Quantum

COMPARING SCALE-OUT FILE AND OBJECT STORAGE ALTERNATIVES

Quantum Myriad™ Brings New Levels of Performance, Simplicity, and Adaptability

COMPETITIVE BRIEF

Unstructured data growth in the enterprise is accelerating – and showing signs of exponential growth. In fact, unstructured data is expected to double over the next 5 years; yet most of this data is stored on systems designed over 20 years ago. For storing and managing this unstructured data, the most common alternatives are scale-out network attached storage (NAS) systems or other scale-out file and object storage platforms.

This brief provides a comparison between Quantum's Myriad all-flash file and object storage platform and some of the more common scale-out storage platforms on the market today.

The Constraints of Legacy, Hardware-Centric Storage Systems

The levels of unstructured data flowing into and through an enterprise today would have been unimaginable years ago. This data is growing at an exponential rate, yet most enterprises continue to store this data on legacy file systems.

To attempt to keep pace with this growth and associated performance requirements, scale-out NAS vendors have "thrown hardware" at the problem. Legacy file and object storage systems have tried to replace hard-drives with NVMe SSDs, but systems not designed for NVMe flash 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 don't run natively in the cloud, so they lack the ability to enable hybrid-cloud infrastructure. This has led to constraints, compromises, and tradeoffs that are impacting IT and holding back data-driven organizations.

Consistent Application Performance

Legacy storage systems were designed for the age of spinning hard drive systems, which measure IOPS in the 10's of read/write operations per second. They are limited by design bottlenecks that must accommodate SATA drives. They are organized around dual storage controllers that must buffer against data loss, in addition to keeping a consistent view of the file system through constant interaction with peer scale-out nodes, independent of data service.

Even when trying to boost IOPS performance by substituting higher RPM drives or SSDs, the IOPS performance is only partially lifted. When these systems serve many users and applications, they quickly reach the limits of performance and service to other users.

Exponential Complexity

IT teams try to meet the rising demand of capacity and performance by scaling to more systems and networking infrastructure for keeping the file system view coherent across all nodes. Adding more scale-out nodes requires considerable networking expertise and planning to reserve IP network address ranges, troubleshoot connections, and optimize the system.

This puts enormous strain on IT and admin staff and fosters a 'fire fighter' mentality of triaging IT issues, preventing these teams from getting a clear picture of their data storage, what applications are using them, and helping stakeholders truly use that data to derive critical insights.

Custom Hardware

Even more recent offerings brought to market within the past several years, such as Pure Storage (2011) and VAST Data (2016), have addressed these constraints with designs that require custom or boutique hardware and use complex designs. As the recent supply chain shortage has shown, custom hardware can get expensive and difficult to procure, especially if there are few vendors for source components.

Moving Towards a 'Future-Proof' Design

It's clear that recent technology advances and market trends suggest the virtues of a system that meets these challenges and 'has the future built in' to address the needs and capabilities for unstructured data.

Make Full Use of NVMe Drive Potential

NVMe flash storage modules are quickly evolving new capacities, driven by market competition. An ideal system would leverage NVMe flash drives readily available from multiple vendors, and benefit from the competition among these vendors as the market drives ever higher capacities in smaller form factors at lower cost.

Make Full Use of RDMA Potential

All this NVMe flash storage potential – up to 100s of thousands of IOPS and performance up to 10s of Gigabytes per second – would be wasted on a storage system designed for HDDs or a system that requires non-standard connectivity between storage nodes. A future-forward design should allow connections over readily available, market-driven fast Ethernet NICs and connections of 100GbE and higher.

Use Proven Cloud Technologies

An ideal system would also leverage technologies, such as containers and microservices used by the largest cloud infrastructure providers, to ensure that every part of the file system is scalable and resilient, then use orchestration tools to manage it.

