

MYRIAD™ ALL-FLASH SCALE-OUT FILE AND OBJECT STORAGE

Cloud-Native Software Brings New Levels of Simplicity and Adaptability to High-Performance Unstructured Data Workloads

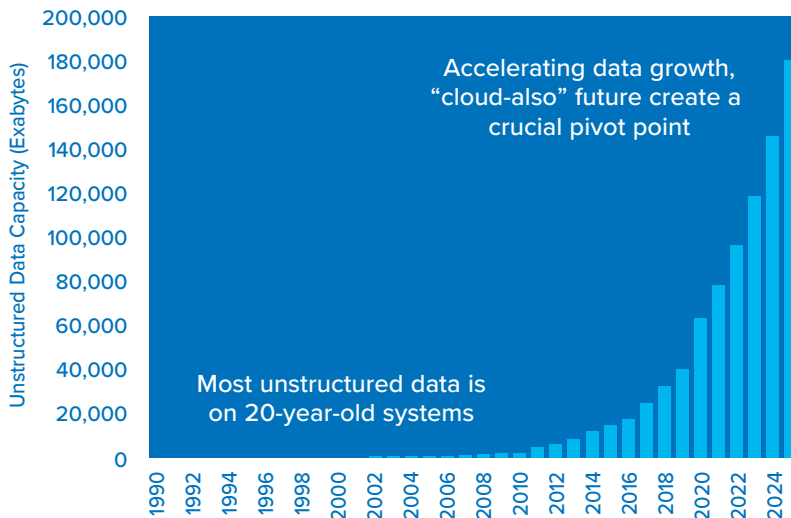
DATASHEET

FEATURES & BENEFITS

- Consistent Low-Latency Performance for High Bandwidth, High IOPS Applications:** Myriad's distributed architecture is based on a transactional key/value store designed for NVMe and RDMA that delivers consistent, low-latency performance for any unstructured data workload at any scale.
- Modern Microservices Architecture Orchestrated by Kubernetes®:** Myriad is fully containerized and uses familiar, proven cloud technologies like Kubernetes to deliver simplicity, automation, and resilience at even the highest scale. Adopt and deploy new features and fixes faster and more predictably with less risk.
- Runs on Standard High-Volume Flash Storage:** Myriad does not rely on any specialized hardware, so you can quickly adopt the latest hardware, reduce costs of flash and hybrid-cloud storage over time and adapt your storage infrastructure to meet future requirements.
- Zero-Touch Storage and Network Management:** Everything about Myriad is designed with simplicity in mind. The software automates much of the storage management and networking management, so that even large clusters can be managed with almost no IT involvement. Software automatically detects, deploys, and configures new storage nodes within a cluster so you can scale, modify, and even shrink your cluster non-disruptively.

Ending the Constraints, Compromises, and Tradeoffs of Legacy Storage Architectures

The amount of unstructured data in the enterprise is expected to double over the next 5 years and yet most enterprises continue to store this data on file storage systems that were designed over 20 years ago.



