

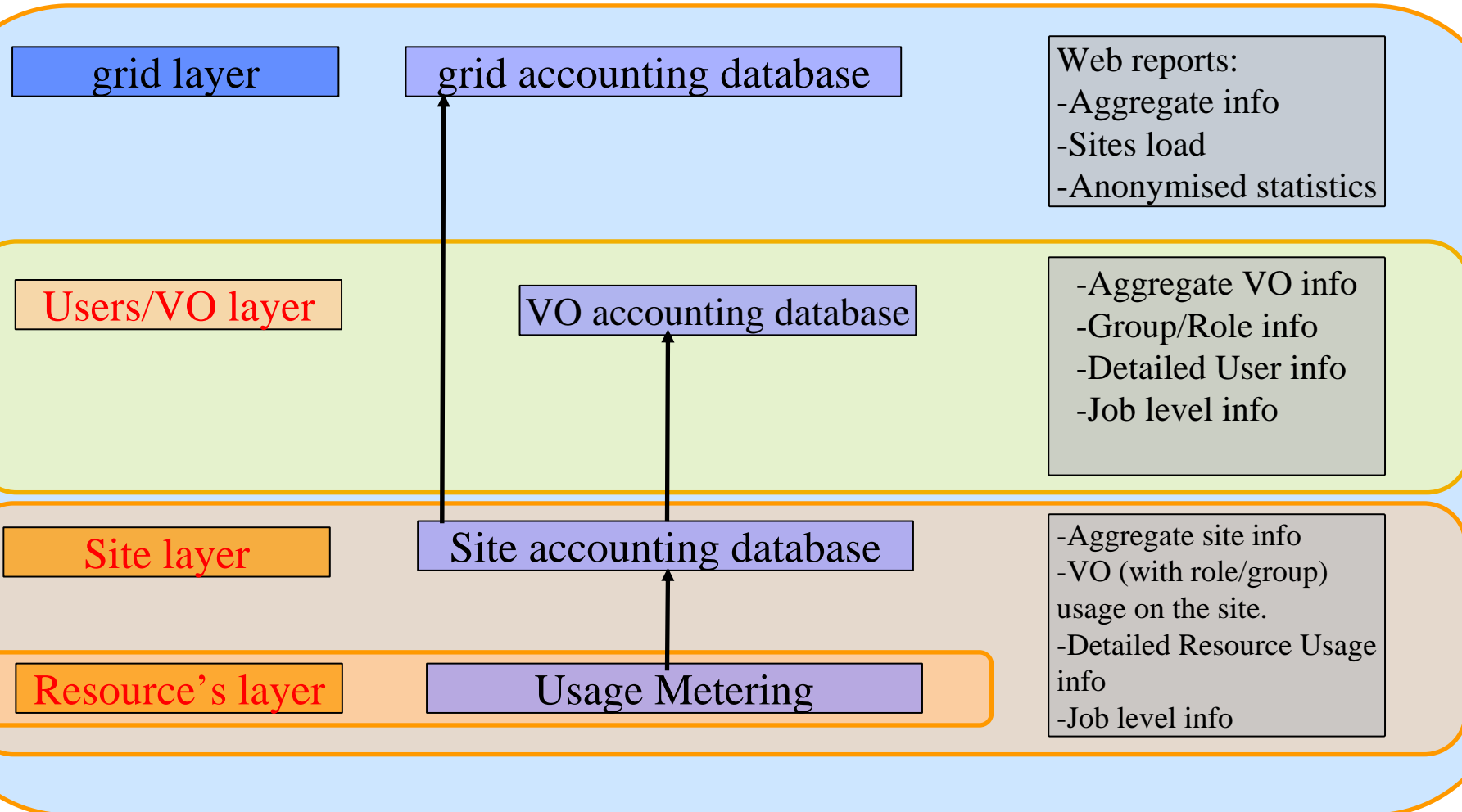
## Comprehensive Accounting Views on large computing farms.

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A generic grid accounting infrastructure should cover the requirements of tree type of customers: Sites, VOs and their users, grid administrators. While fulfilling the requirements it must also be secure, flexible and scalable.

