



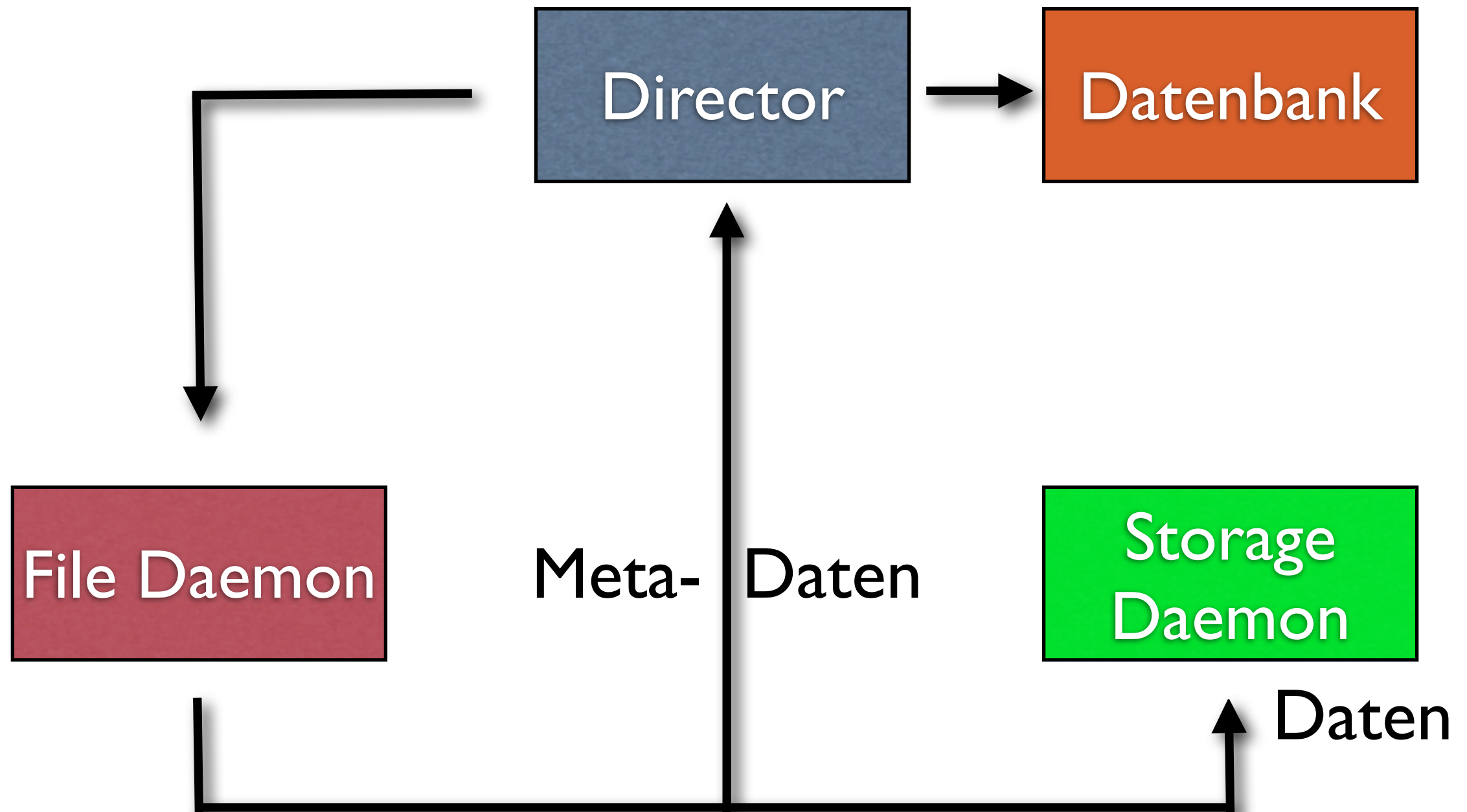
bacula®

The Network Backup Solution

Betriebssysteme

	Client	Server
Linux	X	X
FreeBSD	X	X
OpenBSD	X	
NetBSD	X	X
Mac OS X	X	
Windows	X	manchmal
IRIX	X	

Konzept



Was läuft wo?

