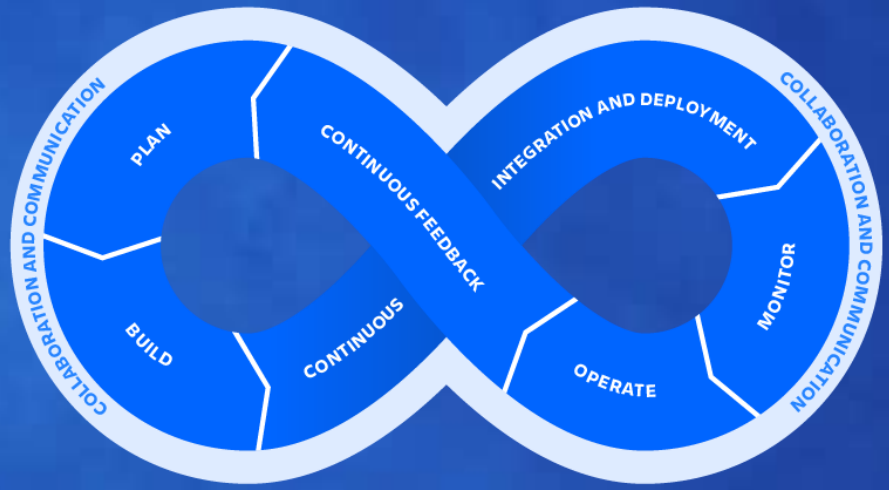


Session 18. Kubernetes Cluster on Oracle Infrastructure

Ram N Sangwan

Objectives

- Containers and Container Orchestration
- Orchestration systems and Kubernetes
- Oracle Container Engine for Kubernetes
- Setting up the Kubernetes Cluster in OCI
- Installing Kubernetes Dashboard
- Exploring your Cluster

Key Containers / Orchestration Use Cases

	Container Use Cases	Orchestration Use Cases
Development	Developer productivity; Consistent appstacks in Dev, Test & Production	Auto deploys to accelerate application release cadence
CI/CD/DevOps (Cont. Integ)	Containerized dependencies; Container registries;	Rolling updates and reversals
Operations	Standardized environments for dev, testing and operations	Resilient, self-healing systems; High Availability; Elastic Scalability
Refactor Legacy Apps	Refactor from N-tier to portable containerized applications	Run distributed, stateful apps on scale-out infrastructure
Migrate to Cloud	Move entire appstacks and see them run identically in the cloud	Cloud bursting; Reduce infrastructure costs by avoiding over-provisioning

Docker and Kubernetes

Docker Containers

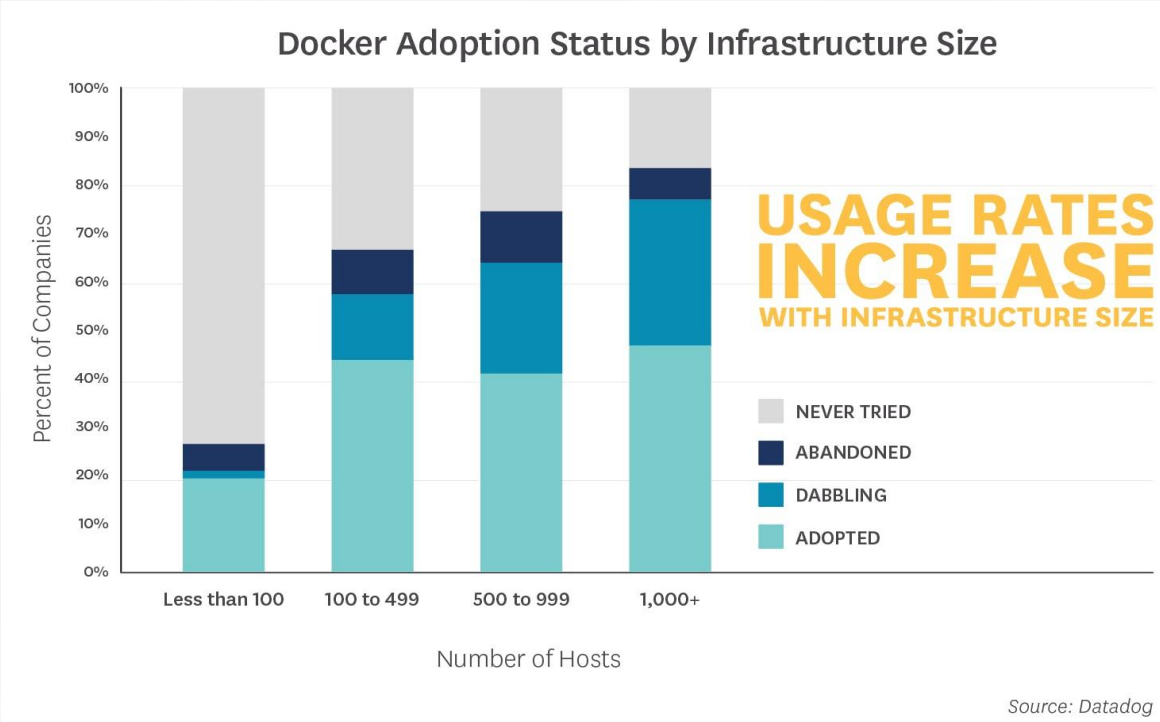
- Popular, easy to use tooling targeting developer productivity
- De-facto standard container runtime and image format
- Used for developer on-boarding and 1st generation application management

• Kubernetes Orchestration

- Production grade container management targeting DevOps and operations, with widespread adoption
- Complex but powerful toolset supporting cloud scale applications
- Rich operations feature set, autos-caling, rolling upgrades, stateful apps and more.

