Összefoglaló

Jagusztin László

HOUG alelnök

Product Momentum

Flexible infrastructure

- Container Governance
- Functions on Arm
- Virtual Nodes Arm
- Container Instances on Arm
- Serverless Kubernetes
- Add-on lifecycle management
- Workload identity
- Pre-built functions

Databases

- Oracle Database 23c enhancements
- MySQL HeatWave ML enhancements
- MySQL Autopilot enhancements
- MySQL – JSON acceleration
- OCI Database with PostgreSQL
- OCI Cache with Redis
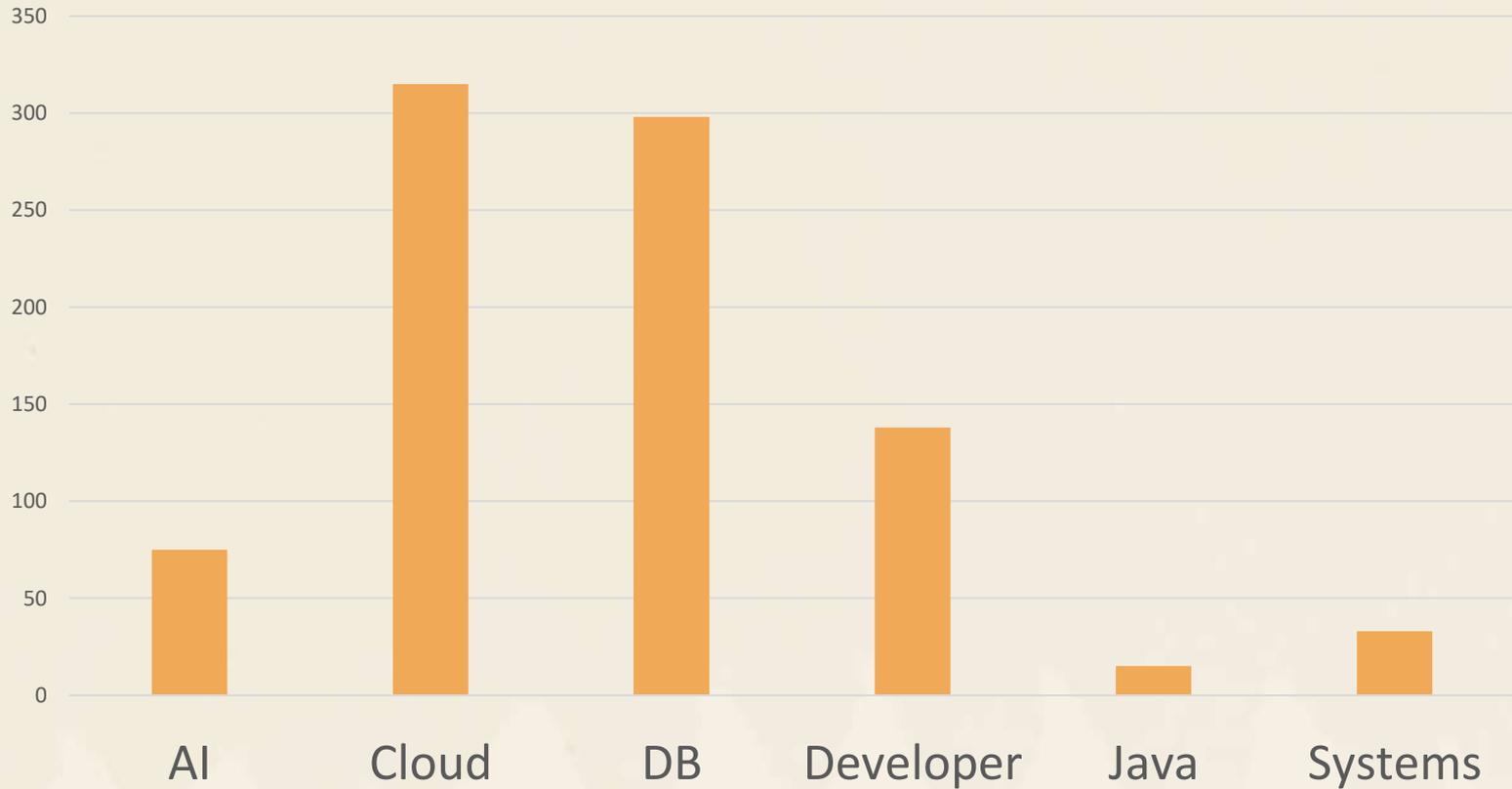- Neural Search with OpenSearch 2.8

Innovative Languages

- Java 21 LTS
- GraalOS
- GraalVM for JDK 21 LTS
- Graal Cloud Native 4.0
- Java Management Service 8.0
- OCI Functions powered by GraalOS

Built-in AI

- Generative AI service
- Oracle Digital Assistant with Generative AI capabilities
- Pre-built AI services enhancements

CloudWorld 2023 Sessions

Bar chart showing number of sessions by category: AI ≈ 75, Cloud ≈ 315, DB ≈ 298, Developer ≈ 138, Java ≈ 15, Systems ≈ 33.

Database topics

Announcing Oracle Database 23ᶜ – The next Long Term Support Release

SQL Domains

Schema Level Privileges
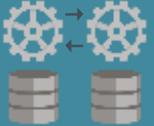
Oracle Database

23ᶜ

App Simple

Read-Only Per-PDB Standby

Property Graphs

Real-time SQL Plan Management
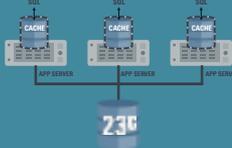
JSON Schema

Microservice Support

JSON / Relational Duality

AI Vector Search

True Cache

SQL Firewall

Priority Transactions

JS Stored Procedures

JS

Developer Role

Shrink Tablespace

Boolean Datatype

Globally Distributed Database

Rolling Patching

Oracle Database 23c

Sample of Marquee Features for DBAs, Analysts, & Developers

Now GA on OCI Base Database Service

NEW IN 23c

DBA
Real-time SQL Plan Management
SQL Firewall
True Cache

ANALYST
Automatic Materialized Views
Improved ML Algorithms

DEVELOPER
JSON Duality Views
Property Graph Views
JavaScript Stored Procedures
SQL Domains
AI Vector Search* (coming soon)

* Sign up to preview AI Vector Search

With Oracle Database 23c...

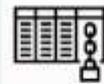One part of an app can treat the data as *relational*, while other parts treat the *same* data as a *document*, and others treat it as a *graph*

{JSON}

You get the *best* of all these worlds, at the *same time.*

Another huge benefit for app dev

JSON *Duality* Views

The use-case simplicity of JSON with the multi-use case *power* of relational

Data **stored as rows** in tables

Data can be **accessed as** **JSON docs using SQL, Rest or MongoDB APIs**

TABLE		
Col 1	Col 2	Col 3
...	...	...
...	...	...
...	...	...
...	...	...

```
{
  "name1" : "String Value1",
  "name2" :
    {

        "name3" : "14:00",

        "name4" :  1234
    }
}
```

Property Graph *Views*

A *powerful* way to
query connections
between data using
standard SQL

Property Graphs are effectively a 'view' on
top of relational data tables

All inserts, updates, and deletes to source tables are
automatically reflected

New GRAPH_TABLE function and MATCH
clause of the SQL:2023 standard

Enables writing simple SQL queries to follow connections in data

Suitable for a variety of application use
cases, including:

Money-laundering detection, next likely purchase models, workflow
dependencies, etc.

