NetApp

Protect data with the vCenter Plug-in

VCP

NetApp
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Table of Contents

Protect data with the vCenter Plug-in

Protect data with the NetApp Element Plug-in for VMware vCenter Server

You can ensure that copies of your data are created and stored where you need them by using the NetApp Element Plug-in for VMware vCenter Server. To do this, you can create and manage volume and group snapshots, set up snapshot schedules, and create volume and cluster pair relationships for replication between remote clusters.

Options

- Create and manage volume snapshots
- Create and manage group snapshots
- Create snapshot schedules
- Perform remote replication between clusters

Find more information

- NetApp HCI Documentation
- SolidFire and Element Resources page

Create and manage volume snapshots in vCenter Server

Creating a volume snapshot creates a point-in-time copy of a volume. The process takes only a small amount of system resources and space, which makes snapshot creation faster than cloning.

You can use snapshots to roll a volume back to the state it was in at the time the snapshot was created. However, because snapshots are simply replicas of volume metadata, you cannot mount or write to them.

Options

- Create a volume snapshot
- View volume snapshot details
- Clone a volume from a snapshot
- Roll back a volume to a snapshot
- Back up a volume snapshot to an external object store
- Delete a volume snapshot

Create a volume snapshot

You can create a snapshot of an active volume to preserve the volume image at any point in time.

Steps

1. From the vCenter Plug-in, open the **Management** tab:

- Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Management**.

- For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Management**.

> ⓘ If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Select the **Volumes** sub-tab.

3. From the **Active** view, select the check box for the volume to use for the snapshot.

4. Select **Actions**.

5. In the resulting menu, select **Create Snapshot**.

6. (Optional): In the Create Snapshot dialog box, enter a name for the snapshot.

> 💡 Use descriptive naming best practices. This is especially important if multiple clusters or vCenter Servers are used in your environment. If you do not enter a name, the system creates a snapshot default name using the date and time that the snapshot was created.

7. (Optional) Select the **Include snapshot in replication when paired** check box to ensure that the snapshot is replicated when the parent volume is paired.

8. Select one of the following as the retention period for the snapshot:

- **Keep forever**: Retains the snapshot on the system indefinitely.

- **Set retention period**: Determine a length of time (days, hours, or minutes) for the system to retain the snapshot.

> ⓘ When you set a retention period, you select a period that begins at the current time. (Retention is not calculated from the snapshot creation time.)

9. To take a single, immediate snapshot, select **Take snapshot now**.

10. To schedule the snapshot to run at a future time, complete the following steps:

    a. Select **Create snapshot schedule**.

    b. Enter a schedule name.

    c. Select a schedule type and configure the schedule details.

    d. (Optional) Select the check box for **Recurrent Schedule** to repeat the scheduled snapshot periodically.

11. Select **OK**.

View volume snapshot details

You might want to verify that the snapshot was added.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

- Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

- For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

> ⓘ If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Select the **Snapshots** sub-tab.

3. (Optional) Select one of the following filters:

   ◦ **Individual**: Volume snapshots that are not members of a group snapshot.

   ◦ **Members**: Volume snapshots that are members of a group snapshot.

   ◦ **Inactive**: Volume snapshots that were created from volumes that have been deleted but not yet purged.

4. View the snapshot details.

Clone a volume from a snapshot

You can create a new volume from a snapshot of a volume. When you do this, the system uses the snapshot information to clone a new volume using the data contained on the volume at the time the snapshot was created. This process also stores information about other snapshots of the volume in the new created volume.

Steps

1. From the vCenter Plug-in, rom the vCenter Plug-in, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   > ⓘ If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Select the **Snapshots** sub-tab.

3. Select one of two views:

   ◦ **Individual**: Lists volume snapshots that are not members of a group snapshot.

   ◦ **Members**: Lists volume snapshots that are members of a group snapshot.

4. Select the check box for the volume snapshot to clone as a volume.

5. Select **Actions**.

6. In the resulting menu, select **Clone Volume from Snapshot**.

7. Enter a volume name, the total size and select either GB or GiB for the new volume.

8. Select an access type for the volume:

   ◦ **Read Only**: Only read operations are allowed.

   ◦ **Read/Write**: Both read and write operations are allowed.

   ◦ **Locked**: No read or write operations are allowed.

   ◦ **Replication Target**: Designated as a target volume in a replicated volume pair.

9. Select a user account to associate with the new volume.

10. Select **OK**.

11. Validate the new volume:

a. Open the **Management** tab:

- Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Management**.

- For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Management**.

b. Select the **Volumes** sub-tab.

c. From the **Active** view, confirm that the new volume is listed.

> Refresh the page if needed.

Roll back a volume to a snapshot

You can roll back a volume to a snapshot at any time. This undoes any changes made to the volume since the snapshot was created.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

   - Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   - For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   > If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Select the **Snapshots** sub-tab.

3. Select one of two views:

   - **Individual**: Lists volume snapshots that are not members of a group snapshot.

   - **Members**: Lists volume snapshots that are members of a group snapshot.

4. Select the check box for the volume snapshot to use for the volume rollback.

5. Select **Actions**.

6. In the resulting menu, select **Rollback Volume to Snapshot**.

7. (Optional) To save the current state of the volume before rolling back to the snapshot:

   a. In the Rollback to Snapshot dialog box, select **Save volume's current state as a snapshot**.

   b. Enter a name for the new snapshot.

8. Select **OK**.

Back up a volume snapshot to an external object store

You can use the integrated backup feature to back up a volume snapshot. You can back up snapshots from a cluster running NetApp Element software to an external object store or to another Element-based cluster.

When you back up a snapshot to an external object store, you must have a connection to the object store that allows read/write operations.

- Back up a volume snapshot to an Amazon S3 object store

- [Back up a volume snapshot to an OpenStack Swift object store](#)
- [Back up a volume snapshot to a cluster running Element software](#)

Back up a volume snapshot to an Amazon S3 object store

You can back up NetApp Element snapshots to external object stores that are compatible with Amazon S3.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   > (i) If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Select the **Snapshots** sub-tab.

