



# Red Hat Advanced Cluster Management for Kubernetes 2.0

## Install

[Install](#)



# Red Hat Advanced Cluster Management for Kubernetes 2.0 Install

---

Install

## Legal Notice

Copyright © 2020 Red Hat, Inc.

The text of and illustrations in this document are licensed by Red Hat under a Creative Commons Attribution–Share Alike 3.0 Unported license ("CC-BY-SA"). An explanation of CC-BY-SA is available at

<http://creativecommons.org/licenses/by-sa/3.0/>

. In accordance with CC-BY-SA, if you distribute this document or an adaptation of it, you must provide the URL for the original version.

Red Hat, as the licensor of this document, waives the right to enforce, and agrees not to assert, Section 4d of CC-BY-SA to the fullest extent permitted by applicable law.

Red Hat, Red Hat Enterprise Linux, the Shadowman logo, the Red Hat logo, JBoss, OpenShift, Fedora, the Infinity logo, and RHCE are trademarks of Red Hat, Inc., registered in the United States and other countries.

Linux<sup>®</sup> is the registered trademark of Linus Torvalds in the United States and other countries.

Java<sup>®</sup> is a registered trademark of Oracle and/or its affiliates.

XFS<sup>®</sup> is a trademark of Silicon Graphics International Corp. or its subsidiaries in the United States and/or other countries.

MySQL<sup>®</sup> is a registered trademark of MySQL AB in the United States, the European Union and other countries.

Node.js<sup>®</sup> is an official trademark of Joyent. Red Hat is not formally related to or endorsed by the official Joyent Node.js open source or commercial project.

The OpenStack<sup>®</sup> Word Mark and OpenStack logo are either registered trademarks/service marks or trademarks/service marks of the OpenStack Foundation, in the United States and other countries and are used with the OpenStack Foundation's permission. We are not affiliated with, endorsed or sponsored by the OpenStack Foundation, or the OpenStack community.

All other trademarks are the property of their respective owners.

## Abstract

Installing instructions for Red Hat Advanced Cluster Management for Kubernetes

---

## Table of Contents

<b>CHAPTER 1. INSTALLING</b> .....	<b>3</b>
1.1. REQUIREMENTS AND RECOMMENDATIONS	3
1.1.1. Supported operating systems and platforms	3
1.1.2. Supported browsers	3
1.2. PERFORMANCE AND SCALABILITY	4
1.2.1. Maximum number of managed clusters	4
1.2.2. Search scalability	4
1.2.2.1. Physical memory	4
1.2.2.2. Write throughput (cache recovery time)	5
1.2.2.3. Query execution considerations	5
1.3. PREPARING YOUR HUB CLUSTER FOR INSTALLATION	6
1.3.1. Confirm your Red Hat OpenShift Container Platform installation	6
1.3.2. Sizing your cluster	6
1.3.2.1. Red Hat Advanced Cluster Management for Kubernetes environment	7
1.4. INSTALLING WHILE CONNECTED ONLINE	8
1.4.1. Prerequisites	8
1.4.2. Installing Red Hat Advanced Cluster Management from the CLI	8
1.4.3. Installing Red Hat Advanced Cluster Management from the console	11
1.5. INSTALL ON DISCONNECTED NETWORKS	12
1.5.1. Prerequisites for a disconnected installation	13
1.5.2. Installing Red Hat Advanced Cluster Management for Kubernetes in a disconnected environment	13
1.6. MIGRATING FROM A PREVIOUS VERSION	14
1.6.1. Migrating from 1.0 to 2.0	14
1.7. UPGRADING OPENSIFT CONTAINER PLATFORM	14
1.8. UNINSTALLING	15
1.8.1. Removing a MultiClusterHub instance by using commands	16
1.8.2. Deleting both components by using the console	16



# CHAPTER 1. INSTALLING

Learn how to install and uninstall Red Hat Advanced Cluster Management for Kubernetes. Before you install Red Hat Advanced Cluster Management for Kubernetes, review the required hardware and system configuration for each product.

You can install the Red Hat Advanced Cluster Management for Kubernetes online on Linux with a supported version of Red Hat OpenShift Container Platform.

High-level installation flow:

1. You must have a supported version of OpenShift Container Platform installed and configured.
2. Install the Operator for Red Hat Advanced Cluster Management for Kubernetes from the catalog.

After you install and deploy the Red Hat Advanced Cluster Management for Kubernetes, view the documentation on how to use the features.

