

ORACLE
AI World

Modern DevX OraOperator + AI Assisted App Development with Oracle Database 26ai

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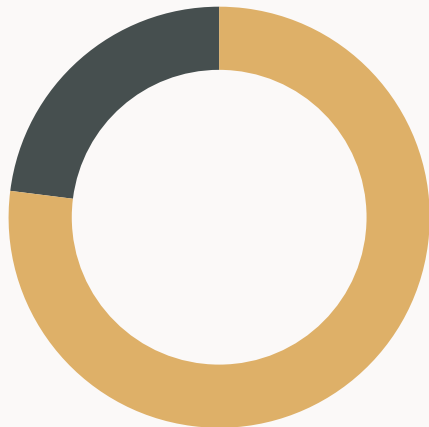
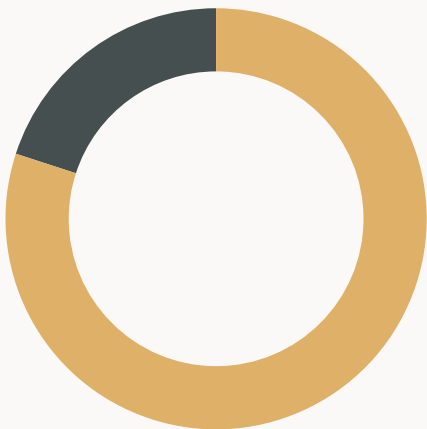
Agenda

1. Welcome
2. Oracle's Strategy for Cloud Native Application Development
3. Oracle's Database Vision for Modern Application Development
4. What's New in Container Runtime Environments and Oracle Database Operator for Kubernetes
5. Demo
6. Oracle RAC on Kubernetes

