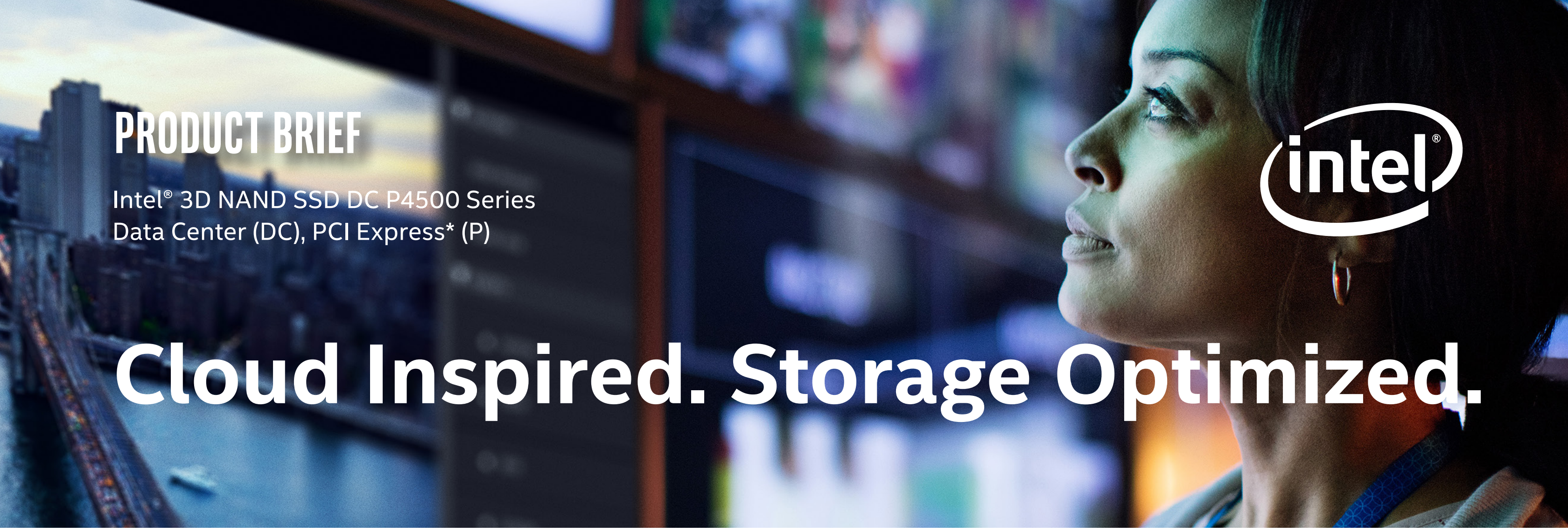
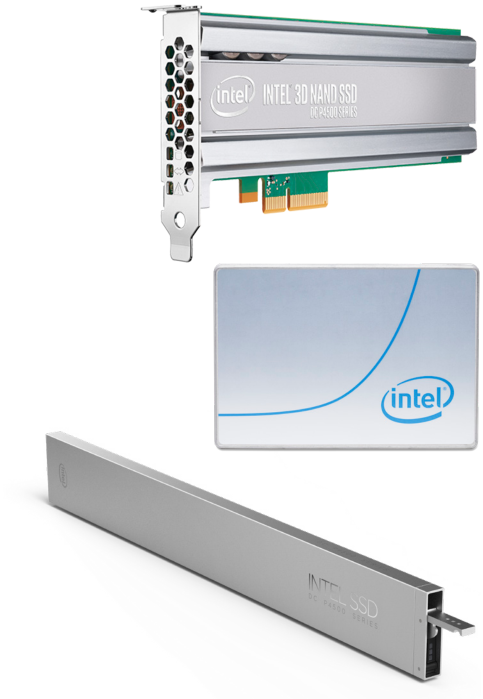


PRODUCT BRIEF

Intel® 3D NAND SSD DC P4500 Series
Data Center (DC), PCI Express* (P)

Cloud Inspired. Storage Optimized.

Designed for modern cloud storage solutions such as software-defined and converged infrastructures.



Pairing a new Intel developed controller, unique firmware innovations, and industry-leading 3D NAND density, the Intel® SSD DC P4500 Series—a member of the Intel® 3D NAND SSD family—delivers an all new design to support cloud storage and software-defined infrastructures. The Intel SSD DC P4500 Series is stacked with a combination of performance, capacity, manageability, and reliability to help data centers fast-track their business and meet the overall demands of their digital business. To meet data center's exacting needs for growing capacity, easy serviceability, and thermal efficiency, the DC P4500 is now available in the revolutionary "ruler" form factor.

An SSD Built for Cloud Storage Architectures

The cloud continues to drive innovation, new services, and agility for businesses which are seeing the need to deploy services faster, scale effectively, and reduce the human costs of managing assets. Multi-cloud has become a core element for any enterprise strategy, with top cloud providers openly embracing PCIe*/NVMe*-based SSDs because of the scalable performance, low latency, and continued innovation.

