Welcome to the

Introduction Workshop

Agenda

1. Setup a virtual machine
2. Introduction of Hosts and Attendees
3. Install Bareos
4. Install Bareos-WebUI
5. Introduce Bareos Architecture
6. Introduce Bareos Configuration
7. Addressing, Passwords, Names
8. Working with Bareos
9. Working with Bareos-WebUI
10. Exercises
11. Open Talk

Setup Virtual Machine

- first steps
  - Make sure you have VirtualBox installed
  - Connect your laptop to the network
  - get DHCP address

Unpack and import into virtualbox the Appliance of your choice

- Debian 8
- CentOS 7

Import appliance

1. Start Virtualbox
2. File .. Import Appliance
3. Choose **.ova**

Introduction of the hosts

- Frank Berkgkemper
  - main programmer of bareos WebUI
- Jörg Steffens
  - founder of bareos
  - new configuration Scheme and API
- Philipp Storz
  - founder of bareos
  - programming and coordination

Introduction of attendees

- Please tell us your
  - name
  - organization
  - experience with bareos

Create teams

- two persons
- can solve tasks together

login information

- Username: **root** / **bareos**
- Password: **bareos**

configure keyboard

configure individual hostname

- edit **/etc/hostname**
- edit **/etc/hosts**
- reboot

Take a snapshot

- Take a snapshot of the vm
  - If things go wrong, you can always go back
- configure/check Network:
  - NAT

Installation of Bareos

- http://doc.bareos.org
  - chapter 2: Installing Bareos
    - Use http://download.bareos.org/bareos/release/16.2/
    - Use Database of your choice

Index of /bareos/release/16.2

Name	Last modified	Size	Description
Parent Directory		-	16.2 Release Candidate 1
CentOS_5/	24-Sep-2016 12:11	-	16.2 Release Candidate 1
CentOS_6/	24-Sep-2016 12:11	-	16.2 Release Candidate 1
CentOS_7/	24-Sep-2016 12:11	-	16.2 Release Candidate 1
Debian_7.0/	23-Sep-2016 19:22	-	16.2 Release Candidate 1
Debian_8.0/	23-Sep-2016 20:10	-	16.2 Release Candidate 1
Fedora_23/	24-Sep-2016 12:11	-	16.2 Release Candidate 1
Fedora_24/	24-Sep-2016 12:11	-	16.2 Release Candidate 1
RHEL_5/	24-Sep-2016 12:11	-	16.2 Release Candidate 1
RHEL_6/	24-Sep-2016 12:11	-	16.2 Release Candidate 1
RHEL_7/	24-Sep-2016 12:11	-	16.2 Release Candidate 1
SLE_11_SP4/	24-Sep-2016 12:11	-	16.2 Release Candidate 1

Installation: Packages

- Add Repository
- Install Packages

Installation: Prepare Database

- create_bareos_database
- make_bareos_tables
- grant_bareos_privileges

Installation: Start the Daemons

- systemctl start bareos-dir
- systemctl start bareos-sd
- systemctl start bareos-fd

Installation: Basic Tests

- start bconsole
  - status director
  - status storage
  - status client

Installation: SUCCESS

- What did we do?
  - added the repository
  - installed the bareos software
  - started the daemons
  - checked daemons are running

