VOLTHA 2.7 Techinar

April 14, 2021 I 9am PST

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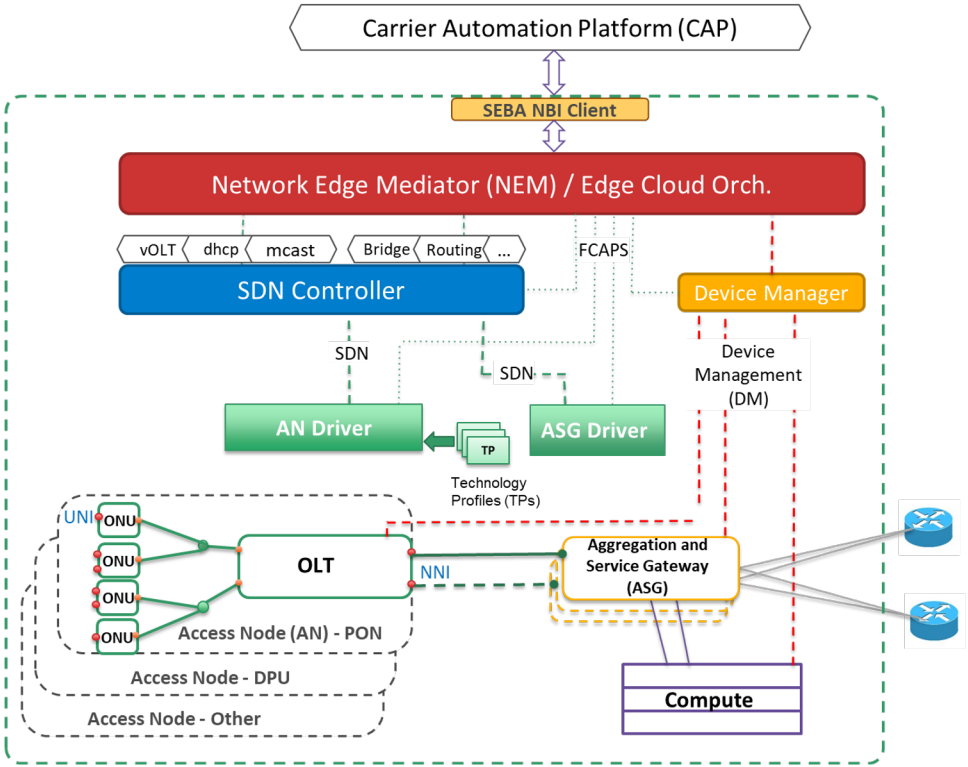
MTS @ ONF

Outline

- SEBA RD 2.0 and VOLTHA Architecture and project state
- VOLTHA deployments with operators (DT, TT) and feedback loop
- VOLTHA 2.7 release
  - In Service Software Upgrade
  - ONU software Update
  - Alarms and Performance Measurements
  - voltha-infra and voltha-stacks helm charts
  - PPPoE
  - Testing
- VOLTHA 2.8 Roadmap
- Q/A

SEBA Reference Design Architecture



SEBA is a lightweight platform for development of solutions for carrier broadband access

SEBA RD v 2.0:

- Disaggregated Broadband Network Gateway (BNG)
- Per-OLT VOLTHA Stack Model for Scaling
- Detailed NBI APIs
- Device Management (DM)

[Seba RD 2.0 is Released]

[SEBA RD 2.0 Webinar]

