Readiness of the ATLAS Spanish Federated Tier-2 for the Physics Analysis of the early collision events at the LHC

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Organization

The ATLAS Spanish Tier-2 (T2-ES) consists of a federation of the three following sites :
- Instituto de Física Corpuscular de Valencia (IFIC) which is the coordinator site of T2-ES
- Institut de Fisica d'Altes Energies de Barcelona (IFAE)
- Universidad Autónoma de Madrid (UAM)

The ATLAS T2-ES belongs to the South Western Cloud (Spain-Portugal) and is associated to the Tier-1 PIC centre.

Resources of T2-ES

UAM - MADRID

Contribution to T2-ES : 25 %
CPU : 276 kSi2k
Disk : 147 TB
Shares :
- Production : 60%
- Analysis : 40%

SE System : dCache

IFIC - VALENCIA

Contribution to T2-ES : 50 %
CPU : 438 kSi2k
Disk : 198 TB
Shares :
- Production : 60%
- Analysis : 40%

SE System : Lustre+StoRM

IFAE - BARCELONA

Contribution to T2-ES : 25 %
CPU : 201 kSi2k
Disk : 104 TB
Shares :
- Production : 50%
- Analysis : 50%

SE System : dCache / disk+SRM posix

Aviability and Reliability of T2-ES

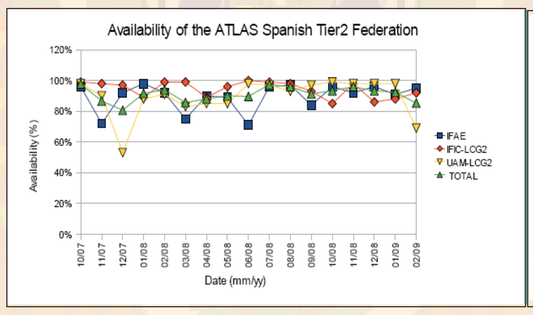
The site availability metrics are calculated by running a range of different tests at regular intervals throughout the day. A site is considered to be available if a defined set of critical tests complete successfully.

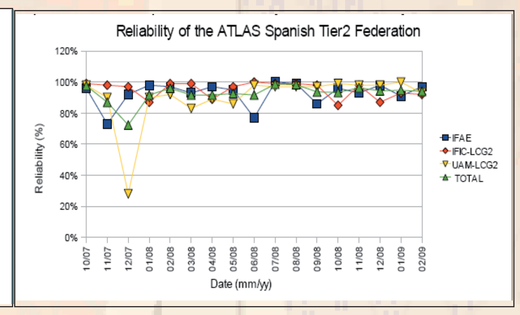
These metrics distinguish between availability and reliability with the following definitions :

availability = time_site_is_available / total_time

$$\text{reliability} = \frac{\text{time\_site\_is\_available}}{\text{total\_time - time\_site\_is\_scheduled\_down}}$$

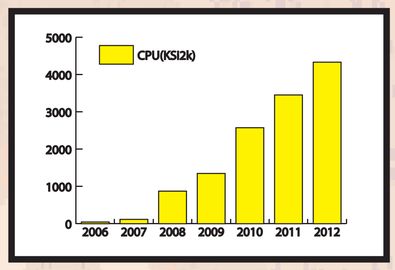
T2-ES has been working according to the expectations during last year

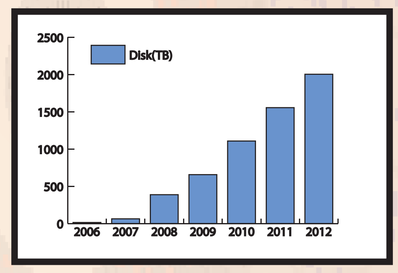




Data from http://lcg.web.cern.ch/LCG/

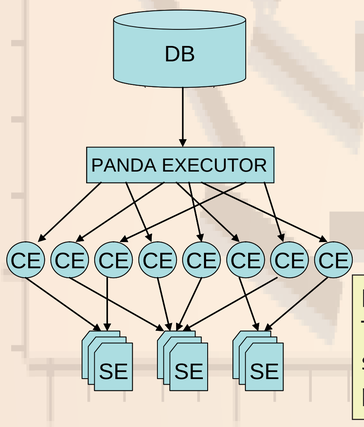
Resource pledges for T2-ES





The major effort in increasing the CPU and Disk storage resources of T2-ES has been done during the period 2007-2008.

