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BBF and BBF-ONF Collaboration Update

May 20th, 2022

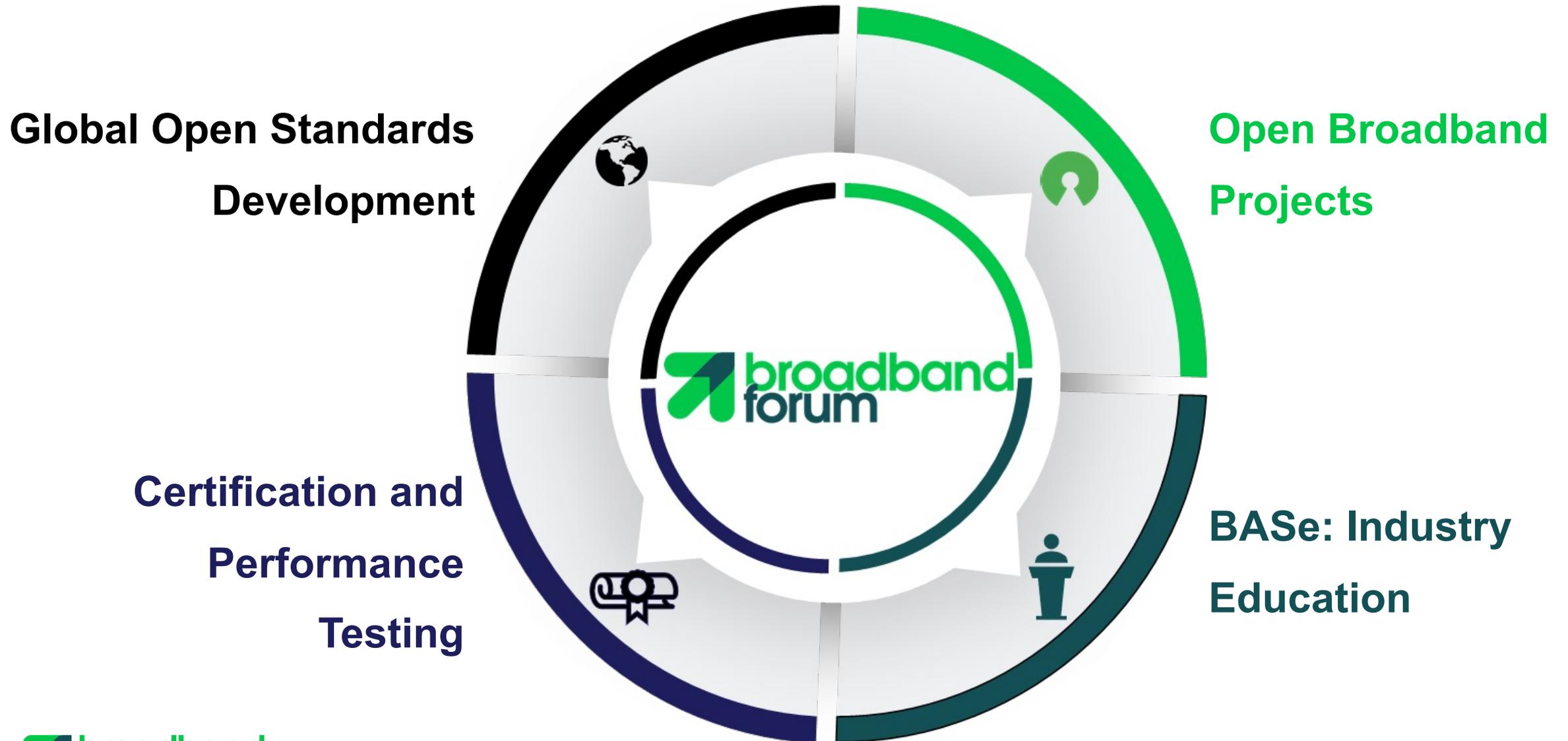




Topics

1. Broadband Forum – Overview
2. Background to BBF-ONF Liaison “Tiger Team”
3. Collaboration Scope and Objectives
4. BBF Work items of common interest
5. Summary and what’s next?

