Building ONOS Cluster in top of openSUSE

openSUSE.Asia Summit 2019

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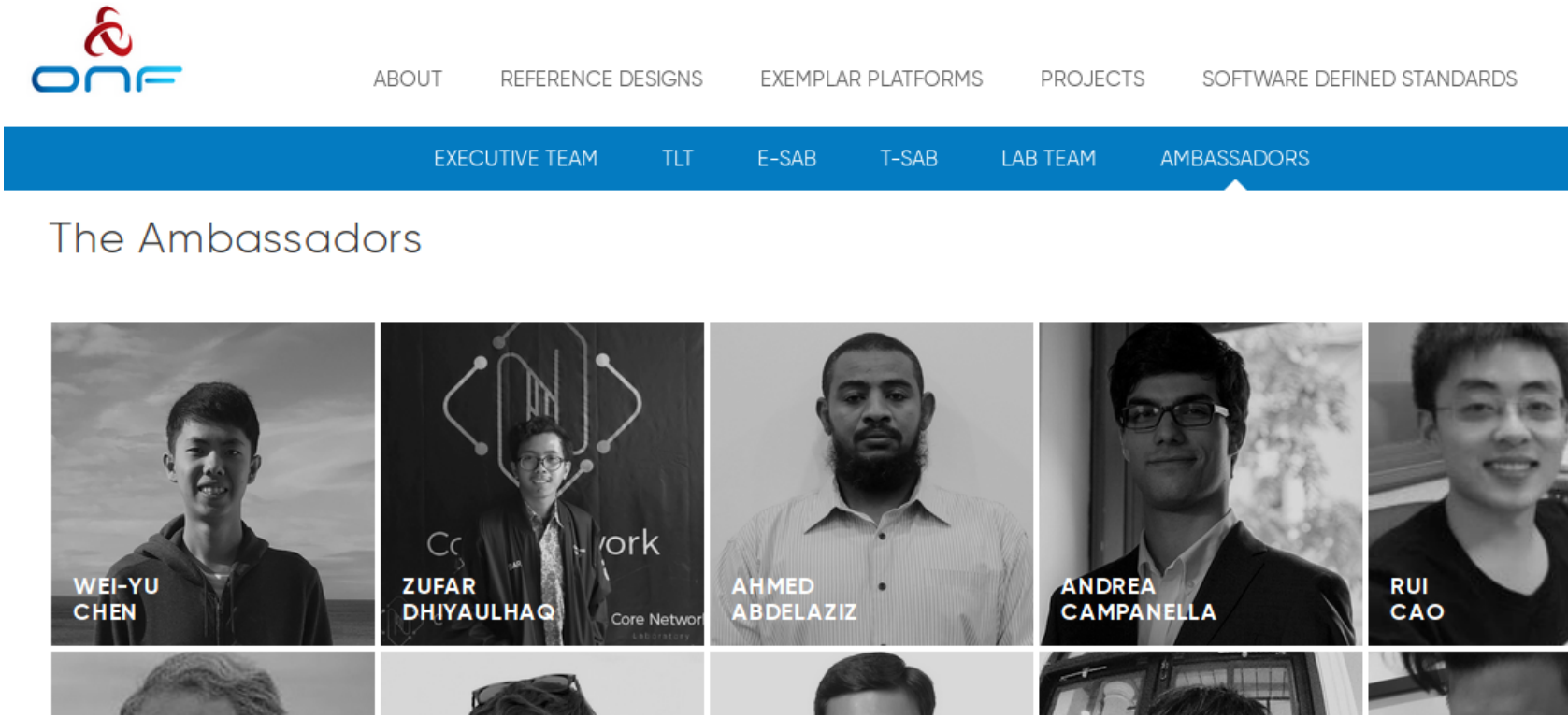
Open Networking Foundation

