CERN

FTS3: quantitative monitoring

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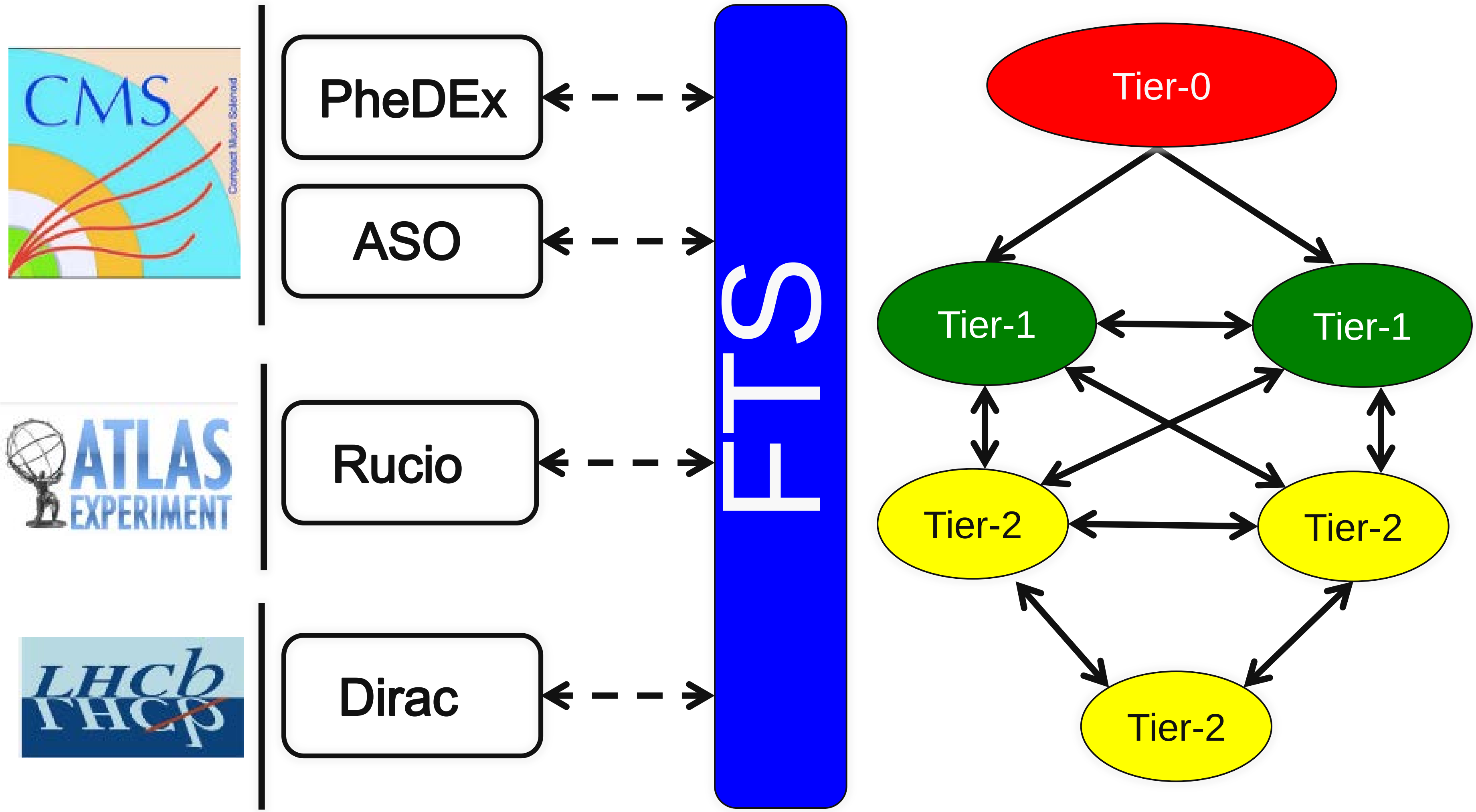
Outline

- WLCG Data Movement
- Monitoring Architecture
- Functionality
- FTS3 Performance
- Conclusions

