

Bareos @ MPI SF

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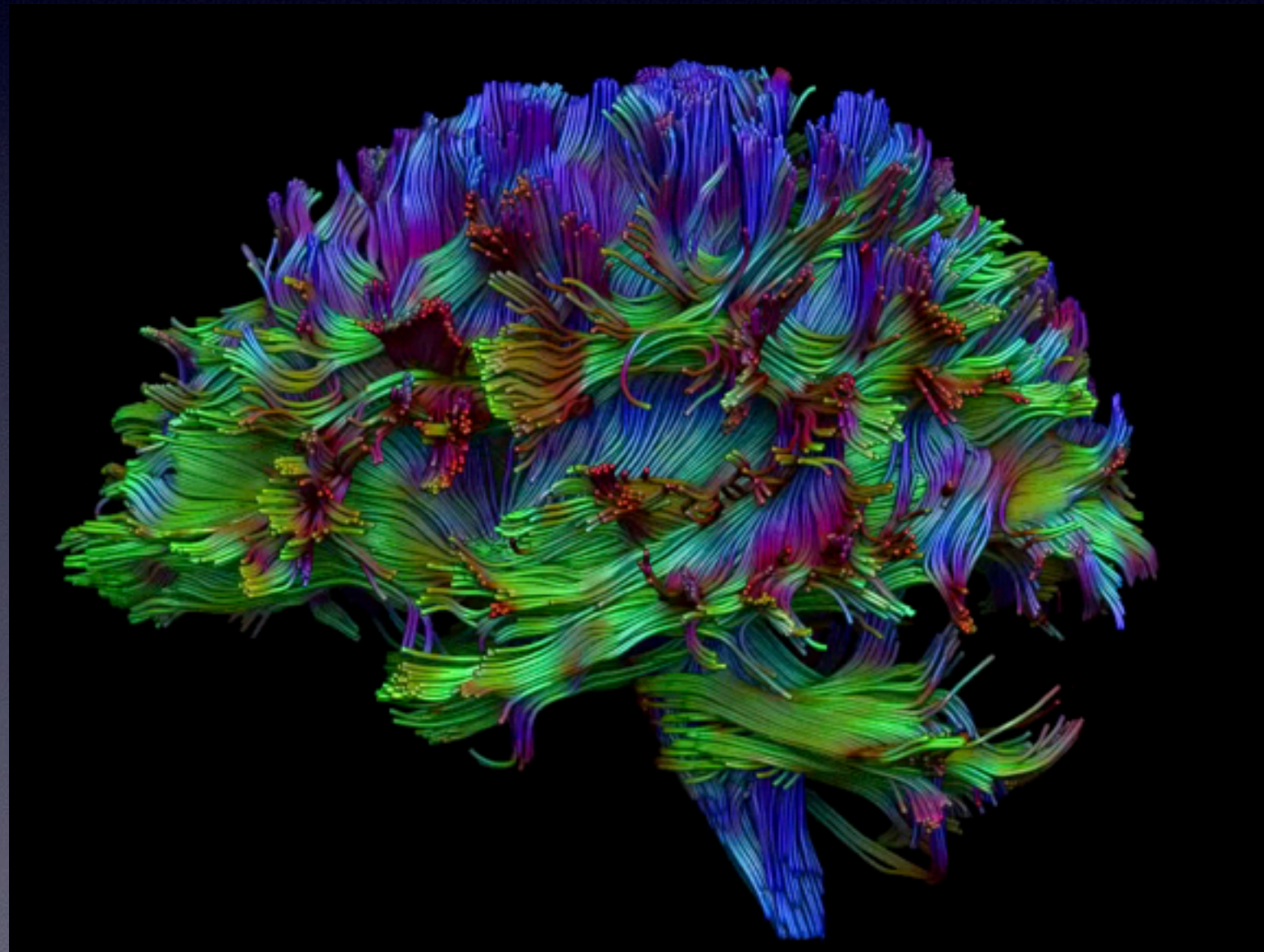


