Red Hat OpenShift Components and Editions

Objectives

- Describe the relationship between OpenShift, Kubernetes, and other Open Source projects, and list key features of Red Hat OpenShift products and editions.

Introduction to Red Hat OpenShift

Kubernetes provides many features to run container workloads on clusters. However, for some features, Kubernetes provides only the building blocks to implement them, because different environments might need different solutions. Kubernetes administrators can select an existing solution or implement their own solution to fit their specific requirements.

OpenShift uses the extensibility of Kubernetes to build a complete solution by adding the following features to a Kubernetes cluster:

Integrated developer workflow
When running applications on Kubernetes, you need to build and store container images for the applications. OpenShift integrates a built-in container registry, CI/CD pipelines, and S2I, a tool to build artifacts from source repositories to container images.

Observability
To achieve the intended reliability, performance, and availability of applications, cluster administrators might need additional tools to prevent and solve issues. OpenShift includes monitoring and logging services for both your applications and the cluster.

Server management
Kubernetes requires an operating system to run on that must be installed, configured, and maintained.

OpenShift provides installation and update procedures for many scenarios.

Additionally, hosts in a cluster use Red Hat Enterprise Linux CoreOS (RHEL CoreOS) as the underlying operating system. RHEL CoreOS is an immutable operating system that is optimized for running containerized applications. RHEL CoreOS uses the same kernel and packages as Red Hat Enterprise Linux. OpenShift also provides features to manage RHEL CoreOS following the Kubernetes configuration model.

OpenShift also brings unified tools and a graphical web console to manage all the different capabilities, and additional enhancements such as improved security measures.

This diagram shows many of the projects that provide the various functions within each OpenShift cluster:

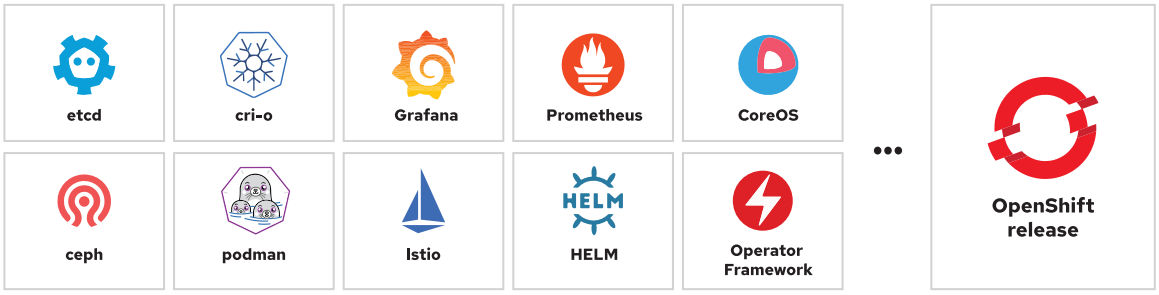

Figure 1.4: Open source projects in an OpenShift release

Because OpenShift features build on Kubernetes extensibility, administrators can often operate these features by using their existing Kubernetes knowledge. Besides Kubernetes knowledge, OpenShift administrators can use most existing products that are designed for Kubernetes.

Red Hat OpenShift Editions

When you initially explore OpenShift, using Red Hat OpenShift Local is a viable approach that deploys a cluster on a local computer for testing and exploration. Red Hat also provides a Developer Sandbox where you get 30 days of free access to a shared OpenShift cluster. These options provide access to a cluster and support testing and exploration as you consider adopting OpenShift, but are not suitable environments for production deployments.

When you are ready to adopt Red Hat OpenShift for production workloads, various editions are available to suit any business requirement for the cluster deployment.

