

Bacula

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	Bacula: The Open Source Commercial Backup Solution	
	Download: Bacula.pdf	

1 Install Bacula

- Install Bacula and its components

```
aptitude install bacula
aptitude install bacula-director
aptitude install bacula-sd
aptitude install bacula-fd
```

- [Recommended] You should install bacula director mysql, and mysql admin

```
aptitude install bacula-director-mysql
aptitude install mysql-admin
```

2 Configure Bacula

- Bacula is almost ready to run, you just need to modify few things.

The best way to learn is to print below conf files and read them while you reading this manual.

1. Director bacula-dir.conf controls what will get run, when it will get run and what client will you be backing up from.
2. Storage Daemon bacula-sd.conf controls which director can talk to it, where and what device will it store the files. Options: HDD, File, DVD, Autochanger, DLT,DDS, DDS4, Onstream, DDS3, Exbyte, NAS

3. [FileDaemon](#) bacula-fd.conf needs to be installed on all clients that you want to backup. This program controls getting the files from client system and sending it to director. Configuration controls which director can use it.
4. All bacula configuration files are in **/etc/bacula**

```
/etc/bacula/  
|-- bacula-dir.conf  
|-- bacula-dir.conf.dist  
|-- bacula-fd.conf  
|-- bacula-sd.conf  
|-- bconsole.conf
```

2.1 Network Binding

- If you want to enable backup over the network comment out the lines that have **Address** in any of dir, sd,fd conf files.

```
#DirAddress = 127.0.0.1  
or  
#SDAddress = 127.0.0.1  
or  
#FDAddress = 127.0.0.1
```

2.2 Director

- Director bacula-dir.conf controls what will get run, when it will get run and what client will you be backing up from.

Brief overview:

1. Basic unit is a Job (one job, one client, one schedule, one storage, one pool)
2. Name – Unique name
3. Type – What to do: backup, Backup, Migrate, Admin, Restore
4. Level – Backup level type: Full, Differential, Incremental
5. [FileSet](#) – What files to backup. Name of the [FileSet](#){ }
6. Client – Where to get the files (machine name). Name of the Client{ }
7. Storage – Where to put the files (which hardware). Name of the Storage{ } : File, DDS-4, 8mmDrive, DVD, etc.
8. Pool – Which set of Volumes (tapes, disk) to use. Name of the pool{ }
9. Schedule – When to do it. Name of the Schedule{ }

You will need to change the following:

1. Password -You can change the password for dir,sd,fd,console. Make sure it matches in all files.
2. Under the section `FileSet` { Name = "Full Set"... change the files you want to back up. Example `File=/home/myusername/`
3. Under the section `Job` { Name = "`RestoreFiles`" change the **Where** to point to where you want to store restor your files. Default **Where=/tmp/bacula-restore**
4. Under the section `Catalog` { Name = `MyCatalog` dbname = bacula; user = "bacula"; password = "secretpassword".... make sure it has the correct information. If the you don't have database created use the script supplied to install it. **mysql -u bacula -p < /usr/share/bacula-director/make_mysql_tables**

Now Start bacula, see if it starts, check the error log to make sure you didn't miss anything.

```
/etc/init.d/bacula-director start
or
/etc/init.d/bacula-director restart
cat /var/log/bacula/log
```

If you get an error in the log, fix it in configuration.

2.3 Storage Daemon

- Storage Daemon `bacula-sd.conf` controls which director can talk to it, where and what device will it store the files

Make sure the following changes are done:

1. All your password match to director configuration
2. If you use networking that `Address=127.0.0.1` is commented out.
3. Under the section `Device` { Name = `FileStorage` Media Type = File Archive Device ... change the **Archive Device** to where you will store your files. If you are like me and have software RAID5 setup on 4 500GB drives mounted to a `/home` directory totaling 1.3 TB available space, you can set it to **Archive Device = /home/bacula/backups**
4. Here is the place to set other devices. Look at the configuration file for examples on how to set: DDS-4, `OnStream`, DVD-Writer, Exbyte 8mm,
5. Make sure the bacula has file permissions to write to the folder.

```
mkdir -p /home/bacula/backups
chown -R bacula:bacula /home/bacula
```

Start the bacula storage daemon

```
/etc/init.d/bacula-sd start
or
/etc/init.d/bacula-sd restart
cat /var/logs/bacula/logs
```

If you get permission, login/password error in the log, fix it in configuration file.