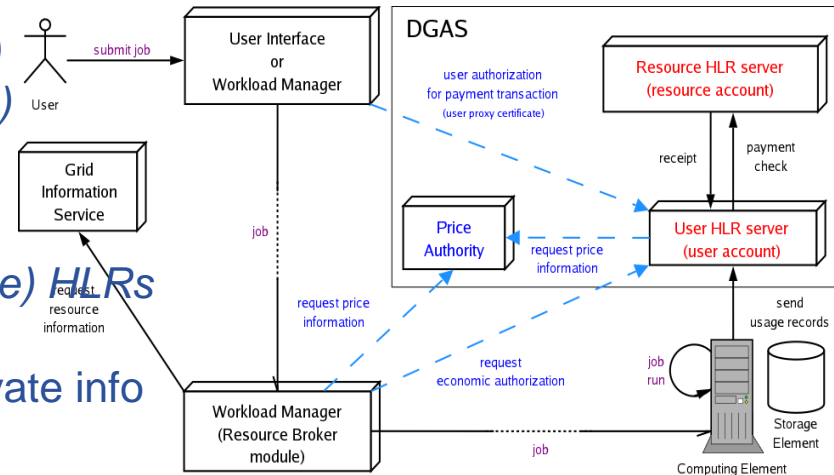


## Gianduia (sensors deployed at site)

- can build accounting records for grid jobs as well as local jobs (accounted on different HLR accounts)
- for grid jobs: integrates local usage information with grid-related information (user DN, user FQAN (VOMS), CE ID, grid job ID).
- supports PBS and LSF (work on SGE and Condor)
- “next-to-real-time” accounting (after job completion)

## HLR service (accounting servers)

- fully distributed architecture (scalability)
- deployed as *User (VO) HLRs* and/or *Resource (Site) HLRs*
- command line tools and C++ API for queries
- strict *authorization control* (x509) for accessing private info
- on Resource/Site HLRs: DGAS2APEL



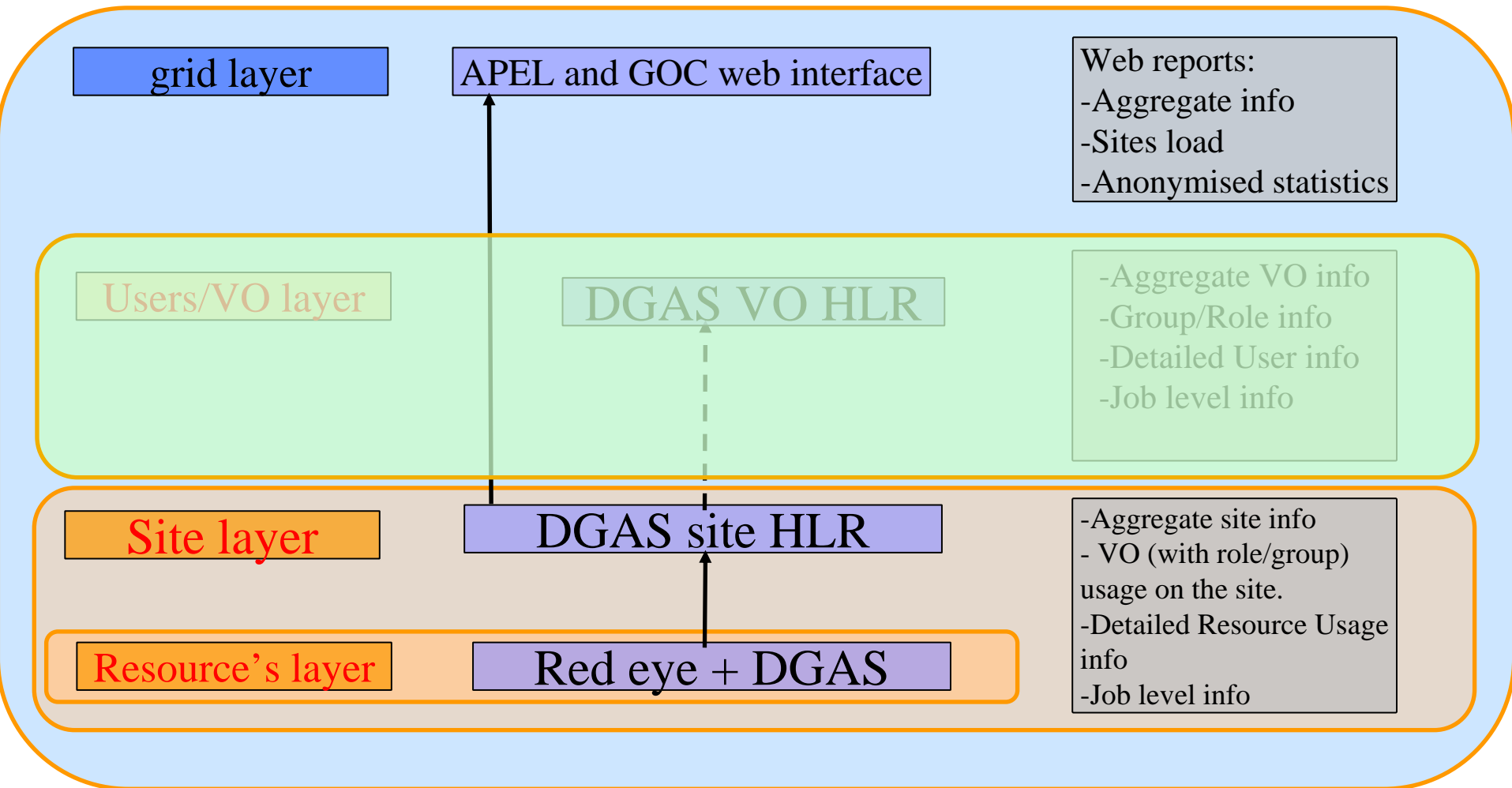
## (optional) PA service (resource pricing servers)

