Feedback on the gLite middleware

Dietrich Liko / IT - LCG

http://cern.ch/arda

www.eu-egee.org   cern.ch/lcg

Overview

- Accessing gLite
  - gLite shell
  - Authorisation

- Job submission
  - Advanced features
  - New WLMS

- Other features
  - Package management
  - Metadata

- Plans for ARDA

- Conclusions

Acessing gLite

- Acess by its own shell and a Perl API
  - nice Shell implemented in Perl
  - very intuitive hierarchical file catalogue

- No API to compile against,
  but Perl-API sufficient for tests

- Perl API poorly documented

- No Protocol documentation

| File-Catalogue | Storage-Manager | Compute-Element |

GSI GAS

PERL

GSI Perl-Shell
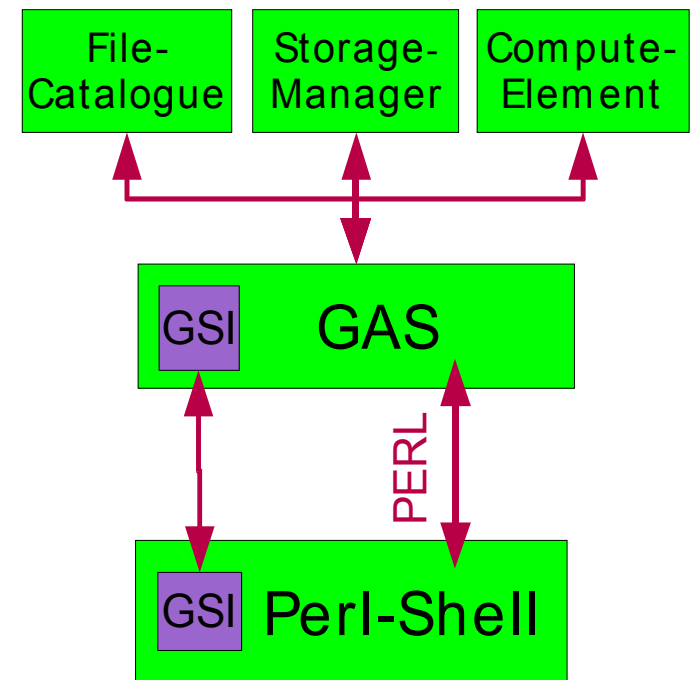
gLite shell

- Shell shows virtual file-system
- Several known shell commands implemented
- No "real" shell (see later presentation by Andreas)

```
/egee/user/b/bkoblitz/ > ls
metadata
t10000
/egee/user/b/bkoblitz/ > add AAA file://lxplus025/tmp/koblitz/AAA
Sep 23 14:28:53  info   Registering the file [......]
Sep 23 14:29:09  info   File /egee/user/b/bkoblitz/AAA inserted in the catalog
/egee/user/b/bkoblitz/ > ls -l
-rwxr-xr-x   bkoblitz bkoblitz   101667 Sep 23 14:29      AAA
drwxr-xr-x   bkoblitz bkoblitz        0 Sep 23 14:19      metadata
drwxr-xr-x   bkoblitz bkoblitz        0 Jul 14 16:33      t100000
/egee/user/b/bkoblitz/ > whereis AAA
And the file is in EGEE::CERN::SRM
srm://lxb2027.cern.ch:8000/castor/cern.ch/home/egee/03/44069/008ef0b2-c...
```

Accessing gLite

- gLite uses Globus 2.4 Grid-Certificates (X.509) to authenticate + authorize, session not encrypted

- VOMS is used for VO Management
  - Sometimes difficulties
  - Browser setup, authentication, communication

- If authentication does not work diagnosis is often difficult

- Practical Example:
  - Without going into technical details …

Certificate Odyssey

St. Petersburg

Moscow

Geneva

Austria

Netherlands

Spain

Positive Surprise

- Finally my colleagues had working certificates …

- No difficulty to install a gLite client in St. Petersburg
  - two rpm's
  - few environment settings

