



# Oracle for Knowledge

Data Management  
Foundations  
Certification Exam



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TechKnowledge  
Enablement  
& DEVs

# Why become Oracle certified?

Make you a better technologist ☺

## Oracle Certification Benefits

### Get Certified to Stand Out in a Crowd

Reap the Benefits of Earning an Oracle Certification

- Expand your knowledge base and validate your skills to appeal to potential employers.
- Improve your potential earning power to command a higher salary.
- Learn to perform complex, hands-on activities through lab, study and practice sessions.
- Access a secure digital badge you can add to your social media profiles.
- Gain exposure to a wide variety of important features, functions and tasks to use on the job.



Preparing for an Oracle Certification Exam will assess & challenge your ability to think & perform. Earning a highly recognized and valued Oracle Certification will improve your job prospects and job stability! Accelerate your career growth, [became a better technologist](#) \o/

# OCI Certifications

## Basics

### Professional

Extensive experience designing, implementing, and operating advanced, large-scale solutions using Oracle Cloud Infrastructure.

### Associate

Experience in designing and implementing solutions using Oracle Cloud Infrastructure

### Foundations

Learn about Cloud concepts and Oracle Cloud Infrastructure fundamentals.

## Oracle Cloud Infrastructure



## Data Management



## Platform



# OCI Data Management Foundations

## Oracle Cloud Data Management 2023 Foundations Associate Exam Number: 1Z0-1105-23

The English version of this exam retires on July 01, 2024. A new exam will be available in June 2024.

### Earn associated certifications

Passing this exam is required to earn these certifications. Select each certification title below to view full requirements.

 Oracle Cloud Data Management 2023 Certified Foundations Associate

**Format:** Multiple Choice

**Duration:** 90 Minutes

**Exam Price:** Free

[Register for free](#)

**Number of Questions:** 55

**Passing Score:** 68%

**Validation:** This exam has been validated against Oracle Cloud Infrastructure 2023.  
**Policy:** Cloud Recertification



# Exam Topics

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- Explain Oracle's Data Management Strategy
- Converged Database
- Discuss multi-cloud and hybrid cloud options
- Autonomous Database and Tools
- Exadata and DBCS
- MySQL and NoSQL
- Resiliency
- Developing an Oracle Database
- Data Lake, Data Warehouse and Machine Learning
- Upgrades and Migrations



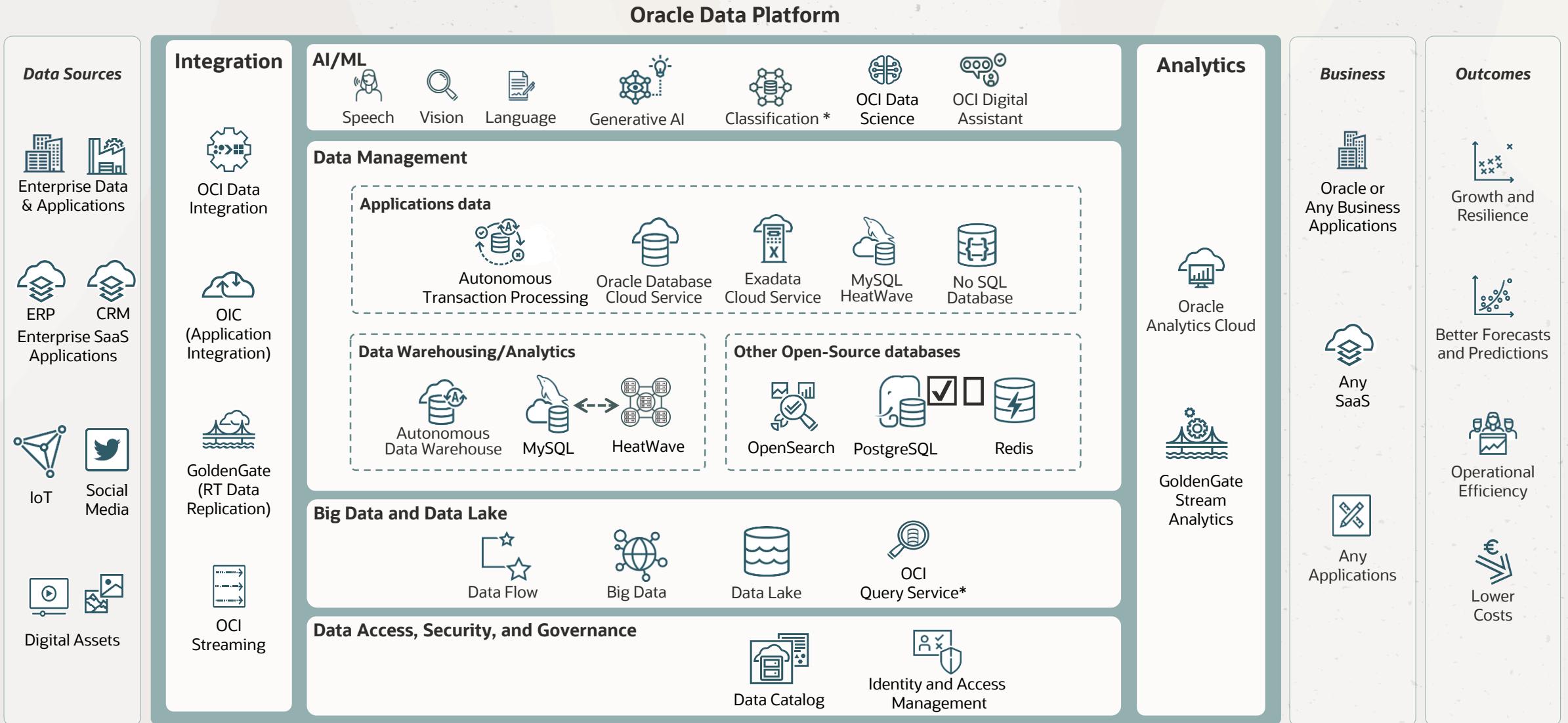
# Cloud Basics



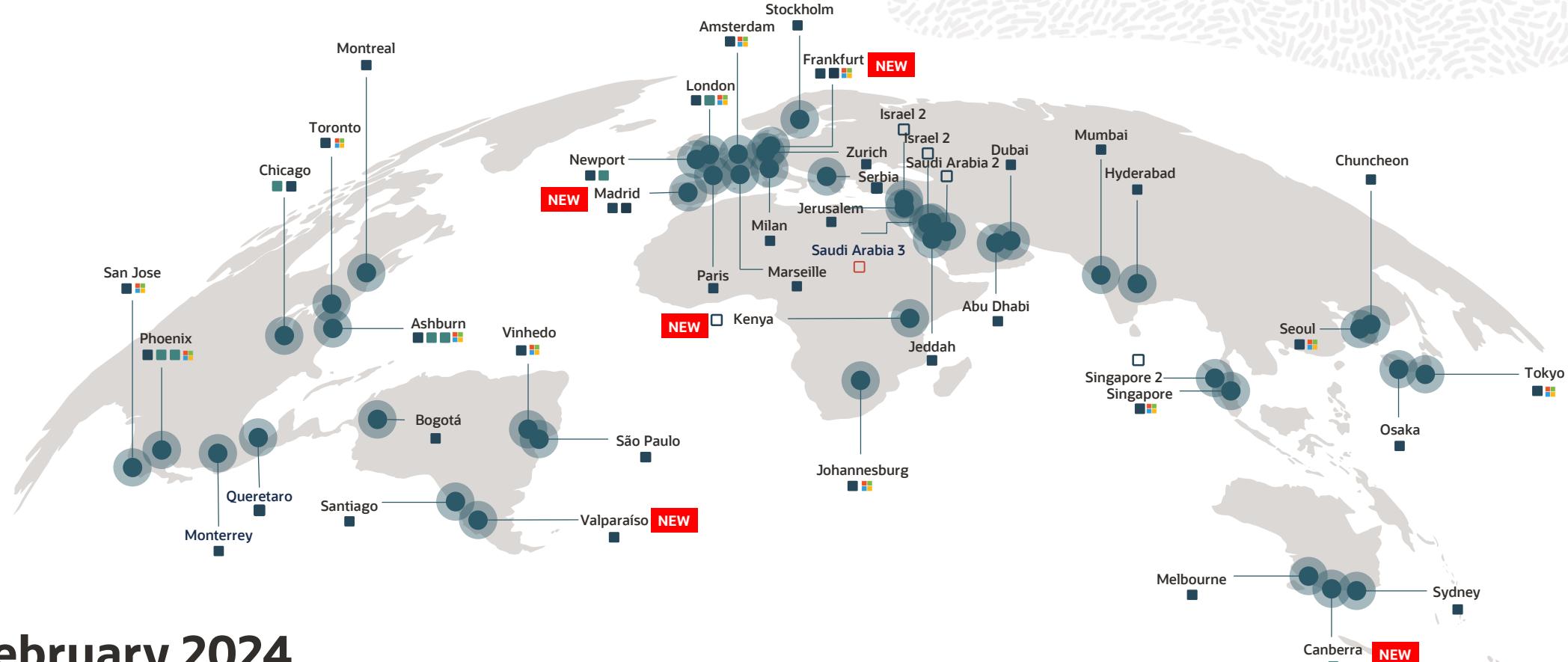
# Key terminology

	<b>High Availability:</b> A system type with redundant components that provides consistent and uninterrupted service, even in the event of hardware or software failures
	<b>Scalability:</b> The ability to add additional nodes to database environments thereby maintaining and achieving improved performance
	<b>Rolling upgrades:</b> The process where software is developed continuously and the updates are released in between the major releases. These updates are compatible with earlier versions where complete re-installation of the software is not required.
	<b>Failover:</b> A method of protecting computer systems from failure, in which standby equipment automatically takes over when the main system fails
	<b>Recovery Point Objective (RPO):</b> Tolerance for data loss (sec's, hours, days); determines frequency of backups and replication approaches
	<b>Recovery Time Objective (RTO):</b> The shorter the Recovery Time Objective (RTO) the quicker you get back to business

# Oracle Data Platform: A complete suite of services



# Oracle Cloud Infrastructure Global Footprint



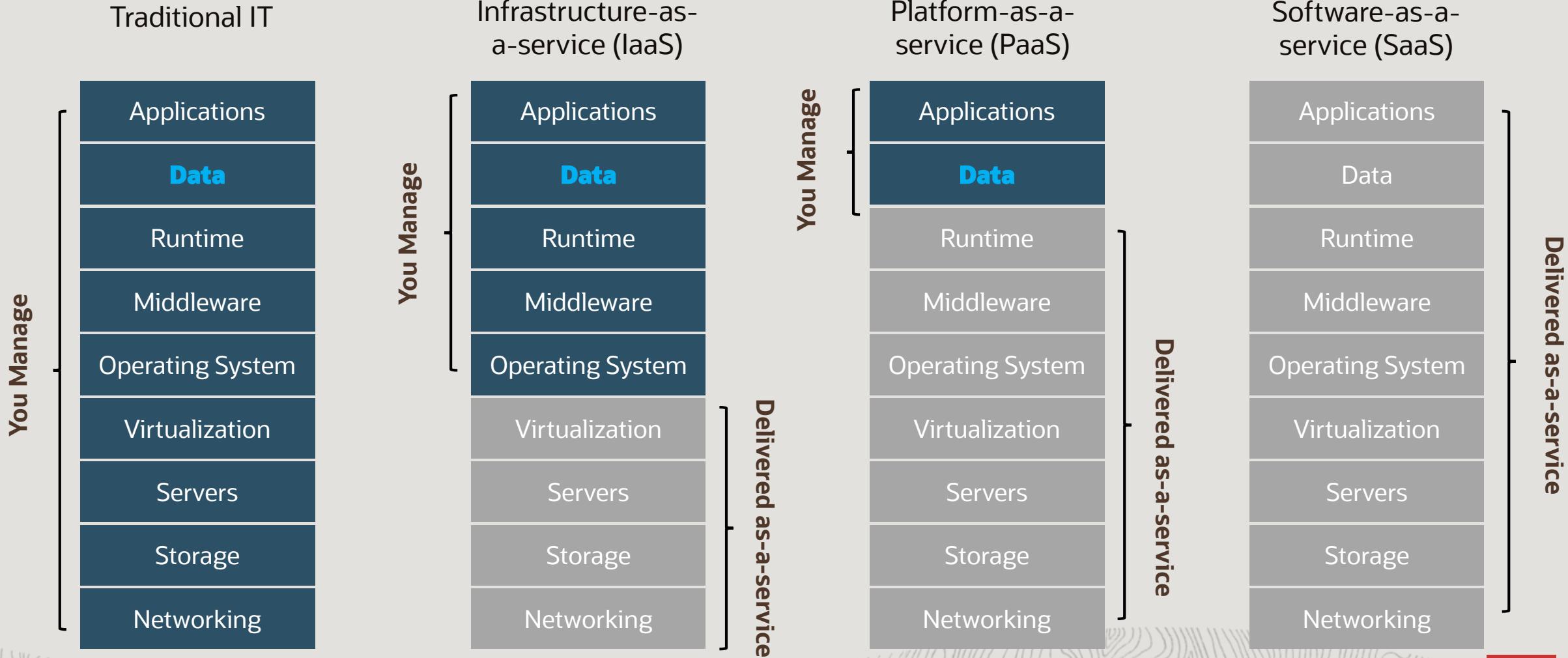
**February 2024**

**48 regions; 5 more planned**

**12 Azure Interconnect Regions**

- Commercial
- Commercial Planned
- Sovereign
- Government
- Microsoft Interconnect Azure

