

### Advanced Cluster Management for Kubernetes on Red Hat OpenShift with NetApp

**NetApp Solutions** 

NetApp March 10, 2022

This PDF was generated from https://docs.netapp.com/us-en/netapp-solutions/containers/rh-os-n\_use\_case\_advanced\_cluster\_management\_overview.html on March 10, 2022. Always check docs.netapp.com for the latest.

### **Table of Contents**

Α	dvanced Cluster Management for Kubernetes on Red Hat OpenShift with NetApp	. 1
	Advanced Cluster Management for Kubernetes: Red Hat OpenShift with NetApp	. 1
	Deployment	. 2
	Features	. 7

# Advanced Cluster Management for Kubernetes on Red Hat OpenShift with NetApp

## Advanced Cluster Management for Kubernetes: Red Hat OpenShift with NetApp

As a containerized application transitions from development to production, many organizations require multiple Red Hat OpenShift clusters to support the testing and deployment of that application. In conjunction with this, organizations usually host multiple applications or workloads on OpenShift clusters. Therefore, each organization ends up managing a set of clusters, and OpenShift administrators must thus face the added challenge of managing and maintaining multiple clusters across a range of environments that span multiple onpremises data centers and public clouds. To address these challenges, Red Hat introduced Advanced Cluster Management for Kubernetes.

Red Hat Advanced Cluster Management for Kubernetes enables you to perform the following tasks:

- 1. Create, import, and manage multiple clusters across data centers and public clouds
- 2. Deploy and manage applications or workloads on multiple clusters from a single console
- 3. Monitor and analyze health and status of different cluster resources
- 4. Monitor and enforce security compliance across multiple clusters

Red Hat Advanced Cluster Management for Kubernetes is installed as an add-on to a Red Hat OpenShift cluster, and it uses this cluster as a central controller for all its operations. This cluster is known as hub cluster, and it exposes a management plane for the users to connect to Advanced Cluster Management. All the other OpenShift clusters that are either imported or created via the Advanced Cluster Management console are managed by the hub cluster and are called managed clusters. It installs an agent called Klusterlet on the managed clusters to connect them to the hub cluster and serve the requests for different activities related to cluster lifecycle management, application lifecycle management, observability, and security compliance.





For more information, see the documentation here.

#### **Deployment**

#### **Deploy Advanced Cluster Management for Kubernetes**

#### **Prerequisites**

- 1. A Red Hat OpenShift cluster (greater than version 4.5) for the hub cluster
- 2. Red Hat OpenShift clusters (greater than version 4.4.3) for managed clusters
- 3. Cluster-admin access to the Red Hat OpenShift cluster
- 4. A Red Hat subscription for Advanced Cluster Management for Kubernetes

Advanced Cluster Management is an add-on on for the OpenShift cluster, so there are certain requirements and restrictions on the hardware resources based on the features used across the hub and managed clusters. You need to take these issues into account when sizing the clusters. See the documentation here for more details.

Optionally, if the hub cluster has dedicated nodes for hosting infrastructure components and you would like to install Advanced Cluster Management resources only on those nodes, you need to add tolerations and selectors to those nodes accordingly. For more details, see the documentation here.

Next: Installation.

#### **Deploy Advanced Cluster Management for Kubernetes**

To install Advanced Cluster Management for Kubernetes on an OpenShift cluster, complete the following steps:

- Choose an OpenShift cluster as the hub cluster and log into it with cluster-admin privileges.
- 2. Navigate to Operators > Operators Hub and search for Advanced Cluster Management for Kubernetes.



3. Select Advanced Cluster Management for Kubernetes and click Install.

Install

#### Latest version

2.2.3

#### Capability level

Basic Install

Seamless Upgrades

Full Lifecycle

O Deep Insights

Auto Pilot

#### Provider type

Red Hat

#### Provider

Red Hat

#### Infrastructure features

Disconnected

Red Hat Advanced Cluster Management for Kubernetes provides the multicluster hub, a central management console for managing multiple Kubernetes-based clusters across data centers, public clouds, and private clouds. You can use the hub to create Red Hat OpenShift Container Platform clusters on selected providers, or import existing Kubernetes-based clusters. After the clusters are managed, you can set compliance requirements to ensure that the clusters maintain the specified security requirements. You can also deploy business applications across your clusters.

