NetBackup Vault Extension Operations Guide For UNIX Servers Revision 3.4

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Table of Contents

Introduction

This document provides operational procedures for running the bpvault system. It is divided into the following sections:

1. **Operational Design** - shows the basic operational responsibilities shared by Storage Administration and Operations to use bpvault successfully.
2. **Operational Procedures** - shows detailed information needed by Operational staff to follow. (Storage Administration has a separate System Administration document)
3. **Sample Reports** - Documents each of the reports used by Operations to process the tapes.

We have also provided a **Functional Design** document that illustrates the technical design and a **System Administration Guide** that provides installation and troubleshooting information.

Background

Bpvault was developed as a utility program developed for use with NetBackup. Its purpose is to assist in disaster recovery by creating duplicate copies of backup tapes. If backup tapes are destroyed at a primary data center location, duplicates for some of these backups are still available at an offsite location. Bpvault creates the duplicates, ejects them from any robotic libraries, and assigns offsite vault slot numbers. Bpvault keeps track of the duplicates and requests these tapes to be returned from the offsite location after a specified period of time, e.g. when the backup is no longer needed.

These Operational Procedures document how to take tapes from the robotic libraries, compare them with the bpvault reports, and send them to the offsite vendor. It also documents how to re-print necessary reports.

Notes

This manual uses “shell script like” notations for certain “variables”; most notably are the $VAULT and $DUPID. These notations are defined as follows:

$VAULT – the name of the vault being used for a given duplication session

$DUPID – a unique number (or ID) referring to a duplication session

Design

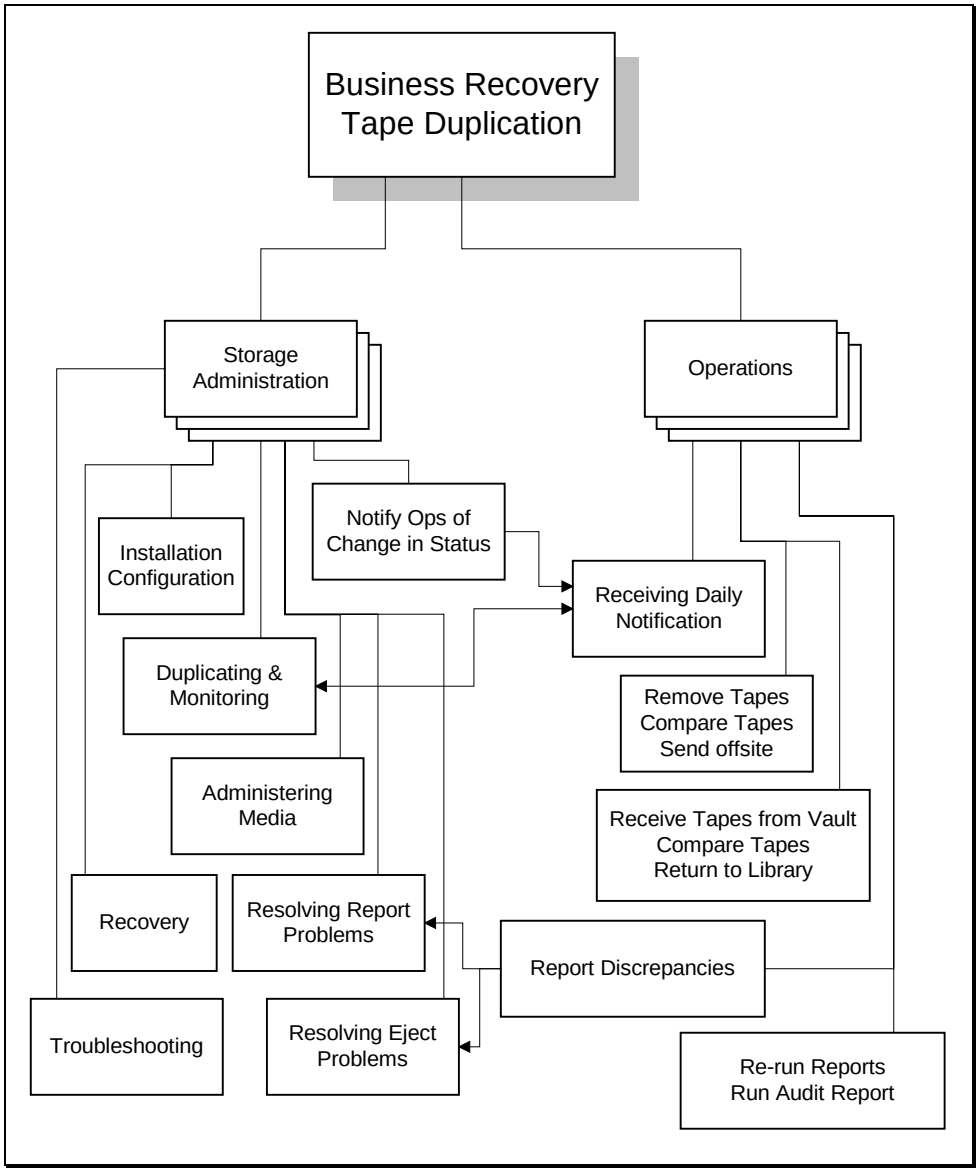
The overall design of bpvault was created to simplify the job for both Storage Administration and Systems Operations. Both Storage Administration and Operations responsibilities are summarized here to help Operations understand how to gain necessary support. Detailed Operations instructions are provided in the next section. The following table highlights the different tasks and assigns responsibilities:

Staff Responsibilities	
Storage Administration	**Operations**
1. Installation and Configuration of bpvault.	1. Receiving daily notification of duplication completion.
2. Running and Monitoring daily duplications to ensure they complete.	2. Removing new tapes from robotic libraries.
3. Administering tape media to ensure sufficient media available for each day's duplicates.	3. Comparing new tapes to be sent from library with report to send to offsite vendor.
4. Resolving conflicts between printed reports and offsite vendor status.	4. Sending new tapes to offsite vendor.
5. Resolving issues about tapes improperly ejected.	5. Receiving returned tapes from offsite vendor.
6. Manually recovering duplicated media.	6. Comparing returned tapes with report from offsite vendor.
	7. Inserting returned tapes into robotic libraries.
	8. Reporting discrepancies between reports, tapes on-hand to storage administration.
	9. Re-running reports as needed.
	10. Periodic auditing of media on-hand.

Support

Please contact VERITAS Customer Support (1-800-342-0652) regarding problems with Vault Extension.

The following diagram shows the overall Operational Design from these responsibilities:



Storage Administration Responsibilities (Summary)

Installation

Bpvault is normally installed on the NetBackup master server.

All files are stored in:

```
/usr/openv/netbackup/vault/production
```

Bpvault is run by a shell script, “bpvault.all”. This script is normally run by cron during the day:

```
/usr/openv/netbackup/vault/production/bpvault.all
```

Operational access to bpvault is provided by another script, “bpvault.opsmenu”:

```
/usr/openv/netbackup/vault/production/bpvault.opsmenu
```

This script provides the ability to re-print current reports and to physically manipulate tapes. There are no operational menus to start jobs or stop jobs.

Other scripts are installed to workaround current NetBackup limitations on Storage Tek robots that use ACSLS and manipulate NetBackup controlled (TLD, TL8, etc.) robotic devices:

```
/usr/openv/netbackup/vault/bin/robot_inventory
/usr/openv/netbackup/vault/bin/eject_tapes
/usr/openv/netbackup/vault/production/bpinject
```

Configuration

Bpvault is setup to duplicate or vault a number of backup images. This information is provided by a file usually named “dup_param”. The quantity of tapes that are duplicated or vaulted can vary based on the number of backup jobs that qualify for vaulting.

Bpvault can run duplications on many machines. These machines will have a number of tape drives used for duplication. A standard configuration will allow a site to duplicate tapes during the day without using network bandwidth since tapes are duplicated on the same machine - tapes should not be duplicated from one machine to another.

Check with the Storage Administration team for detailed configuration information.

Monitoring

Storage Administration can monitor bpvault by viewing an output file created during a production run. This file, “bpvault.all.output_$VAULT” (located in the directory /usr/openv/netbackup/vault/production), shows the on-going processing of each backup image.

Another log file, “log.file” (located in /usr/openv/netbackup/vault/$VAULT), shows each image as it completes duplication. It is intended that this file be monitored using VERITAS Storage Manager or another third party event management utility.

Administering Media

There should be sufficient media allocated for duplication. These media should be allocated using normal NetBackup procedures. The Storage Administration team will determine which Media Manager Volume Pool and Volume Group these media should reside within.

Resolving Report Problems

If there are questions about tapes missing from reports or incorrectly found on reports, the Storage Administration team should be notified.

Resolving Eject Problems

Tapes which are on the daily Eject Reports but are not properly ejected from the library may be manually ejected from the robotic controller using either Media Manager or ACSLS commands, depending on which type of robotic control your site is using. However, such incidents should be reported immediately to reduce potential problems with future sessions.

Notify Operations of Change in Status

Any change in daily run status should be reported to Operations. In most customer situations, bpvault sessions are scheduled to run each day, and automatically notify Operations through email. If Duplications are postponed for some reason, email or phone notification should be provided by Storage Administration.

Operations Responsibilities (Summary)

Receiving Daily Notification

A copy of the daily eject report should be automatically emailed to the Operations team. This report is meant to notify Operations that a session has completed, reports are being sent to the printer, and that tapes are being ejected from the library. Contact Storage Administration if this email is not being received.

Remove Tapes from Library, Compare, Send Offsite

People who receive the eject report should be aware of the person responsible for the processing of the ejected tapes. The steps to follow are documented in the following section.

Receive Tapes from Offsite Vendor

Tapes are normally returned daily or weekly from the offsite vendor for re-use by bpvault. These tapes have backups that are now expired. They should be processed as documented in the next section and returned to the library.

Report Discrepancies

Any mistakes in any report should be reported to Storage Administration. This should be done via phone and/or email.

Re-Run Report

It may be necessary to re-print a specific report or group of reports. This requires logging into the NetBackup master server, running “bpvault.opsmenu”, and selecting the necessary report. Detailed instructions on how to access and run the report, and how to re-direct the report to email, are provided in the next section.

