# OPEN POSSIBILITIES.

### Hyperscale and the Future of Flash Storage



Storage

# Hyperscale and the Future of Flash Storage

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# Agenda



### Background

# Flash Building Blocks

Flash Systems





# Meta's mission is to give people the power to build community and bring the world closer together.

# Meta @ Scale



## **3.3 Billion Users**



## Flash Building Blocks



# Flash Form Factor Adventures

### Key Hyperscale Form Factor Metrics:

- Needs to be a standard form factor
- Power and thermal both need to scale
- Small and dense
- Servicabiltiy and hot plug

#### PCIe Form Factor Comparison, by Exabytes



Why E1.S has strong adoption?



- Standard form factor
- Designed based on PCIe Gen 5
- Excellent power delivery
- Thermal customer can pick standard thermal solution based on their needs
- Small and dense
- Excellent Servicabiltiy
  E1.S adoption is strong as it meets hyperscale needs.



### Flash Building Blocks Summary

Datacenter NVMe SSD and E1.S: Next generation technology ready to solve today's problems

#### Additional Information

- OCP Workshop: Data Center NVMe SSD and EDSFF: April /2021
  - 5 Hyperscaler's/OEMs, 6 NAND Suppliers, and more (~2.5 hours)
  - <u>https://www.opencompute.org/events/past-events/webinar-data-</u> <u>center-nvme-ssd-and-edsff-presented-by-facebook-sk-hynix-kioxia-</u> <u>intel-snia</u>
- Link to 1.0 and 2.0 specifications can be found under OCP Contributions:
  - <u>https://www.opencompute.org/documents/nvme-cloud-ssd-specification-v1-0-3-pdf</u>
  - <u>https://www.opencompute.org/documents/datacenter-nvme-ssd-specification-v2-0r21-pdf</u>





## Flash Systems



# Yosemite V3 Flash Platform

#### Advancements in Compute and Flash

#### YV3 Platform

- Single socket compute platform
- Frontend expansion board
- SSD hot plug support
- SSD presence support

#### CooperLake CPU

Abundant PCIe lanes

#### SSD

- Larger capacity as NAND die grows
- E1.S Form Factor (EDSFF)







DCF

Form Factor Transition: M.2 -> E1.S (EDSFF)

Capacity Enablement: 2TB -> 4TB, 8TB, 16TB



# Yosemite V3 Flash Platforms

- 25mm E1.S platforms
  - Flexible compute/storage ratios
  - High Density
  - Excellent CFM/W (<0.145)
  - Hot Plug
  - Device presence detect for security
- > YV3 Platform: Flexible, efficient and dense



- ✤ 40U Chassis with:
- Twelve 1 OU Blades
- 48 25mm E1.S SSDs
- Up to 768TB per Chassis





- ✤ 40U Chassis with:
- Six 2 OU Blades
- 36 25mm E1.S SSDs
- Up to 576TB per Chassis



# **Flash Applications**

- Common Hardware Building Block
  - Easy to deploy and manage at Hyperscale
  - Adopted by flash applications with different requirements
- Compute Intensive Applications
  - Database solutions (RocksDB)
  - Caching solutions (Cachelib)
  - 10U Flash Blade with low-capacity E1.S
- Storage Oriented Applications
  - Flash Storage Server
  - 20U Flash Blade with high-capacity E1.S





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# Call to Action

- Hyperscale needs and solutions are moving flash forward
  - E1.S solves important hyperscale needs driving rapid adoption
  - Datacenter NVMe SSD Specification driving alignment on industry needs
  - YV3 flash system's scalable, flexible, dense, efficient solutions for hyperscale
- Monthly OCP storage meeting 2<sup>nd</sup> Thursday of each month
- Links to useful information:
  - https://www.opencompute.org/documents/nvme-cloud-ssd-specification-v1-0-3-pdf
  - https://www.opencompute.org/documents/datacenter-nvme-ssd-specification-v2-0r21-pdf
  - https://www.opencompute.org/documents/ocp-yosemite-v3-platform-design-specification-1v16-pdf
  - https://www.opencompute.org/documents/delta-lake-1s-server-design-specification-1v05-pdf
  - https://www.opencompute.org/documents/e1s-faceplate-reference-design-specification-pdf
  - https://www.opencompute.org/documents/e1s-expansion-1ou-1s-server-design-specification-pdf
  - https://www.opencompute.org/documents/e1s-expansion-2ou-1s-server-design-specification-pdf

<u>https://www.opencompute.org/events/past-events/webinar-data-center-nvme-ssd-and-edsff-presented-by-facebook-sk-hynix-kiokur-integented-by-hynix-kiokur-integented-by-facebook-sk-hynix-kiokur-integente</u>



Come see YV3 in Meta booth

### Thank you!