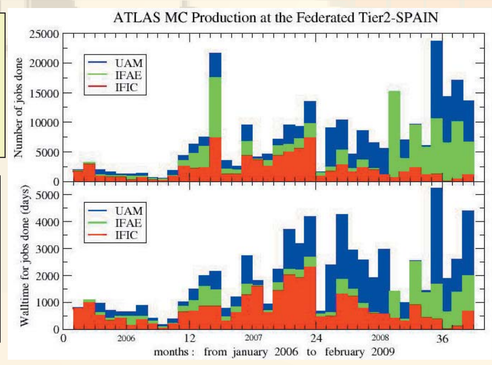
Production System for Simulated Data (MC) :

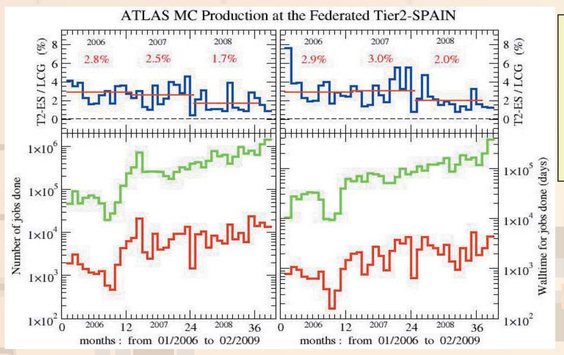


Simulated ATLAS Events Data Production

The ATLAS Production System manages the official continuos production of simulated events data using the Monte Carlo (MC) simulation method. This system consists of :
- a data base (DB) where jobs to be run are defined as well as their run-time status,
- an executor (PANDA) that takes the jobs from the DB and manages sending them to the computing resources of ATLAS, using pilots,
- a distributed data management (DDM) system which stores the produced data on the adequate storage resources at different sites and register them into the defined catalogs.

Number of simulated jobs run successfully at T2-ES (by site) and the corresponding walltime spent for these MC data productions. Covered period is from January 2006 to February 2009.





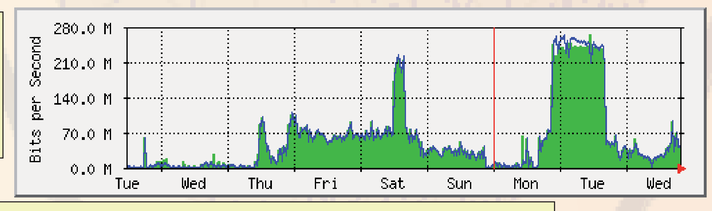
Note that the number of simulating jobs that are running is increasing over the years, as well as the simulated data produced.

The contribution of T2-ES to the massive production of the whole ATLAS simulated data, since January 2006 (and up to February 2009), is around 1.1 %. It is worth noting that there is about 250 Tier-2 worldwide sites and 10 Tier-1 sites contributing to this effort of simulation.

