OpenShift Container Platform 4.17

About

Introduction to OpenShift Container Platform

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Legal Notice

Abstract

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

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CHAPTER 1. OPENSHIFT CONTAINER PLATFORM 4.17 DOCUMENTATION

Table of Contents

Welcome to the official OpenShift Container Platform 4.17 documentation, where you can learn about OpenShift Container Platform and start exploring its features.

To navigate the OpenShift Container Platform 4.17 documentation, you can use one of the following methods:

- Use the navigation bar to browse the documentation.
- Select the task that interests you from Learn more about OpenShift Container Platform .

CHAPTER 2. LEARN MORE ABOUT OPENSHIFT CONTAINER PLATFORM

Use the following sections to find content to help you learn about and better understand OpenShift Container Platform functions:

2.1. ARCHITECTURE

Learn about OpenShift Container Platform	Plan an OpenShift Container Platform deployment	Optional 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	
OpenShift Interactive Learning Portal		• Getting Support • OpenShift Knowledgebase articles

2.2. INSTALLATION

Explore the following OpenShift Container Platform installation tasks:

Learn about installation on OpenShift Container Platform	Optional additional resources
OpenShift Container Platform installation overview	Selecting a cluster installation method and preparing it for users
Installing a cluster in FIPS mode	

2.3. OTHER CLUSTER INSTALLER TASKS

Learn about other installer tasks on OpenShift Container Platform	Optional additional resources
Check installation logs	

Learn about other installer tasks on OpenShift Container Platform	Optional additional resources
Install Red Hat OpenShift Data Foundation	Red Hat Enterprise Linux CoreOS (RHCOS) image layering

Install a cluster in a restricted network

Learn about installing in a restricted network	Optional additional resources
About disconnected installation mirroring	If your cluster uses user-provisioned infrastructure, and the cluster does not have full access to the internet, you must mirror the OpenShift Container Platform installation images. • Amazon Web Services (AWS) • GCP • vSphere • IBM Cloud® • IBM Z® and IBM® LinuxONE • IBM Power® • bare metal

Install a cluster in an existing network

Learn about installing in a restricted network	Optional additional resources
If you use an existing Virtual Private Cloud (VPC) in Amazon Web Services (AWS) or GCP or an existing VNet on Microsoft Azure, you can install a cluster	Installing a cluster on GCP into a shared VPC

2.4. CLUSTER ADMINISTRATOR

Learn about OpenShift Container Platform cluster activities	Optional additional resources
Understand OpenShift Container Platform management	• Machine API • Operators
Enable cluster capabilities	Optional cluster capabilities in OpenShift Container Platform 4.17

2.4.1. Managing and changing cluster components

Managing cluster components

Learn about managing cluster components	Optional additional resources
Manage compute and control plane machines with machine sets.	
Deploying machine health checks	
Applying autoscaling to an OpenShift Container Platform cluster	
Manage container registries	Red Hat Quay
Manage users and groups	
Manage authentication	multiple identity providers
Manage ingress, API server, and service certificates	
Manage networking	• Cluster Network Operator • multiple network interfaces • network policy
Manage Operators	
Understanding Windows container workloads	

Changing cluster components

Learn more about changing cluster components	Optional additional resources
Updating a cluster	• Updating a cluster using the web console • Updating using the CLI • Using the OpenShift Update Service in a disconnected environment
Use custom resource definitions (CRDs) to modify the cluster	• create a CRD • manage resources from CRDs
Set resource quotas	set quotas

Learn more about changing cluster components	Optional additional resources
Prune and reclaim resources	
Scale and tune clusters	

2.5. OBSERVE A CLUSTER

Learn about OpenShift Container Platform	Optional additional resources
Red Hat OpenShift distributed tracing platform (Jaeger)	
Red Hat build of OpenTelemetry	
About Network Observability	• Using metrics with dashboards and alerts • Obsserving the network traffic from the Traffic flows view
Monitoring overview	• In-cluster monitoring • Remote health monitoring • Power monitoring for Red Hat OpenShift (Technology Preview)

2.6. STORAGE ACTIVITIES

Learn about OpenShift Container Platform	Optional additional resources
Manage storage	
Storage	

