SEBA Techinar

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ONF's Reference Designs

Reference Designs

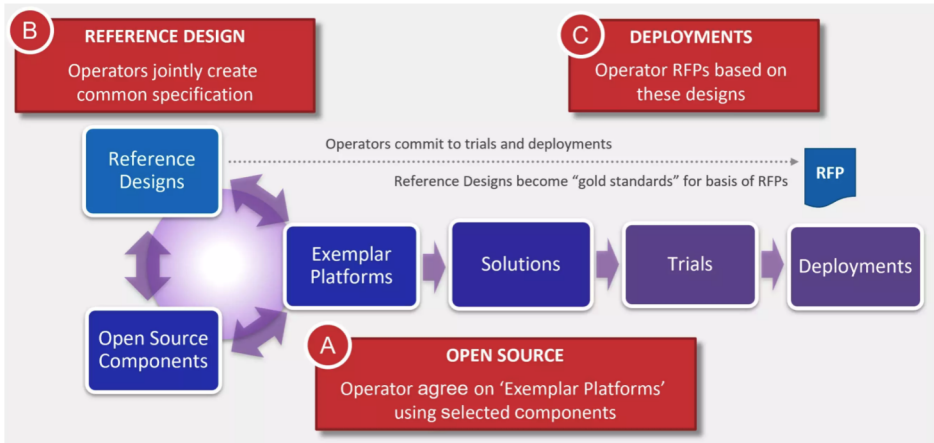
- "Gold Standards" for what's to be deployed in production networks
- Resources from Architecture, Design & Ops teams
- Collaboration betweens community of vendors, supply chain and operators.
- Operators to craft RFPs based on these designs

"Curated Open Source" Model

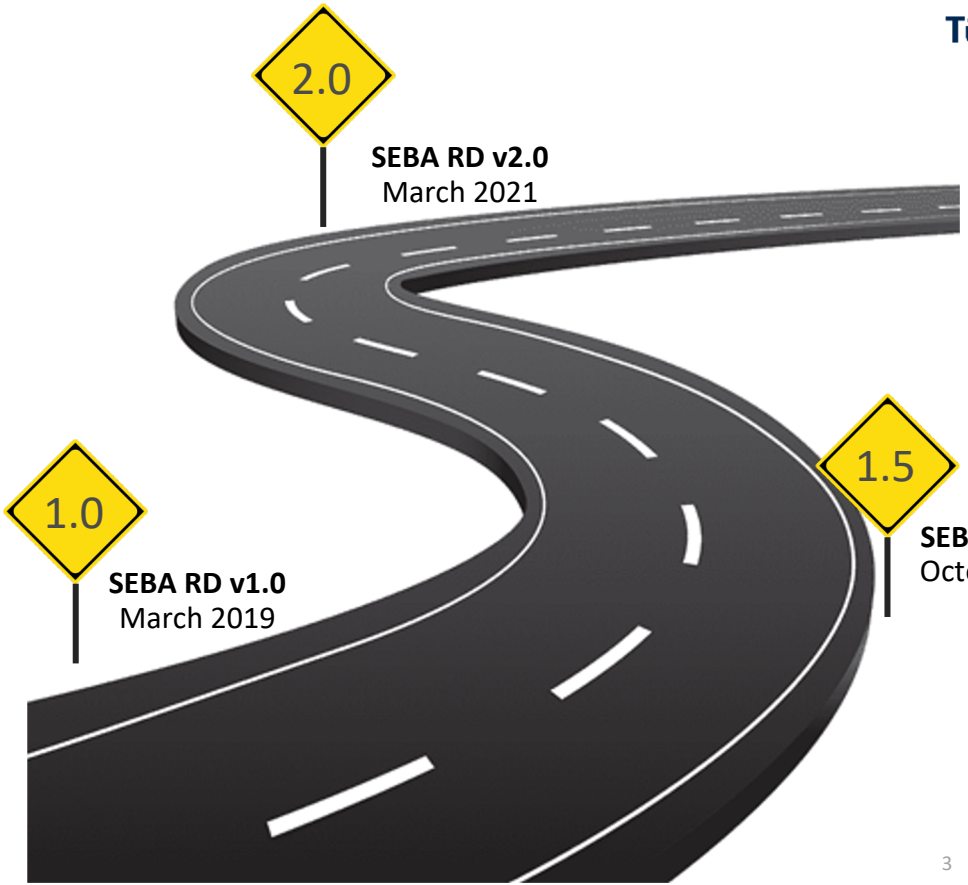
- Operator Consensus on ' exemplar platforms" using Selected Components
- implementation is aligned between operator's requirements and supply chain offering

