NAREGI WP4
(Data Grid Environment)

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NAREGI Software Stack (Beta Ver. 2006)[2]

Grid-Enabled Nano-Applications (WP6)

Packaging

Grid Programming (WP2)
- Grid RPC
- Grid MPI

Grid Visualization

Grid PSE

WP3

Grid Workflow (WFML (Unicore+ WF))

Super Scheduler **WP1**

Distributed Information Service (CIM)

Data (WP4)

WP4

（WSRF (GT4+Fujitsu WP1) + GT4 and other services)

Grid VM (WP1)

Grid Security and High-Performance Grid Networking (WP5)

SuperSINET

NII

IMS

Research Organizations

Major University Computing Centers

Computing Resources and Virtual Organizations

# NAREGI Data Grid Overview

Composed of three parts
- Data Access Management System
- Metadata Management System
- Data Resource Management System

Functionalities
- Grid File System using AIST Gfarm
  - Logical to physical fIle name mapping, File replication, etc
- File Import to WFT (Workflow Tool)
- File Staging Support to SS (Super Scheduler)
- File Retrieval by Metadata
  - For storing file attributes (owner, created date & condition (what application creates the file, etc.). SQL access to Metadata DB (OGSA-DA)

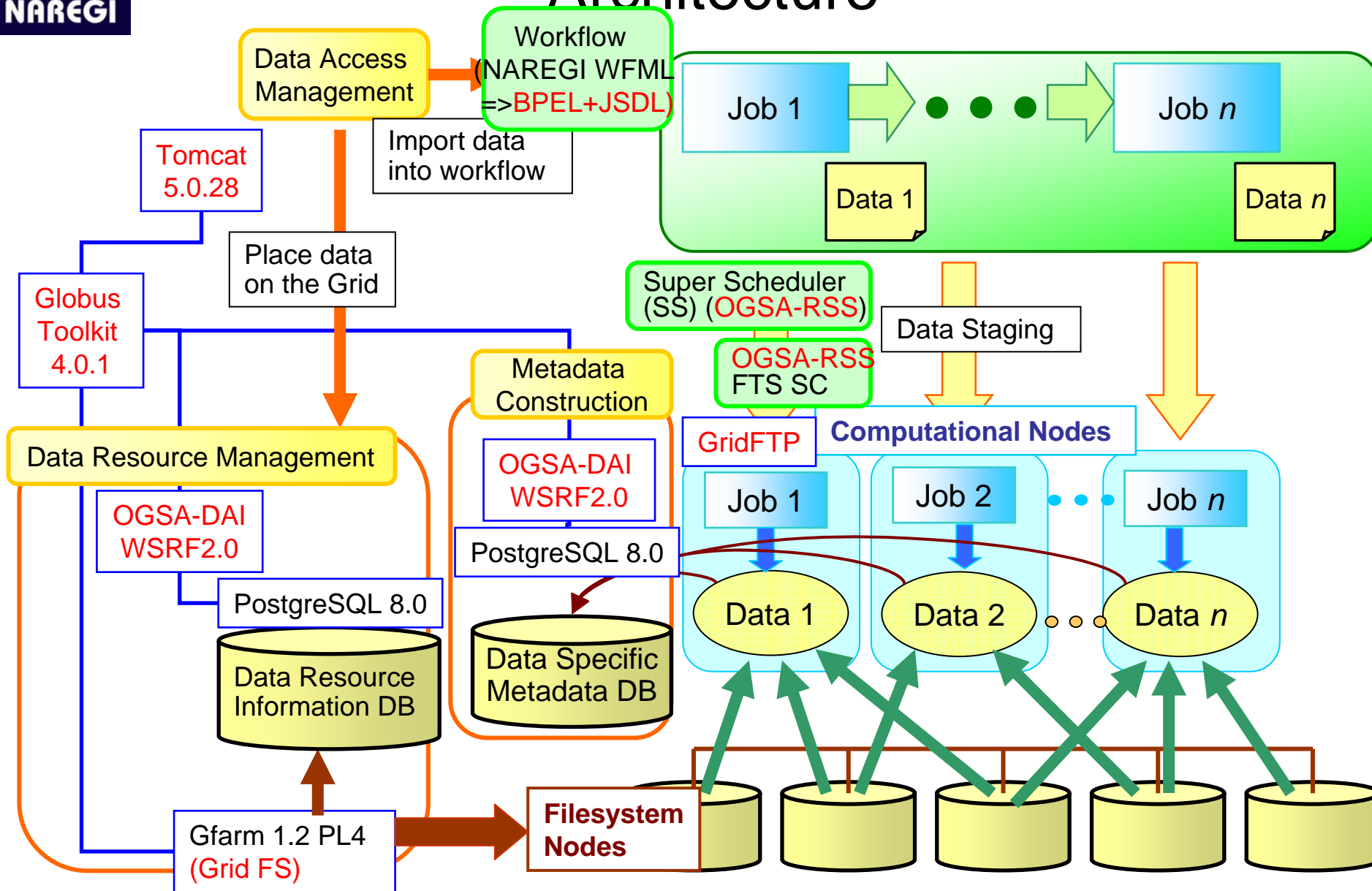# NAREGI Data Grid Architecture (beta 1)
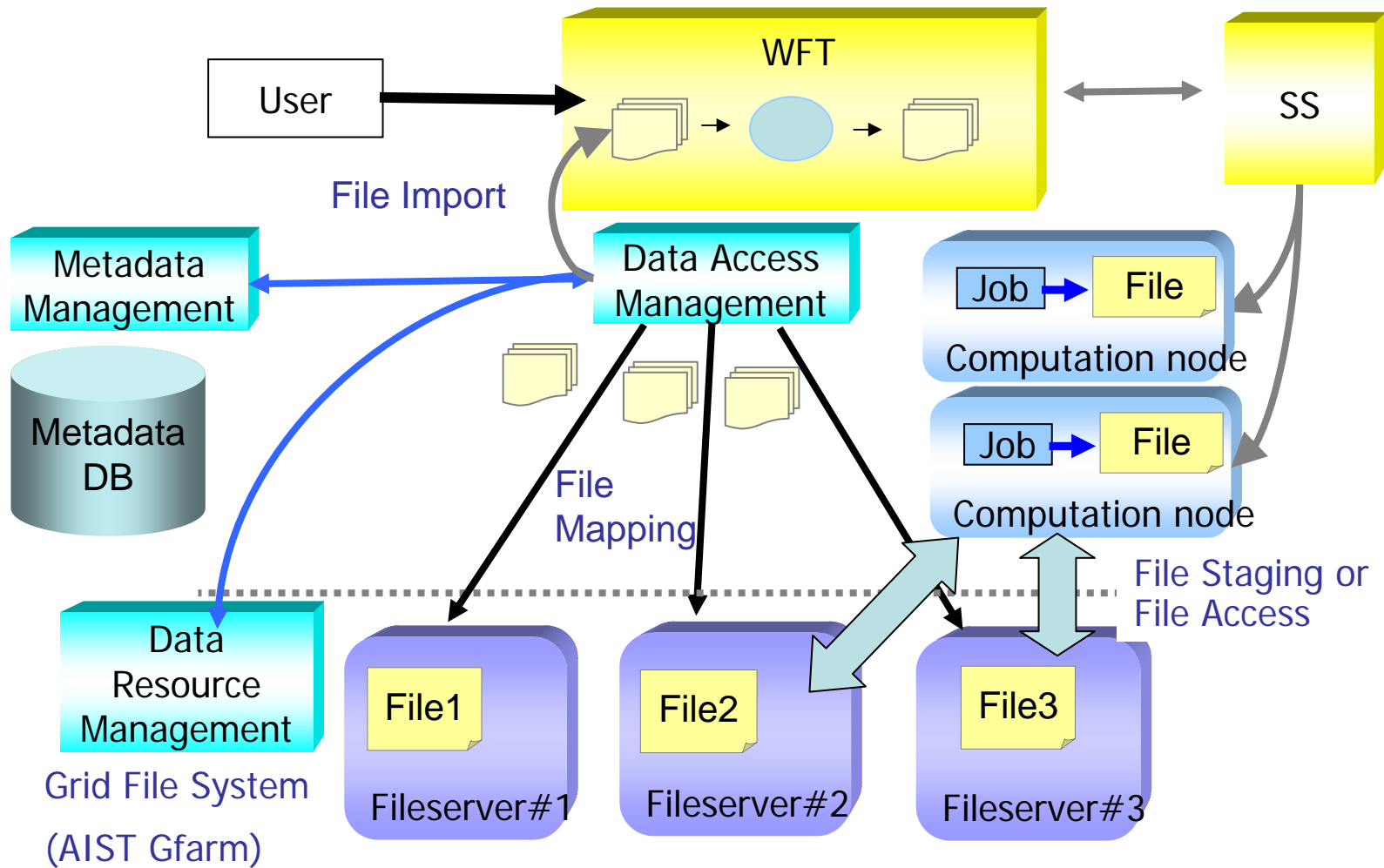
NAREGI Data Grid Functionalities
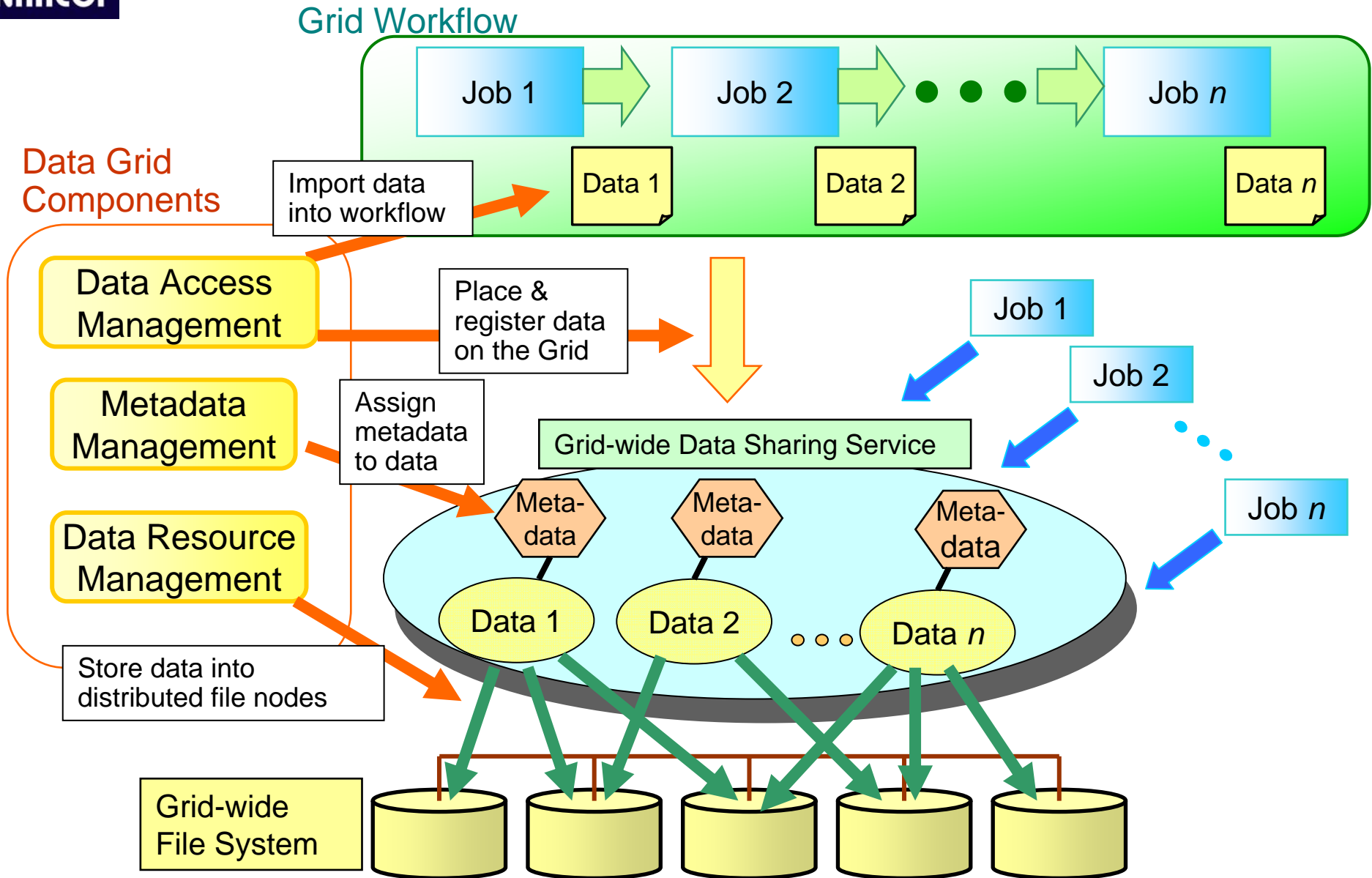
NAREGI WP4: Standards Employed in the Architecture

