Instructions for cluster and storage administrators
Abstract

This document explains how to update Red Hat OpenShift Container Storage.
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Making Open Source More Inclusive

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see our CTO Chris Wright’s message.
PROVIDING FEEDBACK ON RED HAT DOCUMENTATION

We appreciate your input on our documentation. Do let us know how we can make it better. To give feedback:

- For simple comments on specific passages:
  1. Make sure you are viewing the documentation in the *Multi-page HTML* format. In addition, ensure you see the **Feedback** button in the upper right corner of the document.
  2. Use your mouse cursor to highlight the part of text that you want to comment on.
  3. Click the **Add Feedback** pop-up that appears below the highlighted text.
  4. Follow the displayed instructions.

- For submitting more complex feedback, create a Bugzilla ticket:
  1. Go to the **Bugzilla** website.
  2. As the Component, use **Documentation**.
  3. Fill in the **Description** field with your suggestion for improvement. Include a link to the relevant part(s) of documentation.
  4. Click **Submit Bug**.
You can upgrade Red Hat OpenShift Container Storage and its components, either between minor releases like 4.6 and 4.7, or between batch updates like 4.7.0 and 4.7.1.

You need to upgrade the different parts of OpenShift Container Storage in a specific order.

1. Update OpenShift Container Platform according to the Updating clusters documentation for OpenShift Container Platform.

2. Update OpenShift Container Storage.
   a. To prepare a disconnected environment for updates see Operators guide to using Operator Lifecycle Manager on restricted networks to be able to update OpenShift Container Storage as well as Local Storage Operator when in use.
   b. Update the OpenShift Container Storage operator using the appropriate process for your setup:
      - Update OpenShift Container Storage in internal mode
      - Update OpenShift Container Storage in external mode
   c. If you use local storage:
      i. Update the Local Storage operator
         See Checking for Local Storage Operator deployments if you are unsure.
      ii. Perform post-update configuration changes for clusters backed by local storage. See Post-update configuration for clusters backed by local storage for details.

Update considerations

Review the following important considerations before you begin.

- Red Hat recommends using the same version of Red Hat OpenShift Container Platform with Red Hat OpenShift Container Storage. See the Interoperability Matrix for more information about supported combinations of OpenShift Container Platform and OpenShift Container Storage.
- The Local Storage Operator is fully supported only when the Local Storage Operator version matches the Red Hat OpenShift Container Platform version.
CHAPTER 2. UPDATING OPENSIFHT CONTAINER STORAGE IN INTERNAL MODE

Use the following procedures to update your OpenShift Container Storage cluster deployed in internal mode.

2.1. ENABLING AUTOMATIC UPDATES FOR OPENSIFHT CONTAINER STORAGE OPERATOR IN INTERNAL MODE

Use this procedure to enable automatic update approval for updating OpenShift Container Storage operator in OpenShift Container Platform.

Prerequisites

- Under **Persistent Storage** in **Status** card, confirm that the OpenShift Container Storage cluster is healthy and data is resilient.
- Update the OpenShift Container Platform cluster to the latest stable release of version 4.6.X or 4.7.Y, see **Updating Clusters**.
- Switch the Red Hat OpenShift Container Storage channel from **stable-4.6** to **stable-4.7**. For details about channels, see **OpenShift Container Platform upgrade channels and releases**.

**NOTE**

You are required to switch channels only when you are updating minor versions (for example, updating from 4.6 to 4.7) and not when updating between batch updates of 4.7 (for example, updating from 4.7.0 to 4.7.1).

- Ensure that all OpenShift Container Storage Pods, including the operator pods, are in **Running** state in the **openshift-storage namespace**.
  To view the state of the pods, click **Workloads → Pods** from the left pane of the OpenShift Web Console. Select **openshift-storage** from the **Project** drop down list.

- Ensure that you have sufficient time to complete the OpenShift Container Storage update process, as the update time varies depending on the number of OSDs that run in the cluster.

