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Oracle Cloud Native Environment

Oracle Cloud Native Environment is part of Oracle's extensive portfolio of standards-based open software technologies for cloud native application development, deployment, and lifecycle management across on-premises, cloud, and edge environments.

Built on open standards defined by the Cloud Native Computing Foundation and the Open Container Initiative, Oracle Cloud Native Environment enables interoperability and alignment with the broader cloud native ecosystem.

Software features

Oracle Cloud Native Environment provides an integrated and curated set of open source components, including AI-assisted operational capabilities, for deploying, managing, and scaling container-based applications on-premises, in the cloud, and at the edge.

Oracle closely tracks and contributes to Cloud Native Computing Foundation (CNCF) projects and the Open Container Initiative, adhering to their standards to deliver a consistent, standards-based platform for cloud native workloads. Oracle Cloud Native Environment includes tooling and modules to create, provision, and operate Open Container Initiative-compliant containers and Kubernetes environments.

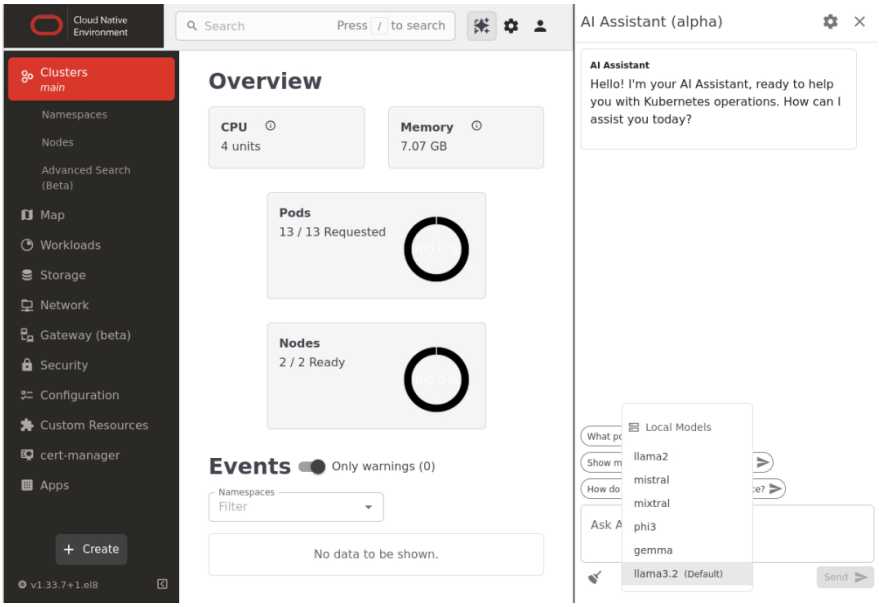
Kubernetes platform

- Includes Kubernetes software released under the CNCF Certified Kubernetes Conformance Program.
- Simplifies the deployment, configuration, and upgrade lifecycle of Kubernetes through a modules-based framework.
- Provides an intuitive CLI to support Kubernetes cluster deployment, module management, and configuration tasks across environments.
- Delivers backup and restore capabilities for Kubernetes clusters, including control plane configuration, to help protect cluster state.
- Features the Oracle Container Host for Kubernetes (OCK) image that bundles the Oracle Linux operating system and Kubernetes software distribution, enabling consistent Kubernetes node deployment, image-based updates, and simplified Kubernetes version upgrades.
- Supports Kubernetes Cluster API for declarative provisioning, upgrade, and lifecycle management of Kubernetes clusters.
    - Oracle Linux Virtualization Manager deployments are supported through a Kubernetes Cluster API provider, enabling integration with enterprise virtualization environments.
    - Oracle Cloud Infrastructure (OCI) deployments use the Kubernetes Cluster API Provider for OCI to manage cluster creation, scaling, and updates.

AI-assisted operations

- Integrates an AI-assisted interface in the Oracle Cloud Native Environment UI that uses natural language and cluster context to support operator interaction and understanding.
- Enables generation of Kubernetes YAML manifests for deployments and services, and supports diagnosis of issues and understanding of deployed services through the AI Assistant.

