Use FlexClone LUNs to protect your data

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Use FlexClone LUNs to protect your data overview

A FlexClone LUN is a point-in-time, writeable copy of another LUN in an active volume or in a Snapshot copy. The clone and its parent can be modified independently without affecting each other.

A FlexClone LUN shares space initially with its parent LUN. By default, the FlexClone LUN inherits the space-reserved attribute of the parent LUN. For example, if the parent LUN is non-space-reserved, the FlexClone LUN is also non-space-reserved by default. However, you can create a non-space-reserved FlexClone LUN from a parent that is a space-reserved LUN.

When you clone a LUN, block sharing occurs in the background and you cannot create a volume Snapshot copy until the block sharing is finished.

You must configure the volume to enable the FlexClone LUN automatic deletion function with the `volume snapshot autodelete modify` command. Otherwise, if you want FlexClone LUNs to be deleted automatically but the volume is not configured for FlexClone auto delete, none of the FlexClone LUNs are deleted.

When you create a FlexClone LUN, the FlexClone LUN automatic deletion function is disabled by default. You must manually enable it on every FlexClone LUN before that FlexClone LUN can be automatically deleted. If you are using semi-thick volume provisioning and you want the “best effort” write guarantee provided by this option, you must make *all* FlexClone LUNs available for automatic deletion.

> When you create a FlexClone LUN from a Snapshot copy, the LUN is automatically split from the Snapshot copy by using a space-efficient background process so that the LUN does not continue to depend on the Snapshot copy or consume any additional space. If this background split has not been completed and this Snapshot copy is automatically deleted, that FlexClone LUN is deleted even if you have disabled the FlexClone auto delete function for that FlexClone LUN. After the background split is complete, the FlexClone LUN is not deleted even if that Snapshot copy is deleted.

Related information

Logical storage management

Reasons for using FlexClone LUNs

You can use FlexClone LUNs to create multiple read/write copies of a LUN.

You might want to do this for the following reasons:

- You need to create a temporary copy of a LUN for testing purposes.
- You need to make a copy of your data available to additional users without giving them access to the production data.
- You want to create a clone of a database for manipulation and projection operations, while preserving the original data in an unaltered form.
- You want to access a specific subset of a LUN’s data (a specific logical volume or file system in a volume group, or a specific file or set of files in a file system) and copy it to the original LUN, without restoring the

rest of the data in the original LUN. This works on operating systems that support mounting a LUN and a clone of the LUN at the same time. SnapDrive for UNIX supports this with the `snap connect` command.

- You need multiple SAN boot hosts with the same operating system.

How a FlexVol volume can reclaim free space with autodelete setting

You can enable the autodelete setting of a FlexVol volume to automatically delete FlexClone files and FlexClone LUNs. By enabling autodelete, you can reclaim a target amount of free space in the volume when a volume is nearly full.

You can configure a volume to automatically start deleting FlexClone files and FlexClone LUNs when the free space in the volume decreases below a particular threshold value, and automatically stop deleting clones when a target amount of free space in the volume is reclaimed. Although, you cannot specify the threshold value that starts the automatic deletion of clones, you can specify whether a clone is eligible for deletion, and you can specify the target amount of free space for a volume.

A volume automatically deletes FlexClone files and FlexClone LUNs when the free space in the volume decreases below a particular threshold and when *both* of the following requirements are met:

- The autodelete capability is enabled for the volume that contains the FlexClone files and FlexClone LUNs.

  You can enable the autodelete capability for a FlexVol volume by using the `volume snapshot autodelete modify` command. You must set the `-trigger` parameter to `volume` or `snap_reserve` for a volume to automatically delete FlexClone files and FlexClone LUNs.

- The autodelete capability is enabled for the FlexClone files and FlexClone LUNs.

  You can enable autodelete for a FlexClone file or FlexClone LUN by using the `file clone create` command with the `-autodelete` parameter. As a result, you can preserve certain FlexClone files and FlexClone LUNs by disabling autodelete for the clones and ensuring that other volume settings do not override the clone setting.

Configure a FlexVol volume to automatically delete FlexClone files and FlexClone LUNs

You can enable a FlexVol volume to automatically delete FlexClone files and FlexClone LUNs with autodelete enabled when the free space in the volume decreases below a particular threshold.

