Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# Building ONOS Cluster in top of openSUSE

## openSUSE.Asia Summit 2019

Zufar Dhiyaulhaq

Open Networking Foundation

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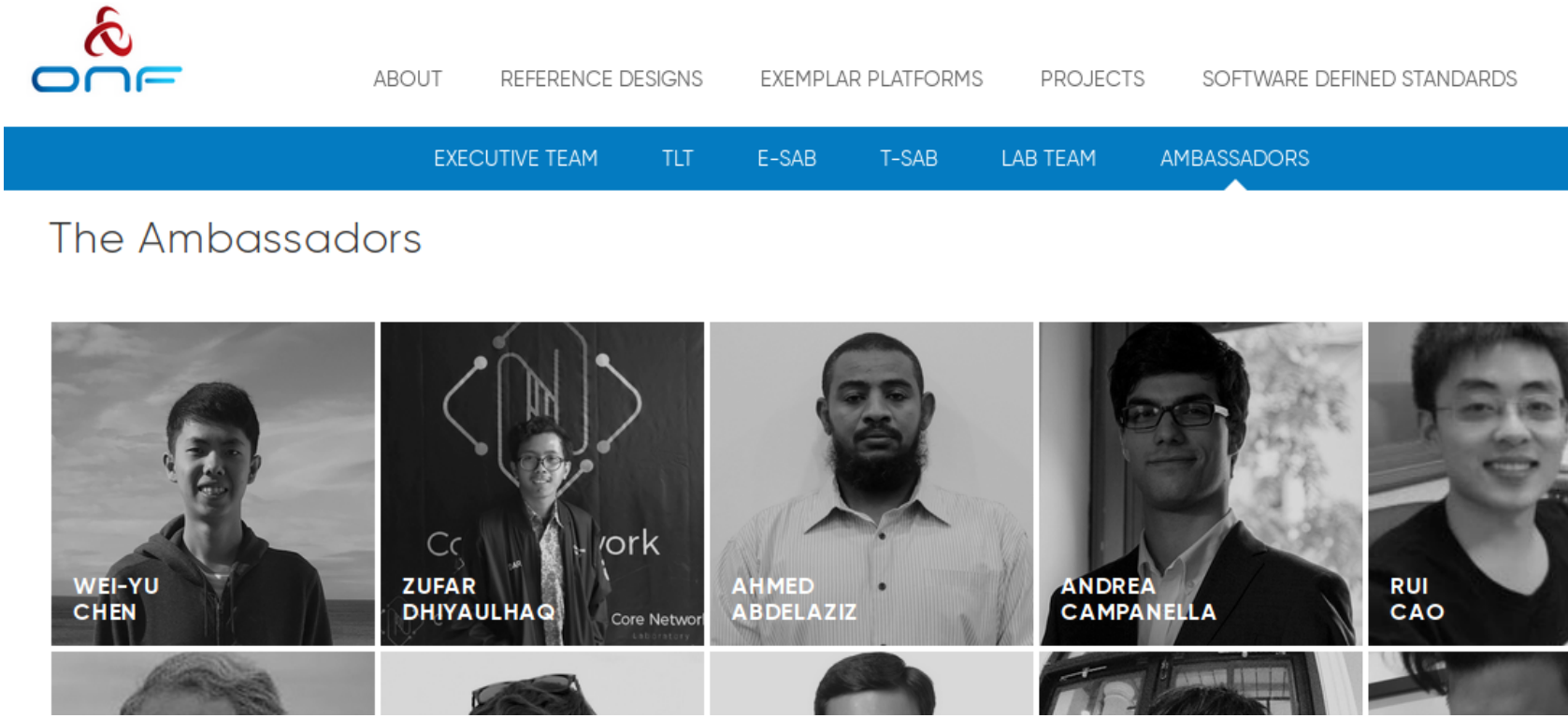
Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# Self Introduction

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



Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# ONF: Operator Led Consortium


