GridPP
UK Computing for Particle Physics

Data Management: gLite File Transfer Service

Graeme Stewart
University of Glasgow

UNIVERSITY of GLASGOW

FTS

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- gLite File Transfer Service
  - Overview
  - Architecture
  - Server Management
  - Client Tools
- Summary

Data Management

- Objective is to relieve users of the burden of knowing where their data is physically located.
- Essential component of making a real grid environment
- Obliges the middleware to deal with
  - Cataloging (Mapping logical->physical names)
  - Data Transport (Shunting data around the grid)

Catalog Services

User works with Logical File Names

/data/grid/myfile/test
/data/grid/atlas/cal
/data/grid/VO/PATH

Storage Elements (SE) hold file aliases/replicas

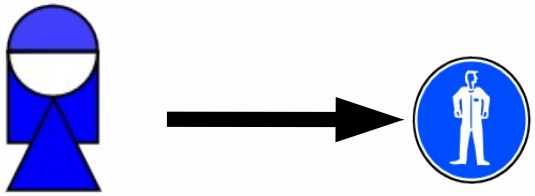
srm://se1.gla.ac.uk/...

srm://castor.cern.ch/...

sfn://a.n.other.site/...

File Catalog translates LFN to Storage URL (aka Physical File Name)

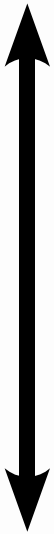
Data Movement



Job Request references LFN

- File Catalog resolves SURLS – job may schedule to run where no copy exists
- File Placement Service schedules new copy based on LFN
- File Transport Service schedules SURL->SURL copy (gsiftp, srmcp, ...)
- File Placement Service registers new SURL with File Catalog

Data Management Middleware Stack



	LFN	SURL	Manipulates	Notes
File Catalog	Yes	Yes	Nothing	Only valid data should get here
File Placement Service	Yes	Yes	Catlog entries, FTS transfers	Will make new catalog entries
File Transport Service	No	Yes	Channels, Data transfers	Will retry failed transfers
Grid FTP	No	Yes	Low level data transport	Can fail disgracefully!

N.B. Alternatives to EGEE data management stack: Globus DRS & RFT, CMS PhEDEx.

Experiment View

From Baseline Services:

Service	ALICE	ATLAS	CMS	LHCb
Storage Element	A	A	A	A
Basic transfer tools	A	A	A	A
Reliable file transfer service	A	A	A/B	A
Catalogue services	B	B	B	B
Catalogue and data management tools	C	C	C	C

As one moves to higher levels, “interest” in a common solution declines and experiments adopt a more specific solution.

DM Status

- Eventually the data on the grid will be easy to use:

- However, at the moment it's more like this:

gLite FTS

gLite File Transfer Service

- Design came from LCG Robust Data Transfer Service Challenge requirements
- Original implementation was called *Radiant*, which was used in SC2. Now replaced by FTS, being used in SC3.
- Satisfies core LCG requreiments (https://edms.cern.ch/file/490347/3)

