

Availability Domains to sub-milliseconds. Latency is even less between compute instances within an Availability Domain. In addition, Oracle Bare Metal Cloud Services enable a secure, private software-defined Virtual Cloud Network (VCN) that allows customers to treat Oracle Bare Metal Cloud Services as a secure and elastic extension of their on-premises network. Customers can configure their Exadata Cloud Service instance in their preferred VCN with complete flexibility that includes assigning their own private IP address space, creating subnets, creating route tables and configuring stateful firewalls. Customers can configure the VCN with an optional Internet Gateway to handle public traffic, and an optional IPSec VPN connection to securely extend their on-premises network.

- Bare Metal Cloud Services also offer fully dedicated bare metal compute infrastructure with powerful processors, high memory, and latest generation NVMe SSDs, which provides unrivaled raw performance ideal to run CPU intensive and I/O intensive applications. These applications connect to the databases deployed on Exadata Cloud Service instances over a secure, high speed network connection, delivering unparalleled performance for any enterprise-scale application deployment.

For more information on Bare Metal Cloud Services, please refer to <https://cloud.oracle.com/bare-metal>.

## 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 Bare Metal 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 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.
- User defined cloud networking (VCN) for security and isolation.

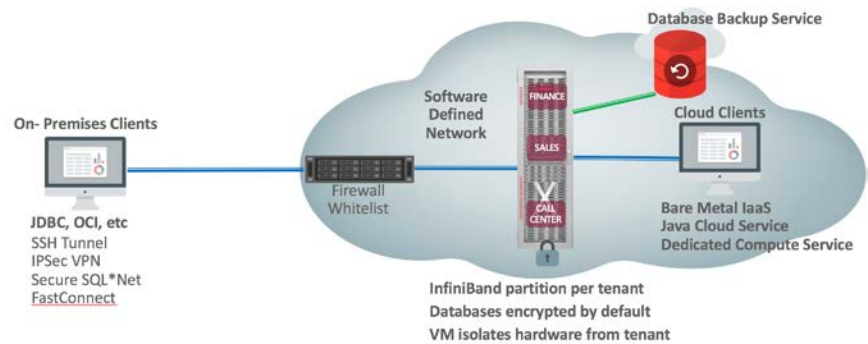


Fig. 2: Access and Security Model for Exadata Service


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. After purchasing Exadata Service, customers get an email prompting to provision an Exadata 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.





Customers create their databases in a very simple manner through a simple web-based wizard; choosing options such as the database version, database administration security credentials, and backup & recovery parameters.

After all required attributes are specified, customers initiate the automated service 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.

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.

Recovery and Backups are easy with Exadata Service with a single click from the cloud UI. Choose when and where to backup from the UI with a single button.

Recovery from a backup in the UI is again a single click of the mouse.

## 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.

## Updating Exadata Service

Updating an Exadata Service can be performed by customers with a single mouse click. To update a database, view the details of the database deployment in the cloud UI. Now, with a single click, the service is updated one node at a time ensuring no disruption to the database or application users accessing the database. The service can also be updated via a REST service or from the compute node with a single command.

## 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 need 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 CLOUD SERVICE X5-2: 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	496 GB	992 GB	1,984 GB
Number of Storage Servers	3	6	12
Total Flash Capacity	19.2 TB	38.4 TB	76.8 TB
Total Usable Disk Capacity <sup>1</sup>	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 <sup>2</sup>	30 GB/sec	60 GB/sec	120 GB/sec
Max SQL Flash Read IOPs <sup>3</sup>	900 K	1.8 M	3.6 M
Max SQL Flash Write IOPs <sup>4</sup>	500 K	1 M	2 M
Max SQL Disk Bandwidth <sup>2</sup>	4.5 GB/sec	9 GB/sec	20 GB/sec
Max SQL Disk IOPs <sup>3</sup>	7,000	14,000	28,000
Max Data Load Rate <sup>5</sup>	5.0 TB/hr	10.0 TB/hr	20.0 TB/hr

1. - After high-redundancy mirroring, but before database compression.
2. - Bandwidth is peak physical scan bandwidth achieved running SQL, assuming no database compression. Effective user data bandwidth is higher when database compression is used.
3. - Based on 8K I/O requests running SQL.
4. - 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.
5. - Load rates are typically limited by database server CPU, not I/O. Rates vary based on load method, indexes, data types, compression and partitioning.

**Table 2. EXADATA CLOUD SERVICE X6-2: Technical Specifications**

	Quarter Rack	Half Rack	Full Rack
Number of Database Servers	2	4	8
Number of OCPUs	22 – 84	44 – 168	88 – 336
Total Memory	1,440 GB	2,880 GB	5,760 GB
Number of Storage Servers	3	6	12
Total Flash Capacity	38.4 TB	76.8 TB	153.6 TB
Total Usable Disk Capacity <sup>1</sup>	85.4 TB	170.9 TB	341.7 TB
Max DB Size Supported (local backup)	34.2 TB	68.4 TB	136.7 TB
Max DB Size Supported (no local backup)	68.3 TB	136.7 TB	273.4 TB
Max SQL Flash Bandwidth <sup>2</sup>	48 GB/sec	96 GB/sec	192 GB/sec
Max SQL Flash Read IOPs <sup>3</sup>	900 K	1.8 M	3.6 M
Max SQL Flash Write IOPs <sup>4</sup>	800 K	1.6 M	3.2 M
Max SQL Disk Bandwidth <sup>2</sup>	5.4 GB/sec	11 GB/sec	21.5 GB/sec
Max SQL Disk IOPs <sup>3</sup>	7,800	16,000	31,000
Max Data Load Rate <sup>5</sup>	5.0 TB/hr	10.0 TB/hr	20.0 TB/hr

1. - After high-redundancy mirroring, but before database compression.
2. - Bandwidth is peak physical scan bandwidth achieved running SQL, assuming no database compression. Effective user data bandwidth is higher when database compression is used.
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#### CONTACT US

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

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