

Oracle Database Exadata Cloud Service

Exadata Performance, Cloud Simplicity

ORACLE®

**DATABASE
CLOUD SERVICE**

Oracle Database Exadata Cloud Service (Exadata Service) delivers the world's best Cloud Database Platform by combining the world's #1 database with Exadata, the most powerful database platform, and adding all the simplicity and cost effectiveness of the public cloud.

Customers can now run Oracle databases in the cloud with the same extreme performance and availability experienced by thousands of organizations deploying Exadata on-premises. Oracle databases deployed in the cloud as part of this service include all Oracle Database options. They are 100% compatible with those deployed on-premises, ensuring a smooth transition to the cloud, and an efficient hybrid cloud strategy. With pay-as you-grow dedicated Exadata configurations, and infrastructure managed by Oracle experts, Exadata Service enables business agility and operational flexibility with zero CapEx.

The Best Database on the Best Cloud Platform

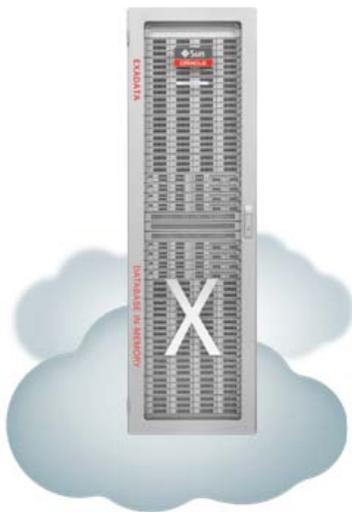
Oracle Database Exadata Cloud Service can consolidate all database workloads including Online Transaction Processing (OLTP), Data Warehousing (DW), In-Memory Analytics, and Mixed/Hybrid Workloads into a single Exadata platform and deliver extreme performance, mission critical availability, and highest security.

Best Database Technology

Oracle Database is the most popular and most versatile database technology for both OLTP and Analytics. With decades of technology innovation, it has been proven at hundreds of thousands of mission-critical deployments around the world. Exadata Cloud Service makes this enterprise-proven, robust database technology available in a cloud-based consumption model, at Oracle's public cloud data centers. All of Oracle's industry-leading capabilities are included with Exadata Cloud Service, such as Database In-Memory, Real Application Clusters (RAC), Active Data Guard, Automatic Storage Management (ASM), Partitioning, Advanced Compression, Advanced Security, Database Vault, Real Application Testing, OLAP, Advanced Analytics and Spatial and Graph. Also included is Oracle Multitenant, enabling high consolidation density, rapid provisioning and cloning, efficient patching and upgrades, and significantly simplified database management.

Most Powerful Database Platform

The platform that delivers Exadata Cloud is Oracle Exadata, which has been established as the highest performing, most cost effective and highest available



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KEY BUSINESS BENEFITS

Exadata Cloud Service combines the world's #1 database with Exadata, the most powerful database platform, controlled by Oracle Cloud software, and managed by Oracle Cloud experts.

- Cloud simplicity
- Faster time-to-market with web based Exadata and database provisioning
- Pay-as-you-go subscription-based pricing
- Dynamic Compute Bursting lowers total costs
- Easily migrate existing databases with no application changes
- Reduced IT administration
- Proven mission-critical database and platform
- Extreme performance for OLTP, Analytics, Hybrid, and Consolidation workloads
- Focus staff on improving business, not operating infrastructure

platform for running Oracle Database. Exadata was designed from the beginning as a cloud architecture featuring scale-out database servers and scale-out intelligent storage servers connected by an ultra-fast InfiniBand network. Exadata includes state-of-the-art PCI flash storage to deliver the highest throughput and best response times along with high capacity disks and database-optimized compression to provide cost effective capacity for the largest databases.

Unique software algorithms in Exadata bring database intelligence to storage, PCI flash, and InfiniBand networking for higher performance and capacity at lower costs than other platforms. Deployed at thousands of sites around the world, Exadata delivers extreme performance for all types of database workloads including Online Transaction Processing (OLTP), Data Warehousing (DW), In-Memory Analytics and mixed workloads.

For additional information on Exadata, please visit <http://www.oracle.com/exadata>.

