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OFFERING OVERVIEW

Oracle Writes the Next Chapter of Exadata With Exadata X10M

Higher Performance and Business Value Make Exadata X10M Even More Attractive for Mission-Critical Next-Generation Enterprise Applications

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TABLE OF CONTENTS

Executive Summary 3

About Oracle Exadata X10M 4

Key Capabilities 9

Analysis and Observations 17

Recommendations 20

Related Research 22

Endnotes 24

Analyst Bio. 26

About Constellation Research 27

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EXECUTIVE SUMMARY

Enterprises need to move faster and become more agile; in short, they must practice Enterprise Acceleration.[1] This report provides an overview of how the next-generation Oracle Exadata, Exadata X10M, helps enterprises enable an acceleration strategy by running mission-critical next-generation applications[2] faster, less expensively, and more reliably while being able to consolidate existing workloads. The report also highlights the improvements in Exadata X10M over its predecessor, X9M.

Oracle Exadata X10M is the latest manifestation of Oracle's vision for the "chip-to-click" integrated technology stack (i.e., from the CPU silicon across all ISO Open Systems Interconnection (OSI) layers and all the way to the end user mouse click). With the availability of Oracle Exadata X10M as of summer 2023, Oracle has proven how this architecture and design approach deliver leading performance and cost savings, further solidifying Exadata X10M as simply the best platform on which to run Oracle Database.

Because Oracle uses the same technology stack and machines in both its cloud and on-premises implementations, it has the highest degree of Identicality[3] across these offerings to be found among all vendors that are part of Constellation Research's Market Overview of next-generation computing platforms.[4] The others are the Amazon Web Services Outposts[5] on-premises portfolio, Google Anthos,[6] IBM Satellite,[7] and Microsoft Azure Stack.[8]

BUSINESS THEMES

- New C-Suite
- Technology Optimization
- Data to Decisions
- Future of Work

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ABOUT ORACLE EXADATA X10M

Overview

Oracle has a unique vision among vendors of next-generation computing platforms, creating the largest "chip-to-click" integrated hardware and software offering—one that ranges from the silicon (the "chip") to the user (the "click") in software-as-a-service (SaaS) offerings. Exadata X10M is an integral part of Oracle's integrated stack.

Oracle Exadata X10M brings the following key innovations to the Exadata portfolio:

- **Improved performance for lower total cost of ownership (TCO).** Oracle Exadata X10M uses the latest 4th Gen AMD EPYC™ CPUs with 96 cores per socket, which increases the number of processor cores by a factor of 3 in database servers. And with as much as 3 terabytes (TB) of memory per database server, customers can hold 50% more of their mission-critical data in memory. Double Data Rate 5 (DDR5) memory has also been boosted by a factor of 2.5. With RDMA over 100Gbs Converged Ethernet (RoCE) internal fabric, bandwidth and latency have been improved. And on the storage side, Oracle also uses the latest AMD EPYC CPUs, doubling the cores, and introduced Exadata RDMA Memory (XRMEM) up to 1.25TB; raw all-flash storage capacity can go now to more than 120TB per storage server, with 27TB of high-performance flash cache, and raw hard disk drive (HDD) storage is up to 264TB with the same 27TB of flash cache.

- **Enhanced software for better performance.** Oracle Exadata X10M features improvements on the software side with reduced SQL read latency using XRMEM, an optimized version of Exadata Smart Scan for parallel queries, an enhanced Linux OS and an improved kernel, faster decryption and encryption algorithms, storage index and columnar cache persistence, support for open monitoring to provide observability data to popular DevOps platforms, and improved support for enhanced Oracle Database algorithms.

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- **One software architecture for key enterprise workloads and strategies.** The combination of hardware and software—coengineered at the source code level—makes Oracle Exadata X10M the platform of choice for the fastest online transactional processing (OLTP) and analytics while offering the best consolidation options, enabling workload isolation and prioritization.

Market Segment

Market Definition

Oracle Exadata X10M competes in the next-generation computing platforms market as a software and services offering. A next-generation computing platform is defined as a computing paradigm that runs the same infrastructure (sometimes with some limitations) for an enterprise on-premises and/or in the public cloud.

For the purposes of this report, Constellation defines cloud as the elastic provisioning of computing, storage, and networking. The elasticity manifests itself in the form of dynamic ramping up and ramping down of resource availability, driven by workload demand, even on a per-second basis. The mechanics for this kind of computing have been established and have matured with public cloud IaaS vendors.[9] Effectively, the public cloud enables the era of Infinite Computing.[10]

In addition to the architectural elasticity, the cloud offers commercial elasticity that is enabled by architectural elasticity. This means that enterprises pay less for cloud consumption when they use fewer services and pay more when they use more. CxOs want exactly this mechanism, which ties their IT cost to the performance of their enterprise.

CxOs who must manage on-premises workloads also find that value proposition—the elasticity of computing resources—attractive. IaaS vendors have realized this and added offerings that make parts of their IaaS infrastructure available on-premises.