With 13+ additional operators at 'Innovator' level

## Collaborating to Address a Common Problem

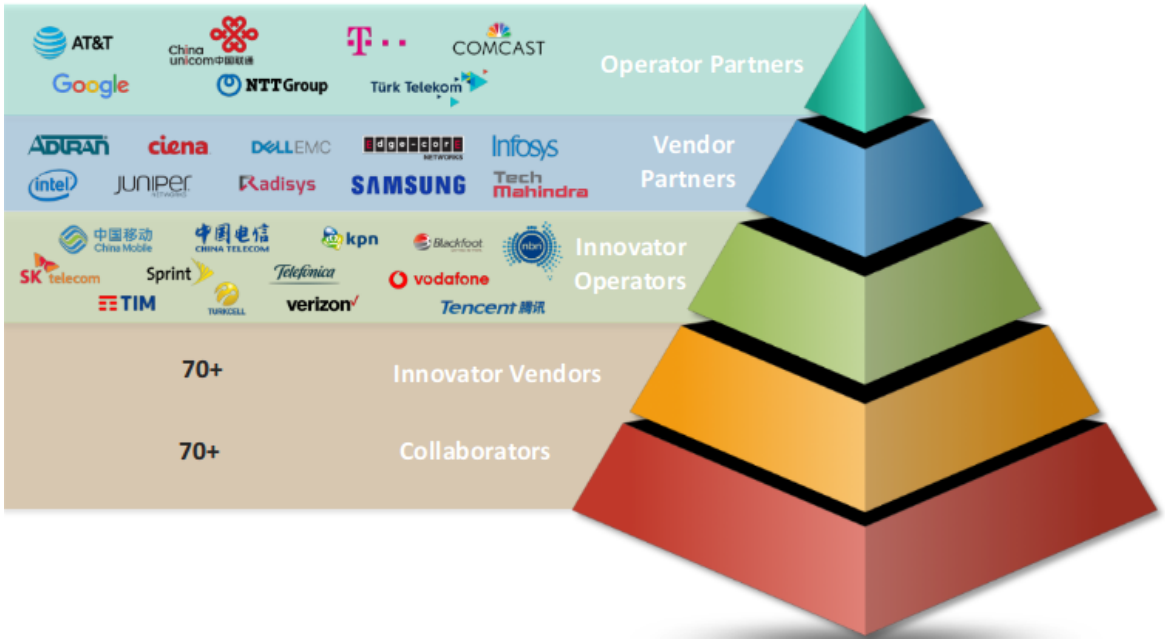
Operators need cloud-like economics and agility

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

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# Operator Led - Curated Open Source Community

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

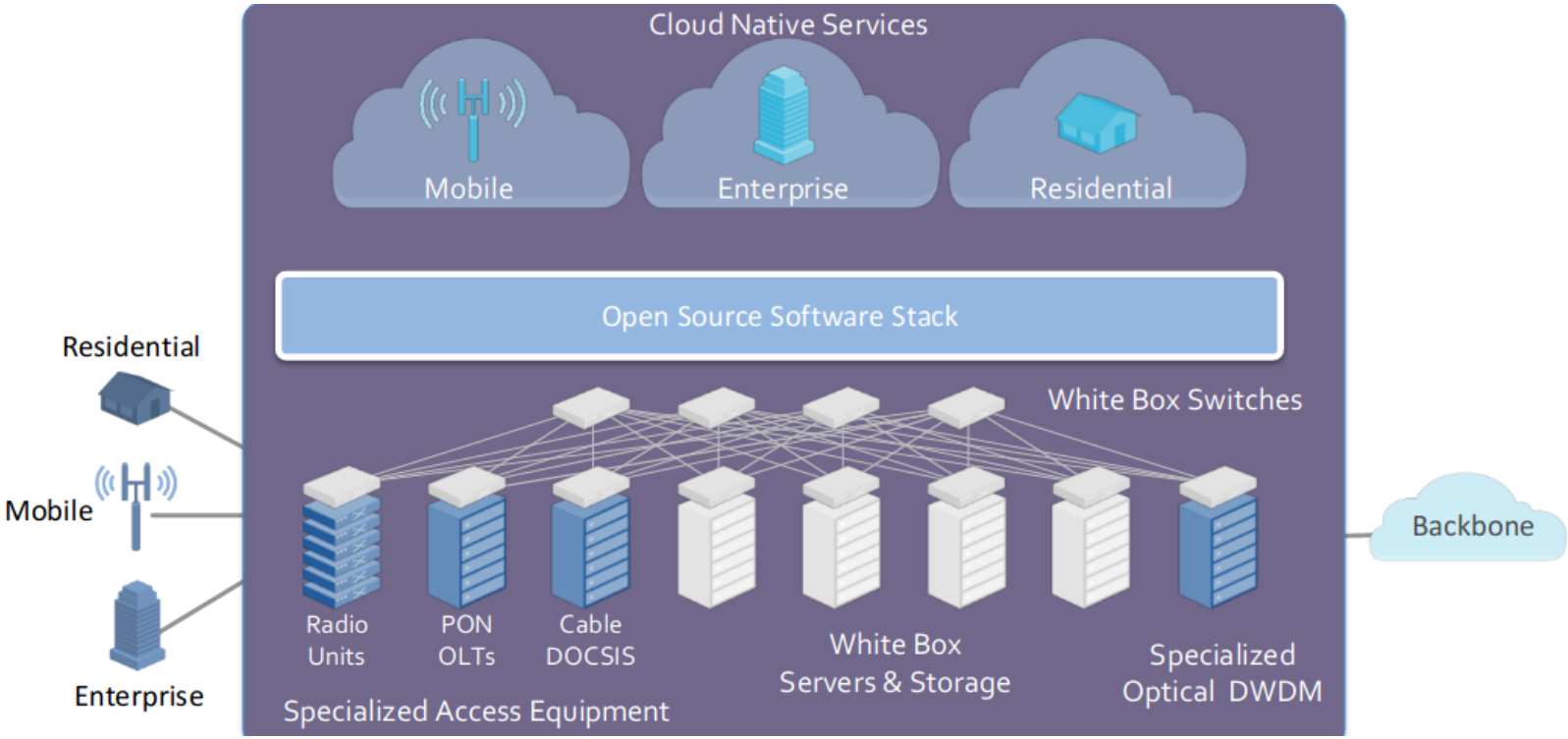



**ONF BOARD**

| | |
|---|---|
| AT&T | Andre Feutsch – CTO & ONF Chair |
| | Jochen Appel - VP |
| Google | Amin Vahdat - Fellow |
| NTT Group | Dai Kashiwa - Director |
| COMCAST | Rob Howald - VP |
| China unicom | Shao Guanglu - SVP |
| | George Tchaparian - CEO |
| Türk Telekom | Yusuf Kirac - CTO |
| STANFORD | Nick McKeown - Prof |
| ONF STANFORD | Guru Parulkar, Exec Dir |