Best Cloud Offering for an Enterprise Database

On top of the rock-solid Oracle Database and Exadata platform, Exadata Service adds the ease, simplicity and flexibility of Oracle Public Cloud. Organizations can now access Oracle Database on Oracle Exadata without capital investments for IT infrastructure such as data center space, power, cooling, compute servers, storage and networks. Oracle experts manage all backend infrastructure on behalf of customers, which means human resources and IT administration costs are significantly reduced, and IT can focus on improving business results. Full Oracle Database functionality with Exadata Service ensures that any existing application can be quickly migrated to the cloud without changes. Provisioning and expanding the Exadata Service is driven through simple web interfaces, providing customers rapid elasticity to meet changing business demands. An Exadata Service instance provisioned for one customer is completely isolated from other tenants, providing assured performance and security for business critical workloads.

Customer Benefits

Exadata Service is 100% compatible with on-premises Oracle databases and all existing applications. With Exadata Service, organizations can easily adopt a pure cloud or hybrid cloud strategy that spans on-premises databases as well as databases in the Cloud.

Exadata Service offers immediate business benefits for a broad range of customers:

- Exadata Service enables existing on-premises Exadata customers to easily embark on a journey to the cloud – without compromising the database performance and availability levels they enjoy with their on-premises Exadata deployments.
- Existing Oracle Database customers who have not yet experienced Exadata can easily start enjoying the performance, availability and scalability benefits of the world's best database platform – without losing any of the database functionality they rely on.
- Organizations that have been forced to settle for public cloud databases with limited functionality, partial security and compromised data consistency can now benefit from the most sophisticated database functionality on the most powerful cloud database platform.

Exadata: The Best Database Platform

EXADATA HARDWARE

- Fastest Networking
 - 40Gbps InfiniBand Networking
- Fastest Storage
 - Ultra-fast NVMe Flash
 - Up to 120GB/sec Throughput
 - Up to 3.6 Million 8K I/Os per sec
 - ¼ millisecond response time
- Fastest Compute
 - Fastest x86 Processors
- Large Memory Capacity
 - 256 GB per Database Server
- Complete Redundancy

EXADATA SOFTWARE

All Exadata Software features, such as:

- Smart Scan
- Storage Indexes
- Data Mining Offload
- Hybrid Columnar Compression
- Smart Flash Cache
- Smart Flash Logging
- In-Memory Fault Tolerance
- I/O Resource Management
- Network Resource Management
- Instant Failure Detection
- Sub-second I/O Latency Capping
- Columnar Flash Cache
- JSON/XML Smart Scan
- Direct-to-Wire OLTP protocol
- Test/Dev Snapshots
- Fastest RAC Node Failure Recovery
- Fastest Data Guard Redo Apply
- Fastest Backup using Offload to Storage

Exadata Hardware

Exadata Cloud Service utilizes powerful database servers, each with two 18-core x86 processors and 256 GB of memory. Exadata also utilizes scale-out, intelligent storage servers, each of which has two 8-core x86 processors, four PCI Flash cards (each with 1.6 TB raw capacity), and twelve 7,200 RPM disks (each with 8 TB raw capacity). Internal connectivity between database and storage servers is enabled by a low-latency 40 Gbps InfiniBand fabric. External connectivity to the Exadata Cloud Service is provided using standard 10 Gigabit Ethernet.

Exadata Cloud Service uses state-of-the-art flash devices that are placed directly on the high speed PCI bus rather than behind slow disk controllers and directors. Exadata flash uses the latest NVMe (Non-Volatile Memory Express) flash protocol to achieve extremely low latency and CPU overhead.

The database-optimized data tiering between RAM, flash and disk implemented in Exadata provides both higher capacity and faster performance than other flash-based solutions. Flash-only storage arrays cannot match the throughput of Exadata's integrated and optimized architecture with full InfiniBand based scale-out, fast PCI flash, offload of data intensive operations to storage, and algorithms that are specifically optimized for databases.

Exadata Software

The technology that enables Exadata's unparalleled performance without any of the bottlenecks of traditional storage arrays is Exadata Storage Server software. This software powers the Exadata storage servers, providing an extremely efficient database-optimized storage infrastructure.

One of the many unique features of Exadata Storage Server software is *Smart Scan* technology, which offloads data intensive SQL operations from the database servers directly into the storage servers. By pushing SQL processing to the storage servers, data filtering and processing occur immediately and in parallel across all storage servers, as data is read from disk and flash. Only the rows and columns that are directly relevant to a query are sent to the database servers. This greatly accelerates analytic queries, eliminates bottlenecks, and significantly reduces the CPU usage of the database servers.