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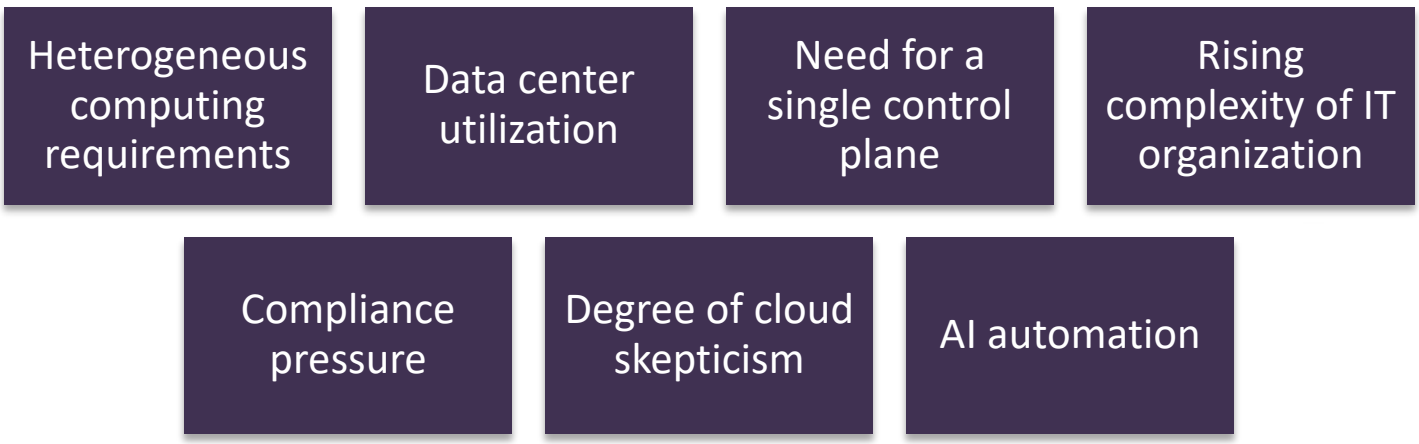
Market Trends

The following seven market trends are prominent in the definition of the market for next-generation computing platforms (see Figure 1):

1. Heterogeneous computing demands

CxOs are confronted with rapidly changing computing demands. Beyond the challenge of satisfying the business need for big data, the computing requirements CIOs must meet range from support for machine learning (ML) to speech recognition for internal and external digital assistant/chatbot solutions, and all the way to the edge of the enterprise. New computing platforms have entered the data center—for instance, with the advent of large GPU racks to run ML. An unprecedented platform diversity manifests itself at the edge of the enterprise to support the Internet of Things (IoT). And the pace of change is not slowing down, as shown by new demands for additional workforce support (e.g., augmented/mixed/virtual reality) and new user experience support (e.g., holographic displays). And lastly, it is impossible to overlook the need to power AI workloads, from both a training and an execution perspective.

Figure 1. Seven Market Trends Defining a Next-Gen Computing Platform



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2. Data center strategy

As workloads move from enterprise data centers to public cloud vendors, CIOs struggle to reach the level of utilization they intended when originally planning and investing in their data centers. One part of the challenge is the business practice of letting individual company divisions choose their own enterprise automation tools, resulting in a lower degree of predictability for available workloads in on-premises data centers. An additional hurdle for CIOs is that physical infrastructure requests are moving more slowly toward approval and have a much longer-lasting budgetary impact. Data center utilization can quickly change from full capacity to two-thirds utilization. Dropping a single server-refresh cycle will create that scenario, which CxOs experience as they move workloads to the public cloud. Additionally, CxOs struggle with creating and keeping the skills to run complex enterprise workloads in-house. Information technology outsourcing (ITO) and business process outsourcing (BPO) can reach and do only a portion of the work, so CxOs welcome vendors that can manage workloads on-premises for them.

3. The need for a single control plane

The era of CxOs' simply accepting that new products bring a new control plane is long past. CxOs operating next-generation applications must run them as efficiently as possible, via a single control plane. This includes all enterprise workloads, no matter where they run: on-premises, in the cloud, and on the edge. This not only results in higher efficiency in managing infrastructure but also is the best way to effectively manage a heterogeneous landscape. Ramping down and ramping up resources on demand cannot be done from a "zoo" of instrumentation but requires a single control plane. At the same time, it is essential to automate resource scaling so that humans can focus on delivering value instead of spending time and energy on operational tasks.

4. Rising complexity of IT operations

Cloud has not fulfilled its promise to simplify IT for most organizations, because they are operating on a fluid automation plane that includes the public cloud and on-premises computing resources.

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Business priorities, timing, and write-down cycles all determine the specific time when a load can be moved to the public cloud or whether it should remain on-premises. Changes in executive management often result in a shifting workload mix (for instance, due to software-as-a-service [SaaS] portfolio changes) that affects the overall computing mix. A greater diversity in workloads and new next-gen application use cases create more heterogeneity and increase the complexity of IT operations.

5. Compliance pressure

Enterprises are confronted with a rise in compliance requirements that, because of the operation of larger software portfolios, affects more of the computing and storage infrastructure than ever. Data privacy and data residency regulations often require enterprises to move loads to different physical locations and sometimes from the cloud back to on-premises. Enterprises had not even recovered from addressing the European Union's General Data Protection Regulation (GDPR) when the California Consumer Privacy Act (CCPA) took effect, and they see more data residency rules coming their way. The rate of regulation will only increase, making CxOs desire a more fluid way to move workloads.

6. Degrees of cloud skepticism

Although many next-generation application use cases are best (and sometimes only) operated in the cloud, there is still a degree of skepticism about computing in the public cloud. It ranges from rational challenges (such as whether IaaS vendor data instances are available inside a necessary jurisdiction) to reasonable challenges (hardware write-downs and connections to existing on-premises computing resources such as mainframes) to less rational concerns (for instance, regarding data safety). Nonetheless, it means that CIOs need to implement and operate workloads in local data centers for at least the next decade.

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7. AI automation

Artificial intelligence (AI) is the most transforming technology innovation society and business has seen in the twenty-first century. CxOs need a strategy to support their enterprise in this new era, where the success of AI adoption can well determine the fate of an enterprise. It is already clear that the future will not be clement for those who are late or wrong in AI adoption, because the automation benefits are too great to be ignored. Consequently, CxOs need to make sure that their AI strategy is supported by the enterprise's next-generation computing platform. This is especially important, because it is clear that although the training of AI models will happen in the public cloud, the execution of those models will, in many use cases, have to occur locally, on-premises. Making data available and enabling AI model validation and model management are quickly becoming inherent features of a next-generation computing platform, first as add-ons to the platform and, sooner rather than later, as a native capability of the platform.

