Offline **A**nalysis **F**ramework

OAF

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Main Objective

- By Automatic Reports [AR] we mean here documents automatically generated on a regular basis from data stored in the Logging/Measurement DB.
- The basic principle would be daily Cron tasks, gathering, analysing and synthetizing Beam Instruments records in DB stored during the last 24h, and sending the corresponding summary reports automatically by mail to the corresponding experts or responsible.

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Disclaimer

- This tool will only look at what happened…
- It can only help us to:
  - Be aware that something went wrong in our instrument:
    - No usage
    - Bad usage
    - Over usage
    - Breakage…
  - Be aware that something is aging:
    - Calibration evolution
    - Status evolution…
- It will still be up to us to be proactive with this.

Anaconda & JPyPy:

- 125+ of the most popular Python packages for science, math, engineering, data analysis (NumPy, SciPy, Pandas, IPython, Matplotlib, Numba, Blaze, Bokeh..)
- Completely free - including for commercial use
- Cross platform on Linux, Windows, Mac
- Installs into a single directory and doesn't affect other Python installations on your system. Doesn't require root or local administrator privileges
- Spyder, Ipython
- We use Jpypy for java – python integration
- Installed on bdidev2

Panda & Spyder

Spyder (Python 2.7) (on cs-ccr-abbi4.cern.ch)

File Edit Search Source Run Debug Consoles Tools View Help

/afs/cern.ch/user/b/bkolad/AnacondaInstallation

Editor - /nfs/cs-ccr-nfsdev/vol1/u1/bkolad/PythonWorkspace/PandaExamples/Panda0.py

ClientExample.py | GetDataFromSnapshot.py | Panda0.py | Panda1.py | example.py

```
# -*- coding: utf-8 -*-
"""
Created on Mon Mar 23 11:01:00 2015

@author: bkolad
"""
from numpy import random
import pandas as pd

ts = pd.Series(random.randn(1000), index=pd.date_range('1/1/2000', periods=1000))

ts = ts.cumsum()

ts.plot()  #import matplotlib.pyplot as plt

print "hello"

from jpype import *
startJVM(getDefaultJVMPath(), "-ea", "-Djava.class.path=/tmp/Jpype/sample")
java.lang.System.out.println("Hello World!!")
shutdownJVM()
```

File explorer

Name	Size	Type	Date Modified
anaconda		Folder	4 Feb 2015 11:43:01
basd.py	230 bytes	py File	20 Mar 2015 10:06:55
file.csv	584 bytes	csv File	23 Mar 2015 15:51:46

IPython console

Console 13271/A

```
Portland         300.000000
San Francisco    366.666667
dtype: float64

In [2]: runfile('/nfs/cs-ccr-nfsdev/vol1/u1/bkolad/PythonWorkspace/PandaExamples/Panda0.py', wdir='/nfs/cs-ccr-nfsdev/vol1/u1/bkolad/PythonWorkspace/PandaExamples')
hello
```

