The Leading Open Source Backup Solution

2022-07-04

version 13.0.0

Bacula Community

Bacula® Utility programs

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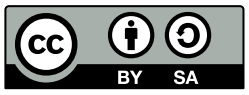
July 4, 2022

This manual documents Bacula Community Edition 13.0.0 (04 July 2022)



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Chapter 1

Volume Utility Tools

This document describes the utility programs written to aid Bacula users and developers in dealing with Volumes external to Bacula.

1.1 Specifying the Configuration File

Each of the following programs requires a valid Storage daemon configuration file (actually, the only part of the configuration file that these programs need is the **Device** resource definitions). This permits the programs to find the configuration parameters for your archive device (generally a tape drive). By default, they read `bacula-sd.conf` in the current directory, but you may specify a different configuration file using the **-c** option.

1.2 Specifying a Device Name For a Tape

Each of these programs require a **device-name** where the Volume can be found. In the case of a tape, this is the physical device name such as `/dev/nst0` or `/dev/rmt/0ubn` depending on your system. For the program to work, it must find the identical name in the Device resource of the configuration file. See below for specifying Volume names.

Please note that if you have Bacula running and you ant to use one of these programs, you will either need to stop the Storage daemon, or `unmount` any tape drive you want to use, otherwise the drive will **busy** because Bacula is using it.

1.3 Specifying a Device Name For a File

If you are attempting to read or write an archive file rather than a tape, the **device-name** should be the full path to the archive location including the filename. The filename (last part of the specification) will be stripped and used as the Volume name, and the path (first part before the filename) must have the same entry in the configuration file. So, the path is equivalent to the archive device name, and the filename is equivalent to the volume name.

1.4 Specifying Volumes

In general, you must specify the Volume name to each of the programs below (with the exception of btape). The best method to do so is to specify a **bootstrap** file on the command line with the **-b** option. As part of the bootstrap file, you will then specify the Volume name or Volume names if more than one volume is needed. For example, suppose you want to read tapes **tape1** and **tape2**. First construct a **bootstrap** file named say, list.bsr which contains:

```
Volume=test1|test2
```

where each Volume is separated by a vertical bar. Then simply use:

```
./bls -b list.bsr /dev/nst0
```

In the case of Bacula Volumes that are on files, you may simply append volumes as follows:

```
./bls /tmp/test1\|test2
```

where the backslash (\) was necessary as a shell escape to permit entering the vertical bar (|).

And finally, if you feel that specifying a Volume name is a bit complicated with a bootstrap file, you can use the **-V** option (on all programs except bcopy) to specify one or more Volume names separated by the vertical bar (|). For example,

```
./bls -V Vol001 /dev/nst0
```

You may also specify an asterisk (*) to indicate that the program should accept any volume. For example:

```
./bls -V* /dev/nst0
```

1.5 bls

bls can be used to do an ls type listing of a **Bacula** tape or file. It is called:

```
Usage: bls [options] <device-name>
 -b <file> specify a bootstrap file
 -c <file> specify a config file
 -d <level> specify debug level
 -e <file> exclude list
 -i <file> include list
 -j list jobs
 -k list blocks
 (no j or k option) list saved files
 -L dump label
 -p proceed inspite of errors
 -v be verbose
 -V specify Volume names (separated by |)
 -E Check records to detect errors
 -? print this message
```

For example, to list the contents of a tape:

```
./bls -V Volume-name /dev/nst0
```

Or to list the contents of a file:

```
./bls /tmp/Volume-name
```

or

```
./bls -V Volume-name /tmp
```

Note that, in the case of a file, the Volume name becomes the filename, so in the above example, you will replace the **Volume-name** with the name of the volume (file) you wrote.

Normally if no options are specified, `bls` will produce the equivalent output to the `ls -l` command for each file on the tape. Using other options listed above, it is possible to display only the Job records, only the tape blocks, etc. For example:

```
./bls /tmp/File002
bls: butil.c:148 Using device: /tmp
drwxrwxr-x   3 k  k  4096 02-10-19 21:08  /home/kern/bacula/k/src/dird/
drwxrwxr-x   2 k  k  4096 02-10-10 18:59  /home/kern/bacula/k/src/dird/CVS/
-rw-rw-r--   1 k  k    54 02-07-06 18:02  /home/kern/bacula/k/src/dird/CVS/Root
-rw-rw-r--   1 k  k    16 02-07-06 18:02  /home/kern/bacula/k/src/dird/CVS/Repository
-rw-rw-r--   1 k  k  1783 02-10-10 18:59  /home/kern/bacula/k/src/dird/CVS/Entries
-rw-rw-r--   1 k  k 97506 02-10-18 21:07  /home/kern/bacula/k/src/dird/Makefile
-rw-r--r--   1 k  k  3513 02-10-18 21:02  /home/kern/bacula/k/src/dird/Makefile.in
-rw-rw-r--   1 k  k  4669 02-07-06 18:02  /home/kern/bacula/k/src/dird/README-config
-rw-r--r--   1 k  k  4391 02-09-14 16:51  /home/kern/bacula/k/src/dird/authenticate.c
-rw-r--r--   1 k  k  3609 02-07-07 16:41  /home/kern/bacula/k/src/dird/autoprune.c
-rw-rw-r--   1 k  k  4418 02-10-18 21:03  /home/kern/bacula/k/src/dird/bacula-dir.conf
...
-rw-rw-r--   1 k  k    83 02-08-31 19:19  /home/kern/bacula/k/src/dird/.cvsignore
bls: Got EOF on device /tmp
84 files found.
```

1.5.1 Listing Jobs

If you are listing a Volume to determine what Jobs to restore, normally the **-j** option provides you with most of what you will need as long as you don't have multiple clients. For example,

```
./bls -j -V Test1 -c stored.conf DDS-4
bls: butil.c:258 Using device: "DDS-4" for reading.
11-Jul 11:54 bls: Ready to read from volume "Test1" on device "DDS-4" (/dev/nst0).
Volume Record: File:blk=0:1 SessId=4 SessTime=1121074625 JobId=0 DataLen=165
Begin Job Session Record: File:blk=0:2 SessId=4 SessTime=1121074625 JobId=1 Level=F Type=B
Begin Job Session Record: File:blk=0:3 SessId=5 SessTime=1121074625 JobId=5 Level=F Type=B
Begin Job Session Record: File:blk=0:6 SessId=3 SessTime=1121074625 JobId=2 Level=F Type=B
Begin Job Session Record: File:blk=0:13 SessId=2 SessTime=1121074625 JobId=4 Level=F Type=B
End Job Session Record: File:blk=0:99 SessId=3 SessTime=1121074625 JobId=2 Level=F Type=B
 Files=168 Bytes=1,732,978 Errors=0 Status=T
End Job Session Record: File:blk=0:101 SessId=2 SessTime=1121074625 JobId=4 Level=F Type=B
 Files=168 Bytes=1,732,978 Errors=0 Status=T
End Job Session Record: File:blk=0:108 SessId=5 SessTime=1121074625 JobId=5 Level=F Type=B
 Files=168 Bytes=1,732,978 Errors=0 Status=T
End Job Session Record: File:blk=0:109 SessId=4 SessTime=1121074625 JobId=1 Level=F Type=B
 Files=168 Bytes=1,732,978 Errors=0 Status=T
11-Jul 11:54 bls: End of Volume at file 1 on device "DDS-4" (/dev/nst0), Volume "Test1"
11-Jul 11:54 bls: End of all volumes.
```

shows a full save followed by two incremental saves.

Adding the **-v** option will display virtually all information that is available for each record:

1.5.2 Listing Blocks

Normally, except for debugging purposes, you will not need to list Bacula blocks (the "primitive" unit of Bacula data on the Volume). However, you can do so with:

```
./bls -k /tmp/File002
bls: butil.c:148 Using device: /tmp
Block: 1 size=64512
Block: 2 size=64512
...
Block: 65 size=64512
Block: 66 size=19195
bls: Got EOF on device /tmp
End of File on device
```

By adding the **-v** option, you can get more information, which can be useful in knowing what sessions were written to the volume:

```
./bls -k -v /tmp/File002
Volume Label:
Id                : Bacula 0.9 mortal
VerNo             : 10
VolName           : File002
PrevVolName       :
VolFile           : 0
LabelType         : VOL_LABEL
LabelSize         : 147
PoolName          : Default
MediaType         : File
PoolType          : Backup
HostName          :
Date label written: 2002-10-19 at 21:16
Block: 1 blen=64512 First rec FI=VOL_LABEL SessId=1 SessTim=1035062102 Strm=0 rlen=147
Block: 2 blen=64512 First rec FI=6 SessId=1 SessTim=1035062102 Strm=DATA rlen=4087
Block: 3 blen=64512 First rec FI=12 SessId=1 SessTim=1035062102 Strm=DATA rlen=5902
Block: 4 blen=64512 First rec FI=19 SessId=1 SessTim=1035062102 Strm=DATA rlen=28382
...
Block: 65 blen=64512 First rec FI=83 SessId=1 SessTim=1035062102 Strm=DATA rlen=1873
Block: 66 blen=19195 First rec FI=83 SessId=1 SessTim=1035062102 Strm=DATA rlen=2973
bls: Got EOF on device /tmp
End of File on device
```

Armed with the SessionId and the SessionTime, you can extract just about anything.

