broadband forum

Shaping the Future of Broadband

WELCOME TO THE BROADBAND FORUM QUARTERLY NEWSLETTER

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

A Word from our CEO

As the Q1 meeting takes place, coinciding with the publishing of our 2018 Annual Report, I am struck by the continuing evolution of Broadband Forum. From the scope of our work to the reach our organization, both in terms of geography and business size, we are truly an egalitarian organization that continues to pioneer the broadband industry.

Among the progress at this meeting was important work around 5G. Having handed recommendations to 3GPP, the collaboration continues to ensure a smooth transition of the Fixed Mobile Convergence (FMC) work as the details are documented in specifications by both bodies. This highlights the important role Broadband Forum is taking in developing 5G by making recommendations for the connection points between the fixed and 5G mobile core networks, driving core convergence.

The recently-launched Broadband Quality Experience Delivered (Broadband QED) project is also flourishing, with Domos among the new companies to get involved, and work to produce the initial study document well underway. Addressing the trend of overall broadband quality of experience replacing speed as the most important element in consumer value perception, the project aims to help service providers deliver a superior broadband experience by addressing network latency, consistency, predictability and reliability, as well as proactively fixing issues before customers notice there is a problem.

Also inspiring much discussion was Deutsche Telekom's demonstration of a NETCONF/YANG proof-of-concept for network management built on standardized APIs and data models. This highlighted the need for standardization in future broadband networks, as this will make it easier for operators to address and manage the ever expanding broadband market – both in terms of rising subscriber numbers and the proliferation of devices in an Internet of Things (IoT) era. The DT demo was extremely thought provoking, and shared significant alignment with the goals of Broadband Forum's current Open Broadband – Broadband Access Abstraction (OB-BAA) and User Services Platform (USP) projects.

Last but not least, I am delighted this meeting comes hot on the heels of an important milestone for Broadband Forum – the launch of our European Open Broadband Lab. Designed to accelerate network transformation and migration to a cloud-based broadband infrastructure, I very much look forward to seeing these labs take shape over the course of the next few months as the first testing begins – underpinning how industry growth and an open market still relies on standards-driven interoperability.

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Congratulations from our Chairman

Our Q1 meeting is a time for both new beginnings and acknowledging past accomplishments for Broadband Forum as we conduct board elections and bestow our annual awards. It's an honor for me to recognize these individuals and their accomplishments, and I look forward to their future contributions to Broadband Forum and the industry.

I am pleased to welcome two new board members - Helge Tiainen of InCoax and Ning Zong of Huawei – who emphasize how much Broadband Forum has evolved since it was the DSL Forum. Today, we work across the entire broadband ecosystem, with Helge bringing further expertise in emerging areas like the connected home/business and coaxial cable networks, and Ning confirming our truly international presence, especially in emerging markets.

In addition, three others were also re-elected to the Board of Directors, including Tom Starr of AT&T, Manuel Paul of Deutsche Telekom AG, and Aleksandra Kozarev of Intel.

The full leadership of Broadband Forum can be viewed here.

Broadband Forum has a long history of bestowing awards to our most deserving members who individually have gone above and beyond to push our noble work and agenda forward in the industry, and 2019 provided a strong cadre of standout contributors. The following industry innovators were recognized for their long-standing contributions to broadband during the Q1 meeting.

Tim Carey of Nokia received a Distinguished Fellow Award in recognition of his significant, long-standing contributions to the worldwide development and advancement of broadband.

Two Circle of Excellence Awards were also presented. The first went to Marco Spini of Huawei Technologies for technical excellence and outstanding contributions to the fixed mobile convergence work and fruitful cooperation with 3GPP. The second was given to Ning Zong of Huawei Technologies for technical excellence and outstanding contributions and Project Stream leadership to Cloud Central Office (CloudCO) and to Open Broadband, where he led effort to drive forward the architectural framework and instantiate the Open Broadband Labs.

Outstanding Contributor Awards were presented to Ken Ko, of ADTRAN, Tim Spets, of Greenwave Systems, Vincent Buchoux, of LAN, Stephane Bryant, of MT2, Kota Asaka, of NTT, Herman Verbueken, of Nokia, Dean Cheng, of Huawei Technologies, Mauro Tilocca, of TIM and Kenneth Wan, of Nokia. Les Brown, of Huawei Technologies, also received a Leadership Award.

A full list of 2019 winners as well as past winners can be found here.

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A word from our Chief Marketing Officer

It has been a phenomenal first quarter for Broadband Forum, both regarding the quantity of work undertaken by members and the quality. This has made for a busy few months for Broadband Forum's PR and marketing machine with a remarkable number of significant developments across a vast range of areas. From Gfast and carrier grade Wi-Fi to 5G and the connected home, Broadband Forum is truly at the cutting edge of broadband development and trends and we have you, our members, to thank for that.