Figure 1. Oracle Cloud Native Environment UI showing the cluster overview and AI Assistant



Container runtime and isolation

- Uses the Kubernetes Container Runtime Interface (CRI) and includes CRI-O to support container runtimes directly from Kubernetes.
- Provides two runtime engines:
  - runC for Open Container Initiative-compliant containers
  - Kata Containers for enhanced isolation using lightweight virtual machines

Service mesh

- Provides an Istio service mesh to coordinate communication between services using a sidecar model powered by the Envoy proxy. Capabilities include:
  - Service discovery and traffic management
  - Load balancing and resiliency
  - Security and policy enforcement
  - Telemetry and observability

Monitoring and observability

- Delivers Prometheus, a powerful and flexible instrumentation solution for monitoring container environments.
- Improves visibility across Kubernetes clusters and containerized applications through time-series metrics, advanced query capabilities, and alerting features.

Storage integration

- Storage integration is provided using plugins referred to as the Container Storage Interface (CSI), a standard specification that enables dynamic provisioning of persistent storage for containerized workloads. Oracle Cloud Native Environment supports CSI-based storage integration through components such as:
  - The Oracle Cloud Infrastructure Cloud Controller Manager module, which enables integration with OCI storage services.
  - The Rook module, which deploys and manages Ceph storage for Oracle Linux.
  - An oVirt CSI driver, which enables persistent storage for Kubernetes clusters deployed on Oracle Linux Virtualization Manager.

Networking

- Uses the Container Network Interface (CNI) project, a CNCF-incubating standard that defines a common framework for dynamically configuring networking resources.
- The CNI plugin simplifies container-to-container networking and supports Flannel, Calico, and Multus.

Unified containers and virtual machines

- Using KubeVirt technology, enables workloads to run in both containers and virtual machines within a shared Kubernetes environment.
- Provides a unified platform for building, modifying, and deploying applications, enabling gradual modernization through the coexistence of legacy virtual machine and cloud-native container workloads.

Key benefits

- Accelerates time-to-value and improves agility through modularity and enhanced developer productivity
- Modernizes applications and lowers costs by leveraging the economic advantages of cloud and open source
- Avoids vendor lock-in through standards-based, CNCF-aligned software, including Kubernetes
- Accelerates the creation and provisioning of Open Container Initiative-compliant containers
- Easily scales Kubernetes clusters up and down to manage peak workload demands
- Supports deployment of highly available Kubernetes clusters
- Can be deployed across on-premises, cloud, and distributed environments
- Backed by enterprise-class worldwide Oracle support
- Reduces DevOps costs with support included at no additional charge with Oracle Linux Premier Support

Flexible enterprise-grade support options and more value

Oracle Cloud Native Environment can be downloaded, used, and distributed free of charge. Updates and errata are freely available, excluding certain updates and errata, such as those released with Oracle Ksplice and Extended Support, which may require Oracle Linux Premier or Extended Support.

With an Oracle Linux Premier Support subscription, there is no need to worry about whether a system runs as a physical or virtual instance; it is all included in the price of a single subscription. Users can run Oracle Cloud Native Environment on the host and as many Oracle Linux guest instances as desired without additional cost. And, when workloads need to move between different deployment models, the transition can be nearly effortless.

Oracle Linux Premier Support, backed by one of the most experienced engineering and QA teams in the world, provides a comprehensive, integrated solution for delivering modern applications at scale that includes:

- Operating system and virtualization
- Container infrastructure runtime
- Infrastructure automation and management

Supported hardware

Oracle Cloud Native Environment is supported on the following hardware architectures:

- 64-bit Intel and AMD (x86_64)
- 64-bit Arm (aarch64)

Visit the Oracle Linux and Oracle Virtualization Hardware Certification List (HCL) for details.

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Free and comprehensive documentation and training

In addition to documentation, Oracle offers free and comprehensive training resources such as learning paths, tutorials, hands-on labs, and videos to help users develop applications on Oracle Cloud Native Environment and get the best value from their Kubernetes deployments.

Resources

- Learn more at oracle.com/linux/cloud-native-environment
- Oracle Cloud Native Environment documentation and training
- Oracle Linux and Oracle Virtualization Hardware Certification List (HCL)

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