PT

Support up to
3.75x
the VDI users

with Intel Optane

compared to a
legacy solution*

*Comparison between the Dell EMC PowerEdge R730xd and the Dell EMC PowerEdge R740xd with Intel Optane

Give your VDI users the memory they need with server technology from Dell EMC and Intel

Intel Optane DC persistent memory in a Dell EMC PowerEdge R740xd server with 2nd Generation Intel Xeon Scalable processors

Vital to industries like healthcare, education, finance, and more, virtual desktop infrastructure (VDI) enables users to access their company desktop regardless of where they happen to be sitting. Traditionally, individual VDI users have just a few gigabytes of RAM to work with. As a VDI user approaches their memory limit, they may experience frustrating slowdowns that impact their work and any customers they serve. Banking customers may grow impatient with slow service. Students may accomplish less during in-class assignments. A healthcare patient could be left waiting as a nurse tries to access their chart, causing compounding schedule delays in the clinic.

A VDI solution that provides more memory to each user could result in improved user experience, greater customer satisfaction, and more productivity. Supporting more users per server could also enable you to cut down on the number of servers in your data center.
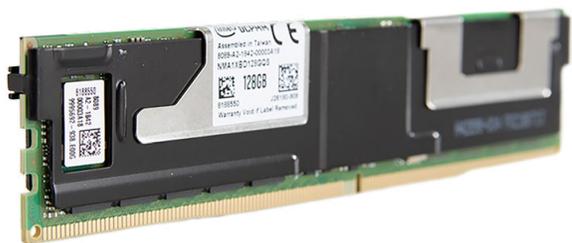
At Principled Technologies, we compared VDI performance between a Dell EMC™ PowerEdge™ R730xd, a newer PowerEdge R740xd, and a PowerEdge R740xd with Intel® Optane™ persistent memory and powered by 2nd Generation Intel Xeon® Scalable Processors. The new solution with Intel Optane technology enabled us to support 75 VDI users—3.75 times as many users as a legacy solution and 2.5 times as many as the same server without Intel Optane memory.

2nd Generation Intel Xeon Scalable Processors

The latest from Intel, the 2nd Generation Intel Xeon Scalable processor platform offers Bronze, Silver, Gold, and Platinum processors to support the applications you run. According to Intel, the 2nd Generation Intel Xeon Scalable platform can handle a variety of workloads, including enterprise, cloud, high-performance computing (HPC), storage, and communications. This new processor line also supports a new memory and storage technology to further accelerate workloads, Intel Optane DC persistent memory.[1]

To learn more about the 2nd Generation Intel Xeon Scalable processor family, visit **https://www.intel.com/content/ www/us/en/products/docs/processors/xeon/2nd-gen-xeon-scalable-processors-brief.html**.

What is Intel Optane persistent memory?

A typical server uses two kinds of devices to process data: RAM to cache data temporarily, and hard drives or SSDs to store data indefinitely. Hard drives and SSDs are fairly inexpensive but slower for the system to access, while RAM is often more expensive but quite fast. In this way, RAM and storage each make up for the other's shortcomings. But, as the amount of data companies use explodes, companies are beginning to see the limitations of the traditional storage/RAM pairing.

According to Intel, the act of data passing back and forth between storage and RAM incurs a considerable penalty to latency and bandwidth—consequences that can carry over to your customers and end users. Intel Optane DC persistent memory acts as a hybrid of the two traditional media, potentially reducing the latency and bandwidth penalties of moving data around separate server components.[2]

To learn more about Intel Optane DC persistent memory, visit https://www.intel.com/content/www/us/en/ architecture-and-technology/optane-dc-persistent-memory.html.

About the Dell EMC PowerEdge R740xd

The Dell EMC PowerEdge R740xd is a 2U, dual-socket platform powered by 2nd Generation Intel Xeon Scalable processors. It features 24 DDR4 DIMM slots and up to 271TB of storage between its front, mid, and rear bays. According to Dell EMC, the PowerEdge R740xd aims to bring scalability and performance to your datacenter.[3]

To learn more about the Dell EMC PowerEdge R740xd, visit **https://www.dell.com/en-us/work/shop/povw/poweredge-r740xd**.

Why does Intel Optane technology matter?

Traditionally, VDI users got by on just a few gigabytes of memory. Today, however, users perform a lot more memory-intensive tasks, one of the most common being opening multiple internet browser tabs and windows. This common habit eats up memory quickly, even for users on dedicated systems.

Simply adding more RAM to a VDI solution may not solve the memory problem because of relatively small RAM capacities. DDR4 memory typically comes in 16 or 32GB sticks and servers have a limited number of DDR slots. And because of the performance differences between memory and persistent storage in traditional systems, when memory resources become scarce on a system, data will page out to slower persistent storage. This can result in applications not launching or frustratingly slow performance while CPU resources remain idle.

Intel Optane DC persistent memory comes in sizes of up to 512 GB, which allows a system to reach memory capacities well beyond what is possible with traditional DDR4 modules. This relieves stress on the system and facilitates fast communication between CPU and RAM, enabling more efficient use of server resources.

What we found

We assessed each server solution by using the load-testing software View Planner from VMware to create a large number of synthetic VDI users, each with 16 gigabytes of shared memory. (For more details on the View Planner workload, see the science behind this report.) We measured the number of users each solution supported, and report that data below.

Our testing revealed a stark contrast between the three solutions:

- The legacy solution, a PowerEdge R730xd , supported only 20 users before using up its 256 GB of RAM.
- A PowerEdge R740xd with 384 GB of RAM supported 30 users before failing.
- When we added 1,536 GB of Intel Optane memory, the same PowerEdge R740xd supported 45 additional VDI users for a total of 75.

