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Oracle Exadata X9M Shellacs AWS and Azure with Latency, Throughput, and Cost Breakthroughs

The News: Oracle announced the availability of the Oracle X9M platforms, the latest version designed to deliver the industry's fastest and most affordable systems for running Oracle Database. The new Exadata X9M offerings include Oracle Exadata Database Machine X9M, and Exadata Cloud@Customer X9M – the only platform that runs Oracle Autonomous Database in customer data centers. Today, 87% of the Global Fortune 100 and thousands of smaller enterprises rely on Oracle Exadata to run their business-critical workloads. [Read the full press release here.](#)

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Analyst Take: An overview of the Oracle Exadata X9M generation portfolio, including the Exadata Cloud@Customer X9M offering, I believe is merited to fully appreciate how the solution provides unequivocal performance, availability, and cost advantages over hyperscale offerings from AWS and Azure. To kick it off, the new Exadata X9M platform offers what I see as superior software architecture capabilities across OLTP (online transaction processing), analytics (OLAP), and consolidation domains—all at the same price as the previous generation, for a considerable cost improvement. The Exadata X9M architecture advantages include:

- **Fastest OLTP.** Oracle Exadata X9M now delivers what I view as the fastest OLTP inputs/outputs (I/O), augmented by scale-out storage, Remote Direct Memory Access (RDMA), Intel Optane Persistent Memory, and the fastest Non-Volatile Memory express (NVMe) Flash capabilities. Moreover, it provides the fastest scale-out features with unique RDMA algorithms for inter-node cluster coordination as well as the fastest recovery from failed or sick components. For example, Exadata X9M database servers use the latest Intel Ice Lake 32-core CPUs (Central Processing Units), providing 33% more cores and 64% more memory bandwidth for OLTP in comparison to Exadata X8M.
- **Fastest Analytics.** Exadata X9M's unique Smart Scan feature automatically offloads data-intensive SQL operations to storage. Unique Smart Flash Cache and storage indexing automatically accelerate database I/O while unique columnarization capabilities automatically converts data to fast in-memory columnar format in flash. Oracle Exadata X9M directly addresses these demands through the support of Intel Ice Lake CPUs in storage servers that deliver 33% more memory bandwidth than Exadata X8M.
- **Best Consolidation.** Exadata X9M supports unique prioritization of latency-sensitive or critical workloads throughout the entire stack and unique workload isolation of multiple tenants or workloads through full stack. Now, Exadata X9M High Capacity and Extended Storage Servers provide 28% more storage capacity by using 18TB disks instead of 14TB disks at the same price to keep up with expanding database (DB) sizes and enable more databases to be consolidated on a single Exadata system.



- **Superlative Architecture and Software.** Exadata X9M's use of Intel Ice Lake CPUs also enables the system to use higher bandwidth flash in its cache and networking between nodes. PCIe 4.0 dual-port active-active 100Gb Remote Direct Memory Access over Converged Ethernet (RoCE) and up to 2TB of memory per DB server allow customers to increase the impact of OLTP caching, key ingredients that enable Exadata X9M to deliver up to 27.6M 8K read IOPS per rack—real world data sizes—and scale DB performance as racks are added. When you sum all this up, each rack can support a mix of up to 1,216 DB cores, 38 TB memory, 3.8 PB Raw Disk, 920 TB Non-Volatile Memory express (NVMe) Flash, and 27 TB Intel Optane Persistent Memory (PMem) so organizations can create configurations that cost-effectively meet their current needs as well as adapt and grow to meet changing requirements.

The overall Exadata portfolio vision encompasses providing the optimal DB hardware, DB-aware systems software, and automated management across the Exadata Cloud@Customer, on-premises, and Oracle Cloud Infrastructure (OCI) offerings. The optimized DB hardware assures scale-out compute, networking, and storage. The DB-aware software systems deliver the unique algorithms that can vastly improve OLTP, analytics, and consolidation processes. The automated management capabilities fulfill fast-growing ecosystem demand for fully automated and optimized DB platforms on an end-to-end basis.

