PR(O)DUCTION TECHNOLOGY SEMINAR

AN EBU EVENT

Geneva, 28-30 January 2020

THE EVOLUTION OF CONTENT CREATION

EVENT SUMMARY

Presentations and videos:
https://tech.ebu.ch/pts2020

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.

KEYNOTE SESSION

Digital PSM of the future – an extrapolation

Heidrun Reisæter (NRK)

The future of PSM is being shaped by forces outside their control. TikTok is a good example: for its young users, the reactions of users and connections to real life are much more important than whether the content is 4K. “We’re letting platforms from Silicon Valley and China take over our relationship with the user.”

NRK is reconsidering its use of third-party platforms. Things will keep changing and they need to be able to adapt. The key is close cooperation between publishing, content, and product & technology – flexible content adapted to different user situations, with more and better metadata.

Content creation in 2030

Jim Helman (MovieLabs)

New technologies in cloud processing and storage, and the use of real-time engines, are going to transform content production over the next decade. MovieLabs wants to enlist help to get there quicker, including from beyond the Hollywood studios. TV production will benefit too.

Two new white papers are available for download. One on production sets out ten principles in three categories: cloud fundamentals, security and access, and software-defined workflows. The security paper zooms in on the opportunity to provide “security by design”, rather than as an add-on.

Stay on top of deepfakes – an opportunity

Tom van de Weghe (VRT)

The dangers of deepfakes are real; PSM have to prepare, build resilience and inoculate society against them. Although we’re not yet seeing many high profile political deepfakes, they are already doing harm and are considered as one of the biggest security threats of the coming decade.

There’s been a huge increase in video deepfakes – 18,000 in circulation as of 01/20. Detection solutions are emerging, many using AI to fight AI. Stanford University has a dedicated research group. Tech platforms have a big responsibility: they should make *detection* as accessible as *creation*.

The evolution of digital media supply chains

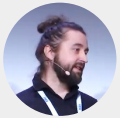
Naz Pethani (Netflix)

We’re living in a golden age of content, but with all of this content, our supply chains need to evolve and we have to set ourselves up for innovation. Change was previously driven by necessity, but today we need to *take charge of the change*.

Standards can reduce complexity for content exchange and collaboration, e.g. MHL for the use of checksums, OTIO for editorial timeline information, ACES for management of colour spaces. Lessons were learned from the IMF experience.

Netflix tries to build a culture of innovation, where cross-functional experts and teams are fundamental.

NEW SERVICES AND NEW WAYS OF PRODUCING (I)



Esports production and publishing platforms

Juha Lahti (Assembly)

Esports is competitive gaming. There are 5-10 big games. When you put a game on TV it's necessary to convey a huge amount of information – if you don't manage to capture it all, you cut off a large portion of the audience, who tend to be gamers themselves. Broadcasters who buy the rights typically need to compete with a free live Twitch stream.

Challenges for bringing esports to TV include conversion from the native 1080p60 format to 1080i50. There are also differences to TV productions, like the importance of the Observer team who control in-game cameras, or the need for noise-cancelling headphones for participants.

Sport analytics combined with game engine workflows

John Murphy (BBC Sport)

First experiments with VR and AR at the 2018 World Cup prepared the ground for BBC's flagship Match of the Day programme moving to a fully virtual studio. The keying and rendering used in gaming engines made this a viable proposition. They use Unreal Engine, as used for Fortnite.

The realism that can be rendered by Unreal is impressive, but there's a knock-on effect with performance. A lot of optimization needs to be done with the virtual scenes, so there can be challenges with the timelines and workflows. The green screen studio isn't permanent – it needs to be reinstalled each week, which is another challenge.

Volumetric capture for broadcast studios

Chris Johns, Sky UK

VR (covering Augmented and Mixed Reality and volumetric video) has developed along the typical hype curve – having peaked and fallen it's now moving back up the "slope of enlightenment", seeing what we can achieve and do with these technologies. Sky makes several experiences available to customers via its app.

There are two main volumetric capture solutions, from Microsoft (using a large number of cameras) and Fraunhofer (with stereoscopy for depth measurement). The post-processing for both is similar, with a huge rendering engine creating a point cloud. Capturing the swings of leading golfers at The Open was a successful use case. It took 8 hours to render a single golf swing, with a frame rate of 90fps.

NEW SERVICES AND NEW WAYS OF PRODUCING (II)

Newsroom evolution or revolution? A socio-technical approach

Yioula Kyriacou (CyBC)

Technology is a core business element in which huge amounts of resources are invested. The costs and the fast pace of change put a lot of pressure on organizations and thus the rate at which technologies are assimilated in our businesses becomes critical. Projects usually fail because human factors are neglected, rather than for technology reasons.

