

Bacula & Bareos: A Complete Backup Solution for the Home and Enterprise

Let's talk about the Bacula & Bareos backup programs.

Preflight

Windows Platform

@!:{Before you deploy Bareos, you'll need the following prerequisites installed and properly configured on the target server:

- PostgreSQL
- PowerShell 2.0 or greater

This requires .Net Framework 2.0 or greater

Platform Info & Defaults Used

Item	Description
OS Platform	Windows Server 2003 R2 32-bit
Bareos Version	14.1.0 32-bit
PostgreSQL Version	9.3 32-bit
Bareos Service Password	bareos
Installation Directory	C:\Program Files\Bareos
Configuration Directory	C:\Documents and Settings\All Users\Application Data\Bareos
Bareos Working Directory	C:\ProgramData\Bareos

@!:{This article relies mostly on command line (cmd) user interaction

[divider]

About Bacula & Bareos

[divider]

What is Bacula?

A Client/Server-based backup program

In a nutshell:

Server component handles the backups, Client component sends the data to be backed up.

Similar to

Symantec Backup Exec

BackupPC

CrashPlan

Bacula website: <http://blog.bacula.org/>

What is Bareos?

Bareos is a fork of the Bacula project, so it boasts all of the same features as Bacula, as well as additional enhancements.

Bareos website: <http://www.bareos.org/en/>

For me, the most attractive feature of this fork is that the server component, the director, can now be installed on Windows.

Features

Enterprise-level

Highly Scalable

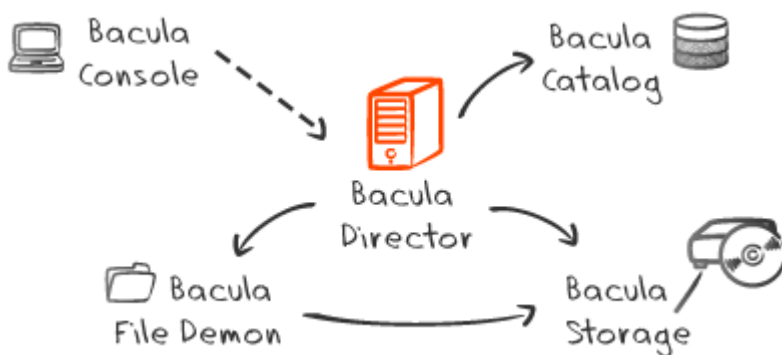
Centrally managed

Secure

Multiplatform Client Component

Linux
OSX
Windows
Unix
Multiplatform Server Component
Bareos
Windows
Bacula
Linux
Unix
Free

How Does Bacula/Bareos Work?



I yanked this verbatim from this website:
http://www.netways.de/en/de/produkte/bacula/architecture_components/

Bacula Architecture & Components

Bacula is made up of several components that can be distributed to operate on several servers. Thus a central Bacula director demon can backup multiple servers, and in turn save data to multiple servers. Even a physically distributed backup strategy can be implemented easily and above all, centrally controlled.

Bacula's individual components consist of:

Bacula director

Bacula director is the central program which controls and monitors all key tasks such as backup, restore, verify and archive. The director usually operates as a daemon or service.

Bacula console

Bacula console is the tool through which the administrator can communicate with the Bacula director. The console comes in 3 different versions, with the simplest and most popular being a text-based shell for Linux. The text-based console offers the greatest functional scope, while the GNOME and Windows GUIs provide fast backup and restore.

Bacula file demon

Bacula file demon is the actual backup client, installed on the machines to be backed up. It is operating system-specific and sends to-be-protected data with their attributes to the Bacula Director. Or in a recovery, it writes the data back onto disk. Bacula File Demon runs as a service on the servers to be backed up and is available for Unix / Linux and Windows.

Bacula storage

Bacula storage is responsible for storing and reading the saved data and their related attributes onto backup media. It runs as a service on the server which is connected to backup hardware (tapes or disks).

Bacula catalog

Bacula catalog is responsible for the indexing of all files and volumes. It allows the administrator to find and restore desired files quickly. All used volumes, saved files and exported jobs are saved in the catalog. This offers fast and efficient file restoration and management. Bacula currently supports MySQL, PostgreSQL and SQLite as catalog databases.

[divider]

Configuration Overview

Bacula/Bareos is pretty simple.

It is nothing but the sum configuration of its components. So, in essence, once you configure all of its 'moving parts', it will just work as intended.

