SEBA Implementation Walkthrough

Session 2: 11am - 12:30am

In this session

- SEBA Community
  - ONF & Brigades
- NEM
  - What are the collections of containers that make up NEM?
  - What does XOS do?
- ONOS & Apps
  - What do the apps written on the SDN controller (ONOS) do?
  - How are multiple OLTs aggregated by the AGG switch?

SEBA and VOLTHA Community

SEBA/VOLTHA Brigades

Brigade	VOLTHA 2.x Stability	BAL 3.1 upgrade	VOLTHA FCAPS	ONOS FCAPS	Multicast	BBSim	Certification
ONF Mentor	David B. (Ciena)	Saurav	Scott	Saurav	Saurav	Matteo	Suchitra
Contri-butors	ciena, ONF, AT&T, and potentially many others	Edge-corE NETWORKS, Radisys, NETSIA, BROADCOM	Edge-corE NETWORKS, SterliteTech	Infosys, NORTHFORGE, FURUKAWA ELECTRIC GROUP	NETSIA, Infosys, SterliteTech	Radisys, NETSIA, NTT, NORTHFORGE	JABIL, University of New Hampshire, And many others

Technology Profile Brigade(s)

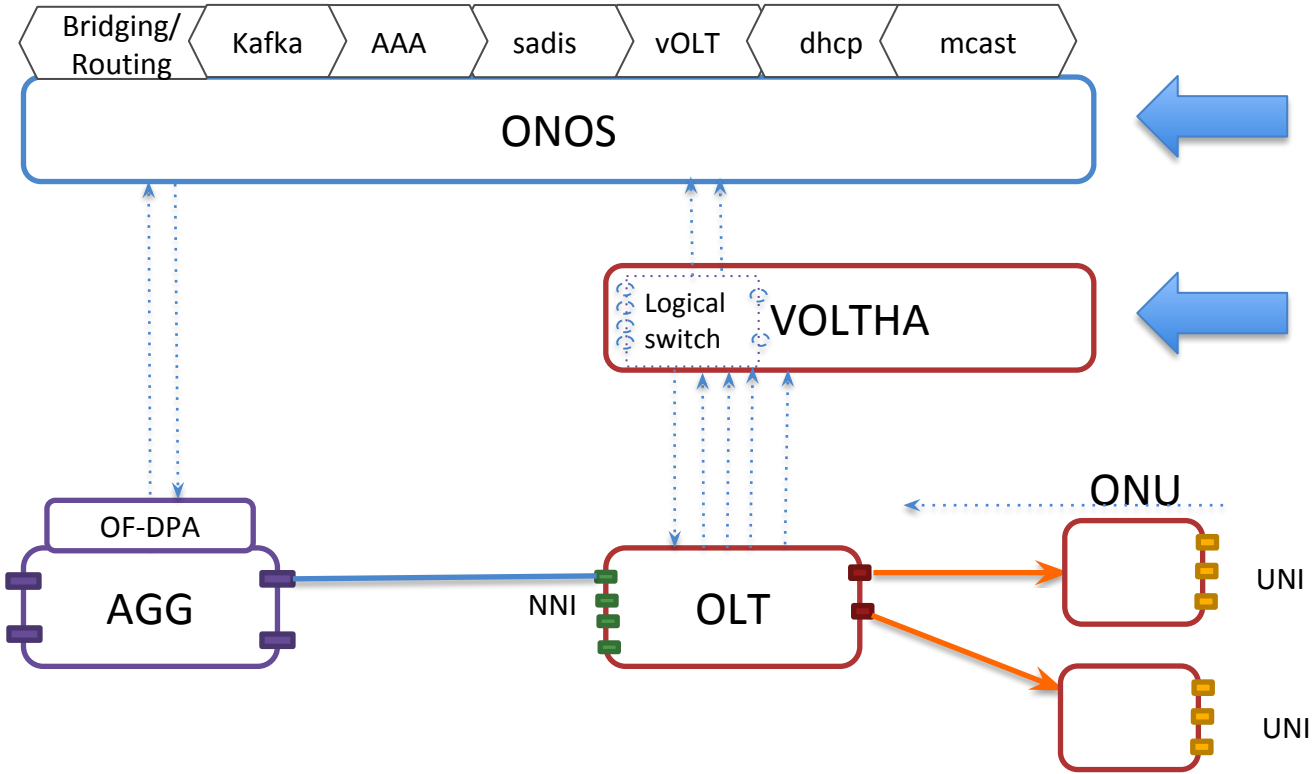
Contributors

Radisys

NETSIA

Infosys Navigate your next

JABIL



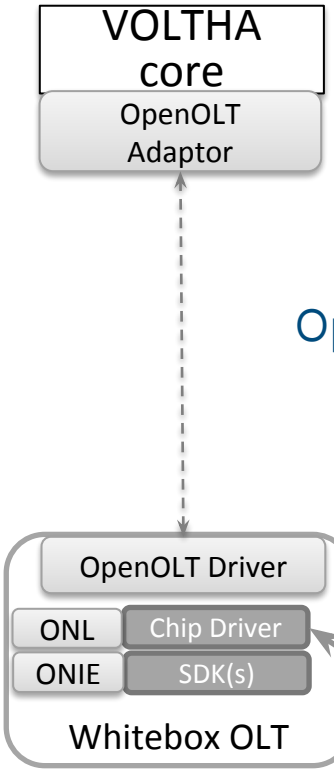
Speed Profile

Per subscriber
up/down bw profile
cir/eir/cbs/ebs

Tech Profile

Access Tech type
Gems/TCONTs
Sched policy
Pbit mapping
Discard policy

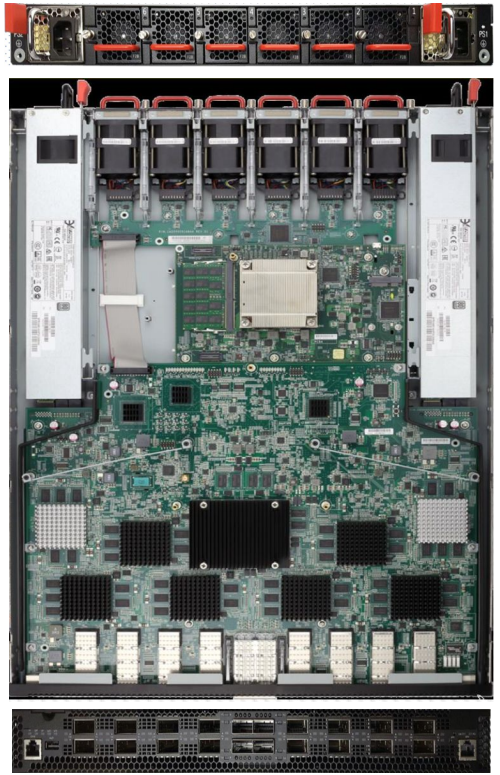
BAL 3.0 Brigade



White-Box =
Open-Hardware Specs (OCP)
+ Open-Source Software (ONF & OCP)