Broadband Forum - Scope



BBF Areas of Focus and Innovation



Connected Home

- *TR-069 (CWMP)*
- *User Services Platform (USP)*
- *Device Requirements*
- *Wi-Fi Performance*



5G

- *5G FMC*
- *5G Transport*



Access/Next

- *Fiber*
- *Copper*
- *Performance Measurement & Analysis*



Cloud

- *CloudCO*
- *Virtualization*
- *Disaggregation*
- *FANS*



Background

- ONF completed the SEBA 2.0 RD and shared its content and vision with the BBF (inviting comments)
- BBF Internal review
 - Analysis against BBF WT-477 (Access Node Disaggregation) and other relevant BBF projects including Cloud-CO and WT-456 (Multi-Service Disaggregated BNG with CUPS)
 - Commonality in TRs 383 (Common YANG Modules for Access Networks) and 385 (ITU-T PON YANG Modules)
- Discussions between our organizations, led to a joint workshop (late 2021) identifying areas of common interest:
 - Potential of standardized APIs produced by the Broadband Forum to be downstreamed to ONF VOLTHA+ONOS App implementations.
 - ONF VOLTHA-ready whiteboxes integration into Cloud-CO widens ecosystem

Joint Tiger team setup to drive the opportunities forward



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Tiger Team Collaboration Scope

- Cloud-CO and SEBA Components and Interfaces:
 - Greenfield and brownfield deployment scenarios
 - Cloud-native, legacy support (BAA) and evolutionary migration to SDN
- Growth in demand for disaggregation and whitebox solutions
 - VOLTHA support adds disaggregated whitebox solution use cases (and suppliers)
- Three opportunities identified to leverage Opensource VOLTHA and Cloud-CO API definitions
 - **Integration of the VOLTHA and ONOS Apps to the CloudCO Access management plane using TR-413 data models**
 - Integration of Native OLTs into the VOLTHA framework
 - Integration of BBF's vOMCI specification TR-451
 - ...Together, these address key requirements of WT-477
- Common Demonstration goals, joint resources, timebound target in BBWF