Oracle Database 23c can store vectors using a new vector data type


```
CREATE TABLE house_for_sale (house_id    number,
                             price       number,
                             city        varchar2(400),
                             house_photo blob,
                             house_vector vector
);
```

Oracle Vector Database: Easily Specialize AI Models & Build AI Apps

- Designing & Training Foundational AI Models: Complex and Expensive
  - Design Multi–Billion Parameter Artificial Neural Network: OpenAI, Cohere, xAI …
  - Ingest Trillions of Training Data Elements: Wikipedia + Everything on the Internet
  - Oracle Cloud: 16,000 Node H100 NVIDIA Supercluster with RDMA Interconnect

- Specializing AI Models: Pretrained Foundational Model + Supplementary Training Data
  - Oracle Vector Database: Stores Vectorized Supplementary Training Data
  - Specialized AI Model with EHR Data: Generate Doctors' Orders – Cerner New Millennium
  - Specialized AI Model with Diagnostic Image Data: Rapid Cancer Detection – Imagene

Most Customers will Train Specialized AI Models for Specific Applications

Oracle *Autonomous* Database

Fully-managed cloud service for the best customer experience & higher productivity

**Exadata
Database Service**

+

**Fully-Managed
Database & Ecosystem**

=

**Autonomous
Database Service**

Extreme Performance,
Availability, Scalability,
& Security

Best Practices
Automated Database Ops
Built-in low code tooling

Lowest TCO
Best Experience

Oracle SaaS *runs* on Autonomous Database

Improve customer experience and reduce costs

Fusion EPM, Warehouse Management, CX Unity and others use Autonomous Database *today*

Full Fusion suite to start new deployments on Autonomous Database in 2024

Netsuite's next generation (NXN) built natively on Autonomous Database, in GA *today*

Current Netsuite to be migrated to Autonomous Database starting early 2024

Fusion analytics and Netsuite analytics Warehouses GA on Autonomous Database *today*

Industry Apps (GBU) have 35 cloud services GA on Autonomous Database *today*

All strategic cloud services to run on Autonomous Database

Autonomous Data Warehouse *Innovations*

Multicloud Data Warehouse

Native integration across public clouds

No coding or extra services needed

Rethink the Data Lake

Database storage at the cost of object storage

Choice of data lake architectures

Open Data Sharing

Delta Sharing standard

Data sharing in any cloud

Data Studio

Comprehensive, built-in low-code analytics tool suite
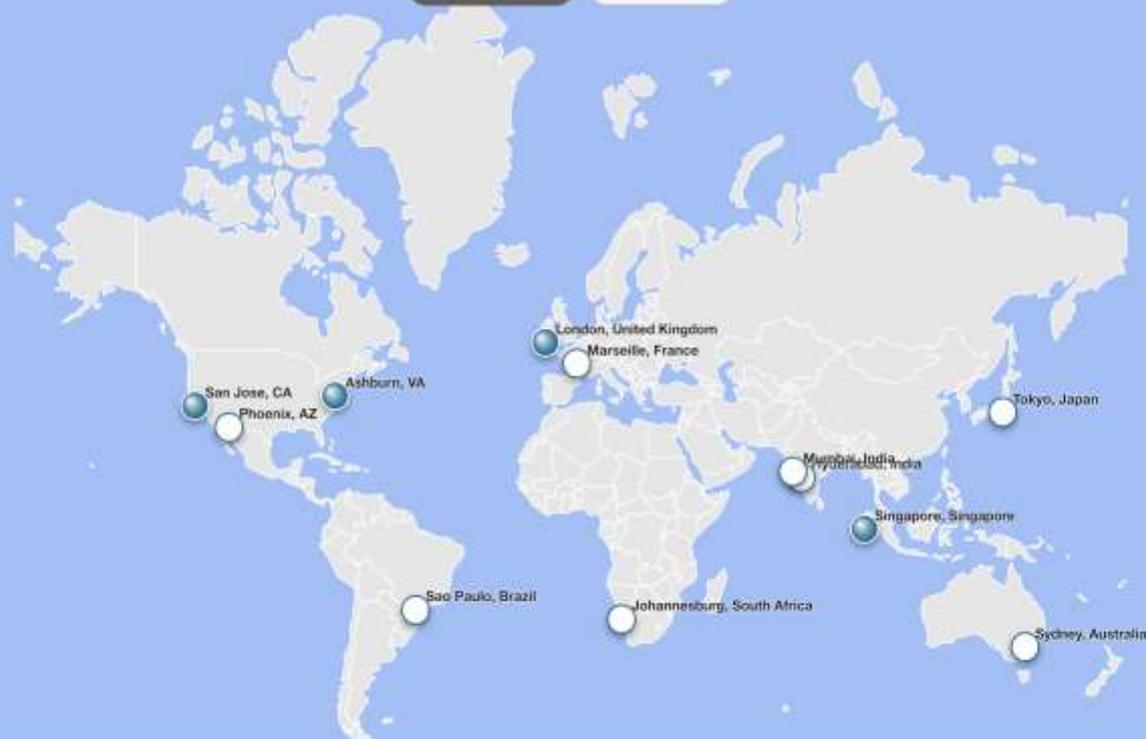
More productivity at no extra cost

Create Globally Distributed Autonomous Database

Help

⊘ Configure Globally Distributed Autonomous Database ——— ② **Configure Shards and Catalog** ——— ③ Review and create

Configure Shards   Clear selection

London, United Kingdom
Marseille, France
San Jose, CA
Ashburn, VA
Phoenix, AZ
Tokyo, Japan
Mumbai, India
Singapore, Singapore
Sao Paulo, Brazil
Johannesburg, South Africa
Sydney, Australia

Previous   Next   Cancel

Cloud topics
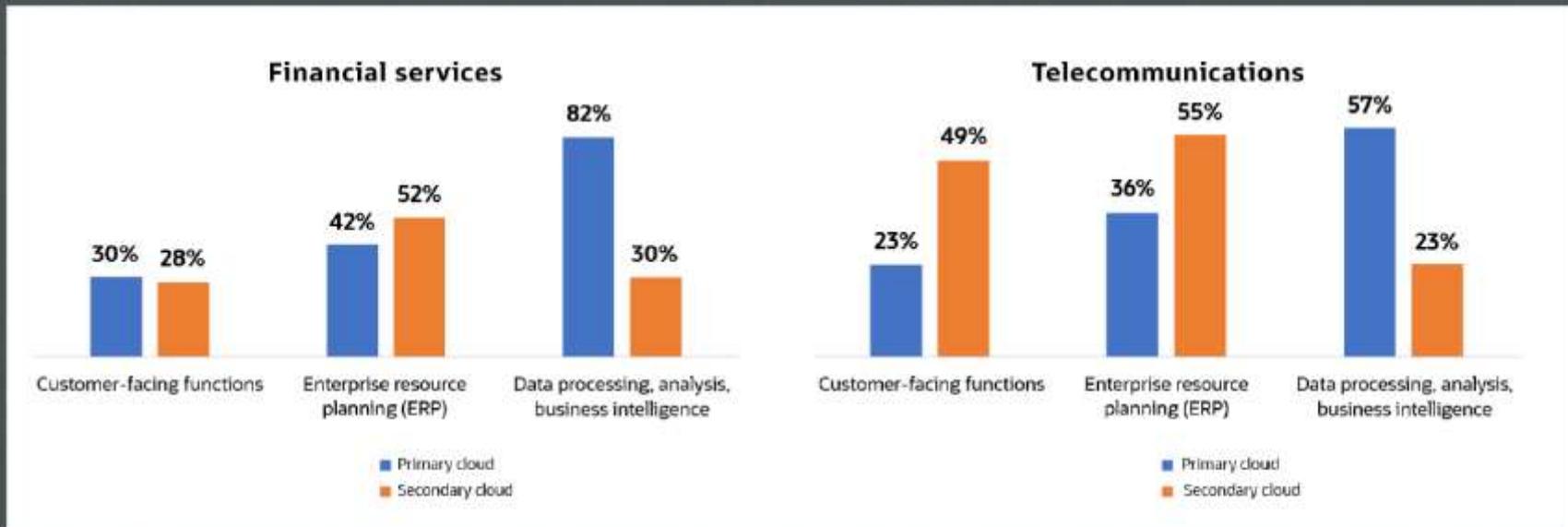
Top multicloud motivators and challenges

Motivators

- Data residency

- Cost optimization

- Business agility and innovation

- Best-of-breed cloud services and applications

- Cloud vendor lock-in concerns
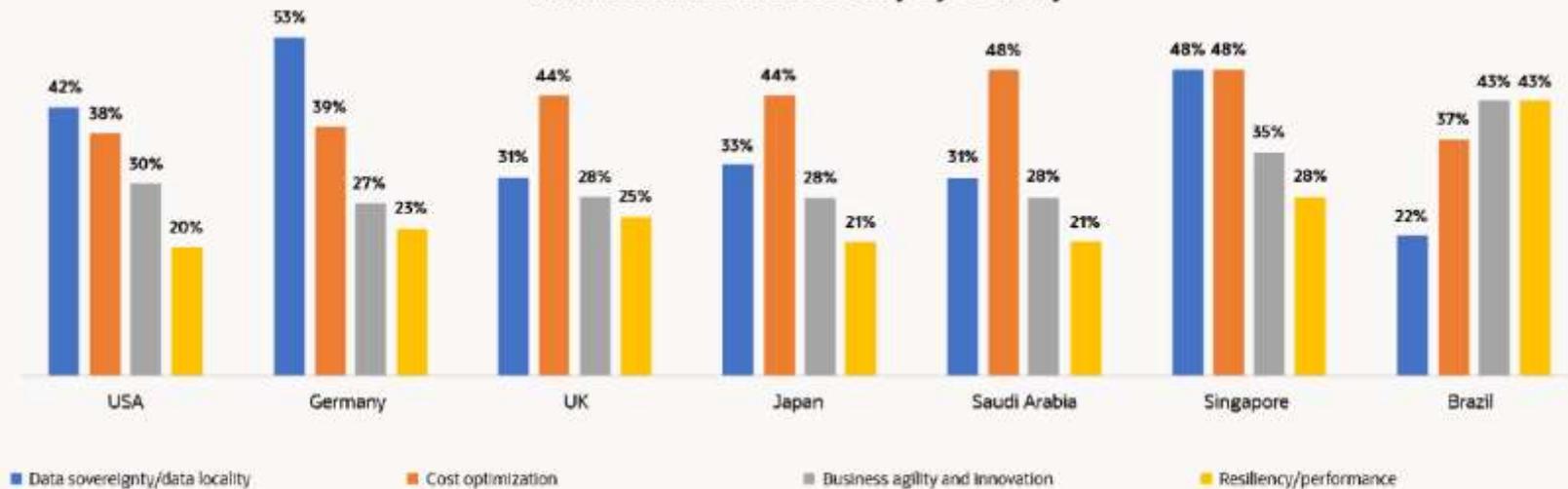
Challenges

