DRCN 2021 — Design of Reliable Communication Networks
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IEEE ComSoc™ — IEEE Communications Society

Industrial Panel – Wednesday 21 April, 11:15-12:45

Open Solutions for the Next Generation Telecom Infrastructure

The telecom infrastructure is evolving towards a progressive but fast integration with the IT infrastructure. In the near future, such integration will allow to deliver new profitable Services and Applications with specific and very high Quality of Transmission and Quality of Service.

A suitable composition of *open reference frameworks* drives the implementation of the Management System of such complex infrastructure. These frameworks are provided by large alliances that include standardisation bodies (e.g., IETF, ITU-T, ETSI), cross-company initiatives (Google, AT&T, Facebook, and many other OTTs, operators and vendors), industrial fora (ONF, MEF, TM Forum) and scientific community. Furthermore, the introduction of the disaggregation concept in the network components is driving commercial solutions towards a standardised architectural approach. In such context, market competition will be mainly delegated to the base technology and the vendors' capacity to provide enhanced tools for the infrastructure management and optimisation.

Integration of those solutions in a comprehensive orchestration framework is a challenge, due to the lack of a single standardised interface. In general, the presence of many competing *open solutions* raises the question of which one will finally drive the market. In addition, integrated and optimised proprietary solutions appear still preferable when very high performance levels must be achieved (in particular, in terms of reliability and availability).

This workshop collects contributions form open-solution providers aimed at presenting the state of the art on this subject. Furthermore, participation of telecom manufacturers and network operators gives the opportunity of sharing visions and specific experiences.

INTENTO Project Funded by Puglia Region sponsors the panel.

Panel Chair: Giorgio Parladori – SM Optics

Open Solutions for the Next Generation Telecom Infrastructure - Industrial Panel

_____ SESSION PROGRAM _____

11:15 – 11:20   Introduction by Panel Chair Giorgio Parladori

11:20 – 11:30   The Telecom Infraproject approach to Open Optical Packet Transport
Vittorio Curri (Telecom Infraproject / PoliTO)

In this talk, we will first review the general mission of the Telecom Infraproject to opening-up the HW and SW in the optical wireline and in the wireless network infrastructure. Then, we'll focus on the optical networking by reviewing the approach of the TIP to open-up each network layer, starting from the the open management of WDM optical tranport as a virtualized network function that enables disaggregated control of open optical linesystems, ROADMs and open tranponder hosting multivendor pluggable transceivers. This enables a full virtualization of the optical transport on a network infrastructure -- being possibly multi-vendor and fully disaggregated -- so allowing virtualized network control, management and slicing within the SDN controller.

11:30 – 11:40   Telco Production deployments with ONF's Open source software projects
Andrea Campanella (Open Networking Forum)

In this talk we will outline how open source software has been transforming Telecommunication networks and the industry at large. Challenges to go to production with open source and how to overcome them will be analysed. Particular focus will be placed on the recent live deployments of VOLTHA, the virtual OLT hardware abstraction and on ONOS SDN controller with datacenter leaf spine fabric solutions and optical implementation. Finally, the importance of the open source community and ONF members and partners will be discussed.

11:40 – 11:50   Open data models for management and automation of disaggregated optical network –
the system vendors perspective Achim Autenrieth (ADVA)

In his talk, Achim will present the current status, opportunities, and challenges of the evolving landscape of open data models for disaggregated optical networks from a system vendors perspective. He will also present current challenges for the integration of technology advances and for the automated operation of future telecommunication infrastructure.

11:50 – 12:00   SDN e Open Interfaces: a telecom manufacturer perspective
Germano Gasparini (SM Optics)

In this talk, we will address how the industry is responding to the market requests for SDN support. While it is clear that the disaggregated management view and the increasing automation are consolidated directions, in terms of open management interfaces the state-of-the-art is more articulated. As far as north-bound interfaces are concerned (controller-to-controller machine interfaces), the different reference open interfaces such as IETF TEAS, ONF T-API and TIP appear to be quite close to each other and substantially decline an homogeneous abstract network model. The trend here is towards convergence. The parallel support of different NBI interfaces at a time in SDN Controller and Orchestrator appears substantially affordable and the goal for multi-vendor or multi-operator interworking based on open interfaces is at reach. As far as the Southband interface is concerned, the state-of-the-art is less mature. OpenConfig is clearly assuming a leading role but, for several reasons, especially for the Optical Networks there are still wide areas

that require proprietary management and are therefore difficult to harmonize in a single reference interface model.

12:00 – 12:10   MUST, A Multi-Operator strategy for Open Optical Networks
Juan Pedro Fernandez-Palacios Gimenez (Telefonica)

An Open Transport Network include application programming interfaces (APIs) which are totally open, standard and vendor agnostic. This means a software developer could implement given application for a new service, for network optimization or any other purpose using a standard programming interface, which is offering an abstracted network view, and hiding different vendors particularities. On the other hand, open and standard configuration interfaces open the door to new technologies and players in Telco networks such as the whiteboxes, which are widespread, used in datacentre environments.

Telefonica and other 5 top operators (Vodafone, Orange, DT, Telia and MTN) have taken a giant step in this process creating a collaboration group within Telecom Infra Project(TIP) called MUST (Mandatory Use case Specification for SDN Transport).

