



**Up to 68%
better performance vs.
Amazon Aurora**

with 16vCore Azure SQL
Database Hyperscale (96 users)



**Up to 38%
better performance vs.
Amazon Aurora**

with 32vCore Azure SQL
Database Hyperscale (96 users)



**Up to 68% better
performance/dollar vs.
Amazon Aurora**

with 16vCore Azure SQL
Database Hyperscale (96 users)



**Get better performance
as you grow**

Both Azure SQL Database
Hyperscale instances
outperformed Amazon Aurora
at 64, 96, and 128 users

Achieve strong performance and value on Azure SQL Database Hyperscale

Azure SQL Database Hyperscale offered better performance and value compared to Amazon Aurora PostgreSQL I/O-Optimized instances

Moving databases and other critical workloads to the cloud has given organizations freedom from on-site hardware management as well as the flexibility to expand resources alongside growing business demands. But while these cloud instances reside elsewhere, traditional instances have still been constrained by set limits of database size, memory, and storage. Now, flexible infrastructures available in the cloud can allow databases to grow on demand, based on usage.

Popular cloud service providers Microsoft Azure and Amazon Web Services™ (AWS) each provide offerings in this space. To assist organizations in their cloud selection process, the Principled Technologies team evaluated the database performance and cost effectiveness of Azure SQL Database Hyperscale and Amazon Aurora PostgreSQL I/O-Optimized instances. In these tests, we used a 2.3TB database to fully utilize system components and used an I/O-intensive workload.

In our testing across multiple vCore counts and using different numbers of database users, we found that Azure SQL Database Hyperscale offered stronger database performance than Amazon Aurora. Plus, Azure SQL Database Hyperscale delivered a better value for cloud customers, improving performance per dollar by as much as 68 percent.

How we tested

To compare database testing across the instance types, we used the HammerDB benchmark, which reports performance in new orders per minute (NOPM) that a system can process. More NOPM indicates that an instance can handle more users accessing and changing the database, which includes real-world actions such as purchasing an item from an online store or making hotel reservations.

We compared the OLTP performance of Azure SQL Database Hyperscale and the Amazon Aurora PostgreSQL I/O-Optimized instances at three different user counts, 64, 96, and 128, to show performance differences across different workload sizes. Within HammerDB test parameters, we enabled the 'use all warehouses' option which increases I/O intensity. This fully utilized the 2.3TB database, resulting in less read activity that could be read out of memory cache. Both services used different underlying database engines. For more about the configurations we tested and the step-by-step details of our testing, read the [science behind the report](#).

About Azure SQL Database Hyperscale

The Hyperscale service tier of Azure SQL Database maintains the high availability of the general purpose and business critical tiers while offering more compute and storage resources. Hyperscale databases can scale up or scale out on demand because they draw from resource pools and don't have defined limits. In a Microsoft Learn post, Microsoft describes Hyperscale architecture thusly: "Hyperscale separates the query processing engine, where the semantics of various data engines diverge, from the components that provide long-term storage and durability for the data. In this way, storage capacity can be smoothly scaled out as far as needed. The initially supported storage limit is 100 TB."¹

Azure SQL Database Hyperscale offers capabilities that include rapid scaling, automatic scaling, and fast database backups and restores.²

About HammerDB

HammerDB is an open-source benchmarking tool that tests the performance of many leading databases. The benchmark tool includes two built-in workloads derived from industry standards: a transactional (TPROC-C) workload and an analytics (TPROC-H) workload. We chose the TPROC-C (TPC-C-like) workload to demonstrate the online transaction processing performance capabilities of each instance, which benefit from high core counts and fast memory. TPROC-C runs a transaction processing workload that simulates an ecommerce business with five types of transactions: receiving a customer order, recording a payment, delivering an order, checking an order's status, and checking stock in inventory.³ Note that our test results do not represent official TPC results and are not comparable to official TPC-audited results.

To learn more about HammerDB, visit <https://www.hammerdb.com/>.



Improve database performance with Azure SQL Database Hyperscale

In our database tests comparing Azure SQL Database Hyperscale to Amazon Aurora instances, Azure SQL Database Hyperscale offered better performance across the board.

Figure 1 compares the database performance of Azure SQL Database Hyperscale with 16 vCores to similarly configured Amazon Aurora instances. Testing with 64 users, Azure SQL Database Hyperscale improved performance by 51 percent; improved performance at 96 users by 68 percent; and improved performance at 128 users by 67 percent.

