Power your business strategy with faster time to insight

Process queries in 19.6% less time*

Enjoy higher data throughput

with up to 27.4% more MB/s**

Enjoy better data analytics performance by upgrading to Dell EMC PowerEdge R7525 servers and Dell EMC PowerStore storage

These Dell EMC servers with AMD EPYC 7542 processors analyzed data in less time than HPE ProLiant DL380 Gen9 servers with older Intel processors and Gen10 servers with newer Intel processors, both of which used HPE 3PAR StoreServ 8450 storage

If your organization is using older servers and storage to support data analytics and other data-intensive activities, an upgrade may be feeling long overdue. But once you've committed to upgrading, several choices still lie before you. For example, should you upgrade your servers but keep your storage environment the same? Or should you opt for a new server-and-storage solution, such as Dell EMC™ PowerEdge™ R7525 servers with Dell EMC PowerStore™ 5000T storage? It can be hard to anticipate the gains your organization might see with one approach or the other—so PT set out to measure both.

In hands-on testing, we captured data analytics performance on three configurations:

- Three HPE ProLiant DL380 Gen9 servers with older Intel® Xeon® E5-2699v4 processors and HPE 3PAR StoreServ 8450 storage
- Three HPE ProLiant DL380 Gen10 servers with newer Intel Xeon Gold 6258R processors and HPE 3PAR StoreServ 8450 storage
- Three Dell EMC PowerEdge R7525 servers with AMD EPYC™ 7542 processors and Dell EMC PowerStore 5000T storage

We used a data analytics workload that measured how quickly each solution could complete a series of query sets and the average data throughput each solution achieved. We also ran an Iometer workload to drive additional I/O load on each storage array. The Dell EMC solution handled the workloads better than the other solutions, analyzing data in less time and achieving greater throughput than either HPE solution. With Dell EMC PowerEdge R7525 servers with AMD EPYC 7542 processors and Dell EMC PowerStore 5000T storage, organizations could reach important business insights sooner.

*HPE Gen10 solution vs Dell EMC solution
** HPE Gen9 solution vs Dell EMC solution

How we tested

In our data center, we tested three environments:

- Three dual-socket Dell EMC PowerEdge R7525 servers, each with two 32-core AMD EPYC 7542 processors, 256 GB of RAM, and a 2-node Dell EMC PowerStore 5000T storage array with 21 1.92TB NVMe SSDs
- Three dual-socket HPE ProLiant DL380 Gen 10 servers, each with two 28-core Intel Xeon Gold 6258R processors, 256 GB of RAM, and a 2-node HPE 3PAR StoreServ 8450 storage array with 24 1.92TB SAS SSDs
- Three dual-socket HPE ProLiant DL380 Gen 9 servers, each with two 22-core Intel Xeon E5-2699 v4 processors, 256 GB of RAM, and a 2-node HPE 3PAR StoreServ 8450 storage array with 24 1.92TB SAS SSDs

We chose the HPE Gen9 environment as a baseline, to represent a sample legacy environment that is due for upgrade. The HPE Gen10 environment represents what performance might look like if a company upgraded its servers to the current generation of HPE and Intel technology while keeping its legacy SAS SSD-based storage array. The Dell EMC environment with Dell EMC PowerStore NVMe SSD-based storage and AMD EPYC 7002 series processors represents the latest Dell EMC and AMD technologies to show the possible advantages of upgrading both servers and storage to the Dell EMC platform. Where possible, we configured the current gen HPE and Dell EMC servers to have comparable hardware. For the Dell EMC and HPE Gen10 servers, we chose Intel and AMD processors that represented the top of each vendor's mid-range offerings. Intel Xeon Gold processors have a maximum of 28 cores, while processors in AMD's equivalent tier have a maximum of 32 cores. The Intel Xeon Gold 6258R processor we used has a maximum boost frequency of 4.0 GHz, while the AMD EPYC 7542 processor we used has a maximum boost frequency of 3.4 GHz. Both the Intel Xeon Gold 6258R and the AMD EPYC 7542 processors are available to purchase today. Both cost around $4K at the time of this writing.[1,2]

All three servers in each environment ran Windows Server 2019 and Microsoft SQL Server 2019. Each host had a dedicated database for testing, supported by two LUNs on the attached storage array. We ran two 16Gb fibre channel ports from each server and four 16Gb fibre channel ports from each array to a 16Gb fibre channel switch. We configured the switch with the proper zoning to ensure traffic from each environment was properly balanced and separated.

