Manage NetApp HCI storage

NetApp HCI

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Manage NetApp HCI storage

Manage NetApp HCI storage overview

With NetApp HCI, you can manage these storage assets by using the NetApp Hybrid Cloud Control.

- Create and manage user accounts
- Add and manage storage clusters
- Create and manage volumes
- Create and manage volume access groups
- Create and manage initiators
- Create and manage volume QoS policies

Find more information

NetApp Element Plug-in for vCenter Server

Create and manage user accounts by using NetApp Hybrid Cloud Control

In Element-based storage systems, authoritative cluster users can be created to enable login access to NetApp Hybrid Cloud Control depending on the permissions you want to grant "Administrator" or "Read-only" users. In addition to cluster users, there are also volume accounts, which enable clients to connect to volumes on a storage node.

Manage the following types of accounts:

- Manage authoritative cluster accounts
- Manage volume accounts

Enable LDAP

To use LDAP for any user account, you must first enable LDAP.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, click on the top right Options icon and select **User Management**.
3. From the Users page, click **Configure LDAP**.
4. Define your LDAP configuration.
5. Select the authentication type of Search and Bind or Direct Bind.
6. Before you save the changes, click **Test LDAP Log In** at the top of the page, enter the user name and password of a user you know exists, and click **Test**.

7. Click **Save**.

Manage authoritative cluster accounts

Authoritative user accounts are managed from the top right menu User Management option in NetApp Hybrid Cloud Control. These types of accounts enable you to authenticate against any storage asset associated with a NetApp Hybrid Cloud Control instance of nodes and clusters. With this account, you can manage volumes, accounts, access groups, and more across all clusters.

Create an authoritative cluster account

You can create an account by using NetApp Hybrid Cloud Control.

This account can be used to log in to the Hybrid Cloud Control, the per-node UI for the cluster, and the storage cluster in NetApp Element software.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, click on the top right Options icon and select **User Management**.
3. Select **Create User**.
4. Select the authentication type of cluster or LDAP.
5. Complete one of the following:
   - If you selected LDAP, enter the DN.

     To use LDAP, you must first enable LDAP or LDAPS. See Enable LDAP.

   - If you selected Cluster as the Auth Type, enter a name and password for the new account.
6. Select either Administrator or Read-only permissions.

   To view the permissions from NetApp Element software, click **Show legacy permissions**. If you select a subset of these permissions, the account is assigned Read-only permissions. If you select all legacy permissions, the account is assigned Administrator permissions.

   To ensure that all children of a group inherit permissions, create a DN organization admin group in the LDAP server. All the children accounts of that group will inherit those permissions.

7. Check the box indicating that "I have read and accept the NetApp End User License Agreement."
8. Click **Create User**.

Edit an authoritative cluster account

You can change the permissions or password on a user account by using NetApp Hybrid Cloud Control.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.

2. From the Dashboard, click on the icon in the top right and select **User Management**.
3. Optionally filter the list of user accounts by selecting **Cluster**, **LDAP**, or **Idp**.

   If you configured users on the storage cluster with LDAP, those accounts show a User Type of "LDAP." If you configured users on the storage cluster with Idp, those accounts show a User Type of "Idp."

4. In the **Actions** column in the table, expand the menu for the account and select **Edit**.
5. Make changes as needed.
6. Select **Save**.
7. Log out of NetApp Hybrid Cloud Control.
8. Update the credentials for the authoritative cluster asset using the NetApp Hybrid Cloud Control API.

   > It might take the NetApp Hybrid Cloud Control UI up to 2 minutes to refresh the inventory. To manually refresh inventory, access the REST API UI inventory service `https://<ManagementNodeIP>/inventory/1/` and run `GET /installations/{id}` for the cluster.

9. Log into NetApp Hybrid Cloud Control.

Delete an authoritative user account

You can delete one or more accounts when it is no longer needed. You can delete an LDAP user account.

You cannot delete the primary administrator user account for the authoritative cluster.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, click on the icon in the top right and select **User Management**.
3. In the **Actions** column in the Users table, expand the menu for the account and select **Delete**.
4. Confirm the deletion by selecting **Yes**.

