





FTS as the interface to archival storage

What is FTS?

- Responsible for distributing the majority of LHC data across the WLCG infrastructure.
 - ATLAS, CMS, LHCb
- Moves sets of files from one site to another while allowing participating sites to control the network resource usage.
- Some numbers:
 - 6 server instances installed at:
 - **Europe: CERN(2), RAL(2) & EEUU: BNL, FNAL**
 - ~ 30 active **Virtual Organizations**
 - **Biggest VO (ATLAS): 51M transfers, 15.6 PB**
 - All VOs in 30 days: ~**35.4 PB** and ~**75M files**
 - **CERN is the busiest instance with ~40M transfers**

FTS Architecture

Horizontal scalability

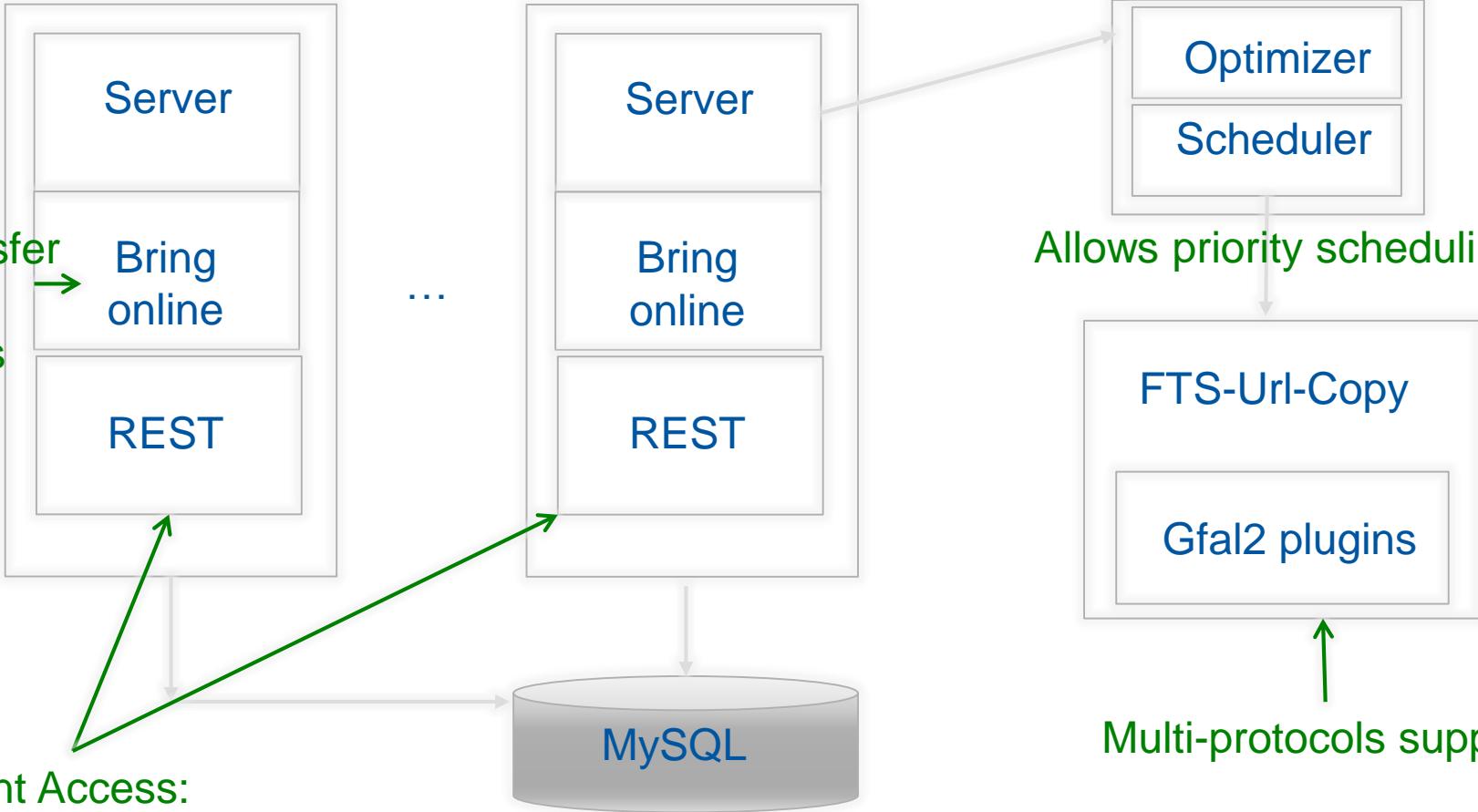
Optimizes parallel transfers

Transfer from tapes

Allows priority scheduling

Client Access:
Python bindings

Multi-protocols support



Why they use FTS?