OpenOLT

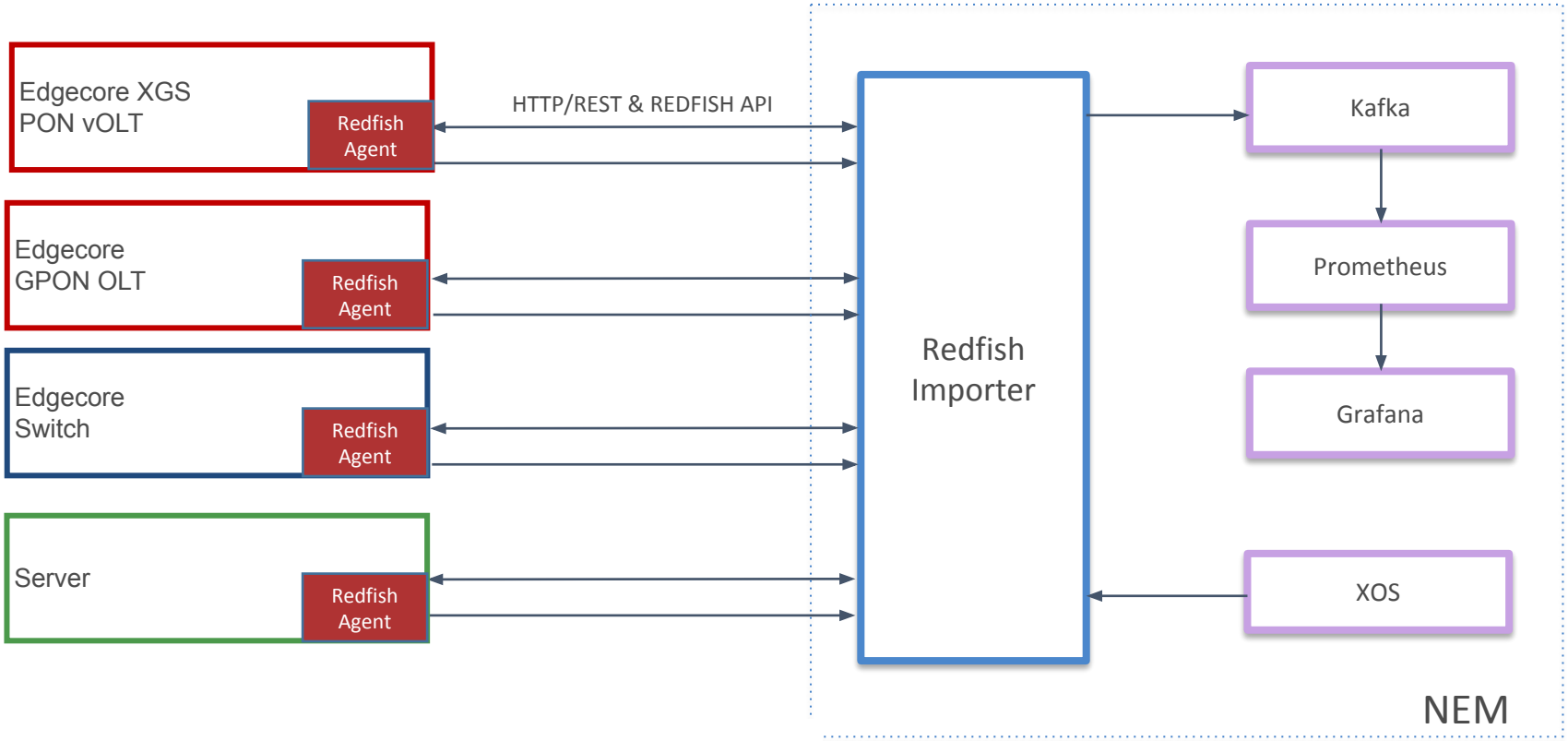
Edgecore
ASFvOLT16
Whitebox OLT



Contributors

Edge-corE NETWORKS · Radisys · NETSIA · BROADCOM · ONF

SEBA Pod Management & VOLTHA FCAPS Brigade

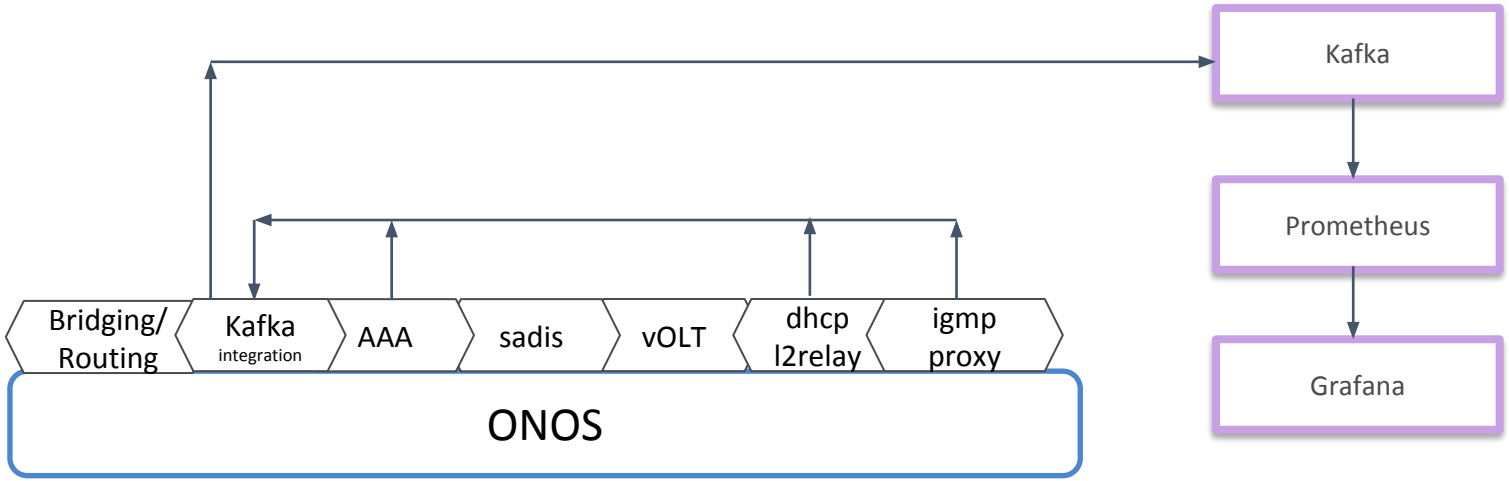


Contributors

Edge-corE NETWORKS

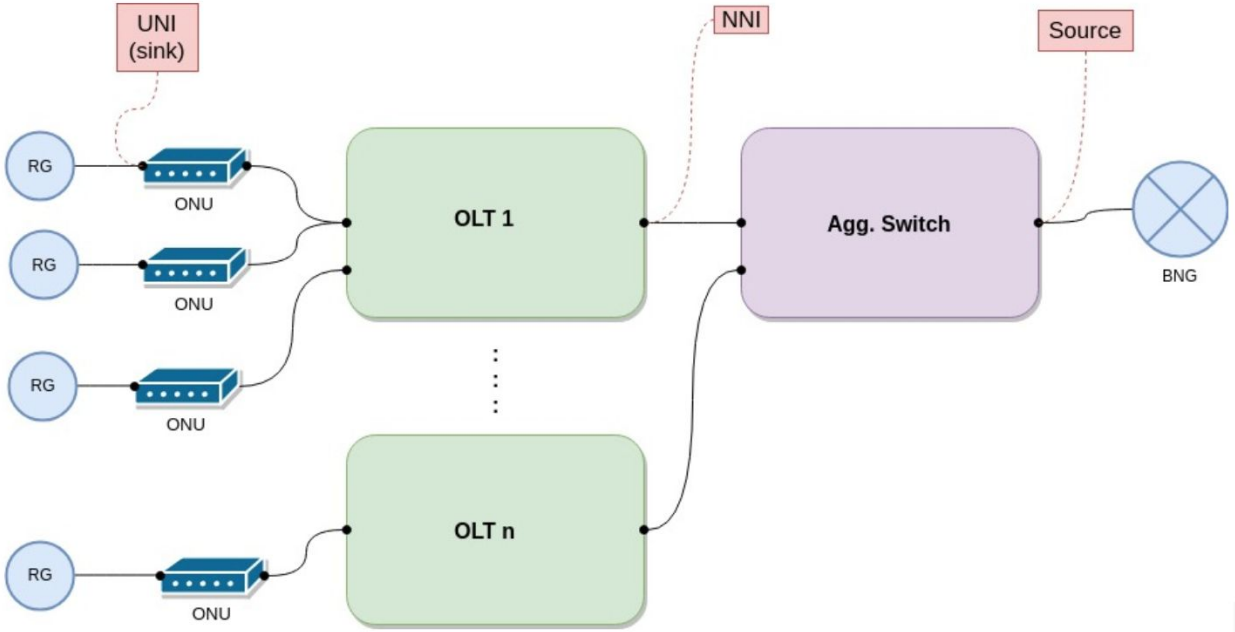
SterliteTech

ONOS FCAPS Brigade



Contributors

Multicast Brigade



Contributors

Infosys® Navigate your next

NETSIA

Sterlite Tech

BBSim Brigade

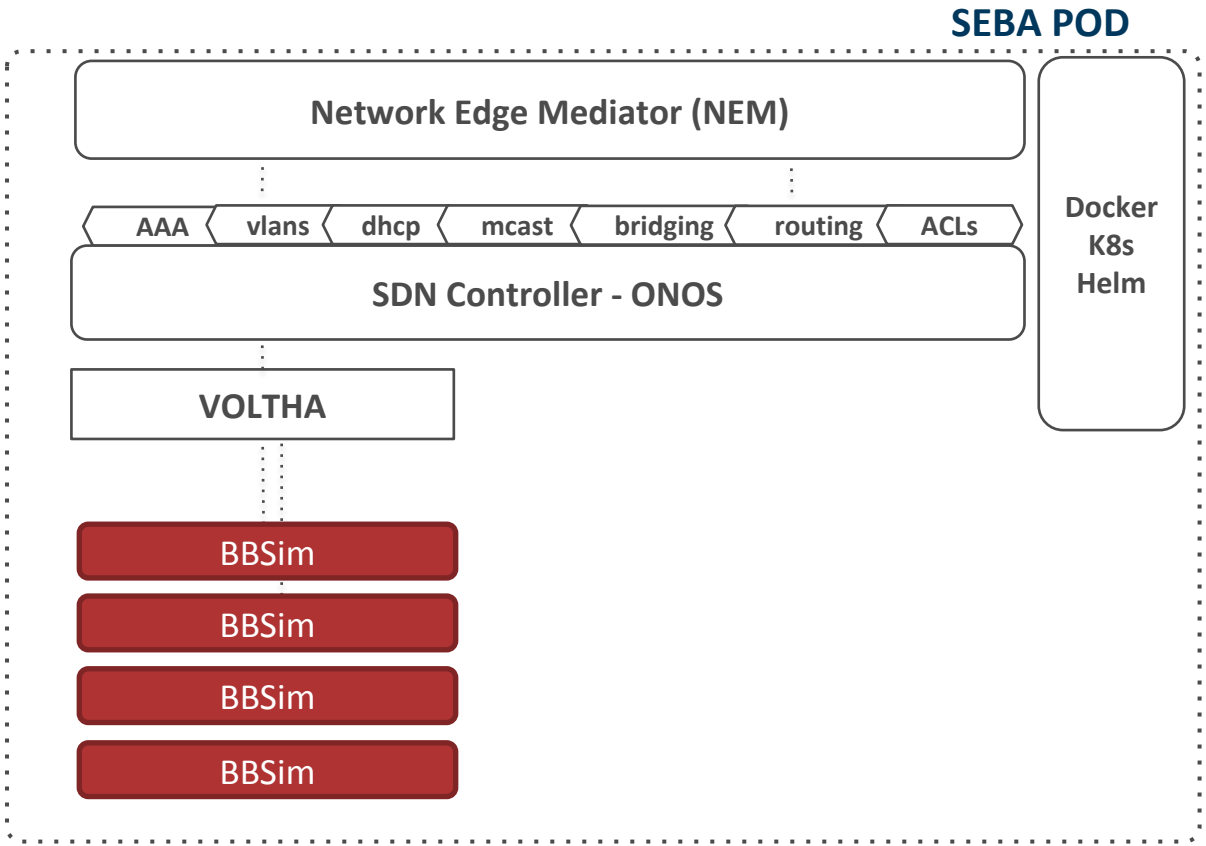
Contributors

Radisys

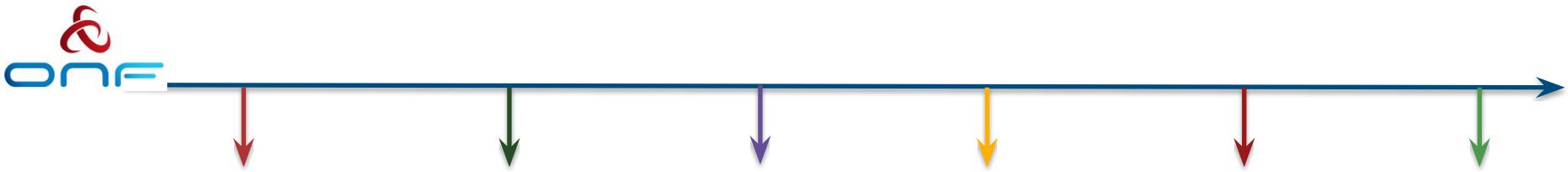
NETSIA

NTT

NORTHFORGE



SEBA Distributed DevOps – ONF Responsibilities



Joint Development with AT&T Foundry

- **Daily scrum**
- **Bugs -** issue analysis; root-cause;
- **Design discussions** for new features
- Documentation
- **Recommend best-practices**/training

