July 2026

Cut cloud instance costs and boost transactional database performance with Dell PowerEdge R770

Running a HammerDB workload, the on-premises Intel Xeon 6 processor-powered PowerEdge server could cut costs compared to an AWS EC2 m8i.2xlarge cloud instance

Executive summary

Small and medium-sized businesses (SMBs) often rely on Microsoft SQL Server database workloads to support transaction-heavy business applications. IT teams for those organizations face many important deployment decisions, but perhaps first and foremost is whether to keep online transaction processing (OLTP) workloads on premises or move them to the cloud. For IT decision-makers with smaller budgets, such as those in SMBs, that choice might come down to cost.

We calculated the three-year total cost of ownership (TCO) of an on-premises Dell PowerEdge R770 server with Intel Xeon 6 processors and Amazon Web Services™ (AWS™) Elastic Compute Cloud (EC2) m8i.2xlarge cloud instances handling the same amount of transactional SQL Server workloads running 24/7. Over three years, the modeled costs showed a significant advantage for the on-prem Dell and Intel solution: a savings of $390,031.03, or 75 percent, less than the AWS EC2 solution.

Our three-year TCO analysis relied on transactional SQL Server output from our testing, which showed the Dell solution delivered higher throughput. Both solutions ran an OLTP workload from HammerDB, which generates throughput in transactions per minute (TPM) and new orders per minute (NOPM). As this report explains, organizations weighing the costs and performance of on-premises and cloud solutions for SQL Server workloads could save money and help their bottom lines by choosing an on-premises Dell PowerEdge R770 solution powered by Intel Xeon 6 processors.

Dell™ PowerEdge™ R770

+ Intel® Xeon® 6 processors
+ Microsoft SQL Server

Images provided by Dell Technologies

Spend less over three years
75% lower three-year cost analysis

Boost hardware investment value
5.59x the performance per dollar

Process more application activity
36% more TPM and NOPM

A Principled Technologies report: Hands-on testing. Real-world results.

Key takeaways

1 SQL Server deployment decisions need workload-specific cost data

Cloud and on-premises deployment choices can look different once teams compare actual workload performance against multi-year costs. We tested a Dell PowerEdge R770 with Intel Xeon 6 processors using HammerDB TPROC-C on Microsoft SQL Server, and then we built a three-year TCO model comparing the on-prem solution with an AWS EC2 m8i.2xlarge instance deployment sized for comparable throughput with the workload running 24/7. The Dell and Intel solution could cost **$390,031.03 less** over three years.

2 Lower cost and better performance can boost an investment

A lower TCO is even more compelling when the solution could meet database throughput demands. Based on our TPROC-C results and three-year cost model, the Dell PowerEdge solution delivered 5.59 times the TPM and NOPM per dollar of the AWS EC2 deployment. For SMB IT teams, this metric connects performance and cost in a way that can support a clearer infrastructure purchase decision.

3 On-premises solutions can exceed the performance of cloud solutions

Many SQL Server environments need to support multiple database workloads at once. In our testing, the on-prem Dell solution supported 3,909,258 total TPM and 1,682,851 total NOPM across 28 VMs. Based on the throughput we measured from the AWS EC2 M8i instance, matching that aggregate on-prem throughput would require more than the estimated 28 cloud instances from our TCO analysis.*

"Cloud and on-premises deployment choices can look different once teams compare actual workload performance against multi-year costs."

4 Per-VM results show the building blocks behind the full-stack result

Full-stack throughput showed the total work the on-prem Dell server supported, while per-VM throughput showed how an average database VM performed against the similarly configured AWS EC2 instance. The average VM on the Dell PowerEdge R770 delivered 139,616 TPM and 60,101 NOPM, compared to 102,576 TPM and 44,078 NOPM from the m8i.2xlarge instance. This per-VM comparison helps show that the aggregate on-prem result came from individual VM performance, not just VM count.

*Note: We used comparable virtual resources in our test configurations: Our analysis focused on 28 cloud instances and 28 VMs for the on-prem Dell solution.