October 4, 2019

Self Introduction

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



ONF: Operator Led Consortium

With 13+ additional operators at 'Innovator' level

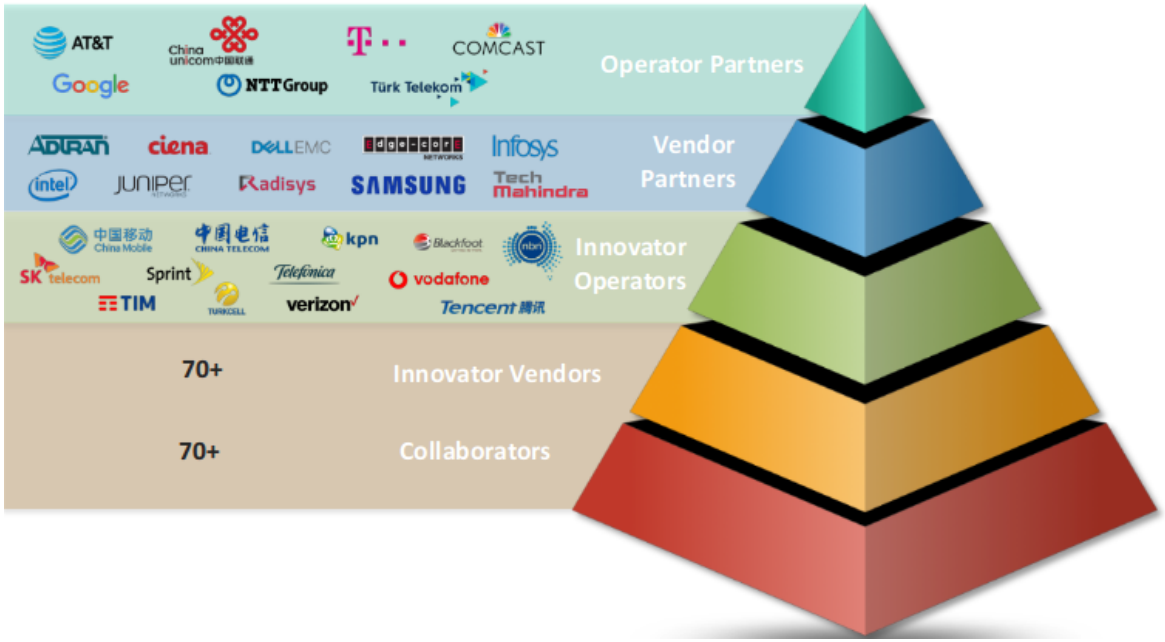
Collaborating to Address a Common Problem