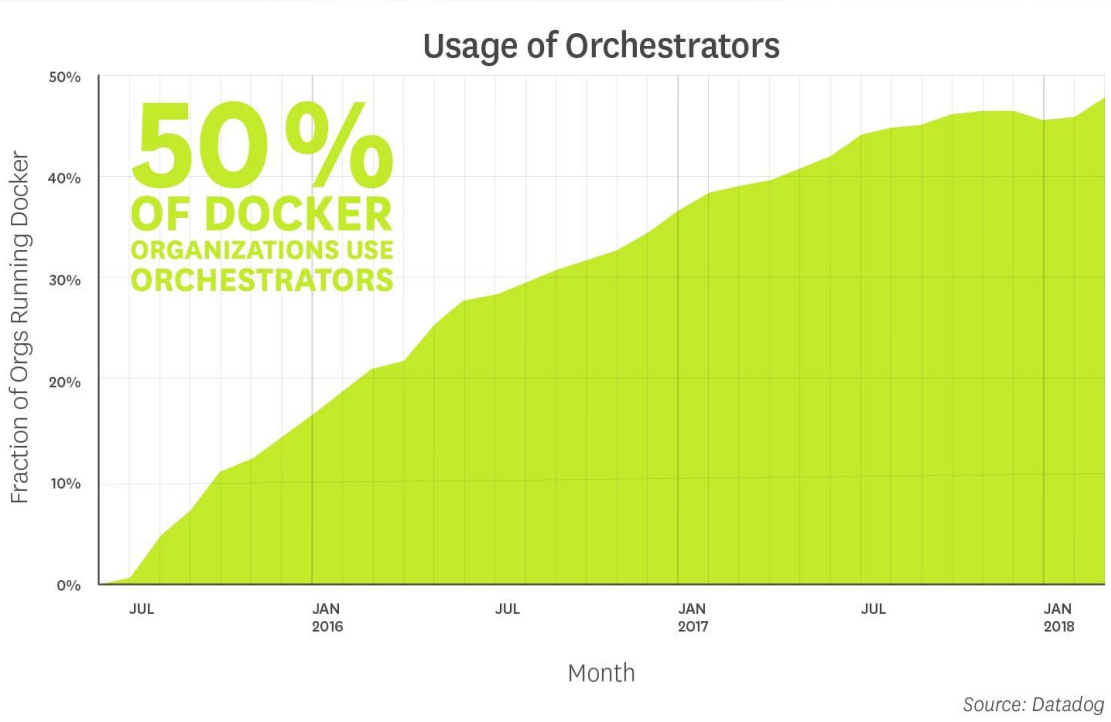
Docker & Kubernetes Lead the Market

Containers (Docker)



- 60% of enterprise companies (500+ hosts) use Docker
- 40% of all the hosts at these companies run Docker

• Orchestration (Kubernetes)



- 50% of Docker users also use orchestrators
- 80% of these orchestration users prefer Kubernetes

Container Orchestration & Containers as a Service (CaaS)

- Multi-container apps
- Scheduling
- Service Discovery
- Maintaining Desired State

- Orchestration as a service
- Hosted Container Runtime
- Minimize operational overhead

Kubernetes Cluster

What is It?

- Managed Kubernetes container service to deploy and run your own container based apps
- Tooling to create, scale, manage & control your own standard Kubernetes clusters instantly

What Problems Does it Solve?

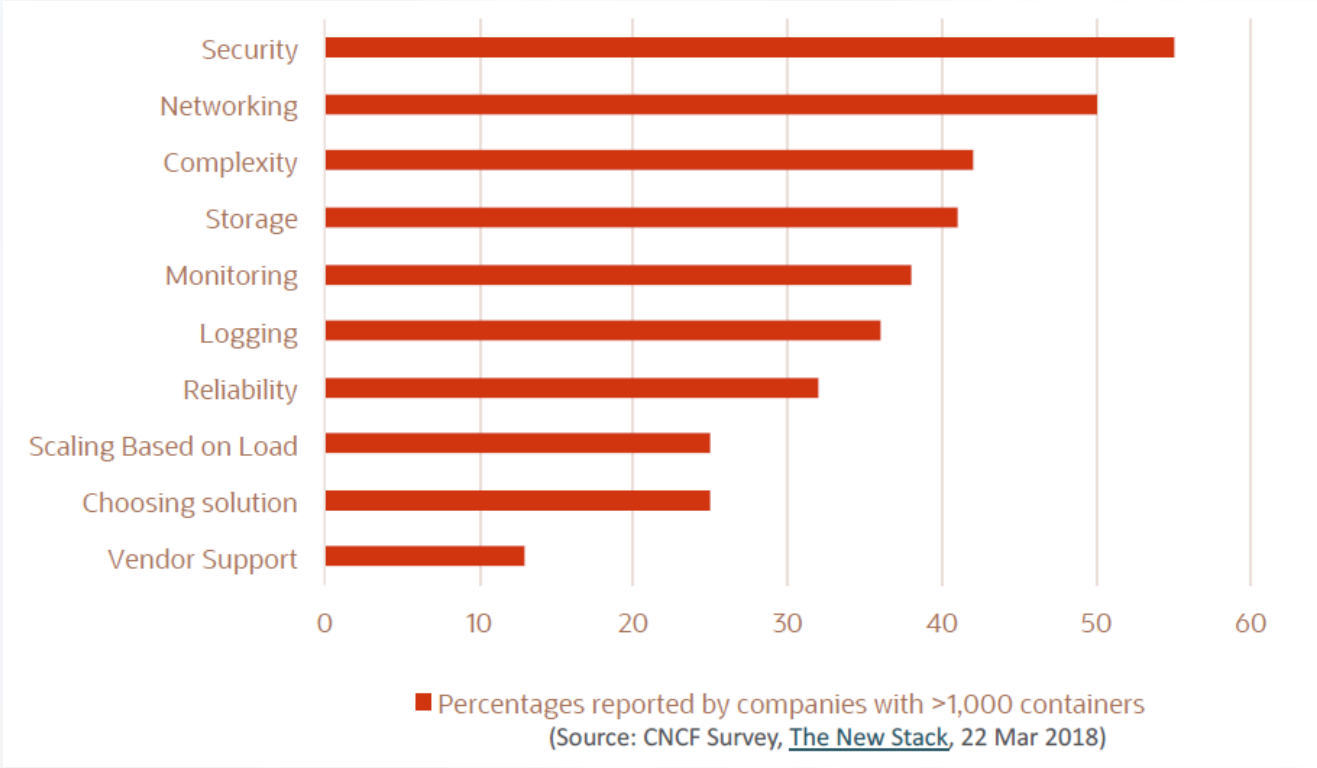
- Complex, costly and time consuming build & maintain environments
- Hard to integrate Kubernetes with a registry and build process for container lifecycle management
- Difficult to manage and control team access to production clusters

