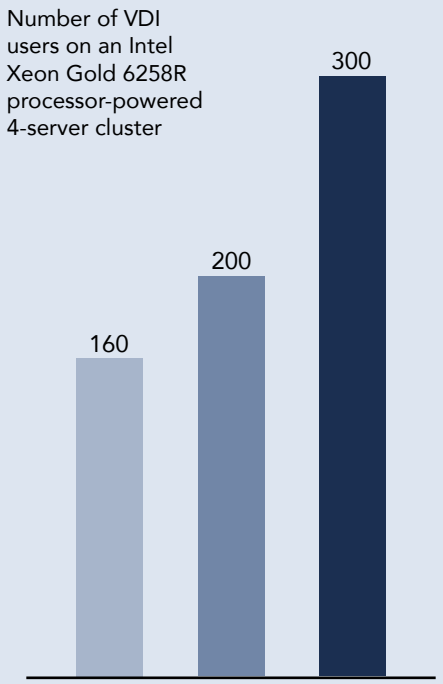
Support more users on VMware Horizon virtual desktops with new Intel Xeon Gold 6258R processor-based servers and Intel Optane Persistent Memory

Adopting new memory technology alongside the latest processors and SSDs lets you support more VDI users

Virtual desktop infrastructure (VDI) allows remote and mobile employees, contractors, field technicians, nurses, students, bankers, and many other workers to access the tools they need, when and where they need them, while sensitive data stays safe. But if increasing user demands tax the underlying hardware, desktop responsiveness can slow, causing frustrating delays for workers and customers alike. How, then, can you ensure that your hyperconverged infrastructure (HCI) can support the hefty virtual desktop workload your users require?

We compared three memory configurations on a four-node, dual-socket, VMware vSphere® vSAN™ cluster powered by Intel® Xeon® Gold 6258R processors and Intel Optane™ SSDs and Intel 3D NAND SSDs. We found that adding Intel Optane persistent memory (PMem) alongside a small amount of traditional DRAM increased VMware Horizon® virtual desktop count by 25 percent to 200 desktop users, and adding a larger amount of Intel Optane PMem increased desktops over the base configuration by 87 percent, for a total of 300 desktop users. This means supporting more users doesn't necessarily require purchasing additional servers. By combining the latest Intel Xeon Gold 6258R processors and the latest SSDs from Intel with new Intel Optane PMem, your organization could support more virtual desktop users and move larger hardware investments down the line.

Supported up to 87% more virtual desktop users



VDI in the hyperconverged data center

As organizations implement VDI for users with more demanding workloads, the compute and memory requirements for each individual desktop increase. HCI merges compute, storage, and networking together through software-defined storage such as VMware vSAN and virtualization platforms such as VMware vSphere. This all-in-one-place model has many attractive benefits, including streamlining deployment and management. In supporting a VDI environment, it is vital to right-size the HCI solution hardware to match the number of virtual desktop users your business requires. See the diagram below to see how Intel technologies and VMware software work together to meet your VDI needs.

Extending the ability of a server cluster to support more virtual desktop users can ultimately affect user experience and the capital outlay an organization must make when implementing VDI on HCI. We explored the impact that the latest Intel Xeon Scalable processors and the new Intel Optane PMem and Intel Optane SSDs would have on VMware Horizon virtual desktop count for hyperconverged infrastructures.

About Intel Optane persistent memory modules

Intel Optane PMem is a new non-volatile memory technology that can store large amounts of frequently read data for memory-fast access while also offering data persistence, which means that the data remains after it's read or written.

According to Intel, Optane PMem "can help businesses get faster insights from their data-intensive applications as well as deliver the benefits of consistently improved service scalability with higher virtual machine and container density."[1]

To learn more about Intel Optane persistent memory, visit http://intel.com/optanepersistentmemory.