CloudCO: Disaggregated Control and User Plane

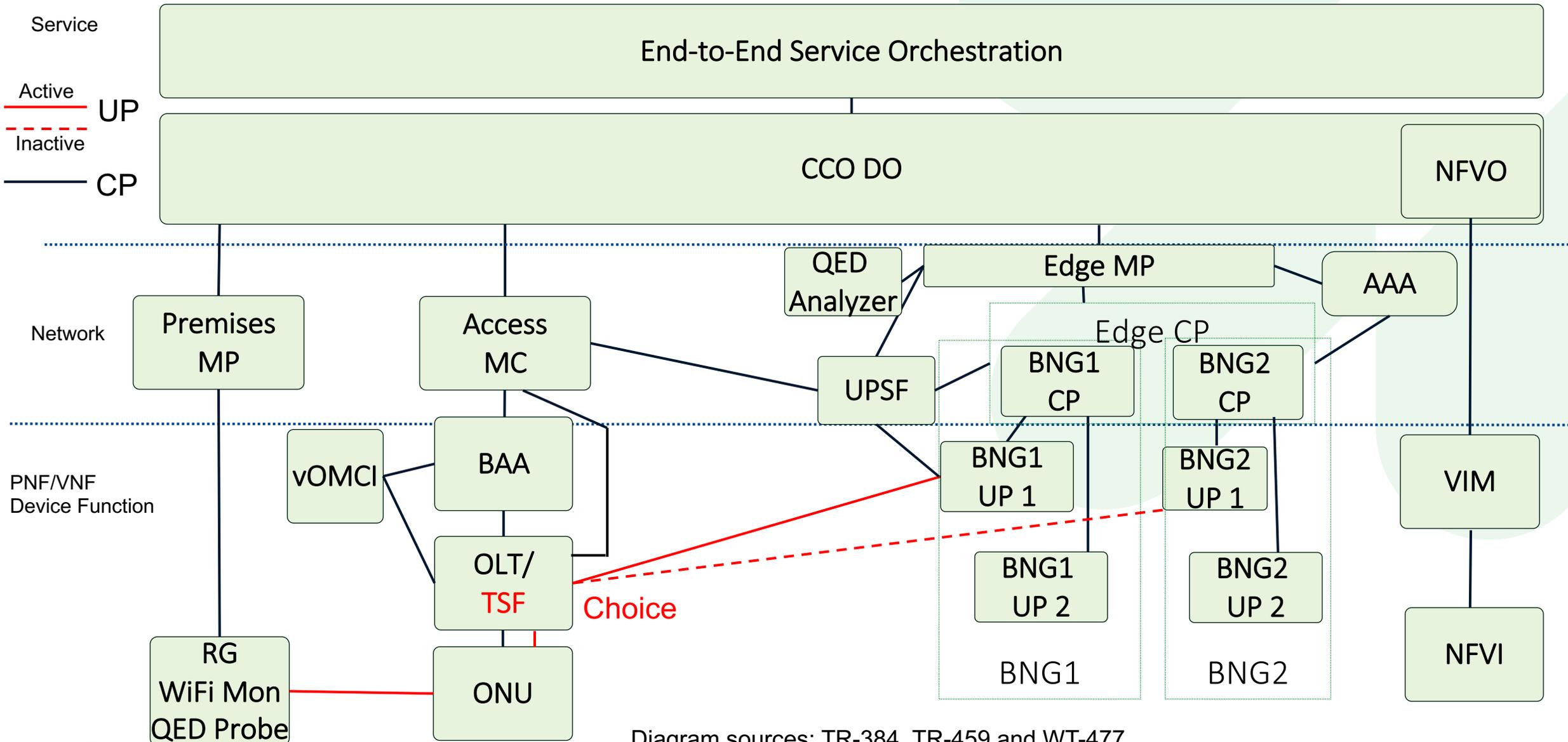
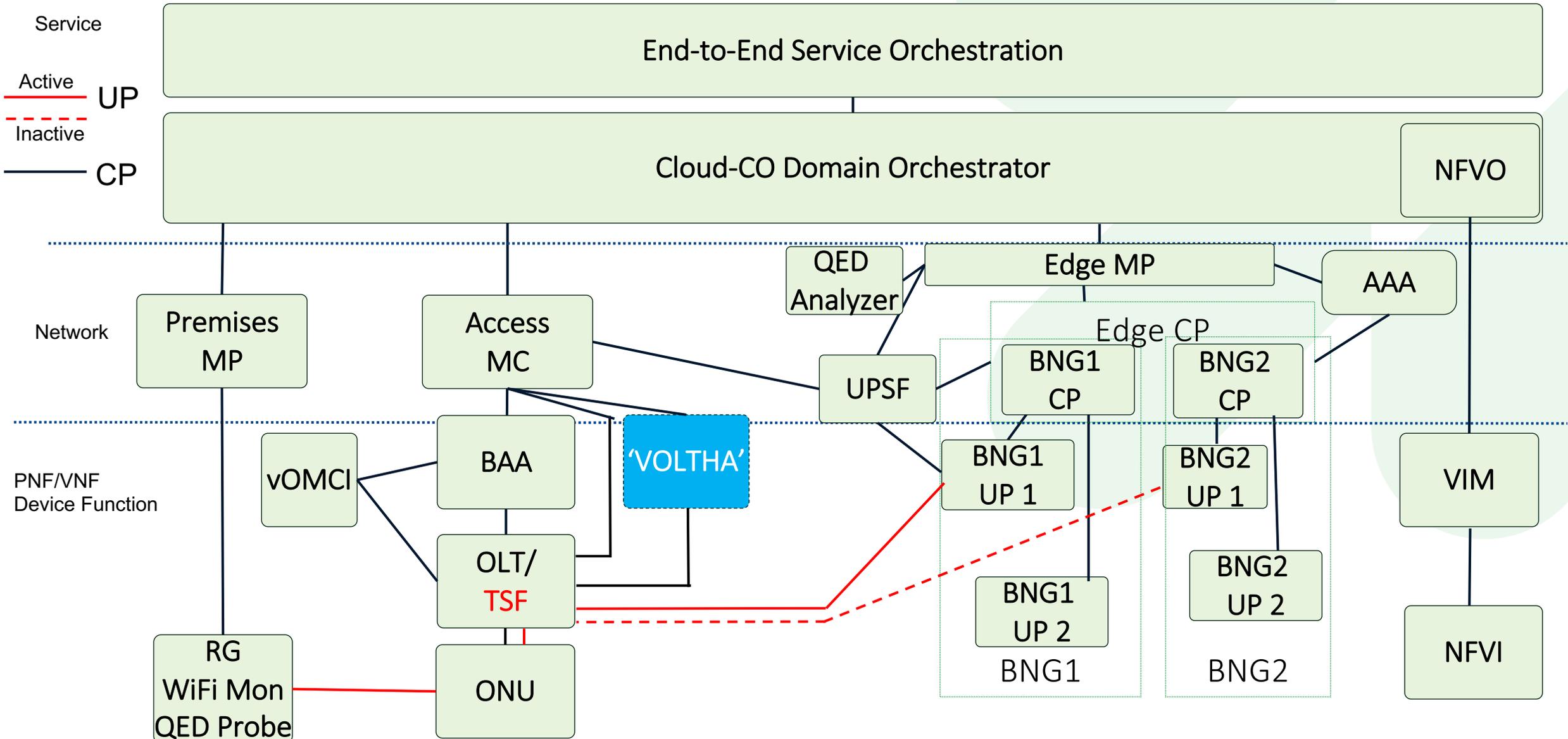