The result has been increased momentum around our media coverage and events program, putting Broadband Forum at the heart of the conversation on next-generation broadband.

A summary of the news stories and issued and the coverage we have achieved is available towards the end of this newsletter, but for me last month's hugely popular BASe event at OFC 2019 epitomized the buzz currently surrounding Broadband Forum in the industry. This event saw nearly 100 delegates gather together to discuss NG-PON2 as a universal platform for residential, business and 5G/wireless broadband networks, providing a symposium for true industry collaboration at every level of the ecosystem. Presentations from the event are now available for download for Broadband Forum Members only at this link.

The feedback received was excellent, and we are already planning for our next BASe event – the Ultra-Fast Broadband Acceleration Seminar (UFBB BASe) in Den Haag 25-27 June – and registration for this must-attend event now open. With the agenda still being shaped and a host of sponsorship opportunities available, we would encourage all our members to get involved. For more insight into the advantages of sponsorship, watch this video produced with the sponsors of BASe OFC which included Calix, Go!Foton, and Lightron Inc.

More details about this upcoming event can be found on our brand new website – which I am thrilled to have launched in time for the quarterly meeting. The new website is designed to mirror the vibrant, innovative work taking place in Broadband Forum and will provide a resource for the whole broadband industry.

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ARRIS: When it comes to connectivity, security and reliability are just as important as speed

Consumers want a seamless broadband experience that is secure and reliable, as well as fast.

That was the message delivered by ARRIS as its Global Marketing Director provided new insight into the company's 2018 Connectivity and Entertainment Index.

Speaking during a first-of-its-kind presentation, Christine Rickett said that 89% of consumers think that constant connectivity is important.

Drawing on the 2018 Index – which surveys more than 20,000 consumers worldwide – Rickett also highlighted the growing pressure on broadband networks, with the report revealing 90% of consumers say high-speed internet is important in every room in the house. This grew from 70% in 2017.

Analyzing various broadband usage trends across the world, Rickett also said that while speed remained a priority, consumers' attitudes were shifting so that security and reliability are becoming just as important. This means, said Rickett, that ensuring carrier grade Wi-Fi will become critical for Service Providers.

The presentation was the first State of Broadband report to be held as part of a Broadband Forum quarterly meeting, with the new feature designed to provide a quarterly update on different areas of focus within Broadband Forum. This will ensure its work is aligned with the market and will potentially highlight new use cases in ongoing projects.

The next presentation will take place at the Q2 meeting in Seoul, Korea, and is expected to focus on 5G.

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Broadband Forum showcases Deutsche Telekom's vision for NETCONF/YANG standardization in future broadband networks at quarterly meeting

The importance of standardization within future broadband networks has been highlighted by Deutsche Telekom at Broadband Forum's Q1 Meeting as it demonstrated a NETCONF/YANG proof-of-concept for network management built on standardized APIs and data models.

Enabling faster time-to-market for new services, increased efficiency and lower operating costs, this network configuration and management with service delivery aims to address existing and emerging networking challenges. These sometimes include complex and slow interfacing between different management systems and vendors' protocols, inflexibility as a result of proprietary management systems and M2M management which often lags behind features.

With Deutsche Telekom now looking to expand the architecture's applicability, Demonstration Leader Mikael Abrahamsson said it must be standardized 'as much as possible' to ensure that automated networks can be built at scale. According to Abrahamsson, this will potentially allow operators to manage every aspect of their networks via a single protocol stack, enabling greater flexibility and efficiency, saving time and money.

"We are fully supportive of standardized APIs and models like NETCONF/YANG as they will allow operators to configure and manage many different things," said Abrahamsson. "As we continue this work, we are working towards having standardized modules as much as possible and with open source development and cooperation between vendors and operators becoming more crucial, we believe Broadband Forum has an important role to play."

Deutsche Telekom is now looking for more collaboration with other operators, Standards Defining Organizations (SDOs) and vendors.

"We were delighted to host this Deutsche Telekom demonstration at our Q1 meeting and as expected, many of our members were interested in these proposals due to its close relationship to projects like OB-BAA and USP," said Broadband Forum CEO Robin Mersh. "The more you

can standardize data models and protocols, the easier it will be for operators to address the expanding market they are working in – both in terms of rising subscriber numbers and the proliferation of devices in an Internet of Things (IoT) era. Of course, that is what OB-BAA and USP are also trying to do and Deutsche Telekom's initiative aligns with this approach."

A video summary of the demonstration can be seen here.

