

# NetBackup 6.0 MP4 and NearStore Storage Units

This document contains information about how to administer Network Appliance (NetApp) NearStore™ disk storage units using NetBackup 6.0 MP4. The NearStore storage unit features introduced in this version are available on all supported media server platforms.

Find general storage unit setup information in Chapter 2 of the *NetBackup 6.0 System Administrator's Guide*.

This document contains the following sections:

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Terms used in this document include:

*WAFL* (Write Anywhere File Layout): The file system used in all Network Appliance storage servers. WAFL supports snapshot creation.

*qtree* (quota tree): A subdirectory in a NearStore volume that acts as a virtual subvolume with special attributes, primarily quotas and permissions.

*Snapshot*: A read-only, point-in-time copy of the entire volume. A snapshot captures file modifications without duplicating file contents.

## Required software, hardware, and licenses

To configure a NearStore storage unit, the following hardware and software (and accompanying licenses) must be in place and configured:

- NetBackup Enterprise 6.0 MP4 on the master server and media server, with the Disk Optimization Capacity license installed.
- NetBackup client software 4.5 or later.
- A Network Appliance NearStore appliance with the following software installed:
  - Network Appliance Data ONTAP 7.2 or later
  - A SnapVault™ secondary license (enabled)

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**Note:** A NetBackup NDMP license is *not* required to create a NearStore storage unit. However, NDMP should be enabled on the NearStore since this enables the NearStore credentials to be entered using the NetBackup Administration Console. Specifically, credentials can be added via **Add NDMP Host** under **Media and Device Management > Devices**.

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## Upgrade considerations

In order to use the file system export mode or the space optimized image mode, both NetBackup 6.0 MP4 and ONTAP 7.2 (or later) are required.

However, if the new functionality is not needed, the following version combinations are supported:

- NetBackup 6.0 MP4 and ONTAP 7.1
- NetBackup 6.0 and ONTAP 7.2

## NearStore and SnapVault topics

### NearStore storage units and SnapVault storage units cannot share volumes

NearStore and SnapVault storage units cannot share the same volume. To prepare a volume to support NearStore storage units:

- Disable any incremental backups to the secondary qtrees that were originally scheduled for the volume.
- Release existing SnapVault relationships. See the *Data ONTAP System Administrator's Guide* for instructions on running the `snapvault -stop` command to stop all backups and delete the qtrees and configurations on a volume.
- Disable any existing WAFL snapshots on the volume. This includes the default WAFL snapshot schedule that is automatically configured when the volume is created.

### Cleaning up configured qtrees

Qtree entries in the SnapVault configuration database are not deleted when a volume is destroyed. Make sure to delete the qtree entry in the configured database:

Log in to the filer:

```
r200> snapvault status -c /* lists config'd Qtrees */
r200> snapvault stop -f /vol/volume_name/Qtree_name
```

Or, as an alternative, run:

```
rsh r200 snapvault status -c | grep /volume_name/ |
awk '{ print $1; }' | while read QT; do
rsh r200 snapvault stop -f $QT; done
```

### NearStore SnapVault snapshot schedules

To display the currently configured SnapVault snapshot schedule, enter the `snapvault snap sched` command and view the basenames of all snapshot sets for all SnapVault volumes on the filer:

```
r200> snap sched MYVOLUME 0 0 0
```

---

**Note:** Volumes configured for NetBackup NearStore storage units do not support the `snapvault snap sched` command. Any attempt to run the `snapvault snap sched` command on a NetBackup NearStore volume will fail.

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To turn off the SnapVault schedule for a set of snapshots and stop the snapshot process for the SnapVault secondary storage system, enter the following command:

```
r200> snapvault snap unsched VOLUME_NAME
```

---

**Note:** This command does not end the SnapVault relationships between the secondary system qtrees and their platform source drives or directories. To do so, run the following command for each qtree configured or existing on the volume to be used as a NearStore storage unit:

```
r200> snapvault stop -f /vol/VOLUME_NAME/QTREE_NAME
```

---

### Initial full backups for client and policy pairs

For every client and policy pair, a full backup must be performed to a NearStore storage unit before an incremental of any type can be performed.