Procedure

1. Log in to OpenShift Web Console.
2. Click **Operators → Installed Operators**
3. Select the **openshift-storage** project.
4. Click the OpenShift Container Storage operator name.
5. Click the **Subscription** tab and click the link under **Approval**.
6. Select **Automatic (default)** and click **Save**.
7. Perform one of the following depending on the **Upgrade Status**:
   - **Upgrade Status shows requires approval**
NOTE

Upgrade status shows requires approval if the new OpenShift Container Storage version is already detected in the channel, and approval strategy was changed from Manual to Automatic at the time of update.

a. Click on the Install Plan link.
b. On the InstallPlan Details page, click Preview Install Plan.
c. Review the install plan and click Approve.
d. Wait for the Status to change from Unknown to Created.
e. Click Operators → Installed Operators
f. Select the openshift-storage project.
g. Wait for the Status to change to Up to date

- Upgrade Status does not show requires approval:
  a. Wait for the update to initiate. This may take up to 20 minutes.
b. Click Operators → Installed Operators
c. Select the openshift-storage project.
d. Wait for the Status to change to Up to date

NOTE

Multicloud Object Gateway outage is expected for a short period of time during upgrade due to migration of NooBaa DB from MongoDB to PostgreSQL.

Verification steps

1. Click Overview → Persistent Storage tab and in the Status card confirm that the OpenShift Container Storage cluster has a green tick mark indicating it is healthy.
2. Click Operators → Installed Operators → OpenShift Container Storage Operator. Under Storage Cluster, verify that the cluster service status is Ready.

NOTE

Once updated from OpenShift Container Storage version 4.6 to 4.7, the Version field here will still display 4.6. This is because the ocs-operator does not update the string represented in this field.

3. Ensure that all OpenShift Container Storage Pods, including the operator pods, are in Running state in the openshift-storage namespace.
   To view the state of the pods, click Workloads → Pods. Select openshift-storage from the Project drop down list.
4. If verification steps fail, contact Red Hat Support.
NOTE

The flexible scaling feature is available only in the new deployments of Red Hat OpenShift Container Storage 4.7. Storage clusters upgraded to the 4.7 version do not support flexible scaling.

Next steps

- Adding annotation to the pre-existing backingstores

Additional Resources

If you face any issues while updating OpenShift Container Storage, see the Commonly required logs for troubleshooting section in the Troubleshooting guide.

2.2. MANUALLY UPDATING OPENSIFT CONTAINER STORAGE OPERATOR IN INTERNAL MODE

Use this procedure to update OpenShift Container Storage operator by providing manual approval to the install plan.

Prerequisites

- Under Persistent Storage in Status card, confirm that the OpenShift Container Storage cluster is healthy and data is resilient.

- Update the OpenShift Container Platform cluster to the latest stable release of version 4.6.X or 4.7.Y, see Updating Clusters.

- Switch the Red Hat OpenShift Container Storage channel channel from stable-4.6 to stable-4.7. For details about channels, see OpenShift Container Platform upgrade channels and releases.

NOTE

You are required to switch channels only when you are updating minor versions (for example, updating from 4.6 to 4.7) and not when updating between batch updates of 4.7 (for example, updating from 4.7.0 to 4.7.1).

- Ensure that all OpenShift Container Storage Pods, including the operator pods, are in Running state in the openshift-storage namespace.
  To view the state of the pods, click Workloads → Pods from the left pane of the OpenShift Web Console. Select openshift-storage from the Project drop down list.

- Ensure that you have sufficient time to complete the OpenShift Container Storage update process, as the update time varies depending on the number of OSDs that run in the cluster.

Procedure

1. Log in to OpenShift Web Console.
2. Click Operators → Installed Operators
3. Select the openshift-storage project.
4. Click the **OpenShift Container Storage** operator name.

