Advancing Open Architectures to Build Your Server Room

Jeff Sharpe, Director Product Strategy, ADLINK

Converging of Markets

ADLINK

Communication Markets

Adjacency Markets

NFV/SDN/5G
Cable/Telecom

Multi-Access
Edge Compute

Mobile
Wireline
Cable
IoT

IoT
Infrastructure

Video & Media
Processing

Converging Technologies
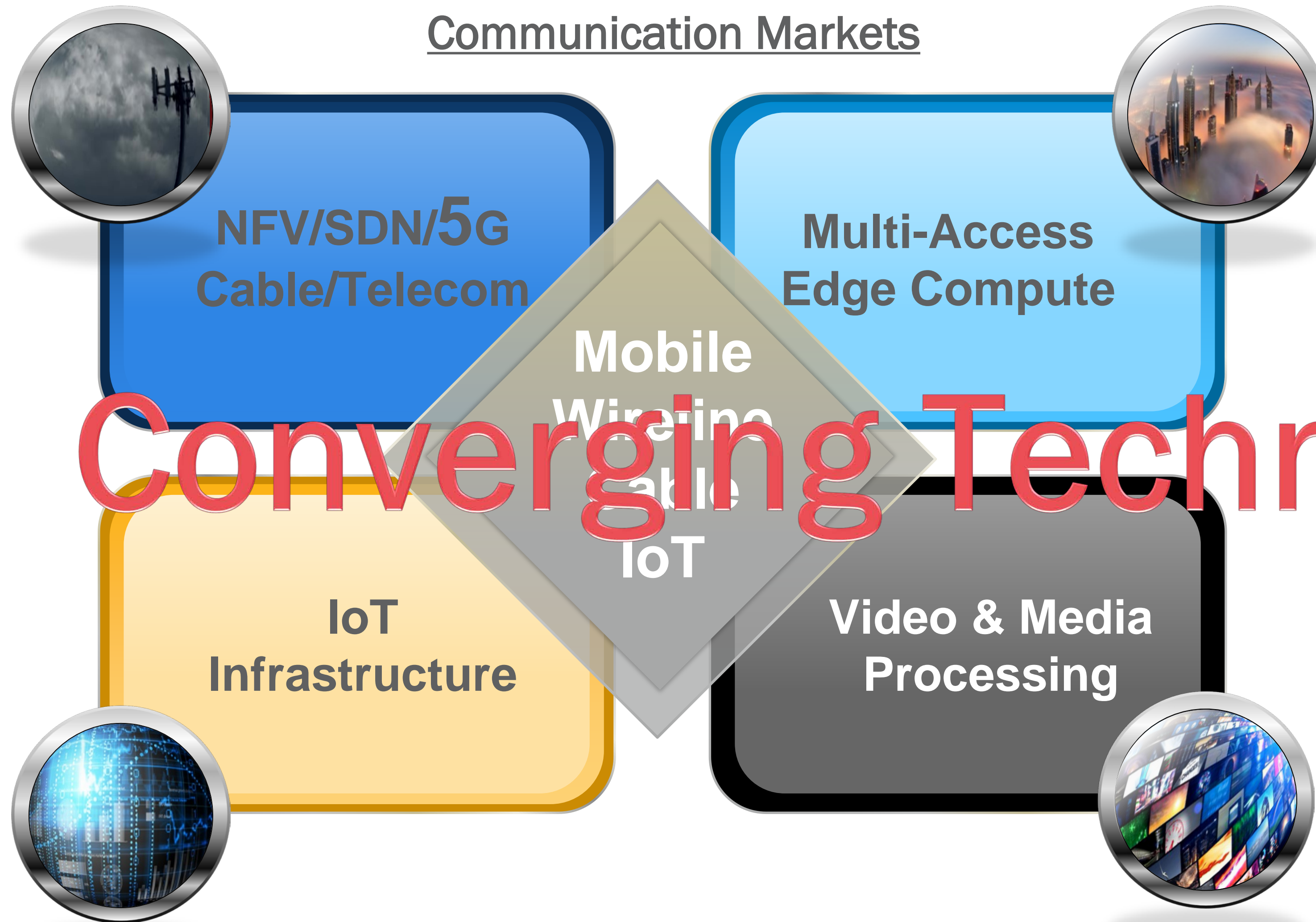
Defense

Mining /
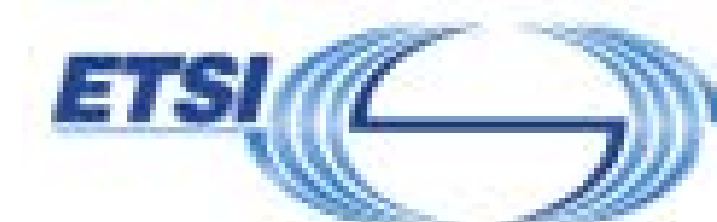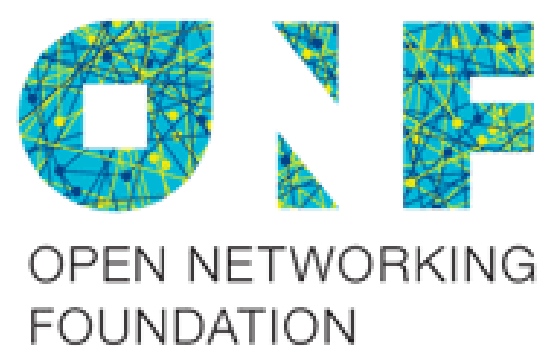**Industrial**

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?**

Cost?
Technology?
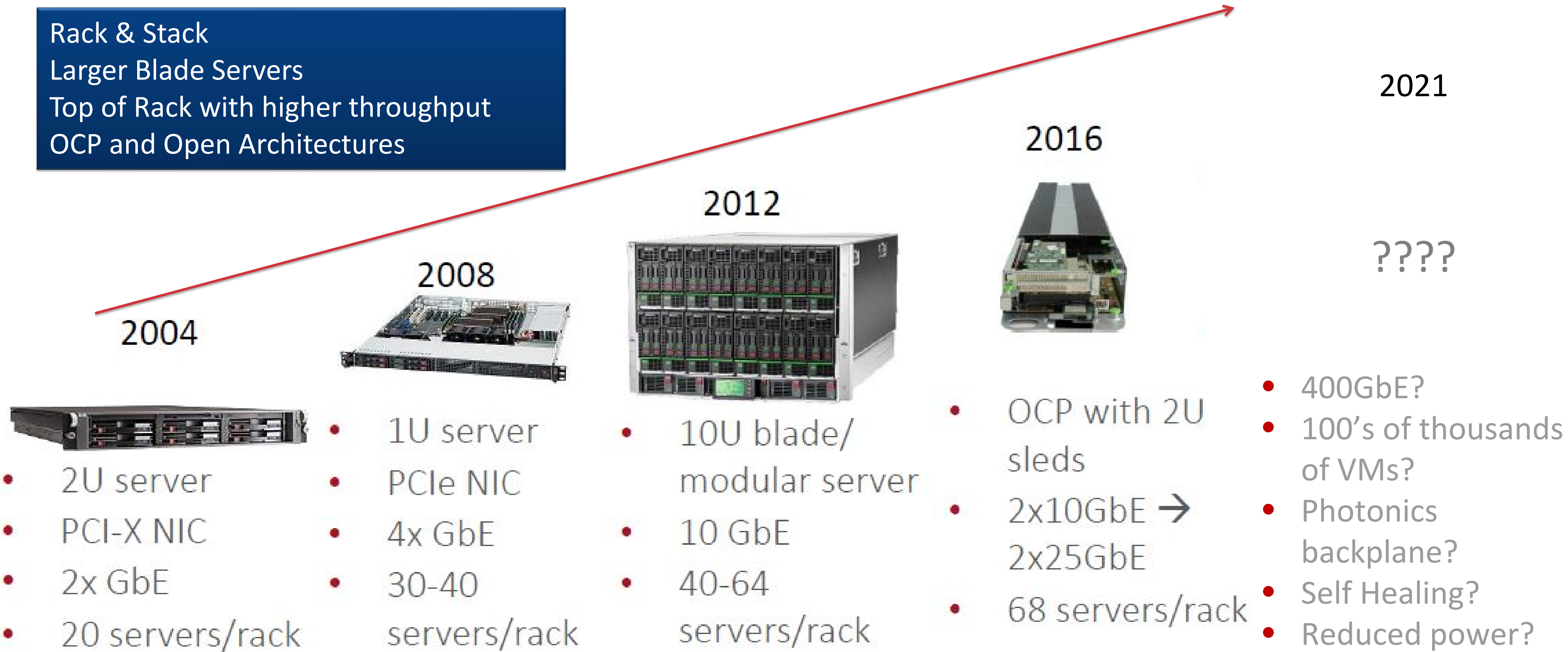Revenues?