- **Simplicity**

- Users interact with FTS by submitting transfer jobs, that simply say “**copy <source URL> to <destination URL>**”
- WebFTS portal for end-users
- Web-based monitoring
- Well documented in <http://fts3-service.web.cern.ch/>

- **Reliability & Integrity**

- Retries and Checksums

- **Flexibility**

- Multiprotocol support
 - Webdav/https, GridFTP, xroot, SRM
- Different Clients to access the service
 - Standard clients (e. g. curl), Python bindings or FTS CLI
- Transfers from different storages ->> Even proof of concept for EOS/CTA
 - (EOS, DPM, Object Storages, STORM, Castor, ...)

- **Scalability**

- Horizontally scalable
 - Identical server's configuration
 - Ideal for shrinking or expanding on-demand

- **Intelligence**

- Optimize the number of parallel transfers per link taking into account the effective throughput without burning the storages
- Supports priorities/activities

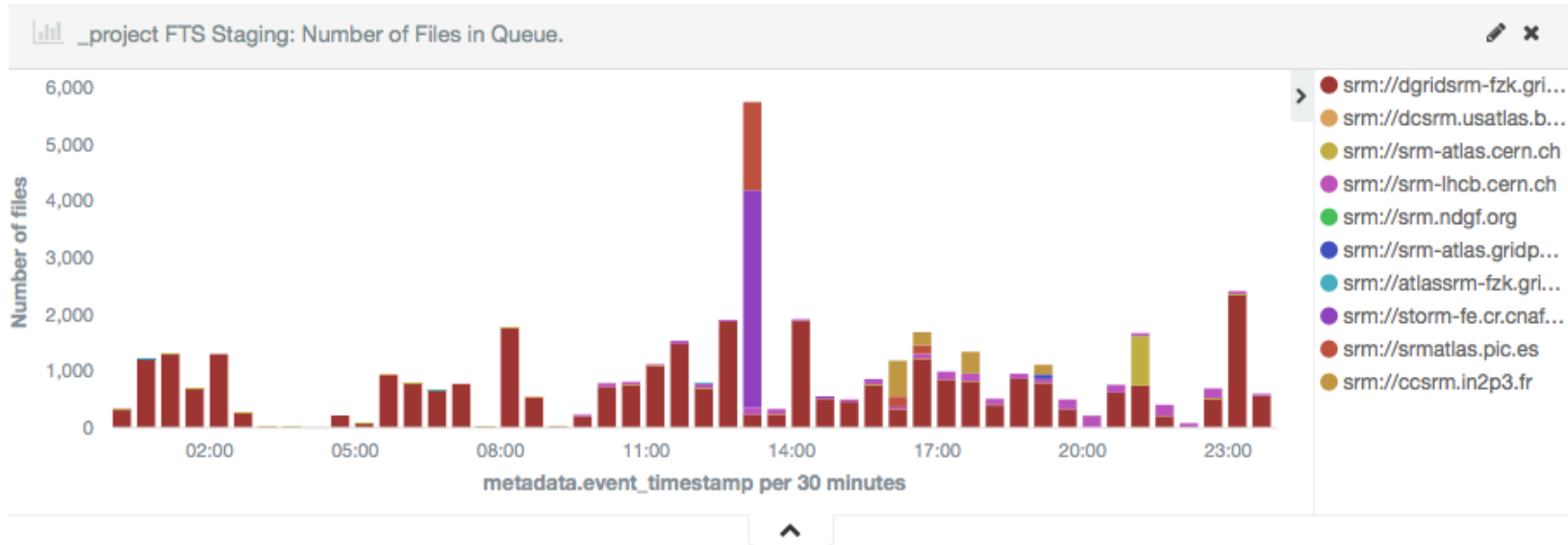
FTS as the interface to archival storage

- Experiments asked to provide what they can expect from tapes
 - Tapes are cheaper than disks
 - Tapes have different metrics
- FTS helps to answer tapes expectations
 - Interface of all tapes (even proof of concept EOS/CTA)
 - Offers comparable metrics

Comparable metrics

- FTS presented a proposal in the steering Dec'16 to provide Staging Real Time information.

