



CUSTOMER SUCCESS

## Summary

**Industry:** Academic Research

**Challenge** Performance demands at the IDRE datacenter exceeded the throughput capability of its legacy NAS systems causing lost productivity for users and maintenance nightmares for system administrators

**Solution**

- Panasas ActiveStor 12 scale-out NAS high performance storage
- Panasas ActiveStor 11 for balanced cost/performance for general purpose, long term storage
- Modular, blade-based storage that scales as needs grow

**Results**

- Dramatically increased bandwidth to handle increasing performance demands
- Linear scalability to meet evolving throughput and capacity demands
- Modular “everything you need” packaging to simplify planning, budgeting, and charge-back within the private cloud

# UCLA Institute for Digital Research & Education Uses Panasas® ActiveStor™ to Accelerate Academic Research and Mathematical Engineering

The Institute for Digital Research and Education (IDRE) at the University of California at Los Angeles (UCLA) provides a high performance computing (HPC) private cloud to empower university scholars with the computational resources they need for core design and discovery. Through the collaborative efforts of its experienced team of researchers, IDRE helps make UCLA a world leader in high-performance computing, visualization research, and education.



“Panasas is one of my favorite vendors. It’s a company that we like dealing with and I know that the Panasas team has my back.”

**Dr. Scott Friedman**

Chief Technologist, UCLA Institute for Digital Research and Education

Throughput (GB/s) Vs. Response Time (IOPS)  
Traditional NAS systems were designed for fast response (IOPS) and managing lots of little files and metadata operations. However, the users of big data at UCLA, those doing weather, physics, and medical research, generate extremely large data files. The sheer number of simultaneous users resulted in the overwhelming need for more throughput than their legacy NAS systems could provide. Even though the storage CPUs were only 10-20% utilized, the network pipes were overloaded and application performance suffered from I/O bottlenecks.

The Panasas parallel file system simultaneously utilizes all available disks and network paths. I/O demands are balanced across the entire system providing much higher aggregate throughput. When an ActiveStor shelf is added, the compute cluster automatically spreads the I/O load over the additional disks, director blades, and network paths, eliminating bottlenecks.

“You don’t have to understand the technology to see how you would get a dramatic increase in performance. I don’t care how many spindles you put behind the NAS controller, you’re going to run out of network bandwidth to the controller. It’s just not going to be able to handle it. Panasas, on the other hand, with its parallel file system, uses all of the network paths to access data directly, not bottlenecked by individual controllers.”

**Dr. Scott Friedman**

Chief Technologist, IDRE



**The Challenge**

IDRE is a research institute that provides computational and storage services to the UCLA research community across virtually every academic department.

This private cloud supports everything from computational cluster storage to experimental research in 3D visualization, allowing students to participate in such virtual activities as exploring ancient Roman temples to conducting behavioral pharmacology research into substance abuse treatment methods.

The demands on the IDRE computing center had grown beyond the performance capabilities of its legacy storage systems which typically ran up to 1,000 jobs at any one time. Users constantly complained about lackluster performance. The 10-Gigabit network links to the legacy NAS storage systems were frequently saturated causing nightmares for system administrators who had to figure out where the problems were and then painstakingly move files around to alleviate the bottlenecks.

**The Panasas Solution**

Dr. Scott Friedman, Chief Technologist responsible for setting IDRE’s strategic direction for HPC, was tasked with - finding a solution to the performance problems. Dr. Friedman acted as a translator between the academic community and computing technologists, balancing user requirements with technical capabilities and budget.

The university recently received a National Science Foundation (NSF) grant to build a large compute cluster for plasma physics research. Friedman researched alternative HPC storage solutions looking at technologies from Panasas, HP, Sun, Isilon, BlueArc, and DataDirect Networks before ultimately selecting Panasas ActiveStor.

## UCLA's Visualization Portal Transcends Time and Space

UCLA's Virtualization Portal provides an immersive virtual reality experience. The portal uses a Linux cluster, managed by IDRE and applications such as VrNav, uSim, and Sound Engine to enhance the visualization experience for groundbreaking research at UCLA. This experiential research is used in such diverse disciplines as architecture, performing arts, archaeology, and behavioral pharmacology.



Friedman knew a parallel file system would eliminate performance bottlenecks that plagued IDRE's legacy NAS storage systems. "In addition to stellar performance, Panasas had a very simple, clean model that worked well for us," said Friedman. "One of the other key decision factors was that we just liked the Panasas people the most. We were looking for a partnership, not just products."

IDRE purchased four Panasas ActiveStor 12 shelves with a total capacity of 160TB – more than sufficient to support IDRE's largest users. "ActiveStor 12 performed exceptionally well for scratch space, but was more than we needed for our general purpose storage," noted Friedman. He then evaluated ActiveStor 11, a balanced cost/performance alternative that fit well with IDRE's budget requirements. So IDRE purchased that solution for general purpose, longer term storage.

### Scalability and Modularity

ActiveStor's modular design ideally suited IDRE, allowing the infrastructure to scale as demand grew. Each shelf provided additional capacity, metadata management, and bandwidth to support user needs. Both ActiveStor 11 and ActiveStor 12 can share a single global namespace, making installation and management a breeze. In the year since the initial Panasas purchase, the IDRE private cloud storage system has grown to 21 ActiveStor shelves, providing over a petabyte of total capacity.

IDRE has only four system administrators who manage the entire HPC infrastructure. Ease of installation and ActiveStor

system management is a major benefit to the IDRE staff. "I don't have to blow a whole full-time employee to run our storage, like we would have to with other technologies," said Dr. Friedman.

Clean and Simple, "Everything You Need" Packaging "Panasas storage has a very clean building block approach," said Friedman. "When we purchase an ActiveStor shelf it includes the storage and support.

With the alternatives we would have to buy a NAS head and then a bunch of disks. It's very difficult to know how often we're going to have to purchase another NAS head or another fibre channel switch. With Panasas, it's very simple – just purchase another shelf and we get everything we need. There are no surprises. Plus, we know exactly what we're paying per TB, so charge-back to the various university departments is simple."

### Summary

UCLA's IDRE chose Panasas to provide high performance parallel storage for big data discovery in its growing high performance computing environment. The combination of ActiveStor 11 and ActiveStor 12 provided both the highest performance and the affordability the budget-conscious university needed. ActiveStor's modular design let IDRE grow its private cloud at a pace that complimented user requirements. Complaints about lackluster performance and system administration headaches are a thing of the past.