Data from http://dashb-atlas-data.cern.ch/dashboard/request.py/site

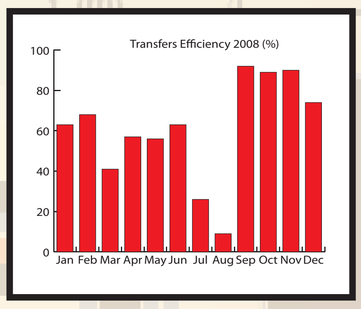
Network Performance and Data Efficiency

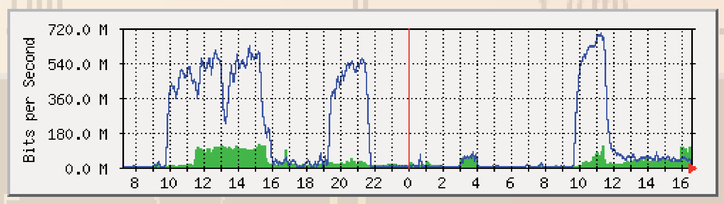
The ATLAS link requirement between Tiers-1 and Tiers-2 has to be 50 MBytes/s (400 Mbps) in a real data taking scenario.



CCRC'08 exercice :
- data transfers from the Tier-1 site (PIC) to T2-ES is done using the gridftp protocol
- in this exercice, a maximum of 250 Mbps transfer rate has been reached

Local File Test Transfer (4 March 2008):
- transfer rate between internal pool disk servers (IFIC site).
- a maximum of 720Mbps transfer rate has been reached.

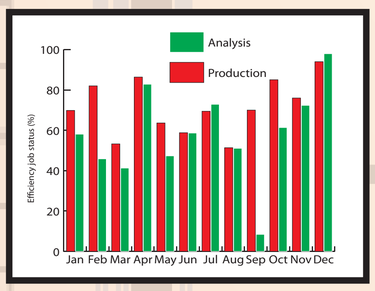




Transfer efficiencies involving T2-ES have been improved during the year 2008

Data from http://dashb-atlas-data.cern.ch/dashboard/request.py/site

Simulation vs Analysis Jobs Efficiency



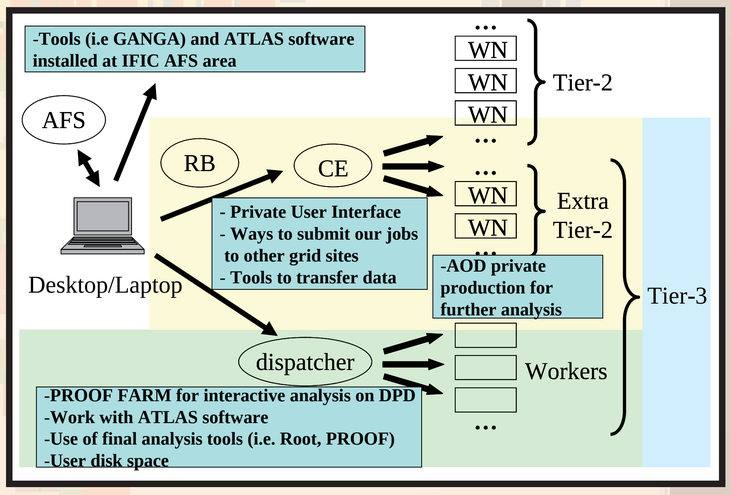
Comparison of the efficiencies for the Simulation and Analysis jobs run. These efficiencies concern the year 2008.
In december, both efficiencies reach closely the 100%.

