
Open. Together.
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Hardware innovations for data growth challenges at cloud-scale

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General Manager & Distinguished Engineer
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Microsoft & OCP

2014

Joined Open Compute Foundation
Open Cloud Server (OCS) spec
Cloud SSD M.2 spec

2015

Local Energy Storage – Server UPS
Switch Abstraction Interface (SAI)

2016

SONiC Network Switch Software
Project Olympus spec

2017

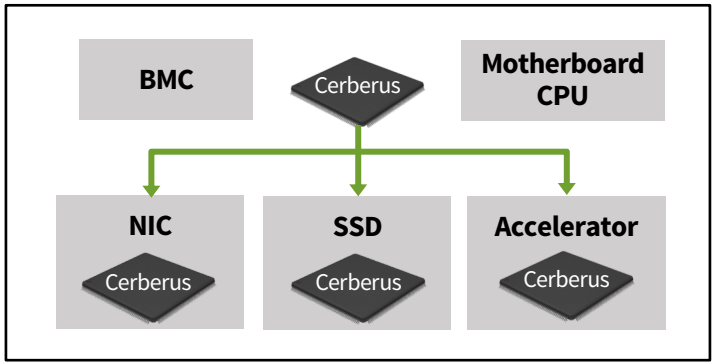
Project Olympus expansion–
Intel/AMD/ARM64, GPU, JBOD, JBOF
Project Cerberus spec

2018

Project Denali spec

Project Cerberus updates

Cerberus Master/Slave architecture - Specification augmented to extend Root of Trust domain to peripheral components



All *Project Olympus* motherboards now have Cerberus capability enabled for secure bringup