Each component has its own config file

director

bacula-dir.conf

console

bconsole.conf

file daemon

bacula-fd.conf

storage

bacula-sd.conf

catalog

n/a

Each config file is formatted based on resources comprised of

directives

Directives:

Specify values relative to the component

Are surrounded by curly braces {}

@!:{For Bareos:

Configuration files are named as bareos-{}.conf instead of bacula-{}.conf

As a security measure, the various Bacula components must authorize themselves to each other

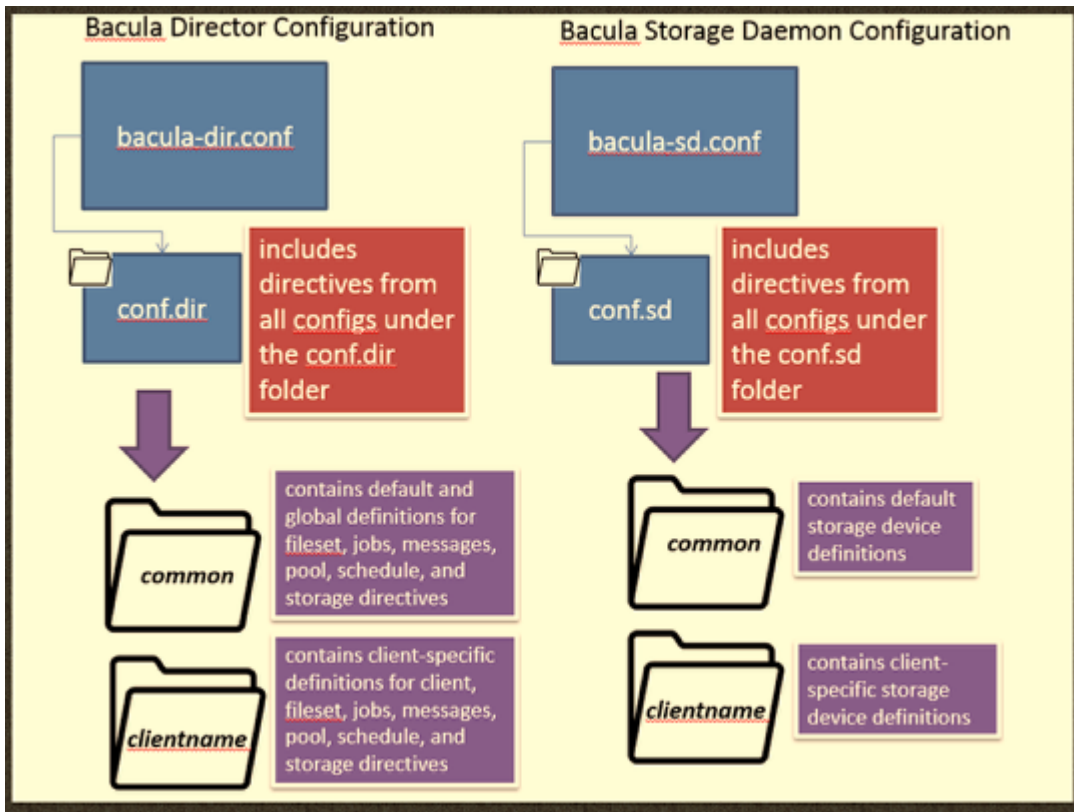
This is accomplished using password specification

example:

the Storage resource password in the bacula-dir.conf file must match the Director resource password in bacula-sd.conf

[divider]

Configuration Architecture



By default, the Bacula/Bareos main configuration files are monolithic

Pros:

One config file

One location

Cons:

Difficult to manage

More prone to user error

Since Bacula 2.2.0 you can include the output of a command within a configuration file with the "@|" syntax.

The same applies to Bareos

This allows us to break up the configs into separate, more manageable 'child' configuration files

How?

By parsing these 'child' configuration files

ForEach child config file

Read content

Incorporate into main config file

In our configuration, we will be using this special syntax to create a distributed configuration

That is ...

The main config file will be built from child config files located in specified folders

Pros:

Compartmentalized

One folder per backup client

With each folder containing relevant client configs

Easier to manage

Easier to deploy new clients

This would involve:

Installing the backup client on the host

Creating a config folder for the client

Populating configuration files in the client folder

Cons:

Multiple configs

Multiple locations

The architecture is as follows:

bacula-dir.conf

Any files in the "conf.dir" folder are considered part of this file

e.g.