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Registration open for Broadband Forum's 2019 Ultra-fast Broadband Acceleration Seminar (UFBB BASe) – 25-27 June in Den Haag

The latest breakthroughs in next-generation access technologies, the current state and future of the broadband market and best practices in advanced services deployment and monetization are the hot topics that will be explored in depth at the upcoming 2019 Ultra-fast Broadband Acceleration Seminar (UFBB BASe), on 25-27 June in Den Haag, The Netherlands.

Hosted by Broadband Forum, which has recently taken the reins of this highly regarded event, the 2019 UFBB BASe will build on the former TNO-led Ultra-Fast Broadband Seminar which developed, over the course of a decade, a stellar reputation for thought leadership, high quality speakers, technical acumen and a collaborative and energetic vibe.

Taking place at the Hotel NH Den Haag, the three-day event will build on TNO's successful recipe by combining the event with the best elements of BASe to provide a unique balance of vision, real-world experience, and technical/operational insights into next-generation broadband networks, as well as a host of networking and social activities.

"Over the last decade, the Ultra-fast Broadband Seminar has become a world-class event and I'm delighted that Broadband Forum and TNO can continue to work together and build on the event's success going forward," said Kevin Foster, Chairman of the Broadband Forum. "The venue is locked in, and the agenda is shaping up to be extremely compelling and timely, with a number of leading industry luminaries already confirmed. We look forward to having you join us for this "can't miss" event of the summer."

To register for the event, click here and to view the full agenda, click here.

For sponsorship opportunities, visit: https://www.broadband-forum.org/about-bbf-sponsorship.

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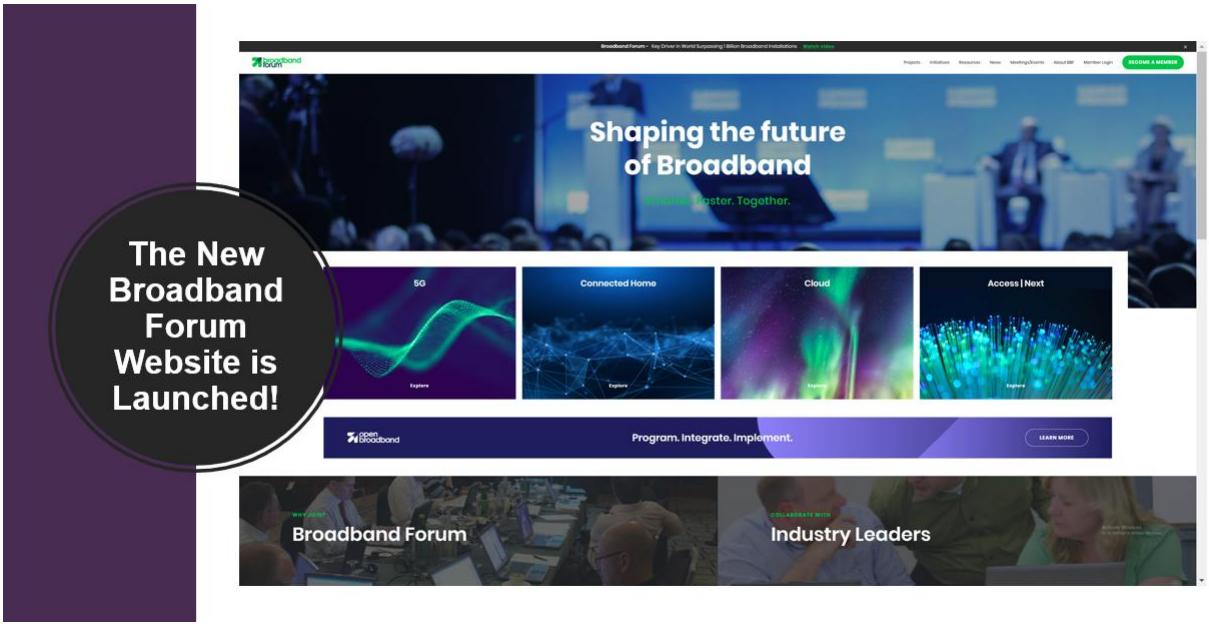

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Work Area Updates from Warsaw, Poland

For a full list of all Technical Reports published by Broadband Forum, click here. Please feel free to share this information with your colleagues, so they are engaged and aware of the developments of this work. For additional insight and to get involved, sign up for the members-only Broadband Forum tools and access your member-only account using your company email address.

