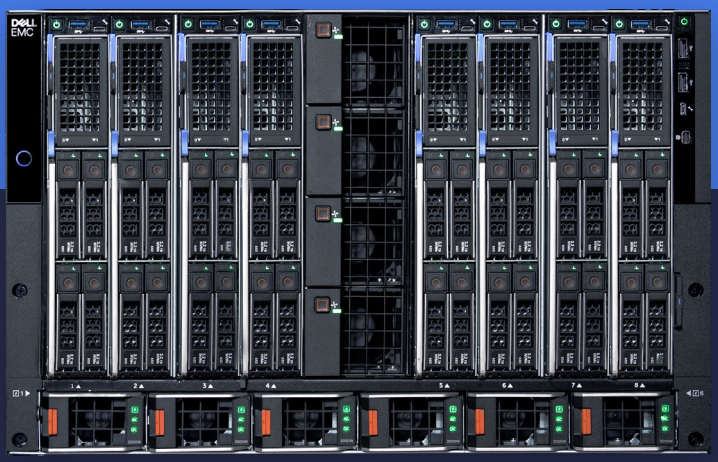
Dell EMC™ PowerEdge™ studies

Reap better SQL Server OLTP performance with next-generation Dell EMC PowerEdge MX servers

These new servers achieved up to 36.1 percent more OLTP database work than current-generation Dell EMC PowerEdge MX servers, while also lowering application response time

Achieve up to 36.1% more total OLTP work

Support up to 25% more VMs with same or better performance



When you need more computing power from your data center, upgrading to hardware with new processor technologies, architecture, and storage can be a great way to improve performance and get the most from precious space.

Our hands-on testing explored the amount of Microsoft SQL Server transaction-processing work that two VMware® vSAN™ workload clusters could achieve within the same MX7000 chassis. One workload cluster comprised current-generation 14G Dell EMC PowerEdge MX740c servers, and the other had new PowerEdge MX750c servers powered by 3rd Generation Intel® Xeon® Scalable Processors. The next-generation cluster achieved 36.1 percent more SQL Server transaction-processing work in terms of database orders per minute (OPM). At the same time, the current-generation cluster also reduced application response time by 8 percent compared to the previous-generation PowerEdge MX740c cluster.

These results indicate that by selecting next-generation servers in the same chassis, you could scale SQL Server performance within the same data center footprint.

Upgrade to achieve a greater OLTP transaction rate

Your company might rely on online transaction processing (OLTP) for retail sales, order entry, customer relationship management, or another type of activity. Business is booming, and along with growth comes increased demand on the servers that run your essential operations. You want new gear that can support your applications well today and into the future, when demand will hopefully be even greater. This makes it wise to choose a server solution that delivers a higher transaction rate.

We tested the next-generation Dell EMC PowerEdge MX750c against the current-generation Dell EMC PowerEdge MX740c in a VMware Cloud Foundation™ environment, using workload clusters. We used the DVD Store 3 benchmark to measure OLTP performance and application response time of two clusters:

- A cluster of three next-generation Dell EMC PowerEdge MX servers, each with Intel Xeon Gold 6330 processors, 512 GB of RAM, and four 3.2TB NVMe™ SSDs
- A cluster of three current-generation 14G Dell EMC PowerEdge MX servers, each with Intel Xeon Gold 6320 processors, 192 GB of RAM, and four 1.6TB NVMe SSDs

Because we configured the current-generation servers in a manner typical of the time of their release, the next-generation servers include faster processors, increased RAM and DIMM capacity, and two additional memory channels per socket with eight DDR4 channels. Also, while both configurations used PCIe 4.0 NVMe SSDs for storage, only the Intel chipset in the next-generation servers works at that speed, which is twice as fast as the 32Gb/s maximum of PCIe 3.0. We found that the new cluster not only delivered more orders per minute per VM and more total OPM, but it also improved application response time. (For complete details of our test systems and approach, see the science behind this report.)

About new-generation Dell EMC PowerEdge MX servers

Dell EMC calls the new PowerEdge MX a "modular, 7U integrated solution designed for enterprise data center density with easy deployment, management, and maximum longevity" and says its no midplane design and scalable fabric architecture allow it to support new processor technologies, storage types, and connectivity options.[1] Learn more at www.delltechnologies.com/en-us/servers/modular-infrastructure/poweredge-mx/.

What our test results showed

In the initial phase of our testing, we ran four virtual machines on each server in our three-node workload clusters, for a total of 12 VMs per cluster. Figure 1 shows the results: the next-generation servers delivered 180,462 OPM, which is 18.7 percent more than the 151,923 OPM the current-generation cluster achieved.

