

# The right mix of compute, memory and storage.



## Micron® 6500 NVMe™ SSD

### Massive capacity for data lakes and cloud storage

Data centers are increasingly focused on HPC, AI, and other projects that require immense storage. While HDDs may be a cost-effective solution, they can become bottlenecks if they lack the performance<sup>1</sup> necessary to keep CPUs and GPUs fed. The challenge is to find SSDs that deliver massive capacity without compromising the performance needed to quickly access critical data submerged in data lakes.

The Micron 6500 ION NVMe SSD is ideal for setups that demand large storage capacity. It can serve as dependable bulk storage, or it can complement high-performance SSDs by providing fast access to data lakes for data-intensive tasks like AI training.

In this tech brief, we examine test results using WekaFS, Ceph storage and NoSQL to see how the Micron 6500 ION NVMe SSD solution can dramatically impact server performance for real-world situations.

- AI data lakes with WekaFS
- Bulk cloud storage with Ceph
- Recording user sessions/activity with NoSQL



### More storage at a lower price point

The Micron 6500 ION SSD lowers operating costs and improves storage efficiency while keeping pace with accelerating data needs.

- Best-in-class value compared to competitors' QLC SSDs; better performance, endurance, and QoS — all using 20% less power<sup>2</sup>
- Nearly 1PB per U or 35PB per rack storage to reduce server sprawl
- Ideal for artificial intelligence data lakes, object stores, general purpose bulk cloud storage, NoSQL databases and content delivery

## Balanced performance for distributed architectures

The Micron 6500 ION NVMe SSD can help address<sup>3</sup> massive storage requirements for data centers using distributed architectures, like WekaFS, to scale and meet data demands.

Tests show that the Micron 6500 ION NVMe SSD delivers excellent performance<sup>4</sup> in workloads using multi-node WekaFS clusters:

- 245.76TB storage per node (8x 30.72TB SSDs)
- Up to 112GB/s bandwidth (0.1 read GB/s per TB)
- Up to 5.2 million IOPS (3,526 read IOPS per TB)

When combining WekaFS across multiple nodes<sup>5</sup> with Micron 6500 ION NVMe SSDs, data centers can achieve horizontal scalability, efficient load balancing and rapid data retrieval.



### Micron 6500 ION NVMe SSD: High-capacity configuration

- Capacity range: 30.72TB
- Form factor: U.3
- Design focus: Best-in-class value vs. competitor's QLC SSDs; better performance, endurance, and QoS — all using 20% less power

### Use case: AI data lakes

AI training involves handling enormous datasets—images, videos, sensor data, and more. These data lakes require substantial storage capacity. The Micron 6500 ION NVMe SSD provides ample storage (up to 30.72TB per SSD) to host data lakes.

- Massive capacity to store and access data efficiently
- Balanced performance for training neural networks, running inference, and processing large datasets
- Cost effective solution to scale seamlessly as AI projects grow

View full test results:

[WekaFS performance in servers with Micron 6500 SSDs, Micron 7450 SSDs and Micron 9400 SSDs.](#)

## Efficient bulk storage solutions

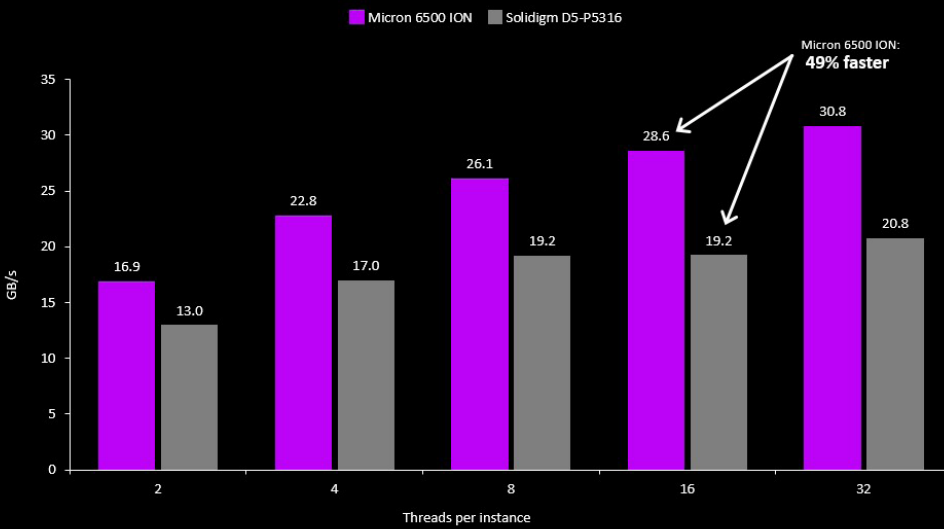
Many data centers rely on Ceph to manage<sup>6</sup> large amounts of unstructured data. The Micron 6500 ION NVMe SSD, with its massive storage capacity, addresses data center requirements for a scalable, efficient solution.