Oracle's Strategy for Cloud Native Application Development

CNCF Annual Survey 2024

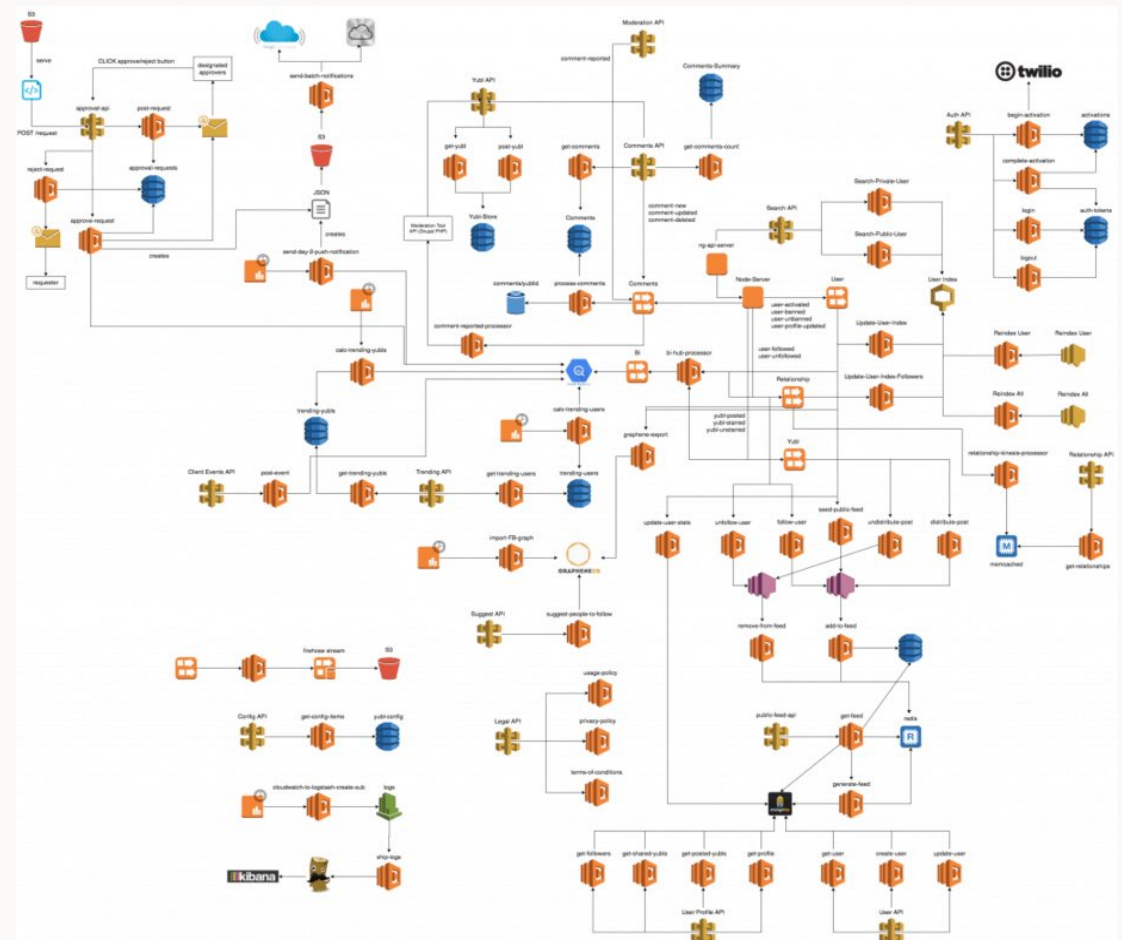
Published April 2025 – 750 participants



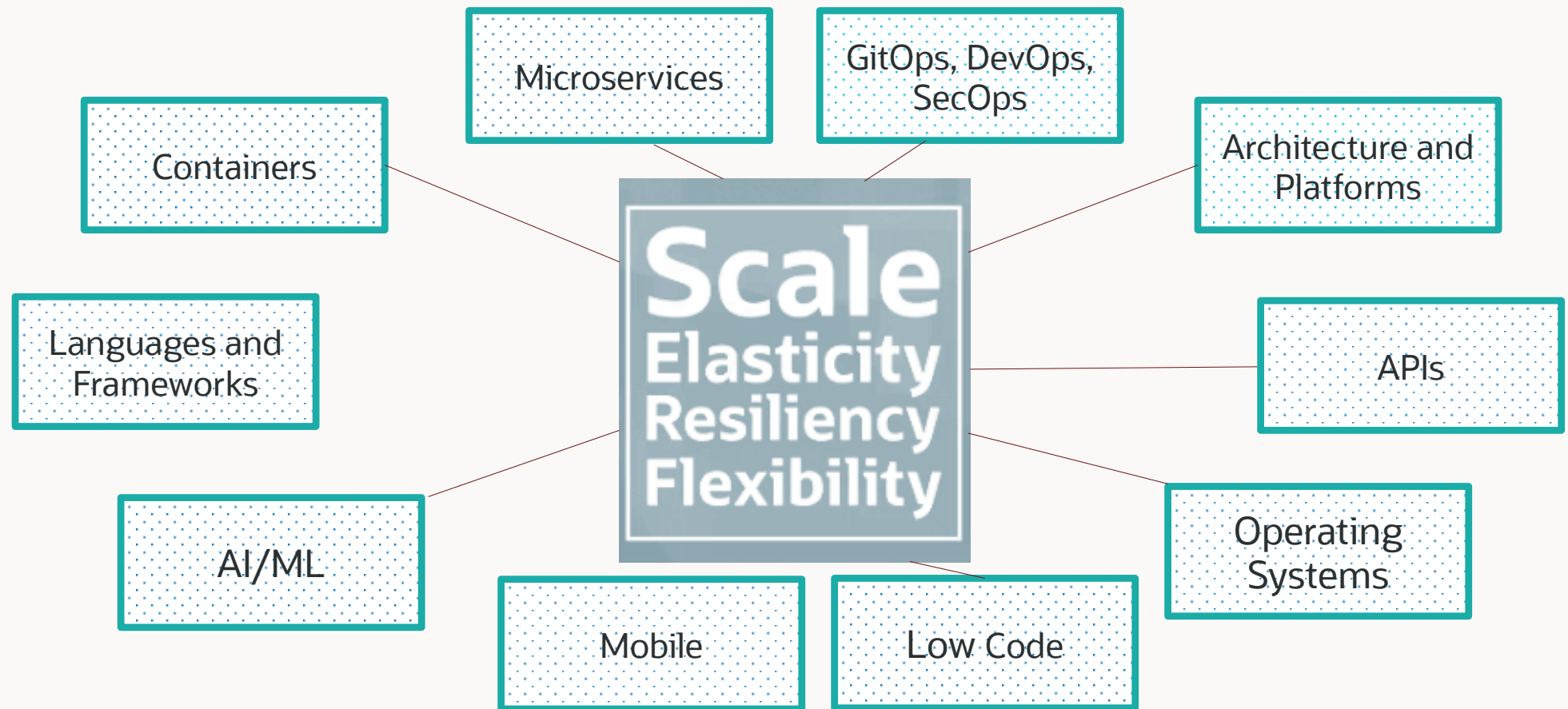
Source: [CNCF Survey 2024](#)



Think end state.
Do it right.

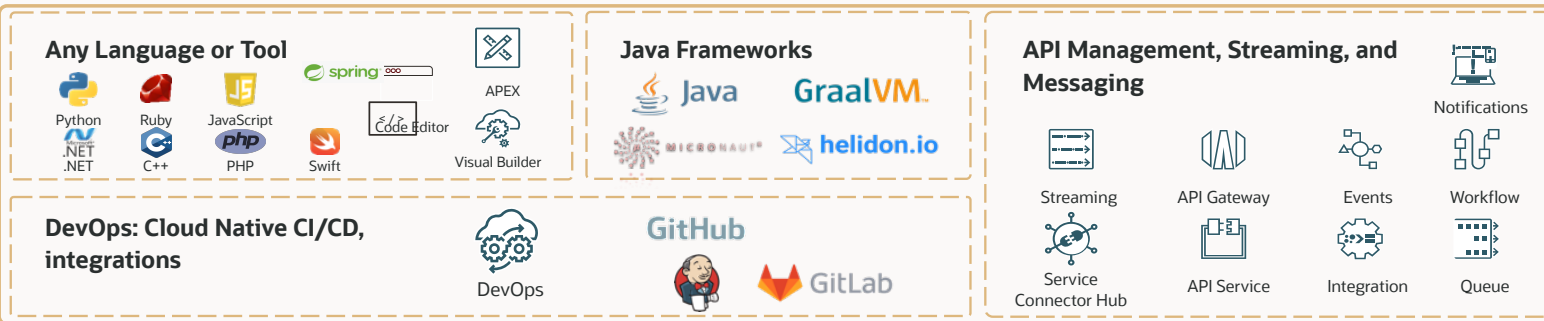


Cloud-Native Application Development



OCI - A Comprehensive Application Development Platform

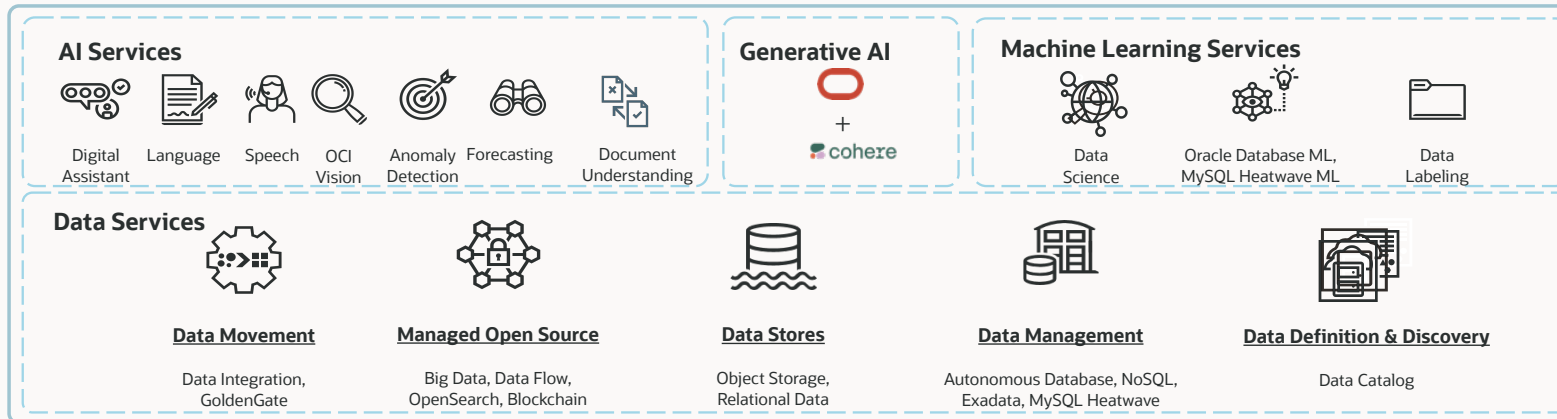
APPLICATION DEVELOPMENT SERVICES + TOOLING



