Managing users and user resources

Learn to manage user permissions and environments in Red Hat OpenShift Data Science
Learn to manage user permissions and environments in Red Hat OpenShift Data Science
Abstract

Learn to manage user permissions and environments in Red Hat OpenShift Data Science.
# Table of Contents

**PREFACE** ................................................................. 3

**CHAPTER 1. USAGE DATA COLLECTION** ................................ 4
   1.1. USAGE DATA COLLECTION NOTICE FOR OPENSHIFT DATA SCIENCE 4
   1.2. ENABLING USAGE DATA COLLECTION 4
   1.3. DISABLING USAGE DATA COLLECTION 5

**CHAPTER 2. OVERVIEW OF USER PERMISSIONS** ......................... 7

**CHAPTER 3. USER TYPES** ............................................... 8

**CHAPTER 4. ADDING USERS FOR OPENSHIFT DATA SCIENCE** ............ 9
   4.1. ADDING EXISTING USER GROUPS FROM AN IDENTITY PROVIDER TO OPENSHIFT DATA SCIENCE 9
   4.2. ADDING USERS TO SPECIALIZED OPENSHIFT DATA SCIENCE USER GROUPS 10
   4.3. ADDITIONAL RESOURCES 12

**CHAPTER 5. VIEWING OPENSHIFT DATA SCIENCE USERS** ............... 13

**CHAPTER 6. DELETING USERS AND USER RESOURCES** .................. 14
   6.1. BACKING UP STORAGE DATA FROM AMAZON EBS 14
   6.2. STOPPING NOTEBOOK SERVERS OWNED BY OTHER USERS 15
   6.3. REVOKING USER ACCESS TO JUPYTERHUB 16
   6.4. CLEANING UP AFTER DELETING USERS 17

**CHAPTER 7. ALLOCATING ADDITIONAL RESOURCES TO OPENSHIFT DATA SCIENCE USERS** 19

**CHAPTER 8. ENABLING GPU SUPPORT IN OPENSHIFT DATA SCIENCE** .......... 20

**CHAPTER 9. CONFIGURING THE DEFAULT PVC SIZE FOR YOUR CLUSTER** ........... 23

**CHAPTER 10. RESTORING THE DEFAULT PVC SIZE FOR YOUR CLUSTER** .......... 24

**CHAPTER 11. MANAGING NOTEBOOK SERVERS** ............................. 25
   11.1. ACCESSING THE JUPYTERHUB ADMINISTRATION INTERFACE 25
   11.2. STARTING NOTEBOOK SERVERS OWNED BY OTHER USERS 25
   11.3. ACCESSING NOTEBOOK SERVERS OWNED BY OTHER USERS 26
   11.4. STOPPING NOTEBOOK SERVERS OWNED BY OTHER USERS 26
   11.5. STOPPING IDLE NOTEBOOKS 27
   11.6. CONFIGURING A CUSTOM NOTEBOOK IMAGE 28

**CHAPTER 12. BACKING UP STORAGE DATA FROM AMAZON EBS** ........... 31
PREFACE

See the following documents for service and life cycle information related to this release:

- OpenShift Data Science Service Definition
- OpenShift Data Science Life Cycle
CHAPTER 1. USAGE DATA COLLECTION

Red Hat OpenShift Data Science administrators can choose whether to allow Red Hat to collect data about OpenShift Data Science usage in their cluster. Collecting this data allows Red Hat to monitor and improve our software and support. For further details about the data Red Hat collects, see Usage data collection notice for OpenShift Data Science.

Usage data collection is enabled by default when you install OpenShift Data Science on your OpenShift Dedicated cluster. See Disabling usage data collection for instructions on disabling the collection of this data in your cluster.

1.1. USAGE DATA COLLECTION NOTICE FOR OPENSHIFT DATA SCIENCE

In connection with your use of this Red Hat offering, Red Hat may collect usage data about your use of the software. This data allows Red Hat to monitor the software and to improve Red Hat offerings and support, including identifying, troubleshooting, and responding to issues that impact users.

What information does Red Hat collect?

Tools within the software monitor various metrics and this information is transmitted to Red Hat. Metrics include information such as:

- Information about applications enabled in the product dashboard.
- The deployment sizes used (that is, the CPU and memory resources allocated).
- Information about documentation resources accessed from the product dashboard.
- The name of the notebook images used (that is, Minimal Python, Standard Data Science, and other images.).
- A unique random identifier that generates during installation to isolate data to a particular user.
- Usage information about components, features, and extensions.

Third Party Service Providers

Red Hat uses certain third party service providers to collect the telemetry data.

Security

Red Hat employs technical and organizational measures designed to protect the usage data.

Personal Data

Red Hat does not intend to collect personal information. If Red Hat discovers that personal information has been inadvertently received, Red Hat will delete such personal information and treat such personal information in accordance with Red Hat’s Privacy Statement. For more information about Red Hat’s privacy practices, see Red Hat’s Privacy Statement.

Enabling and Disabling Usage Data

You can disable usage data by following the instructions in Disabling usage data collection.

1.2. ENABLING USAGE DATA COLLECTION

Red Hat OpenShift Data Science administrators can choose whether to allow Red Hat to collect data about OpenShift Data Science usage in their cluster. Usage data collection is enabled by default when
you install OpenShift Data Science on your OpenShift Dedicated cluster. If you have disabled data collection previously, you can re-enable it by following these steps.

