



OPEN
DAYLIGHT

The State of SDN & NFV: 5 Years In

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There is a Wave Sweeping the IT Industry



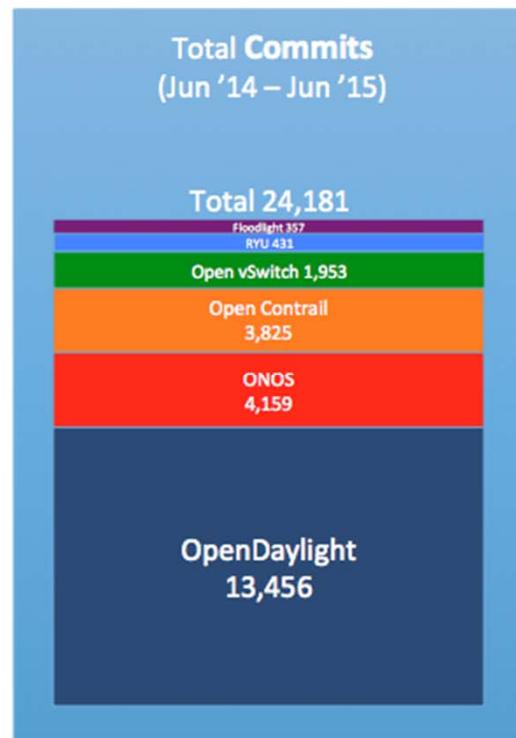
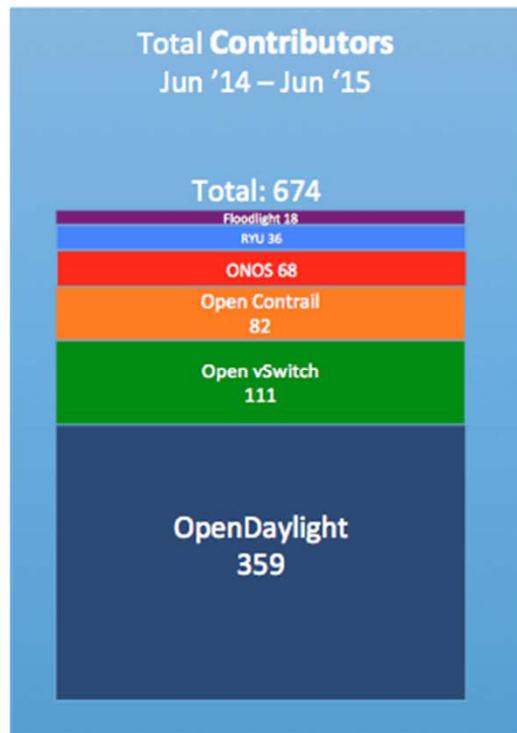
The Era of Standards Wars is Over



Collaboration

With your team ...but also with your competitors!

Significant Industry Investment in Open SDN





Open Collaboration

Vibrant Advisory Group





Balancing Innovation and Standardization

Exploration vs. Rationalization

Strong Desire for One Common Platform

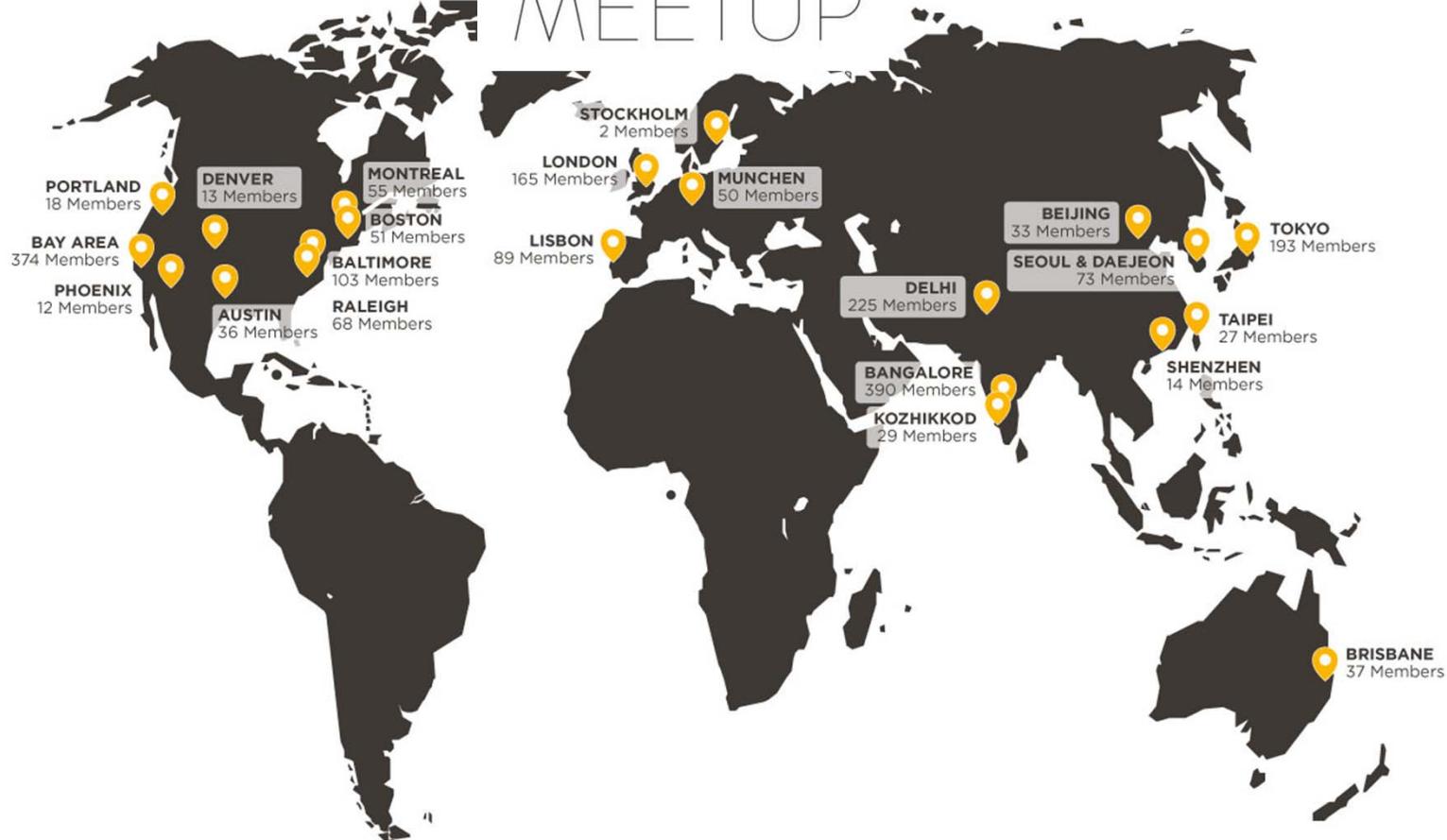
“Open Programmable Network”