DELL Technologies intel intel XEON

Why deployment matters for transactional databases

For many SMBs, SQL Server databases sit behind everyday operations: taking orders, updating inventory, recording payments, checking account status, and feeding the applications employees and customers depend on. In practical terms, database performance is more than just an IT metric: It can actually affect how quickly an organization operates.

Because smaller-scale organizations can be more sensitive to budget constraints, choosing where to run those databases has become complicated. Cloud can offer flexibility, especially when demand is unpredictable or a team wants to avoid buying hardware, and a subscription model might seem to make more fiscal sense on the surface. AWS, for example, offers On-Demand Instances that customers pay for by the hour or second with no long-term commitment, while Reserved Instances can reduce costs in exchange for a one-year or three-year commitment.[2] But for steady, business-critical workloads that run around the clock, the economics can shift. Spikes in usage can mar the user experience if not immediately remedied, which might require unexpected expenditures. A SQL Server environment that needs consistent throughput for months or years may require a different analysis than a short-term, variable workload.

That is why workload-specific cost data matters. In a 2025 survey, 81 percent of respondents named cost efficiency or savings as the top metric for assessing progress against cloud goals.[3] The survey also found that 73 percent of respondents were using hybrid cloud, underscoring that many organizations are not choosing cloud or on-premises infrastructure exclusively.[4] This suggests that organizations might be choosing where to deploy workloads based on a confluence of factors.

For SMBs' SQL Server OLTP workloads, both cost over time and performance should impact that decision. A cloud instance might appear to be a straightforward way to add database capacity, but getting higher throughput can require more instances running continuously. Spending less over three years for an on-premises Dell PowerEdge R770 powered by Intel Xeon 6 processors to run SQL Server workloads can free budget for other IT priorities, from other infrastructure refreshes and security improvements to backup, disaster recovery, and application modernization. The better performance that the Dell server can deliver also helps the database applications behind everyday work feel more responsive, giving employees faster access to the data they need and helping routine business processes move with fewer delays.

About HammerDB TPROC-C

HammerDB is a free, open-source benchmarking tool for databases. Its TPROC-C OLTP workload models a wholesale parts supplier processing orders, payments, deliveries, and stock-level checks—the kinds of transactions that underpin countless small business applications.[1] Think of it as a stress test that mimics what happens when multiple cashiers ring up sales, warehouse staff check inventory, and managers pull reports all at the same time.

Learn more about the HammerDB TPROC-C workload.

"A SQL Server environment that needs consistent throughput for months or years may require a different analysis than a short-term, variable workload."

Understanding the three-year cost savings of the Dell PowerEdge R770

What we tested and analyzed

We tested transactional database performance of one on-prem Dell PowerEdge R770 server supporting 28 VMs and one AWS EC2 m8i.2xlarge instance. We selected the latest Intel processor-backed general-purpose instances to match the core-to-memory ratio of the Dell PowerEdge R770, aligning it as closely as possible in terms of vCPU count, memory, and storage profile. (Note: The AWS EC2 M8i instance used a custom-built processor that is not commercially available. So, for the Dell PowerEdge R770 server, we selected the closest available processor we could get from Dell at the time of testing.) With our like-configured basis for comparing the two solutions, we analyzed per-instance cloud throughput directly to per-VM on-prem throughput. For more information on the systems we tested, see the science behind the report.

The Dell PowerEdge R770 server we tested used direct-attached NVMe drives. For performance-sensitive workloads, modern NVMe drives can also deliver advanced health telemetry to estimate lifespan, monitor for critical conditions, and predict failure so administrators can replace drives proactively.

Table 1. Configuration comparison for the on-prem Dell PowerEdge R770 server and the AWS EC2 M8i instance.