Ceph storage tests show the Micron 6500 ION NVMe SSD consistently outperforming competitive offerings, such as the Solidigm D5-P5316 SSD, resulting<sup>9</sup> in better cluster performance, more efficient CPU utilization, and better cluster resiliency:

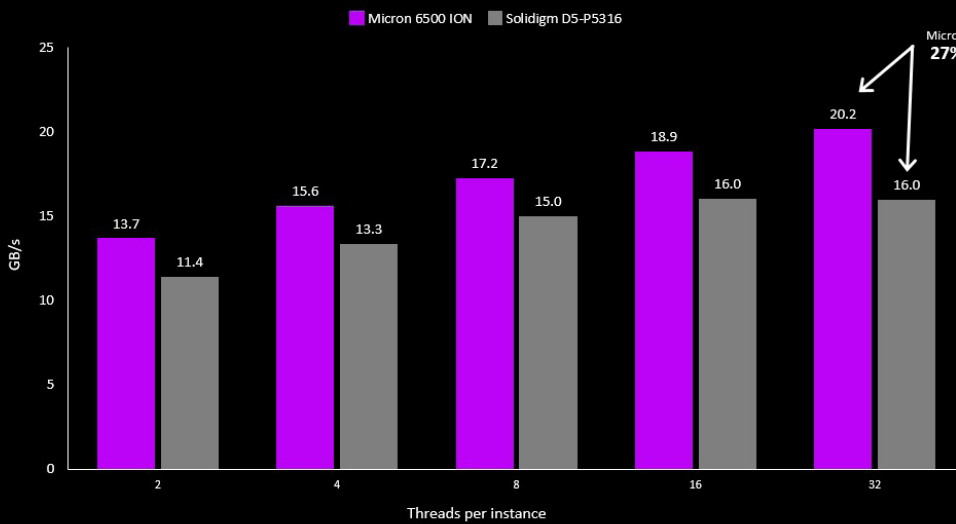
- 3.5x peak improvement in sequential write performance
- 49% peak improvement in random read performance
- 62% peak improvement in mixed read/write performance
- 31% better cluster resiliency (faster recovery time)

Whether using Ceph to manage repositories of unstructured data, power analytics, or to store data lakes, the Micron 6500 ION NVMe SSD ensures efficient and reliable performance at scale.

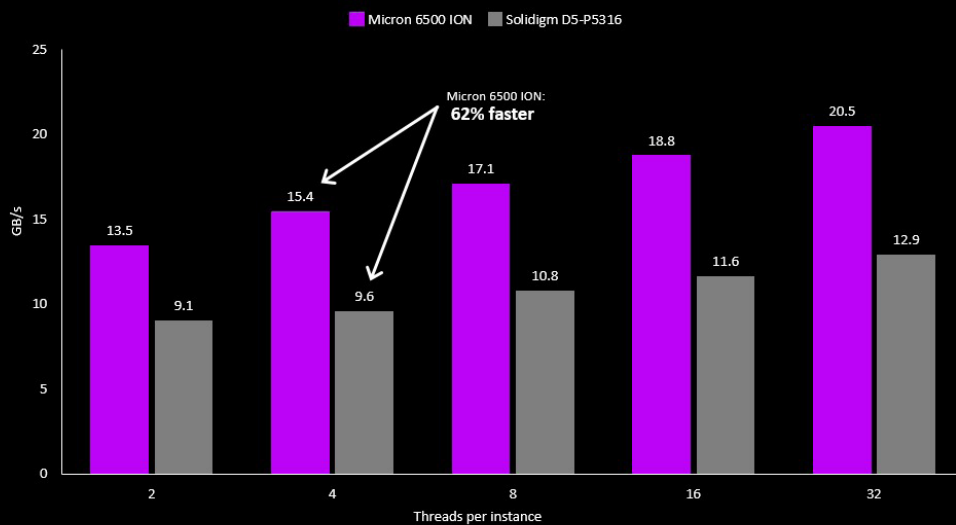
**Figure 1: 100% Random read performance**



