



**24.9% more transactions per minute\***



**24.7% more new orders per minute\***

*\*on a TPROC-C workload using Dell APEX Private Cloud with VMware Tanzu best-effort-4xlarge instance vs. Amazon EKS with EC2 m6i.4xlarge instance*



## **Dell APEX Private Cloud can deliver better OLTP performance in a Kubernetes environment**

### **Relative to a comparable AWS EC2 instance**

According to a report by Fortune Business Insights, the global big data analytics market is expected to grow by 13.4 percent annually between 2022 and 2029.<sup>1</sup> Organizations that rely on the cloud for their online transaction processing (OLTP) workloads need systems that can continue to process transactions quickly, even as the scale of their databases grow. The Kubernetes platform manages workloads and deploys containers as necessary so that read-intensive workloads such as OLTP and big data analytics are processed by the system quickly and efficiently.

With multiple private and public cloud solutions available, it can be difficult to know which is right for you. To get a better understanding of two of these options, we compared the OLTP performance in Kubernetes of two cloud solutions: Dell APEX Private Cloud with VMware Tanzu and Amazon Elastic Kubernetes Service (EKS) with Amazon Elastic Compute Cloud (Amazon EC2) using the TPROC-C workload in the HammerDB 4.5 benchmark. For the Dell solution, we used the best-effort-4xlarge instance; for the Amazon solution, we used the m6i.4xlarge instance. We found that the Dell APEX Private Cloud instance processed 24.9 percent more OLTP transactions per minute and 24.7 percent more new orders per minute (NOPM) than the AWS instance.

## How we tested

Using the TPROC-C workload from HammerDB 4.5 benchmark, we compared the OLTP performance of containerized SQL Server instances in a Kubernetes environment.

According to HammerDB, "you use HammerDB to create a test schema, load it with data and simulate the workload of multiple virtual users against the database for both transactional and analytic scenarios."<sup>2</sup>

For the Dell APEX Private Cloud solution, we used the VMware Tanzu best-effort-4xlarge instance on an Intel® Xeon® Platinum 8358 processor. For the AWS solution, we used the EC2 m6i.4xlarge instance with IOPS set to 12K on an Intel Xeon Platinum 8375C processor. According to AWS, "The M6i instances are SAP Certified and ideal for workloads such as backend servers supporting enterprise applications (such as Microsoft Exchange and SharePoint, SAP Business Suite, MySQL, Microsoft SQL Server, and PostgreSQL databases), gaming servers, caching fleets, and application development environments."<sup>3</sup> For both solutions we set up a database schema with 500 warehouses and 16 virtual users. The two instances have the same number of Intel Xeon Ice Lake processor vCPUs. The Dell APEX Private Cloud instance has more memory than the AWS EKS instance, but we set a limit on the memory inside the SQL PODs so that each POD has the same amount of available memory during the tests. We also set the provisioned IOPS on the AWS EBS SSD volume to 12K to match the measured IOPS on the Dell APEX Private Cloud instance. We measured the number of OLTP transactions each solution handled per minute (TPM) and the number of new orders per minute (NOPM) each solution processed.

### Private cloud vs. public cloud

The key potential benefits of a private cloud are that organizations retain local control of their data and may be able to reduce cloud-consumption costs. Additionally, organizations can customize their private cloud environment to maximize efficiency and flexibility as their needs change.

## Process more OLTP transactions per minute with Dell APEX Private Cloud

Enterprise organizations that rely on the cloud to process OLTP workloads need infrastructure that meets the demands of their databases. Without the right cloud solution, applications might slow down as the workload increases. Choosing a cloud solution that processes transactions faster can give organizations a competitive edge and prevent back-logs. We evaluated the OLTP performance of each system using the TPROC-C workload from the HammerDB 4.5 benchmark and found that the Dell APEX Private Cloud environment was able to process more OLTP transactions per minute than the AWS solution we tested.

