broadband forum

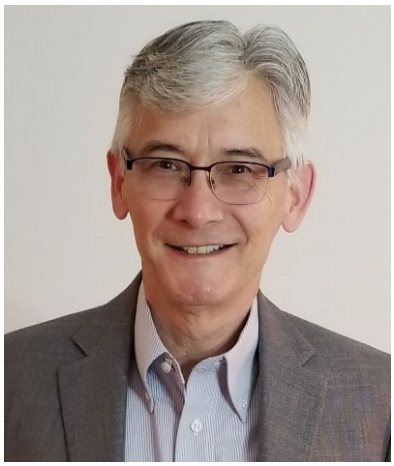
Shaping the Future of Broadband

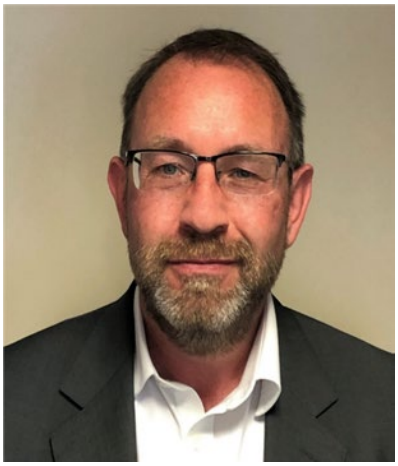
WELCOME TO THE **BROADBAND FORUM**

QUARTERLY NEWSLETTER

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

Leadership Team Update





Broadband Forum had a strong finish in 2021, with its highest number of members in more than a decade. 2022 has continued in this vein, with our virtual Q1 meeting being a massive success. At the meeting, many Technical Reports moved through the ballot stages and an unprecedented amount of work took place to deliver new marketing reports.

Last year we published a new Technical Report nearly every three weeks, in addition to holding 15 training workshops and recording more than 30 hours of industry education videos. Our Work Areas and project teams are maintaining this momentum in 2022, which is especially impressive considering we have been operating virtually for a full two years now. We have high hopes that this will change and that we'll move back to face-to-face meetings in Q3.

During our annual awards ceremony, we recognized a total of 11 individuals for their continued efforts in helping drive innovation and growth in the Broadband Forum and the industry. Congratulations to all our Circle of Excellence and Outstanding Contribution award recipients for all their hard work. Your participation and passion help keep Broadband Forum at the forefront of open standards development. We also recognized three leaders for their dedicated service to the Forum over the years.

We were also delighted to recognize John Blackford as a Distinguished Fellow for his contributions, leadership and innovation over almost two decades, and for the lasting impact he has made on the broadband community as a whole. Finally, Dave Allan was presented with Special Recognition due to his history of accomplishments and the profound impact he has made on the Broadband Forum, as a technical contributor and ambassador in addition to his leadership roles.

Congratulations to our new and re-elected board members and officers, and thank you to those board members who are standing down.

We are really excited about a new project approved around Software-based Architecture for the Smart Gateway and service delivery. This is a great example of work that was initially driven by our Service Provider Action Council (SPAC), and welcomed and agreed within our BUS work area. A new project stream is being created for this important work and we encourage all interested parties to get involved in this.

Our industry-renowned educational BASe series is also growing at record levels. The 2022 BASe program is already experiencing more sponsors than ever before and we are planning

more virtual events and thankfully 'in-person events' this year. 2022 will see BASe drive over 18 events through the year.

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The eagle has landed! Release 5 of OB-USP-Agent arrives

Vendors using the open-source reference implementation of Broadband Forum's connected home standard, User Services Platform (USP/TR-369), will benefit from easier integration and increased functionality thanks to the latest Open Broadband-USP-Agent (OB-USP-Agent) release from Broadband Forum.

The OB-USP-Agent project has published Release 5 (Eagle release) and has begun work on Release 6 (Falcon release). The Eagle release rounds out the support for USP Message Transfer Protocols (MTP) with the implementation of the WebSocket MTP. With the included WebSocket MTP feature, OB-USP-Agent now supports all the defined USP MTPs. MTPs specify how one USP Endpoint can establish a connection to another USP Endpoint and define a common language to enable the USP Endpoints to communicate with each other.

"OB-USP-Agent combines the latest open-source software with standards to increase the number of USP deployments and ensure interoperability in the connected home," said Broadband Forum Chairman and OB-USP-Agent Project Leader John Blackford. "Our latest release incorporates the final unimplemented USP Message Transfer Protocol and highlights the importance of our project work, bringing together collaboration from across the broadband industry. This continues to prove the quality of USP as it supports future standards development and ensures a greater level of device management."

The OB-USP-Agent project continues to grow and expand in user and vendor participation from those across the industry. With the open-source implementation of the USP standard, interested parties can understand USP and use it as a foundation for their own implementations.

