ONOS Overview

Tenets, Roadmap, Deployments

March, 2018
What is ONOS?

Open Network Operating System (ONOS) is an open source SDN network operating system. Our mission is to enable Service Providers to build real SDN/NFV Solutions.
distributed core
provides high-availability, scalability and performance

abstractions & models
allow applications to configure and control the network without becoming dependent on device specifics

applications platform
allows developers to dynamically extend the base capabilities
ONOS applications

ONOS networking core

ONOS distributed applications platform

OSGI / Apache Karaf

GUI
REST API
gRPC
RESTCONF
ONOS Core Subsystems

External Apps

REST API  gRPC  ...  CLI  GUI

Mobility  Proxy ARP  L2 Forwarding  SDN IP / BGP  Packet / Optical  ...

Application  UI Extension  Security  Device Cfg.  Discovery  Network Virt.  Tenant  ...
Config  Storage  Region  Driver  Path  Tunnel  Intent  Statistics  ...
Core  Cluster  Leadership  Mastership  Topology  Network Cfg.  Flow Objective  Group  ...
Event  Messaging  Graph  Device  Link  Host  Flow Rule  Packet  ...

OSGi / Apache Karaf  Opendaylight  NETCONF  OVSDB  ...

OpenFlow  gRPC  CLI  GUI

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device-centric
network-centric
**Brief Retrospective**

- **Started with a minimal platform with only a few apps**
  - built with sound structure and solid code & minimalistic REST API
  - 4 apps and 1 SB plugin, ~50K SLOC

- **Now a platform with many features and apps**
  - new capabilities, distributed primitives and even greater extensibility
  - now ~150+ apps, including SB plugins, drivers, models, etc.
  - ~500K SLOC

- **Added new core functionality and apps with each release**
  - deliberately balancing investments in platform vs. use-cases and apps
  - show innovation, but also take pragmatic steps to be deployment-ready
  - maintain coherence of architecture and quality of code
ONOS Releases

- **Avocet** (1.0.0) 2014-12
- **Blackbird** (1.1.0) 2015-03
- **Cardinal** (1.2.0) 2015-06
- **Drake** (1.3.0) 2015-09
- **Emu** (1.4.0) 2015-12
- **Falcon** (1.5.0) 2016-03
- **Goldeneye** (1.6.0) 2016-06
- **Hummingbird** (1.7.0) 2016-09
- **Ibis** (1.8.0) 2016-12
- **Junco** (1.9.0) 2017-02
- **Kingfisher** (1.10.0) 2017-05
- **Loon** (1.11.0) 2017-08
- **Magpie** (1.12.0) 2017-12

Moving to 4-month release cycles
- **Nightingale** (1.13.0) 2018-04 (in progress)
Present Focus

- Hardening 1.11, 1.12 & 1.13 releases in support of a pending trials & full scale deployment
  - HA of platform & apps in face of node failures and net partitions
  - Scalability optimizations
  - ISSU of platform & apps
Deployments

- Research & Education
  - SDN-IP, VPLS apps

- SDN in Air-Traffic Management
  - Safety-critical, ATM-grade deployment in Brazil (~22M km²)
  - Radar relays, remote control towers, pilot voice, etc.
  - NetBroker from Frequentis developed on ONOS
  - Brown-field & OpenFlow

- Access network for residential customers
  - Trials with a major US telecom provider
  - Edge fabric: ~10K clients, ~150K routes, ~1.5M flows
  - OpenFlow
Software Defined Transformation of Service Provider Networks

Join the journey @ onosproject.org