Run Audit Report

Some sites may require a periodic auditing of a backup system. Therefore, a report is provided that prints the entire set of vault tapes in VOLSER sorted order. You may wish to ask Storage Administration for an additional report showing all of the tapes in the library and vault in addition to this vault report, since it only provides information on tapes used for vaulting and not the standard backup tapes.

Procedures

This section provides detailed instructions for each of the Operational Procedures noted above. (Detailed Administration instructions are provided in the System Administration Guide.)

Receiving Daily Notification

Each time the vaulting process is run, reports are sent to various staff members to notify them that vaulting is finished. The following steps should be followed upon receiving the report:

1. Determine who is responsible for processing the ejected tapes.
2. Retrieve printed reports from the assigned printer, if applicable.
3. Retrieve ejected tapes from the library doors.
4. Prepare tapes for offsite storage.
5. Compare ejected tapes with the daily eject report.
6. Work with Storage Administration for any discrepancies.

If the vaulting process has been postponed for the day (or for several days), you should have received prior notification of a change in daily operations.

If the notification does not arrive by a pre-determined time (e.g. 1:00 PM), it will be difficult to process the tapes in time for offsite vendor delivery and pickup time (e.g. 3:00 PM). Please contact Storage Administration to determine if there are any problems with a given vault session. He/she can monitor the current jobs and interrupt them to allow the session to finish on time.

Remove Tapes from Library

Ejected tapes are placed into one of the library export doors (also known as CAP slots or mail slots), one set of tapes at a time. Following normal procedures for opening the silo doors, all tapes must be removed before the silo will process the next set of tapes. You may need to wait while the silo places the next set of tapes in the door depending on how many tapes are ejected for that session.

The tapes should be ejected in Volser and Slot ID order. That is, we assign a new Slot ID on a session-by-session basis and this assignment is done in Volser order. Thus ejected the tapes should match the Eject Report which is printed in Slot ID order. There may be cases in which the order does not match. This may happen due to the reuse of offsite slot IDs from tapes that have returned from the vault.

Compare Tapes with Reports to Send to Vault

There are several reports printed which are used to process the daily work.

1. The “Picking List for Library” report is provided which documents the tapes to be removed from the silo. It lists the Volser, Slot ID, Date Assigned, and Expiration dates. This report should have the same tapes listed that are physically ejected from the silo. Volser should match the tape label. Slot ID should be in ascending order, and should not match any slot in use at the offsite vendor nor any slot used by a tape in transit to/from the offsite vendor. Slot IDs are re-assigned only after the tape has been physically returned to the silo and after they have been left in the silo for one day. The Date Assigned should be the same day. Expiration dates will vary from 1 week to 1 year. This report is to be kept in the predetermined location. If there are no tapes on this report, it means that no duplications were completed during this session.

2. The “Distribution List for Vault” report is the same report as “Picking from Library”, but has a different header. It should have the same tape information on it, and should be sent to the offsite vendor with the tape batch.
3. The “Picking List for Vault” report shows tapes requested for return from the offsite vendor. One copy of this report is normally printed to be provided to the offsite vendor with each batch. It is very possible that no tapes are on this report if no tapes had expired that day. This report should still be sent to the offsite vendor.
4. The “Distribution List for Library” report the same tapes as “Picking list for Vault”. These tapes will not arrive for at least one day so the report should be left in a predetermined location, awaiting a check in process when the tapes arrive the following day. Only after the tapes are checked in does the report get filed. See below for detailed instructions on processing those tapes.
5. The “Vault Inventory” report shows all the tapes which will be in the offsite vault once the offsite vendor receives the daily batch, and once they remove all the tapes shown in the “Distribution to Vault” report. Two copies of this report are normally printed. One copy of this report should be provided to the offsite vendor with each batch. The other copy should be placed in the predetermined location.

These reports should be sent to a centrally located printer. Copies of the reports should also be sent by email. Delete the email version if you do not need this copy to save space in your mail file.

Other reports may be printed after a vault session. The Storage Administration team should notify operations of all reports that are to be printed and which reports need to be sent offsite. Examples of other reports are detailed distribution lists which show the actual data stored on each tape.

NOTE: The tapes used for NetBackup database backups will not show an "ASSIGNED" date, but rather display NBDBTAPE. The "EXPIRATION" date for these tapes will be that which is calculated as a return date during the assignment, normally anywhere from seven to fourteen days. It also should be noted that the “#IMAGES” and “KBYTES” fields will display zero (0) because NetBackup is not aware of how much data was backed up during the NetBackup database backup. Storage Administration can verify that a NetBackup database backup is valid by using NetBackup interfaces.

Sending Reports & Tapes to the Offsite Vendor

Once all the reports are received and the tapes have been compared, the tapes and appropriate reports should be prepared for pickup by the offsite vendor.

1. Use containers specified by Operations or Storage Administration.
2. Include 3 reports: “Vault Inventory”, “Distribution List for Vault” and “Picking List for Vault”
3. Complete offsite vendor pick up form. Note container numbers, vault number, date of shipment.
4. File a copy of the “Picking List for Library” in the predetermined location. Sign off for completion.
5. Place “Distribution List for Library” in the predetermined location. This is used for returning tapes.

Receiving Tapes from Offsite Vendor Vault

The offsite vendor will return tapes that have been requested, normally the preceding day. These tapes must be compared against our reports to ensure they are the full set of tapes.

