



Enabling Grids for E-science

GFAL, SRMv2 & XROOTD interactions

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On behalf of the JRA1 Data Management team

JRA1 All Hands meeting, CERN

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www.eu-egee.org



Information Society

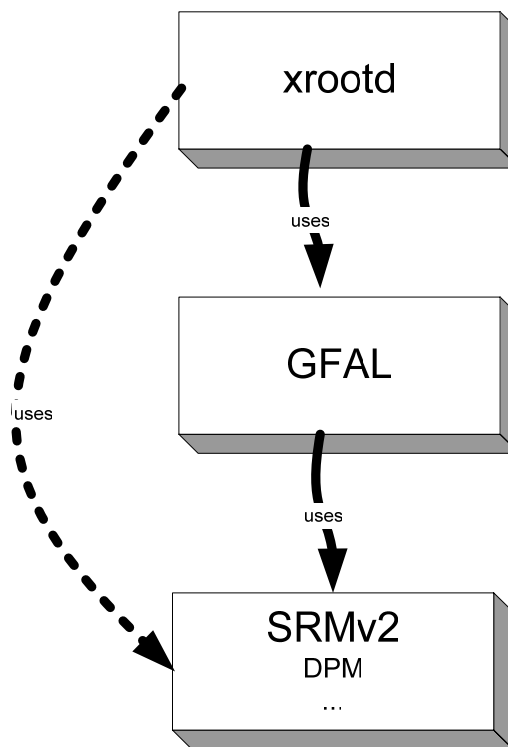


- **Dependencies and definitions**
 - SRM: Storage Resource Management
 - *Collaboration between Lawrence Berkeley, FermiLab, Jefferson Lab, CERN, Rutherford Appleton Lab*

 - GFAL: Grid File Access Library
 - LCG group
 - *RFIO/LFC/DPM/CASTOR*

 - Xrootd
 - Stanford, INFN, CERN, Princeton Univeristy...

 - Interoperability and Integration



- **SRM**
 - Reservation on demand
 - Lifetime management
 - Namespace operations
 - Bulk operations
 - Permissions (ACL mapping)

 - Who steers?
 - Error and return statuses
 - Common state machine for Get/Put/Copy tbd

- **SRMv2 validation testsuite**
 - Stability of the spec
 - Coherency
 - Several test suites
 - Five existing with various quality levels
 - *Closed or poorly documented*
 - Better process and consensus needed

- **7 space management functions**
- **3 permission related functions**
 - new
- **5 directory functions**
- **16 transfer functions**

Function name	Status Code	Explanation	DPM	dCache	CASTOR	LBLSRM
ReserveSpace	SRM_SUCCESS		x		x	x
	SRM_NOT_SUPPORTED	SRM does not implement this function		x		
	SRM_INVALID_REQUEST	Invalid type of space	x		x	
		Invalid userSpaceTokenDescription	x			
		Negative value for space requested	x		x	
		Negative value for lifetime requested	x		x	
	SRM_INTERNAL_ERROR	Database error	x		x	
SRM_FAILURE	Miscellaneous error				x	
ReleaseSpace	SRM_SUCCESS		x		x	x
	SRM_NOT_SUPPORTED	SRM does not implement this function		x		
	SRM_FAILURE	spaceToken is missing	x			x
		Space still contains pinned files			x	x
		Miscellaneous error				x
		spaceToken is too long	x			
	SRM_INVALID_REQUEST	spaceToken is unknown	x		x	x
		spaceToken is missing	x		x	
	SRM_UNAUTHORIZED_ACCESS	Permission denied			x	
SRM_INTERNAL_ERROR	Database failure	x		x		

(<https://srm.fnal.gov/twiki/bin/view/SrmProject/SrmV2StatusCodes>)

