broadband forum

Your quarterly resource for updates on recent activities and our most critical work and focus areas.

A Word from our CEO

I talked in the Q2 newsletter about the amount of work underway, and the expanding scope that the Broadband Forum is now covering across both the working groups and the special projects – including our burgeoning Open Broadband software projects and Open Standards. There is no question that momentum is growing fast, and while network operators are looking for the agility that "Open Source" offers, they also need Open Standards to create a solid framework and safeguard their current deployments while helping them navigate the exciting yet challenging waters that lie ahead.

The Broadband Forum is perfectly positioned to deliver on this need – we have done it before, and we are doing it again. We know the challenges of developing standards and we know how to deliver software, which can push our new initiatives forward. The two concepts of Open Standards and "open source" need each other to be truly successful.

For example, I spoke last quarter about the Open Broadband - Broadband Access Abstraction (OB-BAA) project. Fast forward to Q3, and we were able to announce the first code release for this groundbreaking project, and documentation too. This enables operators globally to move towards optimizing their decision making for introducing new functionality in their networks based on user demand rather than the requirements of a new network device. Similarly, the Open Broadband Multi-Access Point (OB-MAP OSS) project is creating an architecture, requirements and code for establishing a carrier grade Wi-Fi multi-access point home network. This work is critical at a time when consumers are demanding whole home, high-bandwidth wireless coverage to enable the ubiquitous streaming and comprehensive home automation services that they crave.

This is all really exciting for the Broadband Forum and to help get our message out, I am delighted that we also welcomed our new Chief Marketing Officer – Geoff Burke – into the organization. Geoff joined us at the Q3 meeting in Montreal and brings a wealth of experience to the team, from events organization and orchestration to deep knowledge of the networking landscape and the connected home market. Initially he will focus on the BASE workshops and the newly formed Connected Home Council.

While welcoming a new face, I must also pay tribute and give a huge thanks to Dave Thorne and Mike Fargano, who both received Leadership Awards at the Opening Plenary of our Q3 meeting. They have each made an important contribution to the work and achievements of the Broadband Forum over many years and I know you will all echo my sentiments in wishing them both a long and happy retirement.

Finally, I hope as many of you as possible will be joining us at the Broadband World Forum in Berlin next month (October 23-25). We have an executive summit on the opening morning of October 23, an interop pavilion with exciting live demos of Open Broadband and User Services Platform, and up to 18 pods expected, and multiple speaking slots throughout the event!

Q3 has been a watershed quarter for the Broadband Forum and Q4 is shaping up to be even more impactful. Thanks for your support, and I hope to see you in Berlin or at the Q4

meeting in Glasgow.

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Broadband Forum automates, accelerates cloud-based access deployment

The Broadband Forum has published the first code release and documentation of its new OB-BAA project to enable standardized, automated and accelerated deployment of new cloud-based access infrastructure and services.

The Open Broadband reference implementation facilitates co-existence, seamless migration and the agility to adapt to an increasingly wide variety of software defined access models – the key business and operational challenge in creating a potentially vast market.

"The first release of OB-BAA marks a major milestone for the industry," said Tim Carey, Lead Technology Strategist at Nokia and Chair of the Broadband Forum's BAA project. "It delivers an open reference implementation based on standards-compliant interfaces that operators and vendors worldwide can use to develop and deploy interoperable cloud-based access networks more easily and quickly."

Operators and equipment manufacturers involved in the project include Broadcom, BT, Calix, CenturyLink, China Telecom, Huawei, Nokia, Telecom Italia, Tibit Communications, the University of New Hampshire InterOperability Lab (UNH-IOL) and ZTE.

For more information, please see: https://bit.ly/2x6QFNg

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Broadband Forum appoints renowned tech marketeer Geoff Burke

Highly-respected technology marketeer Geoff Burke has been appointed by the Broadband Forum as the standards organization continues to expand its scope of work.

Taking on the role of Chief Marketing Officer, Burke brings a wealth of experience to the Broadband Forum team, including deep events expertise, extensive experience in the connected home market, and broad knowledge of carrier-grade Wi-Fi requirements. His initial areas of focus will see him continue to grow BASE, the Broadband Forum's highly successful workshop series, work closely with the Forum's newly formed Connected Home Council, and drive innovative projects such as Open Broadband and the Cloud Central Office (CloudCO).

