



Upgrade transactional database performance with Dell PowerEdge R660 servers running VMware vSphere 8.0

In a VMware vSAN cluster, the latest-generation servers powered by 4th Generation Intel Xeon Scalable processors completed more orders per minute (OPM) than clusters of older servers

Online transactional processing (OLTP) performance can affect your ability to generate revenue, offer services, and support users. Replacing aging servers with a VMware vSAN™ cluster of latest-generation Dell™ PowerEdge™ R660 servers powered by 4th Generation Intel® Xeon® Scalable processors, or just adding the new servers to your data center, could boost OLTP workload performance to meet current or future needs.

We found that latest-generation Dell PowerEdge R660 servers processed more transactions for Microsoft SQL Server OLTP workloads running in a vSAN cluster. Compared to the performance of older Dell PowerEdge R650 or R640 servers in vSAN clusters at launch, the performance of the latest-generation servers could help your organization generate more revenue, offer more services, or expand your user base.



of the vSAN cluster using PowerEdge R640 servers



than the vSAN cluster using PowerEdge R650 servers

New features of the vSAN cluster using latest-generation Dell PowerEdge R660 servers

- New processors – 4th Generation Intel Xeon Scalable processors power latest-generation Dell EMC PowerEdge R660 servers and can potentially deliver more cores per processor than previous generations of Intel Xeon processors
- Robust memory capacity – Up to 8 TB of RDIMM; the servers support registered ECC DDR5 DIMMs only
- All-flash PCIe NVMe storage – Up to 184 TB of storage from 12 2.5-inch NVMe SSDs
 - NVMe drives can handle more operations per second than SATA SSDs to offer faster storage access and increased bandwidth
 - Support for higher-speed PCIe NVMe, which doubles the throughput per PCIe slot compared to legacy servers
- New versions of VMware vSphere – We installed version 8.0 of the hypervisor on the latest-generation servers

About the Dell PowerEdge R660

According to Dell, the 1U Dell EMC PowerEdge R660 is a full-featured enterprise server that aims to optimize demanding workloads and data center density.¹ The latest-gen server supports PCIe Gen4, NVMe[®] hardware RAID, up to 8 TB of RDIMM, Hot Plug BOSS controllers, and 4th Gen Intel Xeon Scalable processors. Dell also notes that the new Smart Flow chassis “optimizes airflow to support the highest core count CPUs in an air-cooled environment within the current IT infrastructure.”²



How we tested

Our testing measured the virtualized OLTP performance of a VMware vSAN cluster comprised of three latest-generation Dell PowerEdge R660 servers, each powered by two 4th Generation Intel Xeon Gold 6430 processors. Each server had two vSAN disk groups, and we set up each disk group with one NVMe[®] SSD in the cache tier and three NVMe SSDs in the capacity tier. The PowerEdge R660 cluster hosted 42 Microsoft SQL Server 2022 VMs (14 VMs per host), against which we ran iterations of an OLTP workload that we created with the benchmarking tool DVD Store 2 (DS2). We performed all testing remotely.

We compared the performance of the PowerEdge R660 server-based vSAN cluster to the performance of PowerEdge R650 and PowerEdge R640 server-based clusters from a previous study that we published in June 2021 (visit <http://facts.pt/MbQ1xCy>).³ The configurations of the PowerEdge R650 and R640 solutions contrasted with the PowerEdge R660 solution in the following ways:

- Two 3rd Generation Intel Xeon Gold 6330 processors powered each of the three Dell PowerEdge R650 servers. Each server had two vSAN disk groups, and we set up each disk group with one NVMe SSD in the cache tier and three NVMe SSDs in the capacity tier.
- Two Intel Xeon Gold 6230 processors powered each of the three Dell EMC PowerEdge R640 servers. Each server had two vSAN disk groups, and we set up each disk group with one NVMe SSD in the cache tier and three SATA SSDs in the capacity tier.