We measured the data analytics performance of each environment using the TPC-H-like workload from the HammerDB benchmark suite (v3.3) against a 1,000-scale SQL Server database. To drive additional I/O load to the storage array during analytics testing, we ran Iometer v1.1.0 from a separate client host and used a 70%-read, 30%-write random I/O profile and 4 workers. This profile represents the I/O load that OLTP database workloads (such as online retail stores) generate. We ran the analytics workload three times on each environment and reported the median analysis time. For more details on our test process and configurations, see the science behind the report.

About the Dell EMC PowerEdge R7525

The Dell EMC PowerEdge R7525 we tested featured two AMD EPYC 7542 processors. According to Dell EMC, this server also boasts the following:

- Up to 24 NVMe™ direct connections
- 32 DDR4 RDIMM or LRDIMM memory module slots
- Automated server lifecycle management
- Security features such as AMD Secure Memory Encryption (SME) and Secure Encrypted Virtualization (SEV)

To learn more, visit https://www.dell.com/en-us/work/shop/povw/poweredge-r7525.

Power your business strategy with faster time to insights driven by high data throughput

Figure 1 shows the results of our analytics tests. We ran a TPC-H-like workload from HammerDB while simultaneously using Iometer to generate additional I/O load on the backing storage. This mirrors a real-world use case where arrays often support additional workloads besides data analytics. The workload comprised a set of 22 queries for 7 users per host.

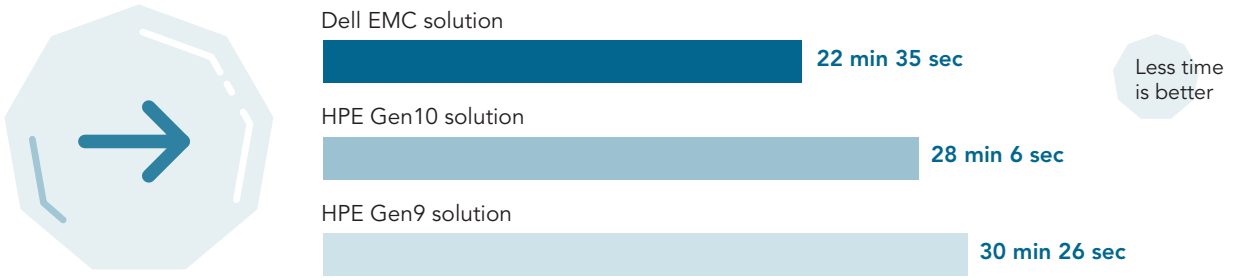


Figure 1: Time required to complete TPC-H-like data analytics queries. Less time is better. The Dell EMC solution comprised three Dell EMC PowerEdge servers and a PowerStore 5000T storage array. The HPE Gen9 solution used three HPE ProLiant DL380 Gen9 servers, while the HPE Gen10 solution had three HPE ProLiant DL380 Gen10 servers. Both HPE solutions used a 3PAR StoreServ 8450 storage array. Source: Principled Technologies

Out of the three environments we tested, the Dell EMC PowerEdge R7525 servers with Dell EMC PowerStore storage completed the workload in the least amount of time—22 minutes and 35 seconds, which is 19.6 percent less time than the HPE Gen10 solution and 25.8 percent less time than the HPE Gen9 solution.

This strong performance could enable your company to run more analytics work during your regularly scheduled window, and help your team discover key business insights sooner than you would have without the power of the latest technology from Dell EMC and AMD.

