



# Oracle Cloud DBA

Lear how to stay up to date on this Dbaas era

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July, 2023



# Nossos Valores

Integridade

Compliance

Trabalho em  
Equipe

Satisfação do  
Cliente

Qualidade

Ética

Inovação

Respeito  
Mútuo

Justiça

Comunicação

Como empresa líder em tecnologia, abraçamos a **diversidade** em todas as suas formas. Acreditamos realmente que a **inovação** começa com a **inclusão**. E isso só pode ser alcançado com a cooperação de nossos **parceiros**. Afirmamos nosso **compromisso** em manter um **ambiente respeitoso e livre de discriminação** e esperamos isso dos nossos **parceiros de negócios**.

A Oracle espera que seus **parceiros** conduzam os negócios de forma **justa** e **ética**, para cumprir as leis anticorrupção em todo o mundo, para cooperar com os pedidos de informação da Oracle e evitar envolver-se em qualquer atividade que envolva até mesmo a aparência de impropriedade.

É vital que os nossos parceiros sejam aderentes aos valores do **Código de Ética e Conduta Empresarial da Oracle**, que baseia-se e implementa os valores que são essenciais para o nosso sucesso como empresa. Nossos valores são a base de tudo o que fazemos e todos nós devemos viver esses valores todos os dias.



Utilize o QR code para acessar o Código de  
Ética e Conduta Empresarial da Oracle.

# Agenda Day 2

OCI MySQL Database

Autonomous ADB Database

OCI Data Safe and Security

DBCS Bare Metal Vs VM System Database

OCI MAA Data Guard

Demo – MySQL Heatwave Provisioning

Demo – Autonomous Database Provisioning

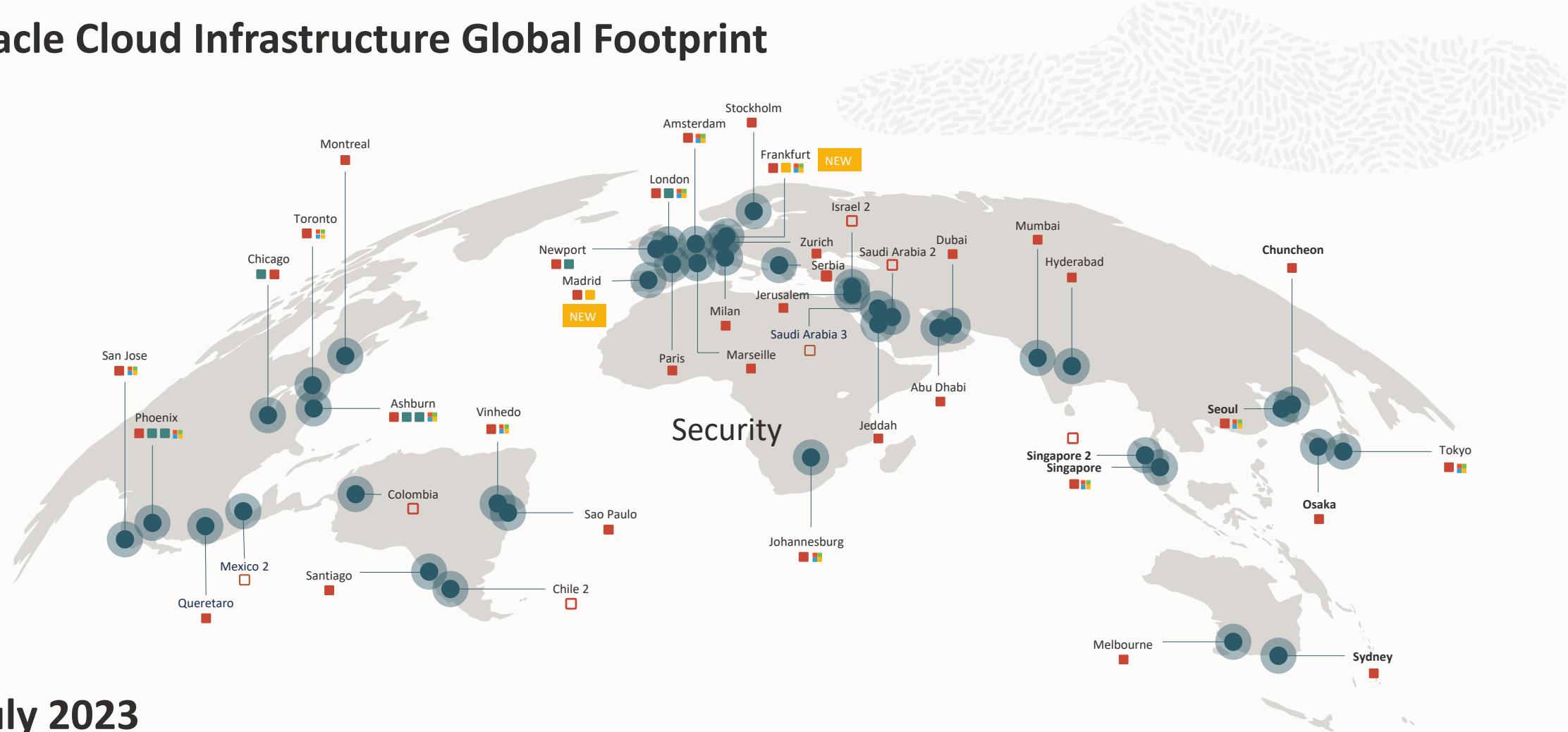
Demo – Data Safe Register

# OCI Cloud Region Map

Current Oracle Datacenter and Microsoft around the Word



# Oracle Cloud Infrastructure Global Footprint



July 2023

44 regions; 7 more planned  
12 Azure Interconnect Regions



# MySQL

MySQL and MySQL Heatwave Available for deploy on OCI



# Oracle MySQL Database Services on OCI Console



# Oracle MySQL Database Services on OCI Console



## Databases

### MySQL

DB Systems

Backups

Channels

Configurations

### MySQL HeatWave on AWS

Administration

### Oracle NoSQL Database

Tables

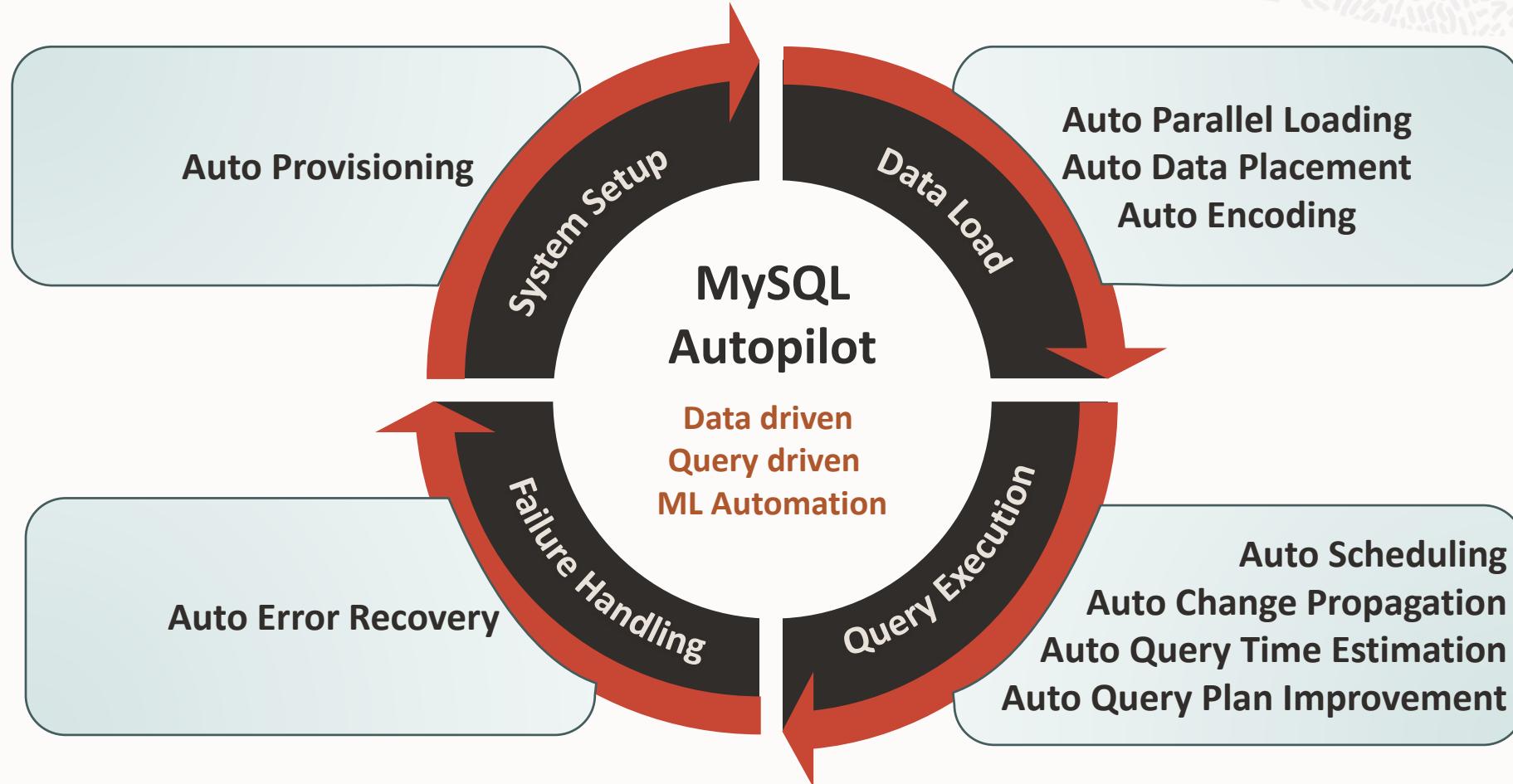
### OpenSearch

Clusters

Backups

# MySQL Autopilot Features

Machine learning based Automation



# MySQL is the most popular database for developers

## Most popular databases

MySQL 47%

PostgreSQL 44%

SQLite 32%

MongoDB 28%

MS SQL Server 27%

[Stackoverflow survey](#)

## Which databases have you used in the last 12 months?

MySQL 64%

PostgreSQL 48%

Redis 36%

MS SQL Server 32%

SQLite 30%

[Jetbrains survey \(SQL is primary\)](#)



