

Jason Waxman

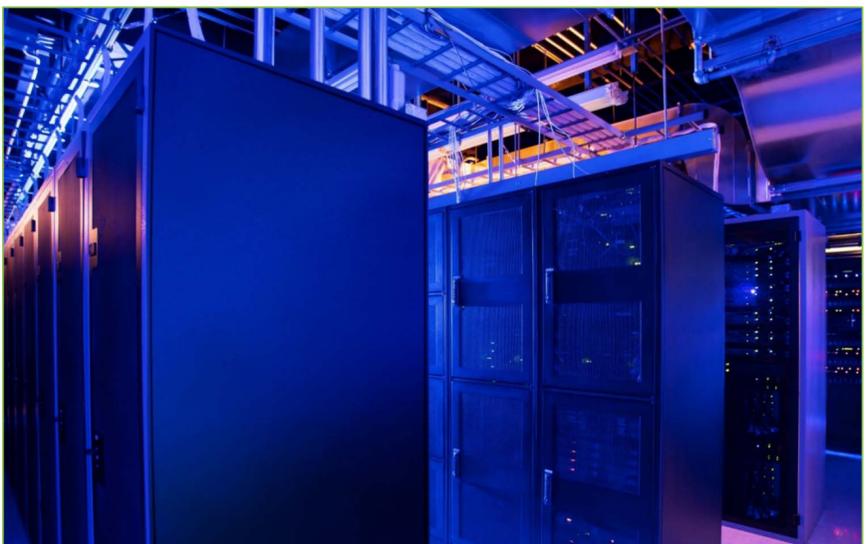
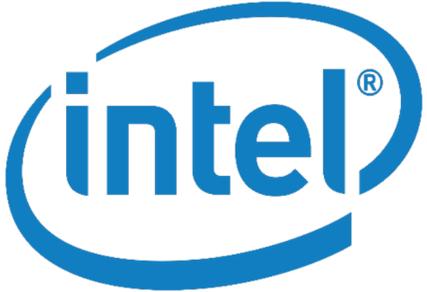
Corporate Vice President and General Manager of
the Data Systems Group

Intel Corporation

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Open Compute History of Commitment



2011 Founding
Member of OCP* **+20**

Contributions
and
Enablements

+75

Products
with
Partners

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Hyperscale Agility: Built on Industry Standards



“an industry-aligned architecture for composable, disaggregated infrastructure built on modern, industry standards.”



