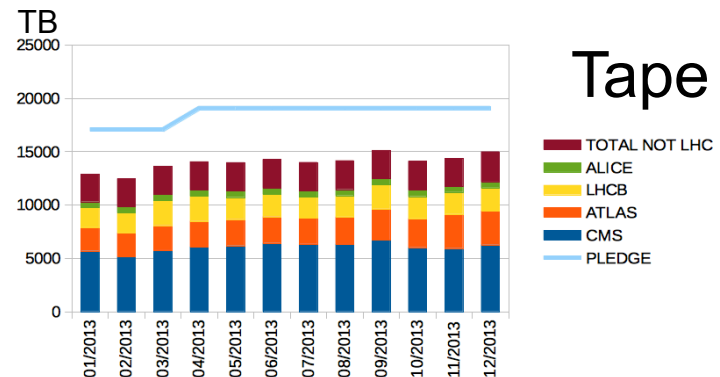
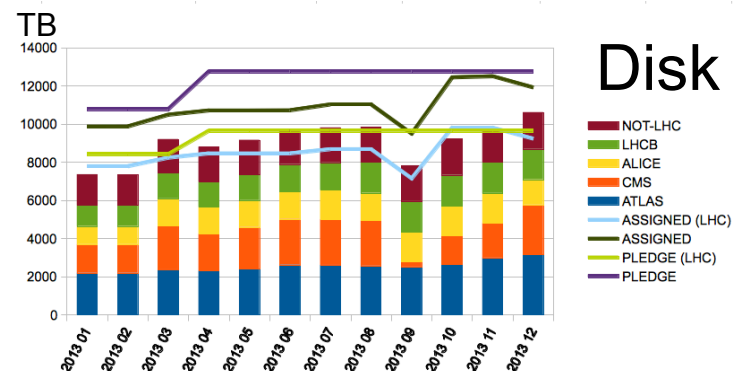
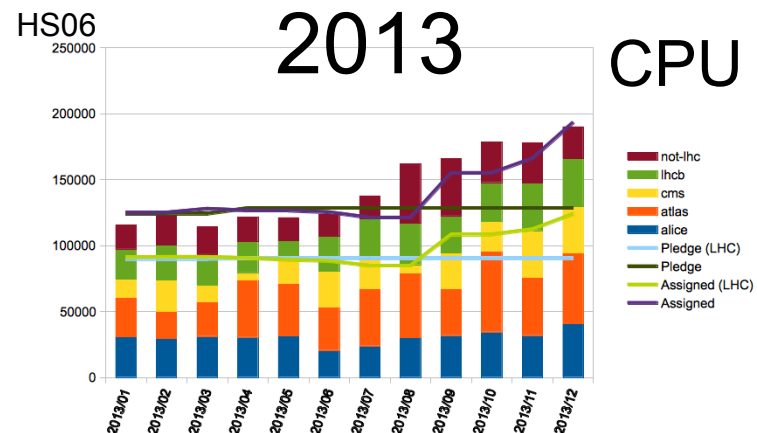


CNAF Experiment Support

Claudio Grandi (INFN Bologna)

The T1 Computing Centre

- Surface: 1000 m²
- Electrical power: 5 MVA
 - Up to 1.4 MW for IT (600 kW in use)
- CPU: 16K cores (195 kHS06)
 - Managed by LSF
- Disk storage 13 PB
 - GPFS file system
- Tape: 1 library with ~20 PB
 - Up to 85 PB with T10Kd
 - HSM system on top of TSM
- 3x10 Gbps WAN connections
- 21 FTE
- Supporting > 25 scientific collaborations



The Tier-1 and Grid Services

- **Tier-1**
 - **Infrastructure**: manage power, cooling, logistics, security systems, ...
 - **Farming**: operate the bulk of the resources (Worker Nodes, User Interfaces, other services, ...) and the user database
 - **Storage**: operate the disk and tape storage services, and the data transfer services
 - **Network**: local and wide area networks, IT security
- **Grid services (ex-IGI)**
 - **Operations**: operate all central Grid services, coordinate middleware deployment in Italy, ticketing systems
 - **User Support**: Help Desk and support for applications migration to the Grid
 - **Middleware**: Development, maintenance and support for Grid components

- Goals:
 - Provide research groups with specific support for day-by-day **operations** on CNAF resources
 - Support experiments in the definition and evolution of their **computing models**
 - Foster **knowledge transfer** from bigger experiments to smaller ones (or simply with less experience in using the CNAF resources)
 - Contribute to CNAF and to supported experiments activities
 - In agreement with national experiment computing coordinators
 - Foster synergies between local and central components of the experiments
 - **Train** the service's staff (currently 6 *Assegni di Ricerca*)
 - Both for internal needs and for their future career
- Weekly meetings with the Tier-1 Grid Services staff