Support VOLTHA/SEBA Community

- **Weekly SEBA public meetings**
- **JIRA issues** – kanban methodology
- **Mailing lists, Slack** community support
- **VOLTHA meetings**, TST, architectural guidance

Deliver New Features

- ONF team resposible for all **ONOS and NEM feature** development
- **FCAPS features** – kpis, alarms & logs in SEBA monitoring infrastructure
- **AT&T workflow** development
- **Integrate** with new ONU and OLT vendors
- **AGG switch** features

SEBA/VOLTHA Stability & Scale

- Focus on **stability of VOLTHA –** robustness and repeatability
- Investigate **scalability and performance** of full SEBA system

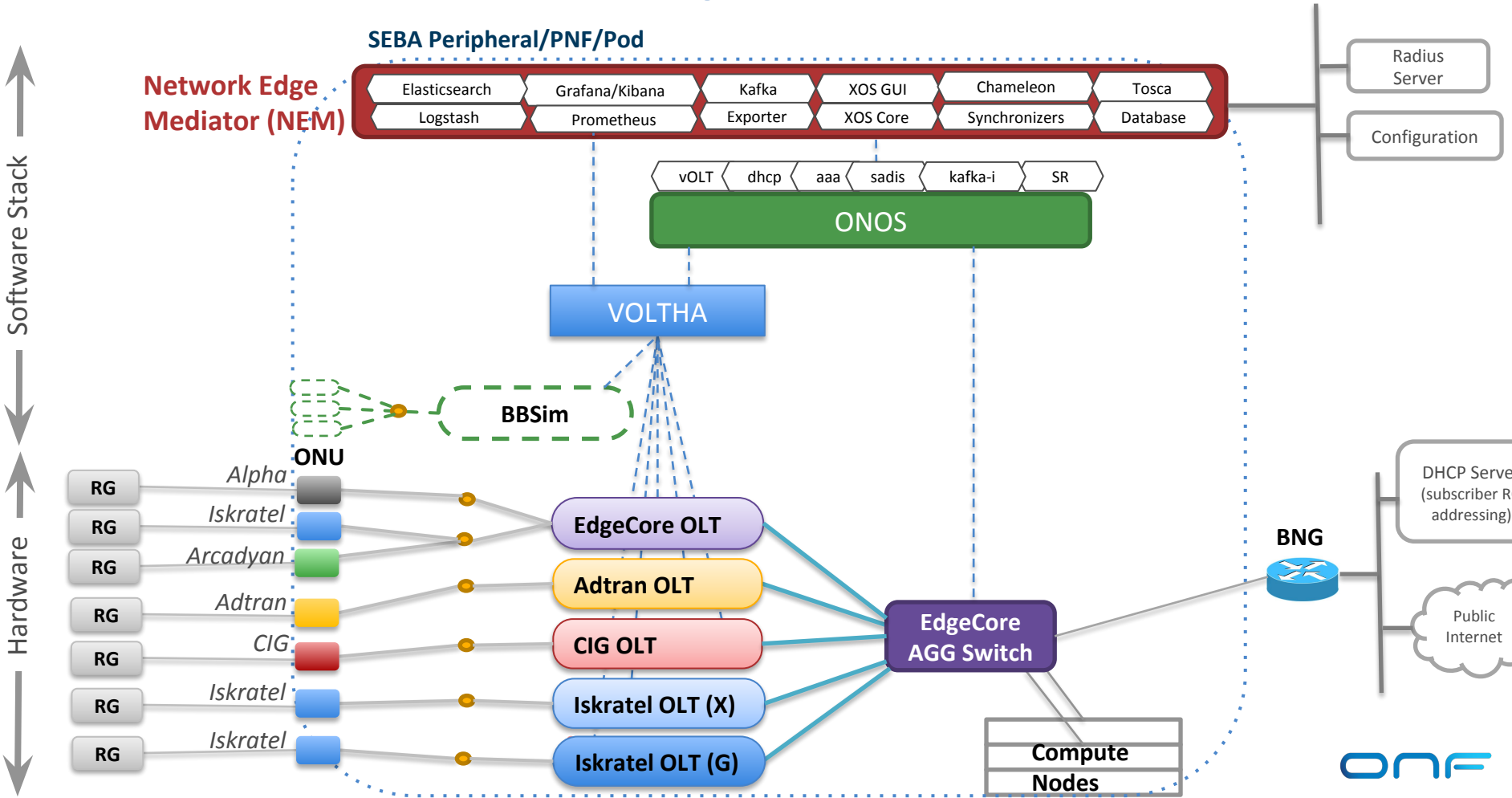
Tooling

- **BBSim** – Work with NTT in the development of PON simulator for scale testing
- **SEBA-in-a-BOX**: Complete end to end emulation of SEBA system with ponsim & mininet

