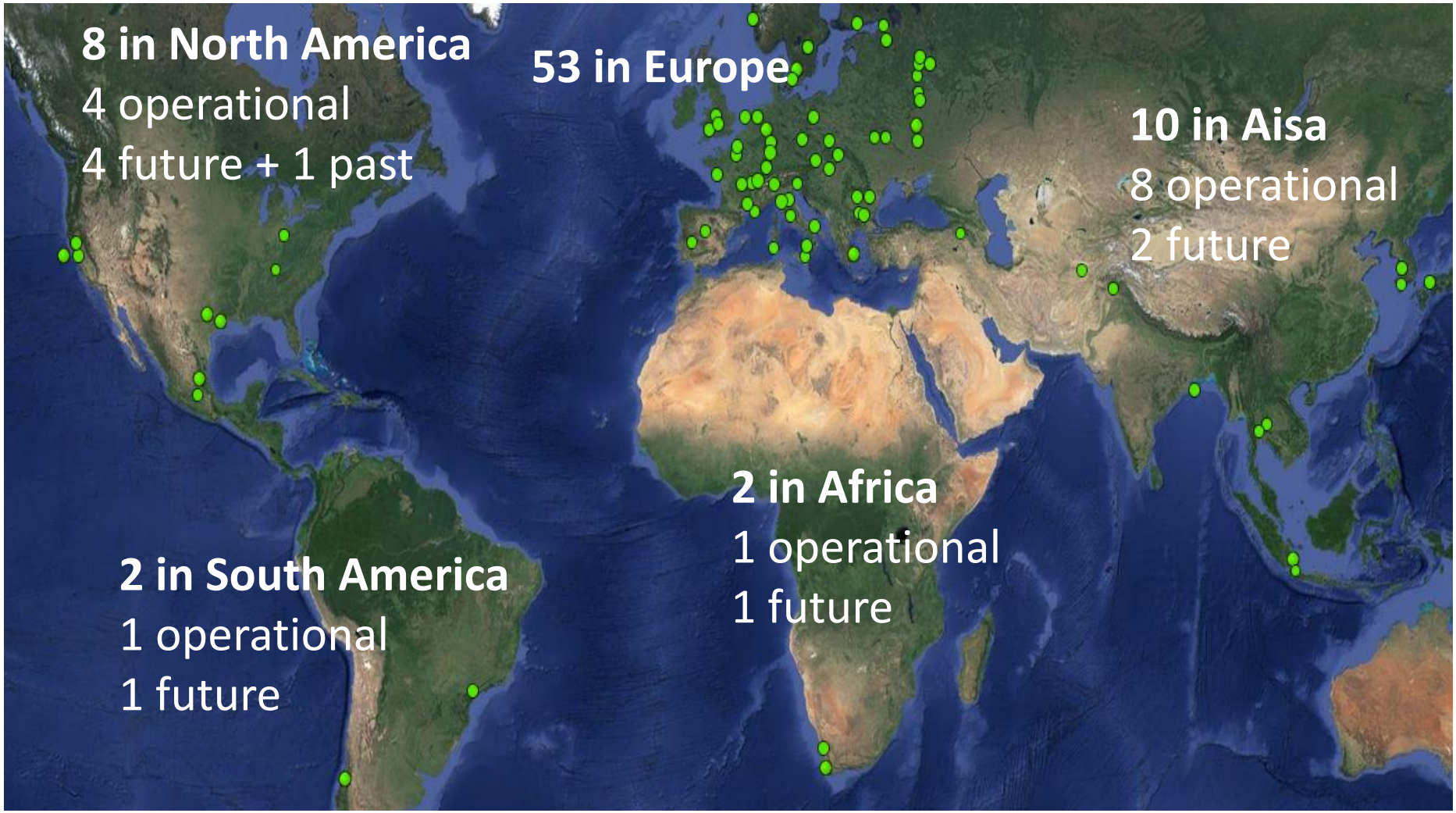
ALICE Grid operations +some specific for T2s