- Cloud management – operational visibility and management across clouds

- Network interconnectivity

- Data management and governance

- Workload and data mobility

- Ensuring security across clouds

Secondary cloud isn't so "secondary" for industry-specific use cases

Financial services

- Customer-facing functions: Primary cloud 30%, Secondary cloud 28%
- Enterprise resource planning (ERP): Primary cloud 42%, Secondary cloud 52%
- Data processing, analysis, business intelligence: Primary cloud 82%, Secondary cloud 30%

■ Primary cloud
■ Secondary cloud

Telecommunications

- Customer-facing functions: Primary cloud 23%, Secondary cloud 49%
- Enterprise resource planning (ERP): Primary cloud 36%, Secondary cloud 55%
- Data processing, analysis, business intelligence: Primary cloud 57%, Secondary cloud 23%

■ Primary cloud
■ Secondary cloud

S&P Global Market Intelligence

No two countries are the same

Multicloud motivators vary by country

- ■ Data sovereignty/data locality
- ■ Cost optimization
- ■ Business agility and innovation
- ■ Resiliency/performance

USA: 42%, 38%, 30%, 20%
Germany: 53%, 39%, 27%, 23%
UK: 31%, 44%, 28%, 25%
Japan: 33%, 44%, 28%, 21%
Saudi Arabia: 31%, 48%, 28%, 21%
Singapore: 48%, 48%, 35%, 28%
Brazil: 22%, 37%, 43%, 43%

New Multicloud - Oracle Database@Azure

OCI Azure Interconnect

Integrated network

2ms latency

No egress fees

Oracle Database Services for Azure

Adds:

Integrated identity

Service metrics, events, logging shipped to Azure

Oracle Database@Azure

Adds:

Exadata systems in Azure regions

10x lower latency

Purchase and bill using Azure Consumption Commitment

Available Oracle Support Rewards

Previous

Now

ORACLE CLOUD
Infrastructure

Microsoft Azure

Microsoft Azure

Ashburn Region

US East Region

US East Region

VCN

Autonomous
DB / Exadata

FastConnect

ExpressRoute

vNet

Microsoft
Applications

Azure
Services

vNet

Oracle Database
@Azure

ORACLE CLOUD
Infrastructure

Microsoft
Applications
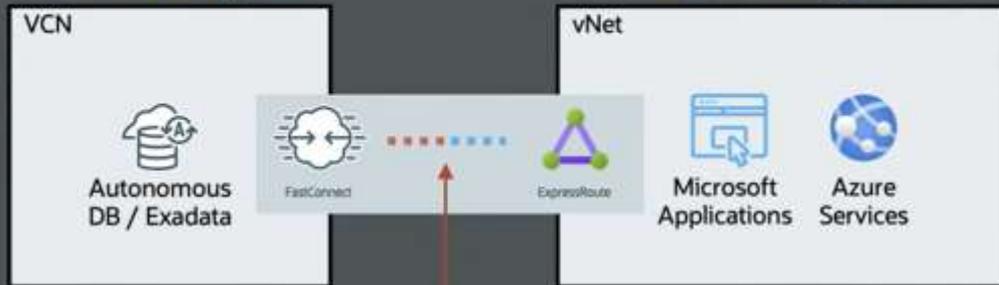
Azure
Services

Oracle Interconnect for Azure
2 millisecond latency
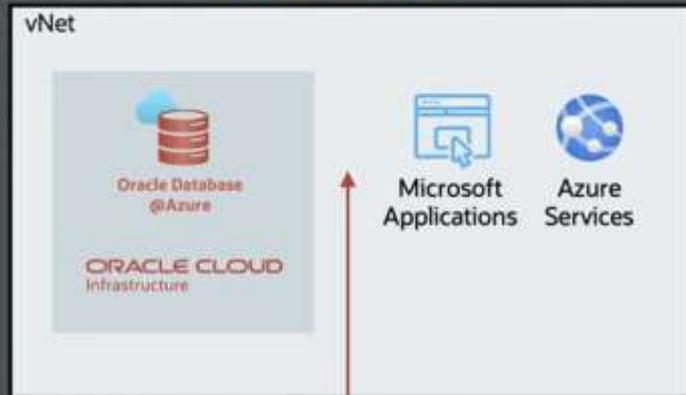
Azure vNet
microsecond latency

Alloy

A complete cloud infrastructure platform that enables partners to become cloud service providers.

Launched October 2022

≡≡ TIM   **NRI**

Unified Cloud

Applications

Enterprise | Industry

Infrastructure

Multicloud

Alloy

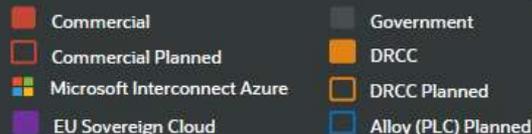# 64 Customer-Facing Regions Live

44 Public & Government regions live and **5** planned

3 Alloy Planned

9 Dedicated Regions (DRCC) live and **11** planned

+ EU Sovereign and National Security Regions (Gov)

Legend:
- Commercial
- Commercial Planned
- Microsoft Interconnect Azure
- EU Sovereign Cloud
- Government
- DRCC
- DRCC Planned
- Alloy (PLC) Planned

Map labels: Montreal, Toronto, Chicago, Salt Lake City, Ft. Worth, Ashburn, North Bergen, New London, Colombia, Queretaro, San Jose, Monterrey, Phoenix, Santiago, Chile 2, Sao Paulo, Vinhedo, Sweden, Amsterdam, Frankfurt, Ratingen, London, Dublin, Newport, Madrid, Zurich, Paris, Marseille, Italy, Serbia, Jerusalem, Neom, Dubai, Qatar, Mumbai, Hyderabad, Bangladesh, Chuncheon, Riyadh, Oman, Abu Dhabi, Jeddah, Johannesburg, Singapore, Seoul, Tokyo, Osaka, Melbourne, Sydney, Canberra

More Sovereign locations

All 100+ OCI services
Same great prices

**Oracle EU
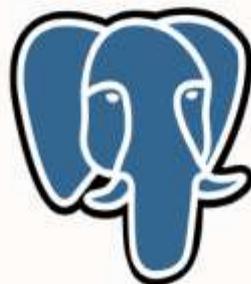Sovereign Cloud**

**OCI for U.S.
Top Secret Missions**

**Oracle Australia
Government Cloud**

OCI Database with PostgreSQL

- ### Higher performance
  Higher performance with database optimized storage

- ### Lower cost
  Only pay for utilized storage

- ### Fully managed
  99.99% SLA, zero RPO and minimal RTO

- ### Secure and scalable
  End-to-end encryption and regular security updates

Bringing managed PostgreSQL to OCI

Fully managed and optimized for our customers

PostgreSQL: The world's most advanced open source database.

+
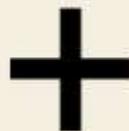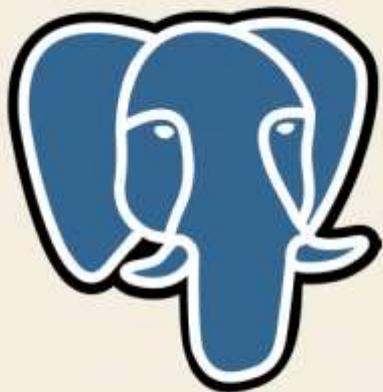
Optimized block storage: Elastic cloud storage that maximizes database availability.

Optimized Storage Features:

- Auto-scales with usage.

- Guaranteed performance

- Distributed across multiple Availability Domains for 0 RPO and fast recovery.

- Storge that grows and shrinks with use. Pay only for what you use.

- Available in single- or multi-node configurations.