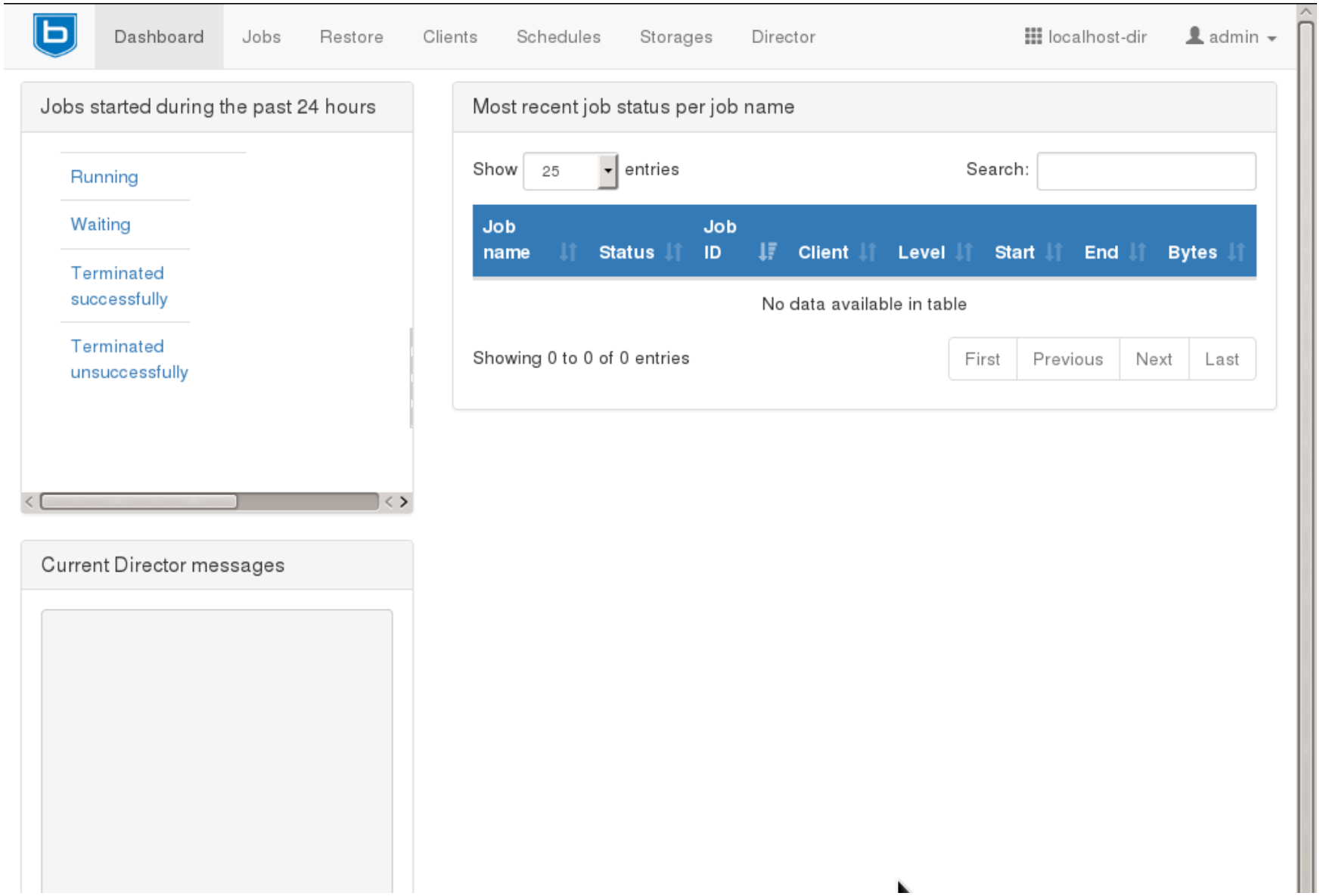
Installation Bareos-Webui

- http://doc.bareos.org
  - 3: Installing Bareos Webui
    - yum install bareos-webui
    - apt-get install bareos-webui

Bareos-Webui: restricted console

```
* configure add console name=admin password=secret profile=webui-admin
* show consoles
* /etc/bareos/bareos-dir.d/console/admin.conf:
Console {
     Name = admin
     Password = secret
     Profile = webui-admin
}
```

Webui: First Login

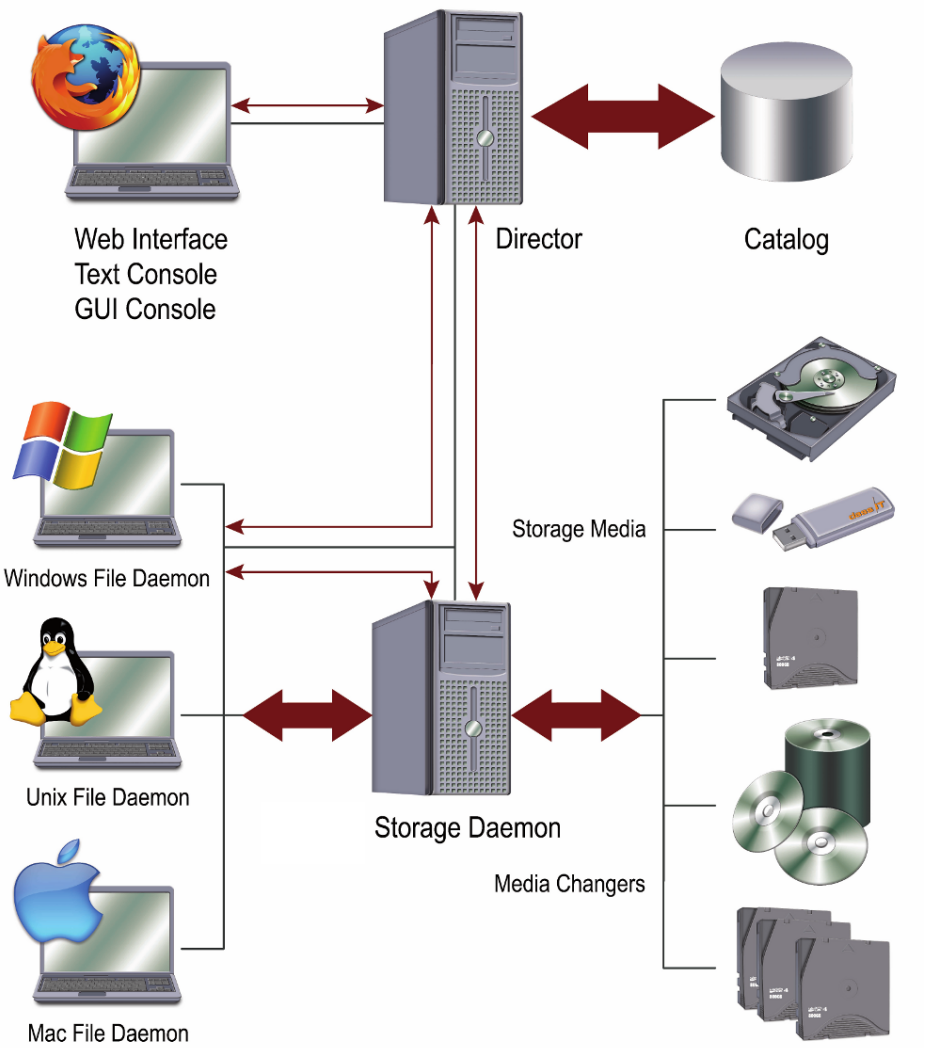


Bareos-Webui: Watch out!

- CentOS: Selinux needs
  - **setsebool -P httpd_can_network_connect on**

Bareos Architecture

- Communication via TCP/IP
- defined ports are used
- communication can use TLS

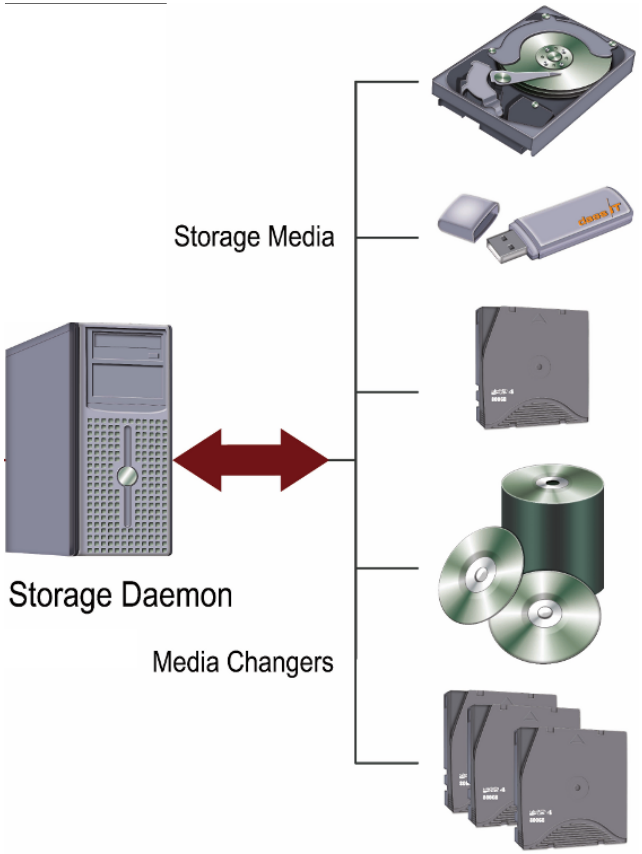


FileDaemon

- Runs on Client Computer
- read, write, verify files
- read, write ACLs, attributes
- make VSS snapshots
- checksum calculation
- compression/encryption
- run scripts

