

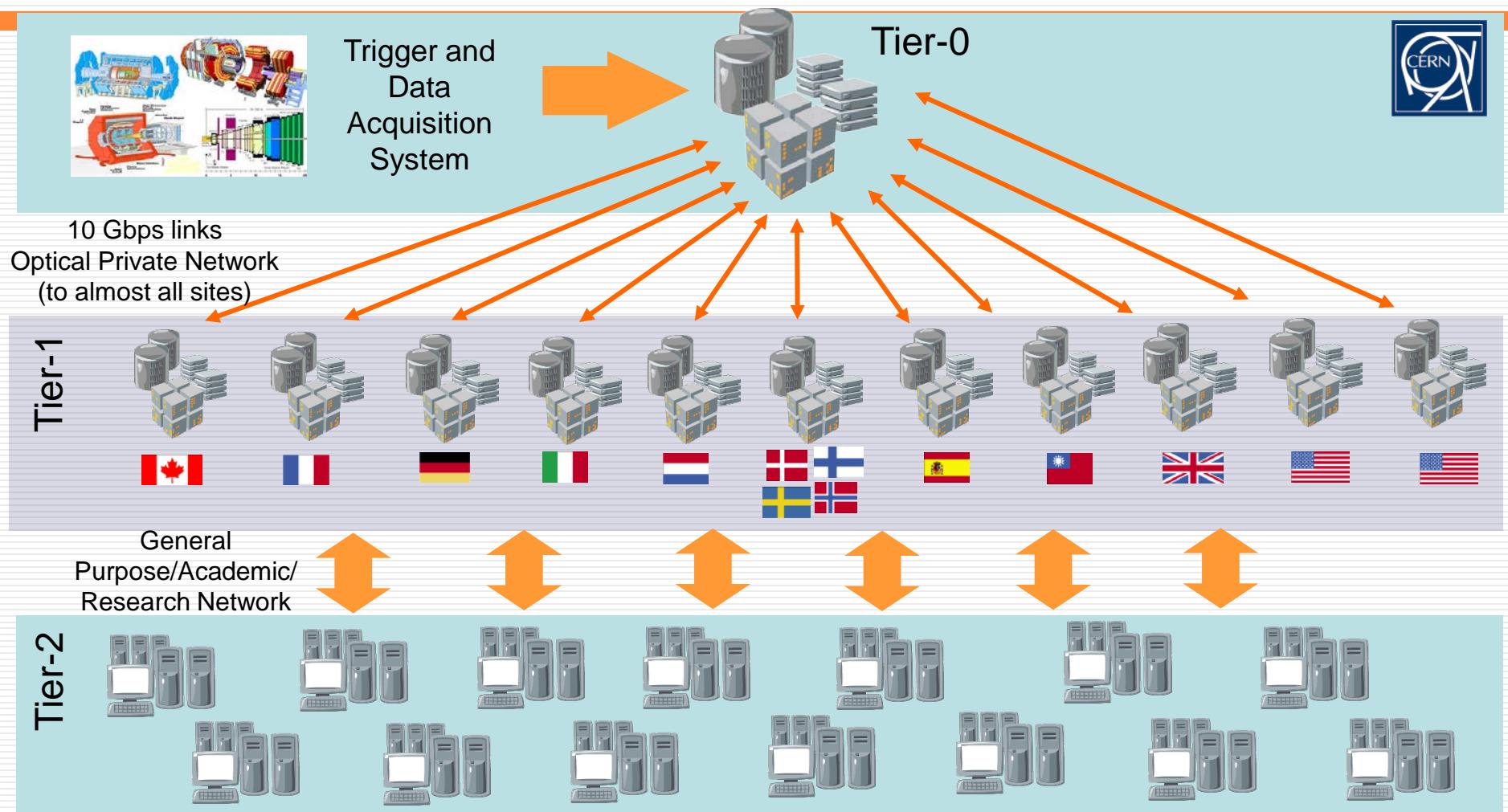
Utilisation de la Grille WLCG

Fairouz Malek (LPSC)

8èmes Journées Informatique IN2P3-IRFU Oct. 22-25,
2012

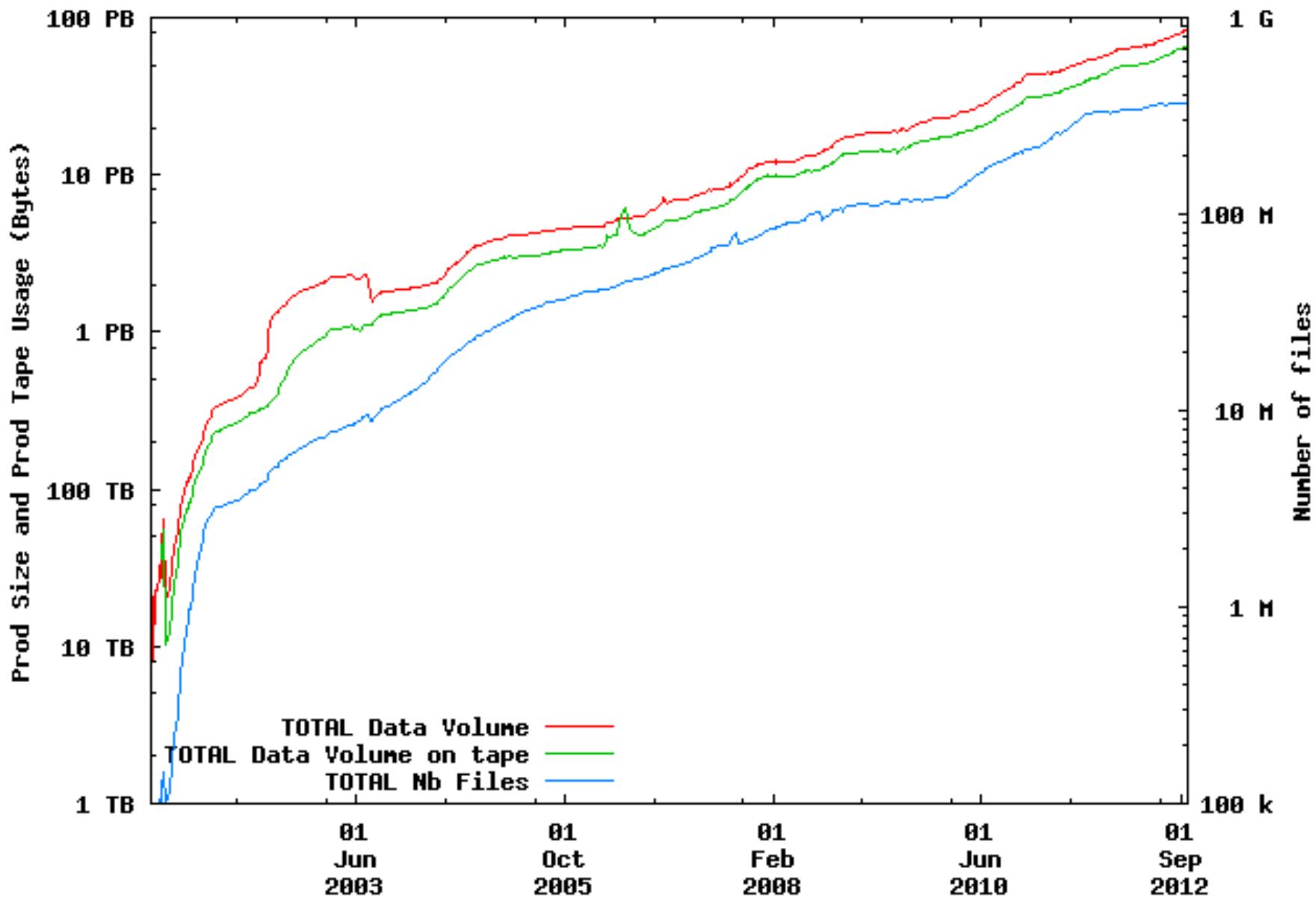
Crédit: F. Chollet(LCG-France), Ian Bird et MB (WLCG), S. Jézéquel (ATLAS)

