VOLTHA Techinar

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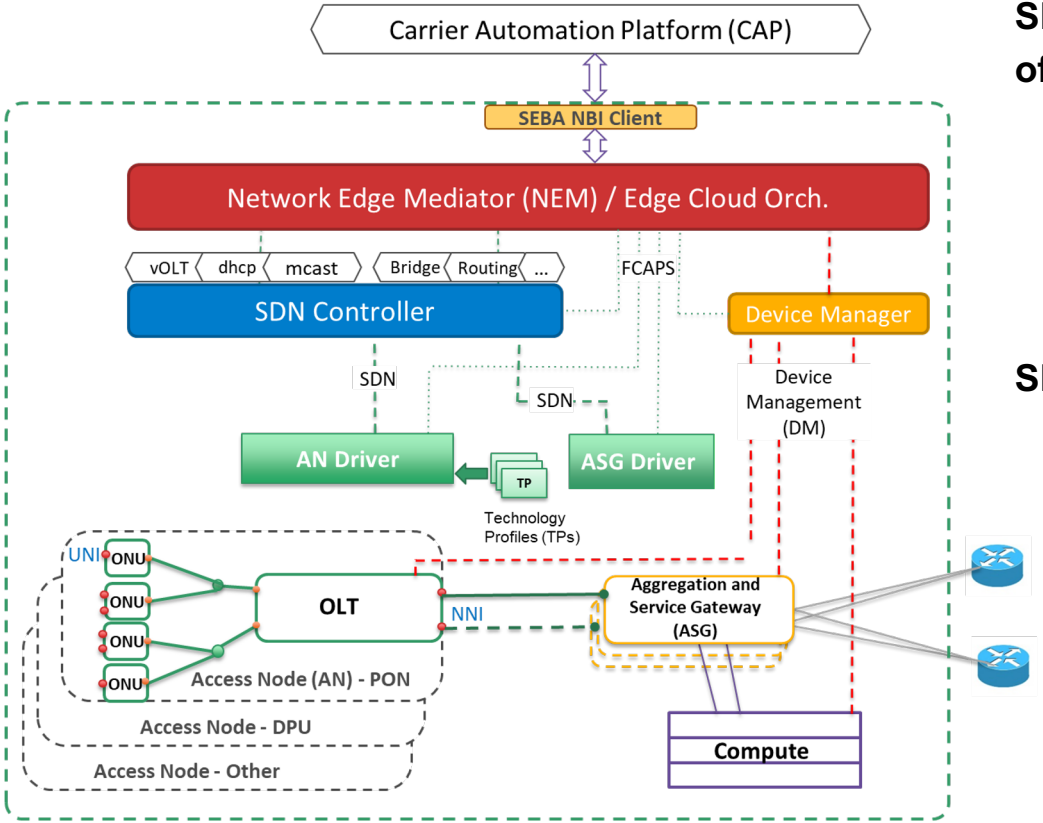
MTS @ ONF