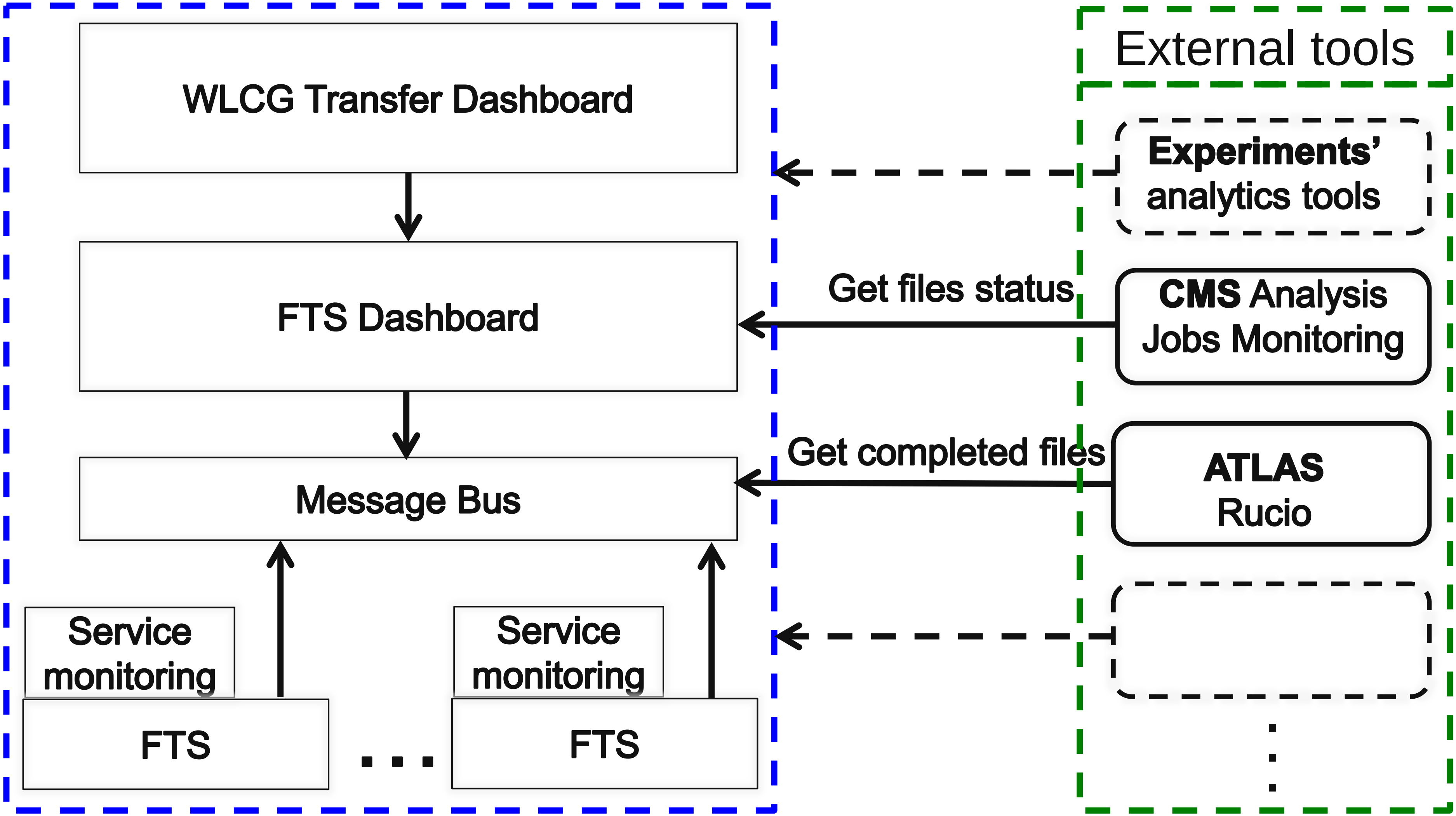
WLCG data movement model



FTS3

- Main features:
  - Transfer auto-tuning/adaptive optimisation
  - Modular protocol support
  - Smart transfer retry mechanism
  - Resource sharing
    - VO activity shares
- FTS3 officially started production for WLCG on August 1st , 2014
  - Atlas Rucio and CMS ASO were being commissioned during the same period