Why Oracle Exadata Cloud@Customer X9M Shellacs AWS and Microsoft Azure

Exadata Cloud@Customer delivers DB and Exadata as a cloud service in the customer's data center, enabling customers to avoid moving applications to the public cloud while gaining cloud benefits. Specifically, Exadata Cloud@Customer X9M makes what I view as the market's fastest on-premises cloud DB system even faster. The fast just got faster—forget about Vin Diesel, this is the real “Fast 9.”

All the Exadata X9M OLTP, analytics, and cost improvements are delivered without exception throughout the Exadata Cloud@Customer X9M offering, including expanded and faster cores in the DB and storage servers as exemplified by the Ice Lake 32-core processors in the DB servers and the 24-core processors in the storage servers as well as faster networking and flash with PCIe 4.0.

As such, the offering provides the breakthrough metrics in relation to Exadata Cloud@Customer X8M such as 28% more storage capacity, 87% more input/output operations per second (IOPS) with IOPS 22.4 million, and the same ultra-fast <19 micro-seconds latency with PMEM and RoCE. In addition, Exadata Cloud@Customer X9M provides 80% more throughput with 540 GB/sec throughput and 24% more vCPUs with 992—all at the same price as the previous generation.

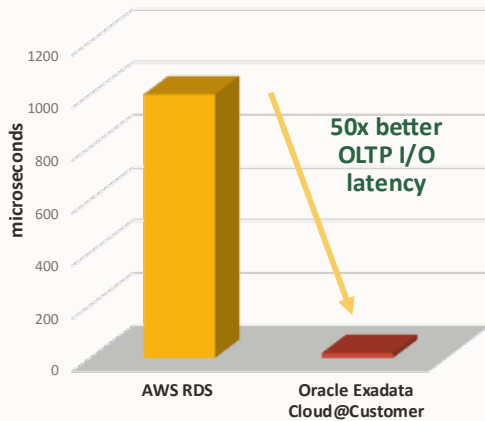
As a result, Exadata Cloud@Customer X9M is superior to AWS RDS and Azure SQL based on all-Flash storage comparisons for OLTP applications. Oracle Exadata Cloud@Customer comes in 50x better OLTP I/O latency than AWS RDS and a remarkable 100x better OLTP I/O latency than Azure SQL.



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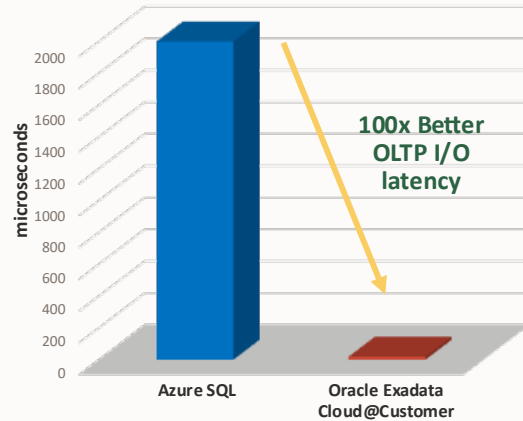
Exadata X9M Cloud@Customer OLTP Comparison