Open Source **Backup**
Conference

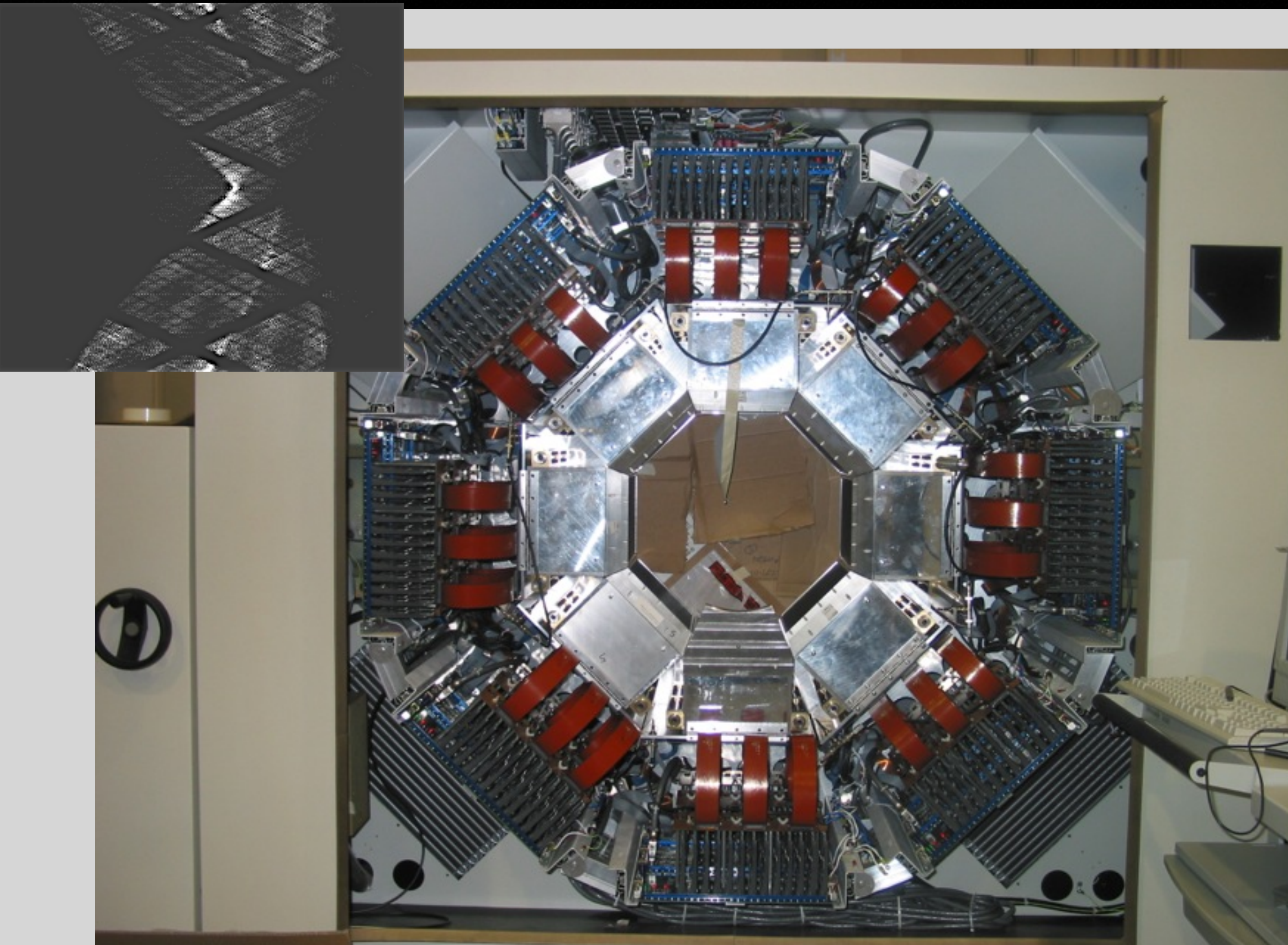
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Diffusion MRI - Fibre Tracking

- “Nothing defines the function of a neuron better than its connections” Mesulam (2006)
- analyzing fiber structure (anatomical connectivity) in-vivo in human brains



The High Resolution Research Tomograph



Migration from Sun SAM-FS to Grau OpenArchive (1)

- **Interdisciplinary and complex projects, heterogeneous groups: fine granular backup/archiving needed for “Good Scientific Practice”**
- **Sun SAM-FS, 50 TB online, 374 x LTO-4 in Sun SL500-Library**
- **Problem: not (nearly) enough online space**
- **Problem: users find it difficult to work efficiently with offline data**
- **Problem: one central file server (Sun V490)**
- **Problem: ESX-Cluster increasingly important, unsatisfactory backup concept (Acronis Backup & Recovery 11.5 Virtual Edition)**

Migration from Sun SAM-FS to Grau OpenArchive (2)

- VMWare ESX-Cluster now with 80 TB HA virtual storage - DataCore SANSymph-V (HP EVA, HP P2000)
- new Grau OpenArchive HSM with 300 x LTO-6 in Quantum i6000-Library for offline storage
- But: GAM setup is not suitable for original SAM-FS concept - no shared pools, need fewer file systems
- So try Bareos for backup of selected VMs with concept of **D. Jahn (contac Datentechnik GmbH): backup-to-disk into a HSM file system**
- Sliced Bread
- New approach: fewer HSM-type "production" file systems for scientific computing - use Bareos!

