eGee

Enabling Grids for E-sciencE

gLite overview

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EGEE Tutorial

Roma, 02.11.2005
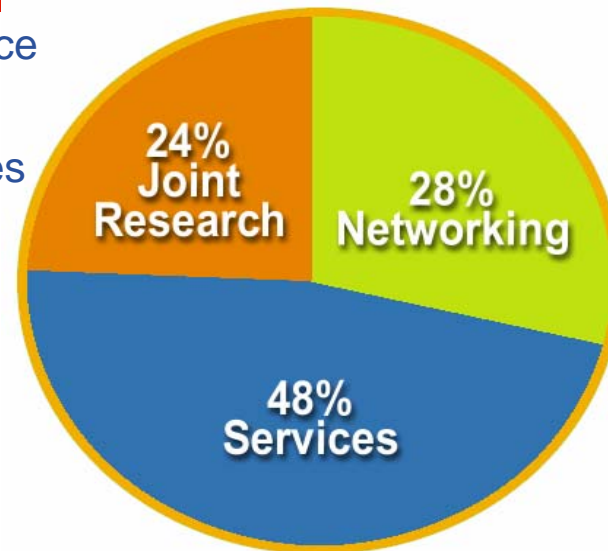
www.eu-egee.org

Information Society

24% Joint Research

JRA1: Middleware Engineering and Integration

JRA2: Quality Assurance

JRA3: Security

JRA4: Network Services Development

28% Networking

NA1: Management

NA2: Dissemination and Outreach
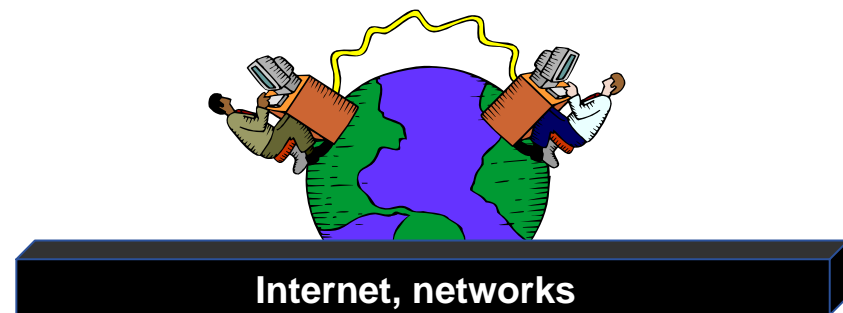
NA3: User Training and Education

NA4: Application Identification and Support

NA5: Policy and International Cooperation

24% Joint Research

28% Networking

48% Services

48% Services

SA1: Grid Operations, Support and Management

SA2: Network Resource Provision

Emphasis in EGEE is on operating a *production Grid* and on supporting the end-users.

- **Generalities**

- **Overview of the gLite middleware**

- **Summary and conclusions**

Generalities

Mobile Access

Workstation

Visualising

GRID MIDDLEWARE

Supercomputer, PC-Cluster

Data-storage, Sensors, Experiments

Internet, networks
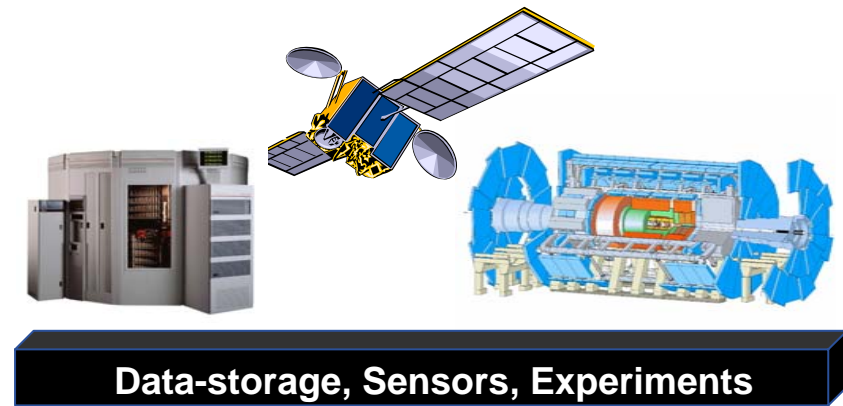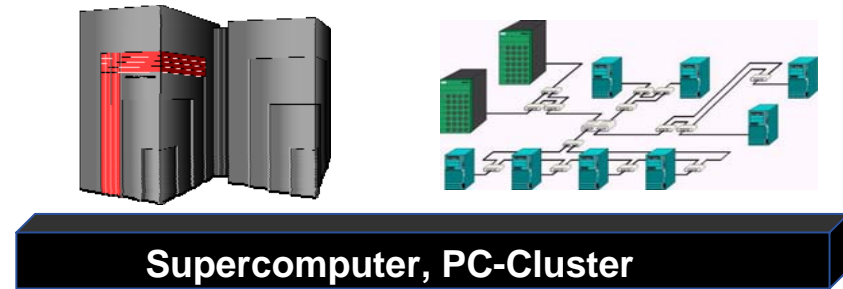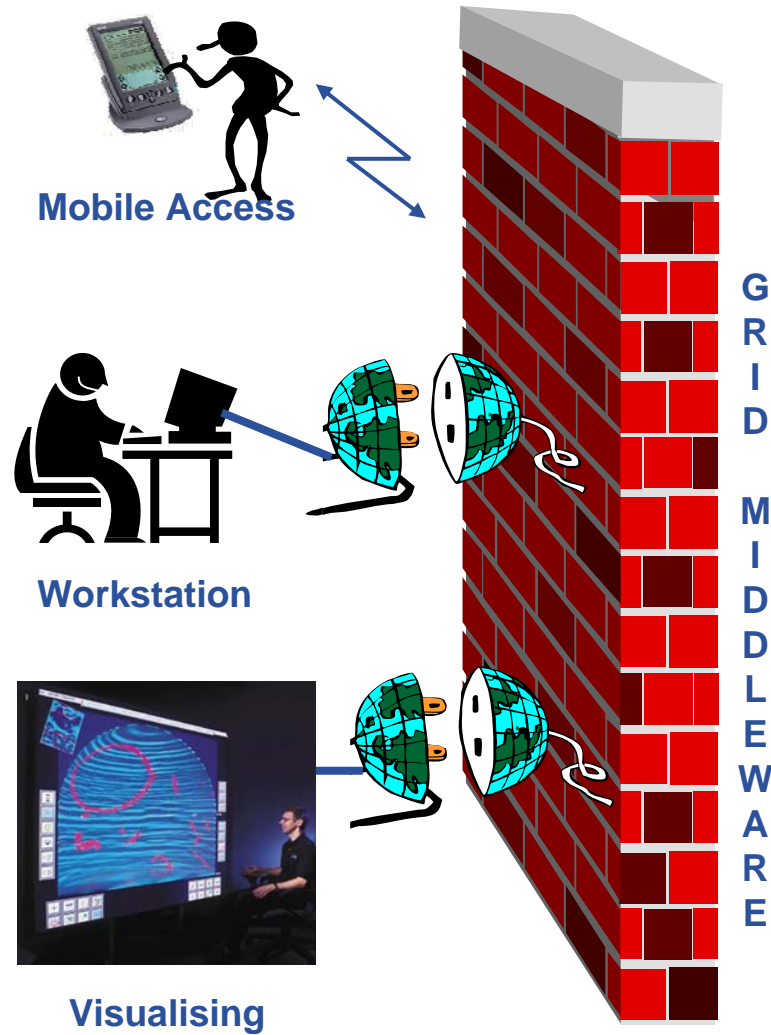
-CPU - Memory