Specification	1x AWS EC2 m8i.2xlarge instance	1x Dell PowerEdge R770
Processor vendor and model	Intel Xeon 6975P-C	Intel Xeon 6767P
Processor base frequency (GHz)	2.7	2.4
vCPUs per VM or instance	8	8
Memory (GB)	32	32
Storage profile	60GB OS volume 100GB data/backup volume 40GB log volume	60GB OS volume 100GB data backup volume 40GB log volume
Operating system	Windows Server 2025	Windows Server 2025
Database	Microsoft SQL Server 2025	Microsoft SQL Server 2025
Workload driver	HammerDB 5.0 TPROC-C	HammerDB 5.0 TPROC-C

About the Dell PowerEdge R770 server

The 2U Dell PowerEdge R770 rack server supports two Intel Xeon 6 processors with up to 144 cores, 32 DIMM slots, two AC or DC power supply units, and up to 16 EDSFF E3.S NVMe® Gen5 SSDs. In addition to NVMe SSDs, Dell lists multiple storage options for the PowerEdge R770, as well as systems management tools such as iDRAC10 and Dell OpenManage™. For organizations running SQL Server workloads, the Dell PowerEdge R770 could provide a high-density platform for consolidating multiple database VMs while maintaining on-premises control of hardware, management, monitoring, and data placement.

Learn more about the Dell PowerEdge R770 server.

What we found: Cut costs over three years with the Dell PowerEdge R770

Using data from our transactional database testing, we calculated the three-year TCO of our two solutions supporting the same number of workloads. The Dell PowerEdge R770 supported 28 VMs with similar CPU utilization to the one AWS EC2 m8i.2xlarge instance, so if we scale up the quantity of instances to match the Dell solution, we estimate that the Dell solution **can reduce costs over the next three years by $390,031.03, or 75 percent**.

Our cost model compared only the Dell PowerEdge R770 on-prem solution against the 28-instance AWS EC2 M8i solution over 36 months. We assumed the AWS instance runs 24/7, and we used three-year contract pricing, and we chose 28 instances to match the resources of the Dell PowerEdge R770 solution. We excluded SQL Server licensing from the model because licensing cost would be the same for both solutions and would cancel out. We also assume a preexisting VMware® environment in the on-prem data center. Table 2 breaks down our three-year cost calculations for both solutions. For further details, including the specific assumptions we made to arrive at these calculations, see the science behind the report. Note: As with any TCO estimate, your cost savings will vary based on your specific environment.

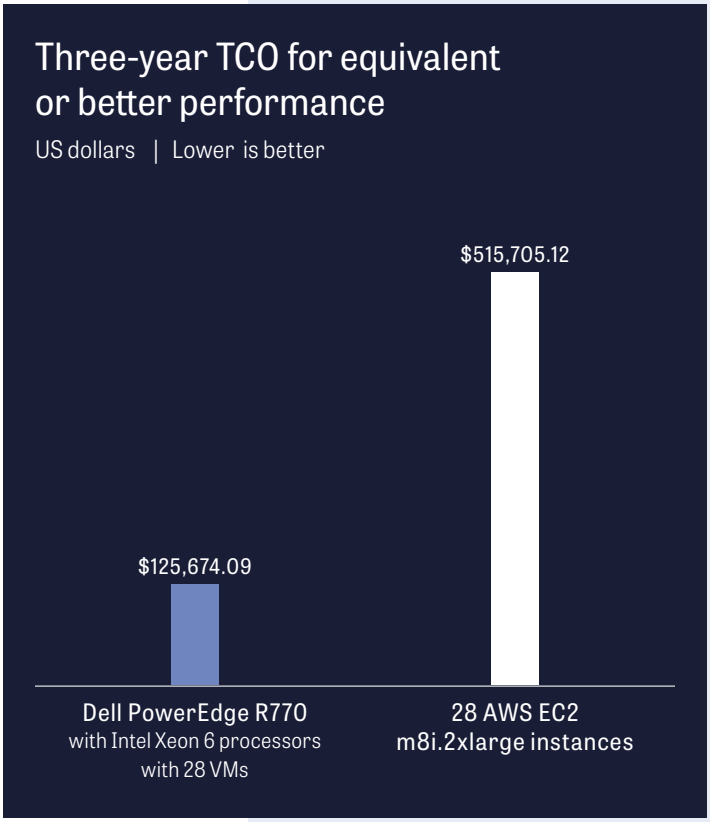

Figure 1. Three-year TCO, in USD, for solutions with comparable transactional database performance: 28 AWS EC2 M8i instances and a single Dell PowerEdge R770 server supporting 28 VMs. Source: PT.