5. Click the **Subscription** tab and click the link under **Approval**.

6. Select **Manual** and click **Save**.

7. Wait for the **Upgrade Status** to change to **Upgrading**.

8. If the **Upgrade Status** shows **requires approval**, click on **requires approval**.

9. On the **InstallPlan Details** page, click **Preview Install Plan**.

10. Review the install plan and click **Approve**.

11. Wait for the **Status** to change from **Unknown** to **Created**.

12. Click **Operators → Installed Operators**

13. Select the **openshift-storage** project.

14. Wait for the **Status** to change to **Up to date**

**NOTE**

Multicloud Object Gateway outage is expected for a short period of time during upgrade due to migration of NooBaa DB from MongoDB to PostgreSQL.

**Verification steps**

1. Click **Overview → Persistent Storage** tab and in **Status** card confirm that the OpenShift Container Storage cluster has a green tick mark indicating it is healthy.

2. Click **Operators → Installed Operators → OpenShift Container Storage Operator**. Under **Storage Cluster**, verify that the cluster service status is **Ready**.

**NOTE**

Once updated from OpenShift Container Storage version 4.6 to 4.7, the **Version** field here will still display 4.6. This is because the **ocs-operator** does not update the string represented in this field.

3. Ensure that all OpenShift Container Storage Pods, including the operator pods, are in **Running** state in the **openshift-storage namespace**.
   To view the state of the pods, click **Workloads → Pods** from the left pane of the OpenShift Web Console. Select **openshift-storage** from the **Project** drop down list.

4. If verification steps fail, contact Red Hat Support.

**Next steps**

- Adding annotation to the pre-existing backingstores

**Additional Resources**

If you face any issues while updating OpenShift Container Storage, see the **Commonly required logs for troubleshooting** section in the **Troubleshooting guide**.
CHAPTER 3. UPDATING OPENSIFT CONTAINER STORAGE IN EXTERNAL MODE

Use the following procedures to update your OpenShift Container Storage cluster deployed in external mode.

IMPORTANT

Upgrading Red Hat OpenShift Container Storage Operator does not upgrade the external Red Hat Ceph Storage cluster. It only upgrades the Red Hat OpenShift Container Storage Services running on the OpenShift Container Platform.

To upgrade the external Red Hat Ceph Storage cluster contact your Red Hat Ceph Storage administrator.

3.1. ENABLING AUTOMATIC UPDATES FOR OPENSIFT CONTAINER STORAGE OPERATOR IN EXTERNAL MODE

Use this procedure to enable automatic update approval for updating OpenShift Container Storage operator in OpenShift Container Platform.

NOTE

Updating OpenShift Container Storage will not update the external Red Hat Ceph Storage cluster.

Prerequisites

- Red Hat Ceph Storage version 4.2z1 or later is required for the external cluster. For more information, see this knowledge base article on Red Hat Ceph Storage releases and corresponding Ceph package versions.

- Update the OpenShift Container Platform cluster to the latest stable release of version 4.6.X or 4.7.Y, see Updating Clusters.

- Switch the Red Hat OpenShift Container Storage channel from stable-4.6 to stable-4.7. For details about channels, see OpenShift Container Platform upgrade channels and releases.

NOTE

You are required to switch channels only when you are updating minor versions (for example, updating from 4.6 to 4.7) and not when updating between batch updates of 4.7 (for example, updating from 4.7.0 to 4.7.1).

- Ensure that all OpenShift Container Storage Pods, including the operator pods, are in Running state in the openshift-storage namespace.
  To view the state of the pods, click Workloads → Pods from the left pane of the OpenShift Web Console. Select openshift-storage from the Project drop down list.

- Under Persistent Storage in the Status card, confirm that the OpenShift Container Storage cluster is healthy.
- Ensure that you have sufficient time to complete the OpenShift Container Storage update process.