- Supports a wide range of use cases
(similar to Linux's reach)
- Takes a modular/approach to architecture
(deploy only what you need)
- Supports the full range of operator
hardware (multiple southbound interfaces)
- Provides easy way to write once, work
everywhere (service abstraction layer)





OPEN DAYLIGHT MEETUP

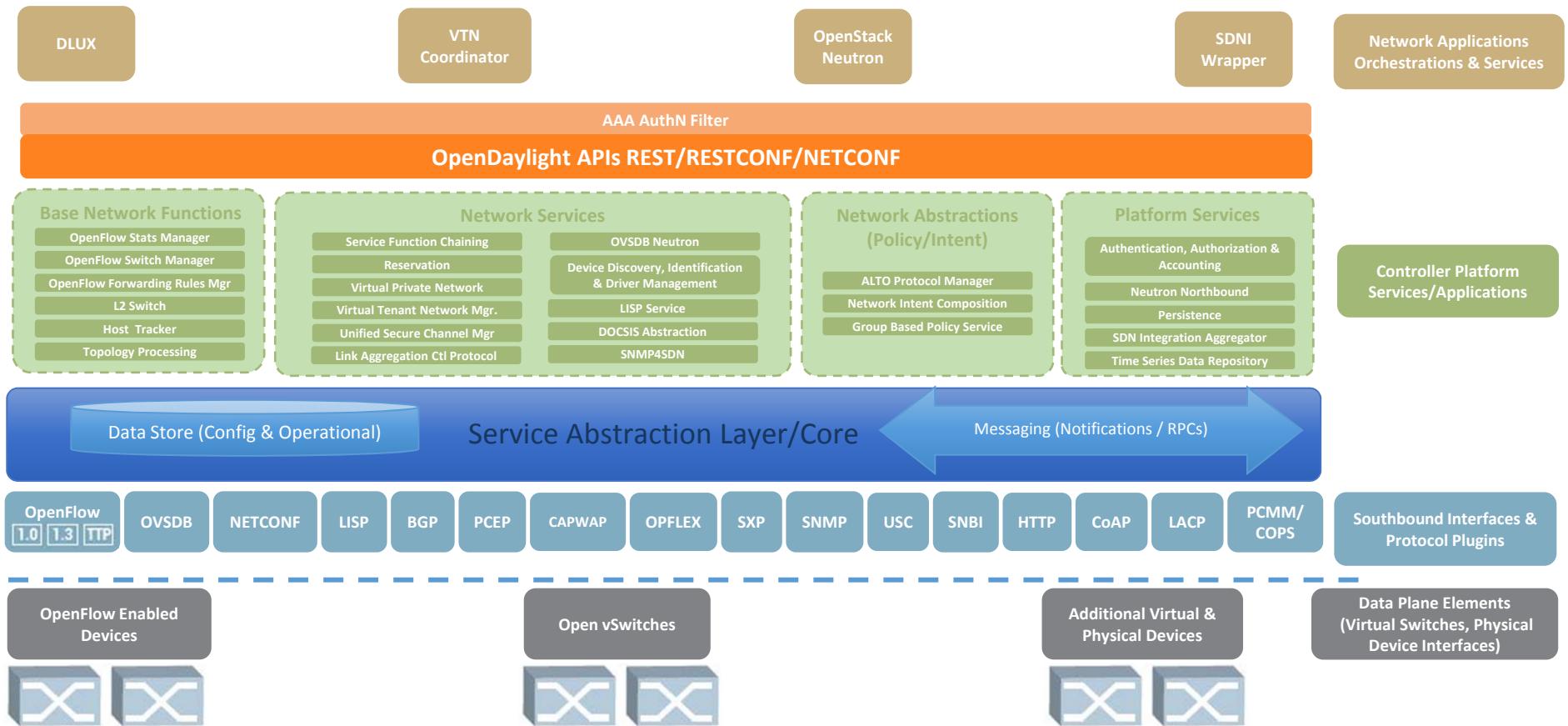


Solutions Based on OpenDaylight



#odsummit





Standardizing the SDN Platform

Some Questions Have Been Addressed...

- Need to support multiple protocols
- YANG models

While Others Still Remain:

- The role of policy / intent
- How to scale out logically centralized control
- Evolving role of OpenFlow
- How to measure end-to-end controller performance



