gLite Basic APIs

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WMProxy (Workload Manager Proxy)

- Is a service providing access to the gLite Workload Management System (WMS) .
- Has been designed to efficiently handle a large number of requests for job submission.
- The service interface addresses the Web Services and SOA (Service Oriented Architecture) architecture standards.
- APIs are available for Java, Python, C++

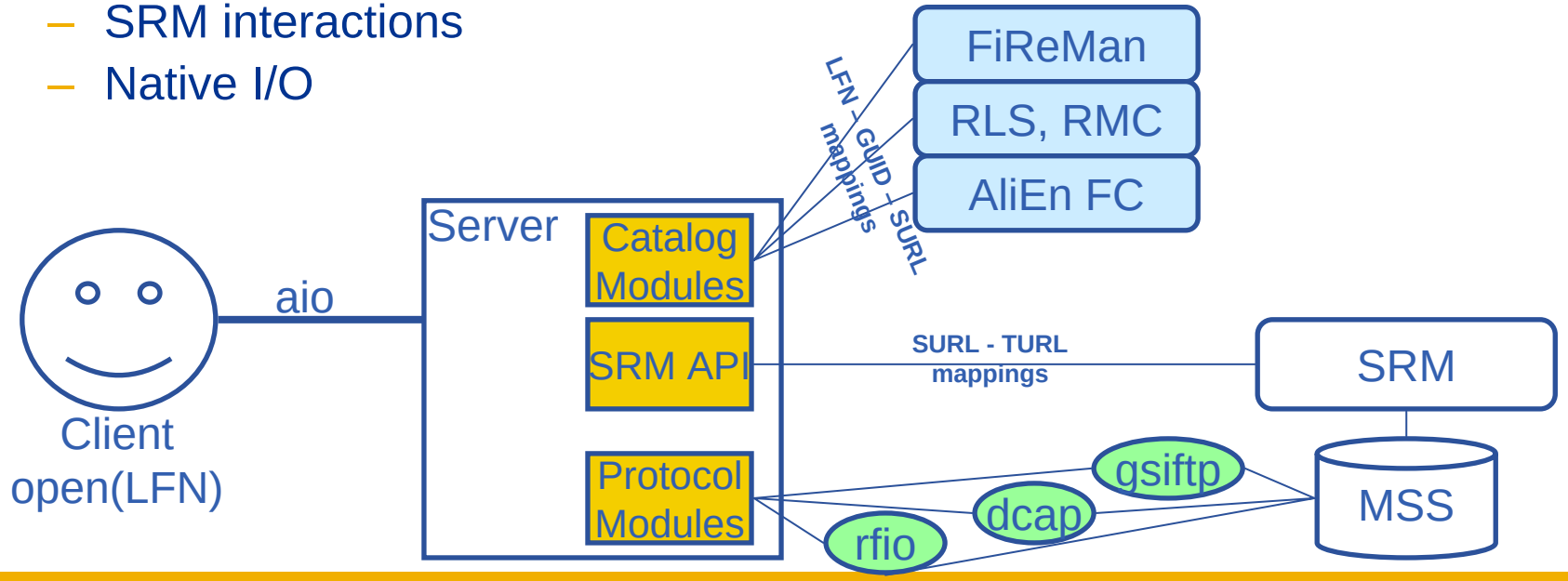
WMProxy Supported types

The request types supported by the WMProxy service are:

- **Job: a simple application**
- **DAG: a direct acyclic graph of dependent jobs**
- **Collection: a set of independent jobs**
- **Jobs in turn can be *batch*, *interactive*, *MPI-based*, *checkpointable, Parametric*.**

