

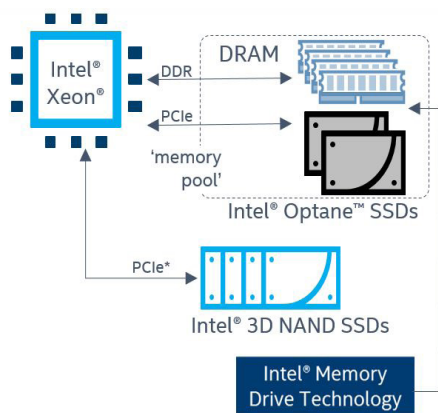
# PRODUCT BRIEF

Intel® Optane™ SSD DC P4800X Series with Intel® Memory Drive Technology  
Industry: Data Center



# Enabling More Affordable or Bigger Memory Solutions

**Intel® Memory Drive Technology transparently integrates Intel® Optane™ SSDs into the memory subsystem.**



Intel® Memory Drive Technology is a revolutionary software that extends system memory transparently. Combined with an Intel® Optane™ Solid State Drive (SSD), Intel® Memory Drive Technology transparently integrates the SSD into the memory subsystem and makes it appear like DRAM to the OS and applications. Intel® Memory Drive Technology increases memory capacity beyond DRAM limitations and delivers DRAM-like performance in a completely transparent manner to the operating system and application. In addition, no changes are required to the OS or applications.

There are two key scenarios in which it is beneficial for an IT environment to use Intel® Memory Drive Technology:

- Displace a portion of DRAM to reduce overall memory cost
- Grow the memory pool beyond DRAM capacities when large system memory is required

## Displace DRAM for More Affordable Memory

Intel® Memory Drive Technology enables data centers to deliver more affordable memory pools by displacing a portion of DRAM. By pairing the DRAM with the high-performing non-volatile memory of the Intel® Optane™ SSD, data centers can more cost-effectively execute workloads that require high-end memory configurations with much lower DRAM capacity installed, saving on both Capex and Opex costs.

## Extend Memory for a Bigger Memory Footprint

Intel® Memory Drive Technology enables data centers to grow the memory footprint beyond the DRAM capacity. Together, the DRAM and the Intel® Optane™ SSD emulate a single volatile memory pool. Intel® Memory Drive Technology intelligently determines where data should be located in the pool to maximize performance, enabling servers to deliver performance across many workloads—even when DRAM is only supplying one-third to one-tenth of the memory pool capacity.

## Enable New Possibilities for the Enterprise

The combination of cost-efficiency and increased capacity means enterprises can break through today's memory limits, enabling new possibilities—like accessing higher-capacity, in-memory datasets to deliver better, faster analytics insight. As an example, cloud providers can reduce capital cost for memory when enabled to oversubscribe workloads with greater overall capacity. Or, high-performance computing centers can increase large memory datasets to improve research and scientific results, and test new simulations quickly and cost-efficiently.

## The World's Most Responsive<sup>1</sup> Data Center SSD

The Intel® Optane™ SSD DC P4800X is the first data center SSD to combine the attributes of memory and storage. With an industry-leading combination of high throughput, low latency, high QoS, and ultra-high endurance, this innovative solution is optimized to break through data access bottlenecks by providing a new data tier. The DC P4800X accelerates applications for fast caching and fast storage to increase scale per server and reduce transaction costs for latency sensitive workloads.

### About Intel® Optane™ Technology

Intel® Optane™ technology is a unique combination of 3D XPoint™ memory media with Intel's advanced system memory controller, interface hardware and software IP. This revolutionary technology is offered in several form factors to unleash vast system performance in a range of products.

HARDWARE REQUIREMENTS	
Intel® Optane™ SSD DC P4800X	375 GB
Supported Processors	Intel® Xeon® E5-x6xx v2 or later, E7-x8xx v2 or later
Maximum Processor Sockets	8
Operating Systems	RHEL* 6.5, 6.6, 6.7, 6.8, 7.0, 7.1, 7.2, 7.3 SLES* 11 SP4, 12, 12 SP1, 12 SP2 Intel® Memory Drive Technology Software <sup>4</sup> requires a bootable media Supported protocols: IDE, UHCI, EHCI Linux OS must be installed in legacy (non-UEFI) mode
SOFTWARE FEATURE	SPECIFICATIONS
Memory Capacity	320 GiB <sup>2,3</sup>
Maximum Software-defined Memory	64 TiB <sup>2</sup>
Recommended DRAM Expansion	Up to 8x <sup>5</sup>
Memory Media Mode	Volatile (non-persistent)



For more information, visit [intel.com/ssd](http://intel.com/ssd)

1. Responsiveness defined as average read latency measured at queue depth 1 during 4k random write workload. Measured using FIO 2.15. Common configuration - Intel® 2U ServerSystem, OS CentOS 7.2, kernel 3.10.0-327.el7.x86\_64, CPU 2 x Intel® Xeon® E5-2699 v4 @ 2.20GHz (22 cores), RAM 396GB DDR @ 2133MHz. Intel drives evaluated - Intel® Optane™ SSD DC P4800X 375GB and Intel® SSD DC P3700 1600GB. Samsung drives evaluated - Samsung® SSD PM1725a, Samsung® SSD PM1725, Samsung® PM963, Samsung® PM953. Micron drive evaluated - Micron® 9100 PCIe® NVMe™ SSD. Toshiba drives evaluated - Toshiba® ZD6300. Test - QD1 Random Read 4K latency, QD1 Random RW 4K 70% Read latency, QD1 Random Write 4K latency using FIO 2.15.

2. GiB = 1,073,741,824 bytes, TiB = 1,099,511,627,776 bytes

3. Total physical capacity is 375GB. Total usable capacity towards Memory Drive is 320 GiB.

4. Technology licensed from ScaleMP\*

5. For example: 128GiB DRAM can be expanded up to 1024GiB based on the capacity of the non-volatile memory media installed. Higher expansion ratios may be supported, with possibly suboptimal performance.

6. Software boots from USB media, network image (PXE boot) or directly from Optane SSD in UEFI mode.

Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at [intel.com](http://intel.com).

Benchmark results were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as "Spectre" and "Meltdown". Implementation of these updates may make these results inapplicable to your device or system.

Tests document performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase. For more complete information about performance and benchmark results, visit [www.intel.com/benchmarks](http://www.intel.com/benchmarks).

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