Upgrade to Dell EMC PowerEdge R940 servers with VMware vSphere 7.0 and gain greater OLTP performance

This newer solution processed more operations per minute than a previous-generation Dell EMC PowerEdge R930 with VMware vSphere 6.7

If your organization is using previous-generation servers, you might be tempted to think that the performance you're getting is good enough. But upgrading to the latest hardware and software can provide better performance and new features that can help you better manage your environment.[1] To quantify the benefits of a newer solution, we tested a Dell EMC™ PowerEdge™ R940, which comes equipped with the latest edition of VMware vSphere® 7.0, against a previous-generation Dell EMC PowerEdge R930 with VMware vSphere 6.7.

We used Oracle® Database 19c and the benchmark DVD Store 3 to test online transactional processing (OLTP) performance. The Dell EMC PowerEdge R940 processed 30 percent more operations per minute than the Dell EMC PowerEdge R930. It also offered additional hardware and software features such as 2nd Generation Intel® Xeon® Scalable processors (with up to 16 percent more cores per processor), 30 percent more PCIe capacity, up to 28 percent more DDR4 memory, and new update capabilities with vSphere Lifecyle Manager and Dell EMC OpenManage Integration for VMware vCenter®.[2] By upgrading the previous-generation solution we tested to Dell EMC PowerEdge R940 servers with VMware vSphere 7.0, organizations could support more customers when running transactional database workloads.

Boost transactional database performance

30% more operations per minute with the latest PowerEdge and vSphere 7*

Take advantage of new hardware and software features

- 2nd Generation Intel Xeon Scalable processors with up to 16% more cores per processor
- 30% more PCIe capacity
- New update capabilities with OpenManage Integration for VMware vCenter†

*Dell EMC PowerEdge R940 with VMware vSphere 7.0 vs. Dell EMC PowerEdge R930 with VMware vSphere 6.7. We normalized all results.
†We based our calculations on publicly available specs for the Dell EMC PowerEdge R930 and R940.

How we tested

Our hands-on testing compared the following four-socket solutions:

- Dell EMC PowerEdge R930 with VMware vSphere 6.7 and Intel Xeon E7-8890 v3 processors
- Dell EMC PowerEdge R940 with VMware vSphere 7.0 and Intel Xeon Platinum 8260 processors

We measured the transactional database performance of each system using Oracle Database 19c and DVD Store 3 running an OLTP workload that targets a transactional database and produces a metric of operations per minute. For more testing and configuration details, see the ***science behind the report***.

Boost transactional database performance

As your customer base grows, your organization needs a solution that can handle more transactions and thus support more online users. When we ran an OLTP workload on each solution, the newer Dell EMC PowerEdge R940 server handled 30 percent more operations per minute than the older Dell EMC PowerEdge R930 server. A solution that offers greater OLTP performance could support more users, potentially enabling organizations to expand their customer base.

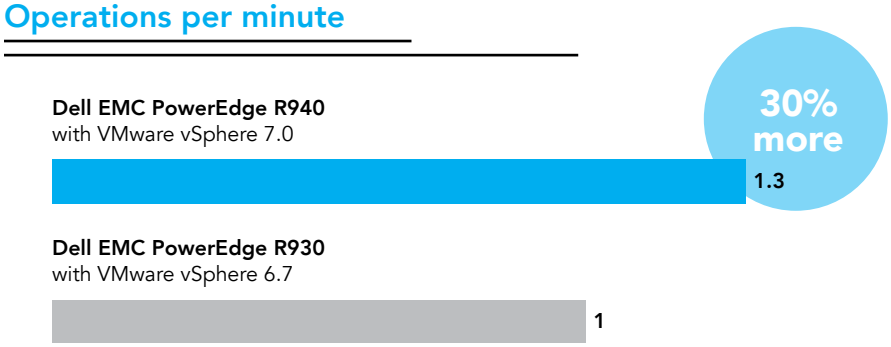

Figure 1: Operations per minute (normalized). Higher is better. Source: Principled Technologies.