Expanding Ecosystem

OEMs/ODMs/
TEMs*



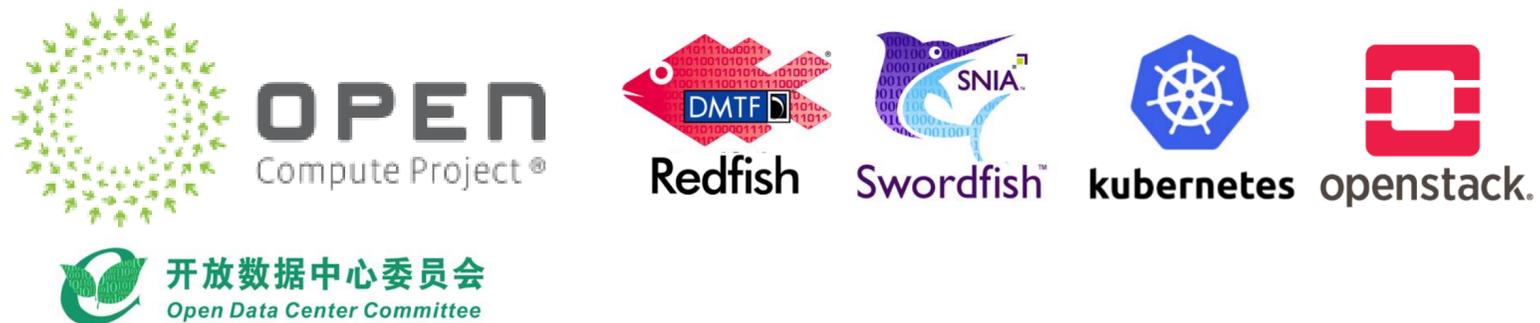
ISVs/OSVs/
HVs*



Publicly
Announced
End Users*



Supporting Open Standards



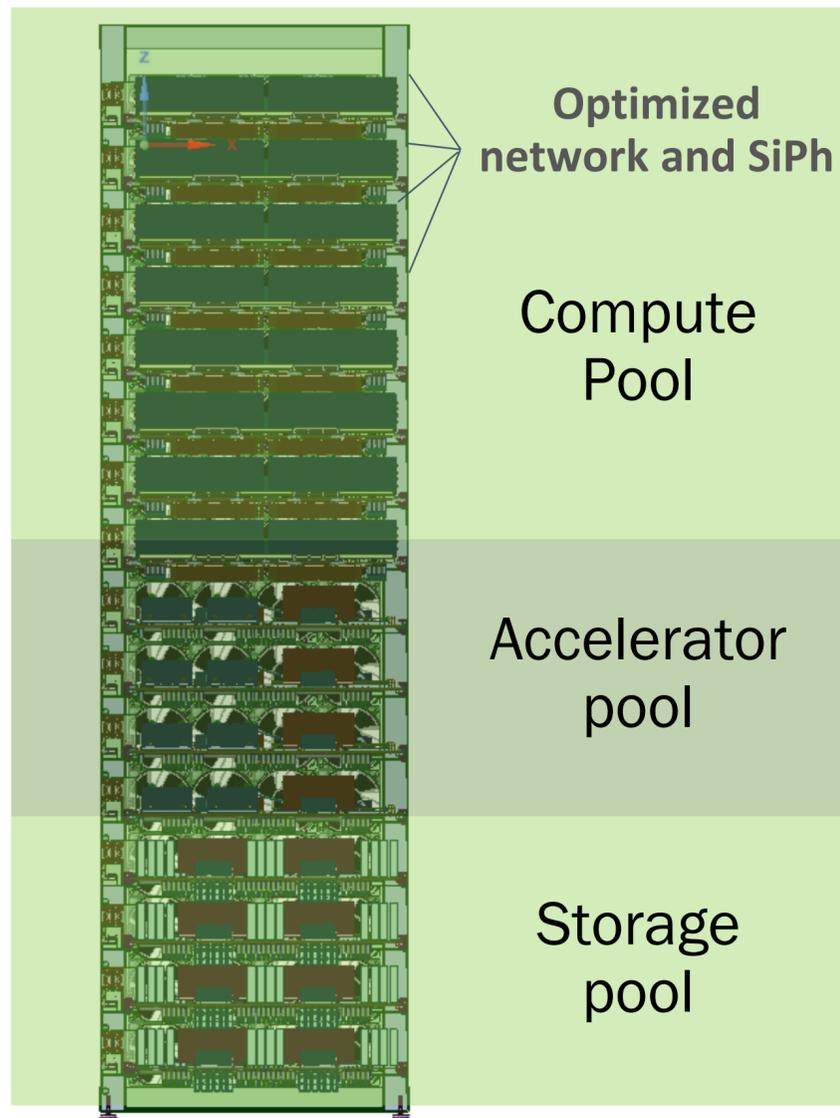
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Intel® Rack Scale Design (RSD): Optimized for Hyperscale

RSD Architecture



Optimize for
higher workload
performance

Resource Pooling:
greater utilization

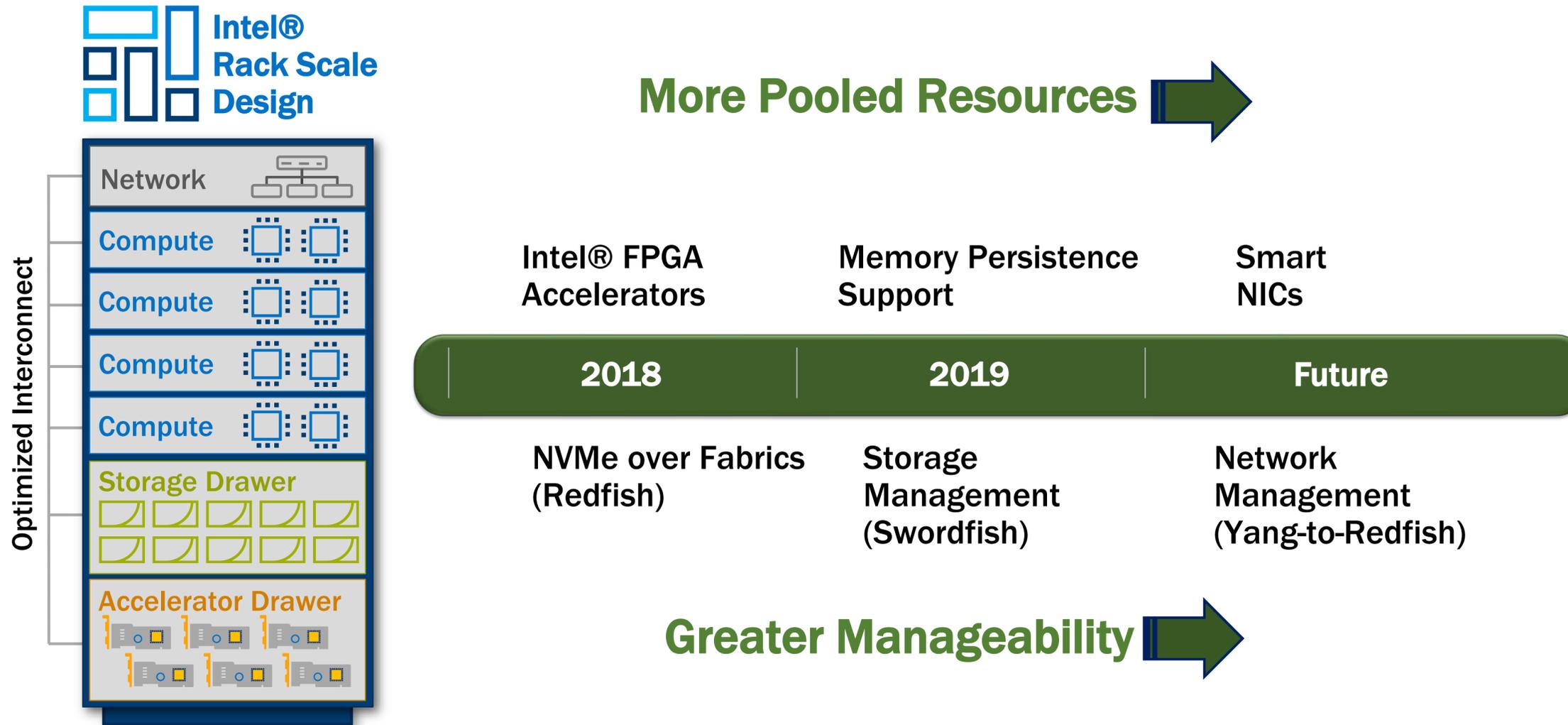
Disaggregation:
Late binding,
different refresh
rates

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Intel® Rack Scale Design Open APIs

Pooling Data Center Resources for Efficiency at Scale



* Statements in this presentation that refer to Intel's plans and expectations for the quarter, the year, and the future, are forward-looking statements that involve a number of risks and uncertainties. All information provided here is subject to change without notice.

