CC - IN2P3 and D0

Workshop D0 – Lyon – 2010 May 4th

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Overview

- General information about CC-IN2P3
- CPU Clusters and D0
- Storage capabilities and D0
- Futur changes

CC- IN2P3 - Lyon

- French National computing center of IN2P3 / CNRS
  in association with IRFU (CEA)

- Users:
  - T1 and T2 for LHC experiments (64% CPU 2010 with T2 and T3) , and D0, Babar
  - ~ 60 experiments or groups HEP, Astroparticle, Biology, Humanities Sciences
    - ~ 4000 non-grid accounts
  - dedicated support for Atlas (1.5 fte), Cms (1.5), Lhcb (1/2) and Alice (1/2)
    1 fte for Astroparticles, 1 for a general support

Computing Teams :	Operation, Infrastructure, Development	59 persons
Others :	Administration, Facility management	18 «
Total		77 «

~ 45% are non permanent people

CPU Clusters

- **Home made batch system BQS is currently being phased out to get Grid-Engine**

- **Main cluster : anastasie** **~ 9400 cores** **+ 2608 in 2010**
  81 K-HS06 (980 machines) **+ 21 K-HS06 (163)**

- **Parallel cluster pistoo (MPI, PVM)** **1024 cores**

- **Mainly SL5 (95%)**

- **~ 10 K running Jobs** **~ 70 K jobs/day** **782 M-H-HS06**

- **D0 :** Allocated CPU : 7.5 % Used in 2009 - 18 % ~ 1200 simultaneous jobs

Batch : Workers use

– **A correct availability of workers**

14% unavailability of workers (schedulred outages, failures)