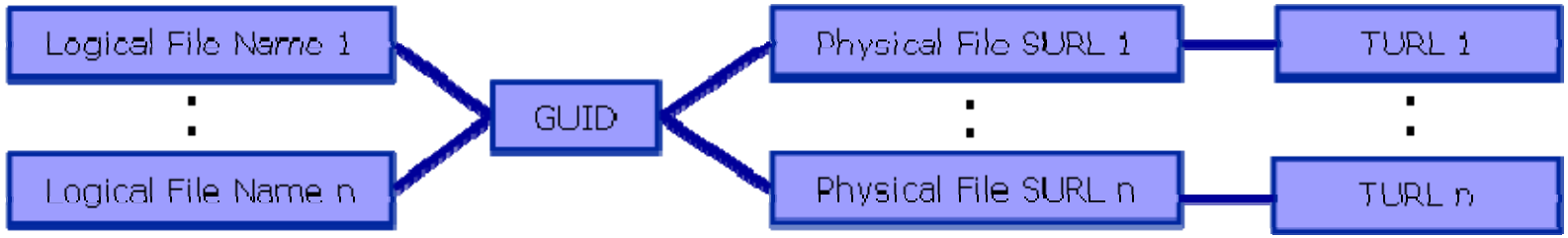
gLite-I/O

- **Client only sees a simple API library and a Command Line Interface**
  - GUID or LFN can be used, i.e. open("/grid/myFile")
- **GSI Delegation to gLite I/O Server**
- **Server performs all operations on User's behalf**
  - Resolve LFN/GUID into SURL and TURL
- **Operations are pluggable**
  - Catalog interactions
  - SRM interactions
  - Native I/O