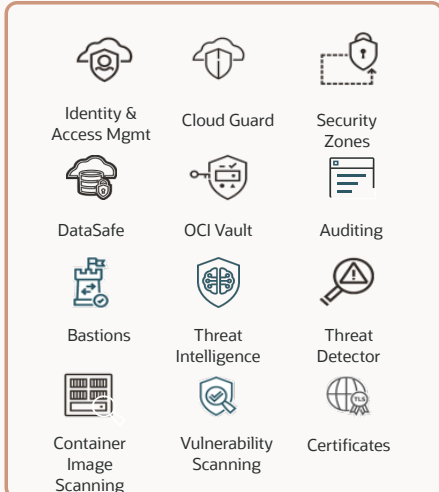
OBSERVABILITY & MANAGEMENT



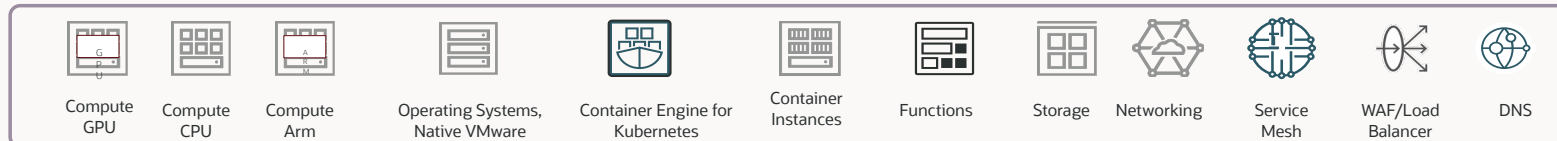
OCI DATA + AI PLATFORM



SECURITY & GOVERNANCE



CORE INFRASTRUCTURE

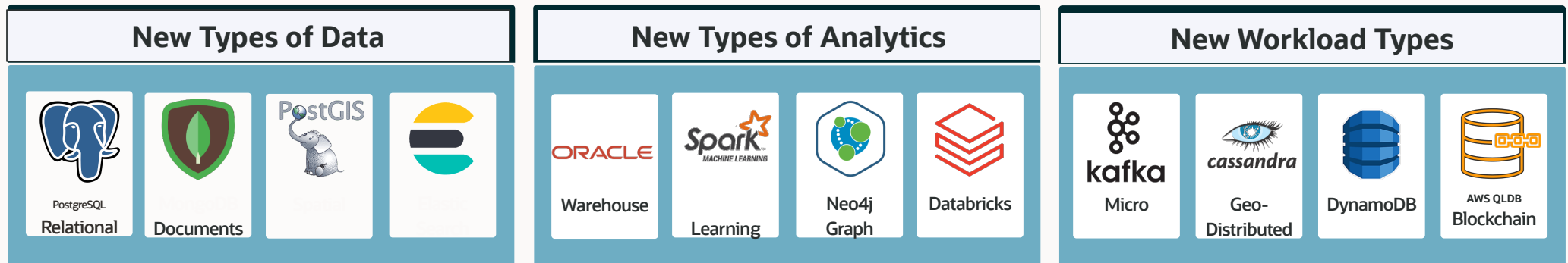


Oracle's Database Vision for Modern Application Development

Specialized Database Approach

One approach to building modern apps is to use a **specialized database** for each application's need

- Each specialized database excels at one aspect of the application's requirements
- Creates complexity since they were not designed to work together

