

# **VERITAS NetBackup FlashBackup™ 3.4**

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## **System Administrator's Guide**

**UNIX**

June 2000  
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**VERITAS**

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# About This Guide

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This guide explains how to install, configure, and use VERITAS NetBackup FlashBackup™. In this publication, VERITAS NetBackup is referred to as NetBackup and VERITAS NetBackup FlashBackup is referred to as FlashBackup.

## Audience

This guide is intended for the system administrator responsible for configuring FlashBackup and assumes a thorough working knowledge of NetBackup administration.

## Organization

- ◆ Chapter 1, “Introduction,” is an overview of the product’s capabilities.
- ◆ Chapter 2, “Installation,” explains how to install FlashBackup.
- ◆ Chapter 3, “Configuration,” explains how to configure your system to use FlashBackup. This chapter supplements the information in the *NetBackup System Administrator’s Guide - UNIX*.
- ◆ Chapter 4, “Using FlashBackup,” explains how to back up a FlashBackup class and how to restore files from FlashBackup backups.
- ◆ Appendix A, “Solaris snapctl Driver,” provides information about the `snapctl` driver.

## Related Manuals

- ◆ *NetBackup Release Notes*  
Describes the platforms and operating systems that are supported and provides operating notes that may not be in the manuals or the online help.
- ◆ *NetBackup System Administrator’s Guide - UNIX*  
Explains how to configure and manage NetBackup on a UNIX platform.



- ◆ *NetBackup User's Guide - UNIX*  
Explains how to perform user-directed backups, restores, and archives on a UNIX client.
- ◆ *Media Manager System Administrator's Guide - UNIX*  
Explains how to configure and manage the storage devices and media that UNIX NetBackup servers use for backups.
- ◆ *Media Manager Device Configuration Guide*  
Provides information about configuring storage devices on UNIX systems.
- ◆ *NetBackup Troubleshooting Guide - UNIX*  
Provides troubleshooting information for NetBackup.

## Conventions

The following explains typographical and other conventions used in this guide.

### Type Style

Table 1. Typographic Conventions

Typeface	Usage
<b>Bold fixed width</b>	Input. For example, type <code>cd</code> to change directories.
Fixed width	Paths, commands, filenames, or output. For example: The default installation directory is <code>/opt/VRTSxxx</code> .
<i>Italics</i>	Book titles, new terms, or used for emphasis. For example: <i>Do not</i> ignore cautions.
<i>Sans serif</i> (italics)	Placeholder text or variables. For example: Replace <i>filename</i> with the name of your file.
Sans serif (no italics)	Graphical user interface (GUI) objects, such as fields, menu choices, etc. For example: Enter your password in the <b>Password</b> field.

### Notes and Cautions

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**Note** This is a Note and is used to call attention to information that makes it easier to use the product or helps you to avoid problems.

---





**Caution** This is a Caution and is used to warn you about situations that can cause data loss.

---

## Key Combinations

Some keyboard command sequences use two or more keys at the same time. For example, you may have to hold down the **Ctrl** key before you press another key. When this type of command is referenced, the keys are connected by plus signs. For example:

Press Ctrl+t

## Command Usage

The following conventions are frequently used in the synopsis of command usage.

brackets [ ]

The enclosed command line component is optional.

Vertical bar or pipe (|)

Separates optional arguments from which the user can choose. For example, when a command has the following format:

`command arg1 | arg2`

the user can use either the *arg1* or *arg2* variable.

## Getting Help

For updated information about this product, including system requirements, supported platforms, supported peripherals, and a list of current patches available from Technical Support, visit our web site:

`http://www.veritas.com/`

For product assistance, contact VERITAS Customer Support.

US and Canadian Customers: 1-800-342-0652

International Customers: +1 (650) 335-8555

VERITAS Customer Support can also be reached through electronic mail at:

`support@veritas.com`





FlashBackup is a separately priced option that combines the increased performance of raw-partition backups with the ability to do individual file restores of ufs or VxFS file systems on Solaris or of JFS or VxFS file systems on HP. This chapter provides an introduction to FlashBackup and contains the following topics.

- ◆ Requirements
- ◆ Features
- ◆ Restrictions
- ◆ Technical Overview

---

**Caution** Do not use FlashBackup to back up HSM-managed file systems.

---

## Requirements

FlashBackup requires the following components:

- ◆ A UNIX master server with NetBackup 3.4 or later installed.
- ◆ NetBackup clients that have Solaris 2.6, Solaris 7, or Solaris 8, and NetBackup 3.4 or later client software installed, or NetBackup clients that have HP 11.00 and NetBackup 3.4 or later installed.
- ◆ The FlashBackup dynamic shared library (`libbpfsmapi.so` for Solaris or `libbpfsmapi.sl` for HP) must be installed on the clients.
- ◆ If you are using VxFS file systems, VxFS 3.3.2 or later must be installed on the clients. If you are using JFS file systems on HP, JFS 3.3 or higher must be installed on the clients.
- ◆ For Solaris only, the FlashBackup `snappctl` driver must be installed on the clients.
- ◆ A raw disk partition to act as the cache device.



## Features

The features that distinguish FlashBackup from other raw-partition backups and standard file system backups are:

- ◆ FlashBackup backs up the following file systems: ufs (Solaris), VxFS (Solaris and HP), and JFS (HP)

- ◆ Allows individual file restores

FlashBackup provides a file system mapping capability that allows individual files to be restored from FlashBackup raw-partition backups.

- ◆ Supports multiple data streams

It is possible to split a backup into multiple data streams in order to further increase the performance of FlashBackup raw-partition backups.

- ◆ Uses standard NetBackup utilities for raw partition restores

You can restore raw partitions from FlashBackup backups by using the NetBackup server Java interface (jbpSA), or by using the standard `xbp` or `bp` restore raw partitions mechanism on the FlashBackup client.

- ◆ The file system remains mounted during raw-partition backups

It is not necessary to unmount the file system or mount it read only, as with standard raw-partition backups.