When you are done with the setup and everything works make sure you read Volume Management Section. We need

2.4 File Daemon

- **FileDaemon** bacula-fd.conf needs to be installed on all clients that you want to backup. So bacula-fd program has to reside on a computer you want to backup.

Make sure the following changes are done:

1. If you use networking that Address=127.0.0.1 is commented out.
2. Make sure passwords match what directors conf file.
3. If you can not resolve the hostname of the computer make sure you add the appropriate computer names to **/etc/hosts** file.

Start the bacula file daemon

```
/etc/init.d/bacula-fd start
or
/etc/init.d/bacula-fd restart
cat /var/logs/bacula/logs
```

If you get permission, login/password error in the log, fix it in configuration file.

2.5 Console

- You have an option on few consoles that that you can control bacula with.

Here is a list:

1. bconsole
2. bacula-console-gnome
3. bacula-console-wx
4. bacula-console-qt

The conf files are located in **/etc/bacula/** make sure the console has the password as it is defined in director.

- Run bconsole to make sure it can connect

```
sudo bconsole
Connecting to Director servername:9101
1000 OK: servername-dir Version: 1.38.11 (28 June 2006)
Enter a period to cancel a command.
*exit
```

Here is a visual representation on how the config files are connected: Conf-Diagram

2.6 Troubleshooting Connection

2.6.1 ip settings

- First thing to do is to telnet into 9102 and see if you connect or the connection gets rejected.
- Connect to director server, then to client where you have fd installed. If you don't get the following then your ip settings are incorrect.

```
telnet server1 9102
Trying 192.168.1.68...
Connected to server1.local.
Escape character is '^]'.
quit
```

- Try each of these to find where you problem is. Telnet into the following:

```
telnet 127.0.0.1 9102 (localhost)
telnet 192.168.1.123 9102 (local ip address)
telnet servername1 9102 (local servername)
```

- Follow the same strategy to connect to your sd, and fd clients.
- If it only works on 127.0.0.1 You need to comment the address lines.

```
#DirAddress = 127.0.0.1
#SDAddress = 127.0.0.1
#FDAddress = 127.0.0.1
```

- If local ip address works you need to add servername to hosts file or enable wins support in /etc/nsswitch.conf

```
ping servername1
```

- If you can't ping them then you probably need to add their address to a hosts file.

```
vi /etc/hosts
```

add this line (replace ip address with yours)

```
192.168.1.123 servername1  
192.168.1.234 servernamefd
```

3 Manage bacula

- Start bacula

```
/etc/init.d/bacula-dir start  
/etc/init.d/bacula-sd start  
/etc/init.d/bacula-fd start
```

- Restart bacula

```
/etc/init.d/bacula-dir restart  
/etc/init.d/bacula-sd restart  
/etc/init.d/bacula-fd restart
```

3.1 Pools, volumes, lables

- I think bacula documentation can explain it best:
- "If you have been using a program such as tar to backup your system, Pools, Volumes, and labeling may be a bit confusing at first. A Volume is a single physical tape (or possibly a single file) on which Bacula will write your backup data. Pools group together Volumes so that a backup is not restricted to the length of a single Volume (tape). Consequently, rather than explicitly naming Volumes in your Job, you specify a Pool, and Bacula will select the next appendable Volume from the Pool and request you to mount it."
- "The steps for creating a Pool, adding Volumes to it, and writing software labels to the Volumes, may seem tedious at first, but in fact, they are quite simple to do, and they allow you to use multiple Volumes (rather than being limited to the size of a single tape). Pools also give you significant flexibility in your backup process. For example, you can have a "Daily" Pool of Volumes for Incremental backups and a "Weekly" Pool of Volumes for Full backups. By specifying the appropriate Pool in the daily and weekly backup Jobs, you thereby insure that no daily Job ever writes to a Volume in the Weekly Pool and vice versa, and Bacula will tell you what tape is needed and when."
- View this tutorial on how to get started with using bacula: [Tutorial Chapter](#)

- You also have an option to tell bacula to create and label volumes for you. You can tell it how many volumes you want and what should be their maximum size. Check the volume management section to set these settings.