3. Select the check box for the volume snapshot you want to back up.

4. Select **Actions**.

5. In the resulting menu, select **Backup to**.

6. In the dialog under **Back up volume to**, select **Amazon S3**.

7. Select an option under **with the following data format**:

   ◦ **Native**: A compressed format readable only by NetApp Element software-based storage systems.

   ◦ **Uncompressed**: An uncompressed format compatible with other systems.

8. Enter the details:

   ◦ **Host name**: Enter a host name to use to access the object store.

   ◦ **Access key ID**: Enter an access key ID for the account.

   ◦ **Secret access key**: Enter the secret access key for the account.

   ◦ **Amazon S3 Bucket**: Enter the S3 bucket in which to store the backup.

   ◦ **Prefix**: (Optional) Enter a prefix for the backup name.

   ◦ **Nametag**: (Optional) Enter a nametag to append to the prefix.

9. Select **OK**.

Back up a volume snapshot to an OpenStack Swift object store

You can back up NetApp Element snapshots to secondary object stores that are compatible with OpenStack Swift.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

> (i) If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Select the **Snapshots** sub-tab.

3. Select the check box for the volume snapshot you want to back up.

4. Select **Actions**.

5. In the resulting menu, select **Backup to**.

6. In the dialog under **Back up volume to**, select **OpenStack Swift**.

7. Select an option under **with the following data format**:

   ◦ **Native**: A compressed format readable only by NetApp Element software-based storage systems.

   ◦ **Uncompressed**: An uncompressed format compatible with other systems.

8. Enter the details:

   ◦ **URL**: Enter a URL to use to access the object store.

   ◦ **User name**: Enter user name for the account.

   ◦ **Authentication key**: Enter the authentication key for the account.

   ◦ **Container**: Enter the container in which to store the backup.

   ◦ **Prefix**: (Optional) Enter a prefix for the backup volume name.

   ◦ **Nametag**: (Optional) Enter a name tag to append to the prefix.

9. Select **OK**.

Back up a volume snapshot to a cluster running Element software

You can back up a volume snapshot that resides on a cluster running NetApp Element software to a remote Element cluster.

What you'll need

You must create a volume on the destination cluster of equal or greater size to the snapshot you are using for the backup.

About this task

When you back up or restore from one cluster to another, the system generates a key to be used as authentication between the clusters. This bulk volume write key enables the source cluster to authenticate with the destination cluster, providing security when writing to the destination volume. As part of the backup or restore process, you need to generate a bulk volume write key from the destination volume before starting the operation.

Steps

1. From the vCenter Plug-in, open the **Management** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Management**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Management**.

   > (i) If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Select the **volumes** sub-tab.

3. Select the check box for the destination volume.

4. Select **Actions**.

5. In the resulting menu, select **Restore from**.

6. In the dialog under **Restore from**, select **NetApp Element**.

7. Select an option under **with the following data format**:

   ◦ **Native**: A compressed format readable only by NetApp Element software-based storage systems.

   ◦ **Uncompressed**: An uncompressed format compatible with other systems.

8. Select **Generate Key** to generate a bulk volume write key for the destination volume.

9. Copy the bulk volume write key to your clipboard to apply to later steps on the source cluster.

10. From the vCenter that contains the source cluster, open the **Protection** tab:

    ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

    ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

    > (i) If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

11. Select the check box for the snapshot you are using for the backup.

12. Select **Actions**.

13. In the resulting menu, select **Backup to**.

14. In the dialog box under **Back up volume to**, select **NetApp Element**.

15. Select the same option as the destination cluster under **with the following data format**.

16. Enter the details:

    ◦ **Remote cluster MVIP**: Enter the management virtual IP address of the destination volume's cluster.

    ◦ **Remote cluster user password**: Enter the remote cluster user name.

    ◦ **Remote user password**: Enter the remote cluster password.

    ◦ **Bulk volume write key**: Paste the key you generated on the destination cluster earlier.

17. Select **OK**.

Delete a volume snapshot

You can delete a volume snapshot from a cluster running NetApp Element software using the plug-in extension point. When you delete a snapshot, the system immediately removes it.

About this task

You can delete snapshots that are being replicated from the source cluster. If a snapshot is syncing to the target cluster when you delete it, the sync replication completes and the snapshot is deleted from the source cluster. The snapshot is not deleted from the target cluster.

You can also delete snapshots that have been replicated to the target from the target cluster. The deleted snapshot is kept in a list of deleted snapshots on the target until the system detects that you have deleted the snapshot on the source cluster. After the target has detected that you have deleted the source snapshot, the

target stops replication of the snapshot.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   > (i) If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. From the **Snapshots** sub-tab, select one of the following views:

   ◦ **Individual**: A list of volume snapshots that are not part of a group snapshot.

   ◦ **Inactive**: A list of volume snapshots that were created from volumes that have been deleted but not yet purged.

3. Select the check box for the volume snapshot you want to delete.

4. Select **Actions**.

5. In the resulting menu, select **Delete**.

6. Confirm the action.

Find more information

- [NetApp HCI Documentation](#)
- [SolidFire and Element Resources page](#)

Create and manage group snapshots in vCenter Server

You can create a group snapshot of a related set of volumes to preserve a point-in-time copy of the metadata for each volume. You can use the group snapshot as a backup or rollback to restore the state of the group of volumes to a desired point in time.

Options

- [Create a group snapshot](#)
- [View group snapshot details](#)
- [Clone volumes from a group snapshot](#)
- [Roll back volumes to a group snapshot](#)
- [Delete a group snapshot](#)

Create a group snapshot

You can create a snapshot of a group of volumes immediately or create a schedule to automate future snapshots of the group of volumes. A single group snapshot can consistently snapshot up to 32 volumes at one time.

You can later change replication settings or the retention period for a group snapshot. The retention period you specify begins when you enter the new interval. When you set a retention period, you can select a period that

begins at the current time (retention is not calculated from the snapshot creation time). You can specify intervals in minutes, hours, and days.