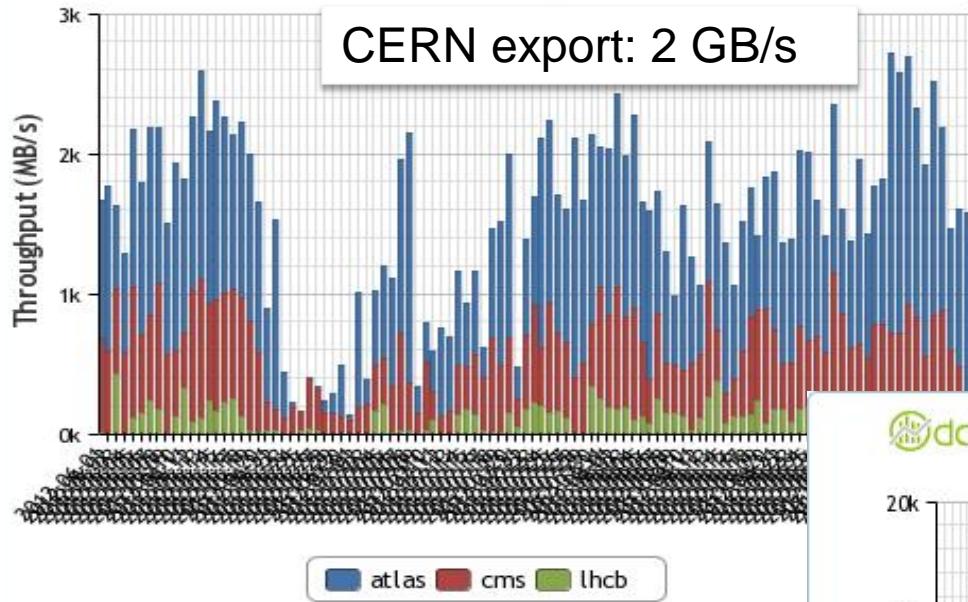




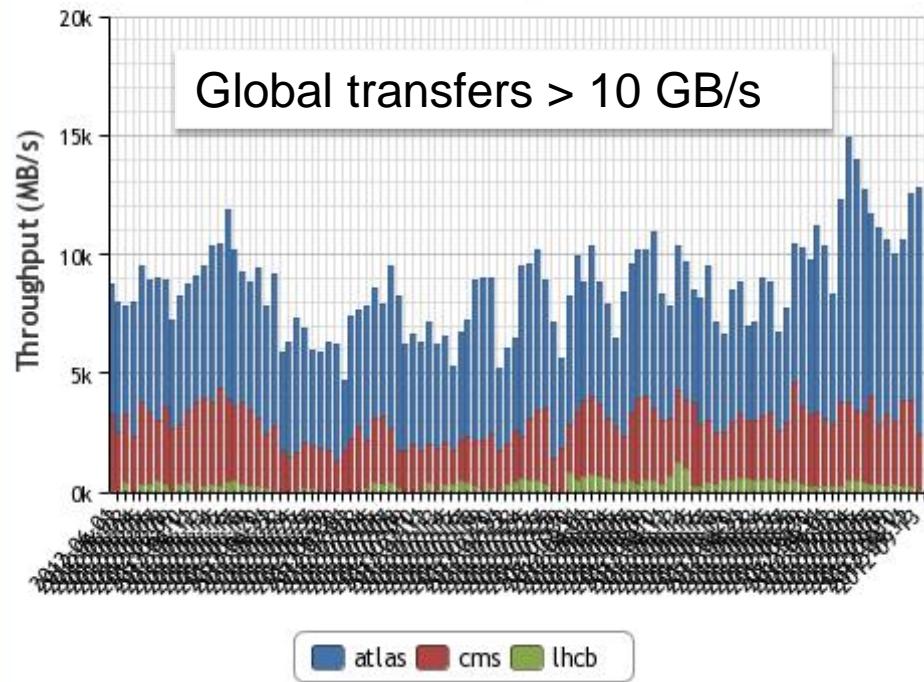
T0

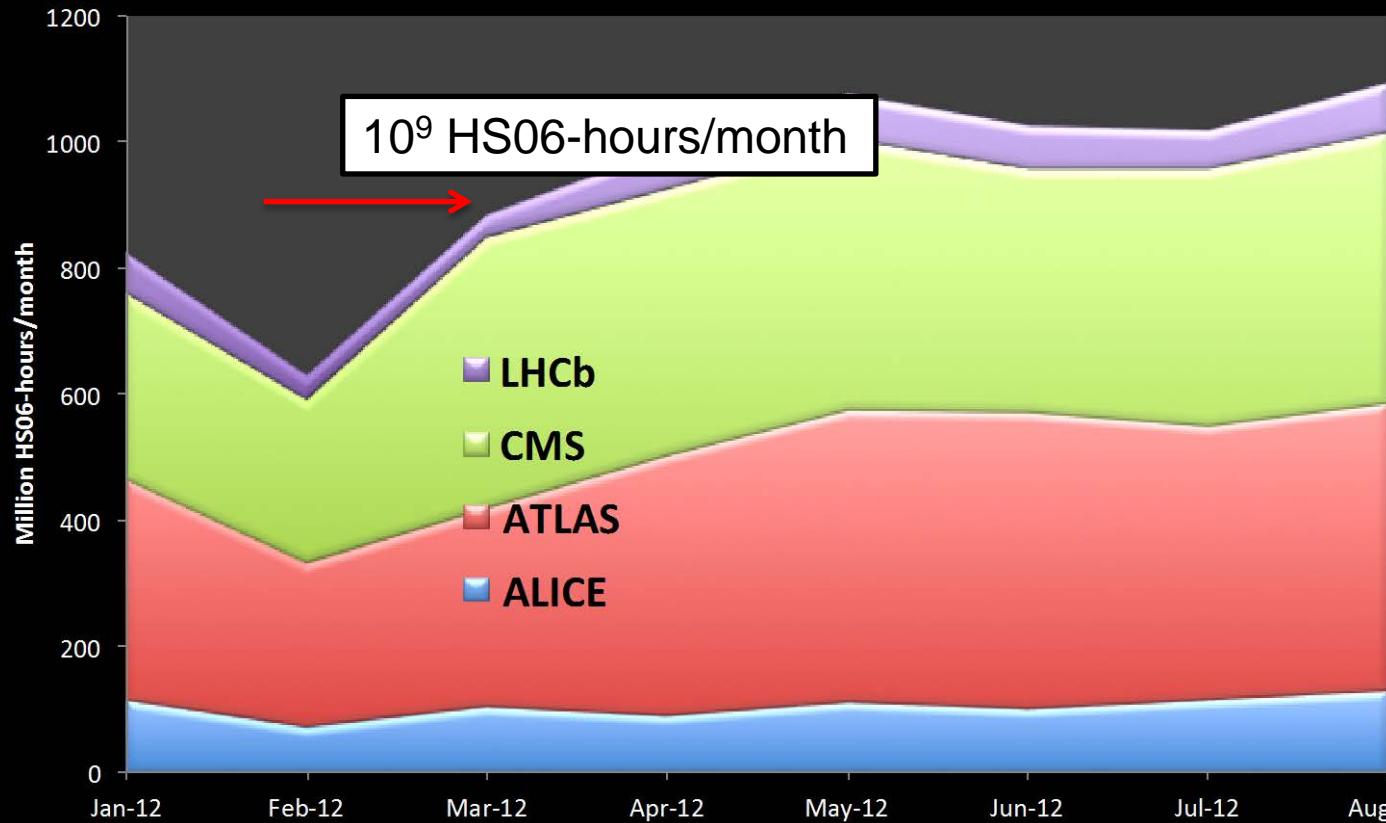
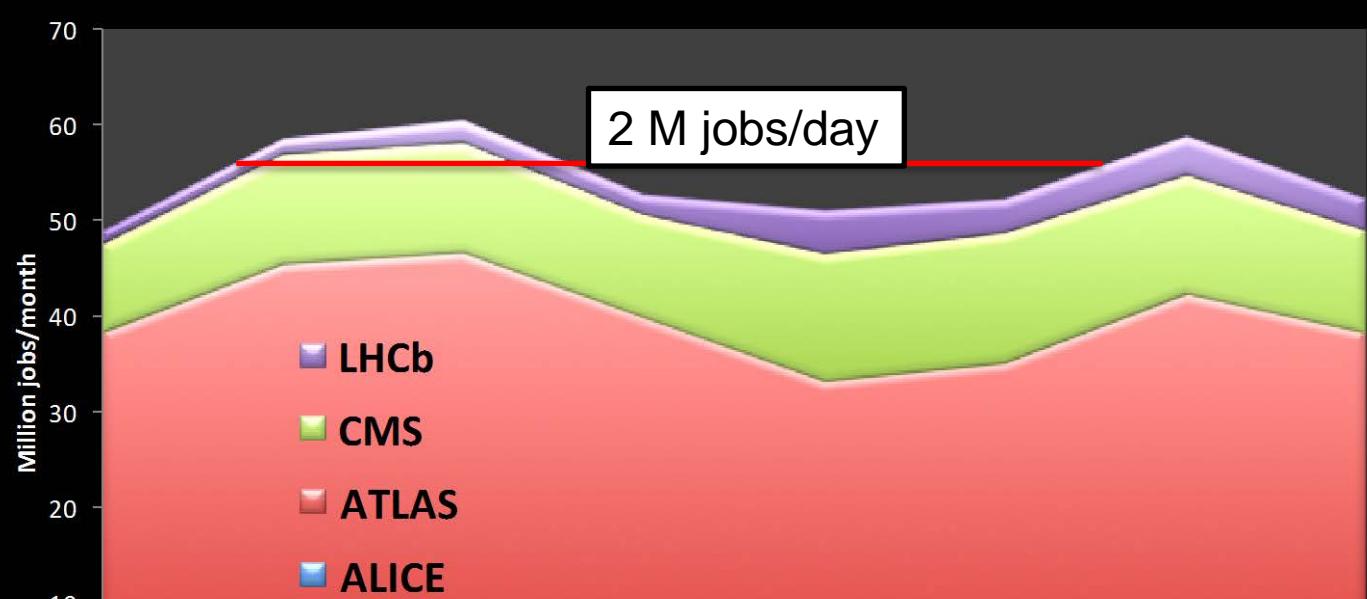
Experiments Production Data in CASTOR