FlashBackup has on-line backup capability that allows the file system mounted on the raw partition to be modified while the backup is in progress.

This on-line backup capability is made possible by backing up a snapshot of the raw partition. The snapshot is a consistent image of the file system at the moment the backup began. The snapshot mechanism is provided by the FlashBackup `snapctl` driver for Solaris ufs backups, and by VxFS snapshot for VxFS backups.

- ◆ Provides economical use of kernel resources (Solaris only)

While a snapshot is active, the `snapctl` driver requires only four kilobytes of physical RAM per gigabyte of snapped file system.

- ◆ Has no effect on file system reliability

The `snapctl` driver does not affect file system reliability. When a file system block is updated, the write to the snapped partition always completes, regardless of errors involving the snapshot. For example, the write will complete even if a cache overflow occurs.

- ◆ Provides increased performance

When used under the right conditions, FlashBackup provides increased backup performance over other backup methods. For example, a FlashBackup of a file system will complete in substantially less time than other types of backup, if the file system contains a very large number of files and most of the file system blocks are allocated.

However, under conditions such as those below, FlashBackup will not necessarily be faster than other backup types and may be slightly slower:

- ◆ If the file system contains a small number of large files.
- ◆ If the file system has a small number of files and most of the file system blocks are not allocated.

---

**Note** While a snapshot is in effect, reads of the snapped file system will execute without loss of performance. Writes to a snapped file system, however, will suffer speed degradation of 200 to 300% the first time a particular block is written. After a block has been cached, subsequent writes to that block will execute without degradation in speed.

---

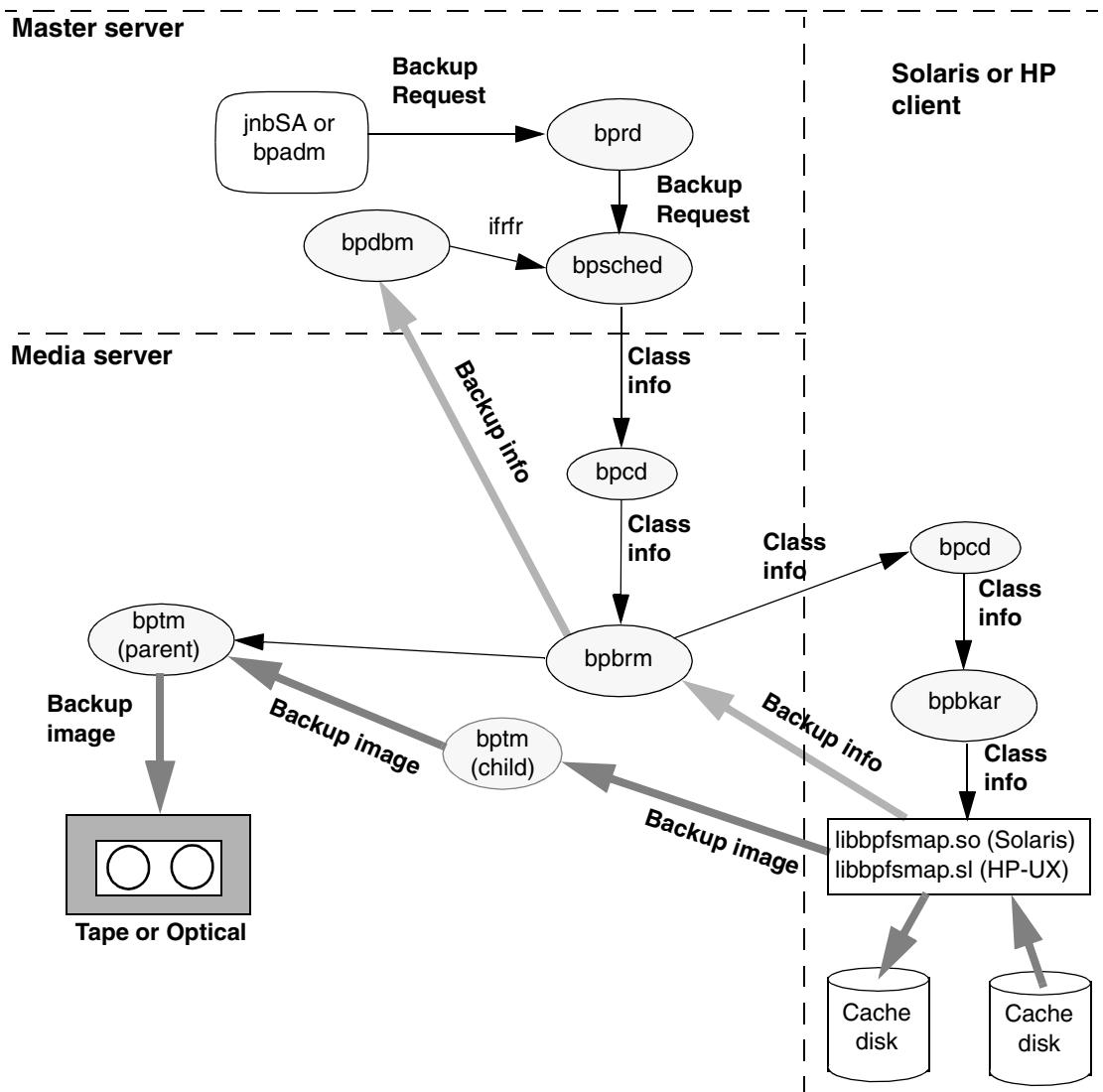
## Restrictions

- ◆ FlashBackup does not support file systems managed by HSM.



## Technical Overview

The following figure shows the major NetBackup components involved in FlashBackup backups.



