Overview

This document details the key Year 2000 tests that the product has been through for the compliant release: these tests will be used for subsequent releases. No distinction is made in this test plan between the NetBackup and Media Manager products. The name NetBackup is used to refer to either or both.

NetBackup uses the operating system’s time structure for almost all of its internal time processing. Because of this fact there is little impact from the Year 2000 rollover or the fact that 2000 is a leap year. NetBackup is generally not concerned with a date, but rather a "date difference", "How many days has a file existed at its current state?" This is accomplished by subtracting the original operating system’s time stamp from "now". This means that the actual date is rarely examined. No formatted dates are placed in databases or on storage media, only raw operating system’s time stamps are used.

Logs generally do not contain a year identifier in their contents but rather are named log.<mmddyy> where the two-digit year identifier will be clear and unambiguous. An exception is the netbackup/db/failure_history files which are named in the same way but also contain a mm/dd/yy line item. Again the meaning is clear.

Testing has taken place with one UNIX (and secondly with one NT alternative) machine as a master and another as the client. Testing was combined with NetBackup clients on UNIX, PCs, MACs, OS/2, VMS and NT to test the client/server mode of operation. The test results were compared with a "control" test using normal dates for equivalence.

These tests were rerun at each time the product was put through an internal or external revision.

Initial Test Environment Setup

The test platform was initialized with the date of December 25, 1999 and NetBackup and Media Manager installed. The second machine, and any other available clients, were also configured at that time. The server platform also had a client for backup of its own files.

Media Manager was configured with an available robotic device that contained media for both NetBackup and HSM. All daemons were run in verbose mode, so that any potential errors could have been easily noticed.

Classes were set up to back up a partition of interest on each platform. Examples were /usr or /home. This varied by operating system and manufacturer - e.g. the equivalent of "my computer" on NT. A backup was scheduled to begin at 23:00 and all available clients multiplexed. One class contained a full backup schedule, another contained a partial backup schedule. Retention level was set to two months. Classes were set up to utilize several tapes. The following tests were performed, and will be performed in subsequent releases.

A test checked for the expiration of one of the tapes to 12/31/1999 at 23:59:59 hours.
All log files were enabled.

Log retention was set to 7 days.

NetBackup database compression was set to 7 days.

The time was set so a backup would begin. ("date 12252300") NOTE: This was done on all clients.

Some files were archived.

When complete the date was reset to the next day so another backup could take place.

This was repeated through Dec 30, 1999.

The NetBackup database directories were backed up.

Test Scenario One: Running During Rollover

Test 1.1.1 Backup Taking Place at Midnight on December 31, 1999

The following instructions were carried out.

1. The system date was reset to Dec 31, 1999 at 23:00 ("date 1231230099") on all platforms.
2. xbpmon was run. When the backup began it was monitored.
3. When the backup completed all logs were checked. All logs were named "log.123199".
4. A verification was made that logs dated "122599" were gone.
5. The xbpmon display was checked to see that dates, times and elapsed times were correct.
6. From the server (as a client)
   Some files were restored from the most current backup to an alternate path and contents verified.
   The same files were restored from the initial backup to an alternate path and contents verified.
7. From a client (other than the server)
   Some files were restored from the most current backup to an alternate path and contents verified.
   "xbp" was used with a 4 character year to restore some.
   "xbp" was used with a 2 character year to restore some.
   The same files were restored from the initial backup to an alternate path and contents verified.
   "bp" was used with a 4 character year to restore some.
   "bp" was used with a 2 character year to restore some.
8. "bplist -s 12/31/99" was run from the server then, also from the server, "bplist -s 12/31/1999" was run.
   The results were identical as required.
9. "bpimagelist -class <class name> -L -verbose" was run and the output examined for the image created during the rollover. "bpimagelist -class <class name> -L -d 12/31/99 -e 01/01/2000" was then run.
The results were identical as required.

10. The "Expiration Time" was noted.

11. "bpexpdate -recalculate -backupid <Backup ID> -d 02/29/2000 06:05:02" was run. It must accept the date, and it did.

12. "bpimagelist -L -backupid <Backup ID>" was run and the "Expiration Time" verified.

13. "bpexpdate -recalculate -backupid <Backup ID> -d <Original Expiration Time>" was run.

14. "bpmedialist" was run to get a list of used media.

15. "vmchange -exp 02/29/2000 -m <mediaid>" was used to set the expiration of one of the tapes to 02/29/2000.

16. xvmadm "Volume Detail Report" was used to verify the change in expiration date. All OK.

