Trellis Bare Metal Switches From Edgecore

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Open Networking Solution Engineer, Edgecore Networks
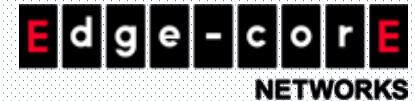
November, 9 2017

Phil Huang 黃秉鈞

- Edgecore Networks Solution Engineer
  - Big Switch Networks / Cumulus Linux / Pica8
  - R-CORD / VOLTHA / Trellis / P4
- ONF Ambassador Steering Team
  - Focus APAC Region

Accton and Edgecore

- **Leading Network ODM**
- **> 3,300 employees worldwide, > 700 network engineers**
- **High volume manufacturing facilities in China and Taiwan**

- **Go-to-market subsidiary of Accton**
- **Full portfolio of traditional and open network products**
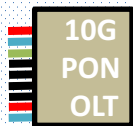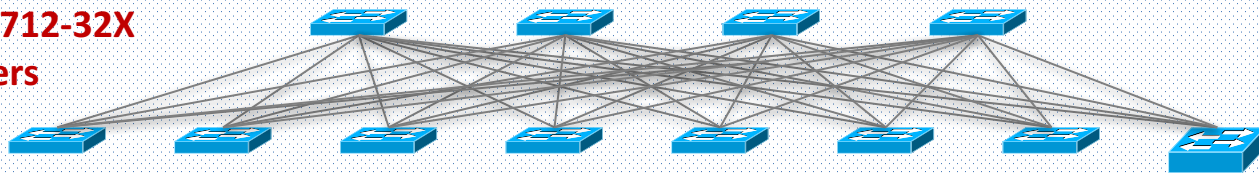- **Leading contributor of network designs to OCP**

Edgecore Switches for Trellis

Leaf-Spine Fabric: 1G, 10G, 40G, 100G Open Network Switches

40G: AS6812-32X
100G: AS7712-32X
Many others

| 10G PON OLT | MEF Edge Switch | DOC SIS | RAN Agg |

OLT: ASXvOLT16   **AS5912-54X**   **10G: AS5912-54X**

ONOS Open Source Controller

BGP App   **Network App**   **Control App**

ONAP / XOS Cloud Management and Service Orchestration

onf
Open Networking Foundation

ONOS
Open Network Operating System

Attribution: Open Networking Foundation

Edgecore Switches for Trellis are
<u>Open</u> and <u>Disaggregated</u>

"Open"

Open Indicates Open Source software components **<u>AND</u>** Open Source hardware design

"Disaggregated"

Disaggregated indicates the software has been somehow separated from the hardware

- Does not necessarily indicate "Open Source"
- Does not indicate where this separation has taken place

