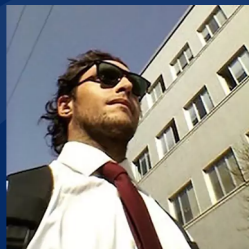




VOLTHA v2.9 Techinar

January 11, 2022 | 9am PDT



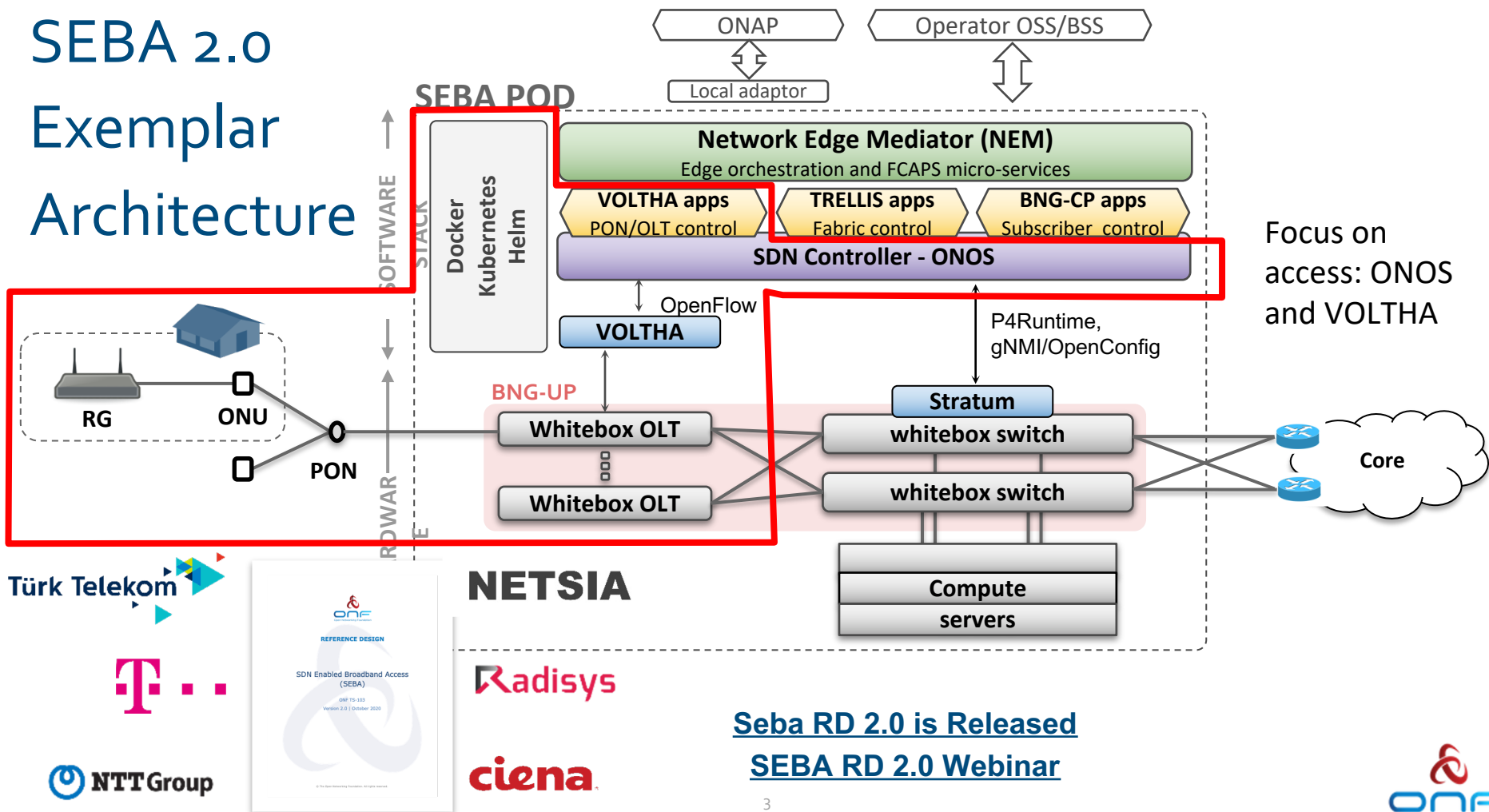
Andrea Campanella, Matteo Scandolo - ONF
Khenaidoo Nursimulu - Ciena

Outline

- SEBA RD 2.0 and VOLTHA Architecture, project state and deployments
- VOLTHA 2.9 release
 - gRPC for inter container communication
 - ONOS OLT application rewrite
 - Transparent OLT workflow (TIM)
 - Platform stabilization (ONOS 2.5.5 with ISSU, BAL 3.10.2.2, OMCI enhancements, ETCD cleanup, multi-uni scenarios)
 - Testing (Multicast, background ping, data cleanup)
 - Certification of new OLTs
- VOLTHA 2.8 LTS Support
- VOLTHA 2.10 Roadmap
- Q/A

