WHERE BROADCAST MEETS BROADBAND

TUESDAY 26 MARCH

09:00-09:05 - **Welcome to BroadThinking 2019**

Antonio Arcidiacono is the EBU's Director of Technology & Innovation. He has extensive experience in conceiving, developing and taking new products and services to market.He is an internationally acclaimed expert in digital television, satellite communications, IP-based multimedia services and mobile telecommunications. With strong knowledge of the European market, he has worked closely with the leading players in the fields of Digital TV and Multimedia Services, and with European institutions at a technical, standardization, regulatory and competition level. Antonio was Director of Innovation, and a Member of the Management Committee, at Eutelsat from 2008 -2018 where he was responsible for launching innovative IP based satellite services. He joined Eutelsat in 1990 and took part in key phases of its development from an international organization to privatization in 2001 and to the IPO in 2005. Before working at Eutelsat, Antonio worked for the European Space Agency and started his career working for Telespazio and Selenia Spazio. He has a Doctorate in Electronics & Telecommunications Engineering from the University of Pisa.

09:05 – 09:30 **- Welcome to BroadThinking 2018**

Bram Tullemans is a senior project manager broadband technology and online services of the EBU Technology & Innovation department. In this role he coordinates the EBU Strategic Programme Internet Services and investigates as programme manager what kind of services the EBU can develop to help its Members in the OTT domain. His main interests are live and video on demand services, the multiscreen ecosystem, content delivery over IP, net-neutrality, (Multi) CDN deployments, (hybrid) cloud services, interactive scenarios merging the linear with on demand experience and the practical applicability of Big Data scenarios for PSM.

Before the EBU Bram worked as senior policy advisor research and development at the Dutch public service broadcast organisation NPO. He developed strategies on a conceptual level and their practical implementations on topics like interactive services, second screen, connected tv's, adaptive streaming, p2p, visual radio, device specific video distribution and strategic policy work related to network neutrality and open source development. Prior to his activities in the broadcast sector he was director of the Dutch cross media department at the international publishing house IDG Communications, worked as journalist for both ICT business and consumer publications and wrote a book about digital video. Bram studied at the University of Amsterdam and Liverpool in the fields of Philosophy, Television & New Media and Computer Science.

SESSION 1: SETTING THE OTT SCENE

09:30-10:00 - **OTT challenges and solutions from RTVE**

Data collection workflows for multidevice delivery

The presentation shows rtve digital approach, how the workflows must addapt to the current technical issues, and finally the ai adoption into the news room or the production.

Manuel Gomez Zotano – PHD in computer engineering. Director of digital development at www.rtve.es. Previously I was crossmedia and application deputy director.

10:00-10:30 - **Online viewing behaviour in motion**

EBU Media Intelligence Service market update

Alexandra Brenkman has been a Senior Media Analyst in the EBU's Media Intelligence Service since 2014. Her work focuses on media consumption trends, audience measurement and EBU Members' online services. Prior to her current role at the EBU, Alexandra worked as a research manager for Eurodata TV Worldwide, specializing in international TV ratings and programming trends.

SESSION 2: APPLICATIONS

11:00-11:30 - **Front end developments that keep player providers awake at night**

Increased user expectations, dealing with emerging trends around video streaming, and novel technologies as well as standards - or sometimes even working ahead of them - while keeping an eye on file size and performance makes player development a challenging task. An inhomogeneous device landscape and video stream variants "at the edge of specs" in combination with use-cases involving advertising and content protection requirements, increase the complexity even further. It needs a skilled team of engineers able to manage all kinds of different programming languages, equipt with various tools and analytics for clear insights into user-behavior and quality, to create a competitive product.

Reinhard Grandl is the Director of Product Management at Bitmovin, a company providing video infrastructure as a service including quality-optimized cloud encoding, adaptive streaming players, and performance analytics. Reinhard is the author of research papers in areas of multimedia streaming, networking, and multimedia adaptation and currently holds several U.S. patents. He received his Master's degree from the Alpen-Adria Universität Klagenfurt, specializing on Networked and Embedded Systems, in 2014 and joined Bitmovin in 2013 as part of the Player department. Reinhard's experience includes positions in international research and development in wireless and wireline networking and telecommunications equipment.

11:30-12:00 - **Progressive web apps: benefits vs limitations**

A look at the relevance of Progressive Web Apps and their HTML5 APIs when doing OTT.

Thijs Lowette is a Solutions Architect at THEOplayer and helps streaming services make sense of this OTT-world we live in.

