



PROGRAM ACCESS 4.0 / A4 ENGAGEMENT ON SEBA AND VOLTHA

Access 4.0 Team

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LIFE IS FOR SHARING.

VOLTHA

VOLTHA – CONTRIBUTIONS RELATED TO DT ACCESS 4.0

CHANGES IN VOLTHA ADAPTER & CORE

- Support for reporting of **Registration ID** of the ONU
- Support for **multiple PON ports**
- Support of basic traffic shaping (e.g. using PON capabilities like DBA)
- Fixes for addition and deletion of flows
- Support for provisioning of **transparent flows for FTTB** in VOLTHA core and adapter
- Support for using any one of the 4 NNI ports of the OLT
- Handling cases of **OLT and ONU reboots** (ONU reboot is either a hard reboot or from the VOLTHA CLI)
- Changes in flow decomposer for **handling LLDP** packet-in on the NNI port



CURRENT ACTIVITIES

- OpenOLT **Resource manager** – done
- **Tech profiles** for OpenOLT adapter – design and implementation agreed and done
- **Adaptation of DT access 4.0 required features** already provided for asfvolt16 adapter
- Submission of **BAL 2.6 upgrade** changes and Traffic profile changes in asfvolt16 adapter
- Submission of changes in asfvolt16 and ONU adapter for addition and deletion of flows

VOLTHA – UPCOMING CHALLENGES (DT PERSPECTIVE)

THINGS TO DO FOR FUTURE VOLTHA RELEASES

- Full support of **DT use cases** in OpenOLT adapter
- **Containerization** of OpenOLT adapter and the ONU adapter
- Support of **transparent VLAN handling** in OpenOLT and broadcom_omci_onu adapter depending on the use case
- Usage of **multiple NNI ports** per OLT
- Integration of **DPU**s into VOLTHA framework

- Additionally we have to focus on **scalability, availability and performance of the entire solution** - not only the core
 - That may include improvement of BBsim and migration of OpenOLT adapter to GoLang

- **Device Management** in the OLT and ONU Adapters
- Retrieval of parameters/**counters** and reporting of **KPIs and alarms** from the devices

