

Introduction

The foundation of an enterprise computing environment is based on high performance and high reliability. Hitachi Global Storage Technologies (Hitachi GST) understands that multi-user enterprise systems require the fastest technology available to meet their



data-intensive processing needs. To address these requirements, Hitachi GST is working with industry leaders to double current storage performance standards with the introduction of 6Gb/s Serial-Attached SCSI (SAS) solutions. Fully interoperable with existing SAS 3Gb/s technology,

the new SAS solutions will double data storage I/O rates to 6Gb/s. New SAS 6Gb/s hard drives from Hitachi provide a key component of the overall SAS infrastructure, and will help meet the ever-increasing performance requirements of enterprise computing.

Initially introduced in 2004 at 3Gb/s, SAS interfaces significantly increased the available bandwidth offered by SCSI-based storage systems. The current introduction of SAS 6Gb/s doubles the available bandwidth of high-performance storage systems. Hitachi is already working with industry leaders to develop the next-generation SAS infrastructure, which will double throughput again to 12Gb/s in the 2012 timeframe. As with previous performance upgrades, the future 12Gb/s SAS components will be fully interoperable with existing SAS solutions.

SAS 6Gb/s—Enterprise-class Storage Solutions from Hitachi GST

The market for storage solutions is currently evolving toward two technologies: Serial ATA (SATA) for single-user systems where performance is less critical, and SAS for enterprise applications where performance and reliability are primary requirements. Legacy technologies, such as SCSI and parallel ATA (PATA), are being replaced by SATA and SAS. Fibre Channel will continue to serve as a system interconnect structure, but its use as a storage device interface is expected to diminish and eventually be replaced by SAS. Hitachi GST has also announced plans to deliver flash-based solid-state drives (SSDs) with SAS and Fibre Channel interfaces early in 2010.

Fast response time is critical for a wide range of enterprise applications, including online transaction processing, real-time business analytics and timely delivery of data-intensive content-on-demand, such as multiple channels of streaming video. 6Gb/s SAS-based solutions are ideal for meeting these challenges and are also well-suited for environments supporting scientific workstations or other infrastructures with complex paths and high volumes of I/O traffic. Fast throughput, reliability and scalability are essential in these applications. SAS 6Gb/s solutions from Hitachi will deliver the following key benefits:

- Double storage system bandwidth from 3Gb/s to 6Gb/s
- Preserve hardware investments by enabling two SAS 3Gb/s devices to be multiplexed to deliver 6Gb/s throughput
- Enhance configuration flexibility by enabling a single storage solution to be associated with, and discovered by, multiple hosts via expander zoning
- Provide dual interfaces that enable a SAS array to be connected to two different systems or support fault-tolerant redundant connections to the same system
- Increase cabling lengths from 6 to 10 meters and support mini-SAS connectors for more space-efficient wiring installations
- Provide support for SATA-based storage arrays

Preserves Hardware Investments

As an evolutionary technology, SAS 6Gb/s extends the viability of your existing investments in SAS 3Gb/s systems. A fully interoperable solution, IT personnel have the choice of leaving SAS 3Gb/s systems in place or multiplexing them together to achieve higher bandwidth through migration to SAS 6Gb/s technology.

Enhances Configuration Flexibility

SAS 6Gb/s delivers several enhancements that deliver additional flexibility when configuring enterprise data center infrastructures. Extending cabling distances from six to 10 meters provides a wider range of configuration options in data centers that have grown increasingly complex. Support for 6Gb/s mini-SAS connectors provides more space-efficient, cleaner cabling options between systems and large disk arrays. SAS 6Gb/s drives from Hitachi are configured with dual ports so that two different systems can access the same drive or redundant connections can be established for additional system resiliency.

