SUMMARY OF PRINCIPLED TECHNOLOGIES TESTING ON NEW-GENERATION DELL EMC POWEREDGE SERVERS

This document summarizes the results of three Principled Technologies (PT) studies. To read the report on the Dell EMC PowerEdge R650 rack server, click http://facts.pt/qvST5X5. To read the reports on the Dell EMC PowerEdge MX750c blade server, click http://facts.pt/l4CpAoi (Microsoft SQL Server database performance testing) or http://facts.pt/j35px5G (deployment).

Overview

In our data center, we tested two new-generation Dell EMC™ PowerEdge™ servers powered by 3rd Generation Intel® Xeon® Scalable processors along with their previous-generation counterparts. We conducted one test of the Dell EMC PowerEdge R650 rack server and two tests of the Dell EMC PowerEdge MX750c blade server:

- **Dell EMC PowerEdge R650 rack server**
  - **IOPS performance testing.** Compared to a previous-generation Dell EMC PowerEdge R640 rack server using SATA and SAS drives, the new server, equipped with NVMe™ drives, delivered up to 15 times the input/output per second (IOPS) using the FIO benchmark tool. With a 4K random read I/O profile, the PowerEdge R650 containing the PERC H755n controller and NVMe drives achieved 3.5 million IOPS.
- **Dell EMC PowerEdge MX750c blade server for the Dell EMC PowerEdge MX7000 chassis**
  - **SQL Server performance testing.** Compared to a previous-generation Dell EMC PowerEdge MX740c blade server, the new server's processor and IO architecture delivered up to 36.1 percent more total database orders per minute (OPM), while using NVMe drives in both configurations. The new cluster supported 25 percent more VMs than the older cluster and achieved a greater per-VM rate. The new cluster also reduced latency by 8 percent.
  - **Deployment testing.** Deploying the new servers took only 2 hours and 22 minutes and used the exact same process—requiring the same amount of time and number of steps—as deploying the previous-generation Dell EMC PowerEdge MX740c blade server.

Dell EMC PowerEdge R650 rack server

IOPS performance testing: Test approach and findings

We ran the FIO benchmarking tool on the new Dell EMC PowerEdge R650 server with PERC H755n RAID controller and NVMe PCIe Gen4 SSDs and on the previous-generation Dell EMC PowerEdge R640 with PERC H730P Mini controller and SATA and SAS drives. The Dell EMC PowerEdge R650 delivered up to 15 times the IOPS of the previous-generation server, transferred up to 15 times the MB per second, and reduced latency by 93 percent.

Configuration details

We configured a previous-generation 14G Dell EMC PowerEdge R640 server powered by a 16-core Intel® Xeon® Gold 6142 processor with 128 GB of RAM, the PERC H730P Mini controller and SATA and SAS storage drives. We also configured a new-generation PowerEdge R650 server powered by a 32-core pre-production 3rd Generation Intel Xeon Scalable processor with 1,024 GB of RAM, the PERC H755n RAID controller, and NVMe PCIe Gen4 SSDs. Both servers ran the Red Hat Enterprise Linux 8.3 operating system.

Dell EMC PowerEdge MX750c blade server for the Dell EMC PowerEdge MX7000 chassis

SQL Server performance testing: Test approach and findings

We set up two three-node VMware® vSAN™ clusters. One cluster comprised current generation 14G Dell EMC PowerEdge MX740c servers and the other had new PowerEdge MX750c servers powered by 3rd Generation Intel Xeon Scalable Processors. We used the DVD Store 3 benchmarking tool to measure the total number of online transaction processing (OLTP) database orders per minute each cluster achieved. With 12 virtual machines (VMs) on each cluster, the new cluster outperformed the previous-generation cluster by 18.7 percent. When we took advantage of unused resources on the new cluster to increase the number of VMs to 15, the performance advantage of the new cluster increased to 36.1 percent. Not only did the new cluster support 25 percent more VMs, it achieved a higher per-VM performance rate and reduced latency by 8 percent.

Deployment testing: Test approach and findings

We captured the amount of time and number of steps necessary to deploy both generations of servers to the chassis. We found that it took us only 2 hours and 22 minutes to add more compute power to our existing MX7000 chassis. Furthermore, the process was simple, whether using previous-generation or new server technology. Once we established the network configuration for the chassis, we needed only to plug in our first compute sled; configure our BIOS, storage, and lifecycle controller settings as appropriate for our environment; and create a template. We then assigned our pre-defined VMware Cloud Foundation™ VLANs to the template, and inserted the remaining compute sleds. We deployed the template to the sleds—using a CIFS or NFS-based ISO share—and quickly got our VMware ESXi™ hosts installed. Dell OpenManage™ Enterprise handled all of networking behind the scenes, and no additional cabling was necessary. From that point, commissioning the new hosts and creating a virtual infrastructure workload cluster was identical to any other VCF deployment.

Configuration details

In an MX7000 chassis, we created one cluster of previous-generation 14G Dell EMC PowerEdge MX740c servers and a second cluster of new-generation PowerEdge MX750c servers powered by 3rd Generation Intel Xeon Scalable processors. We configured each compute sled with four NVMe SSDs, creating an all-flash VMware Cloud Foundation vSAN configuration. Chassis networking was powered by two MX9116n IO modules, with redundant cross-fabric 400Gb links, and uplinks to a pair of S4048-ON switches via redundant 40Gb links. The management cluster, comprised of R640 servers and OLTP client test VMs, was connected to the S4048-ON switches via redundant 10Gb links.

ABOUT PRINCIPLED TECHNOLOGIES

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We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help our clients assess how it will fare against its competition, its performance, its market readiness, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.

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