International Summer School on Grid Computing 2003

Short Summary
by Max Vorobiev

School features
- ~ 85 hours of instructions
- Information from “first hands”
  - renowned Grid experts, ideologists of the Grid, middleware development teams representatives...
    - Carl Kesselman (Univ. of S. California; Globus project)
    - Miron Livny (Univ. of Wisconsin; Condor project leader)
    - ...many others
- Sunshine, sea, lot of fun...

Main Topics
- Toolkits, middleware
  - Globus toolkit 2
  - Condor G
  - Globus Toolkit 3
  - European Data Grid (most of the time)
  - Unicore

Main Topics (continued)
- Technologies, concepts
  - OGSA-DAI (DataBases & the Grid)
  - VOMS (System for authorization management inside virtual organizations)
  - GLUE Information model
- General information...
  - EDG Applications
  - EDG Future direction
  - EU Grid projects
  - Case Study: CMS Particle Production
Main Topics
(continued)

- General topics (continued)
  - IBM Industrial Grid Applications
  - Grid.it Italian High-performance Grid Project
  - Building Grid Portals
  - Biomedical Applications
  - Virtual Observatory (astronomy)

Practice

- Lab Exercises:
  - EDG 1.4, 2.0
  - GT3
  - CondorG & DAGman
  - UNICORE
  - OGSA-DAI
- Nice tutorials:

A very brief overview
of some technologies mentioned above that may be quite new to us...

- Details that might be interesting:
  - UNICORE
  - GT3

Unicore
yet another approach

- Uniform Interface to Computing Resources
- provides a science and engineering GRID combining resources of supercomputer centers and making them available through the Internet.
- “Seamless” computing (platform independent)
- Jobs
  - prepared/modified through the GUI (e.g. Pallas UNICOREPro; nice but commercial)
  - contain a number of interdependent tasks
    - currently, execution of scripts, compile, link, execute tasks and data transfer directives are supported
    - tasks are represented in abstract terms and resources – in abstract units. UNICORE servers translate them into platform-specific.
Unicore (continued)

- Abstract Job Object (collection of classes representing Grid functions; encoded in Java)
- Target system and requirements can be specified for each job
- Security
  - certificate-based (interoperable with Globus)
  - stronger trust model

Some important functions:
- local, remote and nested task graphs
- flow control based on task status, time events and file-state events
- hard/soft fail recovery
- RB:
  - Multi-site resource check prior to submit
  - estimate of time until execution
  - ticket generation and checking
  - dynamic brokering at execution time

More info at www.unicore.org

GT3

- Evolution of Globus toolkit
  - Standard protocols -> Services
  - Open Grid Services Architecture (OGSA)
    - Service orientation to virtualize resources and unify resources/services/information (based on Web-services)
    - Standard interfaces & behaviors for distributed system management: the Grid service
  - Open Grid Services Infrastructure (OGSI)
    - Service (component) is implemented as Java-class. Theres’ API.
    - Exploits existing WS properties
    - Enhancements to WS:
      - state management, event notification, referenceable handles, lifecycle management, service data extension.

GT2 -> GT3

- Security: Adapting X.509 certs to integrate with emerging WS standards
- GRIP/LDAP: Abstractions integrated into OGSI as serviceData
- GRAM: ManagedJobFactory and related service definitions
- GridFTP: Unchanged in 3.0, but will evolve into OGSI-compliant service in 2004
Useful resources

- Official page:
  http://www.dma.unina.it/~murl/SummerSchool/
- EDG Tutorials (handouts, exercise)
- Page by Oxford guys:
  http://ijstokes.paunix.org/ggf/bin/view
  - "Compiled" set of school slides and documents (over 1600 pages, 39 megs!)
  - Photos and other school-related stuff
  - (currently corrupted?)