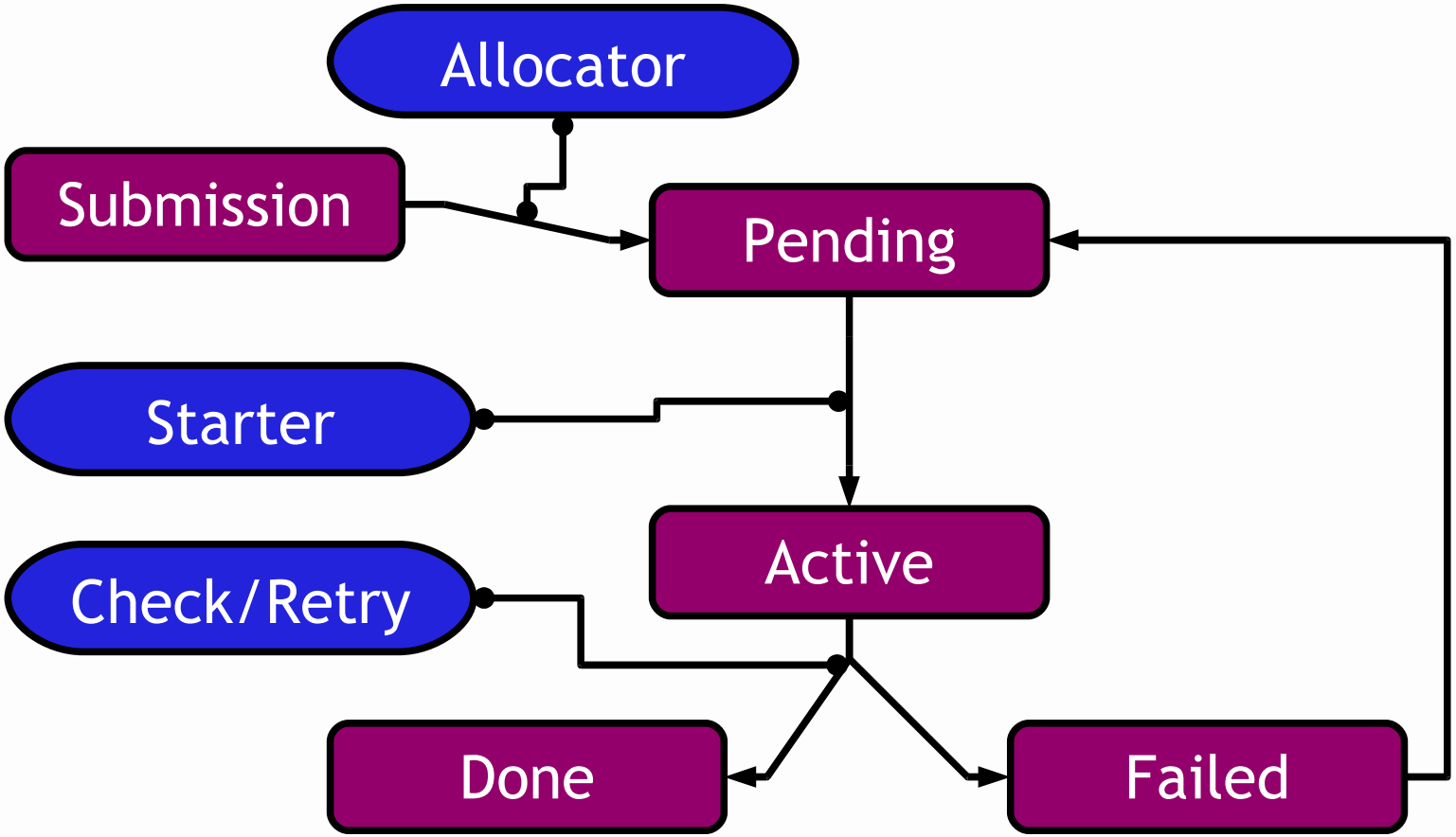
FTS Design

- FTS provides *reliable* movement of SURLs.
- It does not
  - Do “routing”
  - Deal with LFNs or Catalogs
- It does have a pluggable architecture for higher level components.
- So it will interact with, e.g., the EGEE File Placement Service, or an experiment's own framework.

FTS Design

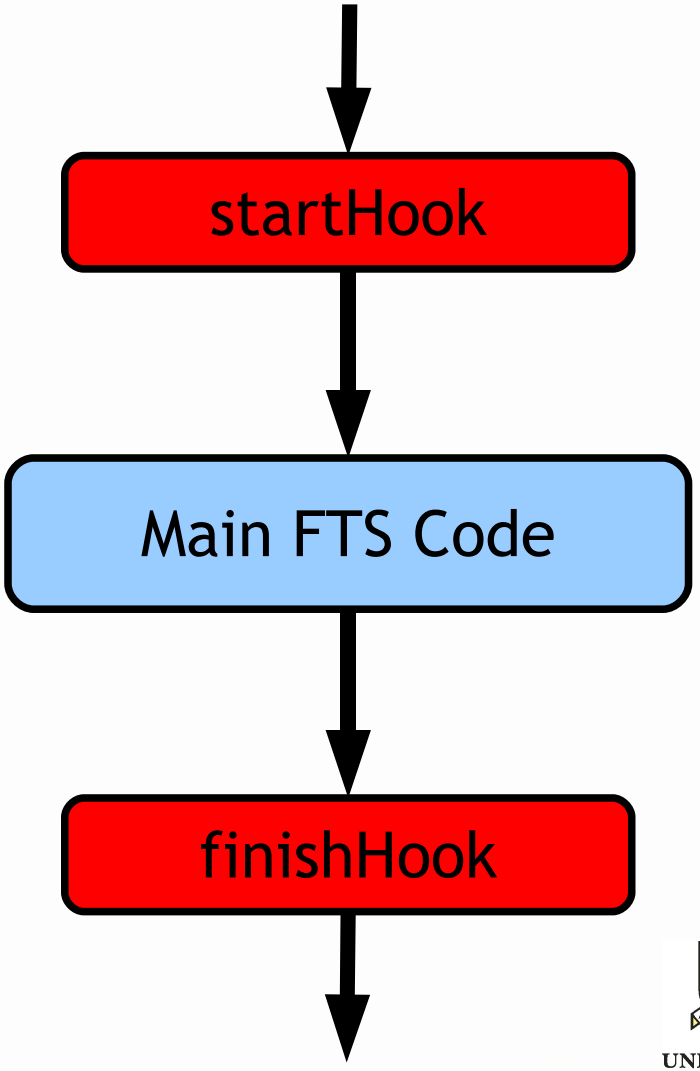
- Stateless agents perform actions:
  - Allocator agents
  - Transfer agents
  - Retry agents
- State held in a database (provides robustness if an agent has problems)
- Interface through a web service wrapper over database
- Command line clients and API