**Prerequisites**

- You have logged in to Red Hat OpenShift Data Science.
- You are part of the OpenShift Data Science administrator group in OpenShift Dedicated.

**Procedure**

1. From the OpenShift Data Science dashboard, click **Settings → Cluster settings.**
2. Locate the **Usage data collection** section.
3. Select the **Allow collection of usage data** checkbox.
4. Click **Save changes.**

**Verification**

- A notification is shown when settings are updated: **Cluster settings updated successfully.**

**Additional resources**

- Usage data collection notice for OpenShift Data Science

### 1.3. DISABLING USAGE DATA COLLECTION

Red Hat OpenShift Data Science administrators can choose whether to allow Red Hat to collect data about OpenShift Data Science usage in their cluster. Usage data collection is enabled by default when you install OpenShift Data Science on your OpenShift Dedicated cluster. You can disable data collection by following these steps.

**Prerequisites**

- You have logged in to Red Hat OpenShift Data Science.
- You are part of the OpenShift Data Science administrator group in OpenShift Dedicated.

**Procedure**

1. From the OpenShift Data Science dashboard, click **Settings → Cluster settings.**
2. Locate the **Usage data collection** section.
3. Deselect the **Allow collection of usage data** checkbox.
4. Click **Save changes.**

**Verification**

- A notification is shown when settings are updated: **Cluster settings updated successfully.**
Additional resources

- Usage data collection notice for OpenShift Data Science
CHAPTER 2. OVERVIEW OF USER PERMISSIONS

By default, all OpenShift users have access to Red Hat OpenShift Data Science. In addition, users in the OpenShift Dedicated administrator group (by default, dedicated-admins), automatically have administrator access in OpenShift Data Science.

Alternatively, you can create specialized user groups to restrict access to OpenShift Data Science for users and administrators. Therefore, you must decide if you want to restrict access to your OpenShift Data Science deployment using specialized user groups, as opposed to allowing all OpenShift users access.

If you decide to restrict access, and you already have user groups defined in your configured identity provider, you can add these user groups to your OpenShift Data Science deployment. If you decide to use specialized user groups without adding these groups from an identity provider, you must create the groups in OpenShift Data Science and then add the appropriate users to them.

The user groups configured in OpenShift Dedicated, cluster-admins and dedicated-admins, are separate to any specialized OpenShift Data Science user groups. There are some operations relevant to OpenShift Data Science that require the cluster-admins or dedicated-admins role. Those operations include:

- Adding users to the OpenShift Data Science user and administrator groups, if you are using specialized groups.
- Removing users from the OpenShift Data Science user and administrator groups, if you are using specialized groups.
- Managing custom environment and storage configuration for users in OpenShift Dedicated, such as Jupyter notebook resources, ConfigMaps, and persistent volume claims (PVCs).

IMPORTANT

Although users of OpenShift Data Science and its components are authenticated through OpenShift, session management is separate from authentication. This means that logging out of OpenShift Dedicated or OpenShift Data Science does not affect a logged in JupyterHub session running on those platforms. This means that when a user’s permissions change, that user must log out of all current sessions in order for the changes to take effect.
CHAPTER 3. USER TYPES

Red Hat OpenShift Data Science has the following user types:

Table 3.1. User types

<table>
<thead>
<tr>
<th>User Type</th>
<th>Permissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data scientists</td>
<td>Data scientists can access and use individual components of Red Hat OpenShift Data Science, such as JupyterHub.</td>
</tr>
<tr>
<td>IT operations</td>
<td>In addition to the actions permitted to a data scientist, IT operations administrators can:</td>
</tr>
<tr>
<td>administrators</td>
<td>• Configure Red Hat OpenShift Data Science settings.</td>
</tr>
<tr>
<td></td>
<td>• Access and manage notebook servers in the JupyterHub administration interface.</td>
</tr>
</tbody>
</table>

Additional resources

- Administering your OpenShift Dedicated cluster
By default, all OpenShift users have access to Red Hat OpenShift Data Science. If you are using these default permission settings, no further action is required. However, if you plan to restrict access to your OpenShift Data Science instance by defining specialized user groups, you must grant users permission to access Red Hat OpenShift Data Science by adding user accounts to the Red Hat OpenShift Data Science user group, administrator group, or both. You can either use the default group name, or specify a group name that already exists in your identity provider.

The **user group** provides the user with access to developer functions in the Red Hat OpenShift Data Science dashboard, and associated services, such as JupyterHub.

The **administrator group** provides the user with access to developer and administrator functions in the Red Hat OpenShift Data Science dashboard and associated services, such as JupyterHub.

If you have restricted access using specialized user groups, users that are not in the OpenShift Data Science user group or administrator group can still view the dashboard, but are unable to use associated services, such as JupyterHub. They are also unable to access the **Cluster settings** page.

To use the default group names, see *Adding users to specialized OpenShift Data Science user groups*. This method is easy to set up, but you must manage the user lists manually in the OpenShift Dedicated web console.

To use groups that already exist in your identity provider, see *Adding existing user groups from an identity provider to OpenShift Data Science*. With this method you can manage users through your identity provider as you normally would.

**IMPORTANT**

If you are using LDAP as your identity provider, you need to configure LDAP syncing to OpenShift Dedicated. See *Syncing LDAP groups* for more information.

### 4.1. ADDING EXISTING USER GROUPS FROM AN IDENTITY PROVIDER TO OPENSHIFT DATA SCIENCE

If you are using specialized user groups to restrict access to OpenShift Data Science, you can add user groups already defined in your identity provider to your OpenShift Data Science deployment.