- for manually or dynamically setting prices (virtual credits) of CEs
- price information might be included in the RB's scheduling process in order to establish a grid resource market (may help in balancing demand and supply)

## Data transport:

- all communication between the components as well as between client tools and servers is *encrypted* and *secure* (x509-based, GSI)
- mostly *asynchronous* data transport between the components for more robustness

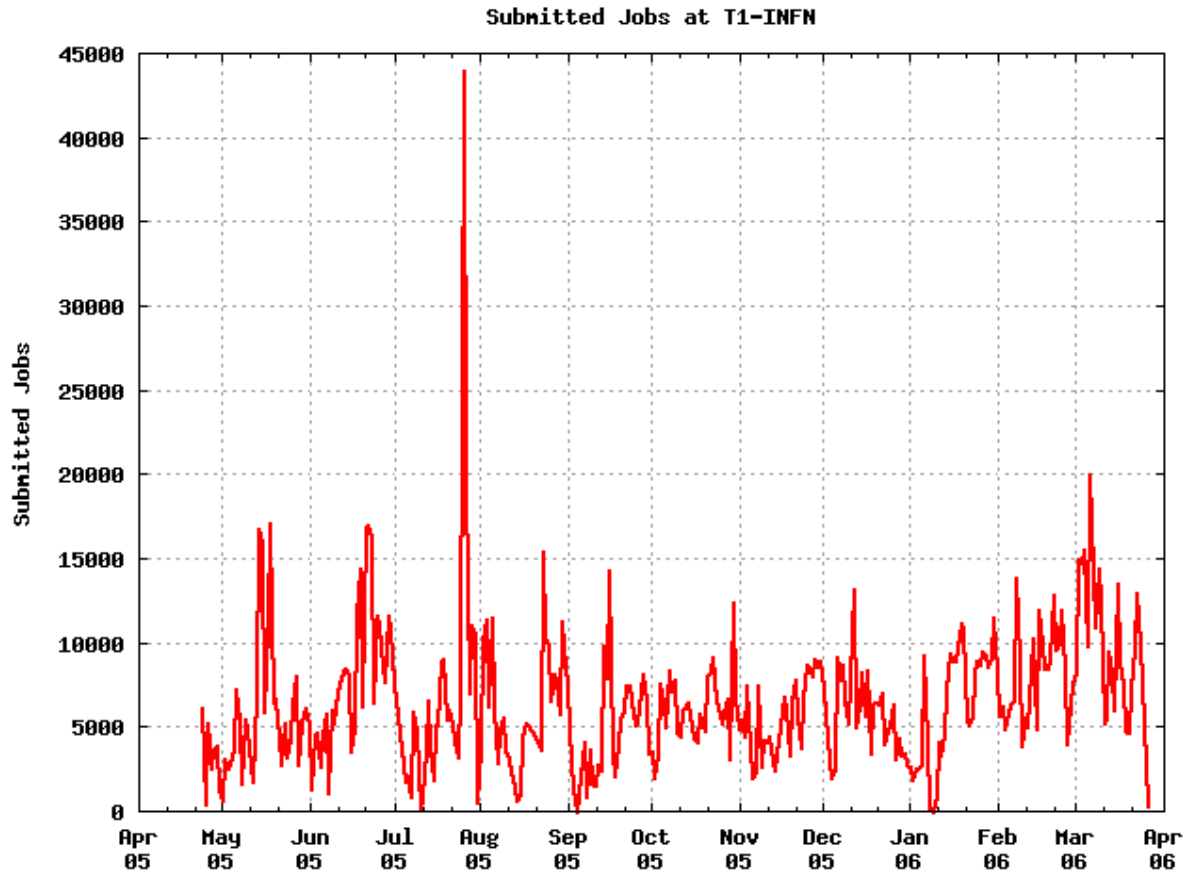
In this talk we illustrate how the resource's layer sensor system 'REDEYE' has been integrated with DGAS to implement the italian grid T1 resource accounting system.