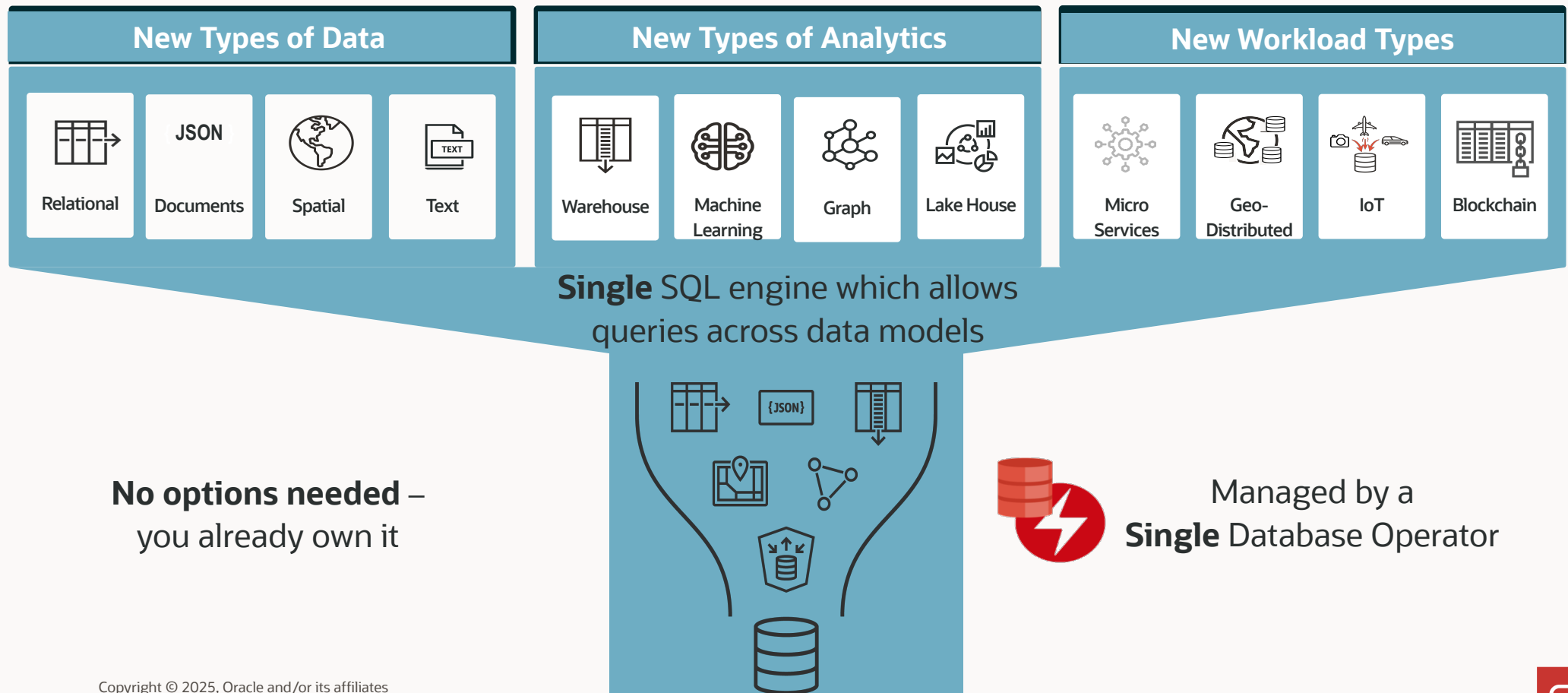


Every app requires **distributed execution** and **data movement** across multiple databases

- Developers and I.T. must focus on **Integration**
- **Multiple Database Operators needed to manage each specialized Database**

Oracle's Converged Database Approach

Delivers best-of-breed support for **all** the data needs of modern applications



User Feedback and Queries

In what ways
does a
converged
database
streamline
development
and operations
processes?

Converged database unifies
multiple data types and
workloads, reducing complexity,
simplifying management, and
enabling faster, more efficient
development and operations

What's New in Container Runtime Environments and Oracle Database Operator for Kubernetes



The Evolution of Container Runtime Based Environments for Oracle Database

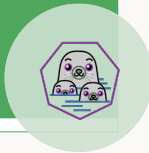
- Running Containers on Docker Engine
- Oracle Images (Single Instance and RAC)
- Standalone Environments
- OL7 Support
- Docker Compose

Docker



- Podman is alternative to Docker
- Portability and Consistency
- Resource Efficiency
- Rapid Deployment and Scaling
- Microservices Architecture
- Isolation and Security
- Oracle Images (SIDB Instance, GDD, RAC, True Cache, CMAN & Private AI)
- Standalone Environments
- OL8/9 Support
- Podman Compose

Podman



- Orchestration and Automation
- High Availability
- Self-Healing and Self-Scaling
- Resource Management
- Service Discovery and Load Balancing
- Storage Orchestration
- Software Defined Networking
- Observability and Scaling
- SIDB, GDD, RAC, True Cache, CMAN, Private AI
- Support Helm and Chart

Kubernetes



- Database-specific Controller
- Software extension of the Kubernetes APIs
- Simplified Database Management
- Declarative Database Management
- Automated Database Provisioning
- Monitoring and Troubleshooting
- ADB, BaseDB, Single Instance database, GDD & Multitenant
- Go-Lang

