Symantec NetBackup™ Troubleshooting Guide

UNIX, Windows, and Linux

Release 7.1

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Symantec

Symantec NetBackup™ Troubleshooting Guide

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Legal Notice

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Technical Support

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www.symantec.com/business/support/

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When you contact Technical Support, please have the following information available:

- Product release level

- Hardware information
- Available memory, disk space, and NIC information
- Operating system
- Version and patch level
- Network topology
- Router, gateway, and IP address information
- Problem description:
  - Error messages and log files
  - Troubleshooting that was performed before contacting Symantec
  - Recent software configuration changes and network changes

Licensing and registration

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- Advice about Symantec's technical support options
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- Issues that are related to CD-ROMs or manuals

Support agreement resources

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Asia-Pacific and Japan	customercare_apac@symantec.com
Europe, Middle-East, and Africa	semea@symantec.com
North America and Latin America	supportsolutions@symantec.com

Contents

Chapter 1

Introduction

This chapter includes the following topics:

Troubleshooting a problem

The following steps offer general guidelines to help you resolve any problems you may encounter while you use NetBackup. The steps provide links to more specific troubleshooting information.

Table 1-1 Steps for troubleshooting NetBackup problems

Step	Action	Description
Step 1	Remember the error message	Error messages are usually the vehicle for telling you something went wrong. If you don't see an error message in an interface, but still suspect a problem, check the reports and logs. NetBackup provides extensive reporting and logging facilities. These can provide an error message that points you directly to a solution. The logs also show you what went right and the NetBackup operation that was ongoing when the problem occurred. For example, a restore operation needs media to be mounted, but the required media is currently in use for another backup. Logs and reports are essential troubleshooting tools. See "About logs" on page 99.

Table 1-1 Steps for troubleshooting NetBackup problems *(continued)*

Step	Action	Description
Step 2	Identify what you were doing when the problem occurred	Ask the following questions: ■ What operation was tried? ■ What method did you use? For example, more than one way exists to install software on a client. Also more than one possible interface exists to use for many operations. Some operations can be performed with a script. ■ What type of server platform and operating system was involved? ■ If your site uses both the master server and the media server, was it a master server or a media server? ■ If a client was involved, what type of client was it? ■ Have you performed the operation successfully in the past? If so, what is different now? ■ What is the service pack level? ■ Do you use operating system software with the latest fixes supplied, especially those required for use with NetBackup? ■ Is your device firmware at a level, or higher than the level, at which it has been tested according to the posted device compatibility lists?
Step 3	Record all information	Capture potentially valuable information: ■ NetBackup progress logs ■ NetBackup Reports ■ NetBackup Utility Reports ■ NetBackup debug logs ■ Media and Device Management debug logs ■ On UNIX NetBackup servers, check for error or status messages in the system log or standard output. ■ Error or status messages in dialog boxes ■ On Windows, NetBackup servers, check for error or status information in the Event Viewer Application and System log. Record this information for each try. Compare the results of multiple tries. A record of tries is also useful for others at your site and for Technical Support in the event that you cannot solve the problem. You can get more information about logs and reports. See "About logs" on page 99.

Table 1-1 Steps for troubleshooting NetBackup problems *(continued)*

Step	Action	Description
Step 4	Correct the problem	After you define the problem, use the following information to correct it: ■ Take the corrective action recommended by the status code or message. See the *Status Code Reference Guide*. ■ If no status code or message exists, or the actions for the status code do not solve the problem, use additional troubleshooting procedures to isolate common problems. See "Troubleshooting NetBackup problems" on page 20.
Step 5	Complete a problem report for Technical Support	If your troubleshooting is unsuccessful, prepare to contact Technical Support by filling out a problem report. See "Problem report for Technical Support" on page 15. See "About gathering information for NetBackup-Java applications" on page 17. On UNIX systems, the `/usr/openv/netbackup/bin/goodies/support` script creates a file containing data necessary for Technical Support to debug any problems you encounter. For more details, consult the usage information of the script by using `support -h`.
Step 6	Contact Technical Support	The Symantec Technical Support Web site has a wealth of information that can help you solve NetBackup problems. Access Technical Support at the following URL: www.symantec.com/business/support/

Note: The term media server may not apply to the NetBackup server product. It depends on the context. When you troubleshoot a server installation, be aware that only one host exists: The master and the media server are one and the same. Ignore references to a media server on a different host.

Problem report for Technical Support

Fill out the following information before you contact support to report a problem.

Date: _____

Record the following product, platform, and device information:

- Product and its release level.
- Server hardware type and operating system level.

- Client hardware type and operating system level, if a client is involved.
- Storage units being used, if it is possible that storage units are involved.
- If it looks like a device problem, be ready to supply the following device information: The types of robots and drives and their version levels along with Media and Device Management and system configuration information.
- Software patches to the products that were installed.
- The service packs and hotfixes that were installed.

_____
_____
_____
_____
_____
_____

Define the problem.

_____
_____
_____

What were you doing when the problem occurred? (for example, a backup on a Windows client)

_____
_____

What were the error indications? (for example, status code, error dialog box)

_____
_____
_____

Did this problem occur during or shortly after any of the following:

_____ Initial installation

_____ Configuration change (explain)

_____ System change or problem (explain)

_____ Have you observed the problem before? (If so, what did you do that time?)

_____
_____
_____

Logs or other failure data you have saved:

_____ All log entries report

_____ Media and Device Management debug logs

_____ NetBackup debug logs

_____ System logs (UNIX)

_____ Event Viewer Application and System logs (Windows)

Ways that you can communicate with us:

_____ ftp

_____ telnet

_____ email

_____ WebEx

About gathering information for NetBackup-Java applications

If you encounter problems with the NetBackup-Java applications, use the following methods to gather data for support.

The following scripts are available for gathering information:

`jnbSA` (NetBackup-Java administration application startup script)	Logs data to a log file in `/usr/openv/netbackup/logs/user_ops/nbjlogs`. At startup, the script tells you which file in this directory it logs to. Normally, this file does not become very large (usually less than 2 KB). Consult the file `/usr/openv/java/Debug.properties` for the options that can affect the contents of this log file.
NetBackup-Java administration application on Windows	Logs data to a log file if NetBackup is installed on the computer where the application was started. It logs on *`install_path`*`\NetBackup\logs\user_ops\nbjlogs`. If NetBackup was not installed on this computer, then no log file is created. To produce a log file, modify the last "java.exe" line in the following to redirect output to a file: `install_path\java\nbjava.bat`. .
`/usr/openv/java/get_trace`	Provides a Java virtual machine stack trace for support to analyze. This stack trace is written to the log file that is associated with the instance of execution.

`/usr/openv/netbackup/bin/goodies/support`	Creates a file containing data necessary for customer support to debug any problems you encounter. For more details, consult the usage information of the script by using `support -h`.

The following example describes how you could gather troubleshooting data for Symantec Technical Support to analyze.

An application does not respond.	Wait for several minutes before you assume that the operation is hung. Some operations can take quite a while to complete, especially operations in the **Activity Monitor** and **Reports** applications.
There is still no response after several minutes.	Run `/usr/openv/java/get_trace` under the account where you started the Java application. This script causes a stack trace to write to the log file. For example, if you started `jnbSA` from the root account, start `/usr/openv/java/get_trace` as root. Otherwise, the command runs without error, but fails to add the stack trace to the debug log. This failure occurs because root is the only account that has permission to run the command that dumps the stack trace.
Get data about your configuration.	Run `/usr/openv/netbackup/bin/goodies/support`. Run this script after you complete the NetBackup installation and every time you change the NetBackup configuration.
Contact Symantec Technical Supoort	Provide the log file and the output of the `support` script for analysis.

Chapter 2

Troubleshooting procedures

This chapter includes the following topics:

About troubleshooting procedures

This chapter has procedures for finding the cause of NetBackup errors. These procedures are general in nature and do not try to cover every problem that can occur. They do, however, recommend the methods that usually result in successful problem resolution.

The &CompanyName; Technical Support site has a wealth of information that can help you solve NetBackup problems. See the following site for comprehensive troubleshooting details:

www.symantec.com/business/support/

When you perform these procedures, try each step in sequence. If you already performed the action or it does not apply, skip to the next step. If it branches you to another topic, use the solutions that are suggested there. If you still have a problem, go to the next step in the procedure. Also, alter your approach according to your configuration and what you have already tried.

Preliminary troubleshooting explains what to check first. It branches off to other procedures as appropriate.

Troubleshooting installation and configuration problems apply specifically to installation problems and configuration problems.

General test and troubleshooting procedures define general methods for finding server and client problems and should be used last.

Note: The term "media server", as distinct from "master server" or "server", does not apply to the NetBackup server product. When you troubleshoot a NetBackup server installation, ignore any references to media server. (This note does not apply to NetBackup Enterprise Server.)

Troubleshooting NetBackup problems

If you have problems with NetBackup, perform these actions first.

This preliminary NetBackup troubleshooting procedure explains what to check first and branches to other procedures as appropriate. These procedures do not try to cover every problem that can occur. However, they do recommend the methods that usually result in successful problem resolution.

When you perform these procedures, try each step in sequence. If you already performed the action or it does not apply, skip to the next step. If you branch to another topic, use the solutions that are suggested there. If you still have a problem, go to the next step in the procedure. Also, alter your approach according to your configuration and what you have already tried.

Table 2-1 Steps for troubleshooting NetBackup problems

Step	Action	Description
Step 1	Verify operating systems and peripherals.	Ensure that your servers and clients are running supported operating system versions and that any peripherals you use are supported. Refer to the NetBackup release notes and the NetBackup compatibility lists on the following Web site: http://www.symantec.com/docs/TECH59978
Step 2	Use reports to check for errors.	Use the **All Log Entries** report and check for NetBackup errors for the appropriate time period. This report can show the context in which the error occurred. Often it provides specific information, which is useful when the status code can result from a variety of problems. See the *NetBackup Administrator's Guide, Volume I*. If the problem involved a backup or archive, check the **Status of Backups** report. This report gives you the status code. If you find a status code or message in either of these reports, perform the recommended corrective actions. See the *Status Codes Reference Guide*.
Step 3	Check the operating system logs.	Check the system log on UNIX or the **Event Viewer** Application and System log on Windows if the problem pertains to media or device management and one of the following is true: ■ NetBackup does not provide a status code. ■ You cannot correct the problem by following the instructions in NetBackup status codes and messages. ■ You cannot correct the problem by following the instructions in media and device management status codes and messages. These logs can show the context in which the error occurred. The error messages are usually descriptive enough to point you to a problem area.
Step 4	Review the debug logs.	Read the applicable enabled debug logs and correct any problems you detect. If these logs are not enabled, enable them before you retry the failed operation. See "About logs" on page 99.

Table 2-1 Steps for troubleshooting NetBackup problems *(continued)*

Step	Action	Description
Step 5	Retry the operation.	If you performed corrective actions, retry the operation. If you did not perform corrective actions or if the problem persists, continue with the next step.
Step 6	Get more information for installation problems.	If you see the problem during a new installation, during an upgrade installation, or after you make changes to an existing configuration, see the following procedures: See "Troubleshooting installation problems" on page 26. See "Troubleshooting configuration problems" on page 27.
Step 7	Ensure that the servers and clients are operational.	If you experienced a server or a client disk crash, procedures are available on how to recover the files that are critical to NetBackup operation.
Step 8	Ensure that the partitions have enough disk space.	Verify that you have enough space available in the disk partitions that NetBackup uses. If one or more of these partitions is full, NetBackup processes that access the full partition fail. The resulting error message depends on the process. Possible error messages: "unable to access" or "unable to create or open a file." On UNIX systems, use the `df` command to view disk partition information. On Windows systems, use Disk Manager or Explorer. Check the following disk partitions: ■ The partition where NetBackup software is installed. ■ On the NetBackup master or media server, the partition where the NetBackup databases reside. ■ The partition where the NetBackup processes write temporary files. ■ The partition where NetBackup logs are stored. ■ The partition where the operating system is installed.
Step 9	Increase the logging level.	Enable verbose logging either for everything or only for areas that you think are related to the problem. See "Changing the logging level" on page 140. See "How to control the amount of information written to legacy logging files" on page 130. See "Changing the logging level on Windows and NetWare clients" on page 140.

Table 2-1 Steps for troubleshooting NetBackup problems *(continued)*

Step	Action	Description
Step 10	Determine which daemons or processes are running.	Follow the procedures for UNIX or Windows NetBackup servers. See "Verifying that all processes are running on UNIX servers" on page 23. See "Verifying that all processes are running on Windows servers" on page 24.

Verifying that all processes are running on UNIX servers

For NetBackup to operate properly, the correct set of processes (daemons) must be running on your UNIX servers. This procedure determines which processes are running and shows how to start processes that may not be running.

To verify that all processes are running on UNIX servers

1. To see the list of processes (daemons) running on the server and on the **Media Manager**, enter the following command:

   ```
   /usr/openv/netbackup/bin/bpps -x
   ```

2. If the master server is also the EMM server, ensure that the `nbemm` and the `nbrb` services are running. If neither service is running, start them by entering the following two commands. If only one of the services is running, start the other service by using the appropriate command.

   ```
   /usr/openv/netbackup/bin/nbemm
   /usr/openv/netbackup/bin/nbrb
   ```

3. The `nbpem` and the `nbjm` services must be running on the master server. If neither service is running, start them by entering the following two commands. If only one of the services is running, start the other service by using the appropriate command.

   ```
   /usr/openv/netbackup/bin/nbjm
   /usr/openv/netbackup/bin/nbpem
   ```

4. If either the NetBackup request daemon (`bprd`) or database manager daemon (`bpdbm`) is not running, start them by entering the following command:

   ```
   /usr/openv/netbackup/bin/initbprd
   ```

5. Make sure that the following media and device management processes are running:
   - `ltid` (needs to be running only if drives are configured on the server)
   - `vmd` (volume)
   - `avrd` (automatic volume recognition), only if drives are configured on the server
   - Processes for all configured robots
6. If any of these processes are not running, stop the device daemon `ltid` by running the following command:

   ```
   /usr/openv/volmgr/bin/stopltid
   ```

7. To verify that the `ltid`, `avrd`, and robotic control daemons are stopped, run the following command:

   ```
   /usr/openv/volmgr/bin/vmps
   ```

8. If you use ACS robotic control, the `acsssi` and the `acssel` daemons may continue to run when `ltid` is terminated. Stop any robot control daemons that may continue to run by entering the following command:

   ```
   /usr/openv/netbackup/bin/bp.kill_all
   ```

9. Then, start all daemons by running the following command:

   ```
   /usr/openv/volmgr/bin/ltid
   ```

   For debugging, start `ltid` with the `-v` (verbose) option.

Verifying that all processes are running on Windows servers

Use the following procedure to make sure that all the processes that need to run on Windows server are actually running.

Table 2-2 Steps to ensure that all necessary processes are running on Windows servers

Step	Action	Description
Step 1	Start all services.	The following services must be running. If these services are not running, start them by using the NetBackup **Activity Monitor** or the Services application in the Windows Control Panel. To start all of the services, run *install_path*\NetBackup\bin\bpup.exe. Services on master servers: ■ NetBackup Request Manager service ■ NetBackup Policy Execution Manager service ■ NetBackup Job Manager service ■ NetBackup database manager service ■ NetBackup Device Manager service (if the system has configured devices) ■ NetBackup Volume Manager service ■ NetBackup Client service Services on EMM servers: ■ NetBackup Enterprise Media Manager service ■ NetBackup Resource Broker service Services on media servers: ■ NetBackup Device Manager service (if the system has configured devices) ■ NetBackup Volume Manager service ■ NetBackup Client service Services on clients (including NetBackup Remote Administration Consoles): ■ NetBackup Client service
Step 2	Start avrd and processes for robots.	Use the NetBackup **Activity Monitor** to see if the following processes are running: ■ avrd (automatic media recognition), only if drives are configured on the server ■ Processes for all configured robots. See the *NetBackup Administrator's Guide, Volume I*. If these processes are not running, stop and restart the NetBackup **Device Manager** service. Use the NetBackup **Activity Monitor** or the Services application in the Windows Control Panel.

Table 2-2 Steps to ensure that all necessary processes are running on Windows servers *(continued)*

Step	Action	Description
Step 3	Restart the operation or do additional troubleshooting.	If you had to start any of the processes or services in the previous steps, retry the operation. If the processes and services are running or the problem persists, you can try to test the servers and clients. See "Testing the master server and clients" on page 32. See "Testing the media server and clients" on page 36. If you cannot start any of these processes or services, check the appropriate debug logs for NetBackup problems. See "About logs" on page 99. When these processes and services start, they continue to run unless you stop them manually or a problem occurs on the system. On Windows systems, we recommend that you add commands for starting them to your startup scripts, so they restart in case you have to reboot.

Troubleshooting installation problems

Use the following steps to troubleshoot installation problems.

Table 2-3 Steps for troubleshooting installation problems.

Step	Action	Description
Step 1	Determine if you can install the software on the master server and the media servers by using the release media.	Some reasons for failure are as follows: ■ Not logged on as an administrator on a Windows system (you must have permission to install services on the system) ■ Permission denied (ensure that you have permission to use the device and to write the directories and files being installed) ■ Bad media (contact Technical Support) ■ Defective drive (replace the drive or refer to vendor's hardware documentation) ■ Improperly configured drive (refer to the system and the vendor documentation)

Table 2-3 Steps for troubleshooting installation problems. *(continued)*

Step	Action	Description
Step 2	Determine if you can install NetBackup client software on the clients.	**Note:** Before you install or use NetBackup on a Linux client, verify that the `inetd` (or `xinetd`) service is started on that computer. This service ensures proper communication between the NetBackup master and the Linux client. **Note:** You cannot install PC client software from a UNIX NetBackup server. Do the following: ■ For an install to a trusting UNIX client, verify the following: ■ The correct client name is in your policy configuration ■ The correct server name is in the client `/.rhosts` file If the installation hangs, check for problems with the shell or the environment variables for the root user on the client. The files that you check depend on the platform, operating system, and shell you use. For example, your `.login` on a Sun system runs an `stty` (such as `stty ^erase`) before it defines your terminal type. If this action causes the install process to hang, you can modify the `.login` file to define the terminal before you run the `stty`. Or, move the client `.login` to another file until the install is complete. ■ For an installation to a secure UNIX client, check your `ftp` configuration. For example, you must use a user name and password that the client considers valid.
Step 3	Resolve network problems.	Determine if the problem is related to general network communications. See "Resolving network communication problems with UNIX clients" on page 41. See "Resolving network communication problems with PC clients" on page 48.

Troubleshooting configuration problems

Use the following steps to check for problems after an initial installation or after changes are made to the configuration.

Table 2-4 Steps for troubleshooting configuration problems

Step	Action	Description
Step 1	Check for device configuration problems.	Check for the following device configuration problems: ■ Configuration for robotic drive does not specify the robot. ■ Drive is configured as wrong type or density. ■ Incorrect Robotic Drive Number. ■ SCSI ID for the robotic control is specified instead of the logical Robot Number that is assigned to the robot. ■ The same robot number is used for different robots. ■ SCSI ID for the drive is specified instead of a unique Drive Index number. ■ A platform does not support a device or was not configured to recognize it. ■ Robotic device is not configured to use LUN 1, which some robot hardware requires. ■ On UNIX, drive no-rewind device path is specified as a rewind path. ■ On UNIX, tape devices are not configured with "Berkeley style close." NetBackup requires this feature which is configurable on some platforms. Further explanation is available. ■ On UNIX, tape devices (other than QIC) are not configured as "variable mode." NetBackup requires this feature which is configurable on some platforms. When this condition exists, you can frequently perform backups but not restores. Further explanation is available. See NetBackup status code 174 in the *Status Codes Reference Guide*. ■ On UNIX, pass-through paths to the tape drives have not been established. More description is available on device configuration problems: See the *NetBackup Device Configuration Guide*.
Step 2	Check the daemons or services.	Check for the following problems with the daemons or services: ■ Daemons or services do not start during reboot (configure system so they start). ■ Wrong daemons or services are started (problems with media server start-up scripts). ■ Configuration was changed while daemons or services were running. ■ On Windows, the `%SystemRoot%\System32\drivers\etc\services` file does not have an entry for `vmd`, `bprd`, `bpdbm`, and `bpcd`. Also, ensure that the processes have entries for configured robots. A list of these processes is available. See the *NetBackup Device Configuration Guide*. ■ On UNIX, the `/etc/services` file (or NIS or DNS) does not have an entry for `vmd`, `bprd`, `bpdbm`, or robotic daemons.

Table 2-4 Steps for troubleshooting configuration problems *(continued)*

Step	Action	Description
Step 3	Retry the operation and check for status codes and messages.	If you found and corrected any configuration problems, retry the operation and check for NetBackup status codes or messages in the following: ■ Check the **All Log Entries** report for NetBackup errors for the appropriate time period. This report can show the context in which the error occurred. Often it provides specific information, which is useful when the error can result from a variety of problems. If the problem involved a backup or archive, check the **Status of Backups** report. This report gives you the status code. If you find a status code or message in either of these reports, perform the recommended corrective actions. See the *Status Codes Reference Guide*. ■ Check the system log on UNIX or the Event Viewer Application and System log on Windows if the following is true: The problem pertains to media or device management, and NetBackup does not provide a status code, or you cannot correct the problem by following the instructions in the status codes. ■ Check the appropriate enabled debug logs. Correct any problems you detect. If these logs are not enabled, enable them before your next try. See "About logs" on page 99.
Step 4	Retry the operation and do additional troubleshooting.	If you performed corrective actions, retry the operation. If you did not perform corrective actions or the problem persists, go to one of the following procedures. See "Resolving full disk problems" on page 69. See "Frozen media troubleshooting considerations" on page 71. See "About conditions that cause media to freeze" on page 72. See "Troubleshooting network interface card performance" on page 91. See "About troubleshooting NetBackup in a SAN environment" on page 93.

Device configuration problem resolution

An auto-configuration warning message appears in the second panel of the Device Configuration Wizard if the selected device meets any of the following conditions:

- Not licensed for NetBackup server
- Exceeds a license restriction
- Has some inherent qualities that make it difficult to auto-configure

The following messages relate to device configuration, along with their explanations and recommended actions.

Table 2-5 Recommended actions for device configuration messages

Message	Explanation	Recommended action
Drive does not support serialization	The drive does not return its serial number. Note that some manufacturers do not support serial numbers. Although automatic device configuration does not function optimally, the drive can be manually configured and operated without its serial number.	Ask the manufacturer for a newer firmware version that returns serial numbers (if available), or manually configure and operate the drive without a serial number.
Robot does not support serialization	The robot does not return its serial number or the serial numbers of the drives that are contained within it. Note that some manufacturers do not support serial numbers. Although automatic device configuration does not function optimally, the robot and drives can be manually configured and operated without serial numbers.	Ask the manufacturer for a newer firmware version that returns serial numbers (if available). Or manually configure and operate the robot and drives without serial numbers.
No license for this robot type	NetBackup server does not support the robotic type that is defined for this robot.	Define a different robot. Use only the robotic libraries that NetBackup server supports.
No license for this drive type	The drive type that is defined for this drive that the NetBackup server does not support.	Define a different drive. Use only the drives that NetBackup supports
Unable to determine robot type	NetBackup does not recognize the robotic library. The robotic library cannot be auto-configured.	Do the following: ■ Download a new device_mapping file from the Symantec support Web site, and try again. ■ Configure the robotic library manually. ■ Use only the robotic libraries that NetBackup supports.
Drive is stand-alone or in unknown robot	Either the drive is stand-alone, or the drive or robot does not return a serial number. Note that some manufacturers do not support serial numbers. Although automatic device configuration does not function optimally, the drive or robot can be manually configured and operated without a serial number.	Ask the manufacturer for a newer firmware version that returns serial numbers (if available), or manually configure and operate the drive robot without serial numbers.

Table 2-5 Recommended actions for device configuration messages *(continued)*

Message	Explanation	Recommended action
Robot drive number is unknown	Either the drive or robot does not return a serial number. Note that some manufacturers do not support serial numbers. Although automatic device configuration does not function optimally, the drive or robot can be manually configured and operated without a serial number.	Ask the manufacturer for a newer firmware version that returns serial numbers (if available). Or manually configure and operate the drive and robot without serial numbers.
Drive is in an unlicensed robot	The drive is in a robotic library that cannot be licensed for NetBackup server. Since the robot cannot be licensed for NetBackup server, any drives that were configured in that robot are unusable.	Configure a drive that does not reside in the unlicensed robot.
Drive's SCSI adapter does not support pass-thru (or pass-thru path does not exist)	A drive was found that does not have a SCSI pass-through path configured. The possible causes are: ■ The drive is connected to an adapter that does not support SCSI pass-through. ■ The pass-through path for this drive has not been defined.	Change the drive's adapter or define a pass-through path for the drive. SCSI adapter pass-through information is available. See the *NetBackup Device Configuration Guide*.
No configuration device file exists	A device has been detected without the corresponding device file necessary to configure that device.	Refer to *NetBackup Device Configuration Guide* for information on how to create device files.
Unable to determine drive type	The NetBackup server does not recognize the drive. The drive cannot be auto-configured.	Do the following: ■ Download a new device_mapping file from the Symantec support Web site, and try again. ■ Configure the drive manually. ■ Use only the drives that NetBackup supports.

Table 2-5 Recommended actions for device configuration messages *(continued)*

Message	Explanation	Recommended action
Unable to determine compression device	A drive was detected without the expected compression device file that is used to configure that device. Automatic device configuration tries to use a device file that supports hardware data compression. When multiple compression device files exist for a drive, automatic device configuration cannot determine which compression device file is best. It uses a non-compression device file instead.	If you do not need hardware data compression, no action is necessary. The drive can be operated without hardware data compression. Hardware data compression and tape drive configuration help are available. Refer to *NetBackup Device Configuration Guide* for information on how to create device files.

Testing the master server and clients

If the NetBackup, installation, and configuration troubleshooting procedures do not reveal the problem, perform the following procedure. Skip those steps that you have already performed.

The procedure assumes that the software was successfully installed, but not necessarily configured correctly. If NetBackup never worked properly, you probably have configuration problems. In particular, look for device configuration problems.

You may also want to perform each backup and restore twice. On UNIX, perform them first as a root user and then as a nonroot user. On Windows, perform them first as a user that is a member of the Administrators group. Then perform them as a user that is not a member of the Administrator group. In all cases, ensure that you have read and write permissions on the test files.

The explanations in these procedures assume that you are familiar with the functional overview information.

See "About backup and restore functional overview" on page 235.

Several steps in this procedure mention the **All Log Entries** report. To access more information on this report and others, refer to the following:

See the *NetBackup Administrator's Guide, Volume I*.

Table 2-6 Steps for testing the master server and clients

Steps	Action	Description
Step 1	Enable debug logs.	Enable the appropriate debug logs on the master server. See "About logs" on page 99. See "About unified logging" on page 102. See "About legacy logging" on page 124. If you do not know which logs apply, enable them all until you solve the problem. Delete the debug log directories when you have resolved the problem.
Step 2	Configure a test policy.	Configure a test policy and set the backup window to be open while you test. Name the master server as the client and a storage unit that is on the master server (preferably a nonrobotic drive). Also, configure a volume in the NetBackup volume pool and insert the volume in the drive. If you don't label the volume by using the `bplabel` command, NetBackup automatically assigns a previously unused media ID.
Step 3	Verify the daemons and services.	To verify that the NetBackup daemons or services are running on the master server, do the following: ■ To check the daemons on a UNIX system, enter the following command: `/usr/openv/netbackup/bin/bpps -a` ■ To check the services on a Windows system, use the NetBackup Activity Monitor or the Services application of the Windows Control Panel.
Step 4	Backup and restore a policy.	Start a manual backup of a policy by using the manual backup option in the NetBackup administration interface. Then, restore the backup. These actions verify the following: ■ NetBackup server software is functional, which includes all daemons or services, programs, and databases. ■ NetBackup can mount the media and use the drive you configured.
Step 5	Check for failure.	If a failure occurs, first check the NetBackup **All Log Entries** report. For the failures that relate to drives or media, verify that the drive is in an UP state and that the hardware functions. To isolate the problem further, use the debug logs. A functional overview sequence of events is available. See "About backup and restore functional overview" on page 235.

Table 2-6 Steps for testing the master server and clients *(continued)*

Steps	Action	Description
Step 6	Consult information besides the debug logs.	If the debug logs do not reveal the problem, check the following: ■ Systems Logs or Event Viewer System logs ■ Event Viewer Application and System logs on Windows systems ■ `vmd` debug logs on the EMM database host for the device ■ `bptm` debug logs See the vendor manuals for information on hardware failures.
Step 7	Verify robotic drives.	If you use a robot and the configuration is an initial configuration, verify that the robotic drive is configured correctly. In particular, verify the following: ■ The same robot number is used both in the Media and Device Management and storage unit configurations. ■ Each robot has a unique robot number. On a UNIX NetBackup server, you can verify only the Media and Device Management part of the configuration. To verify, use the `tpreq` command to request a media mount. Verify that the mount completes and check the drive on which the media was mounted. Repeat the process until the media is mounted and unmounted on each drive from the host where the problem occurred. If this works, the problem is probably with the policy or the storage unit configuration. When you are done, `tpunmount` the media.
Step 8	Include a robot in the test policy.	If you previously configured a nonrobotic drive and your system includes a robot, change your test policy now to specify a robot. Add a volume to the robot. The volume must be in the NetBackup volume pool on the EMM database host for the robot. Return to step 3 and repeat this procedure for the robot. This procedure verifies that NetBackup can find the volume, mount it, and use the robotic drive.
Step 9	Use the robotic test utilities.	If you have difficulties with the robot, try the test utilities. See "About robotic test utilities" on page 311. Do not use the Robotic Test Utilities when backups or restores are active. These utilities prevent the corresponding robotic processes from performing robotic actions, such as loading and unloading media. The result is that it can cause media mount timeouts and prevent other robotic operations like robotic inventory and inject or eject from working.
Step 10	Enhance the test policy.	Add a user schedule to your test policy (the backup window must be open while you test). Use a storage unit and media that was verified in previous steps.

Table 2-6 Steps for testing the master server and clients *(continued)*

Steps	Action	Description
Step 11	Backup and restore a file.	Start a user backup and restore of a file by using the client-user interface on the master server. Monitor the status and the progress log for the operation. If successful, this operation verifies that the client software is functional on the master server. If a failure occurs, check the NetBackup **All Log Entries** report. To isolate the problem further, check the appropriate debug logs from the following list. On a UNIX system, the debug logs are in the `/usr/openv/netbackup/logs/` directory. On a Windows system, the debug logs are in the *`install_path`*`\NetBackup\logs\` directory. Debug log directories exist for the following processes: ■ `bparchive` (UNIX only) ■ `bpbackup` (UNIX only) ■ `bpbkar` ■ `bpcd` ■ `bplist` ■ `bprd` ■ `bprestore` ■ `nbwin` (Windows only) ■ `bpinetd` (Windows only) Explanations about which logs apply to specific client types are available. See "About logs" on page 99. See "About unified logging" on page 102. See "About legacy logging" on page 124.
Step 12	Reconfigure the test policy.	Reconfigure your test policy to name a client that is located elsewhere in the network. Use a storage unit and media that has been verified in previous steps. If necessary, install the NetBackup client software.

Table 2-6 Steps for testing the master server and clients *(continued)*

Steps	Action	Description
Step 13	Create debug log directories.	Create debug log directories for the following processes: ■ `bprd` on the server ■ `bpcd` on the client ■ `bpbkar` on the client ■ `nbwin` on the client (Windows only) ■ `bpbackup` on the client (except Windows clients) ■ `bpinetd` (Windows only) Explanations about which logs apply to specific client types are available. See "About logs" on page 99. See "About unified logging" on page 102. See "About legacy logging" on page 124.
Step 14	Verify communication between the client and the master server.	Perform a user backup and then a restore from the client that is specified in step 8. These actions verify communications between the client and the master server, and NetBackup software on the client. If an error occurs, check the **All Log Entries** report and the debug logs that you created in the previous step. A likely cause for errors is a communications problem between the server and the client.
Step 15	Test other clients or storage units.	When the test policy operates satisfactorily, repeat specific steps as necessary to verify other clients and storage units.
Step 16	Test the remaining policies and schedules.	When all clients and storage units are functional, test the remaining policies and schedules that use storage units on the master server. If a scheduled backup fails, check the **All Log Entries** report for errors. Then follow the recommended actions as is part of the error status code.

Testing the media server and clients

If you use media servers, use the following steps to verify that they are operational. Before testing the media servers, eliminate all problems on the master server.

See "Testing the master server and clients" on page 32.

Table 2-7 Steps for testing the media server and clients

Step	Action	Description
Step 1	Enable legacy debug logs.	Enable appropriate legacy debug logs on the servers See "About logs" on page 99. See "About legacy logging" on page 124. If you are uncertain which logs apply, enable them all until you solve the problem. Delete the legacy debug log directories when you have resolved the problem.
Step 2	Configure a test policy.	Configure a test policy with a user schedule (set the backup window to be open while you test) by doing the following: ■ Name the media server as the client and a storage unit that is on the media server (preferably a nonrobotic drive). ■ Add a volume on the EMM database host for the devices in the storage unit. Ensure that the volume is in the NetBackup volume pool. ■ Insert the volume in the drive. If you do not pre-label the volume by using the `bplabel` command, NetBackup automatically assigns a previously unused media ID.
Step 3	Verify the daemons and services.	Verify that all NetBackup daemons or services are running on the master server. Also, verify that all Media and Device Management daemons or services are running on the media server. To perform this check, do one of the following: ■ On a UNIX system, run: `/usr/openv/netbackup/bin/bpps -a` ■ On a Windows system, use the Services application in the Windows Control Panel.

Table 2-7 Steps for testing the media server and clients *(continued)*

Step	Action	Description
Step 4	Backup and restore a file.	Perform a user backup and then a restore of a file from a client that has been verified to work with the master server. This test verifies the following: ■ NetBackup media server software ■ NetBackup on the media server can mount the media and use the drive that you configured ■ Communications between the master server processes `nbpem`, `nbjm`, `nbrb`, EMM server process `nbemm`, and media server processes `bpcd` and `bpbrm` ■ Communications between media server process `bpbrm` and client processes `bpcd` and `bpbkar` For the failures that relate to drives or media, ensure that the drive is in an UP state and that the hardware functions.
Step 5	Verify communication between the master server and the media servers.	If you suspect a communications problem between the master server and the media servers, check the debug logs for the pertinent processes. If the debug logs don't help you, check the following: ■ On a UNIX server, the System log ■ On a Windows server, the **Event Viewer** Application and System log ■ `vmd` debug logs

Table 2-7 Steps for testing the media server and clients *(continued)*

Step	Action	Description
Step 6	Ensure that the hardware runs correctly.	For the failures that relate to drives or media, ensure that the drive is running and that the hardware functions correctly. See the vendor manuals for information on hardware failures. If you use a robot in an initial configuration condition, verify that the robotic drive is configured correctly. In particular, verify the following: ■ The same robot number is used both in the Media and Device Management and storage unit configurations. ■ Each robot has a unique robot number. On a UNIX server, you can verify only the Media and Device Management part of the configuration. To verify, use the `tpreq` command to request a media mount. Verify that the mount completes and check the drive on which the media was mounted. Repeat the process until the media is mounted and unmounted on each drive from the host where the problem occurred. Perform these steps from the media server. If this works, the problem is probably with the policy or the storage unit configuration on the media server. When you are done, use `tpunmount` to unmount the media.

Table 2-7 Steps for testing the media server and clients *(continued)*

Step	Action	Description
Step 7	Include a robotic device in the test policy.	If you previously configured a non-robotic drive and a robot was attached to your media server, change the test policy to name the robot. Also, add a volume for the robot to the EMM server. Verify that the volume is in the NetBackup volume pool and in the robot. Start with step 3 to repeat this procedure for a robot. This procedure verifies that NetBackup can find the volume, mount it, and use the robotic drive. If a failure occurs, check the NetBackup **All Log Entries** report. Look for any errors that relate to devices or media. See the *NetBackup Administrator's Guide, Volume I.* If the **All Log Entries** report doesn't help, check the following: ■ On a UNIX server, the system logs on the media server ■ `vmd` debug logs on the EMM server for the robot ■ On a Windows system, the **Event Viewer** Application and System log In an initial configuration, verify that the robotic drive is configured correctly. Do not use a robot number that is already configured on another server. Try the test utilities. See "About robotic test utilities" on page 311. Do not use the Robotic Test Utilities when backups or restores are active. These utilities prevent the corresponding robotic processes from performing robotic actions, such as loading and unloading media. The result is that it can cause media mount timeouts and prevent other robotic operations like robotic inventory and inject or eject from working.

Table 2-7 Steps for testing the media server and clients *(continued)*

Step	Action	Description
Step 8	Test other clients or storage units.	When the test policy operates satisfactorily, repeat specific steps as necessary to verify other clients and storage units.
Step 9	Test the remaining policies and schedules.	When all clients and storage units are in operation, test the remaining policies and schedules that use storage units on the media server. If a scheduled backup fails, check the **All Log Entries** report for errors. Then follow the suggested actions for the appropriate status code.

Resolving network communication problems with UNIX clients

The following procedure is for resolving NetBackup communications problems, such as those associated with NetBackup status codes 54, 57, and 58. This procedure consists of two variations: one for UNIX clients and another for PC clients.

Note: In all cases, ensure that your network configuration works correctly outside of NetBackup before trying to resolve NetBackup problems.

For UNIX clients, perform the following steps. Before you start this procedure, add the `VERBOSE` option to the `/usr/openv/netbackup/bp.conf` file. Also, create a `bpcd` debug log directory on your server and clients and a `bprd` log directory on the server. During subsequent retries, the debug logs provide detailed debug information, which can help you analyze the problem.

Table 2-8 Steps for resolving network communication problems with UNIX clients

Step	Action	Description
Step 1	Test a new or modified confitguration.	If this configuration is a new or a modified configuration, do the following: ■ Check any recent modifications to ensure that they did not introduce the problem. ■ Ensure that the client software was installed and that it supports the client operating system. ■ Check the client names, server names, and service entries in your NetBackup configuration as explained in the following topic: See "Verifying host name and service entries in NetBackup" on page 52. You can also use the `hostname` command on the client to determine the host name that the client sends with requests to the server. Check the `bprd` debug log (verbose) on the server to determine what occurred when the server received the request. ■ Note the required NIS or DNS updates. Failure to update these services properly is a common source of network problems.

Table 2-8 Steps for resolving network communication problems with UNIX clients *(continued)*

Step	Action	Description

Step 2	Verify network connectivity.	Verify network connectivity between client and server by trying to `ping` the client from the server.
		`# ping clientname`
		Where ***`clientname`*** is the name of the client as configured in the NetBackup policy configuration, in `/etc/hosts`, and in NIS and DNS (if applicable).
		For example, to `ping` a client that is named ant:
		`# ping ant`
		`ant.nul.nul.com: 64 byte packets`
		`64 bytes from 199.199.199.24: icmp_seq=0. time=1. ms`
		`----ant.nul.nul.com PING Statistics----`
		`2 packets transmitted, 2 packets received, 0% packet loss`
		`round-trip (ms)  min/avg/max = 1/1/1`
		Also, try `ping` from the client to the server.
		If `ping` succeeds in both instances, it verifies connectivity between the server and client. If ping fails, you have a network problem outside of NetBackup that must be resolved before you proceed.
		Some forms of the `ping` command let you `ping` the `bpcd` port on the client as in the following command:
		`# ping ant 13782`
		Or
		`# ping ant bpcd`

Table 2-8 Steps for resolving network communication problems with UNIX clients *(continued)*

Step	Action	Description
Step 3	Ensure that the client listens on the correct port for the `bpcd` connections.	

Table 2-8 Steps for resolving network communication problems with UNIX clients *(continued)*

Step	Action	Description

		Run one of the following commands (depending on platform and operating system):
		
		`netstat -a | grep bpcd`
		`netstat -a | grep 13782`
		`rpcinfo -p | grep 13782`
		
		If no problem occurs with the port, the results are similar to:
		`tcp 0 0 *.13782 *.* LISTEN`
		
		LISTEN indicates that the client listens for connections on this port.
		
		If a problem occurs, this line does not appear. One of the following conditions may exist:
		
		■ `/etc/services` (or applicable NIS file) does not have the correct `bpcd` entry. The correct `/etc` services entry is:
		
		`bpcd 13782/tcp bpcd`
		
		■ `/etc/inetd.conf` (or applicable NIS or DNS file) does not have the correct `bpcd` entry. The correct `/etc/inetd.conf` entry is:
		
		`bpcd stream tcp nowait root /usr/openv/netbackup/bin/bpcd`
		
		■ `/etc/inetd.conf` was changed but was not re-read. Correct this condition by running one of the following (whichever works):
		
		`/bin/ps -ef | grep inetd`
		`kill -HUP the_inetd_pid`
		
		Or
		
		`/bin/ps -aux | grep inetd`
		`kill -HUP the_inetd_pid`
		
		On a Hewlett-Packard platform, use `inetd -c` to send a `SIGHUP` to `inetd`.
		
		On an AIX client, use SMIT to verify that the InetServ object policy was updated with information about the `bpcd` process (`/etc/inetd.conf` and `/etc/services` information). If you use `SMIT` to modify the InetServ object policy, the `inetexp` command automatically runs. If you edit the InetServ object policy, run the `inetexp` command to export the InetServ object policy to the `/etc/inetd.conf` and `/etc/services` files. This command keeps these files in sync with the InetServ object policy. Run the following command

Table 2-8 Steps for resolving network communication problems with UNIX clients *(continued)*

Step	Action	Description
		to inform the `inetd` daemon of the changes to its configuration file: `refresh -s inetd` or `kill -1 InetdPID`

Step 4	Connect to the client through `telnet`.	`telnet` to `bpcd` on the client. If it succeeds, keep the connection until after you perform step 5, then terminate it with Ctrl-c.
		`telnet clientname 13782`
		Where *clientname* is the name of the client as configured in the NetBackup policy configuration, `/etc/hosts`, and also in NIS and DNS (if applicable).
		For example,
		`# telnet ant bpcd`
		`Trying 199.999.999.24 ...`
		`Connected to ant.nul.nul.com.`
		`Escape character is '^]'.`
		In this example, `telnet` can establish a connection to the client ant.
		■ If the `telnet` succeeds, then `inetd` on the client is configured correctly. It can pass its connection to `bpcd` and NetBackup should also be able to establish a connection.
		■ If `telnet` doesn't work, ensure that the `inetd.conf` file and `/etc/services` files on both the server and client are correct and match. By default, these are as follows:
		In `/etc/services`:
		`bpcd 13782/tcp bpcd`
		In `/etc/inetd.conf`:
		`bpcd stream tcp nowait root /usr/openv/netbackup/bin/bpcd bpcd`
		Then, run `kill -HUP` to reread the `/etc/inetd.conf` file as explained in step 3.
		Also, update the applicable NIS or DNS files.
		If these files are correct and you cannot connect to the client, you may have problems with the network routing or the port assignment. (See the next step.)

Table 2-8 Steps for resolving network communication problems with UNIX clients *(continued)*

Step	Action	Description

Step 5	Ensure that the client listens on the correct port for the `telnet` connection to `bpcd`.	Run one of the following commands (depending on platform and operating system).
		`netstat -a | grep bpcd`
		`netstat -a | grep 13782`
		`rpcinfo -p | grep 13782`
		The value 13782 could also be the value that is specified during installation.
		One of the following conditions occurs:
		■ If the port is not the problem, you see the following:
		`tcp 0 0 ant.nul.nul.com.13782 whale...com.1516 ESTABLISHED`
		`tcp 0 0 *.13782 *.* LISTEN`
		Where ESTABLISHED indicates that the `telnet` connection was established to `bpcd` through port 13782 on the client. LISTEN indicates that the client listens for further connections on this port.
		Change the port number for `bpcd` or other NetBackup services only if there is no alternative. All NetBackup servers and clients in the configuration must use this new port assignment.
		■ If a process other than `bpcd` uses the port, try to reboot the client to clear the problem. If the problem is still not fixed, you may need to change one of the service numbers (preferably for the other service). To change a service number, modify the `/etc/services` files Then send `SIGHUP` signals to the `inetd` processes on your clients.
		`/bin/ps -ef | grep inetd`
		`kill -HUP the_inetd_pid`
		Or
		`/bin/ps -aux | grep inetd`
		`kill -HUP the_inetd_pid`
		On a Hewlett-Packard platform, use `inetd -c` to send a `SIGHUP` to `inetd`. Also make applicable NIS or DNS updates.
		If the problem is with an AIX client and you make changes to the `/etc/inetd.conf` and `/etc/services` information, use SMIT to verify that the InetServ object policy was updated. See step 3.

Table 2-8 Steps for resolving network communication problems with UNIX clients *(continued)*

Step	Action	Description
Step 6	Verify communication between the client and the master server.	To verify client to master server communications, use the `bpclntcmd` utility. When `-pn` and `-sv` run on a NetBackup client, they initiate inquiries to the NetBackup master server (as configured in the client `bp.conf` file). The master server then returns information to the requesting client. More information is available about `bpclntcmd`. See "About the bpclntcmd utility" on page 66.

Resolving network communication problems with PC clients

The following procedure is for resolving NetBackup communications problems, such as those associated with NetBackup status codes 54, 57, and 58. This procedure consists of two variations: one for UNIX clients and another for PC clients.

Note: In all cases, ensure that your network configuration works correctly outside of NetBackup before trying to resolve NetBackup problems.

This procedure helps you resolve network communication problems with PC clients.

To resolve network communication problems

1. Before you retry the failed operation, do the following:
   - Increase the logging level on the client (see the client's user guide).
   - On the NetBackup server, create a `bprd` debug log directory and on the clients create a `bpcd` debug log.
   - On the NetBackup server, set the **Verbose** level to 1.
     See "Changing the logging level on Windows and NetWare clients" on page 140.
2. If this client is new, verify the client and the server names in your NetBackup configuration.

   See "Verifying host name and service entries in NetBackup" on page 52.
3. Verify basic network connectivity between client and server by pinging from the server to the client and vice versa. Use the following command:

```
# ping hostname
```

Where *hostname* is the name of the host as configured in the following:

- NetBackup policy configuration
- WINS
- DNS (if applicable).
- `hosts` file in system directory `%SystemRoot%\system32\drivers\etc\hosts` (Windows XP or 2003)

If `ping` succeeds in all instances, it verifies basic connectivity between the server and client.

If `ping` fails, you have a network problem outside of NetBackup that must be resolved before you proceed. As a first step, verify that the workstation is turned on. A workstation that is not turned on is a common source of connection problems with PC workstations.

4 On Microsoft Windows or NetWare clients, check the NetBackup Client service. Do one of the following tasks:

- Ensure that the service is active by checking the logs or by doing one of the following:

Windows XP or Windows Server 2003 clients	Use the Services application in the Control Panel to verify that the NetBackup Client service is running. Start it if necessary.
NetWare clients	Enter modules `bpcd.nlm` from the NetWare server console to verify that the NetBackup client daemon is running. If necessary, type `bpstart.ncf` from the NetWare server console to start the NetBackup client daemon.

- Check the `bpcd` debug logs for problems or errors. Instructions are available on how to enable and use these logs.
  See "About legacy logging" on page 124.
- Verify that the same NetBackup client service (`bpcd`) port number is specified on both the NetBackup client and server (by default, 13782). Do one of the following:

Windows	Check the NetBackup client service port number. Start the **Backup, Archive, and Restore** interface on the client. On the **File** menu, click **NetBackup Client Properties**. In the **NetBackup Client Properties** dialog box on the **Network** tab, check the NetBackup client service port number. Verify that the setting on the **Network** tab matches the one in the services file. The `services` file is located in: `%SystemRoot%\system32\drivers\etc\services` (Windows) The values on the **Network** tab are written to the `services` file when the NetBackup client service starts.
NetWare clients	See the `BPCD` setting in the `SYS:VERITAS\NBUCLT\NetBack\BP.INI` file.
UNIX NetBackup servers	The `bpcd` port number is in the `/etc/services` file. On Windows NetBackup servers, see the Client Properties dialog box in the **Host Properties** window. See "Using the Host Properties window to access configuration settings" on page 69.

Correct the port number if necessary. Then, on Windows clients and servers, stop and restart the NetBackup Client service. On NetWare clients, stop and restart the NetBackup client daemon (`bpcd`).

Do not change NetBackup port assignments unless it is necessary to resolve conflicts with other applications. If you do change them, do so on all NetBackup clients and servers. These numbers must be the same throughout your NetBackup configuration.

5 Verify that the NetBackup Request Service (bprd) port number on Microsoft Windows and NetWare clients is the same as on the server (by default, 13720). Do one of the following:

Windows clients	Check the NetBackup client service port number. Start the **Backup, Archive, and Restore** interface on the client. On the **File** menu, click **NetBackup Client Properties**. In the **NetBackup Client Properties** dialog box on the **Network** tab, check the NetBackup client service port number. Verify that the setting on the **Network** tab matches the one in the services file. The `services` file is located in: `%SystemRoot%\system32\drivers\etc\services` (Windows) The values on the **Network** tab are written to the `services` file when the NetBackup client service starts.
NetWare clients	See the `BPRD` setting in the `SYS:VERITAS\NBUCLT\NetBack\BP.INI` file.
UNIX NetBackup servers	The `bprd` port number is in the `/etc/services` file. See "Using the Host Properties window to access configuration settings" on page 69.
Windows NetBackup servers	Set these numbers in the **Client Properties** dialog box in the Host Properties window. See "Using the Host Properties window to access configuration settings" on page 69.

6 Verify that the `hosts` file or its equivalent contains the NetBackup server name. The `hosts` files are the following:

Windows XP or 2003	`%SystemRoot%\system32\drivers\etc\hosts`
NetWare	`SYS:etc\hosts`
UNIX	`/etc/hosts`

7 Verify client-to-server connectability by using `ping` or its equivalent from the client (step 3 verified the server-to-client connection).

8 If the client's TCP/IP transport allows `telnet` and `ftp` from the server, try these services as additional connectivity checks.

For a NetWare client, ensure that the server does not try to connect when a backup or restore is already in progress on the client. If you try more than one job at a time on these clients, it results in a "can't connect" or similar error.

9 Use the `bpclntcmd` utility to verify basic client to master server communications. When `-pn` and `-sv` run on a client, they initiate inquiries to the master server (as configured in the server list on the client). The master server then returns information to the requesting client.

See "About the bpclntcmd utility" on page 66.

10 Use the `bptestbpcd` utility to try to establish a connection from a NetBackup server to the `bpcd` daemon on another NetBackup system. If successful, it reports information about the sockets that are established.

See "About the bpclntcmd utility" on page 66.

11 Verify that the client operating system is one of those supported by the client software.

Verifying host name and service entries in NetBackup

This procedure is useful if you encounter problems with host names or network connections and want to verify that the NetBackup configuration is correct. Several examples follow the procedure.

For more information on host names, see the following:

- See "Background for troubleshooting" on page 305.
- See the *NetBackup Administrator's Guide, Volume II*.

To verify the host name and service entries in NetBackup

1 Verify that the correct client and server host names are configured in NetBackup. The action you take depends on the computer that you are checking.

On Windows servers, Windows clients, and NetWare nontarget clients	Do the following:
	■ On the **Server to use for backups and restores** drop-down list, ensure that a server entry exists for the master server and each media server.
	Start the **Backup, Archive, and Restore** interface on the client. On the **File** menu, click **Specify NetBackup Machines and Policy Type**. In the **Specify NetBackup Machines and Policy Type** dialog box, click the **Server to use for backups and restores** drop-down list.
	On Windows systems, the correct server must be designated as the current master server in the list. If you add or modify server entries on the master server, stop and restart the NetBackup Request service and NetBackup database manager services.
	On UNIX systems, if you add or modify `SERVER` entries on the master server, stop and restart `bprd` and `bpdbm`.
	■ On the **General** tab, verify that the client name setting is correct and matches what is in the policy client list on the master server.
	Start the **Backup, Archive, and Restore** interface on the client. On the **File** menu, click **NetBackup Client Properties**. In the **NetBackup Client Properties** dialog box, click the **General** tab.
	■ On a master or a media server, ensure that a server entry exists for each Windows administrative client to use to administer that server.
	■ Ensure that host names are spelled correctly in the `bp.conf` file (UNIX) or in the servers list (Windows) on the master server. If a host name is misspelled or cannot be resolved by using `gethostbyname`, the following error messages are logged on the NetBackup error log:
	`Gethostbyname failed for <host_name>:<h_errno_string> (<h_errno>)`
	`One or more servers was excluded from the server list because gethostby name() failed.`
	You can also make these changes on the appropriate tabs in the properties dialog boxes on a Windows NetBackup server
	See "Using the Host Properties window to access configuration settings" on page 69.

On UNIX NetBackup servers and clients and Macintosh clients	Check the server and the client name entries in the `bp.conf` file by doing the following: ■ Ensure that a `SERVER` entry exists for the master server and each media server in the configuration. The master server must be the first name in the list. If you add or modify `SERVER` entries on the master server, stop and restart `bprd` and `bpdbm` before the changes take effect. ■ The bp.conf of the master server does not require the addition of other clients, other than the master server as CLIENT_NAME = master server name. The name is added by default. The `bp.conf` file is in the `/usr/openv/netbackup` directory on UNIX clients and it is in the `Preferences:NetBackup` folder on Macintosh clients. Users on UNIX clients can also have a personal `bp.conf` file in their home directory. A `CLIENT_NAME` option in `$HOME/bp.conf` overrides the option in `/usr/openv/netbackup/bp.conf`.
On NetWare clients	Check the `SYS:VERITAS\NBUCLT\NetBack\BP.INI` file to ensure the following: ■ A `SERVER` entry exists for the master server and each media server in the configuration. The master server must be the first name in the list. ■ The `ClientName` entry and the entries in the [clients] section are correct and match what is in the policy client list on the master server.

On the master server	Verify that you have created any of the following required files: ■ `/usr/openv/netbackup/db/altnames` files (UNIX) ■ `install_path\NetBackup\db\altnames` files (Windows) Pay particular attention to requirements for `host.xlate` file entries.

2 Verify that each server and client have the required entries for NetBackup reserved port numbers.

The following examples show the default port numbers.

See "Example of host name and service entries on UNIX master server and client" on page 57.

See "Example of host name and service entries on UNIX master server and media server" on page 59.

See "Example of host name and service entries on UNIX PC clients" on page 60.

See "Example of host name and service entries on UNIX clients in multiple networks" on page 62.

See "Example of host name and service entries on UNIX server that connects to multiple networks" on page 64.

Do not change NetBackup port assignments unless it is necessary to resolve conflicts with other applications. If you do change them, do so on all NetBackup clients and servers. These numbers must be the same throughout your NetBackup configuration.

3 On NetBackup servers, check the services files to ensure that they have entries for the following:

- `bpcd` and `bprd`
- `vmd`
- `bpdbm`
- Processes for configured robots (for example, `tl8cd`).
  See the *NetBackup Device Configuration Guide*.

Verify the NetBackup client daemon or service number, and the request daemon or service port number. The action you take depends on whether the client is UNIX, Microsoft Windows, or NetWare.

On UNIX clients	Check the `bprd` and the `bpcd` entries in the `/etc/services` file.
On Microsoft Windows clients	Verify that the NetBackup Client Service Port number and NetBackup Request Service Port number match settings in the services file by doing the following: Start the Backup, Archive, and Restore interface on the client. On the **File** menu, click **NetBackup Client Properties**. In the **NetBackup Client Properties** dialog box on the **Network** tab, select the following: The NetBackup Client Service Port number and NetBackup Request Service Port number. The values on the **Network** tab are written to the `services` file when the NetBackup Client service starts. The `services` file is in the following location: `%SystemRoot%\system32\drivers\etc\services`
On NetWare clients	Check the `BPCD` and the `BPRD` entries in the `SYS:VERITAS\NBUCLT\NetBack\BP.INI` file.

4 On UNIX servers and clients, check the `/etc/inetd.conf` file to ensure that it has the following entry:

```
bpcd stream tcp nowait root /usr/openv/netbackup/bin/bpcd bpcd
```

5 On Windows servers and clients, verify that the NetBackup Client service is running.

6 If you use NIS in your network, update those services to include the NetBackup information that is added to the `/etc/services` file.

7 NIS, WINS, or DNS host name information must correspond to what is in the policy configuration and the name entries. On Windows NetBackup servers, Microsoft Windows clients, and NetWare nontarget clients, do the following:

- Check the **General** tab:
  Start the **Backup, Archive, and Restore** interface on the client. On the **File** menu, click **NetBackup Client Properties**. In the **NetBackup Client Properties** dialog box, click the **General** tab.
- Check the **Server to use for backups and restores** drop-down list:
  Start the **Backup, Archive, and Restore** interface on the client. On the **File** menu, click **Specify NetBackup Machines and Policy Type**. In the **Specify NetBackup Machines and Policy Type** dialog box, click the **Server to use for backups and restores** drop-down list.