- Full access to the prototype

Job Submission

- Two CEs set up in CERN/Wisconsin
  - Scientific Linux 3 / CERN-Linux 7.3):
  - For long time 2+1 Nodes only

- ARDA has installed a number of worker nodes, that are currently being integrated into the system

- Jobs are submitted with a JDL script

```
[lxb2041.cern.ch:3308] /egee/user/b/bkoblitz/ > cat job.jdl
Executable="Example";
requirements = other.CE == "EGEE::CERN::CONDOR";
Arguments="$1";
InputFile={"LF:/cms/example/binary.tar.gz",
           "LF:/cms/data/87000001/data/EVD0_Events.22187b7ab[...]_TkMu_g133_CMS"};
OutputFile={"job.87000001.log","bt03_ttH115_6j1l.87000001.root"};
[lxn5220.cern.ch:3308] /bin/ > submit /jdl/helloSite.jdl
```
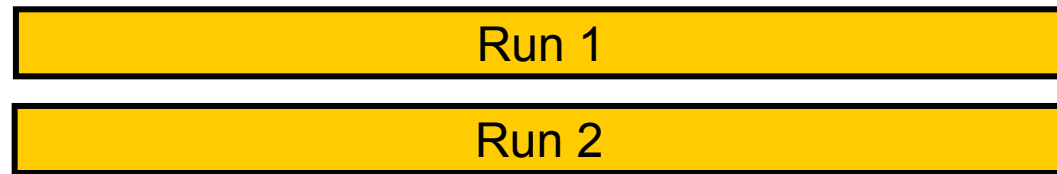
Job Submission

- Its quite straight forward to create a job on gLite
  - A new user can quickly understand the concepts

- Interfacing to various experiment tools is well on its way
  - GANGA, DIAL etc.
  - C/C++ API would help
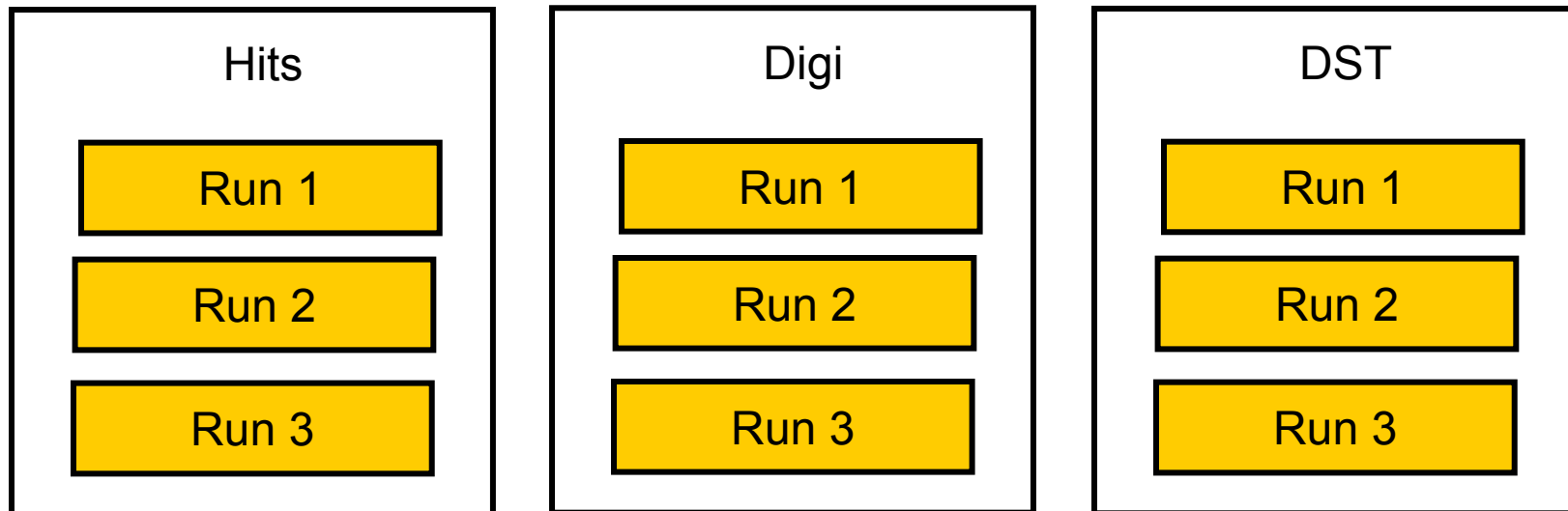
- We found also more advanced features quite useful …

