

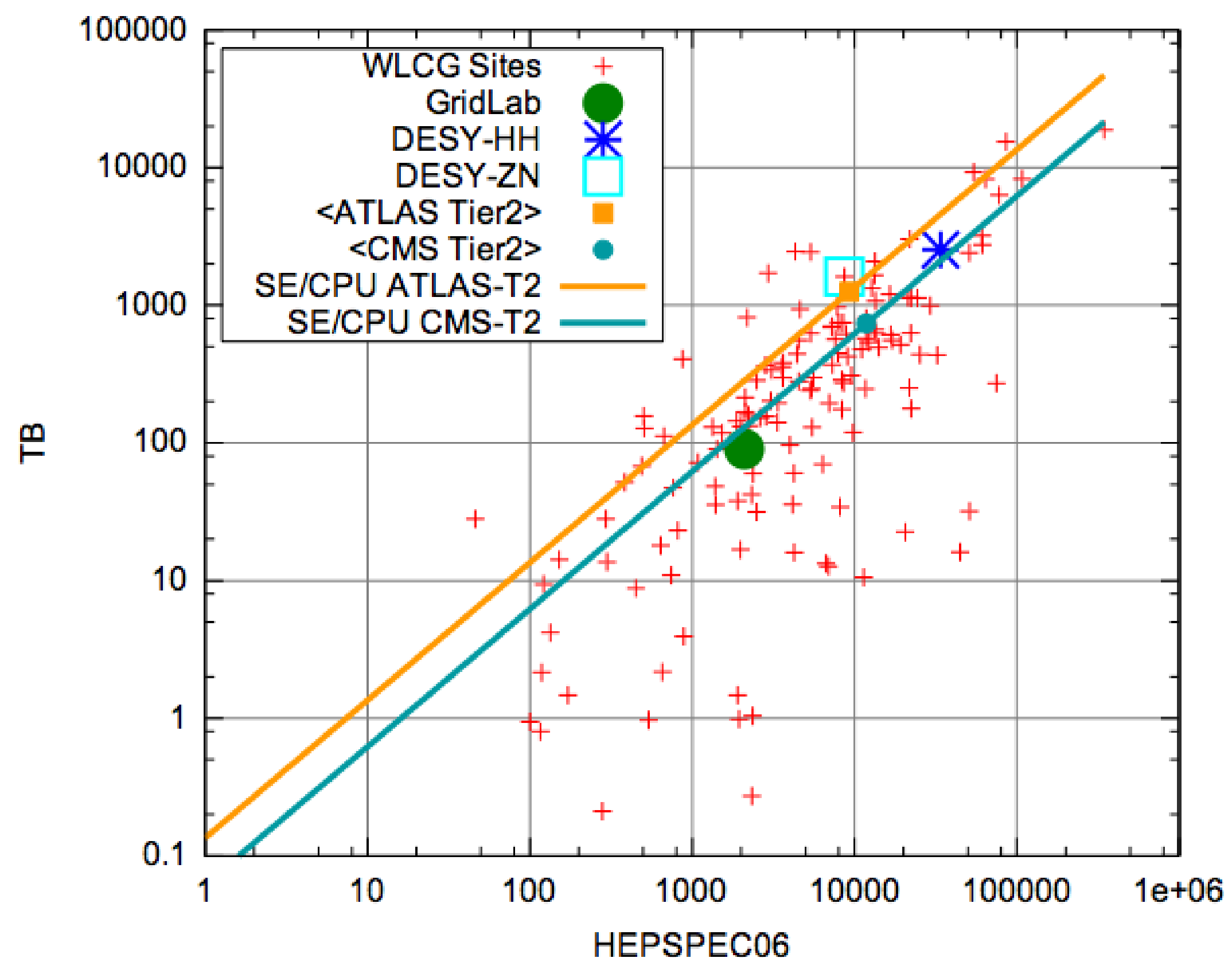
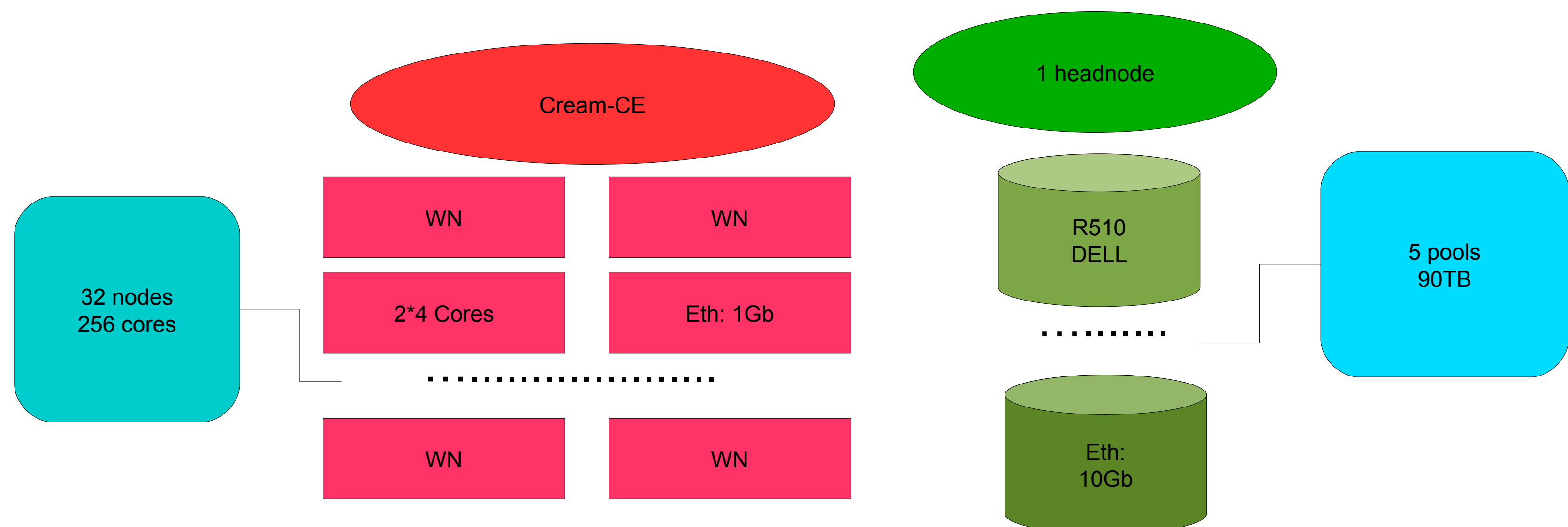
# The DESY Grid Lab in Action



