

Scaling Performance with Ultrastar® Data60 and Data102 Hybrid Storage Platform and ATTO H12F0 GT HBA



Test Environment

- ATTO H12F0 GT PCIe Gen 4.0 12Gbps SAS HBA
- Ultrastar Data102 12Gbps SAS-3 Hybrid Storage Platform
- Workload Generator: FIO 3.41
- Linux Multi-pathing with active/active paths were utilized in the SAS CMR configuration

Challenges Highlights

- Addressing explosive data growth
- Maximizing data center floor space
- Eliminating performance bottlenecks in dense environments
- Enhancing availability and reliability
- Improving end-to-end throughput for data-intensive workloads
- Enabling seamless scalability
- Reducing total cost of ownership

Solution

The WD Ultrastar Data102 Hybrid Storage Platform paired with ATTO H12F0 GT 12Gb/s SAS HBAs delivers a flexible, high-density storage solution optimized for both capacity-driven and performance-sensitive workloads.

The Ultrastar Data102 provides a compact 4U platform capable of supporting up to 102 drives, enabling petabyte-scale deployments within a single enclosure. When populated with SATA SMR HDDs, the solution maximizes usable capacity at the lowest cost per TB—making it ideal for archival, backup, and data lake environments where sequential write efficiency and density are prioritized.

For workloads requiring higher and more consistent throughput, the same platform can be configured with SAS CMR HDDs, leveraging their superior random I/O performance, predictable latency, and dual-port reliability. Paired with the ATTO H12F0 GT SAS HBA, which delivers highly optimized data streaming and low-latency connectivity, this configuration enables sustained high-bandwidth performance for analytics, media workflows, and active data repositories.

Together, the Ultrastar Data102 and ATTO H12F0 GT HBA create a scalable storage architecture that allows organizations to balance maximum capacity with SATA SMR drives or enhanced performance with SAS CMR drives, all within a unified enterprise-grade Just a Bunch of Disks (JBOD) infrastructure.

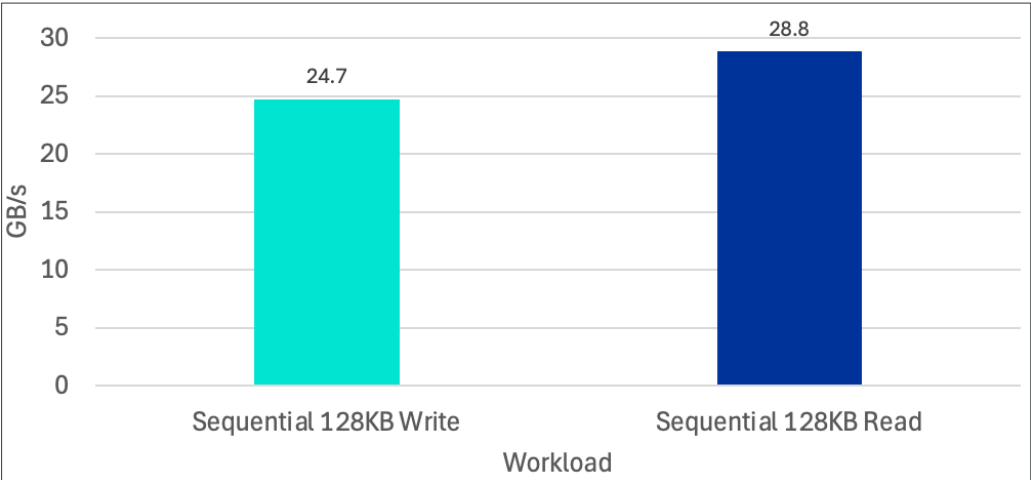
ATTO

ATTO Technology, Inc. is a global leader in network and storage connectivity for data-intensive computing environments. ATTO manufactures high-performance host bus adapters, network adapters, protocol bridges, Thunderbolt™ adapters, and software designed to unlock the full potential of modern storage architectures. Supporting all major storage interfaces—including Fibre Channel, SAS/SATA, iSCSI, Ethernet, NVMe, NVMe over Fabrics, and Thunderbolt—ATTO connectivity solutions pair with WD platforms to deliver end-to-end performance from host to storage.