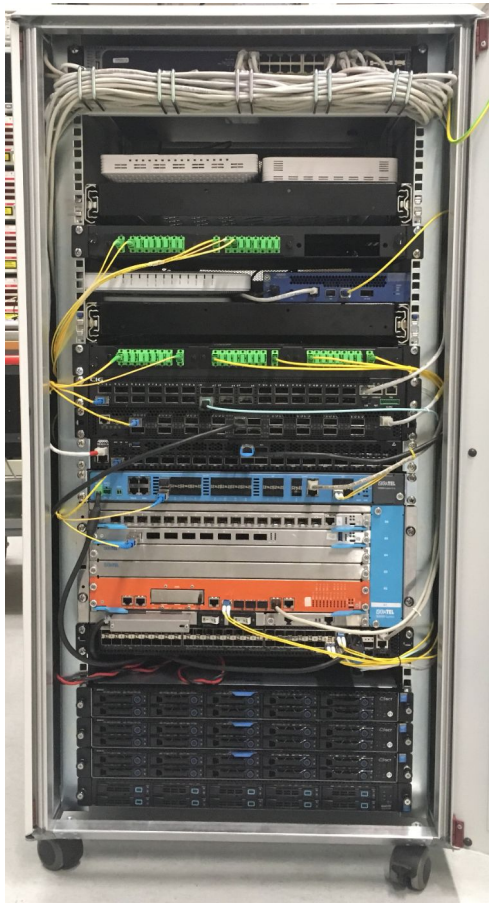
QA

- Developing **automated feature tests**
- Extending framework for **hardware based end-to-end tests**
- Work with community to develop test automation and certification procedures