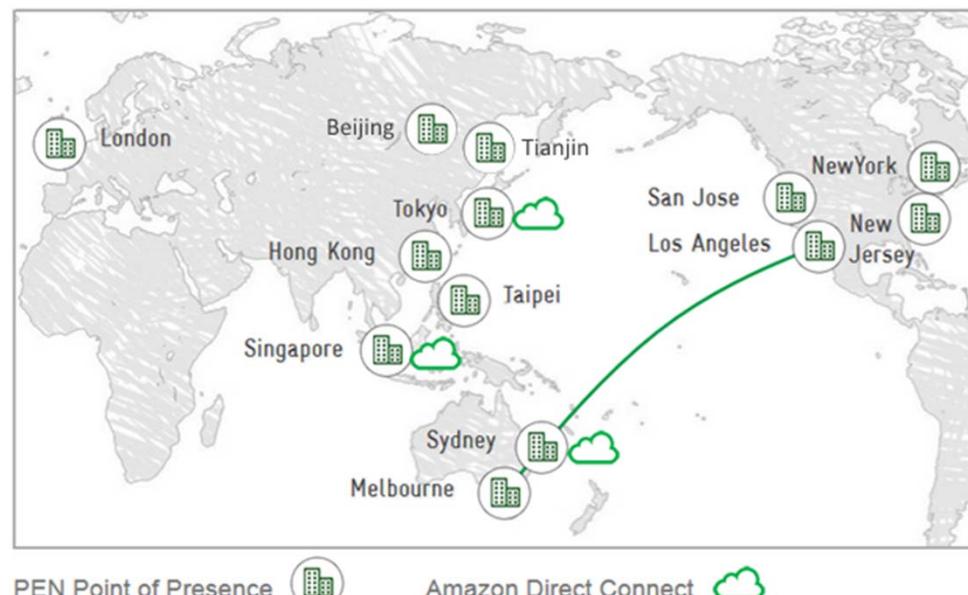
4 Emerging Use Cases for SDN



OpenDaylight in the WAN

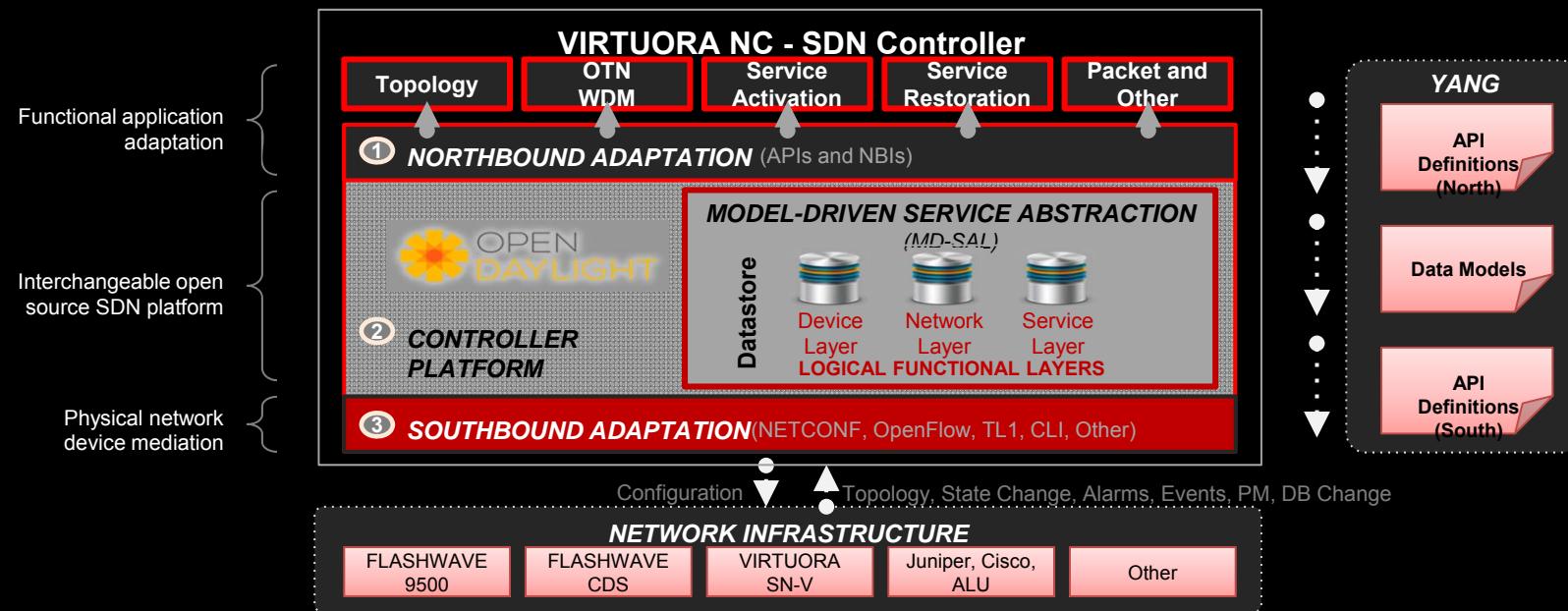


- **Objective:** Self-provisioned dynamic network services
- **What:** Telstra PEN Platform - Layer 2 Ethernet virtual cross connect (VXC) forwards frames between any 2 endpoints on the network
- **How:** MD-SAL application, leveraging OpenFlow protocol
- **Reach:** 25 POPs and growing



Virtuora SDN Controller

Modular Architecture, Multi Layer, Multi Vendor



Value to Customers

“Open Plus”: Open Source advantages, Plus vendor-added value



■ Open Source advantages

- Cross-vendor involvement improves multi-vendor device support
- Community development increases speed of feature and bug fixes

■ Fujitsu functionality

- Optical network provisioning and service restoration
