

Multi-tier Storage and Archiving Solution for Apple Xsan and Final Cut Server with Quantum StorNext and Dell EqualLogic

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Executive Summary

The evolution to digital, tape-less workflows for post production and broadcast workflows is causing a significant demand for ever-growing amounts of storage. Every aspect of a digital workflow is facing challenges to provide sufficient computing and storage resources to cope with technology advancements, including the demands that new formats such as HD and 3D introduce. For example, the amount of storage needed for one hour of Standard Definition (SD) content is about 72GB, for High Definition (HD) it is over 430GB, and for 4k digital cinema an hour of content requires over 4TB of storage. These are only the requirements for the final product, not counting raw footage, out takes etc. A typical movie production in 4K can easily span over 25 hours of raw footage, culminating in over 100TB of storage needed for just this one project, plus additional capacity needed for repurposing (DVD, online distribution), special effects, etc.

Intelligently archiving digital content can significantly reduce storage cost investments as well as improve the productivity of your workflow. The ingest of massive amounts of raw content from various sources, be it from HD or 3D cameras or others feeds require high ingest rates and content must initially be readily accessed by various creative departments within the workflow. However, when that raw content is no longer required for the current project or the current project has been completed, that content, both raw and finished, is consuming valuable storage, computing, and network resources that could otherwise be reallocated back to another project. By implementing a solution that automatically archives and protects that content on a more appropriate and economical tier of storage (while maintaining the integrity of your workflow) will save storage and administrative costs while significantly improving productivity.

Quantum's StorNext® data management software enables you to lower management costs and improve performance and productivity of your Xsan and Final Cut Server environment. StorNext delivers scalable enterprise data management capabilities, such as policy-based storage tiering and archiving, deduplication, replication, and partial file retrieval. StorNext Storage Manager can also improve digital, file-based workflows by supporting a number of industry standard, high-performance disk systems and integrating applications that run on Mac and non-Mac operating systems.

Quantum's StorNext data management software provides Apple Xsan, Final Cut Studio and Final Cut Server users with a solution to seamlessly upgrade their storage environment to a shared storage pool that supports third-party disk storage. StorNext also fully integrates Xsan clients with Linux, Windows and UNIX workstations and servers. At the same time StorNext provides users with the option to lower the total cost of storage by introducing a fully automated, transparent, multi-tier storage infrastructure, including both disk and tape storage options.

For long-term content retention and archive, StorNext expands storage pools into multi-tier archives, automatically moving and copying data between different storage resources to reduce costs and protect content. Data location is virtualized so that any file can easily and directly be accessed by applications, users, or asset managers for re-use, even if it resides on tape storage. Additional cost savings can potentially be achieved leveraging StorNext Deduplication (SNDD), which provides content-specific data reduction using Quantum's patented deduplication technology.

In this product brief we will explore the integration of heterogeneous clients into existing Xsan environments, enabling Xsan environments to support third-party disk products and introducing Intelligent Archiving for cost savings and long-term content retention in Xsan, Final Cut Studio and Final Cut Server environments.

Methodology

StorNext data management software streamlines digital workflows and reduces data retention costs on the SAN by creating a consolidated virtualized storage pool that enables multiple server systems the ability to access content in parallel. This results in greater throughput and faster data sharing than is possible with standard network-attached storage (NAS) architectures. StorNext also includes an integrated data movement engine that transparently migrates files between tiers of storage to reduce data retention costs and provide data protection. StorNext can be broken down into several offerings:

- StorNext File System – provides high-speed, scalable data sharing across all major operating system platforms, including Linux, Windows, UNIX, and Mac OS.
- StorNext Storage Manager – provides intelligent, policy-based data migration for tiering, archiving and data protection

For Xsan users the following additions and upgrades are also available:

- StorNext FX Clients – enable full integration with Linux, Windows and UNIX clients into an existing Xsan environment, transparently sharing all content with Xsan clients. StorNext FX leverages existing Xsan controllers.
- StorNext FX2 – supports advanced features introduced in Xsan 2, including cross-platform spotlight search.
- StorNext File System upgrade for Xsan – enables full support for third-party disk systems such as Dell Equallogic – as well as legacy disk systems from Apple and Promise.
- StorNext Storage Manager upgrade for Xsan – introduces a fully transparent multi-tier storage environment to Xsan, helping users to lower storage costs over time and seamlessly protect and retrieve content from any storage tier at any time.