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

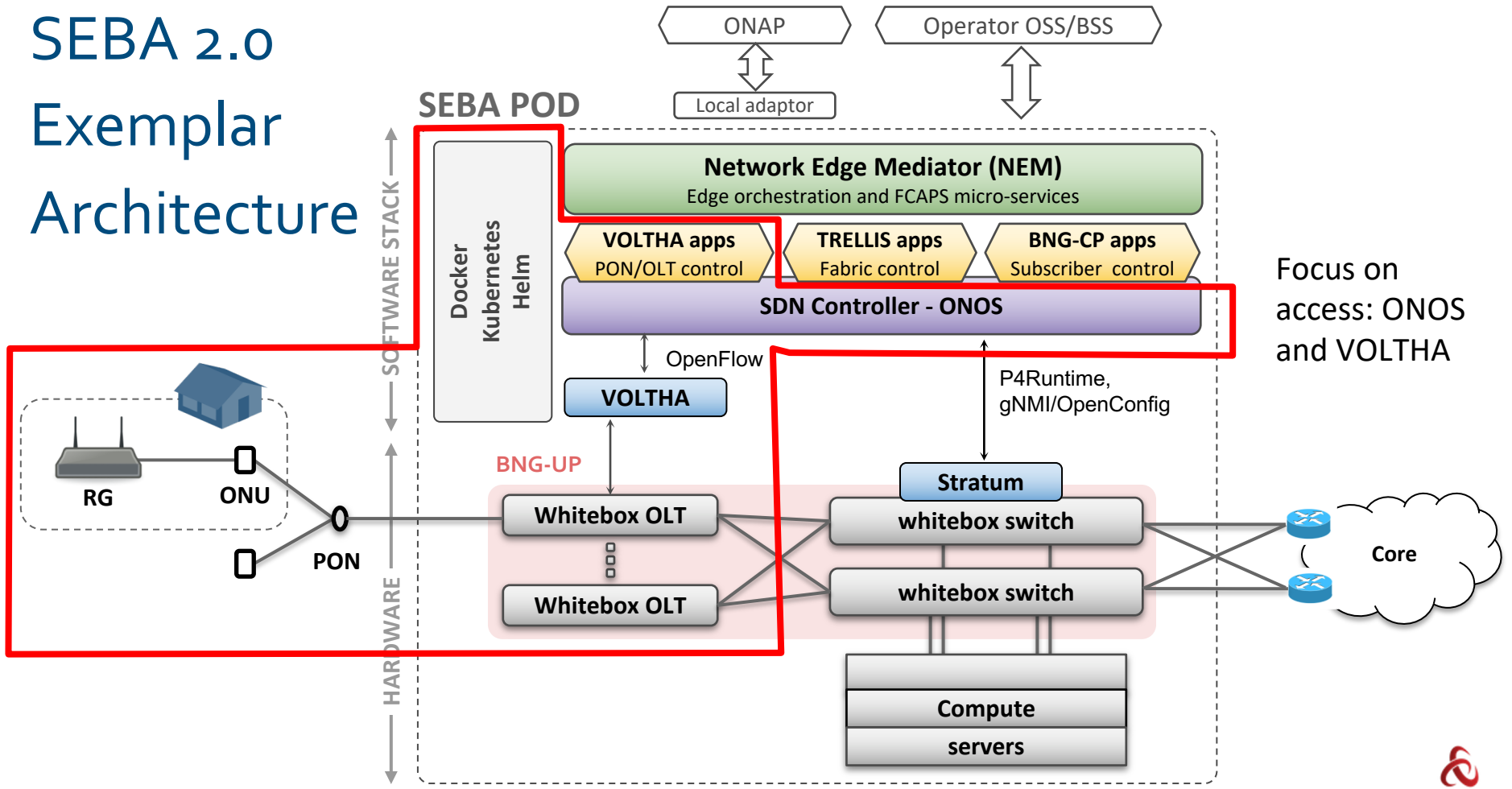
- common infrastructure
- multiple virtualized access technologies
- no VNF processing on a server
- combination of micro-services