FTS3 monitoring architecture

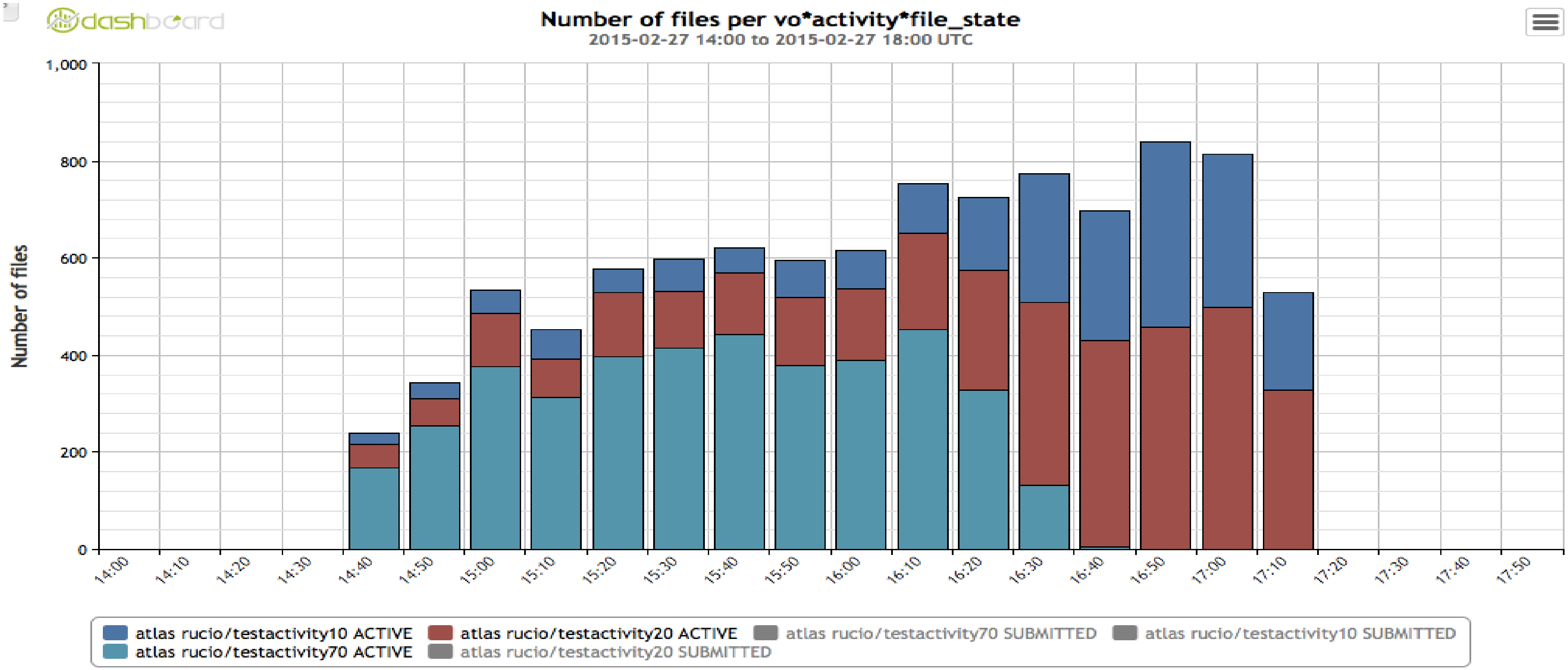


Functionality

- FTS transfer monitoring
  - FTS Dashboard
    - Calculate transfer throughput and volume per VO/workflow, site, host and country
    - Correlation of number of transfers and volume transferred
    - SRM overhead measurement
    - VO/workflow shares monitoring
    - Aggregate and report on common errors
  - FTS service monitoring
    - Per link/endpoint file transfers
    - Service configuration
    - Service performance monitoring
- WLCG transfer monitoring
  - WLCG Transfer Dashboard: Aggregation of Xrootd/FTS transfers throughput/volume per VO, site, host and country

FTS activity-share commissioning

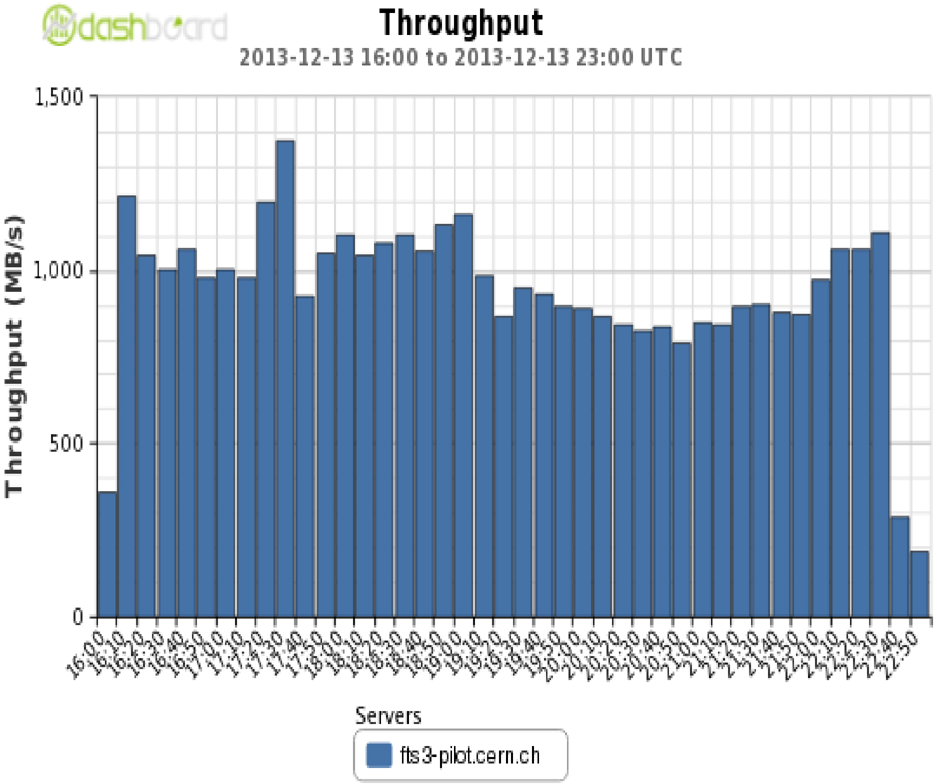
{"vo":"atlas","active":true,"share":[{"testactivity10":0.1},{"testactivity70":0.7},{"testactivity20":0.2}]}

