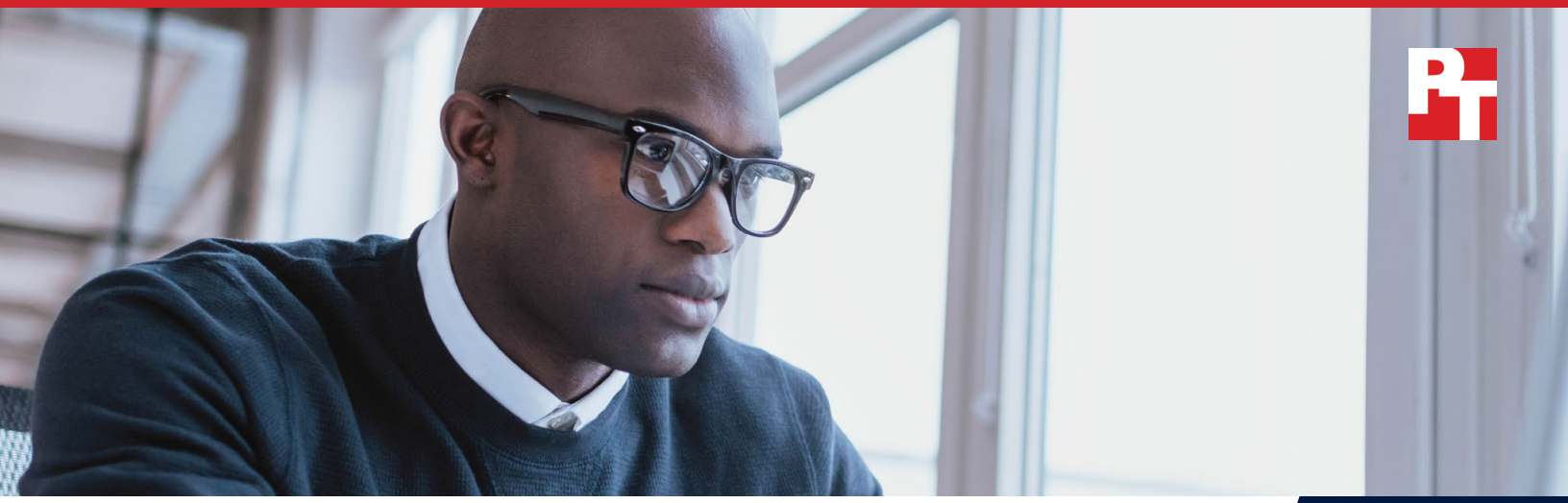


Better meet your Oracle database users' needs with a Dell EMC and HGST solution

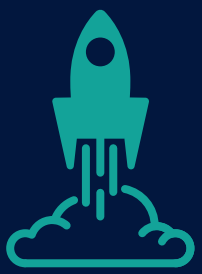
A Dell EMC PowerEdge R740xd with HGST Ultrastar SS300 SAS SSDs executed more Oracle database work with lower latency than a legacy solution with SATA SSDs

Organizations of all types rely heavily on their database servers for everyday work. For these businesses, a high-performing solution is critical for success. If your company is still relying on previous-generation hardware, you could benefit from a refresh to a newer, faster solution that can handle a heavier workload.

In the Principled Technologies datacenter, we set up two solutions: a new Dell EMC™ PowerEdge™ R740xd server with HGST Ultrastar® SAS SSDs and an older Dell EMC PowerEdge R730xd server with SATA SSDs. To test the database performance capabilities of the two solutions, we ran Oracle® databases in eight Microsoft® Hyper-V® virtual machines on each and then used an Oracle input/output (I/O) workload generator to simulate database activity.

The new R740xd servers with HGST SAS SSDs delivered 2.6 times as many input/output (I/O) operations per second (IOPS) as the older servers did, which means you can meet the needs of more users. It also reduced latency dramatically, which means users enjoy a speedier response time.

Whether your company uses transactional databases for customer management, inventory tracking, human resources, or other purposes altogether, it's important that the hardware supporting these applications has to deliver. If you're using previous-generation hardware, refreshing to a new Dell EMC and HGST solution will let you provide a better experience for more users—in the same amount of space. Sounds like a winning proposition.