"The industry is moving at an incredibly rapid pace, with virtualization technologies, the impending commercialization of 5G and explosion of IoT technologies," said Kevin Foster, Chairman of the Broadband Forum. "In all of this, open standards play an important role in ensuring operators can take advantage of new applications and software while utilizing their current infrastructure. Geoff's role will be key in driving this strategy forward and we are very pleased to have him on-board."

Prior to joining the Broadband Forum team, Burke held various senior leadership roles at Calix for 14 years, including most recently Senior Director, Corporate Marketing. He also played a key role in pioneering the IPTV market as Marketing Director at Next Level Communications, led strategy consulting engagements at The McKenna Group and KPMG, and held various management roles at Oracle Corporation.

"I'm thrilled to be joining the Broadband Forum at what is an incredibly exciting time," said Burke. "The potential of USP in enabling the connected home is enormous. Based on the unprecedented success of its predecessor, TR-069, which is rapidly approaching nearly 1 billion installations globally, I have every confidence that this will become an important standard for the industry. The Broadband Forum has a strong history of developing widely-adopted standards that catalyze mass deployment and I look forward to playing a leading role in the future of the organization as it continues to innovate and evolve."

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Leadership Awards for Broadband Forum stalwarts

Dave Thorne receives his award from Broadband Forum Chairman Kevin Foster

Two Leadership Awards were presented at the Opening Plenary of the Q3 meeting, recognizing the achievements of two highly-respected Broadband Forum members.

The Forum's former Technical Committee Chair Mike Fargano and Dave Thorne received the gongs following retirement from CenturyLink and BT, respectively.

Dave received his award for being both a renowned leader of the Broadband Forum's Architecture activities and for his many years of technical contributions.

Broadband Forum Chairman Kevin Foster said: "We thank him for his excellent support of the Forum's work and wish him a happy retirement. Dave always got us to focus on the key business aspects of any new technical initiative and that will be greatly missed."

Mike received his award for both his excellent work as Technical Committee Chairman and navigating the Forum through great changes.

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Broadband Forum Broadband Acceleration Seminar (BASe) brings new broadband perspectives

10Gbps broadband, fiber extension, cloud services, the connected home and 5G will be the focus of the Broadband Forum's latest BASe event at the Encore Hotel in Las Vegas on Sunday, October 28.

BASe Las Vegas will consist of four segments covering topics addressing all aspects of broadband design, implementation and maintenance, from the central office to the cloud and the Connected Home.

Segment titles include:
- Network Access: Applications and Opportunities
- 10 Gigabit and Beyond with Fiber
- Fiber Extension Technologies, Standards and Solutions
- Wireless Broadband

As part of the agenda, SK Telecom, Cox Communications, Telus, and other leading service providers will describe current and future applications, integration challenges, deployments and use of specific technologies in their home and access network architectures. Julie Kunstler, Principal Analyst at Ovum, will jumpstart the event with a report on the market and technology trends affecting broadband.

"After the success of our last two BASE events in Athens and San Diego earlier this year, we're excited to bring together a wide range of speakers to cover topics that are key to service providers across the broadband ecosystem," said Broadband Forum BASE Chair Bernd Hesse. "As we gear up to deploy a new generation of broadband, collaboration on this level is key to delivering ubiquitous next-generation access and realizing the huge potential of 5G, the cloud and virtualization."

The list of companies presenting at BASE includes:

- Calix
- Cox Communications
- GlobalLogic
- Hisense Broadband
- Hybrid Access Technologies
- Nokia
- Pilot Photonics
- Sckipio
- Telus

- Corning Optical Communications
- Fiber Broadband Association
- Google
- Huawei Technologies
- InCoax
- Ovum
- QA Cafe
- SK Telecom
- Zyxel

BASE Las Vegas is sponsored by Calix.

For more information, visit: https://www.broadband-forum.org/base

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Work Area Updates from Montreal, Canada

Architecture and Migration Work Area starts work on Hybrid Access

- **Target:** Specify a more generic hybrid access architecture that can be technology- and system-agnostic to avoid repeated development costs.

- **Progress:** Three more Application Classes have been added and a description of the overall architecture agreed, along with an initial set of requirements.

- **Outcomes:** A white paper has been prepared to advertise this work more widely and to attract a broader range of participants.