**Procedure**

1. Log in to OpenShift Web Console.
2. Click **Operators → Installed Operators**
3. Select the **openshift-storage** project.
4. Click on the OpenShift Container Storage operator name.
5. Click the **Subscription** tab and click the link under **Approval**.
6. Select **Automatic (default)** and click **Save**.
7. Perform one of the following depending on the **Upgrade Status**:
   - **Upgrade Status shows requires approval**
     a. Click the **Install Plan** link.
     b. On the **InstallPlan Details** page, click **Preview Install Plan**.
     c. Review the install plan and click **Approve**.
     d. Wait for the **Status** to change from **Unknown** to **Created**.
     e. Click **Operators → Installed Operators**
     f. Select the **openshift-storage** project.
     g. Wait for the **Status** to change to **Up to date**
   - **Upgrade Status does not show requires approval**
     a. Wait for the update to initiate. This may take up to 20 minutes.
     b. Click **Operators → Installed Operators**
     c. Select the **openshift-storage** project.
     d. Wait for the **Status** to change to **Up to date**

**NOTE**

Upgrade status shows requires approval if the new OpenShift Container Storage version is already detected in the channel, and approval strategy was changed from Manual to Automatic at the time of update.

Multicloud Object Gateway outage is expected for a short period of time during upgrade due to migration of NooBaa DB from MongoDB to PostgreSQL.
Verification steps

1. Click Overview → Persistent Storage tab and in Status card confirm that the OpenShift Container Storage cluster has a green tick mark indicating it is healthy.

2. Click Operators → Installed Operators → OpenShift Container Storage Operator. Under Storage Cluster, verify that the cluster service status in Ready.

   NOTE
   Once updated from OpenShift Container Storage version 4.6 to 4.7, the Version field here will still display 4.6. This is because the ocs-operator does not update the string represented in this field.

3. Ensure that all OpenShift Container Storage Pods, including the operator pods, are in Running state in the openshift-storage namespace.
   To view the state of the pods, click Workloads → Pods from the left pane of the OpenShift Web Console. Select openshift-storage from the Project drop down list.

4. If verification steps fail, contact Red Hat Support.

Next steps

- Adding annotation to the pre-existing backingstores

Additional Resources

If you face any issues while updating OpenShift Container Storage, see the Commonly required logs for troubleshooting section in the Troubleshooting guide.

3.2. MANUALLY UPDATING OPENSHPFT CONTAINER STORAGE OPERATOR IN EXTERNAL MODE

Use this procedure to update OpenShift Container Storage operator by providing manual approval to the install plan.

   NOTE
   Updating OpenShift Container Storage will not update the external Red Hat Ceph Storage cluster.

Prerequisites

- Red Hat Ceph Storage version 4.2z1 or later is required for the external cluster. For more information, see this knowledge base article on Red Hat Ceph Storage releases and corresponding Ceph package versions.

- Update the OpenShift Container Platform cluster to the latest stable release of version 4.6.X or 4.7.Y, see Updating Clusters.

- Switch the Red Hat OpenShift Container Storage channel channel from stable-4.6 to stable-4.7. For details about channels, see OpenShift Container Platform upgrade channels and releases.
NOTE

You are required to switch channels only when you are updating minor versions (for example, updating from 4.6 to 4.7) and not when updating between batch updates of 4.7 (for example, updating from 4.7.0 to 4.7.1).

- Ensure that all OpenShift Container Storage Pods, including the operator pods, are in Running state in the openshift-storage namespace. To view the state of the pods, click Workloads → Pods from the left pane of the OpenShift Web Console. Select openshift-storage from the Project drop down list.

- Under Persistent Storage in Status card, confirm that the OpenShift Container Storage cluster is healthy.

- Ensure that you have sufficient time to complete the Openshift Container Storage update process.

Procedure

1. Log in to OpenShift Web Console.

2. Click Operators → Installed Operators

3. Select the openshift-storage project.

4. Click the OpenShift Container Storage operator name.

5. Click Subscription tab and click the link under Approval.


7. Wait for the Upgrade Status to change to Upgrading.

8. If the Upgrade Status shows requires approval, click on requires approval.


10. Review the install plan and click Approve.

11. Wait for the Status to change from Unknown to Created.

12. Click Operators → Installed Operators

13. Select the openshift-storage project.

14. Wait for the Status to change to Up to date

NOTE

Multicloud Object Gateway outage is expected for a short period of time during upgrade due to migration of NooBaa DB from MongoDB to PostgreSQL.