Key Benefits

- Enables developers to get started and deploy containers quickly. Gives visibility and control for Kubernetes management.
- Combines production grade container orchestration of open Kubernetes, with control, security, IAM, and high predictable performance of Oracle's next generation cloud infrastructure

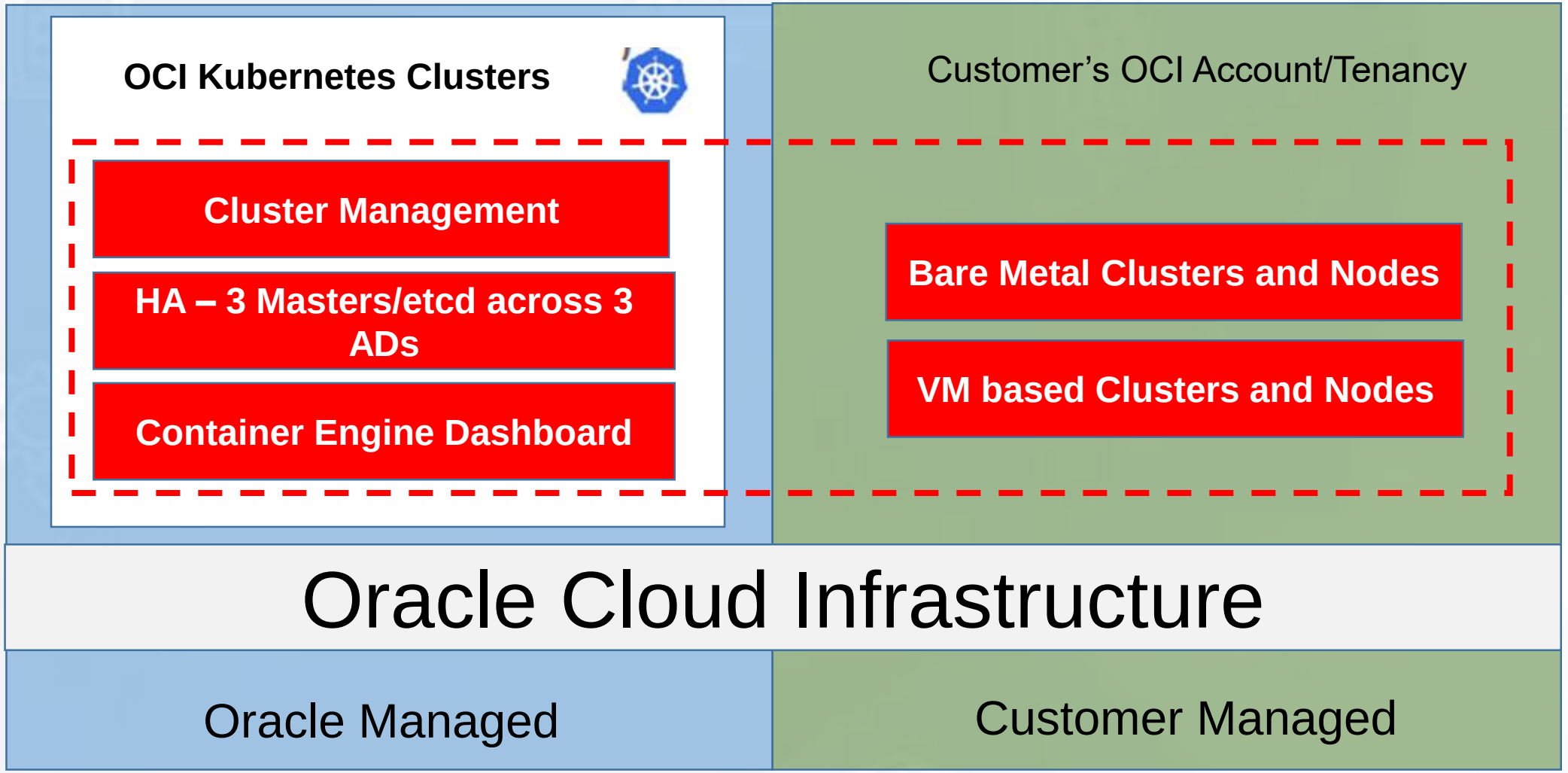
Kubernetes Challenges

- Managing Kubernetes Infrastructure, upgrading, security
- Container networking & persistent storage
- Managing Teams & Access