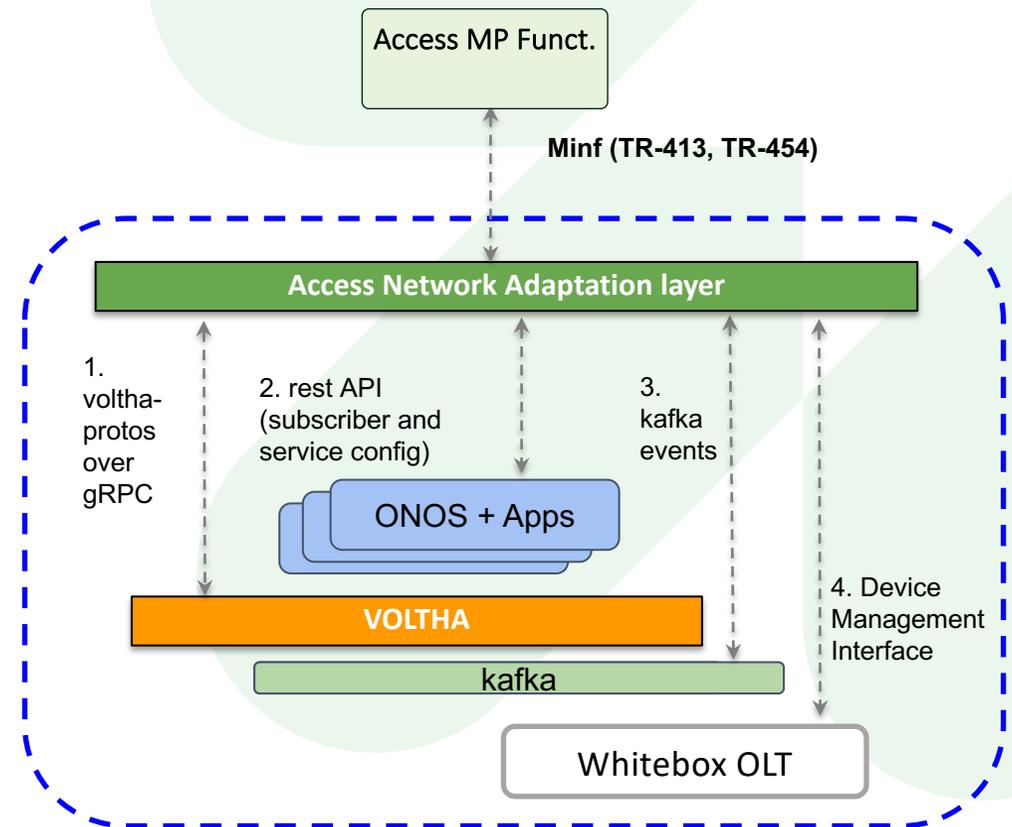
Diagram sources: TR-384, TR-459 and WT-477