12:00-12:30 - **HbbTV as a Smart TV app solution**

Using a single standalone HbbTV 1.5 service **to publish Smart TV apps across multiple brands**

Anders Hebert is the Product Owner for SVT:s VOD service SVT Play on TV platforms. Previously, he worked with video transcoding, video content API:s as well as publishing workflows for our services.

12:30-13:00 - **New Relic for Media**

New Relic is a leading analytics provider for Media. We have large, traditional media customers such as Comcast, SKY, and Bell Media as well as new media companies such as MLBAM, Bleacher Report, and The Huffington Post.

Philippe Attia. I define myself as an modern explorer in the digital era, searching for ideas and innovations. I joined New Relic recently, and I brought there a strong expertise in the fields of telecoms, online video delivery, analytics, cloud services and content delivery.

SESSION 3: AI FOR STREAM OPTIMISATION

14:00-14:30 - **Beyond per-title-encoding**

At Mux, per-title encoding makes use of machine learning to classify uploaded content to make the best possible encoding profile. Moving forward the need to rethink our traditional approach of maintaining consistent frame size and particular rendition. The visual complexity of content between scenes rarely stays consistent, so in some cases, we can achieve much more optimal bandwidth usage by not only changing encoding settings between scenes but also changing the frame size.

Phil Cluff is a seasoned video engineer with 10 years of experience, having worked on some of the largest AVOD and SVOD platforms in the world. Phil currently works for San Francisco Video startup Mux, organises the London Video Technology meetup, and appears on the Demuxed podcast.

14:30-15:00 - **AI for Encoding and Distribution: QoE Optimization Using AI for Live Events.**

Next-generation media processing & delivery Internet video delivery is evolving. Today service providers are encoding video using content-aware encoding and distributing it via network optimization with, for an example, zero rating in the mobile space. In the future, video streaming will rely on more dynamic approaches. This presentation will examine how Machine Learning techniques can be used for live content applications, in particular, to dynamically optimize the encoding parameters based on offline learning. This technology approach can be deployed on existing infrastructure (i.e., encoders and decoders). The session will also describe how, on the delivery side, service providers can use analytics from the network (i.e., client, CDN, network) to modulate in real time and offer personalized content to each user. This can be done through manifest manipulation or other techniques. Using these approaches, service providers can not only reduce delivery costs, but also increase subscribers' Quality of Experience (QoE). The main objective is to resolve the live OTT delivery scaling issues encountered by many broadcasters and telcos today.

Patrick Gendron is Senior Manager, Innovation at Harmonic for Digital Television applications. He joined Harmonic with the acquisition of Thomson Video Networks. Patrick recently moved from managing the Harmonic R&D Innovation team to the Marketing Innovation & Evangelism team and is Harmonic's representative at DASH IF, DVB TM and Streaming Video Alliance. Previously, Patrick held senior program and engineering management positions in the digital television headend domain at Grass Valley and Nextream. He started his career as a research engineer at the Laboratoires Electronique de Rennes (Thomson) where he developed new technologies for video transmission over optical fiber. Patrick is a graduate in Computer Science and Telecommunications from the Ecole Supérieure d'Electricité (Supélec).

15:00-15:30 - **Using video analysis and real time player data to optimize adaptive streaming**

• Rapid adoption of high speed broadband means that native ABR is costing content providers a fortune • Rapid growth in consumption of video content over unpredictable mobile and wireless networks is creating challenges in delivering predictable QoE • This presentation will show how SmartSight analytics can provide unique insight into streaming performance and when combined with QBR can enable autonomous streaming optimization on a per session basis. These tools enable content providers to improve quality of experience whilst saving delivery costs.

Simon Orme (MediaMelon) is a market development manager with over 20 yrs international experience in the digital media, ICT and mobile industries; Simon started his career at the BBC, spent 10 years in the consumer electronics industry and was instrumental in the development of satellite TV in the UK. More recently he has held several senior management roles in BT, leading development of digital media services, including the multicast solution which powers BT Sport. Simon now leads business development for MediaMelon focused on helping customers optimise their streaming services.

SESSION 4: CONTENT PROTECTION

16:00-16:30 - **Learnings from Introducing DRM**

Introducing DRM adds complexity and costs. However, SRG SSR discovered that large parts of the complexity and costs come from unexpected sources. Benefit from SRG SSR's learnings to better assess the impact that the introduction of DRM in your products might have.

Michael Schmidle graduated 2005 in Computer Science in Media. After working four years as IT consultant in the pharma and consumer goods industries, he co-founded and worked as CIO at a startup that lives on as the foundation EDUCA SWISS. Since 2014, Michael works at SRG SSR, currently in the capacity of Digital Strategy & Innovation Manager.

