

Bolometer R&D Computers

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<http://moller.physics.berkeley.edu/doc/CompManual.pdf>

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1 Majorana

Majorana is the data server. It stores and backs up all Bolometer R&D data.

IP		128.32.95.15
DNS		majorana.physics.berkeley.edu

1.1 Setup

Mount Point	Size	Comment
/boot	1G	Boot Directory
/	50G	Root Directory
/home	100G	User Directories
/tmp	5G	Temporary Directory, erased on every reboot.
/usr/local	50G	Centralized Scripts
/var	5G	Logs
/data0	476G	Stored on Same Disk as /home. Meant for processed non-raw data.
/data1	688G	Separate Disk. Meant for processed non-raw data.
/data2	688G	Two 750G disks RAID0. Meant for raw data.

1.2 Disks

Majorana contains 4 hard disks.

sda		750G		/boot, root, /home and /data0
sdb		750G		/data1
sdc		750G		RAID0 with sdd
sdd		750G		RAID0 with sdc

- All raw data should be stored on these disks mounted on /data2.
- All processed, reduced and analyzed data, generated plots, etc, should be stored on /data0 and /data1.

1.3 Data0

Presently, under /data0 is a directory

/data0/Fridge/

with two subdirectories Logs/ and Co60/.

Under Logs/ is a set of directories csv, root, txt and vcl. These contain the log files from the dilution refrigerator in various formats. In Logs/ are also a set

of directories named `log_DATE_TIME`. These directories contain the summary plots for each cool down.

The ‘`log_DATE_TIME`’ directories as well as the root and `txt` directories are generated, and thus stored locally in `/data0/Fridge/Logs/`. The `vcl` and `csv` directories are symlinks to directories stored on `/data2`.

In `/data0/Fridge/Co60/` is the processed Cobalt 60 temperature data.

1.4 Data2

`/data2` contains the Raw data. It is a RAID0, so it is mirrored onto two hard disks.

- `/data2/db`
Contains the data for the `pgsql` database, discussed later.
- `/data2/RawData/Logs/`
Contains the sub-directories
 - `mirror`
Which is a mirror of the data from the fridge computer.
 - `csv`
Which contains symlinks to the `csv` files in ‘`mirror`’. The primary difference here, is that spaces in the filenames are replaced with underscores.
 - `vcl`
Which contains symlinks to the `vcl` files in ‘`mirror`’.
- `/data2/RawData/Co60`
Contains the gzipped text files with the raw cobalt 60 data.

1.5 Database

There are (currently) 3 databases of interest on Majorana.

- `majorana`
A list of the raw data files on Majorana. Table contains, (Filename, Creation Date, Size, MD5 Sum).
- `mott`
A clone of the database from Mott which contains a list of the raw data files on Mott.
- `prova`
A clone of the Apollo database on Mott.

1.6 Batch Scripts

Majorana contains a set of batch scripts which automatically back up the other computers and update anything that needs updating. All batch scripts are run by the user 'bolord'. All batch scripts are contained in the directory /home/bolord/batch/. User 'bolord' contains a working copy of the bolometer R&D repositories in its home directory. Any executables are stored in /home/bolord/bin/ and are updated whenever the bolord repo is updated.

- **BackUpMott**
Automatically copies all raw data files from Mott. Specifically, it copies the remote directories listed in /data2/RawData/Mott/DirectoryList.lis.
- **BackUpCabibbo**
Automatically copies all csv and vcl files from Cabibbo.
- **batch_CSV2ROOT**
Automatically goes through the newly copied data from cabibbo. And generates the root files, txt files and summary plots.
- **UpdateFilesTable.py**
Automatically adds any new files to the psql database majorana.
- **DoEverything**
A batch script which automatically clones the databases from Mott. And then runs the above 4 scripts in order. In addition, each time it runs it logs into a file in /home/bolord/logs/Majorana/. Its this batch script that runs daily as a cronjob.
- **CreateFilesTable**
Automatically generates the psql database. Only needs to be run once to initialize the files table.

2 Moller

Moller is used as our web server.

IP	128.32.95.14
DNS	moller.physics.berkeley.edu

2.1 Setup

Mount Point	Size	Comment
/boot	485M	Boot Directory
/	50G	Root Directory
/home	806G	User Directories and User Web Pages
/tmp	5G	Temporary Directory, erased on every reboot.
/usr/local	50G	Centralized Scripts
/var	2G	Logs

User web pages are stored under the directories

`/home/a_sample_user/public_html/`

and can be accessed at

`http://moller.physics.berkeley.edu/~a_sample_user/`

Users all belong to the group ‘users’ and some users also belong to the group ‘bolord’ or ‘cuore’. There is also a user ‘bolord’ which has write access to most of the bolometer R&D files.

At boot, Moller starts up an autofs daemon which automatically mounts file systems from other computers when called. These automount directories are These directories are mounted only when they are accessed and will stay

Local Dir	RW/RO	Mounted Dir
<code>/mnt/data0</code>	RW	<code>majorana:/data0</code>
<code>/mnt/data1</code>	RW	<code>majorana:/data1</code>
<code>/mnt/data2</code>	RO	<code>majorana:/data2</code>

mounted for five minutes after the last time they were accessed. Then they will automatically dismount.

All central webpages are stored under `/home/html` and symlinked to from `/var/www/html`→`/home/html`. Most central webpage data is owned by user bolord.

