

A Word from our Leadership Team

As we conclude another successful year, we celebrate yet another productive virtual meeting. Our quarterly meetings remain vital for bringing together the shining lights of our industry. As always, we were delighted to welcome new members and first-time attendees into the fold here at Q4. In many ways 2021 has been a record-breaking year for The Forum, and thanks to Rhonda and team and the support of so many members we finish 2021 with our highest total membership in over a decade!

It is great to look across all of the incredible work that has taken place over the last quarter. Behind the scenes there are valuable contributions leading to a large number of specifications going to Straw Ballot and Final Ballot resolution, culminating in new standards being published and approved. Due to all this great work, Q1 2022 is going to be a very busy time for new Broadband Forum publications!

Pivotal work progressed in all our work areas and Open Broadband projects. Some noteworthy highlights included WT-474 on Subscriber Session Steering that was showcased at Broadband World Forum, WT-476 'G.hn Access Performance Test Plan' passing the first technical review cycle of the testing procedures, and the latest amendment to TR-383 'Common YANG Modules for Access Networks' from the Common YANG team. The work doesn't stop with New Project Initiation Forms welcomed during this quarterly meeting.

We thank our members for their continued support and efforts - despite the worldwide restrictions - who remain resolute in their commitment in driving our important work forward. Congratulations to our new Work Area Directors, and now we turn to upcoming elections for our Technical Committee Chair, and for six seats on our Board of Directors who will serve two-year terms starting in March.

As we approach 2022, it is great to look back and celebrate the major success of our vBAsE and BAsE series of events. They involved more than 90 speakers across 24 events and continued to educate and inform all players in the broadband sphere. There are plenty of sponsorship opportunities available if you want to play your part and get involved next year.

And we would like to take this opportunity to pay homage to two long-standing members of the Broadband Forum family who will be retiring from their BBF roles. Barbara Stark, and George Dobrowski, have played pivotal roles within several of our work areas over many years and have worked tirelessly to help shape the future of broadband. You will be sorely missed, and all of us wish you the very best.



We look forward to striking the right balance of virtual and face-to-face events next year and as we bid farewell to 2021, here's to an exciting 2022!



Network automation interoperability across industry improved with YANG release

The automation of the control and configuration of access network elements – crucial in making service providers' operations more efficient and cost-effective – has been improved in the latest YANG data model release from Broadband Forum.

[Amendment 4 of TR-383, 'Common YANG Modules for Access Networks'](#) builds upon the existing feature-rich set of YANG data models, introducing improvements to Quality of Service (QoS) that address large scale deployments as well as providing statistics for debugging services.

“With demand for network capacity, particularly fiber deployments, growing consistently, operators are constantly looking for ways to make their operations more efficient and more cost-effective. Automating the configuration and control of network elements is one way of doing this but as a growing concept, ensuring interoperability has been and continues to be a key concern,” said Vice President, Strategic Marketing and Business Development at Broadband Forum, Craig Thomas.

“This work addresses the challenge by ensuring interoperability between network components of different vendors to allow effective automation, defining YANG data models for functionality which is common across access network elements supporting various physical layer technologies.”

Read the full press release [here](#).



vBASEe and BASEe series set for action packed 2022

With more than 90 speakers at 24 separate events, the vBASEe and BASEe series has been a resounding success as the Forum welcomed a return to physical events this year. The Broadband Forum will continue to strike a balance between virtual and physical events for 2022. Currently planned are a minimum of nine vBase webinars and the multi-day vBASEe Broadband Summit, two face-to-face BASEe owned events and BASEe also at five leading industry events too.

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.

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 return to national key market physical events
3. A focused 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 guest speaker Ofcom!



Ofcom delivered a presentation during the Q4 Opening Plenary discussing the importance and impact of technology and improvements in user experience across sectors that it regulates. Ofcom has joined the Broadband Forum and wishes to understand the evolution and impacts of wireless and wireline convergence as well as wanting to share insights on the impact of global standards on local regulation.

