



# FTS3 monitoring for WLCG Improvements and Next

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# Overview

- Various layers in the FTS3 monitoring infrastructure:
  - WLCG Transfer Dashboard:
    - <http://dashb-wlcg-transfers.cern.ch>
  - **FTS3 Dashboard:**
    - <http://dashb-fts-transfers.cern.ch/ui/>
  - FTS3 service monitoring:
    - <https://FTS3Instance:8449/fts3/ftsmon/#/>

# FTS3 monitoring infrastructure

- WLCG Transfer Dashboard
  - global view on WLCG transfers aggregated by technology: xrootd/FTS
  - rely on FTS Dashboard APIs for FTS3 transfers stats
- FTS3 Dashboard:
  - detailed monitoring/stats on FTS3 transfers
  - expose APIs to external tools
- FTS3 monitoring:
  - service monitoring
  - per link/endpoint file transfers

# Motivations

- FTS3 started production in August 2014
  - Mixed deployment model adopted by experiments' data management tools:
    - single instance VS regional servers
- Needs a complete monitoring and stats infrastructure for FTS3
  - satisfy experiments requirements for monitoring/stats/accounting
  - understand infrastructural issues
  - tune links configuration in FTS3
  - analyse and optimize the VOs transfer workflows
  - provide APIs to experiments tools to make use of stats
- Various improvements have been done so far in FTS3 Dashboard during the commissioning

# Job outputs monitoring for CMS

- Track FTS transfers at file level
- API exposed in FTS Dashboard to retrieve the status by FTS fileid
  - FTS3 Dashboard plays as an interface to the pool of FTS3 instances
- Link jobs and transfers monitoring
  - Cross-Dashboard monitoring applications interactions: Task monitoring and FTS Dashboard

# Job outputs monitoring for CMS

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Start » [ srappocc ] » Tasks » Jobs

Data		Charts	Show 25 entries	Task: 140925_034643_crab3test-2:srappocc_crab_PFReHitTimingPUStep2							Search:	
	Id	Status	AppExitCode	Site	Retries	Submitted	Started	Finished	Wall Time	Job Log	File Access	FTS File Status
	1	finished	0	T2_HU_Budapest	1	2014-09-25T03:49:15	2014-09-25T03:48:45	2014-09-25T06:51:45	03:03:00	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	2	finished	0	T2_UK_SGrid_Bristol	1	2014-09-25T03:49:15	2014-09-25T03:48:36	2014-09-25T05:27:57	01:39:21	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	3	wnpostproc	0	T2_IT_Pisa	5	2014-09-25T17:53:18	2014-09-25T17:54:21	2014-09-25T19:47:40	01:53:19	Not available	File Info	FINISHED
	4	finished	0	T2_UK_SGrid_Bristol	1	2014-09-25T03:49:15	2014-09-25T03:48:37	2014-09-25T05:35:51	01:47:14	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	5	finished	0	T2_ES_CIEMAT	1	2014-09-25T03:49:15	2014-09-25T03:48:38	2014-09-25T06:04:20	02:15:42	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	6	finished	0	T2_HU_Budapest	1	2014-09-25T03:49:15	2014-09-25T03:48:42	2014-09-25T07:07:16	03:18:34	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	7	finished	0	T1_ES_PIC	1	2014-09-25T03:49:15	2014-09-25T03:48:56	2014-09-25T06:11:17	02:22:21	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	8	finished	0	T2_UK_SGrid_Bristol	1	2014-09-25T03:49:15	2014-09-25T03:48:43	2014-09-25T05:49:59	02:01:16	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	9	finished	0	T1_ES_PIC	2	2014-09-25T04:16:31	2014-09-25T04:19:04	2014-09-25T06:45:01	02:25:57	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	10	finished	0	T1_ES_PIC	2	2014-09-25T04:44:14	2014-09-25T04:53:39	2014-09-25T07:16:58	02:23:19	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	11	finished	0	T2_IT_Pisa	1	2014-09-25T03:49:15	2014-09-25T03:48:44	2014-09-25T05:59:30	02:10:46	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	13	wnpostproc	0	T2_UK_London_Brunel	1	2014-09-25T03:49:15	2014-09-25T03:48:55	2014-09-25T06:34:22	02:45:27	Not available	File Info	FINISHED
	14	finished	0	T1_DE_KIT	2	2014-09-25T05:01:02	2014-09-25T05:03:22	2014-09-25T05:59:53	00:56:31	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	15	finished	0	unknown	1	2014-09-25T03:49:15	2014-09-25T03:48:51	2014-09-25T06:45:02	02:56:11	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	16	finished	0	unknown	1	2014-09-25T03:49:15	2014-09-25T03:48:48	2014-09-25T06:41:42	02:52:54	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	17	finished	0	T1_ES_PIC	1	2014-09-25T03:49:15	2014-09-25T03:48:48	2014-09-25T06:35:59	02:47:11	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED
	18	finished	0	T1 ES PIC	1	2014-09-25T03:49:15	2014-09-25T03:48:49	2014-09-25T06:14:32	02:25:43	Job Log,Job Log JSON,Post Job Log	File Info	FINISHED