Verification steps

1. Click Overview → Persistent Storage tab and in Status card confirm that the OpenShift Container Storage cluster has a green tick mark indicating it is healthy.
2. Click **Operators → Installed Operators → OpenShift Container Storage Operator**. Under **Storage Cluster**, verify that the cluster service status is **Ready**.

3. Ensure that all OpenShift Container Storage Pods, including the operator pods, are in **Running** state in the **openshift-storage** namespace.
   To view the state of the pods, click **Workloads → Pods** from the left pane of the OpenShift Web Console. Select **openshift-storage** from the **Project** drop down list.

   **NOTE**
   Once updated from OpenShift Container Storage version 4.6 to 4.7, the **Version** field here will still display 4.6. This is because the **ocs-operator** does not update the string represented in this field.

4. If verification steps fail, contact Red Hat Support.

**Next steps**
- Adding annotation to the pre-existing backingstores

**Additional Resources**
If you face any issues while updating OpenShift Container Storage, see the **Commonly required logs for troubleshooting** section in the **Troubleshooting guide**.
CHAPTER 4. ADDING ANNOTATION TO THE PRE-EXISTING BACKINGSTORES

Adding the correct annotation to the pre-existing backingstores allows the backingstores backed by object gateways (RGWs) to report its actual and free size. The Multicloud Object Gateway (MCG) can retrieve and use this information.

Procedure

1. Log in to the OpenShift Container Platform Web Console.
2. Click Home → Search.
3. Search for BackingStore in Resources and click on it.
4. Beside the S3-compatible BackingStore, click Action Menu (⋯) → Edit annotations
5. Add rgw for KEY.
6. Click Save.

Next steps

For clusters backed by local storage, additional configuration steps are required after an update to ensure that all features work as expected.

For more information, see Post-update configuration changes for clusters backed by local storage.
CHAPTER 5. POST-UPDATE CONFIGURATION CHANGES FOR CLUSTERS BACKED BY LOCAL STORAGE

In clusters backed by local storage, additional configuration steps are required after an update to ensure that all features work as expected. In Red Hat OpenShift Container Platform 4.6 and onward, the Local Storage Operator provides new custom resource types for managing local storage:

- **LocalVolumeDiscovery**
- **LocalVolumeSet**

These resource types are not automatically handled as part of an update from earlier versions and must be created manually.

**NOTE**

If you had already created these resources after upgrading from 4.5 to 4.6, then you do not need to create them after upgrading from 4.6 to 4.7.

5.1. CREATING A LOCALVOLUMEDISCOVERY CUSTOM RESOURCE USING THE COMMAND LINE

Create a **LocalVolumeDiscovery** custom resource to ensure that the device management user interface can discover the state of local devices and provide information about devices that are available on cluster nodes.

**Prerequisites**

- Administrative access to the OpenShift Container Platform cluster.

**Procedure**

1. Identify the namespace where OpenShift local storage operator is installed and assign it to the `local_storage_project` variable:

   ```
   $ local_storage_project=$(oc get csv --all-namespaces | awk '{print $1}' | grep local)
   
   For example:
   
   $ local_storage_project=$(oc get csv --all-namespaces | awk '{print $1}' | grep local)
   ```

2. Change into the project that has the Local Storage Operator installed.

   ```
   $ oc project $local_storage_project
   ```

3. Define the **LocalVolumeDiscovery** custom resource. For example, define the following in a `local-volume-discovery.yaml` file.

   ```yaml
   apiVersion: local.storage.openshift.io/v1alpha1
   kind: LocalVolumeDiscovery
   ```
metadata:
  name: auto-discover-devices
spec:
  nodeSelector:
    nodeSelectorTerms:
      - matchExpressions:
          - key: kubernetes.io/hostname
            operator: In
            values:
              - worker1.example.com
              - worker2.example.com
              - worker3.example.com

4. Create the **LocalVolumeDiscovery** custom resource.

    $ oc create -f local-volume-discovery.yaml

**Verification steps**

1. Log in to the OpenShift web console.
2. Click **Compute → Node** and click on the name of the node.
3. Click the **Disks** tab and check that you can see the devices available on that node.