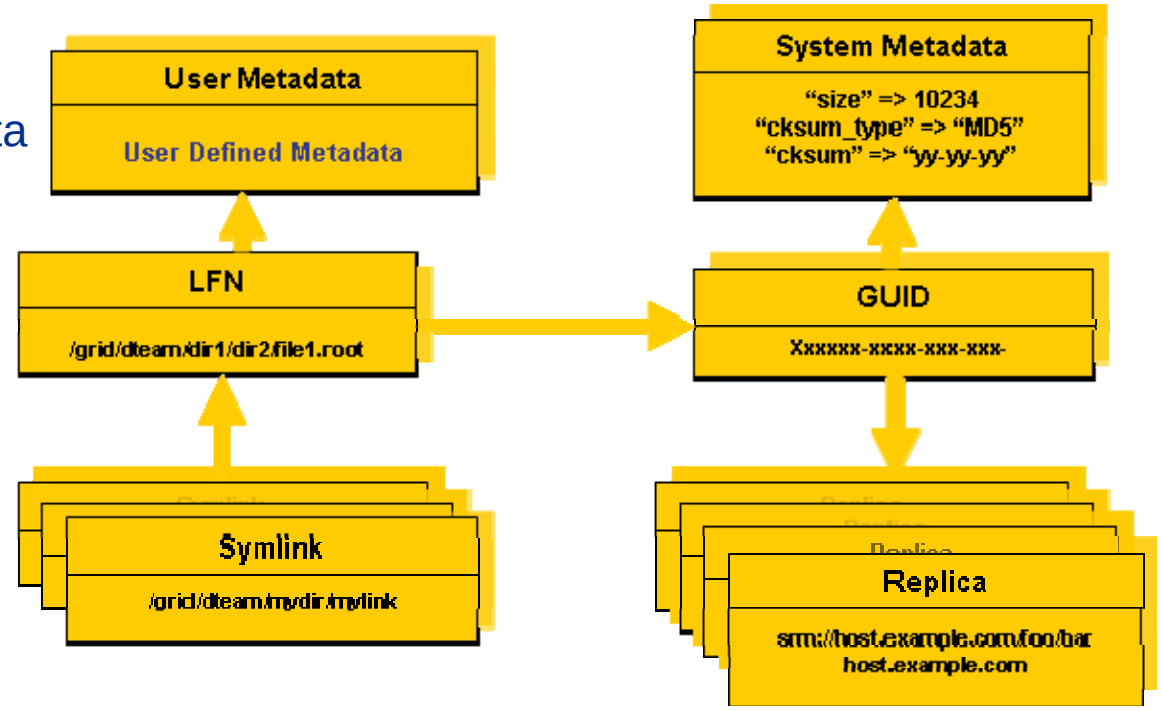
Name conventions

- **Logical File Name (LFN)**
  - An alias created by a user to refer to some item of data, e.g.
    "lfn:cms/20030203/run2/track1"
- **Globally Unique Identifier (GUID)**
  - A non-human-readable unique identifier for an item of data, e.g.
    "guid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6"
- **Site URL (SURL) (or Physical File Name (PFN) or Site FN)**
  - The location of an actual piece of data on a storage system, e.g.
    "srm://pcrd24.cern.ch/flatfiles/cms/output10_1" (SRM)
    "sfn://lxshare0209.cern.ch/data/alice/ntuples.dat" (Classic SE)
- **Transport URL (TURL)**
  - Temporary locator of a replica + access protocol: understood by a SE, e.g.
    "rfio://lxshare0209.cern.ch//data/alice/ntuples.dat"



The LFC

- **One single catalog**
- **LFN acts as main key in the database. It has:**
  - Symbolic links to it (additional LFNs)
  - Unique Identifier (GUID)
  - System metadata
  - Information on replicas
  - One field of user metadata



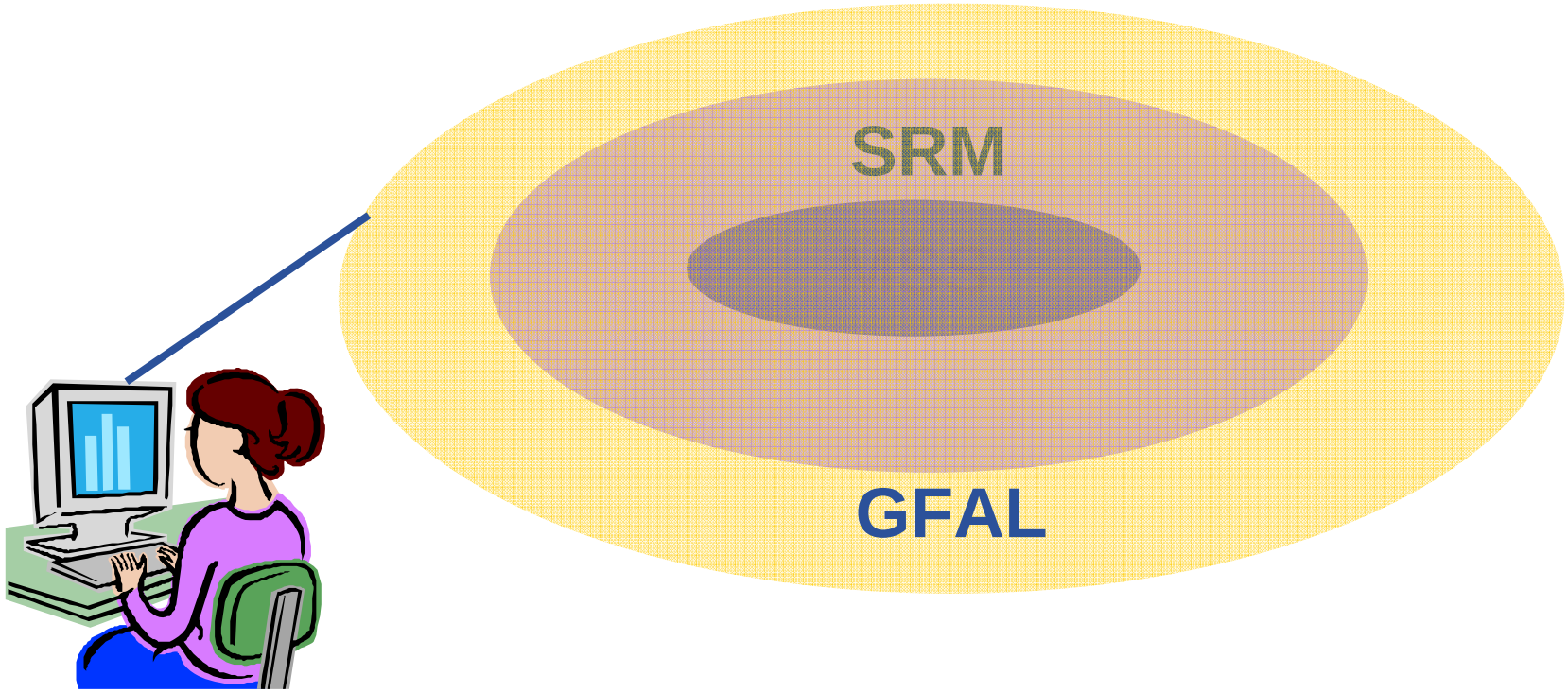
- Grid storage interactions today require using some existing software components:

