TVBEUROPE

TVBEurope ebooks

THE FUTURE OF LIVE PRODUCTION: THE SKY'S THE LIMIT

How NDI® is evolving live production capabilities for broadcasters

In association with vizrt

GETTING AHEAD IN THE CLOUD

Broadcasters have their heads in the cloud, where the sky's the limit on creativity, writes **Ryan Hughes**, Product Marketing Manager, Vizrt

Momentum has been steadily building for advanced, remote-friendly cloud-based live production tools. In 2021, the technology's evolution reached a tipping point as broadcasters began giving the new cloud video paradigm the attention and respect it deserves.

So, when broadcasters become untethered from their expensive, inflexible on-premise-based video facilities, and embrace new live cloud-based production solutions – such as 4K switching, studio automation, sports analysis tools, and cutting-edge graphics from Vizrt – what creative rewards, freedoms, and competitive advantages can they expect?

For answers, we need only consider a few leading-edge success stories, such as: ATP Media serving an ace in cloud-based live production for the ATP Tour, and Sky Sports Germany scoring a winning goal by remotely producing the Bundesliga Handball final using 5G mobile cloud networking. In fact, Sky projects that a sporting event as big as the England's Premier League football season could be produced entirely in the cloud within the next five years.

UNPRECEDENTED PRODUCTION FLEXIBILITY

Given that live broadcasting is mission-critical and technical glitches are detrimental, it's only natural for broadcasters to give pause before leaping to the cloud. But live cloud production's many advantages are hard to discount, including unprecedented flexibility and scalability.

When live cloud production is augmented with NDI® IP-based video networking – and NDI-native software like the Vizrt Live Production Solution – virtually limitless NDI audio and video sources can be mixed together, even from mobile devices and/or video conferencing apps, making it easier to create engaging, entertaining shows that wow audiences.

IN THE CLOUD, REMOTE COLLABORATION BECOMES A DREAM

For remote collaboration and production, the benefits of cloud-based live production and NDI are enormous. For example, producers can go beyond local talent to staff the best teams for their productions wherever they may be. And many crewmembers no longer need to be at the remote site to do their jobs.

To illustrate this point, Media.Monks remotely produced 20 sports games where the action was taking place in New York, while the technical director called the shots from his home office in England. The audio was controlled from Brazil, and US operators provided additional technical support. Cost savings resulting from cloud-based production can be reinvested in other innovations to maintain a competitive edge. The cloud

makes it easier to spin up new channels and ramp up productions with a faster time-to-market. By leveraging infrastructure-as-code, custom-tailored broadcast workflows can be quickly fashioned from scratch.

By eliminating or streamlining tasks, cloud-based production also frees up IT teams to work on higher value activities. Not only does this save man-hours, enterprises report a 50 per cent reduction in tactical IT tasks leading to ten times the number of projects supported.

SUSTAINABILITY AND REDUCED CLIMATE IMPACT

Turning cloud capabilities on and off as needed not only saves money, it also reduces the carbon footprint caused by continuously running on-premises-based hardware.

At the Amazon Web Service (AWS) EMEA Media & Entertainment Symposium in 2021, David Travis, Group Director of Content, Broadcast & Platforms for Sky News, affirmed how well the cloud approach reduced CO2 compared to running on-premises hardware 24/7.

Striving to become net-zero carbon neutral by 2030, Sky News led by example in its coverage of the 12-day COP26 climate change event. By opting for live cloud production, they covered event activities in Glasgow, Scotland remotely from their London headquarters, thereby reducing their CO2 footprint by over 90 per cent.

THE COST OF LETTING THE CLOUD PASS BY

With a cloud- and software-based operating expense (opex) model, broadcasters gain more cost-effective usage of enterprise-grade software – such as 4K switching, studio automation, sports analysis, and cutting-edge graphics from Vizrt – compared to making capital investments in hardware.

While the total cost of ownership (TCO) of premises-based equipment is difficult to compare against live cloud production costs, due to their inherent differences, broadcasters do realize significant cost savings when choosing cloud solutions over premises-based hardware.