OCI Cache with Redis

- **Flexible memory shapes**
  Select the one that best meets the needs of your application

- **Minimal downtime on scaling**
  Adjust your cluster dynamically

- **Automated high availability**
  Cluster nodes are automatically distributed across ADs and FDs

- **Competitive pricing**
  Only pay for the amount of memory you use

Competitive Table

Features	OCI Redis	AWS Elasticache
Fully Managed	Yes	Yes
Flexible Memory Shapes	Yes	No
Automatic Failover	Yes	Yes
Manual Failover	No	Yes
Read Replicas	Yes	Yes
Sharding	No	Yes
Metrics	Yes	Yes
Notifications and Alarms	Yes	Yes
Backups-Manual and Automatic	No	Yes
Version Support	Yes, Redis 7.0.5 only	Yes, multiple Redis versions 2.6.x -7x
Version Upgrade	No	Yes
Maintenance window schedule	No	Yes
Cross Region Replication	No	Yes
Autoscaling	No	Yes
Compliance programs	Yes	Yes
Lua Scripting Support	No	Yes

OCI Search with OpenSearch 2.8

- **Powerful insights**
  Neural search enables integration of ML language models

- **Automated high availability**
  OCI automatically utilizes multiple Availability or Fault Domains

- **Fully managed**
  Automated cluster creation, backups and security updates

- **Best price-performance**
  Choose CPU, memory and storage you need with flex shapes

Oracle Cloud: NVIDIA Superclusters — World's Largest Computer

- Supercluster: NVIDIA H100 GPUs + Oracle Cloud RDMA Network

- Supercluster Scale: 512 GPU Cluster to 16,000 GPU Cluster

- Node Bandwidth: Each GPU has a 200Gb/s RDMA connection

- Node Latency: Few Microseconds between Nodes

- Supercluster Bandwidth: 102,400 Gb/s to 3,200,000 Gb/s

RDMA Network Moves AI Training Data to GPUs Many Times Faster

Generative AI at Oracle
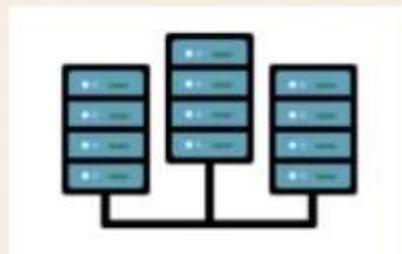
OCI DataScience service

- Notebook based environments to start prototyping
- MLOps features for productization
- GPU accelerated backends

Generative AI service *(coming soon)*

- State of the art LLMs
- Fine-tuning on demand

Bare Metal / VM shapes available on OCI

- A10 instances (4x A10 24GB)
- V100 instances
- A100 instances (8x A100 40GB or 8x A100 80GB)
- Ideal cost for established projects
- Full control on technical solution

SQL Generation from Natural Language *using LLM*

"Give me the average salary of employees in each department"

Oracle Database

1

Set Context
Identify source tables and metadata

2

Build Prompt
Prompt = instructions + context + user question

3

Send Prompt to LLM to Generate SQL

4

Return SQL

LLM
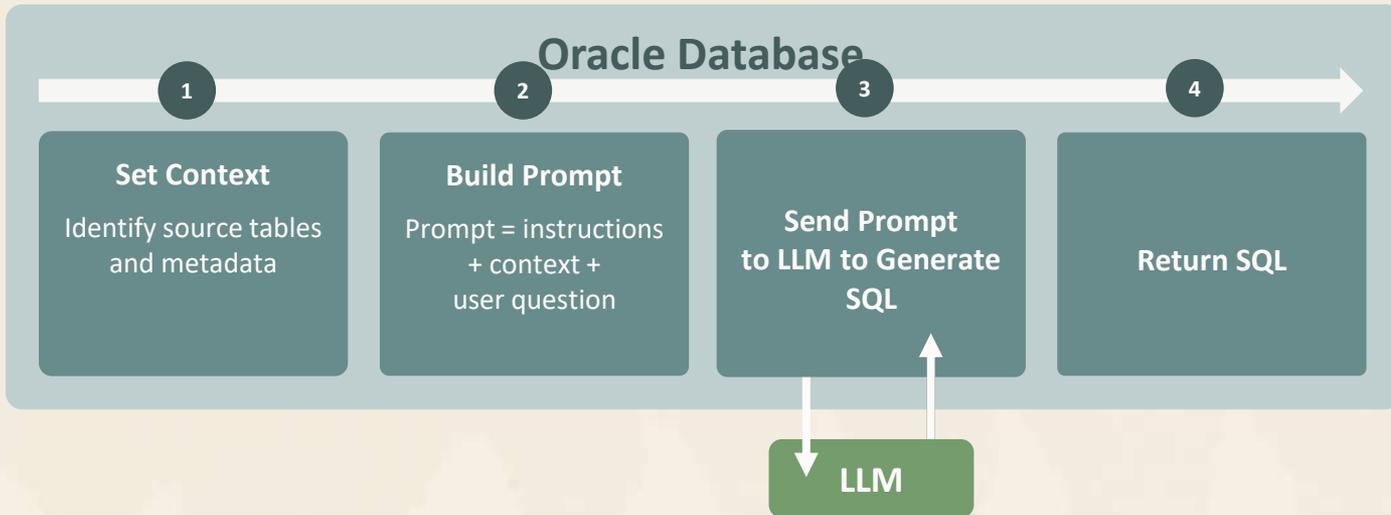
Example of a *Prompt*

Instructions: You are an Oracle SQL expert. Given an input question, first create a syntactically correct Oracle SQL query to run. You must query only the columns that are needed to answer the question.
Pay attention to use only the column names you can see in the tables below. Be careful to not query for columns that do not exist. Also, pay attention to which column is in which table.

Use the following format:
Question: Question here
SQL: Generated SQL query

Context: Only use the following tables and columns

Table: HR.DEPARTMENTS, **Columns**: DEPARTMENT_ID, DEPARTMENT_NAME, MANAGER_ID, LOCATION_ID
Table: HR.EMPLOYEES, **Columns**: EMPLOYEE_ID, FIRST_NAME, LAST_NAME, SALARY, MANAGER_ID, DEPARTMENT_ID
Primary keys: HR.DEPARTMENTS.DEPARTMENT_ID, HR.EMPLOYEES.EMPLOYEE_ID
Foreign keys: HR.EMPLOYEES.DEPARTMENT_ID -> HR.DEPARTMENTS.DEPARTMENT_ID,
HR.DEPARTMENTS.MANAGER_ID -> HR.EMPLOYEES.EMPLOYEE_ID

Question: Give me the average salary of employees in each department
SQL:

cohere.com

APPTIO
an IBM Company

Cloudability

Apptio BI
Home
Insights
Plan
    Current Month
    Forecast
    Budgets
    Workload Planning BETA
    Plans BETA
Organize
Settings

Current Month | Forecast | Budgets

Month
September

Cost Basis
Cash

Apply Budget

Subscribe | Export

September Estimate

Estimated Spend
$1,328

$495 ↑ 60%

more than last month

($832 total)

Delta Spend ⇄

Month-to-Date

Spending Drivers

Signed in as:
Arun R
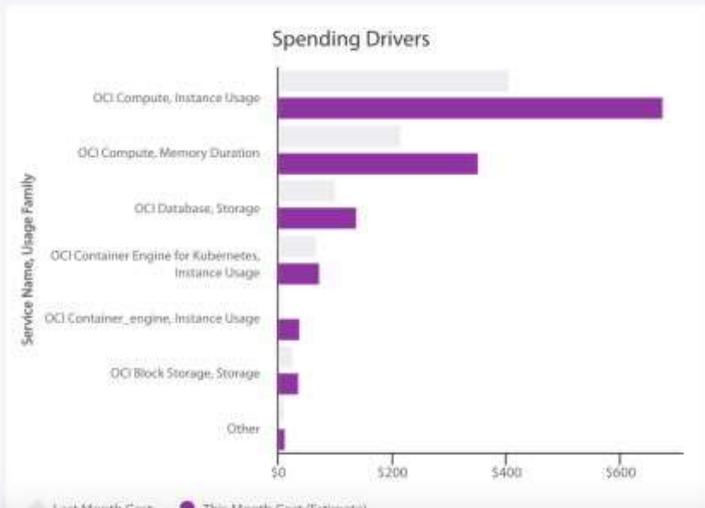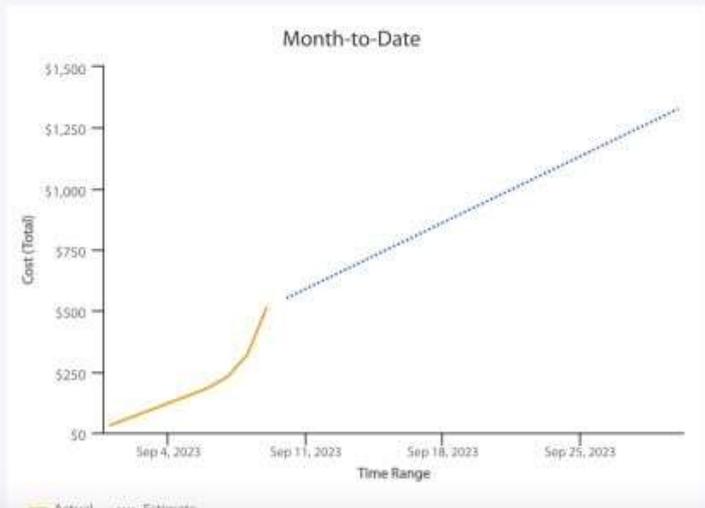
Oracle and Amdocs collaborate to help customers drive growth