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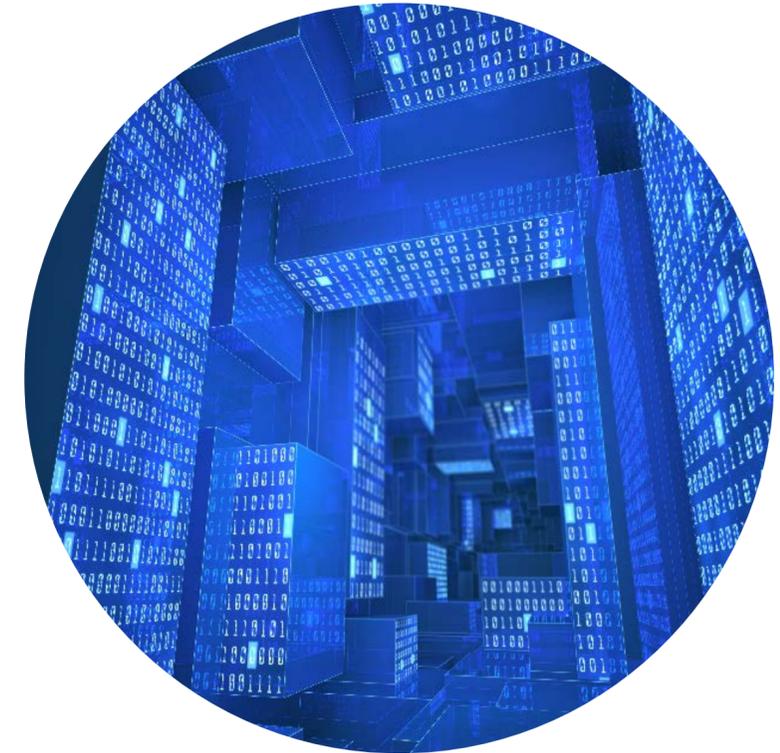
Delivering Software, Compute, Network, and Storage Tech to Scale OCP*



Compute



Network



Storage

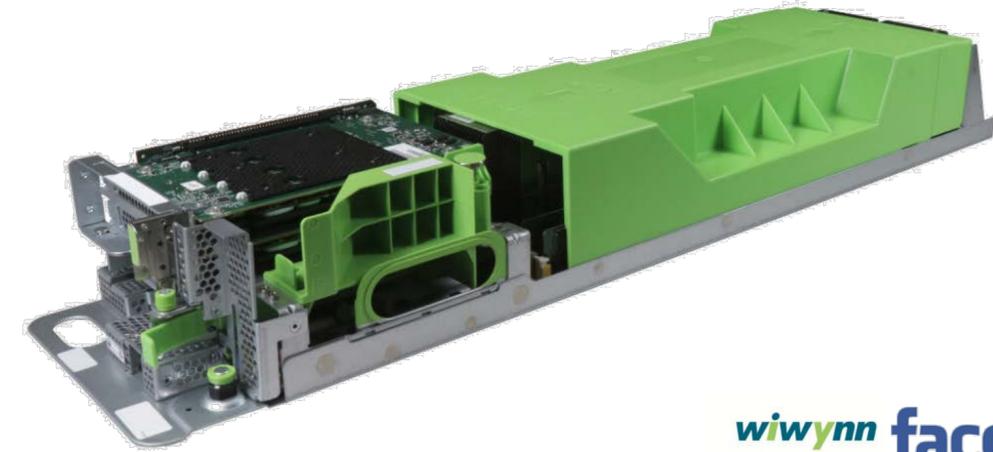
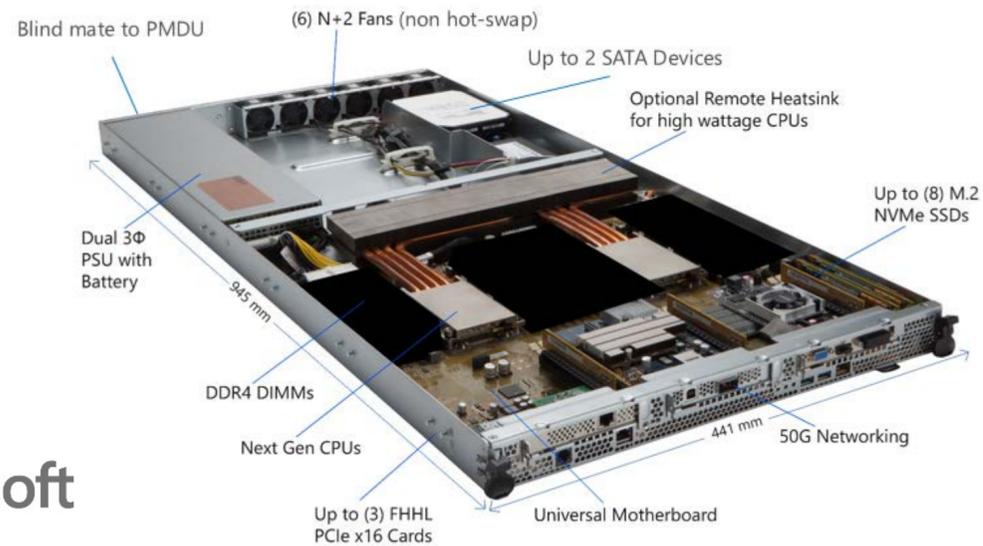
Common Management and Security

