A Picture Paints a Thousand Words
And video streams thousands of pictures

Creating, delivering and managing engaging content is harder than ever. Higher-resolution media, tighter production schedules, and proliferating delivery options push the boundaries of workflow efficiency. Opportunities to monetize content are growing; timelines and budgets are not. The need for high-performance digital storage to capture, process, distribute and archive richer digital video content has never been greater.

For media and entertainment organizations, this means streamlining infrastructure to lower costs while remaining nimble to capitalize on new opportunities. Collaboration—and the shared storage that enables it—is the key to success in today's modern media workflow. Quantum's innovations help content creators and owners power what's next in the fast-evolving media space.
Post Production & Broadcast
Optimized Storage for Media Workflows

Post-production and broadcast professionals face ever-changing client requirements, tighter deadlines and shrinking budgets. The drive for more content to be delivered to more places—at any time on any device—is overwhelming. And with workflows ranging from SD and HD to 4K, HDR, and HFR, you need it all: performance, reliability, flexibility, efficiency, and collaboration.

The StorNext® shared storage and data management platform from Quantum is designed from the ground up for media workflows. From workgroups to full facilities, StorNext enables an end-to-end, no-compromise, collaborative production workflow for your mission-critical applications—and it’s the only 100% Xsan-compatible solution available. StorNext is a complete tiered storage platform, offering shared high-performance storage with coordinated accessibility across both SAN (Fibre Channel) and NAS (Ethernet) ecosystems, near-line and long-term archive, including Quantum’s next-generation Lattus™ object storage and built-in cloud access. Quantum Xcellis® can even bring those enterprise-class performance and capacity capabilities to all-IP infrastructures.

Don’t compromise with a data center-centric IT storage solution, or get locked into a proprietary platform. StorNext is the open answer—ready for today’s challenges and tomorrow’s demands.

Enabling Quantum Technologies:
- StorNext shared storage and data management platform
- F-Series NVMe Storage
- Xcellis high-performance workflow storage appliances
- QXST™-series hybrid RAID storage arrays
- Lattus object storage
- StorNext AEL tape archives

Be ready for 4K and beyond—with the premier open collaboration storage platform for post production.
The demand for visual effects and animation content is almost limitless. The potential for virtual reality content and applications continues to grow. To keep pace, artists and editors must boost creativity and collaboration while improving workflow efficiencies—and the right shared storage solution can make it happen.

Many facilities combine the predictable high performance of SAN storage with general-purpose NAS storage in an effort to contain costs. Yet running two distinct storage environments presents workflow complexities, creating editor islands and bottlenecks that hinder teamwork, limit innovation, and delay project completion.

Quantum Xcellis workflow storage appliances, powered by StorNext, eliminate these complexities by bringing together the power of SAN and the ease of NAS into a single, collaborative, high-performance, shared storage environment. With a modular design for easy expansion, you can start with a “just right” configuration to meet your current requirements, and scale performance and/or capacity as needed. Xcellis streamlines animation and VFX workflows, enabling artists and editors to produce more creative content, more quickly.

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Increase productivity and collaboration with high-performance Xcellis workflow storage.
Video is the preferred means of communication today, and this holds true for corporate communications, too. Whether it’s maintaining corporate branding, training employees, or providing media assets for in-house use, video is essential and the demand for higher quality content, delivered sooner, is only growing.

Media production has unique requirements—namely extreme performance and scalability—that don’t align with traditional IT operations. Some corporations try to adopt an ill-suited enterprise IT storage solution to media workflows and suffer the painful consequences of bottlenecks and incompatibility. Others buy a high-priced—and often limited functionality—proprietary solution only to find that it doesn’t meet IT standards or can’t easily scale as needs grow.

StorNext is an end-to-end media production and archive platform offering the flexibility to start small and scale out as your needs grow. Xcellis Foundation is a high-performance, affordable workflow storage appliance powered by StorNext. This powerful solution works seamlessly with your favorite production tools and meets the most stringent IT security and networking standards. The world’s top broadcasters and post-production facilities use StorNext; now corporate video departments can, too.

Enabling Technologies:
- StorNext shared storage and data management platform
- F-Series NVMe Storage
- Xcellis high-performance workflow storage appliances
- QXS-series hybrid RAID storage arrays
- Lattus object storage
- StorNext AEL tape archives

Choose StorNext for Hollywood-quality production within corporate budgets.
Professional sports drive the bleeding edge of technology as producers strive to differentiate their coverage and offer consumers more choices and more engagement—before, during and after the event. High-resolution 4K content capture with HDR and superior audio is the norm. The unforgiving nature of live events combined with tight schedules, multiple acquisition formats, and an ever greater number of delivery options make sports production the most challenging digital workflow today.

