Micron® 5400 SATA SSD

Get more from legacy servers

In an ideal world, data centers could frequently upgrade their servers to employ cutting-edge technology solutions. In reality, data center managers often grapple with the challenge of balancing legacy architecture alongside current organizational objectives.
Despite the availability of faster alternatives, legacy servers still often rely on SATA drives. This decision is largely driven by these key factors:

- Backward compatibility
- Cost-effectiveness
- Seamless integration to existing architecture

The Micron 5400 SATA SSD makes it possible to get more from legacy server platforms or build new, cost-effective SATA servers. It's Micron's 11th generation of data center SATA SSDs, delivering a proven architecture that provides unparalleled peace of mind, reliability, and endurance.

In this tech brief, we examine how the Micron 5400 SATA SSD enables data centers to optimize every SATA socket to improve workloads. We demonstrate how choosing the right SSD solution can dramatically impact server performance and explore how this translates into better performance for real-world situations.

- Secondary storage for enterprise data centers
- Electronic health records (EHR)
- Data backups and archives

Efficiency meets cost-effectiveness

The Micron 5400 SSD is a feature-rich SSD designed to keep existing infrastructure going strong.

- 50% greater endurance and reliability ratings[1] than the other leading data center SATA SSD
- Performance that saturates[2] 50 Gb/s networks
- The industry's broadest[3] portfolio of data center SATA SSDs
- Eleven generations[4] of data center SATA SSD stability

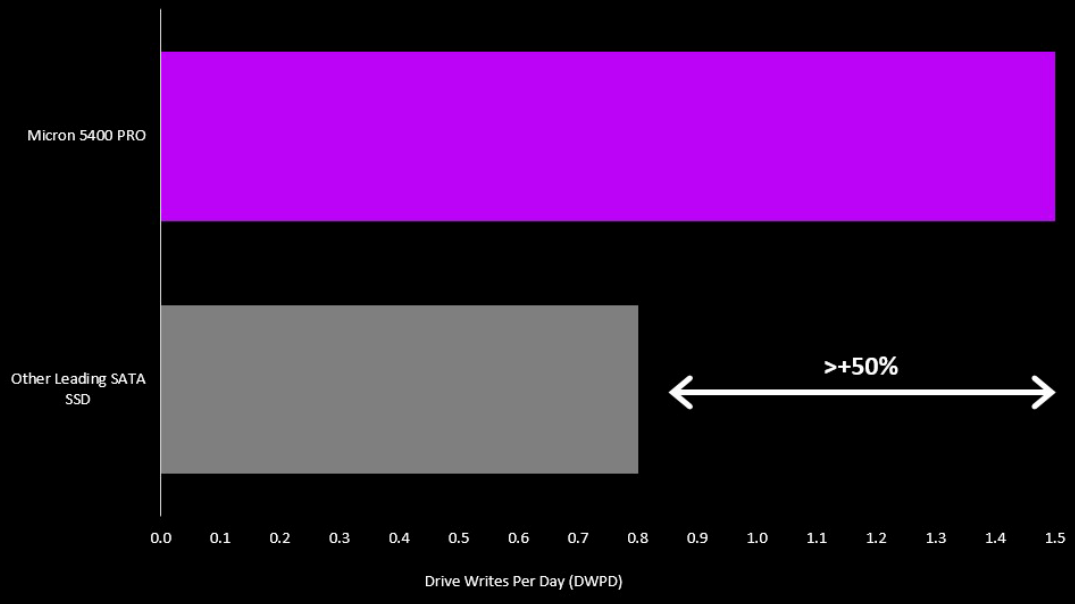
Better endurance and reliability for SATA servers

The Micron 5400 SATA SSD offers industry-leading reliability (50% more MTTF) and endurance (up to 50% more DWPD) compared to the other leading SATA SSD. This provides more usable life per drive and fewer field failures relative to the competition.