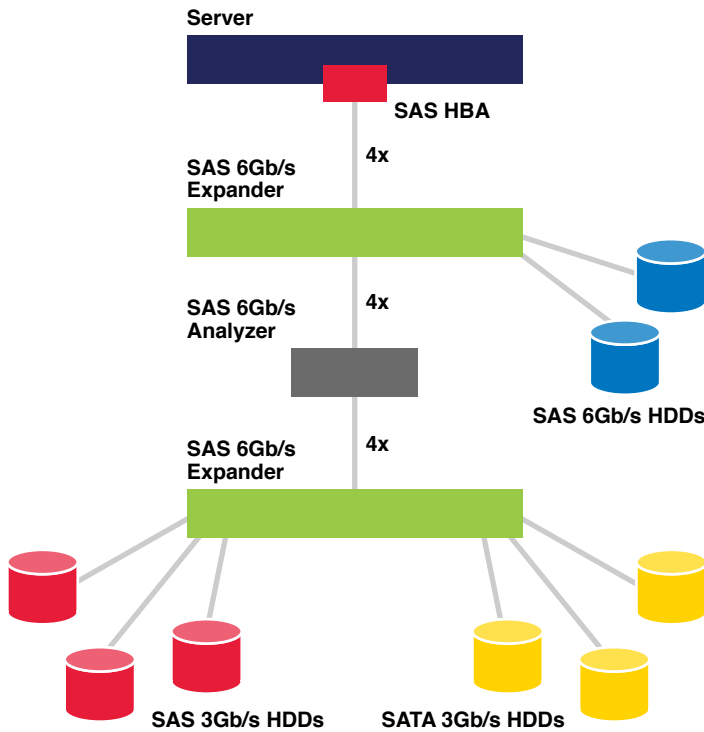


Figure 1. The SAS 6Gb/s infrastructure is ideal for providing servers with high-speed connectivity to data storage systems across the enterprise computing environment

As shown in Figure 1, the high-performance SAS 6Gb/s infrastructure provides enterprise servers with fast access to a variety of data storage systems. This configuration was successfully demonstrated at the SCSI Trade Association Open House held in San Jose, CA in May, 2008. A host bus adapter (HBA) is used to provide connectivity between the server and a SAS 6Gb/s expander. The role of the SAS expander is to provide

additional ports for attachment of peripheral units, such as the SAS 6Gb/s hard drives depicted in blue.

Directly below the SAS 6Gb/s expander is a SAS 6Gb/s analyzer, which is deployed to monitor network traffic between the two SAS 6Gb/s expanders. The lower SAS 6Gb/s expander functions as a connection path to multiple lower-performance storage systems, including three SAS 3Gb/s hard drives and three SATA 3Gb/s hard drives.

Each host bus adapter port provides 6Gb/s of bandwidth to its attached devices. Devices across the SAS infrastructure are provisioned with full 6Gb/s connectivity, and are able to transfer data at their maximum speed dependent on current port topology loading conditions.

- Two 6Gb/s devices on the same HBA port transferring data at different times will benefit from full 6Gb/s connectivity
- Two 6Gb/s devices on the same HBA port transferring data simultaneously will share 6Gb/s of bandwidth
- Two 3Gb/s devices on the same HBA port transferring data simultaneously can be multiplexed so that both devices operate at full bandwidth over the 6Gb/s connection

Increased Performance for Enterprise Computing Environments

SAS 6Gb/s will bring a wide range of benefits to ever-expanding enterprise data centers, and the new generation of SAS 6Gb/s drives from Hitachi will be at the heart of the new installations. By combining high performance with industry-leading reliability and innovative design, Hitachi continues to lead the way as enterprise computing evolves to meet the demands of the future.

Hitachi Global Storage Technologies trademarks are intended and authorized for use only in countries and jurisdictions in which Hitachi Global Storage Technologies has obtained the rights to use, market and advertise the brand. The Travelstar trademark is authorized for use in the Americas, EMEA, and the following Asia-Pacific countries and jurisdictions: Australia, Hong Kong, Japan, New Zealand, South Korea and Taiwan. Contact Hitachi Global Storage Technologies for additional information. Hitachi Global Storage Technologies shall not be liable to third parties for unauthorized use of this document or unauthorized use of its trademarks.

References in this publication to Hitachi Global Storage Technologies' products, programs or services do not imply that Hitachi Global Storage Technologies intends to make these available in all countries in which it operates.

Product specifications provided are sample specifications and do not constitute a warranty. Information is true as of the date of publication and is subject to change. Actual specifications for unique part numbers may vary. Please visit the Support section of our website, www.hitachigst.com/support, for additional information on product specifications. Photographs may show design models.

© 2009 Hitachi Global Storage Technologies

Hitachi Global Storage Technologies
3403 Yerba Buena Road
San Jose, CA 95135 USA

Produced in the United States 03/09.
All rights reserved.