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

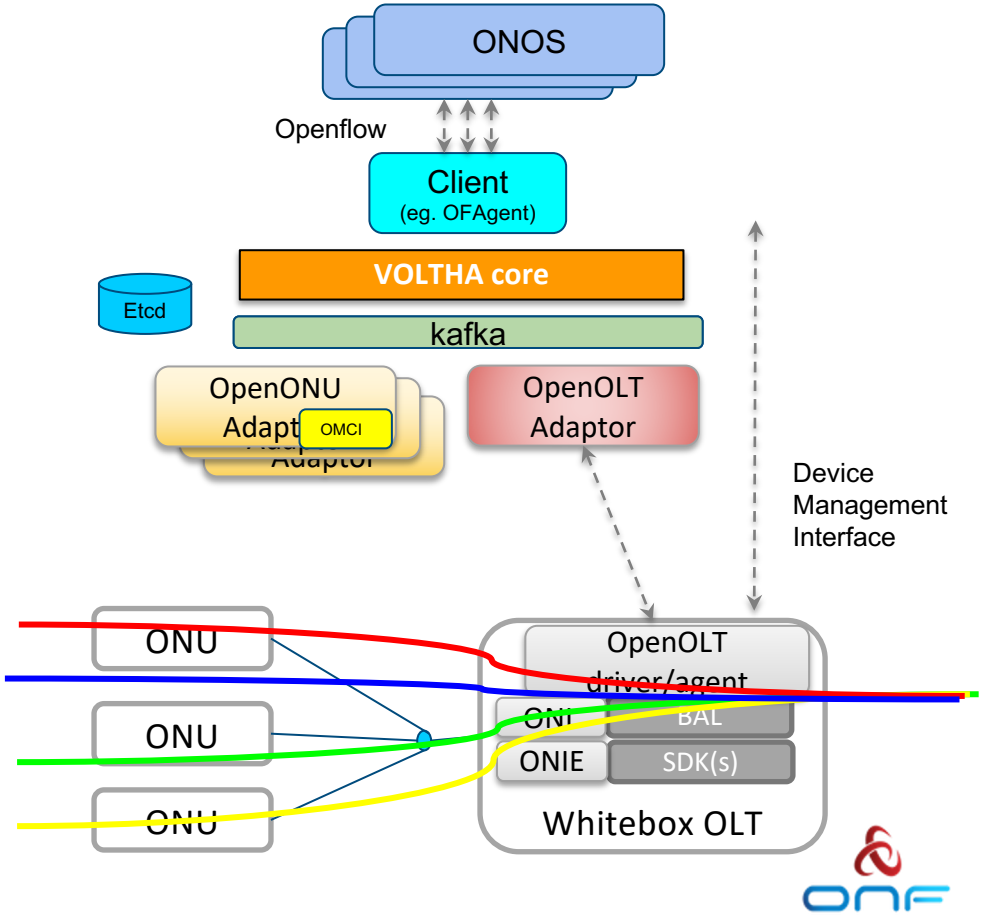
SEBA 2.0 Exemplar Architecture



Focus on access: ONOS and VOLTHA

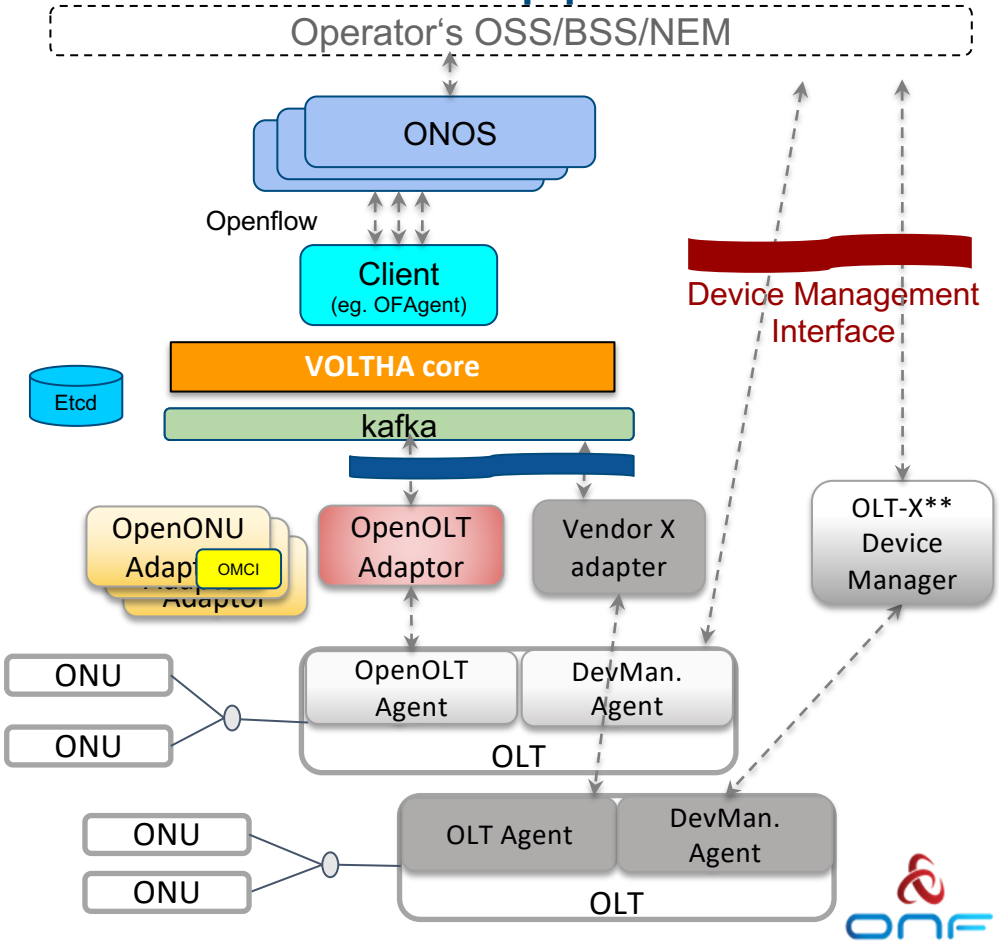
VOLTHA: Virtual OLT Hardware Abstraction

