YOUR NETWORKED MEDIA & IT RENDEZVOUS

PROGRAMME

TUESDAY 18 JUNE - MODERATED BY PHIL TUDOR (BBC)

KEYNOTE SESSION

09:00 – 09:05 **Welcome to NTS 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 – 09:10 **The New Workplan of EBU T&I**

Hans Hoffmann is EBU Senior Manager and head of unit on media fundamentals and production technologies in the EBU Technology and Innovation department. He has been for 9 years with the Institut fuer Rundfunktechnik (IRT) as research staff in new Television production technologies department until moving to the EBU in 2000. In the EBU he has been leading many activities on media integration, production technologies, video codec evaluations, he established the EBU HDTV testing lab, and work with EBU Members on IT based digital workflows and recently UHDTV. He has been author of many EBU Technical documents; IEEE papers and is a standing speaker and contributor to international conferences. Hans is a fellow of the SMPTE and a member of the SID and FKT and IEEE and was the SMPTE Engineering Vice President from 2011-13.

09:10 – 09:20 **The IP Production Landscape**

Phil Tudor (BBC) Phil Tudor is a Principal Technologist at BBC Research & Development, London, U.K. He read Electrical and Information Sciences at Cambridge University. Phil's technical background includes video compression research, software engineering, digital television standardisation, and the development and standardisation of professional media file formats. Phil leads a team of researchers looking at file-based workflows for production & archives, high-speed IP networking for live production, capturing richer production data sets, and the development of open standards. He was awarded the SMPTE workflow systems medal in 2014 for his work on MXF, AAF, IP production and the UK's Digital Production Partnership. Phil is a SMPTE fellow, a Chartered Engineer and a member of the IET.

09:20 – 09:50 **Business Requirements in these disruptive times**

Mathias Coinchon (RTS) is currently chief technology officer at rts swiss radio and television. before joining rts he was senior project manager at ebu technology&innovation in the fields of digital&hybrid radio, audio/video over ip and open source software. he was also vice-chair of worlddab technical comitee and currrently chairs radiodns organisation. his other past experiences include bbc research&development, swiss radio and srg-ssr. as a partime activity, he's also created opendigitalradio, a non-profit association maintaining open source sofware used for small scale dab in europe. he holds a master in communication systems engineering from epfl in switzerland.

09:50 – 10:20 **Building cloud infrastructure**

The advent of programmable infrastructure has revolutionized the way software applications are built and deployed. Industries traditionally using custom hardware and proprietary software, like the telco industry, have also massively adopted open infrastructure solutions to innovate faster while driving their costs down. This presentation will look into this cloud transformation, what is the place of OpenStack and open source-based infrastructure in it, how the OpenStack Foundation can help, and dive deeper in how that transformation happened in the telco industry.

Thierry Carrez is the Vice-President of Engineering at the OpenStack Foundation, in charge of the long-term health of the open source projects under the Foundation. A long-time elected member of the OpenStack Technical Committee, he has been a Release Manager for the OpenStack project since its inception, coordinating the effort and facilitating collaboration between contributors. Thierry spoke about OpenStack, open innovation and open source project management at various conferences around the world, including OSCON, LinuxCon, and FOSDEM. A Python Software Foundation fellow, he was previously the Technical lead for Ubuntu Server at Canonical, an operational manager for the Gentoo Linux Security Team, and an IT manager in various companies.

SESSION 1: NEW WAYS OF WORKING

11:00 – 11:30 **Using automation to achieve low cost/high quality orchestra live streaming**
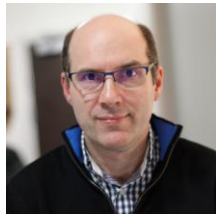
Many publicly funded orchestras are looking to technology to help them engage new audiences beyond the walls of their concert halls, but capturing compelling orchestral performances for TV or live streaming has always been expensive and complicated and beyond the reach of smaller budgets. To address this, orchestras have explored the use of robotic pan-tilt-zoom (PTZ) cameras as a way of reducing cost as a single operator can control multiple cameras. We are pioneering a new approach of using PTZ automation with the BBC Scottish Symphony Orchestra that keeps costs down while maintaining the visual interest and complexity of a high-shot-count orchestral capture. This involves re-purposing automation tools previously used for capturing fast-paced playback-driven pop music performances. We are working in collaboration with respected freelance experts and the developers to adapt the CuePilot software to better suit the requirements of orchestral capture.

