

# Storage accounting

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1. Motivation
2. GridPP storage accounting/monitoring
3. GLUE v1.3 and SRM v2.2
4. Other accounting systems (DGAS and OSG-Gratia)

- CPU accounting provided through APEL. What about storage?
- Different user communities asking questions like:
  - **Management:** Which sites are meeting their MoU targets and pledges?
  - **VO:** Which SE's have space available for my production data?
  - **Site:** Which VOs (and VO sub-groups) are using the storage at my site?
- GridPP started prototype system for measurement/accounting.
  - Dave Kant (RAL) and myself.

# Information system as data source

- Every SE runs a **generic information provider** (GIP) which publishes information according to GLUE schema (v1.2 → v1.3).
- Concept of storage areas (SAs) in GLUE.

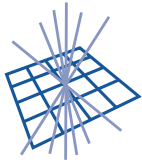
```
GlueSiteName GlueSEArchitecture GlueSAStateUsedSpace  
GlueSAStateAvailableSpace GlueSAType GlueSAPath
```

- Harvest these attributes by querying a top level BDII → MySQL DB.
- **Nothing extra has to be installed on the SE.**

<http://goc02.grid-support.ac.uk/accountingDisplay/index.php>

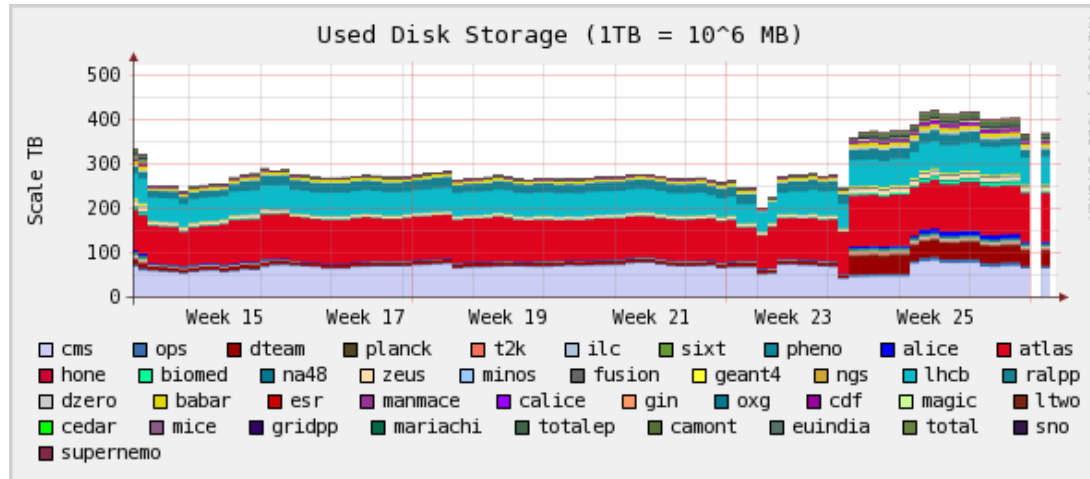
- Allows site admins, production managers and ROC managers to view the data.
- **Historical plots** of the used and available space.
- **Table** of current used and allocated space numbers.
  - Download latest numbers in CSV format.

$$\text{Allocated space for VO} = \text{VO\_GlueSAStateUsedSpace} + \text{VO\_GlueSAStateAvailSpace}$$