Follow the steps in this section to use an existing group from your identity provider that does not use one of the default group names. You can add users to these groups as you normally would with that identity provider.

**Prerequisites**

- You have configured a supported identity provider for OpenShift Dedicated.
- You are part of the **cluster-admins** or **dedicated-admins** user group in OpenShift Dedicated.

**Procedure**

1. In the OpenShift Dedicated web console, change into the **Administrator** perspective.
2. Click **Workloads** → **ConfigMaps**.
3. Set the Project to All Projects or redhat-ods-applications to ensure you can see the appropriate ConfigMap.

4. Click the name of the rhods-groups-config ConfigMap. The ConfigMap details page appears.

5. Click the YAML tab.

6. Change the opendatahub.io/modified label to 'true'.

   ```yaml
   labels:
   app: jupyterhub
   opendatahub.io/modified: 'true'
   ```

7. Replace default values with your group names. Change the value of admin_groups to the new name of your admin group and the value of allowed_groups to the new name of your user group, for example:

   ```yaml
   data:
   admin_groups: it-ops
   allowed_groups: datasci-devs1,datasci-devs2
   ```

8. Click Save.

9. Apply the new application configuration.
   a. Change into the Developer perspective.
   b. Click Topology and click on the JupyterHub application.
   c. Click Actions → Start Rollout to deploy JupyterHub with its updated user configuration.

Verification

- Click the Details tab and confirm that the Labels field contains opendatahub.io/modified: 'true', and the updated group names appear under the Data heading.
- The user can access the Red Hat OpenShift Data Science dashboard, and associated services, such as JupyterHub.

Additional resources

- Sharing the instance address with users

4.2. ADDING USERS TO SPECIALIZED OPENSHIFT DATA SCIENCE USER GROUPS

From Red Hat OpenShift Data Science 1.8, all OpenShift Dedicated users have access to Red Hat OpenShift Data Science by default. Additionally, users in the dedicated-admins administrator group automatically have administrator access to OpenShift Data Science. Versions of OpenShift Data Science before 1.8 contain specialized OpenShift Data Science administrator and user groups. To further restrict access to OpenShift Data Science in versions 1.8 or beyond, you can continue to create specialized OpenShift Data Science administrator and user groups.
Follow the steps in this section to create specialized OpenShift Data Science administrator and user groups, and manually add users to the groups. This method is easy to set up, but you must manage the user lists manually in the OpenShift Dedicated web console.

**Prerequisites**

- You have configured a supported identity provider for OpenShift Dedicated.
- You are part of the **dedicated-admins** user group in OpenShift Dedicated.

**Procedure**

1. In the OpenShift Dedicated web console, click **User Management → Groups**.

2. **Optional:** If not present, create the administrator group, for example, **rhods-admins**.
   
   a. Click **Create Group**.
   
   b. Change the **name** of the group to the name of your administrator group.

   ```yaml
   apiVersion: user.openshift.io/v1
   kind: Group
   metadata:
   name: rhods-admins
   users:
   - user1
   - user2
   ```

   c. Skip to step 6 to add administrative users.

3. **Optional:** If not present, create the user group, for example, **rhods-users**.

   a. Click **Create Group**.

   b. Change the **name** of the group to the name of your user group.

   ```yaml
   apiVersion: user.openshift.io/v1
   kind: Group
   metadata:
   name: rhods-users
   users:
   - user1
   - user2
   ```

   c. Skip to step 6 to add normal users.

4. Click the name of the group you want to add users to.

   - For administrative users, click the administrator group, for example, **rhods-admins**.
   - For normal users, click the user group, for example, **rhods-users**.

   The **Group details** page for that group appears.

5. Click the **YAML** tab.
6. In the **users** section, add the user name of the user that you want to add to the group. For example:

   users:
   - jdoe
   - emustermann

7. Click **Save**.

**Verification**

- Click the **Details** tab for each group and confirm that the **Users** section contains the user names that you added.

**Additional resources**

- [Sharing the instance address with users](#)

**4.3. ADDITIONAL RESOURCES**

- [Adding users to specialized OpenShift Data Science user groups](#)
CHAPTER 5. VIEWING OPENSIGHT DATA SCIENCE USERS

By default, all OpenShift users have access to Red Hat OpenShift Data Science. In addition, users in the OpenShift Dedicated administrator group (by default, *dedicated-admins*), automatically have administrator access in OpenShift Data Science. However, you can create specialized user groups to restrict access to OpenShift Data Science for users and administrators. Follow these steps if you have defined specialized OpenShift Data Science user groups, so that you can view the users that belong to these groups.

**Prerequisites**

- The Red Hat OpenShift Data Science user group, administrator group, or both exist.
- You are part of the OpenShift Dedicated administrator group (by default, *dedicated-admins*). Alternatively, if you have restricted administrator access to OpenShift Data Science by configuring a specific OpenShift Data Science administrator group, such as, *rhods-admins*, you are part of this group.
- You have configured a supported identity provider for OpenShift Dedicated.

**Procedure**

1. In the OpenShift Dedicated web console, click **User Management → Groups**.
2. Click the name of the group containing the users that you want to view.
   - For administrative users, click the name of your administrator group, for example, *rhods-admins*.
   - For normal users, click the name of your user group, for example, *rhods-users*.

The **Group details** page for the group appears.

