Birds of Feather: E-SSD/E-BoF

Virtual Session
Sep 28, 2021
5:00 pm PT / 8:00 pm ET
NVMe Over Fabrics Architectures for Disaggregated Storage

**JBOF with x86**
- **Pros**
  - Current production
  - Established Ecosystem
  - PCIe SSDs in production
- **Cons**
  - BW bottleneck
  - Added PCIe latency
  - High power

**JBOF with SmartNIC**
- **Pros**
  - Finding some use cases
  - Emerging Ecosystem
  - PCIe SSDs in production
  - Lower Power
- **Cons**
  - Added PCIe latency
  - Needs SmartNIC on both sides

**E-BOF**
- **Pros**
  - BOM cost savings
  - Lower latency/power
  - True disaggregation possible
- **Cons**
  - No Ecosystem yet
  - E-SSDs are in PoC

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**Production**

**Engage-Short Term**

**Engage-Long Term**
Disaggregated Architecture

- NIC card’s essential features are offloaded to E-SSD.
- Storage controller can communicate with multiple E-BOFs as it is done with JBOFs.
  - Connection and discovery are added to maintain connection in NVMe-oF specification.
  - NVMe I/O command processing is equal as PCIe based NVMe SSD for E-SSD.
  - Additional target configuration may not be needed, since configured information are saved in E-SSD.
- SW modification
  - Schema of JBOF for Redfish can be changed.

NIC + CPU
- IP address configuration
- Manage Connections
- Network Management

PCIe SSD
- NVMe I/O Processing

BMC (Expected)
- E-SSD IP address configuration

E-SSD (offloaded)
- IP address configuration (manual)
- Manage Connections
- Network Management
- NVMe I/O Processing
E-BoF Value and Applications

▪ Value

- Unlocks all of SSD performance
- Reduces System level TCO
- Ethernet connectivity
  Inherently disaggregated

▪ Applications

Scale Up

Scale Out

Composable Systems

Disaggregation In Hyperscale

C Storage Controller
S Storage
CPU Compute
TOR Top of the Rack Switch
E-SSD and the Hype Cycle

E-SSD is in the early phase of the hype cycle.
## Vendors

### E-SSD
- Samsung
- Marvell/Toshiba
- Kazan/Western Digital?
- Marvell/Hynix

### E-BoF
- Foxconn – Irene
  - Marvell Switch
- Foxconn – Newell
  - Nvidia Switch
## Questions

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<th>Discovery Server</th>
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