

PANASAS SOLUTION NOTE:

Media/Entertainment Solutions Brief

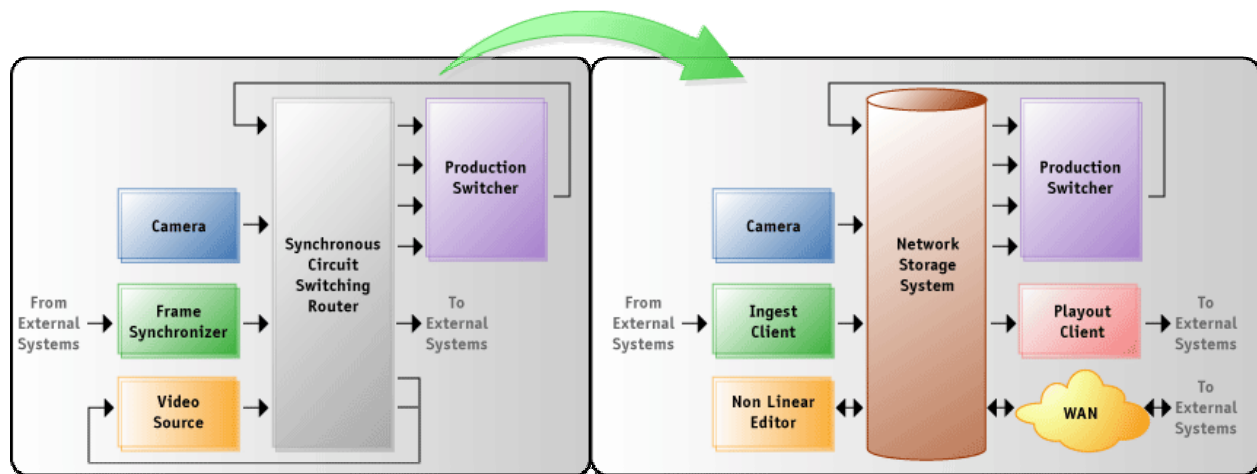
Scalable Storage Solutions for Digital Media

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Abstract: *The Media and Entertainment fields continue to advance the state-of-the-art in digital animation, rendering, and special effects generation. At the core of this discipline are the increasingly capable tools used by artists and animators, and powerful image rendering engines running on Linux compute clusters. Together, these tools place increasing demands on today's storage systems. Specifically, as storage systems increase in size, editing, distribution and asset management become significantly more complex. This Solutions Note provides detailed information on how the Panasas ActiveScale Storage Cluster is tailored to meet the needs of media and entertainment companies. The Panasas Storage Cluster provides virtually unlimited growth - in capacity and bandwidth - for the most aggressive animation and rendering applications. Large input datasets, including models, textures, and animation directives can all be managed within a single global namespace and shared among animators and artists.*

Emergence of Scalable Storage for Digital Media

A fundamental change is occurring in the systems designed to ingest, create, store, manage, edit, and deliver digital media. The rapid advance of cluster computing, commodity hardware, open source software, and high performance network storage is ushering in a new networked architecture for media applications. This architecture promises higher performance and better accessibility at lower cost, enabling a wave of new media applications that include editing and distribution of high definition content, increasing content repurposing, and on-demand and streaming applications. Figure 1 reviews the changes occurring in digital media.



Diagrams Courtesy of Lowell Moulton, AF Associates

Figure 1: Change in Digital Media

In this new model, tape-based systems and proprietary switching hardware are replaced by a network storage-centric model. Specifically, ingest/playout devices and low-cost media workstations are interconnected through a “media storage hub,” that plays a central role in many of the core media services provided to users. These services include tapeless ingest from network-capable cameras, nonlinear editing support, and multiple-format distribution and playout.

Panasas ActiveScale Storage Cluster

The Panasas ActiveScale Storage Cluster helps media companies accelerate time to results by maximizing the capabilities of their Linux compute cluster. By leveraging the company’s object-based storage architecture, the Panasas ActiveScale File System™ breaks down the storage bottleneck created by legacy network storage technologies to deliver record setting performance in both raw bandwidth and random I/O. In addition, the system delivers a seamless, scaleable namespace that allows growth from gigabytes to petabytes in a single system image.

To meet the varied needs common in media environments, Panasas offers two ways to effectively transfer data between Linux compute clusters and storage.

- Panasas’ Out-of-Band DirectFLOW™ data path moves object-based file system capabilities directly to the Linux clusters nodes, enabling direct and highly parallel data access between client applications and the storage system. This results in up to 30X increase in data throughput for the most demanding high bandwidth applications.

- Panasas' In-Band NFS & CIFS data path uses clustering technology to create a virtual NFS/CIFS server that accesses data within a single, easily managed namespace, avoiding the high cost of managing multiple NFS/CIFS servers with multiple namespaces. By using standard UNIX and Windows file access protocols, applications can take full advantage of the Panasas Storage Cluster with no changes required on clients. This results in up to 7X increase in random I/O performance for traditional NFS and CIFS applications.