KEY CAPABILITIES

This section describes the most important capabilities of the Oracle Exadata X10M offering.

The Exadata Vision

Oracle started to ship Oracle Exadata in 2008 and has upgraded the platform for Oracle Database over the years, with additional innovations featured in every release. Originally a partnership between Oracle and Hewlett-Packard, Oracle Exadata evolved to combine hardware assets from Oracle's subsequent Sun Microsystems acquisition as well as substantial additional R&D. Oracle created a hardware/software combination engineered at the source code level with Oracle Database, and it has received a very strong reception in the market: Several customers now are running more than 100 Exadata systems in production environments, and some are running north of 300 systems.

The Exadata vision is defined by the following three pillars (see Figure 2), designed to achieve extreme performance and availability at the lowest cost. Exadata is available on-premises, managed by Oracle; in the public cloud with Oracle Cloud Infrastructure (OCI); and in partnership with Microsoft Azure:

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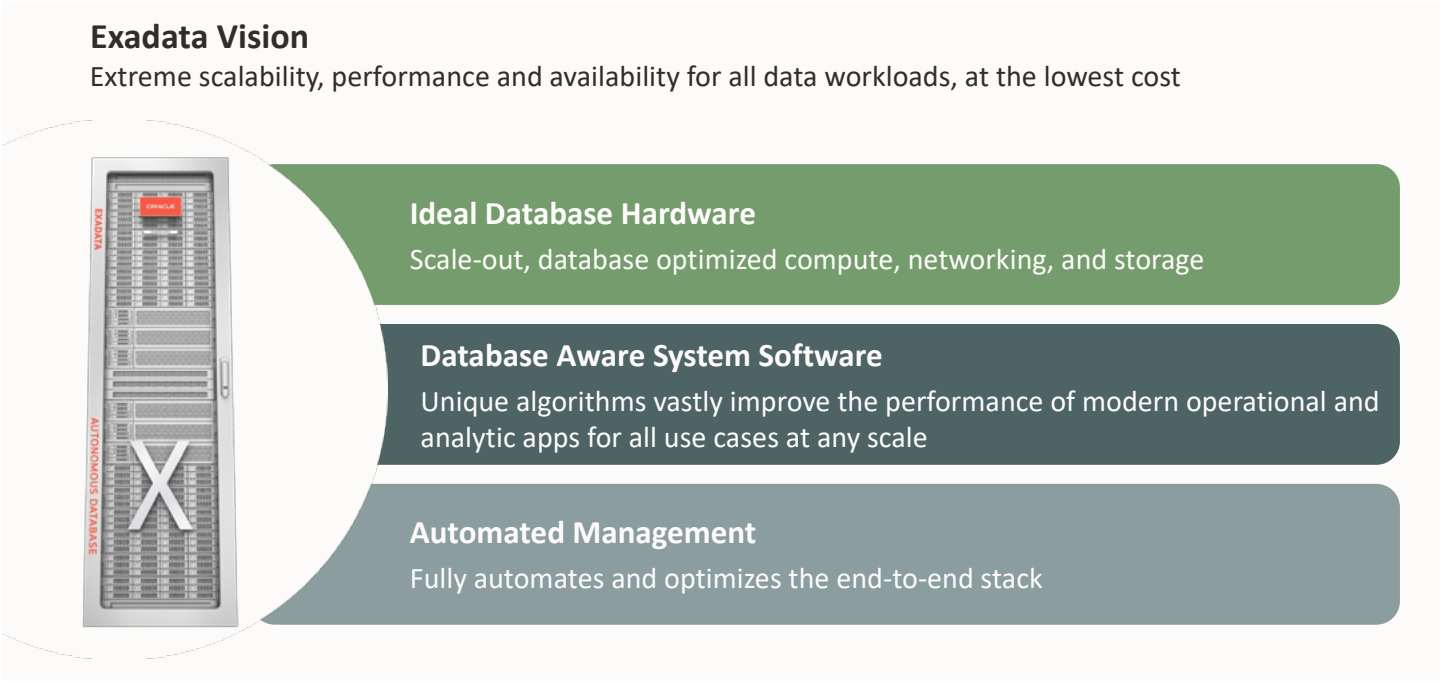
Figure 2. The Oracle Exadata Vision



Source: Oracle

1. **Ideal database hardware.** As the market leader for relational database systems (RDBMSs), Oracle set out to build the ideal hardware platform for its database products. Oracle's detailed knowledge of its products' software architecture has led to a unique hardware platform that optimizes for performance, TCO, return on investment (ROI), and internal rate of return (IRR). Exadata systems use a scale-out architecture that is optimized for running Oracle Database, tightly integrating the latest compute, networking, and storage components to deliver high performance and availability for all database workloads.

2. **Database-aware system software.** In the past, the different natures of different database and information management processes required hardware to be optimized in different ways. With Exadata, Oracle has created a common hardware platform that simultaneously supports different database workloads with optimal performance. The "magic sauce" for that lives in the Oracle Exadata system software, which enables diverse workloads and use cases such as OLTP, online analytical processing (OLAP), and database consolidation to have priority access to the resources they need.

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3. **Autonomous management.** The vision of Oracle's chairman and chief technology officer, Larry Ellison, for the AI-driven autonomous technology stack has been fully infused and enabled with Oracle Exadata. The ability to run technology stacks automatically and to enable them to self-optimize is a crucial capability for enterprises, regardless of whether deployment of their workloads is in the cloud or on-premises.