ORACLE
CloudWorld

ANNOUNCEMENT

Red Hat and Oracle Expand
Collaboration to Bring
Red Hat OpenShift to OCI

Oracle's open source leadership and contributions

Projects led by Oracle

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https://opensource.oracle.com/

Java 21

openjdk.org/projects/jdk/21

Amber

Continuously improve developer productivity through evolutions of the Java language.

Loom

Massively scale lightweight threads, making concurrency simple again.

Panama

High performance with easier creation of I/O intensive apps through Java-native platform changes.

Valhalla

Higher memory density, better performance of ML and big data apps through the introduction of value types.
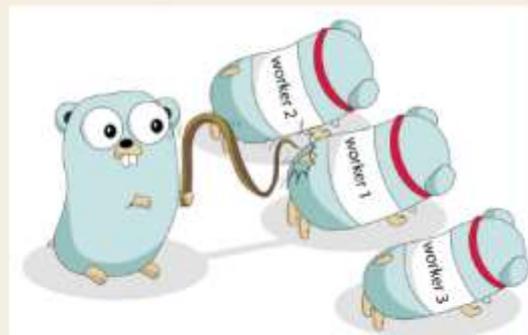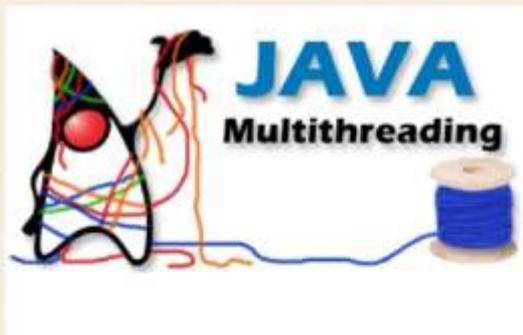
ZGC

Create a scalable low latency garbage collector capable of handling large heaps.

Performance updates

Thousands of performance, stability and other updates

Concurrency Overhead Comparison

	Platform (OS) Threads	Golang Goroutines	Virtual Threads
Memory overhead	Hundreds of kilobytes to megabytes	A few kilobytes	A few hundred bytes
Concurrent upper bound	Thousands	Hundreds of thousands	Millions

Helidon Níma

- The first microservices framework based on virtual threads

- Scalability of reactive models with the simplicity of imperative code

- Built from the ground up in tight collaboration with the Java team

- Contains Níma Web Server plus additional libraries (observability, testing, etc.)

- Performance comparable to Netty

- Core of Helidon 4.0 release (CY2023)

- Available in Maven Central
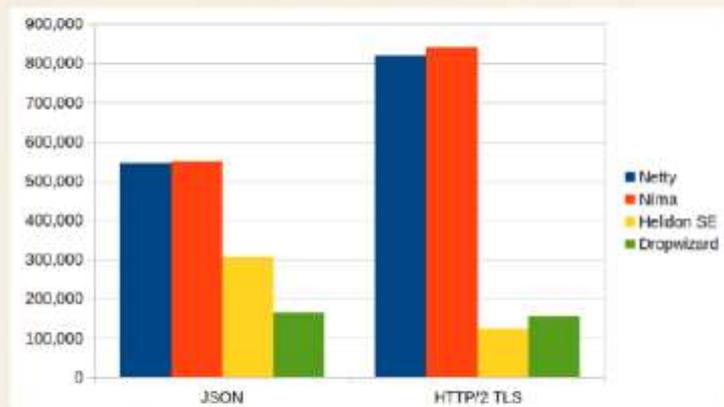
https://helidon.io/nima

Oracle GraalVM – Standardized Platform runtime

- ✓ Fast startup for containerized serverless functions

- ✓ Fast container initialization

- ✓ Simple adoption for existing Java workloads

- ✓ Small & lightweight
  - ✓ Lower memory usage
  - ✓ Lower CPU usage

- ✓ Multilanguage support

- ✓ Open source
  - ✓ Free including commercial and production use!
  - ✓ GraalVM Free Terms and Conditions (GFTC) license
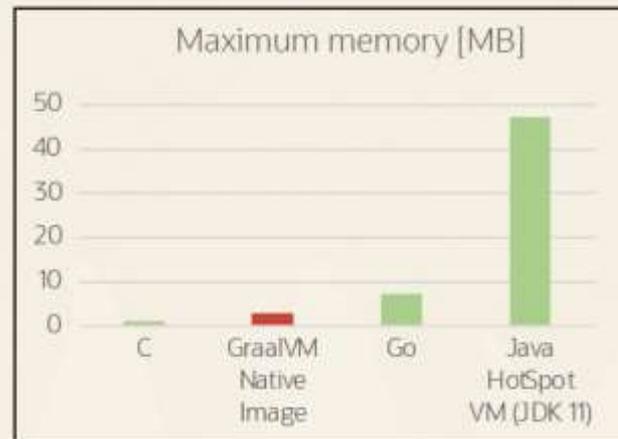
Execution Time [ms]

Maximum memory [MB]

GraalOS

Benefits of GraalOS technology

Rapid scale - up, out, and down

Run on demand, remove idle cost

Hardware enforced application isolation

Stateful microservices, stateless functions

OCI
Functions

powered by GraalOS

Save costs
50% lesser memory

Ultra fast startup time
<100ms latency

Improved productivity
Less code, less complexity,
OCI service integrations

Plethora of Choices in Deploying Containers

Low

Agility & Operational Efficiency

High

OKE with Self-Managed Nodes

Customer sets up and manages data planes, Oracle manages control planes

Announcing

RDMA Cluster Networking with K8s

Plethora of Choices in Deploying Containers

Low

Agility & Operational Efficiency

High

Serverless OKE

Oracle sets up and manages both control planes and data planes using virtual nodes

Announcing

ARM support

Plethora of Choices in Deploying Containers

Low

Agility & Operational Efficiency

High

Announcing

OKE with Container Governance

Leverage Cloud Guard to enforce security and compliance of your K8s environments

Plethora of Choices in Deploying Containers

Low

Agility & Operational Efficiency

High

Announcing

OKE with Managed Namespaces and Profiles

No "clusters". Fully managed K8s environment end to end

Plethora of Choices in Deploying Containers
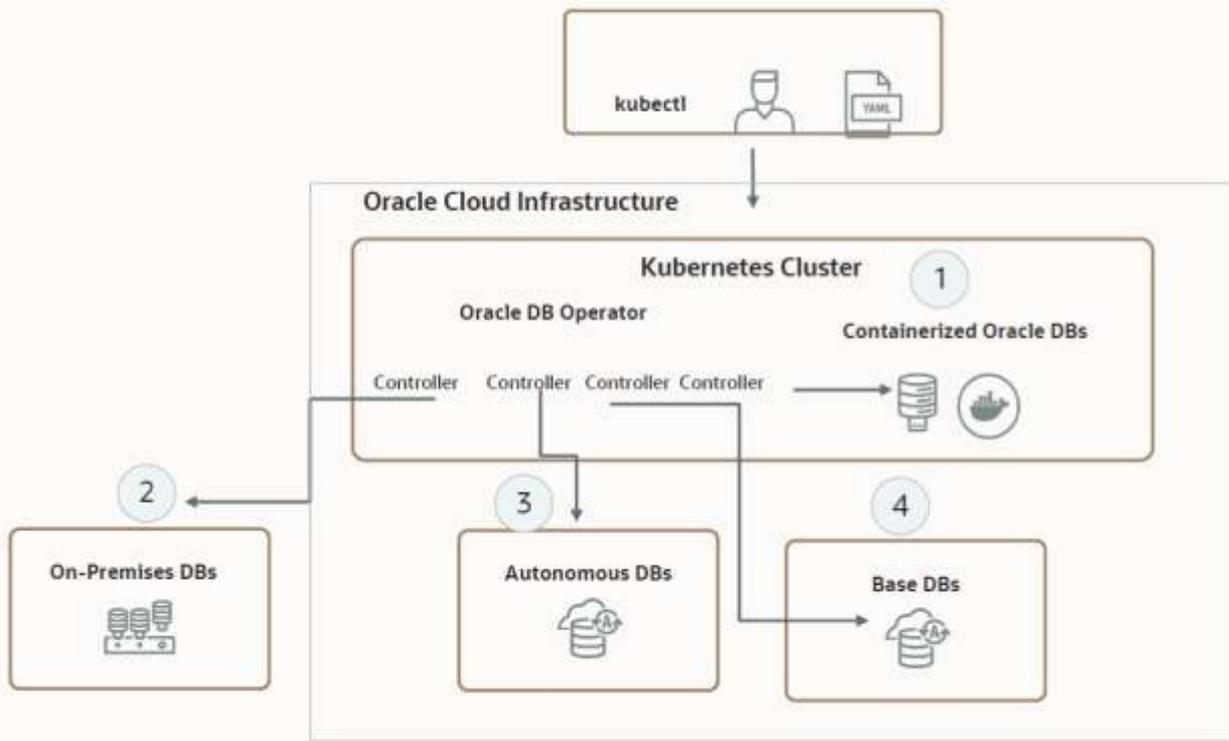