Grid File System

- Adoption of AIST Gfarm 1.2.9
    http://datafarm.apgrid.org/index.en.html
- UNIX file I/O API (open, close, read, write, etc.), and file/directory operations (mkdir, rmdir, ls, etc.).
- Single Virtual Filesystem (Logical to Physical File Name Mapping)
    Client library, File servers, Metadata server (mapping & space balancing)
    Mapping "/gfarm/file1" to "HOST:/GFARM_DIR/file1"
    Extensible file space by adding many file servers
- File replication to user-specified hosts.
- File Metadata (management with PostgreSQL)
    File location (host, pathname), Username, Access/ Modify/ Creation dates, Size
- Access Security with GT4 GSI API
    Certificate-based file access, Access using gridmapfile
- WSRF interface to File Metadata with OGSA-DAI
- Access Control not yet implemented (planned in Gfarm 2.0)

File Import & Staging

- Import files in GFS (Grid File System) to user workflows.

- Imported files can be used from jobs in their local disks (file staging).

- SS transfers GFS files to Job nodes.
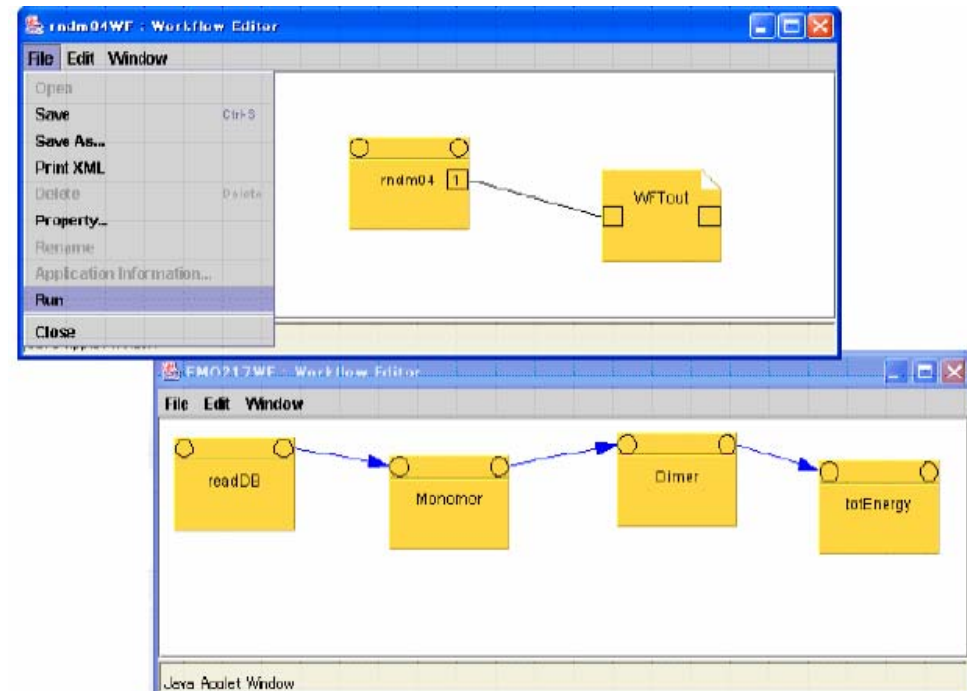
File Metadata Management

- Many applications (or many instances of the same application with different. parameters) can be coupled in a workflow.

- Need many input and output files of the applications.

- This system provides a metadata DB storing application and parameter information as file attributes.