In addition, by leveraging the object-based architecture, the Panasas Storage Cluster virtualizes files across the entire system. As files grow in size, data objects grow seamlessly. This approach creates a single virtual data space and eliminates the fixed physical and logical boundaries of today's network storage solutions. Further, the system is coherent, allowing all distributed clients see the exact same files and directory structure. The Panasas design eliminates time consuming tasks such as taking volumes offline to restripe to new higher capacity volumes or deleting and contracting volumes. Figure 2 reveals the benefits of a shared storage hub for media.

The Panasas Storage Cluster is an integrated HW/SW solution developed from the ground up to ease implementation and system management. Built within a standards-based framework, the system seamlessly fits into existing infrastructures and allows customers to maximize their return on infrastructure investment.

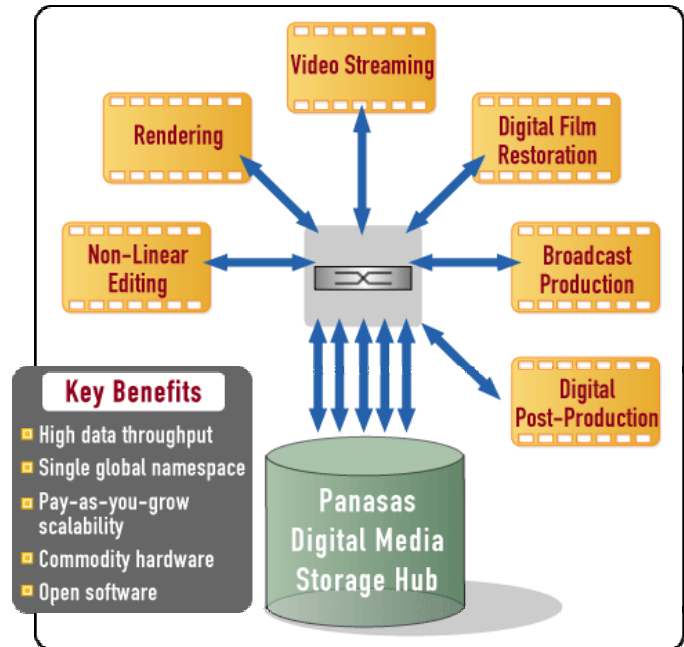


Figure 2: Shared Storage Media Hub

Element Creation and Rendering

The Panasas Storage Cluster supports both element creation as well as high-performance rendering. By supporting industry standard NFS and CIFS protocols in addition to the DirectFLOW protocol, the Panasas Storage Cluster provides comprehensive access to a single, coherent file system. Modelers and Animators are able to develop the requisite models and animation instructions from their NFS desktop machines, depositing resultant files into the shared storage pool. The Rendering Cluster then accesses the required models and scripts, and renders the individual frames back to the shared storage pool where they can be reviewed on artists' desktops for 'digital dailies.' This entire process is accomplished within a single, scalable, global file system able to accommodate the most stringent access requirements. Figure 3 reviews this process.

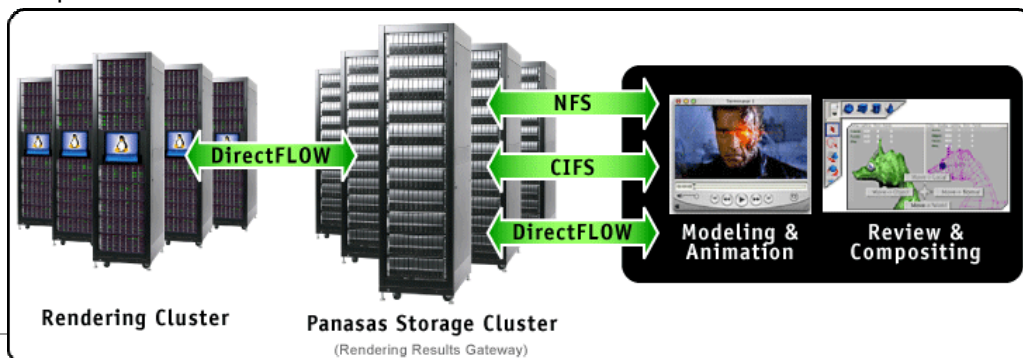


Figure 3: Panasas in Edit Creation and Rendering

The Panasas Storage Cluster delivers several key benefits for media companies working in element creation and rendering:

- Allows concurrent, interactive access for both artists and render jobs, thereby allowing artists to render intermediate results in real time.
- Accelerates final rendering time, thus freeing-up artists' time for more valuable tasks such as polishing and creating enhanced details. Moreover, accelerated rendering time increases time to revenue as the entire media pipeline process becomes more efficient.
- Lower cost by enabling automatic management of one single pool of storage.