As Figure 1 shows, the Dell APEX Private Cloud solution with VMware Tanzu was able to process 24.9 percent more OLTP transactions per minute than the AWS EKS with EC2 instance that we tested. This could mean choosing Dell APEX Private Cloud in a Kubernetes environment for your OLTP workloads might allow your retail website to process more orders in less time. For supply chain managers, the ability to process more OLTP transactions faster could give them faster access to the most current data for their decision making.

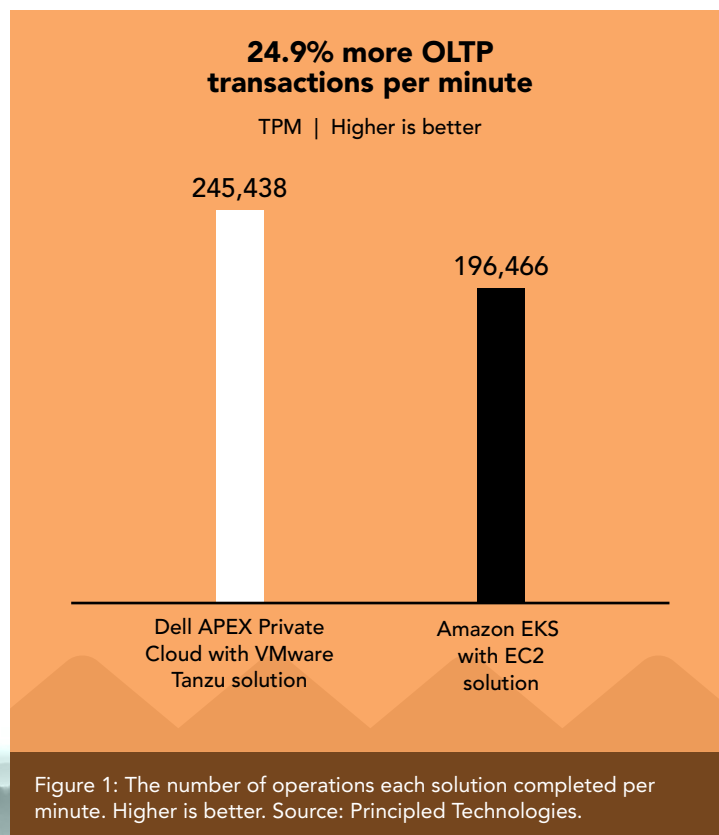
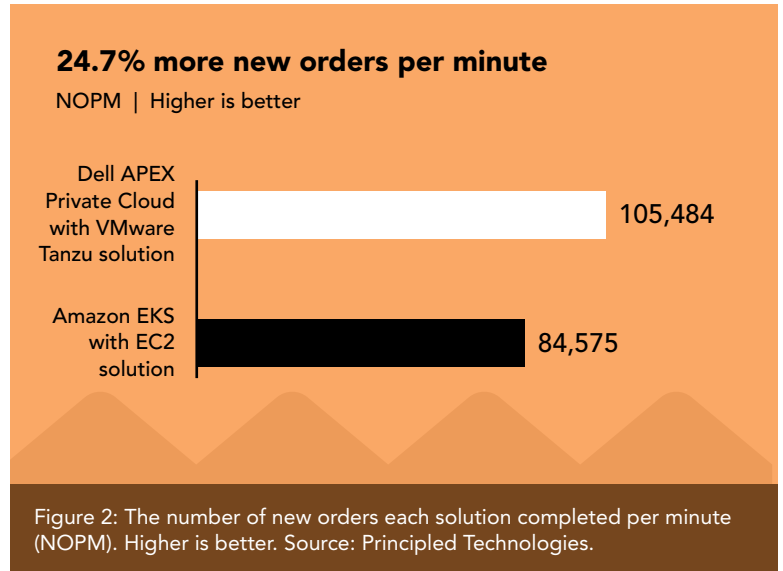


Figure 1: The number of operations each solution completed per minute. Higher is better. Source: Principled Technologies.