US-ALICE Grid operations review

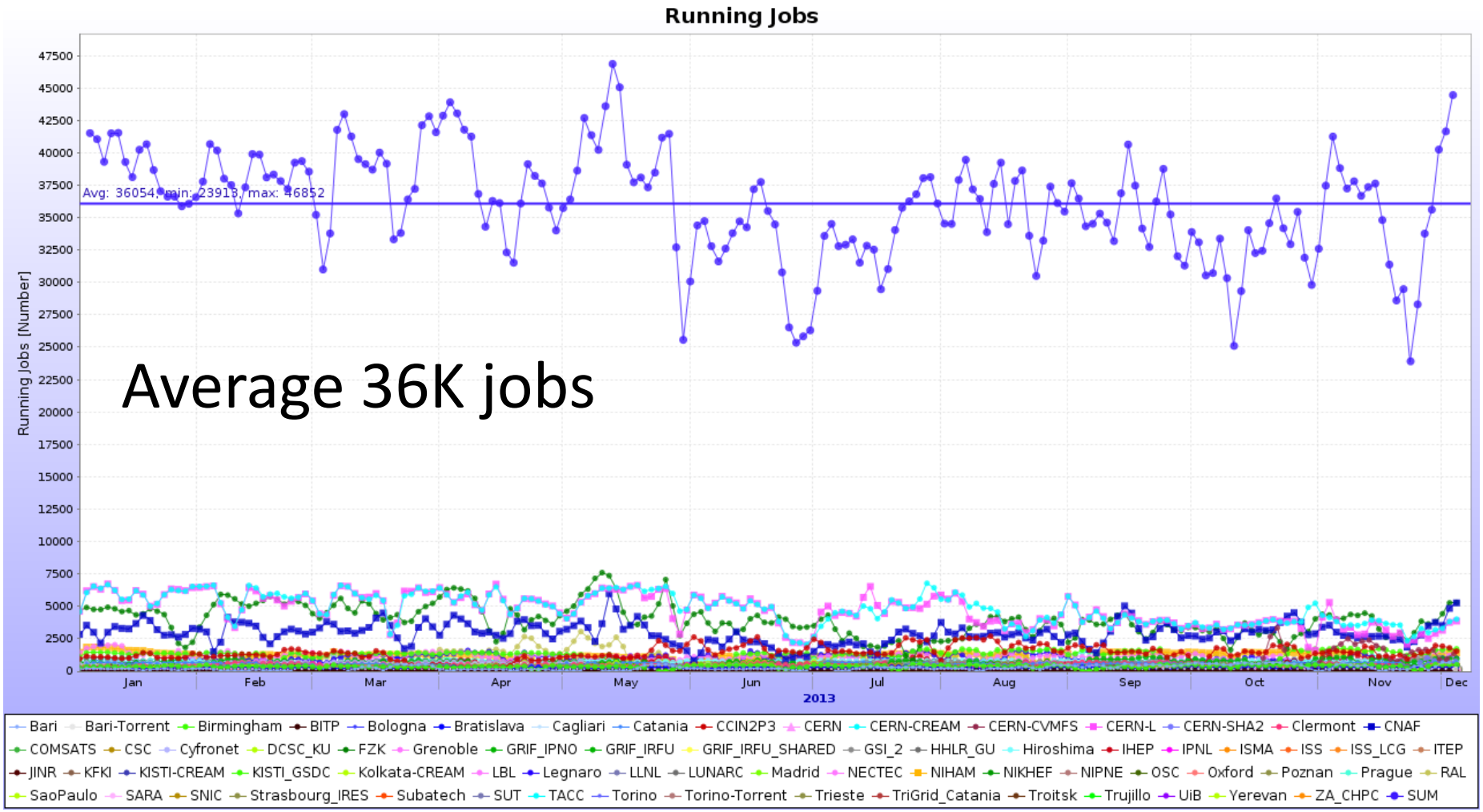
7 March 2014

Latchezar Betev

The ALICE Grid

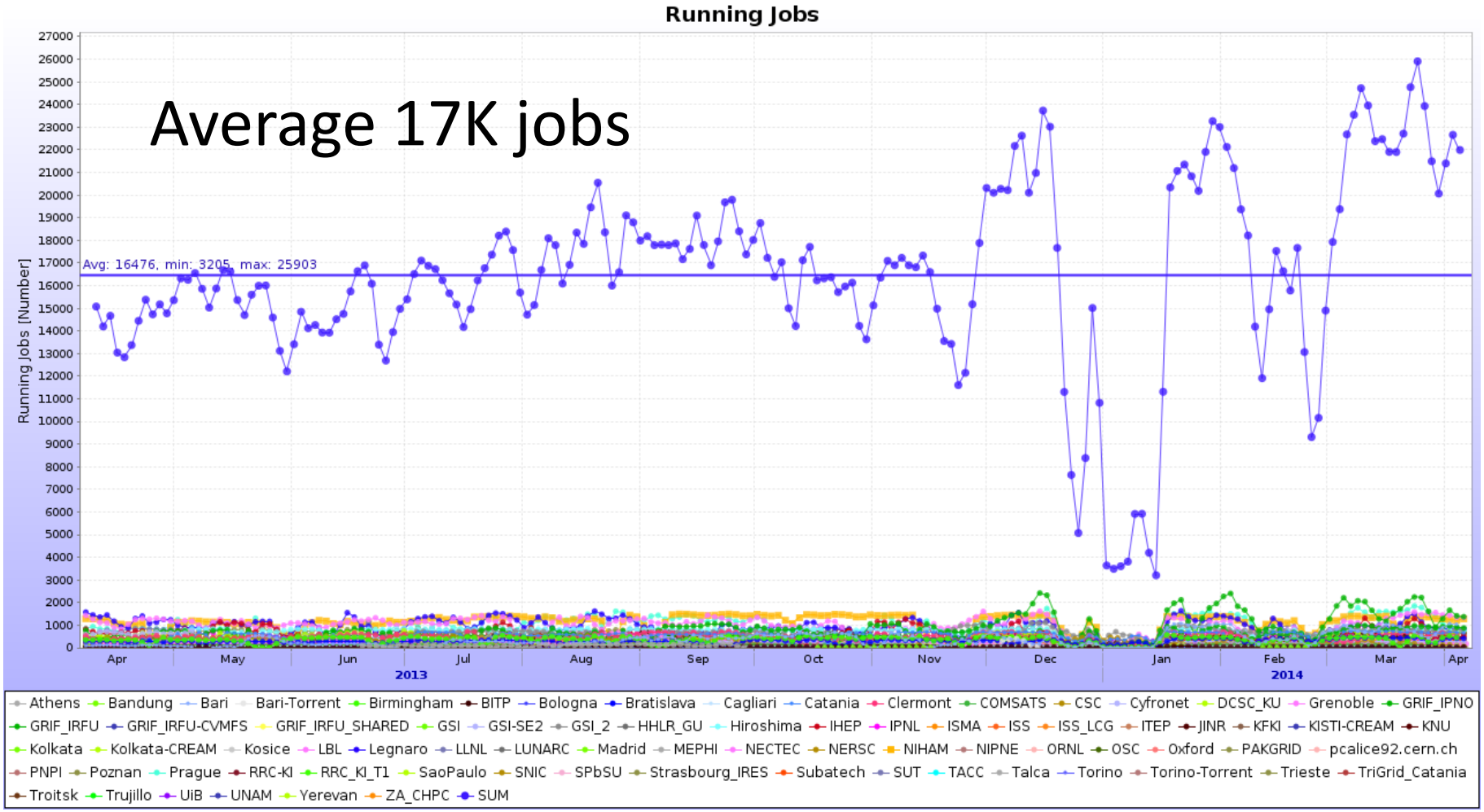


Grid job profile in 2013