Demo setup BBWF 2018



Demo setup BBWF 2018



ONUs: Arcadyan, Alpha, Adtran, CIG, Iskratel

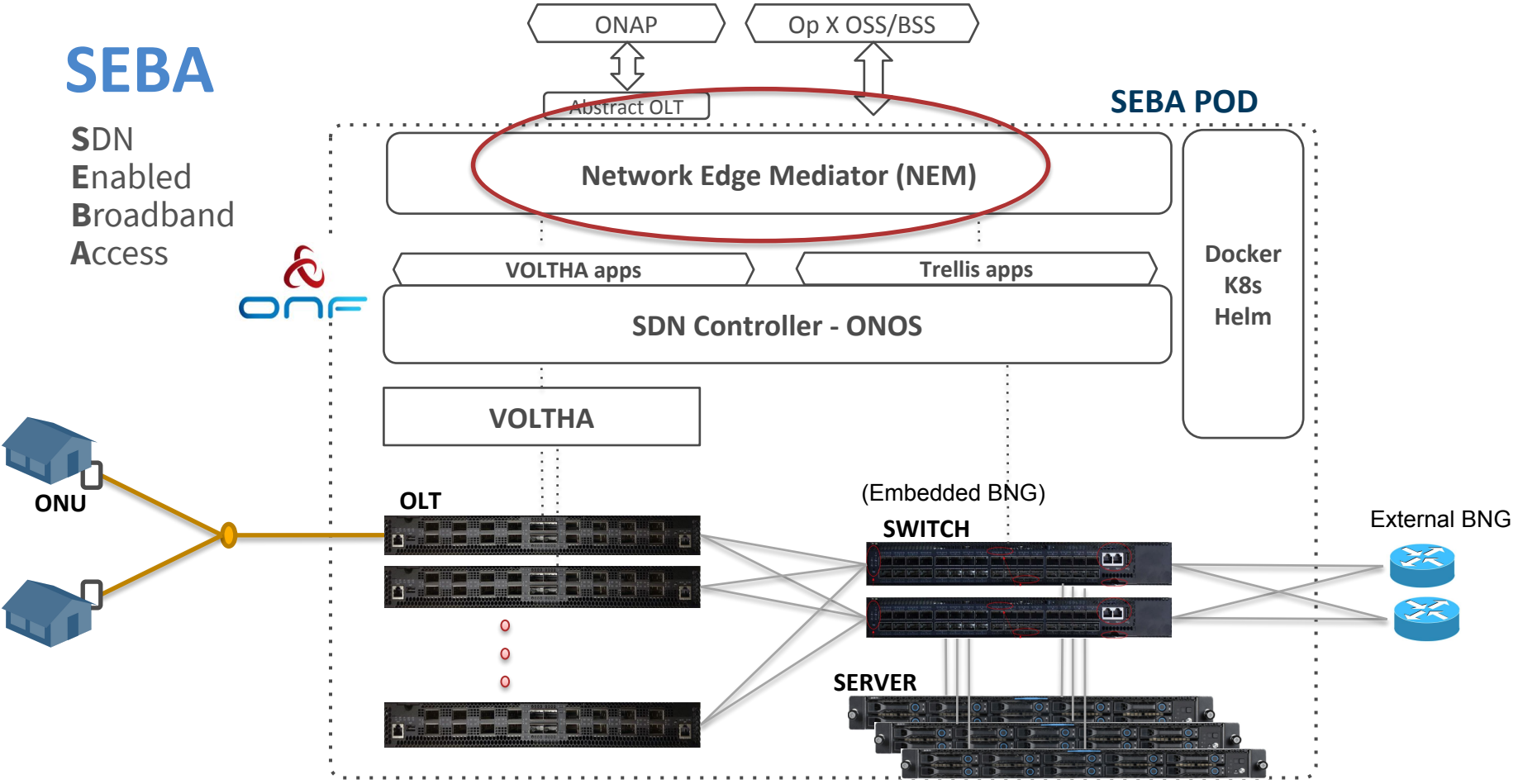
OLTs: Adtran, CIG, EdgeCore & Iskratel

AGG switch: EdgeCore

Servers: VOLTHA, ONOS, XOS, K8s, ELK, Docker, Prometheus, Grafana, Kibana

SEBA

SDN
Enabled
Broadband
Access



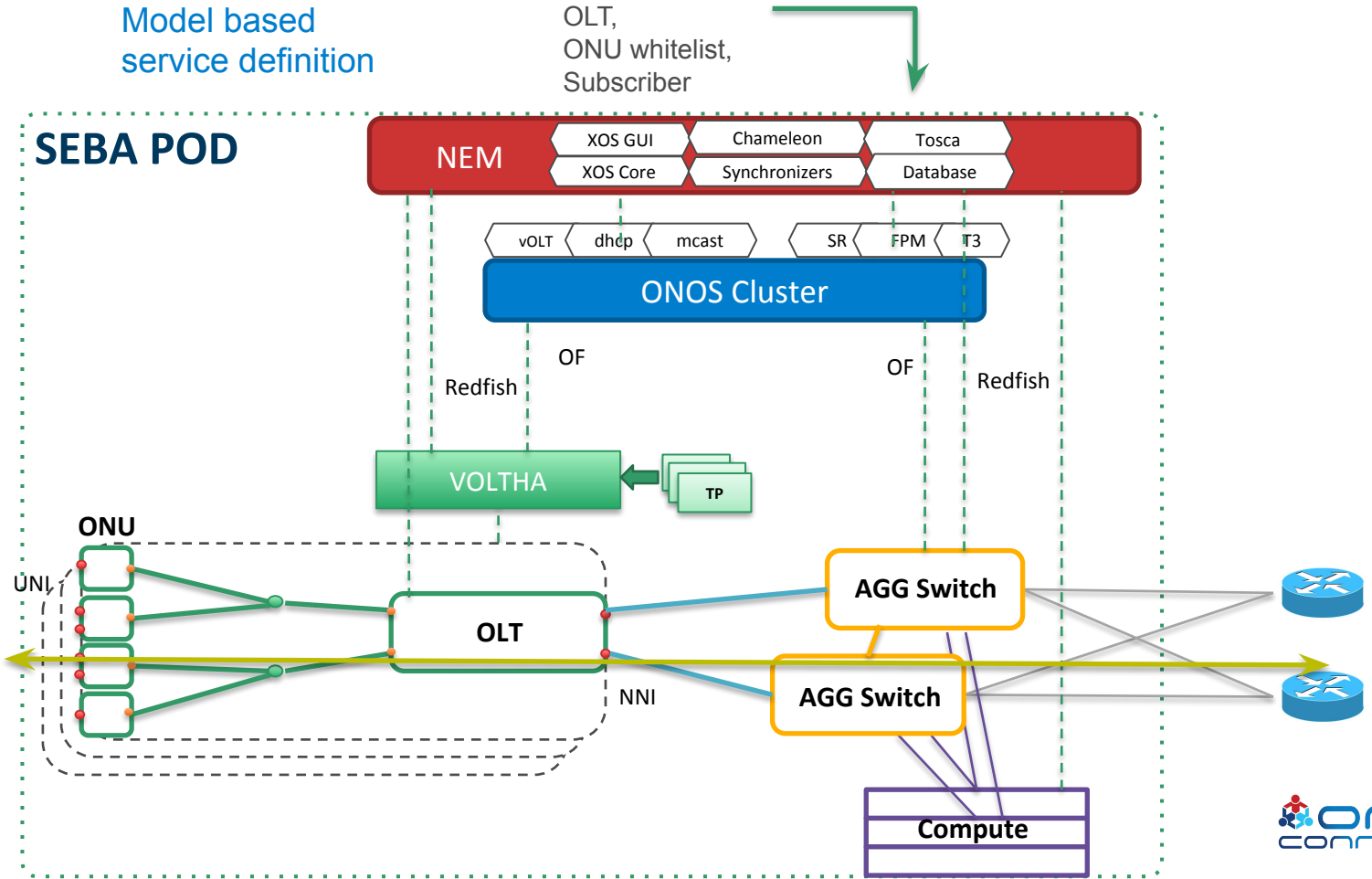
NEM Overview

- Bridge the gap between Operator OSS and SEBA services
- Set of optional components
- FCAPS
- Message bus
- Service Abstraction / Modeling
  - XOS Core
  - Service extensions using Synchronizers
  - Workflows

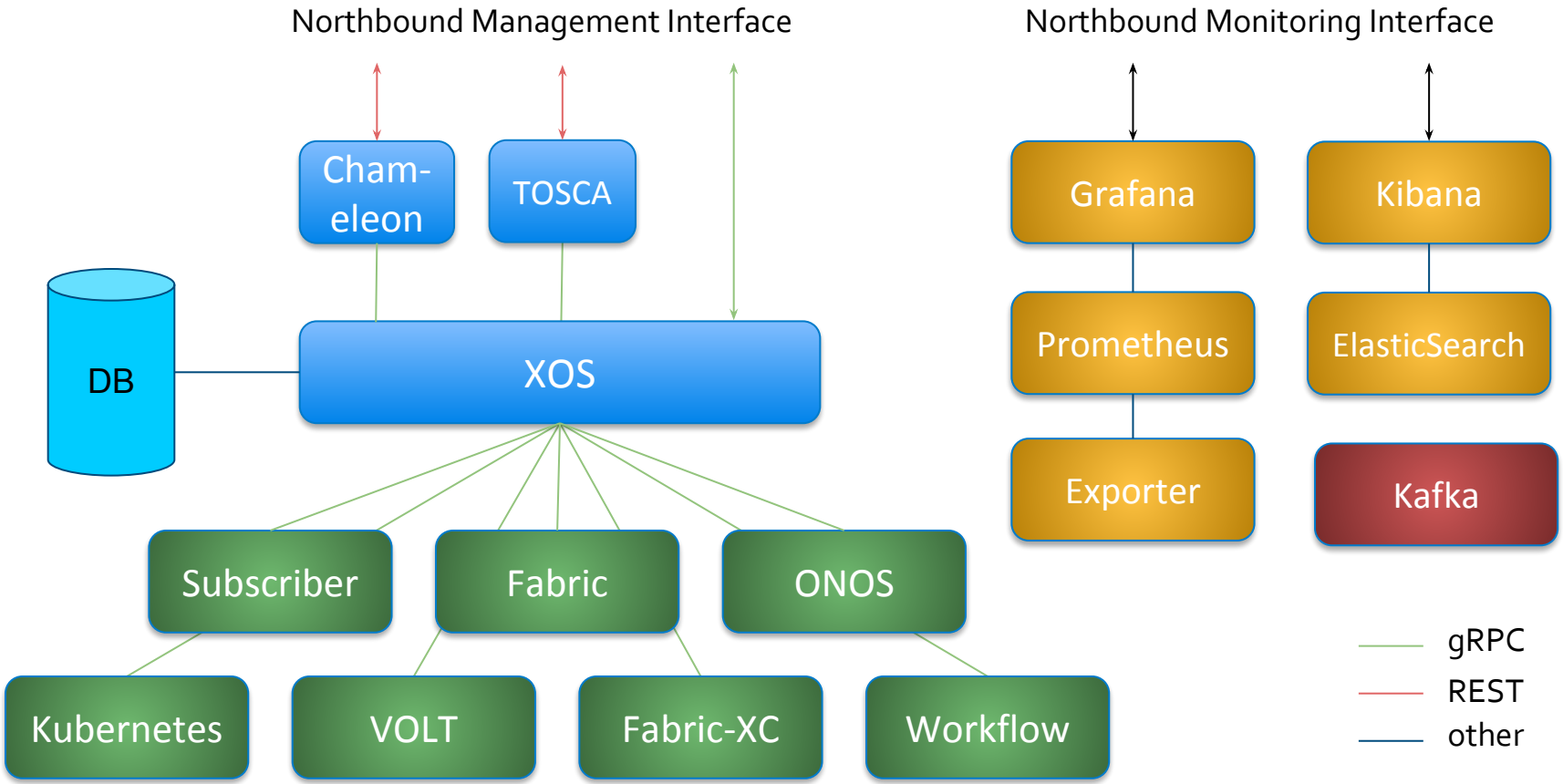
NEM Orchestration & NBI

Model based
service definition

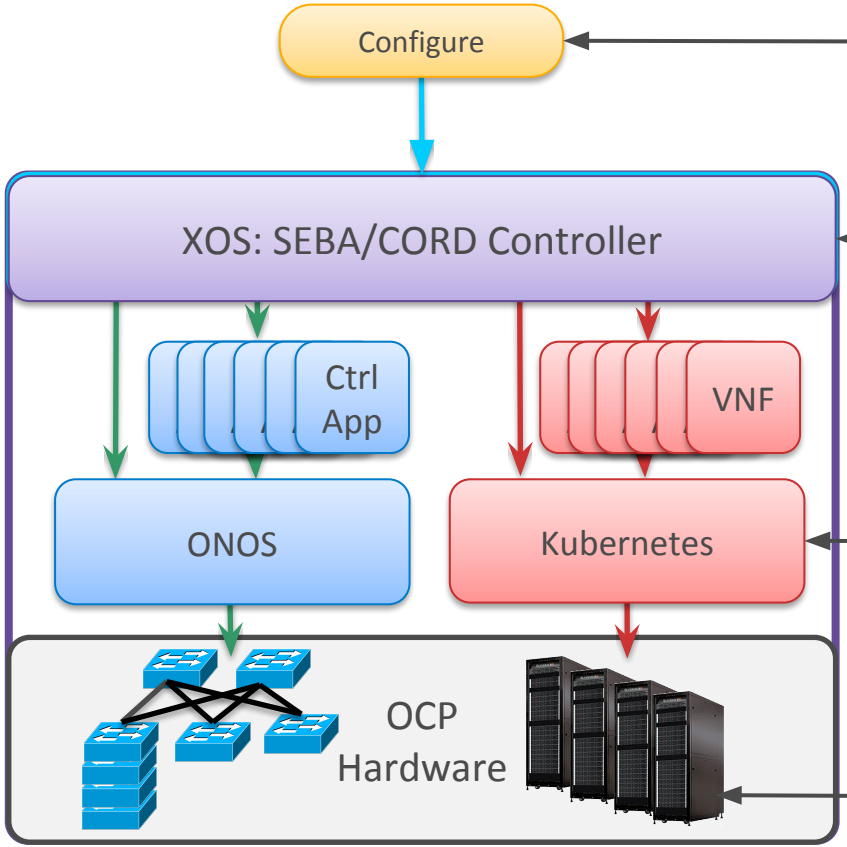
OLT,
ONU whitelist,
Subscriber



NEM Container Organization



What does XOS do?



