CC-IN2P3 Contribution to DC2013

- Storage

- Computing

- Cloud

- Database

Rachid Lemrani
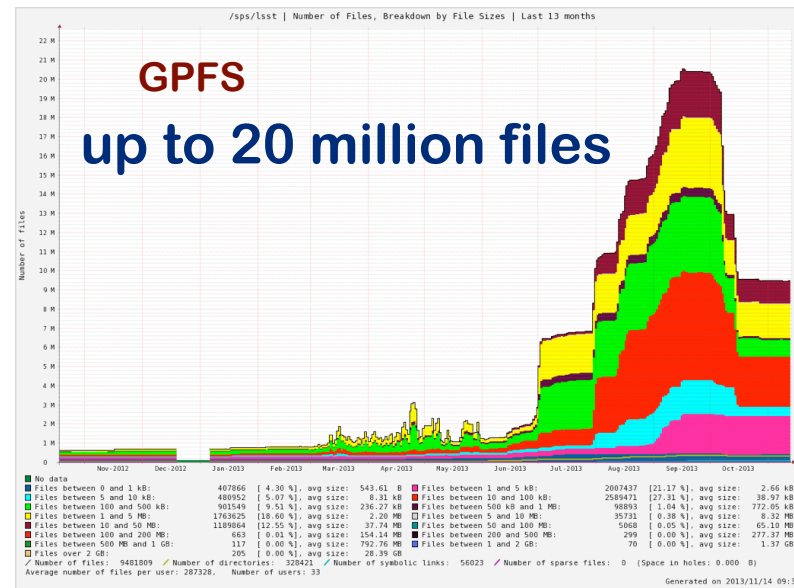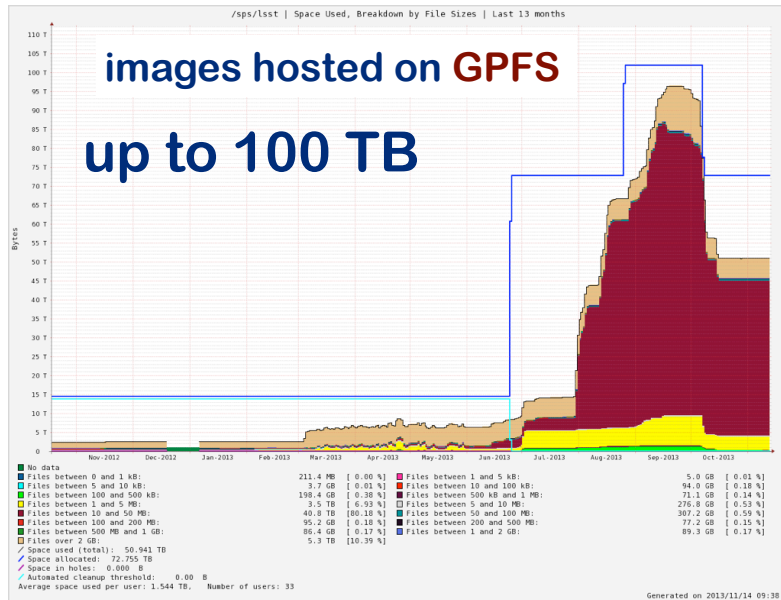*rachid.lemrani@cc.in2p3.fr*