Scheduled backups and immediate backups of FlashBackup classes are initiated and processed in the same manner as standard class backups. However, the Individual file restore from raw (`ifrr`) attribute, which defines FlashBackup classes, causes `bpsched` to send the special

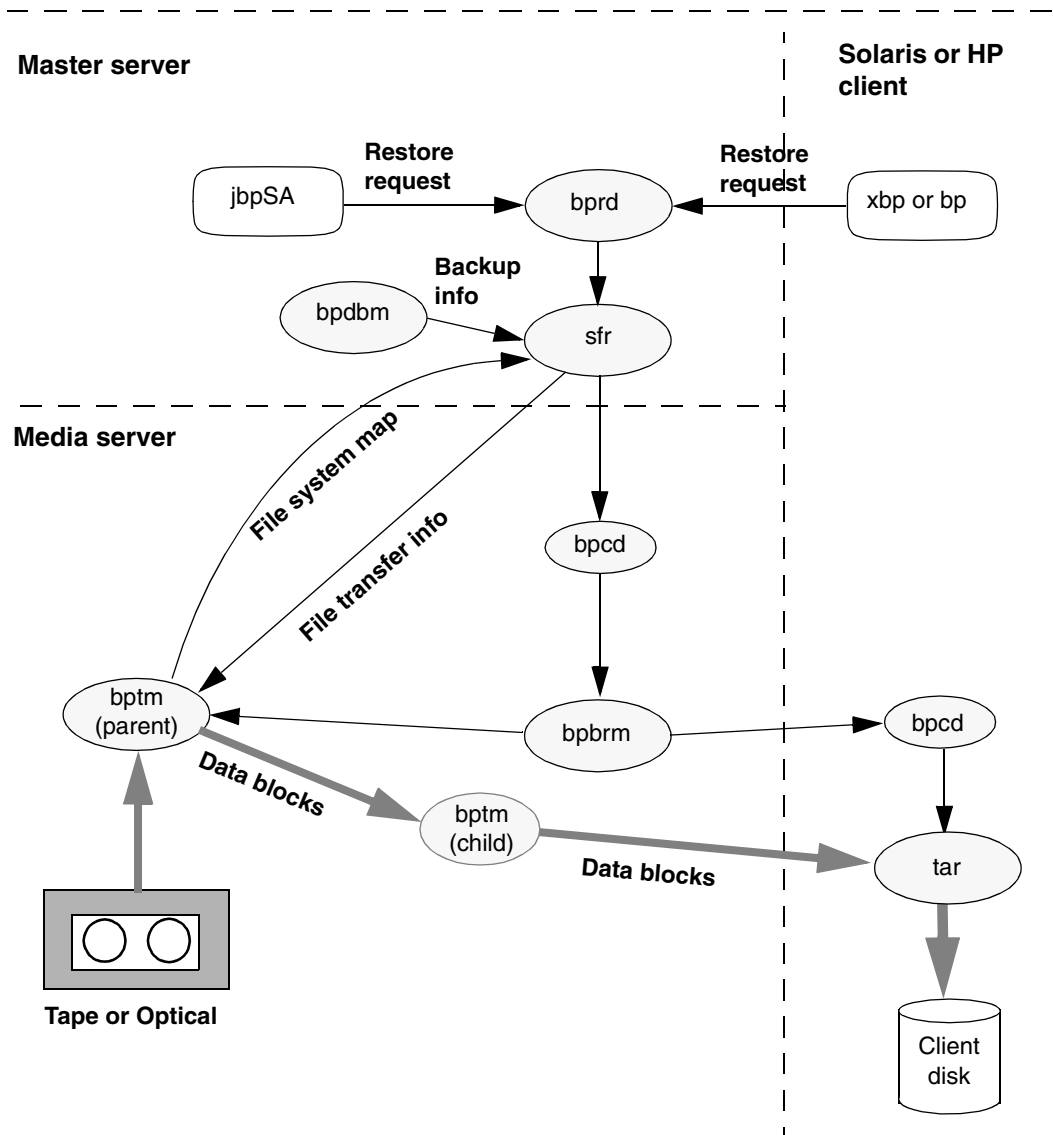
-ifrfr flag to `bpbrm` along with the other class information. `bpbrm` starts `bpbkar` with the -ifrfr flag, which causes `bpbkar` to invoke the FlashBackup dynamic shared library (`libbpfsmmap.so` on Solaris, `libbpfsmmap.sl` on HP).

During the backup, the dynamic shared library (`libbpfsmmap.so` or `libbpfsmmap.sl`) performs the following tasks:

- ◆ Creates a file system map that represents files contained in the raw partition.
- ◆ If the backup type is a file incremental, the dynamic shared library creates a bit map that associates blocks belonging to selected files with their physical addresses in the partition. Note that block level incrementals are not supported.
- ◆ Turns on the raw-partition snapshot mechanism so that when a block is updated in the partition, the previous contents of the block are written to the cache partition.
- ◆ Sends the backup information to `bpbrm`, which in turn directs the backup information to `bpdbm`. The backup information is composed of:
  - ◆ File system map name
  - ◆ Bit map name (if incremental)
  - ◆ Individual file names
  - ◆ Raw-partition name
- ◆ Transmits the backup image to `bptm`. The backup image is composed of:
  - ◆ File system map data blocks
  - ◆ Bit map data blocks
  - ◆ Raw-partition data blocks
- ◆ Turns off the snapshot mechanism.



The following figure shows the major components involved in restoring files from FlashBackup backup images.



During a restore, the user browses for and selects files from FlashBackup images in the same manner as standard backup images. The difference is that `bprd` calls the `sfr` program when processing FlashBackup images. During a restore, the `sfr` program performs the following tasks:





- ◆ Retrieves information about the backup from `bpdbm`. The backup information is composed of:
  - ◆ File system map name and its media location.
  - ◆ Bit map name and its media location.
  - ◆ Raw-partition name and its media location.
- ◆ Using the backup information, `sfr` retrieves the file system map data by directing `bptm` to the location of the file system map on the tape and then reading from the tape. A similar procedure is followed to position `bptm` to obtain the bit map data when restoring from incremental backup images and to obtain the raw-partition data when restoring the raw partition.
- ◆ Then, using the information contained in the file system map, `sfr` directs `bptm` to the location of the individual file data blocks on the tape.