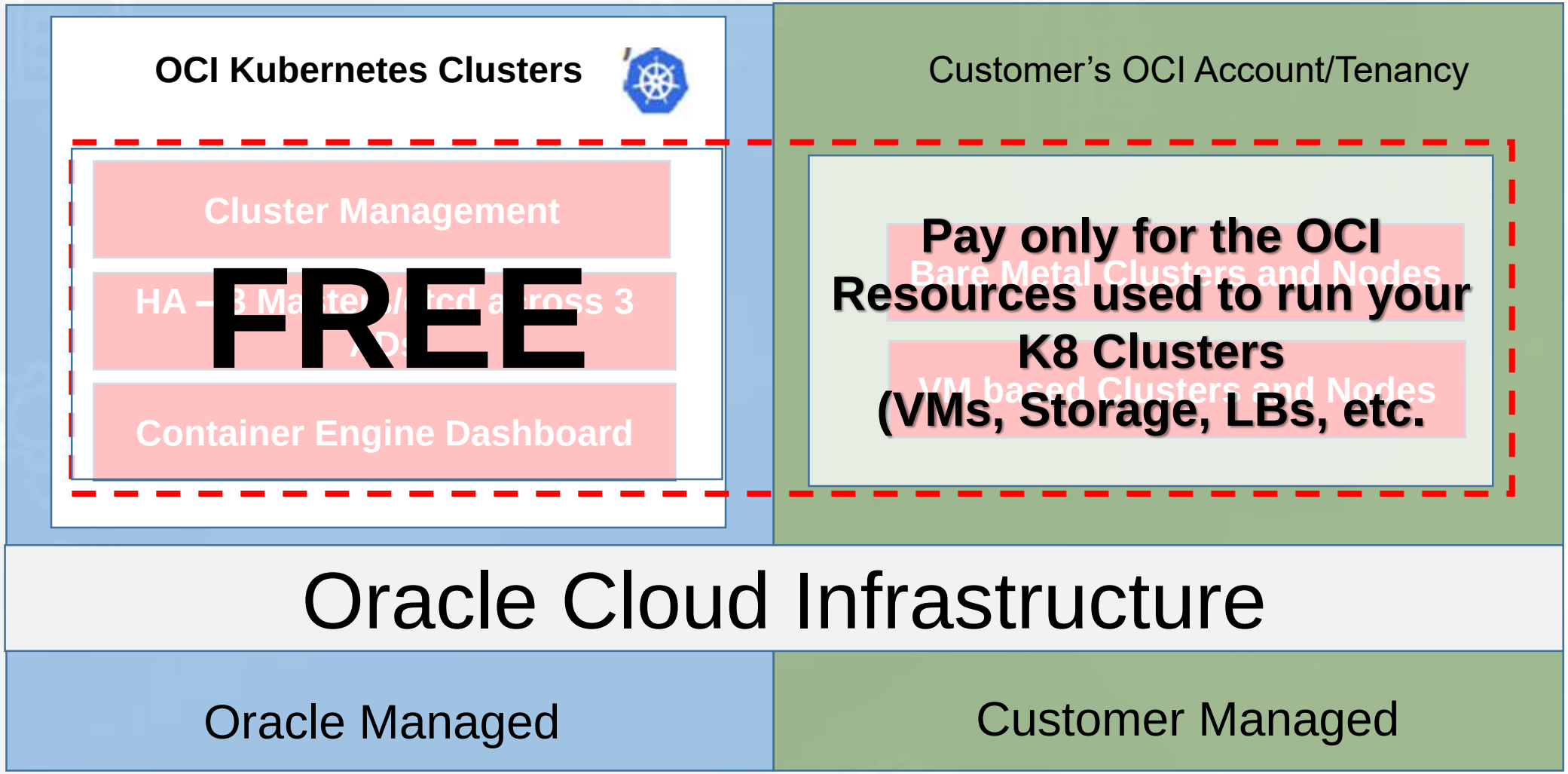


- CI/CD Integration, automated testing, conditional release

Working with Kubernetes Clusters on OCI



Working with Kubernetes Clusters



OCI Kubernetes Clusters

- Container Native
- Developer Friendly
- Enterprise Ready

Container Native

- **Standard Docker & Kubernetes**
  - Deploy standard & open upstream Docker and Kubernetes versions for compatibility across environments
- **Registry Integration**
  - Full Docker v2 compatible private registry to store and manage images
- **Container Engine**
  - Deploy and operate containers and clusters
- **Full integration to cloud networking and storage**
  - Leverage the enterprise class networking, load balancing and persistent storage of Oracle Cloud Infrastructure