All Flash Storage on AWS vs. ExaC@CX9M



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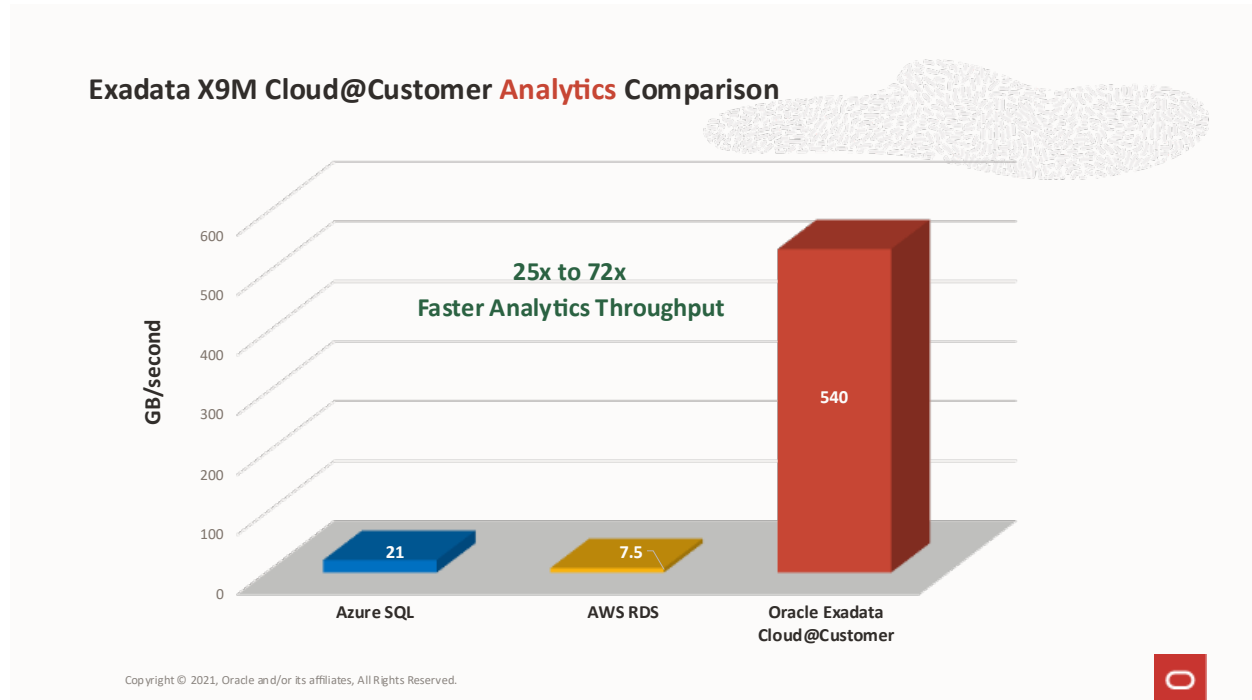
All Flash Storage on Azure vs. ExaC@CX9M



Moreover, in comparison to Azure SQL and AWS RDS, Oracle Exadata X9M Cloud@Customer slam dunks both when it comes to analytics throughput from my perspective. Exadata X9M Cloud@Customer at 540 GB/second provides 25x faster analytics throughput than Azure SQL (21 GB/second) and 72x faster analytics throughput than AWS RDS (7.5 GB/second).



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Oracle’s main competitors in the cloud also have an “at-customer” solution. However, from my perspective, those offerings are so lacking in functionality and performance that comparisons are trite. As such, Oracle Exadata X9M propositions need to be compared against AWS’ and Azure’s absolute best which is their public cloud solutions. Even their best solution that we have compared with Exadata X9M for OLTP—Exadata has 50 times better latency than AWS RDS and 100 times better latency for OLTP than Azure SQL. That’s their public cloud. Their at-customer solutions are notably worse than this.

Key Takeaways on Exadata X9M Cloud@Customer OLTP I/O Latency, Analytics Throughput, and Cost Advantages over AWS and Azure

I believe Exadata X9M Cloud@Customer delivers definitive OLTP I/O latency and analytics performance advantages over both AWS RDS and Azure SQL. Moreover, the Exadata X9M platform supplies faster OLTP and analytics capabilities at no extra cost that further boosts its cost effectiveness. Now DB decision makers across the digital ecosystem can deploy a fully autonomous DB on-premises at tremendous value.

In sum, the Exadata X9M shatters through the limitations of both cloud on-premises and public cloud offerings from the likes of AWS and Azure and the conventional offerings from the iron mongers. To put this in perspective, with the ability to perform analytic scans at up to 1 Terabyte per second, Exadata X9M can scan a petabyte in 16 minutes and 40 seconds. It can scan the entire 20 petabyte U.S. Library of



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Congress digital collection in just over 5 hours. Everything from AWS, Azure, and Snowflake would take days, weeks, or months. Exadata X9M changes the game.

Overall, Exadata X9M Cloud@Customer delivers and is unrivaled through lower costs, and blended OLTP/OLAP workload optimization that AWS and Azure are unable to counter. Accordingly, I anticipate Oracle gaining a rapid and enduring competitive advantage over AWS and Azure throughout the DB platform market segment that can energize customers and prospects to avoid as well as mothball any alternative offering that ends up as a costly, iron-centric mine traps.