Services: Virtually Fat Free?



**4 x HP DL585 G7
> 1 TB RAM
10-Gig-E networking
FC-SAN
approx. 64 cores each**

**approx. 100 virtual machines,
VMWare vSphere 5 ESX cluster**

Storage and Archiving (3)



LTO 6-WORM approx. 6 TB per Tape

Quantum i6000
600 Slots
6 x LTO-6
(for two institutes)



Adding Clients with Templates

```
root@:conf.d# add-client.sh marvin
```

templates courtesy of J. Behrend, thanks!

add-client.sh

```
mkdir "/var/lib/bareos/storage/$1"  
chown bareos "/var/lib/bareos/storage/$1"  
cp _template-linux.dir.conf_ "$1.dir.conf"  
cp _template-linux.sd.conf_ "$1.sd.conf"  
sed -i "s/XXX/$1/g" $1.dir.conf  
sed -i "s/XXX/$1/g" $1.sd.conf
```

```
Device {  
  Name = XXX  
  Media Type = XXX  
  Archive Device = /var/lib/bareos/storage/XXX  
  LabelMedia = yes;          # lets Bareos label unlabeled media  
  Random Access = yes;  
  AutomaticMount = yes;     # when device opened, read it  
  RemovableMedia = no;  
  AlwaysOpen = no;  
}
```

template-linux.sd.conf

```
Schedule {  
  Name = "XXX-all"  
  Run = Level=Full sun at 2:25  
  Run = Level=Incremental mon-sat at 22:30  
}  
#  
Job {  
  Name = "XXX-all"  
  Type = Backup  
  Level = Incremental  
  Client = XXX-fd  
  FileSet= "XXX-all"  
  Messages = Standard  
  Storage = XXX  
  Pool = XXX  
  Accurate = true  
  Schedule = XXX-all  
}  
#  
Client {  
  Name = XXX-fd  
  Address = XXX  
  Catalog = MyCatalog  
  ...  
Pool {  
  Name = XXX  
  Pool Type = Backup  
  LabelFormat = "XXX-"  
  Maximum Volume Jobs = 1  
  Maximum Volume Bytes = 5G  
  Recycle = no  
}
```