2.7. APPLICATION SITE RELIABILITY ENGINEER (APP SRE)

Learn about OpenShift Container Platform	Deploy and manage applications	Optional additional resources
	Projects	Getting Support
Architecture	Operators	OpenShift Knowledgebase articles

Learn about OpenShift Container Platform	Deploy and manage applications	Optional additional resources
	OpenShift Container Platform Life Cycle	
Blogs about logging		

2.8. DEVELOPER

Develop and deploy containerized applications with OpenShift Container Platform. OpenShift Container Platform is a platform for developing and deploying containerized applications. Read the following OpenShift Container Platform documentation, so that you can better understand OpenShift Container Platform functions:

Learn about application development in OpenShift Container Platform	Optional additional resources
Getting started with OpenShift for developers (interactive tutorial)	• Creating applications • Creating applications using the Developer perspective
Understand OpenShift Container Platform development	• Work with projects • Create deployments
Red Hat Developers site	• Builds • Understand image builds
Red Hat OpenShift Dev Spaces (formerly Red Hat CodeReady Workspaces)	Operators
Create container images	Images
odo	Developer-focused CLI
Viewing application composition using the Topology view	Exporting applications
Understanding OpenShift Pipelines	Create CI/CD Pipelines

Learn about application development in OpenShift Container Platform	Optional additional resources
Configuring an OpenShift cluster by deploying an application with cluster configurations	• Controlling pod placement using node taints • Creating infrastructure machine sets