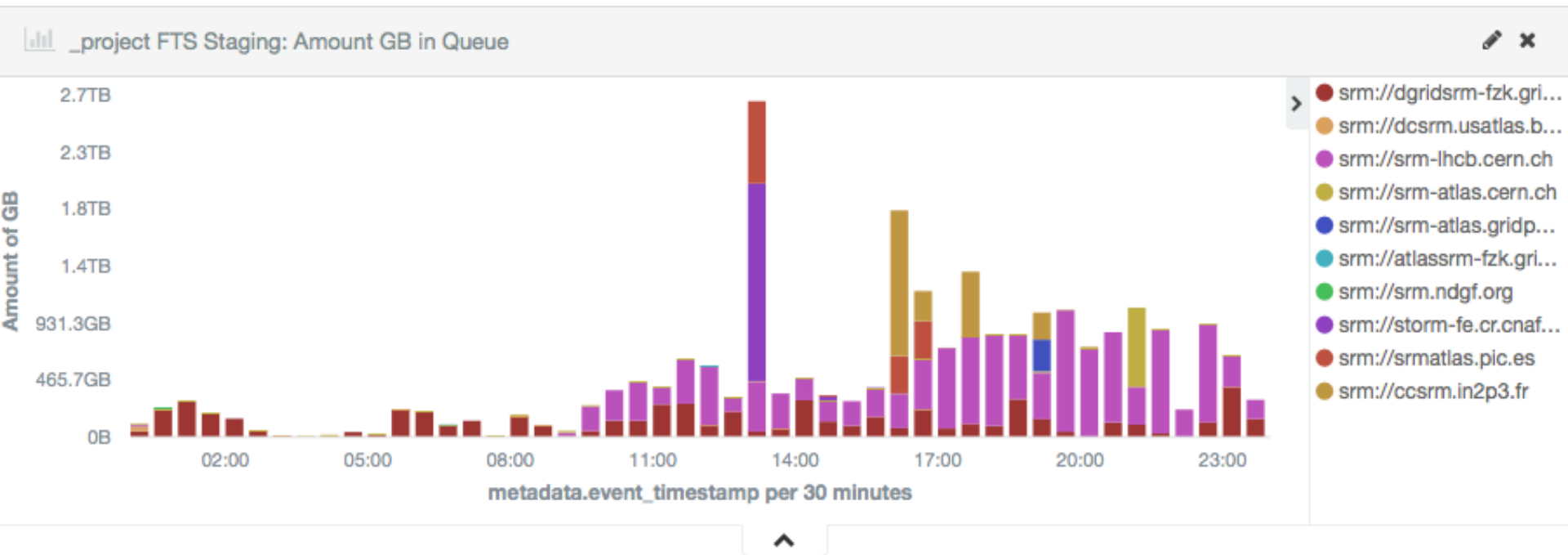
A. Number of files in staging queue



Comparable metrics

B. Amount of GB in staging queue:

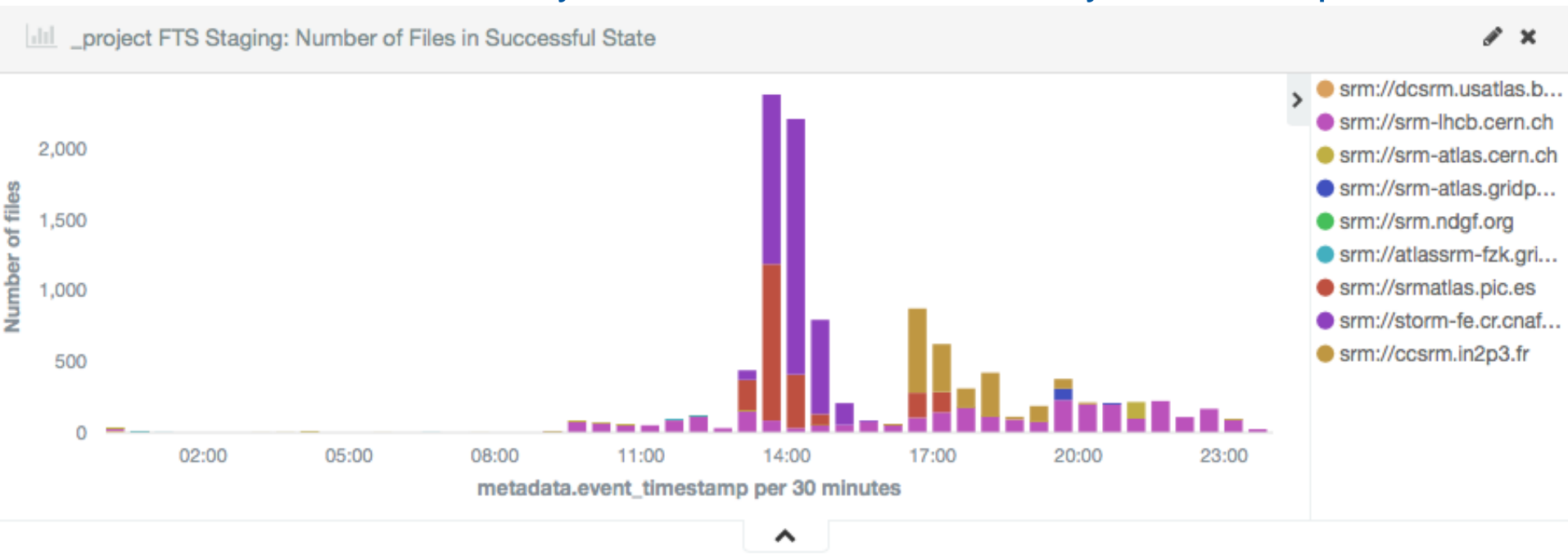
- Users should provide the `user_file_size` for this view.



Comparable metrics