SEBA 2.0

Exemplar Architecture

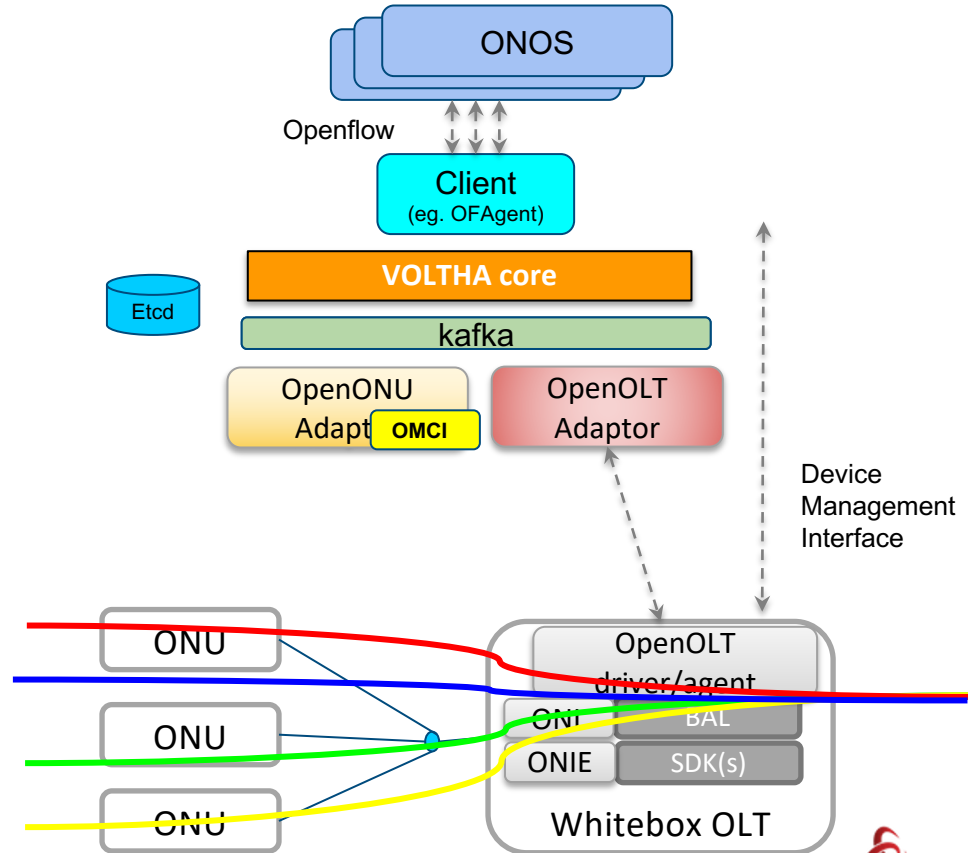


VOLTHA: Virtual OLT Hardware Abstraction

- 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)
- Scale deployments (10 Stack with 10240 subscribers with the same infra)
- Software update (VOLTHA and ONUs)
- Hardware, scale, soak testing
- 2.8 LTS release

[VOLTHA 2.8 Webinar](https://docs.voltha.org/master/release_notes/voltha_2.8.html)

https://docs.voltha.org/master/release_notes/voltha_2.8.html



VOLTHA Deployments with Operators

Voltha is in production with live customers:

- Deutsche Telekom (DT) as part of the A4 project
 - [DT's first live deployment](#)
 - Working on FTTB for mass market deployments with VOLTHA 2.10
- Turk Telekom (TT)
 - [TT initial deployment](#)
 - [TT scale to million of subscribers](#)



gRPC for inter container communication

Kafka in pre-voltha 2.9 release

- Kafka used for inter-container communication
- Voltha Core \Leftrightarrow Adapters
- Adapters \Leftrightarrow Adapters

