



Micron Scales Storage to New Heights With Launch of Two Data Center Drives

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World's first data center SSD featuring 200+ layer NAND and high endurance NVMe cache drive

BOISE, Idaho, May 16, 2023 (GLOBE NEWSWIRE) -- Micron Technology, Inc., (Nasdaq: MU), today announced the release of two SSDs, the Micron 6500 ION NVMe SSD and the Micron XTR NVMe SSD. Designed to keep pace with the accelerating growth of data, these drives provide a major advancement for data centers by lowering operating costs and improving storage efficiency. The Micron 6500 ION is a high-capacity SSD that offers a superior value over competitive QLC-based drives by providing best-in-class performance and enabling a more environmentally sustainable data center. The 6500 ION is able to deliver TLC performance and QLC-like cost due to Micron's 232-layer technology node leadership compared to the competition's use of sub-200-layer QLC technology. When paired with Micron 6500 ION drives or other SSDs, the Micron XTR SSD delivers extreme endurance that enhances system performance.

"Customers are looking for new capabilities to address the data growth and performance needs of artificial intelligence data lakes and other demanding workloads. As a result, we are seeing tremendous traction on the 6500 ION and XTR with customers who are deploying storage at scale due to their unrivaled combination of large capacity, superior performance, and amazing endurance," said Alvaro Toledo, vice president and general manager of Micron's Data Center Storage group. "The 6500 ION SSD offers QLC value with TLC performance and up to a 20% reduction in power consumption versus competing QLC SSDs, allowing our customers to reduce their carbon footprint. Together, these SSDs enable customers to leap ahead and harness the power of artificial intelligence without compromising performance."

Micron 6500 ION SSD: QLC value. TLC performance. Micron innovation.

The Micron 6500 ION SSD is the demonstrably better performing high-capacity value SSD compared to the primary alternative¹ with:

- 34% better average read latency²
- 58% faster sequential writes³
- Up to 62% more 4KB random read IOPS⁴
- Over 30 times more 4KB random write IOPS at a queue depth (QD) of 128 and over 10 times more at QD1
- More than 10 times better 4KB random write endurance (RDWPD)⁵

The Micron 6500 ION also unleashes this high performance in real-world workload testing:

- **For Ceph object storage workloads**, high-performance, high-capacity NVMe SSDs like the Micron 6500 ION are an ideal fit offering high performance and massive capacity in the same object store. Moreover, the Micron 6500 ION NVMe SSD test results show meaningful performance improvements in all tested workloads against the leading competitor.¹

Ceph object storage workload results⁶:

- 100% sequential writes are up to 3.5 times better
 - 100% sequential reads are up to 47% better
 - 100% random reads are up to 49% better
 - Mixed I/O (sequential reads and writes) are up to 62% better
 - Mixed I/O (random reads and sequential writes) are up to 27% better
- **For Cassandra NoSQL database**, a highly scalable, distributed database used for workloads such as fraud detection, global logistics, cloud document storage, and social media applications, the Micron 6500 ION SSD routinely demonstrates higher peak performance and better 99.99% (four nines) read latency than the competitor's QLC SSD. The Micron 6500 ION's peak performance is up to 2.6 times better than the competitor's drive for the Yahoo! Cloud Serving Benchmark ⁷ (YCSB) Workload C (100% read profile). The four nines read latency is up to 9.2 times better for the YCSB Workload F (recording user sessions profile). These improvements across a broad range of common NoSQL workloads will often have a significant impact on data center performance, making the Micron 6500 ION SSD the preferred high-capacity SSD for Cassandra and other NoSQL database deployments.
 - **For WEKA software-defined storage**, a high-performance, scalable software storage solution, the Micron 6500 ION

proves that it can help deliver massive storage capacity and workload results without the compromises of the competitor's QLC SSD. In a six-node cluster configuration, the WEKA cluster with 48 Micron 6500 ION SSDs delivers up to 5.2 million IOPS and up to a whopping 112GB/s throughput per node – all while providing nearly 1.5PB to the cluster.

“WEKA is leading a paradigm shift in how data is stored, managed, and processed. Our software-defined solution helps organizations transform their traditional, stagnant data silos into dynamic, fluid data pipelines that fuel next-generation workloads like AI, ML, and HPC seamlessly and sustainably,” said Nilesh Patel, WEKA's chief product officer. “The WEKA Data Platform requires a high-performance hardware or cloud foundation to deliver maximum value to our customers. Through our collaboration with Micron and its new 6500 ION, we can deliver the performance our customers rely on with improved power consumption and cost savings.”

The Micron 6500 ION reduces upfront purchase costs by coming in at a comparable price point to QLC SSDs while improving performance and endurance.⁸ It decreases operating expenses by using less power and requires less cooling. The drive's 30.72TB capacity and dense form factors facilitate server consolidation lessening server software license costs⁹ and carbon emissions — all while outperforming and outlasting the competition. The 6500 ION also provides the industry's most advanced security features including Federal Information and Processing Standards (FIPS) ASIC certifiability and compliance with the Trade Agreement Act (TAA).

“Supernano works with leading suppliers such as Micron to bring the latest technology to demanding customers worldwide who require a high-performing and secure storage technology,” said Wally Liaw, Co-Founder and Senior Vice President of Business Development at Supernano. “Customers that choose the new Micron 6500 ION SSD for their storage solutions can leverage its security features and the value of QLC with TLC performance.”

Micron XTR SSD: Extreme endurance for write-intensive workloads.

