PRODUCT BRIEF

Intel® Optane™ SSD DC P4800X/P4801X
Data Center (DC), PCI Express* (P)

Breakthrough Performance Expands Datasets, Eliminates Bottlenecks

Solve the most demanding storage and memory challenges with the Intel® Optane™ SSD DC P4800X/P4801X

intel® OPTANE™ DC

Every day, the amount of data created across the world is exploding to new levels. Enterprises and cloud service providers thrive on this data to make critical decisions, gain new insights from the data, and differentiate services. But, today's current storage technologies leave a gap in data storage tiers. DRAM is far too expensive to scale and while NAND has the capacity and cost structure to scale, it lacks sufficient performance to function in the memory space. To address the gap, a storage solution that behaves like system memory is needed.

Combines Attributes of Memory and Storage

The Intel® Optane™ SSD DC P4800X is the first product to combine the attributes of memory and storage. With an industry-leading combination of high throughput, low latency, high QoS and high endurance, this innovative solution is optimized to break through data access bottlenecks by providing a new data storage tier. The DC P4800X/P4801X accelerates applications with fast caching and fast storage to increase scale per server and reduce transaction costs for latency sensitive workloads. In addition, the Intel® Optane™ DC P4800X enables data centers to deploy bigger and more affordable datasets to gain new insights from large memory pools.

High Throughput for Breakthrough Performance

Realize breakthrough application performance with the Intel® Optane™ DC P4800X/P4801X. It is designed to deliver up to 6x faster performance at low queue depth workloads,[1] exhibiting extremely high throughput for single accesses and super low latency. Where NAND-based SSDs are often measured at a queue depth of 32 (SATA) or 128 (NVMe*) in order to showcase maximum throughput, the Intel® Optane™ DC P4800X/P4801X can reach as many as 550,000 IOPS at a queue depth of 16.[2] This new technology is perfectly suited to accelerate enterprise applications to new, breakthrough levels of performance.

Low Latency: Responsive Under Load

With a new data storage tier created by Intel® Optane™ technology, data centers can consistently realize amazing response times under any workload. With NAND-based SSDs, random write operations require an immense amount of background media management. These tasks can add significant delay to the read operations. The Intel® Optane™ SSD DC P4800X/P4801X maintains consistent read response times regardless of the write throughput applied to the drive. Average read response times remain below <30µs while maintaining a 70/30 mixed read/write bandwidth of 2GB/s.[2]

Predictably Fast Service: QoS

In an environment of fast growing data and ever demanding needs, data centers must deploy solutions that enable predictably fast service. The Intel® Optane™ DC P4800X/P4801X is ideal for critical applications with demanding latency requirements. Its 99% read response time is up to 63x better than that of a high-endurance NAND SSD under random write workload.[3] Optimized to minimize delays in data access times, the Intel® Optane™ DC P4800X /P4801X results in faster time to insight for decision making.

High Endurance

Endurance affects the life expectancy and costs of enterprise SSDs. The DC P4800X/P4801X is designed for high write environments, and can withstand intense write traffic that is typically demanded of memory. With its extremely high endurance, the life of the DC P4800X/P4801X is extended, making it suitable for write-intensive applications such as online transaction processing, high performance computing, write caching, boot, and logging.

Use Cases for Today's Data Center

The Intel® Optane™ DC P4800X provides a new storage tier that breaks through the bottlenecks of traditional NAND storage to accelerate applications and enable more work to get done per server. This unique capability means data centers can explore three key use cases, including caching, fast storage, and extended memory. The DC P4801X can also provide fast logging, caching, boot, or extended memory.

Caching and fast storage refer to the tiering and layering that support a better memory-to-storage hierarchy. The Intel® Optane™ SSD facilitates dynamic placement of data that enables fast access to both read and/or write data. In addition, this high performing SSD meets the requirement of an application to accelerate storage access.