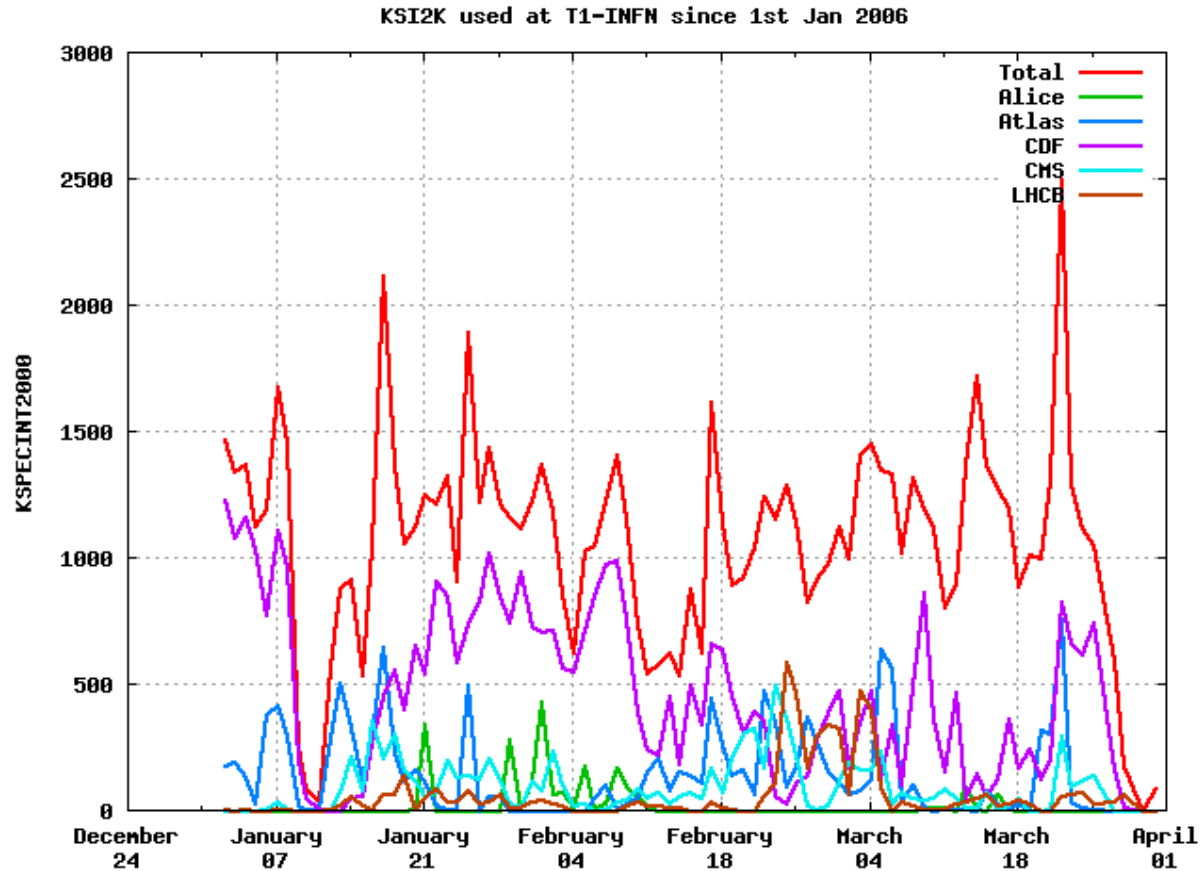
- Developed for LSF 6.x (working since April 2005)
- Parse LSF logfile
- Info: RAM, WCT, CPU, Time, WN, Submitter etc.
- Crossed check between logfiles and LSF cache.
- From local DB: KSI2K and # of LSF slots of the WN
- Identity local user: LDAP server
- Identity GRID user: DN certificate from DB-cert
- DB-cert: realtime upgraded from local CEs
- Upgrade HLR server
  