  - The replica catalog services to locate valid replicas of files in order to :
    - ***Download*** *them to the user local machine*
    - ***Move*** *them from a SE to another one*
    - *Make job running on the worker node able to* ***access and manage*** *files stored on remote storage element.*

  - The SRM software to ensure:
    - *Files existence on disk or disk pool (they are recalled from mass storage if necessary)*
    - *Space allocation on disk for new files (they are possibly migrated to mass storage later)*

GFAL, SRM and MSS

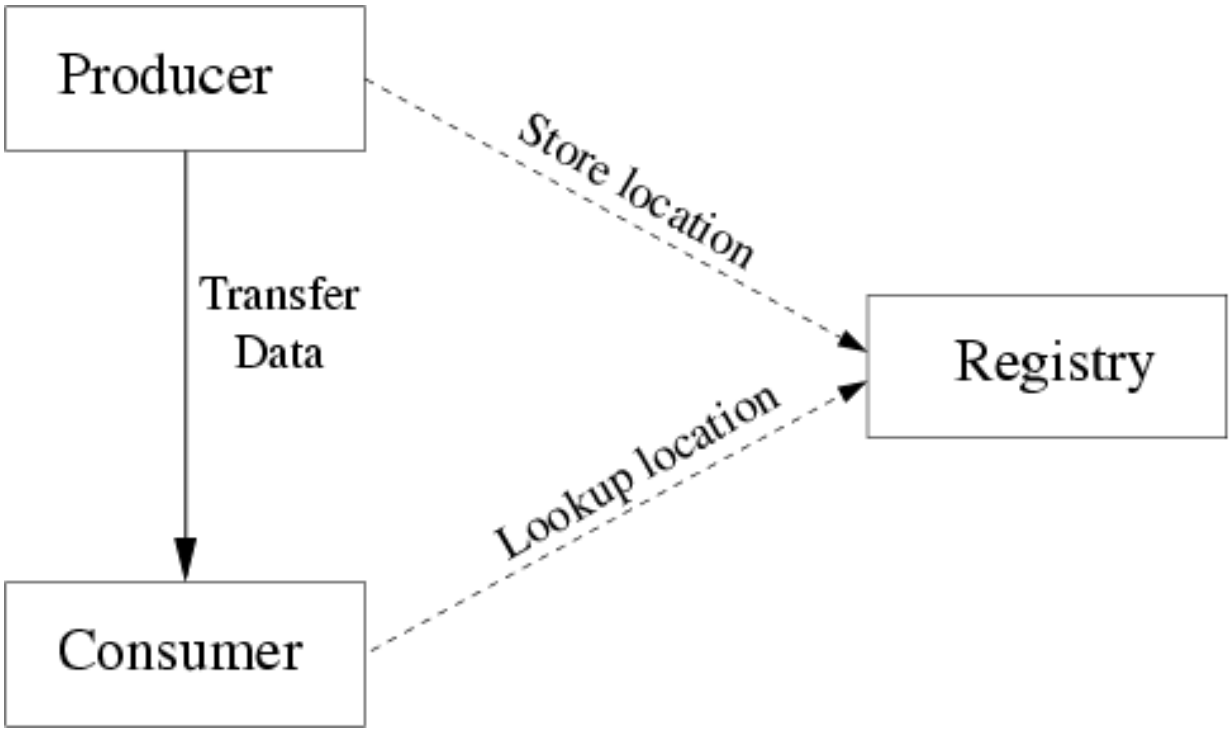
1. **GFAL** will be the highest level interface
2. It will take care of SRM and Replica Managers and protocols (transparent for the user)
3. **SRM** will take care of the handling with **MSS** (not visible for the user)



