Snapshot copy operations

Snapdrive for Unix

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Snapshot copy operations

You can create Snapshot copies by using the `snapdrive snap create` command.

Crash-consistent Snapshot copies

You might have to create a crash-consistent Snapshot copies of your file system or disk groups. SnapDrive for UNIX creates Snapshot copies that contain the image of all the storage system volumes specified in the entity.

When you create a Snapshot copy of a storage entity, such as a file system or disk group, SnapDrive for UNIX creates a Snapshot copy that contains the image of all the storage system volumes that comprise the entity you specified using a `file_spec` argument. The `file_spec` argument specifies the storage entity, such as the file system, LUN, or NFS directory tree that SnapDrive for UNIX uses to create the Snapshot copy.

SnapDrive for UNIX makes consistent storage components that compose the entity you requested in the Snapshot copy. This means that LUNs or directories being used outside those specified by the `snapdrive snap create` command `file_spec` argument might not have consistent images in the Snapshot copy. SnapDrive for UNIX enables you to restore only the entities specified by the `file_spec` argument that are consistent in the Snapshot copy.

Snapshot copies of entities contained on a single storage system volume are always crash-consistent. SnapDrive for UNIX takes special steps to ensure that Snapshot copies that span multiple storage systems or storage system volumes are also crash-consistent. The method that SnapDrive for UNIX uses to ensure crash consistency depends on the Data ONTAP version used where the storage entities in your Snapshot copy resides.

Crash consistency with Data ONTAP 7.2 and later

SnapDrive for UNIX uses the support for consistency groups provided by Data ONTAP 7.2 and later versions, such that all Snapshot copies that span multiple volumes are crash consistent.

Data ONTAP versions 7.2 and greater provides support for consistency groups and storage system fencing. SnapDrive for UNIX uses these features to ensure that all Snapshot copies that span multiple volumes are crash consistent.

To create a crash consistent Snapshot copy across multiple volumes, SnapDrive for UNIX does the following:

- Fences (freezes) I/O to every volume that contains a storage entity.
- Takes a Snapshot copy of each volume.

The time it takes to fence the volume and create the Snapshot copy is limited, and is controlled by Data ONTAP.

The **`snapcreate-cg-timeout`** parameter in the `snapdrive.conf` file specifies the amount of time, within Data ONTAP limitations, that you wish to allow for storage system fencing. You can specify an interval that is urgent, medium, or relaxed. If the storage system requires more time than allowed to complete the fencing operation, SnapDrive for UNIX creates the Snapshot copy using the consistency methodology for previous Data ONTAP 7.2 versions. You can also specify this methodology by using the `-nofilerfence` option when you create the Snapshot copy.

If you request a Snapshot copy for a storage entity that spans storage systems with both Data ONTAP 7.2 and previous Data ONTAP versions, SnapDrive for UNIX also creates the Snapshot copy using the consistency method for Data ONTAP versions before 7.2.

Consistency group Snapshot copies in SnapDrive for UNIX

Consistency Group Snapshot is a Snapshot copy of a set of volumes that span different Vservers or nodes of a cluster, which is managed as a single entity.

SnapDrive for UNIX captures crash-consistent Snapshot copies across all volumes spanning different Vservers or nodes of a cluster. You can also configure the time period within which the Snapshot copy is to be captured.

SnapDrive for UNIX captures consistency group Snapshot copies by default. You can disable this feature and revert to capturing Snapshot copies in best-effort mode.

SnapDrive for UNIX 5.2 supports consistency group Snapshot copies for clustered Data ONTAP only in Data ONTAP 8.2 or later versions.

Related information

Creating a consistency group Snapshot copy

Disabling consistency group Snapshots copies

Creating a consistency group Snapshot copy

You can configure SnapDrive for UNIX to create a consistency group Snapshot copy.

Steps

1. Enter the following command on the host:

   snapdrive snap create -fs /mnt/test -snapname *snapshotname* -f -noprompt.

   snapshotname is the name specified for the consistency group Snapshot copy.

Example

The following is an example of the command:

```
snapdrive snap create -fs /mnt/test -snapname snap_123 -f -noprompt
```

The consistency group Snapshot copy is successfully created.

Disabling consistency group Snapshots copies

You can configure SnapDrive for UNIX to disable a consistency group Snapshot copy.

Steps

1. Enter:

```
snapdrive snap create -fs /mnt/fs3 -snapname nfs_snap -nofilerfence
```

The consistency group Snapshot copy is successfully disabled.

Application-consistent Snapshot copies

To make an application-consistent Snapshot copy, you should halt the application before the Snapshot operation.

To ensure that a Snapshot copy is application-consistent, you might need to stop or perform the necessary steps to quiesce the application before taking the Snapshot copy. Note that database hot backup facilities depend on the methods used by the DBMS, and do not always quiesce I/O to database files.

If the application has not completed its transactions and written data to the storage system, the resulting Snapshot copy might not be application-consistent.

> If your application can recover from a crash-consistent Snapshot copy, you do not need to stop it. Consult the documentation for your application. For more information about taking application-consistent Snapshot copies.