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Broadband forum confers awards and accolades upon industry leaders

Broadband Forum has recognized and honored a number of key industry players with a host of awards at its annual Q1 Meeting this week. Members from AT&T, Axiros, CommScope, Ericsson, Juniper, Net Reply, Nokia, OutSys, PNSol and TIM were among those presented with accolades.

Broadband Forum awarded its Distinguished Fellow accolade to CommScope's John Blackford.

"I am grateful to be receiving this esteemed recognition from the Broadband Forum for all my contributions," said Blackford, who is a Product Management Director with CommScope's Home Networks business segment. "The work of the Broadband Forum is crucial for the development of open industry standards and an accelerated broadband ecosystem globally. I am proud to be an active participant, because the Broadband Forum continues to drive innovation and growth within the industry."

Dave Allan, of Ericsson, received the Special Recognition award due to his profound impact on not only technology and architecture, but the industry as a whole.

“One of the great pleasures of my career has been working with the Broadband Forum community. As a group we've managed to produce some industry impacting work and have always found ways to enjoy the journey wherever it took us,” Mr Allan said.

The Circle of Excellence award was presented to Greg Mirsky, of Ericsson, Rosaria Persico, of TIM, Richard Holme, of CommScope, and Peter Thompson, of Predictable Network Solutions (PNSol).

The Leadership award was given to three industry notables. Barbara Stark, of AT&T, served as a Work Area leader and Board Member, known for her distinguished work on the globally deployed TR-069 standard and USP. David Allan for more than two decades of leadership across multiple Work Areas, and George Dobrowski, a Distinguished Fellow award recipient in 2014, for his continued leadership in the Technical Committee and on the Board.

The Outstanding Contribution award was presented to; Al Morton, of AT&T; Antonio Marchetta, of Net Reply; Fabio Giudici, of Outsys; Ludwig Pauwels, of Nokia; Thales Fragoso, of Axiros; and Venkatesh Padebettu, of Juniper.

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vBASe and BASe series on track for an action packed 2022

With 145 guest speakers at more than 18 separate events, the vBASe and BASe series in 2021 was a resounding success, as the Forum welcomed a return to a number of selected physical events. We are thrilled to report that we hosted the largest number of BASe events in our history, with average registrations totaling more than 500!

This year, the Broadband Forum will continue to strike a balance between virtual and physical events. Over the course of 2022, we have planned 11 vBase events and seven face-to-face BASe events.

BASe sponsors are invited to participate in our thought leadership webinar series that include perspectives from service providers and technology leading vendors, solution providers and analysts. BASe 2022 will continue to be focused around three main broadband ecosystem elements: Connected Home, Fiber Access, and Network & Service Delivery.

We believe 2022 will be a year when physical conferences and industry events will return to meet the demand of the vendor, network and service provider community, and we are already seeing a return to this.

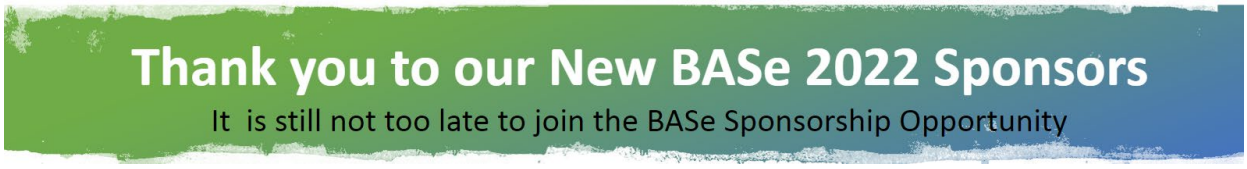
The BASe schedule of events for 2022 are focused around three key expectations:

1. Continued demand for webinars on selective technology hot topics and virtual events
2. A focused demand for national key market physical events
3. A reinvigorated demand for regional and global physical events.

Our calendar of planned events reflects this with a continuation of our phenomenally successful webinar series and virtual conferences. As well as the return of our own “in-person” physical events (including our own UFBB) we will continue to partner with external leading industry events. All of this while not increasing the cost of sponsorship in 2022 to our valued platinum and gold sponsors!

To find out more information on BASe Sponsorship, and to register your interest for BASe series 2022, visit here. If you want to catch up on the latest Broadband Forum webinars, download the respective recording and slide decks here.

Thank you to our New BASe 2022 sponsors!



Thank you to our Q1 Meeting sponsor DZS!

To start off our Q1 2022 open plenary, DZS Chief Marketing Officer Gunter Reiss gave a forward-thinking technical presentation on the rising momentum of driving broadband infrastructure to open standards, the mega-trends fueling bandwidth demand and a shared industry vision for enabling the transformation of service providers to experience providers.

