FTS monitoring work

WLCG service reliability workshop

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Outline

- Monitoring strategy
- Prototype monitoring tool
- (Prototype) operational procedures

New FTS error classification

- ☐ Current version of FTS 2.0 has reasonable error categorization (much improved over 1.5) – you see it in the current error messages
- ☐ New dev version of FTS 2.0 has better categorization
  - ■ No schema update – the current FTS 2.0 already has the necessary schema

Exposing differing levels of detail:

- ☐ Scope: basic, determines where the error occurred
  - ■ SOURCE, DESTINATION, TRANSFER
- ☐ Category: over 30 error classification codes
  - ■ GRIDFTP_ERROR, DEST_PREP_SRM_ERROR, FILE_EXISTS, NO_SPACE_LEFT, TRANSFER_TIMEOUT
- ☐ Phase: determines when in the file lifecycle the error occurred
  - ■ e.g. ALLOCATION , TRANSFER_PREPARATION, TRANSFER, TRANSFER_FINALIZATION
- ☐ Message: the error message detail – and pattern matching on the error message (>350 messages so far)

- ☐ https://twiki.cern.ch/twiki/bin/view/EGEE/FTSErrorClassification

General strategy

- **All our monitoring components should agree on these classifications**
  - Based on a detailed study of all the errors seen over the last 9 months on CERN-PROD
  - These classifications are being stored in the DB
- **Summarizations and their visualizations should make use of these, as necessary**
  - For seeing where the problems really are
  - Differing levels of detail
- **Increasing levels of detail should be available if you want to drill down**
  - Even with reasonable categories, you (often) have to pattern match the errors to distinguish problems

General strategy

- ☐ **Different people want different views**
  - ■ Try to generate different summaries from same data
- ☐ **The 'raw' data is being stored in the DB**
  - ■ Generated summaries for the different views should be stored in the DB (and then exposed however)
  - ■ As much as possible, the (CPU) processing for these summaries should be in the DB
    - ☐ Make more use of DB's CPU
    - ☐ PL/SQL based Oracle analytics is rather efficient: this is what Oracle is for
  - ■ But ... still prototyping ☺

FTS service monitoring

- **Different types of monitoring are being prototyped for different purposes**

- Summary statistics (FTS report) Daily and weekly summary statistics – good for tracking general situation but can't be use in real time monitoring.

- Snapshot summary Snapshot of current status – statistics about current transfers. Is useful to get general view of the situation

- Current transfers Status of the actual transfers submitted during the last hour. Good for tracking certain class of problems, but there is no summarization.

- Channel settings Current channel settings on the tier-0 service - provide the same information which you can get from the CLI using glite-transfer- interface but in an easier way.

- Agent status Status and location of channel agent daemons – same as above but provides information about agent daemons

- Log mining monitoring Detailed log-mining tool – later section.

FTS monitoring prototype

- ☐ Tracking, summarisation and visualization of problems
- ☐ Summarisation data is persistent (i.e. history is available)
- ☐ 1st prototype implementation: Perl+Shell -> MySQL -> PHP+XHTML
  - ■ Development version uses PL/SQL -> Oracle
  - ■ The same local visualisation: PHP + XHTML

- ☐ Uses standardised error categorisation
- ☐ Detail available: more than 350 known 'detail' errors (pattern matching)
- ☐ Views: Flexible setting in selecting channel, error, time period and result form.
- ☐ Presentation result as tables, graphics or charts

Prototype: current architecture

☐ **1st prototype used log-file analysis**

Procedure:
every hour the log files are copied to the web-server where they're parsed by scripts. All the summary information is written to the DB and is accessible through the web-interface.
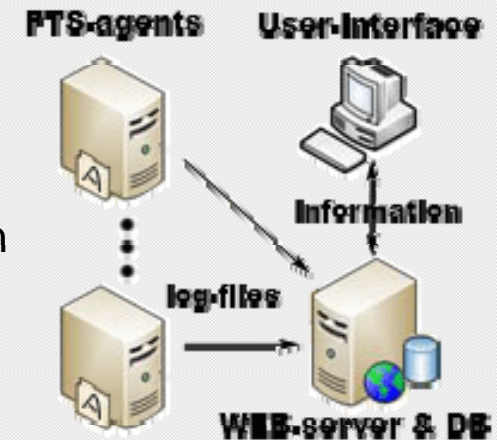
☐ **Current prototype gets the information from the DB**

