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Welcome to the Storage Media Revolution

The next-generation Intel® Optane™ SSD P5800X/P5801X provides the performance needed to support your most data-intensive workloads.

Legacy storage systems are struggling to keep pace with the compute and network technologies emerging to handle today's data-intensive workloads. Instead, the storage media become a bottleneck that inhibits IT innovation and bridles business growth.

Legacy storage technologies can't close the gap

Historically, DRAM and NAND acted as the performance buffer between compute and capacity storage, but they both leave an ever-widening gap for the modern, scaled-out data center. DRAM is far too expensive to scale, and density will fall further behind relative to the CPU core growth rate. And NAND has sufficient capacity and cost to scale, but the performance that allows it to function as an efficient storage tier will continue to decrease with each subsequent generation.

The Intel® Optane™ SSD P5800X Series fills the critical storage performance gap, making these SSDs ideal for fast caching or tiering of hot data.
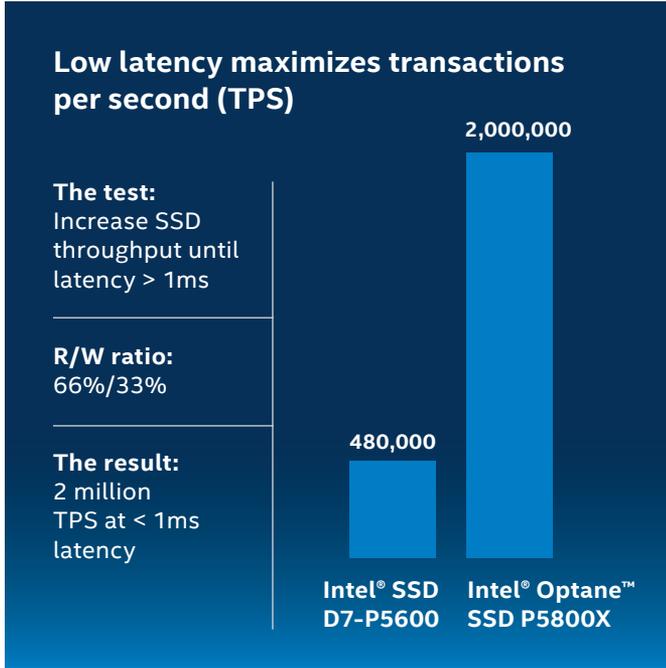

Introducing the world's fastest data center SSD

Even fast NAND SSDs are no longer adequate for data-driven applications that need to access and process data in real time or as a buffer to fast Ethernet (NIC) connections. With an industry-leading combination of low latency, high quality of service (QoS), fast throughput and high endurance, Intel Optane SSD P5800X accelerates access to large and complex data sets needed by enterprises and cloud service providers to run their high-demand workloads. Critically, unlike other SSD technology, Intel Optane SSDs can read and write simultaneously without performance degradation.

Unrivaled random read low latency

The low-latency Intel Optane SSD P5800X Series delivers near-nanosecond response times under any workload, maintaining consistent read response times, regardless of the write throughput. Average read response times remain below 6μs, while maintaining a 70/30 mixed read/write bandwidth of greater than 8GB/sec.

Low latency maximizes transactions per second (TPS)

The test:
Increase SSD throughput until latency > 1ms

R/W ratio:
66%/33%

The result:
2 million TPS at < 1ms latency

	480,000	2,000,000
	Intel® SSD D7-P5600	Intel® Optane™ SSD P5800X

WHAT IT MEANS (versus previous generation Intel® Optane™ SSD DC P4800X)

40% lower 4KB random read average latency

BASED ON

< 6μs 4KB random read average latency

Near-nanosecond capability with sub-4K block 512B 3μs random read average latency

WHY IT MATTERS

Near-nanosecond latency means improved application response time. With its bidirectional capability, Intel Optane SSD P5800X's low latency remains consistent until you reach saturation and is improved even more by being able to read smaller 512B data chunks. For industries like financial services, this means the ability to speed time to insight for fraud detection, analytics, compliance, market modeling and securities market transactions.

Consistent, predictable quality of service (QoS)

In an environment of fast-growing data and demanding customer requirements, data centers need predictable application performance.

WHAT IT MEANS

Up to 50% better — five 9's QoS with minimal read-write variance versus the Intel Optane SSD DC P4800X

Up to 10x better — five 9's response times versus the Intel® SSD D7-P5600 (PCIe 4.0 NVMe NAND)

Up to 6x higher — throughput versus Intel SSD D7-P5600, Intel's fastest NAND SSD

WHY IT MATTERS

Intel Optane SSD P5800X/P5801X drives give you predictable low latency and consistent I/O command completion times, which result in QoS you can count on. They're ideal for critical applications with demanding latency requirements or customers with strict service level agreements (SLAs).