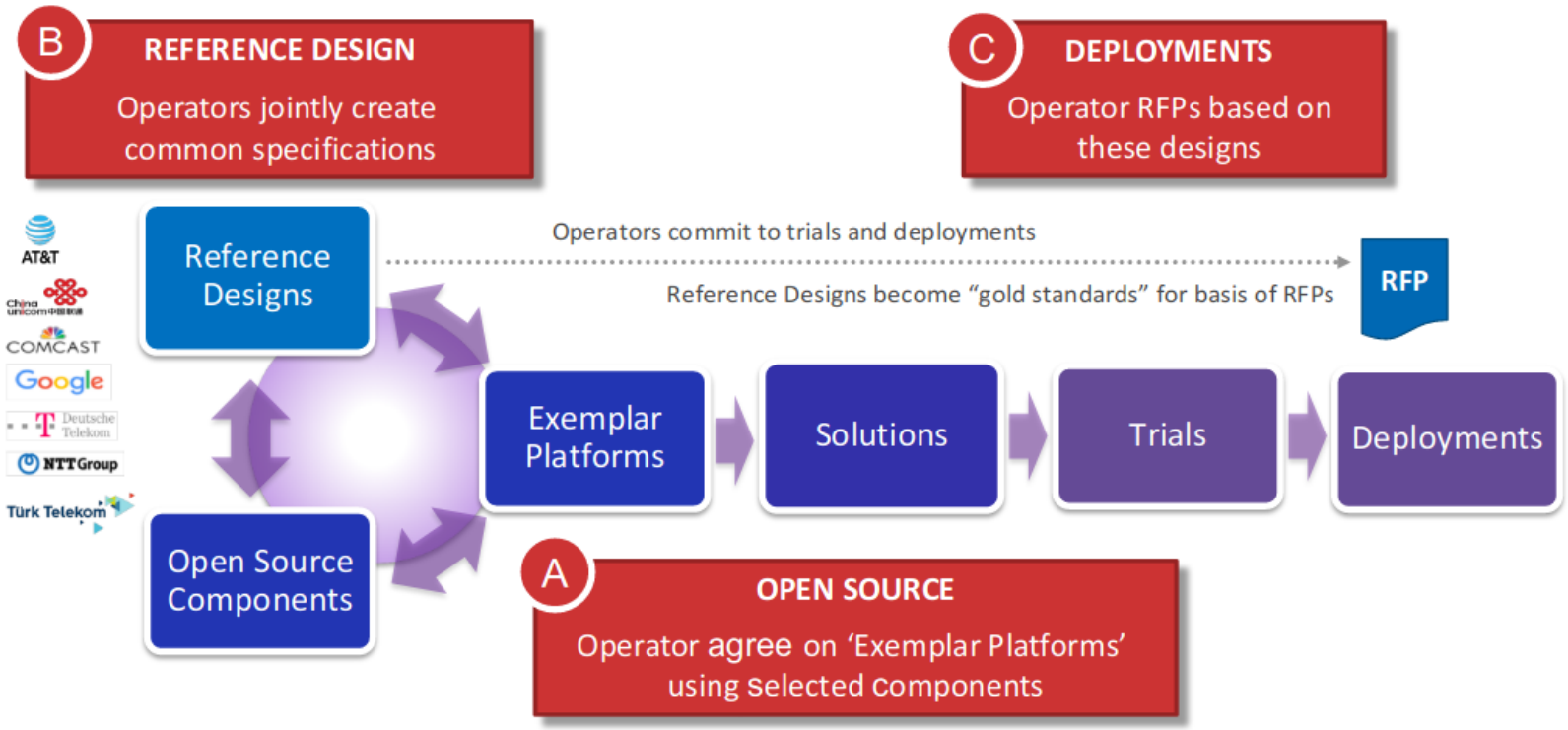
Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# CORD - Next Generation Edge Cloud Platform