Today, Oracle Exadata is used predominantly within large global enterprises that demand high performance, availability, and security while operating under challenging conditions from an operational uptime perspective. Enterprises that run Exadata include:

- 10 of the top 10 banks
- 10 of the top 10 telecoms
- 10 of the top 10 food and drug companies
- 9 of the top 10 automotive companies
- 9 of the top 10 healthcare companies
- 8 of the top 10 retail companies
- 7 of the top 10 technology companies
- 7 of the top 10 energy companies

Exadata: A Scalability Success Story, Starting With Software

Traditionally there has been a focus on the hardware specs of new server architectures; more recently, the conversation has rightfully moved away from "speeds and feeds" to the software architecture that enables enterprises to run their next-generation applications on these platforms.

Specifically regarding Oracle Exadata X10M, Oracle has made sure that Exadata remains the leader for three key enterprise use cases (see Figure 3):

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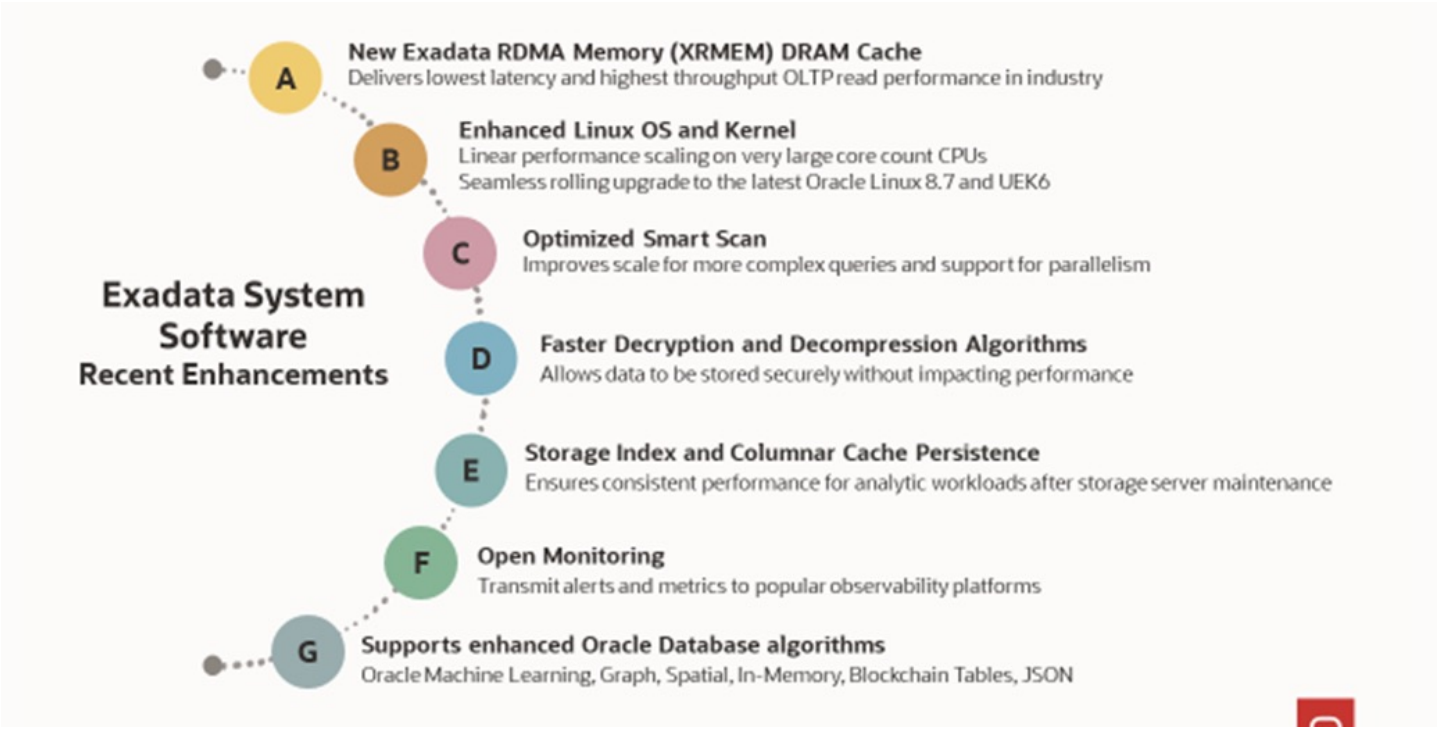
1. **Best OLTP platform.** To be able to run workloads in the best way for their enterprise, CxOs need to select platforms that enable fast OLTP input/output (I/O). Exadata achieves that by offering a variety of storage and memory classes, enabling the correct tiering for the best performance. Oracle Exadata X10M offers scale-out storage with RDMA to XRMEM and active tiering of data from nonvolatile memory express (NVMe) flash cache and permanent storage. It is also the fastest scale-out database platform, thanks to its proprietary algorithms that enable fast internode cluster coordination. And Oracle Exadata X10M offers the fastest recovery from unplanned downtime or component failure, which makes it ideal for mission-critical workloads.

2. **Best analytics platform.** Enterprises not only have to store data but also have to analyze that data, which means that analytical capabilities are key for modern data platforms. Oracle Exadata X10M enables analytical workloads with its unique Smart Scan capabilities, which enable users to offload data-intensive SQL operations to storage. Moreover, the combination of its unique smart flash cache with the storage index automatically allows for faster database I/O, because it reads only the

Figure 3. Recent Exadata System Software Enhancements



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data that's needed. The inherent capability of Oracle Exadata X10M to write data into columnar flash memory substantially accelerates analytical queries.

3. **Best consolidation platform.** CxOs pursuing a consolidation strategy need to move enterprise workloads onto fewer machines. Oracle Exadata X10M is uniquely positioned to serve as a platform for the implementation of a consolidation strategy, because it adds considerable memory and storage capacity and allows prioritization of workloads to give critical ones the necessary resources. If needed, it's also able to isolate workloads from each other to ensure consistent service levels.