Even though each solution had the same fibre channel bandwidth, the Dell EMC solution was able to ingest data for the analytics work at a higher rate: 27.4 percent higher than the HPE Gen9 solution, and 25.9 percent higher than the HPE Gen10 solution. Figure 2 illustrates the throughput data we observed. The data is an aggregate of the disk-read performance for each server running the analytics workload.

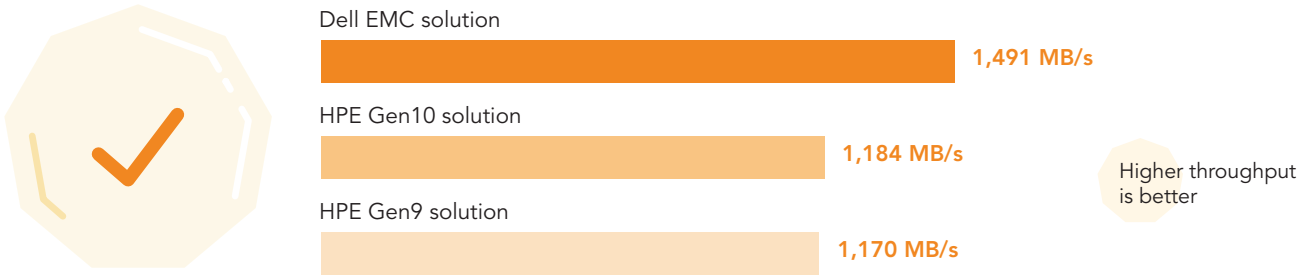
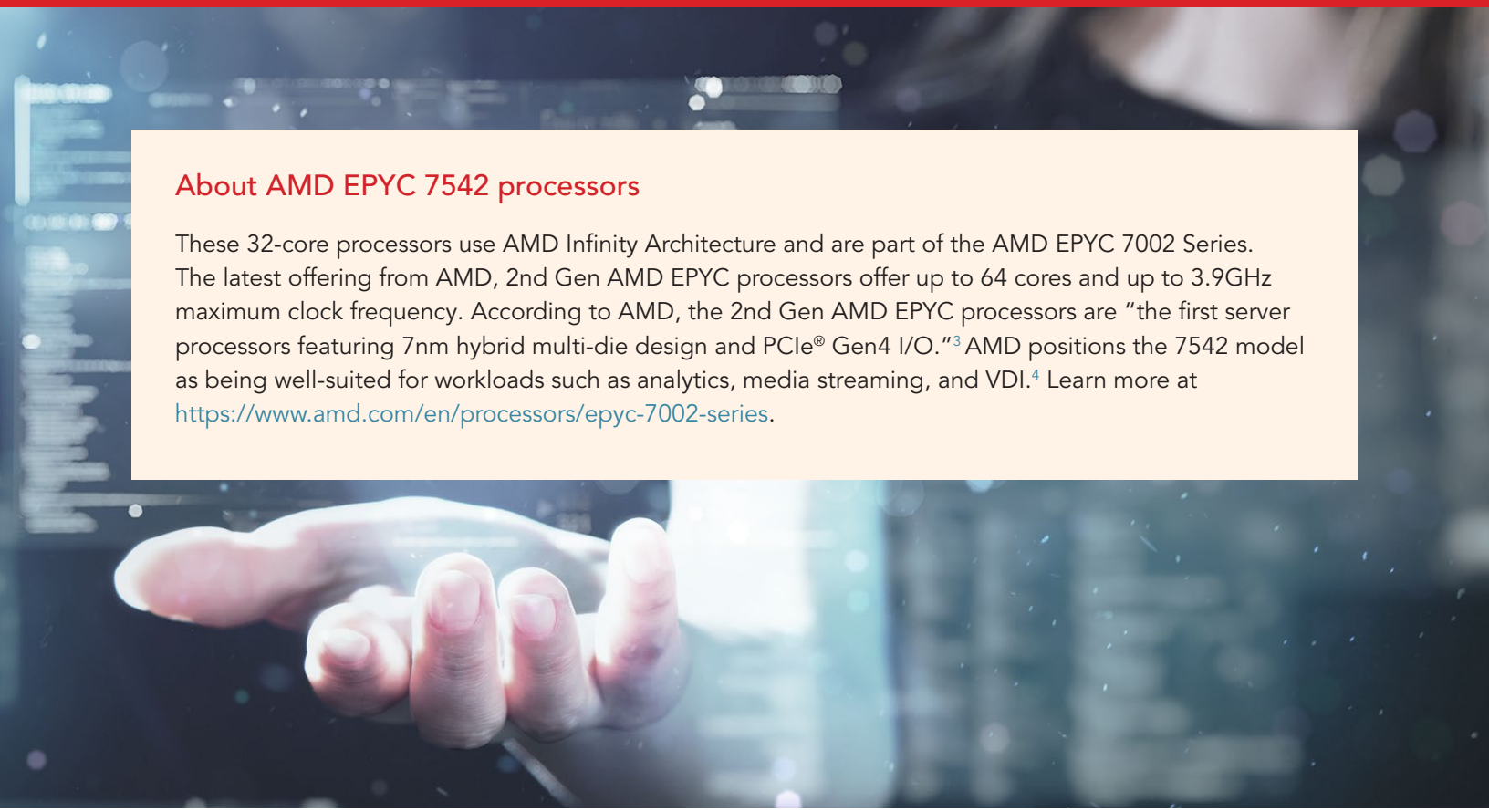


