NYRIAD®

ULTRAIO™ BLOCK STORAGE FOR IBM SPECTRUM® SCALE

Imagine a revolutionary new storage architecture that combines the power of GPUs and CPUs to deliver a combination of performance, resilience, and efficiency, enabling massive amounts of data to be managed in a highly available storage system. Nyriad® is enabling a new generation of storage solutions that empower businesses to grow, adapt, and stay competitive in a data-driven world. We are simplifying how data is stored, accessed, and managed.

PERFORMANCE - RESILIENCE - EFFICIENCY

REIMAGINE YOUR BLOCK STORAGE WITH IBM SPECTRUM® SCALE

AND NYRIAD'S ULTRAIO™ GPU-POWERED STORAGE ARCHITECTURE

KEY RESULTS

- Up to **21 GB/s** sustained writes
- Up to **15 GB/s** sustained reads

WHY ULTRAIO FOR IBM SPECTRUM® SCALE

IBM's Spectrum® Scale file system, formerly known as GPFS, is a flexible, diverse storage platform for modern AI and big data applications. While the Spectrum Scale platform can be deployed in multiple cloud and on-premises configurations, the shared storage deployment with Nyriad's UltraIO™ storage solution delivers Spectrum Scale users an extremely performant, resilient, and efficient datacenter solution with agility and consistency needed for modern data pipelines.

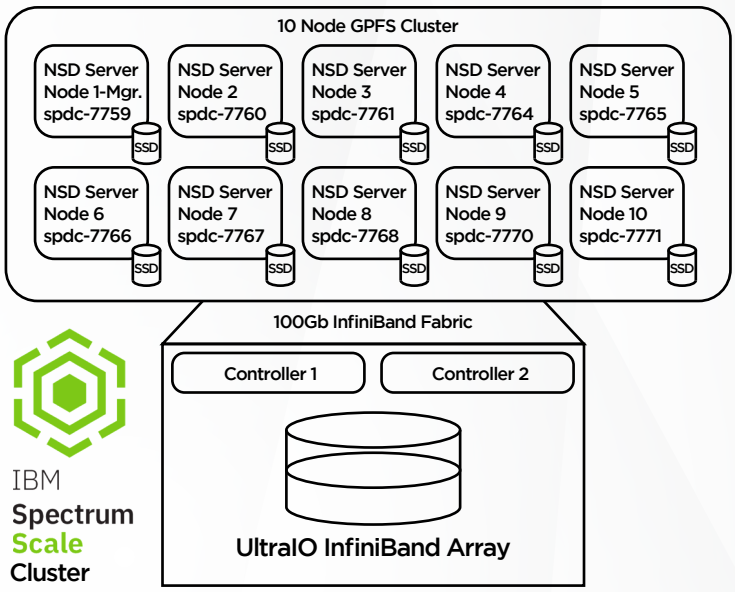
With the UltraIO system's GPU-accelerated erasure coding for block, Spectrum Scale deployments achieve high capacity utilization and simplify network shared disk (NSD) configurations by relying on the UltraIO solution's erasure coding and intelligent data placement.

TEST PURPOSE

Nyriad deployed the Spectrum Scale platform with the UltraIO solution and ran a series of four-corners tests to demonstrate how the UltraIO solution's combined GPU+CPU architecture can deliver consistently high bandwidth for GPFS users. This exercise not only details how to deploy Spectrum Scale with UltraIO products, but it also illustrates what is achievable. Since modern data workflows have a wide range of file sizes and data access patterns, it is critical to accommodate these different workloads without requiring storage reconfiguration.

TEST SETUP

While Spectrum Scale's architecture can be deployed in multiple configurations, this test was designed around a traditional shared storage, physical node architecture typically found in HPC data centers.