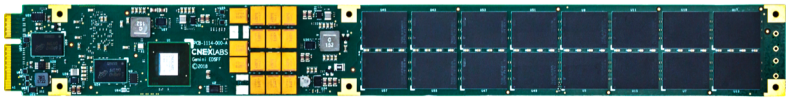
Project Denali updates

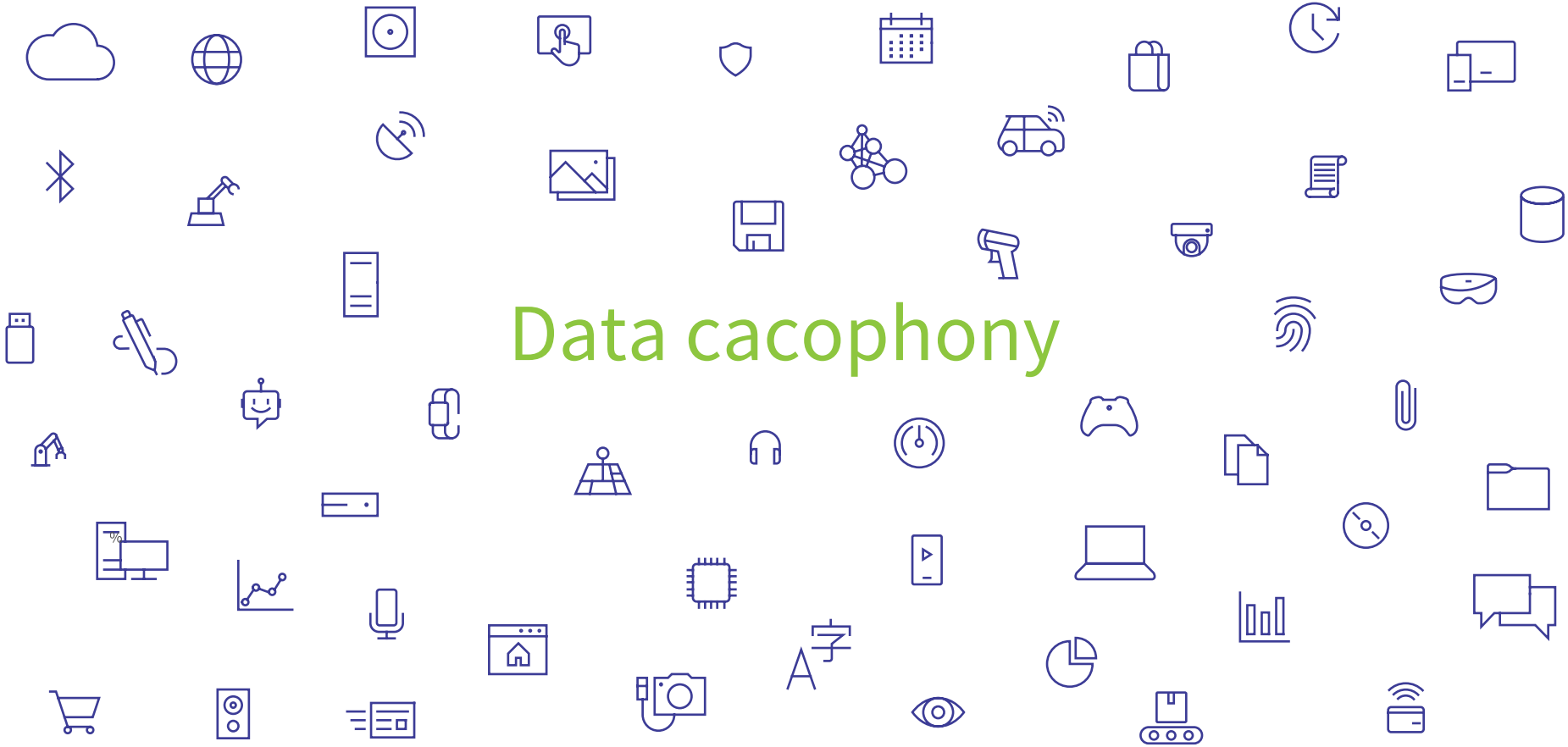
Version 1.0 specification approved by Denali JDF members in February 2019 (*15 member companies collaborating over 12 months*)

Specification scope expanded to include storage/media disaggregation beyond the Cloud