Exadata includes a vast array of software capabilities that enables its unparalleled scalability, performance and availability. Some of these Exadata software features are:

- *Storage Indexes* avoid unnecessary I/O operations by replacing them with a few in-memory lookups.
- *Exafusion Direct-to-Wire Protocol* allows database processes to read and send Oracle RAC messages directly over the InfiniBand network, which considerably improves OLTP response time and scalability in Exadata.
- *Smart Fusion Block Transfer* improves OLTP performance further by eliminating the impact of redo log write latency when moving blocks between nodes.
- *Smart Flash Logging* accelerates OLTP by using the flash memory in Exadata storage combined with the high speed RAM memory in the Exadata disk controllers to reduce the average latency of database commits.

- *Hybrid Columnar Compression* utilizes a combination of row and columnar methods to greatly compress data, enabling tremendous cost-savings and performance improvements due to reduced storage capacity and reduced I/O, especially for analytic workloads.

Exadata is engineered to provide the highest levels of availability. Each Exadata system has completely redundant hardware. In addition, Exadata Cloud Service comes pre-integrated with Oracle Maximum Availability Architecture (MAA) best practices for Database High Availability (HA) technologies such as RAC, ASM, RMAN, Flashback and Data Guard. Further, Exadata-specific HA capabilities such as *Instant Detection of Compute and Storage Server Failures* and *Exadata I/O Latency Capping*, significantly enhance the availability of Exadata.

One single rack powering Exadata Cloud Service can be used to deploy a large number of databases, enabling massive database consolidation. To ensure consistent performance in a highly consolidated environment, Exadata provides unique end-to-end prioritization and resource management capabilities spanning database servers to network and storage. Space-efficient database snapshots can be quickly created for test and development purposes directly on Exadata. Exadata database snapshots are integrated with Oracle Multitenant to provide an extremely simple interface for creating new pluggable database snapshots.

Exadata Cloud Service Overview

Exadata Service enables full-featured Oracle databases to run on the Exadata platform in the Oracle Public Cloud. Exadata Service instances come pre-configured according to best-practices that have been proven at thousands of mission critical Exadata sites around the world.

Exadata Service is available through two subscription offerings: Metered and Non-metered:

- A Metered Exadata Service subscription enables short-term pay-as-you-go service usage, with minimum duration of one month. Pre-paid Oracle Database Cloud Service funds can be consumed. Ideal applications and use-cases include short-term test & development projects, application certification projects, proof-of-concept (PoC) exercises, trials and performance validation projects.
- A Non-metered Exadata Service subscription requires a minimum term of 12 months. The service is purchased directly with a service subscription. The Non-metered offering is ideally suited for deploying production databases in the Cloud on a long-term Exadata deployment. It is also suitable for on-going long-term test and development projects, such as those associated with agile application development cycles.

Databases provisioned include all the features of Oracle Database Enterprise Edition, plus all Oracle Enterprise Manager Packs and all Database Enterprise Edition Options. Customers can choose to deploy Oracle Database 11g Release 2 (11.2.0.4), Oracle Database 12c Release 1 (12.1.0.2), Oracle Database 12c Release 2 (12.2.0.1), or a combination of these. They connect to the configured database from either Oracle Compute Cloud Services such as Oracle Dedicated Compute, or from their on-premises applications, using standard Oracle Net Services clients such as JDBC and OCI. Customers also have full privileged OS level access to their database servers.

As shown in Fig. 1, Exadata Cloud Service also includes all capabilities of the underlying Exadata platform.

KEY FEATURES

- Most powerful Oracle Database with all options, features, and Enterprise Manager Database Packs
- All Exadata capabilities, ensuring extremely high levels of performance, availability and security
- Easy and rapid Exadata and database provisioning in a few clicks
- Cloud automation software reduces administration
- Subscribe to only the compute cores needed by the application
- Online Compute Bursting allows elastic expansion during business peaks
- 100% compatibility with on-premises databases
- Comprehensive database management through Oracle Enterprise Manager, as well as Cloud-based self-service
- All infrastructure management and monitoring by Oracle Cloud Operations