-Disc - Input/Output

01011010110
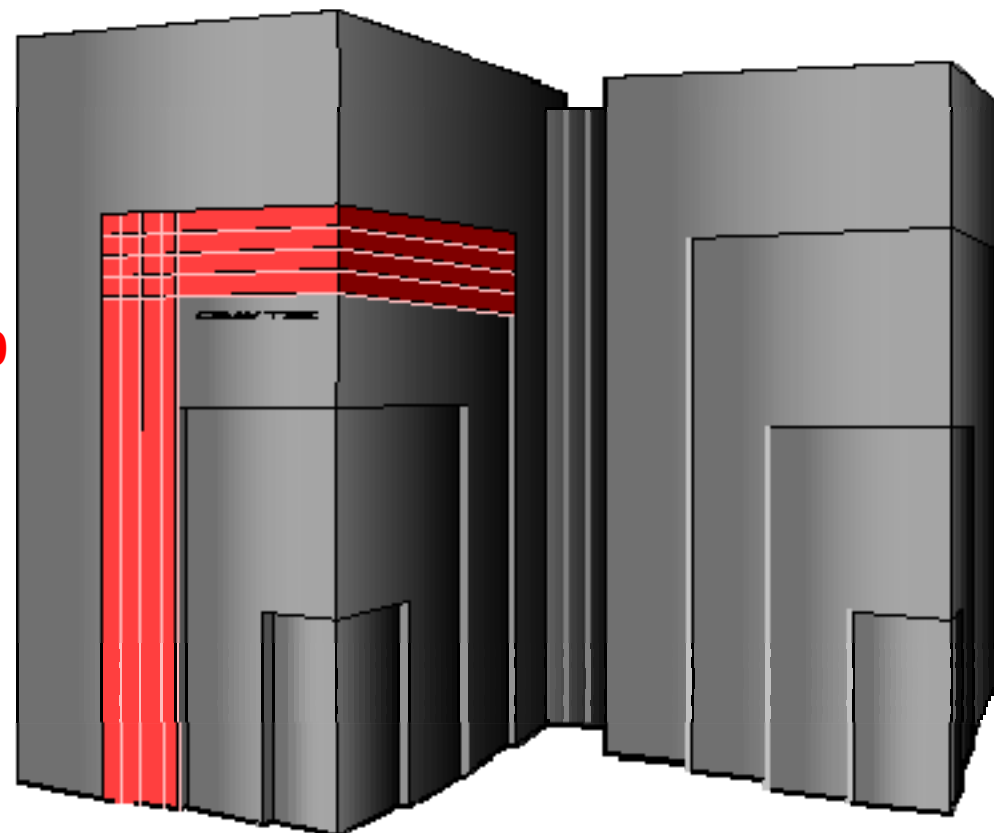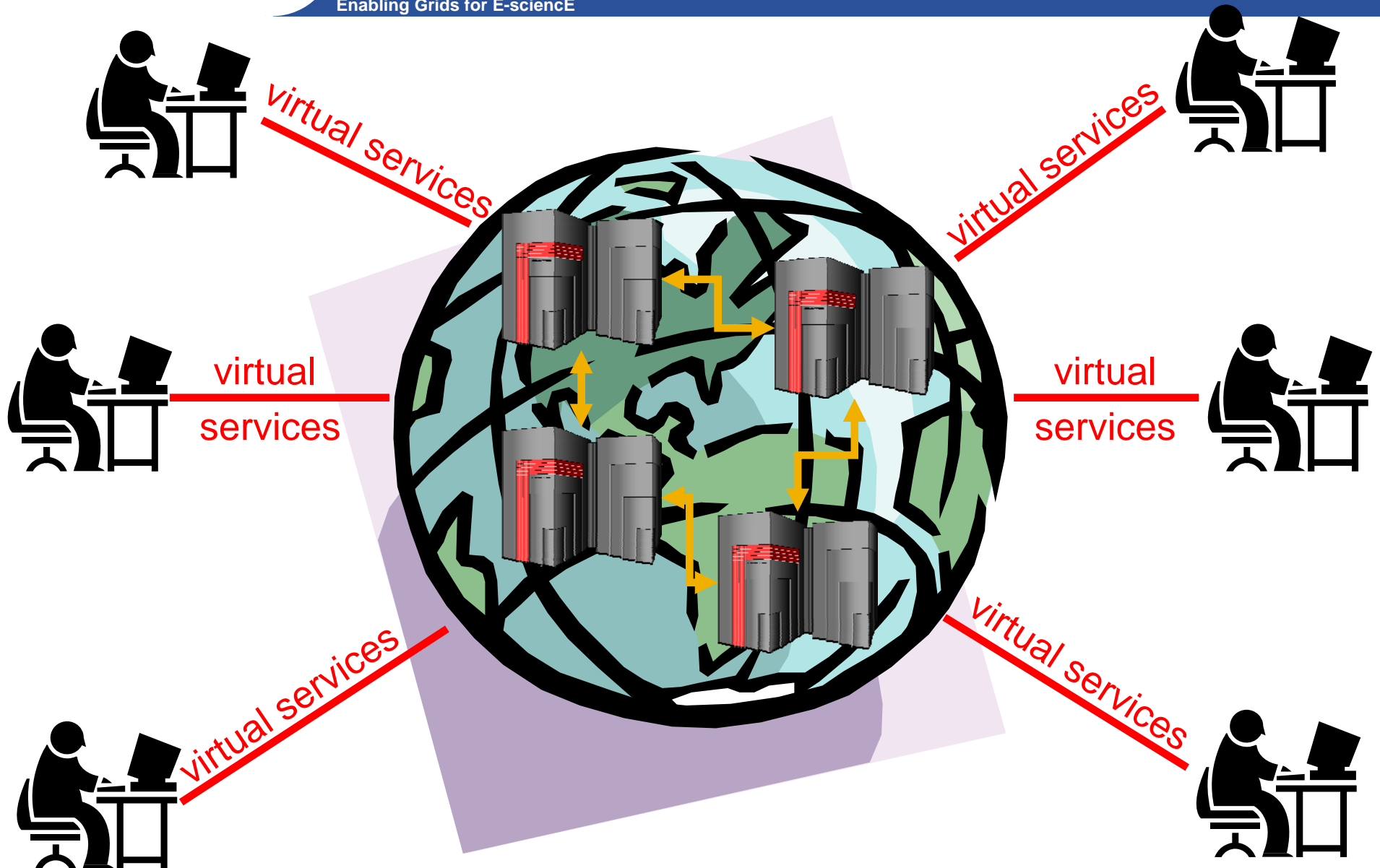
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- **EGEE is establishing a production grid service to support multiple, diverse VO's**

