



Google Cloud N2 instances featuring 3rd Gen Intel Xeon Scalable processors executed more MongoDB operations per second

Compared to N2 instances with previous-generation Intel Xeon processors

MongoDB is a document-based database that uses a distributed approach to storing data. Organizations use distributed MongoDB database workloads to bring together information from a variety of sources. A platform that enables MongoDB to calculate at a faster rate can deliver actionable insights into the hands of decision-makers earlier.

If you're interested in running your MongoDB workloads in the cloud, it's important to understand the performance differences between instances. To help customers do this, we measured the MongoDB workload performance of two sets of Google Cloud N2 instances, one featuring 3rd Gen Intel® Xeon® Scalable processors and the other with 2nd Gen Intel Xeon Scalable processors.

When we ran the Yahoo Cloud Serving Benchmark (YCSB) on small, medium, and large instances from each set, all three latest-generation N2 instances outperformed the older instances in terms of the rate of YCSB operations per second. In addition to making important information available sooner, this increased speed could translate to reduced active instance time, which could lower costs.



Up to 1.28 times the MongoDB operations/sec on 8vCPU instances*



Up to 1.26 times the MongoDB operations/sec on 16vCPU instances*



Up to 1.35 times the MongoDB operations/sec on 64vCPU instances*

**compared to the same size N2 instances with 2nd Gen Intel Scalable Processors*

How we tested

We tested two generations of Google Cloud N2 instance clusters at three sizes:

- A three-node cluster of N2 instances featuring 3rd Gen Intel Xeon Scalable processors
- A three-node cluster of N2 instances featuring 2nd Gen Intel Xeon Scalable processors

We used the Yahoo Cloud Serving Benchmark to measure MongoDB performance.

In Figure 1, we present the size specifications of the instances we tested.

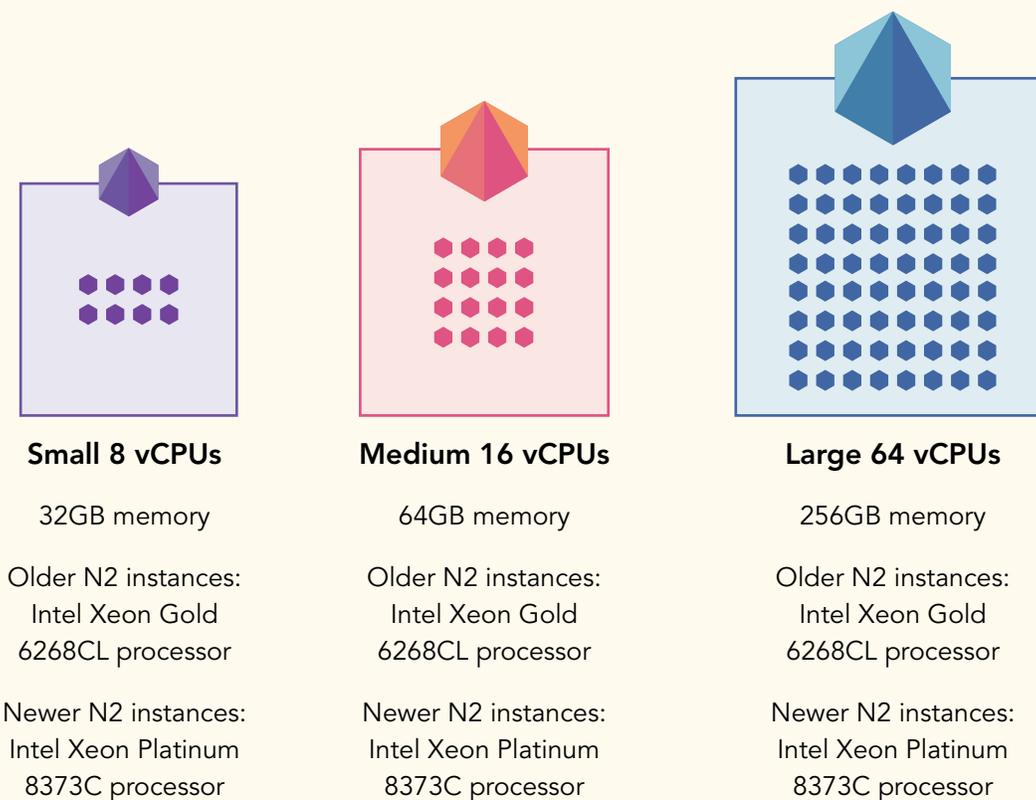


Figure 1: Key specifications of the Google Cloud N2 instances we tested. Source: Principled Technologies.