If you want to know even more, add a second **-v** to the command line to get a dump of every record in every block.

```
./bls -k -v -v /tmp/File002
bls: block.c:79 Dump block  80f8ad0: size=64512 BlkNum=1
               Hdrcksum=b1bdfd6d cksum=b1bdfd6d
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=VOL_LABEL Strm=0 len=147 p=80f8b40
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=SOS_LABEL Strm=-7 len=122 p=80f8be7
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=1 Strm=UATTR len=86 p=80f8c75
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=2 Strm=UATTR len=90 p=80f8cdf
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=3 Strm=UATTR len=92 p=80f8d4d
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=3 Strm=DATA len=54 p=80f8dbd
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=3 Strm=MD5 len=16 p=80f8e07
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=4 Strm=UATTR len=98 p=80f8e2b
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=4 Strm=DATA len=16 p=80f8ea1
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=4 Strm=MD5 len=16 p=80f8ec5
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=5 Strm=UATTR len=96 p=80f8ee9
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=5 Strm=DATA len=1783 p=80f8f5d
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=5 Strm=MD5 len=16 p=80f9668
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=6 Strm=UATTR len=95 p=80f968c
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=6 Strm=DATA len=32768 p=80f96ff
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=6 Strm=DATA len=32768 p=8101713
bls: block.c:79 Dump block  80f8ad0: size=64512 BlkNum=2
```

```
               Hdrcksum=9acc1e7f cksum=9acc1e7f
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=6 Strm=contDATA len=4087 p=80f8b40
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=6 Strm=DATA len=31970 p=80f9b4b
bls: block.c:92    Rec: VId=1 VT=1035062102 FI=6 Strm=MD5 len=16 p=8101841
...
```

Normally, except for deep debugging purposes, you will not need to verify Bacula checksum blocks. However, you can do so with:

```
./bls -j -E -V File002 FileStorage
bls: butil.c:297-0 Using device: "FileChgr1-Dev2" for reading.
14-Feb 09:43 bls JobId 0: Ready to read from volume "TestVolume001" on file device "FileChgr1-Dev2" (/tmp/regr
Volume Record: File:blk=0:215 SessId=1 SessTime=1423731064 JobId=0 DataLen=180
14-Feb 09:43 bls JobId 0: Error: block_util.c:451 Volume data error at 0:215!
Block checksum mismatch in block=1 len=64512: calc=34589ccc blk=8d8c5921
```

1.6 bextract

If you find yourself using bextract, you probably have done something wrong. For example, if you are trying to recover a file but are having problems, please see the **Restoring When Things Go Wrong** section (section 29.13 page 375) of the Bacula Community Edition Main manual.

Normally, you will restore files by running a **Restore** Job from the **Console** program. However, bextract can be used to extract a single file or a list of files from a Bacula tape or file. In fact, bextract can be a useful tool to restore files to an empty system assuming you are able to boot, you have statically linked bextract and you have an appropriate **bootstrap** file.

Please note that some of the current limitations of bextract are:

1. It cannot restore access control lists (ACL) that have been backed up along with the file data.
2. It cannot restore encrypted files.
3. The command line length is relatively limited, which means that you cannot enter a huge number of volumes. If you need to enter more volumes than the command line supports, please use a bootstrap file (see below).

It is called:

```
Usage: bextract [-d debug_level] <device-name> <directory-to-store-files>
 -b <file> specify a bootstrap file
 -dnn set debug level to nn
 -dt print timestamp in debug output
 -T send debug traces to trace file
 -e <file> exclude list
 -i <file> include list
 -p proceed inspite of I/O errors
 -t read data from volume, do not write anything
 -v verbose
 -V specify Volume names (separated by |)
 -? print this message
```

where **device-name** is the Archive Device (raw device name or full filename) of the device to be read, and **directory-to-store-files** is a path prefix to prepend to all the files restored.

NOTE: On Windows systems, if you specify a prefix of say d:/tmp, any file that would have been restored to c:/My Documents will be restored to d:/tmp/My Documents. That is, the original drive specification will be stripped. If no prefix is specified, the file will be restored to the original drive.

1.6.1 Extracting with Include or Exclude Lists

Using the **-e** option, you can specify a file containing a list of files to be excluded. Wildcards can be used in the exclusion list. This option will normally be used in conjunction with the **-i** option (see below). Both the **-e** and the **-i** options may be specified at the same time as the **-b** option. The bootstrap filters will be applied first, then the include list, then the exclude list.

Likewise, and probably more importantly, with the **-i** option, you can specify a file that contains a list (one file per line) of files and directories to include to be restored. The list must contain the full filename with the path. If you specify a path name only, all files and subdirectories of that path will be restored. If you specify a line containing only the filename (e.g. `my-file.txt`) it probably will not be extracted because you have not specified the full path.

For example, if the file `include-list` contains:

```
/home/kern/bacula
/usr/local/bin
```

Then the command:

```
./bextract -i include-list -V Volume /dev/nst0 /tmp
```

will restore from the Bacula archive `/dev/nst0` all files and directories in the backup from `/home/kern/bacula` and from `/usr/local/bin`. The restored files will be placed in a file of the original name under the directory `/tmp` (i.e. `/tmp/home/kern/bacula/...` and `/tmp/usr/local/bin/...`).

1.6.2 Extracting With a Bootstrap File

The **-b** option is used to specify a **bootstrap** file containing the information needed to restore precisely the files you want. Specifying a **bootstrap** file is optional but recommended because it gives you the most control over which files will be restored. For more details on the **bootstrap** file, please see Restoring Files with the Bootstrap File chapter of this document. Note, you may also use a bootstrap file produced by the `restore` command. For example:

```
./bextract -b bootstrap-file /dev/nst0 /tmp
```

The bootstrap file allows detailed specification of what files you want restored (extracted). You may specify a bootstrap file and include and/or exclude files at the same time. The bootstrap conditions will first be applied, and then each file record seen will be compared to the include and exclude lists.

1.6.3 Extracting From Multiple Volumes

If you wish to extract files that span several Volumes, you can specify the Volume names in the bootstrap file or you may specify the Volume names on the command line by separating them with a vertical bar. See the section above under the `bls` program entitled **Listing Multiple Volumes** for more information. The same techniques apply equally well to the `bextract` program or read the Bootstrap chapter of this document.

1.6.4 Test Extraction

If you wish to ensure that all blocks of a volume are valid, you can specify the **-t** flag. A bootstrap might be used with this option. It is also possible to setup and use a Verify Job.

1.7 bscan

If you find yourself using this program, you have probably done something wrong. For example, the best way to recover a lost or damaged Bacula database is to reload the database by using the bootstrap file that was written when you saved it (default bacula-dir.conf file).

The bscan program can be used to re-create a database (catalog) records from the backup information written to one or more Volumes. This is normally needed only if one or more Volumes have been pruned or purged from your catalog so that the records on the Volume are no longer in the catalog, or for Volumes that you have archived. Note, if you scan in Volumes that were previously purged, you will be able to do restores from those Volumes. However, unless you modify the Job and File retention times for the Jobs that were added by scanning, the next time you run any backup Job with the same name, the records will be pruned again. Since it takes a long time to scan Volumes this can be very frustrating.

With some care, bscan can also be used to synchronize your existing catalog with a Volume. Although we have never seen a case of bscan damaging a catalog, since bscan modifies your catalog, we recommend that you do a simple ASCII backup of your database before running bscan just to be sure. See Compacting Your Database for the details of making a copy of your database.

bscan can also be useful in a disaster recovery situation, after the loss of a hard disk, if you do not have a valid **bootstrap** file for reloading your system, or if a Volume has been recycled but not overwritten, you can use bscan to re-create your database, which can then be used to **restore** your system or a file to its previous state.

bscan Is also able to re-create / list records such as Restore Object and Plugin Objects.

It is called:

```
Usage: bscan [options] <bacula-archive>
       -b bootstrap   specify a bootstrap file
       -c <file>      specify configuration file
       -d <nn>        set debug level to nn
       -m             update media info in database
       -n <name>      specify the database name (default bacula)
       -u <user>      specify database user name (default bacula)
       -P <password>  specify database password (default none)
       -h <host>      specify database host (default NULL)
       -p             proceed inspite of I/O errors
       -r             list records
       -s             synchronize or store in database
       -v             verbose
       -V <Volumes>   specify Volume names (separated by |)
       -w <dir>       specify working directory (default from conf file)
       -?             print this message
```

If you are using MySQL or PostgreSQL, there is no need to supply a working directory since in that case, bscan knows where the databases are. However, if you have provided security on your database, you may need to supply either the database name (**-b** option), the user name (**-u** option), and/or the password (**-p**) options.