3.2 bconsole

Start bconsole and type in help:

```

bconsole
help

Command      Description
=====
add           add media to a pool
autodisplay  autodisplay [on|off] -- console messages
automount    automount [on|off] -- after label
cancel       cancel [<jobid=nnn> | <job=name>] -- cancel a ↵
            job
create       create DB Pool from resource
delete       delete [pool=<pool-name> | media volume=<volume- ↵
            name>]
disable      disable <job=name> -- disable a job
enable       enable <job=name> -- enable a job
estimate     performs FileSet estimate, listing gives full ↵
            listing
exit         exit = quit
gui          gui [on|off] -- non-interactive gui mode
help         print this command
list         list [pools | jobs | jobtotals | media <pool= ↵
            pool-name> | files <jobid=nn>]; from catalog
label        label a tape
l            full or long list like list command
messages    messages
mount        mount <storage-name>
prune        prune expired records from catalog
purge        purge records from catalog
python       python control commands
quit         quit
query        query catalog
restore      restore files
relabel      relabel a tape
release      release <storage-name>
reload       reload conf file
run          run <job-name>
status       status [storage | client]=<name>
setdebug     sets debug level
setip        sets new client address -- if authorized
show         show (resource records) [jobs | pools | ... | ↵
            all]
sqlquery     use SQL to query catalog

```

```
time      print current time
trace     turn on/off trace to file
unmount   unmount <storage-name>
umount    umount <storage-name> for old-time Unix guys
update    update Volume, Pool or slots
use       use catalog xxx
var       does variable expansion
version   print Director version
wait      wait until no jobs are running [<jobname=name> | ←
          <jobid=nnn> | <ujobid=complete_name>]
```

When at a prompt, entering a period cancels the command.

3.3 using bacula

- Run bconsole then type:

3.3.1 show filesets

```
show filesets
```

- You should see:

```
FileSet: name=Full Set
  O M
  N
  I /home/myusername/
  I /etc/
  N
  E /proc
  E /tmp
  E /.journal
  E /.fsck
  N
```

- I- Include
- E- Exclude
- O- Options

3.3.2 status dir

- Type in status dir

```
status dir
```

And you will see:

```
Level          Type      Pri  Scheduled          Name ↵
              Volume
===== ↵
Incremental    Backup    10  01-Aug-08 23:05    server1 ↵
              bacula20080801
Incremental    Backup    10  01-Aug-08 23:05    server2 ↵
              bacula20080801
Full           Backup    11  01-Aug-08 23:10    BackupCatalog ↵
              bacula20080801
=====

Running Jobs:
Console connected at 01-Aug-08 12:20
No Jobs running.
=====

Terminated Jobs:
JobId  Level  Files      Bytes      Status  Finished ↵
      Name
===== ↵

      1  Full    11,651  5,808,650,275 OK      01-Aug-08 ↵
          11:01 server1
      3  Full    63,930  2,651,212,530 OK      01-Aug-08 ↵
          12:14 server2
```

3.3.3 status client

Lets get a status on the client

```
status client
```

Pick the client and you will see his status, jobs run etc.

```
status client
The defined Client resources are:
  1: server1
  2: server2
Select Client (File daemon) resource (1-2): 2
Connecting to Client server2-fd at server2:9102

server2-fd Version: 1.38.11 (28 June 2006) i486-pc-linux-gnu ↵
      debian 4.0
Daemon started 01-Aug-08 12:01, 1 Job run since started.

Terminated Jobs:
JobId  Level  Files      Bytes      Status  Finished ↵
      Name
```

```

===== ↵
      3 Full      63,930 2,651,212,530 OK      01-Aug-08 ↵
        12:14 server2
=====
Running Jobs:
Director connected at: 01-Aug-08 12:53
No Jobs running.

```

3.3.4 status storage

Lets find out what is the status on our storage

```
status storage
```

You should see:

```

Automatically selected Storage: File
Connecting to Storage daemon File at server1:9103

server1-sd Version: 1.38.11 (28 June 2006) x86_64-pc-linux- ↵
  gnu debian 4.0
Daemon started 01-Aug-08 09:19, 3 Jobs run since started.

Running Jobs:
No Jobs running.
=====

Jobs waiting to reserve a drive:
=====

Terminated Jobs:
  JobId  Level  Files      Bytes Status  Finished ↵
      Name
===== ↵

      1 Full      11,651 5,810,545,052 OK      01-Aug-08 ↵
        11:01 server1
      2 Full      63,930 2,660,294,477 OK      01-Aug-08 ↵
        12:14 server2
=====

Device status:
Device "FileStorage" (/home/bacula/backups) is not open or ↵
  does not exist.
=====

In Use Volume status:
=====