While each business takes a different approach in calculating the TCO of their IT systems, it's hard to ignore the 61% TCO savings made by Discovery, Inc. when it moved its playout infrastructure to AWS. And, two independent and in-depth studies of 1500 AWS customers found they averaged 42% reduction in IT costs-per-user.

"We love the cloud because we can test new things, fail fast, learn from it, and go again until you get it right"

DAVID TRAVIS, SKY UK, SPEAKING AT THE AWS M&E SYMPOSIUM (2021)

FASTER CREATIVE EXPERIMENTATION

The ATP Tour project exemplifies trial and error until success. Orchestrated by ATP Media, the broadcast and media arm of the ATP Tour, along with Gravity Media and AWS, the project covered seven tennis matches a day over the first four days of the Rolex Paris Masters (an ATP Masters 1000 event).

Besides bringing its NDI-native Vizrt Live Production Solution to the table, Vizrt collaborated with other software vendors in an AWS cloud environment to give ATP Media the ideal platform to test various cloud-based live production tools to find the best complement.

This project involved multiple freelance broadcast experts testing various AWS-hosted live production solutions. In a real testament to just how far virtualized production environments have come, David Sabine at AWS commented that the freelance experts reported they "could not notice any difference [using cloud-based live production tools] than what they would expect in traditional set-ups".

"This is all about finding out what does work, what doesn't work, and start to build, test, break, and fix"

SHANE WARDEN, ATP MEDIA CTO

ATP Media, Gravity Media, AWS, Vizrt, and other software vendors all collaborated, giving ATP Media the opportunity to find the perfect complement. "To experiment with vendors interoperating with each other, and to understand the benefits and limitations of single vendor solutions, is so invaluable as we look to create our roadmap to this exciting future and all the benefits it can bring," said ATP Media CTO, Shane Warden. "Using a protocol like NDI across the board was really important to giving us the opportunity to see how the gluing of [different vendor] products together could work."

THE CLOUD-BASED PRODUCTION FUTURE IS NOW, AND HERE'S WHY

Live cloud-based production offers broadcast producers many intrinsic benefits, including creating better quality content with faster time-to-market; significant cost savings, productivity and operational efficiency; less adverse impact on the environment, and the ability to test, fail quickly, and test again. It's no wonder broadcasters now have their heads in the cloud. ■

VIZ VECTAR PLUS: THE SILVER LINING FOR LIVE PRODUCTION

Media.Monks pivots to scalable cloud production with Vizrt's live production solution, and business is booming...

A Media.Monks employee remotely producing a sports game.

Image credit: Media.Monks

When the pandemic first hit and sports leagues were forced to cancel their seasons or televise games without live audiences, it sent production companies and technical engineers scrambling to find workaround solutions. Broadcasters needed content to support viewers at home due to health safety restrictions and streaming that content at the highest quality was the only answer.

In November of 2020 Media.Monks, a digital-first marketing and advertising services company – with 57 talent hubs in 33 countries around the world – received a call from a major sports league inquiring about producing roughly 20 games in pristine 4K UHD. The catch: due to Covid restrictions, the on-site crew at each of the league's arenas would be limited to two people and they would have a mere 4x4 table-top encoding set-up. This made it challenging, the Media.Monks' team knew, but not impossible.

NEW WORKFLOW

Led by Lewis Smithingham, Media.Monks director of creative solutions, they quickly set to work devising a workflow to produce multiple games, sometimes simultaneously, that would include six fixed (unmanned) cameras strategically placed around each arena along with a camera technician and one encoding engineer. The live game would be distributed via public cloud service AWS.

"When we first looked at Viz Vectar, we immediately realised it had all of the tools we were used to, just in a virtualised environment"

JOE DEMAX, MEDIA.MONKS

Taking into account the cameras, graphics, remote announcers and other production sources, they needed a 4K switcher that could handle up to 16 inputs and also support 59.94 frames per second distribution. Smithingham said that type of product was not easy to find. After some trial and error, the answer came in the form of a decentralised architecture based in the cloud that could basically do the work of three traditional mobile production trucks. Once the cloud was chosen as the

foundation of this remote production workflow, the Vectar Plus – a new live production solution from the Vizrt Production Control Suite portfolio of software-enabled products and systems – was put through some 'real-world' testing in January before being fully integrated into Media.Monks' workflows in just two weeks. The first live games went on air (from the cloud) a week later.