DZS has been in alignment with many facets of Broadband Forum’s mission and efforts, as reflected in its contributions across several of the Forum’s activities and work areas. DZS technical experts have made contributions to groundbreaking Cloud Central Office (CloudCO) and Open Broadband – Broadband Access Abstraction (OB-BAA) demonstrations. As well as taking on major roles in several key work areas, including Fiber Access Networks, Wireless/Wireline Convergence, SDN & NFV and Broadband User Services.

Drumroll please! New Board Members and Officers elected for 2022

The following Directors were elected for their terms that will commence in 2022. Congratulations to all!

- Gregory Bathrick (Calix)
- John Blackford (CommScope)
- Bernd Hesse (DZS)
- Chen Li (AT&T)
- David Sinicrope (Ericsson)
- Mauro Tilocca (TIM)
- Frank Van der Putten (Nokia)

Congratulations to our returning Technical Committee Chair:

- Lincoln Lavoie (UNH-IOL)

Directors who were not up for election and will continue to serve for one more year are:

- Aleksandra Kozarev (MaxLinear)
- Hongyu Li (Huawei)
- Manuel Paul (DT)
- Mike Talbert (Verizon)

Our Elected Officers are:

- Chairman – John Blackford
- President – Mike Talbert
- Vice President – Aleksandra Kozarev
- Vice President – Manuel Paul
- Treasurer – Frank Van der Putten
- Secretary – Gregory Bathrick

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Work Area Updates

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 access to Broadband Forum tools and access your account using your company email address.

Great Start to 2022 for ATA Work Area

Target: The Access & Transport Architecture 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 and new architectures. These architectures are augmented to leverage new industry practices, while protecting the investment in broadband networks already deployed.

Outcomes:

- Access Architecture Project Stream - New work started on Public Wi-Fi user authentication and data local forwarding technical requirements.

- Mobile Transport & Routing Project Stream - WT-521 5G Transport Architecture and Requirements - completed Straw Ballot resolution.
- Mobile Transport & Routing Project Stream - WT-522 MMI - All comments addressed, wrapping up actions.
- Performance, Experience, Application Testing Project Stream - TR-471i2 released (December 2021).
- Performance, Experience, Application Testing Project Stream - WT-471i3 started.
- Start of ATA Marketing Group - See Join or Leave BBF Groups and Email Lists to subscribe. First call anticipated for 29 March 2022.

Progress:

- Q1-Q2 2022 conference calls start next week. Stay tuned for the ATA email list and calendar for the call details.
- Access Architecture Project Stream - Good progress on all DBNG projects (WT-459i2 and WT-487). Overflow continues starting Monday 14 Marth via interim calls.
- Access Architecture Project Stream - Subscriber Session Steering project has a YANG data modeling project (YMSSS) for the entities and relationships defined in WT-474. Good progress offline via BitBucket.
- Performance, Experience, Application Testing Project Stream - Work continues on Quality Attenuation (WT-452*) and performance measurement using STAMP (WT-390.2 Amendment 1).

For more information on ATA Work Area's ongoing work, visit: https://wiki.broadband-forum.org/display/BBF/Access+and+Transport+Architecture.

BUS adds features to its flagship standards and launches two new project streams

Target: Progress on standards that enable a containerized, app-enabled subscriber network and subscriber network devices for operators to quickly realize and deploy new revenue generating services.

Outcomes:

- WT-181 Device:2.16 and WT-369 are on track to be released by Q4 2022.
- The group opened two new project streams: the "Subscriber Network Infrastructure" Project Stream, working on WT-488, which defines architecture and best practices for the edge network, as well as continuing work on the popular TR-398 Wi-Fi performance metrics standard; and "Software, Hardware, and Applications" Project Stream, working on the new WT-492 standard, "Software Based Architecture for the Smart Gateway Design Principles".

The Broadband User Services Work Area had an amazing week progressing its 2022 goal to add features to its flagship standards (TR-181 Device Data Model and TR-369 USP) and build new architecture and best practice guidelines for the creation of a truly "app-enabled" subscriber network, paving the way for operators to quickly realize and deploy new revenue generating services and an efficient home distribution network that optimizes Wi-Fi and other in-premise connectivity technology. This includes improvements to well-developed features like Software Module Management (SMM), rapid progress on WT-488 ("Architecture and Requirements for Home Distribution Networks"), nearing completion on the next version of the popular WT-398

test metrics standard, and more.

The group also gathered with the Wireline Wireless Convergence (WWC) Work Area to develop 'Phase 3' of the device requirements and management objects for 5G fixed remote gateways, exploring the requirements and object modelling for voice connectivity and IP multimedia subsystems (IMS).

Take a look at the BUS Work Area's latest work: https://wiki.broadband-forum.org/display/BBF/Broadband+User+Services.