TOSCA Recipes
- Provision & Configure Services
- Runtime Operation

Protobuf (xproto) Models
- Schema that Model Services
- Core set Loaded at Boot Time
- Dynamically Updated at Runtime

Lifecycle Management

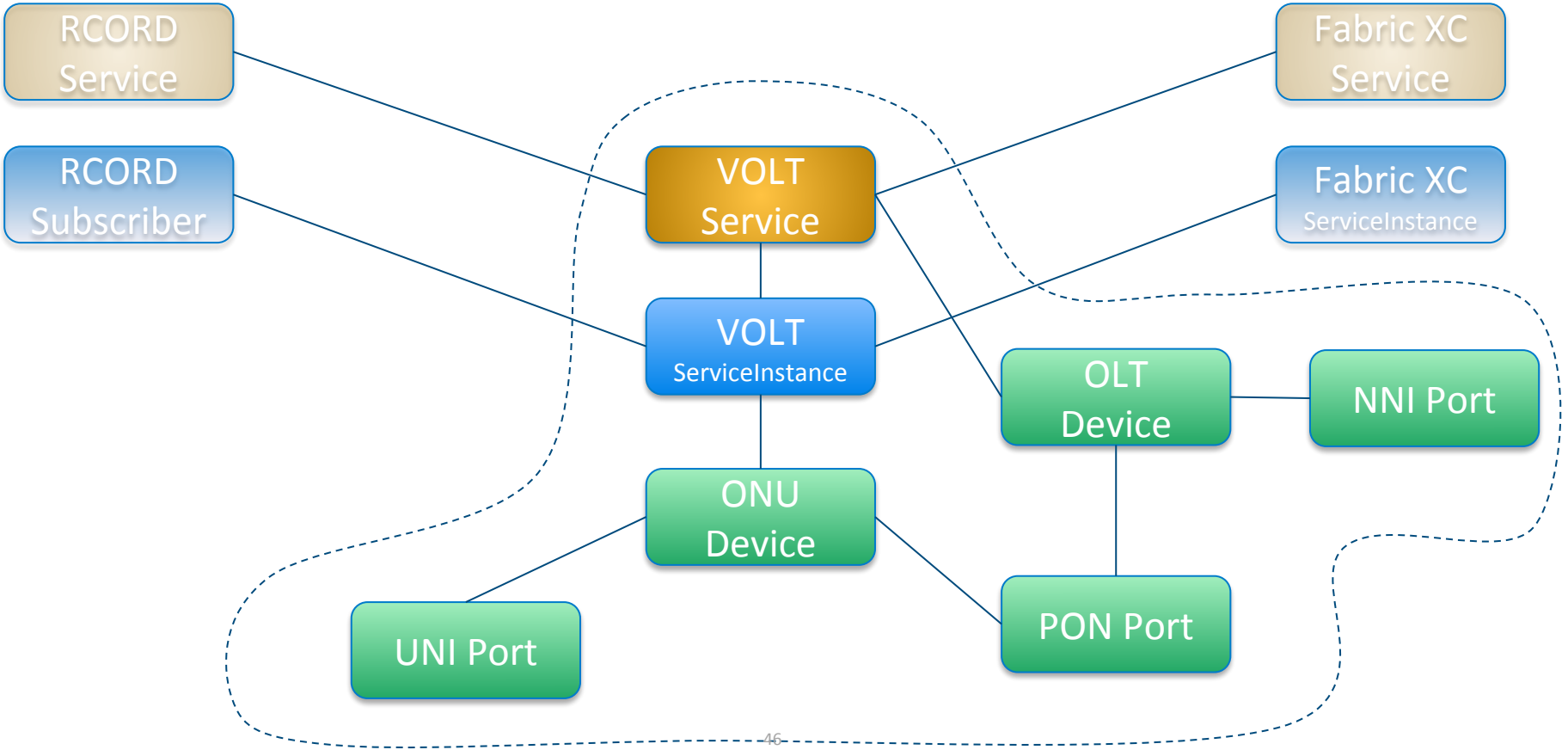
Helm Charts
- Containers that Implement Services
- Core set Loaded at Boot Time
- Dynamically Updated at Runtime

Kubernetes

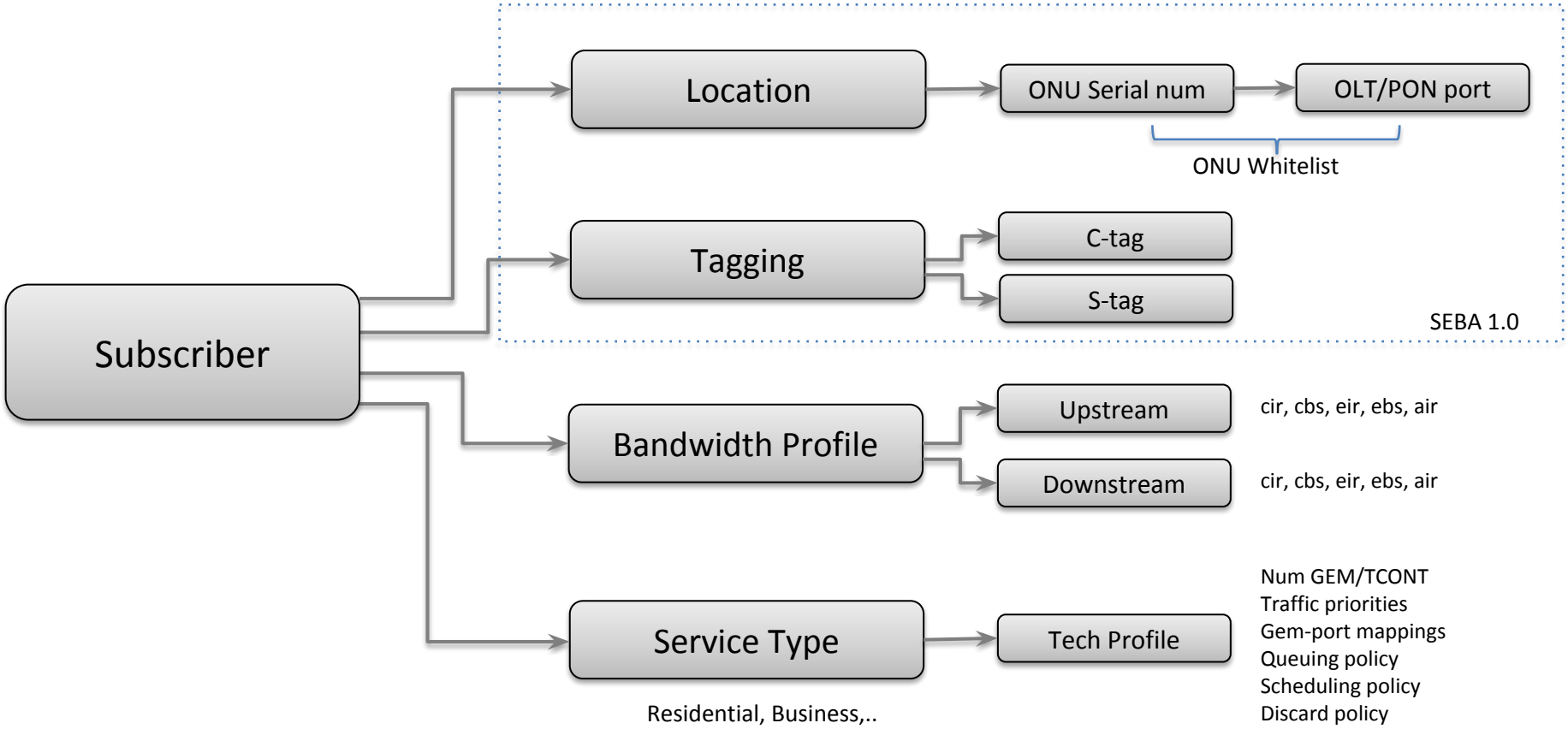
XOS Implements the Data Model

- Traditional Relational Database Management System (RDBMS) with support for inheritance
- Service-independent "core" models (Users, etc)
- Three kinds of service models
  - *Service* - global service configuration
  - *ServiceInstance* - per-subscriber config and state, often formed into subscriber-specific *chains*.
  - *Auxiliary* - additional related models