template-linux.dir.conf

Backup-to-Disk on HSM

-rw-r-----	1	bareos	bareos	18M	Sep	17	13:35	dbintern-5797	-rw-r-----	1	bareos	bareos	309M	Aug	3	01:08	nfhome-4560
-rw-r-----	1	bareos	bareos	25M	Sep	17	21:35	dbintern-5806	-rw-r-----	1	bareos	bareos	187M	Aug	4	01:08	nfhome-4580
-rw-r-----	1	bareos	bareos	43M	Sep	18	10:36	dbintern-5824	-rw-r-----	1	bareos	bareos	4.4G	Aug	5	01:10	nfhome-4607
-rw-r-----	1	bareos	bareos	17M	Sep	18	13:35	dbintern-5826	-rw-r-----	1	bareos	bareos	1.4G	Aug	6	01:07	nfhome-4634
-rw-r-----	1	bareos	bareos	23M	Sep	18	21:35	dbintern-5835	-rw-r-----	1	bareos	bareos	1.1G	Aug	7	01:13	nfhome-4661
-rw-r-----	1	bareos	bareos	30M	Sep	19	10:35	dbintern-5853	-rw-r-----	1	bareos	bareos	3.7G	Aug	8	01:07	nfhome-4688
-rw-r-----	1	bareos	bareos	17M	Sep	19	13:35	dbintern-5855	-rw-r-----	1	bareos	bareos	5.0G	Aug	9	00:58	nfhome-4715
-rw-r-----	1	bareos	bareos	19M	Sep	19	21:35	dbintern-5864	-rw-r-----	1	bareos	bareos	5.0G	Aug	9	01:00	nfhome-4716
-rw-r-----	1	bareos	bareos	27M	Sep	20	10:35	dbintern-5882	-rw-r-----	1	bareos	bareos	1.2G	Aug	9	01:05	nfhome-4717
-rw-r-----	1	bareos	bareos	11M	Sep	20	13:35	dbintern-5883	-rw-r-----	1	bareos	bareos	196M	Aug	10	01:35	nfhome-4746
-rw-r-----	1	bareos	bareos	15M	Sep	20	21:35	dbintern-5894	-rw-r-----	1	bareos	bareos	243M	Aug	11	01:04	nfhome-4761
-rw-r-----	1	bareos	bareos	5.0G	Sep	21	01:12	dbintern-5908	-rw-r-----	1	bareos	bareos	5.0G	Aug	12	01:01	nfhome-4788
-rw-r-----	1	bareos	bareos	5.0G	Sep	21	01:27	dbintern-5909	-rw-r-----	1	bareos	bareos	5.0G	Aug	12	01:08	nfhome-4789
-rw-r-----	1	bareos	bareos	2.9G	Sep	21	01:41	dbintern-5910	-rw-r-----	1	bareos	bareos	1.2G	Aug	12	01:11	nfhome-4790
-rw-r-----	1	bareos	bareos	49M	Sep	22	10:36	dbintern-5933	-rw-r-----	1	bareos	bareos	5.0G	Aug	13	01:18	nfhome-4817
-rw-r-----	1	bareos	bareos	16M	Sep	22	13:35	dbintern-5935	-rw-r-----	1	bareos	bareos	86M	Aug	13	01:28	nfhome-4818
									-rw-r-----	1	bareos	bareos	1.9G	Aug	14	01:10	nfhome-4845
									-rw-r-----	1	bareos	bareos	2.8G	Aug	15	01:04	nfhome-4873

- Files should have a sensible size limit (here: 5 GB)
- HSM needs suitable “MinFileAge”
- one job per virtual tape (file) to avoid writing earlier data of a particular file more than once

Backup of small DB servers

- mostly (very) small MySQL databases
- Cronjob 1: create dump files (for each database) several times a day, store them **locally**
- Cronjob 2: run daily and make sure that older dumps are deleted as necessary
- Run Bareos several times daily

-rw-r--r--	1	bcka	bcka	2.1M	2014-09-17	11:05	itdb_2014-09-17T1105.sql.gz
-rw-r--r--	1	bcka	bcka	2.1M	2014-09-17	14:05	itdb_2014-09-17T1405.sql.gz
-rw-r--r--	1	bcka	bcka	2.1M	2014-09-17	18:05	itdb_2014-09-17T1805.sql.gz
-rw-r--r--	1	bcka	bcka	2.1M	2014-09-18	11:05	itdb_2014-09-18T1105.sql.gz
-rw-r--r--	1	bcka	bcka	2.1M	2014-09-18	14:05	itdb_2014-09-18T1405.sql.gz
-rw-r--r--	1	bcka	bcka	2.1M	2014-09-18	18:05	itdb_2014-09-18T1805.sql.gz
-rw-r--r--	1	bcka	bcka	2.1M	2014-09-19	11:05	itdb_2014-09-19T1105.sql.gz
-rw-r--r--	1	bcka	bcka	2.1M	2014-09-19	14:05	itdb_2014-09-19T1405.sql.gz
-rw-r--r--	1	bcka	bcka	2.1M	2014-09-22	11:05	itdb_2014-09-22T1105.sql.gz
-rw-r--r--	1	bcka	bcka	2.1M	2014-09-22	14:05	itdb_2014-09-22T1405.sql.gz

Improved Security with RunBefore- and RunAfter-Hooks

- use a “private” network which only exists during the backup window and which contains two virtual network cards: one in the database server, one in the Bareos server
- grant user “bareos” (which is running the local director daemon) via sudo permission to activate virtual network board eth1, also to deactivate it
- add these commands to the backup job:
RunBeforeJob = "dbsec-run-before.sh"
RunAfterJob = "dbsec-run-after.sh"
- these shell scripts simply take eth1 up and down, resp.

