Broadband Forum Update
November 2019

Author: Tim Carey (Nokia)

Background on the Broadband Forum

- The Broadband Forum (BBF) is the industry leading standards organization that is central to the development of the Broadband ecosystem focusing on the enabling revenue-generating services in the connected home, access, 5G, and Cloud for the benefit of service providers, equipment manufacturers, and communities worldwide.

- As a standards organization, the BBF collaborates with a number of other industry standards organizations and fora, as well a number open source communities using the BBF's Open Broadband program to accelerate the delivery of new broadband services.

Agenda

- Update on the BBF's use of the ONAP Broadband Services (BBS) Use Case with Feedback to the TSC.

- Information regarding other BBF CloudCO application notes that can be potentially use ONAP with Feedback to the TSC.

ONAP
OPEN NETWORK AUTOMATION PLATFORM

BBF's Use of the BBS Use Case

Broadband Services Use Case: Specification Update

- The BBF used the ONAP BBS Use Case to update its CloudCO Application Note (APPN-446) that is based on the Dublin BBS Use Case.

- The ONAP BBS Use case is a **single vendor, proprietary interface** use case, the BBF has completed the process of making the Use Case **multi-vendor** and will look at adapting the ONAP BBS Use case to **align to the BBF WT-411 Definition of interfaces between Cloud CO Functional Modules standard".**

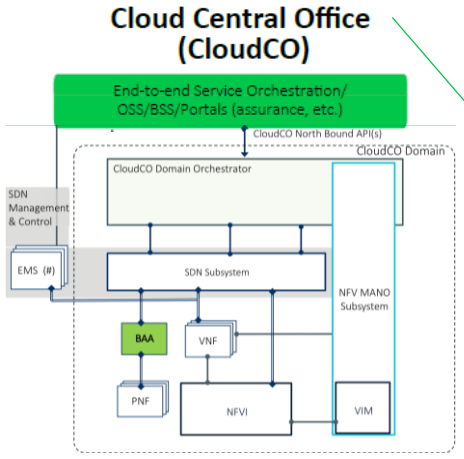
- The BBF has created implementations of the **multi-vendor** use case within the BBF's OB-LABs as well as vendor labs. This **was demonstration at Broadband World Forum 2019**.

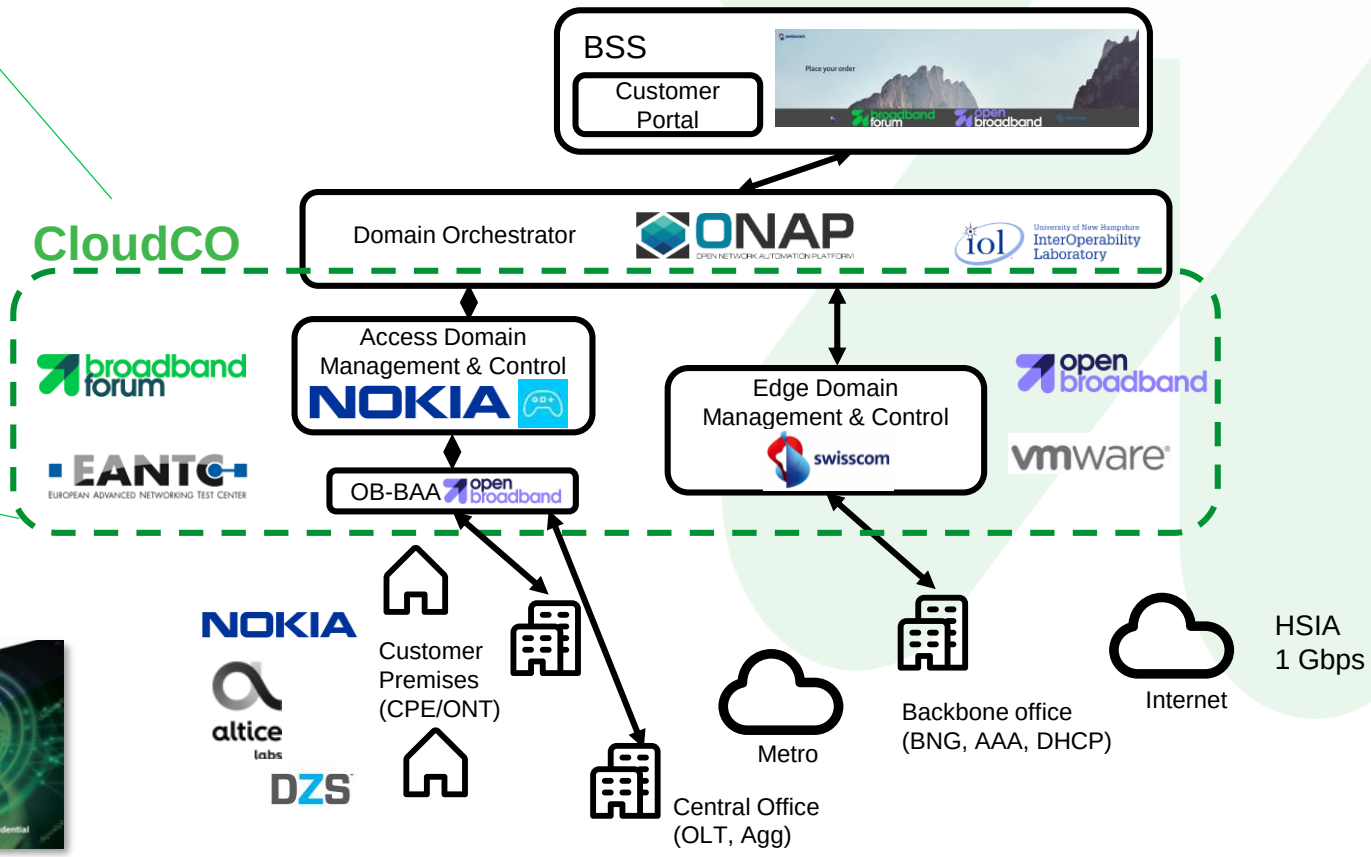
- **The BBF plans to extend the use case with additional functionality (closed loop) in 2020 which it will feed back into ONAP.**