- The `bp.conf` file on UNIX servers and clients and Macintosh clients.
- The `\veritas\nbuclt\netback\bp.ini` file on NetWare clients.

Also, verify that reverse DNS addressing is configured.

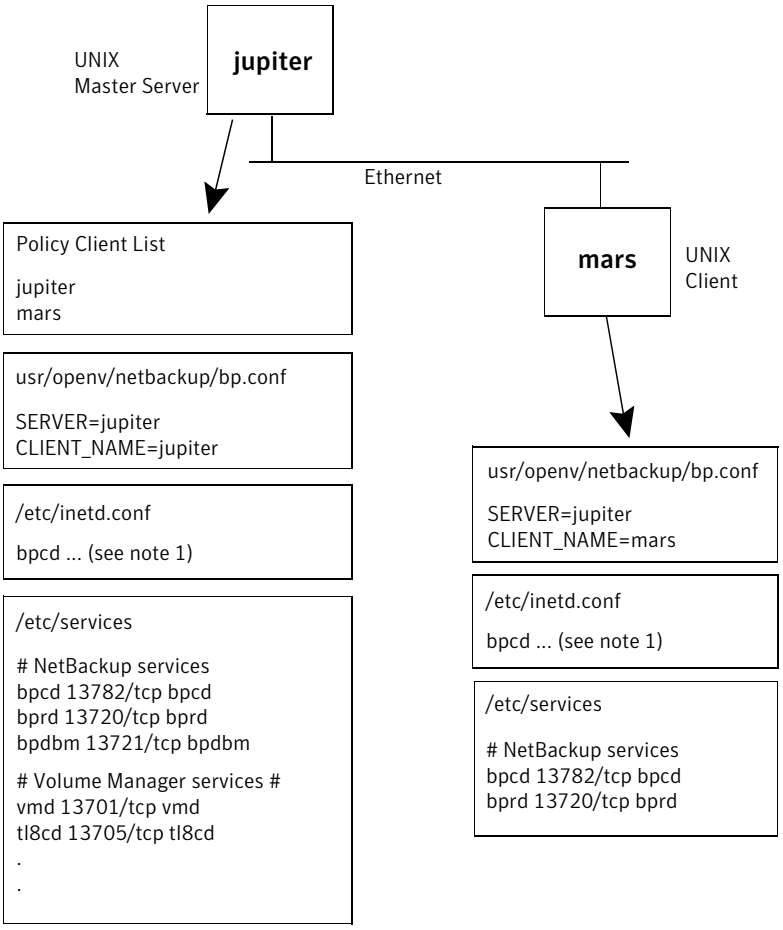
8 To confirm the setup, use the NetBackup `bpclntcmd` utility: the IP addresses and hostnames in DNS, NIS, and local hosts files on each NetBackup node.

See "About the bpclntcmd utility" on page 66.

Example of host name and service entries on UNIX master server and client

The following illustration shows a UNIX master server with one UNIX client.

Figure 2-1 UNIX master server and client



Consider the following notes about Figure 2-1:

- The following is the complete `inetd.conf` entry:

```
bpcd stream tcp nowait root /usr/openv/netbackup/bin/bpcd bpcd
```

- All other applicable network configuration must also be updated to reflect the NetBackup information. For example, this information could include the `/etc/hosts` file and NIS, and DNS (if used).

See "Example of host name and service entries on UNIX master server and media server" on page 59.

See "Example of host name and service entries on UNIX PC clients" on page 60.

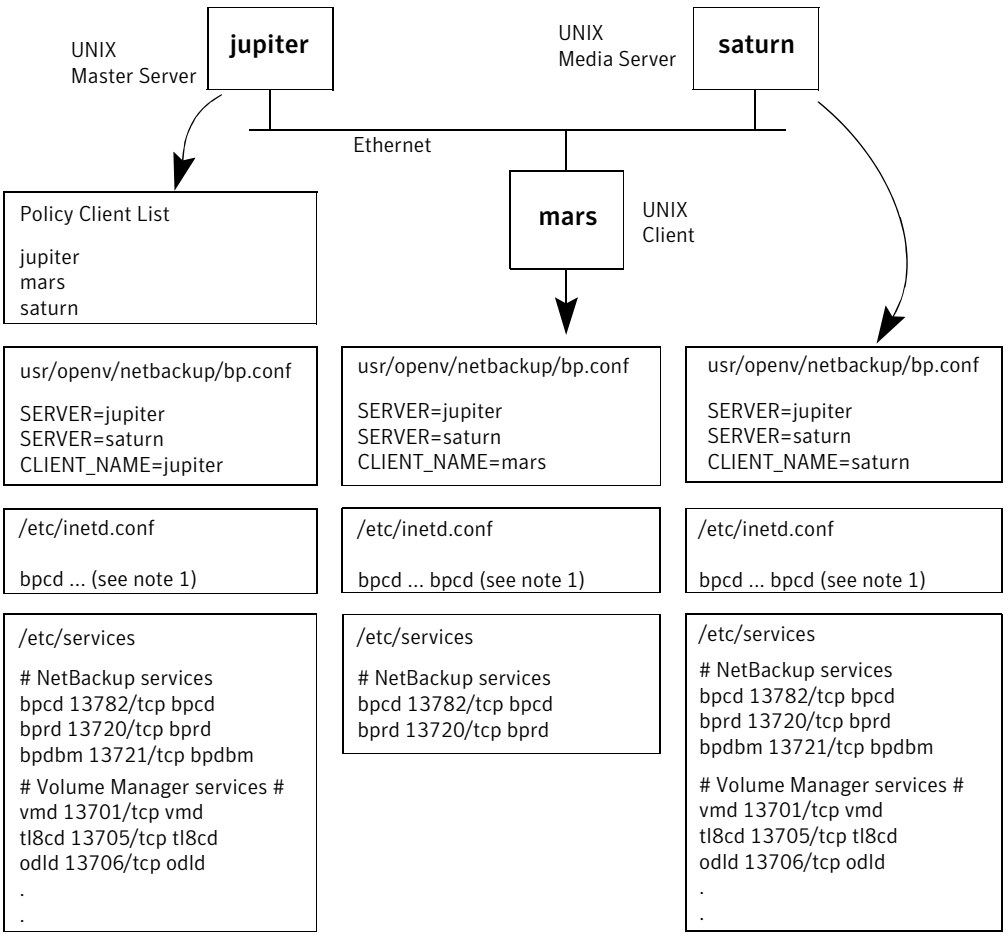
See "Example of host name and service entries on UNIX clients in multiple networks" on page 62.

See "Example of host name and service entries on UNIX server that connects to multiple networks" on page 64.

Example of host name and service entries on UNIX master server and media server

The following illustration shows a UNIX NetBackup media server named *saturn*. Note the addition of a `SERVER` entry for *saturn* in the `bp.conf` files on all the systems. This entry is second, beneath the one for the master server *jupiter*.

Figure 2-2 UNIX master and media servers



Consider the following notes about Figure 2-2:

- The following is the complete `inetd.conf` entry:

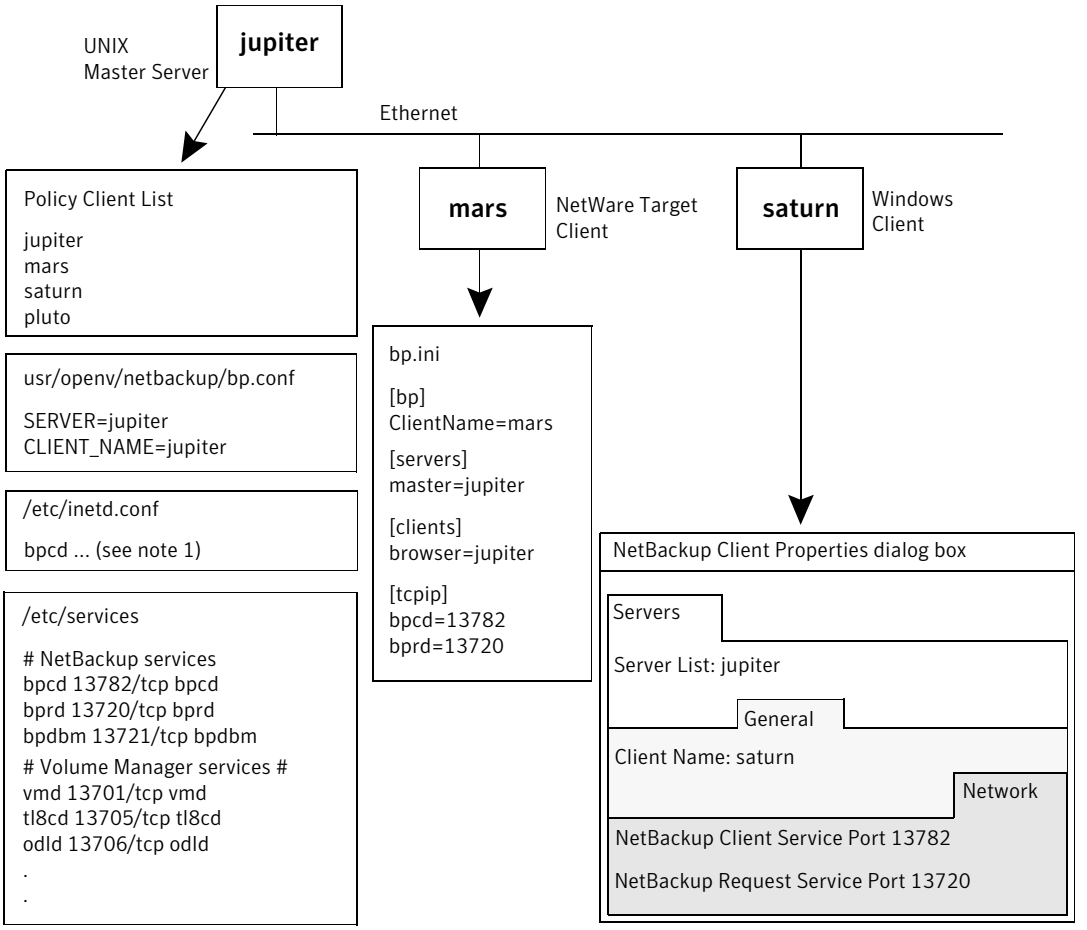
  ```
  bpcd stream tcp nowait root /usr/openv/netbackup/bin/bpcd bpcd
  ```

- All other applicable network configuration must also be updated to reflect the NetBackup information. For example, this information could include the `/etc/hosts` file and NIS, and DNS (if used).

Example of host name and service entries on UNIX PC clients

The following illustration shows a NetBackup master server with PC clients, defined here as Windows, NetWare, or Macintosh clients. Server configuration is the same as it is for UNIX clients. These clients do not have `inetd.conf` entries.

Figure 2-3 UNIX PC clients



Consider the following notes about Figure 2-3:

- The following is the complete `inetd.conf` entry:

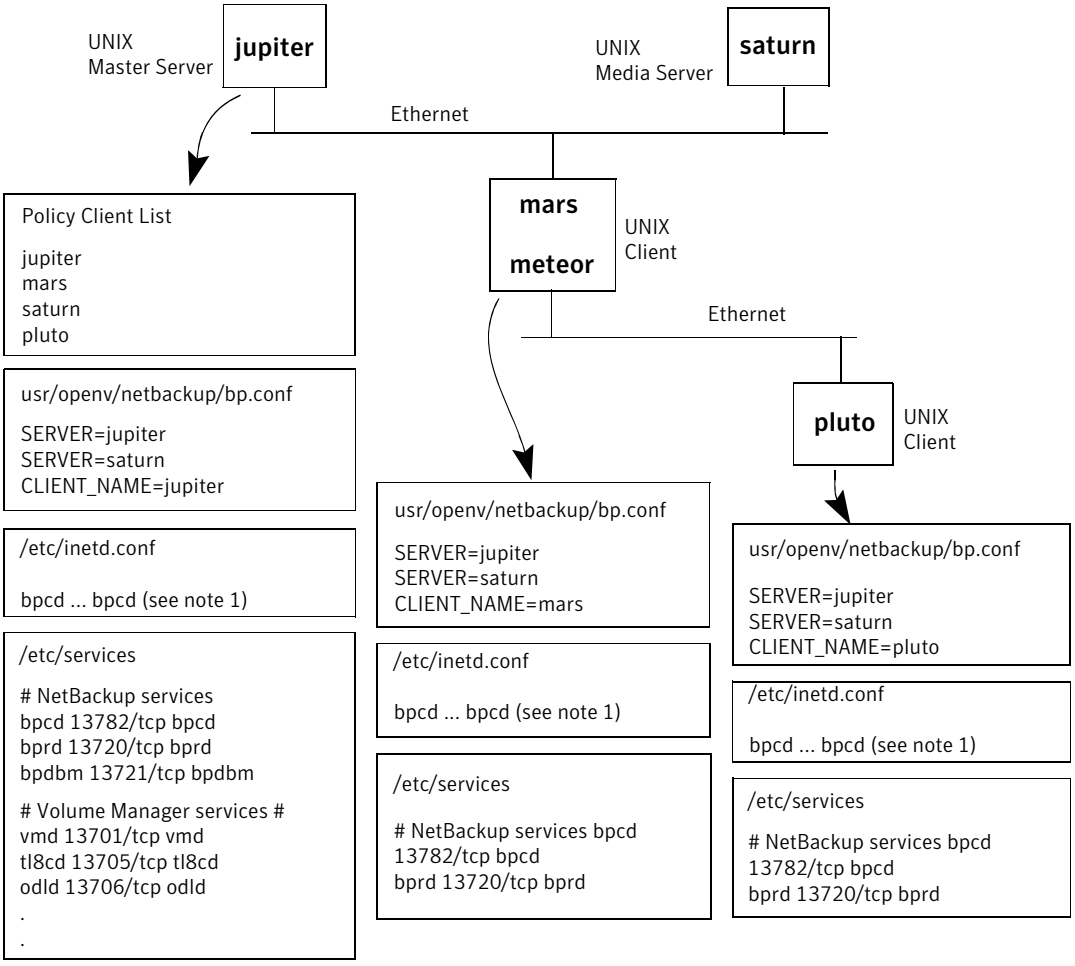
  ```
  bpcd stream tcp nowait root /usr/openv/netbackup/bin/bpcd bpcd
  ```

- All other applicable network configuration must also be updated to reflect the NetBackup information. For example, this information could include the `/etc/hosts` file and NIS, and DNS (if used).

Example of host name and service entries on UNIX clients in multiple networks

The following illustration shows a client that is a router to clients in another network. The client host name on the master server side is *mars* and the host name that is presented to the client *pluto* is *meteor*.

Figure 2-4 UNIX clients in multiple networks



Consider the following notes about Figure 2-4:

- The following is the complete `inetd.conf` entry:

```
bpcd stream tcp nowait root /usr/openv/netbackup/bin/bpcd bpcd
```

- All other applicable network configuration must also be updated to reflect the NetBackup information. For example, this information could include the `/etc/hosts` file and NIS, and DNS (if used).

The policy client list shows the configuration of the router system as *mars* because that is the name of the interface to the master server. Other than the client name setting, this setup has no special configuration. This name must be set to *mars*, because *mars* is the name that the master server recognizes.

The second client, *pluto*, is also configured no differently than if it were in the same network as the master server. If all the standard networking files (hosts, NIS, DNS, WINS, and routing tables) are set up correctly, all the required network connections can be made.

However, to restore files from *pluto* would be a problem in the following situation: the *mars-meteor* system is a type of router that hides the name of the originating host when it routes requests between the two networks. For example, a router between an Ethernet and a token ring network exhibits this behavior.

To illustrate what occurs, assume that *pluto* is on FDDI (token ring) and the server is on Ethernet. Then a user on *pluto* starts a restore. The router can use the name of its network interface to *pluto* (*meteor*) as the peer name when it forwards the request to the server. The server interprets the request as coming from a host that is named *meteor*. It does not allow the restore because *meteor* is not in the client list.

To resolve this problem, the administrator creates an `altnames` directory on the master server and adds a file for *meteor* to that directory.

On a Windows NetBackup server, the file path is:

```
install_path\netbackup\db\altnames\meteor
```

On a UNIX NetBackup server, the file path is:

```
/usr/openv/netbackup/db/altnames/meteor
```

Then, the administrator adds the following line to this file:

```
pluto
```

The master server now recognizes as legitimate any of the restore requests with a peer name of *meteor* and client name of *pluto*.

See the *NetBackup Administrator's Guide, Volume I*.

Regardless of the type of router, the configuration for the media server, *saturn*, is the same as in another example.

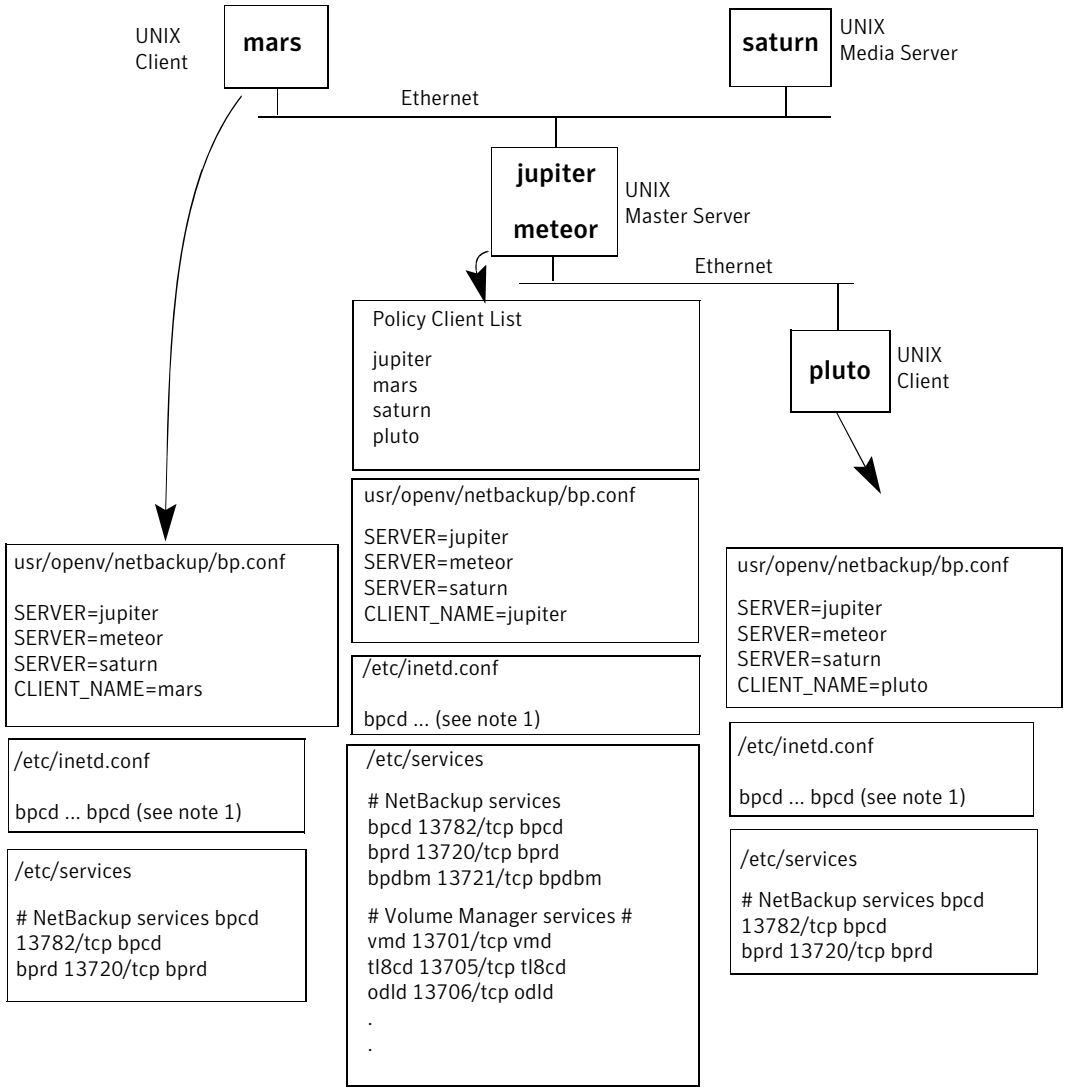
See "Example of host name and service entries on UNIX master server and media server" on page 59.

If a media server is involved in a backup or restore for *pluto*, the master server provides the following: the correct peer name and client name for the media server to use to establish connections.

Example of host name and service entries on UNIX server that connects to multiple networks

The following illustration shows an NBU server with two Ethernet connections and clients in both networks. The server host name is *jupiter* on one and *meteor* on the other.

Figure 2-5 UNIX server connects to multiple networks



Consider the following notes about Figure 2-5:

- The complete inetd.conf entry is:

```
bpcd stream tcp nowait root /usr/openv/netbackup/bin/bpcd bpcd
```

- All other applicable network configuration must also be updated to reflect the NetBackup information. For example, this information could include the `/etc/hosts` file and NIS, and DNS (if used).

This example illustrates a UNIX server that connects to multiple networks. The NetBackup policy client list specifies *jupiter* as the client name for the master server. The list can show either *jupiter* or *meteor* but not both.

The NetBackup server list on the master server has entries for both *jupiter* and *meteor*. The reason for both is that when the server does a backup, it uses the name that is associated with the client it backs up. For example, it uses the *meteor* interface when it backs up *pluto* and the *jupiter* interface when it backs up *mars*. The first server entry (master server name) is *jupiter* because that is the name used to back up the client on the master server.

The NetBackup server list for the other systems also has entries for both the *jupiter* and the *meteor* interfaces. This setup is recommended to keep the server entries the same on all clients and servers in the configuration. It would be adequate to list only the master-server name for the local network interface to the client system or media server. (For example, list *meteor* for *pluto*.)

For the network that is shown, the only configurations that are required are the differences for the policy client list and the server list. If all the standard networking files (hosts, WINS, NIS, DNS, and routing tables) are set up correctly, all required network connections can be made.

A problem exists to restore the files in the following situation: the master server system is a router that hides the originating host name when it routes requests between networks. For example, if *pluto* were on FDDI (token ring), the master server would use *meteor* as the peer name when it forwards the request to NetBackup. NetBackup would then interpret the request as coming from a host that is named *meteor*, which was not in the client list. The restore would fail.

The solution, in this case, is identical to the solution that is discussed in the following:

About the bpclntcmd utility

The `bpclntcmd` utility resolves IP addresses into host names and host names into IP addresses. It uses the same system calls as the NetBackup application software. The following directory contains the command that starts the utility:

Windows	`install_path\NetBackup\bin`
UNIX	`/usr/openv/netbackup/bin`

On Windows, run this `bpclntcmd` command in an MS-DOS command window so you can see the results.

The `bpclntcmd` options that are useful for testing the functionality of the host name and IP address resolution are `-ip`, `-hn`, `-sv`, and `-pn`. The following topics explain each of these options:

-ip

`bpclntcmd -ip IP_Address`

The `-ip` option lets you specify an IP address. `bpclntcmd` uses `gethostbyaddr()` on the NetBackup node and `gethostbyaddr()` returns the host name with the IP address as defined in the following: the node's DNS, WINS, NIS, or local hosts file entries. No connection is established with the NetBackup server.

-hn

`bpclntcmd -hn Hostname`

The `-hn` option specifies a host name. `bpclntcmd` uses `gethostbyname()` on the NetBackup node to obtain the IP address that is associated with the host name defined in the following: the node's DNS, WINS, NIS, or local hosts file entries. No connection is established with the NetBackup server.

-sv

`bpclntcmd -sv`

The `-sv` option displays the NetBackup version number on the master server.

-pn

When the -pn option is run on a NetBackup client, it initiates an inquiry to the NetBackup master server. The server then returns information to the requesting client. First, the server is the Current Server in the server list. Then it displays the information that the server returns. For example:

```
bpclntcmd -pn
expecting response from server rabbit.friendlyanimals.com
dove.friendlyanimals.com dove 123.145.167.3 57141
```

The following is true of this command example:

- `expecting response from server rabbit.friendlyanimals.com` is the master server entry from the server list on the client.
- `dove.friendlyanimals.com` is the connection name (peer name) returned by the master server. The master server obtained this name through `gethostbyaddress()`.
- `dove` is the client name configured in the NetBackup policy client list.
- `123.145.167.3` is the IP address of the client connection at the master server.
- `57141` is the port number of the connection on the client.

Use `-ip` and `-hn` to verify the ability of a NetBackup node to resolve the IP addresses and host names of other NetBackup nodes.

For example, to verify that a NetBackup server can connect to a client, do the following:

- On the NetBackup server, use `bpclntcmd -hn` to verify the following: The operating system can resolve the host name of the NetBackup client (as configured in the client list for the policy) to an IP address. The IP address is then used in the node's routing tables to route a network message from the NetBackup server.
- On the NetBackup client, use `bpclntcmd -ip` to verify that the operating system can resolve the IP address of the NetBackup server. (The IP address is in the message that arrives at the client's network interface.)

See "Verifying host name and service entries in NetBackup" on page 52.

See "Resolving network communication problems with PC clients" on page 48.

See "Resolving network communication problems with UNIX clients" on page 41.

Using the Host Properties window to access configuration settings

The **Host Properties** window in the **NetBackup Administration Console** provides access to many configuration settings for NetBackup clients and servers. For example, you can modify the server list, email notification settings, and various timeout values for servers and clients. The following are general instructions for using this window.

Many procedures in this guide also refer to the **NetBackup Client Properties** dialog box in the **Backup, Archive, and Restore** interface on Microsoft Windows clients. This dialog box lets you change NetBackup configuration settings only for the local system where you are running the interface. Most settings in the **NetBackup Client Properties** dialog box are also available in the **Host Properties** window.

To use the Host Properties window to access configuration settings

1. In the **NetBackup Administration Console**, in the left pane, expand **NetBackup Management > Host Properties**.
2. Depending on the host to be configured, select **Master Servers**, **Media Servers**, or **Clients**.
3. On the **Actions** menu, select **Properties**.
4. In the **Properties** dialog box, in the left pane, click the appropriate property and make your change.

Resolving full disk problems

If the NetBackup installation directory fills up, such as with logging files, a number of problems can result. NetBackup may become unresponsive. For example, NetBackup jobs may remain queued for long periods, even though all NetBackup processes and services are running.

To resolve full disk problems

1. The NetBackup Resource Broker (nbrb) log may have database connection errors in it. These errors indicate failed tries to establish connections to the nbemm database. The following is an example of such errors in the nbrb log:

```
7/20/2005 12:33:47.239 [RBDatabase::connectDatabase()] ODBC connection failed.
ErrMsg: [Sybase][ODBC Driver][Adaptive Server Anywhere]Disk write failure
'Fatal error: disk write failure C:\Program Files\VERITAS\NetBackupDB\data\NBDB.log' --
transaction rolled back ErrCode: -1Sqlstate: HY000
```

   The nbrb log (originator ID 118) is written in /usr/openv/logs (UNIX) or *install_path*\NetBackup\logs (Windows). More information is available about unified logging.

   See "About logs" on page 99.

2. To correct the situation, clear up disk space in the directory where NetBackup is installed by doing the following:

   - You may need to delete log files manually, reduce logging levels, and adjust log retention to have log files automatically deleted sooner.
     More information is available about logging levels, log file retention, and how to configure unified logging.
     See "About logs" on page 99.
   - Consider moving the NetBackup unified logging files to a different file system.
     See "About changing the location of unified log files" on page 112.

3. Use the Activity Monitor to verify that the NetBackup relational database service is running. This service is the NB_dbsrv daemon on UNIX and the "Adaptive Server Anywhere - Veritas_NB" service on Windows.

4. If the NetBackup relational database service is stopped, note the following:

   - Do not stop the nbrb service. If you stop the nbrb service while the NetBackup relational database service is down, it can result in errors.
   - Restart the NetBackup relational database service.

   Verify that the NetBackup relational database service is running. If it is not and you remove files to free up disk space, you may not fix the problem. The relational database service must be restarted to allow the Resource Broker (nbrb) to allocate job resources.

Frozen media troubleshooting considerations

Frozen media can cause a number of problems including one of the following status codes: 84, 85, 86, 87 and 96.

When troubleshooting frozen media, be aware of the following:

- Be sure that the media server that freezes the media stores the actual FROZEN status of that media in its media database (MediaDB). Every media server including the master server has its own unique media database.
- Use the `bpmedialist` command to access the MediaDB information including the media status (Frozen, Full, or Active).
- To unfreeze the media, use the `bpmedia` command. Specify the media server that contains that frozen record in the command syntax. Unfreeze the media one at a time.
- Frozen media does not necessarily mean that the media is defective. NetBackup may freeze media as a safety measure to prevent further errors, drive damage, or data loss.
- Investigate any patterns to the media IDs, tape drives, or media servers that are involved when media is frozen.

Logs for troubleshooting frozen media

The following logs are useful when troubleshooting frozen media:

UNIX and Linux
- The `bptm` log from the media servers that froze the media:

  `/usr/openv/netbackup/logs/bptm`
- The Admin messages or syslog from the operating system.

Windows
- The `bptm` log from the media servers that froze the media:

  `install_dir``\VERITAS\NetBackup\logs\bptm`
- The Windows Event Viewer System Log
- The Windows Event Viewer Application Log

Set the verbosity of the `bptm` process log to 5 to troubleshoot any media and drive-related issues. This log does not use excessive drive space or resources even at an elevated verbosity. When media is frozen, the `bptm` logs may contain more detailed information that the Activity Monitor or Problems Report. Set the verbosity for `bptm` on individual media servers by changing their logging levels under Host Properties on the NetBackup Administration Console.

See "Frozen media troubleshooting considerations" on page 71.

See "About conditions that cause media to freeze" on page 72.

About conditions that cause media to freeze

The following conditions can cause media to freeze:

- The same media has excessive errors during backup. An example of the log entry is as follows:

```
FREEZING media id E00109, it has had at least 3 errors in the last
12 hour(s)
```

Causes and resolutions for this problem include:

Dirty drives	Clean the drives that are freezing the media according to the manufacturer's suggestions.. One of the first symptoms of a dirty drive is frozen media.
The drive itself	Check for tape device errors that are reported by the operating system logs or by the device driver. If any are found, follow the hardware manufacturer's recommendations for this type of error.
Communication issues at the SCSI or host bus adapter (HBA) level	Check for SCSI or HBA device errors that are reported by the operating system logs or by their driver. If any are found, follow the hardware manufacturer's recommendations for this type of error.
Drive not supported	Ensure that the tape drives appear on the hardware compatibility list as supported for NetBackup. This list is located on the following Symantec support Web site: http://www.symantec.com/business/support/overview.jsp?pid=15143
Media not supported	Ensure that the media is supported for use with the tape drive by the tape drive vendor.

- An unexpected media is found in the drive. An example of the log entry is as follows:

```
Incorrect media found in drive index 2, expected 30349,     \
found 20244, FREEZING 30349
```

The following conditions can cause this error:

- NetBackup requests a media ID to be mounted in a drive. If the media ID that is physically recorded on the tape is different than the NetBackup

media ID, the media freezes. This error occurs if the robot needs to be inventoried, or if bar codes have been physically changed on the media.

- Another NetBackup installation previously wrote to the media with different barcode rules.
- The drives in the robot are not configured in order within NetBackup, or they are configured with the wrong tape paths. The correct robot drive number is important to the proper mounting and use of media. The robot drive number is normally based on the relationship of the drive serial number with the drive serial number information from the robotic library. Validate this number before you consider that the device configuration is complete.

- The media contain a non-NetBackup format. An example of the log entry is as follows:

```
FREEZING media id 000438, it contains MTF1-format data and cannot
be used for backups
FREEZING media id 000414, it contains tar-format data and cannot
be used for backups
FREEZING media id 000199, it contains ANSI-format data and cannot
be used for backups
```

These library tapes may have been written outside of NetBackup. By default, NetBackup only writes to a blank media or other NetBackup media. Other media types (DBR, TAR, CPIO, ANSI, MTF1, and recycled Backup Exec BE-MTF1 media) are frozen as a safety measure. Change this behavior by using the following procedure:

On UNIX and Linux

To allow NetBackup to overwrite foreign media, add the following to the `bp.conf` file that is located at `/usr/openv/netbackup/bp.conf` for the related media server:

```
ALLOW_MEDIA_OVERWRITE = DBR
ALLOW_MEDIA_OVERWRITE = TAR
ALLOW_MEDIA_OVERWRITE = CPIO
ALLOW_MEDIA_OVERWRITE = ANSI
ALLOW_MEDIA_OVERWRITE = MTF1
ALLOW_MEDIA_OVERWRITE = BE-MTF1
```

Stop and restart the NetBackup daemons for the changes to take effect.

On Windows	On the Administration Console, proceed to **Host Properties	Media Server** Open the properties for the media server in question. Select the **Media** tab. The **Allow Media Overwrite** property overrides the NetBackup overwrite protection for specific media types. To disable the overwrite protection, select one or more of the listed media formats. Then stop and restart the NetBackup services for the changes to take effect. Do not select a foreign media type for overwriting unless you are sure that you want to overwrite this media type. More details are available on each media type. See the *NetBackup Device Configuration Guide*.

- The media is a tape formerly used for the NetBackup catalog backup. For example, the log entry may be the following:

  ```
  FREEZING media id 000067: it contains Symantec NetBackup (tm)
  database backup data and cannot be used for backups.
  ```

  The media is frozen because it is an old catalog backup tape which NetBackup does not overwrite by default. The `bplabel` command must label the media to reset the media header.
- The media is intentionally frozen. You can use the `bpmedia` command to manually freeze media for a variety of administrative reasons. If no record exists of a specific job freezing the media, the media may have been frozen manually.
- The media is physically write protected. If the media has a write-protect notch that is set for write protection, NetBackup freezes the media.

To unfreeze frozen media, enter the following `bpmedia` command:

```
# bpmedia -unfreeze -m mediaID -h media_server
```

The *media_server* variable is the one that froze the media. If this item is unknown, run the `bpmedialist` command and note the "Server Host:" listed in the output. The following example shows that media server `denton` froze media `div008`:

```
# bpmedialist -m div008

Server Host = denton
```

```
ID    rl images  allocated      last updated    density  kbytes restores
         vimages expiration      last read      <------- STATUS ------->
-------------------------------------------------------------------------

DIV08  1    1    04/22/2010 10:12 04/22/2010 10:12  hcart     35     5
            1    05/06/2010 10:12 04/22/2010 10:25  FROZEN
```

See "Frozen media troubleshooting considerations" on page 71.

See "Logs for troubleshooting frozen media" on page 71.

Resolving PBX problems

The Enterprise Media Manager (EMM) services and other services of NetBackup require a common services framework that is called Private Branch Exchange (PBX). Like vnetd, PBX helps limit the number of TCP/IP ports that the CORBA services of NetBackup use.

In troubleshooting PBX, consider the issues that are described in this section.

Note: If PBX is not installed or is configured incorrectly, NetBackup is unresponsive.

Checking PBX installation

NetBackup requires the Symantec Private Branch Exchange service (PBX). PBX can be installed before NetBackup or during NetBackup installation.

See the *NetBackup Installation Guide*.

If you uninstall PBX, you must reinstall it.

To check PBX installation

1. Look for the following directory on the NetBackup master server:
   - On UNIX: `/opt/VRTSpbx`
   - On Windows: *`install_path`*`\VxPBX`
2. To check the version of PBX, enter the following:
   - On UNIX: `/opt/VRTSpbx/bin/pbxcfg -v`
   - On Windows: *`install_path`*`\VxPBX\bin\pbxcfg -v`

Checking that PBX is running

After you know that PBX is installed on the NetBackup master server, you need to verify that it is running.

To see if PBX is running

1. On UNIX, check for the PBX process:

   ```
   ps | grep pbx_exchange
   ```

2. To start PBX on UNIX, type the following:

   /opt/VRTSpbx/bin/vxpbx_exchanged start

   On Windows, make sure the Symantec Private Branch Exchange service is started. (Go to **Start > Run** and enter `services.msc`.)

Checking that PBX is set correctly

Two settings are vital to the correct functioning of PBX: Auth User (authenticated user) and Secure Mode. When PBX is installed, they are automatically set as required.

To check that PBX is set correctly

1. To display the current PBX settings, do one of the following:

   - On UNIX, type the following:

     /opt/VRTSpbx/bin/pbxcfg -p

     Example output:

     ```
     Auth User:0 : root
      Secure Mode: false
      Debug Level: 10
      Port Number: 1556
      PBX service is not cluster configured
     ```

     `Auth User` must be `root` and `Secure Mode` must be `false`.

   - On Windows, type the following:

     ***install_path*\VxPBX\bin\pbxcfg -p**

     Example output:

```
Auth User:0 : localsystem
 Secure Mode: false
 Debug Level: 10
 Port Number: 1556
 PBX service is not cluster configured
```

`Auth User` must be `localsystem` and `Secure Mode` must be `false`.

2 Reset `Auth User` or `Secure Mode` as needed:

- To add the correct user to the authenticated user list (UNIX example):

  `/opt/VRTSpbx/bin/pbxcfg -a -u root`

- To set `Secure Mode` to false:

  `/opt/VRTSpbx/bin/pbxcfg -d -m`

  For more information on the `pbxcfg` command, refer to the `pbxcfg` man page.

Accessing the PBX logs

PBX uses unified logging. PBX logs are written to the following:

- `/opt/VRTSpbx/log` (UNIX)
- *`install_path`*`\VxPBX\log` (Windows)

The unified logging originator number for PBX is 103. More information is available about unified logging.

See "About unified logging" on page 102.

Error messages regarding PBX may appear in the PBX log or in the unified logging logs for `nbemm`, `nbpem`, `nbrb`, or `nbjm`. The following is an example of an error that is related to PBX:

```
05/11/10 10:36:37.368 [Critical] V-137-6 failed to initialize
 ORB:
 check to see if PBX is running or if service has permissions to
 connect to PBX. Check PBX logs for details
```

To access the PBX logs

1. Use the `vxlogview` command to view PBX and other unified logs. The originator ID for PBX is 103. For more information, see the `vxlogview` man page. You can also refer to the following topic:

   See "About unified logging" on page 102.

2. To change the logging level for PBX, enter the following:

   `pbxcfg -s -l debug_level`

   where *debug_level* is a number from 0 to 10, where the settings 10 is the most verbose.

   PBX may log messages by default to the UNIX system logs (`/var/adm/messages` or `/var/adm/syslog`) or to the Windows Event Log. As a result, the system logs may fill up with unnecessary PBX log messages, since the messages are also written to the PBX logs (/opt/VRTSpbx/log on UNIX and <install_path>\VxPBX\log on Windows).

3. To disable PBX logging to the system or event logs, enter the following command:

   ```
   # vxlogcfg -a -p 50936 -o 103 -s LogToOslog=false
   ```

   You do not have to restart PBX for this setting to take effect.

Troubleshooting PBX security

The PBX `Secure Mode` must be set to `false`. If `Secure Mode` is `true`, NetBackup commands such as `bplabel` and `vmoprcmd` do not work. PBX messages similar to the following appear in `/opt/VRTSpbx/log` (UNIX) or *`install_path`*`\VxPBX\log` (Windows).

```
5/12/2008 16:32:17.477 [Error] V-103-11 User MINOV\Administrator
 not authorized to register servers
 5/12/2008 16:32:17.477 [Error] Unauthorized Server
```

To troubleshoot PBX security

1. Set `Secure Mode` to `false` by entering the following:

   - On UNIX:

     `/opt/VRTSpbx/bin/pbxcfg -d -m`

   - On Windows:

```
install_path\VxPBX\bin\pbxcfg -d -m
```

2 Verity the PBX security settings by entering the following:

```
pbxcfg -p
```

3 Stop NetBackup:

- On UNIX:

```
/usr/openv/netbackup/bin/bp.kill_all
```

- On Windows:

```
install_path\NetBackup\bin\bpdown
```

4 Stop PBX:

- On UNIX:

```
/opt/VRTSpbx/bin/vxpbx_exchanged stop
```

- On Windows: Go to **Start > Run**, enter `services.msc`, and stop the Symantec Private Branch Exchange service.

5 Start PBX:

- On UNIX:

```
/opt/VRTSpbx/bin/vxpbx_exchanged start
```

- On Windows: Go to **Start > Run**, enter `services.msc`, and start the Symantec Private Branch Exchange service.

6 Start NetBackup:

- On UNIX:

```
/usr/openv/netbackup/bin/bp.start_all
```

- On Windows:

```
install_path\NetBackup\bin\bpup
```

Determining if the PBX daemon or service is available

If NetBackup does not work as configured, a required NetBackup service may have stopped. For example, backups may not be scheduled or may be scheduled but are not running. The type of problem depends on which process is not running.

When a NetBackup service is not running and another process tries to connect to it, messages similar to the following appear in `/usr/openv/logs` for PBX. (The unified logging originator for PBX is 103.)

```
05/17/10 9:00:47.79 [Info] PBX_Manager:: handle_input with fd = 4
05/17/10 9:00:47.79 [Info] PBX_Client_Proxy::parse_line, line = ack=1
05/17/10 9:00:47.79 [Info] PBX_Client_Proxy::parse_line, line =
extension=EMM
05/17/10 9:00:47.80 [Info] hand_off looking for proxy for = EMM
05/17/10 9:00:47.80 [Error] No proxy found.
05/17/10 9:00:47.80 [Info] PBX_Client_Proxy::handle_close
```

To determine if the PBX daemon or service is available

1. Start the needed service.

   In this example, the missing NetBackup service is EMM. To start the needed service, enter the `nbemm` command (UNIX) or start the NetBackup Enterprise Media Manager service (Windows; **Start > Run**, enter `services.msc`).

2. If necessary, stop and restart all NetBackup services.

   - On UNIX:

     ```
     /usr/openv/netbackup/bin/bp.kill_all
     /usr/openv/netbackup/bin/bp.start_all
     ```

   - On Windows:

     ```
     install_path\NetBackup\bin\bpdown
     install_path\NetBackup\bin\bpup
     ```

About troubleshooting duplication to a remote master

Duplicate-to-remote-master operations are characteried by storage lifecycle policies in at least two NetBackup master server domains. Verify that the two master servers follow these rules:

- The name of the storage lifecycle policy in the source master server domain must match the name of the storage lifecycle policy in the target master server domain. The names are case sensitive.

- The name of the data classification used by the storage lifecycle policy in the source master server domain must match the name of the data classificationn in the storage lifecycle policy in the target master server domain. The names are case sensitive.
- The duplicate-to-remote-master copy in the source storage lifecycle policy must use hierarchical duplication and specify a source copy with a residence capable of replication. (The disk pool replication column must show Source.)
- The storage lifecycle policy in the target domain must specify an import for its first copy. The residence for the import must include the device that is the replication partner of the source copy in the source storage lifecycle policy. The import copy may specify a storage unit group or a storage unit but not Any Available.
- The storage lifecycle policy in the target domain must have at least one copy that specifies the Remote Retention type.

Troubleshooting duplication to remote master jobs

The duplication to remote master job works like any duplication job except that the duplication to remote master job contains no write side. The job must run on a media server running NetBackup 7.1 or higher. It consumes a read resource from the disk volume that the duplicated images reside on. If no media server is available with NetBackup 7.1 or higher, the job fails with status 800.

The duplication to remote master job works at a disk volume level. Within the storage unit specified in the storage lifecycle policy for the source copy, some disk volumes may not support replication and some media servers may not be running NetBackup 7.1 or higher. Use the **Disk Pools** interface of the **System Administration Console** to verify that the image is on a disk volume that supports replication. If the interface shows that the disk volume is not a replication source, click **Update Replication** to update the disk volumes in the disk pool. If the problem persists, check your disk device configuration.

The following procedure is based on NetBackup that operates in an OpenStorage configuration. This configuration communicates with an media server deduplication pool (MSDP) that uses the duplication to remote master feature.

To troubleshoot duplication to remote master jobs

1 To display the storage server information, run the following command:

```
# bpstsinfo -lsuinfo -stype PureDisk -storage_server PureDisk1
LSU Info:
Server Name: PureDisk:woodridge.min.veritas.com
LSU Name: PureDiskVolume
Allocation : STS_LSU_AT_STATIC
Storage: STS_LSU_ST_NONE
Description: PureDisk storage unit (/woodridge.min.veritas.com#1/2)
Configuration:
Media: (STS_LSUF_DISK | STS_LSUF_ACTIVE | STS_LSUF_STORAGE_NOT_FREED
   | STS_LSUF_REP_ENABLED | STS_LSUF_REP_SOURCE)
Save As : (STS_SA_CLEARF | STS_SA_OPAQUEF | STS_SA_IMAGE)
Replication Sources: 0 ( )
Replication Targets: 1 ( PureDisk:bayside:PureDiskVolume )
...
```

This output shows the logical storage unit (LSU) flags STS_LSUF_REP_ENABLED and STS_LSUF_REP_SOURCE for PureDiskVolume. PureDiskVolume is enabled for duplication to remote master jobs and it is a replication source.

2 To verify that NetBackup recognizes these two flags, run the following command:

```
# nbdevconfig -previewdv -stype PureDisk -storage_server woodridge
   -media_server woodridge - U
Disk Pool Name      :
Disk Type           : PureDisk
Disk Volume Name    : PureDiskVolume
...
Flag                : ReplicationSource
...
```

The ReplicationSource flag confirms that NetBackup recognizes the LSU flags.

3 To display the replication targets by using the raw output, run the following command:

```
# nbdevconfig -previewdv -stype PureDisk -storage_server woodridge
   -media_server woodridge
V7.0 DiskVolume < "PureDiskVolume" "PureDiskVolume" 46068048064
   46058373120 0 0 0 16 1 >
V7.0 ReplicationTarget < "bayside:PureDiskVolume" >
```

The display shows that the replication target is a storage server called bayside and the LSU (volume) name is PureDiskVolume.

4 To ensure that NetBackup captured this configuration correctly, run the following command:

```
# nbdevquery -listdv -stype PureDisk -U
Disk Pool Name      : PDpool
Disk Type           : PureDisk
Disk Volume Name    : PureDiskVolume
...
Flag                : AdminUp
Flag                : InternalUp
Flag                : ReplicationSource
Num Read Mounts     : 0
...
```

The listing shows that disk volume PureDiskVolume is configured in disk pool PDPool, and that NetBackup recognizes the replication capability.

5 If NetBackup does not recognize the replication capability, run the following command:

```
# nbdevconfig -updatedv -stype PureDisk -dp PDpool
```

6 To ensure that you have a storage unit that uses this disk pool, run the following command:

```
# bpstulist
PDstu 0 _STU_NO_DEV_HOST_ 0 -1 -1 1 0 "*NULL*"
   1 1 51200 *NULL* 2 6 0 0 0 0 PDpool *NULL*
```

The output shows that storage unit `PDstu` uses disk pool `PDpool`.

7 Check the settings on the disk pool by running the following command:

```
nbdevquery -listdp -stype PureDisk -dp PDpool -U
Disk Pool Name   : PDpool
Disk Pool Id     : PDpool
Disk Type        : PureDisk
Status           : UP
Flag             : Patchwork
...
Flag             : OptimizedImage
Raw Size (GB)    : 42.88
Usable Size (GB) : 42.88
Num Volumes      : 1
High Watermark   : 98
Low Watermark    : 80
Max IO Streams   : -1
Comment          :
Storage Server   : woodridge.min.veritas.com (UP)
```

Max IO Streams is set to -1, which means the disk pool has unlimited input-output streams.

8 To check the media servers, run the following command:

```
# tpconfig -dsh -all_host
============================================================
Media Server:                   woodridge.min.veritas.com
Storage Server:                 woodridge.min.veritas.com
User Id:                        root
    Storage Server Type:        BasicDisk
    Storage Server Type:        NearStore
    Storage Server Type:        SnapVault
    Storage Server Type:        PureDisk
============================================================
```

This disk pool only has one media server, `woodridge`. You have completed the storage configuration validation.

9 The last phase of validation is the storage lifecycle policy configuration. To run a duplication to remote master operation, the source copy must be on storage unit `PDstu`. Run the following command:

```
nbstl woodridge2bayside -L
                                Name: woodridge2bayside
                 Data Classification: (none specified)
           Duplication job priority: 0
                               State: active
                             Version: 0
 Destination  1             Use for: backup
                             Storage: PDstu
                         Volume Pool: (none specified)
                        Server Group: (none specified)
                      Retention Type: Fixed
                     Retention Level: 1 (2 weeks)
                Alternate Read Server: (none specified)
                Preserve Multiplexing: false
     Enable Automatic Remote Import: true
                               State: active
                              Source: (client)
                      Destination ID: 0
 Destination  2             Use for: duplication to remote master
                             Storage: Remote Master
                         Volume Pool: (none specified)
                        Server Group: (none specified)
                                 ...
                Preserve Multiplexing: false
     Enable Automatic Remote Import: false
                               State: active
                              Source: Destination 1 (backup:PDstu)
                      Destination ID: 0
```

For troubleshooting job flow for duplication to remote master, use the same command lines as you use for other storage lifecycle policy managed jobs. For example, to list images which have been duplicated to remote master, run the following:

```
nbstlutil list -copy_type replica -U -copy_state 3
```

To list images which have not been duplicated to remote master (either pending or failed), run the following:

```
nbstlutil list -copy_type replica -U -copy_incomplete
```

10 To list the target storage devices that complete duplication to remote master copies (replication destination), run the following command:

```
nbstlutil repllist
Image:
 Master Server            : woodridge.min.veritas.com
 Backup ID                : woodridge_1287610477
 Client                   : woodridge
 Backup Time              : 1287610477 (Wed Oct 20 16:34:37 2010)
 Policy                   : two-hop-with-dup
 Client Type              : 0
 Schedule Type            : 0
 Storage Lifecycle Policy : woodridge2bayside2pearl_withdup
 Storage Lifecycle State  : 3 (COMPLETE)
 Time In Process          : 1287610545 (Wed Oct 20 16:35:45 2010)
 Data Classification ID   : (none specified)
 Version Number           : 0
 OriginMasterServer       : (none specified)
 OriginMasterServerID     : 00000000-0000-0000-0000-000000000000
 Import From Replica Time : 0 (Wed Dec 31 18:00:00 1969)
 Required Expiration Date : 0 (Wed Dec 31 18:00:00 1969)
 Created Date Time        : 1287610496 (Wed Oct 20 16:34:56 2010)

 Copy:
   Master Server       : woodridge.min.veritas.com
   Backup ID           : woodridge_1287610477
   Copy Number         : 102
   Copy Type           : 3
   Expire Time         : 1290288877 (Sat Nov 20 15:34:37 2010)
   Expire LC Time      : 1290288877 (Sat Nov 20 15:34:37 2010)
   Try To Keep Time    : 1290288877 (Sat Nov 20 15:34:37 2010)
   Residence           : Remote Master
   Copy State          : 3 (COMPLETE)
   Job ID              : 25
   Retention Type      : 0 (FIXED)
   MPX State           : 0 (FALSE)
   Source              : 1
   Destination ID      :
   Last Retry Time     : 1287610614

 Replication Destination:
   Source Master Server: woodridge.min.veritas.com
   Backup ID           : woodridge_1287610477
```

```
Copy Number          : 102
Target Machine       : bayside
Target Info          : PureDiskVolume
Remote Master        : (none specified)
```

About troubleshooting automatic import jobs

The automatic import jobs managed by the storage lifecycle policy components are different than legacy import jobs. Automatic import jobs asynchronously notify NetBackup that an image needs to be imported. Also, the source duplication to remote master job gives the catalog entries for this copy to the storage device so the job does not have to read the entire image. Automatic import jobs simply read the catalog record off the storage device and add it into its own catalog. This process is so fast that NetBackup batches images for import for efficiency. The state where NetBackup has been notified, but the import has not yet occurred is called pending import.

See the *NetBackup Administrator Guide*f or tuning the batching interval of the import manager process and other information about automatic import.

The notify event from the storage server provides the image name, where on the storage server to read the catalog for this image, and the name of the storage lifecycle policy that processes the image. Images for automatic import jobs are batched by storage lifecycle policy name and disk volume. The import job consumes an input-output stream on the disk volume.

To view images that are pending import, run the following command:

```
# nbstlutil pendimplist -U
Image:
 Master Server            : bayside.min.veritas.com
 Backup ID                : gdwinlin04_1280299412
 Client                   : gdwinlin04
 Backup Time              : 1280299412 (Wed Jul 28 01:43:32 2010)
 Policy                   : (none specified)
 Client Type              : 0
 Schedule Type            : 0
 Storage Lifecycle Policy : (none specified)
 Storage Lifecycle State  : 1 (NOT_STARTED)
 Time In Process          : 0 (Wed Dec 31 18:00:00 1969)
 Data Classification ID   : (none specified)
 Version Number           : 0
 OriginMasterServer       : master_tlk
 OriginMasterServerID     : 00000000-0000-0000-0000-000000000000
```

```
Import From Replica Time : 0 (Wed Dec 31 18:00:00 1969)
Required Expiration Date : 0 (Wed Dec 31 18:00:00 1969)
Created Date Time        : 1287678771 (Thu Oct 21 11:32:51 2010)

Copy:
  Master Server       : bayside.min.veritas.com
  Backup ID           : gdwinlin04_1280299412
  Copy Number         : 1
  Copy Type           : 4
  Expire Time         : 0 (Wed Dec 31 18:00:00 1969)
  Expire LC Time      : 0 (Wed Dec 31 18:00:00 1969)
  Try To Keep Time    : 0 (Wed Dec 31 18:00:00 1969)
  Residence           : (none specified)
  Copy State          : 1 (NOT_STARTED)
  Job ID              : 0
  Retention Type      : 0 (FIXED)
  MPX State           : 0 (FALSE)
  Source              : 0
  Destination ID      :
  Last Retry Time     : 0

  Fragment:
    Master Server     : bayside.min.veritas.com
    Backup ID         : gdwinlin04_1280299412
    Copy Number       : 1
    Fragment Number   : -2147482648
    Resume Count      : 0
    Media ID          : @aaaab
    Media Server      : bayside.min.veritas.com
    Storage Server    : bayside.min.veritas.com
    Media Type        : 0 (DISK)
    Media Sub-Type    : 0 (DEFAULT)
    Fragment State    : 1 (ACTIVE)
    Fragment Size     : 0
    Delete Header     : 1
    Fragment ID       : gdwinlin04_1280299412_C1_IM
```

The action taken on the automatic import job and the automatic import event depends on the several conditions as shown in the following table.

Action	Condition
Automatic import jobs queue	No media server or I/O stream is available for this disk volume.

Action	Condition
Automatic import jobs never start (copy stays at storage lifecycle state 1)	■ The storage lifecycle policy is inactive. ■ The storage lifecycle policy import destination is inactive. ■ The storage lifecycle policy is between sessions. ■ The image has exceeded the extended retry count and the extended retry time has not passed.
Automatic import event is discarded and the image is ignored	■ The event specifies a backup ID that already exists in this master server's catalog. ■ The event specifies a disk volume that is not configured in NetBackup for this storage server.
Automatic import job is started but the image is expired and deleted to clean up disk space in some cases. The event logs an error in the Problems Report or bperror output. An import job runs, but the import for this image fails showing an status code of 1532–1535.	■ The storage lifecycle policy that is specified in the event does not contain an import destination. ■ The storage lifecycle policy that is specified in the event has an import destination with a residence that does not include the disk volume specified by the event ■ The storage lifecycle policy that is specified does not exist. This is default behavior. More information is available for the storage lifecycle policy configuration options. See the *NetBackup Administrator's Guide, Volume 1*.

Look at the Problems Report or the `bperror` list for these cases.

For troubleshooting job flow for automatic import jobs, use the same command lines as you would for other storage lifecycle policy managed jobs. To list images for which NetBackup has received notification from storage but not yet initiated import (either pending or failed), use the commands noted above or run the following command:

```
# nbstlutil list -copy_type import -U -copy_incomplete
```

To list images that have been automatically imported, run the following command:

```
# nbstlutil list -copy_type import -U -copy_state 3 -U
Master Server            : bayside.min.veritas.com
 Backup ID                : woodridge_1287610477
```

```
 Client                    : woodridge
 Backup Time               : 1287610477 (Wed Oct 20 16:34:37 2010)
 Policy                    : two-hop-with-dup
 Client Type               : 0
 Schedule Type             : 0
 Storage L ifecycle Policy : woodridge2bayside2pearl_withdup
 Storage Lifecycle State   : 3 (COMPLETE)
 Time In Process           : 1287610714 (Wed Oct 20 16:38:34 2010)
 Data Classification ID    : (none specified)
 Version Number            : 0
 OriginMasterServer        : woodridge.min.veritas.com
 OriginMasterServerID      : f5cec09a-da74-11df-8000-f5b9412d8988
 Import From Replica Time  : 1287610672 (Wed Oct 20 16:37:52 2010)
 Required Expiration Date  : 1290288877 (Sat Nov 20 15:34:37 2010)
 Created Date Time         : 1287610652 (Wed Oct 20 16:37:32 2010)
```

The OriginMasterServer, OriginMasterServerID, Import From Replica Time, and Required Expiration Date are not known until after the image is imported so a pending record may look like this:

```
Image:
 Master Server             : bayside.min.veritas.com
 Backup ID                 : gdwinlin04_1280299412
 Client                    : gdwinlin04
 Backup Time               : 1280299412 (Wed Jul 28 01:43:32 2010)
 Policy                    : (none specified)
 Client Type               : 0
 Schedule Type             : 0
 Storage Lifecycle Policy  : (none specified)
 Storage Lifecycle State   : 1 (NOT_STARTED)
 Time In Process           : 0 (Wed Dec 31 18:00:00 1969)
 Data Classification ID    : (none specified)
 Version Number            : 0
 OriginMasterServer        : master_tlk
 OriginMasterServerID      : 00000000-0000-0000-0000-000000000000
 Import From Replica Time  : 0 (Wed Dec 31 18:00:00 1969)
 Required Expiration Date  : 0 (Wed Dec 31 18:00:00 1969)
 Created Date Time         : 1287680533 (Thu Oct 21 12:02:13 2010)
```

The OriginMasterServer here is not empty, although it may be in some cases. In cascading duplication to remote master, the master server sends the notification.