Steps

1. From the vCenter Plug-in, open the **Management** tab:

   - Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Management**.

   - For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Management**.

   > ⓘ If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Click the **Volumes** sub-tab.

3. From the **Active** view, select the check box for the volume to use for the snapshot.

4. Click **Actions**.

5. In the resulting menu, select **Create Group Snapshot**.

6. (Optional) In the Create Group Snapshot dialog box, enter a name for the snapshot.

   > 💡 Use descriptive naming best practices. This is especially important if multiple clusters or vCenter Servers are used in your environment. If you do not enter a name, the system creates a group snapshot default name using the date and time that the snapshot was created.

7. (Optional) Select the **Include snapshot in replication when paired** check box to ensure that the snapshot is replicated when the parent volume is paired.

8. Select one of the following as the retention period for the snapshot:

   - **Keep forever**: Retains the snapshot on the system indefinitely.

   - **Set retention period**: Determine a length of time (days, hours, or minutes) for the system to retain the snapshot.

   > ⓘ When you set a retention period, you select a period that begins at the current time. (Retention is not calculated from the snapshot creation time.)

9. To take a single, immediate snapshot, select **Take group snapshot now**.

10. To schedule the snapshot to run at a future time, complete the following steps:

    a. Select **Create snapshot schedule**.

    b. Enter a schedule name.

    c. Select a schedule type and configure the schedule details.

    d. (Optional) Select the check box for **Recurrent Schedule** to repeat the scheduled snapshot periodically.

11. Click **OK**.

View group snapshot details

You might want to verify that the snapshot was added.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

    ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

    ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

    > ⓘ   If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Click the **Group Snapshots** sub-tab.

3. Verify the snapshot details:

    ◦ **Create date**: The date and time when the group snapshot was created.

    ◦ **Status**: Displays the status of the snapshot on the remote cluster running NetApp Element software:

        ▪ **Preparing**: The snapshot is being prepared for use and is not yet writable.

        ▪ **Done**: This snapshot has finished preparation and is now usable.

        ▪ **Active**: The snapshot is the active branch.

    ◦ **Number of volumes**: Number of volumes in the group snapshot.

Clone volumes from a group snapshot

You can clone a group of volumes from a point-in-time group snapshot. After you create the volumes, you can use them like any other volume in the system.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

    ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

    ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

    > ⓘ   If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Click the **Group Snapshots** sub-tab.

3. Select the check box for the group snapshot to use for the volume clones.

4. Click **Actions**.

5. In the resulting menu, select **Clone Volumes from Group Snapshot**.

6. (Optional) Enter a new volume name prefix, which will be applied to all volumes created from the group snapshot.

7. (Optional) Select a different account to which the clone will belong. If you do not select an account, the system assigns the new volumes to the current volume account.

8. Select a different access method for the volumes in the clone. If you do not select a method, the system uses the current volume access:

    ◦ **Read Only**: Only read operations are allowed.

    ◦ **Read/Write**: All read and write operations are accepted.

- **Locked**: Only administrator access is allowed.

- **Replication Target**: Designated as a target volume in a replicated volume pair.

9. Click **OK**.

> ⓘ   Volume size and current cluster load affect the time needed to complete a cloning operation.

Roll back volumes to a group snapshot

You can roll back a group of active volumes to a group snapshot. This restores all the associated volumes in a group snapshot to their state at the time the group snapshot was created. This procedure also restores volume sizes to the size recorded in the original snapshot. If the system has purged a volume, all snapshots of that volume were also deleted at the time of the purge; the system does not restore any deleted volume snapshots.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

   - Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   - For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

     > ⓘ   If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Click the **Group Snapshots** sub-tab.

3. Select the check box for the group snapshot to use for the volume rollback.

4. Click **Actions**.

5. In the resulting menu, select **Rollback Volumes to Group Snapshot**.

6. (Optional) To save the current state of the volumes before rolling back to the snapshot:

   a. In the **Rollback to Snapshot** dialog box, select **Save volumes' current state as a group snapshot**.

   b. Enter a name for the new snapshot.

7. Click **OK**.

Delete a group snapshot

You can delete a group snapshot from the system. When you delete the group snapshot, you can choose whether all snapshots associated with the group are deleted or retained as individual snapshots.

If you delete a volume or snapshot that is a member of a group snapshot, you can no longer roll back to the group snapshot. However, you can roll back each volume individually.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

   - Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   - For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

> ⓘ If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Select the check box for the group snapshot you want to delete.

3. Click **Actions**.

4. In the resulting menu, select **Delete**.

5. Select one of the following options:
   - **Delete group snapshot and members**: Deletes the group snapshot and all member snapshots.
   - **Retain members**: Deletes the group snapshot but keeps all member snapshots.

6. Confirm the action.

Find more information

- NetApp HCI Documentation
- SolidFire and Element Resources page

Create snapshot schedules

You can schedule a snapshot of a volume to occur automatically at specified date and time intervals. You can schedule either single volume snapshots or group snapshots to run automatically.

When you create snapshot schedules, you can store the resulting snapshots on a remote NetApp Element storage system if the volume is being replicated.

> ⓘ Schedules are created using UTC+0 time. You may need to adjust the actual time a snapshot will run based on your time zone.

- Create a snapshot schedule
- View snapshot schedule details
- Edit a snapshot schedule
- Copy a snapshot schedule
- Delete a snapshot schedule

Create a snapshot schedule

You can schedule a snapshot of a volume or volumes to occur automatically at specified intervals.

When you configure a snapshot schedule, you can choose from time intervals based on days of the week or days of the month. You can also specify the days, hours, and minutes before the next snapshot occurs.

If you schedule a snapshot to run at a time period that is not divisible by 5 minutes, the snapshot will run at the next time period that is divisible by 5 minutes. For example, if you schedule a snapshot to run at 12:42:00 UTC, it will run at 12:45:00 UTC. You cannot schedule a snapshot to run at intervals of less than 5 minutes.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   ⓘ   If two or more clusters are added, ensure that the cluster that you intend to use is selected in the navigation bar.

