

# 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

Just a week before we came together for the Q4 meeting in Kona, Hawaii, the Mauna Loa volcano erupted for the first time in nearly four decades. The last time an eruption occurred was in 1984. Back then, only eight percent of households owned a computer and 99 percent of the US population was not connected to the Internet. Fast forward to 2022 and the development of open standards and the enablement of smarter and faster broadband networks has changed the face of the earth.

Despite the natural disaster on our doorstep and with Hawaii being one of the most isolated places on Earth (nearly 2,500 miles from mainland US) our members still gathered for the final meeting of the year.

This last quarter has seen our members continue to educate and inform the sector through our industry events. We had our successful CloudCO Demo (available to watch [here](#) on demand) at Network X with 14 vendors, service providers, and consultancy companies coming together to demonstrate greater automation, reduced network congestion and greater interoperability. Our BAsE North America event also attracted a lot of attention and built awareness of our important work.

For those interested in getting involved, our global BAsE 2023 sponsorship is now open. So, please get in touch. Our total membership reached a 10-year high, with 19 new members during 2022. We always appreciate new member referrals and have a referral award process if you know any other potential members that would like to join.

It has been a busy quarter for external communications with 14 press releases, blogs and editorial features going live. This has spanned a range of Work Areas including disaggregated access nodes, QED, 5G Transport, WWC, G.hn Access Pre-Certification Plugfest, the CloudCO demo and the app-enabled services gateway.

A big congratulations to our new Work Area Directors that will embark on two-year terms from 2023! Moving forward, our annual meeting is moving to Q2, and our Board of Directors election will also be completed during the second quarter with the nomination deadline moving to April instead of January.

We have announced our dates for next year's quarterly meetings with the first is in Dallas/Fort Worth on March 20-23, 2023, and the following three set to be in Europe (Q2), Virtual (Q3), and Asia (Q4). We look forward to seeing you next year! Thanks for your efforts during 2022.

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### Astronomy meets broadband



Marc Kassis, Instrument Program Manager at the W. M. Keck Observatory joined us in Hawaii and provided an overview of the observatory that has produced Nobel Prize winning science and has led the astronomical world in discoveries for three decades. Current instrumentation activities were also outlined and this included the installation and commissioning of our newest instrument, the Keck Planet Finder, that achieved first light a month ago.

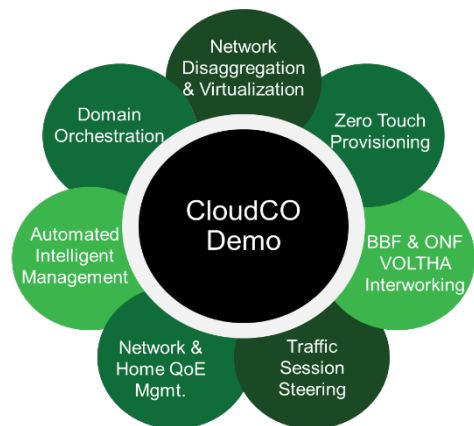
Marc advised how collaboration with Hawaii’s mainland instrument developers and science community helps identify and bring to life new technologies. Broadband plays a critical role in this instrumentation and observing, and these new technologies help keep the observatory at the forefront of astronomy.

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### Watch Now! Broadband Forum’s CloudCO Demo 2022

This year’s CloudCO demo, showcased at this year’s Network X, was a great success! We had more than 25 demonstrations during the three days with high operator interest, and significant new vendor interest wanting to get involved in the 2023 demo.

With the increasing adoption of software defined access networks, the separation of control and data planes is



driving an increasing need for the virtualization and disaggregation of operator’s networks and functions.

Visit [Broadband Forum’s YouTube channel](#) as we hear from Lincoln Lavoie, Technical Committee Chair at Broadband Forum and Ken Ko, Managing Director at Broadband Forum as they discuss this year’s CloudCO demonstration.

The industry’s appetite for informative and educational demos are increasing and we have already identified three initial 2023 demo candidates, including CloudCO, USP including the app-enabled services gateway and the first working demo of WWC’s Phase 2 and Phase 3 work.