On our Windows host, we have the following layout:

conf.dir [folder]

A 'global' folder contains default and global definitions for fileset, jobs, messages, pool, schedule, and storage directives

Client folders contain client-specific definitions for client, fileset, jobs, messages, pool, schedule, and storage directives

global [folder]

fileset.conf

jobs.conf

messages.conf

pools.conf

schedules.conf

storages.conf

NewJersey [folder]

njexch01 [folder]

```
configs    {njexch01.fileset.conf;    njexch01.jobs.conf;
njexch01.pools.conf ...}
```

NewYork [folder]

nyweb03 [folder]

```
configs    {nyweb01.fileset.conf;    nyweb01.jobs.conf;
nyweb01.pools.conf ...}
```

Pennsylvania [folder]

padb01 [folder]

```
configs    {padb01.fileset.conf;    padb01.jobs.conf;
padb01.pools.conf ...}
```

Florida [folder]

flexch01 [folder]

```
configs    {flexch01.fileset.conf;    flexch01.jobs.conf;
flexch01.pools.conf ...}
```

bacula-sd.conf

Any files in the “conf.sd” folder are considered part of this file

e.g.

On our Windows host, we have the following layout:

conf.sd [folder]

A ‘global’ folder contains default and global storage device definitions

Client folders contains client-specific storage device definitions

global [folder]

default-device.conf

NewJersey [folder]

njexch01-device.conf

NewYork [folder]

nyweb03-device.conf

Pennsylvania [folder]

padb01-device.conf

Florida [folder]

flexch01-device.conf

File Paths

Windows Server 2003

[shell]C:\Documents and Settings\All Users\Application Data\Bareos\bareos-dir.conf

C:\Documents and Settings\All Users\Application Data\Bareos\bareos-dir.conf.readme.txt

C:\Documents and Settings\All Users\Application Data\Bareos\bareos-fd.conf

C:\Documents and Settings\All Users\Application Data\Bareos\bareos-sd.conf

C:\Documents and Settings\All Users\Application Data\Bareos\conf.dir

C:\Documents and Settings\All Users\Application Data\Bareos\conf.sd

C:\Documents and Settings\All Users\Application Data\Bareos\logs

C:\Documents and Settings\All Users\Application Data\Bareos\scripts

C:\Documents and Settings\All Users\Application Data\Bareos\tray-monitor.conf

C:\Documents and Settings\All Users\Application Data\Bareos\working

C:\ProgramData\Bareos\logs\bareos.log

C:\ProgramData\Bareos\logs\bareos-audit.log

C:\ProgramData\Bareos\working[/shell]

[divider]

Getting Started

Let's get down to the guts shall we?

[Installing Bacula on CentOS Linux 6.x](#)

Installing Bareoes on Windows Server 2003 R2

Installing Bacula on CentOS Linux 6.x

@!:{this should work for the RedHat equivalent.

[divider]

Install MySQL and Bacula

```
[shell]yum install mysql-devel mysql-server
yum install bacula-storage-mysql bacula-docs
yum install bacula-director-mysql bacula-console
yum install bacula-client bacula-traymonitor[/shell]
```

Start and Configure MySQL for Bacula

```
[shell]service mysqld start
chkconfig mysqld on[/shell]
```

Change the MySQL root password if you have a fresh install of MySQL

```
[shell]mysqladmin -u root password 'new-password'[/shell]
```

Creating the mysql database structure

```

Privileges for user bacula granted on database bacula.
[ bacula]# /usr/libexec/bacula/create_mysql_database -u root -p
Enter password:
Creation of bacula database succeeded.
[ bacula]# /usr/libexec/bacula/make_mysql_tables -u root -p
Enter password:
Creation of Bacula MySQL tables succeeded.
[ bacula]# /usr/libexec/bacula/grant_bacula_privileges -u root -p
Granting MySQL privileges
Enter password:
Host      User      Password      Select_priv      Insert_priv      Update_priv      Delete_priv
Process_priv      File_priv      Grant_priv      References_priv      Index_priv      Alter_priv
Privileges for user bacula granted on database bacula.
[root@cpsv11105 bacula]#

```

```

[shell]/usr/libexec/bacula/grant_mysql_privileges -u root -p
/usr/libexec/bacula/create_mysql_database -u root -p
/usr/libexec/bacula/make_mysql_tables -u root -p
/usr/libexec/bacula/grant_bacula_privileges -u root -p[/shell]

```

Installing from Source [Optional]

see: http://wiki.bacula.org/doku.php?id=bacula_manual:installing_bacula

gls*install bacula from source

see: {Bacula Client For HP-UX@<http://h30499.www3.hp.com/t5/System-Administration/Bacula-Client-For-HP-UX/td-p/5173539#.Ut7NwvQo5ok>}