Troubleshooting network interface card performance

If backup or restore jobs are running slowly, verify that the network interface cards (NIC) are set to full duplex. Half duplex often causes poor performance.

Note: If the NIC in a NetBackup master or media server is changed, or if the server IP address changes, CORBA communications may be interrupted. To address this situation, stop and restart NetBackup.

For help on how to view and reset duplex mode for a particular host or device, consult the manufacturer's documentation. If the documentation is not helpful, perform the following procedure.

To troubleshoot network interface card performance

1. Log on to the host that contains the network interface card whose duplex mode you want to check.
2. Enter the following command to view the current duplex setting.

   ```
   ifconfig -a
   ```

   On some operating systems, this command is `ipconfig`.

   The following is an example output from a NAS filer:

   ```
   e0: flags=1948043<UP,BROADCAST,RUNNING,MULTICAST,TCPCKSUM> mtu
   1500
   inet 10.80.90.91 netmask 0xfffff800 broadcast 10.80.95.255
   ether 00:a0:98:01:3c:61 (100tx-fd-up) flowcontrol full
   e9a: flags=108042<BROADCAST,RUNNING,MULTICAST,TCPCKSUM> mtu 1500
   ether 00:07:e9:3e:ca:b4 (auto-unknown-cfg_down) flowcontrol full
   e9b: flags=108042<BROADCAST,RUNNING,MULTICAST,TCPCKSUM> mtu 1500
   ether 00:07:e9:3e:ca:b5 (auto-unknown-cfg_down) flowcontrol full
   ```

   In this example, the network interface that shows "100tx-fd-up" is running in full duplex. Only interface `e0` (the first in the list) is at full duplex.

   A setting of "auto" is not recommended, because devices can auto-negotiate to half duplex.

3 The duplex mode can be reset by using the `ifconfig` (or `ipconfig`) command. For example:

```
ifconfig e0 mediatype 100tx-fd
```

4 For most hosts, you can set full-duplex mode permanently, such as in the host's /etc/rc files. Refer to the host's documentation for more information.

About SERVER entries in the bp.conf file

On Solaris and Linux systems, every SERVER entry in a client bp.conf file must be a NetBackup master or media server. That is, each system that is listed as a SERVER must have either NetBackup master or media server software installed. The client service on some clients cannot be started if the client name is incorrectly listed as a server.

If a bp.conf SERVER entry specifies a NetBackup client-only computer, SAN client backups or restores over Fibre Channel may fail to start. In this case, determine if the `nbftclnt` process is running on the client. If it is not running, check the `nbftclnt` unified logging file (OID 200) for errors. You may see the following in the `nbftclnt` log:

```
The license is expired or this is not a NBU server. Please check
your configuration. Note: unless NBU server, the host name can't be
listed as server in NBU configuration.
```

Remove or correct the SERVER entry in the `bp.conf` file, restart `nbftclnt` on the client, and retry the operation.

Note: The `nbftclnt` process on the client must be running before you start a SAN client backup or restore over Fibre Channel.

About unavailable storage unit problems

NetBackup jobs sometimes fail because storage units are unavailable, due to drives that are down or configuration errors, such as referencing an incorrect robot number. NetBackup processes log messages to the NetBackup error log that help you pinpoint and resolve these types of issues.

In addition, the Job Details dialog box available from the Activity Monitor contains messages that describe the following:

- The resources that the job requests

- The granted (allocated) resources.

If a job is queued awaiting resources, the Job Details dialog lists the resources for which the job waits. The three types of messages begin with the following headers:

```
requesting resource ...
awaiting resource ...
granted resource ...
```

About troubleshooting NetBackup in a SAN environment

NetBackup administrators may encounter any or all of the following common problems in a SAN (storage area network) environment:

- Intermittent backup failures
- Connectivity issues (drives that are down)
- SAN configuration changes

If the SAN administrator rezones the network or masks an array in use by NetBackup, some of the devices that NetBackup needs may be unavailable. Either action causes backups to fail and drives to go down. The only information available to the NetBackup administrator is an error 83 (media open error) or error 84 (media write error) status code.

You can use Veritas CommandCentral Storage to check elements of the SAN configuration. For example, you can check whether a particular device is connected as well as the zoning and masking on the SAN.

Sometimes a switch or a Windows box is interrupted and sends out a reset command. Since NetBackup doesn't automatically maintain persistent bindings, the reset command can cause drives to be mapped differently. CommandCentral Storage can help find the problem by showing the changes in the drive mappings, although it cannot automatically fix the problem.

For information on how to implement persistent bindings, refer to the *NetBackup Device Configuration Guide*.

NetBackup lets you launch CommandCentral Storage in context. The CommandCentral Storage Web GUI precisely displays the area of the SAN configuration you plan to troubleshoot.

NetBackup enterprise lifecycle best practices

SAN-related problems generally involve the use of Shared Storage Option (SSO). The two types of NetBackup users generally are as follows:

- Operators who have limited access to hosts and to the fabric of the SAN
- System administrators who have administrator privileges, but no access to the fabric

The SAN administrator generally operates outside the NetBackup domain entirely. Troubleshooting NetBackup is difficult when it involves the SAN because administrative responsibility tends to be spread out. No one person has a clear picture of the overall backup structure.

CommandCentral Storage provides a consistent view of the entire SAN against which to measure performance. It gives NetBackup administrators the data they need to request changes of and collaborate with the SAN administrators. It helps NetBackup administrators when they design, configure, implement, or modify solutions in response to changes in backup environments (hardware, applications, demand).

CommandCentral Storage can help those responsible for managing a backup system in a SAN environment by integrating SAN management and backup operation information.

CommandCentral Storage can provide support during the following backup lifecycle stages:

- Design

  Use CommandCentral Storage during the design phase to determine the following:

  - Where to deploy a backup system on the SAN
  - If SAN redesign is required to meet backup windows at minimum hardware cost and application impact

    For example, a backup design may not require the purchase of additional switches if it takes into account the following: the performance trending reports that CommandCentral Storage keeps to determine the pattern of fabric utilization.

    Or perhaps if you re-zone the fabric through CommandCentral Storage, it may provide sufficient bandwidth for meeting backup window requirements. In addition, CommandCentral Storage can provide visibility into recovery designs and fabric performance in the event of large restores that critical business operations require.

- Configuration, testing

Generally, backup systems are tested before implementation to obtain benchmarks and adjust (tune) the system for maximum efficiency. CommandCentral Storage can provide the performance metrics for end-to-end I/O capabilities for all elements in the backup path. Additionally, CommandCentral Storage can provide valuable environmental information for qualifying the backup environment as well as a baseline for future troubleshooting configuration management.

- Implementation, reconfiguration, production
  CommandCentral Storage can help to determine whether a host can see through the entire I/O path to the target backup device by pinpointing connectivity issues.

About using CommandCentral Storage to troubleshoot NetBackup in a SAN environment

You can use CommandCentral Storage in the following ways to troubleshoot NetBackup in a SAN environment:

In-context launch	The ability to launch CommandCentral Storage and access an overview of the SAN from NetBackup in context is valuable for determining root cause problems quickly. In addition, because NetBackup administrators and SAN administrators are often in different groups, the fragmented operations that lead to resolution delays may be avoided. With CommandCentral Storage, the NetBackup administrator has a view of the overall health of the SAN as part of the initial troubleshooting process.
Connectivity and device check	The CommandCentral Storage view of the SAN environment can help you detect any failure in the topology. In addition, having an environment inventory to provide to support for troubleshooting is valuable to the support process.
General troubleshooting tools	Some ways to investigate a backup failure are as follows: ■ Launch CommandCentral Storage in context from NetBackup to check fabric health. ■ Check reports for fabric events occurring around the time NetBackup generated the error log.

Using CommandCentral Storage to troubleshoot the inability to access drives or robots in a SAN environment

The following use case demonstrates how CommandCentral Storage can be integrated into a NetBackup troubleshooting procedure to investigate the SAN context of a backup system. Most common NetBackup problems on SANs revolve around connectivity issues.

Typically found as an error 213 (no storage units available for use) in NetBackup, this problem represents a loss of connectivity. This issue is a problem because NetBackup freezes tapes with two write failures, even when SAN problems cause the failures.

Symptom: Backup jobs fail

To use CommandCentral Storage to troubleshoot the inability to access drives or robots in a SAN environment

1. Check the NetBackup device monitor to see whether a device is down. If a device is down, try to bring it back up.
2. If the drive is still down, check the following for status 219 (the required storage unit is unavailable) and 213 (no storage units available for use) on the media server:
   - Syslog
   - Device logs
   - NetBackup logs
3. Check the NetBackup logs for status 83, 84, 85, and 86. These codes relate to write, read, open, position failures to access the drive.
4. Try a `robtest` to determine connectivity.

   If there is no connectivity, the likely problem is with hardware.
5. From the master server, select the robot or device the storage unit is associated with.
6. Launch CommandCentral Storage for a view of the media server and devices.
7. Check the fabric connectivity (whether any I/O path devices are down).

Using CommandCentral Storage to troubleshoot the inability to discover a drive or robot in a SAN environment

The following use case demonstrates how CommandCentral Storage can be integrated into a NetBackup troubleshooting procedure to investigate the SAN

context of a backup system. Most common NetBackup problems on SANs revolve around connectivity issues.

The NetBackup administrator installs a new device and runs the Device Configuration Wizard to discover and configure it. The wizard does not see the newly installed device.

CommandCentral Storage topology is a good visual tool to check connectivity between the hosts and the devices. You can use it to see if a network cable was dislodged or if some other problem exists.

This use case may be encountered when you configure off-host backups. Off-host backups require the media server to be able to see all devices with which it conducts the backup: disk array, disk cache, data mover, library, and drive. Connectivity must be correct. In addition, the `bptpcinfo` command in NetBackup Snapshot Client generates a `3pc.conf` configuration file for running the backup. Often the WWN (world wide name) for some devices is incorrect. You can use CommandCentral Storage to verify that the contents of the `3pc.conf` file correlate to the actual fabric configuration.

For a description of off-host backup, the `bptpcinfo` command, and the `3pc.conf` file, refer to the *NetBackup Snapshot Client Configuration* document.

For help accessing this document, see "Snapshot Client Assistance" in the *NetBackup Snapshot Client Administrator's Guide*.

Symptom: After you run the Device Configuration Wizard, the new device does not appear in the discovered devices list.

To use CommandCentral Storage to troubleshoot the inability to discover a drive or robot in a SAN environment

1. Run device discovery again.
2. If the new device is still not seen, the likely problem is with hardware. Launch CommandCentral Storage.
3. If the new device does not appear in the CommandCentral Storage topology, check the SAN hardware connections to determine whether or not the device is connected.

   If the new device shows up as disconnected or offline, contact the SAN administrator and check switch configuration.

   Compare this troubleshooting procedure to a similar problem without the benefit of CommandCentral Storage, such as Robotic status code 214: robot number does not exist.

   See Robotic status code 214 in the *Status Codes Reference Guide*.
4. Rerun the Device Configuration Wizard.

Using CommandCentral Storage to troubleshoot an intermittent drive failure in a SAN environment

The following use case demonstrates how CommandCentral Storage can be integrated into a NetBackup troubleshooting procedure to investigate the SAN context of a backup system. Most common NetBackup problems on SANs revolve around connectivity issues.

A drive fails and causes a backup to fail, but on examination the drive looks fine.

Sometimes a problem with a switch or bridge either before or during the backup job causes the job to fail and takes down the drive. This problem is one of the most difficult to diagnose. By the time the NetBackup administrator looks at the SAN everything may be fine again. To use CommandCentral Storage to troubleshoot this issue, do the following: check for alerts around the time of the job failure and see if a SAN problem occurred that would have caused the job to fail.

Another possibility is that another application reserved the device. A SCSI device monitoring utility is required to resolve this issue, which neither CommandCentral Storage nor NetBackup currently supplies.

Symptom: The backup job fails intermittently and the drive is down intermittently. No errors appear in the error log other than that the job failed.

To use CommandCentral Storage to troubleshoot an intermittent drive failure in a SAN environment

1. Select a drive inside the NetBackup Device Monitor. Launch CommandCentral Storage in the drive context to see whether the drive is connected to the SAN.
2. Check CommandCentral Storage alert reports to see whether a SAN problem existed that would have affected the drive during the time the backup job failed.

Chapter 3

Using logs

This chapter includes the following topics:

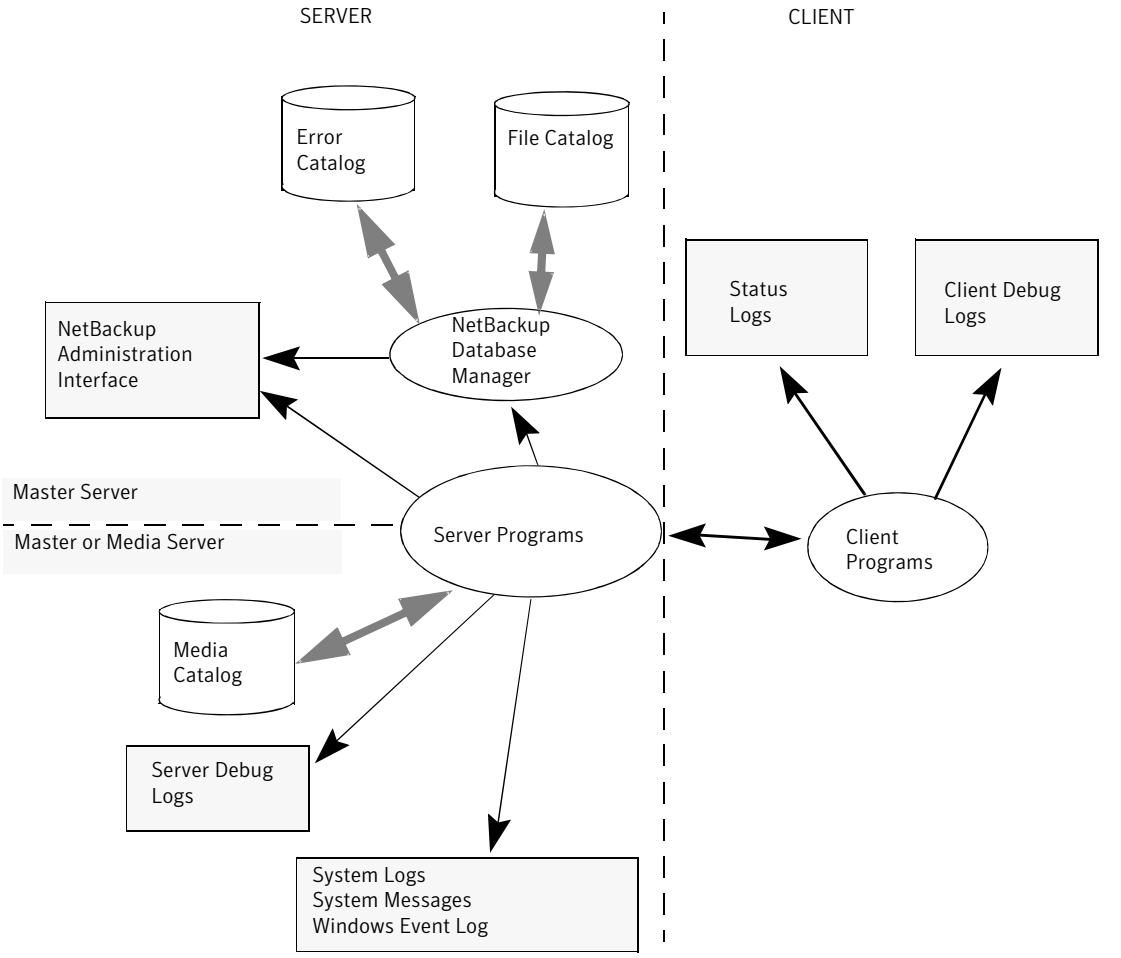
About logs

NetBackup uses several different logs and reports to help you troubleshoot any problems that you encounter.

Users need to know where log and report information is on their systems.

Figure 3-1 shows the location of the log and report information on the client and the server and the processes that make the information available.

Figure 3-1 Logs in the NetBackup Enterprise system



You can review a functional overview that describes the programs and daemons that are mentioned in this figure.

See "About backup and restore functional overview" on page 235.

You can also use NetBackup reports to help troubleshoot problems. NetBackup reports give information about status and errors. To run reports, use the **NetBackup Administration Console**.

See the *NetBackup Administrator's Guide, Volume I* for detailed descriptions of NetBackup reports.

Note: The log-entry format in the NetBackup logs is subject to change without notice.

Note: The term “media server”, as distinct from “master server” or “server”, does not apply to the NetBackup server product. When you troubleshoot a NetBackup server installation, ignore any references to media server. (This note does not apply to NetBackup Enterprise Server.)

About UNIX system logs

The NetBackup server daemons and programs occasionally log information through the `syslogd` man page. `syslogd` then shows a message or writes the information in an appropriate system log or the console log.

On UNIX, NetBackup automatically records robotic and network errors in the system logs by using `syslogd`. On Windows, NetBackup records robotic and drive errors in the **Event Viewer** Application log. On both operating systems, log entries are also made when robotically controlled drives change between UP and DOWN states.

Note: On HP-UX, the `sysdiag` tool may provide additional information on hardware errors.

To enable system logs, use one of the following:

- Use the `ltid` command that started the device management processes. If the `-v` option is included on the `ltid` command, all daemons that were started as a result also have the `-v` option in effect.
- Use a command to start a specific daemon (for example, `acsd -v`).

On UNIX, enable debug logging to the system logs by including the verbose option (`-v`) on the command that you use to start a daemon.

To troubleshoot `ltid` or robotic software, you must enable system logging. See the `syslogd(8)` man page for information on setting up system logs. Errors are logged with `LOG_ERR`, warnings with `LOG_WARNING`, and debug information with `LOG_NOTICE`. The facility type is daemon.

See the `syslogd` man page for the locations of system log messages on your system.

About unified logging

Unified logging and legacy logging are the two forms of debug logging used in NetBackup. Unified logging creates log file names and messages in a standardized format. All NetBackup processes use either unified logging or legacy logging.

Unlike the files that are written in legacy logging, unified logging files cannot be viewed with a text editor. The unified logging files are in binary format, and some of the information is contained in an associated resource file.

See "About legacy logging" on page 124.

Server processes and client processes use unified logging.

See "Server processes that use unified logging" on page 106.

See "UNIX client processes that use unified logging" on page 111.

See "PC client processes that use unified logging" on page 112.

Unlike legacy logging, unified logging does not require that you create logging subdirectories. Log files for originator IDs are written to a subdirectory with the name specified in the log configuration file. All unified logs are written to subdirectories in the following directory:

UNIX	`/usr/openv/logs`
Windows	*`install_path`*`\NetBackup\logs`

You can access logging controls in the **NetBackup Administration Console**. In the left pane, expand **NetBackup Management > Host Properties > Master Servers** or **Media Servers**. Double-click the server you want to change. In the left pane of the dialog box, click **Logging**.

You can also manage unified logging by using the following commands:

`vxlogcfg`	Modifies the unified logging configuration settings. See "Examples of using vxlogmgr to manage unified logs" on page 120.
`vxlogmgr`	Manages the log files that are generated by the products that support unified logging. See "Examples of using vxlogcfg to configure unified logs" on page 121.
`vxlogview`	Displays the logs that unified logging generates. See "Examples of using vxlogview to view unified logs" on page 118.

The commands `vxlogcfg`, `vxlogmgr`, `vxlogview`are located in the following directory.

UNIX	`/usr/openv/netbackup/bin`
Windows	*`install_path`*`\NetBackup\bin`

Refer to the *NetBackup Commands Reference Guide* for a complete description of these commands.

Gathering unified logs for NetBackup

This topic uses an example to describe how to gather unified logs for NetBackup.

To gather unified logs for NetBackup

1. Create a directory named `/upload` by using the following command.

```
# mkdir /upload
```

2. Copy unified logs (for NetBackup only) to the `/upload` directory by using the following command:

```
# vxlogmgr -p NB -c --dir /upload
```

Example output:

```
Following are the files that were found:
/usr/openv/logs/bmrsetup/51216-157-2202872032-050125-0000000000.log
/usr/openv/logs/nbemm/51216-111-2202872032-050125-0000000000.log
/usr/openv/logs/nbrb/51216-118-2202872032-050125-0000000000.log
/usr/openv/logs/nbjm/51216-117-2202872032-050125-0000000000.log
/usr/openv/logs/nbpem/51216-116-2202872032-050125-0000000000.log
/usr/openv/logs/nbsl/51216-132-2202872032-050125-0000000000.log
Total 6 file(s)
Copying
/usr/openv/logs/bmrsetup/51216-157-2202872032-050125-0000000000.log ...
Copying
/usr/openv/logs/nbemm/51216-111-2202872032-050125-0000000000.log ...
Copying
/usr/openv/logs/nbrb/51216-118-2202872032-050125-0000000000.log ...
Copying
/usr/openv/logs/nbjm/51216-117-2202872032-050125-0000000000.log ...
Copying
/usr/openv/logs/nbpem/51216-116-2202872032-050125-0000000000.log ...
Copying
/usr/openv/logs/nbsl/51216-132-2202872032-050125-0000000000.log ...
```

3 Change to the `/upload` directory and list its contents.

```
# cd /upload
  ls
```

Example output:

```
51216-111-2202872032-050125-0000000000.log
51216-116-2202872032-050125-0000000000.log
51216-117-2202872032-050125-0000000000.log
51216-118-2202872032-050125-0000000000.log
51216-132-2202872032-050125-0000000000.log
51216-157-2202872032-050125-0000000000.log
```

4 Tar the log files.

```
# tar -cvf file_name.logs ./*
```

Types of unified logging messages

The following message types can appear in unified logging files:

Application log messages

Application log messages include informational, warning, and error messages. They are always logged and cannot be disabled. These messages are localized.

An example of an application message follows:

```
05/02/10 11:02:01.717 [Warning] V-116-18
failed to connect to nbjm, will retry
```

Diagnostic log messages

Diagnostic log messages are the unified logging equivalent of the legacy debug log messages. They can be issued at various levels of detail (similar to verbose levels in legacy logging). These messages are localized.

Diagnostic messages can be disabled with the `vxlogcfg` command.

An example of a diagnostic message follows:

```
05/05/09 14:14:30.347 V-116-71
[JobScheduler::doCatIncr] no configured
session based incremental catalog schedules
```

Debug log messages

Debug log messages are intended primarily for Symantec engineering. Like diagnostic messages, they can be issued at various levels of detail. These messages are not localized.

Debug messages can be disabled with the `vxlogcfg` command.

An example of a debug message follows:

```
10/29/09 13:11:28.065 [taolog] TAO (12066|1) -
Transport_Cache_Manager::bind_i, 0xffbfc194 ->
0x7179d0 Transport[12]
```

File name format for unified logging

Unified logging uses a standardized naming format for log files. The following is an example of a log file name.

```
/usr/openv/logs/nbpem/51216-116-2201360136-041029-0000000000.log
```

Table 3-1 describes each part of the log file name.

Table 3-1 Description of the file name format for unified logging

Example	Description	Details
51216	Product ID	Identifies the product. The NetBackup product ID is 51216. The product ID is also known as the entity ID.
116	Originator ID	Identifies the log writing entity, such as a process, service, script, or other software. The number 116 is the originator ID of the `nbpem` process (the NetBackup policy execution manager).
2201360136	Host ID	Identifies the host that created the log file. Unless the file was moved, this ID is the host where the log resides..
041029	Date	Shows the date when the log was written in YYMMDD format.
0000000000	Rotation	Identifies the numbered instance of a log file for a given originator. The rollover number (rotation) indicates the instance of this log file. By default, log files roll over (rotate) based on file size. If the file reaches maximum size and a new log file is created for this originator, the new file is designated 0000000001. See "About rolling over unified log files" on page 113.

Server processes that use unified logging

Many server processes use unified logging. The originator IDs correspond to NetBackup processes. More than one process may use an originator ID. UNIX clients and Windows clients also include the processes that use unified logging.

See "UNIX client processes that use unified logging" on page 111.

See "PC client processes that use unified logging" on page 112.

The log configuration file specifies the name of the directories where the log files for originator IDs are written. These directories and the log files that they hold are written to the following directory, except as noted in Table 3-2.

UNIX	`/usr/openv/logs`
Windows	*`install_path`*`\NetBackup\logs`

Table 3-2 lists the NetBackup server processes that use unified logging.

Table 3-2 Originator IDs for the server processes that use unified logging

Originator ID	Process	Description
103	None	■ Private Branch Exchange service (PBX) ■ Writes logs to `/opt/VRTSpbx/log` (UNIX) and *`install_path`*`\VxPBX\log` (Windows).
111	`nbemm`	■ Enterprise Media Manager (EMM) ■ Runs only on the EMM server.
116	`nbpem`	■ NetBackup Policy Execution Manager ■ Runs only on the master server.
117	`nbjm`	■ NetBackup Job Manager ■ Runs only on the master server.
118	`nbrb`	■ NetBackup Resource Broker ■ Runs only on the EMM server.
119	`bmrd` and `bmrbd`	■ Bare Metal Restore (BMR) master (or boot) server daemons ■ `bmrbd` runs on the BMR boot server.

Table 3-2 Originator IDs for the server processes that use unified logging *(continued)*

Originator ID	Process	Description
121	`bmrsavecfg`	■ Bare Metal Restore data collection utility ■ Runs on the NetBackup client, not server.
122	`bmrc`	■ Bare Metal Restore utility ■ Originates on the BMR boot server and runs on the restoring client. ■ UNIX clients use it to communicate to the BMR master server during a restore.
123	`bmrs`	Bare Metal Restore commands and database interface.
124	`bmrcreatefloppy.exe`	■ Runs on the BMR boot server. ■ Used by the Bare Metal Restore commands that create floppy disks. ■ Windows only
125	`bmrsrtadm`	■ Bare Metal Restore utility ■ Creates a shared resource tree and bootable CDs, and runs on the BMR boot server.
126	`bmrprep`	■ Bare Metal Restore utility ■ Prepares the BMR servers for a client restoration.
127	`bmrsetupmaster` and `bmrsetupboot`	Bare Metal Restore installation, configuration, and upgrade processes.
128		Bare Metal Restore libraries get their log messages from this catalog.
129	`bmrconfig`	■ Bare Metal Restore utility ■ Modifies a client's configuration.
130	`bmrpkg` and `bmrcreatepkg`	■ Bare Metal Restore utilities ■ They add Windows drivers, service packs, and hotfixes to the BMR master server so they can be used in a restore.

Table 3-2 Originator IDs for the server processes that use unified logging *(continued)*

Originator ID	Process	Description
131	`bmrrst.exe` and `bmrmap.exe`	■ Windows systems only ■ They restore Windows Bare Metal Restore clients. ■ They run on the restoring client.
132	`nbsl`	NetBackup Service Layer
134	`ndmpagent`	■ NDMP agent daemon ■ Manages NDMP backup and restore.
137		Controls the logging level in the NetBackup libraries. The application and diagnostic messages are for customer use; debug messages are intended for Symantec engineering.
140		Media server user interface for the Enterprise Media Manager (EMM).
142	`bmrepadm`	Manages the Bare Metal Restore external procedures that are used during a restore.
143	`mds`	The media selection component and device selection component of Enterprise Media Manager (EMM).
144		Device Allocator, for shared drives.
146		TheSymantec OpsCenter reporting service Part of Symantec OpsCenter
147		The Symantec OpsCenter Client Part of Symantec OpsCenter
148		The Symantec OpsCenter Server Part of Symantec OpsCenter
151		NDMP protocol messages, `avrd`, and robotic processes.
154	`bmrovradm`	Manages the custom override functions for Bare Metal Restore.

Table 3-2 Originator IDs for the server processes that use unified logging *(continued)*

Originator ID	Process	Description
156		Controls the logging level in the (ACE/TAO) CORBA components for any process that uses a CORBA interface. The default level is 0 (only important messages are logged). This logging is intended for Symantec engineering. **Note:** If Symantec Technical Support instructs you to increase the logging level, you must increase the level for originator ID 137 to 4 or higher. **Warning:** A debug logging level greater than 0 generates large amounts of data.
158		Remote access interface for NetBackup clients.
159		Transmater for NetBackup clients.
163	`svcmon`	NetBackup Service Monitor Monitors the NetBackup services and attempts to restart a service that unexpectedly terminates.
166		NetBackup Vault
178		Disk Service Manager (DSM), which performs set and get operations on disk storage and disk storage units.
199	`nbftsrvr`	FT Server process Part of SAN Client
200	`nbftclnt`	FT Client process Part of SAN Client
201		FT Service Manager (FSM) component of the Enterprise Media Manager (EMM), for SAN Client.
210		Exchange Firedrill Wizard for NetBackup clients.

Table 3-2 Originator IDs for the server processes that use unified logging *(continued)*

Originator ID	Process	Description
219		The Resource Event Manager (REM) is a CORBA loadable service that runs inside `nbemm`. REM works with the Disk Polling Service to monitor free space and volume status, and to watch for disk-full conditions.
220		Disk polling service for NetBackup clients.
221		The Media Performance Monitor Service (MPMS). This service runs on every media server within RMMS and gathers CPU load and free memory information for the host.
222		Remote monitoring and Management Service (RMMS), which is the conduit through which EMM discovers and configures disk storage on media servers.
226	`libssmgr`	Storage lifecycle manager Controls the lifecycle image duplication operations.
230		The Remote Disk Service Manager interface (RDSM) that runs within the Remote Manager and Monitor Service. RMMS runs on media servers.
231	`nbevtmgr`	Event Manager Service Provides asynchronous Event Management Services for cooperating participants.
248	`bmrlauncher`	BMR launcher A utility in the Windows BMR Fast Restore image that configures the BMR environment.
254		Recovery assistant for SharePoint Portal Server for NetBackup clients.
261		Artifact generator generated source.
263	`nbconsole`	NetBackup Administration Console for Windows

Table 3-2 Originator IDs for the server processes that use unified logging *(continued)*

Originator ID	Process	Description
271		Legacy error codes.
272	`libexpmgr`	Expiration Manager Handles the capacity management and the image expiration for storage lifecycle operations.
286		Encryption key Management Service
293		NetBackup Audit service
294		NetBackup Audit messages
360		NetBackup Client Oracle utility
363	`nbars`	Database Agent Request server process call

UNIX client processes that use unified logging

Most UNIX client processes use legacy logging, with the exception of a few Bare Metal Restore processes. However, the following UNIX client processes use unified logging.

Table 3-3 UNIX client processes that use unified logging

Originator ID	Process	Description
121	`bmrsavecfg`	
122	`bmrc`	Originates from the BMR boot server, which may not be a NetBackup server, and runs on the restoring client.
200	`nbftclnt`	
359	`nbbrowse`	NetBackup Client Browser
366	`ncfnbcs`	Client service

PC client processes that use unified logging

Most PC client processes use legacy logging except for a few Bare Metal Restore processes. However, the following Windows client processes use unified logging. Unified logging is enabled by default.

Table 3-4 PC client process that use unified logging

Originator ID	Process	Description
121	`bmrsavecfg`	
122	`bmrc`	Originates from the BMR boot server, which may or may not be a NetBackup server, and runs on the restoring client.
131	`bmrrst.exe` and `bmrmap.exe`	Originate from the BMR boot server, which may or may not be a NetBackup server, and run on the restoring client.
351	`nblbc`	NetBackup Live Browse Client
200	`nbftclnt`	
352	`nbgre`	NetBackup Granular Restore
359	`nbbrowse`	NetBackup Client Browser
366	`nbcs`	Client service

About changing the location of unified log files

The unified logging files can consume a lot of disk space. If necessary, enter the following to direct them to a different location.

UNIX `/usr/openv/netbackup/bin/vxlogcfg -a -p NB -o Default -s LogDirectory=`*`new_log_path`*

Where *`new_log_path`* is a full path, such as `/bigdisk/logs`.

Windows *`install_path`*`\NetBackup\bin\vxlogcfg -a -p NB -o Default -s LogDirectory=`*`new_log_path`*

Where *`new_log_path`* is a full path, such as `D:\logs`.

About recycling unified log files

Deleting the oldest log files is referred to as recycling. You can recycle unified logging files in the following ways.

Limit the number of log files	Specify the maximum number of log files that NetBackup retains. When the number of log files exceeds the maximum, the oldest log files are automatically deleted. The `NumberOfLogFiles` option for the `vxlogcfg` command defines that number. The following example sets to 8000 the maximum number of log files that are allowed for all unified logging originators in the NetBackup (product ID 51216). When the number of log files exceeds 8000 for a particular originator, the oldest log files are automatically deleted. `# vxlogcfg -a -p 51216 -o ALL -s NumberOfLogFiles=8000` See "Examples of using vxlogcfg to configure unified logs" on page 121.
Specify the number of days the log files are kept	Use the **Keep logs** property to specify the maximum number of days logs are kept. When the maximum number of days is reached, the unified logs and legacy logs are automatically deleted. In the NetBackup Administration Console, in the left pane, expand **NetBackup Management > Host Properties > Master Servers**. Double-click the server you want to change. A new dialog box appears. In the left pane, click **Clean-up > Keep logs**.
Explicitly delete the log files	Use the `vxlogmgr` command. If you cannot manually delete or move files with `vxlogmgr`, the **Keep logs** property removes the old logs for both unified logging and legacy logging. See "Examples of using vxlogmgr to manage unified logs" on page 120.

If the `vxlogcfg LogRecycle` option is ON (true), the **Keep logs** setting is disabled for unified logs. In this case, unified logging files are deleted when their number (for a particular originator) exceeds the number that the `NumberOfLogFiles` option specifies on the `vxlogcfg` command.

About rolling over unified log files

To prevent log files from becoming too large, or to control when or how often logs are created, you can set a log rollover option. When a file size or time setting is

reached, the current log file is closed. New log messages for the logging process are written or “rolled over” to a new log file.

You can set log file rollover to occur based on file size, time of day, or elapsed time. Set the conditions by using the `vxlogcfg` command with the options described in Table 3-5.

Table 3-5 Options of the vxlogcfg command that control the rollover of unified log files

Option	Description
`MaxLogFileSizeKB`	Specifies the maximum size that is allowed for the log file (in kilobytes) before rollover occurs, if the `RolloverMode` is set to `FileSize`.
`RolloverAtLocalTime`	Specifies the time of day at which the log file is rolled over, if the `RolloverMode` is set to `LocalTime`.
`RolloverPeriodInSeconds`	Specifies a period of time in seconds after which the log file is rolled over, if the `RolloverMode` is set to `Periodic`.
`MaxLogFileSizeKB` or `RolloverAtLocalTime`	Specifies that the log file rollover occurs whenever the file size limit or the local time limit is reached, whichever is first.
`MaxLogFileSizeKB` or `RolloverPeriodInSeconds`	Specifies that the log file rollover occurs whenever the file size limit or the periodic time limit is reached, whichever is first.

By default, log file rollover is based on a file size of 5120 KB. When a log file reaches 5120 KB in size, the file closes and a new log file opens.

The following example sets the NetBackup (`prodid` 51216) rollover mode to `Periodic`.

```
# vxlogcfg -a --prodid 51216 --orgid 116 -s RolloverMode=Periodic
    RolloverPeriodInSeconds=86400
```

The previous example uses the `vxlogcfg` command with the `RolloverMode` option. It sets rollover mode for `nbpem` (originator ID 116) to `Periodic`. It also sets the interval until the next `nbpem` log file rollover to 24 hours (86400 seconds).

In the following example, the file names show the log file rollover with the rotation ID incremented:

```
/usr/openv/logs/nbpem/51216-116-2201360136-041029-0000000000.log
/usr/openv/logs/nbpem/51216-116-2201360136-041029-0000000001.log
/usr/openv/logs/nbpem/51216-116-2201360136-041029-0000000002.log
```

In addition, you can use log file rotation with the following:

- Logs for the server processes that use unified logging
  See "Server processes that use unified logging" on page 106.
- Certain legacy logs
- The unified logging files that the Bare Metal Restore process `bmrsavecfg` creates

About using the vxlogview command to view unified logs

Use the `vxlogview` command to view the logs that unified logging creates. These logs are stored in the following directory.

UNIX	`/usr/openv/logs`
Windows	*`install_path`*`\logs`

Unlike the files that are written in legacy logging, unified logging files cannot be viewed with a text editor. The unified logging files are in binary format, and some of the information is contained in an associated resource file. Only the `vxlogview` command can assemble and display the log information correctly.

You can use `vxlogview` to view NetBackup log files as well as PBX log files.

To view PBX logs using the `vxlogview` command, do the following:

- Ensure that you are an authorized user. For UNIX and Linux, you must have root privileges. For Windows, you must have administrator privileges.
- Specify the PBX product ID by entering `-p 50936` as a parameter on the `vxlogview` command line.

About query strings used with the vxlogview command

Use the `vxlogview` command to display the logs that unified logging generates. The `vxlogview` command includes the following option: `-w` (`- -where`) *`QueryString`*.

`QueryString` represents a text expression similar to a database WHERE clause. The query string expression is used to retrieve log entries from the unified logging system. The expression is a combination of relational operators, constant integers,

constant strings, and names of log fields that evaluate to a single value. Expressions are grouped by logical operators such as AND and OR.

The supported relational operators are as follows:

<	less than
>	greater than
<=	less than and equal to
>=	greater than and equal to
=	equal to
!=	not equal to

The supported logical operators are as follows:

&&	logical AND
||	logical OR

Table 3-6 shows data types for specific fields as well as description and an example. When more than one example is listed, both examples produce the same results.

Table 3-6 Data types for fields

Field name	Type	Description	Example
PRODID	Integer or string	Provide the product ID or the abbreviated name of product.	PRODID = 51216 PRODID = 'NBU'
ORGID	Integer or string	Provide the originator ID or the abbreviated name of the component.	ORGID = 1 ORGID = 'VxAM'
PID	Long Integer	Provide the process ID	PID = 1234567
TID	Long Integer	Provide the thread ID	TID = 2874950
STDATE	Long Integer or string	Provide the start date in seconds or in the locale-specific short date and time format. For example, a locale may have format 'mm/dd/yy hh:mm:ss AM/PM'	STDATE = 98736352 STDATE = '4/26/04 11:01:00 AM'

Table 3-6 Data types for fields *(continued)*

Field name	Type	Description	Example
ENDATE	Long Integer or string	Provide the end date in seconds or in the locale-specific short date and time format. For example, a locale may have format 'mm/dd/yy hh:mm:ss AM/PM'	ENDATE = 99736352 ENDATE = '04/27/04 10:01:00 AM'
PREVTIME	String	Provide the hours in 'hh:mm:ss' format. This field should be used only with operators =, <, >, >= and <=	PREVTIME = '2:34:00'
SEV	Integer	Provide one of the following possible severity types: 0 = INFO 1 = WARNING 2 = ERR 3 = CRIT 4 = EMERG	SEV = 0 SEV = INFO
MSGTYPE	Integer	Provide one of the following possible message types: 0 = DEBUG (debug messages) 1 = DIAG (diagnostic messages) 2 = APP (application messages) 3 = CTX (context messages) 4 = AUDIT (audit messages)	MSGTYPE = 1 MSGTYPE = DIAG
CTX	Integer or string	Provide the context token as string identifier or 'ALL' to get all the context instances to be displayed. This field should be used only with the operators = and !=.	CTX = 78 CTX = 'ALL'

Consider the following when writing a query string.

Case sensitivity	Field names, severity types, and message types are not case-sensitive. For example, the following are valid entries: ■ `sev = info` ■ `msgtype = diag`
String constants	String constants should be given in single quotes. For example, `PRODID = 'NBU'`
Dates	Start and end dates can be provided in the following formats: ■ A string constant that corresponds to the regional display short date format ■ A long value of number of seconds that elapsed since midnight January 1, 1970.

Table 3-7 provides examples of query strings.

Table 3-7 Examples of query strings

Example	Description
`(PRODID == 51216) && ((PID == 178964) || ((STDATE == '2/5/09 00:00:00 AM') && (ENDATE == '2/5/03 12:00:00 PM'))`	
`((prodid = 'NBU') && ((stdate >= '11/18/09 0:0:0 AM') && (endate <= '12/13/09 13:0:0 AM'))) || ((prodid = 'BENT') && ((stdate >= '12/12/09 0:0:0 AM') && (endate <= '12/25/09 25:0:0 PM')))`	
`(STDATE <= '04/05/09 0:0:0 AM')`	Retrieves the log messages that were logged on or before 2009-05-04 for all the installed Symantec products.

Examples of using vxlogview to view unified logs

The following examples demonstrate how to use the `vxlogview` command to view unified logs.

Table 3-8 Example uses of the vxlogview command

Item	Example
Display specific attributes of the log messages	Display the log messages for NetBackup (51216) that show only the date, time, message type, and message text: `vxlogview --prodid 51216 --display D,T,m,x`
Display the latest log messages	Display the log messages for originator 116 (`nbpem`) that were issued during the last 20 minutes. Note that you can specify `-o nbpem` instead of `-o 116`: `# vxlogview -o 116 -t 00:20:00`
Display the log messages from a specific time period	Display the log messages for `nbpem` that were issued during the specified time period: `# vxlogview -o nbpem -b "05/03/05 06:51:48 AM" -e "05/03/05 06:52:48 AM"`
Display results faster	You can use the `-i` option instead of `-o`, to specify an originator: `# vxlogview -i nbpem` The `vxlogview -i` option searches only the log files that the specified process (`nbpem`) creates. 116 is the originator ID of these files in the log file name. By limiting the log files that it has to search, `vxlogview` returns a result faster. By comparison, the `vxlogview -o` option searches all unified log files for the messages that the specified process are logged by. **Note:** If you use the `-i` option with a process that is not a service, `vxlogview` returns the message "No log files found." A process that is not a service has no originator ID in the file name. In this case, use the `-o` option instead of the `-i` option. Typically, the NetBackup process is a service if it appears in the **Activity Monitor** of the **NetBackup Administration Console**, under the **Daemons** tab (UNIX) or **Services** tab (Windows).

Table 3-8 Example uses of the vxlogview command *(continued)*

Item	Example
Search for a job ID	You can search the logs for a particular job ID: `# vxlogview -i nbpem | grep "jobid=job_ID"` The `jobid=` search key should contain no spaces and must be lowercase. When searching for a job ID, you can use any `vxlogview` command option. This example uses the `-i` option with the name of the process (`nbpem`).

Examples of using vxlogmgr to manage unified logs

The following examples show how to use the `vxlogmgr` command to manage unified logging files. Log file management includes actions such as deleting or moving the log files.

Table 3-9 Example uses of the vxlogmgr command

Item	Example

List the log files	List all unified log files for the `nbrb` service:
	`# vxlogmgr -s -o nbrb`
	`/usr/openv/logs/nbrb/51216-118-1342895976-050503-00.log`
	`/usr/openv/logs/nbrb/51216-118-1342895976-050504-00.log`
	`/usr/openv/logs/nbrb/51216-118-1342895976-050505-00.log`
	`Total 3 file(s)`

Delete the oldest log files	Based on the "List the log files" example, if the `vxlogcfg NumberOfLogFiles` option is set to 1, the following deletes the two oldest log files for the `nbrb` service:
	`# vxlogmgr -d -o nbrb -a`
	`Following are the files that were found:`
	`/usr/openv/logs/nbrb/51216-118-1342895976-050504-00.log`
	`/usr/openv/logs/nbrb/51216-118-1342895976-050503-00.log`
	`Total 2 file(s)`
	`Are you sure you want to delete the file(s)? (Y/N):`
	`Y`
	`Deleting`
	`/usr/openv/logs/nbrb/51216-118-1342895976-050504-00.log ...`
	`Deleting`
	`/usr/openv/logs/nbrb/51216-118-1342895976-050503-00.log ...`

Table 3-9 Example uses of the vxlogmgr command *(continued)*

Item	Example
Delete the newest log files	Delete all the unified log files that NetBackup created in the last 15 days: `# vxlogmgr -d --prodid 51216 -n 15`
Delete the log files for a specific originator	Delete all unified log files for originator `nbrb`: `# vxlogmgr -d -o nbrb`
Delete all the log files	Delete all unified log files for NetBackup:. `# vxlogmgr -d -p NB`

Examples of using vxlogcfg to configure unified logs

Use the `vxlogcfg`command to change logging levels and rollover settings.

The `vxlogcfg` command has the following characteristics:

- The `vxlogcfg` command is the only way to turn off diagnostic and debug messages in unified logging. In legacy logging, the writing of messages cannot be turned off, only minimized.
- The `vxlogcfg` options for robust file logging (`MaxLogFileSizeKB` and `NumberOfLogFiles`) also affect certain legacy logs.
  See "About limiting the size and the retention of legacy logs" on page 131.
- Absolute paths must be specified. Do not use relat Control the log file size ive paths.

The following examples show how to use the `vxlogcfg` command to configure unified logging settings.

Table 3-10 Example uses of the vxlogcfg command

Item	Example

Set the maximum log file size	By default, the maximum log file size in unified logging is 5120 KB. When a log file reaches 5120 KB, the file closes and a new log file opens.
	
	You can change the maximum file size with the `MaxLogFileSizeKB` option. The following command changes the default maximum log size to 2048 KB for the NetBackup product:
	
	`# vxlogcfg -a -p 51216 -o Default -s MaxLogFileSizeKB=2048`
	
	For `MaxLogFileSizeKB` to be effective, the `RolloverMode` option must be set to `FileSize` :
	
	`# vxlogcfg -a --prodid 51216 --orgid Default -s RolloverMode=FileSize`
	
	`MaxLogFileSizeKB` can be set per originator. An originator that is not configured uses the default value. The following example overrides the default value for service `nbrb` (originator 118).
	
	`# vxlogcfg -a -p 51216 -o nbrb -s MaxLogFileSizeKB=1024`

Set log recycling	The following example sets automatic log file deletion for `nbemm` logs (originator ID 111): `# vxlogcfg -a --prodid 51216 --orgid 111 -s RolloverMode=FileSize MaxLogFileSizeKB=5120 NumberOfLogFiles=999999 LogRecycle=TRUE` This example sets `nbemm` rollover mode to file size, and turns on log recycling. When the number of log files exceeds 999999, the oldest log file is deleted. EXAMPLE 5 shows how to control the number of log files.
Set the debug level and diagnostic level	The following example sets the debug level and diagnostic level for all the originators of product ID NetBackup (51216): `# vxlogcfg -a --prodid 51216 --orgid ALL -s DebugLevel=0 DiagnosticLevel=1`

Table 3-10 Example uses of the vxlogcfg command *(continued)*

Item	Example

List the unified logging settings	The following `vxlogcfg` example shows how to list the active unified logging settings for a given originator (the `nbrb` service). Note that `MaxLogFileSizeKB`, `NumberOfLogFiles`, and `RolloverMode` are included in the output.
	
	`# vxlogcfg -l -o nbrb -p NB`
	
	`Configuration settings for originator 118,`
	`    of product 51,216...`
	`LogDirectory = /usr/openv/logs/`
	`DebugLevel = 5`
	`DiagnosticLevel = 5`
	`LogToStdout = False`
	`LogToStderr = False`
	`LogToOslog = False`
	`RolloverMode = FileSize`
	`MaxLogFileSizeKB = 5120`
	`RolloverPeriodInSeconds = 43200`
	`RolloverAtLocalTime = 0:00`
	`NumberOfLogFiles = 4`
	`...`

Control the number of log files	You can use the `vxlogmgr` command with the `vxlogcfg` command's `NumberOfLogFiles` option to manually delete log files.
	
	For example, you currently have 10 unified logging files and the `NumberOfLogFiles` option is set to 2. Enter the following to keep the two most recent log files and delete the rest for all originators:
	
	`# vxlogmgr -a -d`
	
	The following command keeps the two most recent log files of all PBX originators:
	
	`# vxlogmgr -a -d -p ics`
	
	The following deletes log files for the `nbrb` service only:
	
	`# vxlogmgr -a -d -o nbrb`

Table 3-10 Example uses of the vxlogcfg command *(continued)*

Item	Example
Control disk space usage	Periodically run the `vxlogmgr -a` command (such as through a `cron` job) to delete logs and monitor the disk space that unified logging uses. The disk space that a given originator uses can be calculated as follows: `NumberOfFiles` for originator * `MaxLogFileSizeKB` for originator The total disk space that unified logs consume is the sum of the disk space that each originator consumes. If none of the originators overrides the `NumberOfFiles` and `MaxLogFileSizeKB` settings, then the total disk space that unified logging consumes is as follows: Number of originators * default `MaxLogFileSizeKB` * default `NumberOfFiles` Use the `vxlogcfg` command to list the current unified logging settings. For example, assume the following: ■ `vxlogmgr -a -p NB` is configured as a `cron` job with a frequency of one hour. ■ No originators override default settings for `MaxLogFileSizeKB` or `NumberOfFiles`. ■ The number of active NetBackup originators on the host is 10. (Typical of a NetBackup master server that is not running BMR or NDMP.) ■ The default `MaxLogFileSizeKB` is equal to 5120. ■ The default `NumberOfFiles` is equal to 3. To calculate the total disk space that unified logging consumes, insert the values from the example into the previous formula. The results are as follows: 10 * 5120 * 3 KB = 15,360 KB of additional disk space used each hour.

About legacy logging

Legacy logging and unified logging are the two forms of debug logging used in NetBackup. In legacy debug logging, each process creates logs of debug activity

in its own logging directory. All NetBackup processes use either unified logging or legacy logging.

See "About unified logging" on page 102.

To enable legacy debug logging on NetBackup servers, you must first create the appropriate directories for each process.

UNIX	`/usr/openv/netbackup/logs` `/usr/openv/volmgr/debug`
Windows	*install_path*`\NetBackup\logs` *install_path*`\Volmgr\debug`

After the directories are created, NetBackup creates log files in the directory that is associated with each process. A debug log file is created when the process begins.

To enable debug logging for the NetBackup Status Collection Daemon (`vmscd`), create the following directory before you start `nbemm`.

As an alternative, you can stop and restart `nbemm` after creating the following directory:

UNIX	`/usr/openv/volmgr/debug/reqlib`
Windows	*install_path*`\Volmgr\debug\reqlib\`

Tables are available that list the log directories that you must create.

See "Directory names for legacy debug logs for servers " on page 127.

See "Directory names for legacy debug logs for media and device management" on page 129.

Note: On a Windows server, you can create the debug log directories at once, under *install_path*`\NetBackup\Logs`, by running the following batch file: *install_path*`\NetBackup\Logs\mklogdir.bat`.

Media servers have only the `bpbrm`, `bpcd`, `bpdm`, and `bptm` debug logs.

Creating legacy log directories to accompany problem reports for synthetic backup

If the legacy log directories have not been created, you must create them. If the directories do not exist, the logs cannot be written to disk.

Table 3-11 Creating legacy log directories

Step	Action	Description
Step 1	Create directories on the master server.	Create the following directories: *install_path*/netbackup/logs/bpsynth *install_path*/netbackup/logs/bpdbm *install_path*/netbackup/logs/vnetd
Step 2	Create directories on the media server.	Create the following directories: *install_path*/netbackup/logs/bpcd *install_path*/netbackup/logs/bptm *install_path*/netbackup/logs/bpdm
Step 3	Change the **Global logging level**.	In **Host Properties**, select a master server and set the **Global logging level** to 5. See "Changing the logging level" on page 140. See "About global logging levels" on page 138. See "Using the Host Properties window to access configuration settings" on page 69.
Step 4	Rerun the job.	Rerun the job and gather the logs from the directories that you created. The bptm logs are required only if the images are read from or written to a tape device. The bpdm logs are needed only if the images are read from or written to disk. If the images are read from multiple media servers, the debug logs for bptm or bpdm must be collected from each media server.

See "Logs to accompany problem reports for synthetic backups" on page 141.

File name formats for legacy logging

In the standard legacy log system, a single NetBackup process creates one debug log file per day. In the legacy logging system with **Enable robust logging** enabled, a NetBackup process creates a certain number of log files. Each file grows to a certain size before it closes and a new one is created.

Legacy logging uses two formats for log file names. The format that is used depends on whether the log uses the standard system or file rotation (robust logging).

Table 3-12 File name formats for different types of legacy logging

Type	File name format
Standard legacy logging	■ On UNIX: `log.mmddyy` For example: `log.040805` ■ On Windows: `mmddyy.log` For example: `040105.log`
Legacy logging with robust logging enabled	`mmddyy_nnnnn.log` For example: `040105_00001.log` Where *nnnnn* is a counter or a rotation number for the log file. When the counter exceeds the setting for number of log files, the oldest log file is deleted. The `NumberOfLogFiles` option on the `vxlogcfg` command sets the number of log files.

For compatibility with existing scripts, the debug log file naming format does not change. If robust file logging is enabled after standard legacy logs have been created, only the log files for the processes that robust logging governs use the file rotation naming format.

Any mixture of new and old log file names in a legacy debug log directory is managed according to the **Keep logs** setting and the robust logging settings.

Directory names for legacy debug logs for servers

Table 3-13 describes the directories you need to create to support legacy debug logs for servers. Each directory corresponds to a process. Unless it is noted, each directory should be created under the following directory.

UNIX	/usr/openv/netbackup/logs
Windows	*install_path*\NetBackup\logs

Table 3-13 Directory names for legacy debug logs

Directory	Associated process
admin	Administrative commands.
`bpbrm`	NetBackup backup and restore manager.
`bpcd`	NetBackup client daemon or manager. The NetBackup Client service starts this process
`bpdbjobs`	NetBackup jobs database manager program.

Table 3-13 Directory names for legacy debug logs *(continued)*

Directory	Associated process
bpdm	NetBackup disk manager.
bpdbm	NetBackup database manager. This process runs only on master servers. On Windows systems, it is the NetBackup database manager service.
bpjava-msvc	The NetBackup-Java application server authentication service that is started when the NetBackup Java interface applications start. On UNIX servers, inetd starts it. On Windows servers, the Client Services service starts it. This program authenticates the user that started the application.
bpjava-susvc	The NetBackup program that bpjava-msvc starts upon successful logon through the logon dialog box that is presented when a NetBackup-Java interface starts. This program services all requests from the Java user interfaces on the NetBackup master or media server host where the bpjava-msvc program is running (all Windows platforms).
bprd	NetBackup request daemon or manager. On Windows systems, this process is called the NetBackup Request Manager service.
bpsynth	The NetBackup process for synthetic backup. nbjm starts bpsynth. bpsynth runs on the master server.
bptm	NetBackup tape management process.
syslogs	System log. You must enable system logging to troubleshoot ltid or robotic software. See the syslogd man page.
user_ops	The user_ops directory is created during the install of NetBackup on all servers and clients. NetBackup Java interface programs use it for the following: temporary files and for job and progress log files that the **Backup, Archive, and Restore** program (jbpSA) generates. This directory must exist for successful operation of any of the Java programs and must have public read, write, and execute permissions. user_ops contains a directory for every user that uses the Java programs. In addition, on NetBackup-Java capable platforms, the NetBackup Java interface log files are written in the nbjlogs subdirectory. All files in the user_ops directory hierarchy are removed according to the setting of the KEEP_LOGS_DAYS configuration option.
vnetd	The Symantec network daemon, used to create firewall-friendly socket connections. Started by the inetd(1M) process. **Note:** Logging occurs in either the /usr/openv/logs directory or the /usr/openv/netbackup/logs if the vnetd directory exists there. If the vnetd directory exists in both locations, logging occurs only in /usr/openv/netbackup/logs/vnetd.

More information is available on the programs and daemons that write the logs.

See "About backup and restore functional overview" on page 235.

On UNIX systems, also refer to the `README` file in the `/usr/openv/netbackup/logs` directory.

Directory names for legacy debug logs for media and device management

The debug log directories enable logging for the media management processes and device management processes. Table 3-14 describes the directories you need to create to support legacy debug logs for media and device management. Each directory corresponds to a process.