# Innovative organizations across many industries run MySQL

## Social

**facebook**



**Linkedin**



**Pinterest**

## E-Commerce

**Booking.com**

**NETFLIX**

**U B E R**



**淘宝网**  
**Taobao.com**

**阿里巴巴**  
**Alibaba.com**

## Tech

**APPDYNAMICS**  
part of Cisco

**GitHub**

**HubSpot**

**zendesk**

**intuit**  
**mint**

**New Relic**

## Finance

**Bank of America**

**J.P.Morgan**

**citi**

**Fidelity**  
INVESTMENTS

**VISA**

**CA**

## Manufacturing

**T E S L A**



**TOYOTA**

**CAT**

# MySQL powers Open Source applications

## Custom Apps Development



**django**



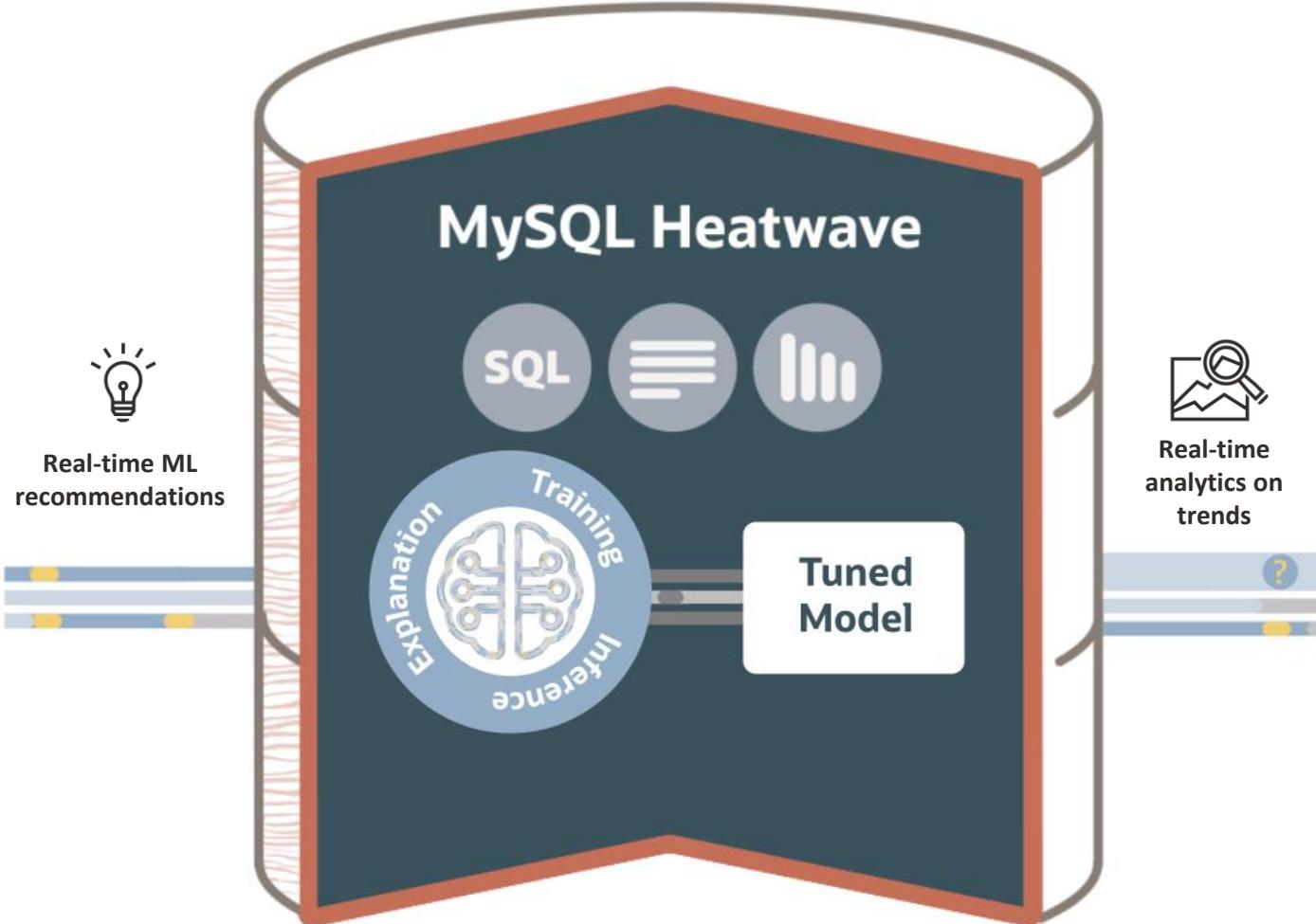
## Content management and eCommerce



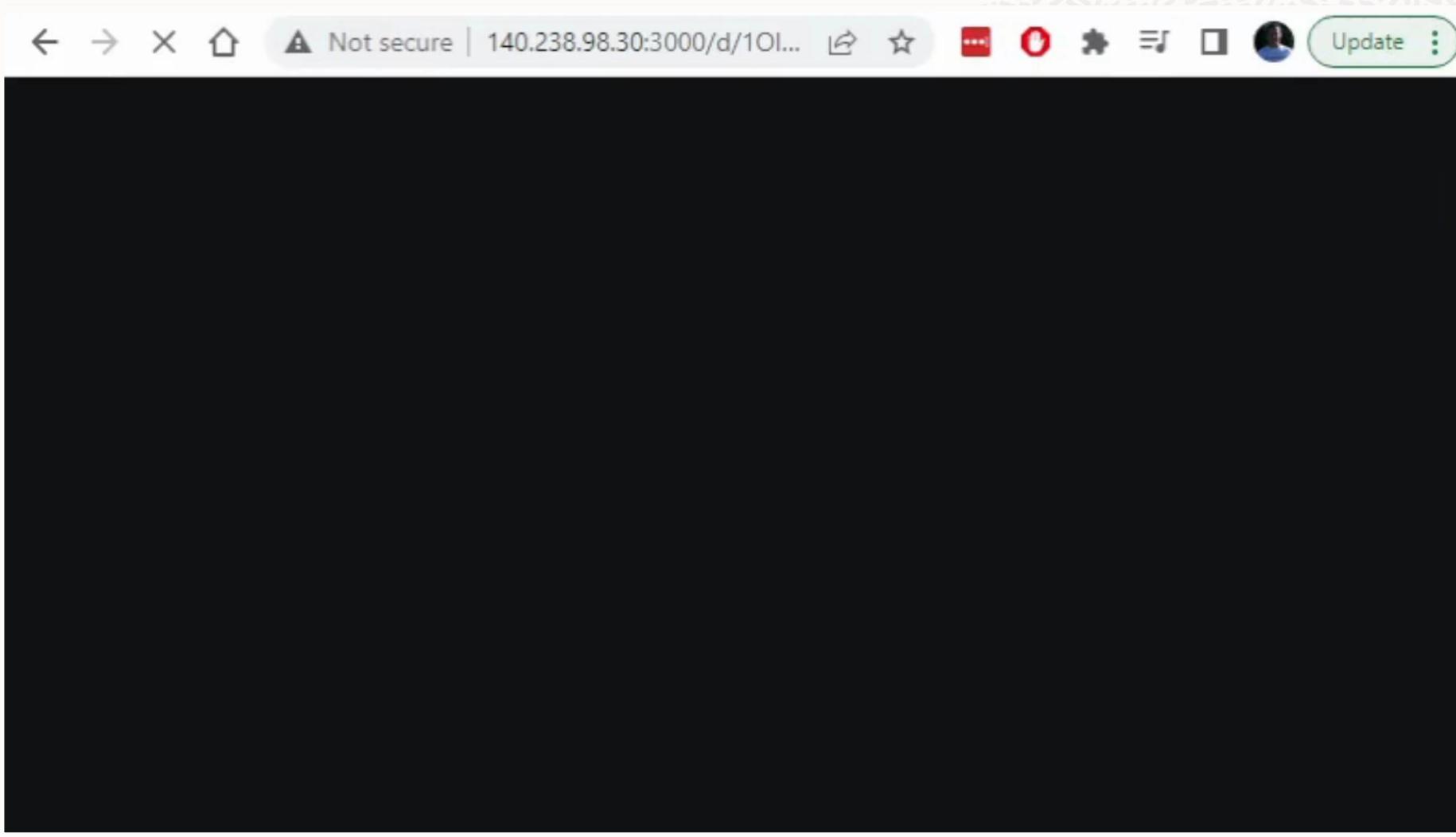
## Learning platforms



# Machine learning in action with MySQL HeatWave



# MySQL HeatWave in action



# Oracle MySQL Console Management

## Create DB system

**Production**  
Sets up a high availability DB system with recommended defaults for a production environment.

**Development or testing**  
Sets up a standalone DB system with recommended defaults for a development or testing environment.

### Provide DB system information

Create in compartment

marlamar  
acteamiad (root)/marlamar  
More

MySQL.VM.Standard.E4.4.64GB

CPU core count: 4  
Memory size: 64 GB  
Max network bandwidth: 4Gbps

A shape determines the number of OCPUs, memory, and other resources allocated to a MySQL instance of a DB system. A high availability DB system contains three MySQL instances and hence has thrice the number of OCPUs and memory. [See supported shapes.](#)

Data storage size (GB)

1024  
Storage allocated to each MySQL instance for data and log files. Storage size impacts IOPS and throughput. Data storage size must be an integer between 50 and 131,072.

Total IOPS: 76800  
Total throughput: 600 MB

**Standalone**  
Single-instance DB system

**High availability**  
Run a DB system with 3 MySQL instances providing automatic failover and zero data loss

**HeatWave**  
DB system that allows you to enable HeatWave for accelerated query processing, suitable for running both OLTP and OLAP workloads

### Create administrator credentials

Username  Define the administrator username

### Browse all shapes

A shape determines the number of OCPUs, memory, and other resources allocated to a MySQL instance of a DB system. A high availability DB system contains three MySQL instances and hence has thrice the number of OCPUs and memory. [See supported shapes.](#)

All types  Virtual machine  Bare metal

Available shapes

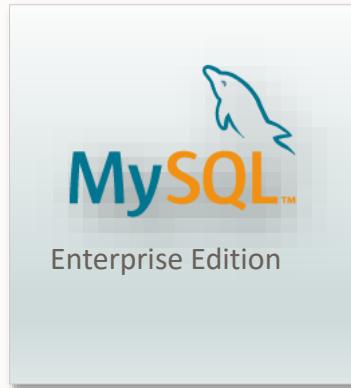
Name	Supports HeatWave	CPU core count	Memory size	Max network bandwidth
<input type="checkbox"/> MySQL.VM.Standard.E3.1.8GB	No	1	8 GB	1Gbps
<input type="checkbox"/> MySQL.VM.Standard.E3.1.16GB	No	1	16 GB	1Gbps
<input type="checkbox"/> MySQL.VM.Standard.E3.2.32GB	No	2	32 GB	2Gbps
<input type="checkbox"/> MySQL.VM.Standard.E3.4.64GB	No	4	64 GB	4Gbps
<input type="checkbox"/> MySQL.VM.Standard.E3.8.128GB	No	8	128 GB	8Gbps
<input type="checkbox"/> MySQL.VM.Standard.E3.16.256GB	No	16	256 GB	16Gbps
<input type="checkbox"/> MySQL.VM.Standard.E3.24.384GB	No	24	384 GB	24Gbps
<input type="checkbox"/> MySQL.VM.Standard.E3.32.512GB	No	32	512 GB	32Gbps

Select a shape  Cancel



# Available On-premises and Cloud

## On-Prem



## Cloud



Security



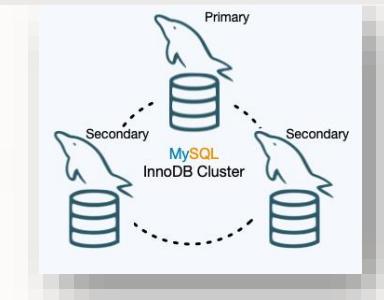
Thread Pool



Premier Support



Document Store



High Availability



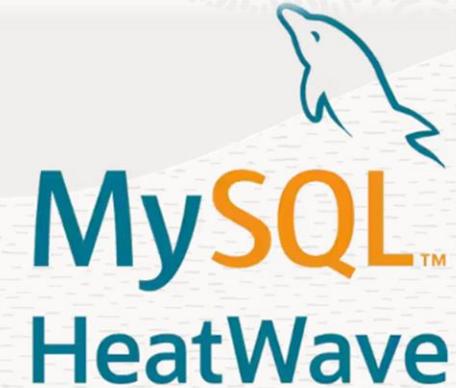
SCAN ME

## My SQL Available in OCI Free

Get \$300 in credits and try MySQL Database Service free for 30 days

## Try MySQL HeatWave for free

- Get US\$300 in cloud credits and try Oracle MySQL HeatWave for 30 days.
- Choose your cloud provider: Oracle Cloud Infrastructure (OCI) or Amazon Web Services (AWS).
- Simplify operations with one MySQL Database service for transactions, analytics, and machine learning (ML)—eliminating the complexity and cost of separate analytics database, ML, and ETL services.
- Get real-time analytics and improve security—eliminating the latency and risks of data movement between data stores.
- Benefit from unmatched price performance and machine learning-powered automation—with changes to current MySQL applications.



[Click Here](#)

# Oracle Autonomous Database

Autonomous database on shared or dedicated infrastructure





SCAN ME

# What is Oracle Autonomous Database?

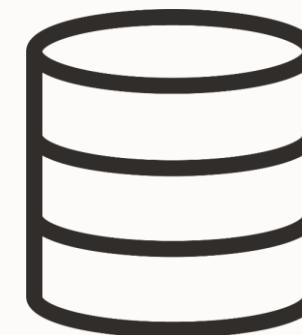
Using the cloud to eliminate all the complexity of mission critical databases



Oracle  
Autonomous  
Database



Complete  
Infrastructure  
Automation



Complete  
Database  
Automation



Automated  
Data Center Operations

[Click here](#)