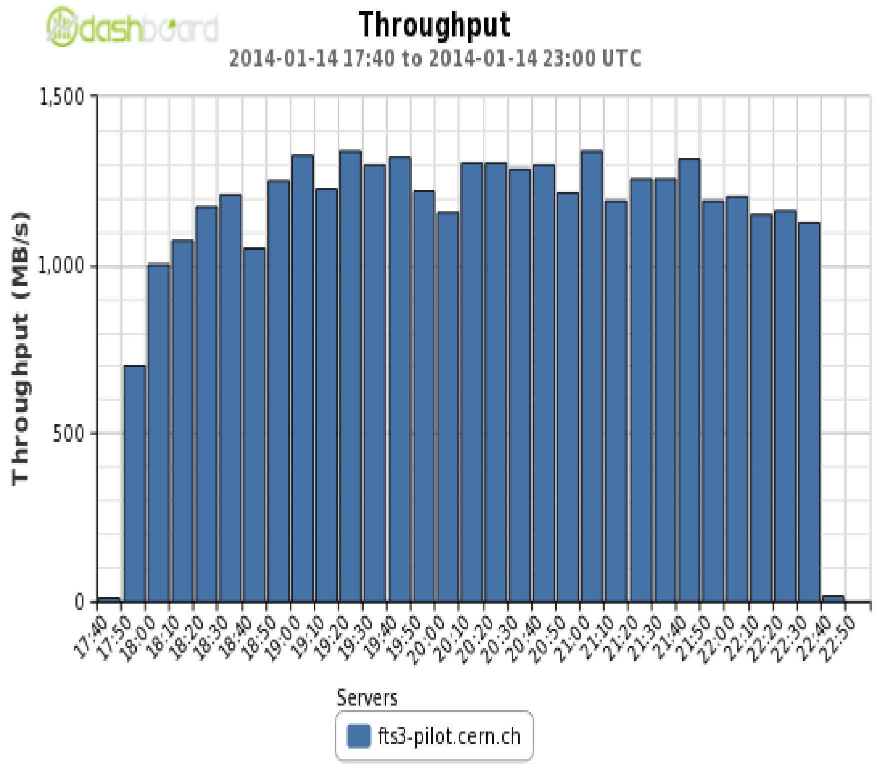


Workflows = $\{A_{1,} A_{2,} A_{3,} \ldots, A_n\}$
if $A_{jActive} < A_{jQueued}$ & $A_{iActive} < A_{iqueued}$
then $A_{jActive} \approx A_{iActive} \times A_{jShares}/A_{iShares}$