Bacula: Post-Installation

Create the backup folder(s)

```

[shell]mkdir /backup
chown bacula /backup
chmod 766 /backup[/shell]

```

Set the MySQL password for user bacula

```
[shell]mysql -u root -p
-Enter Password:
WHERE user='bacula';
UPDATE mysql.user SET password=PASSWORD
('somepassword') WHERE user='bacula';
FLUSH PRIVILEGES;
quit[/shell]
```

Configure and Start the Bacula Services

```
[shell]chkconfig bacula-dir on
chkconfig bacula-fd on
chkconfig bacula-sd on
service bacula-dir start
service bacula-fd start
service bacula-sd start[/shell]
```

Update Firewall Rules (If Applicable)

Modify the iptables configuration file to allow traffic to the bacula-director

```
[shell]vi /etc/sysconfig/iptables[/shell]
#Allow TCP – Bacula Director
[shell] -A INPUT -m state --state NEW -m tcp -p tcp --dport
9101 -j ACCEPT
-A INPUT -m state --state NEW -m tcp -p tcp --dport 9102 -j
ACCEPT
-A INPUT -m state --state NEW -m tcp -p tcp --dport 9103-j
ACCEPT
:q[/shell]
```

Restart the firewall

```
[shell]service iptables restart[/shell]
```

[divider]

Installing Bareos on Windows Server 2003 R2

@!:{Before you deploy Bareos, you'll need the following

prerequisites installed and properly configured on the target server:

- postgresQL
- PowerShell Installed

Preflight Information

Item	Description OS Platform	Windows Server 2003 R2 32-bit Bareos Version	14.1.0 32-bit PostgreSQL Version	9.3 32-bit Bareos Service Password Being Used	bareos Installation Directory	C:\PostgreSQL\9.3 Data Directory	C:\PostgreSQL\9.3\data
------	-------------------------	----------------------------------------------	----------------------------------	-----------------------------------------------	-------------------------------	----------------------------------	------------------------

[divider]

Bareos Setup



Installation

Installer Filename: winbareos-14.1.0.g.1406399071-32-bit-r786.1.exe

Launch the installer

Next

Agree to Licence • Next
Destination Folder: C:\Program Files\Bareos • Next
Type of install: Full • Next
Bareos Client Configuration
Client Name
bareos-fd
Director Name
bareos-dir
Password
bareos
Network Address
bareos.mydomain.local
Client Monitor Password
bareos
Bacula Compatibility
Unchecked

Post-Installation

After installation is complete:

Ensure sufficient permissions are in place for the Bareos Service Account

Bareos config paths

```
[shell]cacls "C:\Documents and Settings\All Users\Application Data\Bareos\scripts" /e /g bareos:f /t[/shell]
```

```
libbareocats-postgresql.dll
```

```
[shell]copy "C:\Program Files\Bareos\libbareocats-postgresql.dll" to %WINDIR%\System32[/shell]
```

Launch the PostgreSQL **database creation scripts**

Change Working Directory

```
[shell]cd "C:\Documents and Settings\All Users\Application Data\Bareos\scripts\"[/shell]
```

Create the bareos database

```
[shell]psql.exe -U <postgres username> -f postgresql-createdb.sql[/shell]
```

Grant Database Rights

```
[shell]psql.exe -U <postgres username> -f postgresql-grant.sql
bareos[/shell]
```

This concludes installation on Windows Server 2003

[divider]

Configuring The Services

Great! You've installed Bacula/Bareos
Now it's time to configure everything
The config files we are concerned with:

Windows

bareos-dir.conf

bareos-fd.conf

bareos-sd.conf

bat.conf

bconsole.conf

tray-monitor.conf

[divider]

Director Config [bacula-dir.conf] – Directives Explained

Client

A pointer to the computer you want to back up

Schedule

Definition of when this job will run and the type of backup

Where type can be

Full

Incremental

Differential

Storage

A pointer to the backup device (tape drive or disk storage)

Catalogue

Details of the SQL database which stores the catalogue (index

to contents of backup)

Pool

Collection of tapes or disk files which make up the storage
You may have multiple pools in different rotations

Messages

This is the Notification Engine
Can send messages to

Email

Log File

etc

Fileset

Path definitions for the backup selection
Answers the question: What are you backing up?
Allows inclusion/exclusion rules

Job

The Job directive can be considered the glue that binds all other directives in the Director config
The following specifications comprise this directive:

Client

Schedule

FileSet

Pool

The Pool of backup destinations
Where the destination is a backup device defined in a Storage directive

