VOLTHA v2.10 Techinar

July 7, 2022 | 9am PDT

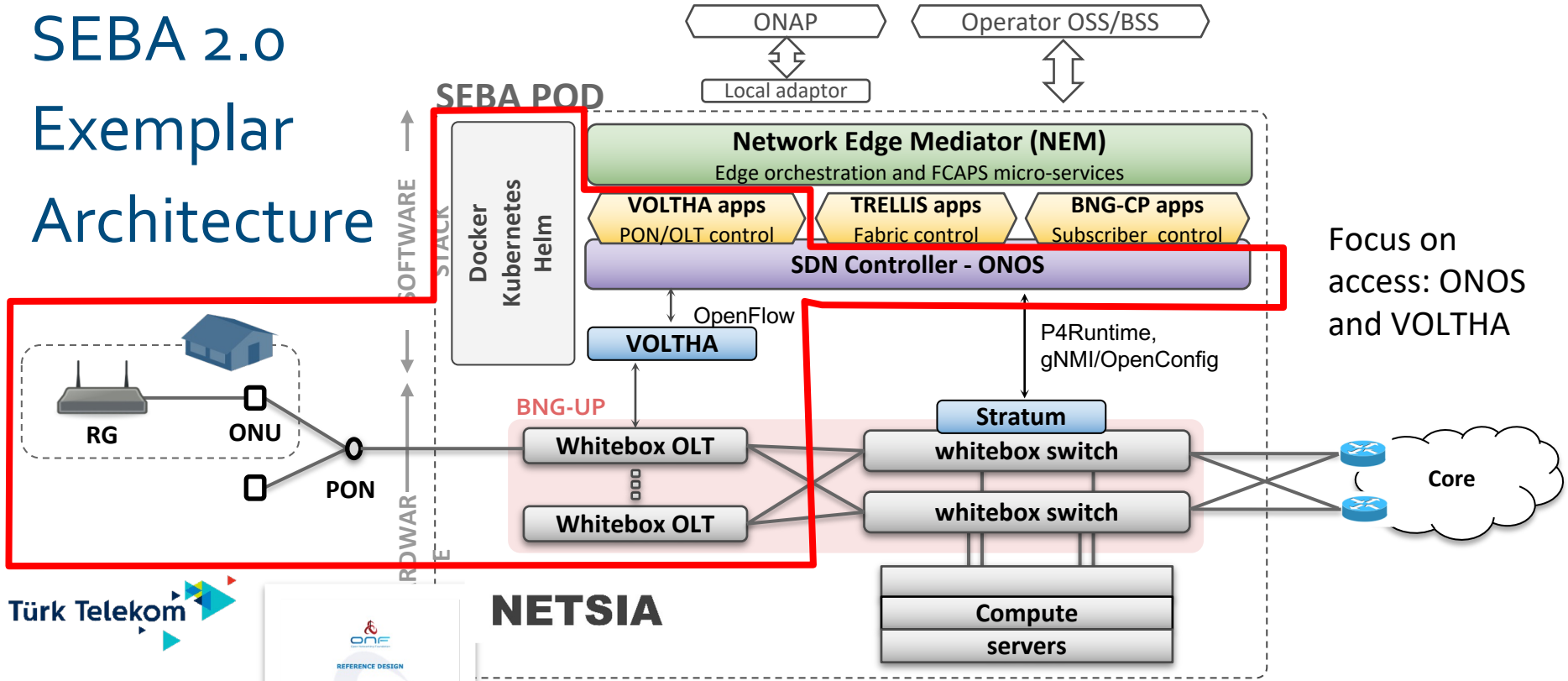


Andrea Campanella - ONF
Amit Ghosh, Elia Battiston - Radisys

Outline

- SEBA RD 2.0 and VOLTHA Architecture, project state and deployments
- VOLTHA 2.10 release
  - Fiber to the Building (FTTB) Support
  - Scale enhancement and Rolling software upgrade capabilities
  - Initial Combo PON support
  - Platform stabilization (ONOS 2.5.8, Extended Message Support, Unknown MEs handling, ONU Delete and re-discovery)
  - BBF Adapter Initial Implementation
  - Testing (FTTB, Memory Leak,TIM, DMI, Rolling upgrade)
  - Certification of new OLT
  - ONOS replacement Design
- VOLTHA 2.8 LTS Support
- Transition to Community leadership & new TST
- Q/A