- Beliebig viele Instanzen möglich
- Director auf einer stabilen, always-on Kiste
- Datenbankserver ebenso
- Storage Daemon dort wo Storage hängt
- File Daemon auf jedem Client (~ 250 KB)

Was wird gesichert?

- Dateien und ihre Metadaten (auch unter Windows und Mac OS X)
- Include und Exclude-Direktiven möglich
- Include = / für **ALLES**
- Standard-Filesets, diese kann man ergänzen

Wie wird gesichert?

- Alle Daten werden aneinanderhängend in ein Volume gepackt
- Kompression (GZIP) möglich (auf FD)
- Signatur der Daten (MD5)
- SSL unterstützt, aber bei NAT problematisch

Backuplevel

- **Full Backup:** Sichert alle Daten
- **Incremental Backup:** Sichert alle Daten, die sich seit dem letzten Backup geändert haben
- **Differential Backup:** Sichert alle Daten, die sich seit dem letzten Full Backup geändert haben

Wohin wird gesichert?

- Festplatte
- DVD (pre- und post-mount Befehle zum DVD-wechseln zB)
- Bandlaufwerk
- Netzwerk via ftpfs/sshfs/samba/NFS/AFS
→ alles was via FS abbildbar ist

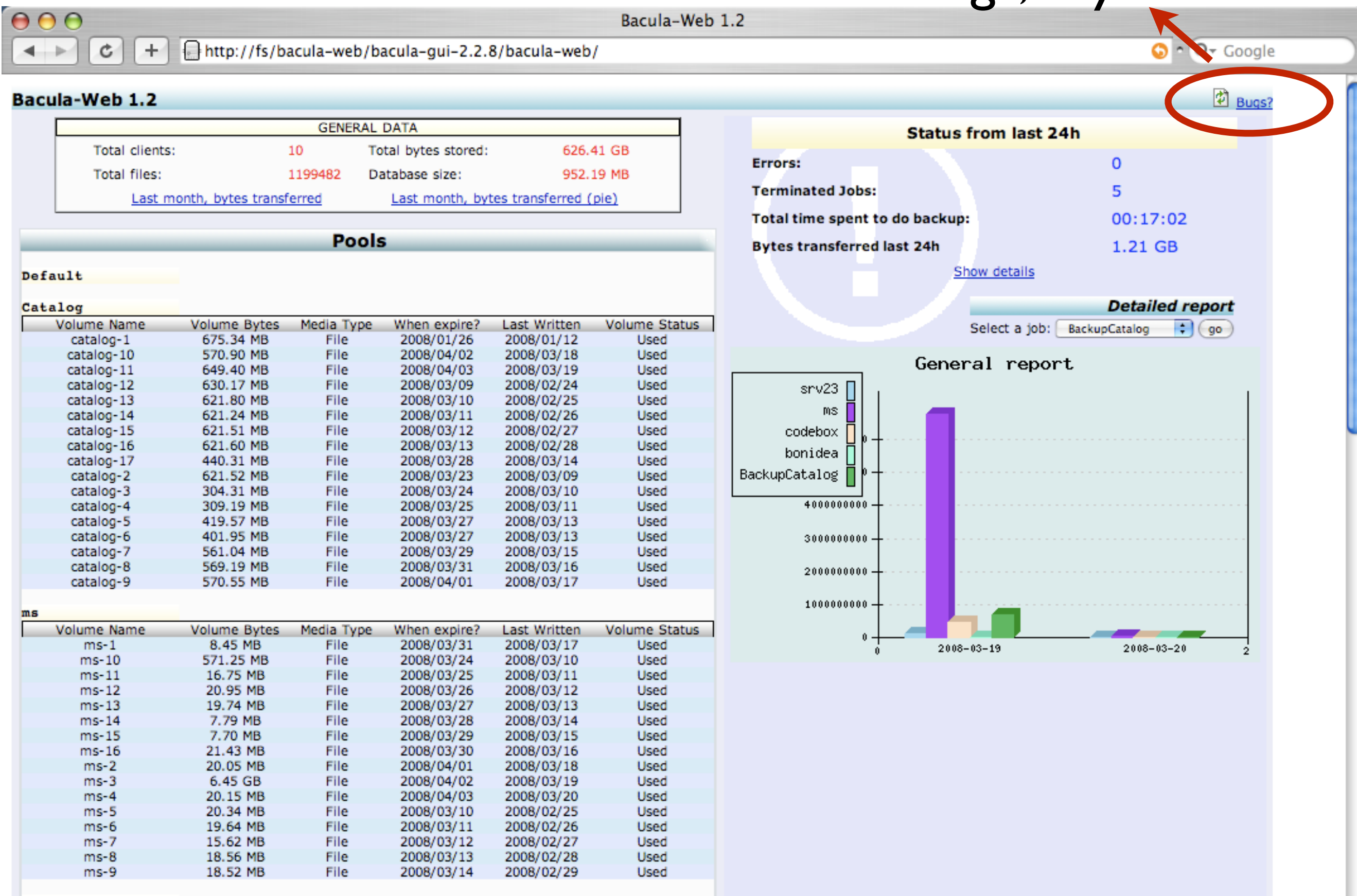
Volumes

- Einheit für Container, Sicherungsläufe legen ihre Daten in Volumes ab
- Mehrere Jobs pro Volume möglich
- Volume kann eine max. Kapazität haben
- Volume wird irgendwann wiederverwertet

Webinterfaces/GUI

- existieren.
- saugen.

bugs, anyone?



←

→

↺

+

http://fs/bacula-web/foo/

↻

Q Google

BACULA

Backup Jobs

Media

Clients

File Sets

Job Media

Pool

Tables

Website

Manual

Download

⏪

⏩

March 20, 2008

⏴

⏵

Su	M	T	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

View Jobs

Latest Jobs

All Jobs

Job Control

Start Job

Stop Job

Delete Job

Backup Jobs Found : 2

ID	Client	Name	Operation	Level	Status	Volume	Scheduled Time	Start Time	End Time	Run Time	Files	Bytes	Delete Job	
932	 Unknown Linux	ms	ms	Backup	Incremental	Done	ms-4	2008-03-20 01:00:00	2008-03-20 01:00:02	2008-03-20 01:02:12	02:10	181	21,074,585	