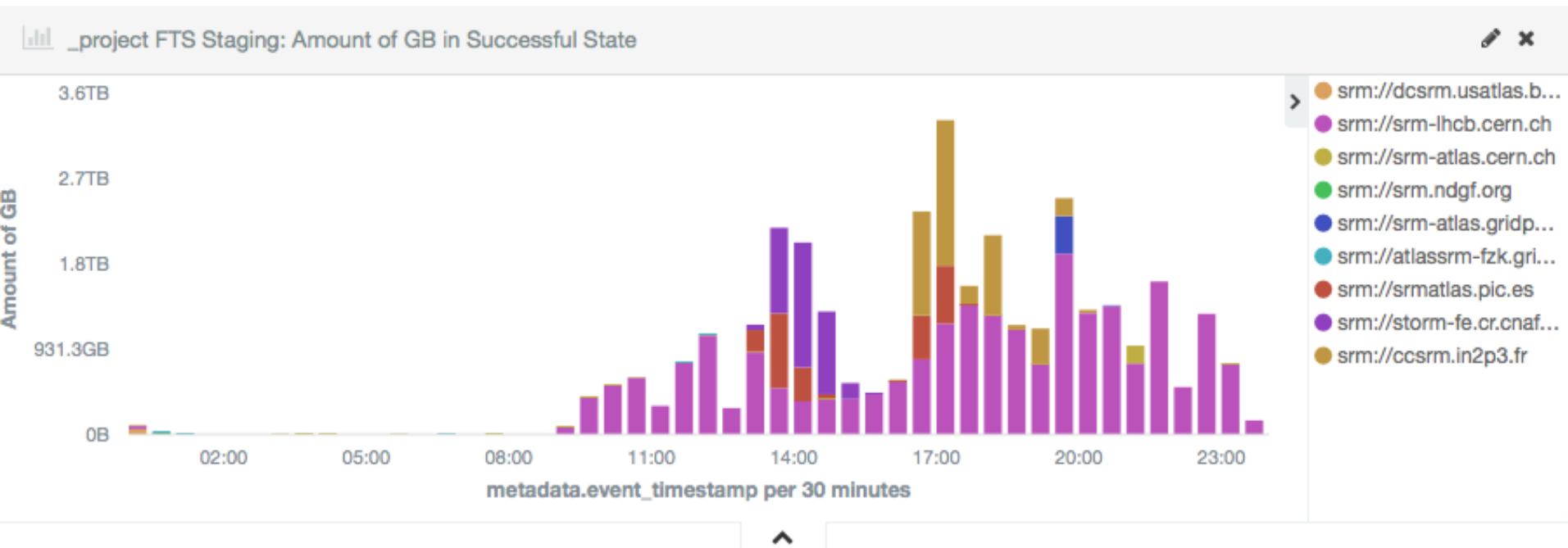
C. Number of successful staging files

- Submitted or Successful states
 - staging indicator included to differentiate them from normal transfers.
- Files already in disk are also counted by ATLAS request



