



# Features supported by FlexClone files and FlexClone LUNs

ONTAP 9

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# Features supported by FlexClone files and FlexClone LUNs

## Features supported by FlexClone files and FlexClone LUNs

FlexClone files and FlexClone LUNs work with different ONTAP features, such as deduplication, Snapshot copies, quotas, and volume SnapMirror.

The following features are supported by FlexClone files and FlexClone LUNs:

- Deduplication
- Snapshot copies
- Access control lists
- Quotas
- FlexClone volumes
- NDMP
- Volume SnapMirror
- The `volume move` command
- Space reservation
- HA configuration

## Deduplication with FlexClone files and FlexClone LUNs

You can efficiently use the physical storage space of the data blocks by creating a FlexClone file or FlexClone LUN of the parent file and parent LUN in a deduplication-enabled volume.

The block-sharing mechanism used by FlexClone files and LUNs is also used by deduplication. You can maximize the space savings in a FlexVol volume by enabling deduplication on the volume and then cloning the deduplication-enabled volume.



While executing the `sis undo` command on a deduplication-enabled volume, you cannot create FlexClone files and FlexClone LUNs of the parent files and parent LUNs residing in that volume.

## How Snapshot copies work with FlexClone files and FlexClone LUNs

There is a synergy between Snapshot copies and the FlexClone files and FlexClone LUNs. If you work with these technologies, you should be aware of what is possible as well as the relevant restrictions.

### Creating FlexClone files and LUNs

You can create a FlexClone file or FlexClone LUN from an existing Snapshot copy. The copy is based on the parent files and parent LUNs contained in a FlexVol volume.

### **Deleting a Snapshot copy**

You cannot manually delete a Snapshot copy from which FlexClone files or FlexClone LUNs are currently being created. The Snapshot copy remains locked until the background block-sharing process is completed. If you try to delete a locked Snapshot copy, the system displays a message asking you to retry the operation after some amount of time. In this case, you need to continue retrying the deletion operation. You'll be able to delete the Snapshot copy after the block sharing is done.

## **Inheritance of access control lists by FlexClone files and FlexClone LUNs**

FlexClone files and FlexClone LUNs inherit the access control lists of their parent files and LUNs.

If the parent files contain Windows NT streams, the FlexClone files also inherit the stream information. However, parent files containing more than six streams cannot be cloned.

## **How quotas work with FlexClone files and FlexClone LUNs**

You should be familiar with how quotas work with FlexClone files and FlexClone LUNs before using them.

Quota limits are applied on the total logical size of the FlexClone files or FlexClone LUNs. Cloning operations do not fail block sharing even if it causes quotas to be exceeded.

When you create a FlexClone file or FlexClone LUN, quotas do not recognize any space savings. For example, if you create a FlexClone file of a parent file of 10 GB, you are only using 10 GB of physical space, but the quota utilization is recorded as 20 GB (10 GB for the parent and 10 GB for the FlexClone file).

If the creation of a FlexClone file or LUN results in the group or user quota's being exceeded, the clone operation succeeds provided the FlexVol volume has enough space to hold the metadata for the clone. However, the quota for that user or group is oversubscribed.

## **FlexClone volumes and associated FlexClone files and FlexClone LUNs**

You can create a FlexClone volume of a FlexVol volume that has both a FlexClone file and FlexClone LUN and its parent file or LUN in it.

FlexClone files or FlexClone LUNs and their parent files or LUNs that are present in the FlexClone volume continue to share blocks the same way they do in the parent FlexVol volume. In fact, all the FlexClone entities and their parents share the same underlying physical data blocks, minimizing physical disk space usage.

If the FlexClone volume is split from its parent volume, then the FlexClone files or FlexClone LUNs and their parent files or LUNs stop sharing the blocks in the clone of the FlexClone volume. Thereafter they exist as independent files or LUNs. This means that the clone of the volume uses more space than before the splitting operation.

# How NDMP works with FlexClone files and FlexClone LUNs

NDMP works at the logical level with FlexClone files and FlexClone LUNs. All FlexClone files or LUNs are backed up as separate files or LUNs.

When you use NDMP services to back up a qtree or a FlexVol volume that contains FlexClone files or FlexClone LUNs, block sharing between parent and clone entities is not preserved, and clone entities are backed up to tape as separate files or LUNs. The space saving is lost. Therefore, the tape onto which you are backing up should have sufficient space to store the expanded amount of data. When you restore, all the FlexClone files and FlexClone LUNs are restored as separate physical files and LUNs. You can enable deduplication on the volume to restore the block-sharing benefits.



When FlexClone files and FlexClone LUNs are being created from an existing Snapshot copy of a FlexVol volume, you cannot back up the volume to tape until the block-sharing process, which happens in the background, is complete. If you use NDMP on the volume when the block-sharing process is in progress, the system displays a message asking you to retry the operation after some time. In such a situation, you must keep retrying the tape backup operation so that it succeeds after the block sharing is complete.

## How volume SnapMirror works with FlexClone files and FlexClone LUNs

Using volume SnapMirror with FlexClone files and FlexClone LUNs helps in maintaining space savings because the cloned entities are replicated only once.

If a FlexVol volume is a volume SnapMirror source and contains FlexClone files or FlexClone LUNs, volume SnapMirror transfers only the shared physical block and a small amount of metadata to the volume SnapMirror destination. The destination stores only one copy of the physical block, and this block is shared between the parent and cloned entities. Therefore, the destination volume is an exact copy of the source volume and all the clone files or LUNs on the destination volume share the same physical block.

## How space reservation works with FlexClone files and FlexClone LUNs

When using FlexClone files and FlexClone LUNs, you should understand how the space reservation attribute works.

By default, the FlexClone files and LUNs inherit the space reservation attribute from the parent file and parent LUN respectively. However, you can create FlexClone files and FlexClone LUNs with space reservation disabled if the FlexVol volume lacks space. This is possible even if the attribute in the respective parent is enabled.

Note that if the FlexVol volume does not contain enough space to create a FlexClone file or FlexClone LUN with the same space reservation as that of the parent, the cloning operation will fail.

## How an HA configuration works with FlexClone files and FlexClone LUNs

FlexClone file and FlexClone LUN operations are supported in an HA configuration.

In an HA pair, you cannot create FlexClone files or FlexClone LUNs on the partner while the takeover or giveback operation is in progress. All the pending block sharing operations on the partner are resumed after the takeover or giveback operation is complete.

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