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Solution Brief

Western Digital & Xinnor Deliver High-Performance, Protected, Portable Storage

XINNOR

Highlights

- Xinnor xiRAID and Western Digital Ultrastar Transporter deliver a portable storage solution that simultaneously delivers high performance throughput and durable data protection.
- xiRAID is ideal for Western Digital Ultrastar Transporter because it delivers superb performance with minimal impact to CPU cycles and does not require additional hardware.
- Western Digital Ultrastar Transporter offers a well balanced portable storage system designed to accommodate software just like xiRAID.

Large Dataset Portability Challenges

Organizations seek portable, temporary storage solutions for large datasets in several use cases. First, many companies want to restructure their data storage strategy by relocating the data from one location (a datacenter, a storage or server silo, or a cloud location) to another location. These companies need to offload data from the old solution to the new solution and in many cases, they are faced with the only available option of moving the data via online methods from point A to point B. In some cases, both A and B will not co-exist, as one will replace the other, and in other cases A and B are located a distance away and transferring data over a WAN between the two may take weeks or months. The second use case describes organizations that generate or capture data or content remotely, in a temporary location and then need to port it back to its next destination where the data or content will be processed. This scenario is common in industries such as research, exploration, and media and entertainment. In this case, users need the storage solution to be performant enough for real time capture, and durable enough for reliable portability to its next destination.

The Solution

Western Digital Ultrastar® Transporter with Xinnor xiRAID software delivers high performance, protected storage in a physically portable container. While Western Digital Ultrastar Transporter offers a performant system that can leverage Intel vROC RAID internally, Xinnor xiRAID has been tested with Ultrastar Transporter to significantly exceed the performance levels achieved with the internal vROC option. Further, xiRAID offers a greater number of RAID configurations beyond what the internal vROC RAID solution can offer.

Demonstrated Performance

RAID5, Nominal Configuration Performance Result

The following table contains the results for xiRAID's sequential writes and reads for a RAID5 set. The writes are increased from other conventional RAID appliances by a factor of two. The reads are also slightly increased.

Transporter	RAID5 xiRAID 1M Block size, QD 16	RAID5 vROC 128K Block size, QD 32	Performance Improvement
Sequential Write (GB/s)	19.7	8.8	123%
Sequential Read (GB/s)	35.3	32.7	8%

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RAID5+0, Nominal Configuration Performance Result

The following table contains the comparative results of xiRAID 4.1 running with both a single-threaded and multi-threaded workload with a RAID5+0 set versus vROC in RAID5. We could not compare the results versus RAID 5+0 as vROC only supports RAID5 as parity RAID. These tests include sequential writes and reads.

Transporter	RAID5+0 16+2 xiRAID Single-threaded Block Size 1M, QD=16	RAID5+0 16+2 xiRAID Multi-threaded Block Size 1M, QD=2	RAID5 23+1 vROC 128K block size, QD 32	Performance Improvement Single-threaded	Performance Improvement Multi-threaded
Sequential Write (GB/s)	21.4	30.3	8.8	143%	244%
Sequential Read (GB/s)	34.2	35.2	32.7	5%	8%

Note the improvement between the single-threaded and multi-threaded workloads. There is a more prominent improvement on the sequential writes than the sequential reads. The multi-threaded results are also closer to being symmetrical than the single-threaded results. The writes are increased from vROC RAID5 by a factor of three.

xiRAID Options

xiRAID supports a wide range of RAID levels (0/1/10/5/6/7.3/50/60/70) to provide best balance between data protection and performance for multiple use-cases: HPC, AI/ML, Databases, Post-Production, Edge and Cloud Storage.

xiRAID Flexibility

xiRAID flexible architecture allows the system administrator to select the optimal chunk size to optimize performance and minimize write amplification, based on the specific RAID level, geometry, drive topology and workload.

Low Power

xiRAID architecture utilizes minimal system resources by leveraging Advance Vector Extension (AVX) technology available on all moder x86 CPU, combined with Xinnor's innovative lockless data path. xiRAID does not utilize a cache, reducing the need for system memory. By not requiring extra hardware, xiRAID drastically reduces power consumption making your data center greener.

Future-Ready

xiRAID is already compatible with PCie Gen5 SSDs

Western Digital Ultrastar Transporter Features

- Demonstrated performance with Xinnor xiRAID
- Includes 12 core Intel® Xeon® CPU with high performance NVMe™ storage and 2-port 200 GbE connectivity
- Keeps Data Secure—Designed for FIPS 140–2 Level 2 with Trusted Platform Module (TPM) version 2 to accommodate secure environments
- TAA Compliant—Enables optimal government sourcing options
- Accommodates Large Data Sets—368TB of NVMe flash storage[1]
- Eases User Operation and System Status Checks
- 6-button LCD display with 4 LEDs

Solving large data set movement and edge storage challenges, Western Digital Ultrastar Transporter with Xinnor xiRAID addresses the demanding storage needs of large enterprise customers, cloud service providers and resellers/integrators that require durable, high-performance, transportable NVMe SSD storage.

[1] One terabyte (TB) is equal to one trillion bytes and one petabyte (PB) is equal to 1,000 TB. Actual user capacity may be less due to operating environment.

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