Türk Telekom

NETSIA

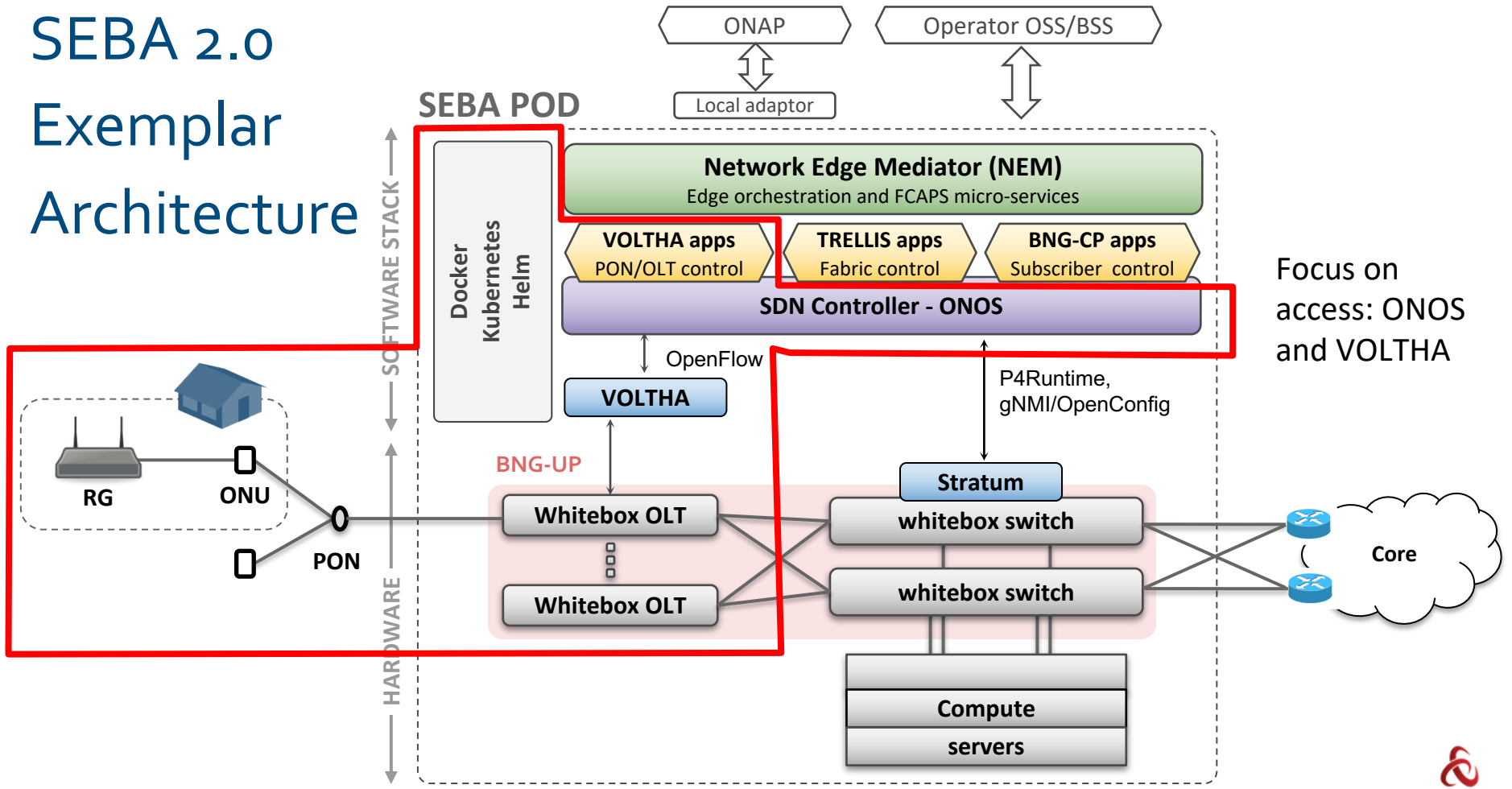
Radisys

NTT Group

ciena

ONF

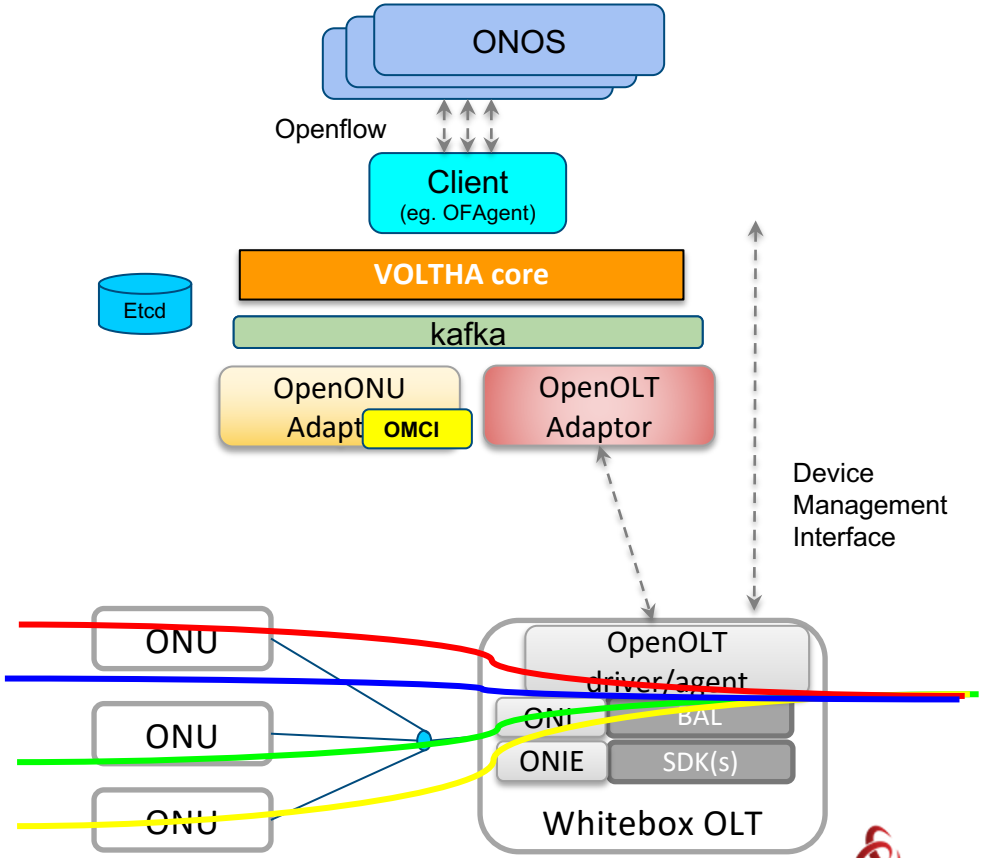
SEBA 2.0 Exemplar Architecture



Focus on access: ONOS and VOLTHA

VOLTHA: Virtual OLT Hardware Abstraction

- Common Control & Management for PON networks (OLTs and ONUs)
- Different brands of OLTs and ONUs
- Multiple services and operator workflows (ATT, TT, DT)
- Device Management Interface for non datapath operations (e.g olt software upgrade)
- OpenONU adapter written in Go
- Multi-stack Support