LSST meeting - December 18th, 2013

l r f u

cea
saclay

Cnrs

DC-2013 : Storage

images hosted on GPFS

up to 100 TB

GPFS

up to 20 million files

**Some additional storage temporarily provided,
borrowed from other groups …**

➡ **Better anticipate the needs in the future**
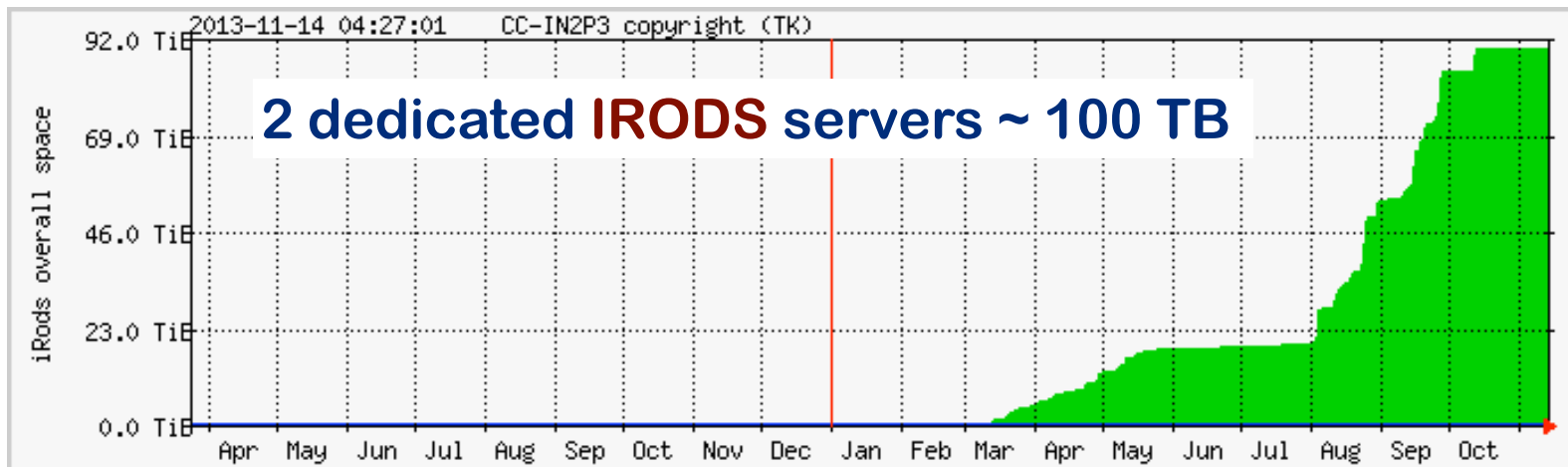
Currently > 8 M files on sps and > 1 M files on AFS

➡ **Reduce number of files / use only sps (not AFS) ?**

DC-2013 : IRODS

IRODS used for data transfers, data management

2 dedicated IRODS servers ~ 100 TB

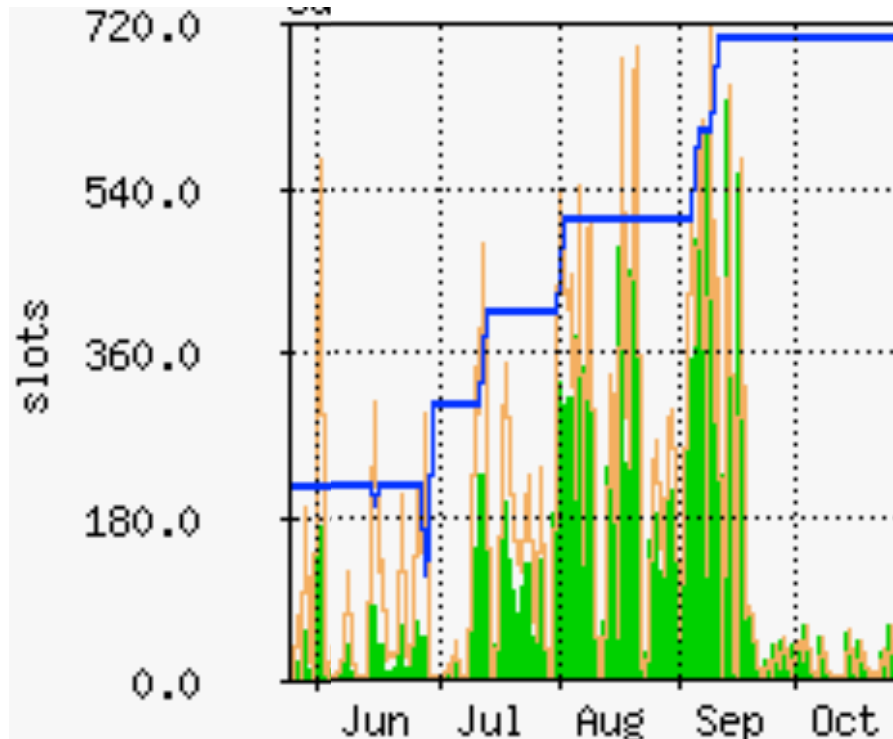**Need to use tapes and reduce disk space :**
➡ **IRODS/ HPSS interface**

