



CUSTOMER SUCCESS

Summary

Industry: Academic Research

Challenge: Increasing use of HPC@USU services was taxing existing storage systems, limiting the center's ability to support burgeoning university research projects

Solution

- Panasas ActiveStor scale-out NAS appliances with the integrated PanFS parallel file system
- Comprehensive Panasas technical support

Results

- Steadfast reliability with unmatched performance and seamless scalability
- Simple and care-free storage management

Utah State University Center for high Performance Computing Uses Panasas ActiveStor to Accelerate Academic Research

The Center for High Performance Computing at Utah State University (HPC@USU) provides campus-wide HPC resources to facilitate world-class research and scientific discovery. The center relies on Panasas® ActiveStor® to provide cost-effective performance, scalability, and ease of use to fuel research excellence. Established in 2005, the Center for HPC serves a growing number of users, including the science, engineering, and mathematics departments. The center plays a key role in driving campus-wide technology advances, raising the visibility of the university's leadership in advanced academic research. The center's resources are used extensively for big data design and discover applications— researchers study fluid dynamics, perform climate modeling, and solve complex quantum chemistry problems. One up-and-coming power user is the university's Center for Integrated BioSystems which uses the HPC@USU clusters to analyze massive data sets generated by its genome sequencer.



Panasas delivered an extremely reliable storage solution for us— and it just keeps going.”

Dr. Eric Held

Chair, HPC@USU Faculty Steering Committee



The Challenge

Due to its success, by 2009, the center needed to significantly expand its HPC and storage capabilities. One of the largest groups of users from the Mechanical Engineering Department was running ANSYS FLUENT, a computer-aided engineering (CAE) application, for reactor flow analysis. ANSYS had adapted the application to take advantage of the Panasas® PanFS® parallel file system so that it would run much faster and significantly reduce the time for researchers to run the design application.

Additionally, because large numbers of users run jobs simultaneously, even applications that were not parallelized ran faster thanks to the Panasas parallel file system.

The Solution

The director and staff at the center had struggled with problematic open source parallel file systems in the past and were therefore very cautious when considering their options for a new parallel storage system. They were very impressed with Panasas ActiveStor for its ease of use, reliability, and cutting edge performance, coupled with the superior customer support provided by Panasas. The decision to deploy ActiveStor was ultimately quite simple to make, given the staff's IT support limitations.

The first two ActiveStor shelves, containing 30TB of storage, were installed quickly and easily. The transition to the new storage system went seamlessly and users were pleased with the performance improvements even as more users came on line.

Panasas ActiveStor has proven to be an extremely reliable solution for the continually growing center. Additional shelves have been added to the system over time, increasing total capacity and throughput to support the growing number of users and applications.

Enabling Climate Research

Dr. Jiming Jin, Assistant Professor in the Natural Resources Department, is one of the major users of the HPC@USU. Funded by NOAA and NSF, Dr. Jin and his graduate students use the center for climate modeling research and to prepare recommendations for regional water management and forecasting. They collect vast amounts of climate data and develop complex analytical models. These models consume up to 150TBs of storage capacity and can take more than a year to develop and up to two years to analyze so they rely heavily on the HPC@USU for cluster computing and fast, reliable storage to complete their research.

“Panasas storage has virtually managed itself. even during the period when we didn’t have anyone dedicated full-time to administer the center we didn’t have any problems or complaints about the storage. Our users are happy with the performance which allows them to do more with their big data workloads and get results faster.”

Dr. Eric Held

Chair, HPC@USU Faculty Steering Committee



Overcoming On-going Growth Challenges

Over the past two years, the center has undergone a number of changes. The full-time director has left the university and the center is now guided by a steering committee of 10 faculty members representing the departments that use the HPC@USU most. Dr. Eric Held, professor of Plasma Physics, is the current chairman responsible for overall center management. Maintaining the laboratory, in addition to his duties as full-time professor and researcher means that the storage system has to be as trouble-free and simple to manage as possible.

USU has continued to support and invest in the Center for High Performance Computing even though many universities leverage the HPC facilities at national laboratories for research, paying on a per-use basis, rather than maintaining their own HPC centers. Using the national labs could potentially eliminate on-going capital equipment investment along with the associated operating and maintenance expenses. However, while the national labs maintain very large compute clusters, they are heavily used so getting access to them frequently involves long delays and shared processing queues. More importantly, the HPC@USU has demonstrated that it is a valuable asset for the university. The center provides a major benefit to students and faculty, helping to draw top talent and research funds to the university.

The modular design of both the compute cluster and the Panasas storage lends itself well to scaling to support

increasing user needs. Adding computer cores and ActiveStor shelves has allowed the center to increase processing power, storage capacity, and throughput to serve growing demands—capacity is up seven-fold since the initial Panasas installation. Today the compute clusters are in constant use, typically at 75-80% utilization, leaving enough capacity so that the systems are rarely maxed out. The center is a big part of USU's push to increase awareness of the university as a leader in academic research.