# Autonomous Database | Shared Infrastructure

## Oracle Database

### Overview

#### Autonomous Database

Autonomous Data Warehouse

Autonomous JSON Database

Autonomous Transaction Processing

#### Autonomous Dedicated Infrastructure

#### Oracle Base Database (VM, BM)

#### Exadata on Oracle Public Cloud

### Exadata Cloud@Customer

#### External Database

#### Data Safe - Database Security

Overview

Security Assessment

User Assessment

Data Discovery

Data Masking

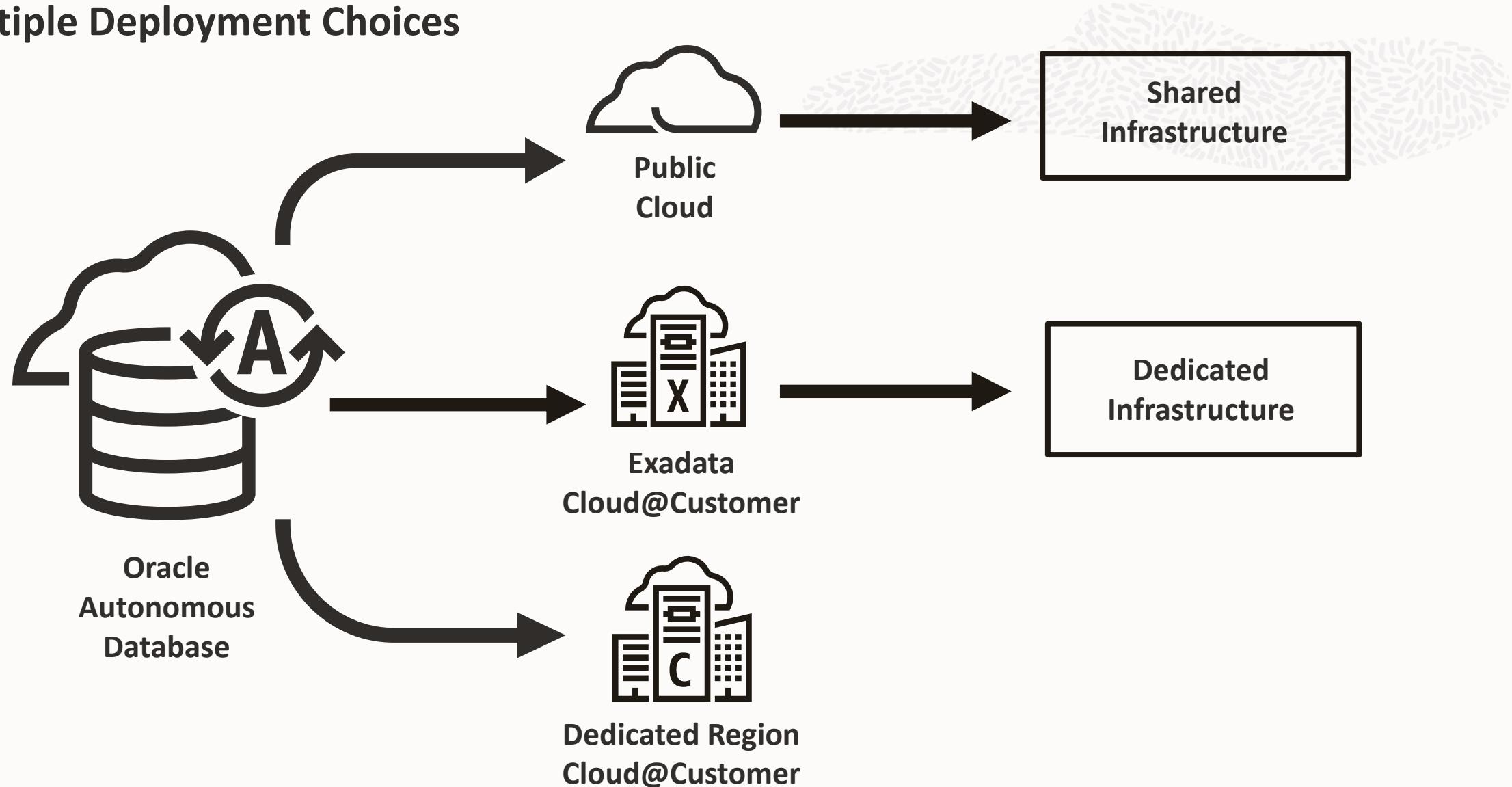
Activity Auditing

### Database Backups

#### GoldenGate

#### Operator Access Control

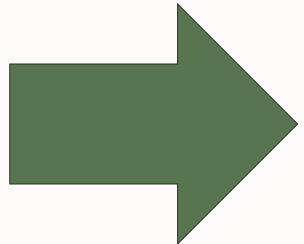
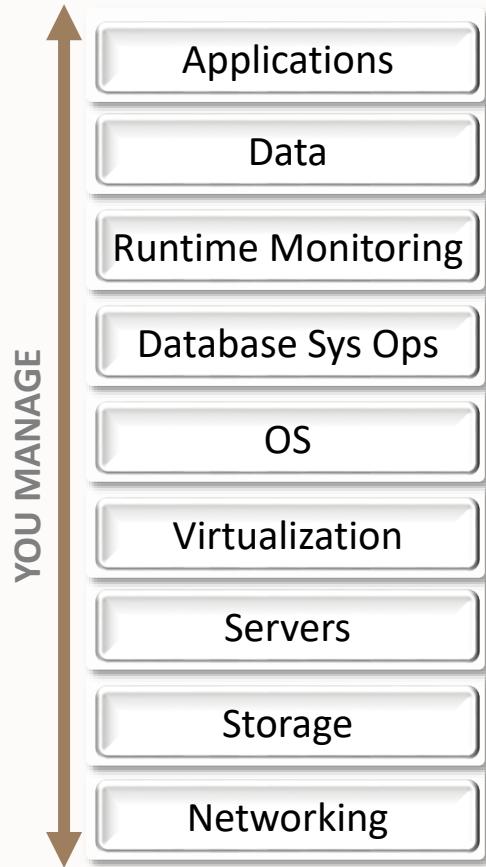
# Multiple Deployment Choices



# Transfer more responsibility to the service while lowering costs

Same cost per OCPU, greater value with Autonomous

## Traditional IT



YOU  
MANAGE

DELIVERED AS  
A SERVICE

Exadata Database

Applications

Data

Runtime Monitoring

Database Sys Ops

OS

Virtualization

Servers

Storage

Networking

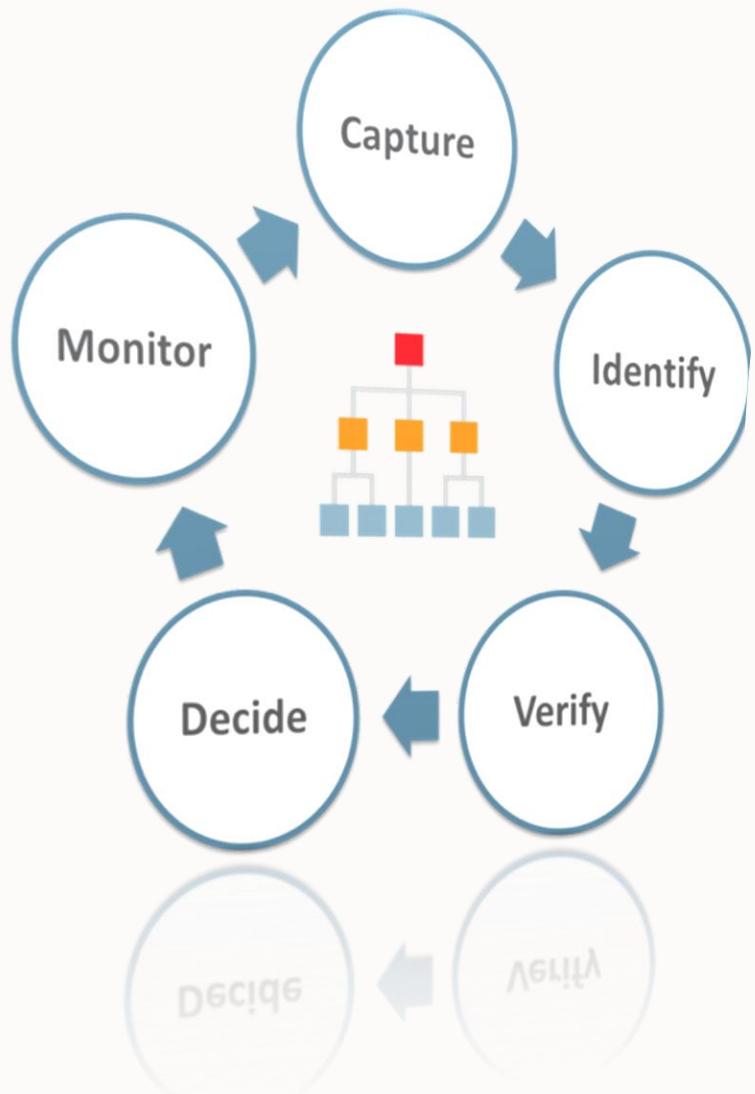


YOU  
MANAGE

DELIVERED AS A SERVICE



# Autonomous Database | Automatic Indexing



Indexes implemented using Machine Learning

The entire process is continuous and fully automatic

Index activities are viewable, controllable and auditable

# Oracle Autonomous Console Management

## Create Autonomous Database

Data Warehouse	Transaction Processing	JSON	APEX
Built for decision support and data warehouse workloads. Fast queries over large volumes of data.	Built for transactional workloads. High concurrency for short-running queries and transactions.	Built for JSON-centric application development. Developer-friendly document APIs and native JSON storage.	Built for Oracle APEX application development. Creation and deployment of low-code applications, with database included.

Choose a deployment type

Shared Infrastructure	Dedicated Infrastructure
Run Autonomous Database on shared Exadata infrastructure.	Run Autonomous Database on dedicated Exadata infrastructure.

## Choose Autonomous Container Database

Autonomous Data Guard-enabled Autonomous Container Databases

Autonomous Container Database in **FleetCompartment** ([Change Compartment](#))

FLEET\_ACD ([View Autonomous ACD](#))

## Configure the database

OCPUs count

0.1

You can enable up to 35 OCPUs. Available cores are subject to compartment quotas and existing core allocation. [Learn more](#).

Auto scaling

Allows system to use up to three times the provisioned number of cores as the workload increases. [Learn more](#).

Storage (GB)

32

The available storage, up to 131072 GB. Available storage is subject to compartment quotas. [Learn more](#).

## General Information

**Database Name:** ATPDevTest1

**Workload Type:** Transaction Processing

**Compartment:** [REDACTED] /PM\_Compartment

**OCID:** ...ibmzoq [Show](#) [Copy](#)

**Created:** Tue, May 25, 2021, 17:34:32 UTC

**OCPU Count:** 0.1

**Auto Scaling:** Enabled [\(i\)](#)

**Storage:** 32 GB

**Database Version:** 19.11.0.0.0

**Lifecycle State:** Available

**Instance Type:** Paid

## Scale Up/Down

[Help](#)

OCPUs count

0.6

You can enable up to 74 OCPUs. Available cores are subject to compartment quotas and existing core allocation. [Learn more](#).

Auto Scaling

Allows system to use up to three times the number of cores specified by the OCPU count as the workload increases. [Learn more](#).

Storage (GB)

512

The available storage, up to 131072 GB. Available storage is subject to compartment quotas. [Learn more](#).

[Update](#)

[Cancel](#)

# Oracle Autonomous secure connection | Credential Wallet

The screenshot shows the Oracle Cloud interface for an Autonomous Database. The main title is "Autonomous Database » Autonomous Database Details". On the left sidebar, there are sections for Resources, Backups, and Backups (0). The main content area is titled "Database Connection" and contains the following information:

You will need the client credentials and connection information to connect to your database. The client credentials include the wallet, which is required for all types of connections.

**Download Client Credentials (Wallet)**

To download your client credentials, click Download, and supply a password for the wallet.

[Download](#)