```

3.3.5 list jobs

- You should forward all emails from the server to you account, but if you want to see a list of jobs type:

```
list jobs
```

- You should see:

```
1 | server2      | 2008-08-01 10:57:43 | B  | F  | ←
   11,651 | 5,808,650,275 | T          |    |    |
| 2 | server2      | 2008-08-01 11:42:43 | B  | F  | ←
   0 | 0 | R          |    |    |
| 3 | server3      | 2008-08-01 12:05:10 | B  | F  | ←
   63,930 | 2,651,212,530 | T          |    |    |
| 4 | server2      | 2008-08-01 13:05:39 | B  | I  | ←
   12 | 125,049 | T          |    |    |
| 5 | server1      | 2008-08-01 13:53:08 | B  | F  | ←
   5,900 | 127,019,988 | T          |    |    |
| 6 | server1      | 2008-08-01 13:53:39 | B  | F  | ←
   5,900 | 127,019,988 | T          |    |    |
| 7 | server2      | 2008-08-01 23:05:04 | B  | I  | ←
   17 | 128,228 | T          |    |    |
| 8 | server3      | 2008-08-01 23:05:14 | B  | I  | ←
   888 | 49,182,024 | T          |    |    |
| 9 | server1      | 2008-08-01 23:05:45 | B  | I  | ←
   2 | 15,433 | T          |    |    |
```

3.3.6 run

To run a job type in:

```
run
Using default Catalog name=MyCatalog DB=bacula
A job name must be specified.
The defined Job resources are:
  1: server1
  2: BackupCatalog
  3: RestoreFiles
Select Job resource (1-3):
```

If you select 1 you will be asked:

```
Run Backup job
JobName: Client1
FileSet: Full Set
Level: Incremental
Client: rufus-fd
```

```
Storage: File
Pool:     Default
When:     2003-04-28 14:18:57
OK to run? (yes/mod/no):
```

3.3.7 stop/delete/cancell jobs

If there is need to stop a job from running you can do the following:

1. log into bconsole
2. Issue **list jobs** to see which one is running **R**.
3. Issue cancell and tell it which jobid to cancel **cancel jobid=59**, you can also use jobname **cancel job=myjobname**
4. If you want a job to start again you can do: **status dir**, get a list of currently scheduled jobs, then for each job execute **run yes job=\$host-backup**.

In the last resort where you need to cancel jobs NOW because soemthing is going wrong, run

```
/etc/init.d/bacula-dir stop
/etc/init.d/bacula-dir start
or
/etc/init.d/bacula-dir restart
```

3.4 restore

- Its important that you do few trial backups and restore few files before you move on to. Its crucial that you know what the process will look like.

3.4.1 restore all

To restore run

```
restore all
```

You should see:

```
First you select one or more JobIds that contain files
to be restored. You will be presented several methods
of specifying the JobIds. Then you will be allowed to
select which files from those JobIds are to be restored.
```

To select the JobIds, you have the following choices:

- 1: List last 20 Jobs run
- 2: List Jobs where a given File is saved
- 3: Enter list of comma separated JobIds to select
- 4: Enter SQL list command
- 5: Select the most recent backup for a client

```
6: Select backup for a client before a specified time
7: Enter a list of files to restore
8: Enter a list of files to restore before a specified ←
   time
9: Find the JobIds of the most recent backup for a ←
   client
10: Find the JobIds for a backup for a client before a ←
    specified time
11: Enter a list of directories to restore for found ←
    JobIds
12: Cancel
Select item: (1-12):
```

- Select 5 and select the client.
- Then bacula will show you the filesystem it has. You can browse it with ls, cd. When done browsing you type in **done** and you will be asked if you want to run this job.

```
done
Bootstrap records written to /var/lib/bacula/server1-dir.1. ←
restore.bsr

The job will require the following Volumes:

bacula20080801

63930 files selected to be restored.

Run Restore job
JobName: RestoreFiles
Bootstrap: /var/lib/bacula/server1-dir.1.restore.bsr
Where: /home/bacula/restore
Replace: always
FileSet: Full Set
Client: server1-fd
Storage: File
When: 2008-08-01 13:13:32
Catalog: MyCatalog
Priority: 10
OK to run? (yes/mod/no):
```

- At This point you could tell it yes and it will restore the files to the default folder you specified in the director.conf.