Table 3-14 Media and device management legacy debug logs

Directory	Associated process
`acsssi`	UNIX only. Debug information on transactions between NetBackup and the Storage Tek ACSLS server.
daemon	Debug information for `vmd` (NetBackup Volume Manager service, Windows) and its associated processes (`oprd` and `rdevmi`). Stop and restart `vmd` after creating the directory.
`ltid`	Debug information on `ltid`, the Media Manager device daemon (UNIX), or on the NetBackup Device Manager service (Windows), and on `avrd`. Stop and restart `ltid` after creating the directory.
`reqlib`	Debug information on the processes that request media management services from `vmd` or EMM. Stop and restart `vmd` after creating the directory.
robots	Debug information on all robotic daemons, which includes `tldcd`, tl8cd, and tl4d daemons. Stop and restart robotic daemons.
`tpcommand`	Debug information for device configuration, including the `tpconfig` and the `tpautoconf` commands and the **NetBackup Administration Console**.
`vmscd`	Debug information for the NetBackup Status Collection daemon. Stop and restart `vmscd` after creating the directory.

Unless it is noted, each directory should be created under the following directory.

UNIX /usr/openv/volmgr/debug

Windows	*install_path*\Volmgr\debug

NetBackup creates one log per day in each of the debug directories.

You can disable debug logging by deleting or renaming the following directory:

UNIX: `vmd` command	`/usr/openv/volmgr/debug/daemon`
Windows: NetBackup Volume Manager service	*`install_path`*`\Volmgr\debug\daemon`

See "File name formats for legacy logging" on page 126.

See "About limiting the size and the retention of legacy logs" on page 131.

See "Directory names for legacy debug logs for media and device management" on page 129.

How to control the amount of information written to legacy logging files

You can set legacy logging levels to increase the amount of information that NetBackup processes write in the logs.

The following settings affect legacy logging, except media and device management.

- Increase the **Global logging level**.
  See "Changing the logging level" on page 140.

  Note: This setting also affects unified logging.

- On UNIX, add a `VERBOSE` entry in the `/usr/openv/netbackup/bp.conf` file.
  If you enter `VERBOSE` without a value, the verbose value defaults to 1. For more log detail, enter `VERBOSE = 2` or a higher value. This setting affects legacy logging only.

  Warning: High verbose values can cause debug logs to become very large.

- Set the logging level for individual processes.
  In **Host Properties**, change logging levels for individual processes in the **Logging** dialog box. Or, specify the verbose flag (if available) when you start the program or daemon.
  See the *NetBackup Administrator's Guide, Volume I*.

Media and device management legacy logging has two levels: not verbose (the default) and verbose. To set the verbose (higher) level, add the word `VERBOSE` to the `vm.conf` file. Create the file if necessary. Restart `ltid` and `vmd` after you add the VERBOSE entry. This entry affects logging levels in the **Event Viewer** Application and System log. The `vm.conf` file is located in the following directory:

UNIX	`/usr/openv/volmgr/`
Windows	*`install_path`*`\Volmgr\`

About limiting the size and the retention of legacy logs

Certain NetBackup processes write legacy debug logs. Because legacy debug logs can grow very large, enable them only if unexplained problems exist. Delete the logs and the associated directories when they are no longer needed.

To limit the time NetBackup retains legacy debug logs, specify the number of days in the **Keep logs** field. The default is 28 days. You can specify the number under **Host Properties** in the **Clean-up** dialog box.

See the *NetBackup Administrator's Guide, Volume I*.

To limit the amount of disk space that the logs consume, use robust logging. Robust logging involves file rotation, like that which is used in unified logging. Robust logging does not apply to media and device management logging.

See "About rolling over unified log files" on page 113.

Specify the maximum size for a log file and the maximum number of log files to keep in a logging directory. When a log file grows to its maximum size, it closes and a new file opens. If the number of log files exceeds the number that is allowed for the directory, the oldest file is deleted.

Logs created by the following NetBackup processes can use log rotation (robust logging):

- `bpbkar` (client process only)
- `bpbrm`
- `bpcd`
- `bpdbm`
- `bpdm`
- `bprd`
- `bptm`

For the legacy logs created by other NetBackup processes (except media and device management logs), use the **Keep logs** property.

The **Keep logs** property may override the robust file logging settings. If **Keep logs** is set to 10 days and robust file logging settings allow more than 10 days, the logs are deleted on day 11.

For media and device management legacy logs, use the `DAYS_TO_KEEP_LOGS` setting in the `vm.conf` file to control log file rotation. The default is infinite retention. The `vm.comf` file is located in the following directory:

UNIX	`/usr/openv/volmgr/`
Windows	*`install_path`*`\Volmgr\`

To retain logs for three days, enter the following in the `vm.conf` file:

```
DAYS_TO_KEEP_LOGS = 3
```

For instructions on how to use this entry, see the *NetBackup Administrator's Guide, Volume II*.

See "Directory names for legacy debug logs for media and device management" on page 129.

Configuring legacy log rotation

You can specify the maximum file size for a legacy log and the maximum number of log files to retain.

To configure the legacy log rotation

1. In the **NetBackup Administration Console**, in the left pane, expand **NetBackup Management > Host Properties > Master Servers**.
2. In the right pane, double-click the server you wan to modify.

3 In the dialog box that appears, in the left pane, select **Logging** and check **Enable robust logging**.

Robust logging applies only to legacy logs. Robust logging is also known as log rotation.

By default, the maximum file size is 5120 KB and the maximum number of files that are kept per log directory is 3.

If **Enable robust logging** is disabled, the standard behavior remains in effect. A single log file is created per log directory per day, and log deletion is based on the **Keep logs** property.

4 To change the maximum file size or the maximum number of log files per directory, use the `MaxLogFileSizeKB` and the `NumberOfLogFiles` options. These options are part of the `vxlogcfg` command, which is located in the following directory:

UNIX	`/usr/openv/netbackup/bin`
Windows	*`install_path`*`\NetBackup\bin`

Use the following example to set the maximum file size to 2048 and the maximum number of log files per log directory to 10:

```
vxlogcfg -a -p 51216 --orgid Default -s
MaxLogFileSizeKB=2048,NumberOfLogFiles=10
```

The example sets the default values for all unified logging processes and for all legacy processes for NetBackup (product ID 51216). :

See the `vxlogcfg` man page or the *NetBackup Commands Reference Guide*.

See "About limiting the size and the retention of legacy logs" on page 131.

See "Examples of using vxlogcfg to configure unified logs" on page 121.

UNIX client processes that use legacy logging

Most UNIX client processes use legacy logging. To enable legacy debug logging on UNIX clients, create the appropriate subdirectories in the following directory.

```
/usr/openv/netbackup/logs
```

Note: Create the directories with access modes of 777 so that user processes can write to the log files.

Table 3-15 describes the directories for the legacy debug logs that apply to UNIX clients..

Table 3-15 UNIX client processes that use legacy logging

Directory	Associated process
bp	Menu driven client-user interface program.
bparchive	Archive program. Also useful for debugging bp.
bpbackup	Backup program. Also useful for debugging bp.
bpbkar	Program that is used to generate backup images.
bpcd	NetBackup client daemon or manager.
bphdb	Program that starts a script to back up a database on a NetBackup database agent client. See the system administrator's guide for the appropriate NetBackup database agent for more information.
bpjava-msvc	The NetBackup-Java application server authentication service that inetd starts during startup of the NetBackup Java interface applications. This program authenticates the user that started the application.
bpjava-usvc	The NetBackup program that bpjava-msvc starts upon successful logon through the logon dialog box that is presented when a NetBackup-Java interface is started. This program services all requests from the Java administration and user interfaces on the host where bpjava-msvc is running.
bplist	Program that lists backed up and archived files. Also useful for debugging bp.
bpmount	Program that determines local mount points and wildcard expansion for multiple data streams.
bporaexp	Command-line program on clients to export Oracle data in XML format. Communicates with bprd on server.
bporaexp64	64-bit command-line program on clients to export Oracle data in XML format. Communicates with bprd on server.
bporaimp	Command-line program on clients to import Oracle data in XML format. Communicates with bprd on server.
bporaimp64	64-bit command-line program on clients to import Oracle data in XML format. Communicates with bprd on server.

Table 3-15 UNIX client processes that use legacy logging *(continued)*

Directory	Associated process
bprestore	Restore program. Also useful for debugging bp.
db_log	For more information on these logs, see the NetBackup guide for the database-extension product that you use.
mtfrd	These logs have information about the mtfrd process, which is used for phase 2 imports and restores of Backup Exec media.
tar	tar process during restores.
user_ops	The user_ops directory is created during the install of NetBackup on all servers and clients. The NetBackup Java interface programs use it for the following: temporary files and for job and progress log files that the **Backup, Archive, and Restore** program (jbpSA) generates. This directory must exist for successful operation of any of the Java programs and must have public read, write, and run permissions. This directory contains a directory for every user that uses the Java programs. In addition, on NetBackup-Java capable platforms, the NetBackup Java interface log files are written in a subdirectory that is called nbjlogs. All files in the user_ops directory hierarchy are removed according to the setting of the KEEP_LOGS_DAYS configuration option.

PC client processes that use legacy logging

Most PC client processes use legacy logging. To enable detailed legacy debug logging on Windows clients or NetWare target clients, create the directories in the following location. The directory names that you create correspond to the processes you want to create logs for.

Windows clients `C:\Program Files\VERITAS\NetBackup\Logs\`

NetWare clients `SYS:VERITAS\NBUCLT\NetBack\logs\`

Note: These are the default locations in which to place these directories. You can specify another location during client installation.

Table 3-16 lists the legacy debug log directories that apply to these clients.

Table 3-16 PC client processes that use legacy logging

Directory	NetBackup client	Associated process
bp	NetWare target	Client-user interface program for NetWare.
bpinetd	Windows2003	Client service logs. These logs have information on the bpinetd32 process.
bparchive	Windows 2003	Archive program that is run from the command line.
bpbackup	Windows 2003	The backup program that is run from the command line.
bpbkar	Windows 2003	Backup and archive manager. These logs have information on the bpbkar32 process.
bpcd	All Windows and NetWare clients	NetBackup client daemon or manager. These logs have information on communications between the server and client. On NetWare clients, these logs also contain the log information for the backup and restore processes.
bpjava-msvc	The NetBackup-Java application server authentication service that the Client Services service starts during startup of the NetBackup Java interface applications. This program authenticates the user that started the application. (On all Windows platforms.)	bpjava-msvc

Table 3-16 PC client processes that use legacy logging *(continued)*

Directory	NetBackup client	Associated process
bpjava-usvc	NetBackup program that bpjava-msvc starts upon successful logon through the logon dialog box that is presented when a NetBackup-Java interface is started. This program services all requests from the Java administration and user interfaces on the NetBackup host where bpjava-msvc is running. (On all Windows platforms.)	bpjava-usvc
bplist	Windows 2003	List program that is run from the command line.
bpmount	Windows 2003	The program that is used to collect drive names on the client for multistreaming clients.
bprestore	Windows 2003	The restore program that is run from the command line.
bpsrv	NetWare nontarget	NetBackup service utility. This program allows the system with the user interface to communicate with the NetBackup for NetWare client.
tar	Windows 2003	tar process. These logs have information about the tar32 process.

Table 3-16 PC client processes that use legacy logging *(continued)*

Directory	NetBackup client	Associated process
`user_ops`	Windows 2003	The `user_ops` directory is created during the install of NetBackup on all servers and clients. The NetBackup Java interface programs use it for the following: temporary files and for job and progress log files that the **Backup, Archive, and Restore** program (`jbpSA`) generates. This directory must exist for successful operation of any of the Java programs and must have public read, write, and run permissions. `user_ops` contains a directory for every user that uses the Java programs. In addition, on NetBackup-Java capable platforms, the NetBackup Java interface log files are written in a subdirectory that is called `nbjlogs`. All files in the `user_ops` directory hierarchy are removed according to the setting of the KEEP_LOGS_DAYS configuration option.

About global logging levels

The logging level determines how much information is included in the log message. The log range is 0-5. The higher the level number, the greater the amount of detail is in the log message.

The following table describes the detail that each level includes.

Table 3-17 Global logging levels

Logging level	Description
0	Includes very important, low-volume diagnostic messages and debug messages
1	Adds verbose diagnostic messages and debug messages
2	Adds the progress messages

Table 3-17 Global logging levels *(continued)*

Logging level	Description
3	Adds the informational dumps
4	Adds the function entry and exits
5	Includes everything. The finest detail.

Unified logging is enabled by default to log debug messages at level 0 and application messages at level 5.

The following actions affect logging levels:

- In the **Global logging level** list, a zero (0) level specifies the minimum level of logging for both legacy and unified logging. However, for diagnostic and debug messages in unified logging, the logging level can be turned off completely. No diagnostic messages or debug messages are logged. This level cannot be set with the **Global logging level** list in the **NetBackup Administration Console**. You can set it with the `vxlogcfg` command.
  See "Examples of using vxlogcfg to configure unified logs" on page 121.
- A change to the **Global logging level** list affects the logging level of all NetBackup and Enterprise Media Manager (EMM) processes on the server or client. (The exceptions are PBX and media and device management logging.) This setting overrides any previous settings.
- If you make a change to the VERBOSE level in the `bp.conf` file or the `vm.conf` file, it only affects the legacy logging level.
  See "How to control the amount of information written to legacy logging files" on page 130.
- If you make a change with the `vxlogcfg` command, it only affects the unified logging level.

A change to the **Global logging level** list does not affect the level of the following logging processes:

- PBX logging
  See "Accessing the PBX logs" on page 77.
- Media and device management logging (`vmd`, `ltid`, `avrd`, robotic daemons, media manager commands)
  See "Directory names for legacy debug logs for media and device management" on page 129.TAG
- Any unified logging process whose debug level has been changed from the default setting

Changing the logging level

The logging level determines how much information is included in the log message. The log range is 0-5. The higher the level number, the greater the amount of detail is in the log message.

To change the logging level

1. In the **NetBackup Administration Console**, in the left pane, expand **NetBackup Management > Host Properties**.
2. Select **Master Servers**, **Media Servers**, or **Clients**.
3. In the right pane, click the server or client to view the version and platform. Then, double-click to view the properties.
4. In the properties dialog box, in the left pane, click **Logging**.
5. In the **Global logging level** list, select a value from 0 to 5.

   Changes affect the logging level of both unified logging and legacy logging.

   See "About global logging levels" on page 138.
6. Click **OK**.

See "Changing the logging level on Windows and NetWare clients" on page 140.

See "About global logging levels" on page 138.

Changing the logging level on Windows and NetWare clients

You can increase the amount of information that client processes write in the logs.

To change the logging level on Windows clients

1. In the **NetBackup Administraion Console**, on the **File** menu, click **Backup, Archive, and Restore**.
2. In the **Backup, Archive, and Restore** interface, on the **File** menu, click **NetBackup Client Properties**.
3. In the **NetBackup Client Properties** dialog box, select the **Troubleshooting** tab.
4. In the **Verbose** property field, enter a debug level from 0 to 5.

   Use the default level of 0 unless advised otherwise by Technical Support. Higher levels can cause the logs to accumulate large amounts of information.
5. Click **OK**.

You can also change logging levels in the following ways:

- On NetWare clients, change the value of the `level` and the `tcp` parameters in the debug section of the `bp.ini` file. For instructions, see the NetBackup user guide for the client.
- For the unified logging files that the Bare Metal Restore process `bmrsavecfg` creates, you also can control the logging level with the `vxlogcfg` command.
  See "Examples of using vxlogcfg to configure unified logs" on page 121.

An increase in the log level can cause the logs to grow very large; increase the logging level only if unexplained problems exist.

Logs to accompany problem reports for synthetic backups

To debug problems with synthetic backups, you must include a complete set of logs in the problem report and additional items. Send all the information to Symantec Technical Support.

Include the following log types:

- Log files that unified logging creates
  See "Gathering unified logs for NetBackup" on page 103.
- Log files that legacy logging creates
  See "Creating legacy log directories to accompany problem reports for synthetic backup" on page 125.

Include the following additional items:

Try file	The try file is located in the following directory: *install_path*/netbackup/db/jobs/trylogs/*jobid*.t If the job ID of the synthetic backup job was 110, the try file is named `110.t`.
Policy attributes	Use the following command to capture the policy attributes: *install_path*/netbackup/bin/admincmd/bppllist *policy_name* -L where *policy_name* is the name of the policy for which the synthetic backup job was run.
List of storage units	Capture the list of storage units from the following command: *install_path*/netbackup/bin/admincmd/bpstulist -L

See "Creating legacy log directories to accompany problem reports for synthetic backup" on page 125.

Setting retention limits for logs on clients

You can specify the numbers of days that NetBackup retains client logs on UNIX, Windows, and NetWare.

To set retention limits for logs on UNIX clients

1. In the **NetBackup Administration Console**, in the left pane, expand **Host Properties > Clients**.
2. In the right pane, double-click the client you want to modify.
3. In the properties dialog box, click **UNIX Client**.
4. In the **Client Settings** dialog box, find the **Keep status of user-directed backups, archives, and restores for** field.
5. Enter the number of days you want to retain the log files, and click **OK**.

To set the retention limits for logs on Windows clients

1. In the **NetBackup Adminsistration Console**, on the **File** menu, click **Backup, Archive, and Restore**.
2. In the **Backup, Archive, and Restore** interface, on the **File** menu, click **NetBackup Client Properties**.
3. In the **NetBackup Client Properties** dialog box, select the **General** tab.
4. In the **Keep status of user-directed backups, archives, and restores for** field, enter the number of days you want to retain the log files.
5. Click **OK**.

To set retention limits for the logs on NetWare clients

1. Open the following file:

   `\veritas\nbuclt\netback\bp.ini`

2. Under `Keep_Logs_Days`, specify the number of days to keep the logs.
3. Save the file with your changes.

Logging options with the Windows Event Viewer

NetBackup Windows master servers can be configured so messages from NetBackup reports are written to the Windows **Event Viewer** Application log. You

can see these messages in the Application log and also use third-party tools to monitor the Application log for these messages.

To route unified logging application and diagnostic messages for an originator to the Application log, set the `LogToOslog` value to true for that originator.

The following example routes the application and diagnostic messages for `nbrb` to the Windows event log:

```
vxlogcfg -a -o nbrb -p NB -s "LogToOslog=true"
```

Note: For this setting to take effect, restart NetBackup services.

To enable the logging tool, do the following:

- Create the following file on the NetBackup master serve.

  install_path\NetBackup\db\config\eventlog

- Optionally, add an entry to the `eventlog` file. The following is an example:

  ```
  56 255
  ```

The parameters in the `eventlog` represent severity and type. The parameters have the following characteristics:

Severity	■ Listed as the first parameter. ■ Controls the messages that NetBackup writes to the Application log. ■ If the file is empty, the default severity is **Error** (16). ■ If the file has only one parameter, it is used for the severity level.
Type	■ Listed as the second parameter. ■ Controls the type of messages that NetBackup writes to the Application log ■ If the file is empty, the default type is **Backup Status** (64).

Both parameters are specified as decimal numbers and equate to a bitmap that expresses the following values:

Severity	1 = Unknown
	2 = Debug
	4 = Info
	8 = Warning
	16 = Error
	32 = Critical
Type	1 = Unknown
	2 = General
	4 = Backup
	8 = Archive
	16 = Retrieve
	32 = Security
	64 = Backup Status
	128 = Media Device

You can configure the `eventlog` file to log the messages that include several different severities and types. Consider the results that the following entry in the `eventlog` file produces:

```
56 255
```

Entry `56`	Produces a log with messages that have a severity of warning, error, and critical. (56 = 8 + 16 + 32)
Entry `255`	Produces a log with messages for all types. (225 = 1 + 2 + 4 + 8 + 16 + 32 + 64 +128)

Consider the following example message that is written in the Windows **Event Viewer** Application log:

```
16 4 10797 -1 cacao bush nbpem backup of client bush exited with
status 71
```

The definition of each value is as follows (left to right):

- Severity = `16` (Error)
- Type = `4` (Backup)
- Job ID = `10797`
- Job group ID = `1`

- Server = `cacao`
- Client = `bush`
- Process = `nbpem`
- Text = `backup of client bush exited with status 71`

Troubleshooting error messages in the NetBackup Administration Console for UNIX

Most error messages in the **NetBackup Administration Console** for UNIX appear in the following locations:

- An attention dialog box
- An error message pane in the lower right area of the console

If the errors appear elsewhere, they are Java exception errors. They may appear in the status line (bottom) of the **NetBackup Administration Console** window. They also may appear in the log file that contains the `stdout` or the `stderr` messages that the Java APIs or the **NetBackup Administration Console** write. Symantec does not document Java exception errors.

Four types of error messages appear in the **NetBackup Administration Console**.

NetBackup status codes and messages	The operations that are performed in the **NetBackup Administration Console** can result in errors that are recognized in other parts of NetBackup. These errors usually appear exactly as documented in the NetBackup status codes and messages. **Note:** A status code does not always accompany the error message. To find the status code, look up the NetBackup message in the alphabetical listing and click the link to see a full description. See the *Status Codes Reference Guide*.
NetBackup Administration Console: application server status codes and messages	These messages have status codes in the 500 range. Messages with status codes 500, 501, 502, 503 and 504 begin with `"Unable to login, status:"`. Messages with status codes 511 and 512 may or may not begin with `"Unable to login, status:"`. **Note:** A status code does not always accompany the error message. See the *Status Codes Reference Guide*.

Java exceptions	Either the Java APIs or NetBackup Administration APIs generate these exceptions. These messages begin with the name of the exception. For example:
	`java.lang.ClassCastException`
	or
	`vrts.nbu.NBUCommandExecutionException`
	Java exceptions usually appear in one of the following places:
	■ The status line (bottom) of the NetBackup Administration window
	■ The log file that the `jnbSA` or `jbpSA` commands generate
	■ The output file of the Windows Display Console `.bat` file if it is set up
	See "Troubleshooting error messages in the NetBackup Administration Console for UNIX" on page 145.

Operating system errors	Any messages that do not match those in the NetBackup documentation are most likely messages from the operating system.

About extra disk space required for logs and temporary files

For successful operation, the **NetBackup Administration Console** requires extra disk space to store logs and temporary files. The disk space should be available in the following locations.

- On the host that is specified in the logon dialog box
- In `/usr/openv/netbackup/logs/user_ops`
- On the host where the console was started
- In `/usr/openv/netbackup/logs/user_ops/nbjlogs`

If space is not available in the respective file systems, you may experience the following:

- Long waits for application response
- Incomplete data
- No response during logon
- Reduced functionality in the NetBackup interface, for example, only the Backup, Archive, and Restore and Files System Analyzer nodes appear in the tree
- Unexpected error messages:

- "Cannot connect" socket errors during logon to the NBJava application server
- "Unable to login, status: 35 cannot make required directory"
- "/bin/sh: null: not found (1) "
- "An exception occurred: vrts.nbu.admin.bpmgmt.CommandOutputException: Invalid or unexpected class configuration data: *<the rest of the message will vary>*"
- Empty warning dialog boxes

Enabling detailed debug logging

The **NetBackup Administration Console** is a distributed application that allows administration of remote NetBackup servers. All administration is accomplished through the application server of the **NetBackup Administration Console**. This application server is made up of an authentication service and a user service.

The logon request from the logon dialog box is sent to the authentication service for validation. The user name and password have to be valid in the Windows/UNIX authentication files and process.

After validation, the authentication service starts a user service under the user's account. Thereafter, all NetBackup administrative tasks are performed through an instance of the user service. Additional user service processes are initiated to process requests from the console.

On both UNIX and Windows, the authentication service is the `bpjava-msvc` application. The user service is the `bpjava-susvc` or `bpjava-usvc` application. To enable detailed debug logging, you must first create logging directories for these applications.

Table 3-18 Enabling detailed debug logging

Step	Action	Description
Step 1	Create logging directories	On the NetBackup client or server that is specified in the logon dialog box, create the following directories: ■ `bpjava-msvc` ■ `bpjava-susvc` (if a NetBackup server) ■ `bpjava-usvc` (if a NetBackup client) Create the directories in the following locations: ■ `/usr/openv/netbackup/logs` (UNIX) ■ *`install_path`*`\NetBackup\logs` (Windows) See "About unified logging" on page 102. See "About legacy logging" on page 124.
Step 2	Edit the `Debug.properties` file	Add the following line to the `Debug.properties` file: `debugMask=2` The `Debug.properties` file can be found in the following locations: ■ `/usr/openv/java` Change the file on the UNIX machine where you run the `jnbSA` or `jbpSA` commands. The log file name is displayed in the xterm window where you ran the `jnbSA` or `jbpSA` commands. ■ *`install_path`*`\VERITAS\java` Change the file at this location if you use the **NetBackup Java Windows Display Console**.
Step 3	Edit the `nbjava.bat` file	Perform this step if you use the **Windows Display Console** on a host where NetBackup is not installed. Edit the `nbjava.bat` file to redirect output to a file. The `nbjava.bat` file is located in *`install_path`*`\VERITAS\java` See the `nbjava.bat` file for details.

Chapter 4

Using NetBackup utilities

This chapter includes the following topics:

About NetBackup troubleshooting utilities

Several utilities are available to help diagnose NetBackup problems. The analysis utilities for NetBackup debug logs and the NetBackup support utility (`nbsu`) are especially useful in troubleshooting.

Table 4-1 Troubleshooting utilities

Utility	Description
Analysis utilities for NetBackup debug logs	They enhance NetBackup's existing debug capabilities by providing a consolidated view of a job debug log. See "About the analysis utilities for NetBackup debug logs" on page 150.

Table 4-1 Troubleshooting utilities *(continued)*

Utility	Description
Network troubleshooting utilities	They verify various aspects of the network configuration inside and outside NetBackup to ensure that there is no misconfiguration See "About network troubleshooting utilities" on page 154.
NetBackup support utility (`nbsu`)	It queries the host and gathers appropriate diagnostic information about NetBackup and the operating system. See "About the NetBackup support utility (nbsu)" on page 155.
NetBackup consistency check utility (`NBCC`)	It analyzes the integrity of portions of the NetBackup configuration and catalog and database information as they pertain to tape media. See "About the NetBackup consistency check utility (NBCC)" on page 161.
NetBackup consistency check repair (`NBCCR`) utility	It processes database-catalog repair actions and automates the application of approved suggested repair actions. See "About the NetBackup consistency check repair (NBCCR) utility" on page 167.
`nbcplogs` utility	It simplifies the process of gathering logs for deliver to Symantec technical support. See "About the nbcplogs utility" on page 170.

About the analysis utilities for NetBackup debug logs

The debug log analysis utilities enhance NetBackup's existing debug capabilities by providing a consolidated view of a job debug log.

NetBackup jobs span multiple processes that are distributed across servers.

You can get more information about legacy logging and unified logging.

See "About logs" on page 99.

To trace a NetBackup job you must view and correlate messages in multiple log files on multiple hosts. The log analysis utilities provide a consolidated view of

the job debug logs. The utilities scan the logs for all processes that are traversed or run for the job. The utilities can consolidate job information by client, job ID, start time for the job, and policy that is associated with the job.

Table 4-2 describes the log analysis utilities. To see the parameters, limitations, and examples of use for each utility, use the command with the `-help` option. All the commands require administrative privileges. The log analysis utilities are available for all platforms that are supported for NetBackup servers.

Note: The utilities must be initiated on supported platforms. However, the utilities can analyze debug log files from most NetBackup client and server platforms for UNIX and Windows.

Table 4-2 Analysis utilities for NetBackup debug logs

Utility	Description
`backupdbtrace`	Consolidates the debug log messages for specified NetBackup database backup jobs and writes them to standard output. It sorts the messages by time. `backupdbtrace` attempts to compensate for time zone changes and clock drift between remote servers and clients. At a minimum, you must enable debug logging for `admin` on the master server, and for `bptm` and `bpbkar` on the media server. For best results, set the verbose logging level to 5 and enable debug logging for the following: `bpdbm` on the master server and `bpcd` on all servers in addition to the processes already identified. See `backupdbtrace` in the Commands Reference Guide.
`backuptrace`	Copies to standard output the debug log lines relevant to the specified backup jobs, including online (hot) catalog backups. The `backuptrace` utility can be used for regular file system, database extension, and alternate backup method backup jobs. It consolidates the debug logs for specified NetBackup jobs. The utility writes the relevant debug log messages to standard output and sorts the messages by time. `backuptrace` attempts to compensate for time zone changes and clock drift between remote servers and clients. The format of the output makes it relatively easy to sort or `grep` by timestamp , program name, and server or client name. The `backuptrace` utility works with the `nbpem`, `nbjm`, and `nbrb` logs on the master server. You should enable debug logging for `bpbrm` and `bptm` or `bpdm` on the media server and for `bpbkar` on the client. For best results, set the verbose logging level to 5. Enable debug logging for the following: `bpdbm` and `bprd` on the master server and for `bpcd` on all servers and clients in addition to the processes already identified. See `backuptrace` in the Commands Reference Guide.

Table 4-2 Analysis utilities for NetBackup debug logs *(continued)*

Utility	Description
bpgetdebuglog	A helper program for backuptrace and restoretrace. It can also be useful as a stand-alone program and is available for all NetBackup server platforms. bpgetdebuglog prints to standard output the contents of a specified debug log file. If only the remote machine parameter is specified, bpgetdebuglog prints the following to standard output: the number of seconds of clock drift between the local computer and the remote computer. See bpgetdebuglog in the Commands Reference Guide.
duplicatetrace	Consolidates the debug logs for the specified NetBackup duplicate jobs and writes them to standard output. It sorts the messages by time. duplicatetrace attempts to compensate for time zone changes and clock drift between remote servers and clients. At a minimum, you must enable debug logging for admin on the master server and for bptm or bpdm on the media server. For best results, set the verbose logging level to 5 and enable debug logging for the following: bpdbm on the master server and bpcd on all servers and clients in addition to the processes already identified. See duplicatetrace in the Commands Reference Guide.
importtrace	Consolidates the debug log messages for the specified NetBackup import jobs and writes them to standard output. It sorts the messages by time. importtrace attempts to compensate for time zone changes and clock drift between remote servers and clients. At a minimum, you must enable debug logging for admin on the master server. And for bpbrm, you must enable debug logging for bptm and tar on the media server. For best results, set the verbose logging level to 5 and enable debug logging for the following: bpdbm on the master server and bpcd on all servers and clients in addition to the processes already identified. See importtrace in the Commands Reference Guide.
restoretrace	Copies to standard output the debug log lines relevant to the specified restore jobs. The restoretrace utility consolidates the debug logs for specified NetBackup restore jobs. The utility writes debug log messages relevant to the specified jobs to standard output and sorts the messages by time. restoretrace attempts to compensate for time zone changes and clock drift between remote servers and clients. The format of the output makes it relatively easy to sort or grep by timestamp , program name, and server or client name. At a minimum, you must enable debug logging for bprd on the master server. Enable debug logging for bpbrm and bptm or bpdm on the media server and tar on the client. For best results, set the verbose logging level to 5. Enable debug logging for bpdbm on the master server and for bpcd on all servers and clients. See restoretrace in the Commands Reference Guide.

Table 4-2 Analysis utilities for NetBackup debug logs *(continued)*

Utility	Description
verifytrace	Consolidates the debug log messages for the specified verify jobs and writes them to standard output. It sorts the messages by time. verifytrace attempts to compensate for time zone changes and clock drift between remote servers and clients. At a minimum, you must enable debug logging as follows: for admin on the master server and for bpbrm, bptm (or bpdm) and tar on the media server. For best results, set the verbose logging level to 5 and enable debug logging for the following: bpdbm on the master server and bpcd on all servers and clients in addition to the processes already identified. See verifytrace in the Commands Reference Guide.

The analysis utilities have the following limitations:

- Media and device management logs are not analyzed.
- The legacy debug log files must be in standard locations on the servers and clients.

  UNIX `/usr/openv/netbackup/logs/<PROGRAM_NAME>/log.mmddyy`

  Windows `install_path/NetBackup/Logs/<PROGRAM_NAME>/mmddyy.log`

  An option may be added later that allows the analyzed log files to reside on alternate paths.

  Note: For the processes that use unified logging, no log directories must be created.

- The consolidated debug log may contain messages from unrelated processes. You can ignore messages with timestamps outside the duration of the job from the following: bprd, nbpem, nbjm, nbrb, bpdbm, bpbrm, bptm, bpdm, and bpcd.

An output line from the log analysis utilities uses the following format:

```
daystamp.millisecs.program.sequence machine log_line
```

daystamp	The date of the log that is in the format *yyyymmdd*.
millisecs	The number of milliseconds since midnight on the local computer.
program	The name of program (BPCD, BPRD, etc.) being logged.
sequence	Line number within the debug log file.

machine	The name of the NetBackup server or client.
log_line	The line that appears in the debug log file.

For more information, see the *NetBackup Commands Reference Guide*.

About network troubleshooting utilities

A set of utility programs (commands) verifies various aspects of the network configuration inside and outside NetBackup to ensure that there is no misconfiguration. The utilities also provide user-friendly messages for any errors they find.

Network configuration broadly falls into the following categories:

- Hardware, operating system, and NetBackup level settings.
  Examples include correct DNS lookups, firewall port openings, and network routes and connections. The NetBackup Domain Network Analyzer (`nbdna`) verifies this configuration.
- A set of utilities that verify the NetBackup level settings.
  The utilities include `bptestcd` and `bptestnetconn`, and the settings they verify include CONNECT_OPTIONS and CORBA endpoint selection.

Table 4-3 Network troubleshooting utilities

Utility	Description
`bptestbpcd`	Tries to establish a connection from a NetBackup server to the `bpcd` daemon on another NetBackup system. If successful, it reports information about the sockets that are established.
`bptestnetconn`	Performs several tasks that aid in the analysis of DNS and connectivity problems with any specified list of hosts. This list includes the server list in the NetBackup configuration. To help troubleshoot connectivity problems between the services that use CORBA communications, `bptestnetconn` can perform and report on CORBA connections to named services.
`nbdna` (NetBackup Domain Network Analyzer)	Evaluates the hostnames in the NetBackup Domain. The `nbdna` utility self-discovers the NetBackup domain and evaluates hostname information, then tests connectivity to these hostnames and validates their network relationship status. Network connectivity evaluation in a NetBackup domain is difficult. NetBackup domains can scale to hundreds of servers, and thousands of clients across complex network topologies.

For more information on these utilities, refer to the *NetBackup Commands Reference Guide*.

About the NetBackup support utility (nbsu)

The NetBackup support utility (`nbsu`) is a command line tool. It queries the host and gathers appropriate diagnostic information about NetBackup and the operating system. `nbsu` provides a wide range of control over the types of diagnostic information gathered. For instance, you can obtain information about NetBackup configuration settings, about specific troubleshooting areas, or about NetBackup or media management job status codes.

The NetBackup support utility (`nbsu`) resides in the following location:

UNIX	`/usr/openv/netbackup/bin/support/nbsu`
Windows	*`install_path`*`\NetBackup\bin\support\nbsu.exe`

Symantec recommends that you run the NetBackup support utility (`nbsu`) in the following circumstances:

- To obtain baseline data on your NetBackup installation. If you encounter problems later, this data can be useful.
- To document changes in your NetBackup or operating system environment. Run `nbsu` periodically to keep your baseline data up to date.
- To help isolate a NetBackup or operating system issue.
- To report issues to Symantec technical support.

The following suggestions can help you run the `nbsu` utility more effectively:

- For an `nbsu` description, examples, and how to gather diagnostic information to send to Symantec Technical Support, refer to the `nbsu` command.
- For troubleshooting, run `nbsu` when the system is in the same state as when the problem occurred. For example, do not stop and restart the NetBackup processes after the error occurs or make a change to the server or network. If you do, `nbsu` may not be able to gather key information about the problem.
- If a NetBackup component is not operational (for example, `bpgetconfig` does not return information), `nbsu` may be unable to properly report on the system. For these cases, use the `-nbu_down` command line option to bypass the need for NetBackup to be operational.
  For a full description of the `-nbu_down` command line option, see the *NetBackup Commands Reference Guide*.

If nbsu does not perform as expected, try the following:

- By default, nbsu sends error messages to standard error (STDERR) and also includes the messages in its output files under the header STDERR. Note the following alternate ways to view nbsu error messages:

To redirect the nbsu error messages to standard output (STDOUT)	Enter the following: ■ UNIX `/usr/openv/netbackup/bin/support/nbsu 2>&1` ■ Windows *install_path*\NetBackup\bin\support\nbsu.exe 2>&1
To send all nbsu screen output including error messages to a file	Enter the following: `nbsu 2>&1 > file_name` Where 2>&1 directs standard error into standard output, and file_name directs standard output into the designated file.

- To generate the debug messages that relate to nbsu, enter the following:

  ```
  # nbsu -debug
  ```

  The messages are written to the nbsu_info.txt file.

The nbsu_info.txt file provides an overview of the environment where nbsu is run. It contains the following:

- General operating system and NetBackup information on the environment that nbsu detects
- A list of diagnostics that were run
- A list of diagnostics that returned a non-zero status

The information in nbsu_info.txt may indicate why nbsu returned particular values, or why it did not run certain commands.

If nbsu does not produce adequate information or if it seems to perform incorrectly, run nbsu with the -debug option. This option includes additional debug messages in the nbsu_info.txt file.

More information on the nbsu command options is available.

See the *NetBackup Commands Reference Guide*.

Output from the NetBackup support utility (nbsu)

The NetBackup support utility (nbsu) writes the information it gathers to text files in the following directory:

UNIX `/usr/openv/netbackup/bin/support/output/nbsu/hostname_timestamp`

Windows `install_path\NetBackup\bin\support\output\nbsu\hostname_timestamp`

The NetBackup environment where nbsu runs determines the particular files that nbsu creates. nbsu runs only those diagnostic commands that are appropriate to the operating system and the NetBackup version and configuration. For each diagnostic command that it runs, nbsu writes the command output to a separate file. As a rule, the name of each output file reflects the command that nbsu ran to obtain the output. For example, nbsu created the NBU_bpplclients.txt by running the NetBackup bpplclients command and created the OS_set.txt file by running the operating system's set command.

Each output file begins with a header that identifies the commands that nbsu ran. If output from more than one command was included in the file, the header identifies the output as an "internal procedure."

Figure 4-1 shows the actual commands and output follow the header.

Figure 4-1 Example nbsu output file: ipconfig command (excerpt)

```
-------------------- Network ipconfig information report --------------
----------------------------- Command used ----------------------------
> "C:\WINDOWS\system32\ipconfig" /all

Windows IP Configuration

    Host Name . . . . . . . . . . . . : host1
    Primary Dns Suffix  . . . . . . . :
    Node Type . . . . . . . . . . . . : Hybrid
    IP Routing Enabled. . . . . . . . : No
    WINS Proxy Enabled. . . . . . . . : No
    DNS Suffix Search List. . . . . . : company.com
```

Figure 4-2 shows an example of part of the nbsu output file for the bpgetconfig command.

Figure 4-2 Example nbsu output file: bpgetconfig command (excerpt)

```
------------------ NetBackup bpgetconfig information report ----------------
------------- nbsu diagnostic name and internal procedure used -------------
NBU_bpgetconfig - NBU_get_bpgetconfig_info
------------------------------ Command Used ------------------------------
> "C:\Program Files\VERITAS\netbackup\bin\admincmd\bpgetconfig" -g host1 -L
Client/Master = Master
NetBackup Client Platform = PC, Windows2000
NetBackup Client Protocol Level = 6.5.0
Product = NetBackup
Version Name = 6.5Alpha
Version Number = 650000
NetBackup Installation Path = C:\Program Files\VERITAS\NetBackup\bin
Client OS/Release = Windows2003 5
------------------------------ Command Used ------------------------------
> "C:\Program Files\VERITAS\netbackup\bin\admincmd\bpgetconfig"
SERVER = host1
SERVER = host2
SERVER = host3
SERVER = host4
SERVER = host5
SERVER = host6
SERVER = host7
```

If the executed command returned a non-zero status, an `EXIT STATUS` header indicates the status. For example:

```
---------------------- EXIT STATUS = 227 -------------------------
```

As part of the internal processing of each command that a diagnostic command runs, `nbsu` redirects each command's `STDERR` to an internal file. If the command writes information to `STDERR`, `nbsu` captures this information and includes a `STDERR` header along with the information. For example:

```
----------------------------- STDERR -------------------------------
bpclient: no entity was found (227)
```

If a supported archive program is available on the host where `nbsu` runs, `nbsu` bundles its output files into an archive file. If a supported compression utility is available, `nbsu` compresses the archive file. Otherwise, the individual output files remain unarchived and uncompressed.

An example of a compressed archive file that `nbsu` created is as follows:

```
/usr/openv/netbackup/bin/support/output/nbsu/host1_master_20060814_
164443/host1_master_20060814_164443.tar.gz
```

where *host1* is the name of the host on which `nbsu` ran. *master* indicates that the host is a NetBackup master server.

nbsu supports tar for archive and gzip for compression. Symantec may add support for other archive and compression utilities in the future. For an up-to-date list of supported archive and compression utilities, run the nbsu -H command on your installed version of NetBackup.

Note: Archiving and compression utilities are usually available on UNIX and Linux systems. On Windows, it may be necessary to install these programs. Note that the archiving utility must be referenced in the system PATH environment variable.

If no archive utility is installed on your system, use the -xml option of the nbsu command. This option lets you create a single .xml file in place of the individual output files. The single .xml file contains all the diagnostic information that the individual files contain. Use this command to conveniently bundle nbsu output for Symantec technical support.

Status code information gathered by the NetBackup support utility (nbsu)

You can use nbsu to gather diagnostic information about certain NetBackup or Media Manager status codes. nbsu gathers this information by running one or more NetBackup commands whose output may indicate the cause of the problem.

You can get more information about the commands that nbsu runs by looking under "Recommended Actions" for the topics that describe the status codes.

See the *Status Codes Reference Guide*.

See nbsu in the *Commands Reference Guide*.

The following are examples of the results you can get when you enter specific commands:

To gather diagnostic information about status code 25	Enter nbsu -nbu_e 25. This command runs only the diagnostic commands that are related to NetBackup status code 25. Since fewer commands are run, the result may be a smaller set of output files.
To determine what information nbsu can collect for a particular status code	Enter nbsu -l -nbu_e 25.

You can get more information about the output files that nbsu generates.

See "Output from the NetBackup support utility (nbsu)" on page 157.

Note: You can also use a NetBackup exit script to call `nbsu`. The script passes the NetBackup status code to `nbsu` to gather associated diagnostics for a job.

Example of a progress display for the NetBackup support utility (nbsu)

By default, the NetBackup support utility (`nbsu`) displays its progress to standard output. First, it lists environment queries, and then it lists the diagnostic commands that it runs as in the following example:

```
C:\Program Files\VERITAS\NetBackup\bin\support>nbsu
1.0 Determining initial nbsu settings
1.1 Determining OS environment
1.2 Determining OS host services
1.3 Determining identified network interface hostnames
1.4 Determining NetBackup environment
2.0 Querying nbsu diagnostic lists
2.1 Determining nbsu diagnostics to run
3.0 Executing nbsu diagnostics
    Executing diagnostic DEV_scsi_reg
    Registry query of HKEY_LOCAL_MACHINE\hardware\DeviceMap\Scsi\

    Executing diagnostic MM_ndmp
        "C:\Program Files\VERITAS\volmgr\bin\set_ndmp_attr" -list
        "C:\Program Files\VERITAS\volmgr\bin\set_ndmp_attr" -probe
        <hostname>
        "C:\Program Files\VERITAS\volmgr\bin\set_ndmp_attr" -verify
        <hostname>

    Executing diagnostic MM_tpconfig
        "C:\Program Files\VERITAS\\Volmgr\Bin\tpconfig" -d

4.0 nbsu successfully completed the identified diagnostic commands.
    Creating support package...
Microsoft (R) Cabinet Maker - Version 5.2.3790.0
Copyright (c) Microsoft Corporation. All rights reserved..

770,201 bytes in 36 files
Total files:             36
Bytes before:       770,201
Bytes after:        105,503
After/Before:             13.70% compression
Time:                      0.67 seconds ( 0 hr 0 min 0.67 sec)
Throughput:             1119.27 Kb/second
```

```
        Cleaning up output files...

      The results are located in the
.\output\nbsu\lou4_master_20070409_160403 directory...
```

See "About the NetBackup support utility (nbsu)" on page 155.

See "Output from the NetBackup support utility (nbsu)" on page 157.

About the NetBackup consistency check utility (NBCC)

The NetBackup consistency check utility (NBCC) is a command line utility. It is used to analyze the integrity of portions of the NetBackup configuration and catalog and database information as they pertain to tape media. This analysis includes review of NetBackup storage units, the EMM server, volume pools, tape media, and backup images that are associated with tape media.

NBCC does the following:

- Queries the EMM database to obtain the primary hostname, associated hostnames, and server attributes for hostname normalization
- Through examination of the NetBackup configuration, identifies, cluster, application cluster and servers
- Gathers database and catalog information
- Analyzes the consistency of the gathered configuration and database and catalog information
- Creates a packaged bundle for Symantec technical support to review

NBCC resides in the following location:

UNIX	`/usr/openv/netbackup/bin/support/NBCC`
Windows	*`install_path`*`\NetBackup\bin\support\NBCC.exe`

Symantec recommends that you run NBCC in the following circumstances:

- To check the consistency of the NetBackup configuration and catalog and database information from a tape media perspective
- To gather and create a package bundle when directed to do so by Symantec technical support

The following items can help you run the NBCC utility:

- For an NBCC description, examples, and how to gather NetBackup catalog and database information to send to Symantec technical support , refer to the NBCC -help command.
- NBCC is designed to be run on NetBackup master servers.
- In some cases, a non-functioning operating system or NetBackup process or service can prevent NBCC from running properly or completing. As NBCC progresses through the interrogation of various operating system or NetBackup components, it outputs what processes to STDOUT. As NBCC processes catalog and database components, it displays how many records have been processed. The number of records that are processed is in direct relationship to the size of the catalog and database being processed. If NBCC detects a failure, related information is output to STDERR. Information to STDOUT or STDERR are also output to the nbcc-info.txt file (if available).

If NBCC does not perform as expected, try the following:

- Use a text editor to look for error notices in the nbcc-into.txt file.
- By default, NBCC sends error messages to standard error (STDERR) and also includes the messages in its output files under the header STDERR.
- If NBCC does not produce adequate information or if it seems to perform incorrectly, run NBCC with the -debug option to include additional debug messages in the nbcc-info.txt file.
- For troubleshooting, run NBCC when the system is in the same state as when the problem occurred. For example, do not stop and restart the NetBackup processes after the error occurs or make a change to the server or network. NBCC may not be able to gather key information about the problem.

The nbcc-info.txt file provides an overview of the environment where NBCC is run, and contains the following:

- General operating system and NetBackup configuration information on the environment that NBCC detects
- A copy of the NBCC processing information that was displayed to STDOUT or STDERR.

This information would indicate the processing that NBCC had done.

The “Processing detected NetBackup server entries” section of the nbcc-info.txt contains a “Summary of NBCC server processing”. This information summarizes the results of the processing of detected server entries.

See “Example of an NBCC progress display” on page 163.

For a full description of the NBCC command options, refer to the NBCC man page.

See the *NetBackup Commands Reference Guide*.

Output from the NetBackup consistency check utility (NBCC)

NBCC writes the information it gathers to packaged files in the following directory.

UNIX and Linux `/usr/openv/netbackup/bin/support/output/nbcc/hostname_NBCC_timestamp`

Windows `install_path\NetBackup\bin\support\output\nbcc\hostname_NBCC_timestamp`

If a supported archive program is available on the host where NBCC runs, NBCC bundles its output files into an archive file. If a supported compression utility is available, NBCC compresses the archive file. Otherwise, the individual output files remain unarchived and uncompressed.

An example of a compressed (UNIX) archive file that NBCC created is as follows:

`/usr/openv/netbackup/bin/support/output/NBCC/host1_NBCC_20060814_164443/host1_NBCC_20060814_164443.tar.gz`

where *host1* is the name of the host where NBCC had been run.

On UNIX platforms, NBCC supports the tar , compress, and gzip utilities for UNIX file archiving and compression. On Windows platforms, NBCC supports the tar, Makecab, and gzip utilities for Windows file archiving and compression.

Example of an NBCC progress display

By default, NetBackup consistency check utility (NBCC) displays its progress numerically to standard output. The name of the output file is nbcc-info.txt.

The following example of NBCC output has been edited for brevity:

```
1.0  Gathering initial NBCC information
1.1  Obtaining initial NetBackup configuration information

      If NBCC DOES NOT detect any catalog inconsistencies, would you
      like NBCC to create a support package?  [Y/y,N/n] N

       Would you then like NBCC to remove the output files
       after completion?  [Y/y,N/n] N
```

```
2.0  Gathering required NetBackup configuration information

       If NBCC is unable to determine the NetBackup version for
       ANY detected media server, is there a SINGLE version of NetBackup
       that you would like associated to these media servers? [Y/y,N/n] N

       After NBCC has completed gathering the NetBackup database
       information, if there are any media servers that NBCC was unable
       to determine the NetBackup version, you will be prompted for the
       version to associate with each media server.

       If NBCC detects images that were written by media servers
       that are not known to NetBackup, would you like NBCC to:

       1.  Stop now, since I know of such media servers, and I wish to
           resolve these before running NBCC again

       2.  Prompt me again, after NBCC has processed all images, so
           that I can designate a media server known to NetBackup that full
           analysis will use to INHERIT ALL of the image copies associated
           to the unknown media servers

       3.  Prompt me again, after NBCC has processed ALL images, so that I
           can select the course of action to take for EACH media server

       4.  Flag ALL of the unknown media servers so that full analysis will
           mark all of their related image copies to be EXPIRED

       5.  Flag ALL of the unknown media servers so that full analysis will
           generate COMMENTED out repairs that can be reviewed

       [1,2,3,4,5] 4
2.1  Determining the date format to use with NetBackup commands...
       Using the date format /mm/dd/yyyy
2.2  Building EMM host configuration information...
       ...

2.3  Obtaining EMM server aliases...
       ...

2.4  Building NetBackup storage unit list...
       ...
```

```
2.5  Analyzing EMM master and/or media servers and configured
     Storage Units...
2.6  Obtaining NetBackup unrestricted media sharing status...
       Configuration state = NO
2.7  Obtaining NetBackup Media Server Groups...
       No Server Groups configured
2.8  Building NetBackup retention level list...
3.0  Obtaining NetBackup version from media servers
       ...

3.1  Gathering required NetBackup catalog information
       Start time = 2010-10-18 10:19:06

3.2  Gathering NetBackup EMM conflict table list
       Found 0 EMM conflict records
3.3 Gathering list of all tapes associated with any Active Jobs
       Building NetBackup bpdbjobs list
       No active jobs found
3.4  Building NetBackup Image database contents list
       Found 30391 images in the Image database
3.5  Building EMM database Media and Device configuration
     attribute lists
         Found 207 media records in the EMM database
3.6  Building EMM database Unrestricted Sharing Media attribute lists
         Found 0 Unrestricted Sharing media records in the EMM database
3.7  Building the EMM database Volume attribute list...
       Found 321 Volume attribute records in the EMM database
3.8  Building NetBackup volume pool configuration list
       EMM Server hostname
3.9  Building NetBackup scratch pool configuration list
       EMM Server hostname
3.10  Gathering NetBackup EMM merge table list
       Found 0 EMM merge table records

     Summary of gathered NetBackup catalog information

       End time = 2010-10-18 10:19:14
       Number of Images gathered = 30391
       Number of database corrupt images gathered = 0
       Number of EMM database Media attribute records gathered = 207
       Number of EMM database Volume attribute records gathered = 321
       Catalog data gathering took 8 seconds to complete
```

```
     dir results for created NBCC files:
       ...

4.0  Verifying required catalog components were gathered

5.0  Beginning NetBackup catalog consistency check
       Start time = 2010-10-18 10:19:16

5.1  There were no no tape media involved in active NetBackup jobs
5.3  Processing EMM database Volume attribute records, pass 1 (of 2),
     321 records to be processed
       Processed 321 EMM database Volume attribute records.
5.4  Checking for duplicate EMM server host names in Volume
     attribute data
5.5  Processing Image DB, pass 1 (of 2),
     30391 images to be processed
       30391 images processed on pass 1
5.6  Processing EMM database Media attribute records, pass 1 (of 3),
     207 records to be processed
       Processed 207 EMM database Media attribute records.
5.8  Check for duplicate media server names in the EMM database
       Media attribute data
5.9  Processing EMM database Media attribute records, pass 2 (of 3),
      207 records to be processed
5.10  Processing Image DB, pass 2 (of 2),
     30391 images to be processed
CONSISTENCY_ERROR Oper_7_1

5.11  NetBackup catalog consistency check completed
       End time = 2010-10-18 10:19:16

5.12  Checking for the latest NBCCR repair output directory
        Reading the
          output\nbccr\hostname_NBCCR_20101018_101007\NBCCR.output.txt
        file located in the
          output\nbccr\hostname_NBCCR_20101018_101007
        directory...
          Detected 2 records.
        dir results for
          output\nbcc\hostname_NBCC_20101018_101900\nbcc-NBCCR.output.txt
        10/18/2010  10:19 AM               384 nbcc-NBCCR.output.txt

        Copying the
```

```
          output\nbccr\hostname_NBCCR_20101018_101007\NBCCR.history.txt
         file located in the
          output\nbccr\hostname_NBCCR_20101018_101007
         directory to include with the Support package...
        dir results for
          output\nbcc\hostname_NBCC_20101018_101900\nbcc-NBCCR.history.txt
         10/18/2010  10:18 AM            21,155 nbcc-NBCCR.history.txt

        Summary of NBCC server processing
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+ Primary and associated alias hostnames:
+ hostname hostname.FQN.com
+ Sources:
+ nbemmcmd bpstulist bpgetconfig vmoprcmd
+ Master server = yes
+ EMM NetBackup version = 7.1.0.0
+ EMM Server = yes
+ NBCC NetBackup version = 7.1
+ Tape STU detected = no - Disk STU detected = yes
+ EMM tape media record extract attempted = yes
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
...

Report complete, closing the
.\output\nbcc\hostname_NBCC_20101018_101900\nbcc-info.txt output file.
```

About the NetBackup consistency check repair (NBCCR) utility

The NetBackup consistency check repair (NBCCR) utility is a command line tool that processes database-catalog repair actions. It automates the application of approved suggested repair actions. Symantec technical support analyzes the data that is collected by the NBCC utility and site-specific configuration information. This analysis results in the generation of a suggested repair actions (SRA) file. Before NBCCR is run, Symantec technical support interacts with the customer to determine which repairs are needed. Undesirable repair actions are deleted or commented out of the SRA file. Each line of the SRA file contains one repair action that is paired with an associated parameter.

The NBCCR utility executes each repair action in several stages.

Table 4-4 Stages of repair

Stage	Name	Description
Stage 1	Data collection	NBCCR first collects the information that is required to perform a repair.
Stage 2	Repair qualification	Immediately before the suggested repair is applied, NBCCR verifies that the current status of the tape still qualifies for the requested repair. It recognizes that time has passed and the environment may have changed since the data was collected. If so, it reports in a history file that the repair is not qualified.
Stage 3	Repair	Finally, NBCCR performs up to three steps of repair for every repair entry in the SRA file. An element may be modified to enable the repair and steps may be necessary after the repair. If the repair fails during the repair operation, NBCCR tries to roll back the repair so that the corrective action does not introduce any new errors.

NBCCR resides in the following location:

UNIX `/usr/openv/netbackup/bin/support/NBCCR`

Windows *install_path*`\NetBackup\bin\support\NBCCR.exe`

NBCCR accepts one input file, creates two output files, and uses one temporary file.

Input file

NBCCR accepts as input the Suggested Repair Action (SRA) file named *mastername*`_NBCCA_`*timestamp*`txt`. Technical Support analyzes the NBCC support package and generates this file which is sent to the end user. This file is placed in the following directory for NBCCR processing:

On Unix:
`/usr/openv/netbackup/bin/support/input/nbccr/SRA`

On Windows:
install_path`\NetBackup\bin\support\input\nbccr\SRA`

Output files

NBCCR automatically creates a separate directory for each SRA file processed. The file name is based on the contents of the SRA file. The name of the directory is as follows:

On UNIX:
/usr/openv/netbackup/bin/support/output/nbccr/mastername_nbccr_timestamp

On Windows:
install_path\NetBackup\bin\support\output\nbccr*mastername*_nbccr_*timestamp*.

After repair processing is complete, NBCCR relocates the SRA file to the same directory.

NBCCR also creates the following output files and places them in the same directory.

- `NBCCR` creates `NBCCR.History.txt`, which is a history file of all the repair actions attempted.
- `NBCCR` creates `NBCCR.output.txt`.

Temporary file

While it runs, the `NBCCR` utility uses `KeepOnTruckin.txt`, which appears in the same location as the output files described above.