CloudCO: Disaggregated Control and User Plane



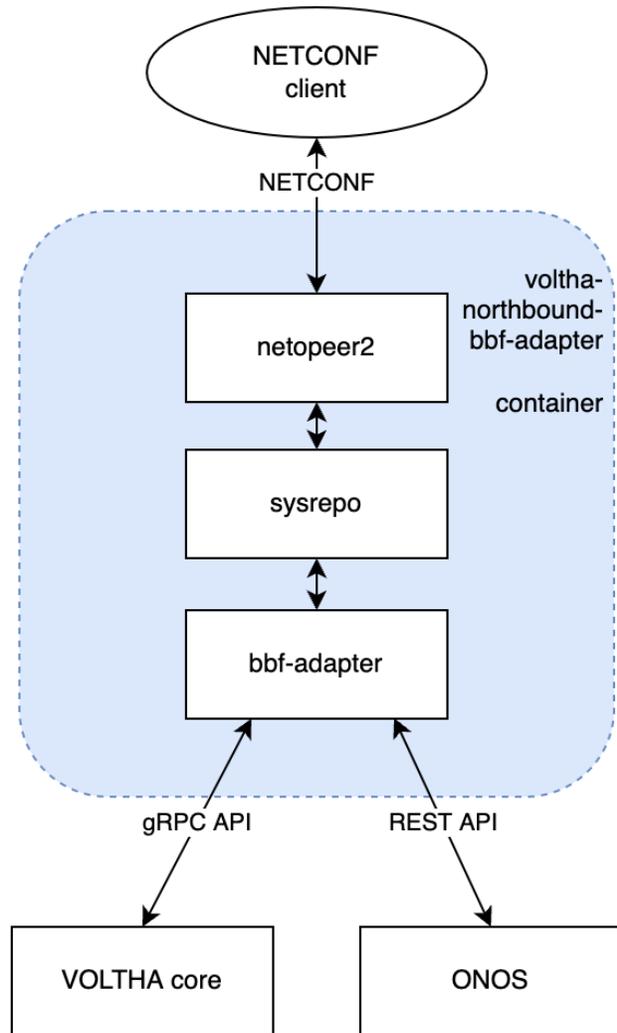
Integration of SEBA POD in CloudCO

- New interface and adapter layer
- Management and control of the functions are abstracted and automated via portals, NB Interfaces and orchestrators/controllers
- Enabling technologies are developed (mature) in open-source communities inc. ONF and BBF
 - Open APIs and de-facto protocols
- BBF Standardized data models and specifications
 - Changes for ONF SW support



Will be demonstrated as part of the BBF's CloudCO demonstrations at BBWF in October 2022

Northbound BBF Adapter



- Translation layer between the VOLTHA Northbound APIs and the BBF yang model
- Enables VOLTHA to be integrated into Cloud CO deployments (N/Y)

- Implemented as a (ONF seeded) plugin for the [sysrepo](#) data store
- Uses libsysrepo and act upon requests coming from NETCONF clients through the [netopeer2](#) NETCONF server
- A deployment of the adapter's container includes an instance of netopeer2 and the bbf-adapter process itself