Installing Red Hat Advanced Cluster Management for Kubernetes sets up a multi-node cluster production environment. You can install Red Hat Advanced Cluster Management for Kubernetes in either standard or high availability configurations.

## 1.1. REQUIREMENTS AND RECOMMENDATIONS

Before you install Red Hat Advanced Cluster Management for Kubernetes, review the system configuration requirements and settings.

### 1.1.1. Supported operating systems and platforms

See the following table for supported operating systems:

Platform	Operating system	OpenShift Container Platform version
Linux x86_64	Red Hat Enterprise Linux 7.6, or later	4.3.18 or later, 4.4.4 or later, 4.5.2 or later (bare metal features only supported on 4.5, or later)

### 1.1.2. Supported browsers

You can access the Red Hat Advanced Cluster Management for Kubernetes console from Mozilla Firefox, Google Chrome, Microsoft™ Edge, and Safari. See the following versions that are tested and supported:

Platform	Supported browsers
Microsoft Windows	Microsoft Edge - latest, Mozilla Firefox - 74.0 or later, Google Chrome - Version 80.0 and later

Platform	Supported browsers
Linux	Mozilla Firefox - 74.0 and later, Google Chrome - Version 80.0 and later
macOS	Mozilla Firefox - 74.0 and later, Google Chrome - Version 80.0 and later, Safari - 13.0.5 and later

See the [Red Hat Advanced Cluster Management for Kubernetes 2.0 Support matrix](#) for additional information.

## 1.2. PERFORMANCE AND SCALABILITY

Red Hat Advanced Cluster Management for Kubernetes is tested to determine certain scalability and performance data. The major areas that are tested are cluster scalability and search performance.

You can use this information to help you plan your environment.

**Note:** Data is based on the results from a lab environment at the time of testing. Your results might vary, depending on your environment, network speed, and changes to the product.

### 1.2.1. Maximum number of managed clusters

The Red Hat Advanced Cluster Management for Kubernetes hub cluster provided good performance when managing up to 250 managed clusters. The following table shows the configuration information for the clusters on the Amazon Web Services cloud platform that were used to determine the cluster maximums:

Node	Flavor	vCPU	RAM (GiB)	Disk type	Disk size(GiB) /IOS	Count	Region
Master	m5.2xlarge	8	32	gp2	100	3	us-east-1
Worker	m5.2xlarge	8	32	gp2	100	3/5	us-east-1

### 1.2.2. Search scalability

The scalability of the Search component depends on the performance of the data store. The following variables are important when analyzing the search performance:

- Physical memory
- Write throughput (Cache recovery time)
- Query execution time

#### 1.2.2.1. Physical memory



Search keeps the data in-memory to achieve fast response times. The memory required is proportional to the number of Kubernetes resources and their relationships in the cluster.

Clusters	Kubernetes resources	Relationships	Observed size (with simulated data)
1 medium	5000	9500	50 MB
5 medium	25,000	75,000	120 MB
15 medium	75,000	20,0000	263 MB
30 medium	150,000	450,000	492 MB
50 medium	250,000	750,000	878 MB

By default, the datastore is deployed with a memory limit of 1 GB. If you are managing larger clusters, you might need to increase this limit by editing the deployment named **search-prod-xxxxx-redisgraph** in the hub cluster namespace.

#### 1.2.2.2. Write throughput (cache recovery time)

Most clusters in steady state generate a small number of resource updates. The highest rate of updates happen when the data in RedisGraph is cleared, which causes the remote collectors to synchronize their full state around the same time.

Clusters	Kubernetes resources	Relationships	Average recovery time from simulation
1 medium	5000	9500	less than 2 seconds
5 medium	25,000	75,000	less than 15 seconds
15 medium	75,000	200,000	2 minutes and 40 seconds
30 medium	150,000	450,000	5-8 minutes

**Remember:** Times might increase for clusters that have a slow network connection to the hub.

#### 1.2.2.3. Query execution considerations

There are some things that can affect the time that it takes to run and return results from a query. Consider the following items when planning and configuring your environment:

- Searching for a keyword is not efficient.
- The first search takes longer than later searches because it takes additional time to gather the user's access rules.

- The length of time to complete a request is proportional to the number of namespaces and resources the user is authorized to access.
- The worst performance is observed for a request by a non-administrator user with access to all of the namespaces, or all of the managed clusters.