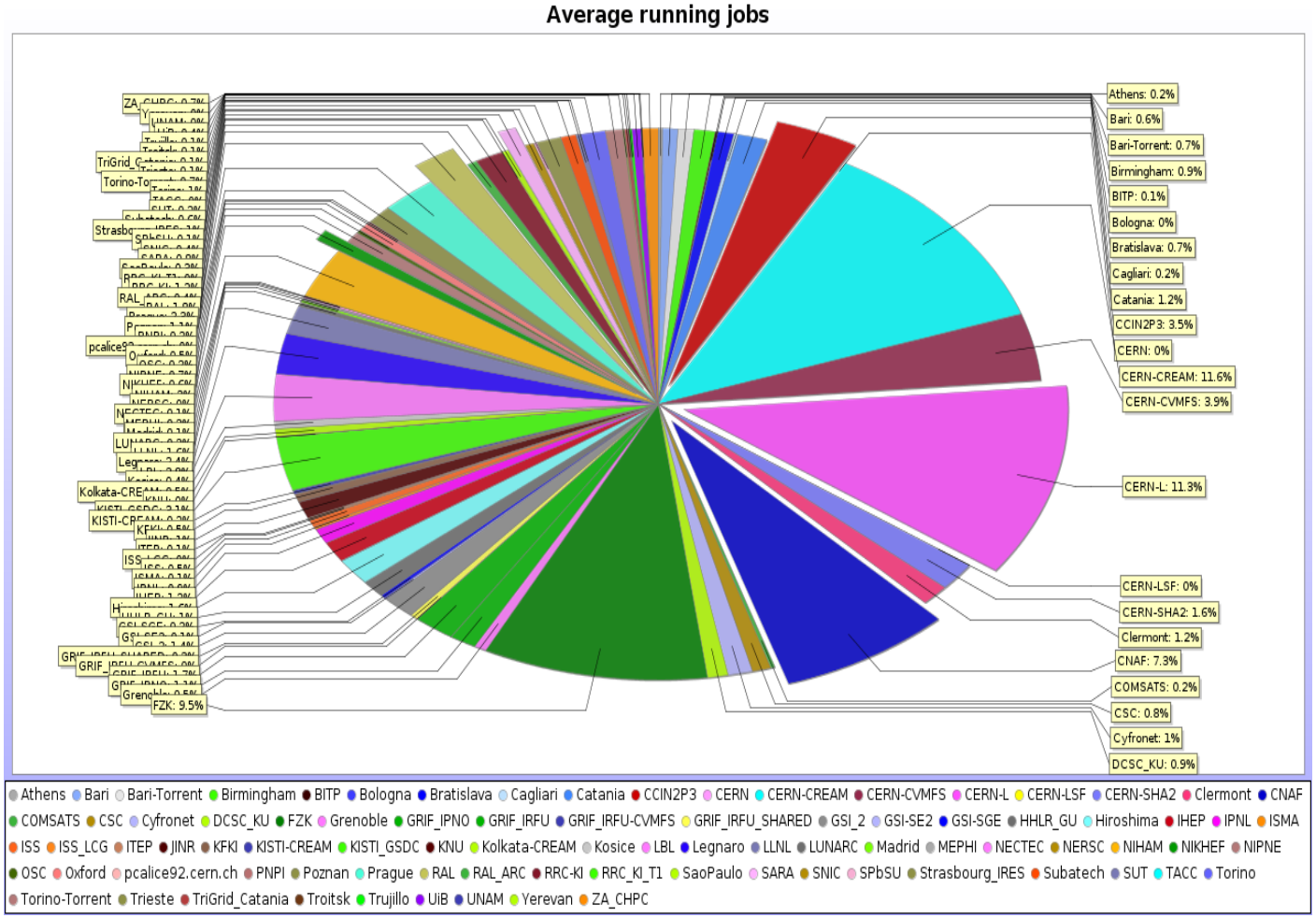
Average 36K jobs

Grid job profile in 2013 – T2s



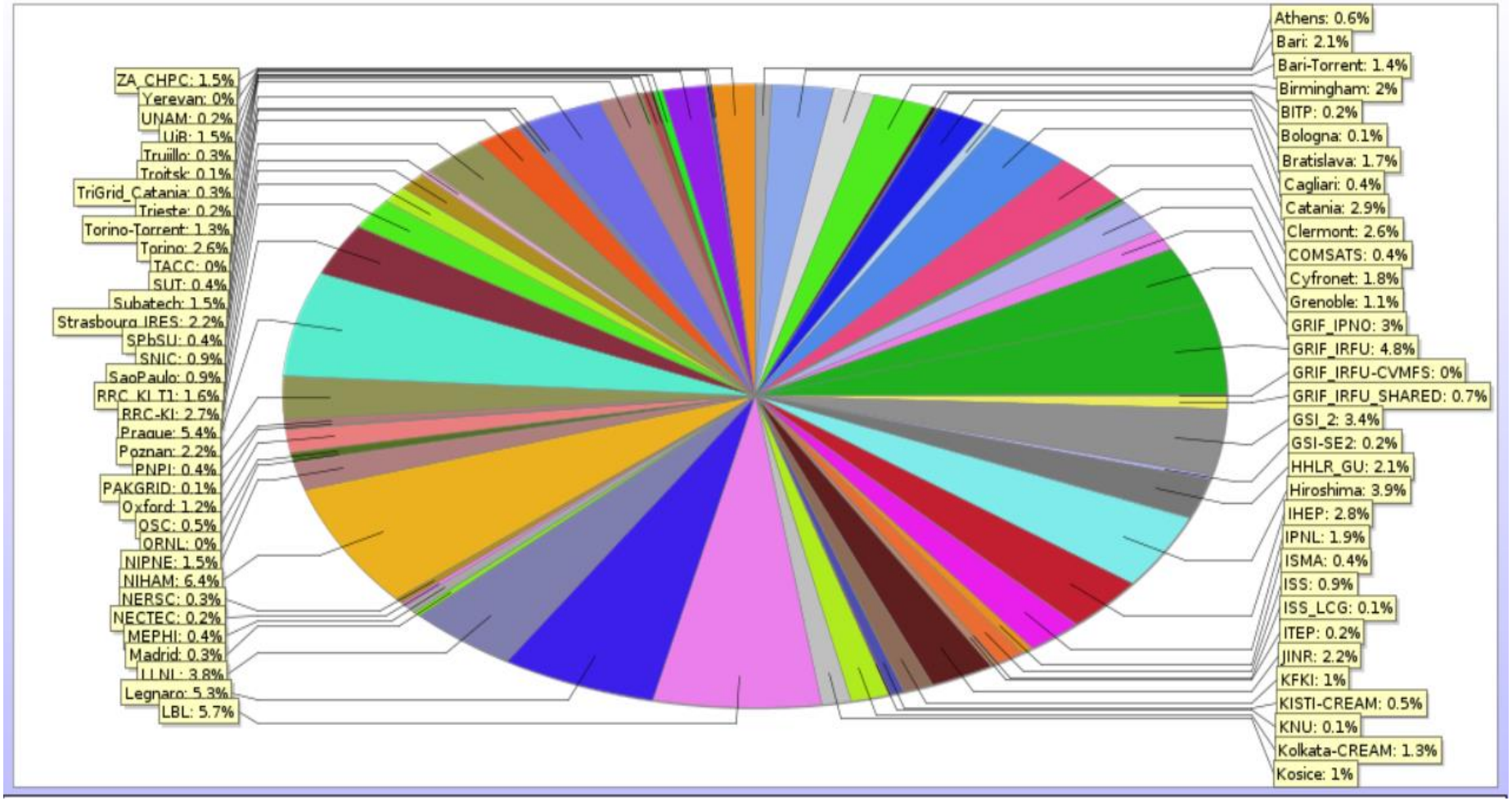
Resources delivery distribution