Creating winning content is not easy. Managing the storage and accessibility of valuable sports footage demands a robust infrastructure designed for collaboration. Every user needs simultaneous shared access to content with no fear of slowdowns or dropped frames. Multiple applications run concurrently while accelerated file ingest and multi-transcode delivery takes place, pushing the boundaries of volume and speed.

Quantum StorNext delivers end-to-end media workflow storage to meet the demands of sports production: real-time collaboration, rock-solid reliability, ingest and delivery across geographies, and unlimited scalability at 4K resolution and beyond. Seamless integration of disk and tape archive, including Quantum’s next-generation Lattus object storage, as well as easy access to the cloud, assures that your assets will be protected for decades.

Enabling Technologies:
- StorNext shared storage and data management platform
- F-Series NVMe Storage
- Xcellis high-performance workflow storage appliances
- QXS-series hybrid RAID storage arrays
- Lattus object storage
- StorNext AEL tape archives

StorNext is a game-changer for today’s top sports broadcasters, teams and brands.
StorNext provides the performance and reliability needed to meet extreme production and delivery deadlines—from small editorial studios to massive media production environments, and from HD to 4K and beyond. An end-to-end solution, StorNext provides the power to rapidly and efficiently ingest, collaborate, deliver and monetize content in digital libraries, plus the automation tools to help you manage content throughout its lifecycle. With StorNext, your creative team can focus on creative work, no matter what application or platform they, or their fellow team members, are using.

Whether powering a shared edit environment, ingesting multiple streams of high-res video, or supporting compute-intensive transcoding, StorNext enables high-performance capture, collaboration, processing, and preservation of your media. And while each workflow is different, some things remain the same: your content is invaluable, growing, and irreplaceable—and it must be preserved for future repurposing and monetization that you haven’t yet imagined.

At Quantum, we’ve moved beyond traditional tiered approaches to deliver workflow storage that is tailored to the needs of the distinct workflow stages. Our StorNext platform lets you align your storage, whether it’s NVMe SSDs, HDDs, object storage, LTO tape or cloud services, to meet the diverse needs of your end-to-end media workflow. StorNext provides a cost-effective solution regardless of the size of your creative team. A single StorNext system can simultaneously support frame-based visual effects and stream-based editing and compositing applications. And with StorNext you can manage your tiers of workflow storage as a single infrastructure with automated, seamless movement of data.

The Industry’s #1 Workflow Storage Platform

StorNext is designed to fit seamlessly into your workflow. Mix clients, network protocols, operating systems, and end-user applications—they all work. And with StorNext’s policy-based tiering, you can integrate different types of storage into a single namespace that can include SSDs, spinning disk, object storage, LTO/LTFS tape, and cloud. Now that’s flexible.

With every increase in image resolution, every bit added to color depth and every new camera source, the storage capacity needed to capture and manipulate content grows dramatically. With StorNext you can start with the amount of storage you need today and easily scale up to dozens of petabytes with zero downtime. StorNext is built for the data management challenges associated with large media repositories—and with its policy-based tiering, StorNext gives you cost-effective options to produce and preserve vast amounts of content for the future.

Visit quantum.com/StorNext for more information
Quantum F-Series NVMe Storage

In order to create stunning visual content, your entire team must be as talented as they are hard-working. There are no cutting corners to greatness. In today’s world, the same should be expected of the technology that supports your operations.

With the ability to support massive 1,000+ node render farms without data contention, support playout to multiple digital intermediaries from a single volume, or work effortlessly with uncompresssed 8K content, Quantum F-Series supports all these workflows and more without breaking a sweat. It does this by taking advantage of NVMe performance and parallelism. The end result being extremely low latency, 25 GB/s read and write performance, and over hundreds of thousands of IOPS per chassis.

Combining a software-defined architecture, 100% NVMe all-flash storage media, and the power of the #1 shared file system for video, it is as transformative as it is powerful.

Visit quantum.com/F-Series for more information
StorNext 4K Architectures

When it comes to 4K workflows, no storage provider knows as much about high-resolution video performance requirements and the application ecosystem as Quantum. StorNext 4K reference architectures leverage the power and reliability of the Xcellis Workflow Director and QXS storage arrays and are designed to be customized to the needs of each deployment.

StorNext 4K reference architectures range from entry-level systems designed to support a small workgroup to large-scale facility-level systems capable of scores of 4K streams across entire departments of users. Every reference architecture supports 4K playout—including uncompressed formats—and includes a scalability path to add performance and capacity as needed.

