EVENT SUMMARY

Presentations and videos:
https://tech.ebu.ch/nts2020

Disclaimer: This report is intended as a quick overview of the event. Before quoting any of the speakers we recommend that you refer to the original presentation and check with the speakers themselves.

WELCOME TO NTS 2020

Opening remarks
Antonio Arcidiacono (EBU)

The COVID crisis has been a huge problem but also an incredible accelerator in the pervasive use of live production and in the promotion of large scale online interactive education. As we get used to new ways of doing things, we will see a continuum between remote production used by media professionals and the videoconferencing used by consumers. They will resemble each other more and more: the private side will become more professional, while on the professional media side, remote production will be no longer just for special events, but will be for everyday use.

This will be further enhanced when the new 5G technologies for production and contribution are rolled out, in private and public networks with a guaranteed QoS for audiovisual contribution. The EBU and 5G-MAG are actively contributing to the development of those solutions to accelerate their availability to the audiovisual industry and to society in general.

KEYNOTE!

Lessons learned from the lockdown
Karl Petermichl (ORF), Dave Matthews (RTÉ), interviewed by Phil Tudor (BBC)

As the lockdowns began, both ORF and RTÉ were able to quickly implement schemes to ensure business continuity, including work-from-home (WFH) for the majority of staff and isolation of production teams, whether sleeping on-site (ORF) or in fixed crews on the same shifts (RTÉ).

RTÉ's move to remote production made use of consumer tools, with the availability of low latency IP tools being key. There was previously resistance to these products, but they became the norm overnight.

ORF had already fully switched to Skype for Business and completed the Windows 10 roll-out, so was well positioned for the move to WFH. Everything was run over the VPN, with the speed increased to 1 Tbps.

While RTÉ had previously implemented two-factor authentication, and so was ready for WFH, making the core craft tools remotely accessible and working well was a big challenge. Based on the lessons learned, they are now leaning towards a hybrid cloud solution for graphics, editing, radio production, because it looks like the best cost option. The egress is much better and everything is commoditized. They don't need the full suite of tools remotely – just cut-down versions to do limited work or to view things.

ORF: Going forward, if we don't push the change and establish processes, it won't happen by itself. It's too easy to fall back to the processes we're used to – it needs to be managed actively. Also, license costs will increase, as now everyone has a laptop as opposed to shared workspaces before.

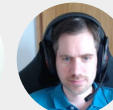# TECHNICAL BUSINESS TRANSFORMATION

Standardizing the new normal – what needs to change?

Bruce Devlin (SMPTE)

In a post-COVID world we'll be more virtual, more remote and more "cloudy". Standards provide stable platforms, common vocabularies and interactive networks. Standards Developing Organizations need to document places where standards can help, not just to facilitate interoperability, but also agility.

While the due process involved in standardization can slow things down, SMPTE has introduced tools to speed up or simplify the process (like the public CDs). It's not a question of standards versus open source – there's a middle ground where you use the standardization process to get rid of the conflict.

For IP production, SMPTE's current focus is on defining a Production Network Layer that sits on top of the media layer and below the application layer.
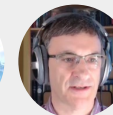
Orchestration: from discord to harmony

Jemma Phillips (BBC), Ivan Hassan (BBC)

Using virtualized servers with a multiplicity of production islands can lead to repetition and over-provisioning. An orchestrator brings much-needed consolidation into software-defined services, and can deliver significant savings. It allows more precise resource management, so you can plan ahead.

An orchestrator should act as one central brain that unifies requirements for business (with awareness of the rules and priorities) and technology (visibility over the entire estate, real-time monitoring, ease of upgrade and rollback). It shouldn't have to be always on and shouldn't take the environment down with it. The costs of operation can be further reduced by moving to a microservices model.