User Interface

User Interface

Grid services

Enabling Grids for E-sciencE
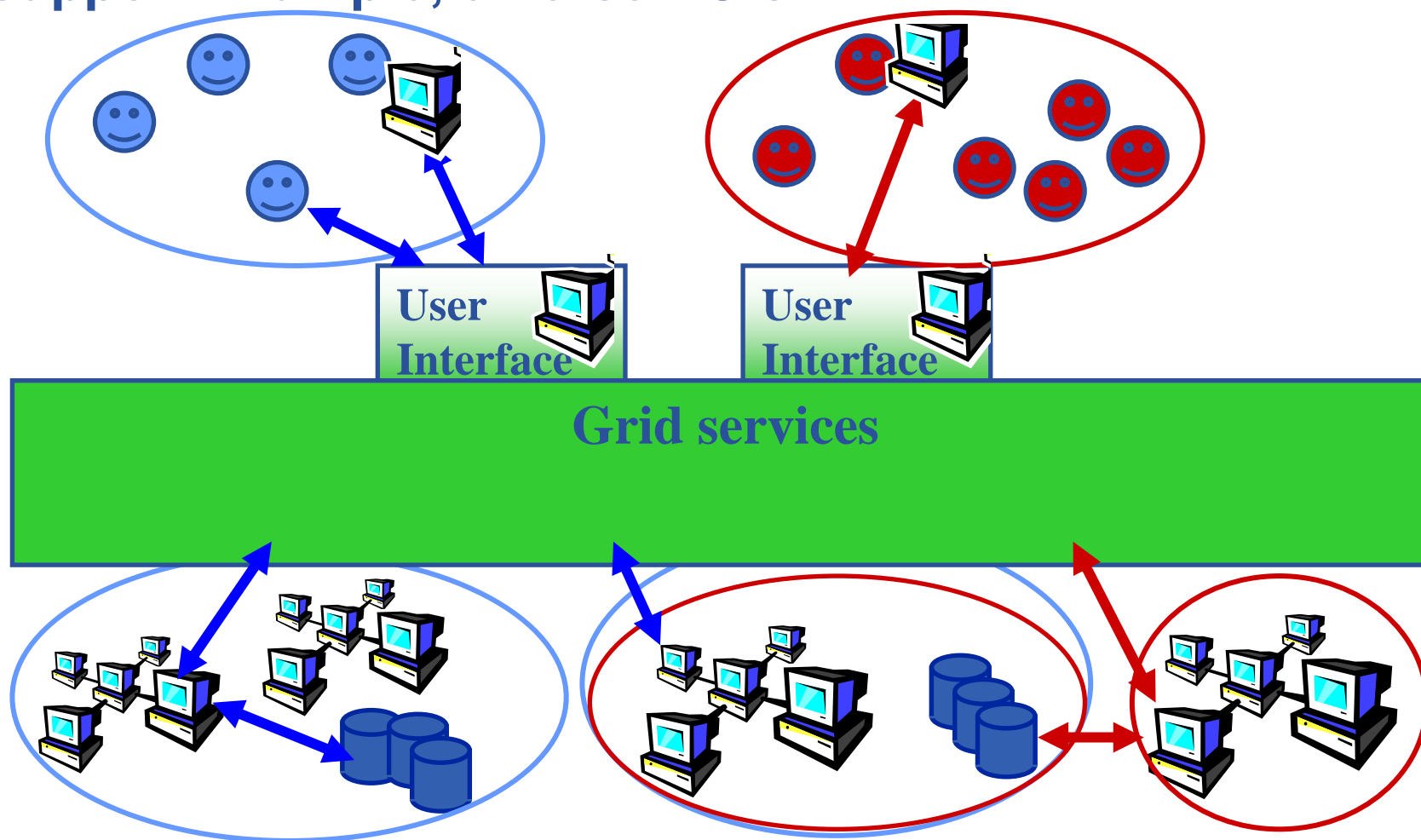
- **Users join VO**
- **Virtual organisation contributes resources & negotiates access**