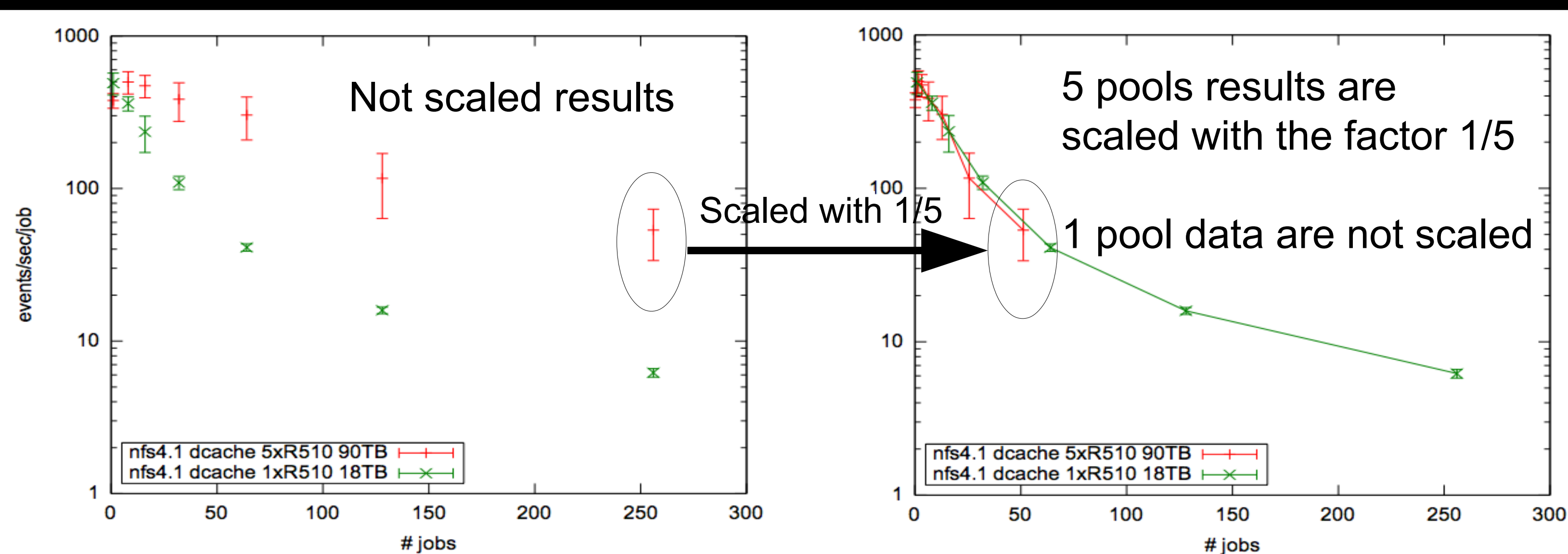
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## Hardware Setup of GridLab