Director Config [bacula-dir.conf] – Sample

```
[md]@|”sh -c ‘powershell.exe -ExecutionPolicy ByPass -Command C:/Docume~1/AllUse~1/Applic~1/Bareos/scripts/Get-BareosConf.ps1’”
```

```
C:\Documents and Settings\All Users\Application Data\Bareos\bareos-sd.conf  
#Includes
```



```
@|"sh -c 'powershell.exe -ExecutionPolicy ByPass -Command C:/Docume~1/AllUse~1/Applic~1/Bareos/scripts/Get-BareosConf.sd.ps1' "[/md]
```

Storage Daemon Config [bacula-sd.conf] – Directives Explained

Storage

One storage record for general setup

Messages

This is the Notification Engine

Can send messages to

Director

Director

Defines the Director allowed to control the Storage Daemon

Name

Password

Device

Defines the storage device

Type

Tape

Disk

[divider]

Appendix

[divider]

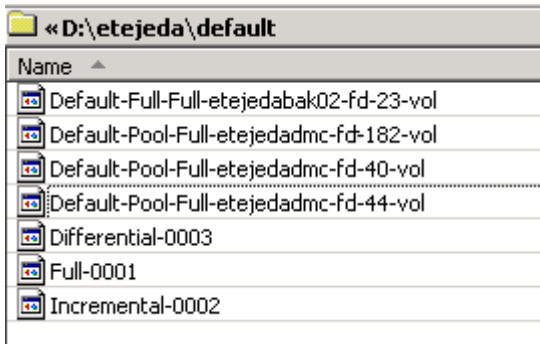
Managing Backup Volumes

You might need to manage the backup volumes for various reasons, e.g.

You need to clean up some unneeded volumes that are taking up valuable disk space

[divider]

Prune & Purge Multiple Volumes From The Command Line



Bacula on Linux:

```
echo "use bacula;SELECT volumename
FROM Media,Pool,Storage
WHERE Media.PoolId=Pool.PoolId
AND lastwritten < DATE_SUB(CURDATE(), INTERVAL 1 DAY)
AND Pool.Name='etejedadmc-full-pool'
AND Media.StorageId=Storage.StorageId
ORDER BY VolumeName ASC;
" | mysql -u root -p | tail -n+2 > MatchedVolumes.list
cat MatchedVolumes.list | xargs -n 1 -I % echo 'prune
volume="%'" yes' | bconsole
cat MatchedVolumes.list | xargs -n 1 -I % echo 'purge
volume="%'" yes' | bconsole
cat MatchedVolumes.list | xargs -n 1 -I % echo rm -f
/mnt/backups/etejedabackups/regular/etejedadmc.ufn.local/%
cat MatchedVolumes.list | xargs -n 1 -I % echo rm -f
/mnt/backups/etejedabackups/regular/etejedadmc.ufn.local/%
cat MatchedVolumes.list | xargs -n 1 -I % ls -lh
/mnt/backups/etejedabackups/regular/etejedadmc.ufn.local/%
#verify purge status
cat MatchedVolumes.list | xargs -n 1 -I % echo list volume=% |
bconsole |grep '^|'|tail -n +2|sed 's,|,,g'
#remove volumes
cat MatchedVolumes.list | xargs -n 1 -I % rm -f
```

```
/mnt/backups/etejedabackups/regular/etejedadm.c.ufn.local/%
```

Bareos on Windows:

```
echo prune volume=Default-Pool-Full-etejedadm.c-fd-183-vol yes |  
bconsole.exe
```

```
echo prune volume=Default-Full-Full-etejedabak02-fd-23-vol yes  
| bconsole.exe
```

```
echo prune volume=Default-Pool-Full-etejedadm.c-fd-182-vol yes  
| bconsole.exe
```

```
echo prune volume=Default-Pool-Full-etejedadm.c-fd-40-vol yes |  
bconsole.exe
```

```
echo prune volume=Default-Pool-Full-etejedadm.c-fd-44-vol yes |  
bconsole.exe
```

```
echo prune volume=Full-0001 yes | bconsole.exe
```

```
echo prune volume=Incremental-0002 yes | bconsole.exe
```

```
echo prune volume=Differential-0003 yes | bconsole.exe
```

```
echo purge volume=Default-Pool-Full-etejedadm.c-fd-183-vol yes |  
bconsole.exe
```

```
echo purge volume=Default-Full-Full-etejedabak02-fd-23-vol yes  
| bconsole.exe
```

```
echo purge volume=Default-Pool-Full-etejedadm.c-fd-182-vol yes  
| bconsole.exe
```

```
echo purge volume=Default-Pool-Full-etejedadm.c-fd-40-vol yes |  
bconsole.exe
```

```
echo purge volume=Default-Pool-Full-etejedadm.c-fd-44-vol yes |  
bconsole.exe
```

```
echo purge volume=Full-0001 yes | bconsole.exe
```

```
echo purge volume=Incremental-0002 yes | bconsole.exe
```

```
echo purge volume=Differential-0003 yes | bconsole.exe
```