## 1.3. PREPARING YOUR HUB CLUSTER FOR INSTALLATION

Before you install Red Hat Advanced Cluster Management for Kubernetes, review the following installation requirements and recommendations for setting up your hub cluster:

### 1.3.1. Confirm your Red Hat OpenShift Container Platform installation

- You must have a supported Red Hat OpenShift Container Platform version, including the registry and storage services, installed and working in your cluster. For more information about installing the Red Hat OpenShift Container Platform, see the Red Hat OpenShift documentation.
- For Red Hat OpenShift Container Platform version 4.3, see [Red Hat OpenShift Container Platform 4.3 Documentation](#).
- To ensure that the Red Hat OpenShift Container Platform cluster is set up correctly, access the Red Hat OpenShift Container Platform web console.  
Run the **kubectl -n openshift-console get route** command to access the Red Hat OpenShift Container Platform web console. See the following example output:

```
openshift-console      console      console-openshift-console.apps.new-coral.purple-
chesterfield.com      console      https reencrypt/Redirect  None
```

The console URL in this example is **https:// console-openshift-console.apps.new-coral.purple-chesterfield.com**. Open the URL in your browser and check the result. If the console URL displays **console-openshift-console.router.default.svc.cluster.local**, set **openshift\_master\_default\_subdomain** when you install the Red Hat OpenShift Container Platform.

See [Sizing your cluster](#) to learn about setting up capacity for your hub cluster.

### 1.3.2. Sizing your cluster

Each Red Hat Advanced Cluster Management for Kubernetes cluster has its own characteristics. There are guidelines that provide sample deployment sizes. They have been classified by size and purpose. The considerations are focused on clusters that are either deployed to VMware or OpenStack environments.

Red Hat Advanced Cluster Management applies the following 3 dimensions for sizing and placement of supporting services:

- Availability Zones that isolate potential fault domains across the cluster. Typical clusters should have roughly equivalent worker node capacity in 3 or more availability zones.
- vCPU reservations and limits establish vCPU capacity on a worker node to assign to a container. A vCPU is equivalent to a Kubernetes compute unit. For more information, see [Kubernetes Meaning of CPU](#).

- Memory reservations and limits establish memory capacity on a worker node to assign to a container. Reservations establish a lower bound of CPU or memory and limits establish an upper bound.

The persistent data managed by the product is stored in the cluster-wide etcd data store. Best practices for OpenShift recommend distributing the master nodes of the cluster across three (3) availability zones, as well.

**Note:** The requirements that are listed are not minimum requirements.

### 1.3.2.1. Red Hat Advanced Cluster Management for Kubernetes environment

**Table 1.1. Table of the product environment**

OpenShift node role	Availability zones	Data stores	Total reserved memory (lower bound)	Total reserved CPU (lower bound)
master	3	etcd x 3	Per OpenShift sizing guidelines	Per OpenShift sizing guidelines
worker	3	redisgraph or redis x 1	12 Gi	6 CPU

In addition to Red Hat Advanced Cluster Management for Kubernetes, the OpenShift cluster runs additional services to support cluster features. The following list contains the recommended sizes of the three (3) installed nodes that are distributed across availability zones for each of the providers.

- **Creating an OpenShift cluster on Amazon Web Services**  
See the [Amazon Web Services information in the Red Hat OpenShift product documentation](#) for more information. Also learn more about [machine types](#).
  - Node Count: 3
  - Availability zones: 3
  - Instance size: m5.xlarge
    - vCPU: 4
    - Memory: 16 GB
    - Storage size: 120 GB
- **Creating an OpenShift cluster on Google Cloud Platform**  
See the [Google Cloud Platform product documentation](#) for more information about quotas. Also learn more about [machine types](#).
  - Node Count: 3
  - Availability zones: 3
  - Instance size: N1-standard-4 (0.95–6.5 GB)
    - vCPU: 6

- Memory: 15 GB
- Storage size: 120 GB
- **Creating an OpenShift cluster on Microsoft Azure** See the following [product documentation](#) for more details.
  - Node Count: 3
  - Availability zones: 3
  - Instance size: Standard\_D2s\_v3
    - vCPU: 6
    - Memory: 16 GB
    - Storage size: 120 GB
- **Creating an OpenShift cluster on bare metal** See the following [product documentation](#) for more details.
  - CPU: 6 (minimum)
  - Memory: 16 GB (minimum)
  - Storage size: 50 GB (minimum)

## 1.4. INSTALLING WHILE CONNECTED ONLINE

Red Hat Advanced Cluster Management for Kubernetes is installed using an operator that deploys all of the required components.