- Adding SDN automation to a historically manual and static realm
- Domain-specific GUI and high-level APIs

■ Easy modularity

- All Open Source APIs and features are available
- User can add additional Fujitsu or Open Source apps onto platform

■ Turn-key vendor solution

- Pre-packaged to reduce installation & configuration
- Commercial support for immediate help

Value to Fujitsu

Leveraging the value provided by the community



■ Easier to get started

- Building on existing specialized platform
- Allows focus on core competency

■ Easier to add value

- Community is open to helping other developers
- YANG models enable multivendor support like never before

■ Easier to maintain

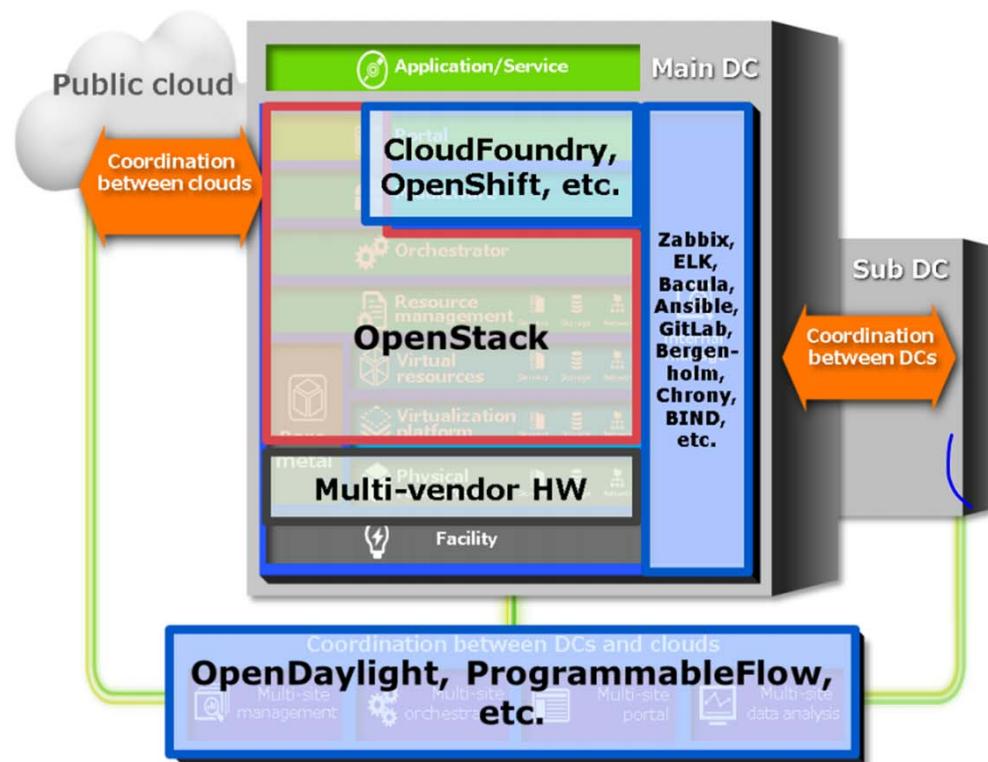
- Upstream bug fixes and features
- Strong value in Formal Release / Service Release strategy
 - Easier to go from Li-SR1 to Li-SR2 than from He to Li