## Advantages to using a NearStore storage unit

### ■ Backup data reduction

NearStore avoids duplicating disk blocks by comparing blocks in the most recent backup with the preceding backup image. Incremental backups do not consume disk space unless blocks in the new backup image differ from blocks in the active file system. As a result, multiple backups to the same volume store only uncommon blocks, and blocks that are common continue to share.

To view storage savings, use the Data ONTAP `df -s` command:

```
r200> df -s
Filesystem                used      shared      saved      %saved
/vol/vol0/                 1335000          0          0          0%
/vol/flexsle/              96             0          0          0%
/vol/sim/                  292            0          0          0%
/vol/p3/                   21304124    14637384    21731976    50%
```

The `df` command is described in the *Data ONTAP System Administrator's Guide*.

### ■ Tar image retained for interoperability

The NetBackup tar image is preserved in a WAFL qtree to support NetBackup administrative functions such as file restoration, duplication, staging, import from disk, and twinning to another storage unit.

### ■ No administrator necessary to perform user restores

Client backups to a NearStore storage unit are translated by the NetBackup media server into WAFL qtree images.

### ■ No administrator necessary to perform user restores

NetApp converts the modified-from-TAR image that NetBackup sends the NearStore into the NetApp WAFL format.

### ■ NetBackup offers extensive support for NearStore storage units

- All policy types, attributes, and schedule types are supported.
- All supported NetBackup clients can be backed up to, and restored from, a NearStore storage unit.
- NearStore storage units can be used for synthetic backups.
- One of the best applications for a NearStore storage unit is that of a disk staging storage unit or the target of a disk staging storage unit.
- NearStore allows twinning to other storage units—tape or disk.
- NearStore allows duplication, expiration, and verification of images.
- NearStore images can be imported.
- NearStore storage units can be used for NetBackup catalog backups and restores.

- NearStore can serve as a source or a target for Vault.

- **Restrictions in the current release**

There are few restrictions using a NearStore storage unit:

- A NearStore requires an Ethernet connection because data is transferred over a TCP/IP socket.
- A NearStore storage unit does not support the checkpoint restart feature. This restriction will be removed in future NetBackup releases.
- A NearStore storage unit does not support backups based on the following policy configurations:
  - Multistreamed backups using NetBackup for Microsoft SQL Server.
  - Multistreamed backups using NetBackup for Sybase.
  - Multistreamed NetBackup for Oracle Proxy Block Level Incremental (BLI) backups.
  - User backups to File System Export-enabled storage units. The File System Export option requires that True Image Restore information is collected. NetBackup does not collect TIR information for user backups. (See “[Enable file system export](#)” on page 11.)
  - Hot catalog backups to File System Export-enabled storage units. Hot catalog backups are not supported because they rely, in part, on the user backup process.
- The NearStore storage unit dialog box can be sensitive to configuration changes in high latency environments. For example, while selecting a NearStore server, selecting a volume, or selecting **Enable block sharing** or **Enable file system export**.

## NearStore configuration

To make the NearStore storage unit available for backups, add and enable the secondary SnapVault license:

- 1 Add the secondary SnapVault license:

```
r200> license add sv_secondary_license
```

- 2 Enable SnapVault:

```
r200> options snapvault.enable on
```

- 3 Grant access to media servers authorized to access the NearStore by entering the following command:

```
r200> options snapvault.access host=nbu_media_server1,  
nbu_media_server2...
```

## NearStore authentication

A NearStore user name and password must be configured in NetBackup before the storage unit is created. NearStore authentication information is stored in the NetBackup Enterprise Media Manager (EMM) database. This allows for global authentication or authentication on a per-media server basis.