17. "bpschedreq -predict 01/01/00" was run and the output examined and found correct. "bpschedreq -predict 01/01/2000" was run and the output examined and found correct.

18. From xbpadm an "Immediately Backup NetBackup DB" was run to a disk location.
The file HEADER from the bpbackupdb was inspected and the dates verified as correctly listed.

Note that the year is a 2 digit field but is unambiguous.

19. In bpadm the following were done and found to be correct:

<table>
<thead>
<tr>
<th>Run Reports</th>
<th>Check Backup Status</th>
<th>List Client Backups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Dates</td>
<td>New Start Date: 12/01/1999</td>
<td>New End Date: 01/01/2000</td>
</tr>
<tr>
<td>Problems</td>
<td>Change Media</td>
<td>Check Media List and Summary</td>
</tr>
<tr>
<td>Change Media ID/Path</td>
<td>Select an appropriate piece of media</td>
<td></td>
</tr>
<tr>
<td>Check Media Contents</td>
<td>Check Images on Media</td>
<td></td>
</tr>
<tr>
<td>Change Dates</td>
<td>New Start Date: 12/01/1999</td>
<td>New End Date: 01/01/2000</td>
</tr>
<tr>
<td>Check Media Log Entries</td>
<td>Check Media Written</td>
<td></td>
</tr>
</tbody>
</table>

20. In another window with xbpadm the following were carried out and found to give correct results:
21. The outputs from the two windows were compared.
22. The NetBackup database directories were backed up.
23. All logs were checked (and were named "log.010100"). All OK.

**Test 1.1.2 Archive Taking Place at Midnight on December 31, 1999**

1. The system date was reset to Dec 31, 1999 at 12:00 ("date 1231120099") on all platforms.
2. The NetBackup database directories were restored from the initialization step.
3. The time was reset to 23:00 ("date 12312300") on all platforms.
4. From the server (as a client)

   A set of files from the backed up directory was archived.

   The same files were restored from the archive.

   "bp" was used with a 4 character year to restore some.

   "bp" was used with a 2 character year to restore some.

   The same files were restored from the initial archive to an alternate path and contents verified.

   "xbp" was used with a 4 character year to restore some.

   "xbp" was used with a 2 character year to restore some.

5. From a client (other than the server)

   A set of files from the backed up directory was archived.

   The same files were restored from the archive.

   The same files were restored from the initial backup to an alternate path and contents verified.
6. "bpclimagelist" was run from a client.
7. "bpsyncinfo -L" was run and the contents examined.
8. All logs were checked (and were named "log.010100"). All OK.

Test 1.2.1 Backup Taking Place at Midnight on February 28, 2000

1. The system date was reset to Feb 28, 2000 at 23:00 ("date 022823002000") on all platforms.
2. When the backup was completed all logs were checked. All logs were named "log.022800".
3. From the server (as a client)
   Some files from the most current backup were restored to an alternate path and contents verified.
   The same files were restored from the initial backup to an alternate path and contents verified.
4. From a client (other than the server)
   Some files from the most current backup were restored to an alternate path and contents verified.
   The same files were restored from the initial backup to an alternate path and contents verified.
   "bpimmedia -L -client <X> -mediaid <XX> -d 12/01/99 -e 01/01/00" was run.
   "bpimmedia -L -client <X> -mediaid <XX> -d 12/01/1999 -e 01/01/2000" was run.
   Both provided the same output as required. The date format of the output was inspected and found OK.
   "bpflist -U -client <X>" was run. "bpflist -U -client <X> -d 12/01/1999 -e 01/01/2000" was run.
   "bpverify -client <X> -class <XX> -s 12/01/1999 -e 01/01/2000" was run.
   "bpverify -client <X> -class <XX> -backupid <XXXX>" was run, where XXXX was one of the backupids listed in the first running.
   All logs were checked (and were named "log.022800" as required).

Test 1.2.2 Archive Taking Place at Midnight on February 28, 2000

1. The system date was reset to Feb 28, 2000 at 12:00 ("date 022812002000") on all platforms.
2. The NetBackup database directories were backed up from Test 1.1. (bprecover).
3. All the NetBackup classes were set to inactive.
4. The time was set to 23:00 ("date 02282300") on all platforms.
5. From the server (as a client)
A set of files from the backed up directory were archived.

The same files from the archive were restored.

The same files from the initial backup were restored to an alternate path and verified that they were the same as those restored from the archive.

The "bprestore" command line was used for these restores.

"bprestore" was used with a 4 character year to restore some

"bprestore" was used with a 2 character year to restore some. All OK.

