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Building ONOS Cluster in top of openSUSE openSUSE.Asia Summit 2019

Zufar Dhiyaulhaq

Open Networking Foundation

October 16, 2019





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Self Introduction

- Zufar Dhiyaulhaq
- ONF ambassador
- Cloud Engineer @ Btech
- Undergraduate Student @ Telkom University



ABOUT

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EXEMPLAR PLATFORMS

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SOFTWARE DEFINED STANDARDS

CUTIVE TEAM

E-SAE

LAB 1

1BASSADORS

The Ambassadors











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Introduction to ONE

ONF: Operator Led Consortium















With 13+ additional operators at 'Innovator' level

Collaborating to Address a Common Problem

Operators need cloud-like economics and agility

Incumbent vendors have not been providing open tools & cloud-like building blocks

Operator Led

Operator Led - Curated Open Source Community

Partners committed to disaggregation, open source and SDN/NFV/Cloudification



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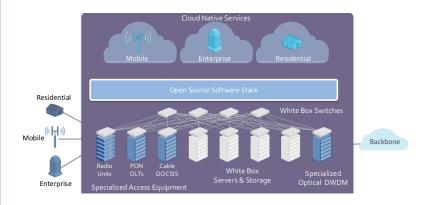
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CORD - Next Generation Edge Cloud Platform



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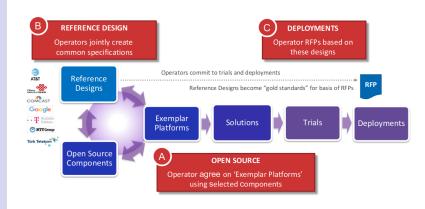
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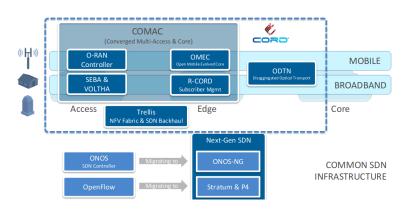
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Software-Defined Networking

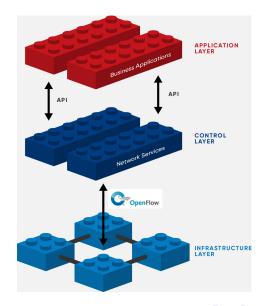
The physical separation of the network control plane from the forwarding plane, and where a control plane controls several devices.

- Directly Programmable
- Agile
- Centrally Managed
- Programmatically Configured
- Open Standards-Based and Vendor-Neutral

Introduction to Software-Defined

Networking

Software-Defined Networking



Introduction to ONOS

Introduction to 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.

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Architectural principles

- High-availability, scalability and performance
- Strong abstractions and simplicity to develop apps and solutions
- Protocol and device behaviour independence
- Separation of concerns and modularity

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Retrospective

- In the last 12 months, ONOS had the following releases
 - 1.14 (Owl), 1.15 (Peacock), 2.0.0 (Quail), 2.1.0 (Raven), 2.2.0 (Sparrow)
- ONOS community continued to add apps, device drivers, etc.
- New SB APIs for NG SDN & Stratum
- GUI rewrite using Angular 7 and TypeScript

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Where we are now

- ONOS provides a stable platform with nice characteristics:
 - easy app development
 - SDK, etc.
 - easy deployment as a distributed Cluster
 - Docker containers, Kubernetes, etc.
 - super-fast
 - lots of existing apps and extensions
 - support for both legacy protocols and next-gen SDN interfaces

Retrospective

Where we are now

- ONOS architecture also has some caveats and limitations:
 - apps limited to Java or JVM-based languages
 - e.g. Scala, Jython, Groovy
 - limited isolation mechanism
 - core & apps share same resources
 - horizontal app/service scaling is difficult

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NG ONOS Architectural Tenets

- Use gRPC-centric interfaces
 - gNMI, gNOI, P4Runtime, OpenConfig, etc.
- Follow micro-services principles
 - horizontal scaling of services, support for tenant apps, etc.
- Rely on existing orchestration platforms
 - e.g. Kubernetes, Helm charts
- Allow components written in different languages (Java, Go, Python, etc.)

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Use Cases

- Interconnecting SDN network with traditional network using SDN-IP
- SONA: DC Network Virtualization
- CORD: Central Office re-architected as a Datacenter
- Virtual Private LAN Service (VPLS)
- more uses cases in wiki.onosproject.org
- or you can create your uses cases!

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ONOS Clustering

- The Owl release (1.14) features a new architecture which physically decouples cluster management, service discovery, and persistent data storage from the ONOS nodes themselves.
- These functions are now the responsibility of a separate Atomix cluster.

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ONOS Distributed Architecture

- Distributed
 - Set up as a cluster of instances
- Symmetric
 - Each instance runs identical software and configuration
- Fault-tolerant
 - Cluster remains operational in the face of node failures
- Location Transparent
 - A client can interact with any instance. The cluster presents the abstraction of a single logical instance
- Dynamic
 - The cluster can be scaled up/down to meet usage demands

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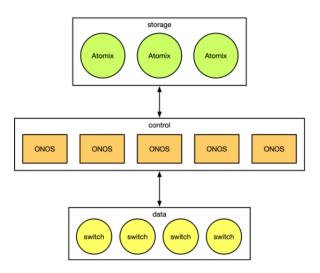
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ONOS Clustering



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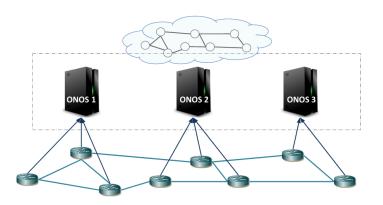
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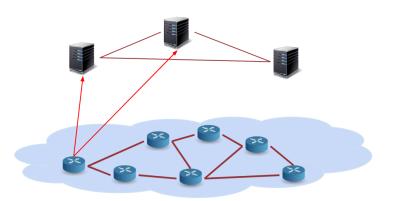
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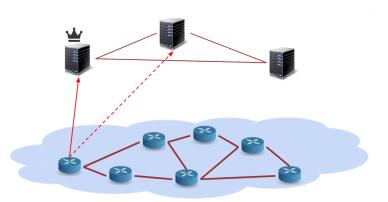
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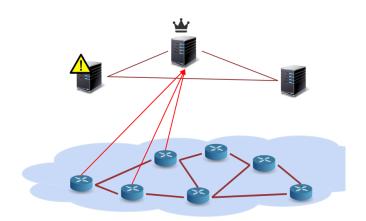
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ONOS Cluster commands

- Entering ONOS management /opt/onos/bin/onos
- Balancing Master balance-masters
- Activate auto balance app activate mlb
- Activate layout app activate layout
- Change topology to access topo-layout access

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Slides

Slide & Automation script available on GitHub bit.ly/ONOSopenSUSE

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Any Question? contact me on zufar@onf-ambassador.org linkedin Zufar Dhiyaulhaq telegram @zufardhiyaulhaq