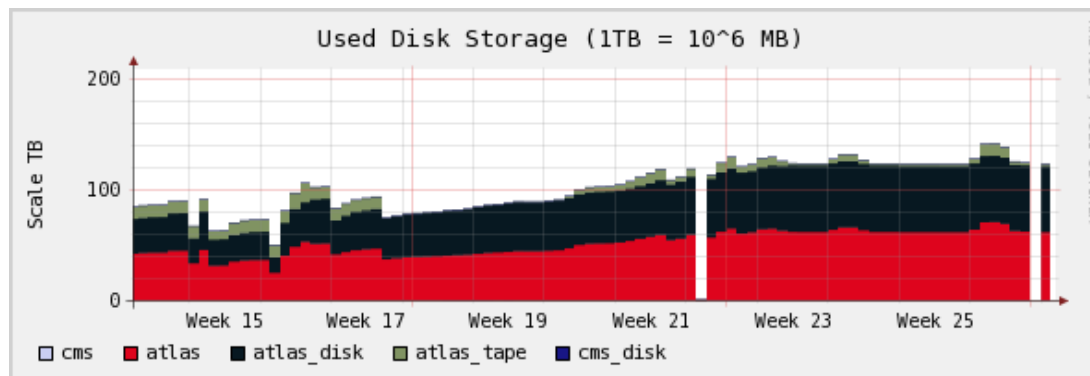


# Site/ROC historical usage by VO

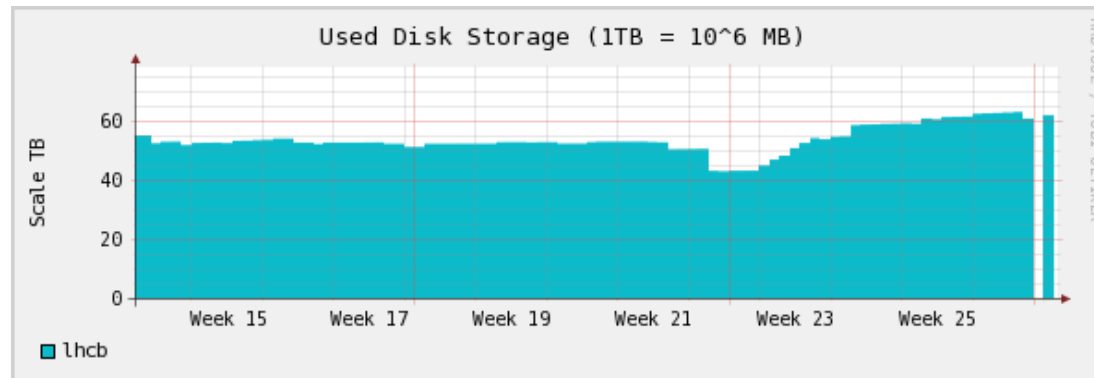
**GridPP** disk usage over past month for all VOs (~ 400TB)



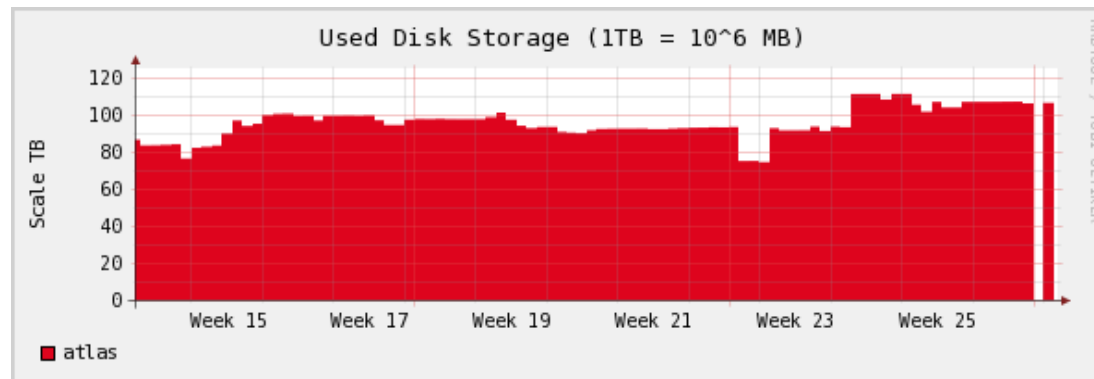
**NDGF-T1** disk usage over past 3 months for LHC VOs (> 100TB)