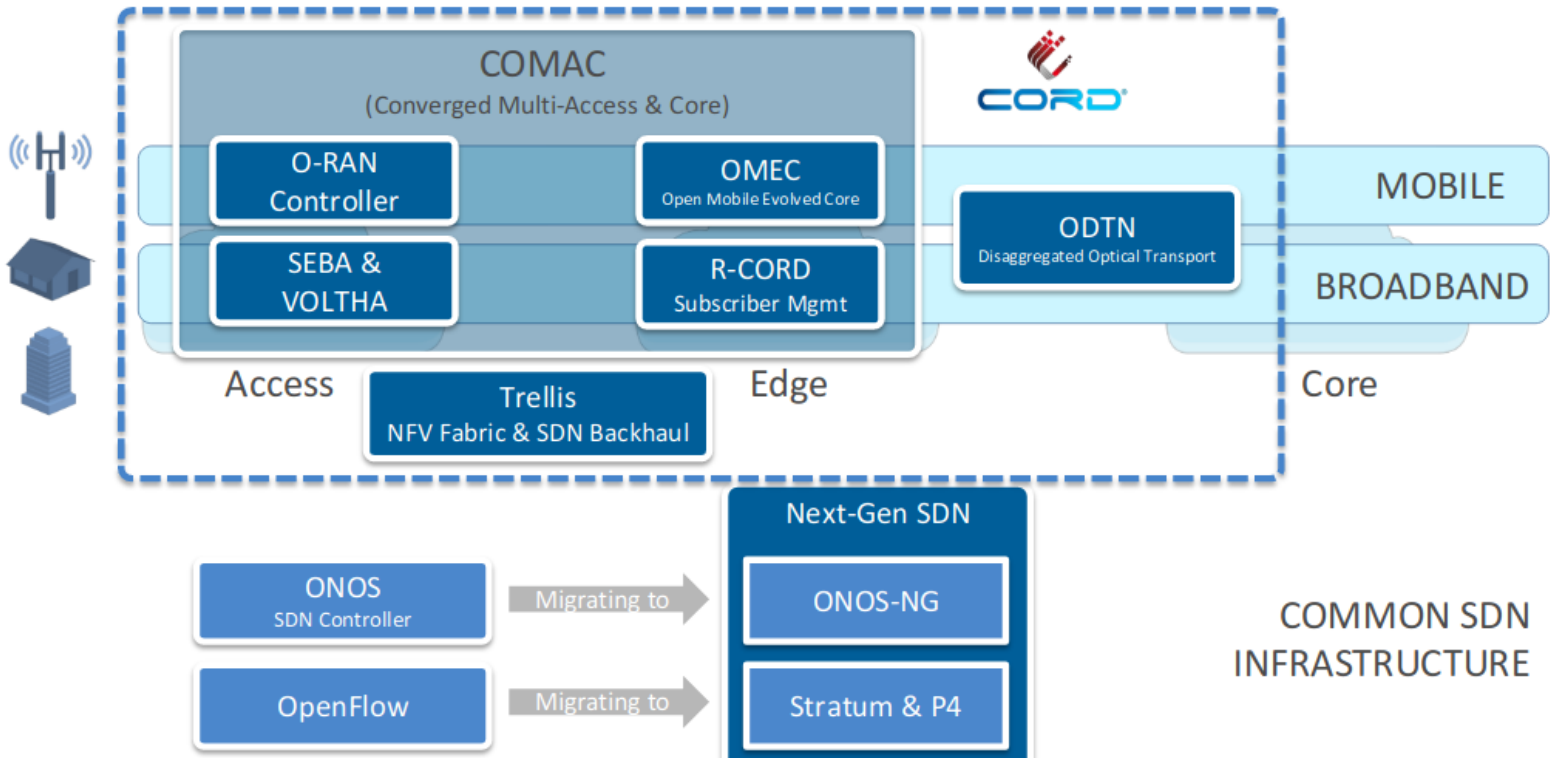
Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# Reference Design Strategy



Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# ONF Solutions



Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

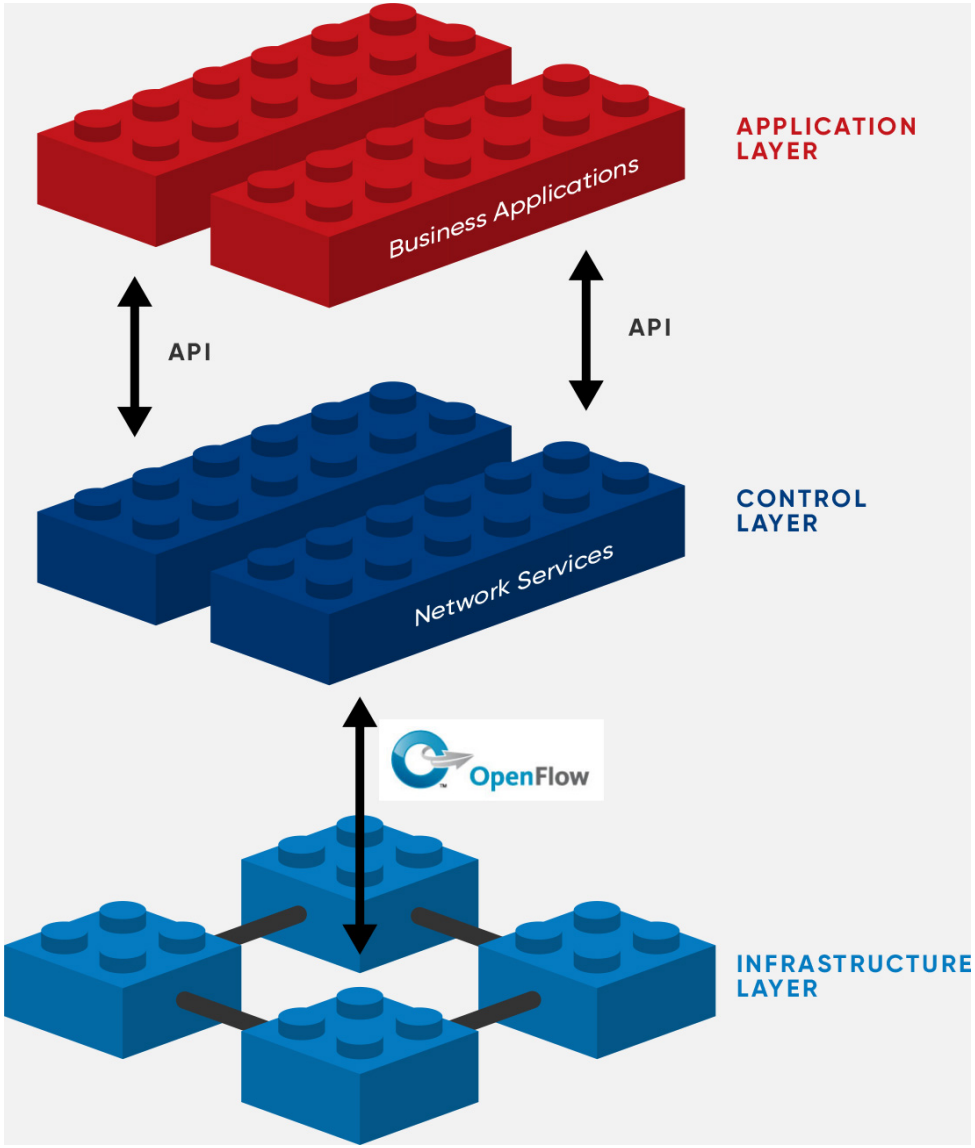
# Software-Defined Networking

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 ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# Software-Defined Networking



Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# 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.

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# 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

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# 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

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# 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

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# 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

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# 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.)

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# 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!

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# 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.

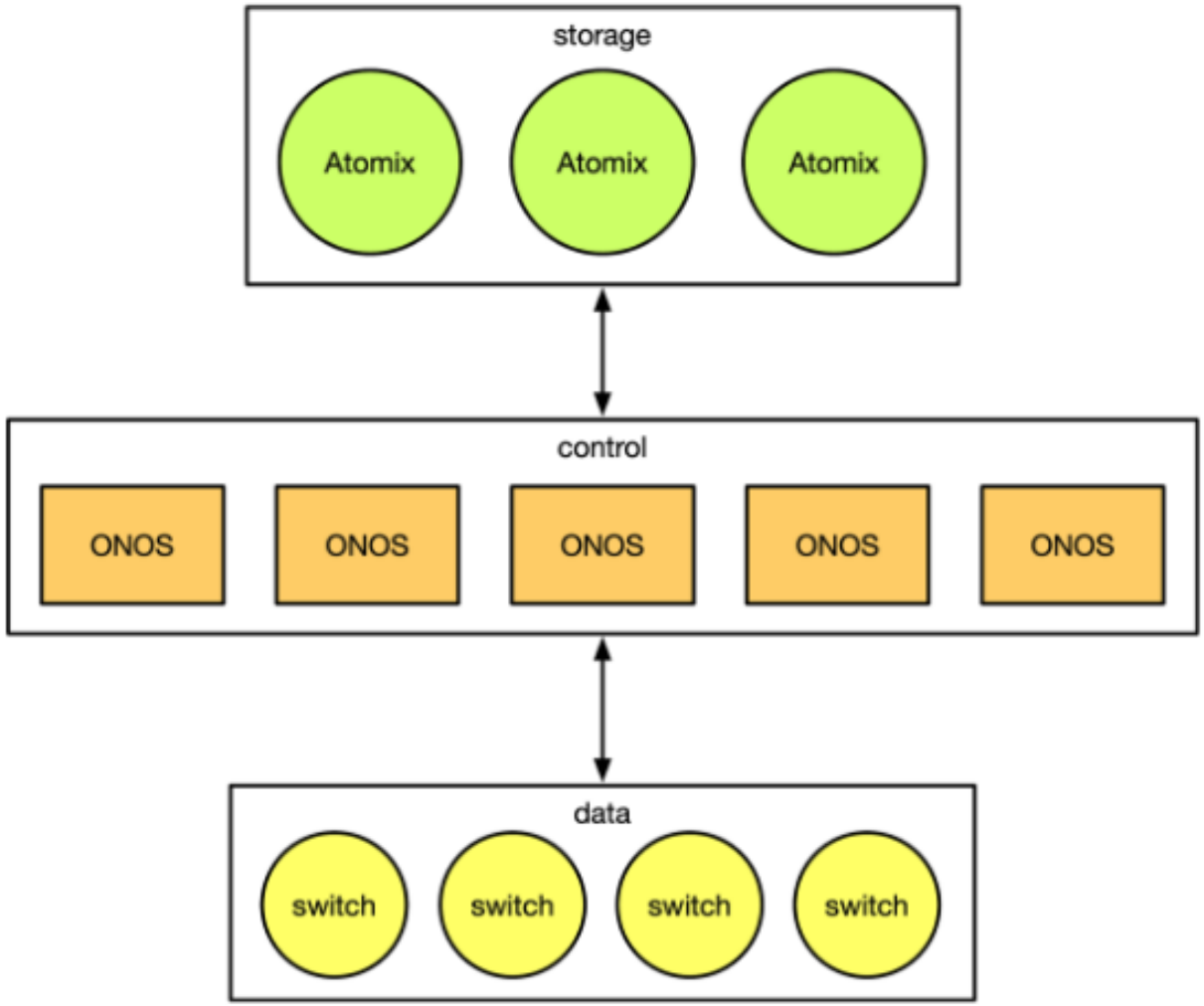
Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# 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

