



Dell EMC™ PowerEdge™ studies

## Analyze more data, faster, by upgrading to latest-generation Dell EMC PowerEdge R750 servers

Two test cases using latest-generation Dell EMC PowerEdge R750 servers, powered by 3rd Generation Intel Xeon Scalable processors and featuring a Dell PERC H755N front NVMe RAID controller, performed more data analysis and in less time than two older servers

Data analytics can allow you to learn more about your organization and find areas for improvement, optimization, and growth. Running those workloads on Dell EMC™ PowerEdge™ R750 servers could boost the speed and quantity of data analysis, which could lead to getting key business insights sooner.

At Principled Technologies, we assessed the data warehouse capabilities of three Dell EMC PowerEdge server models: A PowerEdge R730xd, a previous-generation PowerEdge R740xd, and a latest-generation PowerEdge R750 powered by 3rd Generation Intel® Xeon® Scalable processors. The PowerEdge R750 analyzed more data than either older server and needed less time to do so. Processing more data and saving time while doing it could allow you to attain key business metrics faster while maintaining a competitive edge.

The 3rd Generation Intel Xeon Scalable processor-powered Dell EMC PowerEdge R750 server included the new Dell PERC H755N front NVMe™ RAID controller, which allows the server to combine high-performance NVMe storage in RAID configurations. Until now, servers primarily provided data protection for NVMe drives with software solutions, which could potentially create additional work for the server's CPUs.



**Improve data analytics performance and get results faster**

Complete 8X the analytics in 39% less time with 16 VMs

vs. a PowerEdge R730xd with 2 VMs, all it could handle with this workload

Complete more analytics in 17% less time with 60% more VMs

vs. a PowerEdge R740xd with 10 VMs, all it could handle with this workload



**Get results even faster while maintaining <70% CPU utilization**

Complete 6X the analytics in 47% less time with 12 VMs

vs. a PowerEdge R730xd with 2 VMs, all it could handle with this workload

## About the new Dell PERC H755N front NVMe RAID controller in latest-generation Dell EMC PowerEdge R750 servers

RAID controllers can combine the physical disks of a server into logical units and manage them. They apply RAID levels that allow storage to offer data redundancy, workload performance enhancements, or both. The new Dell PERC H755N Front RAID controller in Dell EMC PowerEdge R750 servers can allow the servers to access high-performance NVMe PCIe Gen4 storage with data redundancy.

### Finding insight with data analytics

Analytics software can extract valuable insight from your organization's data. Analytics work can take intense server power, though, and five-to-ten-year-old servers in your data center may not perform as well as you'd want when dealing with modern data analytics demands. By upgrading to 3rd Generation Intel Xeon Scalable processor-powered Dell EMC PowerEdge R750 servers featuring PERC H755N front NVMe RAID controllers and NVMe drives, your organization could meet today's data analytics demands as well as prepare for an expansion of that work in the future. Our results show that the latest-generation PowerEdge R750 handled more analytics query sets than the older servers and performed that work in less time.

### How we tested

In the Principled Technologies data center, we used a workload comprised of 22 data analytics queries from the benchmarking tool HammerDB. We created VMs on the latest-generation Dell EMC PowerEdge R750 server and set up one workload on each. IT organizations often target maximum server processor utilization at 70 percent, so we increased the VM count to hit that level without exceeding it, at which point we had 12 VMs with 68 percent CPU utilization. Then, to get a sense of what performance was possible without that processor utilization cap, we increased the VM count to 16 and saw 78 percent processor utilization.

We used the same workload in a previous study where we tested Dell EMC PowerEdge R740xd, PowerEdge R730xd, and PowerEdge R720 servers.<sup>1</sup> Note that the time to complete queries depends on many factors, including the type of query and the size of the database.

### About the Dell EMC PowerEdge R750

Dell Technologies considers the 3rd Generation Intel Xeon Scalable processor-powered Dell EMC PowerEdge R750 to be a rack server that addresses "application performance and acceleration."<sup>2</sup> The dual-socket, 2U server can support eight channels of memory per CPU and up to 32 DDR4 DIMMs at 3,200 MT/s speeds. The new H755N front NVMe RAID controller in the latest-generation server is particularly helpful because the server supports PCIe Gen 4 and up to 24 NVMe drives.