StorNext FX Client Software for Xsan

StorNext FX Clients add support for Linux, Windows and UNIX systems into an existing Xsan environment. This support is completely transparent and unobtrusive, as both the Xsan controller and Xsan clients remain unchanged. With StorNext FX, Apple Xsan administration GUI tools are used to configure and manage the complete storage environment. Using StorNext FX Clients, applications on non-Mac platforms can access the same content as Xsan clients, sharing the same, high-speed Fibre-Channel infrastructure. In other words – StorNext FX Clients act like Xsan clients for non-Mac platforms.

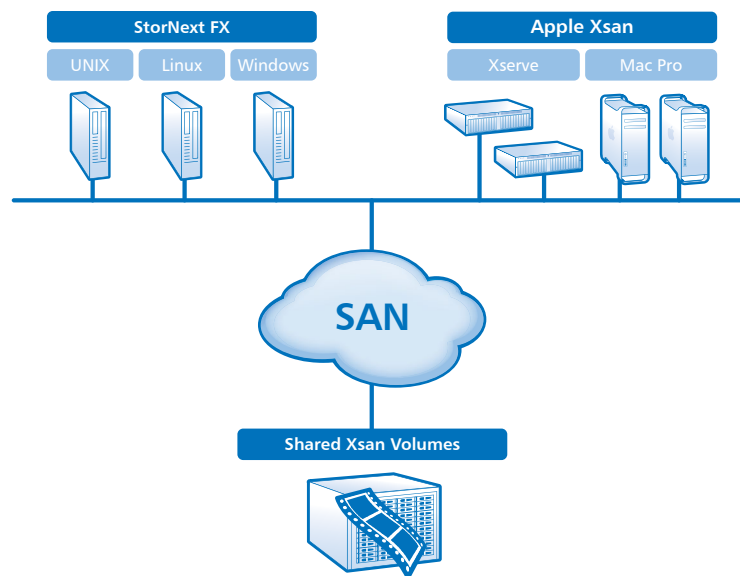


Figure 1: A typical Xsan environment with StorNext FX for heterogeneous client support

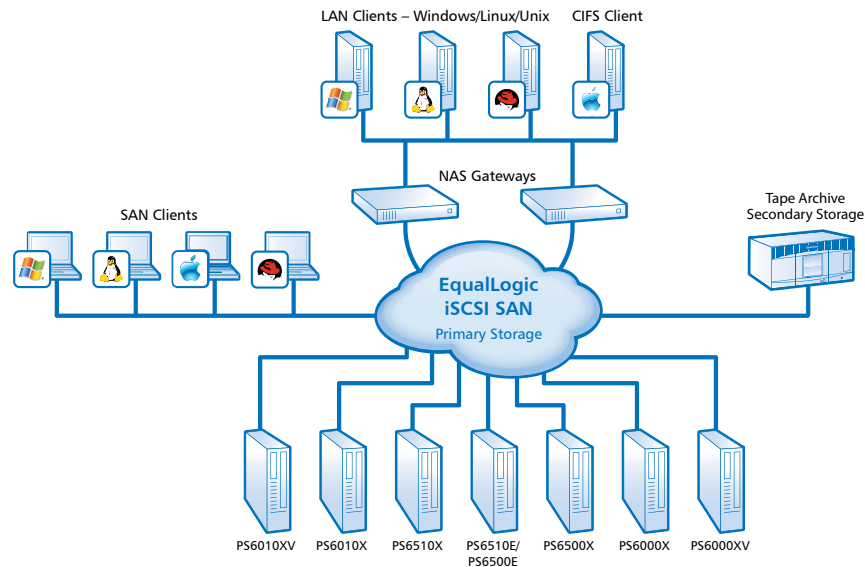
StorNext File System Upgrade for Xsan

The increasing demand of HD and digital cinema 2k and 4k workflows creates new challenges for post production or broadcasting industries, forcing users to evaluate storage infrastructure solutions that provide performance and scalability above and beyond standard, off-the-shelf hardware and software.