Reference design creation process

- Partner only definition/creation phase
- Member review and comment
- General public release



Overview of SEBA Reference Design



Türk Telekom

T··

NTT Group

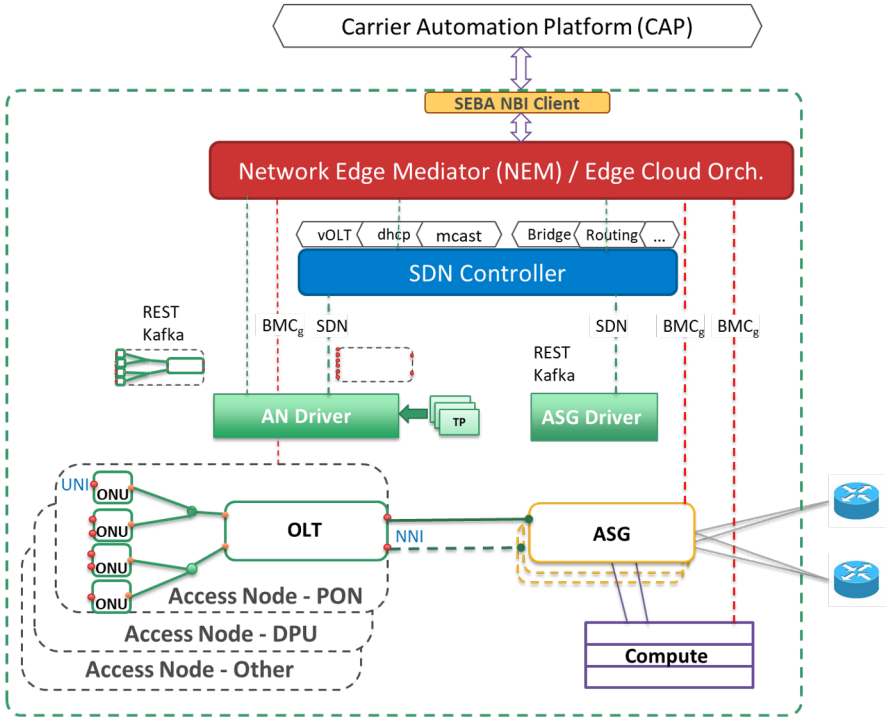
NETSIA

Radisys

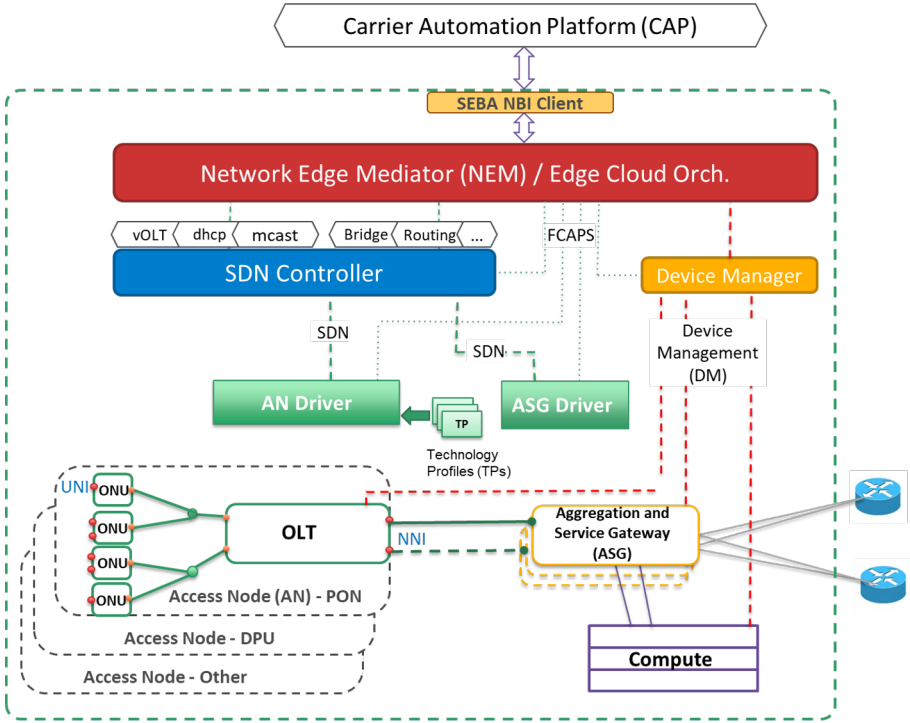
ciena

- Standardization
- Open Source
- Productization

RD1.0 vs. RD2.0 - High Level Target Architecture



RD1.0



RD2.0

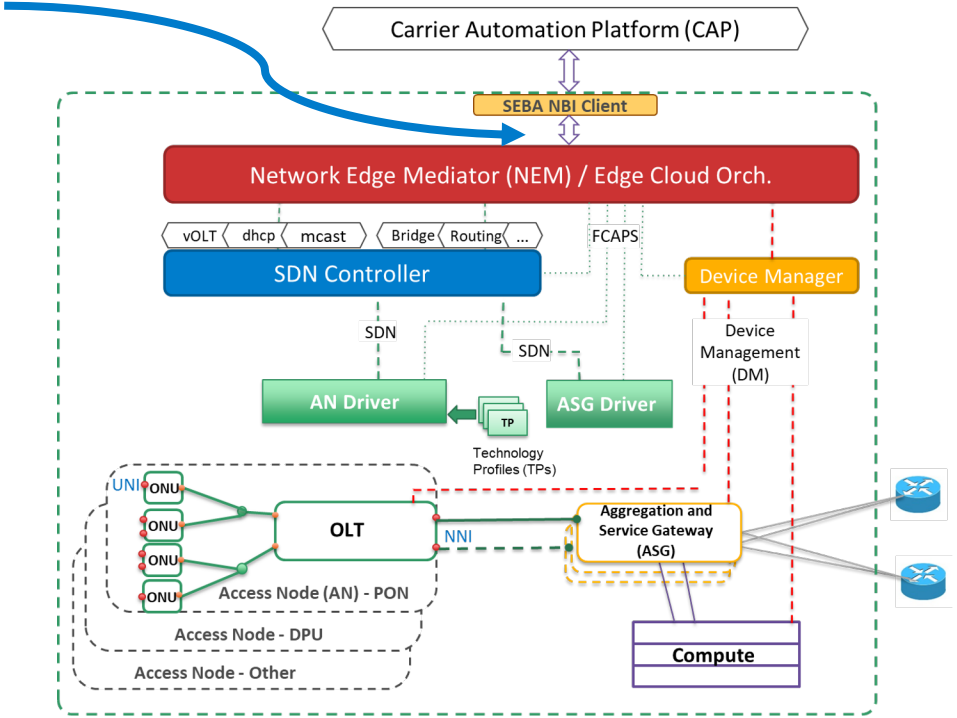
RD 2.0 Additions

- Detailed NBI APIs for POD, OLT, ONT, Service Management
- Broadband Network Gateway (BNG) Updates
- Device Management (DM)
- Per OLT VOLTHA Stack Model for Scaling
- Access Technology – Fixed Wireless Access (FWA) / mmWAVE
- Use Cases for POD Lifecycle Management

RD2.0 - Northbound Interface APIs

Added NBI APIs for for POD, OLT, ONT, Service Management

- With definitions
- With input parameters & return values



RD2.0 - Northbound Interface APIs

POD Management

- Provide inventory info
- Monitor hardware resources
- Status Reporting
- Alarm Management
- Performance Monitoring

Service Management

- Provision/Delete service subscription
- Delete list/all of service subscriptions
- Enable/Disable service subscription
- Create/Delete technology profile
- Create/Delete/Get service definition
- List All service definitions
- Create/Delete/Get speed profile
- List all speed profiles
- List ONTs/UNIs having specific service
- Get service subscription info