To learn more about the Dell EMC PowerEdge R750, visit <https://www.dell.com/en-us/work/shop/povw/poweredge-R750>.



## About 3rd Generation Intel Xeon Scalable processors

According to Intel, 3rd Generation Intel Xeon Scalable processors are “[o]ptimized for cloud, enterprise, HPC, network, security, and IoT workloads with 8 to 40 powerful cores and a wide range of frequency, feature, and power levels.”<sup>3</sup> Intel continues to offer many models from the Platinum, Gold, Silver, and Bronze processor lines that were “designed through decades of innovation for the most common workload requirements.”<sup>4</sup>

For more information, visit <http://intel.com/xeonscalable>.

## Our results

The previous study, available at <http://facts.pt/6yh586b>, aimed to show how a company’s analytics work could benefit by upgrading from older servers to a Dell EMC PowerEdge R740xd server with newer components. We’ve continued that work in this study with the latest-generation Dell EMC PowerEdge R750 server, comparing its analytics performance results to those we found in the previous study. Thanks in part to its 3rd Generation Intel Xeon Scalable Gold processors and a RAID controller that supports hardware RAID configurations of PCIe Gen4 NVMe 4.0 drives, the latest-generation PowerEdge R750 servers show strong performance improvements compared to PowerEdge R740xd and R730xd models. Note: We did not include the PowerEdge R720 results from the previous study in this report because we assume those servers play a diminished role in today’s data centers.

### Run more data warehouse workloads

We ran the workload on as many VMs as each server could handle. Thus, the servers that supported more VMs also could handle more workloads.

In our previous study, a PowerEdge R730xd server supported just 2 VMs before its performance decreased dramatically. Compared to the seven-year-old PowerEdge R730xd, the PowerEdge R750 running 16 VMs completed eight times the work and running 12 VMs completed six times the work.

The previous-generation PowerEdge R740xd server from our previous study, which had NVMe SSDs in a Microsoft Storage Spaces configuration, was more capable than the PowerEdge R730xd, supporting 10 VMs before it showed signs of saturation. Compared to the PowerEdge R740xd, the latest-generation PowerEdge R750 ran 60 percent more work when handling 16 VMs. Supporting 12 VMs, the latest-generation server did 20 percent more work than the PowerEdge R740xd server. Figure 1 shows the VM quantity each solution supported while running our query workload.



Figure 1: VM count for each solution. Each VM ran one workload of 22 queries. Higher is better. Source: Principled Technologies.

### Number of VMs

Dell EMC PowerEdge R750 solution - 16 VMs

16 VMs

Dell EMC PowerEdge R750 solution - 12 VMs

12 VMs

Dell EMC PowerEdge R740xd solution

10 VMs

Dell EMC PowerEdge R730xd solution

2 VMs



## About HammerDB

We tested each server with a TPC-H-like data warehouse workload from the HammerDB suite of benchmarks. Our test results do not represent official TPC results and are not comparable in any manner.

For more information on the HammerDB benchmark suite, visit their website at [www.hammerdb.com](http://www.hammerdb.com).

## See results from data analytics workloads sooner

Having data center resources that allow users to do more work is great—it allows IT decision makers to consider consolidating workloads onto fewer servers or increasing a data center’s virtual density without increasing its physical footprint. Speed, however, plays a crucial role in seeing insight sooner. The two VMs on the PowerEdge R730xd took an average of 4 minutes and 53 seconds to complete the workload. While the previous-generation PowerEdge R740xd was faster (completing its 10 sets of 22 queries in 3 minutes and 20 seconds on average), both configurations of the latest-generation PowerEdge R750 managed to complete more workloads in even less time than either of the two older servers.

