



Enabling Grids for E-scienceE

# gLite Data Management Services - Overview

*Mike Mineter*

*National e-Science Centre, Edinburgh*

[www.eu-egee.org](http://www.eu-egee.org)



- **EGEE Middleware Architecture and Planning**  
<https://edms.cern.ch/document/594698/>
- **SRM slides derived from presentation by Andrew Smith (NeSC)**
- **Roberto Barbera, ISSGC05, Vico Equense, July2005**  
<http://www.dma.unina.it/~murli/GridSummerSchool2005/index.htm>

- **Data services in gLite**
- **Storage Element**
- **Catalogs**
- **File Transfer**

# gLite components overview

Near Future

now

|                     |     |     |
|---------------------|-----|-----|
| Grid Access Service | API | CLI |
|---------------------|-----|-----|

**Access Services**

|                |                      |
|----------------|----------------------|
| Authorization  | Auditing             |
| Authentication | Dynamic Connectivity |

**Security Services**

|                          |                   |                    |
|--------------------------|-------------------|--------------------|
| Information & Monitoring | Job Monitoring    | Service Monitoring |
|                          | Service Discovery |                    |

**Information & Monitoring Services**

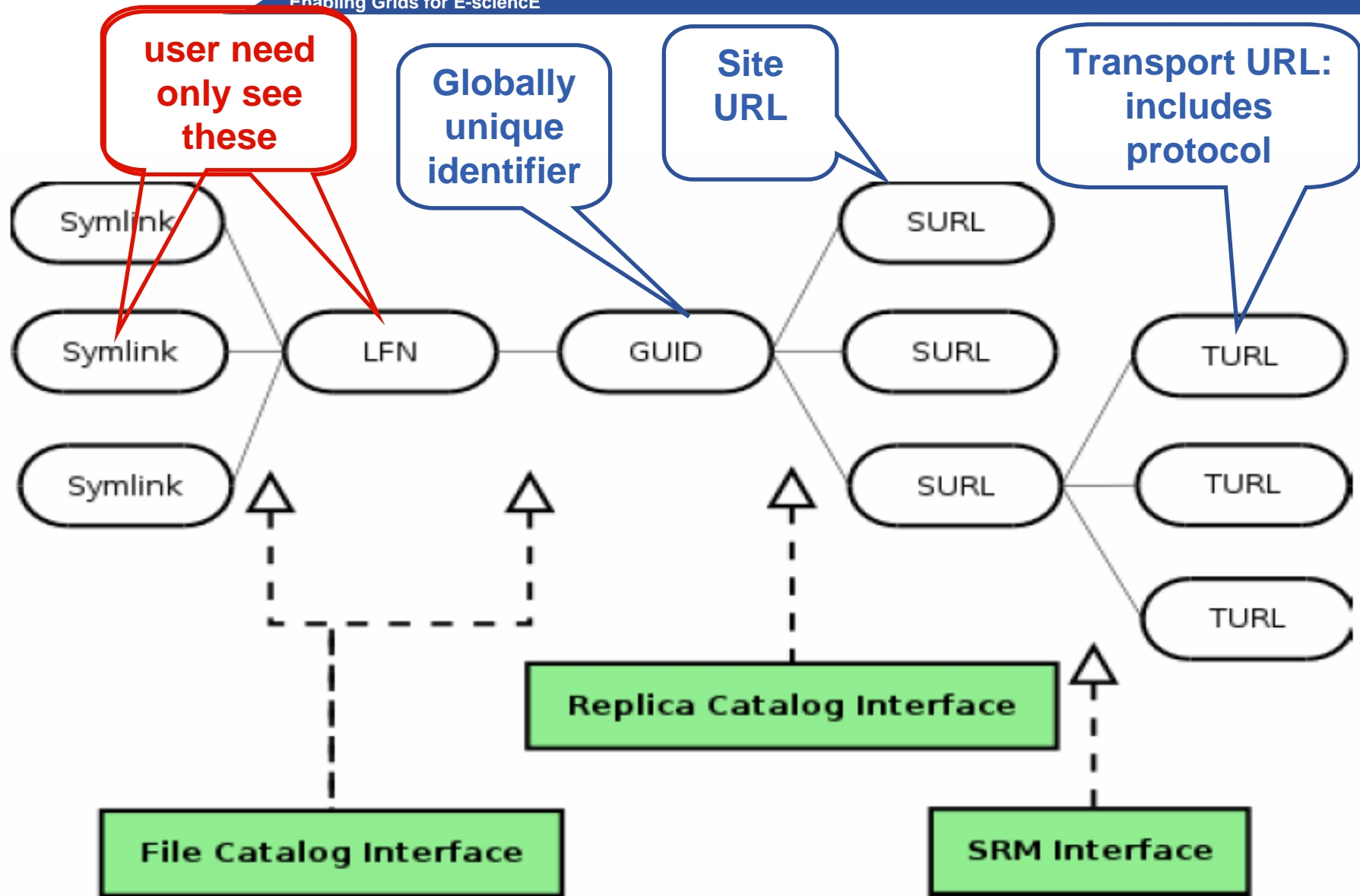
|                  |                        |            |
|------------------|------------------------|------------|
| Metadata Catalog | File & Replica Catalog | Accounting |
| Storage Element  | Data Movement          | Site Proxy |