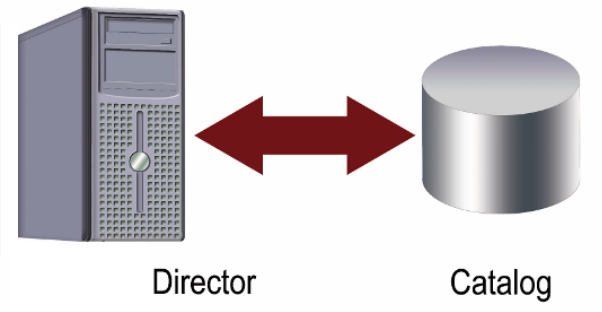
Storage Daemon

- device access (disk, tape)
- media changer control
- read barcodes labels
- write logical labels
- run copy and migration jobs
- handle media errors



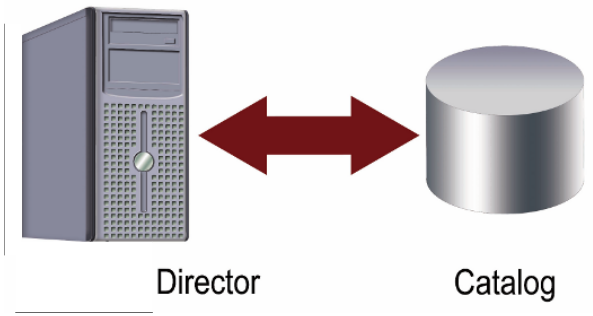
Director

- handle catalog
- media and pool handling
- scheduling
- determine what to backup
- backup level
- does message, statistics and reports
- run scripts