VMware vSAN server node

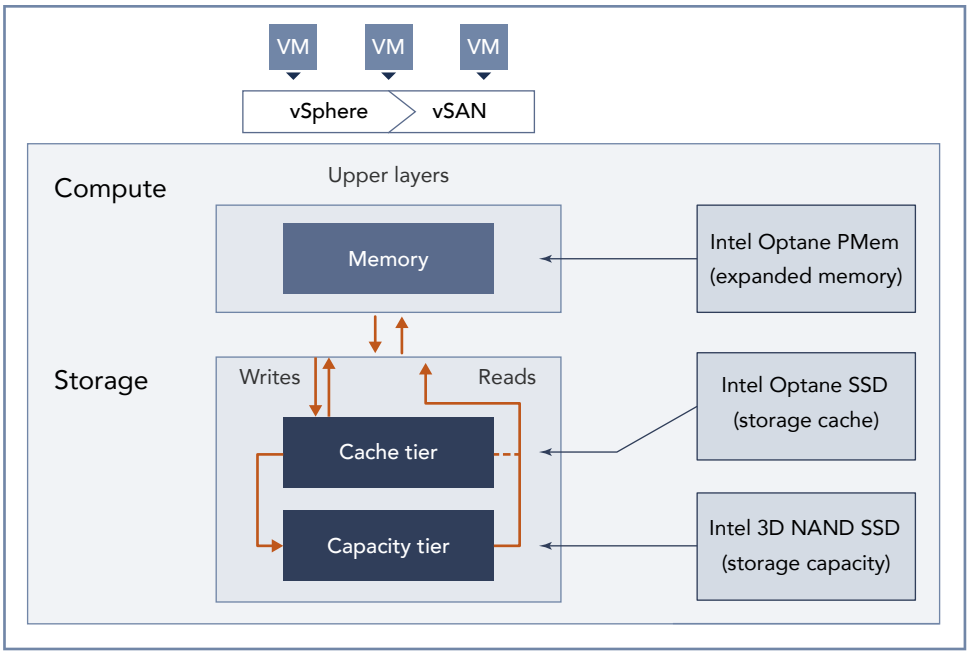
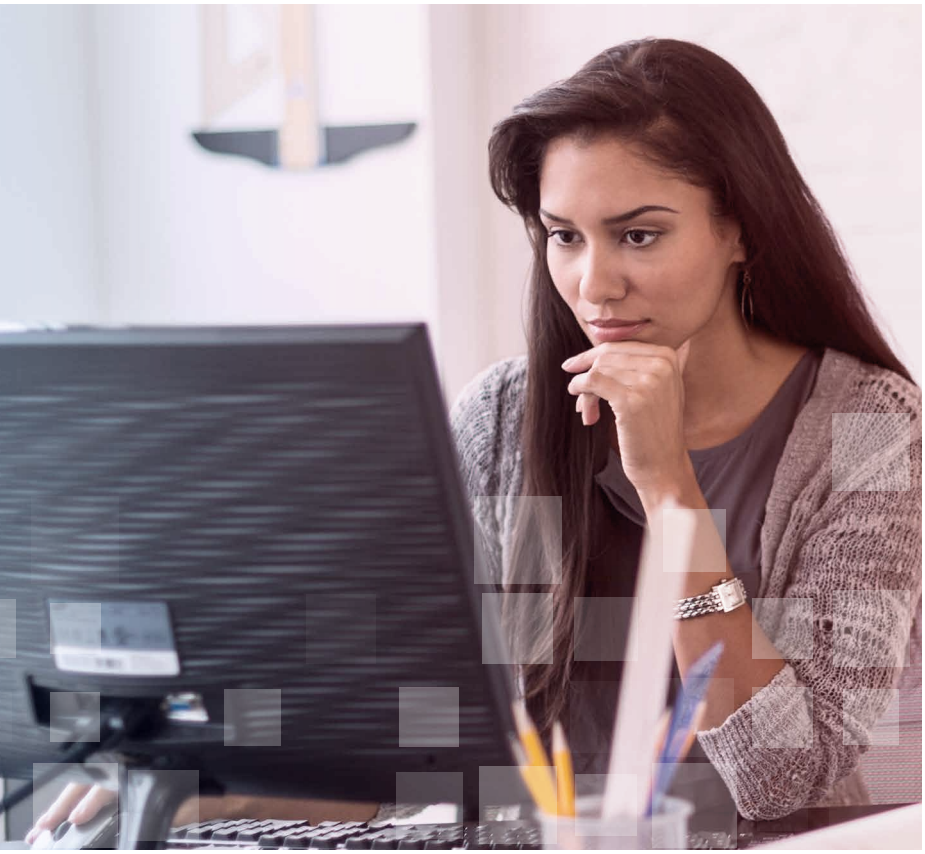