✓ **Get devices (list)**

Provision OLT and Provision a subscriber



Plugin

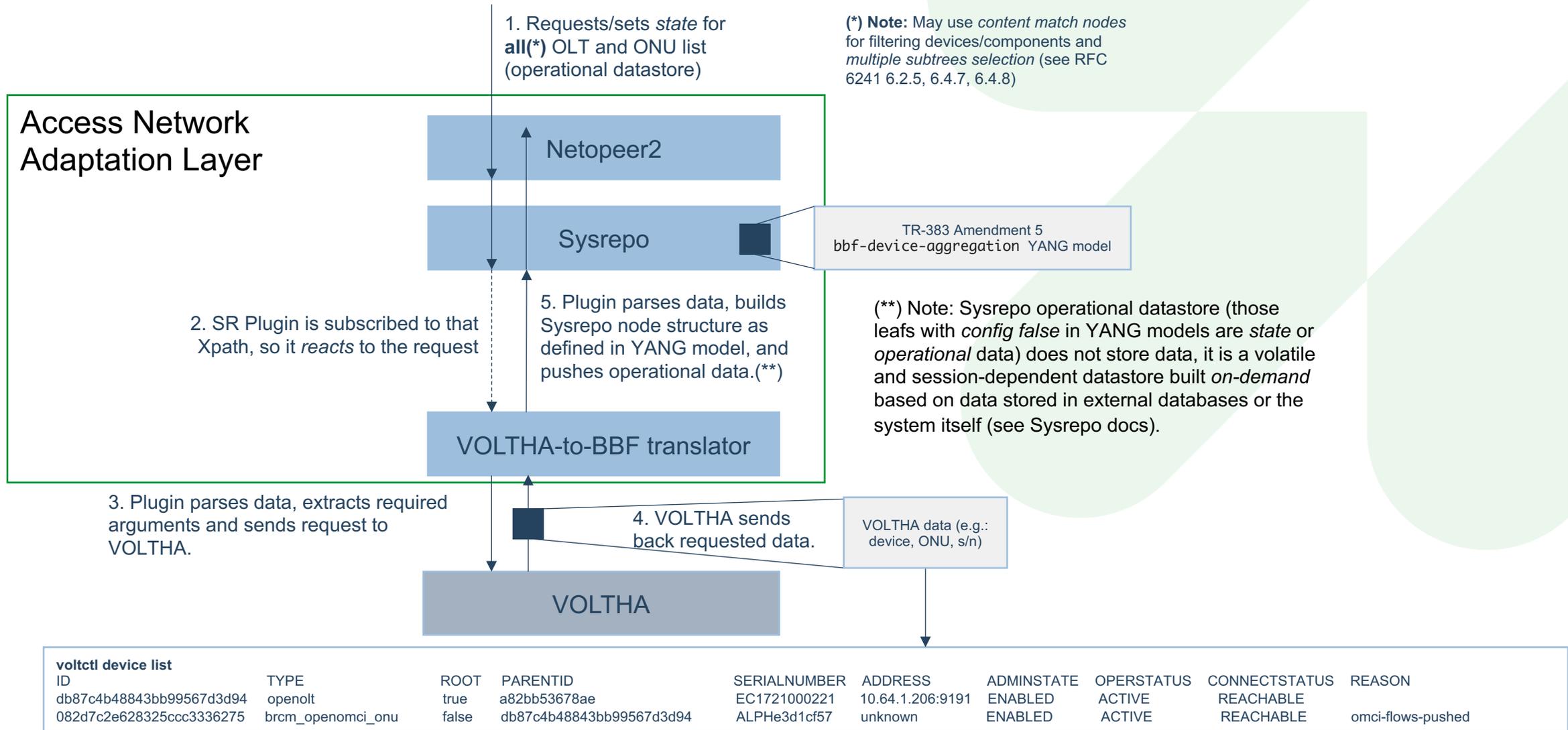


Data models



VOLTHA

BBF to VOLTHA Sysrepo Plugin



Implementation of BBF/VOLTHA Adapter - Status

- Recorded overview of the implementation of the was presented on the 2022-04-22 and the recording is available [here](#), thanks to [Elia Battiston](#)
- Currently implements retrieval of OLT and ONU information
- Service provisioning is waiting for model definition to complete
 - L2-access from BAA)
- Pull-Requests for YANG models under review (BBF internal comments)
 - [Devices and Services PRs being merged](#)
- Message Flow Charts
 - [BBF 2022 CloudCO: Data/Control Plane Disaggregation](#)
- [Wiki](#) for the collaboration