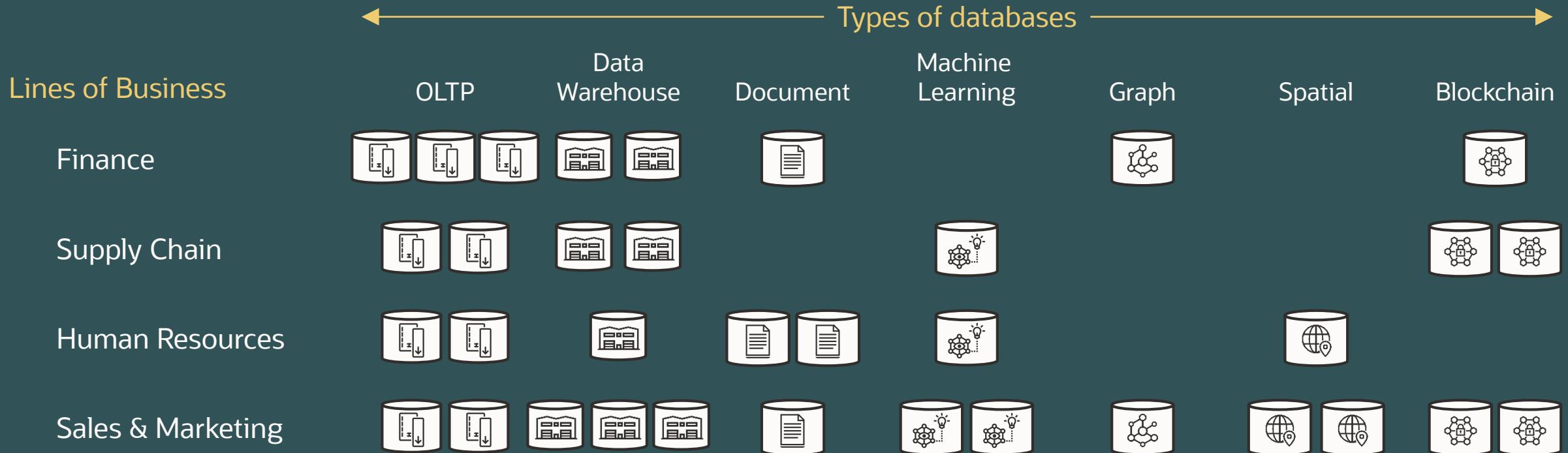
# Service Models



# Database Convergence



# Organizations typically use many database silos



Using multiple databases per application creates complexity and risk

# Oracle Database's complete capabilities enable database convergence

## Multiple data types

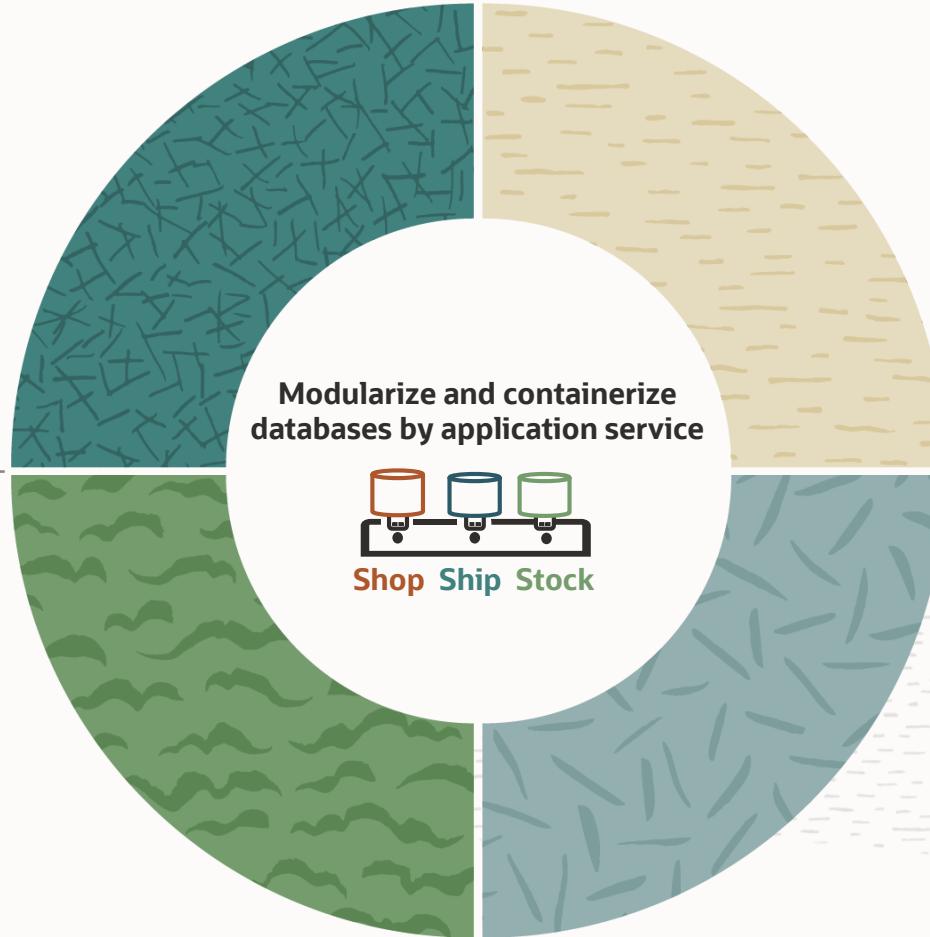
Structured: Relational, Graph, Avro, Parquet, Blockchain

Unstructured: Geospatial, XML, JSON, Text

## Mission-critical capabilities

Scaling: Performance, capacity, query parallelism, analytics, multitenant

Risk reduction: Disaster protection, replication, security, zero data loss backup, crypto-security



## Multiple workloads

Transactional: OLTP, IoT, distributed, key-value

Analytical: Data warehouse, data lake, operational intelligence, machine learning, multi-dimensional

## Multiple development styles

Decentralized: Microservices, events, data mesh, APIs

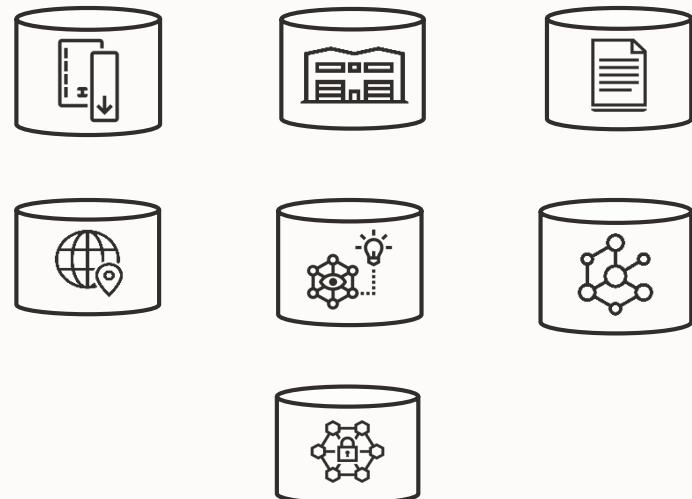
Accelerated: Low code, data engineering, schema-less, SaaS



# Converged capabilities reduce the number of database types you need

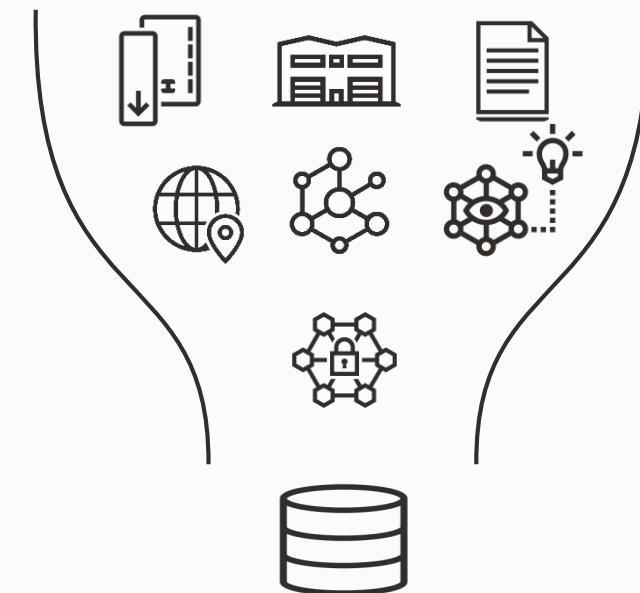
## Non-converged databases

Apps integrate multiple database types,  
one for each type of data



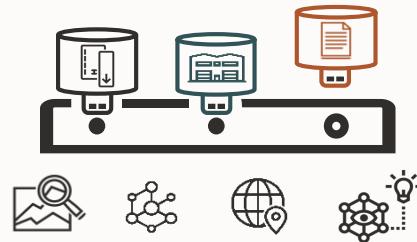
## Converged Oracle Database

Apps use one database for all  
data types and workloads



# How Oracle improves converged database consolidation

Complete data type and workload support



- Developers use **one database** when working with multiple data types
- Multiple application **databases run and are managed together** using Oracle Multitenant
- Native JSON** with high performance and scale simplify modern apps
- Multiple types of analytics** and machine learning eliminate stand-alone services

Automation of the complete dev lifecycle



- Point-and-click **cloud native development** using native tools
- AutoML** helps automate machine learning model creation
- Autoscaling** eliminates the need for developers to implement scaling inside applications
- Autoindexing** eliminates the need for DBAs to tune database indexes for greater performance

Mission-critical apps are easy to run



- Automatic performance optimizations on **Exadata** reduce tuning requirements
- Transparent** query parallelism simplify performance tuning
- Consistent governance** of self-service databases with fleet management
- Databases run unchanged for **Oracle and 3rd-party apps**

Important data is easy to secure



- Transparent encryption** protects data at rest, in motion, and in backups
- Data masking and redaction** remove sensitive information
- Separation of duties** controls administrative access to data, software, and infrastructure
- Label security** and virtual private databases limit users access to data
- Blockchain tables** enable tamper-resistant ledgers for centralized apps

# Database Offerings



# Oracle Spent Last **23** Years Automating Database Technology

- Machine Learning Algorithms
- Native Json
- In-Memory improve
- Blockchain tables

**21c**

**19c**

- Automatic Indexes
- SQL Quarantine
- Real-Time Statistics

**18c**

- Automatic Columnar Flash
- Automatic IM population
- Automatic Application Continuity

**12c**

- Autonomous Health Framework
- Automatic Diagnostic Framework
- Automatic Refresh of Clones

**11g**

- Automatic SQL Tuning
- Automatic Workload Capture/Replay
- Automatic SQL Plan Management
- Automatic Capture of SQL Monitor
- Automatic Data Optimization

- Automatic Query Rewrite
- Automatic Undo Management

**9i**

**10g**

- Automatic Memory Management
- Automatic Segment Space Mgmt
- Automatic Statistics Gathering
- Automatic Storage Management
- Automatic Workload Repository
- Automatic Diagnostic Monitor

**ORACLE**  
**DATABASE**

**O**

# OCI Oracle Database options

## Oracle Public Cloud



Base Database Service



Exadata Database Service on Dedicated Infrastructure



Autonomous Database on Shared & Dedicated Exadata Infrastructure

## Customer Data Center



Exadata Database Service on Cloud@Customer



Autonomous Database on Exadata Cloud@Customer

Oracle Cloud Infrastructure

Cloud@Customer

Co-Managed

Autonomous

Co-Managed

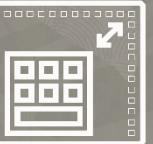
Autonomous

# Everything enterprise databases need to run in cloud



## Flexibility

- Converged database
- Any database workload



## Scalability

- VMs with 2 to 128 vCPUs
- 2-node active-active clusters



## Reliability

- Continuous availability
- Disaster recovery



## Simplicity

- Lifecycle management
- Low-code development



## Security

- Security-first infrastructure
- Oracle Data Safe included



## Cost Effectiveness

- Elastic compute consumption
- 4 tiers of licensing options

# Oracle Base Database Service

Simple path to move Oracle Database instances to Oracle Cloud Infrastructure

## Feature and Pricing tiers

- Oracle Standard Database Service
- Oracle Enterprise Database Service
- Oracle Enterprise Database Service high performance
- Oracle Enterprise Database Service extreme performance



**Versions:** All supported Oracle Database versions

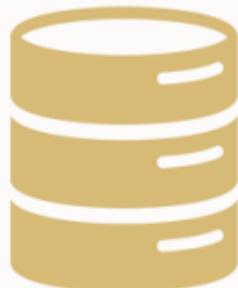
**Licensing:** License Included options or Bring Your Own License

**Management:** Oracle managed infrastructure with customer managed databases

# Oracle Database Deployment

## Virtual Machines (VMs)

- Easier deployment for **small databases**.
- You may provision 1 OCPU, the minimum Compute Power unit available on Oracle Cloud.
- Memory allocation related to the selected VM shape.
- Size of storage may be scaled up as needed at any time.
- The number of CPU cores on an existing VM DB system cannot be changed.
- **Option of selecting an older database version.**
- Oracle RAC may be enabled in a 2-node DB cluster.
- Data Guard within and across ADs is available for VM DB systems (requires DB Enterprise Edition).



# Oracle Database Deployment

## Bare Metal (BMs)

- Direct access to the machines (Bare Metal definition)
- **Better performance due to the lack of virtualization.**
- Locally attached 51 TB NVMe storage (raw).
- Start with 2 cores and **scale up/down OCPUs based on requirement.**
- Data Guard within and across ADs (requires DB Enterprise Edition).
- If single node fails, launch another system and restore the databases from current backups.
- Oracle RAC not available ([Deploy a highly available bare metal database](#))



# Oracle Database Deployment

## Exadata DB System

- Full Oracle Database with all advanced options.
- On fastest and most available database platform.
- Scale-Out Compute, Scale-Out Storage.
- Complete Isolation of tenants with no overprovisioning.
- All Benefits of Public Cloud in Cloud@Customer.
- Fast, Elastic, Web Driven Provisioning.
- Oracle Experts Deploy and Manage Infrastructure.



# Oracle Exadata is the best place to run Oracle Database

A fully automated and optimized platform coengineered with Oracle Database



## Autonomous Database and Oracle Database

- Unique capabilities available only with Exadata
- Available in OCI and customer data centers

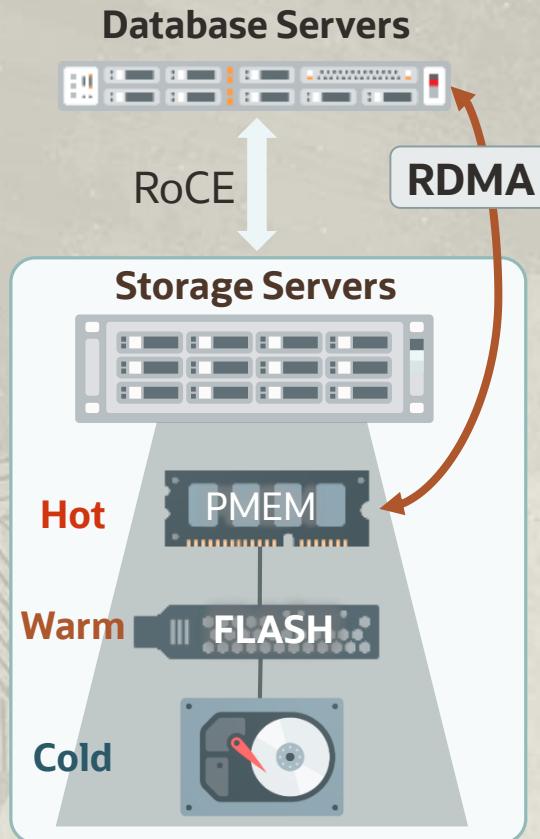
## Database-Aware System Software

- Smart system software with unique algorithms accelerate OLTP, analytics, and consolidated workloads
- Automatic storage tiering and resource management with I/O prioritization by workload

## Scalable, Highly Available Hardware

- Scale-out with optimized compute, networking and storage for best performance at lowest cost
- Fully automated and optimized configuration, performance, fault-tolerance, and updates

# Exadata architecture optimizes all Oracle Database workloads



## Fastest OLTP

- Uses RDMA instead of IO to read PMEM in smart storage servers
- Unique algorithms for inter-node cluster coordination
- Result: 19 $\mu$ s IO – 10X faster than flash