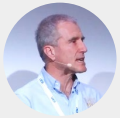
CyBC, one of the smallest EBU Members (360 employees), tries to keep pace with technology changes, with a major new project every ~1.5 years. Training and a focus on reliability are important success factors. Leveraging the archives via a new unified platform has been a key project.

The future of mobile journalism

Mark Egan (Purple Bridge Media)

Mobile journalism has not peaked – the trajectory is upwards and there are exciting developments to come. Phones have bigger sensors, battery life is better, zoom and stabilization are improving. They are the Swiss army knife of media: there are better individual tools out there, but a smartphone can do it all and fits in your pocket.

People are doing MoJo because demand for video is growing, while budgets are falling. It's a cheap way to meet that demand. It's also easier to create content *for* mobiles (and young audiences) *on* mobiles. At Davos 2020, 30% were doing MoJo. Filmic Pro is a key app in this space.



Middleware for media: the case for standardization with a light touch

Bruce Devlin (SMPTE)

To remain relevant, SDOs should look to expand their services to foster stable platforms for innovation. The creation of middleware for the Live IP production space could be one fertile work area.

The industry has taken a monolithic approach in the past. Microservices are a different way of putting things together – splitting the code up into little grains that do something very specific and do it well. SMPTE and others could build a framework that makes safe and secure microservices, for example a standardized way to wrap your metadata once. It can start with existing patterns.

EXPLOITING AI AND ARCHIVES

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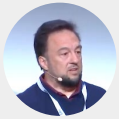


Keynote: Cloud and AI-enabled workflows

Grant Franklin Totten (Al Jazeera)

Al Jazeera is increasingly applying data science and AI techniques to various parts of the production environment, in particular to transform the newsroom. The focus is on turning unstructured data into structured data for various purposes, unlocking the potential of the content.

Metadata detected in video content is enriched through the use of knowledge graphs and datasets that put it in context. This “derived metadata” provides much more intelligence to journalists. Rather than trying to integrate this with the MAM, stand-alone applications make it easier to quickly roll the search tools out to journalists.

Using your archive metadata for AI applications

Alberto Messina (Rai)

There’s a mismatch between the archive metadata you have and the metadata applications that you need. Messina’s law on datasets: having annotated assets in the archive doesn’t mean you have datasets for machine learning. The dilemma is whether to reuse or remake the metadata – a cost analysis is key.

Rai is using AI to generate more and better metadata. Natural Language Processing (NLP) is used for semantic search, to explore relationships and perform structural analysis. The metadata architecture developed serves as middleware to integrate internal and external solutions. Rai’s Media Cognitive Services framework is in development as a dataset production tool.

Using AI to make archives searchable

Léonard Bouchet (RTS)

RTS has been developing AI and machine learning tools to enhance search and discoverability of the archives. They started making good progress when they stopped trying to understand text – extracting metadata from video and audio content brought much more success.

They have built the tools on top of the MAM system, but are selectively putting some metadata back into the legacy system. With the different vendors and systems, putting the right metadata everywhere will take decades, so it’s driven by use cases. Tools include face and gender recognition and are mainly used by search professionals for now.

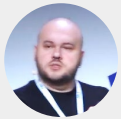
How to implement AI-services into production tools & increase efficiency for both journalists and archives

Christian Vogg (SRF)

SRF is solving several problems with AI-driven speech-to-text services, working with Speechmatics. A key factor in choosing the vendor was the ability to add words to a custom dictionary – with just 230 words added, the error rate fell from 23% to 3%.

They have built a web editor that makes it easy to view and edit video transcripts, also using the React Transcript Editor, an open source solution from BBC. Speechmatics has also been integrated into the DigaSystem editor for radio journalists, enabling search and text-based editing of the audio. A related radio archiving project will soon be fully automated.

KEY ENABLING INFRASTRUCTURE

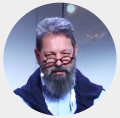


NMOS interoperability and the JT-NM Tested programme for IP equipment

Ievgen Kostiukevych (EBU), Willem Vermost (VRT), Andrew Bonney (BBC)

The JT-NM Tested programme aims to give users an understanding of how Live IP production devices may perform under certain conditions, and to give vendors recognition for having made the effort to integrate the standards and specifications. Two events have taken place already; a third will take place in March 2020, with a shift towards pre-event self-testing.

The tests cover three areas: the data plane (SMPTE ST 2110), the control plane (AMWA NMOS and JT-NM TR-1001-1) and cybersecurity (EBU R 148). The results of the second event showed a marked improvement over the first, indicating that the industry is moving in the right direction.