New scalable BNG architecture and testing to ensure quality experience

- **Target:** The Architecture and Migration Work Area maintains primary architectural work of the Broadband Forum. This work reflects the control, management and data plane aspects of the Broadband Forum's defined architectures. These architectures are augmented to leverage new industry practices, while protecting the investment in broadband networks already deployed.
- **Progress:** Significant technical work was under taken on the new Disaggregated Broadband Network Gateway (BNG) project and Broadband QED.
- **Outcomes: The** Application-Layer Test Traffic Architecture and Requirements (WT-421) was sent for final approval.

The Access and Transport Architecture Work Area progressed a range of work during the Q1 meeting. Much of the work revolved around the testing methodologies and specifications that Broadband Forum is developing to ensure a quality end-user experience. A new work item on Disaggregated BNG saw significant progress in its first meeting.

New technical work made significant progress on the **new Disaggregated BNG (WT-459) project**, which was agreed and started on 20 February 2019. A number of member companies contributed to the document in the first meeting after the New Project Initiation Form (NPIF) approval.

The **Broadband Forum's BNG Disaggregation project** addresses the increased bandwidth

demands being placed on BNGs – a result of the exponential growth in broadband demand and acceleration in video consumption across devices, as well as the incorporation of additional bandwidth-hungry functionalities. BNG Disaggregation also simplifies network operation, as without it operators are forced to deploy and manage multiple BNGs across numerous locations closer to the network edge to address load spreading. These factors have created challenges in control plane and user plane scaling, as well as geographical-related issues such as fragmented IP pool management, under-utilized control plane and complex operation and management for software upgrades and service provisioning. To solve these challenges, BNG Disaggregation will define the architecture and requirements for a disaggregated BNG control plane and user plane which separates the control plane and data plane. This will bring benefits such as centralized locations for configuration and IP address management, leading to faster delivery of new services. The work will also ensure the control plane and user plane can be easily scaled according to customer demand. Click here for a press release announcing the commencement of this project. A video summary of this project can be seen here.

In the **Application Layer Testing group**, it was agreed to send the Application-Layer Test Traffic Architecture and Requirements (WT-421) for final approval. The Quality of Experience (QoE) perceived by network services' customers is dependent on both the design of the network, and on the behavior of the traffic sent over the network by the applications used by those customers. Different types of applications generate traffic with very different characteristics. This Working Text (WT) defines an architecture and requirements for the specification of test traffic generated at the application layer. It supports specification of test traffic that exhibits the complexity resulting from multiple types of applications and subscribers aggregated in a common network and competing for resources. The WT also enables test traffic to be specified using consistent, unambiguous parameters that support repeatable test results under complex scenarios across different test labs, service providers, and vendors.

The **Broadband QED** (SD-452) project continued the substantial contribution on SD-452 that started before the meeting. The Broadband QED project is developing a new Quality Attenuation (ΔQ) method to capture packet network performance that may be applied to analysis of both deployed networks and in laboratory testing. ΔQ is an approach to systems performance analysis that has applicability to broadband networks. It uses statistical distributions as a proxy for QoE and application outcomes. ΔQ can decompose a round trip time into separate constituent components, corresponding to various sources of performance degradation (packet loss/delay), be they structural (architecture/design), network dimensioning (link speeds etc.) or network load/scheduling related. It is this mathematical tractability that makes the technique so powerful for reasoning about systems (network) performance and facilitates "performance by design." A video summary of progress in this project area can be seen here.

Work also progressed on **Performance Measurement from IP Edge to Customer Equipment using STAMP (WT-390i2)**. Reliable and well-performing network services are becoming critical for broadband subscribers, as their lives increasingly rely on a 'connected world'. In this demanding and competitive environment, service providers are looking for insight on how their networks are performing but cannot currently use standardized mechanisms for measuring the performance of the access network, which provides services to residential and business subscribers. This WT defines the capabilities required in the customer equipment and the IP Edge for service assurance of broadband subscribers using Simple Two-way Active Measurement Protocol (STAMP) performance measurement, including architectural and nodal requirements.

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

Broadband User Services Work Area strengthens connected home business model

- **Target:** Help service providers control the connected home business model.
- **Progress:** Work on the next version of USP and a robust service element for Wi-Fi mesh networks continued.
- **Outcomes:** The next USP Plugfest will take place on April 1-5, 2019.

The Broadband User Services Work Area made great strides in enabling service providers to control the connected home business model. With new participation from leading gateway application vendors, the group pushed forward with the **next version (1.1) of USP**, slated for release this summer. Implementations continue to expand and improve with participation in ongoing Plugfests – with the next one starting on April 1 – and a certification program for USP Agents targeted for July 2019.