Manage volume accounts

Volume accounts are managed within the NetApp Hybrid Cloud Control Volumes table. These accounts are specific only to the storage cluster on which they were created. These types of accounts enable you to set permissions on volumes across the network, but have no effect outside of those volumes.

A volume account contains the CHAP authentication required to access the volumes assigned to it.

Create a volume account

Create an account specific to this volume.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, select **Storage** > **Volumes**.

3. Select the **Accounts** tab.
4. Select the **Create Account** button.
5. Enter a name for the new account.
6. In the CHAP Settings section, enter the following information:
   - Initiator Secret for CHAP node session authentication
   - Target Secret for CHAP node session authentication

   To auto-generate either password, leave the credential fields blank.

7. Select **Create Account**.

Edit a volume account

You can change the CHAP info and change whether an account is active or locked.

Deleting or locking an account associated with the management node results in an inaccessible management node.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, select **Storage** > **Volumes**.
3. Select the **Accounts** tab.
4. In the **Actions** column in the table, expand the menu for the account and select **Edit**.
5. Make changes as needed.
6. Confirm the changes by selecting **Yes**.

Delete a volume account

Delete an account that you no longer need.

Before you delete a volume account, delete and purge any volumes associated with the account first.

Deleting or locking an account associated with the management node results in an inaccessible management node.

Persistent volumes that are associated with management services are assigned to a new account during installation or upgrade. If you are using persistent volumes, do not modify or delete the volumes or their associated account. If you do delete these accounts, you could render your management node unusable.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, select **Storage** > **Volumes**.
3. Select the **Accounts** tab.

4. In the **Actions** column in the table, expand the menu for the account and select **Delete**.
5. Confirm the deletion by selecting **Yes**.

Find more information

- Learn about accounts
- Work with user accounts
- NetApp Element Plug-in for vCenter Server

Add and manage storage clusters using NetApp Hybrid Cloud Control

You can add storage clusters to the management node assets inventory so that they can be managed using NetApp Hybrid Cloud Control (HCC). The first storage cluster added during system setup is the default authoritative storage cluster, but additional clusters can be added using HCC UI.

After a storage cluster is added, you can monitor cluster performance, change storage cluster credentials for the managed asset, or remove a storage cluster from the management node asset inventory if it no longer needs to be managed using HCC.

Starting with Element 12.2, you can use the maintenance mode feature options to enable and disable maintenance mode for your storage cluster nodes.

What you'll need

- **Cluster administrator permissions**: You have permissions as administrator on the authoritative storage cluster. The authoritative cluster is the first cluster added to the management node inventory during system setup.
- **Element software**: Your storage cluster version is running NetApp Element software 11.3 or later.
- **Management node**: You have deployed a management node running version 11.3 or later.
- **Management services**: You have updated your management services bundle to version 2.17 or later.

Options

- Add a storage cluster
- Confirm storage cluster status
- Edit storage cluster credentials
- Remove a storage cluster
- Enable and disable maintenance mode

Add a storage cluster

You can add a storage cluster to the management node assets inventory using NetApp Hybrid Cloud Control. This allows you to manage and monitor the cluster using the HCC UI.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the authoritative storage cluster administrator credentials.

2. From the Dashboard, select the options menu on the top right and select **Configure**.
3. In the **Storage Clusters** pane, select **Storage Cluster Details**.
4. Select **Add Storage Cluster**.
5. Enter the following information:
    - Storage cluster management virtual IP address

    > Only remote storage clusters that are not currently managed by a management node can be added.

    - Storage cluster user name and password
6. Select **Add**.

    > After you add the storage cluster, the cluster inventory can take up to 2 minutes to refresh and display the new addition. You might need to refresh the page in your browser to see the changes.

7. If you are adding Element eSDS clusters, enter or upload your SSH private key and SSH user account.

Confirm storage cluster status

You can monitor the connection status of storage clusters assets using the NetApp Hybrid Cloud Control UI.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the authoritative storage cluster administrator credentials.
2. From the Dashboard, select the options menu on the top right and select **Configure**.
3. Review the status of storage clusters in the inventory.
4. From the **Storage Clusters** pane, select **Storage Cluster Details** for additional detail.

