ONOS and the importance of deployments

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International OpenFlow/SDN Testbeds
Miami – April 1st, 2015
Why this talk?

WE WANT YOU!
The importance of deployments

In general, for ONOS and its community
• Demonstrate ONOS in production
• Quickly improve the codebase
• Understand production requirements

For Service Providers
• Innovation
• Requirements support

For Vendors
• Participate in transformation
• Lead the latest SDN technology
ONOS mission

To produce the Open Source SDN Network Operating System that enables Service Providers to build real Software Defined Networks
ON.Lab

“The Open Networking Lab was founded as a 501 (c) (3) non-profit to pursue our vision of what Software Defined Networking could be for the public good.”

Nick McKeown
KP, Mayfield, Sequoia Professor, Stanford

Scott Shenker
Professor, UC Berkeley
Chief Scientist, ICSI

Guru Parulkar
Executive Director, ON.Lab, Executive Director ONRC Consulting Professor, Stanford

Larry Peterson
Robert Kahn Professor Princeton (Emeritus)
Open source ONOS ecosystem

ON.LAB

SERVICE PROVIDER PARTNERS
- at&t
- NTT Communications
- SK telecom

VENDOR PARTNERS
- ciena
- CISCO
- ERICSSON
- Fujitsu
- Intel
- Huawei
- NEC

COLLABORATORS
- Infoblox
- SRI International
- ONF
- CNIT
- Consortium GARR

COMMUNITY
“Avocet” released on Dec 5th, 2014
Welcome to open source ONOS!

~1000 code downloads in one month after release...
“Blackbird” released on Mar 17th, 2015
Significant performance improvements
ONOS for Service Providers

- Scalability, High Availability & Performance
- Northbound & Southbound Abstractions
- Modularity
ONOS – Distributed

Apps

NB – Application Intent Framework

Distributed Core

(performance, scale-out, availability, state management, notifications)

Southbound Core API

Adapters

Protocols

Adapters

Protocols

Adapters

Protocols

Adapters

Protocols

ONOS Instance 1

ONOS Instance 2

ONOS Instance 3

ONOS Instance N

Distributed Core (performance, scale-out, availability, state management, notifications)
APPLICATION INTENT FRAMEWORK

Intent translated and compiled into specific instructions for network devices.

Flexible and intuitive northbound abstraction and interface for user or app to define what it needs without worrying about how.

“Provision 10G path from Datacenter 1 to Datacenter2 optimized for cost”
1. Centralized Control of packet and optical
2. Multilayer optimization based on availability, economics and policies
SDN-IP enables communication between:

- SDN network and external IP networks
- external networks across SDN island

ONOS Cluster

- ONOS/SDN-IP HA
- BGP speaker HA
- External BGP router/connection HA
Segment routing

- Requests
- Routing Service
- Discovery Service
- Forwarding Service
- ONOS
  - OpenFlow 1.3
  - SR Labels imposed by controller
  - Forwarding Service
  - OSR FIB built by controller
  - Routing, Recovery, Label imposition
- Open Segment Routers (OSR)
Central Office Reimagined as Datacenter (CORD)

Centralized Control & Management Plane – ONOS + OVX + XOS

Mobile Customers
- PGW
- XCODE
- NLA
- CDN

Residential Customers
- BNG
- CDN
- CG-NAT
- Firewall

Enterprise Customers
- VPN
- WanEx
- DSA
- IDS

Commodity servers + NFaaS = CAPEX and OPEX savings
Internet2 and SDN-IP

• Seamless peering of SDN islands with existing networks = Migration strategy for real networks
• L3 connectivity with no need of routers in the core
THREEHOUSE – BGP peering

Other SDN Controller
USA - Bay Area
ESNET Production network

15,000 routes advertised

Australia - Sydney
AARNET
KREONET-S – A full SDN network

- The Korean NREN is planning to deploy a fully SDN network controlled by ONOS!

- ONOS controlling core, edge, international op.

- **Use cases:**
  - ✓ Network Virtualization
  - ✓ Packet/Optical + Bandwidth calendaring
  - ✓ SDN-IP

- Work in progress, deployment coming soon!
Conclusions

● **ONOS is out** and we already have positive feedback!
  ✓ Focused on SP (Scalability, HA, performance)
  ✓ Use-cases
  ✓ On-going Deployments

● **Deployments are terribly important** for everyone
  ✓ ONOS community
  ✓ Service Providers
  ✓ Vendors

● This is not enough. We can quickly **make things better, TOGETHER!**
“Software-defined networking can radically reshape the wide area network. The introduction of **ONOS** provides another open source SDN option designed for service provider networks with the potential to deliver the performance, scale, availability and core features that we value”

**John Donovan**  
Senior Executive Vice President  
AT&T Technology & Operations