2. Select the **Schedules** sub-tab.

3. Select **Create Schedule**.

4. In the **Volume IDs CSV** field, enter a single volume ID or a comma-separated list of volume IDs to include in the snapshot schedule operation.

5. Enter a schedule name.

6. Select a schedule type and configure the details.

7. (Optional) To repeat the schedule indefinitely, check **Recurring Schedule**.

8. (Optional) In the New Snapshot Name field, enter a name for the new snapshot.

   ⓘ   If you do not enter a name, the system creates a default snapshot name using the date and time the snapshot was created.

9. (Optional) Check **Include snapshot in replication when paired** to ensure that the snapshot is replicated when the parent volume is paired.

10. Select one of the following as the retention period for the snapshot:

    ◦ **Keep forever**: Retains the snapshot on the system indefinitely.

    ◦ **Set retention period**: Determine a length of time (days, hours, or minutes) for the system to retain the snapshot.

    ⓘ   When you set a retention period, you select a period that begins at the current time. (Retention is not calculated from the snapshot creation time.)

11. Select **OK**.

View snapshot schedule details

You might want to verify snapshot schedule details.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   ⓘ   If two or more clusters are added, ensure that the cluster that you intend to view is selected in the navigation bar.

2. Select the **Schedules** page.

3. Verify the schedule details.

Edit a snapshot schedule

You can modify existing snapshot schedules. After modification, the next time the schedule runs it uses the updated attributes. Any snapshots created by the original schedule remain on the storage system.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   > ⓘ If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Click the **Schedules** sub-tab.

3. Select the check box for the snapshot schedule you want to edit.

4. Click **Actions**.

5. In the resulting menu, select **Edit**.

6. In the **Volume IDs CSV** field, modify the single volume ID or comma-separated list of volume IDs currently included in the snapshot operation.

7. (Optional) To pause an active schedule or resume a paused schedule, select the **Manually Pause Schedule** check box.

8. (Optional) Enter a different name for the schedule in the **New Schedule Name** field.

9. (Optional) Change the current schedule type to one of the following:

   a. **Days of Week**: Select one of more days of the week and a time of day to create a snapshot.

   b. **Days of Month**: Select one of more days of the month and a time of day to create a snapshot.

   c. **Time Interval**: Select an interval for the schedule to run based on number of days, hours and minutes between snapshots.

10. (Optional) Select **Recurrent Schedule** to repeat the snapshot schedule indefinitely.

11. (Optional) Enter or modify the name for the snapshots defined by the schedule in the **New Snapshot Name** field.

    > ⓘ If you leave the field blank, the system uses the time and date of the snapshot's creation as the name.

12. (Optional) Select the **Include snapshots in replication when paired** check box to ensure that the snapshots are captured in replication when the parent volume is paired.

13. (Optional) Select one of the following as the retention period for the snapshot:

    ◦ **Keep forever**: Retains the snapshot on the system indefinitely.

    ◦ **Set retention period**: Determine a length of time (days, hours, or minutes) for the system to retain the snapshot.

> (i) When you set a retention period, you select a period that begins at the current time (retention is not calculated from the snapshot creation time).

14. Click **OK**.

Copy a snapshot schedule

You can make a copy of a snapshot schedule and assign it to new volumes or use it for other purposes.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   > (i) If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Click the **Schedules** sub-tab.

3. Select the check box for the snapshot schedule you want to copy.

4. Click **Actions**.

5. In the resulting menu, click **Copy**.
   The Copy Schedule dialog box appears, populated with the current attributes of the schedule.

6. (Optional) Enter a name and update attributes for the copy of the schedule.

7. Click **OK**.

Delete a snapshot schedule

You can delete a snapshot schedule. After you delete the schedule, it does not run any future scheduled snapshots. Any snapshots that were created by the schedule remain on the storage system.

Steps

1. From the vCenter Plug-in, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   > (i) If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Click the **Schedules** sub-tab.

3. Select the check box for the snapshot schedule you want to delete.

4. Click **Actions**.

5. In the resulting menu, click **Delete**.

6. Confirm the action.

Find more information

- [NetApp HCI Documentation](#)
- [SolidFire and Element Resources page](#)

Perform remote replication between clusters

For clusters running NetApp Element software, real-time replication enables the quick creation of remote copies of volume data. You can pair a storage cluster with up to four other storage clusters.

You can replicate volume data synchronously or asynchronously from either cluster in a cluster pair for failover and failback scenarios. You must first pair two NetApp Element clusters and then pair volumes on each cluster to take advantage of real-time remote replication.

What you'll need

- Ensure that you have added at least one cluster to the plug-in.
- Ensure that all node IP addresses on both management and storage networks for paired clusters are routed to each other.
- Ensure that the MTU of all paired nodes are the same and be supported end-to-end between clusters.
- Ensure that the difference between NetApp Element software versions on the clusters is no greater than one major version. If the difference is greater, one of the clusters must be upgraded to perform data replication.

> ⓘ WAN Accelerator appliances have not been qualified by NetApp for use when replicating data. These appliances can interfere with compression and deduplication if deployed between two clusters that are replicating data. Be sure to fully qualify the effects of any WAN Accelerator appliance before you deploy it in a production environment.

Steps

1. [Pair clusters](#)
2. [Pair volumes](#)
3. [Validate volume replication](#)
4. [Delete a volume relationship after replication](#)
5. [Manage volume relationships](#)

Pair clusters

You must pair two clusters as a first step to using real-time replication functionality. After you pair and connect two clusters, you can configure active volumes on one cluster to be continuously replicated to a second cluster, providing continuous data protection (CDP).

You can pair a source and target cluster using the MVIP of the target cluster if there is Cluster Admin access to both clusters. If Cluster Admin access is only available on one cluster in a cluster pair, a pairing key can be used on the target cluster to complete the cluster pairing.

What you'll need

- You need Cluster Admin privileges to one or both clusters being paired.

