

The operator container image defines the requirements for deployment, such as dependent services and hardware resources. Because operators require resource access, they typically use custom security settings. Operators provide an API for resource management and service configuration, and deliver levels of automated management and upgrade strategies.

OpenShift Container Platform uses the *Operator Lifecycle Manager (OLM)* to manage operators. OLM orchestrates the deployment, update, resource utilization, and deletion of other operators from the operator catalog. Every operator has a *Cluster Service Version (CSV)* that describes the required technical information to run the operator, such as the RBAC rules that it requires and the resources that it manages or depends on. OLM is itself an operator.

Custom Resource Definition (CRD) objects define unique object types in the cluster. *Custom Resource (CR)* objects are created from CRDs. Only cluster administrators can create CRDs. Developers with CRD read permission can add defined CR object types into their project.

Operators use CRDs by packaging them with any required RBAC policy and other software-specific logic. Cluster administrators can add CRDs manually to a cluster independently from an Operator lifecycle, to be available to all users.

Introducing Red Hat OpenShift Data Foundation

Red Hat OpenShift Data Foundation (formerly Red Hat OpenShift Container Storage) is a highly integrated collection of cloud storage and data services that acts as the storage control plane for OpenShift Container Platform. OpenShift Data Foundation is available as an operator in the *Red Hat OpenShift Container Platform Service Catalog*. OpenShift Data Foundation 4.8 uses *Red Hat Ceph Storage 4.2*.

Introducing OpenShift Container Storage Operator

The OpenShift Container Storage operator integrates three operators as an operator bundle to initialize and manage OpenShift Data Foundation services. The three operators are OpenShift Container Storage (ocs-operator), Rook-Ceph, and Multicloud Object Gateway (NooBaa). The operator bundle includes a converged CSV and all the needed CRDs to deploy ocs-operator, Rook-Ceph, and NooBaa operators.

Describing the ocs-operator

The operator `ocs-operator` initializes tasks for the OpenShift Data Foundation service and acts as a configuration gateway for Rook-Ceph and NooBaa. The operator `ocs-operator` depends on the configuration that is defined in the `OCSInitialization` and `StorageCluster` CRDs in the CSV bundle.

When the operator bundle is installed, the `ocs-operator` starts and creates an `OCSInitialization` resource if it does not already exist. The `OCSInitialization` resource performs basic setup and initializes services. It creates the `openshift-storage` namespace in which other bundle operators will create resources. You can edit this resource to adjust the tools that are included in the OpenShift Data Foundation operator. If the `OCSInitialization` resource is in a failed state, further start requests are ignored until the resource is deleted.

The `StorageCluster` resource manages the creation and reconciliation of CRDs for the Rook-Ceph and NooBaa operators. These CRDs are defined by known best practices and policies that Red Hat supports. You can create a `StorageCluster` resource with an installation wizard in OpenShift Container Platform.