ORACLE DATABASE

- Oracle Database 12.2.0.1, 12.1.0.2, or 11.2.0.4
- All Oracle Database Options:
 - Active Data Guard
 - Advanced Analytics
 - Advanced Compression
 - Advanced Security
 - Database In-Memory
 - Database Vault
 - Label Security
 - Multitenant
 - On-Line Analytical Processing
 - Partitioning
 - RAC One Node
 - Real Application Clusters
 - Real Application Testing
 - Spatial and Graph
 - TimesTen Application-Tier Database Cache
- All Oracle Database Enterprise Manager Packs
 - Cloud Management Pack for Oracle Database
 - Data Masking and Subsetting Pack
 - Database Lifecycle Management Pack for Oracle Database
 - Diagnostics Pack
 - Tuning Pack

WORKLOADS

- Any combination or mix of OLTP, Data Warehousing, Reporting, OLAP, In-Memory Analytics, Spatial, Graph, JSON, XML, Objects, Large Objects
- Consolidate many physical databases or pluggable databases
- Disaster Recovery in Cloud with query offload
- Full ACID compliance (Atomicity, Consistency, Isolation, Durability) greatly simplifies application development and ensures data correctness

Exadata Cloud: Compatible, Scalable, Available, Secure
 Decades of Database Innovation Proven at Millions of Mission-Critical Deployments

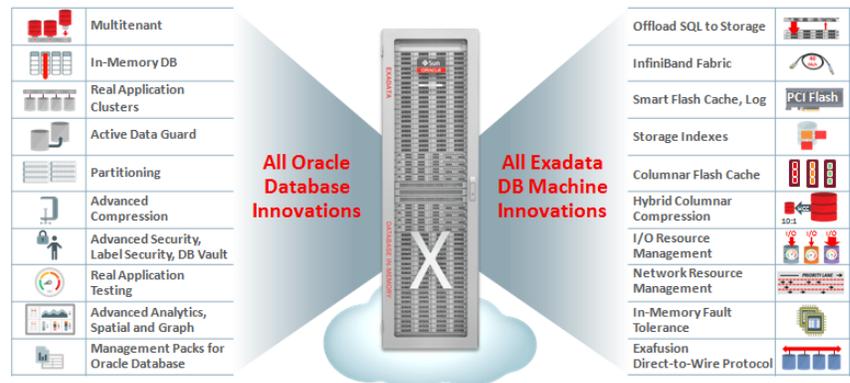


Figure 1: Exadata Cloud Service with all Database and Exadata features

Customers choose an Exadata configuration starting with a Quarter Rack which has 2 database servers and 3 storage servers. The database servers have a minimum and maximum number of compute cores (OCPUs) that can be enabled for the chosen configuration, and customers can specify their desired number of compute cores within these limits. Pricing is based on the number of enabled compute cores, and as business grows, customers can enable additional compute cores, thus paying only for the processing power that they require. A unique advantage to the Exadata Service is all the disk/flash storage, IOPs and memory for the configuration chosen is included in the subscription price.

Customers with additional resource requirements may choose larger Exadata configurations, such as the Quarter, Half and Full Racks, enabling higher compute, network and storage capacity. Detailed specifications for each Exadata Cloud Service configuration are provided in Table 1.

Online Compute Bursting

Exadata Cloud Service features infrastructure that is dedicated to each customer, to ensure that response times and throughput are predictable for critical business processes. In addition, Exadata Cloud Service also allows Compute Bursting, enabling customers to grow, and then later shrink, their database server CPU capacity over their base subscription level to meet their peak or seasonal demands. With this feature, customers can add database server OCPUs to achieve a total processor capacity up to double their base subscription level. Adjustments can be made completely online as frequently as the customer wants. The incremental processor capacity used in Compute Bursting is billed at the hourly Metered rate for peak usage within that hour.

Compute Bursting provides Exadata Cloud Service customers with the best of both worlds: subscription pricing for their normal needs, plus the flexibility to rapidly adjust processor capacity as business conditions change. This avoids the costly practice of sizing for the highest possible peak workload, which is often required for on-premises systems and reserved cloud capacity on other cloud providers.

Administration

Customers have complete access to all Oracle Database and OS features to ensure smooth and simple migration from on-premises Oracle deployments to Exadata Cloud Service. Each Exadata Cloud Service instance is configured such that there is a single Virtual Machine (VM), called the domU, which is owned by the customer, in each database server of the Exadata system. Customers have root privileges for the Exadata database server domU and DBA privileges on the Oracle databases. Customers can configure the system as they like, and load additional agent software on the Exadata database servers to conform to business standards or security monitoring requirements.