What you'll need

- The FlexVol volume must contain FlexClone files and FlexClone LUNs and be online.
- The FlexVol volume must not be a read-only volume.

Steps

1. Enable automatic deletion of FlexClone files and FlexClone LUNs in the FlexVol volume by using the `volume snapshot autodelete modify` command.
   - For the `-trigger` parameter, you can specify `volume` or `snap_reserve`.

- For the `-destroy-list` parameter, you must always specify `lun_clone,file_clone` regardless of whether you want to delete only one type of clone.
  The following example shows how you can enable volume vol1 to trigger the automatic deletion of FlexClone files and FlexClone LUNs for space reclamation until 25% of the volume consists of free space:

```
cluster1::> volume snapshot autodelete modify -vserver vs1 -volume
vol1 -enabled true -commitment disrupt -trigger volume -target-free
-space 25 -destroy-list lun_clone,file_clone

Volume modify successful on volume:vol1
```

> While enabling FlexVol volumes for automatic deletion, if you set the value of the `-commitment` parameter to `destroy`, all the FlexClone files and FlexClone LUNs with the `-autodelete` parameter set to `true` might be deleted when the free space in the volume decreases below the specified threshold value. However, FlexClone files and FlexClone LUNs with the `-autodelete` parameter set to `false` will not be deleted.

2. Verify that automatic deletion of FlexClone files and FlexClone LUNs is enabled in the FlexVol volume by using the `volume snapshot autodelete show` command.

   The following example shows that volume vol1 is enabled for automatic deletion of FlexClone files and FlexClone LUNs:

```
cluster1::> volume snapshot autodelete show -vserver vs1 -volume vol1

         Vserver Name: vs1
          Volume Name: vol1
          Enabled: true
           Commitment: disrupt
         Defer Delete: user_created
         Delete Order: oldest_first
  Defer Delete Prefix: (not specified)*
    Target Free Space: 25%
              Trigger: volume
     Destroy List: lun_clone,file_clone
Is Constituent Volume: false
```

3. Ensure that autodelete is enabled for the FlexClone files and FlexClone LUNs in the volume that you want to delete by performing the following steps:

   a. Enable automatic deletion of a particular FlexClone file or FlexClone LUN by using the `volume file clone autodelete` command.

      You can force a specific FlexClone file or FlexClone LUN to be automatically deleted by using the `volume file clone autodelete` command with the `-force` parameter.

The following example shows that automatic deletion of the FlexClone LUN lun1_clone contained in volume vol1 is enabled:

```
cluster1::> volume file clone autodelete -vserver vs1 -clone-path
/vol/vol1/lun1_clone -enabled true
```

You can enable autodelete when you create FlexClone files and FlexClone LUNs.

b. Verify that the FlexClone file or FlexClone LUN is enabled for automatic deletion by using the `volume file clone show-autodelete` command.

The following example shows that the FlexClone LUN lun1_clone is enabled for automatic deletion:

```
cluster1::> volume file clone show-autodelete -vserver vs1 -clone
-path vol/vol1/lun1_clone
                                                                Vserver
Name: vs1
                                                                Clone
Path: vol/vol1/lun1_clone

**Autodelete Enabled: true**
```

For more information about using the commands, see the respective man pages.

Clone LUNs from an active volume

You can create copies of your LUNs by cloning the LUNs in the active volume. These FlexClone LUNs are readable and writeable copies of the original LUNs in the active volume.

What you'll need

A FlexClone license must be installed.

About this task

A space-reserved FlexClone LUN requires as much space as the space-reserved parent LUN. If the FlexClone LUN is not space-reserved, you must ensure that the volume has enough space to accommodate changes to the FlexClone LUN.

Steps

1. You must have verified that the LUNs are not mapped to an igroup or are written to before making the clone.
2. Use the `lun show` command to verify that the LUN exists.

   ```
   lun show -vserver vs1
   ```

```
Vserver  Path                State     Mapped    Type     Size
-------- ------------------ --------- --------- -------- -------
vs1      /vol/vol1/lun1     online    unmapped  windows  47.07MB
```

3. Use the `volume file clone create` command to create the FlexClone LUN.

   ```
   volume file clone create -vserver vs1 -volume vol1 -source-path lun1
   -destination-path/lun1_clone
   ```

   If you need the FlexClone LUN to be available for automatic deletion, you include `-autodelete true`. If you are creating this FlexClone LUN in a volume using semi-thick provisioning, you must enable automatic deletion for all FlexClone LUNs.