- Ensure there is less than 2000 ms of round-trip latency between clusters.
- Ensure that the difference between NetApp Element software versions on the clusters is no greater than one major version.
- Ensure that all node IPs on paired clusters are routed to each other.

> (i) Cluster pairing requires full connectivity between nodes on the management network. Replication requires connectivity between the individual nodes on the storage cluster network.

You can pair one NetApp Element cluster with up to four other clusters for replicating volumes. You can also pair clusters within the cluster group with each other.

Choose one of the following methods:

- Pair clusters using known credentials
- Pair clusters with a pairing key

Pair clusters using known credentials

You can pair two clusters for real-time replication by using the MVIP of one cluster to establish a connection with the other cluster. Cluster Admin access on both clusters is required to use this method.

About this task

The Cluster Admin user name and password is used to authenticate cluster access before the clusters can be paired.

If the MVIP is not known, or access to the cluster is not available, you can pair the cluster by generating a pairing key and use the key to pair the two clusters. For instructions, see Pair clusters with a pairing key.

Steps

1. In your vSphere Web Client, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Configuration > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Configuration > Protection**.

   > (i) If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Select the **Cluster Pairs** sub-tab.

3. Select **Create Cluster Pairing**.

4. Select one of the following:

   ◦ **Registered Cluster**: If the remote cluster of the pairing is controlled by the same instance of the Element vCenter plug-in, select this.

   ◦ **Credentialed Cluster**: If the remote cluster has known credentials that are outside of the Element vCenter plug-in configuration, select this.

5. If you selected **Registered Cluster**, select a cluster from the list of available clusters and click **Pair**.

6. If you selected **Credentialed Cluster**, do the following:

   a. Enter the remote cluster MVIP address.

b. Enter a cluster administrator user name.

c. Enter a cluster administrator password.

d. Select **Start Pairing**.

7. After the task completes and you see the Cluster Pairs page, verify that the cluster pair is connected.

8. (Optional) On the remote cluster, verify that the cluster pair is connected by using the Element UI or the plug-in extension points:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection > Cluster Pairs**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection > Cluster Pairs**.

Pair clusters with a pairing key

If you have Cluster Admin access to a local cluster but not the remote cluster, you can pair the clusters using a pairing key. A pairing key is generated on a local cluster and then sent securely to a Cluster Admin at a remote site to establish a connection and complete the cluster pairing for real-time replication.

This procedure describes cluster pairing between two clusters using vCenter on the local and remote sites. For clusters not controlled by the vCenter Plug-in, you can alternatively start or complete cluster pairing using the Element web UI.

Steps

1. From the vCenter that contains the local cluster, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   > (i) If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Select the **Cluster Pairs** sub-tab.

3. Select **Create Cluster Pairing**.

4. Select **Inaccessible Cluster**.

5. Select **Generate Key**.

   > (i) This action generates a text key for pairing and creates an unconfigured cluster pair on the local cluster. If you do not complete the procedure, you will need to manually delete the cluster pair.

6. Copy the cluster pairing key to your clipboard.

7. Select **Close**.

8. Make the pairing key accessible to the Cluster Admin at the remote cluster site.

   > (i) The cluster pairing key contains a version of the MVIP, user name, password, and database information to permit volume connections for remote replication. This key should be treated in a secure manner and not stored in a way that would allow accidental or unsecured access to the user name or password.

> **(i)** Do not modify any of the characters in the pairing key. The key becomes invalid if it is modified.

9. From the vCenter that contains the remote cluster, open the Protection tab.

> **(i)** If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

> **(i)** You can alternatively complete the pairing using the Element UI.

10. Select the **Cluster Pairs** sub-tab.

11. Select **Complete Cluster Pairing**.

> **(i)** Wait for the loading spinner to disappear before proceeding to the next step. If an unexpected error occurs during the pairing process, check for and manually delete any unconfigured cluster pairs on the local and remote cluster and perform the pairing again.

12. Paste the pairing key from the local cluster in the **Cluster Pairing Key** field.

13. Select **Pair Cluster**.

14. After the task completes and you see the **Cluster Pair** page, verify that the cluster pair is connected.

15. To verify that the cluster pair is connected, on the remote cluster open the Protection tab or use the Element UI.

Validate the cluster pair connections

After the cluster pairing has completed, you might want to verify the cluster pair connection to ensure replication success.

Steps

1. On the local cluster, select **Data Protection** > **Cluster Pairs**.

2. Verify that the cluster pair is connected.

3. Navigate back to the local cluster and the **Cluster Pairs** window and verify that the cluster pair is connected.

Pair volumes

After you have established a connection between clusters in a cluster pair, you can pair a volume on one cluster with a volume on the other cluster in the pair.

You can pair the volume using one of the following methods:

- Pair volumes using known credentials: Use known credentials for both clusters

- Pair volumes using a pairing key: Use a pairing key if cluster credentials are available only on the source cluster.

- Create target volumes and pair them with local volumes: If you know the credentials for both clusters, create a replication target volume on the remote cluster to pair with the source cluster.

After a volume pairing relationship is established, you must identify which volume is the replication target:

- [Assign a replication source and target to paired volumes](#)

What you'll need

- You should have established a connection between clusters in a cluster pair.
- You need to have Cluster admin privileges to one or both clusters being paired.

Pair volumes using known credentials

You can pair a local volume with another volume on a remote cluster. Use this method if there is Cluster Admin access to both clusters on which volumes are to be paired. This method uses the volume ID of the volume on the remote cluster to initiate a connection.

Before you begin

- You have Cluster Admin credentials for the remote cluster.
- Ensure that the clusters containing the volumes are paired.
- You know the remote Volume ID unless you intend to create a new volume during this process.
- If you intend for the local volume to be the source, ensure that the access mode of the volume is set to Read/Write.

Steps

1. From the vCenter that contains the local cluster, open the **Management** tab:

   - Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Management**.
   - For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Management**.