Extreme Performance for Mission-Critical Workloads

Oracle Exadata X10M features substantial performance improvements over Oracle Exadata X9M for powering an enterprise's mission-critical workloads (see Figure 4):

- **Latest AMD EPYC CPUs.** Oracle Exadata X10M is powered by 192 4th Gen AMD EPYC CPU cores per database server, triple what was available in X9M, and 64 cores in each storage server, up to twice what was previously available.
- **More memory.** Oracle Exadata X10M has up to 50% more memory capacity for memory-intensive workloads and database consolidation, providing up to 3TB of memory per database server, and memory that's up to 2.5 times as fast, thanks to DDR5.
- **Better connectivity.** By increasing the number of network interface controller (NIC) cards per database server from three to five, Oracle Exadata has improved connectivity to the latest Exadata platform by more than 60%.
- **Higher performance for transactions.** With Exadata X10M, individual transactions run faster, due to 15% faster read input/output operations per second (IOPS), 2.8 million 8K RDMA reads per storage server with under-17-microsecond latency, and up to 50% higher flash write IOPS in storage servers while transaction processing throughput increases more than threefold, due to the greater number of database server cores.

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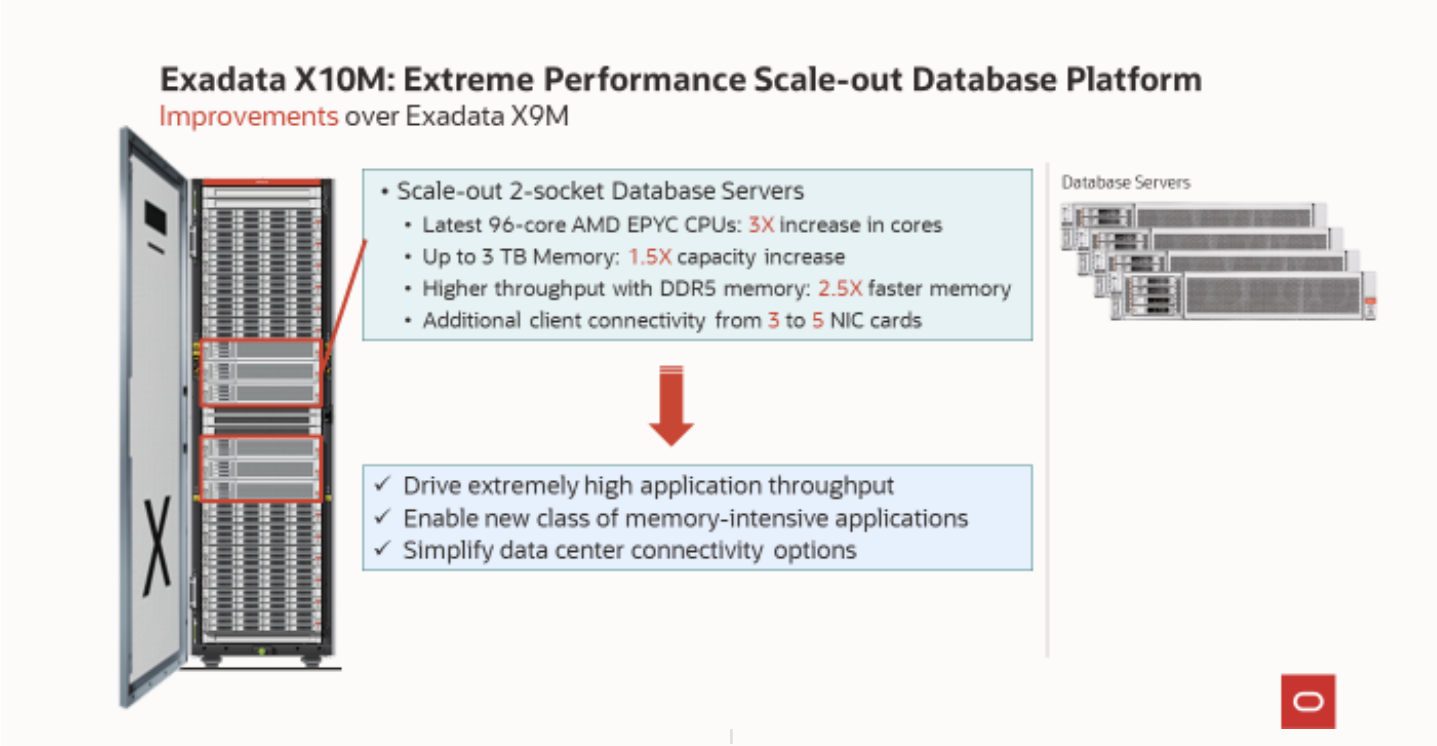
Figure 4. Exadata X10M Scale-out Performance Enhancements for Database Use Cases



Source: Oracle

- **Faster analytical workloads.** For analytical workloads, queries on database servers have been accelerated to 3.6 times as fast, Smart Scan SQL queries on storage servers run up to 2.6 times as fast, and memory scans are as much as 2.4 times as fast.

- **More performance for consolidation projects.** With 1.5 times the memory capacity, 2.4 times the flash capacity in an all-flash config, and 22% more disk storage capacity, more workloads can be consolidated in Exadata X10M.

Remarkably, as with previous Exadata releases, Exadata X10M ships at the same starting price as its predecessor (Oracle Exadata X9M in this case). Effectively, once again, Oracle passes the advances of Moore's Law to Exadata customers, who, for the same price, are receiving a remarkably more powerful platform. Running Oracle Database on anything other than Exadata is basically a waste of time, resources, and money at this point, as the X10M generation takes synergies with the Oracle Database to a whole new trajectory.