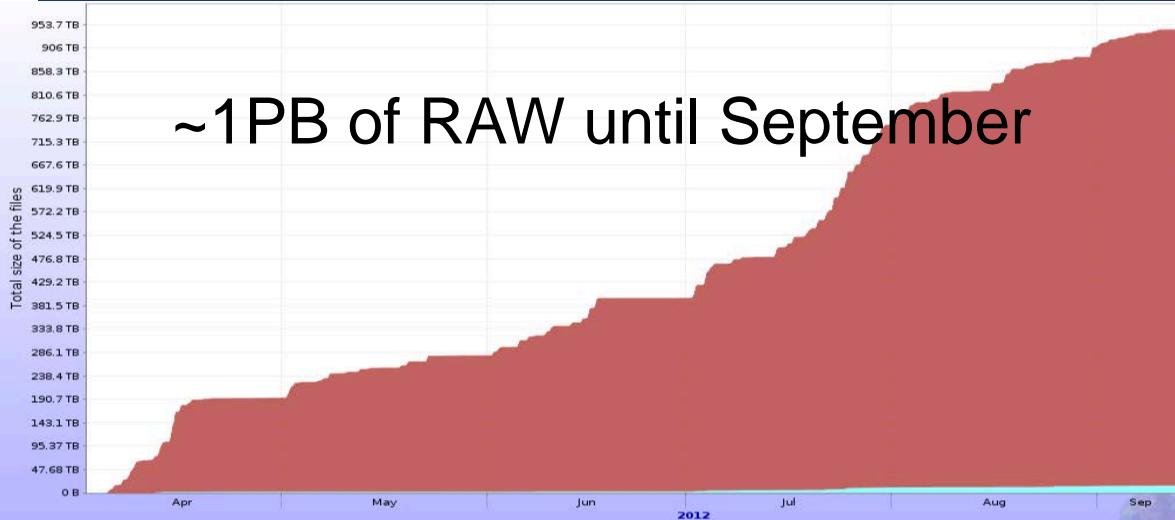
June – Sep 2012



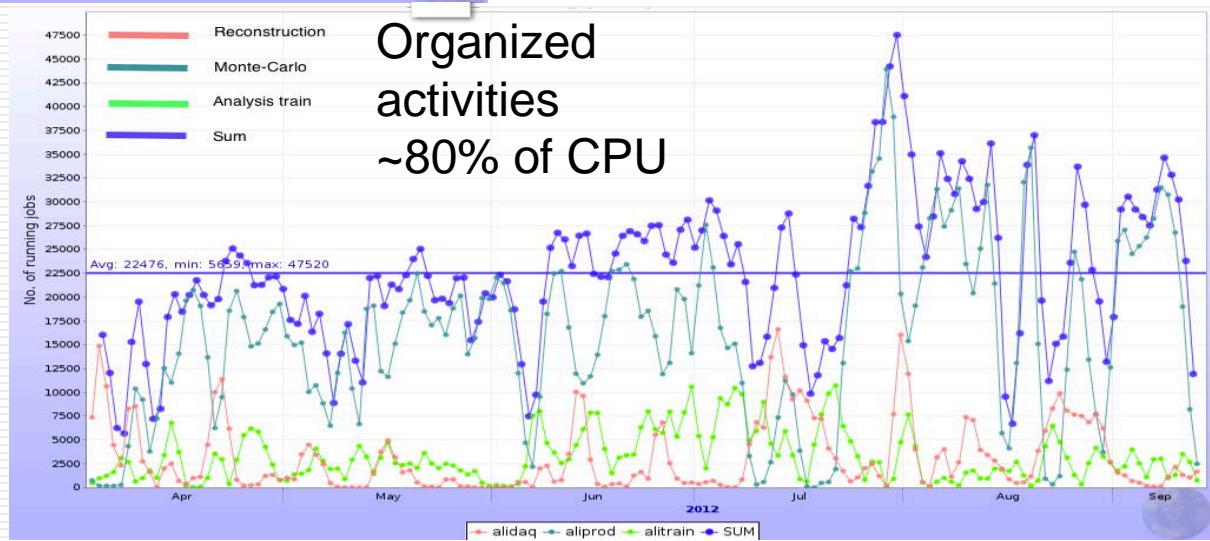


ALICE

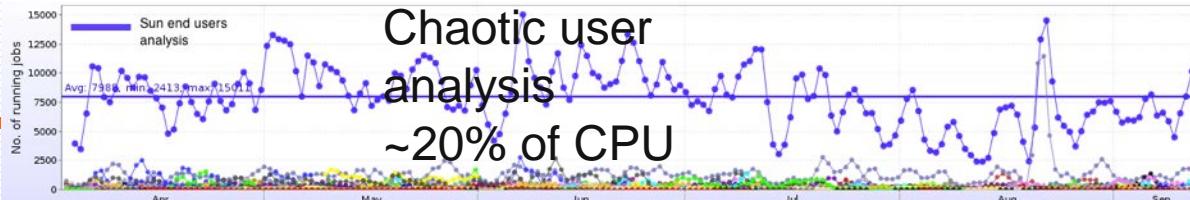
~1PB of RAW until September



Increase of CPU for analysis trains, proportional decrease of chaotic

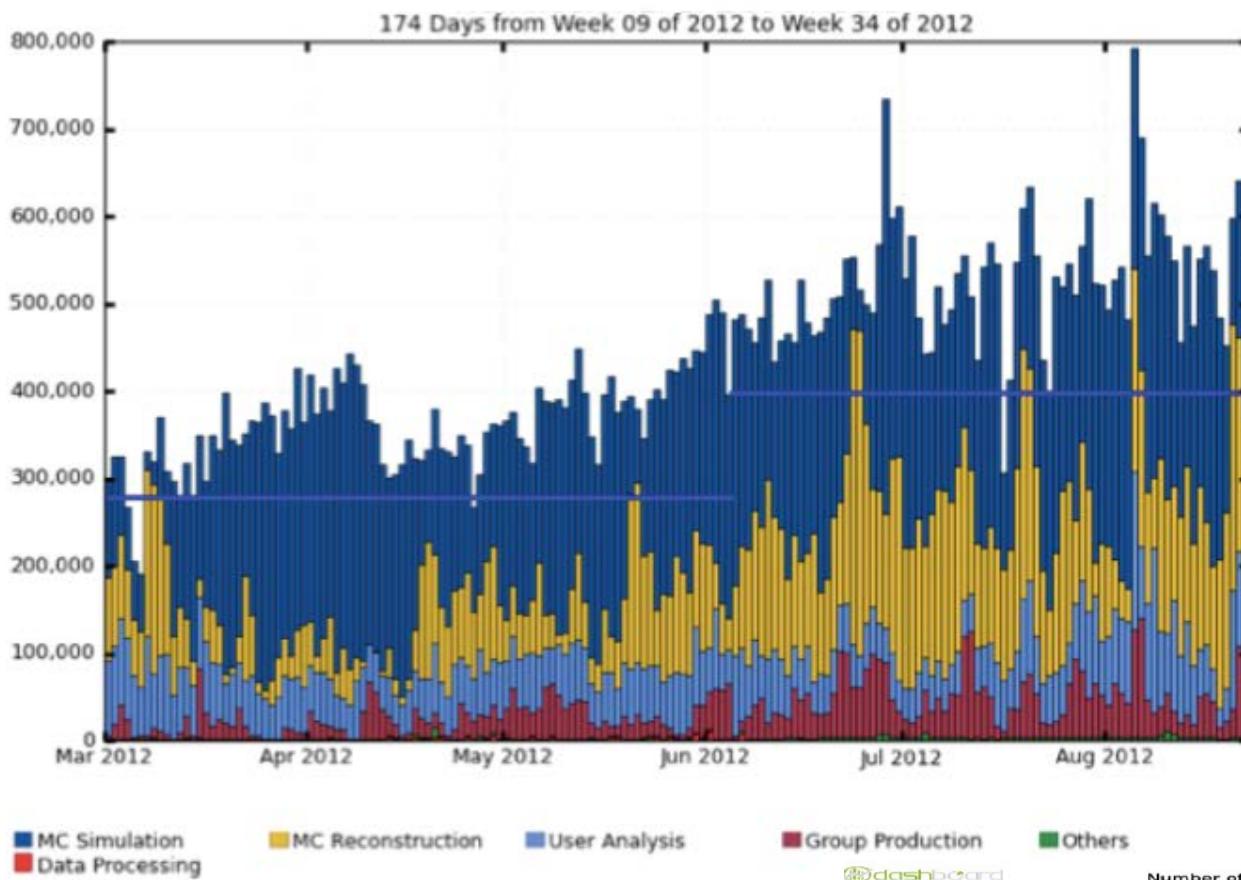


Organized activities
~80% of CPU



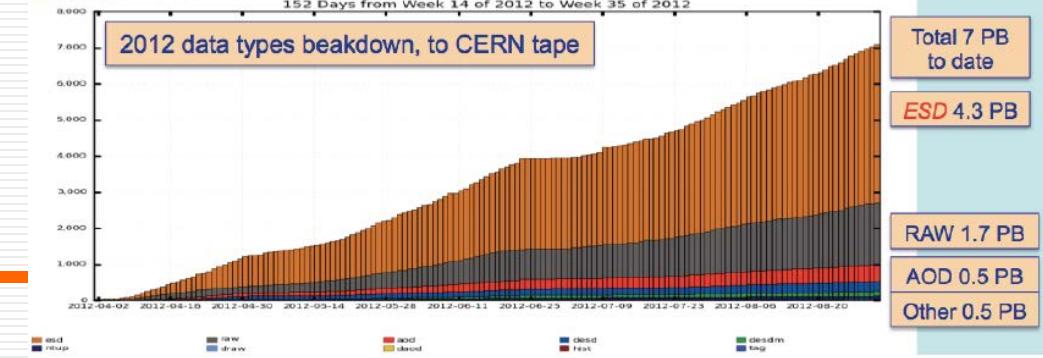
Chaotic user analysis
~20% of CPU

ATLAS – Tier 1 (and 0)



dashboard

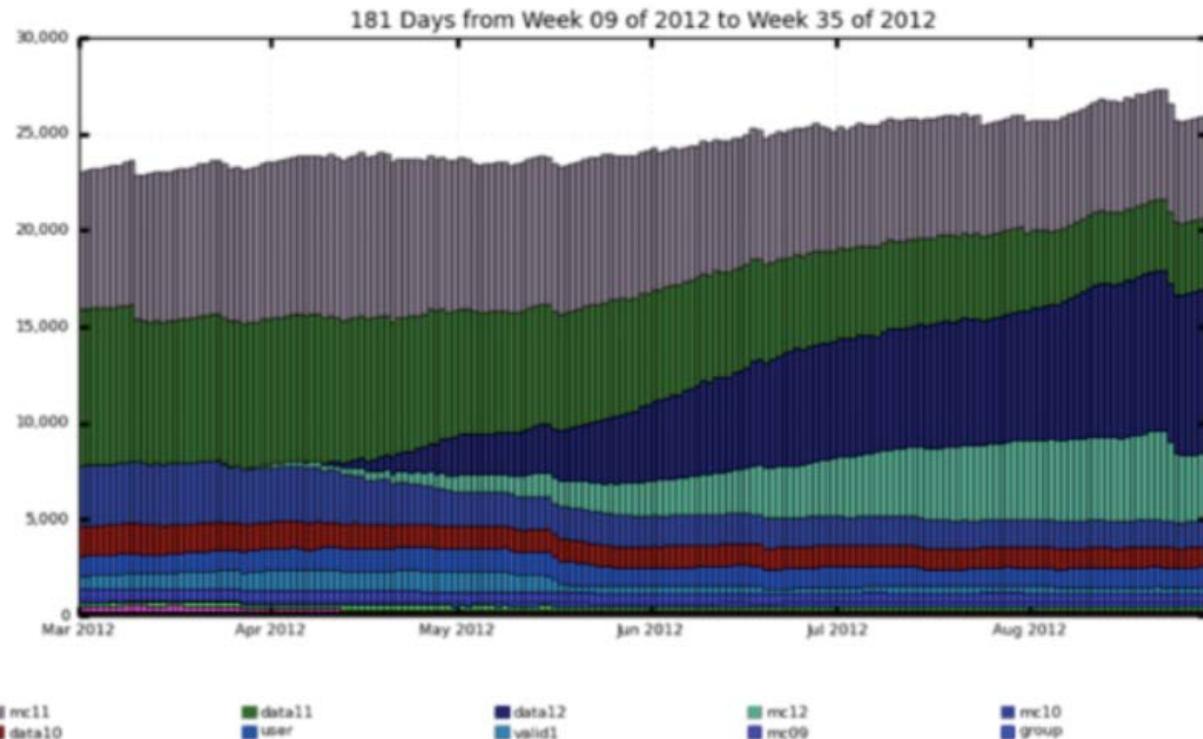
Number of Physical Bytes (in TBs)
152 Days from Week 14 of 2012 to Week 35 of 2012



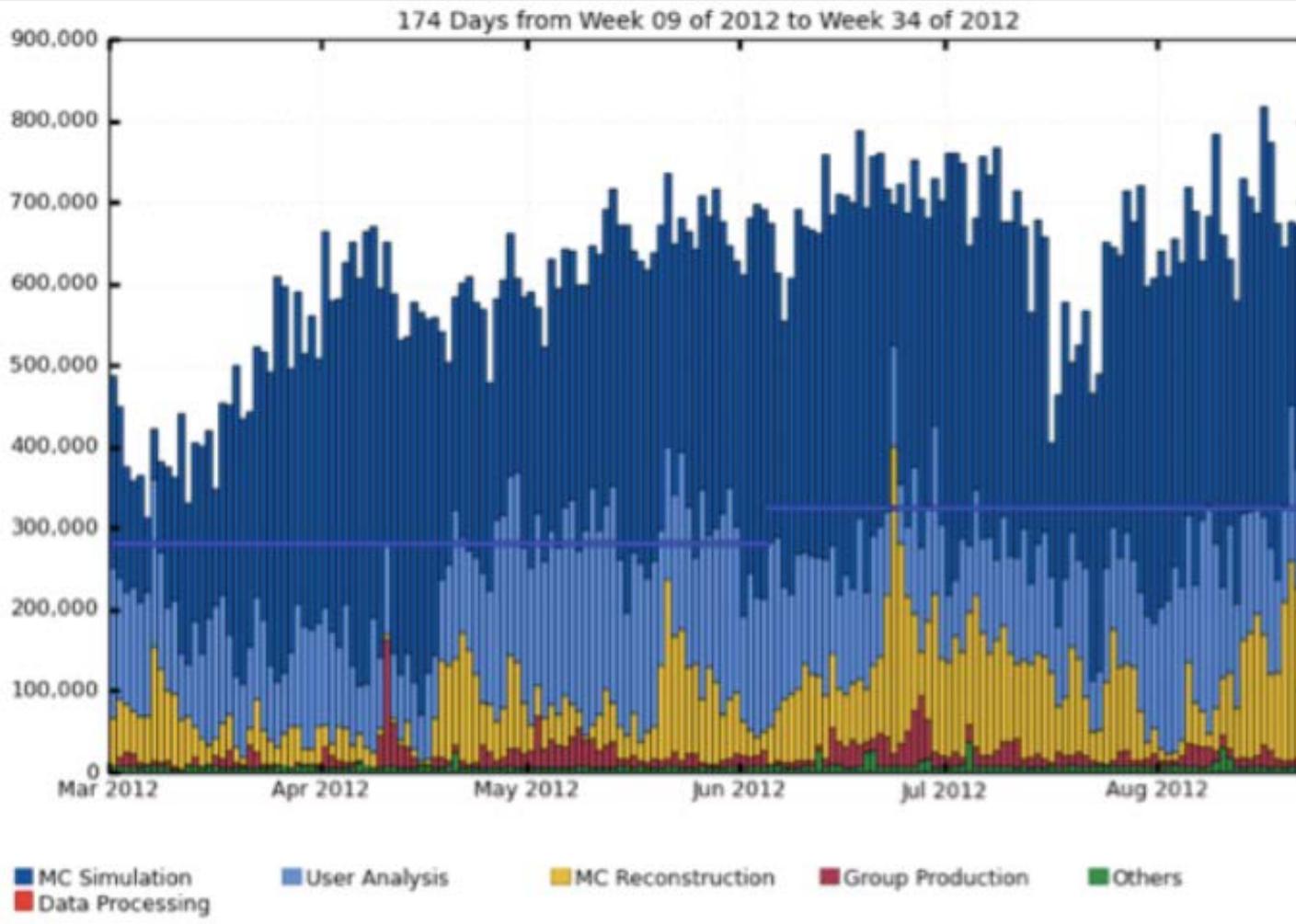
ATLAS – Tier 1 (and 0)

- ATLAS Grid activities at Tier-1s:

- As stated, we have more CPU as well as (but not that much) disk, we need to be careful!
- Performing very well!
- There are two upcoming data reprocessings:
 - 8 TeV pp data,
 - Heavy ion data from 2011.