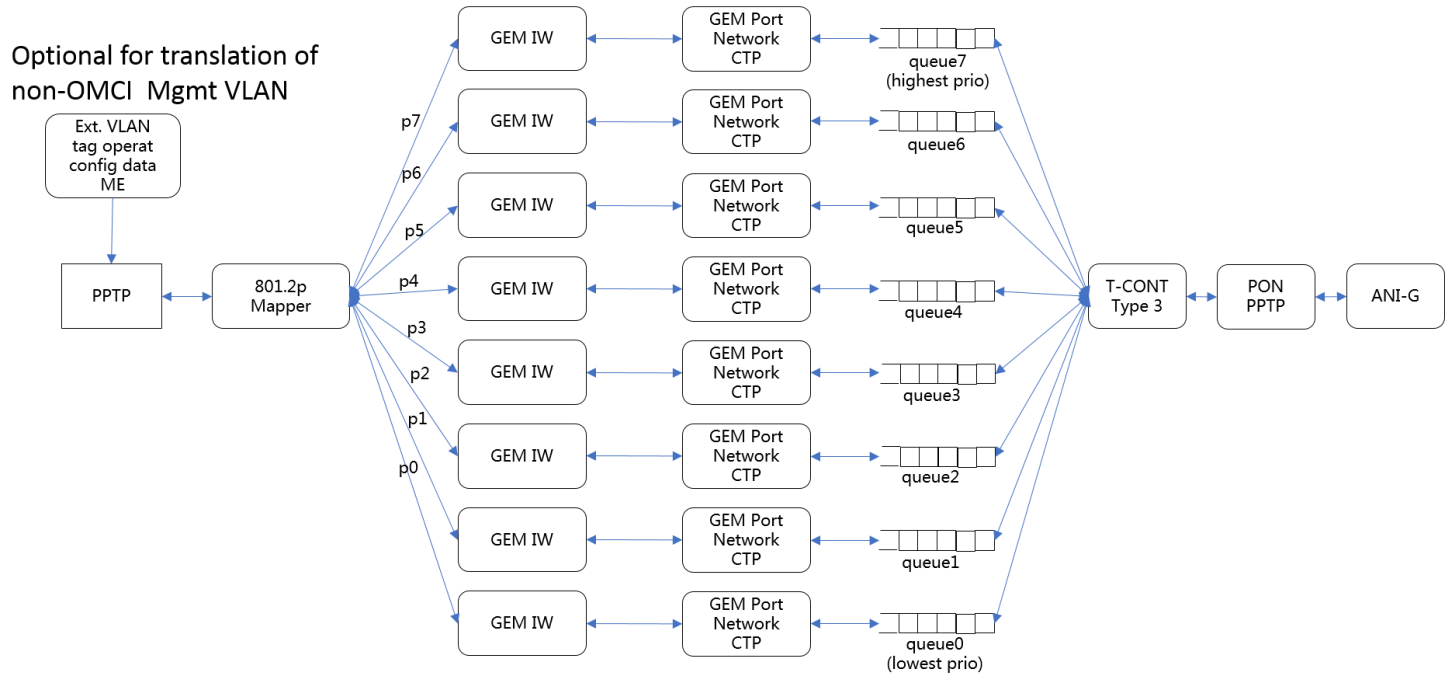


DT DATA PLANE WORKFLOW (FTTH)

WORKFLOW FTTH – PON LAYER

PON LAYER ARCHITECTURE

- Using of single port, bridged ONT
- ONT must use a .1p mapper to map traffic in to 8 queues and schedule it acc. to strict priority (one GEM port per queue and one T-CONT per user)
- OMCI (ONT management) in general use a separate path with its own GEM port and T-CONT
- ONT is transparent regarding L2+ IDs / functions



WORKFLOW ASPECTS

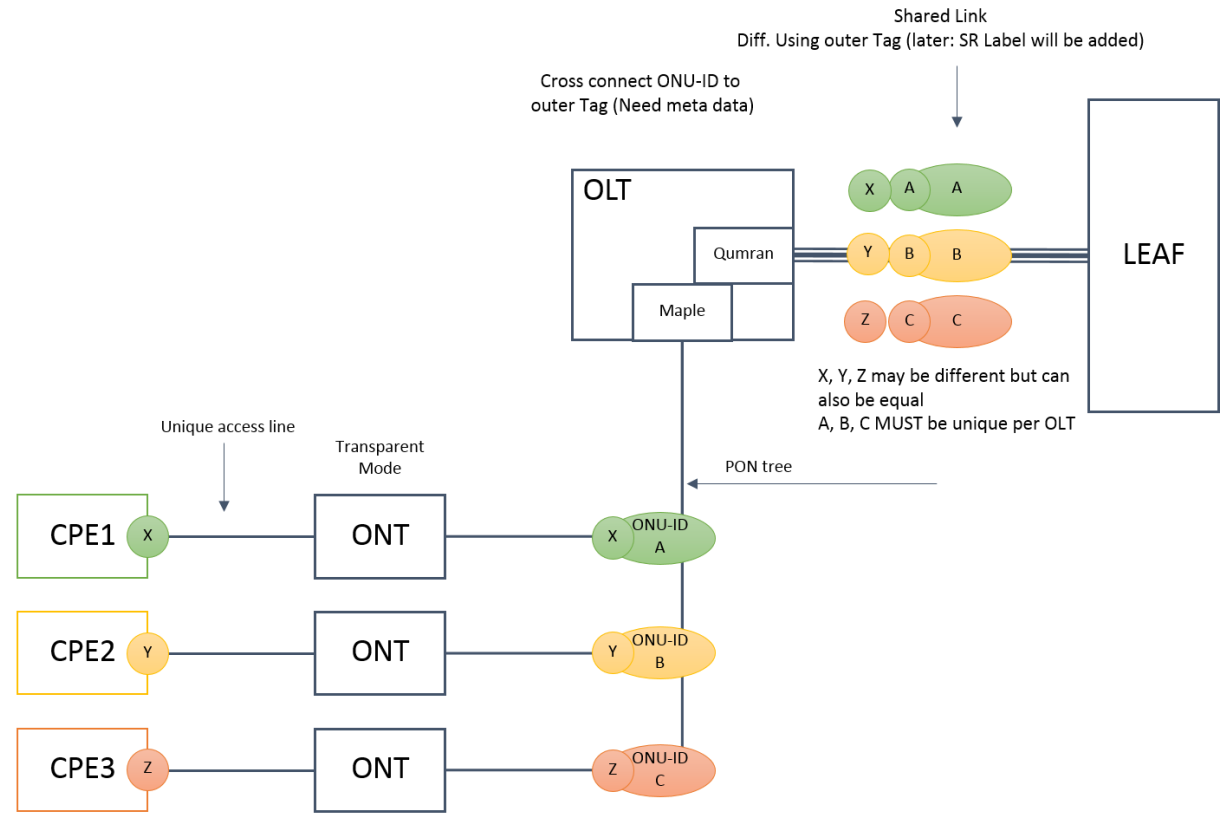
- New ONT – discovered by OLT – must trigger a kind of “port up” message with at least serial number (optional plus registration ID)
- All ONTs will be accepted by the OLT in the first step and a management path will be established
- ONT authentication and localization will be handled by federation of customer provided SN and information from different BSS applications
- Finally the data path based on customer subscription will be created (assign ONU-ID and Lineprofile incl. GEM-Ports and T-CONTs)



