Move and copy volumes

ONTAP 9

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Move a FlexVol volume overview

You can move or copy volumes for capacity utilization, improved performance, and to satisfy service-level agreements.

Knowing how moving a FlexVol volume works helps you to determine whether the volume move satisfies service-level agreements and to understand where a volume move is in the volume move process.

FlexVol volumes are moved from one aggregate or node to another within the same storage virtual machine (SVM). A volume move does not disrupt client access during the move.

Moving a volume occurs in multiple phases:

- A new volume is made on the destination aggregate.
- The data from the original volume is copied to the new volume.

  During this time, the original volume is intact and available for clients to access.

- At the end of the move process, client access is temporarily blocked.

  During this time the system performs a final replication from the source volume to the destination volume, swaps the identities of the source and destination volumes, and changes the destination volume to the source volume.

- After completing the move, the system routes client traffic to the new source volume and resumes client access.

The move is not disruptive to client access because the time in which client access is blocked ends before clients notice a disruption and time out. Client access is blocked for 35 seconds by default. If the volume move operation cannot finish in the time that access is denied, the system aborts this final phase of the volume move operation and allows client access. The system attempts the final phase three times by default. After the third attempt, the system waits an hour before attempting the final phase sequence again. The system runs the final phase of the volume move operation until the volume move is complete.

Considerations and recommendations when moving volumes

Moving a volume has many considerations and recommendations that are influenced by the volume you are moving or by the system configuration, such as a MetroCluster configuration. You should understand the considerations and recommendations associated with moving volumes.

General considerations and recommendations

- If you are upgrading the release family for a cluster, do not move a volume until after you upgrade all of the nodes in the cluster.

  This recommendation prevents you from inadvertently attempting to move a volume from a newer release

family to an older release family.

- The source volume must be consistent.
- If you have assigned one or more aggregates to the associated storage virtual machine (SVM), the destination aggregate must be one of the assigned aggregates.
- You cannot move a volume to or from a taken-over CFO aggregate.
- If a volume that contains LUNs is not NVFAIL enabled before you move it, the volume will be NVFAIL enabled after you move it.
- You can move a volume from a Flash Pool aggregate to another Flash Pool aggregate.
  - The caching policies of that volume are also moved.
  - The move might affect volume performance.
- You can move volumes between a Flash Pool aggregate and a non-Flash Pool aggregate.
  - If you move a volume from a Flash Pool aggregate to a non-Flash Pool aggregate, ONTAP displays a message warning you that the move might affect volume performance and asks whether you want to continue.
  - If you move a volume from a non-Flash Pool aggregate to a Flash Pool aggregate, ONTAP assigns the `auto` caching policy.
- Volumes have the data-at-rest protections of the aggregate they reside on. If you move a volume from an aggregate that consists of NSE drives to one that does not, the volume no longer has NSE data-at-rest protection.

FlexClone volume considerations and recommendations

- FlexClone volumes cannot be offline when they are being moved.
- You can move FlexClone volumes from one aggregate to another aggregate on the same node or another node in the same SVM without splitting.
- FlexClone volume Snapshot copies are not lost after moving a clone.
- You can move FlexClone parent volumes from one aggregate to another aggregate.

  When you move a FlexClone parent volume, a temporary volume is left behind that acts as a parent volume for all FlexClone volumes. No operations are allowed on the temporary volume except to take it offline or to delete it. After all FlexClone volumes are either split or destroyed, the temporary volume is cleaned up automatically.

- After you move a FlexClone child volume, the volume is no longer a FlexClone volume.
- FlexClone move operations are mutually exclusive from FlexClone copy or split operations.
- If a clone-splitting operation is in progress, moving a volume might fail.

  You should not move a volume until clone-splitting operations are completed.

MetroCluster configuration considerations

- During a volume move in a MetroCluster configuration, when a temporary volume is created on the destination aggregate on the source cluster a record of the temporary volume corresponding to the volume in the mirrored, but unassimilated, aggregate is also created on the surviving cluster.
- If a MetroCluster switchover occurs before the cutover, the destination volume has a record and is a

temporary volume (a volume of type TMP).

Move job restarts on the surviving (disaster recovery) cluster, reports a failure, and cleans up all move-related items including the temporary volume. In any event where cleanup cannot be done correctly, an EMS is generated alerting the system administrator to do the necessary cleanup.

- If a MetroCluster switchover occurs after the cutover phase has started but before the move job has completed (that is, the move reached a stage where it can update the cluster to point to the destination aggregate), the move job restarts on the surviving (disaster recovery) cluster and runs to completion.

  All move-related items are cleaned up including the temporary volume (original source). In any event where cleanup cannot be done correctly, an EMS is generated alerting the system administrator to do the necessary cleanup.

- Neither forced nor unforced MetroCluster switchbacks are allowed if there are any volume move operations in progress for volumes belonging to the switched over site.