Within the shift to the cloud is an increased adoption of software-defined and converged infrastructures. This fast adoption is being driven by the need to increase efficiency, refresh existing hardware, deploy new workloads, and reduce operational expenditures.

The DC P4500 significantly increases server agility and utilization, while also accelerating applications, across a wide range of cloud workloads.

Optimized for Storage Efficiency Across a Range of Workloads

This cloud-inspired SSD is built with an entirely new NVMe controller, optimized for read intensive workloads and designed to maximize CPU utilization.

With controller support for up to 128 queues, the DC P4500 helps minimize the risk of idle CPU cores and performs most effectively on Intel platforms with Intel® Xeon® processors. The queue pair-to-CPU core mapping supports high drive count and also supports multiple SSDs scaling on Intel platforms.

With the DC P4500, data centers can increase users, add more services, and perform more workloads per server, or quickly repartition to adapt to conditions. Now you can store more and know more.

Manageability to Maximize IT Efficiency

The DC P4500 is built for software-defined cloud infrastructures across the multi-cloud environment to enable greater efficiency within existing server footprints.

New firmware manageability features help reduce server downtime through improved update processes and expanded monitoring capabilities.

SMART management and Intel custom log pages provide advanced drive telemetry to manage thermals, monitor endurance, and track drive health status. Management coverage is now expanded across a wider range of drive states with support for the NVMe-Management Interface (NVMe-MI) specification, an industry standard way to manage the SSD out-of-band.

The new "ruler" form factor further improves service efficiency with support for programmable LEDs to enable indication of more device states; integrated power cycling to enable remote, drive specific reboot; and, an integrated pull latch for optimal front-end servicing.

Industry-leading Reliability and Security

As capacity per server continues to scale, the risk of data corruption and errors increases. With an eye toward this risk, Intel has built industry-leading end-to-end data protection into the DC P4500.[1] This includes protection from silent data corruption which can cause catastrophic downtime and errors in major businesses.

Learn more now at intel.com/ssd

Power Loss Imminent (PLI) provides protection from unplanned power loss, and is obtained through a propriety combination of power management chips, capacitors, firmware algorithms, and a built-in PLI self-test. Intel's PLI feature provides data centers with high confidence of preventing data loss during unplanned power interrupts.

Designed for Today's Modern Data Centers

The DC P4500 is Intel's new 3D NAND SSD for read-intensive workloads in cloud-driven data centers. The mix of performance, capacity, manageability, and reliability make it the ideal solution for software-defined and converged infrastructures.

Features At-a-Glance	
Capacity	1, 2, 4, 8 TB
Performance[2,3]	64k Sequential Read/Write – up to 3300/1900 MB/s
	4k Random Read/Write – up to 645,000/65,600 IOPS
Manageability	Support for NVM Express-Management Interface (NVMe-MI), NVMe SMART / Health and Log Pages
Reliability[1]	End-to-end data protection from silent data corruption, uncorrectable bit error rate < 1 sector per 10^{17} bits read
Interface	PCIe 3.1 x4, NVMe 1.2
Form Factors	"Ruler"
	U.2 2.5in x 15mm (for serviceability, hot-plug, and density)
	Add-in-Card: Half-Height Half-Length, low-profile (for legacy and mainstream server compatibility)
Media	Intel 3D NAND, TLC
Endurance	Random/JEDEC up to 0.75 DWPD / 7 PBW, sequential workload up to 4.62 DWPD / 19.8 PBW
Power	Max read/write 10W / 20W
Warranty	5-year warranty

1. Source - Intel. End-to-end data protection refers to the set of methods used to detect and correct the integrity of data across the full path as it is read or written between the host and the SSD controller and media. Test performed on Intel® SSD DC S3520 Series, Intel® SSD DC P3520, Intel® SSD DC P3510, Intel® SSD DC P4500, Samsung PM953*, Samsung PM1725*, Samsung PM961*, Samsung PM863*, Micron 7100*, Micron 510DC*, Micron 9100*, HGST SN100*, Seagate 1200.2*, SanDisk CS ECO* drives. Claim is based on average of Intel drive error rates vs. average of competitor drive error rates. Neutron radiation is used to determine silent data corruption rates and as a measure of overall end-to-end data protection effectiveness. Among the causes of data corruption in an SSD controller are ionizing radiation, signal noise and crosstalk, and SRAM instability. Silent errors were measured at run-time and at post-reboot after a drive "hang" by comparing expected data vs actual data returned by drive. The annual rate of data corruption was projected from the rate during accelerated testing divided by the acceleration of the beam (see JEDEC standard JESD89A).
2. Performance consistency measured using FIO* based on Sequential 64KB QD= 128 (QD=32, workers=4) workload, measured as (IOPS in the 99.9th percentile slowest 1-second interval)/ (average IOPS during the test). Measurements are performed on a full Logical Block Address (LBA) span of the drive once the workload has reached steady state, including all background activities required for normal operation and data reliability.
3. Performance measured with QD=1, and QD=256 (QD=64, workers=4). Measurements performed on the full Logical Block Address (LBA) span of the drive.