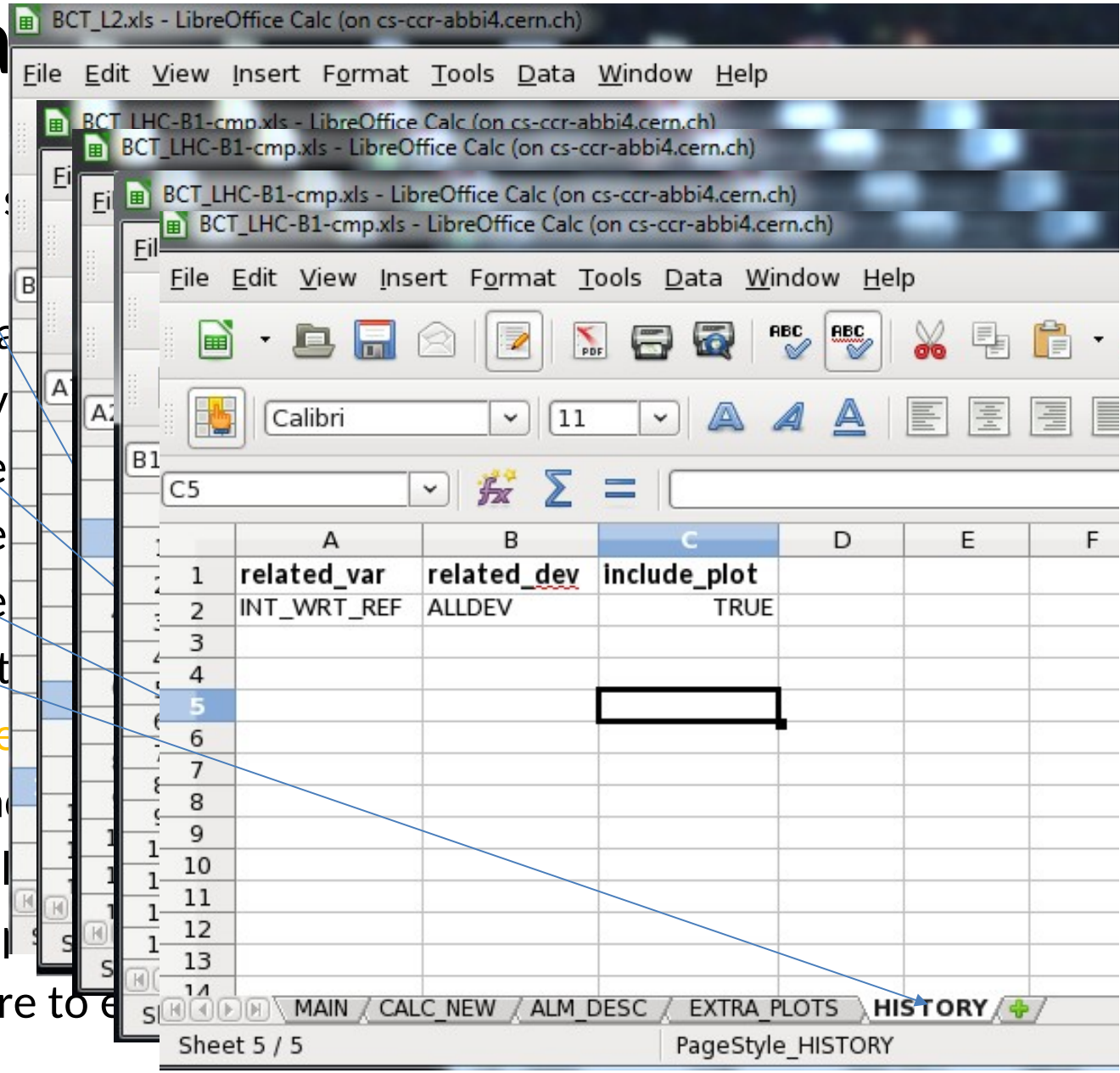

```
In [3]:
```

Console | IPython console | History log

Memory: 55 %

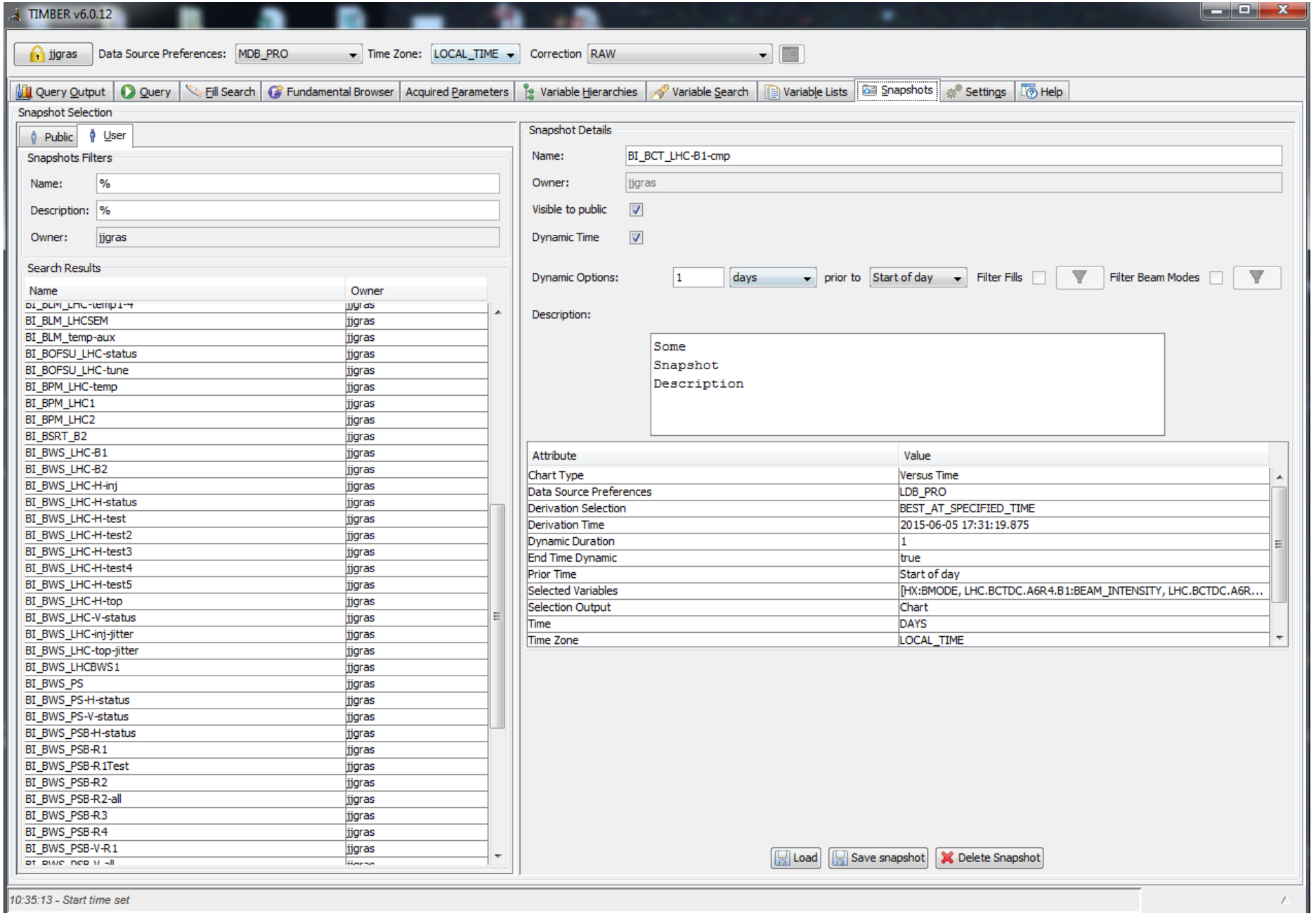
Main Fra

1. **extract_data**() # Get the
2. **compute_extra_data**() #
3. **make_front_figure**() # Ma
4. **analyse_alarms**() # Analy
5. **display_alarms**() # make
6. **make_dft_plots**() # make
7. **make_ext_plots**() # make
8. **make_histo**() # makes 'hist
9. **run_exp_code**() # run expe
10. **close_report**() # close an
11. **inform**() # send info mail
12. **show_plots**() # shows the
13. **clean_all**() # clean all before to e



- **Green**: Based on config file <inst>_<dataset>
- **Orange**: Under internal discussion. Not operational yet

Timber-Snapshots



Main Tools: Cron Tasks

- The tasks configured in cron task file will be executed sequentially.
- We have now cron task sequence executed every morning at 8:00. These are based on dynamic snapshot of DB data covering the full previous day
- We could have in addition cron task sequence executed every week or hours if useful…