To terminate `NBCCR` while it processes repairs, delete this file. This action causes NBCCR to complete the current repair, then shut down. Any other interruption causes undetermined results.

The following sample `NBCCR.output.txt` files show the results of two `MContents` repairs. One where all images were found on tape and one where one or more images were not found on the tape:

- Example 1: `NBCCR` found all images on the tape. The `MContents`repair action is successful.

```
MContents for ULT001 MediaServerExpireImagesNotOnTapeFlag
  ExpireImagesNotOnTape flag not set
  ULT001 MContents - All images in images catalog found on tape
  MContents ULT001 status: Success
```

- Example 2: `NBCCR` did not find one or more images on the tape. The `MContents`repair action was not performed.

```
MContents for ULT000 MediaServerExpireImagesNotOnTapeFlag
  ExpireImagesNotOnTape flag not set
    Did NOT find Backup ID winmaster_1234315163 Copy 1 AssignTime 2009-0
    01:19:13 (1234315153) on ULT000
    Leaving winmaster_1234315163 Copy 1 on ULT000 in ImageDB
  ULT000 MContents - One or more images from images catalog NOT found on
  MContents ULT000 status: ActionFailed
```

For a full description of the NBCCR command options, refer to the NBCCR man page.

See the *NetBackup Commands Reference Guide*.

About the nbcplogs utility

When you troubleshoot a customer problem, you must gather and copy the correct logs to debug the issue. The log types (NBU, vxul, vm, pbx,...) may be in many places. The process of getting the logs to Symantec technical support can be difficult and time consuming.

By default, nbcplogs (NetBackup log uploader) now runs the nbsu utility and uploads nbsu information for the host system. This capability improves the end-user experience with Technical Support by saving time and keystrokes to gather and upload information. The utility also gathers additional log information for clusters and pack history information.

nbcplogs uses file transfer protocol (FTP) to upload its support package to Technical Support. This process requires temporary disk space to build the compressed bundle that it transfers. You can configure this temporary space by setting up an environment variable (TMPDIR) and using a nbcplogs command line option (--tmpdir) as follows:

On Windows:

```
# nbcplogs --tmpdir=C:\temp -f ###-###-###
```

On UNIX:

In /bin/sh, enter the following:

```
# TMPDIR=/tmp
# export TMPDIR
# nbcplogs -f ###-###-###
```

In /bin/bash, enter the following:

```
# export TMPDIR=/tmp
# nbcplogs -f ###-###-###
```

In /bin/csh or /bin/tcsh, enter the following:

```
# nbcplogs --tmpdir=/tmp -f ###-###-###
```

This utility supports three types of search algorithms. These are command options that are part of the nbcplogs command line.

- `--filecopy`. File copy is the default condition. It copies the entire log file. File copy with compression is usually enough to get the job done.
- `--fast`. Fast search uses a binary search to strip out lines that are outside the time frame of the file. This mechanism is useful when copying extremely large log files such as `bpdbm`. This option is rarely needed and should be used with caution.

The default condition is the file copy, which copies the entire log file. A fast search algorithm uses a binary search to strip out lines that are outside the time frame of the file. This mechanism is useful when copying extremely large log files such as `bpdbm`.

The `nbcplogs` utility is intended to simplify the process of copying logs by specifying the following options:

- A time frame for the logs.
- The log types that you want to collect.
- Bundling and in-transit data compression.

In addition, you can preview the amount of log data to be copied.

More information on the `nbcplogs` utility is available in the *NetBackup Commands Reference Guide* manual.

Chapter 5

Disaster recovery

This chapter includes the following topics:

About disaster recovery

Data backup is essential to any data protection strategy, especially a strategy that is expected to assist in disaster recovery. Regularly backing up data and therefore being able to restore that data within a specified time frame are important components of recovery. Regardless of any other recovery provisions, backup protects against data loss from complete system failure. And off-site storage of backup images protects against damage to your on-site media or against a disaster that damages or destroys your facility or site.

To perform recovery successfully, the data must be tracked. Knowing at what point in time the data was backed up allows your organization to assess the information that cannot be recovered. Configure your data backup schedules to allow your organization to achieve its recovery point objective (RPO). The RPO is the point in time before which you cannot accept lost data. If your organization can accept one day's data loss, your backup schedule should be at least daily. That way you can achieve an RPO of one day before any disaster.

Your organization also may have a recovery time objective (RTO), which is the expected recovery time or how long it takes to recover. Recovery time is a function of the type of disaster and of the methods that are used for recovery. You may have multiple RTOs, depending on which services your organization must recover when.

High availability technologies can make the recovery point very close or even identical to the point of failure or disaster. They also can provide very short recovery times. However, the closer your RTO and RPO are to the failure point, the more expensive it is to build and maintain the systems that are required to achieve recovery. Your analysis of the costs and benefits of various recovery strategies should be part of your organization's recovery planning.

Effective disaster recovery requires procedures specific to an environment. These procedures provide detailed information regarding preparation for and recovering from a disaster. Use the disaster recovery information in this chapter as a model only; evaluate and then develop your own disaster recovery plans and procedures.

Warning: Before you try any of the disaster recovery procedures in this chapter, Symantec recommends that you contact technical support.

This topic provides information about NetBackup installation and (if necessary), catalog recovery after a system disk failure. Symantec assumes that you recover to the original system disk or one configured exactly like it.

Warning: NetBackup may not function properly if you reinstall and recover to a different partition or to one that is partitioned differently due to internal configuration information. Instead, configure a replacement disk with partitioning that is identical to the failed disk. Then reinstall NetBackup on the same partition on which it was originally installed.

The specific procedures that replace failed disks, build partitions and logical volumes, and reinstall operating systems can be complicated and time consuming. Such procedures are beyond the scope of this manual. Appropriate vendor-specific information should be referenced.

Recommended backup practices

The following backup practices are recommended:

Selecting files to back up	In addition to backing up files on a regular basis, it is important to select the correct files to back up. Include all files with records that are critical to users and the organization. Back up system and application files, so you can quickly and accurately restore a system to normal operation if a disaster occurs. Include all Windows system files in your backups. In addition to the other system software, the Windows system directories include the registry, which is needed to restore the client to its original configuration. If you use a NetBackup exclude list for a client, do not specify any Windows system files in that list. Do not omit executables and other application files. You may want to save tape by excluding these easy-to-reinstall files. However, backing up the entire application ensures that it is restored to its exact configuration. For example, if you have applied software updates and patches, restoring from a backup eliminates the need to reapply them.
Bare Metal Restore	NetBackup Bare Metal Restore (BMR) protects client systems by backing them up with a policy configured for BMR protection. A complete description of BMR backup and recovery procedures is available. See the *Bare Metal Restore System Administrator's Guide*.
Critical policies	When you configure a policy for online catalog backup, designate certain NetBackup policies as critical. Critical policies back up systems and data deemed critical to end-user operation. During a catalog recovery, NetBackup verifies that all of the media that is needed to restore critical policies are available.
Full backup after catalog recovery	If the configuration contains Windows clients that have incremental backup configurations set to **Perform Incrementals Based on Archive Bit**, run a full backup of these clients as soon as possible after a catalog recovery. The archive bit resets on the files that were incrementally backed up after the catalog backup that was used for the catalog recovery. If a full backup of these clients is not run after a catalog recovery, these files could be skipped and not backed up by subsequent incremental backups.
Online catalog backups	Online, hot catalog backup is a policy-driven backup that supports tape-spanning and incremental backups. It allows for restoring catalog files from the Backup, Archive, and Restore interface. Online catalog backups may be run while other NetBackup activity occurs, which provides improved support for environments in which continual backup activity is typical.
Online catalog backup disaster recovery files	Symantec recommends saving the disaster recovery files that are created by the online catalog backup to a network share or removable device. Do not save the disaster recovery files to the local computer. Catalog recovery from an online catalog backup without the disaster recovery image file is a more complex procedure and time-consuming procedure.

Automated recovery	The catalog disaster recovery file (created during an online catalog backup) is intended to automate the process of NetBackup recovery. If you recover a system other than the one that originally made the backups, it should be identical to the original system. For example, the system that performs the recovery should include NetBackup servers with identical names to those servers where the backups were made. If not, the automated recovery may not succeed.
Online catalog disaster recovery information email	Configure the online catalog backup policy to email a copy of the disaster recovery information to a NetBackup administrator in your organization. Configure this policy as part of every catalog backup. Do not save the disaster recovery information emails to the local computer. Catalog recovery without the disaster recovery image file or the disaster recovery information email available is exceedingly complex, time consuming, and requires assistance. You may tailor the disaster recovery email process by providing a customized mail script. More details are available. See Reference Topics of the *NetBackup Administrator's Guide, Volume II*.
Identifying the correct catalog backup	Ensure that you identify and use the appropriate catalog backup for your recovery. For example, if you recover from your most recent backups, use the catalog from your most recent backups. Similarly, if you recover from a specific point in time, use the catalog backup from that specific point in time.
Catalog recovery time	System environment, catalog size, location, and backup configuration (full and incremental policy schedules) all help determine the time that is required to recover the catalog. Carefully plan and test to determine the catalog backup methods that result in the desired catalog recovery time.
Master and media server backups	The NetBackup catalog backup protects your configuration data and catalog data. Set up backup schedules for the master servers and media servers in your NetBackup installation. These schedules protect the operating systems, device configurations, and other applications on the servers. Master or media server recovery procedures when the system disk has been lost assume that the servers are backed up separately from the catalog backup. Backups of master and media servers should not include NetBackup binaries, configuration or catalog files, or relational database data.

About disk recovery procedures for UNIX and Linux

The three different types of disk recovery for UNIX and Linux are as follows:

- Master server disk recovery procedures
  See "Recovering the master server disk for UNIX and Linux" on page 177.
- Media server disk recovery procedures

See "About recovering the NetBackup media server disk for UNIX and Linux" on page 182.

- Client disk recovery procedures
  See "Recovering the system disk on a UNIX client workstation" on page 182.

The disk-based images that reside on AdvancedDisk or on OpenStorage disks cannot be recovered by means of the NetBackup catalog. These disk images must be recovered by means of the NetBackup import feature. For information on import,

See the topic on importing NetBackup images in the *NetBackup Administrator's Guide, Volume I*.

When the disk image is imported, NetBackup does not recover the original catalog entry for the image. Instead, a new catalog entry is created.

Recovering the master server disk for UNIX and Linux

The procedure in this section explains how to recover data if the system disk fails on a UNIX or Linux NetBackup master server.

The following two scenarios are covered:

- Root file system is intact. The operating system, NetBackup software and some (if not all) other files are assumed to be lost.
  See "Recovering the master server when root is intact" on page 178.
- Root file system is lost along with everything else on the disk. This situation requires a total recovery. This recovery reloads the operating system to an alternate boot disk and boots from this disk during recovery. This operation lets you recover the root partition without risking a crash that is caused by overwriting the files that the operating system uses during the restore.
  See "Recovering the master server when the root partition is lost" on page 179.

For NetBackup master and media servers, the directory locations of the NetBackup catalog become an integral part of NetBackup catalog backups. Any recovery of the NetBackup catalog requires identical directory paths or locations be created during the NetBackup software reinstallation. Disk partitioning, symbolic links, and NetBackup catalog relocation utilities may be needed.

NetBackup Bare Metal Restore (BMR) protects client systems by backing them up with a policy configured for BMR protection. Information is available that describes backup and recovery procedures.

See the *NetBackup Bare Metal Restore System Administrator's Guide*.

Recovering the master server when root is intact

The following procedure recovers the master server by reloading the operating system, then restoring NetBackup, and finally restoring all other files.

To recover the master server when root is intact

1. Verify that the operating system works, that any require patches are installed, and that specific configuration settings are made. Take corrective action as needed.
2. Reinstall NetBackup software on the server you want to recover.

   See the *NetBackup Installation Guide for UNIX* for instructions.
3. Install any NetBackup patches that had been previously installed. See the documentation that was included with the patch software.

   Note: &CompanyName; does not support the recovery of a catalog image that was backed up using an earlier version of NetBackup.

   ---
4. If any of the default catalog directories have changed that may be reflected in the NetBackup catalog backups, recreate those directories before the catalog recovery.

   The following are examples:

   - Use of symbolic links as part of the NetBackup catalog directory structure.
   - Use of the NetBackup `nbdb_move` command to relocate parts of the NetBackup relational database catalog.
5. If the recovery scenario involves restoring policy or catalog backups, the appropriate recovery device(s) must be configured, which may involve the following tasks:

   - Install and configure the robotic software for the devices that read backups of the NetBackup catalog and regular backups of the disk being restored. If a non-robotic drive is available that can read these backups, then no robot is required. Although manual intervention is required if multiple pieces of media are required.
     See the *NetBackup Device Configuration Guide*.
   - Use the NetBackup **Device Configuration** Wizard to discover and configure the recovery device in NetBackup.
     See the *NetBackup Administrator's Guide, Volume I*.
   - Use the NetBackup command `tpautoconf` to discover and configure the recovery device in NetBackup.

See the *NetBackup Commands Reference Guide*.

- Update the device mapping files.
  See the *NetBackup Administrator's Guide, Volume I*.

6 If you must restore from the policy backups or catalog backups that were done to media, the appropriate media may have to be configured in NetBackup.

  See the *NetBackup Administrator's Guide, Volume I*.

  Configuring the media may require some or all of the following tasks:

  - Manually load the required media into a stand-alone recovery device.
  - Use the NetBackup utilities such as `robtest` or vendor-specific robotic control software to load media into the required recovery device or devices.
  - Use the NetBackup Volume Configuration Wizard to inventory the media contents of a robotic device.
  - Use the vendor-specific robotic control software to load the media into the required recovery device(s).

7 Recover the NetBackup catalogs to the server you are recovering.

  The NetBackup catalogs can be recovered only to the same directory structure from which they were backed up (alternate path recovery is not allowed).

8 Stop and restart all NetBackup daemons. Use the following NetBackup commands, or use the **Activity Monitor** in the NetBackup Administration Console.

  Your configuration may include an EMM server that is separate from the master server. If so, start NetBackup on the EMM server before starting NetBackup on the master server.

```
/usr/openv/netbackup/bin/bp.kill_all
/usr/openv/netbackup/bin/bp.start_all
```

9 Start the NetBackup Backup, Archive, and Restore interface (or the `bp` command) and restore other files to the server as desired. When the files are restored, you are done.

Recovering the master server when the root partition is lost

The following procedure assumes that the root file system is lost along with everything else on the disk. This procedure reloads the operating system to an alternate boot disk and boots from that disk during recovery. This operation lets you recover the root partition without risking a crash that is caused by overwriting the files that the operating system uses during the restore.

To recover the master server when the root partition is lost

1. Load the operating system on an alternate boot disk, using the same procedure as you would normally use for the server type.
2. On the alternate disk, create the partition and directory where NetBackup, its catalogs (if applicable), and databases resided on the original disk. By default, they reside under the `/usr/openv` directory.
3. Verify that the operating system works, that any required patches are installed, and that specific configuration settings are made. Take corrective action as needed.
4. Install NetBackup on the alternate disk. Install only the robotic software for the devices that are required to read backups of the NetBackup catalogs and regular backups of the disk being restored. If a non-robotic drive can read these backups, no robot is required.
5. Install any NetBackup patches that had been previously installed. See the documentation that was included with the patch software.
6. If the catalog directories differ from those in the NetBackup catalog backups, recreate that directory structure on disk before you recover the catalog.

   Examples of those directories are the following:

   - Use of symbolic links as part of the NetBackup catalog directory structure.
   - Use of the NetBackup `nbdb_move` command to relocate parts of the NetBackup relational database catalog.
7. If the recovery scenario involves restoring policy or catalog backups, the appropriate recovery device(s) must be configured.

   Device configuration may include the following tasks:

   - Install and configure the robotic software for the devices that read backups of the NetBackup catalog and regular backups of the disk being restored. If a non-robotic drive is available that can read these backups, then no robot is required. Although manual intervention is required if multiple pieces of media are required.
     See the *NetBackup Device Configuration Guide*.
   - Use the NetBackup **Device Configuration** Wizard to discover and configure the recovery device in NetBackup.
     See the *NetBackup Administrator's Guide, Volume I*.
   - Use the NetBackup command `tpautoconf` to discover and configure the recovery device in NetBackup.
     See the *NetBackup Commands Reference Guide* manual.

- Update the device mapping files.
  See the *NetBackup Administrator's Guide, Volume I*.

8 If you must restore from the policy backups or catalog backups that were done to media, the appropriate media may have to be configured in NetBackup.

  See the *NetBackup Administrator's Guide, Volume I*.

  Configuring the media may require some or all of the following tasks:

  - Manually load the required media into a stand-alone recovery device.
  - Use the NetBackup utilities such as `robtest` or vendor-specific robotic control software to load media into the required recovery device or devices.
  - Use the NetBackup Volume Configuration Wizard to inventory the media contents of a robotic device.
  - Use the vendor-specific robotic control software to load the media into the required recovery device(s).

9 Recover the NetBackup catalogs to the alternate disk.

  See "How to recover a catalog from a backup " on page 199.

  The catalogs can be recovered only to the same directory structure from which they were backed up (alternate path recovery is not allowed).

10 Start the NetBackup Backup, Archive, and Restore interface (or the `bp` command). Restore the latest backed up version of all files.

  You restore these files from the backup of the master server, not from the NetBackup catalog backup. Be sure to specify the disk that you recover as the alternate recovery location.

  Warning: Do not restore files to the `/usr/openv/var`, `/usr/openv/db/data`, or `/usr/openv/volmgr/database` directories (or relocated locations) or the directories that contain NetBackup database data. This data was recovered to the alternate disk in step 9 and is copied back to the recovery disk in step 12.

  ---

11 Stop all NetBackup processes that you started from NetBackup on the alternate disk. Use the **Activity Monitor** in the NetBackup Administration Console or the following:

```
/usr/openv/netbackup/bin/bp.kill_all
```

12 Maintaining the same directory structure, copy the NetBackup catalogs from the alternate disk to the disk that you recover. These are the catalogs recovered in step 9.

13 Make the recovered disk the boot disk again and restart the system.

14 Start and test the copy of NetBackup on the disk that you have recovered.

If your configuration includes an Enterprise Media Manager (EMM) server that is separate from the master server, start NetBackup on the EMM server before starting NetBackup on the master server.

```
/usr/openv/netbackup/bin/bp.start_all
```

Try the NetBackup Administration utilities. Also, try some backups and restores.

15 When you are satisfied that the recovery is complete, delete the NetBackup files from the alternate disk. Or, unhook that disk, if it is a spare.

About recovering the NetBackup media server disk for UNIX and Linux

NetBackup 6.0 and later media servers store information in the NetBackup relational database. If you need to recover the system disk on a NetBackup media server, the recommended procedure is similar to disk recovery for the client.

See "Recovering the system disk on a UNIX client workstation" on page 182.

Note: A separate computer that functions as a NetBackup 6.0 or later media server is available only on NetBackup Enterprise Server. For NetBackup server installations, the master server and the media server are installed on the same system and have the same host name. Therefore, recovering the master server disk also recovers the media server.

Recovering the system disk on a UNIX client workstation

NetBackup Bare Metal Restore (BMR) protects client systems by backing them up with a policy configured for BMR protection. A complete description of BMR backup and recovery procedures is available.

See the *Bare Metal Restore Administrator's Guide*.

To recover the system disk on a client workstation

1. Reload the operating system as you normally would for a client workstation of that type.

   If the root file system is lost, the best approach may be to reload the operating system on an alternate boot disk and start from this disk. After restoring the system, restore root to its original partition. This operation lets you recover the root partition without risking a crash due to overwriting the files that the operating system uses during the restore. The procedure is similar to the procedure that is used for the master server, except that recovering the NetBackup catalogs is not necessary.

   See "About recovering the master server disk for Windows" on page 187.

2. Reinstall NetBackup client software and patches.
3. Use the NetBackup Backup, Archive, and Restore interface to select and restore files.

About clustered NBU server recovery for UNIX and Linux

NetBackup server clusters do not protect against catalog corruption, loss of the shared disk, or loss of the whole cluster. Regular catalog backups must be performed. More information is available about configuring catalog backups and system backup policies in a clustered environment.

Refer to topics about configuring NetBackup in the *NetBackup High Availability Guide*.

Warning: Before attempting any of the recovery procedures in this topic, contact technical support.

Replacing a failed node on a UNIX or Linux cluster

Cluster technology-specific information is available about how to bring the NetBackup resource group online and offline. Also, information about how to freeze and unfreeze (that is, disable and enable monitoring for) the NetBackup Resource group.

Refer to topics about configuring NetBackup in the *NetBackup High Availability Guide*.

The following procedure applies when the shared disk and at least one configured cluster node remain available.

To replace a failed node on a UNIX or Linux cluster

1. Configure the hardware, system software, and cluster environment on the replacement node.
2. Verify that the device configuration matches that of the surviving nodes.
3. Ensure that the NetBackup Resource group is offline on all nodes before installing NetBackup on the replacement node.
4. Ensure that the NetBackup shared disks are not mounted on the node on which NetBackup is to be installed.
5. Freeze the NetBackup service.
6. Reinstall NetBackup on the new mode or replacement node. Be sure to use the NetBackup Virtual Name as the name of the NetBackup server. Follow the instructions for installing the NetBackup server software.

   Refer to the *NetBackup Installation Guide*.
7. Install any Maintenance Packs and patches that are required to bring the newly installed node to the same patch level as the other cluster nodes.
8. Bring the NetBackup Resource group online on a node other than the freshly installed node.
9. Log onto the node on which the NetBackup resource group is online and run the following command:

   ```
   /usr/openv/netbackup/bin/cluster/cluster_config -s nbu -o
   add_node -n node_name
   ```

   node_name is the name of the freshly installed node.
10. Switch the NetBackup resource group to the replacement node.
11. Freeze the NetBackup group.
12. Ensure that the appropriate low-level tape device and robotic control device configuration necessary for your operating system has been performed. Information is available for your operating system.

    Refer to the *NetBackup Device Configuration Guide*.
13. Run the **Device Configuration Wizard** to configure the devices. You do not have to rerun the device configuration on the pre-existing nodes. Configuration information on your particular cluster is available.

    See the *NetBackup Administrator's Guide, Volume I*.

14 Check that the robot numbers and robot drive numbers for each robot are consistent across all nodes of the cluster. Repeat for any other servers that are connected to that robot and correct if necessary.

See the *NetBackup Administrator's Guide , Volume 1*.

15 Test the ability of NetBackup to perform restores using the configured devices on the replacement node.

16 Unfreeze the NetBackup resource group.

Recovering the shared disk on a UNIX or Linux cluster

The following procedure is applicable in situations where the configured cluster nodes remain available but files on the shared disk have been corrupted or lost. These files can include the NetBackup catalog, the database files, or both.

The following conditions must be true to proceed with this procedure:

- The shared storage hardware is restored to a working state, so that the shared disk resource can be brought online with an empty shared directory.
- Valid online catalog backups exist.

To recover the shared disk on a UNIX or Linux cluster

1 Clear the faulted NetBackup resource group, disable monitoring, and bring up the shared disk and virtual name resources on a functioning node.

2 Manually create the following directories on the shared disk:

<shared disk path>/netbackup/db

<shared disk path>/db/data

<shared disk path>/var/global

<shared disk path>/volmgr/misc/robotic_db

3 If this server is an EMM server, enter the following to bring up the database server and EMM, then run `tpext` to initialize the EMM db:

```
# SHARED_DISK=<top-level shared disk mount point>
  # dataDir=${SHARED_DISK}/db/data
  # /usr/openv/netbackup/bin/nbdbms_start_stop start
       /usr/openv/db/bin/create_nbdb \
           -data ${dataDir} \
           -index ${dataDir} \
           -tlog ${dataDir} \
           -mlog ${dataDir} \
           -staging ${dataDir}/staging \
           -drop
  # /usr/openv/volmgr/bin/tpext -loadEMM
```

4 Configure required devices and media and recover the NetBackup catalogs.

See "Recovering the master server when root is intact" on page 178.

5 Manually shut down and restart NetBackup on the active node.

6 Re-enable monitoring of the NetBackup resource group.

7 Verify that the NetBackup server can now be brought online on all configured nodes.

Recovering the entire UNIX or Linux cluster

The following procedure applies to the clustered NetBackup server environment that must be re-created from scratch.

Before you proceed, ensure that you have valid online catalog backups.

To recover the entire UNIX or Linux cluster

1 Configure the hardware, system software, and cluster environment on the replacement cluster.

2 Ensure that the appropriate low-level tape device and robotic control device configuration necessary for your operating system has been performed.

Refer to the *NetBackup Device Configuration Guide*.

3 Reinstall NetBackup on each of the cluster nodes. Be sure to use the NetBackup Virtual Name as the name of the NetBackup server. Follow the instructions for installing NetBackup server software.

Refer to the *NetBackup Installation Guide*.

4 Configure the clustered NetBackup server.

Refer to the *NetBackup High Availability Guide*.

5 Install any Maintenance Packs and patches that are required to bring the newly installed NetBackup server to the same patch level as the server being replaced.

6 Configure required devices and media and recover the NetBackup catalogs.

See "Recovering the master server when root is intact" on page 178.

7 Bring the NetBackup resource group on each node in turn and run the **Device Configuration** Wizard to configure the devices.

Configuration information on your particular cluster is available.

Refer to the *NetBackup High Availability Guide*.

About disk recovery procedures for Windows

The three different types of disk recovery for Windows are as follows:

- Master server disk recovery procedures
  See "About recovering the master server disk for Windows" on page 187.
- Media server disk recovery procedures
  See "About recovering the NetBackup media server disk for Windows" on page 194.
- Client disk recovery procedures
  See "Recovering a Windows client disk" on page 194.

The disk-based images that reside on AdvancedDisk or on OpenStorage disks cannot be recovered by means of the NetBackup catalog. These disk images must be recovered by means of the NetBackup import feature. For information on import, refer to the section on importing NetBackup images in the following manual:

See *NetBackup Administrator's Guide, Volume I*.

Note: When the disk image is imported, NetBackup does not recover the original catalog entry for the image. Instead, a new catalog entry is created.

About recovering the master server disk for Windows

The procedure in this section explains how to recover data if one or more disk partitions are lost on a Windows NetBackup master server.

The following two scenarios are covered:

- Windows is intact and not corrupted. The system still starts Windows, but some or all other partitions are lost. NetBackup software is assumed to be lost.
  See "Recovering the master server with Windows intact" on page 188.
- All disk partitions are lost. Windows must be reinstalled, which is a total recovery. These procedures assume that the NetBackup master disk was running a supported version of Windows and that the defective hardware has been replaced.
  See "Recovering the master server and Windows" on page 191.

For NetBackup master and media servers, the directory locations of the NetBackup catalog become an integral part of NetBackup catalog backups. Any recovery of the NetBackup catalog requires the identical directory paths or locations be created before the catalog recovery.

Recovering the master server with Windows intact

This procedure shows how to recover the NetBackup master server with the Windows operating system intact.

To recover the master server with Windows intact

1. Determine the *install_path* in which NetBackup is installed. By default, NetBackup is installed in the `C:\Program Files\VERITAS` directory.
2. Determine if any directory paths or locations need to be created for NetBackup catalog recovery.
3. Partition any disks being recovered as they were before the failure (if partitioning is necessary). Then reformat each partition as it was before the failure.
4. Reinstall NetBackup software on the server.

   Refer to the *NetBackup Installation Guide for Windows*.
5. Install any NetBackup patches that had been previously installed. See the documentation that was included with the patch software.
6. If the catalog directories differ from those in the NetBackup catalog backups, recreate that directory structure on disk before you recover the catalog. For example, use the NetBackup `nbdb_move` command to relocate parts of the NetBackup relational database catalog.
7. If the recovery scenario involves restoring policy or catalog backups, the appropriate recovery devices must be configured.

   You may have to do some or all of the following:

- Install and configure the robotic software for the devices that read backups of the NetBackup catalog and regular backups of the disk being restored. If a non-robotic drive is available that can read these backups, then no robot is required. Although manual intervention is required if multiple pieces of media are required.
  See the *NetBackup Device Configuration Guide*.
- Use the NetBackup **Device Configuration** Wizard to discover and configure the recovery device in NetBackup.
  See the *NetBackup Administrator's Guide, Volume I*.
- Use the NetBackup command `tpautoconf` to discover and configure the recovery device in NetBackup.
  See the *NetBackup Commands Reference Guide* manual.
- Update the device mapping files.
  See the *NetBackup Administrator's Guide, Volume I*.

8 If the recovery scenario involves restoring the policy backups or catalog backups that were done to media, the appropriate recovery device(s) must be configured.

Configuring the media may involve the following actions:

- Manually load the required media into a stand-alone recovery device.
- Use NetBackup utilities such as `robtest` or vendor-specific robotic control software to load media into the required recovery devices.
- Use the NetBackup Volume Configuration Wizard to inventory the media contents of a robotic device.
- Use the vendor-specific robotic control software to load the media into the required recovery device(s).

9 Recover the NetBackup catalogs.

See "How to recover a catalog from a backup " on page 199.

10 When catalog recovery is complete, stop and restart the NetBackup services. Use the following `bpdown` and `bpup` commands, the **Activity Monitor** in the **NetBackup Administration Console**, or the Services application in the Windows Control Panel.

install_path\NetBackup\bin\bpdown
install_path\NetBackup\bin\bpup

Your configuration may include an EMM server that is separate from the master server. If so, start NetBackup on the EMM server before starting NetBackup on the master server.

Warning: In step 11, do not restore files to the *install_path*\NetBackup\db, *install_path*\NetBackupDB, *install_path*\NetBackup\var, or *install_path*\Volmgr\database directories. The catalogs were recovered in step 9 and overwriting them with regular backups leave them in an inconsistent state.

If the NetBackup relational database files were relocated using `nbdb_move` from *install_path*\NetBackupDB\data, they are recovered in step 9 and should not be restored in step 11.

11 To restore all other files, do the following actions in the order shown:

- Start the NetBackup Administration interface on the master server.
- Start the Backup, Archive, and Restore utility.
- Browse for restores and select only the partitions that were lost. Select the system directory (typically `C:\Winnt`), which ensures that all registry files are restored.
- Deselect the *install_path*\NetBackup\db, *install_path*\NetBackupDB, *install_path*\NetBackup\var, and *install_path*\Volmgr\database directories (see the caution in step 10).
- If you reinstall Windows, select the **Overwrite existing files** option, which ensures that existing files are replaced with the backups.
- Start the restore.

12 Reboot the system, which replaces any files that were busy during the restore. When the boot process is complete, the system is restored to the state it was in at the time of the last backup.

Recovering the master server and Windows

This procedure assumes that all disk partitions in Windows are lost.

To recover the master server and Windows

1. Install a minimal Windows operating system (perform the Express install).
   - Install the same type and version of Windows software that was used previously.
   - Install Windows in the same partition that was used before the failure.
   - Install any required patches. Take corrective action as needed.
   - Specify the default workgroup. Do not restore the domain.
   - Install and configure special drivers or other software that is required to get the hardware operational (for example, a special driver for the disk drive).
   - Install SCSI or other drivers as needed to communicate with the tape drives on the system.
   - Follow any hardware manufacturer's instructions that apply, such as loading SSD on a Compaq system.
   - Reboot the system when Windows installation is complete.
2. Determine the *install_path* in which NetBackup is installed. By default, NetBackup is installed in the `C:\Program Files\VERITAS` directory.
3. Determine if any directory paths or locations need to be created for NetBackup catalog recovery.
4. If necessary, partition any disks being recovered as they were before the failure. Then reformat each partition as it was before the failure.
5. Reinstall NetBackup software on the server being recovered. Do not configure any NetBackup policies or devices at this time.
6. Install any NetBackup patches that had been previously installed. See the documentation that was included with the patch software.
7. If the catalog directories differ from those in the NetBackup catalog backups, recreate that directory structure on disk before you recover the catalog. For example, use the NetBackup `nbdb_move` command to relocate parts of the NetBackup relational database catalog.
8. If the recovery scenario involves restoring policy or catalog backups, the appropriate recovery device or devices have to be configured.

   You may have to do all or some of the following tasks:

- Install and configure the robotic software for the devices that read backups of the NetBackup catalog and regular backups of the disk being restored. If a non-robotic drive is available that can read these backups, then no robot is required. Although manual intervention is required if multiple pieces of media are required.
  See the *NetBackup Device Configuration Guide*.
- Use the NetBackup **Device Configuration** Wizard to discover and configure the recovery device in NetBackup.
  See the *NetBackup Administrator's Guide, Volume I*.
- Use the NetBackup command `tpautoconf` to discover and configure the recovery device in NetBackup.
  See the *NetBackup Commands Reference Guide* manual.
- Update the device mapping files.
  See the *NetBackup Administrator's Guide, Volume I*.

9 If you must restore from the policy backups or catalog backups that were done to media, the appropriate media may have to be configured in NetBackup.

See the *NetBackup Administrator's Guide, Volume I*.

When you configure the media, you may have to do some or all of the following:

- Manually load the required media into a stand-alone recovery device.
- Use the NetBackup utilities such as `robtest` or vendor-specific robotic control software to load media into the required recovery devices.
- Use the NetBackup Volume Configuration Wizard to inventory the media contents of a robotic device.
- Use the vendor-specific robotic control software to load the media into the required recovery devices.

10 Recover the NetBackup catalogs.

See "How to recover a catalog from a backup " on page 199.

11 When catalog recovery is complete, stop and restart the NetBackup services. Use the following `bpdown` and `bpup` commands, the **Activity Monitor** in the **NetBackup Administration Console**, or the Services application in the Windows Control Panel.

```
install_path\NetBackup\bin\bpdown
install_path\NetBackup\bin\bpup
```

If your configuration includes an Enterprise Media Manager (EMM) server that is separate from the master server, start NetBackup on the EMM server first.

Warning:

In step 12, do not restore files to the *install_path*`\NetBackup\db`, *install_path*`\NetBackupDB`, *install_path*`\NetBackup\var`, or *install_path*`\Volmgr\database` directories. These directories were recovered in step 10 and overwriting them with regular backups leaves the catalogs in an inconsistent state. If the relational database files were relocated using `nbdb_move` from *install_path*`\NetBackupDB\data`, they are recovered in step 10 and should not be restored in step 12.

---

12 To restore all other files, do the following steps in the order presented:

- Start the NetBackup Administration interface on the master server.
- Start the Backup, Archive, and Restore client interface.
- Browse for restores and select only the partitions that were lost. Select the system directory (typically `C:\Winnt`), which ensures that all registry files are restored.
- Deselect the *install_path*`\NetBackup\db`, *install_path*`\NetBackupDB` (or relocated NetBackup relational database path), *install_path*`\NetBackup\var`, or *install_path*`\Volmgr\database` directories.
  See the caution in this procedure.
- If you reinstall Windows, select the **Overwrite existing files** option, which ensures that existing files are replaced with the backups.
- Start the restore.

13 Restart the system, which replaces any files that were busy during the restore. When the boot process is complete, the system is restored to the state it was in at the time of the last backup.

About recovering the NetBackup media server disk for Windows

A separate computer that functions as a NetBackup 6.0 or later media server is available only on NetBackup Enterprise Server. For NetBackup server installations, the master server and the media server are installed on the same system and have the same host name. Therefore, recovering the master server disk also recovers the media server.

NetBackup media servers store their information in the NetBackup relational database. If you need to recover the system disk on a NetBackup media server, the recommended procedure is similar to disk recovery for the client.

See "Recovering a Windows client disk" on page 194.

Recovering a Windows client disk

The following procedure explains how to perform a total recovery of a Windows NetBackup client in the event of a system disk failure.

NetBackup Bare Metal Restore (BMR) protects client systems by backing them up with a policy configured for BMR protection. A complete description of BMR backup and recovery procedures is available.

See the *Bare Metal Restore System Administrator's Guide*.

This procedure assumes that the Windows operating system and NetBackup are reinstalled to boot the system and perform a restore.

The following are additional assumptions:

- The NetBackup client was running a supported Microsoft Windows version.
- The NetBackup client was backed up with a supported version of NetBackup client and server software.
- The NetBackup master server to which the client sent its backups is operational. You request the restore from this server.
- The backups included the directory where the operating system and its registry resided.
  If the backups excluded any files that resided in the directory, you may not be able to restore the system identically to the previous configuration.
- Defective hardware has been replaced.

Before starting, verify that you have the following:

- Windows system software to reinstall on the NetBackup client that being restored. Reinstall the same type and version of software that was previously used.

- NetBackup client software to install on the client that being restored.
- Special drivers or other software that is required to make the hardware operational (for example, a special driver for the disk drive).
- IP address and host name of the NetBackup client.
- IP address and host name of the NetBackup master server.
- The partitioning and formatting scheme that was used on the system to be restored. You must duplicate that scheme during Windows installation.

To recover a Windows client disk

1. Install a minimal Windows operating system (perform the Express install).

   During the installation, do the following tasks:

   - Partition the disk as it was before the failure (if partitioning is necessary). Then, reformat each partition as it was before the failure.
   - Install the operating system in the same partition that was used before the failure.
   - Specify the default workgroup. Do not restore to the domain.
   - Follow any hardware manufacturers' instructions that apply.

2. Reboot the system when the installation is complete.
3. Configure the NetBackup client system to re-establish network connectivity to the NetBackup master server.

   For example, if your network uses DNS, the configuration on the client must use the same IP address that was used before the failure. Also, it must specify the same name server (or another name server that recognizes both the NetBackup client and master server). On the client, configure DNS in the **Network** dialog, accessible from the Windows Control Panel.
4. Install NetBackup client software.

   Refer to the *NetBackup Installation Guide for Windows* for instructions. Ensure that you specify the correct names for the client server and master server.

   - To specify the client name, start the Backup, Archive, and Restore interface on the client and click **NetBackup Client Properties** on the **File** menu. Enter the client name on the **General** tab of the **NetBackup Client Properties** dialog.
   - To specify the server name, click **Specify NetBackup Machines and Policy Type** on the **File** menu.
5. Install any NetBackup patches that had previously been installed.

6 Enable debug logging by creating the following debug log directories on the client:

```
install_path\NetBackup\Logs\tar
install_path\NetBackup\Logs\bpinetd
```

NetBackup creates logs in these directories.

7 Stop and restart the NetBackup Client service.

This action enables NetBackup to start logging to the `bpinetd` debug log.

8 Use the NetBackup Backup, Archive, and Restore interface to restore the system files and user files to the client system.

For example, if all files are on the `C` drive, restoring that drive restores the entire system.

To restore files, you do not need to be the administrator, but you must have restore privileges. For instructions, refer to the online Help or refer to the following:

See the *NetBackup Backup, Archive, and Restore Getting Started Guide*.

NetBackup restores the registry when it restores the Windows system files. For example, if the system files are in the `C:\Winnt` directory, NetBackup restores the registry when it restores that directory and its subordinate subdirectories and files.

9 Check for ERR or WRN messages in the log files that are in the directories you created in step 6.

If the logs indicate problems with the restore of Windows system files, resolve those problems before proceeding.

10 Stop the NetBackup Client service and verify that the `bpinetd` program is no longer running.

11 Restart the NetBackup client system.

When the boot process is complete, the system is restored to the state it was in at the time of the last backup.

About clustered NBU server recovery for Windows

NetBackup server clusters do not protect against catalog corruption, loss of the shared disk, or loss of the whole cluster. Regular catalog backups must be performed. More information is available about configuring catalog backups and system backup policies in a clustered environment.

Refer to topics about configuring NetBackup in the *NetBackup High Availability Guide*.

Warning: Contact technical support before you try these recovery procedures.

Replacing a failed node on a Windows VCS cluster

Cluster technology-specific information is available about how to bring the NetBackup resource group online and offline. Also, it is available on how to freeze and unfreeze (disable and enable the monitoring for) the resource group.

Refer to topics about configuring NetBackup in the *NetBackup High Availability Guide*.

Check the following conditions before you proceed with this procedure:

- The hardware, system software, and cluster environment on the replacement node have been configured.
- The reconfigured node or replacement node has been made a member of the cluster and has the same name as the failed node.

The following procedure applies when the shared disk and at least one configured cluster node remain available.

To replace a failed node on a Windows cluster using VCS

1. Freeze the NetBackup service.
2. Ensure that the NetBackup shared disks are not mounted on the node on which NetBackup is to be installed.
3. Reinstall NetBackup on the new node or replacement node. Be sure to use the NetBackup Virtual Name as the name of the NetBackup server. Follow the instructions for installing the NetBackup server software.

   Refer to the *NetBackup Installation Guide*.
4. Ensure that the node is a member of an existing cluster and that it performs the necessary configuration automatically.
5. Install any Maintenance Packs and patches that are required to bring the newly installed node to the same patch level as the other cluster nodes.
6. Unfreeze the NetBackup service and verify that it can be brought up on the replacement node.

Recovering the shared disk on a Windows VCS cluster

The following procedure is applicable in situations where the configured cluster nodes remain available but the NetBackup catalog, database files, or both on the shared disk have been corrupted or lost.

Check the following conditions before you proceed with this procedure:

- The shared storage hardware is restored to a working state, so that the shared disk resource can be brought online with an empty shared directory.
- Valid online catalog backups exist.

To recover the shared disk on a Windows cluster that uses VCS

1. Clear the faulted NetBackup resource group, disable monitoring, and bring up the shared disk and virtual name resources on a functioning node.
2. Ensure that all NetBackup shared disks are assigned the same drive letters that were used when NetBackup was originally installed and configured.
3. To reconfigure NetBackup for the cluster, initialize the database by running the following commands in sequence on the active node:

   ```
   bpclusterutil -ci
   tpext
   bpclusterutil -online
   ```

4. Use the appropriate NetBackup catalog recovery procedure to restore the NetBackup catalog information on the shared disk.

   See "Recovering the master server and Windows" on page 191.
5. If the clustered NetBackup server is a media server, verify that the restored vm.conf file contains the correct host-specific MM_SERVER_NAME configuration entry for the active node. If MM_SERVER_NAME is different from the local host name, edit the file and change the server name to the local host name:

   MM_SERVER_NAME=<local host name>
6. Use NetBackup to restore any data on the shared disks. Details are available on how to perform a restore.

   Refer to the *NetBackup Backup, Archive, and Restore Getting Started Guide*.
7. Configure required devices and media and recover the NetBackup catalogs.
8. Manually shut down and restart NetBackup on the active node.

9 Re-enable monitoring of the NetBackup resource group.

10 Verify that the NetBackup server can now be brought online on all configured nodes.

Recovering the entire Windows VCS cluster

The following procedure applies to the clustered NetBackup server environment that must be re-created from scratch.

Before you proceed, ensure that you have valid online catalog backups.

To recover the entire Windows VCS cluster

1 Configure the hardware, system software, and cluster environment on the replacement cluster.

2 Ensure that the appropriate low-level tape device and robotic control device configuration necessary for your operating system has been performed.

Refer to the *NetBackup Device Configuration Guide*.

3 Reinstall NetBackup on each of the cluster nodes. Be sure to use the NetBackup Virtual Name as the name of the NetBackup server. Follow the instructions for installing NetBackup server software.

Refer to the *NetBackup Installation Guide*.

4 Configure the clustered NetBackup server.

Refer to the *NetBackup High Availability Guide*.

5 Install any Maintenance Packs and patches that are required to bring the newly installed NetBackup server to the same patch level as the server that is being replaced.

6 Configure required devices and media and recover the NetBackup catalogs.

See "Recovering the master server and Windows" on page 191.

7 Bring the NetBackup resource group on each node in turn and run the **Device Configuration** Wizard to configure the devices.

Configuration information on your cluster (MSCS or VCS) is available.

Refer to the *NetBackup High Availability Guide*.

How to recover a catalog from a backup

This topic explains how to recover a catalog that was backed up using the online, hot catalog backup method. This method is described in the following manual:

See the *NetBackup Administrator's Guide, Volume I*.

This procedure can be stand-alone or part of a larger disk recovery procedure. See one of the following topics:

See "About disk recovery procedures for UNIX and Linux" on page 176.

See "About disk recovery procedures for Windows" on page 187.

Note: When any online catalog backup recovery try that involves media completes, NetBackup changes the state of the media that contains the catalog backup to frozen. This operation prevents a subsequent accidental overwrite action on the final catalog backup image on the media. This final image pertains to the actual catalog backup itself and its recovery is not part of the catalog recovery.

You can unfreeze the media.

Note: You must have root (administrative) privileges to perform these procedures.

You can recover the catalog in either of two ways:

- Recovering the entire catalog.
  See "When recovering the entire catalog from an online backup " on page 200.
  This procedure is the recommended method for recovering the entire catalog. This procedure recovers the NetBackup relational database as well as NetBackup policy files, backup image files, and configuration files.
- Recovering the catalog image file.
  See "About recovering the catalog image file " on page 209.
  This method recovers only the NetBackup policy files, backup image files, and configuration files. Use this method if the NetBackup relational database is valid but NetBackup policy, backup image, or configuration files are lost. The NetBackup relational database can also be recovered separately using the `bprecover -nbdb` command.

See "Recovering relational database files from an online catalog backup " on page 219.

See "Recovering the NetBackup catalog when NetBackup Access Control is configured " on page 223.

When recovering the entire catalog from an online backup

The entire catalog can be recovered by using the **Catalog Recovery** Wizard or the text-based `bprecover -wizard` command.

See "Recovering the entire catalog using the Catalog Recovery Wizard " on page 201.

See "Recovering the entire catalog using bprecover -wizard " on page 207.

Warning: Do not run any client backups before you recover the NetBackup catalog.

Recovering the entire catalog using the Catalog Recovery Wizard

This procedure shows you how to recover the entire catalog using the **Catalog Recovery** Wizard. You must have root (administrative) privileges.

The **Catalog Recovery** Wizard panels that appear when you are performing these procedures are very similar for UNIX, Linux, and Windows platforms. Only the Windows panels are shown in text in the following procedures.

Note: The **Catalog Recovery** Wizard does not work after you perform a change server operation. You must be logged on locally to the master server that being recovered.

Note: During the catalog recovery process, services may be shut down and restarted. If NetBackup is configured as a highly available application (cluster or global cluster), freeze the cluster before starting the recovery process to prevent a failover. Then unfreeze the cluster after the recovery process is complete.

To recover the entire catalog

1. Your configuration may include an Enterprise Media Manager (EMM) server that is separate from the master server. If so, start NetBackup on the EMM server before starting NetBackup on the master server.
2. Start NetBackup by entering the following:

   On UNIX and Linux:

   ```
   /usr/openv/netbackup/bin/bp.start_all
   ```

   On Windows:

   ```
   install_path\NetBackup\bin\bpup
   ```

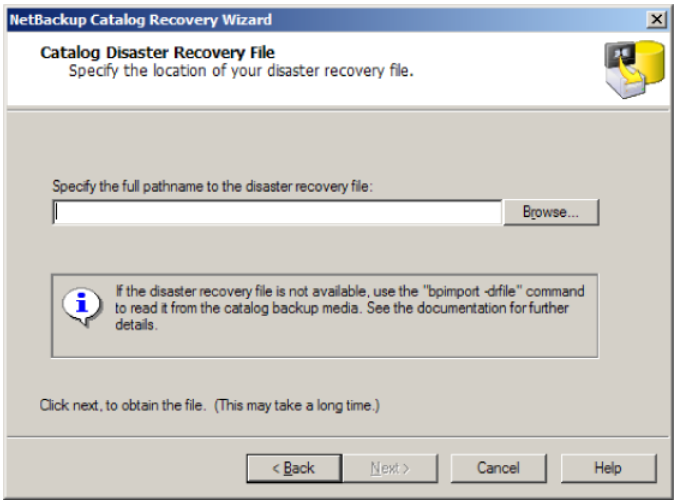
   The **NetBackup Administration Console** appears.
3. If the necessary devices are not already configured, configure them in NetBackup.

4 Make available to NetBackup the media that contains the catalog backup.

5 Click **Recover the Catalogs** on the **NetBackup Administration Console** to start the **Catalog Recovery** Wizard.

The **Welcome** panel appears.

6 Click **Next** on the **Welcome** panel to display the **Catalog Disaster Recovery File** panel.



This wizard relies on the disaster recovery information that is generated during the online catalog backup. Part of the online catalog backup configuration indicates where the disaster recovery information file was to be stored and-or sent.

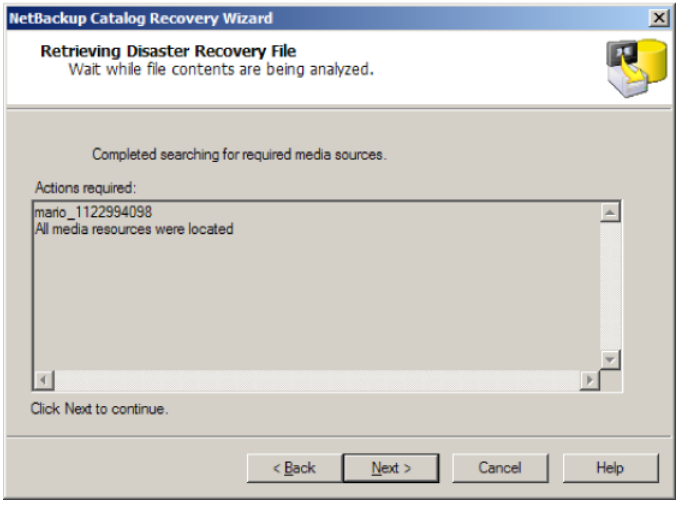
In most cases, you specify the most recent disaster recovery information file available. If some form of corruption has occurred, then you may want to restore to an earlier state of the catalog. If the most recent catalog backup was an incremental backup, use the disaster recovery file from the incremental backup. (There is no need to first restore the full backup and then follow with the incremental backup.)

Indicate where the disaster recovery file is stored by entering the fully qualified path to the disaster recovery file.

More information is available on the email that is sent and the attached disaster recovery file.

See “Recovering the catalog without the disaster recovery file ” on page 225.

7 The wizard waits while NetBackup searches for the necessary media sources. The wizard then informs you if the necessary backup ID of the disaster recovery image is located.

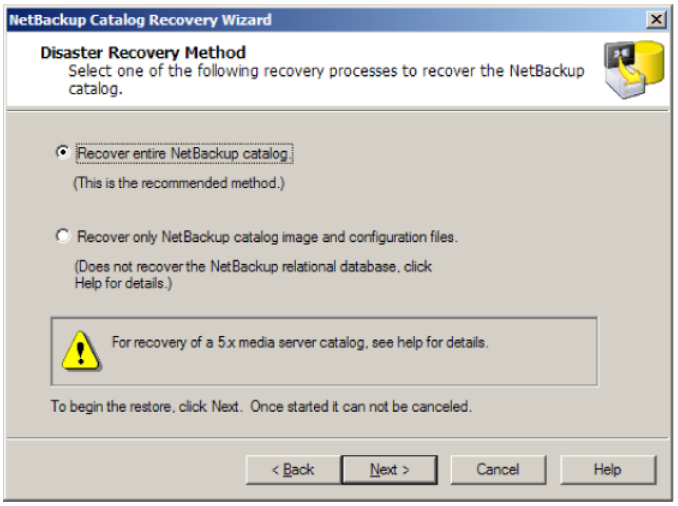


Or, if the media is not located, the wizard lists which media is needed to update the database.

Follow the wizard instructions to insert the media that is indicated and run an inventory to update the NetBackup database. The information that is displayed on this panel depends on whether the recovery is from a full backup or an incremental backup.

If an online catalog backup policy includes both full backups and incremental backups, the disaster recovery email may indicate either a full backup or an incremental backup for recovery. An incremental backup recovery completely recovers the entire catalog because it references information from the last full backup. You don't need to first recover the last full catalog backup, then follow with subsequent incremental backups.

8 When the required media sources are all found, click **Next** to display the **Disaster Recovery Method** panel. The **Recover entire NetBackup catalog** radio option is selected.



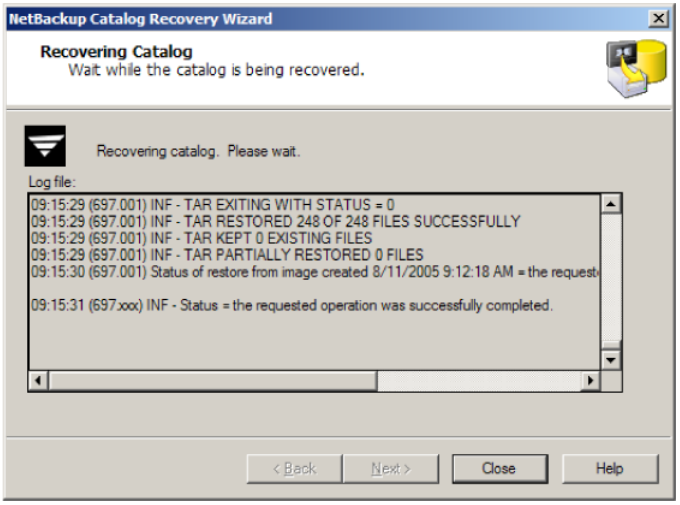
9 With the **Recover entire NetBackup catalog** radio option selected, click **Next** to initiate the recovery of the entire NetBackup catalog.

NetBackup restores the entire NetBackup relational database, which includes the following:

- NBDB database (including the EMM database)
- BMR database (if applicable)
- NetBackup policy files
- Backup image files
- Other configuration files

If the EMM server is located on a remote computer, the NBDB database is recovered on the remote computer.

10 The wizard displays the recovery progress.



If the recovery is not successful, consult the log file messages for an indication of the problem.

11 The final panel announces that the full recovery is complete. Each image file is restored to the proper image directory, and the NetBackup relational databases (NBDB and optionally BMRDB) have been restored and recovered.

If this step is part of a server recovery procedure, complete the remaining steps in the appropriate Server Disk Recovery procedure.

12 NetBackup does not run scheduled backup jobs until NetBackup is stopped and restarted. Before you restart NetBackup, protect the media that contains the backups that were successfully performed after the catalog backup that was used to recover the catalog.

This recovery can include the following:

- Importing the backups from the backup media into the catalog.
- Write protecting the media.
- Ejecting the media and setting it aside.
- Freezing the media.

13 You can manually submit backup jobs before you stop and restart NetBackup. Be aware that if you have not protected the media containing the backups done after the catalog backup, the media may be overwritten.

14 Stop and restart NetBackup on all the servers.

On UNIX and Linux:

```
/usr/openv/netbackup/bin/bp.kill_all
/usr/openv/netbackup/bin/bp.start_all
```

On Windows:

```
install_path\NetBackup\bin\bpdown
install_path\NetBackup\bin\bpup
```

If a remote EMM server is used, start NetBackup on it before you start NetBackup on the master server.

If you have recovered from removable media, that media is now frozen.

To unfreeze, see the following:

See "Unfreezing the online catalog recovery media " on page 233.

Recovering the entire catalog using bprecover -wizard

The `bprecover -wizard` command is an alternate way to recover an entire catalog that is backed up using the online catalog backup method. This method does not require the **NetBackup Administration Console**. You must have root (administrative) privileges to perform this procedure.

Note: You must be logged on locally to the master server that being recovered.

Note: During the catalog recovery process, services may be shut down and restarted. If NetBackup is configured as a highly available application (cluster or global cluster), freeze the cluster before starting the recovery process to prevent a failover. Then unfreeze the cluster after the recovery process is complete.

The steps are the same as those in the following topic:

See "Recovering the entire catalog using the Catalog Recovery Wizard " on page 201.

To recover the entire catalog using bprecover -wizard

1 Start NetBackup by entering the following:

If your configuration includes an Enterprise Media Manager (EMM) server that is separate from the master server, first start NetBackup on the EMM server. Then start NetBackup on the master server.

On UNIX and Linux:

```
/usr/openv/netbackup/bin/bp.start_all
```

On Windows:

```
install_path\NetBackup\bin\bpup
```

2 Run the following command:

```
bprecover -wizard
```

The following is displayed:

```
Welcome to the NetBackup Catalog Recovery Wizard!

Please make sure the devices and media that contain catalog
disaster recovery data are available
Are you ready to continue?(Y/N)
```

3 Enter Y to continue. The following prompt appears:

```
Please specify the full pathname to the catalog disaster
recovery file:
```

4 Enter the fully qualified pathname to the Backup ID file. For example:

```
C:\DR_INFO\HotCatBack_1120078077_FULL
```

The following is displayed:

```
All media resources were located
Do you want to recover the entire NetBackup catalog? (Y/N)
```

5 Enter Y to continue. The following is displayed:

```
Catalog recovery is in progress. Please wait...
Database server restarted, and completed successful recovery of
NBDB on <EMM Server>
Catalog recovery has completed.
Please review the log file C:\Program
Files\VERITAS\NetBackup\Logs
\user_ops\Administrator\logs\Recover1120078220.log for more
information.
```

The image file is restored to the proper image directory and the NetBackup relational databases (NBDB and optionally BMRDB) are restored and recovered.

6 NetBackup does not run scheduled backup jobs until NetBackup is stopped and restarted. Before restarting NetBackup, protect the media that contains the backups that were successfully performed after the catalog backup that was used to recover the catalog.