Open Hardware Designs

Sponsor + Community
definition

Vendor
definition and design

*Product definition and design
completely done in the OPEN*

OPEN
PLATINUM

TELECOM INFRA PROJECT

Release to Community

Edge-corE
found in the file.
NETWORKS
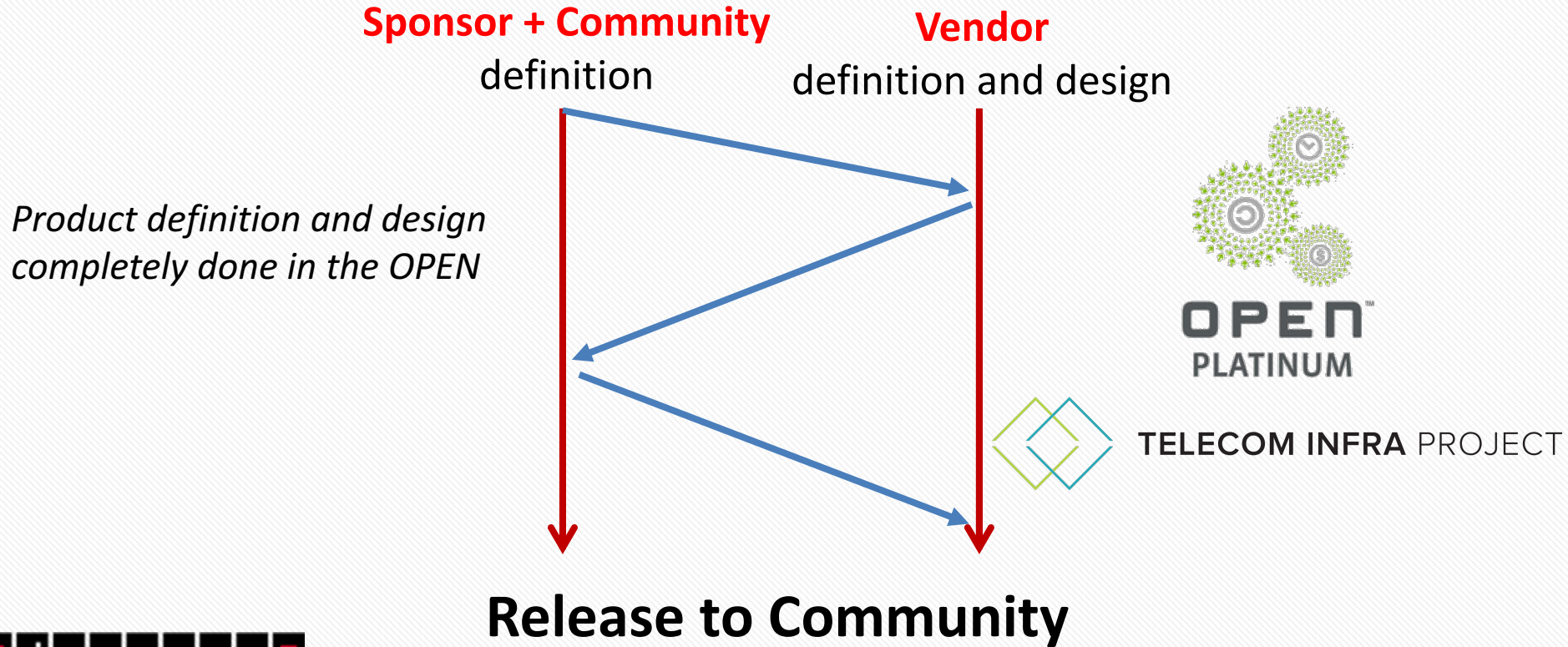
Open Source Design Contributions to OCP&TIP

OCP-ACCEPTED™ DC and Telecom Products

• **1G Rack Mngmt Switch**	**Helix4**
• **10G TOR Switch**	**Trident II+**
• **40G Spine Switch**	**Trident II+**
• **100G TOR & Spine Switch**	**Tomahawk+**
• **100G TOR & Spine Switch**	**XPliant**
• **10G/100G Edge Switch**	**Qumran**
• Open Rack Switch Adapter	

Design Contributions

▪ **100G OMP800 Chassis**	**Tomahawk**
▪ **100G OMP1600 Chassis**	**Tomahawk**
▪ **25G TOR Switch**	**Tomahawk+**
▪ **64 x 100G Spine Switch**	**Tomahawk II**

Partner Designs, Edgecore Product

TELECOM INFRA PROJECT

▪ Wedge40-16X	Facebook
▪ Wedge100-32X	Facebook
▪ Wedge100BF-32X	Barefoot
▪ Wedge100BF-65X	Barefoot

Design Contribution
Nov 8, 2017

▪ **AS7816-24C**

AT&T Spec, Edgecore Design Contribution

▪ ASFvOLT16 10G OLT   BCM Qumran & Maple

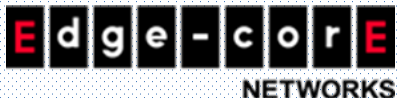## OCP-ACCEPTED™ Access Products

▪ **1G PoE Switch**	**Helix4**
▪ 802.11ac Wave1 Wi-Fi APs	BCM

Design Contributions

▪ 802.11ac Wave2 Wi-Fi APs   QCA

OPEN™ PLATINUM

Edge-core NETWORKS
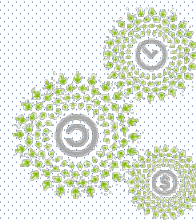
Green = Trellis Support