David Chalmers is the Technology Development Manager for BBC Scotland. He is responsible for technology strategy and innovation across all BBC Scotland output including News, Sport, Entertainment and general production. His background is in electronic product design & camera sensor development. He has worked at BBC Scotland for 11 years and has considerable experience in developing low cost production and contribution models, making use of innovative IP contribution technologies.

11:30 – 12:00 **Live Radio production in the Cloud**

Why? What did we want achieve. About 5 min How? What did we actually do. About 5 min Conclusion? How did it go an how will we continue. About 5 min O&A

Mikko Nevalainen (YLE) started as script editor / assistant director on TV sports news in the Yle. Before that a sneak peak on the commersial side. From TV jumped to the audio side as audio engineer. 15 years ago made jump to the IT-deparment. Since then been in part of implementing corporate level production system and integrations for publishing, reporting and archiving. At a moment working as a development manager for audio related IT-systems.

12:00 – 12:30 **IP Based MCR**

Since we switched to IP Based MCR a year ago, we can share our experience, advantages challenges and also interconnection between IP Based MCR and File Based Production System (MAM).

Genc Mucolli started working on RTK back in 2003, first as an MCR operator before moving to IT tech support and then being promoted to the engineering level in IT , I was a team member in developing our home made file based production system and newsroom module , also was a member of technical working group in RTK/JICA project which concluded last year with MCR upgrade to IP based.

SESSION 2: MEDIA TRANSPORT

13:30 – 14:00 **Streaming over WAN - RIST and SRT**

The Internet transport market has revolutionized the way pro media can being transported, adding yet another tool to the media networking toolbox. But while standards like ST 2110 has created emerged from a common blueprint which all vendors implement, the internet transport market is fragmented with multiple different ecosystems grabbing market share. This session aims to dive deeper into the changes that are currently happening in this market, and how the two main options, RIST and SRT, stack up and ultimately answer the question: what do I actually choose?

Love Thyresson (Netinsight) Senior product manager with over a decade of international experience from the IP & Media industries.

14:00 – 14:30 **What about SMPTE ST 2110 over WAN?**

Andy Rayner (Nevion)

14:30 – 15:00 **ARD HYBNET III OTN-based Broadcast Network**

ARD HYBNET III is a high available OTN-based network built for and used by ARD, DRadio and Deutsche Welle. It spreads across Germany, providing encrypted, high bitrate connections for both live uncompressed TV signals and data transmissions. Held by the respective project leads from ARD and Vodafone, this presentation offers an overview of the project itself as well as a quick dive into using OTN in media networks.

Sonja Langhans (Dipl. Ing) is a Senior Engineer in the Department of Network technologies at IRT GmbH in Munich. At IRT she has been working in the field of audio and video over IP. For the last 3 years she had the project lead for the new ARD HYBNET III.

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Sven Thomas (Vodafone)

15:00 – 15:30 **SMPTE ST 2110-22 using JPEG-XS**

Live IP Production is now made simple, cost effective and bandwith-efficient with JPEG XS & SMPTE ST 2110-22. IntoPIX is expert in image processing and video compression technologies and has co-created JPEG XS, a new ISO standard and an evolution of the SMPTE RDD35 TICO technology. The technology meets all the Live production requirements in terms of low latency and high quality while offering a bandwidth-reduction that enables to achieve more with the new ST2110 standard. This presentation will highlight the key features of JPEG XS and show how a combo "SMPTE ST2110-22 + JPEG XS" enables a bandwidth-efficient workflow.