Watch this year’s CloudCO demo [here](#).

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## Improved network performance measurement and analysis enabled by Broadband Forum



Broadband network operators can now take advantage of improved performance measurement and analysis tools with the principles of quality attenuation being applied more widely to operators' networks and at low cost by leveraging its capabilities in pre-existing equipment – for example, in CPE devices.

Crucially, the [TR-452.2](#) extension to Broadband Forum's Quality Attenuation (QED) framework means that real-world quality attenuation testing such as proactive analysis of network performance and support for customer service troubleshooting can now be done, taking testing beyond network design and lab evaluation. This will help operators identify and resolve network faults before customers perceive any service issue, as well as enable the arrangement and delivery of new experience-specific Service Level Agreements (SLAs).

“In an evolving broadband market, once broadband speed stops constraining service delivery, Quality Attenuation (which includes latency, jitter and packet loss) becomes the most important metric to delivering QoE for increasingly time-sensitive applications,” said Craig Thomas, Vice President Strategic Marketing and Business Development at Broadband Forum. “A standards-driven approach is critical to how metrics are automated and continuously measured leading to zero-touch Automated Intelligent Management (AIM) tools that ensure subscriber service quality.”

The Quality Attenuation (QED) framework is developed by the [Broadband Quality of Experience Delivered \(Broadband QED\) initiative](#) from Broadband Forum. It uses Quality Attenuation to encompass factors such as latency, consistency, predictability, and reliability, enabling operators to [look beyond conventional measurements, such as Quality of Service \(QoS\), as a standalone litmus test of quality, and provide deeper insights into QoE and application outcomes](#).

Read the full story [here](#).

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## Innovation Group is calling for submissions!

The Innovation Group continues to welcome the submission of any ideas or projects that members might feel are disruptive or may not perfectly align to any existing areas of focus within the Broadband Forum. The Innovation Group will review the proposals and, as it sees fit, help to organize a wider Broadband Forum discussion.

These sessions will take place on the first day of the quarterly meetings and are intended to be open discussions where members can share their expertise. The purpose is to incubate new work topics, drive attendance and increase membership. Speakers will be invited that can discuss the latest technology trends and local operational challenges facing our industry. These speakers will be encouraged to gear their presentations to stimulate future work for the Forum.

Please approach [Christele Bouchat and Mauro Tilocca](#), the Innovation Group Leaders, with your ideas and the group will look at scheduling dedicated innovation tracks at our quarterly meetings in the future. Any accepted submissions may act as a catalyst for the creation of new projects

within Broadband Forum.

**Congratulations to our Work Area Directors!**

The following Work Area Director appointments have been made for two-year durations from 2023.

- John Blackford, BUS Work Area
- Jason Walls, BUS Work Area
- Dave Sinicrope, ATA Work Area
- Jonathan Newton, ATA Work Area
- Marta Seda, FAN Work Area

Congratulations to all!

**Editorials went live on Quality of Experience, USP, Multi-Dwelling Unit connectivity, the app-enabled services gateway and embracing open standards**



A host of editorial articles went live during the last quarter, covering a range of topics spanning the broadband ecosystem. Broadband Forum Chairman **John Blackford** spoke to [Telecom Tech Outlook](#) about how the app-enabled services gateway is a game-changer for service providers and a great opportunity for the industry to grasp. Achieving Multi-Dwelling Unit connectivity with broadband access extension technologies was a topic discussed by PHYtx Work Area Director **Herman Verbueken** in [Broadband Communities Magazine](#).



The need for a unified, interoperable, and standardized platform to develop value-add solutions is paramount for the connected home according to Leader of the "BUS Data Modeling" Project Stream at Broadband Forum, **Daniel Egger** in [Telecoms.com](#). Broadband Forum Technical Chair **Lincoln Lavoie** spoke to [ISE Magazine](#) about how embracing open standards together with open source can help CSPs upgrade and transform their networks.