- Scale improvements (10 Stack with 10240 subscribers with the same infra)



[VOLTHA 2.6 Webinar]
https://docs.voltha.org/master/release_notes/voltha_2.6.html

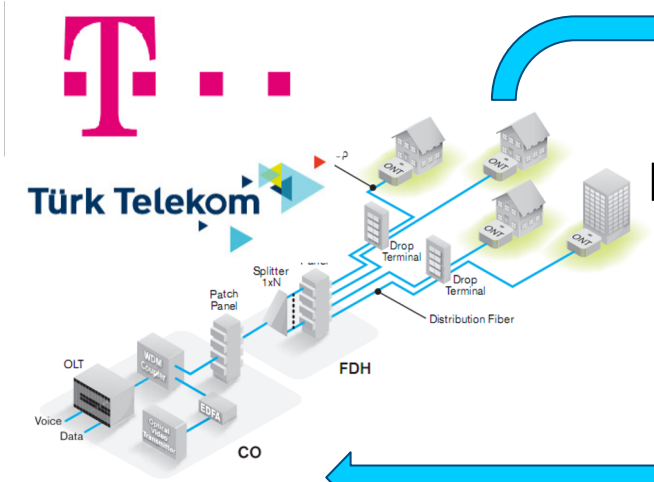
VOLTHA Deployments with Operators

Voltha 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

Feedback Loop from Operator's Deployments

Lessons Learned
Requirements
Bugs and scale



Enhanced product quality
feature richness
maturity

ONF

VOLTHA

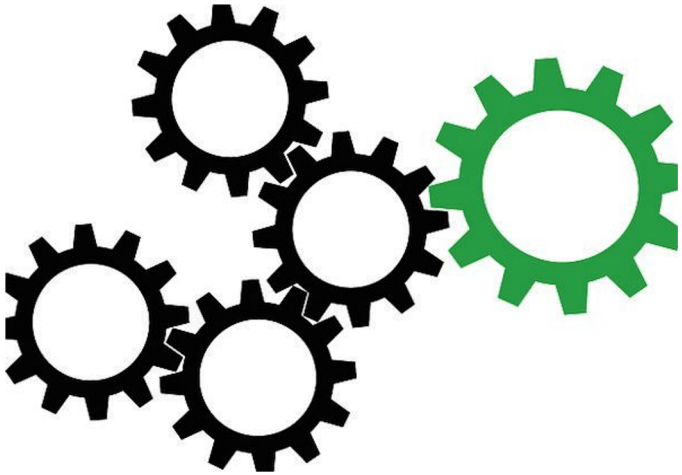
Community

Releases
Features
Bug fixes

Software Update Requirements

In Service Software upgrade of deployed components:

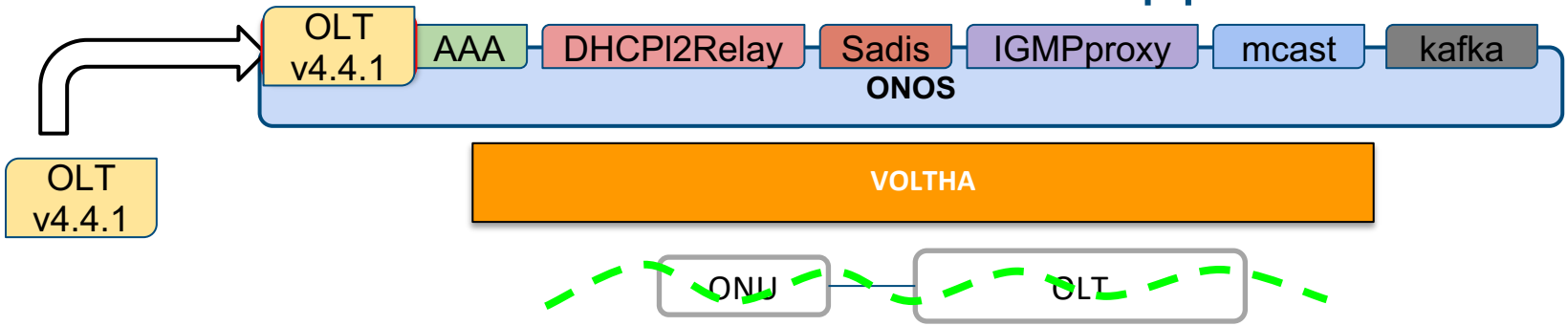
- Minor version update
  - no API change
  - no stored data format change
- ONOS apps
- VOLTHA components
- No user dataplane impact



Deployed ONUs Software upgrade

Support Bug fixes in live production networks

ISSU 1/2:ONOS apps



Implementation:

- Removed Mandatory inter application dependency
- Separated API pkg version from implementation pkg
- Distributed all required state in Atomix

Procedure:

- ONOS Rest API: deactivate, uninstall, install with new fixed .OAR, activate

VOLTHA components and dataplane do not perceive any change

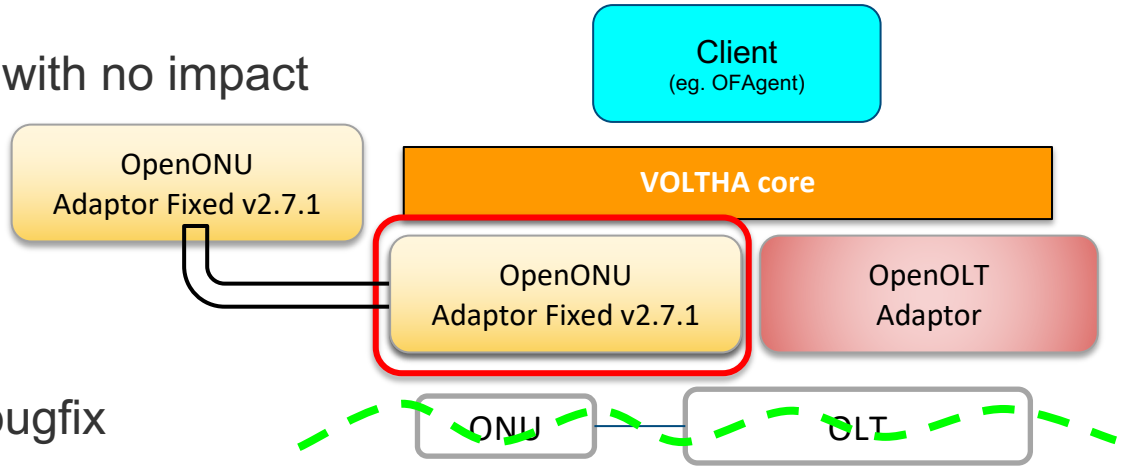
ISSU 2/2: VOLTHA components

Implementation:

- Support component restart with no impact to the system
- Storage of State in ETCD

Procedure:

- Create docker image with bugfix
- Helm install --upgrade <component>

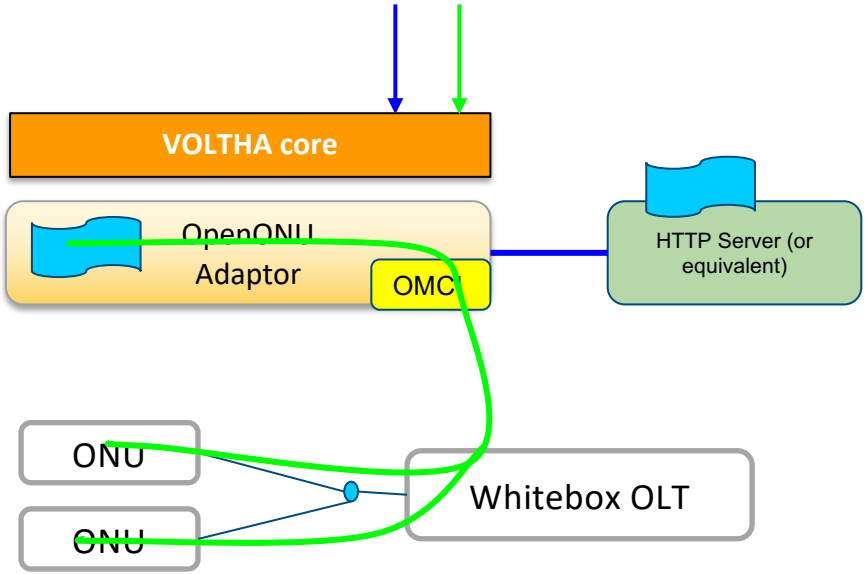


other VOLTHA components perceive this as a component restart

→ no dataplane impact

ONUs SW update

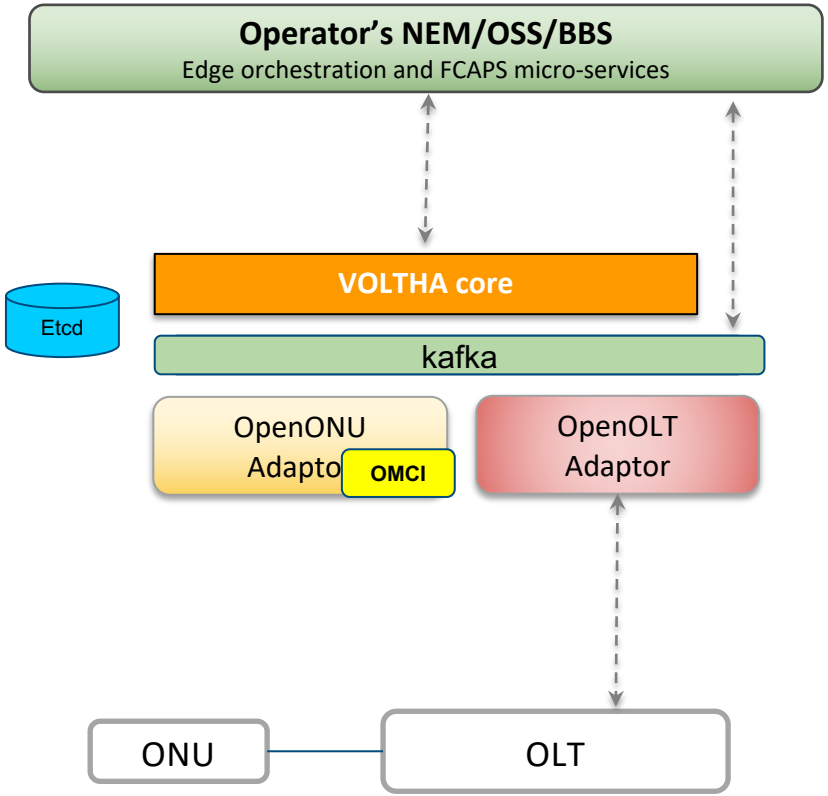
- DownloadImage API: Download to ONU Adapter from HTTP Server
- ActivateImage API: dissemination to the ONUs via OMCI channel
- Activation on the ONUs
- ONU Reboot
- Updated Image is not active