Operators need cloud-like economics and agility

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

Operator Led - Curated Open Source Community

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



ONF BOARD

AT&T	Andre Feutsch – CTO & ONF Chair
T-Mobile	Jochen Appel - VP
Google	Amin Vahdat - Fellow
NTT Group	Dai Kashiwa - Director
COMCAST	Rob Howald - VP
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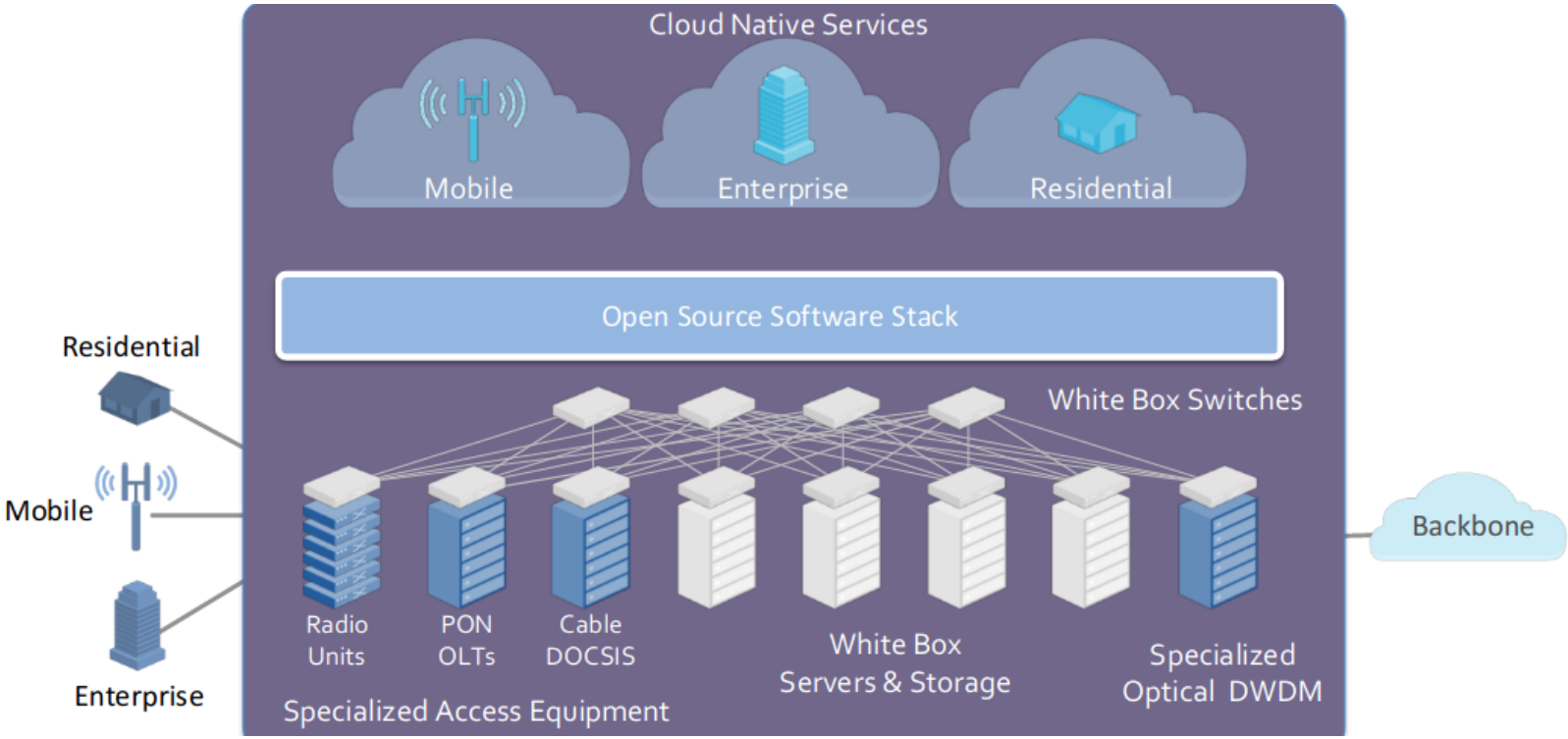
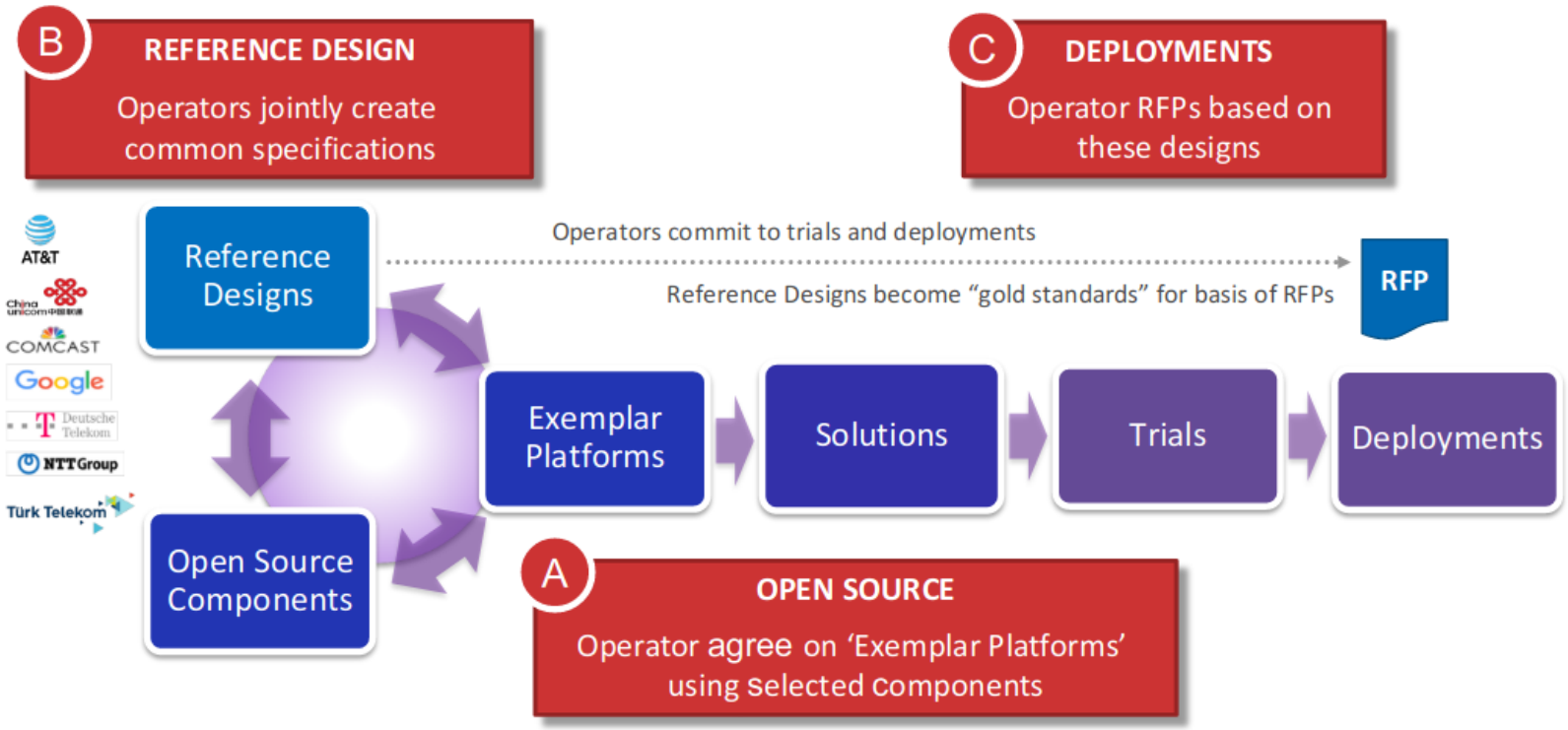
Türk Telekom	Yusuf Kirac - CTO
Stanford	Nick McKeown - Prof
ONF / Stanford	Guru Parulkar, Exec Dir