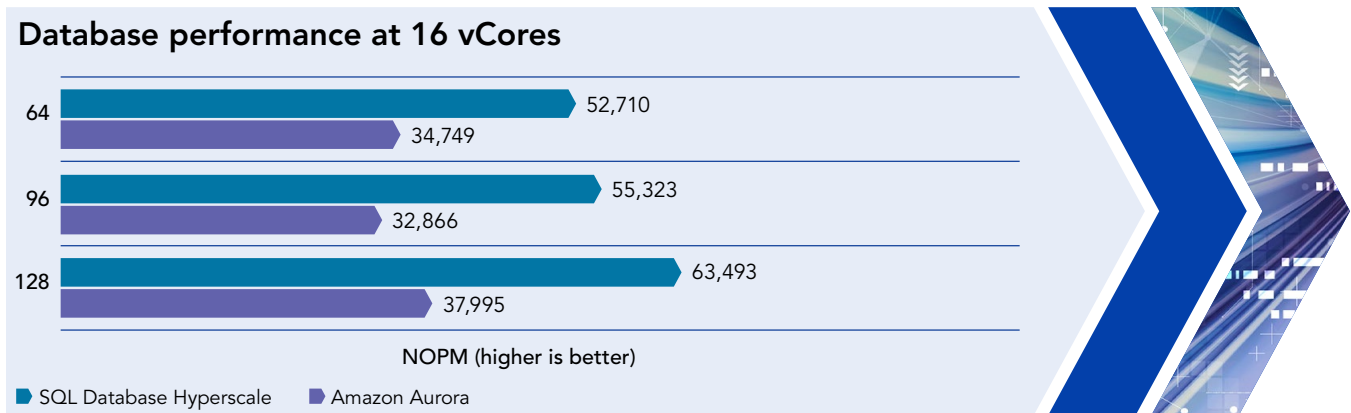


Figure 1: HammerDB benchmark results, in NOPM, at 64, 96, and 128 user counts for Azure SQL Database Hyperscale and Amazon Aurora databases with 16 vCores. Higher is better. Source: Principled Technologies.

At 32 vCores, Azure SQL Database Hyperscale again delivered stronger performance than their Amazon Aurora counterparts, achieving up to 38 percent more NOPM at 96 users (see Figure 2).

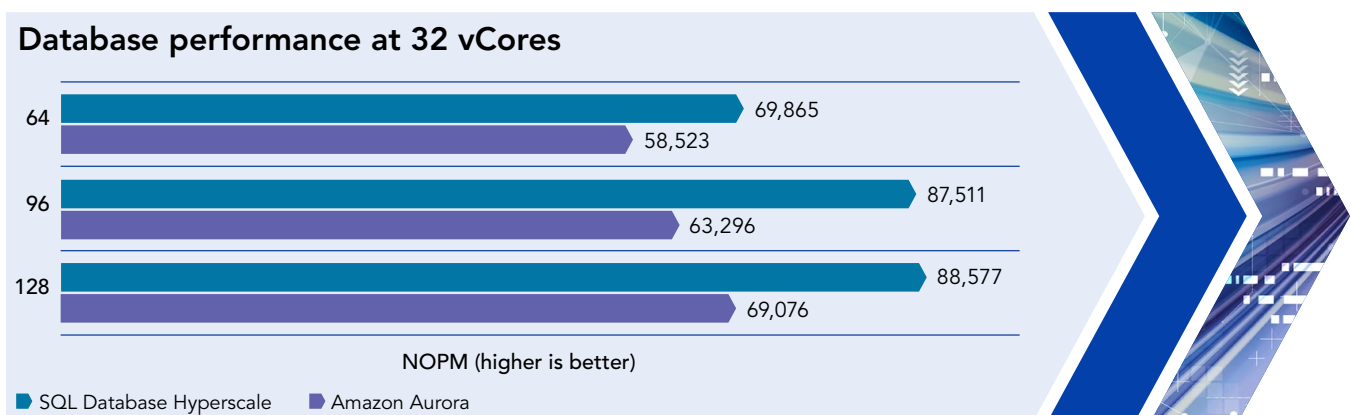


Figure 2: HammerDB benchmark results, in NOPM, at 64, 96, and 128 user counts for Azure SQL Database Hyperscale and Amazon Aurora databases with 32 vCores. Higher is better. Source: Principled Technologies.

These significant performance gains across core counts and user counts show that Azure SQL Database Hyperscale databases handle a greater transaction volume, which means more users can access and make updates to the database, which ultimately helps your organization's bottom line, no matter the specific business you're in.

Ensure your cloud instances provide top performance and value

Database performance is critical, but so too is the value you get for spending your IT budget with a cloud provider. For details on the pricing we used to calculate performance/per dollar, read the [science behind the report](#). As Figure 3 shows, Azure SQL Database Hyperscale offered better value than did Amazon Aurora, offering up to 68 percent better performance per dollar.

