OpenShift Container Platform 4.1

Updating clusters

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Legal Notice

Abstract

This document provides instructions for updating, or upgrading, OpenShift Container Platform 4.1 clusters. In version 4.1, updating your cluster is a simple process that does not require you to take your cluster offline.

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CHAPTER 1. UPDATING A CLUSTER WITHIN A MINOR VERSION FROM THE WEB CONSOLE

You can update, or upgrade, an OpenShift Container Platform cluster to a minor version by using the web console.

Prerequisites

- Have access to the cluster as a user with **admin** privileges. See Using RBAC to define and apply permissions.
- Have a recent etcd backup in case your upgrade fails and you must restore your cluster to a previous state.

1.1. ABOUT THE OPENSHIFT CONTAINER PLATFORM UPDATE SERVICE

The OpenShift Container Platform update service is the hosted service that provides over-the-air updates to both OpenShift Container Platform and Red Hat Enterprise Linux CoreOS (RHCOS). It provides a graph, or diagram that contain *vertices* and the *edges* that connect them, of component Operators. The edges in the graph show which versions you can safely update to, and the vertices are update payloads that specify the intended state of the managed cluster components.

The Cluster Version Operator (CVO) in your cluster checks with the OpenShift Container Platform update service to see the valid updates and update paths based on current component versions and information in the graph. When you request an update, the OpenShift Container Platform CVO uses the release image for that update to upgrade your cluster. The release artifacts are hosted in Quay as container images.

To allow the OpenShift Container Platform update service to provide only compatible updates, a release verification pipeline exists to drive automation. Each release artifact is verified for compatibility with supported cloud platforms and system architectures as well as other component packages. After the pipeline confirms the suitability of a release, the OpenShift Container Platform update service notifies you that it is available.

During continuous update mode, two controllers run. One continuously updates the payload manifests, applies them to the cluster, and outputs the status of the controlled rollout of the Operators, whether they are available, upgrading, or failed. The second controller polls the OpenShift Container Platform update service to determine if updates are available.

IMPORTANT

Reverting your cluster to a previous version, or a rollback, is not supported. Only upgrading to a newer version is supported.

1.2. UPDATING A CLUSTER BY USING THE WEB CONSOLE

If updates are available, you can update your cluster from the web console.

You can find information about available OpenShift Container Platform advisories and updates in the errata section of the Customer Portal.

Prerequisites

- Have access to the web console as a user with **admin** privileges.

Procedure

1. From the web console, click **Administration** > **Cluster Settings** and review the contents of the **Overview** tab.

   a. For production clusters, ensure that the **CHANNEL** is set to **stable-4.1**.

   

   IMPORTANT

   For production clusters, you must subscribe to the **stable-4.1** channel.

   b. If the **UPDATE STATUS** is not **Updates Available**, you cannot upgrade your cluster.

   c. The **DESIRED VERSION** indicates the cluster version that your cluster is running or is updating to.

2. Click **Updates Available**, select a version to update to, and click **Update**. The **UPDATE STATUS** changes to **Updating**, and you can review the progress of the Operator upgrades on the **Cluster Operators** tab.

CHAPTER 2. UPDATING A CLUSTER WITHIN A MINOR VERSION BY USING THE CLI

You can update, or upgrade, an OpenShift Container Platform cluster by using the OpenShift CLI (**oc**).

Prerequisites

- Have access to the cluster as a user with **admin** privileges. See Using RBAC to define and apply permissions.
- Have a recent etcd backup in case your upgrade fails and you must restore your cluster to a previous state.

2.1. ABOUT THE OPENSHIFT CONTAINER PLATFORM UPDATE SERVICE

The OpenShift Container Platform update service is the hosted service that provides over-the-air updates to both OpenShift Container Platform and Red Hat Enterprise Linux CoreOS (RHCOS). It provides a graph, or diagram that contain *vertices* and the *edges* that connect them, of component Operators. The edges in the graph show which versions you can safely update to, and the vertices are update payloads that specify the intended state of the managed cluster components.

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To allow the OpenShift Container Platform update service to provide only compatible updates, a release verification pipeline exists to drive automation. Each release artifact is verified for compatibility with supported cloud platforms and system architectures as well as other component packages. After the pipeline confirms the suitability of a release, the OpenShift Container Platform update service notifies you that it is available.

During continuous update mode, two controllers run. One continuously updates the payload manifests, applies them to the cluster, and outputs the status of the controlled rollout of the Operators, whether they are available, upgrading, or failed. The second controller polls the OpenShift Container Platform update service to determine if updates are available.

IMPORTANT

Reverting your cluster to a previous version, or a rollback, is not supported. Only upgrading to a newer version is supported.

2.2. UPDATING A CLUSTER BY USING THE CLI

If updates are available, you can update your cluster by using the OpenShift CLI (**oc**).

You can find information about available OpenShift Container Platform advisories and updates in the errata section of the Customer Portal.

Prerequisites

- Install the version of the OpenShift Command-line Interface (CLI), commonly known as **oc**, that matches the version for your updated version.
- Log in to the cluster as user with **cluster-admin** privileges.
- Install the **jq** package.