FTS optimiser commissioning

20*1000 files, 1 GB files





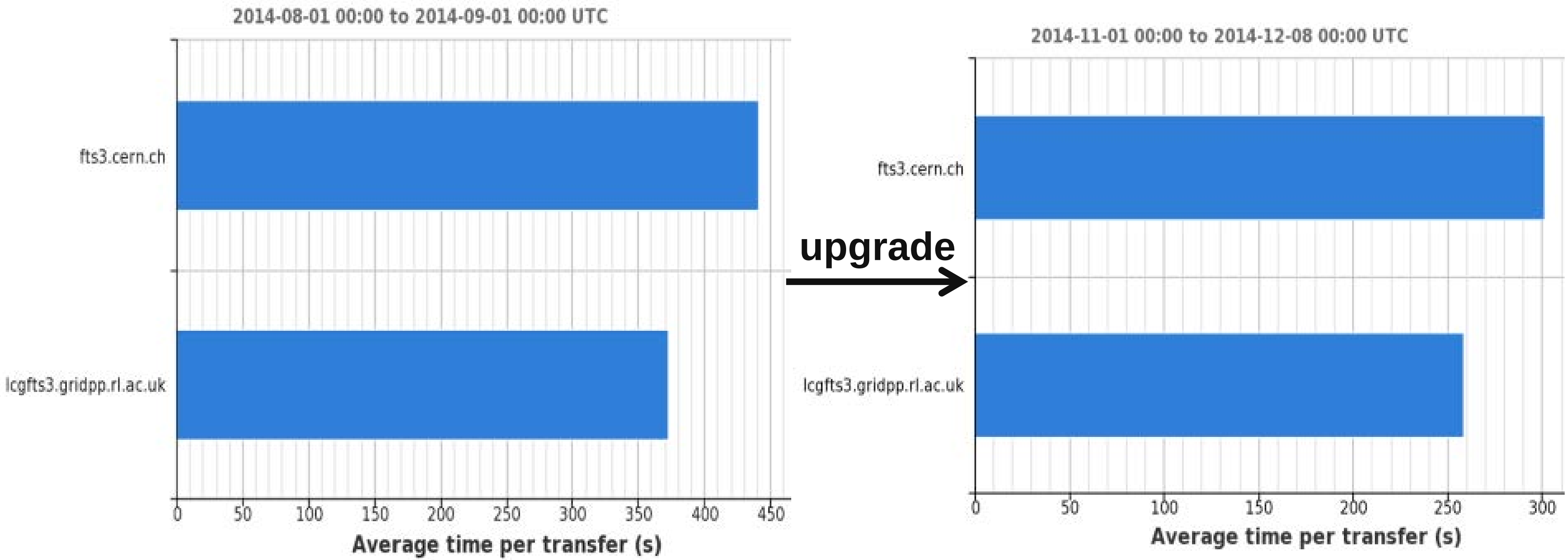
Fixed config (60 files, 20 streams)

Auto-config optimiser

✓ FTS3 Optimiser can increase throughput

Algorithm improvement measurement during production

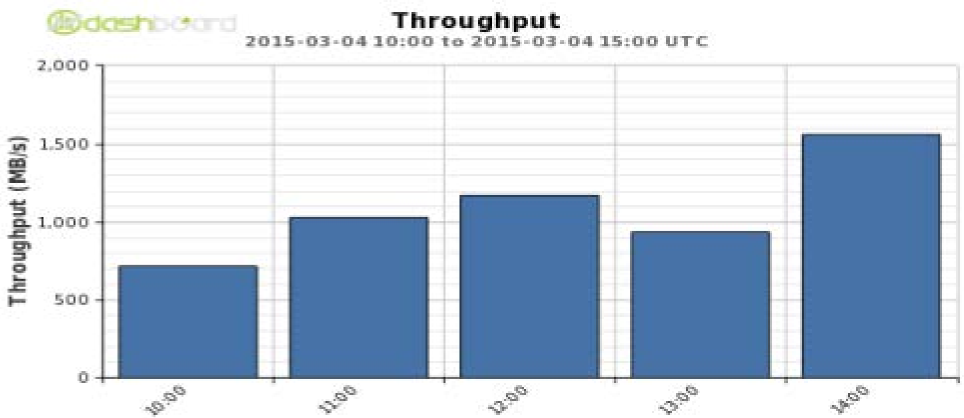
~ 20 M files, ~ 6 PB data, ~ 3 GB avg size