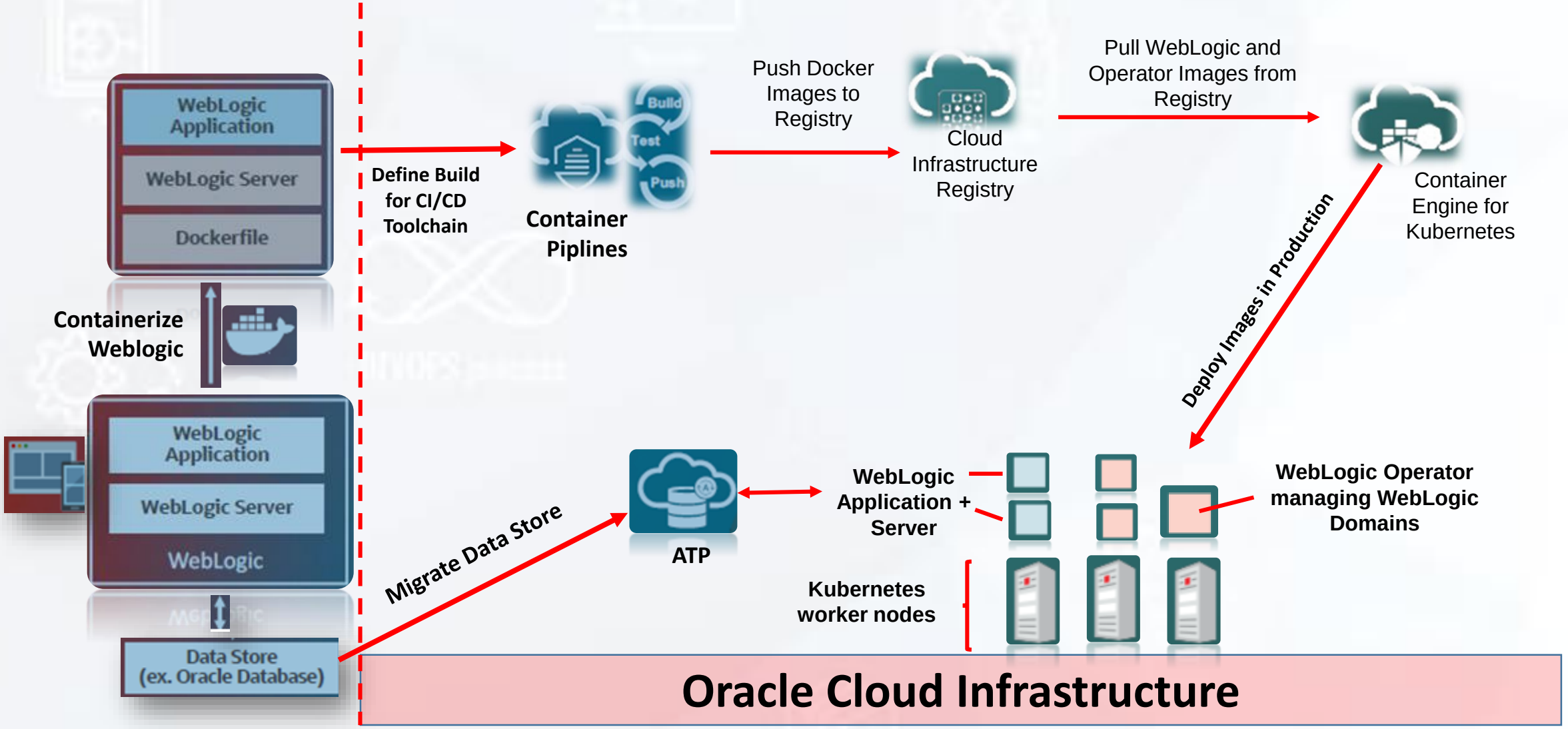
Developer Friendly

- Streamlined Workflow
  - Use your favorite CI to push containers to the registry, then Kubernetes to deploy to clusters and manage operations
- Full REST API
  - Automate the workflow, create and scale clusters through full REST API
- Open Standards
  - Docker Based Runtime
  - Worker Node SSH Access
  - Standard Kubernetes