Disaggregated Software

Enabling Deliverables

Diagnostics

onie

Open BMC
Vendor BMC

Open Network Linux
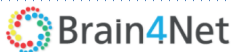
ubuntu core

RedFish
HW Mgr API

OOM

sFlow Agent

1. Commercial Disaggregated Software Partners

Enterprise	Packet Broker	Data Center Fabric	Service Provider
Pluribus NETWORKS	ixia	BROADCOM	DRIVENETS
PICA8 WHITE BOX SDN	NETSCOUT	CUMULUS	ip infusion
ADARA		snaproute	rtbrick
Brain4Net	big switch networks		exaware
			VOLTA Networks

2. Open Source Software

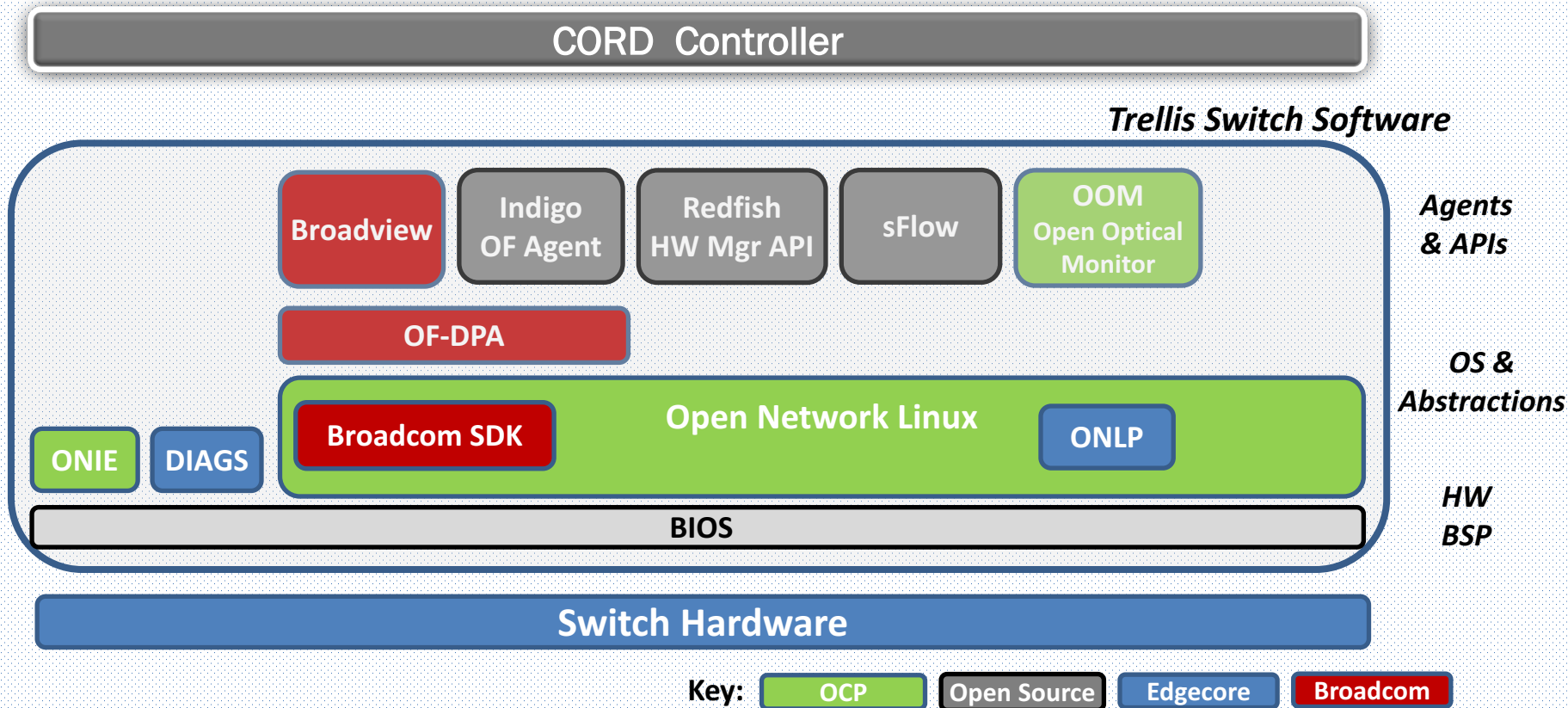SAI   SONiC   P4   Open Switch   CORD Central Office Re-architected as a Datacenter