Procedure:
every so often, a PL/SQL job runs summarising the information in the DB (which is the same as that in the logs). All the summary information is written to the DB and is accessible through the web-interface. Selected summary views may be broadcast externally using the mechanisms defined by the WLCG monitoring group.
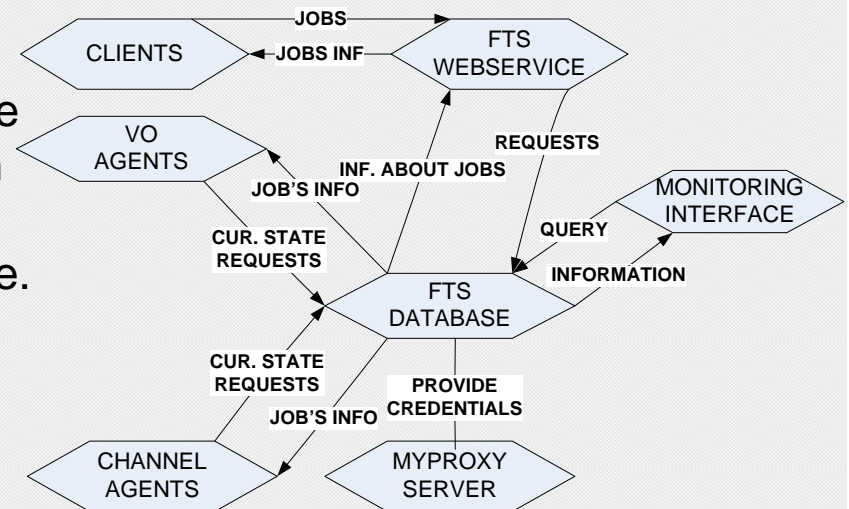
1ˢᵗ monitoring prototype

1. Main module provides information about individual errors or grouped by category on all FTS channels. Different time views: latest, last 24 hours, fixed period