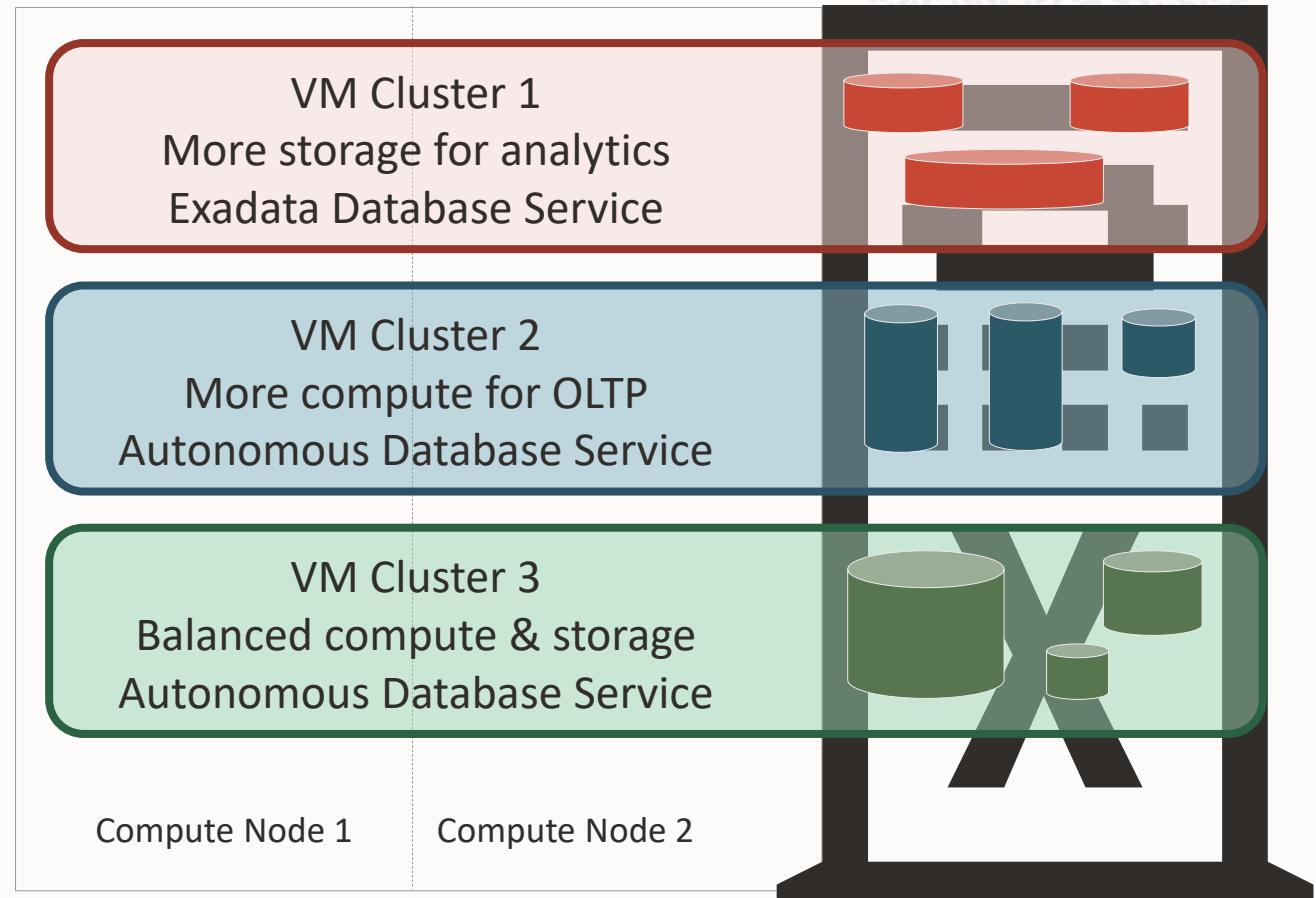
**Connection Strings**

Use the following connection strings or TNS names for your connections. See the [documentation](#) for details. Oracle recommends using TLS connections to connect to your Autonomous Database.

TNS Name <small>(i)</small>	Connection String <small>(i)</small>
ATPDB2_tp	...ME=ATPDB2_tp.atp.oraclecloud.com))) <a href="#">Show</a> <a href="#">Copy</a>
ATPDB2_medium	...TPDB2_medium.atp.oraclecloud.com))) <a href="#">Show</a> <a href="#">Copy</a>
ATPDB2_tpurgent	...DB2_tpurgent.atp.oraclecloud.com))) <a href="#">Show</a> <a href="#">Copy</a>
ATPDB2_low	...E=ATPDB2_low.atp.oraclecloud.com))) <a href="#">Show</a> <a href="#">Copy</a>
ATPDB2_high	...=ATPDB2_high.atp.oraclecloud.com))) <a href="#">Show</a> <a href="#">Copy</a>
ATPDB2_tp_tls	...ME=ATPDB2_tp.atp.oraclecloud.com))) <a href="#">Show</a> <a href="#">Copy</a>
ATPDB2_medium_tls	...TPDB2_medium.atp.oraclecloud.com))) <a href="#">Show</a> <a href="#">Copy</a>
ATPDB2_tpurgent_tls	...DB2_tpurgent.atp.oraclecloud.com))) <a href="#">Show</a> <a href="#">Copy</a>
ATPDB2_low_tls	...E=ATPDB2_low.atp.oraclecloud.com))) <a href="#">Show</a> <a href="#">Copy</a>

# Increasing Resource Utilization Efficiency and Consolidation Savings

1. Multiple VM clusters can be created on Exadata Cloud@Customer Infrastructure
2. Each VM cluster can be configured to match workload needs (e.g. more storage for analytics or more compute for OLTP)
3. Each VM cluster can be used for either Autonomous or Exadata Database Service
4. Each VM cluster can support multiple databases for consolidation
5. More VM clusters can be added as needed using unallocated resources
6. Consumption in each cluster can be scaled independently (and automatically with Autonomous Database)



Available on Exadata Cloud@Customer Infrastructure X7 through X9M

# Automated Data Protection – Autonomous Data Guard On ADB

- One-click enable
- Simple and transparent data protection
- Fully-managed standby database
- Completely transparent to customer applications
- Automated failover for zero-data loss scenarios
- User initiated failover for other scenarios
- Seamless reconnection - no new wallet or network configuration required
- RPO: 5 mins, RTO: 2 mins
- Cross Exadata machine or Availability Domain (AD)
- Cross Region

The screenshot shows the Oracle Cloud interface with the following details:

**My Quick Start Lab**

**Autonomous Database Information**

- General Information:
  - Database Name: QSLDB
  - Workload Type: Data Warehouse
  - Compartment: adwc4pm (root)/ADW\_Frankfurt
  - OCID: ...njbqzq Show Copy
  - Created: Tue, Jan 19, 2021, 13:34:29 UTC
- Infrastructure:
  - Dedicated Infrastructure: No
  - Autonomous Data Guard (i)
  - Status: Disabled Enable

**Enable Autonomous Data Guard**

Enabling Autonomous Data Guard creates a peer database, and database billing. Do you want to enable Autonomous Data Guard?

Region: UK South (London) - Current Region

- Canada Southeast (Montreal)
- Canada Southeast (Toronto)
- Chile Central (Santiago)
- Germany Central (Frankfurt)
- India South (Hyderabad)
- India West (Mumbai)
- Japan Central (Osaka)
- Japan East (Tokyo)
- Netherlands Northwest (Amsterdam)
- sa-vinheido-1
- Saudi Arabia West (Jeddah)
- South Korea Central (Seoul)
- South Korea North (Chuncheon)
- Switzerland North (Zurich)
- UAE East (Dubai)
- UK South (London) - Current Region
- UK West (Newport)
- US East (Ashburn)
- US West (Phoenix)
- US West (San Jose)



SCAN ME

# Move Standard Database Workload Autonomous Database



Autonomous Database

## Autonomous Operation

- Reduce intensive and manual DBA Tasks
- Auto Database Tuning, Pathing and Securing Capabilities

## Lowest cost to adopt Autonomous Database (ADB)

- No additional infrastructure costs, pay only for ADB OCPUs
- Leverage features that drive a true pay-per-use consumption
- Use BYOL to reduce your costs and TCO

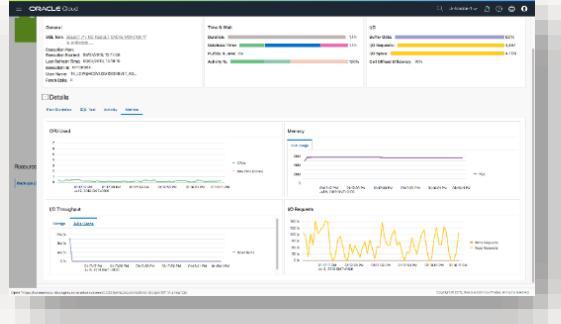
## Simplest transformation for new and existing workloads

- Autonomous automation and optimized end-to-end
- Developer self-service for new database application development

[Click Here](#)

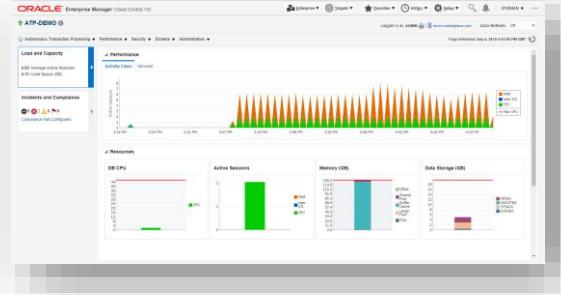


# Autonomous Management Tools | All Tools Bundled with ADB



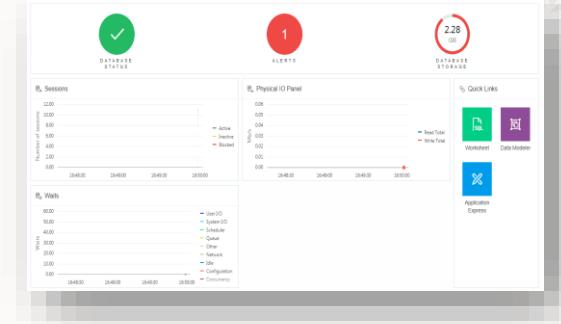
## Oracle Management Cloud

Managing multiple DB instances across On-premises and Oracle Cloud - Need a consolidate view



## Enterprise Manager

Get rid of time-consuming and resource-intensive weekly full backups on production database services



## OCI Console DB Mgmt Services

Working across multiple ADB instances (dev, Test, QA and etc.)  
Needs access to SQL performance data

# Maximizing Data Privacy and Security

Keeping Data Safe with the Oracle Database



# People are after **your** data



Nation States

Criminals

Hacktivists

Insiders

Former Employees

Curiosity Seekers

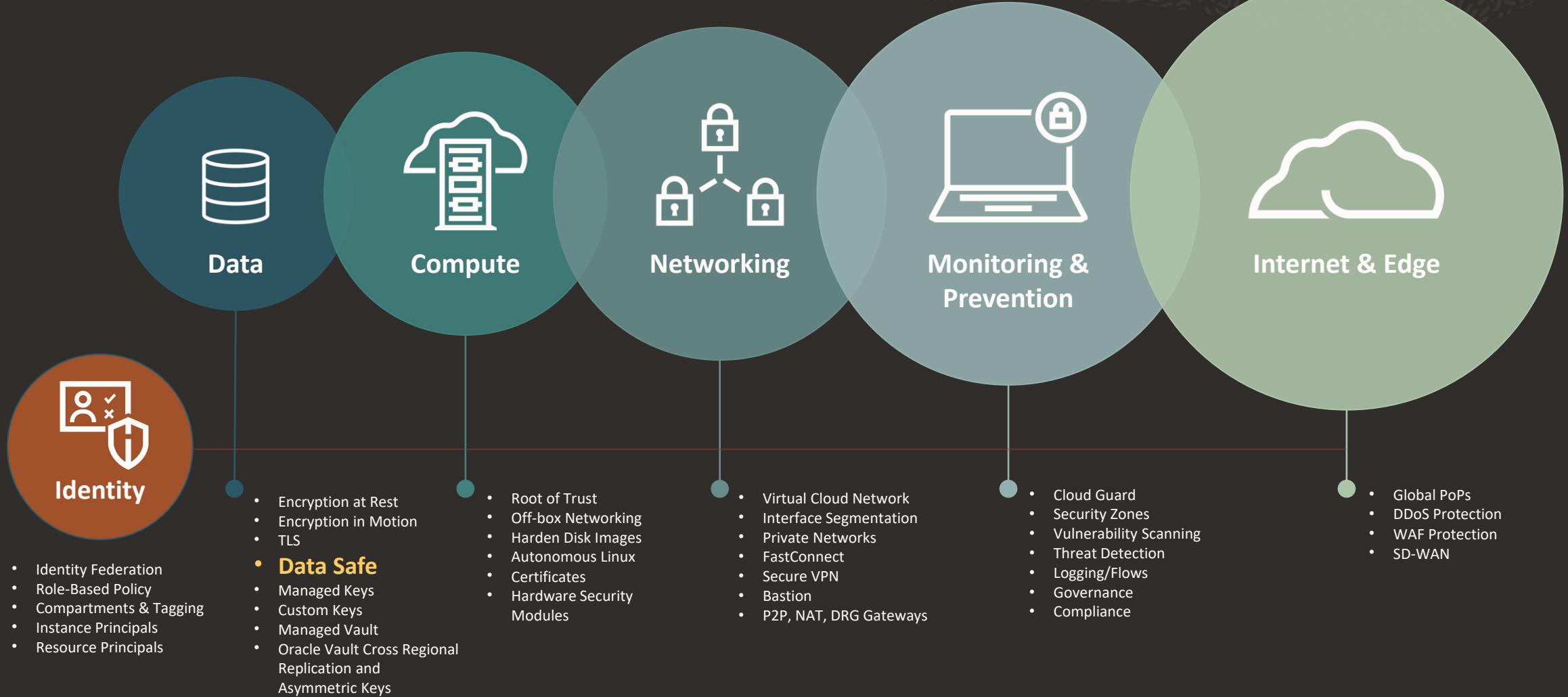
Customers

Competitors

Personal Data  
Financial Data  
Trade Secrets  
Regulated Data



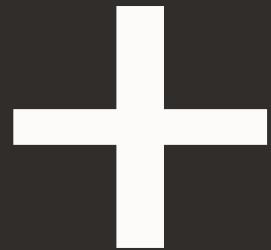
# Integrated and Automated Security from Data to Identity



# The best security for your data



ORACLE  
AUTONOMOUS  
DATABASE



ORACLE DATA SAFE



ORACLE CLOUD

# Oracle Data Safe available on your OCI Tenancy

## Oracle Database

### Overview

#### Autonomous Database

Autonomous Data Warehouse

Autonomous JSON Database

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#### Data Safe - Database Security

Overview

Security Assessment

User Assessment

Data Discovery

Data Masking

Activity Auditing

### Database Backups



# Introducing Oracle Data Safe

## Unified database security control center

- Risk dashboard: configuration, data, users
- Monitor user activity
- Mask data for test
- Extensible - more features to come...