A new project on Hybrid Access has been started. Although the Forum has already done some work on this topic, this is a new approach as it starts with an analysis of why Hybrid Access has been slow to take off so far, addressing both the commercial and technical/systems aspects. The intention is then to specify a more generic architecture that can be technology and system agnostic to avoid repeated development costs.

Work on the initial deliverable for the Application Layer Testing project continues to make rapid progress. Three more Application Classes have been added and a description of the overall Architecture agreed, along with an initial set of requirements. A white paper has been prepared to advertise this work more widely and to attract a broader range of participants.

The first technical contributions on adding multi-pair bonded Gfast as a new backhaul option for Fiber-to-the-Distribution Point (FTTdp) were presented and some draft text adopted. This new option is to extend the footprint of a Gfast cabinet-based deployment

without the need to install additional fiber. This is being done in conjunction with ITU-T as there are implications for the start-up "handshake" and crosstalk cancellation.

The joint study with the Physical Layer Transmission group on use cases for the repurposing of existing premises infrastructure to distribute high-speed fiber access throughout a building is nearing completion. There was further debate on the relative merits of point-to-point and point-to-multipoint architectures. Possible next steps are now being considered.

Work on the second edition of Performance Measurement to the IP Edge (WT-390) has started. This update is to reflect the IETF's move to the STAMP protocol rather than the TWAMPLite specified in the first edition. It will also add a new monitoring mode.

For more information about the Architecture and Migration group, please see: https://wiki.broadband-forum.org/display/BBF/Architecture+and+Migration

BUS fine-tunes USP ahead of first major showcase in Berlin

- **Target:** Build an intelligent User Service Platform that extends TR-069, including architecture, protocol, and data model.

- **Progress:** Broadband User Services (BUS) Work Area spent the week fine-tuning details of the User Services Platform (USP), worked on the next version of the Device:2 data model for advanced Wi-Fi and Wi-Fi mesh technologies, finalized new requirements for home gateways, and continued work on Wi-Fi performance.

- **Outcomes:** A Plugfest will be held on Monday, September 17 and the Forum is planning some major promotion of USP at the Broadband World Forum.

The Broadband User Services (BUS) Work Area spent the week fine-tuning details of the User Services Platform (USP), planning for another corrigendum release to fix some minor details and prepare for feedback from the next Plugfest, which will be held on Monday, September 17. The Forum is planning some major promotion of USP at the Broadband World Forum, where the vibrant TR-069 community will see demonstrations and panel discussions on this evolution of the popular protocol.

USP is not the only project under the BUS group critical to the Connected Home. The group also worked on the next version of the Device:2 data model, Device:2.13, which will include mechanisms for configuration and monitoring of advanced Wi-Fi and Wi-Fi mesh technologies. The group also finalized new requirements for home gateways, particularly around security and dynamic, expandable "smart" gateways, in the WT-124 project.

Lastly, work continued on the Wi-Fi performance defined in WT-398, which describes detailed test setups, procedures and performance metrics for validating robust Wi-Fi implementations. Understandably, this is a complex topic and many comments were entertained in this continuing work.

For further updates from BUS, please see: https://wiki.broadband-forum.org/display/BBF/Broadband+User+Services

Common YANG projects enable flexibility in managing ultra-broadband networks

- **Target:** Specify YANG modules that are applicable to multiple Work Areas, NETCONF/YANG test plans and certification for the defined YANG modules, and

maintain YANG Best Current Practices, processes, procedures and tools.

- **Progress:** Continued work on managing the Access Node Control Protocol (ANCP), alarm management and bulk data collection, enabling additional functionality for network troubleshooting and data analysis, as well definition of a YANG model to manage thresholds for reporting VDSL or Gfast line state, and another PMAA YANG Data Model for a northbound Interface for operators to leverage.

- **Outcomes:** Amendment 1 of the YANG Modules for FTTdp Management was approved, adding reverse power feeding support for Distribution Point Units (DPUs) and updates existing models.

Since the last meeting, Amendment 1 of the YANG Modules for FTTdp Management (TR-355a1) was approved. This Amendment adds reverse power feeding support for Distribution Point Units (DPUs) and updates existing models to align with the latest revisions of underlying ITU specifications. Together with the recently approved Amendment 1 of the Common YANG Modules for Access Nodes (TR-383a1), both documents form the foundation of next-generation ultra-broadband access nodes managed via NETCONF/YANG. This is truly an achievement the Broadband Forum can be proud of, as a leader on YANG specification work within the standards community.

