LCG-France

Activities of the LCG tier-2 associated to tier-1 at CC-IN2P3

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LCG Grid Deployment Board
CERN, July 4th 2007

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LCG-France project overview

- **Goals**
  - Setup, develop and maintain a LCG tier-1 and an Analysis Facility at CC-IN2P3
  - Promote the creation of tier-2/tier-3 French sites and coordinate their integration into the WLCG collaboration
- **Funding**
  - national funding for tier-1 and analysis facility
  - Tier-2s and tier-3s are funded by universities, local/regional governments, hosting laboratories, …
- **Organization**
  - Started in June 2004
    - ◆ Scientific and technical leaders appointed, management (executive) and overview boards in place since then
  - Formal coordination of tier-2 & tier-3s started on April 2006
    - ◆ Technical coordinator for tier-2s & tier-3s appointed
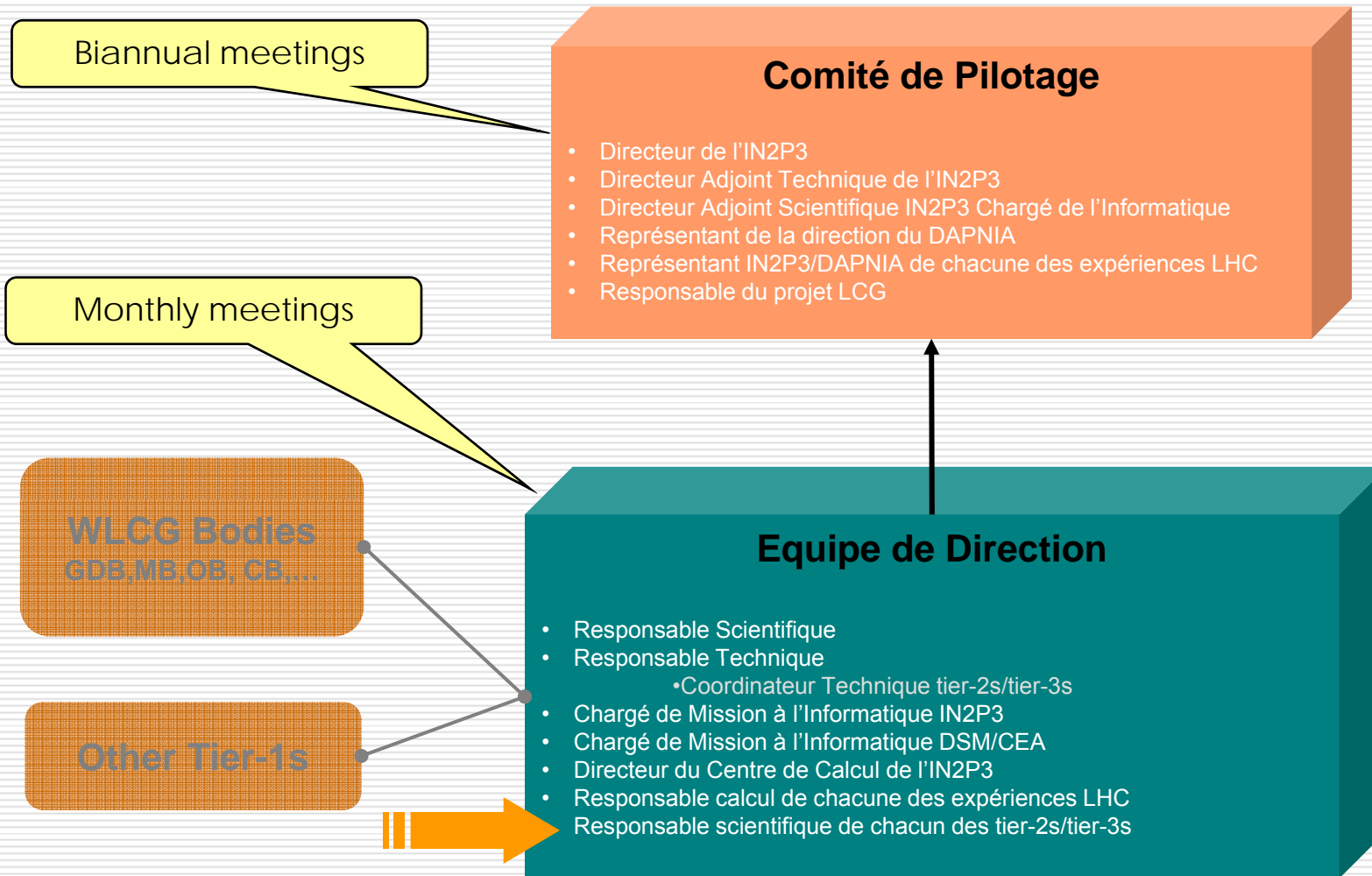- **More information**
  - Project web site: http://lcg.in2p3.fr
  - Project charter: https://edms.in2p3.fr/document/I-003682
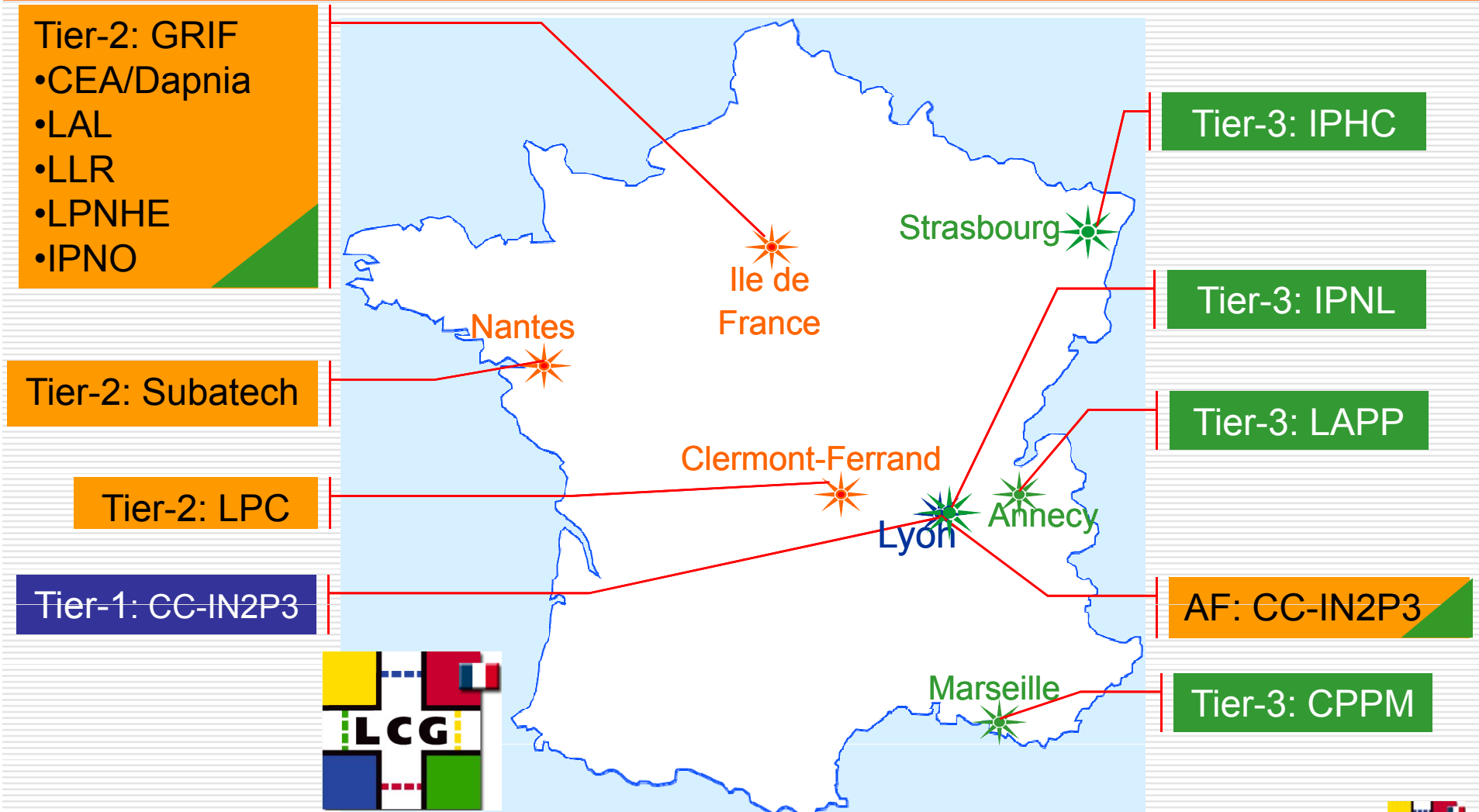
Tier-2s & Tier-3s technical group