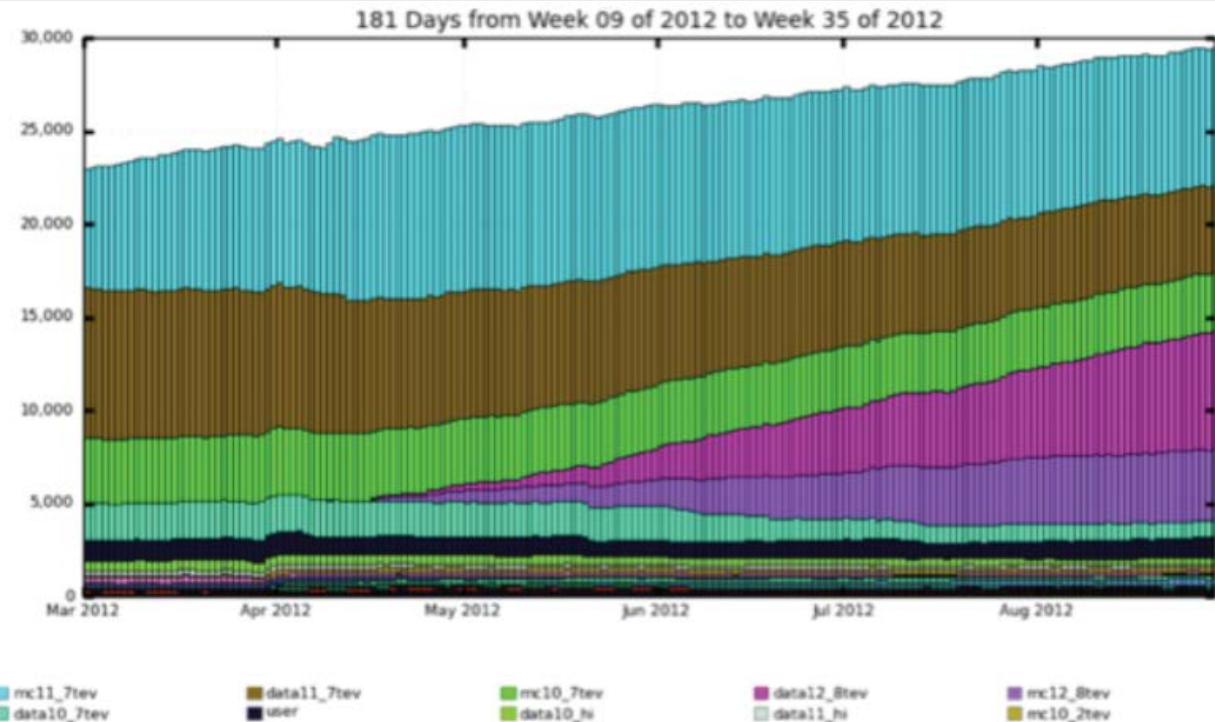
ATLAS – Tier 2



ATLAS – Tier 2

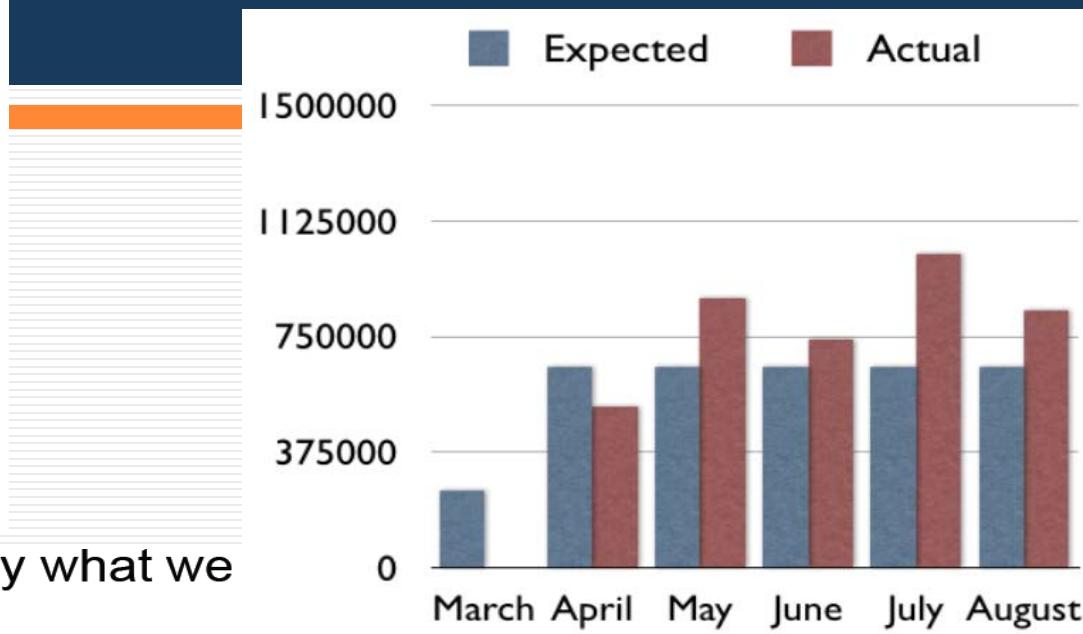
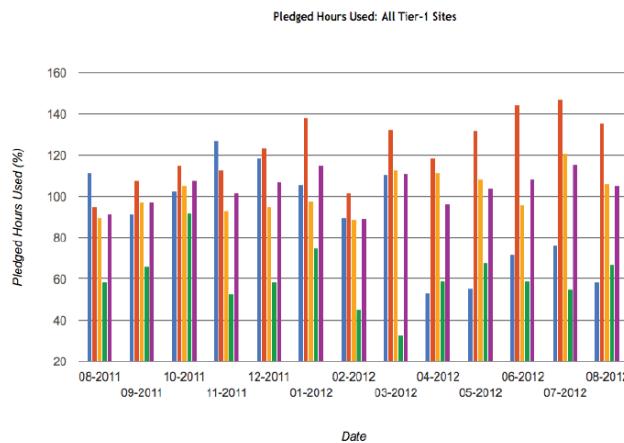
Tier-2s.

- Successful running of digitization and reconstruction, implemented beginning of the year.
- Now also taking a big part in group (D3PD/NTUP) production.
- Repositories for all ‘active’ data and MC.
- About 30% of disk space used for ‘dynamic data buffers’:
 - Popular data (group production, AODs..) replicated dynamically by PD2P.



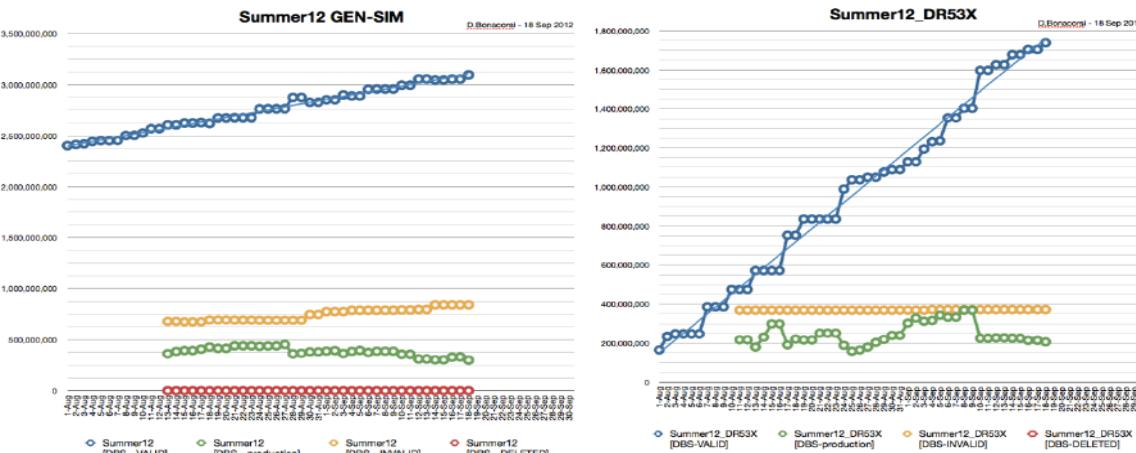
CMS

- Utilization of Tier-1s is high
 - Averaging 102% of pledged capacity used over the last 12 months



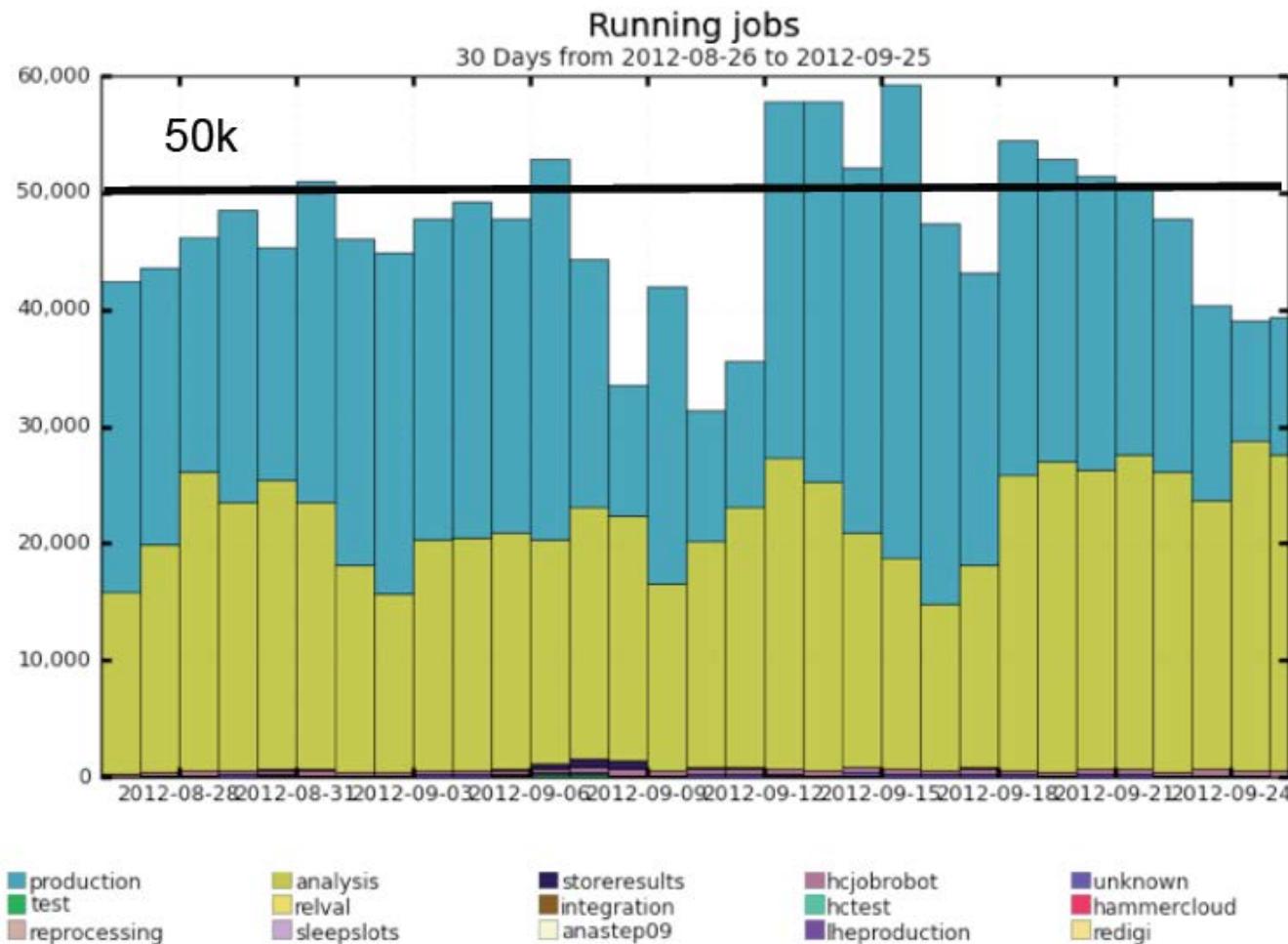
Données collectées

- Simulation Production is roughly what we anticipated
 - ~400M simulated events
 - ~1B reconstructed events



