HighPoint RocketStor 4243AS NVMe-oF™ Storage Solution SSD Test Results using 15.36TB SSDs

HighPoint Technologies, Inc.

RocketStor 4243AS Enclosure Details

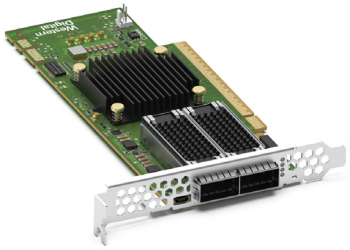
Form Factor	2U rackmount chassis
Drives Capacity	24 U.2 drive bays
Network Interface	Dual 100GbE ports (200Gbps aggregate)
Fabric Bridge Controller	Western Digital® RapidFlex™ C2000 NVMe-oF™ Controller
Supported Protocols	NVMe™/TCP and NVMe/RoCE v2 (RDMA)
Internal Switching	Integrated HighPoint R1528D PCIe Gen4 switch

The The HighPoint RocketStor 4243AS is a 2U Disaggregated NVMe-over-Fabrics (NVMe-oF) storage platform designed for high-density shared flash environments. Featuring 24 U.2/U.3 bays and dual 100GbE ports, it delivers line-rate throughput up to 23.4 GB/s and 4.08M IOPS via NVMe/TCP and RoCE v2. Built with the Western Digital RapidFlex™ C2000 controller and an integrated HighPoint R1528D PCIe Gen4 switch, the RS4243AS provides low-latency pooled storage for AI, cloud, and enterprise media workloads while supporting open composable infrastructure (CDI) frameworks.

For additional information on the HighPoint RocketStor 4243AS NVMe-oF storage solution, see: https://www.highpoint-tech.com/nvme-storage-platform/rocketstor4243as.

RapidFlex C2000 Fabric Bridge Controller

WD's RapidFlex C2000 is a half-height/half-length fabric bridge adapter that enables NVMe-oF attached storage systems. Based on Western Digital's RapidFlex C2000 Fabric Bridge Controller, this high-performance adapter forms a key component for enabling Composable Disaggregated Infrastructures (CDI).



Ultrastar DC SN650 15.36TB SSD

The Ultrastar DC SN650 15.36TB SSD were the NVMe drives that used in this benchmark.

These test results are based on a comprehensive evaluation to ensure compatibility, performance, and reliability performed by the Open Composable Compatibility Lab (OCCL)[1]. The assessment covers basic interoperability and specialized workload performance using industry-standard benchmarking tools. This test result is not an endorsement of the third-party product by Western Digital and no warranty of the product is expressed or implied by Western Digital or the OCCL.

SN650 Drive Details

Drive	Ultrastar DC SN650
Form Factor	U.3 15mm
Interface	PCIe® Gen4, NVMe 1.4b
Security	ISE
Power	16W
Power Idle	9W
Part Number	WUS5EA1A1ESP5E3

[1] For more information related OCCL, see: https://www.opencomposable.com/.

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Ultrastar DC SN650 15.36TB Top Line Performance

Test Description	Local x1	RS4243AS x16
Read Bandwidth (128KB) MB/s	7,107	23,402
Write Bandwidth (128KB) MB/s	3,003	18,103
Random Read (4KB)K IOPS	983	4,079
Random Write (4KB) K IOPS	110	1,880
Random Mixed (4KB) K IOPS	278	3,966
4K Random Write Latency (µs)	10.8	21.29
4K Random Read Latency (µs)	89.3	99.31
4K Random Write 4-9s µs	20.9	29,312
4K Random Read 4-9s µs	213.3	305,830

Coefficients of Variation (CoV) are a standard statistical measure that are directly comparable to other CoVs as opposed to Standard Deviations (SD) that can only be compared if the mean is the same for two sets of data. CoV = SD/MEAN. NAND storage has a higher variability than DRAM, for example, that is highly consistent. NAND is a noise technology that has higher error rates than most solid state memory. Each manufacturing process has its own baseline error rate. These error rates are based on one second intervals provided by standard monitoring tools like iosstat.