Ofcom will be able to provide technology and innovation policy advice, as well as supporting the introduction and adoption of new technologies. This will help track and determine the impact of changes to technical architecture of networks encompassing hardware, software, standards and enablers to meet future requirements. This will help improve its knowledge and awareness of emerging technologies and understand the potential impact they will have on the sectors it regulates.

Roll up, roll up! New Work Area Directors appointed for 2022

The following Work Area Director appointments have been completed for their two-year terms that will commence in 2022. Congratulations to all!

- Joey Boyd, Common YANG
- Sven Ooghe, Common YANG
- Evan Sun, PHYtx
- Herman Verbueken, PHYtx
- Bruno Cornaglia, SDN and NFV
- Mengmeng Li, SDN and NFV
- Christele Bouchat, WWC
- Manuel Paul, WWC

The Board of Directors nominations are now also open, with six available seats to be filled for the two-year terms. The nominations are due by January 24th, with election voting opening on January 31st. To learn more or become a candidate, visit: <https://wiki.broadband-forum.org/display/BBF/2022+Board+of+Directors+Election>.

The Technical Committee Chair election is underway to fill the available seat with nominations due by January 24th, with election voting opening on January 31st. For further information, please see: <https://wiki.broadband-forum.org/display/BBF/2022+Technical+Committee+Chair+Election>.

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.

ATA - Wrapping Up Work and Preparing for 2022



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 - TR-459.2 CGN for DBNG - Released!
- Access Architecture Project Stream - Start to Subscriber Session Steering data modeling
- Mobile Transport & Routing Project Stream - WT-521 5G Transport Architecture and Requirements - Is completing Straw Ballot resolution
- Performance, Experience, Application Testing Project Stream - The Project Stream (PS) decided to start a new marketing group in early 2022
- Performance, Experience, Application Testing Project Stream - WT-471i2 was agreed to send to Final Ballot

Progress: Overall, the ATA Q4 meeting contribution was good, in particular for the Access Architecture PS which will run overflow sessions starting the week following the meeting. Highlights from the meeting and the Autumn conference calls are below.

Access Architecture (AA) Project Stream

- TR-459.2 CGN for DBNG completed Final Ballot and was released. A big thanks to Ken Wan, Nokia who was Editor for the document.
- Subscriber Session Steering (SSS) - AA PS participants put together a demonstrator for Subscriber Session Steering (WT-474) for Broadband World Forum (BBWF) in October. The demonstration was a big success with substantial interest at BBWF.

Mobile Transport & Routing (MT&R) Project Stream

- WT-521 5G Transport Architecture and Requirements - Continues Straw Ballot resolution with more contributions anticipated.
- WT-522 MMI continues development with contributions encouraged for the remaining document sections.

Performance, Experience, Application Testing (PEAT) Project Stream

- MR-452.2: Use of DeltaQ to Manage Customer SLA - Released! Big thanks to Editor Jonathan Newton, Vodafone.
- PEAT discussed the scope and structure of WT-452.2 relative to protocol specific specifications such as TR-390. The group concluded that protocol extension and profiling for QED should be directed to TR-390 and amendments to TR-390 while general protocol requirements, use and method of protocols for QED should be directed to WT-452.2.
- Participants working on QED made a joint submission to the IAB Workshop on "Measuring Network Quality for End-Users, 2021".

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

BUS to publish next versions of its suite of standards in early 2022



Goal: Bring the next generation of managed services to operators using USP/TR-181.

Progress: Next versions of Device:2.15 (TR-181), USP (TR-369), and the BBF.369 Certification for USP (TP-469) to be published at the beginning of 2022.

The Broadband User Services (BUS) Work Area has completed the final steps towards publishing the next versions of its suite of standards for managed services, including the ever-present need for Wi-Fi optimization and management. Version Device:2.15 of the TR-181 data model, USP version 1.2, and the associated Conformance Test Plan (TP-469) are ready to be published in the early weeks of 2022. This improves on the already widely popular USP protocol based on feedback from industry deployments and adds new elements for management for TR-181, including improvements to whole-home Wi-Fi management, DOCSIS interfaces, IP capacity measurement capabilities, and more.