One Architecture from On-Premises to 'Cloud-Also'

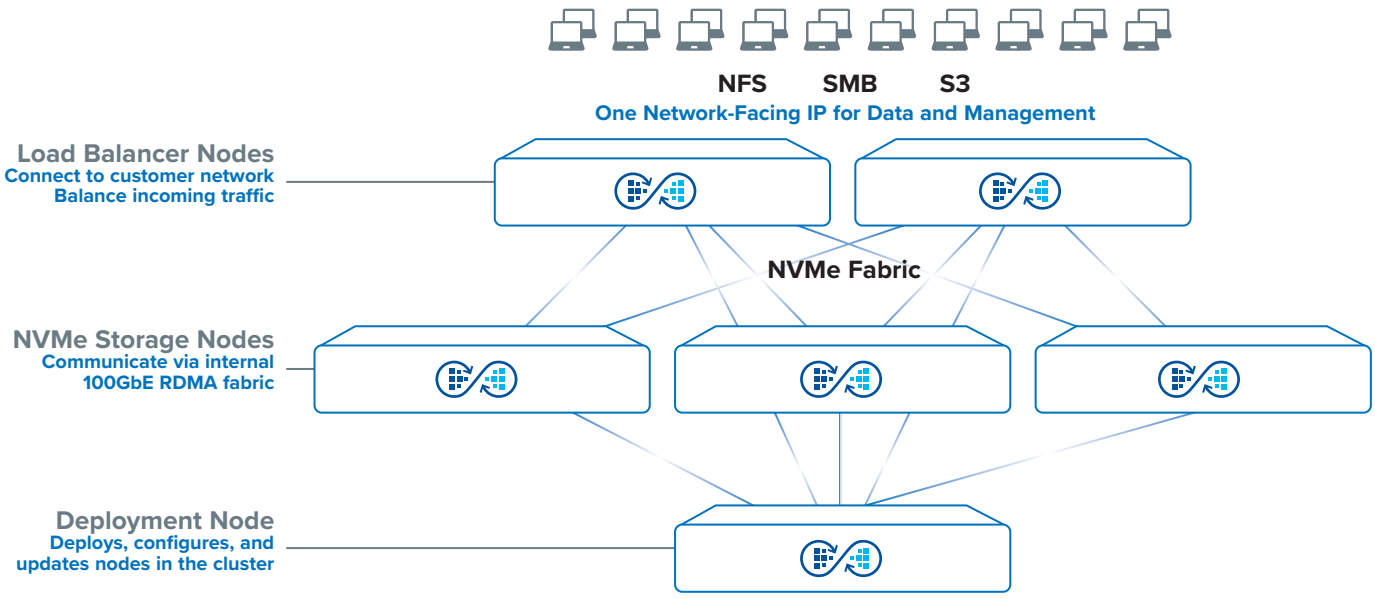
Finally, any new system considered should not only be highly scalable, reduce bottlenecks, and make best use of its hardware resource for not only on-premises, but also provide this same experience when deployed in the cloud.

Built for the Future: Myriad Brings New Levels of Simplicity and Adaptability

Myriad is an all-flash file and object storage software platform for unstructured data for the enterprise. Its modern, cloud-native software architecture makes it an easy-to-use solution that avoids the trappings of hardware-centric systems, making it highly adaptable to future needs while reducing the burden on over-extended IT staff. 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.

Key attributes include:

- **Consistent Low-Latency Performance for High Bandwidth Applications:** Myriad's distributed architecture is designed for NVMe and RDMA, delivering low-latency performance for any workload at any scale.
- **Modern Microservices Architecture Orchestrated by Kubernetes®:** Myriad is fully containerized and uses familiar and proven cloud technologies like Kubernetes to deliver simplicity, automation, and resilience.
- **Runs on Standard High-Volume Flash Storage:** Myriad does not rely on any specialized hardware or complicated combinations of different types of flash storage, so organizations can quickly adopt the latest hardware and adapt their storage infrastructure to meet any future requirements.
- **Automated Storage, Networking, and Cluster Management:** The software automatically detects, deploys, and configures storage nodes, and manages the networking of the internal RDMA fabric. Admins can install, expand, modify, and shrink the cluster with minimal IT involvement.
- **Data is stored efficiently** with intelligent deduplication and compression and self-healing, self-balancing software.
- **Data protection, data security, and ransomware recovery are simple** with instant snapshots, space-efficient clones, snapshot recovery tools, and rollback capabilities.