- Enterprise Arrays
- Computational Storage
- IoT Applications

Microsoft Denali EDSFF Prototype –
Up to 70% savings on non-media SSD costs



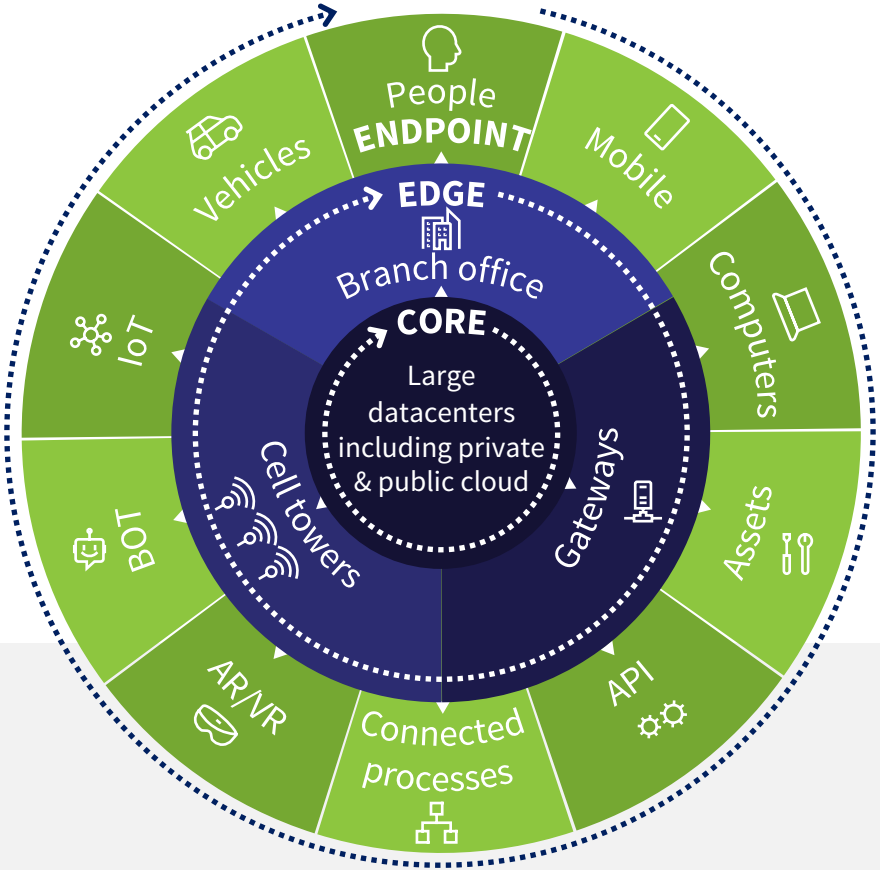

Data cacophony

Where is the data coming from?

Generated at the **Endpoints**

Collected and pre-processed at the **Edge**

Analyzed, stored, archived at the **Core**



Data propagates from endpoints to core and back

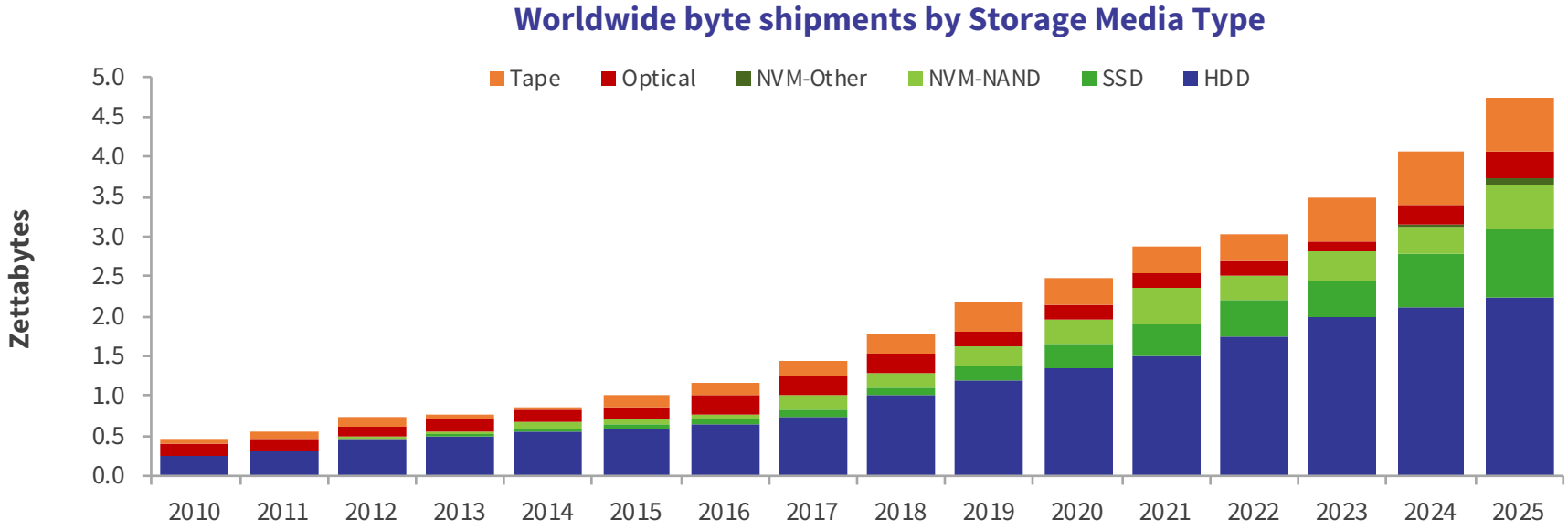
Source: IDC's Data Age 2025 study, sponsored by Seagate