   > ⓘ If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Select the **Volumes** sub-tab.
3. From the **Active** view, select the check box for the volume that you want to pair.
4. Select **Actions**.
5. Select **Volume Pairing**.
6. Select one of the following:

   - **Volume Creation**: To create a replication target volume on the remote cluster, select this. This method can be used only on remote clusters that are controlled by a Element vCenter plug-in.
   - **Volume Selection**: If the remote cluster for the target volume is controlled by a Element vCenter plug-in, select this.
   - **Volume ID**: If the remote cluster for the target volume has known credentials that are outside of the Element vCenter plug-in configuration, select this.

7. Select a Replication Mode:

   - **Real-time (Synchronous)**: Writes are acknowledged to the client after they are committed on both of the source and target clusters.
   - **Real-time (Asynchronous)**: Writes are acknowledged to the client after they are committed on the source cluster.
   - **Snapshots Only**: Only snapshots created on the source cluster are replicated. Active writes from the

source volume are not replicated.

8. If you selected **Volume Creation** as the pairing mode option, do the following:

   a. Select a paired cluster from the drop-down list.

   > (i) This action populates the available accounts on the cluster to be selected in the next step.

   b. Select an account on the target cluster for the replication target volume.

   c. Enter a replication target volume name.

   > (i) Volume size cannot be adjusted during this process.

9. If you selected **Volume Selection** as the pairing mode option, do the following:

   a. Select a paired cluster.

   > (i) This action populates the available volumes on the cluster to be selected in the next step.

   b. (Optional) Select the **Set remote volume to Replication Target** option if you want to set the remote volume as the target in the volume pairing. The local volume, if set to read/write, becomes the source in the pair.

   > (i) If you assign an existing volume as the replication target, the data on that volume will be overwritten. As a best practice, you should use a new volume as the replication target.

   > (i) You can also assign replication source and target later in the pairing process from **Volumes** > **Actions** > **Edit**. You must assign a source and target to complete the pairing.

   c. Select a volume from the list of available volumes.

10. If you selected **Volume ID** as the pairing mode option, do the following:

    a. Select a paired cluster from the drop-down list.

    b. If the cluster is not registered with the plug-in, enter a cluster administrator user ID and a cluster administrator password.

    c. Enter a volume ID.

    d. Select the **Set remote volume to Replication Target** option if you want to set the remote volume as the target in the volume pairing. The local volume, if set to read/write, becomes the source in the pair.

    > (i) If you assign an existing volume as the replication target, the data on that volume will be overwritten. As a best practice, you should use a new volume as the replication target.

    > (i) You can also assign replication source and target later in the pairing process from **Volumes** > **Actions** > **Edit**. You must assign a source and target to complete the pairing.

11. Select **Pair**.

(i) After you confirm the pairing, the two clusters begin the process of connecting the volumes. During the pairing process, you can see progress messages in the Volume Status column on the Volume Pairs page.

(i) If you have not yet assigned a volume to be the replication target, the pairing configuration is not complete. The volume pair displays PausedMisconfigured until the volume pair source and target are assigned. You must assign a source and target to complete the volume pairing.

12. Select **Protection** > **Volume Pairs** on either cluster.

13. Verify the status of the volume pairing.

Pair volumes using a pairing key

You can pair a local volume with another volume on a remote cluster using a pairing key. Use this method if there is Cluster Admin access to only the source cluster. This method generates a pairing key that can be used on the remote cluster to complete the volume pair.

Before you begin

- Ensure that the clusters containing the volumes are paired.

- **Best Practices**: Set the source volume to Read/Write and the target volume to Replication Target. The target volume should contain no data and have the exact characteristics of the source volume, such as size, 512e setting, and QoS configuration. If you assign an existing volume as the replication target, the data on that volume will be overwritten. The target volume may be greater or equal in size to the source volume, but it cannot be smaller.

About this task

This procedure describes volume pairing between two volumes using vCenter on the local and remote sites. For volumes not controlled by the vCenter Plug-in, you can alternately start or complete volume pairing using the Element web UI.

For instructions on starting or completing volume pairing from the Element web UI, see NetApp Element software documentation.

(i) The volume pairing key contains an encrypted version of the volume information and may contain sensitive information. Share this key only in a secure manner.

Steps

1. From the vCenter that contains the local cluster, open the **Management** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Management**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Management**.

     (i) If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Select the **Volumes** sub-tab.

3. From the **Active** view, select the check box for the volume that you want to pair.

4. Select **Actions**.

5. Select **Volume Pairing**.

6. Select **Inaccessible Cluster**.

7. Select a Replication Mode:

   ○ **Real-time (Synchronous)**: Writes are acknowledged to the client after they are committed on both of the source and target clusters.

   ○ **Real-time (Asynchronous)**: Writes are acknowledged to the client after they are committed on the source cluster.

   ○ **Snapshots Only**: Only snapshots created on the source cluster are replicated. Active writes from the source volume are not replicated.

8. Select **Generate Key**.

   > (i) This action generates a text key for pairing and creates an unconfigured volume pair on the local cluster. If you don't do this, you will need to manually delete the volume pair.

9. Copy the pairing key to your clipboard.

10. Select **Close**.

11. Make the pairing key accessible to the Cluster Admin at the remote cluster site.

    > (i) The volume pairing key should be treated in a secure manner and not stored in a way that would allow accidental or unsecured access.

    > (i) Do not modify any of the characters in the pairing key. The key becomes invalid if it is modified.

12. From the vCenter that contains the remote cluster, open the Management tab.

    > (i) If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

13. Select the **Volumes** sub-tab.

14. From the **Active** view, select the check box for the volume you want to pair.

15. Select **Actions**.

16. Select **Volume Pairing**.

17. Select **Complete Cluster Pairing**.

18. Paste the pairing key from the other cluster into the **Pairing Key** box.

19. Select **Complete Pairing**.

    > (i) After you confirm the pairing, the two clusters begin the process of connecting the volumes. During the pairing process, you can see progress messages in the Volume Status column of the Volume Pairs page. If an unexpected error occurs during the pairing process, check for and manually delete any unconfigured cluster pairs on the local and remote cluster and perform the pairing again.