DB Operator
#OraOperator

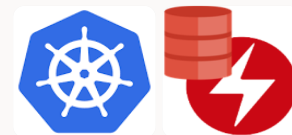


Oracle Container Based Runtime Environments

Production on Database Releases

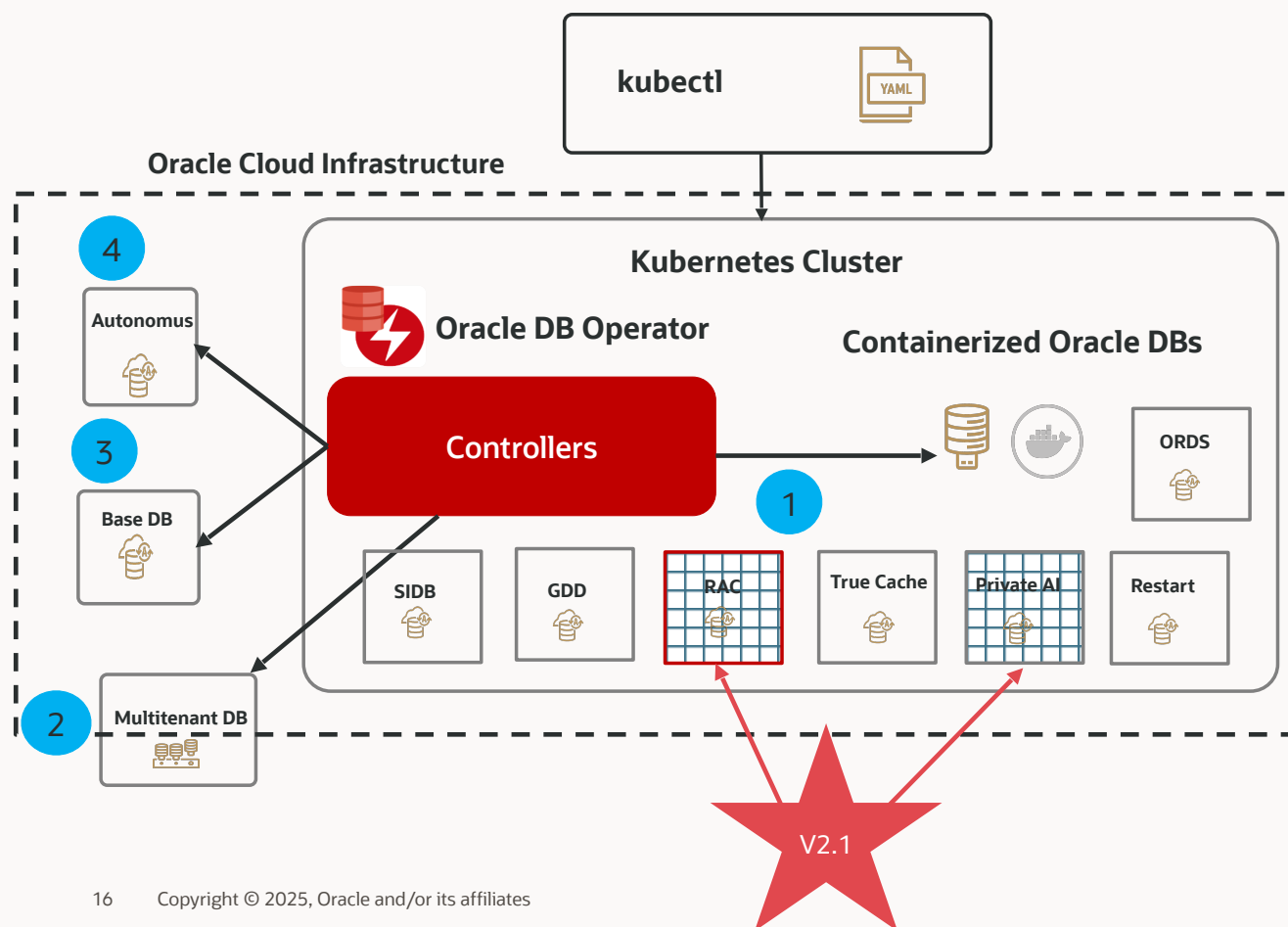
Database features	Container images Oracle Linux 7/8/9 Docker and Podman RedHat Linux 8	Kubernetes Distributions Oracle Cloud Native Environment (Oracle CNE) Oracle Kubernetes Engine(OKE) OpenShift	Oracle DB Operator Release Version	Comments
Containerized DB on K8s clusters				
Single Instance Database (SE, EE, XE)	19.28c, 21.17c, 23ai Free and 26ai Free	19.28c, 21.17c, 23ai Free and 26ai Free	V2.0	#OraOperator supported on MultiCloud 23ai and 26ai Free with resource limits Oracle AI Database Cloud-First, Developer-First Strategy for the 26ai Release (Doc ID 3068039.1)
Globally Distributed Database				
Real Application Clusters	19.28c, 21.17c and 23ai Beta Program	19.28c and 23ai Beta Program		RAC 23ai Beta Program on-premise only
Oracle Restart			V2.0	Oracle Restart 19.28
True Cache	23ai Free and 26ai Free	23ai Free and 26ai Free	V2.0	True Cache on Oracle AI Database Free
CMAN	19.28c, 23ai	19.28c, 23ai	planned	CMAN planned for V2.1 Database Operator
Private AI			planned	Private AI planned for V2.1 Database Operator
OCI, On-Premises and OCI DBs				
Autonomous Database with RAC (Serverless & Dedicated)			V2.0	#OraOperator supported on Mult iCloud
Base DB with RAC				
Multitenant Database with RAC (Exadata, PDB/CDB)				





Oracle Database Operator for Kubernetes

Automation to manage an Oracle Database in a Kubernetes Cluster



Supported Database Configurations

1. Containerized Database in Kubernetes
2. Multitenant Databases On-Premises
3. BaseDB Service
4. Autonomous Database

Oracle Cloud Platforms: OCI, PCA, C3

Support major K8s Distributions and Clouds

- Oracle Kubernetes Engine(OKE)
- Oracle Cloud Native Environment (Oracle CNE)
- **OpenShift RedHat**
- Azure, AWS and GCP

Download Distributions

- GitHub
- OperatorHub.io
- Oracle Container Registry
- **RedHat Catalog**

Supported Lifecycle Operations

- Provision / Bind / Start / Stop / Terminate
- Backup / Restore / Patch / Upgrade / Scale





Features in v1.2.0 of DB Operator (March 2025)

Globally Distributed Database (Sharding)

- Support for 23ai Raft replication enhances data consistency and reliability

Autonomous Database Enhancements

- Database cloning feature for easier environment duplication

Multitenant DB Enhancements

- ORDS-based Controller introduces an assertive deletion policy for better resource management
- New LREST-based Controller (ARM & AMD) allows PDB settings via init parameters config map for flexible configuration

Database Observability

- Expanded metrics and logs for improved monitoring and troubleshooting

Base DB Enhancements

- Database cloning now supports Oracle 23ai for greater flexibility in instance replication

New ORDS Controller: ORDSSERVICES

- Install ORDSSERVICES on both SIDB and Autonomous Database (ADB)
- Provision and delete ORDS instances efficiently

SIDB Enhancements

- Support for Oracle Free-lite database
- Enhanced SIDB resource management capabilities
- True Cache support enabled for free SIDB databases
- Observer introduced for FastStartFailover with Data Guard
- Snapshot Standby now supported in Data Guard setups
- Oracle 23ai free version available



User Feedback: On v1.2.0 of DB Operator

Global Distributed Database Support with 23ai Raft Replication

“Kubernetes and operators are excellent for deploying complex clusters. OraOperator provides robust functionality and streamlines Oracle Sharding deployments. Defining requirements in YAML lets the operator handle the heavy lifting with StatefulSets and services, enabling best-practice, complex configurations — I'm a fan”

A power Kubernetes user leveraging 23ai with Global Distributed Database

User Feedback: On v1.2.0 of DB Operator

Global Distributed Database Support with 23ai Raft Replication

“ We now reliably deploy 16-shard clusters (each with 16 CPU cores, 450 GB RAM, 4 TB storage) in just 10 minutes using the DB Operator on OKE (OCI). We attempted up to 1000 shards before scaling to 100 due to resource and quota limitations, but the DB Operator made the setup fast and easy for customers”

A Kubernetes architect deploying scalable applications on Oracle 23ai with GDD

User Feedback and Queries

How does using the DB Operator enhance the developer experience with Oracle Converged Database?