Introduction to R-GMA

- **Relational Grid Monitoring Architecture (R-GMA)**
  - Developed as part of the EuropeanDataGrid Project (EDG)
  - Now as part of the EGEE project.
  - Based the Grid Monitoring Architecture (GMA) from the Global Grid Forum (GGF).
- **Uses a relational data model.**
  - Data is viewed as a table.
  - Data structure defined by the columns.
  - Each entry is a row (tuple).
  - Queried using Structured Query Language (SQL).
- **APIs exist in Java, C, C++, Python.**
  - For clients (servlets contacted behind the scenes)

The Grid Monitoring Architecture



VOMS API

Virtual Organization Membership Service Provides information on the user's relationship with his Virtual Organization:

- **Groups**
- **Roles**
- **Capabilities.**

VOMS API

- single login using voms-proxy-init only at the beginning of the session (was grid-proxy-init)
- multiple VOs: the user may "log-in" into multiple VOs and create an aggregate proxy certificate, which enables him to access resources in any of them

voms-proxy-info -all

$ voms-proxy-info -all

- **subject :/C=GR/O=HellasGrid/OU=inp.demokritos.gr/CN=Christos Filippidis /CN=proxy**
- **issuer : /C=GR/O=HellasGrid/OU=inp.demokritos.gr/CN=Christos Filippidis**
- **identity : /C=GR/O=HellasGrid/OU=inp.demokritos.gr/CN=Christos Filippidis**
- **type : proxy**
- **strength : 512**
- **path : /tmp/x509up_u21457**
- **timeleft : 11:59:51**

=== VO cms extension information ===

- **VO : cms**
- **subject : /C=GR/O=HellasGrid/OU=inp.demokritos.gr/CN=Christos Filippidis**
- **issuer : /C=CH/O=CERN/OU=GRID/CN=host/lcg-voms.cern.ch**
- **attribute : /cms/Role=NULL/Capability=NULL**
- **timeleft : 11:59:51**