The group is continuing its work preparing for Amendment 2 of both TR-383 and TR-355. In regard to TR-383, the focus remains on managing the Access Node Control Protocol (ANCP), alarm management and bulk data collection. These developments will meet service provider requirements, enabling additional functionality for network troubleshooting and data analysis.

Additionally, discussions on Amendment 2 of TR-355 included the definition of a YANG model to manage thresholds for reporting VDSL or Gfast line state, and additional alarm identities. Lastly, a contribution towards Persistent Management Agent Aggregator (PMAA) Management Model (WT-393) has outlined how a PMAA YANG Data Model can be constructed. The end goal is to have a defined interoperable interface at the PMMA Northbound Interface for operators to leverage.

For an overview of the Common YANG Work Area's work, please visit: https://wiki.broadband-forum.org/display/BBF/Common+YANG+Work+Area

FAN moves forward in delivering major benefits for service providers

- **Target:** To define the requirements and data models for deploying network architectures in fiber access technologies so as to accelerate deployments and ensure interoperability.

- **Progress:** Defined the PON abstraction use cases for time critical functions, such as Dynamic Bandwidth Assignment (DBA), and defined the open interface for time critical API functions. Several test plans were brought forward across XGS-PON and NG-PON2.

- **Outcomes:** The team also decided to move forward on EPON YANG development and NETCONF interop testing.

Since the Q2 meeting in Osaka, the Fiber Access Networks (FAN) Work Area has been busy progressing a number of key documents that will bring a range of benefits to service providers around the world.

Starting with the PON Abstraction Project Stream, the final ballot for the Functional Model for PON Abstraction Interface project (WT-402) closed prior to the meeting and has passed. This working text aims to define the PON abstraction use cases for time critical functions, such as Dynamic Bandwidth Assignment (DBA), on PON systems. The purpose of this is to reduce costs and accelerate development of PON systems by disaggregation of time critical functions.

The straw ballot resolution for the PON Abstraction Interface Specification (WT-403) occurred in Montreal. WT-403 defined the open interface for time critical API functions. WT-403 will be sent for final ballot following the Forum's Q3 meeting.

Several test plans were brought forward for straw ballot as part of the work of the Interoperability Project Stream. They included:

- The NG-PON2 TC Layer Test Plan (WT-426), which defines the NG-PON2 Transmission Convergence Layer test plan. WT-426 is going through Straw Ballot at the moment.

- The XGS-PON TC Layer Test Plan (WT-309, Issue 2), which defines the XGS Transmission

- The XG(S)-PON and NGPON-2 PON PMD Layer Test Plan (WT-423), which is going through Straw Ballot resolution period during the Q3 BBF meeting.

Also in straw ballot stage with the PON YANG Project Stream is WT-385. The group has also agreed to create WT-431 for EPON YANG development. EPON YANG will be based on appropriate YANG models already developed within the Forum and IEEE. The group is also updating and testing nctool for NETCONF interop testing. There are ongoing discussions on making SD-417 OLT Management Study into a working text for general purpose use.

The NGPON Wavelength Management project stream has agreed to update WT-352 Issue 2. Collaboration on extending WT-352 Issue 2 to include missing use cases will be discussed during teleconferences.

For the latest updates from the FAN Work Area, please visit: https://wiki.broadband-forum.org/display/BBF/Call+Agendas+and+Minutes+-+FAN

Innovation Group hosts ONAP speakers

A Birds of a Feather (BOF) session was held concerning Cloud CO orchestration part 2, with invited speakers attending from Open Networking Automation Platform (ONAP). They were Timo Perala of Nokia – talking about the ONAP architecture and methodology – and David Perez of Swisscom – presenting a use case about using ONAP to abstract the access network.

The session was well-attended, with lots of questions and interaction. This BOF was followed the next day by a CloudCO and ONAP discussion on how to best make the right choices in order to move forward with the CloudCO framework in the Open Source space.

At the Q4 meeting, the Innovation group will have a BOF session on access equipment and Customer Premises Equipment (CPE) powering in ultrafast architectures. It will be held on the Monday evening of the Glasgow meeting and several service providers from across the world are expected to attend.