Dr Antonin Descampe received his M.Sc. and Ph.D., both in Electrical Engineering, from the Université catholique de Louvain (UCL), Belgium, in 2003 and 2008 respectively. He also holds a M.Sc. in Telecommunications from the Ecole Centrale Paris (ECP), France. In 2006, he co-founded intoPIX, a leader provider of image and video compression solutions. He is now involved in the development and standardization of new compression technologies at intoPIX. Active member of ISO (JPEG, MPEG) and VSF, he is one of the project leaders of the JPEG XS standardisation effort. He also holds a position of senior researcher and invited lecturer at UCL. His current research interests include image compression, compressed image retrieval, and optimized hardware implementations.

SESSION 3: USE CASES

15:30 – 16:00 **BBC Wales Cardiff Central Square project update and a look forward towards plans for BBC Northern Ireland's refresh of facilities in Belfast**

An update on the Cardiff Central Square project where systems based on ST2110 are now being installed with go-live planned for later in year, looking at what's worked well and what's worked less well with our adoption of ST2110 for our core routing, with an exploration of how we have addressed various issues. Also a look forward to what lessons we can take from the Cardiff project into out next major project in Belfast.

Mark Patrick has worked on multiple major BBC projects including W1, Salford and now Cardiff Central Square, specialising in broadcast infrastructure including routing, central apparatus rooms and MCRs. In Cardiff his primary focus has been on the move from conventional baseband broadcast routing to the use of IP, based on ST2110 standards.

16:30 – 17:00 **Software IP production at RTBF**

Hugo Ortiz (RTBF)

17:00 – 17:30 **Plazamedia – IP SDN for new broadcastfacilities**

Andy Rayner is Chief Technologist at Nevion. As well providing technical direction for the evolution of the company's media transport solutions, he heads up the Nevion UK technology centre. Nevion provides award-winning media transport solutions to broadcasters, telecom service providers, governmental agencies and other industries. Prior to joining Nevion in 2010, Andy was head of the Broadcast Technology at BT. In this role he was responsible for the design of the BT Global Media Network and oversaw the development of key video interfacing, monitoring and protection technology. Andrew has filed many patents - both with BT & Nevion.

17:30 – 18:00 **YLE radio towards IP platform based on AES67**

Veli-Matti Jarvelainen (YLE) started as media technician at Yle 1990, switches to media and IT business around 1995. After that I worked in IT industry as a trainer, support functions and network consultant with various position within customer and provider functions. Returned to work with Yle networks around 2015 as a consultant. Now working at Yle as a IP architect concentrating Yle Live IP productions and architecture.

WEDNESDAY 19 JUNE - MODERATED BY MARKUS BERG (IRT)

Markus Berg joined the IRT's Digital Networks department in January 1997 after he graduated in communication engineering at the Technical University of Saarbruecken. He worked as a research engineer and project leader in the field of adaptation of broadcast applications on high speed networks, leading projects dealing with co-operative postproduction over ATM/IP networks, Wide Area Networking Technologies, ALL IP Live-production networks and research on QoS issues for broadcasters. Since April 2002 he is head of IRT's "Network Technologies" department. Markus is a regular speaker on national and international conferences and seminars on networking and is the chairman of the EBU's (European Broadcasting Union) Strategic Program on Live & IP Production (PI)

TUTORIALS – DESIGN PATTERNS

09:00 – 09:50 **Architecturing Redundant PTP Deployments**

New MRC project high level description - Media IP Architecture summary - Specific PTP architecture decisions - Grand Masters Clocks requirements - Transparent clock and distribution networks - Problems found, how (troubleshooting), how it was fixed - Topology (loops, vlans) - Management messages - BMCA instability in boundary clocks implementations - Boundary clock and switch CPU impact Monitoring the PTP networks, and clients

Louis Lamarre joined CBC/Radio-Canada in 2011 as the technical lead for the migration of the corporation phone network to a VoIP centralized architecture. Since 2017, he is part of the Architecture and Strategic Development team, involved in tests and architecture decisions behind the migration to the new media IP infrastructure. His main areas of interest is to bring IT know-how in robustness, operationality and network management to the new media architecture. Before working in the broadcast industry, he spent twenty years in telephony, for national service providers Bell Canada and Vidéotron, where he participated to multiple VoIP integration projects. Louis Lamarre has a Computer Engineering degree from École Polytechnique de Montréal (1989).