# Activity monitoring

- Provide monitoring and stats of transfers aggregated by (cross-)experiments' activities (e.g: users files, production, HammerCloud...)
  - Account and understand the network resource usage by transfer activity
  - Allow FTS3 activity-shares monitoring
  - decide the activity shares in FTS3
    - Prioritize time-critical activities
- Use the FTS3 job metadata flag to separate experiment workflows
  - Initial Message format: {'label': 'production', 'issuer': 'phedex'}
- Available within the FTS3 REST submission

# Activity monitoring



TRANSFER PLOTS (2014-09-30 00:00 to 2014-10-07 00:00 UTC SLIDING)

FTS DASHBOARD

Latest statistics update: 2014-10-07T08:00:00.102353

PLOT: GROUPING TYPE SERIES SIZE STYLE BIN: SIZE FORMAT STEP

Summary

Interval

Last 7 days

VOs

cms

Activities

all

Servers

all

Sources

Countries:

Sites:

Host:

Tokens:

Grouping: COUNTRY

Destinations

Countries:

Sites:

Host:

Tokens:

Grouping:

Interval

VOs

Activities

Servers

Channels

Sources

Destinations

Apply

Cancel

Default

Matrix

Transfers Plots

Correlated Plots

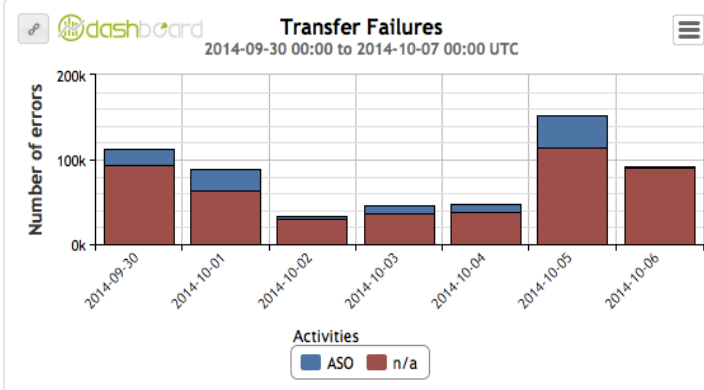
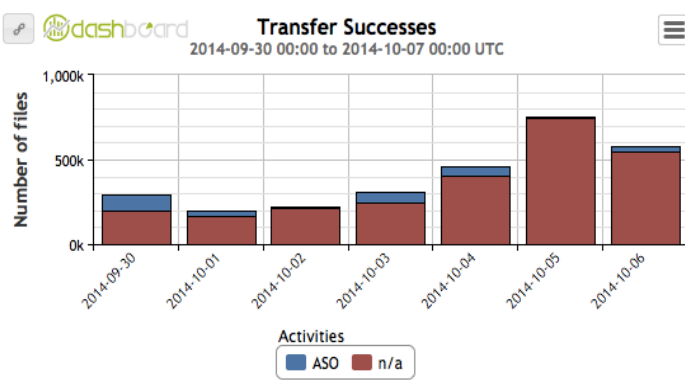
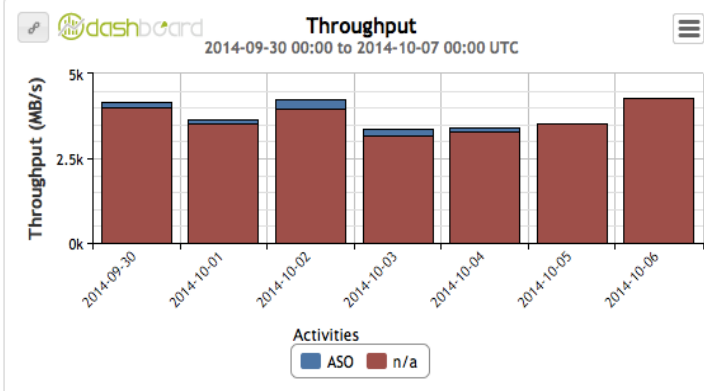
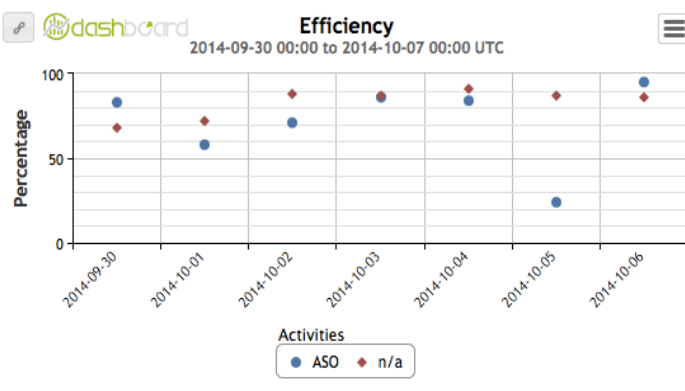
Ranking Plots

Latency plots

Details

FTS 3 Jobs

MAP Experimental





# Active&Queued transfers monitoring

- Provide a monitoring of FTS queues
  - Transient states are now represented as average over time
  - Active&queued transfers per hosts have been enabled
  - Allow FTS3 shares monitoring

# Active&Queued transfers monitoring



TRANSFER (2014-10-07 05:00 to 2014-10-07 09:00 UTC SLIDING)

FTS DASHBOARD

Latest statistics update: 2014-10-07T09:00:01.831602

PLOT: PLOT GROUPING TYPE SERIES SIZE STYLE BIN: SIZE FORMAT STEP

Summary

incb

Activities

all

Servers

lcgfts3.gridpp.rl.ac.uk

Sources

Countries:

Sites:

Host:

Tokens:

Grouping: HOST

Destinations

Countries:

Sites:

Host: srm://dcache-se-atlas.desy.de

Tokens:

Grouping: HOST

Interval

VOs

Activities

Servers

Channels

Sources

Destinations

Apply

Cancel

Default

Matrix

Transfers Plots

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Latency plots

Details

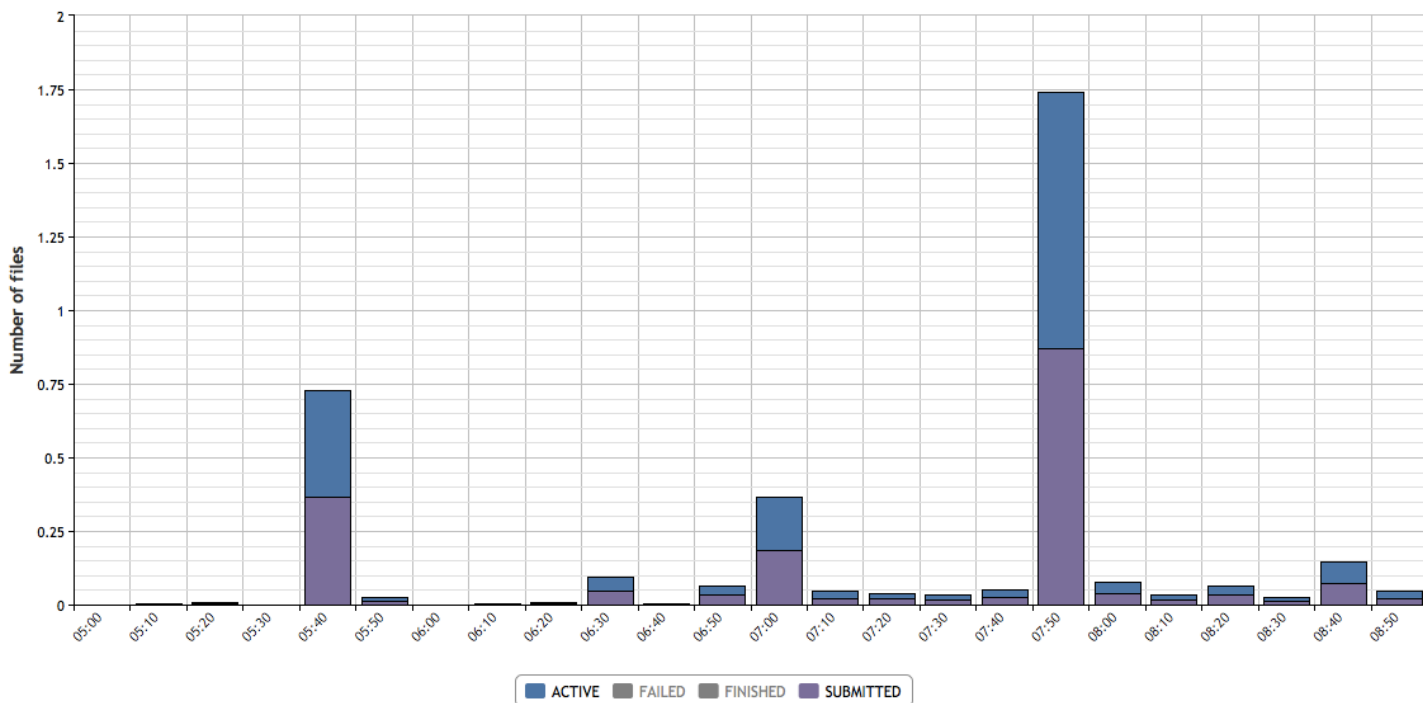
FTS 3 Jobs

MAP Experimental



Number of files per file\_state

2014-10-07 05:00 to 2014-10-07 09:00 UTC



# VO-shares monitoring



FTS DASHBOARD

Latest statistics update: 2014-10-07T09:00:01.831602

TRANSFER (2014-10-05 10:10 to 2014-10-07 10:10 UTC SLIDING)