- 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)

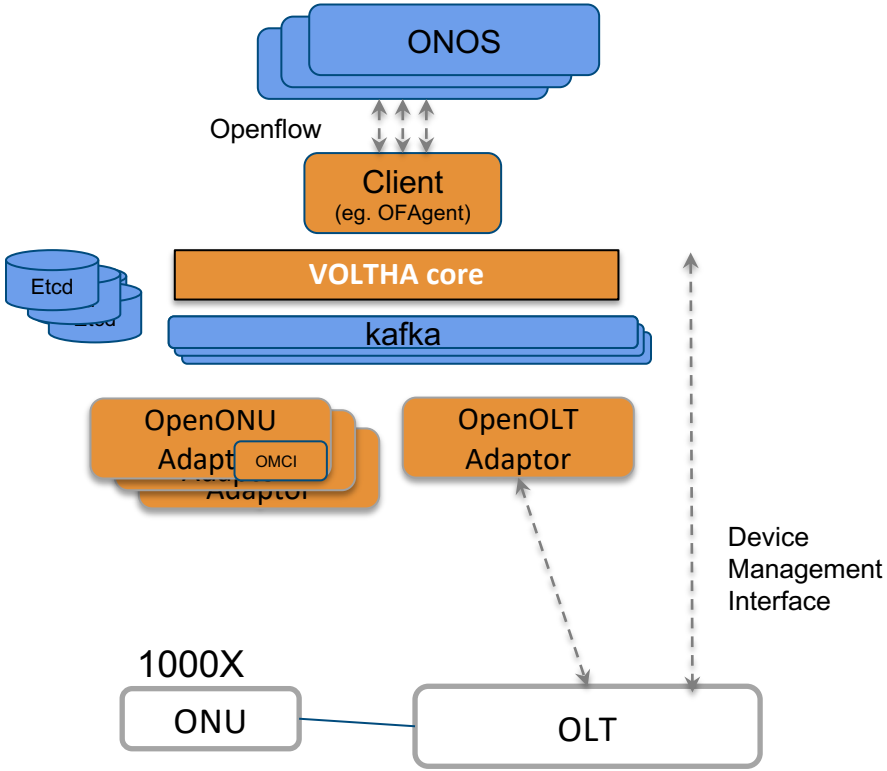


Open APIs and Multi-vendor support

- 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 Deployments with Operators

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)
  - https://www.aa.com.tr/en/science-technology/turkish-gsm-giant-makes-global-move-in-network-tech/2126349

VOLTHA 2.6

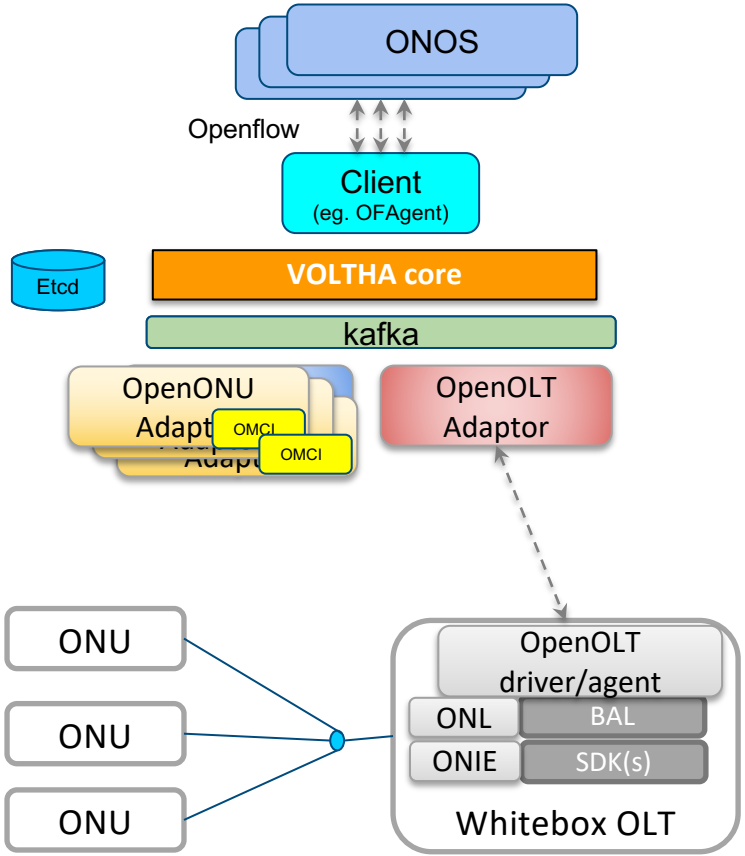
Key features:

