



***Panasas ActiveStor Parallel Storage*** is the premier storage system for scalable Linux clusters. *Panasas delivers exceptional scaling in capacity and performance while extending appliance-like ease of management to a virtually boundless storage system for High Performance Computing (HPC) organizations around the world. All Panasas storage clusters contain the object-based, PanFS™ parallel file system. Using Panasas storage solutions, organizations can achieve maximum application performance while reducing total cost of ownership (TCO) by driving cost and complexity out of their storage infrastructures. Panasas solutions break the storage I/O bottleneck and are deployed in a broad range of government, academic and Fortune 500 organizations.*

### **Panasas Target Markets**

Panasas targets technical (scientific research and engineering) and emerging commercial departmental computing environments adopting Linux clusters, including key vertical markets such as life sciences, government, oil & gas, financial services and manufacturing. For these organizations, greater performance from their clusters deliver tangible benefits to their bottom-line, including accelerating the rate of drug discovery through genomic analysis, increasing the success rate of natural resource drilling through complex seismic algorithms or ensuring optimal response to natural disasters. We help organizations make better decisions, faster. Research can be concluded faster, products can get to market sooner and IT can be used as a true competitive advantage.

### **Scalable Storage for Linux Clusters – Market Evolution**

A fundamental change is occurring in the large-scale computing landscape. The emergence of Linux clusters, and the new generation of data-intensive parallel applications built to run on these clusters, is driving a new approach to scalable computing. Whether imaging the earth's substructure to find new energy reserves, mapping the human genome, or generating the latest blockbuster animated feature, Linux clusters deliver a more scalable, easy-to-manage and cost-effective platform for simulation and modeling. Now it is essential to extend the benefits of clustering to storage. A new storage paradigm is needed to complement Linux clusters by offering linear scaling of performance, massive growth in capacity, and an appliance-like management approach to a unified storage resource.

The Panasas Parallel Storage Cluster delivers a new architecture uniquely suited to complement Linux Clusters by delivering the performance and scalability required of these emerging clustered applications.

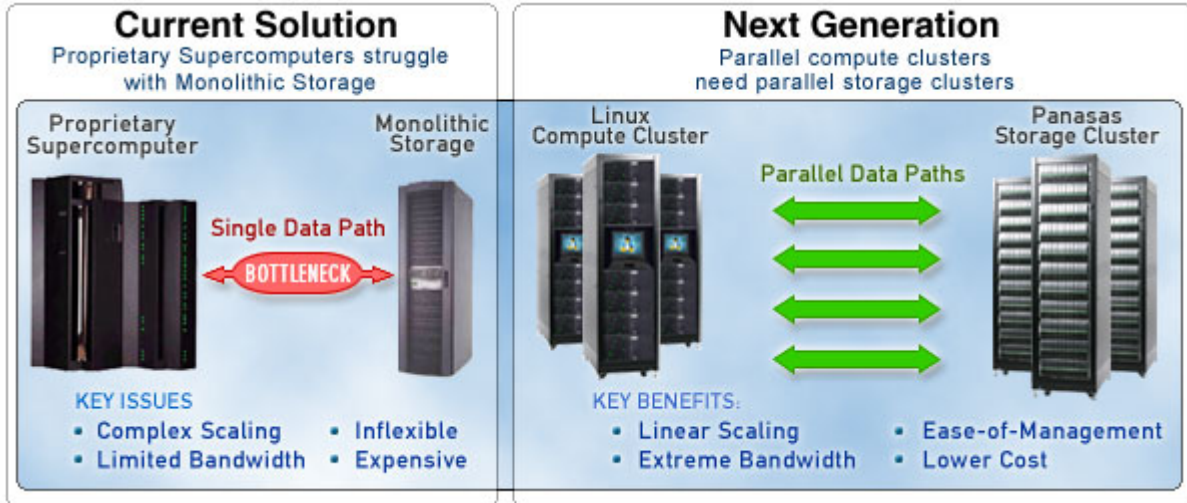


Figure 1: Market Evolution

### Parallelism is Critical

Several companies are attempting to address the storage needs of Linux clusters today. However Panasas is unique because our focus is on delivering a truly parallel architecture that is designed and optimized for clusters of multi-core servers. Linux clusters are at the forefront of a general migration to more parallel computing models. Applications are now being actively designed specifically to take advantage of clusters that use multi-core chipsets and threaded operating systems.