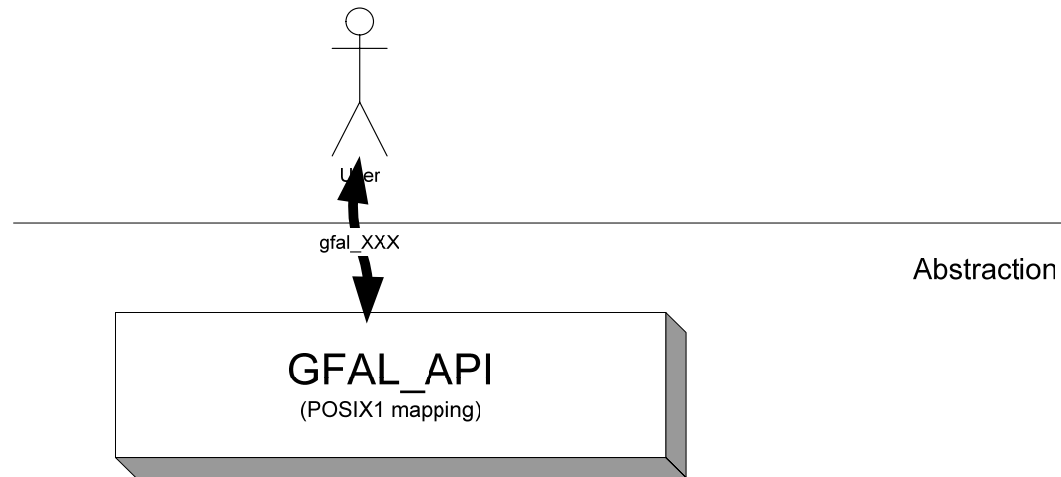
- **LCG way to achieve IO abstraction in heterogeneous MSS/Catalog environment**

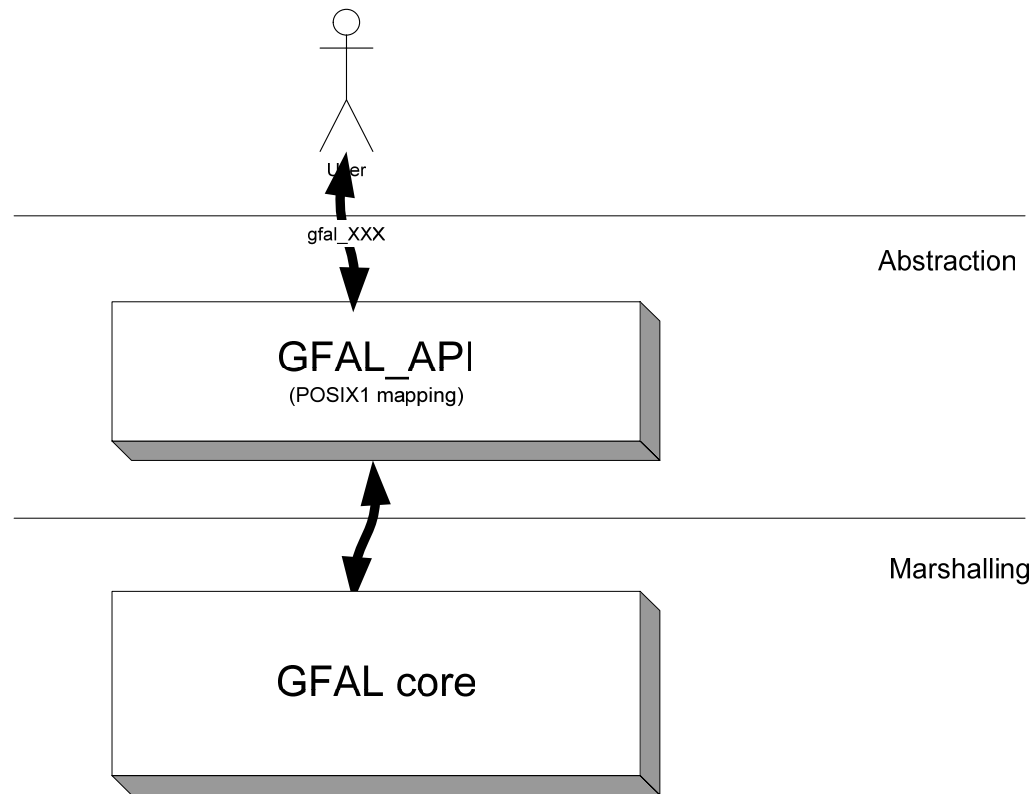
- POSIX1 I/O mapping:

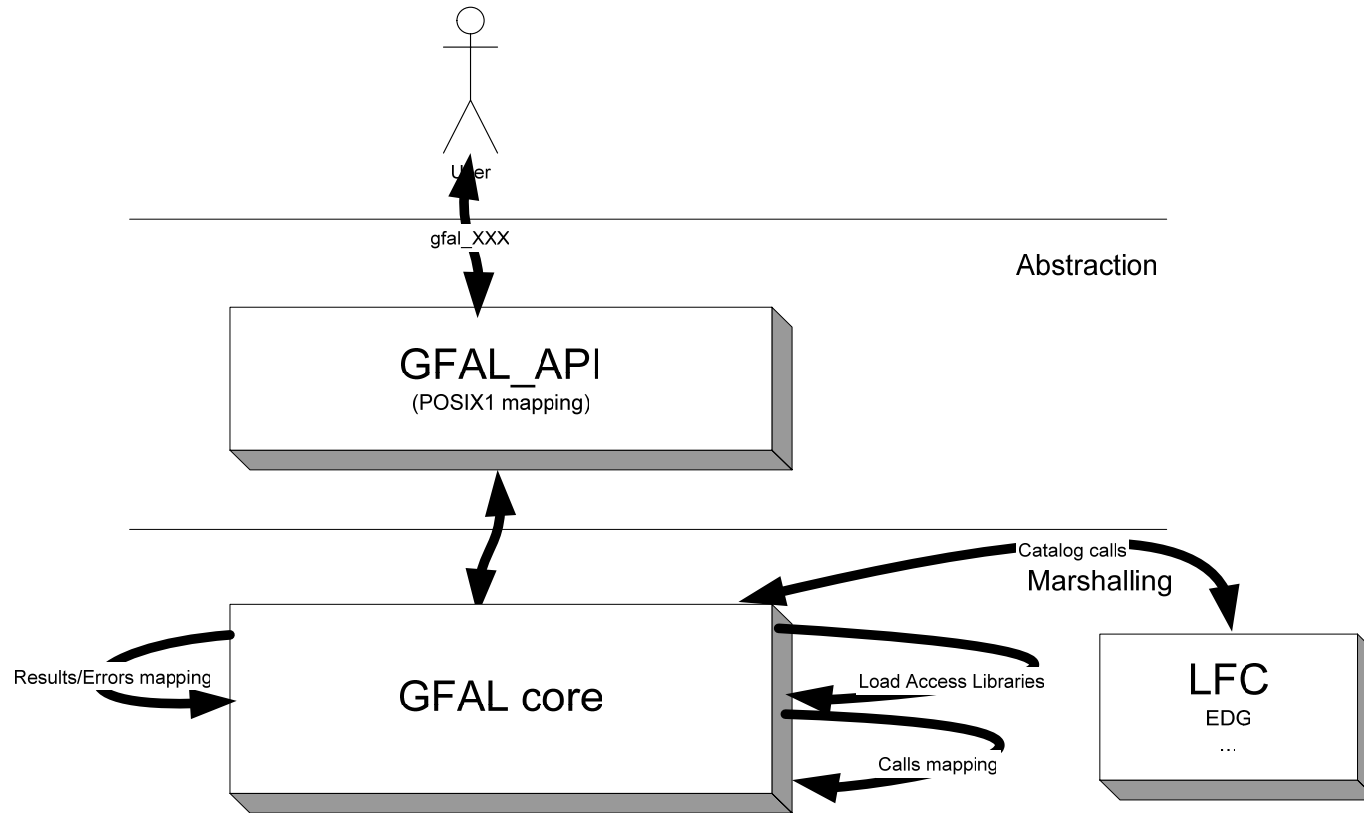
- `int gfal_access (const char *, int);`
 - `int gfal_chmod (const char *, mode_t);`
 - `int gfal_close (int);`
 - `int gfal_closedir (DIR *);`
 - `int gfal_creat (const char *, mode_t);`
 - `int gfal_creat64 (const char *, mode_t);`
 - `int gfal_errmsg (char *, int, const char *);`
 - `off_t gfal_lseek (int, off_t, int);`
 - `int gfal_lstat (const char *, struct stat *);`
 - `int gfal_mkdir (const char *, mode_t);`
 - `int gfal_open (const char *, int, mode_t);`
 - `int gfal_open64 (const char *, int, mode_t);`
 - `DIR * gfal_opendir (const char *);`
 - `ssize_t gfal_read (int, void *, size_t);`
 - `struct dirent * gfal_readdir (DIR *);`
 - `int gfal_rename (const char *, const char *);`
 - `int gfal_rmdir (const char *);`
 - `ssize_t gfal_setfilchg (int, const void *, size_t);`
 - `int gfal_stat (const char *, struct stat *);`
 - `int gfal_unlink (const char *);`
 - `ssize_t gfal_write (int, const void *, size_t);`
 - `off_t gfal_lseek64 (int, off_t, int);`
 - `int gfal_lstat64 (const char *, struct stat *);`
 - `struct dirent * gfal_readdir64 (DIR *);`
 - `int gfal_stat64 (const char *, struct stat *);`