The remarkable 50/50 share T1/T2 is still alive and well



Resources delivery T2s

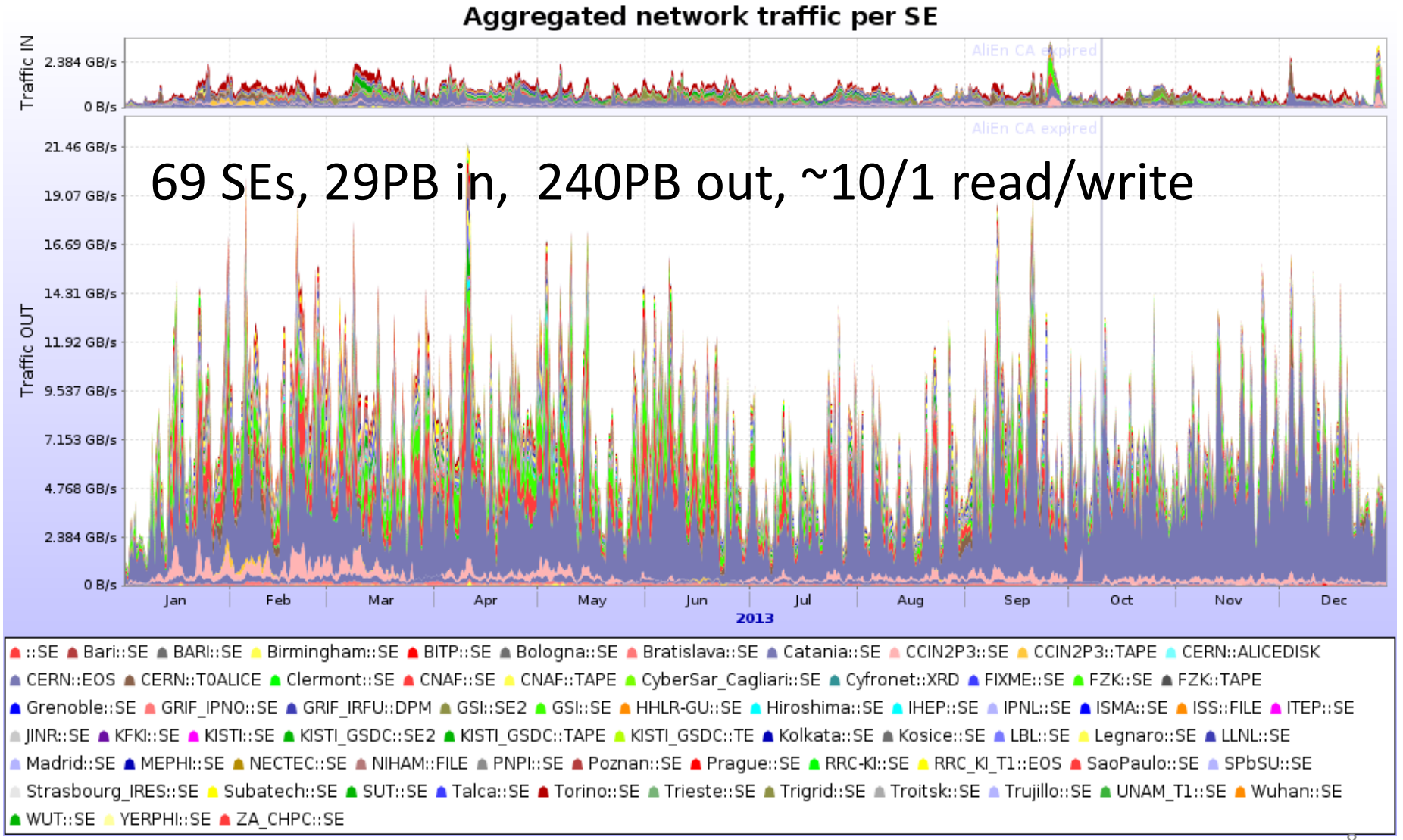
LBL (6%) + LLNL (4%) + OSC (0.5%) = 10.5% of total T2