Procedure

1. Ensure that your cluster is available:

```
$ oc get clusterversion

NAME      VERSION   AVAILABLE   PROGRESSING   SINCE   STATUS
version   4.1.0     True        False         158m    Cluster version is 4.1.0
```

2. Review the current update channel information and confirm that your channel is set to **stable-4.1**:

```
$ oc get clusterversion -o json|jq ".items[0].spec"

{
  "channel": "stable-4.1",
  "clusterID": "990f7ab8-109b-4c95-8480-2bd1deec55ff",
  "upstream": "https://api.openshift.com/api/upgrades_info/v1/graph"
}
```

IMPORTANT

For production clusters, you must subscribe to the **stable-4.1** channel.

3. View the available updates and note the version number of the update that you want to apply:

```
$ oc adm upgrade

Cluster version is 4.1.0

Updates:

VERSION IMAGE
4.1.2   quay.io/openshift-release-dev/ocp-release@sha256:9c5f0df8b192a0d7b46cd5f6a4da2289c155fd5302dec7954f8f06c878160b8b
```

4. Apply an update:
   - To update to the latest version:

```
$ oc adm upgrade --to-latest=true (1)
```

   - To update to a specific version:

```
$ oc adm upgrade --to=<version> (1)
```

1 1 **<version>** is the update version that you obtained from the output of the previous command.

5. Review the status of the Cluster Version Operator:

```
$ oc get clusterversion -o json|jq ".items[0].spec"

{
  "channel": "stable-4.1",
  "clusterID": "990f7ab8-109b-4c95-8480-2bd1deec55ff",
  "desiredUpdate": {
    "force": false,
    "image": "quay.io/openshift-release-dev/ocp-
release@sha256:9c5f0df8b192a0d7b46cd5f6a4da2289c155fd5302dec7954f8f06c878160b8b",

    "version": "4.1.2" 1
  },
  "upstream": "https://api.openshift.com/api/upgrades_info/v1/graph"
}
```

1 If the **version** number in the **desiredUpdate** stanza matches the value that you specified, the update is in progress.

6. Review the cluster version status history to monitor the status of the update. It might take some time for all the objects to finish updating.

```
$ oc get clusterversion -o json|jq ".items[0].status.history"

[
  {
    "completionTime": null,
    "image": "quay.io/openshift-release-dev/ocp-
release@sha256:9c5f0df8b192a0d7b46cd5f6a4da2289c155fd5302dec7954f8f06c878160b8b",

    "startedTime": "2019-06-19T20:30:50Z",
    "state": "Partial",
    "verified": true,
    "version": "4.1.2"
  },
  {
    "completionTime": "2019-06-19T20:30:50Z",
    "image": "quay.io/openshift-release-dev/ocp-
release@sha256:b8307ac0f3ec4ac86c3f3b52846425205022da52c16f56ec31cbe428501001d6
",
    "startedTime": "2019-06-19T17:38:10Z",
    "state": "Completed",
    "verified": false,
    "version": "4.1.0"
  }
]
```

The history contains a list of the most recent versions applied to the cluster. This value is updated when the CVO applies an update. The list is ordered by date, where the newest update is first in the list. Updates in the history have state **Completed** if the rollout completed and

Partial if the update failed or did not complete.

IMPORTANT

If an upgrade fails, the Operator stops and reports the status of the failing component. Rolling your cluster back to a previous version is not supported. If your upgrade fails, contact Red Hat support.

7. After the update completes, you can confirm that the cluster version has updated to the new version:

```
$ oc get clusterversion

NAME      VERSION     AVAILABLE   PROGRESSING   SINCE     STATUS
version   4.1.2       True        False         2m        Cluster version is 4.1.2
```

CHAPTER 3. UPDATING A CLUSTER THAT INCLUDES RHEL COMPUTE MACHINES

You can update, or upgrade, an OpenShift Container Platform cluster. If your cluster contains Red Hat Enterprise Linux (RHEL) machines, you must perform more steps to update those machines.

Prerequisites

- Have access to the cluster as a user with **admin** privileges. See Using RBAC to define and apply permissions.
- Have a recent etcd backup in case your upgrade fails and you must restore your cluster to a previous state.

3.1. ABOUT THE OPENSHIFT CONTAINER PLATFORM UPDATE SERVICE

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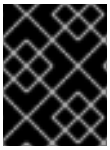

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Procedure

1. From the web console, click **Administration** > **Cluster Settings** and review the contents of the **Overview** tab.
   a. For production clusters, ensure that the **CHANNEL** is set to **stable-4.1**.

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For production clusters, you must subscribe to the **stable-4.1** channel.

   b. If the **UPDATE STATUS** is not **Updates Available**, you cannot upgrade your cluster.

   c. The **DESIRED VERSION** indicates the cluster version that your cluster is running or is updating to.

2. Click **Updates Available**, select a version to update to, and click **Update**. The **UPDATE STATUS** changes to **Updating**, and you can review the progress of the Operator upgrades on the **Cluster Operators** tab.