## Fastest Analytics

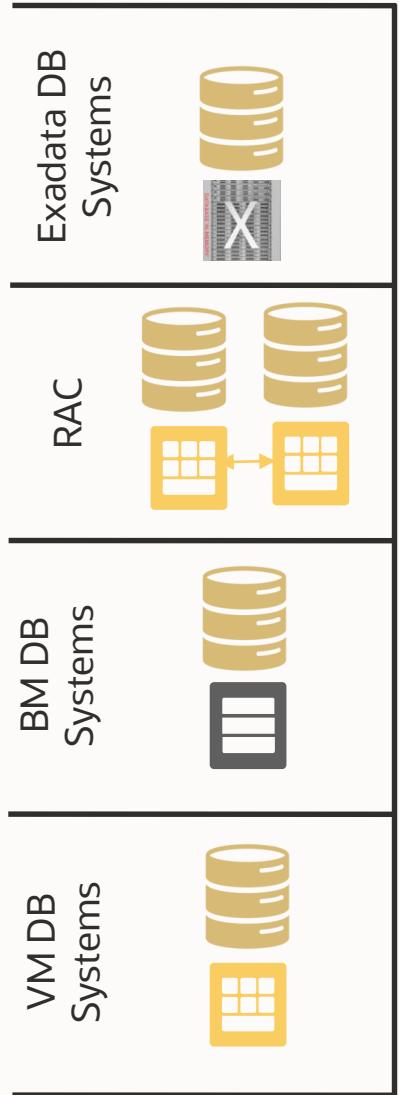
- Automatically offloads SQL processing to parallel smart storage servers
- Smart flash cache and Storage Index accelerates database IO automatically
- Unique columnarization converts data to fast in-memory formats

## Best Consolidation

- Unique prioritization of latency sensitive and important workloads
- Isolation of multiple tenants and workloads

**World's Only Shared Persistent Memory Optimized for Database**

# Oracle DB Systems



**Managed DB Systems – Exadata, RAC, Bare Metal, VM**

**Complete lifecycle automation – Provisioning, Patching, Backup & Restore**

**High Availability and DR – RAC & Data Guard**

**Scalability – Dynamic CPU and Storage scaling**

**Security – Infrastructure (IAM, VCN, Audit), Database (TDE, Encrypted RMAN backup / Block volume encryption)**

**Bring Your Own License (BYOL)**

# Autonomous Database



# Oracle Autonomous Database

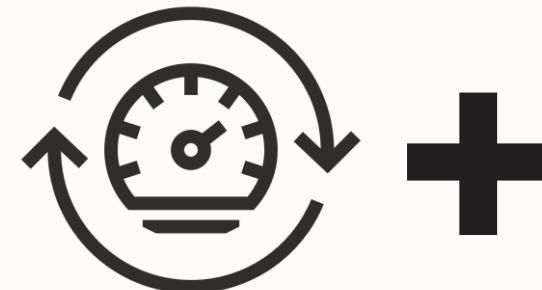
Simplifies advanced data management obfuscating database and infrastructure complexity



**Oracle  
Autonomous  
Database**



**Complete  
Infrastructure  
Automation**



**Complete  
Database  
Automation**



**Automated Data  
Center Operations and  
Machine Learning**

# Autonomous Database Options

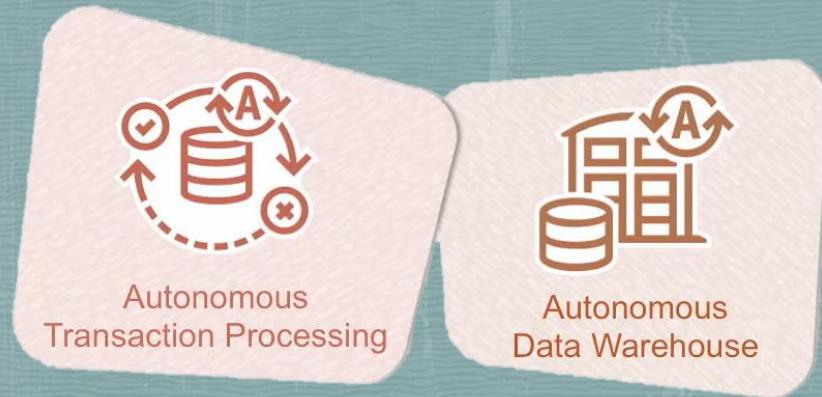


Autonomous - Shared



Autonomous - Dedicated

Self-Driving



Self-Securing

Self-Repairing

# Oracle Autonomous Database – serverless or dedicated deployments

Autonomous JSON, Transaction Processing or Autonomous Data Warehouse



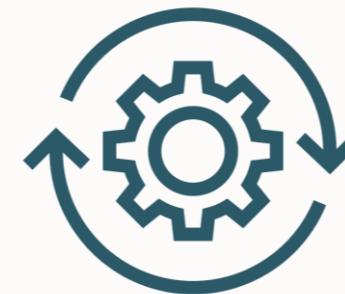
## Self-driving

- Scale-out database with fault-tolerance and DR
- Runs on enterprise-proven Exadata platform
- Full compatibility with existing enterprise databases



## Self-secur ing

- Automatically applies security updates online
- Secure configuration with full database encryption
- Sensitive data hidden from Oracle or customer admins



## Self-repairing

- Recovers automatically from any failure
- 99.995% uptime including maintenance
- Elastically scales compute or storage as needed

# The complete database lifecycle is automated



## Provisioning

Create scalable databases quickly

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Create in Exadata Cloud Infrastructure, RAC scale-out database, Active Data Guard standby

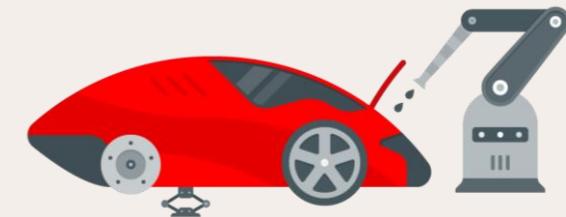


## Security

Protects against external and internal threats

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Monitor threats, apply online security updates, encrypt all data, secure connections



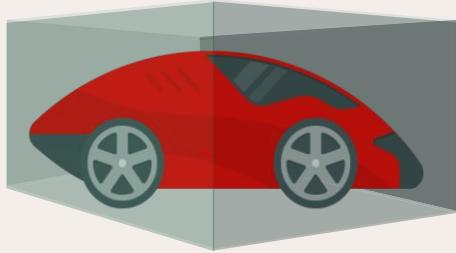
## Management

Automates all infrastructure and database management

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Perform all OS and SYSDBA operations, adjust settings, fix all software online, diagnose errors

# The complete database lifecycle is automated



## Protection

Recover from any failure without downtime

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Automates backup, restore, application transparent failover in scale-out cluster or to active remote standby



## Scalability

Online scale for higher performance and lower cost

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The instant online elasticity of serverless computing and storage enables true pay-per-use



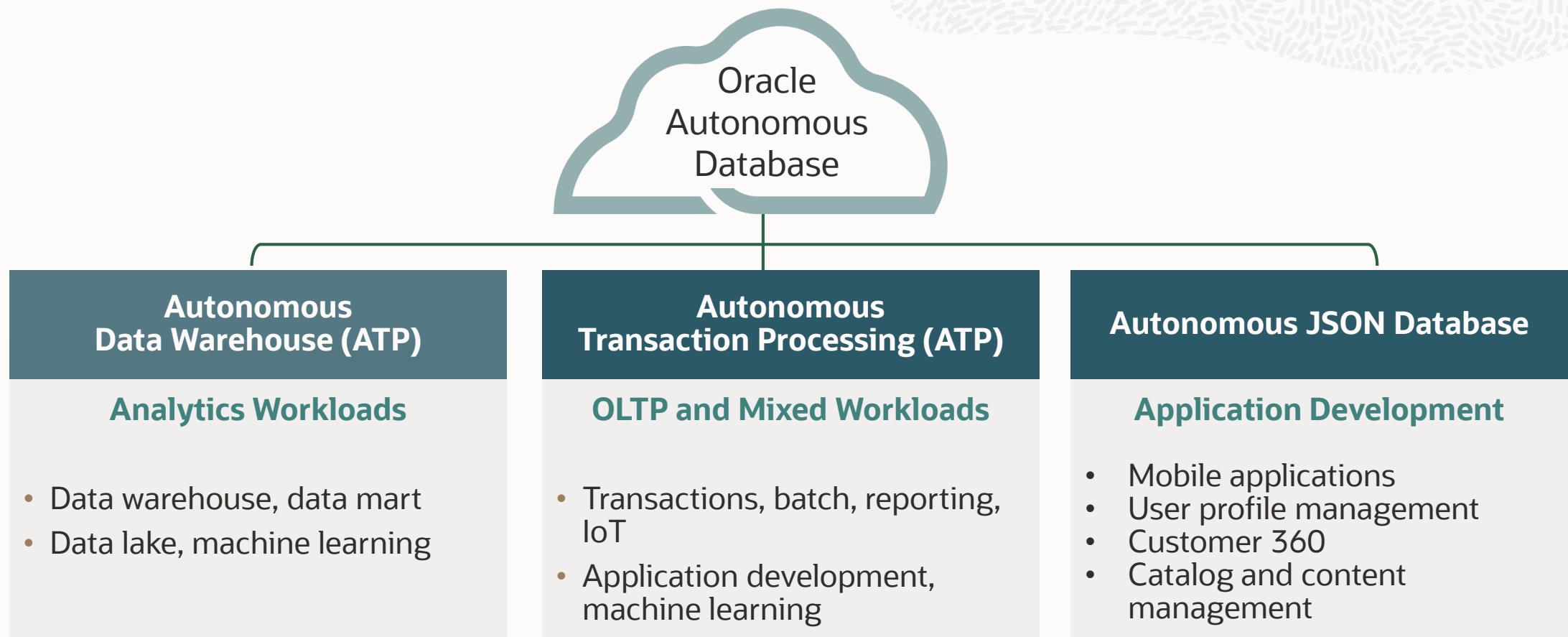
## Optimization

Machine learning optimizes the database for each workload

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Continuously optimizes memory, data formats, indexes, parallelism and plans for each workload

# Oracle Autonomous Database provides workload optimized service options



Choose the one that best meets your workload needs

<https://www.oracle.com/autonomous-database/>



# Simplify innovation and prototyping

Immediately start developing using cloud native tools; nothing to install

## ⌚ Deploy in minutes



Autonomous  
Database



Data Modeling



Low-code APEX



Notebooks



Data Analysis



SQL Worksheet



REST Services



ML Modeling



Data Sharing



JSON Worksheet



Data Catalog



Graph Modeling



Data Integration

# Simplify development using your favorite tools

## Example: Microsoft Visual Studio Code + Free Oracle Developer Tools plugin

# Lifecycle management of Oracle Autonomous Database

- Oracle Cloud Infrastructure Explorer
  - Create, Start, Stop, Terminate ADBs
  - Simple database connections

# Develop database apps

- Edit and Execute SQL and PLSQL
  - Format results in CSV, JSON...
  - Autocomplete and Intellisense
  - SQL history and bookmarks
  - Syntax highlighting/Code Snippets

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

- ORACLE EXPLORER** sidebar:
  - DATABASE**: HR.myalwaysfree\_high
    - Tables
    - Views
    - Procedures
    - Functions
  - Packages**: CSHAYDEMO
    - Package Body
    - ADPPERSON
      - FIRST\_NAME: VARCHAR2
      - LAST\_NAME: VARCHAR2
  - ORACLE CLOUD INFRASTRUCTURE**:
    - DEFAULT (oradbdotnetdemo:us-ashburn-1)
    - Autonomous Transaction Processing Databases
      - MTDRDB
      - MyAlwaysFree
    - Autonomous Data Warehouses
    - Autonomous JSON Databases
  - BOOKMARKS**: Christian's Bookmarks, substitution variables

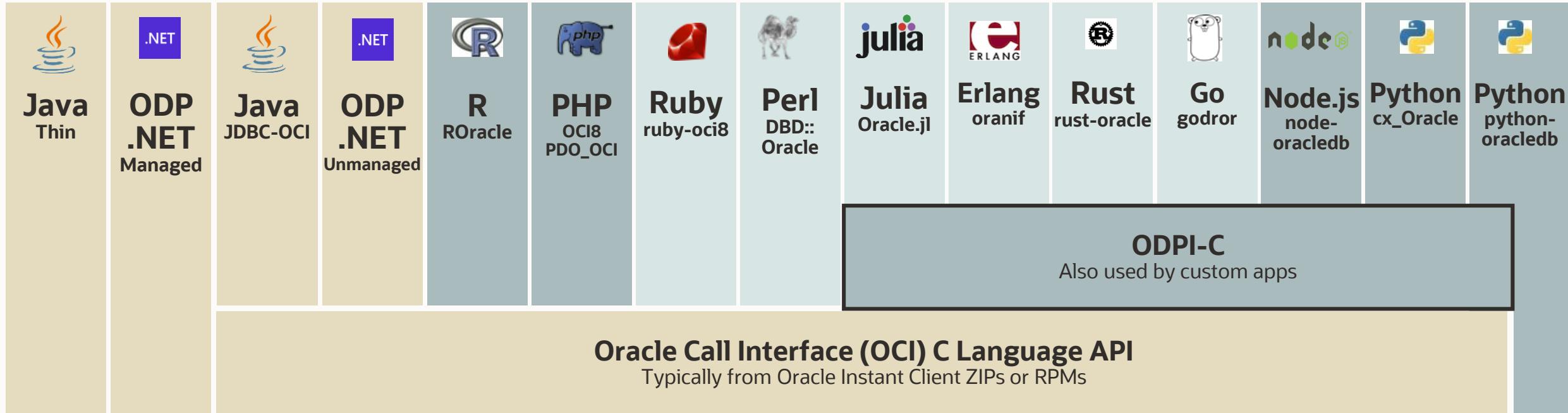
**demoscript.sql 1** editor pane:

```
2964
2965 BEGIN
2966
2967 CSHAYDEMO.ADPPERSON('David', 'Smith', 175343,
2968
2969 END;
2970
2971 -- ORAMAG
2972 --
2973 CREATE OR REPLACE PACKAGE BODY "ORAMAG" IS
2974     -- procedure that processes the incoming associative arrays
2975     -- calls the method IS_PRIME to determine if element is likely prime
2976 PROCEDURE "DETERMINE_PRIMES" ("P_IN_VALUES" IN T_IN_VALUES, "P_OUT_VALUES" OUT T_OUT_VALUES)
2977 BEGIN
2978     for i in p_in_values.first..p_in_values.last
2979     loop
2980         p_out_values(i) := is_prime(p_in_values(i));
2981     end loop;
```

Bottom status bar: TERMINAL, SQL CONSOLE, PROBLEMS 1, OUTPUT, DEBUG CONSOLE, Filter (e.g. text, \*\*/\*.ts, \*\*/\*.n)



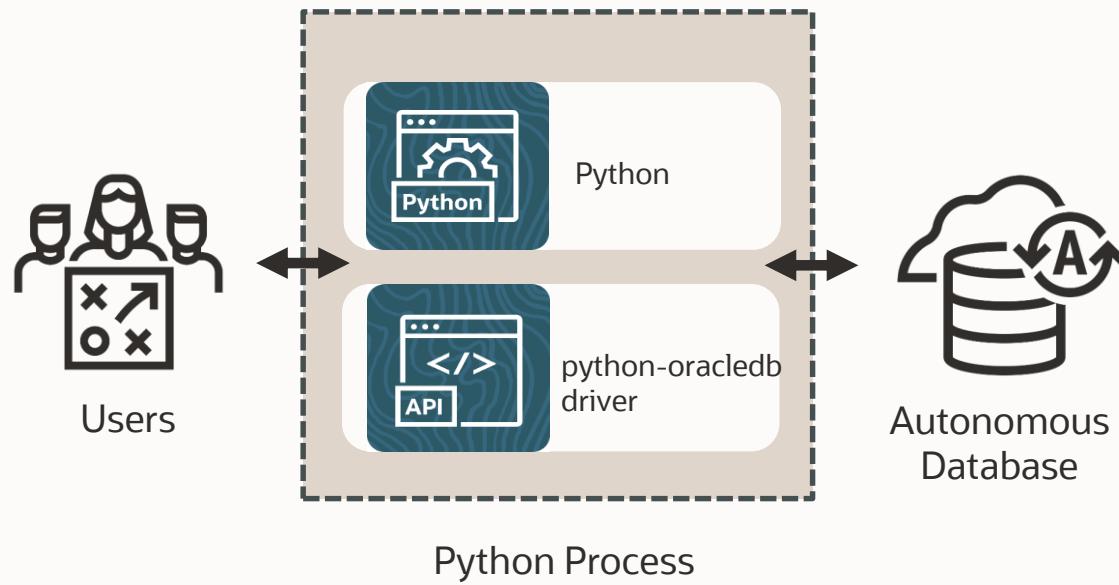
# Use your favorite language with high performance drivers