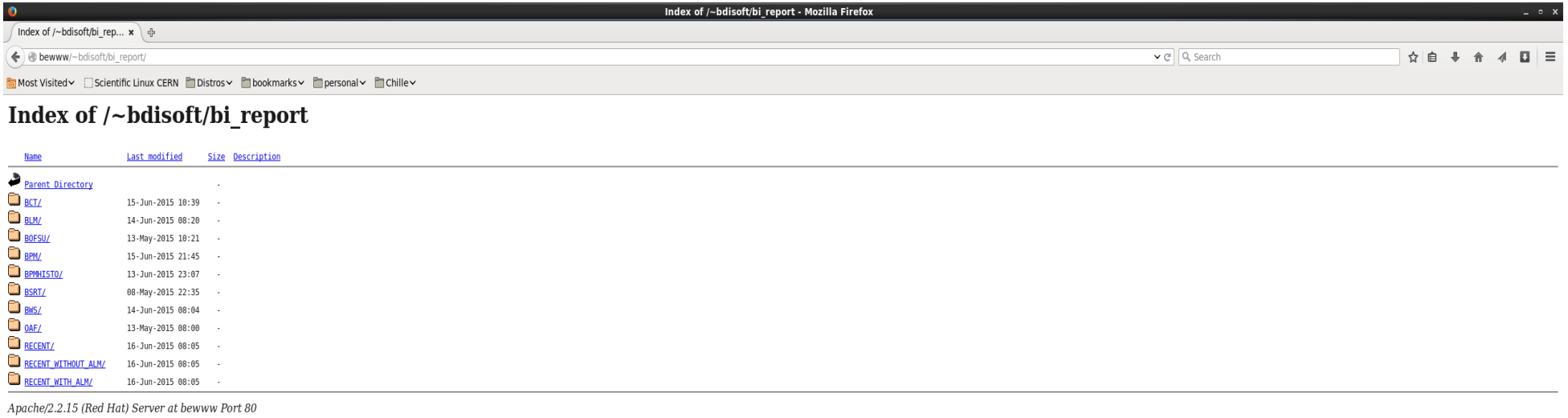
E20

	A	B	C	D	E	F	G	H
1	Instrument	Source	DataSet	UserId	email	DftPlot	ExpCode	
2	BCT	LDB	L2	jigras	TRUE	TRUE	None	
3	BCT	LDB	LHC-B1-cmp	jigras	TRUE	TRUE	None	
4	BCT	LDB	LHC-B2-cmp	jigras	TRUE	TRUE	None	
5	BWS	LDB	LHC-B1-cmp	jigras	TRUE	TRUE	None	
6	BWS	LDB	LHC-B2	jigras	TRUE	TRUE	None	
7	BWS	LDB	PS	jigras	TRUE	TRUE	None	
8	BWS	LDB	PSB-R1	jigras	TRUE	TRUE	None	
9	BWS	LDB	PSB-R2	jigras	TRUE	TRUE	None	
10	BWS	LDB	PSB-R3	jigras	TRUE	TRUE	None	
11	BWS	LDB	PSB-R4	jigras	TRUE	TRUE	None	
12	BWS	LDB	SPS-414	jigras	TRUE	TRUE	None	
13	BWS	LDB	SPS-416	jigras	TRUE	TRUE	None	

Main Tools:
Report Repository