**Data Services**

|                   |                     |
|-------------------|---------------------|
| Job Provenance    | Package Manager     |
| Computing Element | Workload Management |

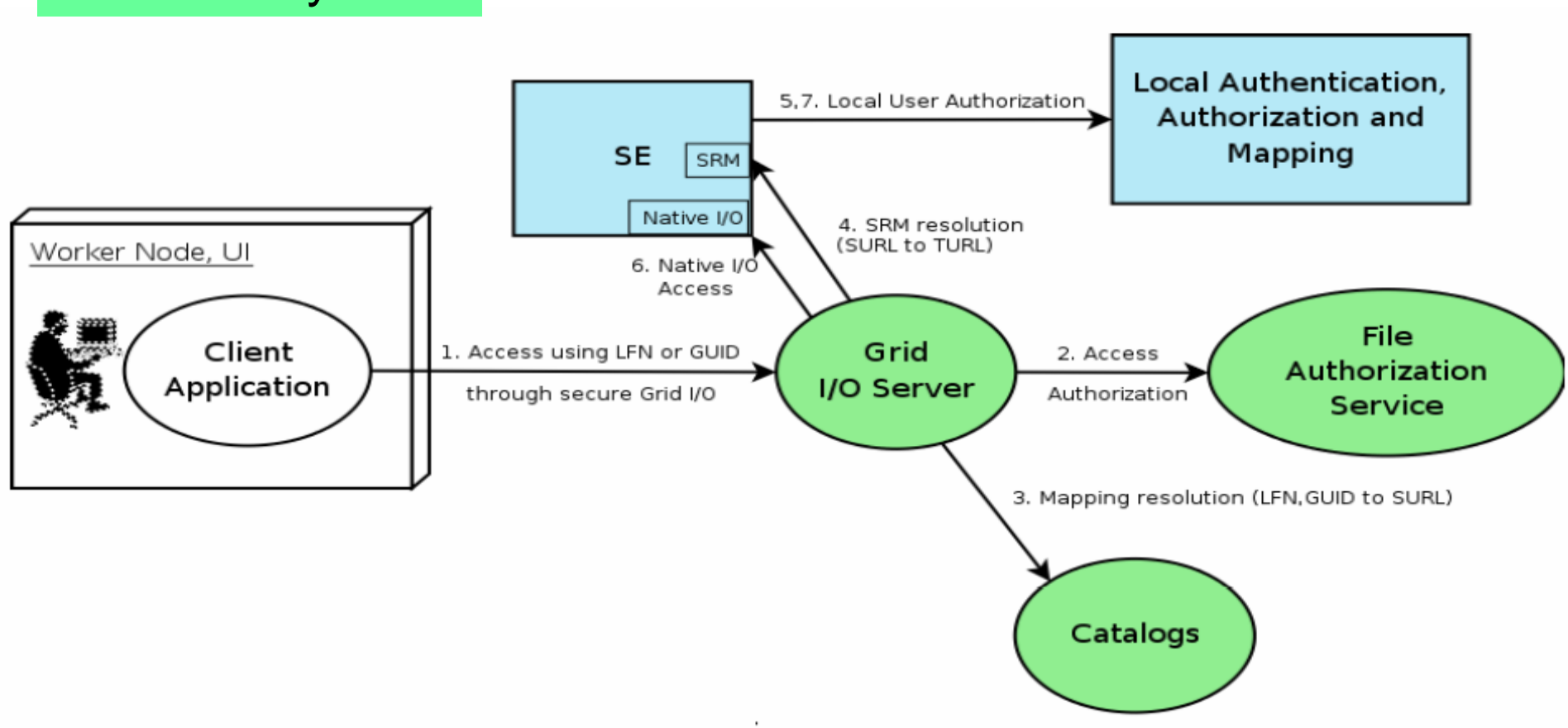
**Job Management Services**

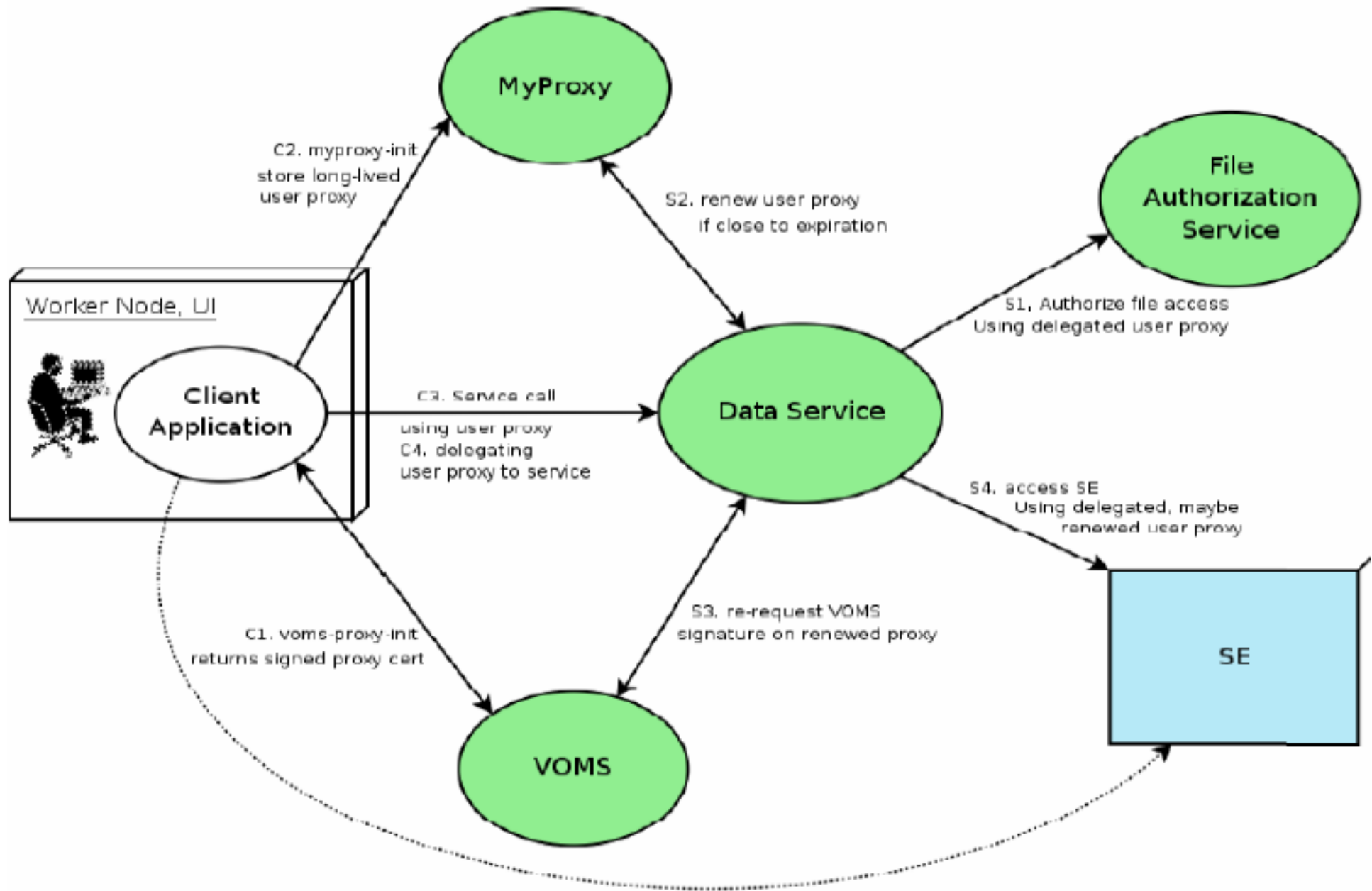
- **File Access Patterns:**
  - Write once, read-many
  - Rare append-only with one owner
  - Frequent updated at one source - replicas check/pull new version
  - (NOT frequent updates, many users, many sites)
- **File naming**
  - Mostly, see the “logical file name” (LFN)
  - LFN must be unique:
    - includes logical directory name
    - in a VO namespace
  - E.g. /gLite/myVOname.org/runs/12aug05/data1.res
- **3 service types for data**
  - Storage
  - Catalogs
  - Movement