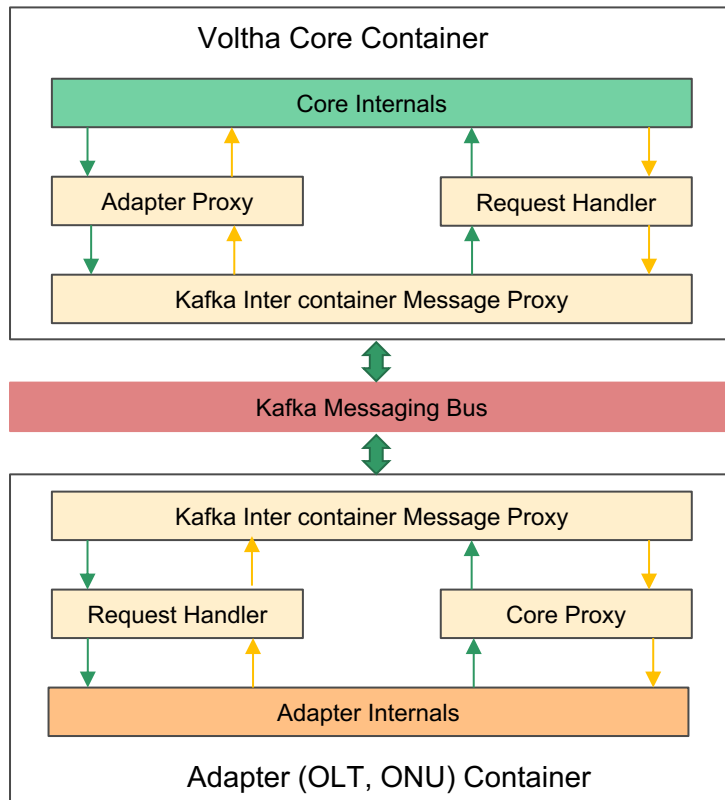
Why Kafka?

- Ease of HA implementation
- Multipoint to multipoint communication
- Message persistence

Why moving away from Kafka in 2.9?

- Control plane moved from HA to fast restart
- Moved to point-to-point communication
- Message persistency never used
- Boilerplate code (kafka proxies) is complex with some limitations

Kafka still used for events/kpis in 2.9 release



gRPC for inter container communication

gRPC in 2.9 release

- gRPC used for inter-container communication
- Voltha Core \Leftrightarrow Adapters
- Adapters \Leftrightarrow Adapters

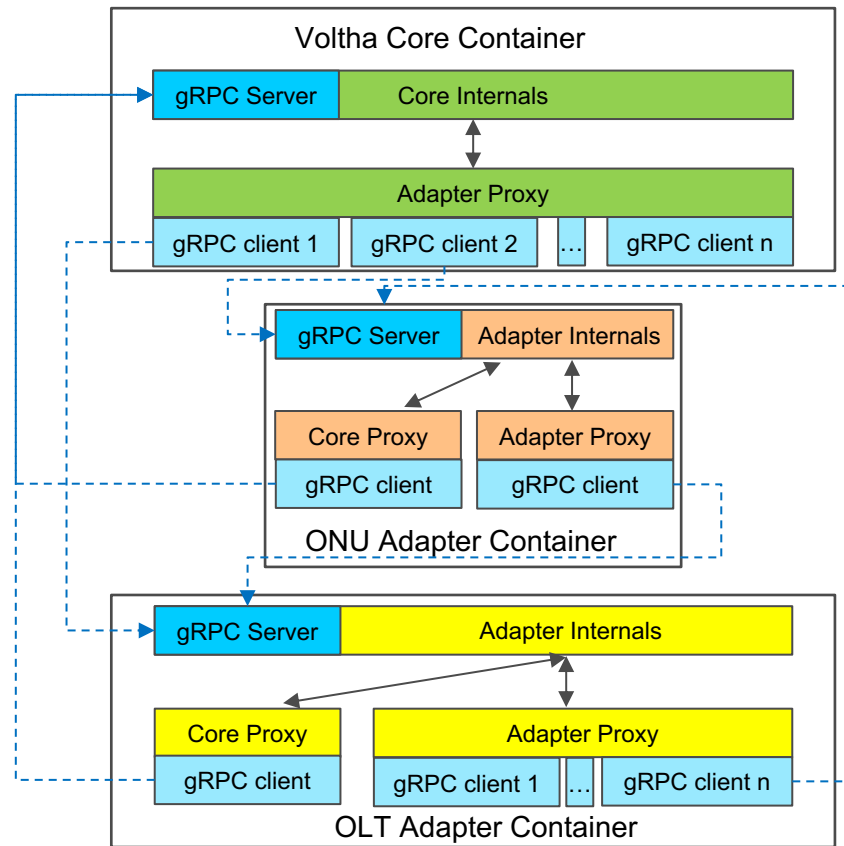
Why gRPC?