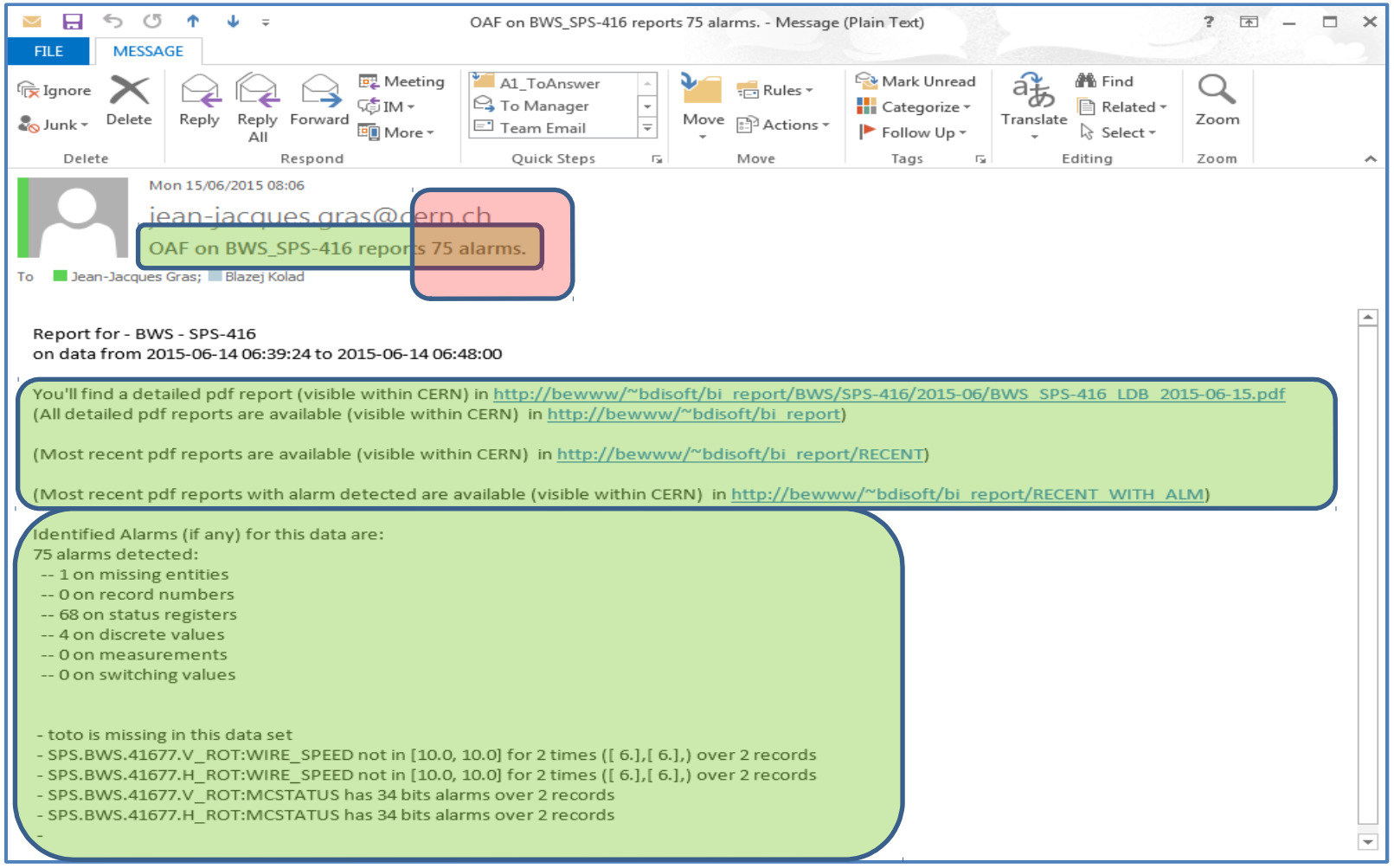
- Mail sent will contain in addition to a summary of the alarm report:
  - A link towards the new report
  - A link towards the repository where all reports are stored (http://bewww/~bdisoft/bi_report/)
  - A link towards the repository where most recent reports are referred (http://bewww/~bdisoft/bi_report/RECENT/)
  - A link towards the repository where most recent reports with alarms are referred (http://bewww/~bdisoft/bi_report/RECENT_WITH_ALM/)
  - A link towards the repository where most recent reports without alarms are referred (http://bewww/~bdisoft/bi_report/RECENT_WITHOUT_ALM/)