Proven, Real-World 4K Performance

Unlike generic or IT-centric storage providers, Quantum extensively tests every level of the media production workflow—from disks, to arrays, to networks, to client operating systems, to applications. We understand the impact of these choices, and we have the largest network of ecosystem partners, so we know the entire workflow.

**4K Quad HD**
- (10-bit) 60 fps

**4K Full HD**
- (10-bit) 24 fps

**UHD**
- (10-bit) 24 fps

**ProRes**
- 4444 XQ 30 fps

**Apple ProRes**
- 422 HQ 60 fps

<table>
<thead>
<tr>
<th>Stream Count</th>
<th>Base 4K</th>
<th>High-Capacity 4K</th>
<th>Performance Disk 4K</th>
<th>All-Flash 4K</th>
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<td>2</td>
<td>4</td>
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<td>32</td>
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</tr>
</tbody>
</table>
StorNext Base 4K
The perfect system for small workgroups working in compressed formats. Scales to support up to 15 streams of compressed and two streams of full-aperture 10-bit uncompresssed 4K.

Available Upgrades

<table>
<thead>
<tr>
<th>Component</th>
<th>Base Cost</th>
<th>Upgrade Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Capacity</td>
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<tr>
<td>Archiving</td>
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<td>Optional</td>
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</tbody>
</table>

Note: All tests performed using RGB data with arrays 85% full. Raw drive capacity 1.2 TB.

StorNext High-Capacity 4K
For groups that need additional capacity for primary storage. Scales to support up to 24 streams of compressed and up to six streams of full-aperture 10-bit uncompresssed 4K.

Available Upgrades

<table>
<thead>
<tr>
<th>Component</th>
<th>Base Cost</th>
<th>Upgrade Options</th>
</tr>
</thead>
<tbody>
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<td>6 TB</td>
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<tr>
<td>Metadata Storage</td>
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<tr>
<td>Archiving</td>
<td>N/A</td>
<td>Optional</td>
</tr>
</tbody>
</table>

Note: All tests performed using RGB data with arrays 85% full. Raw drive capacity 4 TB.

StorNext Performance Disk 4K
The right starting point when higher stream counts and capacity are required with almost endless scalability. Scales to support up to 28 streams of compressed and up to five streams of full-aperture 10-bit uncompresssed 4K.

Available Upgrades

<table>
<thead>
<tr>
<th>Component</th>
<th>Base Cost</th>
<th>Upgrade Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Capacity</td>
<td>1.2 TB</td>
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<tr>
<td>Array Count</td>
<td>24 Disks</td>
<td>48 Disks*</td>
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<tr>
<td>Metadata Storage</td>
<td>Dedicated</td>
<td>Optional</td>
</tr>
<tr>
<td>Archiving</td>
<td>N/A</td>
<td>Optional</td>
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</tbody>
</table>

Note: Includes support for StorNext Storage Manager automated archives.

StorNext All-Flash 4K
Maximum compressed stream counts and uncompressed support for high-value content production. Scales to support up to 66 streams of compressed and up to six streams of full-aperture 10-bit uncompresssed 4K.

Available Upgrades

<table>
<thead>
<tr>
<th>Component</th>
<th>Base Cost</th>
<th>Upgrade Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Capacity</td>
<td>480 GB</td>
<td>960 GB</td>
</tr>
<tr>
<td>Array Count</td>
<td>24 Disks</td>
<td>48 Disks*</td>
</tr>
<tr>
<td>Metadata Storage</td>
<td>Dedicated</td>
<td>Optional</td>
</tr>
<tr>
<td>Archiving</td>
<td>N/A</td>
<td>Optional</td>
</tr>
</tbody>
</table>

Note: Includes support for StorNext Storage Manager automated archives.
With ever shortening production schedules, content creators need immediate, shared access to media files to collaborate effectively. With an ever growing demand for higher-resolution, high-quality content, it’s no small task to store and deliver multiple content streams to production team members without dropping a single frame—even with uncompressed 4K. And the demands get tougher with each increase of resolution and every new distribution format.

High-resolution content production requires high-performance storage that can stream HD, 4K or greater content to multiple workstations without dropping frames. Approximately 700 MB/sec read or write performance is needed per user or application to stream files at 2K resolution or above. These levels of performance must be matched with a low-latency protocol designed for streaming, whether in all-IP or Fibre Channel-based environments. The real-time workflow operations with these requirements include edit, color correction, FX, live ingest or playout, and finishing.