Perceived from VOLTHA and ONOS as a ONU reboot (port down)

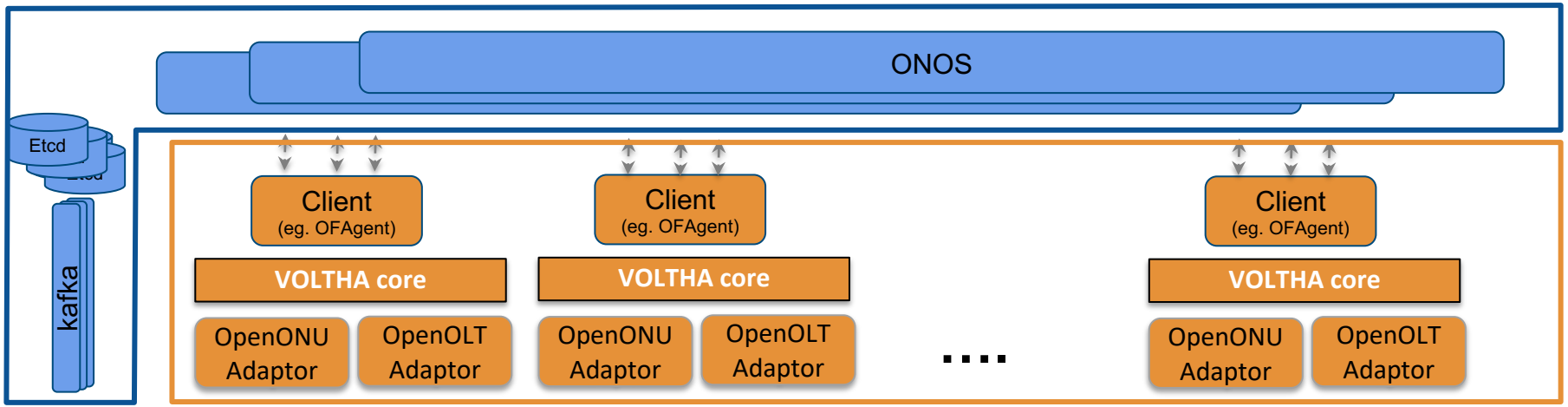
https://github.com/opencord/voltha-openonu-adapter-go/blob/master/ONU_Upgrade_Notes.md

Alarms and Performance Measurements



- Request from Alarm and Performance Measurements NEM via gRPC
- Enhanced PM configuration capability, stored in ETCD
- Both Alarms and PMs published to Kafka
- PMs:
  - *OpticalPower*
  - *UniStatus*
  - *EthernetBridgeHistory*
  - *EthernetUniHistory*
  - *FecHistory*
  - *GemPortHistory*
- https://github.com/opencord/voltha-openonu-adapter-go/blob/master/PM_Notes.md