Red Hat Advanced Cluster Management for Kubernetes also provides the following operators:

- Multicluster subscriptions: An operator that provides application management capabilties including subscribing to resources from a channel and deploying those resources on MCH-managed Kubernetes clusters based on placement rules.
- Hive for Red Hat OpenShift: An operator that provides APIs for provisioning and performing initial
  configuration of OpenShift clusters. These operators are used by the multicluster hub to provide its
  provisioning and application-management capabilities.

#### How to Install

Use of this Red Hat product requires a licensing and subscription agreement.

4. On the Install Operator screen, provide the necessary details (NetApp recommends retaining the default parameters) and click Install.

#### Install Operator

Install your Operator by subscribing to one of the update channels to keep the Operator up to date. The strategy determines either manual or automatic updates.



5. Wait for the operator installation to complete.



6. After the operator is installed, click Create MultiClusterHub.



7. On the Create MultiClusterHub screen, click Create after furnishing the details. This initiates the installation of a multi-cluster hub.



8. After all the pods move to the Running state in the open-cluster-management namespace and the operator moves to the Succeeded state, Advanced Cluster Management for Kubernetes is installed.



9. It takes some time to complete the hub installation, and, after it is done, the MultiCluster hub moves to Running state.



10. It creates a route in the open-cluster-management namespace. Connect to the URL in the route to access the Advanced Cluster Management console.



Next: Features - Cluster Lifecycle Management.

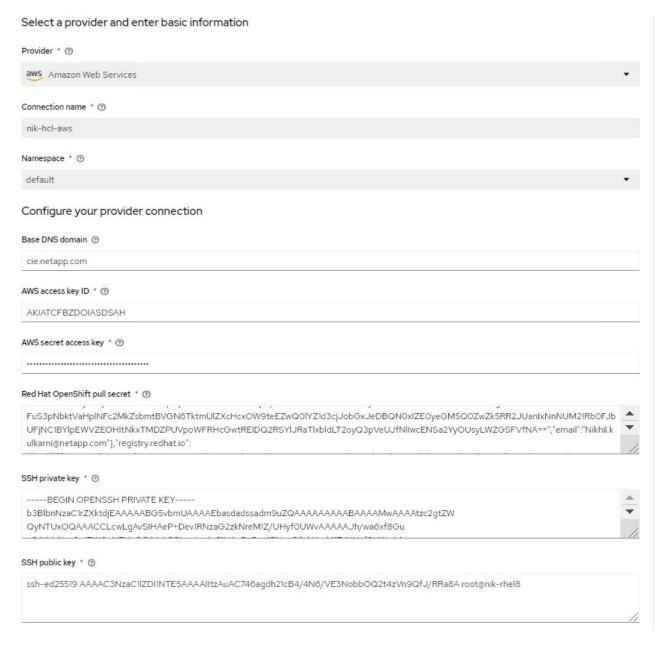
#### **Features**

### Features: Advanced Cluster Management for Kubernetes on Red Hat OpenShift with NetApp

#### **Cluster Lifecycle Management**

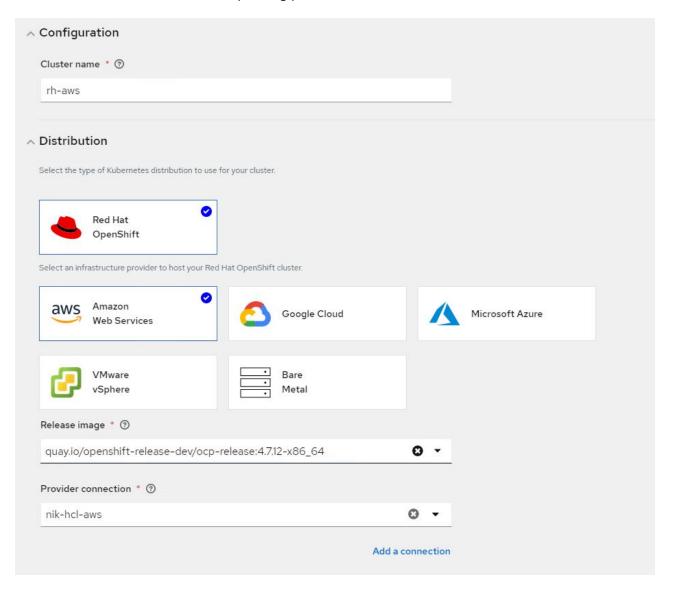
To manage different OpenShift clusters, you can either create or import them into Advanced Cluster Management.