Containers vs. Serverless

Alexandre Rouxel (EBU), Joost Rovers (Rovers IT)

Virtualization using containers (usually Docker plus Kubernetes for the management) is great for applications that require constant low latency and for migration of existing applications. Serverless is great where there is unpredictable traffic (as it scales automatically) and has the advantage of being pay-as-you-go. Both containers and serverless are well suited to microservices.

You will end up using both serverless and containers, as they complement each other. However, serverless will improve in future, and it is easier to move from serverless to containers than vice versa. "If you can build it serverless, go for it!"

Driving the adoption of Live IP

Willem Vermost (VRT), Peter Brightwell (BBC)

JT-NM Tested is not a certification programme; it's a snapshot in time to see how vendors and equipment conform to key parts of the standards. The evolution of the results show that it is delivering high value for the industry, with implementations improving constantly. The recent COVID-impacted round leaned heavily on self-testing, with only the controller tests validated (remotely). The results catalogues are available on the JT-NM website.

A new version of the EBU Technology Pyramid For Media Nodes is imminent, reflecting progress in standards compliance across the industry. A new EBU group on Automation & Provisioning, has produced TR 055 to provide public service media with guidance on automation with regard to applications, techniques and technologies.
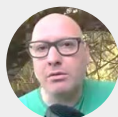
The Cloud enabling interaction

Floris Daelemans (VRT)

The VRT Video Snackbar helps content creators introduce new media workflows and technologies. They've recently been working on using the cloud and online systems to get more interaction into live shows. They've used a combination of Web RTC (open source real time communication) and Jitsi, an open source system for video calling. A live proof-of-concept for the StuBru Golden Circle went well, although current limitations for Jitsi on smartphones pushed them to use Zoom at the last minute. Jitsi shows promise, particularly in combination with OBS.

The next use cases they're working on are a remote two-person interview solution for journalists (with the ability to generate clean feeds, etc) and bringing a virtual audience to live studio shows.
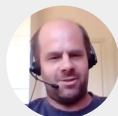
Lessons from cybersecurity

Gerben Dierick (VRT)

A quick search, using Shodan, for specific terms related to tools commonly used by broadcasters returns several examples vulnerabilities. Examples included an NDI studio monitor, PTP clock, vMix streaming software. An attacker doing this doesn't need any specific skills – even kids playing around could cause many problems.

There is still a problem in the industry because either we don't think it's important or we know it's important but don't have the time to address it. JT-NM Tested turned up a huge number of vulnerabilities including some very serious ones. Neither broadcasters nor equipment vendors have a good enough understanding of what is at stake. EBU Members should follow the Recommendations issued by the Media Cybersecurity group. If you use IT, use (current!) IT best practices.

IT thinking for professional media

Brad Gilmer (AMWA)

For media companies, the amount of *business value* that's generated just by moving to IP is relatively small: it's not bill-per-use, not cheaper, not easy to implement, etc. We need to approach professional media with a computer science mindset. Start by focusing on *business-driven user requirements* and look at what you can steal from the IT domain as best practices to meet those requirements.

IT has been successful because of some bedrock principles: thinking of things as resources, having a persistent identity framework, stateless machines, idempotency, automate everything, etc. Most importantly, security: an IT person who is thinking in an IT way about media starts with security.

State of IP video networking and distribution

KEYNOTE!

Andy Bechtolsheim (ARISTA Networks)

Even a year ago, over 60% of the bits on the internet were video streams. SVOD continues to be the fastest growing channel for video consumption, with the large US platforms dominating. During the pandemic, viewing has doubled on the major platforms.

The rapid progress in network speeds has been driven by the underlying silicon chips, which have doubled their speed every other year. In production, ST 2110 has been an incredible revolution in the way uncompressed video streams can be handled and the workflows that it enables. With 400G optics (and 800G in two years), any event can be produced remotely with uncompressed 4k video. This greatly reduces the need for OB trucks – you just need cameras, operators and maybe big screens for interviews.