Comparing Scale-Out File and Object Alternatives

To understand how Myriad compares to other solutions, let's evaluate a few other platforms and compare them to Myriad.

Legacy Scale-Out NAS (Dell/EMC PowerScale, formerly Isilon)

Difficult to Scale, Inefficient Data Storage

Legacy scale-out NAS, like Dell/EMC PowerScale, employ an architecture designed for disk-based storage systems. They have the reputation for being difficult to scale and require advanced networking experience to deploy and manage. Because of this, scaling is effectively limited to low 10s of Petabytes and encourages islands of NAS storage. Further, as these systems grow, insight operations must resort to file-tree 'walks' that impact performance, especially as the number of files and metadata grows.

Myriad Advantages vs. Legacy Storage Vendors

1. **Myriad Delivers Consistent Low-Latency Performance at Any Scale:** Myriad provides consistent, low-latency performance for both high bandwidth and high IOPS workloads on a single system and takes full advantage of NVMe and RDMA capabilities. Legacy storage systems run into performance bottlenecks when dealing with workloads that require a lot of metadata operations, causing slowdowns in performance.
2. **Myriad Eliminates Networking Challenges Associated with Legacy Scale-Out NAS:** Myriad requires only one network-facing IP address for data and management, whereas legacy NAS clusters require a large number of IP addresses. In a Myriad cluster, the NVMe storage

nodes communicate via an internal RDMA network and the networking management is automated. In fact, everything needed for intelligent fabric nodes for internal connectivity and external, load-balanced networking is included with Myriad.

3. **Myriad Provides up to 60% Better Data Efficiency:** Legacy NAS systems require more overhead to store metadata, meaning in some cases, much of the raw capacity is used for system needs, as opposed to user storage. Myriad stores data and metadata as objects in a transactional key value store, and employs "always on" inline deduplication and compression to deliver up to 60% better data efficiency than legacy NAS.

All-Flash NAS and Object Systems (Pure Storage, VAST Data)

Custom Hardware, Complex Requirements, Limited Platform Tooling, and 'Cloud-Also' Options

Many scale-out NAS and object systems, like Pure Storage and Vast Data, rely heavily on custom hardware in a complex range of products that require substantial installation time and network expertise. Further, these designs push much of the intelligence of their storage stacks into the storage initiator and rely on NVMe over Fabrics rather than taking full advantage of the exponentially more powerful resources available in the storage target and NVMe RDMA.

Further, these solutions have a limited range of complementary data migration or replication tooling and cannot run the same systems on hardware on-premises and in the cloud.

Myriad Advantages vs. All-Flash NAS and Object Vendors

1. **Myriad Requires No Specialized Hardware:** Myriad is cloud-native software that runs on readily available NVMe servers, NVMe flash drives, and standard network switches. Other vendors' architectures rely on custom flash chips or specialized memory technologies that are not widely used in enterprise storage or NVME storage drives that aren't readily available on the market With Myriad, customers can quickly benefit from falling flash costs in the future, and know they have a future-proof architecture.

2. **Myriad is Based on a Modern Microservices Architecture, Orchestrated by Kubernetes:** While other vendors are either partially or fully based on a microservices architecture, Myriad clusters are orchestrated by Kubernetes, a familiar and proven tool widely used by enterprises and cloud providers. Myriad customers do not require any knowledge of Kubernetes to operate a Myriad cluster, it is all internal to the software, providing the operational benefits of the cloud wherever it is deployed.