With 2.1 KHS CPU and 90 TB, the DESY GridLab is well positioned on the WLCG site map. The CPU/STORAGE ratio is large enough to make a realistic storage stress test.



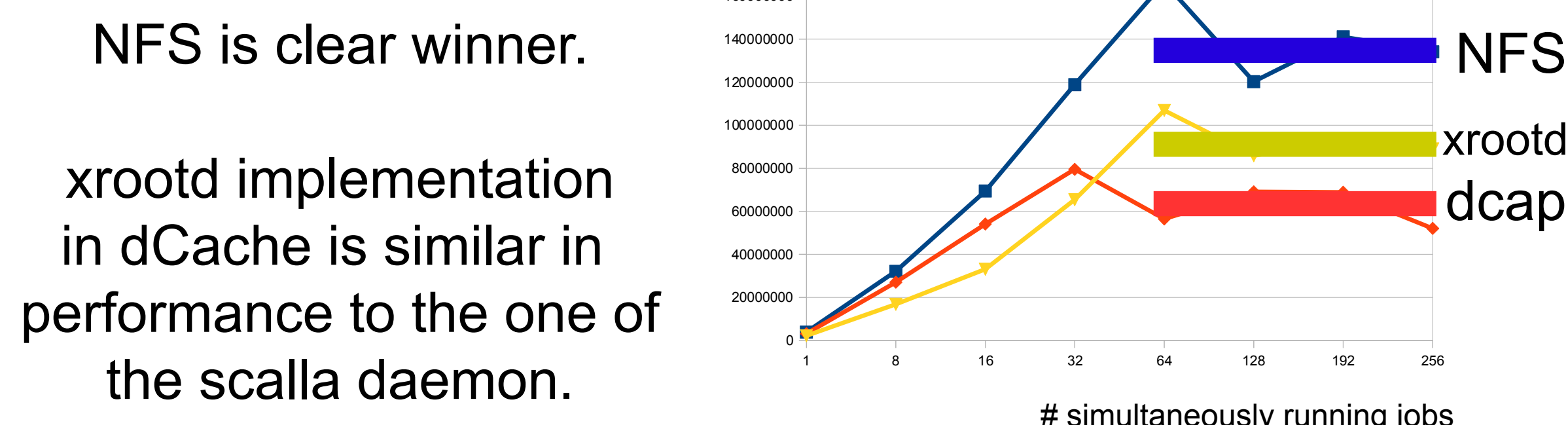
How well does IO performance scale with the number of pools? Are 100 jobs accessing a single pool server equivalent to 500 jobs accessing 5 pool servers?

**Answer:** Yes, the setup scales proportionally, if the data is well distributed or the hotswap feature is enabled.

**Consequence:** One can compare the dCache performance evaluation results with the results of any other system, if dCache results are scaled according to the difference in size of the systems.