"We knew we had to build our workflow from the ground up to be cloud enabled, allowing remote working," said Media.Monks broadcast technical manager, Joe DeMax. "Viz Vectar was our way of getting there quickly and efficiently. There really was nothing else powerful enough."

INVALUABLE FLEXIBILITY

Viz Vectar Plus is a fully featured live production solution that can be implemented either as a software download to install locally on a standard PC that meets the necessary performance requirements on-premise, or as a virtualised package that runs in private or public cloud environments that support GPU processing. This flexibility has proved invaluable for a lot of production companies that work with a variety of clients in different environments.

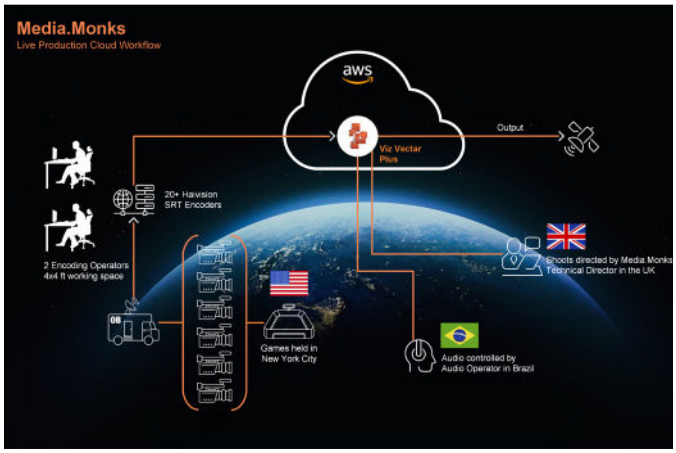
With built-in media players, recording, streaming, audio, and graphics control, this cloud-based production tool suite makes it simple to output multiple versions of the same programme with differences in graphics presentations, aspect ratios, and resolutions. And because Viz Vectar Plus is purpose-built software – tightly integrating standard computing and network infrastructures with NDI IP integration and optional SMPTE 2110 connectivity – Media.Monks said it has led to reduced physical technology costs and constant software updates.

"We looked at other products in the cloud to serve our purpose and there was no product out there that could handle the workflow the way we wanted it to go," said Smithingham. "Our production trucks can work around the world in a single day. It's fascinating to see that type of business transformation occurring."

STAYING CONNECTED

This cloud connectivity has also allowed Media.Monks to keep its staff of some 6,000 people around the world working steadily throughout the pandemic. "When we first looked at Viz Vectar, we immediately realised it had all of the tools we were used to, just in a virtualised environment," explained DeMax. "This meant we could continue to put our best people on the production no matter where they were located. It was like being in a broadcast truck, except it was all in the cloud."

Indeed, Viz Vectar Plus helped the digital media company staff up its teams best suited for the job by offering a fully remote solution and a secure bridge to the cloud. This enabled the team to work collaboratively without being in the same physical location. During one of the live sports productions, Media.Monks used a truly global team: one person is based in Nottingham, England; several in the US; and some in the company's São Paulo, Brazil office. So it was truly a global production team working on the same project in real time. That, said DeMax, was critical to their success. And the best part, according to Rob McNeil, operations director live/broadcast at Media.Monks, is that Viz Vectar "eliminates the need for a stack of servers and UPSs, power, generators, etc. You can now have flexible access and all of the



production capabilities you need via a licence that you can fire up at the drop of a hat. We realised that the applications that we were using a year ago simply were not capable of what we are able to do now with Viz Vectar Plus."