1. Find “Distribution List for Library” report. This is normally the previous day’s report.

2. Compare tapes received with report. Notify Storage Administration if there are any discrepancies which cannot be resolved with the offsite vendor.
3. Remove tapes from containers and enter them into the silo according to your normal operating procedures. Be sure not to skip any slots as the silo may not reload the tapes properly. If using Media Manager controlled robots (e.g. TLD, TL8), run the inject process as specified by Storage Administration.
4. Sign off the report and file in its proper binder.
5. All discrepancies (outgoing or returning) must be resolved by the individual preparing or checking in of the tapes. Do not file reports until all discrepancies have been resolved.

Report Discrepancies

Escalation Procedures:

In case of report discrepancies or issues, contact Storage Administration.

Re-Run Report

To re-run a specific report: You need to use a Telnet session or other terminal emulator to access the NetBackup master server for your site.

Once logged into the master server, you should run “bpvault.opsmenu” as follows:

```
bpvault.opsmenu <parameter file>
```

where <parameter file> is the appropriate parameter file (e.g. dup_param).

```
  bpvault opsmenu
  Current Vault:  V1      Current Session: DUP 86
  Parameter:  dup_param   Output:  bpvault.opsmenu.output
  Print Command: /usr/bin/lp –d hplj5

  1)  Change Vault         2)  Change Session
  3)  Change Print Command 4)  Change Parm File
  5)  Change Output File
Print Reports:
  6)  Vault Inventory      7)  Library Pick List
  8)  Vault Dist. List     9)  Vault Pick List
  10) Library Dist. List   11) Reports 6,7,8,9,10
  12) Full Vault Inventory List
  13) Full Inventory List in Volser order
  14) Distribution Detail List
  15) Distribution Summary List
  16) Recovery Report
Other Functions:
  17) Eject Tapes from this Session
  x) Exit
  ->
```

If your site is using TLD robotic libraries that are controlled by Media Manager, you will also see the following option:

```
  18) Inject Tapes on TLD Robot
```

Or, if your site is using TLM robotic libraries that are controlled by Media Manager, you will also see the following option:

```
  18) Inject Tapes on TLM Robot
```

The defaults for “bpvault.opsmenu” should be correct to simply re-generate the reports for the most recent session. Select one of options (6) through (10), or option (11) to print the full report list.

To print a previous days reports: You may re-generate a previous report by changing the session number. Select option (2) and enter a session number which is normally one less than the number shown on the screen.

To show requested volumes: Report option (12) is similar to the Vault Inventory, but it also shows the date a specific volume was requested from the offsite vendor.

To send report to email: You may change the printer destination to allow the report to be sent through email. Select option (3), and enter the mail command as the “printer”, with appropriate subject header:

```
/usr/bin/mailx <username>,<username2>,… <username-n>
```

Where <username> is a valid username to which you wish to send email.

Then select the report you wish to email and bpvault will send the report via email.

To save a report to a file: You may also change the printer destination to allow the report to be saved to a file. Select option (3), and enter the following command, substituting <file> with the name of the file you wish to save the report to:

```
tee –a <file>
```

Run Audit Report

Report option (13) can be used as an audit report. It prints out a full inventory of all media used for duplication of backups. First, it prints out all the media in the silo which is used for duplicates, and then all the media which is in the offsite vault. This information is printed in Volser order. Storage Administration may choose to create another audit report which shows all the media in the silo along with its status if offsite, since this report only shows media used for vaulting usage, and not the other media used for regular backups.

Resending Eject Commands

Option (17) from “bpvault.opsmenu” allows the operator to re-send the eject commands from a particular session. If using ACSLS for robotic control, this will cause bpvault to re-run the “eject_tapes” script (located in /usr/openv/netbackup/vault/bin) with the file “bpvault.eject” (located in the session working directory). With ACSLS, this should not present a problem if some tapes have already been ejected, although some error messages may be logged on the ACSLS console.

If you are not using ACSLS for robotic control, the script “eject_tapes” (located in the session working directory) will be re-executed. This script contains Media Manager commands that will attempt to move each media from the library into an empty export slot. If you attempt to re-send the same Media Manager command for a given media, you may receive an error message.

Normally, this option is only used if the eject process was interrupted and certain media were not ejected from the library. If there are still discrepancies between ejected media and the bpvault reports after using this command, contact the Storage Administration team.

Injecting Tapes on TLD robots

Option (18) will only appear if your site is using TLD controlled robots (those that are controlled by Media Manager). In this case, it is necessary to manually move tapes from the export slots of the robot into the library slots. Normally, this is done within the Media Manager interface (also known as xvmadm). However, a script has been written to automate some of this functionality. Therefore, after placing tapes into the library export slots, run “bpvault.opsmenu” on the server that is

controlling the robot. Select option (18) and a script will be executed to scan the export slots and move the appropriate tapes into empty slots within the library. The log file will contain any errors that may occur during the inject process. If any problems occur during this process, contact Storage Administration.

Sample Reports

The following are samples of bpvault reports.