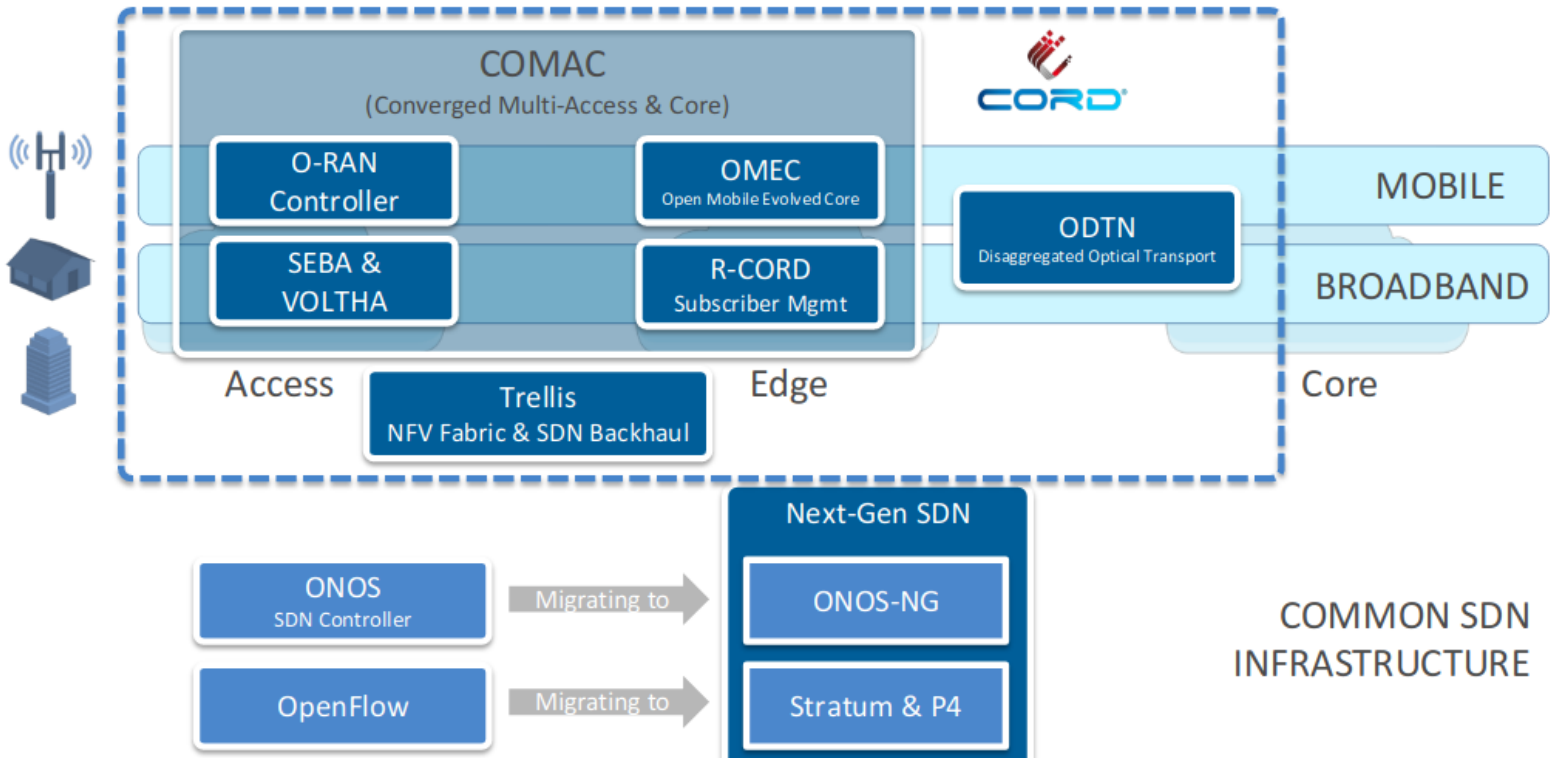
CORD - Next Generation Edge Cloud Platform