Oracle maintains key driver APIs and works closely with driver communities

# Get started quickly developing with Python

Example: python-oracledb



- Oracle Database driver for Python
- Single step install < 20MB
- Default Thin mode: no Oracle Client libraries
- Runtime choice to use Thick Mode
- Support of new platforms: Alpine, Apple M1/M2, IoT
- Python 3.6 – 3.11
- Dual Apache 2 or UPL open source license
- Binary module for performance
- Python Database API V2 support

# Develop faster, more scalable AI/ML apps with Python

Bring algorithms to the data using Autonomous Database

## Classification

- Decision Tree
- Naïve Bayes
- Generalized Linear Model
- Support Vector Machine
- Random Forest
- Neural Network
- XGBoost (21c)

## Clustering

- Expectation Maximization (EM)
- Gaussian Mixture Models via EM
- Hierarchical k-Means

## Attribute Importance

- Minimum Description Length
- Random Forest

## Association Rules

- Apriori – Association Rules

## Feature Extraction

- Explicit Semantic Analysis
- Nonnegative Matrix Factorization
- Principal Comp Analysis via SVD
- Singular Value Decomposition

## Regression

- Generalized Linear Model
- Neural Network
- Support Vector Machine
- XGBoost (21c)

## Anomaly Detection

- One-Class Support Vector Mach

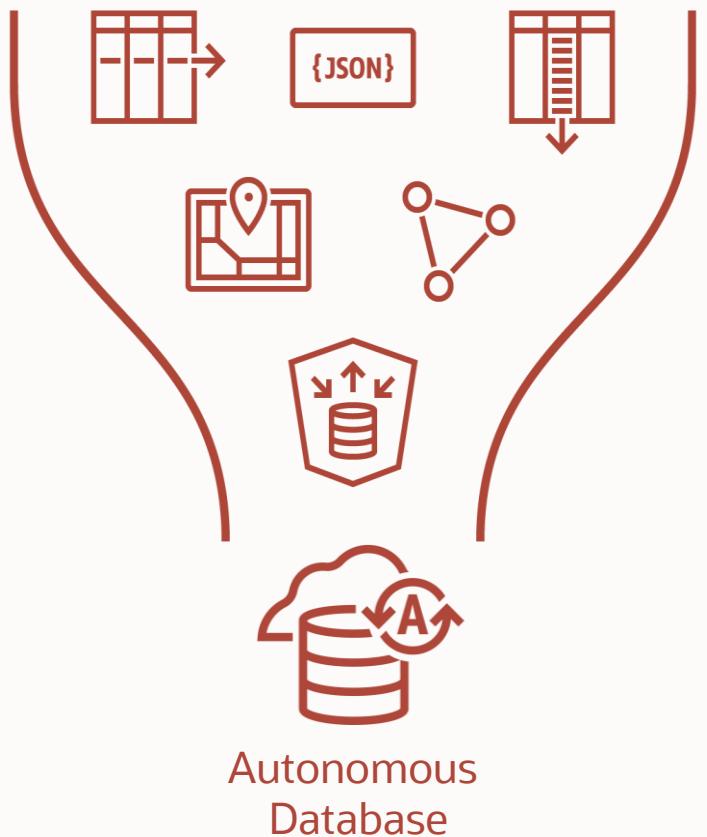
## Time Series

- Single Exponential Smoothing
- Double Exponential Smoothing
- Triple Exponential Smoothing

Supports automatic data preparation, partitioned model ensembles, integrated text mining

# Simplify developing modern apps

Use multiple data types and analytics for intelligent applications



Derive those insights in a **single, mixed-workload data platform**:

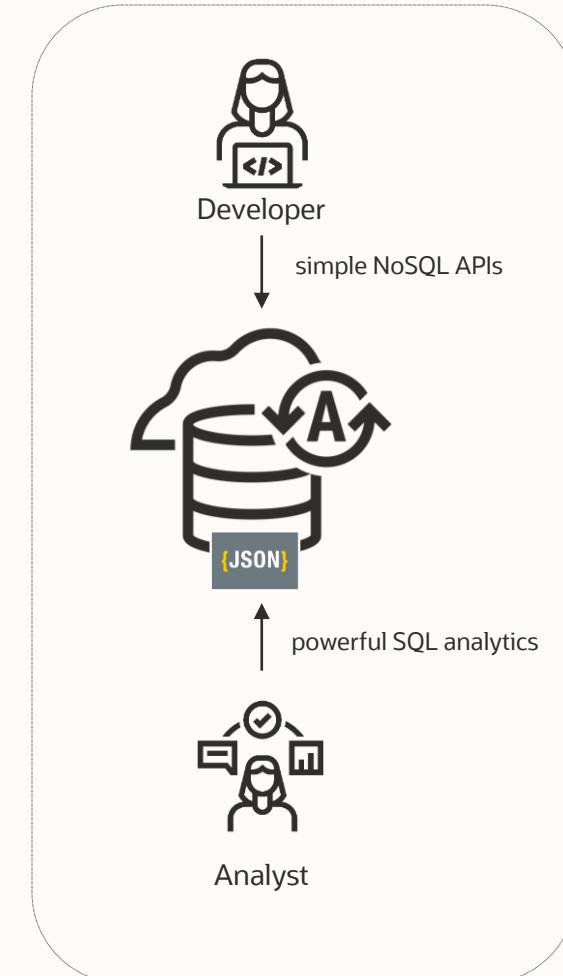
- **Eliminate administrative overhead**; no need to deploy specialized analytic engines
- **Build applications faster** by reducing data integration complexity
- **Minimize security risks** introduced by moving data to specialized engines
- **Reduce latency** by bringing algorithms to the data
- Use your favorite tools and frameworks to develop the solution

# Complete JSON database **within Autonomous Database**

Unique blending of transactional NoSQL APIs with SQL analytics

## Designed to simplify development

- Flexible and fast at scale
- Full ACID compliance
- Native JSON storage
- Simple document APIs
  - MongoDB API compatible
    - Language drivers, command-line, and REST
  - Gain instant insights using SQL analytics across relational tables and JSON documents



# Use productive DevOps methodology with Autonomous Database



**Self-Service APIs**  
for database  
lifecycle:  
provisioning,  
cloning, scaling and  
more...



**Cloud Events,**  
**Metrics and**  
**Alarms** integrated  
for hands-free  
automation



**Cloud agnostic**  
Terraform/Ansible  
Orchestration  
simplifies  
deployments



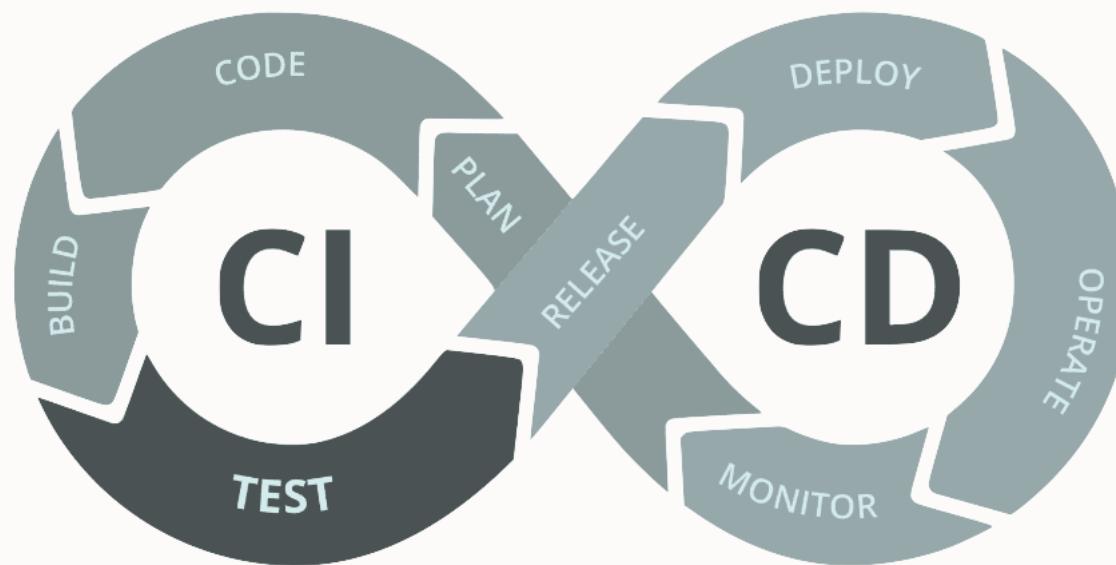
**Monitoring**  
**Dashboards and**  
**team messaging**  
plugins for real-time  
collaboration

# CI/CD on Autonomous Database

Liquibase + SQLcl simple schema versioning, enables you to execute commands to generate a changelog for a single object or a full schema

OCI DevOps with Jenkins or Pipeline Process allow for integration of the database to your automation processes

Terraform/Ansible support provides industry standard database-as-code for you automated deployments



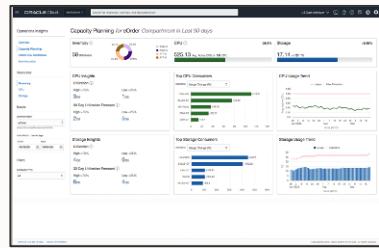
EBR simplifies online updates of application schema, allows gradual transition from old applications to editions without heavyweight cloning processes

APIs for easy code management with GitHub, AWS CodeCommit and Azure repos

# Simplify management

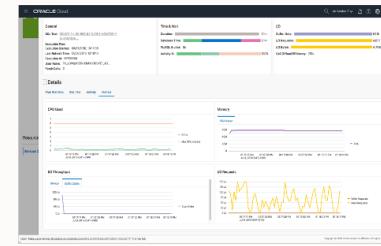
Focus on what's needed - manage by exception

## OCI Events



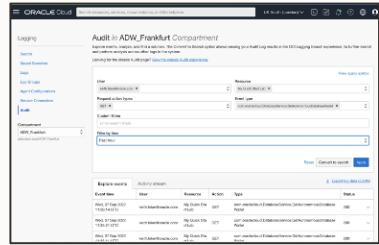
Get notified for maintenance windows, ADMIN password expiry, New IP address database logon...

## Performance Hub



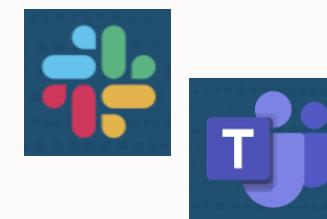
Analyze and drill down SQL performance

## Service Metrics



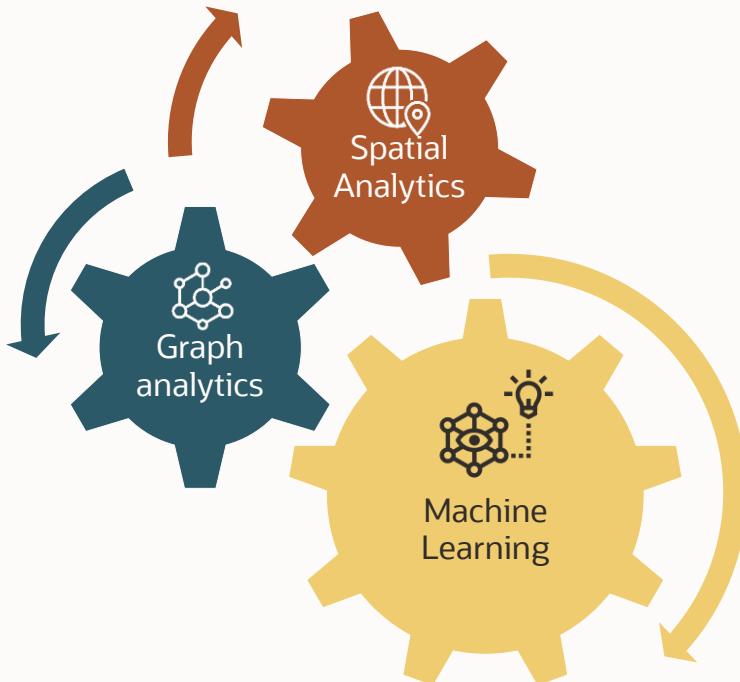
Alarm on exceptions based on service metrics - CPU, Sessions, IO...

## Notifications



Notify stakeholders using Slack, Teams, email and more

# Driving data discoveries through richer in-database analytics



## Extensive domain specific algorithms

- Apply algorithms to all types of data
- Use multiple algorithms to derive insights quickly

## Collaborative web-based notebooks

- Easily visualize and document discoveries
- Supports any user: data scientists, analysts, application developers and DBAs

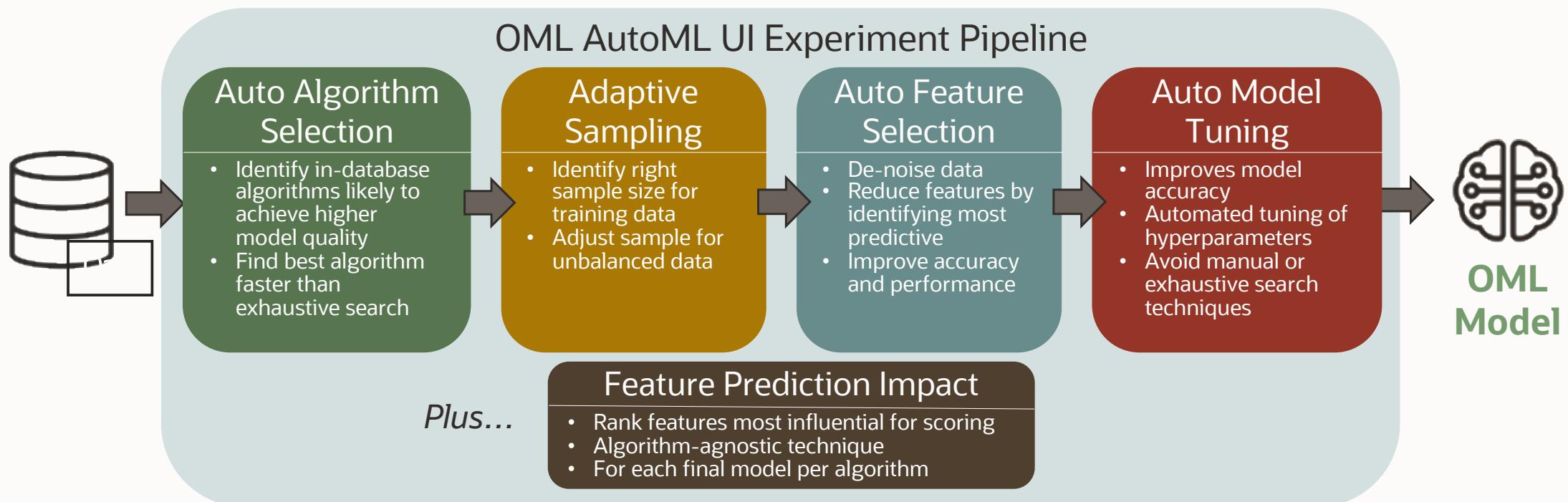
## Agile, fast and secure

- Use ADB processing power to apply algorithms to the data
- Keep data secure by avoiding copy contagion