- We are ready for fireworks!

- **Protocol: https**
- **Common GRID user can have info about his/her own jobs or to global statistics (privacy is safe!)**
- **Special users can have access to their whole VO info**
- **Local System Managers have access to whole HLR**
- **Table creations**
- **Global/VO/User pie chart plots**
- **Global/VO/User historical plots**

- Accessible by everyone

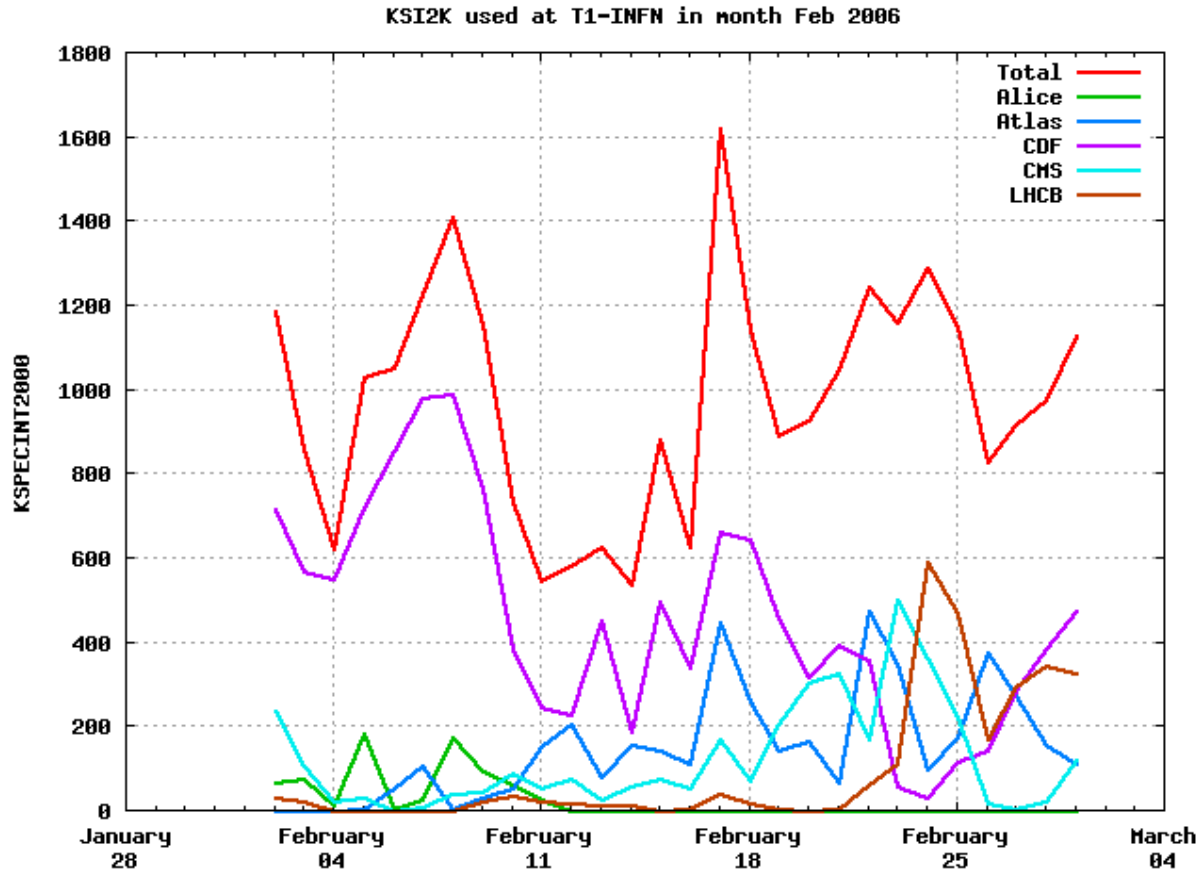


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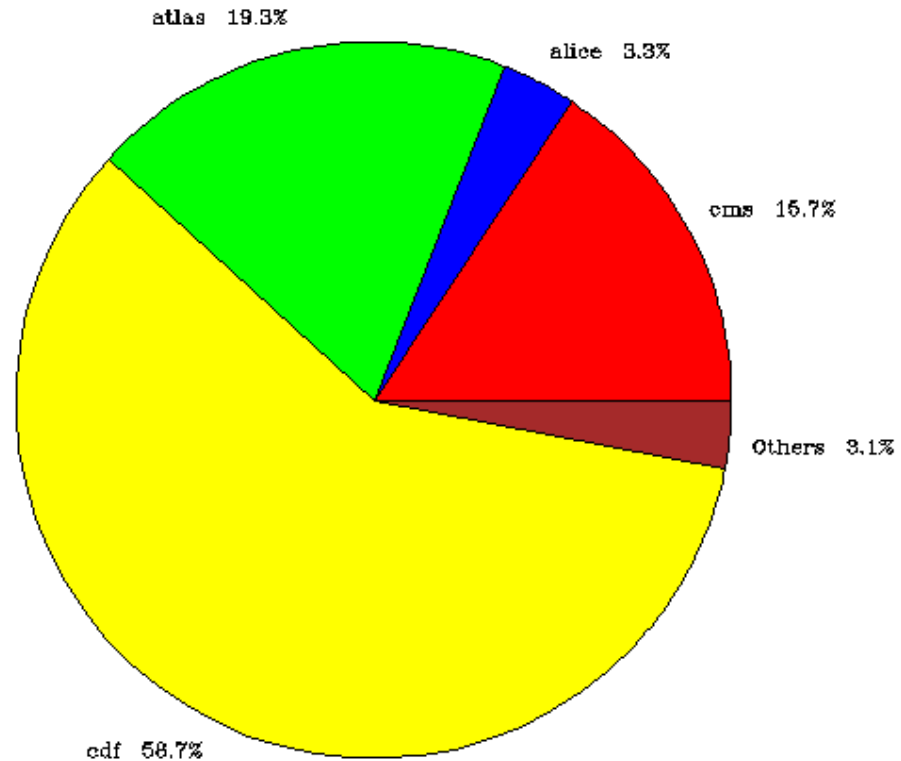


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Queue	KSpec (WCT)	%
cms	122.16	15.664
bio	4.71	0.604
alice	26.04	3.339
lhcb	12.10	1.551
ingv	6.07	0.778
dteam	0.22	0.028
infngrid	0.03	0.004
atlas	150.14	19.252
virgo	0.12	0.015
babar_grid	0.78	0.100
cdf	457.51	58.665