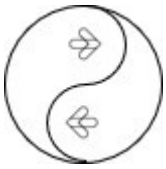
BUS is also finalizing **a robust service element for Wi-Fi mesh networks** in its standardized Device:2 data model. Combined with USP, this empowers providers to offer real carrier grade Wi-Fi. This is helped along by the recently published TR-398 Wi-Fi Performance Test specification, allowing vendors to demonstrate that they can meet the requirements of carrier grade Wi-Fi.

A video summary of updates in BUS can be seen here.

Anyone interested in attending the **next USP Plugfest** can register here.

For more information on BUS' ongoing work, visit: https://wiki.broadband-forum.org/display/BBF/Broadband+User+Services. If you are interested in attending a new webinar, titled 'Deliver on the promise of the connected home: An expert panel webinar on USP/TR-369' will take place on Thursday, April 4 at 10am Eastern Time.

Common YANG to publish revamped FTTdp YANG model next month



- **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:** High interest in both vendor and service provider community; continued work on managing the Access Node Control Protocol (ANCP) and alarm management, enabling additional functionality for network troubleshooting and data analysis.
- **Outcomes:** Amendment 2 of the YANG Modules for Fiber-to-the-distribution-point (FTTdp) Management to proceed to Final Ballot on April 8; creation of YANG Modules for Broadband Network Gateways (SD-460).

Since the last meeting, work continued on Amendment 3 of the Common YANG Modules for Access Nodes (WT-383a3), which will further enhance the suite of YANG Modules, focusing on aspects such as alarm management, managing the Access Node Control Protocol (ANCP), and hardware management. These developments will meet service provider requirements, enabling additional functionality for network troubleshooting and data analysis for ultrafast broadband

over VDSL, FAST and Passive Optical Networks (PON).

In addition, Amendment 2 of the YANG Modules for FTTdp Management (WT-355a2) was approved to proceed to Final Ballot on April 8. This Amendment updates existing models to align with the latest revisions of underlying ITU specifications. A two-week review will be done on the latest YANG model changes.

The group agreed to kick off a Study Document, YANG Modules for Broadband Network Gateways (SD-460). The intention of this work is to work through the project scope that would feed a future WT covering BNG YANG Modules. The group is aiming to complete the study prior to the Q2 meeting so that a well-informed decision can be taken at that point in time. The aim of this work is to smoothen interop for BNG deployments.

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

A video summary of updates in Common YANG can be seen here.

FAN moves forward with several documents, collaborates on next-gen networks

- **Target:** At the end of 2019 Q2, FAN is aiming to have a Straw Ballot Readiness meeting on PON PMD Test Plan (WT-423) and Inter-Channel Termination Protocol (WT-352).
- **Progress:** Work is continuing on PON PMD Test Plan (WT-423), with the addition of several test cases.
- **Outcomes:** TR-385 ITU-T PON YANG has been finalized and work on WT-385 Issue 2 has begun.

Since the Q4 2018 meeting, the Fiber Access Networks (FAN) Work Area has continued to update several key study documents that will bring a range of benefits to service providers.

The **PON Management Project Stream** – which is dedicated to the development and testing of NETCONF management models to manage ITU-T and IEEE PON YANG models – has progressed ITU-T PON YANG (TR-385) through to straw ballot, with the document passing final ballot in February. Work has also started on a contribution on how to manage Inter-Channel Termination Protocol (ICTP) and IP Flow Information Export (IPFIX) through WT-385. This work will become part of WT-385 Issue 2 if passed.

Within the **Interoperability and Test Project Stream**, work continued on PON PMD TP (WT-423), with the addition of several test cases, for example, optical path penalty test cases, based on the NPIF that was previously approved. The Optical Network Unit (ONU) transmit power pass criteria was also modified, resulting in the WT-423 NPIF moving from an Amendment to an Issue.

ID-247 GPON & XG-PON1 ONU Conformance Test Plan Collaboration has seen significant progression over the last quarter. An ad hoc group working on this has several test cases including (but not limited to) to multicast bandwidth, dying gasp, VLAN operations, and ONU Management and Control Interface (OMCI) reboot.

In the **Wavelength Management Project Stream**, the following categories of changes were incorporated:

- Editorial fixes
- ICTP through NAT

- ICTP IPFIX clarifications
- Inventory Type–Length–Value (TLV)
- Vendor extensions
- ICTP IPFIX IE descriptions to be added to Broadband Forum's website were discussed.

This new section will detail ICTP IPFIX IEs previously published in TR-352 Issue 1 ICTP Technical Report.

The FAN Work Area also held two joint sessions with the SDN/NFV Work Area. The first item discussed was Virtualized OMCI (vOMCI) on issues and questions surrounding the virtualization of OMCI, as well as how vOMCI is implemented. The SDN/NFV Work Area will now continue this work in vOMCI Interface Specification (WT-451).