Data opportunities

IDC predicts Global DataSphere will grow from 33 Zettabytes (ZB) in 2018 to 175 ZB by 2025

Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018

Storage capacity growth projections

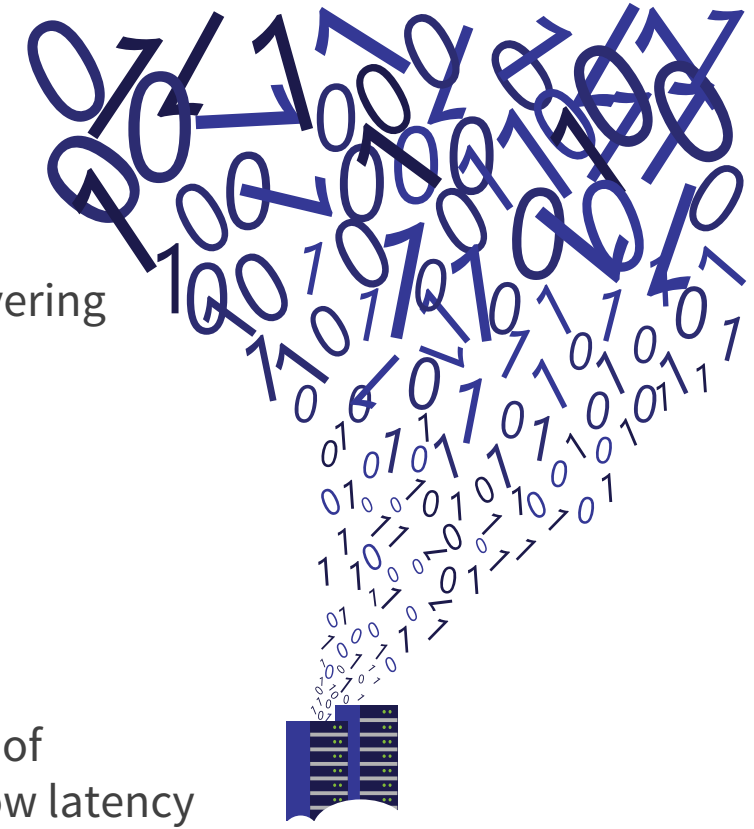


Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018

- Supply capacity not sufficient to keep up with 6x projected growth in storage demand
- Need new radical solutions for data processing improvements to address this supply/demand gap