3.4.2 restore select

- To restore selected files do:

```
restore select
```

- Select client you want to restore
- Navigate to the directory you want to restore:
- Mark files to restore

```
cd /home/lucas/  
mark myimportantfolder  
exit
```

- You will be asked yes/mod/no. If you want to restore it to a different client, different folder, or just overwrite the files that are in the client type *mod and change the parameters.*

3.4.3 messages

- If you want to see messages run

```
messages  
or  
autodisplay on
```

To view the rest of the console commands see [Bacula Console](#)

3.5 Backups

3.5.1 Incremental vs Differential

- Bacula has 3 different backup types.

```
full (complete dumps)  
differential (files changed since last full backup)  
incremental (changed files since the last backup of any sort) ←  
backups
```

3.5.2 VMware Images

- If you are using vmware server you need to stop/suspend vmware and then make a backup of the snapshot. [VMWare Bacula Backup](#)
- If you are using ESX you are able to do a snapshot while the server is tuning.

3.6 Repaid Mysql Tables

- After big power outage that spanned for 3 days and caused the computer to shut down at least 3 times at night the mysql table got corrupted because it wasn't closed properly. Since all the emails from my backup machine are going into our admin group I am notified about it right away.
- Log into mysql

```
mysql -u bacula -p
```

- Set the database

```
use bacula;
```

Check tables:

```
check table BaseFiles;  
check table CDImages;  
check table Client;  
check table Counters;  
check table Device;  
check table File;  
check table FileSet;  
check table Filename;  
check table Job;  
check table JobMedia;  
check table Media;  
check table MediaType;  
check table Path;  
check table Pool;  
check table Status;  
check table Storage;  
check table UnsavedFiles;  
check table Version;
```

Repair Tables:

```
repair table BaseFiles;  
repair table CDImages;  
repair table Client;  
repair table Counters;  
repair table Device;  
repair table File;  
repair table FileSet;  
repair table Filename;  
repair table Job;  
repair table JobMedia;  
repair table Media;
```

```
repair table MediaType;
repair table Path;
repair table Pool;
repair table Status;
repair table Storage;
repair table UnsavedFiles;
repair table Version;
```

- [Optional] Alternative to fixing each table manually is to run the following command that will fix the all MyISAM tables.

```
mysqlcheck --repair --all-databases -p
```

3.7 Volume Management

3.7.1 Limiting the volume size

- **Basic Volume Management**
- By limiting the volume size and number of volumes you can allow rotation of volumes, and keep you backup volume at a constant level.
- Breaking up the volumes helps with restoration when a catalog isn't available (avoids rescanning a huge file).

```
Limit your volume size to about 10%-15% of the HD capacity. ←
IE, 1TB drive, volume size 100GB. And then set your max ←
volume on the pool to ((HD space/volume space) - 1) so ←
you don't need to worry about a full HD.
```

- In the director change the default **pool settings**. **Below I have you an example of 20 volumes with 25GB size totaling 500GB. When all volumes are filled the oldest one will get recycled and overwritten. Modify this section to fit you size requirements and retention. Be aware that retention starts when a volume is full.:**
- 'Automatic recycling of Volumes is performed by Bacula only when it wants a new Volume and no appendable Volumes are available in the Pool. It will then search the Pool for any Volumes with the Recycle flag set and whose Volume Status is Full. At that point, the recycling occurs in two steps. The first is that the Catalog for a Volume must be purged of all Jobs and Files contained on that Volume, and the second step is the actual recycling of the Volume. The Volume will be purged if the [VolumeRetention](#) period has expired. When a Volume is marked as Purged, it means that no Catalog records reference that Volume, and the Volume can be recycled.'

- Add the last 3 settings to your Pool so it looks as follows:

```
Pool {
  Name = Default
  Pool Type = Backup
  Recycle = yes # Bacula can ←
    automatically recycle Volumes
  AutoPrune = yes # Prune expired volumes
  Volume Retention = 31 days # one year
  Accept Any Volume = yes # write on any volume ←
    in the pool
  Maximum Volumes = 20
  Maximum Volume Bytes = 25G #25 GB
  Label Format = Volumes # (should I pick a ←
    different name/ format)
```

- You also have options on naming you volumes, for example in above the first volumes will be named volumes0001, Volumes0002,..
- You can specify names like:

```
Label Format = "${Pool}_${Year}-${Month:p/2/0/r}-${Day:p/2/0/ ←
  r}_${Hour:p/2/0/r}h${Minute:p/2/0/r}m"
```