Speed is no longer enough, and the industry needs to prioritize network quality over bandwidth according to Broadband Forum Vice President of Strategic Marketing and Business Development **Craig Thomas** in [Fibre Systems](#).



**BASEe industry education and events continues at full steam ahead**

## BASEe 2023 Sponsorship Now Open

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  - 5 already in planning
- 12-14 vBASEe Webinars
  - Across 3 tracks
- Pricing Frozen

Please Contact **Rhonda Heier** for more information

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During 2022, there were 14 virtual BASEe (vBASEe) webinars, six BASEe knowledge webinar virtual events, a vBASEe State of Broadband Summit, vBASEe APAC, and seven face-to-face events. It goes without saying that the whole BASEe team would like to thank our sponsors, trade associations and attendees who travelled and participated in our events this year!

BASEe sponsorship continued to climb to an all-time high with 20 platinum and gold sponsors. We are excited by the number of returning and new sponsors, and the high level of thought leadership they bring to our events.

Through our vBASEe events and Knowledge vBASEe events, it is exciting that we continue to drive such a high number of attendee registrations and experience a significant amount of post event downloads, as well as live attendees. If you have ever missed any of our vBASEe webinars, you can always download recordings of them at [https://www.broadband-forum.org/category/meetings\\_and\\_events/past-base-events](https://www.broadband-forum.org/category/meetings_and_events/past-base-events).



To find out more information on BAsE events, sponsorship, and speaker opportunities, 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 BAsE 2022 sponsors! Our BAsE 2023 sponsorship is now open, please get in touch if you wish to get involved!



**Thank you to our BAsE 2022 Sponsors**  
Record Year for BAsE Sponsorship!!

## 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 with 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 - Aloha - wrapping up 2022 in paradise!

**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:

- Performance, Experience, Application Testing Project Stream - [TR-452.2](#) Quality Attenuation Measurements using Active Test Protocols - Final Ballot passed! Document posted to the public website. The latest press release can be viewed [here](#).
- Performance, Experience, Application Testing Project Stream - WT-471 Issue 3: IP Layer Capacity Metrics and Measurement - Final Ballot passed! (This will be posted to

the public website soon).

- Access Architecture Project Stream - MD-459.4 CUPS for a Disaggregated BNG: Objective and Scope started (during ATA interim meeting in London).

#### Progress:

- Access Architecture Project Stream - WT-459i2 working through Straw Ballot comments and making significant progress.
- Access Architecture Project Stream - WT-474 Subscriber Session Steering project continuing YANG data modeling project (YMSSS) for the entities and relationships defined in WT-474 offline via BitBucket.
- Access Architecture Project Stream - WT-487 DBNG for Wired Access - Under development - protocol analysis phase and debates.
- Access Architecture Project Stream - WT-497 - WiFi Authentication - Under development.
- Mobile Transport & Routing Project Stream - Next steps discussion identified a number of potential future work items for the project stream.
- Performance, Experience, Application Testing Project Stream - WT-452.4 QED Measurement Formats (started at ATA interim meeting in London).
- Performance, Experience, Application Testing Project Stream - WT-452.5 Quality Attenuation Measurements Using L2 PM OAM (started at ATA interim meeting in London).

ATA Marketing Group - See [Join or Leave BBF Groups and Email Lists](#) to subscribe.

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

### Key components of the app-enabled services gateway being finalized, and Smart Home Project Stream launched



**Target:** Finalize key technical components of the app-enabled services gateway.

**Outcomes:** WT-181 Device:2.16 and USP version 1.3 are on track to be released by Q2 2023 along with important deployment guidelines in WT-488 and WT-492.

The Broadband User Services Work Area is finalizing the key components necessary for operators and vendors to have a standardized app-enabled services gateway to realize new revenue-generating services and efficiently deploy applications in the connected user network. This includes updates to its flagship standards, TR-369/USP and the TR-181 Device:2 Data Model to support containerized applications on end-user devices, as well as a guide to developing those devices (WT-492) and deploying them in a managed heterogeneous network.