Additionally, the group has been working closely with the Wireless-Wireline Convergence (WWC) Work Area to update the requirements defined in TR-124 for 5G Fixed Residential Gateways. As the need to address broadband subscribers in new ways grows, this work helps unify two different worlds of network access to promote interoperability, coverage, and redundancy for subscribers.

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

Common YANG on track to publish TR-383 Amendment 5 in Q1 2022



- **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:** WT-383 Amendment 5 'Common YANG Modules for Access Networks' Straw Ballot comment resolution is progressing well and remains on track to move to Final Ballot in Q1 2022. Beyond Amendment 5, additional updates have been agreed in principle, covering Dynamic Host Configuration Protocol (DHCP) relay agent and Color-aware policing YANG model improvements.
- **Outcomes:** The group will start a two-week review on all accepted pull requests. WT-383 Amendment 5 Straw Ballot comment resolution will continue on interim calls.

The Common YANG Work Area had a very productive week with good discussions among YANG experts from both the vendor and operator community.

WT-383 Amendment 5 'Common YANG Modules for Access Networks' Straw Ballot comment resolution is progressing well and remains on track to move to Final Ballot in Q1 2022. This new amendment will add 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).

Beyond Amendment 5, additional updates have been agreed in principle, covering DHCP relay agent and color-aware policing YANG model improvements. The group will also work to further harmonize and improve the unit statement descriptions used within the different YANG modules defined across Common YANG and other Work Areas.

A joint review was held with the SDN/NFV and FAN Work Areas covering Straw Ballot comments on the virtual OMCI YANG model. Common YANG is also anticipating further contributions on Amendment 4 of the YANG Modules for Fiber-To-The-distribution-point (FTTdp) Management (WT-355).

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

FAN Work Area closes year with strong Q4



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, NGPON2 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 Straw Ballot. Straw Ballot resolution was completed during the Q4 virtual meeting.
- The kick off meeting was held to update the WT-142 Issue 4 Framework for CPE WAN Management Protocol (CWMP) and USP enabled PON devices. Thank you Samuel Chen for stepping up as editor.
- Work began on WT-489 Issue 1 Authentication of an Optical Network Unit (ONU) and selection of embedded OMCI (eOMCI) or virtualized OMCI (vOMCI) development. This Working Text is an effort towards specifying requirements around embedded or virtual OMCI enabled devices. Thank you Robert Peschi for stepping up as editor.

PON Management Project Stream

- The PON Management Project Stream continues WT-385 ITU-PON YANG Management Issue 2 Amendment 1 work. This project resumed discussions around the use of shared schema mount during the virtual meeting and will continue discussions during the Q1 2022 interim period.

Interop Project Stream

- The Interop Project Stream continues DTP-247 Issue 4 Corrigendum 1: G-PON, XG-PON and XGS-PON ONU Conformance Test Plan.

Other Studies

- FAN is presently discussing TR-309 PON TC Layer Interoperability field test issues and discussing how to resolve them through its active discussion Wiki pages.
- FAN has agreed to discuss the impacts of High Speed PON on existing Broadband Forum Technical Reports and Test Plans. This work will be done through the Wiki and future teleconference calls for those interested in participating.

Outcome: The Unassigned Project Stream is finalizing WT-280 Issue 2 ITU-T PON in the context of TR-178 and is targeting Final Ballot resolution in Q1 2022.

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 starts technical review of WT-419 Issue 2 Fiber Access Extension over Existing Copper Infrastructure



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

Progress: The next issue of 'Fiber Access Extension over Existing Copper Infrastructure' (WT-419i2) was prepared for Straw Ballot review. The 'Gfast Certification Test Plan' (DTP-

337i4) is now all but one conference call away from being sent to Straw Ballot.

The Working Texts of 'Reverse Power Feed Testing Issue 3' (WT-338i3) and 'Architecture and Requirements for Home Distribution Networks' (WT-488) were further developed.

Outcome: WT-419i2 sent to Straw Ballot.

The PHYtx Work Area continued developing various Working Texts during this quarterly meeting. WT-419i2 is now ready for technical review (Straw Ballot). The revision adds several deployment models for fiber extension addressing the bonded G.fast backhaul use case and two MDU G.hn access use cases. This gives operators more choices to roll out high bitrate services quickly.

