Expand your data center capabilities with software-defined Dell EMC hyperconverged infrastructure

An Intel Xeon Scalable processor-powered Dell EMC vSAN Ready Node solution delivered strong, reliable performance for database transaction processing and data analytics workloads

A digital infrastructure that meets today's challenges could falter as your organization grows. A new product launch, an unforeseen spike in your user base, or an expansion of services could burden your existing hardware and cause slowdowns that increase wait times and frustrate your customers. Running applications on a high-performance hyperconverged infrastructure (HCI) solution from Dell EMC™, Intel®, and VMware® can help database applications handle these growing pains without a large data center footprint.

In our data center, we tested the performance of an Intel® Xeon® Scalable processor-powered Dell EMC vSAN Ready Node™ HCI solution with multiple instances of online transaction processing (OLTP) and online analytical processing (OLAP) workloads. When a solution can process a high volume of database transactions, you could support a sizeable user base (ecommerce customers, for example) or allow existing users to access your database without processing delays. And when a solution can quickly complete analytics workloads, you can put relevant analysis into the hands of sales reps and senior management sooner so they can make timely, data-driven decisions. The Dell EMC, Intel, and VMware HCI solution delivered strong, reliable performance for both kinds of workloads.

Centralize multiple database instances and workloads
Supported 16 VMs running OLTP workloads in 8U

Run ecommerce applications efficiently
Handled 15,932 transactions per second

Deliver speedy analysis
Completed 60 OLAP query streams across 10 databases in 32 minutes

What is vSAN?

VMware vSAN™ turns physical storage into a virtual resource for your applications, reducing the need to add external storage arrays to your data center. Embedded in the hypervisor of VMware Hyper-Converged Software solutions, vSAN clusters server-attached flash drives and hard disks to create a shared datastore. According to VMware, "when combined with vSphere, [vSAN] allows you to manage compute and storage with a single platform."[1] For more information, visit https://www.vmware.com/products/vsan.html.

Get more than just performance gains

HCI solutions leverage software to make the most of hardware resources. In our testing, VMware vSAN software-defined storage enabled our high-performance solution to run 16 VMs with database applications in just 8U of rack space. If you're part of a smaller organization, this presents a real opportunity to use your data center space efficiently.

This Intel Xeon Scalable processor-powered Dell EMC solution can reduce the planning and preparation burden on your small IT staff, too—Dell EMC vSAN Ready Nodes come pre-configured and validated to run vSAN environments.

Why choose HCI software?

Organizations of any size can effectively use HCI software, but smaller organizations could see a particularly significant benefit. Traditional approaches to infrastructure can hamstring smaller organizations: Data center sprawl, complexity of infrastructure, and using multiple management processes and applications can limit the ability and speed of smaller organizations to scale their resources. HCI software platforms, such as vSAN, offer a sensible option to help overcome these hurdles by pooling together and virtualizing resources. With vSAN, for example, an organization could reclaim unused physical storage from legacy servers to boost database access for critical ecommerce applications seeing a spike in customer demand. Reclaiming unused resources can ensure organizations get the most from storage arrays and servers, which helps combat the complexity that comes from an ever-expanding data center.

HCI platforms can also give IT teams a single pane of glass to manage, monitor, and provision resources and hardware. Simplified management could reduce the time admins spend performing common management tasks.

We ran OLTP and OLAP database workloads in our testing, but organizations can use vSAN and other HCI platforms to run file and print, virtual desktop, and web-facing workloads, among others.

How we tested

Our Dell EMC vSAN Ready Node solution consisted of four Dell EMC PowerEdge™ R740 servers clustered together and powered by Intel Xeon Scalable Gold 6240 processors. We configured the solution with the following specifications:

- Each node featured 72 CPU threads, 384 GB RAM, and a 3.8TB storage capacity tier.
- The solution featured VMware vSphere® Standard Edition™, VMware vSAN Standard, and VMware vCenter Server® Foundation™.
- The solution used Microsoft Windows Server 2019 Standard Edition for its operating system and Microsoft SQL Server 2019 Standard Edition for the databases.