The second session with the SDN/NFV Work Area focused on YANG Modules for Access Network Map & Equipment Inventory (WT-454). The groups agreed that WT-454 should include Optical Network Units (ONUs) and that the metadata that was needed for this particular module was going to be stored in the SDN manager. The SDN/NFV Work Area will now take on this work and continue to move it forward.

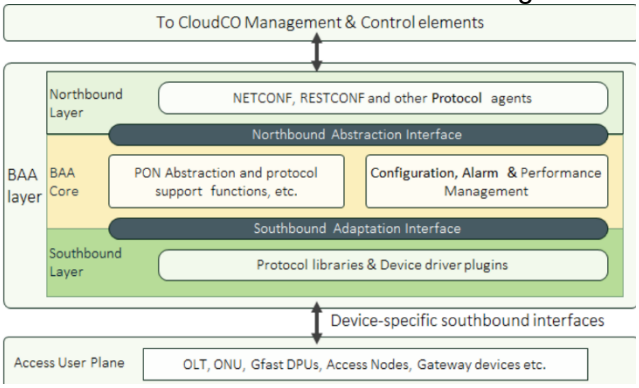
A video summary of the latest updates in FAN can be seen here.

Easy as one, two three! OB-BAA publishes second release, starts work on third

OB-BAA has issued its second release, opening the door for service providers to achieve dramatically simplified service provisioning and faster time-to-market

Building on the functionalities enabled by Releases 1.0 and 1.1, which were demonstrated to wide-acclaim at Broadband World Forum last October, the OB-BAA project released its second major version that expands the types of proprietary access nodes that can be managed and controlled via the BAA layer. This includes enabling additional adaptation of access nodes to meet individual network needs and providing examples of common functions that service providers are likely to perform when automating and managing their networks.

Taking accelerated migration to cloud-based access networks to the next level, this Open Broadband reference implementation expands the breadth of vendors and network configurations capable of leveraging its ability to facilitate co-existence, seamless migration and adaptation to an increasingly wide variety of software defined access technologies and implementations.



The next release is scheduled for August and will include additional enhancements for service monitoring, including performance monitoring and alarm notifications, as well as control plane relay experiments. This will give Service Providers the functionality needed to effectively manage the access nodes in a software defined access network.

View the press release announcing this release here.

A video summary of OB-BAA release 2 and other Open Broadband initiatives can be see here.

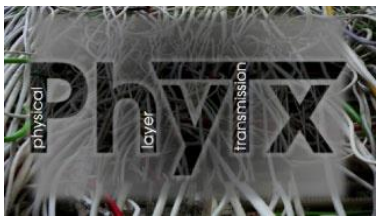
OB-MAP prepares for Release 1

Broadband Forum launched the leading-edge Open Broadband Multi-AP (OB-MAP) project to ensure that the software of open-source innovators, like prpl Foundation, and their mesh software projects will be scalable to large service provider deployments via carrier grade manageability.

Together, the two organizations are fostering a vibrant open-source community to define requirements and create a reference implementation.

At the Q1 meeting, work continued on understanding the use cases and requirements, while anticipating software from the prpl Foundation for the EasyMesh MAP Release 1 implementation.

Physical Layer Transmission finalizes Gfast Issue 2 certification



- **Target:** To carry out work which will help service providers deploy equipment that will give a better quality of experience for their end-users.
- **Progress:** The Physical Layer Transmission group work continued on its Gfast Performance Testing document, Reverse Powering Feeding, long reach VDSL2, Fiber Extension, and many more projects.
- **Outcome:** Gfast Issue 2 certification and copper cable models have been sent to final ballot.

Having completed the resolution of straw ballot comments on Issue 2 of ID-337 (Gfast certification), the group agreed to send the document to final ballot. Issue 2 addresses 212MHz operation, Gfast over coax (profiles 106c and 212c) and increases performance requirements.

Work on WT-338 Issue 1 Amendment 1 – the Reverse Power Feed test plan is near complete as most straw ballot comments have been resolved. This allows for testing of remote powering of access network equipment from the customer premises. The plan is to send Issue 1, Amendment 1 to final ballot in Q2 2019.

The Fiber Access Networks - Copper Extensions (FANCE) project stream initiated work on WT-301 Issue 3, which includes architectures and requirements for FASTBACK - copper backhaul from a Distribution Point Unit (DPU) using bonded Gfast. In addition, Projects WT-419/SD-419 made progress on use cases and requirements for extending fiber access over existing local copper infrastructure.

In conjunction with BUS, the group published a technical report on Wi-Fi Performance Testing (TR-398). Work progressed on 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.