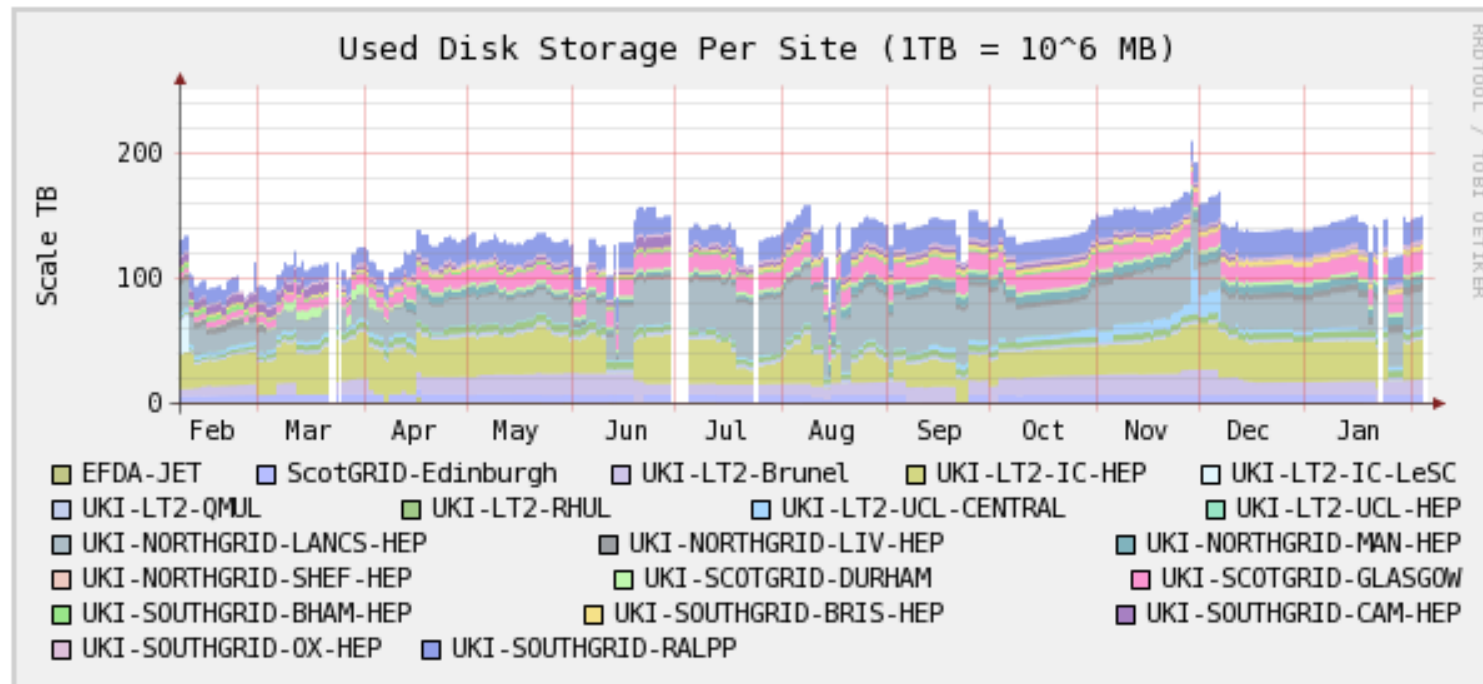
**LHCb** disk usage over past 3 months in GridPP (> 60TB)



**ATLAS** disk usage over past 3 months in GridPP (> 100TB)



## GridPP disk usage over past year **broken down by site**





- User interface is **slow**.
  - There are currently  $\sim 1.3$ M entries in the database.
- Plot building carried out every hour.
  - **Inefficient** to have data in DB and RRD files.
  - Investigating other tools for plotting.
    - \* Give users **more control over the queries** of the historical data in the DB.
- Need **comprehensive review** of the data that is being published to check for consistency with monthly **WLCG accounting**.
  - Already finding inconsistencies.

- Dave Kant has left; P. Colclough (RAL) is now developing the code with input from myself.
- Implementation details:

[http://www.gridpp.ac.uk/wiki/Storage\\_Accounting](http://www.gridpp.ac.uk/wiki/Storage_Accounting)

- Bug tracker:

<https://savannah.cern.ch/projects/storage-account>

- With SRMv2.2 deployed, we can reserve spaces on SEs.
  - These reservations can be mapped to **space token descriptions**, e.g.,
    - \* `ATLASDATADISK, CMS_DEFAULT, LHCb_RAW`
  - GLUE v1.3 allows space token descriptions to be advertised in BDII along with the space token **attributes**, e.g.,