- 1. First navigate to Automate Infrastructures > Clusters.
- 2. To create a new OpenShift cluster, complete the following steps:
  - a. Create a provider connection: Navigate to Provider Connections and click Add a Connection, provide all the details corresponding to the selected provider type and click Add.



b. To create a new cluster, navigate to Clusters and click Add a Cluster > Create a Cluster. Provide the

details for the cluster and the corresponding provider and click Create.



- c. After the cluster is created, it appears in the cluster list with the status Ready.
- 3. To import an existing cluster, complete the following steps:
  - a. Navigate to Clusters and click Add a Cluster > Import an Existing Cluster.
  - b. Enter the name of the cluster and click Save Import and Generate Code. A command to add the existing cluster is displayed.
  - c. Click Copy Command and run the command on the cluster to be added to the hub cluster. This initiates the installation of the necessary agents on the cluster, and, after this process is complete, the cluster appears in the cluster list with status Ready.



4. After you create and import multiple clusters, you can monitor and manage them from a single console.

Next: Features - Application Lifecycle Management.

### Features: Advanced Cluster Management for Kubernetes on Red Hat OpenShift with NetApp

#### **Application lifecycle management**

To create an application and manage it across a set of clusters,

1. Navigate to Manage Applications from the sidebar and click Create Application. Provide the details of the application you would like to create and click Save.



2. After the application components are installed, the application appears in the list.



3. The application can now be monitored and managed from the console.

### Features: Advanced Cluster Management for Kubernetes on Red Hat OpenShift with NetApp

#### Governance and risk

This feature allows you to define the compliance policies for different clusters and make sure that the clusters adhere to it. You can configure the policies to either inform or remediate any deviations or violations of the rules.

- 1. Navigate to Governance and Risk from the sidebar.
- 2. To create compliance policies, click Create Policy, enter the details of the policy standards, and select the clusters that should adhere to this policy. If you want to automatically remediate the violations of this policy, select the checkbox Enforce if Supported and click Create.

## Governance and risk / Policies / Create policy ① O YAML: Off



3. After all the required policies are configured, any policy or cluster violations can be monitored and remediated from Advanced Cluster Management.

#### Governance and risk <sup>®</sup>





Next: Features - Observability.

### Features: Advanced Cluster Management for Kubernetes on Red Hat OpenShift with NetApp

#### Observability

Advanced Cluster Management for Kubernetes provides a way to monitor the nodes, pods, and applications, and workloads across all the clusters.

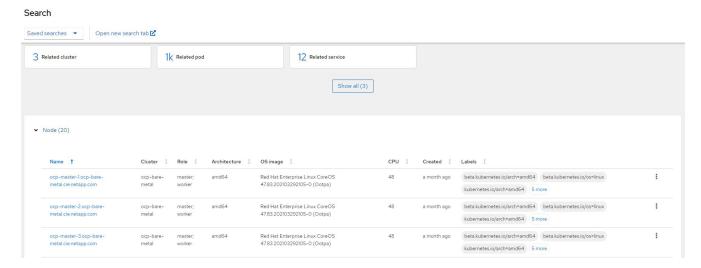
1. Navigate to Observe Environments > Overview.



2. All pods and workloads across all clusters are monitored and sorted based on a variety of filters. Click Pods to view the corresponding data.



3. All nodes across the clusters are monitored and analyzed based on a variety of data points. Click Nodes to get more insight into the corresponding details.



4. All clusters are monitored and organized based on different cluster resources and parameters. Click Clusters to view cluster details.



Next: Features - Create Resources.

### Features: Advanced Cluster Management for Kubernetes on Red Hat OpenShift with NetApp

#### Create resources on multiple clusters

Advanced Cluster Management for Kubernetes allows users to create resources on one or more managed clusters simultaneously from the console. As an example, if you have OpenShift clusters at different sites backed with different NetApp ONTAP clusters and want to provision PVC's at both sites, you can click the (+) sign on the top bar. Then select the clusters on which you want to create the PVC, paste the resource YAML, and click Create.

#### Create resource





#### **Copyright Information**

Copyright © 2022 NetApp, Inc. All rights reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means-graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system-without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

#### **Trademark Information**

NETAPP, the NETAPP logo, and the marks listed at <a href="http://www.netapp.com/TM">http://www.netapp.com/TM</a> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.