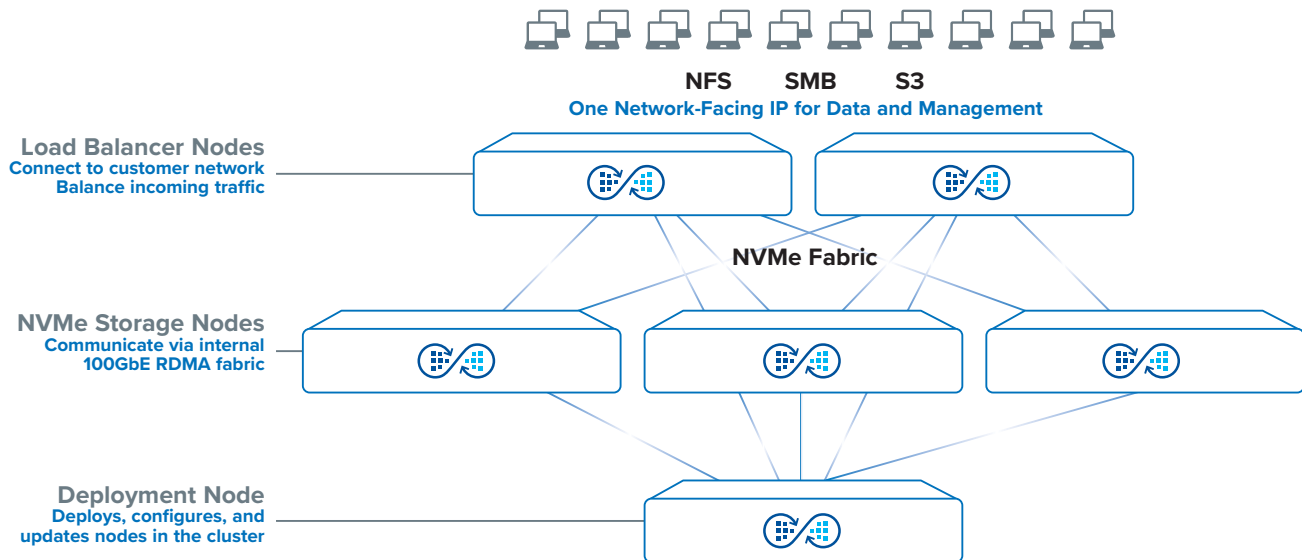
In an attempt to keep pace with this growth and associated performance requirements, scale-out NAS systems have “thrown hardware” at the problem. Current file and object storage systems have tried to bolt-on flash storage, but these systems were not designed for NVMe flash and can't provide the consistent low-latency, high IOPS performance required by today's applications.

Even more recent all-flash file and object storage systems are shackled to specialized hardware and won't run natively in the cloud, so they don't enable hybrid-cloud infrastructure. This has led to constraints, compromises, and tradeoffs that are impacting IT and holding back data-driven organizations.

Myriad Brings New Levels of Simplicity and Adaptability to File and Object Storage

Quantum Myriad™ provides organizations with a totally modern, cloud-native architecture that brings enterprises new levels of simplicity and adaptability for their unstructured data storage.

A Myriad cluster can start with as few as three* NVMe all-flash storage nodes, and its architecture enables scaling to hundreds of nodes in a single distributed, scale-out cluster.



Myriad Software Architecture and Feature Set

Myriad is ideal for rapid recovery of mission-critical data, rendering demanding VFX and animation workloads, and building modern data lakes for analytics and business intelligence.

Clients	NFS v4	NFS v3*	SMB*	S3*	Proprietary Client*	GPU-Direct*
Data Services	Snapshots	Clones	Inline Deduplication and Compression	Replication*	Data Catalog and Analytics*	
File System	Fully distributed		Composable (one FS per user, per app, etc.)			
Transactional Key/Value Store	Redirect-on-write	Lock-free	Self-Balancing, Self-Healing	Dynamic n+m Erasure coding		

Myriad Client Connectivity

Myriad supports connectivity via NFS v4, NFS v3*, SMB*, and will, in the future, add S3 and additional interfaces. Clients connect through a single IP address no matter how large the cluster grows. Myriad automatically load-balances client connections across multiple 100GbE ports using equal cost multipathing (ECMP). BGP routing uses unnumbered interfaces to minimize networking effort at initial deployment and when scaling.

Myriad Data Services

Myriad provides inline, small-block automatic deduplication and compression. Versioning support is via snapshots and clones and does not impact file service operation.

Myriad File System

Myriad was designed to take full advantage of NVMe flash storage and fast, low-latency RDMA networking. The Myriad distributed file system stores both file and object data, attributes, and inherent metadata in an underlying key/value store. Both data and metadata are distributed across all nodes for maximum resiliency.

Myriad Transactional Key/Value Store

Myriad is designed for lock-free scaling across even the largest of systems and responds on-the-fly to changes in storage node availability. The redirect-on-write nature of Myriad ensures that new data is always written to free space vs. overwriting data in place. This inherently supports versioning, snapshots, and rollback, providing resistance to data loss from accidental deletion and ransomware alike.

Dynamic Erasure Coding Data Protection

Stored data is protected with dynamic n+m erasure coding. As the cluster grows or shrinks, and drives or nodes fail and are replaced, the EC spread dynamically adjusts for maximum efficiency and protection, all without administrator intervention.