16:30-17:00 - **Beyond proprietary protocols - a new era of content key security**

In recent years there has been a strong move towards multi-DRM and standardization in terms of content protection for the multi-screen world. Handling of key material, however, has until now been rather unregulated – resulting in a plethora of incompatible and even directly insecure implementations. Fortunately, with CPIX protocol adoption on the rise, we can solve many of those issues in the future. Let's take a look at the current state and new developments in the field of content key management and security.

Jürgen Jõgeva is Axinom's Director of Products. He has broad experience in shaping software products and bringing them to market. He has been instrumental to creating Axinom's product stack and combines a rare mix of deep technical knowledge and market focus. Since joining the company 7 years ago he shaped the product vision and business strategy of Axinom's digital rights management and encoding and packaging products. He is also a frequent speaker at industry events around the globe.

WEDNESDAY 27 MARCH – DAY 2

SESSION 5: FUTURE DISTRIBUTION MODELS

09:00-09:30 - **Streaming technologies that define the future**

5G update: required standards and formats

Thomas Stockhammer (Director Technical Standards, Qualcomm) is active in 3GPP, DVB, MPEG, IETF, ATSC, CTA, ETSI, VR-IF and DASH-IF in multimedia communication, TV-distribution, CDPs, immersive media and adaptive streaming.

09:30-10:00 - **Online delivery scenarios using satellite**

Satellite contribution to online distribution

Maria Guta Senior 5G SatCom Solutions Architect in Future Projects Business Acquisition Sector of Telecom Technologies, Products and Systems Department Directorate of Telecommunications & Integrated Applications in European Space Agency. Involved in the ESA initiative for 5G, prepares and implements technologies and services development activities to foster the integration of satellite and terrestrial solutions within the 5G and for various verticals. Interfaces with external stakeholders, space and non-space, national agencies and EU to develop common understanding for 5G SatCom requirements in view of integration with terrestrial networks. She has more than 20 years of experience in the field. In her previous positions, she was with Eutelsat and the Space Engineering SpA.

BR(O)ADTHINKING
AN EBU EVENT

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10:00-10:30 - The relevance of telcos in the video distribution landscape.

An overview on how telco's have been, currently are and are going to be of importance in the distribution of video and what trends are currently underway changing the way on how distribution will be handled in the future.

Mark de Jong - Deutsche Telekom - has a career in bridging innovation, technology and business in online video for over 20 years and has been involved in video distribution and Content Delivery Networks (CDN) for over 10 years. He joined Deutsche Telekom's international wholesale business in late 2013 in heading up and growing their CDN business for media and enterprise. Nowadays Mark is involved in harmonizing, directing and developing all worldwide CDN-businesses and -projects across the Deutsche Telekom Group.
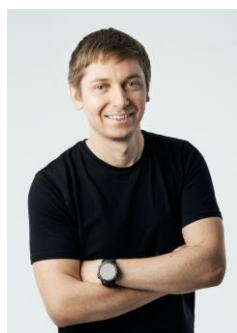
10:30-11:00 - Programmable Internet - Using Distributed Ledger and Segment Routing to control dynamic data distribution and routing over the Internet

NOIA presents how Distributed P2P CDN network can be decentralised and what challenges such technology face. NOIA is also pioneering the concept of Programmable Internet. We show how utilising Segment Routing, IPv6 and Distributed Ledger technologies we are creating global Software Defined Network (SDN) on public Internet. Programmable Internet allows ISPs, Data Centres and individual infrastructure providers connect to Distributed Ledger and sell their infrastructure as internet transit. We use latest Segment Routing protocol released by IETF and heavily adopted by Cisco and other names in the industry. Segment Routing allows programming of data sent over the internet to use predefined routes, solving internet reliability, scalability and BGP security issues. This can be done through NOIA Platform which is World's First Programmable Internet Backbone As a Service.

Jonas Simanavicius is a Co-founder and CTO of NOIA Network. Jonas have a BSc (Hons) Software Engineering degree form Edinburgh University, previously founded other startups in London and worked in Investment Banking Industry in Trading Technology for J.P. Morgan and Royal Bank of Scotland.

SESSION 6: MULTI AND HYBRID CDNS

11:30-12:00 - Multipath CDN: how content providers can truly control the QoE

Beyond financial reason, controlling the QOE is one of the key motivation for a content provider to master its content delivery. Building its own content delivery network follows a progressive approach at a pace associated with business growth. We present the multi-path HTTP adaptive streaming technology as a key technology for allowing the content provider to control the QOE of its streaming service. Combined with other typical CDN related features, we depict a business case wherein a content provider can expand progressively its controlled CDN without compromising the QOE.