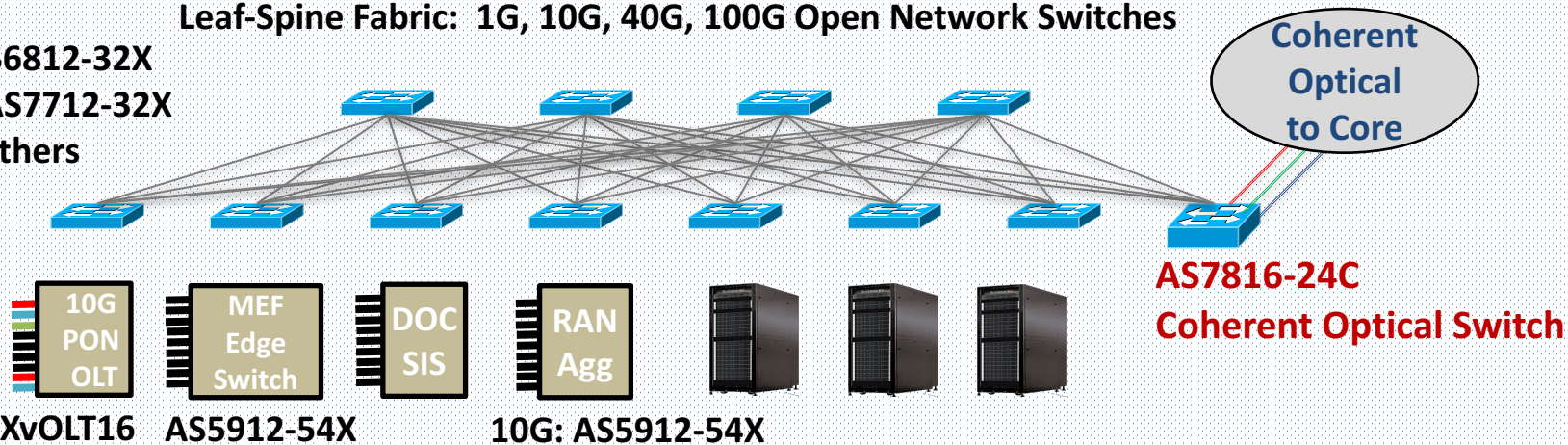Edge-core NETWORKS

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Edgecore Switch Software for Trellis