Ticketing system

- New [ticketing system](https://issues.infn.it/) available on <https://issues.infn.it/>
 - Project: [Supporto Utenti T1](#)
 - User friendly interface in development

The screenshot shows the JIRA interface for the 'Supporto Utenti T1' project. The top navigation bar includes 'Dashboards', 'Projects', and 'Issues', along with a 'Create Issue' button and a search field. The project name 'Supporto Utenti T1' is prominently displayed, with the key 'EXPSUPP' and lead 'Claudio Grandi'. A sidebar on the left offers navigation options like 'Summary', 'Issues', 'Popular Issues', 'Components', and 'Labels'. The main content area features a 'Summary' section with a welcome message and a 30-day summary chart. The chart shows a sharp increase in issues starting around February 4th, reaching a peak of 30 issues by February 18th. Below the chart, it states 'Issues: 30 created and 13 resolved'. To the right, an 'Activity Stream' shows recent updates and comments from users like Lucia Morganti and Stefano Dal Pra.

Summary

Welcome to the CNAF User Support

The system can be used by CNAF users to request support on their operations at the Centre. Furthermore is used to track internal requests between the User Support Service and the Tier-1 and Grid Services of CNAF

A few hints:

- Use the Component field to identify the service that is primarily involved in addressing the issue
- Add a label to identify the Experiment or research group involved
- If you know the person who should address the issue assign the ticket. All unassigned tickets will be taken care by the User Support staff

[Change the project description](#)

Issues: 30 Day Summary

Issues: 30 created and 13 resolved

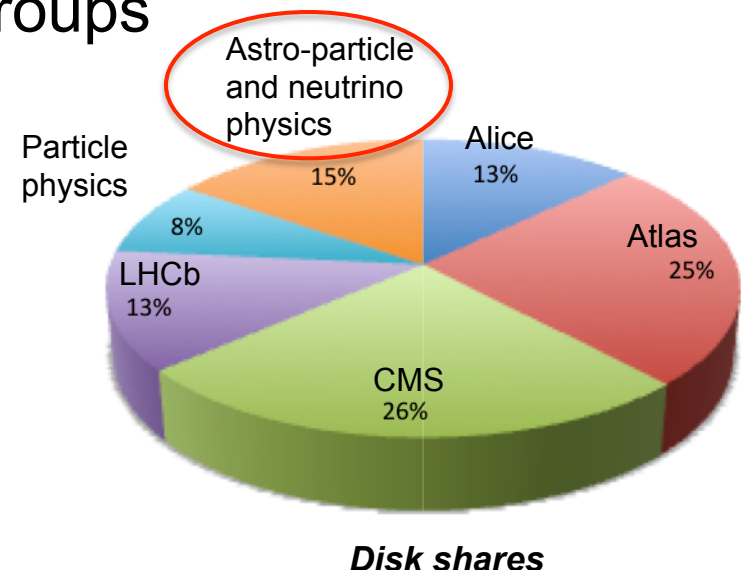
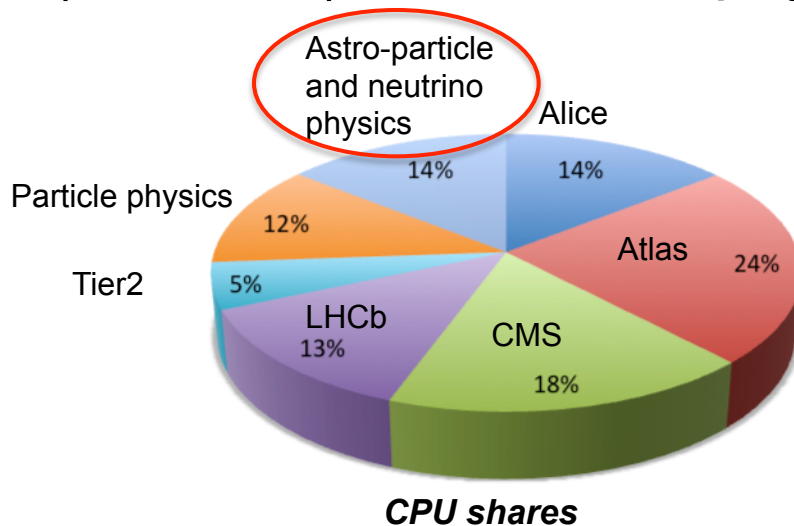
Activity Stream