# AutoML brings machine learning opportunities to all users

Enables non-expert users to leverage machine learning

- Eliminate repetitive tasks of model building/evaluation to increase user productivity
- Enable non-expert users to leverage machine learning
- Apply ML to the ML process to reduce algorithm and hyperparameters search space and reduce compute time and cost



# Enable powerful analytics based on connectivity

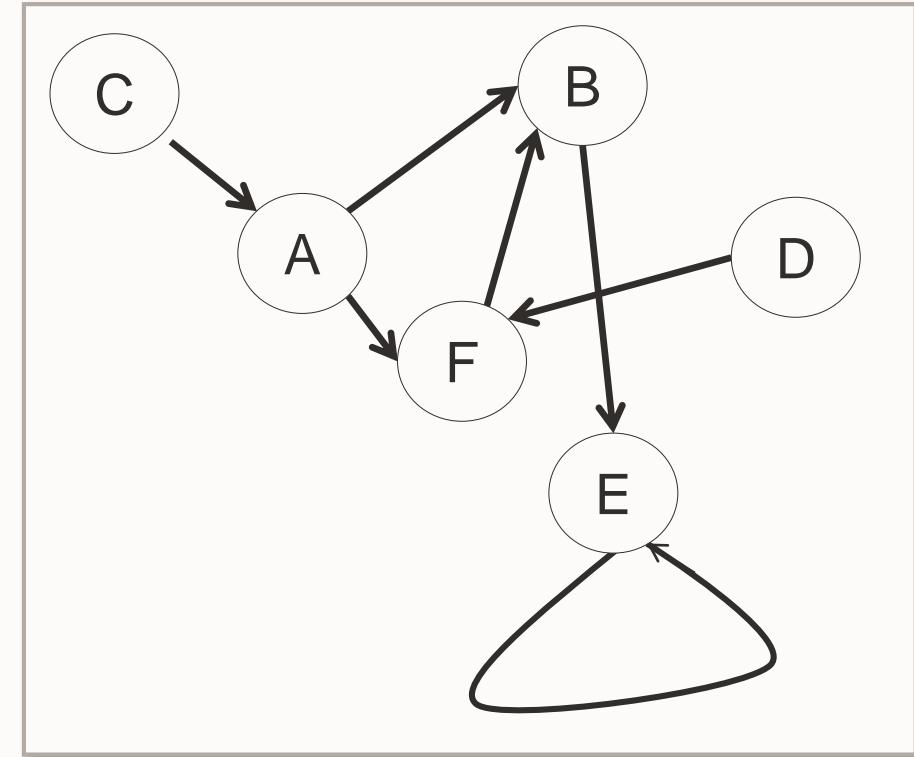
## Graph analytics

What is a graph?

- Data model representing entities as vertices and relationships as edges
- Optionally including attributes

What are typical graphs?

- Social Networks
  - LinkedIn, Facebook, Twitter, ...
- Physical networks, Supplier networks,...
- Dependency Graphs
  - Part hierarchies, data lineage, org charts, ...
- Knowledge Graphs
  - Apple SIRI, Google Knowledge Graph, ...



# Enable powerful analytics based on connectivity

Graph use cases

## Community detection and influencer analysis

- Churn risk analysis/targeted marketing, HR Turnover analysis, Customer 360

## Product recommendation

- Collaborative filtering, clustering

## Anomaly detection

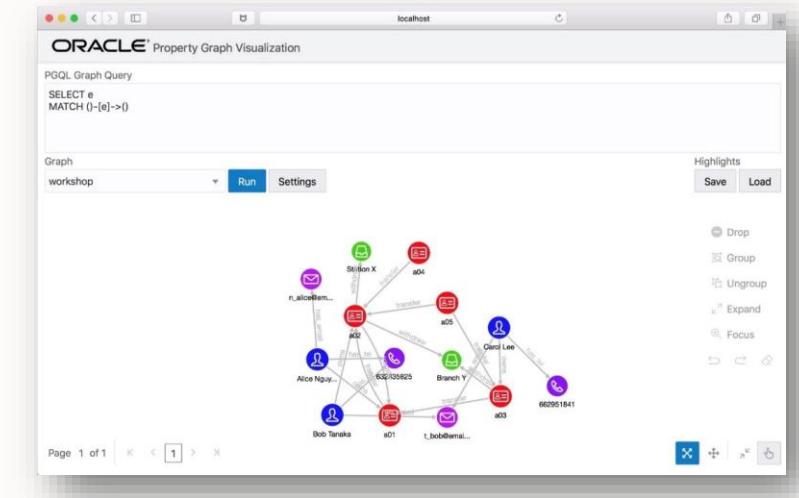
- Social Network Analysis (spam detection), fraud detection in healthcare

## Path analysis and reachability

- Outage analysis in utilities networks, data lineage, vulnerability analysis in IP networks, „Panama Papers“, access management/GDPR compliance

## Pattern matching

- Tax fraud detection, anti-money-laundering, data extraction



# Built in spatial analytics using SQL

## Geospatial data Processing

Convert address data or place names to geospatial data  
Prepare, validate and cleanse geospatial data

## Geospatial data Analysis

Categorize or filter based on location and proximity

## Map visualization

Graphical representation for interactive analysis or reporting

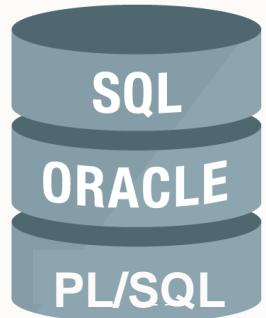
Are events occurring **within a mile** of each other? Which is the **nearest**? Which **tax zone** is this in? Where can we deliver **within 35 minutes**? Which are in my **sales territory**? Is this built in a **flood zone**?

## Spatial Analysis Through SQL

```
SELECT a.customer_name,  
       a.phone_number  
  FROM policy_holders a  
 WHERE  
 sdo_within_distance(  
      a.policy_location,  
      hurricane_path,  
      'distance=10 unit=KM') = 'TRUE' ;
```

# Accelerate migration of existing workloads to the cloud

## Use your existing skills



No need to learn new database skills or languages because Autonomous Database fully supports all of SQL and PL/SQL.

## Compatible with existing apps



Supports existing workloads and apps from on-premise deployments (Oracle Apps, APEX apps, custom apps, data marts, EDWs, etc)

## Migrate with zero-downtime



Migrate your database with no downtime using Zero Downtime Database Migration Service

# Accelerate moving to cloud – low risk, no disruption, zero downtime

Reduced risk - 100% portability and compatibility with on-premise Oracle databases

1. Assess and evaluate



2. Plan migration resources

DIY

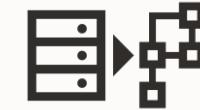
vs.

Cloud Lift Services

3. Leverage migration tools



Zero Downtime Migration (ZDM)



Database Migration Service (DMS)

4. Execute migration



# Accelerate success – Run all your Oracle Apps better on ADB

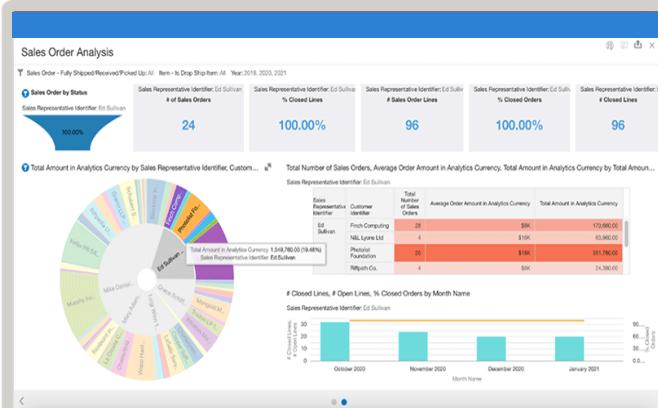
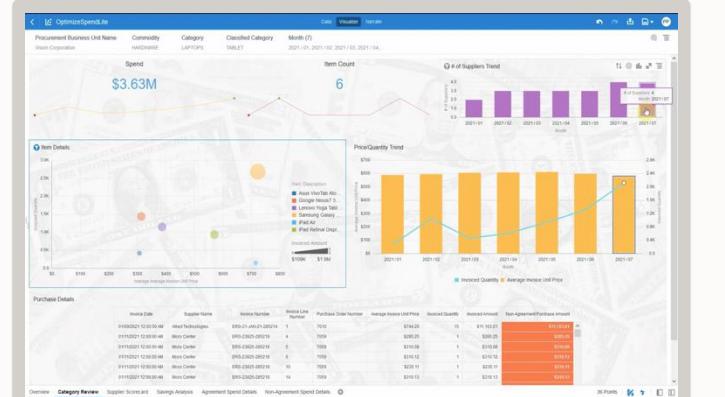
Complete portfolio of Oracle Apps now certified



- 1 Simplify managing applications**  
Take advantage of Autonomous Database full managed operations
- 2 Lower costs and risks**  
Only pay for the resources you use with auto-scaling. Backup, restore, and cloning of Oracle E-Business suite environments
- 3 Fast-track getting started**  
Use certified procedures for migrating to Autonomous Database

# Accelerate insights with Data Model Accelerators

Prebuilt solutions fast-track developing models, pipelines, KPIs and dashboards



**NetSuite Data Warehouse  
Accelerator for Autonomous  
Database**

**E-Business Analytics Accelerator  
for Autonomous Database**

**Manufacturing Data Platform  
Accelerator  
for Autonomous Database**

# Open Source Databases



# OCI Database with MySQL



Fast Provisioning

Standalone Options

Elasticidade

High Availability Option

Compute

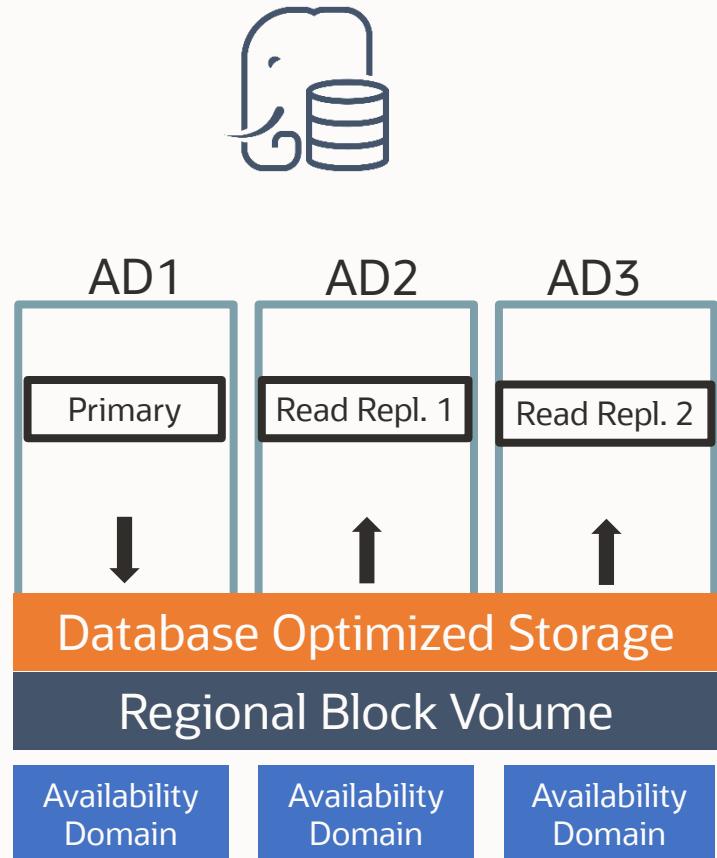
3-nodes

Storage

RAC

HeatWave

# OCI Database with PostgreSQL



## Fully Managed:

- Automated deployment and patching

## Highly Available:

- SLA is 99.99%
- Data distributed across multiple redundant Availability Domains or across multiple Fault Domains (single AD)
- Shared storage architecture with **Zero RPO** and **Low RTO**
- Dynamic storage scaling (zero downtime)

## High Performance

- 3x higher perf than the open-source version

## Scalable:

- Scales linearly with additional read replicas - utilizing shared storage

## Secure:

- End-to-end encryption
- Automatic security patching

## Best-in-class TCO:

- 60% less expensive than Amazon Aurora PostgreSQL.
- Pay-as-you-grow shared(across nodes) storage

# Open Source Databases - NoSQL

## NoSQL

Data Model Flexibility

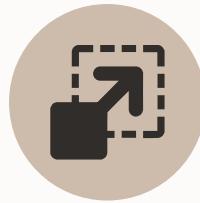
High Performance –  
Milisecond latencies

# Oracle NoSQL Database Cloud Service – Value Proposition



## Fully Managed

Database operation, maintenance, tuning are managed by Oracle



## Elastic

Dynamically change throughput and storage capacities based on workloads



## High Performance

Predictable low latency for all types of workloads



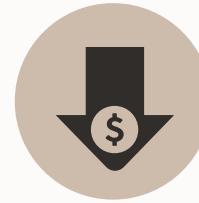
## Data Model Flexibility

Document, columnar, key/value models supported with a single application interface



## Security

Enterprise grade security with roles, privileges, encryption



## Low Operating Cost

Pay only for the throughput and storage capacities provisioned



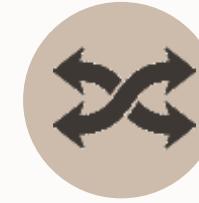
## Developer Friendly

Easy-to-use APIs and integrated with different developer tools



## Always Available

Built-in high availability to ensure business continuity



## Hybrid Cloud

Interoperate with Oracle NoSQL on-premise solution using a single application interface



