

To keep things interesting while keeping costs down, 611 Church incorporates virtual graphics into its productions. Pastor Kwok, who is in charge of the church's broadcast operation, needed a powerful, user-friendly solution not only for creating virtual environments, but also for accurate filming in those environments.

Pastor Kwok and his team chose ChyronHego's Plutonium virtual set tracking solution, which provides real-time, precise camera motion within the church's 2D or 3D computer-generated backgrounds.

From hand-held camera movements to pan-tilt-zoom focus, Plutonium employs an open and scalable solution for tracking virtual reality (VR) — whether supporting robotic cameras with its own precise motion-tracking capability or interfacing with third-party tracking systems. Plutonium also offers a trackless virtual set system that uses fixed-camera signals on a green screen to enable virtual-camera motions such as virtual roll, pan, travelling and crane movements. In addition, Plutonium provides an augmented reality (AR) solution that enables 611 Church to enrich its presentations with 3D objects and animations that track perfectly with the motion of the camera.

611 Church modifies Plutonium's template sets to create a customised church set and other environments, and then uses the robotic tracking system to film every VR or AR piece. The Plutonium virtual set tracking solution makes it possible for the church to broadcast against compelling, visually striking, realistic virtual environments without the costs associated with constructing a set or travelling to a location.

Pastor Kwok said: "ChyronHego's Plutonium solution gave us an easy yet powerful way to employ VR to visually enhance our productions. That combination — coupled with ChyronHego's friendly service, quick response time, and keen problem-solving — made Plutonium stand out above all other solutions of its kind." APB

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4K/UHD and 8K venture into larger digital displays

Chou Chen-Kun, vice-president of Analog Way APAC Operations, shares more with ***APB*** on how large video walls are able to not only support 4K/Ultra HD (UHD) resolution, but also process and deliver content in 8K.

Analog Way's LiveCore product line has been deployed by Sansi North America (SNA) Displays for the installation of the 17,000sqf LED screens at Times Square in New York.

In recent years, the broadcast industry has seen the emergence of several technologies such as IP, 4K/Ultra HD (UHD) and high dynamic range (HDR). Hence, which technologies do you expect to have a sustained impact in 2018, particularly in Asia-Pacific?

Chou Chen-Kun: All technologies mentioned will continue to grow in their respective influences in 2018. 4K/UHD recognition is ramping up, and especially 4K@50/60Hz, which will gradually gain momentum.

IP has its own lovers. However, the key in ensuring its performance in production and transmission within affordable costs, when compared to baseband videos, still needs to be explored.

HDR is widely adopted among display manufacturers, be it LED, OLED, or others. We expect to see convergence among various specifications of HDR in near future.

In Asia-Pacific, the industry is following these trends closely; the same with Analog Way and its Asia-Pacific office.

How these technologies impact Analog Way's approach towards product development for the broadcast sector?

Chou: As one of the leading companies in professional audio/video industry around the world, Analog Way has been monitoring all emerging technologies. We adopt technologies at early stages.

For instance, our multi-format converter — VIO4K — is equipped with the capability to convert DP1.2, HDMI 2.0 and 12G-SDI among one another. It is one of the first in the industry. However, we are also very careful and selective at prematured stage of any emerging technology. We believe it is our responsibility to avoid any risk as our customers would like us to.

Can you share with us on a project that Analog Way has recently completed? What are some of Analog Way's solutions that were adopted, and the challenges Analog Way has overcome to successfully deliver the project?

Chou: Analog Way's solutions have been deployed by Sansi North America (SNA) Displays for the installation of LED screens at Times Square in New York. SNA selected Analog Way to provide a full 8K/60Hz resolution processing solution for the massive wrap-around display, which showcases NFL (National Football League) Experience, a joint venture of the NFL and Cirque du Soleil.

It is currently the highest-resolution LED screen in the history of Times Square, with the debut of the newest large-format LED video spectacular at 701 7th Avenue (also known as 20 Times Square). The building features SNA's wrap-around SlVideo display canvas, one of the largest continuous exterior displays in the world, featuring more than 17,000sqf of LED display technology. With 8K/60Hz processing, the screen is designed to accommodate the next generation of video and broadcast media content.