Edit storage cluster credentials

You can edit the storage cluster's administrator user name and password using the NetApp Hybrid Cloud Control UI.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the authoritative storage cluster administrator credentials.
2. From the Dashboard, select the options menu on the top right and select **Configure**.
3. In the **Storage Clusters** pane, select **Storage Cluster Details**.
4. Select the **Actions** menu for the cluster and select **Edit Cluster Credentials**.
5. Update the storage cluster user name and password.
6. Select **Save**.

Remove a storage cluster

Removing a storage cluster from NetApp Hybrid Cloud Control removes the cluster from the management

node inventory. After you remove a storage cluster, the cluster can no longer be managed by HCC and you can access it only by navigating directly to its management IP address.

> You cannot remove the authoritative cluster from the inventory. To determine the authoritative cluster, go to **User Management > Users**. The authoritative cluster is listed next to the heading **Users**.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the authoritative storage cluster administrator credentials.
2. From the Dashboard, select the options menu on the top right and select **Configure**.
3. In the **Storage Clusters** pane, select **Storage Cluster Details**.
4. Select the **Actions** menu for the cluster and select **Remove Storage Cluster**.

   > Clicking **Yes** next removes the cluster from the installation.

5. Select **Yes**.

Enable and disable maintenance mode

This maintenance mode feature options give you the capability to enable and disable maintenance mode for a storage cluster node.

What you'll need

- **Element software**: Your storage cluster version is running NetApp Element software 12.2 or later.
- **Management node**: You have deployed a management node running version 12.2 or later.
- **Management services**: You have updated your management services bundle to version 2.19 or later.
- You have access to log in at the administrator level.

Enable maintenance mode

You can use the following procedure to enable maintenance mode for a storage cluster node.

> Only one node can be in maintenance mode at a time.

Steps

1. Open the IP address of the management node in a web browser. For example:

   ```
   https://<ManagementNodeIP>
   ```

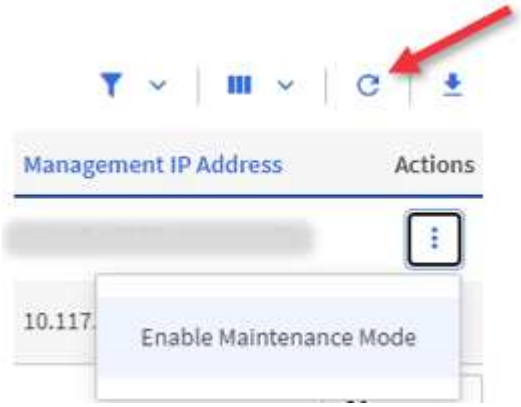
2. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI storage cluster administrator credentials.

   > The maintenance mode feature options are disabled at the read-only level.

3. In the left navigation blue box, select the NetApp HCI installation.

4. In the left navigation pane, select **Nodes**.
5. To view storage inventory information, select **Storage**.
6. Enable maintenance mode on a storage node:

> The storage nodes table is updated automatically every two minutes for non-user initiated actions. Before an action, to ensure that you have the most up-to-date status, you can refresh the nodes table by using the refresh icon located on the upper-right side of the nodes table.



   a. Under **Actions**, select **Enable Maintenance Mode**.

      While **Maintenance Mode** is being enabled, maintenance mode actions are unavailable for the selected node and all other nodes on the same cluster.

      After **Enabling Maintenance Mode** completes, the **Node Status** column displays a wrench icon and the text "**Maintenance Mode**" for the node that is in maintenance mode.

Disable maintenance mode

After a node is successfully placed in maintenance mode, the **Disable Maintenance Mode** action is available for this node. Actions on the other nodes are unavailable until maintenance mode is disabled successfully on the node undergoing maintenance.

Steps

1. For the node under maintenance mode, under **Actions**, select **Disable Maintenance Mode**.

   While **Maintenance Mode** is being disabled, maintenance mode actions are unavailable for the selected node and all other nodes on the same cluster.

   After **Disabling Maintenance Mode** completes, the **Node Status** column displays **Active**.

> When a node is in maintenance mode, it does not accept new data. As a result, it can take longer to disable maintenance mode because the node must sync its data back up before it can exit maintenance mode. The longer you spend in maintenance mode, the longer it can take to disable maintenance mode.

