



D201P

Gen5 capacity in an E1.S footprint

Solutions Brief



PHISON

Gen5 throughput and capacity for the data center.

The Pascari D201P Enterprise SSD is Phison's density-optimized PCIe Gen5 SSD, built for the storage tiers that hold the bulk of a data center content: object storage back ends, distributed database and analytics clusters, content delivery caches and origin tiers, and the read-serving capacity layers underneath AI training pipelines. These tiers are spacious and designed for read-dominant, deeply concurrent, and continuous workloads; they're where the terabytes of data get stored. Drives targeting these environments need to deliver capacity, with throughput that holds up under sustained loads, in the correct form factor for the servers in the rack.

The D201P is built to meet all three requirements. It uses the E1.S form factor that new data center server designs have standardized on, with capacities up to 15.36 TB per drive, and it keeps mixed-workload performance flat under the deep queues a busy capacity node continuously sustains. That combination sets cost per usable terabyte, because a capacity tier is priced by the rack rather than by the drive. Fewer, denser drives mean fewer slots, cables, failure domains, and rebuild events for the same usable capacity. A drive that sustains its rated throughput means architects don't need to buy extra headroom to cover the gap between a benchmark number and a production workload.

Density and efficiency

Two numbers govern a data center build: terabytes per rack unit and useful IOPS per watt. The Pascari D201P SSD improves both without asking anything of the chassis. Active power stays at or below 25 W and idle at or below 5 W across all capacities, so the 17% average throughput gain over the D200P arrives with an unchanged thermal envelope. At peak throughput, that works out to roughly 48,600 IOPS per active watt, and 15.36 TB in the same 25 W yields 0.61 TB of capacity per active watt. It does this while requiring no extra airflow, no larger PDU allocation, and no change to rack thermal design.

E1.S turns those per-drive figures into rack-level density. The form factor has become the default carrier for new data center server designs for reasons that have little to do with any one drive: E1.S carriers stand vertically in the front airstream rather than blocking it, which improves airflow to the CPUs and accelerators behind them and lets a 1U node carry far more devices than a 2.5-inch form factor allows. A 1U chassis built around 32 E1.S bays can deliver 491 TB of usable capacity; the same capacity in U.2 normally requires at least twice the rack space.

The two heights address different sleds. The 9.5 mm build fits the densest 1U compute nodes, while the 15 mm build adds heatsink area that keeps a Gen5 controller from thermal throttling during long sequential ingest, compaction, and multi-hour rebuilds. Both variants ship at every capacity and in every port and firmware configuration.

Mixed-workload performance

Capacity tiers rarely see a pure read or a pure write profile. They see a blend, dominated by reads but carrying enough compaction, replication, and cache-fill traffic that garbage collection never goes fully idle. A 70/30 read/write mix at 4K models that condition. Phison measured the 15.36 TB Pascari D201P against the previous-generation D200P at 7.68 TB, its highest capacity, and two leading current-generation Gen5 enterprise SSDs at their maximum capacities of 7.68 TB and 3.84 TB, from QD1 to QD2048. No competitor in this segment offers a 15.36 TB model, so the D201P carries at least twice the data of every drive it's measured against.

The Pascari D201P leads every drive from QD1 through QD256, the range where the large majority of production concurrency sits. Against the D200P it gains roughly 8% to 10% through the shallow depths, then opens to 28% at QD64 and holds 24% to 26% across QD128 and QD256. It reaches its ceiling by QD256 and holds roughly 1.24 million IOPS from there through QD2048, a spread of less than 0.6% and the flattest plateau of any drive measured.

Comp A tracks the D201P through the midrange but needs four times the queue depth to approach the same throughput. At QD512, it achieved what the D201P managed at just QD128, and it remains 5% to 6% behind at every depth beyond that. Comp B stops scaling above QD64 entirely, flattening near 550K IOPS, and the D201P more than doubles its throughput at every depth from QD128 on.

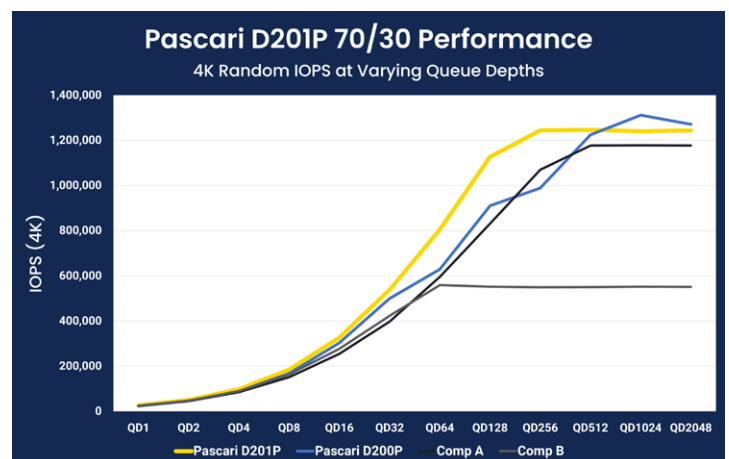


Figure 1. 4K random 70/30 read/write IOPS versus queue depth.

