Interoperability of Grid Infrastructures

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Analogous to the electric power grid, computational Grids have evolved to access computational and human resources.

Different Grids solutions exist, e.g. Globus, Legion, UNICORE, ...

→ Interoperability to build The Grid
Grid Interoperability Project

- www.grid-interoperability.org
- Research Centre Jülich, Argonne National Laboratory, Deutscher Wetterdienst, Pallas, Victoria University of Manchester, University of Southhampton, Warsaw University
- Funded in part by the European Commission
Grid Standards

Working with the Global Grid Forum on standards, protocols & interfaces

- Security
- Grid Architectures
- Information Services
- Resource Management
- Applications & Grid Environments
Interoperability Software

- UNICORE – Globus interoperability prototype
- Interoperable resource broker

Inter-Grid Applications

- Biomolecular simulations
- Weather prediction
“UNICORE as a workflow portal for Globus”
UNICORE client
Plugins
UNICORE architecture

User tier

Client
- Job Preparation Agent (JPA)
- X.509 User Certificate
- Job Monitor Controller (JMC)

Abstract Job Objects (AJO) Authentication

Gateway
- User validation
- Site-specific authentication
- optional firewall

Server tier

Network Job Supervisor (NJS)
- Incarnation DB
- Local User DB

optional firewall

Target system tier

Target System Interface
- Batch Subsystem
- Batch Subsystem
- Batch Subsystem

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Globus architecture

**Local machine**

- Client application using Globus APIs
- GIIS
- GRAM Client
- GASS Server
- X.509 User Certificate

**Remote machine**

- GRAM Gatekeeper
- GRAM Job Manager
- GRIS
- GASS Client
- Batch Subsystem

**Connections**

- Resource info
- GRAM Job request
- Callback
- Data
- Creation
- Job request
- Status
Interoperability modules

- Security
- Resource management
- Job preparation/submission
- Job monitoring
- Output retrieval
Example module: Security

UNICORE jobs are signed & send via SSL to the target system

A temporary Globus user proxy certificate is used for all computations

→ Create user proxy certificate at the UNICORE client & send it to the target
Prototype architecture

User tier

Client
- Globus User Certificate
- Proxy Creation Plugin
- User Proxy Certificate

Resource info (within AJO) → Abstract Job Objects (AJO)

Server tier

- Generic Incarnation DB
- Globus Incarnation DB

Batch jobs
- Status requests, Data

Target system tier

- Globus Target System Interface
- GRAM Job request
- Callback, Data
- GRIS

Globus “Subsystem”
The future Grid

- Interoperable?
- Service-oriented?
- Boundless?
- Self-organizing?
- ...
Reality

Presentation of the first prototype ...