(i) If you have not yet assigned a volume to be the replication target, the pairing configuration is not complete. The volume pair displays "PausedMisconfigured" until the volume pair source and target are assigned. You must assign a source and target to complete the volume pairing.

20. Select **Protection** > **Volume Pairs** on either cluster.

21. Verify the status of the volume pairing.

(i) Volumes that are paired using a pairing key appear after the pairing process has been completed at the remote location.

Create target volumes and pair them with local volumes

You can pair two or more local volumes with associated target volumes on a remote cluster. This process creates a replication target volume on the remote cluster for each local source volume you select. Use this method if there is Cluster Admin access to both clusters on which volumes are to be paired and remote cluster is controlled by the plug-in.

This method uses the volume ID of each volume on the remote cluster to initiate one or more connections.

Before you begin

- Ensure that you have Cluster Admin credentials for the remote cluster.
- Ensure that the clusters containing the volumes are paired using the plug-in.
- Ensure that the remote cluster is controlled by the plug-in.
- Ensure that the access mode of each local volume is set to Read/Write.

Steps

1. From the vCenter that contains the local cluster, open the **Management** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Management**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Management**.

   (i) If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Select the **Volumes** sub-tab.

3. From the **Active** view, select two or more volumes that you want to pair.

4. Select **Actions**.

5. Select **Volume Pairing**.

6. Select a **Replication Mode**:

   ◦ **Real-time (Synchronous)**: Writes are acknowledged to the client after they are committed on both of the source and target clusters.

   ◦ **Real-time (Asynchronous)**: Writes are acknowledged to the client after they are committed on the source cluster.

   ◦ **Snapshots Only**: Only snapshots created on the source cluster are replicated. Active writes from the source volume are not replicated.

7. Select a paired cluster from the drop-down list.

8. Select an account on the target cluster for the replication target volume.

9. (Optional) Type a prefix or suffix for the new volume names on the target cluster.

> ℹ️ A sample volume name with the modified name appears.

10. Select **Create Pairs**.

> ℹ️ After you confirm the pairing, the two clusters begin the process of connecting the volumes. During the pairing process, you can see progress messages in the Volume Status column on the Volume Pairs page. After the process completes, new target volumes are created and connected on the remote cluster.

11. Select **Protection** > **Volume Pairs** on either cluster.

12. Verify the status of the volume pairing.

Assign a replication source and target to paired volumes

If you did not assign a volume to be the replication target during volume pairing, configuration is not complete. You can use this procedure to assign a source volume and its replication target volume. A replication source or target can be either volume in a volume pair.

You can also use this procedure to redirect data from a source volume to a remote target volume should the source volume become unavailable.

Before you begin

You have access to the clusters containing the source and target volumes.

About this task

This procedure describes assigning source and replication volumes between two clusters using vCenter on the local and remote sites. For volumes not controlled by the vCenter Plug-in, you can alternately assign a source or replication volume using the Element web UI.

A replication source volume has read/write account access. A replication target volume can only be accessed by the replication source as read/write.

Best Practices: The target volume should contain no data and have the exact characteristics of the source volume, such as size, 512e setting, and QoS configuration. The target volume may be greater or equal in size to the source volume, but it cannot be smaller.

Steps

1. Select the cluster that contains the paired volume that you want to use as the replication source from the plug-in extension point:

   ◦ Beginning with Element vCenter plug-in 5.0 From the **NetApp Remote Plugin > Management**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management**.

2. From the extension point for your Element Plug-in for vCenter Server version, select the **Management** tab.

3. Select the **Volumes** sub-tab.

4. From the **Active** view, select the check box for the volume that you want to edit.

5. Select **Actions**.

6. Select **Edit**.

7. From the Access drop-down list, select **Read/Write**.

> ⓘ   If you are reversing source and target assignment, this action will cause the volume pair to display PausedMisconfigured until a new replication target is assigned. Changing access pauses volume replication and causes the transmission of data to cease. Be sure that you have coordinated these changes at both sites.

8. Select **OK**.

9. Select the cluster containing the paired volume that you want to use as the replication target:

   - For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Management > Management**.

   - Beginning with Element vCenter plug-in 5.0 From the **NetApp Remote Plugin > Management > Management**.

10. Select the **Volumes** sub-tab.

11. From the **Active** view, select the check box for the volume you want to edit.

12. Select **Actions**.

13. Select **Edit**.

14. In the **Access** drop-down list, select **Replication Target**.

> ⓘ   If you assign an existing volume as the replication target, the data on that volume will be overwritten. As a best practice, you should use a new volume as the replication target.

15. Select **OK**.

Validate volume replication

After a volume is replicated, you should ensure that the source and target volumes are active. When in Active state, volumes are paired, data is being sent from the source to the target volume, and the data is in sync.

Steps

1. From the vCenter that contains the local cluster, open the **Protection** tab:

   - Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   - For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   > ⓘ   If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Select the **Volume Pairs** sub-tab.

3. Verify that the volume status is Active.

Delete a volume relationship after replication

After replication completes and you no longer need the volume pairing relationship, you can delete the volume relationship.

See [Delete a volume pair](#).

Manage volume relationships

You can manage volume relationships in many ways, such as pausing replication, reversing volume pairing, changing the mode of replication, deleting a volume pair, or deleting a cluster pair.

- [Pause replication](#)
- [Change the mode of replication](#)
- [Delete a volume pair](#)
- [Delete a cluster pair](#)

Pause replication

You can edit volume pair properties to manually pause replication.

Steps

1. From the vCenter that contains the local cluster, open the **Protection** tab:

   - Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   - For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   > ⓘ If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Select the **Volume Pairs** sub-tab.

3. Select the check box for the volume pair you want to edit.

4. Select **Actions**.

5. Select **Edit**.

6. Manually pause or start the replication process.

   > ⓘ Pausing or resuming volume replication manually will cause the transmission of data to cease or resume. Be sure that you have coordinated these changes at both sites.