09:00 – 09:50 **Orchestration / Automation**

Gerard Phillips (Arista)

10:00 – 10:50 **Network security for broadcast equipment**

An overview of the current recommendations on how to secure broadcast equipment which connects to a network, including both network and device design best practices.

Mike Ellis has worked for the BBC since leaving university in 1993, starting with DAB equipment design and test sequences for receivers. He sat on the WorldDMB Technical Committee drafting, reviewing and updating the DAB standards. He has also contributed to the development of the WiFi wireless networking standards. More recently, Mike was the Technical Architect for the BBC's two largest studio building projects in the last decade: MediaCityUK and Phase 2 of Broadcasting House. Mike is now Head of Architecture for Production Systems in the BBC, and is working on delivering IP based solutions into the BBC through major projects running in Cardiff and Belfast.

10:00 – 10:50 **Cloud compute 101**

Ildiko Vansca (Openstack)

11:00 – 11:50 **5G for Public Service Media**

Roland Beutler (SWR) studied Physics at the University of Stuttgart, Germany, and went on to receive a Ph.D. in Mathematical Physics from the Max-Planck-Institute for Metal Physics, also in Stuttgart. Between 1995 and 1996 he worked at the Università degli Studi di Lecce, Italy, under a Fellowship of the European Commission. In 1993 he joined SWR to work in the frequency planning department and is currently responsible for strategy of programme distribution and international frequency management issues.

Dr Beutler has been participating in EBU Technical activities for more than 10 years and has chaired several EBU groups dealing with the future of radio (S/FOR and S/FB2) and sharing and compatibility studies (SMR-SDB). He was chair of the Strategic Programmes on Terrestrial Broadcasting (SP-TB) and Cooperative Terrestrial Networks (SP-CTN). Currently he acts as chairman for the Strategic Programme on Future Distribution Strategies.

Roland Beutler is also involved in ITU and CEPT work and has been responsible for several of their working groups. He participated in WRC-12, WRC-15 and RRC-06 and was heavily involved in the preparation of the latter conference. Moreover, he has published several articles and four books on frequency and network planning for digital terrestrial broadcasting systems, the Digital Dividend and the evolution of broadcast content

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11:00 – 11:50 Patterns of cloud infrastructure on premise

Peter Brightwell (BBC) is a Lead Engineer at BBC's R&D, where he is leading work to guide the BBC's transition to IP. Working mostly at R&D but also in other parts of the BBC, Peter has an extensive background in broadcast and technology, in particular video compression, file-based acquisition, networked delivery, and virtual graphics. He has been a frequent collaborator on international projects on metadata, media services and networked media. He has been a significant contributor to the industry's Joint Taskforce for Networked media and is currently chair of the Networked Media Incubator of the Advanced Media Workflow Association, a collaborative project that is developing the NMOS family of open specifications for networked media.


SESSION 4: TECHNOLOGY PYRAMID FOR MEDIA NODES

13:30 – 14:00 EBU Tech 3371 – JT-NM TR-1001-1:2018 - PYRAMID

Willem Vermost joined EBU Technology & Innovation as Network IP Media Technology Architect in 2016. He obtained a Master's degree in electronic engineering and a Master's degree in applied computer science. Before this, Willem gained 16 years of experience at the Belgian public broadcaster VRT in different roles. He has always sought to combine broadcast and IT technology in the best possible ways and in many different projects. Willem is a member of SMPTE and the AES.

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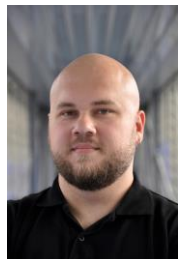
Ievgen Kostiukevych is a member of EBU Technology & Innovation team.

He has gained more than a decade of experience in broadcasting and sound production industry, including experience in change management, solutions architecture and AoIP integration. He is working on topics of IP networks, Media over IP, PTP, networks programmability and automation, etc. Ievgen is a member of SMPTE and AES.