- Point-to-point communication
- Clearly defined interfaces (proto rpcs)
- Code simplicity (no more boilerplate code)
- Improved performance

Implementation – high level

- gRPC client code implemented in voltha-lib-go
- Automatic connection re-establishment implemented in voltha-lib-go
- New gRPC service in Core and Adapters

Better overall performance, code simplicity, code reuse, and clearly defined interfaces for better LTS release support



ONOS OLT application rewrite

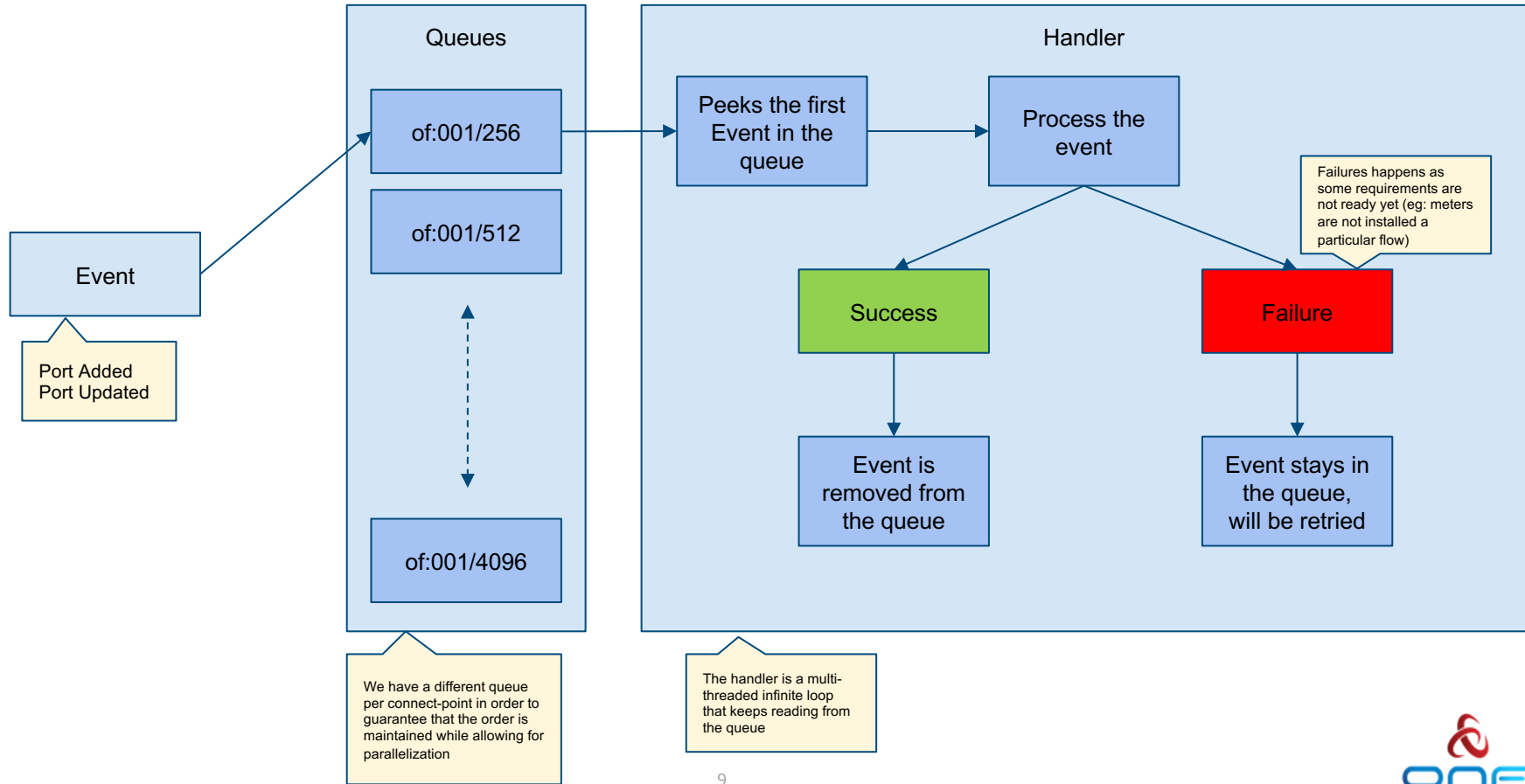
Complete OLT application rewrite:

- Queue based mechanism for subscribers and events
- Flow installation feedback
- Workflow separation
- 2x performance increase
- Fully backwards compatible with VOLTHA 2.8 APIs
- Version 5.0.0