The latest-generation PowerEdge R660 servers used 1,024 GB of RAM and ran VMware vSphere[®] 8.0. The servers from the PowerEdge R650 study also used 1,024 GB of RAM but ran vSphere 7.0 Update 2. The servers from the PowerEdge R640 study used 256 GB of RAM and ran vSphere 6.7.

For more information on the server configurations and our testing, see the [science behind the report](#).

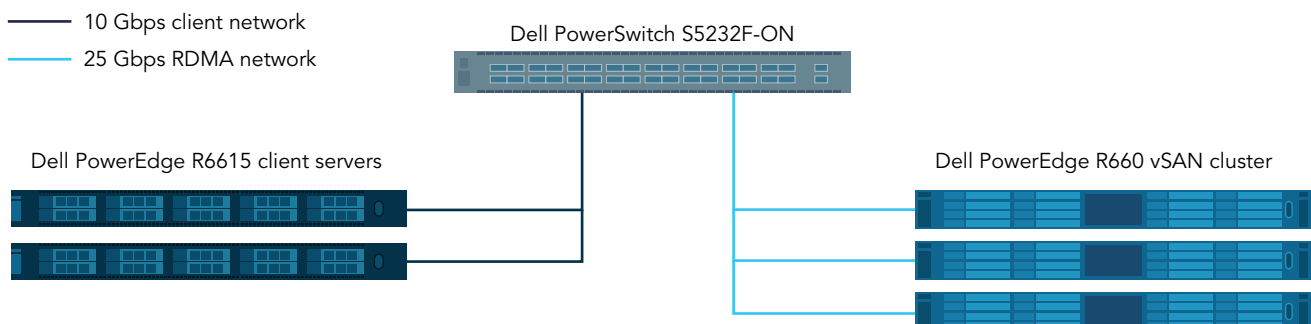


Figure 1: Our testbed. Source: Principled Technologies.

Generate more revenue with greater application delivery capacity

When we ran our OLTP database workload on the Dell PowerEdge R660 server-based vSAN cluster, we saw significantly better performance for the solution powered by 4th Generation Intel Xeon Scalable processors versus the older solutions. The latest-generation servers delivered 17 percent more orders per minute (OPM) than the previous-generation PowerEdge R650 solution and 2.3 times the OPM of the older PowerEdge R640 solution. Based on these outputs, a vSAN cluster of latest-generation PowerEdge R660 servers with 4th Generation Intel Xeon Scalable processors could help organizations handle more ecommerce orders now and in the future.

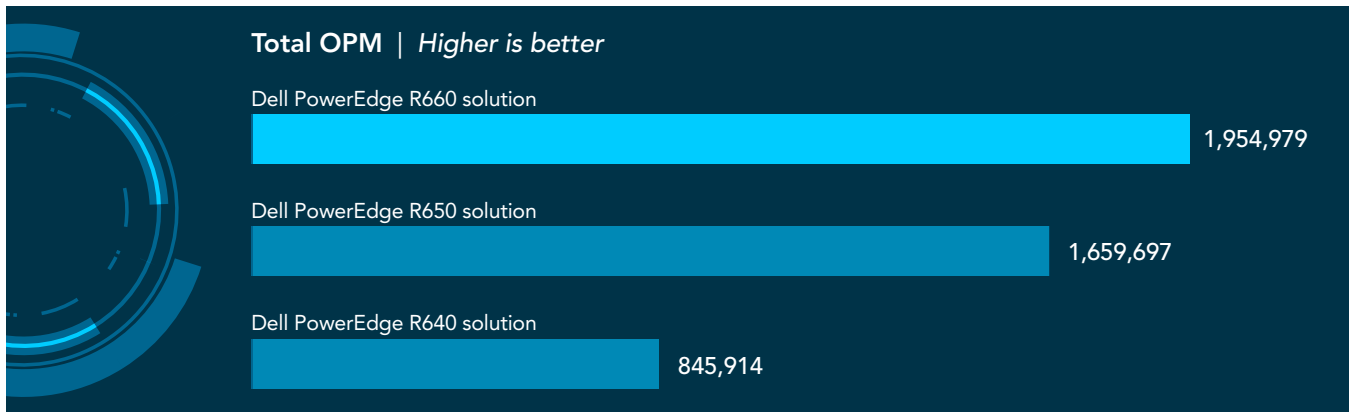


Figure 2: Total OPM each solution achieved while running the OLTP workloads against SQL Server 2022 VMs. Higher is better. Source: Principled Technologies.