Below is a sample of the “Library Pick List” report, which shows the tapes to be removed from the library.

```
Tuesday, December 16, 1997       Bpvault Report             Page: 1

      Picking List for Library: (V1)   Session: DUP9


      VOLSER SLOT   ASSIGNED     EXPIRATION    #IMAGES      KBYTES


      A00028 0003   12/16/97     12/28/97        2     1483488
      A00029 0004   12/16/97     12/28/97        1     1526432
      A00030 0005   12/16/97     12/28/97        2     4200096
      A00031 0006   12/16/97     12/28/97        1     1283040
      A00032 0007   12/16/97     12/28/97        3     1322528
      A00033 0008   12/16/97     12/28/97        3     1337184
      A00034 0009   12/16/97     12/28/97        1      152992
      A00035 0010   12/16/97     12/28/97        1     1301088
      A00036 0011   NBDBTAPE     12/28/97        0           0


      TOTALS
      VOLSER #IMAGES       KBYTES
      9      14     12606848
```

Below is a sample of the “Vault Distribution List” report, which is identical to the “Library Pick List” except that the tapes are sorted by slot number. This report should be sent offsite to the vault vendor.

```
Tuesday, December 16, 1997       Bpvault Report            Page: 1

       Distribution List for Vault ARCUS: (V1) Session: DUP9


       SLOT  VOLSER  ASSIGNED  EXPIRATION  #IMAGES  KBYTES


       0003  A00028  12/16/97  12/28/97          2    1483488
       0004  A00029  12/16/97  12/28/97          1    1526432
       0005  A00030  12/16/97  12/28/97          2    4200096
       0006  A00031  12/16/97  12/28/97          1    1283040
       0007  A00032  12/16/97  12/28/97          3    1322528
       0008  A00033  12/16/97  12/28/97          3    1337184
       0009  A00034  12/16/97  12/28/97          1     152992
       0010  A00035  12/16/97  12/28/97          1    1301088
       0011  A00036  NBDBTAPE  12/28/97          0          0


       TOTALS
       VOLSER #IMAGES      KBYTES
       9      14     12606848
```

Below is a sample of the “Library Distribution List” report, which shows the tapes that will be returned from the offsite vault on the next pick-up/drop-off day. This report should be kept in a central location until these tapes are returned from the vault vendor.

```
Tuesday, December 16, 1997       Bpvault Report            Page: 1

       Distribution List for Library: (V1)     Session: DUP9


       SLOT   VOLSER LAST MNT      LAST DUP      REQUESTED


       0001   A00026 12/01/97      4             12/16/97
       0002   A00027 12/01/97      4             12/16/97


       TOTAL VOLSER
       2
```

Below is a sample of the “Vault Pick List” report, which is identical to the “Library Distribution List” except for the report header. This report indicates which tapes are being requested back from the offsite vault. This report should be given to the vault vendor so that these tapes return on the following pick-up/drop-off day.

```
Tuesday, December 16, 1997       Bpvault Report            Page: 1

       Picking List for Vault ARCUS: (V1)      Session: DUP9


       SLOT   VOLSER LAST MNT     LAST DUP     REQUESTED


       0001   A00026 12/01/97     4            12/16/97
       0002   A00027 12/01/97     4            12/16/97


       TOTAL VOLSER
       2
```

Below is a sample of the “Vault Inventory List” report, which is shows all tapes that are currently stored at the offsite vault including those that are being transported offsite today. This report should be sent to the vault vendor to verify that their records match.

```
Tuesday, December 16, 1997       Bpvault Report            Page: 1

       Inventory List for Vault ARCUS: (V1)    Session: DUP9


       SLOT   VOLSER ASSIGNED     EXPIRATION


       0003   A00028 12/16/97     12/28/97
       0004   A00029 12/16/97     12/28/97
       0005   A00030 12/16/97     12/28/97
       0006   A00031 12/16/97     12/28/97
       0007   A00032 12/16/97     12/28/97
       0008   A00033 12/16/97     12/28/97
       0009   A00034 12/16/97     12/28/97
       0010   A00035 12/16/97     12/28/97
       0011   A00036 NBDBTAPE     12/28/97


       VAULT TOTALS
       VOLSER #IMAGES      KBYTES
       9      14     12606848
```

Below is a sample of the “Full Vault Inventory List” report, which is identical to the “Vault Inventory List” except that any requested media are also shown. These requested media should have already been requested back from the vault and have not been detected in the robot at this time (i.e. still in transport from vault vendor, have not been injected into the library, etc.).

```
Tuesday, December 16, 1997       Bpvault Report             Page: 1

      Full Inventory List for Vault ARCUS: (V1)     Session: DUP9


      SLOT   VOLSER ASSIGNED     EXPIRATION   REQUESTED


      0001   A00026                           12/16/97
      0002   A00027                           12/16/97
      0003   A00028 12/16/97     12/28/97
      0004   A00029 12/16/97     12/28/97
      0005   A00030 12/16/97     12/28/97
      0006   A00031 12/16/97     12/28/97
      0007   A00032 12/16/97     12/28/97
      0008   A00033 12/16/97     12/28/97
      0009   A00034 12/16/97     12/28/97
      0010   A00035 12/16/97     12/28/97
      0011   A00036 NBDBTAPE     12/28/97


      VAULT TOTALS
      VOLSER #IMAGES      KBYTES
      11     14     12606848
```