### 1.4.1. Prerequisites

You must meet the following requirements before you install Red Hat Advanced Cluster Management:

- Your Red Hat OpenShift Container Platform must have access to the Red Hat Advanced Cluster Management operator in the OperatorHub catalog.
- Red Hat OpenShift Container Platform version 4.3, or later, must be deployed in your environment, and you must be logged into it with the CLI. See the [OpenShift version 4.3 documentation](#) or [OpenShift version 4.4 documentation](#).
- Your Red Hat OpenShift Container Platform command line interface (CLI) must be version 4.3, or later, and configured to run **oc** commands. See [Getting started with the CLI](#) for information about installing and configuring the Red Hat OpenShift CLI.
- Your Red Hat OpenShift Container Platform permissions must allow you to create a namespace.
- You must have an Internet connection to access the dependencies for the operator.

### 1.4.2. Installing Red Hat Advanced Cluster Management from the CLI

1. Create a hub cluster namespace where the operator requirements are contained:

```
oc create namespace <namespace>
```

Replace *namespace* with a name for your hub cluster namespace. REMEMBER: The value for *namespace* might be referred to as *Project* in the Red Hat OpenShift Container Platform environment.



### IMPORTANT

The Red Hat Advanced Cluster Management operator must be installed in its own namespace. A **ServiceAccount** with a **ClusterRoleBinding** automatically gives cluster administrator privileges to Red Hat Advanced Cluster Management and to any ID with access to the namespace. For security, make sure that anyone who is given access to this namespace already has cluster-administrator access.

2. Switch your project namespace to the one that you created:

```
oc project <namespace>
```

Replace *namespace* with the name of the hub cluster namespace that you created in step 1.

3. Create an operator group. Each namespace can have only one operator group.
  - a. Create a **.yaml** file that defines the operator group. Your file should look similar to the following example:

```
apiVersion: operators.coreos.com/v1
kind: OperatorGroup
metadata:
  name: <default>
spec:
  targetNamespaces:
    - <namespace>
```

Replace *default* with the name of your operator group. Replace *namespace* with the name of your project namespace.

- b. Apply the file that you created to define the operator group:

```
oc apply -f local/<operator-group>.yaml
```

Replace *operator-group* with the name of the operator group **.yaml** file that you created.

4. Apply the subscription.
  - a. Create a **.yaml** file that defines the subscription. Your file should look similar to the following example:

```
apiVersion: operators.coreos.com/v1alpha1
kind: Subscription
metadata:
  name: acm-operator-subscription
spec:
  sourceNamespace: openshift-marketplace
  source: redhat-operators
```

```
channel: release-2.0
installPlanApproval: Automatic
name: advanced-cluster-management
```

- b. Apply the subscription:

```
oc apply -f local/<subscription>.yaml
```

Replace *subscription* with the name of the subscription file that you created.

5. If you plan to import Kubernetes clusters that were not created by OpenShift Container Platform or Red Hat Advanced Cluster Management, generate a pull secret to access the entitled content from the distribution registry. Pull secret requirements for OpenShift Container Platform clusters are automatically resolved by OpenShift Container Platform and Red Hat Advanced Cluster Management. You do not have to generate the pull secret if you are not importing other types of Kubernetes clusters to be managed. **Important:** Pull secrets are namespace-specific, so make sure that you are in the namespace that you created in step 1.
  - a. Download your OpenShift Container Platform pull secret file from [cloud.redhat.com/openshift/install/pull-secret](https://cloud.redhat.com/openshift/install/pull-secret) by selecting **Download pull secret**. Your OpenShift Container Platform pull secret is associated with your Red Hat Customer Portal ID, and is the same across all Kubernetes providers.
  - b. Run the following command to generate your pull secret:

```
oc create secret generic <secret> -n <namespace> --from-file=.dockerconfigjson=<path-to-pull-secret> --type=kubernetes.io/dockerconfigjson
```

Replace *secret* with the name of the secret that you want to create. Replace *namespace* with your project namespace. Replace *path-to-pull-secret* with the path to your OpenShift Container Platform pull secret that you downloaded.