- Objectives
  - federate tier-2 & tier-3 technical teams and ensure their integration in the WLCG collaboration
  - coordinate the deployment of computing resources in tiers-2 & tiers-3 for simulation and analysis of LHC experiments
- Organization
  - Strong collaboration
    - with tier-1 at CC-IN2P3
    - with national experiment representatives
  - Monthly (remote) meetings with representatives of french sites
  - Separate, monthly (remote) meetings dedicated to foreign sites
  - Work in coordination with the EGEE operations organization in the region
    - Based at the tier-1, which acts as EGEE Regional Operations Centre
    - Includes non LHC sites (both academic and private)
  - Dedicated mailing list, wiki (http://lcg.in2p3.fr/wiki/index.php/T2-T3) and agenda category (http://indico.in2p3.fr/categoryDisplay.py?categId=61)

LCG-France: project structure

Biannual meetings

Comité de Pilotage

- Directeur de l'IN2P3
- Directeur Adjoint Technique de l'IN2P3
- Directeur Adjoint Scientifique IN2P3 Chargé de l'Informatique
- Représentant de la direction du DAPNIA
- Représentant IN2P3/DAPNIA de chacune des expériences LHC
- Responsable du projet LCG

Monthly meetings

WLCG Bodies
GDB,MB,OB, CB,...

Other Tier-1s

Equipe de Direction

- Responsable Scientifique
- Responsable Technique
  - Coordinateur Technique tier-2s/tier-3s
- Chargé de Mission à l'Informatique IN2P3
- Chargé de Mission à l'Informatique DSM/CEA
- Directeur du Centre de Calcul de l'IN2P3
- Responsable calcul de chacune des expériences LHC
Responsable scientifique de chacun des tier-2s/tier-3s

Agendas: http://indico.in2p3.fr/categoryDisplay.py?categId=59

LCG-France sites

Tier-2: GRIF
- CEA/Dapnia
- LAL
- LLR
- LPNHE
- IPNO

Tier-2: Subatech

Tier-2: LPC

Tier-1: CC-IN2P3

Tier-3: IPHC

Tier-3: IPNL

Tier-3: LAPP

AF: CC-IN2P3

Tier-3: CPPM

Strasbourg

Ile de France

Nantes

Clermont-Ferrand

Lyon

Annecy

Marseille

Foreign sites

- In close contact with some associated sites to the LCG-France tier-1
  - Europe
    - Belgium CMS Tier-2
    - Romanian Federation ATLAS Tier-2
  - Asia
    - IHEP China - ATLAS and CMS Tier2
    - ICEPP Japan - ATLAS Tier2

Supported VOs

- Supported LHC experiments
  - All sites also support other virtual organizations, including the EGEE official VOs and local users

		Alice	Atlas	CMS	LHCb
T1	CC-IN2P3	●	●	●	●
Tier-2	AF Lyon	●	●	●	●
	GRIF (Paris region)	●	●	●	●
	LPC (Clermont)	●	●		●
	Subatech (Nantes)	●			
Tier-3	CPPM (Marseille)		●		●
	IPHC (Strasbourg)	●		●	
	IPNL (Lyon)	●		●	
	LAPP (Annecy)		●		●

Tier-2s Planned Contribution

2.5 M SpecInt2000 :
12/2006 CPU capacity
of CC-IN2P3

% of LCG-France resources per experiment
CPU (2008)

- Alice 21%
- Atlas 39%
- CMS 17%
- LHCb 23%

Disk (2008)