How new VMware vSphere 7.0 features integrate with Open Manage Integration for VMware vCenter

In an August 2020 study, Principled Technologies set up a cluster of previous- and current-generation Dell EMC PowerEdge servers and carried out updates and compatibility verification tasks manually as well as using VMware vSphere 7.0 features such as vSphere Lifecycle Manager with Quick Boot and the Dell OpenManage Integration for VMware vCenter (OMIVV). Using these tools allowed our admins to update the hypervisor 34 times faster, complete hypervisor and firmware updates 68 times faster, and conduct hardware compatibility checks 7 times faster than with a manual approach alone.[3] Read the full report: ***https://www.principledtechnologies.com/Dell/vSphere-7.0-update-compatibility-check-0820-v3.pdf***.

Major feature comparison of Dell EMC PowerEdge R930 and R940 servers

The Dell EMC PowerEdge R940 server configuration we tested costs approximately US$98,556.00. We obtained this pricing information through a third-party reseller on November 12, 2020. The quote included the server hardware, VMware vSphere 7.0, Dell ProSupport, and Next Business Day Onsite Service (the VMware software and Dell support services were for three years). Note that the RAM in the quotes we received was for 3,200 MT/s, but we tested with 2,666 MT/s of RAM. Below is a table comparing the platform configuration capabilities of the Dell EMC PowerEdge R930 and R940. By upgrading from the Dell EMC PowerEdge R930 platform to the R940 platform, organizations could get up to 16 percent more cores per processor, up to 28 percent more DDR4 memory, and 30 percent more PCIe capacity.

Feature	Dell EMC PowerEdge R930[4]	Dell EMC PowerEdge R940[5]	Difference with Dell EMC PowerEdge R940
Processors	Up to four Intel Xeon E7-8800 v4 and E7-4800 v4 processors	Up to four 2nd Generation Intel Xeon Scalable processors	Newer Intel Xeon processors
Cores	Up to 24 per processor	Up to 28 per processor	Up to 16% more cores per processor
Memory	Up to 12 TB of DDR4 memory	Up to 15.36 TB of memory in 48 DIMMS (24 of which can be Intel® Optane™ DC persistent memory DCPMMs)	Up to 28% more DDR4 memory
PCIe capacity	10 PCIe 3.0 slots	13 PCIe Gen. 3 slots	30% more PCIe capacity

How the latest VMware vSphere 7.0 features could scale with your Dell EMC environment

We focused on single-node database virtualization in our testing, but many virtualized environments rely on multiple nodes for additional performance, capacity, and data protection. VMware vSphere 7.0 provides new features that further support both small and large virtualized environments, while Dell EMC offers integrations for environments comprised of Dell EMC PowerEdge hardware. Below are some of the new features in vSphere 7.0 that could help support and grow a virtualized database environment on the Dell EMC PowerEdge R940 platform. We did not test these features, and gathered the following information from publicly available sources.

vSphere Lifecycle Manager (vLCM)

New vLCM features, like cluster-level hardware compatibility checks and desired state image compliance, help manage hypervisor updates across large cluster deployments, while Dell EMC integrations like OMIVV improve vLCM by adding firmware management across your PowerEdge environment.[6]

Improved Distributed Resource Scheduler (DRS)

DRS now monitors VM usage and moves heavily utilized VMs to a host with a high VM DRS score to ensure better performance for that VM and fewer performance hits for its neighbors. This feature can increase performance across the cluster by avoiding resource contention among individual VMs.[7]

Improved VM template management

With this feature, organizations can quickly spin up multiple VMs based on a single template. In our testing, we used a SQL database VM; in a larger server environment, we could create a template based on that VM and use it to generate multiple VMs.[8]

In addition to these features, Dell EMC offers the following VMware vSphere integrations, which can help organizations support Dell EMC PowerEdge environments of varying sizes.