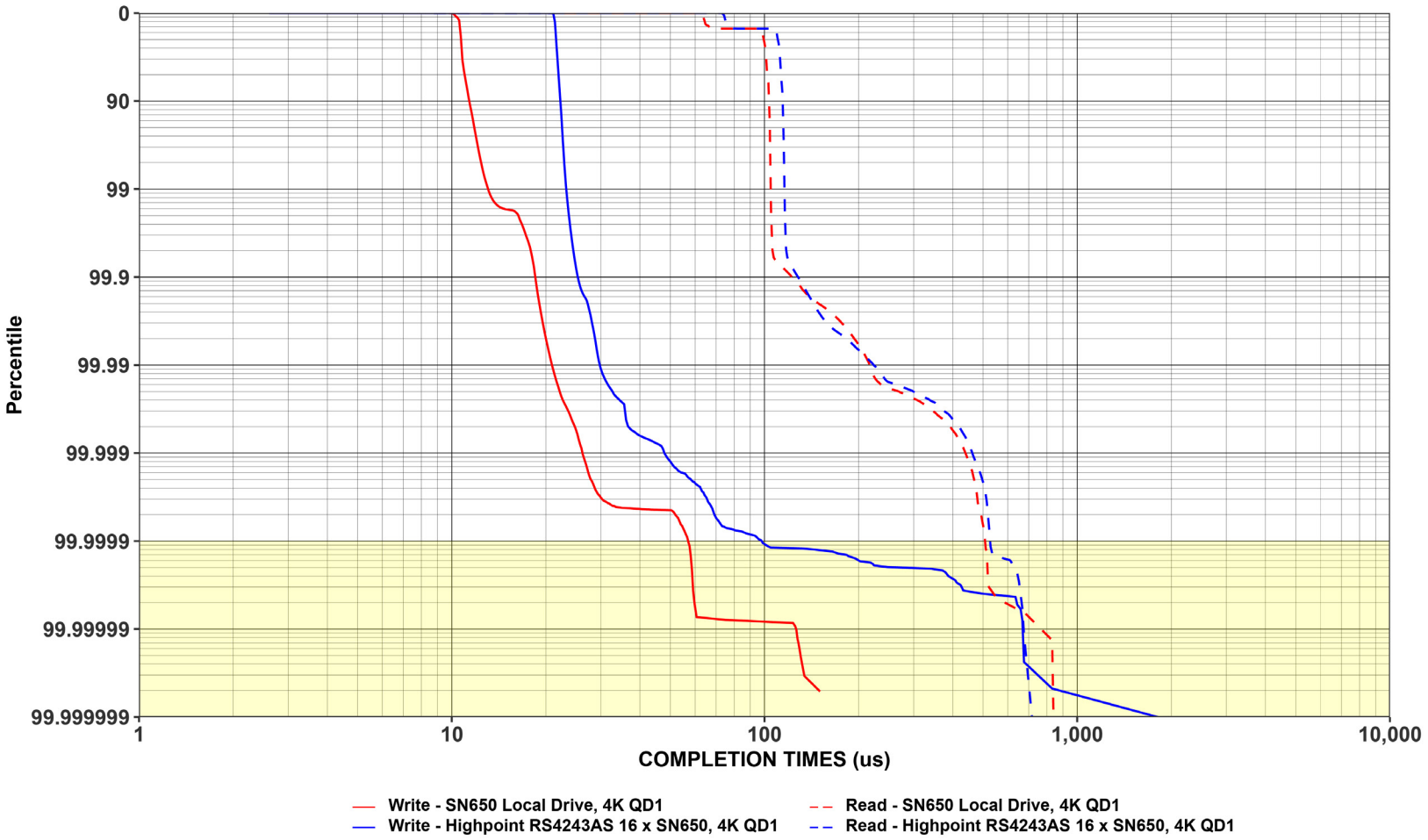
Ultrastar DC SN650 15.36TB CoV Analysis

Test Description	Local x1	RS4243AS x16
Read Bandwidth (128KB) MB/s	0.019%	0.650%
Write Bandwidth (128KB) MB/s	0.095%	3.695%
Random Read (4KB)K IOPS	0.115%	0.058%
Random Write (4KB) K IOPS	0.239%	0.077%
Random Mixed (4KB) K IOPS	0.264%	0.030%
4K Random Write Latency (µs)	0.740%	3.560%
4K Random Read Latency (µs)	0.881%	0.700%
4K Random Write 4-9s µs	0.547%	3.773%
4K Random Read 4-9s µs	0.960%	37.722%

Exceedance Chart

The following charts contain the most technical and most accurate information. Exceedance charts are typically used for only single drive, single process, queue depth one analysis as in the following example. The chart is the most fundamental measurement of SSD or disk performance as it shows the minimum latency as well as the expected error rate and latency for the device under test. These results are often referred to as the “number of nines”. For example, “4-9s” shows the latency or response time for 9999 of 10000 IOs. The number of IOs grows exponentially with the increase in the number of nines. The last two rows of the Top Line Performance Chart provides the 4-9s values for 4K Random Reads and Writes. Random writes are faster than random reads, because random writes are cached in the asynchronous write buffer and are periodically written to the underlying NAND media. Exceedance charts can be run and compared as long as all tests were run on similar systems using the same workload.

Latency Exceedance for Ultrastar DC SN650



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