- 45%
- 29%
- 4%
- 21%
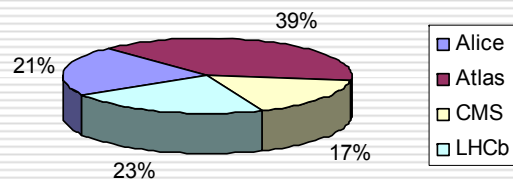
Planned Capacity of LCG-France Tier-2 Sites in 2008
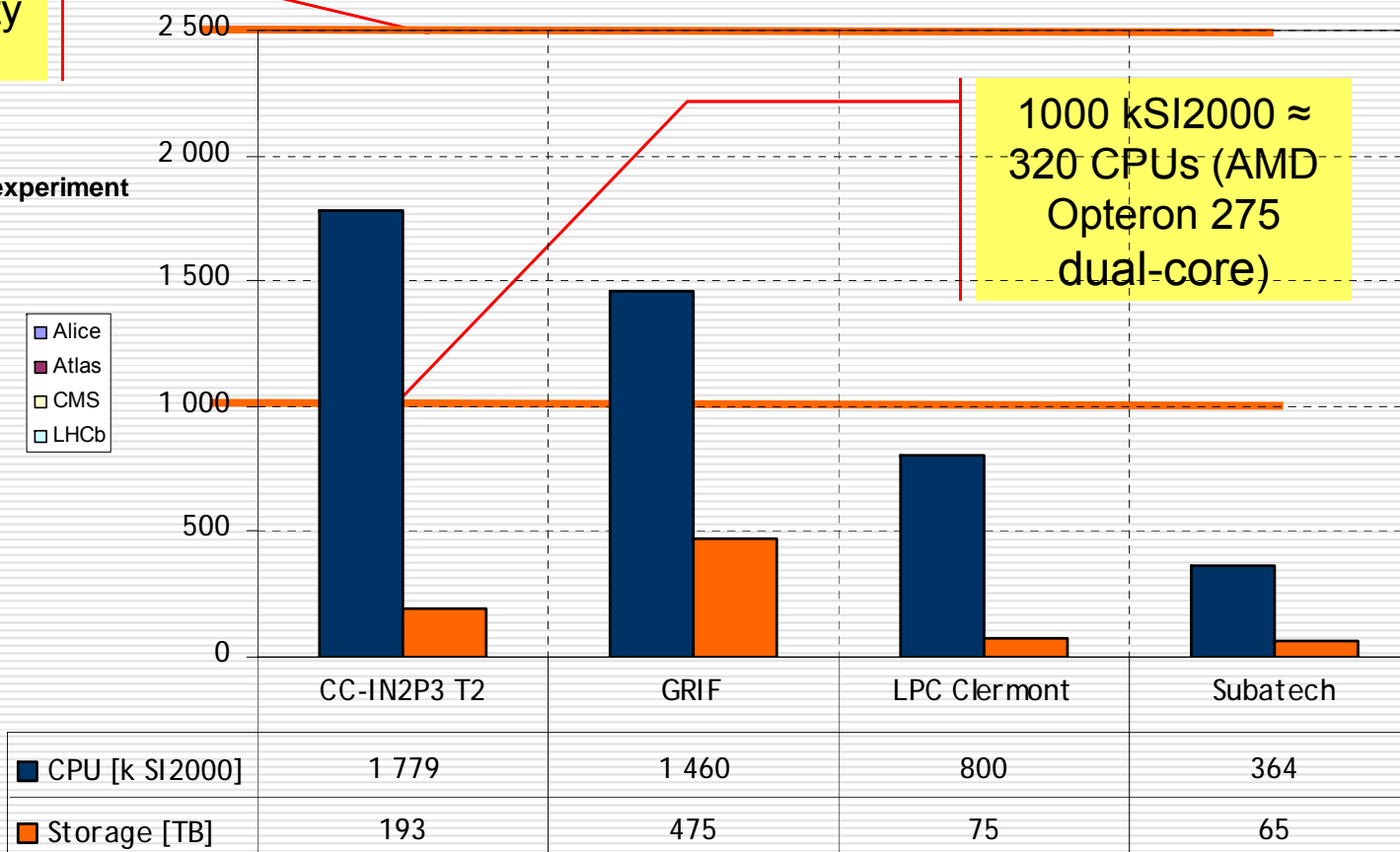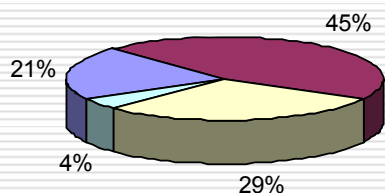
1000 kSI2000 ≈
320 CPUs (AMD
Opteron 275
dual-core)

	CC-IN2P3 T2	GRIF	LPC Clermont	Subatech
CPU [k SI2000]	1 779	1 460	800	364
Storage [TB]	193	475	75	65

Tier-2s Planned Contribution (cont.)

CPU [k SI2000]

	2006	2007	2008	2009	2010
■ Subatech	56	224	364	504	504
■ LPC Clermont	200	450	800	800	800
■ GRIF	283	529	1 460	2 614	3 853
■ AF Lyon	44	319	1 779	3 825	5 256

Disk [TB]