SEBA 2.0 Exemplar Architecture



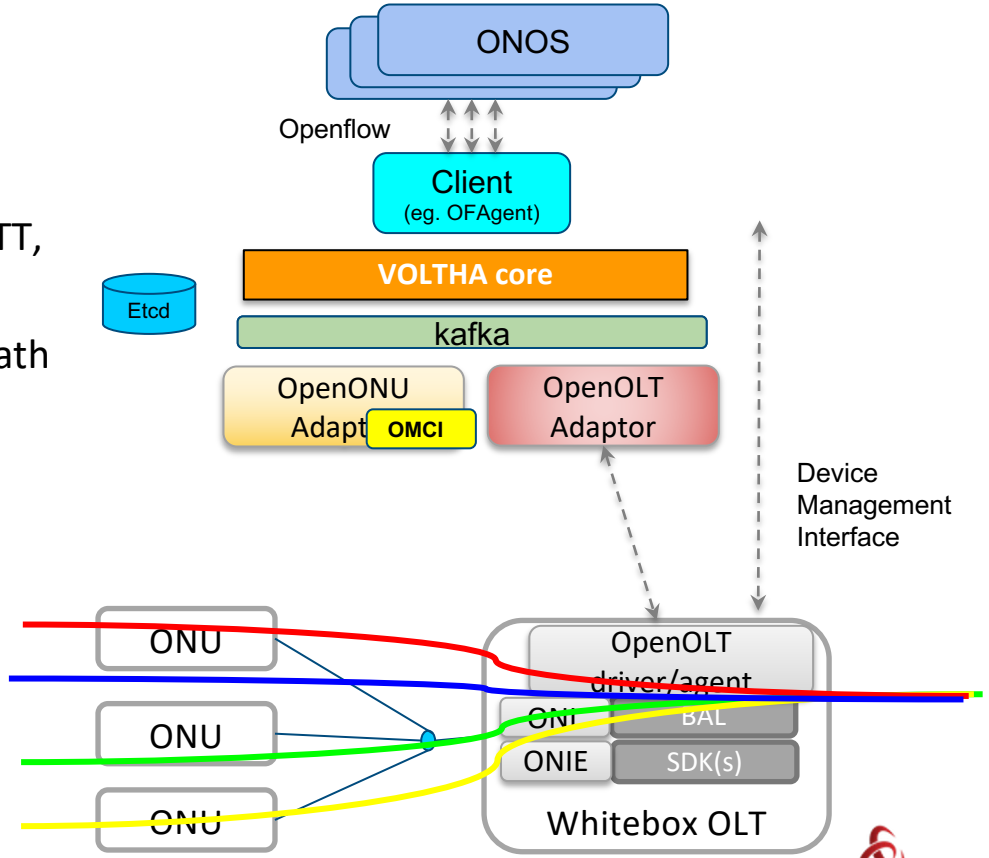
Focus on access: ONOS and VOLTHA

[Seba RD 2.0 is Released]

[SEBA RD 2.0 Webinar]

VOLTHA: Virtual OLT Hardware Abstraction

- Common Control & Management for PON networks (OLTs and ONUs)
- Different brands of OLTs and ONUs
- Multiple services and operator workflows (ATT, TT, DT, TIM) - FTTH and FTTB
- Device Management Interface for non datapath operations (e.g olt software upgrade)
- Scale deployments (4096 ONUs per Stack)
- Software update (VOLTHA and ONUs)
- gRPC for inter container communication
- Hardware, scale, soak testing
- 2.8 LTS release



[VOLTHA 2.9 Webinar]

https://docs.voltha.org/master/release_notes/voltha_2.9.html

VOLTHA Deployments with Operators

Voltha is in production with live customers:

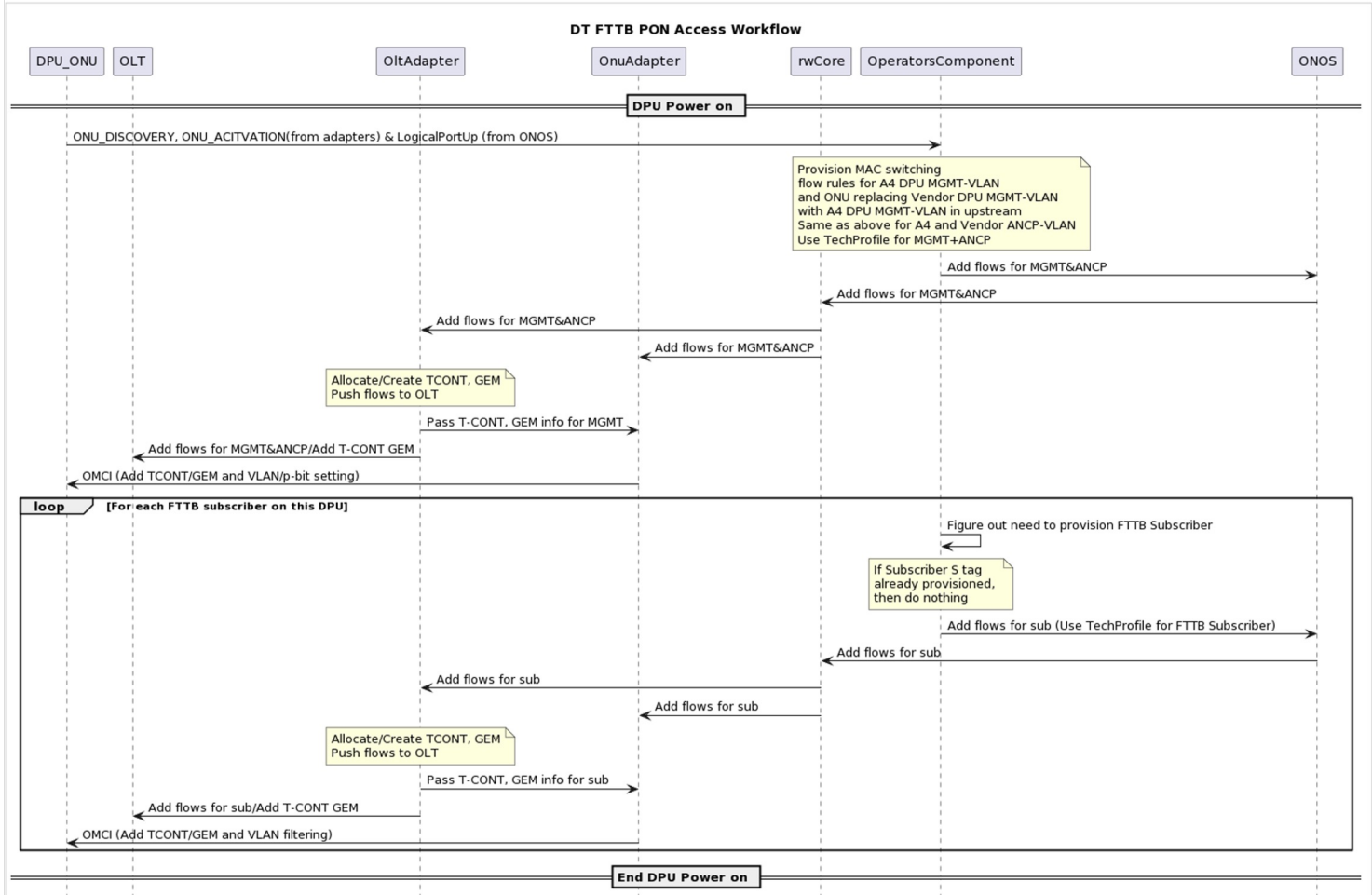
- Deutsche Telekom (DT) as part of the A4 project
  - DT's first live deployment
  - mass market deployments with VOLTHA 2.10
- Turk Telekom (TT)
  - TT initial deployment
  - TT scale to million of subscribers