We tested the instance clusters in the Central US region. A persistent SSD hosted the test datasets, which consisted of 20 million, 40 million, or 80 million records, depending on the test size. We tuned each instance's kernel parameters and security limits using Tuned with the virtual-guest profile. We sharded the database across all three nodes for maximum throughput. For additional configuration information, see the [science behind the report](#).



Our findings

As Figure 2 shows, for small instances with 8 vCPUs, the N2 instances featuring 3rd Gen Intel Xeon Scalable processors executed 1.28 times the YCSB operations per second of the N2 instances with previous-generation processors.

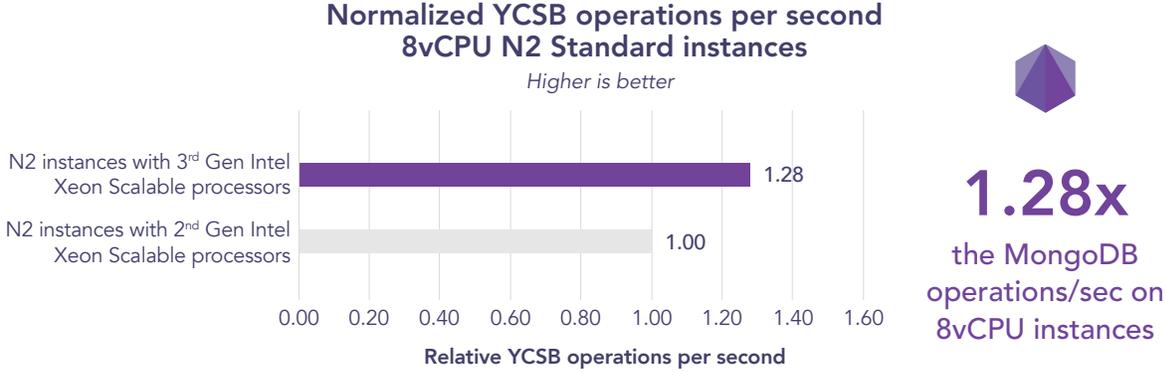


Figure 2: Comparison of the rate at which each of the small N2 instances featuring 3rd Gen Intel Xeon Scalable processors completed the MongoDB workload, relative to the rate of the N2 instances with older processors. Higher is better. Source: Principled Technologies.

About the MongoDB workload we used in testing

To measure MongoDB performance, we used the Yahoo Cloud Serving Benchmark. According to Yahoo!, “the goal of the Yahoo Cloud Serving Benchmark (YCSB) project is to develop a framework and common set of workloads for evaluating the performance of different ‘key-value’ and ‘cloud’ serving stores.”¹ The benchmark serves many databases including Apache HBase and Cassandra, two NoSQL databases that can handle large datasets.

To learn more, visit <https://research.yahoo.com/news/yahoo-cloud-serving-benchmark>.

As Figure 3 shows, for medium instances with 16 vCPUs, the N2 instances featuring 3rd Gen Intel Xeon Scalable processors executed 1.26x the YCSB operations per second of the N2 instances with previous-generation processors.