WORKFLOW FTTH – LAYER 2

LAYER 2 ARCHITECTURE

- The entire VLAN range is allowed as customer tag (c-tag)
- ONT will transparently forward frames
- OLT adds / removes an outer VLAN-tag (s-tag) based on user parameter (one-by-one relation between user and s-tag) -> VLAN cross-connect model
- p-bit value must be set according to special rules – not only copied from customer packet



WORKFLOW ASPECTS

- After initial data path creation is finalized (incl. s-tag assignment) PPPoE process starts including customer authentication
- Based on successful customer authentication a public IP address will be assigned to the Home-gateway behind the ONT
- All services running as unicast services inside this PPPoE session between Home-gateway and Service creation (SE) point
- The service differentiation is realized by using different p-Bit values inside the s-tag
- It exists a PON internal data base with all relevant information for provisioning and fulfillment.

OPEN HARDWARE

HARDWARE DESIGN: MOTIVATION & DESIGN GUIDELINES

MOTIVATION FOR OCP SPECIFICATION

Eco system for white box PON devices leaves room for improvement !

- Few devices from few vendors – with little telco experience

Carriers want at least two suppliers – need more choice !

DT wishes to foster the community & there was a need for more participation ...

Last but not least :

We hope to instigate other contributions to create competition, innovation and better economics ...

After some great joint efforts with partners the spec went through the administrative process and is published now!

DESIGN GUIDELINES

- Reuse existing work to allow for quick implementation
- Use mainstream merchant silicon & COTS (Commercial Off The Shelf) components
- Comply to relevant standards
- Allow & promote the use of open source software
- Aim for state of the art performance at optimum total cost of ownership
- Create something that „the world“ needs !

DT OLT SPECIFICATION AT OCP

Design choices and details :

- Specification selects a first straight forward solution, derive from what works for XGS-PON :
 - Well known merchant silicon combination from Broadcom (Maple/Qumran) with off the shelf driver software (BAL) to be integrated into open source VOLTHA framework.
- 32 and 64 port variants : good fit to chip granularity, uplink capacity and Central Office size (as number of subscribers)
- Redundant AC/DC PSUs (hot swappable, 110-230VAC, 50-60Hz autoranging & 48VDC), high efficiency
- Flexible Uplinks :
 - 2x100G as QSFP28 to allows in-rack AOC/DAC
 - plus 8x10/25G SFP28 cages or (C)WDM transceivers for longer reach and WDM for fiber saving
- Telco environment implies a long life span – 10 years is typical
- The control SW & interface is evolving rapidly - Our spec explicitly embraces this fact !



FIRST IMPLEMENTATION PROPOSAL



Accton
Making Partnership Work

Images Courtesy of Accton / Edgecore October 1st 2018!

OUTLOOK

OUTLOOK FOR UPCOMING DT ACTIVITIES

- **Providing detailed DT Workflow to integrate in SEBA**
- **intensify DT contributions to VOLTHA**
 - To establish full support of DT use cases incl. operational aspects
 - To incorporate DPUs into VOLTHA
 - To address end-to-end performance and scalability
- **Establishing community based VOLTHA / SEBA Lab setup in Berlin (similar to BBWF) with focus on access nodes and associated abstraction**
- **Further contributions to open / common Hardware specifications**
 - Usage of different chip set options
 - Additional option e.g. for usage in remote sites
- ...

THANK YOU