CMS

- Activity remains high for analysis



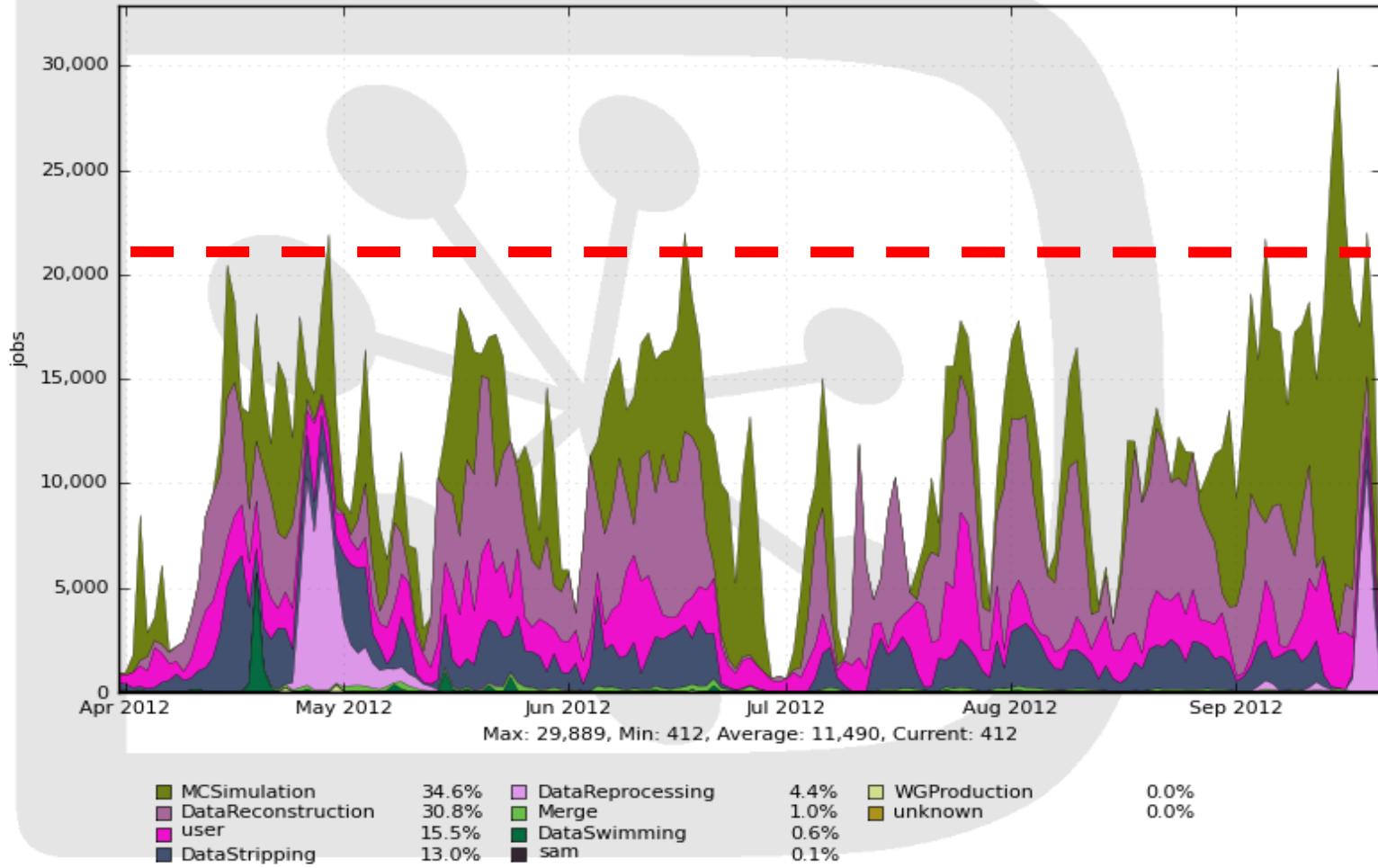
LHCb

- MC production
 - Large samples for analysis of 2011 data
 - Preliminary samples for 2012 data
- Reprocessing of complete 2012 dataset
 - Started 17th September
- Resources OK until now:
 - CPU usage 50% of pledge
 - ↳ As expected for first half of year
 - ↳ now ramping to >100% with reprocessing
 - 2012 disk pledge ~sufficient also for reprocessed data
 - ↳ Active data management
- Major shortage of tape, already using full pledge at Tier1s!
- Serious shortfall in tape, no solution yet
 - Already cleaned up all 2012 prompt SDST to fit in existing tape
 - No room at Tier1s for second copy of new RAW, and for ONLY copy of FULL.DST

LHCb

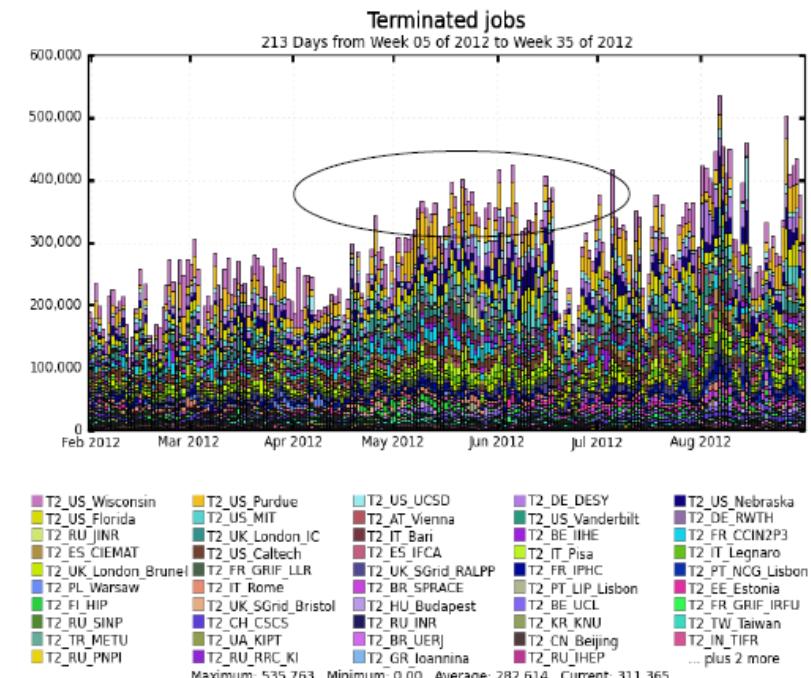
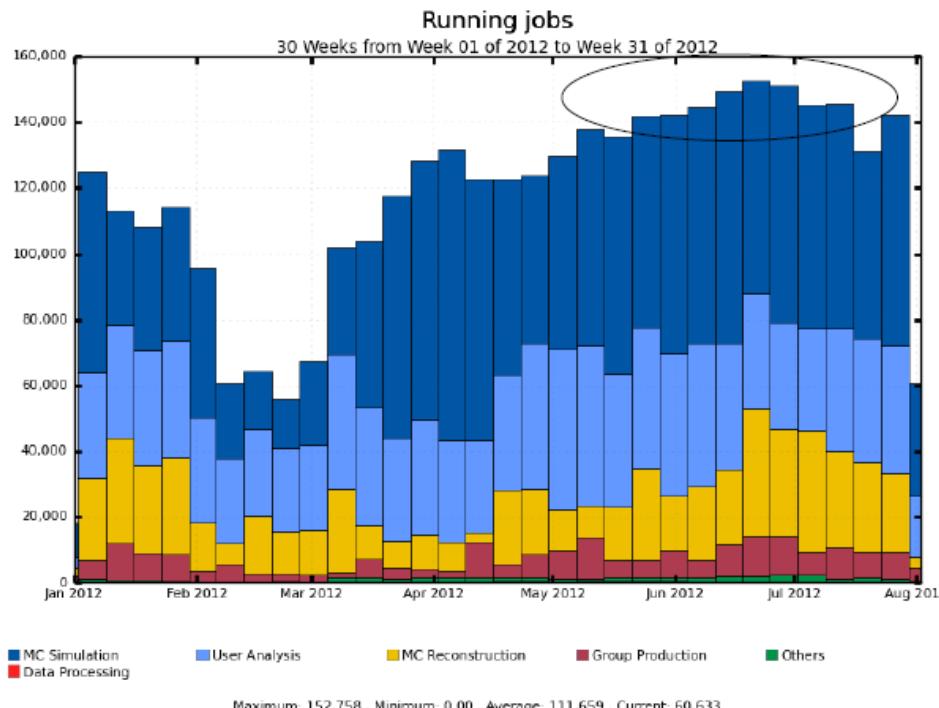
Running jobs by JobType

24 Weeks from Week 13 of 2012 to Week 38 of 2012



Computing avant publication

- ♦ Fin mai : Premières indications en interne sur la découverte d'une nouvelle particule
 - ♦ Pression pour que le computing ne bloque pas le résultat
(Pas de site critique en panne pendant > qq jours)
 - ♦ Requête pour avoir plus de ressources informatiques et meilleure réactivité des sites



ATLAS

Stéphane JEZEQUEL

11

CMS - analysis

LCG France-18 Sept 2012

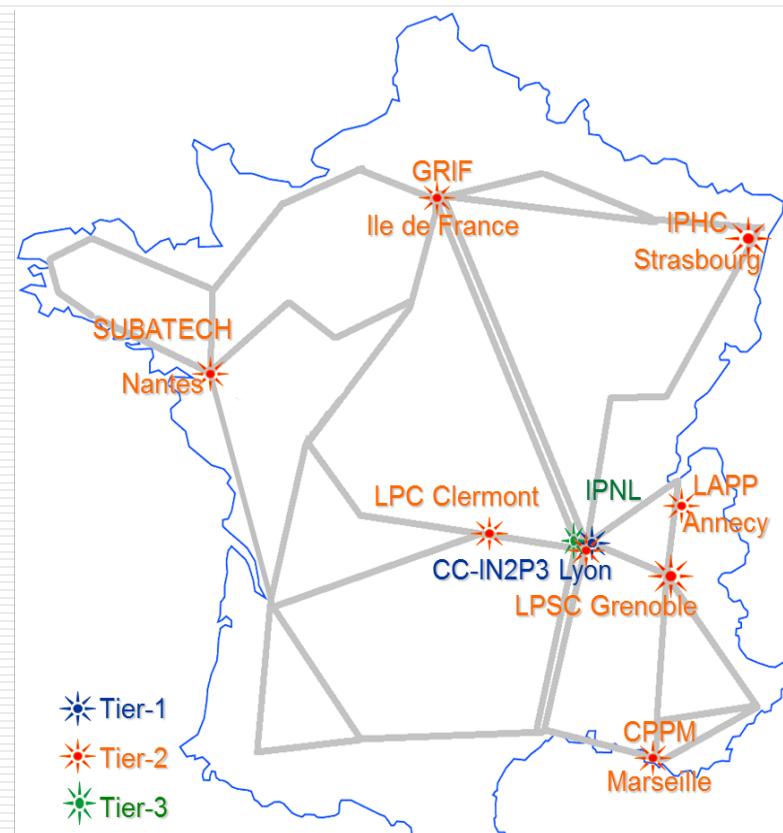
Computing avant publication

- ♦ Dernières semaines : Augmenter la réactivité pour traiter les derniers lots de données (réactivité < 12 heures)
- ♦ Pannes → Opération centrale devait réassigner les jobs au bout de qq heures
- ♦ Analyse : Défi dans l'expérience pour gérer plusieurs centaines d'utilisateurs (Higgs CMS > CDF)
- ♦ Au final :
 - ♦ Grille WLCG était prête pour permettre , pour la première fois, de produire des résultats scientifique en qq semaines
 - ♦ Toutefois, nécessite encore forte contribution d'experts d'expériences et de site