Today

- Lucia Morganti** commented on EXPSUPP-37 - cta sottomette a ritmo eccessivo
Ricevuta la seguente email dalla referente, Luisa Arrabito:
Adesso dovrebbero sottomettere direttamente ai CE, e ci pregano di informarli se il problema e' risolto.
Dear Lucia,
[Read more >](#)
57 minutes ago
- Lucia Morganti** commented on EXPSUPP-37 - cta sottomette a ritmo eccessivo
Esperimento avisato.
4 hours ago
- Stefano Dal Pra** updated the Description of EXPSUPP-37 - cta sottomette a ritmo eccessivo
cta sottomette a ritmo eccessivo rispetto alo share dedicato (circa 3000HS06).
Ho chiuso la coda alle sottomissioni.
[root@lsfmaster-1 ~]# bqueues cta
QUEUE_NAME PRIORITY STATUS MAX JLU JLP JLH NJOBS PEND RUN SUSP
cta
[Read more >](#)
4 hours ago
- Stefano Dal Pra** updated the Description of EXPSUPP-37 - cta sottomette a ritmo eccessivo
cta sottomette a ritmo eccessivo rispetto alo share dedicato (circa 3000HS06).
Ho chiuso la coda alle sottomissioni.
[root@lsfmaster-1 ~]# bqueues cta

Supported research communities

- The **LHC experiments** (ALICE, ATLAS, CMS, LHCb) are the main CNAF users
- Most of the non-LHC research groups are **astro-particle and neutrino physics** experiments
 - CDF, (Babar), (SuperB), Belle II, NA62, KLOE, LHCf, Argo, AMS2, Auger, Icarus, Fermi/GLAST, Pamela, Borexino, Xenon, Gerda, Virgo, CTA, Opera, Magic, Agata, (Panda), (KM3NeT), Theoretical physics groups



Experiment support for LHC

- **LHC experiments** provide most of the resources
 - Over 10K cores (11 KHS06), 9.5 PB disk and 16 PB tape
- Rely heavily on **Grid technologies**, using standard middleware or through tools developed independently
 - Data management (catalogues, agents)
 - Workload management (pilot job frameworks)
 - Resource monitoring tools
- Require also **specific services** that are managed by the experiment support personnel that are also experiment members
- Use the resources quite constantly but when not using them the increase in available power for the other groups is big compared with their assignments

- Smaller than LHC experiments but many (and increasing)
- Have **heterogeneous** resource utilization **models**
 - Via Grid (like LHC experiments)
 - Partial use (e.g. only for data archival)
 - Hybrid: some services via Grid and some locally
 - ...
 - Completely local access
- Sometimes not enough computing expertise in the groups to be autonomous
 - Often start with a local approach and migrate to common tools later (Grid)
- Some groups have non constant usage of resources
 - When not using them, they are used by other groups
 - In general they can use more than their quota when they need it

Criticalities 1/2

- Hardware provisioning
 - Bound to tender bureaucracy
- The Tier-1 has been built to be a Grid site
 - Batch job access through CREAM Computing Elements and data access through SRM based Storage Elements
 - Interactive access limited to the minimum on simple User Interfaces without running services
- Many exceptions to this model
 - LHC experiments already have custom services that they manage directly (running in user space)
 - Local job submission to LSF possible upon request
 - Proliferation of user account
 - Local access to the storage from UIs and WNs
 - Requires attention in order to keep performances of GPFS

- More exceptions to the model
 - Custom Operating Systems (via WNoDeS)
 - Had some problems recently but supported
 - Hybrid access to data (locally and via Grid) and multiple transfer protocols
 - Authorization issues – support issues for multiple servers
 - Remote access to data
 - Dedicated services, network load
 - Custom configuration of nodes (e.g. packages installed on the nodes and not in the experiment software areas)
 - Bookkeeping issues, complexity, fragility
 - Custom services running on nodes (e.g. databases)
 - Ditto, security issues for services out of site's control
 - Root access to nodes
 - Security issues – tolerated only in exceptional cases

Conclusions

- CNAF can provide research groups with enterprise quality services, with 24/7 support
- Resource sharing allows an efficient usage
- A dedicated user support group is available to provide direct support, help addressing specific requests but also evolve the computing practices
- Best quality of service if using standard tools
- Available to address specific (non-standard) requests but need “negotiation” not to jeopardize the efficiency of the infrastructure
- For LNGS specifically, that is an INFN laboratory we need to identify a set of agreed best practices to provide hosted experiments with efficient support for their activities at CNAF

BACKUP SLIDES

- Data produced outside CNAF, transferred to CNAF using Grid tools to be archived and reprocessed (either locally or via Grid
 - Get **Grid credentials**
 - X.509 certificates by standard or on-line Certificate Authorities
 - **Grid access to CNAF storage** to copy, read and delete files or directories, with possible tape archival
 - Upload, download o 3rd party transfers
 - Client software may need to be installed on user machines
 - Use of a **catalogue** to store information of files (being) transferred, with associated information for file search and transfer validation (e.g. checksum)
 - Standard Grid tools like LFC, Amga or developed by the experiments
 - **Interactive access** (via ssh) to a CNAF node to submit jobs to the local batch farm
 - Software may be built and installed in a shared area seen by farm nodes
 - Alternatively **Grid submission** to the CNAF resources via client software installed on dedicated machines (**User Interfaces**)
 - Preferred even though more complex
 - Transparent access to similar resources at other sites

Example of data transfer and local processing