At least 4 other operators have VOLTHA based solutions in several stages of field trial and production

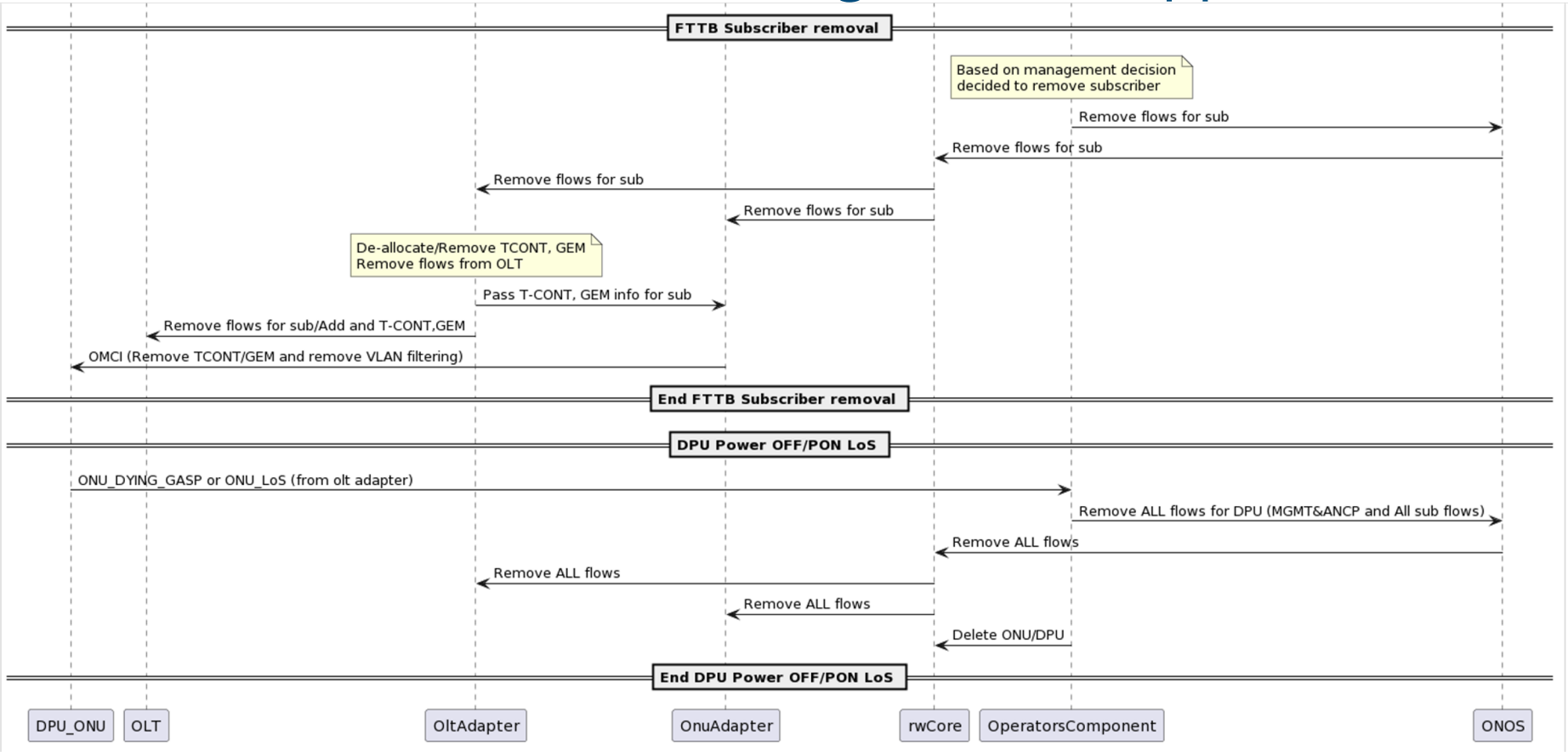
Fiber to the Building (FTTB) Support

- FTTB (Fibre to the Basement) uses DPU (Distribution Point Unit) as the termination of the PON network towards the subscribers.
- DPU has two parts, a G.fast part responsible for switching of traffic towards the multiple subscribers connected to the DPU and a PON part (ONU) for connecting to the PON network
- VOLTHA is responsible for managing only the PON part of the DPU
- DPU talks NETCONF and ANCP towards its PMA. It would work on a specific VLAN for this traffic. All the DPUs use the same VLAN for this management traffic
- Each subscriber is identified by a unique S-TAG, same as FTTH.
- Design doc available at https://docs.google.com/document/d/1l3RHt3c0Pc3BcyqRsCOIeawTNqlQFZz3VDpC7Pv3L8U/

Fiber to the Building (FTTB) Support



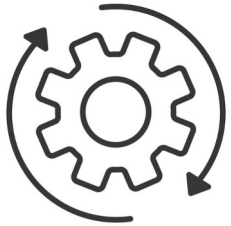
Fiber to the Building (FTTB) Support



Scale enhancements & Rolling software upgrade

- **Scale enhancements**
  - 4096 subscribers on one OLT with 1 VOLTHA stack
  - 4096 subscribers on two OLTs with 1 VOLTHA stack