Broadband Services Application Note (APPN-446)

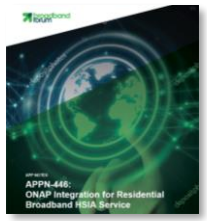
broadband forum

System Overview

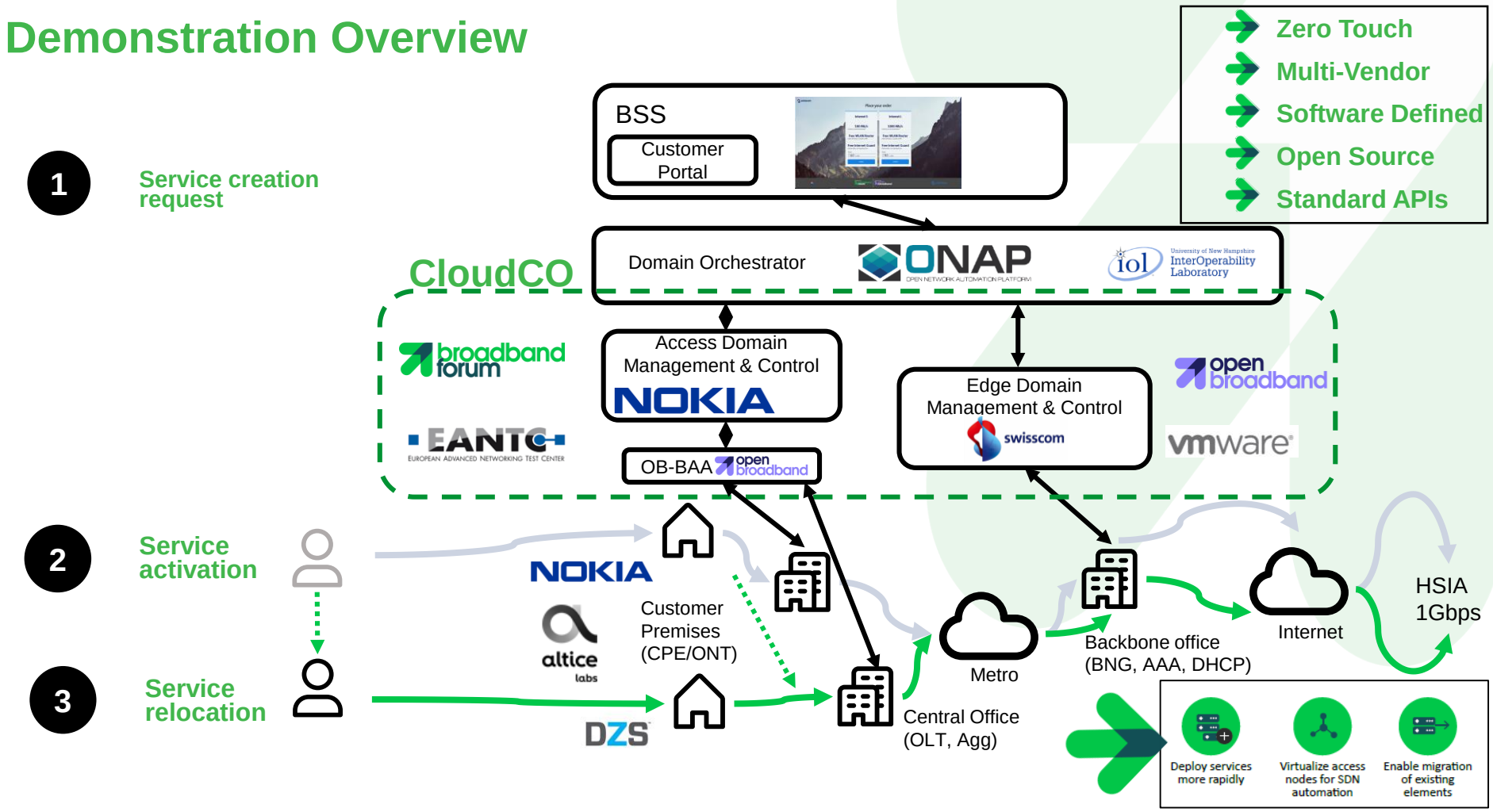




Enabled Via CloudCO APPN-446



Demonstration Overview



Broadband Services Feedback

- To make the Dublin BBS use case multi-vendor simply required a configuration change of the directed graph in SDN-C: **Yes – Good Job!**
  - **However the current implementation (bugs, hardcoding to a single vendor and deployment, non-working relocation scenario) of the BBS use case for the service design and in hardcoded, buggy SO workflows didn't allow for the standard interface to be implemented in SDN-C directed graphs. For this use case to be of any real use, enhancements are needed.**

- Certain Dublin components were misbehaving at some point so we had to restart them. For example SO or Policy APEX. Most probably the issue was related with logic residing in internal components like SO recipes or Policy rules via JS engine.
  - **It would be nice to have a functionality of restarting recipes or rules without restarting respective PODs.**

- Due do a power loss related to the severe weather, the NFVI suffered power loss and restart. The restart of the Kubernetes infrastructure caused ONAP to become non-functional upon bring-up (mostly Cassandra failure but other PODs as well).
  - **Overall we feel that ONAP instance needs to be hardened against these types of failures, along with better tools for recovery without reinstallation.**

Broadband Services Feedback (cont)

- In general, the ONAP BBS use case still has many manual steps to be completed after Dublin installation (besides Service design, onboarding and distribution).
  - **For ONAP to be the best chosen End-2-End orchestrator for CloudCO, it has to eliminate all manual steps so that it is easily deployable and maintainable.**

- In November 2019, the BBF will be reviewing the CloudCO BBS instantiation to determine what bugs and features to report to ONAP and what, if any, fixes and enhancements to provide for the Use Case.
  - We have attached the draft version of the bug fixes and enhancements we accumulated during the work to instantiate the CloudCO BBS application note.