NDI Video – making IP video accessible for live, post-production, mobile devices & delivery

Roberto Musso (Vizrt)

NDI (Network Device Interface) is a free-to-use but proprietary solution to replace SDI infrastructure. It is easy to configure and manage. It can use existing network infrastructure. NDI doesn't require a synchronization method, meaning the cost and complexity of implementing PTP can be avoided.

The idea behind NDI is to have efficient compression of the source and avoid further compression until delivery. It uses adaptive bit rate compression and typically the bandwidth needed is over-estimated when the network is designed. The bitrate for 4K 50p can be up to 250 Mbit/sec.

The future of infrastructure is agile

Phil Tudor (BBC)

Broadcasters are feeding their use cases into several infrastructure trends: changes in connectivity (IP, fixed and mobile); the transition from hardware to software (with only the devices on the edge, like cameras and monitors, remaining in hardware); cloud computing (managing resources through APIs); and automation and DevSecOps. The prize is flexibility, scalability and agility.

The hybrid infrastructure that must be built is absolutely necessary. Through the EBU Strategic Programme on Infrastructures and Security we can work together on the areas that we've identified as the key challenges.

PRODUCTION WORKFLOWS (& SPECIAL SESSION)

5G in future production workflows

Ian Wagdin (BBC)

Experiments to use 5G for content production use cases have been taking place in the UK, Denmark and Switzerland. For now it's mostly around the 5G radio functions, as the core elements are not ready yet. Private networks (as distinct from the use of network slices on the public network) will be particularly useful for media, e.g. connecting several UHD cameras together.

3GPP Release 17, in 2021, will include several new options relevant for media, such as high bandwidth, QoS, PTP, etc. The EBU 5GCP group needs help to track the work in 3GPP. Get involved!

Microservices and metadata enablers for workflows

Loic Barbou (Bloomberg)

Media services have evolved from running on physical servers, to virtual machines, to cloud containers (which remain useful in many cases) and now to functions in the cloud. Serverless infrastructure will become increasingly relevant: you only pay for the execution time of the function, and writing and deploying them is quick and easy.

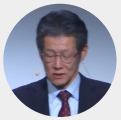
MCMA (on GitHub) is a way to easily implement media workflows in the cloud – serverless, multiple providers – with a set of libraries to sequence services and manage jobs. Bloomberg has used MCMA to process 500k assets over 18 months, at just $2 per day for the environment!

Producing "maiLab" for YouTube – opportunities and risks

Melanie Gath (SWR)

maiLab is a YouTube Channel produced as part of ARD's funk youth network. It's produced by a team of three: the presenter, another scientist, and Melanie Gath on graphic and motion design. They have over 600k subscribers and found success by going into more depth in longer videos – up to 20 minutes. The studio is in Mai's apartment.

Leveraging the YouTube algorithm is important. This means making use of the tools provided, such as infocards (for interaction), endcards, playlists, thumbnails. Embracing the community is also important, with creative calls to action



Special session: Media technologies for Tokyo 2020 and beyond at NHK Japan

Kohji Mitani (NHK)

Tokyo 2020 will have an integrated 2K/4K international signal. There will also be an 8K OBS/NHK co-production, including use of rail and high speed cameras. NHK's live automated synthesized commentary and closed captioning will use the OBS data feed, also used for computer generated real-time signing. The entire torch relay will be covered live in 4K using a mobile IP network and streamed online globally.

2030-2040 see a new axis of media evolution, with quality and functionality joined by an extension of the presentation dimensions: "Diverse Vision", enabled by 8K rollable screens, haptic devices, AR/VR.

THE EVOLUTION OF VIDEO AND AUDIO

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EBU work on audio & video – NGA, HDR, the UHDTV spec & logo, and more

Dagmar Driesnack (IRT), Matthieu Parmentier (FranceTV)

The Video Systems group has been very active, publishing the results of subjective tests on HFR (TR 050), and updates to Tech 3320 and 3325, for display monitors in production. Tech 3372 is a new set of UHD HDR and NGA parameters that can be expected to match well with end user devices in the market. It's coupled with a logo and certification scheme from Eurofins. HDR production codec test results and new EBU HDR colour bars will be published soon.

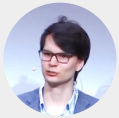
For Audio Systems, 2019 saw three milestone ITU publications cementing the position of the Audio Definition Model. The focus is now on industrializing the workflows. Loudness work continues, focusing on streaming use cases.

Next Generation Audio (NGA)

Nuno Duarte (OBS)

The Tokyo Olympics will be the first to be produced in UHD with 5.1.4 immersive audio. A full end-to-end test was conducted for the Youth Olympic Games in January 2020. The Tokyo audio crew will have more than 200 engineers and 85 OB vans working simultaneously, with 3600+ microphones. New mics, monitoring and metering will be used.