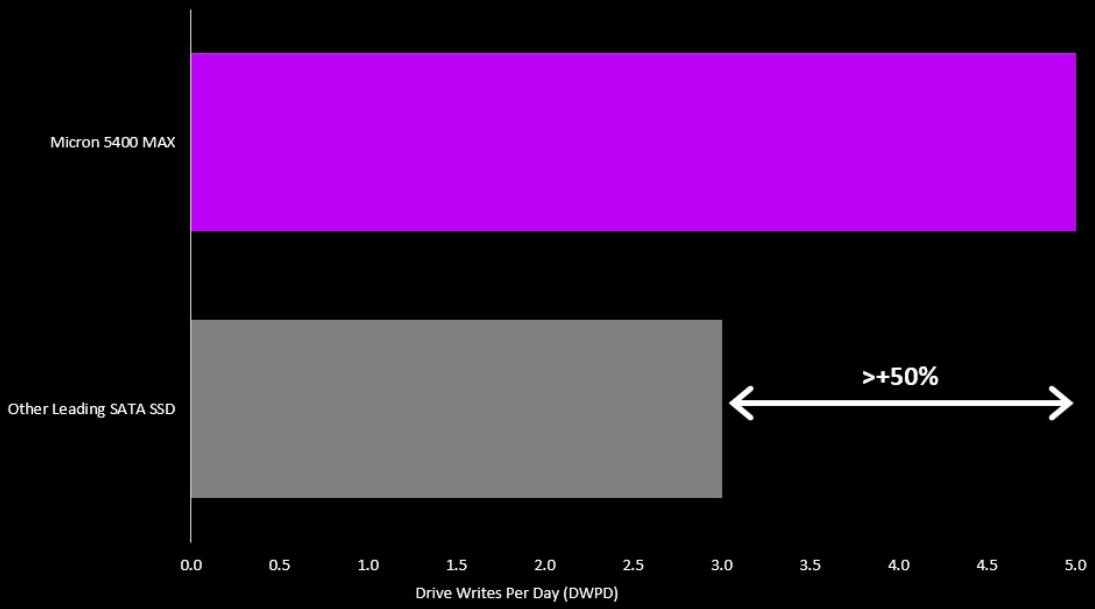
For data centers, this translates into:

- Less downtime
- Lower maintenance costs
- Fewer replacements

50% higher endurance ratings (DWPD) to absorb more written data

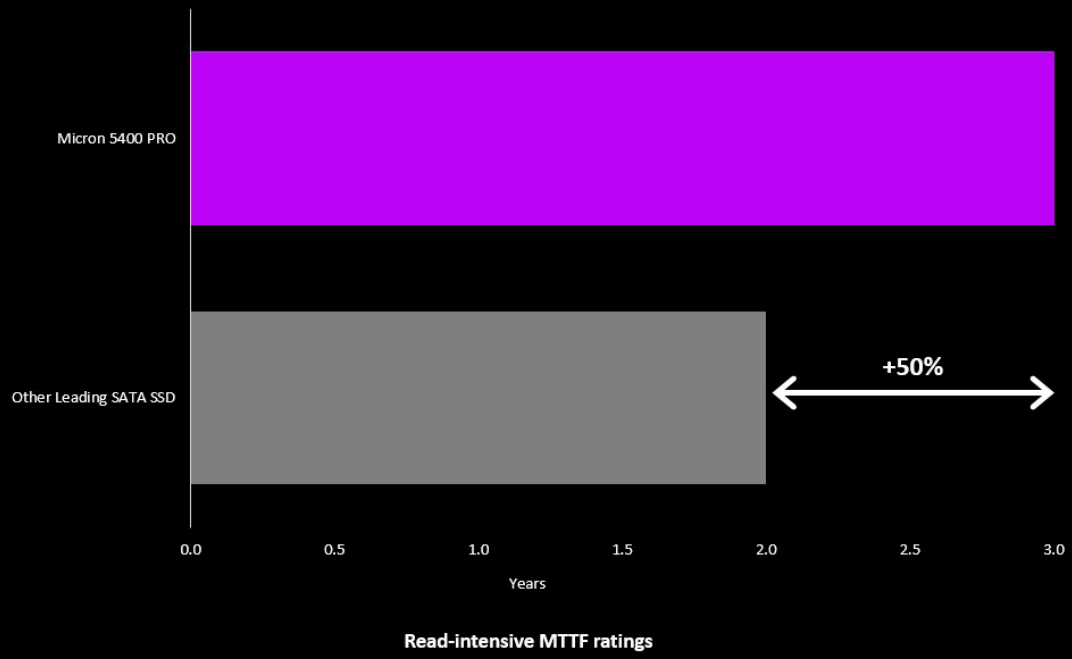


Read-intensive SSD endurance ratings

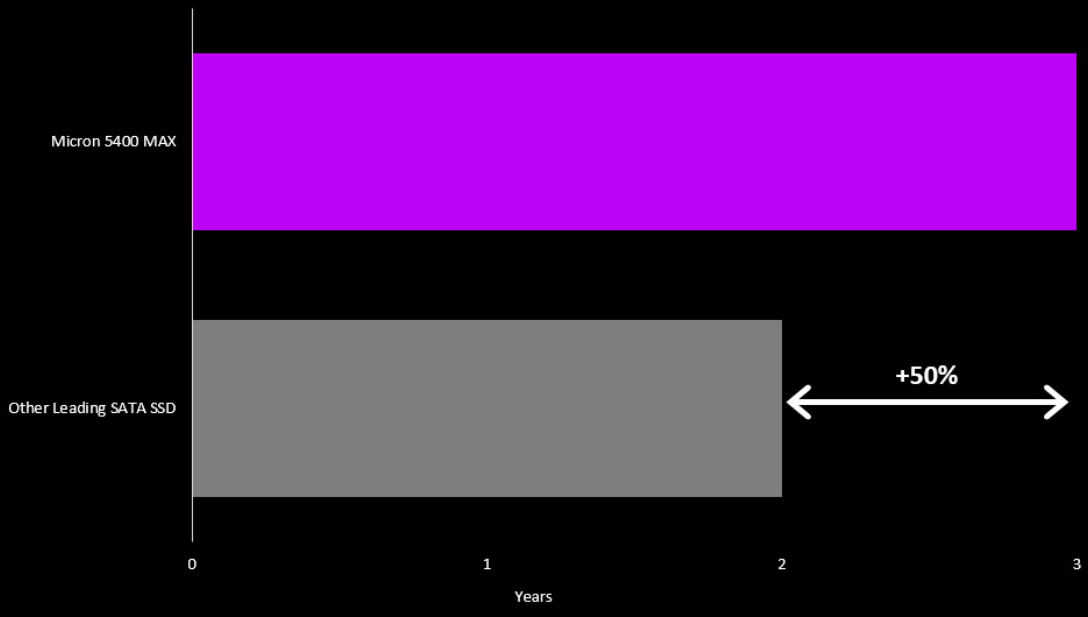


Mixed-use SSD endurance comparison

50% higher reliability rating (MTTF) for extended use



Read-intensive MTTF ratings



Mixed-use MTTF ratings

Use case: Secondary storage for enterprise data centers

The Micron 5400 SSD is a practical choice when data centers need to scale up storage capacity while sticking to a budget. In many situations, they serve as secondary storage tiers alongside faster drives like NVMe SSDs.

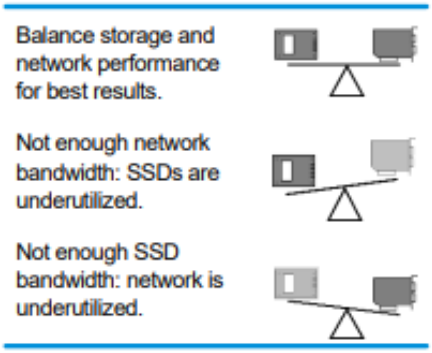
- Bulk storage for less-frequently accessed data, backups and archives
- SATA compatibility integrates seamlessly with existing infrastructure
- Cost-effective solution to scale storage when speed is not the main priority

Achieve optimal saturation

Data centers need to ensure that the SSDs used for generating and storing information are well-suited for the available network bandwidth. Achieving optimal performance involves balancing SSD capabilities with network bandwidth:

- Overbuying network capacity leads to underutilized resources
- Excess storage bandwidth can oversaturate the network

The Micron 5400 SATA SSD is available[5] in a variety of form factors to align with network bandwidths and achieve optimal saturation.



System balance

Read-intensive Micron 5400 SSD	IO Type	Network Bandwidth 10GbE	25GbE	50GbE
1.92TB PRO	Sequential Read	3	6	12
	Sequential Write	3	7	13
	Random Read	4	9	17
	Random Write	10	24	47
3.84TB PRO	Sequential Read	3	6	12
	Sequential Write	3	7	13
	Random Read	4	9	17
	Random Write	11	26	51
7.68TB PRO	Sequential Read	3	6	12
	Sequential Write	3	7	13
	Random Read	4	9	17
	Random Write	33	81	161

Mixed-use Micron 5400 SSD	IO Type	Network Bandwidth 10GbE	25GbE	50GbE
800GB MAX	Sequential Read	3	6	12
	Sequential Write	3	7	13
	Random Read	4	9	17
	Random Write	5	12	24
1.6TB MAX	Sequential Read	3	6	12
	Sequential Write	3	7	13
	Random Read	4	9	17
	Random Write	5	13	25
3.2TB MAX	Sequential Read	3	6	12
	Sequential Write	3	7	13
	Random Read	4	9	17
	Random Write	9	23	45

Micron 5400 SSDs to saturate common data center networks

Use case: Electronic health records (EHR)

EHRs contain patient information, including medical history, diagnoses, medications, and treatment plans. The Micron 5400 SSD can provide reliable and affordable storage for these critical records.