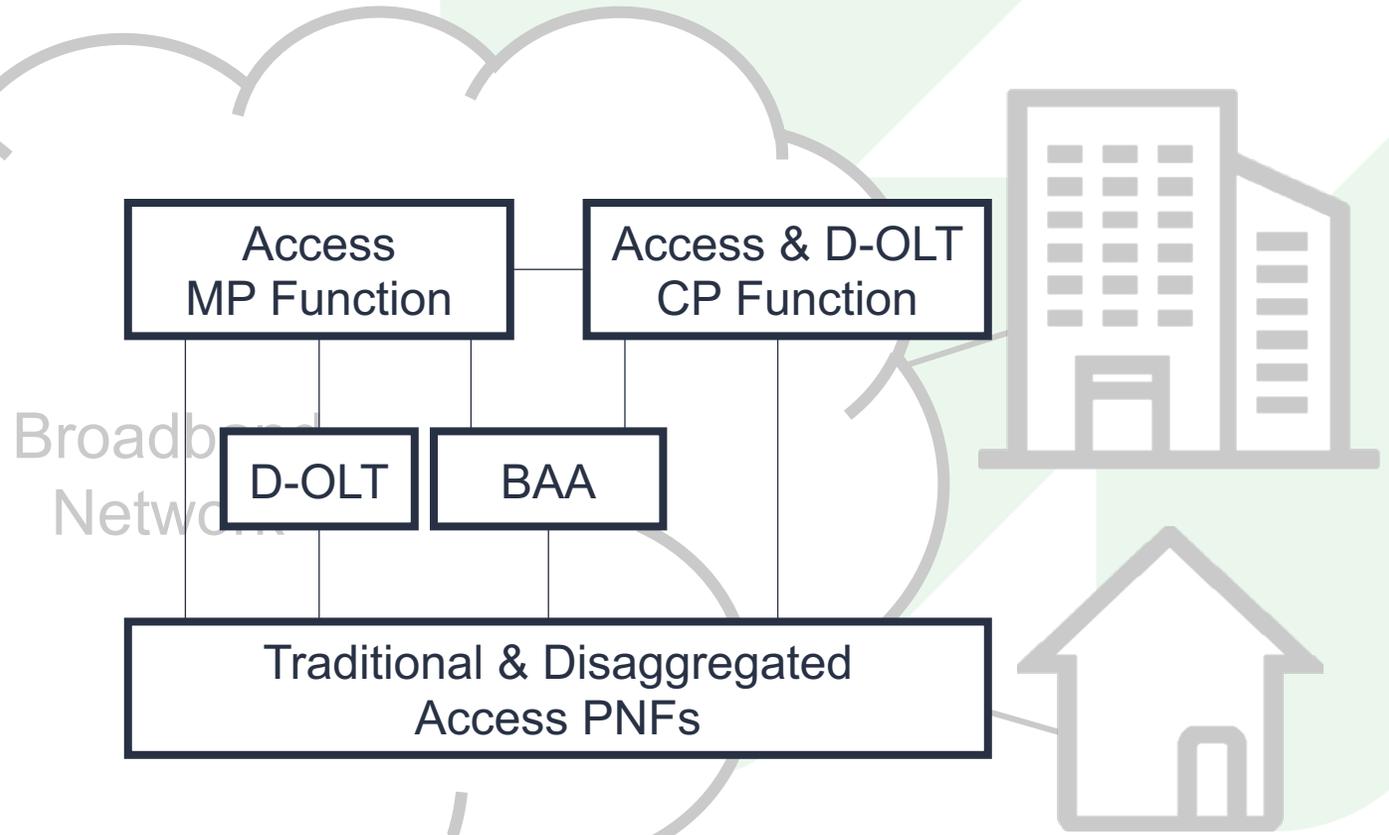


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Cloud Open Standards of relevance to collaboration: Access Nodes

- **Broadband Access Abstraction (WT-484)**
- **Access Node Hardware Disaggregation (WT-477)**
- **Marketing whitepaper ([MD-477](#))**
- **vOMCI Interface (WT-451)**



Cloud Open Standards: CloudCO

- **Reference Architectural Framework (TR-384)**
- **Use Cases and Scenarios (TR-416)**
- **Migration and Coexistence (TR-408)**
- **Interfaces between CloudCO Functional Modules (TR-411)**
- **Management and Control Interfaces (TR-413)**
- **Subscriber Session Steering (WT-474)**
- **NETCONF requirements for Access Nodes and Broadband Access Abstraction (TR-435)**
- **YANG Modules for Access Network Map & Equipment Inventory (TR-454)**
- **Test Cases for Cloud CO Applications (TR-412)**

Internet





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Companies involved - thanks

- Initial workshop on 16th November 2021
- Bi-weekly Tiger Team meetings since 23rd November
 - 1st June 15:00 BST
 - bbf-onf-collab@broadband-forum.or