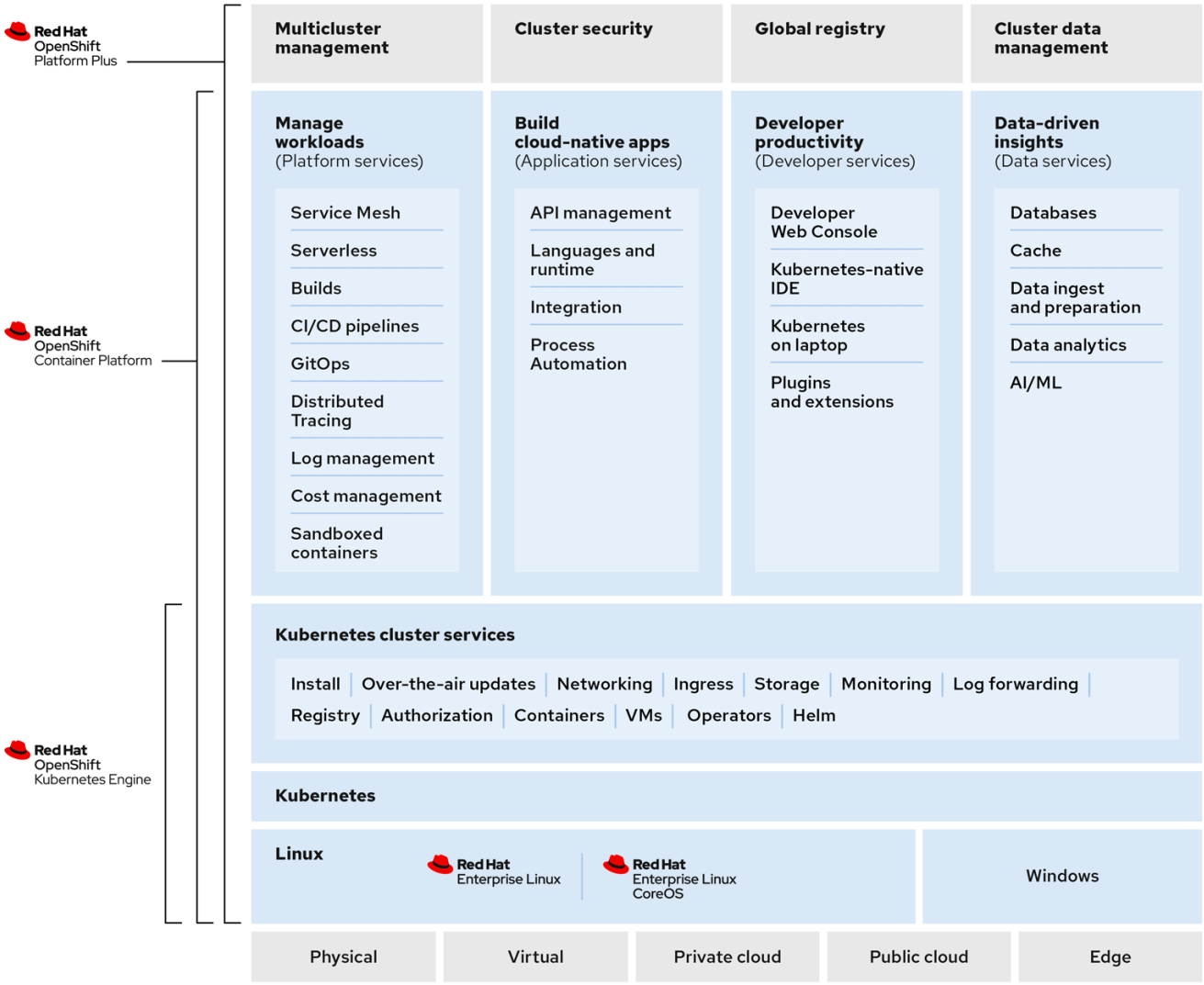
2.9. HOSTED CONTROL PLANES

Learn about hosted control planes	Optional additional resources
Hosted control planes overview	Versioning for hosted control planes
Preparing to deploy	• Requirements for hosted control planes • Sizing guidance for hosted control planes • Overriding resource utilization measurements • Installing the hosted control planes command-line interface • Distributing hosted cluster workloads • Enabling or disabling the hosted control planes feature
Deploying hosted control planes	• Deploying hosted control planes on OpenShift Virtualization • Deploying hosted control planes on AWS • Deploying hosted control planes on bare metal • Deploying hosted control planes on non-bare-metal agent machines • Deploying hosted control planes on IBM Z • Deploying hosted control planes on IBM Power
Deploying hosted control planes in a disconnected environment	• Deploying hosted control planes on bare metal in a disconnected environment • Deploying hosted control planes on OpenShift Virtualization in a disconnected environment

Learn about hosted control planes	Optional additional resources
Troubleshooting hosted control planes	Gathering information to troubleshoot hosted control planes

CHAPTER 3. ABOUT OPENSHIFT KUBERNETES ENGINE

As of 27 April 2020, Red Hat has decided to rename Red Hat OpenShift Container Engine to Red Hat OpenShift Kubernetes Engine to better communicate what value the product offering delivers.



Red Hat OpenShift Kubernetes Engine is a product offering from Red Hat that lets you use an enterprise class Kubernetes platform as a production platform for launching containers. You download and install OpenShift Kubernetes Engine the same way as OpenShift Container Platform as they are the same binary distribution, but OpenShift Kubernetes Engine offers a subset of the features that OpenShift Container Platform offers.

3.1. SIMILARITIES AND DIFFERENCES

You can see the similarities and differences between OpenShift Kubernetes Engine and OpenShift Container Platform in the following table:

Table 3.1. Product comparison for OpenShift Kubernetes Engine and OpenShift Container Platform

	OpenShift Kubernetes Engine	OpenShift Container Platform
Fully Automated Installers	Yes	Yes
Over the Air Smart Upgrades	Yes	Yes
Enterprise Secured Kubernetes	Yes	Yes
Kubectl and oc automated command line	Yes	Yes
Operator Lifecycle Manager (OLM)	Yes	Yes
Administrator Web console	Yes	Yes
OpenShift Virtualization	Yes	Yes
User Workload Monitoring		Yes
Cluster Monitoring	Yes	Yes
Cost Management SaaS Service	Yes	Yes
Platform Logging		Yes
Developer Web Console		Yes
Developer Application Catalog		Yes
Source to Image and Builder Automation (Tekton)		Yes
OpenShift Service Mesh (Maistra, Kiali, and Jaeger)		Yes
OpenShift distributed tracing (Jaeger)		Yes
OpenShift Serverless (Knative)		Yes
OpenShift Pipelines (Jenkins and Tekton)		Yes
Embedded Component of IBM Cloud® Pak and RHT MW Bundles		Yes
OpenShift sandboxed containers		Yes

3.1.1. Core Kubernetes and container orchestration

OpenShift Kubernetes Engine offers full access to an enterprise-ready Kubernetes environment that is easy to install and offers an extensive compatibility test matrix with many of the software elements that you might use in your data center.