A StorNext File System Upgrade for Xsan introduces support for third-party disk systems, such as Dell's EqualLogic PS Series for full integration of Xsan clients with Linux, Windows and UNIX systems. This enables users to choose best-of-breed hardware to fulfill any current and future requirements for their storage infrastructure, while being supported by a global, industry-leading support organization.

Dell EqualLogic iSCSI SAN

An EqualLogic iSCSI SAN provides the level of throughput and capacity growth that is needed by many Xsan users today, and StorNext provides the flexibility to use EqualLogic disk systems with standard Xsan clients. Dell's EqualLogic storage solutions deliver the benefits of consolidated networked storage in a self-managing, iSCSI storage area network that is affordable and easy to use, regardless of scale. By eliminating complex tasks and enabling fast and flexible storage provisioning, these solutions dramatically reduce the costs of storage acquisition and ongoing operations. The newest iSCSI arrays in the PS Series, the EqualLogic PS6010 and PS6510, add the power of 10GbE technology to the exceptional EqualLogic storage performance of previous generations. They deliver increased bandwidth performance for streaming workloads, editing applications, video analytics and high-volume data backup and data protection. The PS6000 and PS4000 series meet the needs of smaller scale media applications.



Video Editing and Media Production Workgroup with EqualLogic PS-Series iSCSI SAN

A typical upgrade to a StorNext File System will include the purchase of one or two supported server Systems, such as a Dell PowerEdge server running a supported version of Windows or Linux to host the StorNext Metadata Controller(s) (MDC). The StorNext MDC is a drop-in replacement for the Xsan controller, assuming control of all storage-related operations of the connected Xsan and StorNext clients. Xsan client licenses are honored and supported, so existing Xsan clients will not need additional licenses. In most cases the upgrade from an Xsan controller to a StorNext controller will not require a recreation of file systems, greatly simplifying the upgrade process.

Upgrading to a StorNext File System also provides the option to lower connectivity costs by using StorNext Distributed LAN Clients (DLC). DLC is a high-performance, resilient alternative to standard file-sharing protocols like NFS or CIFS, integrating systems attached to Local Area Networks (LAN) into a StorNext environment. Providing built-in load-balancing and failover functionality in addition to highly effective use of network bandwidth makes Distributed LAN Client the choice solution for users wanting to extend a StorNext SAN environment into standard TCP/IP-based networks at near line rate performance. DLC is currently available for clients running supported Linux or Windows platforms and provides the same functionality as regular, SAN-attached StorNext clients.

Additional features of the StorNext File System include StorNext Replication for data protection of digital assets as well as global distribution to extend your digital workflow. StorNext Replication provides a mechanism for consolidating from, or distributing content between file systems. StorNext Replication is an asynchronous, host based replication feature that is highly flexible and configurable. Replication is implemented at the directory level and is policy driven to initiate timed or user initiated copies of data. The policy engine within StorNext also includes the capability to specify how many copies are maintained and managed on both the source and target locations. Flexible replication options include n-to-1, 1-to-n, and cascading.

Quantum developed the pioneering technology known as variable-length hash-based data deduplication that has become an industry leader in the deduplication market. StorNext deduplication reduces the amount of capacity consumed by data on disk. Unlike compression technologies that use static “pattern table” methodologies based on an individual file being compressed, SNDD builds its redundancy index based on all the data being deduplicated, not just the file being processed at that moment. SNDD will find redundancies within a file, making it extremely efficient at saving storage space.