On the opening morning in Glasgow, there will also be an open SPAC and Innovation session, with invited speakers talking about innovative quality monitoring.

For more insight into the Innovation group's work, please visit: https://wiki.broadband-forum.org/display/BBF/Innovation+Group

Forum maps out true end-to-end broadband experience for ISPs via Open Source Initiative in partnership with prpl Foundation

Following the launch of the OB-MAP OSS project, the Forum, together with the prpl Foundation, has made significant progress in creating an architecture, requirements and code for establishing a carrier grade Wi-Fi multi-access point home network. This work is critical at a time when consumers are demanding whole-home, high-bandwidth wireless coverage to enable the streaming and home automation services that they crave.

Internet Service Providers (ISPs) are keen to deliver the best possible service they can and want the ability to establish a leadership position for themselves by offering a truly end-to-end broadband experience. This project will enhance and expand the Wi-Fi Alliance's EasyMesh™ specification and will give ISPs the ability to provide a "carrier grade" experience in a standardized way.

This key project is open to not only Broadband Forum and prpl Foundation members but to everyone in the industry. Interested companies need only to sign the participant agreement and they will be granted full and equal involvement in the development and the ultimate delivery of this project. Forum members who have not signed the agreement still have full "view only" access to the OB-MAP Wiki space.

Find out more about OB-MAP and its progress so far, at: https://wiki.broadband-forum.org/display/OBMAP/OBMAP+Home

Milestone for OB-BAA project as it prepares to showcase progress at BBWF

In Q3, OB-BAA continues to make a difference by issuing its first code release and documentation to enable standardized, automated and accelerated deployment of new cloud-based access infrastructure and services. This will facilitate co-existence, seamless migration and the increased agility to adapt to an increasingly wide variety of software defined access models - the key business and operational challenge in creating a potentially vast market for service providers worldwide.

Along with the release of the code, the project team is pulling out all the stops to educate service providers and equipment vendors regarding the benefits of using the release as an Open Broadband reference implementation by issuing a system overview that describes what OB-BAA is about and how it benefits the industry. Likewise, the project held a webinar on OB-BAA and will provide demonstrations that show the benefits of the BAA layer at the Broadband Forum's pavilion during Broadband World Forum, which takes place in Berlin, Germany, from October 23-25.

To see the OB-BAA's work so far, see: https://wiki.broadband-forum.org/display/OBBAA/Open+Broadband-Broadband+Access+Abstraction+Project+Home

Physical Layer Transmission continues Gfast progress

The group resolved straw ballot comments on issue 2 of ID-337 (Gfast certification) arising from the ongoing BETA test program. Issue 2 addresses 212MHz operation, Gfast over coax

(profiles 106c and 212c) and increases the performance requirements. Progress was made on Gfast Performance Testing (WT-380) in specifying the multi-port test bed.

Work progressed on WT-338 Issue 1 Amendment 1 and Issue 2, Reverse Power Feed test plan with the goal to send Issue 1, Amendment 1 to straw ballot at the Q4 meeting in Glasgow. This allows for the testing of reverse power supply equipment for service providers.

In conjunction with BUS, the group started to resolve straw ballot comments on Wi-Fi Performance Testing (WT-398) with plans to continue this work in conference calls between meetings. A New Project Initiation Form (NPIF) was agreed on to start work for Performance Testing of In-premises Video Support over Wi-Fi (WT-434). This will help service providers deploy equipment to give a better quality of experience for their end users.

Work continued jointly with the Architecture and Migration group on SD-419, which addresses use cases for extending fiber access over existing in-premises infrastructure. A conference call was agreed to move this further. Work was also started with the Architecture and Migration Work Area on WT-301 Issue 3 to add a third type of backhaul for DPUs. This type of backhaul will use existing copper lines with the bonding of Gfast or VDSL.

Work progressed on the Infrastructure for Testing Mitigation of Interference between Power Line Communications (PLC) and Digital Subscriber Line (DSL), also known as WT-425. An architectural overview of the required setup was analyzed.

Gfast Plugfest dates for the first half of 2019 have been set, as follows:
- January 28-February 1, 2019
- March 11-15, 2019
- May 13-17, 2019

These are in addition to the already agreed date of November 5-9, 2018 at the University of New Hampshire InterOperability Laboratory (UNH-IOL) in New Hampshire.