OpenShift Kubernetes Engine offers the same service level agreements, bug fixes, and common vulnerabilities and errors protection as OpenShift Container Platform. OpenShift Kubernetes Engine includes a Red Hat Enterprise Linux (RHEL) Virtual Datacenter and Red Hat Enterprise Linux CoreOS (RHCOS) entitlement that allows you to use an integrated Linux operating system with container runtime from the same technology provider.

The OpenShift Kubernetes Engine subscription is compatible with the Red Hat OpenShift support for Windows Containers subscription.

3.1.2. Enterprise-ready configurations

OpenShift Kubernetes Engine uses the same security options and default settings as the OpenShift Container Platform. Default security context constraints, pod security policies, best practice network and storage settings, service account configuration, SELinux integration, HAproxy edge routing configuration, and all other standard protections that OpenShift Container Platform offers are available in OpenShift Kubernetes Engine. OpenShift Kubernetes Engine offers full access to the integrated monitoring solution that OpenShift Container Platform uses, which is based on Prometheus and offers deep coverage and alerting for common Kubernetes issues.

OpenShift Kubernetes Engine uses the same installation and upgrade automation as OpenShift Container Platform.

3.1.3. Standard infrastructure services

With an OpenShift Kubernetes Engine subscription, you receive support for all storage plugins that OpenShift Container Platform supports.

In terms of networking, OpenShift Kubernetes Engine offers full and supported access to the Kubernetes Container Network Interface (CNI) and therefore allows you to use any third-party SDN that supports OpenShift Container Platform. It also allows you to use the included Open vSwitch software defined network to its fullest extent. OpenShift Kubernetes Engine allows you to take full advantage of the OVN Kubernetes overlay, Multus, and Multus plugins that are supported on OpenShift Container Platform. OpenShift Kubernetes Engine allows customers to use a Kubernetes Network Policy to create microsegmentation between deployed application services on the cluster.

You can also use the **Route** API objects that are found in OpenShift Container Platform, including its sophisticated integration with the HAproxy edge routing layer as an out of the box Kubernetes Ingress Controller.

3.1.4. Core user experience

OpenShift Kubernetes Engine users have full access to Kubernetes Operators, pod deployment strategies, Helm, and OpenShift Container Platform templates. OpenShift Kubernetes Engine users can use both the **oc** and **kubectl** command line interfaces. OpenShift Kubernetes Engine also offers an administrator web-based console that shows all aspects of the deployed container services and offers a container-as-a service experience. OpenShift Kubernetes Engine grants access to the Operator Life Cycle Manager that helps you control access to content on the cluster and life cycle operator-enabled services that you use. With an OpenShift Kubernetes Engine subscription, you receive access to the Kubernetes namespace, the OpenShift **Project** API object, and cluster-level Prometheus monitoring metrics and events.

3.1.5. Maintained and curated content

With an OpenShift Kubernetes Engine subscription, you receive access to the OpenShift Container Platform content from the Red Hat Ecosystem Catalog and Red Hat Connect ISV marketplace. You can access all maintained and curated content that the OpenShift Container Platform eco-system offers.

3.1.6. OpenShift Data Foundation compatible

OpenShift Kubernetes Engine is compatible and supported with your purchase of OpenShift Data Foundation.

3.1.7. Red Hat Middleware compatible

OpenShift Kubernetes Engine is compatible and supported with individual Red Hat Middleware product solutions. Red Hat Middleware Bundles that include OpenShift embedded in them only contain OpenShift Container Platform.

3.1.8. OpenShift Serverless

OpenShift Kubernetes Engine does not include OpenShift Serverless support. Use OpenShift Container Platform for this support.

3.1.9. Quay Integration compatible

OpenShift Kubernetes Engine is compatible and supported with a Red Hat Quay purchase.

3.1.10. OpenShift Virtualization

OpenShift Kubernetes Engine includes support for the Red Hat product offerings derived from the kubevirt.io open source project.