Open Architectures & Committees

**Open Architectures/Committees
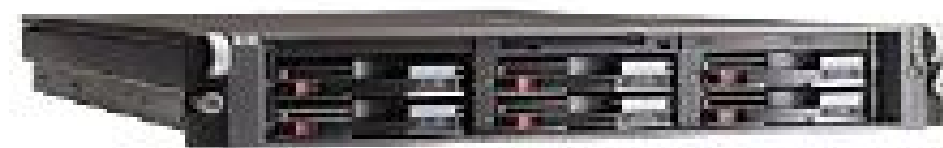Double Edged Sword
What is the right fit?**

Looking back – We've come a long way

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

2021

2016

2012

2008

2004

????

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

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

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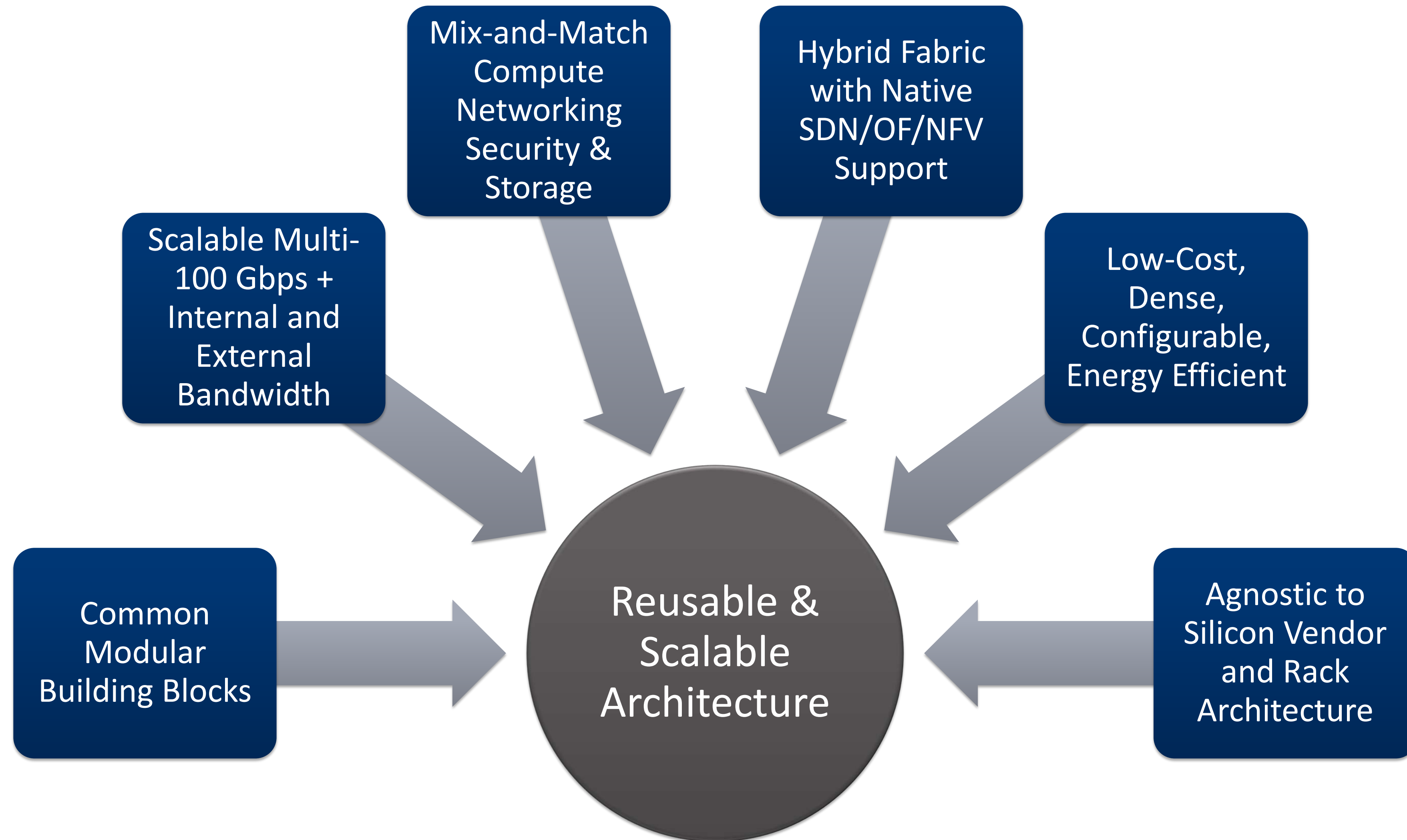- 10U blade/ modular server
- 10 GbE
- 40-64 servers/rack