To gain further insight into what the Physical Layer Transmission Work Area is doing, visit: https://wiki.broadband-forum.org/display/BBF/Physical+Layer+Transmission

EVPN - been there, done that. What's next?

- **Target:** Produce industry-agreed specifications of the routing and transport network infrastructure for applications such as mobile backhaul/transport infrastructure, data center interconnect, video distribution.

- **Progress:** Wrapped up the phase 2 work on its Ethernet Virtual Private Network document, with particular focus on transport for 5G networks.

- **Outcomes:** Delivered essential architecture and equipment requirements for using the EVPN technology developed in IETF and IEEE for providing cloud services, video distribution and mobile backhaul.

Between the Q2 and Q3 Broadband Forum meetings, Routing and Transport (R&T) wrapped up the phase 2 work on its Ethernet Virtual Private Network document. This document provides the essential architecture and equipment requirements for using the EVPN technology developed in IETF and IEEE for providing cloud services, video distribution and mobile backhaul. EVPN provides scalability, resiliency and operational enhancements over previous technologies used to provide Ethernet services such as PBB, VPWS and VPLS. These enhancements help meet the higher performance and more versatile needs of today's networks and, in particular, transport for 5G networks, both fixed and mobile.

The Routing and Transport Work Area also progressed its work on 5G Transport, introducing deterministic transport into the team's efforts. Deterministic transport, in the form of IEEE Time Sensitive Networking (TSN) and IETF Deterministic Networking (DetNet) are technologies that augment existing packet networking, providing deterministic latency, latency variation and loss for applications that demand these stringent constraints. The vision of self-driving cars and remote medical procedures cannot be realized without these augmentations and this work provides some of the first standardized usage of these technologies toward building a reliable, scalable and high-performance transport network to support 5G.

To find out more about the Routing and Transport Work Area's work, see: https://wiki.broadband-forum.org/display/BBF/Routing+and+Transport

SDN/NFV moves forward with ONAP on CloudCO

- **Target:** Create an application note to drive work that would bring ONAP and BBF closer.

- **Progress:** Work on the group's co-existence and migration document gained significant momentum – this document should now be on track for publishing during the first half of 2019, helping service providers with their network planning and migration strategies.

- **Outcomes:** The Work Area has agreed to publish seven of the 14 application notes that have been authored and make them available on the public Wiki before Broadband World Forum next month.

Following the BoF session on Wednesday evening (see Innovation section), the CloudCO project held further discussion with the ONAP representatives and it was decided to create an application note to drive work that would bring the two organizations closer. This will involve the creation of a use case that will drive integration of the ONAP/Open Source Access Manager (OSAM) with CloudCO access including the OB-BAA layer. This work will help give service providers more choice by adding additional functionality into both projects.

Work on the group's co-existence and migration document (WT-408) has gained significant momentum with several new contributions agreed for insertion. This document should now be on track for publishing during the first half of 2019. This should help service providers in their network planning and in migration strategies.

The Work Area has agreed to publish seven of the 14 application notes that have been authored. These should be available on the public Wiki before the Broadband World Forum next month. These form the basis of the use cases that drive the interfaces and test cases. The Open Broadband (OB) Labs have already started using these for test cases within a CloudCO environment. OB Labs Asia gave a report on its testing of two application notes against three different vendors' equipment.

The group has two working texts – FANS Interfaces (WT-386) and SDN Management and Control Interfaces for Network Functions (WT-413) – that are currently in the straw ballot comment resolution phase and the group is hoping to target Final Ballot before the Q4 meeting in Glasgow.

The CloudCO white paper should be published soon after the end of this meeting which will give the reader a simpler view of what CloudCO is all about.

More information about the SDN/NFV Work Area can be found at: https://wiki.broadband-forum.org/display/BBF/SDN+and+NFV

Starfish addresses ordering cloud resources on legacy services

Current cloud and telecom ordering systems are un-aligned and disparate, leaving customers and providers without a way to migrate and/or interwork legacy and cloud together.

The OB-Starfish project has now addressed how to deliver cloud resources on legacy telecom services by creating a converged cloud resource model to evolve legacy ordering systems. The combined resource model leverages the cloud information model containment approach from Redfish (hosted resources) and TOSCA (orchestrated resources) to establish a standard resource containment that works regardless of implementation.