3.1.11. Advanced cluster management

OpenShift Kubernetes Engine is compatible with your additional purchase of Red Hat Advanced Cluster Management (RHACM) for Kubernetes. An OpenShift Kubernetes Engine subscription does not offer a cluster-wide log aggregation solution or support Elasticsearch, Fluentd, or Kibana-based logging solutions. Red Hat OpenShift Service Mesh capabilities derived from the open-source istio.io and kiali.io projects that offer OpenTracing observability for containerized services on OpenShift Container Platform are not supported in OpenShift Kubernetes Engine.

3.1.12. Advanced networking

The standard networking solutions in OpenShift Container Platform are supported with an OpenShift Kubernetes Engine subscription. The OpenShift Container Platform Kubernetes CNI plugin for automation of multi-tenant network segmentation between OpenShift Container Platform projects is entitled for use with OpenShift Kubernetes Engine. OpenShift Kubernetes Engine offers all the granular control of the source IP addresses that are used by application services on the cluster. Those egress IP address controls are entitled for use with OpenShift Kubernetes Engine. OpenShift Container Platform offers ingress routing to on cluster services that use non-standard ports when no public cloud provider is in use via the VIP pods found in OpenShift Container Platform. That ingress solution is supported in OpenShift Kubernetes Engine. OpenShift Kubernetes Engine users are supported for the Kubernetes ingress control object, which offers integrations with public cloud providers. Red Hat Service Mesh,

which is derived from the istio.io open source project, is not supported in OpenShift Kubernetes Engine. Also, the Kourier Ingress Controller found in OpenShift Serverless is not supported on OpenShift Kubernetes Engine.

3.1.13. OpenShift sandboxed containers

OpenShift Kubernetes Engine does not include OpenShift sandboxed containers. Use OpenShift Container Platform for this support.

3.1.14. Developer experience

With OpenShift Kubernetes Engine, the following capabilities are not supported:

- The OpenShift Container Platform developer experience utilities and tools, such as Red Hat OpenShift Dev Spaces.
- The OpenShift Container Platform pipeline feature that integrates a streamlined, Kubernetes-enabled Jenkins and Tekton experience in the user's project space.
- The OpenShift Container Platform source-to-image feature, which allows you to easily deploy source code, dockerfiles, or container images across the cluster.
- Build strategies, builder pods, or Tekton for end user container deployments.
- The **odo** developer command line.
- The developer persona in the OpenShift Container Platform web console.

3.1.15. Feature summary

The following table is a summary of the feature availability in OpenShift Kubernetes Engine and OpenShift Container Platform. Where applicable, it includes the name of the Operator that enables a feature.

Table 3.2. Features in OpenShift Kubernetes Engine and OpenShift Container Platform

Feature	OpenShift Kubernetes Engine	OpenShift Container Platform	Operator name
Fully Automated Installers (IPI)	Included	Included	N/A
Customizable Installers (UPI)	Included	Included	N/A
Disconnected Installation	Included	Included	N/A
Red Hat Enterprise Linux (RHEL) or Red Hat Enterprise Linux CoreOS (RHCOS) entitlement	Included	Included	N/A

Feature	OpenShift Kubernetes Engine	OpenShift Container Platform	Operator name
Existing RHEL manual attach to cluster (BYO)	Included	Included	N/A
CRIO Runtime	Included	Included	N/A
Over the Air Smart Upgrades and Operating System (RHCOS) Management	Included	Included	N/A
Enterprise Secured Kubernetes	Included	Included	N/A
Kubectl and `oc` automated command line	Included	Included	N/A
Auth Integrations, RBAC, SCC, Multi-Tenancy Admission Controller	Included	Included	N/A
Operator Lifecycle Manager (OLM)	Included	Included	N/A
Administrator web console	Included	Included	N/A
OpenShift Virtualization	Included	Included	OpenShift Virtualization Operator
Compliance Operator provided by Red Hat	Included	Included	Compliance Operator
File Integrity Operator	Included	Included	File Integrity Operator
Gatekeeper Operator	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Gatekeeper Operator
Klusterlet	Not Included - Requires separate subscription	Not Included - Requires separate subscription	N/A
Kube Descheduler Operator provided by Red Hat	Included	Included	Kube Descheduler Operator