OMIVV

With this tool, admins can monitor Dell EMC PowerEdge hardware inventory, view hardware system alerts, manage firmware with vSphere Lifecycle Manager, create cluster configuration and firmware profiles for cluster updates, and streamline deployment of ESXi™ to PowerEdge servers, all from the vCenter UI. Whether your environment has one Dell EMC server or many, OMIVV helps simplify management of ESXi updates and firmware.[9]

Dell EMC add-ons

vLCM can use incremental software updates, released by Dell EMC in between major releases, in conjunction with the ESXi base image to create an updated custom Dell EMC image.[10]

Conclusion

Newer hardware and software can help organizations unlock performance benefits in their data center environment. In the case of Dell EMC PowerEdge R940 servers with VMware vSphere 7.0, features such as 2nd Generation Intel Xeon Scalable processors could increase performance on transactional database workloads, while admins can use VMware vCenter integrations like Dell EMC OMIVV to manage Dell EMC server hardware (including firmware updates in tandem with vSphere Lifecycle Manager[11]). In hands-on testing, we ran the DVD Store 3 benchmark on the newer Dell EMC PowerEdge R940 solution and an older Dell EMC PowerEdge R930 server with VMware vSphere 6.7. The Dell EMC PowerEdge R940 handled 30 percent more operations per minute than the older server, indicating that organizations using the newer solution could support more online users and potentially boost revenue.

1 For an example of how new software features could provide performance benefits, see the August 2020 Principled Technologies report, "New VMware vSphere 7.0 features reduced the time and complexity of routine update and hardware compliance tasks," *https://www.principledtechnologies.com/Dell/vSphere-7.0-update-compatibility-check-0820-v3.pdf*. For an example of how newer hardware could provide performance benefits, see the July 2019 Principled Technologies report, "Elevate your e-commerce business by upgrading to the Dell EMC PowerEdge R740xd with 2nd Generation Intel Xeon Scalable processors," *https://www.principledtechnologies.com/Dell/PowerEdge-R740xd-2nd-Intel-Xeon-Scalable-0719.pdf*.

2 We made our calculations based on information availabe in datasheets for the Dell EMC PowerEdge R930 (*https://i.dell.com/sites/doccontent/shared-content/data-sheets/en/Documents/PowerEdge_R930_spec_sheet-FINAL.pdf*) and R940 (*https://i.dell.com/sites/csdocuments/Shared-Content_data-Sheets_Documents/en/aa/poweredge-r940-spec-sheet.pdf*).

3 Principled Technologies, "New VMware vSphere 7.0 features reduced the time and complexity of routine update and hardware compliance tasks," accessed October 28, 2020, *https://www.principledtechnologies.com/Dell/vSphere-7.0-update-compatibility-check-0820-v3.pdf*.

4 Dell EMC, "PowerEdge R930," accessed October 28, 2020, *https://i.dell.com/sites/doccontent/shared-content/data-sheets/en/Documents/PowerEdge_R930_spec_sheet-FINAL.pdf*.

5 Dell EMC, "PowerEdge R940," accessed October 28, 2020, *https://i.dell.com/sites/csdocuments/Shared-Content_data-Sheets_Documents/en/aa/poweredge-r940-spec-sheet.pdf*.

6 Dell Technologies, "VMware vSphere Life Cycle Manager (vLCM) and Dell EMC integration," accessed October 28, 2020, *https://downloads.dell.com/manuals/all-products/esuprt_software_int/esuprt_software_virtualization_solutions/vmware-esxi-7x_white-papers3_en-us.pdf*.

7 Adam Eckerle, "Introducing vSphere 7: Features & Technology for the Hybrid Cloud," accessed November 13, 2020, *https://blogs.vmware.com/vsphere/2020/03/vsphere-7-features.html*.

8 Nigel Hickey, "vSphere 7 – Content Library," accessed October 30, 2020, *https://blogs.vmware.com/vsphere/2020/04/vsphere-7-content-library.html*.

9 Dell Technologies, "OpenManage Integration for VMware vCenter," accessed October 28, 2020, *https://www.dell.com/support/article/en-us/sln311238/openmanage-integration-for-vmware-vcenter?lang=en*.

10 Dell Technologies, "VMware vSphere Life Cycle Manager (vLCM) and Dell EMC integration," accessed October 28, 2020, *https://downloads.dell.com/manuals/all-products/esuprt_software_int/esuprt_software_virtualization_solutions/vmware-esxi-7x_white-papers3_en-us.pdf*.

11 Nigel Hickey, "vSphere 7 – Content Library," accessed October 30, 2020, *https://blogs.vmware.com/vsphere/2020/04/vsphere-7-content-library.html*.

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

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