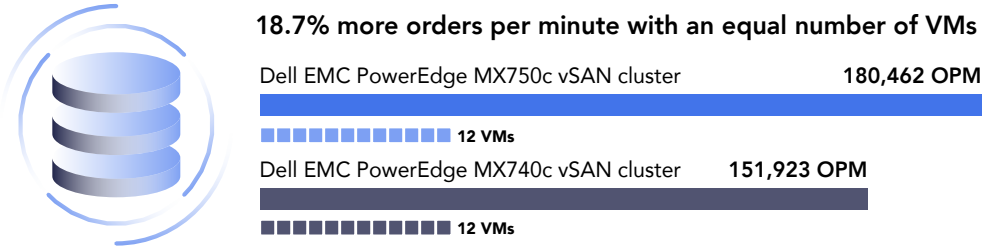


Figure 1: Total OPM the 2 clusters achieved with 4 VMs/node. Higher is better. Source: Principled Technologies.

During the first phase of testing, the next-generation cluster also achieved an average DVD Store 3 response time that was 18.4 percent less than that of the current-generation cluster.

During our first phase of testing, we pushed the current-generation servers to their peak performance, fully utilizing the processors. We observed that the same VM configuration on the next-generation cluster still had processor resources available. In our second phase of testing, we deployed one more virtual machine per host on the next-generation cluster, boosting VM density per node. This meant the next-generation cluster ran 15 VMs, a 25 percent increase over the 12 VMs on the legacy cluster. As Figure 2 shows, these additional VMs allowed the next-generation cluster to deliver 206,864 OPM, an increase of 36.1 percent over the current-generation cluster's 151,923 OPM.

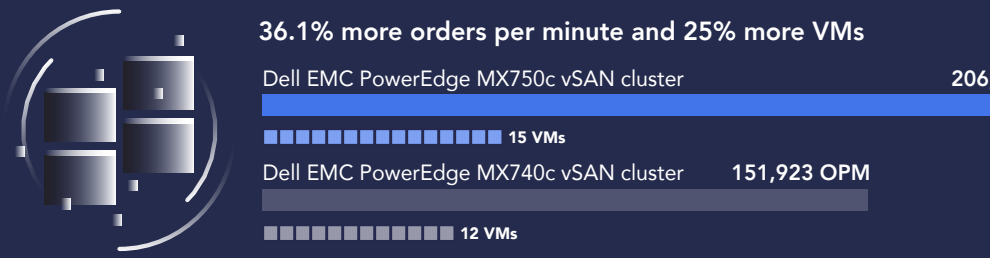


Figure 2: Total OPM the 2 clusters achieved with 5 VMs per node on the next-generation cluster and 4 VMs/node on the current-gen cluster. Higher is better. Source: Principled Technologies.

During the second phase of testing, the next-generation cluster also achieved an average DVD Store 3 response time that was 8.5 percent less than that of the current-generation cluster.

Table 1: Number of OPM each VM achieved. Source: Principled Technologies.

VMs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Avg.
Dell EMC PowerEdge MX740c vSAN cluster	12,438	13,170	13,166	12,385	12,459	13,094	11,771	12,652	12,593	12,767	12,732	12,696	NA	NA	NA	**12,660**
Dell EMC PowerEdge MX750c vSAN cluster (Phase 1)	15,391	15,141	15,585	15,199	15,088	14,805	14,749	14,772	14,497	15,076	14,997	15,162	NA	NA	NA	**15,038**
Dell EMC PowerEdge MX750c vSAN cluster (Phase 2)	14,018	14,010	13,487	13,831	13,350	15,277	13,228	13,054	15,205	12,744	13,413	13,404	14,014	14,247	13,582	**13,790**

What about deployment?

In a companion study to this one,[2] we learned that the process of deploying next-generation PowerEdge MX servers to an MX7000 chassis was identical to that of deploying current-generation servers. We were able to complete this process in 2.5 hours. If you want to reap the performance benefits we discuss in this report, rest assured that you won't offset them with a steep learning curve for your IT administrators.

Conclusion

When the demands of business require more computing power from your data center, it can be tempting to stick with the server models to which you've become accustomed. Choosing the right newer models, however, can deliver advantages in both transaction rate and response time.

In our hands-on testing, a VMware vSAN cluster of next-generation Dell EMC PowerEdge MX servers not only boosted total OLTP performance by more than a third over a cluster of current-generation models, but it also reduced application response time by 8.5 percent.

Investing in these new servers could provide the high-density environment you need to handle your current and future business demands.

1 Dell EMC PowerEdge MX, accessed March 22, 2021, https://www.delltechnologies.com/en-us/servers/modular-infrastructure/poweredge-mx/.

2 "Add next-generation Dell EMC PowerEdge MX servers to your VMware Cloud Foundation infrastructure with ease," accessed April 7, 2021, https://www.principledtechnologies.com/Dell/PowerEdge-MX-deployment-process-0421.pdf.

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

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This project was commissioned by Dell EMC.