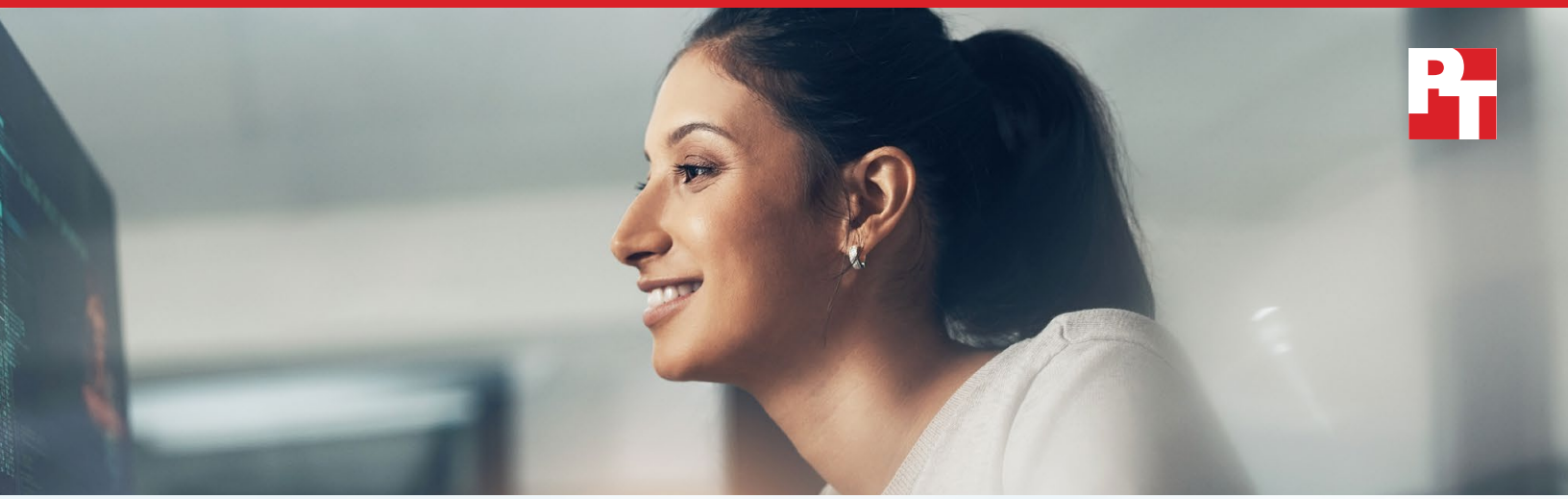

Run more data analysis more quickly using Dell PowerEdge R760 servers

The latest-generation Dell PowerEdge R760 server, powered by 4th Generation Intel Xeon Scalable processors, performed more data analysis in less time than either older server we tested

Insight from data analytics can translate into timely decision-making and a better understanding of operations. By adding latest-generation Dell™ PowerEdge™ R760 servers to your data center, or replacing aging servers with them, you could run data analysis workloads faster to gain insights sooner.

At Principled Technologies, we assessed the data warehouse capabilities of three Dell PowerEdge server models: a latest-generation PowerEdge R760 powered by 4th Generation Intel® Xeon® Scalable processors, a previous-generation PowerEdge R750, and a PowerEdge R740xd. The PowerEdge R760 analyzed more data than either older server and needed less time to do so, which can help you get key business metrics sooner while maintaining a competitive edge.

Improve data analytics performance and get results faster

Complete 2x the analytics work with twice as many VMs in

41% less time

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

Complete 25% more analytics work with 25% more VMs in

29% less time

vs. a PowerEdge R750 with 16 VMs, all it could handle with this workload

Finding insight with data analytics

Workloads that use analytics software can take intense server power, and five-to-ten-year-old servers in your data center might not perform as well as you'd want when dealing with modern data analytics demands. By upgrading to 4th Generation Intel Xeon Scalable processor-powered Dell PowerEdge R760 servers, 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 R760 handled more analytics query sets than either of the older servers and performed that work in less time.

How we tested

We used a workload comprised of 22 data analytics queries from the benchmarking tool HammerDB. We created Microsoft Hyper-V VMs with Windows Server 2022 on the latest-generation Dell PowerEdge R760 server and set up one workload on each that used Microsoft SQL Server 2022 databases. To determine the maximum number of VMs the server could support, we scaled up the number of VMs in pairs until we hit a limit of available system resources (e.g., storage capacity, memory, or processor utilization) without oversubscribing. We reached storage capacity and processor utilization limits impacting performance at 22 VMs, which told us the server comfortably supported 20 VMs. We performed all testing remotely.