Below is a sample of the “Complete Inventory List” report, where “LOC” corresponds to the location of the tapes (R for robot, V for offsite vault). This report shows all tapes that are believed to be offsite (either in transport or at the vault) and those that are currently onsite within the tape library.

```
Tuesday, December 16, 1997       Bpvault Report             Page: 1

       Complete Inventory List: (V1)    Duplicate Pool: Duplicates

       VOLSER SLOT   LOC    DUP ID ASSIGNED     EXPIRATION    REQUESTED


       A00037 0000   R
       A00038 0000   R
       A00039 0000   R
       A00197 0000   R
       A00198 0000   R
       A00199 0000   R
       A00223 0000   R
       A00224 0000   R
       A00225 0000   R
       A00026 0001   V      4                                 12/16/97
       A00027 0002   V      4                                 12/16/97
       A00028 0003   V      9      12/16/97     12/28/97
       A00029 0004   V      9      12/16/97     12/28/97
       A00030 0005   V      9      12/16/97     12/28/97
       A00031 0006   V      9      12/16/97     12/28/97
       A00032 0007   V      9      12/16/97     12/28/97
       A00033 0008   V      9      12/16/97     12/28/97
       A00034 0009   V      9      12/16/97     12/28/97
       A00035 0010   V      9      12/16/97     12/28/97
       A00036 0011   V      9      NBDBTAPE     12/28/97


       ROBOT TOTALS
       VOLSER #IMAGES      KBYTES
       9      0      0


       VAULT TOTALS
       VOLSER #IMAGES      KBYTES
       11     14     12606848
```

Below is a sample of the “Distribution Detail List” report, which shows the individual client backups recorded on each media. Each backup image fragment is displayed on two lines, which include the backup client, backup identifier, backup date and time and number of kilobytes backed up.

```
Tuesday, December 16, 1997       Bpvault Report             Page: 1

       Detailed Dist. List for Vault ARCUS: (V1)     Session: DUP9


       SLOT  VOLSER  ASSIGNED  EXPIRATION  #IMAGES  KBYTES
             CLIENT                                    KBYTES
                BACKUP TIME                BACKUP ID


       0003  A00028  12/16/97  12/28/97          2    1483488
             svr1                                      1172032
                Sun Dec 14 19:06:16 1997   svr1_0882155176
             svr2                                       311456
                Sun Dec 14 19:06:19 1997   svr2_0882155179

       0004  A00029  12/16/97  12/28/97          1    1526432
             svr3                                     1526432
                Sun Dec 14 19:06:18 1997   svr3_0882155178

       0005  A00030  12/16/97  12/28/97          2    4200096
             svr4                                      4113280
                Sun Dec 14 19:06:20 1997   svr4_0882155180
             svr5                                       86816
                Sun Dec 14 19:06:24 1997   svr5_0882155184

       0006  A00031  12/16/97  12/28/97          1    1283040
             svr3                                     1283040
                Sun Dec 14 19:06:18 1997   svr3_0882155178

       0007  A00032  12/16/97  12/28/97          3    1322528
             svr3                                      588256
                Sun Dec 14 19:06:18 1997   svr3_0882155178
             svr6                                       293408
                Sun Dec 14 19:06:22 1997   svr6_0882155182
             svr7                                      440864
                Sun Dec 14 19:11:32 1997   svr7_0882155492

       0008  A00033  12/16/97  12/28/97          3    1337184
             svr2                                      1154784
                Sun Dec 14 19:06:19 1997   svr2_0882155179
             svr8                                       172896
                Sun Dec 14 19:06:23 1997   svr8_0882155183
             svr9                                        9504
                Sun Dec 14 19:16:57 1997   svr9_0882155817

       0009  A00034  12/16/97  12/28/97          1     152992
             svr7                                      152992
                Sun Dec 14 19:11:32 1997   svr7_0882155492
```

Below is the continuation of the “Distribution Detail List” report.

```
Tuesday, December 16, 1997       Bpvault Report            Page: 2

      Detailed Dist. List for Vault ARCUS: (V1)     Session: DUP9


      SLOT  VOLSER  ASSIGNED  EXPIRATION  #IMAGES  KBYTES
            CLIENT                                   KBYTES
               BACKUP TIME                BACKUP ID


      0010  A00035  12/16/97  12/28/97          1    1301088
            svr5                                      1301088
               Sun Dec 14 19:06:24 1997   svr5_0882155184

      0011  A00036  NBDBTAPE  12/28/97          0          0



      TOTALS
      VOLSER #IMAGES      KBYTES
      9      14     12606848
```