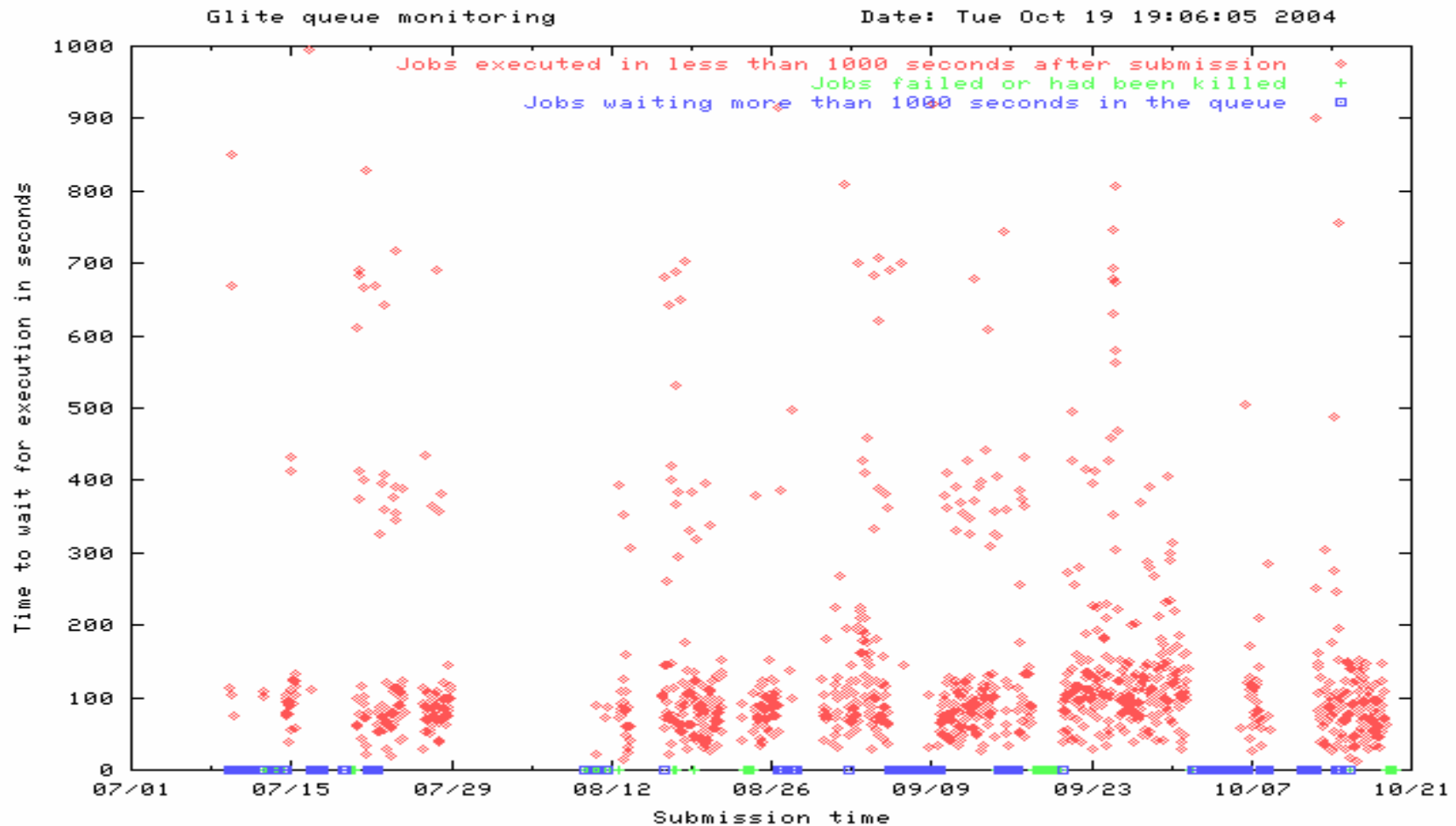# Job Splitting integrated with FC

- File level job splitting, example: LHCb

Run 1

Run 2

- Directory level job splitting, example: CMS

Hits	Digi	DST
Run 1	Run 1	Run 1
Run 2	Run 2	Run 2
Run 3	Run 3	Run 3

Job Submission: Stability

Job queues monitored at CERN every hour:
80% Success rate (Jobs don't do anything real)

New WLMS

- Available to us since Friday, October 15th

- We ran first test jobs

- We are eagerly waiting for the integration with the other parts of the system

# Package Management

- External software or executables are accessed through packages
  - tar-Files in /egee/<home>/packages/version
  - Common and private packages

- Installation can be triggered by request specified in the JDL

- System has been used successfully
  - Some limitations

- Clearly some work has to be done to understand the integration with experiments
  - Both on middleware side and the experiment side

File Access

- gLite allows users to access files on AFS (temporary!),
  - CASTOR and dCache SEs:
  - Very important to test experiment software!
  - Files accessible via RFIO
  - Automatic local staging of CASTOR files

- SE setup with CASTOR backend was very painful
  - General instability of CASTOR
  - Several problems with setting up of virtual castor user
  - CASTOR access solved by end of August