■ Easier to support

- Even vendors get value from being able to see the source code

How NEC is Leveraging OpenDaylight

OSS-Based Open Cloud Infrastructure



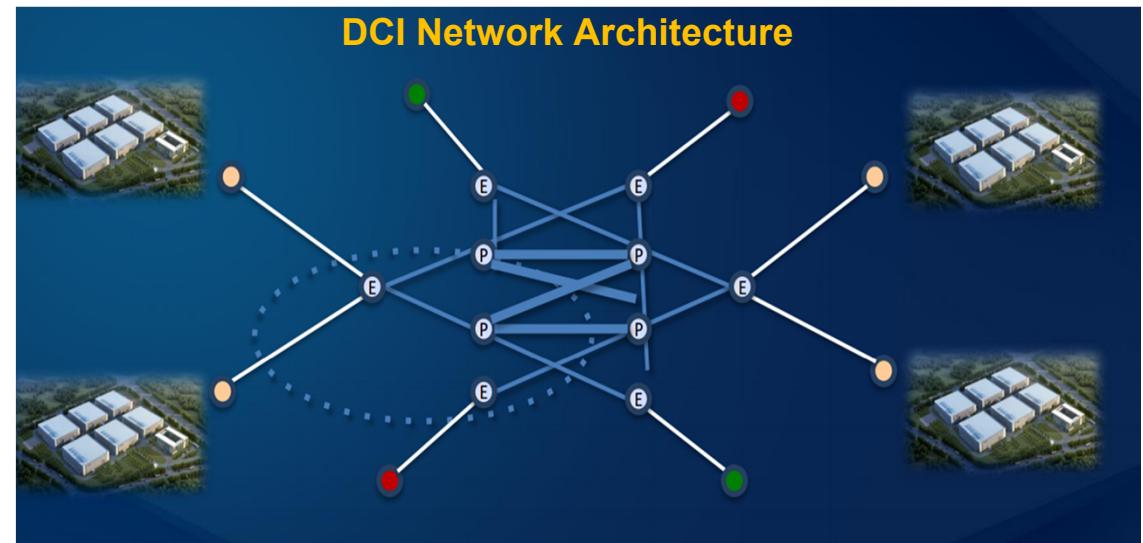
How Tencent is Leveraging OpenDaylight

CHALLENGE

One of the largest web-scale companies in the world experienced low bandwidth usage of expensive WAN connections, low service redundancy scheduling efficiency

SOLUTION

Built DCI controller based on ODL and achieved real bandwidth usage improvement + network service quality enhancement



How Tencent is Leveraging OpenDaylight

Why OpenDaylight:

Great scalability of the architecture and extensible with rich southbound protocols / healthy ecosystem, resilient architecture, increasingly rich features and southbound protocols, clear version evolution rhythm and its reputation in the open source community



*Marty Ma,
Chief Architect*

“We request all our partners to be OpenDaylight compatible by end of 2015”

Korea Telecom: T-SDN



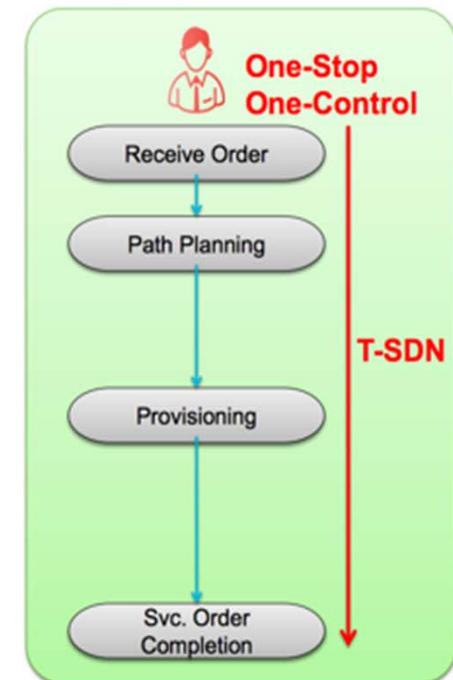
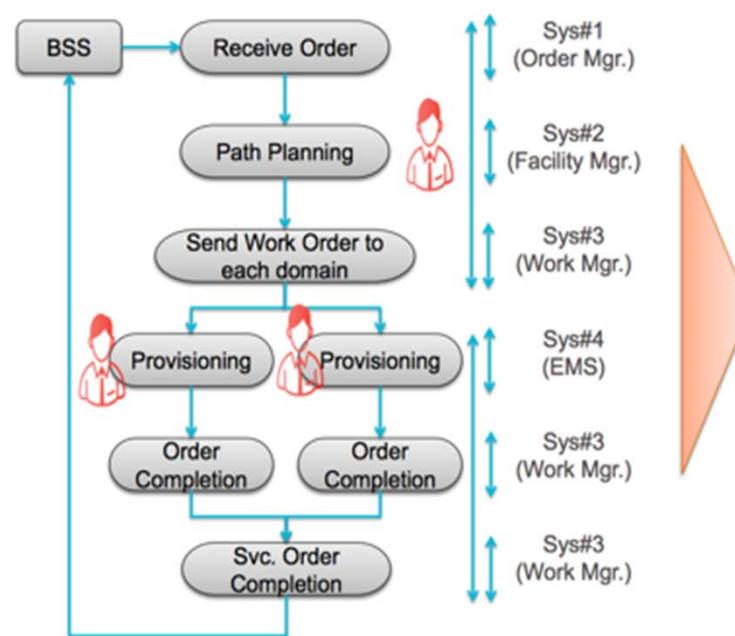
CHALLENGE:

OPEX increase by segmented operations

- For E2E Service Configuration, many domain operators should participate
- Delayed service deployment because of manual planning and provisioning

SOLUTION:

Simplify and automate provisioning processes using T-SDN



95% Time reduction

Korea Telecom:T-SDN



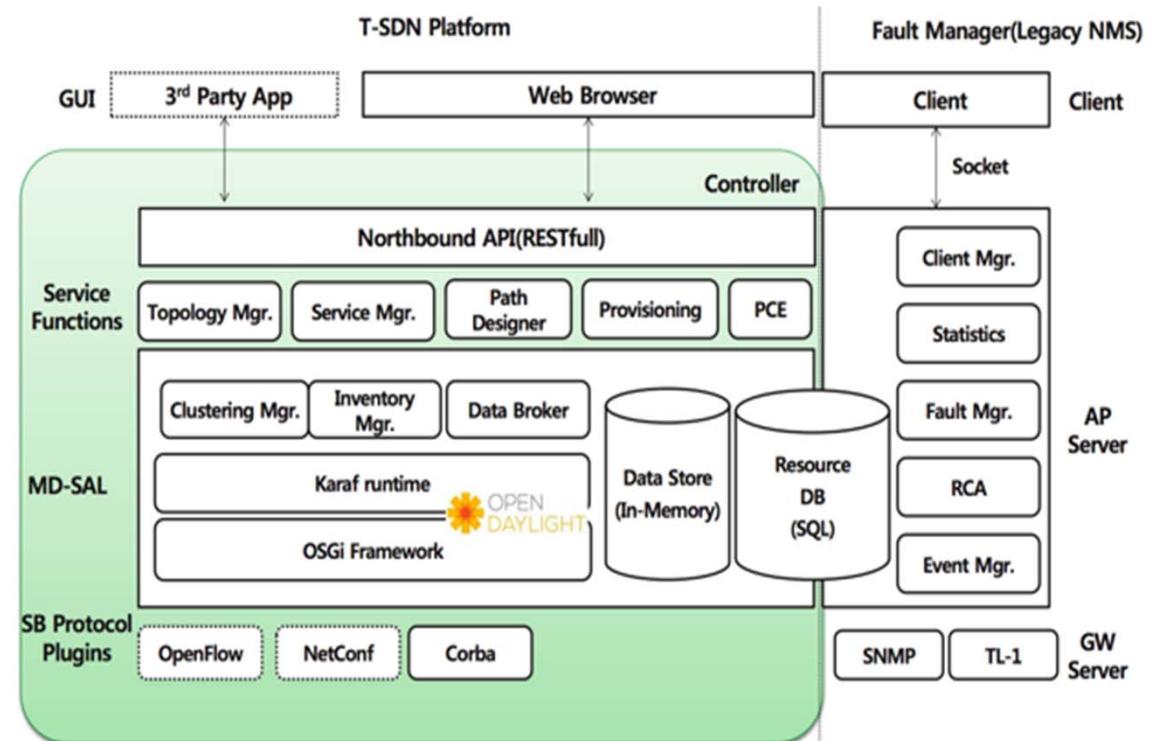
KT Architecture

Adopted open source SDN controller
(OpenDaylight Helium release)