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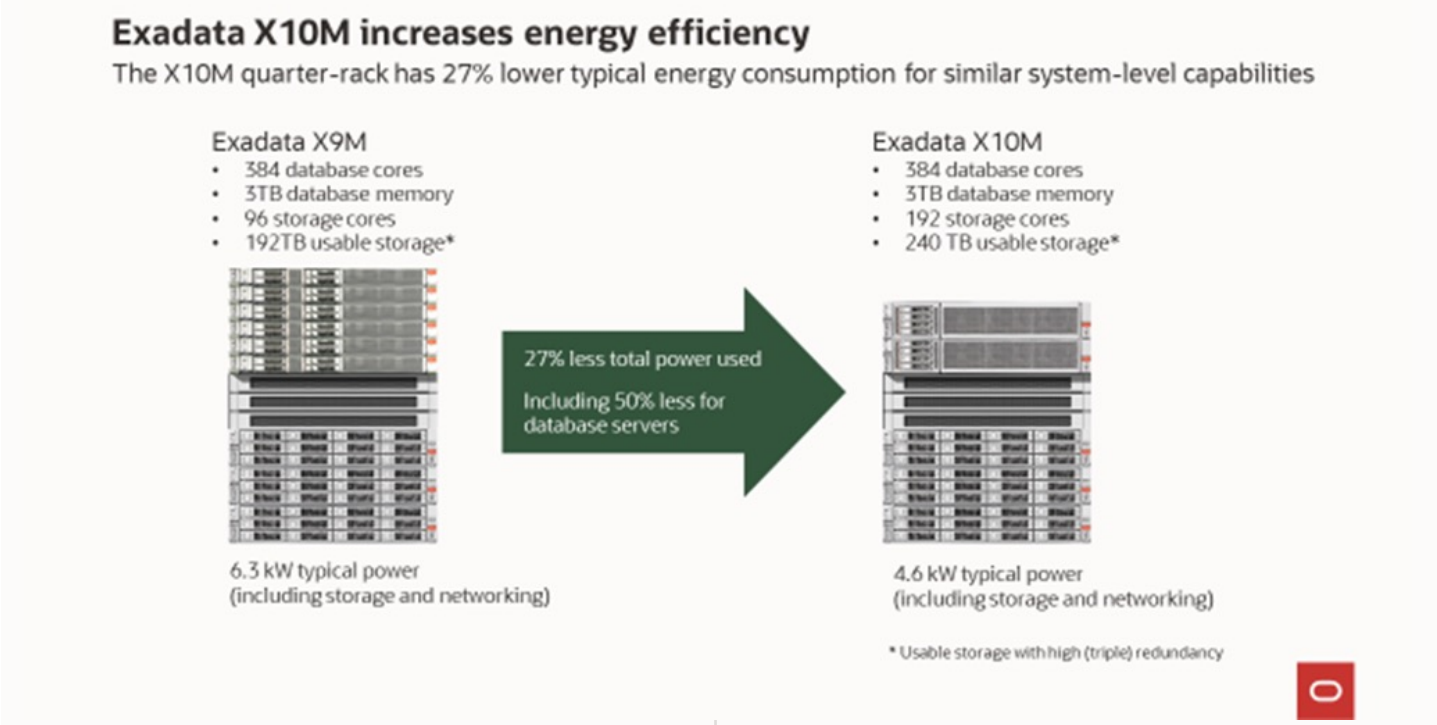
More Performance, More Sustainability

Clearly, Oracle has substantially increased the specs of Oracle Exadata, and more performance has always meant more energy usage. In the design of Exadata X10M, however, Oracle engineers managed to deliver on a remarkable design goal: The power usage of an Oracle Exadata X10M quarter-rack system is 27% lower than that of an Exadata X9M with the same number of processing cores and memory. This includes lowering the electricity bill for 384 cores' worth of database servers by 50% (see Figure 5).

Oracle is meeting a key customer demand by making Oracle Exadata more sustainable: It not only has reduced the cost for operating Exadata but it also has made enterprise workloads running on Oracle Exadata greener and more sustainable, something customers, consumers, and employees care about more and more.

Figure 5. Exadata 10XM Increases Energy Efficiency



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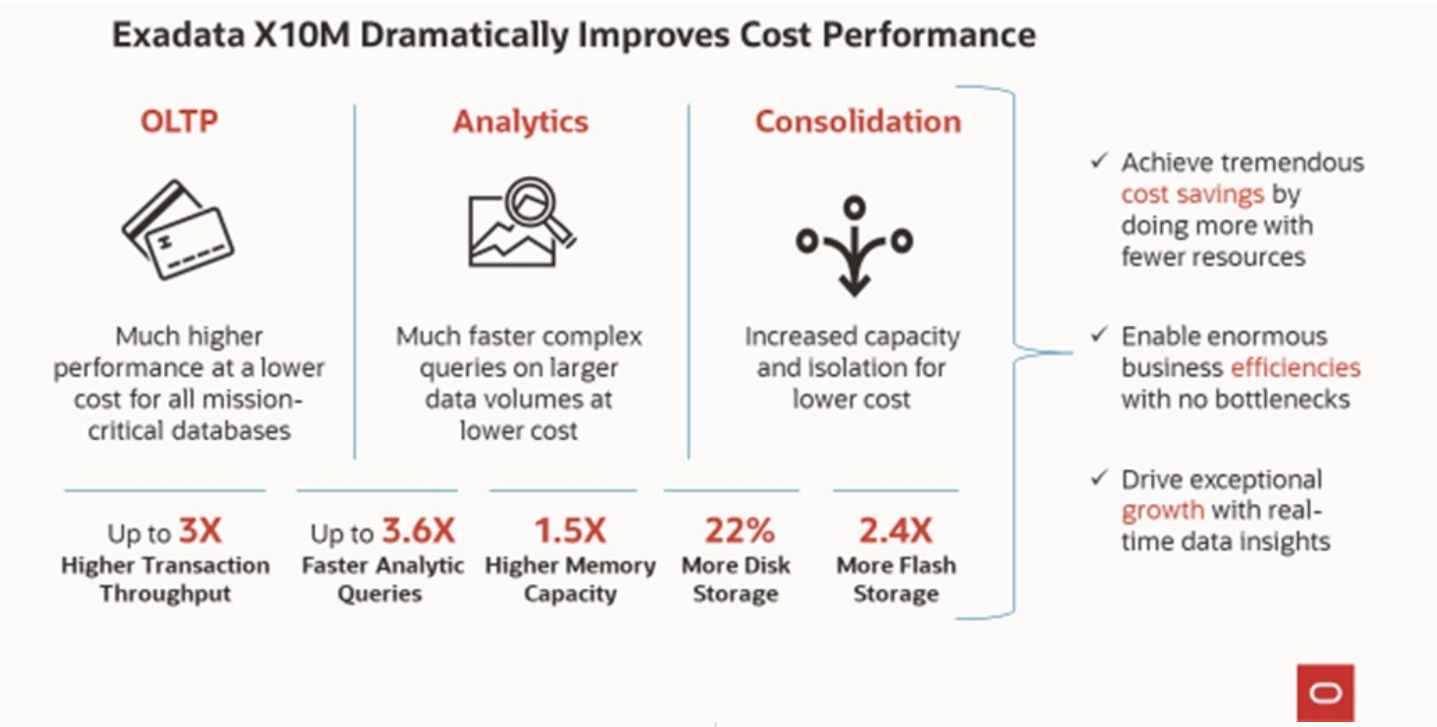
Exadata Leads in Cost Performance