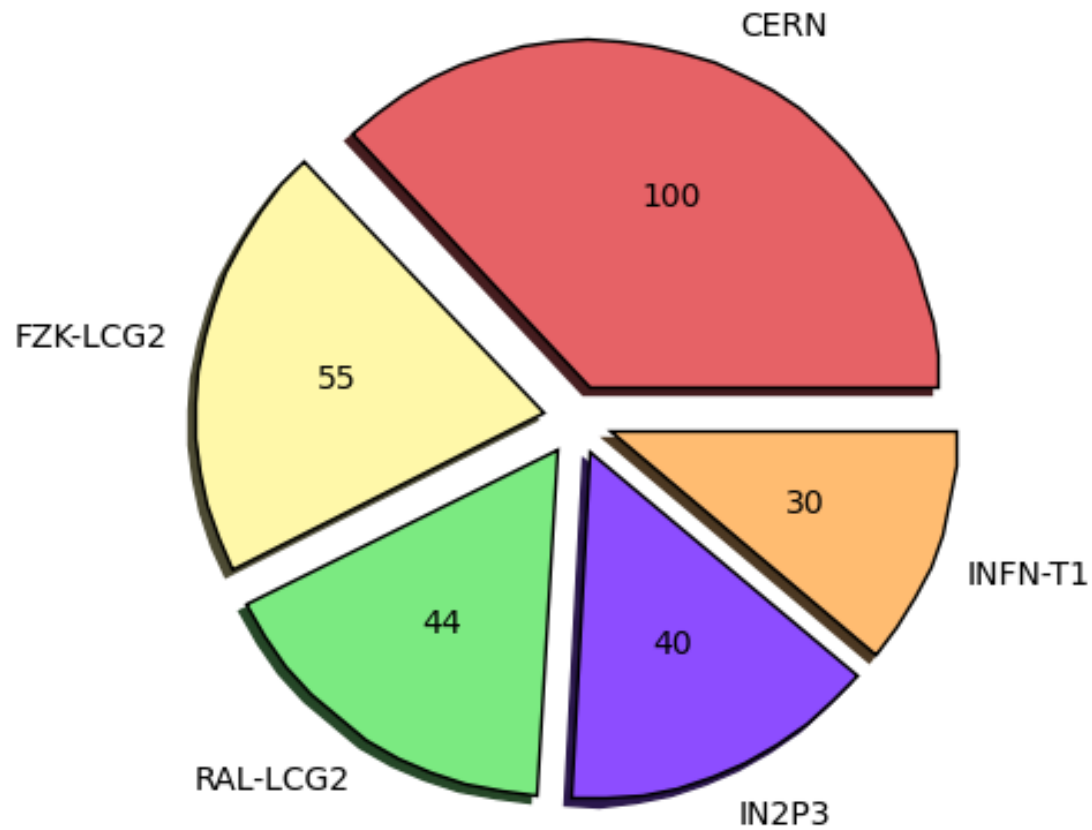
```
GlueVOInfoTag GlueSATotalNearlineSize  
GlueSAUsedOnlineSize GlueSARententionPolicy
```

- We can collect this information about the sizes of space tokens and provide useful views for sites and VOs (next slide).

```
http://twiki.cern.ch/twiki/bin/view/LCG/GSSDGLUEProposal
```

# Example use of token desc data

LHCb\_RAW Online Space (Sum: 270)



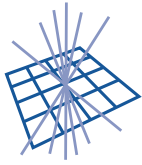
CERN (100)

FZK-LCG2 (55)

RAL-LCG2 (45)

IN2P3 (40)

INFN-T1 (30)



**GridPP**

UK Computing for Particle Physics

# OTHER ACCOUNTING PROJETS

- **Gratia** aims to provide both CPU, storage and transfer accounting for OSG.
- CPU accounting already available.
- Prototype exists for a dCache storage accounting probe.
  - **Probe runs on the dCache**, collecting information from the internal billing DB.
  - Reports to central OSG server.
  - Will take some time to ensure that the data being reported is reliable.
- **No probes available for DPM or CASTOR.**
  - Assumes that you can collect the same information from different SEs.

<http://twiki.grid.iu.edu/twiki/bin/view/Accounting/WebHome>

# Distributed Grid Accounting System

- **DGAS** is an EGEE project, based in Italy.
- Aims to implement:
  - Resource usage metering
  - (Storage) accounting
  - Account balancing through resource pricing
- **Requires probes to be installed on each SE** which reports data to central service.
- Not clear what current state of the storage accounting is.

<http://www.to.infn.it/grid/accounting>

- Improve **user interface** to the DB to provide more useful views of data.
- Account/monitor at the level of **space token descriptions**.
  - Move to GLUE v1.3.
    - \* Involved with the ongoing GLUE v2.0 discussions.
  - Provide **useful views** of this data for sites and VOs.
- Cross-check with **WLCG accounting** reports.
- Discussion required about need for user-level accounting.
  - **Information system was designed for resource discovery, not accounting.**
    - \* Will not scale to publishing for each user.