For this project, SNA chose Analog Way to design an 8K/60Hz scaling solution using Analog Way's LiveCore product line. We provided four Ascender 48-4K-PL processors to support the delivery of 16 feeds to the display, all with precise sub-frame level sync lock. Having precise sync lock on all 16 outputs ensures zero tearing of the image across the huge pixel spaces. This offers SNA, and the screen's tenant, flexibility and security since they are not tied to a single-source device or format.

A key aspect of the Times Square project is the support for 8K display resolution. So what are your views on the development of 8K, given that most media productions are still in either HD or 4K/UHD?

Chou: 4K/UHD is gaining momentum, and one of the main driving forces is big LED displays, indoor and outdoor. We believe it will become the same driving force to 8K. For instance, if advertisers were to advertise on a huge video wall, they would want to showcase their content with highest resolution possible. And if we look back, HD has been through the same path by the popularity of 40-inch to 60-inch LCD TV.

Another important factor is small-pitch LED. We have seen many reports that revealed the growing revenue of small-pitch LED around the world. Thus, for those two reasons — bigger in size and smaller in pitch — there will be more high-resolution media content to come. In addition, we have seen some production studios in England and Asia producing 4K/60Hz, or even 8K/60Hz videos, and it would not be surprising to see more and more such content. APB

When is a broadcaster not a broadcaster?

BY PETER MACAVOCK

A less attractive way of asking the same question might be: "When is an over-the-top (OTT) provider a broadcaster?" Either way, the answer is "shortly".

But of course, the answer very much depends on what you view as a "broadcaster".

Whatever your views are, the definition of a broadcaster is changing for sure. Broadcasting has been around since the 1920s. Indeed, in my role in the European Broadcasting Union (EBU), I have been sorting through some archives of the predecessor to the EBU, the International Broadcasting Union (est. April 1925). Back in those days, a broadcaster produced all its own content, aggregated it, distributed it and, indeed, handled the broadcast to the consumer. Okay, so that was AM radio, but the principle was carried over into TV and remained thus until the 1990s.

Now, traditional broadcasters, OTT providers and even social media networks are commissioning content and acquiring sports rights.

The devices to which this content is being delivered have changed too. We can comfort ourselves that consumers are watching and listening to more content than ever, but this is because that content is available any time, in any place, and can be specifically tailored to that consumer's preferences.

The days of the remote control controlling who watched which content are long gone. A TV has gone from having a terrestrial antenna input to be a sophisticated media hub with USB, Wi-Fi, HDMI, analogue video/audio, satellite, cable and terrestrial inputs. And who controls that user experience?

We have gone from the 1990s trend of the consumer electronics vendors investing in content production because they produce — in the end — furniture that did not look good unless it had pictures on it. Today, it is the OTT providers investing billions in commissioning their own content. Does that not make them broadcasters? After all, they commission, produce, aggregate and deliver their own content; sometimes, even to their own receivers.

Well, technically yes, but is broadcasting not a highly locally regulated market with tightly controlled licences to broadcast?

This is where regulation lags behind the technology by some years. Indeed, in Europe, a number of broadcasters gathered together in their respective markets to offer a consistent package of OTT services combining their content and others — rather like Netflix, although in each market where it was tried, anti-trust authorities systematically blocked the moves. Netflix encountered no such barriers when they launched across Europe.

So, we need a level playing field. Are we going to get this in 2018?

There are other sides to regulation too. We are all familiar with "fake news", although some of us have differing definitions for it. Europe, where I come from, has a strong tradition of public service broadcasting. For generations, broadcasters have been implementing systems to verify their news: it is what you would expect from a tightly regulated trusted source.

And there is more: these broadcasters are also at the heart of the cultural lives of a small but very diverse region. Broadcasters know that drama and other cultural genres are quite specific to each culture: some are exportable, while some can be dumbed-down enough to be made so. All the same, there is real magic in good quality cultural content that appeals to a specific audience.

In terms of technology, next year will see an acceleration of the trend towards more OTT services. Today, the preserve of the big multinationals like Netflix and Amazon and the bigger pay-TV operators, OTT services will expand rapidly. The DVB Project, the organisation at the heart of the transition from analogue to digital television, is wholeheartedly embracing this tradition.

The secret here is that nobody — apart from the very biggest operators — is making any money from OTT. And for broadcasters to survive, OTT has to be made economically viable. Larger pay-TV operators can afford to swallow a loss on OTT, provided their linear business remains profitable. But if all the predictions are correct: that day will end. Maybe not in 2018.