Data management takes long :
➡ **(again) reduce number of files**

Number of jobs

← Up to 700 batch slots accessing /sps/lsst

all LSST jobs : 325 Khours
Data Challenge : 260 KHours

DC jobs submitted on dedicated batch project P_lsst_prod restricted to lsstprod
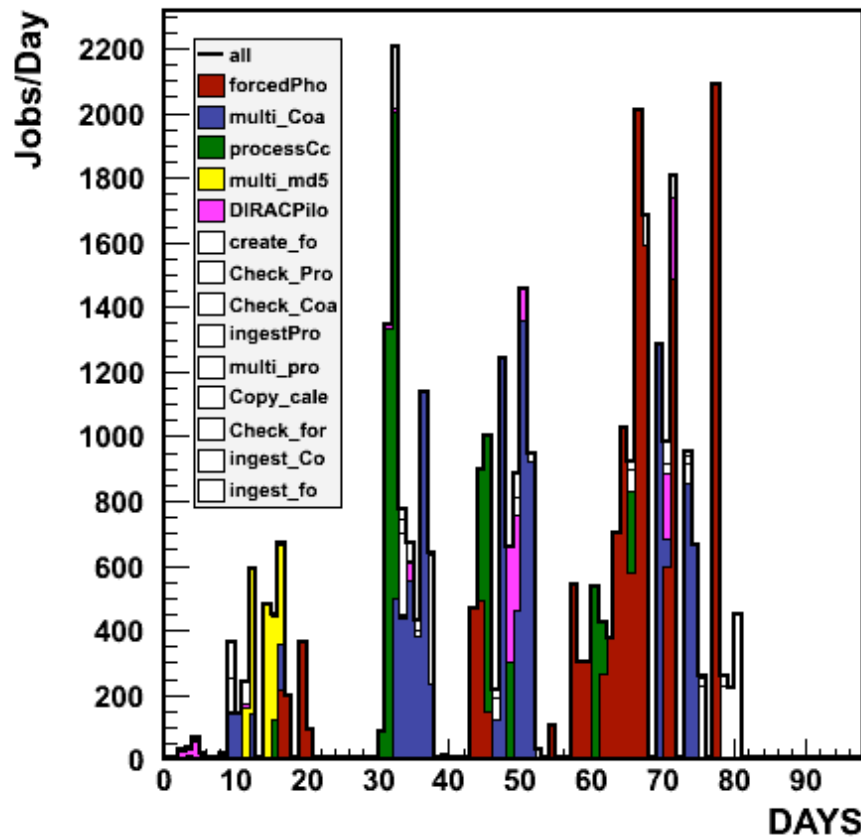
DC successfull jobs :
215 KHours wallclock
 92 KHours cpu