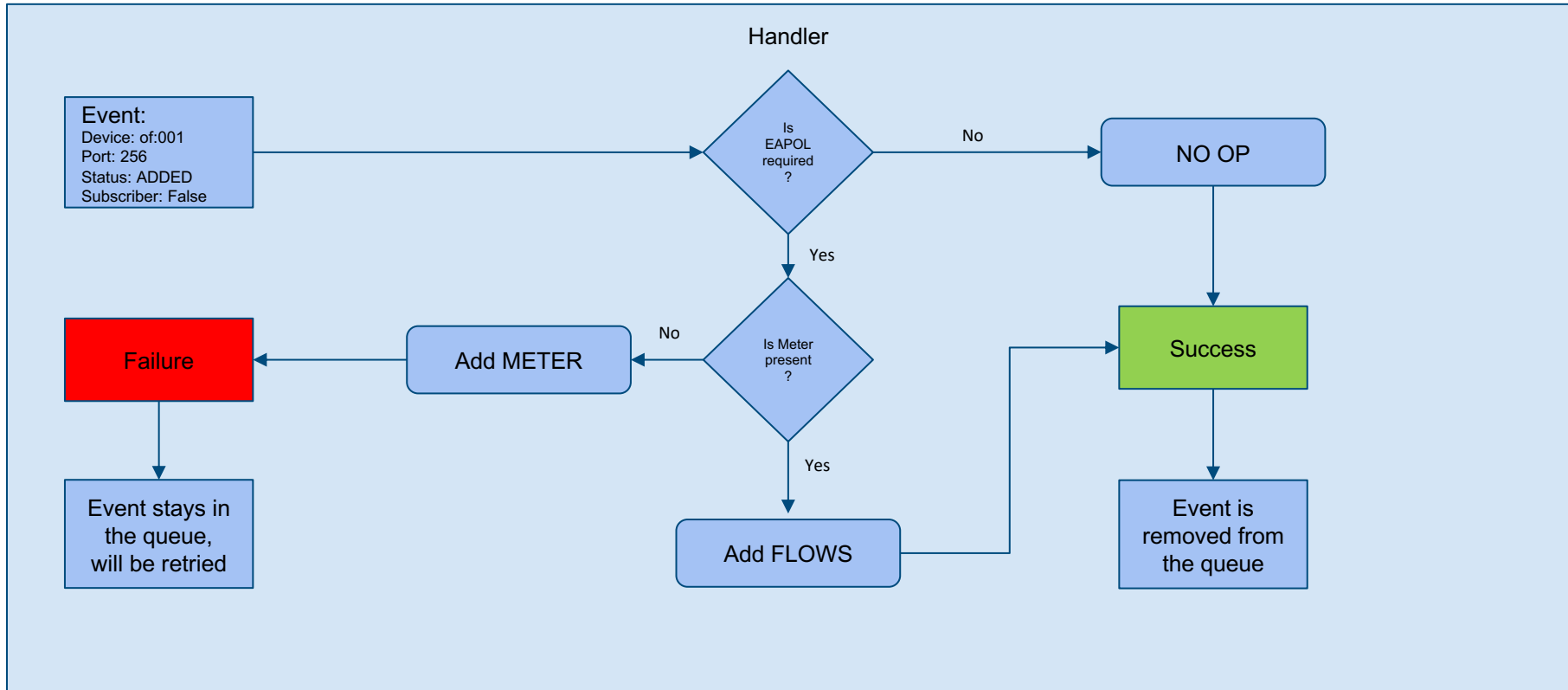


Better overall performance, event sequence handling, code quality and extensibility, ensuring longer lifespan.

