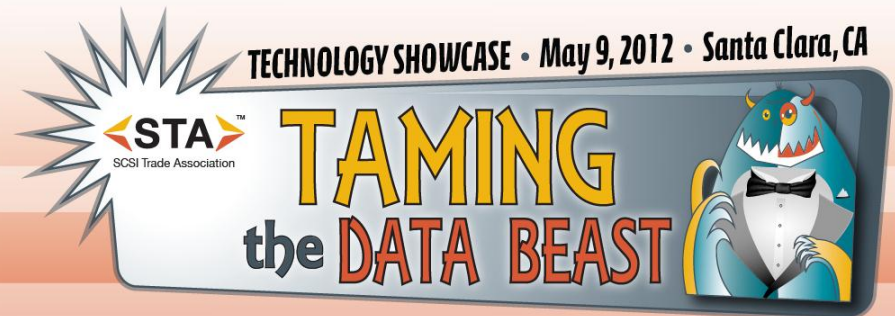


# Reaping the Rewards of SAS Deployments

Dennis Martin, President, Demartek



Demartek provides real-world, hands-on research & analysis by focusing on industry analysis and **lab validation testing** of server, network, storage and security technologies, for the small and medium business (SMB) environment and the large enterprise.



- SAS: A device interface
- SAS: A host interface for storage systems
- SAS: A “modest” shared storage environment
- Connectivity Solutions – Cabling options
- Demartek reference information



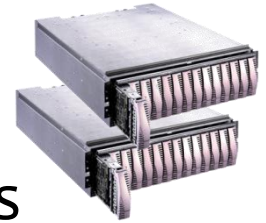
# SAS: A Device Interface

- Enterprise interface for HDDs & SSDs
  - Broad adoption of 6Gb/s SAS
  - End-of-life for FC (4Gb/s) as drive interface (not to be confused with FC SAN interface)
- Dual-port and wide port implementations provide higher transfer rate possibilities
- Expect to see 12Gb/s SAS as a primary device interface for enterprise SSDs in the future
- 12Gb/s HDDs expected to follow