Common YANG publishes TR-383 Amendment 5, on track to publish TR-355 Amendment 4 in Q2 2022

- **Target:** Specify YANG modules that are applicable to multiple Work Areas, provide support to those same Work Areas for their specific YANG projects, and maintain YANG Best Current Practices, processes, procedures, and tools.
- **Progress:** Momentum for WT-383 continues with new contributions towards future amendments, enhancing hardware transceiver support and progressing OAM support to include ITU-T G.8052.1 YANG model extensions to IEEE 802.1 Qcx in the binding of these models to TR-383.
- **Outcomes:** The group will start a two-week review on all accepted pull requests and prepare for WT-355 Amendment 4 Straw Ballot out of an interim call.

The Common YANG Work Area continued to make good progress on its key project deliverables.

TR-383 Amendment 5 'Common YANG Modules for Access Networks' was published early March 2022. This new amendment adds software management, device aggregation, improved alarm handling for Ethernet Connectivity Fault Management (CFM) Operations, Administration, and Maintenance (OAM) and Access Node Control Protocol (ANCP) alarms. With these modules, service providers can efficiently manage a range of broadband services supported over any access technology, including VDSL, FAST and Passive Optical Networks (PON).

Work on Amendment 6 is progressing well, with several contributions accepted, covering enhancements of the hardware transceiver model and proposed bindings of the ITU-T G.8052.1 Ethernet OAM YANG model that further extends the IEEE 802.1 Qcx CFM model.

The group agreed to prepare WT-355 Amendment 4 'YANG Modules for Fiber-To-The-distribution-point (FTTdp) Management' for Straw Ballot. This new amendment adds support for the latest ITU-T Recommendations and provides a range of fixes and improvements.

A joint review was held with the FAN Work Area covering guidelines for the use of unit statement in YANG models. A list of guidelines will be created and captured as part of OD-360 'BBF YANG Best Current Practices', available at https://yang.broadband-forum.org/.

Finally, a joint review was held with the SDN/NFV Work Area covering Straw Ballot comments on the YANG models for North Bound Interfaces.

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

Key progress rounds off FAN-tastic quarter

Target: The Fiber Access Networks (FAN) Work Area specifies and maintains PON architecture and nodal requirements, PON abstraction and mobile backhaul requirements. It is also responsible for PON test suites related to ITU-T PON Conformance, and compliance Test Plans related to XGS-PON, NG-PON2 and PMD/TC Layer. Lastly, it is responsible for ITU and IEEE PON YANG data model specifications.

In Progress:

Unassigned Project Stream

In the last quarter, the Unassigned Project Stream continued with:

- Preparation of WT-280 Issue 2 ITU-T PON in the context of TR-178 for Final Ballot.
- Working Text development of WT-142 Issue 4 Framework for CPE WAN Management Protocol (CWMP) and USP enabled PON devices. Work is progressing well on aligning WT-142 Issue 4 with relevant technical specifications.
- Working Text development of WT-489 Issue 1 ONU Authentication and Selection of eOMCI or vOMCI. An initial baseline Working Text has been adopted.

PON Management Project Stream

- The PON Management Project Stream continues its WT-385 ITU-PON YANG Management Issue 2 Amendment 1 work. Various contributions, including the support of WT-489, the support of combo PON optical transceivers, and the alignment of unit statements, are currently under technical review.

Other Studies

- The impact of High Speed PON on existing Broadband Forum Technical Reports and Test Plans. This impact is currently under study and review.
- Multi-managed ONU definition and best practices to apply.

Outcome: WT-280 Issue 2 ITU-T PON in the context of TR-178 is in the Final Ballot approval phase, which will close on March 21.

For more on the FAN Work Area's ongoing work, please see: https://wiki.broadband-forum.org/display/BBF/Fiber+Access+Networks.

PHYtx Work Area completes technical review of WT-419 Issue 2 and DTP-337 Issue 4

Target: To help service providers deploy equipment that will provide a better Quality of Experience (QoE) for their end-users.

Progress: Completed the technical review of next issue of 'Fiber Access Extension over Existing Copper Infrastructure' (WT-419i2) and 'G.fast Certification Test Plan' (DTP-337i4). The Working Text of 'Reverse Power Feed Testing Issue 3' (WT-338i3) is ready for Straw Ballot.

Outcome: WT-419i2 and TP-337i4 are ready for Final Ballot.

The PHYtx Work Area made great progress during this quarterly meeting.

All comments made during the technical review of WT-419i2 have been resolved and it is ready for Final Ballot approval. This revision adds several deployment models for fiber extension:

- Use case for “Fiber extension by concatenating copper distribution networks (CDNs)-CuTTB”. This addresses the bonded Gfast backhaul use case.
- Use case “Point-to-Point data-grade twisted pair for HSIA in MDU”.
- Use case “Point-to-Point telco-grade twisted pair for HSIA in MDU”.
  These two use cases are addressing G.hn Access in Multi-Dwelling Unit environments for living units where crosstalk between lines may exist.