Table 2. Three-year TCO summary for a single on-premises Dell PowerEdge R770 server supporting 28 VMs vs. 28 AWS EC2 M8i instances. The Dell solution pricing came from a reseller quote on May 29, 2026. The AWS EC2 solution pricing came from the AWS Pricing Calculator on May 29, 2026. Source: PT.

Cost category	28x AWS EC2 m8i.2xlarge instances (cloud solution)	1x Dell PowerEdge R770 server (on-prem solution)
One-time server acquisition	N/A	$104,164.78
Hardware maintenance and administration	N/A	$4,732.20
Power and cooling	N/A	$4,777.11
Data center footprint	N/A	$12,000.00
Cloud instance subscription (28 instances at $18,418.04/ month for 36 months)	$515,705.12	N/A
Three-year TCO	**$515,705.12**	**$125,674.09**
Three-year savings with the on-prem Dell solution		**$390,031.03**
Percentage savings		**75%**

Get more SQL Server OLTP throughput per dollar over three years

When comparing on-prem infrastructure with cloud deployment options, the purchase or subscription price alone does not show the full value of a database platform. A solution that supports more transactional database work for each dollar spent can help IT teams stretch budget across the full lifecycle of the investment. To evaluate this, we combined our HammerDB TPROC-C results with our three-year TCO model and calculated throughput per dollar for the Dell PowerEdge R770 with Intel Xeon 6 processors and the AWS EC2 m8i.2xlarge instance.

For the on-prem Dell PowerEdge R770 solution, we used the full-stack throughput result of 1,682,851 NOPM and divided those values by the three-year on-prem TCO of $125,674.09. For the cloud solution, we used the estimated aggregate throughput of 28 AWS EC2 M8i instances, which delivered 1,234,184 NOPM, and divided those values by the three-year cloud TCO of $515,705.12. Using this approach, the Dell PowerEdge R770 server with Intel Xeon 6 processors delivered **5.59 times the NOPM per dollar** that the 28-instance AWS EC2 M8i deployment could achieve (see Figure 2).

This metric can add useful context to the raw performance and TCO results. NOPM shows how much SQL Server OLTP work each solution completed, while the three-year TCO model shows the cost to support that work over time. Performance per dollar brings those two metrics together. In this analysis, the Dell PowerEdge R770 solution provided more OLTP throughput than the scaled AWS EC2 M8i instance deployment while delivering more transactional database work per dollar spent, helping further demonstrate how the Dell and Intel solution could make more fiscal sense for budget-conscious organizations.