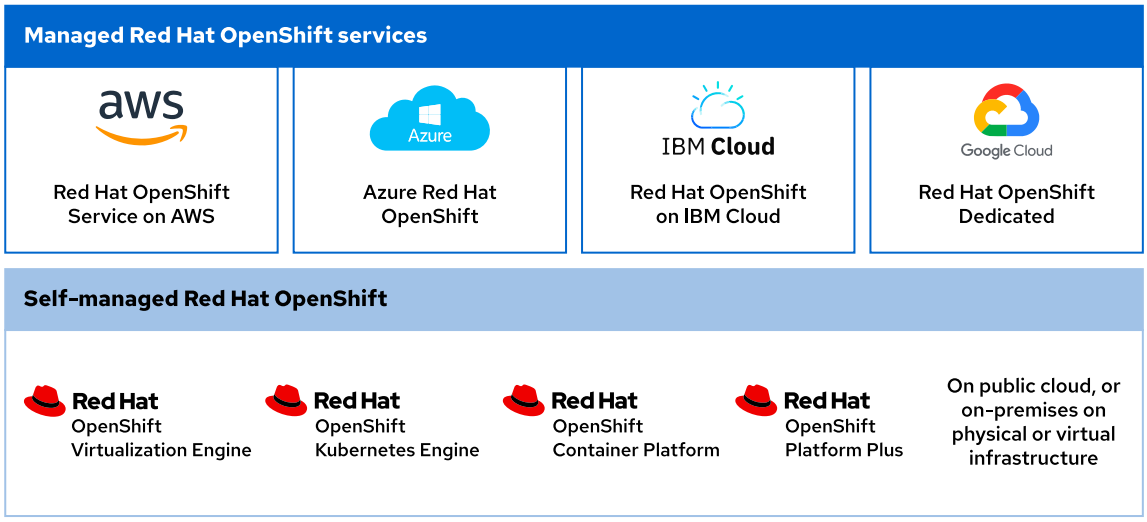

Figure 1.5: Product editions

Public cloud partners, such as Amazon Web Services, Microsoft Azure, IBM Cloud, and Google Cloud each provide quick access to an on-demand Red Hat OpenShift deployment. These managed deployments offer quick access to a cluster on infrastructure that you can rely on from a Red Hat trusted cloud provider.

You can also deploy a Red Hat OpenShift cluster by using the available installers on physical or virtual infrastructure, either on-premise or in a public cloud. These self-managed offerings are available in several forms.

The choice of deployment methods depends on many factors. When using the managed services, more responsibilities are delegated to Red Hat and the cloud provider. Because the installation process integrates with the cloud provider, the managed service creates and manages all necessary cloud resources.

When using the installers, you can still delegate hardware management to a cloud provider, or use your own. However, you manage the rest of the solution. With self-managed editions, you have greater control and flexibility, but you also take on greater responsibilities over the service.

For example, with managed services, the Red Hat Site Reliability Engineering teams update the clusters and remedy update issues (although you still participate in scheduling the updates). On self-managed editions, you update the clusters and remedy update issues. On the other hand, on self-managed editions you have complete control over aspects such as authentication, when managed editions might restrict some options.

Each managed edition documents the responsibilities for customers, Red Hat, and the cloud provider.

Additionally, to assist in managing clusters, the Red Hat Insights Advisor is available from the Red Hat Hybrid Cloud Console. The Insights Advisor helps administrators to identify and remediate cluster issues by analyzing data that the Insights Operator provides. The data from the operator is uploaded to the Red Hat Hybrid Cloud Console, where you further inspect the recommendations and their impact on the cluster.

The contents of this course apply to both managed services and self-managed editions.

Red Hat OpenShift Virtualization Engine provides the virtualization functionality found across all OpenShift editions to deploy, manage, and scale virtual machines (VMs) exclusively. This solution offers a focused approach to virtual machine management and includes key capabilities for VM support including a dedicated virtualization admin console, Red Hat OpenShift GitOps, user workload monitoring, and platform logging.

Red Hat OpenShift Kubernetes Engine includes the latest version of the Kubernetes platform with the additional security hardening and enterprise stability that Red Hat is famous for delivering. This deployment runs on the Red Hat Enterprise Linux CoreOS immutable container operating system, by using Red Hat OpenShift Virtualization for virtual machine management, and provides an administrator console to aid in operational support.

Red Hat OpenShift Container Platform builds on the features of the OpenShift Kubernetes Engine to include additional cluster manageability, security, stability, and ease of application development for businesses. Additional features of this tier include a developer console, as well as log management, cost management, and metering information. This offering adds Red Hat OpenShift Serverless (Knative), Red Hat OpenShift Service Mesh (Istio), Red Hat OpenShift Pipelines (Tekton), and Red Hat OpenShift GitOps (Argo CD) to the deployment.

Red Hat OpenShift Platform Plus expands further on the offering to deliver the most valuable and robust available features. This offering includes Red Hat Advanced Cluster Management for Kubernetes, Red Hat Advanced Cluster Security for Kubernetes, and the Red Hat Quay private registry platform. For the most complete and full-featured container experience, Red Hat OpenShift Platform Plus bundles all the necessary tools for a complete development and administrative approach to containerized application platform management.

All OpenShift editions use the same code. Most content in this course applies to all OpenShift editions.

REFERENCES

What Kubernetes Is Not

For more information, refer to the *OpenShift Container Platform Overview* section in the *OpenShift Container Platform Architecture* chapter in the Red Hat OpenShift Container Platform 4.18 *Architecture* documentation at https://docs.redhat.com/en/documentation/openshift_container_platform/4.18/html-single/architecture/index#architecture-platform-benefits_architecture

For more information, refer to the *Supported Platforms for OpenShift Container Platform Clusters* section in the *Installation and Update* chapter in the Red Hat OpenShift Container Platform 4.18 *Architecture* documentation at https://docs.redhat.com/en/documentation/openshift_container_platform/4.18/html-single/architecture/index#supported-platforms-for-openshift-clusters_architecture-installation

Red Hat OpenShift Cloud Services

Overview of Responsibilities for Red Hat OpenShift Service on AWS

Red Hat OpenShift Kubernetes Engine

Red Hat OpenShift Platform Plus