- Budget-friendly solution for expanding EHR data capacity
- Reliable archives for secure patient data storage
- Long-term storage to ensure data availability while managing costs

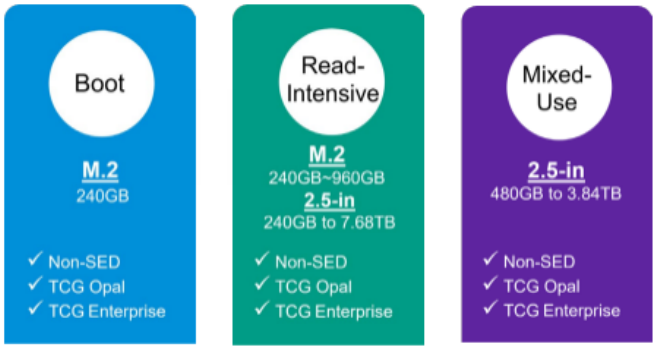
Broadest portfolio of data center SATA SSDs

The Micron 5400 SSDs provide the industry's widest range of data center SATA SSDs. This extensive portfolio offers organizations multiple choices to maximize the use of each SATA socket in their server infrastructure.

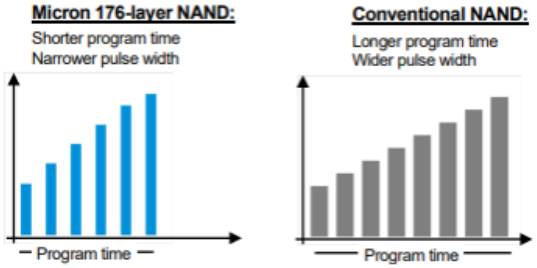
Security options include:

- TCG Enterprise
- TCG Opal
- Non-SED (Self-encrypting drive)

Models are available with a range of capacities and endurance ratings to match your requirements. This makes replacing legacy hard disk drives (HDDs) and existing data center SATA SSDs straightforward.



Micron 5400 SSD configurations

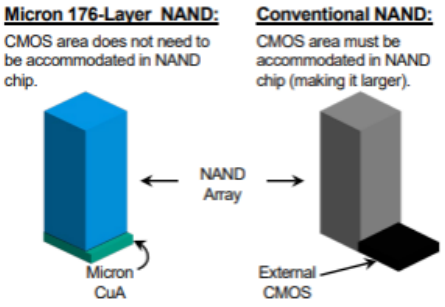


Improved power efficiency (through shorter NAND program times)

Improved storage performance

Micron's industry-leading 176-layer NAND utilizes replacement gate (RG) technology, transitioning from separate insulators to a single insulator. This approach employs fewer, lower-strength electrical pulses for data programming, resulting[6] in improved NAND write performance.

Additionally, Micron continues to position the controlling CMOS circuitry beneath the NAND array. This helps optimize space and increase the number of bits per die and per wafer, leading to lower costs. In contrast, conventional NAND technology places the CMOS control circuitry beside the NAND array, consuming more space without adding extra storage capacity.



Micron CuA space savings compared to designs that do not use Micron CuA

Use case: Data backups and archives

The Micron 5400 SATA SSD excels in situations where budget and capacity take priority, such as data backups and archives.

- Proven reliability from the 11th generation of Micron SATA technology
- Secure storage for peace of mind when storing critical data
- Broad range of configuration options to fit seamlessly into many server systems

Micron: Your partner for data center upgrades

Micron has been at the forefront of memory and storage solutions for more than 45 years. Our experts are uniquely qualified to help you optimize your server configurations, whether you're upgrading your legacy systems or building entirely new servers.

We collaborate with teams across the ecosystem to rigorously test configurations on diverse platforms, spanning a wide range of workloads. No matter your workload requirements, we can help you make your data center more powerful, efficient and scalable.

Learn more at micronpg.com/balance

Footnotes:

1. Based on a comparison of public documents.
2. 50Gbs rated network bandwidth, 80% typical Ethernet efficiency. 24x 800GB Micron 5400 MAX SSDs 100% 128K sequential or write or 100% 4K random read or write performance.
3. The Micron 5400 SSD is offered in 14 data center capacity/form factor combinations that include power loss protection and data path protection.
4. Micron's first data center, SATA SSD was released in 2008, see https://investors.micron.com/news-releases/news-release-details/micron-introduces-next-generation-realssdtm-solid-state-drives
5. Values are calculated estimates based on Micron's published performance data and 80% network efficiency. Actual results may vary.
6. Additional information is available here: https://www.micron.com/products/nand-flash/176-layer-nand