7. Select **Save Changes**.

Change the mode of replication

You can edit volume pair properties to make changes to the replication mode of the volume pair relationship.

Steps

1. From the vCenter that contains the local cluster, open the **Protection** tab:

   - Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   - For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

> ⓘ If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Select the **Volume Pairs** sub-tab.

3. Select the check box for the volume pair you want to edit.

4. Select **Actions**.

5. Select **Edit**.

6. Select a new replication mode:

   > ⓘ Changing the mode of replication causes the mode to change immediately. Be sure that you have coordinated these changes at both sites.

   ◦ **Real-time (Synchronous)**: Writes are acknowledged to the client after they are committed on both the source and target clusters.

   ◦ **Real-time (Asynchronous)**: Writes are acknowledged to the client after they are committed on the source cluster.

   ◦ **Snapshots Only**: Only snapshots created on the source cluster are replicated. Active writes from the source volume are not replicated.

7. Select **Save Changes**.

Delete a volume pair

You can delete a volume pair if you want to remove a pair association between two volumes.

About this task

This procedure describes deleting a volume pairing relationship between two volumes using vCenter on the local and remote sites.

For volumes not controlled by the vCenter Plug-in, you can alternatively delete a volume pair end using the Element web UI.

Steps

1. From the vCenter that contains the local cluster, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

   > ⓘ If two or more clusters are added, ensure that the cluster you intend to use for the task is selected in the navigation bar.

2. Select the **Volume Pairs** sub-tab.

3. Select one or more volume pairs you want to delete.

4. Select **Actions**.

5. Select **Delete**.

6. Confirm the details of each volume pair.

> (i) For clusters that are not managed by the plug-in, this action deletes only the volume pair end on the local cluster. You need to manually delete the volume pair end from the remote cluster to fully remove the pairing relationship.

7. (Optional for clusters managed by plug-in) Select the check box for **Change Replication Target Access to** and select a new access mode for the replication target volume. This new access mode will be applied after the volume pairing relationship has been removed.

8. Select **Yes**.

Delete a cluster pair

You can delete a cluster pairing relationship between two clusters using vCenter on the local and remote sites. To completely remove a cluster pairing relationship, you must remove cluster pair ends from both the local and remote clusters.

You can use the vCenter Plug-in to delete a cluster pair end.

For clusters not controlled by the vCenter Plug-in, you can alternatively delete a cluster pair end using the Element web UI.

Steps

1. From the vCenter that contains the local cluster, open the **Protection** tab:

   ◦ Beginning with Element vCenter plug-in 5.0, select **NetApp Element Remote Plugin > Management > Protection**.

   ◦ For Element vCenter plug-in 4.10 and earlier, select **NetApp Element Management > Protection**.

2. Select the **Cluster Pairs** sub-tab.

3. Select the check box for the cluster pair you want to delete.

4. Select **Actions**.

5. Select **Delete**.

6. Confirm action.

> (i) This action deletes only the cluster pair end on the local cluster. You need to manually delete the cluster pair end from the remote cluster to fully remove the pairing relationship.

7. Repeat the steps from the remote cluster in the cluster pairing.

Volume pairing messages and warnings

You can view the information for volumes that have been paired or are in the process of being paired on the Volume Pairs page of the Protection tab from the plug-in extension point. Beginning with Element vCenter plug-in 5.0, select the Management tab from the NetApp Element Remote Plugin extension point. For Element vCenter plug-in 4.10 and earlier, select the NetApp Element Management extension point.

The system displays pairing and progress messages in the Volume Status column.

- Volume pairing messages
- Volume pairing warnings

Volume pairing messages

You can view messages during the initial pairing process on the Volume Pairs page of the Protection tab from the plug-in extension point. These messages are displayed in the Volume Status column and can display on both source and target ends of the pairing.

- **PausedDisconnected**: Source replication or sync RPCs timed out. Connection to the remote cluster has been lost. Check network connections to the cluster.

- **ResumingConnected***: The remote replication sync is now active. Beginning the sync process and waiting for data.

- **ResumingRRSync***: A single helix copy of the volume metadata is being made to the paired cluster.

- **ResumingLocalSync***: A double helix copy of the volume metadata is being made to the paired cluster.

- **ResumingDataTransfer***: Data transfer has been resumed.

- **Active**: Volumes are paired and data is being sent from the source to the target volume and the data is in sync.

- **Idle**: No replication activity is occurring.

*This process is driven by the target volume and might not display on the source volume.

Volume pairing warnings

You can view warning messages after you pair volumes on the Volume Pairs page of the Protection tab from the plug-in extension point. These messages are displayed in the Volume Status column and can display on both source and target ends of the pairing.

These messages can display on both source and target ends of the pairing unless otherwise indicated.

- **PausedClusterFull**: Because the target cluster is full, source replication and bulk data transfer cannot proceed. The message displays on the source end of the pair only.

- **PausedExceededMaxSnapshotCount**: The target volume already has the maximum number of snapshots and cannot replicate additional snapshots.

- **PausedManual**: Local volume has been manually paused. It must be unpaused before replication resumes.

- **PausedManualRemote**: Remote volume is in manual paused mode. Manual intervention required to unpause the remote volume before replication resumes.

- **PausedMisconfigured**: Waiting for an active source and target. Manual intervention required to resume replication.

- **PausedQoS**: Target QoS could not sustain incoming IO. Replication auto-resumes. The message displays on the source end of the pair only.

- **PausedSlowLink**: Slow link detected and stopped replication. Replication auto-resumes. The message displays on the source end of the pair only.

- **PausedVolumeSizeMismatch**: Target volume is smaller than the source volume.

- **PausedXCopy**: A SCSI XCOPY command is being issued to a source volume. The command must complete before replication can resume. The message displays on the source end of the pair only.

- **StoppedMisconfigured**: A permanent configuration error has been detected. The remote volume has been purged or unpaired. No corrective action is possible; a new pairing must be established.

Find more information

- NetApp HCI Documentation
- SolidFire and Element Resources page