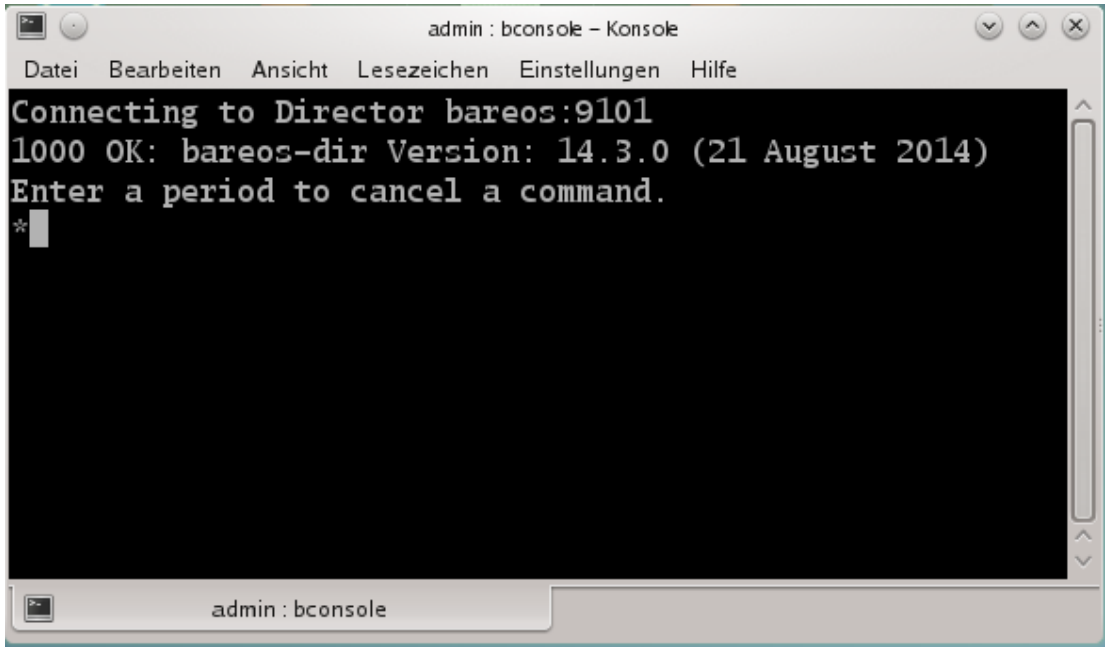


Catalog

- store info about all files, media, jobs
- PostgreSQL/MySQL/SQLite DB



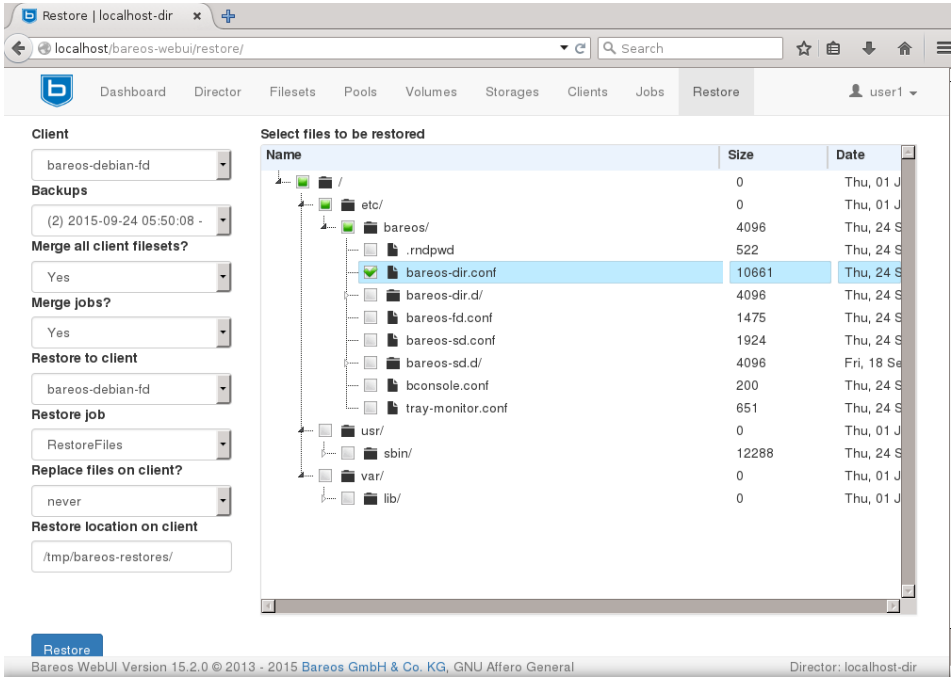
bconsole



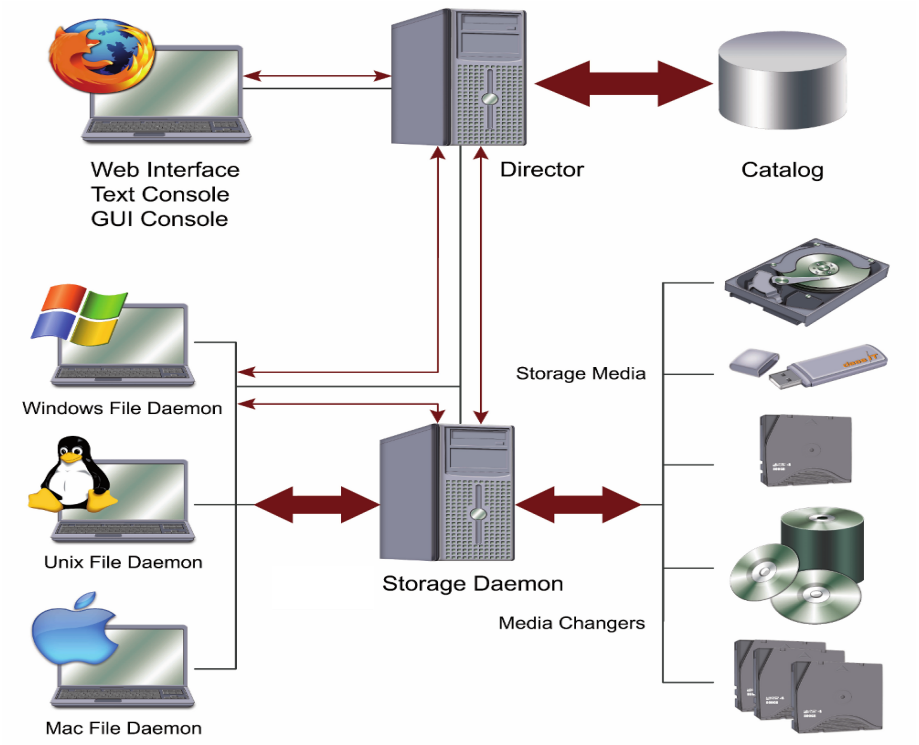
- UI for restores
- query status
- catalog queries
- run jobs

Bareos WebUI

- Resource Information
- Backup
- Restore
- Statistics
- Errors
- NO DB connection



Bareos Architecture



Architecture Test

- which bareos daemon schedules the backups?
- where is the administrative data stored?
- which bareos daemon reads and writes files on the client?
- which bareos daemon handles media?

Bareos Configuration

- Configuration is done in config files
- Each daemon has its own config directory
- usually in ***/etc/bareos/[daemon].d/[resource]/***
  - */etc/bareos/bareos-dir.d/*
  - */etc/bareos/bareos-fd.d/*
  - */etc/bareos/bareos-sd.d/*
- bconsole:
  - */etc/bareos/bconsole.conf*

Bareos configuration syntax

- Configuration files consist of
  - resources
  - directives
- resources can have subresources

```
resourcename {
  directive = value
  directive = value
    SubResource {
      directive = value
      directive = value
  }
}
```

Most important Director Resources:

- Director
- Fileset
- Schedule
- Client
- Job

Director Resource: Definition of Directors' properties

```
Director {                            # define myself
  Name = bareos-dir
  QueryFile = "/usr/lib/bareos/scripts/query.sql"
  Maximum Concurrent Jobs = 1
  Password = "UbCeWuuamTN/FNQhNH7rbdmx8X+ra9j0UkMMrSdUmkO4"         # Con
  Messages = Daemon

  # remove comment in next line to load plugins from specified directory
  # Plugin Directory = /usr/lib64/bareos/plugins
}
```

FileSet: Definition what to backup

```
FileSet {
  Name = "Full Set"
  Include {
    Options {
      signature = MD5
    }
    File = /usr/sbin
  }
```

Schedule: Definition when to run a backup

```
Schedule {
  Name = "WeeklyCycle"
  Run = Full 1st sun at 23:05
  Run = Differential 2nd-5th sun at 23:05
  Run = Incremental mon-sat at 23:05
}
```

Client: Definition of a Client

```
Client {
  Name = bareos-fd
  Address = bareos
  Password = "lecCqzgBjxgM0J3+1adiuLzhy0cPGIHrdYMdtGHMbvKX"          # pa
  File Retention = 30 days            # 30 days
  Job Retention = 6 months            # six months
  AutoPrune = no                      # Prune expired Jobs/Files
}
```

Job: Definition of a Job

- combines the other resources to a runnable backup job

```
Job {
  [...]
  Client = bareos-fd        # what client to backup?
  FileSet = "Full Set"      # which files to backup?
  Schedule = "WeeklyCycle" # when to backup?
  Storage = File            # where to backup?
  Messages = Standard       # where to send messages?
  Pool = File               # what target pool?
}
```

Configuration Test

- which resource configures when a job is scheduled?
- which resource configures what files are backed up?
- which resource configures what client to backup?
- which resource combines the other resources?