# NoSQL Database –Use Cases



Mobile applications



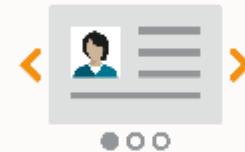
Internet of things



360 degree customer view



User profile management



Catalog data



Content management



Online advertising



Real time Big data



Social network



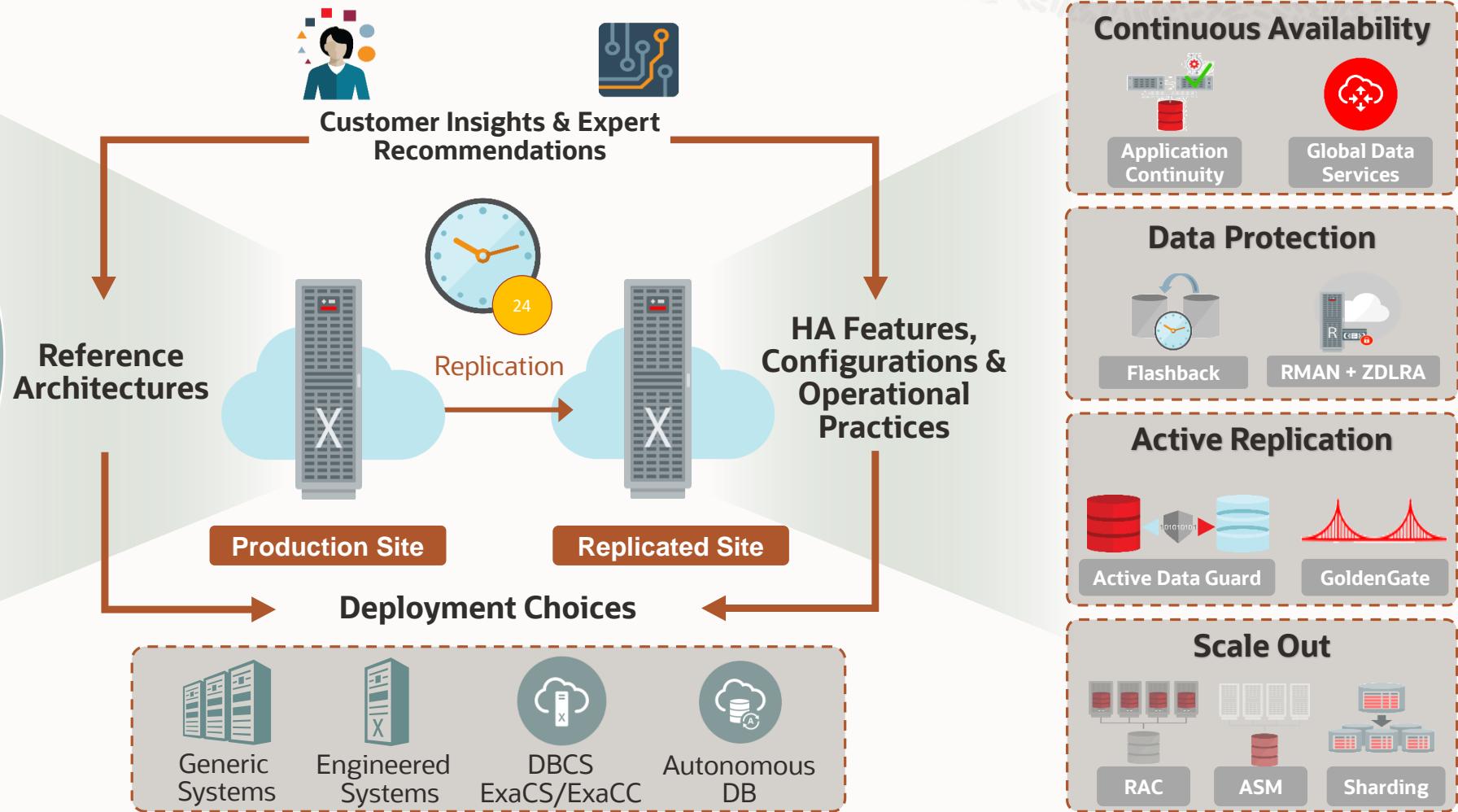
Gaming



# Max Availability Max Security Architectures

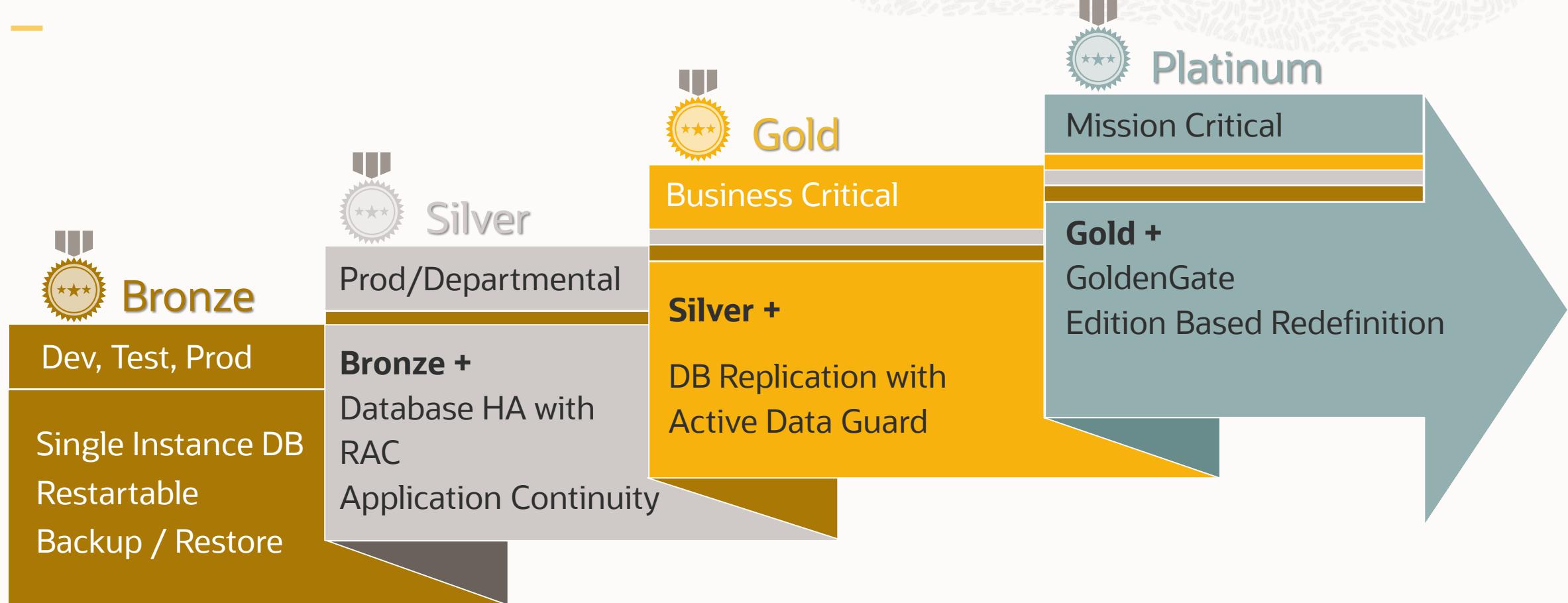


# Oracle Maximum Availability Architecture (MAA)



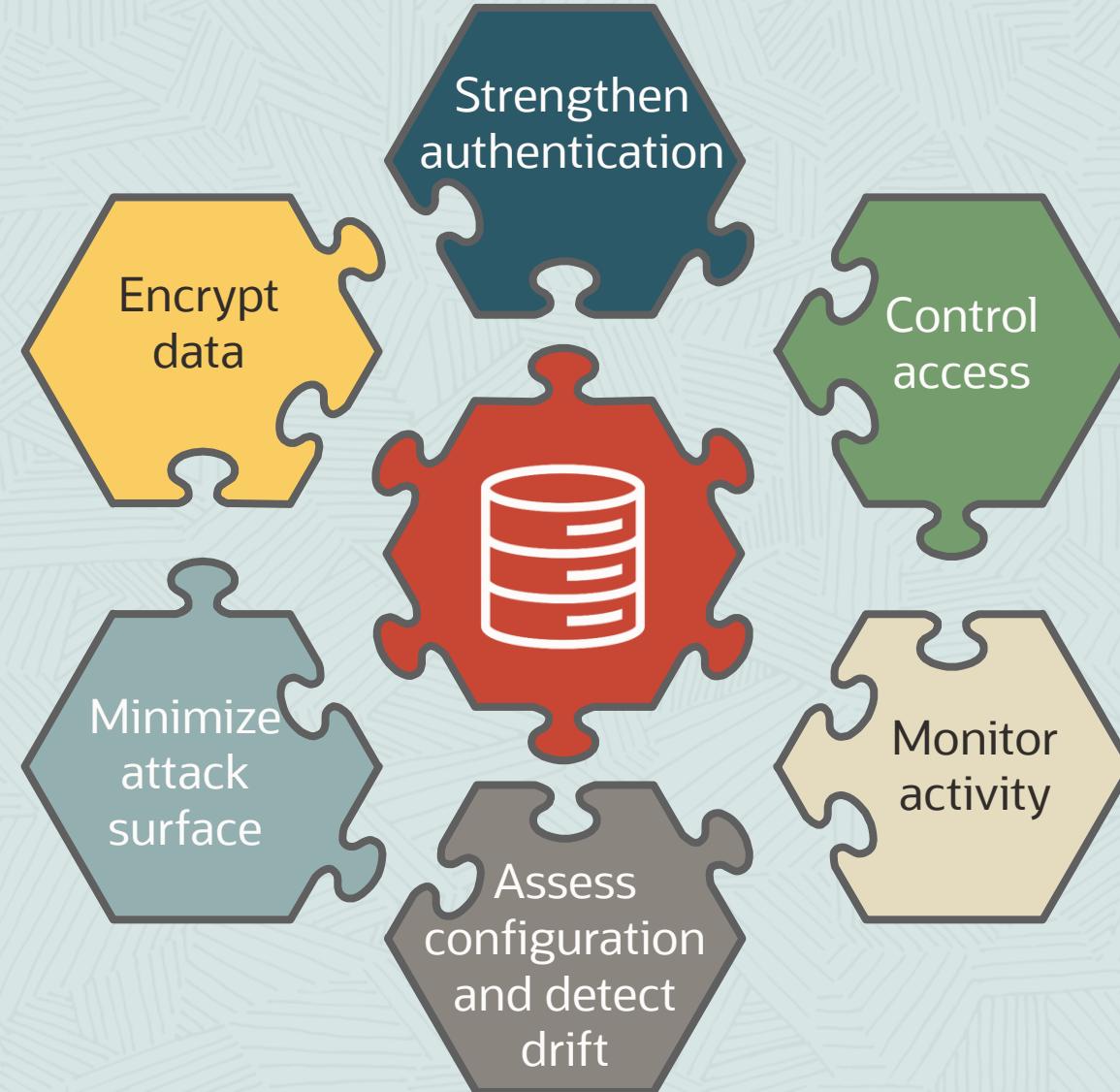
# MAA Reference Architectures for the Cloud

## Availability service levels

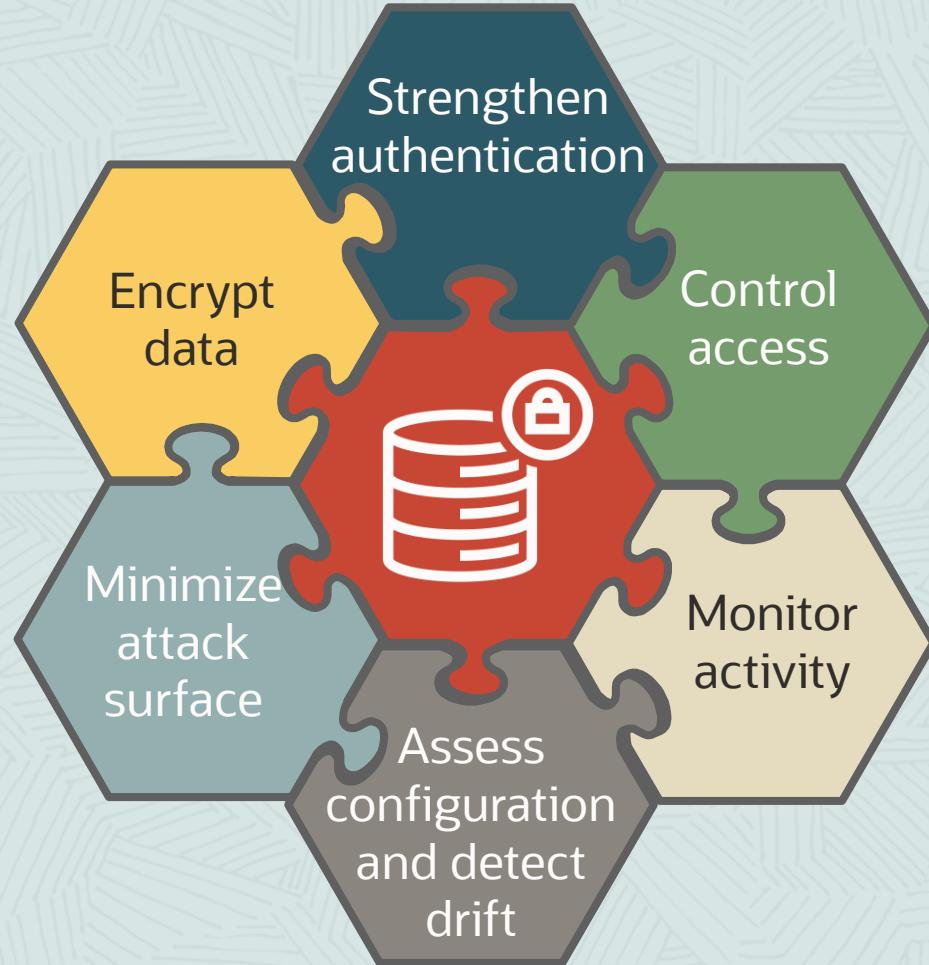


All tiers exist with on-premise and cloud. However, platinum currently must be configured manually while bronze to gold are covered with cloud tool automation

# Securing the Oracle Database



# Securing the Oracle Database



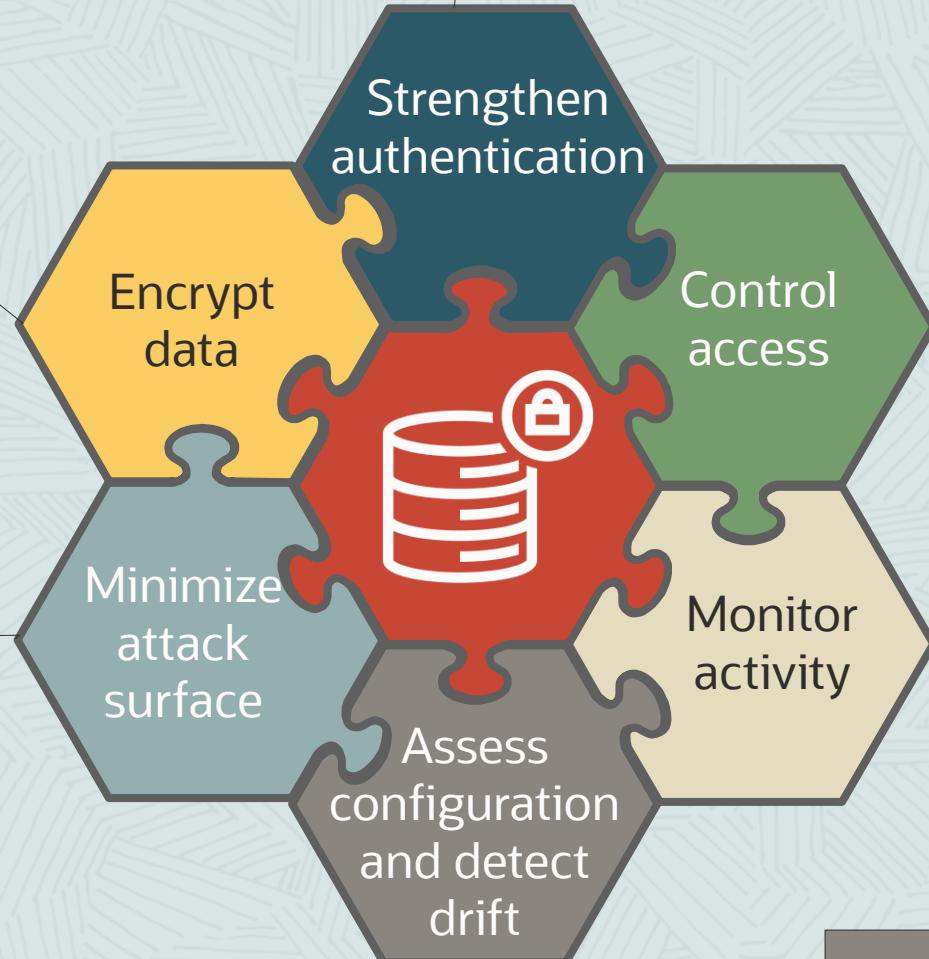
# Getting down to details

- Database Strong Authentication
- Database Centrally Managed Users
- Database IAM integration
- Database Password Profiles