6. From a client (other than the server)

   A set of files from the backed up directory was archived.

   The same files from the archive were restored.

   The same files from the initial backup were restored to an alternate path and verified that they were the same as those restored from the archive.

   "bpschedreq -predict 02/28/2000" was run and the output examined.

   "bpschedreq -predict 02/29/2000" was run and the output examined.

   All logs were checked (and were named "log.022800"). All OK.

Test 1.3.1 Backup Taking Place at Midnight on February 29, 2000

1. The system date was reset to Feb 29, 2000 at 23:00 ("date 022923002000") on all platforms.
2. When the backup completed all logs were checked. All logs were named "log.022900".
3. From the server (as a client)

   Some files were restored from the most current backup to an alternate path and their contents verified.

   The same files were restored from the initial backup to an alternate path and their contents verified.

4. From a client (other than the server)

   Some files were restored from the most current backup to an alternate path and their contents verified.

   The same files were restored from the initial backup to an alternate path and their contents verified.

   vmquery was run on a volume used for the most recent backup.
vmquery was run on a volume not used for the most recent backup.

The same volume in an xvmadm display was selected and verified that the presentation was the same and correct in all cases.

"bpduplicate -dstunit <As Needed> -s /12/27/99 -e /12/28/99" was run to duplicate an image from before 2000.

"bpduplicate -dstunit <As Needed> -s /02/29/2000 -e /03/01/00" was run to duplicate the backup just run.

Both were checked and were well behaved.

"bperror -d /12/01/99 -e 01/01/2000 -media -verbose" was run.

"bperror -d /12/01/1997 -e 01/01/00 -media -verbose" was run.

Note: "bpdbm -ctime <UNIX time>" was used to convert a UNIX time to wall clock time.

xdevadm was run and Drives selected. All OK.

5. Drive Cleaning

The dates were all checked and were all correctly displayed.

"Action" was selected - the drives were cleaned and the dates re-inspected for correctness.

All logs were checked (and were named "log.022900").

The system date was reset to March 7, 2000 at 23:40 ("date 03072300") on all platforms.

After the backups were completed, the "022900" logs were inspected and were deleted. All OK.

Test 1.3.2 Archive Taking Place at Midnight on February 29, 2000

1. The system date was reset to Feb 29, 2000 at 12:00 ("date 022912002000") on all platforms.
2. All NetBackup classes were set to inactive.
3. The time was set to 23:00 ("date 02292300") on all platforms.
4. From the server (as a client)

A set of files from the backed up directory was archived.

The same files from the archive were restored.

The same files from the initial backup were restored to an alternate path and verified that they were the same as those restored from the archive. All OK.
5. From a client (other than the server)
   
   A set of files from the backed up directory was archived.
   
   The same files from the archive were restored.
   
   The same files from the initial backup were restored to an alternate path and verified that they were the same as those restored from the archive.
   
   `vmdb_dump` was run and all logs were checked (and were named "log.022900"). All OK.

**Test Scenario Two: Not Running During Rollover**

*Test 2.1*

1. All data and the file systems were restored to the "Initial Test Environment"
2. The system date was reset to Jan 1, 2000 at 12:00 ("date 010112002000") on all platforms.
3. From the server (as a client)
   
   A file from the initial backup was restored to an alternate path and contents verified.

4. From a client (other than the server)
   
   A file from the initial backup was restored to an alternate path and contents verified.
   
   A user-directed backup of some files was carried out, verifying that logs from 1999 were deleted.
   
   "tpclean -l" was run and the output date fields examined. All OK.

*Test 2.2*

1. The system date was set to Jan 10, 2000 at 12:00 ("date 011012002000") on all platforms.
2. All data and the file systems were restored to the "Initial Test Environment".
3. From the server (as a client)
   
   A file from the initial archive was restored to an alternate path and contents verified.

4. From a client (other than the server)
   
   A file from the initial archive was restored to an alternate path and contents verified.

**Test Scenario Three: 2000+, Not Rolling Over**

*Test 3.1*
1. All NetBackup binaries and databases were removed from the machine. I.e. the product was de-installed.
2. All system files were restored to the way they were before installing NetBackup, /etc/services, /etc/inet/inetd.conf, /etc/inet/inetd.local, etc.
3. NetBackup and Media Manager were installed again.
4. Names of save files were checked (e.g. /etc/services-mm-dd-yy-hh:mm:ss).
5. A user-directed backup class and a backup of 5 files were defined.
6. The files were restored to an alternate path and their contents verified.
7. A full backup class was defined and the time advanced sufficiently to institute the backup. All OK.