Tests have shown that the standards are not yet well matched to real-world experience, for example, with mixing commentary. Tokyo will serve to educate the audio engineers, but also the directors, to learn how to use immersive audio creatively. OTT app designers also need to learn.

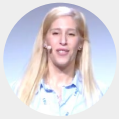


How can dynamic conversion help to improve HDR live production

Lucien Lenzen (Hochschule Rheinmain)

As HDR comes into production workflows, it's not feasible to run parallel productions: HDR and SDR workflows must be combined to reduce complexity and costs. Typically today we generate the SDR through a static convertor, and shade the resulting SDR. The SDR shading can affect the HDR image.

Dynamic mapping and conversion offers opportunities to do HDR with real HDR shading. No additional SDR shading is required – the conversion algorithm serves as a virtual shader. Ideally SDR graphics would be handled separately.



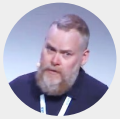
Audio workflow automation

Michal Grundland (insoundz)

Arguably there hasn't been a significant breakthrough in audio – nobody is challenging the basic way that sound is captured and produced. It remains manually operated (in contrast with video), intrusive, inefficient and limiting.

insoundz offers a software-based solution enabling sound capture in any given space and without the use of any intrusive microphones. The full sound in a space is captured and an algorithm analyses the information to create a volumetric model of the audio and the acoustic environment. It is tagged with metadata to allow use for several applications and platforms.

PERSONALIZED & ENRICHED MEDIA EXPERIENCES



Quantity and quality, putting the person back in personalization at Swedish Radio

Jörgen Bang (SR)

Personalization is about expressing personality. The personalization team's vision at SR is: "We make our users see themselves in our digital products." They actively combine qualitative (focus groups, beta testers, personas) and quantitative (user behaviour, tracking) data. Qualitative insights are used to form a hypothesis which is then tested against quantitative data, sometimes needing to build a way of collecting the latter.

SR uses the EBU PEACH platform, enabling dashboards, data visualization and lots of A/B testing. Microservices are also important.

Accessibility or personalized media?

Andy Quested (BBC)

PSM have a duty to make their content accessible to all. WHO estimates ~1 billion people with disabilities. The rights extend beyond participation in cultural life – also relevant are freedom of expression, right to education, health and work, and participation in political and public life. Accessibility for media doesn't need to be considered as interfering with creative intent or as something separate to be added later. It needs to be redefined.

Personalization can be about giving people a choice on how they experience media. There are four options: hearing, seeing, participating and understanding. Cover all four and you serve 100% of the audience.

Personalization in Yle Areena

Kari Haakana (YLE)

For Yle's online player Areena, personalization is as important a goal as having the necessary rights and content and addressing new platforms. It is expected by users, as they get it from Netflix and YouTube. It is based on cookies and device IDs. As Yle login is not mandatory, it is not used much for personalization, but enables "continue watching" and favourites.

It has been a great success so far: front page personalization generated 30% more stream starts; personalized thumbnails generated 5% more stream starts; 2% of push notifications create a stream start. Logged-in users spend 8% more time on the service.

DEMONSTRATIONS

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IP production infrastructure diagnostics with the Live IP Software Toolkit (LIST)
Pedro Ferreira (Bisect), Willem Vermost (VRT), Ievgen Kostiukevych (EBU)

Serverless AI agile workflows (MCMA)
Joost Rovers (Rovers IT), Loic Barbou (Bloomberg), Jean-Pierre Evain (EBU), Alexandre Rouxel (EBU)

Open Source EBU-TT/IMSC subtitling editor
Andreas Tai (IRT)

EuroVox
Ben Poor (EBU)

MAM Semantic
Mariem Solanet (Perfect Memory), Guillaume Rachez (Perfect Memory)

The UHDTV spec and logo
EBU

HDR Live Production
Andrew Cotton (BBC), Simon Thompson (BBC)

File-based production with SDR and HDR deliveries
Pierre Routhier (CBC), Tania Pouli (B<>Com)

VRT Sandbox: In The Pocket
Bjorn Robbens (In The Pocket), Sebastiaan Van den Branden (In The Pocket)

Highlights Detection in Sports Videos
Vikalp Kamdar (EBU / RTS / EPFL), Alexandre Rouxel (EBU)

Explainable Fake News Detection
Pierre Fouché (EBU / SDSC / EPFL), Alexandre Rouxel (EBU)

AI for radio
Luke Eldridge (BBC), Chris Roberts (BBC), Will Metcalf (BBC)

Autonomous cameras
Nikos Kariotoglou (Seervision)

Next Generation Audio (NGA)
Volker Koch (WDR), Alfred Riedel (WDR), Christian Simon (Fraunhofer), Paola Sunna (EBU)

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Presentations and videos:
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We'll be back on 26-28 January 2021