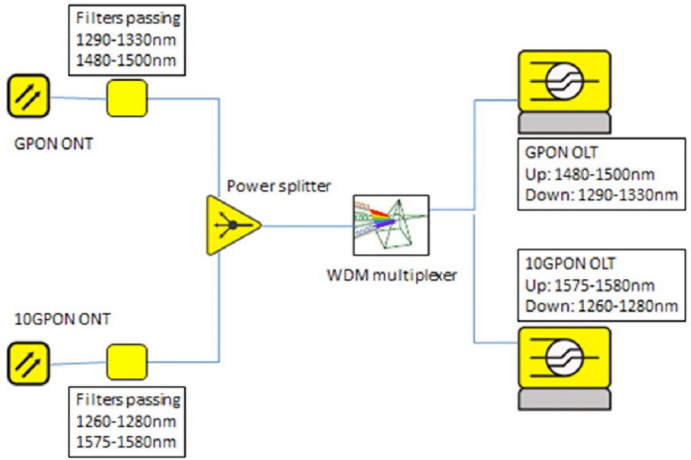
- **Rolling software upgrade**
  - Kubernetes rolling upgrade of pods
  - Requests served with no pod downtime
  - In Service Software update of VOLTHA PODS
  - ONOS ISSU mechanism



Support for in production Updates and for full 64 Ports GPON OLT completely loaded with ONTs in just one stack.

Initial Combo PON support

- **Initial Combo PON support**
  - Framework for dynamic detection of PON Transceiver Technology
  - Configure the MAC and PON modes.
  - DIfferent PON port ranges reported to VOLTHA-core
  - BBSIM support



Deploy COMBO OLT now with GPON ONTs, move to XGSPON as per customer needs in the future with no OLT change.

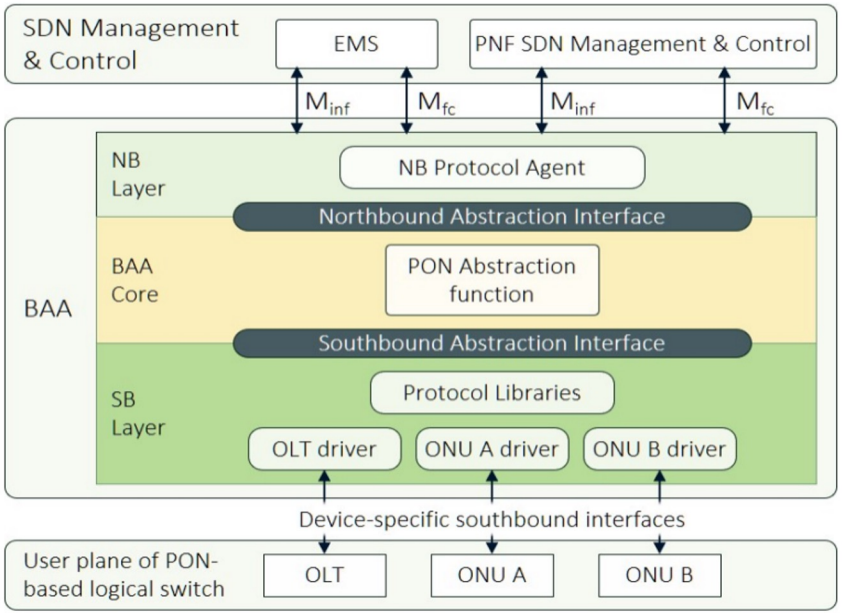
Platform stabilization

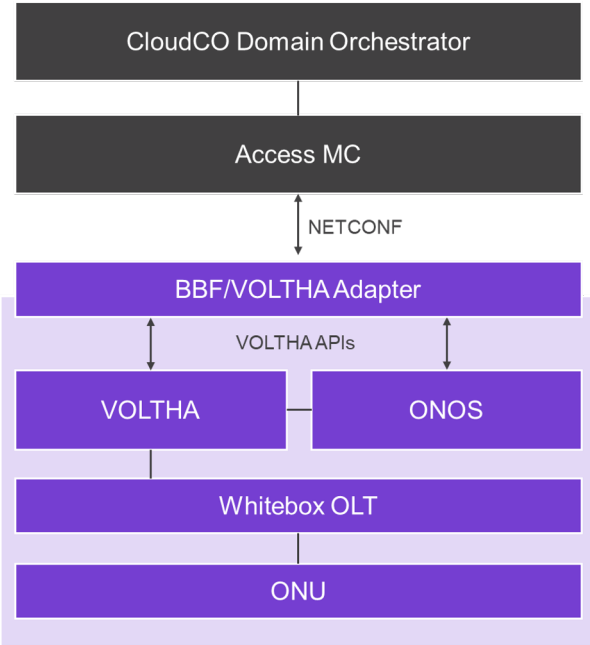
- **OMCI Extended Message Support**
  - Reduced number of messages for ONU Software Upgrade and MIB template download
  - Higher speed of software image and MIB template download
- **Unknown MEs handling**
  - Relaxed decoding of unknown MEs
  - Discaded unknown entities but proceed with ONU MIB download for that ONU.
- **ONU Delete and re-discovery**
- **Resource Cleanup**
- **ONOS 2.5.8**

Credit: https://www.fiverr.com/buigiahuy/fix-you-html-css-javascript-bugs

Better overall error handling and new ONUs support, code quality and extensibility, ensuring longer lifespan.

The ONF-BBF collaboration





VOLTHA's features closely match the Broadband Access Abstraction (BAA) layer for PON Access Networks, defined in the Cloud CO Architecture (BBF TR-384)

A translation layer between CloudCO Access M&C and VOLTHA/ONOS has been introduced.
It translates the northbound NETCONF APIs to enable a BBF-compliant management interface for VOLTHA Whitebox OLTs.