WT-337i4 has almost finalized the test procedures and is planning to go to Straw Ballot following a conference call. New features are the verification of 'HLOG Accuracy' and operation of 'Recovery of the Gfast Management Channel' (RMCR). WT-488 addresses the heterogeneous home network infrastructure for delivering multi-gigabit services to end-users. It provides insights into typical use cases and services delivered over a mixture of in-home broadband and narrowband connection technologies.

During this meeting, the group started to work on the mapping of two use cases to the reference architecture of the Home Distribution Network:

- Direct connectivity of the end-user devices to the Residential Gateway
- Improved connectivity to Residential Gateway, where the end-user devices are connected over a Repeater/Extender Device to the Residential Gateway

Another discussion point is related to the management and operational aspects of a Home Distribution Network. Contributions on both topics are encouraged. WT-338i3 addresses the reverse power feeding over coaxial cable deployments, according to ETSI TS101 548-2. The first draft has been created, with the goal to start Straw Ballot review in the first quarter next year.

WT-476 'G.hn Access Performance Test Plan' has passed the first technical review cycle of the testing procedures. A measurement campaign will be organized at the University of New Hampshire in January 2022 (exact dates to be announced) to create a result set that will be used to determine G.hn access performance requirements. This plugfest is open to both the Broadband Forum and HomeGrid Forum memberships. If you are not able to participate, you can still submit measurements on setups complying to WT-476 requirements. In that case you must notify [Lincoln Lavoie \(lylavoie@iol.unh.edu\)](mailto:lylavoie@iol.unh.edu) prior to event to be included in the result set.

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>.

SDN/NFV continues progress on a host of Project Streams



- **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:

- ‘Metro Compute Networking: Use Cases and High Level Requirements’ (TR-466) has been published.
- ‘vOMCI for New Access Nodes’ (WT-451) with the Straw Ballot completed and activity shifted to Straw Ballot for the YANG Data Model, with the goal to publish Issue 1 before the Q1 2022 meeting.

Phase 2 of ‘Metro Compute Networking Architecture and Functional Modules’ has begun by defining the purpose and scope. 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) is almost complete with inputs on definitions, abbreviations and ONU management. Discussion on YANG Data Model structure has also started. A complete revision of the text has also been done by the editor as it is prepared for the Straw Ballot process. This project is now in sync with WT-413, WT-451 and WT-484 and Common YANG for completion in 2022.

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 first proposal to review ‘Fixed Access Network Sharing – Access Network Sharing Interfaces’ (WT-386i2) has been agreed. The next steps are to proceed with the document

revision and with the YANG Data Model structure definition. A new NPIF on 'SD-WAN architecture and node requirements' has also been proposed. Discussions have started but some aspects still need to be further analyzed before it can be approved.

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

WWC to publish a set of new capabilities in the new year



- **Target:** Address the needs of operators, which have wireline or mobile networks deployed and are in a position to leverage their assets with combined subscriber offerings.
- **Progress:** The WWC Work Area is finalizing a number of specifications to complete the second phase of specification development. With this work, the group looks to subsume more of the capabilities of the 5G architecture.
- **Outcomes:** A set of new capabilities and enhancements will be published at the beginning of 2022 and further specifications are in progress for publication later in the year.

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 from legacy to 5G. 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.

The scope of the second phase work provides updates to TR-456 (Access Gateway Function Functional Requirements), TR-470 (5G Wireless Wireline Convergence Architecture) and TR-124 Issue 7 (Functional Requirements for Broadband Residential Gateway Devices).

With the finalization of these documents in progress, the group is now discussing what the focus should be for subsequent work. One key piece of work already identified is the OB-5WWC project designed to get 5G into the CPE open source food chain. Another key piece of work is looking to converge legacy voice services onto the 5G system. In addition, later in the new year, the group is planning to issue two more specifications WT-457 (FMIF Functional Requirements) and WT-458 (CUPS for 5G FMC), both of which expand the deployment options for 5G WWC.