voltha-infra and voltha-stack charts

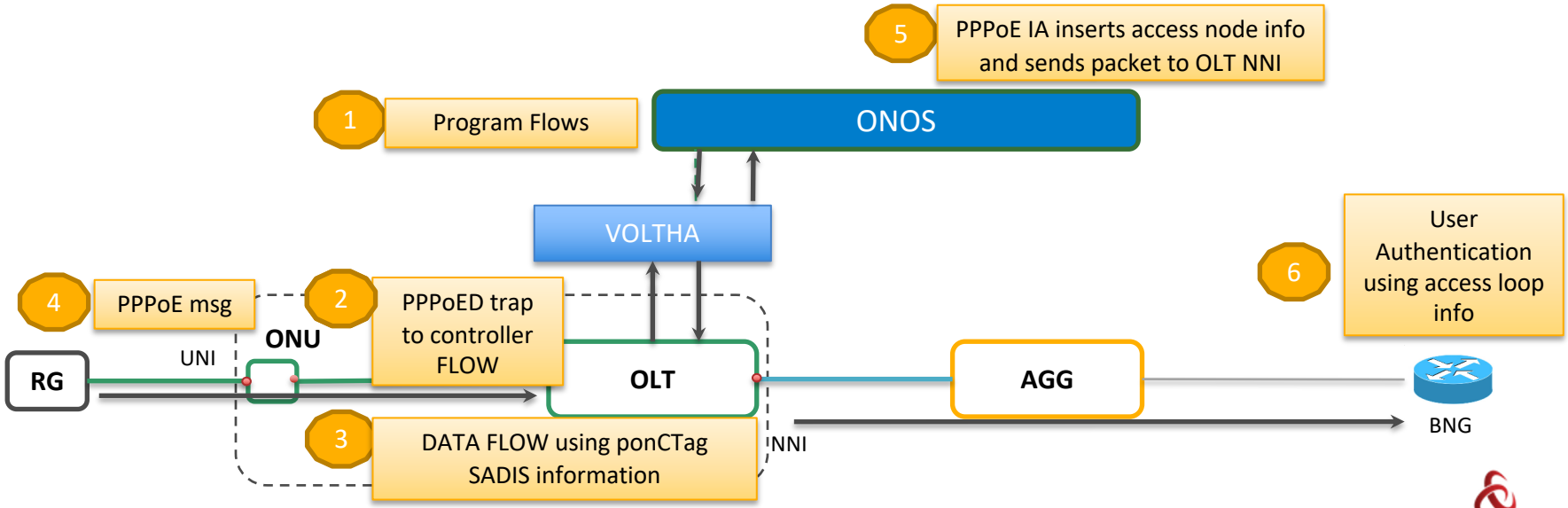


- 2 “umbrella” helm charts for pod deployment and configuration
- VOLTHA-INFRA: ONOS, ETCD, KAFKA
- VOLTHA-STACK: OF-Agent, Core, OLT and ONU adapters.
- support for all 3 workflows with different `values.yaml` file
- Remove kind-voltha bash script → simpler deployment and configuration

https://github.com/opencord/voltha-helm-charts/blob/master/README.md

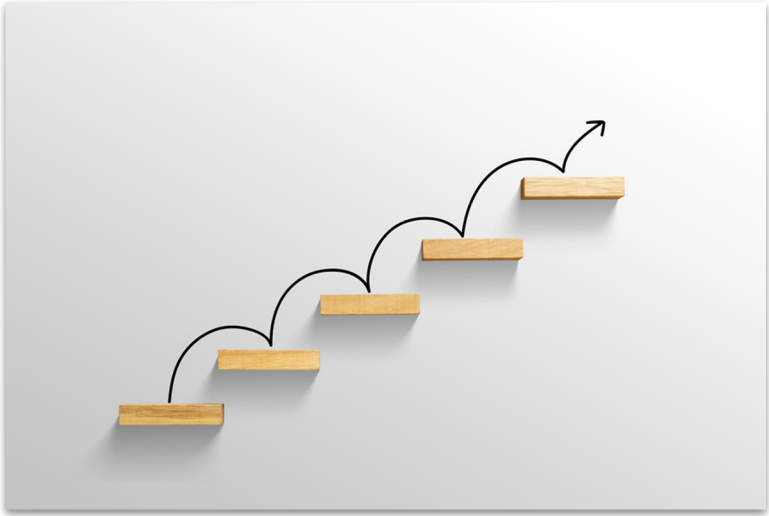
PPPoE Support

- Introduced support for PPPoE IA.
  - ONOS PPPoE IA app
  - VOLTHA stack PPPoE support
- enablePPPoE IA: org.opencord.olt.impl.OltFlowService enablePppoe true;
- program flows: use volt-add-subscriber to program flows



Scale Improvements

- Validation of TCONT and Gem Port IDs at scale (both via OMCI and flows)
- Bug fixes and improvements for Igmpproxy, mcast and olt for TT mcast workflow.