Provided by site

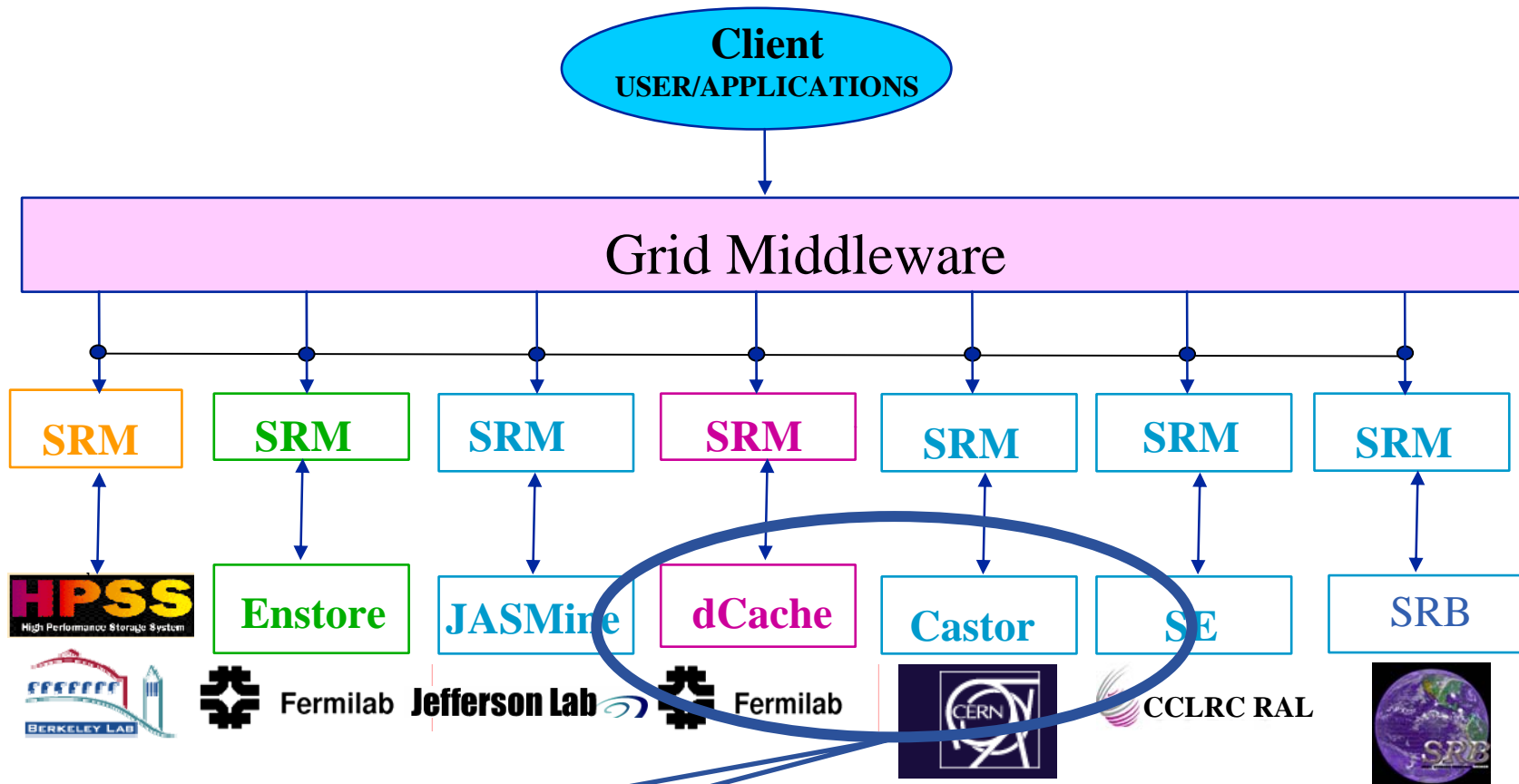
Provided by VO







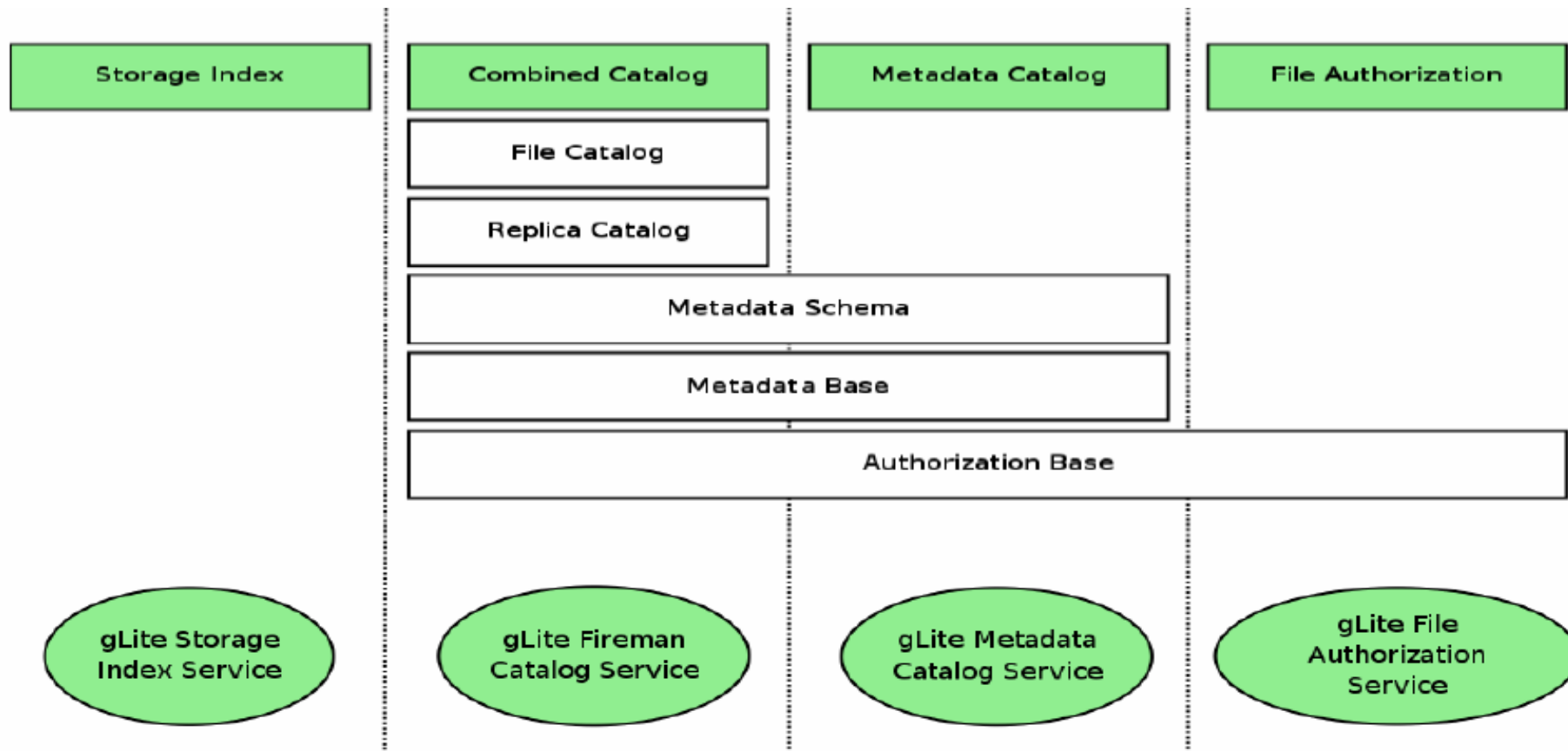
- **Currently, Mass Storage Systems:**
  - Castor, dCache
- **Provides...**
  - Storage services
  - Transfer services
    - At least GridFTP
  - POSIX-like I/O interface
- **An SRM implementation**
- **With**
  - “Auxiliary Security”
    - If SE supports ACL (extensions to POSIX-like access control – e.g. multiple groups), SE accesses the user, group data in VOMS proxy
  - Optional logging and accounting services