1ˢᵗ monitoring prototype

2. Error monitoring module allows you to filter and get information about only the most interesting errors
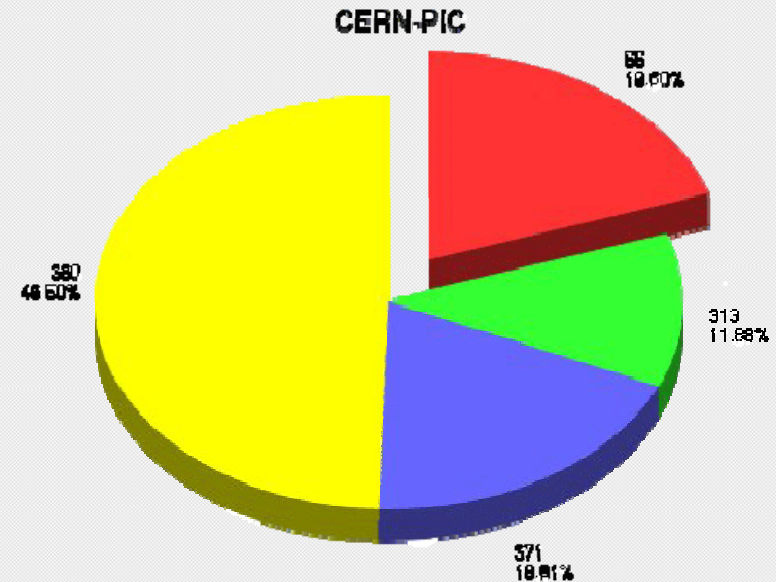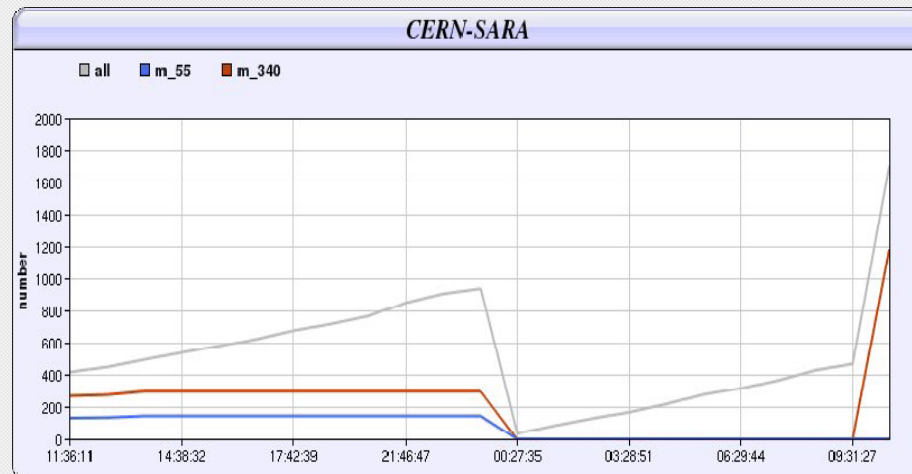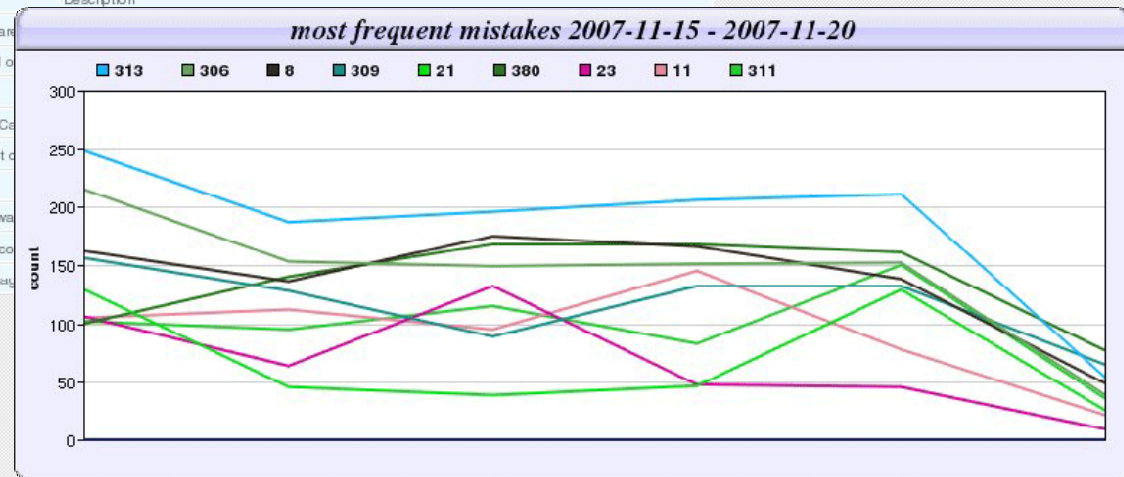
1st monitoring prototype

3. Statistics. Define the channel with biggest number of errors. Ratings of errors by frequency or total quantity on channels.

Top 10 (number)

Place	Error_N	Number	Description
1	380	1048892	Final error on SOURCE during PREPARATION phase: [GENERAL_FAILURE] CastorStagerInterface.c:2162 Unknown error 17.8 (errno=0 serrno=0)
2	313	307608	SOURCE during PREPARATION phase: [REQUEST_TIMEOUT] failed to prepare source file in 180 seconds
3	309	248662	DESTINATION during PREPARATION phase: [CONNECTION] failed to contact on remote SRM [srm]. Givin' up after 3 tries
4	306	180681	failed to prepare Destination file in 180 seconds
5	90	140075	FINAL:SRM_SOURCE: Failed on SRM get: Failed SRM get on [addres] call. Error is RequestFileStatus#-[] failed with error:[at Wed Feb 21 12:18:44 CET 2007 sate Failed : file not found : path [path] not found
6	8	121226	the server sent an error response: 425 425 Can't open data connection. timed out() failed.
7	55	119986	the server sent an error response: 425 425 Cannot open port: java.lang.Exception: Pool manager error: Best pool <[name]> too high : [number]
8	75	116101	SOURCE during PREPARATION phase: [GENERAL_FAILURE] CastorStagerInterface.c:2162 Required tape segments are not all accessible (errno=0, serrno=0)
9	311	97840	TRANSFER during TRANSFER phase: [TRANSFER_TIMEOUT] gridftp_copy_wait: Connection timed out