Troubleshoot

If you encounter errors when you are either enabling or disabling maintenance mode, a banner error displays at the top of the nodes table. For more information on the error, you can select the **Show Details** link that is provided on the banner to show what the API returns are.

Find more information

Create and manage storage cluster assets

Create and manage volumes by using NetApp Hybrid Cloud Control

You can create a volume and associate the volume with a given account. Associating a volume with an account gives the account access to the volume through the iSCSI initiators and CHAP credentials.

You can specify QoS settings for a volume during creation.

You can manage volumes in NetApp Hybrid Cloud Control in the following ways:

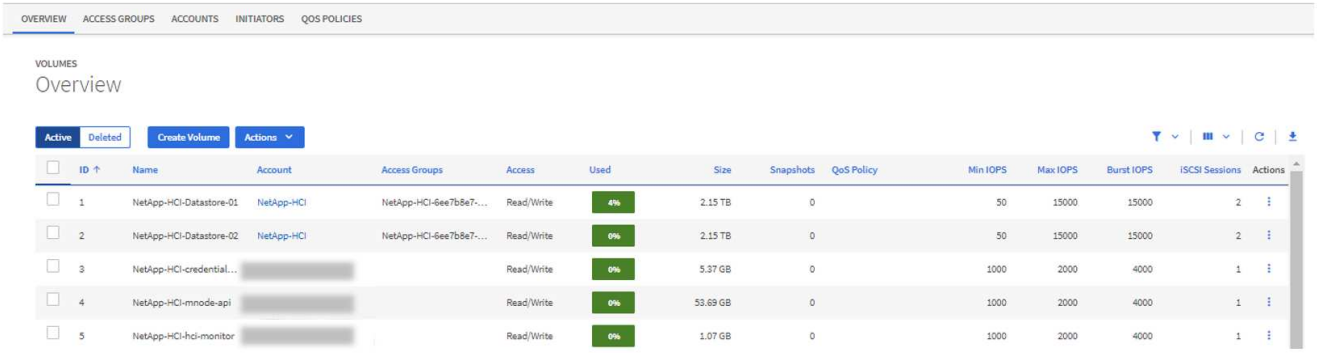
- Create a volume
- Apply a QoS policy to a volume
- Edit a volume
- Clone volumes
- Add volumes to a volume access group
- Delete a volume
- Restore a deleted volume
- Purge a deleted volume

Create a volume

You can create a storage volume using NetApp Hybrid Cloud Control.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes** > **Overview** tab.



4. Select **Create Volume**.
5. Enter a name for the new volume.
6. Enter the total size of the volume.

> The default volume size selection is in GB. You can create volumes using sizes measured in GB or GiB:
> 1GB = 1 000 000 000 bytes
> 1GiB = 1 073 741 824 bytes

7. Select a block size for the volume.
8. From the **Account** list, select the account that should have access to the volume.

   If an account does not exist, click **Create New Account**, enter a new account name, and click **Create Account**. The account is created and associated with the new volume in the **Account** list.

   > If there are more than 50 accounts, the list does not appear. Begin typing and the auto-complete feature displays values for you to choose.

9. To configure the Quality of Service for the volume, do one of the following:
   - Under **Quality of Service Settings**, set customized minimum, maximum, and burst values for IOPS or use the default QoS values.
   - Select an existing QoS policy by enabling the **Assign Quality of Service Policy** toggle and choosing an existing QoS policy from the resulting list.
   - Create and assign a new QoS policy by enabling the **Assign Quality of Service Policy** toggle and clicking **Create New QoS Policy**. In the resulting window, enter a name for the QoS policy and then enter QoS values. When finished, click **Create Quality of Service Policy**.

   Volumes that have a Max or Burst IOPS value greater than 20,000 IOPS might require high queue depth or multiple sessions to achieve this level of IOPS on a single volume.

10. Click **Create Volume**.

Apply a QoS policy to a volume

You can apply a QoS policy to existing storage volumes by using NetApp Hybrid Cloud Control. If instead you need to set custom QoS values for a volume, you can Edit a volume. To create a new QoS policy, see Create and manage volume QoS policies.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes** > **Overview**.
4. Select one or more volumes to associate with a QoS policy.
5. Click the **Actions** drop-down list at the top of the volumes table, and select **Apply QoS Policy**.
6. In the resulting window, select a QoS policy from the list and click **Apply QoS Policy**.