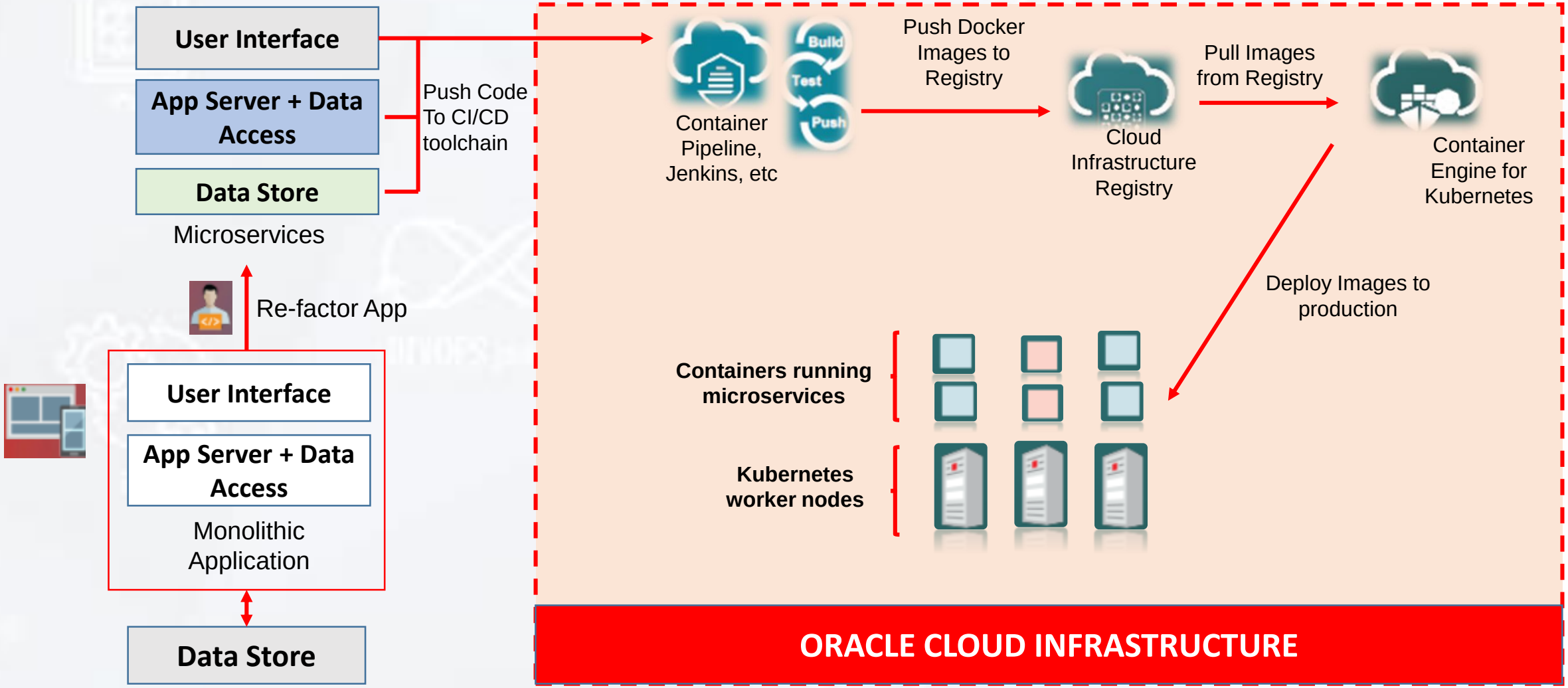
Enterprise Ready

- **Simplified Cluster Operations**
  - Fully managed, highly available registry, master nodes and control plane
  - One-click Quick Create for secure Private Worker Nodes/Subnets
- **Full Bare Metal Performance and Highly Available IaaS**
  - Combine Kubernetes with bare metal shapes for raw performance
  - Deploy Kubernetes clusters across multiple Availability Domains for resilient applications
- **Team Based Access Controls**
  - Control team access and permissions to clusters

Containers Use Case: Lift & Shift WebLogic Application



Containers Use Case: Refactor an Existing Application



Creating Kubernetes Cluster in OCI

Pre-requisites for creating a K8s Cluster via Quickstart

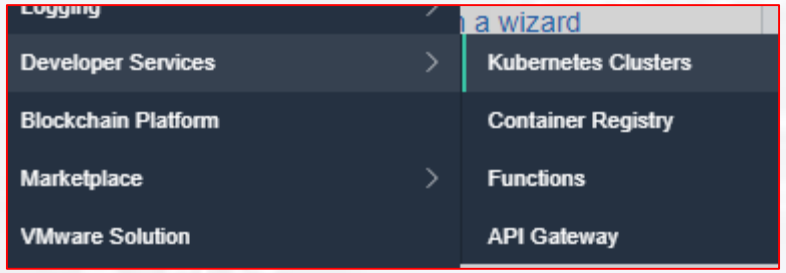
- Monthly Credits have limit of 3 clusters per OCI region with 1000 nodes in a cluster and Pay-as-you-go or Promo accounts have a limit for One Cluster.
- Must also have compute Instance Quota (Required) – to launch k8s worker nodes in an AD or across ADs for HA
- Required Policy in the root compartment of your tenancy

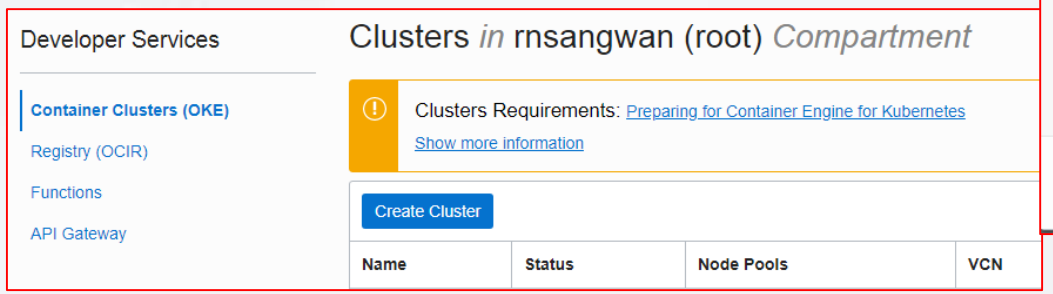
  allow service OKE to manage all-resources in tenancy
- User must be either part of the Admin group or a group to which a policy grants the appropriate Container Engine for Kubernetes permissions.
- Policies can be created for users which are not part of the admin group. Eg.