Main Tools:
Report Repository

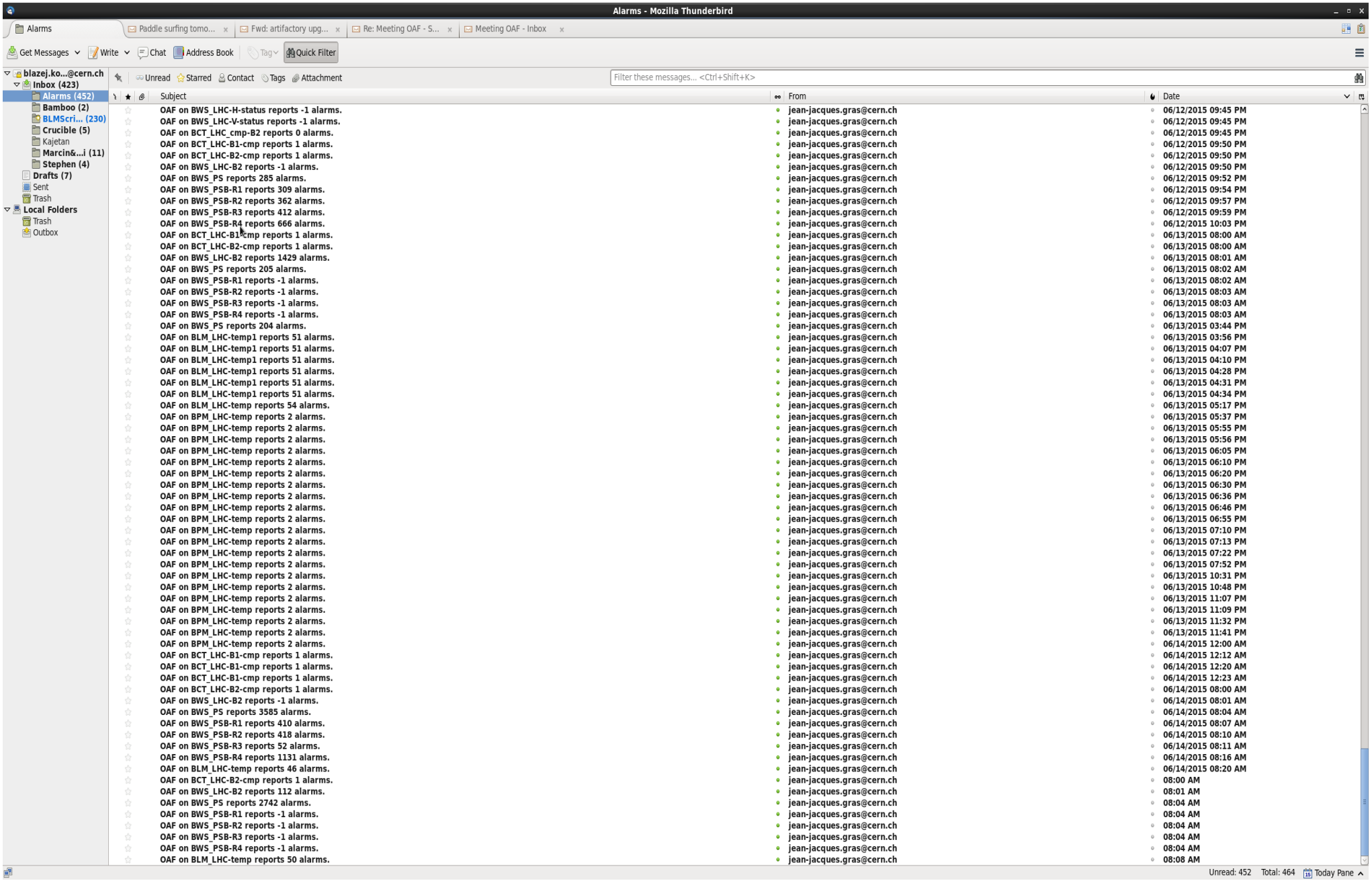


Main Tools: emailing

- Once report is done, informative email will be sent to configured recipient with link towards report and summary of alarms



