OpenDaylight: Introduction, Lithium and Beyond

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Outline

• Introduction
  • to SDN
  • to OpenDaylight

• New in Lithium

• Plans for Beryllium
Traditional SDN (OpenFlow)
The separation of the control and data planes

- Modern switches
  - Control/data plane both on switch
  - Data plane: fast, reads tables
  - Control plane: slow, writes tables
Traditional SDN (OpenFlow)
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• Modern switches
  • Control/data plane both on switch
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• SDN
  • Decouple control/data planes
  • Data plane on the switch
  • Control plane elsewhere, e.g., an x86 server, can do fancier things
Modern, Inclusive SDN
Modern, Inclusive SDN
Modern, Inclusive SDN

Vendor A
- mgmt
- control

Vendor B
- mgmt
- control

Vendor C
- mgmt
- control

Logically Centralized SDN Controller

Northbound API

Industry Standard Control/Management Protocols

Standard Modeling Language

Vendor A

Vendor B

Vendor C

OPEN DAYLIGHT
What is OpenDaylight

OpenDaylight is an Open Source Software project under the Linux Foundation with the goal of furthering the adoption and innovation of Software Defined Networking (SDN) through the creation of a common industry supported platform.

**Code**

To create a robust, extensible, open source code base that covers the major common components required to build an SDN solution.

**Acceptance**

To get broad industry acceptance amongst vendors and users:
- Using it directly or through vendor products
- Vendors using OpenDaylight in commercial products

**Community**

To have a thriving and growing technical community contributing to the code base, using the code in commercial products, and adding value above, below and around.
OpenDaylight Releases

- **Hydrogen** (first release)
  - February 2014
  - 13 projects, 1.3m lines of code
- **Helium** (second release)
  - October 2014
  - 25 projects, 2.1m lines of code
- **Lithium** (latest release)
  - June 2015
  - 40+ projects, 2.3m lines of code
Core Architecture

Model-Driven Service Abstraction Layer (MD-SAL)

- Notifications
- RPCs
- Data
- Plugin
- Plugin

App/Service
App/Service
Core Architecture

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- App/Service
- App/Service

- Notifications
- RPCs

Data

Controllers in a Cluster

Plugin

Plugin
Core Architecture

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Data

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- RPCs

YANG Models

OPEN DAYLIGHT
Core Architecture

Model-Driven Service Abstraction Layer (MD-SAL)

Notifications
RPCs

Data

App/Service
App/Service
Plugin
Plugin

OPEN DAYLIGHT
OpenDaylight Community

• Like any Open Source Project, OpenDaylight primarily consists of those who show up to do the work.

• Running around 250 commits per week over 12 months, trending up
  • 30 Days: ~625 commits, ~100 contributors (7/13/15–8/12/15)
    • Spikes to ~2x this near releases
  • 12 Months: ~13,250 commits, ~365 contributors (8/12/14–8/12/15)

• Strong integration and testing community
  • This stuff really matters

Source: https://www.openhub.net/p/opendaylight
OpenDaylight Community
New in Lithium
Focus in Lithium

Features
- OpenStack/Neutron Integration
  - Significant closing feature gaps
  - More implementations
    - OVSDB, GBP, VPN Svc, VTN, LISP
- Service chaining/NFV
  - Part of OPNFV’s first release
- More on policy
  - NIC as a vendor-neutral layer
  - Big push on SFC+GBP
- ~20 new projects

Meta
- Security
  - Formal process defined
  - Handled many issues/fixes
- Release process refinement
  - Better documentation process
  - Better integration/test process
  - Offsets for coordination
- Deprecation of the AD-SAL
- S3P: Security, Stability, Scalability, and Performance
OpenDaylight with OpenStack

• Single OpenStack Neutron service proxy
  • Handles most of the bookkeeping

• Choose your implementation
  • Group-based Policy
  • LISP
  • OVSDB
  • VPN Service (only for VPNaaS)
  • VTN

• Check it out (see the links for instructions)

New Projects in Lithium

• Apps
  • Application Layer Traffic Optimization (ALTO)
  • Network Intent Composition
  • Neutron Northbound

• Drivers
  • CAPWAP-Support
  • Distributed LLDP with Auto Attach Capability
  • Link Aggregation Control Protocol
  • Internet of Things Data Management (IoTDM)
  • SNMP Plugin
  • Source Group Tag eXchange Protocol (SXP)
  • Unified Secure Channel

• Meta
  • Release Engineering - autorelease
  • Release Engineering - Builder
  • Controller Core Functionality Tutorials

• Services
  • Persistence
  • Device Identification and Driver Management
  • Discovery
  • Time Series Data Repository
  • Topology Processing Framework
  • VPN Service
S3P: Security, Stability, Scalability, Performance

• Focus on the bedrock of OpenDaylight
  • OpenFlow, OVSDB, NETCONF, MD-SAL, etc.

• Significant progress on OpenFlow in Lithium
  • See following slides

• Broader progress planned in Beryllium
OpenFlow performance and scale


https://jenkins.opendaylight.org/releg/view/openflowplugin/job/openflowplugin-csit-1node-periodic-scalability-daily-only-stable-lithium/plot/Inventory%20Scalability/
Beryllium Release

• Focus on S3P, Documentation, Migration, and HA/clustering

• Tries to balance maturity (the above) with feature velocity
  • Some projects will be mature
  • Some of the Karaf features in mature projects will be stable
  • Stable features will have S3P, Migration, and HA/clustering requirements
  • Stable and “normal” distribution; stable only has stable features

• Driving appropriate projects/features to mature/stable
  • Offset 0: Controller, MD-SAL, NETCONF, AAA, YANG Tools, odlparent

Conclusions

- OpenDaylight is a vibrant community building a versatile network controller
  - Plethora of southbound protocols
  - Extensible, take-what-you-want approach

- Strong focus in current key areas
  - NFV
  - Network Virtualization

- Download it and try it out:
  - https://www.opendaylight.org/downloads