	2006	2007	2008	2009	2010
■ Subatech	15	16	65	119	119
■ LPC Clermont	25	50	75	75	75
■ GRIF	72	180	475	940	1 259
■ AF Lyon	7	47	193	322	513
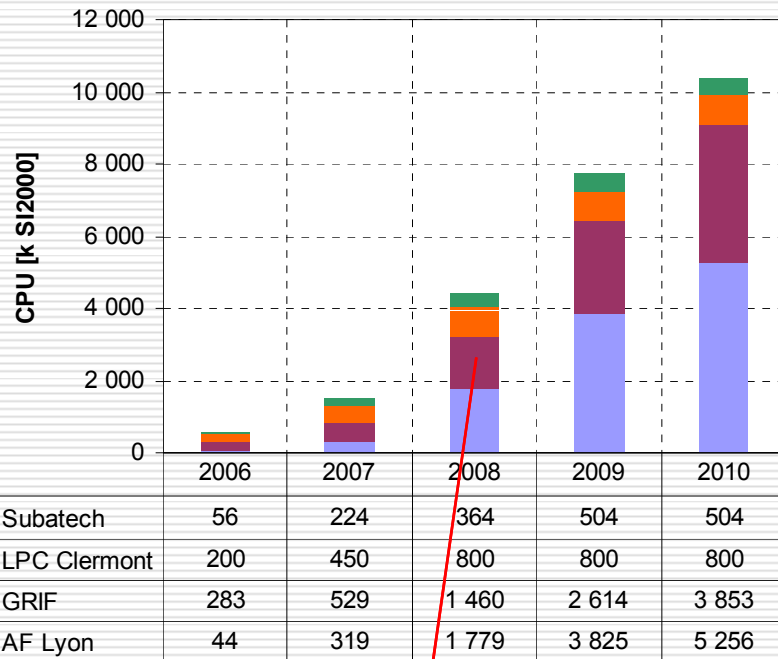
Roughly equivalent to the planned tier-1 CPU capacity the same year
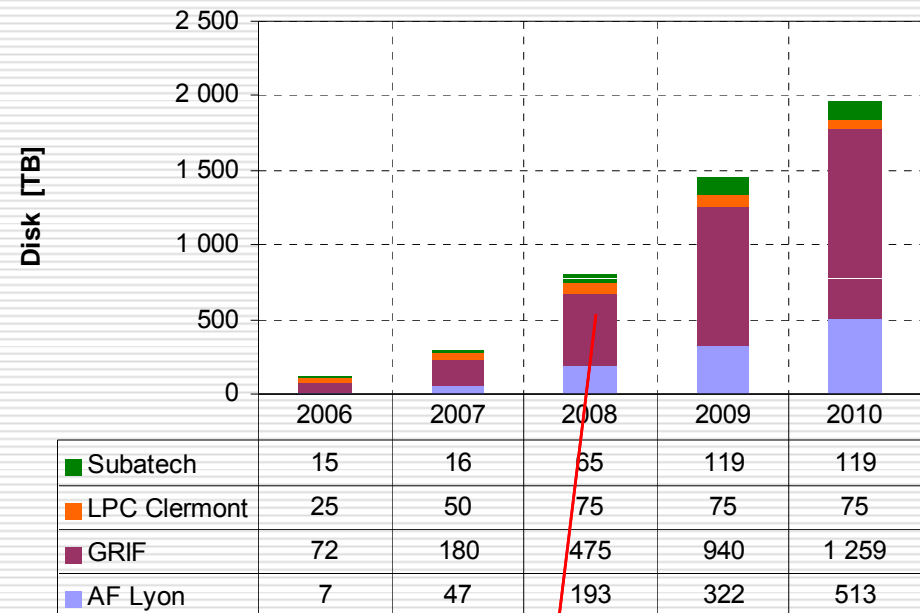
33% of the planned tier-1 disk capacity the same year

Actual contribution
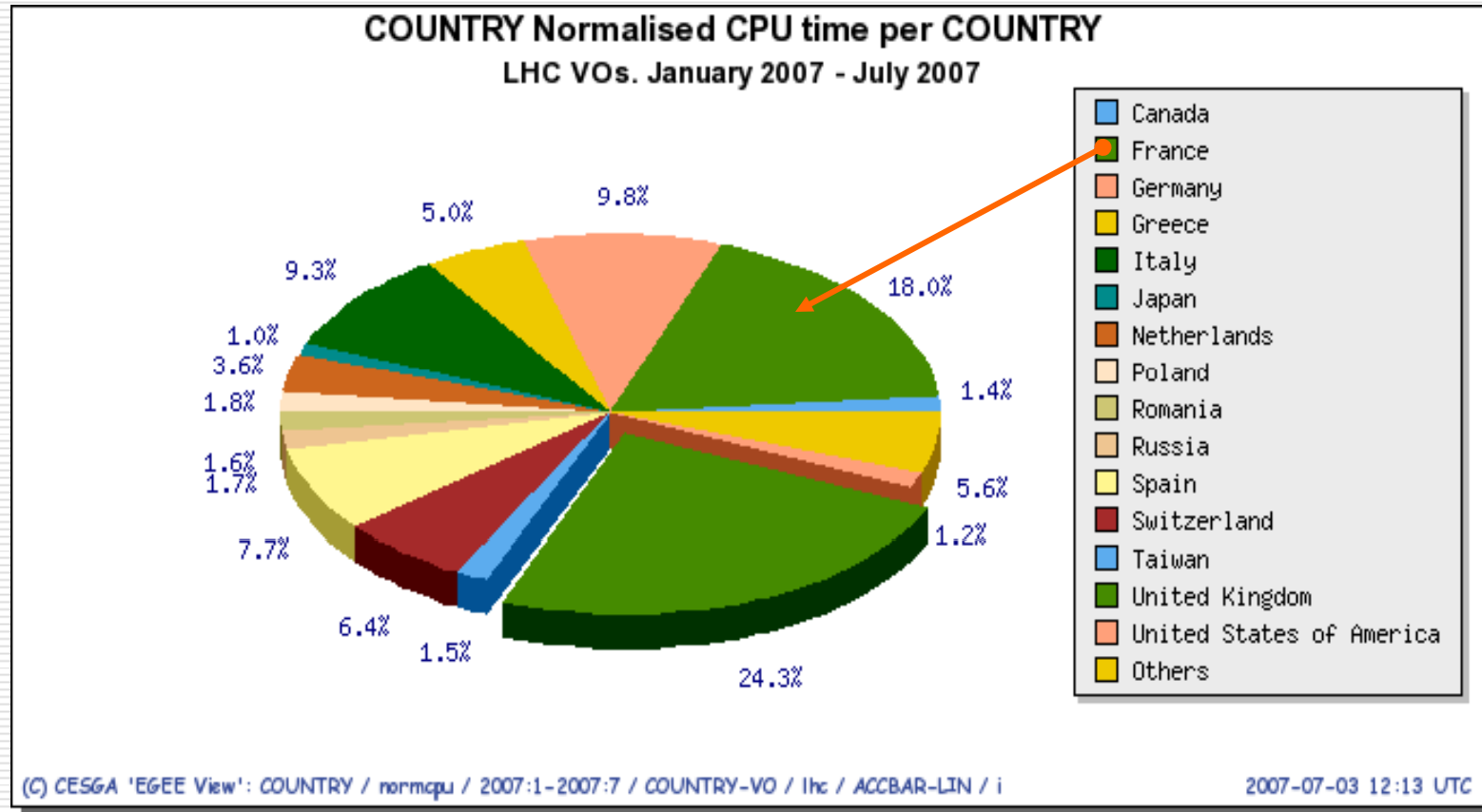
Source: http://www3.egee.cesga.es/gridsite/accounting/CESGA/egee_view.html

F. Hernandez/F. Chollet

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Actual contribution (cont.)