StorNext centralizes content and enables simultaneous, seamless and faster file sharing on high-speed NAS or SAN networks. StorNext Xcellis workflow storage is designed and configured for media files, with the unique performance capabilities required to manipulate large amounts of data at very high rates and with complete reliability. The Xcellis Dynamic Application Environment provides a unique level of integration with many industry-leading third-party application providers.

Online Storage
High-Performance Collaboration

Xcellis Workflow Storage

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Xcellis Workflow Director
- Dual, active high-availability, rack servers
- Redundant power supplies
- Dual six-core high-performance Intel E5 v3 CPUs
- Choice of metadata and content storage options (below)

Visit quantum.com/Xcellis for more information

Xcellis Workflow Storage

<table>
<thead>
<tr>
<th>QXS-412</th>
<th>QXS-424</th>
<th>QXS-456</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usage</td>
<td>Combined user data and metadata</td>
<td>Dedicated metadata</td>
</tr>
<tr>
<td>Capacity Options (Raw)</td>
<td>48 TB, 72 TB per chassis</td>
<td>4.8 TB, 9.6 TB, 19.2 TB</td>
</tr>
<tr>
<td>RAID Array to Expansion Ratio</td>
<td>Up to seven expansions per RAID Array</td>
<td>RAID Array only</td>
</tr>
<tr>
<td>Drive Type</td>
<td>3.5” 7200 RPM NL-SAS</td>
<td>2.5” SSD</td>
</tr>
</tbody>
</table>
High-resolution, high-volume IP media workflows demand extreme performance and scalability from the underlying storage infrastructure. To meet this challenge, content creators have traditionally had to choose between expensive, high-throughput SAN solutions and more affordable but lower-bandwidth NAS offerings. With Quantum’s Xcellis solution, you no longer need to make these trade-offs.

The Xcellis system stands alone in its ability to deliver the uncompromising performance and scalability previously available only in a SAN to all-IP workflows. Users can opt for 100-GbE throughput to clients via Xcellis Workflow Extender nodes, with each node capable of speeds up to 4.8 GB/sec. In fact, a single cluster can accommodate 16 nodes, delivering a maximum of up to 3,000 connections and 77 GB/sec of throughput. And because it’s powered by StorNext, capacity and performance can cost-effectively scale together or independently, from terabytes to petabytes, and with multiple terabytes per second of performance.

All-IP infrastructure is the future of media production. The Xcellis solution simplifies your ability to get there and take advantage of its many benefits.

>> Visit quantum.com/XcellisScaleoutNAS for more information

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**Xcellis Single Client Performance**

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Throughput</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantum SMB (Uncached) 40 GbE</td>
<td>4.0 GB/sec</td>
</tr>
<tr>
<td>Quantum NFS (Uncached) 40 GbE</td>
<td>4.0 GB/sec</td>
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<tr>
<td>Quantum DLC (Uncached) 40 GbE</td>
<td>4.0 GB/sec</td>
</tr>
<tr>
<td>Quantum FC (Uncached)</td>
<td>12 GB/sec</td>
</tr>
<tr>
<td>Quantum NVMeOF 100 GbE</td>
<td>4.8 GB/sec</td>
</tr>
</tbody>
</table>
The value of content doesn’t end after initial delivery. In fact, its long-term value lies in its ability to be reused over time. A wide variety of new delivery channels, devices and outlets bring new opportunities to monetize content. And supplemental uses—second screens, over-the-top (OTT) distribution, behind-the-scenes material, alternate endings and other special features—allow content to be monetized indefinitely.

For the workflow, this means far more compute-intensive transcoding, packaging and delivery formats than ever before, and the need for storage infrastructure that can stand up to these evolving demands. Transcoding and playout servers should be connected to storage that can deliver 70-110 MB/sec with high IOP performance for much smaller files, often only 4-8K in size. These workflow operations are best suited for storage over IP connections. Object storage is ideal for extending online storage, particularly solutions that are tightly integrated with online storage.

Lattus object storage offers the disk-speed access needed to monetize content while allowing you to extend your online storage beyond the petabyte level. Lattus can be used as a policy-driven tier in a StorNext storage environment—a storage tier that sits between high-performance online storage and cost-effective LTO tape. When combined with object-savvy workflow applications, content of Lattus can be transcoded without having to be restored to online storage. The ability to transcode, deliver and directly manage object storage without having to convert back to a file streamlines operations and saves storage capacity.

Built on next-generation object storage technology, Lattus brings unmatched levels of scalability, durability, performance and economy to online media repositories. So you can preserve your content for the long term—even forever.