Content Acquisition, Editing, and Distribution

High-end content acquisition, non-linear editing, and distribution systems have historically been highly expensive and inflexible due to the proprietary nature of the technologies involved. As a result, these tools have been reserved for the privileged few. Scalable, cost-effective networked storage architectures are changing this model by putting productivity-enhancing tools in the hands of local broadcasters, postproduction houses, and streaming media providers.

Panasas delivers a scalable, cost-effective, flexible storage solution that serves as the centerpiece of this new paradigm. Digital media houses can leverage the shared storage pool provided by the Panasas Storage Cluster to manage all aspects of content development, editing and distribution, as revealed by Figure 4.

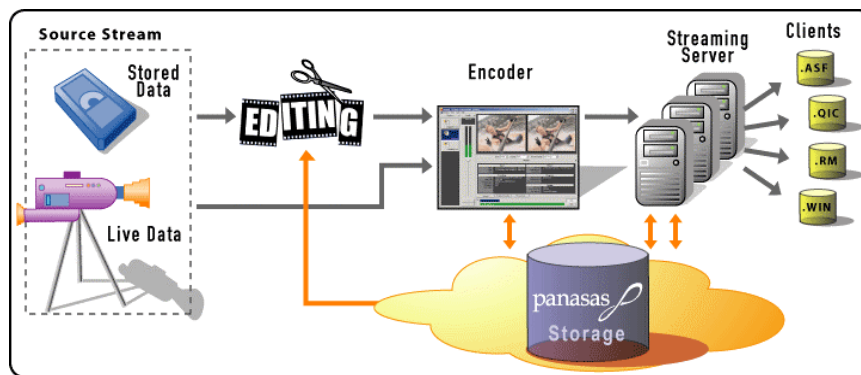


Figure 4: Panasas in Content Acquisition, Editing and Distribution Environment

Digital Asset Management

In addition to the large video capacity requirements, companies storing and serving video content face challenges with performance bottlenecks, managing islands of storage, and sharing data between different stations. There is a significant need for a cost-effective, scalable, easily manageable, and high performance file system to enable seamless and linear scaling of system performance and capacity.

The Panasas Storage Cluster provides virtually boundless scalability a single global namespace to address some of the key challenges in storing, distributing and managing large Digital Assets. The Panasas ActiveScale File System integrates seamlessly with Digital Asset Management software to provide customers with indexing, search and retrieval capabilities through an easy-to-use interface across multiple geographic locations. This solution is exemplified in Figure 5.

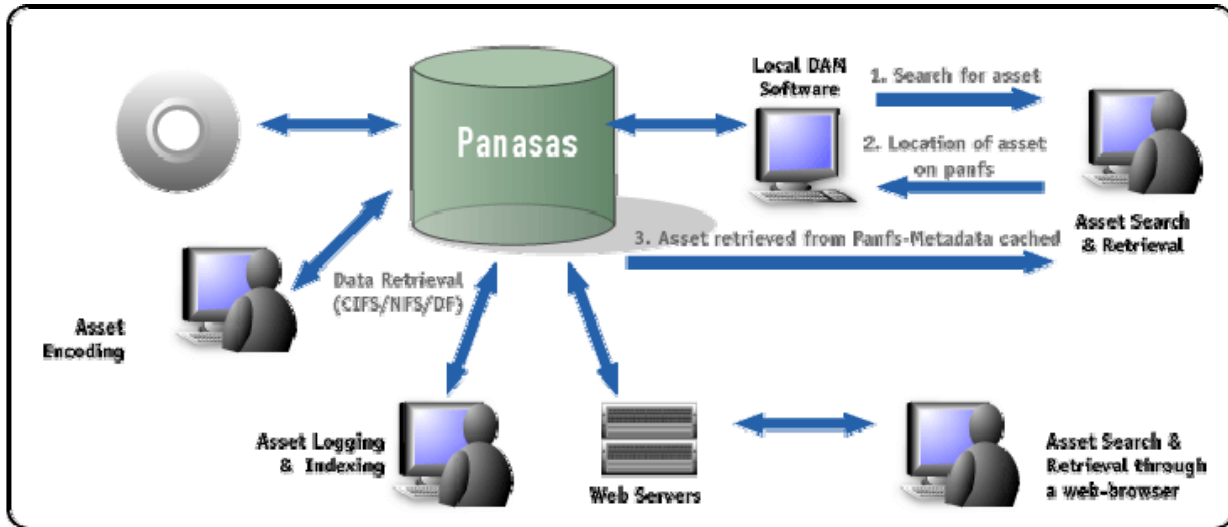


Figure 5: Panasas in Digital Asset Management Environment

Conclusion

The Panasas Storage Cluster is designed to help media environments accelerate time to results with a highly scalable, yet easily manageable storage network. By leveraging an object-based architecture, the Panasas Storage Cluster is able to maximize the capabilities of Linux compute clusters by eliminating the bottleneck associated with traditional network storage solutions. The resulting performance benefits, coupled with the ability to offer a scalable, shared pool of storage makes the Panasas Storage Cluster an ideal solution for multiple media applications.



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