- **Grid middleware runs on each resource**
  - Data storage
  - (Usually) batch jobs on pools of processors

- **Additional services (both people and middleware) enable the grid**

- **Effect: collaboration across administrative domains**

INTERNET
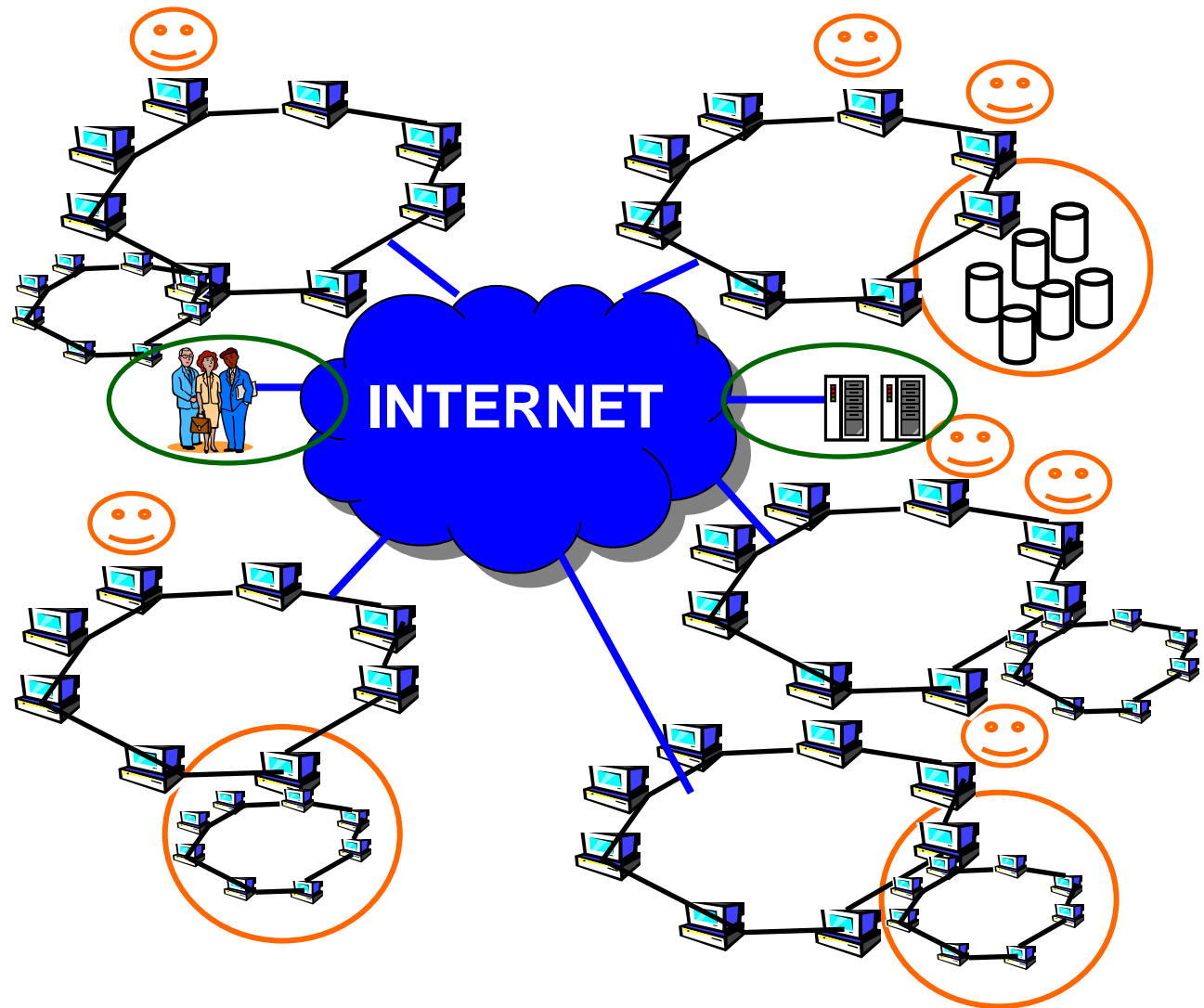
The Grid from a Services View

Applications		
Chemistry	Cosmology	Environment
Biology	High Energy Physics	

Application Toolkits

Distributed Computing Toolkit	Data-Intensive Applications Toolkit	Collaborative Applications Toolkit	Remote Visualization Applications Toolkit	Problem Solving Applications Toolkit	Remote Instrumentation Applications Toolkit

(Middleware)

Resource-independent and application-independent services
authentication, authorization, resource location, resource allocation, events, accounting, remote data access, information, policy, fault detection

Grid Fabric

Resource-specific implementations of basic services
E.g., Transport protocols, name servers, differentiated services, CPU schedulers, public key infrastructure, site accounting, directory service, OS bypass