Figure 1: How Intel Optane storage and persistent memory work together



What we found

For testing, we compared three different memory configurations on a cluster comprising four servers powered by dual Intel Xeon Gold 6258R processors with VMware vSphere software-defined VMware vSAN to simulate a hyperconverged VDI environment. The only way the cluster configuration differed was the amount and type of memory. We kept storage and network resources identical for both all tests to quantify the performance benefits of PMem without any other variables. We used the VMware View Planner 4.3 benchmark tool to simulate VDI users to show how the latest processor and memory advancements can support more VDI users in a heavy compute and memory environment. We chose the high memory test profile—allocating16GB per VDI session—to showcase the effect memory-hungry workloads have on HCI. The View Planner high memory profile (workload) simulates today's typical power user by logging into the Microsoft Windows virtual desktop and launching common applications—Microsoft Excel, PowerPoint, and Word—while simultaneously opening browser tabs and interacting with a large number of websites in Google Chrome.

Intel Optane SSD DC P4800X Series

Intel offers Optane SSD DC P4800X Series drives that merge memory and storage technology to accelerate storage performance. According to Intel, Optane SSDs offer "industry-leading combination of high throughput, low latency, high QoS, and high endurance…to break through data access bottlenecks by providing a new data storage tier."[2]

To learn more about the Intel Optane SSD DC P4800X Series, visit https://www.intel.com/content/www/us/en/products/memory-storage/solid-state-drives/data-center-ssds/optane-dc-ssd-series/optane-dc-p4800x-series.html

About the latest Intel Xeon Scalable processors

The two-socket servers in our tests feature the Intel Xeon Gold 6258R processor, which has a core frequency of 2.7 GHz and 28 cores per processor. This new processor builds on capabilities of the 2nd Generation Intel Xeon Scalable processors to offer even greater performance. To learn more about the latest in the line of Intel Xeon Scalable processors, visit https://www.intel.com/content/www/us/en/products/processors/xeon/scalable/gold-processors/gold-6258r.html.

About VMware Horizon 7

VMware Horizon 7 is a VDI solution that provides desktops from a single platform—be it on premise or in the cloud—to desktop users. According to VMware, virtualizing desktops with Horizon 7 can reduce operations costs and simplify both security compliance and management.[4]

Features of VMware Horizon 7 include software-defined integration with VMware vSAN, support for both Windows and Linux®, and True SSO for simplified authentication. To learn more about VMware Horizon 7, visit https://www.vmware.com/products/horizon.html.

About VMware vSAN

For organizations looking to reduce the complexity and footprint of their data center, VMware offers software-defined storage with VMware vSAN that eliminates the need for bulky, expensive, external arrays and instead brings compute and storage resources together.

According to VMware, vSAN provides "...the easiest path to hyperconverged infrastructure and hybrid cloud."[5] To learn more about VMware vSAN, visit https://www.vmware.com/products/vsan.html.

The cluster powered by dual Intel Xeon Gold 6258R processors and Intel Optane SSDs and Intel 3D NAND SSDs with 384GB of DDR DRAM supported 160 VMware Horizon virtual desktop users. When we upgraded the memory configuration of that cluster to 96GB DDR DRAM and 512GB Intel Optane PMem, the solution supported 200 virtual desktops, a 25 percent increase in virtual desktops supported.

When we upgraded the memory configuration again with 192GB DDR DRAM and 1024GB PMem, the cluster supported an impressive 300 virtual desktops, an 87 percent increase over the base DRAM-only configuration.[3] While many assume that VDI is a CPU-bound workload, CPU and memory are equally important in VDI environments and a bottleneck to either of these resources hurt performance and scaling.

By extending the capabilities of your server cluster to support more virtual desktop users, your organization can plan for business growth, delay additional hardware purchases, and potentially put off renting or building new space to house infrastructure to meet growing demand.