Ressources Tier-2 et Tier-3 dans tous les sites (y compris au Tier-1)

Sites LCG-France

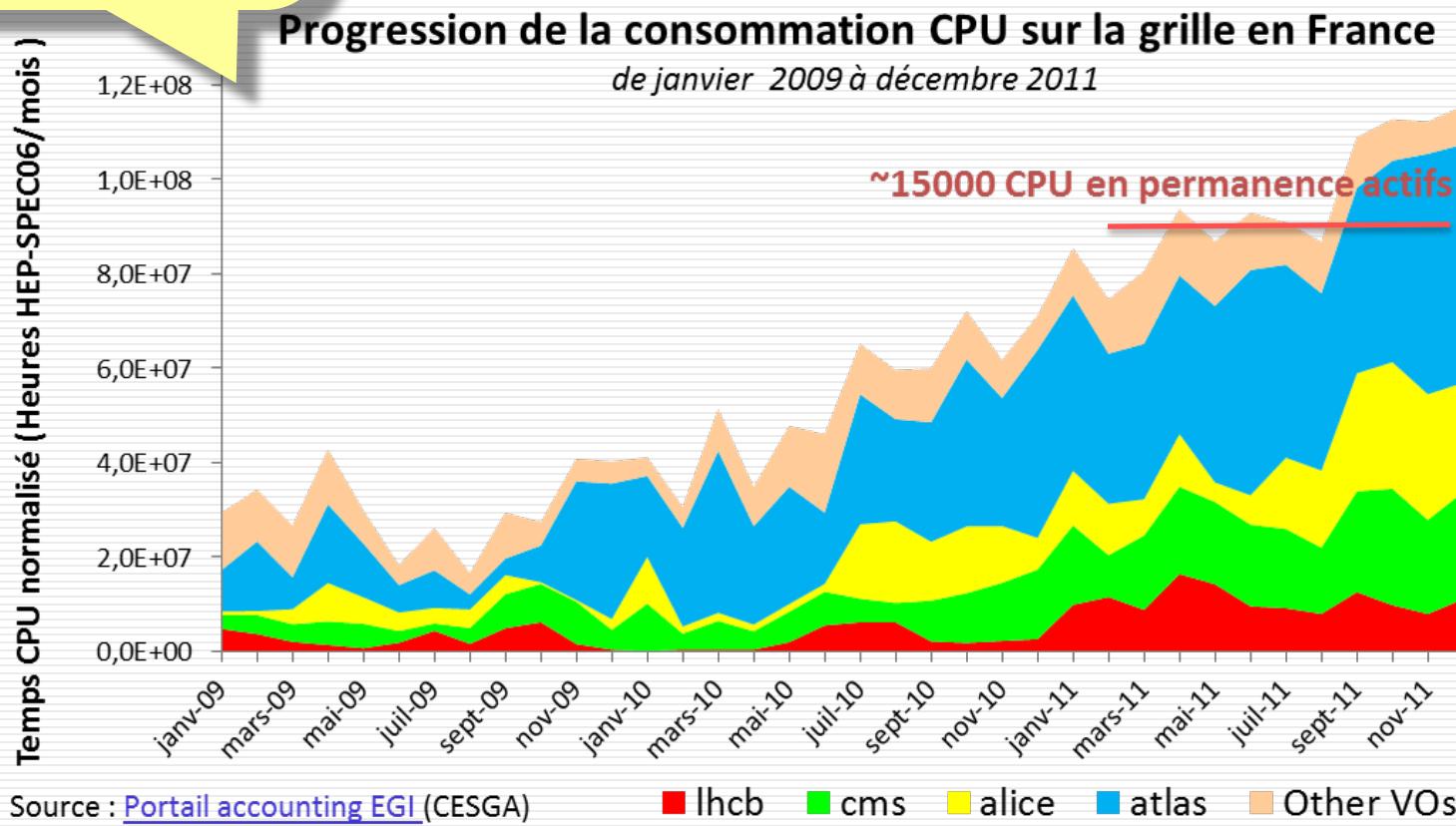
- ouverts à d'autres communautés scientifiques et nœuds de France-Grilles
- en partenariat avec les universités, collectivités locales ou régionales...



Role	Site	ALICE	ATLAS	CMS	LHCb
Tier-1	IN2P3-CC	✓	✓	✓	✓
	IN2P3-CC-T2 (AF)	✓	✓	✓	✓
	IN2P3-CPPM		✓		✓
Tier-2	GRIF	✓	✓	✓	✓
	IN2P3-LPC	✓	✓		✓
	IN2P3-IPHC	✓		✓	
	IN2P3-LAPP		✓		✓
	IN2P3-LPSC	✓	✓		
Tier-3	IN2P3-SUBATECH	✓			
	IN2P3-IPNL	✓		✓	

Calcul LHC en France

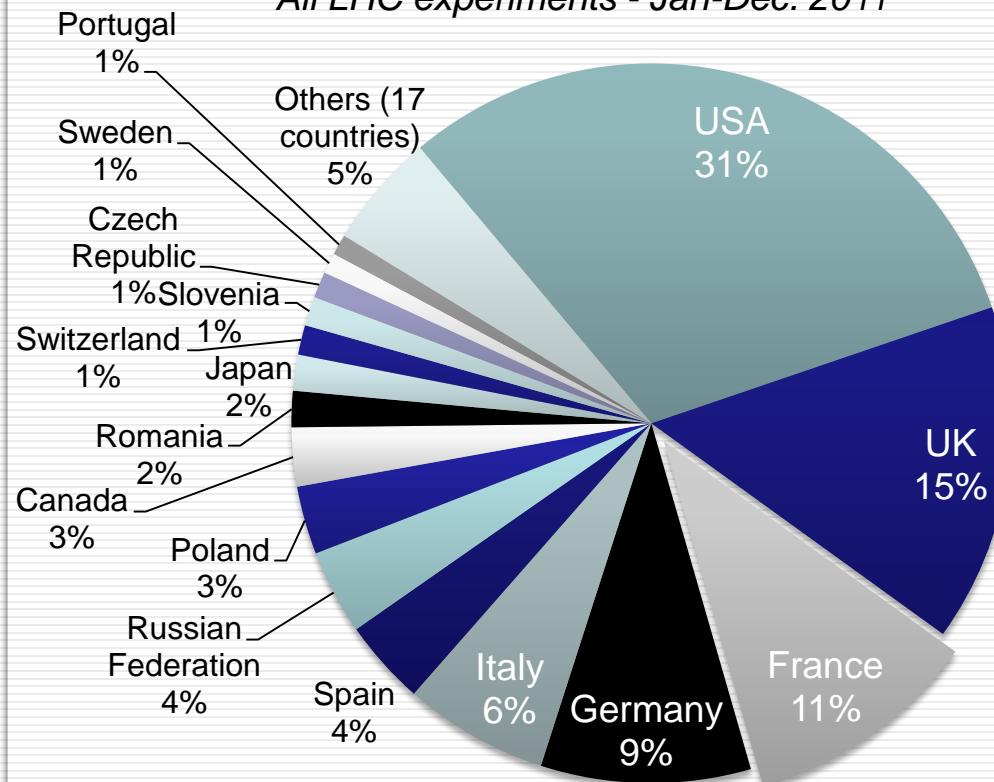
En 2011, la part du calcul LHC continue de progresser et représente plus de 88 % de la consommation CPU sur la grille en France



Contribution CPU des sites T2-T3

Tier-2 CPU contribution per country

Normalised CPU time (HEP-SPEC06)
All LHC experiments - Jan-Dec. 2011



CPU livré en
2011
par les sites Tier-2
Tier-3
(contribution CC-
IN2P3 Tier-2 inc.)

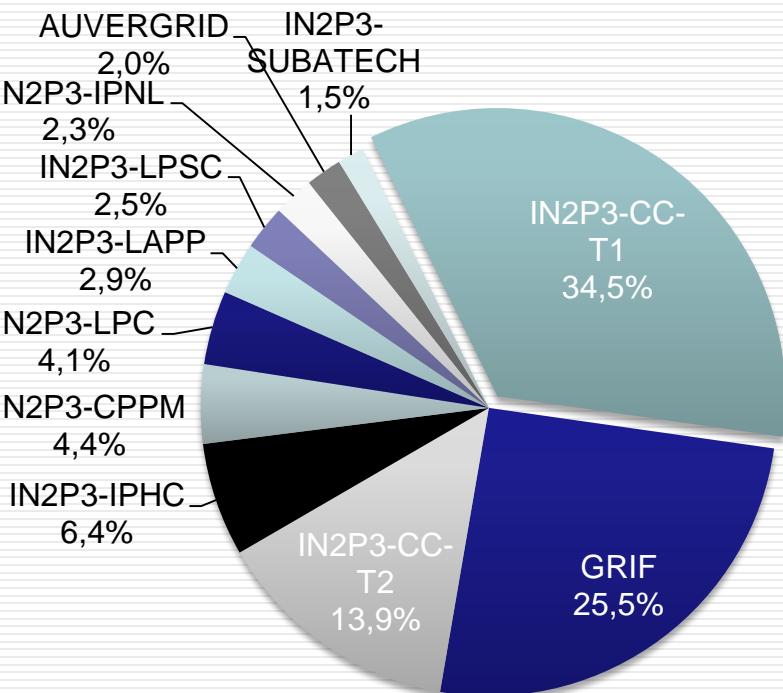
11 % in 2010
8 % in 2009

Calcul LHC en France

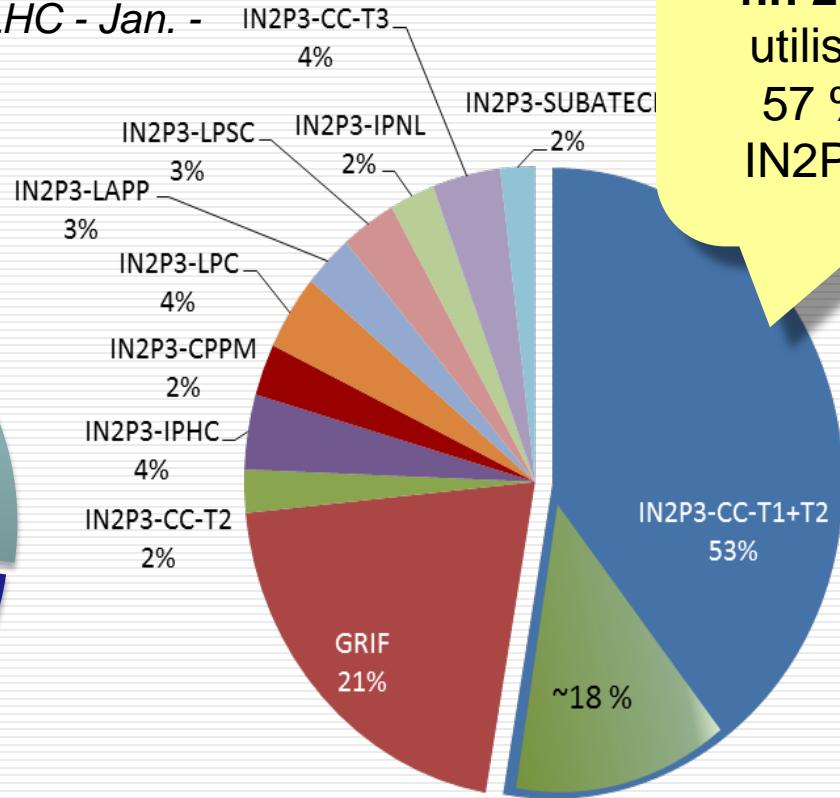
Contribution par site

~ 240 kHEP-SPEC06 disponible
Répartition CPU délivré
 48 % au CC-IN2P3 (T1+AF)

