Advancing Open Architectures to Build Your Server Room

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Converging of Markets

Communication Markets
- NFV/SDN/5G
- Cable/Telecom
- Mobile Edge Computing
- IoT Infrastructure
- Multi-Access Edge Compute

Video & Media Processing

Adjacency Markets
- Defense
- Mining / Industrial
- Transportation
- Private Cloud
- Enterprise
Needs vs. Value vs. Cost

• Appliance vs. Rack level Architectures?

• Silicon requirements now vs. future?

• Requirements for placement?

• Build-out, Life Cycle Management?

• Vendor Lock-in?

• Proprietary vs. Open?
Open Architectures & Committees

Double Edged Sword
What is the right fit?
Looking back – We’ve come a long way

Rack & Stack
Larger Blade Servers
Top of Rack with higher throughput
OCP and Open Architectures

2004
- 2U server
- PCI-X NIC
- 2x GbE
- 20 servers/rack

2008
- 1U server
- PCIe NIC
- 4x GbE
- 30-40 servers/rack

2012
- 10U blade/modular server
- 10 GbE
- 40-64 servers/rack

2016
- OCP with 2U sleds
- 2x10GbE → 2x25GbE
- 68 servers/rack

2021
- 400GbE?
- 100’s of thousands of VMs?
- Photonics backplane?
- Self Healing?
- Reduced power?
My Checklist -> Future Proofing

- Mix-and-Match Compute Networking Security & Storage
- Hybrid Fabric with Native SDN/OF/NFV Support
- Scalable Multi-100 Gbps + Internal and External Bandwidth
- Common Modular Building Blocks
- Low-Cost, Dense, Configurable, Energy Efficient
- Agnostic to Silicon Vendor and Rack Architecture

Reusable & Scalable Architecture
RSA -> RSD -> Open architectures

Intel’s early vision of RSD evolution to Full Aggregation
Carrier Grade Platform Evolution

Proprietary -> Open Architectures
Standards driven Platforms (ATCA)
Lower TCO
Large mix of eco-system participants
Utilization of Central Office for Edge
Scale, density and cost effectiveness

ATCA / Carrier-Grade Appliances
2001 to Now

Proprietary
1990’s to Now

OCP OpenRack
Now to future
Anatomy of an Open OCP – CG system

Physical
• Suitable for CO retrofit, new telco data center environments & Data Centers
• 19” rack width and standard “RU” spacing for greatest flexibility
• 1000 to 1200mm cabinet depth, supporting GR-3160 floor spacing dimensions

Content/workload
• Heterogeneous compute and storage servers
• Built for SDN and Virtualized systems for optimal performance/ecosystem
• Eco-system for CPU, GPU, ARM, DSP and switching

Management
• Ethernet based OOB management network connecting all nodes via a TOR management switch
• Optional rack level platform manager

Networking/Interconnect
• One or more Ethernet TOR networking switches for I/O aggregation to nodes
• Fiber cables, hot-swappable blind-mate with flexible interconnect mapping.
• Environment, power, seismic & acoustic CO environmental requirements applicable
• Safety and other certification standards also applicable
• NEBS optional (L1/L3)
2017 Evolution of OCP Technology into Telecom

OCP-CG-OpenRack-19” Frame Level Specification

Half width

Full width

OCP-CG-OpenRack-19” Open Sled Specification

Sled Definition based on OCCERA

Enables additional container for sleds, components and partners for OCCERA growth/future
42U OpenRack Configuration

**42U OCP-CG OpenRack 19”**
- 600mm & 800mm wide rack options
- Power → 110/208VAC 3ph & 230/400VAC PDU -48VDC option as well
  - 3 PSU shelves provides 12 x 2500W PSU’s
- Management Switches (x2)
  - Switch #1: Connects 1G to each server BMC
  - Switch #2: Connects 1G to each server CPU
- Data Switches
  - 1 or 2 switches (up to 3.2 Tbps each)
  - 40G uplinks to spine switch, 10G downlink to each server
  - Option for 100G uplinks & 25G downlinks (v2.3)