➡ 43% CPU efficiency

CCIN2P3

restricted to "lsstprod" jobs
that didn't fail : ~ 37 000 jobs

**Numerous types of jobs
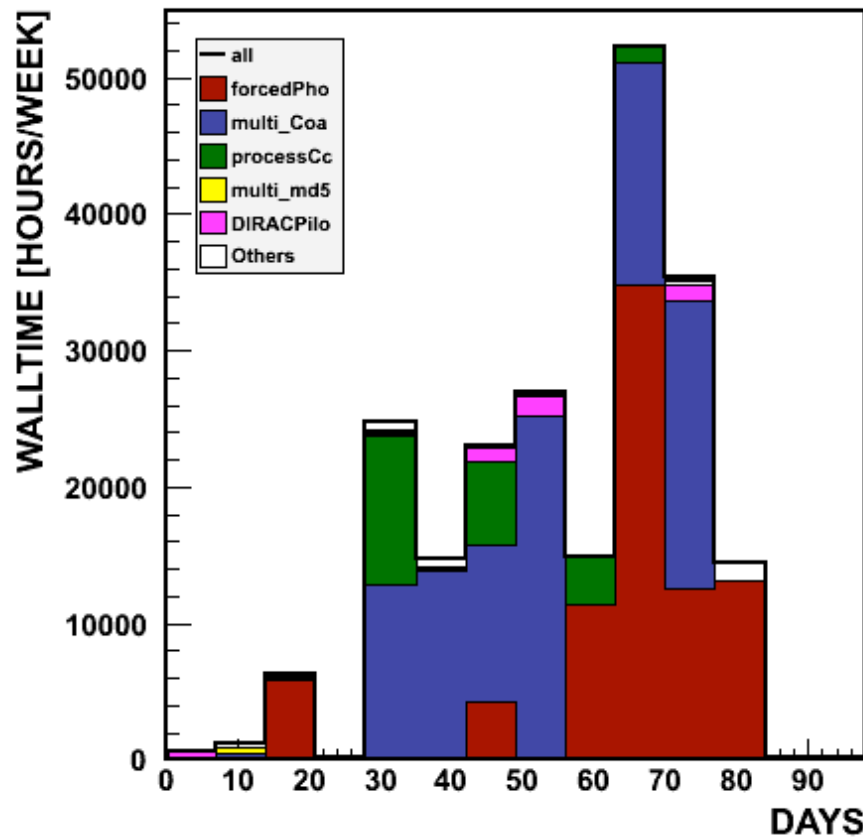launched somewhat sequentially**
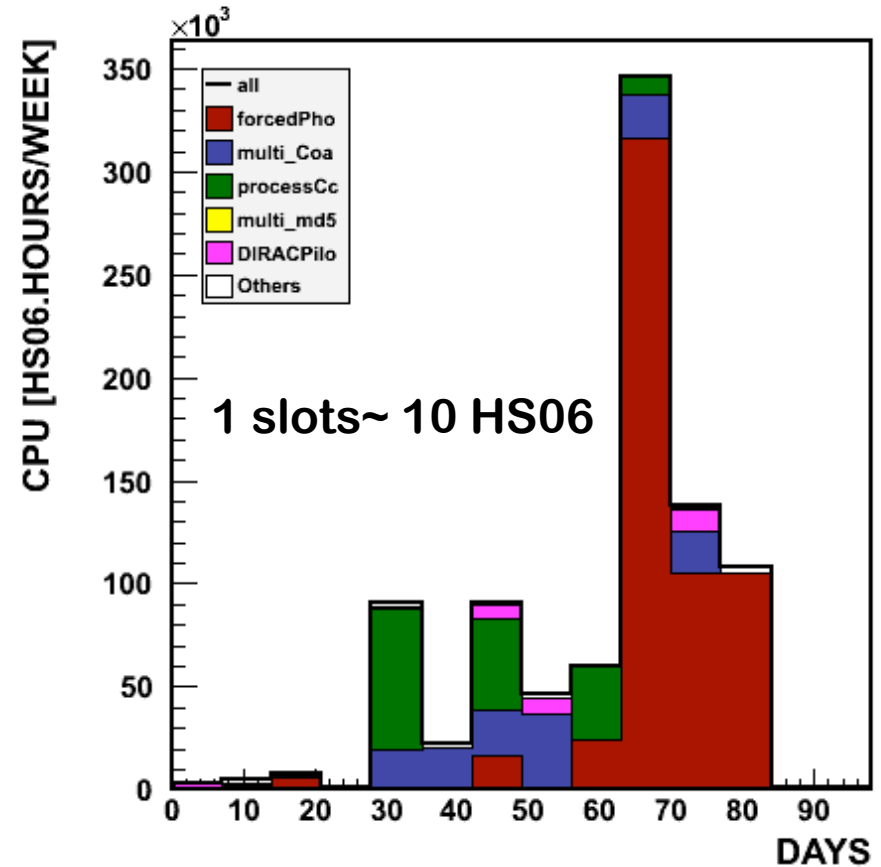
➡ **Significant amount of deadtime**