An Intel Optane SSD can also extend memory, offering bigger or more affordable memory by participating in a shared memory pool with DRAM at either the OS or application level. Bigger memory dramatically increases the size of 'working sets' to enable new insights from data in growing segments such as scientific computing, healthcare and autonomous driving. More affordable memory means data centers can use Intel® Optane™ SSDs to displace some DRAM.

FEATURE	SPECIFICATION
Capacity per Form Factor	Half-height, Half-length (HHHL) Add-in-Card (AIC): 375GB, 750GB, 1.5TB 2.5" x15mm, Small Form Factor U.2: 375GB, 750GB, 1.5TB P4801X: U.2: 100GB M.2: 100GB, 200GB, 375GB
Form Factor	Add-in-Card (AIC), Half-height, Half-length, Low-profile; U.2 2.5in, 15mm; M.2 110mm
Interface	PCIe* 3.0 x4, NVMe*
Latency (typical) R/W[2]	<10/12µs
Quality of Service (QoS): 99.999%[2]	4KB Random, Queue Depth 1, Read/Write: <60/100 µs ; 4KB Random, Queue Depth 16, R/W: <150/200 µs
Throughput[2]	4KB Random, Queue Depth 16, Read/Write: up to 550/550k IOPS 4KB Random, Queue Depth 16, Mixed 70/30 Read/Write: up to 500k IOPS
Endurance (JESD219 workload) Drive Writes per Day=DWPD; Petabytes Written=PBW	30 DWPD: 375GB - 20.5 PBW; 750GB - 41 PBW 60 DWPD: 100GB - 10.9 PBW; 200GB - 21.9 PBW; 375GB - 41.0 PBW; 750GB - 82.0 PBW; 1.5TB - 164 PBW
Power	Enhanced power-loss data protection P4800X: Active/Idle: Up to 18 W / 7 W P4801X: Active/Idle: Up to 11 W / 3 W

For more up-to-date product specifications, visit ark.intel.com

For more information, visit intel.com/ssd

1. Source – Intel-tested: 4K 70/30 RW Performance at Low Queue Depth. Measured using FIO 3.1. Common Configuration - Intel 2U Server System, OS: CentOS 7.5, Kernel 4.17.6-1.el7.x86_64, CPU 2 x Intel® Xeon® 6154 Gold @ 3.0GHz (18 cores), RAM 256GB DDR4 @ 2666MHz. Configuration – Intel® Optane™ SSD DC P4800X 375GB compared to *Intel® SSD DC P4600 1.6TB. Intel Microcode: 0x2000043; System BIOS: 00.01.0013; ME Firmware: 04.00.04.294; BMC Firmware: 1.43.91f76955; FRUSDR: 1.43. The benchmark results may need to be revised as additional testing is conducted. Performance results are based on testing as of November 15, 2018 and may not reflect all publicly available security updates. See configuration disclosure for details. No product can be absolutely secure.
2. Intel drive evaluated - Intel® Optane™ SSD DC P4800X 375GB. Test and System Configuration: CPU: Intel® Xeon® E5-2687W v4 3.0GHz 30MB 160W 12 cores, CPU Sockets: 2, RAM Capacity: 32GB, RAM Model: DDR4 2133MHz, PCIe Attach: CPU (not PCH lane attach), Chipset: Intel C610 chipset, BIOS: SE5C610.86B.01.01.0024.021320181901, Switch/ReTimer Model/Vendor: Intel A2U44X25N-VMEDK, OS: CentOS 7.3.1611, Kernel: 4.14.50, FIO version: 3.5; NVMe Driver: Inbox, C-states: Disabled, Hyper Threading: Disabled, CPU Governor (through OS): Performance Mode; EIST (Speed Step): Disabled, Intel Turbo Mode: Disabled, P-states = Disabled; IRQ Balancing Services (OS) = Off; SMP Affinity, set in the OS; QD1 utilizes I/O Polling Mode. Performance results are based on testing as of August 31, 2018 and may not reflect the publicly available security updates. See configuration disclosure for details.
3. Source – Intel-tested: Response Time refers to average read latency measured at queue depth 1 during 4K random write workload using FIO 3.1. See configuration in Footnote 1 above.

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