- SE(CASTOR) access via local staging now stable!
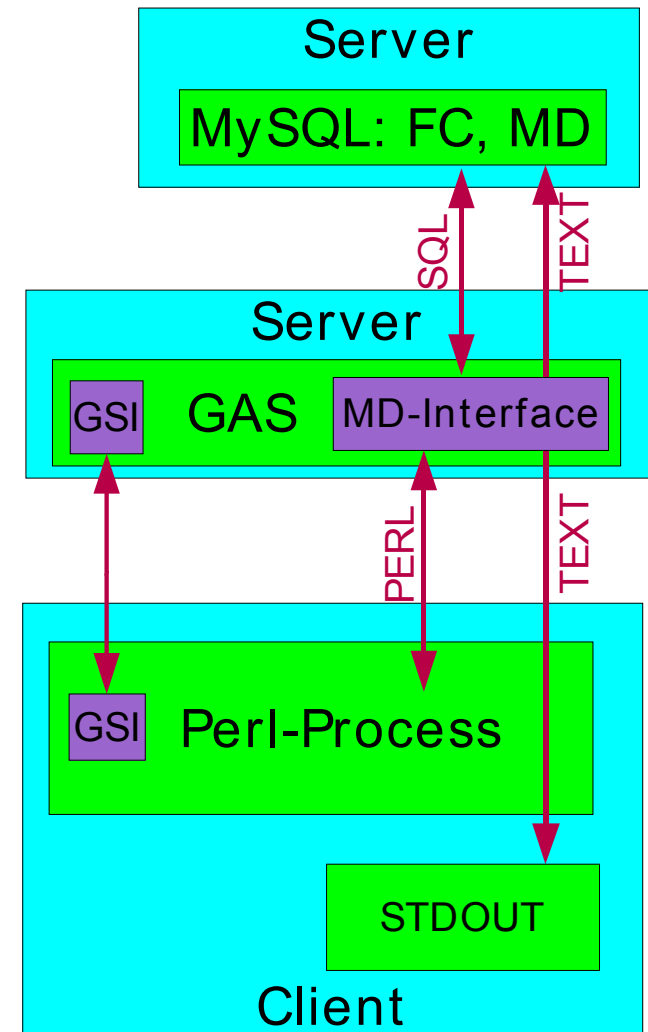