Blazing fast performance

The PCIe 4.0-compliant Intel Optane SSD P5800X can reach up to 1.6M IOPS of random read or random write performance at low queue depths. The PCIe bus is designed as a bidirectional bus (reads and writes) so the Intel Optane SSD P5800X is capable of achieving greater-than-spec sheet performance (up to 2.0M IOPS) under 70/30 mixed loads. The P5800X Series also has a unique 512B (sub-4K block) read capability designed specifically for metadata use cases and is capable of reaching up to 5M IOPS even in mixed-workload scenarios.

WHAT IT MEANS

Up to 5.6x higher
IOPS at low queue depths

Up to 23x lower
latency at 530K IOPS vs. NAND

Up to 6x greater
4KB block bandwidth with bidirectional read/write capability

WHY IT MATTERS

It's all about getting more for less. The concept of performance density means that although the Optane technology may cost more than your legacy technology, you can achieve desired storage performance levels with fewer P5800X drives, potentially saving you money or precious slots in the long-run. If you compare how many SSDs are needed to saturate 100 GbE network to 90%, you can realize 16x to 35x more efficient saturation with the Intel Optane SSD P5800X Series. This has the added benefit of freeing up PCIe slots, which can enable data center footprint reduction, or capacity expansion within the node.

	#SSDs to saturate 100 GbE network to 90%	
	Intel Optane SSD P5800X (400GB)	**Intel SSD D7-P5600** (3,200GB)
100% Random Read	2 SSDs 800GB	4 SSDs 12,800GB
100% Random Write	3 SSDs 1,200GB	13 SSDs 41,600GB
70/30 Mixed Read/Write	3 SSDs 1,200GB	7 SSDs 22,400GB

High endurance for lower storage costs and less downtime

Greater endurance means longer life for your storage media. By using Intel Optane SSDs as a caching or tiering layer for your write-heavy workloads, you can extend the life of your lower-cost NAND storage media with less maintenance and downtime.

WHAT IT MEANS

67% higher
endurance vs. Intel Optane SSD DC P4800X

Up to 20x
extended life for NAND capacity storage drives

WHY IT MATTERS

Intel Optane SSDs are designed for mixed workload environments and can withstand the kind of intense traffic typically demanded of memory. Their extremely high endurance makes them ideal for write-intensive applications such as AI inferencing, high performance computing (HPC), write buffering and logging.
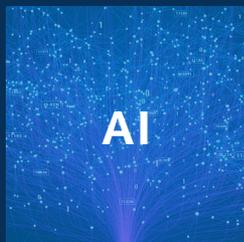
Intel Optane SSD P5800X Series overcomes legacy storage performance shortfalls in today's increasingly intensive workloads:

HCI

Hyperconverged infrastructure

Increase performance without adding nodes.

AI

Artificial intelligence

Overcome IOPS limitations.

HPC

High-performance computing

Eliminate write bandwidth I/O bottlenecks.

DATABASE

Database

Maintain fast, reliable SQL server performance.

The world's fastest data center SSD delivers incredible versatility

Whether you choose Intel Optane SSDs P5800X/P5801X for database acceleration, write caching or in high-performance tiering, they increase scale per server and accelerate latency-sensitive workloads, so data centers can scale with confidence, while deploying bigger and more affordable datasets.

- **Acceleration (store data about data).** You'll get quicker access to metadata and indexes to improve database read performance.

- **Caching (temporarily copy or hold the hottest data).** Write buffer accelerates time-to-durability. Read cache accelerates application performance.

- **Tiering (intelligent data placement).** Intelligent data placement enables you to deploy multiple tiers for cost optimization.

Intel Optane SSD DC P5800X Series Specifications

Feature	Specification
Capacity	400/800/1600GB
Interface	PCIe x4
DWPD	100
Throughput • Sequential Read • Sequential Write • Random 4K Read (IOPS) • Random 4K Write (IOPS) • Random 4K 70/30 (IOPS) • Random 512B Read (IOPS for metadata)	Throughput • Up to 7.4GB/sec • Up to 7.4GB/sec • Up to 1.55M • Up to 1.6M • Up to 2.0M • Up to 5.0M
QoS • 4KRR, QD=1, 99% • 4KRR, RW, Mixed QD=1, 99.999%	QoS • < 6µs • < 66µs

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