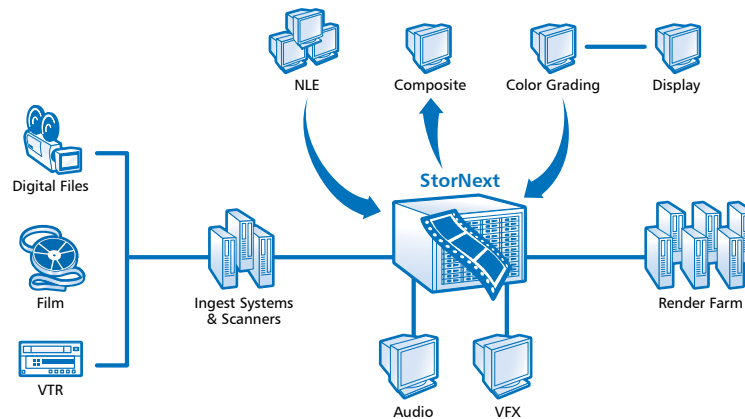


Figure 2: An example use case of a StorNext File System in Post-production

StorNext Storage Manager Upgrade for Xsan

The introduction of digital, tape-less workflows for HD and now 3D have caused a significant amount of digital content to be created, stored and shared on primary disk storage systems. With more and more content being created and stored in HD, 3D, or 2k/4k formats, both compressed and uncompressed, the demand for storage is growing exponentially – causing users to consider whether there is a smarter solution than to purchase more and more relatively expensive primary storage to fulfill those needs. Maintaining all content on primary storage, even raw content or finished projects that are not currently being accessed, increases the costs of storing and managing that content, as well as introduces bottlenecks that can impede your workflow.

StorNext Storage Manager introduces tiered storage and archiving to Xsan and Final Cut Server environments, providing transparent, automated movement of content between tiers of storage, including primary and secondary disk (such as FC, iSCSI and SATA-based disk arrays) and tape storage. In addition, Storage Manager has the ability to create multiple copies and versions of stored content, thus providing a simple and efficient data protection solution.

By leveraging multiple tiers to store content on the most economic storage technology at any given moment in time, StorNext can dramatically decrease the cost of storing digital assets while still making them readily available to users and applications.

StorNext Storage Manager does this by providing a virtualization layer that spans all tiers of storage, providing users and applications with a view of their content, whether the content is actually stored on expensive, primary disk, lower cost secondary disk, or inexpensive, high-capacity digital data tape. All while maintaining the integrity of your digital workflow.

Storage Manager, based on user defined policies automatically and transparently migrates data to tape or disk storage devices while keeping content online for reuse and repurpose. Data movement policies occur in a three-phase process as follows:

- Create archive and data-protection copy(ies) of file-based content at a designated time
- Mark copy of content on primary disk as candidate for truncation
- Remove content from primary storage so only archive copy(ies) remain
- Future access of content will trigger a transparent retrieval from secondary storage

See Figure 3 for a content retention scenario, including primary disk storage, secondary disk storage, tape library archive and off-site vaulting.

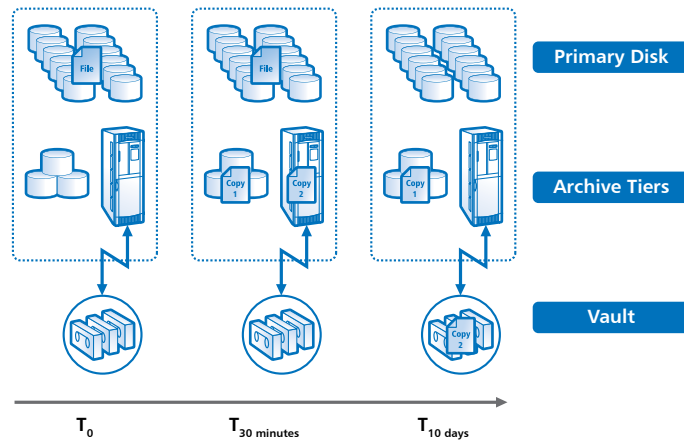


Figure 3: A content retention example showing data protection and archive copies of digital content

StorNext Storage Manager is fully compatible with Final Cut Server – providing a transparent, easy-to manage way of reducing costs while retaining all digital assets in a state ready for re-purposing. Refer to Figure 4 for a typical Storage Manager and Final Cut Server environment.