Top 10 (count)

Place	Error_N	Count	Description
1	313	1470	SOURCE during PREPARATION phase: [REQUEST_TIMEOUT] failed to prepare
2	8	1220	the server sent an error response: 425 425 Can't open data connection. timed o
3	306	1214	failed to prepare Destination file in 180 seconds
4	380	1165	Final error on SOURCE during PREPARATION phase: [GENERAL_FAILURE] Ca
5	309	905	DESTINATION during PREPARATION phase: [CONNECTION] failed to contact
6	11	873	an end-of-file was reached
7	311	864	TRANSFER during TRANSFER phase: [TRANSFER_TIMEOUT] gridftp_copy_wa
8	362	721	TRANSFER during TRANSFER phase: [TRANSFER_TIMEOUT] globus_gass_co
9	21	655	DESTINATION during PREPARATION phase: [GENERAL_FAILURE] CastorStag

most frequent mistakes 2007-11-15 - 2007-11-20

313 306 8 309 21 380 23 11 311

1st monitoring prototype

4. Reports. e.g. Top errors on T1-sites, weekly Tier-0 Castor report

CERN-IN2P3 threshold level 200 (2007-11-10 - 2007-11-20)

all	average	max	min	m_id	m_example	total
3885	353	1746	0	7	425 Cannot open port: java.lang.Exception: Pool request timed out	54950

CERN-INFN threshold level 200 (2007-11-10 - 2007-11-20)

all	average	max	min	m_id	m_example	total
4388	399	2198	0	21	DESTINATION during PREPARATION phase : [GENERAL_FAILURE] CastorStagerInterface.c:2507 Device or resource busy (errno=0, serrno=0)	11609
2794	254	2791	0	321	DESTINATION during PREPARATION phase : [GENERAL_FAILURE] destination file failed on the SRM with error [SRM_FAILURE]	11609

CERN-RAL threshold level 200 (2007-11-10 - 2007-11-20)

all	average	max	min	m_id	m_example	total
2589	235	662	0	32	SOURCE during PREPARATION phase : [INVALID_PATH] specified file(s) does not exist	31605
5701	518	2097	0	309	DESTINATION during PREPARATION phase : [CONNECTION] failed to contact on remote SRM [srm]. Givin' up after 3 tries	31605

CERN-SARA threshold level 200 (2007-11-10 - 2007-11-20)

all	average	max	min	m_id	m_example	total
5263	478	4242	0	309	DESTINATION during PREPARATION phase : [CONNECTION] failed to contact on remote SRM [srm]. Givin' up after 3 tries	16372

GRIDKA-CERN threshold level 200 (2007-11-10 - 2007-11-20)

all	average	max	min	m_id	m_example	total
5307	482	1107	0	313	SOURCE during PREPARATION phase : [REQUEST_TIMEOUT] failed to prepare source file in 180 seconds	7460

Current prototype

☐ New version of system is more integrated into the FTS schema, so we don't have to parse log files, and has extra features:

- 2 dimensions of error representation – error categories and specific errors
- Views for 4 different users group (FTS operations, Storage site admins, VO admins, Management)
- 5 monitored objects
- channels, sites, host, errors, VOs
- General information
- Advanced admin panel
- Alarm mechanism
- …

