OPEN SOURCE NETWORKING DAYS

ONOS(/CORD) Update ^{樋口}裕太 (NEC)



- What is ONOS
- ONOSアプリ・ユースケース例
- (時間があれば)CORD関係

Evolution of SDN and ONF projects



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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.

振返り:SDNとは何だったのか?

疑問: コンピューティング領域と比較し、ネットワーク領域は、 40年に渡りあまりにも進化がなかったのはなぜか?

仮説: NW制御とステート分散の 個々に難しい問題を同時に1つのプロト コルで解こうとするからではないか?

> NW control + State distribution



e.g., OSPF 250p specification, 10p about Dijkstra

Can we think of an architecture separating these different concerns?

先程のアーキテクチャの整理に当てはめると





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



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ONOS Core







Core is a distributed system, not a single server











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Network Control / Programming



ONOS: The Complete Picture



ONOS Core Subsystems



Further reading

ONOS website:

https://onosproject.org

Tutorials, documentation and general reading at:

https://wiki.onosproject.org/

ONOS is on Github at:

https://github.com/opennetworkinglab/onos

Setup Tutorial

https://wiki.onosproject.org/display/ONOS/Installing+and+Running+ONOS

Screencasts:

https://wiki.onosproject.org/display/ONOS/Screencasts





ONOS 適用例

Deployments

- Research & Education
 O SDN-IP, VPLS apps
- Access network for residential customers
 - $\bigcirc\,$ Trials with a major US telecom providers
 - \bigcirc Trellis
 - CORD SEBA (SDN Enabled Broadband Access)
- SDN in Air-Traffic Management
 - Safety-critical, ATM-grade deployment in Brazil (~22M km²)

GÉANT

- \bigcirc Radar relays, remote control towers, pilot voice, etc.
- NetBroker from Frequentis developed on ONOS
- Brown-field & OpenFlow

Trellis – SDN DC fabric





Trellis Provides Common control over underlay & overlay networks, including

- Service Composition for Tenant Networks
- Distributed Virtual Routing
- Optimized Delivery of Multicast Traffic Streams

Trellis is the enabling Network Infrastructure for CORD

Trellis – Multi-purpose Leaf-Spine Fabric

Open Network Operating System



VNF Offloading



- Mobile World Congress (Feb 2018) M-CORD demo showcasing the Serving and Packet Gateway user plane functionality on P4-based fabric using multi-vendor H/W under ONOS control
- Integration of a P4 Trellis Fabric in CORD and extending VNF offloading support to R-CORD (e.g., BNG)





ONF Connect 2018 The Epicenter of Access & Edge Cloud Collaboration



CORD

Umbrella project for Multi-Access Edge Cloud Platform



ONE

CORD[®] as Multi-Access Edge Cloud Platform



SEBA: Software Enabled Broadband Access



Trellis: A Leaf-Spine Fabric for NFV



SDN 2.0 Stack: Unified Programmable Autonomous Network (UPAN)



VNF Offloading

Early NFV – heavy lifting & chaining









CPE – Customer Premises Equipment OLT – Optical Line Termination BNG – Broadband Network Gateway

SEBA: SDN Enabled Broadband Access



SPGW as VNF





VNF Offloading



Trellis & P4



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