A difference this large could enable you to cut down on the physical infrastructure in your data center as your virtual infrastructure paves the way for more happy users. Or, it could allow your business to grow without physically expanding its data center or threatening the customer satisfaction you've worked hard to achieve.

Making better use of resources

Managing server resources well demands a delicate balance. When you underutilize resources, you aren't getting the performance you've paid for. On the other hand, using resources to the point of saturation often presents other issues, such as increased downtime or slow user experiences. For many use cases, using anywhere from 70 to 90 percent of critical resources, notably CPU and RAM, is a good range to target.

In our testing, the two server configurations that lacked Intel Optane DC persistent memory used just 50 percent of their CPU capacity, yet nearly 100 percent of their memory—a RAM usage figure that is well outside the ideal range. In the real world, this memory saturation would cause VDI user sessions to slow, freeze, and ultimately cease functioning. Intel Optane DC persistent memory enabled the PowerEdge R740xd to use just under 80 percent of its memory and around 90 percent of its CPU—a much better balance that enabled the server to take full advantage of its resources. The result in our tests was an increase of up to 3.75 times the number of VDI users, a figure that could help you get more from your data center investment.

Maximum users Higher is better

Percent resource utilization
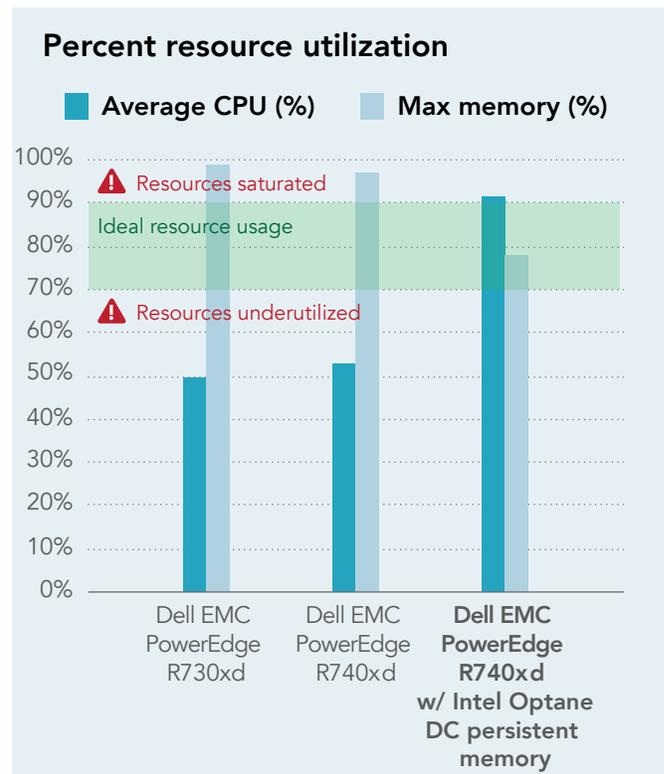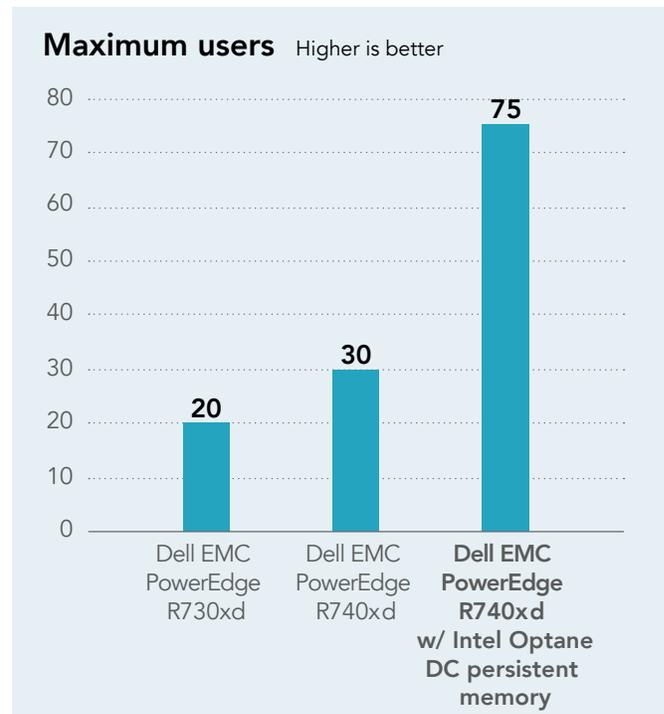
Conclusion

When users log onto their virtual desktops, they expect smooth service that allows them to complete their work and serve customers efficiently. A company approaching the limits of its current infrastructure may begin to see negative effects in terms of customer and end user satisfaction. In our tests, a Dell EMC PowerEdge R740xd server with Intel Optane DC persistent memory supported 3.75 times as many users as a legacy PowerEdge R730xd solution, and 1.5 times more than the PowerEdge R740xd without Intel Optane DC persistent memory. With the ability to support more VDI users—and especially high-memory VDI users—your business could improve its services and even cut down on the number of servers taking up space in your data center.

1   "Second Generation Intel Xeon Scalable Processors," accessed October 16, 2019,
    https://www.intel.com/content/www/us/en/products/docs/processors/xeon/2nd-gen-xeon-scalable-processors-brief.html.

2   "Big Memory Breakthrough for Your Biggest Data Challenges," accessed October 16, 2019,
    https://www.intel.com/content/www/us/en/architecture-and-technology/optane-dc-persistent-memory.html.

3   "Dell PowerEdge R740xd Rack Server," accessed October 16, 2019,
    https://www.dell.com/en-us/work/shop/povw/poweredge-r740xd

Read the science behind this report at http://facts.pt/jzy0eh7 ▶

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