RESILIENCE & BUSINESS RECONFIGURATION

Virtual tour of Flanders 2020
Wouter Degrave (VRT)

VRT's sports channel learned several valuable lessons in running a virtual cycling race. The idea came from the race organizers, while Sporza was happy to provide some sports content for the audience. A Kiswe CloudCast was used to pull in RTMP streams from the 13 riders (who used the Larix Broadcaster app), plus three virtual cameras from the Bkool competition platform, and two commentators.

Lessons learned included the need for very powerful laptops for the virtual camera directors, the need for network expertise to deal with firewall problems, and the continued importance of line-of-sight communication for the directors. The whole production was done using only office infrastructure and no broadcast equipment.
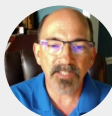
Space exploration-networking challenges for taking us all along for the adventure
Rodney Grubbs (NASA)

Artemis is the NASA project to land humans on the moon in 2024 and will be covered by NASA TV. The recent Demo-2 launch in collaboration with SpaceX generated a lot of interest and provided valuable experience. NASA TV is currently distributed via satellite and streaming. Increasing bandwidth means more content can be provided directly to the public in future.

The goal is to move away from a fulltime 24/7/365 satellite distribution model. The current linear public channel will evolve into a non-linear app. The media feed needs to be very low latency and high quality. Moving away from satellite to cloud-based infrastructure, it's hard to know what the cost impact will be, particularly with surges around major events. (The feed from the ISS is 600 Mbps over Ku-band.)

Big project implementation challenges during lockdown
Steve Fish (Discovery/Eurosport)

As a sports-focused broadcaster, Eurosport faced significant challenges as the pandemic arrived in Europe. Besides simply keeping the channels on air and ensuring a supply of non-live sports content that would be compelling, they also needed to continue with the implementation of an ongoing major project to build a unified production ecosystem.

Going into the lockdown was a big challenge during the commissioning phase, with limited or no on-site staff, vendor delays, etc. Additionally, as a leading-edge ST 2110 system, with a projected 100-150k endpoints, it has been complex to set up and configure. PTP, in particular, has been a painful process. Many of the problems came from the fact that the standards are immature and lack real-world implementations.

TUTORIALS
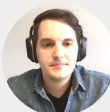
Engaging your staff with broadcasting in the cloud

Hugo Ortiz (RTBF), Karel De Bondt (VRT)

With the COVID-19 crisis, the Video Snackbar Hub partners could put their cloud production solution into practice for several live productions daily. The basic solution used a virtual machine in the cloud, with a dedicated GPU (they chose Paperspace, which has no charge for egress and ingress) and live production software (vMix – many features, including good audio processing options).

They then improved image quality through using the superior cameras on smartphones with SRT (using Haivision Play or Larix Broadcaster), although with increased complexity compared to WebRTC. Directors were given better control panels, building a custom interface for use on a tablet using Open Stage Control; and load-balancing was added, putting the VMs in the same virtual network.

SRT is a great replacement for RTMP/RTSP. NDI can be very useful, even in public clouds. There's a full tutorial online. They need to improve security!
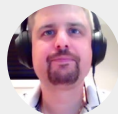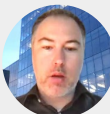
Towards continuous deployment of media over IP infrastructure

Félix Poulin, Alexandre Dugas (CBC/Radio Canada)

Continuous deployment addresses some of the challenges that come with IP infrastructure: configuring multiple devices without introducing errors; updating firmware with 24/7 operation; and the fact that problems are hidden within the many layers of logic or if there's a discrepancy between the logic and the physical reality. IP devices take ten times longer to configure than SDI, so you need automation. Deploying updates and changes is also unsustainable without automation. Devices should be openly controllable; and you should build the deployment tools and monitoring *before* your building.

Ansible performs the information distribution, with workflows generated via Jenkins. At the moment they still rely on multiple spreadsheets, but with the foreseen introduction of an IPAM and DHCP, full automation will be possible. The single source of truth will then be the IPAM plus the physical parameters in WireCAD.