- Managed by a Single Database Operator
- Reduces the complexity of managing lifecycle operations for multiple single-purpose proprietary database which becomes a burden for the developers
- Developers have access to Single SQL engine which allows queries across data models

Is the Database Operator compatible with both multi-cloud environments and on-premises deployments?

Yes, the Oracle Database Operator is compatible with both multi-cloud environments and on-premises Kubernetes deployments, provided all connectivity and security requirements are met

User Feedback and Queries

Can developers connect to Autonomous Database on OCI from any Kubernetes environment using the DB Operator?

Yes, with secure network connectivity and authentication, developers can use the Database Operator to connect Kubernetes workloads to Autonomous Database on OCI.

Is RAC support available for Database Operator ?

This is on the roadmap for latest 19c RU for on-premises only



Features in v2.0 of DB Operator (Oct 2025)

- **OpenShift**

- Validation of Database container images on OpenShift for Kubernetes
 - SIDB and Oracle Restart
- Private Cloud Appliance (PCA) integration of DB Operator
- New Controllers to be developed and integrated into DB Operator V2.0
 - Oracle Restart Controller
 - True Cache Controller (Preview)
- Bug fixing and enhancements for controllers GDD, SIDB, True Cache, ADB, Base DB and Multitenant DB



Controller: Oracle Restart Container for Kubernetes

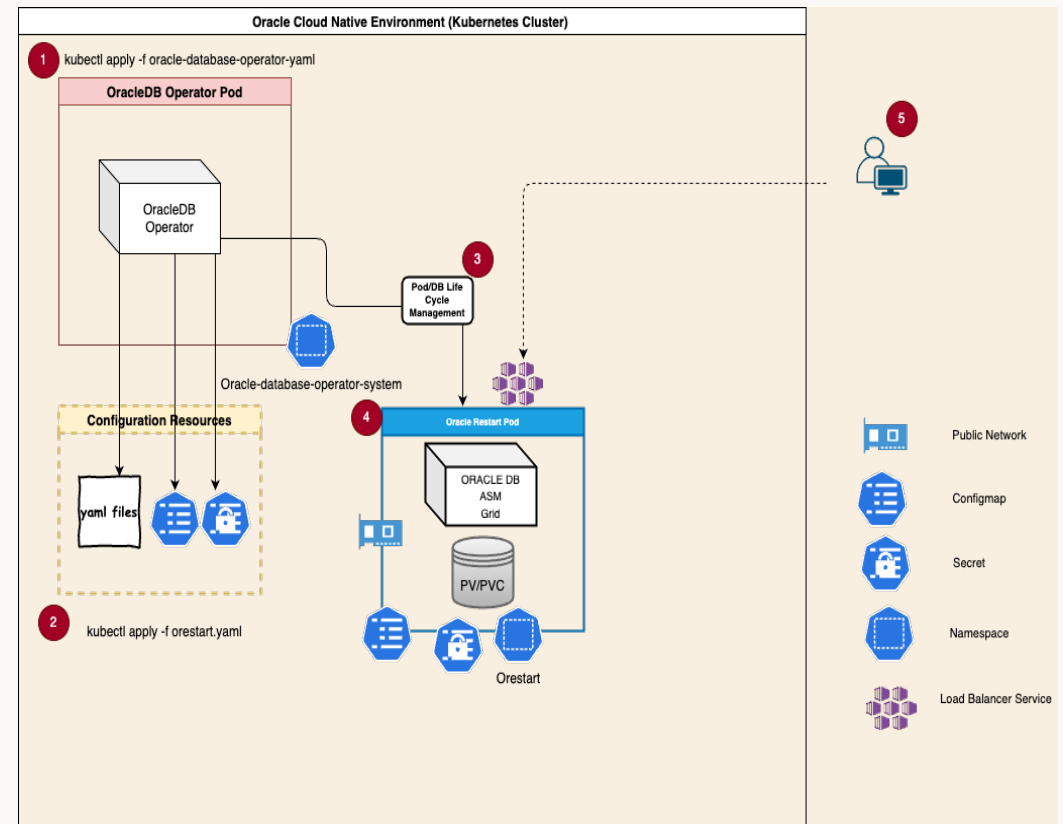
Deploy SIDB with Oracle ASM

A pre-built and pre-tested Oracle Restart Container allows pull command deployment :

- Provides Full Stack of Database with GI/ASM
- Easy way to use FAN/ONS with SIDB
- Supported with 19.28 onwards

Run the Oracle Restart container wherever customer chooses

- On-prem, private cloud, or public cloud
- Oracle Restart Controller Integrated with Database Operator on Kubernetes