Data from http://dashb-atlas-data.cern.ch/dashboard/request.py/site

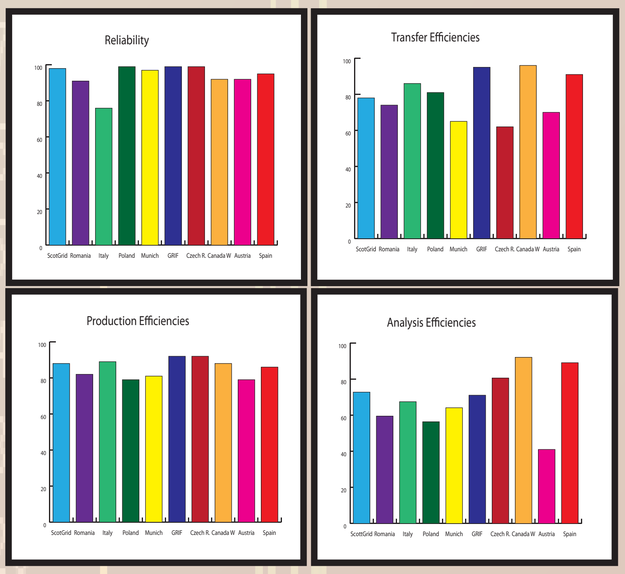
Layout of the Analysis Facility

A Tier-3 site-located computing infrastructure is needed as Analysis Facility for the spanish ATLAS end-user physicists.
It could be used by users for running jobs with few events or storing private datasets and DPDs. The use of the Tier-3 analysis facility could be faster than the grid-use for some kind of jobs.

However, Tier-2-Tier-3 interaction is necessary in order to access AODs and DPDs on DQ2.



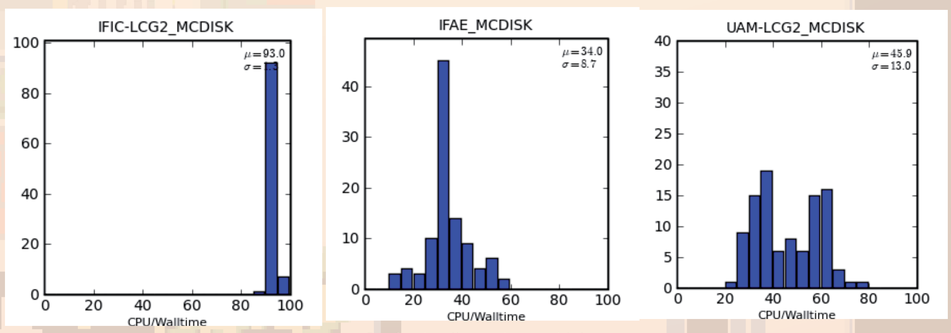
Few other ATLAS Tiers-2



Distributed Analysis Stress Test

A Ganga-based stress testing system called "HammerCloud" is being currently used to submit large number of analysis jobs to all the ATLAS facilities. As result of this, several scalability-related fixes have been included in the ATLAS system.

HammerCloud has been run for T2-ES (4/3/2009 – 6/3/2009). 100 jobs per site have been run. The efficiency obtained is around 98%-100%. The overall CPU/Walltime ratio is shown on the figures for each site. The performance is shown to be dependent on the used file system.



Data from http://gangarobot.cern.ch/st/

The reliability graphic is for January 2009 while the efficiencies concern the period of time from November 2008 to February 2009 (four months).

The ATLAS Tiers-2 shown are the following :

· ScotGrid (UK), 3 Sites
· Romanian Federation (Romania), 2 Sites
· INFN ATLAS Federation (Italy), 4 Sites
· Polish Tier-2 Federation (Poland), 2 Sites
· Atlas Federation, Munich (Germany), 2 Sites
· GRIF, Paris (France), Distributed 6 Sites
· FZU AS, Prague(Czech Republic), 1 Site
· Canada-West Federation(Canada), 3 Sites
· AustrianTier-2 Federation (Austria), 1 Site

Tier-2s with more than two sites show better performance.

Data from http://dashb-atlas-data.cern.ch/dashboard/request.py/site and http://lcg.web.cern.ch/LCG/

The different tests using simulated data have shown that the Spanish ATLAS Tier-2 is ready for data taken:
- Reliability of T2-ES greater than 90% over several months
- Continuos Production of ATLAS Simulated Events Data
- High Rate Data Transfer between T2-ES and its associated Tier-1 (PIC)
- Enable Physics Analysis by Spanish ATLAS Users
- Efficiencies on Data Transfers, MC Production and Analysis Jobs similar to other Tier-2s
- Computing resourses are about to be increased according to ATLAS schedule