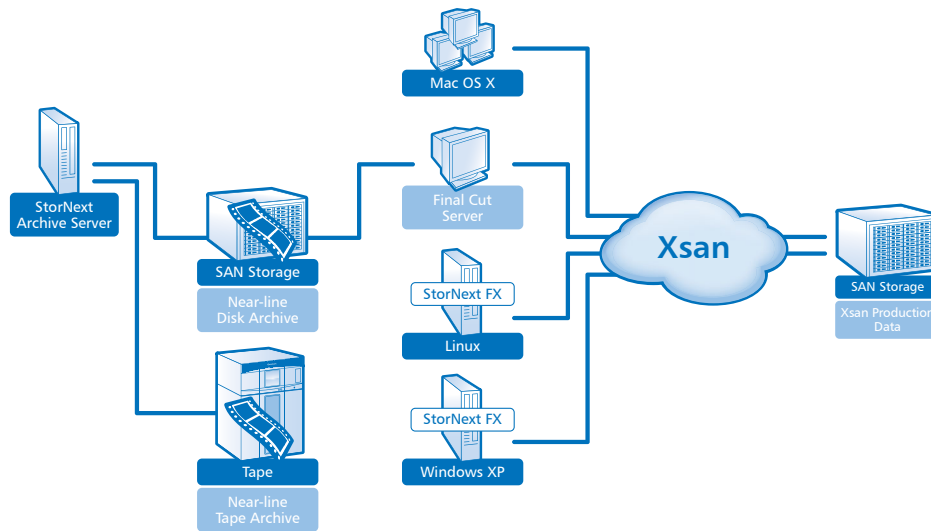


Figure 4: An example of a user using both Xsan for the production data and StorNext Storage Manager combined with Final Cut Server for archiving and data protection

A typical upgrade to StorNext Storage Manager will include the purchase of one or two Dell server systems running a supported version of Linux or Windows to host the StorNext Metadata Controller(s) (MDC). The StorNext MDC is a drop-in replacement for the Xsan controller, assuming control of all storage-related operations of the connected Xsan and StorNext clients. In a Storage Manager environment the MDC is also responsible for the movement of digital content between storage tiers, including content retention and retrieval as well as data protection. StorNext Storage Manager transparently and automatically moves outdated content off primary storage and onto secondary, lower-cost storage providing extraordinary cost savings.

Summary

Quantum StorNext data management software enables users to accelerate revenue generation through optimized workflows and store more data at a lower cost. Combining high speed data sharing with cost-effective content retention, StorNext helps users build an infrastructure for consolidating resources so that workflow operations run faster and storage costs are reduced.

Additional Information

For additional details on StorNext FX, StorNext File System and StorNext Storage Manager, including integration options into your environment, contact the Software team at softwareinfo@quantum.com. For additional details on Dell's EqualLogic PS Series go to www.equallogic.com.

Frequently asked questions

Where can I find more information on StorNext File System and StorNext Storage Manager?

Check out Quantum's StorNext website at <http://www.quantum.com/StorNext/> or Quantum's Media and Entertainment solutions website at <http://www.quantum.com/me>

Where can I find more information on StorNext FX?

See <http://www.quantum.com/Products/Software/StorNextFX/Index.aspx>

Where can I download a StorNext Evaluation?

Check out Quantum's StorNext website at <http://www.quantum.com/StorNext/>

Where can I download product documentation and data sheets?

See Quantum's Product Information website at <http://www.quantum.com/ServiceandSupport/SoftwareandDocumentationDownloads/Index.aspx>

Where can I find product compatibility information?

Check out Quantum's Compatibility Guides at <http://www.quantum.com/ServiceandSupport/CompatibilityGuides/Index.aspx>

What primary disk storage systems does StorNext support?