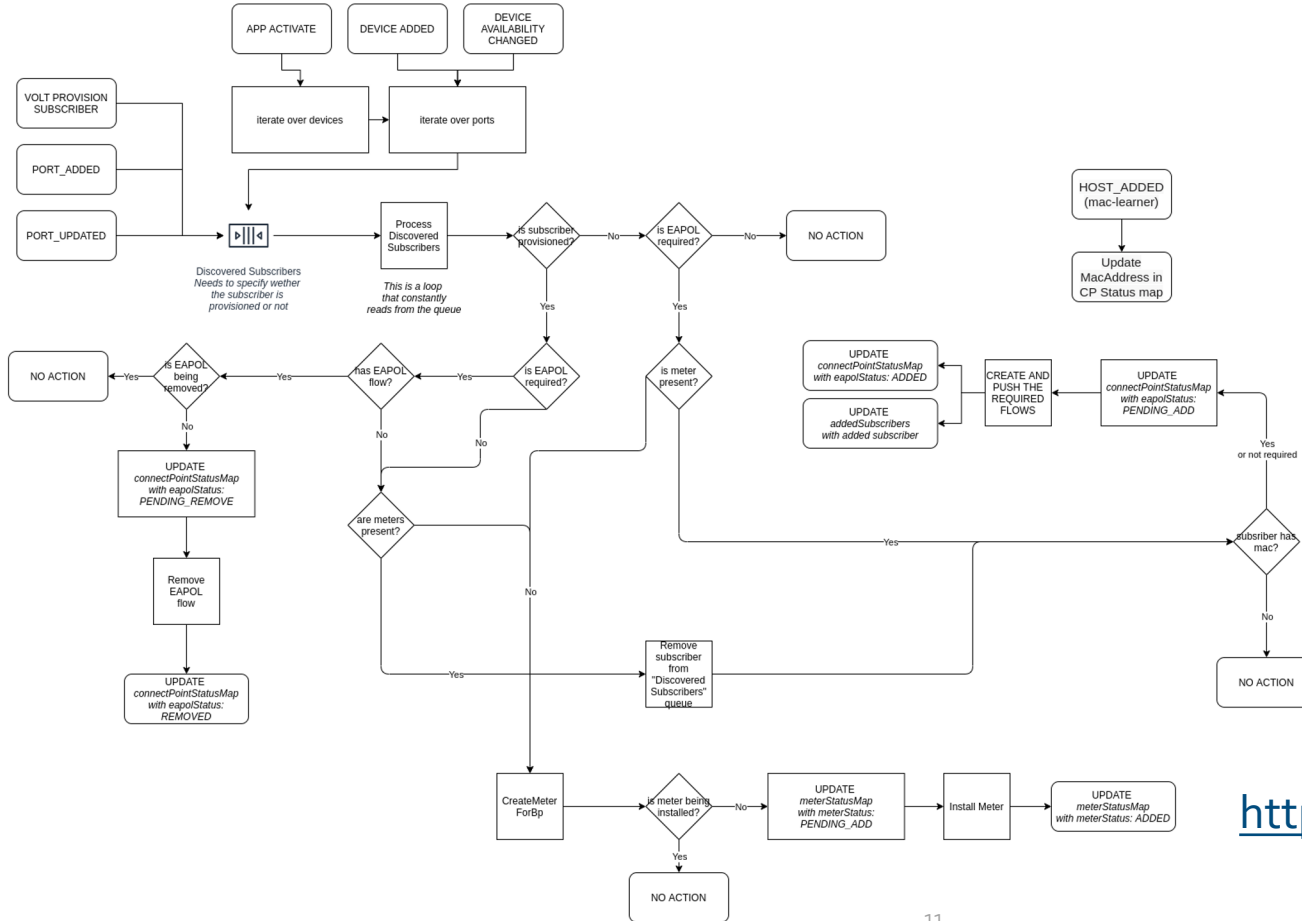
ONOS OLT application architecture



ONOS OLT application architecture



ONOS OLT application architecture



<https://github.com/opencord/olt>

Performance Improvement

2 OLTs, 1024 subscriber, 1 voltha stack, ETCD with persistence (on nVME disks):

- ATT test passes in ~250 seconds vs ~500 seconds before
- DT test passes in ~110 seconds vs ~300 seconds before
- TT test passes in ~350 seconds vs ~650 seconds before

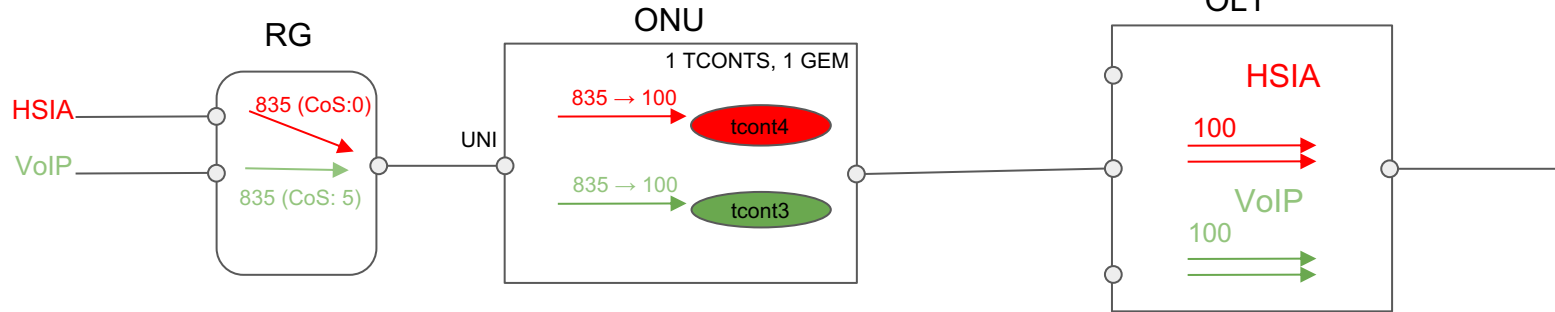
**Substantial performance improvements in scale test
by combining gRPC and new OLT application.**



Transparent OLT workflow (TIM)

Transparent VLAN forwarding at the OLT

- configured with s-tag at 4096
- ONU swaps vlan
- OLT forwards with no VLAN operation
- Telecom Italian (TIM) HSIA workflow)