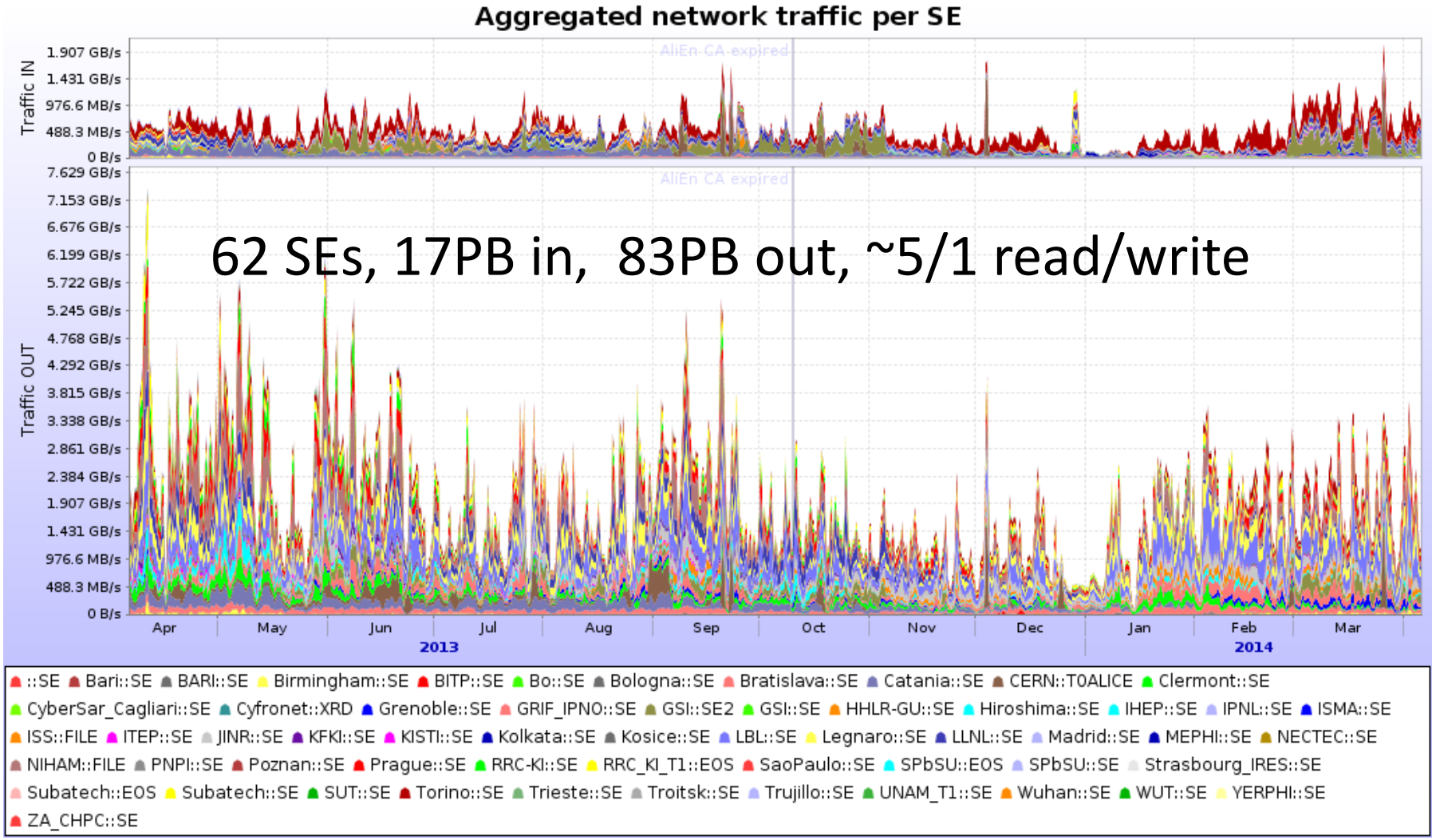
Job mixture

69% MC, 8% RAW, 11% LEGO, 12% individual, 447 individual users

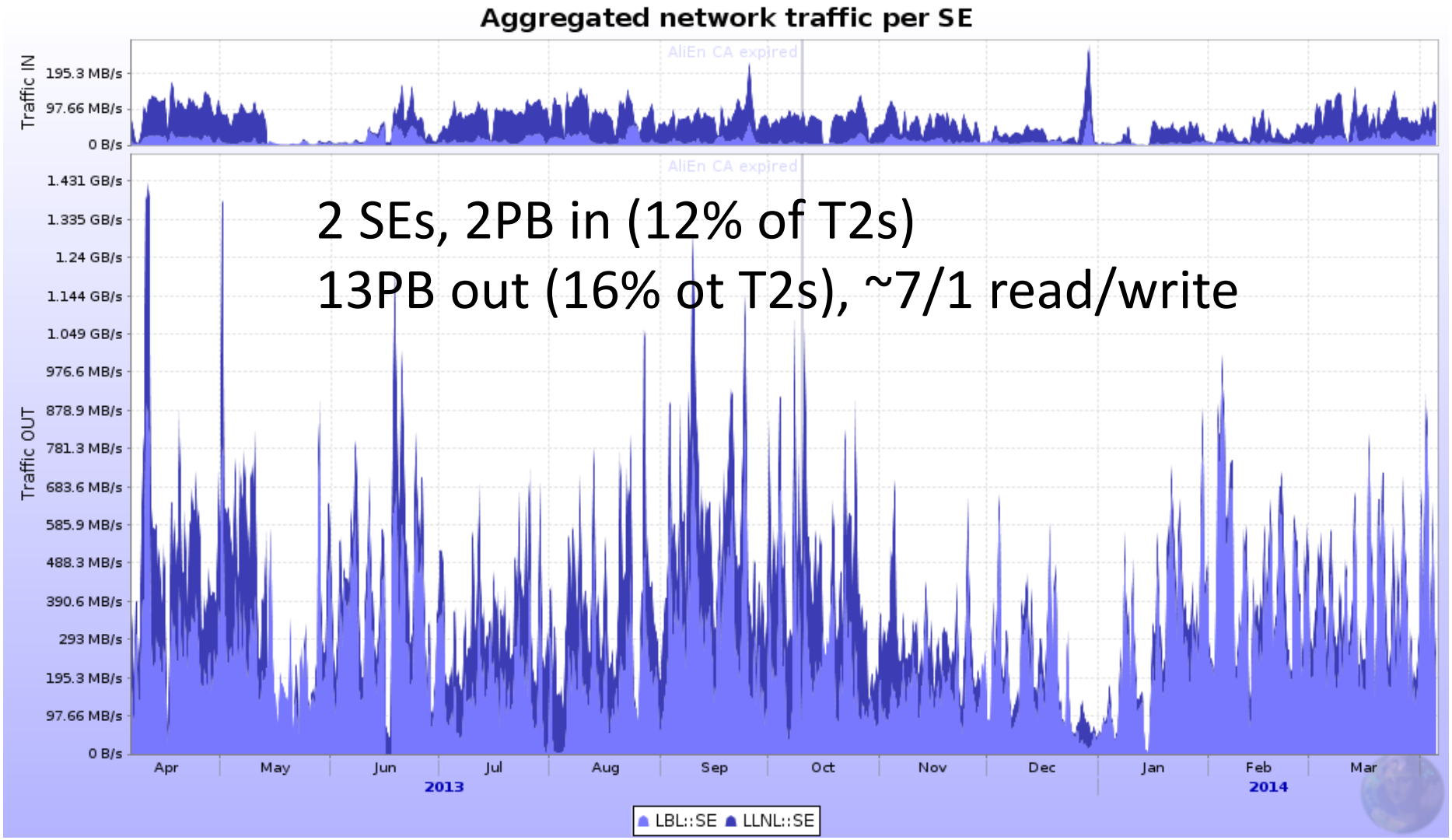
Access to data (disk SEs)



Access to data (disk SEs, T2s)



Access to data (disk SEs, US)