**Verification**

- In the **Users** section for the relevant group, you can view the users who have permission to access Red Hat OpenShift Data Science.
CHAPTER 6. DELETING USERS AND USER RESOURCES

Users with administrator access to OpenShift Dedicated can revoke user access to JupyterHub and delete user resources from Red Hat OpenShift Data Science.

**IMPORTANT**

To completely remove a user from OpenShift Data Science, you must remove them from the allowed group in your OpenShift identity provider.

6.1. BACKING UP STORAGE DATA FROM AMAZON EBS

Red Hat recommends that you back up the data on your persistent volume claims (PVCs) regularly. Backing up your data is particularly important before deleting a user and before uninstalling OpenShift Data Science, as all PVCs are deleted when OpenShift Data Science is uninstalled.

**Prerequisites**

- You have credentials for OpenShift Cluster Manager (https://console.redhat.com/openshift/).
- You have administrator access to the OpenShift Dedicated cluster.
- You have credentials for the Amazon Web Services (AWS) account that the OpenShift Dedicated cluster is deployed under.

**Procedure**

1. Determine the IDs of the persistent volumes (PVs) that you want to back up.
   a. In the OpenShift Dedicated web console, change into the Administrator perspective.
   b. Click Home → Projects.
   c. Click the rhods-notebooks project. The Details page for the project opens.
   d. Click the PersistentVolumeClaims in the Inventory section. The PersistentVolumeClaims page opens.
   e. Note the ID of the persistent volume (PV) that you want to back up.

   **NOTE**

   The persistent volumes (PV) that you make a note of are required to identify the correct EBS volume to back up in your AWS instance.

2. Locate the EBS volume containing the PVs that you want to back up.
   See Create Amazon EBS snapshots for more information.
   a. Log in to AWS (https://aws.amazon.com) and ensure that you are viewing the region that your OpenShift Dedicated cluster is deployed in.
   b. Click Services.
c. Click **Compute → EC2**.

d. Click **Elastic Block Storage → Volumes** in the side navigation. The **Volumes** page opens.

e. In the search bar, enter the ID of the persistent volume (PV) that you made a note of earlier. The **Volumes** page reloads to display the search results.

f. Click on the volume shown and verify that any `kubernetes.io/created-for/pvc/namespace` tags contain the value `rhods-notebooks`, and any `kubernetes.io/created-for/pvc/name` tags match the name of the persistent volume that the EC2 volume is being used for, for example, `jupyterhub-nb-user1-pvc`.

3. Back up the EBS volume that contains your persistent volume (PV).

   a. Right-click on the volume that you want to back up and select **Create Snapshot** from the list. The **Create Snapshot** page opens.

   b. Enter a **Description** for the volume.

   c. Click **Create Snapshot**. The snapshot of the volume is created.

   d. Click **Close**.

**Verification**

- The snapshot that you created is visible on the **Snapshots** page in AWS.

**Additional resources**

- Create Amazon EBS snapshots

### 6.2. STOPPING NOTEBOOK SERVERS OWNED BY OTHER USERS

Administrators can stop notebook servers that are owned by other users to reduce resource consumption on the cluster, or as part of removing a user and their resources from the cluster.

**Prerequisites**

- You are part of the OpenShift Dedicated administrator group. See *Adding administrative users for OpenShift Dedicated* for more information.

- You have logged in to JupyterHub.

- The notebook server that you want to stop is running (started).

**Procedure**

1. In the JupyterHub interface, click the **Admin** tab.

2. Stop one or more servers.

   - If you want to stop one or more specific servers:
i. Locate the user that the notebook server belongs to.

ii. Click the Stop server button beside the user.

- If you want to stop all servers:
  i. Click the Stop all button.
  ii. Click OK to confirm stopping all servers.

Verification

- The Stop server button beside each server changes to a Start server button when the notebook server has stopped.

6.3. REVOKING USER ACCESS TO JUPYTERHUB

You can revoke a user’s access to JupyterHub to prevent them from running notebook servers and consuming resources in your cluster through JupyterHub, while still allowing them access to OpenShift Data Science and other services that use OpenShift’s identity provider for authentication.

**IMPORTANT**

Follow these steps only if you have restricted access to OpenShift Data Science using specialized user groups. To completely remove a user from OpenShift Data Science, you must remove them from the allowed group in your OpenShift identity provider.

Prerequisites

- You have stopped any notebook servers owned by the user you want to delete.
- You are part of the dedicated-admins user group in OpenShift Dedicated.
- If you are using specialized OpenShift Data Science user groups, the user is part of the OpenShift Data Science user group, administrator group, or both.

Procedure

1. In the OpenShift Dedicated web console, click User Management → Groups.

2. Click the name of the group that you want to remove the user from.
   - For administrative users, click the name of your administrator group, for example, rhods-admins.
   - For normal users, click the name of your user group, for example, rhods-users.

   The Group details page for the group appears.

3. In the Users section on the Details tab, locate the user that you want to remove.

4. Click the action menu (⋮) beside the user that you want to remove and click Remove user.

Verification
• Check the Users section on the Details tab and confirm that the user that you removed is not visible.

• In the rhods-notebooks project, check under Workload → Pods and ensure that there is no notebook server pod for this user. If you can see a pod named jupyterhub-nb-<username>* for the user that you have removed, delete that pod to ensure that the deleted user is not consuming resources on the cluster.