Feature	OpenShift Kubernetes Engine	OpenShift Container Platform	Operator name
Local Storage provided by Red Hat	Included	Included	Local Storage Operator
Node Feature Discovery provided by Red Hat	Included	Included	Node Feature Discovery Operator
Performance Profile controller	Included	Included	N/A
PTP Operator provided by Red Hat	Included	Included	PTP Operator
Service Telemetry Operator provided by Red Hat	Not Included	Included	Service Telemetry Operator
SR-IOV Network Operator	Included	Included	SR-IOV Network Operator
Vertical Pod Autoscaler	Included	Included	Vertical Pod Autoscaler
Cluster Monitoring (Prometheus)	Included	Included	Cluster Monitoring
Device Manager (for example, GPU)	Included	Included	N/A
Log Forwarding	Included	Included	Red Hat OpenShift Logging Operator
Telemeter and Insights Connected Experience	Included	Included	N/A
Feature	**OpenShift Kubernetes Engine**	**OpenShift Container Platform**	**Operator name**
OpenShift Cloud Manager SaaS Service	Included	Included	N/A
OVS and OVN SDN	Included	Included	N/A
MetalLB	Included	Included	MetalLB Operator

Feature	OpenShift Kubernetes Engine	OpenShift Container Platform	Operator name
HAProxy Ingress Controller	Included	Included	N/A
Ingress Cluster-wide Firewall	Included	Included	N/A
Egress Pod and Namespace Granular Control	Included	Included	N/A
Ingress Non-Standard Ports	Included	Included	N/A
Multus and Available Multus Plugins	Included	Included	N/A
Network Policies	Included	Included	N/A
IPv6 Single and Dual Stack	Included	Included	N/A
CNI Plugin ISV Compatibility	Included	Included	N/A
CSI Plugin ISV Compatibility	Included	Included	N/A
RHT and IBM® middleware à la carte purchases (not included in OpenShift Container Platform or OpenShift Kubernetes Engine)	Included	Included	N/A
ISV or Partner Operator and Container Compatibility (not included in OpenShift Container Platform or OpenShift Kubernetes Engine)	Included	Included	N/A
Embedded OperatorHub	Included	Included	N/A

Feature	OpenShift Kubernetes Engine	OpenShift Container Platform	Operator name
Embedded Marketplace	Included	Included	N/A
Quay Compatibility (not included)	Included	Included	N/A
OpenShift API for Data Protection (OADP)	Included	Included	OADP Operator
RHEL Software Collections and RHT SSO Common Service (included)	Included	Included	N/A
Embedded Registry	Included	Included	N/A
Helm	Included	Included	N/A
User Workload Monitoring	Not Included	Included	N/A
Cost Management SaaS Service	Included	Included	Cost Management Metrics Operator
Platform Logging	Not Included	Included	Red Hat OpenShift Logging Operator
OpenShift Elasticsearch Operator provided by Red Hat	Not Included	Cannot be run standalone	N/A
Developer Web Console	Not Included	Included	N/A
Developer Application Catalog	Not Included	Included	N/A
Source to Image and Builder Automation (Tekton)	Not Included	Included	N/A
OpenShift Service Mesh	Not Included	Included	OpenShift Service Mesh Operator
Feature	**OpenShift Kubernetes Engine**	**OpenShift Container Platform**	**Operator name**

Feature	OpenShift Kubernetes Engine	OpenShift Container Platform	Operator name
Red Hat OpenShift Serverless	Not Included	Included	OpenShift Serverless Operator
Web Terminal provided by Red Hat	Not Included	Included	Web Terminal Operator
Red Hat OpenShift Pipelines Operator	Not Included	Included	OpenShift Pipelines Operator
Embedded Component of IBM Cloud® Pak and RHT MW Bundles	Not Included	Included	N/A
Red Hat OpenShift GitOps	Not Included	Included	OpenShift GitOps
Red Hat OpenShift Dev Spaces	Not Included	Included	Red Hat OpenShift Dev Spaces
Red Hat OpenShift Local	Not Included	Included	N/A
Quay Bridge Operator provided by Red Hat	Not Included	Included	Quay Bridge Operator
Quay Container Security provided by Red Hat	Not Included	Included	Quay Operator
Red Hat OpenShift distributed tracing platform	Not Included	Included	Red Hat OpenShift distributed tracing platform Operator
Red Hat OpenShift Kiali	Not Included	Included	Kiali Operator
Metering provided by Red Hat (deprecated)	Not Included	Included	N/A
Migration Toolkit for Containers Operator	Not Included	Included	Migration Toolkit for Containers Operator
Cost management for OpenShift	Not included	Included	N/A
JBoss Web Server provided by Red Hat	Not included	Included	JWS Operator