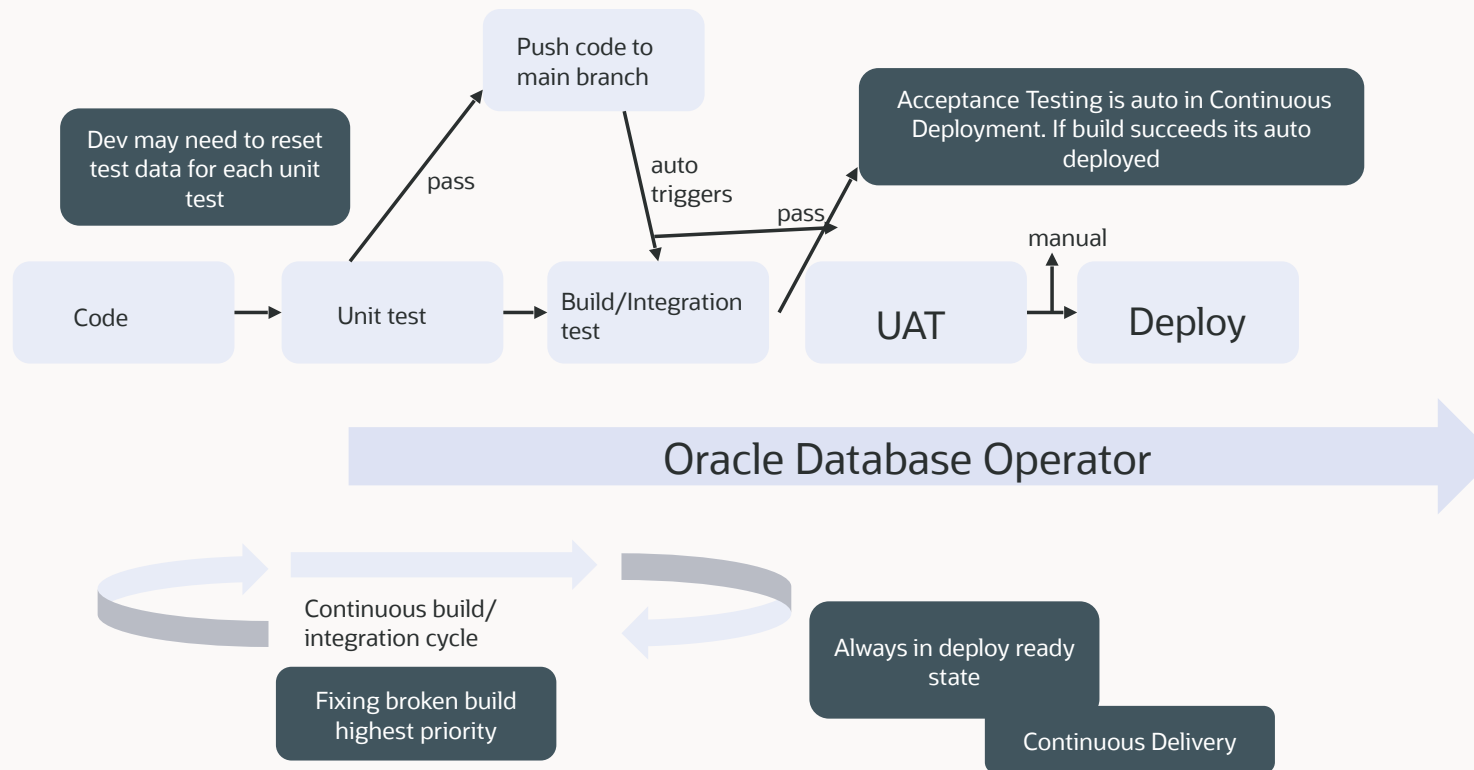


What Database Operator Solves for Developers

- Developers are not DBA's
- Test database prep may need DBA intervention to clone/mask data
- Schema changes are typically applied manually by DBA
- Deployment requires DB isolation/App cycling
- Application generally 'waiting' for DB to be ready
- No automated delivery pipeline possible (except when no database change)

Automated Deployment CI/CD Pipeline

Automation to manage an Oracle Database in a Kubernetes Cluster

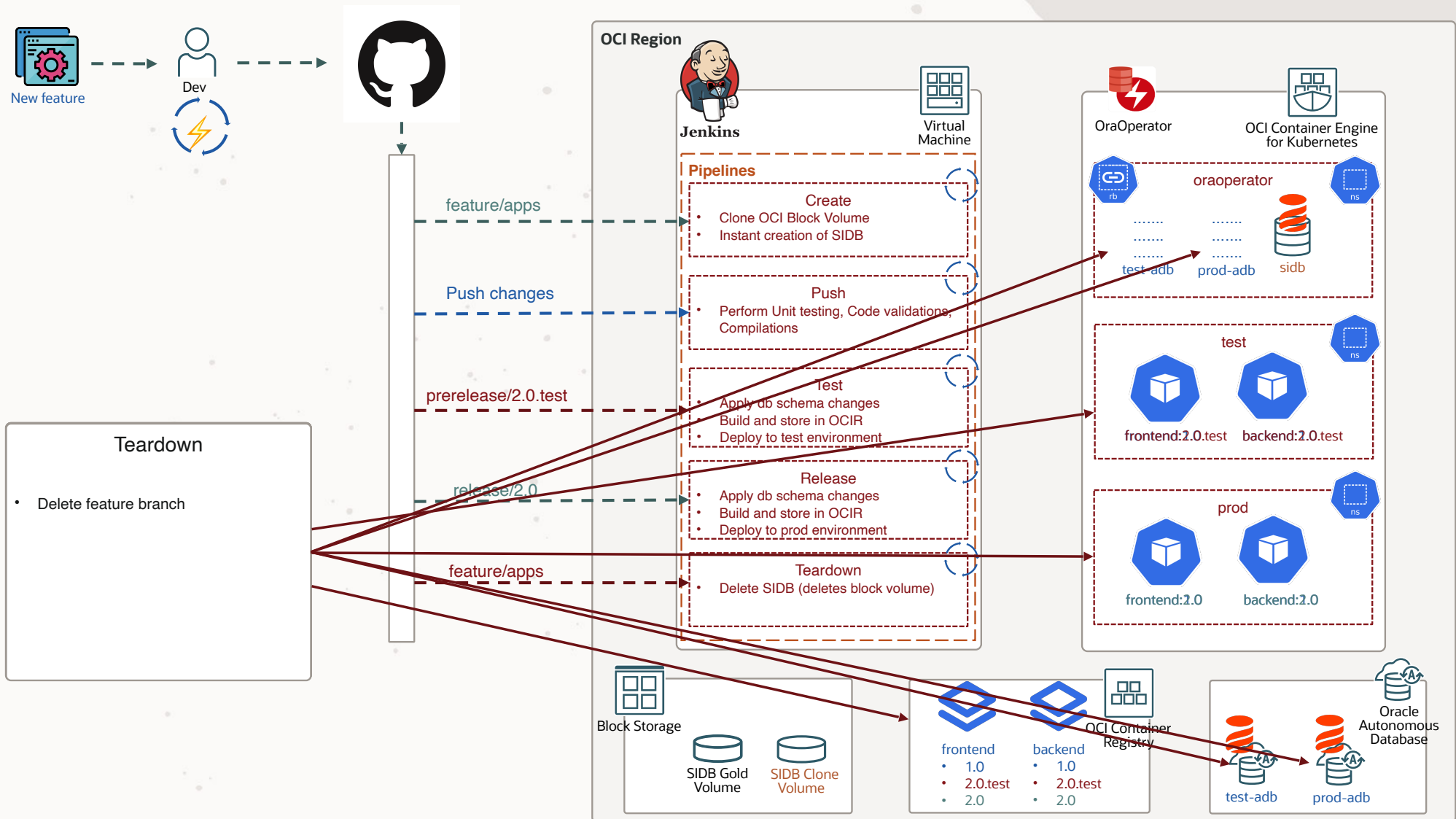


<https://www.oracle.com/a/ocom/docs/database/implementing-devops-principles-with-oracle-database.pdf>



