Slide 1

eGee Enabling Grids for E-sciencE

Grid Computing: Standardising Bodies, Initiatives, Middlewares

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Mumbai, 11.02.06

Slides contributed by FZK + EGEE Team

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www.eu-egee.org

Information Society

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Slide 2

eGee Enabling Grids for E-sciencE — **The Global Grid Forum**

- **Meets 2-3 times per year**
- **Standardising body – similar to IETF**
- **Heart of the action**
- **Abundance of standards, initiatives, workshops ...**

Prof. Malcolm Atkinson at a GGF in Toronto

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Slide 3

eGee — **What other Grid initiatives do exist ?**
Enabling Grids for E-sciencE

- Globus
- Unicore
- AliEn
- Grid-3
- SimDat, Akogrimo, NextGrid, CoreGrid, ...
- CrossGrid
- UK E-Science, D-Grid, Business Grid Computing Project (Japan)
- Geant, TeraGrid, ...
- Oracle 10g, Sun Grid Engine, Discovery Link (IBM)
- ...

to name but a few ...

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Slide 4

eGee — Unicore
Enabling Grids for E-sciencE

- Started at super computer centers in Germany in 1997
- Java based
- widely used, batch-submission like
- Uses portal -> ease of use
- Industry contribution (Sun, IBM, HP, ...)
- See http://www.unicore.org

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Slide 1: AliEn-1/2

- Pure Open Source project, started as part of ALICE collaboration (CERN)
- Small development team (very different from EDG)
- Pragmatic approach (what do we have, how can we make it work)
- 3 Million lines of code (cmp. Linux kernel: ca. 5.5 Mio LOC)
- 99 % of the code taken from publicly available packages, mostly Perl
- Only about 1 % of the code had to be developed in addition
- Similar functionality to EDG framework
- Based on WebServices (SOAP, XML)
- Used in other projects, e.g. MammoGrid (UK), a breast cancer database
- See http://alien.cern.ch
- Now continued as AliEn-2
- See http://gks05.fzk.de/upload/lectures/Peters_alien.pdf for complete explanation!

AliEn @GRID

Slide 2: Grid-3

- US counterpart to EDG / EGEE
- Deployment of an international Data Grid with dozens of sites and thousands of processors.
- Operated jointly by the U.S. Grid projects iVDGL, GriPhyN and PPDG, and the U.S. participants in the LHC experiments ATLAS and CMS.

Slide 3: SimDat, Akogrimo,NextGrid, ...

In the summer of 2004 a total the European Commission launched 12 research projects in the context of FP6 in the area of Grid technologies (see press release) that will receive EUR 52 million of EU funding. The bulk of the EU funding is going to 4 projects - SIMDAT, NextGRID, Akogrimo and CoreGRID with 9 Mio. Euro each.

- NextGRID: Architecture for Next Generation Grids
- SimDat: Industry focus; development of fundamental Grid techniques
- Akogrimo: Access to Knowledge through the Grid in a mobile world; "pervasiveness of Grid computing"
- CoreGrid: aims at strengthening and advancing scientific and technological excellence
- DataMiningGrid, GridCoord, HPC4U, K-WF Grid, OntoGrid, Provenance, UniGridS

Slide 4: CrossGrid, Condor, Condor-G, NIMROD

- CrossGrid: Interactive use of the Grid (MPI, etc.)
- Builds on EDG
- Project was finished this month
- CrossGrid-2 (approved)
- Condor: Batch submission. Condor-G: Globus-enabled
- NIMROD: Parametric optimisation studies across a Grid

Slide 1
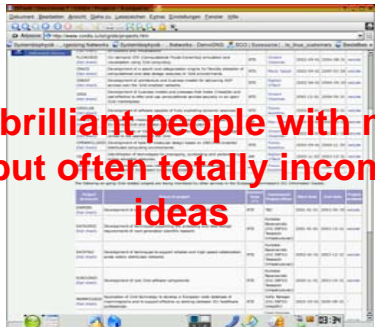
- National Grid deployment projects (D-Grid, E-Science, Business Grid)
- Focus on integration and production quality infrastructure, mostly not Grid research
- Large funding
- Industry involvement
- TeraGrid, Geant: network infrastructure (our backbone)

Slide 2

http://www.cordis.lu/ist/grids/projects.htm

Many brilliant people with many brilliant (but often totally incompatible) ideas

Slide 3

Enabling Grids for E-SciencE

- **Objectives**
  - consistent, robust and secure service grid infrastructure
  - improving and maintaining the middleware as a best-of-breed system
  - attracting new resources and users from industry as well as science

- **Structure**
  - 71 leading institutions in 27 countries, federated in regional Grids
  - leveraging national and regional grid activities worldwide
  - funded by the EU with ~32 M Euros for first 2 years starting 1st April 2004
  - Will be continued as EGEE-II as of 04/2006

CERN
Central Europe
France
Germany and Switzerland
Ireland and UK
Italy
Networking
Northern Europe
Russia
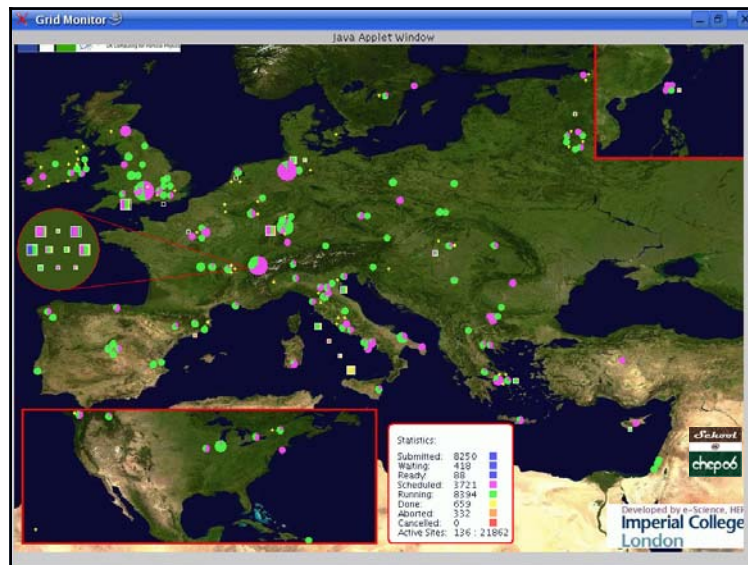South-East Europe
South-West Europe
USA

Slide 4

32 Million Euros EU funding over 2 years, started 1st April 2004

- **48 % service activities (Grid Operations, Support and Management, Network Resource Provision)**

- **24 % middleware re-engineering (Quality Assurance, Security, Network Services Development)**

- **28 % networking (Management, Dissemination and Outreach, User Training and Education, Application Identification and Support, Policy and International Cooperation)**

24% Joint Research
28% Networking
48% Services

Emphasis in EGEE is on operating a production grid and supporting the end-users

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Fundamentals of Grid Technologies

Issues and Problems with "The Grid"

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Enabling Grids for E-sciencE

- Hardware / Software issues
  – Heterogeneous hardware, software, OS are a BIG problems !
  – Example: User Interface
  – Example: floating point accuracy
  – Example: dynamic libraries
  – Example: distributed application across diffferent platforms
  – Revival of the interpreter, JIT ?
  – Security and accounting – IntraGrid vs. InterGrid
  – Submission times ???
- Political Issues
  – Different communities – different agendas / hidden agendas
  – coordination between partners
  – typical problems of large, heterogeneous organisations
  – small and dynamic vs. large and powerful organisations