933	 Unknown Linux	srv23	srv23	Backup	Incremental	Running	Unknown	2008-03-20 02:00:00	2008-03-20 02:00:04	0000-00-00 00:00:00	N/A	0	0	
Totals For : 2008-03-20										02:10	181	21,074,585		

JobMedia : 832

Job MediaID	JobId	MediaId	First Index	Last Index	Start File	End File	Start Block	End Block	VolIndex
485	147	68	1	86	0	0	194	627572080	1
486	148	69	I HAS NUMBERZ, U WANT SUM?						81
487	148	69							756
488	148	69							680
489	148	69							4
490	148	69	145975	236212	0	1	3999743565	704711915	5
491	148	69	236212	312866	1	1	704711916	1704647539	6
492	148	69	312866	317139	1	1	1704647540	2704583496	7
493	148	69	317139	339342	1	1	2704583497	3704519448	8
494	148	69	339342	390631	1	2	3704519449	409487927	9
495	148	69	390631	551896	2	2	409487928	1409487916	10
496	148	69	551896	668565	2	2	1409487917	2409423641	11
497	148	69	668565	726717	2	2	2409423642	3409359428	12
498	148	69	726717	727161	2	3	3409359429	114328098	13
499	148	69	727161	727406	3	3	114328099	1114264085	14
500	148	69	727406	727714	3	3	1114264086	2114200063	15
501	148	69	727714	728173	3	3	2114200064	3114136053	16
502	148	69	728173	728387	3	3	3114136054	4114072043	17
503	148	69	728387	728746	3	4	4114072044	819040728	18

bat - bacula admin tool

The screenshot displays the 'bat - Bacula Admin Tool' window. The interface is divided into several sections:

- Select Page:** A sidebar on the left with a tree view showing 'rufus-dir' and 'roxie-dir' under 'Console'. Other options include Clients, FileSets, Jobs, JobList, Media, Storage, Version Browser, and Job Plot.
- Jobs:** A table listing backup jobs with columns for Job Id, End Time, and Type. The jobs are sorted by End Time in descending order.
- Directories:** A tree view showing the directory structure of the selected job. The 'bacula/' directory is highlighted.
- Files:** A list of files within the selected directory. The file 'svn.txt' is highlighted.
- Versions of File:** A table showing the history of file versions with columns for Job Id, Type, End Time, and Md5.