6.4. CLEANING UP AFTER DELETING USERS

After removing a user’s access to Red Hat OpenShift Data Science or JupyterHub, you must also delete their associated configuration files from OpenShift Dedicated. It is recommended that you back up the user’s data and profile before removing their configuration files.

Prerequisites

• (Optional) If you want to completely remove the user’s access to OpenShift Data Science, you have removed their credentials from your identity provider.

• You have revoked the user’s access to JupyterHub.

• You have backed up the user’s storage data from Amazon EBS.

• You are part of the dedicated-admins user group in OpenShift Dedicated.

• You are part of the rhods-admins user group in OpenShift Dedicated.

• You have logged in to the OpenShift Dedicated web console.

• You have logged in to OpenShift Data Science.

Procedure

1. Back up the user’s single-user profile.
   a. Click Workloads → ConfigMaps in the OpenShift Dedicated web console.
   b. If it is not already selected, select the redhat-ods-applications project from the project list.
   c. Click the jupyterhub-singleuser-profile-<username> ConfigMap. Replace <username> with relevant user name.
   d. In the Data section, click the Copy button ( ) to copy the user’s data profile to the clipboard.
   e. Save the contents of the user’s data profile to a file.
   f. Confirm that the file contents are an accurate backup of the user’s data profile.

2. Delete the user’s persistent volume claim (PVC).
   a. Click Storage → PersistentVolumeClaims.
   b. If it is not already selected, select the redhat-ods-applications project from the project list.
   c. Locate the jupyterhub-nb-<username> PVC.
Replace `<username>` with the relevant user name.

d. Click the action menu (⋮) and select **Delete PersistentVolumeClaim** from the list. The **Delete PersistentVolumeClaim** dialog appears.

e. Inspect the dialog and confirm that you are deleting the correct PVC.

f. Click **Delete**.

3. Delete the user’s ConfigMap.

a. Click **Workloads → ConfigMaps**.

b. If it is not already selected, select the **redhat-ods-applications** project from the project list.

c. Locate the **jupyterhub-singleuser-profile-<username>** ConfigMap. Replace `<username>` with the relevant user name.

d. Click the action menu (⋮) and select **Delete ConfigMap** from the list. The **Delete ConfigMap** dialog appears.

e. Inspect the dialog and confirm that you are deleting the correct ConfigMap.

f. Click **Delete**.

**Verification**

- The user cannot access JupyterHub any more, and sees a 403 Forbidden error if they try. Note that the user’s name remains visible in the JupyterHub administration interface because of a bug in the user deletion process. This is planned for correction in future releases.

- The user’s single-user profile, persistent volume claim (PVC), and ConfigMap are not visible in OpenShift Dedicated.
CHAPTER 7. ALLOCATING ADDITIONAL RESOURCES TO OPENSHIFT DATA SCIENCE USERS

As a cluster administrator, you can allocate additional resources to a cluster to support compute-intensive data science work. This includes increasing the number of nodes in the cluster and changing the cluster’s allocated machine pool.

Prerequisites

- You have an OpenShift Dedicated cluster with an identity provider configured.
- You have credentials for OpenShift Cluster Manager (https://console.redhat.com/openshift/).
- You are part of the `cluster-admins` user group in OpenShift Dedicated.
- If you are increasing the size of a machine pool using NVIDIA GPUs, your OpenShift Dedicated cluster supports them.
- You have an AWS instance with the capacity to create larger container sizes.
- For compute-intensive operations, you have an AWS instance with enough capacity to accommodate the largest container size, `XL`.

Procedure

1. Log in to OpenShift Cluster Manager (https://console.redhat.com/openshift/).

2. Click Clusters. The Clusters page opens.

3. Click the name of the cluster you want to allocate additional resources to.

4. Click Actions → Edit node count.

5. Select a Machine pool from the list.

6. Select the number of nodes assigned to the machine pool from the Node count list.

7. Click Apply.

Verification

- The additional resources that you allocated to the cluster are displayed on the Machine Pools tab.
CHAPTER 8. ENABLING GPU SUPPORT IN OPENSSHIFT DATA SCIENCE

To ensure that your data scientists can use compute-heavy workloads in their models, you can enable graphics processing units (GPUs) in OpenShift Data Science. To make GPUs available in OpenShift Data Science, after you install OpenShift Data Science, you must install the NVIDIA GPU Add-On. This add-on locates and enables any GPU-enabled worker nodes in your cluster, making GPU instance types available for selection. After you have installed the NVIDIA GPU Add-On, and you have ensured there are GPU-enabled worker nodes in your cluster, your data scientists can select one of the GPU-enabled notebooks in JupyterHub, along with the number of GPUs they require for their data science work.

Red Hat recommends that you use a separate machine pool for GPU nodes that have the `nvidia.com/gpu NoSchedule` taint. If you edit an existing machine pool to add this taint, you must first scale the machine pool down to zero nodes, and then increase the machine pool to the number of nodes that you require. This ensures that the new taint is applied to all nodes in the machine pool. To ensure consistent behavior across all nodes in the machine pool, Red Hat recommends that you increase the scale of your machine nodes promptly. As scaling nodes to zero has a disruptive effect on your deployment, Red Hat recommends that you perform this action as soon as possible, while considering your service usage patterns when selecting an appropriate time.

