R-CORD & VOLTHA Introduction

Saurav Das (ONF) & Shawn Ying (AT&T)

CORD Build 2017, San Jose
January 14, 2018
Central Office Re-Architected as a Datacenter (CORD) Overview

**Economies of a datacenter**
- Infrastructure built with a few commodity building blocks using open source software and white-box switches

**Agility of a cloud provider**
*Software platforms that enable rapid creation of new services*

or... *Bringing Access-as-a-Service to the Cloud*
CORD: Multi-Access Architecture

Residential
vOLT, vSG, vRouter, vCDN

Mobile
vBBU, vMME, vSGW, vPGW, vCDN

Enterprise
vCarrierEthernet, vOAM, vWanEx, vIDS

Access Service Orchestration & Control

Metro Ethernet  BBU's  PON OLTs  COTS (Off-the-Shelf) x86 Compute  ROADM (Core)

White-box Switches with Merchant Silicon

COTS (Off-the-Shelf) x86 Compute
Residential CORD

Service Creation and Orchestration

Control Plane VNFs as SDN apps

CORD Controller (XOS)
- AAA Control
- DHCP Relay
- vOLT Control
- Fabric Control
- ... vRouter Control

SDN Controller (ONOS Cluster)
- NETCONF
- ... OpenFlow 1.3

XGS-PON Whitebox OLT (EdgeCore)
- Maple
- QumranAX

Bare-metal Open-source Leaf-Spine Fabric

ToR
- VOLTHA
- vSG

Metro Routers

Multi-vendor ONT/ONUs & RG

Maple QumranAX

Dataplane VNFs in Edge Compute

3rd Party Service VNFs

CDN

VOLTHA

VOLTHA

CDN

vSG

vSG
Virtual OLT Hardware Abstraction (VOLTHA)

VOLTHA hides PON-level details (T-CONT, GEM ports, OMCI etc.) from the SDN controller, and abstracts each PON as a pseudo-Ethernet switch easily programmed by the SDN controller.

Common control and management framework shared by all OLTs & ONUs.
BBWF R-CORD & VOLTHA Demo

CORD Head Node
- ONOS
- XOS
- OpenStack
- MAAS

CORD Compute Node
- VOLTHA
- OvS
- vSG

Whitebox ToR Fabric Switch
EdgeCore 7712 (Tomahawk 32 x 100G)

Central Office

Internet

Residential Subscribers

BCM ONU
Nokia ONU
802.1x Subscriber Authentication
Subscriber VLAN Provisioning

CORD Head Node
- ONOS
- XOS
- OpenStack
- ... Radius

CORD Compute Node
- VOLTHA
- OvS
- vSG

Whitebox ToR Fabric Switch
- EdgeCore 7712 (Tomanawk 32 x 100G)

Internet

Central Office

Nokia SD-OLT (LightSpan CF-24W)

Residential Subscribers

BCM ONU

Nokia ONU

Whitebox ToR Fabric Switch

EdgeCore

OLT
Subscriber Data-plane Traffic

- **Whitebox ToR Fabric Switch**: EdgeCore 7712 (Tomahawk 32 x 100G)
- **CORD Head Node**: ONOS, XOS, OpenStack, Radius
- **CORD Compute Node**: VOLTHA, OvS, vSG

Internet to Residential Subscribers

Central Office

Nokia SD-OLT (LightSpan CF-24W)

EdgeCore Whitebox OLT (ASFvOLT16)
R-CORD and VOLTHA Demonstration
Open SDN/NFV Platform for Delivering Multi-vendor Residential Services