At the bottom, there is a 'Present Working Directory' field showing '/home/kern/bacula/' and a 'Console Command Line Entry' section with a 'Command:' input field.

Job Id	End Time	Type
2265	2007-07-17 03:14:10	I
2260	2007-07-16 03:19:45	D
2255	2007-07-15 03:16:05	I
2250	2007-07-14 03:20:08	I
2245	2007-07-13 03:20:46	I
2240	2007-07-12 03:19:31	I
2235	2007-07-11 03:15:40	I
2230	2007-07-10 03:15:47	I
2225	2007-07-09 03:19:44	D
2220	2007-07-08 03:20:34	I
2215	2007-07-07 03:54:25	I
2210	2007-07-06 03:20:54	I
2205	2007-07-05 03:16:31	I
2200	2007-07-04 03:40:56	I
2195	2007-07-03 03:15:05	I
2190	2007-07-02 04:35:07	F
2185	2007-07-01 03:18:13	I
2180	2007-06-30 03:24:52	I
2175	2007-06-29 03:24:17	I
2170	2007-06-28 03:24:43	I
2165	2007-06-27 03:26:31	I
2160	2007-06-26 03:22:39	I
2155	2007-06-25 04:08:02	D

Job Id	Type	End Time	Md5
2295	D	2007-07-23 03:38:38	dYMkkirSSIRdo92w0MDSxg
2260	D	2007-07-16 03:19:45	dYMkkirSSIRdo92w0MDSxg
2225	D	2007-07-09 03:19:44	dYMkkirSSIRdo92w0MDSxg
2220	I	2007-07-08 03:20:34	dYMkkirSSIRdo92w0MDSxg
2190	F	2007-07-02 04:35:07	crik7ddm7JmOFXlGvA8W0A
2155	D	2007-06-25 04:08:02	crik7ddm7JmOFXlGvA8W0A

Konfiguration

- viel zu überblicken am Anfang
- Hilfe durch sed-Aufrufe (später mehr dazu)
- Zeit nehmen! Min. 2-3 Monate im Testbetrieb bleiben, schauen dass alles läuft, Konfiguration anpassen

Dateien

- **bacula-dir.conf**: Director (Server)
oftmals aber noch aufgeteilt in kleine Files
- **bacula-fd.conf**: File-Daemon (Client)
- **bacula-sd.conf**: Storage-Daemon (Server)
- **bconsole.conf**: Console (Client/Server)

bacula-fd.conf

```
# List Directors who are permitted to contact this File daemon
Director {
    Name = fileserver-dir
    Password = "maYkQKT0ZnaoYyba1ryu9gXzRcH+ncdG5bCqut2Xko6U"
}
FileDaemon {                                # this is me
    Name = macbook-fd
    FDport = 9102                          # where we listen for the director
    WorkingDirectory = /var/bacula/working
    Pid Directory = /var/run
    Maximum Concurrent Jobs = 20
}

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

bacula-sd.conf

```
Storage {
    Name = fileserver-sd
    SDPort = 9103
    WorkingDirectory = "/var/lib/bacula"
    Pid Directory = "/var/run"
    Maximum Concurrent Jobs = 20
}

Director {
    Name = fileserver-dir
    Password = "storagepass"
}

Device {
    Name = macbook-files
    Media Type = File
    Archive Device = /raid/macbook
    LabelMedia = yes
    Random Access = Yes
    AutomaticMount = no
    RemovableMedia = no
    AlwaysOpen = no
}

Messages {
    Name = Standard
    director = fs-dir = all
}
```

bacula-dir.conf

```
Director {
    Name = fileserver-dir
    DIRport = 9101
    QueryFile = "/usr/libexec/bacula/query.sql"
    WorkingDirectory = "/var/lib/bacula"
    PidDirectory = "/var/run"
    Maximum Concurrent Jobs = 4
    Password = "barbarbarbabrfooooooooooooo"
    Messages = Daemon
}