## Benefits

- No special expertise needed: click-and-secure
- Saves time and mitigates security risks
- Defense-in-depth security for all customers

**Now available for securing ALL Oracle Databases, on-premises and in the cloud**



# Data Safe components



Assess              Users              Audit              Discover              Mask

**Data safe comprises five components in a single integrated cloud service for securing Oracle Database targets**

Security  
Assessment

User  
Assessment

Activity  
Auditing

Data  
Discovery

Data  
Masking

# Oracle Advanced Security

Encryption and redaction of sensitive data prevent out-of-band access

- **Transparent Data Encryption**

- Stop would-be attackers from bypassing the database and reading sensitive information directly from storage by enforcing data-at-rest encryption in the database layer.

- **Data redaction**

- Reduce the risk of unauthorized data exposure in applications by redacting sensitive data before it leaves the database. Partial or full redaction prevents large-scale extraction of sensitive data

- **Transparent to applications**

- Encryption is implemented at the database kernel level, eliminating the need for any changes to applications.



# Oracle Database Vault

Restrict access to application data by privileged users with the principle of least privilege

- **Separation of duties**

- Allow only security roles to manage users, profiles, and security controls while limiting admins to managing only the database.

- **Realms**

- Block unauthorized access to sensitive data by creating restricted application environments within Oracle Database.

- **Command rules**

- Block accidental or malicious changes to production databases attempted outside specific maintenance windows.

- **Trusted paths**

- Use factors like client IP address, program, user name, and time of day to control access to data and data operations.



# Security assessment

Instant feedback on configurations that may introduce unnecessary risk



Comprehensive assessment

- Security parameters
- Security controls in use

Identify drift from best practices

Actionable reports

- Prioritized recommendations
- Compliance mappings (EU-GDPR, CIS)

The screenshot shows a security assessment interface with the following key elements:

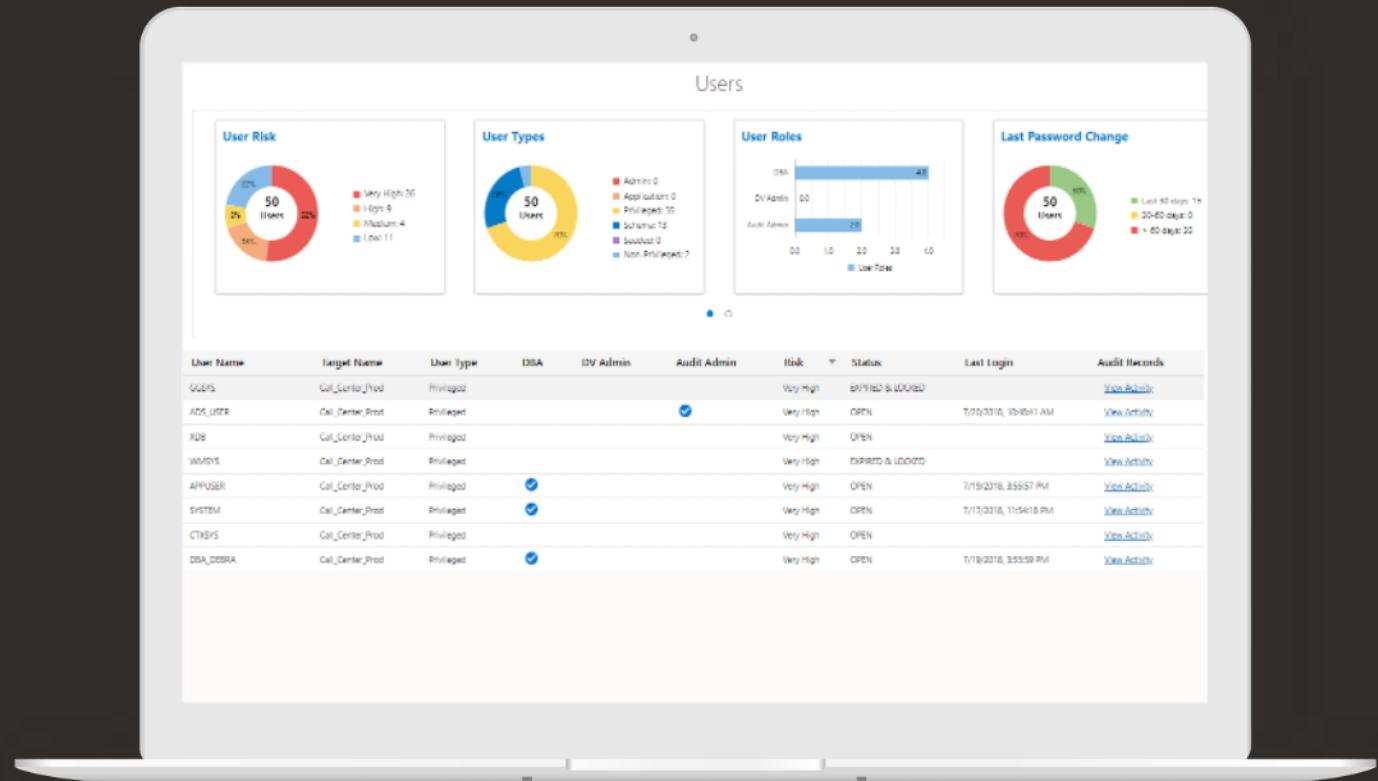
- Summary:** A table showing the count of findings across different categories and risk levels:
  - High Risk: 17
  - Medium Risk: 9
  - Low Risk: 2
  - Advisory: 10
  - Evaluate: 14
  - Pass: 11
  - Total Findings: 20
  - Security Controls: 32
  - User Security: 20
  - System Configuration: 32
- Details:** A detailed view of a specific finding titled "Users with Default Passwords".
  - Status:** High Risk
  - Summary:** Found 10 unlocked user accounts with default password.
  - Details:** Users with default password: ADAMS, BLAKE, CLARK, HR, IX, JONES, OE, PM, SCOTT, SH
  - Remarks:** Default passwords for predefined Oracle accounts are well known and provide a trivial means of entry for attackers. Well-known passwords for locked accounts should be changed as well.
  - References:**
    - dscs-template.cisPrefix
    - dscs-template.stigPrefix
- Remarks:** These PL/SQL packages (DBMS\_BACKUP\_RESTORE, UTL\_DBWS, UTL\_ORAMTS) can send data from the database using the network or file system. Access should be granted only to users with a legitimate need for this functionality. Use Privilege Analysis to identify if these privileges were used. If not, consider revoking.
- References:**
  - dscs-template.cisPrefix

# User assessment

Reduce user risk by managing privileges and identifying risky behavior



- Identify over-privileged risky users
- Static profile: type of user, password policies
- Dynamic profile: last login, audit data





## Data masking

Minimize risk by replacing sensitive data with realistic yet obscured data for use in development, test, and partner environments

- Mask data identified as sensitive
- 55+ pre-defined masking formats
- Masking transformations
- Masking reports

The screenshot shows a software interface for data masking. On the left, a tree view lists 'Sensitive Columns' under categories like 'Financial Information' and 'Personally Identifiable Information'. On the right, a 'Mask Format' dropdown menu is open, displaying various options for masking credit card numbers. The options listed are:

- User Defined Function
- Regular Expression
- American Express Credit Card Number
- Discover Card Credit Card Number
- MasterCard Credit Card Number
- Visa Credit Card Number
- Generic Credit Card Number

## Activity auditing

Track user actions and streamline auditing with policy-based reporting

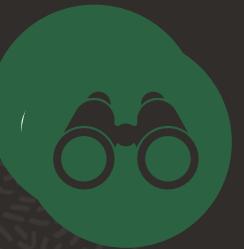


- Collect audit data from databases and track sensitive operations
- Provision audit, compliance, and alert policies
- Generate audit reports
  - Interactive and customizable reports
  - Summary and detailed reports

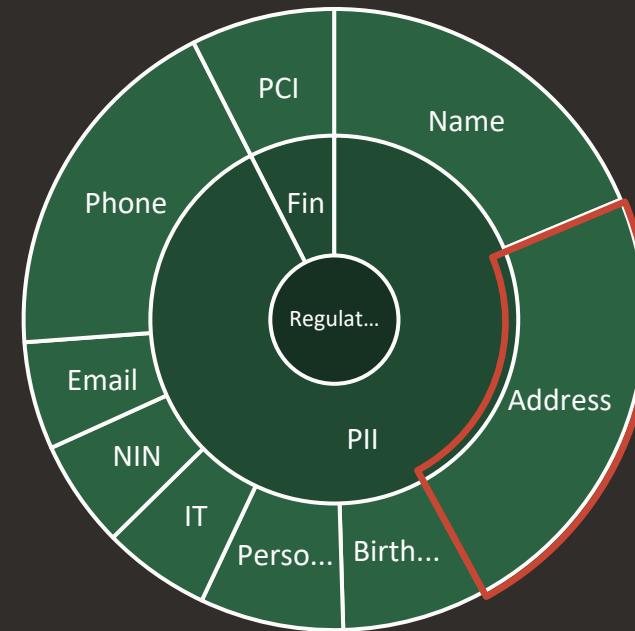
The screenshot shows a modal dialog titled "Edit Policies" with the target name "Call\_Center\_Prod". The dialog is divided into sections: "Audit Policies" (selected), "Alert Policies", "Basic Auditing", "Admin Activity Auditing", "User Activity Auditing", "Audit Compliance Standards", and "Additional Audit Policies". Under "Basic Auditing", "Critical Database Activity" and "Login Events" are selected, with "Exclude Users" set to "ALL USERS". Under "User Activity Auditing", "All User Activity" is selected, with "List of Users" set to "Enter Users". Under "Audit Compliance Standards", "Center for Internet Security (CIS) Configuration" is selected. Under "Additional Audit Policies", links to "Custom Policies" and "Oracle Pre-seeded Policies" are shown. At the bottom are "Provision" and "Cancel" buttons.

## Data discovery

Prioritize security efforts by revealing the location, type, and amount of sensitive data



- Discovers and classifies 150+ sensitive data types
  - Name, address, SSN, salary, medical health, payment card information and many more
- Supports user-defined sensitive data types
- Supports incremental discovery
- Reports amount and type of sensitive data