Addresses, Passwords, Names

- Tricky for beginners
- Director is the boss
- Needs to know how to connect
- Needs to authenticate

Addresses, Passwords, Names

- Addressing via
  1. Address
  2. Port (usually default value is used
- Authentication via
  1. Name
  2. Password

Addresses, Passwords, Names

- Director knows of each daemon (Client, Storage)
  - connection info
    - Address
    - Port
  - authentication info
    - Name
    - Password

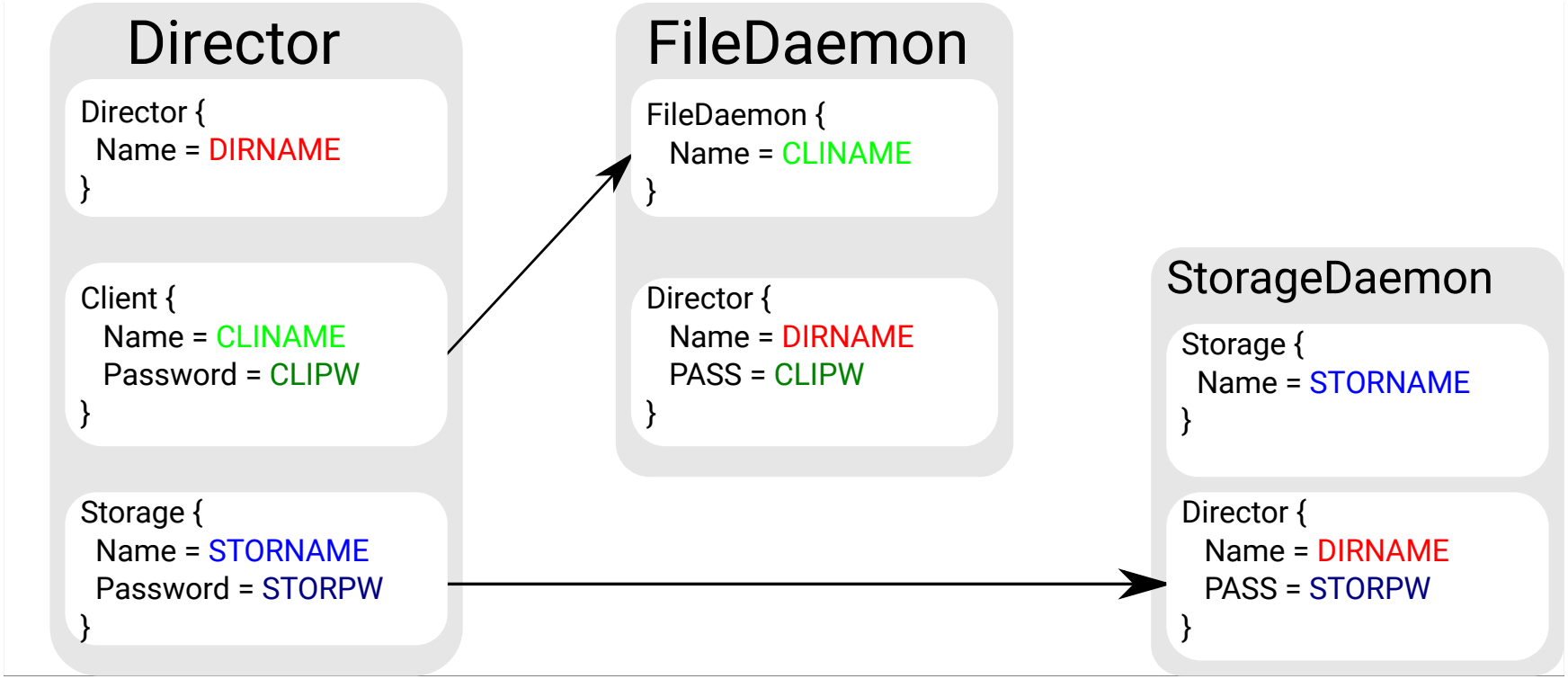
```
Client {
  Name = bareos-fd
  Address = bareos
  Password = "GfYPqgmav"
  [FDPort]
}
```

Addresses, Passwords, Names

- Each Daemon (Client/Storage) knows
  - authentication info
    - Director Name
    - Director Password

```
Director {
   Name = bareos-dir
   Password = "GfYPqgmav"
}
```