Supported up to 87% more virtual desktop users

Number of VDI users on an Intel Xeon Gold 6258R processor-based four-server cluster

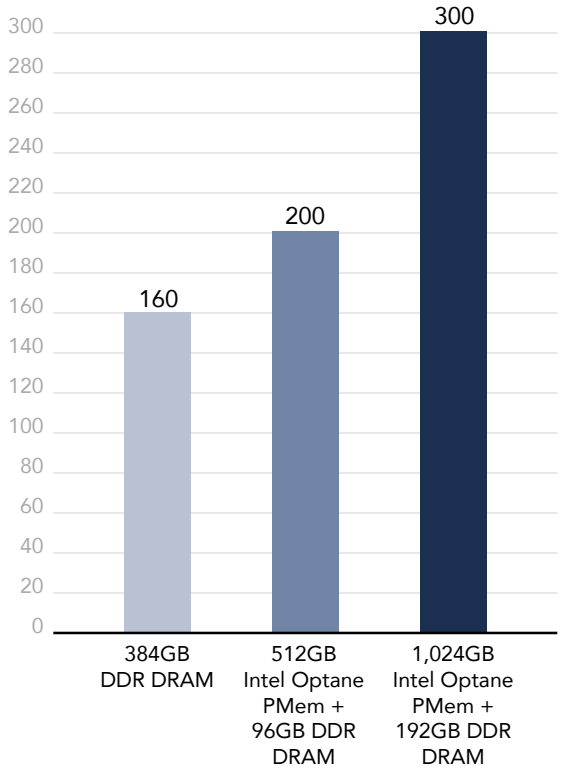
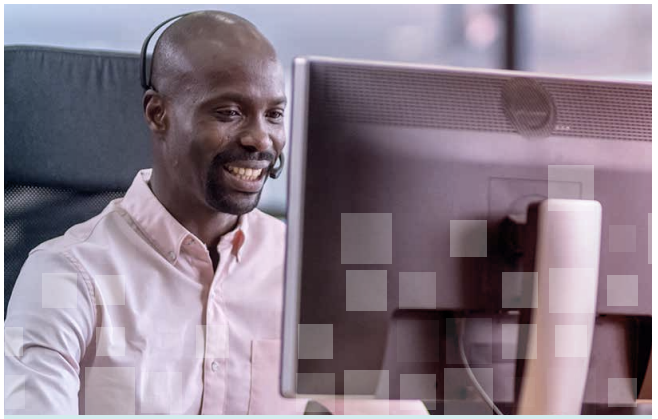


Figure 2: Number of VDI users on a four-server VMware vSAN cluster using View Planner. Higher is better. Source: Principled Technologies.

Conclusion

If your organization is reaping the benefits of hyperconverged infrastructure with VMware vSphere and VMware vSAN, you could improve your virtual desktop capabilities by choosing servers with the latest Intel Xeon Gold 6258R processors and Intel Optane SSDs and Intel 3D NAND SSDs and then adding Intel Optane PMem. In these tests, configuring the cluster with 96GB DDR DRAM and 512GB Intel Optane PMem increased virtual desktop count by 25 percent compared to the cluster with 384GB DDR DRAM alone, while configuring the cluster with 192GB DDR DRAM and 1024GB PMem increased VDI desktop count by 87 percent over the baseline configuration.



About VMware View Planner

We used VMware View Planner to create the desktop workload for our tests. VMware describes the benchmark as "...the first comprehensive standard methodology for comparing virtual desktop deployment platforms."[6] The workload that the benchmark generates includes tasks typical to desktop users and measures both server- and client-side performance, reporting completion times in nanoseconds. The benchmark reports a View Planner score in number of desktops that performed well handling both CPU- and IO-intensive tasks.

To learn more about VMware View Planner, visit https://www.vmware.com/products/view-planner.html.

1 Intel, "Intel Optane DC Persistent Memory," accessed January 29, 2020, http://intel.com/optanepersistentmemory.

2 Intel, "Product Brief: Intel Optane SSD DC P4800X/P4801X Series," accessed April 3, 2020, https://www.intel.com/content/www/us/en/products/docs/memory-storage/solid-state-drives/data-center-ssds/optane-ssd-dc-p4800x-p4801x-brief.html.

3 Please note that these results are not directly comparable to other published View Planner results due to an issue with the benchmark requiring a large volume of URL requests during testing. For more details, see Running the View Planner Benchmark on page 16 of the science behind the report.

4 VMware, "VMware Horizon 7," accessed January 29, 2020, https://www.vmware.com/products/horizon.html.

5 VMware, "What is VMware vSAN?" accessed January 30, 2020, https://www.vmware.com/products/vsan.html.

6 VMware, "View Planner," accessed January 29, 2020, https://www.vmware.com/products/view-planner.html.

Read the science behind this report at http://facts.pt/xme83i3 ►

This project was commissioned by VMware.

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