This procedure can include the following tasks:

- Importing the backups from the backup media into the catalog
- Write protecting the media
- Ejecting the media and setting it aside
- Freezing the media

7 Stop and restart NetBackup.

On UNIX and Linux:

```
/usr/openv/netbackup/bin/bp.kill_all
/usr/openv/netbackup/bin/bp.start_all
```

On Windows:

```
install_path\NetBackup\bin\bpdown
install_path\NetBackup\bin\bpup
```

If a remote EMM server is used, start NetBackup on it before you start NetBackup on the master server.

About recovering the catalog image file

Consider performing this recovery procedure only in the following scenarios:

- The NetBackup relational database is valid, but NetBackup policy, backup image, or configuration files are lost.

- You want to restore part of the NetBackup catalog before you restore the entire catalog. This procedure recovers only the catalog images and configuration files.

The catalog backup images contain information about all the data that has been backed up. This information constitutes the largest part of the NetBackup catalog.

If the backup images are intact but the NetBackup relational database files are not, you can still recover these files.

See "Recovering relational database files from an online catalog backup " on page 219.

The wizard restores whatever catalog images and configuration files are in the backup set identified by the disaster recovery file. If the disaster recovery file is from a full backup, all catalog images and configuration files are restored.

For an incremental backup, the wizard restores only catalog images and configuration the files that were changed since the previous backup. However, all catalog backup image files back to the last full catalog backup are automatically included in an incremental catalog backup. This operation allows for the complete restoration of all backup images by the Backup, Archive, and Restore user interface.

For a catalog that was backed up using the online method of NetBackup catalog image and configuration files, recovery in either of the following ways:

- Use the **Catalog Recovery** Wizard.
  See "Recovering the catalog image files using the Catalog Recovery Wizard " on page 212.
- Use the `bprecover -wizard` command.
  See "Recovering the catalog image file using bprecover -wizard " on page 217.

During a manual recovery, the wizard recovers only NetBackup policy files, NetBackup backup image files, and other NetBackup configuration files. It does not recover the NBDB (includes EMM) or BMR databases.

If the backup from which you recover is an incremental catalog backup and no catalog backup images exist in the catalog, the following occurs: only the NetBackup policy, backup image, and configuration files that are backed up in that incremental backup are restored. However, all of the catalog backup images up to the last full catalog backup are restored. So you can restore the rest of the policy, images, and configuration files from the Backup, Archive and Restore interface. If catalog backup images already exist, all files that were included in the related set of catalog backups are restored. The NBDB (includes EMM) and BMR (if applicable) databases must then be recovered by running the following:

```
bprecover -r -nbdb
```

Table 5-1 is a list of the files that you recover in a manual recovery (an asterisk indicates multiple files within that folder).

Table 5-1 Files you recover when you recover catalog image files

UNIX and Linux	Windows
/usr/openv/netbackup/bp.conf	*install_path*\NetBackup\db*
/usr/openv/netbackup/db/*	*install_path*\NetBackup\vault\sessions*
/usr/openv/netbackup/vault/sessions*	*install_path*\NetBackup\var*
/usr/openv/var/*	*install_path*\Volmgr\database*
/usr/openv/volmgr/database/*	*install_path*\Volmgr\vm.conf
/usr/openv/volmgr/vm.conf	

The following is a list of NetBackup relational database (SQL Anywhere) files that are not recovered in a manual recovery.

```
NBDB.db
NBDB.log
EMM_DATA.db
EMM_INDEX.db
BMRDB.db
BMRDB.log
BMR_DATA.db
BMR_INDEX.db
vxdbms.conf
DARS_DATA.db
DARS_INDEX.db
DBM_DATA.db
DBM_INDEX.db
```

The following is where they reside:

- *install_path*\NetBackupDB\conf\server.conf (Windows only)
- *install_path*\NETBACKUP\DB\conf\databases.conf (Windows only)

You can recover these files.

See "Recovering relational database files from an online catalog backup " on page 219.

Recovering the catalog image files using the Catalog Recovery Wizard

You must have root (administrative) privileges to perform this procedure.

Note: The **Catalog Recovery** Wizard does not work after you perform a change server operation. You must be logged on locally to the master server that being recovered.

To recover the catalog image files using the Catalog Recovery Wizard

1 Start NetBackup by entering the following:

If your configuration includes an EMM server that is separate from the master server, do the following: start NetBackup on the EMM server before starting NetBackup on the master server.

On UNIX and Linux:

```
/usr/openv/netbackup/bin/bp.start_all
```

On Windows:

```
install_path\NetBackup\bin\bpup
```

2 Click **Recover the Catalogs** in the **NetBackup Administration Console** to start the **Catalog Recovery** Wizard.

Warning: Do not run any client backups before you recover the NetBackup catalog.

---

3 This wizard relies on the disaster recovery information that was generated during the online, hot catalog backup. Part of configuring the catalog backup included the indication of where the disaster recovery information was to be stored and sent.

Indicate where the disaster recovery file is stored by entering the fully qualified path to the disaster recovery file.

For example:

```
/net/lex/Cat_DR/CatBk_1119304246_INCR
```

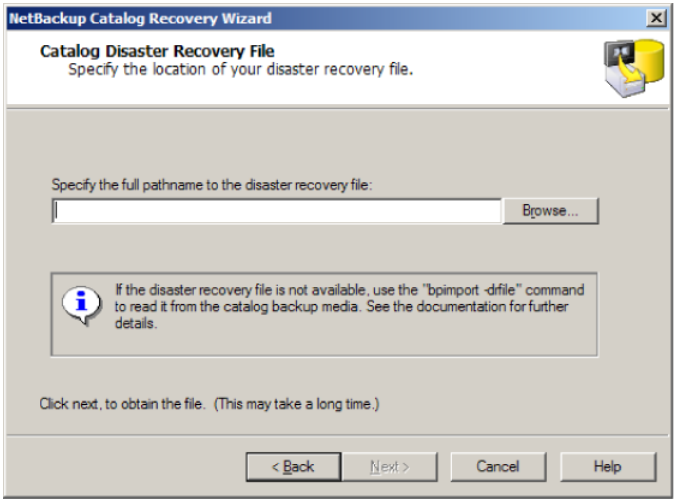
Specify the most recent disaster recovery file available, unless there is a reason to restore from an earlier state.

Note whether the disaster recovery file is based on a full (`*_FULL`) or an incremental (`*_INCR`) catalog backup.

More information is available on the email that is sent and the attached disaster recovery file.

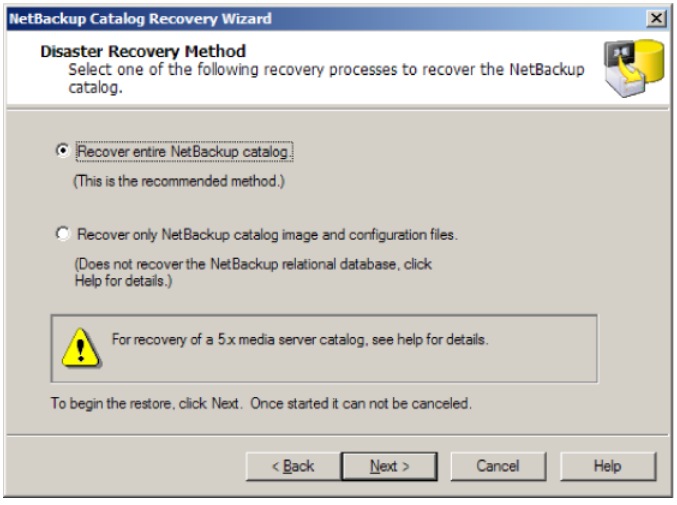
See "Recovering the catalog without the disaster recovery file " on page 225.

4 The wizard waits while NetBackup searches for the necessary media sources, then tells you if the necessary backup ID of the disaster recovery image was located. If the media is not located, the wizard lists which media is needed to update the database.

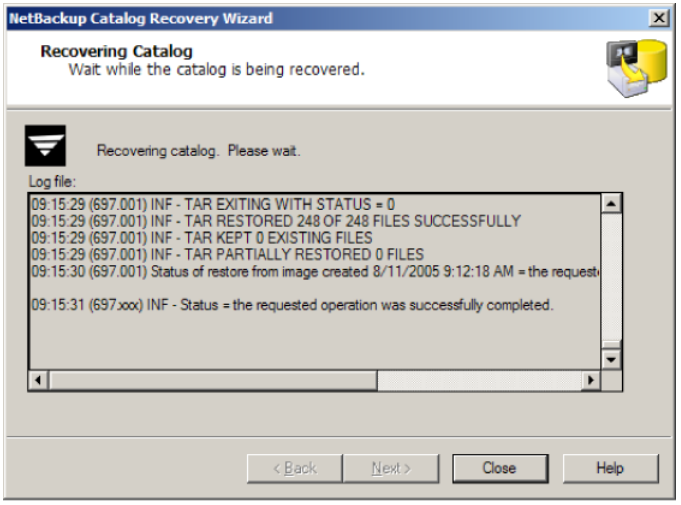


Follow the wizard instructions to insert the indicated media and run an inventory to update the NetBackup database.

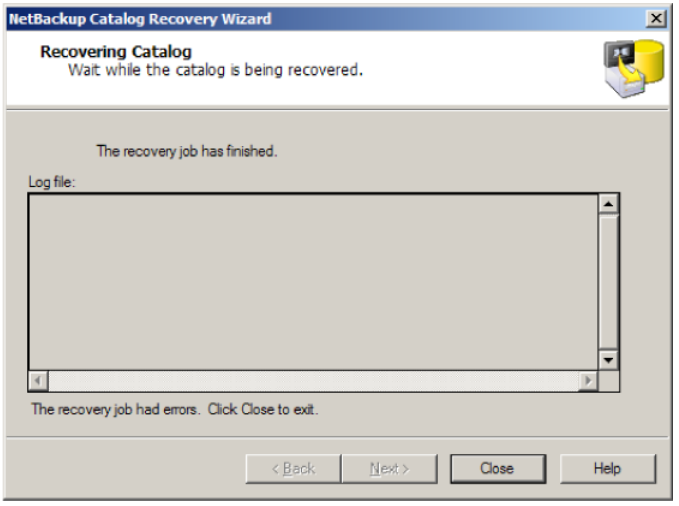
5 Click **Next** to display the **Disaster Recovery Method** dialog. Select the **Recover only NetBackup catalog image and configuration files** radio option and click **Next**.



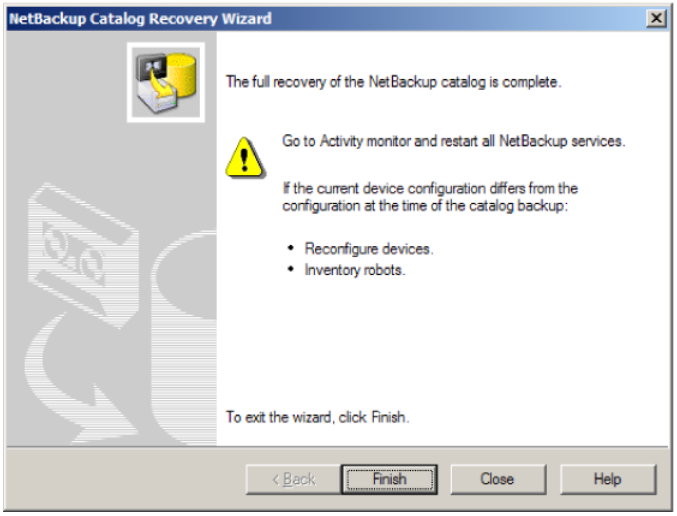
6 The wizard displays the recovery progress and announces when the catalog has been recovered.



If the recovery is not successful, consult the log file messages for an indication of the problem.



7 The final panel indicates that the catalog backup images have been recovered.



You can now recover the NetBackup database if necessary.

8 NetBackup does not run scheduled backup jobs until NetBackup is stopped and restarted. Before restarting NetBackup, protect the media that contains the backups that were successfully performed after the catalog backup that was used to recover the catalog.

Media protection may include the following tasks:

- Importing the backups from the backup media into the catalog
- Write protecting the media
- Ejecting the media and setting it aside

- Freezing the media

9 Stop and restart NetBackup on all the servers.

On UNIX and Linux:

```
/usr/openv/netbackup/bin/bp.kill_all
/usr/openv/netbackup/bin/bp.start_all
```

On Windows:

```
install_path\NetBackup\bin\bpdown
install_path\NetBackup\bin\bpup
```

If a remote EMM server is used, start NetBackup on it before you start NetBackup on the master server.

Recovering the catalog image file using bprecover -wizard

You must have root (administrative) privileges to perform this procedure.

To recover the catalog image file using bprecover -wizard

1 Start NetBackup by entering the following:

If your configuration includes an EMM server separate from the master server, start NetBackup on the EMM server before starting NetBackup on the master server.

On UNIX and Linux:

```
/usr/openv/netbackup/bin/bp.start_all
```

On Windows:

```
install_path\NetBackup\bin\bpup
```

2 Run the following command:

```
bprecover -wizard
```

The following is displayed:

```
Welcome to the NetBackup Catalog Recovery Wizard!
Please make sure the devices and media that contain catalog
disaster recovery data are available
Are you ready to continue?(Y/N)
```

3 Enter Y to continue. The following prompt appears:

```
Please specify the full pathname to the catalog disaster
recovery file:
```

4 Enter the pathname to the Backup ID file. For example:

```
C:\DR_INFO\HotCatBack_1120078077_FULL
```

The following is displayed:

```
All media resources were located
Do you want to recover the entire NetBackup catalog? (Y/N)
```

5 Enter N to continue. The following is displayed:

```
Catalog recovery is in progress. Please wait...
This portion of the catalog recovery has completed.
```

Because this operation is a partial recovery, any remaining portions of the catalog must be restored using Backup, Archive, and Restore.

Please review the following log file for more information

```
C:\Program Files\VERITAS\NetBackup\Logs\user_ops\
Administrator\logs\Recover1123008613.log
```

You can now recover the NetBackup database if necessary.

6 NetBackup does not run scheduled backup jobs until NetBackup is stopped and restarted. Before restarting NetBackup, protect the media that contains the backups that were successfully performed after the catalog backup that was used to recover the catalog.

This media protection may include the following tasks:

- Importing the backups from the backup media into the catalog
- Write protecting the media
- Ejecting the media and setting it aside

- Freezing the media

7 Stop and restart NetBackup on all the servers.

On UNIX and Linux:

```
/usr/openv/netbackup/bin/bp.kill_all
/usr/openv/netbackup/bin/bp.start_all
```

On Windows:

```
install_path\NetBackup\bin\bpdown
install_path\NetBackup\bin\bpup
```

If a remote EMM server is used, start NetBackup on it before you start NetBackup on the master server.

Recovering relational database files from an online catalog backup

If the NetBackup (NBDB) or Bare Metal Restore (BMRDB) relational database files need to be recovered, perform this procedure.

The full procedure is necessary only if the NBDB database has been corrupted. A temporary database must be created to restore from the catalog backup. If the NBDB database is available and the SQL Anywhere server is running, then do only steps 11 and 12. These steps replace the existing database with the copy from the catalog backup.

Note: If your configuration includes a remote EMM server, perform steps 1 through 7 on the EMM server.

To recover relational database files from an online catalog backup

1 If NetBackup is running, stop it.

On UNIX and Linux:

```
/usr/openv/netbackup/bin/bp.kill_all
```

On Windows:

```
install_path\NetBackup\bin\bpdown
```

2 Move the following set of existing database files from their current location to a temporary directory.

NBDB:

```
nbdb.db, nbdb.log, emm_index.db, emm_data.db
```

BMRDB:

```
bmrdb.db, bmrdb.log
```

3 Change databases.conf so SQL Anywhere does not try to automatically start them when the server is started.

On UNIX and Linux:

```
/usr/openv/db/bin/nbdb_admin -auto_start NONE
```

On Windows:

```
install_path\NetBackup\bin\nbdb_admin -auto_start NONE
```

4 Start the SQL Anywhere server.

UNIX and Linux:

```
/usr/openv/netbackup/bin/nbdbms_start_stop start
```

Windows:

```
install_path\NetBackup\bin\bpup -e SQLANYs_VERITAS_NB
```

5 Re-create an empty database.

UNIX and Linux:

```
/usr/openv/db/bin/create_nbdb -drop
```

Windows:

```
install_path\NetBackup\bin\create_nbdb -drop
```

If the database has been moved or the environment is clustered, add `-staging staging_dir` to the end of the `create_nbdb` command line.

If the database has been moved or the environment is clustered, and space constraints force you to create this temporary database in the final location, use the following command:

UNIX and Linux:

```
/usr/openv/db/bin/create_nbdb -drop -data <data_dir> -index \
<index_dir> -tlog <tlog_dir> -staging <staging_dir>
```

Windows:

```
install_path\NetBackup\bin\create_nbdb -drop -data <data_dir>
-index <index_dir> -tlog <tlog_dir> -staging <staging_dir>
```

Where the <data_dir>, <index_dir>, <tlog_dir>, and <staging_dir> values are defined in the vxdbms.conf file as VXDBMS_NB_DATA, VXDBMS_NB_INDEX, VXDBMS_NB_TLOG, and VXDBMS_NB_STAGING.

6 Stop and restart NetBackup.

UNIX and Linux:

```
/usr/openv/netbackup/bin/bp.kill_all
/usr/openv/netbackup/bin/bp.start_all
```

Windows:

```
install_path\NetBackup\bin\bpdown
install_path\NetBackup\bin\bpup
```

7 Run `tpext`:

UNIX and Linux:

```
/usr/openv/volmgr/bin/tpext
```

Windows:

```
install_path\Volmgr\bin\tpext
```

8 If you used the `nbdb_move` command to relocate NetBackup database files, re-create the directories where the files were located when you backed up the catalog. The default location is the following:

UNIX and Linux:

```
/usr/openv/db/data
```

Windows:

```
install_path\NetBackupDB\data
```

9 Start the device manager:

UNIX and Linux:

```
/usr/openv/volmgr/bin/ltid -v
```

Windows: start the device manager service.

10 Configure the necessary recovery device in NetBackup.

11 Make available to NetBackup the media that contains the catalog backup. Inventory the robot or add the media for stand-alone drives.

12 For online catalog recovery, run the following command on the master server:

UNIX and Linux:

```
/usr/openv/netbackup/bin/admincmd/bprecover -r -nbdb
```

Windows: start the device manager service.

```
install_path\NetBackup\bin\admincmd\bprecover -r -nbdb
```

13 Stop and restart NetBackup.

UNIX and Linux:

```
/usr/openv/netbackup/bin/bp.kill_all
/usr/openv/netbackup/bin/bp.start_all
```

Windows:

```
install_path\NetBackup\bin\bpdown
install_path\NetBackup\bin\bpup
```

If a remote EMM server is used, start NetBackup on it before you start NetBackup on the master server.

Recovering the NetBackup catalog when NetBackup Access Control is configured

If you have configured NetBackup Access Control (NBAC), the online, hot catalog backup automatically backs up your authentication information and authorization configuration information.

Both the Operate and Configure permission sets are required on the catalog object to successfully back up and recover NBAC authentication and authorization data.

To recover the NetBackup catalog when NetBackup Access Control is configured

1 Follow the normal NetBackup catalog recovery procedures. Ensure that NetBackup Access Management Control is installed but disabled before you run the actual **Catalog Recovery** Wizard or `bprecover` command. You must have superuser privileges to execute the recovery.

2 Turn off the authentication services and authorization services (Windows) or daemons (UNIX and Linux).

3 Recover the NetBackup catalog from the online catalog backup using the recovery wizard or `bprecover` command. Authentication data and authorization data is not copied back to the hosts from which it was backed up. Instead, it is copied to a staging area for use in step 4.

4 Run `bprecover -r -vxss -p <policy name>` and supply the catalog backup policy name. This action recovers authentication and authorization data from the staging area to the hosts from which it was backed up.

5 Start the authentication and authorization services (Windows) or daemons (UNIX and Linux).

6 To configure NetBackup to use NetBackup Access Management Control, set up the proper **Access Control** host properties for master servers, media servers, and clients.

7 Restart NetBackup.

Recovering the catalog from a nonprimary copy of a catalog backup

By default, the online, hot catalog backup can have multiple copies, and recovery is done from the primary backup copy. The primary copy is the first or the original copy. However, you can recover from a copy other than the primary.

To recover the catalog from a non-primary copy

1 If the copy of the catalog backup is on a medium other than tape, do the following:

BasicDisk	Make sure that the disk that contains the backup is mounted against the correct mount path (as displayed in the disaster recovery file).
Disk pool	For a catalog backup file in a disk pool, do the following: ■ Create the disk storage server for the storage by using the **Storage Server Configuration Wizard**. ■ Create the disk pool for the storage by using the **Disk Pool Configuration Wizard**.

2 Run the following command to synchronize the disaster recovery file to the new disk pool.

```
nbcatsync -sync_dr_file disaster_recovery_file
```

3 Run the following NetBackup command to recover the catalog:

```
bprecover –wizard –copy N
```

N is the number of the copy from which you want to recover.

Recovering the catalog without the disaster recovery file

If the disaster recovery file has been lost, consult the email that was sent to the administrator when the catalog was backed up. The disaster recovery file is written to the location you specify in the catalog backup policy and is appended to the backup stream itself.

To recover the catalog without the disaster recovery file

1. The email identifies the media that contains the disaster recovery file, and the media that was used to back up critical policies. Ensure that this media is available.
2. Follow up the normal catalog recovery steps until the point where the **Catalog Recovery** Wizard or `bprecover` command is called for.
3. Run the following command to retrieve all disaster recovery files from the catalog backup media:

   ```
   bpimport -drfile media_id -drfile_dest fully_qualified_dir_name
   ```

   This command recovers all disaster recovery files from the specified media ID and places them in the specified directory. The ID can be either a tape media ID or the fully qualified location of a disk storage unit.

4 Verify that the correct disaster recovery file is available in the specified directory and that it is available from the NetBackup master server.

5 Continue with the normal catalog recovery procedure by running the **Catalog Recovery** Wizard or `bprecover` command, providing the disaster recovery file location when prompted.

Refer to the email as your primary source for recovery instructions, because they are the most current instructions for recovering your catalog. The instructions are sent when the catalog backup is completed, or when a catalog backup image is duplicated.

Note: If you restore catalog files directly by using `bprestore` on a Solaris system, use the following path: `/opt/openv/netbackup/bin/bprestore`.

The name of the online catalog backup policy is CatalogBackup. The email is written to the following file:

`/storage/DR/CatalogBackup_1123605764_FULL`.

The file name itself indicates if the backup was full or not.

The following is an example of a disaster recovery email:

```
Server
    ant

Date
    Tue Aug 10 11:41:48 2010

Policy
    CatalogBackup

Catalog Backup Status
    the requested operation was successfully completed (status 0).

To ensure that the NetBackup catalog data is protected through Tue
Aug 10 11:41:48 2010, retain a copy of the attached file, and the
media or files listed below:

Catalog Recovery Media
        Media Server                Disk image path
      * ant /storage/DiskUnit1/ant_1123605764_C1_TIR
      * ant /storage/DiskUnit1/ant_1123605764_C1_F1
      * ant /storage/DiskUnit1/ant_1123605713_C1_F1

DR file written to
    /storage/DR/CatalogBackup_1123605764_FULL
```

```
* - Primary Media

Catalog Recovery Procedure for the Loss of an Entire Catalog

Symantec recommends creating a detailed disaster recovery plan
should it become necessary to restore your organization's data in
the event of a disaster.  A checklist of required tasks can be a
tremendous tool in assisting associates in triage.  For example,
after the facility is safe for data to be restored, the power and
data infrastructure need to be verified.  When these tasks are
completed, the following scenarios will help to quickly restore the
NetBackup environment, and in turn, restore applications and data.

Disaster Recovery Procedure using the DR Image File

In the event of a catastrophic failure, use the following procedure
to rebuild the previous NetBackup environment.

Note:  If new hardware is required, make sure that the devices
contain drives capable of reading the media and that the drive
controllers are capable of mounting the drives.

1. Install NetBackup.
2. Configure the devices necessary to read the media listed above.
3. Inventory the media.
4. Make sure master server can access the attached DR image file.
Start NetBackup Recovery Wizard from the NetBackup Administration
   Console. Or, start the wizard from a command line by entering
   bprecover -wizard.

Disaster Recovery Procedure without the DR Image File
NOTE: ONLY ATTEMPT THIS AS A LAST RESORT If you do not have the
attachment included with this email, use the following instructions
to recover your catalog:

1. Install NetBackup.
2. Configure the devices necessary to read the media listed above.
3. Inventory the media.
4. Run: bpimport -create_db_info [-srvr name] -id /storage/DiskUnit1
5. Go to the following directory to find the DR image file
   CatalogBackup_1123605764_FULL:
   /usr/openv/netbackup/db/images/ant/1123000000/tmp
```

```
6. Delete the other files in the directory.
7. Open CatalogBackup_1123605764_FULL file and find the BACKUP_ID
    (for example: ant_1123605764).
8. Run: bpimport [-server name] -backupid ant_1123605764
9. Run: bprestore -T -w [-L progress_log] -C ant -t 35 -p
          CatalogBackup -X -s 1123605764 -e 1123605764 /
10. Run the BAR user interface to restore remaining image database
    if the DR image is a result of an incremental backup.
11. To recover the NetBackup relational database, run:
       bprecover -r -nbdb
12. Stop and Start NetBackup
13. Configure the devices if any device has changed since the last
    backup.
14. To make sure the volume information is updated, inventory
the media to update the NetBackup database.
```

Recovering the user-directed online catalog from the CLI

This procedure recovers the catalog manually through the command line interface (CLI) without a Phase 1 import when the disaster recovery (DR) file is available. You must have root (administrative) privileges to perform this procedure.

Note: Use this procedure only if you want to restore the minimal NetBackup catalog information that lets you begin to recover critical data.

To recover the user-directed online catalog from the command line interface

1. Verify the location of the disaster recovery files that are created from Full and Incremental Hot Catalog backups. These files can be stored in a specified path of the file system on the master server and in email attachments to the NetBackup administrator.
2. Set up each master server and media server in the same configuration as the configuration that is used during the last catalog backup. The master server and media servers have the following same properties as the backed up catalog configuration: name, NetBackup version, operating system patch level, and path to storage devices.

   Configure any devices and volumes you may need for the recovery.

3 Locate the latest DR image file corresponding to the backup that are used for recovery. Open the file in an editor and find values for the following:

`master_server`	Use the exact name that is specified in NetBackup configuration for the master server .
`media_server`	The location of the robot or disk storage unit that is used for catalog backup.
`timestamp`	The four most significant digits in the DR file name and six zeroes attached.
`media`	The location of the catalog backup media as specified by the disaster recovery file under the FRAGMENT keyword.
`backup_id`	Found in the DR file under BACKUP_ID.

Example:

file: Hot_Backup_1122502016_INCR

timestamp: 1122000000

4 Create the DR recovery directory on the master server.

UNIX and Linux:

`/usr/openv/netbackup/db/images/`*`master_server`*`/`*`timestamp`*`/tmp`

Windows:

`C:\Program Files\VERITAS\NetBackup\db\images\`*`master_server`*
`\`*`timestamp`*`\tmp`

Copy the DR file to the newly created directory.

5 Edit the DR file in `netbackup/db/images/`*`master_server`*`/`*`timestamp`*`/tmp` as follows:

- Change the value of IMAGE_TYPE to 1.
- Change the value of TIR_INFO to 0.
- Change the value of NUM_DR_MEDIAS to 0.
- Remove ALL lines containing DR_MEDIA_REC.

6 If your catalog recover media is on tape, run the `vmquery` command to assign the media to the media server.

```
vmquery -assigntohost media timestamp master_server
```

Example:

```
vmquery -assigntohost DL005L 1122000000 klingon
```

7 To recover the catalog .f file from the hot catalog backup, run a Phase II import on the media that is specified by the disaster recovery file .

```
bpimport -server master_server -backupid backup_id
```

8 If your catalog backup was incremental, recover all the other catalog backup images up to and including the most recent Full Catalog backup.

- Open the Backup, Archive, and Restore client interface for NetBackup. Select NBU-Catalog as the policy type. Set the source clients and destination clients to your master server.
- Search the backups and restore all files that are located in the following directory:

  ```
  install_path/netbackup/db/images/master_server
  ```

- Verify that all files are restored successfully on the master server.

9 Restore your critical data by using the Backup, Archive, and Restore client interface or the command line.

- Restore the catalog backup images for each media server which requires data recovery.
- To restore the backup images, select NBU-Catalog as the policy type. Source and destination clients should be your master server. Refresh your view in the BAR GUI. Traverse the file system for the master server to the following:

  ```
  install_path/netbackup/db/images
  ```

  Restore the images for each configured media server. Verify that your images are present by searching for them in the catalog.

10 Recover backup data from each media server in the previous step. Change the Policy Type, Source, and Destination client to match the client that is used to back up the desired data. Select the desired files from the Backup, Archive, and Restore client interface and restore them.

11 To recover the NetBackup relational database, run the following:

```
bprecover -r -nbdb
```

This command restores NetBackup media usage information, ensure that media containing backups are not overwritten, and restore the storage unit configuration.

You cannot recover the NetBackup relational database to a configuration that is not identical to the configuration on which the catalog was backed up. Instead, you must import each piece of backup media.

12 If your catalog recovery media is on tape, freeze the media that contains the catalog backup that is used for recovery. This action protects the media from being reused:

```
bpmedia -freeze -m media -h master_server
```

Run `bpmedialist` to verify that the media is frozen.

13 Recover your policies and configuration data on each master server and media server.

Before recovering NetBackup policy files, ensure that you have recovered all of your critical data, or protected the media that contains your critical data. When policy information is recovered, NetBackup starts to run the scheduled jobs that may overwrite the media that was written after the last catalog backup.

Open the Backup, Archive, and Restore client interface for NetBackup and select NBU-Catalog as the policy type.

For each server to be restored, set the source clients and destination clients to your server, starting with the master server.

Restore all files that are backed up by the hot catalog backup on each server.

14 Stop and restart the NetBackup services.

Restoring files from an online catalog backup

Because the online catalog backup uses the standard backup format, you may recover specific files using the NetBackup Backup, Archive, and Restore user interface. Restoring catalog files directly to their original location may cause inconsistencies in the NetBackup catalog or cause NetBackup to fail. Instead, you should restore catalog files to an alternate location.

To restore files from an online catalog backup

1. From the **Specify NetBackup Machines and Policy Type** menu, select the **NBU-Catalog** policy type.
2. Specify the master server as the source client for the restore.
3. Select the catalog files to restore.

Unfreezing the online catalog recovery media

This procedure shows how to unfreeze your online catalog recovery media.

To unfreeze the online catalog recovery media

1. On the master server, go to the image database. In the master server's portion of the image catalog, locate the catalog backup image file from which the recovery was done.
   - Identify the associated catalog backup parent image file by viewing the PARENT_IMAGE_ID value.
   - Identify the media that the catalog backup was written to by viewing the second to last field in the DR_MEDIA_REC line(s).
   - Save the catalog backup parent image file that was identified in the first substep.
   - Relocate or remove all other image files that relate to the catalog backup policy.
2. If the NetBackup configuration includes a remote EMM server, on the master server, go to the image database for the remote EMM server. Relocate or remove any images that relate to the catalog backup policy.
3. On the master server, for each media that is identified in step 1b, run the following command:

   ```
   bpimport -create_db_info -server server_name -id media_id
   ```

4. On the master server, run the following command:

   ```
   bpimport
   ```

5. On the master server, for each media that is identified in step 1b, run the following command:

   ```
   bpmedia -unfreeze -m media_id -h server_name
   ```

Appendix A

Backup and restore functional overview

This appendix includes the following topics:

About backup and restore functional overview

This appendix provides a functional overview of NetBackup backup and restore operations for both UNIX and Windows. The discussions include descriptions of important services or daemons and programs, and the sequence in which they execute during backup and restore operations. The databases and the directory structure of the installed software are also described.

Note that this appendix does not describe the NetBackup products for backing up relational databases (such as NetBackup for ORACLE). The guides for those products have information regarding their operation.

Backup and restore startup process

When the NetBackup master server starts up, a script automatically starts all services, daemons, and programs that are required by NetBackup. (The start-up commands that are used by the script vary according to the platform.)

The same is true on a media server. NetBackup automatically starts additional programs as required, including robotic daemons. For more information, see the following topic:

Information is available on SAN client and Fibre Transport startup processes.

See the *NetBackup Shared Storage Guide*.

Note: No daemons or programs need to be explicitly started. The necessary programs are started automatically during the backup or restore operation.

A daemon that executes on all servers and clients is the NetBackup client daemon, `bpcd`. On UNIX clients, `inetd` starts `bpcd` automatically so no special actions are required. On Windows clients, `bpinetd` performs the same functions as `inetd`. Netware clients do not use `inetd` or `bpinetd` but are configured to start the `bpcd` NLM (`bpcd.nlm`) automatically. An NLM is similar to a service; NLM stands for NetWare Loadable Module.

Note that all NetBackup processes can be started manually by running the following:

```
/usr/openv/netbackup/bin/bp.start_all
```

Backup and archive processes

The backup processes and archive processes vary depending on the type of client. The following explains the variations and describes the synthetic backup process. A description is included about how NetBackup operates when backing up its catalogs.

Job scheduling

The scheduler process `bpsched` consists of the following services:

- The `nbpem` service (Policy Execution Manager) does the following: creates policy/client tasks and determines when jobs are due to run. It starts the job and upon job completion, determines when the next job should run for the policy-client combination.

- The nbjm service (Job Manager) accepts requests from nbpem to run backup jobs, or to run media jobs from commands such as bplabel and tpreq. nbjm acquires resources for each job, such as storage unit, drives, media, and client and policy resources, and executes the job.
- The nbrb service (Resource Broker) allocates resources in response to requests from nbjm. nbrb acquires physical resources from nbemm (the Enterprise Media Manager service). It also manages logical resources such as multiplex groups, maximum jobs per client, and maximum jobs per policy. nbrb is also responsible for initiating drive unloads and manages pending request queues.

EMM server and master server

The NetBackup master server and the Enterprise Media Manager (EMM) server can be on the same physical host or on different hosts.

The master server is responsible for running jobs as configured in NetBackup policies. The nbpem and nbjm services run only on the master server.

The EMM server allocates resources for one or more master servers. The EMM server is the repository for all device configuration information. The nbemm service and the nbrb service run only on the EMM server. The nbemm service centralizes resource selection and maintains devices, media, and storage units in a relational database.

Backups and archives - UNIX clients

For UNIX clients, NetBackup supports scheduled, immediate manual, and user-directed backups of both files and raw partitions. User-directed archives of files are also supported (you cannot archive raw partitions). When the operations start, they are all similar to the extent that the same daemons and programs execute on the server.

Each type of backup is started differently as follows:

- Scheduled backups begin when the nbpem service detects that a job is due. nbpem checks the policy configurations for the scheduled client backups that are due.
- Immediate manual backups begin if the administrator chooses this option in the NetBackup Administration Console or runs the bpbackup command with the –i option. This action causes bprd to contact nbpem, which then processes the policy, client, and schedule that are selected by the administrator.
- User-directed backups or archives begin when a user on a client starts a backup or archive through the user interface on the client. The user can also enter

the `bpbackup` or `bparchive` commands on the command line. This action invokes the client's `bpbackup` or `bparchive` program, which sends a request to the request daemon `bprd` on the master server. When `bprd` receives the user request, it contacts `nbpem`, which checks the policy configurations for schedules. By default `nbpem` chooses the first user-directed schedule that it finds in a policy that includes the requesting client.

For user-directed backups or archives, it is also possible to specify a policy and schedule. A description is available of the UNIX `BPBACKUP_POLICY` and `BPBACKUP_SCHED` options in bp.conf and the Windows equivalents.

See the *NetBackup Administrator's Guide, Volume I I.*

Backup process

This topic uses a diagram and a table to describe each step of a backup process. PBX (not shown in the diagram) must be running for NetBackup to operate.

See "Resolving PBX problems" on page 75.

Figure A-1 illustrates the various operations that comprise the backup process.

Figure A-1 Backup or archive to tape or disk

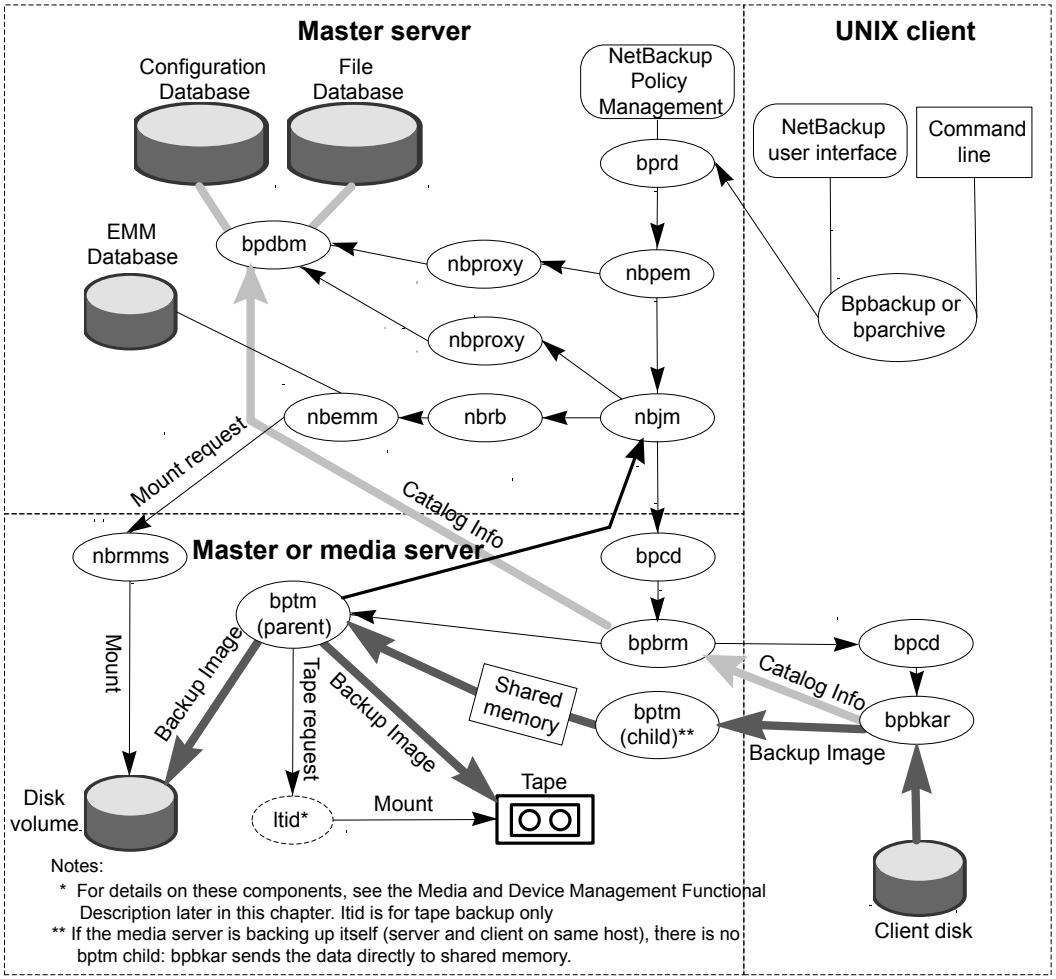


Table A-1 shows the sequence of operation of a backup process.

Table A-1 Backup to tape or disk sequence of operation

Agent	Action
Start-up script	Launches `bprd` on the master server and `ltid` on the master server and all media servers. All other daemons and programs are started as necessary including `nbpem`, `nbjm`, `nbrb`, and `nbemm`.

Table A-1 Backup to tape or disk sequence of operation *(continued)*

Agent	Action
Policy execution manager service (nbpem)	Gets the policy list from bpdbm. Creates a policy-client task for all policy-client combinations specified in the policy list. Computes the due time for each policy-client task (policy priority is honored for internal processing). Submits to nbjm all jobs as policy-client tasks become due. When a job finishes, it recomputes the due time of that policy-client task.
Job manager service (nbjm)	Issues a single request (with a request ID) to `nbrb`, for all resources that are required by a job. `nbrb` gets the storage unit, tape drive, and media id information from `nbemm` and allocates client and policy resources. `nbrb` returns to `nbjm` an allocation sequence that contains one allocation for each resource (each allocation contains a unique ID). `nbrb` also returns allocation data for the specific resource type. `nbrb` also returns the request ID along with the allocations so that `nbjm` can correlate the response with the right request (and job). Note that `nbrb` allocates all resources that are included in a request. If the resources are temporarily unavailable the request is queued in `nbrb`. If the resource cannot be allocated, `nbrb` fails the request. `nbjm` starts the backup by using the client daemon `bpcd` to start the backup and restore manager `bpbrm`. For normal backup (not snapshots), `nbjm` starts `bpbrm` on the media server, which may or may not be the same system as the master server.
Backup and restore manager (bpbrm)	Starts `bptm`. Starts the actual backup (or archive) by using the client daemon `bpcd` to start the backup program and archive program `bpbkar` on the client.

Table A-1 Backup to tape or disk sequence of operation *(continued)*

Agent	Action
Backup and archive manager (bpbkar)	Sends the information about files within the image to `bpbrm`, which directs the file information to the NetBackup file database. The information is sent by means of `bpdbm` on the master server. Transmits the backup image to `bptm` depending on one of the following: whether the media server backs up itself (`bptm` and `bpbkar` are on the same host) or back ups a client that resides on a different host. If the media server backs up itself, `bpbkar` stores the image block-by-block in shared memory on the media server. If the media server backs up a client on a different host, the `bptm` process on the server creates a child process of itself. The child receives the image from the client by means of socket communications and then stores the image block-by-block in shared memory on the server. Use the NOSHM file to force a media server that backs up itself to do the following: create a child process and use socket communications, as though the client is on a different host. More information on the NOSHM file is available. See the *NetBackup Backup Planning and Performance Tuning Guide*.

Table A-1 Backup to tape or disk sequence of operation *(continued)*

Agent	Action
backup manager for tape (bptm) or disk (bpdm)	The bptm process or bpdm process on the server takes the image from shared memory and directs it to the storage media. If the storage media is tape, bptm requests information for the first media and drive to use, by exchanging information with nbjm. bptm sends mount requests for specific media and drives to the NetBackup Device Manager (ltid). This action causes the media to be mounted on the appropriate devices. If, during the backup, a tape span is required, bptm again exchanges information with nbjm to release the correct tape and to get another one. nbjm exchanges information with nbrb to accomplish this function. For AdvancedDisk and OpenStorage, bptm requests the volume from nbjm. nbjm then passes the request to nbemm to choose the volume server and media server to use. nbemm calls nbrmms on the media server that was chosen to mount the volume. If, during the backup, a tape span is required, bptm again exchanges information with nbjm to release the correct tape and to get another one. nbjm exchanges information with nbrb to accomplish this function. For BasicDisk, bpdm writes the images to the path that is configured in the disk storage unit. The system disk manager controls the actual writing of data. In the case of an archive, bpbrm deletes the files from the client disk after the files are successfully backed up.
Job manager service (nbjm)	Receives the completion status of the job from bpbrm. Releases the resources to nbrb and returns the status to nbpem.

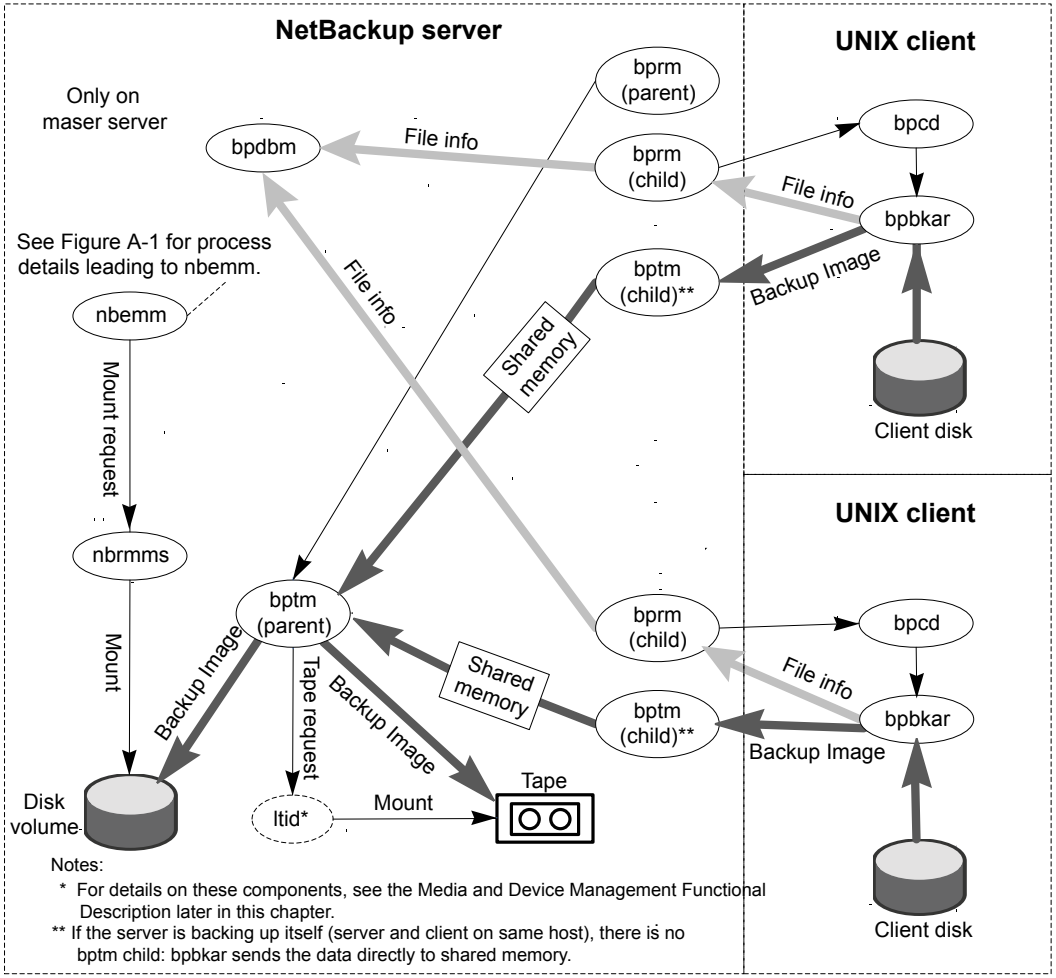
Backup with multiple data streams

For multiplexed backups, the process is essentially the same. An exception is that a separate bpbrm process and bptm process is created for each backup image being multiplexed onto the media. NetBackup also allocates a separate set of shared memory blocks for each image.

The other client and server processes are the same as shown in Figure A-1.

Figure A-2 shows multiplexed images from two clients.

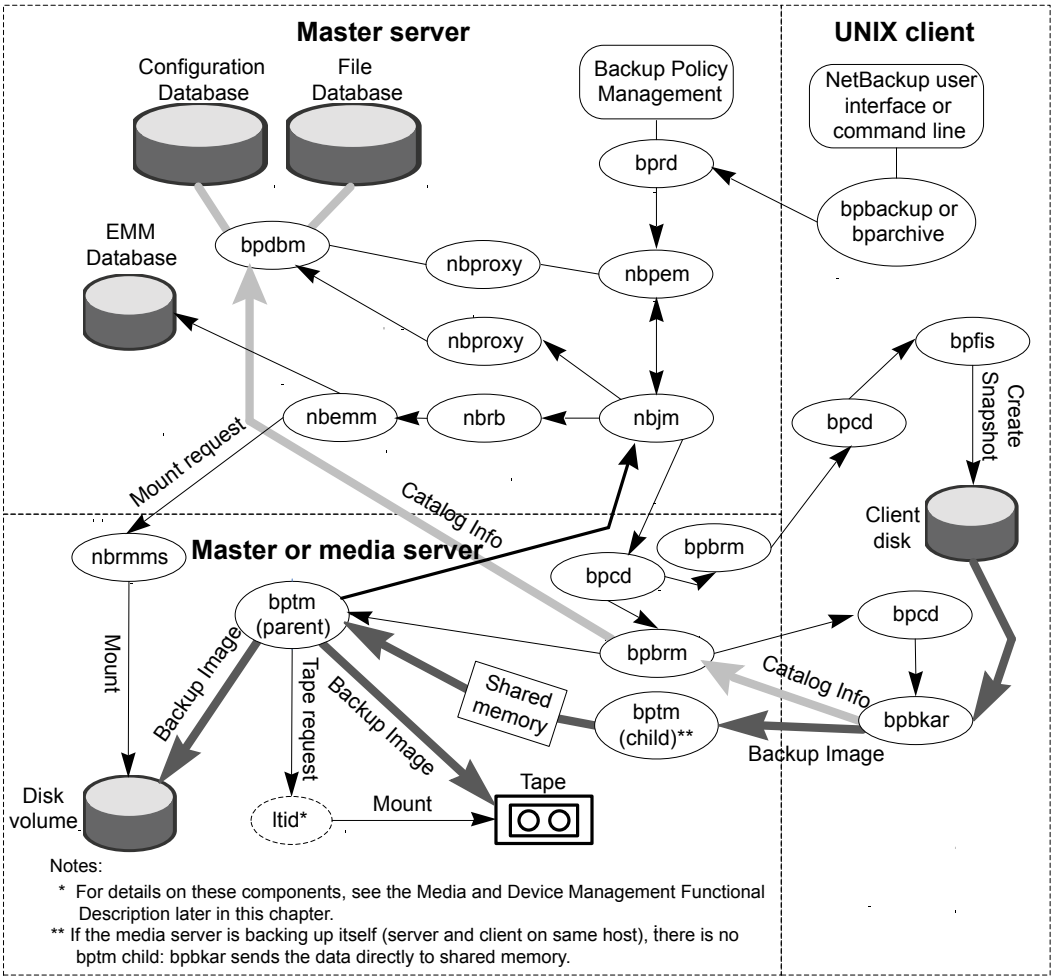
Figure A-2 Multiplexed backups example (two streams)



Snapshot backup and Windows open file backups

Figure A-3 shows the overall snapshot backup process. PBX (not shown in the diagram) must be running for NetBackup to operate.

Figure A-3 Snapshot backup and Windows open file backup using multiple data streams



A separate parent job creates all snapshots followed by a child job that backs up the snapshot. An exception is when Windows opens file backups that do not use multiple data streams.

The following sequence of operation is for snapshot creation and backup that includes Windows open file backups that employ multiple data streams:

- The NetBackup master server or primary client initiates the backup. This action causes the NetBackup request daemon `bprd` to submit a backup request

to the Policy Execution Manager nbpem. nbpem processes the policy configurations.

- nbpem (through nbjm) starts a parent job to create the snapshot. This job is separate from the job that backs up the snapshot.
- nbjm starts an instance of bpbrm through bpcd on the media server, and bpbrm starts bpfis through bpcd on the client.
- bpfis creates a snapshot of the client's data by means of a snapshot method.
- When bpfis is finished, it sends snapshot information and completion status to bpbrm and exits. bpbrm, in turn, reports the snapshot information and status to nbjm and exits. nbjm relays the information and status to nbpem.
- nbpem submits a child job for the backup to nbjm, with a file list derived from the snapshot information. nbjm starts bpbrm to back up the snapshot.
- bpbrm starts bpbkar on the client. bpbkar sends the file catalog information to bpbrm, which relays it to the NetBackup file database bpdbm on the master server.
- bpbrm starts the process bptm (parent) on the media server.
- The next step depends on whether the media server backs up itself (bptm and bpbkar are on the same host) or the media server backs up a client that resides on a different host. If the media server backs up itself, bpbkar stores the snapshot-based image block by block in shared memory on the media server. If the media server backs up a client that resides on a different host, bptm on the server creates a child process of itself. The child receives the snapshot-based image from the client by means of socket communications and then stores the image block-by-block in shared memory.
- The original bptm process then takes the backup image from shared memory and sends it to the storage device (disk or tape).
  Information is available on how the tape request is issued.
  See "Media and device management process" on page 289.
- bptm sends backup completion status to bpbrm, which passes it to nbjm.
- When nbpem receives backup completion status from nbjm, nbpem tells nbjm to delete the snapshot. nbjm starts a new instance of bpbrm on the media server, and bpbrm starts a new instance of bpfis on the client. bpfis deletes the snapshot on the client, unless the snapshot is of the Instant Recovery type, in which case it is not automatically deleted. bpfis and bpbrm report their status and exit.
  For more information on snapshot backups involving Snapshot Client, refer to the following:

See the *NetBackup Snapshot Client Administrator's Guide*.
Note that Windows open file backups do not require Snapshot Client.

SAN client

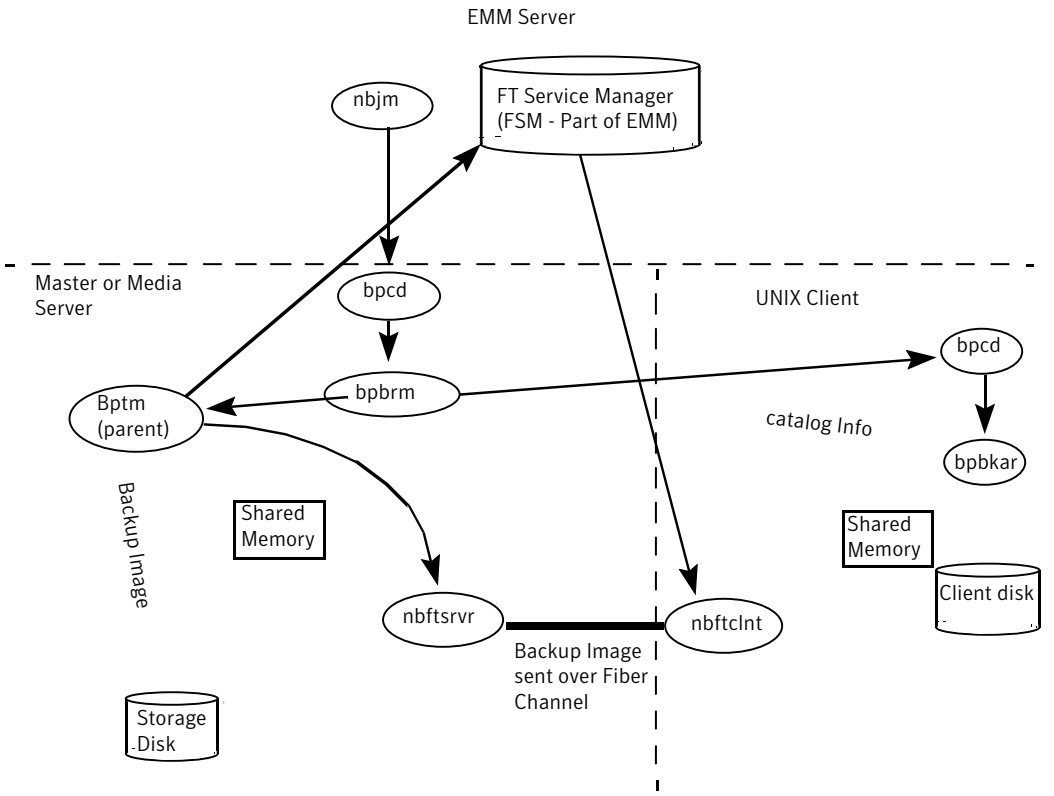
For backups to disk, the SAN Client feature provides high speed data movement between NetBackup media servers and NetBackup SAN-attached clients. SAN-attached clients send backup data to the media server by means of fibre channel connections.

As part of SAN Client, the FT Service Manager (FSM) is a domain layer service that resides on the EMM server. The FSM provides discovery, configuration, and event monitoring of SAN Client resources. The FSM collects fibre channel information from the client and from the media server; FSM then populates the EMM database with the information. (FSM runs in the same process as EMM.) FSM interacts with the nbftclnt process on NetBackup clients and with the nbftsrvr process on media servers.

The initial stages of a backup are the same as shown in Figure A-1

Figure A-4 shows the server and client components that are unique to SAN client backup over Fibre Channel.

Figure A-4 SAN client backup over Fibre Transport



The process flow for a SAN Client backup is as follows (in the order presented):

- A start-up script launches `bprd` on the master server and `ltid` on the master server and all media servers.
  All other daemons and programs are started as necessary including `nbpem`, `nbjm`, `nbrb`, and `nbemm`.
- The policy execution manager service (nbpem) does the following:
  - Gets the policy list from bpdbm.
  - Builds a work list of all scheduled jobs.
  - Computes the due time for each job.
  - Sorts the work list in order of due time.
  - Submits to nbjm all jobs that are currently due.
  - Sets a wakeup timer for the next due job.

- When the job finishes, re-computes the due time of the next job and submits to nbjm all jobs that are currently due.