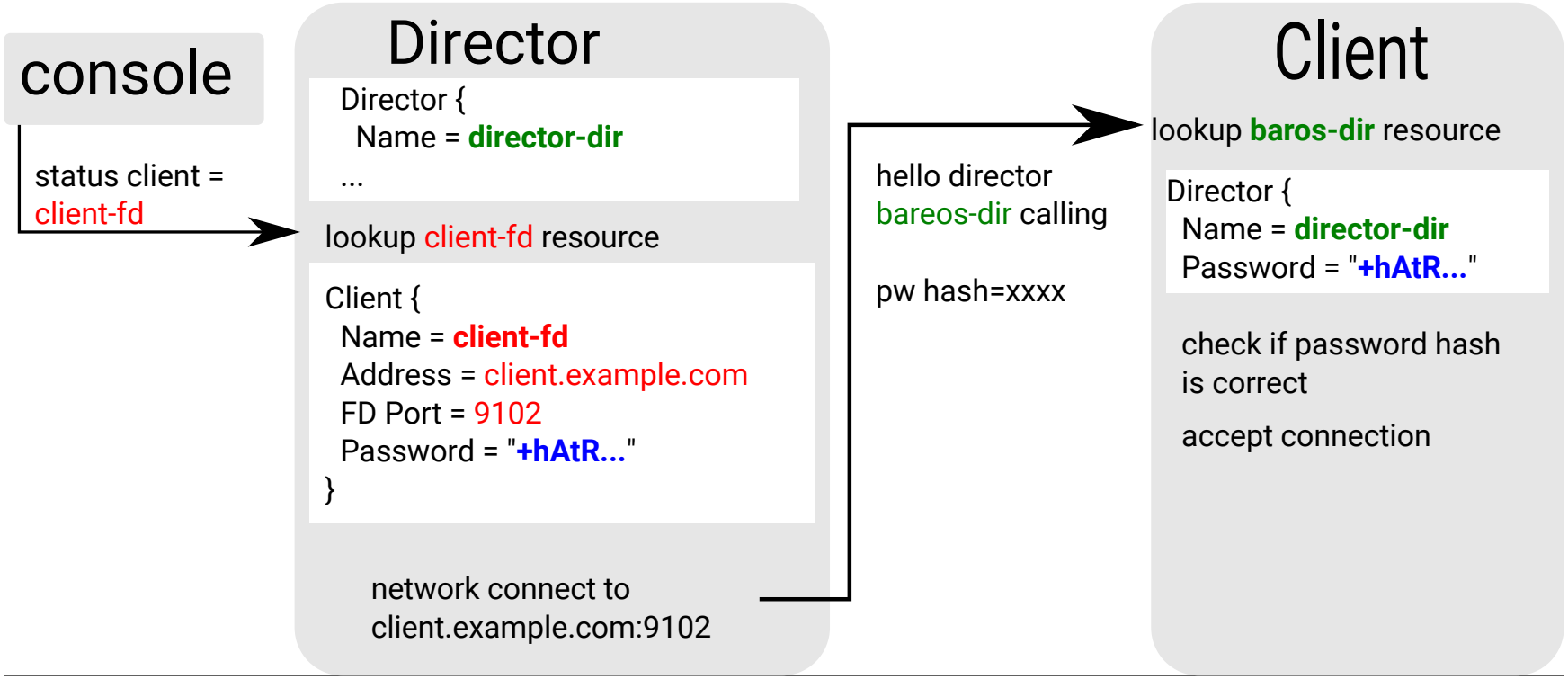
Names and Passwords



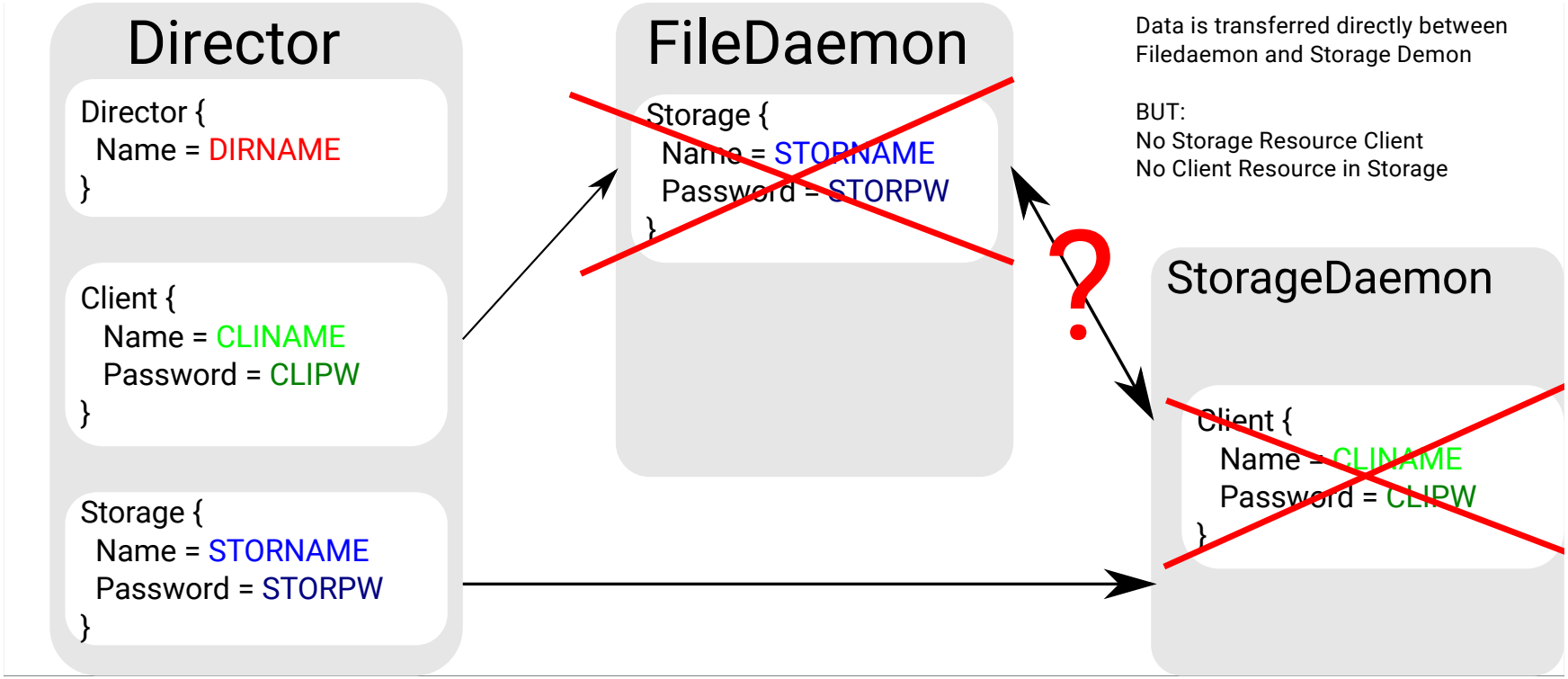
connection dir to fd

1. Lookup client's address in client resource
2. Connect to that address and port
3. Use name and password to authenticate