AMGA - Metadata Access on the Grid

AMGA – ARDA Metadata Grid Application

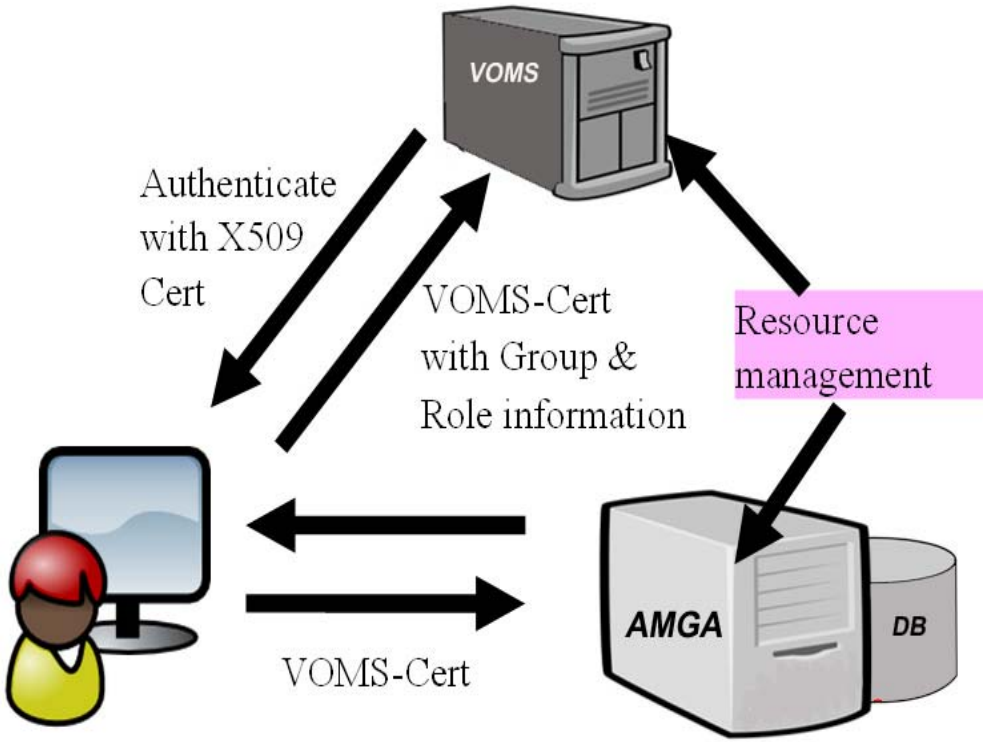
Metadata on the GRID

- **Metadata is data about data**
- **On the Grid: information about files**
  - Describe files
  - Locate files based on their contents
- **But also simplified DB access on the Grid**
  - Many Grid applications need structured data
  - Many applications require only simple schemas
    - Can be modelled as metadata
  - Main advantage: better integration with the Grid environment
    - Metadata Service is a Grid component
    - **Grid security**
    - Hide DB heterogeneity

AMGA Features

- **Dynamic Schemas**
  - Schemas can be modified at runtime by client
    - Create, delete schemas
    - Add, remove attributes
- **Metadata organised as an hierarchy**
  - Schemas can contain sub-schemas
  - Analogy to file system:
    - Schema ⇔ Directory; Entry ⇔ File
- **Flexible Queries**
  - SQL-like query language
  - Joins between schemas

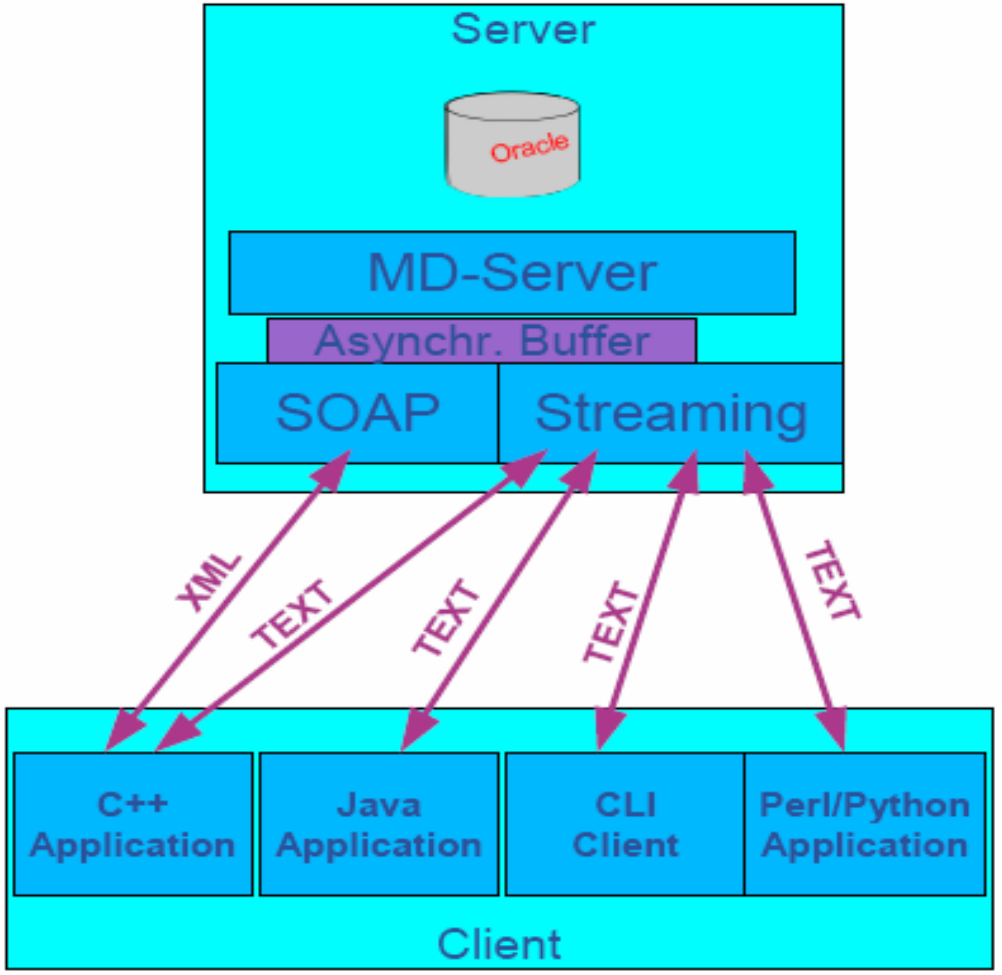
AMGA: ARDA Metadata Grid Application



- **Side-by-Side a File Catalogue (LFC): File Metadata**
- **Access control to resources on the Grid is done via VOMS**
- **Strong security requirements:**
  - patient data is sensitive
  - metadata access must be restricted to authorized users