### To authenticate the NetBackup media server

- 1 Make sure that the SnapVault license is enabled on the media server.
- 2 Use the `tpconfig` command to add a NearStore user ID and password into the EMM global database:

- Authenticates only the media server where this is run:

```
tpconfig -add -snap_vault_filer -nh hostname -user_id  
userID[-password password]
```

- Authenticates all media servers:

```
tpconfig -add -snap_vault_filer -nh hostname  
-filer_user_id userID
```

### To create a root NearStore user name and password

```
tpconfig -add -snap_vault_filer -nh hostname -user_id  
root_ID[-password root_password]
```

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**Note:** It is important to avoid using `root` as an NDMP password because `root` is not encrypted, and could compromise the integrity of your storage system.

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### To create a non-root NearStore user name and password

Administrators can create user accounts on the NearStore to perform backups and restores. The following procedure describes a method to send a user's encrypted password over the network.

- 1 Log onto the Nearstore.
- 2 To create a new user, enter the following command:  
`useradmin user add userID -g groupID`  
Enter a password when prompted.
- 3 To receive the encrypted version of the password, enter:  
`ndmpd password userID`  
where *userID* is the name of the user just added.
- 4 Record the password.
- 5 Log out of the NearStore.
- 6 Enter the following `tpconfig` command:  
`./tpconfig -add -user_id username -nh nearstore_name  
-snap_vault_filer -password encrypted_password`  
The encrypted password is passed across the network.

### To verify that the NearStore credentials have been entered into the NetBackup EMM database

Once the `tpconfig` command is run, ensure that the media server is authenticated by running the following command:

```
nbemmcmd -listhosts -list_snap_vault_filers -machinename  
media_server_name
```

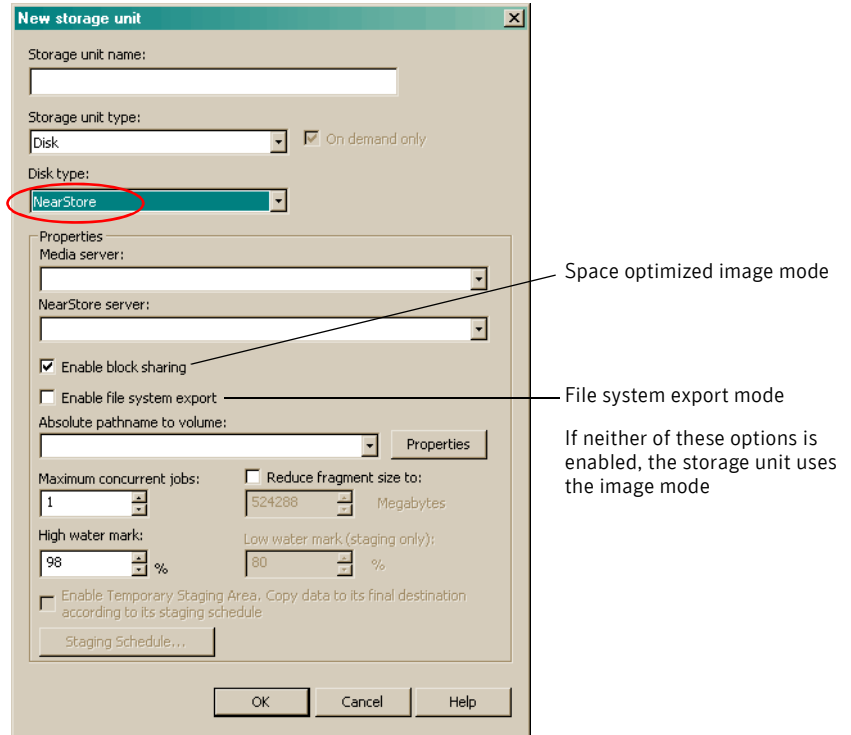
For example:

```
C:\Program Files\VERITAS\NetBackup\bin\admincmd>  
nbemmcmd -listhosts -list_snap_vault_filers -machinename entry  
NBEMMCMD, Version:6.0CA(20050628)  
The following hosts were found:  
ndmp          mmnetapp.xxx.yyy.com  
Command completed successfully.
```

## NearStore disk storage unit properties

The properties that are specific to NearStore storage units are described in the following sections.