CPU per week

Walltime (Hours)

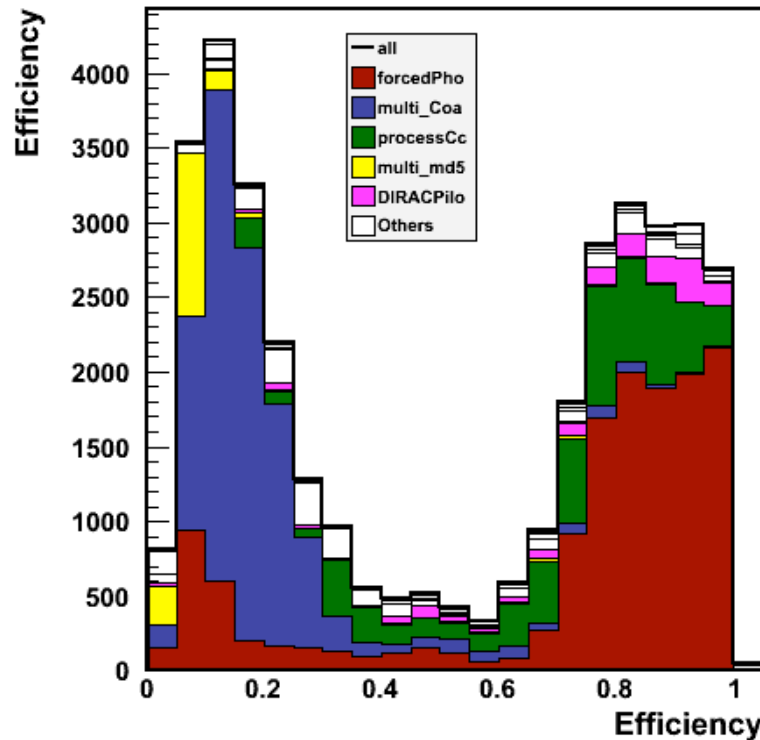Integral 2.151e+05

CPU (HS06.Hours)