- 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

Introduction of Openonu-go

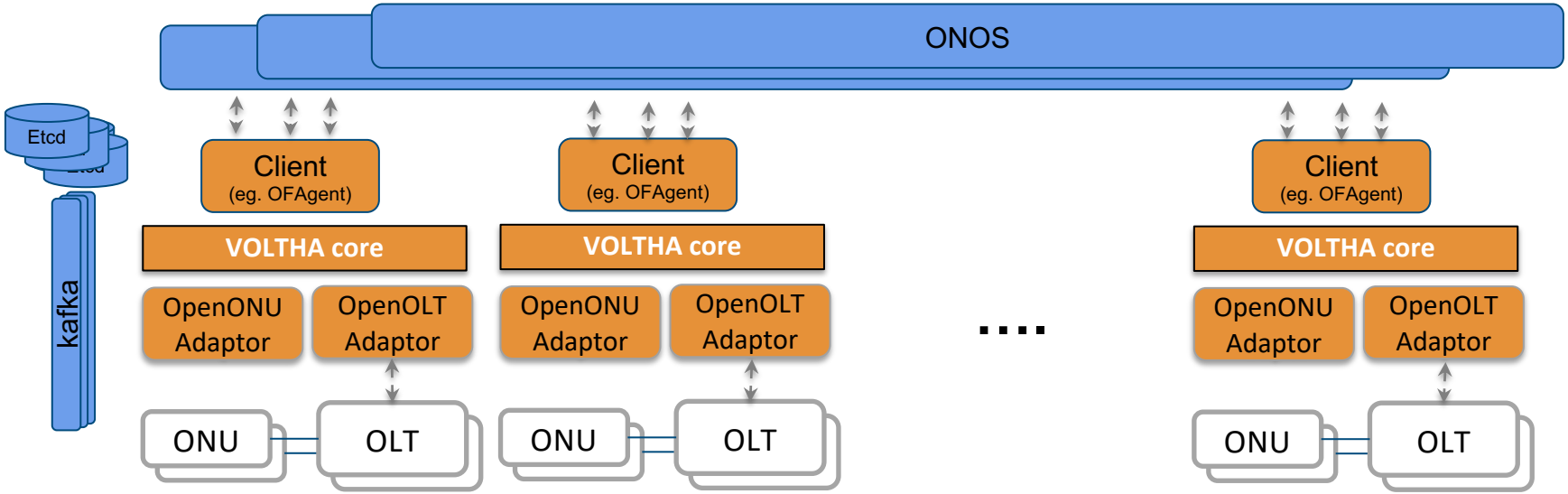


Python openonu adapter had scale issues, required 8 adapters for 1024 ONUs

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
  - ….

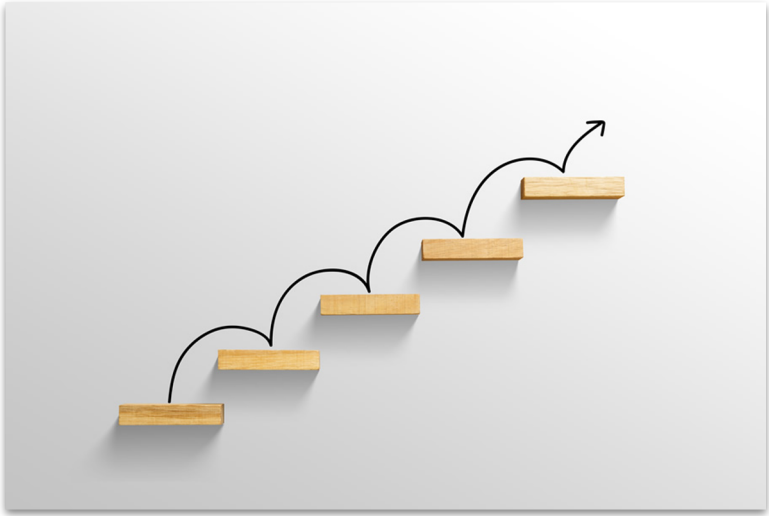
VOLTHA 2.6 multi-stack support



- 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, dhcpl2relay, openflow southbound
  - Use of DHCP relay-agent option82 for port information
- **BBSim Sadis server** rewritten in Golang
  - Support multi-stack speed requirements

