Open – Disaggregated Networking

OCP Japan Meet Up

George Tchaparian, CEO Edgecore Networks

June 27, 2019

Tokyo
Presentation Flow

• Briefly: What is Open – Disaggregated Networking?
  • Open Networking Value Proposition

• Why OCP and “More of” Open Networking?

• Edgecore Networks – Who are we?
  • Edgecore Open Networking Value Proposition
  • Few New (sample) Products Introduction

• Q&A
Switch, Component Ecosystem and OCP

Mgmt Software
Network OS
Drivers
Box / Mechanical
Silicon

Single Vendor Closed Product
“Black Box”

Legacy Networking (Past)

Traditional Networking (Today)

Orchestration
SDN Applications

Open Source
Network Stack/NOS/
Control and
Management Plane

Bare Metal – White Box
(Market Shift ....Tomorrow)

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Cost Reduction ....and more!

Proprietary Chassis

- Proprietary Stack (ASIC, HW, SW)
- Expensive
- Complex /Slow
- Scale UP
- Vendor Lock In

30%-50% Lower Cost

SDN Controller

SDN Applications

Control Plane

Data Plane

Folded Clos

Open Virtual Chassis

Leaf
Leaf
Leaf
Leaf
Presentation Flow

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• Q&A
AI & Edge Computing in 5G Era
The adoption of 5G, AI, and Edge Computing will drive new expectations for:

- always-on,
- low to no latency,
- high quality network and services,
- which will lead to operational efficiency (OPEX reduction) and boost ultra-low latency and intelligent applications.

To honor the promise with the right CAPEX, it is vital to have the proper compute infrastructure in place, aligned to the right strategy, like, Openness, Whitebox, Disaggregation, Automation, etc.
What upgrades are needed for 5G?

- **BBBU** >> RU, CU, DU
- **Fronthaul** >> RoE
- **Aggregation** >> 100/400G
- **Cell Site Gateway** >> 10/25G/100G
- **Core** >> 400G +
How will these **product upgrades** be delivered?

- Openness
- Disaggregation
- Whitebox
- OCP Work Groups / Community DevOps
OCP Community Work .... At Work!

Telco
HW

Hardware Management
RunBMC

Networking
Software

Edgecore AS7316-26

Hardware Management
Redfish Profiles

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Cross Pollination = “A sharing or interchange of knowledge, ideas, etc., as for mutual enrichment;”
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Accton and Edgecore

- #1 Network ODM
- Founded 1988, IPO Taiwan 1995
- ~ 700 network engineers
- Manufacturing: Taiwan (TAA Compliant) and China

Edgecore Accton’s brand business

- Wholly owned subsidiary of Accton Group
- Go-to-market business to network operators - DC, Telecom, and Enterprise
- Manages SW Dev. R&D, customer, partner and open community relationships
- Leading contributor of network designs to OCP
- TIP and LF Active participant – contributor
- ONF – Charter Partner and leading ONF Strategic Initiative – Building Reference Designs (HW and SW).
Edgecore Open Networking

• Open Hardware Leadership
• Open Software Value / Enablement Leadership (Ecosystem Partnership)
• Integration (Ecosystem Partnership)
Most Network Design Contributions to Open Source

*Industry Firsts: 10G to 400G DC switches, New Telco/MSO Use Cases*

**OCP-Accepted™ Designs & Products**

<table>
<thead>
<tr>
<th>Design</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1G Rack Mgmt Switch</td>
<td>Helix4</td>
</tr>
<tr>
<td>10G TOR Switch</td>
<td>Trident II</td>
</tr>
<tr>
<td>40G Spine Switch</td>
<td>Trident II</td>
</tr>
<tr>
<td>100G TOR &amp; Spine Switch</td>
<td>Tomahawk</td>
</tr>
<tr>
<td>100G TOR &amp; Spine Switches</td>
<td>Trident3</td>
</tr>
<tr>
<td>64 x 100G Spine Switch</td>
<td>Tomahawk II</td>
</tr>
<tr>
<td>32 x 400G</td>
<td>Tomahawk III</td>
</tr>
<tr>
<td>10G/100G Edge Switch</td>
<td>Qumran</td>
</tr>
<tr>
<td>Open Rack Switch Adapter</td>
<td></td>
</tr>
</tbody>
</table>

