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.
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
- Servicability and hot plug

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 Servicability

PCIe Form Factor Comparison, by Exabytes

Note: 32.7% Represents ~58 Exabytes

E1.S adoption is strong as it meets hyperscale needs.
History: Datacenter NVMe Spec

Purpose:
- Aligns SSD needs and requirements between Hyperscale/OEMs and SSD makers
- Specification Includes
  - NVM Express
  - PCI Express
  - SMART Logs
  - Reliability
  - Thermal
  - Power
  - Security
  - Form Factor
  - SMBUS
  - Tooling

❖ 127 pages of comprehensive requirements
❖ Everything Needed to build a Datacenter NVMe SSD
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)

➢ Link to 1.0 and 2.0 specifications can be found under OCP Contributions:
  • 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

OPEN POSSIBILITIES.
Flash Systems
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)

Form Factor Transition: M.2 -> **E1.S (EDSFF)**
Capacity Enablement: 2TB -> 4TB, 8TB, 16TB
Yosemite V3 Flash Platform Partitioning

Yosemite V3 Platform Specification

Delta Lake 1S Server Design

Expansion Design

Up to 4 blades in a single sled

Flash Expansion Designs:

- Yosemite V3: Sierra Point E1.S 2OU Flash Blade and Expansion Board Design Specification
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

- 4OU Chassis with:
  - Twelve 1 OU Blades
  - 48 25mm E1.S SSDs
  - Up to 768TB per Chassis

- 4OU Chassis with:
  - Six 2 OU Blades
  - 36 25mm E1.S SSDs
  - Up to 576TB per Chassis

Come see YV3 in Meta booth
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**
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 – 2nd Thursday of each month

• Links to useful information:
  ▪ 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

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Thank you!