`bptm` then reads the file data blocks from the tape and writes them to the client's `tar` program. Finally, `tar` writes the file data to the client disk.





This chapter explains how to install and deinstall FlashBackup.

## Prerequisites

- ◆ A UNIX master server with NetBackup 3.4 or later installed.
- ◆ NetBackup FlashBackup Solaris clients must have Solaris 2.6, Solaris 7, or Solaris 8 installed. NetBackup FlashBackup HP clients must have HP-UX 11.00 installed. FlashBackup provides the necessary libraries and drivers for these clients.
- ◆ NetBackup 3.4 or later client software must also be installed.
- ◆ If you are going to perform VxFS backups, you must have VxFS 3.3.2 or later installed on the clients.

---

**Caution** If you are using a version of NetBackup that is earlier than the version defined for your platform, upgrade to the required version before installing FlashBackup. Otherwise, your FlashBackup backups will work but restores of files greater than two gigabytes will fail.

---

## Installing FlashBackup

### Step 1: Load From Media

1. Log in as root on the master server.
2. Make sure a valid license key for NetBackup FlashBackup has been registered by entering the following command to list and add keys:  

```
/usr/openv/netbackup/bin/admincmd/get_license_key
```
3. Insert the CD-ROM containing the FlashBackup software in the drive.



4. Change your working directory to the CD-ROM directory:

```
cd /cd_rom_directory
```

Where *cd\_rom\_directory* is the path to the directory where you can access the CD-ROM. On some platforms, it may be necessary to mount this directory.

5. To install NetBackup FlashBackup, execute the following:

```
./install
```

Since other NetBackup products are included on the CD-ROM, a menu appears:

- a. Select the NetBackup FlashBackup option.
- b. Enter **q** to quit the menu.
- c. When asked if the list is correct, answer **y**.

On all platforms, FlashBackup libraries are installed in

```
/usr/openv/lib/client/hardware/os
```

and the FlashBackup snapshot drivers and commands are installed in:

```
/usr/openv/netbackup/bin/driver/hardware/os
```

Where:

- ◆ *hardware* is Solaris, HP9000-800, or HP9000-700
- ◆ *os* is Solaris 2.6 or HP-UX11.00

## Step 2: Distribute FlashBackup to the Clients

---

**Note** If the master server is a Solaris or HP system and the master server is also a client, you do not have to distribute FlashBackup software to the client on the master server. This distribution is done automatically when you load the software from the media (see previous step). However, you must distribute the software as explained below to all other clients that will be using FlashBackup.

---

1. Distribute FlashBackup client software to the desired UNIX clients by executing the following commands as the root user on the Netbackup FlashBackup server.
  - a. Check whether `bprd` is running by executing:

```
/usr/openv/netbackup/bin/bpps
```



- b. If only one `bprd` shows up in the `bpps` output, there are no active backups or restores. In that case, terminate the `bprd` daemon by executing:

```
/usr/opensv/netbackup/bin/admincmd/bprdreq -terminate
```

If more than one `bprd` appears, wait until the backups and/or restores are complete and then run `/usr/opensv/netbackup/bin/bpps` again. When only one `bprd` shows up, terminate the `bprd` daemon.

- c. Distribute FlashBackup client software to the desired clients by executing the following command. You may want to redirect the output of the command if you have a large number of clients using FlashBackup:

```
/usr/opensv/netbackup/bin/update_flashclients
```

Or, specify each client individually by executing the following (all on one line):

```
/usr/opensv/netbackup/bin/update_flashclients -ClientList file
```

Where *file* is the name of a file each line of which contains the following three parameters:

```
hardware_type operating_system hostname
```

For example:

```
Solaris Solaris2.6 mysparc
```

or

```
Solaris Solaris7 othersparc
```

or

```
HP9000-800 HP-UX11.00 myhp
```

2. After FlashBackup client software has been distributed to the desired clients, start the NetBackup daemons as the root user on the master server by executing:

```
/usr/opensv/netbackup/bin/initbprd
```

### Step 3: Install snap Driver (Solaris) or Move FlashBackup Library (HP)

On each NetBackup client that will be using FlashBackup to back up ufs or VxFS mounted file systems, execute the following:

```
/usr/opensv/netbackup/bin/driver/fb_snap.install
```

---

**Note** On HP, this command moves the FlashBackup library to `/usr/opensv/lib`.

---



## Deinstalling FlashBackup

### Server Deinstall

On the master server where you initially loaded the FlashBackup software, execute the following:

For Solaris NetBackup servers, execute:

```
pkgrm SUNWnbfs
```

For other UNIX NetBackup servers, delete the following:

```
/usr/opensv/netbackup/bin/driver/HP9000*/HP_UX11.00/*  
/usr/opensv/netbackup/bin/driver/Solaris/Solaris2.6/*  
/usr/opensv/lib/client/*/libbpfsmap.*
```

### Client Deinstall

On each NetBackup client that is using FlashBackup:

1. On Solaris only: execute the following to verify that no snapshots are active:

```
/usr/opensv/netbackup/bin/driver/snaplist
```

If a snapshot is active, wait until the snapshot completes and then do step 2.

2. Execute the following command to deinstall the client software:

```
/usr/opensv/netbackup/bin/driver/fb_snap.install -d
```



To use the features provided by FlashBackup, you must add at least one FlashBackup type of class to NetBackup. This chapter briefly explains how to configure FlashBackup classes.

Only the configuration differences between Standard and FlashBackup classes are described here. For a detailed discussion of configuring NetBackup classes, see the *NetBackup System Administrator's Guide - UNIX*.

The following topics are covered in this chapter:

- ◆ General Class Attributes
- ◆ Client List
- ◆ File List and Cache
- ◆ Schedules
- ◆ General Configuration

Use the NetBackup Administration utility on the NetBackup master server to add your classes.