NOTE: before bscan can work, it needs at least a bare bones valid database. If your database exists but some records are missing because they were pruned, then you are all set. If your database was lost or destroyed, then you must first ensure that you have the SQL program running (MySQL or PostgreSQL), then you must create the Bacula database (normally named bacula), and you must create the Bacula tables using the scripts in the cats directory. This is explained in the Installation chapter of the manual. Finally, before scanning into an empty database, you must start and stop the Director with the appropriate bacula-dir.conf file so that it can create the Client and Storage records which are not stored on the Volumes. Without these records, scanning is unable to connect the Job records to the proper client.

Forgetting for the moment the extra complications of a full rebuild of your catalog, let's suppose

that you did a backup to Volumes "Vol001" and "Vol002", then sometime later all records of one or both those Volumes were pruned or purged from the database. By using bscan you can recreate the catalog entries for those Volumes and then use the restore command in the Console to restore whatever you want. A command something like:

```
bscan -c bacula-sd.conf -v -V Vol001\|Vol002 /dev/nst0
```

will give you an idea of what is going to happen without changing your catalog. Of course, you may need to change the path to the Storage daemon's conf file, the Volume name, and your tape (or disk) device name. This command must read the entire tape, so if it has a lot of data, it may take a long time, and thus you might want to immediately use the command listed below. Note, if you are writing to a disk file, replace the device name with the path to the directory that contains the Volumes. This must correspond to the Archive Device in the conf file.

Then to actually write or store the records in the catalog, add the **-s** option as follows:

```
bscan -s -m -c bacula-sd.conf -v -V Vol001\|Vol002 /dev/nst0
```

When writing to the database, if bscan finds existing records, it will generally either update them if something is wrong or leave them alone. Thus if the Volumes you are scanning are all or partially in the catalog already, no harm will be done to that existing data. Any missing data will simply be added.

If you have multiple tapes, you should scan them with:

```
bscan -s -m -c bacula-sd.conf -v -V Vol001\|Vol002\|Vol003 /dev/nst0
```

Since there is a limit on the command line length (511 bytes) accepted by bscan, if you have too many Volumes, you will need to manually create a bootstrap file. See the **Restoring Files with the Bootstrap File** chapter (chapter 54 page 621) of the Bacula Community Edition Main manual, in particular the section entitled **Bootstrap for bscan** (section 54.2 page 625). Basically, the .bsr file for the above example might look like:

```
Volume=Vol001
Volume=Vol002
Volume=Vol003
```

Note: bscan does not support supplying Volume names on the command line and at the same time in a bootstrap file. Please use only one or the other.

You should, always try to specify the tapes in the order they are written. If you do not, any Jobs that span a volume may not be fully or properly restored. However, bscan can handle scanning tapes that are not sequential. Any incomplete records at the end of the tape will simply be ignored in that case. If you are simply repairing an existing catalog, this may be OK, but if you are creating a new catalog from scratch, it will leave your database in an incorrect state. If you do not specify all necessary Volumes on a single bscan command, bscan will not be able to correctly restore the records that span two volumes. In other words, it is much better to specify two or three volumes on a single bscan command (or in a .bsr file) rather than run bscan two or three times, each with a single volume.

Note, the restoration process using bscan is not identical to the original creation of the catalog data. This is because certain data such as Client records and other non-essential data such as volume reads, volume mounts, etc is not stored on the Volume, and thus is not restored by bscan. The results of bscanning are, however, perfectly valid, and will permit restoration of any or all the files in the catalog using the normal Bacula console commands. If you are starting with an empty catalog and expecting bscan to reconstruct it, you may be a bit disappointed, but at a minimum, you must ensure that your bacula-dir.conf file is the same as what it

previously was – that is, it must contain all the appropriate Client resources so that they will be recreated in your new database **before** running bscan. Normally when the Director starts, it will recreate any missing Client records in the catalog. Another problem you will have is that even if the Volumes (Media records) are recreated in the database, they will not have their autochanger status and slots properly set. As a result, you will need to repair that by using the update slots command. There may be other considerations as well. Rather than bscanning, you should always attempt to recover you previous catalog backup.

1.7.1 Using bscan to Compare a Volume to an existing Catalog

If you wish to compare the contents of a Volume to an existing catalog without changing the catalog, you can safely do so if and only if you do **not** specify either the -**m** or the -**s** options in order to avoid modifying the catalog. However, not every record that is stored in the catalog is stored on the volumes, so we don't particularly recommend using **bscan** other than for testing. Probably the best way to compare what is on a Volume to what is in the Catalog is to use one of the Verify Job options.

1.7.2 Using bscan to Recreate a Catalog from a Volume

This is the mode for which bscan is most useful. You can either bscan into a freshly created catalog, or directly into your existing catalog (after having made an ASCII copy as described above). Normally, you should start with a freshly created catalog that contains no data.

Starting with a single Volume named **TestVolume1**, you run a command such as:

```
./bscan -V TestVolume1 -v -s -m -c bacula-sd.conf /dev/nst0
```

If there is more than one volume, simply append it to the first one separating it with a vertical bar. You may need to precede the vertical bar with a forward slash escape the shell – e.g. **TestVolume1**\|**TestVolume2**. The -**v** option was added for verbose output (this can be omitted if desired). The -**s** option that tells bscan to store information in the database. The physical device name /dev/nst0 is specified after all the options.

For example, after having done a full backup of a directory, then two incrementals, I reinitialized the SQLite database as described above, and using the bootstrap.bsr file noted above, I entered the following command:

```
./bscan -b bootstrap.bsr -v -s -c bacula-sd.conf /dev/nst0
```

which produced the following output:

```
bscan: bscan.c:182 Using Database: bacula, User: bacula
bscan: bscan.c:673 Created Pool record for Pool: Default
bscan: bscan.c:271 Pool type "Backup" is OK.
bscan: bscan.c:632 Created Media record for Volume: TestVolume1
bscan: bscan.c:298 Media type "DDS-4" is OK.
bscan: bscan.c:307 VOL_LABEL: OK for Volume: TestVolume1
bscan: bscan.c:693 Created Client record for Client: Rufus
bscan: bscan.c:769 Created new JobId=1 record for original JobId=2
bscan: bscan.c:717 Created FileSet record "Kerns Files"
bscan: bscan.c:819 Updated Job termination record for new JobId=1
bscan: bscan.c:905 Created JobMedia record JobId 1, MediaId 1
bscan: Got EOF on device /dev/nst0
bscan: bscan.c:693 Created Client record for Client: Rufus
bscan: bscan.c:769 Created new JobId=2 record for original JobId=3
bscan: bscan.c:708 Fileset "Kerns Files" already exists.
bscan: bscan.c:819 Updated Job termination record for new JobId=2
bscan: bscan.c:905 Created JobMedia record JobId 2, MediaId 1
```

```
bscan: Got EOF on device /dev/nst0
bscan: bscan.c:693 Created Client record for Client: Rufus
bscan: bscan.c:769 Created new JobId=3 record for original JobId=4
bscan: bscan.c:708 Fileset "Kerns Files" already exists.
bscan: bscan.c:819 Updated Job termination record for new JobId=3
bscan: bscan.c:905 Created JobMedia record JobId 3, MediaId 1
bscan: Got EOF on device /dev/nst0
bscan: bscan.c:652 Updated Media record at end of Volume: TestVolume1
bscan: bscan.c:428 End of Volume. VolFiles=3 VolBlocks=57 VolBytes=10,027,437
```

The key points to note are that bscan prints a line when each major record is created. Due to the volume of output, it does not print a line for each file record unless you supply the **-v** option twice or more on the command line.

In the case of a Job record, the new JobId will not normally be the same as the original Jobid. For example, for the first JobId above, the new JobId is 1, but the original JobId is 2. This is nothing to be concerned about as it is the normal nature of databases. bscan will keep everything straight.

Although bscan claims that it created a Client record for Client: Rufus three times, it was actually only created the first time. This is normal.

You will also notice that it read an end of file after each Job (Got EOF on device ...). Finally the last line gives the total statistics for the bscan.

If you had added a second **-v** option to the command line, Bacula would have been even more verbose, dumping virtually all the details of each Job record it encountered.

Now if you start Bacula and enter a **list jobs** command to the console program, you will get:

```
+-------+----------+-----------------+------+-----+----------+----------+---------+
| JobId | Name     | StartTime       | Type | Lvl | JobFiles | JobBytes | JobStat |
+-------+----------+-----------------+------+-----+----------+----------+---------+
| 1     | kernsave | 2002-10-07 14:59 | B    | F   | 84       | 4180207  | T       |
| 2     | kernsave | 2002-10-07 15:00 | B    | I   | 15       | 2170314  | T       |
| 3     | kernsave | 2002-10-07 15:01 | B    | I   | 33       | 3662184  | T       |
+-------+----------+-----------------+------+-----+----------+----------+---------+
```

which corresponds virtually identically with what the database contained before it was re-initialized and restored with bscan. All the Jobs and Files found on the tape are restored including most of the Media record. The Volume (Media) records restored will be marked as **Full** so that they cannot be rewritten without operator intervention.

