VOLTHA Overview and Roadmap

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OLT Disaggregation

This is what we (the CORD community) accomplished as part of the R-CORD POCs
Virtual OLT Hardware Abstraction (VOLTHA)

VOLTHA hides PON-level details (T-CONT, GEM ports, OMCI etc.) from the SDN controller, and abstracts each PON as a pseudo-Ethernet switch easily programmed by the SDN controller.
Industry’s First White-Box XGS-PON OLT

White-Box = Open-Hardware Specs + Open-source software

Contributors:
- Accton/Edgecore
- ALTEN Calsoft Labs
- AT&T
- Broadcom
- Ciena
- ONF
- Radisys

Edgecore ASFvOLT16
Whitebox OLT

Hardware available July 2017
Software release with CORD 5.0 Feb 2018
VOLTHA in R-CORD
VOLTHA roadmap
VOLTHA Roadmap - 1.3 Release (April 30 2018)

• VOLTHA High Availability
  ▪ Migrating from Docker Swarm to **Kubernetes**
  ▪ Explore other database redundancy framework

• Supports AT&T OpenOMCI Specification
  ▪ Interoperability of ONUs and OLTs

• Release public docker images so can run without building code
VOLTHA – current state

- PON is abstracted as OpenFlow device that allows SDN controller to program service flows
- However, underneath configuring the PON (tconts, GEM ports, etc) relies heavily on top-down configuration
  - Several config commands/calls to bring up an subscriber’s ONU in the simplest configuration
  - Breaks the simple management abstraction, exposes PON details

```bash
channel_group create -n "Manhattan" -d "Channel Group for Manhattan" -a up -p 100 -s 000000 -r raman_none
channel_partition create -n "WTC" -d "Channel Partition for World Trade Center in Manhattan" -a up -r 20 -o 0 -f false -u false -n serial_number -c "Manhattan"
channel_pair create -n "PON port" -d "Channel Pair for Freedom Tower in WTC" -a up -r down_10_up_10 -t channelpair -g "Manhattan" -p "WTC" -i 0 -o class_a
traffic_descriptor_profile create -n "TDP 1" -t 100000 -a 500000 -m 1000000 -p 1 -w 1 -e
additional_bw_eligibility_indicator_none
channel_termination create -x 0001b59071de28 -n "PON port" -d "Channel Termination for Freedom Tower" -a up -r "PON port" -c "AT&T WTC OLT"
vont ani create -n "ATT Golden User" -d "ATT Golden User in Freedom Tower" -a up -p "WTC" -s "BRCM12345678" -r "PON port" -o 0
ont ani create -n "ATT Golden User" -d "ATT Golden User in Freedom Tower" -a up -u true -m false
tcont create -n "TCont 1" -r "ATT Golden User" -t "TDP 1"
v_enet create -n "Enet UNI 1" -d "Ethernet port - 1" -a up -r "ATT Golden User"
gem_port create -n "Gemport 1" -r "Enet UNI 1" -c 2 -a true -t "TCont 1"
```
VOLTHA 2.0 and beyond – Towards SDN

• Reduce dependency on top-down configuration (xPON)
  ▪ Automatically bring up PON ports on device boot
  ▪ Automatically detect and configure ONUs on registration
    • Allows for validation of ONUs with OSS
  ▪ ‘Service Profile’ mechanism allows configuration of QoS parameters

• Separation of VOLTHA and Adapters into separate repos to enable independent releases

• New OpenOLT adapter and OLT software for whitebox OLTs
VOLTHA/R-CORD reactive workflow

Retrieve ONU data from OSS

Compute server
- XOS
  - segment-routing
  - f-ONOS
  - dhcp-relay
  - olt
  - p-ONOS
  - VOLTHA

Change PORT_STATE (enabled=true)

Add trap flows

VOLTHA/R-CORD reactive workflow

ONU registers

ONU OK? (SN=BRCM12345678)

CENTRAL OFFICE

Internet

Fabric Switch

Fabric Switch

EdgeCore

ASFvOLT16

BCM ONU

Residential Subscribers

ONU data from OSS

OSS DB

ONU data from OSS

Internet

Central Office
Thanks!
May 2017
- VOLTHA core
- Maple Adaptor
- VM-in-the-middle
- Twisted RPC
- EdgeCore OLT
- Closed/Proprietary

Sept 2017
- VOLTHA core
- EdgeCore Adaptor
- GRPC (BRCM-BAL based protobufs)
- EdgeCore OLT

March 2018
- VOLTHA core
- OpenOLT Adaptor
- GRPC (generic protobufs)
- Whitebox OLT
  (including EdgeCore)