Prerequisites

- You have credentials for OpenShift Cluster Manager (https://console.redhat.com/openshift/).
- You are part of the `cluster-admins` user group in OpenShift Dedicated.
- You have provisioned a cluster that contains enough resources to satisfy the requirements of OpenShift Data Science and the NVIDIA GPU Add-On.
- You have installed and logged in to Red Hat OpenShift Data Science.
- You must have installed and logged in to the OpenShift CLI (oc).

Procedure

1. Navigate to your cluster on OpenShift Cluster Manager.
   a. Log in to OpenShift Cluster Manager (https://console.redhat.com/openshift/).
   b. Click Clusters. The Clusters page opens.
   c. Click the name of the cluster that you have installed OpenShift Data Science on. The Details page for the cluster opens.

2. Add a machine pool for nodes with GPUs.
   a. Click the Machine pools tab.
   b. Click the Add machine pool button. The Add machine pool window opens.
   c. Specify a Machine pool name.
   d. Set a Worker node instance type. Ensure that the instance type provides one or more GPUs.
e. Set a **Worker node count** of at least one.

f. Click **Edit node labels and taints** to expand the **Node labels** section.

g. Under **Taints**, add a taint with the **Key** of `nvidia.com/gpu` and an **Effect** of **NoSchedule**. The **Value** can be set to any string, for example, `true`.

**NOTE**
When setting the taint, ensure the taint is correctly declared without typographical errors.

h. Click **Add machine pool**
Your machine pool is created.

i. Confirm that the **Taint** you specified is visible on the **Details** page for the machine pool, for example, `nvidia.com/gpu=true:NoSchedule`.

3. Install the NVIDIA GPU Operator.
   a. Click the **Add-ons** tab.
   b. Click on the **NVIDIA GPU Operator** card.
   c. Click **Install**.

**Verification**

- In OpenShift Cluster Manager, under the **Add-ons** tab for the cluster, confirm that the NVIDIA GPU operator is installed.

- In OpenShift Dedicated web console, under **Compute → Nodes**, confirm that each node in the new machine pool has the `nvidia.com/gpu` taint set, for example, `nvidia.com/gpu=true:NoSchedule`.

- The **jupyterhub-singleuser-profiles** ConfigMap, located in the **redhat-ods-applications** project on the **Workloads → ConfigMaps** page, contains the following **NoSchedule** toleration:

```
gpuTypes:
  - type: gpu_one
    node_tolerations:
      - key: provider
        operator: Equal
        value: gpu-node
        effect: NoSchedule

# This is the default NoSchedule toleration that is supported by the NVIDIA GPU operator
  - type: nvidia_gpu
    node_tolerations:
      - key: "nvidia.com/gpu"
        operator: Exists
        effect: NoSchedule
```

- Check that GPU-enabled functionality is available in Red Hat OpenShift Data Science.
  - Check and validate the nvidia-device-plugin-validator logs. At the OpenShift CLI, enter the following command:

```bash
graphene
```
oc logs nvidia-device-plugin-validator-<alpha-numeric-string> -n redhat-gpu-operator

Where <alpha-numeric-string> is a randomly generated alpha-numeric string.

If the validation is successful, the following response is returned:

device-plugin validation is successful

- Red Hat recommends that you run a sample GPU application to ensure GPU-enabled models can successfully run on Red Hat OpenShift Data Science. For more information, see Running a sample GPU application.

- Run the `nvidia-smi` command within the relevant pod to test the GPU utilization of your sample project. For more information, see Getting information about the GPU.

Additional resources

- Add-on services available for OpenShift Dedicated
- NVIDIA GPU Operator
- Binding infrastructure node workloads using taints and tolerations
CHAPTER 9. CONFIGURING THE DEFAULT PVC SIZE FOR YOUR CLUSTER

To configure how resources are claimed within your OpenShift Data Science cluster, you can change the default size of the cluster’s persistent volume claim (PVC) ensuring that the storage requested matches your common storage workflow. PVCs are requests for resources in your cluster and also act as claim checks to the resource.

Changing your cluster’s default PVC size causes a redeployment of the JupyterHub server launcher, making it temporarily unavailable. PVCs that were already assigned before the default size was changed are unaffected and retain their original size. Notebook servers created by users before the PVC size change are also unaffected.

Users cannot access the JupyterHub server launcher or create a new notebook server until redeployment is complete. Red Hat recommends that administrators consider the impact of these restrictions when determining the best time to change the default PVC size.

Prerequisites

- You have logged in to Red Hat OpenShift Data Science.
- You are part of the OpenShift Data Science administrator group in OpenShift Dedicated.

Changing this setting restarts the JupyterHub pod making JupyterHub unavailable for up to 30 seconds. As a workaround, it is recommended that you perform this action outside of your organization’s typical working day.

Procedure

1. From the OpenShift Data Science dashboard, click Settings → Cluster settings.
2. Under PVC size, enter a new size in gigabytes. The minimum size is 1 GiB, and the maximum size is 16384 GiB.
3. Click Save changes.

Verification

- New PVCs are created with the default storage size that you configured.

Additional resources

- Understanding persistent storage
CHAPTER 10. RESTORING THE DEFAULT PVC SIZE FOR YOUR CLUSTER

To change the size of resources utilized within your OpenShift Data Science cluster, you can restore the default size of your cluster’s persistent volume claim (PVC).

Changing your cluster’s default PVC size causes a redeployment of the JupyterHub server launcher, making it temporarily unavailable. PVCs that were already assigned before the default size was changed are unaffected and retain their original size. Notebook servers created by users before the PVC size change are also unaffected.