Current prototype

4. Main interface, alarms, general information, objects, options.

Current prototype

4. Admin interface – easy way to manage objects and change settings!

Current prototype

4. Cross-module links – possibility to drill down. Categories or errors – you choose!
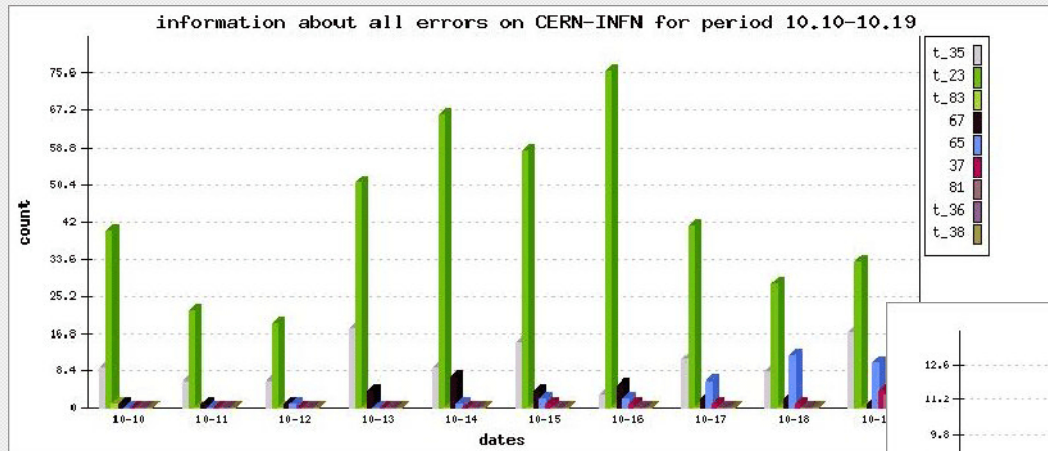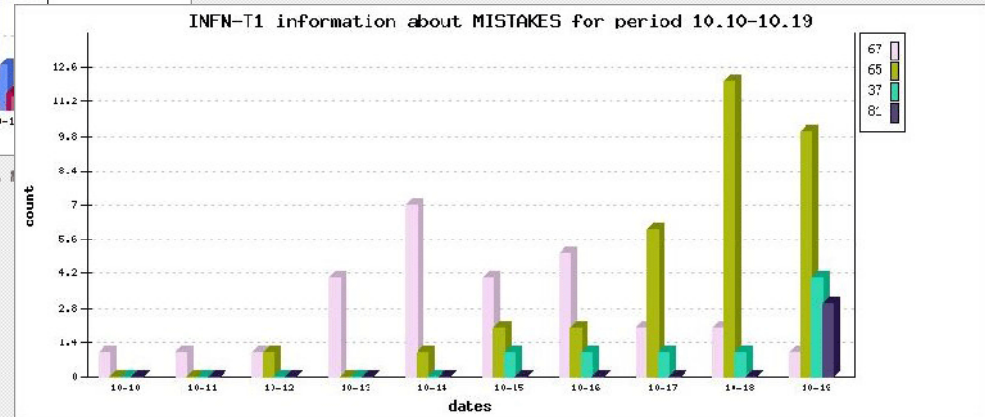
CERN-PROD information about categories for 11.24

	GENERAL_FAILURE	INVALID_PATH	REQUEST_FAILURE
2007-11-24	3	1	3

CERN-PROD information about errors for 11.24

	168	1	33	67
2007-11-24	2	1	3	1

Current prototype

4. We maintain functionality of previous version, but add extra views!

TOP 3 channels with biggest amounts of error 01.10 – 25.11

place	volume	channels
1	104990	CERN-INDIACMS
2	1924	CERN-GRIDKA
3	1743	CERN-INFN

TOP 10 errors for 01.10 - 25.11 sorted by total amount

place	error_id	number	error sample
1	41	60955	failed to contact on remote SRM [srm]. Givin up after 3 tries
2	125	27691	Unable to map request to space for policy TRANSFER_WAN
3	123	17394	No such file or directory
4	23	1100	421 Timeout (900 seconds): closing control connection
5	124	683	426 Transfer aborted, closing connection :failed in recvEBlock
			425 Can|t open data connection. timed out() failed.
			failed to prepare Destination file in 180 seconds
			Request aborted
			gridftp_copy_wait: Connection timed out
			specified file(s) does not exist