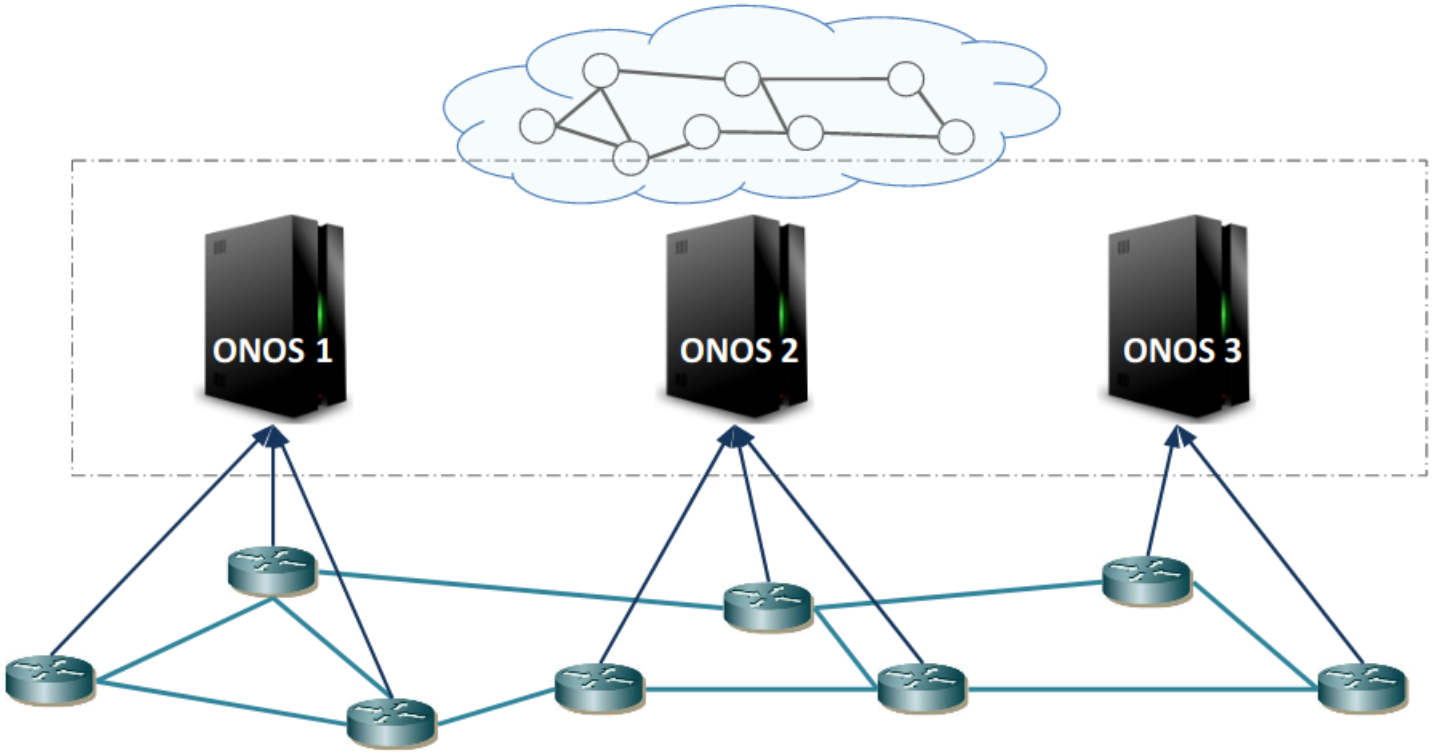
Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# ONOS Clustering



Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# How Devices connect



Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

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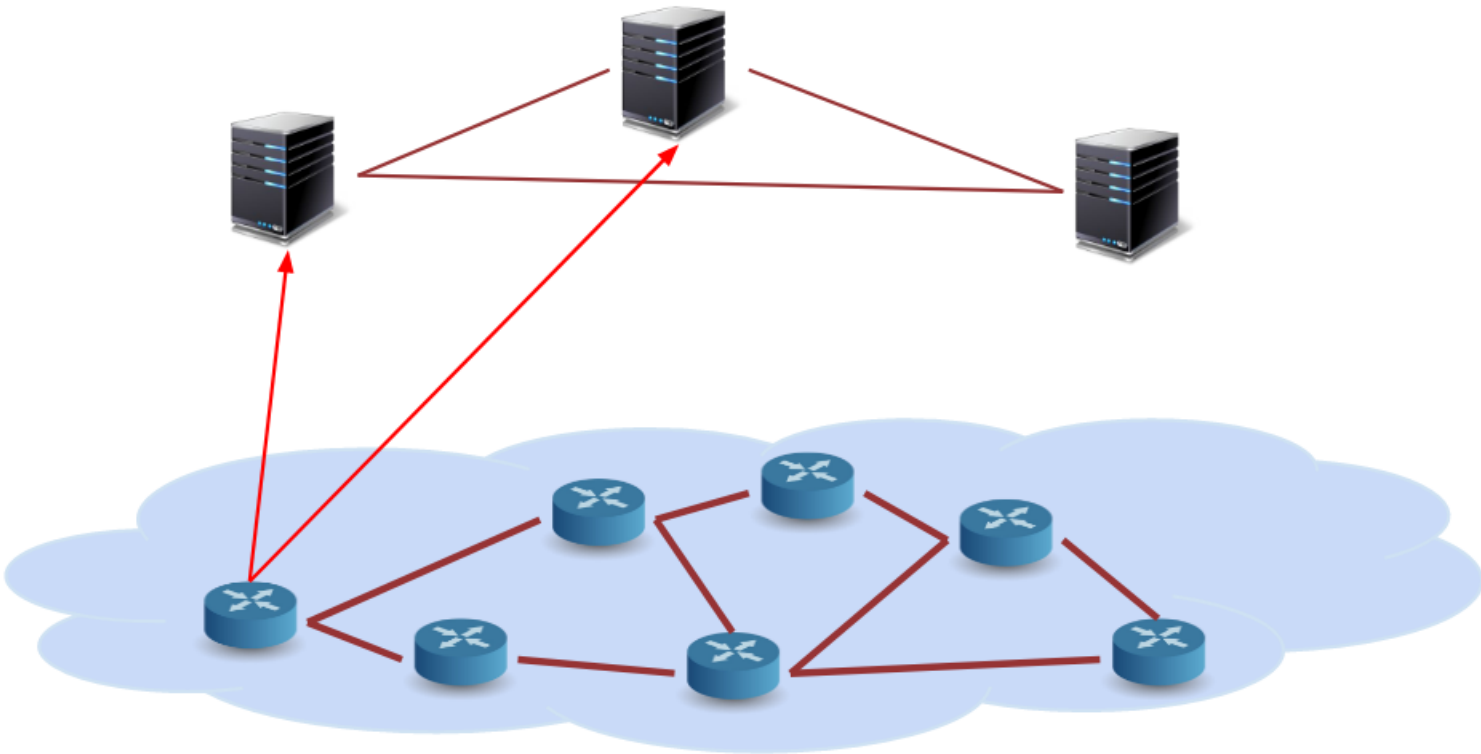

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

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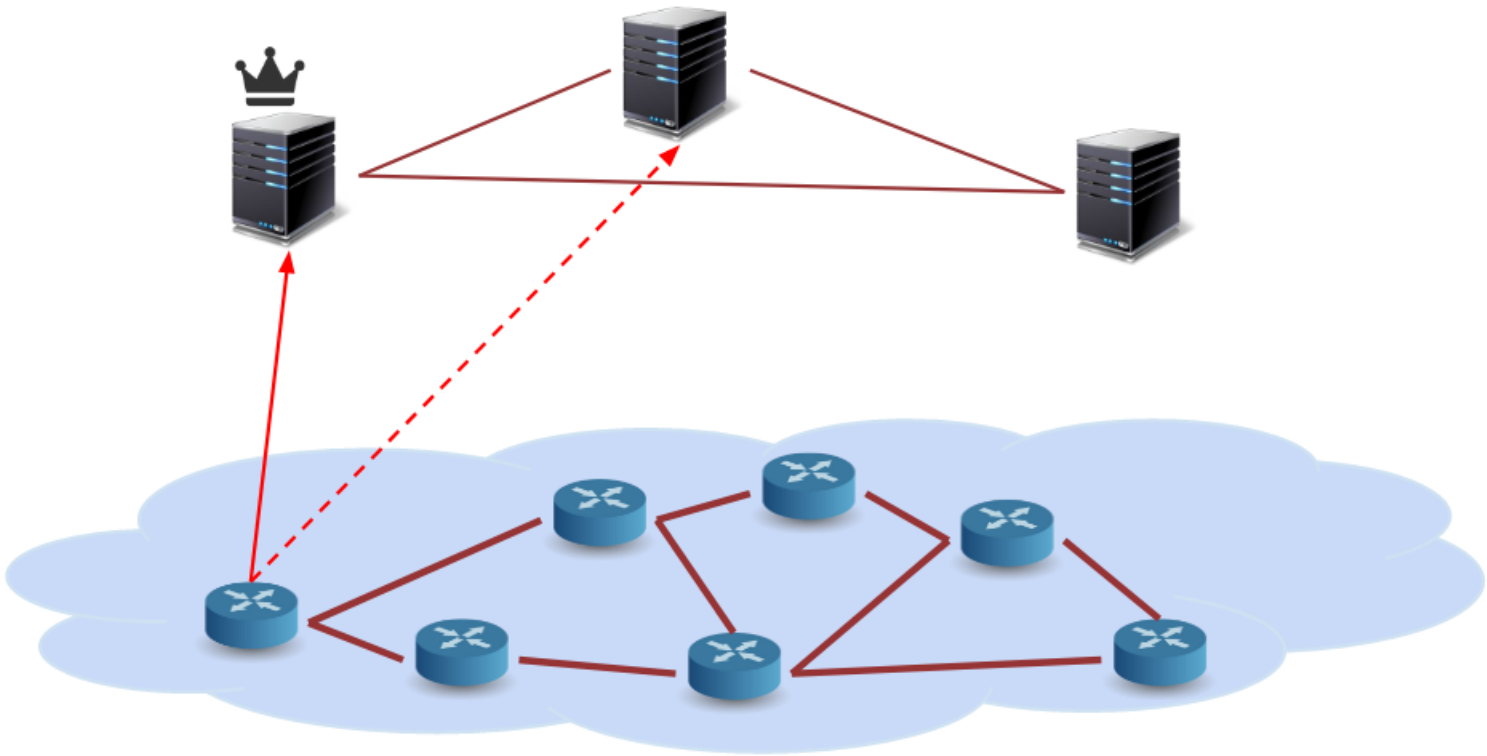