It should be noted that bscan cannot restore a database to the exact condition it was in previously because a lot of the less important information contained in the database is not saved to the tape. Nevertheless, the reconstruction is sufficiently complete, that you can run `restore` against it and get valid results.

An interesting aspect of restoring a catalog backup using bscan is that the backup was made while Bacula was running and writing to a tape. At the point the backup of the catalog is made, the tape Bacula is writing to will have say 10 files on it, but after the catalog backup is made, there will be 11 files on the tape Bacula is writing. This there is a difference between what is contained in the backed up catalog and what is actually on the tape. If after restoring a catalog, you attempt to write on the same tape that was used to backup the catalog, Bacula will detect the difference in the number of files registered in the catalog compared to what is on the tape, and will mark the tape in error.

There are two solutions to this problem. The first is possibly the simplest and is to mark the volume as Used before doing any backups. The second is to manually correct the number of files listed in the Media record of the catalog. This procedure is documented elsewhere in the manual and involves using the `update volume` command in bconsole.

1.7.3 Using bscan to Correct the Volume File Count

If the Storage daemon crashes during a backup Job, the catalog will not be properly updated for the Volume being used at the time of the crash. This means that the Storage daemon will have written say 20 files on the tape, but the catalog record for the Volume indicates only 19 files.

Bacula refuses to write on a tape that contains a different number of files from what is in the catalog. To correct this situation, you may run a bscan with the **-m** option (but **without** the **-s** option) to update only the final Media record for the Volumes read.

1.7.4 After bscan

If you use bscan to enter the contents of the Volume into an existing catalog, you should be aware that the records you entered may be immediately pruned during the next job, particularly if the Volume is very old or had been previously purged. To avoid this, after running bscan, you can manually set the volume status (VolStatus) to **Read-Only** by using the update command in the catalog. This will allow you to restore from the volume without having it immediately purged. When you have restored and backed up the data, you can reset the VolStatus to **Used** and the Volume will be purged from the catalog.

1.8 bcopy

The bcopy program can be used to copy one **Bacula** archive file to another. For example, you may copy a tape to a file, a file to a tape, a file to a file, or a tape to a tape. For tape to tape, you will need two tape drives. (a later version is planned that will buffer it to disk). In the process of making the copy, no record of the information written to the new Volume is stored in the catalog. This means that the new Volume, though it contains valid backup data, cannot be accessed directly from existing catalog entries. If you wish to be able to use the Volume with the Console restore command, for example, you must first bscan the new Volume into the catalog.

1.8.1 bcopy Command Options

```
Usage: bcopy [-d debug_level] <input-archive> <output-archive>
       -b bootstrap      specify a bootstrap file
       -c <file>         specify configuration file
       -dnn              set debug level to nn
       -i                specify input Volume names (separated by |)
       -o                specify output Volume names (separated by |)
       -p                proceed inspite of I/O errors
       -v                verbose
       -w dir            specify working directory (default /tmp)
       -?                print this message
```

By using a **bootstrap** file, you can copy parts of a Bacula archive file to another archive.

One of the objectives of this program is to be able to recover as much data as possible from a damaged tape. However, the current version does not yet have this feature.

As this is a new program, any feedback on its use would be appreciated. In addition, I only have a single tape drive, so I have never been able to test this program with two tape drives.

1.9 btape

This program permits a number of elementary tape operations via a tty command interface. It works only with tapes and not with other kinds of Bacula storage media (DVD, File, ...). The **test** command, described below, can be very useful for testing older tape drive compatibility problems. Aside from initial testing of tape drive compatibility with **Bacula**, btape will be mostly used by developers writing new tape drivers.

btape can be dangerous to use with existing **Bacula** tapes because it will relabel a tape or write on the tape if so requested regardless that the tape may contain valuable data, so please be careful and use it only on blank tapes.

To work properly, btape needs to read the Storage daemon's configuration file. As a default, it will look for bacula-sd.conf in the current directory. If your configuration file is elsewhere, please use the **-c** option to specify where.

The physical device name must be specified on the command line, and this same device name must be present in the Storage daemon's configuration file read by btape

```
Usage: btape <options> <device_name>
       -b <file>   specify bootstrap file
       -c <file>   set configuration file to file
       -d <nn>     set debug level to nn
       -p          proceed inspite of I/O errors
       -s          turn off signals
       -v          be verbose
       -?          print this message.
```

1.9.1 Using btape to Verify your Tape Drive

An important reason for this program is to ensure that a Storage daemon configuration file is defined so that Bacula will correctly read and write tapes.

It is highly recommended that you run the test command before running your first Bacula job to ensure that the parameters you have defined for your storage device (tape drive) will permit **Bacula** to function properly. You only need to mount a blank tape, enter the command, and the output should be reasonably self explanatory. Please see the **Tape Testing** chapter (chapter 3 page 25) of the Bacula Community Edition Problems Resolution Guide for the details.

1.9.2 btape Commands

The full list of commands are:

```
  Command    Description
  =======    ===========
  autochanger test autochanger
  bsf        backspace file
  bsr        backspace record
  cap        list device capabilities
  clear      clear tape errors
  eod        go to end of Bacula data for append
  eom        go to the physical end of medium
  fill       fill tape, write onto second volume
  unfill     read filled tape
  fsf        forward space a file
  fsr        forward space a record
  help       print this command
  label      write a Bacula label to the tape
  load       load a tape
  quit       quit btape
```

```
rawfill    use write() to fill tape
readlabel  read and print the Bacula tape label
rectest    test record handling functions
rewind     rewind the tape
scan       read() tape block by block to EOT and report
scanblocks Bacula read block by block to EOT and report
speed      report drive speed
status     print tape status
test       General test Bacula tape functions
weof       write an EOF on the tape
wr         write a single Bacula block
rr         read a single record
qfill      quick fill command
```

The most useful commands are:

test test writing records and EOF marks and reading them back.

fill completely fill a volume with records, then write a few records on a second volume, and finally, both volumes will be read back. This command writes blocks containing random data, so your drive will not be able to compress the data, and thus it is a good test of the real physical capacity of your tapes.

readlabel read and dump the label on a Bacula tape.

cap list the device capabilities as defined in the configuration file and as perceived by the Storage daemon.

The `readlabel` command can be used to display the details of a Bacula tape label. This can be useful if the physical tape label was lost or damaged.

In the event that you want to relabel a **Bacula**, you can simply use the `label` command which will write over any existing label. However, please note for labeling tapes, we recommend that you use the `label` command in the **Console** program since it will never overwrite a valid Bacula tape.

Testing your Tape Drive

To determine the best configuration of your tape drive, you can run the new `speed` command available in the `btape` program.

This command can have the following arguments:

`file_size=n` Specify the Maximum File Size for this test (between 1 and 5GB). This counter is in GB.

`nb_file=n` Specify the number of file to be written. The amount of data should be greater than your memory ($file\_size * nb\_file$).

`skip_zero` This flag permits to skip tests with constant data.

`skip_random` This flag permits to skip tests with random data.

`skip_raw` This flag permits to skip tests with raw access.

`skip_block` This flag permits to skip tests with Bacula block access.

```
*speed file_size=3 skip_raw
btape.c:1078 Test with zero data and bacula block structure.
btape.c:956 Begin writing 3 files of 3.221 GB with blocks of 129024 bytes.
++++++++++++++++++++++++++++++++++++++++
btape.c:604 Wrote 1 EOF to "Drive-0" (/dev/nst0)
```

```
btape.c:406 Volume bytes=3.221 GB. Write rate = 44.128 MB/s
...
btape.c:383 Total Volume bytes=9.664 GB. Total Write rate = 43.531 MB/s

btape.c:1090 Test with random data, should give the minimum throughput.
btape.c:956 Begin writing 3 files of 3.221 GB with blocks of 129024 bytes.
++++++++++++++++++++++++++++++++++++++++
btape.c:604 Wrote 1 EOF to "Drive-0" (/dev/nst0)
btape.c:406 Volume bytes=3.221 GB. Write rate = 7.271 MB/s
++++++++++++++++++++++++++++++++++++++++
...
btape.c:383 Total Volume bytes=9.664 GB. Total Write rate = 7.365 MB/s
```

When using compression, the random test will give your the minimum throughput of your drive . The test using constant string will give you the maximum speed of your hardware chain. (cpu, memory, scsi card, cable, drive, tape).

You can change the block size in the Storage Daemon configuration file.

1.10 Other Programs

The following programs are general utility programs and in general do not need a configuration file nor a device name.

1.11 bsmtp

bsmtp is a simple mail transport program that permits more flexibility than the standard mail programs typically found on Unix systems. It can even be used on Windows machines.

It is called:

```
Usage: bsmtp [-f from] [-h mailhost] [-s subject] [-c copy] [recipient ...]
       -c          set the Cc: field
       -dnn        set debug level to nn
       -f          set the From: field
       -h          use mailhost:port as the bsmtp server
       -l          limit the lines accepted to nn
       -s          set the Subject: field
       -?          print this message.
```

If the **-f** option is not specified, bsmtp will use your userid. If the option **-h** is not specified bsmtp will use the value in the environment variable **bsmtpSERVER** or if there is none **localhost**. By default port 25 is used.