YANG models for VOLTHA

To expose operations through NETCONF, YANG models that capture the right information are necessary

Device-related operations

- Provision OLT hardware
- Retrieve list of OLT devices
- Enable OLT hardware
- Retrieve list of ONT devices

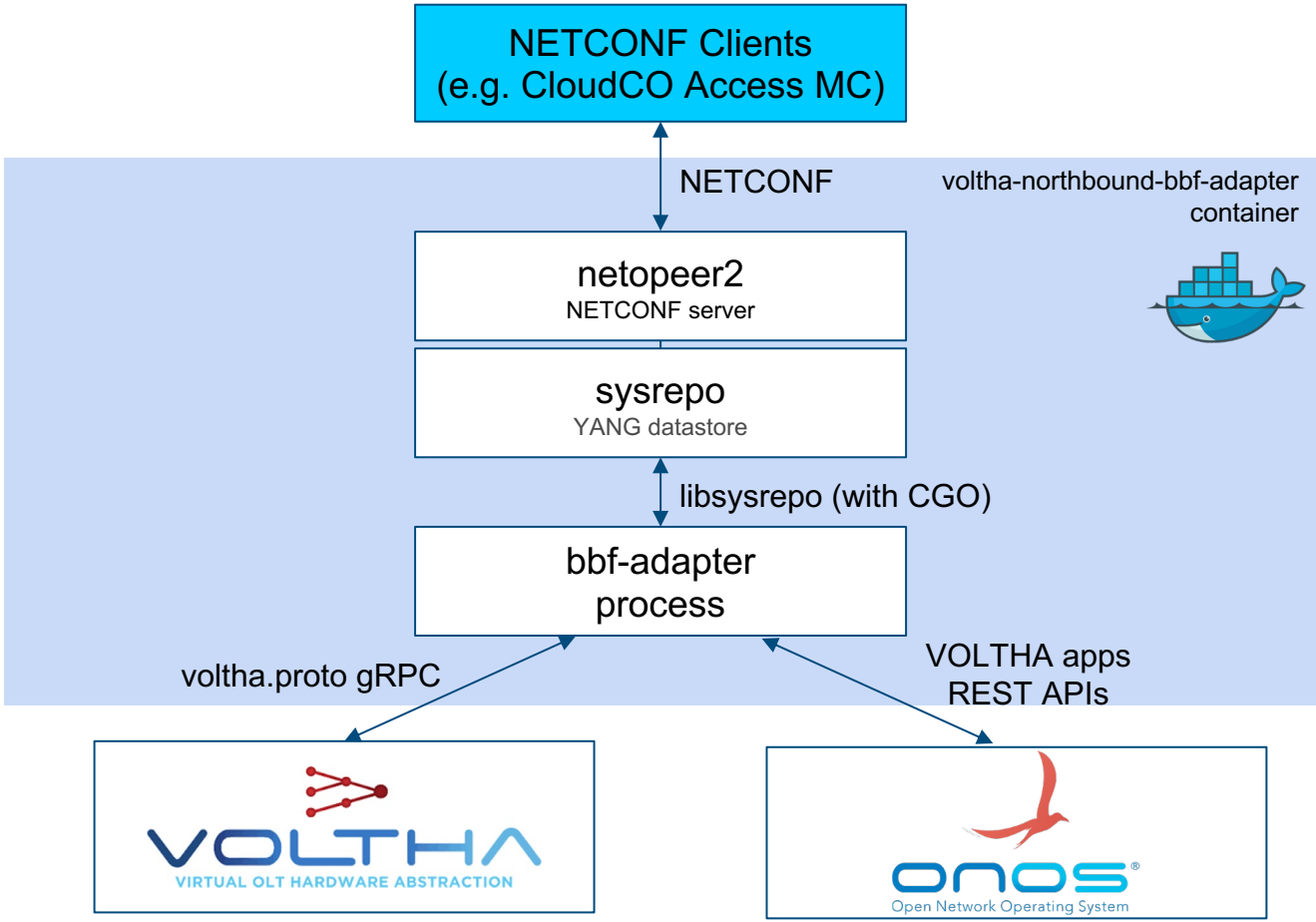
bbf-device-aggregation (BBF TR-383)
bbf-software-management (BBF TR-383)
ietf-hardware

Service-related operations

- Provision service subscription
- Delete list of service subscriptions
- Delete all service subscriptions

Work in progress, based on yet to release BBF models with VOLTHA specific augmentations

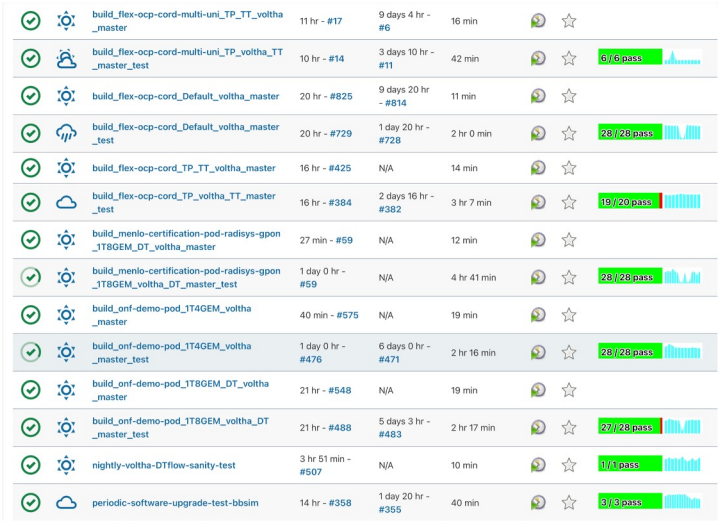
BBF Adapter architecture



VOLTHA+ONOS 2.10 Testing

New 2.10 Tests

- FTTB tests
- Memory leak tests, 200 device deletions
- Onu Adapter: Unknown ME tests and Extended OMCI message support for MIB Upload, Mib Audit, MDS mismatch
- ONU Delete and Rediscovery
- Mac Learning in TT Sanity
- DMI tests on ADTRAN hardware
- Rolling upgrade
- TIM workflow tests
- Unknown attribute tests



Nightly scale and 180+ Hardware tests and a Jenkins view for 2.10 Tests
https://jenkins.opencord.org/

VOLTHA+ONOS 2.10 Testing

1134 total nightly tests between HW and BBSIM (including Soak and Scale)

7 HW pods with 7 different OLTs certified, 5 different ONU brands, 1 DPU

Continuous Certification -- Zyxel SDA3016SS Combo OLT

VOLTHA 2.10 adds **Zyxel SDA3016SS Combo OLT** to the continuous certification**:**