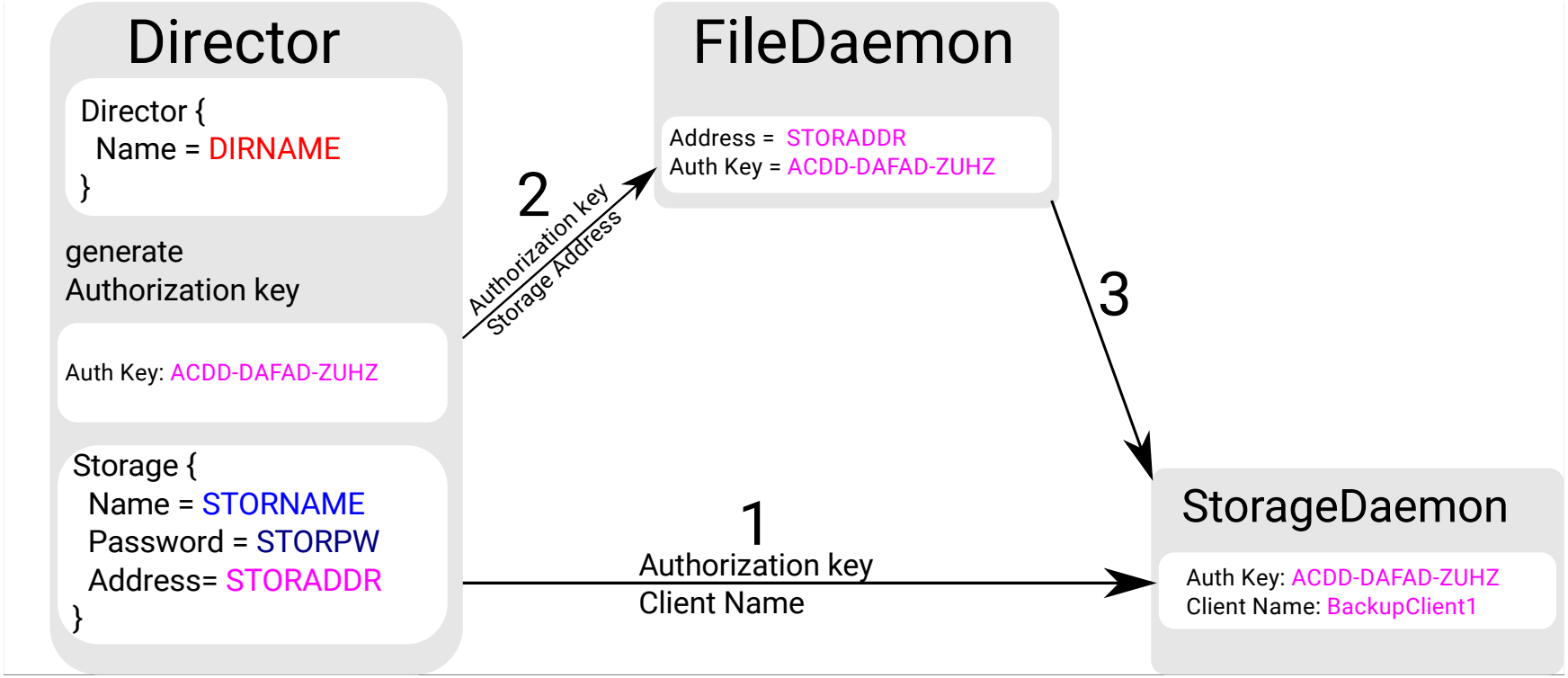
Example: director to fd connection:



What about the Data Channel?



active Client



start console

```
Connecting to Director localhost:9101
1000 OK: localhost-dir Version: 15.2.1 (24 August 2015)
Enter a period to cancel a command.
*
```

- execute **help**

estimate command

```
*estimate
The defined Job resources are:
     1: BackupClient1
     2: BackupCatalog
     3: RestoreFiles
     Select Job resource (1-3): 1
     Using Catalog "MyCatalog"
     Connecting to Client localhost-fd at localhost:9102
     2000 OK estimate files=576 bytes=53,164,275
```

estimate listing

```
*estimate listing
[..]
Using Catalog "MyCatalog"
Connecting to Client bareos-fd at bareos:9102
-rwxr-xr-x   1 root     root           13973 2014-09-17 15:15:46  /usr/sbin/g
-rw-r--r--   1 root     root             987 2014-09-17 15:15:46  /usr/sbin/e
lrwxrwxrwx   1 root     root              24 2014-09-18 14:22:29  /usr/sbin/h
[..]
-rwxr-xr-x   1 root     root           14768 2014-09-17 15:15:46  /usr/sbin/s
-rwxr-xr-x   1 root     root            1593 2014-09-17 15:15:46  /usr/sbin/g
drwxr-xr-x   2 root     root           12288 2014-09-18 14:22:29  /usr/sbin
2000 OK estimate files=310 bytes=18,987,521
```

run job **BackupClient1**

```
*run
Automatically selected Catalog: MyCatalog
Using Catalog "MyCatalog"
A job name must be specified.
The defined Job resources are:
     1: BackupClient1
     2: CopyToTape
     3: BackupCatalog
     4: RestoreFiles
Select Job resource (1-4): 1
Run Backup job
JobName:  BackupClient1
Level:    Incremental
Client:   bareos-fd
Format:   Native
FileSet:  Full Set
Pool:     File (From Job resource)
Storage:  File (From Job resource)
```

check status by looking for messages

```
*messages
18-Sep 17:16 bareos-dir JobId 1: No prior Full backup Job record found.
18-Sep 17:16 bareos-dir JobId 1: No prior or suitable Full backup found in cat
18-Sep 17:16 bareos-dir JobId 1: Start Backup JobId 1, Job=BackupClient1.2014-
18-Sep 17:16 bareos-dir JobId 1: Created new Volume "File-0001" in catalog.
18-Sep 17:16 bareos-dir JobId 1: Using Device "FileStorage" to write.
18-Sep 17:16 bareos-sd JobId 1: Labeled new Volume "File-0001" on device "File
18-Sep 17:16 bareos-sd JobId 1: Wrote label to prelabeled Volume "File-0001" o
18-Sep 17:17 bareos-sd JobId 1: Elapsed time=00:00:15, Transfer rate=1.267 M B
18-Sep 17:17 bareos-dir JobId 1: Bareos bareos-dir 14.3.0 (21Aug14):
  Build OS:               x86_64-suse-linux-gnu suse openSUSE 13.1 (Bottle) (x
  JobId:                  1
  Job:                    BackupClient1.2014-09-18_17.16.49_08
  Backup Level:           Full (upgraded from Incremental)
  Client:                 "bareos-fd" 14.3.0 (21Aug14) x86_64-suse-linux-gnu,s
  FileSet:                "Full Set" 2014-09-18 17:16:52
  Pool:                   "File" (From Job resource)
  Catalog:                "MyCatalog" (From Client resource)
```

