Welcome to the Broadband Forum Quarterly Newsletter

Keeping you updated about our activities! Here we highlight our latest work and focus on areas which are most critical.

A Word from our CEO

With just a seven-week gap between our Q1 and Q2 meetings, it has been a busy time for the Broadband Forum as we look to build upon the efforts of our working groups to deliver the specifications and software that are going to continue to progress and adapt with the broadband industry in a time of great change.

Perhaps the most important contribution we can provide to the industry is to keep an unwavering focus on the implementations of the new technologies that have the most promising business cases. From this, we can bring our technical innovation to show how each can be introduced into the market and holistically managed to the benefit of all stakeholders. This quarter's meeting is a great example of the energy that is driving the contributions to our work at impressive levels, with increased focus being put on areas such as Cloud Central Office (CloudCO), wireless-wireline convergence for the delivery of 5G and the User Services Platform, which brings our renowned TR-069 specification into the realm of consumer technology and virtualization.

For the Q2 Meeting, the Forum returned to Taipei for the first time since 2014. Alongside the meeting, we were delighted to be invited to take part in the Broadband and Narrowband Convergence for IoT Realization Symposium that was organized by the Institute for Information Industry and the Industrial Development Bureau of Taiwan's Ministry of Economic Affairs, more details of which can be found later in this newsletter and our Q2 press release.

The development of these technologies is a key driving force behind the Forum's recent launch of the Open Broadband initiative, which will enable service providers, systems integrators and suppliers to integrate new technologies into their existing offerings quickly and reliably. This initiative – which was coupled with the launch of the Open Broadband Laboratory Asia (OBLA) alongside our partners at the SDN/NFV Industry Alliance – signifies the Forum's desire to not just keep pace with rapidly evolving industry, but remain as innovation leaders.

We have also announced that we will once again be co-hosting TNO's Ultra-fast Broadband Seminar in June - an event that is highly-regarded within our industry -and there are also exciting plans afoot for Broadband World Forum in October which we hope to be able to share with you in our next newsletter.

One final point of note from the Q2 Meeting was the attendance of five new and returning members, with 13 first-time attendees. We welcome them all to the Forum - the scope of work that has been undertaken by our Work Areas throughout Q2 has been wide-ranging, and we're looking forward to seeing our new members contributing to the Forum's continued success!

Robin Mersh

May 2017

Open Broadband launched to accelerate delivery of new services

The Forum's new Open Broadband initiative, a new platform for the integration and migration testing of services such as CloudCO, NFV/SDN, 5G and the IoT, was launched at May's China SDN/NFV Conference in Beijing.

As the industry increasingly migrates towards cloud-based, programmed and virtualized systems, co-existence with existing infrastructure is key to maintaining the rapid pace of innovation and development. The initiative operates a partnership with the open source community, aligning the Forum with open source techniques while focusing on interoperability to mitigate deployment risks.

The launch is linked to the creation of the Open Broadband Laboratory Asia, established in partnership with the SDN/NFV Industry Alliance. The lab will focus implementing the initiative's goals, focusing on the migration from existing broadband infrastructures to cloud-based ones through the introduction of NFV and SDN technologies.

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IoT explosion among topics at Taipei symposium

Co-located with the quarterly meeting, the Broadband and Narrowband Convergence symposium discussed at length the disruptive nature of Internet of Things (IoT) technologies and the increasing importance of standards and interoperability as mobile and wireline networks converge.

"The event was a great opportunity to hear the thoughts of some of the leading voices in the region on a topic that is of ever-increasing importance to the Forum's work," said CEO Robin Mersh. "When we speak to our operator members, it is clear the discussion about the future of network evolution is increasingly moving towards the applications and devices at the user end of the chain. Revenue isn't generated by the network itself - it is the services that it enables that drive the business case, and that was one of the key messages we delivered at the symposium."

Robin took part in a panel session on the challenges posed by IoT convergence alongside chairman Kevin Foster and Board member Manuel Paul, while Broadband User Services Work Area co-chair Jason Walls sat on the day's other discussion, focusing on innovative IoT applications for 5G.

Forum collaborates with IETF on YANG Catalog

Collaboration among a number of network engineers active in the Internet Engineering Task Force (IETF) and the Forum has resulted in the launch of the YANG Catalog, an open online repository designed to simplify the use of network management models.

The catalog's models are specified for use in a wide variety of networking equipment and deployed by operators around the world to accelerate and automate network operations and management.

The catalog contains both industry standards organization and vendor-specific data models, making it easy to search for and identify the maturity level of various models, as well as module type and implementation information. The Forum published its first YANG models for Fiber-To-The-distribution point (FTTdp) management software specifications last year with TR-355, and is making its work in progress public through the catalog so the industry can use the YANG models much more quickly, enabling it to perfect the models through industry feedback.