Reference Design Strategy



ONF Solutions

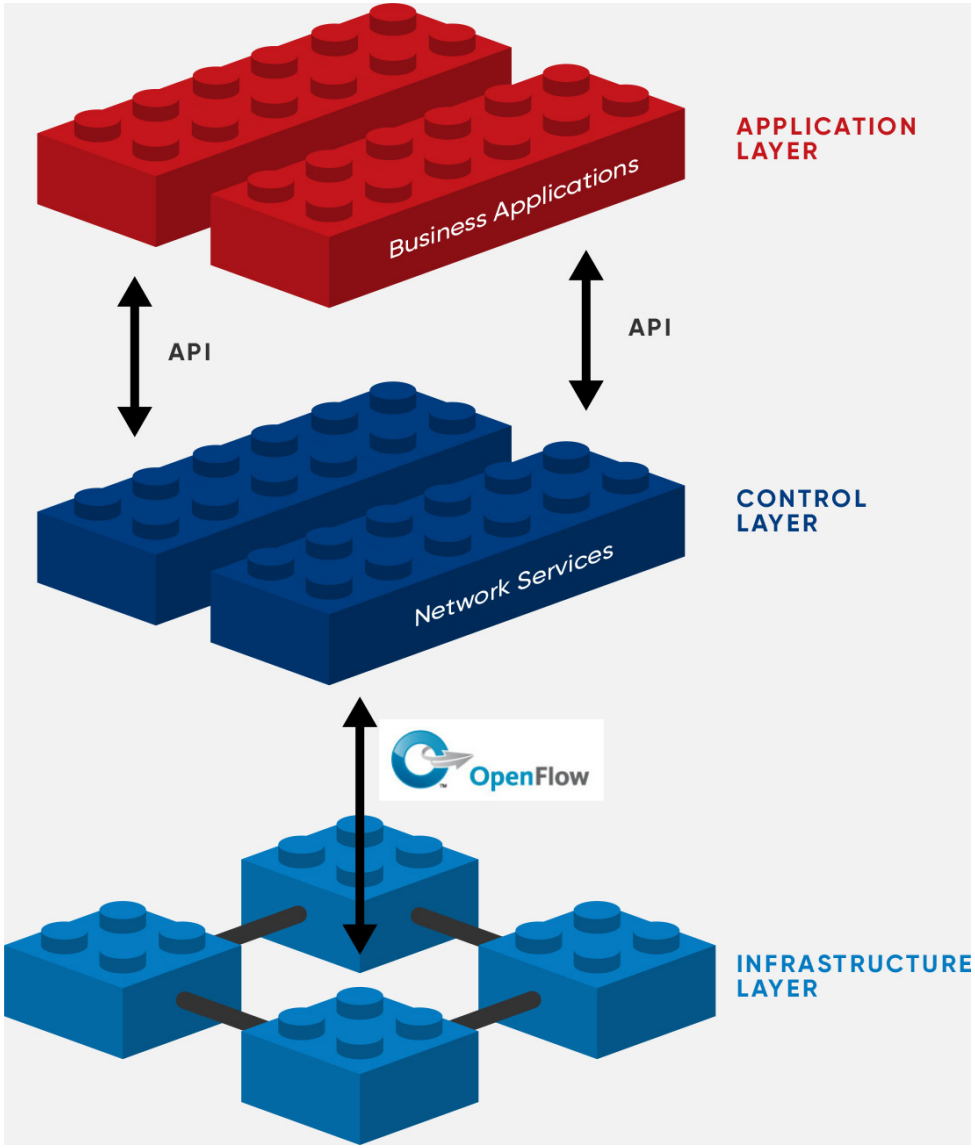


Software-Defined Networking

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

Software-Defined Networking



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.

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

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

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

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

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.)

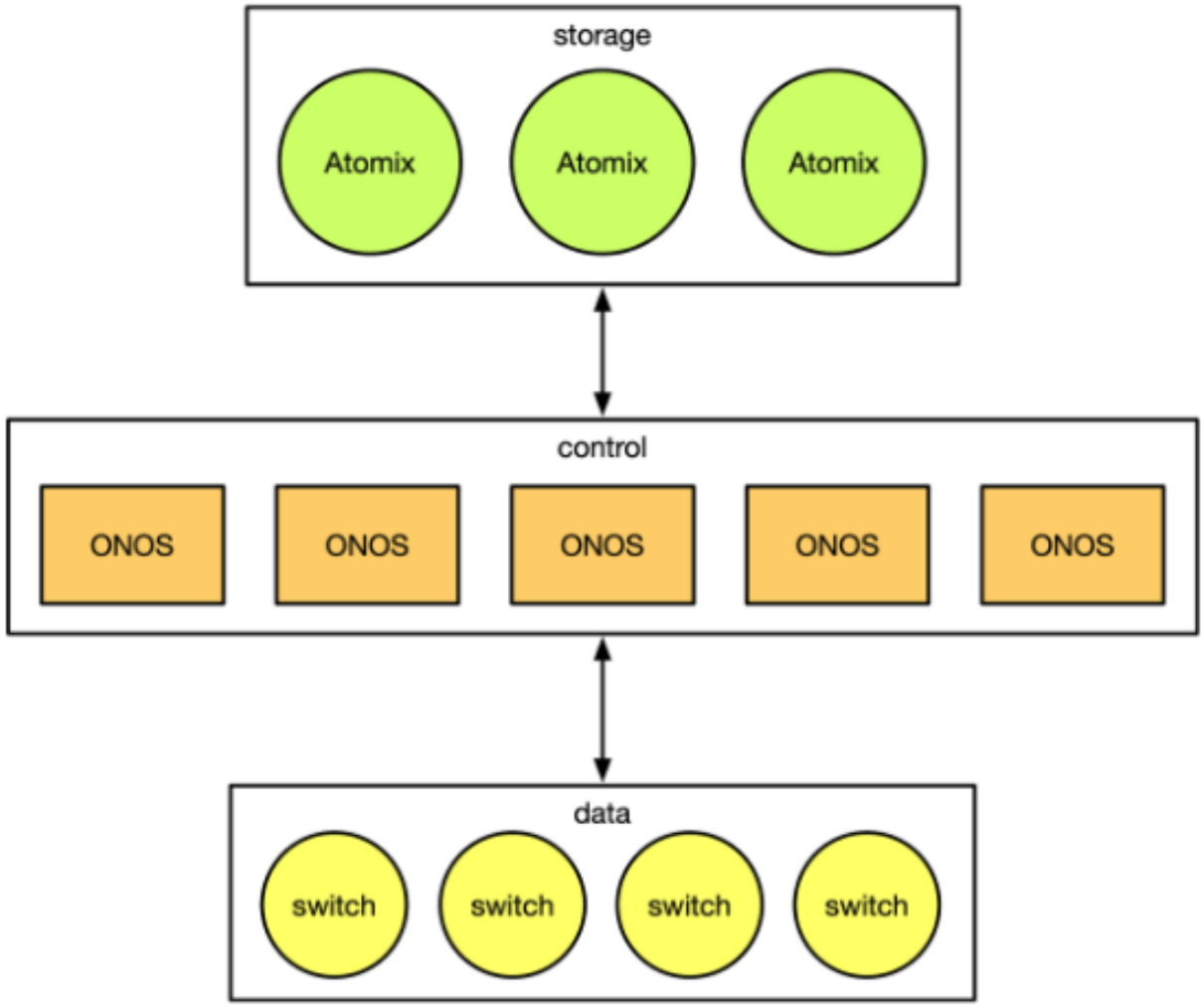
ONOS Clustering

- 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.