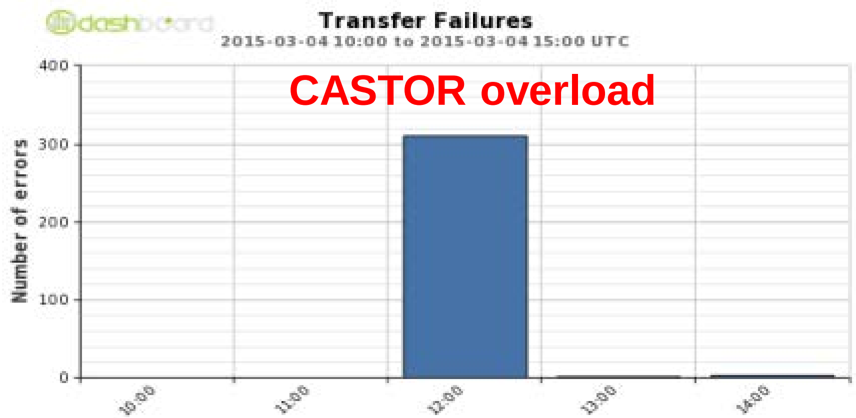


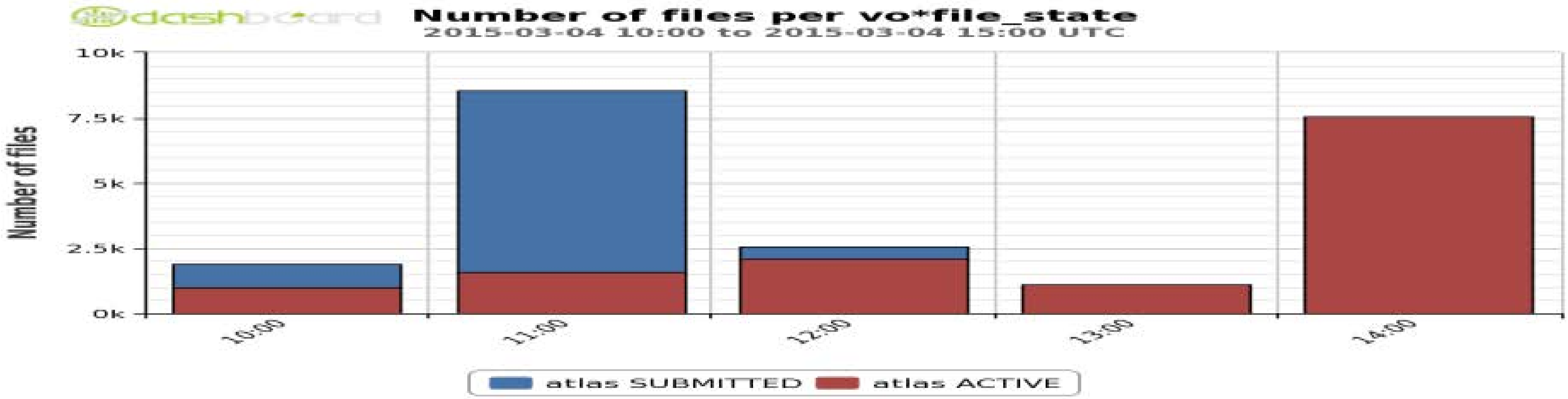
- ✓ For files > 2GB, the throughput has been increased by **~ 33%**