Customers perform familiar database administration and OS administration tasks aided by cloud automation for backup, patching, and upgrades. All supporting infrastructure for Exadata Service is deployed, maintained and managed by Oracle, including datacenter networking, private Exadata InfiniBand networks, physical Exadata compute and storage servers, firmware, and Exadata storage software. This allows customers to focus on their business needs and application requirements, and not IT infrastructure management.

Database and OS patching is initiated by customers on their preferred schedule while infrastructure patching is performed automatically by Oracle, with little/no disruption to the service.

Use Cases

Exadata Service fits a wide variety of business use cases that are governed primarily by two principles – the enterprise-proven reliability and functionality of Oracle databases, and the agility of Cloud to quickly meet business requirements. Business users don't have to wait for long IT budgetary approval and procurement cycles to deliver time-sensitive applications.

Exadata Service is an ideal fit for:

- Running business-critical production OLTP or analytic databases at almost any scale without incurring the capital expenditure and complexity of maintaining the underlying IT infrastructure. Oracle Database 12c In-Memory enables ultra-high-performance analytics to be run on dedicated analytic databases or directly on OLTP databases.
- Consolidating a variety of workloads using multiple Oracle databases or Oracle Multitenant.
- Maintaining synchronized Oracle standby or replica databases for disaster recovery and/or query offloading using Oracle Active Data Guard or Oracle GoldenGate.
- Quickly provisioning high-performance Oracle databases for ad-hoc business reasons such as feature development, functionality testing, application certification, proof-of-concept, and try-before-buy activities.
- Executing time-sensitive large-scale applications such as launching a web-based marketing campaign, running loyalty programs, or rolling out new business initiatives.

An attractive aspect of all these use cases for existing Oracle Database customers is that their applications and data models require no change. Their Data Center simply expands to include the elasticity and flexibility of the Oracle Cloud.

Access and Security

Exadata Service provides secure high-performance access from both on-premises systems and from other Oracle Public Cloud services. To ensure consistent high-performance and isolation, multiple separate physical networks are provided on each Exadata server.

- The Client Network provides 10Gb/sec connectivity for applications to send and receive data to and from databases.
- The Administration Network provides a separate physical network for customer administrators and Oracle Enterprise Manager.
- The Backup Network provides 10Gb/sec connectivity for high-bandwidth use cases such as backup, data loading, and disaster protection using Data Guard.
- InfiniBand is used internally for ultra-high-speed compute-to-compute and compute-to-storage networking.
- A secure isolated Cloud Management network is used by Oracle to manage the servers, storage and switches. This network is not accessible to customers.

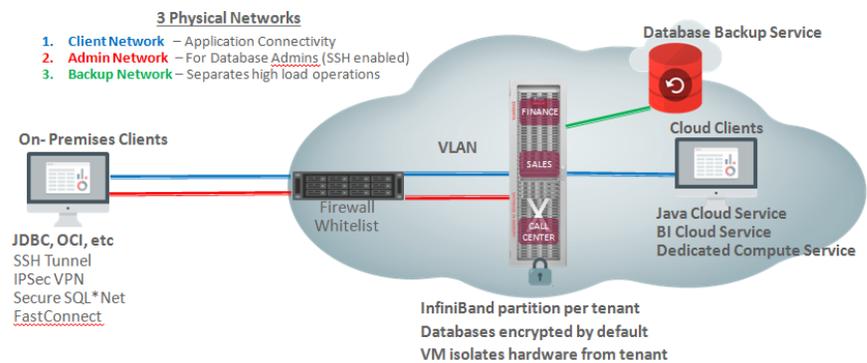


Fig. 2: Access and Security Model for Exadata Service

Secure application connectivity is ensured by using native Oracle Net encryption or an IPsec VPN. A firewall whitelist containing customer-defined trusted IP addresses restricts network access to Exadata Service instances. InfiniBand is used internally for ultra-high-speed networking between database servers and between database and storage servers. InfiniBand security is enforced using InfiniBand partitioning, which provides network isolation on the InfiniBand network. Since customer databases run in a VM container on Exadata database servers, they are isolated from the underlying hardware resources. An additional layer of at-rest data protection is provided by ensuring that all databases created on the Exadata Cloud Service are encrypted with Tablespace Encryption, using the Transparent Data Encryption (TDE) capability of the Oracle Database.