The Micron XTR SSD delivers extreme endurance to enable the reliable caching necessary for write-heavy workloads. When paired with the Micron 6500 ION, the Micron XTR optimizes storage workloads with minimal investment when compared to storage class memory-based solutions. The Micron XTR SSD is ideal for use cases that are write-intensive such as caching tiers, write buffering, logging and journaling, and online transaction processing workloads. Designed with Micron's proven vertically integrated storage architecture, the Micron XTR SSD also features an industry-leading security suite to instill confidence in data center deployments.

The Micron XTR SSD allows:

- Up to 35 random drive writes per day (DWPD) and up to 60 sequential DWPD; endurance ratings that far exceed conventional SSDs
- Up to 35% of the random DWPD endurance at 20% of the cost of a SCM SSD¹⁰
- Up to 44% less power consumption¹¹
- 20% more usable capacity¹²

In Microsoft SQL Server Analytics workload testing, where exceptional storage performance and optimal endurance are vital, the Micron XTR and Micron 6500 ION SSDs perform similarly to a solution using Micron 6500 ION and storage class memory (SCM) SSDs.¹³ When the Micron XTR and 6500 ION SSDs are combined, the Micron XTR fulfills the same role as the SCM SSDs by delivering nearly identical query performance.¹⁴ The Micron 6500 ION offers primary storage to meet the SQL Server performance and capacity needs, while the Micron XTR enables the endurance needed for the write-intensive operations in SQL Server, such as the tempdb volumes.¹⁵

With the availability of the 6500 ION and XTR SSDs, Micron now delivers an innovative duo of high-capacity and high-endurance NVMe SSDs. This new SSD combination enables data center operators to massively scale storage, control costs and improve data center sustainability by using less power than previous technologies.

The 30.72TB capacity Micron 6500 ION SSD is available in the U.3 (15mm) and E1.L (9.5mm) form factor, while the Micron XTR is available in the U.3 (15mm) form factor in both 960GB and 1.92TB capacities.

Visit micron.com/6500ION and micron.com/XTR for more information.

Resources

- **Product pages:** [Micron 6500 ION SSD](#) and [Micron XTR SSD](#)
- **Blog:** [Micron 6500 ION SSD](#)
- **Tech briefs:**
 - [Micron 6500 ION SSD Ceph Tech Brief](#)
 - [Micron 6500 ION SSD Cassandra Tech Brief](#)
 - [Micron 6500 ION SSD WEKA Tech Brief](#)
 - [Micron XTR SQL Server Analytics Tech Brief](#)

About Micron Technology, Inc.

We are an industry leader in innovative memory and storage solutions transforming how the world uses information to enrich life for all. With a relentless focus on our customers, technology leadership, and manufacturing and operational excellence, Micron delivers a rich portfolio of high-performance DRAM, NAND and NOR memory and storage products through our Micron® and Crucial® brands. Every day, the innovations that our people create fuel the data economy, enabling advances in artificial intelligence and 5G applications that unleash opportunities — from the data center to the intelligent edge and across the client and mobile user experience. To learn more about Micron Technology, Inc. (Nasdaq: MU), visit micron.com.

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¹ All comparisons to similar competitive product offerings are based on the Solidigm D5-P5316 30.72TB SSD from public information available at the time of this document's publication or on Micron testing. Value means the combination of performance, features, longevity, capacity, and purchase price. Performance refers to IOPS, GB/s or both. Latency statements refer to 99.99% read latency in 4KB 100% random, 100% read workload. Sequential write statements based on 128KB 100% sequential write workload. Random IOPS statements based on 4KB 100% random workloads.

² Average read latency for 4KB 100% random read at queue depth of 1.

³ 58% improvement measured at QD32 and QD64. Measurements made at QDs 1 to 256 yielded a range of improvements from -7% to 58% when compared to the competitor's drive.

⁴ 62% improvement measured at QD32. Other measurements were made at QDs ranging from 1 to 256 and yielded a range of 18% to 62% improvements over the competitor's drive.

⁵ Solidigm documentation states that its endurance is rated using a 64KB 100% random write workload and is 0.41 DWPD. Rated Solidigm D5-P5316 endurance at 64KB transfer size is estimated to be 1/16 of the rated endurance for a 4KB transfer size, yielding a 4KB value of 0.0256 (0.41/16). Micron 6500 ION rates endurance using 4KB random write workloads and is 0.3 DWPD.

⁶ Testing results are derived from Micron internal testing.

⁷ Additional details on YCSB are available from <https://github.com/brianfrankcooper/YCSB>.

⁸ Pricing statement based on public information available at the time of this document's publication.

⁹ When software is licensed by chassis, CPU, or CPU core.

¹⁰ Statements based on public pricing for the Intel Optane P5800x 1.6TB compared to NAND-based SSDs of similar capacity available at the time of this document's publication. Unformatted. 1GB = 1 billion bytes. Formatted capacity is less.

¹¹ Based on public power consumption data for the Intel Optane P5800X-1.6TB, P5810X-800GB, P5800X-800GB and P5800X-3.2TB SSDs

¹² Statement based on comparison of published usable capacities of the Micron XTR-1.92TB and the Intel Optane P5800X-1.6TB at the time of this document's publication.

¹³ The SCM SSD used in the Microsoft SQL Server Analytics workload testing was the Intel® Optane™ SSD DC P5800X. The supplier has announced that it is discontinuing future development of this product. See the following link for the announcement details: <https://www.intel.com/content/www/us/en/support/articles/000091826/memory-and-storage.html> Intel® Optane™ are trademarks of Intel Corporation or its subsidiaries.

¹⁴ Based on Micron testing. See www.micron.com/XTR for additional details.

¹⁵ See <https://learn.microsoft.com/en-us/sql/relational-databases/databases/tempdb-database?view=sql-server-ver16> for more information on tempdb.

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