- whitebox OLT
- 16 Combo-PON ports
- openolt agent and adapter
- temperature hardened
- x86 architecture COTS CPU

More info

ZYXEL COMMUNICATIONS

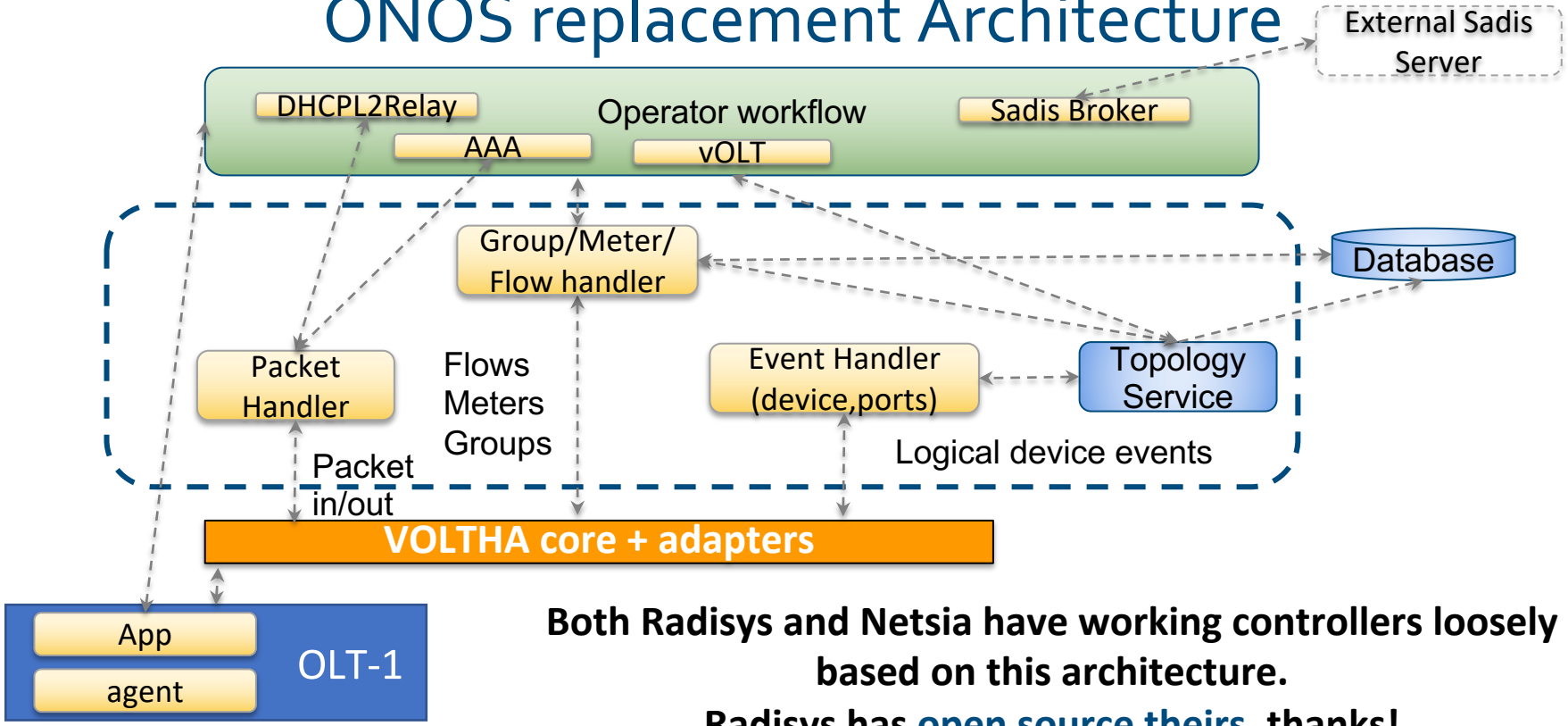
Continuous Certification

180+ nightly Tests certify several HW:

- Edgecore ASFVOLT16 (XGSPON), ASGVOLT64 (GPON)
- Radisys 3200G (GPON)
- Radisys 1600G (GPON)
- Radisys 1600X (GPON)
- Adtran SDX 6320 (GPON)
- **Zyxel SDA3016SS Combo OLT**
- Sercomm FG1000 (GPON ONU)
- …….

ONF Marketplace:
https://opennetworking.org/marketplace/?_product_project=voltha
Operator's Procurements is based on successful ONF certification
https://opennetworking.org/continuous-certification-program/

ONOS replacement Architecture



Both Radisys and Netsia have working controllers loosely based on this architecture.

Radisys has open source theirs, thanks!

Participate in TST discussions and architectural design for the next step of VOLTHA's journey

2.10 Accomplishments

- **Fiber to the Building (FTTB) Support**, DPU management, ancp traffic and rules single tagged with VLAN swap, Subscriber traffic, ADTRAN DPU
- **Scale enhancements**, 4096 subscribers per VOLTHA stack
- **Rolling software upgrade**
- **Initial Combo PON support**, dynamic detection of PON Transceiver Technology
- OMCI Extended Message Support with reduced number of messages and Higher speed for software Upgrade and MIB template download
- **Unknown MEs handling**
- **ONU Delete and automatic re-discovery**
- **BBF Adapter** Initial Implementation with Northbound NETCONF server for OLT and ONU info with standard BBF models
- Move to ONOS 2.5.8 with bug fixes
- Certification of new OLT

https://docs.voltha.org/master/release_notes/voltha_2.10.html

Support for 2.8 VOLTHA LTS release

VOLTHA 2.8 was the first Long Term Support and ONF committed to update, patch and maintain the software (more info)

During release 2.10 continuous testing was done on 2.8 and **more than 15 fixes,** between codebase and tests, were back ported.

Continuous updates were provided to the upstream **2.8 helm charts and documentation**.