We used the same workload and test approach in a previous study where we tested Dell PowerEdge R750 and R740xd servers.[1] 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 PowerEdge R760

The 2U Dell EMC PowerEdge R760 rack server features up to two 4th Generation Intel® Xeon® Scalable processors with up to 56 cores per processor to support "demanding workloads including artificial intelligence, database analytics, and high-density virtualization."[2]

Key features of the Dell PowerEdge R760 include:

- Up to 2 x 300W (dual width) or 6 x 75W (single width) GPUs
- Up to 28 storage drives, including 24 NVMe direct-attached drives and 32 DDR5 DIMMs of memory
- Flexible I/O options, with up to 8 x PCIe Slots and optional 2 x 1GbE LOM + 1 x OCP 3.0 slots
- Dell OpenManage systems management platform for automated deployment, updates, and maintenance (features depend on license)
- Dell Smart Flow design and OpenManage Enterprise Power Manager 3.0 (with license) to improve energy efficiency

For more PowerEdge R760 details, visit https://www.dell.com/en-us/shop/cty/pdp/spd/poweredge-r760.

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."[3]

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."[4]

Our results

A June 2021 study, available at https://facts.pt/poJUNRK, aimed to show how a company's analytics work could benefit by upgrading from older servers to Dell PowerEdge R750 servers with newer components. We've continued that work in this study with the latest-generation Dell PowerEdge R760 server, comparing its analytics performance results to those we found in the previous study. Thanks in part to its 4th Generation Intel Xeon Scalable Platinum 8452Y processors, the latest-generation PowerEdge R760 servers show strong performance improvements compared to PowerEdge R750 and R740xd models.

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 R740xd server supported just 10 VMs. Compared to the seven-year-old PowerEdge R740xd, the PowerEdge R760 running 20 VMs completed twice as much work.

The PowerEdge R750 server from our previous study was more capable than the PowerEdge R740xd, supporting 16 VMs before it showed signs of saturation. Compared to the PowerEdge R750, the latest-generation PowerEdge R760 ran 25 percent more work, handling 20 VMs. Figure 1 shows the VM count each solution supported while running our query workload.

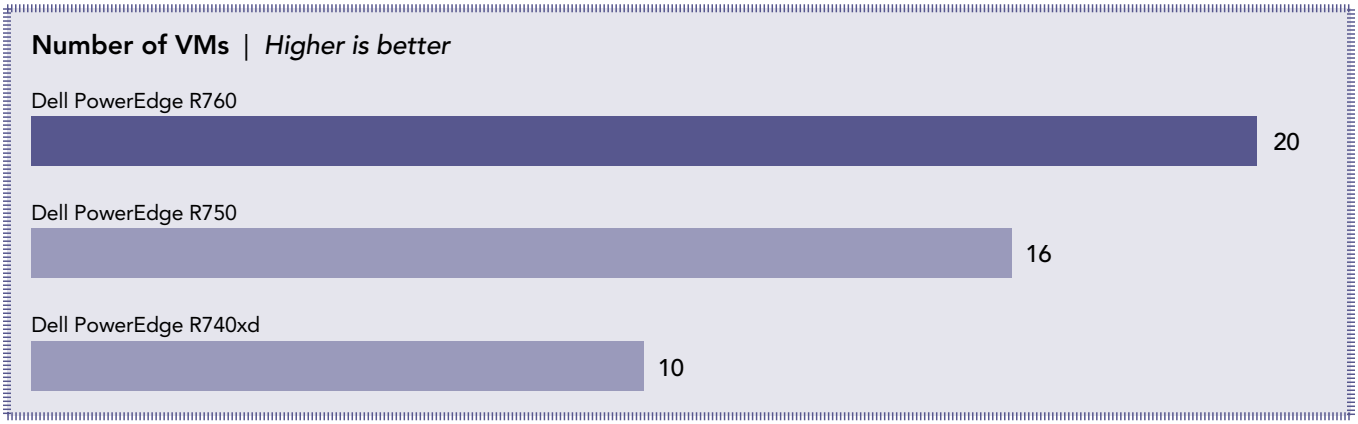

Figure 1: VM count for each solution. Each VM ran one workload of 22 queries. Higher is better. Source: Principled Technologies.