France Normalised CPU time per VO
LHC VOs. July 2006 - July 2007

- alice
- atlas
- cms
- lhcb
- Other VOs

31.1%
11.6%
7.2%
15.0%
35.2%

(C) CESGA 'EGEE View': France / normcpu / 2006:7-2007:7 / SITE-VO / lhc / ACCBAR-LIN / i

France Normalised CPU time per SITE
LHC VOs. July 2006 - July 2007

- AUVERGRID
- GRIF
- IN2P3-CC
- IN2P3-CPPM
- IN2P3-LAPP
- IN2P3-LPC
- IN2P3-SUBATECH
- Others

46.4%
13.7%
3.4%
0.9%
2.9%
4.5%
2.9%
25.2%

(C) CESGA 'EGEE View': France / normcpu / 2006:7-2007:7 / SITE-VO / lhc / ACCBAR-LIN / i   2007-07-03 12:27 UTC

Source: http://www3.egee.cesga.es/gridsite/accounting/CESGA/egee_view.html

Networking infrastructure
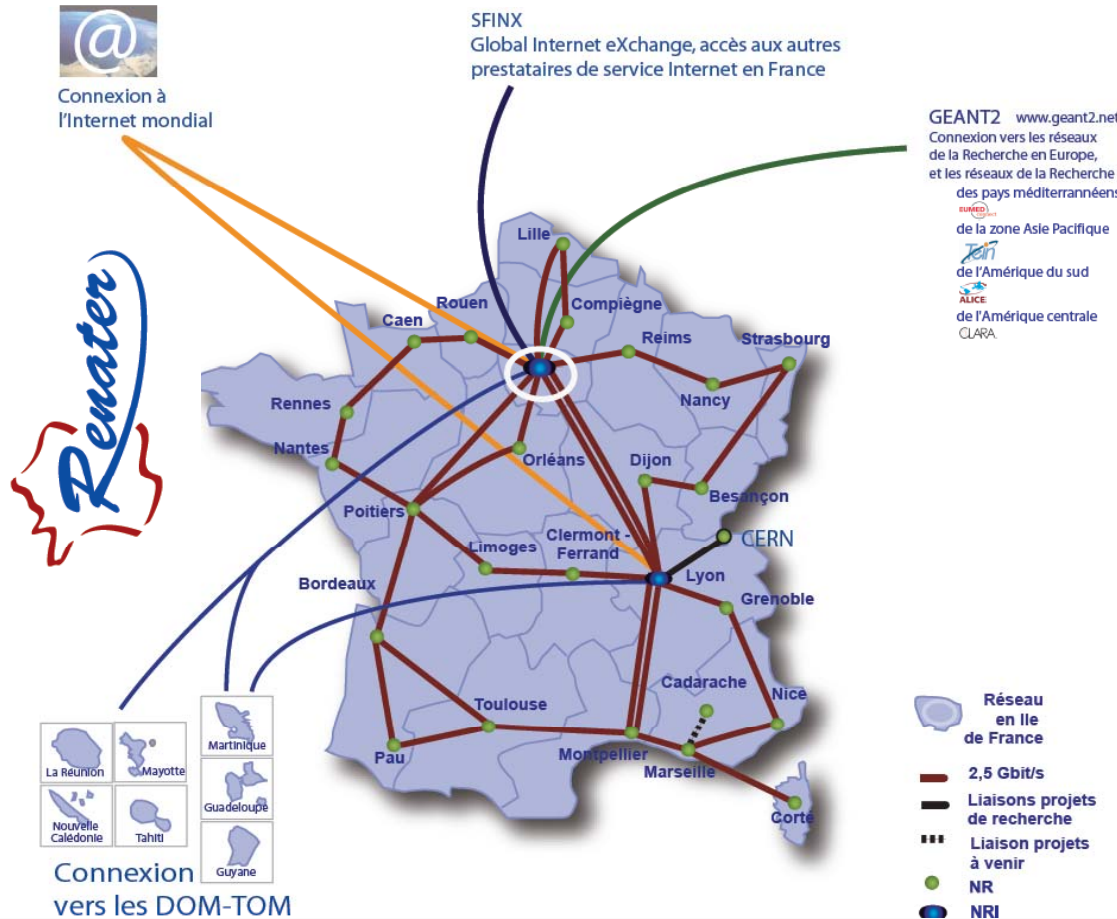
- Each tier-2 connected to RENATER backbone at 1 Gbps
- Separate circuit for connecting tier-1 and foreign sites (through GEANT) at 10 Gbps
  - In operation since June 20th