4. Use the `lun show` command to verify that you created a LUN.

   ```
   lun show -vserver vs1
   ```

```
Vserver  Path                      State    Mapped   Type     Size
-------- ------------------------ -------- -------- -------- ------
vs1      /vol/volX/lun1           online   unmapped windows  47.07MB
vs1      /vol/volX/lun1_clone     online   unmapped windows  47.07MB
```

Create FlexClone LUNs from a Snapshot copy in a volume

You can use a Snapshot copy in your volume to create FlexClone copies of your LUNs. FlexClone copies of LUNs are both readable and writeable.

What you'll need

A FlexClone license must be installed.

About this task

The FlexClone LUN inherits the space reservations attribute of the parent LUN. A space-reserved FlexClone LUN requires as much space as the space-reserved parent LUN. If the FlexClone LUN is not space-reserved, the volume must have enough space to accommodate changes to the clone.

Steps

1. Verify that the LUN is not mapped or being written to.
2. Create a Snapshot copy of the volume that contains the LUNs:

   ```
   volume snapshot create -vserver vserver_name -volume volume_name -snapshot
   snapshot_name
   ```

   You must create a Snapshot copy (the backing Snapshot copy) of the LUN you want to clone.

3. Create the FlexClone LUN from the Snapshot copy:

   ```
   file clone create -vserver vserver_name -volume volume_name -source-path
   ```

source_path -snapshot-name *snapshot_name* -destination-path *destination_path*

If you need the FlexClone LUN to be available for automatic deletion, you include `-autodelete true`. If you are creating this FlexClone LUN in a volume using semi-thick provisioning, you must enable automatic deletion for all FlexClone LUNs.

4. Verify that the FlexClone LUN is correct:

   `lun show -vserver *vserver_name*`

```
Vserver Path                      State    Mapped    Type     Size
------- ----------------------    -------- --------- -------- -------
vs1     /vol/vol1/lun1_clone      online   unmapped windows   47.07MB
vs1     /vol/vol1/lun1_snap_clone online   unmapped windows   47.07MB
```

Prevent a specific FlexClone file or FlexClone LUN from being automatically deleted

If you configure a FlexVol volume to automatically delete FlexClone files and FlexClone LUNs, any clone that fits the criteria you specify might be deleted. If you have specific FlexClone files or FlexClone LUNs that you want to preserve, you can exclude them from the automatic FlexClone deletion process.

What you'll need

A FlexClone license must be installed.

About this task

When you create a FlexClone file or FlexClone LUN, by default the autodelete setting for the clone is disabled. FlexClone files and FlexClone LUNs with autodelete disabled are preserved when you configure a FlexVol volume to automatically delete clones to reclaim space on the volume.

> If you set the `commitment` level on the volume to `try` or `disrupt`, you can individually preserve specific FlexClone files or FlexClone LUNs by disabling autodelete for those clones. However, if you set the `commitment` level on the volume to `destroy` and the destroy lists include `lun_clone,file_clone`, the volume setting overrides the clone setting, and all FlexClone files and FlexClone LUNs can be deleted regardless of the autodelete setting for the clones.

Steps

1. Prevent a specific FlexClone file or FlexClone LUN from being automatically deleted by using the `volume file clone autodelete` command.

   The following example shows how you can disable autodelete for FlexClone LUN lun1_clone contained in vol1:

```
cluster1::> volume file clone autodelete -vserver vs1 -volume vol1
-clone-path lun1_clone -enable false
```

A FlexClone file or FlexClone LUN with autodelete disabled cannot be deleted automatically to reclaim space on the volume.

2. Verify that autodelete is disabled for the FlexClone file or FlexClone LUN by using the `volume file clone show-autodelete` command.

   The following example shows that autodelete is false for the FlexClone LUN lun1_clone:

```
cluster1::> volume file clone show-autodelete -vserver vs1 -clone-path
vol/vol1/lun1_clone
                                                                Vserver
Name: vs1
                                                                Clone Path:
vol/vol1/lun1_clone
                                                                Autodelete
Enabled: false
```