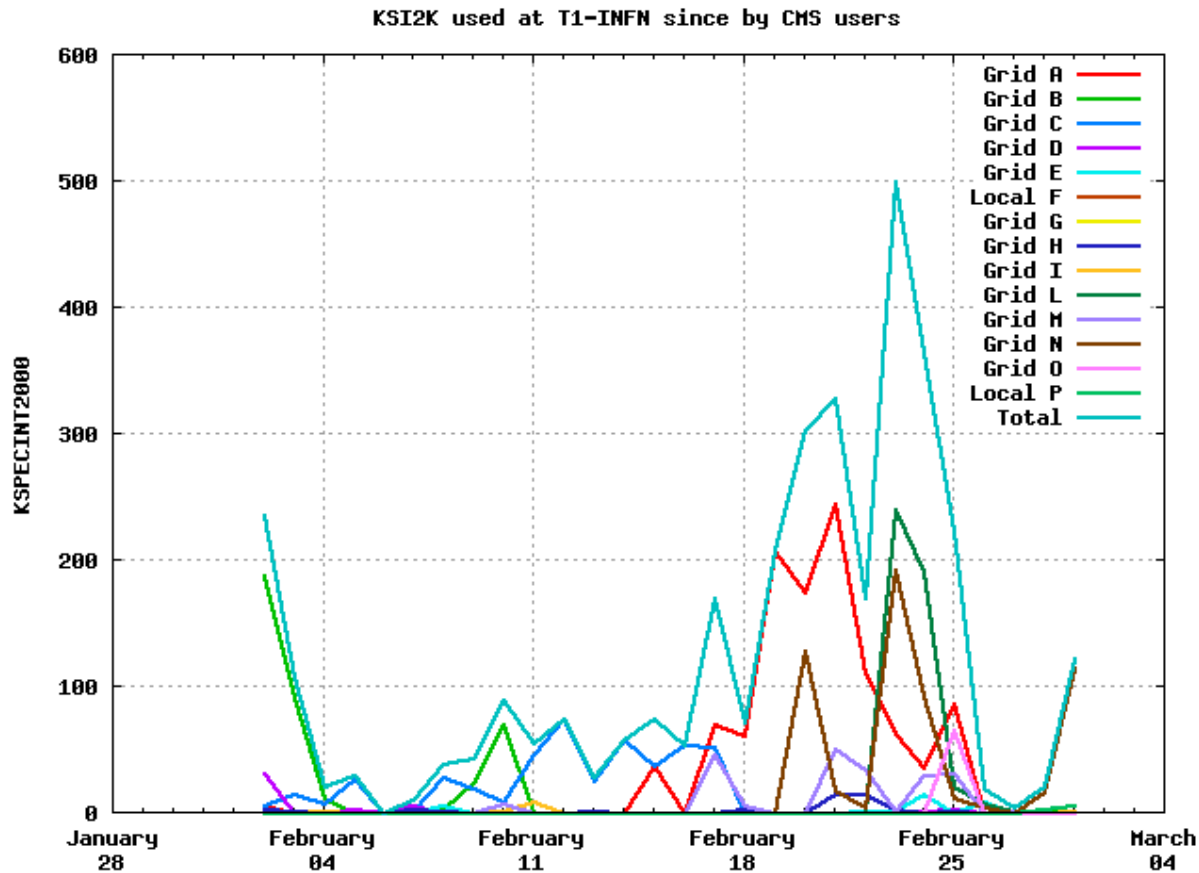


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## Statistics for grid jobs in month 02/2006

Queue	Jobs Completed	Total CPU Time Used (hours)	Total Time Used (hours)	Efficiency (percentage)	Average CPU Time per Job (seconds)	Average Virtual Memory per Job (MBytes)	Average RAM Memory per Job (MBytes)	KSpecINT2k (WCT) <a href="#">Test!</a>
cms	21778	96629.43	129373.73	74.69	15973.27	510.04	353.93	122.16
bio	598	3147.70	5009.05	62.84	18949.36	664.69	547.83	4.71
alice	5754	24047.82	27907.32	86.17	15045.56	887.62	536.64	26.04
lhcb	4324	8953.05	12439.84	71.97	7453.97	113.48	65.76	12.10
ingv	17082	3779.96	6277.70	60.21	796.62	105.68	70.44	6.07
dteam	1730	7.11	166.04	4.28	14.79	72.31	23.31	0.22
infngrid	555	0.65	30.84	2.10	4.21	19.41	6.99	0.03
atlas	26073	143473.18	161789.67	88.68	19809.90	409.18	297.45	150.14
virgo	1586	113.67	125.49	90.58	258.01	64.52	27.67	0.12
babar_grid	251	773.50	852.99	90.68	11094.08	535.77	377.00	0.78
cdf	48037	279714.64	468283.72	59.73	20962.44	373.63	181.91	457.51
Totale	127768	560640.71	812256	69.02	15796.65	374.88	229.22	779.87

- Accessible by special CMS users and local sys managers



- For now access to HLR is only by LAN-CNAF
- In few weeks WAN access
  
- Job monitoring (same HLR ACLs) [Already working, for now access from LAN-CNAF]
  
- Storage (SE) accounting [in progress]