WT-208 Issue 3 on Performance Test Plan for In-premises Powerline Communications Systems was sent to straw ballot. In addition, 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.

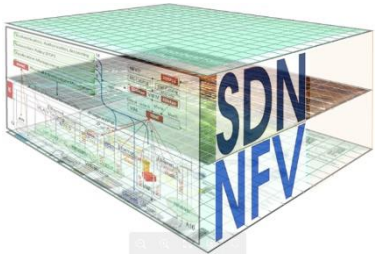
Work also continued on functional and performance requirements for long reach VDSL2.

A Gfast Plugfest at the University of New Hampshire InterOperability Laboratory (UNH-IOL), in New Hampshire, has been scheduled to take place from May 13-17, 2019.

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.

A video summary of the latest work in PHYtx can be seen here.

SDN/NFV Work Area makes good progress on new projects



- **Target:** To drive the migration of SDN and NFV into broadband networks to facilitate the agile deployment of new customized distributed broadband services and applications.
- **Progress:** The new work items (vOMCI, Automated Intelligent Management & YANG models for Access Equipment mapping & inventory) stimulated a good number of contributions on the new topics. These generated good discussion with progress on all three topics.
- **Outcomes:** The new Access & Home Network O&M Automation / Intelligence under the new Automated Intelligent Management Project Stream resulted in all contributions for use cases being agreed in principle.

The SDN/NFV Work Area had good debate on the vOMCI specification project, with key contributions allowing the group to answer and agree some of the fundamental questions which will help shape exactly what the scope includes. Even though some of the questions posed appeared very simple, they exposed some potential complexities that will now need to be worked around and where the group could make use of the discussion tools on the Wiki. This work will define how the virtualized ONUs delivered from a single Optical Line Terminal (OLT) are managed by multiple operators. The WT YANG Modules for Access Network Mapping and Equipment Inventory (WT-454) took shape providing a definition of the metadata needed within the automation / big data analysis systems.

After some stagnation in the development of the group's Application Notes, two new notes were approved for publication. The group also injected new life into a number of others that hadn't been progressed for the last few meetings, with the expectation that these should be agreed for publishing soon. These should help drive the testing within the new European Open Broadband Lab.

Several new use cases under the Access & Home Network O&M Automation/Intelligence (WT-346) were discussed and agreed in principle. These will now be enhanced before inclusion into the document. This led to the template for the use cases being changed so the required information will immediately be available in the future.

The group agreed it should work on delivering an Issue 2 of the Fixed Access Network Sharing (TR-370). This will help align that document with both FANS Interfaces (TR-386) and CloudCO Framework (TR-384). This should be a simple update and will ensure that all the documents are consistent.

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

A video summary of the latest updates in the SDN/NFV work area can be seen here.

WWC continues collaboration with 3GPP for FMC

- **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:** The Wireline-Wireless Convergence Work Area (WWC) has started populating the documents that will provide the normative specifications for the equipment that will connect wireline to the 5G core and the CPE it will serve.

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

Work in the WWC Work Area is now increasingly focused on the technical details that require specification, addressing the needs of converged operators with both wireline and mobile networks deployed who are in a position to leverage all their assets with combined subscriber offerings. This work will allow converged operators to provide a uniform experience to their customers irrespective of the access or appliance they are using. This will be supported by a common and streamlined back office and control plane.

On the journey to making this happen, the study work on 5G fixed access concluded at the Q4 meeting. Broadband Forum and 3GPP are now collaborating to ensure a smooth transition of the FMC work to the normative phase as the details are documented in specifications worked on by both bodies.

Broadband Forum is taking an important role in developing 5G, making recommendations for the connection points between the fixed and 5G mobile core networks in order to drive core convergence.

Joint sessions were held across the Technical Committee examining other aspects of 5G where Broadband Forum's expertise could be applied. In particular, with BUS, which saw the go forward plan to execute Customer Premises Equipment (CPE) changes for FMC firmed up. This will enable USP, and its predecessor, TR-069, to also contribute to the value proposition of FMC and 5G. SDN for 5G (known as CUPS or control user plane separation) is another important topic under intense exploration. This will greatly enhance the deployment options available to carriers that embrace 5G and the overall transition to NFV.

WWC is now settling into the normative phase of this work with the specifications set to be finalized by the end of 2019.

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

A video summary of the latest updates in the Wireless-Wireline Convergence Work Area can be seen here.

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NG-PON2 creates buzz at BASe OFC

Broadband Forum hosted a packed-out Broadband Acceleration Seminar (BASe) seminar at OFC, in Las Vegas, from March 3-7, sharing the latest views from pioneering operators such as Verizon and SK Broadband, as well as thought leaders OVUM and Fiber Broadband Association.