Broadband Forum continues to specify how to extract more value from the available feature set from 3GPP in the context of expanding legacy device support, being able to monetize the additional network functionality 5G brings to the table and expanding the overall addressable market for convergence. The group is currently incorporating technology from the 5G system 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.

The group continues to expose the industry to the latest WWC work and its most recent webinar broadcast in May focused on '[Bringing New 5G Services Inside the Home with 5G-Residential Gateways](#)'.

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 has started the development of its Essex Skipper 5.0 release that includes work on cloud-based authentication of Optical Network Units (ONUs), 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 is being contributed back into the Broadband Forum as part of its Fiber Access Network and cloud-based specifications such as Authentication of an ONU (WT-489), Access Network Abstraction, Softwarization and Disaggregation (WT-484), and Common YANG Modules for Access Networks (WT-383).

For more information on 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 is on final approach

Current Efforts: The OB-USP-Agent team is



wrapping up the last parts of the Eagle Release (Release 5), and it should be posted to GitHub well before the next quarterly meeting. The Eagle Release is focused on the implementation of the WebSocket Message Transfer Protocol (MTP) as defined in the USP specification but will contain several other small improvements and bug fixes. The OB-USP-Agent team has also been addressing 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: Release 5 (Eagle).

Future Plans: Once Release 5 has been pushed out to GitHub, the team will focus on scoping Release 6 and updating the 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>.

Sixth public release delivered by OB-UDPST project team



Current Progress: The OB-UDP Speed Test (OB-UDPST) project team delivered its sixth public release on-time on November 19, 2021. The latest version of the code (7.3.0) will greatly improve the TR-181 support to include virtually all the relevant data model fields (with the JSON-formatted output option). This feature adds a number of additional fields that the team felt significantly enhanced the model implementation when looking to automate and mechanize testing. The JSON output can be easily controlled via the command-line to produce either very comprehensive or concise output – again, depending on the implementation requirements.

Another enhancement in this release is the additional ability to collect the corresponding traffic rate (transmit or receive) observed at a local interface during testing. This is primarily intended for routers and residential gateways where it is highly desirable to know if non-test customer traffic was present during a test. With this capability, even if OB-UDPST results show a lower than expected measured rate, they can be properly categorized as “measured in the context of other traffic”. For example, this diagnostic measurement can show the local interface was carrying 1 Gbps at Layer 2, even if the UDPST tool reports only 800 Mbps Maximum IP-Layer Capacity during a test.

Future Plans: Now that the Internet Engineering Task Force (IETF) has published [RFC 9097](#): ‘Metrics and Methods for One-way IP Capacity’, work has started on standardization of a new test protocol that starts with the OB-UDPST protocol, version 8. Development in OB-UDPST will follow the IETF IP Performance Measurement (IPPM) development and comments closely, resulting in version 9 of the protocol. The next code enhancements include Server Bandwidth Management, an option to designate the maximum bandwidth of server and client connectivity. Knowledge of the maximum test load from a client allows the server to reject a new test if a client request exceeds server's maximum bandwidth. Other features include random UDP payload generation, protocol error messages, and protocol backward compatibility.

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 holds first technical meeting

Current progress: 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. Following the kick off meeting in August, the first OB-5WWC technical meeting has been held during the Q4 meeting week that included introductions, discussions on solution architecture, challenges, and coordination on work planning.

Work has begun on the first key deliverable, Control and User Plane transport, with key deliverables including the Stubbed AGF test tool, userspace daemon supporting both Point-to-Point Protocol over Ethernet (PPPoEv1) and 5G Wireless Wireline Convergence User Plane Encapsulation (5WE), and the 5G controller providing registration and session management.

Next steps: The next steps include the establishment and agreement of the solution architecture and tackling the early challenges that need to be addressed.

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 membership has grown with some key additions and received expressions of interest from industry players. We remain 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>.



The Q4 meeting saw 280 registered attendees with more than 31 first-time attendees welcomed virtually. The line-up of new members consisted of [ISPApp](#), [MitraStar](#), [Ofcom](#), and [RtBrick](#).