It's working


Alarms - Mozilla Thunderbird
Alarms
Paddle surfing tomo...
Fwd: artifactory upg...
Re: Meeting OAF - S...
Meeting OAF - Inbox
Get Messages
Write
Chat
Address Book
Tag
Quick Filter
blazej.ko...@cern.ch
Inbox (423)
Alarms (452)
Bamboo (2)
BLMScri... (230)
Crucible (5)
Kajetan
Marcin&...i (11)
Stephen (4)
Drafts (7)
Sent
Trash
Local Folders
Trash
Outbox
Unread
Starred
Contact
Tags
Attachment
Filter these messages... <Ctrl+Shift+K>
Subject
From
Date
OAF on BWS_LHC-H-status reports -1 alarms. jean-jacques.gras@cern.ch 06/12/2015 09:45 PM
OAF on BWS_LHC-V-status reports -1 alarms. jean-jacques.gras@cern.ch 06/12/2015 09:45 PM
OAF on BCT_LHC_cmp-B2 reports 0 alarms. jean-jacques.gras@cern.ch 06/12/2015 09:45 PM
OAF on BCT_LHC-B1-cmp reports 1 alarms. jean-jacques.gras@cern.ch 06/12/2015 09:50 PM
OAF on BCT_LHC-B2-cmp reports 1 alarms. jean-jacques.gras@cern.ch 06/12/2015 09:50 PM
OAF on BWS_LHC-B2 reports -1 alarms. jean-jacques.gras@cern.ch 06/12/2015 09:50 PM
OAF on BWS_PS reports 285 alarms. jean-jacques.gras@cern.ch 06/12/2015 09:52 PM
OAF on BWS_PSB-R1 reports 309 alarms. jean-jacques.gras@cern.ch 06/12/2015 09:54 PM
OAF on BWS_PSB-R2 reports 362 alarms. jean-jacques.gras@cern.ch 06/12/2015 09:57 PM
OAF on BWS_PSB-R3 reports 412 alarms. jean-jacques.gras@cern.ch 06/12/2015 09:59 PM
OAF on BWS_PSB-R4 reports 666 alarms. jean-jacques.gras@cern.ch 06/12/2015 10:03 PM
OAF on BCT_LHC-B1-cmp reports 1 alarms. jean-jacques.gras@cern.ch 06/13/2015 08:00 AM
OAF on BCT_LHC-B2-cmp reports 1 alarms. jean-jacques.gras@cern.ch 06/13/2015 08:00 AM
OAF on BWS_LHC-B2 reports 1429 alarms. jean-jacques.gras@cern.ch 06/13/2015 08:01 AM
OAF on BWS_PS reports 205 alarms. jean-jacques.gras@cern.ch 06/13/2015 08:02 AM
OAF on BWS_PSB-R1 reports -1 alarms. jean-jacques.gras@cern.ch 06/13/2015 08:02 AM
OAF on BWS_PSB-R2 reports -1 alarms. jean-jacques.gras@cern.ch 06/13/2015 08:03 AM
OAF on BWS_PSB-R3 reports -1 alarms. jean-jacques.gras@cern.ch 06/13/2015 08:03 AM
OAF on BWS_PSB-R4 reports -1 alarms. jean-jacques.gras@cern.ch 06/13/2015 08:03 AM
OAF on BWS_PS reports 204 alarms. jean-jacques.gras@cern.ch 06/13/2015 03:44 PM
OAF on BLM_LHC-temp1 reports 51 alarms. jean-jacques.gras@cern.ch 06/13/2015 03:56 PM
OAF on BLM_LHC-temp1 reports 51 alarms. jean-jacques.gras@cern.ch 06/13/2015 04:07 PM
OAF on BLM_LHC-temp1 reports 51 alarms. jean-jacques.gras@cern.ch 06/13/2015 04:10 PM
OAF on BLM_LHC-temp1 reports 51 alarms. jean-jacques.gras@cern.ch 06/13/2015 04:28 PM
OAF on BLM_LHC-temp1 reports 51 alarms. jean-jacques.gras@cern.ch 06/13/2015 04:31 PM
OAF on BLM_LHC-temp1 reports 51 alarms. jean-jacques.gras@cern.ch 06/13/2015 04:34 PM
OAF on BLM_LHC-temp reports 54 alarms. jean-jacques.gras@cern.ch 06/13/2015 05:17 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 05:37 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 05:55 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 05:56 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 06:05 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 06:10 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 06:20 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 06:30 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 06:36 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 06:46 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 06:55 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 07:10 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 07:13 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 07:22 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 07:52 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 10:31 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 10:48 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 11:07 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 11:09 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 11:32 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/13/2015 11:41 PM
OAF on BPM_LHC-temp reports 2 alarms. jean-jacques.gras@cern.ch 06/14/2015 12:00 AM
OAF on BCT_LHC-B1-cmp reports 1 alarms. jean-jacques.gras@cern.ch 06/14/2015 12:12 AM
OAF on BCT_LHC-B1-cmp reports 1 alarms. jean-jacques.gras@cern.ch 06/14/2015 12:20 AM
OAF on BCT_LHC-B1-cmp reports 1 alarms. jean-jacques.gras@cern.ch 06/14/2015 12:23 AM
OAF on BCT_LHC-B2-cmp reports 1 alarms. jean-jacques.gras@cern.ch 06/14/2015 08:00 AM
OAF on BWS_LHC-B2 reports -1 alarms. jean-jacques.gras@cern.ch 06/14/2015 08:01 AM
OAF on BWS_PS reports 3585 alarms. jean-jacques.gras@cern.ch 06/14/2015 08:04 AM
OAF on BWS_PSB-R1 reports 410 alarms. jean-jacques.gras@cern.ch 06/14/2015 08:07 AM
OAF on BWS_PSB-R2 reports 418 alarms. jean-jacques.gras@cern.ch 06/14/2015 08:10 AM
OAF on BWS_PSB-R3 reports 52 alarms. jean-jacques.gras@cern.ch 06/14/2015 08:11 AM
OAF on BWS_PSB-R4 reports 1131 alarms. jean-jacques.gras@cern.ch 06/14/2015 08:16 AM
OAF on BLM_LHC-temp reports 46 alarms. jean-jacques.gras@cern.ch 06/14/2015 08:20 AM
OAF on BCT_LHC-B2-cmp reports 1 alarms. jean-jacques.gras@cern.ch 08:00 AM
OAF on BWS_LHC-B2 reports 112 alarms. jean-jacques.gras@cern.ch 08:01 AM
OAF on BWS_PS reports 2742 alarms. jean-jacques.gras@cern.ch 08:04 AM
OAF on BWS_PSB-R1 reports -1 alarms. jean-jacques.gras@cern.ch 08:04 AM
OAF on BWS_PSB-R2 reports -1 alarms. jean-jacques.gras@cern.ch 08:04 AM
OAF on BWS_PSB-R3 reports -1 alarms. jean-jacques.gras@cern.ch 08:04 AM
OAF on BWS_PSB-R4 reports -1 alarms. jean-jacques.gras@cern.ch 08:04 AM
OAF on BLM_LHC-temp reports 50 alarms. jean-jacques.gras@cern.ch 08:08 AM
Unread: 452
Total: 464
Today Pane