If a line count limit is set with the **-l** option, bsmtp will not send an email with a body text exceeding that number of lines. This is especially useful for large restore job reports where the list of files restored might produce very long mails your mail-server would refuse or crash. However, be aware that you will probably suppress the job report and any error messages unless you check the log file written by the Director (see the messages resource in this manual for details).

recipients is a space separated list of email recipients.

The body of the email message is read from standard input.

An example of the use of bsmtp would be to put the following statement in the **Messages** resource of your bacula-dir.conf file. Note, these commands should appear on a single line each.

```
mailcommand = "/home/bacula/bin/bsmtp -h mail.domain.com -f \"\(Bacula\) %r\"
              -s \"Bacula: %t %e of %c %l\" %r"
operatorcommand = "/home/bacula/bin/bsmtp -h mail.domain.com -f \"\(Bacula\) %r\"
                  -s \"Bacula: Intervention needed for %j\" %r"
```

Where you replace /home/bacula/bin with the path to your **Bacula** binary directory, and you replace mail.domain.com with the fully qualified name of your bsmtp (email) server, which normally listens on port 25. For more details on the substitution characters (e.g. %r) used in the above line, please see the documentation of the **Mail Command in the Messages Resource** chapter (chapter 26 page 341) of the Bacula Community Edition Main manual.

It is highly recommended that you test one or two cases by hand to make sure that the **mailhost** that you specified is correct and that it will accept your email requests. Since bsmtp always uses a TCP connection rather than writing in the spool file, you may find that your **from** address is being rejected because it does not contain a valid domain, or because your message is caught in your spam filtering rules. Generally, you should specify a fully qualified domain name in the **from** field, and depending on whether your bsmtp gateway is Exim or Sendmail, you may need to modify the syntax of the from part of the message. Please test.

When running bsmtp by hand, you will need to terminate the message by entering a ctl-d in column 1 of the last line.

If you are getting incorrect dates (e.g. 1970) and you are running with a non-English language setting, you might try adding a LANG="en_US" immediately before the bsmtp call.

In general, bsmtp attempts to cleanup email addresses that you specify in the from, copy, mailhost, and recipient fields, by adding the necessary < and > characters around the address part. However, if you include a **display-name** (see RFC 5332), some SMTP servers such as Exchange may not accept the message if the **display-name** is also included in < and >. As mentioned above, you must test, and if you run into this situation, you may manually add the < and > to the Bacula **mailcommand** or **operatorcommand** and when bsmtp is formatting an address if it already contains a < or > character, it will leave the address unchanged.

1.12 dbcheck

dbcheck is a simple program that will search for logical inconsistencies in the Bacula tables in your database, and optionally fix them. It is a database maintenance routine, in the sense that it can detect and remove unused rows, but it is not a database repair routine. To repair a database, see the tools furnished by the database vendor. Normally dbcheck should never need to be run, but if Bacula has crashed or you have a lot of Clients, Pools, or Jobs that you have removed, it could be useful.

The dbcheck program can be found in the /opt/bacula/bin directory.

It is called:

```
Usage: dbcheck [-c config ] [-B] [-C catalog name] [-d debug_level]
  <working-directory> <bacula-database> <user> <password> [<dbhost>] [<dbport>]
       -b              batch mode
       -C              catalog name in the director conf file
       -c              Director conf filename
       -B              print catalog configuration and exit
       -d <nn>         set debug level to <nn>
       -dt             print timestamp in debug output
       -f              fix inconsistencies
       -v              verbose
       -?              print this message
```

If the -**B** option is specified, dbcheck will print out catalog information in a simple text based format. This is useful to backup it in a secure way.

```
$ dbcheck -B
catalog=MyCatalog
db_type=SQLite
db_name=regress
db_driver=
db_user=regress
db_password=
db_address=
db_port=0
db_socket=
```

If the **-c** option is given with the Director's conf file, there is no need to enter any of the command line arguments, in particular the working directory as dbcheck will read them from the file.

If the **-f** option is specified, dbcheck will repair (**fix**) the inconsistencies it finds. Otherwise, it will report only.

If the **-b** option is specified, dbcheck will run in batch mode, and it will proceed to examine and fix (if -f is set) all programmed inconsistency checks. If the **-b** option is not specified, dbcheck will enter interactive mode and prompt with the following:

```
Hello, this is the database check/correct program.
Please select the function you want to perform.
  1) Toggle modify database flag
  2) Toggle verbose flag
  3) Repair bad Filename records
  4) Repair bad Path records
  5) Eliminate duplicate Filename records
  6) Eliminate duplicate Path records
  7) Eliminate orphaned Jobmedia records
  8) Eliminate orphaned File records
  9) Eliminate orphaned Path records
 10) Eliminate orphaned Filename records
 11) Eliminate orphaned FileSet records
 12) Eliminate orphaned Client records
 13) Eliminate orphaned Job records
 14) Eliminate all Admin records
 15) Eliminate all Restore records
 16) All (3-15)
 17) Quit
Select function number:
```

By entering 1 or 2, you can toggle the modify database flag (-f option) and the verbose flag (-v). It can be helpful and reassuring to turn off the modify database flag, then select one or more of the consistency checks (items 3 through 9) to see what will be done, then toggle the modify flag on and re-run the check.

The inconsistencies examined are the following:

- Duplicate filename records. This can happen if you accidentally run two copies of Bacula at the same time, and they are both adding filenames simultaneously. It is a rare occurrence, but will create an inconsistent database. If this is the case, you will receive error messages during Jobs warning of duplicate database records. If you are not getting these error messages, there is no reason to run this check.
- Repair bad Filename records. This checks and corrects filenames that have a trailing slash. They should not.
- Repair bad Path records. This checks and corrects path names that do not have a trailing slash. They should.
- Duplicate path records. This can happen if you accidentally run two copies of Bacula at the same time, and they are both adding filenames simultaneously. It is a rare occurrence, but will create an inconsistent database. See the item above for why this occurs and how you know it is happening.

- Orphaned JobMedia records. This happens when a Job record is deleted (perhaps by a user issued SQL statement), but the corresponding JobMedia record (one for each Volume used in the Job) was not deleted. Normally, this should not happen, and even if it does, these records generally do not take much space in your database. However, by running this check, you can eliminate any such orphans.

- Orphaned File records. This happens when a Job record is deleted (perhaps by a user issued SQL statement), but the corresponding File record (one for each Volume used in the Job) was not deleted. Note, searching for these records can be **very** time consuming (i.e. it may take hours) for a large database. Normally this should not happen as Bacula takes care to prevent it. Just the same, this check can remove any orphaned File records. It is recommended that you run this once a year since orphaned File records can take a large amount of space in your database. You might want to ensure that you have indexes on JobId, FilenameId, and PathId for the File table in your catalog before running this command.

- Orphaned Path records. This condition happens any time a directory is deleted from your system and all associated Job records have been purged. During standard purging (or pruning) of Job records, Bacula does not check for orphaned Path records. As a consequence, over a period of time, old unused Path records will tend to accumulate and use space in your database. This check will eliminate them. It is recommended that you run this check at least once a year.

- Orphaned Filename records. This condition happens any time a file is deleted from your system and all associated Job records have been purged. This can happen quite frequently as there are quite a large number of files that are created and then deleted. In addition, if you do a system update or delete an entire directory, there can be a very large number of Filename records that remain in the catalog but are no longer used.

  During standard purging (or pruning) of Job records, Bacula does not check for orphaned Filename records. As a consequence, over a period of time, old unused Filename records will accumulate and use space in your database. This check will eliminate them. It is strongly recommended that you run this check at least once a year, and for large database (more than 200 Megabytes), it is probably better to run this once every 6 months.

- Orphaned Client records. These records can remain in the database long after you have removed a client.

- Orphaned Job records. If no client is defined for a job or you do not run a job for a long time, you can accumulate old job records. This option allow you to remove jobs that are not attached to any client (and thus useless).

- All Admin records. This command will remove all Admin records, regardless of their age.

- All Restore records. This command will remove all Restore records, regardless of their age.

If you are using MySQL, dbcheck will ask you if you want to create temporary indexes to speed up orphaned Path and Filename elimination.

Mostly for PostgreSQL users, we provide a pure SQL script dbcheck replacement in examples/database/dbcheck.sql that works with global queries instead of many small queries like dbcheck. Execution instructions are at the top of the script and you will need to type COMMIT at the end to validate modifications.

If you are using bweb or brestore, don't eliminate orphaned Path, else you will have to rebuild brestore_pathvisibility and brestore_pathhierarchy indexes.

By the way, I personally run dbcheck only where I have messed up my database due to a bug in developing Bacula code, so normally you should never need to run dbcheck in spite of the recommendations given above, which are given so that users don't waste their time running dbcheck too often.