Users cannot access the JupyterHub server launcher or create a new notebook server until redeployment is complete. Red Hat recommends that administrators consider the impact of these restrictions when determining the best time to change the default PVC size.

Prerequisites

- You have logged in to Red Hat OpenShift Data Science.
- You are part of the OpenShift Data Science administrator group in OpenShift Dedicated.

Procedure

1. From the OpenShift Data Science dashboard, click Settings → Cluster settings.
2. Click Restore defaults to restore the default PVC size of 20GiB.
3. Click Save changes.

Verification

- New PVCs are created with the default storage size of 20 GiB.

Additional resources

- Understanding persistent storage
CHAPTER 11. MANAGING NOTEBOOK SERVERS

11.1. ACCESSING THE JUPYTERHUB ADMINISTRATION INTERFACE

You can use the JupyterHub administrative interface to control notebook servers in your Red Hat OpenShift Data Science environment.

Prerequisites

- You are part of the OpenShift Dedicated administrator group. See Adding administrative users for OpenShift Dedicated for more information.

Procedure

1. In the OpenShift Data Science interface, click Enabled.

2. Locate the JupyterHub card and click Launch application.

3. If your notebook server is already running, the JupyterLab interface appears. Click File → Hub Control Panel to return to JupyterHub.

4. Click Admin to open the JupyterHub administrative interface.

Verification

- You can see the JupyterHub administrative interface.

11.2. STARTING NOTEBOOK SERVERS OWNED BY OTHER USERS

Administrators can start a notebook server for another existing user from the JupyterHub administration interface.

Prerequisites

- You are part of the OpenShift Dedicated administrator group. See Adding administrative users for OpenShift Dedicated for more information.
You have logged in to JupyterHub.

Procedure

a. In the JupyterHub interface, click the Admin tab.

b. Locate the user whose notebook server you want to start.

c. Click the Start server button.

d. Complete the Start a notebook server wizard and click Start server.
   See the Additional resources section for help with this step.

Verification

- The JupyterLab home page opens in a new tab.

Additional resources

- Launching JupyterHub and starting a notebook server
- Options for notebook server environments

11.3. ACCESSING NOTEBOOK SERVERS OWNED BY OTHER USERS

Administrators can access notebook servers that are owned by other users to correct configuration errors or help a data scientist troubleshoot problems with their environment.

Prerequisites

- You are part of the OpenShift Dedicated administrator group. See Adding administrative users for OpenShift Dedicated for more information.

- You have logged in to JupyterHub.

- The notebook server that you want to access is running (started).

Procedure

a. In the JupyterHub interface, click the Admin tab.

b. Locate the user that the notebook server belongs to.

c. Click the Access server button.

Verification

- The user’s notebook server opens in a new tab.

11.4. STOPPING NOTEBOOK SERVERS OWNED BY OTHER USERS

Administrators can stop notebook servers that are owned by other users to reduce resource consumption on the cluster, or as part of removing a user and their resources from the cluster.
Prerequisites

- You are part of the OpenShift Dedicated administrator group. See Adding administrative users for OpenShift Dedicated for more information.
- You have logged in to JupyterHub.
- The notebook server that you want to stop is running (started).

Procedure

1. In the JupyterHub interface, click the Admin tab.
2. Stop one or more servers.
   - If you want to stop one or more specific servers:
     i. Locate the user that the notebook server belongs to.
     ii. Click the Stop server button beside the user.
   - If you want to stop all servers:
     i. Click the Stop all button.
     ii. Click OK to confirm stopping all servers.

Verification

- The Stop server button beside each server changes to a Start server button when the notebook server has stopped.

11.5. STOPPING IDLE NOTEBOOKS

You can reduce resource usage in your OpenShift Data Science deployment by stopping notebook servers that have been idle (without logged in users) for a period of time. This is useful when resource demand in the cluster is high. By default, idle notebooks are not stopped after a specific time limit.

NOTE

If you have configured your cluster settings to disconnect all users from a cluster after a specified time limit, then this setting takes precedence over the idle notebook time limit. Users are logged out of the cluster when their session duration reaches the cluster-wide time limit.

Prerequisites

- You have logged in to Red Hat OpenShift Data Science.
- You are part of the OpenShift Data Science administrator group in OpenShift Dedicated.

Procedure

1. From the OpenShift Data Science dashboard, click Settings → Cluster settings.
2. Under Stop idle notebooks, select Stop idle notebooks after.
3. Enter a time limit, in **hours** and **minutes**, for when idle notebooks are stopped.

4. Click **Save Changes**.

**Verification**

- Check the log for the `jupyterhub-idle-culler-<stop-count>-<alpha-numeric-string>` pod that is currently running, that is, the pod with the highest **Stop-count** value.
  - After the idle notebook time limit has passed, and the notebook has been stopped, the notebook server pod associated with this notebook no longer appears in OpenShift Dedicated. To check this, in **Workloads → Pods**, set the **Project** to `rhods-notebooks` and confirm the stopped notebook’s pod no longer appears in the list.
  - The `jupyterhub-idle-culler-<stop-count>-<alpha-numeric-string>` pod’s log contains the date and time that the notebook pod was stopped, and how long it was inactive for.
  - **Stop-count** is an integer that increases incrementally by one when the `jupyterhub-idle-culler-<stop-count>-<alpha-numeric-string>` pod is run, starting from 1 after a full installation of OpenShift Data Science. Typically, this increment occurs when you manually run the pod, or when you change the time limit in the dashboard and click **Save Changes**.
  - **Alpha-numeric-string** is an alpha-numeric string of five characters.