Test of different protocols on the same hardware:

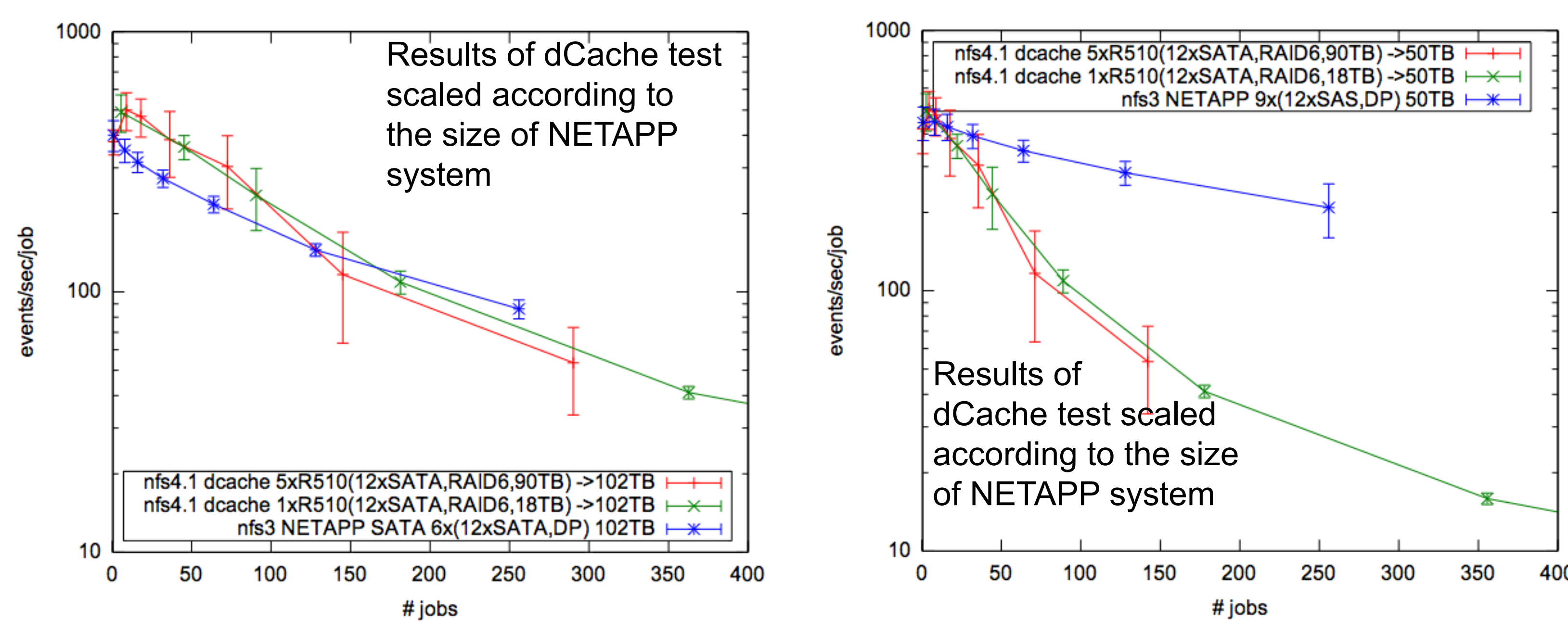
Number of events processed in 24 hours



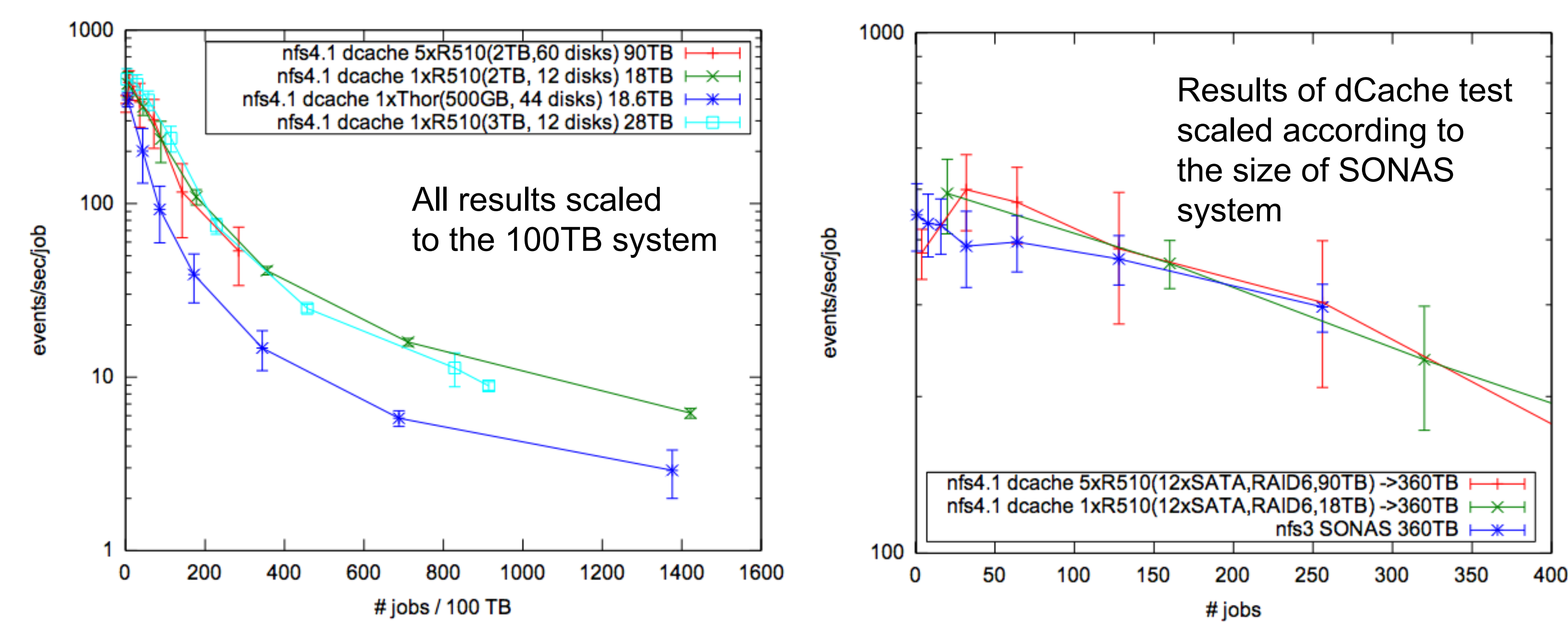
NFS is clear winner.

xrootd implementation in dCache is similar in performance to the one of the scalla daemon.

Protocol	Application Cache	Client cache
Nfs4.1	no	TTreeCache
dcap	V	Vector read
dcap++	V	Smart block caching
Root:// (dcache,xrootd)	V	Vector read