OLT Management

- Provision OLT hardware
- Assign CLLI associated to specific hardware inventory via serial number
- Retrieve list of OLT devices
- Retrieve OLT hardware inventory information
- Retrieve list of OLT NNI/PON ports
- Retrieve OLT PON port information
- Manage OLT software and upgrades
- Reset/Delete OLT hardware
- Run available OLT diagnostics and retrieve results
- Retrieve Operational Status
- Retrieve inventory information for SFP devices plugged into OLT ports
- Disable/Enable OLT hardware

ONT Management

- Provision ONT hardware
- Update ONT hardware serial number
- Map upstream ONT identifications (OLT CLLI ONT port) to dynamic VOLTHA assignments
- Retrieve list of ONT devices
- Retrieve ONT hardware inventory info
- Retrieve list of ONT UNI ports
- Manage ONT software and upgrades
- Reset ONT hardware
- Manage associated ONT DB configurations
- Delete ONT hardware
- Run available ONT diagnostics and retrieve results
- Retrieve Operational Status
- Retrieve inventory information for SFP device plugged into the ONT
- Disable/Enable ONT hardware
- Reset ONT UNI port
- Enable/Disable ONT UNI

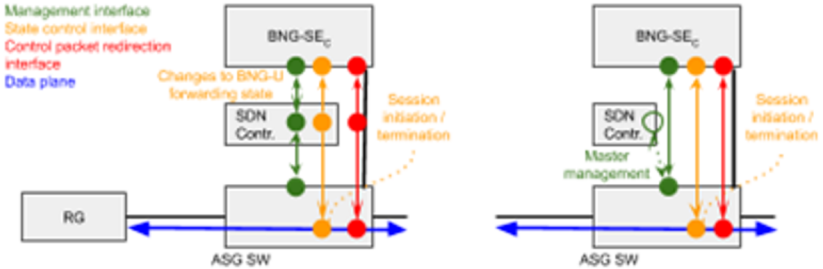
RD2.0 Broadband Network Gateway Updates

- Horizontal separation between Service Edge & Routing Part as well as functional decomposition (SEBA RD1.0)
- RD2.0 extends with vertical separation according to CUPS design principles of BBF TR-459
- Definition of requirements & implementation of the three important interfaces of BBF TR-459
  - Management interface for general aspects
  - State control interface for programming the forwarding
  - Control packet redirection interface for sending control plane information
- Focus on deployment options
- Complementary to BBF TR-459, analysis & implementation work in ONF TASSEN for BNG/UPF data plane abstraction with gRPC and P4Runtime

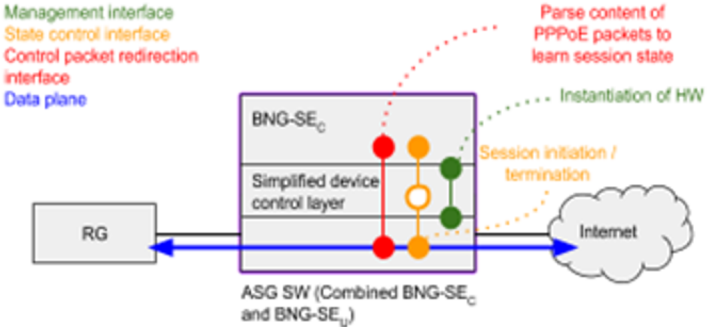
BNG deployment options

Native BNG-SE$_C$

Standalone BNG-SE$_C$



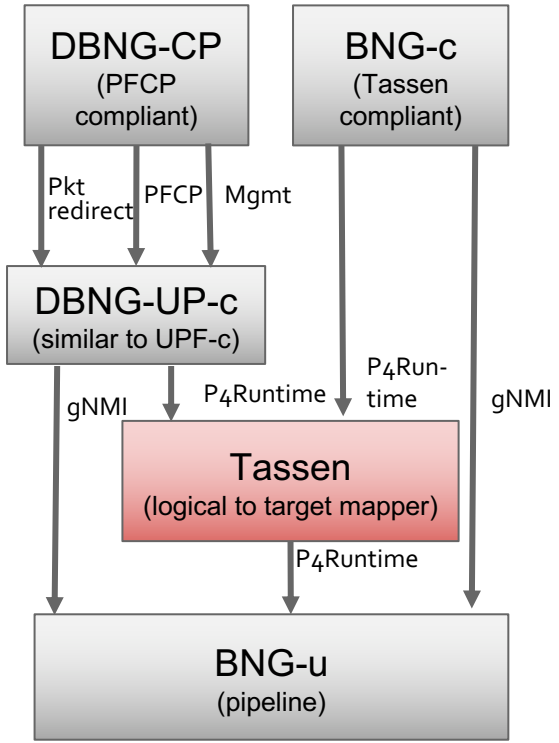
Combined BNG-SE$_C$ and BNG-SE$_U$ with a simplified SDN control layer