**Figure 1-1** 6.0 MP4 storage unit configuration dialog box




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**Note:** NearStore storage units cannot be included in storage unit groups.

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### Storage unit type

For a NearStore storage unit, select *Disk* as the **Storage unit type**.

### On demand only

A NearStore storage unit can only be used on demand. **On demand only** cannot be deselected.

## Disk type

Depending on what is licensed, there are a number of disk types available from which to choose. To configure a NearStore storage unit, select **NearStore**.

## NearStore server

The **NearStore server** drop-down list contains all NearStore hosts configured for the selected media server and available to NetBackup.

## Absolute pathname to volume

The **Absolute pathname to volume** drop-down list contains all the volumes in the selected NearStore that are capable of serving as NetBackup storage units. The list displays only flexible volumes. For example, WORM volumes are filtered out.

## Properties button

Click the **Properties** button to display:

- The total capacity of the NearStore unit
- The storage that is currently in use on the NearStore unit
- The storage available for use on the NearStore unit

## High water mark

To avoid filling up the NearStore and potentially causing problems, use the **High water mark** setting to control the amount of data on the NearStore. The **Low water mark** is not enabled for NearStore storage units.

## Enable block sharing

The **Enable block sharing** setting allows data blocks that have not changed from one backup to the next to be shared. Sharing data blocks can significantly save disk space in the storage unit.

If the **Enable block sharing** setting is enabled, but **Enable file system export** setting is not, the NearStore is using the *space optimized image* mode.

The space optimized image mode makes use of single instance store (SIS) without the additional requirement of managing snapshots. This mode is especially useful for database backups, since an exported file system of a database backup is not useful in that case.

The space optimized image mode differs from the image mode. (The image mode is described in “[Using the NearStore image mode](#)” on page 12.) The files in the space optimized backup image are aligned on 4K file boundaries when placed on

the NearStore. Since each file starts on a new 4K boundary, if the content of a single files changes, the single instance store operation is still performed on the other files.

## Enable file system export

If **Enable file system export** is enabled, the backups to a NearStore storage unit are created using the *file system export* mode. In the file system export mode, backups become user-mountable when exported as CIFS or NFS file systems.

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**Note:** Use NetApp to allow the NearStore storage unit to export the file system.

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The **Enable file system export** setting is available only when **Enable block sharing** setting is also enabled.

When using the file system export mode, keep the following points in mind:

- Each policy that writes to a File System Export-enabled NearStore storage unit must have **Collect true image restore information with move detection** enabled. True Image Restore provides the complete file list for each catalog image to generate accurate results.  
After each successful backup, a list of the files that were deleted between the most recent backup and the previous backup are sent to ONTAP.
- Snapshots are used to ensure the integrity of the exported file system. A snapshot is made up of one or more images in a group. Before a snapshot can be reclaimed (or deleted), all the images it contains must be deleted. The snapshots must be deleted in order to keep the NearStore file system synchronized with the last NetBackup catalog image.
  - Use `bpstsinfo -imagegroup` to determine what image groups are contained within a snapshot.
  - Use `bpstsinfo -deleteimage` to delete the images within the a snapshot.
- A File System Export-enabled NearStore storage unit may generate a return code of 1 (partially successful) even if all the data was backed up successfully. This may occur if the last backup to that client and policy pair did not generate a return code of 0 due to incorrect True Image Restore information.

In the Activity Monitor, the Job Details for the job note that additional files may have been exported on the NearStore that were not in the most recent client backup:

```
9/27/2007 5:20:34 PM - Error bpm(pid=2328) The backup was
successful but the exported filesystem on the storage host gabe
may display files that are no longer present on the client
filesystem . (STS_EEFSCHK)
```

```
9/27/2007 5:20:38 PM - Warning bpbrm(pid=2412) The filesystem
exposed by the nearstore DSU may not be up to date. Check the
Nearstore's nbu_snapvault log for details
```

## Temporary staging area

The speed of NearStore servers makes a NearStore storage unit an excellent choice for temporary disk staging.