How to change Maximum Volume size in Pool Definition

update pool from resource

followed by

update all volumes in pool

follow the prompts in both cases

[divider]

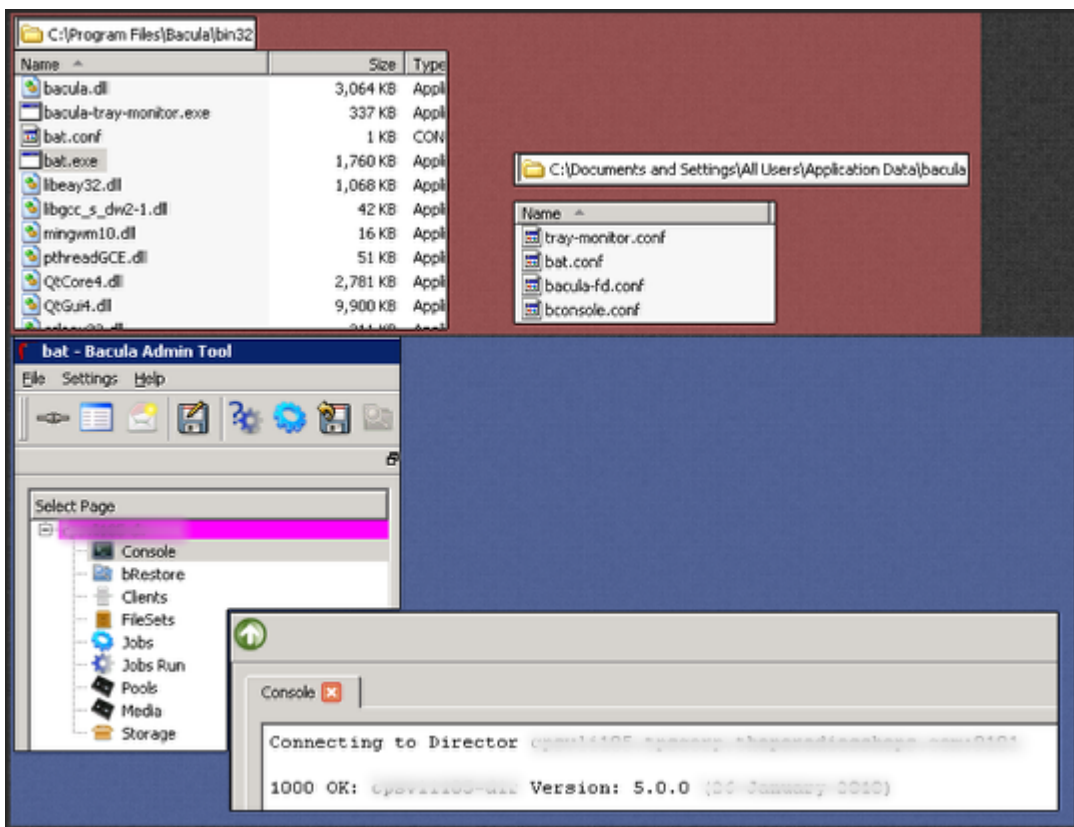
Interacting With Bacula/Bareos

[divider]

Commands Cheatsheet

Scripting Bconsole

Windows BAT: Bacula Admin Tool



[divider]

Monitoring Bacula

This sections covers monitoring basics for the Bacula software

[divider]

Server-Side Key Performance Indicators (KPIs)

Solutions

Nagios Monitoring:

<http://exchange.nagios.org/directory/Plugins/Backup-and-Recovery/Bacula>

Xymon Bacula Check Script

http://www.revpol.com/xymon_bacula_check_script

[divider]

Caveats

This section covers some warnings one should heed to avoid problems in the future.

[divider]

Bacula Output File

```
df -vk
Filesystem            1K-blocks      Used Available Use% Mounted on
/dev/mapper/vg_...    51606140  49640468         0 100% /
tmpfs                 1027832         0   1027832   0% /dev/shm
/dev/sda1             495844       29198    441046   7% /boot
```

If you use the default bacula-dir.conf or some variation of it, you will note that it logs all the Bacula output to a file.