Data Model Example: VOLT Service



Subscriber Model



SEBA

SDN
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Broadband
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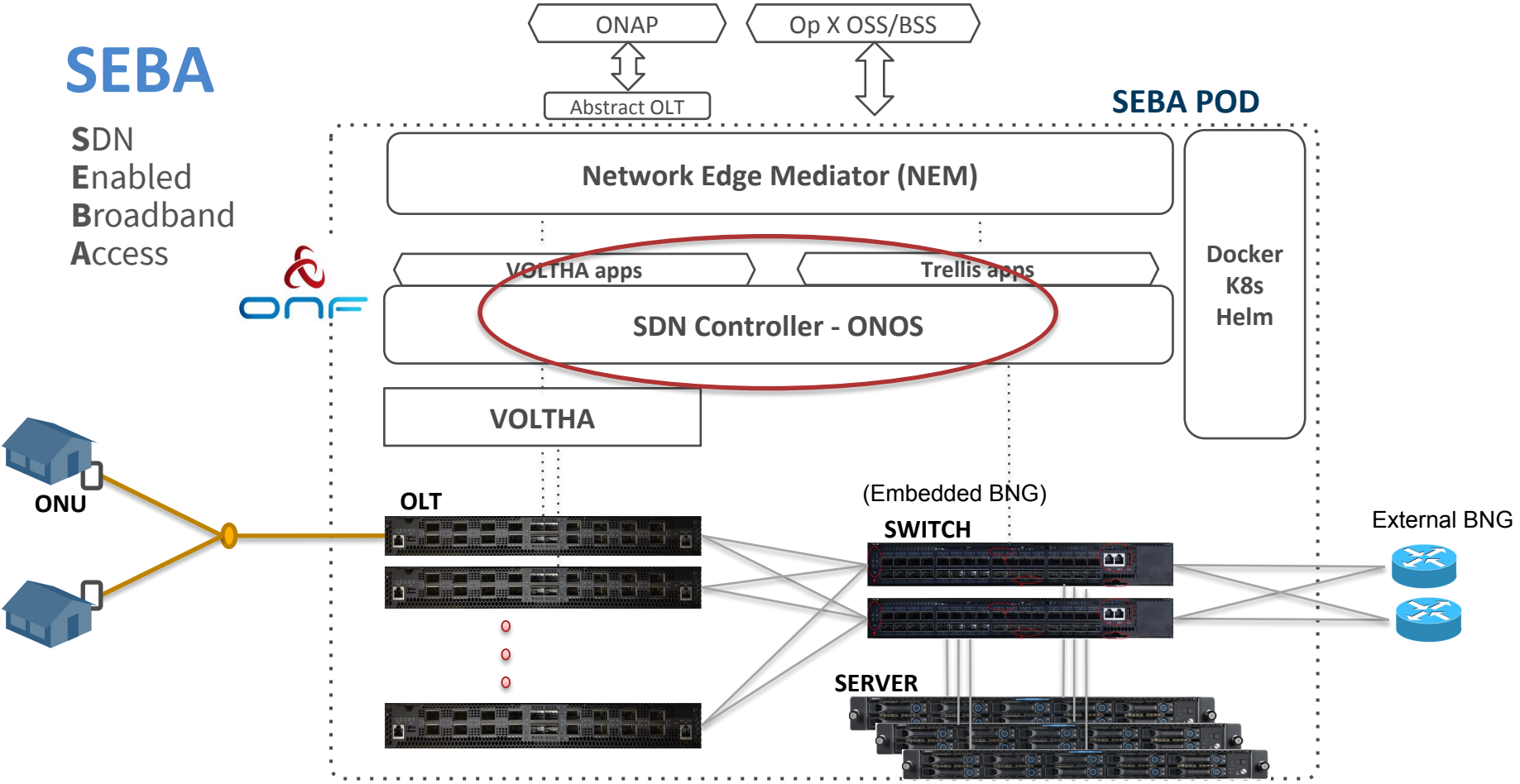


ONOS Apps overview

ONOS Apps are responsible for:

- Bringing SDN principles into the PON network
  - Enabling discovery (OLT, AAA, DHCP)
  - Reporting network analytics
- Configuring networking connectivity:
  - On the PON network through VOLTHA
  - On the aggregation switch via Openflow

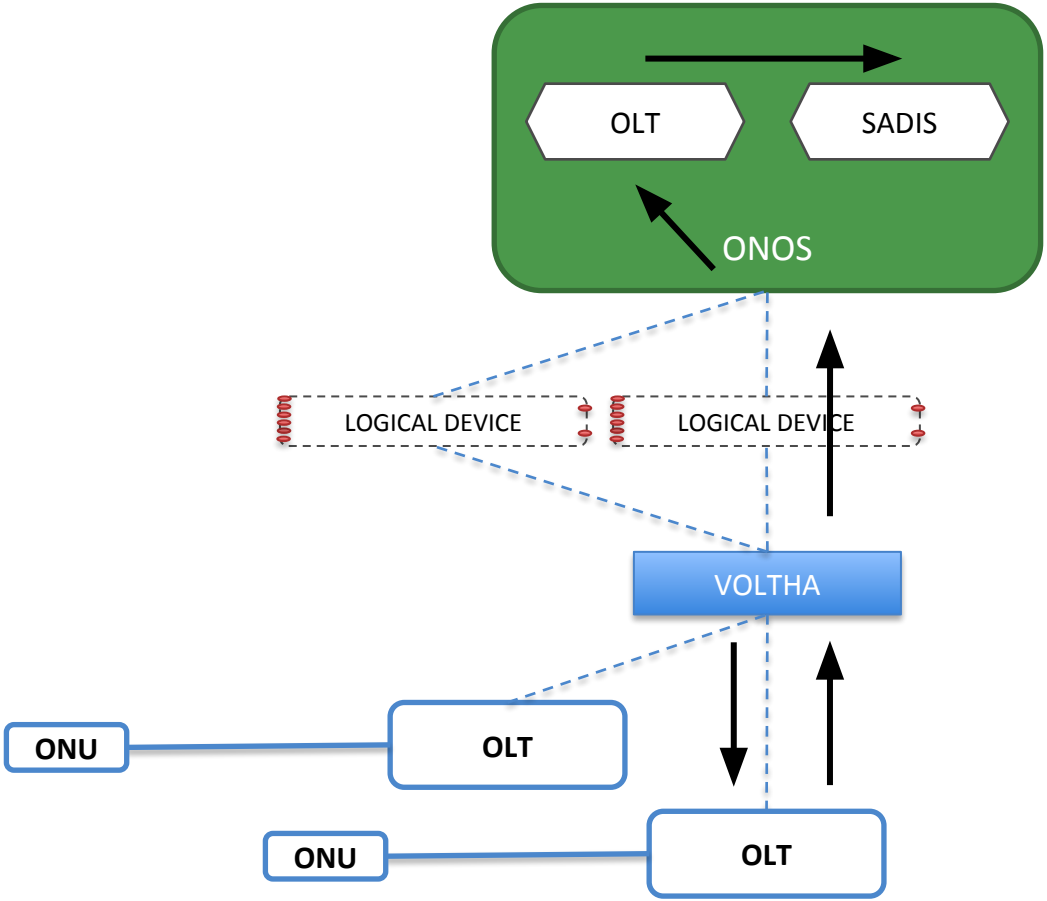
org.opencord.sadis

Sadis (Subscriber and Device Information Service) is responsible to store information related to:

- OLTs
  - Serial Number, MAC Address, ….
- Subscribers:
  - C/S Tags, Bandwidth Profile ID, Technology Profile ID, …
- Bandwidth profiles:
  - Cir, Cbs, Eir, Ebs, …