- **A great diversity of jobs profiles (Memory, Disk, IOs)**

76% of available cpu-time was used

- **Significant part of the compute capacity used through the grid**

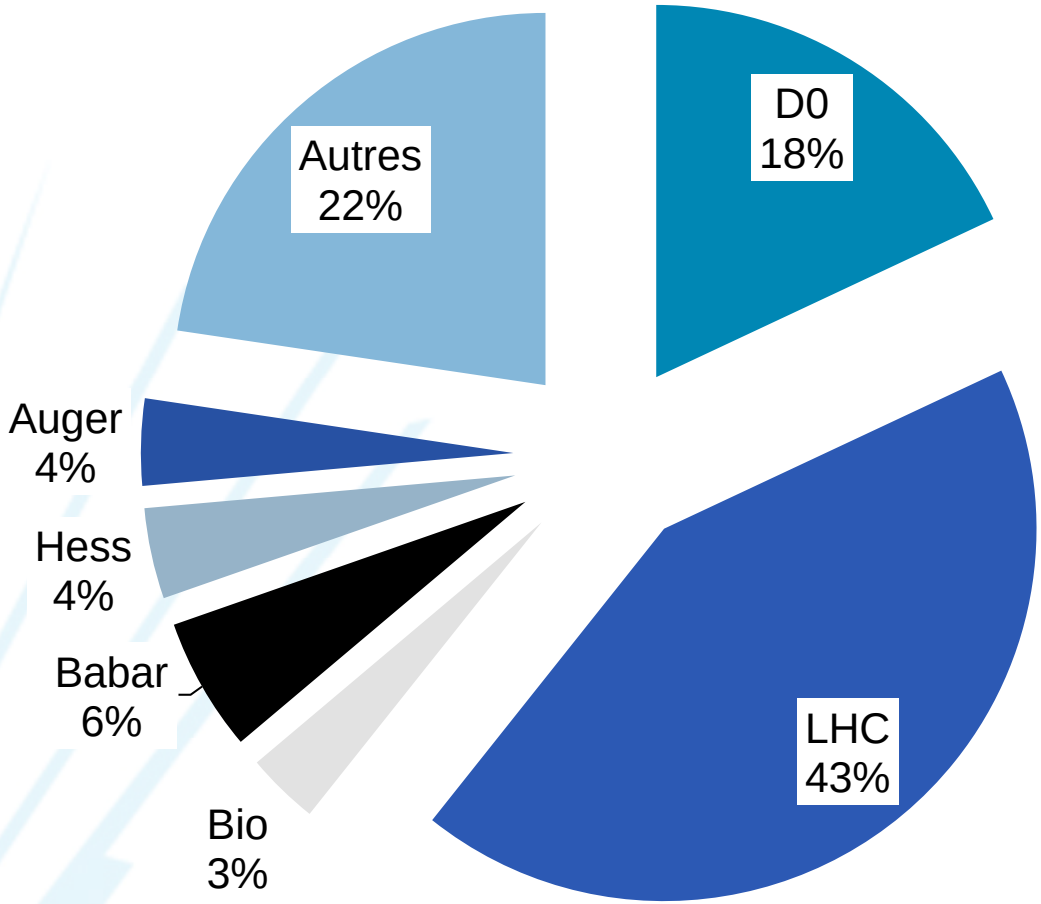
40% of cpu-time used by grid-jobs

- **Grid Jobs submission to be improved (currently being)**

Jobs efficiency (cpu/elaps) :