- User can retrieve files on GFS by their metadata.
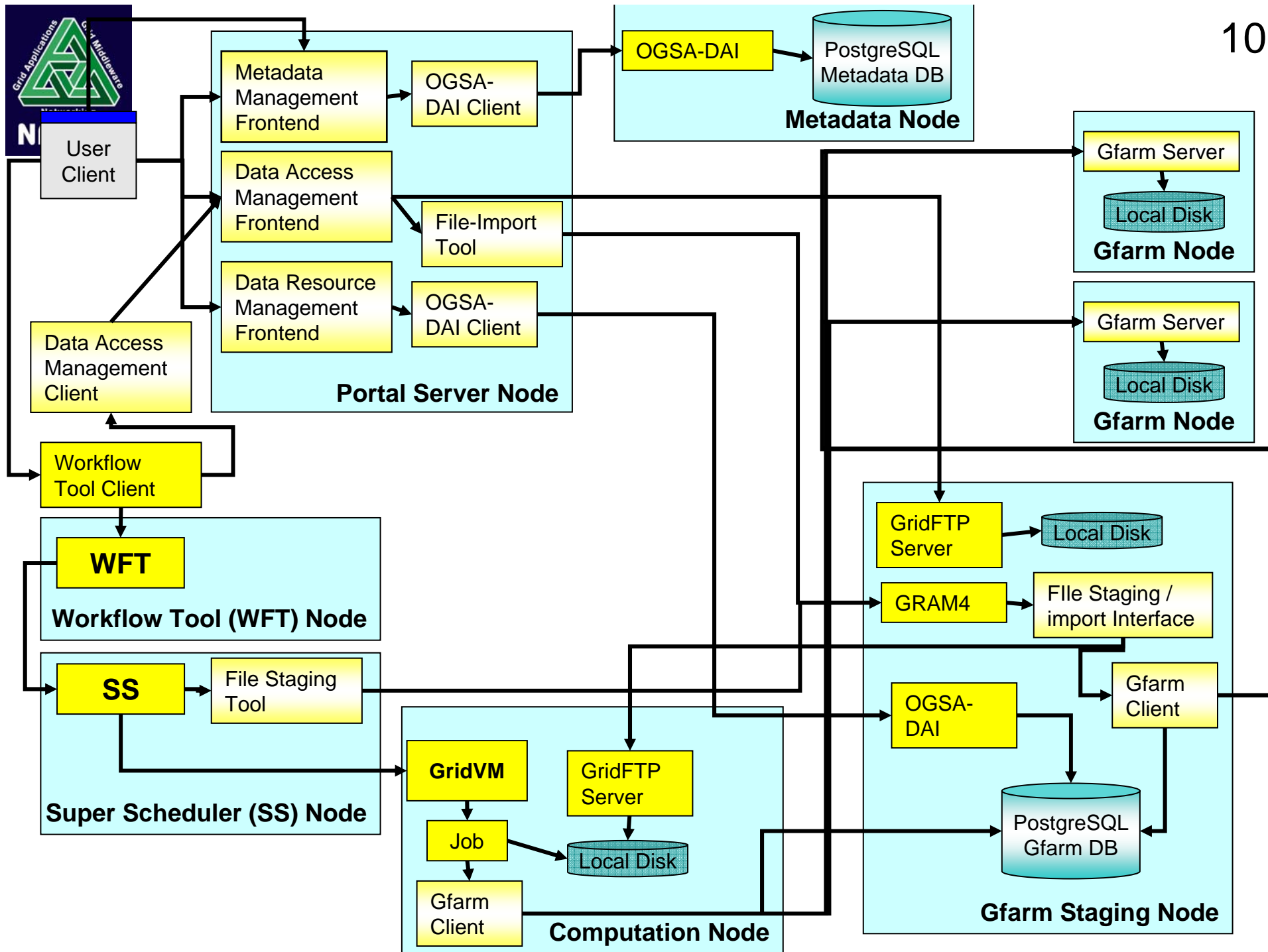
EGEE-NAREGI Interoperation Issues in Data Management

- Data Transfer
  - both groups use GridFTP ?

- Storage Element
  - NAREGI does not have this. Adoption of SRMv2.1 ? or SRB?

- Replication Catalog
  - NAREGI only provides simple file replication (flat table). Adoption of LFC? or RLS?

- Metadata Catalog
  - NAREGI Metadata Schema & Structure are not fixed yet. Again it is just a flat table. Adoption ?