information about error – 23 for period 10.10–10.30
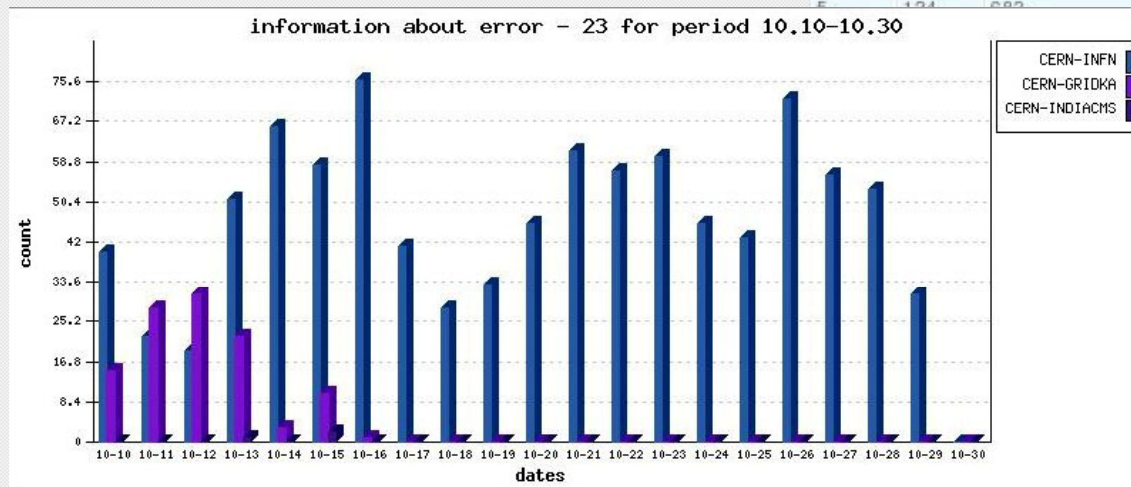
Other tools

- ☐ (Several) other tools exist
  - ■ Developed by T1 sites
    - ☐ Some will be shown today
  - ■ They collect information in various ways
  - ■ They cover different parts of the 'service monitoring' areas discussed
  - ■ Different visualisations

- ☐ Question (for discussion) of how to integrate these ?

Debugging procedures

☐ Have worked out a daily procedure at Tier-0: tracking current situation during the day (e.g. the 'latest info' option) helps us to identify new problems on FTS channels

- ■ Then follow up: e.g. GGUS ticket could be opened or we could try contact with responsible person (but we have only several emails)

☐ 'Top errors' help us get a overall view on general situation, and also point out major problems

- ■ SOURCE during PREPARATION phase: [REQUEST_TIMEOUT] failed to prepare source file in 180 seconds
- ■ DESTINATION during PREPARATION phase: [REQUEST_TIMEOUT] failed to prepare Destination file in 180 seconds
- ■ the server sent an error response: 425 425 Can't open data connection. timed out() failed
- ■ SOURCE during PREPARATION phase: [GENERAL_FAILURE] CastorStagerInterface.c:2162 Required tape segments are not all accessible
- ■ DESTINATION during PREPARATION phase: [GENERAL_FAILURE] CastorStagerInterface.c:2507 Device or resource busy

☐ By working with monitoring tools and following a daily procedure we can get notion about the evolution of certain errors, tendencies and dependences

☐ Reporting tools provide us information about errors on specific site, so 'standard' questions can be answered e.g. reports for Joint Operations Meeting

Operations procedures

1. Daily log – tracking of current problems and open issues
2. Daily log Archive – history of situation on channels from February '07 till present time
3. Weekly Report – summary report for the Joint Operations Meeting
4. Weekly Tier-0 – summary of issues noticed on the Castor Tier-0 service

Summary

- [ ] Strategy is to quickly prototype tools
  - Production versions (ideally) should move into DB

- [ ] We understand the information we have in the schema
  - and some of the summaries, views and reports we'd like to make from it – need input for more!

- [ ] CERN and T1 sites developed some prototype tools following this model

- [ ] We're working out and testing a set of operational procedures based on these tools

- [ ] We need input for more!