Various All Flash Array Architectures

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Agenda

- Architectural Considerations
- Direct Connect Solutions
- Switched Solutions
- JBOF Solutions
- High Availability Solutions
Architectural Considerations

- Limited PCIe lanes for NVMe solutions
  - 96 lanes for dual socket Intel
  - 128 lanes for AMD
- Physical Limitations
- Cable Limitations
- Thermal Limitations
- Balanced Designs
PCIe Tradeoffs

- NVMe SSDs require PCIe lanes
- Network requires PCIe lanes
- How should you divide up the PCIe lanes?
Balanced Designs

Asymmetric

Symmetric
Direct Connect Solutions

- 1U 10 SSD
- 1U/2U 20 SSD
- Multi-node Systems
1U 10 SSD

- 40 PCIe lanes for SSD
- 40 PCIe lanes for slots
- 16 PCIe lanes LOM, etc
- Physical limitation out the back
1U/2U 20 SSD

- 80 PCIe lanes for SSD
- 8 PCIe lanes for slots
- 8 PCIe lanes LOM
- Limited I/O out of the box
- 5:1 ratio SSD to network
Multi-node Systems

- 4 nodes in a 2U system with 24 SSDs
- 24 PCIe lanes for SSD
- 32 PCIe lanes for slots
- 16 PCIe lanes LOM
- Physical limitation out the back
- Low blast radius
Switched Solutions

- 2U 24 SSD
- 1U 32 SSD
- 1U 36 SSD
2U 24 SSD

- 32 PCIe lanes for SSD
- 3:1 ratio at the switch
- 64 PCIe lanes for LOM and slots
- 1:2 ratio SSD to network
1U 32 SSD

- 64 PCIe lanes for SSD
- 2:1 ratio at the switch
- 32 PCIe lanes for LOM and slots
- 2:1 ratio SSD to network
1U 36 SSD

- 48 PCIe lanes for SSD
- 3:1 ratio at the switch
- 48 PCIe lanes for LOM and slots
- 1:1 ratio SSD to network
1U 32 JBOF Solution

- 64 PCIe lanes for SSD
- 2:1 ratio at the switch
- High bandwidth to multiple servers
Multi-node & JBOF System

- 4 nodes in a 2U system with 56 SSDs
- 40 PCIe lanes for SSD
- 16 PCIe lanes for slots
- 16 PCIe lanes LOM
- 800GbE total

Each Node

X16 LOM

From JBOF

x 8

X16 Slot

x6
2U 24 HA Solution

- 16 PCIe for SSD
- 3:1 ratio at switch
- 48 PCIe lanes for LOM and slots
- 1:3 ratio SSD to network
Which Architecture is Right?

- Depends on your configuration
- Depends on your application
- Depends on your usage model
- Depends on what is important to you.