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

ADLINK

Mix-and-Match Compute Networking Security & Storage

Hybrid Fabric with Native SDN/OF/NFV Support

Scalable Multi-100 Gbps + Internal and External Bandwidth

Low-Cost, Dense, Configurable, Energy Efficient

Common Modular Building Blocks

Reusable & Scalable Architecture

Agnostic to Silicon Vendor and Rack Architecture

RSA -> RSD -> Open architectures

Intel's early vision of RSD evolution to Full Aggregation

2010:
Physical Aggregation

2015:
Fabric Integration

Now:
Subsystem Aggregation

Composable Rack

	2010	2015	Now
Rack level Challenges	• Power/thermal inefficiencies • Limited density	• Fixed configuration • High cable count • Limited scalability	• No service based configurability • Limited scalability
Intel RSA Solution	• Shared power • Shared cooling	• Distributed Switching • Flexible topologies • Software Defined Networking	• Pooled storage/boot • Pooled memory • Software Defined Server
End-user Benefit	• Lower TCO	• Lower TCO • Lower CPU refresh costs • Higher compute density	• Resources match workload • Service scalability

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

OCP OpenRack
Now to future

ATCA / Carrier-Grade Appliances
2001 to Now

Proprietary
1990's to Now

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
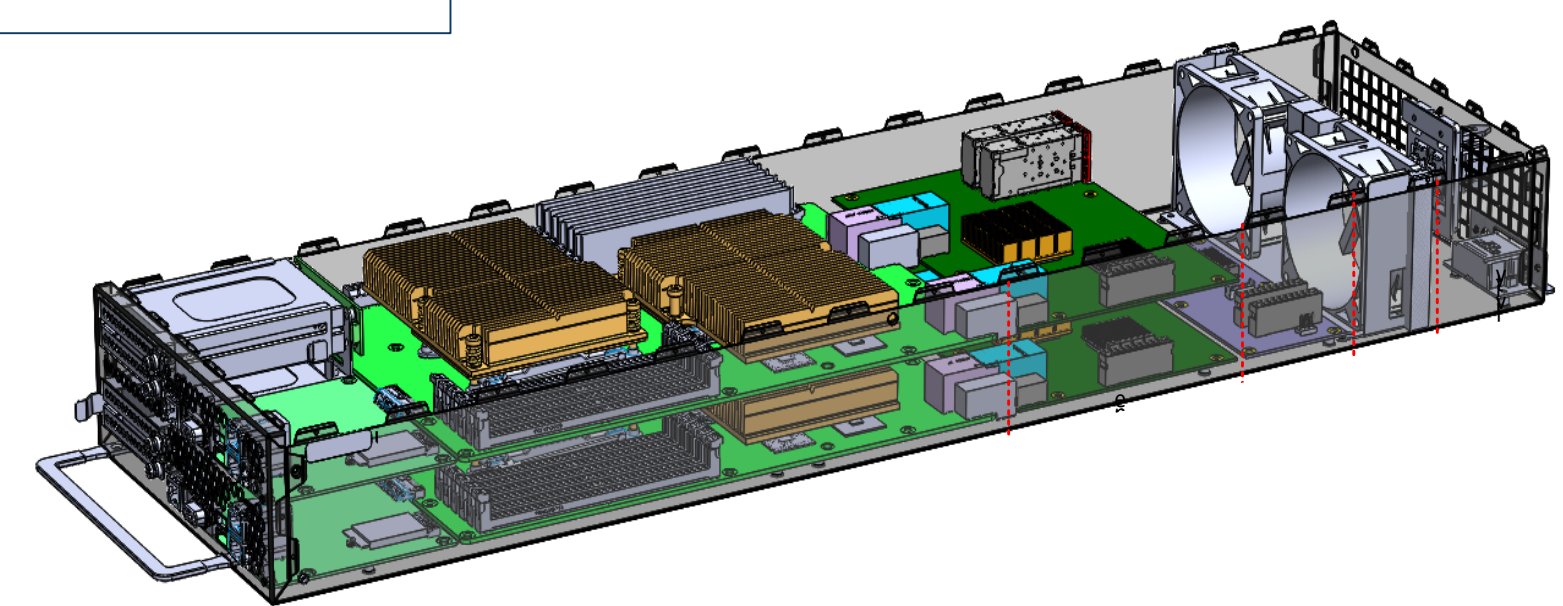