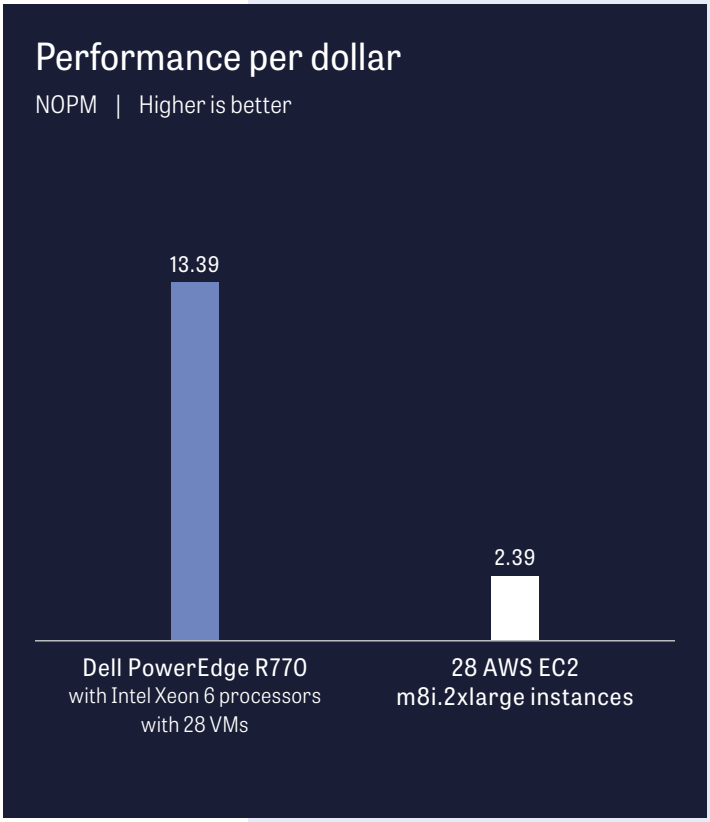

Figure 2. OLTP performance/dollar for the Dell PowerEdge R770 with Intel Xeon 6 processors and the AWS EC2 M8i instance deployment. Source: PT.

Why NOPM?

TPM shows total database transaction activity, while NOPM focuses on completed new-order transactions within the TPROC-C workload mix. HammerDB states that because NOPM is "independent of any particular database implementation[, it] is the recommended primary metric to use."[5]

What we found: Process more SQL Server OLTP transactions on premises with the Dell PowerEdge R770

OLTP performance can affect how quickly applications process orders, update records, and respond to users. Higher TPM and NOPM—the metrics we used in our tests—indicate greater transactional database throughput, which can mean more responsive applications, better user experiences, and more.

Figure 3 shows the head-to-head per-VM results from our testing. As we previously noted, we sized this latest available Intel processor-backed AWS EC2 instance to match a single on-prem VM. Thus, this comparison shows how two similarly configured singular database instances from the two environments handled the same OLTP workload.

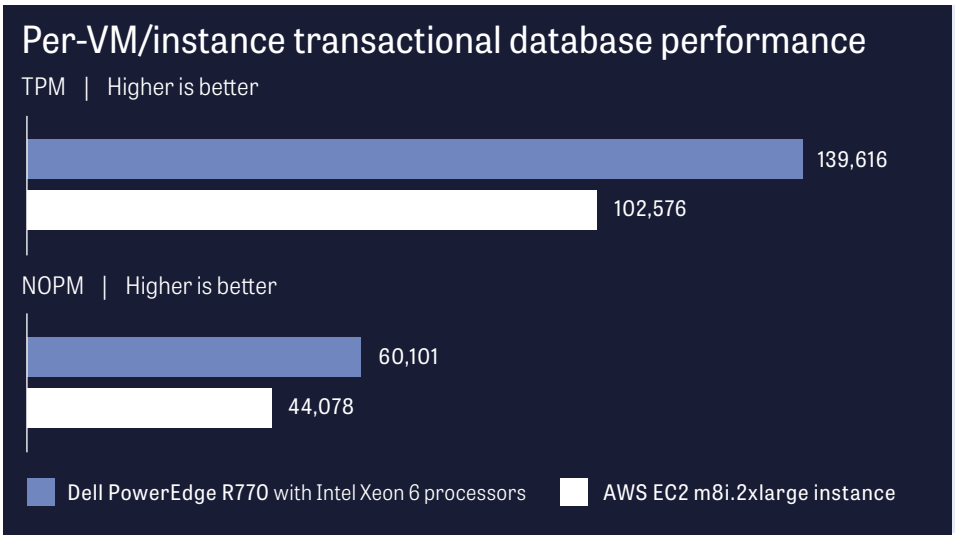

Figure 3. Full-stack SQL Server OLTP performance with a HammerDB TPROC-C workload for the Dell PowerEdge R770 solution supporting 28 VMs and projected performance for 28 comparably configured AWS EC2 M8i instances. Source: PT.

