Integrating the Calix FPGA OLT into R-CORD

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8 November 2017
Agenda

- We’ve come a long way!
- FPGA OLT. What’s the deal?
- What did Calix accomplish?
- Where are you headed?
Celebrate accomplishments

ONF, the R-CORD Community, and Calix
Next Generation Central Office Architectures

Residential CORD
- Vision and architecture

Transformational
- Business, Network, Operations
- Agility of a cloud provider
- Efficiencies of a datacenter

OpenCORD Reference
- Template for production deployment

Benefits:
- Vendor Independence
- Reduce TCO
- Accelerate service delivery
Residential CORD – Disaggregated OLT (& ONU)

- Residential-CORD triple play services
- Mix-and-match 10G PON OLT and ONU
- Virtualized ONOS-based control plane
- Virtualized PON manager (vOLTHA)
- Data-center inspired infrastructure

Controller: ONOS
Manager: vOLTHA

AXOS e92

XGS-PON OLT
XGS-PON ONU
The Heart of CORD: Virtual OLT Hardware Abstraction (VOLTHA)

Isolation, translation, scale
- Harmonized & centralized management

Toward production quality
- Standardized northbound interfaces
- Status and performance monitoring
- OLT / ONT software management
- ONT auto registration
- VOLTHA high availability
- Orchestration integration
ONOS tenant application interoperability

- Operating system for network tenant apps
- Full interoperability with R-CORD applications
  - IGMP Proxy
  - DHCP Relay
  - 802.1x Network Access Control
Global SDN/NFV ecosystems extend Software Defined Access
FPGA-based OLTs

What and why?
What is an FPGA-based OLT? What makes it different?

- High performance four-port PON FPGA supporting NG-PON2, XGS-PON, GPON, 10G EPON, etc.
- Non-blocking Traffic Management and Switch
- CPU and memory
- Timing subsystem
- All that other stuff... LEDs, baseboard management controllers (BMC), craft port, etc.

Q: What’s the difference?
A: Merchant ASIC / SDK vs. merchant FPGA / firmware

More info: http://www.opencompute.org/wiki/Telcos#Specs_and_Designs
Why does Calix use and FPGA instead of merchant silicon?

1. We’ve been building OLTs for nearly 20 years
2. Flexibility… we literally support “any PON”
3. Agility… new functions independent of silicon vendor
4. Packaging, energy efficient, globally compliant options…
What did Calix accomplish?

Huh?
Modular software independently developed, tested, and deployed

- Independent modular software components in a layered architecture
- Incremental development without impact to system
- Full YANG FCAPS modelling drives API integration

AXOS Software Component Library

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HARDWARE & SERVICE ABSTRACTION LAYER

YANG for EVERYTHING

- Services
- Interfaces
- IP functions
- Bridges
- AAA
- PON, ONUs
- User Security
- Upgrade, Backup, Restore, Health
- Alarm Management
- Event Management
- Performance (Export/Poll)
- Troubleshooting & Diagnostics
- Zero Touch and Call Home
- Equipment and Inventory
Separate software from hardware – applying SDN principles at the silicon level

- Decouple software from hardware
- Achieve consistent service models and workflows across all technologies
- Deliver tomorrow’s new technology faster

**AXOS**

**The Platform for Access**

**HARDWARE & SERVICE ABSTRACTION LAYER**

- Vendor A SDK
- Vendor B SDK
- Vendor C SDK

**COMMON SERVICE APIs**

**Hardware/PHY specific APIs**

**MERCHANT CHIPSETS**

- NG-PON2
- Gfast
- Your favorite white box
OpenCORD Integration – a software and hardware packaging exercise
OpenCORD Integration – a software and hardware packaging exercise

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- OF
- REST
- NC/Y
- Kafka
- PON Manager
- OMCI
- PM

VOLTHA

OpenFlow
NETCONF / YANG

XGS-PON OLT
XGS-PON ONU
OpenCord Integration – a software and hardware packaging exercise

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- NB APIs
- Control and Data Plane Functions: DHCP, 802.1x, IGMP
- Service Abstraction
- SB APIs

Diagram:
- VOLTHA
- OpenFlow
- NETCONF / YANG
- OF
- REST
- NC/Y
- Kafka
- PON Manager
- OMCI
- PM

AXOS
The Platform for Access

Calix
Moving forward

Choose the ROI-maximizing path
SDA Takes Many Forms... Maximize your investment

AXOS. Why are we different?
- Integrated into OpenCORD
- Migrate you to OpenCORD
- Ready to extend OpenCORD

Software Defined Access
- The path you take is driven by your business
- Deploy, transform, extend
Thank you