The group also agreed to start a new Project Stream to standardize an Operator-Grade Smart Home. This will be an industry-wide effort focused on leveraging USP and Device:2 to fill gaps in the standardized smart home, define requirements for smart home devices to qualify for

service provider deployments, and test plans to support the project. Look for news in early 2023 on this much needed work.

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

## Common YANG never sleeps; new TR-383 Amendment is on the way



**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:** Good progress on the functional modeling of nodes supporting MoCA Access 2.5 interfaces.

**Outcomes:** Completion of Straw Ballot comment resolution of Amendment 6 of TR-383; accepted proposal to define a YANG model for bulk data export via IPFIX.

The Common YANG Work Area continued to make good progress on its key project deliverables, in close collaboration with both SDN/NFV and FAN Work Areas.

Straw Ballot comment resolution on Amendment 6 of TR-383 'Common YANG Modules for Access Networks' was completed, with an overall objective for publication by Q1 2023. This next amendment aims to add functionality that addresses scale in large networks, as well as further improving existing functionality.

A first proposal was reviewed covering the functional modeling of the Multimedia over Coax (MoCA) Head-end and Client Nodes, as part of WT-496 'YANG Modules for MoCA Access 2.5 Interface'. It is expected that derived YANG data models will be brought forward in a follow-up interim conference call.

The group accepted a proposal to define a YANG model for the management of bulk data export via IPFIX. This will be added in a future amendment of WT-383. The group will start a review of the associated YANG module specification.

Joint sessions were held with the SDN/NFV and FAN Work Areas to review items of common interest, including proposed changes to Issue 2 WT-413 'SDN Management and Control Interfaces for CloudCO Network Functions', contributions on Issue 2 of WT-386 'FANS Access Network Sharing Interfaces' and work on PON management.

Moving forward, the group will continue the formal review of the specification of YANG modules for VoIP; this topic did not get addressed at the meeting but will be covered during a series of interim conference calls. This work is intended to be covered in a future amendment of TR-383.

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 continues key progress across its Project Streams



**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 Interoperability, and compliance Test Plans related to XGS-PON, NG-PON2 and PMD/TC Layer. Lastly, it is responsible for ITU PON YANG data model

specifications.

### In Progress:

#### Unassigned Project Stream

In the last quarter and during the Q4 Meeting, the Unassigned Project Stream continued with:

- WT-142 Issue 4 Framework for CPE WAN Management Protocol (CWMP) and USP enabled PON devices was prepared for Final Ballot. Final ballot closes on Monday, 19 December 2022.
- Multi-management study on how to handle multiple management domains (e.g., OMCI and USP/CWMP). This study continued to review contributions related to firmware management and VLAN bootstrapping.

During the Q4 meeting, the **Interoperability Project Stream** progressed:

- Draft version of DTP-255 and new contributions will be discussed.
- DTP-247 Issue 4 Corrigendum 1 Straw Ballot version will be prepared for future FAN teleconference.

#### PON Management Project Stream

During the interim meeting period, it was identified that WT-385 PON YANG and WT-489 ONU Authentication had dependencies before they can be completed. It was agreed that WT-385 needed to be brought to Straw Ballot (along with WT-489). During the Q4 meeting, there were discussions around how to publish WT-385 to unblock WT-489 Straw Ballot. A path was agreed upon.

A new NPIF on emulated schema mount was discussed in the Q4 meeting. Those interested in cosigning are encouraged to reach out to the NPIF author.

#### 25GS-PON Project Stream

New WT-309 contributions were discussed in Q4 meeting.

#### G.HSP 50G-PON Project Stream

New WT-309 and WT-423 contributions were discussed at the Q4 meeting.

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

## PHYtx Work Area publishes TR-338 Issue 3



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

**Progress:** Resolved all the technical and editorial comments on the Working Text of 'Appendix G Australian cable models' (WT-285i2a1). WT-476 'G.hn Access Performance Test Plan' is scheduled for Straw Ballot comment resolution.