# Generic catalog service
Catalog {
    Name = MyCatalog
    dbname = bacula; user = bacula; password = "dbpw"
}

Messages {
    Name = Standard
    mailcommand = "/usr/local/bin/bacula_mail.sh -f \"Bacula\" -s \"Bacula: %t %e of %c %l\" %r"
    operatorcommand = "/usr/local/bin/bacula_mail.sh -f \"Bacula\" -s \"Bacula: %t %e of %c %l\" %r"
    mail = michael@fileserver = all, !skipped
    operator = michael@fileserver = mount
    console = all, !skipped, !saved
    append = "/var/log/bacula/main.log" = all, !skipped
}

...
```

bacula-dir.conf

```
Job {
    Name = "macbook"
    Type = Backup
    Client = macbook-fd
    FileSet = "macbook-set"
    Schedule = "macbook-schedule"
    Storage = macbook-storage
    Messages = Standard
    Priority = 10
    Write Bootstrap =
"/raid/macbook/bootstrap"
    Pool = macbook-pool
}
Client {
    Name = macbook-fd
    Address = macbook.zekjur.lan
    FDPort = 9102
    Catalog = MyCatalog
    Password = "blahblah"
    File Retention = 2 weeks
    Job Retention = 2 weeks
    AutoPrune = yes
}
Storage {
    Name = macbook-storage
    Address = fileserver.zekjur.lan
    SDPort = 9103
    Password = "storagepass"
    Device = macbook-files
    Media Type = File
}
```

```
Pool {
    Name = macbook-pool
    Pool Type = Backup
    Maximum Volume Jobs = 1
    Volume Retention = 2 weeks
    Maximum Volume Bytes = 0
    Volume Use Duration = 0
}
Schedule {
    Name = "macbook-sched"
}
FileSet {
    Name = "macbook-set"
    Include {
        Options {
            signature = MD5
            compression = gzip
            hfsplussupport = yes
        }
        File = /
        File = /Users/michael
    }
    Exclude {
        File =
/Users/.michael/michael.sparseimage
        File = /Users/michael/Music
        File = /Users/michael/Movies
        File = /Users/michael/Pictures
    }
}
```

Komplexere Schedules

```
Schedule {  
    Name = "websrv-sched"  
    Run = Full 1st sat at 02:00  
    Run = Incremental 2nd-4th sat at 02:00  
  
    Run = Incremental mon-fri at 02:00  
    Run = Incremental sun at 02:00  
}
```

- Volles Backup am ersten Samstag
- Inkrementelle Backups den Rest der Woche

Standard-Filesets

Linux

```
File = /proc  
File = /tmp  
File = /.journal  
File = /.fsck  
File = /media  
File = /mnt  
File = /sys  
File = /lost+found
```

Mac OS X

```
File = /Volumes  
File = /tmp  
File = /private/tmp  
File = /private/var/vm/sleepimage  
File = /cdrom  
File = /automount  
File = /Network  
File = /.vol
```

@include

```
FileSet {  
    Name = "ms-set"  
    Include {  
        Options {  
            signature = MD5  
            compression = gzip  
        }  
        File = /  
        File = /boot  
        File = /var  
    }  
    Exclude {  
        @/etc/bacula/default-fs-excludes-linux.inc  
        File = /home/michael/tv-temp  
    }  
}
```

sed!

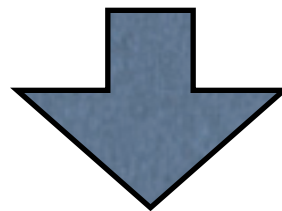
- Include erlaubt auch Piping
- Programme aufrufen, welche Config ausspucken

Beispiel

```
@"|sed 's/%name/macbook/g;s/%address/macbook/g;s/%ret/2 weeks/g;s/%pass/foo/g'  
/etc/bacula/default-client.inc"
```

/etc/bacula/default-client.inc:

```
Client {  
    Name = %name-fd  
    Address = %address  
    FdPort = 9102  
    Catalog = MyCatalog  
    Password = "%pass"  
    File Retention = %ret  
    Job Retention = %ret  
    AutoPrune = yes  
}
```



