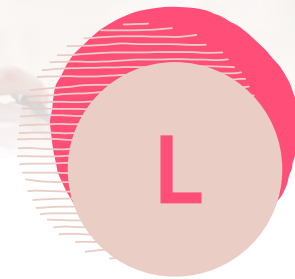**S**

Up to 19.8% more OLTP TPM

on 8-vCPU VMs*

M

Up to 23.6% more OLTP TPM

on 16-vCPU VMs*

L

Up to 19.1% more OLTP TPM

on 32-vCPU VMs*

Complete more PostgreSQL work with new Microsoft Azure Lsv3-series VMs featuring 3rd Gen Intel Xeon Scalable processors

New Azure Lsv3-series VMs processed more PostgreSQL data queries per minute than Lasv3-series VMs enabled by 3rd Gen AMD EPYC processors

Databases have become an essential feature of our lives. Behind every online purchase, emergency room visit, and business insight, there is a database storing information. The ability to quickly process transactions in the cloud gives organizations a competitive edge in our data-driven world. Businesses that need a scalable database often use PostgreSQL, but as the scope of their databases expand, they may have trouble handing a heavier online transaction processing (OLTP) workload. Choosing the Lsv3-series VMs from Microsoft Azure could be a solution.

Using the HammerDB TPROC-C 4.4 benchmark, we compared the OLTP performance of two types of storage-optimized Microsoft Azure VMs running PostgreSQL databases: an Lsv3-series VM with 3rd Gen Intel® Xeon® Scalable processors and an Lasv3-series VM with 3rd Gen AMD EPYC™ processors. We tested each VM at three sizes and found that at every size, the Lsv3-series VM completed more OLTP transactions per minute (TPM) than the Lasv3-series VM.

compared to Lasv3-series VMs

How we tested

We compared the transactional workload performance of two storage-optimized Azure VMs at three sizes:

- An Lsv3-series VM featuring 3rd Gen Intel Xeon Platinum 8370C processors

- An Lasv3-series VM featuring 3rd Gen AMD EPYC 7763 processors

Figure 1 shows the size specifications of the VMs we tested.

Small
8 vCPUs
64GB memory

Medium
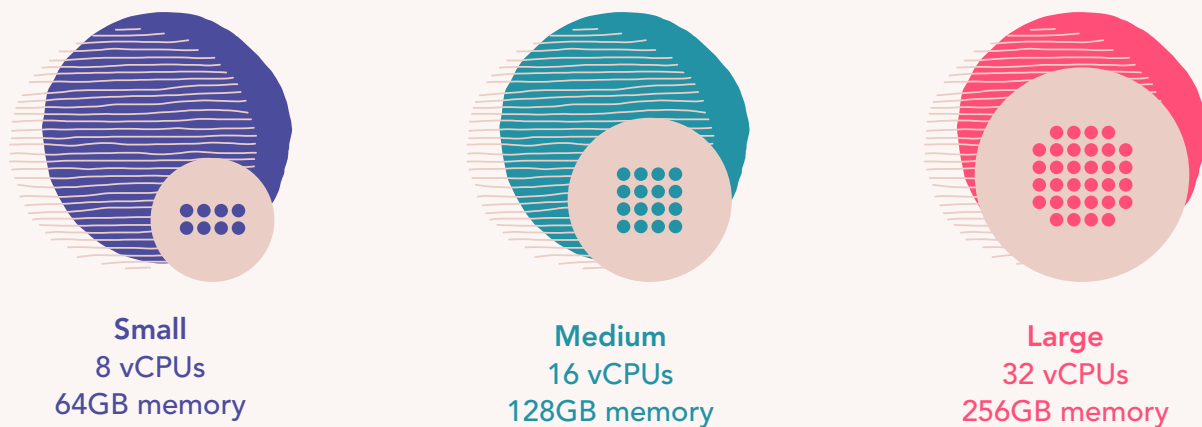16 vCPUs
128GB memory

Large
32 vCPUs
256GB memory

Figure 1: Key specifications of the Microsoft Azure Lsv3- and Lasv3-series VMs we tested. Source: Principled Technologies.

We tested Microsoft Azure VMs featuring 3rd Gen Intel Xeon Scalable processors and compared them to VMs featuring 3rd Gen AMD EPYC processors. We ran the TPROC-C workload from HammerDB running PostgreSQL databases to show the speed customers can expect to see using VMs with new Intel processors vs. VMs with new AMD processors. We placed the PostgreSQL data and log files on the direct-attached NVMe drives to achieve the best possible storage performance. We enabled huge pages and configured the database for best throughput at each VM size. A separate 32-vCPU client VM sent the HammerDB queries.

We tested each VM in Azure's south central US region.

For additional configuration information, see the science behind the report.