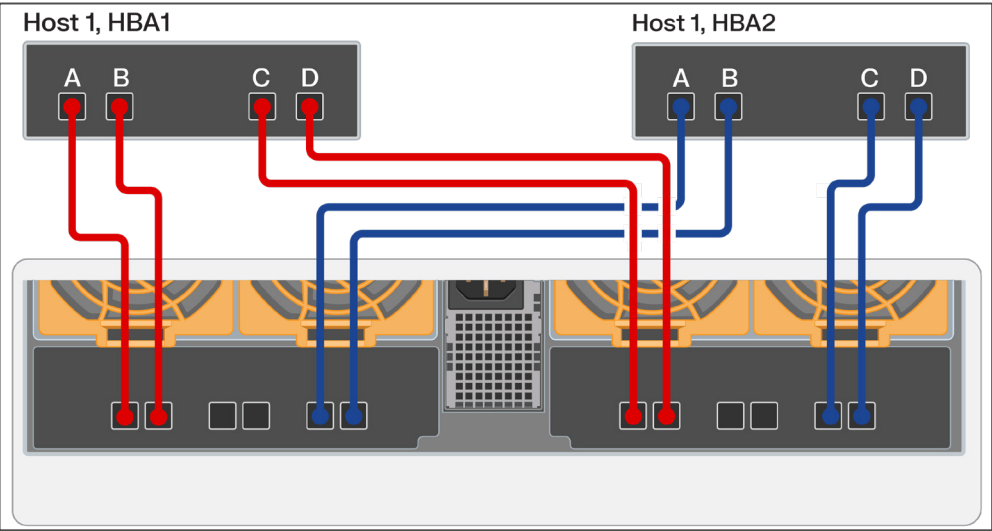
Scaling Performance with Ultrastar Data60 and Data102 Hybrid Storage Platform and ATTO H12F0 GT HBA

Ultrastar DC HC580 22TB CMR SAS Configuration

- 2x ATTO H12F0 GT HBAs
- Ultrastar Data102 was zoned in a 51x3 configuration with each HBA cabled to view its own set of 51 drives.
- Ultrastar DC HC580 22TB CMR SAS HDDs (WUH722422AL5204)