Enabling Grids for E-sciencE

Application

Application
toolkits, standards

Middleware:
"collective services"

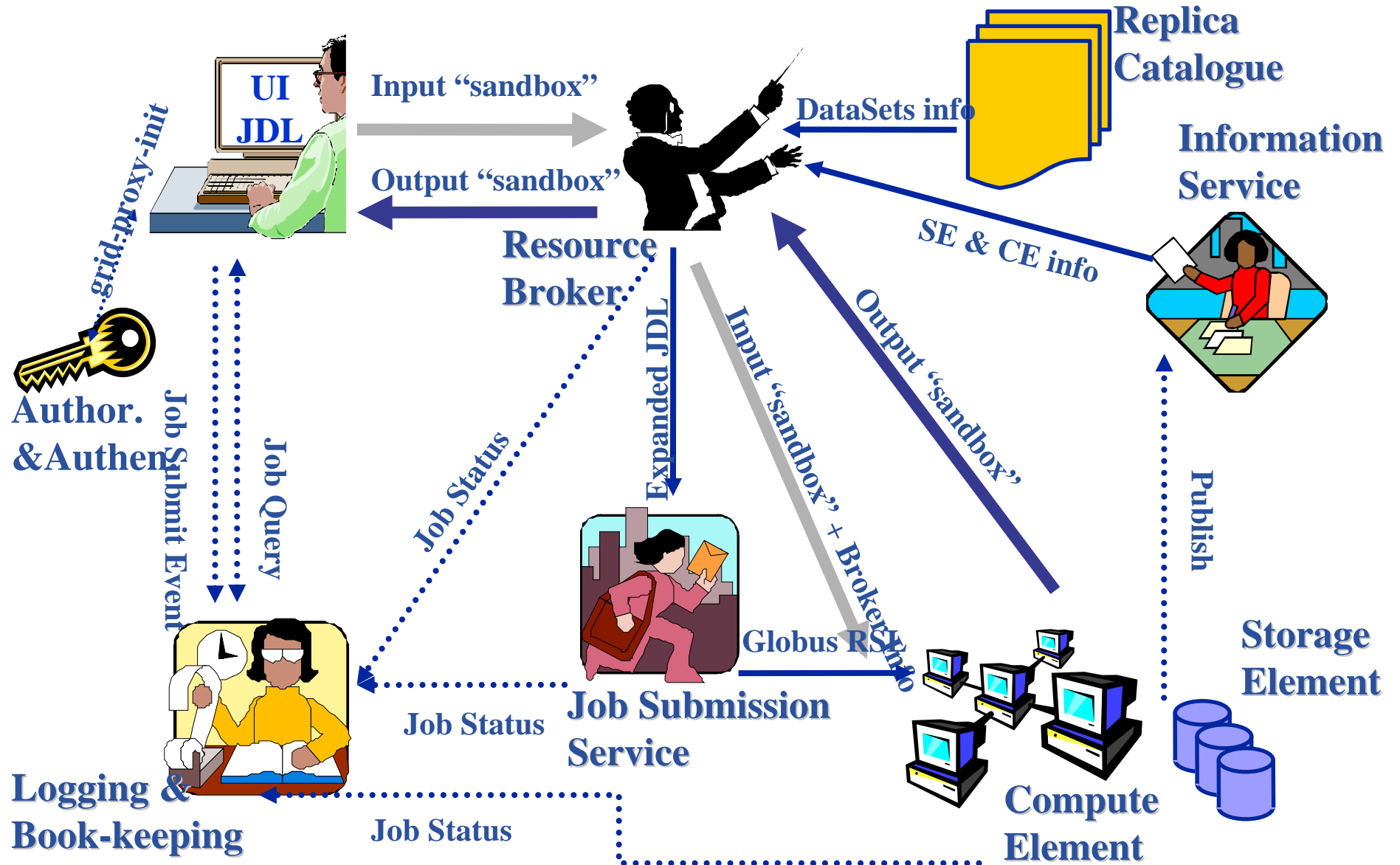Basic Grid services:
AA, job submission, info, …

- **The tools, services used by the VO's applications**
- **Application development environment, portals, semantics, workflow**
- **In EGEE-1: Mainly VO-specific**

- **Emphasis of EGEE -1 middleware**

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UI JDL

Input "sandbox" →

← Output "sandbox"

grid-proxy-init

Author. &Authen

Job Submit Event

Job Query

Resource Broker

DataSets info

Replica Catalogue

Information Service

SE & CE info

Expanded JDL

Job Status

Input "sandbox" + BrokerInfo

Output "sandbox"