3. **Myriad Runs Natively in the Cloud:** Myriad is cloud-native software, fully containerized and orchestrated by Kubernetes. Because of this design, it will run on any cloud, using standard cloud compute, container, and Kubernetes orchestration services. Unlike other all-flash

vendors that are tied to specialized hardware, the Myriad user experience will be the same whether running on-premises or in the cloud so enterprises can be hybrid-cloud ready. Myriad replication services can copy files, folders, buckets and objects between on-prem and cloud instances, so users can port Myriad to different clouds over time to reduce cloud storage spend.

Comparison	Quantum Myriad	DellEMC PowerScale	Pure Storage FlashBlade	VAST Universal Storage
Class	Scale-Out NAS/ Object	Scale-Out NAS	Scale-Out NAS/ Object	Scale-Out NAS/ Object
Application Focus	Media, AI/ML, Life Sciences, Backup	Media, Life Sciences	AI, Backup, Media	HPC, Media, AI, Life Sciences, Backup
Designed for NVMe	YES	NO	YES	YES
Nodes communicate via internal NVMe/ RDMA fabric	YES	NO	YES	YES
Hardware	No specialized hardware required Runs on standard flash servers and switches	Dell Hardware	Custom Pure DirectFlash Modules	Storage Class Memory and QLC Flash
Microservices Architecture	YES, orchestrated by Kubernetes	NO	Partial	YES
Will Run Natively in Cloud	YES	NO	NO	NO
Scale Min-Max Usable	450 TB-Petabytes Software architecture enables scale to thousands of nodes	72 TB-145 PB	123 TB-7.9 PB	500 TB-1 EB
Network Connectivity	Only (1) network-facing IP for data and management	Requires many network-facing ports	Only (1) network-facing IP for data and management	unknown

Comparison	Quantum Myriad	DellEMC PowerScale	Pure Storage FlashBlade	VAST Universal Storage
Protocol Support				
NFS	YES	YES	YES	YES
SMB	YES*	YES	YES	YES
Multi-protocol SMB<>NFS	YES*	YES	YES	YES
Multi-Protocol File<>Object	YES*	NO	NO	YES
S3	YES*	YES	YES	YES
Parallel POSIX Client	Roadmap	NO	NO	NO
Data Services				
Deduplication	Inline, always on	On some offerings	NO	Inline, always on
Compression	Inline, always on	On some offerings	YES	Inline, always on
Global, Cross-Block Compression	Inline, always on	NO	NO	Inline, always on
Snapshots	Zero-impact snapshots and clones	YES	YES	YES
Data Protection	n+m	n+1-n+4	n+2 +	n+4
Connect to Cloud AIOps Software	YES	YES	YES	YES
Data Catalog	Roadmap	NO	NO	NO
Data Analytics	YES*	NO	NO	NO

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

Conclusion

Myriad is cloud-native software that brings new levels of simplicity and adaptability to high-performance unstructured data workloads. Myriad's innovative design and architecture offer these benefits over other systems:

- **Eliminate the Constraints of Legacy Scale-Out NAS and Hardware-Centric Systems:** Adapt to any unstructured data workload on-premises and in any cloud.
- **Reduce Operational Costs:** Consolidate workloads and platforms on to a single high-performance, scalable, simple, and green all-flash Myriad cluster.
- **Free Up IT Resources:** Even large Myriad clusters can be managed with little IT involvement and without networking expertise.
- **Reduce Flash Storage and Cloud Storage Costs:** Because Myriad stores data efficiently on off-the-shelf, high-volume all-flash servers and will run natively in the cloud, customers quickly benefit from reducing flash and cloud storage costs over time.
- **Adopt New Features and Fixes Faster with Less Risk:** Modern, microservices architecture means specific microservices can be upgraded and enhanced quickly with less risk.
- **Future-Proof Infrastructures:** Be ready for the hybrid-cloud future with a platform that can adapt to an unpredictable future.

Learn More

To learn more about Myriad's features and architecture, go to www.quantum.com

Quantum