2.2 Elog

The ELog is owned by root and maintained by the wordpress daemon. The data is stored in /home/html/elog. The elog can be edited from

<http://moller.physics.berkeley.edu/elog/>

2.3 Fridge Data

All the fridge data is stored and Majorana, but can be viewed from the web on Moller. The data is stored in /home/html/dr. Here you will find the symlinks

```
./csv   → /mnt/data0/Fridge/Logs/csv
./root  → /mnt/data0/Fridge/Logs/root
./txt   → /mnt/data0/Fridge/Logs/txt
./vcl   → /mnt/data0/Fridge/Logs/vcl
```

These point to the datafiles stored on majorana. There are also symlinks with the format 'log_DATE.TIME' which link to directories also in /mnt/data0/. Each log directory contains summary plots for that cool down.

You can access this webpage at

<http://moller.physics.berkeley.edu/dr/>

The csv, root, txt and vcl directories are all password protected via http, to make sure that the data is not publicly accessible.

2.4 Current Cryostat Status

The webpage

<http://moller.physics.berkeley.edu/cryo/>

contains a brief summary of the current status of the fridge. This data is completely separate from the logs collected in ./dr/. The program which manages this directory is stored in /usr/local/bin/cryostats_central.py and run every two minutes by a cronjob.

The program queries the fridge computer for the current status. The data is stored in /tmp/cryostat/ and is accessible to all moller users. The data stored is the current pressures, current temperatures, current status and the last 48 hours of temperatures as well as four plots of the previous 48 hours of temperature data. The main website, /home/html/cryo/ accesses this data and creates a simple web page to display it.

Since /tmp/cryostat/ is readable by all users, any user can create their own web page which accesses this data and displays whatever information they deem relevant.

2.5 Documentation

The website

<http://moller.physics.berkeley.edu/doc/>

contains the bolometer R&D documentation for much of the bolometer R&D software.

2.6 Bolord Source Code Repository

The website

<http://moller.physics.berkeley.edu/repos/>

contains the bolometer R&D software git repositories. And symlinks to `/home/bolord/repos/`.

3 Mott

Mott is the computer which collects data from the Fridge.

IP	169.229.38.232
DNS	mott.physics.berkeley.edu

3.1 Setup

Mount Point	Size	Comment
Disk 0 (250G)		
/boot	500M	Boot Directory
/	25G	Root Directory SL6 (64-bit)
/home	62G	User Directories (64-bit)
/usr/local	10G	Centralized Scripts (64-bit)
/var	5G	Logs (64-bit)
WINDOWS	100G	Windows Partition
Disk 1 (750G)		
/	50G	Root & Home Directories for Apollo (32-bit)
/data	639G	Data Directory

Mott has three bootable partitions. A windows partition on Disk0, a 64-bit version of Scientific Linux 6.2 on Disk0, and a 32-bit version of SL5.8 on Disk1.

Apollo requires National Instruments software, which requires a 32-bit OS with RAM limited to 4096M and PAE turned off. This is what's installed on Disk1. The reasoning behind putting it on its own disk is to make it portable.

Mott is backed up nightly to Majorana.

3.2 Windows

The windows partition contains LabView and programs which collect fast data from the PMTs when making measurements with the Cobalt thermometers. Other than that it is of little use.

3.3 Databases

Mott runs its own databases.

- mott
This database keeps track of raw data files contained on Mott.
- prova
These are the Apollo data bases.

3.4 National Instruments Hardware

Mott has two DAQs inside.

- One is the high frequency digitizers, capable of sampling up to 100 MHz. This digitizer has BNC plugs in the back of the computer. Presently, it is used for collecting Cobalt-60 data from the PMTs. It is used mostly in Windows, because of compatibility issues with the NI software and Linux.
- The other is the high resolution digitizer. This is held in a PXI crate, and contains some 36 Single channels or 18 diff channels. As well as analog out, digital in and digital out. It can be operated in the 32-bit Linux boot. And is mostly operated by Apollo.

3.5 Apollo

Apollo is the CUORE software. For installation on Mott, see the documentation.

4 Cabibbo

Cabibbo is the computer which controls the dilution refrigerator and logs all the fridge control data. It is a windows box, so needless to say, its not terribly powerful. But it has some upsides.

IP		169.229.38.141
DNS		cabibbo.physics.berkeley.edu

- For running the Fridge, see the fridge documentation at http://moller.physics.berkeley.edu/doc/cryo_manual.pdf
- Cabibbo is running an rsync server, that allows Majorana to pull data from it. For security purposes, only Majorana is allowed to access the rsync server.
- Cabibbo is running an rdesktop server. For security, only Moller is allowed in. In order to access the rdesktop server, you need to ssh into moller and then rdesktop into cabibbo.
- Cabibbo runs a script server for the fridge which can both query the status of and control the fridge. Again, for security, only Moller is allowed in.
- Cabibbo also runs a VNC server, when you can *monitor* the status of the fridge. But cannot control. This can be accessed by using an encrypted VNC viewer or at <http://cabibbo.physics.berkeley.edu:5800>. This is open to any computer, but requires the usual bolometer R&D password. Presently, it doesn't run under Google Chrome. This is a Java 64-bit/Chrome 32-bit issue.

5 Pauli

Pauli is a four core analysis machine. Its a dual boot computer, with Mathematica on the Windows side. Root, Geant4, and so forth. Its powerful. Use it.

IP	128.32.95.18
DNS	pauli.physics.berkeley.edu

5.1 Setup

Mount Point	Size	Comment
/boot	1G	Boot Directory
/	50G	Root Directory
/home	250G	User Directories
/usr/local	50G	Centralized Scripts
/data	688G	Data Directory

The following directories are also mounted as needed:

Local Dir	RW/RO	Mounted Dir
/mnt/data0	RW	majorana:/data0
/mnt/data1	RW	majorana:/data1
/mnt/data2	RO	majorana:/data2