2 SEs, 2PB in (12% of T2s)

13PB out (16% ot T2s), ~7/1 read/write

Data access 2

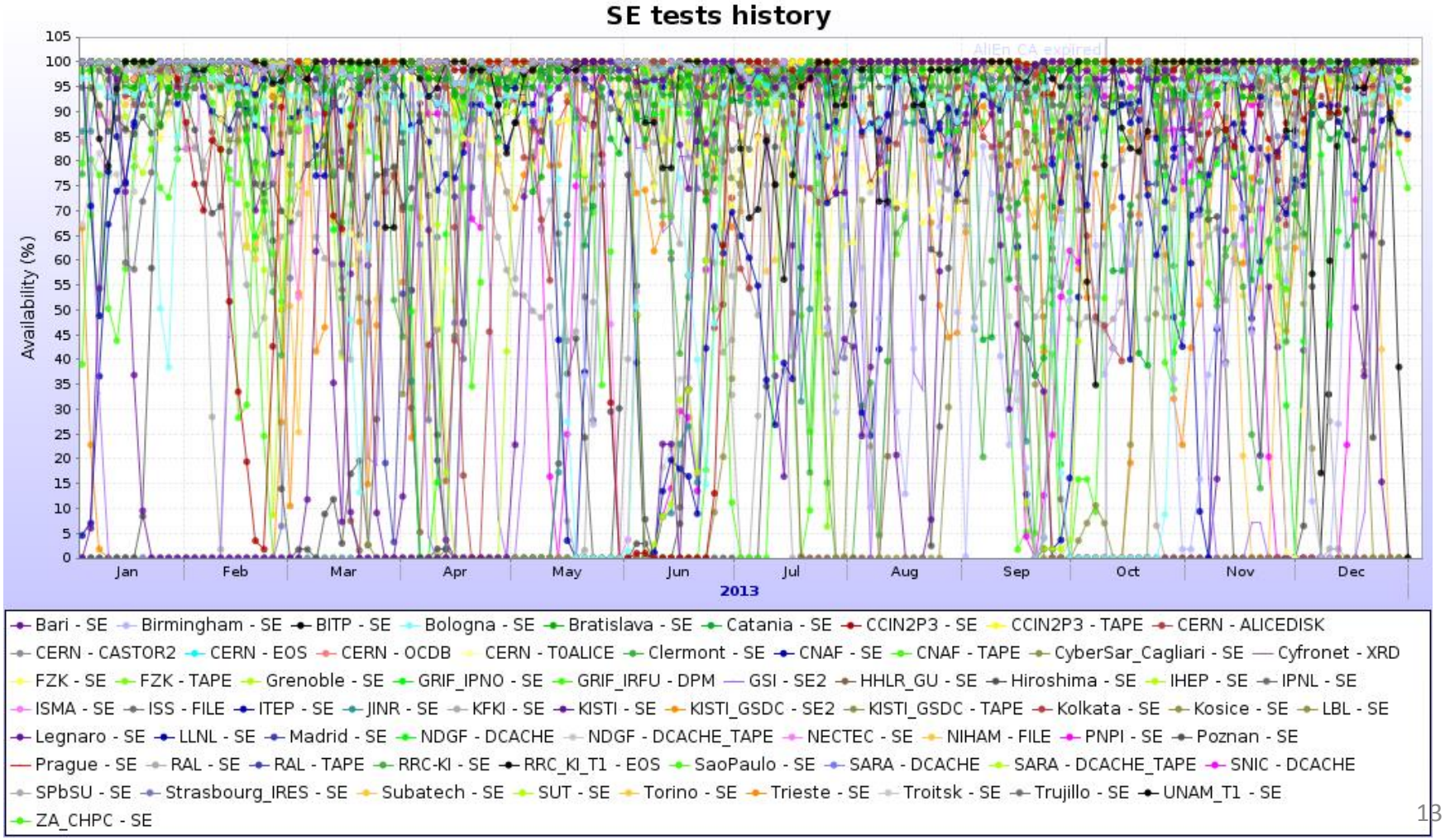
- 99% of the data read are input (ESDs/AODs) to analysis jobs, the remaining 1% are configurations and macros
- From LEGO train statistics, ~93% of the data is read locally
  - The job is sent to the data
- The 7% is file cannot be accessed locally (either server not returning it or file missing)
  - In all such cases, the file is read remotely
  - Or the job has waited for too long and is allowed to run anywhere to complete the train (last train jobs)
- Eliminating some of the remote access (not all possible) will increase the global efficiency by few percent
  - This is not a showstopper at all, especially with better network

Storage availability

- More important question – availability of storage
- ALICE computing model – 2 replicas => if SE is down, we lose efficiency and may overload the remaining SE
  - The CPU resources must access data remotely, otherwise there will be not enough to satisfy the demand
- In the future, we may be forced to go to one replica
  - Cannot be done for popular data

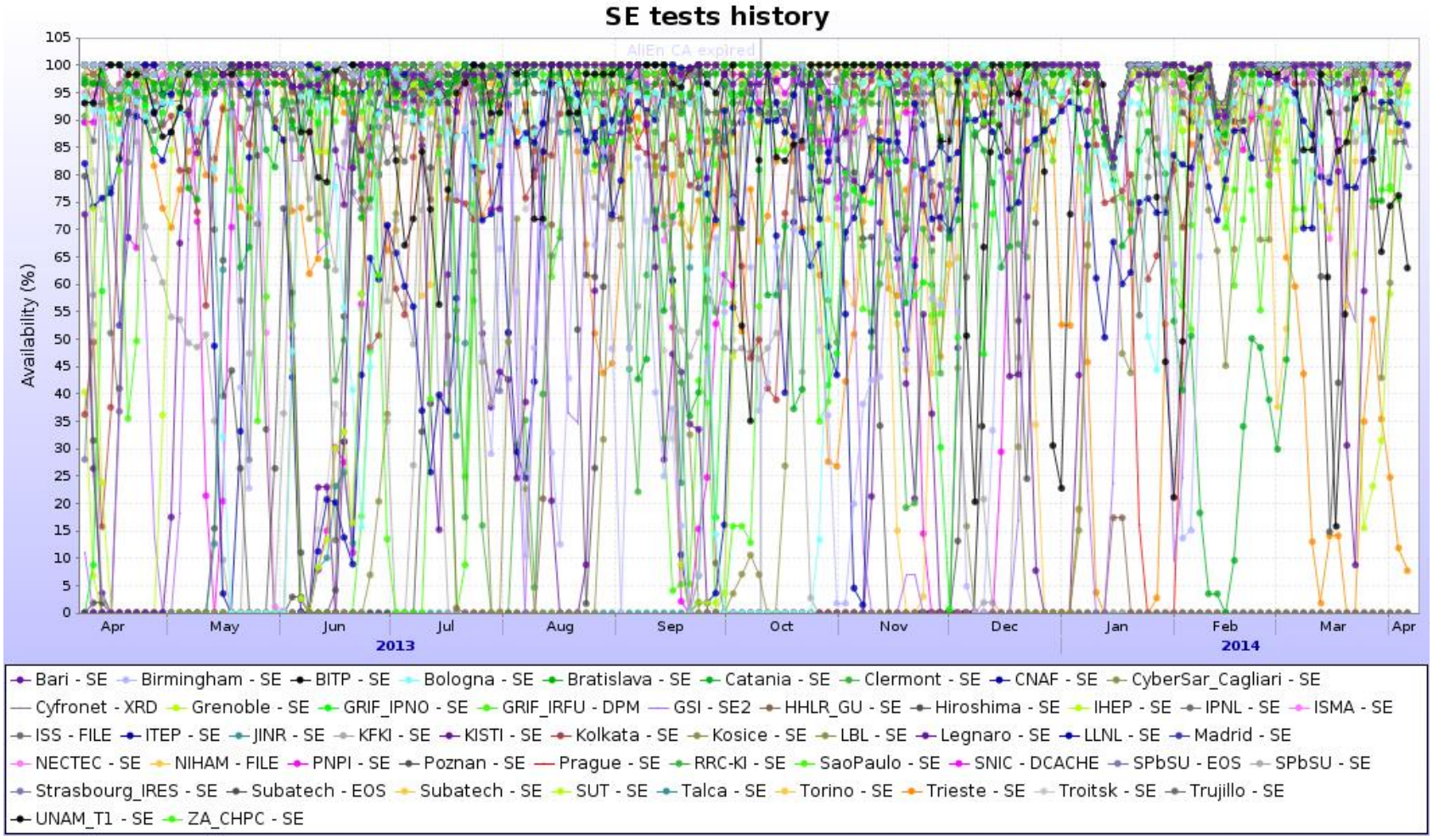
Storage availability (2)