## Handle more new orders per minute with Dell APEX Private Cloud

Businesses that manage and track data using OLTP databases need their data processing system to operate seamlessly with their cloud solution. A key metric in determining the performance of a cloud solution is how many new orders per minute (NOPM) the system can process. We evaluated the NOPM performance of each system using the TPROC-C workload from the HammerDB 4.5 benchmark and found that the Dell APEX Private Cloud environment was able to process more NOPM than the AWS solution we tested.

As Figure 2 shows, the Dell APEX Private Cloud solution processed 24.7 percent more NOPM than the AWS solution we tested against. For a growing e-commerce business, this performance advantage could give them the ability to process more new orders in less time than if they chose Amazon EKS with EC2 to run their OLTP workloads.



### Dell APEX Private Cloud

According to Dell, APEX Private Cloud “delivers an on-premises cloud experience for VMware workloads in the data center and edge locations with scalable compute, storage, and networking resources.”<sup>4</sup> Dell APEX Private Cloud provides a small footprint for getting started with cloud or expanding your data center out to the edge.

For more information about Dell APEX Private Cloud, visit <https://www.dell.com/en-us/dt/apex/compute-hci/private-cloud.htm>.

### About VMware Tanzu

VMware Tanzu is a modular cloud native application platform that VMware created for use in the multi-cloud. According to VMware, Tanzu allows developers to “manage all Kubernetes as one for maximum efficiency and security while operating highly available and performant applications for your customers.”<sup>5</sup> VMware designed Tanzu to “increase developer productivity and invention”<sup>6</sup> while also speeding up and securing modern software delivery.

For more information about VMware Tanzu, visit: <https://tanzu.vmware.com/tanzu>.

## Conclusion

In an increasingly data-driven world, the ability to quickly process online transactions and to be able to handle more orders could give your business a competitive edge. As the scale of your databases grow, it is important to evaluate which available cloud solution is right for you. In our tests, the Dell APEX Private Cloud solution processed 24.9 percent more OLTP transactions per minute than the AWS solution we compared it to. The Dell APEX Private Cloud instance also processed 24.7 percent more NOPM than the AWS solution. Based on these findings, organizations that process OLTP transactions in a Kubernetes cloud environment might consider choosing Dell APEX Private Cloud with VMware Tanzu.

### About the Intel Xeon Platinum 8358 Processor

Part of the 3<sup>rd</sup> Generation Intel Xeon Scalable Processor family, the Intel Xeon Platinum 8358 Processor has 32 cores, 64 threads, a maximum turbo frequency of 3.50 GHz, a processor base frequency of 2.90 GHz, and a 56MB cache. According to Intel, this processor family offers optimization for “cloud, enterprise, HPC, network, security, and IoT workloads with 8 to 40 powerful cores and a wide range of frequency, feature, and power levels.”<sup>7</sup>

1. Fortune Business Insights, “Big Data Analytics Market Size, Share & COVID-19 Impact Analysis,” accessed October 26, 2022, <https://www.fortunebusinessinsights.com/big-data-analytics-market-106179>.
2. HammerDB, “About,” accessed March 16, 2023, <https://www.hammerdb.com/about.html>.
3. AWS, “Amazon EC2 M6i Instances,” accessed April 11, 2023, <https://aws.amazon.com/ec2/instance-types/m6i/>.
4. Dell, “Dell APEX Private Cloud,” accessed March 16, 2023, <https://www.dell.com/en-us/dt/apex/compute-hci/private-cloud.htm>.
5. VMware, “VMware Tanzu,” accessed October 28, 2022, <https://drift-lp-34698915.drift.click/tanzu-all-solutions-brief>.
6. “VMware Tanzu.”
7. Intel, “3<sup>rd</sup> Gen Intel® Xeon® Scalable Processors,” accessed March 23, 2023, <https://www.intel.com/content/www/us/en/products/docs/processors/xeon/3rd-gen-xeon-scalable-processors-brief.html>.

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