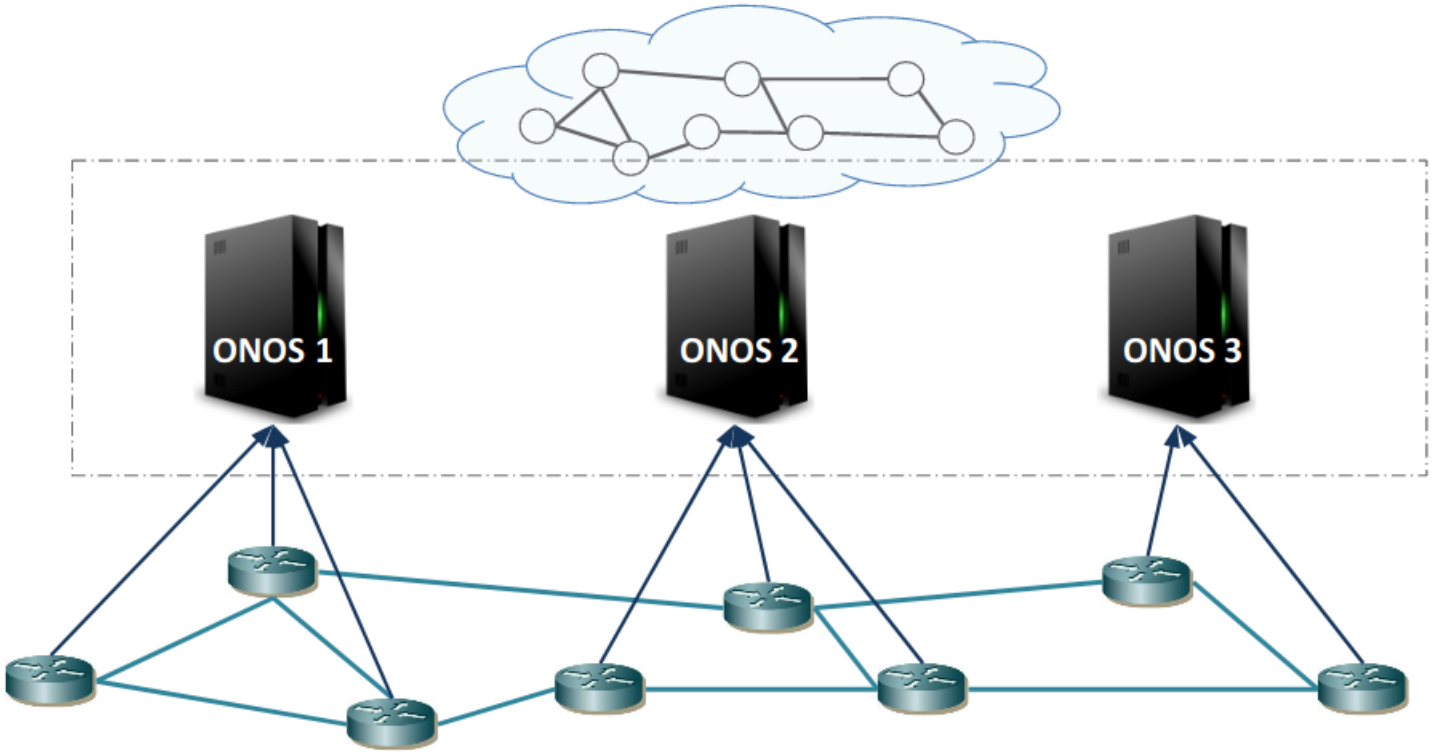
ONOS Distributed Architecture

- 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

ONOS Clustering



How Devices connect