Low

Agility & Operational Efficiency

High

Container Instances & Functions

Fully managed serverless run-times.
You give us your containers and we
run it for you

Announcing

Arm support

Oracle Database Operator for Kubernetes

https://github.com/oracle/oracle-database-operator

Supported Database Configurations
1. Containerized Database in Kubernetes
2. On-premises Databases
3. Autonomous Database
4. Base DBs

Lifecycle Operations
Provision / Bind / Start / Stop / Terminate
Backup / Restore / Patch / Upgrade
Scale

Observability
Monitoring, Logging, Metrics
Support major K8s Distributions and Clouds

WebLogic Kubernetes Toolkit

- Easily deploy applications using Docker and Kubernetes

    Oracle Container Repository

- Integrated tools for WebLogic on Kubernetes

    - Management: Operator

    - Migration, configuration: Deploy Tooling

    - Image Creation: WebLogic Image Tool

    - Monitoring: Exporter for Prometheus

    - Management: WebLogic Remote Console

    - Usability: WebLogic Kubernetes Toolkit UI
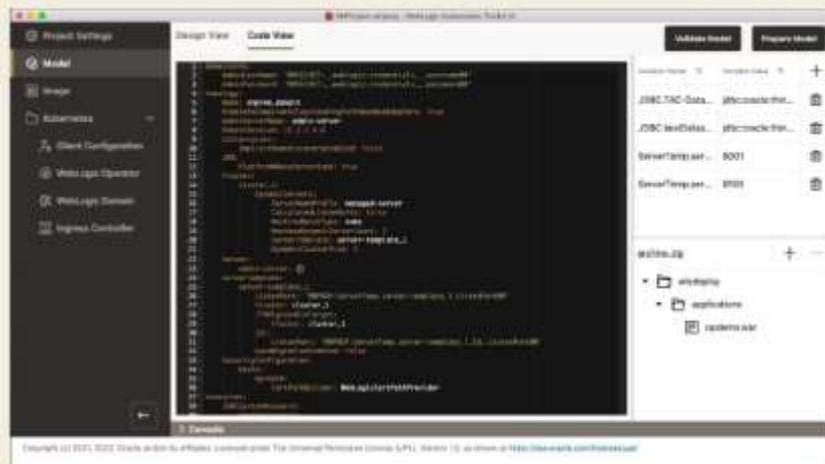
A bridge between worlds…

Oracle Verrazzano
Enterprise Container Platform

CURATED OPEN SOURCE, PORTABLE SOLUTION FOR MULTICLOUD

- Comprehensive secure container platform, from deployment to Day 2 operations
- Curated, integrated, hardened out of the box with standard-based CNCF projects
- Supports all container workloads
- Single pane of glass for Kubernetes clusters in Multicloud environments
- App centric deployment with Open Application Model
- Intelligent workload management across Kubernetes clusters
- Simplifies migrating applications to Kubernetes

# Simpler and more secure multicluster Kubernetes deployments and management
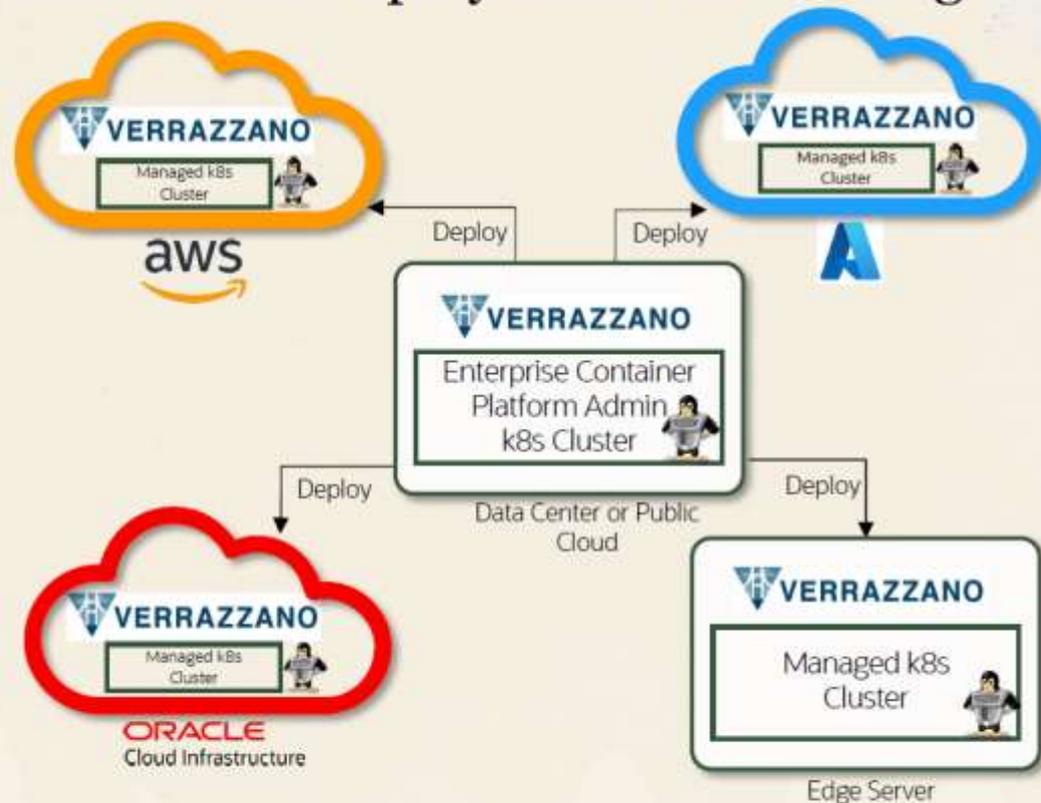
- ✓ Cloud agnostic and on prem deployments
- ✓ Intelligent workload management across clusters
- ✓ Multi-cluster environment management
- ✓ Automated built-in observability
- ✓ Application lifecycle management/ GitOps enablement
- ✓ Integrated defense in depth security

Oracle Transaction Manager for Microservices (MicroTx)