Below is a sample of the “Summary Distribution List” report, which shows the detailed information on each tape with each unique client, class, schedule and date. If multiple fragments were used (or multiple images in the case of RDBMS backups) for a given client, class, schedule and date, the information will only be listed once on a given media.

```
Tuesday, December 16, 1997       Bpvault Report            Page: 1

       Summary Dist. List for Vault ARCUS: (V1)      Session: DUP9


       SLOT  VOLSER  ASSIGNED  EXPIRATION  #IMAGES  KBYTES
           CLIENT             CLASS                SCHEDULE     DATE


       0003  A00028  12/16/97  12/28/97          2    1483488
           svr1               SystemBkups          Full         12/14/97
           svr2               SystemBkups          Full         12/14/97

       0004  A00029  12/16/97  12/28/97          1    1526432
           svr3               SystemBkups          Full         12/14/97

       0005  A00030  12/16/97  12/28/97          2    4200096
           svr4               SystemBkups          Full         12/14/97
           svr5               SystemBkups          Full         12/14/97

       0006  A00031  12/16/97  12/28/97          1    1283040
           svr3               SystemBkups          Full         12/14/97

       0007  A00032  12/16/97  12/28/97          3    1322528
           svr3               SystemBkups          Full         12/14/97
           svr6               SystemBkups          Full         12/14/97
           svr7               SystemBkups          Full         12/14/97

       0008  A00033  12/16/97  12/28/97          3    1337184
           svr2               SystemBkups          Full         12/14/97
           svr8               SystemBkups          Full         12/14/97
           svr9               SystemBkups          Full         12/14/97

       0009  A00034  12/16/97  12/28/97          1     152992
           svr7               SystemBkups          Full         12/14/97

       0010  A00035  12/16/97  12/28/97          1    1301088
           svr5               SystemBkups          Full         12/14/97

       0011  A00036  NBDBTAPE  12/28/97          0          0



       TOTALS
       VOLSER #IMAGES      KBYTES
       9      14     12606848
```

Below is a sample of the “Recovery Report”, which shows the media required to recover a given client between a range of dates for each class in the NetBackup configuration. If multiple copies were made, then each copy would also be listed including the media ID which was used (copy 1 corresponds to the primary copy, copy 2 corresponds to the duplicate). The date listed indicates when the original backup image was created.

```
Wednesday, August 12, 1998           Bpvault Report                Page: 1

        Recovery Report for Vault Arcus: (V1)

        To recover all classes from date 07/24/98 to date 08/12/98
        the following tapes are necessary:


        Class: svr1all
          Client: svr1  Sched: Incr  Media: GC0080  Density: dlt  Date: 08/10/98  Copy: 1
          Client: svr1  Sched: Incr  Media: GC0080  Density: dlt  Date: 08/08/98  Copy: 1
          Client: svr1  Sched: UserTest  Media: GC0046  Density: dlt  Date: 08/07/98
Copy: 1
          Client: svr1  Sched: Incr  Media: GC0058  Density: dlt  Date: 08/06/98  Copy: 1
          Client: svr1  Sched: Incr  Media: GC0058  Density: dlt  Date: 08/05/98  Copy: 1
          Client: svr1  Sched: Full  Media: GC0058  Density: dlt  Date: 08/04/98  Copy: 1
          Client: svr1  Sched: Incr  Media: GC0058  Density: dlt  Date: 08/04/98  Copy: 1
          Client: svr1  Sched: Incr  Media: GC0058  Density: dlt  Date: 08/03/98  Copy: 1
          Client: svr1  Sched: Incr  Media: GC0058  Density: dlt  Date: 08/02/98  Copy: 1
          Client: svr1  Sched: Full  Media: GC0058  Density: dlt  Date: 08/01/98  Copy: 1
          Client: svr1  Sched: Incr  Media: GC0058  Density: dlt  Date: 08/01/98  Copy: 1
          Client: svr1  Sched: Incr  Media: GC0072  Density: dlt  Date: 07/30/98  Copy: 1
          Client: svr1  Sched: Incr  Media: GC0072  Density: dlt  Date: 07/29/98  Copy: 1
          Client: svr1  Sched: Incr  Media: GC0072  Density: dlt  Date: 07/28/98  Copy: 1
          Client: svr1  Sched: Full  Media: GC0072  Density: dlt  Date: 07/27/98  Copy: 1
          Client: svr1  Sched: Incr  Media: GC0072  Density: dlt  Date: 07/27/98  Copy: 1
          Client: svr1  Sched: Incr  Media: GC0072  Density: dlt  Date: 07/25/98  Copy: 1
          Client: svr1  Sched: Full  Media: GC0072  Density: dlt  Date: 07/24/98  Copy: 1
        Class: svr2all
          Client: svr2  Sched: Incr  Media: GB0012  Density: dlt  Date: 08/11/98  Copy: 1
          Client: svr2  Sched: Incr  Media: GB0012  Density: dlt  Date: 08/10/98  Copy: 1
          Client: svr2  Sched: Incr  Media: GB0012  Density: dlt  Date: 08/09/98  Copy: 1
          Client: svr2  Sched: Full  Media: GB0017  Density: dlt  Date: 08/08/98  Copy: 1
          Client: svr2  Sched: Incr  Media: GB0012  Density: dlt  Date: 08/06/98  Copy: 1
          Client: svr2  Sched: Full  Media: GB0017  Density: dlt  Date: 08/01/98  Copy: 1
          Client: svr2  Sched: Incr  Media: GB0017  Density: dlt  Date: 08/01/98  Copy: 1
          Client: svr2  Sched: Incr  Media: GB0017  Density: dlt  Date: 07/30/98  Copy: 1
          Client: svr2  Sched: Full  Media: GB0012  Density: dlt  Date: 07/29/98  Copy: 1
          Client: svr2  Sched: Incr  Media: GB0014  Density: dlt  Date: 07/28/98  Copy: 1
        Class: svr3backtrack
        Class: svr3db1
          Client: svr3  Sched: Incr  Media: GC0075  Density: dlt  Date: 08/11/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0075  Density: dlt  Date: 08/10/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0075  Density: dlt  Date: 08/09/98  Copy: 1
          Client: svr3  Sched: Full  Media: GC0067  Density: dlt  Date: 08/08/98  Copy: 1
          Client: svr3  Sched: Full  Media: GC0078  Density: dlt  Date: 08/08/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0075  Density: dlt  Date: 08/08/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0068  Density: dlt  Date: 08/05/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0075  Density: dlt  Date: 08/05/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0068  Density: dlt  Date: 08/04/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0069  Density: dlt  Date: 08/03/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0078  Density: dlt  Date: 08/03/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0059  Density: dlt  Date: 08/02/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0068  Density: dlt  Date: 08/02/98  Copy: 1
          Client: svr3  Sched: Full  Media: GC0059  Density: dlt  Date: 08/01/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0059  Density: dlt  Date: 08/01/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0059  Density: dlt  Date: 07/30/98  Copy: 1
          Client: svr3  Sched: Incr  Media: GC0059  Density: dlt  Date: 07/29/98  Copy: 1
          Client: svr3  Sched: Full  Media: GC0059  Density: dlt  Date: 07/28/98  Copy: 1
```

