Executive summary

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 operations per second (IOPS) as the older servers did, which would allow you to meet the needs of more users. It also reduced latency dramatically, which means users would 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 can 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.
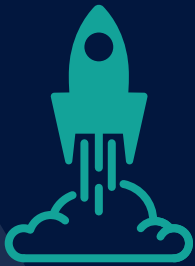
Meet the needs of more simultaneous users

2.6X the IOPS

Respond to users' needs more quickly

Up to 95% lower latency

What are IOPS and why do I care?

Databases drive 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. Measuring I/O offers a helpful window into what different storage choices can deliver.
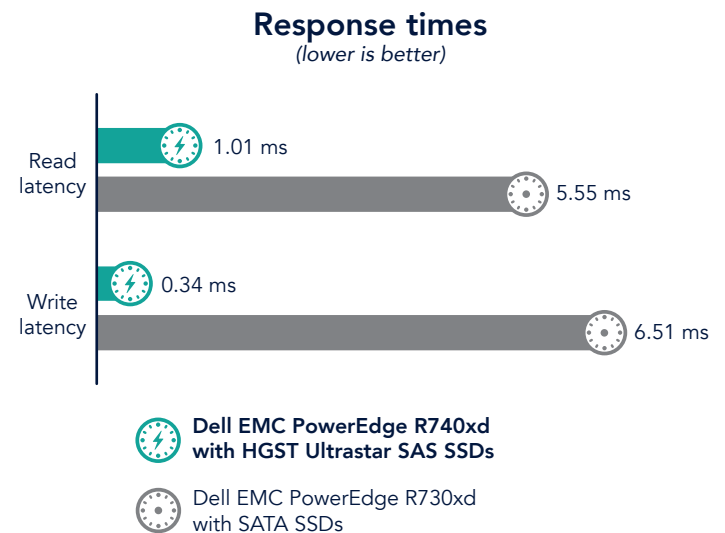
We created eight VMs running Oracle databases on each solution. We then used a tool that generates a heavy 75/25 read/write workload on these databases. The Dell EMC PowerEdge R740xd server with HGST Ultrastar SS300 SAS SSDs delivered 2.6 times the total IOPS of the Dell EMC PowerEdge R730xd server with SATA SSDs. This differential means you may be able to support more users with the Dell EMC and HGST solution.

Total IOPS
(higher is better)

515,666 IOPS

197,523 IOPS

Dell EMC PowerEdge R740xd with HGST Ultrastar SAS SSDs

Dell EMC PowerEdge R730xd with SATA SSDs
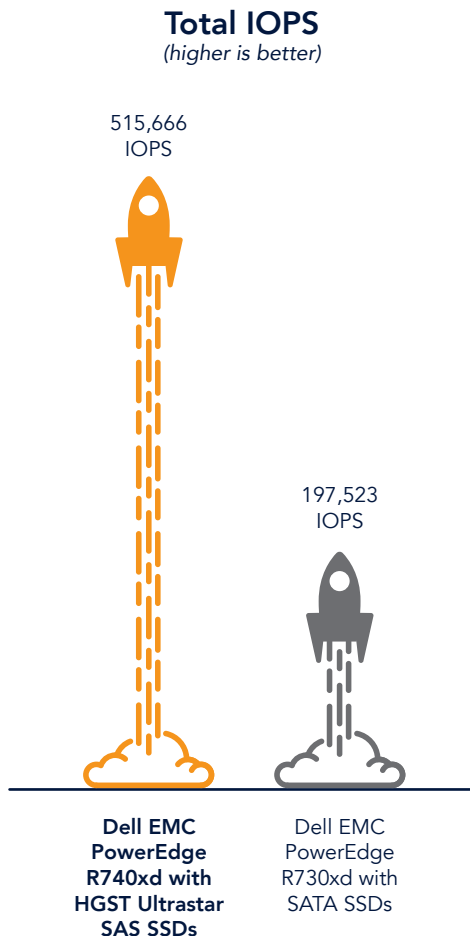
This project was commissioned by Dell Technologies.

How does response time factor into the equation?

While you need a solution that processes IOPS at a high rate, if users must wait a long time for a response, high IOPS become meaningless. In our testing, the Dell EMC PowerEdge R740xd with HGST Ultrastar SS300 SAS SSDs outperformed the older solution in IOPS while also reducing response times. For read operations, latency on the Dell EMC and HGST solution was less than one-fifth of the latency on the older solution—1 millisecond (ms) vs. more than 5 ms. For write operations, the newer solution cut response times from over 6 ms to less than 1 ms—a reduction of 95 percent.

Response times
(lower is better)

Read latency — 1.01 ms / 5.55 ms

Write latency — 0.34 ms / 6.51 ms

Dell EMC PowerEdge R740xd with HGST Ultrastar SAS SSDs

Dell EMC PowerEdge R730xd with SATA SSDs

Conclusion

Your company relies on your database platform to keep business running smoothly. The volume of data in your databases is likely to increase over time, and so are your users' expectations. Our testing revealed the improvements you can expect when refreshing an older server with SATA SSDs to a new Dell EMC PowerEdge R740xd with HGST Ultrastar SS300 SAS SSDs: more than twice the Oracle IOPS and dramatically faster response times.

Read the full report at http://facts.pt/fgoxg2 ▶

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