Provisioning

Exadata Service includes a simple easy-to-use web-based provisioning wizard through which customers can quickly provision their chosen Exadata system and subsequently their database instances. This wizard is available through Oracle's Cloud Portal, <http://cloud.oracle.com>.

After purchasing Exadata Service, customers get an email, such as the one below, prompting to provision an Exadata Service instance.

The image shows an email notification from Oracle Cloud. The header includes the Oracle logo and the word "Cloud". The main body of the email starts with "Hello Admin," followed by a welcome message and instructions for the primary administrator. It mentions that some services may require additional configuration. A "Getting Started" section provides two bullet points: one about reviewing user roles and privileges, and another about the Oracle Customer Success Manager (CSM). Below this, there is a list of three steps for filing a Service Request: adding specific IP addresses, setting up VPN, and reconfiguring grid disks. A yellow highlighted section titled "Access Details" provides the user name and temporary password: Username: binoy.sukumaran@oracle.com, Temporary Password: Aw78WN22, and Identity Domain: a424641. At the bottom, a "Subscription Details" section lists the service as "Exadata Cloud Service - Custom" with data center "US Commercial 2" and service console URL <https://dbaas.oraclecloud.com/dbaas/faces/dbRunner.jspx>. It also includes "Order Details" with Order ID: ExadataQtrRackOAE1553 and Order Date: Friday, September 16, 2016 9:43 AM CDT.

Fig. 3: Creating Exadata Cloud Service instance

Upon selecting this link, customers are taken through a few simple steps to provision their Exadata Cloud Service instance. This process provisions an Exadata system for

the customer, and is completely executed by Oracle Cloud Operations in an automated manner, without requiring any customer resources.

Once an Exadata system is provisioned, customers get another email indicating that the system is available now for database creation. Similar to the previous steps, customers create their databases in a very simple manner through a simple web-based wizard. The first step in this phase is choosing their desired Database Cloud Service, as shown in the diagram below.

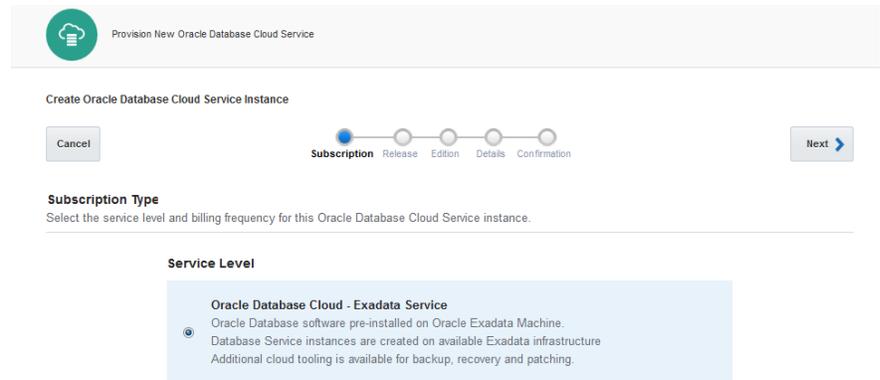


Fig. 4: Choosing Exadata Service through Oracle Cloud Portal

Subsequently, customers specify additional attributes such as the database version, database administration security credentials, and backup & recovery parameters.