Process more OLTP transactions per minute with Azure Lsv3-series VMs

Our results

We evaluated each VM with the HammerDB benchmark tool, which measures the number of OLTP transactions per minute each processed. We tested each VM three times, and we report the median result. In every run, the Lsv3-series VM with 3rd Gen Intel Xeon Scalable processors performed more TPM than the Lasv3-series VM with 3rd Gen AMD EPYC processors. The small Lsv3-series VM processed up to 19.8 percent more OLTP TPM than the Lasv3-series counterpart. The medium Lsv3-series VM offered a performance advantage of up to 23.6 percent more TPM; the large VM, up to 19.1 percent more.

Normalized L8s_v3 vs. L8as_v3 comparison
Higher is better

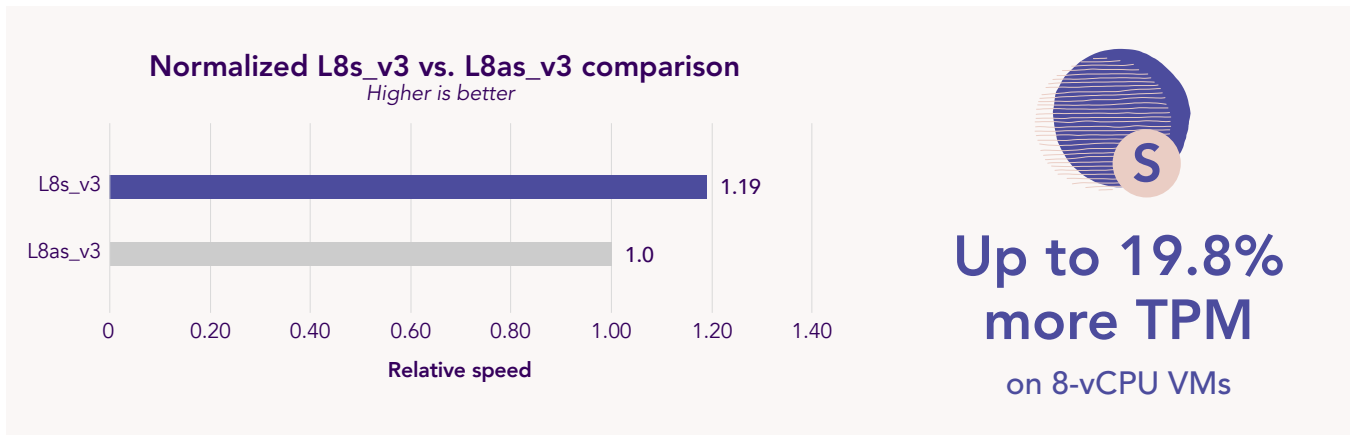|	Relative speed
L8s_v3	1.19
L8as_v3	1.0

Up to 19.8% more TPM on 8-vCPU VMs

Figure 2: Comparison of the number of transactions per minute that the small Lsv3 VM completed, relative to the number of transactions per minute that the small Lasv3 VM completed. Greater speed is better. Source: Principled Technologies.

Normalized L16s_v3 vs. L16as_v3 comparison
Higher is better

	Relative speed
L16s_v3	1.23
L16as_v3	1.0

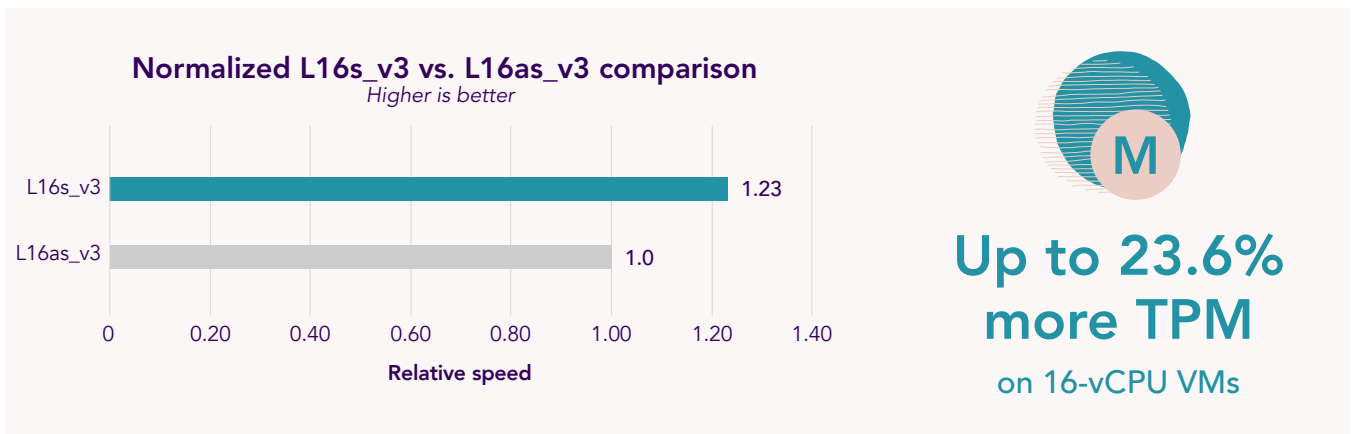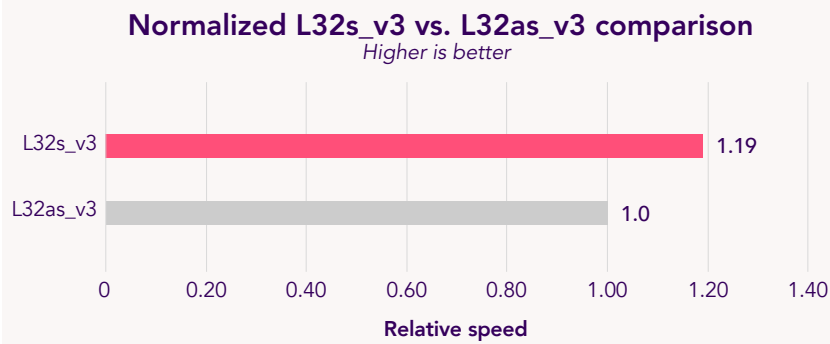Up to 23.6% more TPM on 16-vCPU VMs