The `jupyterhub-idle-culler-<stop-count>-<alpha-numeric-string>` pod’s log contains entries for only for the notebooks stopped by the currently running pod. Logs associated with notebooks stopped by pods that are no longer running are unavailable.

### 11.6. CONFIGURING A CUSTOM NOTEBOOK IMAGE

In addition to notebook images provided and supported by Red Hat and independent software vendors (ISVs), you can configure custom notebook images that cater for your project’s specific requirements.

Red Hat supports you in adding custom notebook images to your deployment of OpenShift Data Science and ensuring that they are available for selection when creating a notebook server. However, Red Hat does not support the contents of your custom notebook image. That is, if your custom notebook image is available for selection during notebook server creation, but does not create a usable notebook server, Red Hat does not provide support to fix your custom notebook image.

**Prerequisites**

- You have logged in to Red Hat OpenShift Data Science.
- You are part of the `dedicated-admins` user group in OpenShift Dedicated.
- Your custom notebook image exists in an image registry and is accessible.

**Procedure**

1. From the OpenShift Data Science dashboard, click **Settings → Notebook images**. The **Notebook image settings** page appears. Previously imported notebook images are displayed. To enable or disable a previously imported notebook image, on the row containing the relevant notebook image, click the toggle in the **Enabled** column.

2. Click **Import new image**. Alternatively, if no previously imported images were found, click **Import image**.
The **Import Notebook images** dialog appears.

3. In the **Repository** field, enter the URL of the repository containing the notebook image.

4. In the **Name** field, enter an appropriate name for the notebook image.

5. In the **Description** field, enter an appropriate description for the notebook image.

6. Optional: Add software to the notebook image. After the import has completed, the software is added to the notebook image’s meta-data and displayed on the JupyterHub server creation page.
   a. Click the **Software** tab.
   b. Click the **Add software** button.
   c. Click **Edit** (تعديل).
   d. Enter the **Software** name.
   e. Enter the software **Version**.
   f. Click **Confirm** (확인) to confirm your entry.
   g. To add additional software, click **Add software**, complete the relevant fields, and confirm your entry.

7. Optional: Add packages to the notebook images. After the import has completed, the packages are added to the notebook image’s meta-data and displayed on the JupyterHub server creation page.
   a. Click the **Packages** tab.
   b. Click the **Add package** button.
   c. Click **Edit** (تعديل).
   d. Enter the **Package** name.
   e. Enter the package **Version**.
   f. Click **Confirm** (확인) to confirm your entry.
   g. To add an additional package, click **Add package**, complete the relevant fields, and confirm your entry.

8. Click **Import**.

**Verification**

- The notebook image that you imported is displayed in the table on the **Notebook image settings** page.

- Your custom notebook image is available for selection on the **Start a notebook server** page in JupyterHub.
Additional resources

- Managing image streams
- Understanding build configurations
CHAPTER 12. BACKING UP STORAGE DATA FROM AMAZON EBS

Red Hat recommends that you back up the data on your persistent volume claims (PVCs) regularly. Backing up your data is particularly important before deleting a user and before uninstalling OpenShift Data Science, as all PVCs are deleted when OpenShift Data Science is uninstalled.

Prerequisites

- You have credentials for OpenShift Cluster Manager (https://console.redhat.com/openshift/).
- You have administrator access to the OpenShift Dedicated cluster.
- You have credentials for the Amazon Web Services (AWS) account that the OpenShift Dedicated cluster is deployed under.

Procedure

1. Determine the IDs of the persistent volumes (PVs) that you want to back up.
   a. In the OpenShift Dedicated web console, change into the Administrator perspective.
   b. Click Home → Projects.
   c. Click the rhods-notebooks project. The Details page for the project opens.
   d. Click the PersistentVolumeClaims in the Inventory section. The PersistentVolumeClaims page opens.
   e. Note the ID of the persistent volume (PV) that you want to back up.
      
      NOTE
      The persistent volumes (PV) that you make a note of are required to identify the correct EBS volume to back up in your AWS instance.

2. Locate the EBS volume containing the PVs that you want to back up.
   See Create Amazon EBS snapshots for more information.
   a. Log in to AWS (https://aws.amazon.com) and ensure that you are viewing the region that your OpenShift Dedicated cluster is deployed in.
   b. Click Services.
   c. Click Compute → EC2.
   d. Click Elastic Block Storage → Volumes in the side navigation. The Volumes page opens.
   e. In the search bar, enter the ID of the persistent volume (PV) that you made a note of earlier. The Volumes page reloads to display the search results.
   f. Click on the volume shown and verify that any kubernetes.io/created-for/pvc/namespace tags contain the value rhods-notebooks, and any kubernetes.io/created-for/pvc/name
tags match the name of the persistent volume that the EC2 volume is being used for, for example, **jupyterhub-nb-user1-pvc**.

3. Back up the EBS volume that contains your persistent volume (PV).
   
   a. Right-click on the volume that you want to back up and select **Create Snapshot** from the list.  
      The **Create Snapshot** page opens.

   b. Enter a **Description** for the volume.

   c. Click **Create Snapshot**  
      The snapshot of the volume is created.

   d. Click **Close**.

**Verification**

- The snapshot that you created is visible on the **Snapshots** page in AWS.

**Additional resources**

- **Create Amazon EBS snapshots**