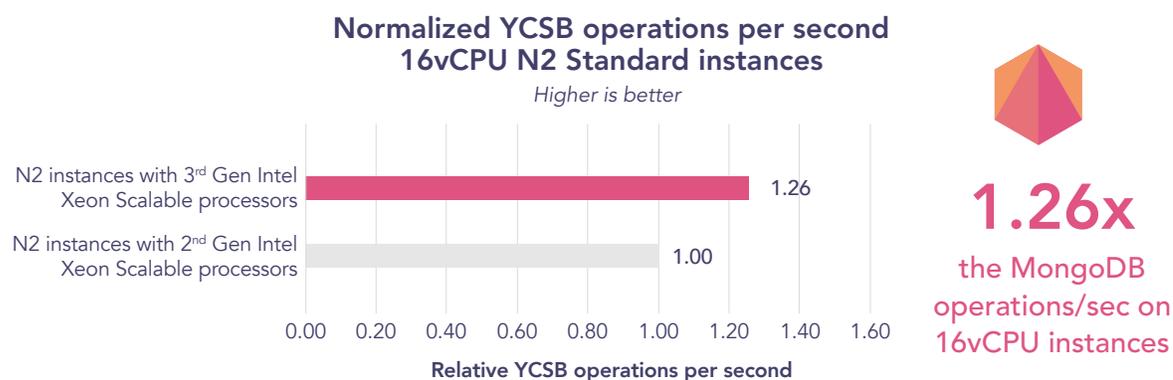


Figure 3: Comparison of the rate at which each of the medium N2 instances featuring 3rd Gen Intel Xeon Scalable processors completed the MongoDB workload, relative to the rate of the N2 instances with older processors. Higher is better.
Source: Principled Technologies.

As Figure 4 shows, for large instances with 64 vCPUs, the N2 instances featuring 3rd Gen Intel Xeon Scalable processors executed 1.35 times the YCSB operations per second of the N2 instances with previous-generation processors.

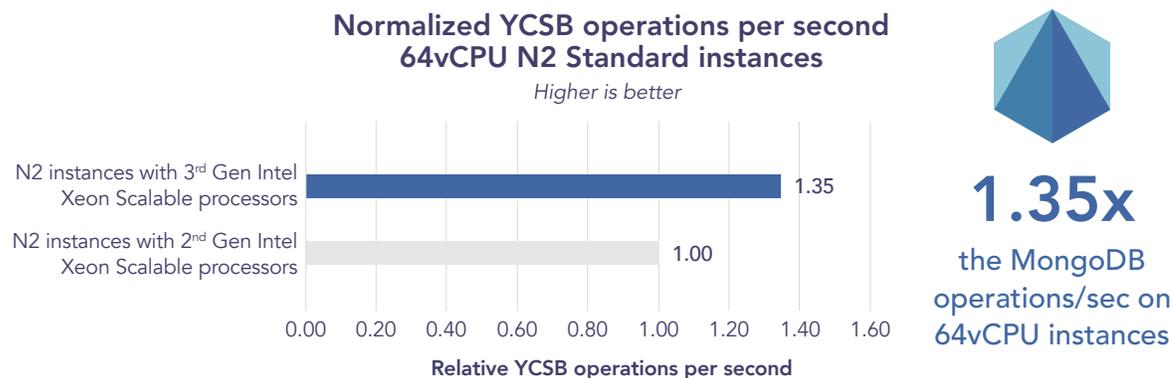


Figure 4: Comparison of the rate at which each of the large N2 instances featuring 3rd Gen Intel Xeon Scalable processors completed the MongoDB workload, relative to the rate of the N2 instances with older processors. Higher is better.
Source: Principled Technologies.

About the Google Cloud N2 machine series

The Google Cloud N2 machine series is available in sizes from 2 to 128 vCPUs and 0.5 to 8 GB of memory per vCPU.² Machine types in this series run on both 3rd Generation Intel Xeon Scalable processors and 2nd Generation Intel Xeon Scalable processors.

According to Google, “Workloads that can take advantage of the higher clock frequency are a good choice for this series. These workloads can get higher per-thread performance while benefiting from all the flexibility that the general-purpose machine family offers.”³

Learn more at <https://cloud.google.com/compute/docs/general-purpose-machines>.



Conclusion

A distributed MongoDB database is an important tool for assembling information from multiple sources. Selecting cloud instances that deliver stronger performance on these workloads is a smart business move that can speed time to insight and could even reduce cloud spending. We tested MongoDB workloads on two generations of Google Cloud instance clusters in three sizes. In our tests, all three N2 clusters featuring 3rd Gen Intel Xeon Scalable processors executed YCSB operations per second at a much higher rate than the same size N2 clusters with previous-generation processors, delivering up to 1.35 times the performance.

1. "Yahoo Cloud Serving Benchmark," accessed October 27, 2022, <https://research.yahoo.com/news/yahoo-cloud-serving-benchmark>.
2. Google Cloud, "General-purpose machine family," accessed October 27, 2022, <https://cloud.google.com/compute/docs/general-purpose-machines>.
3. Google Cloud, "General-purpose machine family."

Read the science behind this report at <https://facts.pt/6PkmWHY> ►



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This project was commissioned by Intel.