"What we have been able to do given the restrictions we were working under is nothing short of amazing"

JOE DEMAX

EXCEEDING EXPECTATIONS

Since that initial success with Viz Vectar, Media.Monks has now signed up several clients that are leveraging cloud-based production operations with it. In fact, several of the company's clients and their brands have been able to thrive, thanks to the production work provided by Media.Monks.

"What we have been able to do given the restrictions we were working under is nothing short of amazing," said DeMax. "It truly distributes the team, not based on where you are but based on talent. The response has been absolutely amazing, with clients' expectations exceeded time after time."

Media.Monks now has most of its staff using Viz Vectar Plus and they are creating more content for multiple distribution platforms than ever before. "This has been the most productive year of my career," said Smithingham, despite the myriad pandemic restrictions and event postponements.

"Having the ability to leverage this scalable platform to work the way we want it to is very empowering. It has really added a layer of stability, comfort and performance to our operations. We're now working with a tool that we're used to, and that we trust. With Viz Vectar Plus, we have not had a problem with latency or some of the issues you get with other solutions on the market. This Vizrt suite of live remote production tools is designed with professional large-scale broadcasters in mind." ■

THE DEMANDS AND FUTURE OF LIVE PRODUCTION TECHNOLOGY

TVBEurope talked with Vizrt's Vice President, Product Management **Ulrich Voigt** about the current live production landscape, the inherent sustainability and cost benefits of operating in the cloud, and how broadcasters might run live productions in the future

HOW DO YOU SEE THE LIVE PRODUCTION MARKET RIGHT NOW AND THE ONGOING DEVELOPMENT OF TECHNOLOGY FOR IT?

The key element we see at the moment is a move to software-based solutions. Specific hardware for this purpose, like vision mixers and audio consoles, is not required any more. It also does not provide the flexibility broadcasters need today, both in terms of functionality and the varying requirements for remote production and smaller productions. The entire production tool set, other than the cameras, obviously, can be software-based. This includes the transmission element, vision mixer, audio mixer, graphics, editing and the replay and analysis process that is so important in sports broadcasting. These building blocks are software-based and they can be more flexible, with the ability to combine them, change configurations, automate configurations and ultimately deploy everything in the cloud.

WHAT ARE THE MAIN FEATURES YOUR CUSTOMERS ARE LOOKING FOR?

Flexibility is one of the main requirements, with the ability to configure [the system] for various purposes. This includes making it bigger or smaller and having customised user interface configurations, as well as being able to spin up the system in an automated way and have it configured quickly for one specific production before switching it over to another. With software, you can take the same solution for a single operator driven news show and then turn it into a sports production with 15 cameras and replay capability. It would always be the same product, the same solution and the same skills within your company but reconfigured and redeployed for different use cases. If a production goes into the

cloud, then the other concern is optimising in terms of latency and audio workflows, which are the main areas where the cloud poses specific challenges.

LATENCY IS A MAJOR CONSIDERATION IN REMOTE PRODUCTION, WHICH WAS ALREADY BEING IMPLEMENTED BY BROADCASTERS BEFORE THE PANDEMIC BUT WHICH WAS ACCELERATED AND NOW IS A KEY PART OF LIVE PRODUCTION. HOW ARE YOU ADDRESSING THIS?

This is where NDI® (Network Device Interface) comes into play. NDI is an inherently low latency protocol for video over IP. It is basically sub-frame latency and that was used at the Guildhall School of Music and Drama in London for a distributed audio production. Audio needs latency that is much lower than the video frame and NDI is able to provide that. This year we extended NDI into wide area networks (WANs) and also the cloud using NDI Bridge, which allows you to have the same NDI experience across networks, including the cloud. There is low latency across networks together with the other functionality that is inherent to NDI, including tally, metadata and back channel. The metadata is used for camera control, feeding back any control information and discovery of streams. Having this functionality built in and not having to use different tools and protocols also reduces latency.

"Sky UK's coverage of the COP26 climate conference generated nine kilograms of CO^2 for nine hours of production in the cloud. The same production using legacy equipment on prem would have been 119kg of carbon"

WHAT PART DOES COMPRESSION PLAY IN THIS?