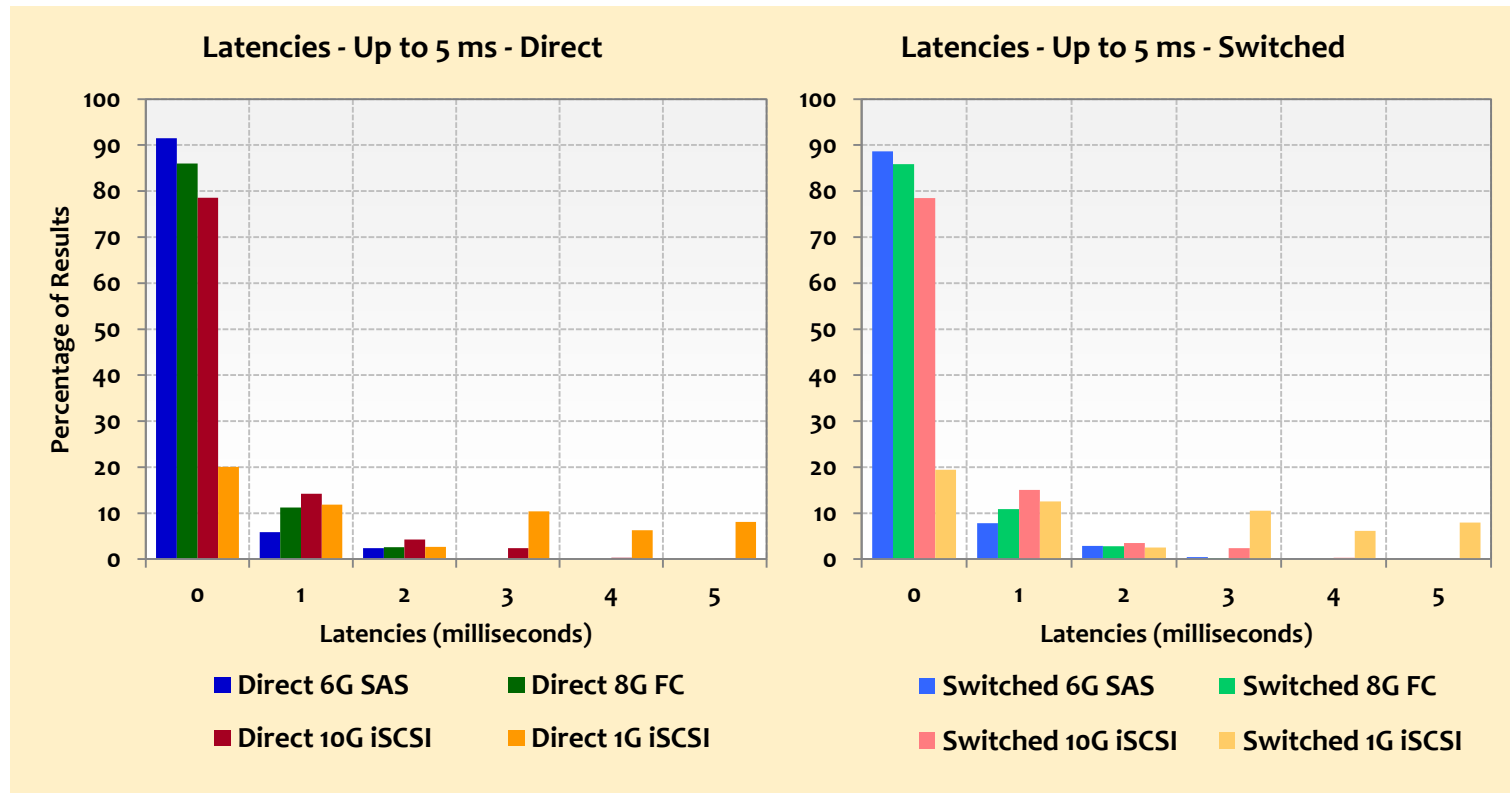


# SAS: A Host Interface

- Very low latency for storage systems
  - Lower than 8Gb/s Fibre Channel in some cases
  - Lower than 10Gb/s iSCSI
- Becoming another viable external host interface for storage systems
  - We are increasingly seeing SAS along side of FC and iSCSI for block interfaces
  - Examples: IBM DS3000, NetApp E2600



## Very low latency for connecting storage systems

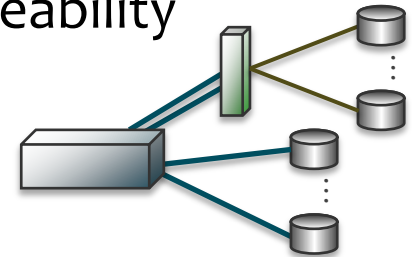


Source: Demartek



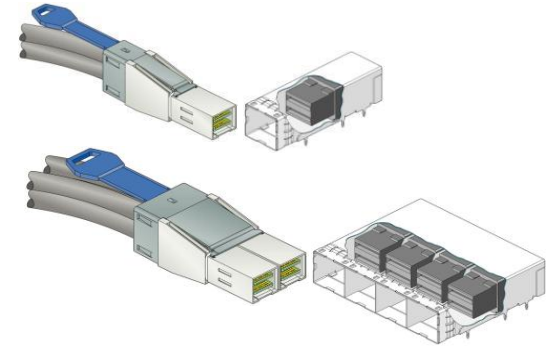
# SAS: “Modest” Shared Storage

- “Fabric” capabilities that make it ideal for “in the room” shared storage environments
  - Some OEMs ship server and storage solutions today with a SAS switch included
    - Allows for multiple servers to share storage
    - Provides centralized location for improved serviceability
  - Windows Server 2012 storage features
    - Supports SCSI enclosure services
    - Requires SAS for “Storage Spaces” in clustered configurations
    - Supports shared SAS backplane configurations
- Adequate for solutions requiring >2K devices



# SAS Cabling Options

- **Passive copper**
  - Within a rack or to a nearby rack
    - Typically 6m – up to 10m for 6Gb/s SAS
- **Active copper**
  - 2x-3x distance of passive cables
  - Compatible with 6Gb/s SAS and 12Gb/s SAS
  - Thinner and lighter than passive cables
- **Fiber optic**
  - Up to 100m
  - Will become more interesting as the clock rates increase for 12Gb/s SAS and beyond
- **Newer connectors – MiniSAS HD (High Density)**
  - Supports 6Gb/s SAS and 12Gb/s SAS
  - Twice the port density (x4 and x8)
  - Supports passive/active copper and optical





- Demartek Low-Latency Interface Evaluation
  - [www.demartek.com/Demartek\\_Low\\_Latency\\_FC\\_iSCSI\\_SAS\\_Evaluation\\_2011-10.html](http://www.demartek.com/Demartek_Low_Latency_FC_iSCSI_SAS_Evaluation_2011-10.html)
- Demartek Storage Interface Comparison
  - [www.demartek.com/Demartek\\_Interface\\_Comparison.html](http://www.demartek.com/Demartek_Interface_Comparison.html)
- Demartek SSD Deployment Guide
  - [www.demartek.com/Demartek\\_SSD\\_Deployment\\_Guide.html](http://www.demartek.com/Demartek_SSD_Deployment_Guide.html)
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# Thank You!

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