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Compute: New Servers with Intel® Xeon® Scalable Processor – 1.73x Higher Performance



Mount Olympus

OCP 19" rack compliant 2S Intel® Xeon® Scalable Processor 1U server

Up to 16 M.2 NVMe SSDs

Provides 56 cores per system with 205W CPUs

Tioga Pass

OCP* Open Rack V2 compliant 2S Intel® Xeon® Scalable Processor server

Up to Eight M.2 NVMe SSDs

3 systems per 2U => 132 cores with 165W CPUs

Geomean based on Normalized Generational Performance (estimated based on Intel internal testing of OLTP Brokerage, SAP SD 2-Tier, HammerDB, Server-side Java, SPECint_rate_base2006, SPECfp_rate_base2006, Server Virtualization, STREAM* triad, LAMMPS, DPDK L3 Packet Forwarding, Black-Scholes, Intel Distribution for LINPACK, AI deep learning training on Neon ResNet18, AI deep learning inference on Neon ResNet18). Performance estimates were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as "Spectre" and "Meltdown." Implementation of these updates may make these results inapplicable to your device or system. Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more information go to <http://www.intel.com/performance>. Intel does not control or audit the design or implementation of third party benchmark data or Web sites referenced in this document. Intel encourages all of its customers to visit the referenced Web sites or others where similar performance benchmark data are reported and confirm whether the referenced benchmark data are accurate and reflect performance of systems available for purchase. Configuration – see slides 25-26

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Flexible Options Maximizing Compute and Storage Density

Chassis	Compute	Storage	Configurations	Usage Models
<p>Yosemite V2</p> 	<p>Twin Lakes Xeon D® 2100 SOC</p>	<p>Glacier Point</p>  <p>m.2 carrier</p>	<p>Yosemite + 4 Twin Lakes</p>	<p>Usage is Web Tier / Edge Compute 72 cores in 1U</p>
<p>Open Rack V2</p> 	<p>Tioga Pass 2 Xeon® Scalable Processors</p>	<p>Ava</p>  <p>m.2 carrier</p>	<p>Yosemite + 2 Twin Lakes + 2 Glacier Point</p>	<p>Storage / Data Caching 32TB in 1U</p>
			<p>ORv2 + Tioga Pass</p>	<p>Memcached, database 132 cores in 2U</p>
			<p>ORv2 + Tioga Pass + 2 Ava</p>	<p>Storage / Data Caching 48TB in 2U</p>

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Intel® Silicon Photonics Innovation



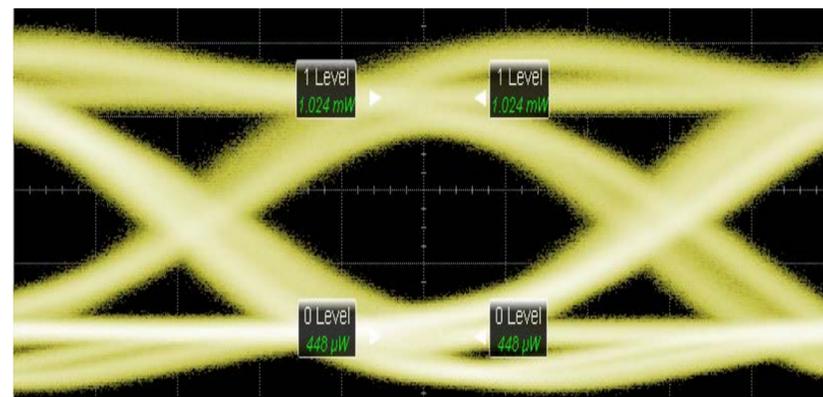
100G CWDM4-
OCP* optical
module
released and
shipping in
high volume

400G CWDM8 targeted at 2 km and 10 km data center links

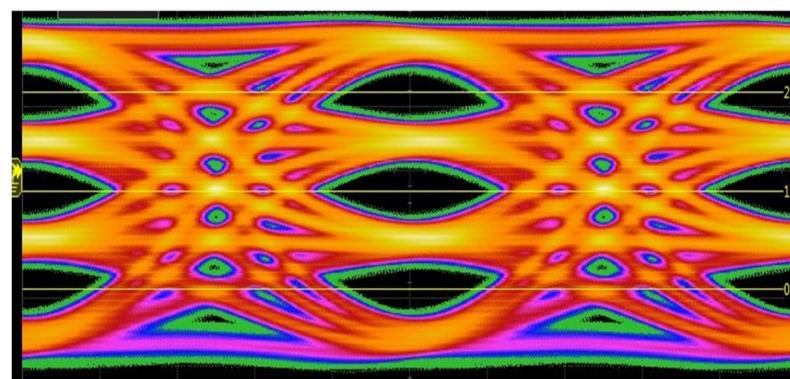
CWDM8 enables low-cost, low-power, volume-manufacturable 400G optics and the industry's only data-center targeted 10 km solution