- Database Roles and Privileges
- Database Centrally Managed Users
- Database Virtual Private Database
- Database Real Application Security
- Database Blockchain and immutable tables
- Database Vault
- Label Security
- Advanced Security Data Redaction

- Advanced Security Transparent Data Encryption
- Key Vault
- Database Native Network Encryption
- Database Transport Layer Security (TLS)

- Data Safe User Assessment
- Database Security Assessment Tool
- Database Privilege Analysis
- Data Safe Masking
- Data Masking and Subsetting



- Database Unified Auditing
- Audit Vault and Database Firewall
- Data Safe Auditing

- Database Security Assessment Tool
- Data Safe Security Assessment

## Legend

- Feature
- Option
- Product
- Service

## Key to Database Security Controls



Assess

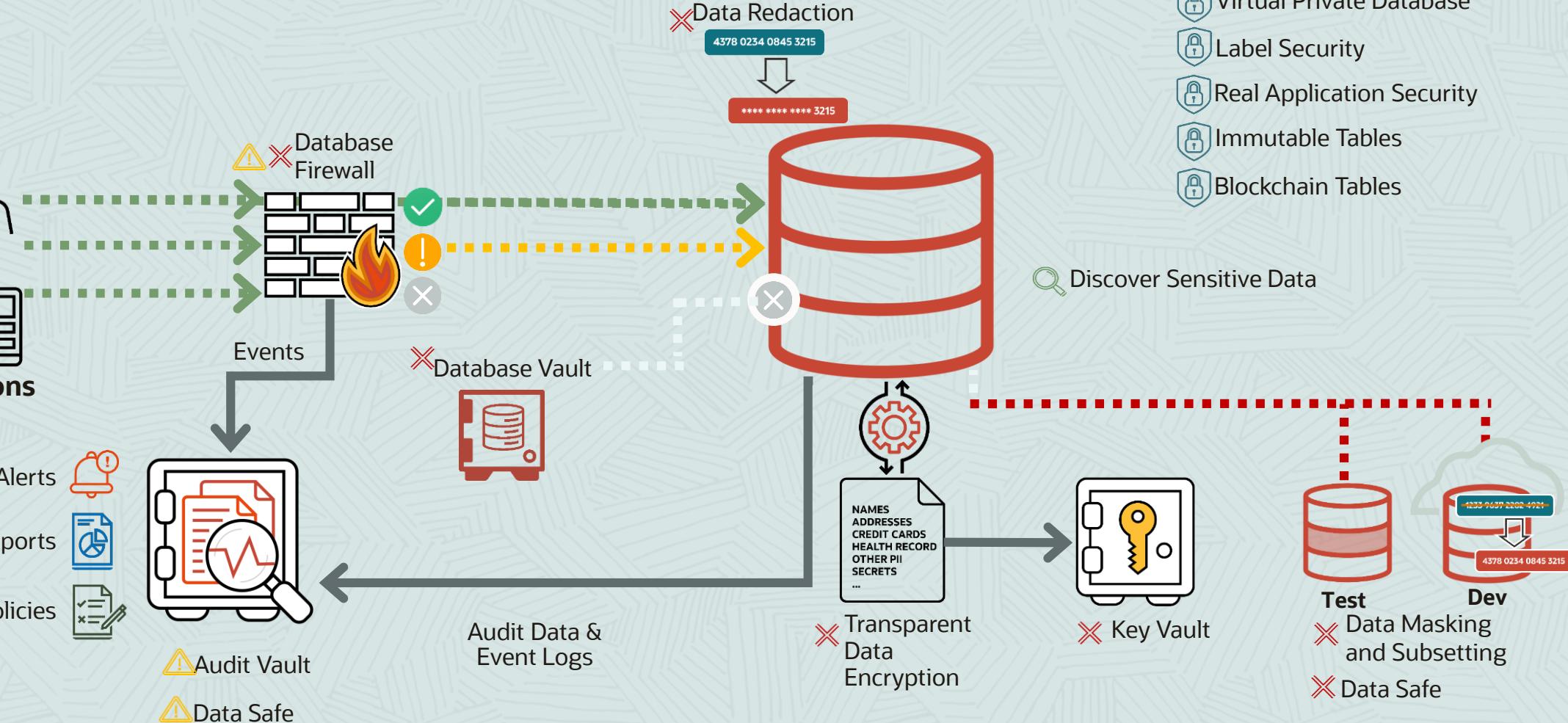
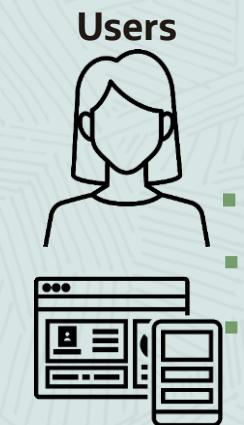


Prevent



Detect

# Maximum Security Architecture



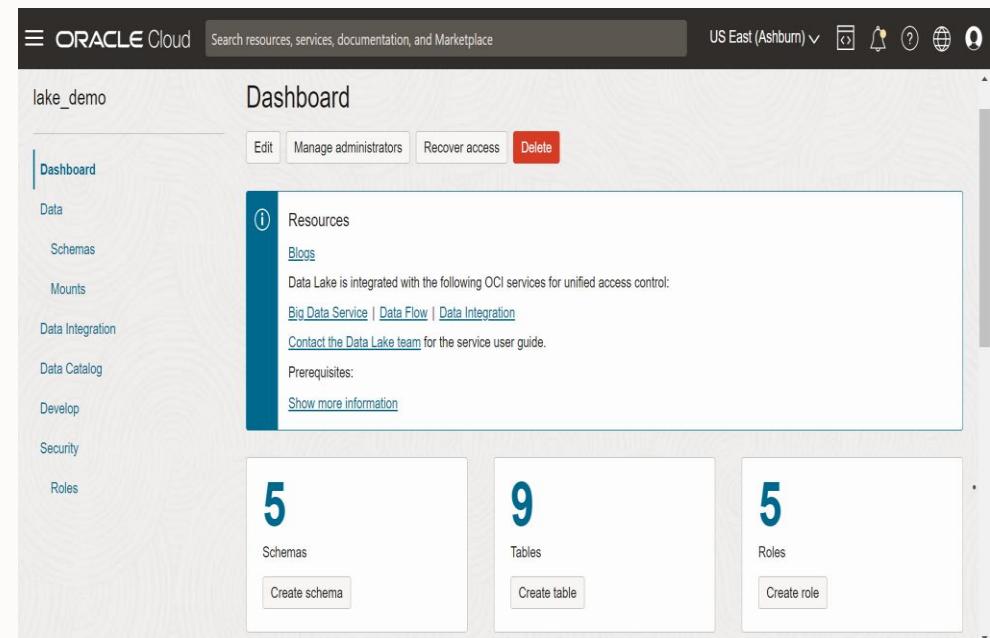
# OCI Data Lake



# Oracle Cloud Infrastructure (OCI) Data Lake

*OCI Data Lake is a fully managed service which provides centralized storage for structured and unstructured data with unified access control and centralized metadata*

- Seamlessly ingest data into the lake by leveraging integration with OCI Data Integration service
- Secure and govern data in the lake with fine grained access control all managed at one place in the lake
- Define access control policies in OCI Data Lake once and apply to all data access/processing tools
- Data compaction and garbage collection routines in managed tables helps optimize the data storage
- Easily discover entities stored in the Data Lake, understand the flow of data with OCI Data Catalog



# OCI Data Services

Drive Advanced Outcomes with All Data

## Data Sources



Database



Applications



Video



Log



IoT

## Data Integration



Oracle  
GoldenGate



OCI Data  
Integration  
Service



OCI Streaming  
Service  
(Apache Kafka)

## Big Data Services (Spark, Hadoop, OpenSearch)



## Data Warehouse



Autonomous Data  
Warehouse  
MySQL HeatWave

## AI / ML Services



## Data Lake (Storage Zone for All Data)



### Data Sharing

Share data securely across the Enterprise.



### Data Catalog

Unified security and governance.



### Lake Mounts and Tables

Data trust and performance.



### Object Storage

Scalable raw storage for all data.



Meaningful  
Business Insight



Accurate  
Forecasts and  
Predictions



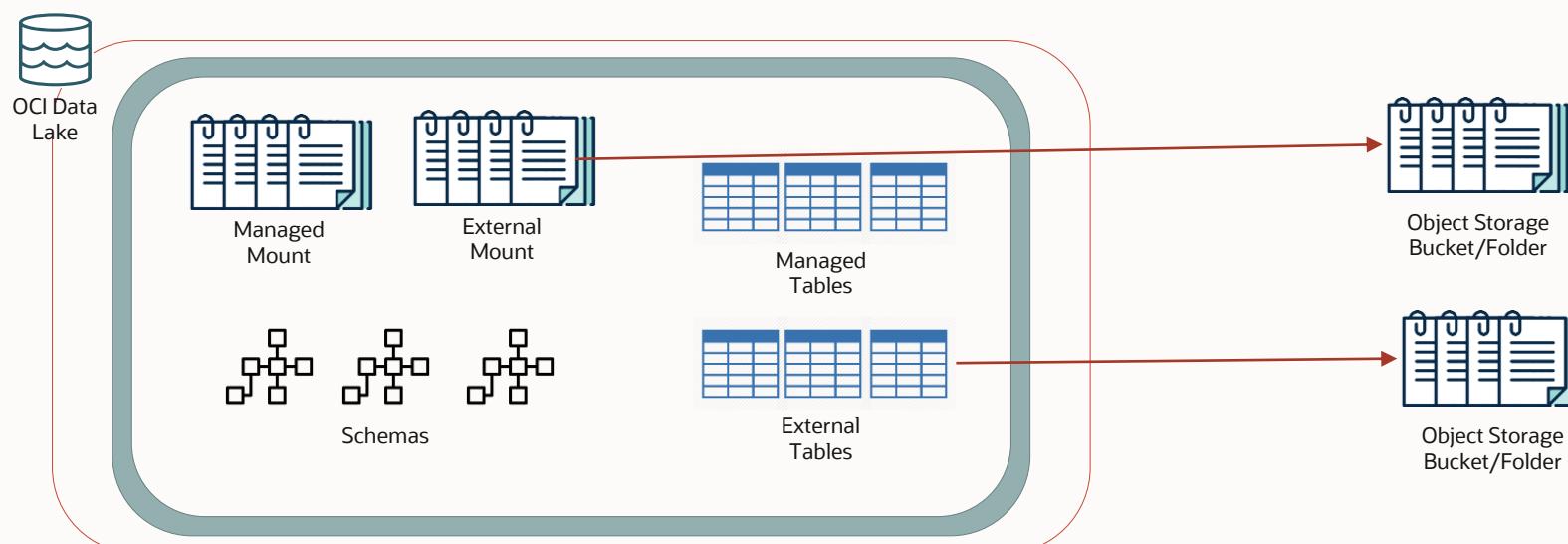
Improved Real-  
time Visibility



Anomaly  
Detection  
Analysis

# Storage in OCI Data Lake

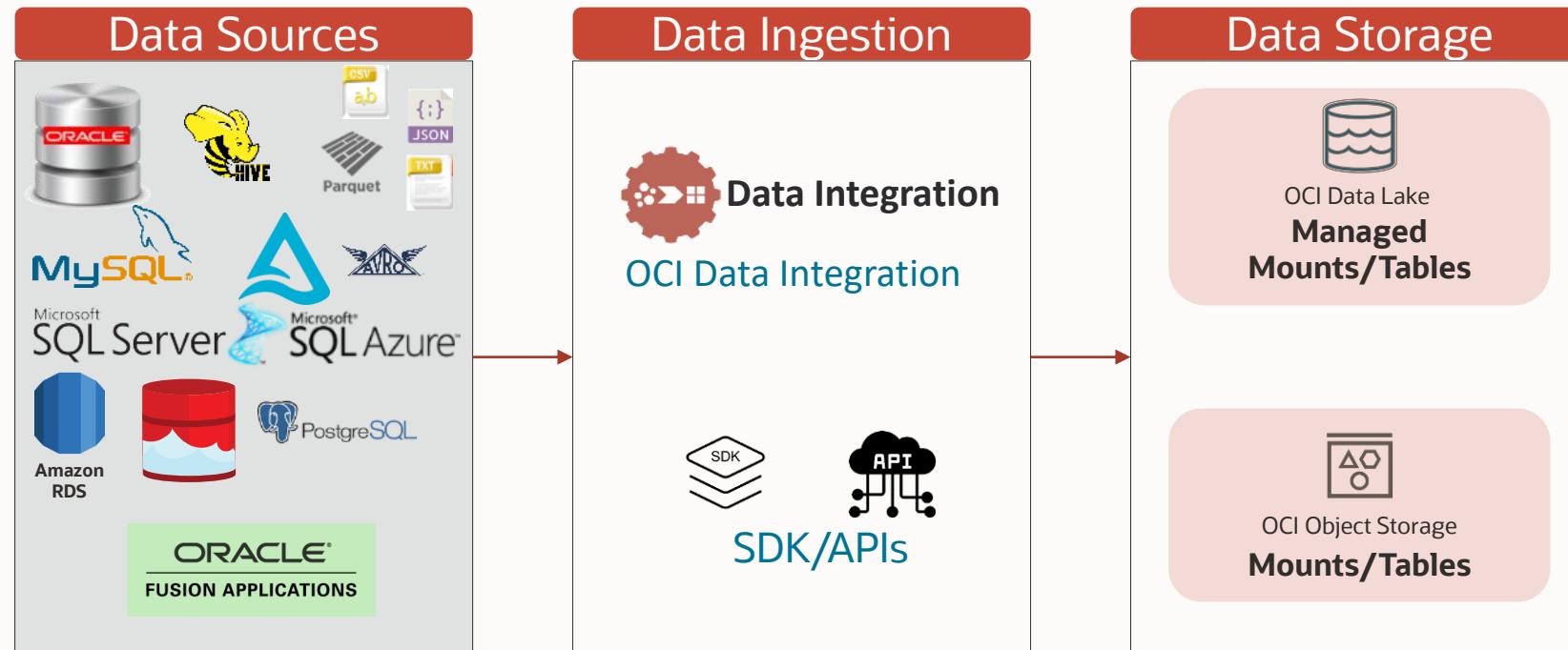
- Mount – File Storage
  - External Mount – Files are referenced to Object Storage Folder/Bucket
  - Managed Mount – Data stored within OCI Data Lake
  - Schema & Table – Logical Entity (Metadata stored in OCI Data Lake)
  - External Table – Table Data is referenced to Object Storage Folder/Bucket or Mount
  - Managed Table – Data Stored within OCI Data Lake and Access via OCI Data Lake