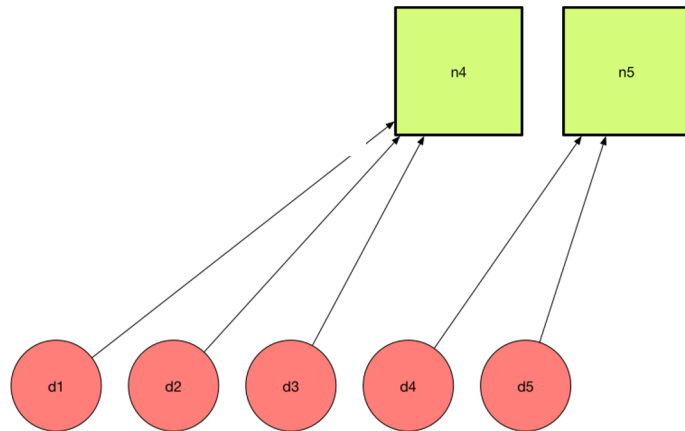


All VLAN operations (double tag, swap, transparent ONU and transparent OLT) are now supported.

ONOS 2.5.5 with ISSU and ETCD cleanup

ONOS In Service Software Upgrade

- upgrade ONOS controller **minor version**
- **no cluster downtime**
- [ISSU documentation](#)



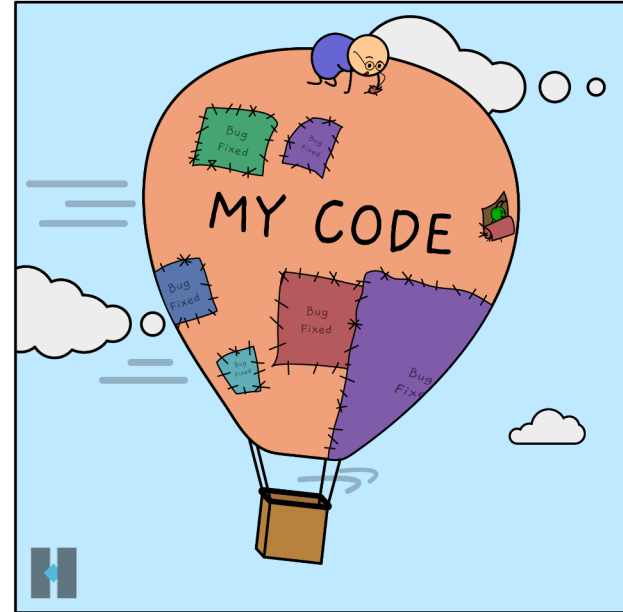
ETCD Data cleanup

- Remove all data from ETCD
- OLT, ONU device,
- flow, group o meter delete ONU
- smaller footprint and faster ETCD cluster.



Platform stabilization

- **ONU interaction enhancements in openonu adapter**
 - Prioritized OMCI sending
 - Relaxed decoding and storing of unknown MEs
 - PM counter Reset
 - Flow serialization and queueing mechanism
- **ONU image upgrade**
 - multiple ONUs
 - abort during any phase
 - Correct indication statuses
- **Flow deletion operations during reconciliation**
- **Flow/GemPort deadlock in multi-uni scenarios**
- **Error reporting and corrections in openolt agent and adapter**
- Bug fixes



f /techindustan

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@ /techindustan

Testing: multicast and per service provisioning

- Expanded multicast tests from 1 to 5 scenarios.
 - 2 RGs on same ONU joins same channel
 - 2 RGs on same ONU joins different channels
 - 2 RGs on different ONUs on same PON joins same channel
 - 2 RGs on different ONUs on same PON joins different channels
 - Tests also include verification for IGMP leave
- Added support for subscriber uniTag (per-service) provisioning for TT test suite.

VOLTHA+ONOS 2.9 Testing

New 2.9 Tests

- Multi-uni, multi-olt, extended software update tests for openonu-go.
- Container restart tests now include a continuous background ping during restart
- Enhanced DT soak pod job with bbsim subscribers provisioning
- Empty device, subscriber and service information verification after deletion.

