THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC

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Global Leader in Software-Defined Storage.

George Washington University
Case Study

GWU is Top-of-Class with Information Availability, Accuracy, and Security from Nexenta

Washington, D.C.
www.smhs.gwu.edu
Research and Education

Summary

Challenge: Not enough storage capacity, compromised data security and accessibility
Solution: NexentaStor High Availability Cluster
Platform: Dell, Supermicro, HGST
Use Case: Business Continuity / Near Line Archiving

Benefits:
- Versatility and freedom from vendor lock-in
- Greater data integrity and security
- Exceptional support
- Effective storage allocation
- Simple management
- Lower TCO

Business Overview

The George Washington University School of Medicine and Health Sciences (SMHS) is the 11th oldest medical school in the country and has been at the forefront of medical education since its establishment. SMHS runs highly-ranked programs in the health and biomedical sciences, carrying out cutting-edge investigations into many areas of medicine and biomedical sciences, including cancer, epilepsy, and genomics and proteomics.

SMHS research and teaching activities depend on seamless access to state-of-the-art IT. The IT group supports the school's 1500 staff and faculty by taking care of everything from desktop support and user training to managing server and storage resources, including web servers and computational clusters for genomics analysis.

> *With Nexenta, we can maximize the effectiveness of our expanding research programs by minimizing the amount of funds that have to go to procuring and managing storage.*
>
> Garrett Fields
> Technical Support Analyst
> GWU, SMHS

Challenges

Until recently, the university data center housed SMHS's group and home drives, but as the school's researchers generated more and more data, that arrangement became increasingly dissatisfactory. The university didn't charge researchers by the terabyte, but contained costs by putting a cap on the amount of storage they could use. Researchers were turning to workarounds – such as setting up external hard drives in their labs – that compromised both data security and accessibility.

"We needed a better solution," says Garrett Fields, technical support analyst at SMHS. "Our researchers were looking for huge amounts of storage, and we thought we could meet their needs more cost-effectively than the university data center. But we were only going to take on responsibility for storage provision if we could ensure excellent performance and extraordinary reliability, as we achieved cost savings."

The SMHS IT team opted for a ZFS software-based storage system, because it offered versatility and freedom from being tied into certain vendors or hardware, as well as greater data integrity. "We wanted to be able to buy enterprise-quality drives inexpensively, rather than having to pay inflated prices to get specific name brands," says Fields.

Data accuracy was the quality that set ZFS apart from other software-based storage solutions. "Whether from cosmic rays hitting hard drives, loose cables, or bad controller cards, garbage gets on a disk," explains Fields. "ZFS checksum keeps checking and repairing data glitches to protect against data corruption, which is essential for the integrity of our data and our research. Plus, we liked how it had built-in Access Control List (ACL) file properties that matched those found in Windows."

In evaluating ZFS, Fields realized that he didn't want to just put ZFS up on a server: he wanted the quality of commercial support as well as the open-source benefits of ZFS. SMHS evaluated three vendors, including Nexenta. "If we ran into problems we wanted to be sure we'd have somebody to fall back on, who could help us resolve issues rapidly," explains Fields. "We chose Nexenta because it offered the best support, and because of its depth of expertise and focus on storage. We felt confident that we were choosing experts."

System Configuration

- 48TB Capacity
- NexentaStor HA Cluster
- Two Dell R720 Servers
- 128GB System Memory
- Supermicro 847E26-RJBOD1
- 24 x 2TB SAS Capacity Drives
- Two sTec ZeusRAM Write Cache

Solution and Benefits

Solution

Nexenta provides free presales technical support and professional services, so the SMHS IT group began by calling in Nexenta presales technical support, to assess the amount of storage and the school's reliability requirements in order to plan hardware purchases, including the makes and models of servers and enclosures. Once the hardware arrived, the group called in Nexenta Professional Services to configure the storage. Focused on reliability rather than driven by a deadline, the group started receiving its hardware in April and had users connected to files in mid-July.

Migration of data was easy and straightforward. When the team got the storage up, it was able to access it just like a Windows share and used Microsoft tools to do the data migration.

High availability (HA) was one of the key differentiators in SMHS's decision to select the Nexenta solution. While some competitors can allow HA add-ons, Nexenta provides the plug-in and actively supports it. The IT group configured its Nexenta system to run on two storage nodes in its data center, with only one working at a time. Both nodes tie in to one set of drives. If something happens to active server, HA detects the problem and fails over to the other server so quickly that most users won't even notice.

The Nexenta configuration provides complete disaster recovery capabilities. The SMHS IT group houses a third Nexenta server in the university's remote data center. The Nexenta software is configured to make frequent incremental syncs between the main system and the backup system. If something brought down its entire data center or data system, SMHS could transition the remote backup server into an active server with a relatively recent state from the remote location.

The SMHS uses zil caches for SSD, providing instant writes for top performance. It also uses thin provisioning for its virtual server hard drives. Storage for a given group will expand up to the amount allocated to it, but unused storage remains available for other groups until needed, making for more effective storage allocation.

The SMHS IT group doesn't yet use automated tiered storage, but has tested it to ensure that it can use it in an emergency to turn its backup node into the primary system. It doesn't yet boot from SAN either, but wanted the capability so that in future some servers could be diskless and access Nexenta across the network, to allow all data to be stored in a redundant high-performance location.

Benefits

SMHS researchers who used to rely on external hard drives now enjoy much greater data security and ease of access. With data put on a properly sized, centrally maintained, and backed-up group drive, it's more protected than before and available from whatever workstation a researcher wants to use. Other users barely noticed the difference. The system was down for a few hours during a weekend, and then it came back. Users continued to work with shares in the same ways, and to get the performance and reliability they expect. Going forward, Fields predicts that performance will continue to match user expectations – or even set new, higher expectations – even while storage volumes grow.

Though most users might not see the change, behind the scenes, the Nexenta difference is huge. "Our network speeds are currently the limiting factor," explains Fields. "But once we get those upgraded, users might well notice that the system is faster. In the data center, we're seeing that already; we can move things around more quickly than before." Network issues aside, there's also scope for greater performance because most users on the system are Windows servers accessing Windows File Share, but Nexenta can also support iSCSI service directly connected to servers as a virtual hard drive.

Thanks to the administrative ease of Nexenta, the IT group was able to take on its new storage responsibilities without adding staff. Though the Nexenta solution requires approximately one FTE to administer it, existing staff had the bandwidth to do it, because they no longer needed to spend time managing and troubleshooting researchers' external drives and providing them with network access. Several members of the IT group can share administrative responsibilities because Nexenta doesn't require special expertise: even when the person who spent the most time with the Nexenta solution went on paternity leave, his colleagues were able to fill in for him without too much additional effort.

The greatest benefit for SMHS was financial. Scaling up is far more cost-effective, too. When the group reached 70 percent capacity on its backup server, it was able to add 16 TB for less than $7,000.

"With Nexenta, we can maximize the effectiveness of our expanding research programs by minimizing the amount of funds that have to go to procuring and managing storage," says Fields. "Thanks to Nexenta, we've managed to free our researchers from restrictions on their storage, so they can move full steam ahead on their research, confident that they're capturing and safeguarding all the data their projects generate."

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Origination. 20150413