Currently supported,  
via SRM, by gLite

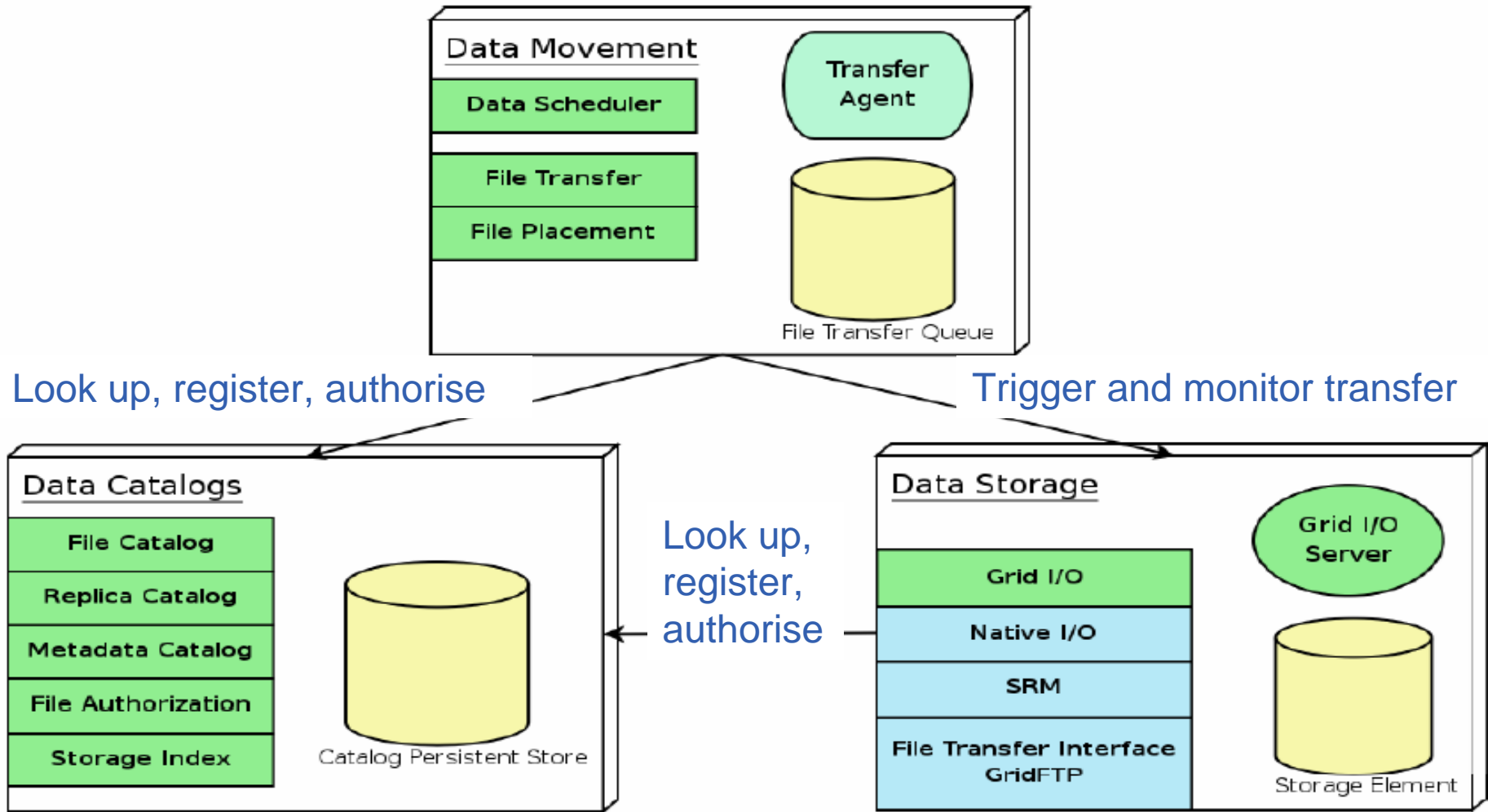
- **Catalogs built based on requirements from HEP experiments and the Biomedical EGEE community**
- **Started design from AliEn File Catalog**
  - Logical namespace management
  - Virtual Filesystem view (DataSets via directory hierarchy)
  - Support Metadata attached to files
  - Bulk Operations
  - Strong security: basic unix permissions and fine-grained ACLs (i.e. not just directory but file-granularity)
  - Support flexible deployment models
    - Single central catalog model
    - Site local catalogs connected to a single central catalog model
    - Site local catalogs without single central catalog model
  - Scalable to many clients and to a large number of entries; address performance issues seen with EDG RLS