1.13 bregex

bregex is a simple program that will allow you to test regular expressions against a file of data. This can be useful because the regex libraries on most systems differ, and in addition, regex expressions can be complicated.

bregex is found in the src/tools directory and it is normally installed with your system binaries. To run it, use:

```
Usage: bregex [-d debug_level] -f <data-file>
       -f          specify file of data to be matched
       -l          suppress line numbers
       -n          print lines that do not match
       -?          print this message.
```

The <data-file> is a filename that contains lines of data to be matched (or not) against one or more patterns. When the program is run, it will prompt you for a regular expression pattern, then apply it one line at a time against the data in the file. Each line that matches will be printed preceded by its line number. You will then be prompted again for another pattern.

Enter an empty line for a pattern to terminate the program. You can print only lines that do not match by using the -n option, and you can suppress printing of line numbers with the -l option.

This program can be useful for testing regex expressions to be applied against a list of filenames.

1.14 bwild

bwild is a simple program that will allow you to test wild-card expressions against a file of data.

bwild is found in the src/tools directory and it is normally installed with your system binaries. To run it, use:

```
Usage: bwild [-d debug_level] -f <data-file>
       -f          specify file of data to be matched
       -l          suppress line numbers
       -n          print lines that do not match
       -?          print this message.
```

The <data-file> is a filename that contains lines of data to be matched (or not) against one or more patterns. When the program is run, it will prompt you for a wild-card pattern, then apply it one line at a time against the data in the file. Each line that matches will be printed preceded by its line number. You will then be prompted again for another pattern.

Enter an empty line for a pattern to terminate the program. You can print only lines that do not match by using the -n option, and you can suppress printing of line numbers with the -l option.

This program can be useful for testing wild expressions to be applied against a list of filenames.

1.15 testfind

testfind permits listing of files using the same search engine that is used for the **Include** resource in Job resources. Note, much of the functionality of this program (listing of files to be included) is present in the estimate command in the Console program.

The original use of testfind was to ensure that Bacula's file search engine was correct and to print some statistics on file name and path length. However, you may find it useful to see what

bacula would do with a given **Include** resource. The testfind program can be found in the <bacula-source>/src/tools directory of the source distribution. Though it is built with the make process, it is not normally "installed".

It is called:

```
Usage: testfind [-d debug_level] [-] [pattern1 ...]
       -a          print extended attributes (Win32 debug)
       -dnn        set debug level to nn
       -           read pattern(s) from stdin
       -?          print this message.
Patterns are used for file inclusion -- normally directories.
Debug level>= 1 prints each file found.
Debug level>= 10 prints path/file for catalog.
Errors are always printed.
Files/paths truncated is a number with len> 255.
Truncation is only in the catalog.
```

Where a pattern is any filename specification that is valid within an **Include** resource definition. If none is specified, / (the root directory) is assumed. For example:

```
./testfind /bin
```

Would print the following:

```
Dir: /bin
Reg: /bin/bash
Lnk: /bin/bash2 -> bash
Lnk: /bin/sh -> bash
Reg: /bin/cpio
Reg: /bin/ed
Lnk: /bin/red -> ed
Reg: /bin/chgrp
...
Reg: /bin/ipcalc
Reg: /bin/usleep
Reg: /bin/aumix-minimal
Reg: /bin/mt
Lnka: /bin/gawk-3.1.0 -> /bin/gawk
Reg: /bin/pgawk
Total files    : 85
Max file length: 13
Max path length: 5
Files truncated: 0
Paths truncated: 0
```

Even though testfind uses the same search engine as **Bacula**, each directory to be listed, must be entered as a separate command line entry or entered one line at a time to standard input if the - option was specified.

Specifying a debug level of one (i.e. **-d1**) on the command line will cause testfind to print the raw filenames without showing the Bacula internal file type, or the link (if any). Debug levels of 10 or greater cause the filename and the path to be separated using the same algorithm that is used when putting filenames into the Catalog database.

1.16 bimagemgr

bimagemgr is a utility for those who backup to disk volumes in order to commit them to CDR disk, rather than tapes. It is a web based interface written in Perl and is used to monitor when a volume file needs to be burned to disk. It requires:

- A web server running on the bacula server
- A CD recorder installed and configured on the bacula server
- The cdrtools package installed on the bacula server.
- perl, perl-DBI module, and either DBD-MySQL DBD-SQLite or DBD-PostgreSQL modules

DVD burning is not supported by bimagemgr at this time, but both are planned for future releases.

1.16.1 bimagemgr installation

Installation from tarball:

1. Examine the Makefile and adjust it to your configuration if needed.
2. Edit config.pm to fit your configuration.
3. Do make install as root.
4. Edit httpd.conf and change the Timeout value. The web server must not time out and close the connection before the burn process is finished. The exact value needed may vary depending upon your CD recorder speed and whether you are burning on the Bacula server on on another machine across your network. In my case I set it to 1000 seconds. Restart httpd.
5. Make sure that cdrecord is setuid root.

Installation from rpm package:

1. Install the rpm package for your platform.
2. Edit /cgi-bin/config.pm to fit your configuration.
3. Edit httpd.conf and change the Timeout value. The web server must not time out and close the connection before the burn process is finished. The exact value needed may vary depending upon your cd recorder speed and whether you are burning on the bacula server on on another machine across your network. In my case I set it to 1000 seconds. Restart httpd.
4. Make sure that cdrecord is setuid root.

For Bacula systems less than 1.36:

1. Edit the configuration section of config.pm to fit your configuration.
2. Run /etc/bacula/create_cdimage_table.pl from a console on your Bacula server (as root) to add the CDImage table to your bacula database.

Accessing the Volume files: The Volume files by default have permissions 640 and can only be read by root. The recommended approach to this is as follows (and only works if bimagemgr and apache are running on the same host as Bacula.

For bacula-1.34 or 1.36 installed from tarball -

1. Create a new user group bacula and add the user apache to the group for Red Hat or Mandrake systems. For SuSE systems add the user wwwrun to the bacula group.
2. Change ownership of all of your Volume files to root.bacula
3. Edit the /etc/bacula/bacula startup script and set SD_USER=root and SD_GROUP=bacula. Restart bacula.

Note: step 3 should also be done in /etc/init.d/bacula-sd but released versions of this file prior to 1.36 do not support it. In that case it would be necessary after a reboot of the server to execute /etc/bacula/bacula restart.

For bacula-1.38 installed from tarball -

1. Your configure statement should include:

```
--with-dir-user=bacula
--with-dir-group=bacula
--with-sd-user=bacula
--with-sd-group=disk
--with-fd-user=root
--with-fd-group=bacula
```

2. Add the user apache to the bacula group for Red Hat or Mandrake systems. For SuSE systems add the user wwwrun to the bacula group.
3. Check/change ownership of all of your Volume files to root.bacula

For bacula-1.36 or bacula-1.38 installed from rpm -

1. Add the user apache to the group bacula for Red Hat or Mandrake systems. For SuSE systems add the user wwwrun to the bacula group.
2. Check/change ownership of all of your Volume files to root.bacula

bimagemgr installed from rpm > 1.38.9 will add the web server user to the bacula group in a post install script. Be sure to edit the configuration information in config.pm after installation of rpm package.

bimagemgr will now be able to read the Volume files but they are still not world readable.

If you are running bimagemgr on another host (not recommended) then you will need to change the permissions on all of your backup volume files to 644 in order to access them via NFS share or other means. This approach should only be taken if you are sure of the security of your environment as it exposes the backup Volume files to world read.

1.16.2 bimagemgr usage

Calling the program in your web browser, e.g. http://localhost/cgi-bin/bimagemgr.pl will produce a display as shown below in Figure 1.1 on the following page. The program will query the bacula database and display all volume files with the date last written and the date last burned to disk. If a volume needs to be burned (last written is newer than last burn date) a "Burn" button will be displayed in the rightmost column.

Place a blank CDR disk in your recorder and click the "Burn" button. This will cause a pop up window as shown in Figure 1.2 on the next page to display the burn progress.