The latest-generation server completed 16 sets of queries at an average pace of 2 minutes and 45 seconds per workload, 39 percent less time than the PowerEdge R730xd and 17 percent less time than the PowerEdge R740xd. With 12 sets of queries, the latest-generation server completed the workload at an average pace of 2 minutes and 24 seconds per workload, 47 percent less time than the PowerEdge R730xd and 28 percent less time than the PowerEdge R740xd. Figure 2 illustrates our findings for this study and compares them to select findings from the previous study.

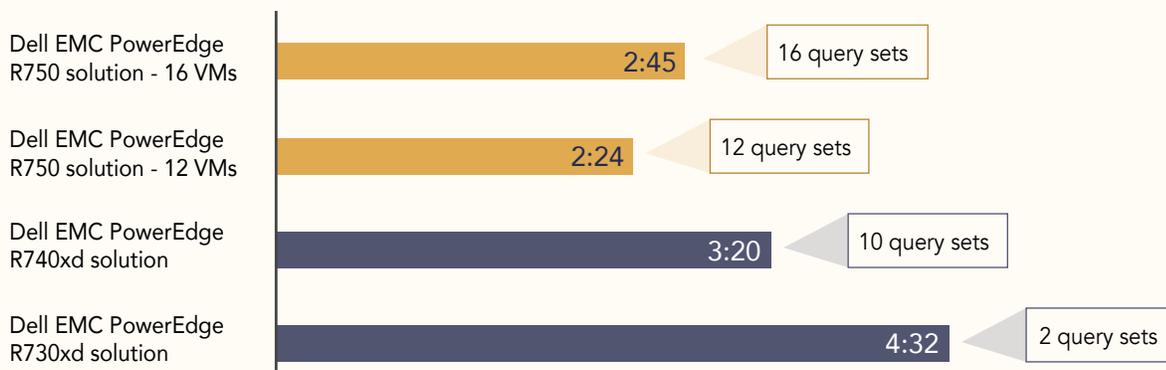


Figure 2: Time to complete data analytics queries in minutes and seconds. Lower times are better. Source: Principled Technologies.

### Average time to complete data analytics queries

*min:sec*

*Lower is better*





## Conclusion

To get timely insight from your data analytics, you'll likely want to run those workloads quickly. Upgrading aging servers in your data center could unlock performance improvements from faster server components and new technologies. In our data center, a latest-generation Dell EMC PowerEdge R750 server with a Dell PERC H755N front NVMe RAID controller and powered by 3rd Generation Intel Xeon Scalable processors completed 16 data analytics workloads in up to 39 percent less time than older Dell EMC PowerEdge R740xd and PowerEdge R730xd servers. In addition, the latest-generation server completed 12 data analytics workloads on as many VMs in even less time than either older server—up to 47 percent less—while maintaining lower CPU utilization levels (68 percent). Upgrading to the latest-generation Dell EMC PowerEdge R750 server can help you run more analytics workloads and get results faster.

- 1 Principled Technologies, "Achieve more analytics work, faster, with the Dell EMC PowerEdge R740xd," accessed May 7, 2021, <https://www.principledtechnologies.com/Dell/PowerEdge-R740xd-analytics-comparison-0719.pdf>.
- 2 Dell Technologies, "Dell EMC PowerEdge R750: Spec Sheet," accessed May 7, 2021, [https://i.dell.com/sites/csdocuments/Product\\_Docs/en/poweredge-R750-spec-sheet.pdf](https://i.dell.com/sites/csdocuments/Product_Docs/en/poweredge-R750-spec-sheet.pdf).
- 3 Intel, "3rd Gen Intel® Xeon® Scalable Processors," accessed May 7, 2021, <https://www.intel.com/content/www/us/en/products/docs/processors/xeon/3rd-gen-xeon-scalable-processors-brief.html>.
- 4 Intel, "Intel® Xeon® Scalable Processors," accessed May 7, 2021, <https://intel.com/xeonscalable>.

Read the science behind this report at <http://facts.pt/fTdo0QN> ►



Facts matter.®

Principled Technologies is a registered trademark of Principled Technologies, Inc. All other product names are the trademarks of their respective owners. For additional information, review the science behind this report.

This project was commissioned by Dell EMC.