6. Create the MultiClusterHub custom resource by creating a **.yaml** file that defines the custom resource. Your file should look similar to the following example:

```
apiVersion: operator.open-cluster-management.io/v1
kind: MultiClusterHub
metadata:
  name: multiclusterhub
  namespace: <namespace>
spec:
  imagePullSecret: <secret>
```

Replace *namespace* with your project namespace. Replace *secret* with the name of the secret that you created.

If this step fails with the following error, the resources are still being created and applied:

```
error: unable to recognize "/mch.yaml": no matches for kind "MultiClusterHub" in version "operator.open-cluster-management.io/v1"
```

Run the command again in a few minutes when the resources are created.

7. View the list of routes after about 10 minutes to find your route:

oc get routes

If you are reinstalling Red Hat Advanced Cluster Management and the pods do not start, see [Troubleshooting reinstallation failure](#) for steps to work around this problem.

### 1.4.3. Installing Red Hat Advanced Cluster Management from the console

1. Create a hub cluster namespace for the operator requirements:
  - a. In the Red Hat OpenShift Container Platform console navigation, select **Administration > Namespaces**.
  - b. Select **Create Namespace**.
  - c. Provide a name for your namespace. This is the namespace that you use throughout the installation process. REMEMBER: The value for *namespace* might be referred to as *Project* in the Red Hat OpenShift Container Platform environment.
  - d. Select **Create**.



#### IMPORTANT

The Red Hat Advanced Cluster Management operator must be installed in its own namespace. A **ServiceAccount** with a **ClusterRoleBinding** automatically gives cluster administrator privileges to Red Hat Advanced Cluster Management and to any ID with access to the namespace. For security, make sure that anyone who is given access to this namespace already has cluster-administrator access.

2. Switch your project namespace to the one that you created in step 1. This ensures that the steps are completed in the correct namespace. Some resources are namespace-specific.
  - a. In the Red Hat OpenShift Container Platform console navigation, select **Administration > Namespaces**.
  - b. In the *Projects* field, select the namespace that you created in step 1 from the dropdown list.
3. Create a pull secret that provides the entitlement to the downloads.
  - a. Copy your OpenShift Container Platform pull secret from [cloud.redhat.com/openshift/install/pull-secret](https://cloud.redhat.com/openshift/install/pull-secret) by selecting **Copy pull secret**. You will use the content of this pull secret in an step later in this procedure. Your OpenShift Container Platform pull secret is associated with your Red Hat Customer Portal ID, and is the same across all Kubernetes providers.
  - b. In the Red Hat OpenShift Container Platform console navigation, select **Workloads > Secrets**.
  - c. Select **Create > Image Pull Secret**.
  - d. Enter a name for your secret.
  - e. Select **Upload Configuration File** as the authentication type.
  - f. In the *Configuration file* field, paste the pull secret that you copied from **cloud.redhat.com**.

- g. Select **Create** to create the pull secret.
4. Subscribe to the operator. REMEMBER: The value for *namespace* might be referred to as *Project* in the Red Hat OpenShift Container Platform environment.
  - a. In the Red Hat OpenShift Container Platform console navigation, select **Operators** > **OperatorHub**.
  - b. Select **Red Hat Advanced Cluster Management** **Tip:** You can filter on the *Integration & Delivery* category to narrow the choices.
  - c. Select **Install**.
  - d. Update the values, if necessary.
  - e. Select **Subscribe**.
5. Create the *MultiClusterHub* custom resource.
  - a. In the Red Hat OpenShift Container Platform console navigation, select **Installed Operators** > **MultiClusterHub**.
  - b. Select the **MultiClusterHub** tab.
  - c. Select **Create MultiClusterHub**.
  - d. Update the default values in the **.yaml** file, according to your needs. The following example shows some sample data:

```
apiVersion: operator.open-cluster-management.io/v1
kind: MultiClusterHub
metadata:
  name: multiclusterhub
  namespace: <namespace>
spec:
  imagePullSecret: <secret>
```

Replace *secret* with the name of the pull secret that you created. Confirm that the *namespace* is your project namespace.

6. Select **Create** to initialize the custom resource. It can take up to 10 minutes for the hub to build and start.

After the hub is created, the status for the operator is *Running* on the *Installed Operators* page.
7. Access the console for the hub.
  - a. In the Red Hat OpenShift Container Platform console navigation, select **Networking** > **Routes**.
  - b. View the URL for your hub in the list, and navigate to it to access the console for your hub.

If you are reinstalling Red Hat Advanced Cluster Management and the pods do not start, see [Troubleshooting reinstallation failure](#) for steps to work around this problem.