- **Fireman**
  - Fireman = File and Replica Manager
    - Also interfaces to metadata catalog
  - Implements all file management interfaces
    - Using replica catalog: manage replicas using GUID
- **File Authorization Service**
  - Request authorisation - based on the DN and the Groups from the user's delegated credentials
  - the FAS and Catalog interfaces are implemented by the same service
- **Metadata Catalog**
  - Metadata are application specific
  - All files in a directory have the same schema
  - (Many directories can share a schema)



- **FiReMan Catalog**
  - Release 1: Single Central deployment model only
  - Release 2: Distributed catalog according to design using Java Messaging Services to propagate updates between catalog instances
- **Storage Index**
  - Already in Release 1
  - Main interaction point with Workload Management
- **Metadata Catalog**
  - Release 1: Base Implemented by FiReMan
  - Also a standalone service, single central instance
  - Release 2: distribution using a messaging infrastructure

- **File movement is asynchronous – submit a job**
  - Held in file transfer queue
- **Data scheduler**
  - Single service per VO – can be distributed
  - VO can apply policies (priorities, preferred sites, recovery modes..)
- **Client interfaces:**
  - Browser
  - APIs
  - Web service
- **“File transfer”**
  - Uses SURL
- **“File placement”**
  - Uses LFN or GUID, accesses Catalogues to resolve them





- **JRA1 Data Management homepage**  
<http://cern.ch/egee-jra1-dm>
- **EGEE Middleware Architecture and Planning**  
<https://edms.cern.ch/document/594698/>
- **gLite FiReMan user guide**
  - Overview  
<https://edms.cern.ch/file/570643/1/EGEE-TECH-570643-v1.0.pdf>
  - Command Line tools  
<https://edms.cern.ch/file/570780/1/EGEE-TECH-570780-v1.0.pdf>
  - C/C++ API  
<https://edms.cern.ch/file/570780/1/EGEE-TECH-570780-C-CPP-API-v1.0.pdf>
  - Java API  
<https://edms.cern.ch/file/570780/1/EGEE-TECH-570780-JAVA-API-v1.0.pdf>