Globus RSL

Publish

Job Submission Service

Job Status

Storage Element

Compute Element

Logging & Book-keeping

Job Status
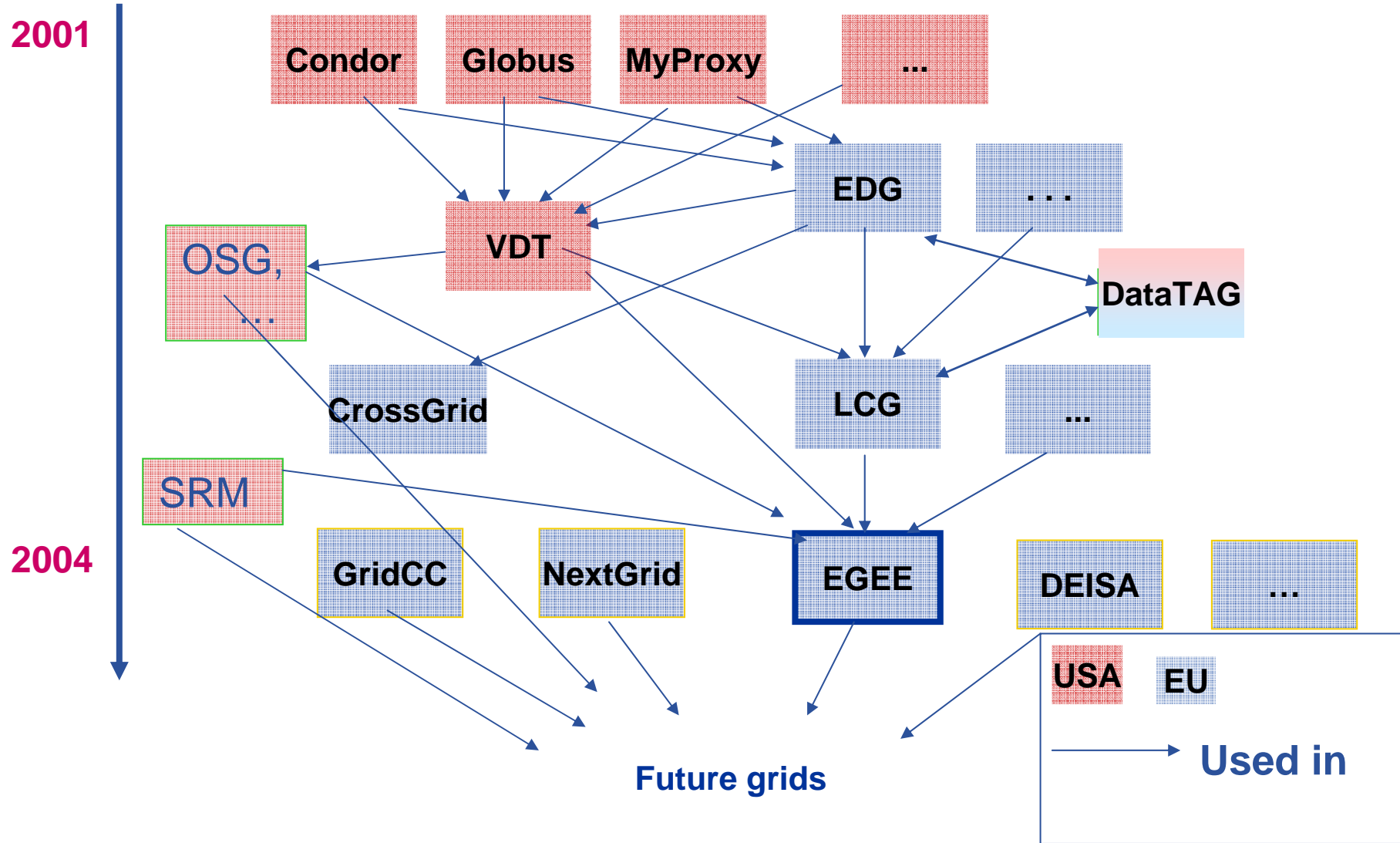
gLite

- The gLite Grid services follow a *Service Oriented Architecture*
  - **facilitate interoperability among Grid services**
  - **allow easier compliance with upcoming standards**

- Architecture is not bound to specific implementations
  - **services are expected to work together**
  - **services can be deployed and used independently**