14:00 – 14:30 Control & Monitoring at SRF/tpc, Zürich

Sandro Furter is working as an Project Manager for broadcast IT projects at tpc switzerland ag, a subsidiary of Switzerland's Public Broadcasting Company SRG SSR. He is responsible for the IP community at tpc and the realtime IP technology at SRG/tpc's new campus in Zurich. With his team, he focusses on the implementation of a SMPTE ST2110 based building on an all-IP production facility for TV, radio and online. As a member of SMPTE and the ST2110 drafting group, he closely follows the ongoing technology developments on the market. As a member of AIMS, he follows the open approach in the movement to IP. Furthermore, he supervises the engineering at SRG's international sport events such as the Olympic Games or the FIFA World Cup.

15:00 – 15:30 Security for Discovery and Connection Management of ST2110 Media Devices

While the AMWA open specifications allow for easy adoption by the broadcast industry, they are fully documented and would easily allow man-in-the-middle attacks to retrieve vital device information, such as IP addresses, for accessing control ports. Usage of those control ports by unauthorized personnel could lead to disruptions in the production chain, or worse. BCP-003-01 can be used to encrypt all API traffic with TLS to initially prevent man-in-the-middle attacks. This presentation describes why the current list of suites was chosen to cover both best security and compatibility with legacy broadcast equipment with small computing performance and how a PKI infrastructure can be deployed in broadcast networks Furthermore, the focus will lie on the current state of AMWA IS-10 and BCP-003-02 as means of specifying authorization mechanisms to secure access to NMOS APIs such as IS-04, -05, or -08. The current concept of an authorization server is explained and how it can secure NMOS nodes against unwanted access for starting/stopping/configuring media endpoints.

Arne Bönninghoff (Riedel) As Head of the IP research team at Riedel Communications GmbH & Co. KG, is currently involved in Riedels product research, continually searching for the latest advances in network technologies. The findings of his team and him result in concepts, training material or product implementations. Arne is member of AES, SMPTE, VSF and AMWAs Networked Media

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Incubator, being active in various working groups regarding interoperability of Networking devices. He was responsible for holding two AMWA NMOS incubator workshops at Riedel. He has a University Diploma in Audio- and Visual Engineering.

SESSION 5: USE CASES

15:30 – 16:00 **OB in a Box**

BBC Sport have been trialling the use of the Simply Live Vibox to bring high end values to some of it's smaller, niche and experimental productions. This presentation outlines some existing case studies, pitfalls, workarounds and future plans of how this equipment can help grow BBC Sports hugely varied output.

Adam Dean (BBC) With more than 10 years experience in technical TV production, he has a strong background in innovation across post and live production. As an Operations Executive working on the BBC Sport Technology team, Adam develops their ongoing IP Strategy as well as researching and implementing new technology across BBC Sport productions.

16:00 – 16:30 **Åre FIS Alpine World Ski Championship - Sustainable remote production reducing the ecological footprint**

Remote production is becoming the new standard for efficient live production and also reducing our ecological footprint. Even though remote production has been an industry talking point for quite some time, it is only recently, as the available bandwidth access increases and the opportunity for uncompressed workflows enable the highest possible production quality, the benefits, both technically and to the environment, become a reality. This presentation will discuss the recent largest remote production by SVT, in Åre, for the FIS Skiing World Championships. The event was produced using a highly efficient and reproducible workflow that enabled the creation of large volumes of high-quality content, driven by sustainable production workflows. Remote production is still in its early stages, but European broadcasters and production companies are pioneering its worldwide adoption and creating continuous innovation in the application of this exciting workflow.

Larissa Görner is the Director of Advanced Live Solutions at Grass Valley, a Belden Brand. Before joining Grass Valley, Larissa worked at Net Insight where she held roles in the CTO office and Product Management. Prior to her time with Net Insight she has held various broadcast vendor roles in R&D, Marketing, Product Management and Business Development. She also has been an active freelancer supporting a variety of live production events including the Olympics. She has been an active member of the Board of Directors of AIMS and is member of the board of FKTG and a regular contributor and speaker at a multitude of Industry events.

16:30 – 17:00 **A virtualised control room? Proof of concept 2018**

Edmond Debar (FTV)

17:00 – 17:30 **Wrap-Up**