## 1.5. INSTALL ON DISCONNECTED NETWORKS

You might need to install Red Hat Advanced Cluster Management for Kubernetes on Red Hat



OpenShift Clusters that are not connected to the Internet. The procedure to install on a disconnected hub requires some of the same steps as the connected installation. You must download copies of the packages in order to access them during the installation, rather than accessing them directly from the network during the installation.

### 1.5.1. Prerequisites for a disconnected installation

You must meet the following requirements before you install Red Hat Advanced Cluster Management for Kubernetes:

- Red Hat OpenShift Container Platform version 4.3, or later, must be deployed in your environment, and you must be logged into it with the command line interface (CLI). Note: For managing bare metal clusters, you must have OpenShift Container Platform version 4.5, or later. See the [OpenShift version 4.3 documentation](#), [OpenShift version 4.4 documentation](#), or [OpenShift version 4.5 documentation](#).
- Your Red Hat OpenShift Container Platform CLI must be version 4.3, or later, and configured to run **oc** commands.
- Your Red Hat OpenShift Container Platform permissions must allow you to create a namespace.
- You must have a workstation with Internet connection to download the dependencies for the operator.

### 1.5.2. Installing Red Hat Advanced Cluster Management for Kubernetes in a disconnected environment

Follow these steps to install Advanced Cluster Management for Kubernetes in a disconnected environment:

1. Create a mirror registry, if necessary.  
If you do not already have a mirror registry, create one by completing the procedure in the [Creating a mirror registry for installation in a restricted network](#) topic of the Red Hat OpenShift Container Platform documentation.  
  
If you already have a mirror registry, you can configure and use your existing one.
2. Bare metal only: Provide the certificate information for the disconnected registry in your **install-config.yaml** file. To access the image in a protected disconnected registry, you must provide the certificate information so Red Hat Advanced Cluster Management can access the registry.
  - a. Copy the certificate information from the registry.
  - b. Open the **install-config.yaml** file in an editor.
  - c. Find the entry for **additionalTrustBundle:** |.
  - d. Add the certificate information after the **additionalTrustBundle** line. The resulting content should look similar to the following example:

```
additionalTrustBundle: |
  -----BEGIN CERTIFICATE-----
  certificate_content
  -----END CERTIFICATE-----
sshKey: >-
```

- e. Save the **install-config.yaml** file.
3. Enable the disconnected Operator Lifecycle Manager (OLM) Red Hat Operators and Community Operators.  
Advanced Cluster Management for Kubernetes is included in the OLM Red Hat Operator catalog.
4. Configure the disconnected OLM for the Red Hat Operator catalog. Follow the steps in the Using Operator Lifecycle Manager on restricted networks topic of the Red Hat OpenShift Container Platform documentation.
5. Now that you have the image in the disconnected OLM, continue to install Advanced Cluster Management for Kubernetes from the OLM catalog. See the steps in [Installing while connected online](#) for the required steps.

## 1.6. MIGRATING FROM A PREVIOUS VERSION

### 1.6.1. Migrating from 1.0 to 2.0

Upgrade from version 1.0 of Red Hat Advanced Cluster Management to version 2.0 is not supported. To *migrate* from the technology preview version of Red Hat Advanced Cluster Management for Kubernetes 1.0 to the generally available version 2.0, you must manually remove version 1.0 and install version 2.0. Complete the following steps to migrate from version 1.0 to version 2.0:

1. Detach each of your managed clusters from your Red Hat Advanced Cluster Management hub cluster before uninstalling the hub cluster. See [Removing a cluster from management](#) for instructions that explain how to remove the managed clusters.
2. Uninstall Red Hat Advanced Cluster Management version 1.0 by completing the procedure in [Uninstalling](#).
3. Install Red Hat Advanced Cluster Management version 2.0 by completing the procedure in [Installing while connected online](#) .  
When you install version 2.0, select **automatic upgrade** to enable automatic upgrades for future versions within the same major release. If you prefer to run manual updates, you can select **manual upgrade**. See the following definitions of the options:
  - Automatic upgrade: If you select automatic upgrades when you install the Red Hat Advanced Cluster Management operator, the Operator Lifecycle Manager automatically upgrades the version when a compatible upgrade is available. This method ensures that you always have the latest version of the operator with the latest fixes.
  - Manual upgrade: If you select manual upgrades when you install the Red Hat Advanced Cluster Management operator, the cluster administrator determines when an upgrade occurs.  
When a compatible upgrade is available, the Operator Lifecycle Manager creates a request to upgrade. A cluster administrator must approve the request to upgrade the version.
4. Import the clusters to the version 2.0 hub cluster by completing the procedure in [Importing a target managed cluster to the hub cluster](#).