- Average SE availability in the last year: 86%



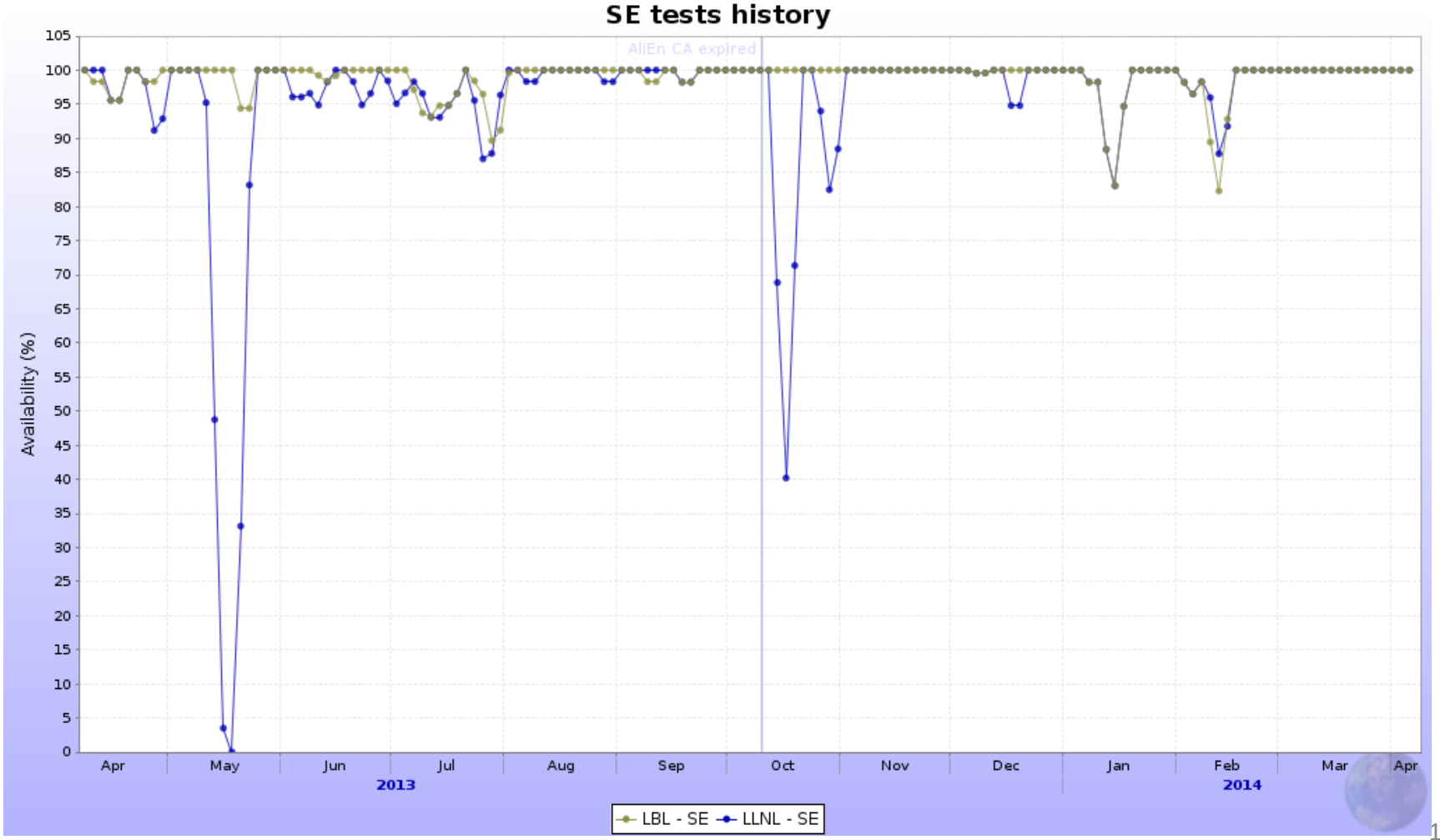
Storage availability – T2s

- Average SE availability in the last year: 80%



Storage availability – US

- Average SE availability in the last year: 97% (!)