Edgecore Switches for Trellis

Leaf-Spine Fabric: 1G, 10G, 40G, 100G Open Network Switches

40G: AS6812-32X
100G: AS7712-32X
Many others

Coherent Optical to Core

AS7816-24C Coherent Optical Switch

10G PON OLT   **MEF Edge Switch**   **DOC SIS**   **RAN Agg**

OLT: ASXvOLT16   AS5912-54X   10G: AS5912-54X

ONOS Open Source Controller

BGP App   **Network App**   **Control App**

ONAP / XOS Cloud Management and Service Orchestration

ONOS
Open Network Operating System

Attribution: Open Networking Foundation

AS7716-24C: Coherent Optical Switch

- **Contribution of Open Optical Packet Transport (OOPT) to TIP**
- 3.2 Tbps Switch: based on Broadcom Tomahawk+
- 16 x 100G QSFP28 Ethernet interfaces plus eight Module Slots
- Modules: flexibility to mix Ethernet & Optical ports, ACO/DCO technologies
  1. 2 x QSFP28 100GbE with MACsec
  2. 100G/200G CFP2 w MACsec supporting DCO pluggables, incl Acacia AC200 CFP2-DCO Module
  3. 100G/200G CFP2 w NTT Electronics ExaSPEED 200 DSP supporting ACO pluggables from Finisar and others
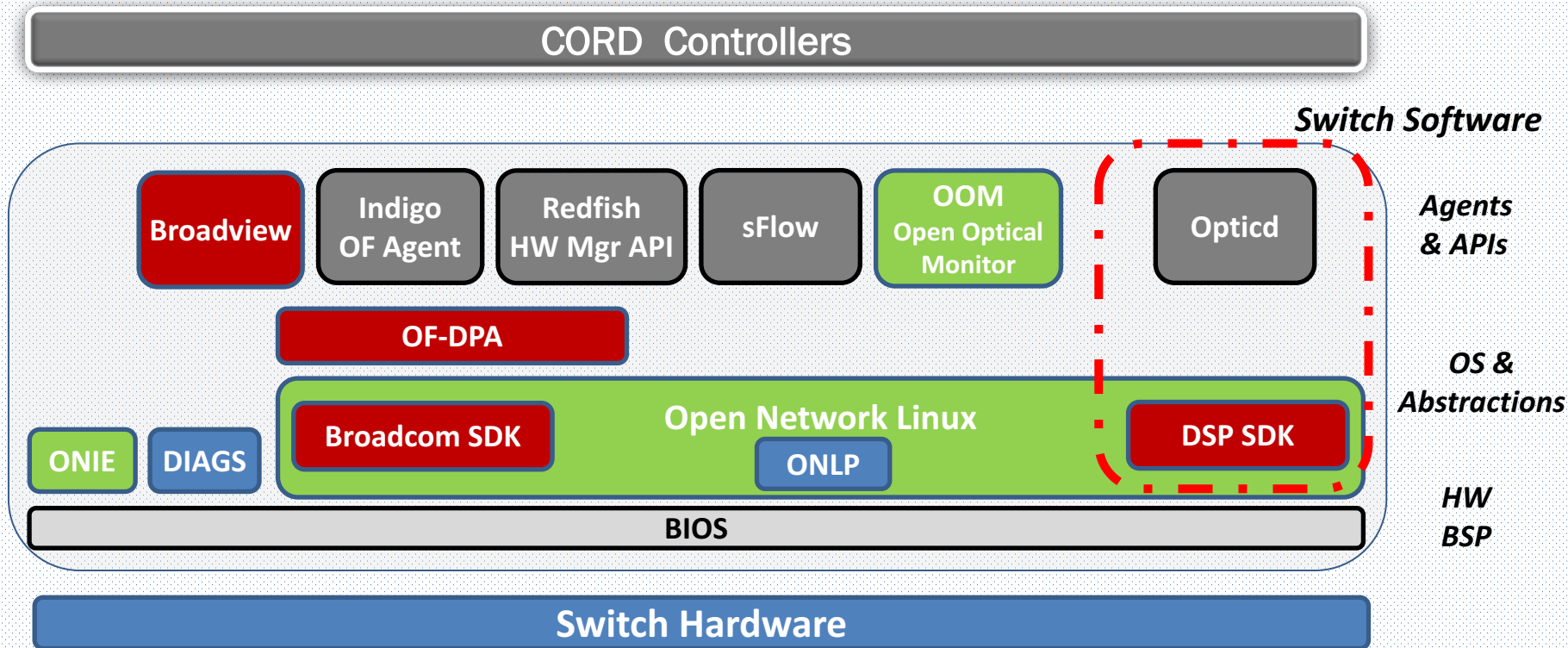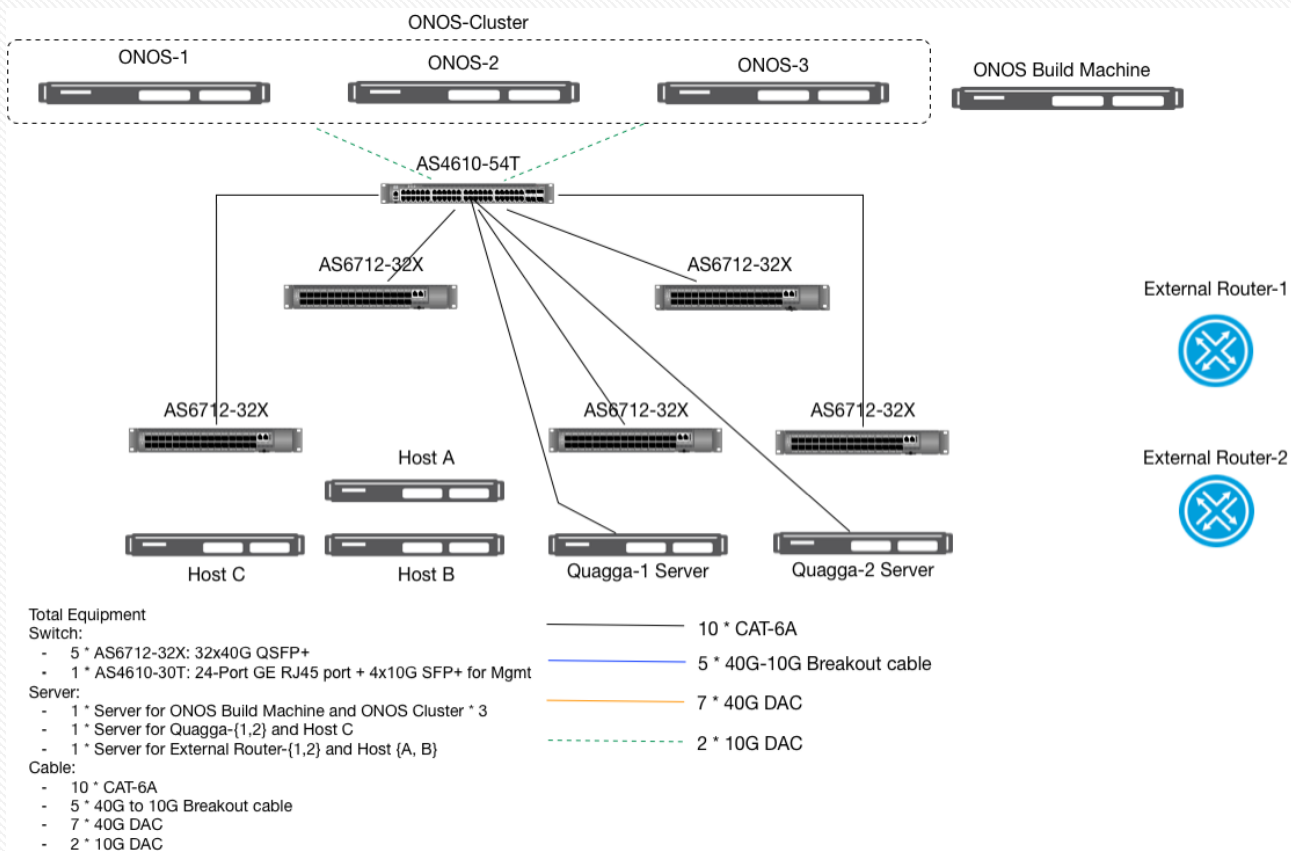 4. Other ACO/DCO modules