> If you are using QoS policies on a volume, you can set custom QoS to remove the QoS policy affiliation with the volume. Custom QoS values override QoS policy values for volume QoS settings.

Edit a volume

Using NetApp Hybrid Cloud Control, you can edit volume attributes such as QoS values, volume size, and the unit of measurement by which byte values are calculated. You can also modify account access for replication usage or to restrict access to the volume.

About this task

You can resize a volume when there is sufficient space on the cluster under the following conditions:

- Normal operating conditions.
- Volume errors or failures are being reported.
- The volume is being cloned.
- The volume is being resynced.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes** > **Overview**.
4. In the **Actions** column in the volumes table, expand the menu for the volume and select **Edit**.
5. Make changes as needed:
   a. Change the total size of the volume.

> You can increase, but not decrease, the size of the volume. You can only resize one volume in a single resizing operation. Garbage collection operations and software upgrades do not interrupt the resizing operation.

> If you are adjusting volume size for replication, first increase the size of the volume assigned as the replication target. Then you can resize the source volume. The target volume can be greater or equal in size to the source volume, but it cannot be smaller.

> The default volume size selection is in GB. You can create volumes using sizes measured in GB or GiB:
> 1GB = 1 000 000 000 bytes
> 1GiB = 1 073 741 824 bytes

b. Select a different account access level:
   - Read Only
   - Read/Write
   - Locked
   - Replication Target

c. Select the account that should have access to the volume.

   Begin typing and the auto-complete function displays possible values for you to choose.

   If an account does not exist, click **Create New Account**, enter a new account name, and click **Create**. The account is created and associated with the existing volume.

d. Change the Quality of Service by doing one of the following:
   i. Select an existing policy.
   ii. Under Custom Settings, set the minimum, maximum, and burst values for IOPS or use the default values.

> If you are using QoS policies on a volume, you can set custom QoS to remove the QoS policy affiliation with the volume. Custom QoS will override QoS policy values for volume QoS settings.

> When you change IOPS values, you should increment in tens or hundreds. Input values require valid whole numbers. Configure volumes with an extremely high burst value. This enables the system to process occasional large block, sequential workloads more quickly, while still constraining the sustained IOPS for a volume.

6. Select **Save**.

Clone volumes

You can create a clone of a single storage volume or clone a group of volumes to make a point-in-time copy of the data. When you clone a volume, the system creates a snapshot of the volume and then creates a copy of the data referenced by the snapshot.

Before you begin

- At least one cluster must be added and running.
- At least one volume has been created.
- A user account has been created.
- Available unprovisioned space must be equal to or more than the volume size.

About this task

The cluster supports up to two running clone requests per volume at a time and up to 8 active volume clone operations at a time. Requests beyond these limits are queued for later processing.

Volume cloning is an asynchronous process, and the amount of time the process requires depends on the size of the volume you are cloning and the current cluster load.

> Cloned volumes do not inherit volume access group membership from the source volume.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select the **Volumes** > **Overview** tab.
4. Select each volume you want to clone.
5. Click the **Actions** drop-down list at the top of the volumes table, and select **Clone**.
6. In the resulting window, do the following:
   a. Enter a volume name prefix (this is optional).
   b. Choose the access type from the **Access** list.
   c. Choose an account to associate with the new volume clone (by default, **Copy from Volume** is selected, which will use the same account that the original volume uses).
   d. If an account does not exist, click **Create New Account**, enter a new account name, and click **Create Account**. The account is created and associated with the volume.

      > Use descriptive naming best practices. This is especially important if multiple clusters or vCenter Servers are used in your environment.

      > Increasing the volume size of a clone results in a new volume with additional free space at the end of the volume. Depending on how you use the volume, you may need to extend partitions or create new partitions in the free space to make use of it.

   e. Click **Clone Volumes**.

      > The time to complete a cloning operation is affected by volume size and current cluster load. Refresh the page if the cloned volume does not appear in the volume list.