Covering four tracks – Worldwide Access Market Overview, Component Market Update, Ecosystem Overview and Best Practices, and Integration and Applications – BASe POINT delved explored the NG-PON2 roadmap and evolution and how it could provide a universal platform for residential, business and wireless and 5G networks.

For a video overview the latest BASe seminars, click here.

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Join broadband pioneers at Broadband World Forum!

Broadband World Forum

Following another successful show in 2018, Broadband Forum is once again bringing its hugely popular Interoperability Pavilion to Broadband World Forum, taking place in Amsterdam, The Netherlands, October 15-17, 2019.

Now in its 19th year, Broadband World Forum provides the perfect opportunity to connect with the entire fixed network ecosystem and bring the latest broadband technologies together.

As an organization at the leading edge of broadband developments and trends, Broadband Forum members are encouraged to take part in the Interoperability Pavilion – and will gain access to a discounted rate for their pod. The first ten applicants will also receive a full access delegate pass for the conference.

“Exhibiting at Broadband World Forum is an excellent opportunity to position your company as an innovator in the space and provides the ideal event to meet potential partners, learn about current challenges, and get a 360-degree view of the industry in one place,” said Geoff Burke, Broadband Forum Chief Marketing Officer.

Anyone interested in taking part in the Interoperability Pavilion should contact Tamas Szuts at tamas.szuts@knect365.com or on +44 (0) 207 017 4260.

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Welcome to new and returning members!

We are welcoming a host of new members to this quarterly meeting, including Telecom, Benu Networks, F-Secure, Humax, KAON, Pico, Roqos, Spirent, Support Robotics and TQ Delta.

Are you interested in becoming the next member of the industry's leading standards body in defining Broadband Networks? Broadband Forum membership will not only accelerate your company's progress but enable you to become a key influencer in developing 5G, the Cloud, the Connected Home and Access Networks. Those who are interested in joining before the end of 2018 are invited to apply for a five Quarter Membership. 2019 Annual Memberships are also now being accepted.

To learn more about the benefits of Membership, please contact Rhonda Heier, Membership Development Manager, at rheier@broadband-forum.org.

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Broadband Forum in the news

It's been an active and exciting month for Broadband Forum, with 10 news releases published – all of which were met by a great response.

The year started with the launch of Broadband QED, inspiring coverage in RCR Wireless, Advanced Television and ISPreview. This was followed by an update on Gfast and an article on BASe OFC, with coverage in Comms Business, Pipeline Magazine and Telecompetitor.

Next up, in quick succession, was the publication of landmark specifications TR-402 and TR-403, a collaboration with 3GPP, the release of the industry's first Wi-Fi performance test standard, the launch of OB-BAA Release 2, and a look at the future of broadband with Point Topic. Coverage ranged far and wide with Lightwave, Mobile Europe, RCR Wireless, 5G.co.uk, telecompaper, Telecom TV, and Telecom Asia among the list. The 3GPP news release was particularly well-received and following an interview with Robin Mersh, Telecom TV produced this article about the work.

More recently, news releases on Broadband Forum's European Open Broadband Lab and new 212 MHz Gfast certification have been published.

Alongside this, longer, more detailed features are also been produced. Silicon Republic featured a Q&A with Robin Mersh, while Telecom Tech Outlook produced this detailed overview of the connected home and the role TR-069 has to play. Broadband World News also created this round up for Broadband Forum's work following an interview Robin Mersh and Geoff Burke. With additional features already secured in Intelligent CIO and Fibre Systems, Broadband Forum is well and truly in the spotlight.

And don't miss a great article covering the launch of Broadband Forum's Disaggregated BNG project form Broadband World News.

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Events Calendar

2019 Broadband Forum Meetings

Don't forget to save the dates for next year's meetings:

- 2019 Q2 Meeting: June 17-20 - Seoul, Korea, Asia
- 2019 Q3 Meeting: September 2-5 – Milan, Italy
- 2019 Q4 Meeting: December 2-5 – Panama City, Panama

Sponsorship opportunities are available for Broadband Forum's 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 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:

- Zero Touch Automation Congress: March 26-28, Madrid, Spain
- Gigabit Access: April 2-3, Cologne, Germany
- MPLS+SDN+NFV World: April 9-12, Paris, France
- Network Transformation Congress: April 29-May 1, San Jose, USA
- SDN NFV World Congress: October 14-17, The Hague, The Netherlands
- Broadband World Forum: October 15-17, Amsterdam, The Netherlands
- Total Telecom Congress: October 29-30, London, UK

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Contact information

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