**Partner Designs, Edgecore OCP-Inspired™ Product**

<table>
<thead>
<tr>
<th>Design</th>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>Wedge40-16X</td>
<td>Facebook</td>
</tr>
<tr>
<td>Wedge100-32X</td>
<td>Facebook</td>
</tr>
<tr>
<td>Wedge100BF-32X</td>
<td>Barefoot</td>
</tr>
<tr>
<td>Wedge100BF-65X</td>
<td>Barefoot</td>
</tr>
</tbody>
</table>

**Design Contributions in OCP Review**

<table>
<thead>
<tr>
<th>Design</th>
<th>Model</th>
</tr>
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<tbody>
<tr>
<td>100G OMP800 Chassis</td>
<td>Tomahawk</td>
</tr>
<tr>
<td>100G OMP1600 Chassis</td>
<td>Tomahawk</td>
</tr>
<tr>
<td>25G TOR Switch</td>
<td>Tomahawk</td>
</tr>
<tr>
<td>MiniPack AS8000</td>
<td>Tomahawk III</td>
</tr>
</tbody>
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**OCP Telco Working Group**

<table>
<thead>
<tr>
<th>Design</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASXvOLT16 10G OLT</td>
<td>BCM Qumran &amp; Maple</td>
</tr>
<tr>
<td>AS7316-26XB Cell Site Gateway</td>
<td>QumranAX</td>
</tr>
<tr>
<td>AS7926-40XX and -80XX Aggregation Routers</td>
<td>Jericho2 in OCP Review</td>
</tr>
</tbody>
</table>

**OCP-Accepted™ Access Products**

<table>
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<th>Design</th>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>1G PoE Switch</td>
<td>Helix4</td>
</tr>
<tr>
<td>802.11ac Wave1 Wi-Fi APs</td>
<td>BCM</td>
</tr>
<tr>
<td>802.11ac Wave2 Wi-Fi APs</td>
<td>QCA</td>
</tr>
</tbody>
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**Leadership in Open Networking Community**

- VP Technology, Jeff Catlin on Incubation Committee
- CEO, George Tchaparian co-chair of OCP Taiwan
- 1st & leading contributor to Network Group
- Designs for new use cases in Telco Project
- Support all OCP Software/Firmware

- CEO, George Tchaparian on ONF Board
- Member since 2014, Partner since 2018
- Edgecore hardware basis for CORD
- Contributing to all four (4) ONF Reference Designs

- Active Member
- Contributed Cassini packet transponder
- Integrating optical technology from leading partners
- 1st contributor to DCSG (TIP) cell site gateway project
Open Networking Community

ONF Operator Partners

AT&T
China Unicom
T
COMCAST
Google
NTT Group
Türk Telekom
Open Networking Roadmap
Technology Focus - Places in the Network

- **5G Switch**
  - Fronthaul
- **Cell Gateway**
  - Backhaul
- **High Scale Deep Buffer Switch**
  - Aggregation/Core
- **Leaf/Spine & Edge**
  - DC and Enterprise
  - Nephos
- **PON OLTs**
  - Wireline Access
- **Optical Packet Transponder**
  - Data Center Interconnect

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MINIPACK AS8000

Industry’s First 400G Open Network Switch
Optimized for Spine Applications

<table>
<thead>
<tr>
<th>Features</th>
</tr>
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<tbody>
<tr>
<td>8 Slot Small Form-Factor</td>
</tr>
<tr>
<td>16x 100G QSFP28 / 8x200G QSFP-56 or 4x 400G QSFP-DD</td>
</tr>
<tr>
<td>Broadcom XGS Tomahawk III BCM56890 12.8Tb</td>
</tr>
<tr>
<td>64MB Packet Buffer</td>
</tr>
<tr>
<td>Xeon D-1527 processor 4-Core 2.2 GHz</td>
</tr>
<tr>
<td>32GB DRAM, 256MB Flash, 32GB SSD</td>
</tr>
<tr>
<td>AC and DC Power Options</td>
</tr>
<tr>
<td>4RU</td>
</tr>
<tr>
<td>Cumulus, SONiC</td>
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Planning Phase:
100G Available Q3 2019
400G Available Q4 2019

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Edgecore Open Networking for Telecom

**Data Center – CSP / Enterprises:**
- Leaf and Spine Fabrics
- 1GE to 400GE
- DCI – Packet Transponder

**Telecom/MSO:**
- Deep Buffer Large TCAM – Edge Switches
- Open OLTs, XGS-PON and GPON
- Cell Site Gateways – OCP and TIP
- Fronthaul / Backhaul Switches
- Aggregation / Core Routers

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THANK YOU