You should take a new Snapshot copy whenever you add or remove a host volume, LUN, or NFS directory tree, or resize host volumes or file systems. This ensures that you have a consistent copy of the newly configured disk group that you can use if you need to restore the disk group.

Snapshot copies that span storage systems or volumes

SnapDrive for UNIX enables you to take Snapshot copies that reside in multiple storage system volumes on the same or different storage systems.

SnapDrive for UNIX allows you to take Snapshot copies that span across multiple storage system volumes or multiple storage systems. These volumes can reside on the same storage system or different storage systems. Although the `snapdrive snap create` command creates a Snapshot copy of all the volumes that comprise the entity you request, SnapDrive for UNIX restores only the entities that you specify in the `snapdrive snap create` command.

When you use the `snapdrive snap create` command to make a Snapshot copy that spans multiple volumes, you do not need to name the volumes on the command prompt. SnapDrive for UNIX gets this information from the `file_spec` argument that you specify.

- If the `file_spec` you enter requests a disk group, or a file system or host volume that resides on a disk group, SnapDrive for UNIX automatically creates a Snapshot copy that includes all the storage system volumes for the disk group, volume, or file system you specified.
- If the `file_spec` you enter requests a LUN, SnapDrive for UNIX takes a Snapshot copy of the storage system volume that contains the LUN.
- If the `file_spec` you enter requests a file system that resides directly on a LUN, SnapDrive for UNIX takes a Snapshot copy of the storage system volume that contains the LUN and file system that you specified.
- If the `file_spec` you enter requests an NFS directory, SnapDrive for UNIX creates a Snapshot copy of the volume that contains the NFS directory tree.

In addition to using a `file_spec` argument that is built on entities from multiple storage systems and storage system volumes, you can also use a combination of `file_spec` arguments where each value is based on single storage system or storage system volume. For example, suppose you have a setup where the disk group dg1 spans the storage systems storage system2 and storage system3, dg2 is on storage system2, and dg3 is on storage system3. In this case, any of the following command lines would be correct:

```
snapdrive snap create -dg dg1 -snapname snapdg1

snapdrive snap create -dg dg2 dg3 -snapname snapdg23

snapdrive snap create -dg dg1 dg2 dg3 -snapname snapdg123
```

Something to keep in mind when creating Snapshot copies that span storage systems and volumes is that SnapDrive for UNIX creates the Snapshot copy on each storage systems volume using a short name. It does not include the full path name in the name, even if the volumes are on different storage system. This means that if you later rename the Snapshot copy, you must go to each storage system and volume and rename it there as well.

Creating Snapshot copies of unrelated entities

SnapDrive for UNIX creates Snapshot copies of unrelated entities by maintaining individual crash-consistent Snapshot copies.

Unless you specify otherwise, SnapDrive for UNIX assumes that all entities that you specify on a particular snapdrive snap create command line are related; in other words the validity of updates to one entity can depend on updates to the other entities specified. When storage entities have dependent writes in this way, SnapDrive for UNIX takes steps to create a Snapshot copy that is crash consistent for all storage entities as a group.

The following example shows how SnapDrive for UNIX creates a Snapshot copy of storage entities that may have dependent writes. In the following example, the snapdrive snap create command specifies a file system on a LUN and also a disk group. The disk group consists of LUNs residing on a single storage system (see Creating a Snapshot copy). The file system on a LUN resides on a different storage system and storage system volume. As a group, the file system and the disk group span multiple storage system volumes; individually they do not.

The following command specifies a Snapshot copy that contains both the file system /mnt/fs1 and the disk group dg1: `snapdrive snap create -fs /mnt/fs1 -dg dg1 -snapname fs1_dg1`

Because these storage entities can have dependent writes, SnapDrive for UNIX attempts to create a crash-consistent Snapshot copy, and treats the file system /mnt/fs1 and the disk group dg1 as a group. This means SnapDrive for UNIX is required to freeze I/O operations to the storage system volumes before creating the Snapshot copy.

Creating crash-consistent Snapshot copies for multiple storage entities across volumes takes extra time, and is not always possible if SnapDrive for UNIX cannot freeze I/O operations. Because this is so, SnapDrive for UNIX allows you to create Snapshot copies of unrelated storage entities. Unrelated storage entities are entities that you can specify that have no dependent writes when the Snapshot copy is taken. Because the entities have no dependent writes, SnapDrive for UNIX does not take steps to make the entities consistent as a group. Instead, SnapDrive for UNIX creates a Snapshot copy in which each of the individual storage entities is crash-consistent.

The following command specifies a Snapshot copy of the file system on a LUN and the disk group described

previously. Because the -unrelated option is specified, SnapDrive for UNIX creates a Snapshot copy in which the file system /mnt/fs1 and the disk group dg1 are crash-consistent as individual storage entities, but are not treated as a group. The following command does not require SnapDrive for UNIX to freeze I/O operations on the storage system volumes: `snapdrive snap create -fs /mnt/fs1 -dg dg1 -unrelated -snapname fs1_dg1`

Related information

Creating a Snapshot copy

Guidelines for Snapshot copy creation

Consider the following while creating Snapshot copies using SnapDrive for UNIX: you can keep maximum 255 Snapshot copies per volume, SnapDrive for UNIX supports only the Snapshot copies that it creates, you cannot create Snapshot copies of root disk groups, and boot device or swap device, and SnapDrive for UNIX requires a freeze operation to maintain crash-consistency.