Oracle Exadata X10M is the latest manifestation of Oracle's organizational DNA, which aims to lower the TCO of computing for enterprises. As discussed earlier, Exadata's core design is focused on delivering the most performance, availability, and value for all database workloads. Exadata X10M's instantiation of the Exadata architecture provides specific benefits for OLTP, analytics, and consolidation (see Figure 6).

- **Faster OLTP performance.** Oracle has improved the specs for database workloads once more with Exadata X10M, effectively delivering higher performance at a lower cost. Up to three times the transaction throughput at the same entry price is the highlight for this use case.
- **Faster analytics.** With Oracle Exadata X10M, complex and more demanding queries run faster on larger data volumes and at a lower cost. The performance spec highlight for this use case is analytical queries' running up to 3.6 times as fast as before.

Figure 6. How Exadata Leads in Performance Across Use Cases



Source: Oracle

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- **More consolidation.** For CxOs trying to consolidate workloads on fewer systems, Oracle has made significant improvements to the Oracle Exadata X10M spec with up to 50% higher memory capacity, 22% more disk storage, and 2.4 times the flash storage. The more generous specs enable enterprises to bring more workloads together on a single system, thus saving operating costs and reducing energy usage.

With Oracle Exadata X10M, Oracle gives CxOs another option for reducing costs by consolidating systems and ending system sprawl, which enables new efficiencies for their enterprise. The generous specifications of Exadata X10M give enough headroom to further grow workload counts on Exadata. And, finally, the combination of data processing with the strong analytical offerings enables CxOs to offer the business users of their enterprise better analytical insights into their data.

ANALYSIS AND OBSERVATIONS

For CxOs making decisions regarding their next-generation computing platform, Oracle offers many very well differentiated capabilities. With the highest Identicality of cloud and on-premises products available, Oracle makes it easy to transfer workloads from on-premises environments to the cloud and vice versa. And with Oracle Exadata X10M, Oracle again offers an attractive platform for running data-centric enterprise workloads faster and less expensively.

Strengths

Oracle Exadata possesses the following strengths compared with other offerings in this market space (see Figure 7):

- **Highest Identicality of cloud and on-premises functionality.** Oracle Exadata is a common platform across on-premises, hybrid cloud, and public cloud environments, delivering flexibility in times of uncertainty—from regulatory, top management, and best-practices perspectives. The main aspect of flexibility for computing platforms is the ability to seamlessly transfer workloads between the cloud and on-premises environments. Enterprises are attracted to Oracle Exadata X10M by the high Identicality of the solution.

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- **Integrated chip-to-click stack.** Oracle is pursuing Larry Ellison's vision of offering a fully integrated technology stack that is designed, engineered, and operated together, from the silicon all the way to the mouse clicks of an end user employing a SaaS application. No other vendor is currently pursuing such a complete vision of a technology stack. This is likely one of the largest software and hardware engineering efforts of our time and, as such, offers substantial simplification, TCO benefits, and efficiency savings.

- **One platform for all database needs.** In contrast to using a specialized database for each workload, Oracle Exadata X10M enables customers to run all Oracle Database workloads on a single platform, with the deployment flexibility that enterprises need. It can scale to the highest and most mission-critical OLTP demands as well as to meet the most challenging OLAP requirements and analytical workloads. It is the de facto best platform for running Oracle Database, making it also the ideal platform for database consolidation.

- **The best platform for Oracle Database being radically better.** With Oracle Exadata X10M, Oracle has shown that it can further improve the Exadata platform, resulting in massive benefits for its customers. Better performance at the same price as with Oracle Exadata X9M shows that Oracle is delivering value to its customers.

Weaknesses

Oracle Exadata X10M shows no sign of weaknesses in the offering itself; the concerns of CxOs are based on general concerns about Oracle as a vendor:

- **Oracle's (still) needing to improve its perception as a services company.** For the longest time, Oracle has been a perpetual-license market leader in the database field. With enterprises moving to a subscription economy, they expect technology providers to become service providers that manage and operate such subscriptions. Although Oracle has delivered on the service value proposition, its market perception still lags behind that of some of its competitors in this category.