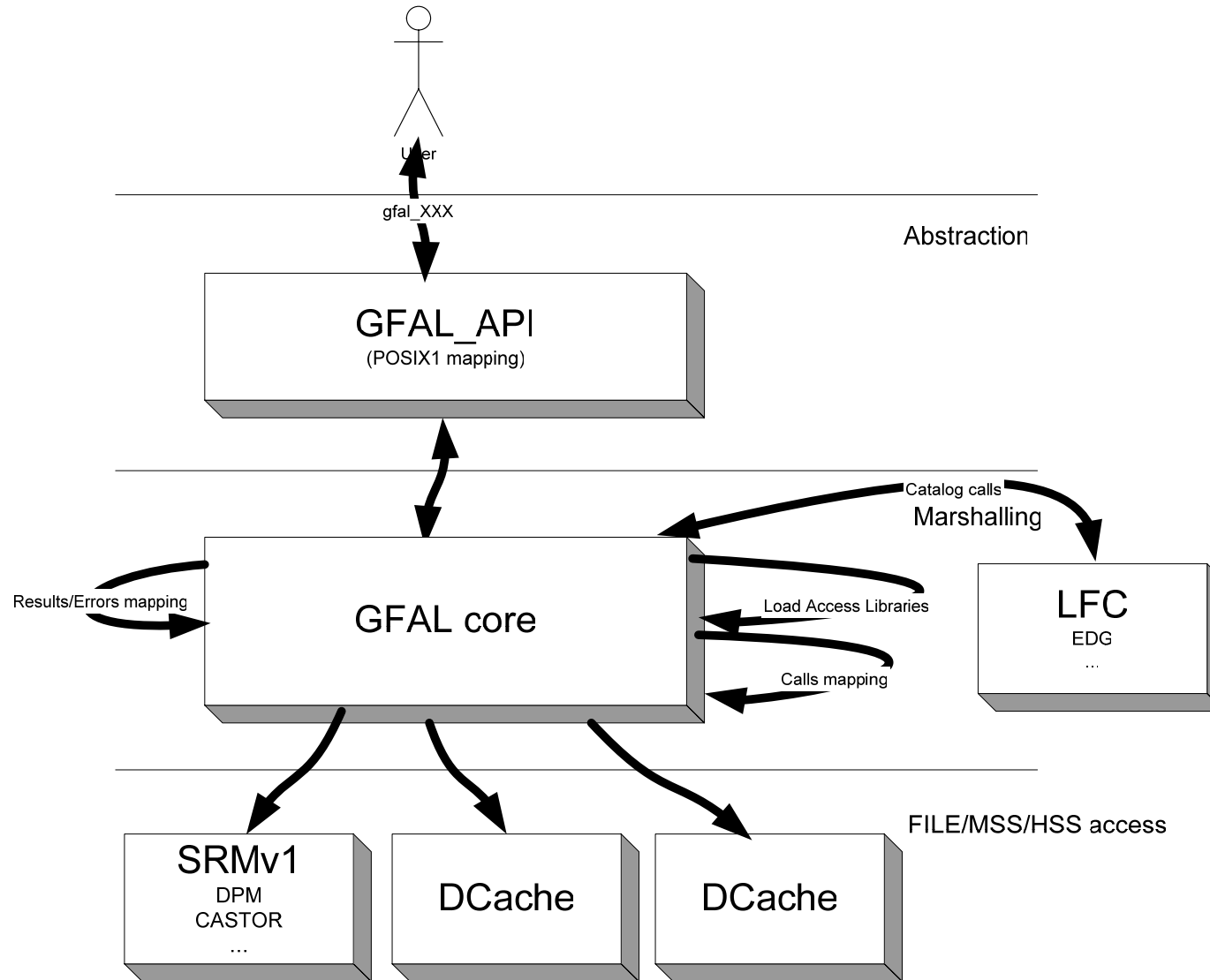
- *Catalog API*

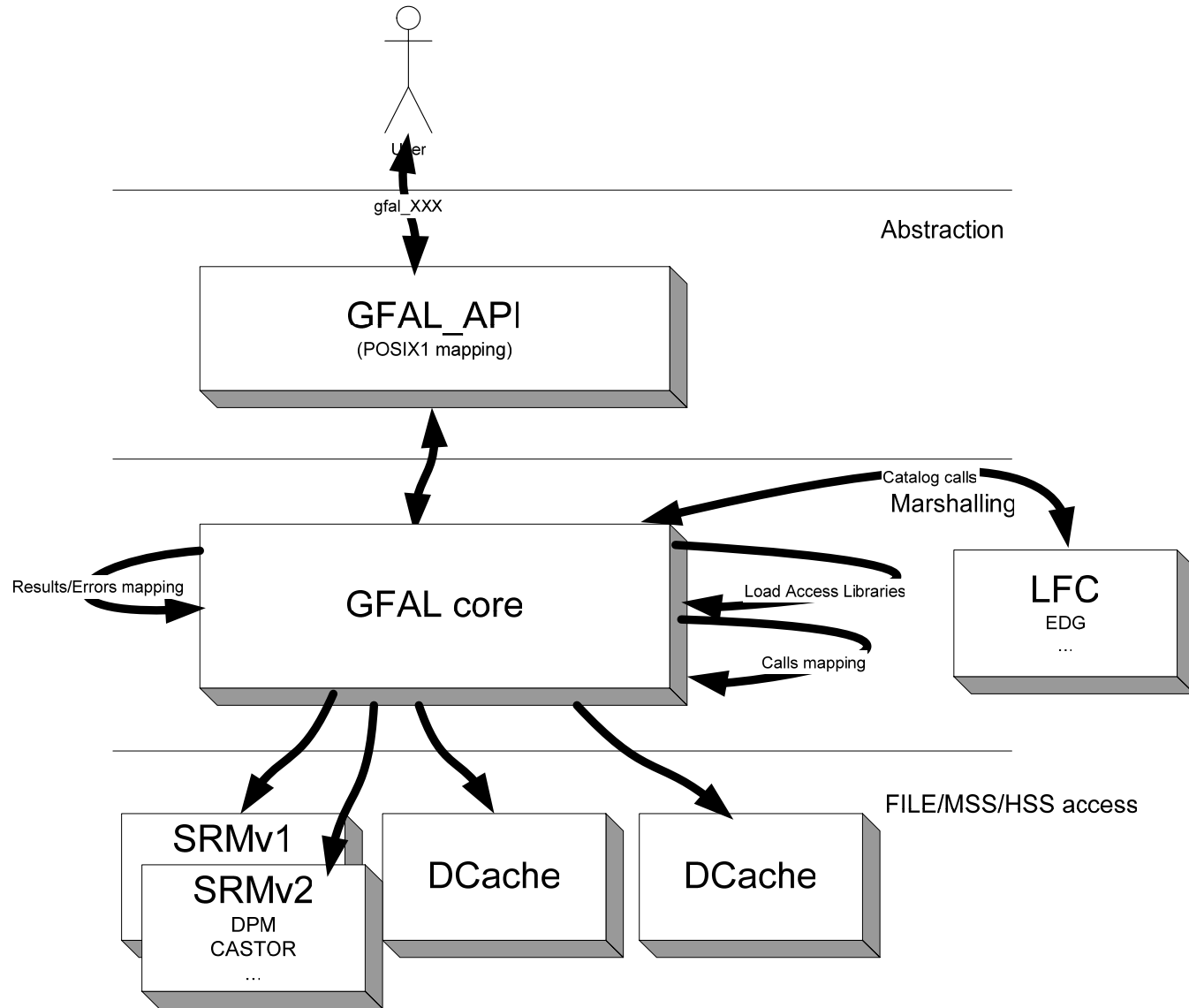
- *Storage API*





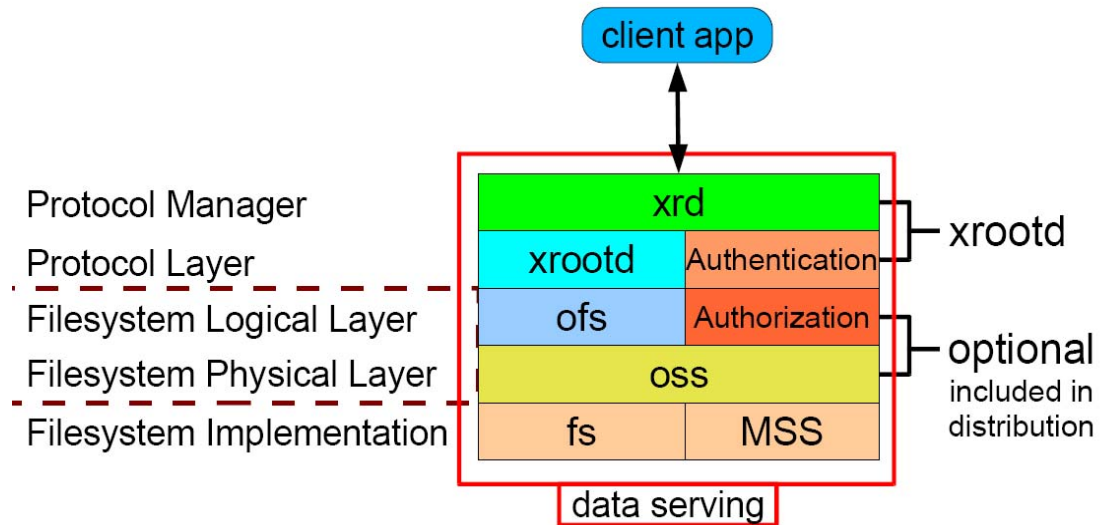






- **SRMv2 to be added**
 - June deadline
 - Changes for SRMv2 error handling
- **Removal of EDG callouts**
- **Preservation of soap context between calls?**
 - Impact on POOL and others
- **FTS/GFAL common lib feasibility study**
- **root SRMv1 & v2 dependencies**
 - Some issues with permissions
 - SRMv1 to be there for good
- **Thread safety**
 - Not so far
 - To share/include mt library with lcg_dm for mt primitives
- **9 open bugs/requests in savannah**

- **Server daemons**
- **Clients**
- **Protocol**
 - Load balancing
 - Fault tolerant
 - Secure
 - Self adopting P2P
 - TXNetFile



- **GFAL integration**
 - September deadline, feasibility study
 - FileSystem Logical Layer
- **Possible issues with GFAL**

(http://hepunix.rl.ac.uk/BFROOT/www/Computing/Distributed/xrootd/presentations/petzold_gsi_xrootd.pdf)

- **xroot(d) shipped with root toolkit**
- **TXNetFile**
- **xroot & DPM**
 - *Native SRMv2*
 - GFAL

- **Driving role of SRMv2**
 - Spec readiness
 - Specification process
 - Validation
- **GFAL**
 - Long term GFAL
 - Issues and alternatives
- **xrootd**
 - GFAL or native integration?
 - Performance issues
 - Bulk ops
 - Catalogs interactions