TELECOM INFRA PROJECT

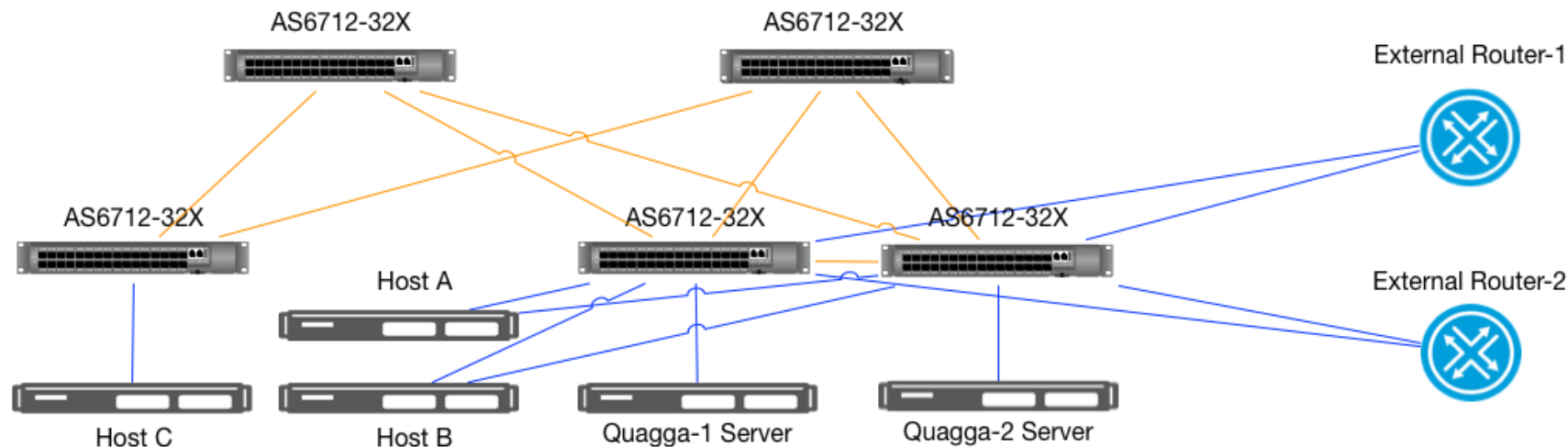
1.5 RU

Edgecore Switch Software for CORD Trellis

CORD Controllers

Switch Software

Broadview | Indigo OF Agent | Redfish HW Mgr API | sFlow | OOM Open Optical Monitor | Opticd

Agents & APIs

OF-DPA

OS & Abstractions

Open Network Linux
Broadcom SDK | ONLP | DSP SDK

ONIE | DIAGS

BIOS

HW BSP

Switch Hardware

Key: OCP | Open Source | Edgecore | Closed

Control Plane

ONOS-Cluster

ONOS-1   ONOS-2   ONOS-3   ONOS Build Machine

AS4610-54T

AS6712-32X   AS6712-32X

External Router-1

AS6712-32X   AS6712-32X   AS6712-32X

Host A

Host C   Host B   Quagga-1 Server   Quagga-2 Server

External Router-2

Total Equipment
Switch:
- 5 * AS6712-32X: 32x40G QSFP+
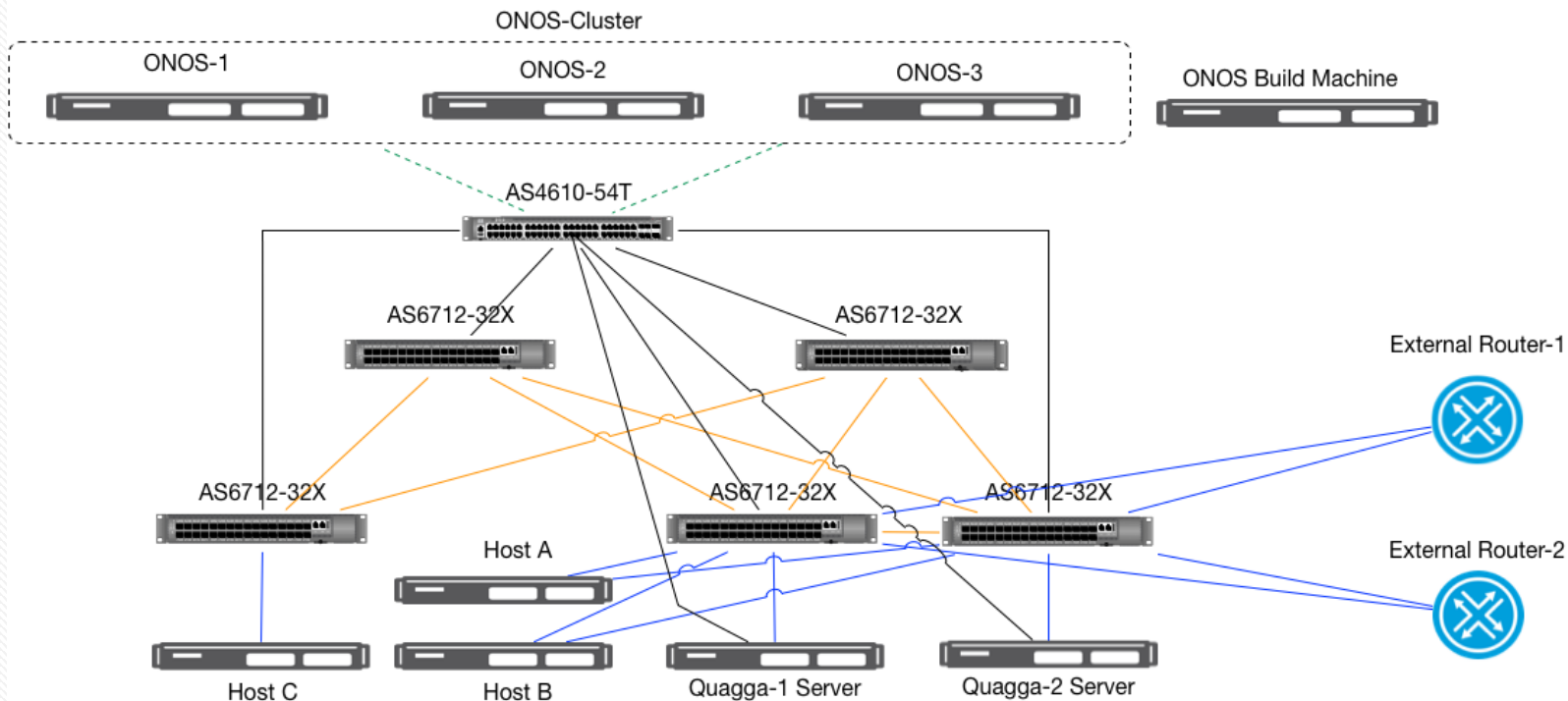- 1 * AS4610-30T: 24-Port GE RJ45 port + 4x10G SFP+ for Mgmt
Server:
- 1 * Server for ONOS Build Machine and ONOS Cluster * 3
- 1 * Server for Quagga-{1,2} and Host C
- 1 * Server for External Router-{1,2} and Host {A, B}
Cable:
- 10 * CAT-6A
- 5 * 40G to 10G Breakout cable
- 7 * 40G DAC
- 2 * 10G DAC