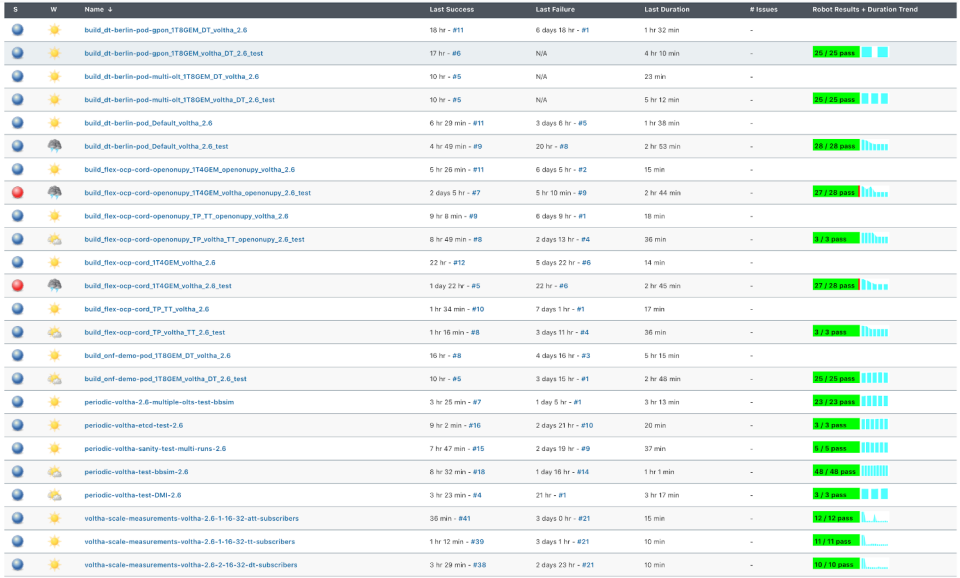


Jenkins view for Scale Tests:

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



S	W	Name ↓	Last Success	Last Failure	Last Duration	# Issues	Robot Results + Duration Trend
		build_dt-berlin-pod-gpon_1T8GEM_DT_voltha_2.6	18 hr - #11	6 days 16 hr - #1	1 hr 32 min	-	
		build_dt-berlin-pod-gpon_1T8GEM_voltha_DT_2.6_test	17 hr - #6	N/A	4 hr 10 min	-	25 / 25 pass
		build_dt-berlin-pod-multi-olt_1T8GEM_DT_voltha_2.6	10 hr - #5	N/A	23 min	-	
		build_dt-berlin-pod-multi-olt_1T8GEM_voltha_DT_2.6_test	10 hr - #5	N/A	5 hr 12 min	-	25 / 25 pass
		build_dt-berlin-pod_Default_voltha_2.6	6 hr 29 min - #11	3 days 6 hr - #5	1 hr 38 min	-	
		build_dt-berlin-pod_Default_voltha_2.6_test	4 hr 49 min - #9	20 hr - #8	2 hr 53 min	-	18 / 28 pass
		build_flex-ocp-cord-openonupy_1T4GEM_openonupy_voltha_2.6	5 hr 26 min - #11	6 days 5 hr - #2	15 min	-	
		build_flex-ocp-cord-openonupy_1T4GEM_voltha_openonupy_2.6_test	2 days 5 hr - #7	5 hr 10 min - #9	2 hr 44 min	-	27 / 28 pass
		build_flex-ocp-cord-openonupy_TP_TT_openonupy_voltha_2.6	9 hr 8 min - #9	6 days 9 hr - #1	18 min	-	
		build_flex-ocp-cord-openonupy_TP_voltha_TT_openonupy_2.6_test	8 hr 49 min - #8	2 days 13 hr - #4	36 min	-	3 / 3 pass
		build_flex-ocp-cord_1T4GEM_voltha_2.6	22 hr - #12	5 days 22 hr - #6	14 min	-	
		build_flex-ocp-cord_1T4GEM_voltha_2.6_test	1 day 22 hr - #5	22 hr - #6	2 hr 46 min	-	17 / 28 pass
		build_flex-ocp-cord_TP_TT_voltha_2.6	1 hr 34 min - #10	7 days 1 hr - #1	17 min	-	
		build_flex-ocp-cord_TP_voltha_TT_2.6_test	1 hr 16 min - #8	3 days 11 hr - #4	36 min	-	3 / 3 pass
		build_onf-demo-pod_1T8GEM_DT_voltha_2.6	16 hr - #8	4 days 16 hr - #3	5 hr 15 min	-	
		build_onf-demo-pod_1T8GEM_voltha_DT_2.6_test	10 hr - #5	3 days 15 hr - #1	2 hr 46 min	-	25 / 25 pass
		periodic-voltha-2.6-multiple-olts-test-bbsim	3 hr 25 min - #7	1 day 5 hr - #1	3 hr 13 min	-	23 / 23 pass
		periodic-voltha-etcd-test-2.6	9 hr 2 min - #16	2 days 21 hr - #10	20 min	-	3 / 3 pass
		periodic-voltha-sanity-test-multi-runs-2.6	7 hr 47 min - #15	2 days 19 hr - #9	37 min	-	5 / 5 pass
		periodic-voltha-test-bbsim-2.6	8 hr 32 min - #18	1 day 16 hr - #14	1 hr 1 min	-	48 / 48 pass
		periodic-voltha-test-DMI-2.6	3 hr 23 min - #4	21 hr - #1	3 hr 17 min	-	3 / 3 pass
		voltha-scale-measurements-voltha-2.6-1-16-32-att-subscribers	36 min - #41	3 days 0 hr - #21	15 min	-	12 / 12 pass
		voltha-scale-measurements-voltha-2.6-1-16-32-tt-subscribers	1 hr 12 min - #39	3 days 1 hr - #21	10 min	-	11 / 11 pass
		voltha-scale-measurements-voltha-2.6-2-16-32-dt-subscribers	3 hr 29 min - #38	2 days 23 hr - #21	10 min	-	10 / 10 pass