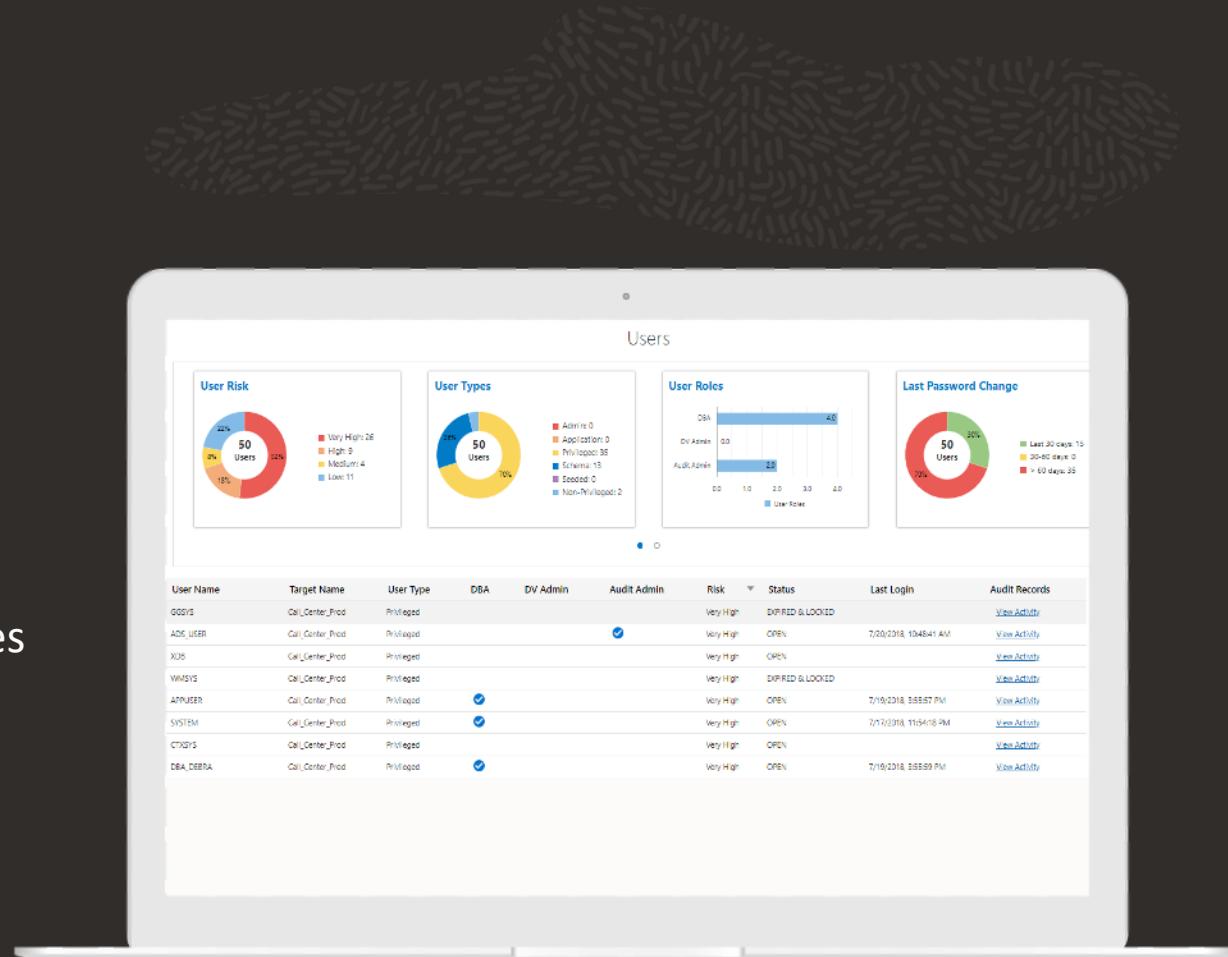


<b>16.6K</b> Sensitive Values	<b>12</b> Sensitive Types
<b>4</b> Sensitive Tables	<b>17</b> Sensitive Columns

# Summary: Oracle Data Safe

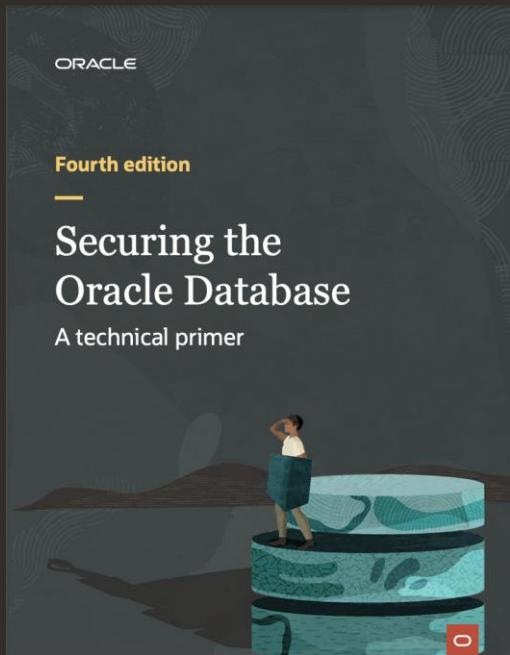
- Unified security control center for cloud and on-premises databases
  - Immediate visibility into risks from data, users, and configurations
  - Click-and-secure: no special expertise required
  - Complete set of proven database security capabilities
- Cuts customer operational cost for securing their databases

Raising the bar on security  
for *all* Oracle Database customers

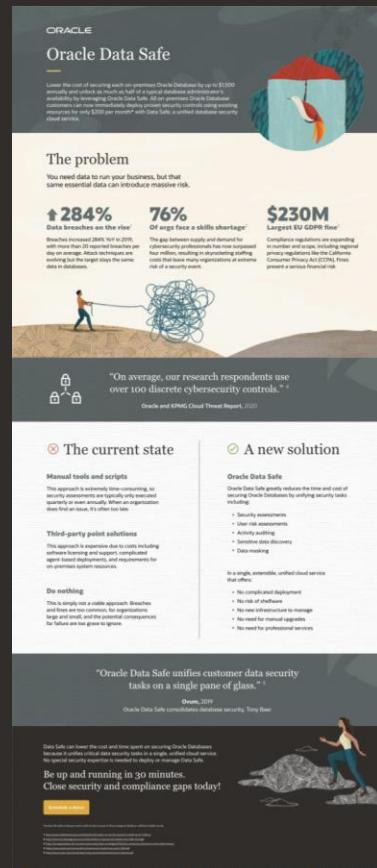


# Learn More

[Read the ebook](#)



[Check out the infographic](#)



[Read the IDC report](#)

**White Paper**  
**The Security Benefits of a Fully Managed Database Service: Oracle Autonomous Database**

Sponsored by: Oracle Corp.  
Carl W. Oldforsen  
March 2020

**IN THIS WHITE PAPER**

In this white paper, we consider the important role of security features such as detection and protection of privacy-related and other sensitive data, detection of improper or suspicious access, and control of database access in a comprehensive way. We also look at timely patching of database management system (DBMS) software, especially where security patches are involved. Patching is done on an infrequent basis in most datacenters, exposing the database to risk in the delay. This white paper discusses that risk and related factors involving database availability. It also looks at other security concerns such as data loss prevention and data governance.

One might think that moving to a managed database service in the cloud would solve the availability problem, but these services may still require interaction between the customer and the service provider, resulting in database unavailability during the patching process. Handling most security issues remains the user's responsibility, but without proper tools and features, this can be problematic at best. The Oracle Autonomous Database service, by contrast, removes these issues, providing availability without compromise but with maximum security and a range of capabilities that enable users to properly monitor and secure their data.

**SITUATION OVERVIEW**

**The Patching Issue**

Computer software is never in a steady state. It requires constant improvement and updating. Some of this effort has to do with shifting usage models or the correction of previously undetected problems, but a great deal has to do with countering vulnerabilities that may be found and exploited by bad actors. This is especially important for databases, where breaches result in significant liability for the enterprise. These updates are applied through patching.

**What Is Patching?**

A patch is a piece of code that is inserted into existing software to alter its behavior. It may represent a fix to a known problem, a much-requested enhancement, or the removal of a security vulnerability. Applying a patch to a database server normally requires taking it offline to modify the code and then bringing it up again.

March 2020, IDC #US46049719

# OCI DBCS Bare Metal

Understanding DBCS Bare Metal characteristics





SCAN ME

# Database Cloud Service | Bare Metal

Understanding Oracle OCI DBCS Bare Metal Roles and Limitations



## Bare Metal DB Systems rely on Bare Metal servers running Oracle Linux

- One-node database system
- Two Bare Metal shapes
  - BM DenselBM.01.36 up to 36 Cores, 512 GB Memory and 9 3.2 TB locally attached (28.8 TB total)
  - BM DenselBM.02.52 up to 52 Cores, 768 GB Memory and 8 6.4 TB locally attached (51.2 TB total)
- Start With 2 cores and Scale Up/Down OCPU's based on your requirement
- Data Guard with and across Ads (Requires DB Enterprise Edition)
- No Oracle RAC Allowed, just Single Instance
- It is not possible to create a non-CDB via the console - use dbcli

[Click here](#)



# Oracle DBCS Bare Metal Console Management

## Create DB system

- 1 DB system information
- 2 Database information

Select an availability domain

AD-1

wBCz:US-ASHBURN-AD-1 ✓

AD-2

wBCz:US-ASHBURN-AD-2

AD-3

wBCz:US-ASHBURN-AD-3

Select a shape type

Virtual Machine

Bare Metal ✓

Select a shape

BM.DenseIO1.36

2 Available Core Count

Change shape

## Configure storage

Data storage percentage

80%

## Browse All Shapes

A shape determines the options for resources such as node count, core count, and storage. For information about shapes, see [Shapes for Bare Metal DB Systems](#).

Name	Maximum Core Count	Minimum Core Count
<input checked="" type="checkbox"/> BM.DenseIO1.36	36	2
<input type="checkbox"/> BM.DenseIO2.52	52	2

1 Selected

Showing 2 Items < 1 of 1 >

## Configure the DB system

Total node count

1

The node count for the selected shape cannot be changed.

Oracle Database software edition

Enterprise Edition High Performance

Select an Oracle Database Software Edition

Standard Edition

Enterprise Edition

Enterprise Edition High Performance

Enterprise Edition Extreme Performance

# OCI DBCS Virtual Machines

Understanding DBCS Virtual Machine characteristics



# Database Cloud Service | Virtual Machine

Understanding Oracle OCI DBCS roles and limitations



SCAN ME



## Entry-level, provision with GI or LVM (fast-provision)

Restrictions:

- 2 DB Systems types on VM
  - One Node – One VB Database System
  - Two Nodes – Two VM Clusters with Oracle RAC Features
- Can have only a Single Database Home and one Database
- Amount of memory allocation depends on VM Shapes
- On A RAC shape, each node is assigned on a different fault domain

[Click here](#)

# Oracle DBCS Virtual Machine Console Management

## Create DB system

1 DB system information  
2 Database information

Select a shape type

Virtual Machine ✓ Bare Metal

Configure shape

A shape determines the options for resources such as node count, core count, and storage. For information about shapes, see [Shapes for Virtual Machine DB Systems](#).

**AMD VM.Standard.E4.Flex**  
4 core OCPU, 64 GB memory, 4 Gbps Network Bandwidth, 64K IOPS

Change shape

## Change shape

AMD AMD  
Flexible OCPU count. AMD processors.

Intel Intel  
Flexible and fixed OCPU count. Intel processors. ✓

Ampere Ampere  
Flexible OCPU count. Arm-based processors.

Intel X9  
Flexible OCPU count ✓

Intel X7  
Fixed OCPU count

## Change shape

### Configure OCPU

Name	OCPUs	Memory	Network bandwidth	Theoretical max IOPS
VM.Standard3.Flex	8	128 GB	8 Gbps	128K

You can customize the number of OCPUs. Other resources scale proportionately. [Learn more about flexible shapes](#).

Number of OCPUs per node

8 1 32

1 Selected Showing 1 Item

## Configure the DB system

Total node count  
2

Oracle Database software edition  
Enterprise Edition Extreme Performance

Total storage (GB) Read-only ⓘ  
912



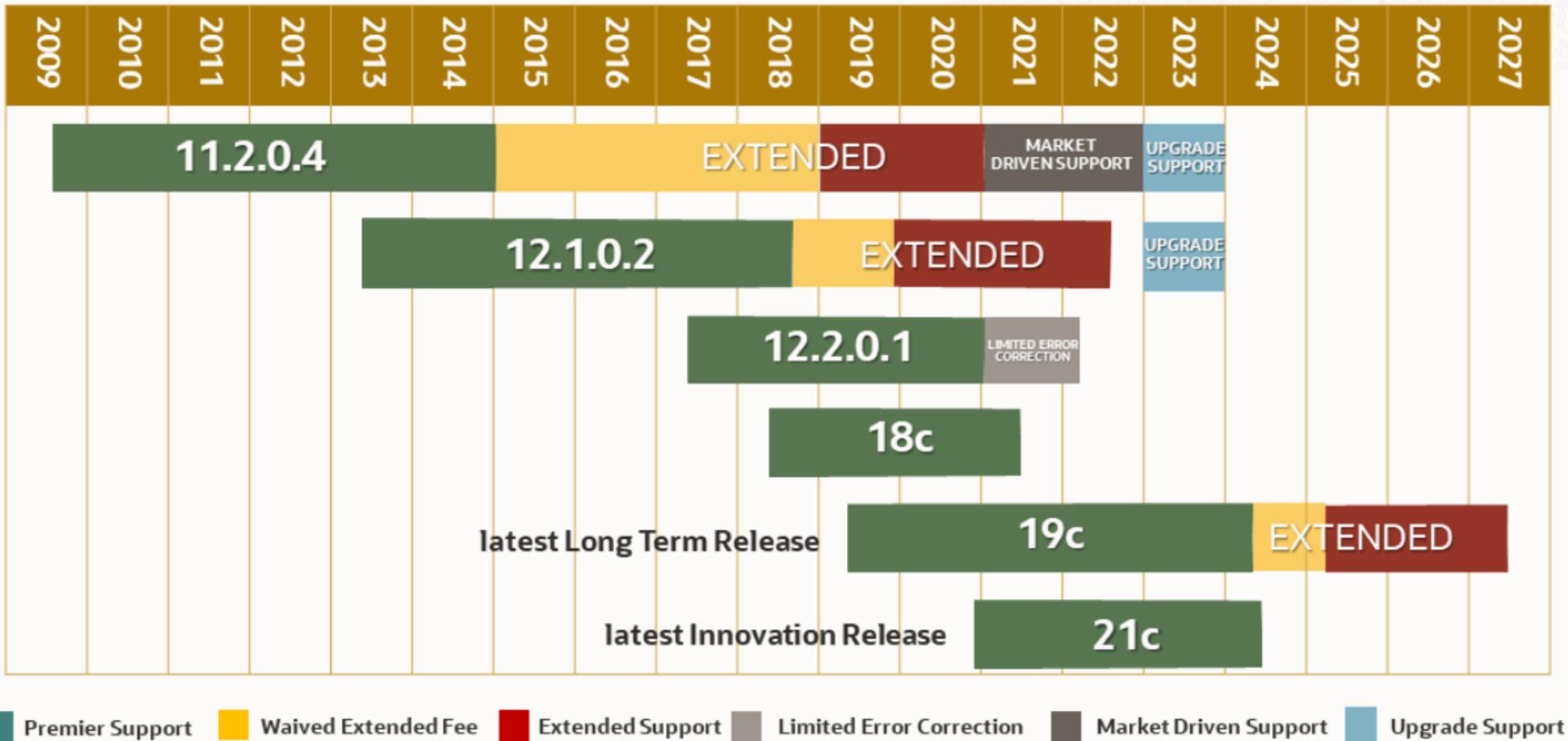
# Oracle Database Version and Timeline

Understanding My Oracle Support Limitations



# Oracle Database 19c – 8 years of support

My Oracle Support Official Note (Doc ID 742060.1)