The per-instance results served as the basis for our full-stack throughput evaluation of the AWS EC2 solution. We matched the full-stack on-prem Dell workload by extrapolating the TPM and NOPM data to 28 AWS EC2 m8i.2xlarge instances. As previously noted, this full-stack calculation formed the performance basis for our three-year TCO analysis.

A single cloud instance can be a useful point of comparison for per-VM database performance, but many production environments need to support multiple database workloads at once. In our testing, the full-stack Dell PowerEdge R770 result shows the amount of SQL Server OLTP workloads the on-prem server could support with similar single-VM CPU utilization as the AWS EC2 solution, while the AWS EC2 m8i.2xlarge instance estimate matches the number of workloads supported by the Dell server.

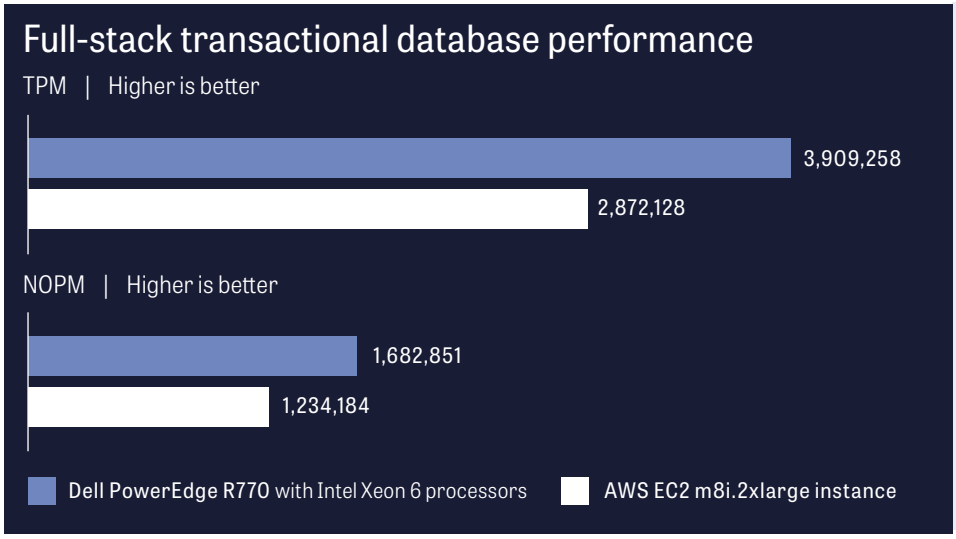

Figure 4. Full-stack SQL Server OLTP performance with a HammerDB TPROC-C workload for the Dell PowerEdge R770 solution supporting 28 VMs and projected performance for 28 comparably configured AWS EC2 M8i instances. Source: PT.

Use resources effectively while leaving headroom

In addition to measuring TPM and NOPM, we captured CPU utilization during the TPROC-C workload. The Dell PowerEdge R770 showed higher but similar in-VM CPU utilization to the AWS EC2 m8i.2xlarge instance while supporting more SQL Server OLTP throughput. At the host level, the Dell server remained well below full CPU utilization. Together, these data points suggest that the on-prem solution was able to use available processor resources effectively while still leaving observable host CPU capacity during the measured workload. Cloud host CPU utilization is not directly visible to customers, so we report host-level CPU utilization only for the Dell PowerEdge R770.

Table 3. CPU utilization during testing of the two solutions. Source: PT.

	AWS EC2 m8i.2xlarge solution (cloud solution)	Dell PowerEdge R770 solution (on-prem solution)
In-VM CPU utilization	**15%**	**25%**
Host CPU utilization	N/A	**53%**

FAQ: Transactions

What is a database transaction?

A database transaction is a unit of work that retrieves, updates, adds, or verifies information in a database.

Are database transactions the same as business transactions?