Integral 9.218e+05

1 slots~ 10 HS06

➡ co-add and forced-photometry   ➡ forced-photometry

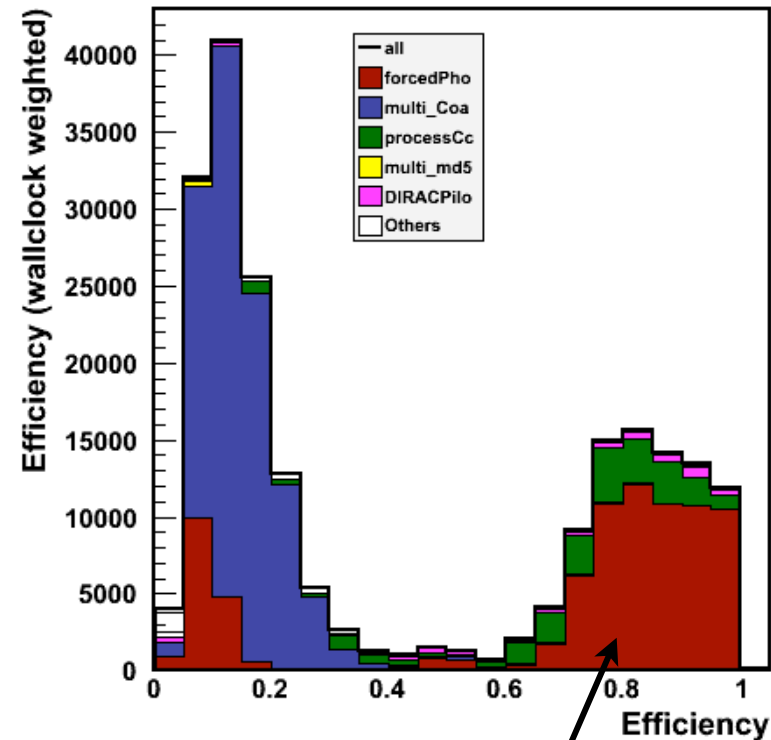# Efficiency of jobs

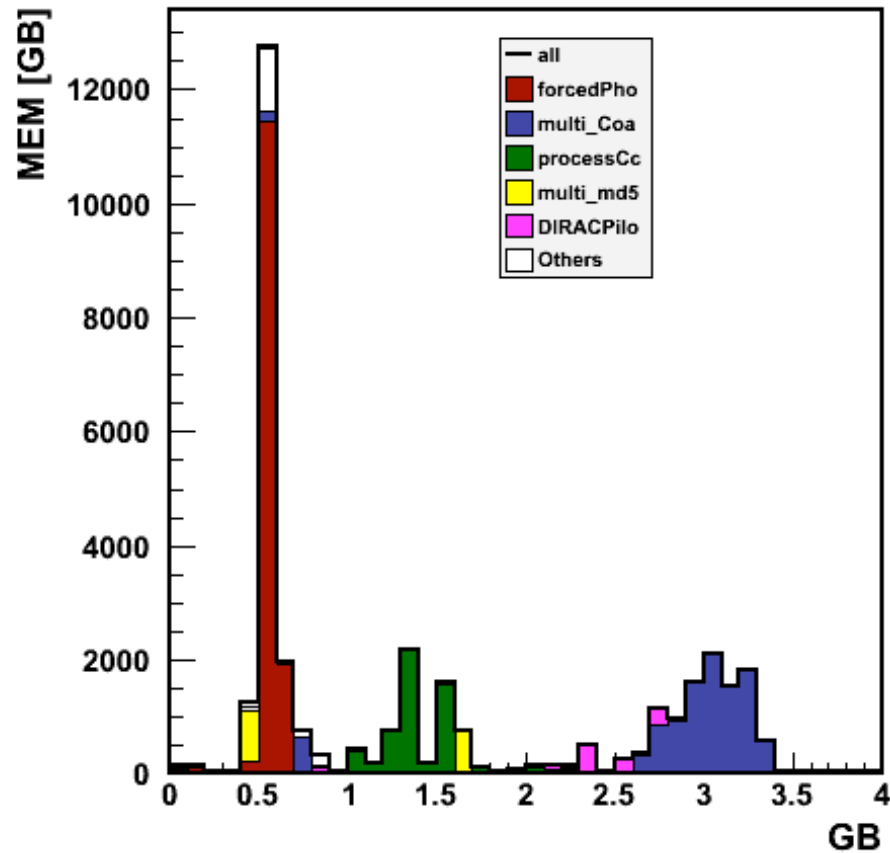**wallclock weighted**

- **Forced-photometry better after upgrade of MYSQL server**
- **Coadd jobs very inefficient (high I/O) : partly blottleneck due to few SL6 workers at that time running several jobs at the same time**