What MicroTx Provides?
- Eclipse Microprofile Long Running Actions
- Support in Java for LRA annotations (@LRA, @compensate, @complete, @status, @forget etc.) and equivalent in Typescript
- APIs for TCC transaction coordination, similar signature as LRA
  - POST, PUT, DELETE verbs for Try, Confirm and Cancel
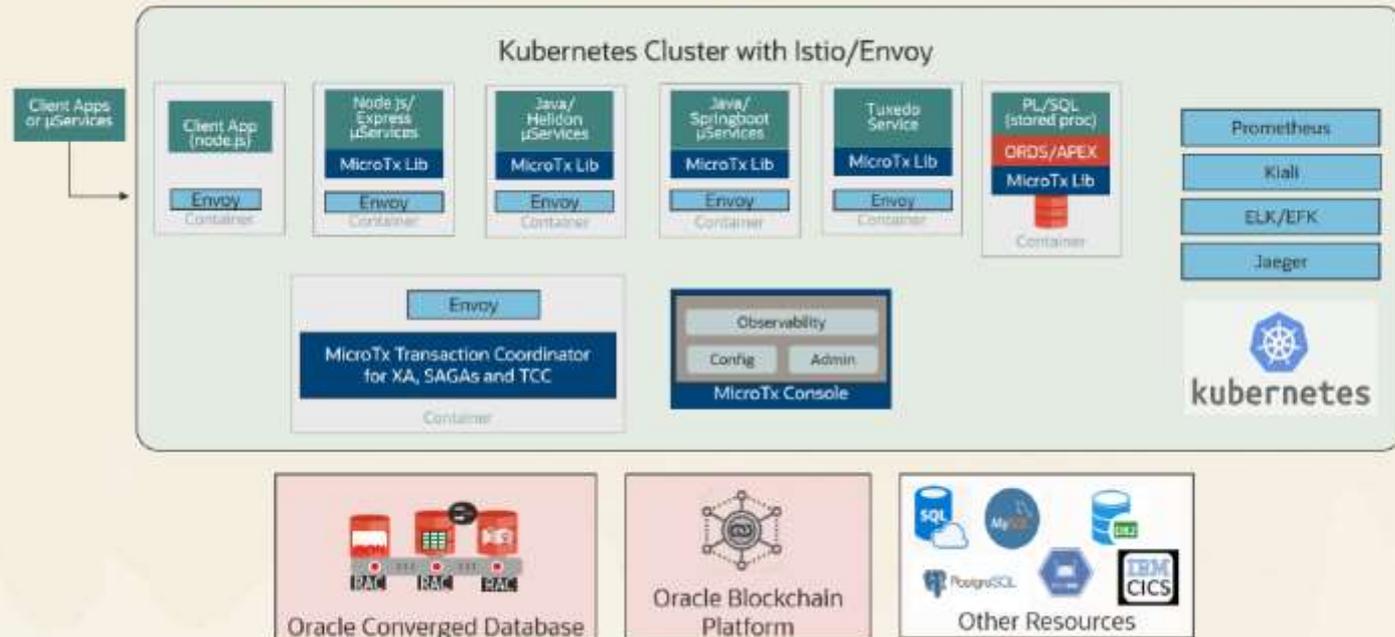
# Oracle Transaction Manager for Microservices (MicroTx)

DATA CONSISTENCY ACROSS MICROSERVICES

Two main components

- Transaction Coordinator microservice
- Client MicroTx Library
  - one for each programing language
  - utilized by each application microservice

REST API based communication

- No additional requirements imposed on application microservices
- Transaction state stored in etcd or Oracle Database
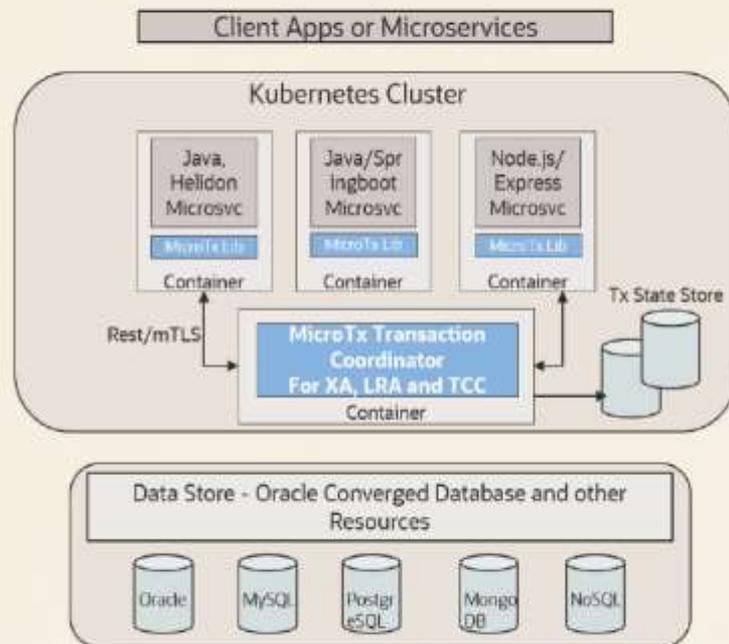
Oracle Coherence

THE FIRST AND LEADING IN-MEMORY DATA GRID

- In-memory clustered caching

- Fault-tolerant automatic sharding

- Fast key-value store with disk persistence

- Parallel querying, aggregation, processing

- Native Multicluster/multicloud federation

- Docker, Kubernetes, OpenTracing support

- Polyglot, REST, GraphQL interfaces

Coherence CE
Open Source Community Edition

Clients

Services

Grid

Enterprise

Site 1

Site 2
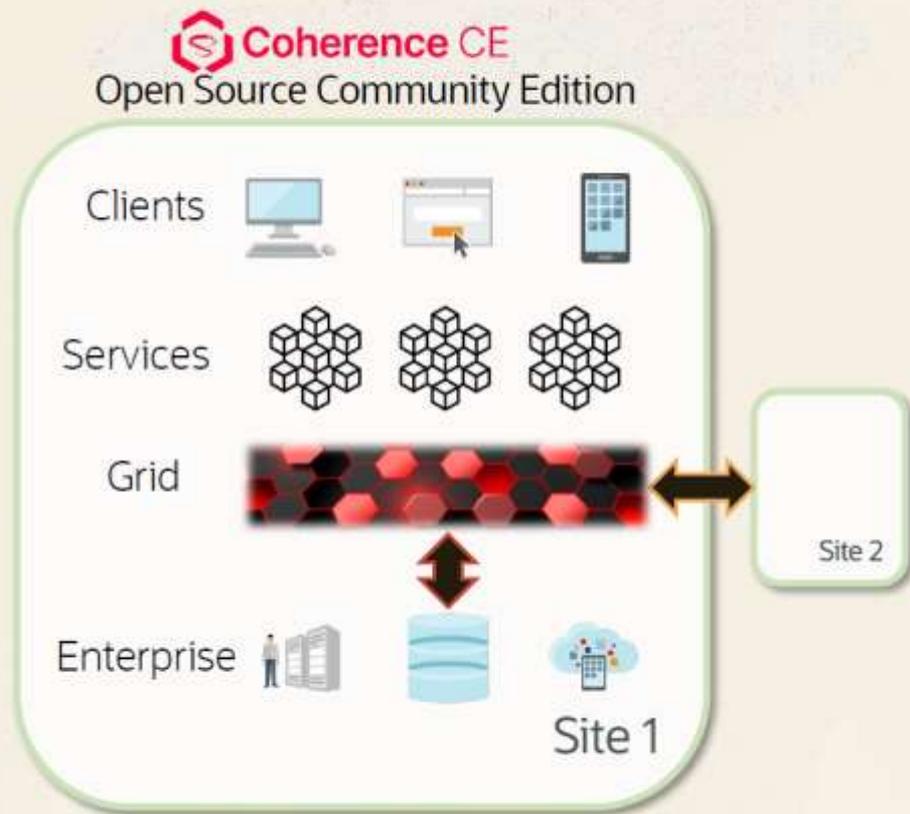
GoldenGate 23c Free

Everyone can now take advantage of the world's most popular real-time data integration software!
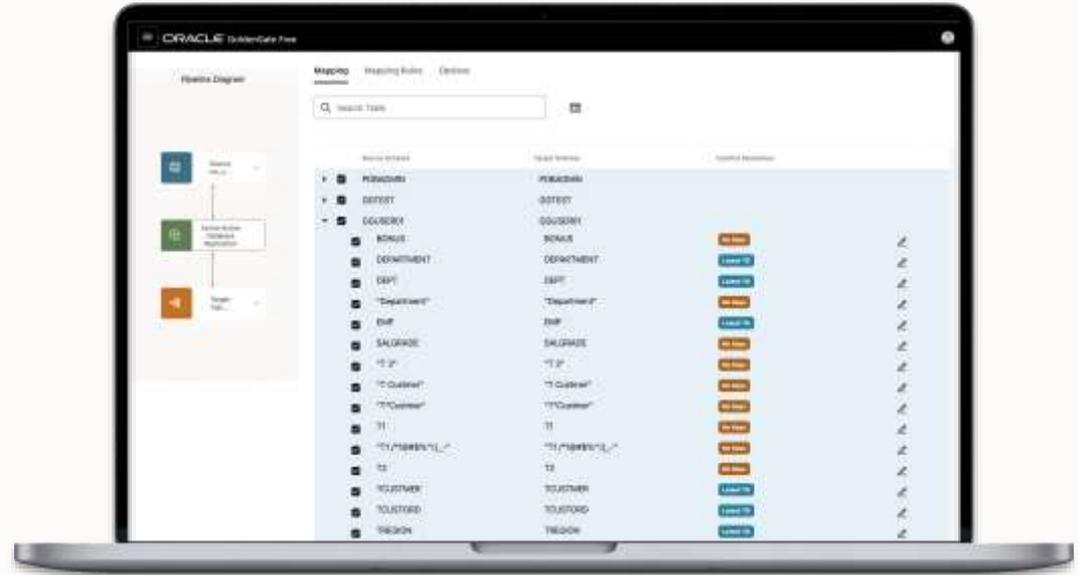
100% free, no catch!
- Use for any/all environments
- Ideal for **trials and education**
- License never expires

