LSI

Storage. Networking. Accelerated.™

Case Study

The Pittsburgh Supercomputing Center Chooses LSI and Seneca Data Technologies to Archive Critical Data

LSI and Seneca Data improve performance and reduce costs with a multi-petabyte archive storage solution for the Pittsburgh Supercomputing Center

The Challenge:

The Pittsburgh Supercomputing Center needed to update its storage solution. It had been using a tape based solution, but a more cost effective and higher performing system was needed.

The Solution:

Seneca Data proposed a solution using two servers, each with a 6Gb/s LSI SAS 9201-16e PCIe HBA connected to JBODs through dual LSI SAS6160 switches. LSI® MegaRAID® SATA+SAS controller cards are designed to provide reliability, availability and performance in demanding computing environments. Having data transfer rates of up to 6Gb/s per port, the MegaRAID controller brings users new features and improved performance.

The Result:

The solution gave PSC an immediate performance increase with data transfer rates going from 300MB/s to 3GB/s. PSC expects to double this as they move forward.

Data protection is critical at the Pittsburgh Supercomputing Center (PSC), a joint effort of Carnegie Mellon University, the University of Pittsburgh and the Westinghouse Electric Company. The PSC provides university, government and industrial researchers with access to systems for high-performance computing, communications and data-handling. The information generated at the PSC, supporting every major field of unclassified research, is almost irreplaceable. Protecting this valuable data is a core function at the PSC.

PSC Data Repository

The PSC supports the efforts of thousands of scientists across the country. For example, they are a leading partner in the Extreme Science and Engineering Discovery Environment (XSEDE), the National Science Foundation program of coordinated cyber infrastructure that replaces the TeraGrid project, which was used by more than 10,000 scientists to complete research projects at limited cost. The data generated by research projects is archived for future retrieval.

Improving Performance, Reducing Costs

"We had been using a previous data migration facility (DMF) based tape in an automated environment. The system worked well enough when we got it, but it was time to move on to a solution that could provide more performance and a better return on our investment," according to Jason Sommerfield, Operations Specialist at PSC.

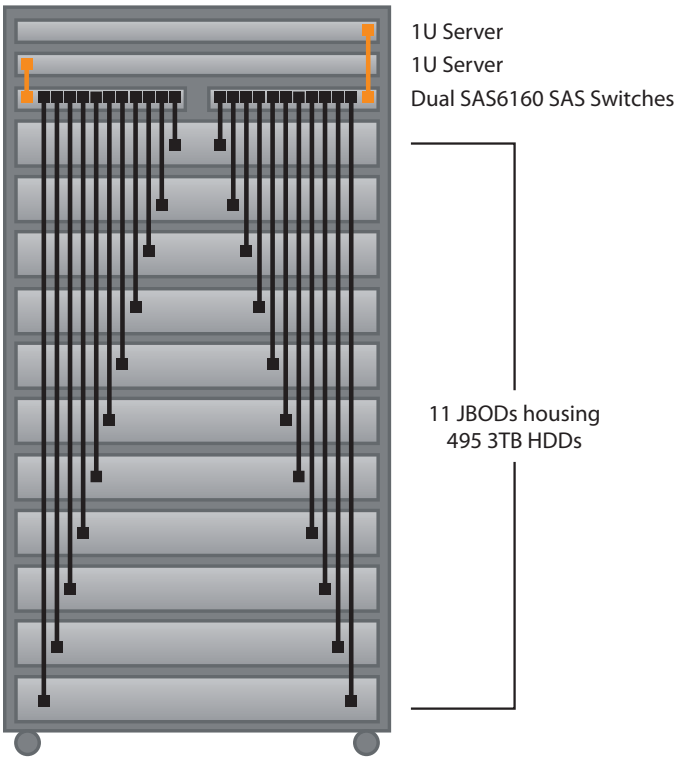
"In our pre-production environment we have been able to get a 10-fold increase in performance over our previous solution. With further tuning we believe that we can double that performance again."

Jason Sommerfield
Operations Specialist
PSC

Before choosing a design the PSC considered a wide range of options to ensure that they found the right solution for their needs. "We looked at a number of different solutions, including newer DMF tape solutions and solutions based on the ZFS file system that use a fibre channel SAN," said Sommerfield, "At the end of the day, the solution that Seneca Data brought to us was the only one that provided the right level of performance, scalability and affordability."

For overall capacity, the PSC needed a solution that could scale to 10PB. "We needed something that could grow with us." said Sommerfield, "This solution allows us to add 1.5PB of raw storage with each cabinet. As our storage need grows, we can put another cabinet in the pool and add it to the file system."

The Seneca Data solution consisted of a single server cabinet with dual servers running the FreeBSD OS and the ZFS file system. Each of the servers featured a 6Gb/s LSI SAS 9201-16e PCI Express® Host Bus Adapter (HBA) connected to 495 3TB SATA hard drives. The drives are housed in JBODs that connect to the HBAs through dual LSI® SAS6160 switches. The servers in each pair work in tandem and are redundantly connected through the switches to the hard drives for failover access.



Dual server solution using SAS switches

"One of the things that really impressed us with the Seneca Data solution was the value proposition of the LSI SAS switches," said Sommerfield. "The switches allow us to support many hundreds of devices for each server pair. Then we aggregate multiple pairs together into a single large file system."

"It was important to us that we provide quality components from vendors that we can trust. A key reason customers choose Seneca Data solutions is that we use quality products, like those from LSI. The support from LSI has always been great; they have been there for us and our customers every step of the way."

Chuck Orcutt
Nexlink Product Line Manager
Seneca Data

The SAS switches support 6Gb/s speeds across each of its16, 4-lane SAS ports for a total of 24Gb/s per port and 384Gb/s aggregated, full duplex bandwidth per switch. With support for SAS and SATA, connectivity of up to 1000 devices and T10 zoning compliance, the SAS6160 switch has the performance and scalability to meet the needs of the most demanding environments.

"The performance has been outstanding. In our pre-production environment we have been able to get a 10-fold increase in performance over our previous solution" said Sommerfield, "With further tuning we believe that we can double that performance again."

"In the end, we got just what we needed," said Sommerfield, "a reliable, cost-effective solution with performance that far exceeds our old solution."

Product Overview – LSI

LSI MegaRAID SATA+SAS controllers provide a new level of reliability, availability, and performance to businesses that are facing storage challenges driven by unprecedented data growth. The MegaRAID SAS 9280-16i4e controller, with sixteen internal and four external ports, supports internal drive storage and external JBOD expansion. Using external SAS ports, multiple JBODs can be connected to a server, providing a more scalable and affordable solution for growing storage requirements.

The LSI SAS6160 switch is a ½ width, 16-port switch in a 1U form factor. The switch extends the capabilities of SAS in direct-attached storage (DAS) environments by allowing multiple servers to connect to one or more independent storage systems. The SAS6160 switch can provide customers with a lower-cost and easier to use storage networking option for storage installations in cloud computing, mega data-center and small- to medium-sized business (SMB) environments, over separations of up to 25 meters.

About Seneca

Seneca is a leading U.S.-based custom computer manufacturer and value-added distributor with over 30 years of industry experience. Through engineering expertise and services that bring value to the total technology lifecycle, Seneca meets the needs of SMB, government, education, and OEM and ISV customers. **www.senecadata.com**

Build Today

You can use the same LSI technology as the Pittsburgh Supercomputing Center. Contact Beau Beatty at **beau.beatty@lsi.com** for more information.

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