

ActiveStor Storage Clusters

Extraordinary Storage for Extraordinary Jobs

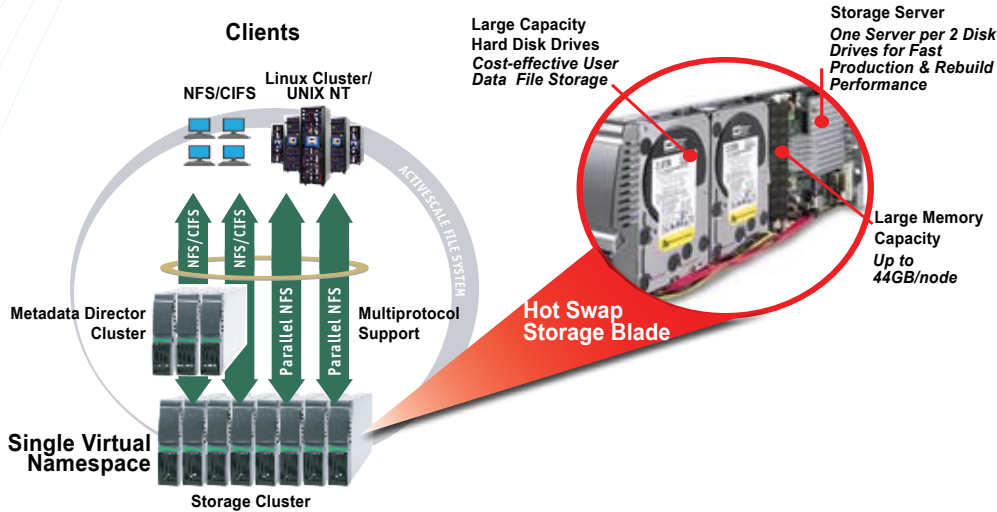
Industry leaders worldwide are using Panasas ActiveStor storage systems to deliver unprecedented breakthroughs in energy exploration, financial and portfolio analysis, climate modeling, manufacturing design, computational fluid dynamics and physics, digital animation, genetic research, and other applications. Panasas ActiveStor storage systems are utilized by Fortune 500 companies to:

- Improve time-to-market
- Solve critical and complex problems at lower cost
- Minimize risk for better returns
- Increase the certainty of research and investments
- Extend research, science, and knowledge
- Improve predictability
- Deliver unprecedented ROI
- Investment protection



Architecture

The Panasas Parallel Storage Cluster represents the next major evolution in networked storage optimized for cluster, server farm, and single client environments. Panasas ActiveStor architecture features aggregate performance by scaling individual nodes in a file system managed by a single global namespace and management interface.



Key Features

- **Variable Workload and Protocol Access Consolidation:** Excellent IOPS and bandwidth performance on a single disk system with CIFS, NFS and Parallel NFS access to a single file
- **Parallel Architecture:** Distributed and load balanced I/O operation eliminates performance bottlenecks
- **Single Global Name Space:** Single point of management for distributed and scalable architecture, eliminating individual islands of data and performance, providing seamless scalability as the size and number of jobs to be processed increases
- **Disk Sector RAID:** Disk sector RAID parity isolates and repairs media errors at the disk level helping to prevent the need for RAID rebuild
- **Predictive Self-Management:** Data objects, or the parity, is moved to empty space on the disk or to other StorageBlade modules, eliminating reconstruction by continuous monitoring of data objects, parity, disk media and individual disk drive attributes with corrective action rules

The Panasas ActiveStor 8 Series supports a broad range of application performance profiles for NFS, Parallel NFS and CIFS data access protocols seamlessly integrating into existing infrastructure to accelerate return on investment. Panasas metadata DirectorBlade Servers act as a cluster of NAS filers capable of serving data for NFS and CIFS clients. All metadata DirectorBlade Servers “virtualized” into a single virtual filer, appearing to NFS and CIFS clients as a single storage access point. The Panasas file system has the ability to support all three data access protocols – DirectFlow Parallel NFS, NFS and CIFS – simultaneously. Multiple clients can access the Panasas storage cluster using the protocol required by that client. This delivers an unprecedented level of flexibility to optimize the utilization of the storage system.