## General Class Attributes

When you select the general attributes for the class, always set the **Class type** attribute to FlashBackup. A FlashBackup class also has the **Individual file restore from raw** attribute, which is always set to Yes. This attribute lets you restore individual files from raw-partition backups. For more information, see the Individual File Restore From Raw discussion in the *NetBackup System Administrator's Guide - UNIX*.

NetBackup forces the following attributes to No. You cannot change them.

- ◆ Follow NFS
- ◆ Cross mount points
- ◆ True image restore information
- ◆ Compression
- ◆ Encryption



- ◆ Block level incremental

## Client List

The client list specifies the clients on which you installed the FlashBackup software. The clients must be Solaris 2.6, 7, 8, or HP 11.00.

## File List and Cache

---

**Caution** Do not use FlashBackup to back up HSM-managed file systems.

---

**Note** A client must contain *all* the raw partitions that are specified in the file list for backups to succeed. Otherwise, you must put the clients in separate classes.

Exclude and include lists have no effect on FlashBackup backups.

---

The entries in the file list for a FlashBackup class are the same as for a standard raw-partition backup, except that there must be a special CACHE= entry before any raw partition entries.

For example:

```
CACHE=/dev/rdisk/c0t4d0s0  
/dev/rdisk/c0t4d0s7
```

The CACHE= entry specifies the cache partition to be used for storing any updates to the raw-partition entry while the backup is in progress.

- ◆ The raw-partition entry specifies the disk partition on the client to be backed up.
- ◆ For all entries in the file list, enter the full path name of the device file. Do not specify wildcards (such as /dev/rdisk/c0\*) as paths for any entry.

---

**Note** Ensure that you are specifying the actual character special device file for each entry. FlashBackup will not work for block special device files.

---

- ◆ Links to the device files are permitted.
- ◆ You can include multiple entries in the same file list.

For example:

```
CACHE=/dev/rdisk/c0t4d0s0  
/dev/rdisk/c0t4d0s7  
CACHE=/dev/rdisk/c0t4d0s1  
/dev/rdisk/c0t4d0s2
```



---

```
/dev/rdisk/c0t4d0s3
```

- ◆ The cache partition is part of the snapshot mechanism that preserves a consistent view of the raw partition for NetBackup.

The basic requirements for the cache partition are:

- ◆ Must reside on the same host as the raw partitions that you are backing up.
- ◆ Multiple backups cannot use the same cache partition simultaneously on HP-UX systems. If multiple classes list the same cache partition on HP-UX systems, backups naming those classes must be run at different times to prevent a failure.
- ◆ Cannot be the raw partition being backed up, or one that is used as part of another file system or virtual partition.
- ◆ Must be unmounted.
- ◆ Must have enough space to hold all the writes to the partition that may occur during the backup. Note that backups during nonworking hours normally require a smaller cache than a backup during peak activity times. Also see the introductory section in Appendix A.
- ◆ You can include directives if `Allow multiple data streams` is set for the class (see “Allow Multiple Data Streams,” below).

## Allow Multiple Data Streams

If you select the `Allow multiple data streams` general attribute for the class, you can include directives in the file list that will start multiple backups for each client that is backed up:

- ◆ The number of backups that start depends on the directives in the file list.
- ◆ The number of backups that can run concurrently depends on the number of available storage units and the maximum jobs parameters (for example, `Limit jobs per class`).

`Allow multiple data streams` is useful for reducing the backup time for very large backups. This is achieved by using multiple drives, multiplexing, or a combination of the two for processing the streams concurrently.

---

**Note** For best performance, use only one data stream to back up each physical device on the client. Multiple concurrent streams from a single physical device can adversely affect backup times.

---

The directives that you can use in the file list for a FlashBackup class are:

```
NEW_STREAM
```

```
CACHE=value (see “File List and Cache” earlier in this chapter)
```

```
UNSET
```



UNSET\_ALL

For FlashBackup classes, the `NEW_STREAM` directive must be the first line of the file list. This directive causes the following to occur:

- ◆ The backup is split into a separate stream at each point in the file list where the `NEW_STREAM` directive occurs.
- ◆ All file paths between `NEW_STREAM` directives are in the same stream.
- ◆ The end of a stream is defined by the start of a new stream (that is, another `NEW_STREAM` directive) or the end of the file list.

For example, consider the file lists below:

On Solaris systems:

```
NEW_STREAM
CACHE=/dev/rdisk/c1t3d0s3
/dev/rdisk/c1t0d0s6
NEW_STREAM
/dev/rdisk/c1t1d0s1
NEW_STREAM
UNSET CACHE
CACHE=/dev/rdisk/c1t3d0s4
/dev/rdisk/c1t2d0s5
/dev/rdisk/c1t5d0s0
NEW_STREAM
UNSET CACHE
CACHE=/dev/rdisk/c0t2d0s3
/dev/rdisk/c1t6d0s1
```

On HP-UX systems:

```
NEW_STREAM
CACHE=/dev/cache_group/rvol1c
/dev/vol_grp/rvol1
NEW_STREAM
UNSET CACHE
CACHE=/dev/cache_group/rvol2c
/dev/vol_grp/rvol2
NEW_STREAM
UNSET CACHE
CACHE=/dev/cache_group/rvol3c
/dev/vol_grp/rvol3
/dev/vol_grp/rvol3a
NEW_STREAM
UNSET CACHE
CACHE=/dev/cache_group/rvol4c
/dev/vol_grp/rvol4
```

This file list produces four backups:

- ◆ The first `NEW_STREAM` directive starts a backup for `/dev/rdisk/c1t0d0s6` (Solaris) or `/dev/vol_grp/rvol1` (HP-UX). The `CACHE=` entry sets the cache partition to `/dev/rdisk/c1t3d0s3` (Solaris) or `/dev/cache_group/rvol1c` (HP-UX).
- ◆ The second `NEW_STREAM` directive starts a second stream to back up `/dev/rdisk/c1t1d0s1` (Solaris) or `/dev/vol_grp/rvol2` (HP-UX). On Solaris systems, this backup uses the same cache partition. On HP-UX systems, a different cache partition must be defined for each stream (`CACHE=/dev/cache_group/rvol2c`).