About Intel Xeon Scalable processors

The 2nd Generation Intel Xeon Scalable processor platform features numerous processors (categorized as Bronze, Silver, Gold, and Platinum) to support the critical workloads your organization relies on. According to Intel, the 2nd Generation Intel Xeon Scalable platform can handle workloads for enterprises as well as cloud and communications providers.[2]

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.

Centralize many VMs to make your data center more efficient

Some organizations may have limited data center floor space, with only a few racks of servers, storage, and networking switches. If your organization falls into this category, software-defined storage can help you do more with the space you have because it enables you to combine storage, compute, and networking into a single solution. In our testing, the Intel Xeon Scalable processor-powered Dell EMC vSAN Ready Node solution supported 16 VMs running OLTP workloads and 10 VMs running OLAP workloads.

It's important to note that we didn't max out the solution; we limited CPU utilization levels (our solution hit 66 percent CPU utilization during OLTP testing and 53 percent during OLAP testing). Software-defined storage needs compute resources to process storage transactions that a RAID controller would handle in an environment without pooled storage. As such, assigning too much of the compute resources to the VMs can slow down workloads.

Supported 16 VMs running OLTP workloads against 300GB databases in 8U
Centralize multiple database instances and workloads

Process numerous database transactions at once to help generate ecommerce revenue

By investing in a vSAN Ready Node solution of Dell EMC PowerEdge R740 servers, your organization could handle an OLTP workload, such as an ecommerce platform, with a large number of customers. This could be helpful if you offer a product or service that spikes in sales at specific times in the year, or if you're looking to expand your customer base. Supporting a high volume of transactions could also help minimize your spending on additional storage and compute resources to meet scaling demands. While running our test workload, each of the 16 VMs in the Intel Xeon Scalable processor-powered Dell EMC vSAN Ready Node solution processed 995 database transactions per second (TPS) on average, totaling 15,932 TPS for the solution. We used a TPC-E-like workload from Benchmark Factory. For more information about the workload, see the Benchmark Factory site: https://www.quest.com/products/benchmark-factory/.

Handled 15,932 transactions per second
Run ecommerce applications efficiently

Run multiple analytics streams to make more timely decisions

Data-driven decision making becomes more relevant each day as our devices generate more data. Your organization can leverage this data for OLAP workloads, such as business intelligence applications for business reporting, to make smart choices in a timely manner. The faster your data center can run OLAP workloads, the sooner decision makers and others can use data to make well-informed choices. For 10 VMs, the Intel Xeon Scalable processor-powered Dell EMC vSAN Ready Node solution processed six streams per VM across 10 databases in 32 minutes. We used a TPC-H-like workload from HammerDB that ran a stream of 22 serialized queries. When running multiple streams, each stream ran the 22 queries in a different order. For more information about the workload, see the HammerDB site: https://www.hammerdb.com/docs/ch10s01.html.

Completed 60 OLAP query streams across 10 databases in 32 minutes
Deliver speedy analysis

About the Dell EMC PowerEdge R740

The Dell EMC PowerEdge R740 is a two-socket rack server built on 2nd Generation Intel Xeon Scalable processors. With support for up to 16 2.5" drives (112.88TB max), eight PCIe slots, and support for Intel Optane PMem, the PowerEdge R740 provides plenty of options to target the appropriate performance for your specific workloads. To learn more about the advantages that the Dell EMC PowerEdge R740 can provide for your workloads, visit https://www.dell.com/en-us/work/shop/povw/poweredge-r740.

Conclusion

To continue growing your organization and stay competitive, you need to plan for the future. If your organization has limited data center rack and floor space, choosing an Intel Xeon Scalable processor-powered Dell EMC vSAN Ready Node solution can help you grow, due to strong performance like we saw in our data center for OLTP and OLAP database applications. In addition to providing strong performance, this HCI solution can make your data center more efficient overall, doing a lot of work in a contained physical environment.

1 "vSAN," accessed July 1, 2020, https://www.vmware.com/products/vsan.html.
2 "2nd Gen Intel Xeon Scalable Processors Brief," accessed July 1, 2020, https://www.intel.com/content/www/us/en/products/docs/processors/xeon/2nd-gen-xeon-scalable-processors-brief.html.

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

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