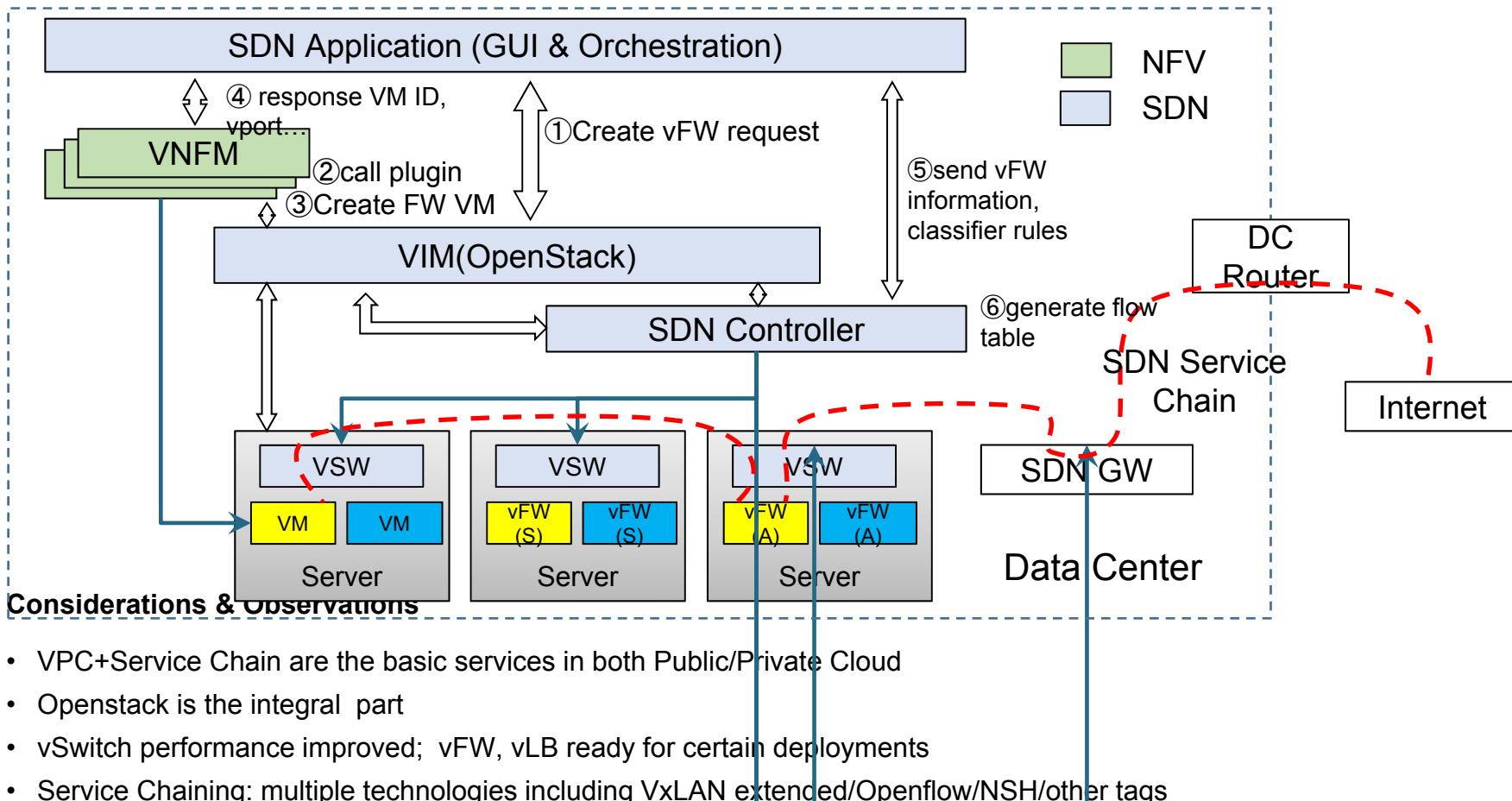
- To reduce time and cost for development

Integrated with legacy transport NMS

- Share inventory, topology and fault information
- Define YANG-model use in memory data store for fast path computation
- Real-time synchronization for resource changes
- Adopted MSPP, OXC, and PRN plugins



NovoDC: An Example in Public/Private Cloud



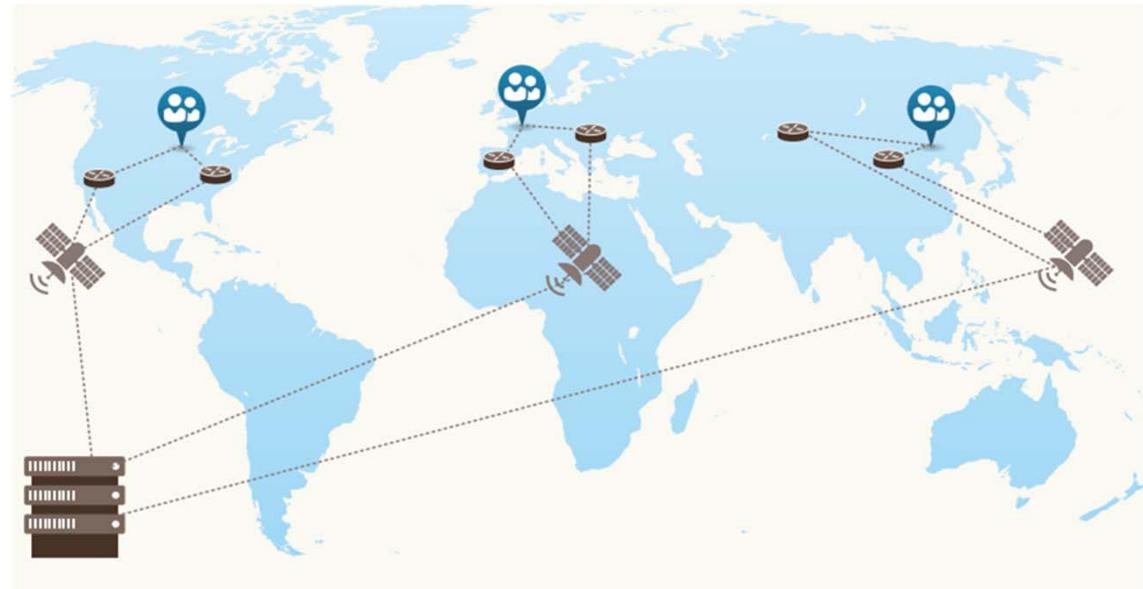
How SERRO is Leveraging OpenDaylight

CHALLENGE:

Atypical customer data flows:
weather, finance, airlines,
government, energy --mapping
packet switch infrastructure to optical
transport networks

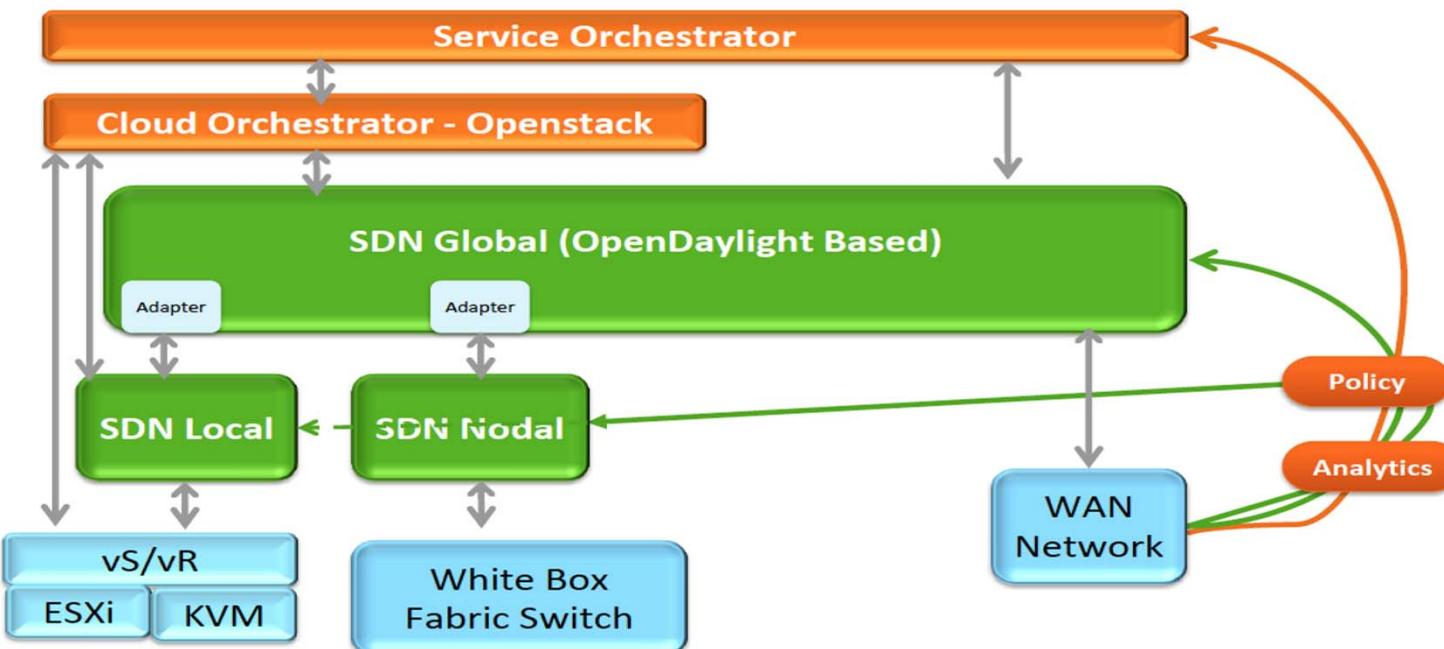
SOLUTION:

Leverage ODL as a global controller
to enable SDN on MEO satellite
network, which provides consistent
and on-demand connection



How AT&T is Leveraging OpenDaylight

How Do They Interact?



How AT&T is Leveraging OpenDaylight

- “AT&T open source is 5% of our code; our goal is to move to >50% by 2020.”—*John Donovan, Senior Executive Vice President, AT&T Technology and Operations*
- OpenDaylight powers AT&T’s Network on Demand Enterprise L2 Service in over 100 markets
- The company is leveraging OpenDaylight for its global SDN controller
- AT&T is contributing to a new ODL project to support YANG models:

“We configure devices in our software-based network using a tool built on a data modeling language called YANG. We’ll submit our customized YANG design tool into open source through the OpenDaylight Community. Innovators will be able to create services that plug into our software-defined framework.” —John Donovan, AT&T



How Caltech is Leveraging OpenDaylight

- **Who:** CalTech – Large Hadron Collider team
- **What:** Distribute 200+ TB data beyond 13 Tier 1 sites to 160 Tier 2 research sites and 300 Tier 3 sites
- **How:** Controller based on ODL leveraging OpenFlow to setup up flow rules for data distribution. First based on Hydrogen, then Helium, soon to be on Lithium
- **Quote:** “ODL has become the De-Facto Standard Controller”

#odsummit



Who: Bristol, England is building a fully programmable, citywide network using ODL

What: Developing an open programmable city region

How: An OpenDaylight-based SDN controller will integrate traffic across Bristol's fiber optic network, LTE and experimental 5G wireless networks, and a mesh network of 1,500 connected lamp posts. NEC will provide equipment and support for the network's radio elements



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Thank You

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