VOLTHA 2.8 will be supported until **December 2022**.

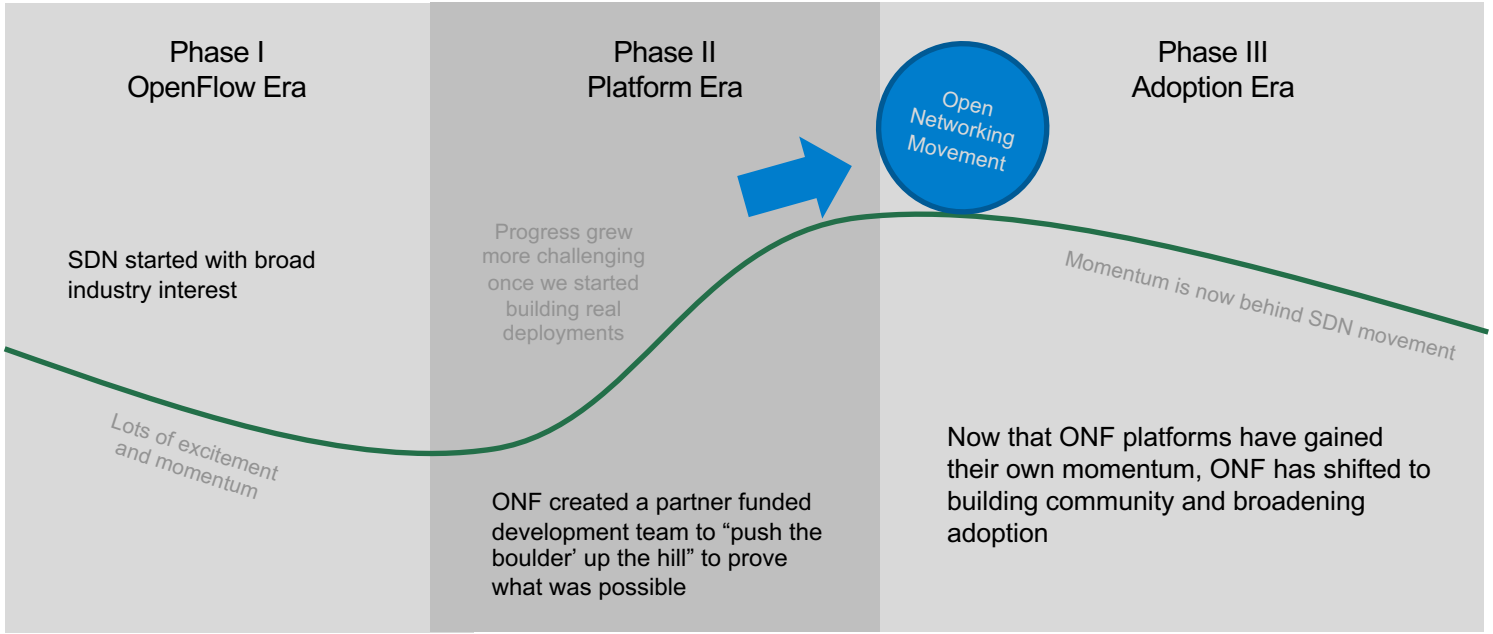
Open Networking Foundation

VOLTHA
in context of ONF

Timon Sloane - ONF

Open Networking is at an inflection point

ONF has crossed an inflection point and momentum is now with us

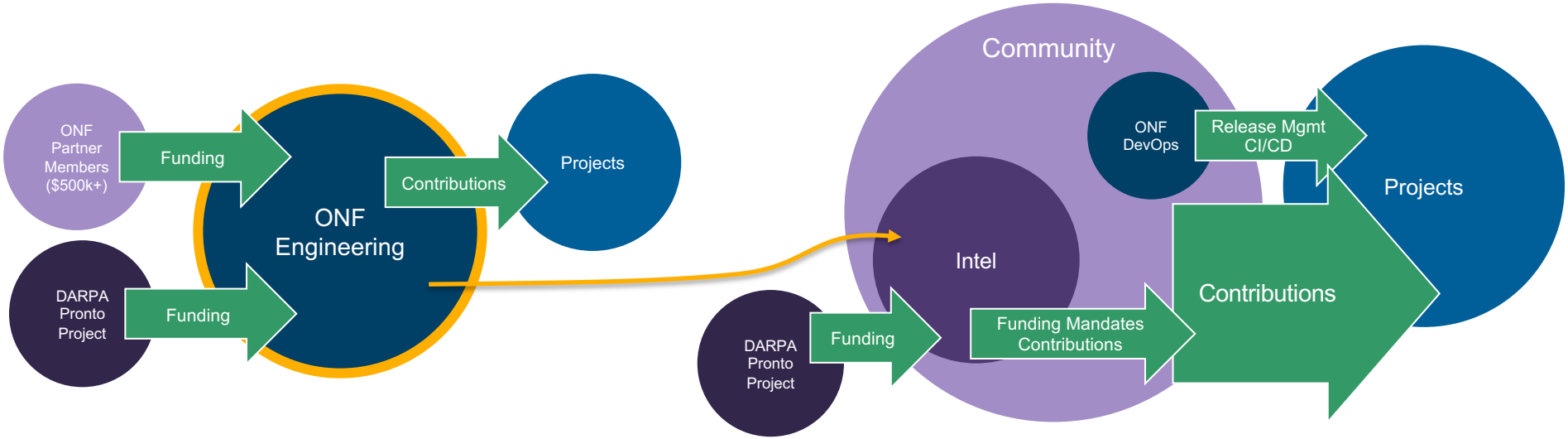


ONF Through Phase II
Partner-Funded Engineering

- ONF owned & led OSS platform development
- 40+ developers funded by Partners
- Small outside dev community