Demos





RAC on Kubernetes

Release Information:

Support for Oracle RAC on OCNE is available starting from version 19.28

Supported Environments:

- **Deployment Type:** On-premises installations
- **Supported Platforms:** Oracle Cloud Native Environment (OCNE) version 1.9
- **Operating Systems:** Oracle Linux 8 (OL8) and Oracle Linux 9 (OL9)

Documentation:

For comprehensive guidance on installing and configuring Oracle Real Application Clusters (RAC) on Oracle Linux Cloud Native Environment (OLCNE), refer to the official Oracle documentation:

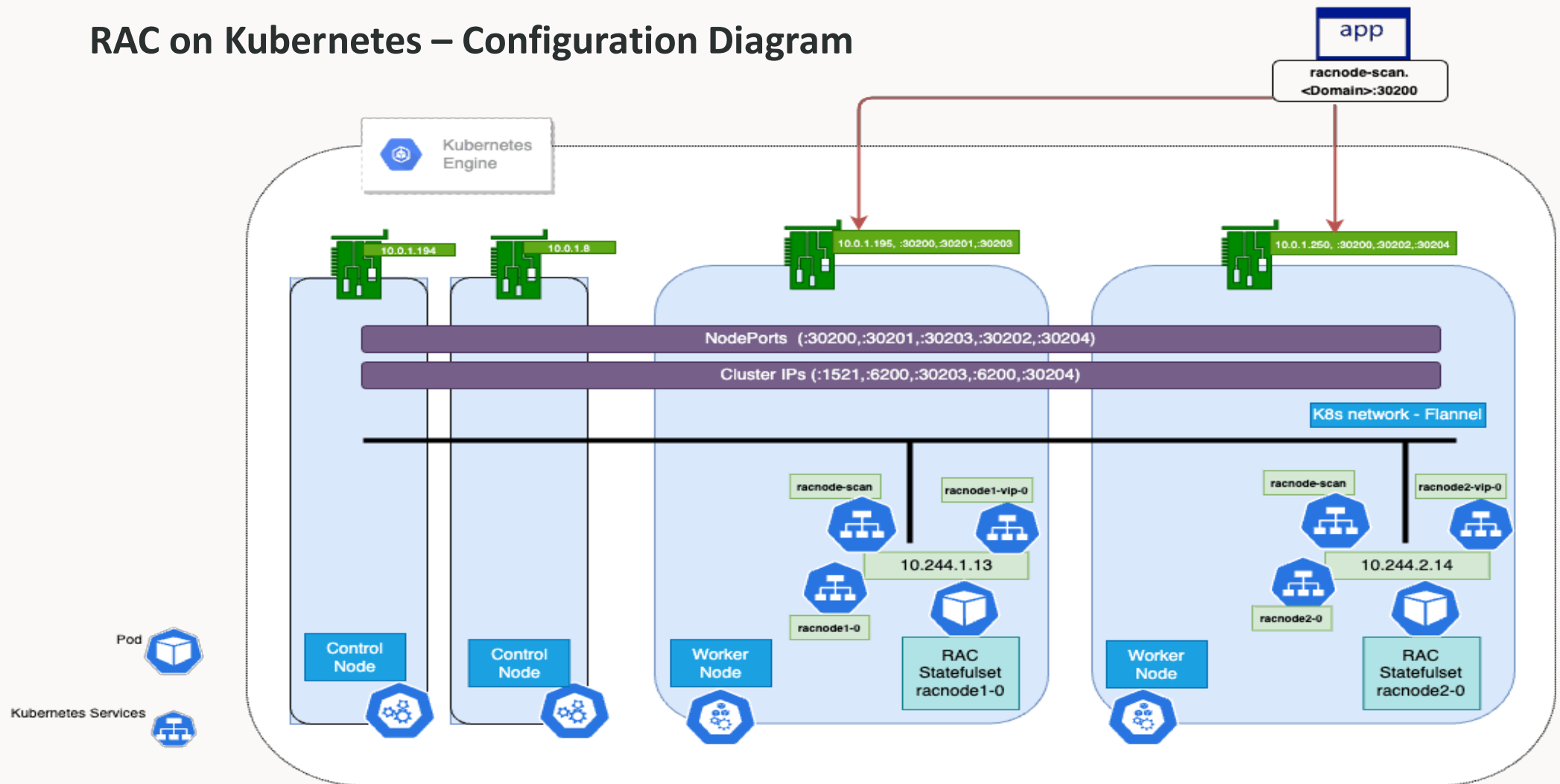
[Install and Configure Oracle RAC on OLCNE](#)

My Oracle Support (MOS) Note:

For information on released versions and known issues related to Oracle RAC on OCNE, consult the following MOS article:

Oracle RAC on OCNE - Released Versions and Known Issues (Doc ID 2969928.1)

RAC on Kubernetes – Configuration Diagram



Summary: Key Takeaways

- Oracle Cloud Infrastructure provides a comprehensive application development platform for modern apps
- Converged Database offers developers a single interface to build multi-modal application
- Oracle provides extensive support for Oracle Container Based Runtime Environments for Oracle Database
- Oracle Database Operator (#OraOperator) greatly simplifies lifecycle management for developers
- An integrated Database Operator significantly improves CI/CD automation

Thank you

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