Announcing Project Zipline

Project Zipline

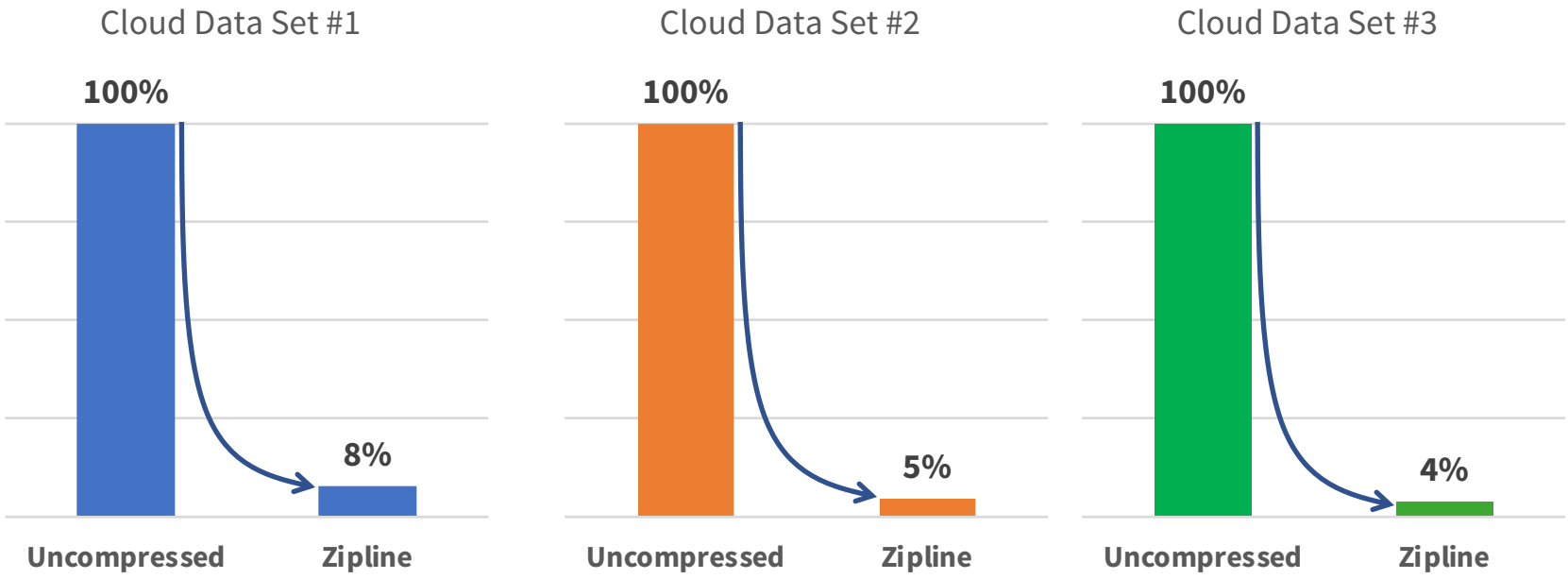


Targeted for legacy and modern datasets Covering various usage scenarios from Edge to Cloud

Full solution stack implementation - Algorithms + Software + Hardware

Compression without compromises
Always-on data processing enabled by trifecta of high compression ratios + high throughout + low latency

Project Zipline compression gains



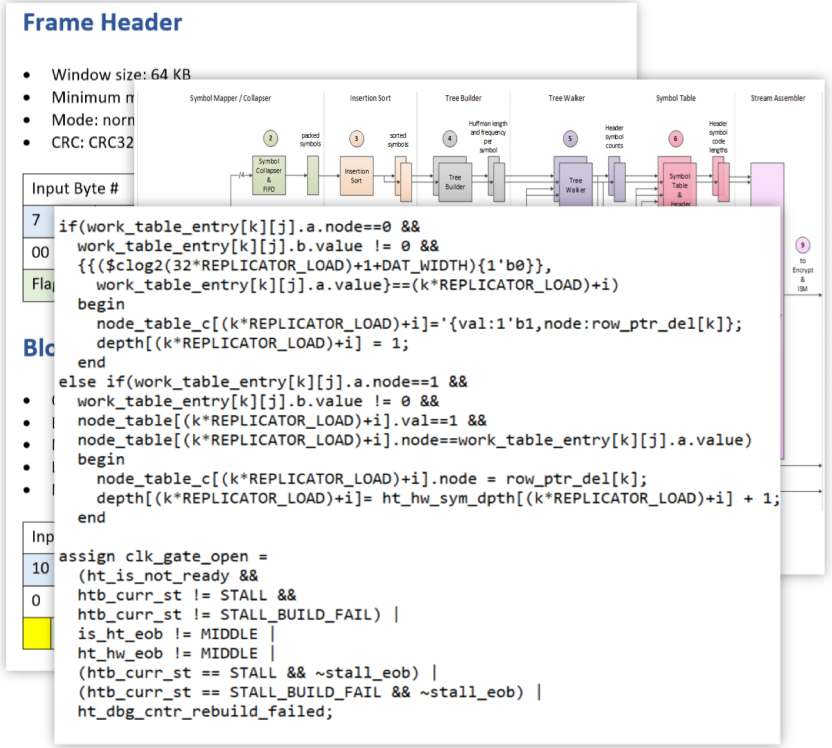
Data sets taken from : Application Services Logs, IoT Text Files, System Logs

Open sourcing *Project Zipline*

Compression algorithm and specifications
Interoperability across endpoints (edge to cloud)