SE: Service Edge

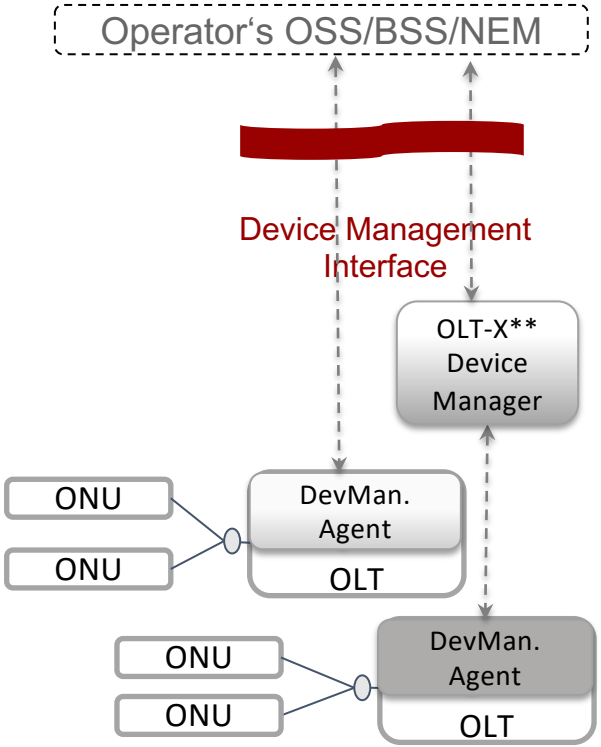
TASSEN: Silicon Independence & Programmability

- Learn from the OpenFlow experience
  - Formal specification of the forwarding pipeline is essential
  - Re-use proven cloud native technologies (gRPC) and focus on capabilities for operator use cases (pipeline data models)
  - Complete testing of forwarding pipeline
- Complementary to BBF-based BNGs
  - DBNG-CP communicates with DBNG-UP-c using BBF-specified interfaces (i.e. SCI, Packet redirect & Management)
  - DBNG-UP can then be split into a DBNG-UP-c that will communicate southbound with the BNG-u using the Tassen interfaces (i.e. P4 Runtime & gNMI)... similar to 5G UPF-c and UPF-u split
- Alternatively native Tassen-based BNGs
  - BNG-c components that support Tassen's south bound interfaces (i.e. P4 Runtime and gNMI) talk natively through the mapper to the BNG-u