Zero-Click Upgrades

Adding storage is as simple as racking and cabling new storage nodes, powering them on, and walking away. No need to submit tickets to the networking team or even open the UI. Myriad automatically detects new nodes and deploys them into the cluster for immediate use.

Myriad Specifications

Myriad System Capacity and Scaling

System Capacity	765 TB in 5 NVMe Storage Nodes up to 1.53 PB raw in 10 NVMe Storage Nodes
Effective System Capacity at 1.5x Effective Data Reduction	921.6 TB in 5 NVMe Storage Nodes up to 1.84 PB in 10 NVMe Storage Nodes
Effective System Capacity TB at 3x Effective Data Reduction	1.84 PB in 5 NVMe Storage Nodes to 3.68 PB in 10 NVMe Storage Nodes
Individual NVMe Storage Node Capacity	153.6 TB per NVMe Storage Node, 10 NVMe Drive Bays of 15.36 TB each

Myriad NVMe Storage Node Specifications

Myriad NVMe Storage Nodes are sold as Quantum appliances and leverage readily available servers and components.

Form Factor	1U server hosting 10 hot-swappable 2.5" NVMe Flash drive bays, and 2 mirrored NVMe M.2 drives for system operation
Connectivity	100 GbE Ethernet RDMA 2x Dual-Port 100 GbE NIC per server
Power	750 W 200-240 VAC Redundant Platinum Power Supplies
Dimensions and Weight	Width: 17.2"/437 mm Height: 1.7"/43 mm Depth: 23.5"/597 mm Weight: 39 lb/17.69 kg
Environmental	Operating Temperature: 10 °C ~ 35 °C (50 °F ~ 95 °F) Non-operating Temperature: -40 °C to 60 °C (-40 °F to 140 °F) Operating Relative Humidity: 8% to 90% (non-condensing) Non-operating Relative Humidity: 5% to 95% (non-condensing)

Myriad Load Balancer Specifications

Form Factor	1U 32 port 100 GbE intelligent fabric switch with Layer 3 routing capability with Myriad software
Connectivity	32 x 100 GbE QSFP28 Ethernet ports Layer 3 forwarding of 6.4 Tbps full duplex Static and dynamic address translation at line rate, no introduced latency, double NAT and BGP routing
Power and Cooling	550 W maximum 100-240 VAC redundant power supplies Hot-swappable 5+1 redundant fans
Dimensions and Weight	Width: 17.25"/438 mm Height: 1.71"/43.5 mm Depth: 20.27"/515 mm Weight: 23.96 lb/10.87 kg
Environmental	Operating Temperature: 0 °C to 45 °C (32 °F to 113 °F) Operating Humidity: 5% to 95% non-condensing

Myriad Deployment Node Specifications

Form Factor	1U 48 port 1 GbE intelligent fabric switch with Layer 3 routing capability with Myriad software
Connectivity	48 x 1 GbE RJ45 Ethernet ports Layer 3 forwarding of 6.4 Tbps full duplex Static and dynamic address translation at line rate, no introduced latency, double NAT and BGP routing
Power and Cooling	Redundant, load-sharing, hot-swappable power supplies Hot-swappable 2+1 redundant fans
Dimensions and Weight	Width: 17.24"/438 mm Height: 1.73"/440 mm Depth: 18.66"/474 mm Weight: 16.91 lb/7.67 kg
Environmental	Operating Temperature: 0 °C to 45 °C (32 °F to 113 °F) Operating Humidity: 5% to 90% non-condensing

*Some features listed in this datasheet are not available at initial product GA. Contact Quantum representative for details.



Quantum technology, software, and services provide the solutions that today's organizations need to make video and other unstructured data smarter – so their data works for them and not the other way around. With over 40 years of innovation, Quantum's end-to-end platform is uniquely equipped to orchestrate, protect, and enrich data across its lifecycle, providing enhanced intelligence and actionable insights. Leading organizations in cloud services, entertainment, government, research, education, transportation, and enterprise IT trust Quantum to bring their data to life, because data makes life better, safer, and smarter. Quantum is listed on Nasdaq (QMCO) and the Russell 2000® Index. For more information visit www.quantum.com.

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