- The job manager service (nbjm) requests backup resources from the resource broker (nbrb). nbrb returns information on the use of shared memory for SAN Client.
- nbjm starts the backup by means of the client daemon bpcd, which starts the backup and restore manager bpbrm.
- bpbrm starts bptm. bptm does the following:
  - Requests SAN Client information from nbjm.
  - Sends a backup request to the FT server process (nbftsrvr).
  - Sends a backup request to the FT Client process on the client (nbftclnt). nbftclnt opens a fibre channel connection to nbftsrvr on the media server, allocates shared memory, and writes shared memory information to the backup ID file.
- bpbrm starts bpbkar by means of bpcd. bpbkar does the following:
  - Reads the shared memory information from the BID file (waits for the file to exist and become valid).
  - Sends the information about files in the image to bpbrm.
  - Writes the file data to tar, optionally compresses it, and writes the data to the shared buffer.
  - When the buffer is full or the job is done, sets buffer flag.
- The FT Client process nbftclnt waits for the shared memory buffer flag to be set. nbftclnt then transfers the image data to the FT Server (nbftsrvr) shared memory buffer, and clears the buffer flag.
- nbftsrvr waits for data from nbftclnt; the data is written to the shared memory buffer. When the transfer completes, nbftsrvr sets the buffer flag.
- bptm waits for the shared memory buffer flag to be set, writes data from the buffer to the storage device, and clears the buffer flag.
- At the end of the job:
  - bpbkar informs bpbrm and bptm that the job is complete.
  - bptm sends bpbrm the final status of the data write.
  - bptm directs nbftclnt to close the fibre channel connection.
  - nbftclnt closes the fibre channel connection and deletes the BID file.

Backups and archives - Windows

NetBackup supports the same types of operations on Windows clients as it does on UNIX clients.

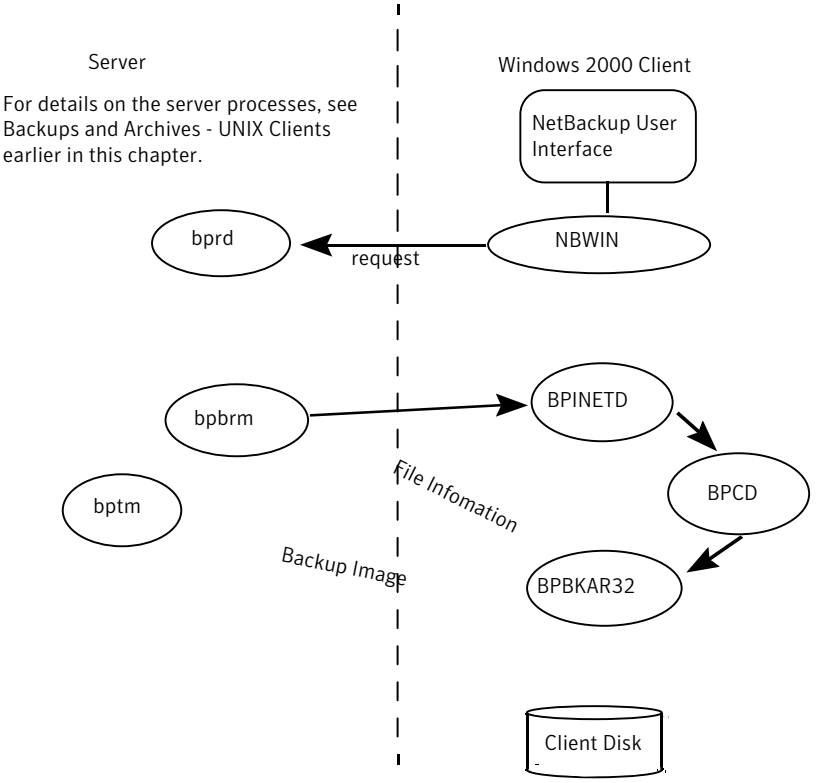
Figure A-5 shows the Windows client processes.

In this figure, the following items applies:

- NBWIN is the user interface program on the client. The bpbackup function and the bparchive function are merged into NBWIN.
- BPINETD serves the same purpose as inetd on UNIX clients.
- The NetBackup client daemon is called BPCD.
- BPBKAR32 serves the same purpose as bpbkar on UNIX clients.

The server processes are the same as described for UNIX.

Figure A-5 Backup and archive - Windows clients



Backups and archives - NetWare clients

NetBackup supports the same types of operations on NetWare clients as it does on UNIX clients, with the following exceptions:

- Raw partition backups are not supported.
- NetBackup for NetWare does not support archiving.

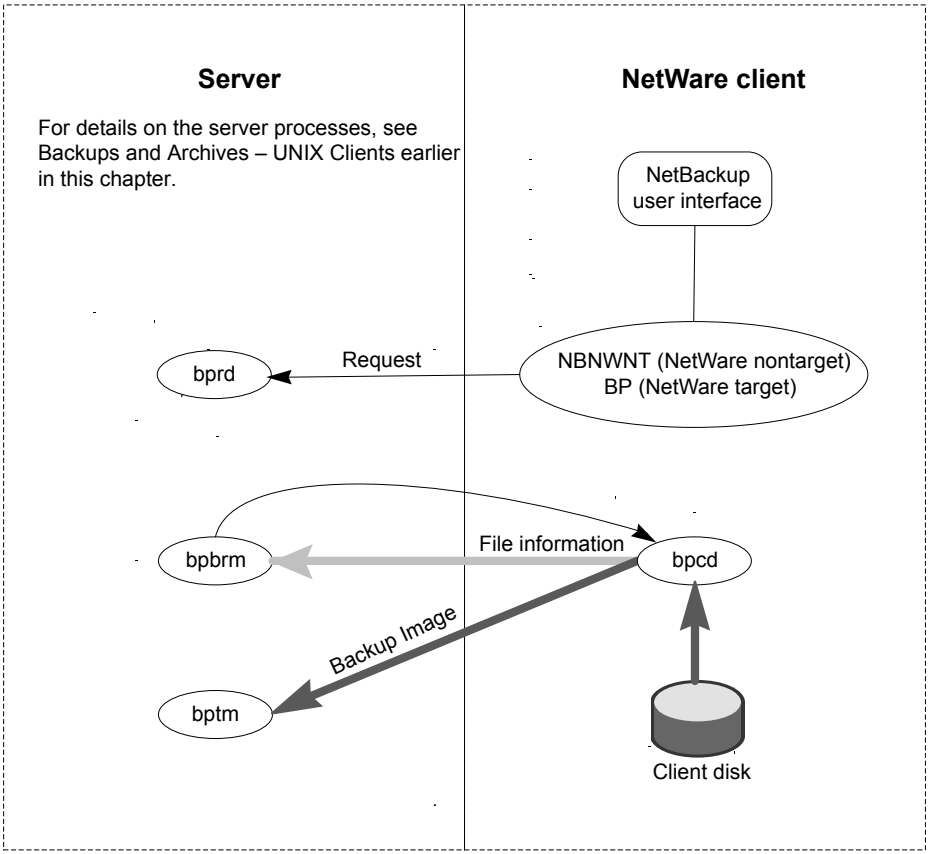
Figure A-6 shows the NetWare client processes.

In this figure, the following item applies:

- For NetWare nontarget operations, the Windows-based user interface program is called `NBNWNT`. For NetWare target operations, the user interface program is called `BP.NLM` on the Netware console. The bpbackup, bparchive, and bplist functions are merged into the user interface programs on the clients.
- The NetBackup NetWare client daemon is called `BPCD`. The `bpbkar` functions are merged into `BPCD`.

The server processes are the same as described for UNIX.

Figure A-6 Backup and archive -- NetWare clients



Synthetic backups

The typical NetBackup backup process accesses the client to create a backup. A synthetic backup is a backup image created without using the client. Instead, a synthetic backup process creates a full or a cumulative incremental image by using only previously created backup images, called component images.

Note: Synthetic archives do not exist.

For example, an existing full image and subsequent differential incremental images may be synthesized to create a new full image. The previous full image and the incrementals are the component images. The new synthetic full image behaves like a backup that is created through the traditional process. The new

synthetic full image is a backup of the client that is as current as the last incremental. The synthetic image is created by copying the most current version of each file from the most recent component image that contain the file. A synthetic backup must be created in a policy with the True Image Restore with Move Detection option selected. This option enables the synthetic backup to exclude the files that have been deleted from the client file system from appearing in the synthetic backup.

Like a traditional backup, `nbpem` typically initiates a synthetic backup. `nbpem` submits a request to `nbjm` to start the synthetic backup job. `nbjm` starts `bpsynth`. `bpsynth` executes on the master server. It controls the creation of the synthetic backup image and the reading of the files that are needed from the component images. If directory `bpsynth` exists in the debug log directory, additional debug log messages are written to a log file in that directory.

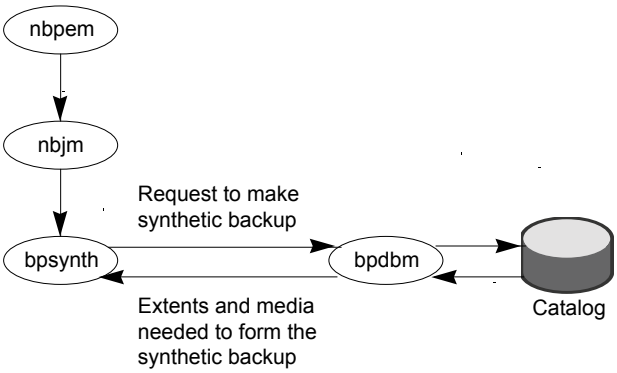
`bpsynth` makes a synthetic image in several phases:

Phase 1 - Prepare catalog information and extents

In phase 1, `bpsynth` makes a synthetic backup request to the database manager, `bpdbm`. `bpdbm` uses the entries and the TIR information from the catalogs of the component images to build the catalog for the new synthetic image. It also builds the extents to be copied from the component images to the synthetic image. Bpdbm returns the list of extents to bpsynth. (An extent is the starting block number and the number of contiguous blocks within a specific component image.) A set of extents must usually be copied from each component image onto the new synthetic image.

Figure A-7 shows how phase 1 operates.

Figure A-7 Synthetic backup -- preparation phase



Phase 2 - Obtain resources

In phase 2, bpsynth obtains write resources (storage unit, drive, and media) for the new image. It also reserves all the read media containing component images and obtains the drive for the first media to be read.

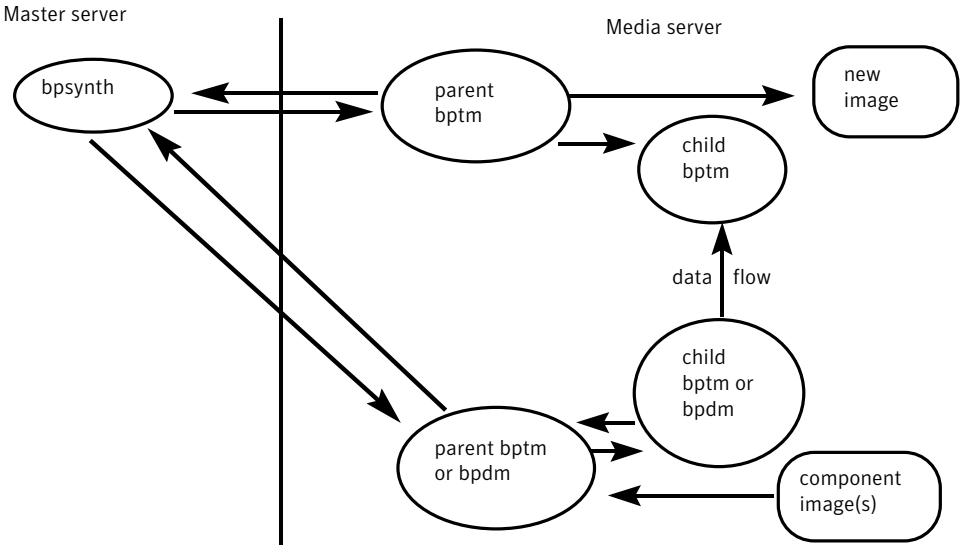
When the component images reside on BasicDisk or NearStore, no resource reservation is done.

Phase 3 - Copy data

In phase 3, `bpsynth` starts the writer `bptm` (for tape and disk) on the media server to write the new synthetic image. `bpsynth` starts a reader `bptm` (tape) or `bpdm` (disk) process for each component image on a media server that can access the component image. The reader process reads all extents for the component image.

Figure A-8 illustrates how phase 3 operates.

Figure A-8 Synthetic backup -- copy data phase



Note that `bpsynth` only starts the parent `bptm` (writer) and `bpdm` (reader) process on the media server. The parent in turn starts a child process. The parent and child communicate by means of buffers in shared memory.

The `bpsynth` process sends the extents (starting block and count) for each component image to the corresponding child `bptm` or `bpdm` reader process.

The parent bptm or bpdm reader process reads the data from the appropriate media into the shared buffers. The child bptm or bpdm reader process sends the data in the shared buffers to the child bptm writer process over a socket. The child bptm writer process writes the data into the shared buffers.

The parent bptm writer process copies the data from the shared buffers to the media and notifies bpsynth when the synthetic image is complete.

Phase 4 - Validate the image

In phase 4, the bpsynth process validates the image. The new image is now visible to NetBackup and can be used like any other full or cumulative incremental backup.

Synthetic backup requires the following:

- That True Image Restore (TIR) with move detection be selected for each component image.
- That the component images are synthetic images.

NetBackup online, hot catalog backup

Online, hot catalog backup. This type of catalog backup is policy-based, with all of the scheduling flexibility of a regular backup policy. This backup type is designed for highly active NetBackup environments where other backup activity usually takes place. The catalog backup is performed online, meaning that the catalog is not turned off. More details are available.

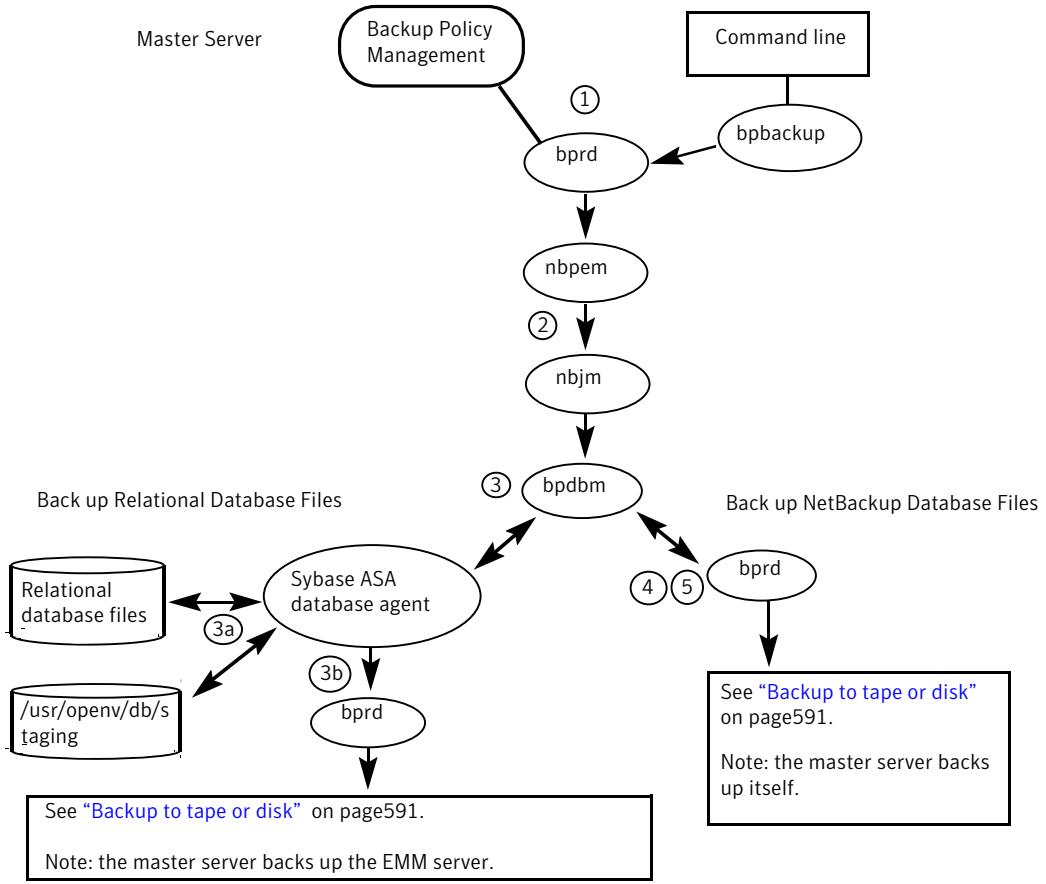
See "Hot catalog backup process" on page 254.

You can use an option in the Administration Console to start a manual backup of the NetBackup catalogs. Or, you can configure a NetBackup policy to automatically back up its catalogs.

Hot catalog backup process

Figure A-9 shows the hot catalog backup that is followed by the backup process itself.

Figure A-9 Hot catalog backup process



A hot catalog backup consists of the following jobs that run on the master server:

- A parent job that is started manually by the administrator or by a catalog backup policy schedule.
- A child job that backs up the NetBackup relational database files.
- A child job that copies the NetBackup database files on pre-6.0 media servers, if any.
- A child job that backs up the NetBackup database files (all files in `/usr/openv/netbackup/db`).

A hot catalog backup process is as follows (in the order presented):

- A manual backup or a catalog backup policy initiates the backup.

- nbpem submits a parent job to nbjm; nbjm sends a request to bpdbm.
- bpdbm handles the backup of the relational database files, in two steps:
  - The SQL Anywhere files database agent makes an online copy of the relational database files to `/usr/openv/db/staging`. See the Disaster Recovery chapter for a list of the relational database files.
  - After the files are in the staging area, the SQL Anywhere database agent backs them up in the same manner as is used for an ordinary backup.
- NetBackup backs up the database files that are in `/usr/openv/netbackup/db` and important NetBackup files to the master server.
- NetBackup creates the disaster recovery file, and emails it to the administrator if the email option was selected in the policy.

Consult the following logs for messages on hot catalog backup:

- `bpdbm`, `bpbkar`, `bpbrm`, `bpcd`, `bpbackup`, `bprd`

Note: If the EMM server is on its own host (separate from the master server), consult this log on the EMM server: `/usr/openv/netbackup/logs/admin` (UNIX), or *`install_path`*`\NetBackup\logs\admin` (Windows).

For messages pertaining only to the relational database files, see the progress log file in the following directory:

- `/usr/openv/netbackup/logs/user_ops/dbext/logs` (UNIX)
- *`install_path`*`\NetBackup\logs\user_ops\dbext\logs` (Windows)

Restore processes

NetBackup restore operations, like backups, can vary according to client type. The following explains the variations.

Restoring UNIX and Linux clients

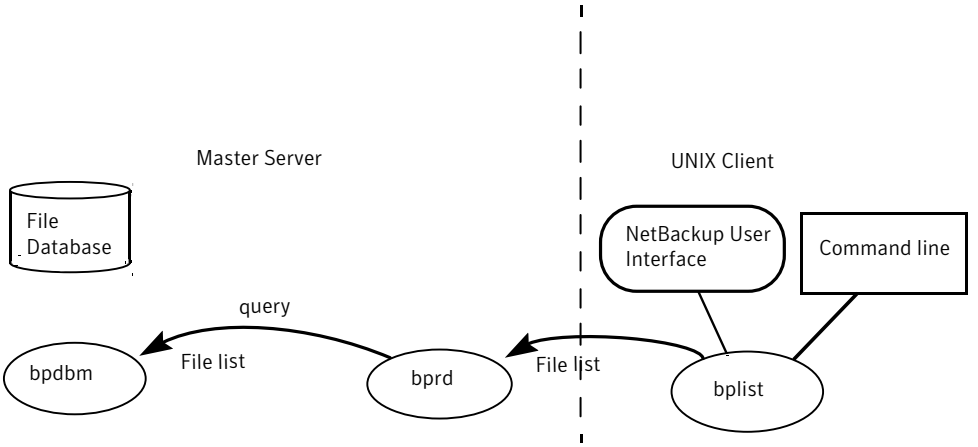
Before starting a restore, a user browses the file catalog to list the files available in the backup images. The desired files can then be selected from the list.

The browsing is done through the `bplist` program on the client. The `bplist` program can be started directly from the command line and the NetBackup user interface programs can use it.

`bplist` obtains the file list by sending a query to the request daemon, `bprd`, on the master server (see Figure A-10).

The request daemon, in turn, queries bpdbm for the information and transmits it to bplist on the client.

Figure A-10 List operation - UNIX and Linux client



Refer to one of the following topics as you read through the restore process.

See Figure A-11 on page 259.

See Figure A-12 on page 260.

The following are the processing steps in a restore (in the order presented):

- When the user starts a restore, NetBackup invokes the client's bprestore program which sends a request to the request daemon, bprd. This request identifies the files and client. The request daemon then uses bpcd (client daemon) to start the backup and restore manager (bpbrm).

  Note: To restore Backup Exec images, bpbrm initiates mtfrd instead of tar on the clients. The server processes are the same as those used for NetBackup restores.

- If the disk device or tape device on which the data resides attaches to the master server, the following occurs: bprd starts the backup and restore manager on the master server. If the disk unit or tape unit connects to a media server, bprd starts the backup and restore manager on the media server.
- The backup and restore manager starts bptm and uses the client daemon (bpcd) to establish a connection between the NetBackup tar program on the client and bptm on the server.

- The bptm process identifies which media (disk or tape) is needed for the restore, based on the image catalog. bptm then requests the allocation of the required media from nbrb through nbjm. nbjm then asks mds (part of nbemm) for the resources. nbemm allocates the media and selects and allocates an appropriate drive (for tape media).
  For tape: bptm asks ltid to mount the tape in the drive. For disk: (such as AdvancedDisk or OpenStorage), nbrb tells nbemm to issue the mount by means of nbrmms, after nbemm allocates the resources.
  For restore from non-shared disk (BasicDisk, PureDisk, NearStore, SnapVault), bptm does not need to ask nbrb for an allocation, because disk inherently supports concurrent access. bptm uses the file path in a read request to the system disk manager.
- When the allocation is granted to it, bptm starts retrieving data. bptm stores the image block-by-block in shared memory.
- bptm directs the image to the client in one of two ways. If the server restores itself (server and client are on the same host), tar reads the data directly from shared memory. If the server restores a client that resides on a different host, it creates a child bptm process which transmits the data to tar on the client.

  Note: Only the part of the image that is required to satisfy the restore request is sent to the client, not necessarily the entire backup image.

- The NetBackup tar program writes the data on the client disk.

PBX must be running for NetBackup to operate (PBX is not shown in the next diagram).

See "Resolving PBX problems" on page 75.

Figure A-11 shows how to restore from tape in the UNIX and Linux environments:

Figure A-11 Restore from tape (UNIX and Linux)

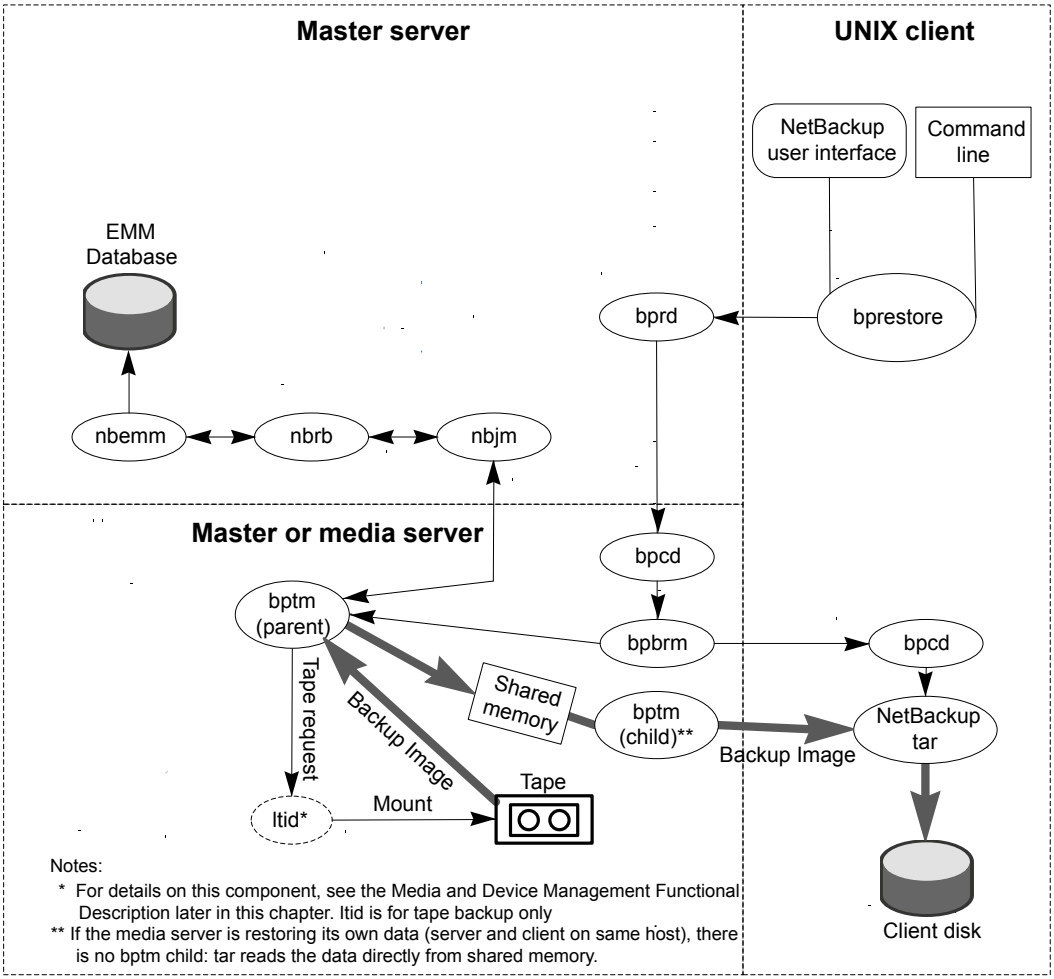
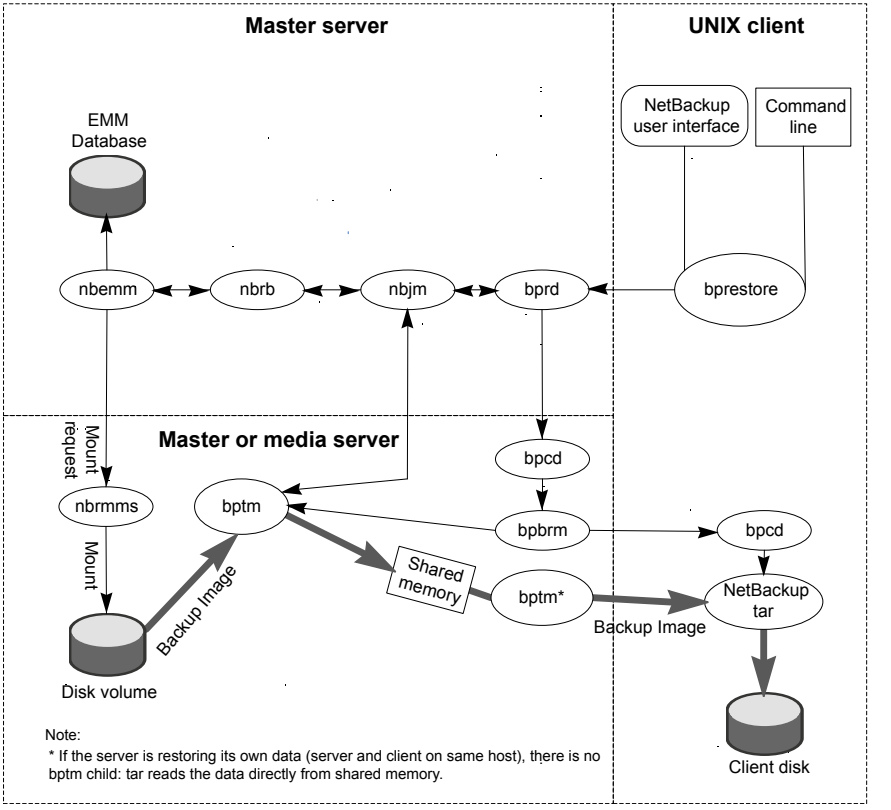


Figure A-12 shows how to restore from disk in the UNIX and Linux environments:

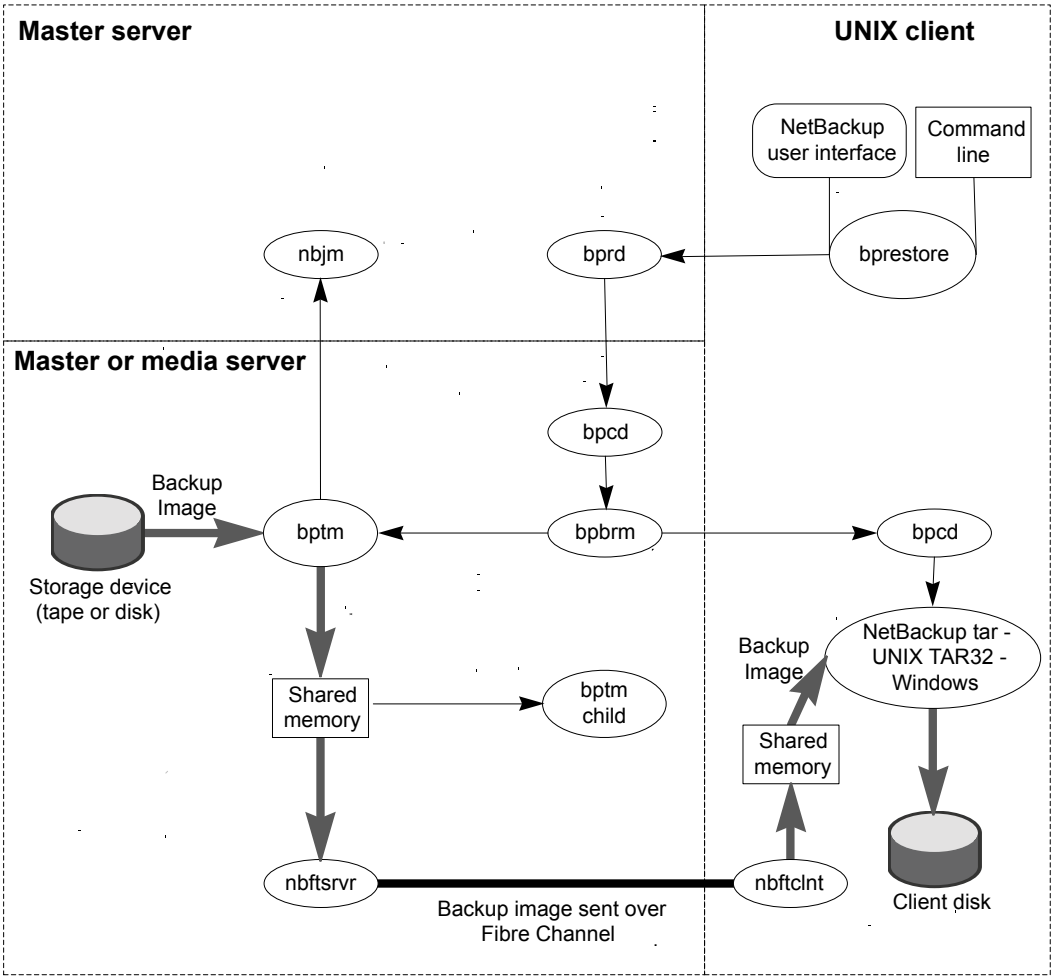
Figure A-12 Restore from disk (UNIX and Linux)



Restoring SAN client (UNIX or Windows)

Figure A-13 shows the server and client components that are used in a restore of a SAN client over Fibre Channel.

Figure A-13 SAN client restore with Fibre Transport



The process flow for a SAN Client restore is as follows (in the order presented).

- When the user starts a restore, NetBackup invokes the client's `bprestore` program which sends a request to the request daemon, `bprd`. This request identifies the files and client. The request daemon then uses `bpcd` (client daemon) to start the backup and restore manager (`bpbrm`).

Note: To restore Backup Exec images, `bpbrm` invoke `mtfrd` instead of `tar` on the clients. The server processes are the same as those used for NetBackup restores.

- If the disk device or tape device on which the data resides attaches to the master server, then `bprd` starts the backup and restore manager on the master server. If the disk unit or tape unit connects to a media server, `bprd` starts the backup and restore manager on the media server.
- bpbrm starts bptm and provides bptm with the backup ID and the shmfat (shared memory) flag.
- bptm does the following:
  - Requests SAN Client information from nbjm.
  - Sends a restore request to the FT server process (nbftsrvr).
  - Sends a restore request to the FT Client process on the client (nbftclnt). nbftclnt opens a fibre channel connection to nbftsrvr on the media server, allocates shared memory, and writes shared memory information to the backup ID file.
- bpbrm starts tar by means of bpcd and provides tar with the backup ID, socket information, and the shmfat (shared memory) flag.
- bptm does the following:
  - Reads the image from the storage device.
  - Creates a bptm child process. This process filters the backup image so that only the files that are selected for the restore are sent to the client.
  - Writes the image data to the shared buffer on the server.
  - When buffer is full or job is done, sets buffer flag (partial buffers may be sent to the client).
- tar does the following:
  - Sends the status and control information to bpbrm.
  - Reads the shared memory information from the local backup ID file (waits for the file to exist and become valid).
  - Waits for the buffer flag that indicates the data is ready to be read.
  - Reads data from the buffer, extracts files and restores them. When the shmfat (shared memory) flag is provided, tar considers the data to be already filtered.
- The FT Server process nbftsrvr waits for the shared memory buffer flag to be set. nbftsrvr then transfers the image data to the FT Client (nbftclnt) shared memory buffer, and clears the buffer flag.
- The FT Client (nbftclnt) waits for the data from nbftsrvr and writes the data to the shared memory buffer on the client. nbftclnt then sets the buffer flag.

- At the end of the job:
  - bptm informs tar and bpbrm that the job is complete.
  - bptm directs nbftclnt to close the fibre channel connection.
  - nbftclnt closes the fibre channel connection and deletes the BID file.

Restoring Windows clients

NetBackup supports the same types of operations on Windows clients as it does for UNIX clients.

The following are the Windows processes involved in restore operations:

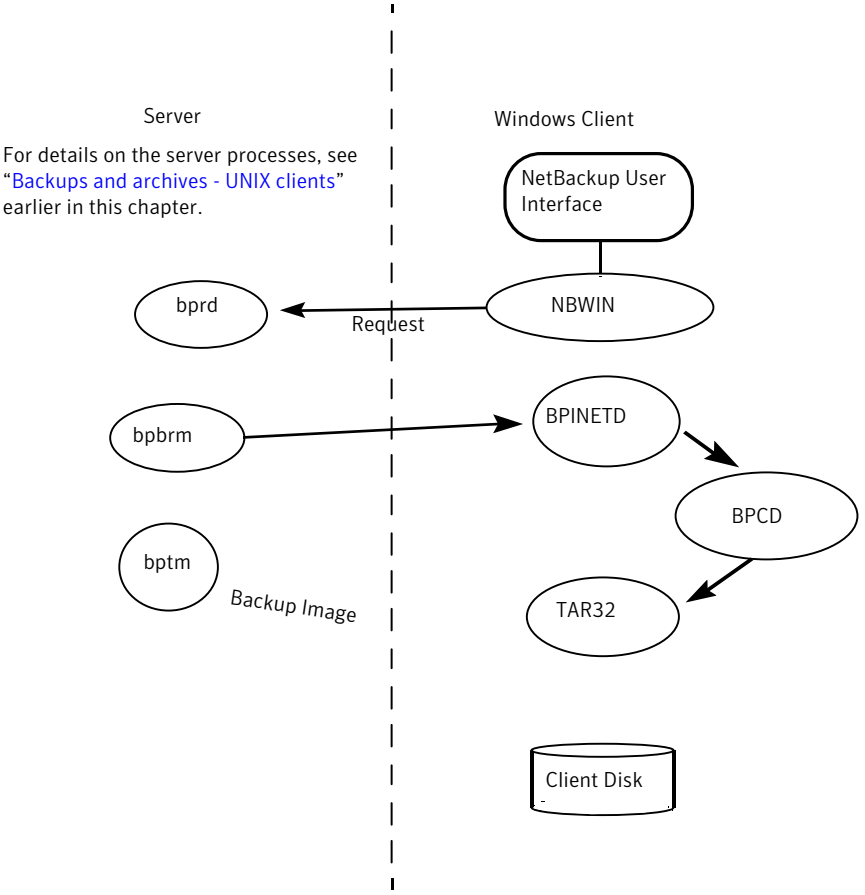
- `NBWIN` is the user interface program on the client. The `bpbackup` function and the `bparchive` function are merged into `NBWIN`.
- `BPINETD` serves the same purpose as `inetd` on UNIX clients.
- The NetBackup client daemon is called `BPCD`.
- `TAR32` is part of NetBackup for Windows and serves the same purpose as NetBackup `tar` on UNIX.

Note: To restore Backup Exec images, `bpbrm` invokes `mtfrd.exe` instead of `tar32.exe` on the clients. The server processes are the same as those used for NetBackup restores.

The server processes are the same as described for UNIX.

Figure A-14 shows the client processes involved in these operations.

Figure A-14 Restore - Windows client



Restoring NetWare clients

NetBackup supports the same types of restore operations on NetWare clients as it does on UNIX clients.Figure A-15 shows the client processes involved in these operations. In this figure, the following applies:

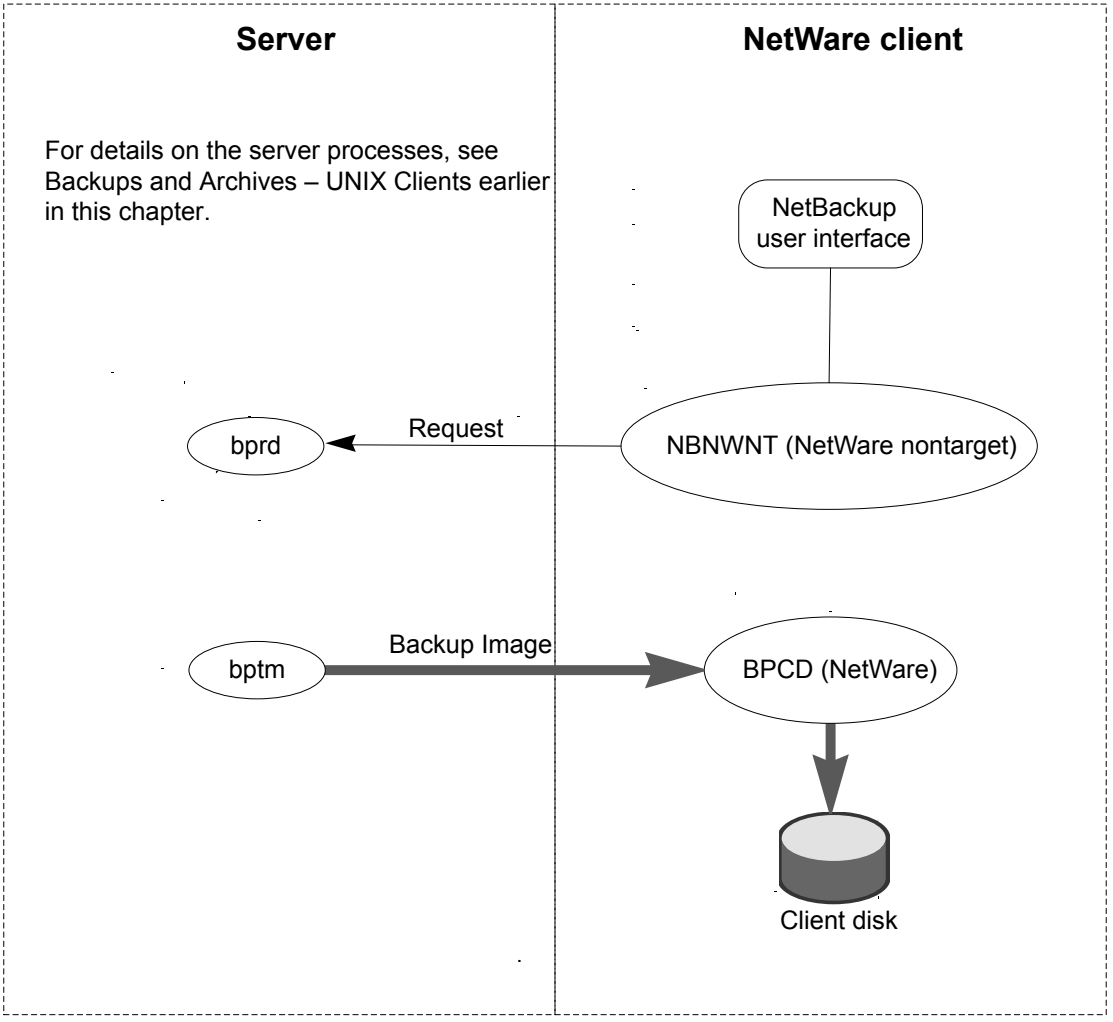
- The NetWare nontarget user interface program is called `NBNWNT`. The NetWare target user interface program is `BP` on the Netware console. The `bprestore` function and the `bplist` function are merged into the user interface programs on the clients.
- The NetBackup NetWare client daemon is called `BPCD`. The NetBackup `tar` functions are merged into `BPCD`.

- `mtfrd` functionality (used to restore Backup Exec images) has been merged into BPCD. The server processes involved in import and restore operations for Backup Exec images are the same as those involved for NetBackup restores.

The server processes are the same as described for UNIX.

Figure A-15 shows the restore operation for a NetWare client

Figure A-15 Restore - NetWare client



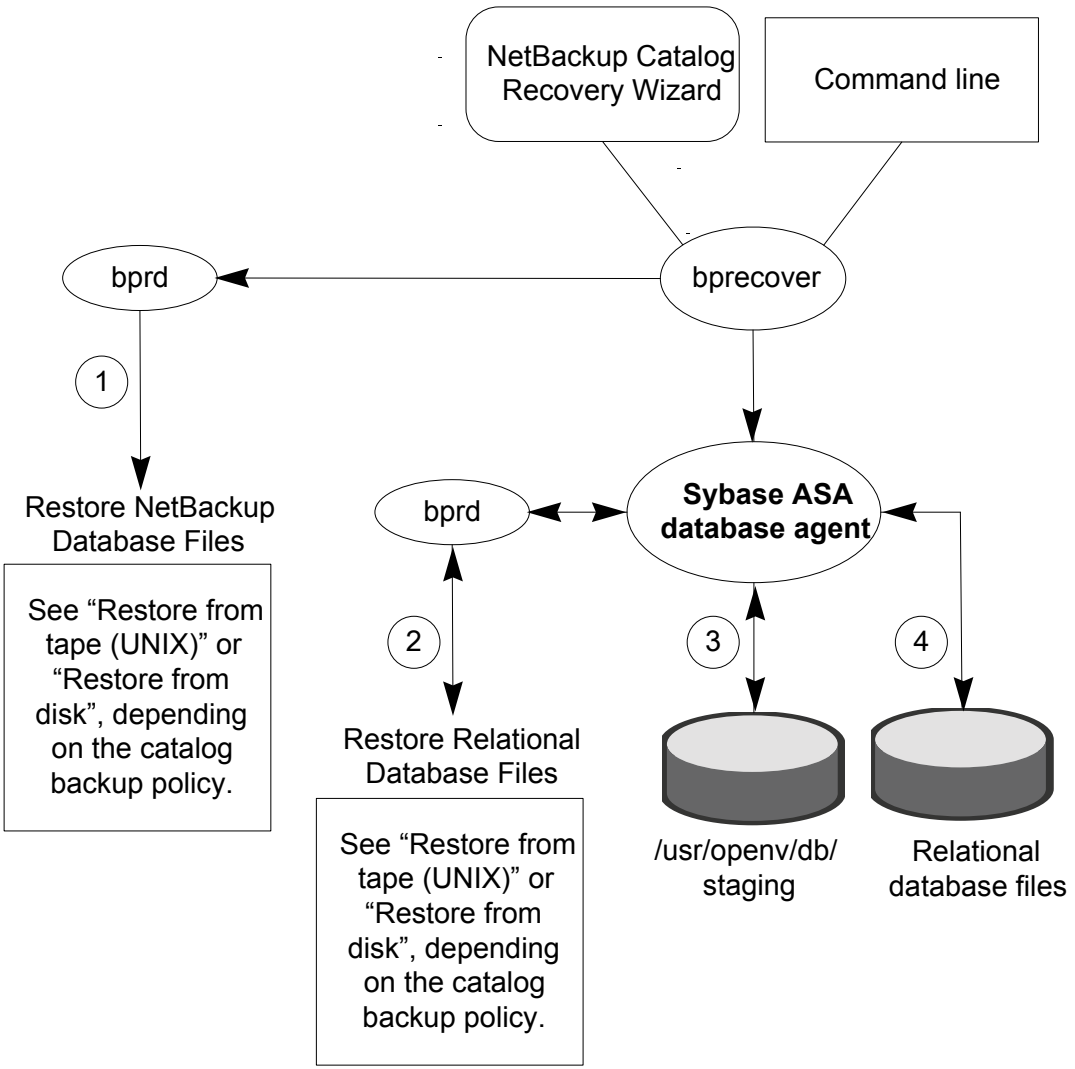
Restoring catalog backups

A catalog restore can be initiated by the NetBackup Catalog Recovery Wizard in the Administration Console, or by manual use of the `bprecover` command. More information is available in the following topic:

See "About disaster recovery" on page 173.

Figure A-16 illustrates the catalog restore and recovery process.

Figure A-16 Catalog restore and recovery



A restore of the NetBackup database and relational database files from a hot catalog backup consists of the following steps (in the order presented):

- The NetBackup database files are restored by means of the standard NetBackup restore procedure.
- The relational database files are restored by means of the standard NetBackup restore procedure. The database files are restored to `/usr/openv/db/staging` (UNIX and Linux), or to *`install_path`*`\NetBackupDB\staging` (Windows).
- After the files are restored to the staging directory, the relational database is recovered. Each transaction log in the staging area is applied in order, one by one.
- The relational database files are moved from the staging directory to a location determined by the following: the `bp.conf` file `VXDBMS_NB_DATA` setting on UNIX or Linux and by the corresponding registry key on Windows. The default location is `/usr/openv/db/data` on UNIX and Linux, and *`install_path`*`\NetBackupDB\data` on Windows.
  If the relational database files are relocated, they are moved from the staging directory to the `/usr/openv/db/data/vxdbms.conf` file (UNIX) or the *`install_path`*`\NetBackupDB\data\vxdbms.conf` file (Windows). A description is available of how the NetBackup relational database files can be relocated after installation.
  See "NetBackup Relational Database" in the *NetBackup Administrator's Guide, Volume I*.

Messages that are related to this catalog recovery process are divided into the following three areas:

- For messages that are related to all catalog recovery steps, consult the `/usr/openv/netbackup/logs/admin` logs (UNIX and Linux), or *`install_path`*`\NetBackup\logs\admin` (Windows).
- For messages that are related to the first two bulleted items, consult the `tar`, `bpbrm`, and `bpcd` logs.
- For messages pertaining only to the relational database files, see the progress logs in the following directory:
  `/usr/openv/netbackup/logs/user_ops/root/logs` (UNIX and Linux), or *`install_path`*`\NetBackup\logs\user_ops\root\logs` (Windows).

NetBackup directories and files

Figure A-17 shows the NetBackup file and directory structure on UNIX servers and clients. If a host is only a client and not a server, only the files in the Client

portion are present. If a host is both a client and a server, the client shares files as necessary from those in the Server portion.

A Windows NetBackup server has equivalent files and folders that are located where NetBackup is installed (`C:\Program Files\VERITAS` by default).

NetBackup directory structure - UNIX

Figure A-17 lists the items that are described in tables on the following pages.

Figure A-17 NetBackup directories and files

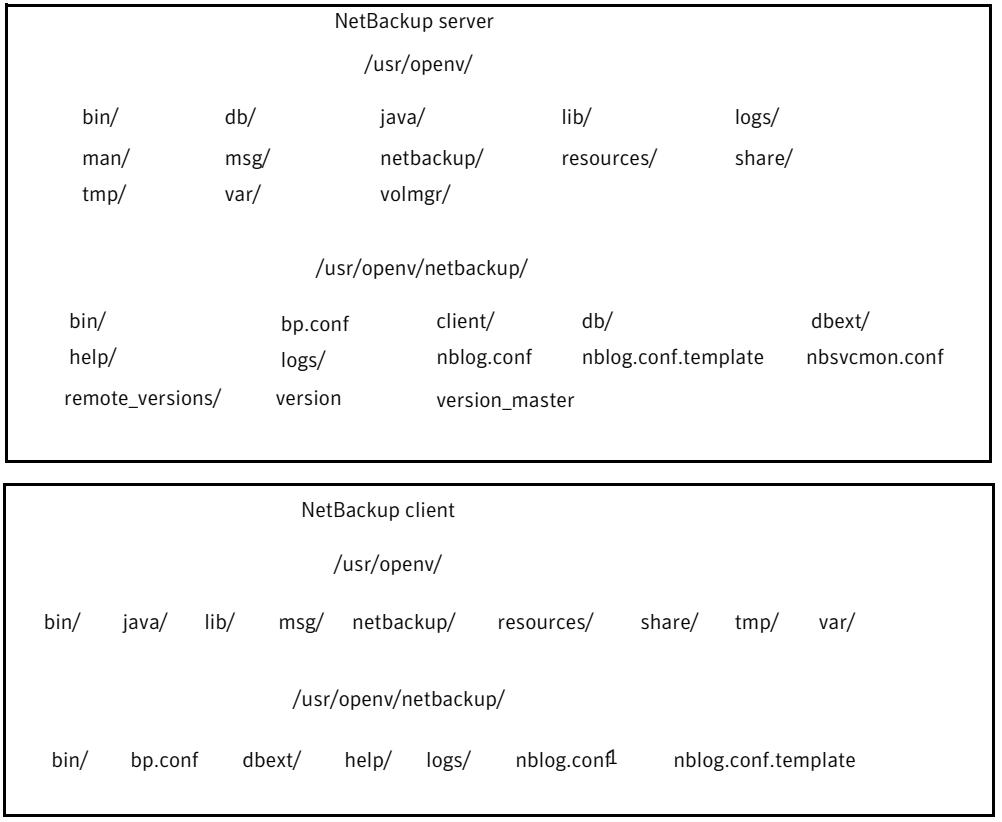


Table A-2 describes the `/usr/openv/` files and directories.

Table A-2 Directories and files in /usr/openv/ - servers and UNIX clients

File or directory in /usr/openv/	Contents
bin/	Contains miscellaneous executable binaries including the vnetd daemon and utilities for legacy enhanced authentication.
db/	Contains the NetBackup Relational Database Manager (SQL Anywhere) and database data file.
java/	Contains the NetBackup-Java Administration Console and the Backup, Archive and Restore user interface.
lib/	Contains shared libraries that are required for NetBackup operation.
logs/	Contains all logs that are written by unified logging. You do not have to create subdirectories for these logs.
man/	Contains man pages for NetBackup commands.
msg/	Contains the message files and a configuration file for all installed languages of NetBackup.
NB-Java.tar.Z	A tar file that contains the NetBackup-Java interfaces.
netbackup/	See Table A-3 on page 270.
resources/	Contains the NetBackup message catalogs that are used by unified logging (VxUL).
share/	Contains static configuration files. These files are normally unchanged between NetBackup releases.
tmp/sqlany	Contains the NetBackup Relational Database Manager (SQL Anywhere) installation trace files, and the log files regarding to database start and stop.
var/	Contains the variable configuration files. These files, which are related to licensing, authentication, authorization, and networking, may change while NetBackup is running. /usr/openv/var/global contains various static and variable configuration files. In a cluster, the /global directory is shared between nodes.
volmgr/	Contains the media and device management directories and files. See "NetBackup directory structure - UNIX" on page 268.

Contents of /usr/openv/netbackup

Table A-3 describes the `/usr/openv/netbackup` files and directories.

Table A-3 Directories and files in /usr/openv/netbackup/ - servers and UNIX clients

File or Directory in `/usr/openv/netbackup/`	Contents
`bin/`	Commands, scripts, programs, daemons, and files that are required for NetBackup operation and administration. On a server, there are two subdirectories under bin. `admincmd`: Contains various commands that used internally by NetBackup. Use these commands ONLY if they are documented. Most of these commands are not documented and should not be used directly. `goodies` (UNIX only): Contains scripts and information that may be useful to the administrator. These subdirectories are not present on clients.
`bp.conf`	Configuration file containing options for NetBackup operation. A detailed explanation is available about each option and how to set it. See the *NetBackup Administrator's Guide, Vol II*. On a Windows server, these options are set in the NetBackup Administration Console.
`client/`	NetBackup client software that is installed on the clients during installation. Do not install this directory on a media server.
`db/`	NetBackup catalogs. See Table A-5 on page 285.
`dbext/`	For NetBackup database agent software, contains the version file, compressed tar file, and install_dbext script.
`help/`	Help files that are used by NetBackup programs. These files are in ASCII format.

Table A-3 Directories and files in /usr/openv/netbackup/ - servers and UNIX clients *(continued)*

File or Directory in /usr/openv/netbackup/	Contents
logs/	Legacy debug logs for NetBackup processes. You must create the necessary subdirectories in order for these log files to be written. See "About legacy logging" on page 124. See Table A-4 on page 272. for an explanation of the processes that produce the logs.
nblog.conf	Specifies the settings for unified logging. **Note:** Do not edit this file manually: use the vxlogcfg command instead. See "About unified logging" on page 102.
nblog.conf.template	Specifies the settings for unified logging. **Note:** Do not edit this file manually: use the vxlogcfg command instead. See "About unified logging" on page 102.
nbsvcmon.conf	Configuration file for the NetBackup Service Monitor. It tells the Service Monitor what services to monitor and how to restart them if they fail unexpectedly.
remote_versions/	A cache of the versions of other media servers in the system.
version	Version and release date of the software.
version_master	Identifies the NetBackup master server.

NetBackup programs and daemons

Table A-4 describes the programs and daemons that provide most of the control for backup, archive, and restore operations.

The explanations include what starts and stops the program or daemon, and the debug log subdirectory (if any) where it records its activities.

You must create legacy logging directories manually; see "logs" in the previous table. More information is available.

See "About legacy logging" on page 124.