For more information about upgrading your operator, see [Adding operators to a cluster](#) .

## 1.7. UPGRADING OPENSIFT CONTAINER PLATFORM

You can upgrade the version of Red Hat OpenShift Container Platform that hosts your Red Hat Advanced Cluster Management for Kubernetes hub cluster. Back up your data before initiating any cluster-wide upgrade.

During the upgrade of the OpenShift Container Platform version, the Red Hat Advanced Cluster Management web console might show brief periods when pages or data are unavailable. Indicators can include HTTP 500 (Internal Server Error), HTTP 504 (Gateway Timeout Error), or errors that data that was previously available is not available. This is a normal part of the upgrade, and no data is lost when this occurs. The availability is eventually restored.

The search index is also rebuilt during this upgrade, so any queries that are submitted during the upgrade might be incomplete.

The following table contains some noted observations from an upgrade from OpenShift Container Platform version 4.4.3 to 4.4.10:

**Table 1.2. Table Observations from an OpenShift Container Platform upgrade from version 4.3.3 to 4.4.10.**

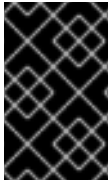
Elapsed time of upgrade process (minutes:seconds)	Observed change	Duration
03:40	Governance and risk console experiences HTTP 500	Service restored within 20 seconds
05:30	AppUI experiences HTTP 504 Gateway Timeout	Service restored within 60 seconds
06:05	Cluster+Search UI experience HTTP 504 Gateway Timeout	Service restored within 20 seconds
07:00	Cluster+Search UI experience HTTP 504 Gateway Timeout	Service restored within 20 seconds
07:10	Topology+Cluster UI Display error messages within the page	Service restored within 20 seconds
07:35	HTTP 500 for most UI pages	Service restored within 60 seconds
08:30	Service restored for all pages	

## 1.8. UNINSTALLING

When you uninstall Red Hat Advanced Cluster Management for Kubernetes, there are two different levels of the process.

The first level is a custom resource removal. It is the most basic type of unistallation that removes the custom resource of the MultiClusterHub instance, but leaves other required components. This level of uninstallation is helpful if you plan another installation that uses the same settings and components of the one that you are removing. Your time to install the next version is reduced when you have all of the other components already installed.

The second level is a more complete uninstallation, except for a few items, like custom resource definitions. This adds the removal of other required components and settings to the items that are removed. When you continue with this step, it removes all of the components and subscriptions that were not removed with the custom resource removal. If you complete this level of uninstallation, you must reinstall the operator before reinstalling the custom resource.



### IMPORTANT

Before you uninstall the Red Hat Advanced Cluster Management hub cluster, you must detach all of the clusters that are managed by that hub cluster. See, [Troubleshooting failed uninstallation because resources exist](#) for the work around.

## 1.8.1. Removing a MultiClusterHub instance by using commands

1. Change to your project namespace by entering the following command:

```
oc project <namespace>
```

Replace *namespace* with the name of your project namespace.

2. Enter the following command to remove the MultiClusterHub custom resource:

```
oc delete multiclusterhub --all
```

### TIP

If you plan to reinstall a new version and want to keep your other information, you can skip the rest of the steps in this procedure and reinstall.

3. Enter the following command to remove all of the related components and subscriptions:

```
oc delete subs --all
```

## 1.8.2. Deleting both components by using the console

When you use the Red Hat OpenShift Container Platform console to uninstall, you remove the operator. Complete the following steps to uninstall by using the console:

1. In the Red Hat OpenShift Container Platform console navigation, select **Operators > Installed Operators > Advanced Cluster Manager for Kubernetes**.
2. Select the tab for *Multiclusterhub operator*.
3. Select the *Options* menu for the MultiClusterHub operator.
4. Select **Delete MultiClusterHub**.

### TIP

If you plan to reinstall a new version and want to keep your other information, you can skip the rest of the steps in this procedure and reinstall.

5. Navigate to **Installed Operators**.

6. Remove the *Red Hat Advanced Cluster Management* operator by selecting the *Options* menu and selecting **Uninstall operator**.