```
Client {  
    Name = macbook-fd  
    Address = macbook  
    FdPort = 9102  
    Catalog = MyCatalog  
    Password = "foo"  
    File Retention = 2 weeks  
    Job Retention = 2 weeks  
    AutoPrune = yes  
}
```

bconsole

- Sobald bacula läuft (oder vermeintlich läuft) kann man den Director mit bconsole steuern
- Jobs anstoßen
- Konfiguration/Fehlermeldungen anzeigen
- Volumes erstellen ("labeln")
- Volumes anzeigen

bconsole

1000 OK: fs-dir Version: 2.2.8 (26 January 2008)

Enter a period to cancel a command.

*list media pool=codebox

Automatically selected Catalog: MyCatalog

Using Catalog "MyCatalog"

MediaId	VolumeName	VolStatus	Enabled	VolBytes	VolFiles	VolRetention	Recycle	Slot	InChanger	MediaType	LastWritten
86	codebox-1	Used	1	56,244,147,021	13	1,209,600	1	0	0	File	2008-03-15 18:05:46
87	codebox-2	Used	1	121,969,626	0	1,209,600	1	0	0	File	2008-03-16 13:42:10
88	codebox-3	Used	1	1,431,613,063	0	1,209,600	1	0	0	File	2008-03-17 13:43:21
89	codebox-4	Used	1	83,886,597	0	1,209,600	1	0	0	File	2008-02-22 12:05:49
90	codebox-5	Used	1	53,484,837,446	12	1,209,600	1	0	0	File	2008-02-23 14:45:45
91	codebox-6	Used	1	128,840,196	0	1,209,600	1	0	0	File	2008-02-24 12:13:36
92	codebox-7	Used	1	261,912,090	0	1,209,600	1	0	0	File	2008-02-25 18:14:54
93	codebox-8	Used	1	74,119,437	0	1,209,600	1	0	0	File	2008-02-26 15:28:06
94	codebox-9	Used	1	114,766,820	0	1,209,600	1	0	0	File	2008-02-27 12:12:26
95	codebox-10	Used	1	862,999,094	0	1,209,600	1	0	0	File	2008-02-28 18:15:20
96	codebox-11	Used	1	621,090,430	0	1,209,600	1	0	0	File	2008-02-29 12:13:25
97	codebox-12	Used	1	2,610,766,587	0	1,209,600	1	0	0	File	2008-03-10 13:47:01
98	codebox-13	Used	1	91,799,334	0	1,209,600	1	0	0	File	2008-03-14 07:42:36
99	codebox-14	Used	1	512,138,117	0	1,209,600	1	0	0	File	2008-03-11 18:16:49
100	codebox-15	Used	1	281,010,354	0	1,209,600	1	0	0	File	2008-03-12 11:11:55
101	codebox-16	Used	1	96,331,418	0	1,209,600	1	0	0	File	2008-03-13 16:42:30

You have messages.

*

labeln

= metadaten in das Volume schreiben

```
*label
The defined Storage resources are:

    9: fs-storage

Select Storage resource (1-11): 9
Enter new Volume name: fs-9
Defined Pools:

    3: fs

Select the Pool (1-12): 3
Connecting to Storage daemon fs-storage ...
Sending label command for Volume "fs-9" Slot 0 ...
3000 OK label. VolBytes=184 DVD=0 Volume="fs-9" Device="fs-files" (/raid/fs)
Catalog record for Volume "fs-9", Slot 0 successfully created.
Requesting to mount fs-files ...
3906 File device "fs-files" (/raid/fs) is always mounted.
*█
```

```
*restore
```

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): 5

Defined Clients:

- 1: codebox-fd
- 2: fs-fd
- 3: srv23-fd
- 4: xekskami-fd
- 5: ibook-fd
- 6: tv-fd
- 7: ms-fd
- 8: fs-system-fd
- 9: codebox-vmware-fd
- 10: bonidea-fd

Select the Client (1-10): 7

Automatically selected FileSet: ms-set

JobId	Level	JobFiles	JobBytes	StartTime	VolumeName
927	F	683,389	6,780,524,440	2008-03-19 01:00:02	ms-3
932	I	181	21,074,585	2008-03-20 01:00:02	ms-4

You have selected the following JobIds: 927,932

Building directory tree for JobId 927 ... ++++++

Building directory tree for JobId 932 ...

2 Jobs, 662,827 files inserted into the tree.

You are now entering file selection mode where you add (mark) and remove (unmark) files to be restored. No files are initially added, unless you used the "all" keyword on the command line.
Enter "done" to leave this mode.

cwd is: /

\$