PLOT: PLOT ▾ GROUPING ▾ TYPE ▾ SERIES ▾ SIZE ▾ STYLE ▾ BIN: SIZE ▾ FORMAT ▾ STEP ▾

## Summary

cms  
lhcb

Activities  
all

Servers  
lcgfts3.gridpp.rl.ac.uk

Sources  
Countries:  
Sites:  
Host:  
Tokens:  
Grouping: HOST

Destinations  
Countries:  
Sites:  
Host:  
Tokens:  
Grouping: HOST

Interval

VOs

Activities

Servers

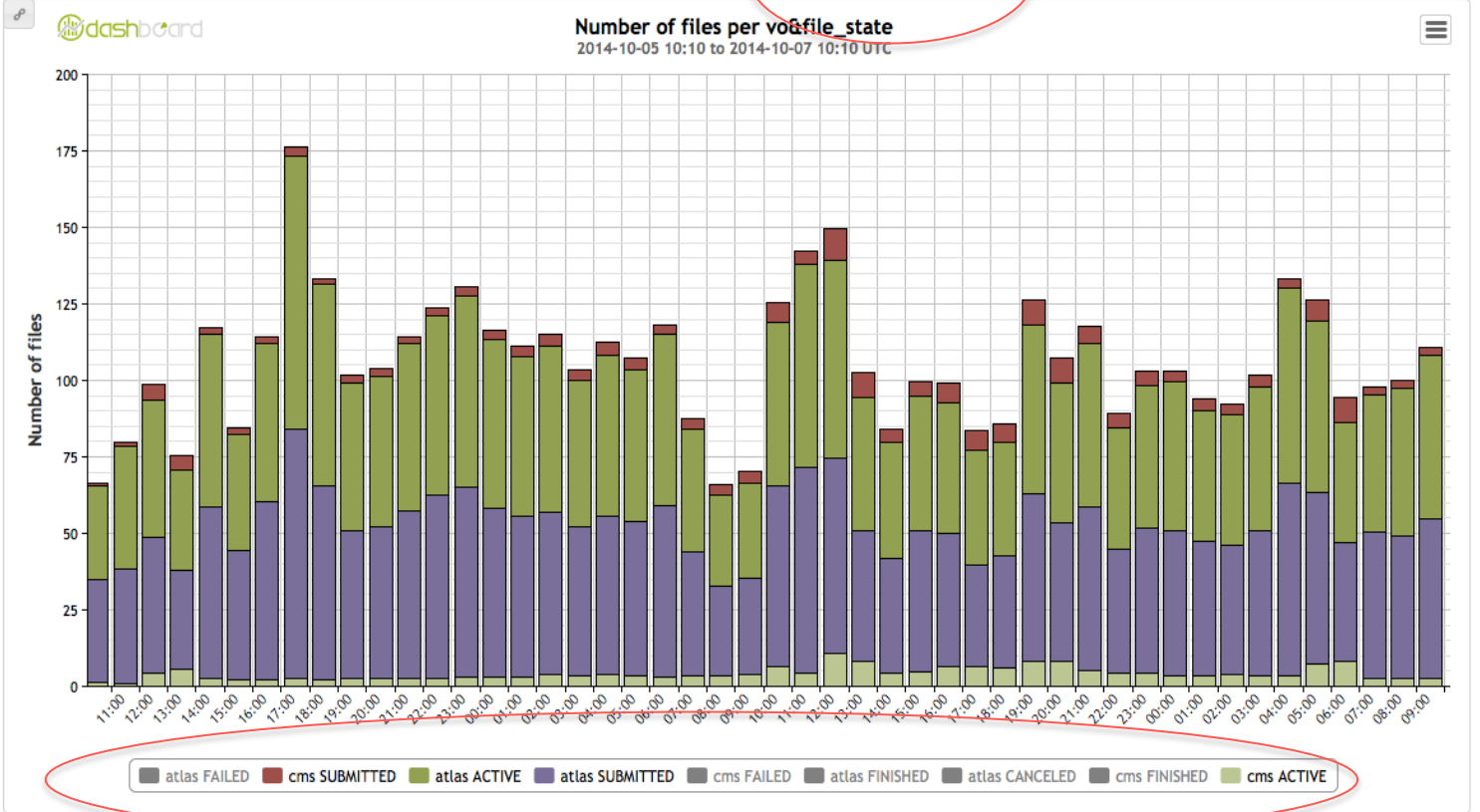
Channels

Sources

Destinations

Apply Cancel Default

Matrix Transfers Plots Correlated Plots Ranking Plots Latency plots Details FTS 3 Jobs MAP Experimental



Activity-shares monitoring will be included once more tools start to use job metadata flag

# Proposed progress

- Transfer rate per stream
- Errors classification by source/dst
- Activity-shares monitoring
- Distinguish the FTS3 retries
- Document/extend the existing APIs exposed
  - starting point for experiments for prototyping their analysis tools over FTS3 transfers data
    - data analytics, mining, predictions...
  - starting point to evolve our platform to support this activity

# Conclusions

- FTS Dashboard is cross-VOs interface to access FTS3 transfers data
- Various improvements have been included in the FTS3 Dashboard during the commissioning phase
- Looking forward to experiments' feedbacks for progress
  - <https://its.cern.ch/jira/browse/WLCGMONCON-69>