PROWESS

# Lower Your TCO with an Upgrade to KIOXIA Data Center NVMe™ SSDs

Prowess Consulting testing reveals that KIOXIA CD8 Series Data Center NVM Express™ (NVMe) PCIe® solid-state drives (SSDs) deliver better overall performance, price-performance, power-performance, and reliability than traditional Serial ATA (SATA) Samsung® SSDs.

Data centers are facing a major infrastructure challenge as the demand for high-capacity, high-throughput, and low-latency storage keeps going up. Traditional 6 gigabits per second (Gb/s) Serial ATA (SATA) solid-state drives (SSDs), the go-to storage technology for decades, are being stretched to their limits by today's modern workloads and massive datasets. At the same time, data centers need storage that can help lower their total costs of ownership (TCOs). All of this has data centers asking the critical question, "Is now the time to switch to NVM Express™ (NVMe™) storage?"

Prowess Consulting conducted storage performance testing to get an answer to this knotty question. The recent explosion of read-intensive applications that use write once, read many (WORM) data storage led us to select two read-only SSDs for our performance testing, the KIOXIA CD8 Series Data Center NVMe PCIe SSD and the 6 Gb/s Samsung® SATA SSD. To get results that we could meaningfully correlate with live-production conditions, we tested three types of virtualized workloads: Microsoft® Active Directory®, file server, and Microsoft® SQL Server®. We tested overall performance using industry-standard output metrics: throughput (MB/s), input/output operations per second (IOPS), and latency (ms). We also conducted TCO analyses that examined SSD reliability (measured as mean time to failure [MTTF] or mean time between failures [MTBF]), price-performance, and power-performance.
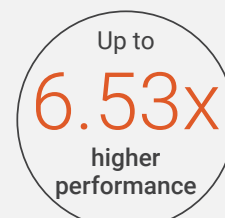
Highlights:

Compared to SATA, NVMe SSDs can deliver:

Nearly
7x
lower latency
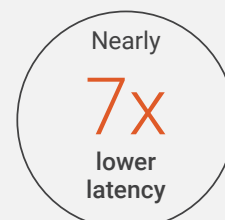
with **negligible variability** for read-only storage[1]

Up to
25%
better reliability

over 2.0 million hours of usage[1]

Up to
6.53x
higher performance

per US dollar[1]

Our benchmark testing for read-only workloads revealed that the KIOXIA NVMe™ SSD outperformed the Samsung® SATA SSD in throughput, IOPS, latency, reliability, price-performance, and power-performance.

What these results can mean for you are higher capacity, higher throughput, and lower latency for demanding applications. For example, NVMe SSDs can run hundreds of virtual machines (VMs) on a single server without experiencing input/output (I/O) bottlenecks that can lead to sluggish application responses.

Our results indicate that video on demand (VOD) customers could experience nearly six-fold faster media delivery, along with less buffering, from content delivery networks (CDNs) that use NVMe storage. Object-storage databases can get a multifold throughput boost for emails, videos, images, web pages, and Internet of Things (IoT) sensors. A multifold drop in transaction latency can translate into substantially increased returns on trading activity for financial exchanges.[1]

How can you benefit from a faster database?

5 milliseconds faster response time = 50% more trade transactions[2]

Our TCO analyses indicate that the KIOXIA NVMe SSD's six-fold better price-performance can quickly make up for a moderately higher acquisition price than the SATA SSD we examined. For organizations seeking to make their data center "greener," our power-performance results indicate that the KIOXIA NVMe SSD can deliver between 78 to 96 percent higher performance/watt.[1]

To find the storage solution that makes the most sense for your business, it's critical to understand what storage technologies are available, what they do, and what makes the most sense for your needs. This short report and our full technical research report can help you make informed, actionable decisions about what storage solution can give you the most performance and value for your needs.

In short, we found our answer: now is an excellent time to upgrade your SATA storage. And our benchmarking confirms that the KIOXIA CD8 Series SSD could be well worth your investment.

Learn More

Get the full story by reading the technical research report, "Life After SATA: Application Benefits of KIOXIA Data Center NVMe™ SSDs vs. Enterprise SATA SSDs."

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¹ For system details, test results, and analyses, see the full report: Prowess Consulting. "Life After SATA: Application Benefits of KIOXIA Data Center NVMe™ SSDs vs. Enterprise SATA SSDs." May 2023. https://prowessconsulting.com/project/220148-kioxia-nvme-delivers-better-performance-price-power-reliability-than-sata.

² The Informaticists. "The price of latency in financial exchanges." August 2020. https://theinformaticists.com/2020/08/25/the-price-of-latency-in-financial-exchanges/.