Coming Next

- New stuff, so expect bugs, missing features… but let give it a try and chance as is to cover correctly its first purpose (status and aging) before seeking for more (absolute perf assessment). JJ is available to discuss and implement your wishes for status/aging reports for this first stage. Probably a lot of useful things can already be done there.
- Possible complains from CO/DM due to our new activity on their DB.
  - We spoke to them. They are aware on our development and methods and will tell us first if they see issues coming on their side. They already also showed that they can help us when we share some interest on the request.
- Data extraction prevented by data size
  - CO/DM recognize a problem on their side preventing extraction when it should be possible. They are working on it. Some progress done already…
  - We should understand on our side that having a lot of details in the DB will slow down or even prevent useful automatic reporting. We should have a good understanding of all the DB configuration features and go for the good compromises.

The Next Steps

- Missing and foreseen features:
  - History features for easy long term monitoring on NUMERICS and VECTORNUMERICS
  - Handling of images (especially with dynamic dimensions)
  - Low resolution reports.
  - When aging/status reports will be properly covered by a stabilized framework, open the door (via a maintainable/efficient solution) to the configurable introduction of dedicated code by <instr/dataset> developed by expert…

Potential Extra Usage

- We could try also to use this tool ‘ONLINE’ during MD
  - We could define a short time (ie 15 mn) dynamic DB snapshot to look at the last 15 mn DB recording to check that things are going well
  - We could define before the MD a DB snapshot covering the entire MD time frame and play this snapshot during the MD to already see in realtime the data analysis we prepared before.

Reports..

ANNEXES

Main Framework Sequence: make_front_figure

Purpose:

Makes the report front pages with title, description of dataset, list of variables extracted…

Main Tools:
Naming Conventions

- In order to make things possible and a little organised, we used (and impose to work with OAF) the following naming conventions.
- Each set of data (not when, only what) will be identified by an <instrument ID> and a <data set ID>
- <dataSet ID> must not contain the '_' or ' ' caracters
- <instrument ID. Must belong to a predefined list that the OAF team is maintaining
- The corresponding Timber 'snapshot' (see later) must be 'Public' and called: **BI**_<instr ID>_<dataSet ID>

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Anaconda packages ...

```
_license                  1.1                      py34_0
abstract-rendering        0.5.1                 np19py34_0
anaconda                  2.2.0                 np19py34_0
argcomplete               0.8.4                    py34_0
astropy                   1.0.1                 np19py34_0
bcolz                     0.8.1                 np19py34_0
beautiful-soup            4.3.2                    py34_0
beautifulsoup4            4.3.2                     <pip>
binstar                   0.10.1                   py34_3
bitarray                  0.8.1                    py34_0
blaze                     0.7.3                     <pip>
blaze-core                0.7.3                 np19py34_0
blz                       0.6.2                 np19py34_0
bokeh                     0.8.1                 np19py34_1
boto                      2.36.0                   py34_0
certifi                   14.05.14                 py34_0
cffi                      0.9.2                    py34_0
clyent                    0.3.4                    py34_0
colorama                  0.3.3                    py34_0
conda                     3.10.0                   py34_0
conda-build               1.11.0                   py34_0
conda-env                 2.1.3                    py34_0
configobj                 5.0.6                    py34_0
cryptography              0.8                      py34_0
```

Anaconda packages ...

```
_license                  1.1                      py34_0
abstract-rendering        0.5.1                 np19py34_0
anaconda                  2.2.0                 np19py34_0
argcomplete               0.8.4                    py34_0
astropy                   1.0.1                 np19py34_0
bcolz                     0.8.1                 np19py34_0
beautiful-soup            4.3.2                    py34_0
beautifulsoup4            4.3.2                     <pip>
binstar                   0.10.1                   py34_3
bitarray                  0.8.1                    py34_0
blaze                     0.7.3                     <pip>
blaze-core                0.7.3                 np19py34_0
blz                       0.6.2                 np19py34_0
bokeh                     0.8.1                 np19py34_1
boto                      2.36.0                   py34_0
certifi                   14.05.14                 py34_0
cffi                      0.9.2                    py34_0
clyent                    0.3.4                    py34_0
colorama                  0.3.3                    py34_0
conda                     3.10.0                   py34_0
conda-build               1.11.0                   py34_0
conda-env                 2.1.3                    py34_0
configobj                 5.0.6                    py34_0
cryptography              0.8                      py34_0
```