



OpenShift Container Platform 4.10

About

Introduction to OpenShift Container Platform

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Abstract

This document provides an overview of the OpenShift Container Platform features.

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CHAPTER 1. OPENSIFT CONTAINER PLATFORM 4.10 DOCUMENTATION

Welcome to the official OpenShift Container Platform 4.10 documentation, where you can learn about OpenShift Container Platform and start exploring its features.

To navigate the OpenShift Container Platform 4.10 documentation, you can use one of the following methods:

- Use the left navigation bar to browse the documentation.
- Select the task that interests you from the contents of this Welcome page.

Start with [Architecture](#) and [Security and compliance](#). Then, see the [release notes](#).

1.1. CLUSTER INSTALLER ACTIVITIES

Explore these OpenShift Container Platform installation tasks.

- **[OpenShift Container Platform installation overview](#)** You can install OpenShift Container Platform on installer-provisioned or user-provisioned infrastructure. The OpenShift Container Platform installation program provides the flexibility to deploy OpenShift Container Platform on a range of different platforms.
- **[Install a cluster on Alibaba](#)** You can install OpenShift Container Platform on Alibaba Cloud on installer-provisioned infrastructure. This is currently a Technology Preview feature only.
- **[Install a cluster on AWS](#)** You have many installation options when you deploy a cluster on Amazon Web Services (AWS). You can deploy clusters with [default settings](#) or [custom AWS settings](#). You can also deploy a cluster on AWS infrastructure that you provisioned yourself. You can modify the provided [AWS CloudFormation templates](#) to meet your needs.
- **[Install a cluster on Azure](#)** You can deploy clusters with [default settings](#), [custom Azure settings](#), or [custom networking settings](#) in Microsoft Azure. You can also provision OpenShift Container Platform into an [Azure Virtual Network](#) or use [Azure Resource Manager Templates](#) to provision your own infrastructure.
- **[Install a cluster on Azure Stack Hub](#)** You can install OpenShift Container Platform on Azure Stack Hub on installer-provisioned infrastructure.
- **[Install a cluster on GCP](#)** You can deploy clusters with [default settings](#) or [custom GCP settings](#) on Google Cloud Platform (GCP). You can also perform a GCP installation where you provision your own infrastructure.
- **[Install a cluster on IBM Cloud](#)** You can install OpenShift Container Platform on IBM Cloud on installer-provisioned infrastructure.
- **[Install a cluster on IBM Power](#)** You can install OpenShift Container Platform on IBM Power on user-provisioned infrastructure.
- **[Install a cluster on VMware vSphere](#)** You can install OpenShift Container Platform on supported versions of vSphere.
- **[Install a cluster on VMware Cloud](#)** You can install OpenShift Container Platform on supported versions of VMware Cloud (VMC) on AWS.

- **Install a cluster with z/VM on IBM Z and LinuxONE** You can install OpenShift Container Platform with z/VM on IBM Z and LinuxONE on user-provisioned infrastructure.
- **Install a cluster with RHEL KVM on IBM Z and LinuxONE** You can install OpenShift Container Platform with RHEL KVM on IBM Z and LinuxONE on user-provisioned infrastructure.
- **Install an installer-provisioned cluster on bare metal** You can install OpenShift Container Platform on bare metal with an installer-provisioned architecture.
- **Install a user-provisioned cluster on bare metal** If none of the available platform and cloud provider deployment options meet your needs, you can install OpenShift Container Platform on user-provisioned bare metal infrastructure.
- **Install a cluster on Red Hat OpenStack Platform (RHOSP)** You can install a cluster on [RHOSP with customizations](#), with [network customizations](#), or [on a restricted network](#) on installer-provisioned infrastructure. You can install a cluster on [RHOSP with customizations](#), [with network customizations](#), or [with SR-IOV](#) on user-provisioned infrastructure.
- **Install a cluster on Red Hat Virtualization (RHV)** You can deploy clusters on Red Hat Virtualization (RHV) with a [quick install](#) or an [install with customizations](#).
- **Install a cluster in a restricted network** If your cluster that uses user-provisioned infrastructure on [AWS](#), [GCP](#), [vSphere](#), [IBM Z and LinuxONE with z/VM](#), [IBM Z and LinuxONE with RHEL KVM](#), [IBM Power](#), or [bare metal](#) does not have full access to the internet, then [mirror the OpenShift Container Platform installation images](#) and install a cluster in a restricted network.
- **Install a cluster in an existing network** If you use an existing Virtual Private Cloud (VPC) in [AWS](#) or [GCP](#) or an existing [VNet](#) on Azure, you can install a cluster.
- **Install a private cluster.** If your cluster does not require external internet access, you can install a private cluster on [AWS](#), [Azure](#), or [GCP](#). Internet access is still required to access the cloud APIs and installation media.
- **Check installation logs** Access installation logs to evaluate issues that occur during OpenShift Container Platform installation.
- **Access OpenShift Container Platform:** Use credentials output at the end of the installation process to log in to the OpenShift Container Platform cluster from the command line or web console.
- **Install Red Hat OpenShift Data Foundation** You can install Red Hat OpenShift Data Foundation as an Operator to provide highly integrated and simplified persistent storage management for containers.