**Figure 2: 100% Random read + 100% sequential write performance**



**Figure 3: 100% Sequential read + 100% sequential write performance**



## Use case: Bulk cloud storage

Organizations use bulk cloud storage to manage and store vast amounts of data, including files, backups, logs, and user-generated content. The Micron 6500 ION NVMe SSD enhances cloud storage with its proven read/write performance and efficiency.

- Enhanced read/write performance for quicker data access, data processing and system responsiveness
- Increased cluster resiliency to ensure high availability and reliability in clustered storage environments
- Superior operational efficiency driven by faster processing speeds

View the full test results: [Low-Latency NVMe® SSDs Unlock High-Performance, Fault-Tolerant Ceph® Object Stores](#)

## Improved NoSQL database performance

Considering another common scenario, we tested NoSQL database performance and latency differences between the Micron 6500 ION SSD and the Solidigm™ D5-P5316. Both tested<sup>9</sup> SSDs were 30.72TB.

Results show that the Micron 6500 ION routinely demonstrates higher performance and better latency in a mixed workload for recording user activity. This translates into faster data retrieval and processing for improved user experience and business efficiency.

Figure 4: Cassandra maximum performance summary by workload

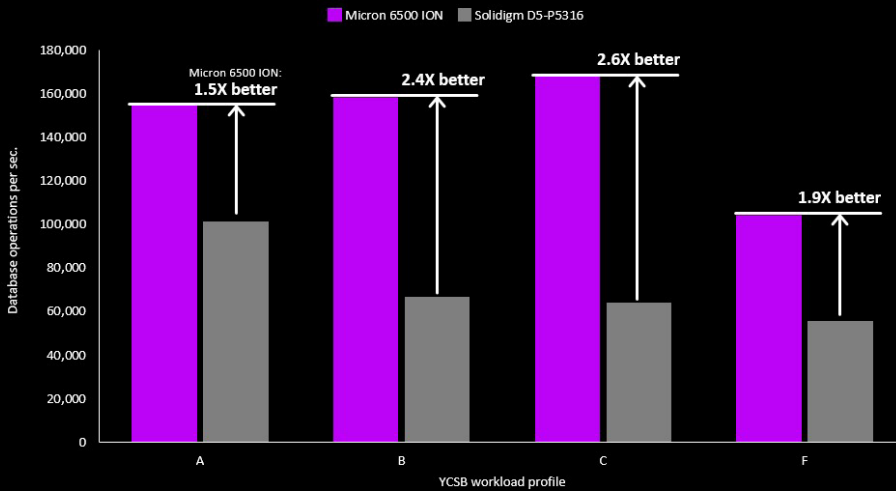
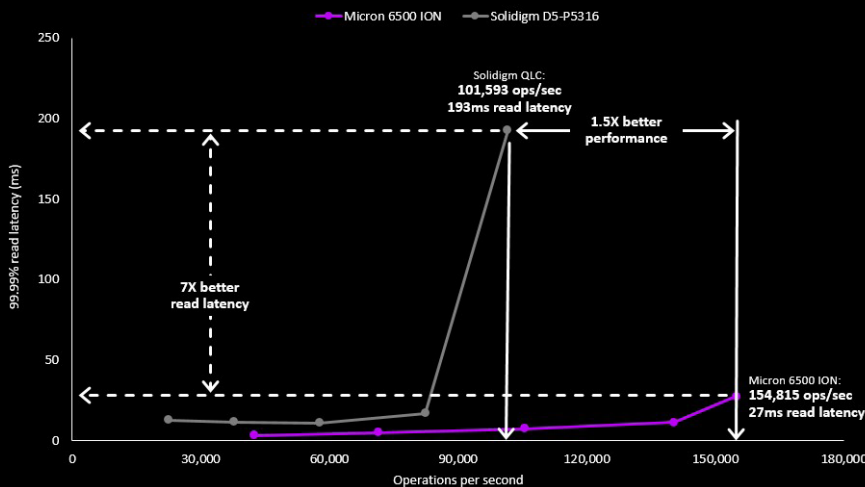


