Solidigm D7-P5520 Maintains Lead in Enterprise Workloads

Today's hyperscalers and data centers are demanding memory density and power efficiency. Solidigm delivers on both in spades with a 44% reduction in overall power compared to its previous-generation P5510 devices. The D7-P5520 is available with capacities ranging from 1.92TB to 15.36TB and is available in a 2.5" U.2 form factor in addition to "EDSFF" (E1.S and E1.L) format.

For this comparison, StorageReview selected an Intel OEM server, which supports eight Gen4 NVMe SSDs. All batches of SSDs were tested identically on the same server.

High-level specifications include:

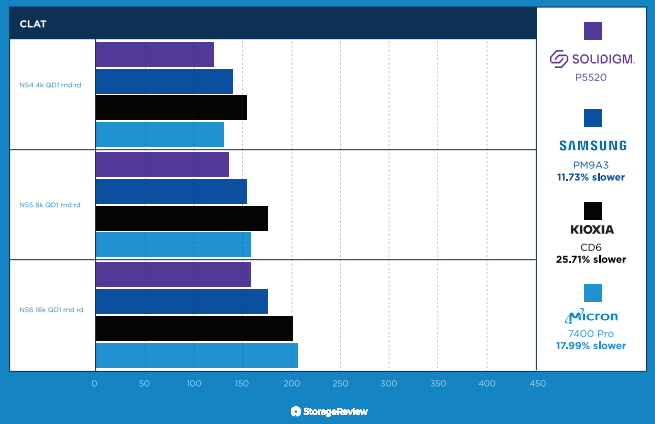
- 2 x Intel® Xeon® Platinum 8380 Processor
- 32 x 32GB DDR4 3200MHz
- Ubuntu 20.04.2 Live Server (Synthetic workloads)
- 8 x PCI Gen4 U.2 NVMe Bays

FIO Noisy Neighbor Test
Traditionally, to see how SSDs operate under varying simultaneous workloads, you apply read and write workloads to the device simultaneously. These workloads can also include varying block sizes and other elements. NVMe SSDs brought a new concept into the mix where they can offer multi-tenant namespace provisioning versus common partitioning.

When multiple tenants are all using their provisioned namespaces with different workloads, latency mustn't increase to the point that the storage is no longer responsive for each tenant. In the noisy neighbor test, we apply mixed write workloads to three of six provisioned namespaces and track the read latency from the remaining three namespaces to see how each drive handles the concurrent write and read activity.

FULL REPORT

QD1 Random Read QoS (usec)
Smaller is better



With more devices on the field, the Solidigm D7-P5520 held the lead for completion latency and 99.99 percentile and 99.9999 percentile latencies. Starting with completion latency (clat), the average of the D7-P5520 times across namespace 4-6 measured 141 microseconds, with the next closest being the Samsung PM9A3 with 157, followed by the Micron 7400 Pro with 166, and lastly, the Kioxia CD6 with 177.

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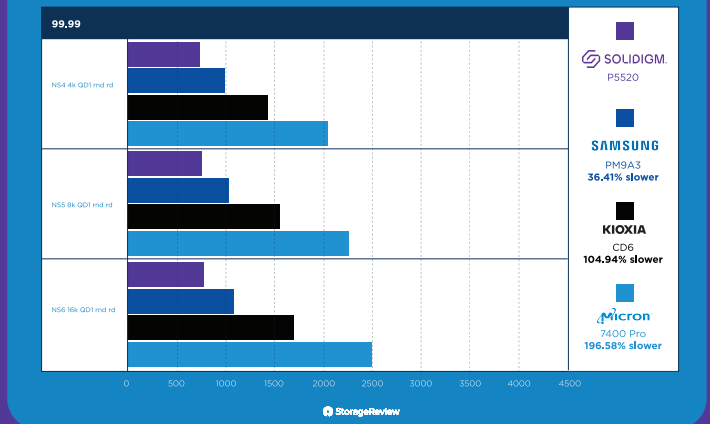

That gap increased, though, moving to the 99.99 percentile, where we started to see competing drives dramatically ramp up response times. Here the Solidigm D7-P5520 measured 769 microseconds, with the Samsung PM9A3 measuring 1,049, the Kioxia CD6 with 1,576, and the Micron 7400 Pro with 2,281.

QD1 Random Read QoS (usec)
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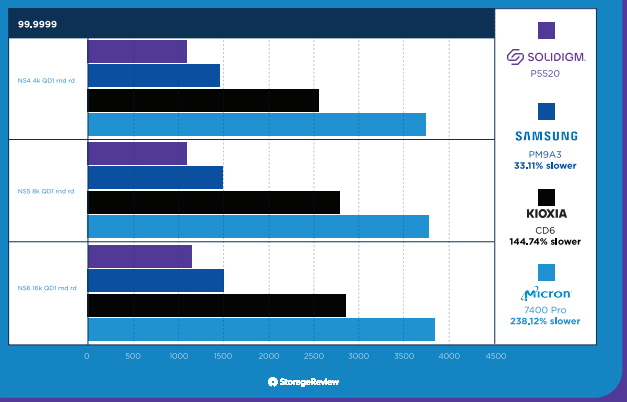

Moving to the six-9s or 99.9999 latency measurement, the D7-P5520 continued its impressive lead over the group, measuring 1,123 microseconds. The Samsung PM9A3 remained in second place, measuring 1,494, the Kioxia CD6 jumped to 2,748, and the Micron 7400 Pro measured a staggering 3,796.

Conclusion

In our previous deep dive of the P5510, we compared it head-to-head against the PM93A. In that round of testing the P5510 performed very well, besting the Samsung drive. This time around, Solidigm is back with an updated enterprise SSD, so we've run the testing again pitting the Solidigm D7-P5520 against the PM9A3. Further, we expanded the scope by including well-respected enterprise SSDs from Micron and KIOXIA in the showdown.

After this exercise, we're left with the D7-P5520 about where we were with the P5510 – that's a very good thing. The D7-P5520 is strong across the workloads we threw at it, really shining in the most intensive workloads like extreme write pressure and noisy neighbor scenarios. Solidigm engineering has proven again that in this mainstream enterprise SSD class, there's a pretty wide chasm and making the right investment in flash is extremely important for application performance.

StorageReview

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