Sustainable equipment and equipment rooms

Mike Ellis (BBC)

In the longer term more sustainable power distribution can be designed into new buildings. For example, the batteries used for uninterruptible power supplies can be used to shift power within a 24-hour period, reducing costs for the peak evening period by taking advantage of cheaper and more sustainable power sources. In the medium term, equipment room layout has a big impact on the efficiency of CRACs (computer room air conditioners). Hot-air containment combined with ducting to send the cold air to the top of the room seems like the best solution.

Quick wins: a DCIM (Data Centre Infrastructure Management) system monitors temperature and power usage for each rack and can help spot problems. They have achieved a PUE of 1.26, which could represent 20-30% opex saving.

With today's software-based infrastructure, there is only a need for a single backup chain that is spun up to match the chain the failed; even better, use microservices and avoid the need for a backup chain.

CHALLENGES OF "CLOUD-ENABLING"

Live-ing in the cloud

Larissa Goerner (GV)

OTT and streaming were early to adopt elastic computing; linear playout came later and it is only just starting now for live production. GV was already working with esports company Blizzard to develop a cloud-based master control room (MCR). For coverage of the Overwatch League, they wanted to be fully elastic so they could spin up and down applications quickly, using them only for the weekend matches. With the arrival of COVID, the entire production had to be handled remotely and in the cloud.

This solution for "elastic distributed production" uses a microservices-based approach, built from the ground up using the latest cloud technologies. One big benefit is that you can have a particular UX attached to a particular functionality. The DevOps approach is necessary, with continuous integration and development. Automating things becomes much more critical.
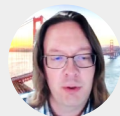
High Throughput JPEG 2000 (HTJ2K) for content workflows

Pierre-Anthony Lemieux (Sandflow Consulting), Michael Smith (Wavelet Consulting)

The changing media landscape has changed the requirements on image coding for professional workflows. It's a trade-off between the cost of compression and the cost of transmission and storage. Image compression is critical in the cloud – cloud costs are really driven by storage costs.

HTJ2K (not to be confused with JPEG-XS) is a new standard from ISO/ITU, published last year. It enhances JPEG 2000 Part 1, replacing the slow block coder with a fast block coder. It keeps everything else from JPEG 2000, including the royalty-free intent. It's possible to convert between the new and old formats in a lossless way.

The main benefits of HTJ2K are that it is faster than its predecessor and it's also very flexible, supporting any image data structure, lossy or lossless compression, resolution scalability, and a range of latencies.
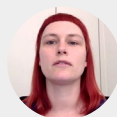
RIST and SRT – basics and test results

Sonja Langhans (IRT) (with Andreas Metz (IRT))

New video transport protocols are needed as the environment, needs and possibilities are changing: the cloud is now available and there are powerful public networks. Protocols exist for local networks (ST 2110), but on wide area networks TCP/UDP are not suitable for professional media.

SRT (open source) and RIST (standardized by VSF) both target video transport at low latency over unmanaged networks. They both offer the whole package, with protection against packet errors, FEC, firewall mechanisms, encryption, and increased availability. Both are worth looking at if you are streaming to the cloud or for reliable video transport over public internet. You need to be careful with additional error protection mechanisms. Use 3-5 times the round trip to dimension your error buffer.

EBU MCMA and its use at Bloomberg

Loic Barbou (Bloomberg), Alexandre Rouxel (EBU)

MCMA (Media Cloud Microservice Architecture) is a serverless microservice strategy for media to aid the move to flexible microservice architectures in the cloud. Libraries facilitate the implementation of cloud services and let developers focus on value-added services and workflows.

Bloomberg's cloud philosophy requires being able to use multiple providers, to have a resilient ecosystem, to be secure, and to have a good handle on cost and performance. They have used MCMA for distribution to social platforms, speech-to-text generation, cloud post-production and Media RSS feed generation. There are many useful production services available out of the box when you get MCMA from GitHub. The cost of running the MCMA production environment is minimal, it has worked for every use case so far, and team productivity increased by ~400%.

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