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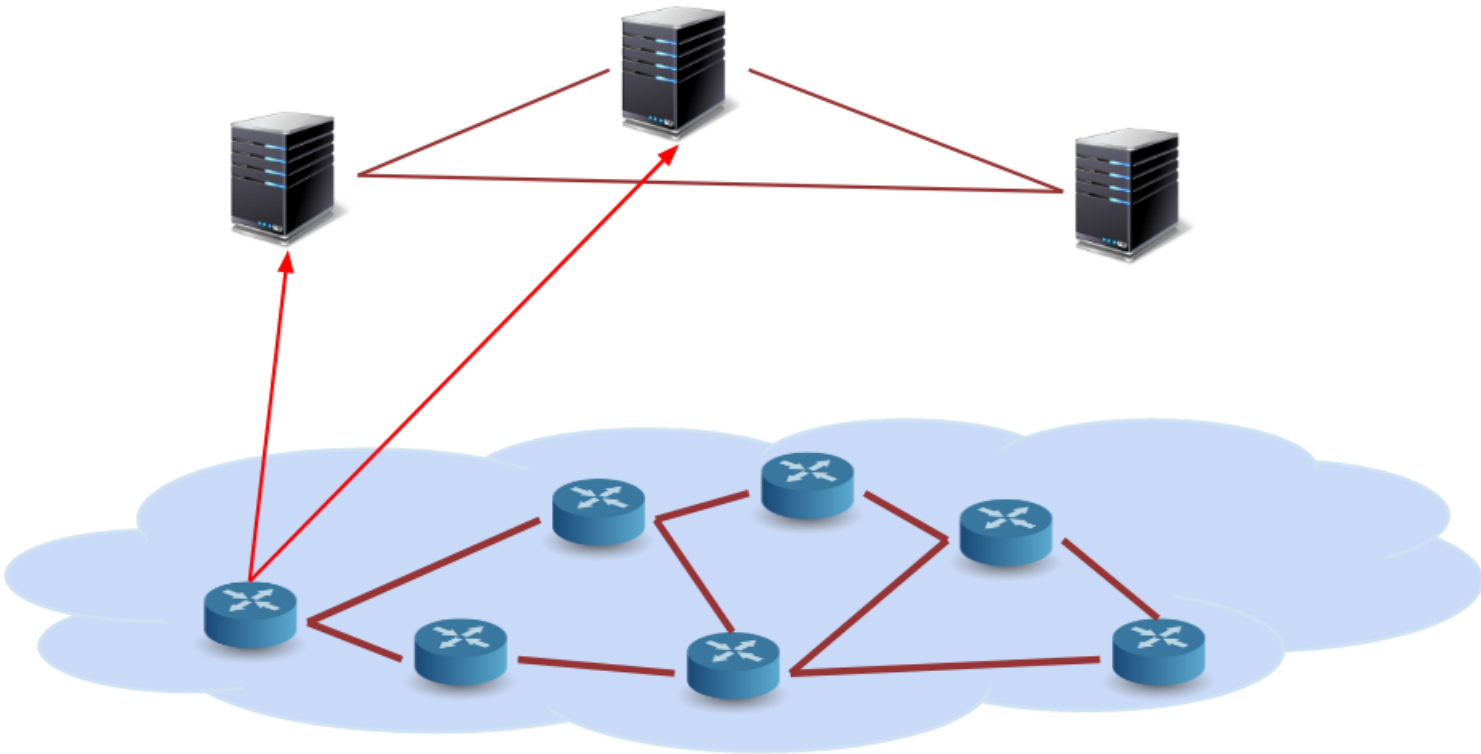

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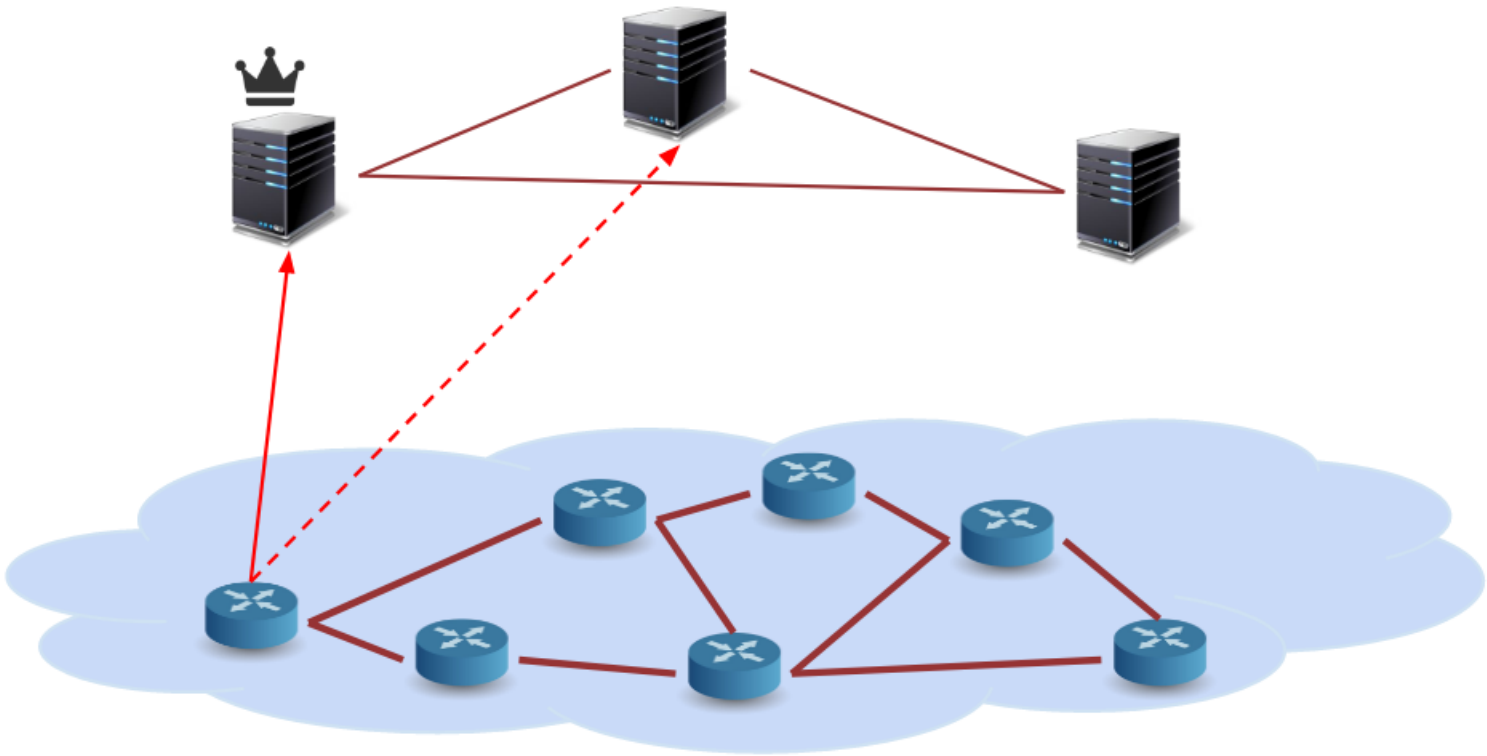