Add volumes to a volume access group

You can add a single volume or a group of volumes to a volume access group.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes** > **Overview**.
4. Select one or more volumes to associate with a volume access group.
5. Click the **Actions** drop-down list at the top of the volumes table, and select **Add to Access Group**.
6. In the resulting window, select a volume access group from the **Volume Access Group** list.

7. Click **Add Volume**.

Delete a volume

You can delete one or more volumes from an Element storage cluster.

About this task

The system does not immediately purge deleted volumes; they remain available for approximately eight hours. After eight hours, they are purged and no longer available. If you restore a volume before the system purges it, the volume comes back online and iSCSI connections are restored.

If a volume used to create a snapshot is deleted, its associated snapshots become inactive. When the deleted source volumes are purged, the associated inactive snapshots are also removed from the system.

> Persistent volumes that are associated with management services are created and assigned to a new account during installation or upgrade. If you are using persistent volumes, do not modify or delete the volumes or their associated account. If you do delete these volumes, you could render your management node unusable.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes** > **Overview**.
4. Select one or more volumes to delete.
5. Click the **Actions** drop-down list at the top of the volumes table, and select **Delete**.
6. In the resulting window, confirm the action by clicking **Yes**.

Restore a deleted volume

After a storage volume is deleted, you can still restore it if you do so before eight hours after deletion.

The system does not immediately purge deleted volumes; they remain available for approximately eight hours. After eight hours, they are purged and no longer available. If you restore a volume before the system purges it, the volume comes back online and iSCSI connections are restored.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes** > **Overview**.
4. Select **Deleted**.
5. In the **Actions** column of the Volumes table, expand the menu for the volume and select **Restore**.
6. Confirm the process by selecting **Yes**.

Purge a deleted volume

After storage volumes are deleted, they remain available for approximately eight hours. After eight hours, they

are purged automatically and no longer available. If you do not want to wait for the eight hours, you can delete

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes** > **Overview**.
4. Select **Deleted**.
5. Select one or more volumes to purge.
6. Do one of the following:
   - If you selected multiple volumes, click the **Purge** quick filter at the top of the table.
   - If you selected a single volume, in the **Actions** column of the Volumes table, expand the menu for the volume and select **Purge**.
7. In the **Actions** column of the Volumes table, expand the menu for the volume and select **Purge**.
8. Confirm the process by selecting **Yes**.

Find more information

- Learn about volumes
- SolidFire and Element Software Documentation
- NetApp Element Plug-in for vCenter Server

Create and manage volume access groups

You can create new volume access groups, make changes to the name, associated initiators, or associated volumes of access groups, or delete existing volume access groups using NetApp Hybrid Cloud Control.

What you'll need

- You have administrator credentials for this NetApp HCI system.
- You have upgraded your management services to at least version 2.15.28. NetApp Hybrid Cloud Control storage management is not available in earlier service bundle versions.
- Ensure you have a logical naming scheme for volume access groups.

Add a volume access group

You can add a volume access group to a storage cluster by using NetApp Hybrid Cloud Control.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes**.
4. Select the **Access Groups** tab.

5. Select the **Create Access Group** button.
6. In the resulting dialog, enter a name for the new volume access group.
7. (Optional) In the **Initiators** section, select one or more initiators to associate with the new volume access group.

   If you associate an initiator with the volume access group, that initiator can access each volume in the group without the need for authentication.

8. (Optional) In the **Volumes** section, select one or more volumes to include in this volume access group.
9. Select **Create Access Group**.

Edit a volume access group

You can edit the properties of an existing volume access group by using NetApp Hybrid Cloud Control. You can make changes to the name, associated initiators, or associated volumes of an access group.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes**.
4. Select the **Access Groups** tab.
5. In the **Actions** column of the table of access groups, expand the options menu for the access group you need to edit.
6. In the options menu, select **Edit**.
7. Make any needed changes to the name, associated initiators, or associated volumes.
8. Confirm your changes by selecting **Save**.
9. In the **Access Groups** table, verify that the access group reflects your changes.

Delete a volume access group

You can remove a volume access group by using NetApp Hybrid Cloud Control, and at the same time remove the initiators associated with this access group from the system.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes**.
4. Select the **Access Groups** tab.
5. In the **Actions** column of the table of access groups, expand the options menu for the access group you need to delete.
6. In the options menu, select **Delete**.
7. If you do not wish to delete the initiators that are associated with the access group, deselect the **Delete initiators in this access group** checkbox.