Jenkins view for Scale Tests:

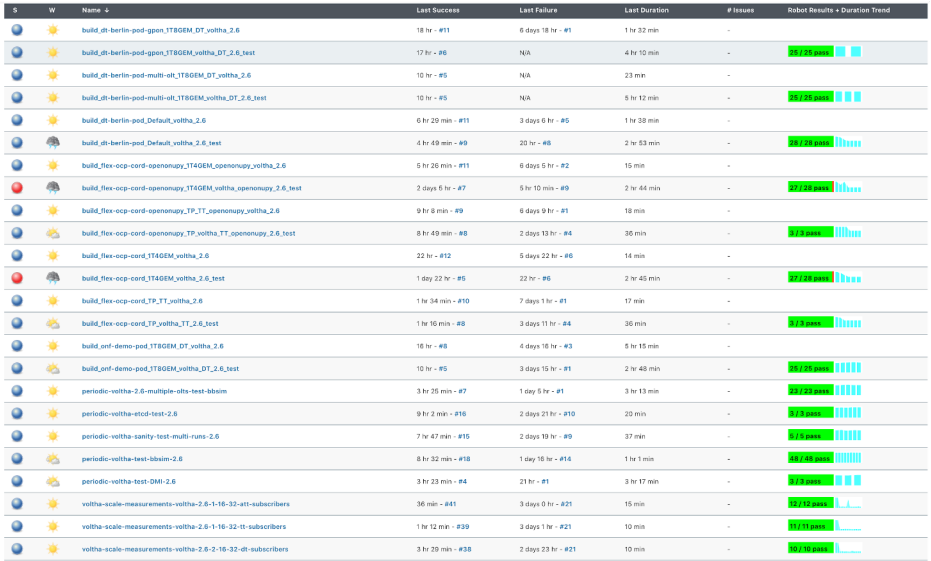
https://jenkins.opencord.org/view/voltha-scale-measurements/

Other 2.7 features

- Distinction between OLT channel disconnection and OLT reboot.
- AES encryption for GEM ports
- Integration of the OLT app with the Mac learning for TT workflow.
- OLT Topology application to learn about OLT peers
- Flow Error reporting form adapter to the core and to ONOS

VOLTHA+ONOS 2.7 Testing

- Software Upgrade
  - ONOS apps
  - VOLTHA components
  - ONU
- Openonu adapter restart and reconcile
- Performance Metrics
- OLT reboot vs disconnect
- TT scale multicast
- Enable/Disable Pon Port
- Nightly scale and 170+ 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 18 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	-	28 / 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 6 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 45 min	-	27 / 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 48 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	-	51 / 51 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 2.7 Tests

https://jenkins.opencord.org/view/VOLTHA-2.7/

SOAK Testing

Soak testing involves testing a system with a typical production load, over a continuous availability period, to validate system behavior under production use.

ONF VOLTHA's soak test

- 15 days
- 2 OLTs, one hardware and BBSim OLT
- Hardware OLT with 3 ONUs:
- BBSIM test with stable 515 ONUs
- WARN log level
- provision/unprovision subscribers
- restart pods

Continuous Certification

170+ 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

Operator's Procurements is based on successful ONF certification
https://opennetworking.org/continuous-certification-program/

2.7 Accomplishments

- **In service software upgrade** with minor versions for VOLTHA components and ONOS apps.
- **ONU software upgrade**
- Enhanced **Performance Metrics and Alarms**
- **PPPoE support** with Intermediate Agent Application on ONOS
- Scale improvements and fixes:
  - Validation of TCONT and Gem Port IDs at scale
  - igmpproxy, mcast and olt for TT mcast workflow.
- Introduction of the **voltha-infra and voltha-stack helm charts**
- **Soak tests for 15 days** (stable with 512 ONUs - 2 OLTs (one hardware OLT and one BBSim OLT)

https://docs.voltha.org/master/release_notes/voltha_2.7.html

VOLTHA 2.8 Roadmap

- Storage and Persistency (ETCD, REDIS)
- Openonu enhancements (unknown MEs, error handling, traffic descriptors)
- Extension of OAM capabilities (on demand, capability based, transceiver power)
- All T-cont type selection in Technology profile
- IETF bandwidth profile definition
- MAC learning for TT workflow at scale
- ONU Auto Registration configuration (possible)
- Multi UNI support (possible)

VOLTHA 2.8 to become the first Long Term Support (LTS) release

SEBA Community

Thank You

Follow Up Links:

docs.voltha.org

andrea@opennetworking.org