### Using the NearStore image mode

In order to select **Enable temporary staging area**, both **Enable block sharing** and **Enable file system export** must be deselected. In this way, the NearStore is storing the backup using the *image* mode. Using this mode, the client's tar stream is passed to the NearStore without additional information. Since the ONTAP kernel cannot read NetBackup's tar format, few operations can be performed using the image. For example, the image can be restored or deleted.

### Using NearStore for stage I disk staging storage units

Stage I disk staging storage units using 6.0 MP3/MP4 and ONTAP 7.2 do not support the *space optimized image mode* or the *file system export mode*.

When creating Stage I disk staging storage units, do not select:

- The **Enable block sharing** option. When this is selected, data is written to the unit in the space optimized image mode.
- The **Enable block sharing** option and the **Enable file system export** option. When these are selected, the file system export mode is indicated.

Stage II disk staging storage units may use any mode. (Stage II disk staging storage units indicate a final destination for the data.)

## Reduce fragment size

NearStore uses the **Reduce fragment size** setting differently than other storage units. NetBackup writes to a NearStore by laying out the data in one large image, and not dividing the data into fragments.

## Ramifications of using snapshots

Backups that use the file system export mode use snapshots to tie images together. The space that is consumed by a snapshot is unavailable for reuse until every image in the snapshot expires and is deleted.

Because of this behavior, configure policies so that the images in the NearStore storage unit do not become inter-related. For example, do not combine schedules with dissimilar backup frequencies or retention periods within the same policy.

Also, an implicit connection exists between a full backup and all subsequent incremental backups until the next full backup is run. This relationship means that even if an incremental is deleted, that space is not freed until all other associated incremental backups and the originating full backup expire and are deleted.

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**Note:** The 7.2 ONTAP kernel enforces a limit of 255 snapshots per volume and 200 volumes per NearStore.

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**Caution:** Some policy combinations that performed well for NetBackup 6.0 with ONTAP 7.1 may need adjusting after upgrading.

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## Viewing the backup image

Use the `bpstsinfo` command to look for images on the NearStore, as well as to look at server and logical storage unit (LSU) attributes. The `bpstsinfo` command is described in *NetBackup Commands for UNIX and Linux*, and in *NetBackup Commands for Windows*. The command options are listed below:

```
bpstsinfo
To query server information:
  bpstsinfo -serverinfo
    [ -servername <server name> ]
    [ -serverprefix <server prefix> ]
    [ -remote <remote server> [-remote <remote server> ...] ]

To query LSU information:
  bpstsinfo -lsuinfo
    [ -servername <server name> ]
    [ -serverprefix <server prefix> ]
    [ -lsuname <lsu name> [-lsuname <lsu name> ...] ]
    [ -filteronimagemodetype [ STS_SA_IMAGE | STS_SA_OPAQUEF |
STS_SA_CLEARF] ]
    [ -remote <remote server> [-remote <remote server> ...] ]
```

The `-filteronimagemodetype` option to the `-imageinfo` flag applies an additional filter to the list of `lsus` that is returned from the storage server. The additional filter removes all volumes except those that support backups of the mode specified by `-filteronimagemodetype`.

For example, the command

```
bpstsinfo ... -filteronimagemodetype STS_SA_CLEARF
```

returns only those volumes that could support a backup of type `STS_SA_CLEARF`, using the file system export mode.