How the video is compressed and treated is the other element in the process. Even in the highly compressed version of our system NDI|HX®, which uses H.264 or H.265 compression for the video, it's still focused on frame accurate switching and production, with a latency which can go as low as one frame. The whole NDI ecosystem, with all its video, audio and control communication, operating in a remote production, allows you to work with the latency of your physical connection. We cannot beat the speed of electrons and light but the overhead that NDI adds on top of it is really minimal. This was proved with the Guildhall remote audio production. There are huge benefits when we combine NDI and cloud with our software-based production tools.

NDI WAS DEVELOPED BY NEWTEK, WHICH IS NOW PART OF THE VIZRT GROUP, AND ALTHOUGH IT IS A PROPRIETARY TECHNOLOGY, IT HAS BEEN ADOPTED BY MANY BROADCAST EQUIPMENT MANUFACTURERS. DO YOU SEE NDI AS A DE FACTO OPEN SYSTEM THAT ENABLES COMPATIBILITY BETWEEN A LOT OF OTHER TECHNOLOGIES?

Yes, and that is why you can really benefit from the wide ecosystem. If you have a specific problem you can go out to the market and find hardware or software, such as a multiviewer or signal processor or teleprompter display, which works on NDI and will solve your problem. All product categories in media production will contain several devices that support NDI. If you base your production on NDI you can choose between the best tools for your specific needs and not be locked into one suite of devices from one vendor. As far as audio is concerned, there is a new element for NDI in the form of NDI Audio Direct. Through this we are providing plug-ins based on VST (virtual studio technology), which is a standard for creating plug-in technology for audio software. Using this you can build digital audio workstations, audio effects and other systems. By using the VST-3 plug-in for NDI and adding it to your audio workstation, of any kind, you can input and output audio for your NDI-based production. In this way it is not only replacing SDI but also the IP-based audio protocols on physical audio connections.

YOU MENTIONED THE CLOUD AND THAT WAS ALSO BEING USED BEFORE THE PANDEMIC BY FACILITIES LOOKING TO DECENTRALISE THEIR OPERATIONS AWAY FROM PHYSICAL PREMISES. IS THIS NOW HOW PEOPLE ARE LOOKING TO WORK IN THE BROADCAST ENVIRONMENT?

It is certainly accelerating and the pandemic has played a part in that. Another element is climate awareness, as well as overall cost pressure. We are seeing different use cases and one of these is the Sky Sports Germany handball production we did with the Vizrt Live Production suite of products where the customer has a requirement to broadcast approximately 250 matches every year. They currently do that with a full team and an OB truck with all the equipment driving to the venue. This can be much more cost-effective by just the camera team going to the venue and having the rest – the technical director, journalists, replay operator, graphics operator and the commentator – working remotely. By not needing all those people to travel or having a requirement for the OB truck, other than the cameras on site, significantly reduces both costs and the carbon footprint. Connected to this is the carbon efficiency that can be achieved by having a gallery only when you need it. Sky UK's coverage of the COP26 climate conference was done using Vizrt products, including NDI. For nine hours of production in the cloud, Sky calculated that it generated nine kilograms of CO^2, while the same production using legacy, physical equipment on prem would have been 119kg of carbon.

HOW DO YOU SEE LIVE PRODUCTION DEVELOPING THROUGH NEW TECHNOLOGIES?

The Sky Germany handball production gives us an idea of how broadcasters might work in the future. With the cloud and a 5G network you can work with less equipment and fewer people on prem. Sky was using four traditional fixed Sony cameras plus cheap, standard smartphones to capture specific angles and enhance their content. The 5G signals were taken into NDI, where the feeds from the Sony cameras and the smartphones could be treated as the same signals and then mixed in our Viz Vectar Plus vision mixer. That offers people more flexibility and new, creative ways of shooting, ensuring that the production is scalable with enhanced content for viewers to have an immersive engaging experience. ■

vizrt

PC

Watch the demo

www.vizrt.com/community/demos/on-demand/production-control-ndi

vizrt.com