Follow these guidelines when you enter commands that create Snapshot copies:

- You can keep a maximum of 255 Snapshot copies per storage system volume. This limit is set by the storage system. The total number can vary depending on whether other tools use these Snapshot copies.

  When the number of Snapshot copies has reached the maximum limit, the Snapshot create operation fails. You must delete some of the old Snapshot copies before you can use SnapDrive for UNIX to take anymore.

- SnapDrive for UNIX does not support Snapshot copies that it does not create. For example, it does not support Snapshot copies that are created from the storage system console, because such a practice can lead to inconsistencies within the file system.
- You cannot use SnapDrive for UNIX to create Snapshot copies of the following:
  - Root disk groups

    The Snapshot create operation fails when you try to take a Snapshot copy of a root disk group for an LVM.

  - Boot device or swap device

    SnapDrive for UNIX does not take a Snapshot copy of a system boot device or a system swap device.
- When a Snapshot copy spans multiple storage systems or storage system volumes, SnapDrive for UNIX requires a freeze operation to guarantee crash-consistency. For information about creating Snapshot copies on configurations for which a freeze operation is not provided.

Information required for using the snapdrive snap create command

When you create a Snapshot copy, you should determine the storage entity that you want to capture and specify a name of the Snapshot copy.

The following table provides the information you need when you use the `snapdrive snap create`

command:

Requirement/Options	Argument
Determine the type of storage entity you want to capture in the Snapshot copy. You can specify NFS entities, LUNs, file systems created directly on LUNs, and LVM entities on a single command line. Supply that entity's name with the appropriate argument. This is the value for the `file_spec` argument. • If you specify a disk group that has a host volume or file specification, the argument translates into a set of disk groups on the storage system. SnapDrive for UNIX creates the entire disk group containing the entity, even if the entity is a host volume or file system. • If you specify a file specification that is an NFS mount point, the argument translates to the directory tree on the storage system volume. • If you specify a LUN, or a LUN that has a file system, the argument translates to the LUN, or to the LUN that has the file system. You cannot specify special characters with the storage entities such as `-vg`, `-dg`, `-fs`, `-lvol`, and `-hostvol`. However, slash (/) is allowed for storage entities such as `-fs`, `-lvol`, and `-hostvol`.	
LUN (`-lun file_spec`)	Name of the LUN You must include the name of the storage system, volume, and LUN.
Disk group (`-dg file_spec`) or volume group (`-vg file_spec`)	Name of the disk or volume group
File system (`-fs file_spec`)	filesystem_name
Host volume (`-hostvol file_spec`) or logical volume (`-lvol file_spec`)	Name of the host or logical volume You must supply both the requested volume and the disk group containing it; for example, `-hostvol dg3/acct_volume`.
Snapshot copy name (`-snapname snap_name`)	Snapshot copy_name
Specify the name for the Snapshot copy. This can be either the long version of the name that includes the storage system and volume with the Snapshot copy name or the short version that is the Snapshot copy name. You must ensure that the value specified for `snapname` does not exceed 200 characters.	
`-unrelated`	~

Requirement/Options	Argument
Optional: To create a Snapshot copy of storage entities that have no dependent writes when the Snapshot copy is created, SnapDrive for UNIX creates a crash-consistent Snapshot copy of the individual storage entities, but does not try to make the entities consistent with each other.	
`-force`	~
`-noprompt`	~
Optional: Decide if you want to overwrite an existing Snapshot copy. Without this option, this operation halts if you supply the name of an existing Snapshot copy. When you supply this option and specify the name of an existing Snapshot copy, the command prompts you to confirm that you want to overwrite the Snapshot copy. To prevent SnapDrive for UNIX from displaying the prompt, include the `-noprompt` option also. (You must always include the `-force` option if you want to use the `-noprompt` option.)	
`-fstype`	*type*
`-vmtype`	*type*
Optional: Specify the type of file system and volume manager to be used for SnapDrive for UNIX operations.	

Creating a Snapshot copy

To create a Snapshot copy, run the `snapdrive snap create` command.

Before you execute this syntax, you must understand the options, keywords, and arguments mentioned in this command.

Steps

1. Enter the following command syntax to create a Snapshot copy:

```
snapdrive snap create {-lun | -dg | -fs | -hostvol } file_spec[file_spec …] [
{-lun |-dg | -fs | -hostvol } file_spec [file_spec…]] -snapname snap_name [
-force [-noprompt]][-unrelated] [-nofilerfence] [-fstype type][-vmtype type]
```

The *file_spec* arguments represent a set of storage entities on one or more storage systems. The Snapshot create operation takes a Snapshot copy of the storage system volume containing those entities and gives it the name specified in the `snap_name` argument.

Related information

Creating Snapshot copies of unrelated entities

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