Open interface specs defined—join the MSA at cdm8-msa.org

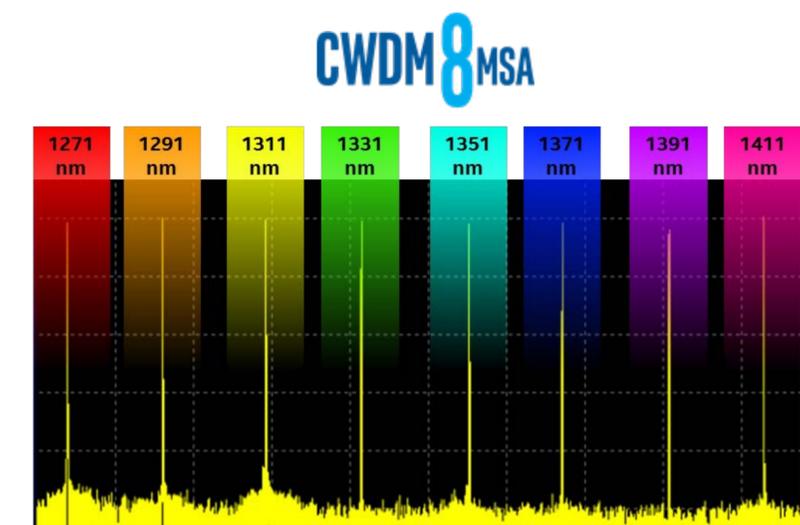
Samples in 2018



8x50G NRZ Optical Transmitter Output



8x50G PAM4 Host-Side Electrical Output



Transmitter 8-Channel Optical Spectrum

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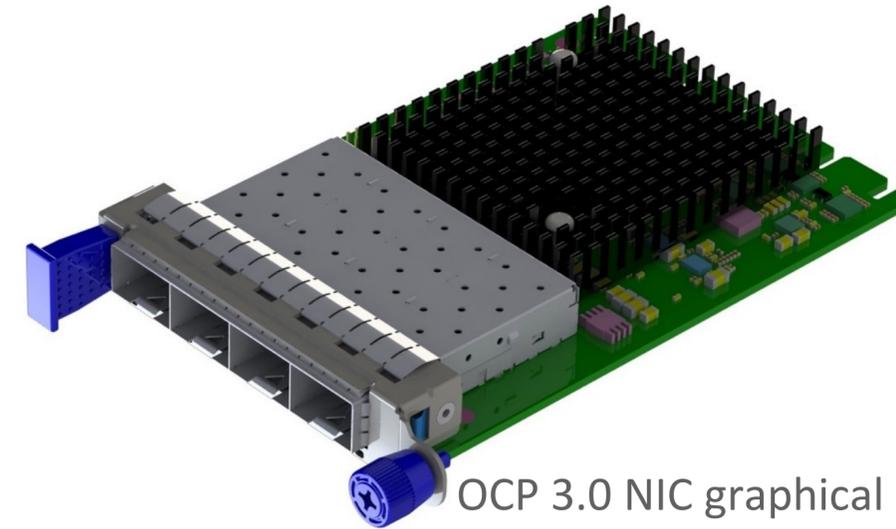
OCP* Network Cards



OCP 2.0 Mezz. Card 25G



OCP 2.0 Mezz. Card 40G



OCP 3.0 NIC graphical representation

facebook

Now: OCP* Mezzanine cards 2.0

2H 18/1H '19: OCP* NIC 3.0

Intel® Ethernet Network Adapters for 10G 25G and 40G are available

Next generation of smart NIC, PCIe Gen 4 and Gen 5, larger power envelope (80 and 150W)

Work with us on implementing your solution and give feedback on the specification

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Intel® Storage and Memory Innovations a Range of Solutions for Today's OCP* Platforms