### 5.2. CREATING A LOCALVOLUMESET CUSTOM RESOURCE USING THE COMMAND LINE

Create a **LocalVolumeSet** custom resource to automatically provision certain storage devices as persistent volumes based on criteria that you specify. Persistent volumes are created for any devices that match the **deviceInclusionSpec** criteria on any node that matches the **nodeSelector** criteria.

**Prerequisites**

- Administrative access to the OpenShift Container Platform cluster.

**Procedure**

1. Define a **LocalVolumeSet** custom resource in a **local-volume-set.yaml** file.

    ```yaml
    apiVersion: local.storage.openshift.io/v1alpha1
    kind: LocalVolumeSet
    metadata:
      name: localblock
    spec:
      nodeSelector:
        nodeSelectorTerms:
          - matchExpressions:
              - key: kubernetes.io/hostname
                operator: In
                values:
                  - worker1.example.com
                  - worker2.example.com
                  - worker3.example.com
    ```
storageClassName: localblock
volumeMode: Block
maxDeviceCount: 10 # optional, limit devices provisioned per node
deviceInclusionSpec:
deviceTypes: # list of types to allow
  - disk
  - part # omit this to use only whole devices
deviceMechanicalProperty:
  - NonRotational
minSize: 100Gi # optional, minimum size of device to allow
maxSize: 100Ti # optional, maximum size of device to allow
models: # (optional) list of models to allow
  - SAMSUNG
  - Crucial_CT525MX3
vendors: # (optional) list of device vendors to allow
  - ATA
  - ST2000LM

The above definition selects whole disks or partitions on specific models of non-rotational devices that are between 100 GB and 100 TB in size, provided by specific vendors, from the worker1, worker2 and worker3 nodes. The localblock storage class is created and persistent volumes are provisioned from discovered devices.

**IMPORTANT**

Select an appropriate value for minSize to ensure system partitions are not selected.

2. Create the LocalVolumeSet

   $ oc create -f local-volume-set.yaml

Verification steps

1. Use the following command to track provisioning of persistent volumes for devices that match the deviceInclusionSpec. It can take a few minutes to provision persistent volumes.

   $ oc describe localvolumeset localblock

   [...] Status:
   Conditions:
   Last Transition Time: 2020-11-17T05:03:32Z
   Message: DiskMaker: Available, LocalProvisioner: Available
   Status: True
   Type: DaemonSetsAvailable
   Last Transition Time: 2020-11-17T05:03:34Z
   Message: Operator reconciled successfully.
   Status: True
   Type: Available
   Observed Generation: 1
   Total Provisioned Device Count: 4
   Events:
   Type  Reason   Age From    Message
2. Verify the state of the provisioned persistent volumes.

```
$ oc get pv
```

<table>
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<th>RECLAIM</th>
<th>STORAGE</th>
</tr>
</thead>
<tbody>
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<td>MODES</td>
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<tr>
<td>local-pv-3584969f</td>
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<td>RWO</td>
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<td>RWO</td>
</tr>
<tr>
<td>local-pv-c73cee1</td>
<td>500Gi</td>
<td>RWO</td>
</tr>
</tbody>
</table>

5.3. ADDING ANNOTATIONS

Use this procedure to add annotations to storage cluster to enable replacing of failed storage devices through the user interface when you upgraded to OpenShift Container Storage 4.7 from a previous version.

Procedure

1. Log in to OpenShift Container Platform Web Console.
2. Click Home → Search.
3. Search for StorageCluster in Resources and click on it.
5. Add cluster.ocs.openshift.io/local-devices=true and true for KEY and VALUE respectively.
6. Click Save.