10 * CAT-6A

5 * 40G-10G Breakout cable

7 * 40G DAC

2 * 10G DAC

Data Plane

Total Equipment
Switch:
- 5 * AS6712-32X: 32x40G QSFP+
- 1 * AS4610-30T: 24-Port GE RJ45 port + 4x10G SFP+ for Mgmt
Server:
- 1 * Server for ONOS Build Machine and ONOS Cluster * 3
- 1 * Server for Quagga-{1,2} and Host C
- 1 * Server for External Router-{1,2} and Host {A, B}
Cable:
- 10 * CAT-6A
- 5 * 40G to 10G Breakout cable
- 7 * 40G DAC
- 2 * 10G DAC

Legend:
- 10 * CAT-6A
- 5 * 40G-10G Breakout cable
- 7 * 40G DAC
- 2 * 10G DAC

Trellis Arch

? onos

10.10.10.1
✓ 10.10.10.1
Devices: 2

10.10.10.2
✓ 10.10.10.2
Devices: 2

10.10.10.3
✓ 10.10.10.3
Devices: 1
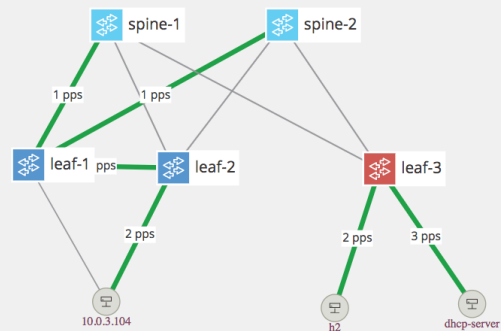
ONOS Summary

Version :	1.11.2*
Devices :	5
Links :	14
Hosts :	3
Topology SCCs :	1
Intents :	0
Tunnels :	0
Flows :	155

spine-1   spine-2

1 pps   1 pps

leaf-1   pps   leaf-2   leaf-3

2 pps   2 pps   3 pps

10.0.3.104   h2   dhcp-server

Thank You