  Switchbacks are not blocked when volume move operations are in progress for volumes local to the surviving site.

- Unforced MetroCluster switchovers are blocked, but forced MetroCluster switchovers are not blocked if there are any volume move operations in progress.

Requirement for moving volumes in SAN environments

Before you move a volume that contains LUNs or namespaces, you must meet certain requirements.

- For volumes containing one or more LUNs, you should have a minimum of two paths per LUN (LIFs) connecting to each node in the cluster.

  This eliminates single points of failure and enables the system to survive component failures.

- For volumes containing namespaces, the cluster must be running ONTAP 9.6 or later.

  Volume move is not supported for NVMe configurations running ONTAP 9.5.

Move a volume

You can move a FlexVol volume to a different aggregate, node, or both within the same storage virtual machine (SVM) to balance storage capacity after determining that there is a storage capacity imbalance.

About this task

By default, if the cutover operation fails to complete within 30 seconds, it will retry. You can adjust the default behavior by using the `-cutover-window` and `-cutover-action` parameters, both of which require advanced privilege level access. For details, see the `volume move start` man page.

Steps

1. If you are moving a data protection mirror and you have not initialized the mirror relationship, initialize the mirror relationship by using the `snapmirror initialize` command.

Data protection mirror relationships must be initialized before you can move one of the volumes.

2. Determine an aggregate to which you can move the volume by using the `volume move target-aggr show` command.

   The aggregate that you select must have enough space for the volume; that is, the available size is bigger than the volume that you are moving.

   The following example shows that the vs2 volume can be moved to any of the listed aggregates:

   ```
   cluster1::> volume move target-aggr show -vserver vs2 -volume user_max
   Aggregate Name    Available Size    Storage Type
   --------------    --------------    ------------
   aggr2             467.9GB           hdd
   node12a_aggr3     10.34GB           hdd
   node12a_aggr2     10.36GB           hdd
   node12a_aggr1     10.36GB           hdd
   node12a_aggr4     10.36GB           hdd
   5 entries were displayed.
   ```

3. Verify that the volume can be moved to the intended aggregate by using the `volume move start -perform-validation-only` command to run a validation check.

4. Move the volume by using the `volume move start` command.

   The following command moves the user_max volume on the vs2 SVM to the node12a_aggr3 aggregate. The move runs as a background process.

   ```
   cluster1::> volume move start -vserver vs2 -volume user_max
   -destination-aggregate node12a_aggr3
   ```

5. Determine the status of the volume move operation by using the `volume move show` command.

   The following example shows the state of a volume move that completed the replication phase and is in the cutover phase:

   ```
   cluster1::> volume move show
   Vserver    Volume      State     Move Phase    Percent-Complete Time-To-
   Complete
   ---------  ----------  --------  ----------    ----------------
   ---------------
   vs2        user_max    healthy   cutover       -                    -
   ```

   The volume move is complete when it no longer appears in the `volume move show` command output.

Commands for moving volumes

There are specific ONTAP commands for managing volume movement.

If you want to…	Use this command…
Abort an active volume move operation.	`volume move abort`
Show status of a volume moving from one aggregate to another aggregate.	`volume move show`
Start moving a volume from one aggregate to another aggregate.	`volume move start`
Manage target aggregates for volume move.	`volume move target-aggr`
Trigger cutover of a move job.	`volume move trigger-cutover`
Change the amount of time client access is blocked if the default is not adequate.	`volume move start` or `volume move modify` with the `-cutover-window` parameter. The `volume move modify` command is an advanced command and the `-cutover-window` is an advanced parameter.
Determine what the system does if the volume move operation cannot be completed during the time client access is blocked.	`volume move start` or `volume move modify` with the `-cutover-action` parameter. The `volume move modify` command is an advanced command and the `-cutover-action` is an advanced parameter.

See the man page for each command for more information.

Methods for copying a volume

Copying a volume creates a stand-alone copy of a volume that you can use for testing and other purposes. The method you use to copy a volume depends on the use case.

The method you use for copying a volume depends on whether you are copying it to the same aggregate or a different aggregate, and whether you want to retain Snapshot copies from the original volume. The following table lists characteristics of the copy and the methods used to create that copy.

If you want to copy a volume…	Then the method you use is…
Within the same aggregate and you do not want to copy Snapshot copies from the original volume.	Creating a FlexClone volume of the original volume.

If you want to copy a volume…	Then the method you use is…
To another aggregate and you do not want to copy Snapshot copies from the original volume.	Creating a FlexClone volume of the original volume, and then moving the volume to another aggregate by using the `volume move` command.
To another aggregate and preserve all of the Snapshot copies from the original volume.	Replicating the original volume using SnapMirror, and then breaking the SnapMirror relationship to make a read-write volume copy.