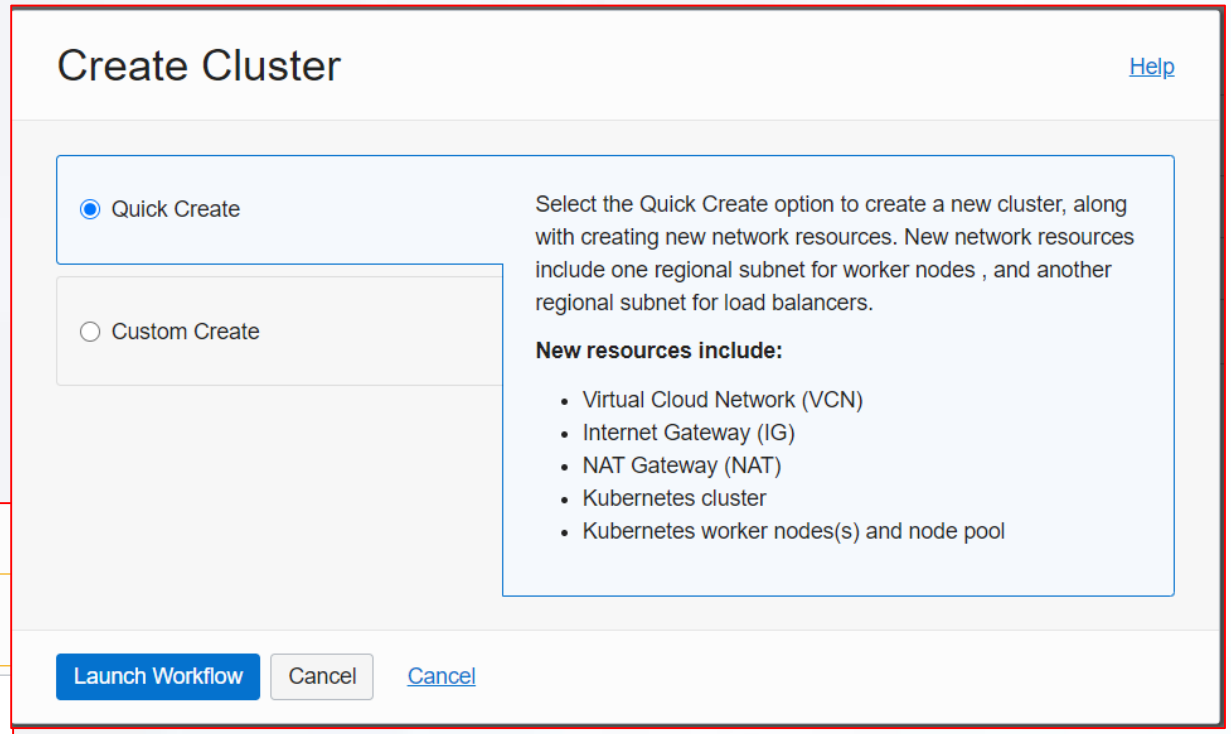
  allow group dev-team to manage cluster-family in tenancy

OKE Quickstart – 1/3

- Navigate to Menu -> Developer Services -> **Kubernetes Clusters**
- -> Create Cluster