Hardware architecture specifications
High bandwidth, low latency implementation

Verilog RTL source and test suite
Open sourced IP – Industry first for OCP contributions
Enabling faster adoption in the silicon ecosystem



Project Zipline – Usage model examples


Network data processing


Productivity Applications


Industrial IoT


Smart SSDs


Cloud migration appliances


Storage Archival Systems


Edge computing


Database accelerators

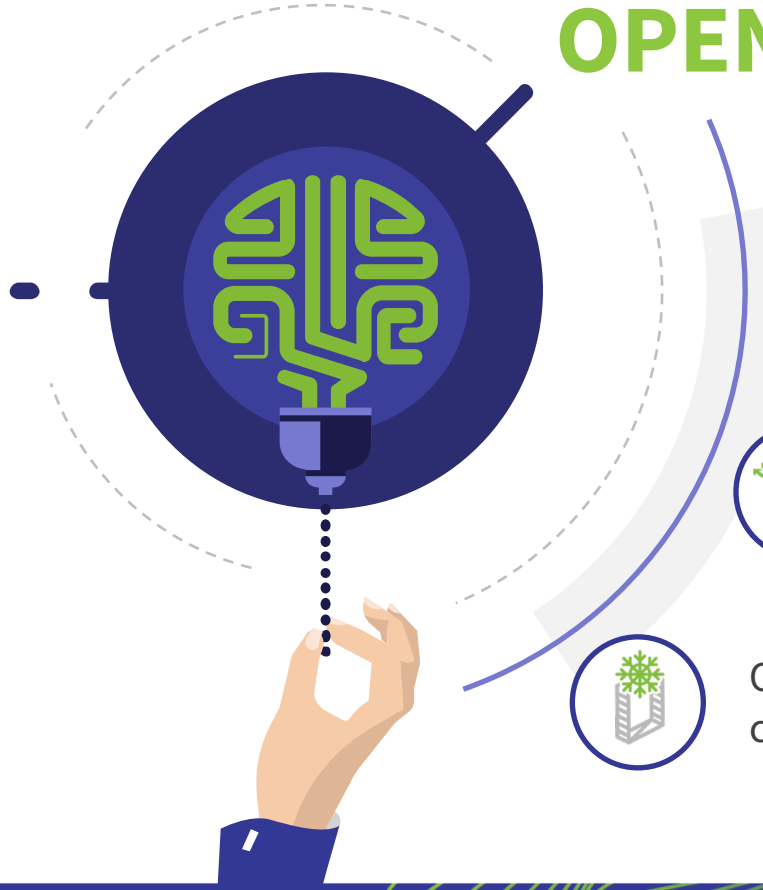

Analytics


General purpose Microprocessors

Ecosystem partners

CPU	intel	AMD	AMPERE	arm	MARVELL	SiFive
Networking	BROADCOM	FUNGIBLE	Mellanox TECHNOLOGIES			
Storage	EIDETICOM	NGD systems Bringing Intelligence to Storage	PURESTORAGE			
EDA	cadence	SYNOPSYS				

OPEN COLLABORATION

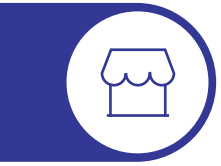


Open Rack and Project Olympus collaboration with Facebook and Quanta

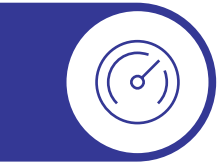
Open Accelerator Module – collaboration with Facebook and Baidu

OCP **alternative cooling** committee

Learn More



Visit Microsoft booth A6 – hardware, demos



Attend talks and workshop sessions

Get specs and collateral at OCP Github repo

2:05pm: Executive Track

Michael Cornwell

Software-defined Flash Futures Driving Next-Generation Cloud Services

4:10pm: Expo Hall

Badriddine Khessib, Bryan Kelly

The State of Hardware Security: Cerberus Present and Future