Guillaume Bichot joined Broadpeak in August 2018 to strengthen the R&D organization as head of Exploration. Principal scientist, he managed technical activities related to video and networking for Thomson & Technicolor since 1996. He led innovation programs, teams and projects since 2005 in a multi-site/international context. Author, lecturer, he has contributed to standard bodies and national, European and international collaborative projects related to home networking, streaming, broadcasting, Mobile and Wireless.

Nivedita Nouvel is in charge of communication and product strategy and positioning. Before joining Broadpeak, she worked for 3 years as a Product Manager for Envivio, specialist of H.264 encoding and for Thomson, where she was in charge of the IPTV and Mobile TV Service Platform. She graduated from IMT Atlantique (formerly Télécom Bretagne) engineering school and holds a Master of Science in Satellite Communications from UCL, London.

12:00-12:30 - Build your own CDN

What is a CDN? - Functions of a CDN - What do I want to solve? - Measuring Points - SWISS TXT implementation

Vincent Baehler – SwissTXT - Study of Information Science (FH) at Bern University of Applied Sciences - Systems Engineer in different areas for multiple companies - DevOps Engineer for SWISS TXT with topics Cloud and CDN - Product Owner Infrastructure as a Service for SWISS TXT

12:30-13:00 - Which functions are supported with Multi-CDN

Market success factors and work update on new version

Martin Schmalohr received his Diploma degree in Electrical Engineering and Information Technology at Munich University of Applied Sciences (FH) in 2000. After he joined IRT he worked in various European research projects like P2P-Next, Savant, Sambits, and national research projects like WiMAC@home, MifoP, ADAMs. He participates in international standardisation bodies of EBU and DVB and was taking care of 17 diploma thesis with the focus of streaming at IRT. He is conducting MPEG-DASH Streaming-Seminars since 2015 at ARD/ZDF Medienakademie. Martin Schmalohr is working with the public broadcasters of ARD and ZDF for online distribution on PC, HbbTV and mobile devices over the open Internet. He currently takes part in the EU-funded 5GMedia project.

SESSION 7: ESSENTIAL UPDATES

14:30-15:00 - **Application information on available content**

DVB-I specification for publication of local stream availability

James Jackson - Digital UK

15:00-15:40 - **Dynamic substitution of Broadcast Adverts using HbbTV**

Targeted advertising by substitution of broadcast adverts with IP-delivered adverts is a reality for many operator managed deployments today. DVB and HbbTV are cooperating on enabling the introduction of this in horizontal retail markets. DVB is defining signaling to be added to broadcasts to identify the opportunities for ad substitution. HbbTV is defining how an broadcaster HbbTV application can act on that signaling to request and play a targeted advert. DVB is also working on some of the interactions around requesting ads and reporting playback. This will give an introduction to how the various activities will fit together to deliver targeted advertising and what can be expected in the HbbTV specification for targeted advertising.

Jon Piesing is the vice-chair of HbbTV. He played a major role facilitating the convergence of the original French and German initiatives which together become HbbTV. He is a member of the Steering Board of the DVB project and the Steering Committee of the CTA Web Application Video Ecosystem (WAVE) project. Jon has been a leading figure in the development of specifications for integration of TV and interactivity for more than ten years. This has included being the chairman of groups in DVB, the Open IPTV Forum and the UK DTG. Jon is now Director, Standardisation for TP Vision (who manufacture Philips TVs for Europe and a number of other territories). He has previously held senior positions related to standardisation in several different units of Philips.

SESSION 8: ESSENTIAL UPDATES

16:00-16:30 **- Origin developments and best practices**

Origin settings for live and on demand services

James Burt - Vualto

16:30-16:40 – **CTA QoE Metrics - update and call for review**

The CTA R4WG20 group has finally released their CTA-2066 "Streaming Quality of Experience Events, Properties and Metrics" specification for industry comment. This short session summarizes the key features and gives the audience instructions for providing feedback.

Will Law is Chief Architect within the Media Engineering division at Akamai and a leading media delivery technologist. Involved with streaming media on the Internet for the last 18 years, he has a strong focus on client-side development and wrote many of the early connection frameworks. Currently focusing on low latency streaming, MPEG DASH, technology evaluation, UHD distribution, VR delivery, CMAF, WebRTC, cloud transcoding and multi-bitrate switching. Law is President of the DASH Industry Forum, Vice-Chairman of the CTA WAVE Project, holds Masters degrees in Aerospace Engineering and an MBA and has worked previously for Adobe, Internap and a series of five engineering and media-related startups.

16:40-17:10 – **CMAF, OMAF progress reports**

Iraj Sodagar (MPEG)

17:10-17:30 - **Wrap-up**

Bram Tullemans - EBU