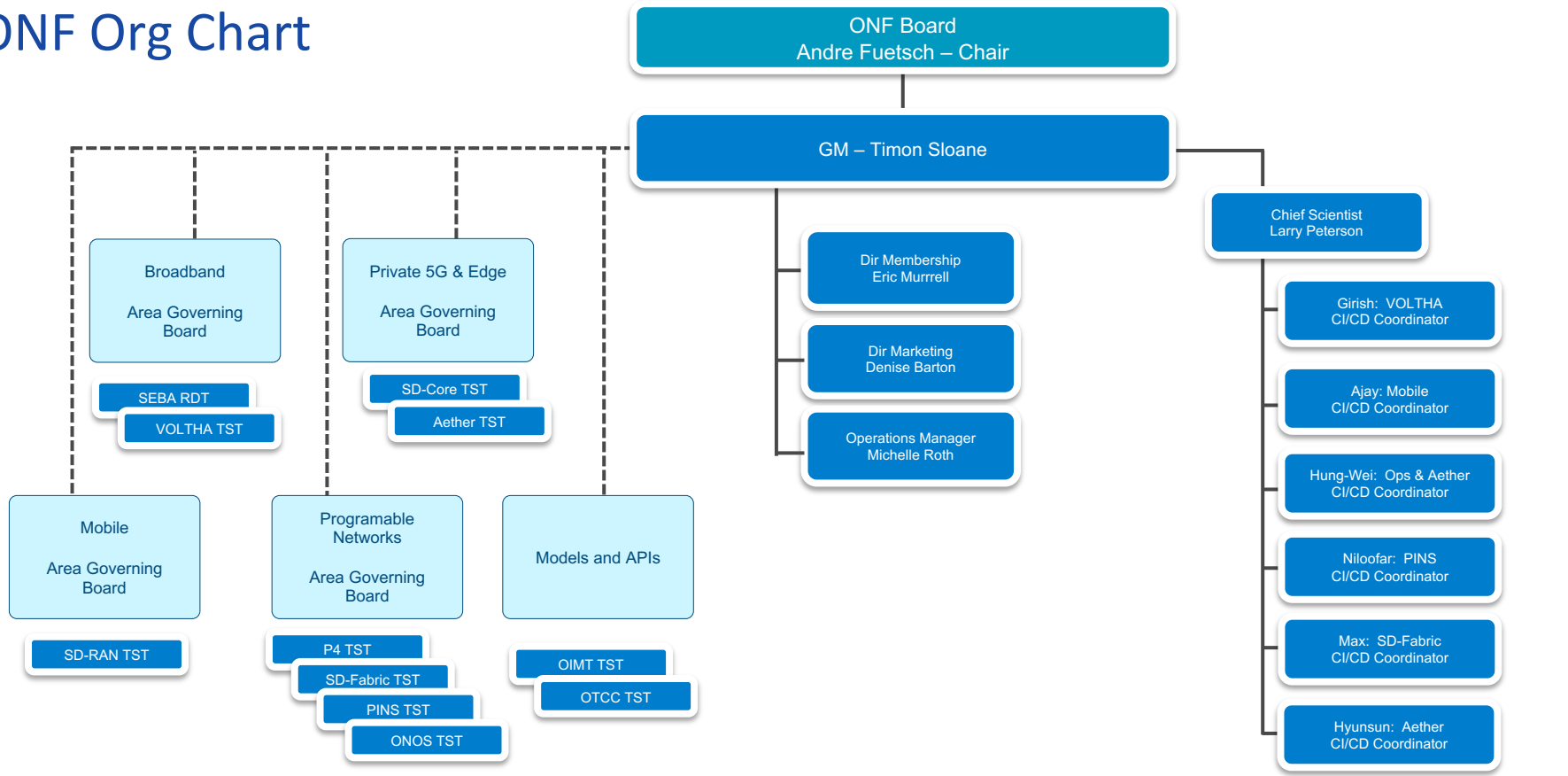
ONF in Phase III
Open Community-Based Approach

- ONF hosts platforms & nurtures developer community
  - Small engineering team for release mgmt & CI/CD
  - Much larger dev community making majority of contributions



- Intel becomes a stronger community member
  - Former ONF engineers remain engaged in ONF projects
  - DARPA funding continues to support dev team contributing to ONF projects

ONF Org Chart



2022 - Project Area Goals

Broadband

VOLTHA community under solid community leadership, with adoption growing and community supporting the product deployments.

Recruit additional operators to publicly share that they are consuming and supporting VOLTHA.

Additional PON vendors certified with the project

Align with BBF for VOLTHA to fit in with a CloudCO/BAA architecture

Open RAN

SD-RAN recognized as the leading open RIC platform.

DT trial to have deployed another RAN CU/DU vendor, demonstrating dual source for all RAN components.

Align SD-RAN with standardized O-RAN service models

New use case demonstrated (power management?) with multiple interoperable xApps.

Private 5G & Edge

Aether becomes de facto open platform for 5G/Edge research (for both academia and commercial)

Aether adopted for at least 1 commercial SaaS product offering

SD-Core adopted by at least one provider building a private 5G solutions

Programable Networks

DPU/IPU support integrated into SD-Fabric

P4 UPF implemented on DPU/IPU and integrated into Aether

PINS demonstrating compelling ONOS-controlled SDN use case on top of conventionally routed network

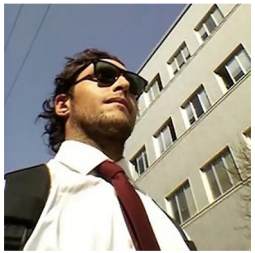
Broadband Meetup Berlin

… a great success

SEBA/VOLTHA Community

A Special Thanks





Girish Gowdra, Hardik Windlass, Matteo Scandolo

Saurav Das

New Technical Steering Team Leads

Amit Ghosh
amit.ghosh@radisys.com

Mahir Gunyel
mahir.gunyel@netsia.com

Thank You

TST Meeting

(Tuesday at 8 AM PST)

docs.voltha.org

andrea.campanella@intel.com
elia.battiston@radisys.com
amit.ghosh@radisys.com