Handle up to 1.28x the MariaDB transactions per minute

with small M6i series instances*

Handle up to 1.29x the MariaDB transactions per minute

with medium M6i series instances*

Handle up to 1.21x the MariaDB transactions per minute

with large M6i series instances*

*compared to older M5 series instances

Achieve better online transaction processing performance on MariaDB with new Amazon EC2 M6i instances featuring 3rd Generation Intel Xeon Scalable processors

Compared to older M5 series instances, the new series processed a higher rate of transactions per minute across three instances/database sizes

Companies seeking to run their online transaction processing (OLTP) database work on the cloud should consider new instance options from their CSP. In some cases, new instances can provide stronger workload performance while being more cost effective than older offerings.

At Principled Technologies, we compared the MariaDB OLTP performance of two series of Amazon EC2 (Elastic Cloud Compute) instances: new M6i series instances featuring 3rd Generation Intel® Xeon® Scalable processors and older M5 series instances featuring 2nd Generation Intel Xeon Scalable processors. In our tests, the M6i series instances handled a higher rate of transactions per minute compared to the M5 series instances. Having a greater capacity for OLTP work can enable companies to serve more users and meet demands during unexpected growth periods.

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How we tested

We compared the following series of general-purpose instances from Amazon EC2:

- **M6i series instances** featuring 3rd Generation Intel Xeon Platinum 8375C (Ice Lake) processors

- **M5 series instances** featuring 2nd Generation Intel Xeon Platinum 8259CL (Cascade Lake) processors

Though we confirmed each M5 series instance in our testing featured the above processor, M5 series instances are available in several different processor configurations.

Instance sizes

To represent the real-world needs of a variety of company types, we tested three sizes of instances from each series. Figure 1 shows key information for the instances we tested. (For more detailed hardware and software configuration information, see the Science behind this report.)

To ensure that each instance's resources were appropriately sized for the workload and that storage would not be a performance bottleneck during the workload, we configured each database to fit within the allocated RAM for each instance. Though this is not always practical in real-life use cases, we generally find that sizing a database to fit within RAM results in strong performance while lowering cloud storage costs.

Small instances	Medium instances	Large instances
8 vCPUs	16 vCPUs	64 vCPUs
32 GB memory	64 GB memory	256 GB memory
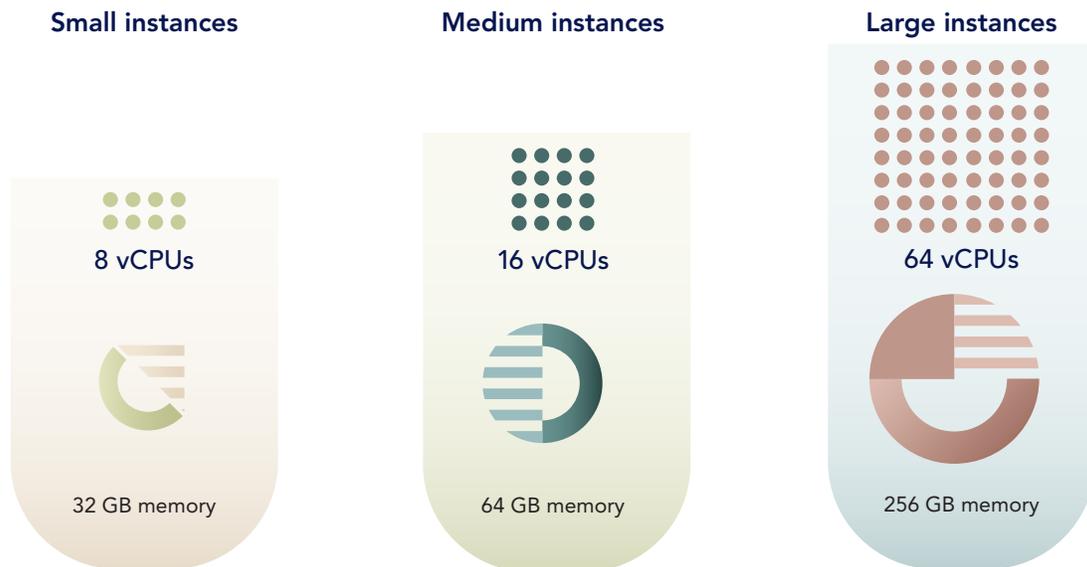
Figure 1: Key information on the instance sizes we tested. Source: Principled Technologies