Data transfers: CMS

- Data exchange
  - CC-IN2P3 → other CMS sites

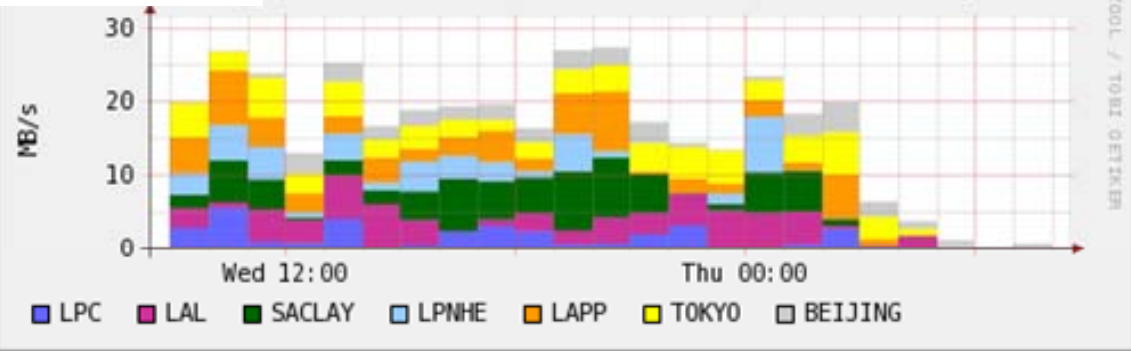**CMS PhEDEx - Transfer Rate**
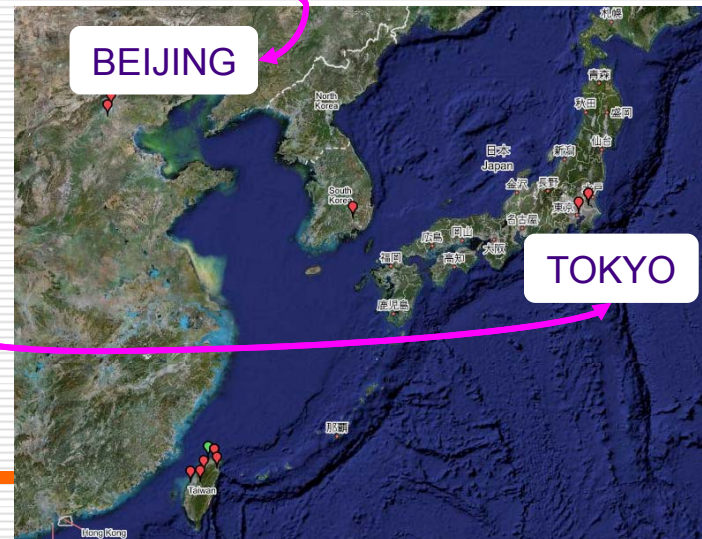17 Weeks from 2007/08 to 2007/25 UTC

Legend:
- T1_CERN_Buffer
- T1_FNAL_Buffer
- T1_FZK_Buffer
- T2_Belgium_IIHE
- T2_Belgium_UCL
- T2_Caltech_Buffer
- T2_DESY_Buffer
- T2_Estonia_Buffer
- T2_Florida_Buffer
- T2_GRIF_LAL
- T2_GRIF_LLR
- T2_GRIF_LPNHE
- T2_London_Brunel
- T2_London_IC_HEP
- T2_MIT_Buffer
- T2_Nebraska_Buffer
- T2_RWTH_Buffer
- T2_Rome_Buffer
- T2_SouthGrid_Bristol
- … plus 6 more

Maximum: 95.48 MB/s, Minimum: 0.05 MB/s, Average: 28.37 MB/s, Current: 48.04 MB/s

Source: Phedex

- ## Data Transfer exercise from T1 to T2-T3

July 2006

May 2007

by courtesy of G.Rahal, S.Jezequel

F. Hernandez

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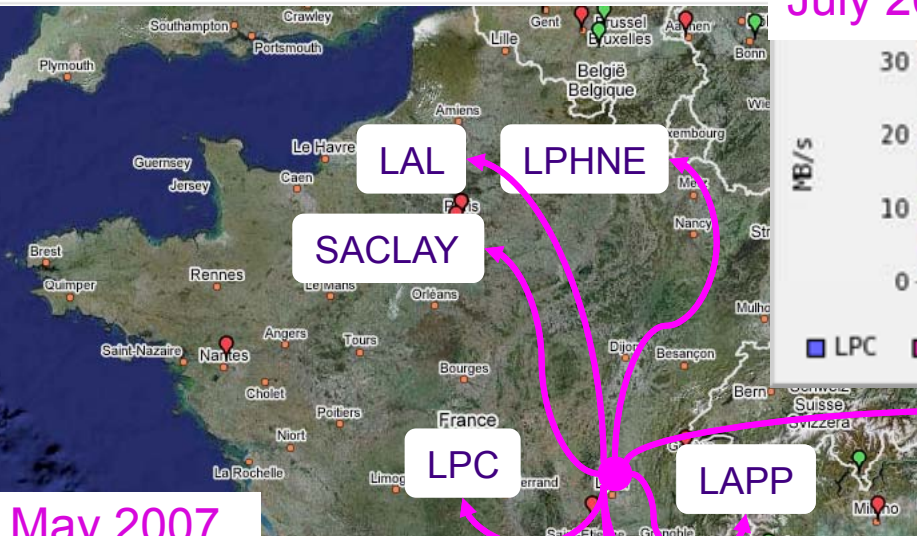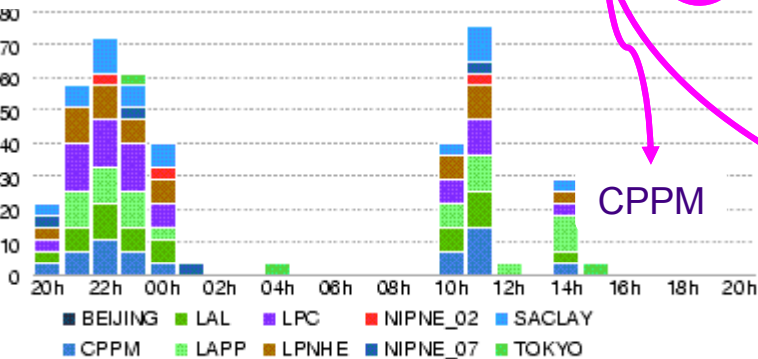
Coordinated activities

- Procurement
  - Meetings with potential hardware vendors for introducing the project, identifying representatives and getting similar commercial conditions for all sites
  - Sharing of technical (i.e. results of hardware evaluation) and commercial information between sites
  - Sharing of technical documents used for call for tenders
- Site management
  - Automated installation
    - Michel Jouvin (GRIF) leads the Quattor Working Group (https://trac.lal.in2p3.fr/LCGQWG)
    - Quattor is used by most of the LCG-France sites
  - Needs for grid services on SL4 for some sites sites (other than WN/UI)
    - DPM disk server : x86_64 non official version
  - Management of clusters with Torque/Maui
    - Sharing technical information on how to configure Torque/Maui in the context of each particular site
  - Information exchange on DPM-based storage elements

Coordinated activities (cont.)