- The gLite service decomposition has been largely influenced by the work performed in the LCG project
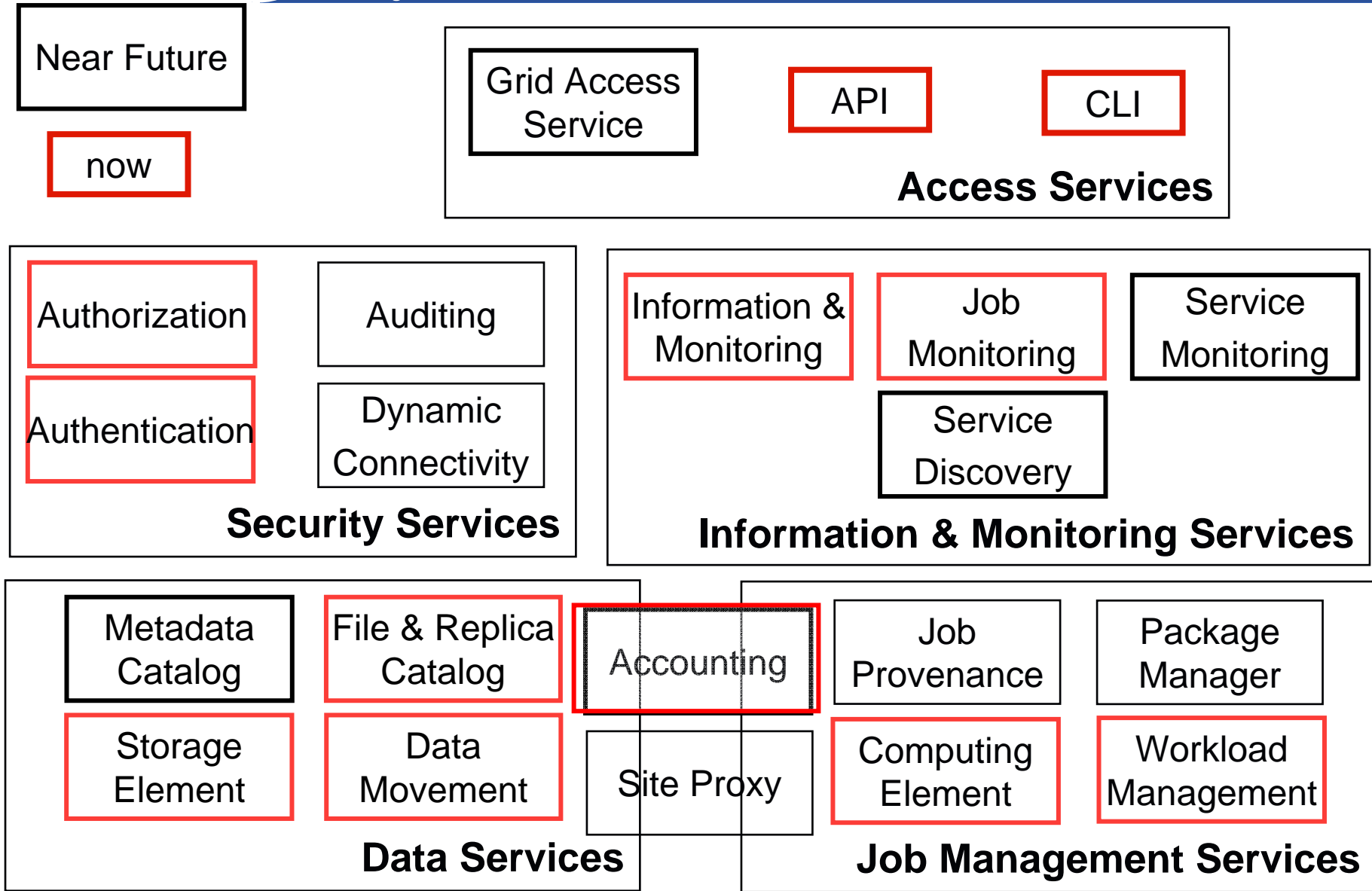
EGEE middlewares face to face
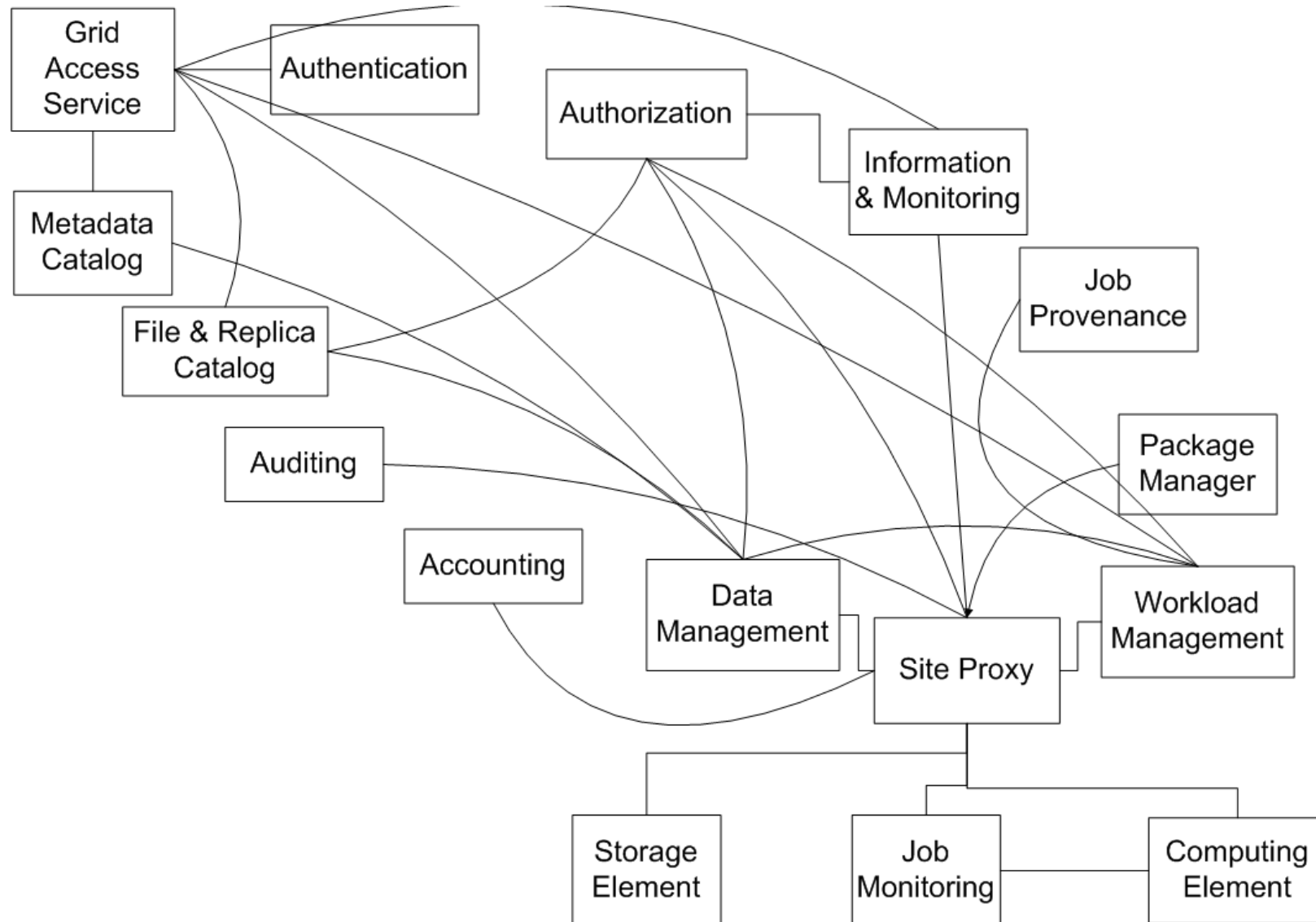
LCG (the present)

- **Security**
  - GSI
- **Job Management**
  - Condor + Globus
  - CE, WN
  - Logging & Bookkeeping

- **Data Management**
  - LCG services

- **Information & Monitoring**
  - BDII (evolution of MDS)