**Standard Configurations**
- Balanced: 8x Compute (16 sleds) + 8x Storage
- Storage: 17x Storage Shelves
- Same components as 19U frame

Additional 12u frame size at our booth
Typical Rack Commissioning: 1-3 months

- Schedule contractors
- …Receive components
- …Schedule different contractors
- …Build rack
- …Schedule different contractors
- ….Install & test
...all gated around scheduled maintenance windows
With OCP-CG delivery: 3 Days

Telco OCP Derived Platforms
Pre-wired & tested rack core, sleds are FRUs with fully optical interconnect to ToR switches

Plug in Power

Connect to Spine

Slide in sleds...fast install...easy serviceability
Why OCP Open Frame / Open Architectures

- Simplified design
- Simple integrated rack
- Improved Serviceability, Reliability
- High density compute and storage
- Fewer racks, significant real-estate savings
- Integrated pooled power
- Improved redundancy
- Tool-less, wire-free design
- Significant operations savings
OCCERA – Open Architecture for Reuse

-Common Architecture, Extreme Throughput, HW Acceleration

CPU

NIC

GPU/
GPGPU

Specific Appliance card
(H/W accelerator/Security/DPI)

CSA-7200/7210
8 NIMs,
128 Eth Ports

Rich I/O

CSA-7400
4 Compute Nodes,
360G Throughput

High Compute Performance
& Throughput

CSA-7600
12 Compute Nodes
6.4T Throughput

Large Compute,
Performance &
Backplane

OCP
2 Compute Nodes,
NIMS, Storage

Leverages all key attributes

CPU

NIC

GPU/
GPGPU

Specific Appliance card
(H/W accelerator/Security/DPI)
OCCERA - Network Edge Portfolio

**OCP-CG Rack Core**
- Mix & Max Compute & Storage Sleds
- X2 Management Switches
- X2 Data Switches
- Balanced Solution:
  - 8x half width sleds 16 sleds 16 sockets
  - Optional full storage frame with 16x Storage sleds
- Roadmap = NVIDIA GPU, Marvell ARM

**CSA-7600 Orthogonal System**
- P1: New develop Switch Card with 8x100G+40x10G;
- P2: 4xE5+RRC as new Service card for double performance/density

**CSA-7400/7200 System**
- Introduction of next gen Intel Skylake
- Updates to Packetmanager
- RedRock Canyon Switching
- Into of GPU and ARM based sleds
- High throughput and Packet customization
- Mix/Match Sleds
Use Case - LifeLine DataCenters
Re-Purpose and building a Niche Market for jobs and Secure Clouds
LifeLine DataCenter, Indianapolis, Ind.

Level 4 of 5 FedRamp Certified – only 3 providers today
Throughput, Ease of Installation, Flexible and Open

Reusable Hardware Configurations:

**Config 1: Appliance for smaller customers:**
- SKU1: CSA-7400 - 4 CPU Node / 2 Switch Node
- SKU2: AMEC – GPU Edge Dev Kit
- SKU3: CSA-7600 – Orthogonal System

**Config 2: OCP Half Rack or Full Rack:**
- SKU 1: 100% Storage, 3 Switches
- SKU 2: 60% CPU 40% Storage 3 Switches

**Config 3 – GPU**
- SKU1: 4U Dev Kit Appliance
- SKU2: GPU OCP Full Rack, Half Rack
Conclusion

• **Open Standards/Architecture**: Lot’s to choose from – what works best? We’ve selected OCP OpenRack for scalability, flexibility and long-term viability

• **Collaboration & Open Architectures**: ADLINK believes in collaboration, open architectures while working with industry leading eco-system partners/committees

• **On-going dedication to OCP CG OpenRack 19”**: Content rich roadmap for converged markets with continued expansion of eco-system providers

• **Extreme Computing**: OCCERA is a base for many types of systems from 1U to 42U focusing on re-usability and scalability using open architectures