Easy Integration with Existing Workflow

High-speed access to content is available through a variety of access on-ramps. Applications can connect via Quantum’s NAS gateway as well as Lattus native S3 HTTP REST protocol. Additionally, many 3rd-party applications already integrate with Quantum StorNext Storage Manager, which provides immediate access to Lattus as a storage tier.

Lattus object storage solutions are policy-driven tiers that sit between high-performance online storage and cost-effective LTO tape. When combined with object-savvy workflow applications, content of Lattus can be transcoded without being restored to online storage. The ability to transcode, deliver and directly manage object storage without having to convert back to a file streamlines operations and saves storage capacity.

Durable, Self-Healing Protection from Data Loss

Using field-proven erasure code technology, Lattus provides extreme durability to ensure data is protected in the event of drive or component failure. Lattus is self-healing: In the background it checks for disk errors and corrects them. When failed drives are replaced or additional capacity is added to the storage, intelligent algorithms redisperse the objects to make full use of the new storage capacity. These capabilities ensure data is well protected and virtually eliminates unscheduled maintenance.

Predictably Fast Retrieval Times

Low-latency disk storage pools predictably fast retrieval times, independent of physical location. High-speed access to the data objects is available through Quantum file system technologies, including NAS access and StorNext Storage Manager integration, as well as native HTTP REST.

Scales to Hundreds of Petabytes

Built on next-generation object storage, Lattus offers an architecture that enables it to scale to hundreds of petabytes with a flat object namespace. Plus, dispersion algorithms can be tuned to spread the data across multiple sites to improve accessibility and availability.

Visit quantum.com/Lattus for more information
Long-Term Archive
Preserving Valuable Content for the Future

Online storage is too expensive for all your content. That’s because the value of content is not fully realized when it’s delivered, but rather when it’s carefully preserved, curated and made accessible for re-use or monetization in a digital library.

Whether legacy content is being actively monetized or not, it must be preserved and protected from loss. As digital asset libraries grow, scalability, durability and economy of storage are paramount. At the same time, asset libraries must be searchable and readily accessible through media asset management. If content can’t be easily located and accessed, it can’t live up to its potential. And for disaster protection, this storage should support some level of geographic dispersion, either through copies, replication or more sophisticated methods. Buildings can burn or flood. If content isn’t properly protected it can be lost forever.

StorNext offers the broadest range of archive storage options, including petabyte-scale, disk-based Lattus object storage; public and private cloud data management; and StorNext AEL tape archives, an economical choice with offsite protection.

StorNext AEL Tape Archives

StorNext AEL tape archives provide a massively scalable storage tier in a StorNext active archive, giving you the option to preserve data without the cost, space, power consumption, and management of conventional disk. StorNext AEL archives are powered by policy-based StorNext data tiering, allowing you to match the cost of the storage to the access needs of the data—and the archives come with optional AES 256-bit FIPS-certified encryption and continuous offline data integrity checking to ensure the long-term preservation of information. StorNext AEL archives offer slot-based pricing, allowing the library capacity to grow without additional capacity/license fees, as new generations of LTO tape support greater capacities.

* Maximum requires optional HDEMs. Addition of optional drives, optional I/E Stations, or optional Dual Robot will reduce maximum size.
Flexible Data Management
Simplifying Tiered Storage with Automation

With greater quantities of higher-resolution content becoming the norm for media production workflows, it’s no longer feasible to maintain content in a single, primary storage tier. Storage performance required to support work in progress is simply too costly to devote to content that should be archived. Aligning content and storage with the needs of particular workflow steps is critical. Piecemeal archival systems that require manual processes and offline reports can’t support the requirements of modern content creation, retention, distribution, and repurposing. An effective storage platform must include a complement of appropriately priced and scaled repositories that act together to move content automatically and based on business policies, while maintaining visibility and access.

To help manage content throughout its lifecycle, the StorNext Storage Manager data management system provides a policy engine that automatically migrates assets between storage types, while keeping the assets transparently accessible to users and applications regardless of location. In addition, StorNext extends your tiered storage environment into the cloud, offering a virtually limitless pool of off-premise public or private cloud storage. No scripts, programming, or manual processes required.

Intelligently manage StorNext storage tiers as a single infrastructure—even into the cloud.

Visit quantum.com/archive for more information
Quantum media workflow storage solutions provide the performance and reliability needed to meet extreme production and delivery deadlines, so you can efficiently ingest, collaborate, deliver, and monetize content in digital libraries, plus automation to help you manage content throughout its lifecycle. With Quantum, your creative teams can stay focused on creative work, no matter what application, platform, or location they and their fellow team members are working from.