These additional use cases give operators more choice to roll out high bitrate services quickly, without the need to bring fiber into the home.

The technical review of DTP-337i4 was also completed. This issue of the G.fast Certification Test Plan brings the verification of:

- The 'HLOG Accuracy’ test parameter.
- The ‘Robust Management Channel (RMC) tone masking configuration'.
- The operation of the ‘G.fast Robust Management Channel Recovery (RMCR)’.
- The correct reporting of the used G.fast profile.
- Coverage of the 106b profile.

This document is now ready for Final Ballot approval.

WT-488, which addresses the heterogeneous home network infrastructure for delivering multi-gigabit services to end-users has been transferred to a new Project Stream ‘Subscriber Network Infrastructure’ managed by the BUS Work Area. This document provides insights into typical use cases and services delivered over a mixture of in-home broadband and narrowband connection technologies.

WT-338i3 addresses the reverse power feeding over coaxial cable deployments, according to ETSI TS101 548-2. By adding the performance requirements, the document is now ready for Straw Ballot review, starting Monday, 9 May and closing 6 June 2022.

The Plugfest to obtain the WT-476 ‘G.hn Access Performance Test Plan’ pass/ fail metrics has been moved out to the second quarter of this year. The goal is to align with the Beta-test of the GHNA Certification Program from the HomeGrid Forum (HGF).

For further insight into the current work of the Physical Layer Transmission Work Area, visit: https://wiki.broadband-forum.org/display/BBF/Physical+Layer+Transmission.

MD-451 and MD-477 close to finalization for SDN/NFV Work Area

- **Target:** Define the Cloud Central Office (CloudCO) architecture using SDN, NFV, and cloud technologies to support network functions fundamentally redefining the architecture of access and aggregation networks and support the migration of SDN and NFV into all aspects of broadband networks facilitating the agile deployment of new distributed broadband services and applications for operators with greater operational efficiency and lower cost.

- **Progress:** The SDN/NFV Work Area continues to progress the Cloud-based-Central Office (CloudCO) project for virtualized network functions, SDN management and control and CloudCO domain orchestration capabilities in Broadband Network. The main activities currently ongoing are related to the disaggregation of the access node and to define the related interfaces. The "Cloud Component" Project Stream is continuing work on vOMCI, Metro Compute Networking and Automated Intelligence Management.
- **Outcomes:**

The SDN/NFV Work Area continued to progress work on:

- Marketing documents on a number of SDN-NFV projects: 'Automated Intelligent Management' (MD-436) and 'Metro Compute Networking' (MD-466) continued, with 'ONU Management using Virtualized OMCI' (MD-451) and 'CloudCO Enhancement – Access Node Hardware Disaggregation' (MD-477) close to finalization and approved to move to Straw Ballot.
- 'vOMCI for New Access Nodes' WT-451 Issue 1 was sent to the Common YANG Work Area for additional review before Final Ballot approval.

Phase 2 of 'Metro Compute Networking Architecture and Functional Modules' has been defined and the work has begun. Work on 'Metro Compute Networking Architecture, Functional Modules and Interface Definitions' (WT-491) is follow-on work to TR-466 that defines the reference architecture for metro compute networking that includes specification of the functional modules and nodal requirements related to this architecture consistent with TR-466, TR-384 and TR-178.

Work on 'CloudCO Enhancement - Access Node Hardware Disaggregation' (WT-477) completed the inputs on definitions, abbreviations and ONU management and started the Straw Ballot process. This project is now in sync with WT-413 Issue 2, WT-451 and WT-484 and Common YANG for completion in 2022. WT-484 is expected to go to Straw Ballot before the Q2 Meeting.

On the Artificial Intelligence and automation fronts, work continues on WT-486, which specifies the interfaces for the Automated Intelligent Management Framework specification TR-436 previously approved. While this is a different Project Stream within the SDN/NFV Work Area, network automation and low-maintenance operations are imperative for simplifying network validation and engineering, streamlining network deployment and upgrades, and improving operations with less error-prone and automated OAM in the CloudCO environment. This will also automate some management functions and help realize rapid troubleshooting and pre-emptive maintenance.

The group has reviewed the model of 'Fixed Access Network Sharing – Access Network Sharing Interfaces' (WT-386i2) and will continue its work based on this. The next steps are to proceed with the YANG Data Model structure definition.

A new NPIF on 'SD-WAN architecture and node requirements' has been approved. The following work on SD-WAN will be carried out after the Q1 Meeting. The group is also discussing a Plugfest for the vOMCI work to be hosted later this year.