File Access: Stability
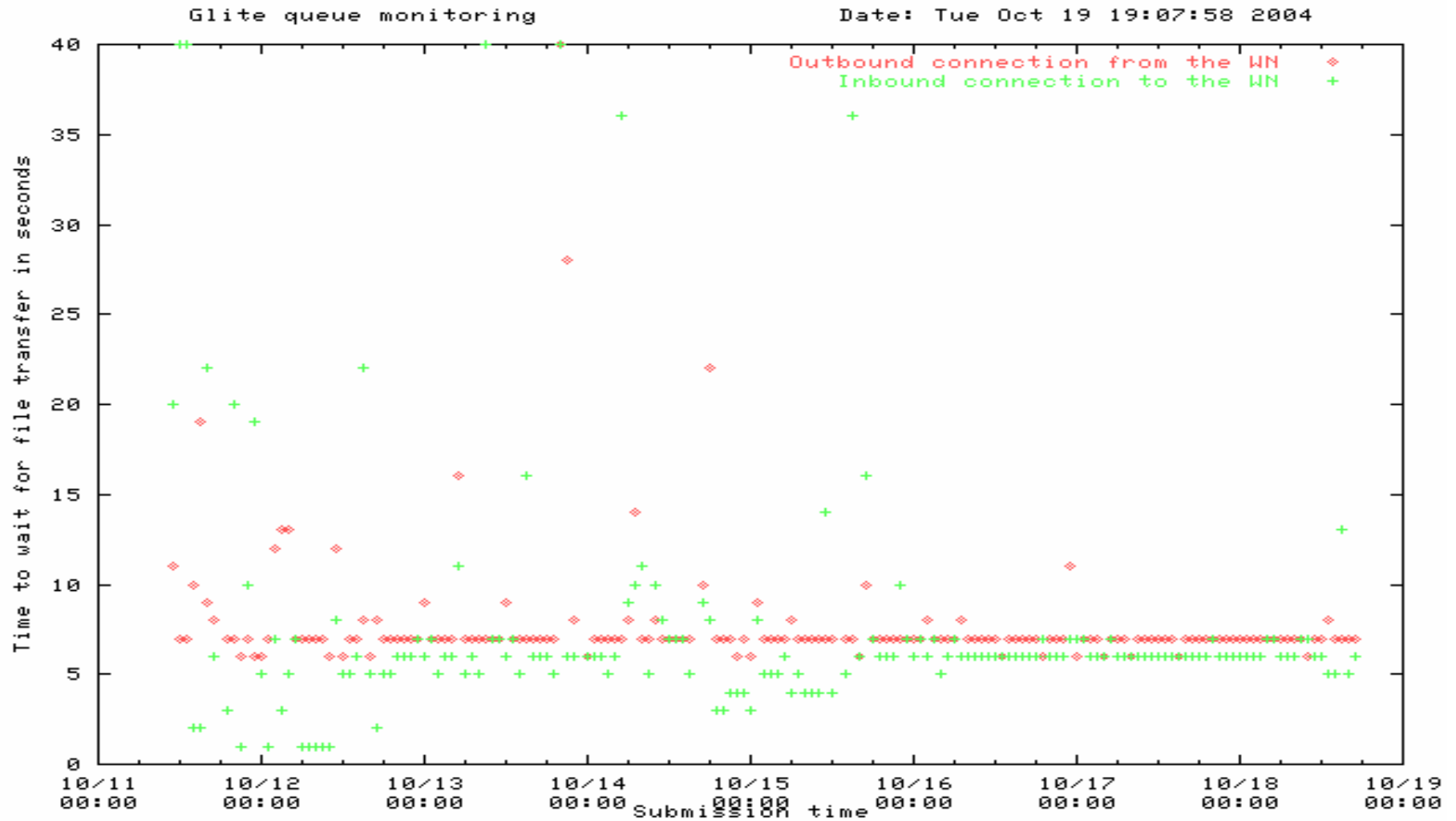
Metadata