Reporting (Mail)

```
Date: Sat, 29 Dec 2012 05:19:15 +0100
From: ABR@reserve.nf.mpg.de
Subject: [ABR11.5]: Task 'Inkrementelles Backup' erfolgreich abgeschlossen auf Maschine
To: securitylist@nf.mpg.de

1  Information    29.12.2012 05:01:15  Befehl 'Backup-Plan 'DBSEC_inkrementell_taeiglich
2  Information    29.12.2012 05:02:35  Befehl 'Backup' wird ausgeführt.
3  Information    29.12.2012 05:02:41  Backup von VM 'vm://host-859/421d7d4c-28e3-2497-
4  Information    29.12.2012 05:02:45  Gewählter 'Changed Block Tracking'-Modus: 'CBT a
5  Information    29.12.2012 05:02:46  Changed Block Tracking ist bereits für die virtu
6  Information    29.12.2012 05:02:54  Snapshot 'Sat Dec 29 05:02:48 2012' wird erstell
7  Information    29.12.2012 05:03:02  Virtuelle Maschine 'vm://host-859/421d7d4c-28e3-
8  Information    29.12.2012 05:03:03  VMware_VDDK: SSLVerifyIsEnabled: failed to open
...
14 Information    29.12.2012 05:03:08  Ermittelter 'GRUB 2 Loader' auf Laufwerk '\comp
15 Information    29.12.2012 05:03:14  Der Linux-Gerätenamen kann 'sda' sein.
16 Information    29.12.2012 05:03:14  Der Linux-Gerätenamen kann 'sda1' sein.
...
19 Information    29.12.2012 05:03:18  Volume 'C:' wird analysiert...
20 Information    29.12.2012 05:03:18  Volume 'L1' wird analysiert...
21 Information    29.12.2012 05:03:21  Ermittelter 'GRUB 2 Loader' auf Laufwerk '\comp
22 Information    29.12.2012 05:03:26  Der Linux-Gerätenamen kann 'sda' sein.
...
37 Information    29.12.2012 05:05:39  Ausstehende Aktion 152 wurde gestartet: 'Partit
38 Information    29.12.2012 05:05:42  Entfernen des Snapshots (snapshot-2061).
39 Information    29.12.2012 05:06:01  Befehl 'Backup' wurde erfolgreich abgeschlossen
40 Information    29.12.2012 05:06:23  Befehl 'Validierung' wird ausgeführt.
41 Information    29.12.2012 05:19:11  Befehl 'Validierung' wurde erfolgreich abgeschl
Task 'Inkrementelles Backup' erfolgreich abgeschlossen auf Maschine 'RESERVE'
```

- Several pages of useless gibberish
- How much data? On which media?

</rant>

:-)

```
#!/bin/sh                                list-jobs.sh
dbname="bareos"
username="postgres"
psql $dbname $username << EOF
SELECT
  starttime,
  round(readbytes/1024.0/1024.0, 2) AS "read [MB]"
FROM job WHERE name LIKE '%$1%'
ORDER by starttime DESC
LIMIT 500;
EOF
```

```
root@:conf.d# list-jobs.sh marvin
```

- We even like the special appeal of **bconsole**
- But then we also like Emacs and even the other editor...

Know thy Increments

original code by John H. Pierce

<http://adsm.org/lists/html/Bacula-users/2011-06/msg00159.html>

```
#!/bin/sh
dbname="bareos"
username="postgres"
jobid=$1
psql $dbname $username << EOF
SELECT (SELECT st_size FROM decode_lstat(File.lstat)) AS Size,
Path.path AS PATH, FileName.Name, File.MD5
FROM File,FileName,Path
WHERE File.JobId = '$1'
AND Filename.FileNameId = File.FileNameId
AND File.PathId = Path.PathId
ORDER by Size DESC
LIMIT 20;
EOF
```

largest-from-jobid.sh

```
root@:conf.d# ./largest-from-jobid.sh 5023
```

size	path	name	md5
29420997	/var/log/mysql/	mysql-bin.000888	QdHJreWvGWiis4ZXNiQJSCqryuU
19301500	/var/lib/mlocate/	mlocate.db	A5Nm9Aozf3pT2uSL0AXLNy1p05I
1147109	/var/log/	auth.log ...	n6pkSuuJxGhwAf+SXGeNv7fuw5k
584751	/var/cache/man/	index.db	O4YFMt4ycElhgpV87dy5PF/rvRI
58264	/var/lib/apt/lists/	de.archive.ubuntu.com_ubuntu_updates_Release	yNB+bjLB8eDvHHggaq3AstMRB8M
57254	/var/lib/apt/lists/	security.ubuntu.com_ubuntu_dists_se	OJoiBYptg8/DYpYJ7Xf9NbNnwfw
57242	/var/lib/apt/lists/	de.archive.ubuntu.com_ubuntu_dist	BZKDq7xmy44tApRrvMLRkNeHjiw