- Monitoring tier-2 availabilility (quarterly)
  - Target availability: 95%

2007 Q1 : January - March

T2s : Site Availability for OPS VO including downtimes

Tier-2s Average availability 93 % including downtimes

—— Average T2s
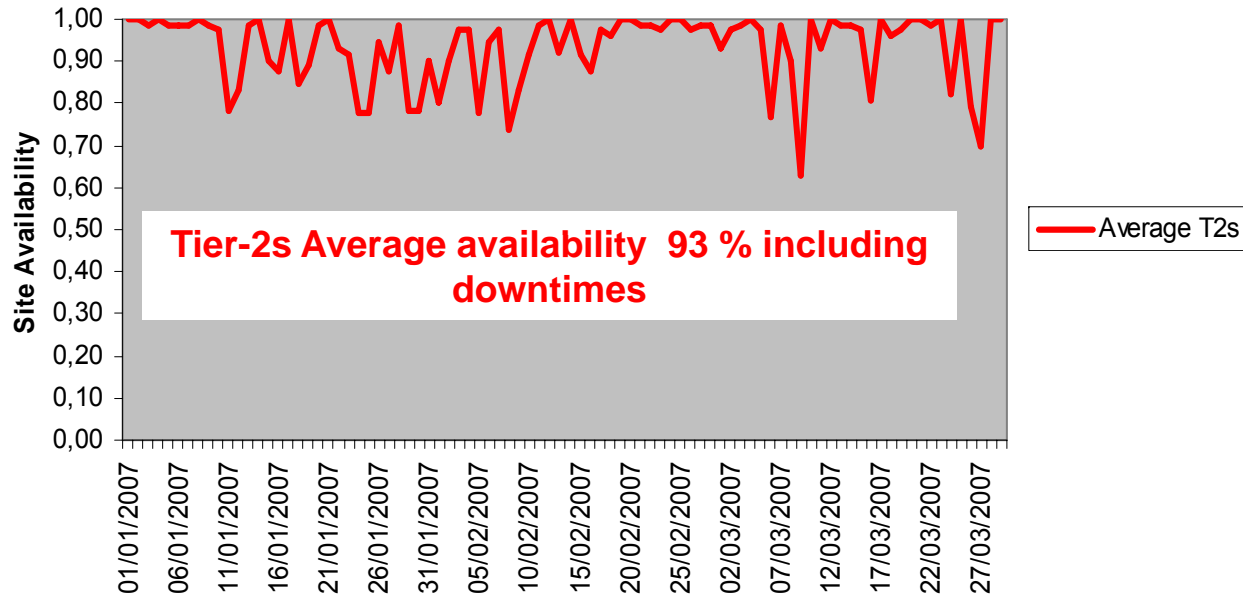
Source : https://lcg-sam.cern.ch:8443/sam/sam.py

Coordinated activities (cont.)

- Deployment of several regional top-level BDIIs
  - CC-IN2P3, GRIF, LAPP
  - With appropriate indexes for performance
  - Failover mechanism has been exercised during site downtimes
- Data transfer
  - Several campaigns of site-driven data exchange tests between tier-1 and tier-2s, both domestic and foreign
    - **both at the network-level and at the application-level**
  - Using filetransfer.py tool from GRIDPP
- Accounting
  - Ongoing work to systematically verify that local site accounting agrees with what is sent and stored in the APEL repository
 - Observed problems filling gaps with APEL publisher

Coordinated activities (cont.)

- Development of tools for monitoring data transfer activities
  - FTS: http://cctools.in2p3.fr/dcache/monitoring/ftsmonitor.php
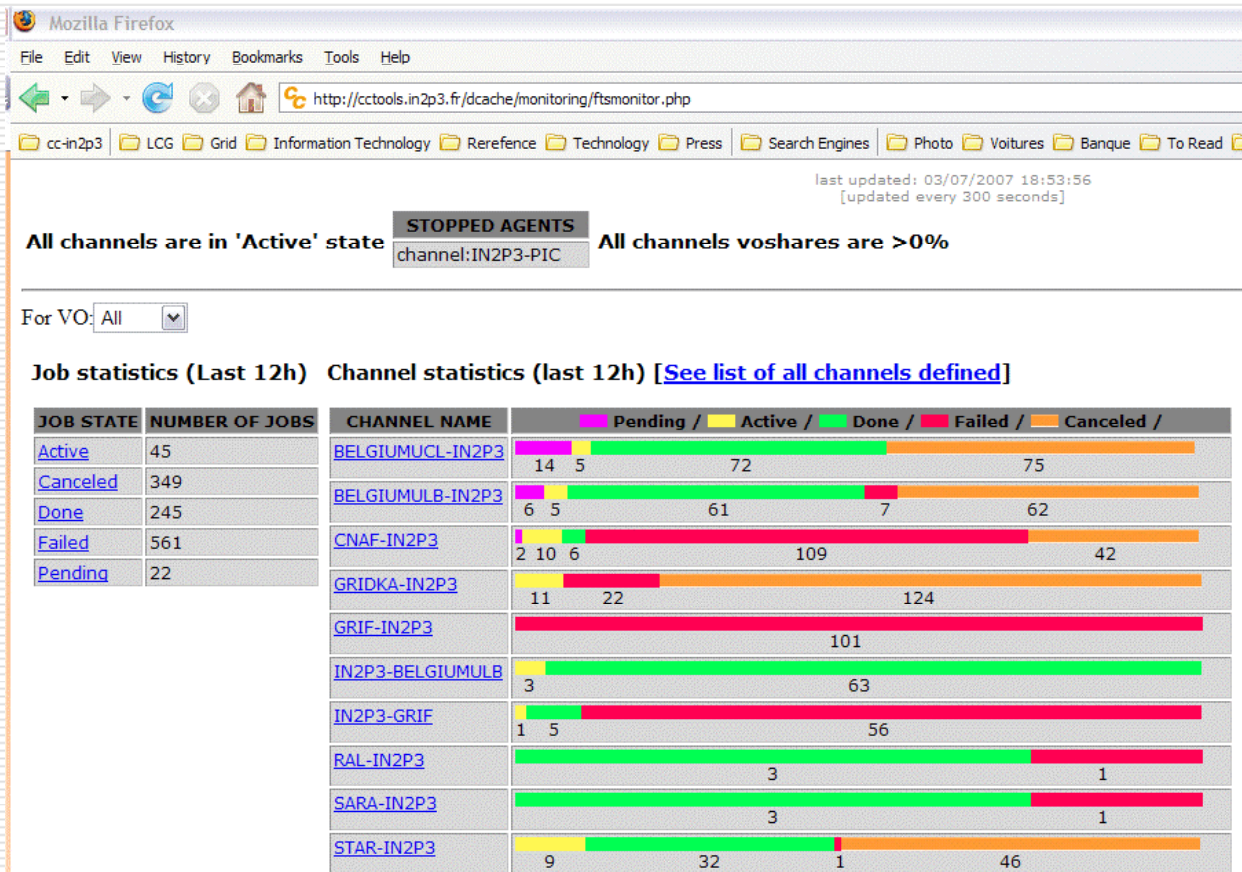
Coordinated activities (cont.)