The main goal of MUST to define common technical specifications for Open Transport networks following a use case approach so that we are periodically publishing joint documentswith describing the interface implementation for a given set of use cases (network discovery, service provisioning performance monitoring, disaggregation..etc)

12:10 – 12:20   Promises and challenges of network automation Christian Jacquenet (Orange)

Network automation can be defined as a set of techniques that facilitate the delivery and the operation of services supported by network infrastructures while minimizing declarative and manual interventions. Despite their legitimate concerns about the risk of losing control, operators now consider network automation as a potential asset to dramatically improve the time it takes to build and deliver network services, regardless of their scope and complexity. Yet, most of these services have been deployed for the past three decades primarily based on static production procedures that are more and more exposed to the risk of erroneous configuration commands. The emergence of Software-Defined Networking as well as Network Functions Virtualization has often been the opportunity to make promises about their so-called flexibility or their intrinsic ability to facilitate the automation of service delivery procedures.

But reality is much different.

Claimed automation is currently mostly restricted to the elaboration and the execution of configuration scripts, which reflect the application of decision-making procedures that essentially remain manually declarative: the data that are used to drive the execution of configuration tasks are statically declared. In addition, current automation frameworks mostly deal with tasks that remain local to a device to the detriment of a global, network-wide, systemic view that would be able to guarantee the global consistency of the set of actions taken to deliver a service.

The talk will highlight some of the challenges raised by the introduction of network automation techniques from both a functional and standardization standpoints.

12:20 – 12:35   Open discussion on the Panel Topic   All Panelists

12:35 – 12:45   Q&A from the audience

Panelists' Bios

Giorgio Parladori *was born in Verona in 1959. Bachelor in Electronic Engineer at Padua University. He joined Telettra DSP Laboratory in 1985, developing his final dissertation work on sound compression. From 1997 to 1998, he was Manager of Signal Processing Division in Alcatel Corporate Research Centre organization. From 1998 to 1999, Advanced Research Laboratory Manager for Transmission System Division. From 2005, Deputy Director of SW Laboratories, System Architecture and Validation manager and responsible of funded projects coordination in Italy for Alcatel-Lucent. In 2014, he joined SM Optics Company, part of SIAE Microelettronica Group as Research Program Director, with the responsibility for funded research programs and relationship with Universities and Research Centres.*

Vittorio Curri *(PoilTO – Telecom Infraproject) Vittorio Curri is a Faculty at the Department of Electronics and Telecommunications (DET) of Politecnico di Torino (PoliTO) since 2004,currently in the role of Associate Professor. His main research interests are in physical layer aware networking for an open and holistic approach to the optimal exploitation of network infrastructure. Prof. Curri represents PoliTO in the consortium Telecom Infraproject (TIP) for open networks promoted by Facebook and other service providers, where he holds the role of Scientific Chair of the GNPy project for open optical data transport. Prof. Curri is author of about 300 scientific publications with a citation score exceeding 6500.*
WEB: planet.polito.it, Linkedin: https://www.linkedin.com/in/vittorio-curri-82aa21a5/,

Andrea Campanella, *28, from Milan, Italy, is a Member of Technical staff (MTS) at Open Networking Foundation (ONF). Andrea is currently part of the SEBA/VOLTHA team taking the fiber to the home open source solution in production with service providers across the globe. Andrea leads the ONF's European Cluster to Forster the ONF's European community and partner relationships.*

Germano Gasparini, *bachelor in Electronic Engineer at Padua University, he was employed in Telettra and the in Alcatel/Lucent as software designer for network element controllers. Subsequently was in charge of specification of the device interface towards the Network Management systems. As System Engineer, was afterwards in charge for defining and validating OTN and WDM network solutions together including the network management aspects. In SM Optics since 2014, is in charge for the definition of the SDN management interface based on Yang data models.*

Achim Autenrieth *is currently working as Director Advanced Technology at ADVA Optical Networking, where he is leading the research activities on networking technologies including SDNand NFV concepts, and design and evaluation of multilayer networks. He received his Dipl.-Ing. and Dr.-Ing. degree in Electrical Engineering and Information Technology from the Munich University of Technology, Germany, in 1996 and 2003.*
Achim is a member of IEEE and VDE/ITG, he authored or co-authored more than 120 scientific publications and he served or is serving as technical program committee member of ECOC, OFC, DRCN, and ONDM.

Juan Pedro Fernández-Palacios Giménez *received the MS in Telecommunications Engineering from Polytechnic University of Valencia in 2000. In Sept. of 2000 he joined TelefonicaI+D where his research activities where focused on the design of new data and control plane architectures for IP over optical networks. He is author of 6 patents filled in Europe and US and more than 70 publications in conferences and journals. Currently he is leading the Transport Planning and Technology department in Telefonica Gobal CTIO.*

Christian Jacquenet graduated from the Ecole Nationale Supérieure de Physique de Marseille, a French school of engineers. He joined Orange in 1989, and he's currently the Referent Expert of the "Networks of the Future" Orange Expert community. Until recently, he was the Director of the Strategic Program Office for advanced IP networking within Orange Labs. He is also the head of Orange's IPv6 Program that aims at defining and driving the enforcement of the Group's IPv6 strategy and which yielded the deployment of IPv6 networks and services in most European and African Orange affiliates since 2010. He leads development activities in the areas of network automation (including SDN, automated service delivery procedures combined with Artificial Intelligence techniques, intent-based networking), and IP networking techniques. He authored and co-authored several Internet standards in the areas of dynamic routing protocols and resource allocation techniques, as well as numerous papers and books about IP multicast, traffic engineering and automated IP service delivery techniques. He also holds 20+ patents in the areas of advanced home and IP networking techniques.

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