

Quantum QXS Hybrid Storage for Lustre HPC Environments

THE SITUATION

For companies or research departments performing extreme data analysis, high-performance computing applications are being used to solve some of the hardest challenges in the world. Typical industries and use cases dealing with this challenge include scientific research, life sciences, geospatial exploration, oil and gas or seismic exploration, and network forensics for cybersecurity.

These intensive data analysis applications require massive parallel processing capabilities, and storage that can support the ultra-high streaming performance—both writes and reads—in order to enable the parallel file system and applications.



QUANTUM QXS STORAGE IN HPC ENVIRONMENTS

To meet the demands of high-performance parallel file system applications in the industries above, Quantum QXS hybrid storage provides extremely fast read and write performance that meets the needs of these applications.

Quantum QXS hybrid storage also includes Q-Tier, real-time intelligent tiering that moves data among different tiers of storage within an array, including flash, high-performance HDDs, and lower-cost HDDs, based on real-time data access patterns. Unlike other hybrid storage arrays that tier data daily to avoid performance degradation during peak hours, QXS arrays have dedicated processing and dual active-active controllers to tier data every 5 seconds—constantly promoting active workloads to the fastest tier available with no reduction in performance. This provides the most-needed data with the highest I/O possible, and also reduces the bottlenecks.

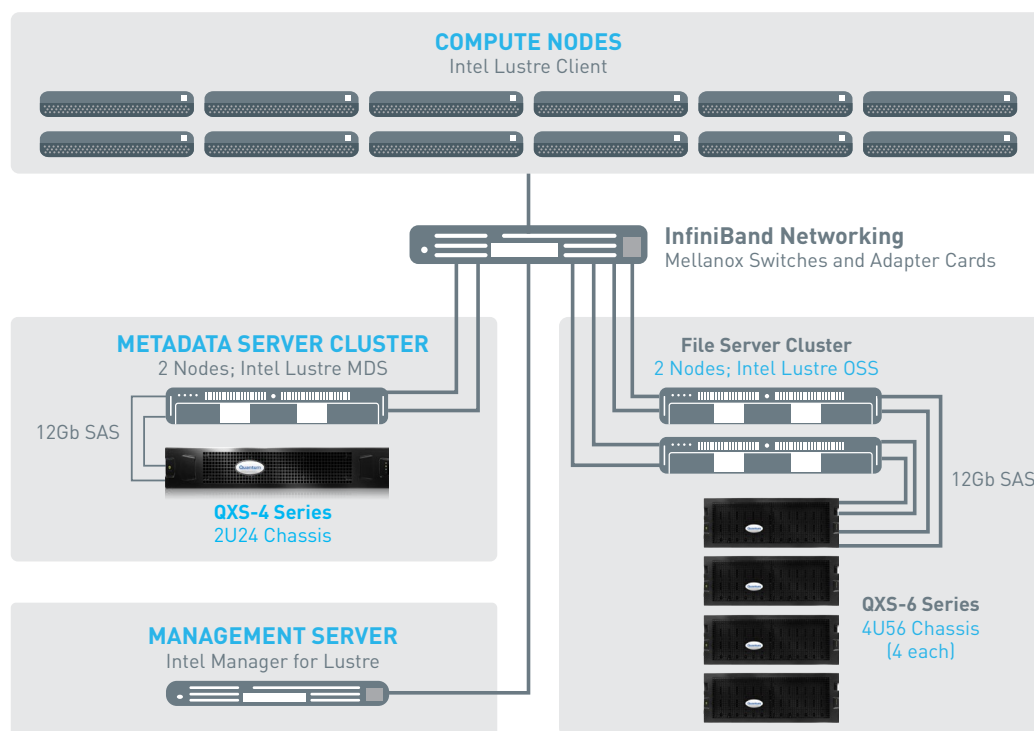
Some common file system applications in these industries include Lustre, GPFS, HPSS, and also Quantum StorNext® 5 high-performance scale-out storage. Figure 1 highlights Lustre as the file system, though the general solution applies for other file systems.

SOLUTION DESCRIPTION

As shown in Figure 1, this solution consists of a number of compute nodes with Lustre clients, connected to a scaled-out block storage architecture leveraging Quantum QXS-6 Series. A management server provides management for the cluster, and the details of the storage architecture include:

- A metadata module containing a metadata server (that stores and manages the file system metadata), and using a QXS-4 series storage array to store the metadata.

Figure 1. Lustre HPC Environment with Quantum QXS Hybrid Storage



- A number of 'data storage modules' that consist of a file server cluster connected to Quantum's QXS-6 series storage array directly connected via SAS. These storage modules can be scaled out to scale performance and capacity, depending on the application.

The entire storage system is connected via a high-performance storage network.

SOLUTION BENEFITS

In the solution above, the key benefit provided by Quantum QXS storage is the extreme read performance, up to 12Gb per second. For applications requiring extreme streaming performance, Quantum's QXS hybrid storage arrays provide the integrated software and purpose-built hardware architecture to deliver the necessary performance. In particular, Quantum's QXS-6 series controller was purpose-built for high streaming performance, both writes and reads. These benefits exist in this Lustre environment, but also

generally apply for any application or use case that requires high streaming performance, such as corporate video or video surveillance. Quantum QXS Series also includes Q-Tier to enable automated, intelligent tiering to ensure that the most frequently accessed data is in the fastest storage. QXS also includes Q-Tools that include thin provisioning, caching, pooling, snapping, and quick rebuilds. Flexible configurations allow for any combination of flash and disk with densities of up to 56 drivers per rack.

By providing real-time intelligent tiering, Quantum QXS hybrid arrays combine flash with small and large form factor HDDs, in a variety of different chassis options, to deliver the benefits of flash performance without the cost of an all-flash array. Quantum QXS hybrid storage arrays deliver excellent value without sacrificing functionality, reliability, or performance.

Learn more at www.quantum.com/hybridstorage.

ABOUT QUANTUM

Quantum is a leading expert in scale-out storage, archive and data protection, providing solutions for sharing, preserving and accessing digital assets over the entire data lifecycle. From small businesses to major enterprises, more than 100,000 customers have trusted Quantum to address their most demanding data workflow challenges. With Quantum, customers can Be Certain™ they have the end-to-end storage foundation to maximize the value of their data by making it accessible whenever and wherever needed, retaining it indefinitely and reducing total cost and complexity. See how at www.quantum.com/customerstories.

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