For more information about how to contribute to and participate in the YANG Catalog, please see: https://www.yangcatalog.org/about.html

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Work Area Updates from Taipei

Architecture and Migration deliver on performance monitoring

Work on performance monitoring from customer equipment through to the IP edge has completed letter ballot and now been published. This is an important step which will improve service providers' ability to monitor and adjust Service Level Agreements to improve network operations accordingly.

Following on from the positive progress made in Q1, the team has continued to work on the development of TR-359 Issue 2. Building on the momentum of the foundations of the NFV enhanced architecture defined by Issue 1, Issue 2 introduces SDN and greater management, which will increase the applicability of virtualization to the wider multi-service broadband network. Work is progressing well, and is expected to go to straw ballot in Q4.

The group is continuing to work on the use cases for Broadband Assured Services, and progress has also been made in defining a specification for Adaptive Bit Rate in broadband networks. This will create enhanced efficiency for video and media delivery and enable carriers to offer wholesale delivery to Over-The-Top operators.

User Services Platform moves a step closer

The Broadband User Services Work Area is in the final stages of preparing its draft release of the new User Services Platform, a protocol that represents the natural evolution of TR-069 into the world of consumer electronics.

This draft will be available to the public to encourage developers to begin building prototype implementations and the group is looking to host a plug-fest on the protocol in November of 2017. This project represents a culmination of work that will also update the TR-069 protocol itself, as well as the Device:2 data model used for managing TR-069 devices.

Along with the Physical Layer Transmission Work Area, the team has continued work on its Carrier Grade Wi-Fi project, investigating performance requirements and resulting test cases for Wi-Fi in the home that meets the expectations of end-users and service providers. The joint group also agreed to start new work examining video streaming requirements in the home network.

FTTdp Work Area makes significant strides

The Fiber to the Distribution Point (FTTdp) Work Area has completed work on Issue 2 of TR-301 (Architecture and Requirements for FTTdp), which simplifies network troubleshooting, software management and Distribution Point Unit (DPU) installation.

Contributions towards commencement of Issue 3 have already been received, discussing aspects such as DPU daisy-chaining, different backhaul technologies and ideas pertaining to the move towards the next generation of Gfast technologies.

The FTTdp Management Project Stream continued to progress the next revision of TR-355, receiving contributions and discussions on a significant number of improvements to YANG modules for managing ultrafast broadband.

The group has continued to work in conjunction with the Common YANG Project Stream to progress aspects related to common YANG specification (TR-383), which will make significant strides in reducing management complexity for service providers looking to deploy virtualized networks.

FAN takes the initiative on PON convergence

YANG model projects such as WT-385 (YANG model for management of ITU-T PON) are of high interest to the community and the whole group has agreed on how to start further building Passive Optical Network (PON) related YANG models. This work will continue to benefit the service provider community as they move towards a more unified SDN/NFV fiber access network infrastructure.

The Project Stream for PON abstraction interfaces for time-critical applications is making good progress. This work is needed because operators are interested in providing more additional valued or differentiated services to meet the trend towards more diversified network requirements, particularly where the network is used as business infrastructure. These are all-time critical functions where flexibility and quality of experience are vital to the operator. These include dynamic bandwidth allocation, energy efficient ONT sleep mode, dynamic wavelength allocation and network protection.

The second FSAN/BBF XGS-PON interoperability test session is in the process of being scheduled for the 3Q – 4Q 2017 timeframe. The purpose of this event is for PON technology vendors to test their equipment with the purpose to drive technology maturity through interoperability. Please keep an eye on the Broadband Forum website for more details on this important event.

The new white paper project, MD-396 - gigabit access over FTTx - has started and aims to promote PON deployment in multiple applications – that is, to use PON as a transportation technology to backhaul all kinds of access medium (fiber, DSL, cable, etc.) to provide a gigabit access pipe. There has already been agreement on use cases and architecture for the paper.

Routing and Transport Work Area works toward 5G target

The Routing and Transport Work Area has approved a new project defining solution architecture and equipment requirements for the FlexE technology. This innovative technology combines the ubiquity of Ethernet with the guaranteed consistency of optical network. The architecture will address the use of this technology in conventional IP/ Multiprotocol Label Switching (MPLS) networks to realize 5G issues such as network slicing and service orchestration. The first deliverables for the project will be documents discussing the problems to be addressed, the technology approach and the market drivers for the technology.