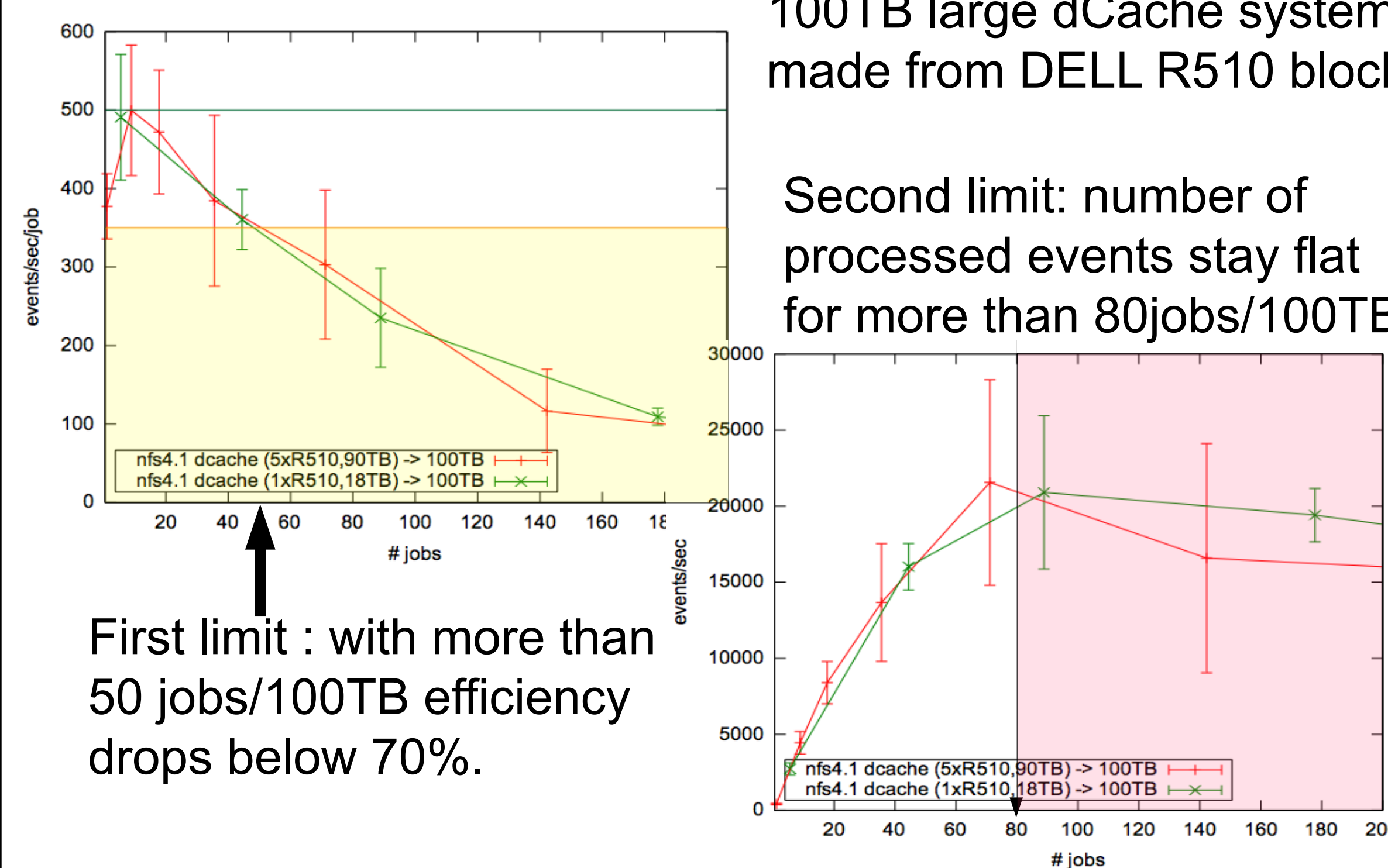
- SATA NetApp systems are similar to dCache in price and performance.
- High-end NetApp systems with SAS show a much better performance.
- Better performance of DELL R510 (12 disks) compared with Thor (48 disks).
- Despite the increase in capacity, performance per TB didn't decrease in the DELL R510, going from 2TB to 3TB disks.
- A first evaluation of a DESY SONAS system shows a performance similar to dCache.



## What are the limits of the system?

100TB large dCache system made from DELL R510 blocks

Second limit: number of processed events stay flat for more than 80jobs/100TB.



## GridLab Activity

- nfs4.1 demonstrator
- tests of different hardware
- cernvmfs tests
- dCache testbed
- HC tests development

Open for your ideas!

## GridLab Presentations/Publications

P.Fuhrmann, "NFS4.1 Initiative", HEP'10 Cornell  
 Y.Kemp et al. "NFS4.1 evaluation" CHEP2010  
 G.Behrmann et al. "xrootd in dCache" CHEP2010  
 P.Fuhrmann, "EMI,dCache and standards", LBNL seminar  
 P.Fuhrmann, "Report on NFS4.1" GDB 01/2011  
 P.Fuhrmann, EGI User Forum; dCache Workshop  
 S.Kalinin, "xRootd", dCache Workshop, Gottingen  
 D.Ozerov, "Detailed local access protocol evaluation", HEP'11 Darmstadt  
 P.Fix et al., Dell Technical White Paper, "A dCache Comparison for Tier2/3 LHC Research Sites"  
 Y.Kemp et al., "Experience with HEP analysis on mounted filesystems", CHEP2012