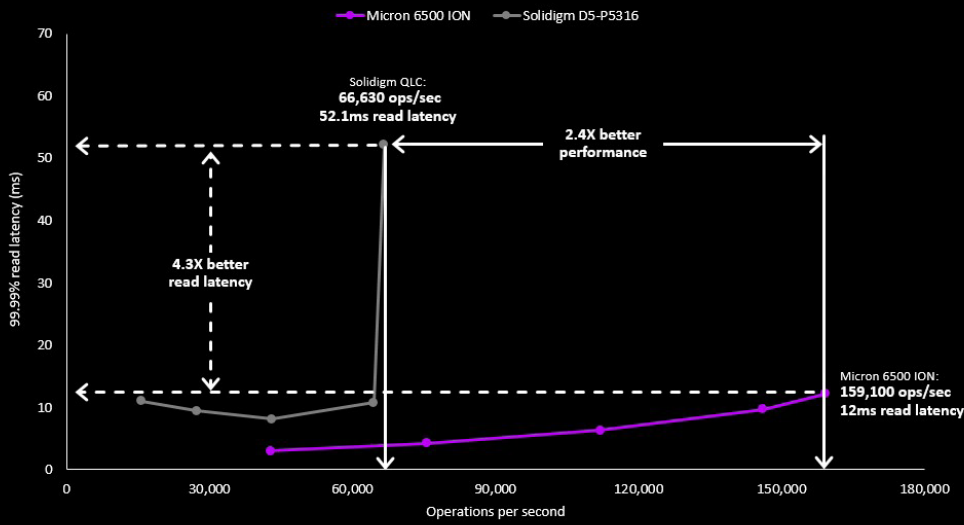
Figure 5: Workload A performance vs. latency



Recording user sessions:

- 1.5x better performance
- 7x lower latency

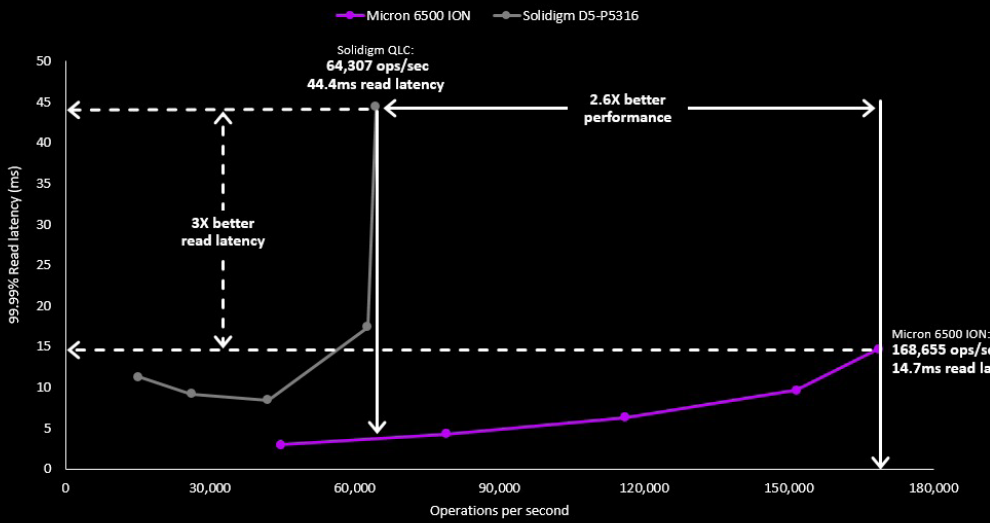
**Figure 6: Workload B performance vs. latency**



Adding metadata:

- 2.4x better performance
- 4.3x lower latency

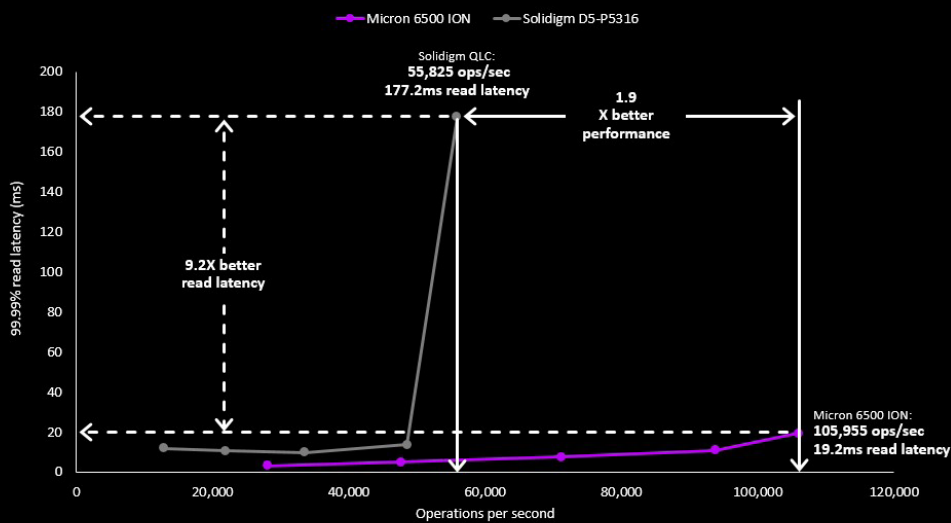
**Figure 7: Workload C performance vs. latency**



Reading profiles:

- 2.6x better performance
- 3x lower latency

**Figure 8: Workload F performance vs. latency**



Recording user activity:

- 1.9x better performance
- 9.2x lower latency



## Use case: Recording user sessions

Recording user sessions involves capturing a continuous stream of data — clicks, interactions, queries, and more. The Micron 6500 ION NVMe SSD excels in handling this workload.

- High throughput when recording user sessions to improve user experience and security monitoring
- Low latency results in quick metadata tagging and faster response times
- Efficient reads for rapid retrieval of user data to deliver personalized experiences

View the full test results:

[Micron® 6500 ION SSD Delivers Breakout NoSQL Database Performance Without Breaking The Budget](#)

## Micron can help with massive storage requirements

Drawing on over 45 years of memory and storage innovation, Micron's experts are uniquely qualified to help you optimize your server configurations, no matter the size of your data lakes.

Our experts collaborate with teams across the ecosystem to rigorously test configurations on diverse platforms, spanning a wide range of workloads.

Informed by nearly half a century of test data and expert insights, we can help you make your data center more powerful, efficient and scalable.

Learn more at [microncp.com/balance](https://microncp.com/balance)

### Footnotes:

1. The term "performance" in this document means throughput or IOPS.
2. Comparison to the 30.72TB Solidigm D5-P5316 based on public information available at the time of this document's publication. 20% less power based on Micron 6500 ION default 4KB, 100% random, 100% read power = 20 watts, Solidigm P5316 default power consumption for 4KB, 100% random, 100% read = 25 watts. 56% greater power efficiency: 4KB, 100% random, 100% read IOPS per watt comparison.
3. Results measured using the Micron 6500 ION SSD (30.72TB). See [micron.com/6500](https://micron.com/6500) for details.
4. We used WekaFS in this testing. See <https://www.weka.io/> for additional information about all WEKA products.
5. All results measured in Micron test lab using 6-node clusters. Results may vary.
6. See <https://www.redhat.com/en/blog/ceph-open-source-community-powering-red-hats-data-services-portfolio> for additional information on Ceph Storage Community Edition.
7. Performance means throughput (GB/s). Resiliency means the time needed for the Ceph cluster to rebuild to its default data protection level after an SSD failure. Comparative statements refer to test results shown herein versus the Solidigm D5-P5316, a competing, quad-level cell (4 bits per cell) NVMe, NAND-based SSD.
8. Unformatted. 1 GB = 1 billion bytes. Formatted capacity is less.