About DVD Store 2

DVD Store 2 simulates customers creating accounts, logging in, searching for items, and placing orders to an ecommerce website. It is available for MySQL, Microsoft SQL Server, Oracle®, and PostgreSQL databases.

To learn more about OPM and other information specific to our benchmark workloads, visit the DVD Store 2 website at <https://github.com/dvdstore/ds21>.

About the 4th Generation Intel Xeon Scalable processors

According to Intel, its strategy for 4th Gen Intel Xeon Scalable processors “aligns CPU cores with built-in accelerators optimized for specific workloads and delivers increased performance at higher efficiency for optimal total cost of ownership.”⁴

The processors deliver “a range of features for managing power and performance, making the best use of CPU resources to achieve key sustainability goals. In addition, the Xeon CPU Max and the Max Series GPU add high-bandwidth memory and maximum compute density to solve the world’s most challenging problems faster.”⁵



About VMware vSphere 8.0

vSphere is an enterprise compute virtualization program that aims to bring “the benefits of cloud to on-premises workloads” by combining “industry-leading cloud infrastructure technology with data processing unit (DPU)- and GPU-based acceleration to boost workload performance.”⁶ This latest version introduces the vSphere Distributed Services Engine, which enables organizations to distribute infrastructure services across compute resources available to the VMware ESXi™ host and, for systems with DPUs, offload networking functions to the DPU.⁷

Conclusion

If the performance of your Microsoft SQL Server workloads has diminished over time or just cannot keep up with the growing demands of your organization, then new servers could help you rectify those problems. In our transactional database testing, a VMware vSAN cluster of latest-generation Dell PowerEdge R660 servers with 4th Generation Intel Xeon Scalable processors outperformed clusters of the servers’ two most recent predecessors. The latest-generation solution handled 17 percent more OPM than the PowerEdge R650 server cluster and 2.3 times the OPM of the PowerEdge R640 cluster.

1. Dell, “Dell PowerEdge R660,” accessed March 9, 2023, <https://www.delltechnologies.com/asset/en-in/products/servers/technical-support/poweredge-r660-spec-sheet.pdf>.
2. Dell, “Dell PowerEdge R660.”
3. Principled Technologies, “Dell EMC PowerEdge R650 servers running VMware vSphere 7.0 Update 2 can boost transactional database performance to help you become future ready,” accessed January 10, 2023, <https://www.principledtechnologies.com/Dell/PowerEdge-R650-vs-previous-generation-OPM-0621.pdf>.
4. Intel, “4th Gen Intel Xeon Scalable Processors,” accessed January 26, 2023, <https://www.intel.com/content/www/us/en/newsroom/resources/press-kit-4th-gen-intel-xeon-scalable-processors.html>.
5. Intel, “4th Gen Intel Xeon Scalable Processors.”
6. VMware, “VMware vSphere,” accessed January 12, 2023, <https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/vsphere/vmw-vsphere-datasheet.pdf>.
7. VMware, “Introducing VMware vSphere Distributed Services Engine and Networking Acceleration by Using DPUs,” accessed January 12, 2023, <https://docs.vmware.com/en/VMware-vSphere/8.0/vsphere-esxi-installation/GUID-EC3CE886-63A9-4FF0-B79F-111BCB61038F.html>.

Read the science behind this report at <https://facts.pt/OUyW6Dw> ►



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This project was commissioned by Dell Technologies.