Memory usage

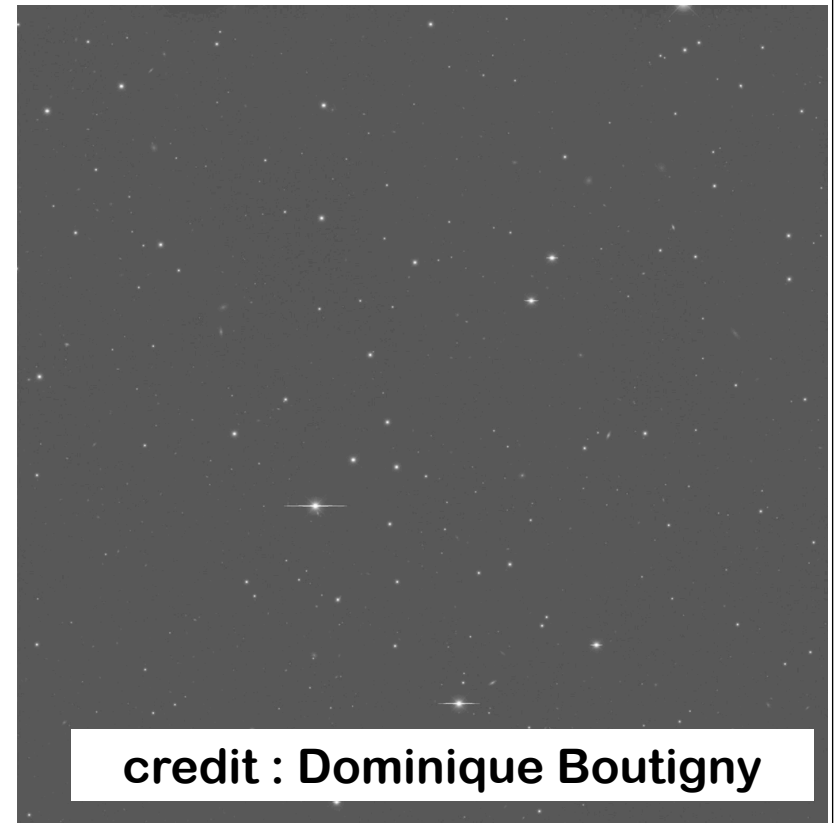➡ **OK**

LSST and Cloud

Test running LSST software using Openstack

Production of simulated images using all available cores of the virtual machines

Total production : 150 000 CPU hours
70 to 100 hours for one pair
of images (2 x 15 s exposition)
on a VM with 20 cores

1single CDD : 1/189 focal plan

credit : Dominique Boutigny

DC-2013 : Database

See Osman Aidel's talk :

Mysql Server : bi-proc, bi-core 40 GB RAM, 9TB Disk
Space Usage of 4,3 TB : 770 GB (18%) indexes 3,6 GB (82%) Data,

- Main issue to overcome :

  - ENDLESS INDEXING ~ 2 billion lines for each the 5 filter tables
   Trick : - Load tables without indexing
            - Switch-on indexing with appropriate configuration

   status : Indexing takes 15 hours for each table

-> The MySQL database will be available for physics analysis

Large scale test at CC-IN2P3

See Fabrice Jammes' talk
Tests "Very usefull uncovering unexpected issues"

Largest QSERV platform ever with 310 nodes

From July to Septembre 2013
IBM iDataplex 8 cores / 16 GB RAM / 160 GB disks (~130 Go for data)

- The machines are installed by CC-IN2P3 :
  Automatic installation of the nodes using puppet

- QSERV service is administrated by CC-IN2P3 :
  Automatic installation of the QSERV software,
  Extensive adaptation and correction of original scripts

- Distribution of the data on the local disks of the nodes
  from high-throughput GPFS disk space

Conclusions

- Very challenging DC with only 5TB of input RAW data

- Coadd very I/O intensive : low cpu efficiency

- Huge amount of files : ~ 20 M

- Huge Database : 2 B lines per table

- "Heavy" implication of CC-IN2P3 Staff : Database, Sys. Admins and Storage