So DVB is working hard now to profile the technology available to the broadcasting community to make sure that the OTT services on offer today can be more affordable to the mainstream broadcasters. The direction is to ensure that the live TV experience can be replicated on Live OTT. The technology will start to come on stream in 2018, although it may be 2020-2021 before it becomes mainstream.

Exciting times are ahead for sure, and broadcasters must adapt or die; it is as simple as that. Still, adapting profitably is so much harder in today's multi-device, multi-network world — made all the harder with large multinationals steaming in to attract audiences. But then, they are broadcasters as well are they not?

"Today, it is the OTT providers investing billions in commissioning their own content. Does that not make them broadcasters?"

— **Peter MacAvock**
Chairman, DVB Steering Board

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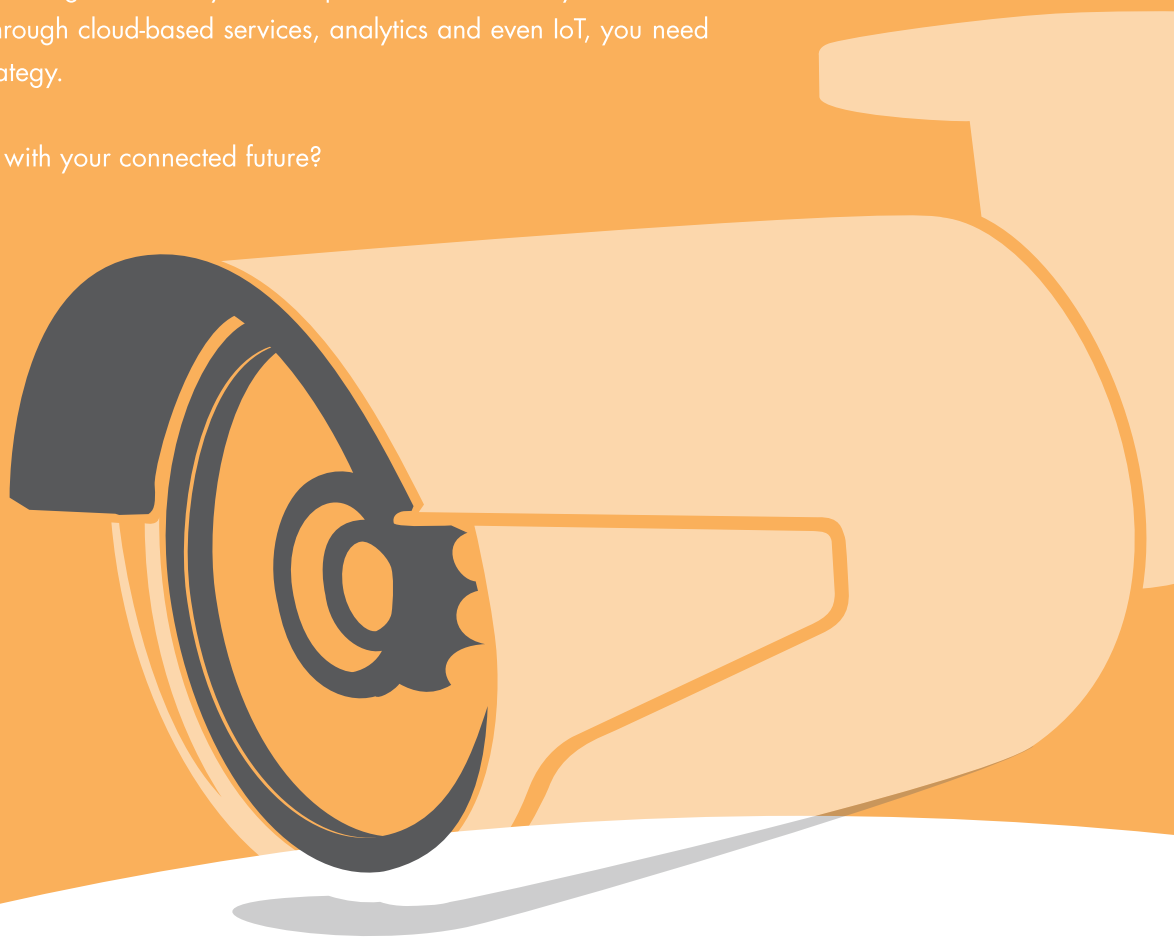

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