8. Confirm the delete operation by selecting **Yes**.

Find more information

- Learn about volume access groups
- Add initiator to a volume access group
- NetApp Element Plug-in for vCenter Server

Create and manage initiators

You can use initiators for CHAP-based rather than account-based access to volumes. You can create and delete initiators, and give them friendly aliases to simplify administration and volume access. When you add an initiator to a volume access group, that initiator enables access to all volumes in the group.

What you'll need

- You have cluster administrator credentials.
- You have upgraded your management services to at least version 2.17. NetApp Hybrid Cloud Control initiator management is not available in earlier service bundle versions.

Options

- Create an initiator
- Add initiators to a volume access group
- Change an initiator alias
- Delete initiators

Create an initiator

You can create iSCSI or Fibre Channel initiators and optionally assign them aliases.

About this task

The accepted format of an initiator IQN is `iqn.yyyy-mm` where y and m are digits followed by text which must only contain digits, lower-case alphabetic characters, a period (`.`), colon (`:`) or dash (`-`).
A sample of the format is as follows:

```
iqn.2010-01.com.solidfire:c2r9.fc0.2100000e1e09bb8b
```

The accepted format of a Fibre Channel initiator WWPN is `:Aa:bB:CC:dd:11:22:33:44` or `AabBCCdd11223344`.
A sample of the format is as follows:

```
5f:47:ac:c0:5c:74:d4:02
```

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the Element storage cluster administrator credentials.

2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes**.
4. Select the **Initiators** tab.
5. Select the **Create Initiators** button.

Option	Steps
Create one or more initiators	a. Enter the IQN or WWPN for the initiator in the **IQN/WWPN** field. b. Enter a friendly name for the initiator in the **Alias** field. c. (Optional) Select **Add Initiator** to open new initiator fields or use the bulk create option instead. d. Select **Create Initiators**.
Bulk create initiators	a. Select **Bulk Add IQNs/WWPNs**. b. Enter a list of IQNs or WWPNs in the text box. Each IQN or WWPN must be comma or space separated or on its own line. c. Select **Add IQNs/WWPNs**. d. (Optional) Add unique aliases to each initiator. e. Remove any initiator from the list that might already exist in the installation. f. Select **Create Initiators**.

Add initiators to a volume access group

You can add initiators to an volume access group. When you add an initiator to a volume access group, the initiator enables access to all volumes in that volume access group.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes**.
4. Select the **Initiators** tab.
5. Select one or more initiators you want to add.
6. Select **Actions > Add to Access Group**.
7. Select the access group.
8. Confirm your changes by selecting **Add Initiator**.

Change an initiator alias

You can change the alias of an existing initiator or add an alias if one does not already exist.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes**.
4. Select the **Initiators** tab.
5. In the **Actions** column, expand the options menu for the initiator.
6. Select **Edit**.
7. Make any needed changes to the alias or add a new alias.
8. Select **Save**.

Delete initiators

You can delete one or more initiators. When you delete an initiator, the system removes it from any associated volume access group. Any connections using the initiator remain valid until the connection is reset.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the Element storage cluster administrator credentials.
2. From the Dashboard, expand the name of your storage cluster on the left navigation menu.
3. Select **Volumes**.
4. Select the **Initiators** tab.
5. Delete one or more initiators:
   a. Select one or more initiators you want to delete.
   b. Select **Actions > Delete**.
   c. Confirm the delete operation and select **Yes**.

Find more information

- Learn about initiators
- Learn about volume access groups
- NetApp Element Plug-in for vCenter Server

Create and manage volume QoS policies

A QoS (Quality of Service) policy enables you to create and save a standardized quality of service setting that can be applied to many volumes. The selected cluster must be Element 10.0 or later to use QoS policies; otherwise, QoS policy functions are not available.

> See NetApp HCI Concepts content for more information about using QoS policies instead of individual volume QoS.

Using NetApp Hybrid Cloud Control, you can create and manage QoS policies by completing the following tasks:

- Create a QoS policy
- Apply a QoS policy to a volume
- Change the QoS policy assignment of a volume
- Edit a QoS policy
- Delete a QoS policy

Create a QoS policy

You can create QoS policies and apply them to volumes that should have equivalent performance.