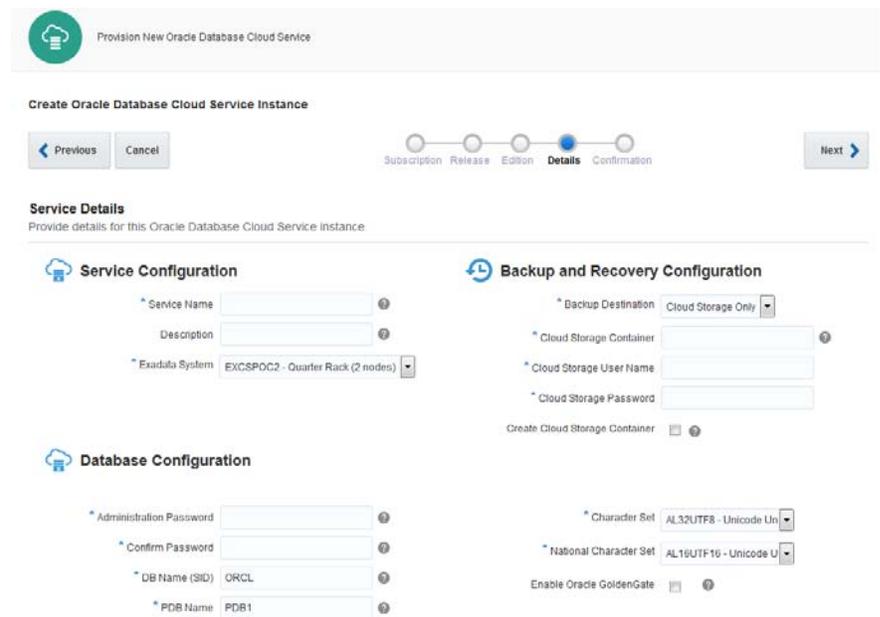


Fig. 5: Creating Databases on Exadata Service

After all required attributes are specified, customers initiate the automated database creation process. Once the database is created, customers are presented with a summary screen of the system configuration and database connection strings, indicating that the database is available for data load and application access:

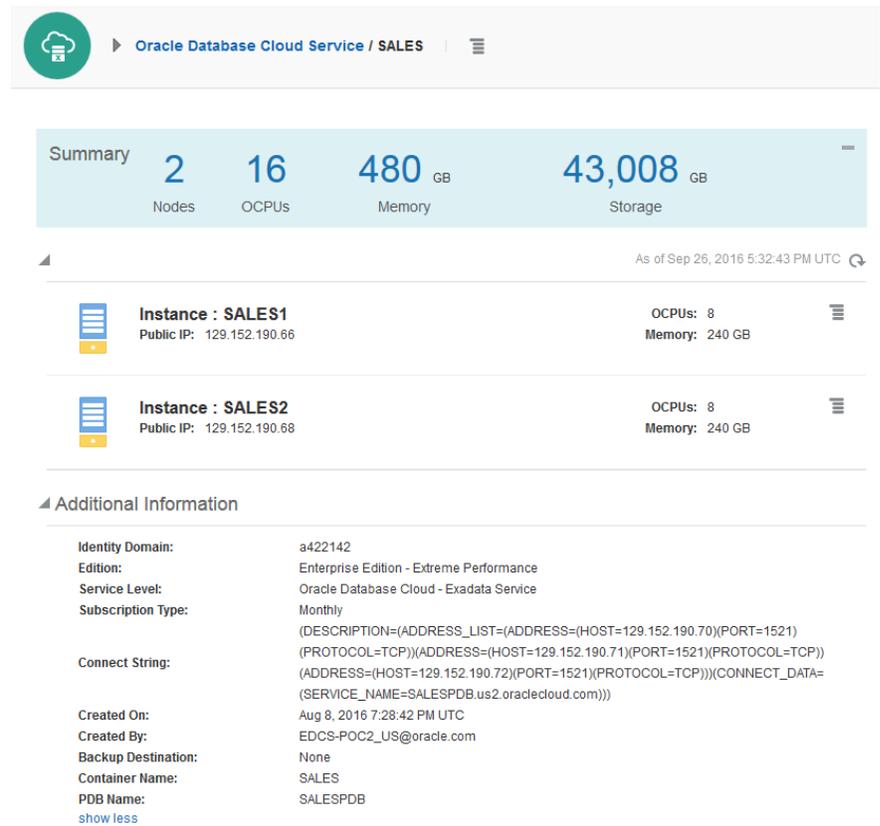


Fig. 6: Summary Screen Showing a 2-node RAC Database Created on Exadata Service

This automated streamlined process of deploying a dedicated Exadata system for the customer along with RAC databases ready for application access, significantly cuts down the labor-intensive procurement-to-deployment cycle that typically takes weeks to months in an enterprise IT setting. This forms the essence of the business agility and rapid time to market capabilities of Oracle Public Cloud.

Backup & Recovery

Exadata Service provides automatic built-in database backup facilities, with weekly full backups and daily incremental backups. At the time of service provisioning, customers can choose for backups to be stored on either cloud storage or local storage.

Backups to cloud storage leverage Oracle Database Backup Cloud Service, which is an RMAN-integrated solution that sends Oracle Database backups directly to Oracle Storage Cloud. This presents the most affordable and elastic option to store backups for Exadata Service.

Customers also have the option to back up to local Exadata storage, which delivers the fastest backup and recovery solution.