OCP-CG-OpenRack-19"
Frame Level
Specification

Half width

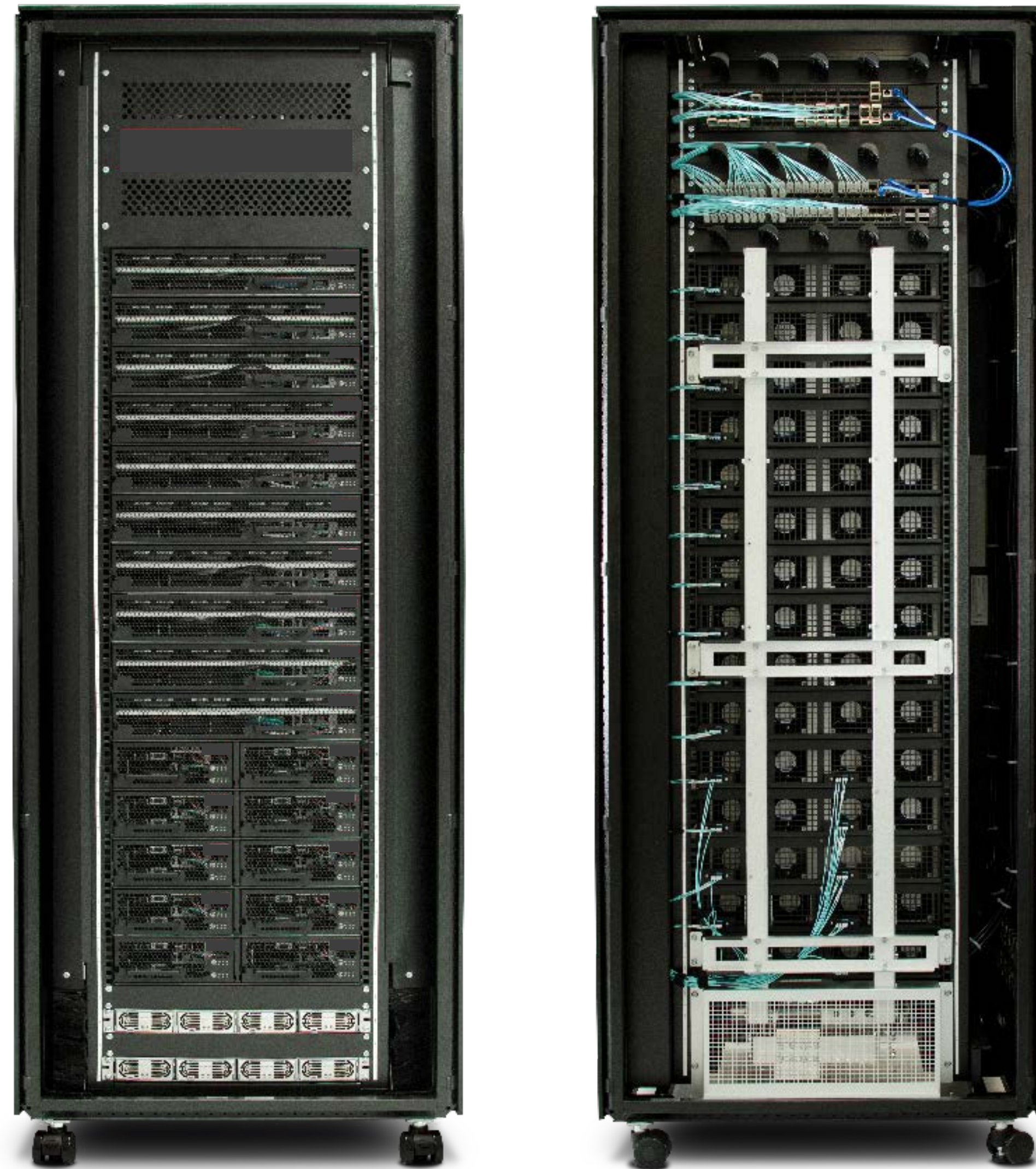Full width

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
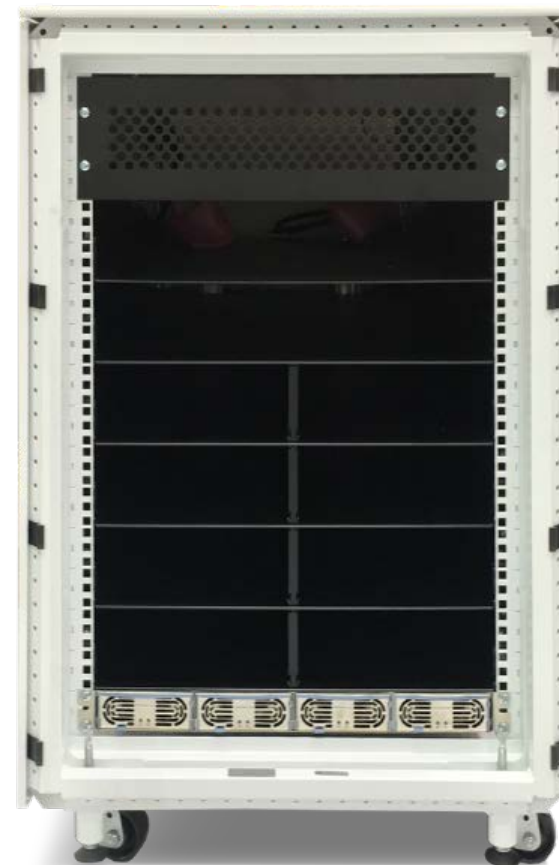
Typical Rack Commissioning: 1-3 months