To avoid that this file grows without limit, we recommend that you copy the file logrotate from the scripts/logrotate to /etc/logrotate.d/bacula.

This will cause the log file to be rotated once a month and kept for a maximum of five months.

You may want to edit this file to change the default log rotation preferences.

See: http://www.bacula.org/en/dev-manual/main/main/Getting_Started_with_Bacula.html

[divider]

Scripts

Windows

Get-BareosConf.dir.ps1

```
$fso = New-Object -ComObject Scripting.FileSystemObject;
Get-ChildItem -Recurse
"C:\Docume~1\AllUse~1\Applic~1\Bareos\conf.dir" `
| Where-Object {$_.PSIsContainer} `
| ForEach-Object {
$conf=$fso.GetFile($_.FullName).ShortPath
'@' + "$conf"
}
```

Get-BareosConf.sd.ps1

```
$fso = New-Object -ComObject Scripting.FileSystemObject;
Get-ChildItem -Recurse
"C:\Docume~1\AllUse~1\Applic~1\Bareos\conf.sd" `
| Where-Object {$_.PSIsContainer} `
| ForEach-Object {
$conf=$fso.GetFile($_.FullName).ShortPath;'@' + "$conf"
}
```

[divider]

Miscellaneous Tasks

[divider]

Reset Bacula Databases and Files

Linux

Backup Existing Database And Files

```
[shell]/usr/bin/mysqldump -aecqQ bacula >
bacula_before_purge.sql[/shell]
```

Stop Bacula Services

```
[shell]service bacula-dir stop
service bacula-fd stop
service bacula-sd stop[/shell]
```

Drop MySQL Tables

```
[shell]mysql -u root -p -e "drop database bacula;"[/shell]
```

Recreate Database & Grant Permissions

```
/usr/libexec/bacula/create_mysql_database -u root -p
/usr/libexec/bacula/make_mysql_tables -u root -p
/usr/libexec/bacula/grant_mysql_privileges -u root -p
```

Stop Bacula Services

```
[shell]service bacula-dir start
service bacula-sd start
service bacula-fd start[/shell]
```

@!:{Assumes you are using MySQL for the Bacula Database

[divider]