- After the first volume fills you should see something like this:

```
User defined maximum volume capacity 26,843,545,600 exceeded ←
  on device "FileStorage" (/home/bacula/backups
End of medium on Volume "Volumes0001" Bytes=26,843,504,883 ←
  Blocks=416,105 at 08-Dec-2008 19:49.
Created new Volume "Volumes0002" in catalog.
Labeled new Volume "Volumes0002" on device "FileStorage" (/ ←
  home/bacula/backups).
Wrote label to prelabeled Volume "Volumes0002" on device " ←
  FileStorage" (/home/bacula/backups)
New volume "Volumes0002" mounted on device "FileStorage" (/ ←
  home/bacula/backups) at 08-Dec-2008 19:49.
```

4 Adding Clients

4.1 Linux

- On linux Client you just need to install bacula-fd (File Daemon) and tell it where the director is.

- On you backup server you need to specify the Client, Job and FileSet (if different from default)
- Here is a sample code for client #2

```
#-----Clients -----
#Setup client to backup part1
Client {
  Name = server2-fd
  Address = server2
  FDPort = 9102
  Catalog = MyCatalog
  Password = "mypassword"           # password for FileDaemon 2
  File Retention = 30 days          # 30 days
  Job Retention = 6 months          # six months
  AutoPrune = yes                   # Prune expired Jobs/ ↔
  Files
}

#Second Job for client 2 part 2
Job {
  Name = "server2"
  Client = server2-fd
  FileSet = "Full Set server2"
  JobDefs = "DefaultJob"
  Write Bootstrap = "/var/lib/bacula/server2.bsr"
}

#Fileset for client2 part 3
# List of files to be backed up
FileSet {
  Name = "Full Set server2"
  Include {
    Options {
      signature = MD5
    }
  }
#
# Put your list of files here, preceded by 'File =', one per ↔
#   line
#   or include an external list with:
#
#
#File = /home/jgoerzen/work/bacula-1.38.11/debian/tmp- ↔
#   build-sqlite
#File = /usr/local/pythonenv
#File = /usr/local/turbogears
#File = /usr/local/src/
#File = /var/www/
}
#
```

```

# If you backup the root directory, the following two ↵
  excluded
#   files can be useful
#
  Exclude {
    File = /proc
    File = /tmp
    File = /.journal
    File = /.fsck
  }
}

```

4.2 Windows

- Install Windows bacula version which supports: Microsoft Windows: Win98, [WinMe](#), WinXP, WinNT, Win2003, and Win2000
- See bacula windows notes for compatibility and permission issues: [Bacula for Windows](#)

```

#
# Default Bacula File Daemon Configuration file
#
# For Bacula release 1.38.10 (08 June 2006) -- cygwin ↵
  1.5.18(0.132/4/2)
#
# There is not much to change here except perhaps the
# File daemon Name to
#
#
# List Directors who are permitted to contact this File ↵
  daemon
#
Director {
  Name = server1-dir
  Password = "mypassword"
}
#
# "Global" File daemon configuration specifications
#
FileDaemon {
  Name = windowsserver2-fd # this is me
  FDport = 9102 # where we listen for the ↵
    director
  WorkingDirectory = "c:/bacula/working"
  Pid Directory = "c:/bacula/working"
}

```

```

}

# Send all messages except skipped files back to Director
Messages {
  Name = Standard
  director = server1-dir = all, !skipped
}

```

5 Performance

5.1 Initial Setup

- With the default setup, after setting up 3 linux servers to be backed up, and 3 windows 2000 servers here are some statistics.

```

Days = ~20
Bacula Volume = 360GB

Biggest Full Backup:
FD Bytes Written: 63,668,167,347 (63.66 GB)
SD Bytes Written: 63,983,912,475 (63.98 GB)
Rate: 771.2 KB/s
Software Compression: 82.3 %

```

Others have expressed that they use bacula for: "46 clients, 12400 jobs, and 4.7 million files" and more.

Its been suggested that three settings that can have an impact on performance: VSS, compression and Maximum Network Buffer Size

5.2 Increase Windows speed

- You have 2 options. You either lower the max buffer size on bacula to 32K which will slow down backup of linux machines and possible the speed of writing to DLT tape, or you increase the windows network buffer size to 64K so it matches bacula, and other OS.