StorNext supports iSCSI and FC-SAN attached primary disk storage

What secondary disk storage systems does StorNext support for archive-tier storage?

StorNext supports iSCSI , FC-SAN, NFS-attached and certain UNIX file systems as secondary storage systems.

What tape technologies does StorNext support for archive-tier storage?

StorNext supports a variety of tape technologies including LTO and DLT as well as a variety of tape libraries from Quantum, ADIC, Dell, and others.

What licenses do I need?

StorNext FX Clients - licensed per client, pricing depends on OS (Linux/Windows/UNIX) and number of clients.

StorNext File System Upgrade – Purchase one StorNext client license for MDC or two client licenses plus High-Availability (HA) Option for failover between two MDCs. Also purchase additional client licenses for Linux, Windows or UNIX systems as needed. Xsan clients are considered licensed and do not require a new client license purchase.

StorNext Storage Manager Upgrade – Purchase client licenses as part of the File System Upgrade, then purchase capacity-based licenses for tiered storage and data movement. Additional options are available, such as Integrity Checking (ensure data read back from tape is identical to data stored on tape in the first place) and Vaulting (tapes removed from tape library do not count against capacity license).

Contact softwareinfo@quantum.com for additional information and quotes.

When migrating from an Xsan controller to a StorNext MDC – are there differences for administrators or users?

StorNext comes with its own, web-based administration interface, replacing the Xsan GUI. The StorNext GUI runs on all major browsers (including Safari and Firefox), providing very rich and detailed information about the combined StorNext/Xsan environment and various configuration wizards. Policies and Alerts are quickly set up within the StorNext GUI. StorNext MDCs do not support centralized Spotlight search, a new feature introduced with Xsan 2.

Does StorNext support LAN-attached clients?

Yes – In addition to supporting industry-standard file-sharing protocols like CIFS, NFS or FTP, StorNext provides a faster, more resilient alternative with the Distributed LAN Client (DLC) feature. DLC enables clients to connect to a StorNext environment through standard TCP/IP based networks, with the same functionality as SAN-attached clients. DLC provides enhanced performance over NFS/CIFS and comes with standard load-balancing and failover functionality. This provides higher performance and a more resilient solution than common NAS solutions. DLC is currently available for clients running supported Linux or Windows platforms.

What storage virtualization features does StorNext offer?

StorNext offers a variety of storage virtualization features, including:

- Spanning file systems across multiple, heterogeneous storage systems
- Dynamically moving data from one to another storage system while data is being accessed
- Dynamically replacing out-of-service storage systems while data is being accessed
- Dynamically enlarging file systems to incorporate increased capacity or additional storage systems
- Automatically and transparently moving data between on-line and near-line storage tiers, including disk and tape
- All clients have access to the same data at the same time, regardless of Operating System and connectivity type

What is the maximum size of a StorNext File System?

There is no artificial limit imposed by StorNext other than the limits defined by the attached host operating systems, device drivers and hardware.

For example – assuming a LUN (Logical Unit Number) size of 2TB, which is supported in common Operating Systems today, a StorNext File System can be over 32PB in size.

Even though a maximum LUN size of 2TB is common, many operating systems are supporting larger LUN sizes, taking the maximum file system size significantly beyond 32PB. With LUN sizes of 6.7TB the maximum file system size is over 107PB.

What is the maximum number of clients that can be attached to a StorNext environment?

StorNext currently supports 256 SAN-attached clients as well as 1000 LAN-attached clients (using StorNext Distributed LAN Client functionality). Further fan-out to clients can be achieved by using industry-standard NFS and CIFS protocols.

However, it is important to understand that in many cases the expected performance, throughput and latency define the exact number of clients suitable for a specific user environment and storage setup. The Quantum Software Architecture Group together with our partners can help define this number specific to your requirements.

For contact and product information, visit quantum.com, call **800-677-6268** or send an email to softwareinfo@quantum.com

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About Quantum

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