restore files

```
*restore
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
[..]
5
[...]
You have selected the following JobId: 1

Building directory tree for JobId(s) 1 ...  ++++++++++++++++++++++++++++++++++
309 files inserted into the tree.
cwd is: /

$ find *
[...]
```

check restore

```
*mess
18-Sep 17:29 bareos-dir JobId 2: Start Restore Job RestoreFiles.2014-09-18_17.
18-Sep 17:29 bareos-dir JobId 2: Using Device "FileStorage" to read.
18-Sep 17:29 bareos-sd JobId 2: Ready to read from volume "File-0001" on devic
18-Sep 17:29 bareos-sd JobId 2: Forward spacing Volume "File-0001" to file:blo
18-Sep 17:29 bareos-dir JobId 2: Bareos bareos-dir 14.3.0 (21Aug14):
  Build OS:               x86_64-suse-linux-gnu suse openSUSE 13.1 (Bottle) (x
  JobId:                  2
  Job:                    RestoreFiles.2014-09-18_17.29.41_09
  Restore Client:         bareos-fd
  Start time:             18-Sep-2014 17:29:43
  End time:               18-Sep-2014 17:29:45
  Elapsed time:           2 secs
  Files Expected:         1
  Files Restored:         1
  Bytes Restored:         49,296
  Rate:                   24.6 KB/s
  FD Errors:              0
```

check in system:

```
$ find /tmp/bareos-restores/
/tmp/bareos-restores/
/tmp/bareos-restores/usr
/tmp/bareos-restores/usr/sbin
/tmp/bareos-restores/usr/sbin/mtx
```

bconsole test

- What command shows possible available commands?
- What command is used to show how much data a backup will contain, and how can the exact files be shown?
- What command is used to run a backup?
- What command is used to do a recover files?

Exercise 1

- BackupClient1 should additionally backup ***/etc***
  - Hint: *reload* command can be used to update dir configuration without new start

Solution for Exercise 1

1. Add line "File = /etc" to FileSet "SelfTest" in /etc/bareos-dir.d/fileset/SelfTest.conf
2. open bconsole and type "reload"
3. run "estimate listing" to see if /etc would be backed up
4. alternatively, run job "BackupClient1"

status command

- shows status of system components

status director

- shows next scheduled jobs

```
Scheduled Jobs:
Level          Type     Pri  Scheduled          Name               Volume
===================================================================================
Incremental    Backup    10  19-Sep-14 23:05    BackupClient1      File-000
Incremental    Copy      10  19-Sep-14 23:05    CopyToTape
Full           Backup    11  19-Sep-14 23:10    BackupCatalog      File-000
```

- shows running jobs

```
Running Jobs:
Console connected at 19-Sep-14 13:51
No Jobs running.
```

- show terminated jobs

```
Terminated Jobs:
 JobId  Level    Files      Bytes   Status   Finished        Name
====================================================================
     1  Full       310    18.98 M  OK       18-Sep-14 17:17 BackupClient1
     2                1    49.29 K  OK       18-Sep-14 17:29 RestoreFiles
```

status client

- shows runnig jobs on client

```
Running Jobs:
Director connected at: 19-Sep-14 13:54
No Jobs running.
====
```

- shows terminated jobs on client Terminated Jobs:

```
JobId  Level    Files      Bytes   Status   Finished        Name
====================================================================
    1  Full         310    18.98 M  OK       18-Sep-14 17:17 BackupClient1
    2                 1    49.29 K  OK       18-Sep-14 17:29 RestoreFiles
    3  Incr           0          0  OK       18-Sep-14 23:05 BackupClient1
====
```

- info comes from local status file
- can differ from director view as other director can also connect this client

status storage

- shows running jobs
- shows waiting jobs
- shows terminated jobs
- shows device status Autochanger "LTO-Changer" with devices:

```
  "Drive-1" (/dev/nst0)
```

  Device "FileStorage" (/var/lib/bareos/storage) is not open.
  Device "Drive-1" (/dev/nst0) is not open.

```
   Drive 0 is not loaded.
```

- shows volume status

```
Used Volume status:
====

====
```

status scheduler

- shows what jobs are triggered by which schedule

```
Schedule                Jobs Triggered
=========================================================
WeeklyCycle
                        BackupClient1
                        CopyToTape

WeeklyCycleAfterBackup
                        BackupCatalog
```

- shows a preview for 7 days

```
Scheduler Preview for 7 days:

Date                    Schedule                Overrides
=========================================================
Fri 19-Sep-2014 23:05  WeeklyCycle             Level=Increme
Fri 19-Sep-2014 23:10  WeeklyCycleAfterBackup  Level=Full
Sat 20-Sep-2014 23:05  WeeklyCycle             Level=Increme
Sat 20-Sep-2014 23:10  WeeklyCycleAfterBackup  Level=Full
[...]
```

Exercise 2

- Full Backup of Job BackupClient1 should be scheduled in 5 minutes

Solution for Exercise 2

1. Add line "Run = Full at 15:05" to Schedule "WeeklyCycle" in /etc/bareos/bareos-dir.d/schedule/WeeklyCycle.conf
2. open bconsole and type "reload"
3. run "status schedule schedule=WeeklyCycle" and check if schedule is updated
4. wait 5 minutes and check if backup starts

Exercise 3: backup partner's client

- Part 1: Configure link between director and client

Solution for Exercise 3 p.1

1. Add a client ressource to your director configuration pointing to your partner's client
2. Add a director ressource to your client's config pointing to your partner's director
3. Restart director and filedaemon
4. run status client to see if your partner's client is accessible

Exercise 3: backup partner's client

- Part 2: configure a backup job for partner's client

Solution for Exercise 3 p.2

1. Create a fileset to backup your partner's client
2. Create a job ressource to backup partner's client
3. Run backup of your partner's client
4. Run restore to your partner's client

Open talk

- your questions?
- other ideas:
  - Disaster recovery
  - usage of bls/bextract
  - check copy to tape setup in vm