

Oracle Unleashes Multi-VM Autonomous Database on Exadata Cloud@Customer to Transform Data Management

The News: Oracle announced the availability of Multiple-VM Autonomous Database on [Oracle Exadata Cloud@Customer](#). Multiple-VM Autonomous Database enables organizations to create and run isolated, highly available Autonomous Database instances on Exadata Cloud@Customer systems that are also running non-autonomous Oracle Databases. This helps customers lower costs through better infrastructure utilization and makes it easier for customers to adopt Autonomous Database. Multiple-VM Autonomous Database is available at no charge via an over-the-air update for existing Exadata Cloud@Customer customers. [Read the Oracle Press Release here.](#)

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Analyst Take: Oracle is rolling out a new way for organizations to use Oracle Autonomous Database on Exadata Cloud@Customer, taking on-premises database cloud automation to the next level by providing a full self-service database cloud with pay-per-use pricing and featuring an ultra-competitive low-cost entry point. I see the new offering as enabling Oracle to advance its prime objective of solving today's data management problems which make modern applications and analytics complex to run and simultaneously help customers focus on their core business strategies.

To fulfill its objective, Oracle's vision emphasizes offering the most complete database (DB) wherever customers want it. This includes support for all modern data workloads, types, and development styles taking advantage of capabilities that are completely scalable, available, secure, and consistent. As such, Oracle focuses its portfolio development on providing a converged database platform which seeks to make it significantly simpler and more productive to develop and enhance applications. This includes calling SQL for any data workload, type or analytics while avoiding consigning data to database silos that can undermine support for new application requirements.

Oracle Exadata Cloud@Customer (C@C) is integral to Oracle's ability to offer customers full-range flexibility in their deployment options. In addition to on-prem traditional implementations, such as Oracle Exadata, and public cloud deployments, such as Exadata Database Service and Autonomous Database Service, Exadata C@C brings cloud-based Oracle managed database services to the customer's data center.

Through Exadata C@C, clients can move their DB assets to the cloud model without the encumbrance of disentangling Oracle databases from on-prem systems, especially since regulated and sensitive data is difficult or impossible to move to the public cloud. Moreover, moving applications to the public cloud can prove hard as they are frequently tightly integrated with multiple applications and on-premises middleware. Accordingly, Exadata C@C provides DB-as-a-service at the customer's DC which supports public cloud benefits such as public cloud financial and operational models as well as public cloud interoperability where needed.



I am impressed that the Exadata C@CX9M infrastructure delivers exceptional performance metrics at the customer's DC, including:

- 22.4M OLTP IOPS with <19 millisecond SQL read latency
- 540 GB/sec analytics throughput
- 992 vCPUs and intelligent storage servers
- 763 TB usable capacity

Such performance metrics underpin the Oracle Autonomous Database (ADB) on Exadata C@C's value in delivering an easy-to-use cloud DB for developers and data analysts, particularly in running any application at any scale or criticality. This approach undoes the perception that high function, mission critical DBs are expensive and difficult to use based on the traditional narrative. Oracle ADB on Exadata C@C combines ease-of-use and cost effectiveness to ensure that application development and administration is simpler so that organizations can accelerate business innovation and operate more efficiently.

To streamline cloud native application development, Oracle ADB focuses on the complete development lifecycle encompassing modeling, coding, ETL, optimization, and analytics. As a result, Oracle ADB is designed to run all applications regardless of intricacy, scale, criticality, or sensitivity using push-button techniques for the most demanding enterprise applications and assuring quality-of-service and the highest security for both sophisticated and basic applications.

I anticipate that machine learning (ML) in ADB boosts reliability and performance in key areas such as the provisioning of DBs and infrastructure, elastic scaling, performance tuning, security controls, and data protection. This positions Oracle ADB on Exadata C@C to fulfill the full range of customer DB requirements, including data residency safeguards, latency requirements, DB performance improvement, minimizing human-error in data management through automation, containing consumption costs through auto-scaling and zero-consumption DBs, and lowering TCO through increased database consolidation.

Oracle Autonomous Database on Exadata Cloud@Customer Sizzle: Lowering the Entry Cost for Market Expansion

The new Multi-VM ADB on Exadata C@C introduces the ability to concurrently run the ADB Service and Exadata DB Service on the same infrastructure. Now, when a customer adds ADB to an existing Exadata C@C environment, they can immediately achieve additional operational and economic advantages by avoiding the deployment of additional infrastructure.

The new offering enables multiple VM clusters to be created on Exadata C@C infrastructure with each VM cluster configurable to match workload needs (e.g., more compute for OLTP or more storage for analytics). Each VM cluster can be used for either ADB Service or Exadata DB Service and can support thousands of DBs for extreme consolidation. Also, more VM clusters can be added as needed using unallocated resources and consumption in each cluster can scale and auto-scale independently.



I believe the solution offers total cost of ownership (TCO) benefits that merit consideration such as enabling auto-scaling on a per-database basis, the provisioning of one-fifth of a vCPU per server for low-usage applications, and zero-cost billing for ADB VM clusters when consumption is set to zero, and extreme consolidation as mentioned above. Customers avoid CapEx by using subscription pricing for infrastructure and can lower software costs with auto-scaling that yields low pay-per-use consumption.