No. A business transaction—such as completing a sale, scheduling an appointment, or updating a customer order—can involve one or more database transactions. Database transactions also happen during behind-the-scenes work, such as checking inventory, saving customer records, refreshing dashboards, or pulling data for reports.

Why does transactional database performance matter for SMBs?

Higher transactional database performance indicates that a solution can complete more work in a given amount of time. That could mean employees wait less, applications respond better, and routine tasks, such as inventory updates, run more smoothly.

How does transactional database performance affect IT budgets?

With a subscription-based model, such as cloud, getting a higher rate of transactions to meet demand, improve the user experience, and so on, can mean spending more for cloud resources. Over time, those costs could consume more of the quarterly or yearly IT budget.

What this means for you

For SMBs weighing on-prem infrastructure against a cloud SQL Server deployment, our comparison highlights practical differences between the two approaches. Cloud instances can offer flexibility, but continuously running workloads with consistent transactional demand can generate high ongoing costs. An on-prem server requires an up-front hardware investment and ongoing facilities costs, but it can also provide a fixed platform for running multiple database VMs in an environment your IT teams control, maintain, and monitor.

An on-prem Dell PowerEdge solution can balance performance, cost control, and operational control:

- **Stronger transactional performance** can help applications remain responsive as workloads grow
- **A centralized and controlled on-prem platform** can reduce long-term costs while making them more predictable, avoiding cloud subscription models that offer resources to meet demand for a fee
- **Direct infrastructure control** can help IT teams align resources with business priorities, schedule updates around operational needs, and maintain visibility into system behavior
- **Keeping SQL Server workloads on premises** can also help teams apply existing security controls, backup processes, monitoring tools, and compliance requirements

"An on-prem Dell PowerEdge solution can balance performance, cost control, and operational control."

Conclusion

For SMBs running steady SQL Server OLTP workloads, infrastructure decisions can affect both the IT budget and the applications that support everyday work. Our three-year TCO model showed that a Dell PowerEdge R770 server powered by Intel Xeon 6 processors **could cost $390,031.03 less over three years** than an AWS EC2 m8i.2xlarge deployment sized to support the same number of transactional database workloads. In our testing on Microsoft SQL Server, the average VM on the Dell PowerEdge R770 delivered **36 percent higher database performance** than the single AWS EC2 m8i.2xlarge instance. Those results create a significant performance per dollar advantage for the Dell solution—**5.59 times the NOPM per dollar** of the AWS EC2 solution.

Spending less on infrastructure can free IT budgets for other priorities such as security improvements, backup and recovery, or application modernization, while higher OLTP throughput can help SQL Server applications complete more database work. Keeping workloads on premises can also give IT teams host-level visibility and operational control over the hardware, management tools, monitoring practices, and data placement policies supporting their database environment.

For organizations refreshing database infrastructure or reevaluating cloud spend, those advantages could make an on-prem Dell PowerEdge R770 solution a strong option for SQL Server OLTP workloads.

Resources

1. HammerDB, "Understanding the TPROC-C workload derived from TPC-C," accessed June 24, 2026, https://www.hammerdb.com/docs/ch03s05.html.
2. Amazon, "Amazon EC2 Pricing," accessed June 24, 2026, https://aws.amazon.com/ec2/pricing.
3. Flexera, "2026 State of the Cloud Report," accessed June 24, 2026, https://info.flexera.com/CM-REPORT-State-of-the-Cloud.
4. Flexera, "2026 State of the Cloud Report."
5. HammerDB, "Comparing HammerDB results," accessed June 25, 2026, https://www.hammerdb.com/docs/ch03s04.html.

In the science behind the report, we provide a detailed breakdown of the results, hardware configurations, methodologies, and any scripts we used to produce the results in this report.

Read the science behind the report ►

Principled Technologies®

Primary contributors

Tech: Jesse L.

Writing: Nathan P.

Design: Emily B.

PM: Greg C.

How we created this report

A PT team, which includes the contributors we've listed and others, created this report and performed the technical work behind it. We used AI to generate text and edit content.

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