# Building Data Lake in OCI

## File Formats

- OCI Data Lake enable Data Engineers to store and work with data in a format of their choice
- OCI Data Lake supports CSV, JSON, Parquet, AVRO, ORC, DELTA and Text files
- DELTA file format provides ACID transactions, time travel support and is best suited for analytics workloads



# Multi Cloud DB Options



# Unify database management across hybrid and multicloud environments

Regardless of where the application binaries run and low latency connection available

## Unified Database Management

Run all database workloads



Customer-dedicated  
Exadata Cloud Infrastructure X9M



Autonomous  
Database



Exadata  
Database  
Service



Oracle Cloud Infrastructure

100 Gbps network

ORACLE

OCI-Azure Interconnect

AZURE

<2ms RTT latency between clouds

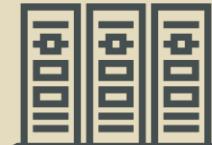
FastConnect / VPN



Customer  
Data Center

## Disaster recovery

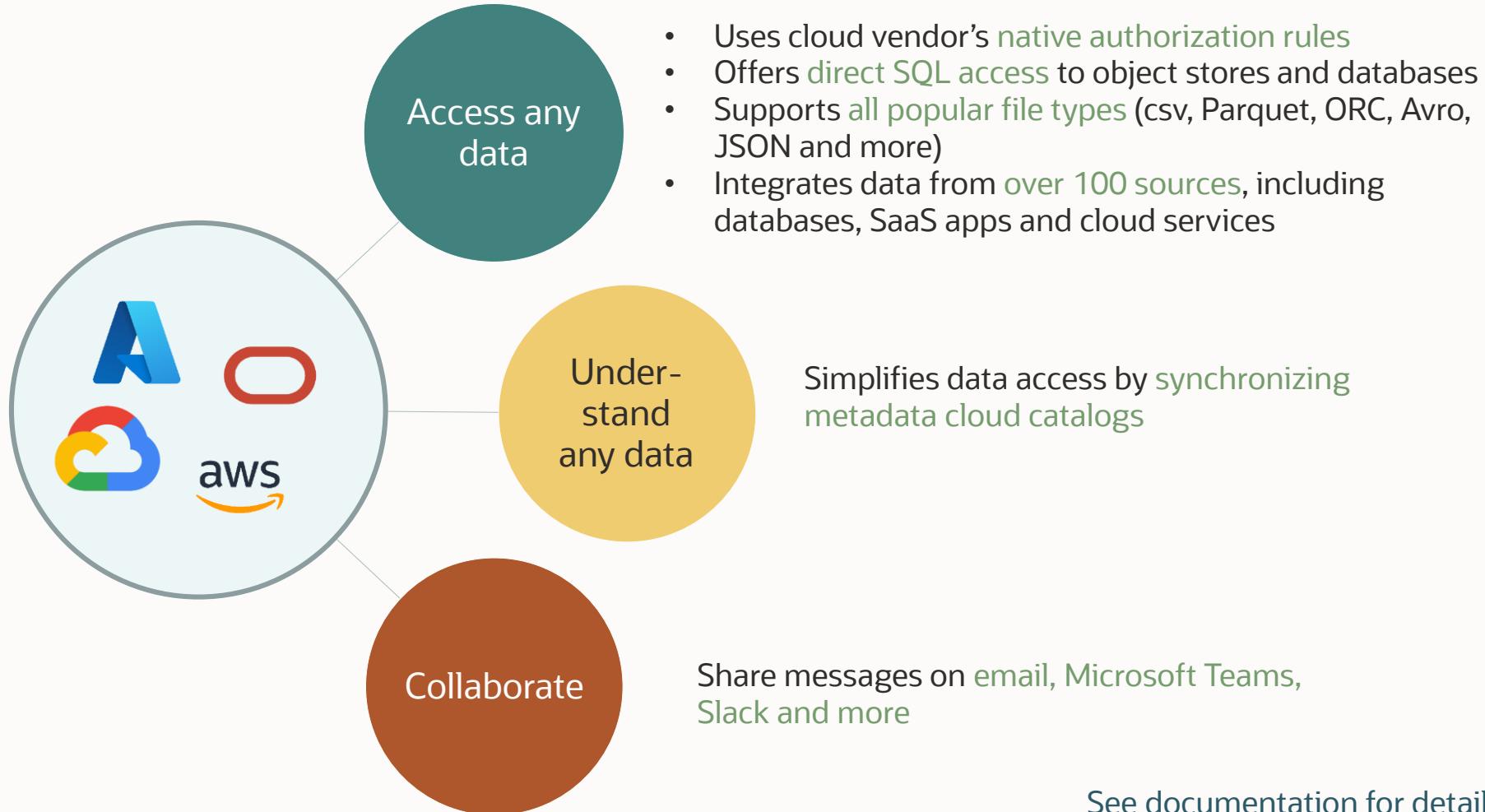
FastConnect / VPN



Customer Data Center

# Autonomous Database **simplifies** multi-cloud solutions

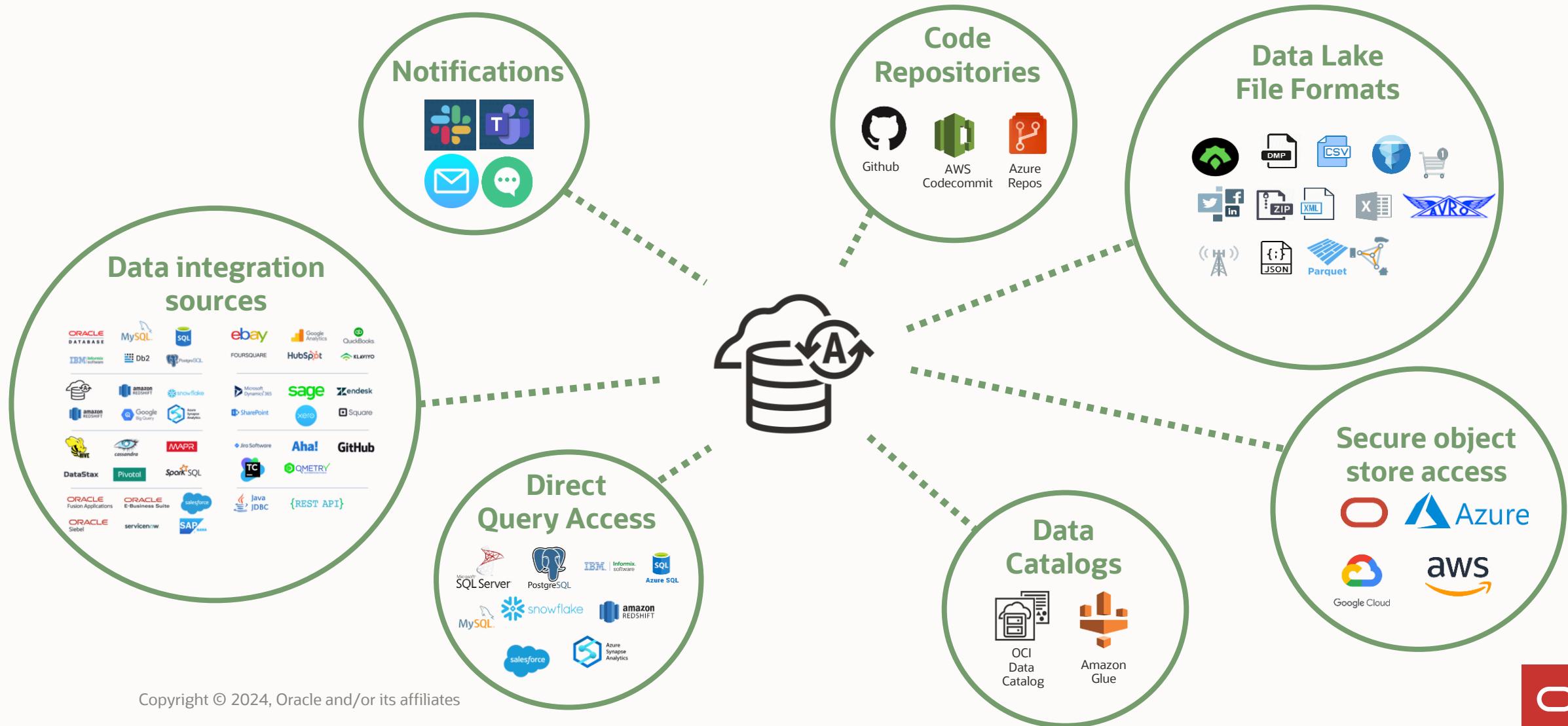
Deep integration with native cloud services abstracts differences



[See documentation for details on support](#)



# Summary of Autonomous Database multi-cloud integration

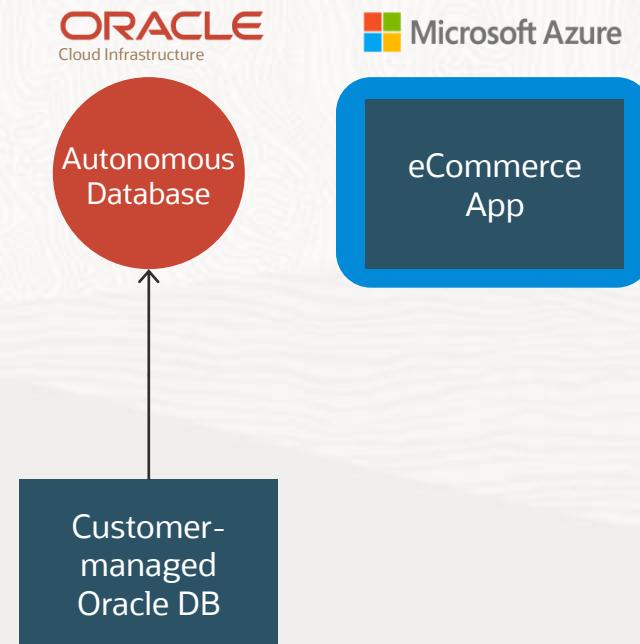


# ODSA creates more options for customers to harness cloud innovation

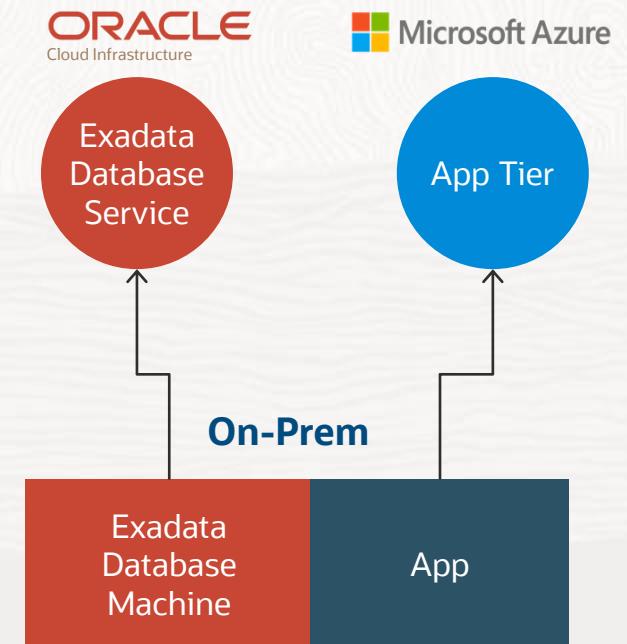
Build with the best of OCI and Azure services



Use fully managed Oracle Databases with Azure



Run exclusive OCI database services with Azure



# ODSA creates more options for customers to harness cloud innovation

Build with the best of OCI and Azure services

**ORACLE**  
Cloud Infrastructure



**Microsoft Azure**

- |                     |                  |
|---------------------|------------------|
| Any Azure Analytics | Any Azure App    |
| Power BI            | App Services     |
| Synapse             | Kubernetes       |
| HDInsights          | Virtual Machines |
| Event Clusters      | Functions        |
|                     | Containers       |

Use fully managed Oracle Databases with Azure

**ORACLE**  
Cloud Infrastructure



**Microsoft Azure**

Marketing analytics app

Customer-managed MySQL database for transactions + analytics database + ML tools + ETL processes between data stores

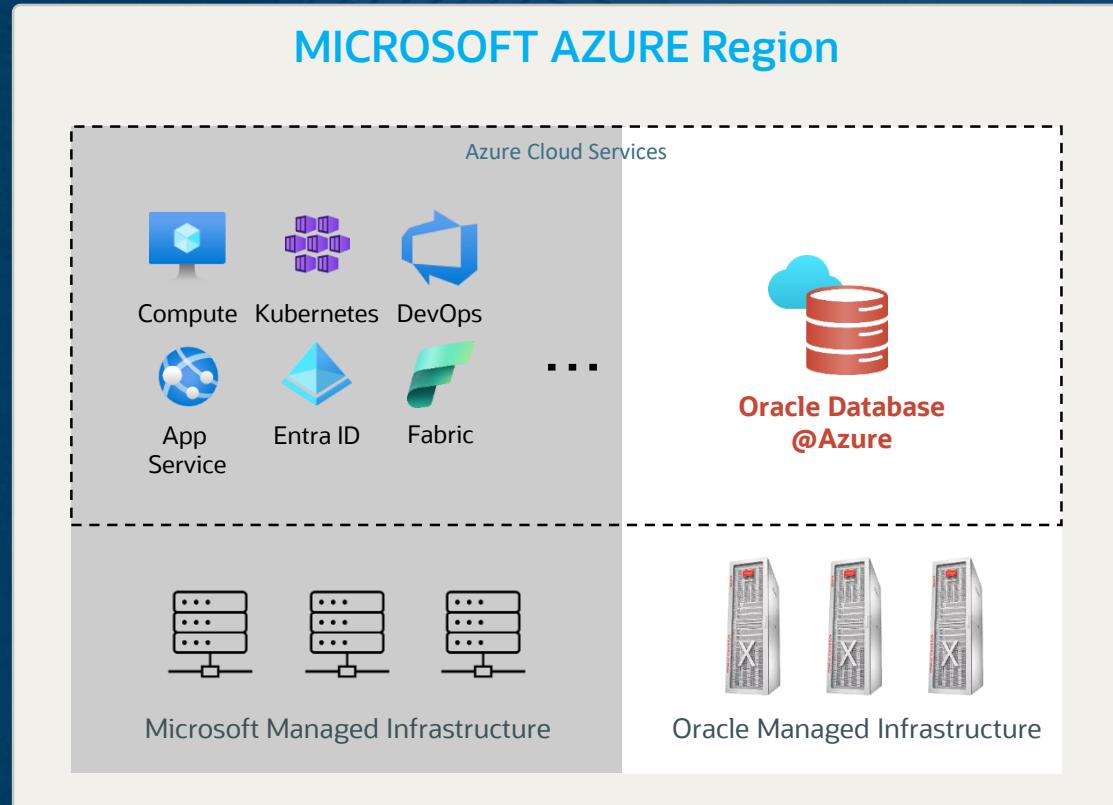
# Oracle Database@Azure

Available December 2024

- Oracle and Microsoft deliver Oracle database services on OCI in Microsoft Azure datacenters*

ORACLE

Microsoft



# Certification: OCI Data Management Foundations 2023

- Oracle University:
  - [Become an OCI Data Management Foundations Associate 2023](#)
- Real-Practical Labs and Exercises in LiveLabs
  - [Access LiveLabs](#)

# Any doubts?

# Pls let me know!



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**Cloud Architect, Oracle Latin America**



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