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

WWC publishes Phase 2 specifications

- **Target**: Address the needs of operators, which have wireline or mobile networks deployed so they can leverage their assets with combined subscriber offerings with a converged core.
- **Progress**: The WWC Work Area has now finalized a number of specifications (TR-456 Issue 2, TR-470 Issue 2, and TR-124 Issue 7) to complete the second phase of specification development. With this work, the group has subsumed more of the capabilities of the 5G architecture.
- **Outcomes**: A set of new capabilities and enhancements have been published in Q1. Further specifications are in progress for subsequent publication.

Work in the WWC Work Area has transitioned from completing the basic set of specifications to focusing on topics that bring more value to 5G for wireline and provide operators with increased flexibility, revenue potential and deployment options. The goal is to increase the service capabilities of the network to allow operators to fully leverage convergence of their networks while at the same time giving them more paths to transition their networks to a single 5G Core.

The group continues to incorporate capabilities from the 5G Toolkit into our specifications to realize a variety of use cases. These range across a broad spectrum and include topics such as hybrid access, enhanced work from home, access sharing scenarios and convergence of voice with the mobile system. This work will allow converged operators to provide a uniform experience to their customers irrespective of the access or appliance they are using, supported by a common and streamlined back office and control plane.

The second phase of work provided updates to TR-456 Issue 2 (Access Gateway Function Functional Requirements), TR-470 Issue 2 (5G Wireless Wireline Convergence Architecture) and TR-124 Issue 7 (Functional Requirements for Broadband Residential Gateway Devices). The capabilities introduced included multi-session and multi-access support for existing Residential Gateways and 5G-Residential Gateways. Operators now have hybrid-access with the functionality of ATSSS (Access Traffic Steering, Switching, Splitting) that supports multiple traffic distribution mechanisms and policies.

The group is now progressing two more specifications, WT-457 (FMIF Functional Requirements) and WT-458 (CUPS for WWC), both of which expand the deployment options for 5G WWC. Another key piece of work is looking to converge legacy voice services onto the 5G system. The group has established a new Project Stream addressing 5G-RG IMS Voice support, starting with work on the architecture and a profile for residential voice.

The group continues to expose the industry to the latest WWC work and supports the ongoing education and marketing activities, including the continued development of its webinar series. There will be a chance to hear about the Quality of Experience in the converged network at the upcoming webinar on March 17.

Broadband Forum is taking an important role in developing 5G, continuing the productive cooperation with 3GPP, and making recommendations for the connection points between the fixed and 5G mobile core networks in order to drive core convergence.

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

OB-BAA – Ongoing collaboration between Open Source and Open Standards continues to advance and accelerate the adoption of interoperable, standardized solutions across the industry

The Open Broadband – Broadband Access Abstraction (OB-BAA) project team is continuing the development of its Essex Skipper 5.0 release that includes work on cloud-based authentication of Optical Network Units (ONUs). This encompasses the ability to automatically discover and maintain virtualized network functions used by the BAA layer by interfacing with the environments that host the virtualized functions, and enhancements to its virtual ONU Management Control Interface (vOMCI) solution. The results of the work that defined these functions has been contributed back into the Broadband Forum as part of its Fiber Access Network (FAN) Work Area and cloud-based specifications. These specifications include Authentication of an ONU (WT-489), Access Network Abstraction, Softwarization and Disaggregation (WT-484), and Common YANG Modules for Access Networks (WT-383).

Additionally, the project team has started work on defining a set of YANG modules that effectively abstracts the connectivity requirements for User Plane Functions. This allows northbound management and control entities to configure, control, and maintain an access node's User Plane without needing to understand the specific access technology (e.g., G-PON, XGS-PON, G.fast).

For more information about the OB-BAA project's latest work, see: https://wiki.broadband-forum.org/display/OBBAA/Open+Broadband-Broadband+Access+Abstraction+Project+Home.

OB-MAP and prpl Foundation continue promising collaboration

The Open Broadband – Multi Access Point (OB-MAP) project and the prpl Foundation's prplMesh project have completed a baseline vision of how data and control commands will be represented in TR-181. This will influence the design of the APIs presented by prplMesh. The data model (and prplMesh APIs) will meet the diagnostics and management needs of service providers that use multiple physical layer networking technologies to deliver ever-increasing broadband bandwidth and innovative services through increasingly complex home networks to end-user devices.

The OB-MAP project team has continued to collaborate with prpl team on requirements and feature prioritization, and data modelling of multiple devices and services in a mesh network. Progress has also been made on prplMesh's Northbound API (NAPI), and the group has been assisting with the use and definition of Broadband Forum's USP internal Messaging Transport Protocol (iMTP) in the context of prplOS.

For more on the OB-MAP project's ongoing work, please see: https://wiki.broadband-forum.org/display/OBMAP/OBMAP+Home.