IT Project Plan Layout

- 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
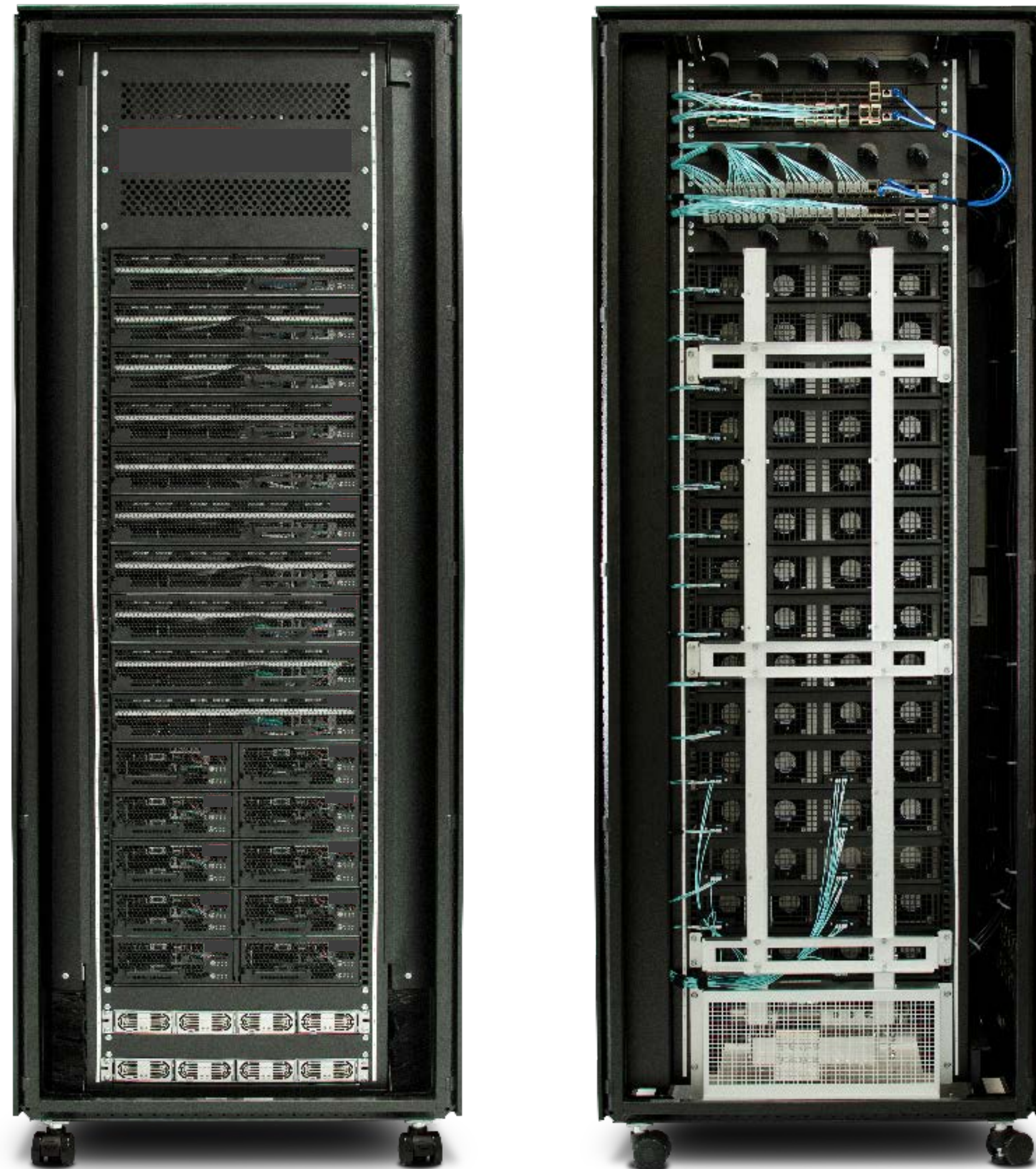