# OCI DBCS Patching

Keep your OCI DBCS Database Up to Date



# OCI DBCS Grid Patching

Pre check through OCI Console before change any bundle patch version



## Updates

DB System: [demo12rac](#)

Update description	Type	State	Component	Version	Last successful precheck	Release date	⋮
Jan 2023 19c Db System patch	Patch	<span>Available</span>	GI patch	19.18.0.0.0	—	Tue, Oct 17, 2023, 01:00:00 UTC	⋮
Oct 2022 19c Db System patch	Patch	<span>Available</span>	GI patch	19.17.0.0.0	Wed, Feb 8, 2023, 16:16:34 UTC	<span>Run precheck</span>	⋮

# OCI VM System DBCS | Oracle Home Patching Precheck

Pre check through OCI Console



## Database: [dem12rac](#)

Oracle Database Software Images

Custom Database Software Images

Patch description	Type	State	Version	Release date	
Jan 2023 12.1.0.2 Database patch	Patch	<span>● Available</span>	12.1.0.2.230117	Wed, Jan 25, 2023 UTC	<span>Precheck</span> <span>⋮</span>
Oct 2022 12.1.0.2 Database patch	Patch	<span>● Available</span>	12.1.0.2.221018	Thu, Dec 15, 2022 UTC	<span>Apply</span> <span>⋮</span> <span>Copy OCID</span>

# OCI VM System DBCS | RAC Grid Patching in rolling mode

For a DBCS RAC environment a Grid patch will run in rolling format

[grid@demo12crac2 ~]\$ crsctl stat res -t				
Name	Target	State	Server	State details
<b>Local Resources</b>				
ora.DATA.COMMONSTORE.advm	ONLINE	ONLINE	demo12crac2	STABLE
ora.LISTENER.lsnr	ONLINE	ONLINE	demo12crac2	STABLE
ora.chad	ONLINE	ONLINE	demo12crac2	STABLE
ora.data.commonstore.acfs	ONLINE	ONLINE	demo12crac2	mounted on /opt/oracle/dcs/commonstore, STABLE
ora.net1.network	ONLINE	ONLINE	demo12crac2	STABLE
ora.ons	ONLINE	ONLINE	demo12crac2	STABLE
ora.proxy_advm	ONLINE	ONLINE	demo12crac2	STABLE
<b>Cluster Resources</b>				

# OCI DBCS Oracle Home | One-off Patch Messages

Check if you have one-off patch installed before any database patch activity

## Confirm

The action might result in database downtime. Are you sure you want to apply the patch to the database?

If you have manually installed one-off patches on this database, Oracle recommends that you patch using a custom database software image that includes your one-off patches.

[Learn more](#) about OCI custom database software images.

This operation may roll back one-off patches that have been applied manually.

Do you want to continue?

OK

[Cancel](#)

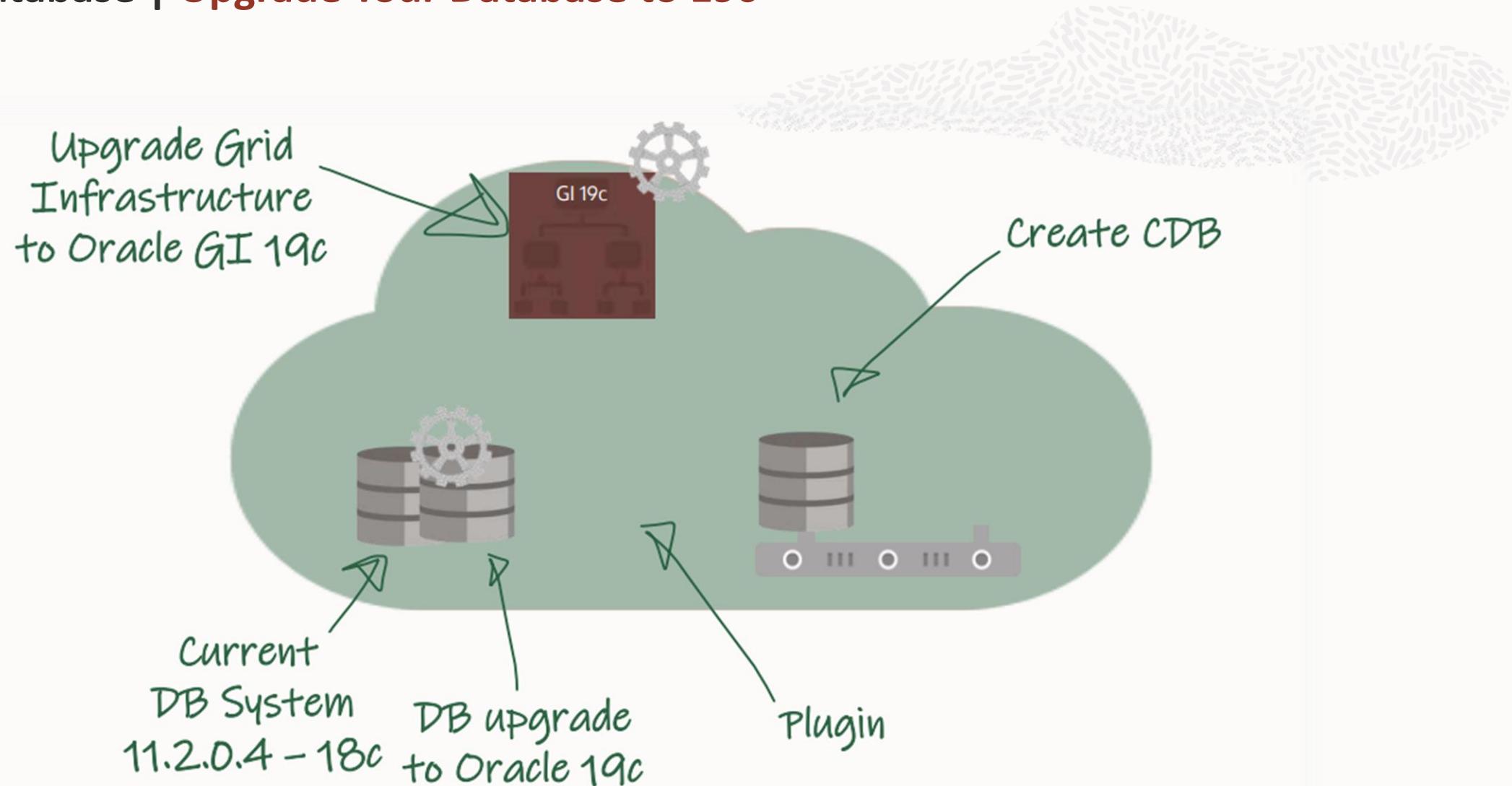


# OCI DBCS Upgrade Database Version

Move your Oracle Database to 19c



# Oracle Database | Upgrade Your Database to 19c



# OCI VM System DBCS Upgrade Precheck

Oracle Database 19c Upgrade pre check using OCI console



Database: [dem12rac](#)

Oracle Database Software Images

Custom Database Software Images

Patch description	Type	State	Version	Release date	Precheck	⋮
Oracle Database 19.15.0.0	Upgrade	● Available	19.15.0.0	-	Precheck	⋮
Oracle Database 19.16.0.0	Upgrade	● Available	19.16.0.0	-	Upgrade	⋮
Oracle Database 19.17.0.0	Upgrade	● Available	19.17.0.0	-		⋮
Showing 3 Items < 1 of 1 >						

# OCI VM System DBCS | Upgrade Database

It's recommended to update Gris Home first Oracle Database Upgrade



## Upgrade Database

[Help](#)

i An Oracle Grid Infrastructure (GI) patch is available for your DB system. Oracle recommends patching your GI before upgrading the database.

There are no manual backups of this database. Oracle recommends creating a manual backup of the database before starting an upgrade. [Learn more about creating a manual backup](#)

During the upgrade process, the system performs an automatic precheck. However, Oracle recommends running a manual precheck before upgrading to detect and mitigate any problems before the upgrade to minimize the downtime window. [Learn more](#) about upgrading.

Upgrade Precheck Cancel



# OCI VM System DBCS - Upgrade Pre check

Oracle Database 19c Upgrade pre check using OCI console



## Work requests

Operation	State	% complete	Accepted	Started	Finished	
<a href="#">Upgrade Database</a>	<span style="color: orange;">●</span> In progress	0%	Sun, Feb 12, 2023, 12:52:22 UTC	Sun, Feb 12, 2023, 12:52:31 UTC	—	⋮
<a href="#">Patch DB Home</a>	<span style="color: green;">●</span> Succeeded	100%	Wed, Feb 8, 2023, 20:52:17 UTC	Wed, Feb 8, 2023, 20:52:46 UTC	Wed, Feb 8, 2023, 21:51:01 UTC	⋮
<a href="#">Patch DB Home</a>	<span style="color: green;">●</span> Succeeded	100%	Wed, Feb 8, 2023, 14:17:47 UTC	Wed, Feb 8, 2023, 14:17:59 UTC	Wed, Feb 8, 2023, 14:29:11 UTC	⋮
<a href="#">Create DB System</a>	<span style="color: green;">●</span> Succeeded	100%	Wed, Feb 8, 2023, 00:27:28 UTC	Wed, Feb 8, 2023, 00:27:52 UTC	Wed, Feb 8, 2023, 04:47:36 UTC	⋮

Showing 4 Items < 1 of 1 >

# OCI DBCS Pos Database Upgrade

What we must to check after a susses Database Upgrade Version



# OCI VM System DBCS - Grid Patching check

Current Database and Grid home using dbcli tool

```
SQL> select COMP_NAME, VERSION, STATUS from dba_registry;
```

COMP_NAME	VERSION	STATUS
Oracle Database Catalog Views	19.0.0.0.0	VALID
Oracle Database Packages and Types	19.0.0.0.0	VALID
JServer JAVA Virtual Machine	19.0.0.0.0	VALID
Oracle XDK	19.0.0.0.0	VALID
Oracle Database Java Packages	19.0.0.0.0	VALID
OLAP Analytic Workspace	19.0.0.0.0	VALID
Oracle Real Application Clusters	19.0.0.0.0	VALID
oracle XML Database	19.0.0.0.0	VALID
oracle Workspace Manager	19.0.0.0.0	VALID
Oracle Text	19.0.0.0.0	VALID
Oracle Multimedia	19.0.0.0.0	VALID
Spatial	19.0.0.0.0	VALID
Oracle OLAP API	19.0.0.0.0	VALID
Oracle Label Security	19.0.0.0.0	VALID
oracle Database Vault	19.0.0.0.0	VALID

```
-----  
Oracle Database Catalog Views  
Oracle Database Packages and Types  
JServer JAVA Virtual Machine  
Oracle XDK  
Oracle Database Java Packages  
OLAP Analytic Workspace  
Oracle Real Application Clusters  
oracle XML Database  
oracle Workspace Manager  
Oracle Text  
Oracle Multimedia  
Spatial  
Oracle OLAP API  
Oracle Label Security  
oracle Database Vault
```

```
15 rows selected.
```

```
SQL> □
```

# Dbcli Command Line Interface

Using dbcli to manage your entire Oracle DBCS database command



# OCI Command Line Interface (*dbcli*)

OCI Command Line Interface Database Options and doc references

## Backup Commands

- *dbcli* create-backup
- *dbcli* getstatus-backup
- *dbcli* schedule-backup



## DB Storage Commands

- *dbcli* list-dbstorages
- *dbcli* describe-dbstorage
- *dbcli* create-dbstorage
- *dbcli* delete-dbstorage



## Database Home Commands

- *dbcli* create-dbhomes
- *dbcli* describe-dbhomes
- *dbcli* list-dbhomes
- *dbcli* update-dbhomes



<https://docs.cloud.oracle.com/iaas/Content/Database/References/dbacli.htm>

# CLI Command Line Interface

The database CLI (dbcli) is a command line interface available on bare metal and virtual machine DB systems. After you connect to the DB system, you can use the database CLI to perform tasks such as creating Oracle database homes and databases.