AMGA Implementation

- **AMGA Implementation:**
  - SOAP and Text frontends
  - Streamed Bulk Operations
  - Supports single calls, sessions & connections
  - SSL security with grid certs (negociated by client)
  - Own User & Group management + VOMS
  - PostgreSQL, Oracle, MySQL, SQLite backends
  - Works alongside LFC
  - C++, Java, Perl, Python clients



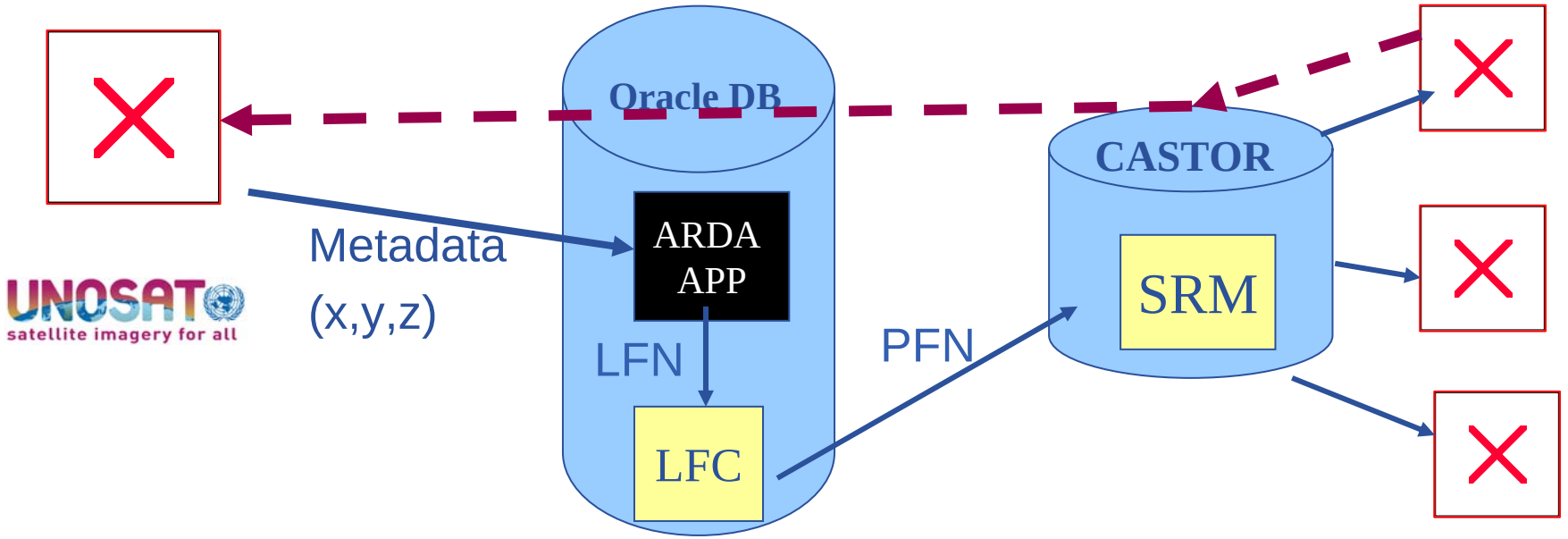
A GRID Metadata Catalogue

LFC Catalogue

- Mapping of LFN to PFN

UNOSAT requires

- User will give as input data certain coordinates
- As output, want the PFN for downloading



gLite Documentation

http://glite.web.cern.ch/glite/documentation/