Supported image mode types:

- `STS_SA_IMAGE` (image mode)
- `STS_SA_OPAQUEF` (space optimized image; an equivalent flag, `STS_SA_OPTIMIZED_IMAGE`, is also usable)
- `STS_SA_CLEARF` (file system export mode)

```
To query image information:
  bpstsinfo -imageinfo
    [ -servername <server name> ]
    [ -serverprefix <server prefix> ]
    [ -lsuname <lsu name> [-lsuname <lsu name> ...] ]
    [ -imagename <image name> ]
    [ [-imagedate <image date>] | [ [-imagedatestart <image
date>] [-imagedateend <image date>] ] ] ]
```

```
[ -imagetype <STS_FULL_ONLY | STS_INCR_ONLY> ]
[ -remote <remote server> [-remote <remote server> ...] ]
```

To query image group information:

```
bpstsinfo -imagegrouplist
  -servername <server name>
  -serverprefix <server prefix>
  -lsuname <lsu name>
  -imagename <image name>
  -imagegroupuptype <STS_IGT_SNAP | STS_IGT_REUSE>
  -imagedate <image date> | [ [ -imagedatestart <image date>]
```

**-imagegrouplist** requires a storage server name, a volume name, an image id, an image date, and an image group type. It returns a list off the backup ids of all the images that are in an image group along with the image specified. The specified image is returned.

```
[-imagedat
end <image date>] ] ]
  -imagetype <STS_FULL_ONLY | STS_INCR_ONLY>
  [ -remote <remote server> [-remote <remote server> ...] ]
```

To delete an image:

```
bpstsinfo -deleteimage
  -servername <server name>
  -serverprefix <server prefix>
  -lsuname <lsu name>
  -imagename <image name>
  -imagedate <image date>
  [ -remote <remote server> [-remote <remote server> ...] ]
```

## Disk consumption

Snapshot creation consumes a large amount of disk space. NetBackup prepares for this space requirement by reserving 20% of the disk space on the volume to be used exclusively for the snapshot, and not for the active file system.

If the snapshots exceed the reserved amount, space is consumed as needed from the active file system. The active file system cannot, however, consume disk space reserved for snapshots.

### File system full conditions

Whenever snapshots consume more than 100% of the reserved space, the active file system is in danger of becoming full. Under these conditions, backups fail until administrative action is taken.

Administrative action could include:

- Expiring images through NetBackup. This can be accomplished through the Catalog interface.
- Lowering the retention level for images so that images are expired sooner.

### End of media detection on disk staging storage units

To permit End of Media detection on NearStore disk staging storage units, backup performance is diminished when a NearStore volume is within 4 gigabytes of being full.

### Multi-using the NearStore

The volume properties of the NearStore storage unit display a value for the storage available on the volume. However, the value doesn't reflect any multi-use situations in which an administrator has allotted part of the volume for another use.

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**Caution:** Symantec strongly recommends using the volume for NetBackup only.

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## Logging information

Logging occurs in the following locations log files:

- By default (if not twinning): `/usr/opensv/netbackup/logs/bpdm`
- For twinning logs only: `/usr/opensv/netbackup/logs/bptm`

All other logging is similar to a standard backup, producing, for example, progress logs.

Logs contain more information about the interaction with NearStore.

On the NearStore, the root volume contains a NetBackup-specific log file that details the protocol between NetBackup and the NearStore.

ONTAP debug logs are found in the following location:

```
/vol/vol0/etc/logs/nbu_snapvault
```

## Troubleshooting

- Make sure that the permissions on the disk storage unit are set so that data can be written to the volume. If permissions are Read Only, NetBackup cannot write to it.
- Make sure that the SnapVault license has been added and is turned on:

```
license add sv_secondary_license
```
- Make sure the `tpconfig` command is used to add the NearStore user ID and password into the EMM global database. For more information, see [“To authenticate the NetBackup media server”](#) on page 7.
- Check the storage unit configuration to make sure that NearStore is selected as the storage unit type.
- If jobs are failing to write to the NearStore, make sure that the space reserved for snapshots on the NearStore is not completely full. When the reserved space is full, NetBackup uses the active file system space as needed.
- In the case of a disk full condition on the NearStore, make sure that there are no WAFL snapshots consuming disk space unnecessarily.
- If the maximum number of transfers allowed to a single NearStore is exceeded, the ONTAP kernel reports the following error:

```
inf Wed Jul 6 07:28:27 CDT [10.80.106.36:58645] Maximum active transfers reached.
```

The maximum number of concurrent backup and/or restore connections is 128.