**Test 3.2**

1. The date was set to Feb 28, 2000 and the time advanced sufficiently to institute the full backup class.
2. The date was set to Feb 29, 2000 and the time advanced sufficiently to institute the full backup class. All OK.

**Other Commands**

The following group of commands was not explicitly tested as a date failure would have been apparent in the other testing that was done. No problems were found.

```
bpbkar bpbrm bpcd bpclntcmd
bpdbm bprd bpsched ltid tar vmd
```

The following group of commands was not tested as the only "date" field involved was an operating system’s time stamp, which has a year field that is a "number of years", or does not include "year fields".

```
bpclist bpclsched bpclschedwin bpconfig
bpdjobs bpdm bpfrag bplabel bpmedia
bpretlevel tpconfig vmdb_compact
```

The following group of commands was not tested as there is no reference to dates or they are scripts that just echo "date" to output or a log file.
add_slave  add_slave_on_clients  backup_exit_notify
backup_notify bp.inst  bpccname  bpclassnew
bpclclients bpcldelete  bpclexclude  bpclient
bpclinclude  bpclinfo  bpclschedrep
bpdynamicclient  bpgp bpinst  bpps
bprdreq  bpstuadd bpstude  bpstulist
bpsturep  client_config  dbbackup_notify
diskfull_notify  ftp_to_client  index_clients  initbpd  initbpd
initbprd  install_bp  install_client  install_client_files
lsdev  opr  robtest
scsi_command  session_start_notify  session_notify sgscan
stopltid  tpformat  tpreq tpunmount
update_clients  userreq_notify  vmadd vmcheckvtl
vmcheckxxx  vmconf  vmctrlbvm vmdelete
vminitlists  vmmedia  vmoprcmd vmpool
vmps  vmrule  xnb xopr

The following group of commands was not tested as the only date reference was to create a save file
named file.mm-dd-yy.hh:mn:ss cp_to_client

The following group of commands was not tested because of the commonality of code that was being
tested. All robotic daemons are listed even though one was implicitly tested for the robotic type used for
the test.

bpimage  bpimport
acsd
odld  tc4d  tc8d  tl4d  tlc8d  tlc8d  tldcd
tldd  tlm  ts8d  tsdd  tshd

Special Testing

The Sum y2000_usage tool is a program that looks for binaries and checks for reliance on the UNIX time
functions. This facility was used to identify any potential problems. If such a dependency existed the 
binary was further examined for a %y or 19% string. When these searches were satisfied, then it was 
highly likely that the binary was not Year 2000-safe.

The time functions that were checked were:

- `asctime`  
- `ctime`  
- `getdate`  
- `gmtime`  
- `localtime`  
- `mktime`  
- `strftime`  
- `strptime`  
- `time`  
- `*printf`  
- `*gettext`

`y2000_usage` defined the following possible trouble areas.

- `netbackup/bin/xbp` calls time functions and contained: %D
- `netbackup/bin/admincmd/bpschedreq` calls time functions and contained: %D
- `netbackup/bin/xbpadm` calls time functions and contained: %D 8%D =%D
- `netbackup/bin/xbpmmon` calls time functions and contained: %D -%D .%D
- `netbackup/bin/xnb` calls time functions and contained: %D %DP %yl -%D
- `volmgr/bin/xdevadm` calls time functions and contained: %D
- `volmgr/bin/xvmadm` calls time functions and contained: %D %y 3%D
- `volmgr/bin/tl8cd` calls time functions and contained: %D FALSE REPORT
- `volmgr/bin/acsd` calls time functions and contained: (acsx/h/defs.h: #define DEFAULT_TIME_FORMAT
  "%m-%d-%y %H:%M:%S")

The necessary changes have been made to make the code compliant.

**Special Test for 9 9 99**

Although this product does not hold dates in character format, to satisfy requests from key partners and 
customers a specific test was also done for correct processing across the date boundary of 9th September 
1999. This test showed proper date processing and full compliance. The actual test was identical to that 
used for 31 Dec, 1999 to 1 Jan, 2000.

**Other**

These tests did not cover any modifications made to the released products. This includes modifications 
made to scripts by customers. Also not covered by this test plan are any programs, scripts or analysis 
procedures provided to customers by VERITAS (or OpenVision) Sales Engineers or consultants. If a 
customer requires assistance on any such item, this can be provided by VERITAS consulting services on 
a fee-paying basis.

This document was issued on August 20th, 1998 and replaces all prior versions.
Dates after 2038 are outside the scope of this document.