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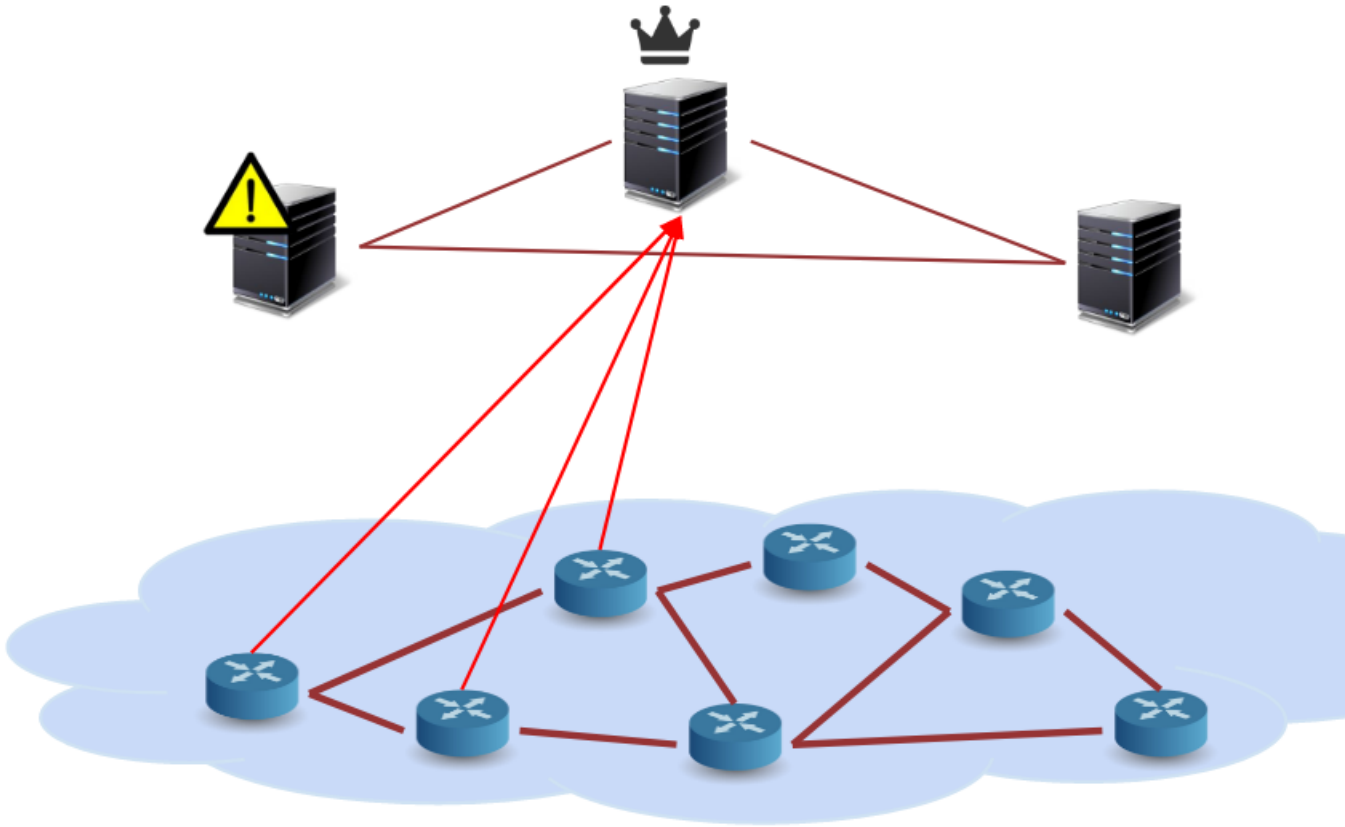

Clustering Demo

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