- **75% for grid jobs**
- **83% for « local » jobs**

Répartition CPU -- 2009

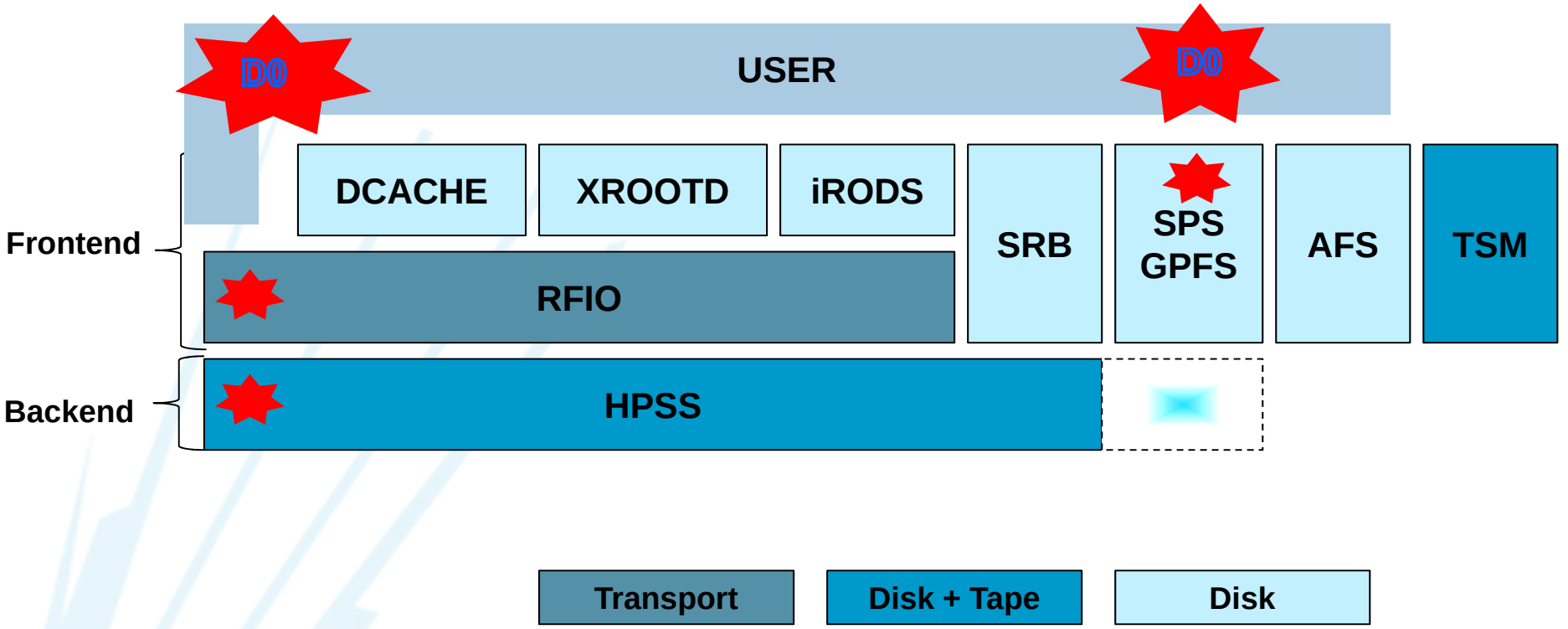


Storage

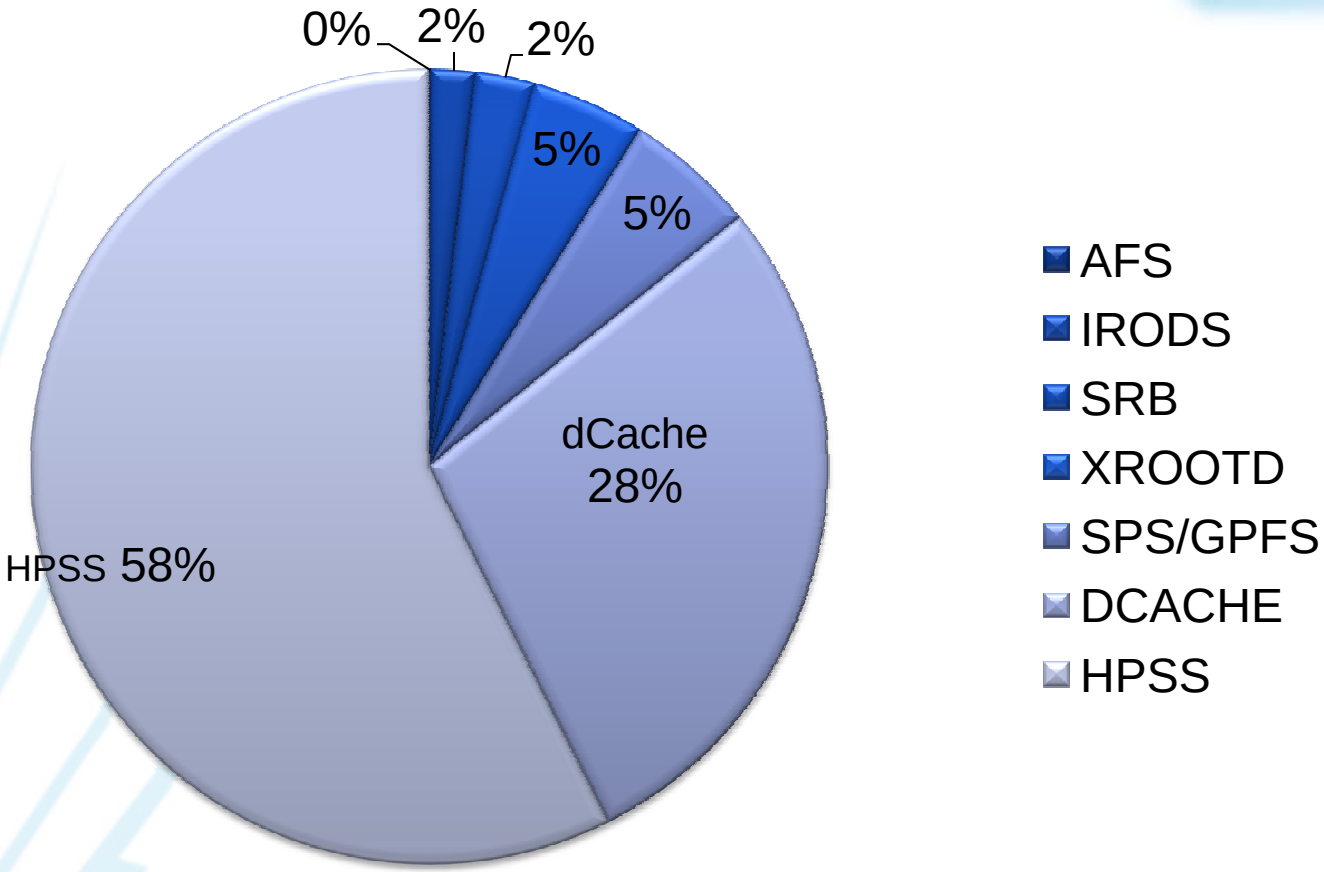
- **Automated cartridges Libraries**
  - **Used By HPSS and TSM (Backup)**
  - **4 SUN SL 8500**
    - **10,000 slots each (virtual Capacity = 40 PB)**
    - **118 drives (T10K-A T10K-B LTO-4)**