- ◆ The third `NEW_STREAM` starts a backup for `/dev/rdisk/c1t2d0s5` and `/dev/rdisk/c1t5d0s0` (Solaris) or `/dev/vol_grp/rvol13` and `/dev/vol_grp/rvol13a` (HP-UX). These two partitions are backed up serially within the stream. In addition, the `UNSET CACHE` directive unsets the previous cache setting and the `CACHE=` directive sets a new cache partition for this backup.
- ◆ The last `NEW_STREAM` directive starts a backup for `/dev/rdisk/c1t6d0s1` (Solaris) or `/dev/vol_grp/rvol14` (HP-UX). Like the third stream, this one also unsets the cache directive and defines a new cache partition.

As shown in the example, class-specific directives such as `CACHE` are passed to the client with the current stream and all subsequent streams, until the directive is redefined or unset.

If the directive is encountered again, its value is redefined.

An `UNSET` or `UNSET_ALL` directive unsets a directive that was previously defined in the file list.

- ◆ `UNSET` unsets a class-specific directive so it is not passed with additional streams. The directive that was unset can be defined again later in the file list so it is included in the current or a later stream.
- ◆ `UNSET_ALL` has the same effect as `UNSET` but affects all class-specific directives that have been defined up to this point in the file list. If used, `UNSET_ALL` must appear directly after the second or later `NEW_STREAM` keyword.

For more information on **Allow multiple data streams**, see the *NetBackup System Administrator's Guide - UNIX*.

## Schedules

FlashBackup supports only full and incremental schedule types. User backup and archive schedule types are not allowed.

## General Configuration

### Client Read Timeout Setting

If the file system being backed up is very large and has a very large number of files, the default `CLIENT_READ_TIMEOUT` setting can cause a backup to fail with a status code of 41. A large number of concurrent data streams being active at the same time can also cause this failure.



To avoid or correct this problem, add `CLIENT_READ_TIMEOUT` to the `/usr/opensv/netbackup/bp.conf` file on the server and set it to a higher value (the NetBackup default is 300 seconds). The best value depends on the file system size, number of files, and system activity.



The following topics are covered in this chapter:

- ◆ Performing a Backup
- ◆ Performing a Server-Directed Restore
- ◆ Performing a Client-Directed Restore
- ◆ Troubleshooting

## Performing a Backup

### Automatic Backup of a FlashBackup Class

The most convenient way to back up raw partitions with FlashBackup is to configure a FlashBackup class and then set up schedules for automatic, unattended backups. To add new schedules or change existing schedules for automatic backups, follow the guidelines in the *NetBackup System Administrator's Guide - UNIX*.

### Manual Backup of a FlashBackup Class

The administrator can use the NetBackup Administration interface on the master server to execute a backup for a FlashBackup class. See the *NetBackup System Administrator's Guide - UNIX* for instructions.



## Performing a Server-Directed Restore

As root user on the master server, you can perform a server-directed restore to a client. Using the server's NetBackup Administration interface, you can restore individual directories or files (or an entire raw partition) backed up by FlashBackup. The procedure is the same as that for restoring from a regular file system backup as described in the *NetBackup User's Guide - UNIX*. However, note the following before starting the restore.

### Note on Restoring Individual Directories or Files

- ◆ In order to restore individual directories or files from a raw partition backup, the client must be in a FlashBackup Auspex-FastBackup class and the server must be configured to allow for individual file restores from raw partition backups.

### Notes on Restoring Raw Partitions

- ◆ To restore a raw partition, you must have administrator capabilities on the NetBackup server.
- ◆ An entire raw partition can only be restored from a full backup. FlashBackup and Auspex-FastBackup incremental backups only support individual file restores. (NetBackup does not distinguish between full and incremental backups when performing a standard raw partition backup.)
- ◆ Ensure that the partition is not mounted and not in use (if the partition is being used by a database, make sure to shut down the database). The partition must be the same size as when it was backed up. Otherwise, the results of the restore are unpredictable.
- ◆ Ensure that the device file for the raw partition exists prior to the restore.
- ◆ The overwrite option is ignored during raw partition restores. The device file must exist and the disk partition is overwritten whether this option is set or not.
- ◆ To avoid overwriting the entire partition, use the alternate-path restore feature to restore the raw partition to another raw partition of the same size, and then copy individual files to the original file system.

## Performing a Client-Directed Restore

You can use the NetBackup xbp user interface on a FlashBackup client to restore individual directories or files (or an entire raw partition) from a FlashBackup backup, as follows.



## To Restore Individual Directories or Files with xbp

1. Start xbp. For example, execute:  

```
/usr/opensv/netbackup/bin/xbp
```
2. In the Directory to Search field, specify the file path.
3. On the File menu, click Browse backups (restore).

---

**Note** Do not choose Browse backups (restore raw partitions) or Browse backups (Auspex FastBackup raw partition).

---

4. In the Backup Images pane, select the desired FlashBackup backup and update the display (choose Update Display on the Edit menu).  
The list of directories and files appears in the Directory Structure and Files panes in the same way as if you had chosen a regular file system backup.
5. Select the desired directory or files.

## To Restore an Entire Raw Partition with xbp

---

**Note** To restore an entire raw partition, select a FlashBackup full backup. You cannot restore the partition from FlashBackup incremental backups because those incrementals support only individual file restores.

---

1. Start xbp. For example, execute:  

```
/usr/opensv/netbackup/bin/xbp
```
2. In the Directory to Search field, specify the raw partition.  
Specify the device file name (for example, /dev/rdisk), not the file system name.
3. On the File menu, click Browse backups (restore raw partitions).