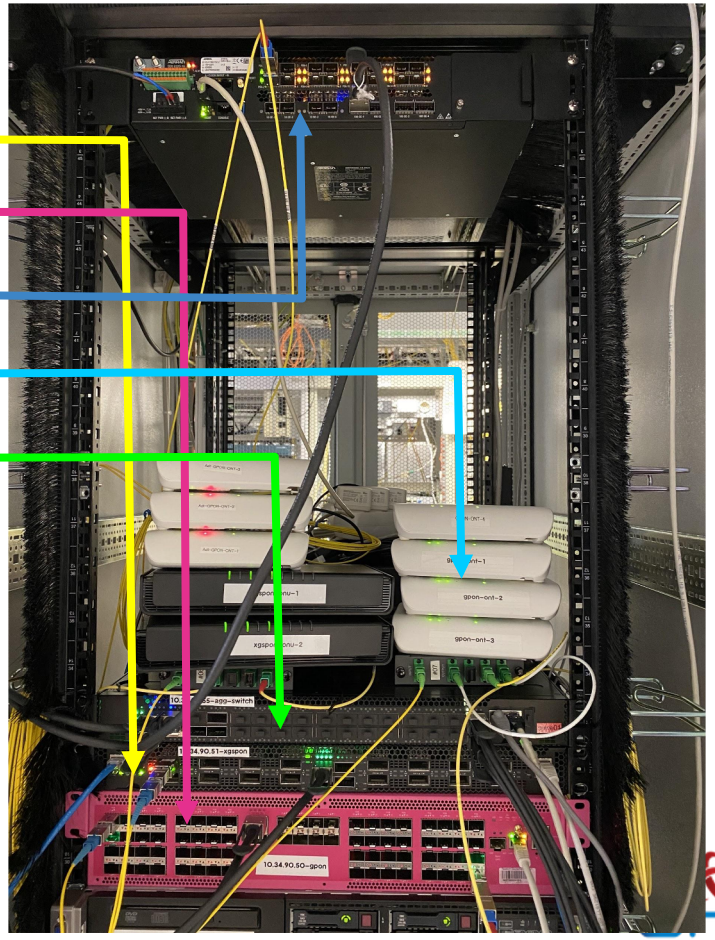
Jenkins view for 2.6 Tests

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-lDlw7biSbNwFbpM/edit?usp=sharing

SEBA Community

Thank You

Follow Up Links:

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