The Starfish pattern contains the same cloud patterns of "properties" which are used to order resources and "attributes" used to return the service details to the customer from the implemented cloud standards. These are now moving to be implemented in ordering systems to allow cloud resources to be ordered on broadband and other services.

For more information about Starfish, visit: https://wiki.broadband-forum.org/display/OBUMOF/Open+Broadband+Starfish+Project+Home

5G work continues for Wireline-Wireless Convergence Work Area

- **Target:** Address the needs of converged operators, which have both wireline and mobile networks deployed and are in a position to leverage all their assets with combined subscriber offerings.

- **Progress:** Joint sessions were held across the Technical Committee examining other aspects of 5G where the Forum's expertise could be applied, in particular network slicing and access convergence impact on transport networks and nodal Requirements for Hybrid Access.

- **Outcomes:** Complete solutions to Fixed Mobile Convergence (FMC) will be delivered in the release 16 timeframe as originally planned.

The Wireline-Wireless Convergence Work Area addresses the needs of converged operators, which have both wireline and mobile networks deployed and are in a position to leverage all their assets with combined subscriber offerings.

Study work on 5G fixed access continued throughout the Q3 meeting. The study, being carried out jointly with 3GPP, is targeted to complete at the end of November, so the "push is on" to close the remaining gaps and make key technical choices. This will ensure complete solutions to Fixed Mobile Convergence (FMC) are delivered in the release 16 timeframe as originally planned. The work will transition to the generation of normative specifications at this point.

The Forum is taking an important role in 5G, making recommendations for the connection points between the fixed and 5G mobile core networks in order to drive core convergence. This work, led by the 5G project stream, is detailed in SD-407 5G Fixed Mobile Convergence.

Joint sessions were held across the Technical Committee examining other aspects of 5G where the Forum's expertise could be applied. In particular, the impact network slicing and access convergence will have on transport networks. Network slicing, the ability to construct mission-specific virtual networks leveraging the 5G core, is expected to be a major new revenue source for carriers. This will allow carriers to move into new adjacencies such as smart cities, IoT and industrial/critical, real-time applications. The intention is to allow wireline to seamlessly integrate into the 5G ecosystem. This work is coordinated with the Innovation Group, the Routing and Transport Work Area, the SDN/NFV Work Area and other standards organizations that are part of the larger 5G ecosystem.

Work on Nodal Requirements for Hybrid Access (WT-378) is being finalized and is expected to be published shortly. Hybrid access offers converged carriers an opportunity to leverage both wireline and wireless assets to provide high-bandwidth services, increased reliability and faster fulfilment. It also gives them additional options as to how they serve their customers in areas where fiber deployment would be extremely challenging.

For more on the Wireline-Wireless Convergence Work Area, please see: https://wiki.broadband-forum.org/display/BBF/Wireline-Wireless+Convergence.

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Welcome to new and returning members!

We are pleased to welcome new and returning members to the Q3 meeting, including Talk Talk UK, Genexis, Domos and Furukawa.

If you are interested in joining the Broadband Forum, please contact Rhonda Heier (rheier@broadband-forum.org).

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Documents approved include:

- USP
- Gfast Certification
- Ethernet Services (EVPN)
- YANG for FTTdp Management
- Functional Model for PON Abstraction

These documents will be published in the coming days. For a full list of all work in progress, click here. Please feel free to share this information with your colleagues, so they are engaged and aware of the developments of this work.

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Broadband Forum in the news

The Broadband Forum's CEO Robin Mersh has contributed a number of articles to well-known publications over the past quarter, with topics including Gfast, NG-PON2, 5G and the connected home. These articles appeared in ISPreview, EE Times, Mobile Marketing Magazine and Fibre Systems, and IoT Agenda, respectively. In addition, IT Wire covered the series of 5G webinars held by the Forum.

Finally, the Forum's latest announcements – "Broadband Forum hits 5G milestone" and "Broadband Forum automates, accelerates cloud-based access deployment" – continued to attract attention from top publications, including Total Telecom, Telecom TV, The Register,

Fierce Telecom, Broadband World News, Disruptive Asia, Pipeline, SDxCentral, Telecom Asia, telecoms.com and Mobile Europe.

For all of the Forum's latest news and updated, make sure you are following Broadband Forum on LinkedIn.