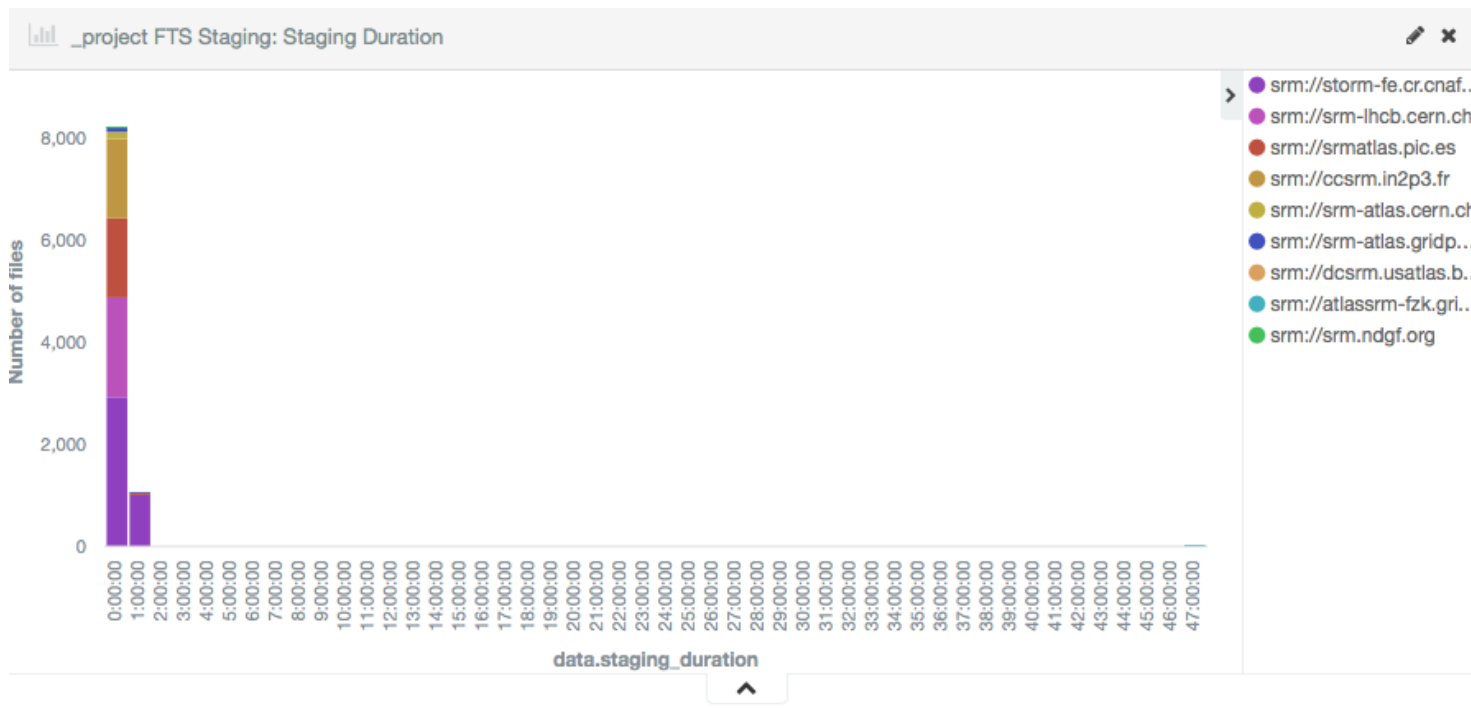
Comparable metrics

- D. Amount of GB of successful staging files



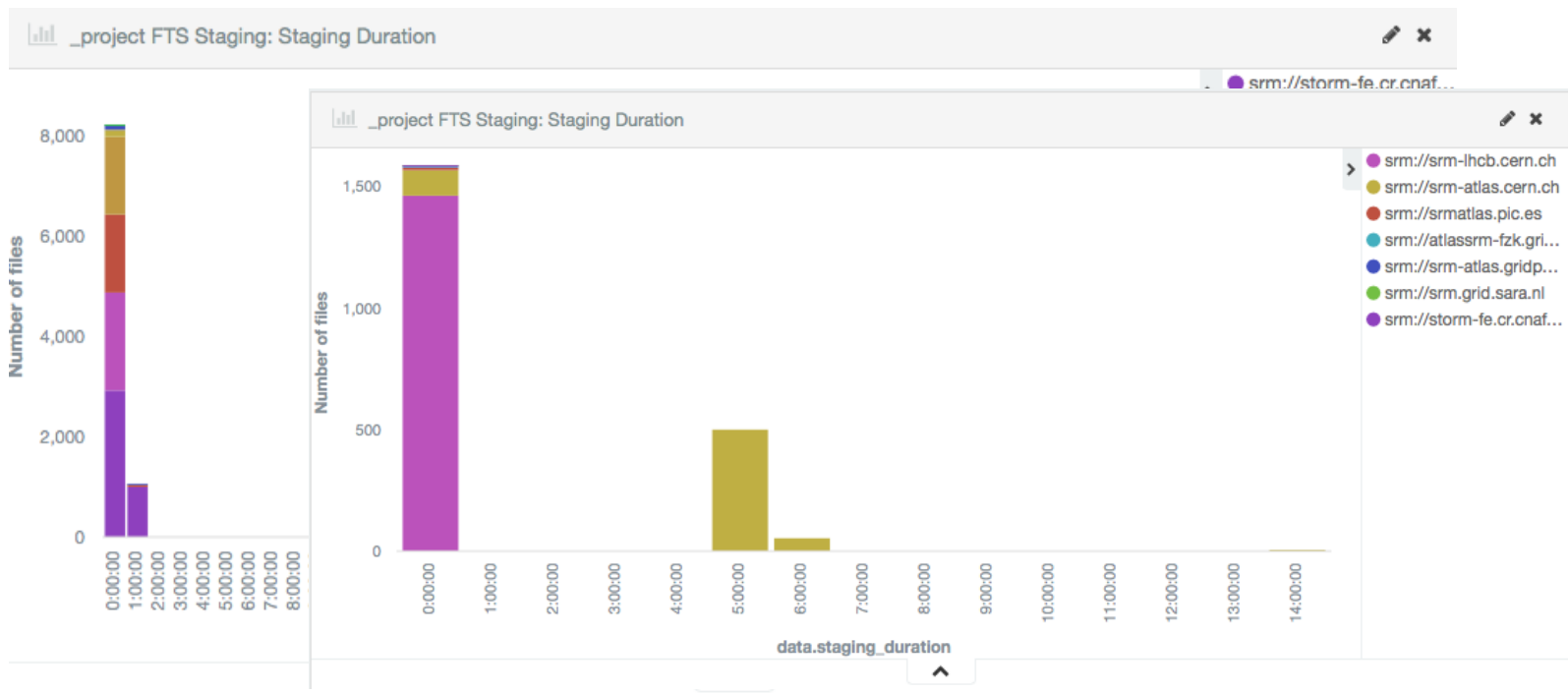
Additional comparable metrics

- Staging duration
 - FTS provides the timestamps for staging_start and staging_finished