When the burn finishes the pop up window will display the results of cdrecord as shown in Figure 1.3 on page 23. Close the pop up window and refresh the main window. The last burn

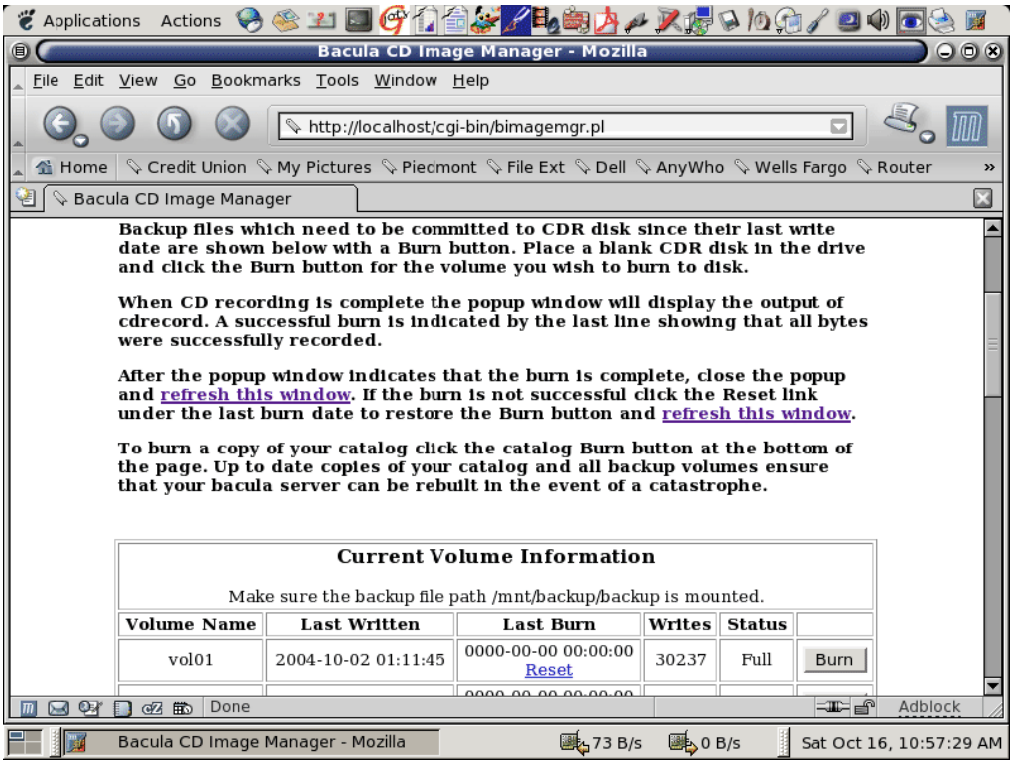

Figure 1.1: Bacula CD Image Manager

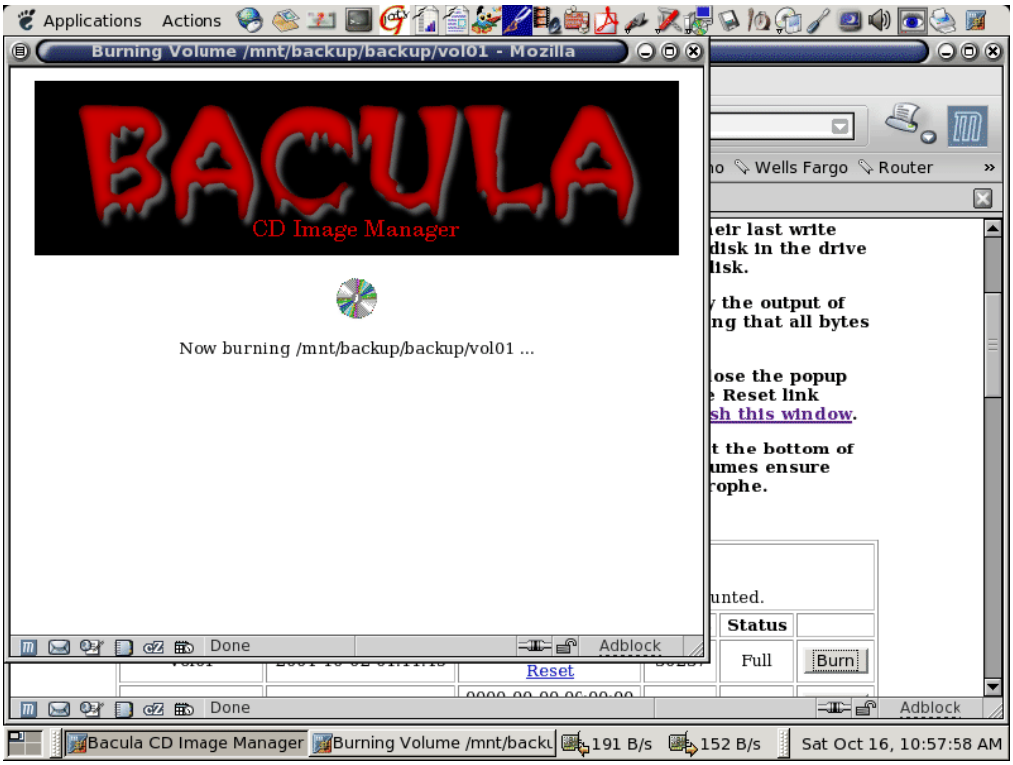

Figure 1.2: Bacula CD Image Burn Progress Window

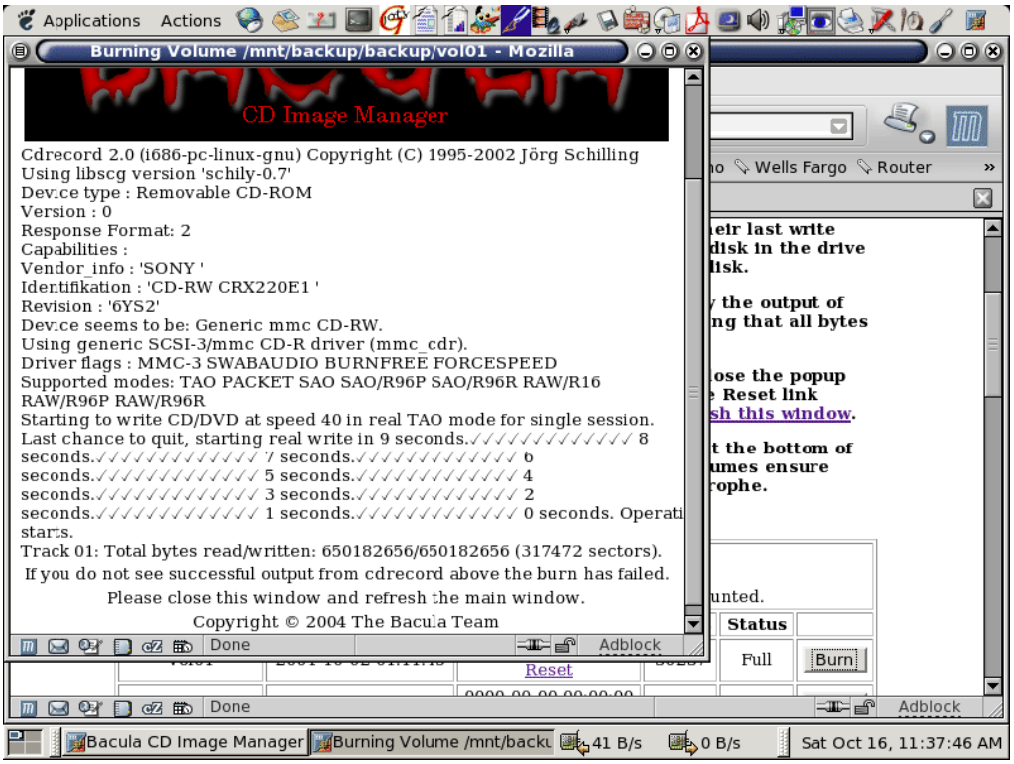

Figure 1.3: Bacula CD Image Burn Results

date will be updated and the "Burn" button for that volume will disappear. Should you have a failed burn you can reset the last burn date of that volume by clicking its "Reset" link.

In the bottom row of the main display window are two more buttons labeled "Burn Catalog" and "Blank CDRW". "Burn Catalog" will place a copy of your Bacula catalog on a disk. If you use CDRW disks rather than CDR then "Blank CDRW" allows you to erase the disk before re-burning it. Regularly committing your backup volume files and your catalog to disk with `bimagemgr` ensures that you can rebuild easily in the event of some disaster on the Bacula server itself.

Chapter 2

Bacula RPM Packaging FAQ

1. How do I build Bacula for platform xxx?
2. How do I control which database support gets built?
3. What other defines are used?
4. I'm getting errors about not having permission when I try to build the packages. Do I need to be root?
5. I'm building my own rpms but on all platforms and compiles I get an unresolved dependency for something called /usr/afsws/bin/pagsh.
6. I'm building my own rpms because you don't publish for my platform. Can I get my packages released to sourceforge for other people to use?
7. Is there an easier way than sorting out all these command line options?
8. I just upgraded from 1.36.x to 1.38.x and now my director daemon won't start. It appears to start but dies silently and I get a "connection refused" error when starting the console. What is wrong?
9. There are a lot of rpm packages. Which packages do I need for what?
10. What happened to the build switches for gnome console, wxconsole and bat?

2.1 Answers

1. **How do I build Bacula for platform xxx?** The Bacula spec file contains defines to build for several platforms:

   Red Hat 7.x (rh7), Red Hat 8.0 (rh8), Red Hat 9 (rh9),
   Fedora Core (fc1, fc3, fc4, fc5, fc6, fc7, fc8, fc9, fc10),
   Whitebox Enterprise Linux 3.0 (wb3),
   Red Hat Enterprise Linux (rhel3, rhel4, rhel5),
   Mandrake 10.x (mdk), Mandriva 2006.x (mdv),
   CentOS (centos3, centos4, centos5)
   Scientific Linux (sl3, sl4, sl5) and
   SuSE (su9, su10, su102, su103, su110, su111, su112).