**Outcome:** [TR-338](#) 'Reverse Power Feed Test Plan' Issue 3 has been published. DTP-337i4c1 and WT-285i2a1 are ready for Final Ballot approval.

At this meeting, the PHYtx Work Area addressed the technical and editorial comments provided during the Straw Ballot review of WT-285 Issue 2 Amendment 1 'Appendix G Australian cable models'. The Working Text is now ready for Final Ballot approval.

[TR-338](#) Issue 3 'Reverse Power Feed Test Plan' has been published. This issue adds testing of reverse power feeding over coaxial cable deployments, according to ETSI TS101 548-2, increasing the operators' options to reliably roll out reverse powered access equipment.

A corrigendum to [TP-337i4](#), the G.fast Certification Test plan, has been approved to go to Final ballot.

Performance pass/fail metrics derived from a Plugfest held on September 26-30 have been included in WT-476 'G.hn Access Performance Test Plan'. The document is now ready to undergo its second Straw Ballot commenting round, immediately followed by the Final Ballot approval prior to the 2023 Q1 Meeting.

When approved, the performance requirements of WT-476 will become part of the GHNA Certification Program in collaboration with the HomeGrid Forum.

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 closes in on publication of TR-477 on disaggregated Access Nodes



**Target:** Define the Cloud-based 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 CloudCO project for virtualized network functions, SDN management and control and domain orchestration capabilities in a broadband network. The main activities currently ongoing are related to the disaggregation of the Access Node and defining the related interfaces. The "Cloud Component" Project Stream is continuing work on Automated Intelligence Management (AIM), Fixed Access Network Sharing and Smart SD-WAN.

**Outcomes:**

WT-477 on Access Node disaggregation is close to be completed. The missing data models were created and reviewed by the Common YANG and FAN Work Areas in a joint session. Further details need to be analyzed to finalize the document.

WT-413 Issue 2 on 'SDN Management and Control Interfaces for CloudCO Network Functions' is progressing. In a joint meeting, the SDN/NFV and Common YANG Work Areas reviewed the approach and agreed to report a detailed list of data models, so that vendors can rapidly discover the data models to be implemented for each access network function.

On the Artificial Intelligence and automation fronts, work continues on WT-486, which specifies the interfaces for the previously published AIM Framework specification TR-436. Contributions were submitted on the missing interfaces and now the document is almost ready for Straw Ballot. It was also discussed whether further details are needed for specific implementations and if a liaison needs to be submitted to TM Forum. While this is a different Project Stream within the SDN/NFV Work Area, network automation and closed-loop 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.

There was a proposal related to an initial set of YANG data models for WT-386i2 on Fixed Access Network Sharing discussed in a joint call with the Common YANG and FAN Work Areas. It was agreed that comments would be received ahead of final approval.

The Work Area has also approved NPIFs for three focus areas. This includes Access Node Disaggregation (WT-477i2) to include new virtualized functions, AIM Framework (WT-436i2) to extend the architecture for new use cases, and on CloudCO interfaces (WT-411i2) to include the Access SDN Management and Control northbound interface intent-based interactions addressing access network topology and abstraction.

Two NPIFs were also proposed on vOMCI Telemetry (WT-451i2) with partially different scopes. It was agreed to merge them together into a single project that also includes possible impact on other documents (e.g. WT-477).

Bjørn Ivar Teigen, Head of Research at Domos discussed the [notable advantage of dynamic subscriber session steering](#) in a blog post focused on this year's CloudCO demo at Network X. The blog highlighted how subscriber session steering can allow an ISP to dynamically re-allocate resources between isolated slices in a running network and increase a subscriber's bandwidth on-demand.

Bruno Cornaglia and Mengmeng Li, SDN/NFV Work Area Co-Directors at Broadband Forum discussed how [disaggregating Access Nodes brings simplified operations and promotes greater competition within the supply chain](#). The blog post from Bruno and Mengmeng also outlined the business motivations offering greater choice for operators.