```

cwl is: /
$ ls

.bash_history
bin/
boot/
cdrom
dev/
etc/
home/
keyfile.usr3
lib/
opt
root/
sbin/
srv
usr/
usr2/
usr3
var/
$ mark
No files marked.
$ mark .
No files marked.
$ mark *
679,145 files marked.
$ done
Bootstrap records written to /var/lib/bacula/fs-dir.restore.1.bsr

The job will require the following
Volume(s)                Storage(s)                SD Device(s)
=====
ms-3                      ms-storage                ms-files
ms-4                      ms-storage                ms-files

679,145 files selected to be restored.

Run Restore job
JobName:      RestoreFiles
Bootstrap:    /var/lib/bacula/fs-dir.restore.1.bsr
Where:        /tmp/bacula-restores
Replace:      always
FileSet:      codebox-set
Backup Client: ms-fd
Restore Client: ms-fd
Storage:      ms-storage
When:         2008-03-20 02:20:15
Catalog:      MyCatalog
Priority:      10
OK to run? (yes/mod/no): █

```

Flexible Jobs

```
Job {  
    Name = "%name"  
    Type = Backup  
    Client = %name-fd  
    FileSet = "%name-set"  
    Schedule = "%name-sched"  
    Storage = %name-storage  
    Messages = Standard  
    Priority = 10  
    Write Bootstrap = "/raid/%name/bootstrap"  
    Pool = %name  
    Rerun Failed Levels = yes  
    Reschedule On Error = yes  
    Reschedule Interval = 1 hour  
    Reschedule Times = 10  
}
```

Flexible Jobs (Log)

```
- 5/69: Bacula          Bacula: Backup OK of codebox-fd Incremental -- (82%)
Retrying ...
17-Mar 12:14 fs-dir JobId 920: Warning: bsock.c:123 Could not connect to Client: codebox-fd on codebox:9102. ERR=No
route to host
Retrying ...
17-Mar 12:20 fs-dir JobId 920: Warning: bsock.c:123 Could not connect to Client: codebox-fd on codebox:9102. ERR=No
route to host
Retrying ...
17-Mar 12:27 fs-dir JobId 920: Warning: bsock.c:123 Could not connect to Client: codebox-fd on codebox:9102. ERR=No
route to host
Retrying ...
17-Mar 12:30 fs-dir JobId 920: Fatal error: bsock.c:129 Unable to connect to Client: codebox-fd on codebox:9102.
ERR=No route to host
17-Mar 12:30 fs-dir JobId 920: Error: Bacula fs-dir 2.2.8 (26Jan08): 17-Mar-2008 12:30:23
Build OS:          i686-pc-linux-gnu gentoo
JobId:             920
Job:               codebox.2008-03-17_06.00.06
Backup Level:      Incremental, since=2008-03-16 13:30:13
Client:            "codebox-fd" 2.0.3 (06Mar07) x86_64-pc-linux-gnu,gentoo,
FileSet:           "codebox-set" 2007-08-17 06:00:00
Pool:              "codebox" (From Job resource)
Storage:           "codebox-storage" (From Job resource)
Scheduled time:    17-Mar-2008 06:00:00
Start time:        17-Mar-2008 12:00:23
End time:          17-Mar-2008 12:30:23
Elapsed time:      30 mins
Priority:           10
FD Files Written:  0
SD Files Written:  0
FD Bytes Written:  0 (0 B)
SD Bytes Written:  0 (0 B)
Rate:              0.0 KB/s
Software Compression: None
VSS:               no
Storage Encryption: no
q:Exit  -:PrevPg  <Space>:NextPg v:View Attachm.  d:Del  r:Reply  j:Next ? :Help
```