Potential Bugs Found in the BBS Use Case

1. Service-Orchestrator (SO) must be enhanced to
   A. Read Remote-ID/CVLAN/SVLAN from incoming PNF_READY event (PNF registration) and NOT from the service attributes (or at least read from event and check with service attributes)
   B. Re-work the current limitation of relying on the 60 seconds timeout of HTTP call when the PNF-Handle recipe is being executed. This 60 seconds actually invalidates the recipe timeout value that someone can provision to SO database
2. Apex PDP Policy-component POD needs to be updated with a newer container image and a new model file encapsulating the latest Policy-related code for ONT relocation
3. Service-instance metadata attributes are never updated when an ONT relocation takes place
4. Service deletion currently is done with the help of a helper-k8s-mini-service but from ONAP side it only cleans A&AI. SO/SDN-C/Ext-API are not cleaned. Proper service deletion use case must be introduced
5. CPE authentication namespace should change to another namespace for the CPE authentication event
6. Choose an appropriate allocation scheme for Remote-ID/CVLAN/SVLAN and remove the demo-oriented static mappings and PORT-VLAN calculation algorithm
   A. Circuit-ID should be read from PNF events provided by the BNG, providing access to/notification of this information in the operator OSS/BSS
   B. VES notifications from BNG rely on demo specific SourceNames, which will not be available to a BNG within a typically deployment.
7. RGW MAC address parameter may not always be necessary. Check if Edge part just relays the information taken from SDN-C. If that is the case, this parameters offers no real-value. Also remove the RGW MAC validation from BBS-event-processor microservice
8. For some reason, DCAE's RestConfCollector component (RCC) saturated all the threads from the k8s worker node it was running on. It created about **28770 threads** in 10 days and left their resources not-OS-reclaimable. That in turn resulted in a lot of PODs that were co-located to the same node to fail as their functionality was relying on periodically creating new threads. OS could not start any new native thread … all resources were consumed.

Potential Feature Enhancements in the BBS Use Case

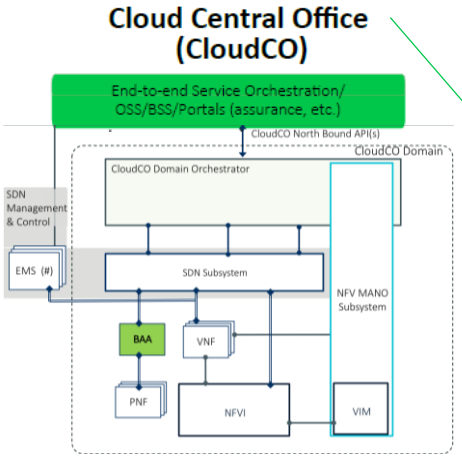
1. BBS use case provisioning should be fully automated (currently after Dublin installation, too many manual steps must be done in many components)
2. Reevaluate the SDN-C technical-debt implementation (choosing between Access SDN M&C vendors based on flags found in core DGs)
3. DCAE service components (RESTconf-Controller & BBS-event-processor) are manually started inside Cloudify platform of DCAE.
   A. May be mandated by ONAP community to start these via CLAMP and certain Policy related data being injected into them dynamically
   B. May be mandated by ONAP community to adhere to some development standards that are now missing
   C. For BBS-event-processor also check item #10
4. Introduce proper service deletion in SO
5. No Robot integration tests exists for the use case
6. Enhance BSS Portal to remove hard-coded segments and make it more user-friendly
7. Introduce close-loop use case
8. Introduce service-change use case
9. Remove BBS-event-processor in favor of moving its functionality to Service-Orchestration where it mostly belongs
10. Register external controllers via ESR/AAI. Investigate topology discovery considerations.
11. **Develop a BBF WT-411 standards based DG for the Use case in the Access and Edge**