Feature	OpenShift Kubernetes Engine	OpenShift Container Platform	Operator name
Red Hat Build of Quarkus	Not included	Included	N/A
Kourier Ingress Controller	Not included	Included	N/A
RHT Middleware Bundles Sub Compatibility (not included in OpenShift Container Platform)	Not included	Included	N/A
IBM Cloud® Pak Sub Compatibility (not included in OpenShift Container Platform)	Not included	Included	N/A
OpenShift Do (odo)	Not included	Included	N/A
Source to Image and Tekton Builders	Not included	Included	N/A
OpenShift Serverless FaaS	Not included	Included	N/A
IDE Integrations	Not included	Included	N/A
{sandboxed-containers-first}	Not included	Not included	{sandboxed-containers-operator}
Windows Machine Config Operator	Community Windows Machine Config Operator included - no subscription required	Red Hat Windows Machine Config Operator included - Requires separate subscription	Windows Machine Config Operator
Red Hat Quay	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Quay Operator
Red Hat Advanced Cluster Management	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Advanced Cluster Management for Kubernetes

Feature	OpenShift Kubernetes Engine	OpenShift Container Platform	Operator name
Red Hat Advanced Cluster Security	Not Included - Requires separate subscription	Not Included - Requires separate subscription	N/A
OpenShift Data Foundation	Not Included - Requires separate subscription	Not Included - Requires separate subscription	OpenShift Data Foundation
Feature	**OpenShift Kubernetes Engine**	**OpenShift Container Platform**	**Operator name**
Ansible Automation Platform Resource Operator	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Ansible Automation Platform Resource Operator
Business Automation provided by Red Hat	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Business Automation Operator
Data Grid provided by Red Hat	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Data Grid Operator
Red Hat Integration provided by Red Hat	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Red Hat Integration Operator
Red Hat Integration - 3Scale provided by Red Hat	Not Included - Requires separate subscription	Not Included - Requires separate subscription	3scale
Red Hat Integration - 3Scale APICast gateway provided by Red Hat	Not Included - Requires separate subscription	Not Included - Requires separate subscription	3scale APIcast
Red Hat Integration - AMQ Broker	Not Included - Requires separate subscription	Not Included - Requires separate subscription	AMQ Broker
Red Hat Integration - AMQ Broker LTS	Not Included - Requires separate subscription	Not Included - Requires separate subscription	
Red Hat Integration - AMQ Interconnect	Not Included - Requires separate subscription	Not Included - Requires separate subscription	AMQ Interconnect
Red Hat Integration - AMQ Online	Not Included - Requires separate subscription	Not Included - Requires separate subscription	
Red Hat Integration - AMQ Streams	Not Included - Requires separate subscription	Not Included - Requires separate subscription	AMQ Streams

Feature	OpenShift Kubernetes Engine	OpenShift Container Platform	Operator name
Red Hat Integration - Camel K	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Camel K
Red Hat Integration - Fuse Console	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Fuse Console
Red Hat Integration - Fuse Online	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Fuse Online
Red Hat Integration - Service Registry Operator	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Service Registry
API Designer provided by Red Hat	Not Included - Requires separate subscription	Not Included - Requires separate subscription	API Designer
JBoss EAP provided by Red Hat	Not Included - Requires separate subscription	Not Included - Requires separate subscription	JBoss EAP
Smart Gateway Operator	Not Included - Requires separate subscription	Not Included - Requires separate subscription	Smart Gateway Operator
Kubernetes NMState Operator	Included	Included	N/A

3.2. SUBSCRIPTION LIMITATIONS

OpenShift Kubernetes Engine is a subscription offering that provides OpenShift Container Platform with a limited set of supported features at a lower list price. OpenShift Kubernetes Engine and OpenShift Container Platform are the same product and, therefore, all software and features are delivered in both. There is only one download, OpenShift Container Platform. OpenShift Kubernetes Engine uses the OpenShift Container Platform documentation and support services and bug errata for this reason.