- **Grid Access**
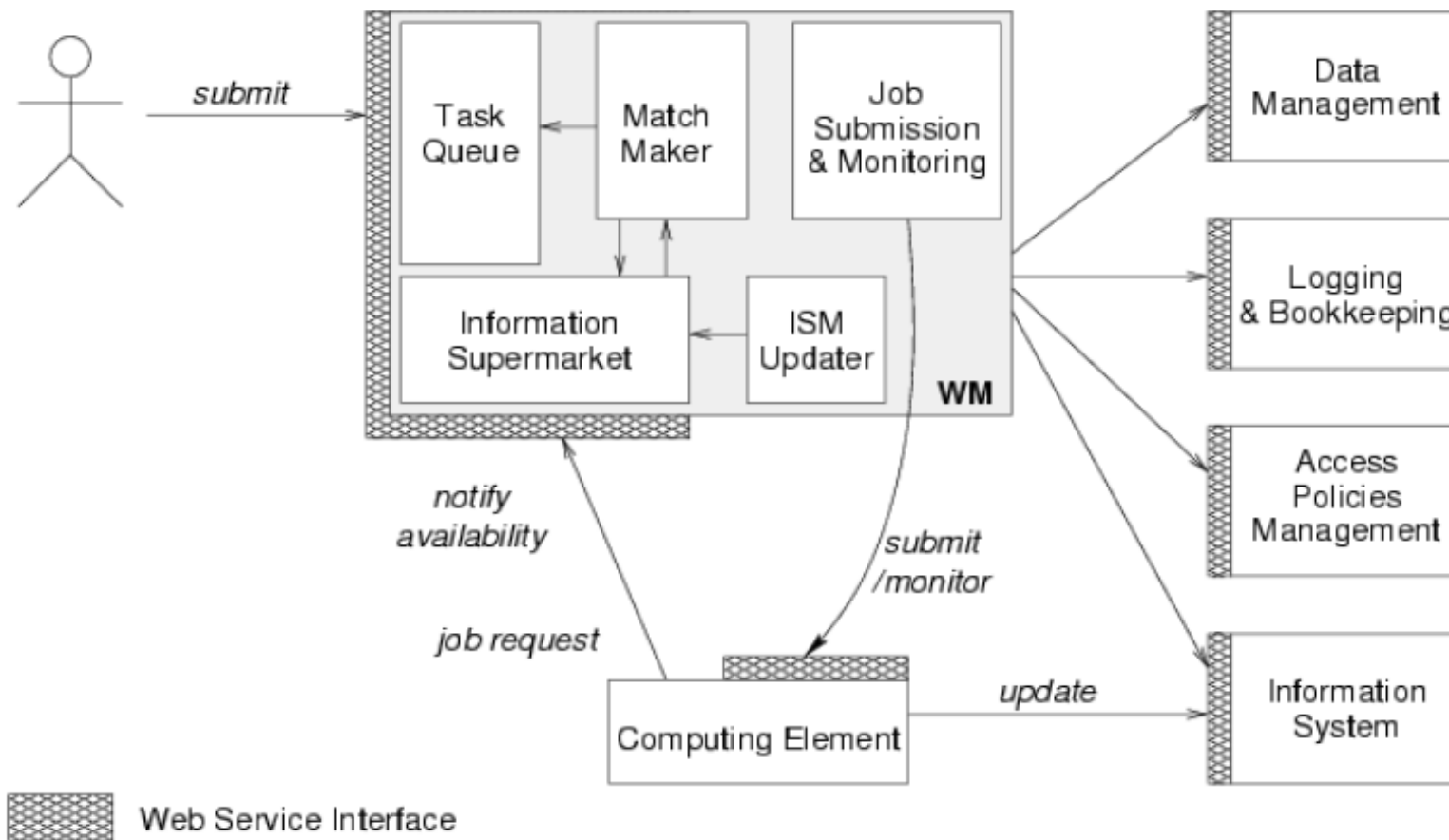 - CLI + API

gLite (the future)

- **Security**
  - GSI and VOMS
- **Job Management**
  - Condor + Globus + blahp
  - CE, WN
  - Logging & Bookkeeping
  - Job Provenance
  - Package management
- **Data Management**
  - LFC
  - gLite-I/O + FiReMan
- **Information & Monitoring**
  - BDII
  - R-GMA + Service Discovery
- **Grid Access**
  - CLI + API + Web Services

Near Future

now

Access Services

Grid Access Service

API

CLI

Security Services

Authorization

Authentication

Auditing

Dynamic Connectivity

Information & Monitoring Services

Information & Monitoring

Job Monitoring

Service Monitoring

Service Discovery

Data Services

Metadata Catalog

File & Replica Catalog

Accounting

Storage Element

Data Movement

Site Proxy

Job Management Services

Job Provenance

Package Manager

Computing Element

Workload Management

Enabling Grids for E-sciencE

VOMS

Storage Element

Storage

WSDL

API

Get credential

File I/O

gLite I/O **SRM** **gridFTP**

File namespace and Metadata mgmt

Fireman File and Replica Catalog

Database

Store credential

File replication

FPS Transfer Agent

StorageIndex

MyProxy

Proxy renewal

Database

File Transfer and Placement Service **FTS**

Replica Location

WMS

- **gLite v1.3 released 05/08/2005**
  - File Placement Service, File Placement Service clients added to UI and WNs modules
  - new data transfer agents including architecture refactoring to allow proper inter-VO scheduling and
  - documentation
- **gLite v1.2 released 22/07/2005**
  - File Transfer Service and the File Transfer Agents
  - improvements in all modules.
  - documentation page.
- **gLite v. 1.1 released 13/05/2005**
  - File Transfer Service and the Metadata Catalog
  - documentation
- **gLite v. 1.0 released 05/04/2005**
  - documentation page.
- **http://www.glite.org/**

Enabling Grids for E-sciencE

- **The EGEE middleware:**
  - Is exiting prototyping phase and entering real production phase (LHC first real data are only 2 years away from now!)
  - Implements a full and complete stack of grid services that can be used all together or separately at user's discretion
  - Closely follow the standardization process going in GGF and other for a