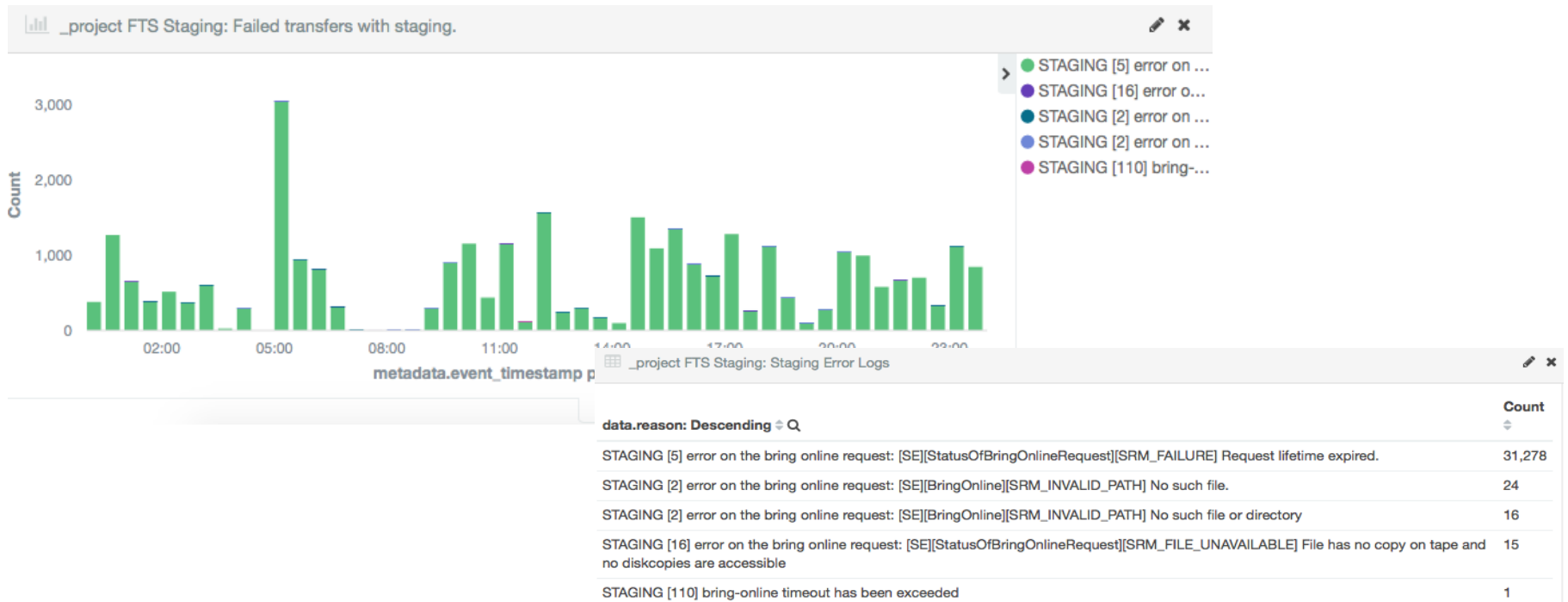
Additional comparable metrics

- Staging duration
 - FTS provides the timestamps for `staging_start` and `staging_finished`



Additional comparable metrics

- Error staging analysis
 - Staging errors along time
 - Staging error logs and codes



Additional comparable metrics

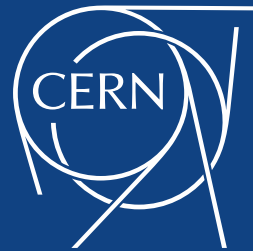
- Filtering
 - FTS Server
 - SE
 - VO
 - File ID

_project FTS Staging: Filter by F...		_project FTS Staging: Filter by Source SE	
FTS Server	Count	data.source_se: Descending	Count
fts3.cern.ch	91,165	srm://dgridsrm-fzk.gridka.de	67,744
fts3-test.gridpp.rl.ac.uk	21,800	srm://storm-fe.cr.cnaf.infn.it	14,893
fts3-pilot.cern.ch	237	srm://srm-lhcb.cern.ch	12,893
fts3-daq.cern.ch	106	srm://srmatlas.pic.es	8,284
bnl	101	srm://ccsrm.in2p3.fr	7,163
		srm://srm-atlas.cern.ch	1,541
		srm://srm-atlas.gridpp.rl.ac.uk	417
		srm://dcsrm.usatlas.bnl.gov	134

_project FTS Staging: Filtering b...		_project FTS Staging: Filter by File ID	
data.vo: Descending	Count		
atlas	100,220	1727191491	4981ce8c-9079-11e7-8ec9-02163e018d65
lhcb	12,893	1727285252	aafb5c4c-908c-11e7-a6e0-02163e018122
dteam	296	1727348368	4c2ecfb6-9099-11e7-ab86-02163e01879c
		1727378494	dbf3de9c-909f-11e7-af71-02163e01879c
		1727412500	bebbf656-90a5-11e7-b2f3-02163e018fe3
		1727488434	7ad75591-01cc-5b44-a7c7-384bc9904804
		1727488463	cc11e56e-16aa-5b6c-8200-50f6f737dfdb
		1727488600	f88acf1b-2969-5614-b8ba-c495c01193aa
		1727488621	209e1574-70fe-59d8-a954-d12ae5453138

FTS Staging Dashboard

- Dashboard in monit.cern.ch
 - https://monit-kibana.cern.ch/app/kibana#/dashboard/_project-FTS-Staging-Analysis
 - File Transfer Service -> Staging Analysis
 - The data is consumed from FTS 3.6 version
 - Next steps
 - Dashboard iterations



www.cern.ch