facebook



Lightning²

Intel® Xeon® Processor



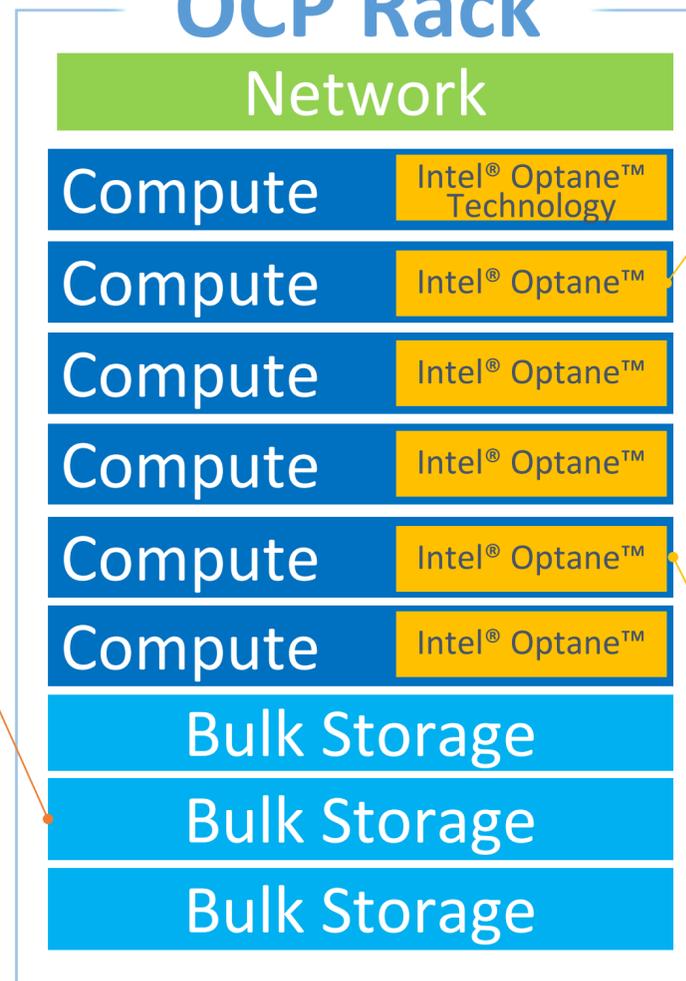
U.2 Intel® SSD DC P4510



m.2 Intel® SSD DC P4511



OCP Rack



Yosemite/Twinlakes¹

Glacier Point Carrier



Intel® Xeon® Processor
Scalable Family



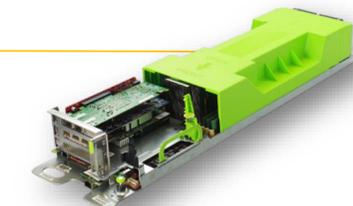
m.2** Intel® Optane™ SSD



m.2 Intel® SSD DC P4511

Tioga Pass¹

AVA Carrier



Intel® Xeon® Processor
Scalable Family



AIC, m.2** Intel® Optane™ SSD

¹Tioga Pass and Glacier Point – Based on OCP* Yosemite V.2 specification 0.4
<http://files.opencompute.org/oc/public.php?service=files&t=837133ef9167e70d79ba57450eccb826>

²Lightening – Based on OCP* Lightning v1.0 specification <http://www.opencompute.org/wiki/Storage>

** Product available at a later date. Check Intel roadmap for more details.

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Storage: Addressing the Storage Challenges for Hyper Scale Datacenters



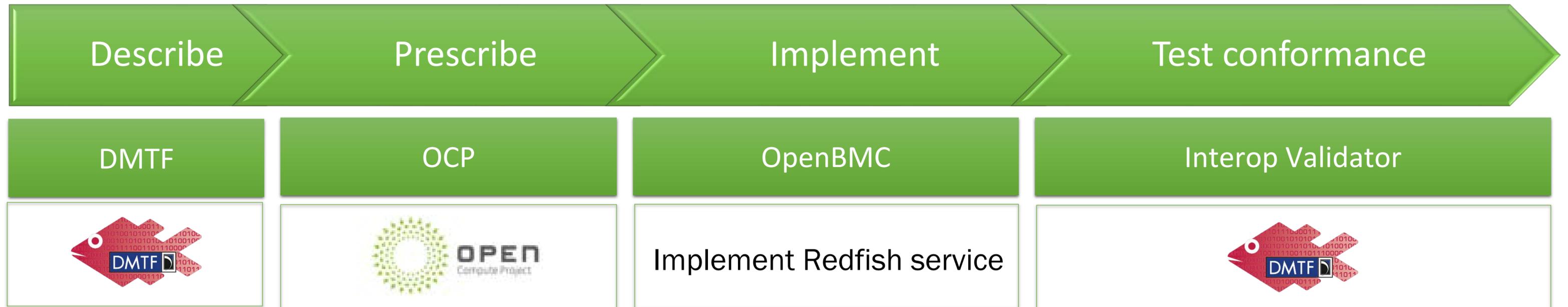
Project Denali is a streamlined SSD architecture that standardizes SSD to host drive interface and media management

In the future: combination of Intel® Optane™ Technology and floating gate (FG) 3D NAND to address hyperscale challenges

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OpenBMC Open Platform Manageability



Management – OpenBMC

Open source Baseboard Management Controller firmware

Controls system management functions debug, monitoring, provisioning...

Lower cost to implement out-of-band manageability

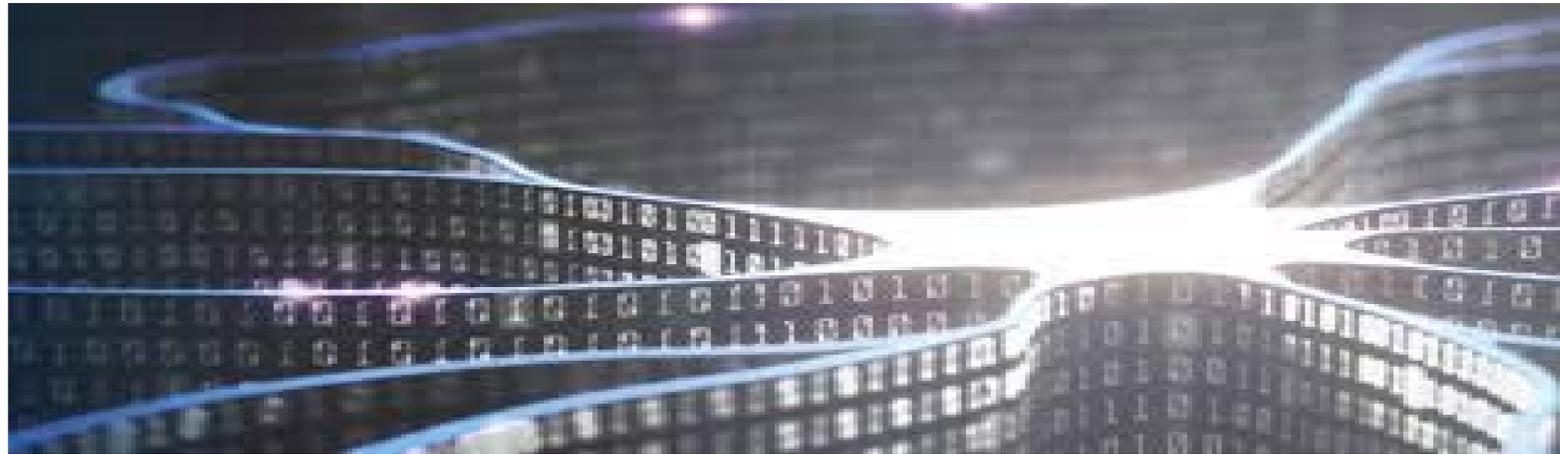
OpenBMC will be available on platforms by end of year for use as a software development vehicle

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Security: Better as a Community