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



## WWC is finalizing key Phase 3 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 is progressing its work on the third phase of specification development. It currently has two active Project Streams, the 5G Project Stream and IMS for 5G-RG Project Stream. With this work, the group continues to subsume more of the capabilities of the 5G architecture.

**Outcomes:** Work continues on a new set of capabilities and enhancements with the latest specifications in progress for subsequent publication.

Work in the WWC Work Area has transitioned from improving the basic set of specifications in Phase 2 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 5G Project Stream is working on finalizing two specifications, WT-457 (FMIF Functional Requirements) and WT-458 (CUPS for 5G Wireless Wireline Convergence), with WT-458 scheduled to enter the Straw Ballot process before the Q1 Meeting, following WT-457 which has undergone Straw Ballot review in the Q4 Meeting. Both of these documents expand the deployment options for 5G WWC. The IMS for 5G-RG Project Stream addresses 5G-RG IMS Voice support, with work on the architecture and a profile for residential voice. Work is moving forward on WT-493 (IMS for 5G-RG Architecture) and WT-494 (IMS for 5G-RG Residential Voice Requirements). This key piece of work will converge legacy voice services onto the 5G system. With these two key baseline texts established, there is now an opportunity for all interested parties to contribute to this important work.

The group along with the BUS Work Area continue to work with 3GPP to introduce the Release 18 Study output, and this is expected to facilitate a WWC study around "Devices behind the RG". The BUS and WWC Work Area has jointly reviewed and responded to the liaison, according to the ongoing collaboration with 3GPP on WWC and 5G-RG management requirements.

The WWC Work Area has been discussing plans for the group's first demonstration at an industry event to showcase the 5G Phase 2 and Phase 3 work. 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.

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.

Christele Bouchat and Manuel Paul, Work Area Directors of the Wireless-Wireline Convergence Work Area at Broadband Forum produced a blog post this quarter on achieving [a smooth evolution path to a standardized 5G hybrid model](#). The blog discusses how operators can unlock more value and a greater range of options thanks to Broadband Forum's latest phase of specifications.

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

### **OB-BAA's Release 5.1.1 launched during fourth quarter**

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 successfully launched Release 5.1.1 in November. This included enhancements and fixes to the existing OB-BAA software, providing enhancements to microservices discovery and scale testing of 10,000 ONUs. The group also continues to plan Release 6.0 activities, with discussions continuing on identifying a list of candidates to focus on.

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 joint collaboration**



The Open Broadband – Multi Access Point (OB-MAP) project and the prpl Foundation's prplMesh project are establishing 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 the 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 support for internal services. Recently, work continued on defining management interfaces for:

- Network-wide SSID, with groupings and an underlying distribution system / VLAN.
- Statistics and topology for wired stations and wired backhaul
- IEEE 1905 neighbor statistics
- Unassociated station statistics
- Extender with both EasyMesh agent and USP/cloud agent
- Station statistics while roaming

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



## Goldeneye Release rounds off successful 2022 for OB-USP-Agent



OB-USP-Agent Release 7 (Goldeneye) is wrapping up in the next few weeks. Goldeneye is mostly a maintenance release with the following focus:

- Key improvements around the MQTT MTP implementation.
- Performance improvements for large data models that can result in big Get responses.
- Fixes related to compliance testing and the updated TP-469a2 Test Plan.
- Resolution of some known issues (including several raised in GitHub).

The plan is to keep to the usual OB-USP-Agent six-month release cadence, which means that the team will be scoping Release 8 at the start of the year with an expected release date of mid-2023. Based on recent OB-USP-Agent meeting discussions and the BUS Work Area's focus on finalizing the Services Architecture solution, it looks like Release 8 will mostly focus on implementing the UNIX Domain Socket MTP and the associated components. This will help enable USP communications between services within the CPE.