Unified Scalability

The Panasas ActiveScale File System provides a scalable architecture capable of achieving performance in the 100,000's of IOPS and 100's of GB/sec in a single disk systems by simply adding as many individual nodes/shelves, or racks, to achieve aggregate performance. All aggregated nodes/shelves are presented as a single system featuring a global name space providing unified management.

Single system in aggregate:
one-to-hundreds of hardware nodes/shelves



Ease of Use

The Panasas PanActive Manager™ graphical user interface offers a single, comprehensive view of your Panasas ActiveStor Storage Cluster. As the system scales, you continue to view a single, easy to manage namespace. The console operates with the simplicity of an appliance, while supporting sophisticated administration, management, and reporting capabilities, including overall system state, error messages, capacity and disk utilization, throughput, response time, volume management and reporting.

Panasas ActiveStor Series 8 Product Specifications

Product Attributes

Clustered Architecture	Parallel clustered file system that turns files into smart data objects and then dynamically distributes and load balances data transfer operations across a networked blade architecture.
Modular Design	Self-contained nodes includes operating and file system, network connectivity, redundant and hot swappable metadata director and storage blade servers, power supplies and battery backup.
File System	Panasas ActiveScale distributed file system creates a cluster with a single file system and single global namespace. Fully journaled, fully distributed, globally coherent write/read cache.
Scalability	Up to 12,000 clients, over 50GB/sec, and 100,000's of IOPS aggregate production reliability performance of multiple nodes per single name space.
High Availability	No single point of failure. Self-healing design protects against disk or node failure including back end intracluster failover. Redundant instances of metadata service nodes. Client to node data parity. Redundant network data path with failover option.
Advanced RAID Protection	Intelligent system assigned RAID level based on file size providing performance optimization. Single object high performance reconstruction with parallel rebuild reads from RAID stripe. Disk drive sector RAID parity rebuild.
Data Protection	Compatible with Panasas Activelmage Snapshots and Panasas ActiveStor Asynchronous Replication.
Protocol Support	Panasas Parallel NFS Client, NFS v3 (UDP or TCP), CIFS, NDMP, SNMP, LDAP, ADS
Client Support	Red Hat and SuSE Linux on x86, x86-64, IA64, and IBM POWER6, UNIX, Microsoft Windows

Node/Shelf Hardware Attributes

Capacity	16TB to 44TB per node/shelf
Hard Drives (3.5" SATA)	Sixteen (16), Eighteen (18), Twenty (20), or Twenty-two (22) 1TB or 2TB Hard Drives per node/shelf.
ECC Memory	16GB to 44GB per node/shelf
Integrated Network Switch	1Gbe x 4, 10Gbe x1 (CX4, SFP+ or Twinax). Second switch optional.
External Indicators	Cluster status and alert (LED)
Optional Network Connectivity	Infiniband DDR & QDR

Node/Shelf Software Attributes

File System	Panasas ActiveScale File System
Parallel NFS Client	Panasas DirectFLOW Clients
High Availability	Panasas ActiveStor Network and Volume Failover
Data Protection	Panasas Activelmage Snapshot
Optional Data Protection	Panasas ActiveStor Replicator Asynchronous Replication

Environmental Specifications

Power Supply	Dual redundant hot swappable, Output power rating 950W each, Input power rating 1200W each, 100V to 240V self regulating voltage, Typical operating current 4.4A @208VAC, Maximum in rush current 30A, Maximum current 7A @208VAC
Backup Battery	Self charging, hot swappable, several minutes of system backup power
Operating Environment	Ambient Operating temperature +10C to +35C, Operating relative humidity 10% to 90%, Altitude 0m to 2440m
Non-Operating	Non-operating temperature -20C to 70C. Non-operating relative humidity 5% to 95%, Altitude 0m to 2440m

6520 Kaiser Drive Fremont, California 94555 Phone: 1-888-PANASAS (US & Canada) Fax: 510-608-4798
00 (800) PANASAS2 (UK & France) 00 (800) 787-702 (Italy) +001 (510) 608-7790 (All Other Countries)

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