About HammerDB

We tested each server with a TPROC-H data warehouse workload from the HammerDB suite of benchmarks. This is an online analytics processors (OLAP) workload that measures the time VMs require to analyze a stream of 22 serialized database queries. While the HammerDB developers derived TPROC-H from the TPC-H specification, the workload is not a full implementation of the TPC-H standard. For this reason, our test results are not official TPC results and are not comparable to them in any manner.

For more information on the HammerDB benchmark suite, visit their website at www.hammerdb.com.

See results from data analytics workloads sooner

Having data center resources that allow users to do more work is helpful—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. In addition, speed plays a crucial role in unlocking insights sooner, and in our tests, newer hardware delivered this speed.

From generation to generation, not only did the number of query sets each server could run increase along with the number of VMs, but the time required to run them decreased. Each of the 10 VMs on the PowerEdge R740xd took an average of 3 minutes and 20 seconds to complete the queries, while each of the 16 VMs on the previous-generation PowerEdge R750 averaged 2 minutes and 45 seconds. As Figure 2 shows, each of the 20 VMs on the latest-generation PowerEdge R760 took even less time to execute the set of queries, only 1 minute and 57 seconds on average. This is 29 percent less time than the PowerEdge R750 and 41 percent less time than the PowerEdge R740xd.

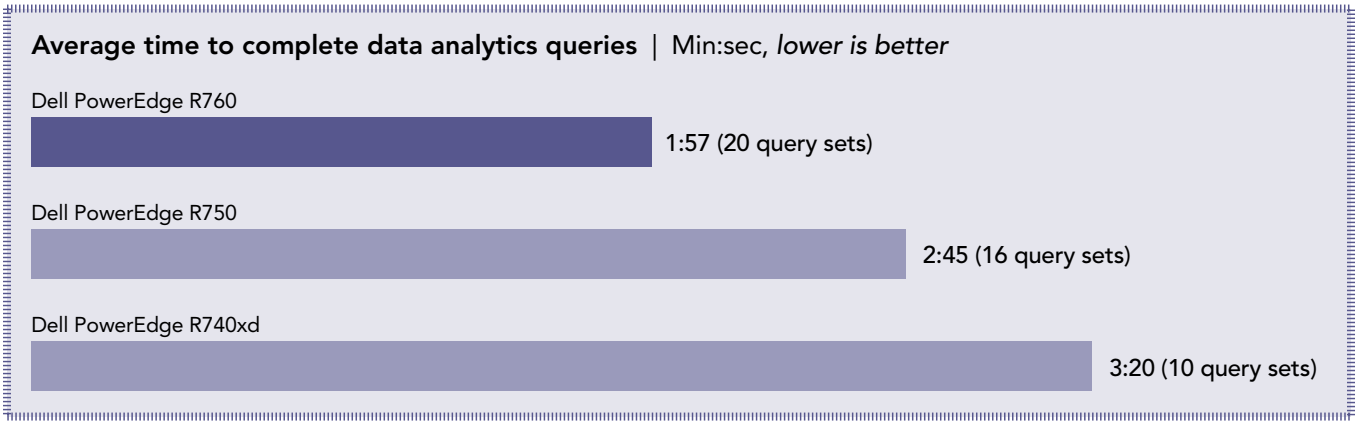

Figure 2: Time to complete data analytics queries in minutes and seconds. Lower times are better. Source: Principled Technologies.

Conclusion

Data analytics can play a critical role in understanding your organization. With timely data analysis, decision-makers can respond to trends or activity quickly and with the support of data-driven insight. New Dell PowerEdge R760 servers, either in addition to or in place of aging servers, can boost data warehouse workload performance to deliver insights sooner. In our testing, a latest-generation Dell PowerEdge R760 server powered by 4th Generation Intel Xeon Scalable processors completed 20 data analytics workloads in up to 41 percent less time than older Dell PowerEdge R750 and PowerEdge R740xd servers.

---

1. Principled Technologies, "Analyze more data, faster, by upgrading to latest-generation Dell EMC PowerEdge R750 servers," accessed January 11, 2023, http://facts.pt/poJUNRK. This report includes data from a report published in July 2019.
2. Dell, "Dell PowerEdge R760," accessed February 16, 2023, https://www.dell.com/en-us/shop/cty/pdp/spd/poweredge-r760.
3. 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.
4. Intel, "4th Gen Intel Xeon Scalable Processors.

Read the science behind this report at https://facts.pt/dTeAiV6 ▶

Principled Technologies®

Facts matter.®

This project was commissioned by Dell Technologies.