Figure 2: Disk-read throughput (in megabytes per second) achieved by each solution while running a TPC-H-like data analytics workload. Higher throughput is better. The Dell EMC solution comprised three Dell EMC PowerEdge servers and a PowerStore 5000T storage array. The HPE Gen9 solution used three HPE ProLiant DL380 Gen9 servers, while the HPE Gen10 solution had three HPE ProLiant DL380 Gen10 servers. Both HPE solutions used a 3PAR StoreServ 8450 storage array. Source: Principled Technologies



About AMD EPYC 7542 processors

These 32-core processors use AMD Infinity Architecture and are part of the AMD EPYC 7002 Series. The latest offering from AMD, 2nd Gen AMD EPYC processors offer up to 64 cores and up to 3.9GHz maximum clock frequency. According to AMD, the 2nd Gen AMD EPYC processors are "the first server processors featuring 7nm hybrid multi-die design and PCIe® Gen4 I/O."[3] AMD positions the 7542 model as being well-suited for workloads such as analytics, media streaming, and VDI.[4] Learn more at https://www.amd.com/en/processors/epyc-7002-series.

Conclusion

In hands-on testing, we determined that a data analytics solution (comprised of new Dell EMC PowerEdge R7525 servers powered by AMD EPYC 7542 processors and Dell EMC PowerStore 5000T storage) delivered faster data analysis with a higher throughput than two HPE solutions that used Gen9 and Gen10 ProLiant DL380 servers and legacy HPE 3PAR storage. By replacing aging servers and storage arrays with current-generation Dell EMC hardware, organizations could speed time to insights that could improve the course of their business.

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1 Amazon, "INTEL - SERVER CPU -TRAY XEON Gold 6258R PROC 38.5M Cache 2.7G," accessed February 19, 2021, https://www.amazon.com/dp/B0858566ZK/.

2 TigerDirect Business, "AMD EPYC 7542 Processor - 2.9GHz, 32-Core, 64 Threads, 128MB Cache, Socket SP3, OEM - 100-000000075," accessed February 19, 2021, https://www.tigerdirect.com/applications/searchtools/item-details.asp?EdpNo=6789739.

3 AMD, "AMD EPYC™ 7002 Series Processors: A New Standard for the Modern Data Center," accessed October 8, 2020, https://www.amd.com/system/files/documents/AMD-EPYC-7002-Series-Datasheet.pdf.

4 AMD, "AMD EPYC™ 7532," accessed October 8, 2020, https://www.amd.com/en/products/cpu/amd-epyc-7532.

Read the science behind this report at http://facts.pt/Cc1DomB ▶

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