Option 1

- To increase performance on some windows machines you might need to set Maximum Network Buffer Size = <bytes>
- "Please use care in setting this value since if it is too large, it will be trimmed by 512 bytes until the OS is happy, which may require a large number of system calls. The default value is 65,536 bytes. Note, on certain Windows machines, there are reports that the transfer rates are very slow and this seems to be related to the default 65,536 size. On systems where the transfer rates seem abnormally slow compared to other systems, you might try setting the Maximum Network Buffer Size to 64K."

Buffer Size to 32,768 in both the File daemon and in the Storage daemon. If a Windows machine is so slow as you describe I would try to set Maximum Network Buffer Size = 32768 in the fd-conf of this machine. After this you have to restart the bacula service."

Option 2

```
The primary TCP tuning parameters appear in the registry ↔
under HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\ ↔
Services\Tcpip\Parameters.
On the Edit menu, point to New, and then click DWORD Value.
    Type GlobalMaxTcpWindowSize in the New Value box, and ↔
    then press Enter
    Click Modify on the Edit menu.
    Type the desired window size in the Value data box.

Note. The valid range for window size is 0-0x3FFFC000 ↔
Hexadecimal.

System Key: [HKEY_LOCAL_MACHINE\System\CurrentControlSet\ ↔
Services\Tcpip\Parameters]
Value Name: GlobalMaxTcpWindowSize
Data Type: REG_DWORD (DWORD Value)
Value Data: 0-0xFFFFFFFF

Set the windows size to: 65536
```

- You could also use: [DR tcp](#)

5.3 Hardware RAID5 vs Software RAID5

- In this documentation we are using Software RAID 5.
- [Hardware RAID vs Software RAID speeds](#)
- [Hardware RAID vs Software RAID speeds](#)
- [Memory speed vs CL](#)

5.4 Disk speed

- You can install the following package that will let you read performance of your hard drives.

```
aptitude update
aptitude install sysstat
```

- This package comes with few useful programs: sar, sadf, mpstat, iostat, pidstat and sa tools.

- The one we will use is iostat. Run this command:

```
iostat -m 5
```

- The m tells it to display output in megabytes, 5 tells it to refresh every 5sec.
- If you know which array you want to watch run

```
iostat -m 5 /dev/md5
```

- [SATA drives and debian performance overview](#)

Some statistics on block size of the harddrive

- To test your speeds you could try the following:
- This writes from /dev/zero to a file called /home/lucas/bigfile; try any of these commands and see what is the write speed.

```
dd if=/dev/zero of=/home/lucas/bigfile bs=64k count=8192
dd if=/dev/zero of=/home/lucas/bigfile bs=128k count=8192
dd if=/dev/zero of=/home/lucas/bigfile bs=256k count=8192
dd if=/dev/zero of=/home/lucas/bigfile bs=512k count=8192
dd if=/dev/zero of=/home/lucas/bigfile bs=1024k count=8192
dd if=/dev/zero of=/home/lucas/bigfile bs=2048k count=8192
dd if=/dev/zero of=/home/lucas/bigfile bs=4096k count=8192
```

- If you want to experiment with block size, find out what is your current default size 64K usually.

```
cat /proc/mdstat
cat /sys/block/md0/md/stripe_cache_size
echo 1024 > /sys/block/md1/md/stripe_cache_size
```

- [stripe_cache_size effects](#)
- [mdmanpage that explains each option](#)

6 Offsite Storage

6.1 Amazon S3

- Here is a script that reads bacula mysql database and uploads the files into amazon s3 servers for backup. [Bacula with Amazon S3 backup](#)

- You might need to divide the bacula volume in 5gb files.
- Add Maximum Block Size to your device configuration.

```
Maximum Block Size = nnn  
or  
Maximum Block Size = 5368709120 #5,368,709,120
```

7 References

1. <http://www.bacula.org/presentations/Bacula-UKUUG-talk-20Feb08.pdf>
2. <http://www.howto.gr/dr/node/2>
3. <http://www.linux-mag.com/id/4429>
4. Debian Config Files in /etc/bacula/bacula-*.conf
5. http://www.bacula.org/en/dev-manual/Brief_Tutorial.html#TutorialChapter
6. http://www.isds.duke.edu/~brown/bacula-talk/Bacula_ISDS.pdf
7. http://www.bacula.org/en/dev-manual/Basic_Volume_Management.html