Figure 3: Comparison of the number of transactions per minute that the medium Lsv3 VM completed, relative to the number of transactions per minute that the medium Lasv3 VM completed. Greater speed is better. Source: Principled Technologies.

Normalized L32s_v3 vs. L32as_v3 comparison
Higher is better

L32s_v3 — 1.19
L32as_v3 — 1.0

Relative speed
(axis: 0, 0.20, 0.40, 0.60, 0.80, 1.00, 1.20, 1.40)

L

Up to 19.1% more TPM
on 32-vCPU VMs

Figure 4: Comparison of the number of transactions per minute that the large Lsv3 VM completed, relative to the number of transactions per minute that the large Lasv3 VM completed. Greater speed is better. Source: Principled Technologies.

About the HammerDB TPROC-C 4.4 benchmark test

According to HammerDB, "HammerDB workloads are designed to be reliable, scalable and tested to produce accurate, repeatable and consistent results."[1]

We evaluated the OLTP performance of the VMs using the HammerDB TPROC-C 4.4 benchmark. According to documentation, the benchmark "is designed to measure relative as opposed to absolute database performance between systems."[2] Because we derived our workload from the TPROC-C benchmark, it is not comparable to any published TPC-C results.

For more information, visit https://www.hammerdb.com/docs/ch03s03.html.

About Microsoft Azure Lsv3-series VMs

New storage-optimized Azure Lsv3-series VMs feature 3rd Generation Intel Xeon Scalable processors in hyperthreaded configurations. According to Microsoft, the VMs also offer the following specifications.[3]

- Up to 80 vCPUs and up to 800 GiB of RAM
- All-core turbo clock speed of up to 3.5GHz
- Intel Turbo Boost Technology
- Intel Advanced-Vector Extensions 512 (Intel AVX-512)
- Intel Deep Learning Boost

To learn more, visit https://docs.microsoft.com/en-us/azure/virtual-machines/lsv3-series.

In context

For an e-commerce company, the ability to process a high volume of online transactions is essential to the bottom line. As organizations attempt to grow their business, they need the ability to scale their OLTP workloads to meet increasing demands. By choosing the performance-optimized Lsv3-series VM your organization could process more PostgreSQL database transactions in less time.

Based on the results of our TPROC-C tests, the 16-vCPU Lsv3 VM with 3rd Gen Intel Xeon Scalable processors would allow your company to complete up to 23.6 percent more TPM than if your organization was using the 16-vCPU Lasv3 VM with 3rd Gen AMD EPYC processors. The 8-vCPU Lsv3 VM could allow you to process up to 19.8 percent more transactions per minute; the 32-vCPU Lsv3 VM could allow you to process up to 19.1 percent more.

In a competitive space like e-commerce, this sort of advantage could mean the difference between success and failure for your organization.

Conclusion

As the scope and scale of your databases increase, so too must the processing power and storage capacity of your VMs. Businesses that rely on the cloud to house their PostgreSQL databases need systems that can consistently handle a large number of OLTP transactions. The Lsv3-series VMs we tested are storage optimized for high performance. When we compared the HammerDB TPROC-C benchmark performance of the Lsv3-series VMs to that of the Lasv3-series VMs, the Lsv3-series VMs executed more OLTP TPM than the Lasv3-series VMs at all three sizes.

1. HammerDB, "3. HammerDB TPROC-C workload," accessed July 13, 2022, https://www.hammerdb.com/docs/ch03s03.html.
2. HammerDB, "3. HammerDB TPROC-C workload."
3. Microsoft, "Lsv3-series," accessed July 14, 2022, https://docs.microsoft.com/en-us/azure/virtual-machines/lsv3-series.

Read the science behind this report at https://facts.pt/DjE9RzX ▶

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This project was commissioned by Intel.