1.2. DEVELOPER ACTIVITIES

Develop and deploy containerized applications with OpenShift Container Platform. OpenShift Container Platform is a platform for developing and deploying containerized applications. OpenShift Container Platform documentation helps you:

- **Understand OpenShift Container Platform development** Learn the different types of containerized applications, from simple containers to advanced Kubernetes deployments and Operators.

- **Work with projects:** Create projects from the OpenShift Container Platform web console or OpenShift CLI (**oc**) to organize and share the software you develop.
- **Work with applications:**

Use the **Developer perspective** in the OpenShift Container Platform web console to [create and deploy applications](#).

Use the **Topology view** to see your applications, monitor status, connect and group components, and modify your code base.

- **Connect your workloads to backing services** The Service Binding Operator enables application developers to easily bind workloads with Operator-managed backing services by automatically collecting and sharing binding data with the workloads. The Service Binding Operator improves the development lifecycle with a consistent and declarative service binding method that prevents discrepancies in cluster environments.
- **Use the developer CLI tool (odo)** : The **odo** CLI tool lets developers create single or multi-component applications easily and automates deployment, build, and service route configurations. It abstracts complex Kubernetes and OpenShift Container Platform concepts, allowing you to focus on developing your applications.
- **Create CI/CD Pipelines:** Pipelines are serverless, cloud-native, continuous integration and continuous deployment systems that run in isolated containers. They use standard Tekton custom resources to automate deployments and are designed for decentralized teams that work on microservice-based architecture.
- **Manage your infrastructure and application configurations** GitOps is a declarative way to implement continuous deployment for cloud native applications. GitOps defines infrastructure and application definitions as code. Then, it uses this code to manage multiple workspaces and clusters to simplify the creation of infrastructure and application configurations. GitOps also handles and automates complex deployments at a fast pace, saving time during deployment and release cycles.
- **Deploy Helm charts** **Helm** is a software package manager that simplifies deployment of applications and services to OpenShift Container Platform clusters. Helm uses a packaging format called charts. A Helm chart is a collection of files that describes the OpenShift Container Platform resources.
- **Understand image builds:** Choose from different build strategies (Docker, S2I, custom, and pipeline) that can include different kinds of source materials (from places like Git repositories, local binary inputs, and external artifacts). Then, follow examples of build types from basic builds to advanced builds.
- **Create container images:** A container image is the most basic building block in OpenShift Container Platform (and Kubernetes) applications. Defining image streams lets you gather multiple versions of an image in one place as you continue its development. S2I containers let you insert your source code into a base container that is set up to run code of a particular type, such as Ruby, Node.js, or Python.
- **Create deployments:** Use **Deployment** and **DeploymentConfig** objects to exert fine-grained management over applications. [Manage deployments](#) using the **Workloads** page or OpenShift CLI (**oc**). Learn [rolling, recreate, and custom](#) deployment strategies.
- **Create templates:** Use existing templates or create your own templates that describe how an application is built or deployed. A template can combine images with descriptions, parameters, replicas, exposed ports and other content that defines how an application can be run or built.

- **Understand Operators:** Operators are the preferred method for creating on-cluster applications for OpenShift Container Platform 4.10. Learn about the Operator Framework and how to deploy applications using installed Operators into your projects.
- **Develop Operators:** Operators are the preferred method for creating on-cluster applications for OpenShift Container Platform 4.10. Learn the workflow for building, testing, and deploying Operators. Then, create your own Operators based on [Ansible](#) or [Helm](#), or configure [built-in Prometheus monitoring](#) using the Operator SDK.
- **REST API reference** Learn about OpenShift Container Platform application programming interface endpoints.

1.3. CLUSTER ADMINISTRATOR ACTIVITIES

Manage machines, provide services to users, and follow monitoring and logging reports. This documentation helps you:

- **Understand OpenShift Container Platform management** Learn about components of the OpenShift Container Platform 4.10 control plane. See how OpenShift Container Platform control plane and worker nodes are managed and updated through the [Machine API](#) and [Operators](#).