Migration to Exadata Service

Full compatibility between on-premises databases and databases in Exadata Service makes migration to Exadata Service easy and low risk. Following established Oracle Database best practices, two types of migration methodologies are supported:

- Logical Migration – this methodology allows data reorganization as part of migration. Database solutions that can be used for this purpose are Oracle Data Pump and Oracle GoldenGate.
- Physical Migration – this methodology, which is a byte-to-byte copy of the data, offers the simplest way to migrate databases. Solutions that can be used for this purpose are RMAN backup, Transportable technologies, and Data Guard. Customers can also restore from a backup made on the Oracle Public Cloud through the Oracle Database Backup Service.

Scaling Exadata Service

With Exadata Service, customers can easily scale their business by expanding their allocated infrastructure. This can be done in two ways:

- Scaling up within an allocated Exadata system enables customers to add, or remove, compute node processing power within the existing Exadata system. Online Compute Bursting is one example of this kind of scaling.
- Scaling up to a different Exadata system enables customers to upgrade their allocated Exadata configuration to the next higher configuration, for example, from a Quarter Rack to a Half Rack. This is done when the required processing power, storage capacity or bandwidth exceeds the amount that is available within the current configuration.

Conclusion: Transform IT, Unleash Business Potential

Oracle Database Exadata Cloud Service features the most versatile and functional database technology – Oracle Database, on the most powerful platform – Exadata, with the simplicity and cost effectiveness of Oracle Cloud software deployed in Oracle Cloud Data Centers.

Enterprise-proven database capabilities are now instantly available to maximize productivity, lower risk and accelerate time-to-value. To embrace the Cloud, customers no longer have to compromise their SQL functionality, performance, availability, data models, or transactional integrity. No changes to on-premises applications are required either, enabling rapid and easy migration to the cloud, or deployment of a hybrid cloud strategy. Finally, with Exadata Cloud Service, organizations no longer have to dedicate limited IT talent to managing and maintaining infrastructure. Instead they can focus on business logic and leverage the cloud innovation benefits much more expeditiously.

With a database platform uniquely engineered for extreme performance, along with fast deployment, simplified management, low operating costs and reduced risks, Exadata Cloud Service is the best public cloud database platform available today.

Table 1. EXADATA SERVICE: Technical Specifications

	Quarter Rack	Half Rack	Full Rack
Number of Database Servers	2	4	8
Number of OCPUs	16 – 68	56 – 136	112 – 272
Total Memory	480 GB	960 GB	1,920 GB
Number of Storage Servers	3	6 ¹	12 ¹
Total Flash Capacity	19.2 TB	38.4 TB	76.8 TB
Total Usable Disk Capacity ²	42 TB	84 TB	168 TB
Max DB Size Supported (local backup)	16.8 TB	33.6 TB	67.2 TB
Max DB Size Supported (no local backup)	33.6 TB	67.2 TB	134.4 TB
Max SQL Flash Bandwidth ³	30 GB/sec	60 GB/sec	120 GB/sec
Max SQL Flash Read IOPs ⁴	900 K	1.8 M	3.6 M
Max SQL Flash Write IOPs ⁵	500 K	1 M	2 M
Max SQL Disk Bandwidth ³	4.5 GB/sec	9 GB/sec	20 GB/sec
Max SQL Disk IOPs ⁴	7 K	14 K	28 K
Max Data Load Rate ⁶	5 TB/hr	10 TB/hr	20 TB/hr

1. Note that Exadata Service Half Rack and Full Rack Configurations differ from on-premises Half Rack and Full Rack. The Exadata Service Half Rack is twice the size of a Quarter Rack and has six storage servers. The Exadata Service Full Rack is twice the size of the Half Rack and has twelve storage servers.
2. After high-redundancy mirroring, but before database compression.
3. Bandwidth is peak physical scan bandwidth achieved running SQL, assuming no database compression. Effective user data bandwidth is higher when database compression is used.
4. Based on 8K I/O requests running SQL.
5. Based on 8K I/O requests running SQL. Flash write I/Os measured at the storage servers after ASM mirroring, which issues multiple storage I/Os to maintain redundancy.
6. Load rates are typically limited by database server CPU, not I/O. Rates vary based on load method, indexes, data types, compression and partitioning.



CONTACT US

For more information about Oracle Database Exadata Cloud Service, visit oracle.com/exadata or call +1.800.ORACLE1 to speak to an Oracle representative.

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Integrated Cloud Applications & Platform Services

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