---

**Note** Do not choose Browse backups (Auspex FastBackup raw partition).

---

4. In the Backup Images pane, select the desired FlashBackup full backup and update the display (choose Update Display on the Edit menu).  
The list of device paths appears in the Directory Structure and Files panes.
5. Select the desired directory or device paths and start the restore.



## Troubleshooting

This section addresses issues and problems encountered when using FlashBackup.

### Gathering Information and Checking Logs

You can resolve many problems on your own by setting up the appropriate logs, reproducing the problem, and then checking the logs.

- ◆ To create more log information, put `VERBOSE` in the `bp.conf` file on the NetBackup master and client.

---

**Note** The directories under `/usr/opensv/netbackup/logs` can eventually require a lot of disk space, so delete them when you are finished troubleshooting.

---

- ◆ Backup Messages

During a backup, FlashBackup messages are logged to the `bpbkar` activity log directory on the client: `/usr/opensv/netbackup/logs/bpbkar`. If necessary, create this directory (use access mode of `777` so the client can write to the logs).

- ◆ Restore Messages

During a restore, FlashBackup messages are logged to the `bprd` activity log directory on the master server: `/usr/opensv/netbackup/logs/bprd`. If necessary, create this directory (use access mode of `777` so the client can write to the logs).

- ◆ `snaptcl` Driver Messages

Messages from the `snaptcl` driver are logged in the client's `/var/adm/messages` file along with other kernel messages.

### Before Contacting VERITAS Customer Support

Before calling customer support, please gather as much log information as possible. Be sure to have the following information ready:

- ◆ NetBackup version
- ◆ Operating system version of the FlashBackup client
- ◆ Note whether or not the action that failed had ever worked, and whether the problem is repeatable
- ◆ Log information (see “Gathering Information and Checking Logs” on page 22)

For the customer support phone number, refer to the preface.





## Particular FlashBackup Problems

Some of the following items pertain only to Solaris-based systems, as noted.

### On Solaris: the backup failed with status code 12

This error can occur if the snap driver is not installed. Make sure that the following files exist on the client.

32-bit system	64-bit system
<code>/usr/kernel/drv/snapctl.conf</code>	<code>/usr/kernel/drv/snapctl.conf</code>
<code>/usr/kernel/drv/snapctl</code>	<code>/usr/kernel/drv/sparcv9/snapctl</code>

If the snap driver files do not exist, install the snap driver as described in Chapter 2 on page 11.

### The `/tmp` directory on the FlashBackup client or server filled up during a backup

Prior to the 3.4 release of FlashBackup, FlashBackup created temporary files in the `/tmp` directory on the client and server during backups and restores. The temporary files are deleted when the backup or restore is finished.

To change the default location for these files from `/tmp` to any other directory, you can create a symbolic link called `BPFSSMAP_TMPDIR` or `SFR_TMPDIR` that points to a directory with more space.

To change the directory on the client, execute the following:

```
cd /usr/opensv/netbackup
ln -s /fb_tmp_dir BPFSSMAP_TMPDIR
```

where `fb_tmp_dir` is the directory where you want FlashBackup to create its temporary files.

To change the directory on the server, execute the following:

```
cd /usr/opensv/netbackup
ln -s /fb_tmp_dir SFR_TMPDIR
```

With the 3.4 release, the default location of the temporary files changed to `/usr/opensv/BPFSSMAP_TMPDIR` and `/usr/opensv/SFR_TMPDIR`. This prevents problems that might result if the `/tmp` directory filled up.

To change the location of these temporary files, remove the following:

```
/usr/opensv/netbackup/BPFSSMAP_TMPDIR
```



`/usr/opensv/netbackup/SFR_TMPDIR`

and enter the commands listed above for the server or client, specifying a different directory for `fb_tmp_dir`.

### Status code 13 occurs during backups

This status can result from any of the following:

- ◆ The FlashBackup client may have run out of space in `/tmp`. If this occurred, you should see a message such as the following in your `bptm` log:

```
16:58:44 [8467] <32> bpfsmmap: flush_imebuf: write to tmp inomap
file failed errno=28
```

Note that `errno 28` is `ENOSPC`, “No space left on device.”

You need to change the default location for the FlashBackup temporary files from `/tmp` to a directory with more space. To do so, refer to the instructions under “The `/tmp` directory on the FlashBackup client or server filled up during a backup” on page 23.

- ◆ The FlashBackup cache partition may have run out of space. In that case, the cache partition may not be large enough for the backup requirements.

If the cache partition is full, you will see messages such as the following in the system log:

```
WARNING: sn_alloccache: cache /dev/vx/rdsk/flashldg/f full - all
snaps using this cache are now unusable
WARNING: sn_failsnap: snapshot id 5 failed error 28
```

Specify a larger cache partition, or designate additional cache partitions in the file list. See Chapter 3 in this guide for cache partition requirements.

- ◆ **On Solaris:** If your cache partition runs out of space, there may be “stale” snapshots taking up space on the cache partition. Stale snapshots are those that were not automatically deleted by FlashBackup.

- a. Determine if there are stale snapshots on your Solaris client by executing the following:

```
/usr/opensv/netbackup/bin/driver/snaplist
```

- b. For each snapshot listed, execute the following to make sure there is a `bpbkar` process associated with it:

```
ps -eaf |grep ident
```

where *ident* is the snapshot process id displayed by the `snaplist` command.

- c. Remove snapshots that do not have an associated `bpbkar` process by entering the following:

```
/usr/opensv/netbackup/bin/driver/snapoff snapn
```

where *snapn* is the snapshot id displayed by the `snaplist` command.

- ◆ **On Solaris:** The `snap.c` component of the snap driver `snapctl` must be at version 1.22 or higher. Earlier versions of this file could cause the backup to fail with status code 13.

Execute the following to determine the version of the `snap.c` component of `snapctl`.

```
cd /usr/kernel/drv
strings snapctl |grep Revision
```

If `snap.c` is at an earlier version than 1.22, you have a pre-release version of the product and must install the official release version.