This creates a need for storage that matches the parallel nature of these applications and compute models – that storage needs to be both parallel AND standards-based so that it can be accessed easily from any compute environment and by any application.

Panasas already solves the parallel component of this need with its fully parallel patented DirectFLOW® protocol. The DirectFLOW protocol is the foundation of the emerging Parallel NFS (pNFS) standard, which has been endorsed by every major storage provider. As pNFS becomes a standard (via NFS v4.1) Panasas will be uniquely positioned to provide storage to the emerging universe of parallel compute environments.

### Leveraging Object-Based Architecture

The Panasas Parallel Storage Cluster represents the next major evolution in networked storage. Designed from the ground up to radically boost I/O performance and enhance manageability, it is the first storage solution optimized for Linux cluster environments. Groundbreaking Panasas solutions herald a next-generation, object-based storage clustering architecture. This, combined with cost-effective intelligent hardware components – Panasas StorageBlade® Modules and Panasas DirectorBlade® Modules – delivers record-breaking performance in both throughput and random I/O. All components are managed within a single seamless namespace that dramatically simplifies cluster management.

Panasas is championing an industry-wide move to an object-based storage architecture. Instead of storing information in standard data blocks or files, the object-based architecture enables information to be organized into smart data objects. These objects are higher-level

abstractions that can be more easily managed and dynamically distributed across physical disks. An object-based architecture provides the foundation to deliver seamless and continuous growth in both capacity and performance. Further, it eliminates the management complexity of moving data between discrete volumes within a system or between discrete storage systems, when typical capacity and performance bottlenecks occur.

The Panasas solution is developed within a standards-based framework allowing customers to maximize their return on infrastructure investment. Everything from the components used to the protocols supported are industry standard and will integrate seamlessly into all customer environments. For example, Panasas supports NFS and CIFS network file system protocols for UNIX and Windows client access, NDMP protocol for backup and Ethernet-based TCP/IP for connectivity.

### **ActiveStor 5000 and ActiveStor 3000 Parallel Storage Clusters**

The recently introduced ActiveStor™ 5000 Parallel Storage Cluster was designed for commercial HPC users who require a unified storage solution for both their batch and interactive applications to improve overall workflow processes. The ActiveStor 5000 cluster includes performance enhancements to improve random I/O access and two integrated software products: ActiveGuard High Availability software, which improves overall data availability, and ActiVeImage Snapshot software, which provides an advanced snapshot capability.

The ActiveStor 3000 Parallel Storage Cluster is ideal for those customers focused solely on large batch processing operations where superior performance is required at a competitive price point. ActiveGuard and ActiVeImage are available as software upgrades to the ActiveStor 3000.

Both the ActiveStor 5000 and ActiveStor 3000 clusters run the ActiveScale® 3.0 Operating Environment.

### **ActiveScale 3.0 Operating Environment**

Now in its 3<sup>rd</sup> generation, the ActiveScale Operating Environment, that includes the PanFS parallel file system, is the foundation for all ActiveStor Storage Clusters. The PanFS file system delivers incredible scalability and fault tolerance by allowing clustered components to efficiently distribute workloads. In addition a number of key technologies work together to continuously monitor and maintain the health of the system and stored data. These Predictive Self Management capabilities will identify potential problems and move data away from a StorageBlade module allowing that module to be proactively swapped out before a reconstruction becomes necessary. In the event that a reconstruction is required a 500GB StorageBlade component can be rebuilt in less than 90 minutes which represents a 10x improvement over traditional RAID controller performance.

## **Proven Customer Benefits**

Panasas sells completely integrated software/hardware storage systems and related services. The Panasas Parallel Storage Cluster is designed for engineering and scientific customers using Linux clusters that demand a highly scalable, yet easily manageable storage network.

The key benefits of the Panasas Parallel Storage Cluster include:

- Record-setting performance: up to 7X random I/O performance and 30X data throughput relative to alternative NFS servers.
- Seamless Scalability from Terabyte to Petabyte scale: Storage capacity can be quickly and easily added and configured in less than 30 minutes. As capacity is added system performance scales linearly.
- Low Total Cost of Ownership: Easy to use appliance-like management of a virtually boundless system.
- Data Availability: Breakthrough ActiveScale Operating Environment for Predictive Self Management and Object-based RAID maximizes system and data availability.
- Customer-centric support including a personalized customer extranet site for product update information and immediate online problem resolution.

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