Transfer auto-tuning optimisation

ATLAS data taking exercise: transfer from EOS to CASTOR

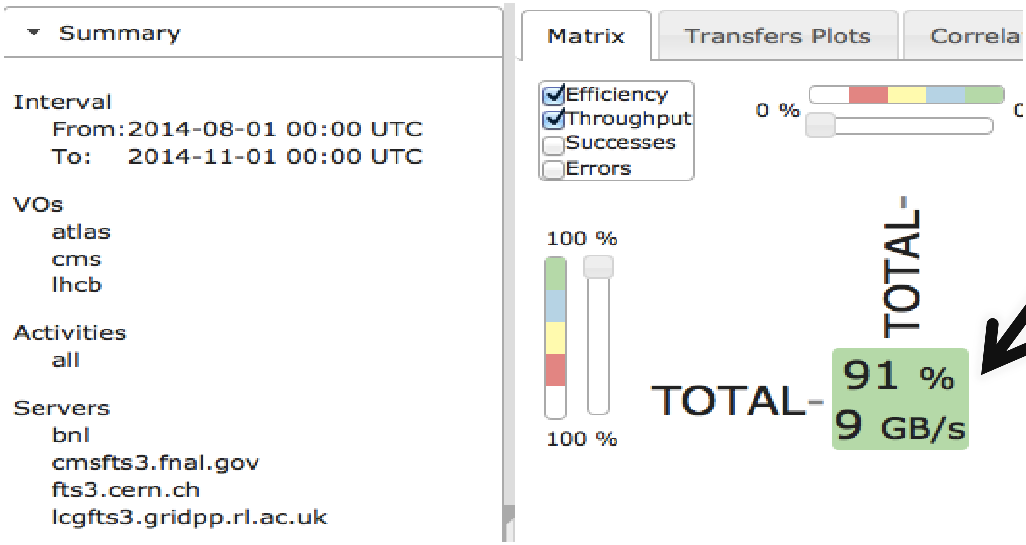




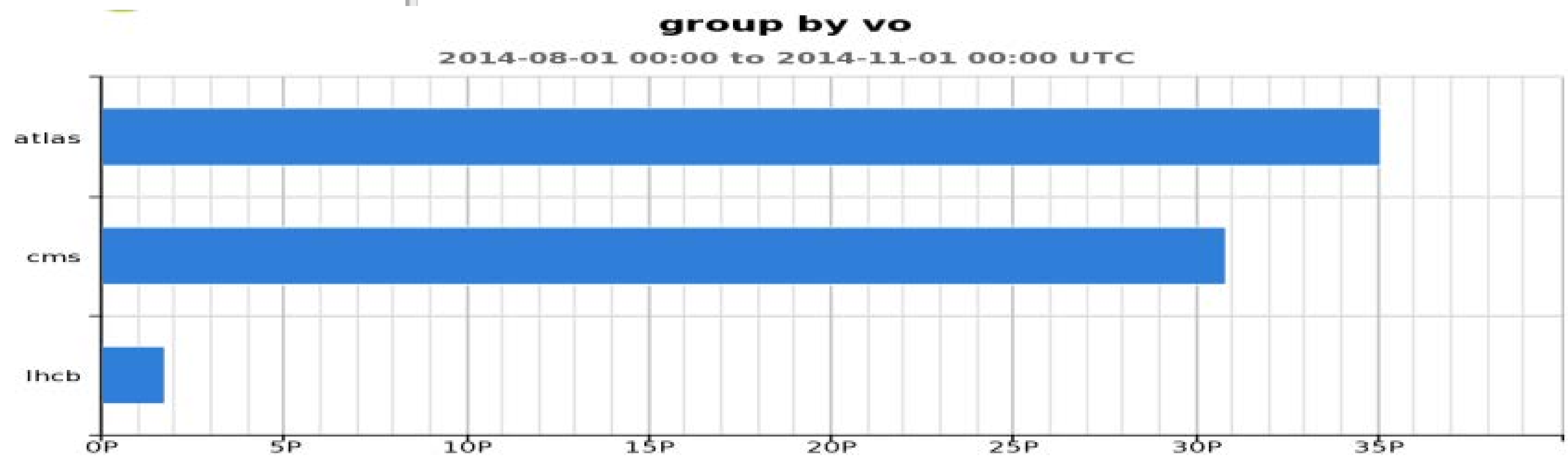


✓ The load on the storage has been adjusted automatically by FTS to maximise the throughput and efficiency