Meet the needs of more simultaneous users

2.6X the IOPS

Respond to users' needs more quickly

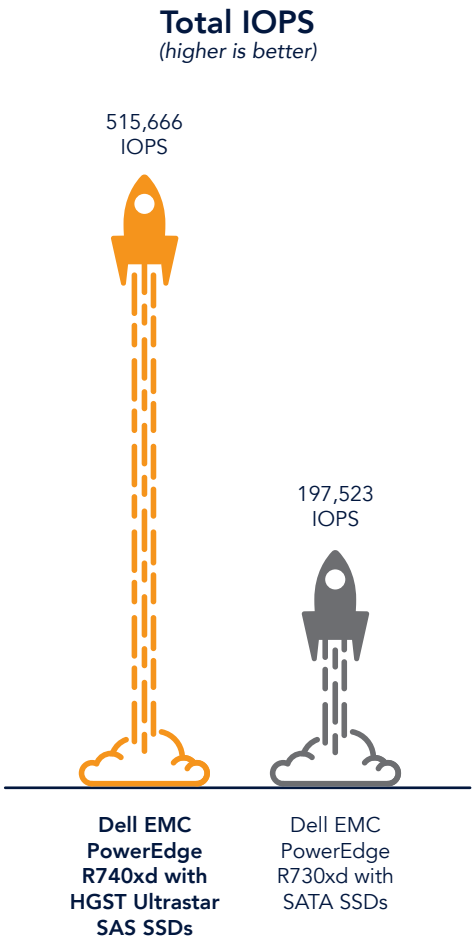
Up to 95% lower latency

What are IOPS and why do I care?

Databases are the engines behind many business operations—both external activities involving customers and internal ones such as inventory and HR. Databases store information, which applications access using read operations and add to using write operations. The disks, whose performance we can measure in disk-level IOPS, handle many of these operations. When a server and its internal storage can handle more of these IOPS while maintaining acceptable response times, it provides greater value.

As the volume of information that companies must handle explodes, the importance of speedy, high-performing storage grows as well. Measuring I/O provides a helpful window into what different storage choices can deliver.

To see how our two solutions fared, we created eight VMs running Oracle databases on each solution. We then used a tool that generates a heavy 75/25 read/write workload on these databases. As the chart to the right shows, the Dell EMC PowerEdge R740xd server with HGST Ultrastar SS300 SAS SSDs delivered 2.6 times the total IOPS of the Dell EMC PowerEdge R730xd server with SATA SSDs. Regardless of the activities your users are performing, this differential means you can support more of them with the Dell EMC and HGST solution.



About HGST Ultrastar SS300 SAS SSDs

According to HGST, the Ultrastar SS300 SSD draws on "decades of proven enterprise storage expertise in Serial Attached SCSI (SAS) design, reliability, firmware, customer qualification and system integration."[1]

Highlights of the Ultrastar SS300 include the following:

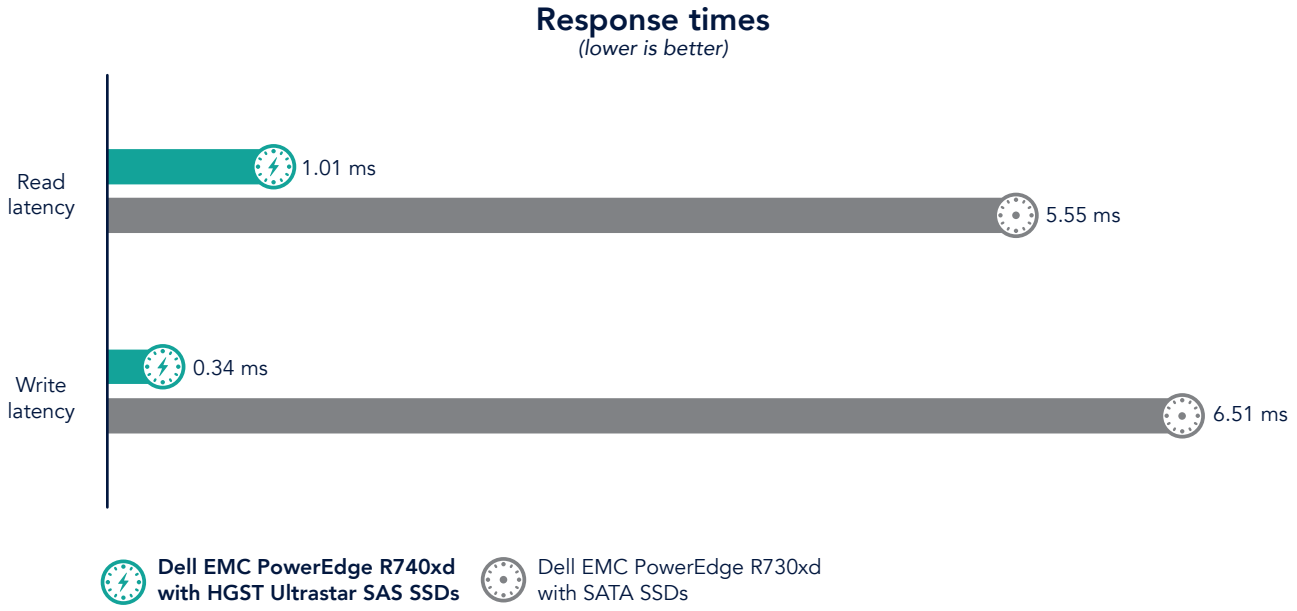
- small 2.5-inch form factor
- 12Gb/s SAS interface for maximum throughput
- sequential throughput up to 2100MB/s read at 14W power
- capacities ranging from 400 GB to 7.68 TB
- enterprise-grade 3D MLC or TLC NAND Flash memory for ultra-high performance and endurance
- advanced power loss data management technology

The Ultrastar SS300 SSD we used in our testing had an 800GB capacity and 3D MLC Flash memory. You can learn more about Ultrastar SS300 SAS SSDs at https://www.hgst.com/products/solid-state-solutions/ultrastar-ss300.

How does response time factor into the equation?

For a server-and-storage solution to be able to process IOPS at a high rate is clearly advantageous, but it's essential to consider the win alongside response time, or latency. If users must wait an unacceptably long time for a response, high IOPS become meaningless.

In our testing, the Dell EMC PowerEdge R740xd server with HGST Ultrastar SS300 SAS SSDs achieved much higher IOPS performance while simultaneously reducing response times. For read operations, latency on the Dell EMC and HGST solution was less than one-fifth of what it was on the older solution—one millisecond vs. more than five milliseconds. The improvement in write operations was even more pronounced, with the newer solution cutting response times from six-plus milliseconds to less than one millisecond—a reduction of 95 percent.



About the Dell EMC PowerEdge R740xd

The 2U, two-socket, 14th generation Dell EMC PowerEdge R740xd rack server comes in a variety of storage configurations. The R740xd supports up to 24 NVMe SSDs, but in this study, we highlighted the strong database performance the server could achieve with just four HGST Ultrastar SS300 SAS SSDs. Learn more about the PowerEdge R740xd and other PowerEdge servers at DellEMC.com/servers.

Conclusion

Whether your company uses Oracle or a different database platform, you rely on these applications to keep business running smoothly. The volume of data they hold is likely to increase—steadily if not exponentially—and your users' expectations are likely to rise as well. A server-and-storage solution that was once good enough probably won't remain that way for long.

Our testing revealed the improvements you can expect to see from refreshing a previous-generation Dell EMC PowerEdge R730xd server with SATA SSDs to a new R740xd server outfitted with four HGST Ultrastar SS300 SAS SSDs: Total Oracle IOPS more than doubled, while response times shrank by more than four-fifths.

To provide a growing number of users accessing a growing volume of data with an improved experience, the Dell EMC PowerEdge R740xd with HGST Ultrastar SS300 SAS SSDs has what it takes.

1 HGST Ultrastar SS300 data sheet, accessed August 1, 2018, https://www.hgst.com/sites/default/files/resources/UltrastarSS300-datasheet.pdf

Read the science behind this report at http://facts.pt/0ztag4 ▶

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