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

## Ninth OB-UDPST Release: applicability to mobile access measurement improves



**Current progress:** The project team delivered its Ninth release, 7.5.1 on November 18, 2022. This release incorporates feedback from users of a key enhancement in Release 7.5.0, which was the new "Type C" load adjustment (search) algorithm, which is faster and more dynamic than "Type B". The 7.5.1 release adds a new feature in response to testing/experience on mobile/radio access with the new algorithm. In this feature, the team made the decision that UDPST will now ignore the Reordering and Duplication impairments as input to the load adjustment search algorithms as the default. Reordered and Duplicate packets are legitimate contributions to IP-Layer Capacity and are sometimes prolific in mobile access environments. The UDPST utility still measures these impairments in every test, so this change only affects the impairment processing in Type B and Type C algorithms.

Issue 3 of TR-471 now incorporates all the 2022 improvements and features implemented by the OB-UDPST project. TR-181 has been updated with changes to the UDPST data model and the default configuration settings. The team also ensures that ITU-T Recommendation Y.1540 and other industry specifications remain in-sync with UDPST running code.

The OB-UDPST project team contributes to the IETF IP Performance Measurement (IPPM) Internet Draft development of the UDPST protocol specification and measurements. This includes evaluation of UDPST-based measurements to assess "Latency under Working Conditions/Load". Latency is a topic of considerable interest when attempting to support cloud game-players and the platforms they use, in addition to requirements for sufficient IP-Layer Capacity (a metric and measurement already standardized in TR-471 and RFC 9097).



**Future Plans:** The project team provided its status report to the Open Broadband Oversight Committee (OBOC) in November 2022. The UDPST applicability to Working Latency measurement, and the ability to implement application-layer traffic performance estimation were both of considerable interest to OBOC participants.

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 progresses into the implementation phase**



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 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 Residential Gateway (RG) test tool development.

**Current Progress:** The project team worked on the low-level design including WWCd as a key component and clarified modules' roles. Thanks to the members that have recently joined, the alignment on the architecture for integration with RDK-B has also progressed.

A new development environment was established and Continuous Integration (CI) was operationalized, with exploration taking place of the components for the end-to-end test environment, including AGF and 5G Core. The development 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 (WWCd) providing registration and session management.

**Next steps:** The project team's next steps will be to start the MVP implementation of WWCd as a key module, and further improve the test environment. The group continues to align the low-level design with OpenWRT/prpl and RDK-B.


Members of the project team aim to submit an NPIF to the BUS Work Area to establish an RG architecture Technical Report.

There is now an opportunity for interested parties to offer contributions as we enter this key phase of implementation. The project continues to welcome interested parties, including candidates with software development experience in the C programming language, and radio module and mobile experience.

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>.



**.....**  
 **Welcome to our new and returning members!**

We welcomed a mix of new members and guest companies during the Q4 Meeting. We had 133 registrations, with seven first-time attendees, four guest companies comprising of [DCCA Hawaii](#), [Hawaiian Telecom](#), [NTIA](#) and RX Telecom, and new members of [C-Data](#), [Centec](#), [CityFibre](#) and [Pantacor](#).

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](mailto:rheier@broadband-forum.org) for more information.

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**Save the dates! Broadband Forum Meetings and BASe Events**



**2023 Meeting Dates Announced**

	DATE	REGION
Q1	March 20-23	Dallas/Ft Worth
Q2	June 5-8	Europe
Q3	September 4-7 (Tue-Fri)	Virtual
Q4	December 4-7	Asia

- December 13, 2022, Broadband Access Webinar, vBASe, Virtual
- March 20-23, 2023, Broadband Forum Q1 Meeting, Dallas/Fort Worth
- June 5-8, 2023, Broadband Forum Q2 Meeting, Europe TBC
- September 4-7, 2023, Broadband Forum Q3 Meeting, Virtual
- December 4-7, 2023, Broadband Forum Q4 Meeting, Asia TBC

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

Sponsorship opportunities are available for Broadband Forum’s 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](mailto:rheier@broadband-forum.org).

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**Contact information**

Questions or ideas? Contact the Broadband Forum on +1 510.492.4020 or email  
[info@broadband-forum.org](mailto:info@broadband-forum.org).