Introducing OpenShift Storage Architecture

Objectives

After completing this section, you should be able to describe Red Hat OpenShift Container Platform storage requirements, and compare the architecture choices for using Red Hat Ceph Storage as an RHOCP storage back end.

Red Hat OpenShift Container Platform overview

Kubernetes is an orchestration service that deploys, manages, and scales containerized applications. Developers can use Kubernetes to iterate on application building and automate administrative tasks. Kubernetes wraps containers and other resources into pods, and enables abstracting an application into a single deployment unit.

Red Hat OpenShift Container Platform (RHOCP) is a collection of modular components and services that are built on top of a Kubernetes container infrastructure. OpenShift Container Platform provides remote management, multitenancy, monitoring, auditing, and application lifecycle management. It features enhanced security capabilities and self-service interfaces. It also integrates with major Red Hat products, that extend the capabilities of the platform.

OpenShift Container Platform is available in most clouds, whether as a managed cloud service in public clouds or as self-managed software in your data center. These implementations offer different levels of platform automation, update strategies, and operation customization. This training material references RHOCP 4.8.

OpenShift Container Platform assigns the responsibilities of each node within the cluster by using different roles. The *machine config pools (MCP)* are sets of hosts where a role is assigned. Each MCP manages the hosts and their configuration. The *control plane* and the *compute* MCPs are created by defualt.

Compute nodes are responsible for running the scheduled workloads of the control plane. Compute nodes contain services such as *CRI-O* (Container Runtime Interface with Open Container Initiative compatibility), to run, stop or restart containers, and *kubelet*, which acts as an agent to accept a request to operate the containers.

Control plane nodes are responsible for running the main OpenShift services, such as the following ones:

- OpenShift API server. It validates and configures the data for OpenShift resources, such as projects, routes, and templates.
- OpenShift controller manager. It watches the `etcd` service for changes to resources and uses the API to enforce the specified state.
- OpenShift OAuth API server. It validates and configures the data to authenticate to the OpenShift Container Platform, such as users, groups, and OAuth tokens.

Describing Operators and Custom Resource Definitions

Operators are applications that invoke the OpenShift controller API to manage resources. Operators provide a repeatable way to package, deploy, and manage a containerized application.