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- **CxOs' perception of Oracle.** At best, CxOs see Oracle as a challenging vendor. Too many stories of unfavorable and harsh business tactics are out there—some true, some more in the realm of myth. Oracle has made substantial progress but must make itself easier to do business with and manage the transition from being a respected to being a liked technology partner for CxOs. This is an ongoing process, and Oracle is gradually improving but has not fully turned the corner yet.

- **Integrated stacks' not harmonizing with heterogeneous systems landscapes.** Enterprises have built up considerable technical debt over time, following a do-it-yourself philosophy that has resulted in operating a vast number of isolated databases, systems, and platforms. In some situations, enterprises need to keep operating these platforms for the foreseeable future and cannot move to Oracle Exadata X10M.

Figure 7. Oracle Exadata X10M Strengths and Weaknesses

STRENGTHS	WEAKNESSES
- Highest Identicality of cloud and on-premises functionality - Integrated chip-to-click stack - One platform for all database needs - The best platform for Oracle Database being radically better	- Oracle's (still) needing to improve its perception as a services company - CxOs' perception of Oracle - Integrated stacks' not harmonizing with heterogeneous systems landscapes

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RECOMMENDATIONS

The following are recommendations for CxOs looking to improve their computing architecture and considering Oracle Exadata X10M:

- **Enable Enterprise Acceleration.** Enterprises need to move faster than ever, and IT/computing infrastructures cannot continue to be the shackles on agility that they have been in the past. Therefore, CxOs should look for next-generation computing platforms, such as Oracle Exadata X10M, that enable them to transfer workloads from on-premises to the cloud and vice versa. In the case of Exadata, this is made easier by its high Identicality across deployment options. This is a key strategy for helping the technical side of an enterprise contribute to overall business objectives and the necessity of Enterprise Acceleration.[11]

- **Select vendors that have the greatest Identicality.** Identicality is the key to workload portability. The higher the Identicality between an on-premises architecture and a cloud architecture, the better the chances to seamlessly move workloads. This argument is intuitively clear to CxOs leading the transformation, and the platforms with high Identicality are, therefore, clearly preferred. It is even better when vendors state that they design for Identicality and want to keep it high—as high as technically feasible. Oracle excels at Identicality between Oracle Exadata on-premises, Oracle Exadata in public cloud, and the Oracle Exadata Cloud@Customer deployment options.

- **Pick your next-generation computing platform carefully.** There are substantial value proposition differences between the five vendors Constellation has analyzed in the underlying Constellation Market Overview. Differences in hardware provisioning, ownership in managing the offering, and functionalities make these five vendors very different partners for enterprises that want to manage their next-generation applications on the right next-generation computing platform. Oracle Exadata X10M delivers the highest Oracle Database performance at the lowest price, compared with alternative on-premises and cloud database providers, and brings its very best services from the cloud to customer data centers.

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- **Evaluate Oracle Exadata as an existing Oracle Database and analytics customer.** Because most Oracle customers run Oracle Database in one way or another, it is important that they familiarize themselves with the newest member of the Oracle Exadata product family, Oracle Exadata X10M. Being able to lower TCO; reduce licensing, support, and maintenance costs; fit sizing to match the load of the machine instead of peaks; consolidate databases; run petabyte-scale data warehouses; burst to the cloud for peaks; and transfer loads between Oracle Cloud and on-premises is a substantial benefit driver that CxOs simply cannot ignore. Similarly, Oracle Exadata is the ideal platform for consolidating Oracle workloads. Experienced Oracle customers know that the best deals are usually available in the fourth quarter.

- **Consider Oracle Exadata offerings as a prospect.** Database and tech stack migrations are challenging, so non-Oracle customers will look at Oracle Exadata from some distance. The benefits of Oracle Exadata X10M are so substantial, however, that CxOs need to talk with their respective cloud and technology stack vendors about what they can do in this regard. Should the projected gap of those vendors' future roadmaps compared with Oracle become too large and the potential cost savings with Oracle Exadata X10M become substantial enough, it will be time to pay attention—and consider a potential migration. This perspective becomes even more relevant because R&D investment in databases at Oracle's traditional competitors has been relatively minimal in recent years.

- **Take a stance on commercial prudence.** Regardless of vendor, enterprises need to make sure that they obtain the value they seek. For Oracle Exadata X10M, CxOs must pay attention to ensure that licenses and services (for instance, costs to burst to the cloud) are still providing their enterprise with an attractive TCO. As with all services-related offerings, prices will fluctuate, need to be contractually agreed upon as long as desired, and must be constantly monitored to avoid negative commercial surprises.

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RELATED RESEARCH

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[1] *The term* Enterprise Acceleration *was defined by the author in this Constellation Big Idea report: "Why the C-Suite Must Embrace Enterprise Acceleration," Constellation Research, May 2, 2019. https://www.constellationr.com/research/why-c-suite-must-embrace-enterprise-acceleration*

[2] *The term* next-generation applications *is used by the author to describe applications that use a combination of AI, big data, cloud, and build applications across seven distinct use cases. Find more on next-generation applications here: Holger Mueller, "The Era of Infinite Computing Triggers Next-Generation Applications," June 1, 2018. https://www.constellationr.com/research/era-infinite-computing-triggers-next-generation-applications*

[3] *The term* Identicality *was defined by the author in this Market Overview: Holger Mueller, "Next-Gen Computing: The Enterprise Computing Model for the 2020s," Constellation Research, September 14, 2018. https://www.constellationr.com/research/next-gen-computing-enterprise-computing-model-2020s and refers to the identical technology stack being available between the public cloud and the on-premises offering of a vendor's next-gen computing offering.*

[4] *For the Market Overview, see: Holger Mueller, "Next-Gen Computing: The Enterprise Computing Model for the 2020s," Constellation Research, September 14, 2018. https://www.constellationr.com/research/next-gen-computing-enterprise-computing-model-2020s*

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