Nightly scale and 180+ Hardware tests

Jenkins view for 2.9 Tests

<https://jenkins.opencord.org/view/VOLTHA-2.9/>

✓	⚙️	build_flex-ocp-cord-multi-uni_TP_TT_voltha_master	11 hr - #17	9 days 4 hr - #6	16 min	🔔	☆	
✓	🔄	build_flex-ocp-cord-multi-uni_TP_voltha_TT_master_test	10 hr - #14	3 days 10 hr - #11	42 min	🔔	☆	0/0 pass
✓	⚙️	build_flex-ocp-cord_Default_voltha_master	20 hr - #825	9 days 20 hr - #814	11 min	🔔	☆	
✓	🔄	build_flex-ocp-cord_Default_voltha_master_test	20 hr - #729	1 day 20 hr - #728	2 hr 0 min	🔔	☆	28/28 pass
✓	⚙️	build_flex-ocp-cord_TP_TT_voltha_master	16 hr - #425	N/A	14 min	🔔	☆	
✓	☁️	build_flex-ocp-cord_TP_voltha_TT_master_test	16 hr - #384	2 days 16 hr - #382	3 hr 7 min	🔔	☆	19/20 pass
✓	⚙️	build_menlo-certification-pod-radisys-gpon_T8GEM_DT_voltha_master	27 min - #59	N/A	12 min	🔔	☆	
✓	⚙️	build_menlo-certification-pod-radisys-gpon_T8GEM_voltha_DT_master_test	1 day 0 hr - #59	N/A	4 hr 41 min	🔔	☆	28/28 pass
✓	⚙️	build_onf-demo-pod_TT4GEM_voltha_master	40 min - #575	N/A	19 min	🔔	☆	
✓	⚙️	build_onf-demo-pod_TT4GEM_voltha_master_test	1 day 0 hr - #476	6 days 0 hr - #471	2 hr 16 min	🔔	☆	28/28 pass
✓	⚙️	build_onf-demo-pod_TT8GEM_DT_voltha_master	21 hr - #548	N/A	19 min	🔔	☆	
✓	⚙️	build_onf-demo-pod_TT8GEM_voltha_DT_master_test	21 hr - #488	5 days 3 hr - #483	2 hr 17 min	🔔	☆	27/28 pass
✓	⚙️	nightly-voltha-DTflow-sanity-test	3 hr 51 min - #507	N/A	10 min	🔔	☆	1/0 pass
✓	☁️	periodic-software-upgrade-test-bbsim	14 hr - #358	1 day 20 hr - #355	40 min	🔔	☆	3/3 pass



Jenkins



Continuous Certification -- Radisys 1600X, 1600G, Adtran SDX 6320

VOLTHA 2.8 adds the **Radisys 1600X, 1600G, Adtran SDX 6320 (GPON)** to the Certified Hardware.

Radisys 1600G:

- whitebox OLT
- 16 GPON ports
- openolt agent and adapter



Radisys 1600X:

- whitebox OLT
- 16 Combo-PON ports
- openolt agent and adapter



Adtran 6320X:

- greybox OLT
- 32 Combo-PON ports
- adtran-olt-adapter



More info: [radisys](http://radisys.com), [adtran](http://adtran.com)



Continuous Certification

180+ nightly Tests certify several HW:

- Edgecore ASFVOLT16 (XGSPON), ASGVOLT64 (GPON)
- Radisys 3200G (GPON)
- **Radisys 1600G (GPON)**
- **Radisys 1600X (GPON)**
- **Adtran SDX 6320 (GPON)**
- Sercomm FG1000 (GPON ONU)
-



ONF Marketplace:

https://opennetworking.org/marketplace/?_product_project=voltha

Operator's Procurements is based on successful ONF certification

<https://opennetworking.org/continuous-certification-program/>

2.9 Accomplishments

- **gRPC** for inter container communication for **faster, more reliable communication and a simpler architecture**
- **ONOS OLT application rewrite**: higher performance, simplification, bug fixes
- **Transparent OLT workflow (TIM)**, OLT forwards traffic without tagging.
- Platform stabilization
 - **ONOS 2.5.5** with in service software upgrade (**ISSU**),
 - **BAL 3.10.2.2** as base for IPv6, LAG, LACP and bugfixes
 - **OMCI enhancements**, serialization, decoding, software upgrade
 - **ETCD cleanup**, thus **smaller footprint and no stale data**
 - bugfixes
- Testing (Multicast, background ping, data cleanup)
- Certification of new OLTs

**No Functionality,
testing or Scale
regressions**

Support for 2.8 VOLTHA LTS release

VOLTHA 2.8 was the first Long Term Support and ONF committed to update, patch and maintain the software [\(more info\)](#)

During release 2.9 continuous testing was done on 2.8 and **more than 50 fixes**, between codebase and tests, were back ported.

Continuous updates were provided to the upstream **2.8 helm charts and documentation.**

VOLTHA 2.8 will be supported until **December 2022.**



VOLTHA 2.10 Roadmap

- **Edge Scale enhancements:**
 - TT: 128k subscribers
 - DT: 50k customer -- possibly 4k ONUs per core.
- **Fiber to the building/basement (FTTB)/DPU support**
- **Voice Support** on POTS/multi UNI supported devices
- **Rolling Software Upgrade** Testing
- **New Micro-Service-based VOLTHA controller** as replacement for onos-classic
- **LAG and LACP** (possible/stretch)
- **Certification** with Adtran DMI and New OLTs
- **BAL Upgrade to 3.12 LTS** to support newer chipsets



SEBA Community





Thank You

TST Meeting

(Tuesday at 8 AM PST)

docs.voltha.org

Year in review part 1 Year in review part 2

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