Temps CPU normalisé (HEP-SPEC06)
 Consommation des expériences LHC - Jan. - Déc. 2011



Capacité Disque installée :
 déc. 2011

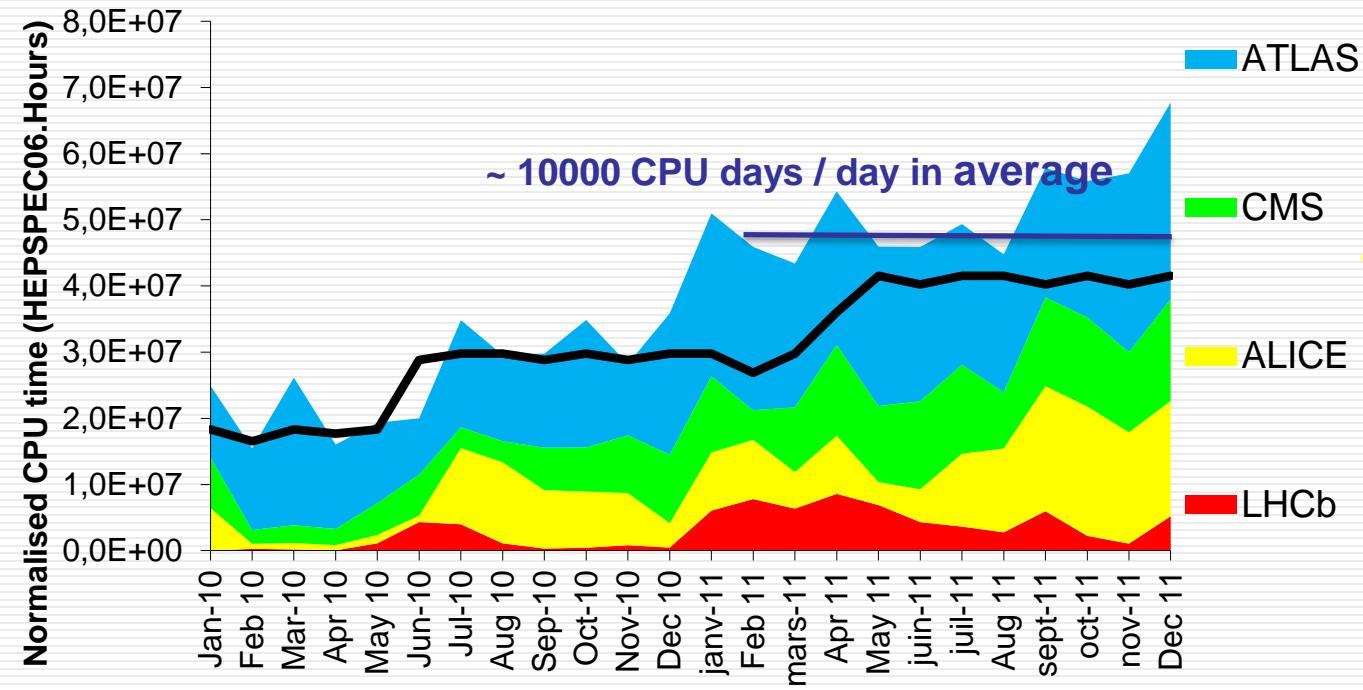


Répartition disque disponible fin 2011: 15 Po utilisée à ~73 %
 57 % au CC-IN2P3 (T1+AF)

Sources : http://gstat.egi.eu/gstat/summary/EGI_NGI/NGI_FRANCE/
<https://grid.in2p3.fr/LCGFrAccounting/>

Contribution CPU des sites T2 T3

France (Tier2) Normalised CPU time
used by LHC VOs Jan. 2010 - Dec. 2011



Source: [EGI Accounting Project](#)

Forte croissance de l'activité en 2011

CPU consommé:
137 % des pledges (tient compte d'un facteur d'efficacité de 67 %)

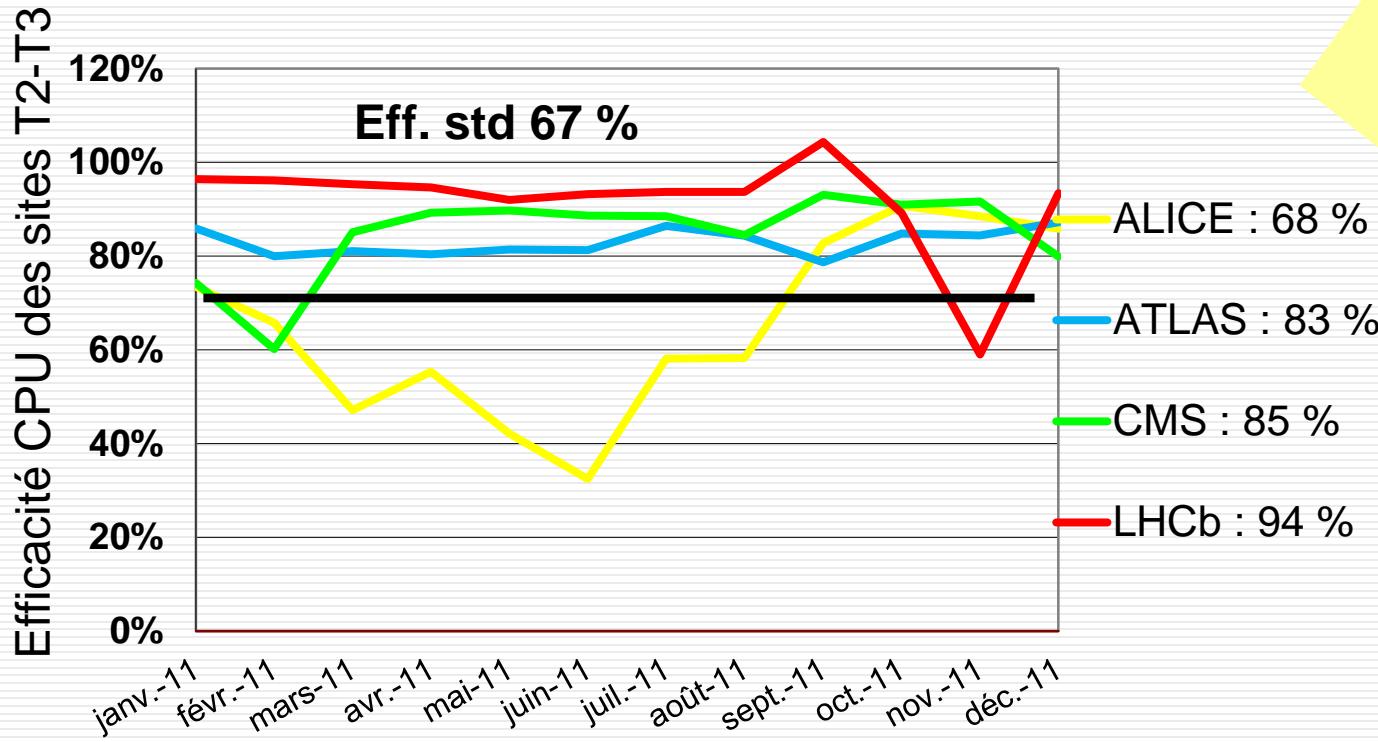
Sites utilisés au-delà des pledges
• contribution ressources T3
• bonne efficacité

Used CPU as % of pledge inc. std efficiency (67 % since may 11) : 137 % in



Contribution CPU des sites T2 T3

LCG-France T2 - T3 (inc. AF CC-IN2P3)
CPU / Wall_clock Times

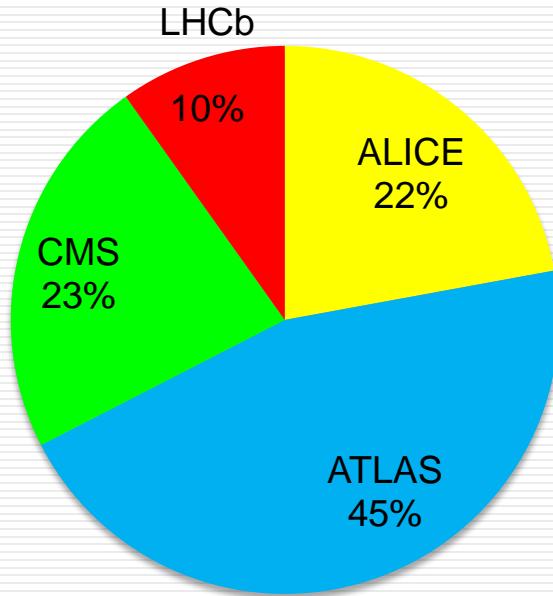


Efficacité CPU
des sites
supérieure à
l'efficacité
standard
attendue (67 %)

Efficacité CPU :
rapport du temps
CPU consommé sur
le temps passé en
machine

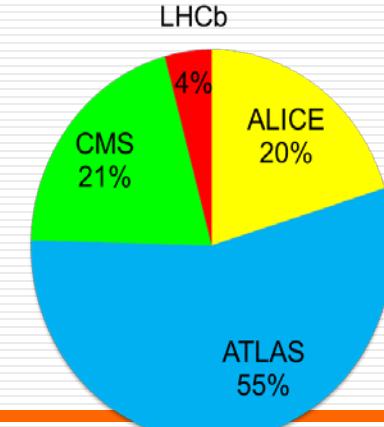
Contribution CPU des sites T2 T3

France (Tier2) CPU usage
by LHC VOs in 2011



à comparer avec la consommation CPU 2011 dans les sites Tier-2 WLCG :
ALICE : 9 %
ATLAS : 53 %
CMS : 31 %
LHCb : 7 %

France (Tier2) CPU usage
by LHC VOs in 2010

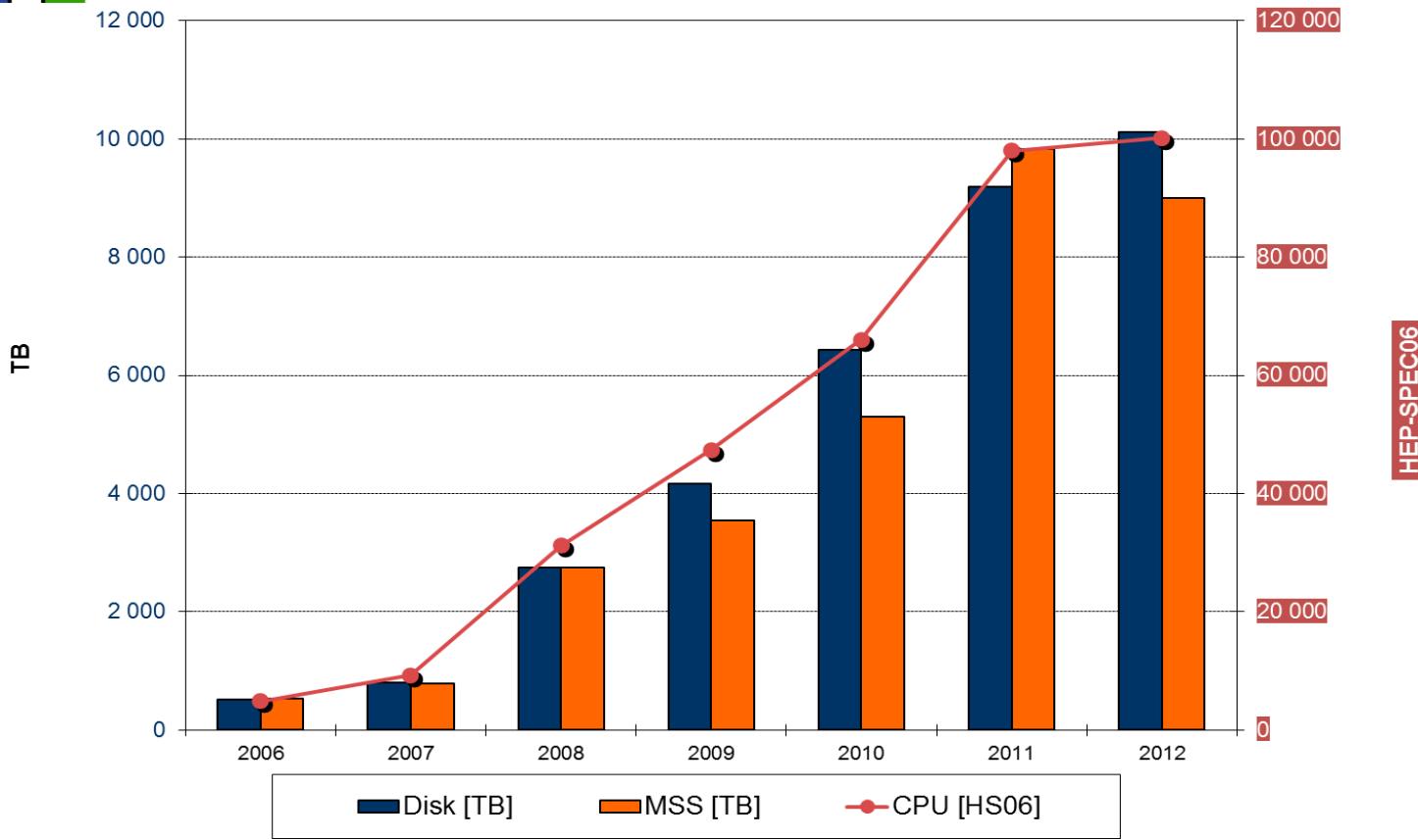


Maintien de la capacité T1/AF du CCin2p3



Resource Deployment plan
(Tier-1 + Analysis Facility)