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Events Calendar

2018 Broadband Forum Meetings

Keep the below dates free for this year's upcoming quarterly meetings.
- 2018 Q4 Meeting: December 10-13 (Glasgow, UK)

2019 Broadband Forum Meetings

And don't forget to save the dates for next year's meetings. Here's a first glance of what the calendar looks like:
- 2019 Q1 Meeting: March 18-21 (Europe)
- 2019 Q2 Meeting: June 17-20 (Asia)
- 2019 Q3 Meeting: September 2-5 (Europe)
- 2019 Q4 Meeting: September 2-5 (Americas)

Sponsorship opportunities are available for the Forum's remaining 2018 and 2019 quarterly meetings.

Sponsoring a meeting is a great way to highlight your company and exhibit your company's innovation in the broadband industry – including demonstrations or prototypes – while showing your support of the Broadband Forum. Opportunities vary and can be customized to accommodate a variety of budgets.

Please view the list of our standard sponsorship packages and benefits at:https://wiki.broadband-forum.org/display/BBF/Sponsorship+Opportunities.

If you are interested in sponsoring a meeting, please contact Rhonda Heier at rheier@broadband-forum.org.

Other dates for your diary:

- SDN NFV World Congress 2018: October 8-12, The Hague, Netherlands
- Broadband World Forum: October 23-25, Berlin, Germany
- BASE Las Vegas: October 28, Encore Hotel, Las Vegas
- Total Telecom Congress: October 30-31, London, UK
- Convergence India: January 29-31, New Delhi, India

Established in 2012, SDN NFV World Congress creates the principal market focus for network innovation and has grown to become the world's largest meeting place for carrier Network

Transformation industry leaders.

1,700+ executives, decision makers, leaders and activists meet, learn and exchange knowledge face-to-face in The Hague, watched by a global audience via live webcast.

Broadband Forum CEO Robin Mersh will present the OB-BAA project during a presentation on Thursday, October 11 at 12.05pm.

Looking beyond hype and buzzwords, Broadband World Forum is the only event in the world with an exhibition and agenda focused exclusively on network infrastructure.

The first morning of the event will see the Broadband Forum host an exclusive executive workshop that will review the developments in broadband networks and services over the last three years, and will look to develop a plan that brings open standards and the agility of 'open source' software together. Areas which will be covered include the changing business climate, the requirements of the operators, the promise of programmable networks, developing the new functionality and the process for migrating from the existing broadband network to the new one.

Following this, innovative demos of the Broadband Forum's latest developments, including USP and OB-BAA will take place at its interop pavilion, part of the Broadband World Forum exhibition, and CEO Robin Mersh will speak on "The new Broadband network - powered by Open Standards and Open Source" on Wednesday, October 24 at 2.30pm as part of the conference.

Total Telecom Congress 2018 is back in London on October 30-31 and promises to be bigger and better than ever.

With 5 streams, 200+ expert speakers and over 700 attendees, it's a must-attend for anyone who wants to be at the forefront of telco industry transformation.

No matter where your interest lies – from digital transformation, to virtualization, to customer experience, 5G, data driven technologies and IoT – we have content and speakers tailored just for you.

Broadband Forum members who are currently working in a consumer facing telco have a chance to attend the event with a free guest pass – please email Christopher.sedgwick@totaltele.com for more information.

If you do not quality for this, you can still secure your place today. Use discount code RXLP when booking for 15% off your pass.

Convergence India is the only platform in this region which demonstrates convergence of technologies in Telecom, IT, Broadcast & Digital

media sectors.

The expo will showcase latest trends and technologies related to Telecom, Broadcast, Cable and Satellite TV, Cloud & Big Data, IoT, Digital Homes, Mobile devices, Film and Radio, Content Creation, Management and Delivery, etc. and also provides engagement with digital innovators, international business gurus, telecom and broadcasting czars, leaders from IT & Internet and IoT industries. It is a mecca of mega-minds accumulating under one roof to take Prime Minister Narendra Modi's vision of Digital India ahead, thus resulting in empowering the citizens of the country by transforming the landscape of Indian economy.

The three-day exhibition and concurrent conference sessions provides an excellent networking opportunity for speakers, visitors and delegates. This platform attracts high quality exhibitors to showcase their expertise and identify the thriving business opportunities in India.

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Contact information

Questions or ideas? Contact the Broadband Forum +1 510.492.4020 or email info@broadband-forum.org