   The package build is controlled by a mandatory define set at the beginning of the file. These defines basically just control the dependency information that gets coded into

the finished rpm package as well as any special configure options required. The platform define may be edited in the spec file directly (by default all defines are set to 0 or "not set"). For example, to build the Red Hat 7.x package find the line in the spec file which reads

```
%define rh7 0
```

and edit it to read

```
%define rh7 1
```

Alternately you may pass the define on the command line when calling rpmbuild:

```
rpmbuild -ba --define "build_rh7 1" bacula.spec
rpmbuild --rebuild --define build_rh7 1" bacula-x.x.x-x.src.rpm
```

2. **How do I control which database support gets built?** Another mandatory build define controls which database support is compiled, one of build_sqlite, build_mysql or build_postgresql. To get the MySQL package and support either set the

```
%define mysql 0
```

to

```
%define mysql 1
```

in the spec file directly or pass it to rpmbuild on the command line:

```
rpmbuild -ba --define "build_rh7 1" --define "build_mysql 1" bacula.spec
```

3. **What other defines are used?**
One other building define of note is the depkgs_version. This define is set with each release and must match the version of the source that is being used to build the packages. You would not ordinarily need to edit this. See also the Build Options section below for other build time options that can be passed on the command line.

4. **I'm getting errors about not having permission when I try to build the packages. Do I need to be root?**
No, you do not need to be root and, in fact, it is better practice to build rpm packages as a non-root user. Bacula packages are designed to be built by a regular user but you must make a few changes on your system to do this. If you are building on your own system then the simplest method is to add write permissions for all to the build directory (/usr/src/redhat/, /usr/src/RPM or /usr/src/packages). To accomplish this, execute the following command as root:

```
chmod -R 777 /usr/src/redhat
chmod -R 777 /usr/src/RPM
chmod -R 777 /usr/src/packages
```

If you are working on a shared system where you can not use the method above then you need to recreate the appropriate above directory tree with all of its subdirectories inside your home directory. Then create a file named .rpmmacros

in your home directory (or edit the file if it already exists) and add the following line:

```
%_topdir /home/myuser/redhat
%_tmppath /tmp
```

It should be noted that Fedora from verion 10 and up is configured to build in the directory /rpmbuild.

Another handy directive for the .rpmmacros file if you wish to suppress the creation of debug rpm packages is:

```
%debug_package %{nil}
```

5. **I'm building my own rpms but on all platforms and compiles I get an unresolved dependency for something called /usr/afsws/bin/pagsh.**
   This is a shell from the OpenAFS (Andrew File System). If you are seeing this then you chose to include the `docs/examples` directory in your package. One of the example scripts in this directory is a `pagsh` script. `rpmbuild`, when scanning for dependencies, looks at the shebang line of all packaged scripts in addition to checking shared libraries. To avoid this do not package the examples directory. If you are seeing this problem you are building a very old bacula package as the examples have been removed from the doc packaging.

6. **I'm building my own rpms because you don't publish for my platform. Can I get my packages released to sourceforge for other people to use?**
   Yes, contributions from users are accepted and appreciated. Please examine the directory `platforms/contrib-rpm` in the source code for further information.

7. **Is there an easier way than sorting out all these command line options?**
   Yes, there is a gui wizard shell script which you can use to rebuild the src rpm package. Look in the source archive for `platforms/contrib-rpm/rpm\_wizard.sh`. This script will allow you to specify build options using GNOME dialog screens. It requires zenity.

8. **I just upgraded from 1.36.x to 1.38.x and now my director daemon won't start. It appears to start but dies silently and I get a "connection refused" error when starting the console. What is wrong?**
   Beginning with 1.38 the rpm packages are configured to run the director and storage daemons as a non-root user. The file daemon runs as user `root` and group `bacula`, the storage daemon as user `bacula` and group `disk`, and the director as user `bacula` and group `bacula`. If you are upgrading you will need to change some file permissions for things to work. Execute the following commands as `root`:

   ```
   chown bacula.bacula /var/bacula/*
   chown root.bacula /var/bacula/bacula-fd.9102.state
   chown bacula.disk /var/bacula/bacula-sd.9103.state
   ```

   Further, if you are using File storage volumes rather than tapes those files will also need to have ownership set to user `bacula` and group `bacula`.

9. **There are a lot of rpm packages. Which packages do I need for what?**
   For a Bacula server you need to select the packsge based upon your preferred catalog database: one of `bacula-mysql`, `bacula-postgresql` or `bacula-sqlite`. If your system does not provide an `mtx` package you also need `bacula-mtx` to satisfy that dependancy. For a client machine you need only install `bacula-client`. Optionally, for either server or client machines, you may install a graphical console `bacula-gconsole` and/or `bacula-wxconsole`. The Bacula Administration Tool is installed with the `bacula-bat` package. One last package, `bacula-updatedb` is required only when upgrading a server more than one database revision level.

10. The gnome console and wxconsole software is deprecated in favor of BAT. The BAT (Bacula Administration Tool) is now packaged in it's own source RPM. There are no command line switches to build it. The SRPM contains the current version of QT that bat is developed against. Building the RPM will build QT and then build bat against it. It will not install QT on your system. The resulting bat binary can then be installed on a system without QT or with a different version of QT as it will not use the QT shared objects.

11. **Support for RHEL3/4/5, CentOS 3/4/5, Scientific Linux 3/4/5 and x86_64**
    The examples below show explicit build support for RHEL4 and CentOS 4. Build support for x86_64 has also been added.

```
Build with one of these 3 commands:

rpmbuild --rebuild \
        --define "build_rhel4 1" \
        --define "build_sqlite 1" \
        bacula-1.38.3-1.src.rpm
```

```
rpmbuild --rebuild \
        --define "build_rhel4 1" \
        --define "build_postgresql 1" \
        bacula-1.38.3-1.src.rpm

rpmbuild --rebuild \
        --define "build_rhel4 1" \
        --define "build_mysql4 1" \
        bacula-1.38.3-1.src.rpm

For CentOS substitute '--define "build_centos4 1"' in place of rhel4.
For Scientific Linux substitute '--define "build_sl4 1"' in place of rhel4.

For 64 bit support add '--define "build_x86_64 1"'
```

2.2 Build Options

The spec file currently supports building on the following platforms:

```
Red Hat builds
--define "build_rh7 1"
--define "build_rh8 1"
--define "build_rh9 1"

Fedora Core build
--define "build_fc1 1"
--define "build_fc3 1"
--define "build_fc4 1"
--define "build_fc5 1"
--define "build_fc6 1"
--define "build_fc7 1"
--define "build_fc8 1"
--define "build_fc9 1"
--define "build_fc10 1"

Whitebox Enterprise build
--define "build_wb3 1"

Red Hat Enterprise builds
--define "build_rhel3 1"
--define "build_rhel4 1"
--define "build_rhel5 1"

CentOS build
--define "build_centos3 1"
--define "build_centos4 1"
--define "build_centos5 1"

Scientific Linux build
--define "build_sl3 1"
--define "build_sl4 1"
--define "build_sl5 1"

SuSE build
--define "build_su9 1"
--define "build_su10 1"
--define "build_su102 1"
--define "build_su103 1"
--define "build_su110 1"
--define "build_su111 1"
--define "build_su112 1"

Mandrake 10.x build
--define "build_mdk 1"

Mandriva build
--define "build_mdv 1"
```

```
MySQL support:
--define "build_mysql 1"

PostgreSQL support:
--define "build_postgresql 1"

Sqlite support:
--define "build_sqlite 1"

Build the client rpm only in place of one of the above database full builds:
--define "build_client_only 1"

X86-64 support:
--define "build_x86_64 1"

Build tcpwrappers support:
--define "build_tcpwrappers 1"

Modify the Packager tag for third party packages:
--define "contrib_packager Your Name <youremail@site.org>"

Install most files to /opt/bacula directory:
--define "single_dir_install 1"
```

2.3 RPM Install Problems

In general the RPMs, once properly built should install correctly. However, when attempting to run the daemons, a number of problems can occur:

- Wrong /var/bacula permissions
  By default, the Director and Storage daemon do not run with root permission. If the /var/bacula is owned by root, then it is possible that the Director and the Storage daemon will not be able to access this directory, which is used as the Working Directory. To fix this, the easiest thing to do is:

  ```
  chown bacula:bacula /var/bacula
  ```

  Note: as of 1.38.8 /var/bacula is installed root:bacula with permissions 770.

- The Storage daemon cannot Access the Tape drive
  This can happen in some older RPM releases where the Storage daemon ran under userid bacula, group bacula. There are two ways of fixing this: the best is to modify the /etc/init.d/bacula-sd file so that it starts the Storage daemon with group disk. The second way to fix the problem is to change the permissions of your tape drive (usually /dev/nst0) so that Bacula can access it. You will probably need to change the permissions of the SCSI control device as well, which is usually /dev/sg0. The exact names depend on your configuration, please see the Tape Testing chapter for more information on devices.

Appendices

Appendix A

Acronyms

ACL Access Control List

BAT Bacula Administration Tool

CD Compact Disk

EOF End Of File

NFS Network File System

RPM Red Hat Packet Manager

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