FTS performance for WLCG during the first phase of production

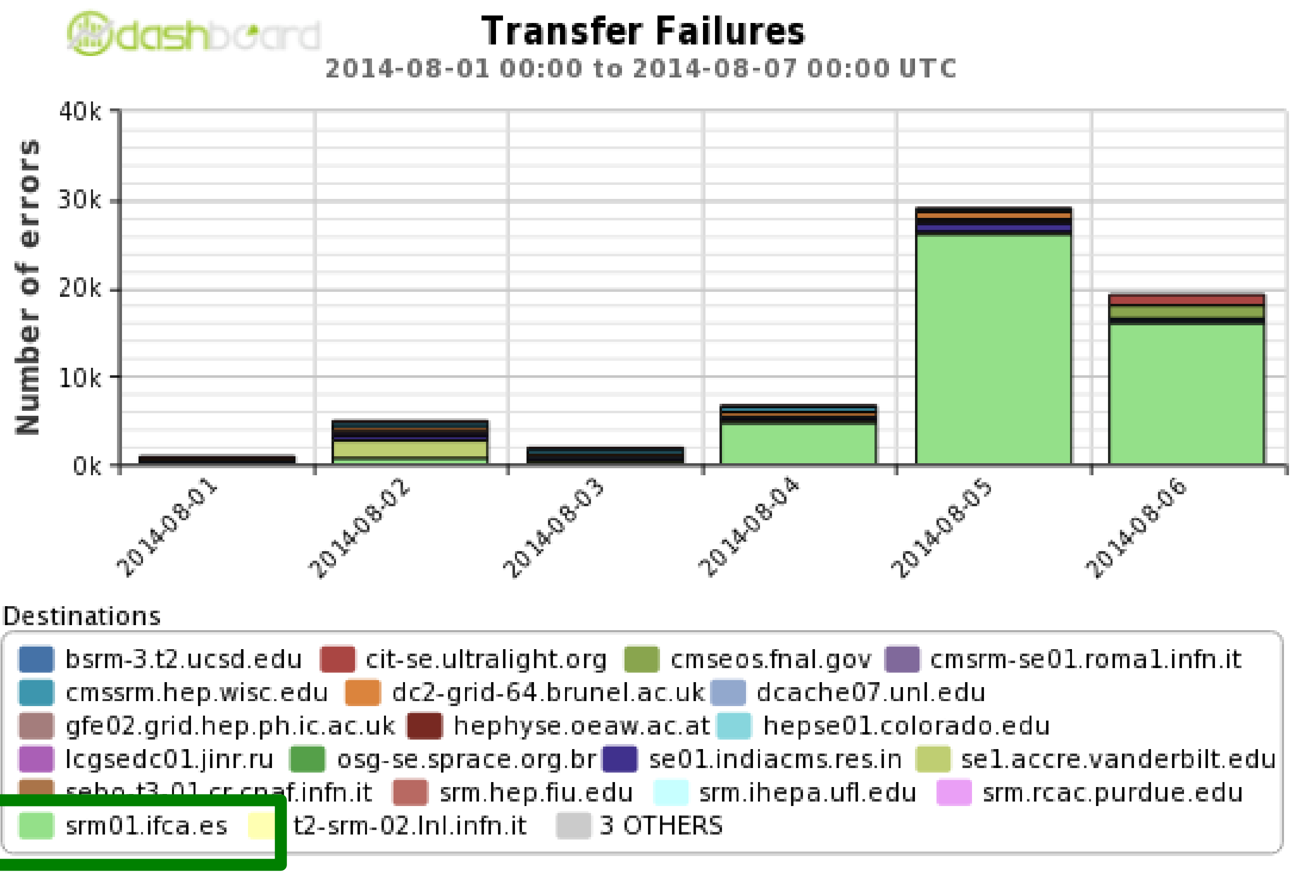


- ✓ No particular configuration by experiments: auto-configurations adjusted by the optimiser
- ✓ Only **~2 %** of failures are caused by service issues: Transfer process died (**FIXED**)



Troubleshooting transfer issues

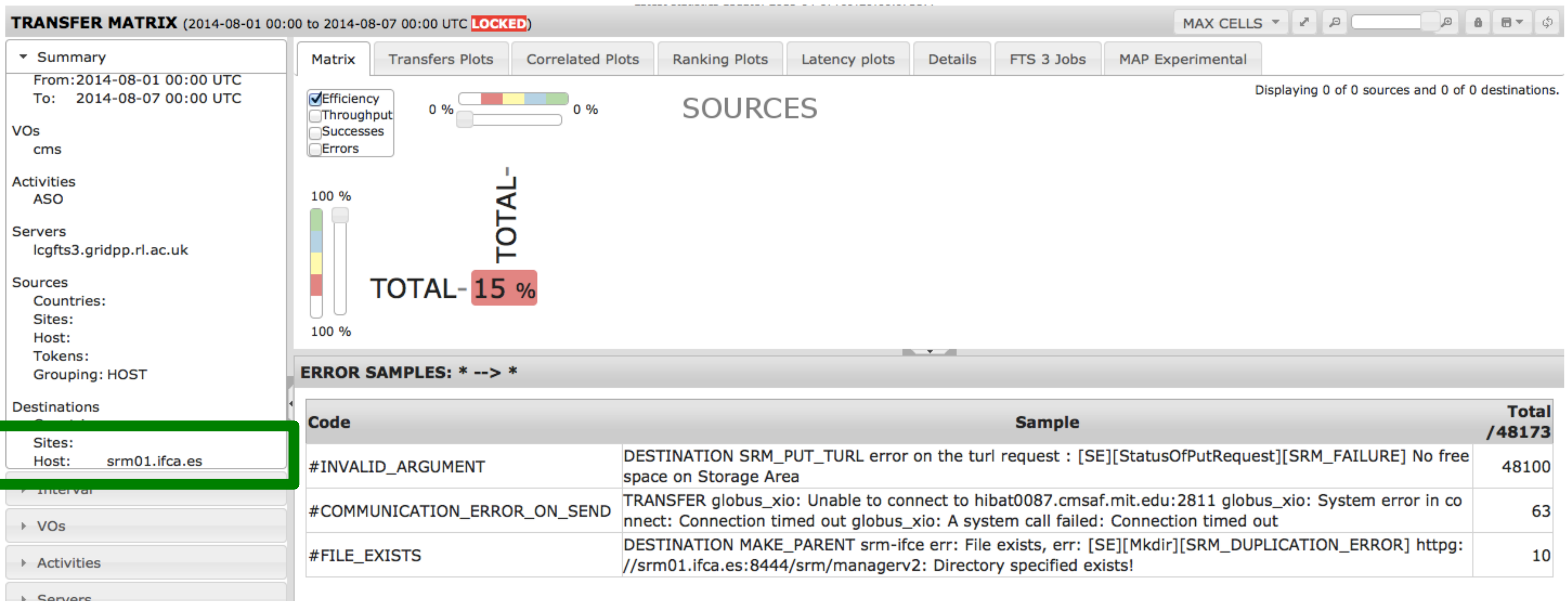
CMS CSA14 challenge



Grouping transfer failures by destination

Troubleshooting transfer issues

CMS CSA14 challenge



Classifying the errors

Summary and conclusions

- FTS3 started production in August 1st 2014 and has shown good performance
- FTS3 monitoring has been crucial for the service commissioning and during production
- Next:
  - Evolve FTS3 monitoring to correlate network and FTS measurements for easier troubleshooting
  - Explore historical monitoring data to improve service efficiency