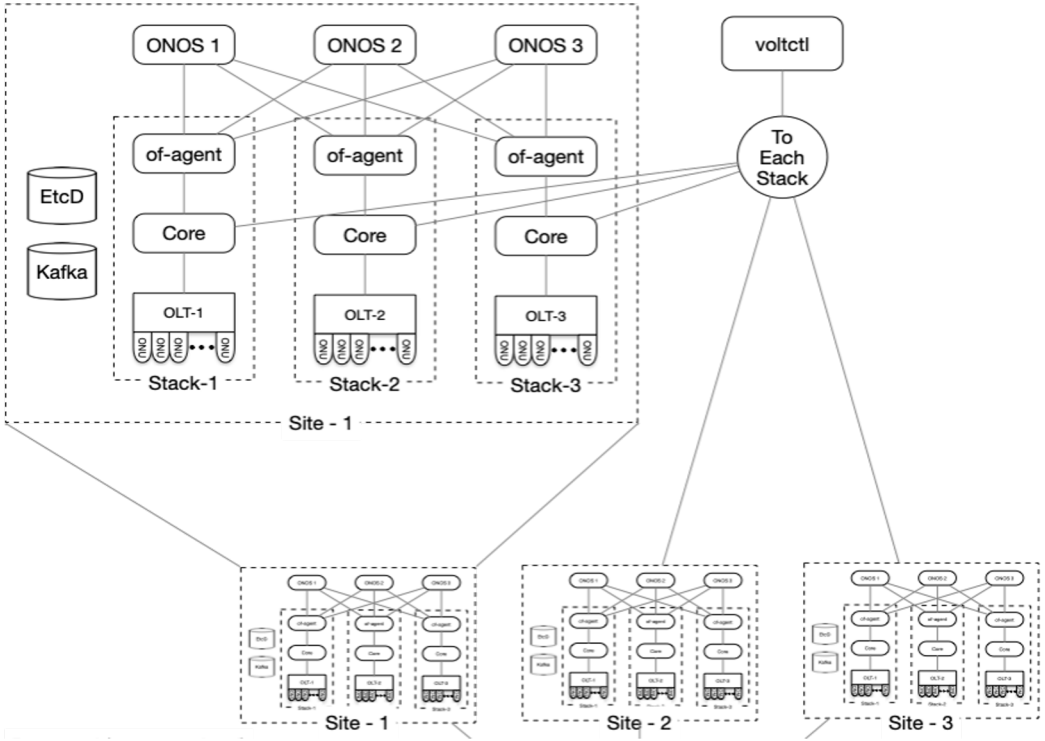


Device Management Interface

- Encompass **Inventory, Hardware configuration** and state that are not access-specific and do not pertain to VOLTHA, e.g. OLT software update, Transceiver status, Fans, Power supplies etc.
- **Common OLT device management API** across different families of devices from different vendors
- **Abstracts device complexity** from NMS/EMS of the operator by means of closed (protocol and models) to open APIs
- Support **on the box or out of the box implementation**.
- Implemented Device Management Interface based on IETF RFC-8348 and BBF TR-383