Now 23c ready
- Works with Oracle DB 23c
  (up to 20GB size)
- Runs GoldenGate 23c
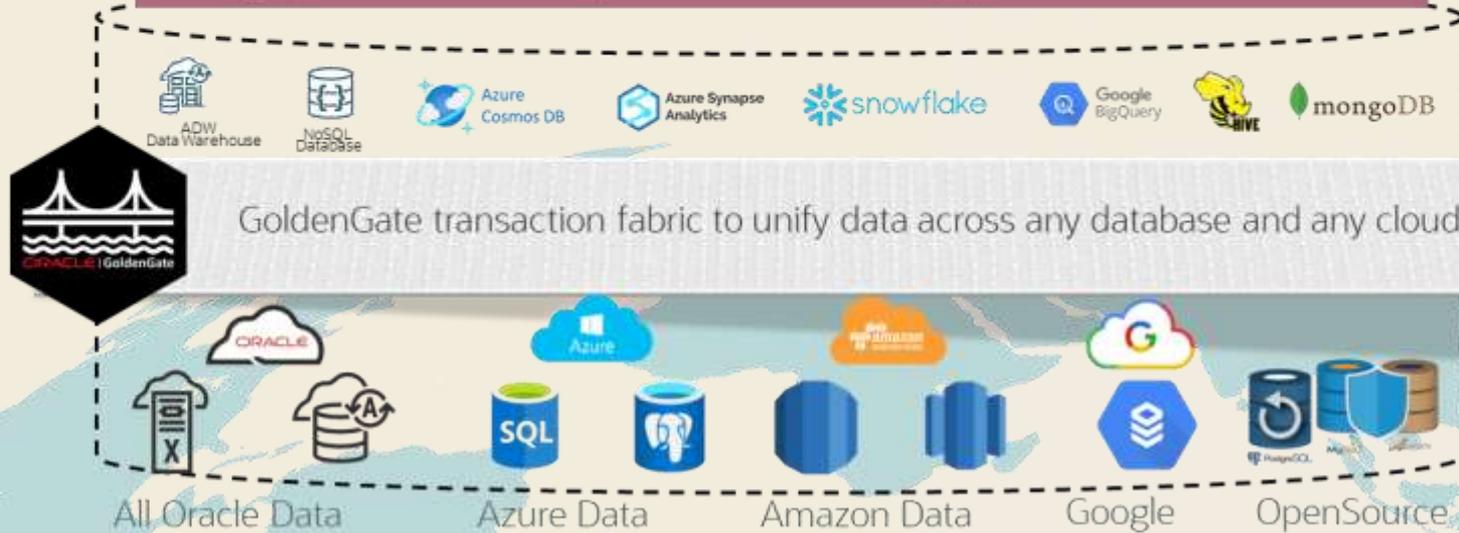
New simple user interface
- Automated, easy to use recipes
- Uni-directional & Bi-directional

https://blogs.oracle.com/dataintegration/post**/top-7-oracle-goldengate-announcements-at-cloudworld-2023/**

You can use GoldenGate Free:

- As a production environment*, if your database is 20GB or smaller
- As a development or test environment
- As a training tool in a learning environment

Oracle GoldenGate Free is not supported by Oracle Support. Questions regarding GoldenGate Free can be posted in the GoldenGate Free Community Forum.

Oracle Database 23c *Free* (23.3)

Develop, Learn, and Run for Free

Early and easy access to 23c AppDev features

Developers get a head-start on building apps with innovative 23c features

Simplifies development of modern data-driven apps

Oracle Database 23c Free Released via:

Docker image, VirtualBox VM, Linux RPM file

Windows coming soon

Available under the Free Use Terms & Conditions license

Download straight from the web - no user account or login required

Capped database resources for 12GB storage, 2GB memory, and 2 CPU cores

Oracle Autonomous Database

OCI Always Free

Oracle Autonomous Database

New

Download Free Container Image

Diagnose on First Failure

Diagnose faster when encountering errors

OpenTelemetry

End-to-end industry standard observability with Oracle JDBC and ODP.NET apps

Dynamic and Secure Tracing

Optimize and limit sharing of diagnostic data

JDBC Diagnose-on-first-failure

JDBC Self-Driven Diagnosability
- This feature diagnoses the first occurrence of a failure.
- Records the critical execution state in memory, then dumps the recording on error.
- ON by default
- May be disabled via
  `-Doracle.jdbc.diagnostic.enableDiagnoseFirstFailure=false`
  or using the DiagnosticMBeans interface.
- You must configure `java.util.logging` to get diagnostic output on diagnose-on-first-failure.

A single JDBC jar (`ojdbc8.jar or ojdbc11.jar`) for production, debug and metrics
- No more `ojdbc8_g.jar or ojdbc11_g.jar` for debugging
- No more `ojdbc8dms.jar or ojdbc11dms.jar` for Dynamic Monitoring Service (DMS) metrics
- No more `ojdbc8dms_g.jar or ojdbc11dms_g.jar` for DMS debugging.

Oracle JDBC Support for OpenTelemetry

The Oracle JDBC 23c provisions a hook for 3rd party observability frameworks.

For OpenTelemetry, we use "*OpenTelemetry Instrumentation For Java*" @ https://tinyurl.com/2762xkak
It has a JDBC instrumentation, and a Java agent .
1. Create a parent span
2. The Oracle JDBC furnishes a wrapper interface to jdbc calls
3. The implementation of the wrapper interface creates a BEFORE and AFTER child spans,

time

[**Java agent**] ----> Create a parent span for JDBC API call
      [**Oracle JDBC Tracer callback**] ----> Creates a BEFORE, child span
          JDBC Call
      [**Oracle DBC Tracer callback**] ----> Creates an AFTER, child span
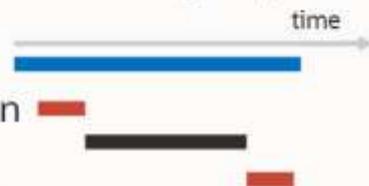
- Observe the exported instrumentations at the specified endpoints (e.g., logging, Zipkin, Jaeger, etc)
- (optionally) export the collected data into the OpenTelemetry Collector

ODP.NET OpenTelemetry

.NET OpenTelemetry
- ActivitySource creates and starts Activity objects
- App starts and stops Activity objects around meaningful units of work

ODP.NET internally creates one .NET ActivitySource

ODP.NET creates and starts an Activity for public command execution and data retrieval APIs
- OracleCommand
  - ExecuteNonQuery, ExecuteNonQueryAsync, ExecuteReader, ExecuteReadyAsync, ExecuteStream, etc.
- OracleDataAdapter
  - Fill
- OracleDataReader
  - Read and ReadAsync

ODP.NET creates and starts a child Activity for server round-trips in above operations separately
- Understand server round trip cost relative to total time spent executing each API

Dynamic ODP.NET Tracing

Turn on/off tracing only when problem occurs

Benefits
- Smaller trace file
- Limit tracing overhead to only necessary times
- Limits unnecessary data sharing

How to enable

```
// C#
OracleConfiguration.TraceLevel = 7;
```

Limit maximum trace file size

```
// C# - limit file sizes to 200 MB
OracleConfiguration.TraceFileMaxSize = 200;
```

Dynamic and Secure Tracing with Oracle JDBC

Oracle JDBC furnishes two modes for generating debug/tracing info: public and sensitive.

- **In the public mode, the features do not record or persist sensitive information**
  - This reduces the amount of data captured but limits the effectiveness of the features

- **In the sensitive mode, these features record and persist sensitive information.**
  - Java developers can share traces with the redaction of sensitive data.
  - <u>The sensitive mode can only be enabled by a privileged user</u> and is controlled by two switches; one for enabling and another one for permitting.

```
-Doracle.jdbc.diagnostic.enableSensitiveDiagnostics=true
-Doracle.jdbc.diagnostic.permitSensitiveDiagnostics=true
```

  - The sensitive mode can be enabled and disabled programmatically at runtime, or via MBean

Regulations continues to proliferate across the globe

Path forward with Unified auditing

Oracle 7 (1992)
Traditional audit

Oracle 9iR2 (2002)
Fine-grained audit

Oracle 12cR1 (2013)

Unified audit
- Conditions for precision
- Predefined audit policies for most common scenarios
- Extensible audit
- Simplified manageability
- Consolidated view of audit
- Option to turn off traditional for smooth transition

Oracle 19c, 21c
Traditional audit deprecated

Oracle 23c
- Columnar audit
- Traditional audit de-support
  - Pre-23c audit settings honored