The latest work on the Broadband mobile backhaul architecture is on track for final approval out of the Q2 meeting. The group has incorporated all input, including synchronization from our esteemed colleague at ITU-T Study Group 15. There are some final issues to discuss, which should be addressed before the Q3 meeting.

The evolution to 5G will be in phases and the transport for 5G network will be no exception. The TR-221 MPLS in Mobile Backhaul architecture sets the stage for initial 5G architectures by establishing the time/synchronization, scalability and resiliency a 5G network will depend on. The group continues to explore how to transform transport and IP networks to efficiently support 5G and the innovative services brought about by 2020 mobile networks. These new services, through the development of new applications that they enable, generate new revenues both for the provider and their customers.

The last of the updates to the Ethernet Virtual Private Network (EVPN) architecture and requirements (TR-350) Phase 2 have been completed and the work is entering the approval stage. The latest work focuses on point-to-point and point-to-multipoint service implementation. The work continues to be done virtually (via the wiki and conference calls) to allow broader, more expedient participation. The document will be sent for final comment and should be published in late Q3 or early Q4.

TR-350 Phase 2 architects the Metro Ethernet Forum Carrier Ethernet service definitions for both E-LINE and E-TREE, and the architecture and requirements are based on the latest Internet Engineering Task Force specifications for EVPN. This work makes the Ethernet services network more efficient and resilient, thereby supporting services for new and demanding applications while potentially reducing expense. The services provided by the architectures are used for network management, video distribution and big data connectivity.

For more detail please see the EVPN white paper available on the BBF website here.

Physical Layer Transmission Work Area focuses on Gfast

Much of the Physical Layer Transmission Work Area's time was spent on Gfast-related projects. The Gfast Testing and Certification Project Stream finalized addressing issues in ID-337, raised from the beta trial program. It's expected that the internal report (IR-337) will go for final ballot by the end of June 2017 and its associated abstract test plan (ATP-337) will be prepared for publication.

Significant progress was made on test set-ups for Gfast performance testing (WT-380) and on system level test cases for reverse power feeding testing (WT-338).

In the VDSL2 Project Stream, the group progressed the work on the testing of long reach VDSL2 for WT-114 Issue 3 amendment 3 and on the testing of vectored long reach VDSL2 for

WT-249 Issue 2.

It was agreed to open a new project for analysis and requirements for video support in premises, relating to the project on TCP/UDP Traffic Generation for Testing (SD-405). These projects are important not only to physical layer transmission, but may be applicable throughout the Broadband Forum, as they address reliable delivery of all-IP based services.

In a joint Broadband User Services and PhyTx project stream, work progressed on the two study documents; one on Wi-Fi in-premises installation and diagnostics (SD-401) and the other on Wi-Fi in-premises performance testing (SD-398). The group will continue to inform the Wi-Fi Alliance, Wireless Broadband Alliance and IEEE 802.11 about this work as it progresses.

Heads in the Cloud (CO) for SDN and NFV Group

Cloud CO has been a major focus for the SDN and NFV Group since the Q1 meeting, taking up more than half of the work area's total meeting time and seeing lots of participation and contributions in Taipei. The importance and urgency for this work is the operator shift to all new services to be offered from a dynamic, cloud-based network infrastructure.

Work on Cloud CO is continuing steadily through the group's online consensus process, scheduling an interim face-to-face meeting for July 11–13, and the work area team is currently filling in the first specifications. The Taipei meeting also saw the group launch its second project, focusing on migration and co-existence in a Cloud CO context. In addition, the Work Area initiated three additional specification deliverables:

- Cloud CO Interfaces (deliverable #2 from PS NPIF)
- Migration to SDN-enabled Management and Control
- Test Cases for Cloud CO Applications

Also in progress are important planning exercises, which will coordinate Cloud CO's activities in the context of Open Broadband Laboratories where the development of the test cases deliverable will be essential for the Laboratories, for open source and closed source participants and verification of co-existence and migration with existing MSBN.

Work has also been completed on the initial SDN project (WT-358) that was launched by the work area two years ago. Since this was initiated, both the industry and the project itself have evolved, and as a result the group decided that the best course of action is to take the material from WT-358 and incorporate it into the wider Cloud CO work.

The virtual Business Gateway (vBG) project (WT-328) has now completed straw ballot and will be entering final ballot shortly after the Taipei meeting. Also, aligned with Cloud CO framework, vBG will be essential in enabling the next generation of agile business services.

Finally, Fixed Access Network Sharing (FANS) (WT-370) continued to progress through straw ballot common resolution and is anticipated to be completed in Q3, and progress was also made with the FANS interfaces document (WT-386).