Storage systems

D0 accesses HPSS via RFIO and uses SemiPerment FS by GPFS

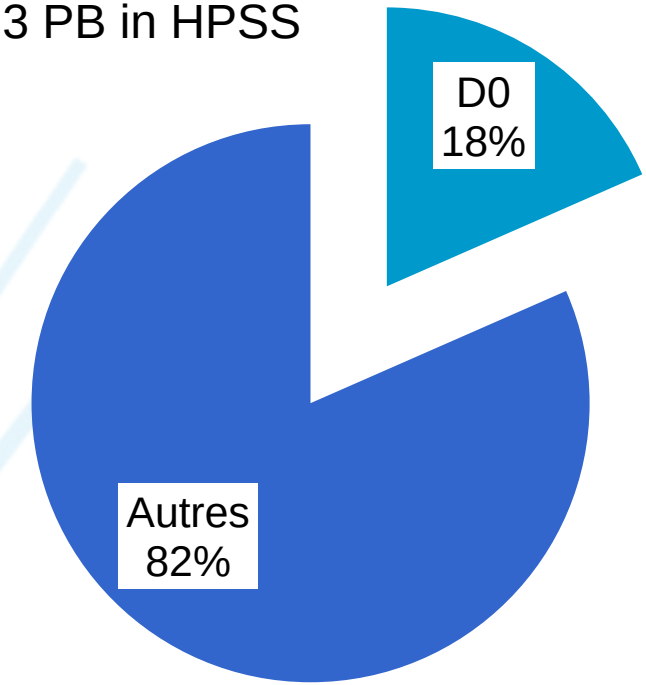


Data Repartition

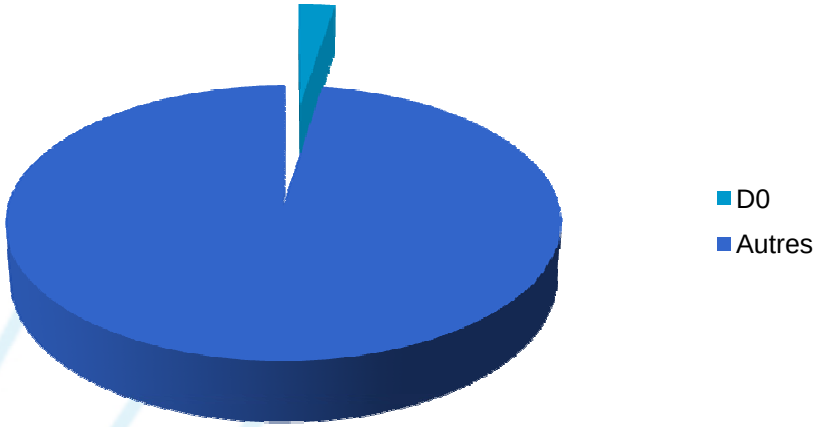


Storage : HPSS Data Allocation

D0 : 1.3 PB out of 7.3 PB in HPSS



Storage : SPS Data Allocation



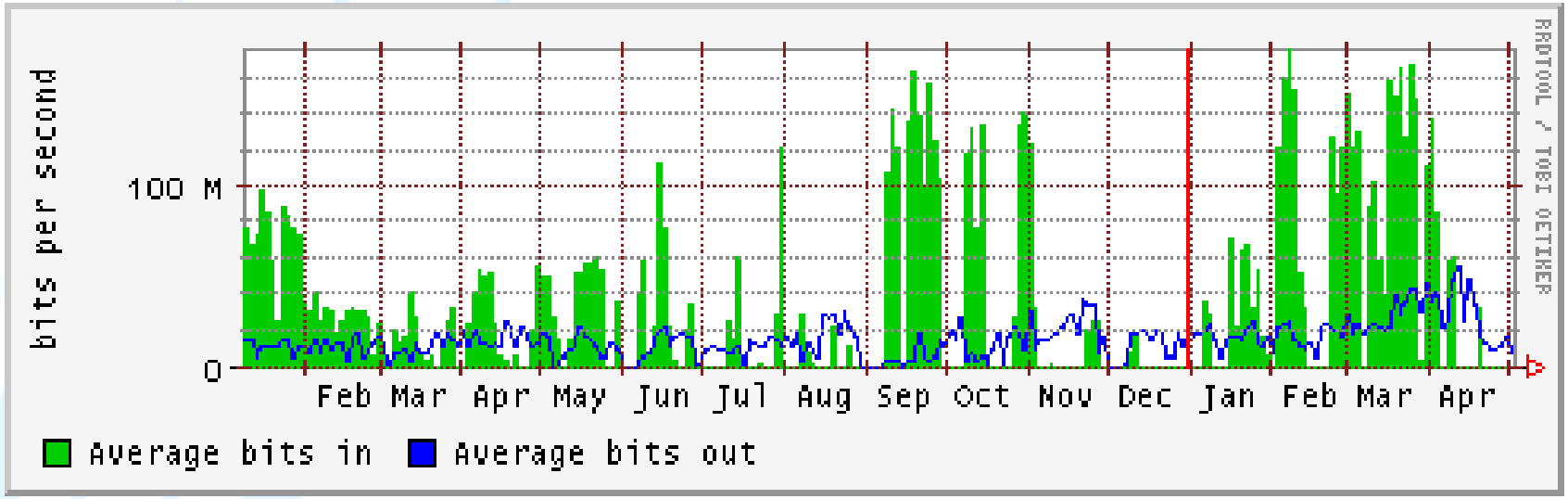
D0 :