Metadata in additional Tables in File Catalog

- User uploads SQL table description into File Catalogue
- User associates directory with table
- User fills in table on a per file basis
- Access through gLite-shell, Perl scripts
- Knowledge of Schema required
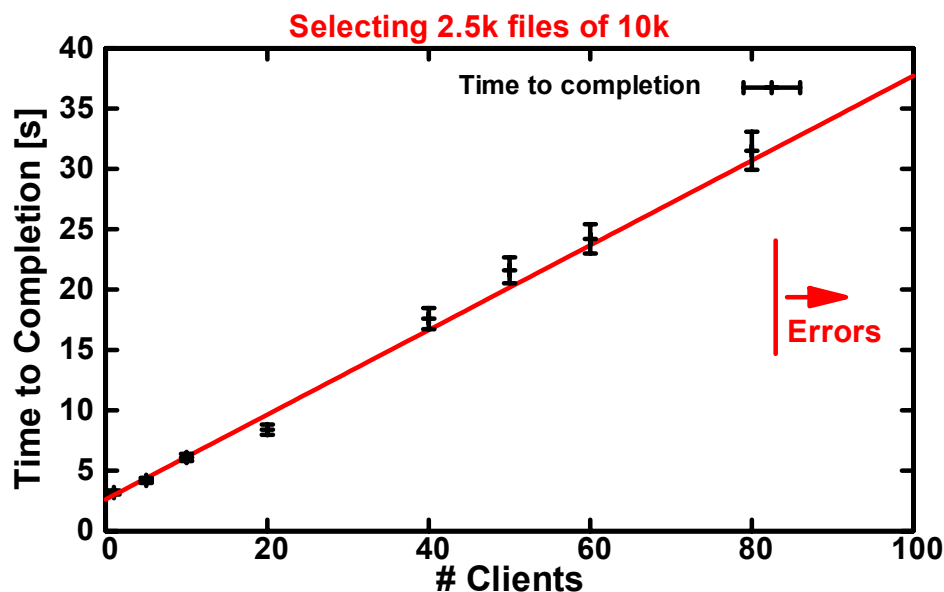- No Schema evolution
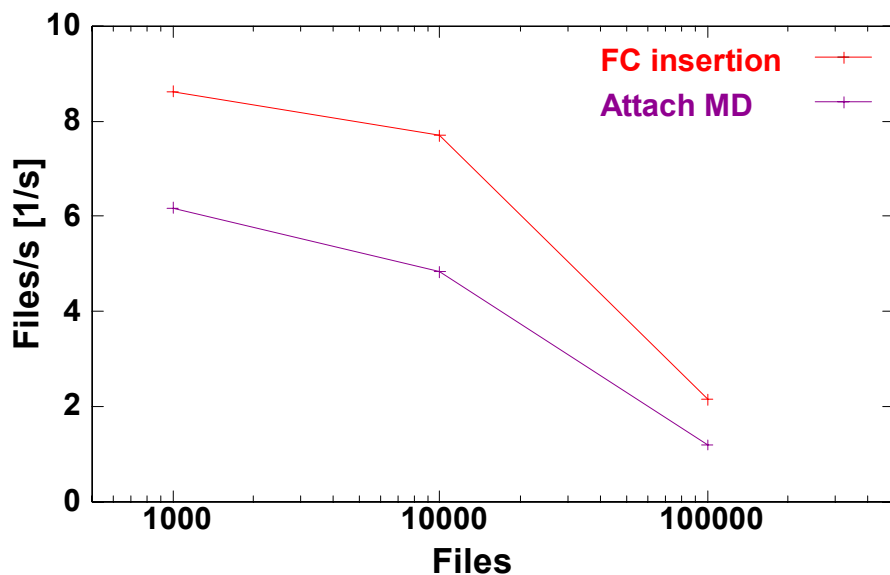
Metadata Catalog tested