Security First Commitment

Released microcode updates for 100% of past 5 years of products that require mitigation

Redesigned parts of the processor to introduce new levels of protection through partitioning for next-generation Intel® Xeon® Scalable Processors (Cascade Lake) as well as 8th Generation Intel® Core™ processors

Platform Security - Cerberus

OCP project that supports secure firmware using device attestation of platform elements, including CPUs, FPGAs, NICs and SSDs

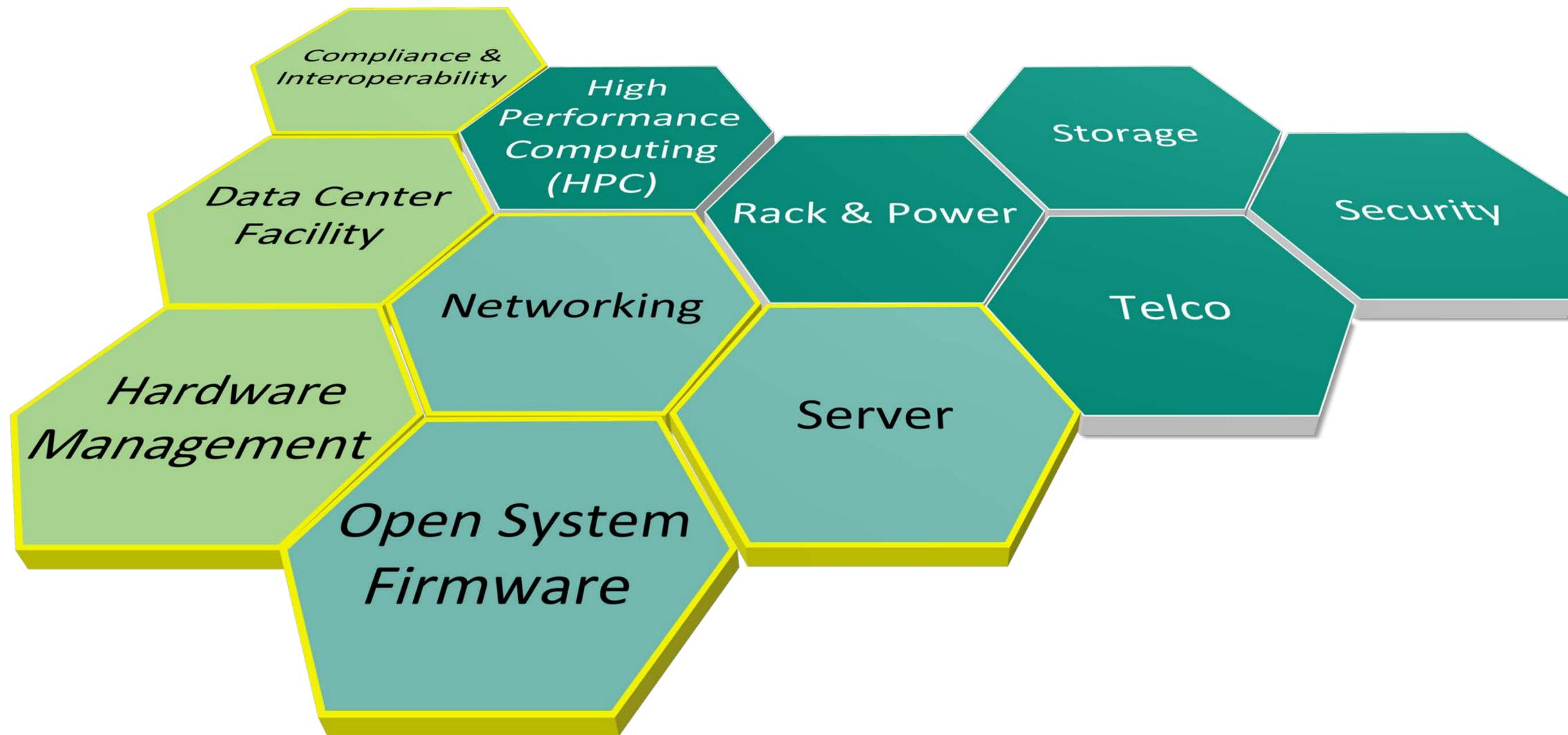
Mutual authentication delivered in Intel® Platform Firmware Resilience (Intel® PFR)