1.3.1. Manage cluster components

- **Manage machines:** Manage machines in your cluster on [AWS](#), [Azure](#), or [GCP](#) by [deploying health checks](#) and [applying autoscaling to machines](#).
- **Manage container registries:** Each OpenShift Container Platform cluster includes a built-in container registry for storing its images. You can also configure a separate [Red Hat Quay](#) registry to use with OpenShift Container Platform. The [Quay.io](#) web site provides a public container registry that stores OpenShift Container Platform containers and Operators.
- **Manage users and groups:** Add users and groups with different levels of permissions to use or modify clusters.
- **Manage authentication:** Learn how user, group, and API authentication works in OpenShift Container Platform. OpenShift Container Platform supports [multiple identity providers](#).
- **Manage ingress, API server, and service certificates:** OpenShift Container Platform creates certificates by default for the Ingress Operator, the API server, and for services needed by complex middleware applications that require encryption. You might need to change, add, or rotate these certificates.
- **Manage networking:** The cluster network in OpenShift Container Platform is managed by the [Cluster Network Operator](#) (CNO). The CNO uses iptables rules in [kube-proxy](#) to direct traffic between nodes and pods running on those nodes. The Multus Container Network Interface adds the capability to attach [multiple network interfaces](#) to a pod. Using [network policy](#) features, you can isolate your pods or permit selected traffic.
- **Manage storage:** OpenShift Container Platform allows cluster administrators to configure persistent storage using [Red Hat OpenShift Data Foundation](#), [AWS Elastic Block Store](#), [NFS](#), [iSCSI](#), [Container Storage Interface \(CSI\)](#), and more. You can [expand persistent volumes](#), configure [dynamic provisioning](#), and use CSI to [configure](#), [clone](#), and use [snapshots](#) of persistent storage.

- **Manage Operators:** Lists of Red Hat, ISV, and community Operators can be reviewed by cluster administrators and [installed on their clusters](#). After you install them, you can [run](#), [upgrade](#), back up, or otherwise manage the Operator on your cluster.

1.3.2. Change cluster components

- **Use custom resource definitions (CRDs) to modify the cluster** Cluster features implemented with Operators can be modified with CRDs. Learn to [create a CRD](#) and [manage resources from CRDs](#).
- **Set resource quotas:** Choose from CPU, memory, and other system resources to [set quotas](#).
- **Prune and reclaim resources** Reclaim space by pruning unneeded Operators, groups, deployments, builds, images, registries, and cron jobs.
- **Scale and tune clusters:** Set cluster limits, tune nodes, scale cluster monitoring, and optimize networking, storage, and routes for your environment.
- **Update a cluster:** Use the Cluster Version Operator (CVO) to upgrade your OpenShift Container Platform cluster. If an update is available from the OpenShift Update Service (OSUS), you apply that cluster update from either the OpenShift Container Platform [web console](#) or the [OpenShift CLI \(oc\)](#).
- **Understanding the OpenShift Update Service** Learn about installing and managing a local OpenShift Update Service for recommending OpenShift Container Platform updates in disconnected environments.

1.3.3. Monitor the cluster

- **Work with OpenShift Logging:** Learn about OpenShift Logging and configure different OpenShift Logging types, such as Elasticsearch, Fluentd, and Kibana.
- **Monitor:** Learn to [configure the monitoring stack](#). After configuring monitoring, use the web console to access [monitoring dashboards](#). In addition to infrastructure metrics, you can also scrape and view metrics for your own services.
- **Remote health monitoring:** OpenShift Container Platform collects anonymized aggregated information about your cluster. Using Telemetry and the Insights Operator, this data is received by Red Hat and used to improve OpenShift Container Platform. You can view the [data collected by remote health monitoring](#).

CHAPTER 2. LEARN MORE ABOUT OPENSIFT CONTAINER PLATFORM

Use the following sections to find content to help you learn about and use OpenShift Container Platform.

2.1. ARCHITECT

Learn about OpenShift Container Platform	Plan an OpenShift Container Platform deployment	Additional resources
Enterprise Kubernetes with OpenShift	Tested platforms	OpenShift blog
Architecture	Security and compliance	What's new in OpenShift Container Platform
	Networking	OpenShift Container Platform life cycle
	Backup and restore	

2.2. CLUSTER ADMINISTRATOR

Learn about OpenShift Container Platform	Deploy OpenShift Container Platform	Manage OpenShift Container Platform	Additional resources
Enterprise Kubernetes with OpenShift	Installing OpenShift Container Platform	Using Insights to identify issues with your cluster	Getting Support
Architecture	Post installation configuration	Logging	OpenShift Knowledgebase articles
OpenShift Interactive Learning Portal	Networking	Monitoring overview	OpenShift Container Platform Life Cycle
	Storage		
	Backup and restore		
	Updating a cluster		

2.3. APPLICATION SITE RELIABILITY ENGINEER (APP SRE)

Learn about OpenShift Container Platform	Deploy and manage applications	Additional resources
OpenShift Interactive Learning Portal	Projects	Getting Support
Architecture	Operators	OpenShift Knowledgebase articles
	Logging	OpenShift Container Platform Life Cycle
	Blogs about logging	
	Monitoring	

2.4. DEVELOPER

Learn about application development in OpenShift Container Platform	Deploy applications
Getting started with OpenShift for developers (interactive tutorial)	Creating applications
Red Hat Developers site	Builds
Red Hat CodeReady Workspaces	Operators
	Images
	Developer-focused CLI