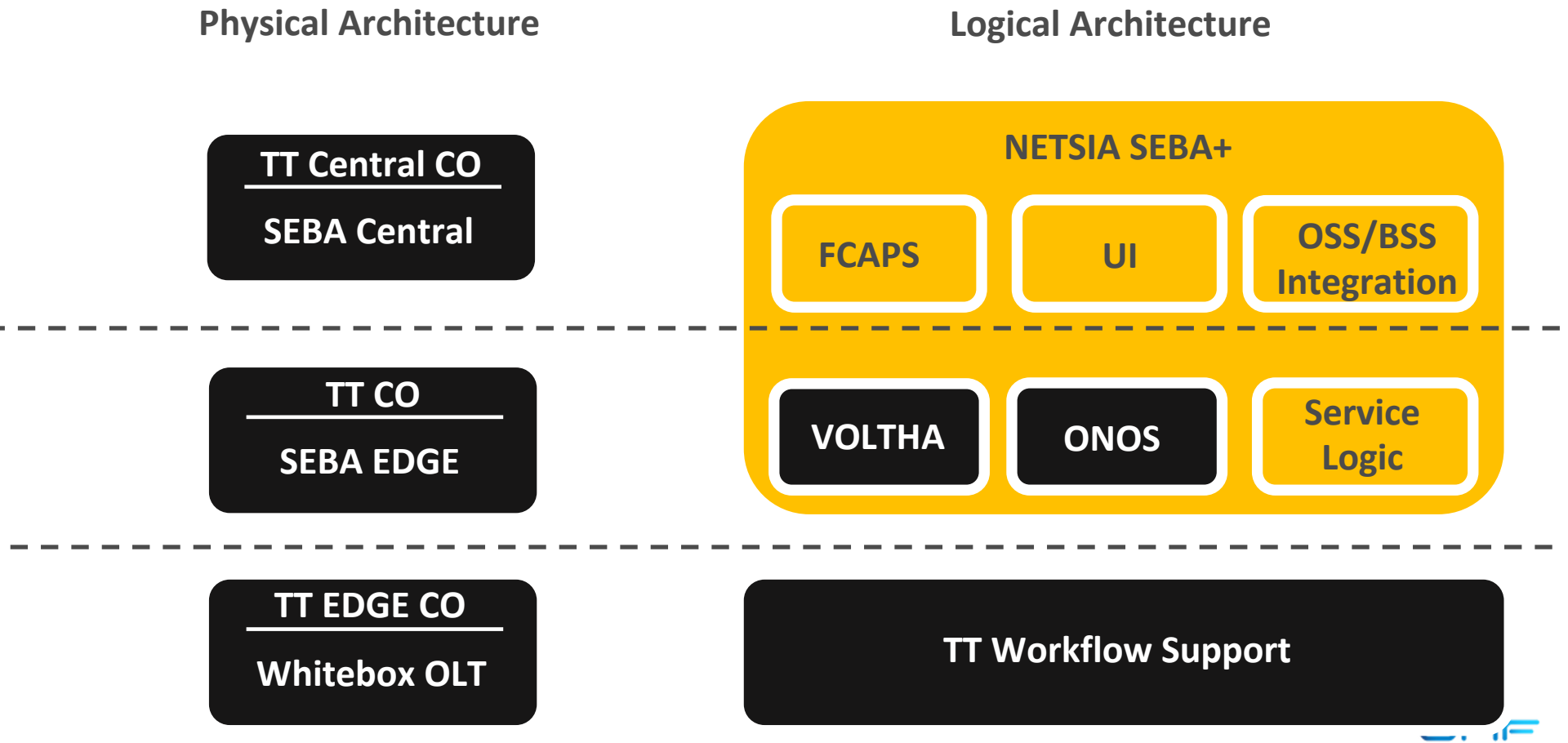
SEBA/VOLTHA Stack Model for Scaling



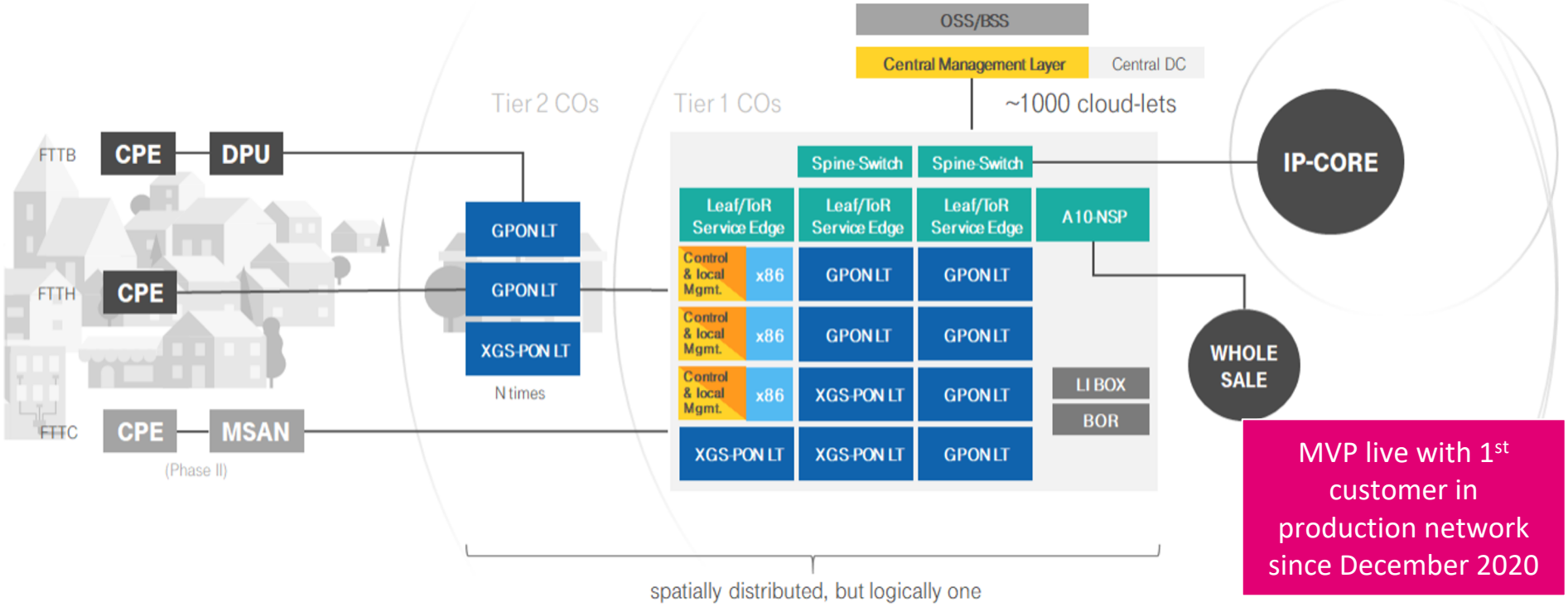
- Horizontal Scaling
- Per OLT

  VOLTHA Stack

TT SEBA Architecture



DT's Access 4.0 builds Disaggregated & Programmable Access



MVP live with 1st customer in production network since December 2020

Access 4.0 is based on the SEBA2.0 Architecture

DISAGGREGATED PON

Multi-vendor PON (OLT and ONU)

Supplier and technology agnostic Northbound abstraction

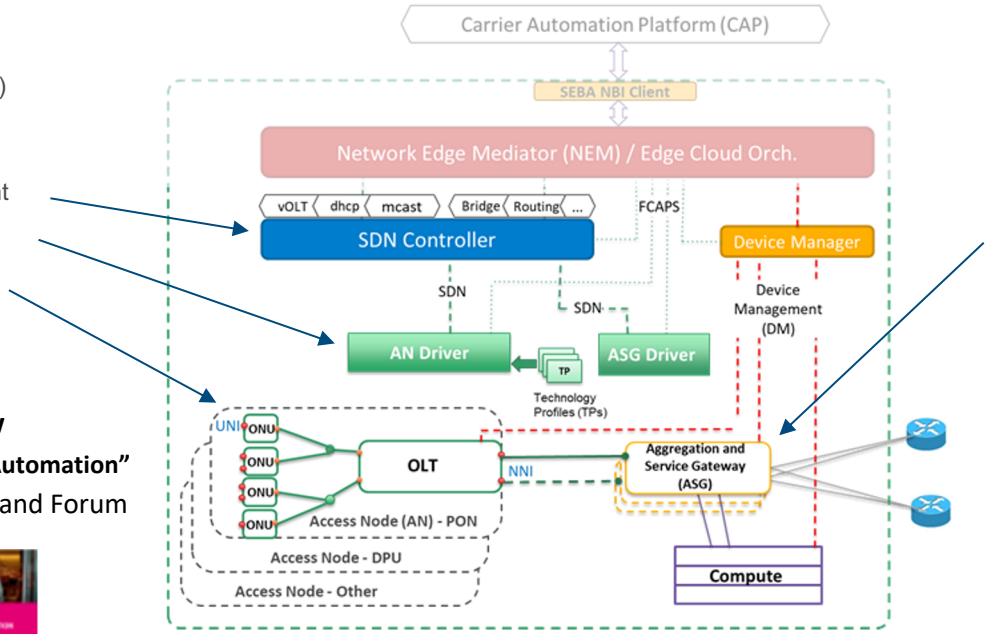
Common control and management

Working through well-defined interfaces and models (no proprietary EMS)

DT Access Workflow

"SDN-based FTTx Access with Full Automation"

as submitted to ONF and Broadband Forum



DISAGGREGATED BNG

Fabric design with functional separation in Service Edge and LER

Production-ready implementation with open hardware

Fabric and BNG SW from RtBrick

Further development in collaborative community OpenBNG combining strength of BBF, OCP, ONF and TIP

Evaluating DC-like BNG HAL API (ONF TASSEN project)

Target hardware design along magenta switch design proposal at OCP 

Currently developing a reference platform description and RFI in TIP working group OpenBNG

DT Access workflow: https://drive.google.com/open?id=1Qt4RMH08ghSGOdwsQ6ztTgGac2dd_3m0

Open BNG Position Paper: https://www.telekom.com/en/company/details/all-at-a-glance-609418

RD Roadmap and Useful Links

Roadmap

- FTTB
- EPON
- IPv6
- MDU
- … driven by operators and partners

Useful Links and References

- SEBA RD2.0
- ONF TASSEN Overview
- ONF TASSEN Repo (member only)
- DT deployment article
- TT deployment
- VOLTHA 2.7 Release Notes

➢ Collaborative Effort of ONF and other communities (OCP, BBF, TIP)

Thank You

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