Outline

• Intro
• SEBA RD/Architecture
• VOLTHA Architecture and project state
• VOLTHA deployments with operators (DT, TT)
• VOLTHA 2.6 release
  • Introduction of openonu-go
  • Scale improvements and Multi-Stack
  • Device management Interface (testing and BBSIM implementation)
• VOLTHA 2.7 and beyond Roadmap
• Q/A
SEBA Reference Design Architecture

SEBA is a lightweight platform for development of solutions for carrier broadband access:
- common infrastructure
- multiple virtualized access technologies
- no VNF processing on a server
- combination of micro-services

SEBA RD v 2.0 adds:
- Disaggregated Broadband Network Gateway (BNG)
- Per-OLT VOLTHA Stack Model for Scaling
- Detailed NBI APIs
- Device Management (DM)

Seba RD 2.0 is under final member review
SEBA 2.0 Exemplar Architecture

Focus on access: ONOS and VOLTHA
VOLTHA: Virtual OLT Hardware Abstraction

- Common Control & Management for PON networks (OLTs and ONUs)
- Hides PON level details (T-CONTS, GEM, OMCI) through abstractions.
- Micro-service components
- XGS-PON and GPON
- Different brands of OLTs and ONUs
- Multiple services (HSIA, VoIP, VoD, IPTV)
- Different operator workflows (ATT, TT, DT)
- Device Management Interface for non datapath operations (e.g. olt software upgrade)
Open APIs and Multi-vendor support

- Different brands of OLTs and ONUs
- Protocol to the device can be vendor proprietary
- Common Open Source NB API specification in protobuf: Adapter-Core interface (VOLTHA) for OLT adapter and Device Management Interface
- Adapter-core interface: voltha-protos
- **Device Management Interface**: based on IETF RFC-8348 and BBF WT-383
VOLTHA Scale and Failure

- Infrastructure (ONOS, ETCD, KAFKA)
- VOLTHA stack (OF-agent, VOLTHA-core, ONU and OLT adapter)
- 1 voltha-stack scales up to 1000 ONUs, distributed across 1 or more OLTs
- Support OLT and ONU reboot
- Support adapter and core failure/restart
- Multi instance for high availability
  - ETCD
  - Kafka
  - ONOS
Voltha 2.5 is in production with live customers:

- Deutsche Telekom (DT) as part of the A4 project
  - https://www.telekom.com/en/media/media-information/archive/deutsche-telekom-s-access-4-0-platform-goes-live-615974

- Turk Telekom (TT)
VOLTHA 2.6

Key features:

- OpenONU adapter written in Go
- Multi-stack Support
- Scale improvements
- Upstream charts from BITNAMI for etcd and kafka
- Enhanced Testing and continuous certification
- OLT software upgrade support (in-band mode only) and migration to BAL 3.4.9.6
- Bug fixes

VOLTHA 2.6 Release notes:

https://docs.voltha.org/master/release_notes/voltha_2.6.html
Python openonu adapter had scale issues, required 8 adapters for 1024 ONUs

2.6 Open Onu Adapter:
- Completely rewritten in go with multithreading
- Simpler architecture
- Less resource consumption
- 1 instance can support >>> 1024 ONUs
- Faster bring-up time
- Supports adapter restart
- Platform for new features
  - ONUS SW update
  - ....
VOLTHA 2.6 multi-stack support

- Up to **10 voltha-stacks enabled one at a time** on the three workflows
- **10240** ONUs supported in a single VOLTHA pod
- Each **voltha-stack 2x OLTs, 512 ONUs each**
- Shared ETCD/KAFKA/ONOS (common voltha-infrastructure)
- Supported for all workflows and services
Scale Improvements

- **Flow replication** openolt agent
  - Avoid processing olt-adapter
- **Parallelization** in ONOS apps
  - Multithreading of aaa, dhcpd2relay, openflow southbound
  - Use of DHCP relay-agent option82 for port information
- **BBSim Sadis server** rewritten in Golang
  - Support multi-stack speed requirements

Jenkins view for Scale Tests:
https://jenkins.opencord.org/view/voltha-scale-measurements/
VOLTHA+ONOS 2.6 Testing

- Multi-stack testing up to 10240 Subscribers with 10 stacks
- Complete new Openonu-go suite of tests
- Multi-olt hw test (GPON and XGSPON managed by the same voltha stack)
- Device Management Interface Tests on BBSIM
- Nightly scale and 150+ Hardware tests

Jenkins view for 2.6 Tests

https://jenkins.opencord.org/view/VOLTHA-2.6/
Continuous Certification

150+ nightly Tests certify several HW:
- Edgecore ASFVOLT16 (XGSPON)
- Edgecore ASGVOLT64 (GPON)
- ADTRAN SDX 6320 (GPON) -- in progress
- Sercomm FG1000 (GPON ONU)
- Edgecore 7712 (Agg switch)
- Edgecore 6712 (Agg Switch)

ONF Marketplace:
https://opennetworking.org/marketplace/?_product_project=voltha
Continuous Certification

Operator’s Procurements is based on successful ONF certification

Join the Certification program: https://opennetworking.org/continuous-certification-program/
VOLTHA+ONOS Status

- HSIA, VOIP, VoD, IpTV (Multicast)
- 3 operator workflows (DT, TT, ATT)
- Different PON technology and ONU and OLT vendors with certification
- Up to 1024 Subscribers per voltha-stack
- Up to 10 stacks, 10240 subscribers with common infrastructure
- Failure tolerance via reconciliation in voltha stacks
- High Availability via replicas in voltha infrastructure (ONOS, KAFKA, ETCD)
- Nightly regression test with 150+ tests run on hardware based pods
- Nightly scale tests
- Deployed in production networks
VOLTHA 2.7 and Beyond Roadmap

● New Features
  ○ ONU software upgrade
  ○ MPLS Pseudowire (PW) support at the OLT
  ○ Mac learning
  ○ Multi UNI support
  ○ PPPoE

● Security and deployment
  ○ External API encryption
  ○ Use of gRPC for inter-adapter communication
  ○ OLT reboot vs channel disconnect distinction
VOLTHA 2.7 and Beyond Roadmap

- Deployment support
  - VOLTHA software upgrade
  - Scale improvements
  - ONU Performance Metrics
- New Testing for all features
- Expansion of the Continuous Certification Program, e.g. Radisys

Voltha 2.7 wishlist

https://docs.google.com/document/d/1-L7R3bS1s90VH6aQj7oitUuLPeG-IDlw7biSbNwFbpM/edit?usp=sharing
Thank You

Follow Up Links:
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