Troubleshooting

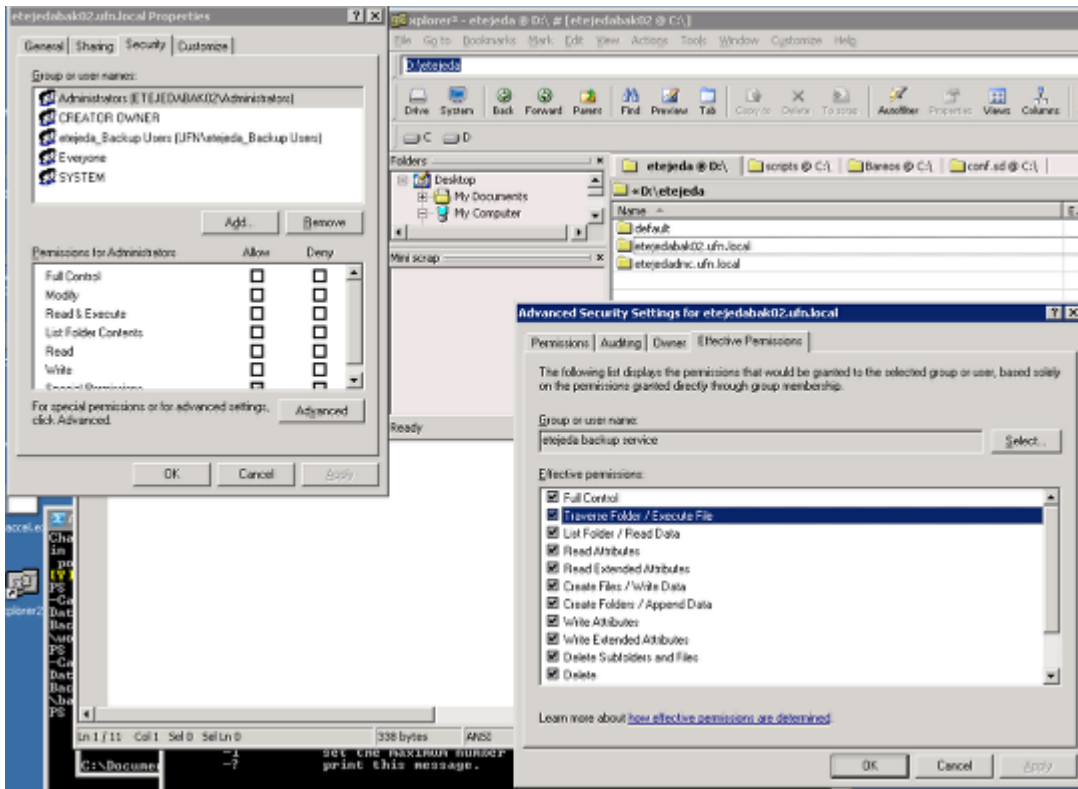
Problem Scenarios

Problem	Possible Cause	Troubleshooting
The Bacula Director service fails to start or starts then quickly stops	There is most likely an error in the configuration preventing proper function	<p>The first step in troubleshooting is to determine what the problem is</p> <p>Try launching the Director interactively from command line (without the /service flag) and observing output, e.g.:</p> <pre>[shell]"C:\Program Files\Bareos\bareos-dir.exe" -c "C:\Documents and Settings\All Users\Application Data\Bareos\bareos-dir.conf" [/shell]</pre> <p>In my case, I had an error in the configuration, so I was presented with the following standard output: [diff] ... bareos-dir: ERROR TERMINATION atlib/res.c:459</p> <p>Config error: Could not find config Resource Full referenced on line 13 : Full Backup Pool = Full ... : line 13, col 43 of file C:\DOCUME~1\ALLUSE~1\APPLIC~1\Bareos\conf.dir\base\JOBS~1.CON[/diff]</p>

Problem	Possible Cause	Troubleshooting
<pre>[diff]Fatal error: Storage daemon didn't accept Device "device-name" because: 3924 Device "device-name" not in SD Device resources or no matching Media Type[/diff]</pre>	<p>Possibilities include:</p> <ol style="list-style-type: none"> 1. Mismatching Media Type definitions between client storage definition and bacula storage definition 2. Missing Media Type definitions in either the client storage definition, bacula storage definition, or both 3. Insufficient permissions on the backup destination folder (if Media Type is File) 4. Storage daemon not running 5. You updated parameters for a storage device or pertinent configuration, but did not restart the storage daemon to finalize the changes [attr style="width:300px" 	
<pre>[diff]Fatal error: Storage daemon didn't accept Device "device-name" command[/diff]</pre>	<p>An error in the Storage Daemon configuration</p>	<p>Double-check your SD configuration Common problems include:</p> <ol style="list-style-type: none"> 1. Invalid or non-existing path specified in Device directive (applies to Disk backup types)
<pre>[diff]Error: Director's comm line to SD dropped. ... Fatal error: filed/dir_cmd.c:2208 Comm error with SD. bad response to Append Data. ERR=Input/output error[/diff]</pre>	<p>An error in the Storage Daemon configuration</p>	<p>Double-check your SD configuration Common problems include:</p> <ol style="list-style-type: none"> 1. Invalid or non-existing path specified in Device directive (applies to Disk backup types)

@!:{Again, make sure to restart the storage daemon if you make any changes to the storage daemon configuration!

Filesystem Permissions



Sources

see:{Bacula volumes – running low on disk space@<http://dan.langille.org/2012/10/04/bacula-volumes-running-low-on-disk-space/>}

see:{File storage: disk full, how to recover@<http://bacula.10910.n7.nabble.com/File-storage-disk-full-how-to-recover-td40740.html>}

see:{pruneall@<http://bacula.10910.n7.nabble.com/file/n40741/pruneall>}

see:{delpurged@<http://bacula.10910.n7.nabble.com/file/n40741/delpurged>}

see:{gls*bacula delete failed jobs}

see:{Purge Jobs @<http://www.backupcentral.com/phpBB2/two-way-mirrors-of-external-mailing-lists-3/bacula-25/purge-jobs-103092/>}

see:{gls*bacula disk full recycle}

see:{Bacula disk space management@<http://www.bignose.ca/2013/09/19/bacula-disk-space-management/>}

see:{Run sql-command from bash-}

script?<http://stackoverflow.com/questions/20351573/run-sql-command-from-bash-script>

see: {produce a separate
sqlhttp://www.crumpeta.com/using_xargs_to_create_sql_statements

see: {Volume Status is Full instead of
Purge<http://bacula.10910.n7.nabble.com/Volume-Status-is-Full-instead-of-Purge-td76522.html>

see: {gl**s** console list vol status purged

see: {Bacula Cheat
Sheet<https://workaround.org/bacula-cheatsheet>

see: {Reset Bacula database and
files<http://blog.mansonthomas.com/2009/09/reset-bacula-database-and-files.html>