FTS Job State (Simplified)



FTS Hooks

- Start hook could
  - Resolve LFN to SURL
  - Choose best SURL
- Finish hook could
  - Register new SURL in file Catalog
  - Deal with errors gracefully



FTS Channels

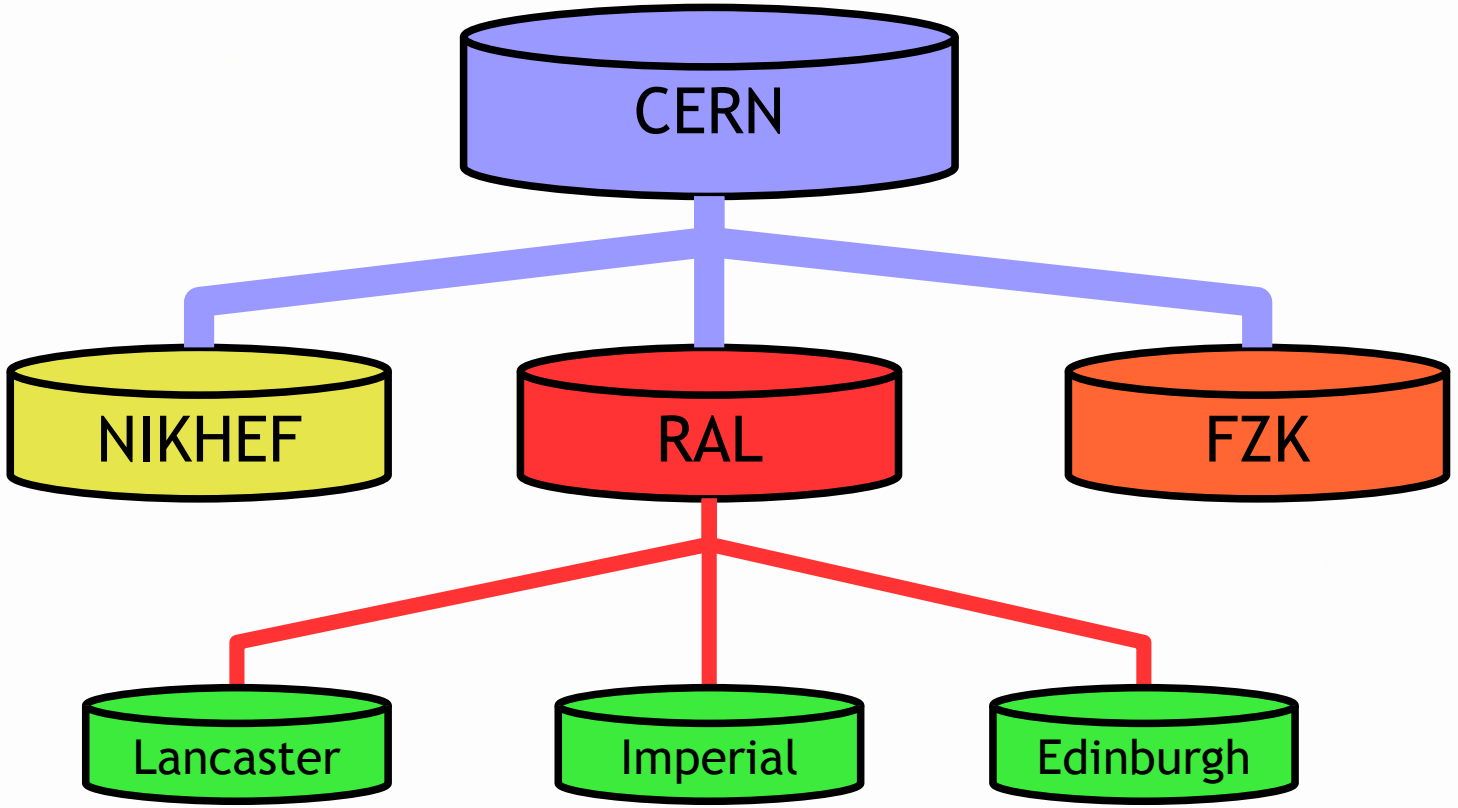
FTS has a concept of network channels

- Channels are point to point queues e.g., `cern.ch` to `ral.ac.uk`
- Jobs matching a channel's domains get added to that channel's queue by the allocator agent
- Each channel can independently have
  - State (Active, inactive, drain, ...)
  - Nominal bandwidth
  - Number of concurrent transfers
- A default channel can be set as a catch all

FTS Server Install

- For SC3 install is at T0 and T1s
- FTS Server available from glite (1.1.2 glite release, 2.3.1 FTS)
- Install guide:
  - `https://uimon.cern.ch/twiki/bin/view/LCG/FtsServerInstall`
- An Oracle db *is required*. (MySQL coming...)
- Other than that, one needs the “usual suspects” (java, host certificates, ...)

LCG Deployment



N.B. Higher level always “owns” the channel endpoint, i.e. push down, pull up.

FTS Clients

- Client RPMs for FTS (`glite-data-transfer-*`) are released through LCG:
  - 2.5.0 for SC3 sites
  - 2.6.0 for the rest of the world
- Installed as part of the set for UI and WN
- At the moment the FTS service portal is configured by hand (BDII coming).

https://uimon.cern.ch/twiki/bin/view/LCG/FtsClientInstall

http://egee-jra1-dm.web.cern.ch/egee-jra1-dm/doc.htm

FTS Command Line

```
$ voms-proxy-init
$ export MYPROXY_SERVER=somwhere.rl.ac.uk
$ myproxy-init
$ glite-transfer-submit -v \
   srm://srm.epcc.ed.ac.uk:8443/pnfs/epcc.ed.ac.uk/data/dteam/graemeSt
   ewart2005-07-06 \
   srm://dcache.gridpp.rl.ac.uk:8443/pnfs/gridpp.rl.ac.uk/home/dteam/g