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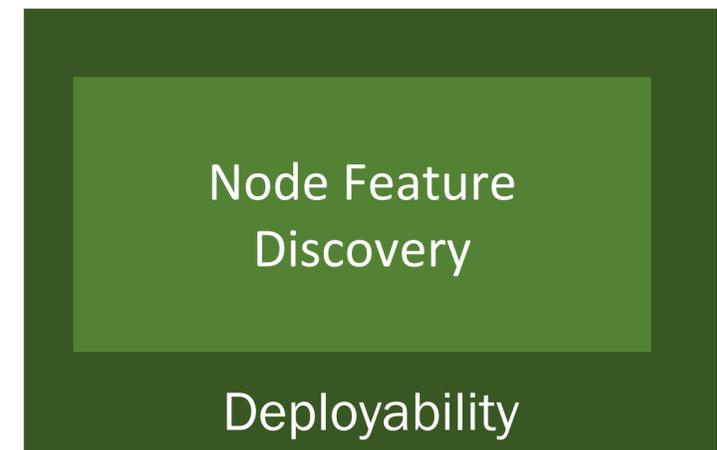
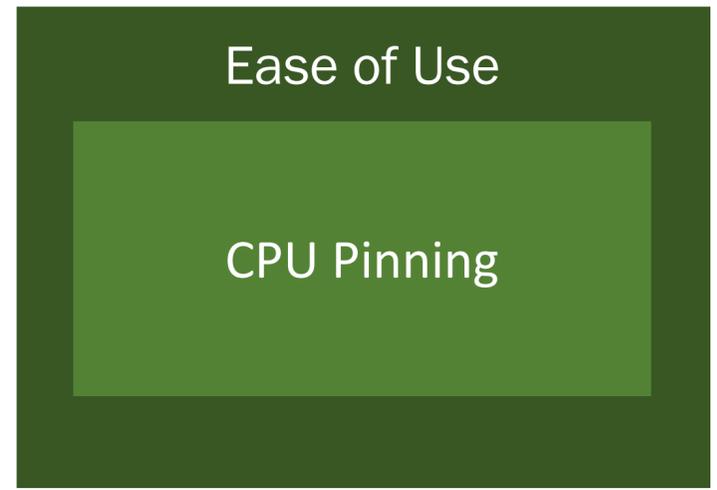
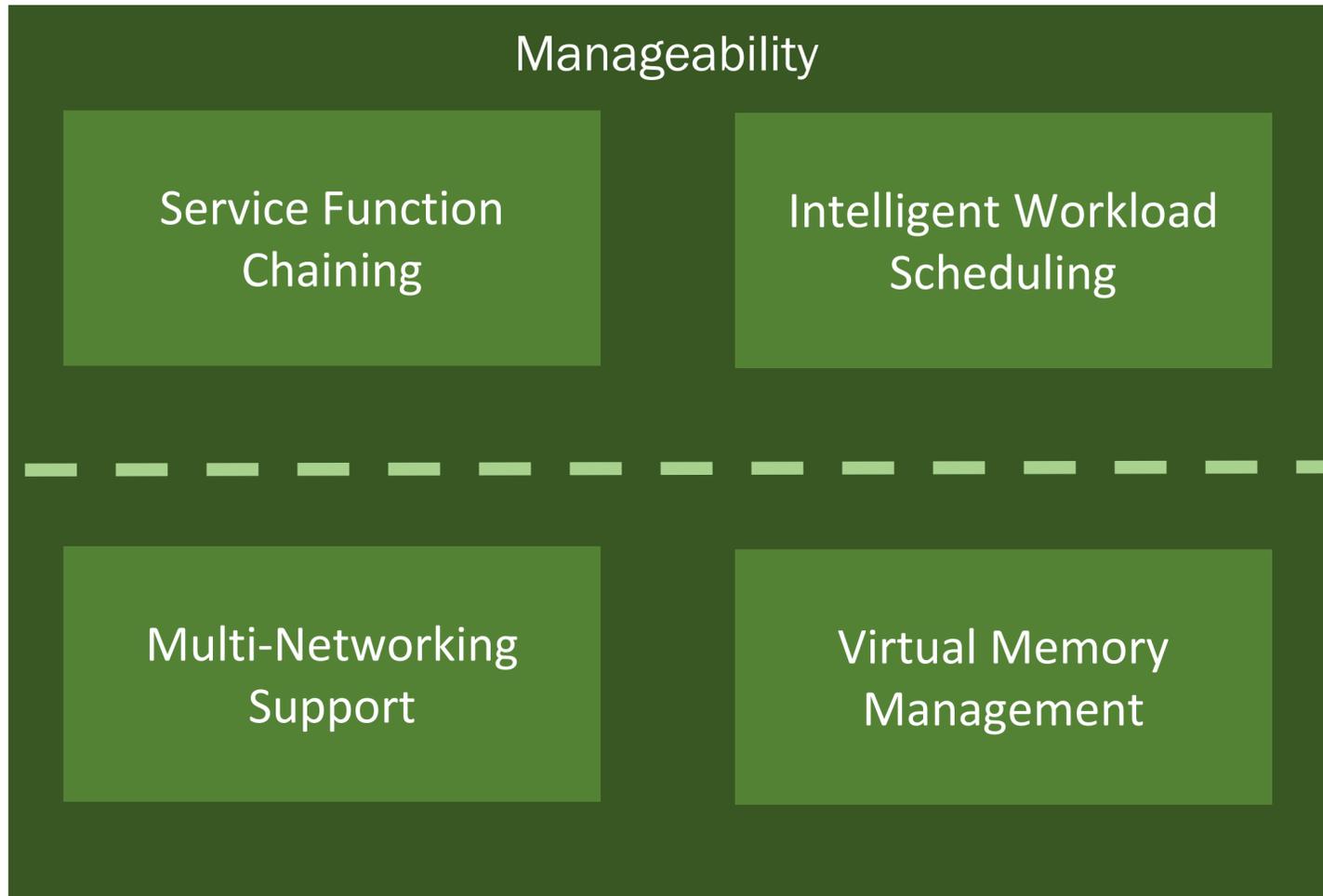
Software Momentum: Breaking Through Requires Focus and Clear Goals



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Orchestration to Improve Datacenter Manageability, Deployability, and Ease of Use



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Intel + OCP*: Architecting for the Hyperscale Datacenter

Intel® Rack Scale
Design
Management

Intel Booth A12

OCP* Initiatives
and Intel
Implementations

Mohan Kumar
session 3/20
16:20

New Workloads
and the Evolving
Network

Uri Cumming
session 3/20
17:30

Democratizing AI

Carlos Morales
session 3/20
17:30

Re-Imagining
Data Center
Storage and
Memory

Greg Matson
session 3/21 09:25

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OoCP SUMMIT

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