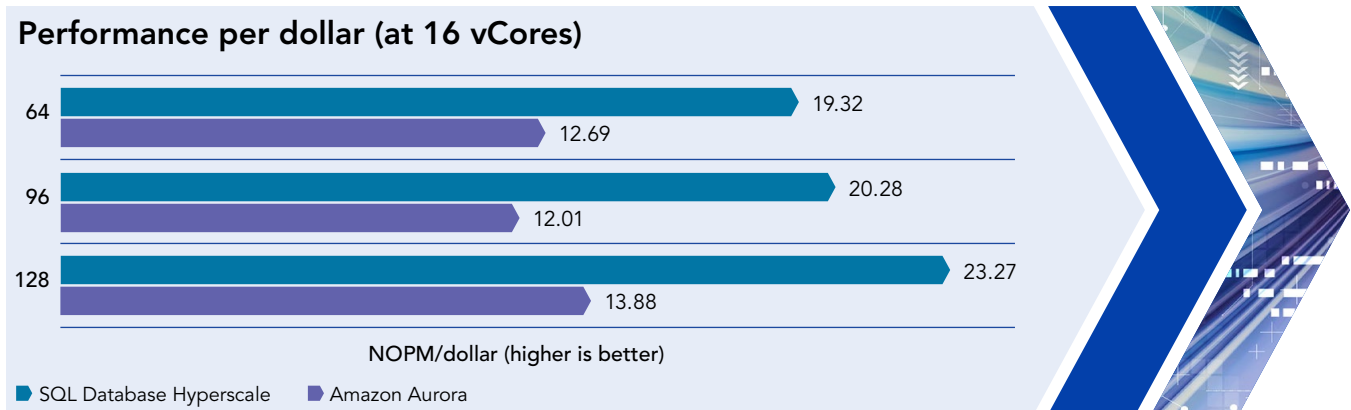


Figure 3: Performance/dollar comparison for Azure SQL Database Hyperscale and Amazon Aurora databases with 16 vCores, based on our HammerDB testing and prices as of 1/04/2024. Higher is better. Source: Principled Technologies.

When we configured the instances with 32 vCores, Azure SQL Database Hyperscale again offered better value than did Amazon Aurora, offering up to 40 percent better performance per dollar (see Figure 4).

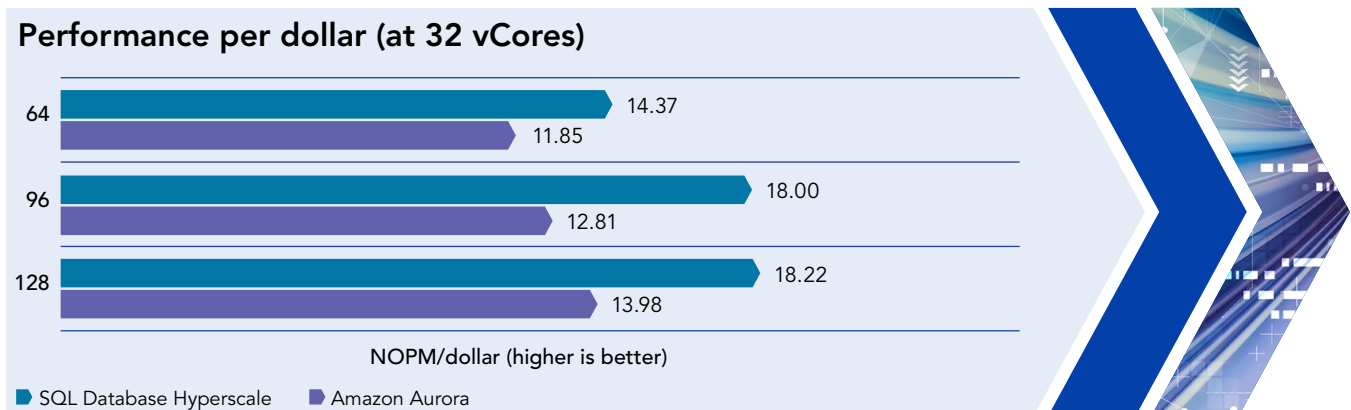


Figure 4: Performance/dollar comparison for Azure SQL Database Hyperscale and Amazon Aurora databases with 32 vCores, based on our HammerDB testing and prices as of 1/04/2024. Higher is better. Source: Principled Technologies.



Conclusion

Selecting a cloud database service that not only provides the easy scaling your organization requires, but also a stronger balance of performance and value, can help your team meet business goals without burning through your budgeted cloud costs. In our hands-on tests, Azure SQL Database Hyperscale delivered up to 68 percent stronger database performance than Amazon Aurora did, which shows it can meet strenuous performance needs at various user counts. In addition, Azure SQL Database Hyperscale offered better performance per dollar, making it an overall more cost-effective choice in addition to being stronger in raw performance.

1. Microsoft, "Hyperscale architecture," accessed December 3, 2023, <https://learn.microsoft.com/azure/azure-sql/database/hyperscale-architecture?view=azuresql>.
2. Microsoft, "Hyperscale service tier," accessed December 3, 2023, <https://learn.microsoft.com/en-us/azure/azure-sql/database/service-tier-hyperscale?view=azuresql>.
3. HammerDB, "Understanding the TPROC-C workload derived from TPC-C," accessed December 3, 2023, <https://www.hammerdb.com/docs/ch03s05.html>.

Read the science behind this report at <https://facts.pt/RZ1VaAm> ►



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