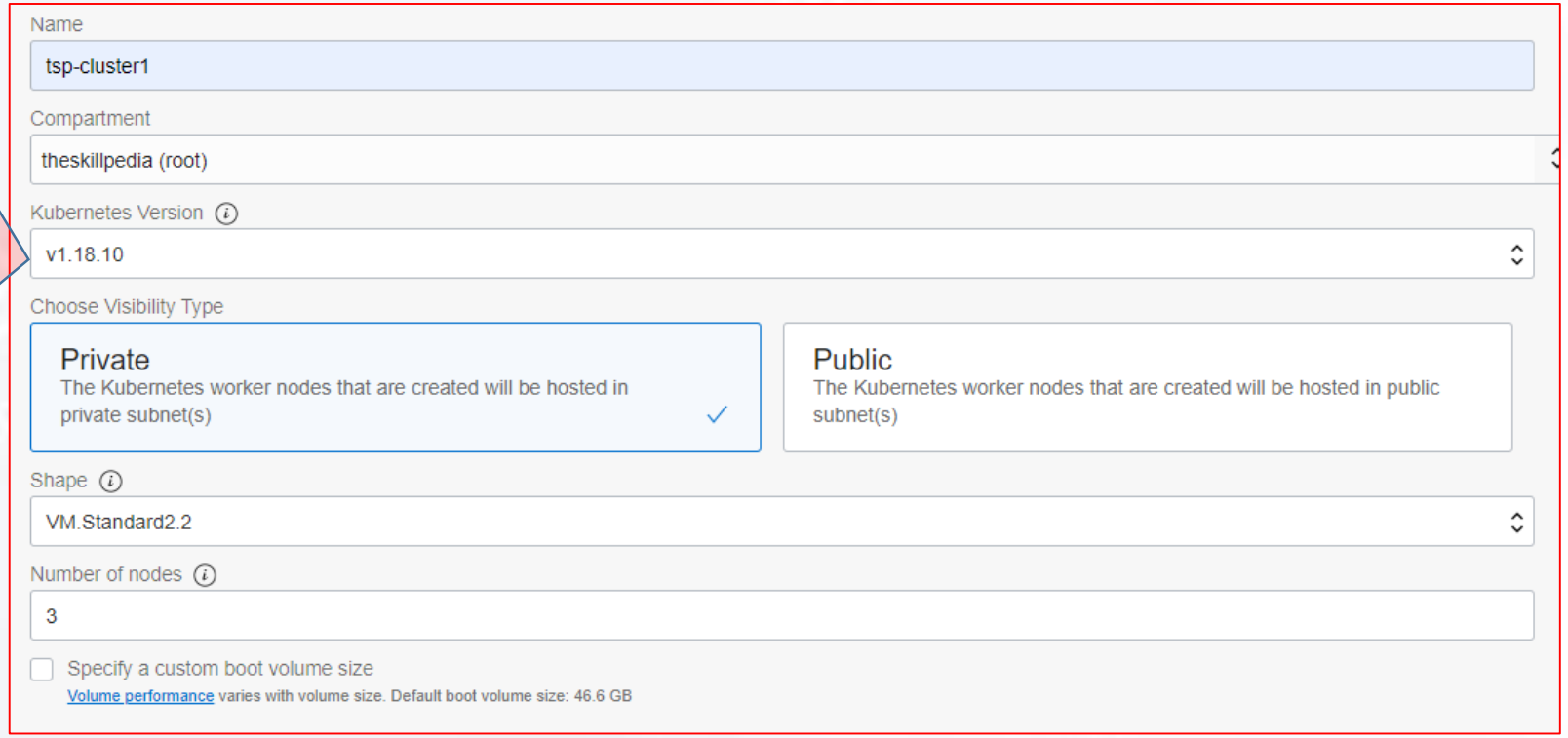




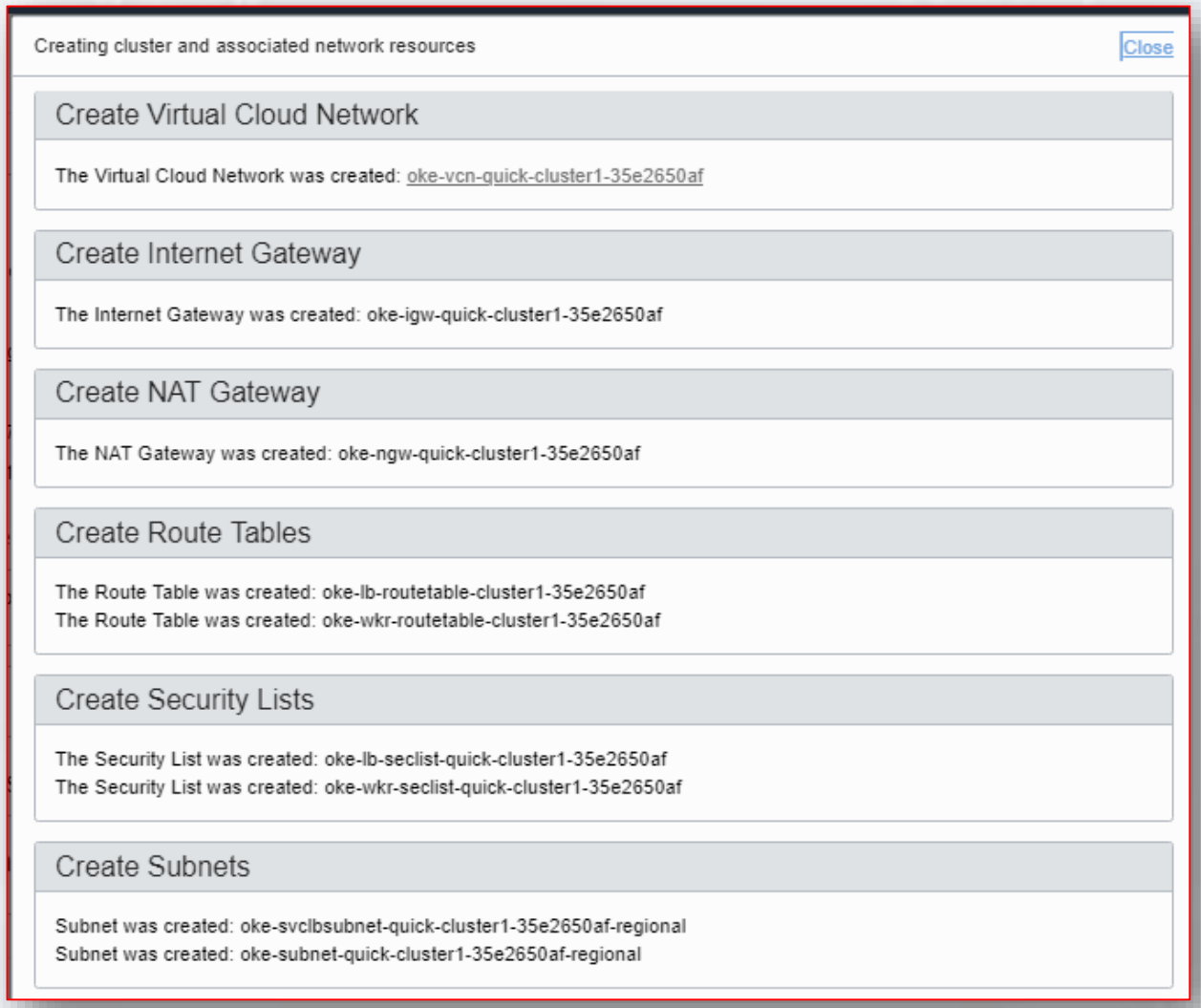


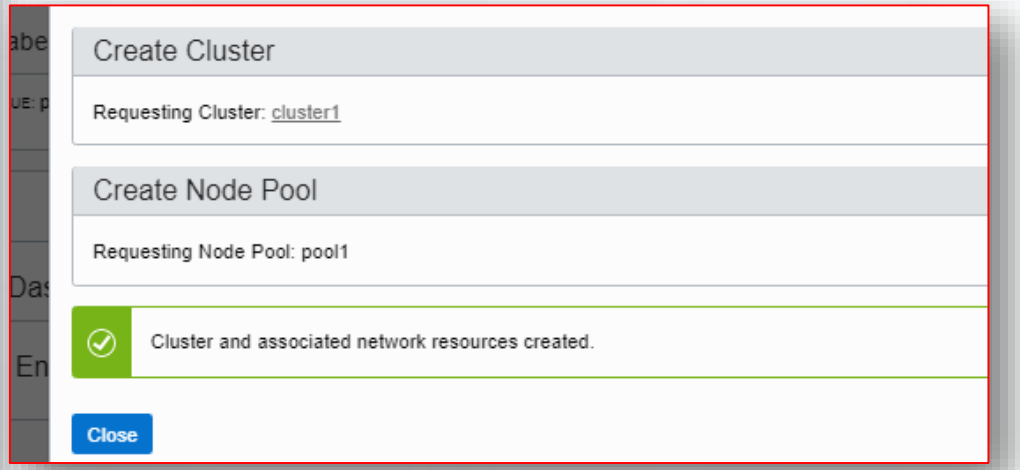
OKE Quickstart – 2/3

The version of Kubernetes to run on the master nodes and worker nodes of the cluster. Either accept the default version or select a version of your choice. Amongst other things, the Kubernetes version you select determines the default set of admission controllers that are turned on in the created cluster



OKE Quickstart – 3/3





Thank You