Table A-4 NetBackup daemons and programs

Program/Daemon	Description
bp	On UNIX clients, this menu-driven, character-based interface program has options for starting user-directed backups, restores, and archives. Started By: /usr/openv/netbackup/bin/bp command on the client. Stopped By: Exiting the interface program. Debug Log: /usr/openv/netbackup/logs/bp on the client. The debug logs for bpbackup, bparchive, bprestore, and bplist also have information about bp activities.
BP.NLM	On NetWare target clients, BP.NLM is the NetWare Loadable Module that starts the client-user interface. Started By: LOAD BP command. Stopped By: Choosing Quit Utility from the main menu. Debug Log: SYS:\VERITAS\NBUCLT\NETBACK\LOGS\BP*mmddyy*.log file on the client.
bpadm	On a UNIX master server, this administrator utility has a menu-driven, character-based, interface with options for configuring and managing NetBackup. Started By: /usr/openv/netbackup/bin/bpadm command on the master server. Stopped By: Quit option from within bpadm. Debug Log: admin legacy log directory on the server.
bparchive	On UNIX clients, this program communicates with bprd on the master server when a user starts an archive. Started By: Starting an archive by using the client-user interface or by executing the /usr/openv/netbackup/bin/bparchive command on the client. Stopped By: Completion of operation. Debug Log: bparchive legacy log directory on the client.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
bpbackup	On UNIX clients, this program communicates with bprd on the master server when a user starts a backup. Started By: Starting a backup by using the client-user interface or by executing the /usr/openv/netbackup/bin/bpbackup command on the client. Stopped By: Completion of operation Debug Log: bpbackup legacy log directory on the client.
bpbkar	On UNIX clients the Backup/Archive Manager generates the backup images. Started By: bpbrm on the server with the storage unit. Stopped By: Completion of operation. Debug Log: bpbkar legacy log directory on the client.
BPBKAR32	On Windows clients, the Backup/Archive Manager generates the backup images. Started By: BPCDW32 on the client. Stopped By: Completion of operation. Debug Log: BPBKAR legacy log directory in the NetBackup logs directory on the client.
bpbrm	On master and media servers, the Backup/Restore Manager manages the client and bptm or bpdm process. It also uses error status from the client and from bptm or bpdm to determine the final status of backup or restore operations. Started By: For each backup or restore, nbjm starts an instance of bpbrm on the server with the appropriate storage unit. Stopped By: Completion of operation. Debug Log: bpbrm legacy log directory on the server.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
bpcd	On UNIX clients, bpcd is the NetBackup client daemon and lets NetBackup start programs on remote hosts (can be UNIX clients or other servers). For example, the server can connect to UNIX clients without requiring /.rhosts entries on the remote host. The program is used when nbjm starts bpbrm and when bpbrm communicates with the client. (For a description of the NetBackup client daemon on PC clients, see BPCDW32.EXE and BPCD.NLM in this table.) Started By: inetd. Stopped By: Completion of operation. Debug Log: bpcd legacy log directory on both client and server.
BPCD.NLM	On NetWare clients, BPCD.NLM is the executable file that starts the NetBackup client daemon. Started By: When you enter BPSTART.NCF at the NetWare Server console. Or, add BPSTART.NCF to your autoexec.ncf file. Stopped By: UNLOAD BP command Debug Log: BPCD legacy log directory on the client.
BPCDW32.EXE	On Windows clients, BPCDW32.EXE is the executable file that starts the NetBackup client daemon. Started By: When Windows starts if the daemon is in the Startup group. Otherwise, by double clicking on its icon. Stopped By: On Windows, you can stop it through the Services application in the Control Panel. Debug Log: BPCD legacy log directory on the client.
bpdbjobs	On UNIX master servers, this program is used to clean up the NetBackup jobs database. Started By: /usr/openv/netbackup/bin/admincmd/bpdbjobs. When bprd starts, it runs this command automatically. The administrator can also execute it manually or with a cron job. Stopped By: No terminate option exists for this command outside of using kill. Debug Log: bpdbjobs legacy log directory on the server.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
bpdbm	On master servers, the NetBackup database manager program that manages the configuration, error, and file databases. Started By: bprd (also by /usr/openv/netbackup/bin/initbpdbm on UNIX) Stopped By: /usr/openv/netbackup/bin/bpdbm -terminate command on UNIX and by stopping the NetBackup Database Manager service on Windows. Debug Log: bpdbm legacy log directory on the server.
bpdm	On master and media servers, bpdm is used for the following disk operations: read phase of disk duplication, read phase of synthetic backups, disk verify and disk import, true image restore from disk, disk image deletion. Started By: For each backup or restore, bpbrm starts an instance of bpdm, on the server with the storage unit. Stopped By: Completion of operation. Debug Log: bpdm legacy log directory on the server.
bpfis	On clients, bpfis creates and deletes snapshots. Note that bpfis is part of the Snapshot Client add-on product. Started By: bpbrm. Stopped By: Completion of operation. Debug Log: bpfis legacy log directory on the client or alternate client.
bphdb	On SQL, Oracle, Informix, Sybase, DB2, and SAP database clients, bphdb executes scripts to back up the database. Started By: Client-user interface when the user starts a database backup operation. Stopped By: Completion of operation. Debug Log: bphdb legacy log directory on the client.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
`bpjava-msvc`	NetBackup-Java master server application program. This program runs on all NetBackup UNIX systems and authenticates the users that start the NetBackup-Java interface programs. Started By: `inetd` during startup of the NetBackup Java interfaces. Stopped By: When authentication is complete. Debug Log: `bpjava-msvc` legacy log directory on the server.
`bpjava-usvc`	NetBackup-Java user server application program. This program services all requests from the NetBackup-Java user and administration interfaces. Started By: `bpjava-msvc` upon successful login through the Login dialog box that is presented when a NetBackup-Java interface is started. Stopped By: When the interface program is terminated. Debug Log: `bpjava-usvc` legacy log directory.
`bplist`	On UNIX clients, this program communicates with `bprd` on the master server when a user browses the database during a restore operation. Started By: Starting a search of the image database by using the client-user interface or by executing the `/usr/openv/netbackup/bin/bplist` command on the client. Stopped By: Completion of operation Debug Log: `bplist` legacy log directory on the client.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
bprd	On master servers, the request daemon responds to client and administrative requests for the following: ■ Restores ■ Backups (scheduled and user-directed) ■ Archives ■ List that is backed up or archived files ■ Manual immediate backups (started through the NetBackup administration interface manual backup option) Started By: Initiate Request Daemon option on the Special Actions menu in bpadm (also the /usr/openv/netbackup/bin/initbprd command). Stopped By: Terminate Request Daemon option on the Special Actions menu in bpadm. Debug Log: bprd legacy log directory on the server.
bprestore	On UNIX clients, this program communicates with bprd on the master server when a user starts a restore. Started By: Starting restore by using the client-user interface (or by executing the /usr/openv/netbackup/bin/bprestore command on the client). Stopped By: Completion of operation Debug Log: bprestore legacy log directory on the client.
BPSVR.NLM	On NetWare nontarget clients, BPSVR.NLM is the program that allows the system that has the client-user interface to communicate with the Netware server that is the NetBackup client. Started By: Enter bpstart.ncf. Stopped By: Enter bpstop.ncf. Debug Log: SYS:VERITAS\NBUCLT\NetBack\logs\bpsrv\ directory on the client.
BPSYS.EXE	On Windows clients, BPSYS.EXE is the NetBackup System Registry Replacement utility. Started By: NetBackup as required. Stopped By: Completion of operation. Debug Log: BPSYS legacy log directory on the client.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
bptm	On master and media servers, bptm manages both disk and tape backup and restore. It is used when the storage unit type is either disk or Media Manager. This program manages the transfer of images between the client and the storage device. Started By: For each backup or restore, bpbrm starts an instance of bptm on the server that has the storage unit. Stopped By: Completion of operation. Debug Log: bptm legacy log directory on the server.
jbpSA	A Java-based program for performing backups, archives, and restores of UNIX clients. Started By: On UNIX, the /usr/openv/netbackup/bin/jbpSA command. Debug Log: None, although the logs for the bpbackup, bparchive, bplist, and bprestore commands on the client can be useful. Also, check the bpjava-msvc and bpjava-usvc logs.
jnbSA	A Java-based administration utility for managing NetBackup on UNIX. In addition, administration of supported UNIX systems can be performed by using the NetBackup-Java Windows Display Console on a Windows system. Started By: On UNIX, the /usr/openv/netbackup/bin/jnbSA command. On a NetBackup-Java Windows Display console, the NetBackup - Java on *host* menu item on the Programs/NetBackup menu. Stopped By: Exit option in jnbSA. Debug Log: None, although the logs for bpjava-msvc and bpjava-usvc can be helpful.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
`nbemm`	On the server that is defined as the EMM server, nbemm manages devices, media, and storage unit configuration, and performs resource selection. Replaces vmd as the device allocator. Started By: Started when NetBackup starts. Stopped By: `/usr/openv/netbackup/bin/nbemmm -terminate` Debug Log: On the server, `/usr/openv/logs` (UNIX) or *`install_path`*`\logs` (Windows). See "About unified logging" on page 102.
`nbaudit`	On the master server, the audit daemon accepts audit requests from other NetBackup components and persists the audit records in the database. It also queries and returns the audit records from the database to display to the user. Started By: Started when NetBackup starts. Stopped By: `/usr/openv/netbackup/bin/nbaudit -terminate`. Debug Log: On the server, `/usr/openv/logs/nbaudit` (UNIX) or *`install_path`*`\logs\nbaudit` (Windows).
`nbfdrv64`	On a media server that is enabled for SAN Client backup over fibre channel, nbfdrv64 is the following: a user mode component that is used for both backup and restore. nbfdrv64 uses a windrvr6 proxy to move fibre channel data between nbftclnt and bptm buffers. Started By: `/usr/openv/netbackup/bin/nbftsrvr` Stopped By: `/usr/openv/netbackup/bin/nbftsrvr -terminate` Debug Log: On the server, `/usr/openv/logs` (UNIX) or *`install_path`*`\logs` (Windows). See "About unified logging" on page 102.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
`nbftclnt`	On clients that are enabled for SAN Client backup over fibre channel, nbftclnt transfers the backup image over fibre channel to nbftsrvr on the media server. Started By: Started when NetBackup starts. Stopped By: `/usr/openv/netbackup/bin/nbftclnt -terminate`. Debug Log: On the client, `/usr/openv/logs` (UNIX) or *`install_path`*`\logs` (Windows). See "About unified logging" on page 102.
`nbftsrvr`	On a media server that is enabled for SAN Client backup over fibre channel, nbftsrvr does the following: reads the backup image from nbftclnt and transfers it to shared memory on the media server. Started By: Started when NetBackup starts. Stopped By: `/usr/openv/netbackup/bin/nbftsrvr -terminate`. Debug Log: On the server, `/usr/openv/logs` (UNIX) or *`install_path`*`\logs` (Windows). See "About unified logging" on page 102.
`nbjm`	On master servers, the nbjm service accepts job requests from nbpem and from media commands such as bplabel and tpreq. nbjm acquires job resources from nbrb, and runs the jobs once resources are available. Started By: Started when NetBackup starts. Stopped By: `/usr/openv/netbackup/bin/nbjm -terminate` Debug Log: On the server, `/usr/openv/logs` (UNIX) or *`install_path`*`\logs` (Windows). See "About unified logging" on page 102.
`NBNWNT.EXE`	For NetWare nontarget clients, `NBNWNT.EXE` is the executable file that starts the client-user interface on Windows systems. Started By: From the Windows Start menu, under Programs/ NetBackup. Stopped By: Exiting the client-user interface. Debug Log: none.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
`nbpem`	On master servers, the nbpem service uses nbproxy to get the policy list from bpdbm, creates the policy-client tasks, determines when jobs are due to run, and starts due jobs. Started By: Started when NetBackup starts. Stopped By: `/usr/openv/netbackup/bin/nbpem -terminate` Debug Log: On the server, `/usr/openv/logs` (UNIX) or *`install_path`*`\logs` (Windows). See "About unified logging" on page 102.
`nbproxy`	Runs on the master server and the media server as a child of the process it serves. `nbproxy` provides a thread-safe API for the libraries that are not yet thread safe. Started By: the process that uses `nbproxy` as a proxy. Stopped By: stops the process that uses `nbproxy`. Debug Log: `nbproxy` legacy log directory on the server.
`nbrb`	On the server that is defined as the EMM server, the nbrb service accepts resource requests from nbjm, acquires physical resources from nbemm, and manages logical resources. Started By: Started when NetBackup starts. Stopped By: `/usr/openv/netbackup/bin/nbrb -terminate` Debug Log: On the server, `/usr/openv/logs` (UNIX) or *`install_path`*`\logs` (Windows). See "About unified logging" on page 102.
`ndmpagent`	Controls backup and restore operations on a NAS server. ndmpagent is for remote NDMP: backing up NDMP data to a drive that is configured in a Media Manager storage unit on a NetBackup media server. Started By: `bpbrm`. Stopped By: Completion of backup or restore. Debug Log: On the server, `/usr/openv/logs` (UNIX) or *`install_path`*`\logs` (Windows). See "About unified logging" on page 102.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
`nbstserv`	Runs on the master server. The nbstserv service manages lifecycle operations including duplication, staging, and image expiration. Started By: Started when NetBackup starts. Stopped By: `/usr/openv/netbackup/bin/nbstserv -terminate` Debug Log: On the server, `/usr/openv/logs` (UNIX) or *`install_path`*`\logs` (Windows). For more information about OID 226 and 272, see the following topic: See "Server processes that use unified logging" on page 106.
`NBWIN.EXE`	For Windows clients, NBWIN.EXE is the executable file that starts the client-user interface on Windows systems. Started By: From the Windows Start menu, under Programs/ NetBackup. Stopped By: Exiting the client-user interface. Debug Log: `NBWIN` legacy log directory on the client.
`nbrmms`	Remote Manager and Monitor Service (nbrmms) is the conduit through which EMM discovers and configures storage on media servers. In addition to configuration management, nbrmms provides all access to media server resources for monitoring and event notifications. Started By: Started when NetBackup starts, or by `/usr/openv/netbackup/bin/nbrmms` Stopped By: Stopped when NetBackup stops, or by `/usr/openv/netbackup/bin/nbrmms -terminate` Debug Log: On the server, `/usr/openv/logs` (UNIX) or *`install_path`*`\logs` (Windows). See "About unified logging" on page 102.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
`pbx_exchange`	Private Branch Exchange (PBX) is a common services framework that helps limit the number of TCP/IP ports that the CORBA services of NetBackup use. Started By: Started when NetBackup starts, or by `/opt/VRTSpbx/bin/vxpbx_exchanged start` Stopped By: Stopped when NetBackup stops, or by `/opt/VRTSpbx/bin/vxpbx_exchanged stop` Debug Log: On the server, `/opt/VRTSpbx/log` (UNIX) or *`install_path`*`\VxPBX\log` (Windows). See "Accessing the PBX logs" on page 77.
`ql2300_stub`	On a Solaris media server that is enabled for SAN Client transfers over fibre channel: ql2300_stub is a device driver used to read and write to the NVRAM on a target mode Fibre Channel Host Bus Adapter. On Linux, it also prevents initiator mode drivers from binding to the target mode fibre channel HBAs. Started By: Device driver that is started by the operating system on a reboot after `nbftsrv_config -nbhba` on Linux and Solaris. On Linux, it is also started on all reboots after `nbftsrv_config`. Stopped By: Device driver that is stopped by `nbfdrv64` on Linux and `nbftsrv_config` on Solaris. Debug Log: The host operating system handles the logging for the device driver in the system messages log: `/var/adm/messages` (Solaris) or `/var/log/messages` (Linux).
`tar`	On UNIX clients, the Tape ARchive program is a special version of `tar` provided with NetBackup and used to restore images. Started By: For each restore, `bpbrm` starts an instance of `tar` on the client. Stopped By: Completion of restore operation. Debug Log: `tar` legacy log directory on the client.

Table A-4 NetBackup daemons and programs *(continued)*

Program/Daemon	Description
TAR32	On Windows clients, the TAR32 program is a special version of tar provided with NetBackup and used to restore images. Started By: For each restore, NetBackup starts an instance of TAR32 on the client. Stopped By: Completion of restore operation. Debug Log: TAR legacy log directory on the client.
windrvr6	On a Media Server that is enabled for SAN Client transfers using fibre channel: windrvr6 is a kernel device driver used to communicate through the PCI bus to the target mode Fibre Channel Host Bus Adapters. Started By: Device driver that is started by the operating system at boot (Solaris) or by nbfdrv64 (Linux). Stopped By: Device driver that is stopped by the operating system at shutdown. Debug Log: The host operating system handles the logging in the system messages log log: /var/adm/messages (Solaris) or /var/log/messages (Linux).

NetBackup catalogs

The NetBackup catalogs contain the information that is used internally by NetBackup and reside in the /usr/openv/netbackup/db directory on UNIX servers and in the *install_path*\NetBackup\db directory on Windows NetBackup servers.

Note also that the /usr/openv/netbackup/db/class directory (*install_path*\NetBackup\db\class on Windows) has a subdirectory for each NetBackuppolicy, that contains information about the policy.

Table A-5 describes the NetBackup catalogs.

Table A-5 NetBackup catalogs

Database	Contents
config	Configuration information. This database resides on the master server and has three parts: `policy`: Contains the information about each NetBackup policy. `config`: Contains the information about global attributes, storage units, and database backups. `altnames`: Contains the information about client names for restores.
error	Error and status information about NetBackup operations. This database resides on the master server and has two parts: `error`: Contains the information that is recorded during backup operations and used in the NetBackup reports. `failure_history`: Contains the daily history of backup errors.
images	Information about the backup images and resides only on the master server. One of the files in the `images` directory is the `file` database. The `file` database is the one that NetBackup accesses when a user browses for files to restore.
jobs	Job information that is used by the NetBackup job monitor (UNIX NetBackup server) and activity monitor (Windows NetBackup server). The Jobs database is on the master server.
media	Media related information that is used by `bptm`. Also has an errors file that contains error history information for media and devices.

Appendix B

Media and device management functional description

This appendix includes the following topics:

Media and device management startup process

Media and device management processes are automatically initiated during NetBackup startup. To start these processes manually, run bp.start_all (UNIX) or bpup (Windows). ltid automatically starts other daemons and programs as necessary. The daemons should be running after initial startup.

See Figure B-1 on page 289.

In the case of robotic daemons, such as tl8d and tlhd, the associated robot must also be configured for the daemon to run. There are also additional ways to start and stop daemons.

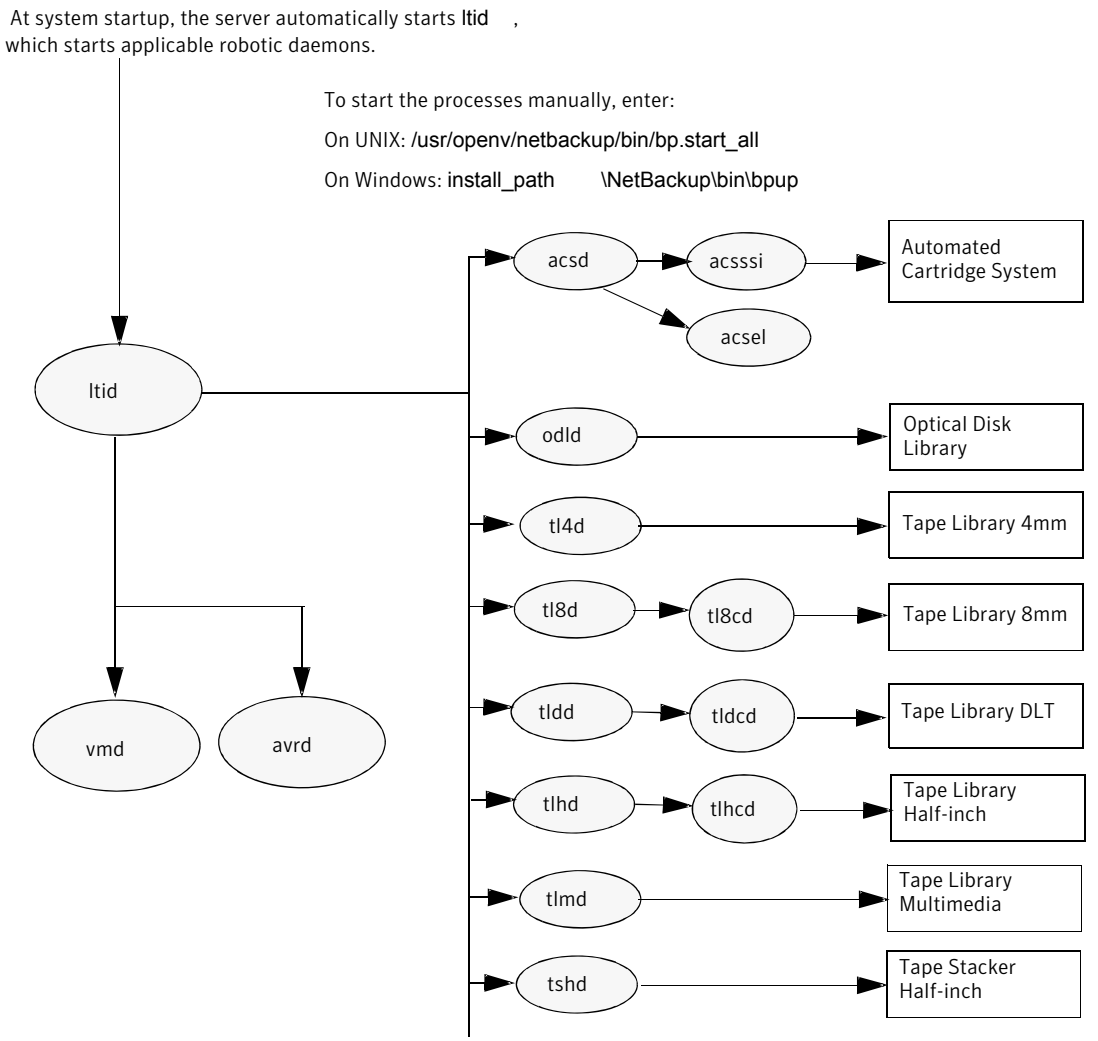
See Table B-1 on page 296.

TL8, TLH, and TLD require following types of daemons:

robotic	Each host with a robotic drive attached must have a robotic daemon. These daemons provide the interface between ltid and the robot or, if different drives within a robot can attach to different hosts, the robotic daemon communicates with a robotic-control daemon (see below).
robotic control	Robotic-control daemons centralize the control of robots when drives within a robot can connect to different hosts. A robotic-control daemon receives mount and unmount requests from the robotic daemon on the host to which the drive is attached and then communicates these requests to the robot.

You must know the hosts involved in order to start all the daemons for a robot.

Figure B-1 Starting media and device management



Media and device management process

When the media and device management daemons are running, NetBackup, Storage Migrator (UNIX only), Storage Migrator for Microsoft Exchange (Windows only), or users can request data storage or retrieval. The request is initially handled by the scheduling services.

See "Backup and archive processes" on page 236.

The resulting request to mount a device is passed from nbjm to nbrb, which acquires the physical resources from nbemm (the Enterprise Media Manager service).

If the backup requires media in a robot, ltid sends a mount request to the robotic daemon that manages the drives in the robot that are configured on the local host. The robotic daemon then mounts the media, and sets a drive busy status in memory shared by itself and ltid. Drive busy status also appears in the Device Monitor.

See Figure B-2 on page 291.

Assuming that the media is physically in the robot, the media is mounted and the operation proceeds. If the media is not in the robot, nbrb creates a pending request, which appears as a pending request in the Device Monitor. An operator must then insert the media in the robot and use the appropriate Device Monitor command to resubmit the request so the mount request can occur.

A mount request is also issued if the media is for a nonrobotic (standalone) drive and the drive does not contain media that meets the criteria in the request. If the request is from NetBackup and the drive does contain appropriate media, then that media is automatically assigned and the operation proceeds. More information is available on NetBackup media selection for nonrobotic drives.

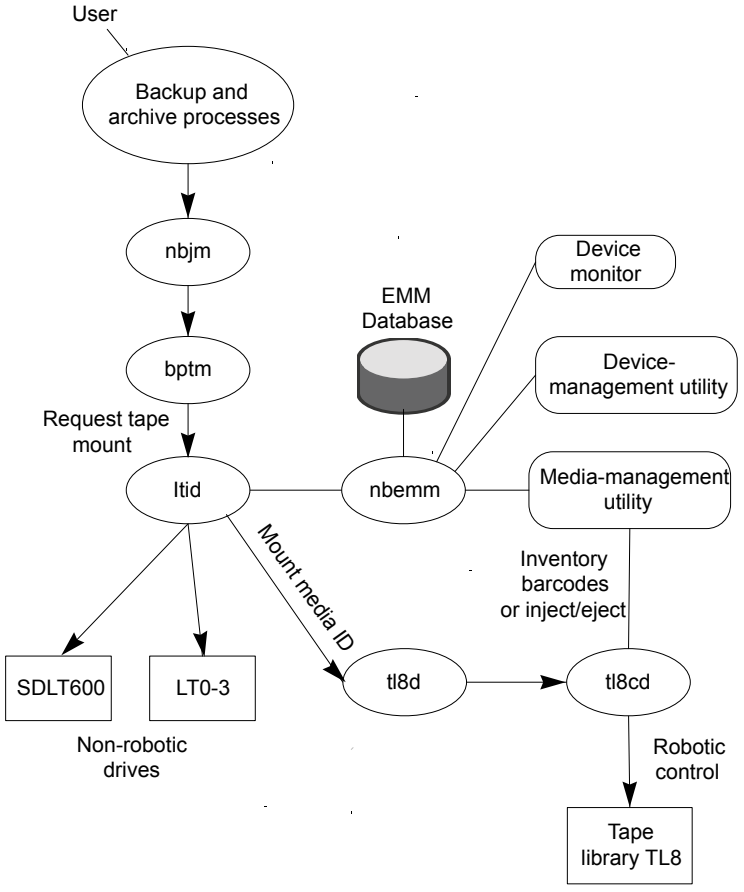
See the *NetBackup Administrator's Guide, Volume II*.

Note: On UNIX systems, when a tape is being mounted, the drive_mount_notify script is called. This script is in the /usr/openv/volmgr/bin directory. Information on the script can be found within the script itself. A similar script is called for the unmount process (drive_unmount_notify, in the same directory).

When a robotic volume is added or removed through the media access port, the media management utility communicates with the appropriate robotic daemon to verify the volume location and/or barcode. The media management utility (through a library or command-line interface) also calls the robotic daemon for robot inventory operations.

Figure B-2 shows an example of the media and device management process.

Figure B-2 Media and device management example process



Shared Storage option management process

Shared Storage Option (SSO) is an extension to tape drive allocation and configuration for media and device management. SSO allows individual tape drives (stand-alone or in a robotic library) to be dynamically shared between multiple NetBackup media servers or SAN media servers.

See the *NetBackup Shared Storage Guide*.

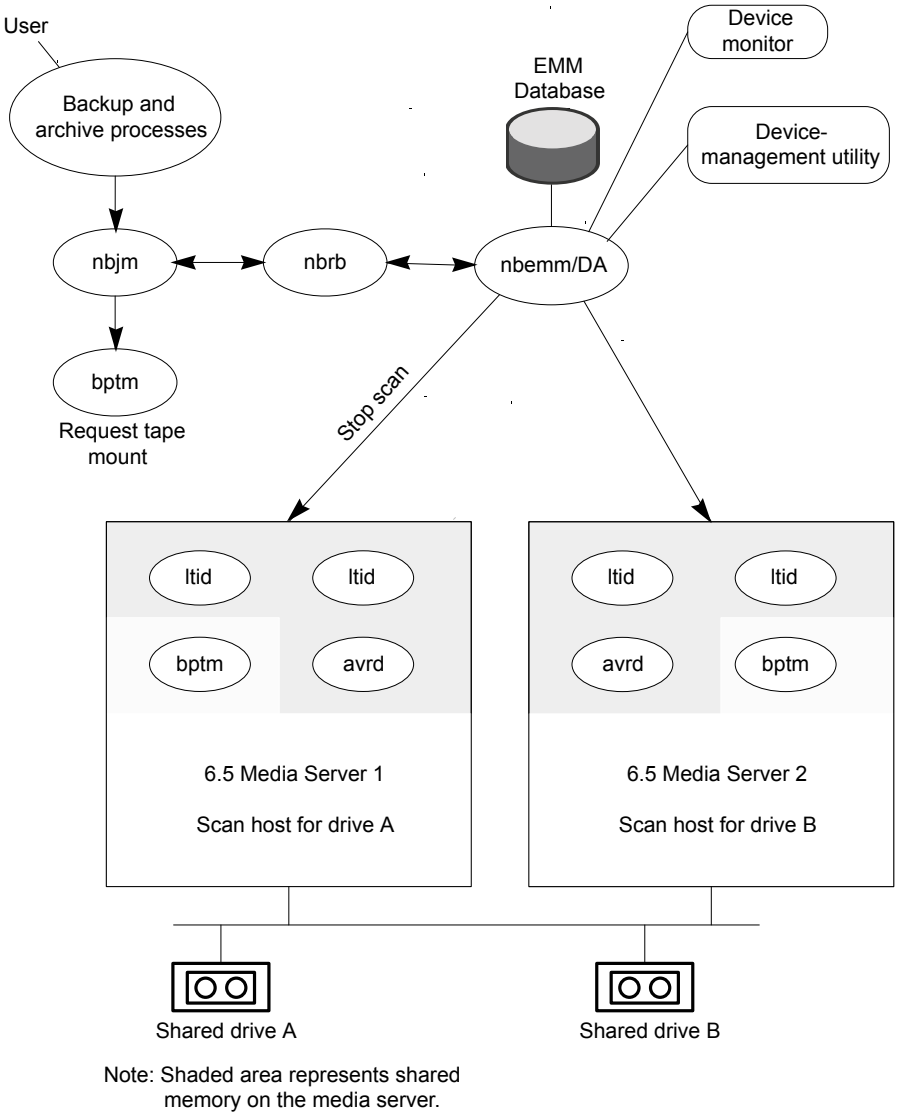
The following shows the shared storage option management process in the order presented:

- NetBackup, Storage Migrator, or users can initiate backups. nbjm makes a mount request for the backup.

- nbrb tells the EMM server to obtain a drive for the backup.
- nbrb tells the device allocator (DA) in the EMM server to stop scanning the selected drive.
- nbemm tells the appropriate media server (the scan host for the selected drive) to stop scanning the drive. The stop scan request is carried out by means of oprd, ltid, and avrd in the media server's shared memory.
- nbemm informs nbrb when scanning on the selected drive has stopped.
- nbrb informs nbjm that the selected drive (A) is available for the backup.
- nbjm conveys the mount request and drive selection to bptm, which proceeds with the backup. To protect the integrity of the write operation, bptm uses SCSI reservations.
  See "How NetBackup reserves drives" in the *NetBackup Administrator's Guide, Volume II*.
- The mount-media operation is initiated.
- bptm makes position checks on the drive to ensure that the drive has not been rewound by another application. bptm also does the actual write to the tape.
- When the backup is complete, nbjm tells nbrb to release resources.
- nbrb de-allocates the drive in EMM.
- EMM tells the scan host to resume scanning the drive. The scan request is carried out by means of oprd, ltid, and avrd in the media server's shared memory.

Figure B-3 illustrates the shared storage option management process.

Figure B-3 Media and device management process flow showing SSO components



Barcode operations

Barcode reading is mainly a function of the robot hardware rather than media and device management. When a robot has a barcode reader, it scans any barcode

that may be on a tape and stores the code in its internal memory. This associates the slot number and the barcode of the tape in that slot. NetBackup determines that association for its own use by interrogating the robot.

If a robot supports barcodes, NetBackup automatically compares a tape's barcode to what is in the EMM database as an extra measure of verification before mounting the tape. A request for media that is in a robot that can read barcodes begins in the same manner as other requests.

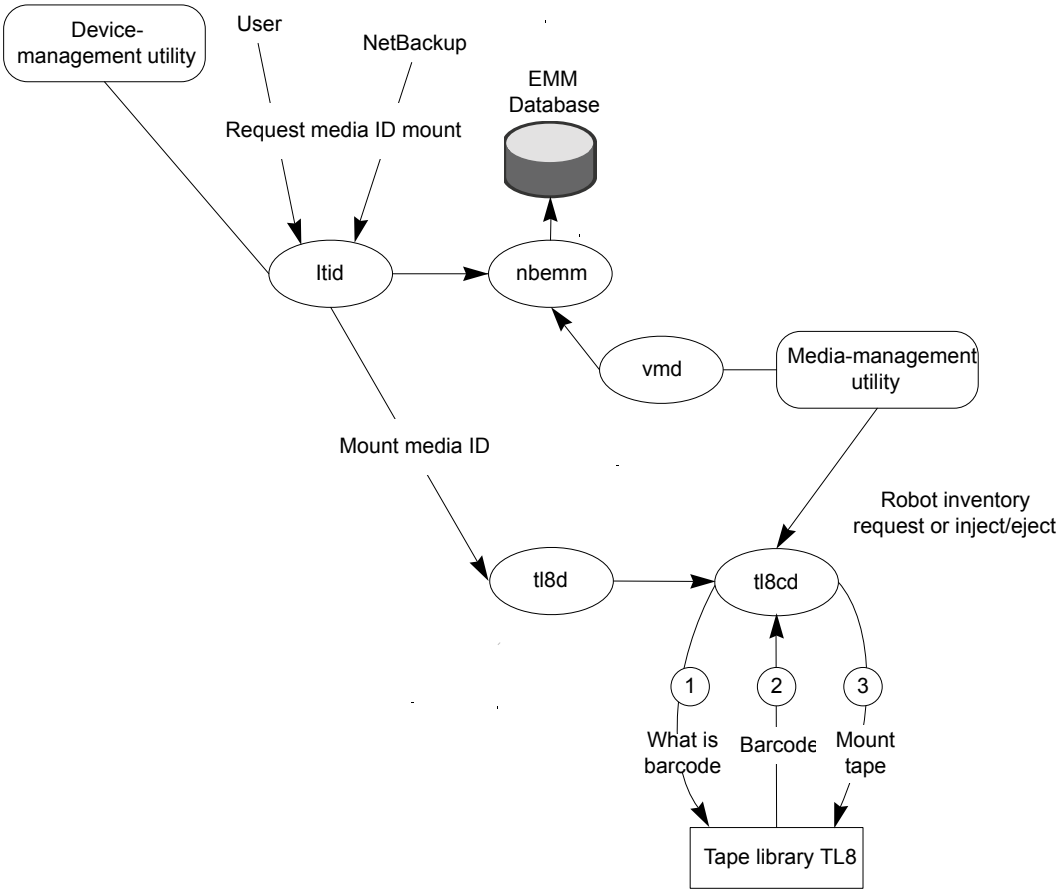
See Figure B-4 on page 295.

ltid includes the media ID and location information in a mount request to the robotic daemon for the robot that has the media ID. This request causes the robotic daemon to query the robotic-control daemon or the robot for the barcode of the tape in the designated slot. (This is a preliminary check to see if the correct media is in the slot.) The robot returns the barcode value it has in memory.

The robotic daemon compares this barcode with the value it received from ltid and takes one of the following actions:

- If the barcodes don't match, and the mount request is not for a NetBackup backup job, the robotic daemon informs ltid and a pending action request (Misplaced Tape) appears in the Device Monitor. An operator must then insert the correct tape in the slot.
- If the barcodes don't match and the mount request is for a NetBackup backup job, the robotic daemon informs ltid and the mount request is canceled. NetBackup (bptm) then requests a new volume from nbjm and from EMM.
- If the barcodes match, the robotic daemon requests the robot to move the tape to a drive. The robot then mounts the tape. At the start of the operation, the application (for example, NetBackup) checks the media ID and if it also matches what should be in this slot, the operation proceeds. For NetBackup, a wrong media ID results in a "media manager found wrong tape in drive" error (NetBackup status code 93).

Figure B-4 Barcode request



Media and device management components

This topic shows the file and directory structure and the programs and daemons assoicated with the media and device management.

Figure B-5 shows the file and directory structure for media and device management on a UNIX server. A Windows NetBackup server has equivalent files and directories that are located in the directory where NetBackup is installed (by default, C:\Program Files\VERITAS).

Figure B-5 Media and device management directories and files

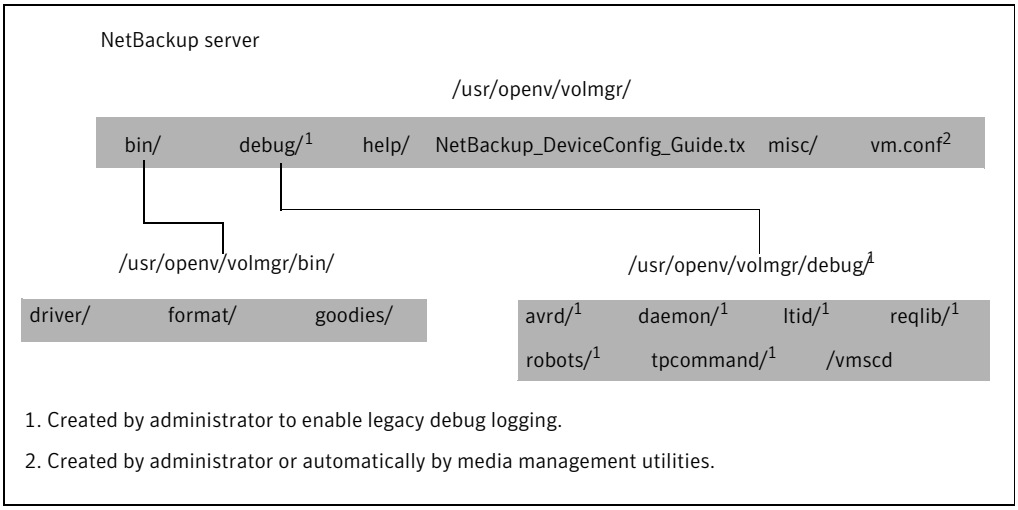


Table B-1 describes the directories and files that are of special interest.

Table B-1 Media and device management directories and files

File or directory	Contents
bin	Commands, scripts, programs, daemons, and files required for media and device management. There are three subdirectories under bin. driver: Contains SCSI drivers used on various platforms to control robotics. format: Disk format information for optical platters on Solaris (SPARC only) platforms. goodies: Contains vmconf script and scan utility.
debug	Legacy debug logs for the Volume Manager daemon, vmd, and all requesters of vmd, ltid, and device configuration. The administrator must create these directories for debug logging to occur.
help	Help files used by media and device management programs. These files are in ASCII format.
misc	Lock files and temporary files required by various components of media and device management.

Table B-1 Media and device management directories and files *(continued)*

File or directory	Contents
vm.conf	Media and device management configuration options.

Table B-2 describes the media and device management programs and daemons. The explanations include what starts and stops the program or daemon, and the log (if any) where it records its activities. On UNIX, all of the components discussed in this table reside under /usr/openv/volmgr/bin. On Windows, they reside under install_path\volmgr\bin.

Note: The following table contains references to the system log. This log is managed by syslog on UNIX (the facility is daemon). On Windows the Event Viewer manages the system log (the log type is Application).

Table B-2 Media and device management daemons and programs

Program or daemon	Description
acsd	The Automated Cartridge System daemon interfaces with the Automated Cartridge System. It communicates with the server that controls the ACS robotics through the acsssi process (UNIX) or the STK Libattach Service (Windows). Also, for UNIX, see the acsssi and acssel programs. **Started By**: Starting ltid (or on UNIX, independently by using the `/usr/openv/volmgr/bin/ascd` command. **Stopped By**: Stopping ltid (or on UNIX, independently by finding the PID (process id) and then using the kill command). **Debug Log**: Errors are logged in the system log and robots debug log. Debug information is included by adding VERBOSE to the vm.conf file. On UNIX, debug information is also included by starting the daemon with the -v option: this option can also be used through ltid, or by putting VERBOSE in the vm.conf file.
acssel	Available only on UNIX. See the *NetBackup Device Configuration Guide.*
acsssi	Available only on UNIX. See the *NetBackup Device Configuration Guide.*

Table B-2 Media and device management daemons and programs *(continued)*

Program or daemon	Description
avrd	The automatic-volume-recognition daemon controls automatic volume assignment and label scanning. This lets NetBackup read labeled tape and optical disk volumes and to automatically assign the associated removable media to requesting processes. **Started By**: Starting ltid (or on UNIX, independently by using the /usr/openv/volmgr/bin/avrd command). **Stopped By**: Stopping ltid, (or on UNIX, independently by finding the PID (process id) and then using the kill command). **Debug Log**: All errors are logged in the system log. Debug information is included by adding VERBOSE to the vm.conf file. On UNIX, debug information is also included by aborting avrd and starting the daemon with the -v option.
ltid	The device demon (UNIX) or NetBackup Device Manager service (Windows) controls the reservation and assignment of tapes and optical disks. **Started By**: /usr/openv/volmgr/bin/ltid command on UNIX or Stop/Restart Device Manager Service command in Media and Device Management window on Windows. **Stopped By**: /usr/openv/volmgr/bin/stopltid command on UNIX or Stop/Restart Device Manager Service command in the Media and Device Management window on Windows. **Debug Log**: Errors are logged in the system log and ltid debug log. Debug information is included if the daemon is started with the -v option (available only on UNIX) or adding VERBOSE to the vm.conf file.
odld	The Optical Disk Library daemon interfaces with the Optical Disk Library, communicating with the robotics through a SCSI interface. This library is not supported on Windows. **Started By**: Starting ltid or independently by using the /usr/openv/volmgr/bin/odld command. **Stopped By**: Stopping ltid or independently by finding the PID (process id) and then using the kill command. **Debug Log**: All errors are logged in the system log. Debug information is included if the daemon is started with the -v option (either by itself or through ltid) or adding VERBOSE to the vm.conf file.

Table B-2 Media and device management daemons and programs *(continued)*

Program or daemon	Description
tl4d	The Tape Library 4MM daemon is the interface between ltid and the Tape Library 4MM and communicates with the robotics through a SCSI interface. **Started By**: Starting ltid (or on UNIX, independently by using the /usr/openv/volmgr/bin/tl4d command). **Stopped By**: Stopping ltid (or on UNIX, independently by finding the PID (process id) and then using the kill command). **Debug Log**: All errors are logged in the system log. Debug information is included by adding VERBOSE to the vm.conf file. On UNIX, debug information is also included by starting the daemon with the -v option (either by itself or through ltid).
tl8d	The Tape Library 8MM daemon provides the robotic control for a TL8 robot (Tape Library 8mm or Tape Stacker 8mm). The Tape Library 8MM daemon drives in the same TL8 robot may be attached to different hosts than the robotic control. tl8d is the interface between the local ltid and the robotic control. If a host has a device path for a drive in a TL8 robot, then mount or unmount requests for that drive go first to the local ltid and then to the local tl8d (all on the same host). tl8d then forwards the request to tl8cd on the host that is controlling the robot (could be on another host). **Started By**: Starting ltid (or on UNIX, independently by using the /usr/openv/volmgr/bin/tl8d command). **Stopped By**: Stopping ltid (or on UNIX, independently by finding the PID (process id) and then using the kill command. **Debug Log**: Errors are logged in the system log and robots debug log. Debug information is included by adding VERBOSE to the vm.conf file. On UNIX, debug information is also included by starting the daemon with the -v option (either by itself or through ltid).

Table B-2 Media and device management daemons and programs *(continued)*

Program or daemon	Description
tl8cd	The Tape Library 8MM Control daemon provides the robotic control for a TL8 robot and communicates with the robotics through a SCSI interface. tl8cd receives mount and unmount requests from tl8d on the host to which the drive is attached and then communicates these requests to the robot. **Started By**: Starting ltid (or on UNIX, independently by using the /usr/openv/volmgr/bin/tl8cd command). **Stopped By**: Stopping ltid or by using the tl8cd -t command. **Debug Log:** Errors are logged in the system log and robots debug log. Debug information is included by adding VERBOSE to the vm.conf file. On UNIX, debug information is also included by starting the daemon with the -v option (either by itself or through ltid).
tldd	The Tape Library DLT daemon works in conjunction with tldcd to handle requests to TLD robots (Tape Library DLT and Tape Stacker DLT). tldd provides the interface between the local ltid and the robotic control (tldcd) in the same manner as explained previously for tl8d. **Started By**: Starting ltid (or on UNIX, independently by using the /usr/openv/volmgr/bin/tldd command). **Stopped By**: Stopping ltid (or on UNIX, independently by finding the PID (process id) and then using the kill command). **Debug Log**: Errors are logged in the system log and robots debug log. Debug information is included by adding VERBOSE to the vm.conf file. On UNIX, debug information is also included by starting the daemon with the -v option (either by itself or through ltid).

Table B-2 Media and device management daemons and programs *(continued)*

Program or daemon	Description
tldcd	The Tape Library DLT Control daemon provides robotic control for a TLD robot in the same manner as explained previously for tl8cd. **Started By**: Starting ltid (or on UNIX, independently by using the /usr/openv/volmgr/bin/tldcd command). **Stopped By**: Using the tldcd -t command. Stopping ltid or by using the tldcd -t command. **Debug Log**: Errors are logged in the system log and robots debug log. Debug information is included by adding VERBOSE to the vm.conf file. On UNIX, debug information is also included by starting the daemon with the -v option (either by itself or through ltid).
tlhd	The Tape Library Half-inch daemon works in conjunction with tlhcd to handle requests to TLH robots that are in an IBM Automated Tape Library (ATL). tlhd provides the interface between the local ltid and the robotic control (tlhcd) in the same manner as explained previously for tl8d. **Started By**: Starting ltid (or on UNIX, independently by using the /usr/openv/volmgr/bin/tlhd command). **Stopped By**: Stopping ltid (or on UNIX, independently by finding the PID (process id) and then using the kill command). **Debug Log**: Errors are logged in the system log and robots debug log. Debug information is included by adding VERBOSE to the vm.conf file. On UNIX, debug information is also included by starting the daemon with the -v option (either by itself or through ltid).

Table B-2 Media and device management daemons and programs *(continued)*

Program or daemon	Description
tlhcd	The Tape Library Half-inch Control daemon provides robotic control for a TLH robot that is in an IBM Automated Tape Library (ATL) in a similar manner to that which was explained previously for tl8cd. **Started By**: Starting ltid (or on UNIX, independently by using the /usr/openv/volmgr/bin/tlhcd command). **Stopped By**: Stopping ltid or by using the tlhcd -t command. **Debug Log**: Errors are logged in the system log and robots debug log. Debug information is included if the daemon is started with the -v option (either by itself or through ltid). The -v option is available only on UNIX. Also, add the VERBOSE option to the vm.conf file.
tlmd	The Tape Library Multimedia daemon is the interface between ltid and a TLM robot that is in an ADIC Distributed AML Server (DAS). This daemon communicates with the TLM robotics through a network API interface. **Started By**: Starting ltid or independently by using the /usr/openv/volmgr/bin/tlmd command. **Stopped By**: Stopping ltid or independently by finding the PID (process id) and then using the kill command. **Debug Log**: Errors are logged in the system log and robots debug log. Debug information is included if the daemon is started with the -v option (either by itself or through ltid). The -v option is available only on UNIX. Also, add the VERBOSE option to the vm.conf file.

Table B-2 Media and device management daemons and programs *(continued)*

Program or daemon	Description
tpconfig	The Tape Library Multimedia daemon is the interface between ltid and a TLM robot that is in an ADIC Distributed AML Server (DAS). This daemon communicates with the TLM robotics through a network API interface. **Started By**: Starting ltid or independently by using the /usr/openv/volmgr/bin/tlmd command. **Stopped By**: Stopping ltid or independently by finding the PID (process id) and then using the kill command. **Debug Log**: Errors are logged in the system log and robots debug log. Debug information is included if the daemon is started with the -v option (either by itself or through ltid). The -v option is available only on UNIX. Also, add the VERBOSE option to the vm.conf file.
tshd	The Tape Stacker Half-inch daemon is the interface between ltid and the half-inch-cartridge stacker and communicates with the robotics through a SCSI interface. This robot is not supported on Windows. **Started By**: Starting ltid (or on UNIX, independently by using the /usr/openv/volmgr/bin/tshd command). **Started By**: tpconfig command. **Stopped By**: Quit option from within the utility on UNIX. On Windows, tpconfig is only a command-line interface that runs to completion (no quit option). **Debug Log**: tpcommand debug logs.
vmd	The Volume Manager daemon (NetBackup Volume Manager service on Windows) allows remote administration and control of Media and Device Management. vmd provides a proxy to EMM for pre-6.0 NetBackup servers. **Started By**: Starting ltid (or on UNIX, independently by using the Initiate Media Manager Volume Daemon option in vmadm) **Stopped By**: Terminate Media Manager Volume Daemon option in vmadm). **Debug Log**: System log and also a debug log if the daemon or reqlib debug directories exist

Table B-2 Media and device management daemons and programs *(continued)*

Program or daemon	Description
vmadm	Available only on UNIX. An administrator utility with options for configuring and managing volumes under control of media and device management. It has a menu-driven, character-based interface that can be used from workstations that do not have graphical display capabilities. **Started By**: /usr/openv/volmgr/bin/vmadm command **Stopped By**: Quit option from within the utility. **Debug Log**: /usr/openv/volmgr/debug/reqlib
vmscd	The Media Manager Status Collector Daemon keeps the EMM server database up-to-date with the actual status of drives attached to 5.x servers. **Started By**: the EMM server. **Stopped By**: the EMM server. **Debug Log**: /usr/openv/volmgr/debug/vmscd (UNIX), install_path\Volmgr\debug\vmscd (Windows)

Appendix C

Networks and hostnames

This appendix includes the following topics:

Background for troubleshooting

In a configuration with multiple networks and clients with more than one hostname, NetBackup administrators must configure the policy entries carefully. They must consider the network configuration (physical, hostnames and aliases, NIS/DNS, routing tables, and so on). If administrators want to direct backup and restore data across specific network paths, they especially need to consider these things.

For a backup, NetBackup connects to the host name as configured in the policy. The operating system's network code resolves this name and sends the connection across the network path that is defined by the system's routing tables. The `bp.conf` file is not a factor making this decision.

For restores from the client, the client connects to the master server. For example, on a UNIX system, the master server is the first one named in the `/usr/openv/netbackup/bp.conf` file. On a Windows system, the master server is specified on the **Server to use for backups and restores** drop-down of the Specify NetBackup Machines and Policy Type dialog box. To open this dialog, start the NetBackup Backup, Archive, and Restore interface and click **Specify NetBackup Machines and Policy Type** on the **File** menu. The client's network code that maps the server name to an IP address determines the network path to the server.

Upon receipt of the connection, the server determines the client's configured name from the peername of its connection to the server.

The peername is derived from the IP address of the connection. This means that the address must translate into a host name (using the `gethostbyaddr()` network

routine). This name is visible in the `bprd` debug log when a connection is made as in the line:

```
Connection from host peername ipaddress ...
```

The client's configured name is then derived from the peername by querying the `bpdbm` process on UNIX systems. On Windows systems, you must query the NetBackup Database Manager service.

The `bpdbm` process compares the peername to a list of client names that are generated from the following:

- All clients for which a backup has been attempted
- All clients in all policies

The comparison is first a simple string comparison. The comparison is verified by comparing hostnames and aliases that are retrieved by using the network function `gethostbyname()`.

If none of the comparisons succeed, a more brute force method is used, which compares all names and aliases using `gethostbyname()`.

The configured name is the first comparison that succeeds. Note that other comparisons might also have succeeded if aliases or other "network names" are configured.

If the comparison fails, the client's hostname as returned by the `gethostname()` function on the client is used as the configured name. An example of a failed comparison is when the client had changed its hostname but its new hostname is not yet reflected in any policies.

These comparisons are logged in the `bpdbm` debug log if `VERBOSE` is set. You can determine a client's configured name by using the `bpclntcmd` command on the client. For example:

`# /usr/openv/netbackup/bin/bpclntcmd -pn` (UNIX)

`# install_path\NetBackup\bin\bpclntcmd -pn` (Windows)

```
expecting response from server wind.abc.me.com
danr.abc.me.com danr 194.133.172.3 4823
```

Where the first output line identifies the server to which the request is directed and the second output line is the server's response in the following order:

- Peername of the connection to the server
- Configured name of the client
- IP address of the connection to the server

- Port number that is used in the connection

When the client connects to the server, it sends the following three names to the server:

- browse client
- requesting client
- destination client

The browse client name is used to identify the client files to list or restore from. The user on the client can modify this name to restore files from another client. For example, on a Windows client, the user can change the client name by using the Backup, Archive, and Restore interface. (See the NetBackup online Help for instructions). For this change to work, however, the administrator must also have made a corresponding change on the server.

See the *NetBackup Administrator's Guide, Volume I*.

The requesting client is the value from the `gethostname()` function on the client.

The destination client name is a factor only if an administrator pushes a restore to a client from a server. For a user restore, the destination client and the requesting client are the same. For an administrator restore, the administrator can specify a different name for the destination client.

By the time these names appear in the `bprd` debug log, the requesting client name has been translated into the client's configured name.

The name that used to connect back to the client to complete the restore is either the client's peername or its configured name. The type of restore request (for example, from root on a server, from a client, to a different client, and so on) influences this action.

When you modify client names in NetBackup policies to accommodate specific network paths, the administrator needs to consider:

- The client name as configured on the client. For example, on UNIX the client name is `CLIENT_NAME` in the client's `bp.conf` file. On a Windows client, it is on the **General** tab of the NetBackup Client Properties dialog box. To open this dialog box, select **NetBackup Client Properties** from the **File** menu in the Backup, Archive, and Restore interface.
- The client as currently named in the policy configuration.
- Client backup and archive images that already exist as recorded in the `images` directory on the master server. On a UNIX or Linux server, the `images` directory is `/usr/openv/netbackup/db/`. On a Windows NetBackup server, the `images` directory is *`install_path`*`\NetBackup\db\images`.

Any of these client names can require manual modification by the administrator if the following: a client has multiple network connections to the server and restores from the client fail due to a connection-related problem.

On UNIX, the public domain program `traceroute` (not included with NetBackup) often can provide valuable information about a network's configuration. Some system vendors include this program with their systems.

The master server may be unable to reply to client requests, if the Domain Name Services (DNS) are used and the following is true: the name that the client obtains through its `gethostname()` library (UNIX) or `gethostbyname()` network (Windows) function is unknown to the DNS on the master server, The client and the server configurations can determine if this situation exists. `gethostname()` or `gethostbyname()` on the client may return an unqualified host name that the DNS on the master server cannot resolve.

Although you can reconfigure the client or the master server DNS hosts file, this solution is not always desirable. For this reason, NetBackup provides a special file on the master server. This file is as follows:

`/usr/openv/netbackup/db/altnames/host.xlate` (UNIX and Linux)

`install_path``\NetBackup\db\altnames\host.xlate` (Windows)

You can create and edit this file to force the desired translation of NetBackup client host names.

Each line in the `host.xlate` file has three elements: a numeric key and two hostnames. Each line is left-justified, and a space character separates each element of the line.

`key hostname_from_client client_as_known_by_server`

The following describes the preceding variables:

- *key* is a numeric value used by NetBackup to specify the cases where the translation is to be done. Currently this value must always be 0, which indicates a configured name translation.
- *hostname_from_client* is the value to translate. This value must correspond to the name that is obtained by the client's `gethostname()` function and sent to the server in the request.
- *client_as_known_by_server* is the name to substitute for *hostname_from_client* when responding to requests. This name must be the name that is configured in the NetBackup configuration on the master server. It must also be known to the master server's network services.

This following is an example:

```
0 danr danr.eng.aaa.com
```

When the master server receives a request for a configured client name (numeric key 0), the name danr is always replaced by the name danr.eng.aaa.com. The problem is resolved, assuming the following:

- The client's `gethostname()` function returns danr.
- The master server's network services `gethostbyname()` function did not recognize the name danr.
- The client was configured and named in the NetBackup configuration as danr.eng.aaa.com and this name is also known to network services on the master server.

Appendix D

Robotic test utilities

This appendix includes the following topics:

About robotic test utilities

Each of the robotic software packages includes a robotic test utility for communicating directly with robotic peripherals. The tests are for diagnostic purposes and the only documentation is the online Help that you can view by entering a question mark (?) after starting the utility. Specify `-h` to display the usage message.

Note: Do not use the robotic test utilities when backups or restores are active. The tests lock the robotic control path and prevent the corresponding robotic software from performing actions, such as loading and unloading media. If a mount is requested, the corresponding robotic process times out and goes to the DOWN state. This usually results in a media mount timeout. Also, be certain to quit the utility when your testing is complete.

Robotic tests on UNIX

If the robot has been configured (that is, added to the EMM database), start the robotic test utility by using the `robtest` command. This action saves time, since robotic and drive device paths are passed to the test utility automatically. The procedure is as follows:

To use the `robtest` command, do the following (in the order presented):

- Execute the following command:

  /usr/openv/volmgr/bin/robtest

  The test utility menu appears.

- Select a robot and press **Enter**.
  The test starts.

If the robot is not configured, you cannot use `robtest` and must execute the command that applies to the robot you test.

ACS	`/usr/openv/volmgr/bin/acstest -r ACSLS_hostpath` for `acstest` to work on UNIX and Linux, `acssel` and `acsssi` must be running
ODL	`/usr/openv/volmgr/bin/odltest -r roboticpath`
TL4	`/usr/openv/volmgr/bin/tl4test -r roboticpath`
TL8	`/usr/openv/volmgr/bin/tl8test -r roboticpath`
TLD	`/usr/openv/volmgr/bin/tldtest -r roboticpath`
TLH	`/usr/openv/volmgr/bin/tlhtest -r robotic_library_path`
TLM	`/usr/openv/volmgr/bin/tlmtest -r DAS_host`
TSH	`/usr/openv/volmgr/bin/tshtest -r roboticpath`

More information on ACS, TLH, and TLM robotic control is available.

See the *NetBackup Device Configuration Guide*.

In the previous list of commands, *roboticpath* is the full path to the device file for the robotic control (SCSI). You can review the section for your platform to find the appropriate value for *roboticpath*.

An optional parameter specifies the device file path for the drives so that this utility can unload the drives using the SCSI interface.

Robotic tests on Windows

If the robot has been configured (that is, added to the EMM database), start the robotic test utility by using the `robtest` command. This action saves time, since robotic and drive device paths are passed to the test utility automatically.

To use the `robtest` command, do the following (in the order presented):

- Execute the following command:

  ```
  install_path\Volmgr\bin\robtest.exe
  ```

  The test utility menu appears.
- Select a robot and press Enter.
  The test starts.

Note: If the robot is not configured, you cannot use `robtest` and must execute the command that applies to the robot you are testing (see following list).

ACS	`install_path\Volmgr\bin\acstest -r ACSLS_HOST`
TL4	`install_path\Volmgr\bin\tl4test -r roboticpath`
TL8	`install_path\Volmgr\bin\tl8test -r roboticpath`
TLD	`install_path\Volmgr\bin\tldtest -r roboticpath`
TLH	`install_path\Volmgr\bin\tlhtest -r robotic_library_name`
TLM	`install_path\Volmgr\bin\tlmtest -r DAS_Hostname`

More information on ACS, TLH, and TLM robotic control is available.

See the *NetBackup Device Configuration Guide*.

In the previous list of commands, *roboticpath* is the full path to the device file for the robotic control (SCSI). You can review the section for your platform to find the appropriate value for *roboticpath*.

An optional parameter specifies the device file path for the drives so that this utility can unload the drives using the SCSI interface.

Usage is:

```
install_path <-p port -b bus -t target -l lan | -r
roboticpath>
```

where: *roboticpath* is the changer name (e.g., Changer0).

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