Note: The database CLI is not for use on Exadata DB systems.

The database CLI commands must be run as the root user.

- dbcli is in the /opt/oracle/dcs/bin/ directory. This directory is included in the path for the root user's environment.
- Oracle Database maintains logs of the dbcli command output in the dcscli.log and dcs-agent.log files in the /opt/oracle/dcs/log/ directory.
- The database CLI commands and most parameters are case sensitive and should be typed correctly. A few parameters are not case sensitive, you should look at parameter descriptions.



# OCI Data Guard MAA

Understanding options and Database editions limitations



# OCI Active Data Guard VS Data Guard



- Data Guard and Active Data Guard provide disaster recovery (DR) for databases with recovery time objectives (RTO) that cannot be met by restoring from backup.
- **Active Data Guard extends Data Guard capabilities** by providing advanced features for data protection and availability as well as **offloading read-only workload and fast incremental backups** from a production database. Active Data Guard is included in the Extreme Performance Edition and Exadata Service.
- To configure a Data Guard **system across regions or between on-premises** and Oracle Cloud Infrastructure DB systems, you must access the database host directly and use the **DGMGRL utility**.
- Oracle recommends that the DB system of **the standby database be in a different availability domain**.
- The standby databases in Oracle Cloud Infrastructure Database are physical standbys

# Oracle OCI Physical Data Guard Console Management

Database information Tags

## General information

Lifecycle state: Available  
OCID: ...32vonq [Show](#) [Copy](#)  
Created: Sat, Oct 22, 2022, 19:54:02 UTC  
Database Role: Standby  
Database unique name: DB12\_iad1r5  
Oracle SID Prefix: None  
Database Architecture: Container Database  
Character Set: AL32UTF8

## Backup

Automatic backup: Disabled [i](#)

## Data Guard

Status: Enabled

## Encryption

Encryption Key: Oracle-managed key

Data Guard Associations							
<a href="#">Enable Data Guard</a>							
Peer database	Peer DB system	Peer role	Protection Mode	Transport type	Apply lag	Data Guard Type	Launched
<a href="#">DB12</a>	<a href="#">DB12STDBY</a>	Standby	Maximum Availability	Sync	0 seconds	Mounted (Data Guard)	Sat, Oct 22, 2022, 19:50:14 UTC

## Edit Data Guard Association

Help

### Data Guard association details

Data Guard Type

Active Data Guard  
Active Data Guard is a licensed option to the Oracle Database Enterprise Edition and enables advanced capabilities that extend the basic Data Guard functionality. These capabilities include Real-Time Query and DML Offload, Automatic Block Repair, Standby Block Change Tracking, Far Sync, Global Data Services, and Application Continuity. [Learn more.](#)

Data Guard  
Oracle Data Guard ensures high availability, data protection, and disaster recovery for enterprise data. Data Guard provides a comprehensive set of services that create, maintain, manage, and monitor one or more standby databases to enable production Oracle databases to survive disasters and data corruptions. Data Guard maintains these standby databases as transactionally consistent copies of the production database. [Learn more.](#)

Protection mode

Maximum Availability

Data Guard Associations							
<a href="#">Enable Data Guard</a>							
Peer database	Peer DB system	Peer role	Protection Mode	Transport type	Apply lag	Data Guard Type	Last updated
<a href="#">DB12</a>	<a href="#">single_marcel01</a>	Standby	Maximum Availability	Sync	0 seconds	Mounted (Data Guard)	Sat, Oct 22, 2022, 19:50:14 UTC



# Oracle OCI Data Guard Network Requirements

Avoid security know issues during physical OCI Data Guard provisioning

- Properly configure the security list ingress and egress rules for the subnets of both DB systems in the Data Guard association to allow TCP traffic to flow between the applicable ports. Ensure that the rules you create are stateful (the default).
- The egress rules in the example show how to enable TCP traffic only for port 1521, which is a minimum requirement for Data Guard to work. If TCP traffic is already enabled on all of your outgoing ports (0.0.0.0/0), then you need not explicitly add these specific egress rules. Service Gateway can provide NW connectivity.

Rules(Prod)	Stateless	Source	IP Protocol	Source Port	Dest Port
Ingress	No	10.0.01.0/24	TCP	All	1521
Egress	No	10.0.1.0/24	TCP	All	1521
Rules(Sby)	Stateless	Source	IP Protocol	Source Port	Dest Port
Ingress	No	10.0.0.0/24	TCP	All	1521
Egress	No	10.0.0.0/24	TCP	All	1521

# Avoid Data Guard Provisioning Error | Change Ingress and Egress roles

## Enable Data Guard

Provide information for the initial database

1 DB system information      2 Database information

### Configure standby database

Database image *Optional*

Click **Change Database Image** to select your software version

Change database image

Database password

.....

Show advanced options

Data Guard Association cannot be created when standard database service port (1521) is used with Subnet: `ocid1.subnet.oc1.iad.aaaaaaaaacx5bqxh24cgpgrzg7psrf4okvwhboryv6pj63xs`

Instances in Subnet: `ocid1.instance.oc1.iad.aaaaaaaaacx5bqxh24cgpgrzg7psrf4okvwhboryv6pj63xs435ii5hcwkq` by security rules associated

Previous    **Enable Data Guard**    Cancel

# VM Data Guard Switchover through OCI Console

The screenshot illustrates the process of performing a VM Data Guard switchover through the Oracle Cloud OCI console. It consists of three main panels:

- Top Panel:** Shows the OCI navigation bar with "Cloud Classic >" and a search bar. The location path is: Overview > Oracle Base Database > DB Systems > DB System Details > Database Home Details > Database Details > Work requests > Work request details.
- Middle Panel:** Titled "Switchover Data Guard". It displays a large orange box with "WR" and the status "IN PROGRESS". Below it is a progress bar labeled "Switchover Data Guard" which is "In progress" and "0% complete".

**Work request information:**

  - Operation:** Switchover Data Guard
  - OCID:** ...s3rlha [Show](#) [Copy](#)
  - Compartment:** acteamlad (root)/marlamar

**Accepted:** Tue, Apr 25, 2023, 22:28:56 UTC    **Started:** Tue, Apr 25, 2023, 22:29:33 UTC    **Finished:** —
- Right Panel:** A modal window titled "Switchover Database". It contains a confirmation message: "Are you sure you want to perform a database switchover? A switchover reverses the primary and standby database roles." It also includes a password input field and "OK" and "Cancel" buttons.
- Bottom Panel:** Another instance of the "Switchover Data Guard" page, showing a green box with "WR" and the status "SUCCEEDED". The progress bar is now "Succeeded" and "100% complete".

**Work request information:**

  - Operation:** Switchover Data Guard
  - OCID:** ...s3rlha [Show](#) [Copy](#)
  - Compartment:** acteamlad (root)/marlamar

**Accepted:** Tue, Apr 25, 2023, 22:28:56 UTC    **Started:** Tue, Apr 25, 2023, 22:29:33 UTC    **Finished:** Tue, Apr 25, 2023, 22:32:43 UTC

# Studding and costs useful tools

Very good tools to test and



# Oracle Cloud Cost Estimator



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Serviços   Formas de computação   Arquiteturas de referência   Meus favoritos   Pesquisa Avançada

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All Categories

Search



Most Popular Services

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Carregar

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Carregar

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#### Certified Autonomous Database Professional

#### Certified Database Services Professional

#### Certified Database Migration and Integration Professional

[https://education.oracle.com/es/learn/oracle-cloud-infrastructure/pPillar\\_640](https://education.oracle.com/es/learn/oracle-cloud-infrastructure/pPillar_640)



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[www.education.oracle.com/oracle-certification-path](http://www.education.oracle.com/oracle-certification-path)

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Mike Dietrich's Blog About Oracle Database Upgrades... Mostly



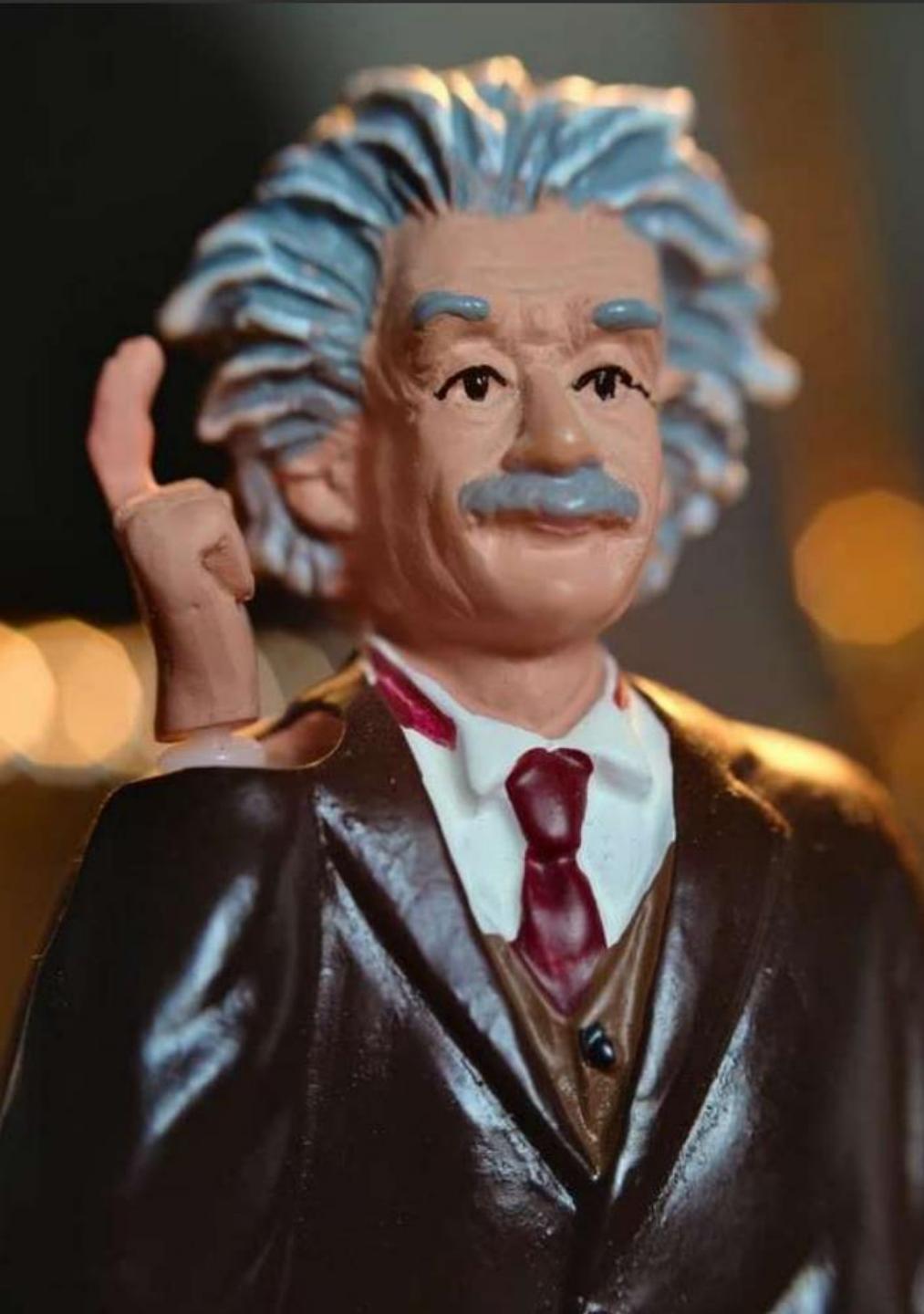
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Patching my environments with  
the January 2023 Bundle Patches

Photo by [karokrasinska](#) on [Unsplash](#)

Rolling back or removing  
all patch SQL changes

<https://mikedietrichde.com>



## Demo 1 - Mysql

- OCI Mysql Database Provisioning
- OCI Mysql Database Tour



## Demo 2 – OCI Data Safe

- Oracle ADB Provisioning
- Oracle Data Safe Register
- Oracle Data Safe Report Generate





**Thank You 😊**

**Questions / Feedback / Training Suggestions**

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**Ask for help 😊**

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