- 23 participants from 13 companies

Altice Labs
BISDN
Broadcom
Cap Gemini
CommScope
Intel
Netsia

Nokia
Radysis
Reply
Telecom Italia
UNH
Vodafone
ONF

Summary and what's next

Summary

- The catalyst for “getting started” was a **mapping** between ONF VOLTHA operations and the BBF Cloud-CO API
 - Methods to existing YANG model
 - Prioritization of the operations
- Seeding the adapter with an existing ONF/BISDN Sysrepo plugin, provided momentum
- Common goal for BBWF 2022
 - Demo creation in progress

What's next?

- Northbound
 - Software upgrade
 - VOLTHA Tech profile integration
 - Alarms and PMs
 - Device management interface (TR-383 based) integration to expose more info
- Southbound
 - BBF native OLT adapter (voltha-protos to BBF OLT models)
 - Phase I: **3** VOLTHA operations
- vOMCI integration adapter
 - voltha-protos to vOMCI model(s)

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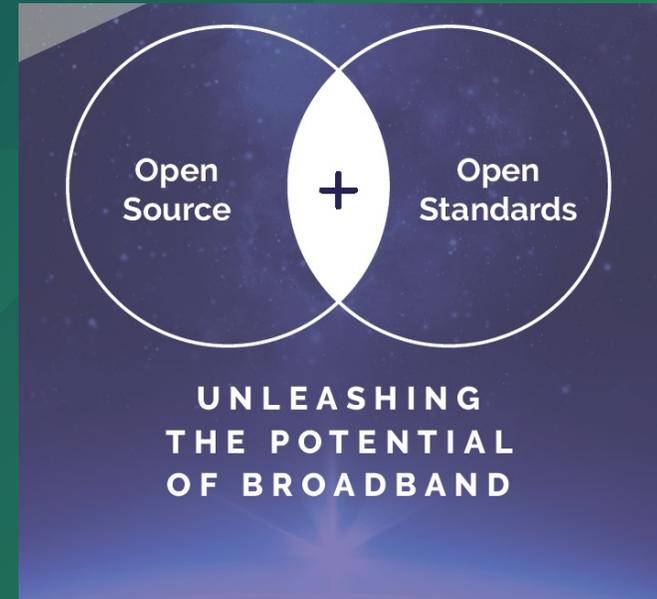
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open broadband



- Get involved in the future of Broadband and Cloud-based Access
 - Full details at <https://wiki.broadband-forum.org> (members) and broadband-forum.org/membership

VOLTHA API Calls List

ListLogicalDevices(google.protobuf.Empty)
GetLogicalDevice(common.ID)
ListLogicalDevicePorts(common.ID)
GetLogicalDevicePort(logical_device.LogicalPortId)
EnableLogicalDevicePort(logical_device.LogicalPortId)
DisableLogicalDevicePort(logical_device.LogicalPortId)
ListLogicalDeviceFlows(common.ID)
ListLogicalDeviceMeters(common.ID)
ListLogicalDeviceFlowGroups(common.ID)
ListDevices(google.protobuf.Empty)
ListDeviceIds(google.protobuf.Empty)
ReconcileDevices(common.IDs)
GetDevice(common.ID)
CreateDevice(device.Device)
EnableDevice(common.ID)
DisableDevice(common.ID)
RebootDevice(common.ID)
DeleteDevice
ForceDeleteDevice
DownloadImageToDevice
GetImageStatus

AbortImageUpgradeToDevice
GetOnulImages
ActivateImage
CommitImage
ListDevicePorts
ListDevicePmConfigs
UpdateDevicePmConfigs(device.PmConfigs)
ListDeviceFlows(common.ID)
ListDeviceFlowGroups(common.ID)
ListDeviceTypes(google.protobuf.Empty)
GetDeviceType(common.ID)
GetImages(common.ID)
SelfTest(common.ID)
GetMibDeviceData(common.ID)
GetAlarmDeviceData(common.ID)
EnablePort(device.Port)
DisablePort(device.Port)
GetExtValue(extension.ValueSpecifier)
SetExtValue(extension.ValueSet)
StartOmciTestAction(omci.OmciTestRequest)