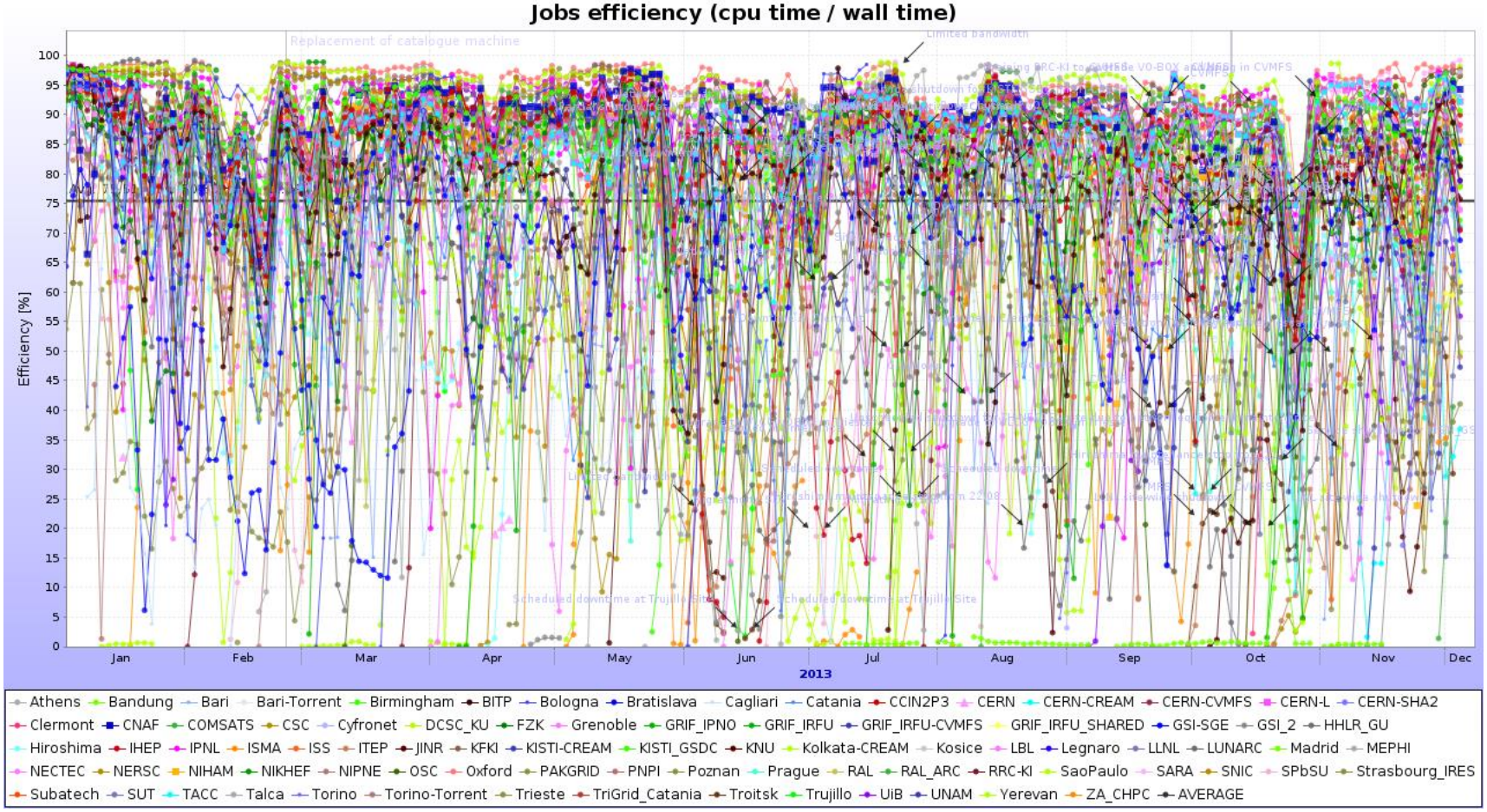


Other services

- Nothing special to report
  - Services are mature and stable
  - Operators are well aware of what is to be done and where
  - Ample monitoring is available for every service (more on this will be reported throughout the workshop)
  - Personal reminders needed from time to time
  - Several services updates were done in 2013…

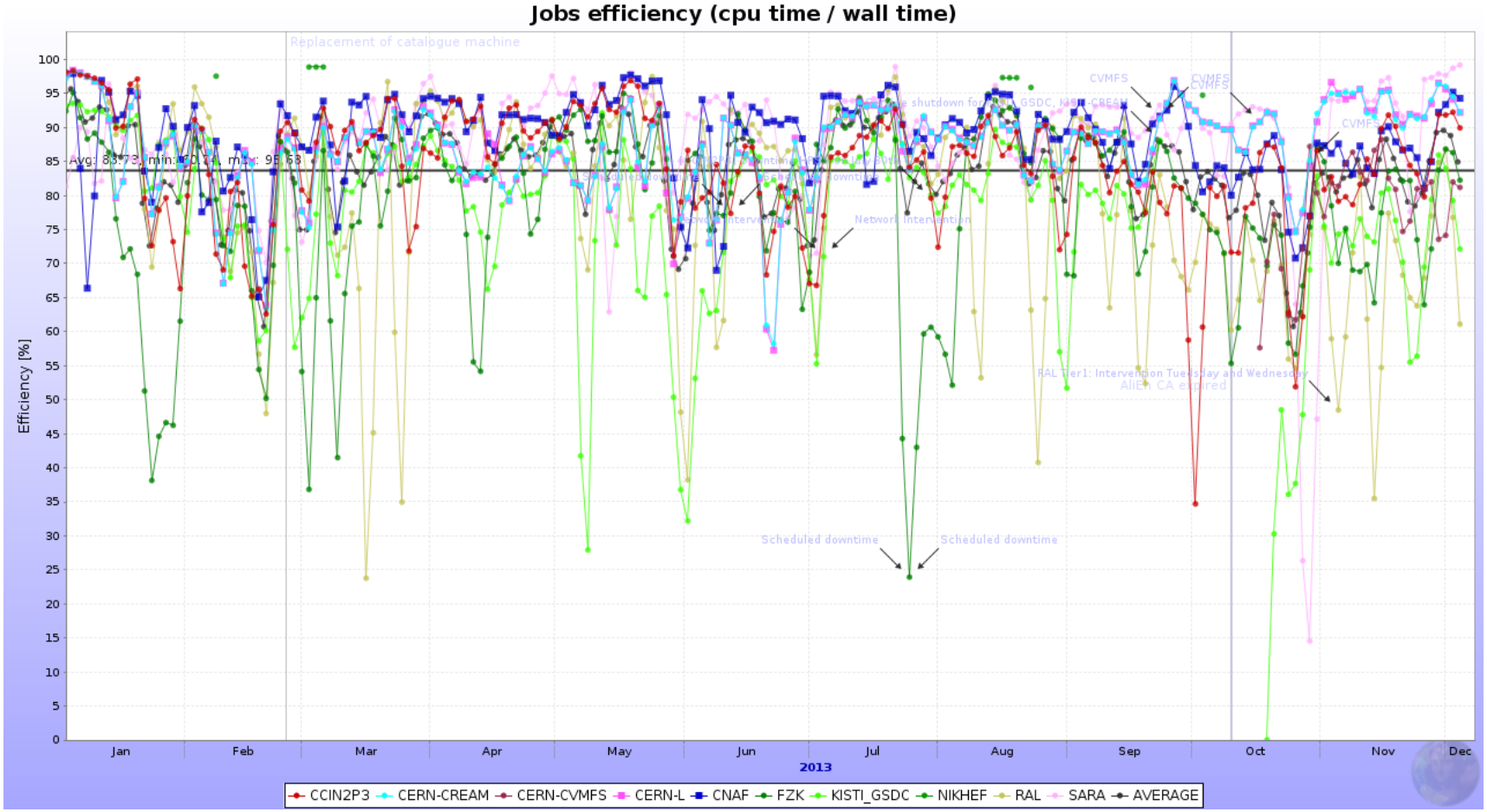
The Efficiency

Average of all sites: 75% (unweighted)



Closer look – T0/T1s

Average – 85% (unweighted)



Closer look – US

Average –75% (unweighted)

Summary on efficiency

- Stable throughout the year
- T2s efficiencies are not much below T0/T1s
  - It is possible to equalize all, it is in the storage and networking
- Biggest gains through
  - Inter-sites network improvement (LHCONE);
  - Storage – keep it simple – xrootd works best directly on a Linux FS and on generic storage boxes

What's in store for 2014

- Production and analysis will not stop – know how to handle these, nothing to worry about
  - Some of the RAW data production is left over from 2013
- Another 'flat' resources year – no increase in requirements
- Year 2015
  - Start of LHC RUN2 - higher luminosity, higher energy
  - Upgraded ALICE detector/DAQ – higher data taking rate; basically 2x the RUN1 rate

What's in store for 2014 - sites

- We should finish with the largest upgrades before March 2015
  - Storage – new xrootd/EOS
  - Services updates
  - Network – IPv6, LHCONE
  - New sites installation – Indonesia, US, Mexico, South Africa
  - Build and validate new T1s – UNAM, RRC-KI (already on the way)

Summary

- Stable and productive Grid operations in 2013
- Resources fully used
- Software updates successfully completed
- MC productions completed according to requests and planning
  - Next year – continue with RAW data reprocessing and associated MC
- Analysis – OK
- 2014 - focus on SE consolidation, resources ramp-up for 2015 (where applicable), networking, new sites installation and validation