   raemeStewart2005-07-06
# Using endpoint https://fts0344.gridpp.rl.ac.uk:8443/sc3ral/glite-
   data-transfer-fts/services/FileTransfer
# Service version: 2.3.1
# Interface version: 2.9.0
# Schema version: 1.3.10
# Service features: glite-data-transfer-fts-2.3.1-1
Enter password:
2d907e1b-ee0d-11d9-bffc-82dc9903dc08
$
```

FTS Command Line

```
$ grid05:~$ glite-transfer-status -v 2d907e1b-ee0d-11d9-bffc-82dc9903dc08
# Using endpoint https://fts0344.gridpp.rl.ac.uk:8443/sc3ral/glite-data-transfer-fts/services/FileTransfer
# Service version: 2.3.1
# Interface version: 2.9.0
# Schema version: 1.3.10
# Service features: glite-data-transfer-fts-2.3.1-1
Request ID:     2d907e1b-ee0d-11d9-bffc-82dc9903dc08
Status:         Pending
Channel:        raled
Client DN:      /C=UK/O=eScience/OU=Glasgow/L=Compserv/CN=graeme stewart
Reason:         <None>
Submit time:    2005-07-06 12:00:35.000
Files:          1
        Done:           0
        Active:         0
        Pending:        1
        Canceled:       0
        Failed:         0
        Finished:       0
        Submitted:      0
        Restarted:      0
```

Summary

- Data management in LCG is improving
  - Performant file catalogs
  - FTS service
- FTS fulfils an important role, making SURL to SURL copies robust – SC3 will be a good workout.
- Next major component in LCG Data Management is some File Placement Service (gLite, experiments, ..., ?)

GridPP Data Management

Data Management Pages:

http://www.gridpp.ac.uk/deployment/admin/datamanagement/

Data Management Wiki:

http://www.physics.gla.ac.uk/gridpp/datamanagement/

T2 Support:

dm@gridpp.ac.uk

g.stewart@physics.gla.ac.uk

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