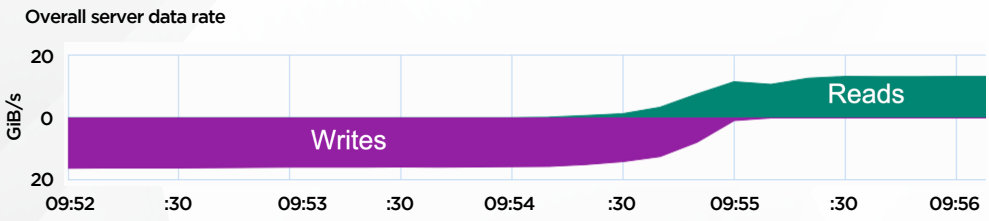


IBM Spectrum Scale 5.1.3 was deployed as follows:

- Ten dedicated blade servers, all configured as NSD Nodes with single 100Gb InfiniBand iSER connections
- RedHat Enterprise LINUX 8.4 with Mellanox OFED 5.4 drivers
- 500TB UltraIO Capacity for data (5 volumes for each NSD node)
- 5TB NVMe SSD capacity for distributed metadata

TEST RESULTS

Using a series of ElBencho test scripts running across all 10 NSD servers with varying block sizes and IO patterns, GPFS with the UltraIO product delivered exceptional performance with **no tuning tricks.** Additionally, the tests did not demonstrate the sawtooth trendline that is typical with caching arrays. Instead, the read and write bandwidth was consistent throughout.

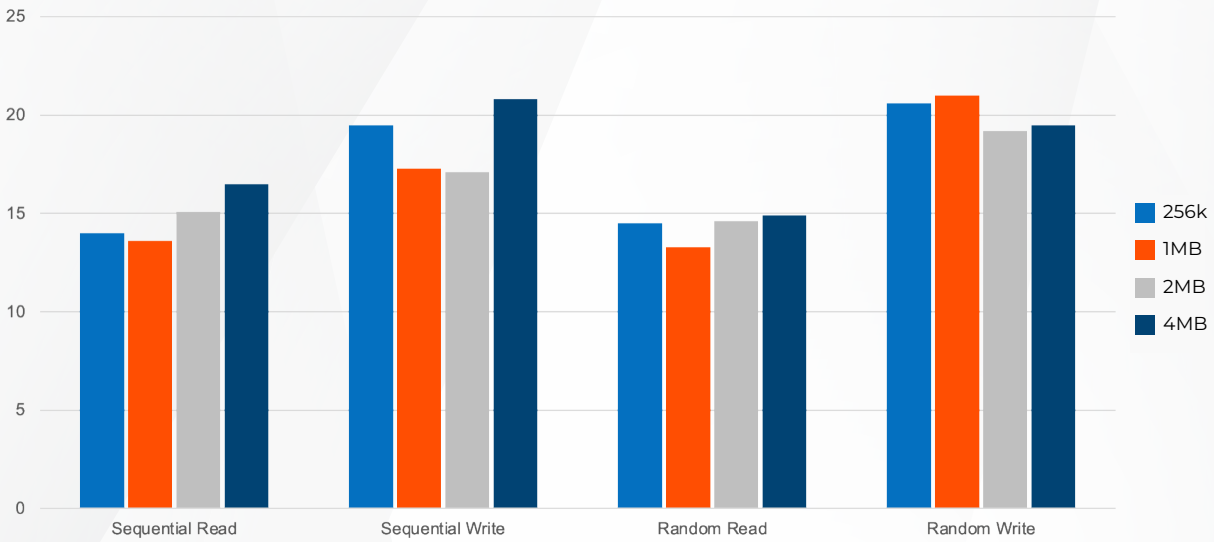


It is expected that a storage array performs well when everything is optimal, yet performance when degraded is one of the UltraIO system's strengths. In this test, 10 random HDDs were physically removed from the array while running the benchmark test. The system sustained the same write performance with 5% of available media in a failed state. Reads were initially impacted as the erasure group strips were recalculated, but read performance returned to normal several hours before the 13 hour, 10 drive rebuild was completed.

LEARN MORE

Nyriad can provide test results for specific test parameters along with implementation best practices for integrating UltraIO storage into new or existing GPFS deployments.

Spectrum Scale Bandwidth in GB/s for Various ElBencho Test Parameters



The UltraIO system's simple management and large scale also permit workloads other than IBM Spectrum Scale to reside on the same array. This means organizations can have over 3PB of usable capacity servicing **file, object, and block** on the same system with performance and capacity to spare.

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