3.3. (OPTIONAL) ADDING HOOKS TO PERFORM ANSIBLE TASKS ON RHEL MACHINES

You can use *hooks* to run Ansible tasks on the RHEL compute machines during the OpenShift Container Platform update.

3.3.1. About Ansible hooks for upgrades

When you update OpenShift Container Platform, you can run custom tasks on your Red Hat Enterprise Linux (RHEL) nodes during specific operations by using *hooks*. Hooks allow you to provide files that define tasks to run before or after specific update tasks. You can use hooks to validate or modify custom infrastructure when you update the RHEL compute nodes in you OpenShift Container Platform cluster.

Because when a hook fails, the operation fails, you must design hooks that are idempotent, or can run multiple times and provide the same results.

Hooks have the following important limitations: - Hooks do not have a defined or versioned interface. They can use internal **openshift-ansible** variables, but it is possible that the variables will be modified or removed in future OpenShift Container Platform releases. - Hooks do not have error handling, so an error in a hook halts the update process. If you get an error, you must address the problem and then start the upgrade again.

3.3.2. Configuring the Ansible inventory file to use hooks

You define the hooks to use when you update the Red Hat Enterprise Linux (RHEL) compute machines, which are also known as worker machines, in the **hosts** inventory file under the **all:vars** section.

Prerequisites

- You have access to the machine that you used to add the RHEL compute machines cluster. You must have access to the **hosts** Ansible inventory file that defines your RHEL machines.

Procedure

1. After you design the hook, create a YAML file that defines the Ansible tasks for it. This file must be a set of tasks and cannot be a playbook, as shown in the following example:

```
---
# Trivial example forcing an operator to acknowledge the start of an upgrade
# file=/home/user/openshift-ansible/hooks/pre_compute.yml

- name: note the start of a compute machine update
  debug:
    msg: "Compute machine upgrade of {{ inventory_hostname }} is about to start"

- name: require the user agree to start an upgrade
  pause:
    prompt: "Press Enter to start the compute machine update"
```

2. Modify the **hosts** Ansible inventory file to specify the hook files. The hook files are specified as parameter values in the **[all:vars]** section, as shown:

   Example hook definitions in an inventory file

```
[all:vars]
openshift_node_pre_upgrade_hook=/home/user/openshift-ansible/hooks/pre_node.yml
openshift_node_post_upgrade_hook=/home/user/openshift-ansible/hooks/post_node.yml
```

   To avoid ambiguity in the paths to the hook, use absolute paths instead of a relative paths in their definitions.

3.3.3. Available hooks for RHEL compute machines

You can use the following hooks when you update the Red Hat Enterprise Linux (RHEL) compute machines in your OpenShift Container Platform cluster.

Hook name	Description
openshift_node_pre_cordon_hook	• Runs **before** each node is cordoned. • This hook runs against **each node** in serial. • If a task must run against a different host, the task must use **delegate_to** or **local_action**.
openshift_node_pre_upgrade_hook	• Runs **after** each node is cordoned but **before** it is updated. • This hook runs against **each node** in serial. • If a task must run against a different host, the task must use **delegate_to** or **local_action**.

Hook name	Description
openshift_node_pre_uncordon_hook	• Runs **after** each node is updated but **before** it is uncordoned. • This hook runs against **each node** in serial. • If a task must run against a different host, they task must use **delegate_to** or **local_action**.
openshift_node_post_upgrade_hook	• Runs **after** each node uncordoned. It is the **last** node update action. • This hook runs against **each node** in serial. • If a task must run against a different host, the task must use **delegate_to** or **local_action**.

3.4. UPDATING RHEL COMPUTE MACHINES IN YOUR CLUSTER

After you update your cluster, you must update the Red Hat Enterprise Linux (RHEL) compute machines in your cluster.

Prerequisites

- You updated your cluster.

IMPORTANT

Because the RHEL machines require assets that are generated by the cluster to complete the update process, you must update the cluster before you update the RHEL compute machines in it.

- You have access to the machine that you used to add the RHEL compute machines cluster. You must have access to the **hosts** Ansible inventory file that defines your RHEL machines and the **upgrade** playbook.

Procedure

1. Stop and disable firewalld on the host:

```
# systemctl disable --now firewalld.service
```

NOTE

You must not enable firewalld later. If you do, you cannot access OpenShift Container Platform logs on the worker.

2. Review your Ansible inventory file at **/<path>/inventory/hosts** and ensure that all of your compute, or worker, machines are listed in the **[workers]** section, as shown in the following example:

```
[all:vars]
ansible_user=root
#ansible_become=True

openshift_kubeconfig_path="~/.kube/config"
openshift_pull_secret_path="~/pull-secret.txt"

[workers]
mycluster-worker-0.example.com
mycluster-worker-1.example.com
mycluster-worker-2.example.com
mycluster-worker-3.example.com
```

   If all of your RHEL compute machines are not listed in the **[workers]** section, you must move them to that section.

3. Change to the **openshift-ansible** directory and run the **upgrade** playbook:

```
$ cd /usr/share/ansible/openshift-ansible
$ ansible-playbook -i /<path>/inventory/hosts playbooks/upgrade.yml 1
```

1 For **<path>**, specify the path to the Ansible inventory file that you created.