It's all 5G for Wireline-Wireless Convergence Work Area

The Wireline-Wireless Convergence (WWC) Work Area addressed 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.

Building on the joint Broadband Forum workshop with 3GPP in February, WWC initiated two study documents – SD406 on network slicing and SD407 on 5G fixed mobile convergence. The project team considered many contributions on the subject in Taipei and made significant progress towards driving a common understanding of the common architecture and many of the issues to be addressed. This work will continue to be aggressively pursued with conference calls and online collaboration tools with a goal to aligning with 3GPP's 5G schedule.

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Documents approved include:

- ATP/IR-069 Issue 2 Corrigendum 1: TR-069 Conformance Test Plan and TR-069 Conformance Abstract Test Plan
  Editor: Marion Dillon, UNH-IOL
- TR-114 Issue 3 Amendment 1: VDSL2 Performance Test
  Editor: Aleksandra Kozarev, Intel
- TR-140 Amendment 3: TR-069 Data Model for Storage Service Enabled Devices
  Editor: Steve Nicolai, ARRIS
- TR-383 Corrigendum 1: Common YANG Modules for Access Networks
  Editors: Joey Boyd, ADTRAN and Ludwig Pauwels, Nokia
- TR-390 Performance Measurement from Customer Equipment to IP Edge
  Editor: Guiu Fabregas, Nokia

These documents will be published shortly. For a list of work in progress, click here. Please share this information with your colleagues, so they are aware of development.

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New Initiatives: Innovation Group, Gfast Council, Executive Advisory Council

Innovation Group leads the way with joint session

The Innovation Group initiated a Birds of a Feather (BoF) session on Multi-access Edge Computing alongside the ETSI ISG-MEC group. The first part of the BoF took place on Wednesday, May 3 and was attended by more than 70 people. The work of MEC Phase 1 was well received and MEC Phase 2 planning was reviewed. During the session, the Broadband Forum gave an overview of the CloudCO project, as well as the 5G Fixed Mobile Convergence project which received great interest. The second part of the BoF session will focus on use cases and field trials from operators and will be held on Wednesday, June 28 at 1pm CET.

A white paper on Traffic Management has been prepared and is now ready for straw ballot. This high-level educational paper will highlight current industry practices for ensuring that networks operate efficiently and offer quality of experience to end-users.

Finally, a conference call has been arranged for July to review the MEF's document on IP services' attributes with a view to create a white paper socializing different ubiquitous and performance-aware IP services.

Executive Advisory Council off to a 5G start

The Forum's first online meeting Executive Advisory Council held in May jumped straight into arguably the industry's hottest topic: 5G. As discussed above, one of the most commercially

and technically important areas is wireless-wireline convergence Work Area. The Forum anticipates playing a leading role in the impact of 5G in the Backhaul, Fronthaul and Access transport of the broadband network and is already receiving invaluable input from the Advisory Council membership.

Gfast Council: The Forum's most active group?

Gfast has the potential to create huge numbers of new connected communities by delivering gigabit broadband faster where it is impracticable to economically deliver fiber. The new Gfast Council has brought together many newly participating members to define and execute the marketing activities to raise awareness and grow the market. These includes Gfast technology, use cases, certification of member products and services. The several meetings each week cover all aspects with plans already in place for the Forum's most ambitious event presence at this years' Broadband World Forum in Berlin.

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Want to track new work and participate? Join 800+ members' already using Forum's new collaborative sites: Confluence, Jira and BitBucket. Not signed up? Click here

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Broadband Forum in the news

Plans to further utilize the content of the Q1 newsletter resulted in a round-up piece on Light Reading's UBB2020 website, leading the site to offer the Forum a regular blogging opportunity. The site also covered the launch of the NG-PON2 Council and hosted a video interview produced at FTTH Conference 2017, with additional comment from Vincent O'Byrne, while the launch of Open Broadband was covered by leading publications worldwide, including Telecom Asia and RCR Wireless.

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Events Calendar

2017 Broadband Forum Meetings

Keep the below dates free for this year's quarterly meetings.

Q3 Meeting: September 11 - 14, Helsinki, Finland
Q4 Meeting: December 4 - 7, New Orleans, LA, USA

Sponsoring a BBF meeting can be a great way to get some company recognition! If you are interested in sponsoring a meeting, then please *click here* for more information or contact Christine Corby at ccorby@broadband-forum.org.

Forthcoming Industry Events

- CommunicAsia: May 23-25, Singapore
- FiberConnect: June 12-14, Orlando
- Third Global 5G Event: May 24-25, Tokyo
- Ultra-fast Broadband Seminar: June 12-15, The Hague, Netherlands

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Contact information

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