Metadata catalogue performs well:

Find matching 2500 entries in 10000 entry directory:

80 concurrent queries
0.35 s/query
2.6s startup time

Selecting 2.5k files of 10k

Comparison with all Experiment MD-C

Fast: Streaming, combined with FC

C-API

- Lack of C/C++ API largest problem for experiment prototypes

- Create Interface sending text-commands to server:
  - UUEncode Strings
  - Send Strings via gSOAP
  - Encrypt with SSL
  - Authentication via GSI (Globus TK3)

- High performance increase compared to SOAP calls with structures

- Protocol quite proprietary...

- See presentation by Andreas later
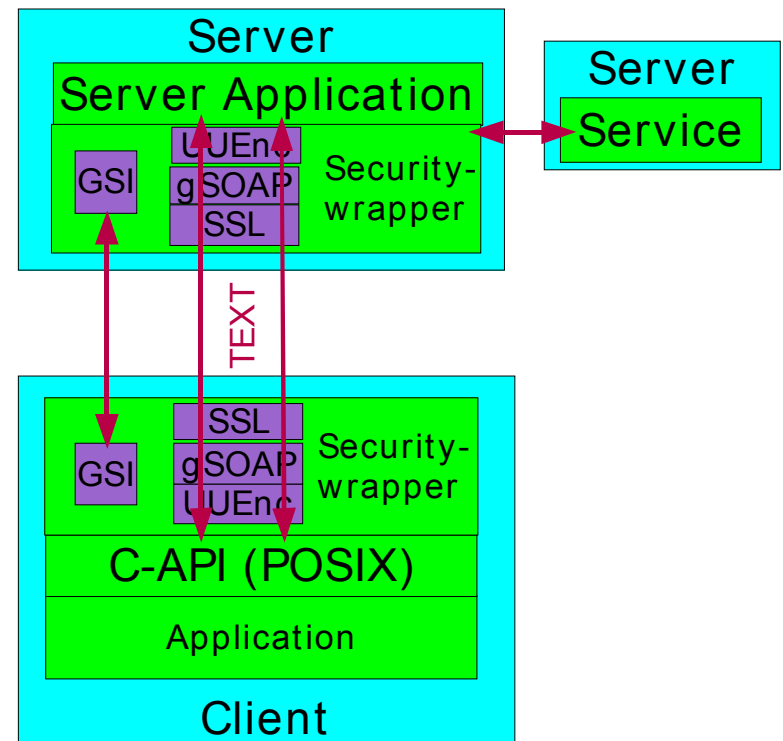
Plans for the ARDA group

- We will follow gLite development:
  - Validate interface (currently being defined)
  - Study new implementation of components

    e.g. New WLMS, New File-Catalogue Fireman
  - Contribute to generic metadata catalogue

- We want to gain experiences with larger installation

- We want to further integrate gLite into experiment software:
  - ATLAS: Integration of gLite with Don Quixote
  - ALICE: Integration into ROOT-Framework

    ➔PROOF-clients on gLite WNs

- We collect user feed-back on experiment prototypes

Conclusions

- We find prototype approach very useful
  - Participation of experiments
  - We see constant progress
  - Many stability issues already solved
  - Can run & monitor jobs, access data
  - First analysis jobs work!

- gLite concept of filesystem-like file catalogue allows intuitive usage of gLite prototype

- Gained experience comparing gLite and experiment implementations:
  - Metadata-Catalogues, File-Transfer, Job-Submission

Conclusions

- There is still some way in front of us
  - Integration of new components

- Many observed problems are due to the fact that it is a testbed for developers
  - We eagerly await a more production like environment
  - We hope also for an decent increase of the size of the installation

- In general we found gLite easy to use

- We would like to thank the gLite middleware team for a the very fruitful collaboration!