> If you are using QoS policies, do not use custom QoS on a volume. Custom QoS will override and adjust QoS policy values for volume QoS settings.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the menu for your storage cluster.
3. Select **Storage > Volumes**.
4. Click the **QoS Policies** tab.
5. Click **Create Policy**.
6. Enter the **Policy Name**.

   > Use descriptive naming best practices. This is especially important if multiple clusters or vCenter Servers are used in your environment.

7. Enter the minimum IOPS, maximum IOPS, and burst IOPS values.
8. Click **Create QoS Policy**.

   A system ID is generated for the policy and the policy appears on the QoS Policies page with its assigned QoS values.

Apply a QoS policy to a volume

You can assign an existing QoS policy to a volume using NetApp Hybrid Cloud Control.

What you'll need

The QoS policy you want to assign has been created.

About this task

This task describes how to assign a QoS policy to an individual volume by changing its settings. The latest version of NetApp Hybrid Cloud Control does not have a bulk assign option for more than one volume. Until the functionality to bulk assign is provided in a future release, you can use the Element web UI or vCenter Plug-in UI to bulk assign QoS policies.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the menu for your storage cluster.
3. Select **Storage > Volumes**.
4. Click the **Actions** menu next to the volume you intend to modify.
5. In the resulting menu, select **Edit**.
6. In the dialog box, enable **Assign QoS Policy** and select the QoS policy from the drop-down list to apply to the selected volume.

   > Assigning QoS will override any individual volume QoS values that have been previously applied.

7. Click **Save**.

   The updated volume with the assigned QoS policy appears on the Overview page.

Change the QoS policy assignment of a volume

You can remove the assignment of a QoS policy from a volume or select a different QoS policy or custom QoS.

What you'll need

The volume you want to modify is assigned a QoS policy.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the menu for your storage cluster.
3. Select **Storage > Volumes**.
4. Click the **Actions** menu next to the volume you intend to modify.
5. In the resulting menu, select **Edit**.
6. In the dialog box, do one of the following:
   - Disable **Assign QoS Policy** and modify the **Min IOPS**, **Max IOPS**, and **Burst IOPS** values for individual volume QoS.

     > When QoS policies are disabled, the volume uses default QoS IOPS values unless otherwise modified.

   - Select a different QoS policy from the drop-down list to apply to the selected volume.
7. Click **Save**.

   The updated volume appears on the Overview page.

Edit a QoS policy

You can change the name of an existing QoS policy or edit the values associated with the policy. Changing

QoS policy performance values affects QoS for all volumes associated with the policy.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the menu for your storage cluster.
3. Select **Storage > Volumes**.
4. Click the **QoS Policies** tab.
5. Click the **Actions** menu next to the QoS policy you intend to modify.
6. Click **Edit**.
7. In the **Edit QoS Policy** dialog box, change one or more of the following:
   - **Name**: The user-defined name for the QoS policy.
   - **Min IOPS**: The minimum number of IOPS guaranteed for the volume. Default = 50.
   - **Max IOPS**: The maximum number of IOPS allowed for the volume. Default = 15,000.
   - **Burst IOPS**: The maximum number of IOPS allowed over a short period of time for the volume. Default = 15,000.
8. Click **Save**.

   The updated QoS policy appears on the QoS Policies page.

   You can click on the link in the **Active Volumes** column for a policy to show a filtered list of the volumes assigned to that policy.

Delete a QoS policy

You can delete a QoS policy if it is no longer needed. When you delete a QoS policy, all volumes assigned with the policy maintain the QoS values previously defined by the policy but as individual volume QoS. Any association with the deleted QoS policy is removed.

Steps

1. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI or Element storage cluster administrator credentials.
2. From the Dashboard, expand the menu for your storage cluster.
3. Select **Storage > Volumes**.
4. Click the **QoS Policies** tab.
5. Click the **Actions** menu next to the QoS policy you intend to modify.
6. Click **Delete**.
7. Confirm the action.

Find more information

- NetApp Element Plug-in for vCenter Server
- SolidFire and Element Software Documentation

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