A flurry of guest companies were welcomed, this included [All Points Broadband](#), [Alleyoop Networks](#), BCD, [Commnet](#), [Eastern Communications](#), [Eurofins](#), [IPLAN](#), [ITX Telecoms](#), [Paltel](#), [LogicomUSA](#), [MBUZZ](#), [NetCologne](#), and [Tejas Networks](#).

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.

Worldwide gigabit deployment, and effective Wi-Fi testing blogs round off Q4

Poor signal, coverage, and performance – these Wi-Fi ‘experience killers’ within the subscriber network have been exacerbated over the past year or two with the switch to home working and schooling. Take slow loading time and the speed of access – the common perception amongst customers is that, when these components fail or falter, it means that their broadband connection is to blame. Because of this, it's critical for Wi-Fi performance to meet the expectations of the customer. **Lincoln Lavoie, Broadband Forum Technical Chair**, explains [how the TR-398 Issue 2 can help service providers and operators adequately manage, to control, and to proactively understand and ensure the Quality of Experience \(QoE\)](#) for their subscribers.

Earlier this year, the Broadband Forum hosted its insightful ‘Future of PON technology update’ vBASE webinar, focusing on the emerging technologies set to revolutionize the Passive Optical Network (PON) market, as well as the evolution and changing trends ahead for the worldwide deployment of gigabit technology. As ongoing demand for full fiber access and connectivity inside the home continues to heighten, a seamless customer experience becomes more critical than ever. **Bernd Hesse, Chief Marketing Officer of the Board of Directors, Marketing and BASE Chair of Broadband Forum** discusses all in his blog entitled [‘The emerging PON technologies accelerating worldwide gigabit deployment’](#).

Broadband Forum in the news

A trio of articles were published on Wireless Wireline Convergence, Disaggregated BNG, and CloudCO following briefings with Fierce Telecom. **Ken Ko, Managing Director of Broadband Forum**, [told Fierce the BNG has traditionally been a “monolithic piece of equipment,”](#) meaning operators might have to purchase a second BNG if they want to scale up or add capacity. But with a disaggregated BNG, operators can deploy the control and user planes in a new way, centralizing the former and distributing the latter to reap myriad benefits, Ko said. For instance, the user plane can be deployed closer to the customer, delivering improved performance for users, and giving the operator the option to scale in more flexible increments.

Dave Allan, Distinguished Engineer at Ericsson and WWC Work Area Director at Broadband Forum, [told Fierce he's been working on convergence for a long time](#). The ultimate goal, of course, is a common core for both the fixed and mobile access networks. Allan summed up why convergence is such a big deal and why operators continue to chase it. He explained once an operator's core network becomes a common digital platform “the services are common, the tooling is common, [and] you can provide ubiquitous policy



irrespective of access to a given subscriber for things like parental controls, corporate access et cetera. That's kind of huge."

Broadband Forum offered a tantalizing glimpse of what the networks of the future might look like, demonstrating a technology called dynamic session steering which uses software-defined networking (SDN) to reconfigure a user's connection on the fly based on the application they're using. **Tim Carey, Lead Technology Strategist at Nokia and Chair of Broadband Forum's OB-BAA project**, [told Fierce specifications for most of the major CloudCO components have already been published](#). "We want to take elements that are currently used in the current multi-service broadband network and we want to be able to use those elements in this new SDN and NFV world," Carey said. "The journey to SDN isn't a one and done journey, it's a migration toward it."

By taking a holistic approach to network management and operation, South African operators can provide a unified broadband customer experience according to **Craig Thomas, Vice President Strategic Marketing and Business Development at Broadband Forum** in [The African Wireless Yearbook 2021](#). This means it's imperative to integrate wireless and wireline convergence at all levels of broadband ecosystem. According to Thomas, operators must look at utilizing fixed and mobile networks to deliver enhanced customer experience, as a single network will not deliver Quality of Experience that consumers want. For true convergence to occur, a single converged 5G core network must be leveraged regardless of whether they connect via a wireless or wireline technology.

Events Calendar

Broadband Forum Meetings and BAsE Events

Q4 2021

- 'PON Interoperability and Certification' Webinar, December 9, 2021

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

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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

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