Oracle Multi-VM Autonomous Database on Exadata Cloud@Customer: Boosting Development Productivity and Spurring Cloud Adoption

For greater development productivity, the solution enables developers and application DBAs to use ADB resources such as self-service databases, exclusive views of assigned environments and resources, and operation within assigned quotas. Fleet managers, through visibility to all resources, can create Multi-VM ADB clusters for different needs, such as Dev-Testing, production, OLTP, analytics, and mixed workloads, along with setting quotas and SLA policies for each environment.

For more flexibility, license type selection (bring your own license or software included) can be set for each Autonomous Database VM cluster. In addition, container DBs with Autonomous Data Guard can be created between Autonomous Exadata VM clusters on the same Exadata infrastructure to test disaster recovery. In addition, this enables dev/test use cases with Autonomous Data Guard at low cost and customized ADB VM configurations can enable mission-critical workloads to run with ADB on Exadata C@C.

The new development capabilities are good news for developers as they can increase their productivity by using any data, any workload, and any development style without silo-bound constraints as in specialized, isolated cloud databases. Moreover, the highest levels of performance, scalability, availability, and security are built-in, avoiding the complexities and costs of integrating such capabilities later. Plus, ADBs that can tune, scale, manage, and secure themselves on an as-a-Service basis frees developers from oversight and management burdens.

By streamlining the movement of mission-critical applications to hybrid cloud database resources, I also expect that even small organizations can attain cloud benefits quicker through reduced complexity and expense and minimize the need to address all dependencies at once. Key cloud adoption benefits enabled by Oracle's new Multi-VM ADB on Exadata C@C capabilities include enabling moving individual DBs to an on-premises cloud service without disruption of the solution architecture and the need to wait for additional infrastructure to be provisioned is eliminated.

Oracle Multi-VM Autonomous Database on Exadata Cloud@Customer: Competitive Advantages

Taken together, I believe that Oracle Multi-VM ABD on Exadata C@C furnishes competitive advantages over key rival solutions such as Amazon RDS on AWS Outposts. For instance, ADB and Exadata DB both support OLTP, analytics, machine learning, JSON Document, Key-Value, Graph, Blockchain, Time Series, and Spatial programs. In contrast, Amazon RDS on AWS Outposts is a subset of AWS database cloud services and supports only open-

source MySQL and Postgres SQL DBs and SQL Server. It does not support any of Amazon's strategic cloud database offerings such as Aurora (OLTP), Document DB (JSON), DynamoDB (Key-Value), Neptune (Graph), Redshift (Analytics), Ledger (Blockchain), Timestream (Time Series), and Spatial.

The competitive advantages become starker when comparing performance metrics. For example, Oracle Multi-VM ABD on Exadata C@C's minimum SQL read latency is 19 milliseconds while Amazon RDS on AWS Outposts is 1000 milliseconds. Oracle's maximum SQL Read OPS is 22.4M and AWS is only 0.96M. Oracle's maximum SQL throughput is 540 GB/S while AWS is limited to 28.5 GB/S and Oracle's maximum DB size is 763 TB with AWS notably constrained at 64 TB. No contest here. And, of course, higher performance means faster compute which equals less cost. What Oracle is doing with ADB on ExaC@C compared to AWS Outposts is like taking three different streaming services—say Disney+, ESPN+ and Hulu—and providing them all in one low-cost bundle rather than 1 out of 3 services at an inflated price.

Comparing ADB on ExaC@C to Microsoft Azure Stack reveals that the latter is analogous to Microsoft's PC model, where customers pick their own certified hardware such as Huawei, Dell or HPE, and then apply the Azure Stack software on top. I see the support model as convoluted with both hardware vendor and Microsoft being involved; the Azure Stack software differs from the Azure software in the Microsoft public cloud, in effect being frozen in a "point-in-time" and not fully compatible with one another—and, furthermore, Microsoft requires that customers hire their own Azure Stack Operator, who needs to be both trained and certified by Microsoft. At an estimated cost of \$200K+ per headcount, an average company would likely require three of these operators just to try and run Azure Stack. So, from my perspective, an economical managed cloud service it is not.

Google Anthos on the other hand I believe is not especially about running cloud databases as it is for running a Kubernetes environment with on-premises compatibility with GCP. And Snowflake lacks any sort of hybrid cloud offering whatsoever, which puts it further behind in this market segment.

Clearly, compared to AWS, Azure, Google, and Snowflake, Oracle ADB on ExaC@C I view is at least two generations ahead and demonstrates Oracle's serious commitment to the on-premises cloud/hybrid cloud market at a time when its principal competitors appear to be doing the "bare minimum" on this front.

Key Takeaways on Oracle Multi-VM Autonomous Database on Exadata Cloud@Customer Debut

Overall, I believe Oracle Multi-VM ABD on Exadata C@C delivers breakthrough cloud DB capabilities in customers' DCs that fulfill the complete range of customer DB needs. Due to clear differentiators, rivals such as AWS Outposts must now counter Oracle's new offering. This will be a hard road to travel since AWS has not upgraded Outposts since availability two years ago. The Oracle solution can make it simpler to develop and deploy cloud-native and mission-critical DBs with consumption economics and streamlined management while upholding data residency, security, and connectivity requirements. Additionally, it provides the cloud DB framework to ease data management throughout DB environments and accelerate transitions to the cloud for organizations of all sizes by enabling existing applications to simply connect and run at lower costs. With this



announcement, Oracle has effectively unleashed the beast—the mothership of all hybrid cloud implementations.