OB-USP-Agent… the Eagle has landed

Current Efforts: The OB-USP-Agent team wrapped up the last parts of the Eagle release (Release 5) and made it available on GitHub towards the end of last year. The Eagle Release was focused on the implementation of the WebSocket Message Transfer Protocol (MTP) as defined in the USP specification, and it

contained several other small improvements and bug fixes. MTPs specify how one USP Endpoint can establish a connection to another USP Endpoint and define a common language to enable the USP Endpoints to communicate with each other. The OB-USP-Agent team has continued to address several community identified defects by quickly resolving the issues and pushing them to the main code branch in GitHub. These additional fixes will be rolled up into the next formal release: the Falcon release (Release 6), which is focused on delivering initial support for the End-to-End Session Security mechanism as well as some of the features from version 1.2 of USP.

Future Plans: The team is focused on implementing the features and enhancements assigned to the Falcon release and then moving towards fulfilling the updated Roadmap.

For more on the OB-USP-Agent project's ongoing work, please see: https://wiki.broadband-forum.org/display/OBUSPA/OB-USP-Agent+Home.

Seventh release from the OB-UDPST project team adds Server Capacity management and more.

Current Progress: The OB-UDP Speed Test (OB-UDPST) project team delivered its seventh public release (7.4.0) on-time on February 24, 2022. The Server can set a Capacity limit for mission-control, where the Client would supply a maximum Capacity for its specific access test to help the Server manage tests within its limit (stemming from link rate or other limitations). Knowledge of the maximum test load from a Client allows the Server to reject a new test if a Client request exceeds the Server's maximum Capacity. This way, a Server can allocate appropriate resources to low Capacity tests, while successfully conducting tests at the highest Capacity (e.g., 10Gbps) when needed. This release also offers backward compatibility: Servers can test with Clients using either protocol version 8 or version 9 (in 7.4.0).

Another enhancement in this release is the additional ability to randomize UDP payload generation. Performance tests suggest very limited compressibility when this option is selected. This is a key feature when testing Access services that compress user traffic, such as satellite links. There is a new optional Start rate for the load-adjustment algorithm (the fixed sending-rate option remains). Expanded protocol error messages cover all the new features. Extensive testing revealed several small bugs, mostly connected with testing at very low rates, and they were fixed in this release.

Future Plans: Next steps include a new/optional Load Adjustment Algorithm for challenging circumstances, such as persistent competing traffic and non-congestion-related Loss. This is the main goal of the next release, 7.5.0, coming soon.

Now that the Internet Engineering Task Force (IETF) has published RFC 9097: 'Metrics and Methods for One-way IP Capacity', the IP Performance Metrics Working Group has adopted the OB-UDPST protocol specification. Development in OB-UDPST will follow the IETF IP Performance Measurement (IPPM) development and comments closely.

For more information on the OB-UDPST project team's ongoing progress, please visit: https://wiki.broadband-forum.org/display/OBUDPST/OB+UDP+Speed+Test+Home.

OB-5WWC project carries momentum into Q1

Open Broadband-5WWC (OB-5WWC) is an Open Source project focused on bringing the full benefits of the 5G ecosystem to fixed-line services and offering a full end-to-end solution to operators. The aim is to create a reference implementation of the Broadband Forum specified Wireless Wireline Convergence solution for 5G capable Residential Gateways (5G-RGs). There are already key Broadband Forum and 3GPP specifications available to help fulfill the need for 5G and fixed-line convergence, and a 5G-RG reference implementation will be of great benefit to operators, providing shorter time-to-market for products and reduced development times and cycles.

OB-5WWC also seeks to provide a production grade 5G solution stack capable of integration with OpenWRT/RDK-B frameworks and to provide a reference for testing Access Gateway Function (AGF) and RG test tool development.

Current Progress: A number of achievements have been made this quarter, including work beginning on high-level architecture with key components and their roles identified. This includes developments on Control Plane Transport and the Wireshark enhancements for the specifications from the Broadband Forum. Wireshark is the industry-standard tool that is continually used by implementers.

The 5G negotiation and establishment of VSNP has been completed, the fragmentation and reliability as per TR-456 Issue 2 is being tested and development of next step communication with WWC controller daemon continues.

Next steps: The next steps include the establishment and agreement of the solution architecture and tackling the early challenges that need to be addressed. This includes the solution design of the Control and User Plane transport including the Stubbed AGF test tool, and 5G Wireless Wireline Convergence User Plane Encapsulation (5WE), and the 5G controller providing registration and session management.

With strong support from the service provider community, the project team continues to reach out to candidates to broaden the project membership including hardware and software vendors. The project remains open to and interested in bringing additional companies on board.

For any interested parties (including non-Broadband Forum members) that wish to be part of the project, please sign the project participation agreement online here.

For more on the OB-5WWC project's current work, please see: https://wiki.broadband-forum.org/display/OB5WWC/OB-5WWC+Home.

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broadband forum member company

There were 282 Registered Attendees at the Q1 Meeting, with more than 32 first-time attendees welcomed. Our new and upgraded members included Compal Broadband Networks, Consult Red, CyberTAN, Open Networking Foundation, PVentures, Tejas Networks and UfiSpace.