Below is the continuation of the “Recovery Report”.

```
Wednesday, August 12, 1998           Bpvault Report               Page: 2

       Recovery Report for Vault Arcus: (V1)

       To recover all classes from date 07/24/98 to date 08/12/98
       the following tapes are necessary:


       Class: svr4all
         Client: svr4  Sched: Full  Media: GC0052  Density: dlt  Date: 08/01/98  Copy: 1
         Client: svr4  Sched: Incr  Media: GC0052  Density: dlt  Date: 08/01/98  Copy: 1
         Client: svr4  Sched: Incr  Media: GC0072  Density: dlt  Date: 08/01/98  Copy: 1
         Client: svr4  Sched: Incr  Media: GC0072  Density: dlt  Date: 07/30/98  Copy: 1
         Client: svr4  Sched: Incr  Media: GC0052  Density: dlt  Date: 07/29/98  Copy: 1
         Client: svr4  Sched: Full  Media: GC0062  Density: dlt  Date: 07/27/98  Copy: 1
         Client: svr4  Sched: Incr  Media: GC0062  Density: dlt  Date: 07/27/98  Copy: 1
         Client: svr4  Sched: Incr  Media: GC0062  Density: dlt  Date: 07/25/98  Copy: 1
         Client: svr4  Sched: Full  Media: GC0062  Density: dlt  Date: 07/24/98  Copy: 1
       Class: svr5db2
         Client: svr5  Sched: Incr  Media: GA0192  Density: dlt  Date: 08/11/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0192  Density: dlt  Date: 08/10/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0192  Density: dlt  Date: 08/09/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0180  Density: dlt  Date: 08/08/98  Copy: 1
         Client: svr5  Sched: Full  Media: GA0192  Density: dlt  Date: 08/07/98  Copy: 1
         Client: svr5  Sched: Full  Media: GA0200  Density: dlt  Date: 08/07/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0200  Density: dlt  Date: 08/06/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0200  Density: dlt  Date: 08/05/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0200  Density: dlt  Date: 08/04/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0200  Density: dlt  Date: 08/03/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0180  Density: dlt  Date: 08/02/98  Copy: 1
         Client: svr5  Sched: Full  Media: GA0200  Density: dlt  Date: 08/01/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0200  Density: dlt  Date: 08/01/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0200  Density: dlt  Date: 07/30/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0200  Density: dlt  Date: 07/29/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0200  Density: dlt  Date: 07/28/98  Copy: 1
         Client: svr5  Sched: Full  Media: GA0200  Density: dlt  Date: 07/27/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0180  Density: dlt  Date: 07/27/98  Copy: 1
         Client: svr5  Sched: Incr  Media: GA0200  Density: dlt  Date: 07/25/98  Copy: 1
         Client: svr5  Sched: Full  Media: GA0200  Density: dlt  Date: 07/24/98  Copy: 1


       NetBackup Database Tapes Offsite in Vault Arcus

              Media: A00002  Written: 08/10/98  Expiration: 08/17/98
              Media: A00003  Written: 08/11/98  Expiration: 08/18/98
              Media: A00005  Written: 08/12/98  Expiration: 08/19/98


       Total NBU DB Media Offsite: 3


*** END OF REPORT ***
```

Below is a sample of the “Library Pick List” report in flat file format. Most of the other standard bpvault reports can be generated in this format, which are used for importing into another database management system (e.g. mainframe tape management system). All fields are written in fixed lengths and no headers are included.

```
A00028 0003 12/16/97 12/28/97    2   1483488
A00029 0004 12/16/97 12/28/97    1   1526432
A00030 0005 12/16/97 12/28/97    2   4200096
A00031 0006 12/16/97 12/28/97    1   1283040
A00032 0007 12/16/97 12/28/97    3   1322528
A00033 0008 12/16/97 12/28/97    3   1337184
A00034 0009 12/16/97 12/28/97    1    152992
A00035 0010 12/16/97 12/28/97    1   1301088
A00036 0011 NBDBTAPE 12/28/97    0         0
```