fully optical interconnect to ToR switches
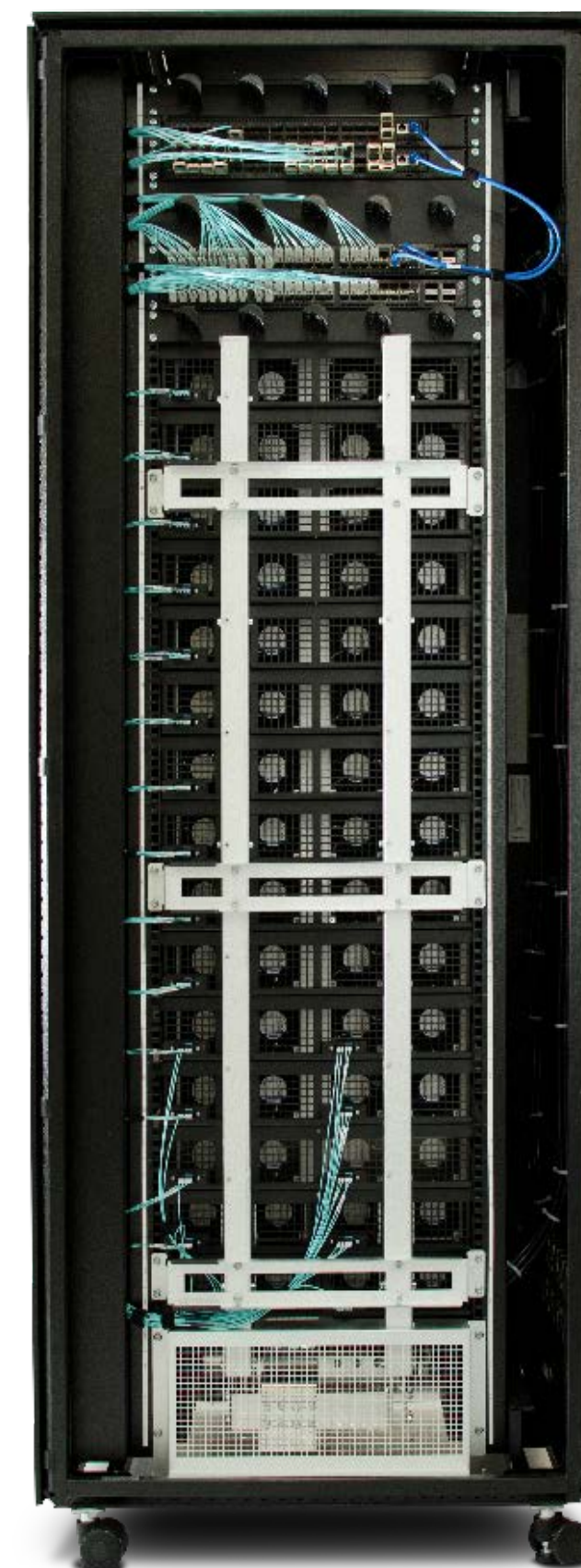