Guest companies at the meeting were CCI Systems , Ciminko , CityFibre , Etisalat , NetCologne, and Telekom Malaysia. Our auditing members consisted of Compal Broadband, Humax Networks and Zyxel Communications.

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.

We have a range of membership options for companies of all sizes, from startup companies to large corporations and not-for-profit organizations. Our new Regional Operator Membership category has further opened participation, take a look for further details of the access level privileges, benefits and requirements.

To learn more about the benefits of membership, watch the video interview with Rhonda Heier, Director of Membership Development, as Rhonda discusses the value of the Broadband Forum membership here or email rheier@broadband-forum.org for more information.

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Wi-Fi 6 management, certification and multi-vendor interoperability were all topics for discussion in Q1

We kicked off the new year with a blog exploring the newest generation of WiFi technology to enter living rooms, offices, and more. **Donovan C.E Smith MSc. CEng. MIET, C|EH, C|NDA, ECSA, Telecoms Engineering Consultant at Fine Point Technologies Inc.** asked whether **Wi-Fi 6 and mesh management is a service provider necessity?** Smith concluded that by monitoring the KPIs of high data rates and quality connectivity in a typical Wi-Fi environment and using automation to manage and optimize for the customer's changing requirements, operators can deliver on their QoE promises and keep their clients happy.

Franck-Nicolas Sellier, CEO at MT2, and Thierry Doligez, Director at LANPARK teamed up to tell service providers using Passive Optical Networks (PON) technology that their **interoperability woes could be cured by the right certification programme**. Readers of the Broadband Forum blog series were told about the Physical Layer Transmission Work Area's latest updates, by providing multi-vendor interoperability, and ensuring that new services and technologies are introduced quickly, reliably and effectively through to Gfast deployments. **Read Work Area Director Herman Verbueken's blog here.**

Wrapping up Q1 was a blog from David Woolley – Network Engineering and Planning Senior Lead at Telstra and Project Leader for OB-5WWC at Broadband Forum and Manuel Paul – Senior Expert Technology and Innovation at Deutsche Telekom AG, and Vice President, Project Leader for OB-5WWC at Broadband Forum on **why Residential Gateways are essential for Wireless Wireline Convergence.**

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Broadband Forum in the news

'Here Today, PON Tomorrow' was the message from **Ken Ko in ISE Magazine** as he asked what, as traffic growth continues to grow at exponential levels, can we expect to see in terms of the technologies and developments that will meet this need? And how will access networks evolve to meet ever-changing requirements? The answer can be found in the magazine's March issue here.

In its **annual Yearbook, Fibre Systems** called upon the expertise of **Craig Thomas** to share his thoughts on regulations and standards and why they're key to building the networks of tomorrow. A key takeaway from Thomas was that the increased growth and demand of Fiber-

To-The-Home deployments and the roll out of next generation 10G technology such as XGS-PON and NG-PON 2 is being reflected in the behaviour of operators. One metric by which the change can be measured is the exceptional growth in XGS-PON interoperability certification, with more vendors seeking accreditation.

Events Calendar

Broadband Forum Meetings and BASe Events

Q2 2022

- April 13-14, 2022, China Cloud Network Conference 2022, Beijing
- April 21, 2022, Fiber Access State of Play vBASe series, Virtual
- May 5, 2022, Network Services and Delivery – 5G, Virtual
- May 17-19, 2022, State of Broadband Virtual Summit, Virtual
- May 23-25, 2022, FTTH Conference, Vienna
- June 12, 2022, Fiber Broadband Association Workshops
- June 13, 2022, BREKO Workshops
- June 13-16, 2022, Broadband Forum Q2 Meeting, Virtual
- June 28, 2022, Fiber Access State of Play vBASe series, Virtual

Q3 2022

- July 14, 2022, Connected User State of Play vBASe series, Virtual
- August 9-10, 2022, vBASe Asia, Virtual
- September 7-8, 2022, UFBB
- September 13-16, 2022, Broadband Forum Q3 Meeting, Location TBD
- September, 2022, Managed the Customer Service Experience/Connected User vBASe, Virtual

Q4 2022

- October 6, 2022, Network and Service Delivery State of Play vBASe series, Virtual
- October 18-20, 2022, BBWF
- November 3, 2022, Connected User State of Play vBASe series, Virtual
- December 5-8, 2022, Broadband Forum Q4 Meeting, Location TBD
- December 13, 2022, Broadband Access State of Play vBASe series, Virtual

To register for our latest events, visit: https://www.broadband-forum.org/meetings-and-events.

Sponsorship opportunities are available for Broadband Forum's 2021 quarterly meetings and BASe events. Sponsoring Broadband Forum events 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.

Contact information

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