Pre-Conference Seminar E: Flash Storage Networking

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Agenda

- **Networked Flash Storage Overview**
  - Mellanox – Rob Davis

- **The Effects on Networks Caused by Including Flash Storage**
  - Avago – Saurabh Sureka

- **The Effects on Flash Storage Systems Caused by Networking**
  - Samsung – Tameesh Suri and Gunna Marripudi

- **Competing Technologies and Architectures for Networked Flash Storage**
  - Chelsio – Asgeir Eiriksson

- **The Market for Networked Flash Storage**
  - DellOro – Chris DePuy
Networked Flash Storage Overview

- Why networked flash storage?
- What’s involved in networking flash storage?
- What do typical implementations look like?
- What are the tradeoffs?
Why Network Flash Storage?

- There are advantages to shared storage
  - Better utilization of capacity
  - Scalability
  - Easier to manage
  - Cluster applications
  - Server Virtualization
  - Fault Isolation
- Shared Storage requires a Network
Better Utilization, Scalability, and management

- Driven by Hyper Scale market need compute efficiency
  - Best possible utilization of capacity, rack space, power, cost
- Scalability
- Easier to manage
Enabled by Shared Storage

- Cluster applications
  - Oracle Rack
  - DB2
- Server Virtualization
- Fault Isolation
What’s involved in networking flash storage?

- Equipment/Hardware
- Software
- Vendors/Suppliers
Equipment/Hardware needed to networking flash storage

- Pick a Network Technology
  - Ethernet, Fibre Channel, InfiniBand, SAS, PCIe
- Make sure your storage device supports this
  - N/A if doing Hyper Converged or Scale Out
- Network Adaptors for your servers
  - NIC or LOM – Ethernet
    - iSCSI
    - iSER, NVMeOF
      - RDMA support
  - HBA – Fibre Channel or SAS
  - HCA – InfiniBand
  - Bus Extender – PCIe
- Switches
Software needed to networking flash storage

- Driver software for your Adapters that matches the OS on your servers
- Storage Management software
  - Often part of the OS
  - Open Source – SDS
- Switch and/or Fabric Management software
  - Usually from switch supplier
  - Open Source – SDN
Who are the Storage Networking Vendors

- **Adapters**
  - Mellanox, Avago, QLogic, Intel, PMC, others

- **Switches**
  - Cisco, Arista, Mellanox, Brocade, Dell, HP, Lenovo, others

- **Arrays**
  - EMC, NetApp, HP, Dell, IBM, HGST, Violin, many others

- **Software**
  - VMWare, Microsoft, Red Hat, Symantec, open source, others
What do typical implementations look like?

- Components, Boxes, Topology, etc.
Some assembly required
Where best to plug in?
Some assembly required
Classic Network Architecture
New Leaf-Spine Architecture
SAS/PCI Architecture
Scale-Out Architecture

- Scale-out grows capacity and performance in parallel
- White Box Servers with a clustered storage application
  - Ceph, ScaleIO (now EMC)
- Need high performance network
  - High bandwidth and low latency
- Flash storage is added to augment or replace disks for performance
Hyper-Converged

- Collapse Separate Compute & Storage
  - Integrated Compute-Storage nodes
- Integrated workload
  - Hadoop, MongoDB, Nutanix
  - SMB-D, V-SAN
What are the tradeoffs: Local vs. Shared

- Performance: Depends on remote and local controller, network performance and remote controller load

- Trade-offs:
  - Better utilization of capacity
  - Scalability
  - Management ease
  - Applications
    - Server Virtualization
    - Cluster
  - Fault Isolation
Questions?

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