### The restore failed with status code 5 after a NetBackup patch was installed

If you receive status code 5 when attempting to restore a FlashBackup file after a NetBackup patch was installed, the patch may not have been installed properly. Follow the installation instructions in the patch README file and make sure the `libsfr.so` file is copied as instructed.

### On Solaris: The backup failed with status code 6, with an 'insane directory entry' message in the bpbkar log file

To avoid this error, the `snap.c` component of the snap driver `snapctl` must be at version 1.22 or higher. Earlier versions of this file could cause the backup to fail with status code 6 and 'insane directory entry' messages in the `bpbkar` log.

Execute the following to determine the version of the `snap.c` component of `snapctl`.

```
cd /usr/kernel/drv
strings snapctl |grep Revision
```

If `snap.c` is at an earlier version than 1.22, you have a pre-release version of the product and must install the official release version.

### Client is not updated after the update\_flashclients script is run

If the `update_flashclients` script is run directly from the `/usr/opensv/netbackup/bin` directory, the files may not be properly updated on the client. In this case, note the following.



- ◆ If this is a new installation, the `update_flashclients` log file in `/tmp` will contain the following entry:

```
Couldn't execute sh /usr/opensv/netbackup/bin/extract.sh>/dev/null
2>/dev /null on duo
```

- ◆ If `update_flashclients` is being used to install a patch and `update_flashclients` is run from the `/usr/opensv/netbackup/bin` directory, the files will not be updated on the client but there will be no indication of a failure in the log file.

If you are having this problem, make sure to run the `update_flashclients` script from the `/` (root) directory.

### System crashed after installing a NetBackup patch

If a patch is installed on the NetBackup server, but the `update_flashclients` script did not complete successfully on the FlashBackup client, inconsistencies between binaries can cause a system crash. If you have installed a patch on the NetBackup server, make sure the `update_flashclients` script completed successfully on the client.

### On HP-UX: the backup failed with status code 20

The HP-UX VxFS snapshot mechanism requires a dedicated cache partition for each snapshot. A check is made in the mount table to make sure the cache partition is not already in use. If the cache partition is already in use, status code 20 will occur.

Check the `/usr/opensv/netbackup/logs/bpbkar` log for a message similar to the following:

```
bpfsmmap: FTL - bpfsmmap: snapshot cache already in use, /dev/arrayvg/vol14c
bpbkar Exit: ERR - bpbkar FATAL exit status = 20: invalid command parameter
bpbkar Exit: INF - EXIT STATUS 20: invalid command parameter
```

If the snapshot cache partition is already in use, you will have to set up your class schedules to run at different times, or use different cache partitions for each backup.

If the `Allow multiple data streams` option is enabled, each stream must have its own dedicated cache partition.

# Solaris snapctl Driver

---

**A**

Under normal conditions, the snap driver is invoked only by NetBackup.

Each FlashBackup backup requires that a cache partition be specified in the class file list by using a `CACHE=` entry (see “File List and Cache” on page 14). On Solaris systems, the same cache can be used by any number of concurrent backups, as long as it is big enough. For HP-UX systems, each concurrent backup must have a dedicated cache partition.

The cache size should be approximately 10% to 15% of the total of all partitions that are associated with the specific cache. This assumes no more than a moderate level of write activity during backups.

If a cache overflows, all snapshots that are using the cache will become unreadable and the backups that are reading the snapshots will fail.

## Command Usage

### **snapoff**

`snapoff` terminates a snapshot that was previously initiated by a backup that failed abnormally. `snapoff` must be invoked as:

```
/usr/openv/netbackup/bin/driver/snapoff snap1 ... snapn
```



If `snapoff` is successful, a message of the following form will be displayed:

```
snap 1 disabled
snap 2 disabled
...
snap n disabled
```

If `snapoff` fails, an explanatory message is displayed. Error codes are identified in `/usr/include/sys/errno.h`.

## snaplist

This command must be invoked as:

```
/usr/opensv/netbackup/bin/driver/snaplist
```

`snaplist` displays information about all active snapshots in the following form:

id	device	size	cached	cache	err	time
1	/dev/rdisk/c0t3d0s0	72560	16450	/dev/rdisk/c0t4d0s0	0	12/19/99 13:23:48

Where:

- ◆ `size` is the size of the snapped partition in 512-byte blocks.
- ◆ `cached` is the number of 512-byte blocks that have been cached (written to) for this snapshot since it was initiated.
- ◆ `err` is an error code; 0 indicates no error.

If a snapshot has encountered an error, then `err` will be non-zero and the snapshot will be inaccessible. It can be terminated using `snapoff`. Error codes are identified in `/usr/include/sys/errno.h`. Also, error messages may be found in `/var/adm/messages`.

## snapcachelist

This command must be invoked as:

```
/usr/opensv/netbackup/bin/driver/snapcachelist
```

`snapcachelist` displays information about all partitions currently in use as snapshot caches. It is useful for monitoring the extent to which caches are full. Displayed output is of the form:

device	free	busy
/dev/rdisk/c0t4d0s0	238528	264472

Where:

- ◆ `free` is the number of 512-byte blocks available.

- ◆ `busy` is the number of 512-byte blocks that have been written to.

When a cache is full, any write to a snapped partition or snapped file system associated with that cache will cause the snapshot to fail and the snapshot will no longer be readable or writable. Reads or writes to the snapped partition will remain unaffected. The failed snapshot will not be terminated automatically and must be terminated using `snapoff` in the usual way.

---

**Note** Snapshots used by the FlashBackup mechanism in NetBackup are initiated and terminated by NetBackup. While a FlashBackup backup is in progress, `snaplist` and `snpcachelist` can be used to monitor the snapshot.

---

---

**Caution** Do not terminate a NetBackup snapshot using `snapoff` because corruption of the backup image may result.

---

## snapstat

The `snapstat` command must be invoked as:

```
/usr/opensv/netbackup/bin/driver/snapstat
```

`snapstat` displays diagnostic information about the snap driver.







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