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

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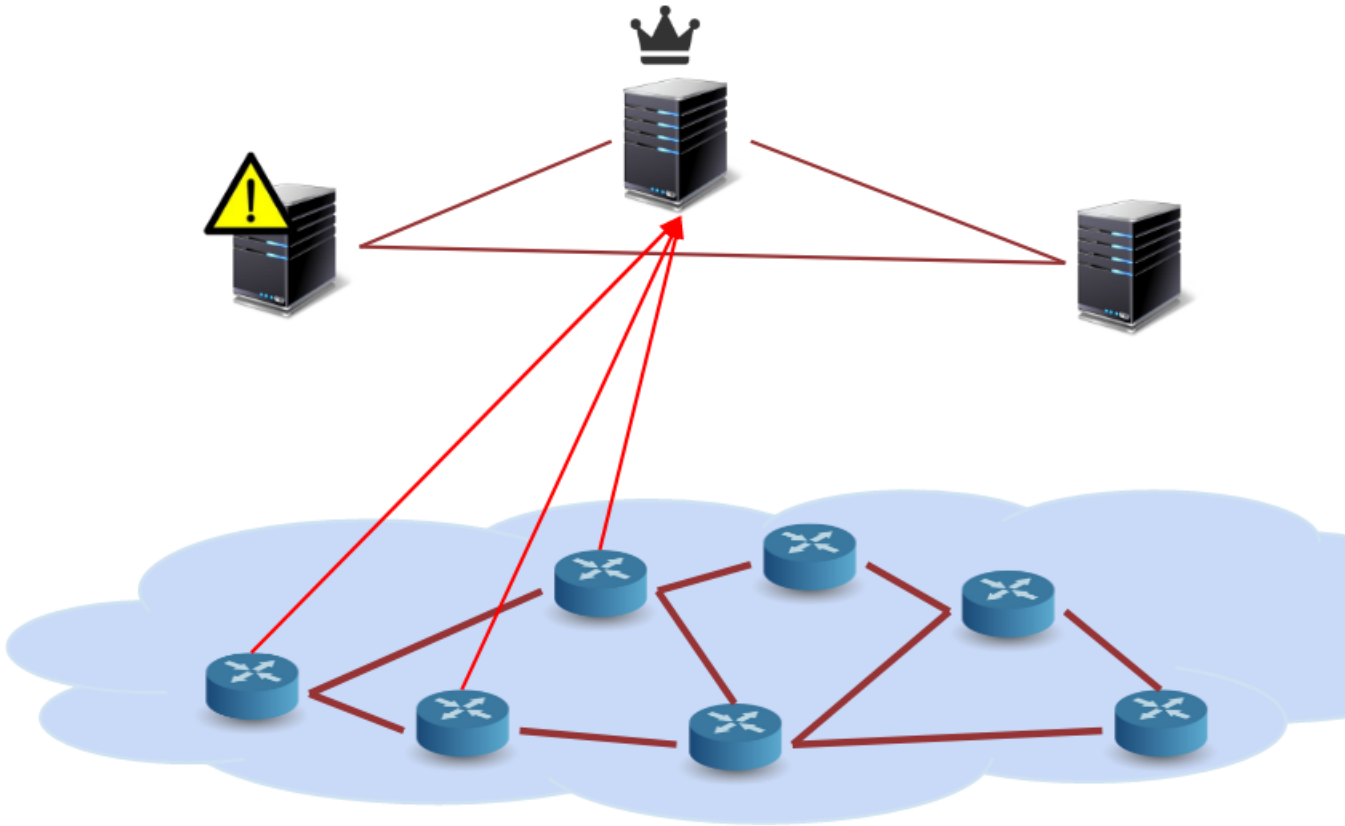

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# Clustering Demo

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

# 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*

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

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

Introduction to ONF
Operator Led
CORD
Reference Design Strategy
ONF Solutions
Introduction to Software-Defined Networking
Introduction to ONOS
Architectural principles
Retrospective
Use Cases
Clustering
Devices Connection
Demo
Slides

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