SAS CMR Zoning 51x3



Cabling

HBA 1

- Ports A and B to IOM A1 and A2
- Ports C and D to IOM B1 and B2

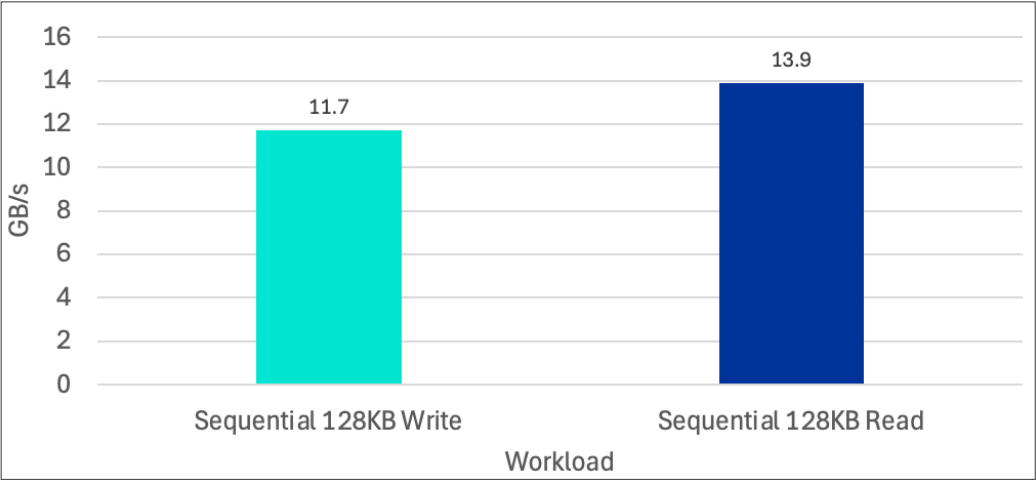
HBA 2

- Ports A and B to IOM A5 and A6
- Ports C and D to IOM B5 and B6

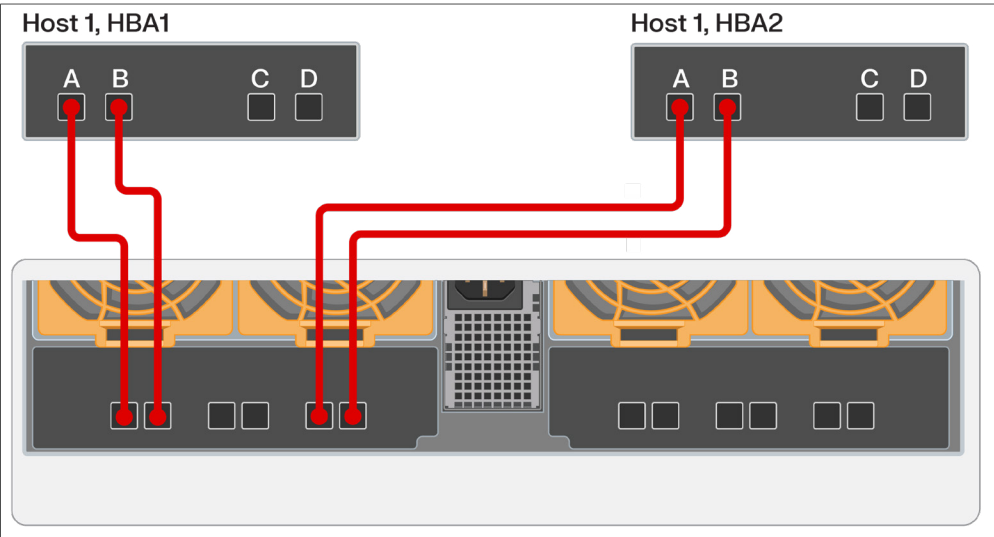
Scaling Performance with Ultrastar Data60 and Data102 Hybrid Storage Platform and ATTO H12F0 GT HBA

Ultrastar DC HC690 30TB SMR SATA Configuration

- 2x ATTO H12F0 GT HBAs
- Ultrastar Data102 was zoned in a 51x3 configuration with each HBA cabled to view its own set of 51 drives.
- Ultrastar DC HC690 30TB SMR SATA HDDs (WSH723200ALN604)



SATA SMR Zoning 51x3



Cabling

HBA 1

- Ports A and B to IOM A1 and A2

HBA 2

- Ports A and B to IOM A5 and A6

Scaling Performance with Ultrastar Data60 and Data102 Hybrid Storage Platform and ATTO H12F0 GT HBA

Conclusion

The combination of the WD Ultrastar Data102 Hybrid Storage Platform and ATTO H12F0 GT SAS HBAs provides a highly adaptable storage platform that can be tuned to meet diverse workload requirements. By leveraging high-capacity SATA SMR drives, organizations can achieve exceptional storage density and cost efficiency for large-scale data repositories, while SAS CMR configurations deliver the consistent performance and reliability required for active and throughput-intensive workloads. The validated performance results demonstrated in these topologies its ability to scale predictably, enabling customers to confidently deploy a storage architecture that aligns capacity, performance, and cost with their operational goals.

Ultrastar Data60

- Up to 60 Ultrastar HDDs (SAS or SATA)
- Up to 1.56 PB of raw storage using 26TB CMR HDDs and 1.92PB using 32TB SMR HDDs
- 4U form factor



Ultrastar Data102

- Up to 102 Ultrastar HDDs (SAS or SATA)
- Up to 2.65PB of raw storage using 26TB CMR HDDs and 3.26PB using 32TB SMR HDDs
- 4U form factor



Daisy-chaining for High Capacity

Up to 4 units may be daisy-chained for a total raw max capacity of 7.68PB (Data60) or 13.05PB (Data102).

Innovations for Performance and Reliability

IsoVibe™: Patented technology improves isolation of vibration propagation both to and from each individual drive to help maximize performance even in heavy workloads.

ArcticFlow™: Improves cooling via discrete airflow channels that allow cool air to reach more components within the system, improving cooling effectiveness that can improve drive reliability.

Flexible

- Choose dual-port SAS for high availability or single-port SATA for low cost.
- Up to 12 x 12Gb/s SAS-3 host connections.

Designed for Serviceability

- Enterprise-grade redundant and hot swappable PSUs, IO Modules, and fans.
- Rack-mounted top cover for quick and easy service.