- Development of tools for monitoring data transfer activities

  - dCache portal: https://cctools.in2p3.fr/dcache/monitoring/lcg/portal.php
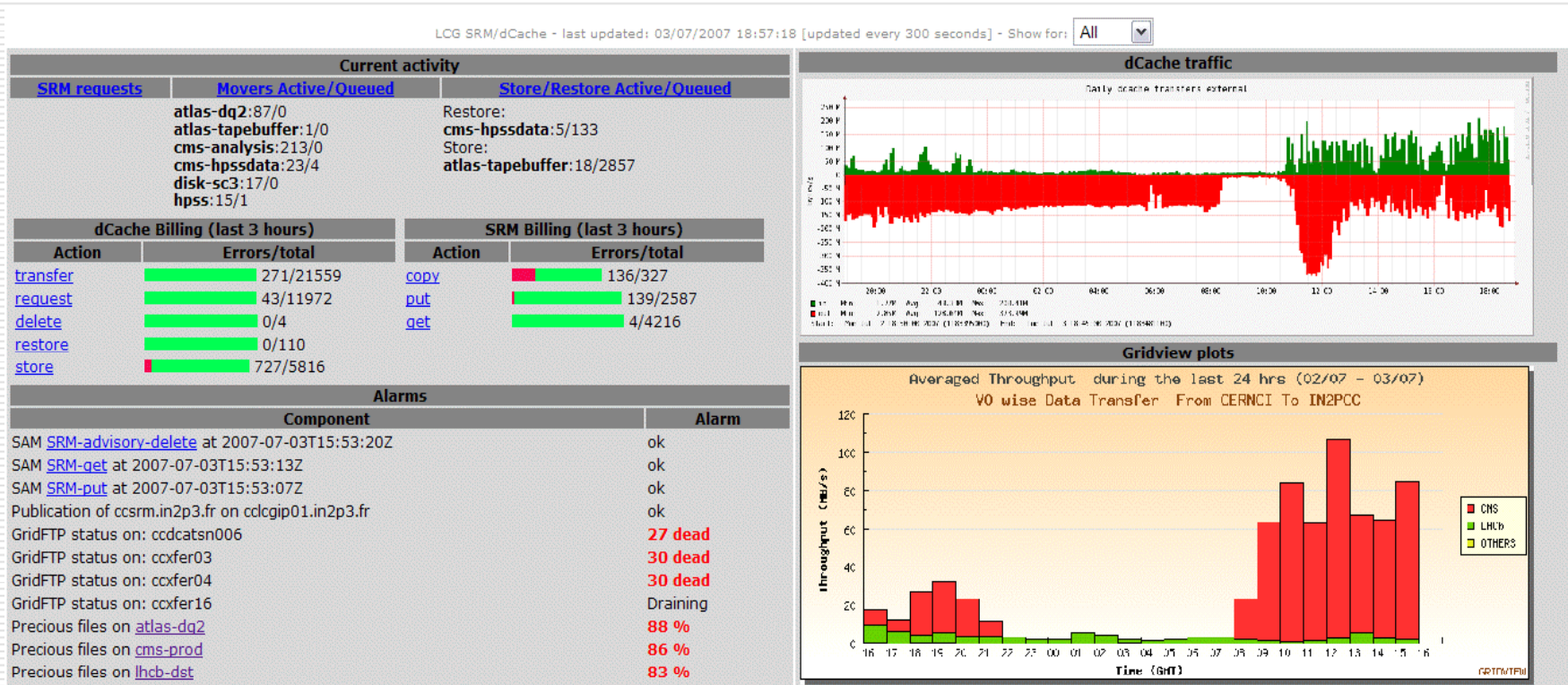
Current and future work

- **Consolidate the accounting of resources**
  - CPU: implement the proposed normalization based on SpecInt 2000 benchmark on all the sites of the region
  - Storage: make sure that what is accounted is what is actually provided

- **Finalize the deployment of the tier-2 at CC-IN2P3**
  - Understand what it takes to support a tier-1 and a tier-2 sites sharing the same infrastructure

- **Follow the activities of the grid security, system management and grid service monitoring working groups**

Events

- LCG-France conferences
    - http://indico.in2p3.fr/conferenceDisplay.py?confId=148
    - http://indico.in2p3.fr/conferenceDisplay.py?confId=82
- Atlas tier-1 (and associated tier-2s) tour
    - http://indico.in2p3.fr/conferenceDisplay.py?confId=239
- Training sessions for EGEE users and site administrators
    - Deployment issues, DPM, batch operations, etc.
    - http://indico.in2p3.fr/conferenceDisplay.py?confId=190
    - http://indico.in2p3.fr/conferenceDisplay.py?confId=CCa0713

Press & media, public relations

- Organization of several visits to CERN for VIPs, funding agencies, press, hardware vendors, etc.
- CERN Courrier, June 4, 2007
  - http://cerncourier.com/main/article/47/5/15/1
- International science grid this week, May 9, 2007
  - http://www.isgtw.org/?pid=1000414
- Annual booths for the « Fête de la Science » since 2005
- LCG News, Sep. 2006
  - http://lcg.web.cern.ch/LCG/LCGnews/LCGSepOct06.pdf
- Creation of LCG-related communication supports
  - Flyers, brochures, etc.
- Several articles both in the national and regional press

Conclusions

- Operating the grid services in their current status is complex and requires (highly competent and motivated) people
  - the available manpower for operating the tier-2 & tier-3 sites is limited
- LCG-France sites are operational but ramp up plans are rather aggressive
- Project has created a community
  - Involved sites sharing a common goal
  - Technological and scientific impact on the sites
- Visibility of the french contribution to WLCG
  - Involvement of physicists working together with engineers is instrumental for the success of this project
- Still a long way ahead!

Questions/Comments