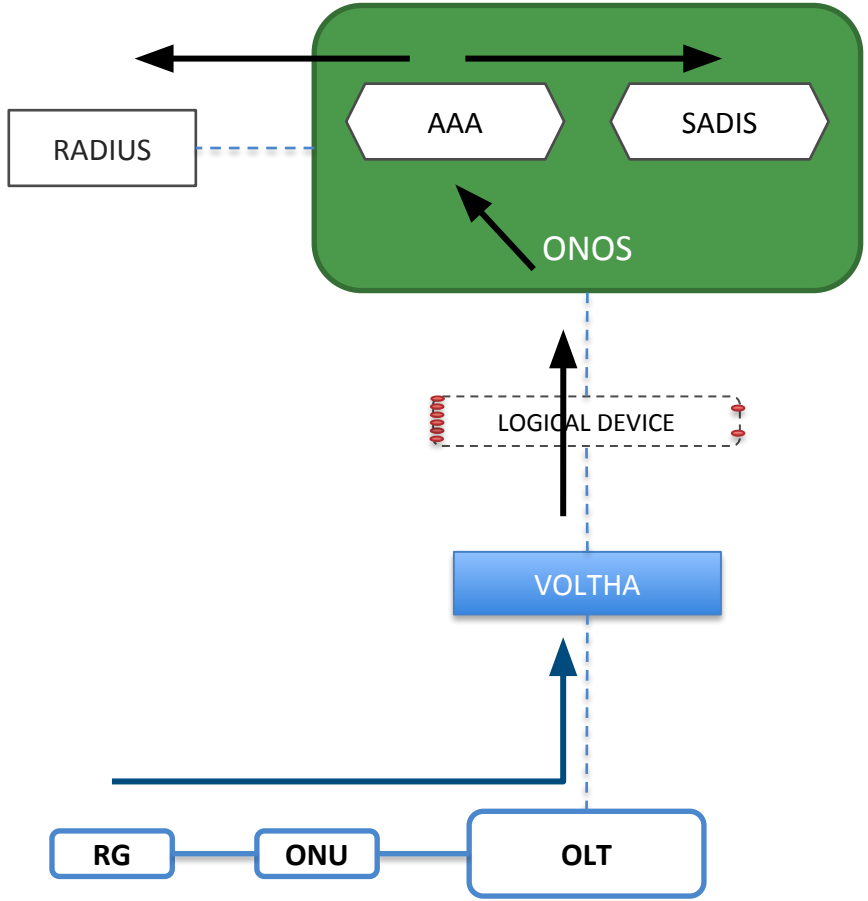
org.opencord.olt

The OLT application configures the access side of the network via the logical Openflow switch presented by VOLTHA



org.opencord.aaa

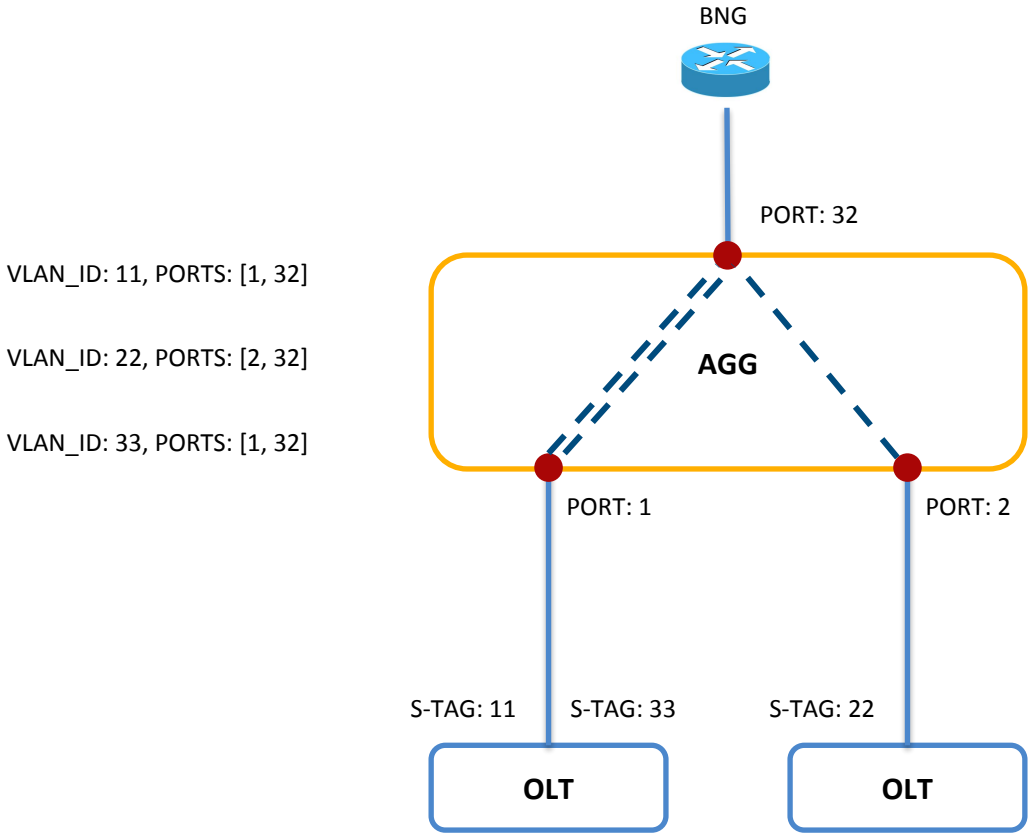
The AAA App is responsible for relaying subscribers authentication requests to an external Radius server



org.onosproject.segment-routing

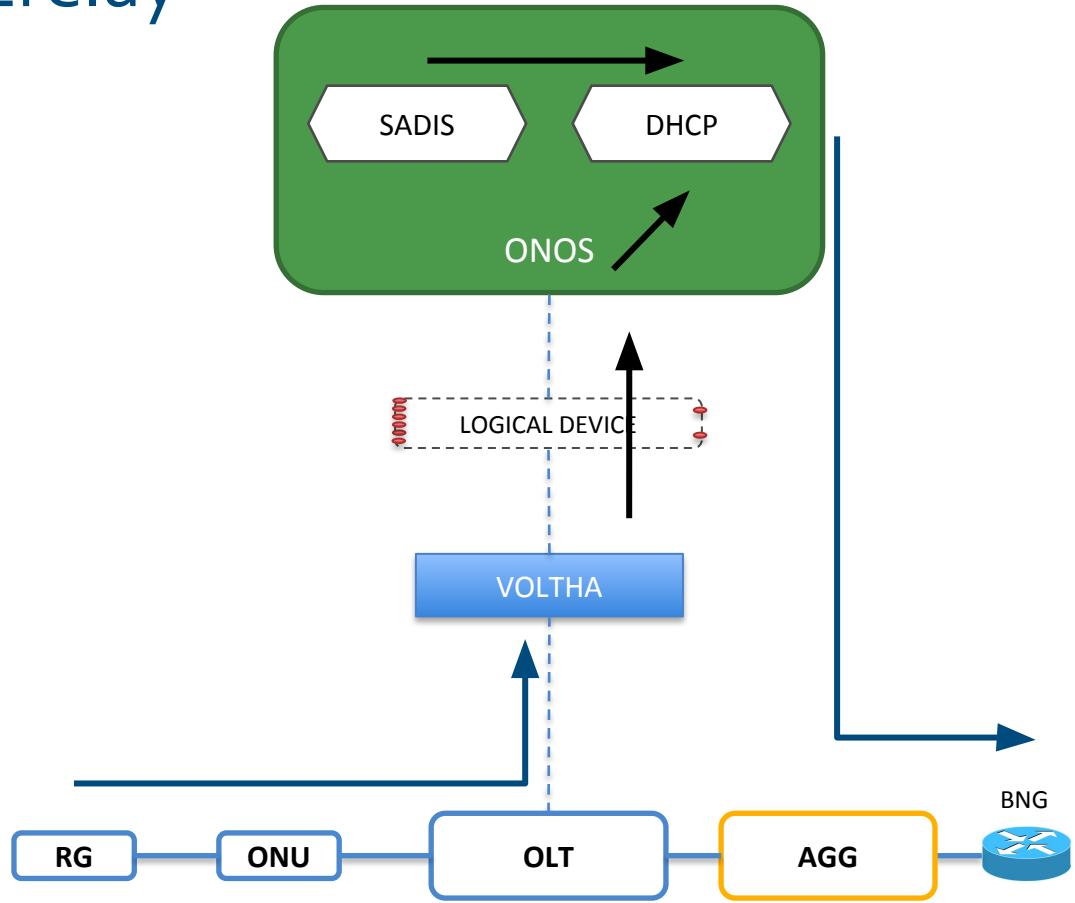
Fabric Crossconnect aggregates traffic from subscribers on the same OLT.

Functionality is provided by Trellis



org.opencord.dhcpl2relay

The DHCP Layer 2 Relay App relays DHCP packets to the BNG



org.opencord.kafka

The kafka integration app publishes events from ONOS apps to kafka topics