OLTP workload: HammerDB TPROC-C

Many types of organizations regularly run OLTP workloads daily, such as online warehouse stores, banks, and delivery services. To test the OLTP performance of each Amazon EC2 instance, we used the TPROC-C test from the HammerDB benchmarking suite. The HammerDB developers derived TPROC-C from the TPC-C standard, but note that this workload is not a full implementation of TPC-C. As such, this paper's results are not directly comparable to official published TPC results. For more information, see the HammerDB website: https://www.hammerdb.com/docs/ch03s05.html.[1]

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Our results

Your company's database work is mission-critical—your customers and users make potentially billions of database transactions each day. To ensure they can access your services uninterrupted, you need a cloud solution that can handle the load. In each of our tests, new M6i instances featuring 3rd Generation Intel Xeon Scalable processors handled a higher rate of OLTP transactions per minute compared to older M5 instances featuring 2nd Gen Intel Xeon Scalable processors.

Figures 2 through 4 illustrate the results of our testing.

1.28x the transactions per minute with small instances

OLTP workload on MariaDB | Higher is better | Normalized results

m6i.2xlarge

1.28

m5.2xlarge

1
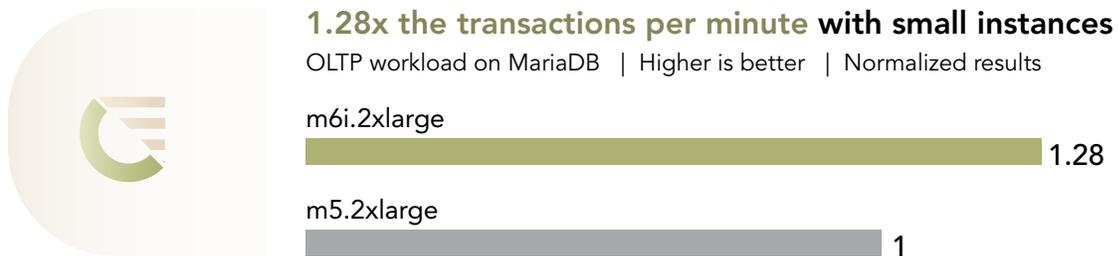
Figure 2: Comparison of average transactions per minute achieved by each 8vCPU instance, normalized to the rate achieved by the m5.2xlarge instance. Source: Principled Technologies.

1.29x the transactions per minute with medium instances

OLTP workload on MariaDB | Higher is better | Normalized results

m6i.4xlarge

1.29

m5.4xlarge

1

Figure 3: Comparison of average transactions per minute achieved by each 16vCPU instance, normalized to the rate achieved by the m5.4xlarge instance. Source: Principled Technologies.

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1.21x the transactions per minute with large instances

OLTP workload on MariaDB | Higher is better | Normalized results

m6i.16xlarge

1.21

m5.16xlarge

1
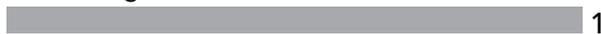
Figure 4: Comparison of average transactions per minute achieved by each 64vCPU instance, normalized to the rate achieved by the m5.16xlarge instance. Source: Principled Technologies.

The cost-effectiveness of new M6i series instances

According to pricing information from the Amazon EC2 website, new m6i series instances have the same on-demand hourly rate cost as older M5 series instances.[2] That means your MariaDB OLTP work could be up to 1.29x as cost-effective with instances featuring 3rd Gen Intel Xeon Scalable processors than with instances featuring 2nd Gen Intel Xeon Scalable processors.

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Conclusion

Your company stands to benefit from using faster cloud instances to support its OLTP database work. New M6i instances can increase your capacity to do good work for your customers—and they can also be a lighter load for your wallet for the same performance.

In our OLTP tests on MariaDB, new Amazon EC2 M6i instances featuring 3rd Generation Intel Xeon Scalable processors handled a higher rate of database transactions per minute compared to older M5 series instances featuring 2nd Gen Intel Xeon Scalable processors. And because the M6i series instances have the same hourly cost as the M5 series instances, the new series is more cost-effective in addition to being better performing.

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1 "Understanding the TPROC-C workload derived from TPC-C," accessed November 3, 2021,
   https://www.hammerdb.com/docs/ch03s05.html.
2 "Amazon EC2 On-Demand Pricing," accessed November 3, 2021,
   https://aws.amazon.com/ec2/pricing/on-demand/.

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

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For additional information, review the science behind this report.

This project was commissioned by Intel.

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