OpenDaylight for Telcos and Service Providers

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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 Users

Organization Type

- Research/Education: 25%
- Ecosystem: 28%
- Service Provider: 30%
- Enterprise: 17%
- End User: 17%

Industry Segments

- Telecom: 62
- Information Tech: 36
- Academic/Research: 31
- Finance: 4
- Energy: 3
- Other: 8

Organization Size

- 1 to 9 employees: 10
- 10-99 employees: 20
- 100 to 999 employees: 30
- 1,000 to 9,999 employees: 30
- 10,000 to 99,999 employees: 30
- 100,000 employees: 20
- Don't know / not sure: 0

ODL User Survey, February 2016
What do SPs see in OpenDaylight?

- Extensible, model-based architecture
  - custom NB APIs for new services/APIs
  - custom east-west interfaces to OSS/BSS
  - custom southbound interfaces for particular devices

- Exiting support for carrier-oriented protocols
  - BGP
  - PCEP
  - NETCONF
  - SNMP
  - PacketCable/PCMM
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- Good toolkit with useful tools
- Easy to add more tools
- Large community to provide support and help add more tools
OpenDaylight Advisory Group
Key SPs deploying/testing OpenDaylight

- AT&T
  - Later slides
- KT (Korea Telecom)
  - T-SDN to do automated, centralized WAN provisioning
  - Reduced deployment time 95%
- Serro Solutions
  - Automated service delivery for satellite links
- Orange
  - “we see OpenDaylight growing to become a Carrier Grade SDN Open Source Reference Platform”
- Comcast PoCs
  - Internal CDN
  - Overlay Edge Services
  - Energy Monitoring

https://www.opendaylight.org/user-stories/
OpenDaylight at AT&T

Brian Freeman
Distinguished Member of Technical Staff
High-Level View of AT&T ECOMP

- **Service Orchestrator**: AIC Platform Orchestrator
- **Controller Framework**: OpenStack
- **DCAE**: OSS/BSS
- **A&AI**: Policy Creation Framework
- **ASDC**: OSS

Roles and Components:
- **Service Definition**: Distribution
- **Service & Network Design**: Net App Onboarding
- **Net Ops**: Service Recipe (TOSCA, HEAT/YANG) Distribution
- **OSS/BSS**: Service Orders
- **AIC Cloud**: VM & Image Mgmt.

- **Policy Creation Framework**: Manual Fault & Performance Exceptions
- **DCAE**: Fault, Performance, Usage

- **VM & Images**: Net Apps
- **Network Adapters**: Configuration Mgmt.
- **Application Adapters**: Application Mgmt.

- **Policy Mgmt.**: Fault, Performance, Usage

- **OSS**: Service Recipes (HEAT/ Templates & Service Recipes)

- **Service Orchestration**: YANG Definitions, Adapters & VNF Config.

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OpenDaylight at AT&T

SDN-C Framework

- **Security Applications**
  - API (REST)

- **Control Loop Applications**
  - API (REST)

- **Service Orchestrators**
  - API (REST)

- **Service-related Artifacts for SLI, API Handlers, Network Adapters**
  - Directed Graph Files – XML (Eng Rules)
  - Network Data Model Files – YANG (i.e. IPAG EMT)
  - Service Data Model Files – YANG (i.e. UNI port)

- **SDN-C Database**
  - Service Logic/Eng Rules
  - Assigned Resource Inventory

- **API Handlers**

- **Service Logic Interpreter**
  - Config Tree
  - Operational Tree

- **Network Adapters**
  - OpenStack Adapter
  - VOIP VNF Adapter
  - VRR Smart Adapter Support CLU/NetConf/BGP
  - vCE/vPE Smart Adapter
  - BGPCEP Adapter
  - Etc.

- **OpenDaylight with AT&T customizations**

- **A&AI**
  - Inventory

- **External API calls**
Things that we use the most (today)

- Yangtools
- MD-SAL
- Clustering
- BGP-LS
- PCEP
- BGP
- Netconf
- Northbound Services (MSO and other AT&T OSSs)
- Custom Adaptors
  - East/West Adaptors to AT&T OSS’s
  - Southbound REST Adaptors
  - Southbound CLI VNF Adaptors

SDK Platform

Over 30 AT&T Specific Karaf Feature Bundles
Applications of Opendaylight

- Resource Assignment and Inventory Update
- L3 VNF Configuration
- VOIP VNF Configuration
- IP Flow Redirection
- MPLS Traffic Engineering
- Closed loop control
Conclusions

• OpenDaylight is designed for a wide variety of use cases

• Telcos and Service Providers are some of the most aggressive adopters

• There is a growing, active community of people collaborating on solutions based on OpenDaylight in this space