Where the Pascari D201P Enterprise SSD fits.

Object storage represents an ideal use-case for the Pascari D201P. Erasure-coded pools price themselves on cost per usable terabyte, and capacity per node is the lever that moves it. Moving from 7.68 TB to 15.36 TB drives cuts the device count in half for a given usable capacity, which also means half the slots, cables, failure domains, and annual rebuild events. The access pattern fits as well, since object stores are write-once, read-many, so 1 DWPD covers the workload while read performance carries the load that matters.

Distributed database and analytics clusters land in the same place. Many sharded relational database fleets run read-dominant mixed workloads that look much like a 70/30 profile at moderate-to-deep queue depths, precisely where the D201P's 42% QD128 lead applies. Density reshapes the cluster too: A node holding twice the data needs half as many peers, which shrinks replication fan-out and coordination overhead. Consistent QoS is the other half of the argument, because a query touching dozens of shards finishes only when its slowest shard finishes.

Content delivery caches and origin tiers care about how much of the working set fits on the node and how many concurrent range requests it can serve. Capacity answers the first, since every additional terabyte of cache improves the hit rate and removes origin fetch and transit cost, and up to 3,300K random read IOPS with 14,800 MB/s sequential read speeds covers both the small-object and large-object portions of an edge node mix at the most space- and power-constrained places in any network. Read-heavy AI staging follows the same logic.

Pascari D201P: The bottom line

A capacity tier does not need maximum endurance. It needs the raw terabytes, throughput that stays predictable under sustained concurrency, and a form factor appropriate for the rack. The Pascari D201P delivers all three: 15.36 TB per drive in E1.S, a 1.24 million IOPS plateau that varies by less than 0.7% from QD256 to QD2048, and performance advantages of 17% on average and 42% at peak over the prior generation D200P, extending to 24% to 73% higher throughput compared to three leading current-generation competitors. Backed by Phison's enterprise roadmap and a five-year limited warranty, installations can standardize on the Pascari D201P drive when the key constraint is petabytes per rack.



Testing Details: All testing was conducted on an Intel Xeon w5-3435X processor, using an ASUS Pro WS W790E-SAGE SE motherboard, equipped with 128GB (8x16GB) of DDR5-4800 memory. Benchmarks were collected on Ubuntu 24.04.4 LTS, with testing done running FIO 3.36 after full SSD conditioning.

Specifications

The Pascari D201P ships at 1.92, 3.84, 7.68, and 15.36 TB in E1.S, with both 9.5 mm and 15 mm heights. It provides a configurable PCIe Gen5 x4 or dual-port 2x2 interface for high-availability failover. Every capacity carries a 1 DWPD rating, 2.5-million-hour MTBF, and a limited five-year warranty. The drive implements NVMe 2.0d and the OCP Datacenter NVMe SSD Specification v2.0d, with OCP v2.6 telemetry, 128 namespaces, power loss protection, and end-to-end data path protection; ISE, TCG Opal 2.02, and AES-XTS 256-bit encryption are available across single-port and dual-port part models.



Pascari D201 E1.S Specifications

Capacity	1.92 TB	3.84 TB	7.68 TB	15.36 TB
Interface	PCIe 5.0 x4, 2x2	PCIe 5.0 x4, 2x2	PCIe 5.0 x4, 2x2	PCIe 5.0 x4, 2x2
NVMe Protocol	2.0d	2.0d	2.0d	2.0d
NAND Flash	3D TLC	3D TLC	3D TLC	3D TLC
Sequential Read (MB/s)	14,800	14,800	14,800	14,800
Sequential Write (MB/s)	2,300	4,600	9,200	11,000
4K Random Read (IOPS)	1,400K	2,700K	3,300K	3,250K
4K Random Write (IOPS)	75K	230K	480K	600K
Random Read Latency (µs)	55	55	55	55
Random Write Latency (µs)	14	8	8	8
Active Power (W)	≤25	≤25	≤25	≤25
Idle Power (W)	≤5	≤5	≤5	≤5
DWPD	1	1	1	1
Endurance (TBW)	3,504	7,008	14,016	28,032
Warranty	5	5	5	5
Form Factor	E1S 9.5 / 15mm	E1S 9.5 / 15mm	E1S 9.5 / 15mm	E1S 9.5 / 15mm

Endurance calculated at 1 DWPD across the five-year warranty term. Sequential performance measured with FIO on Linux, 512 KB, QD32, 1 job; random performance with FIO on Linux, 4 KB, QD128, 8 jobs; latency with FIO on Linux, 4 KB, QD1, 1 job. 1 TB = 10¹² bytes.

Legal Disclaimer: 1 TB = 1,000,000,000,000 bytes. Performance figures, specifications, and other technical information are based on specified test conditions and are provided for informational purposes only. Actual performance can vary depending on system configuration, workload, operating environment, firmware, and other factors. Specifications and product availability are subject to change without notice.