Plug in Power

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**
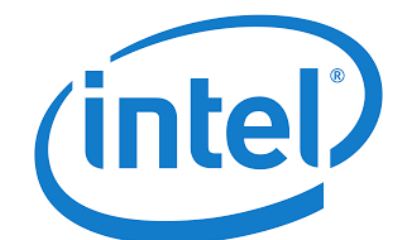
OCCERA – Open Architecture for Reuse

-Common Architecture, Extreme Throughput, HW Acceleration

CPU

NIC

GPU/
GPGPU

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

CSA-7200/7210
8 NIMs,
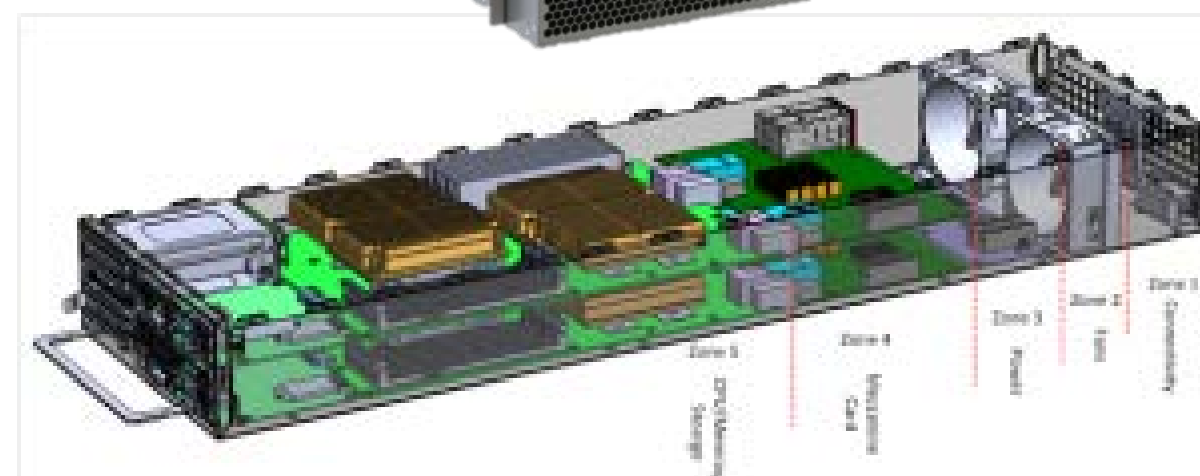*128 Eth Ports*

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**

OCCERA - Network Edge Portfolio

Edge
Data Center

Backbone
& IDC

Metro

Access

CSA-7600
1.4T~2.8T

CSA-7400
400G

CSA-7200/7210

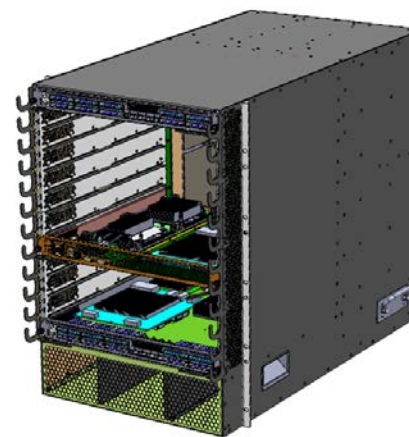## OCP-CG Rack Core
- Mix & Max Compute & Storage Sleds
- X2 Management Switches
- X2 Data Switches
- Balanced Solution:
  - 8x half width sleds 16 sleds 16 sockets
  - Optional full storage frame with 16x Storage sleds
- Roadmap = NVIDIA GPU, Marvell ARM

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