Production Grid Computing

EUROGRID

HPC Symposium
Kobe Japan November 1st 2002
Dr. David Snelling - Fujitsu Laboratories of Europe
<d.snelling@fte.fujitsu.com>

Overview

- Background of Unicore and EuroGrid
- Unicore Architecture
- EuroGrid Aims
- EuroGrid Extended Technology
- The EuroGrid Client
- The Way Forward
Background

History
- Conceived in 1997
  - Fecit project promoted by Dr. K. Uchida
  - UNICORE and UNICORE Plus BMBF Projects
  - EuroGrid and GRIP EC Projects
  - RealityGrid UK e-Science Project
  - Varied Commercial Projects

Focus on Seamless Computing
Open Source and Online Demo Site
- www.unicore.org

OGSA Compliant Demonstrator
- June 7th 2002, First release.
- September 4th 2002:
  - Fast Track Demonstrator in RealtyGrid (UK e-Science).
  - www.sve.man.ac.uk/Research/AtoZ/RealityGrid/AHM2002/

Unicore Extended Architecture

Site A Gateway
- Network Job Supervisor
  - NEC TSI
  - UUDB

Site B Gateway
- Network Job Supervisor
  - IBM TSI
  - Globus TSI
  - OGSA TSI

OGSA Extension

A2A Client

GUI Client

OGSA Client
**EuroGrid Aim**

*Build a European Grid Infrastructure*  
*Providing Users*  
*Seamless and Secure Access*  
*to*  
*High Performance Computing Resources*  
*to*  
*Advance Computational Science in Europe.*

---

**Structure of EuroGrid Project**

- **Application GRIDS:**  
  - Application-specific interfaces and evaluation of GRID solutions  
  - Real world problem domains  
    - Bio-GRID  
    - Meteo-GRID  
    - CAE-GRID

- **HPC GRID Infrastructure:**  
  - Connect HPC centres using UNICORE technology

- **Development and Integration of New Components**  
  - Technology Upgrade

- **Dissemination and Exploitation**
**Bio-Grid**

- A GRID for Biomolecular Simulations
- Develop interfaces to existing biological and chemical codes

---

**Meto-Grid**

- A Relocatable Weather Prediction Model from DWD
- Goal: Weather prediction on-demand ASP
**CAE-Grid**

- Coupled Structural & Electromagnetic Aircraft Simulation

**Goal:**

*HPC portal for engineers at EADS, Daimler-Chrysler, and partners*

---

**HPC-Grid**

- Demonstrate a European HPC GRID
- Develop New GRID Applications
- Agree on:
  - Security Standards
  - User Certification
  - Access Policies
  - ...
- Enable Sharing of Know-How
**EuroGrid Extended Technology**

- **Interactive Access Extension**
  - Allows standard terminal style interaction.
  - Unicore Single Sign-on
    - Complete multi-site authentication & authorization.
  - Includes “Interactive Batch”.

- **High Performance File Transfer**
  - Support for partial and parallel file transfer.

- **File Streaming**
  - Logically a Unix “pipe”.
  - Connect systems to data sources (e.g. telescope).

**EuroGrid Resource Broker**

- **Current or Very Soon**
  - Resource request check prior to submit.
  - Multi site brokering is “simulated” on the client.
  - Checks disk space requirements in real time.
  - Naive estimate of time until execution.
  - Return “Tickets” which the client incorporates into job.

- **From Early 2003**
  - Tickets can have a modified/refined resource set which must be associated with the job for the Ticket to be accepted.
  - Server verifies any presented tickets.
  - Server side brokering for other servers.
  - Dynamic brokering at execution time.
The EuroGrid Client

Do Construct

If Construct

Complex Dependencies
**Plugins**

- **CPMD Plugin & Wizard**

**Plugin Development**

- **Very Seamful: Scripts**
  - Different for every system
- **Seamful: Command Task**
  - Path to command
  - Environment variables
- **Seamless: Resource**
  - Fully abstracted
  - No system/site differences
  - Application metadata
- **Ideal: Plugin**
  - User’s view of application
  - Not a computer, but a solution

- **Client Development**
  - A few Java classes
  - GUI
  - Plugin start/stop
  - Data container
  - Use Client Functions
    - Job management
    - Resource editor
  - Examples available

- **System Development**
  - Install application
  - Edit of server data base
  - Application location
  - Environment
The Way Forward

The Possibilities Are Infinite

- A Complete GRID Solution Today
  - Fujitsu Server + Pallas Client +
  - Plugins (from Fujitsu, 3rd Parties, Home Grown, ...)
- Bespoke GRID Applications on Demand
  - Fujitsu Server and C2C Client
- Toward the Open Grid Services Architecture
  - In progress today at Fujitsu Labs Europe