Grid Data Access: Proxy Caches and User Views

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BiG Grid
the dutch e-science grid
Outline

- Who?
- Why?
- What?
- How?
- Results
- What's next?
By who and for whom?

By who

- Developed by Cristian Cirstea
  - Student at TU Eindhoven in the Netherlands
  - 9 month master thesis project
- Supervised by Jeff Templon and yours truly

For whom

- Initially for HEP users, but made applicable to all grid users
- End users that wish to browse datafiles on the grid on their laptop or desktop computers
- Grid users that have many jobs requiring access to the same set of files
Why was it built?

**Existing data management tools:**

- Require a specific version of Linux – no other platforms are supported
- Provide command-line tools only
- Do not integrate well into the operating system
- Do not scale well when requesting the same datafile many times
- ...  

Need I continue?
Grid Proxy Cache

- Offers a standard WebDAV interface to users and to grid jobs
- Authentication can be done using username+password (via a MyProxy store) and using grid proxies
- Serves as a proxy to existing LFC and SRM implementations without having to change the LFCs or SRMs themselves
- Current implementation is readonly (it's a cache!)
How does it work?

Using mostly existing technologies

- WebDAV server and cache nodes are based on apache+mod_gridsite
- Cache nodes configured for automatic failover and load balancing
- Files retrieved from LFC/SRM using GFAL
- Linux FUSE client 'webdavfs'
- WebDAV interface done using FastCGI scripts

Modifications made

- Gridsite's 'htproxyput' enhanced to support limited proxies
- 'webdavfs' enhanced to support grid proxies and HTTP REDIRECTs
Architecture

End User

Worker Nodes

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SRM
LFC

MyProxy

WebDAV Frontend

Cache nodes

SRM
SRM
Results (1): Usability

• Works with Windows XP/7, Mac OS X, Linux native WebDAV clients
• Also works with a web browser (and 'curl'/ 'wget')
• Browsing of various LFCs and SRMs is transparent
• Linux FUSE driver offers full POSIX access ('open'/ 'fopen') to grid files from within grid jobs

Issues

• Unmounting FUSE mounts sometimes fails ➔ Obstacle for production use
• MyProxy credentials need to be uploaded using Firefox plugin or command-line tool
Results (2): Performance

Issues

• When many jobs all request different files a proxy cache can add extra overhead
Conclusions

• For end user file browsing current solution is production ready
• The system scales well under load
• For grid job access the FUSE issue needs to solved

Future work

• Investigate possible write access
• Optimize WebDAV throughput
• Once SRMs provide an HTTPS interface SSLProxyCaching might be possible ➔ further speed improvement
• Add a translation layer (e.g. grab ZIP file from SRM, unpack it, then server the contents via WebDAV)