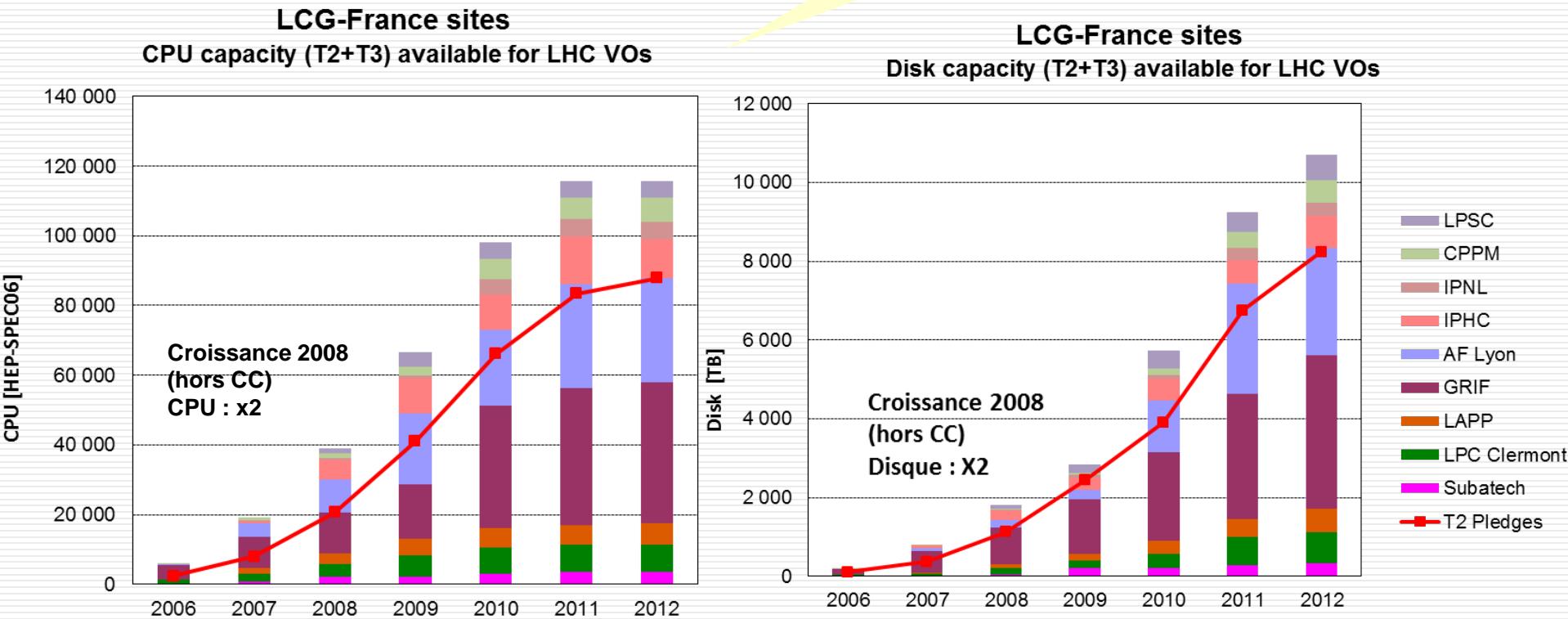
Pas de croissance



Croissance T2-T3 2006-2012

Capacité CPU, Disque (hors CC) x 2 en 2008
soit ~ 16 kHS06 et 900 To de disque à
renouveler en 2012

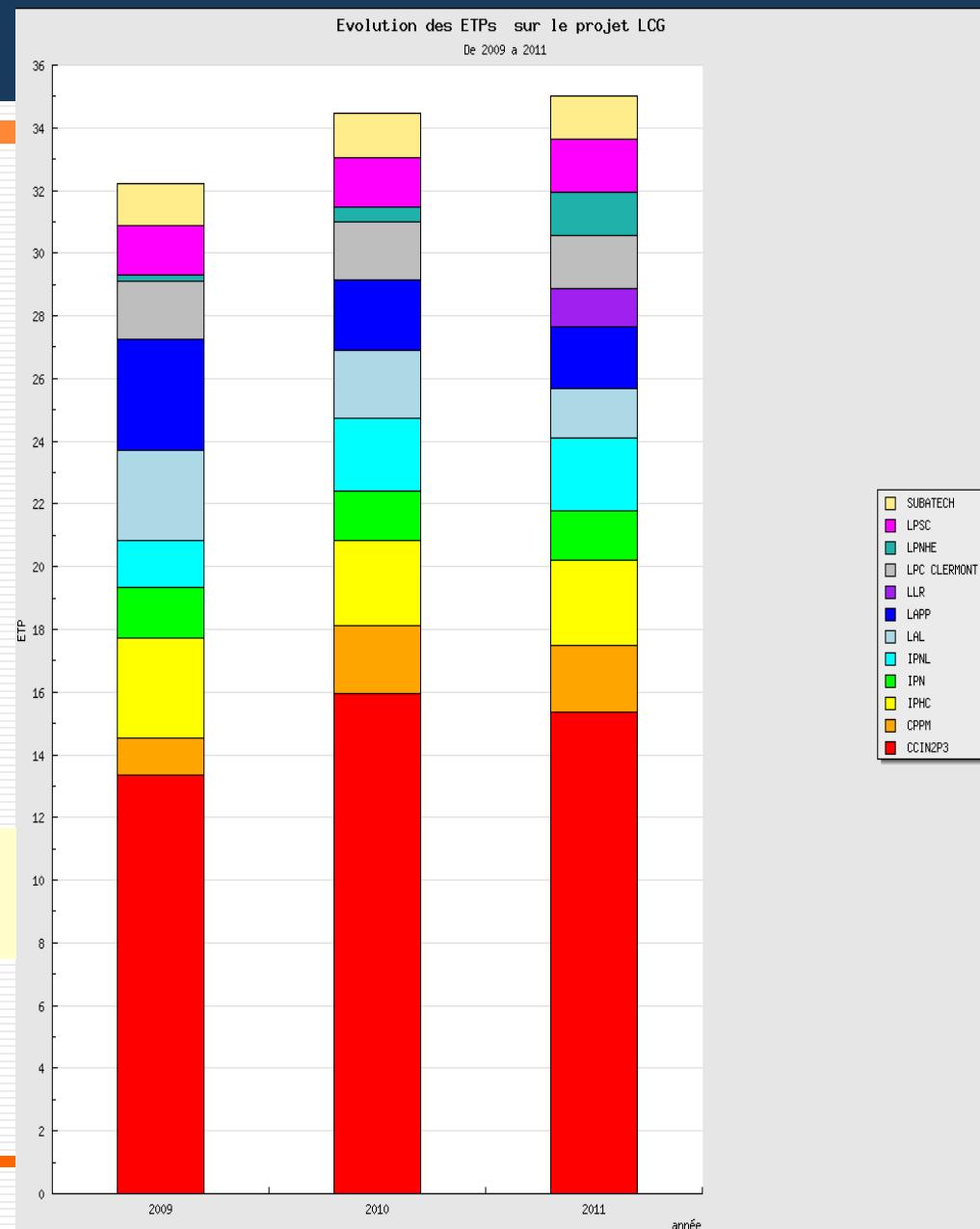
2008 : genèse des sites T2-T3
2008-2010 : croissance CPU
2010 – 2011 : rattrapage ratio
disque / CPU (à la demande
expériences)



Implication RH In2p3

RH In2p3 (Source ISIS)

En 2011 : ~34 ETP sont déclarés par les laboratoires IN2P3 dans ISIS (dont 40 % CC).



Estimation 2011 : ~ 37 ETP
34 ETP IN2P3 + 3 ETP (CEA)

Global Effort → Global Success

Results today only possible due to
extraordinary performance of
accelerators – experiments – Grid computing

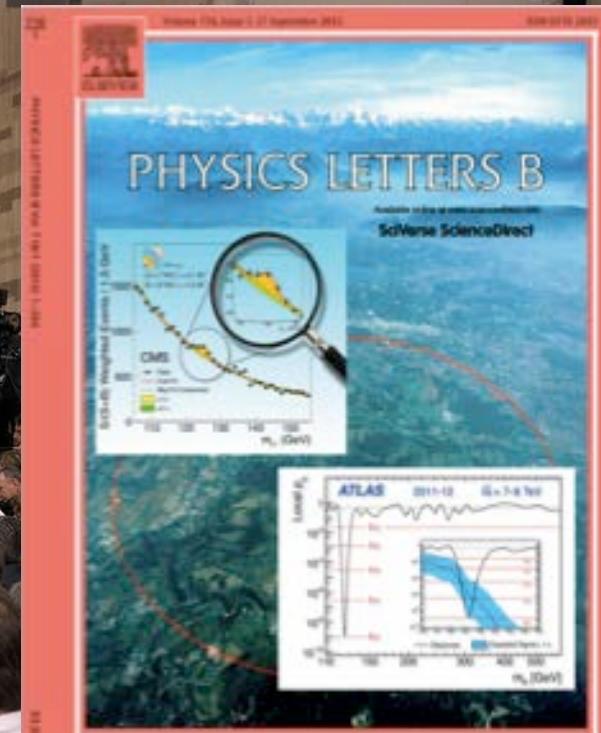
Observation of a new particle consistent with
a Higgs Boson (but which one...?)

Historic Milestone but only the beginning

Global Implications for the future



R.D. Heuer



Proposal for a special issue of Journal of Computer and System Sciences (JCSS) on “Computers in the search for the Higgs Boson”

ATLAS contacted by JCSS inviting to contribute a special issue (SI) of JCSS on “Computers in the search for the Higgs Boson”

JCSS is an Elsevier publication; current impact factor: 1.157

Computing Coordinators very positive: JCSS is a good journal; this SI would recognize the role of SW and Computing and the work of the many involved people

Following some further iterations with JCSS, this has now evolved into a joint special issue with CMS for publication in 2013/14

JCSS has ~ 6-8 papers per issue, no strict limitation on page length; could also be 2 volumes

We have asked N. McCubbin to be the ATLAS Guest Editor. Ian Fisk will be the CMS GE.

Scope to be discussed within ATLAS and with CMS (NMCC will prepare a layout): likely span SW and Computing aspects from trigger to analysis