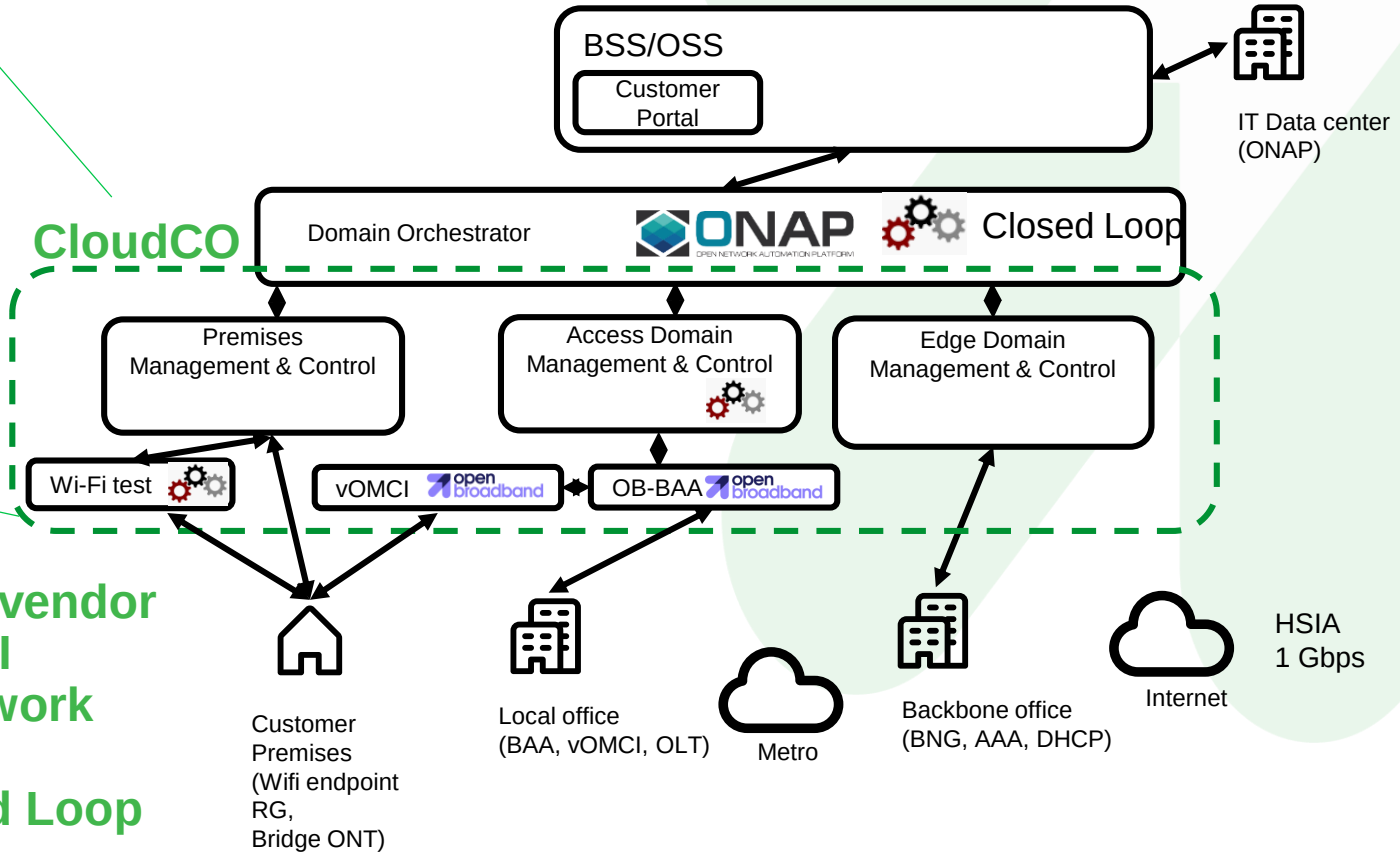
Expanding the use of ONAP for other CloudCO Application notes

Expanding the use of ONAP in BBF CloudCO

- The BBF uses Application Notes to drive the scenarios that are instantiated using the CloudCO framework. There is **work currently being proposed** that would expand the use of ONAP and thus **standardized interfaces within ONAP** that will:
  - Extend the existing BBS Use Case to include:
    - Support for ONU management via vOMCI functions
    - Change and Delete of the BBS service
    - Expand BBS to the premises
  - Introduce new Application Notes for the following
    - Broadband services closed loop for network troubleshooting
    - Premises WiFi troubleshooting use case
- Based on the work that will be planned, the expectation is that these CloudCO application notes can be demonstrated at the BBWF in October 2020. It could be possible that we show these application notes during an ONS event.

2020 BBWF Demonstration Overview





APPN-446 w/multi-vendor ONUs using vOMCI
APPN-Access Network Closed Loop
APPN-Wi-Fi Closed Loop

CloudCO Feedback: Use of ETSI NFV Specifications

- The CloudCO framework heavily relies on the NFV specifications from ETSI.
- As ONAP plays the role of the CloudCO domain orchestrator, ONAP would be expected to perform VNF LCM.
- The BBF is thankful that the ONAP community is working toward **alignment with the ETSI NFV specification sets** and encourages continued involvement and alignment **such that we can use the VNF LCM capabilities of ONAP in future Application Note instantiations**.