10 TB out of 431 TB allocated

6.1 M-files 1.75 MB (mean file)

CC-IN2P3 <-> FNAL Transfers

FNAL direct 1Gbps



Short term changes

- New Batch System : Grid Engine
  - Expected migration during first quarter of 2011
  - Expected detailed information to users by june 2010

- Ongoing reflexion and improvements within the support group
  - organisation of the activities, tools improvements, better communication

- LAF : Lyon Analysis Facility - official availability before summer
  - 1 master PROOF, 20 worker nodes PROOF (160 cores) , 1 serveur Xrootd

Medium term : New Building

Architect view :

expected before summer 2011

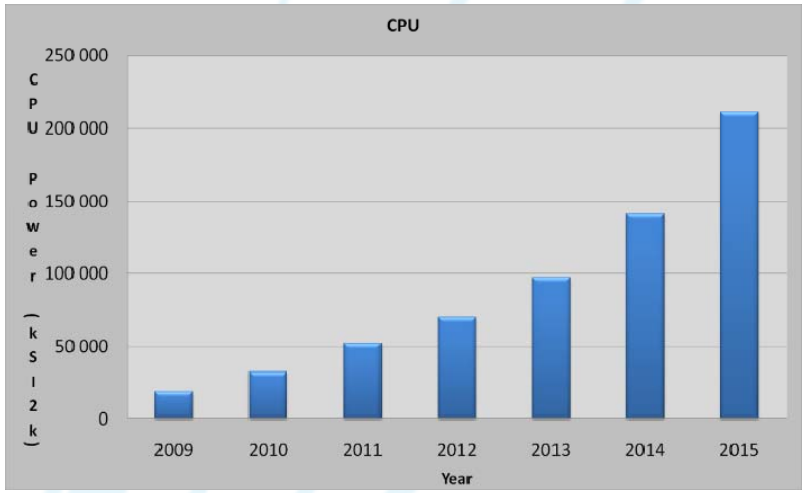
- One computing level 600 Kw
- One technical level
- ~800 sq. meters each

Long term : Planified resources up 2015

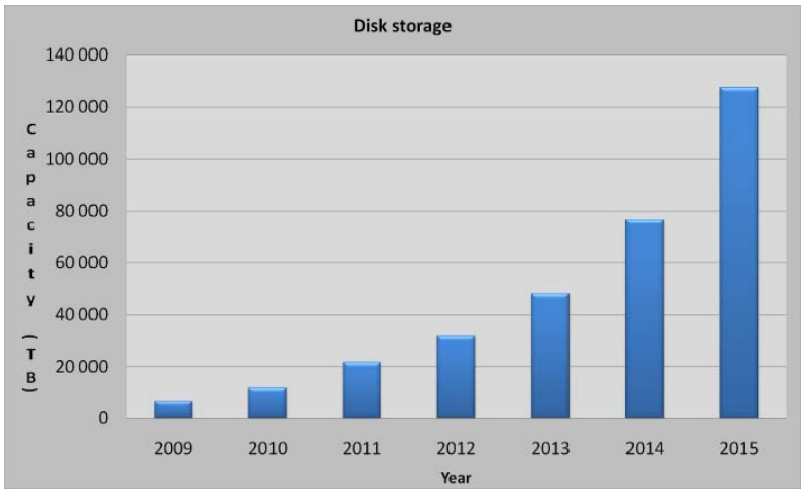
Coping with LHC upgrade, next Astroparticles needs, other experiments

216 racks ~5 MW (with cooling equipment)

CPU



Disk Storage



Crédit graphs : D. Boutigny

Thank you ! Questions ?

Credits:

Cecile Evesque, Suzanne Poulat, Ghita Rahal, Fabio Hernandez