EU Grid projects

Introduction

- The EU had a quick start in the support and promotion of Grid technology:
  - Joint support with NSF for the Annapolis EU-US workshop in 1999 (P. Messina, chair)
  - First EU Grid projects approved in 2000
  - 20 Projects approved by end 2001
  - GRIDSTART initiative to coordinate all these projects launched in 2002
    - www.gridstart.org

Acknowledgement

- Following slides prepared by Mark Parsons
  - EPCC – GRIDSTART Project Coordinator
- Technical contributions mainly from:
  - Ariel Oleksiak, PSNC
  - Paul Graham, EPCC
  - Matti Heikkurinen, CERN
  - Heinz Stockinger, CERN

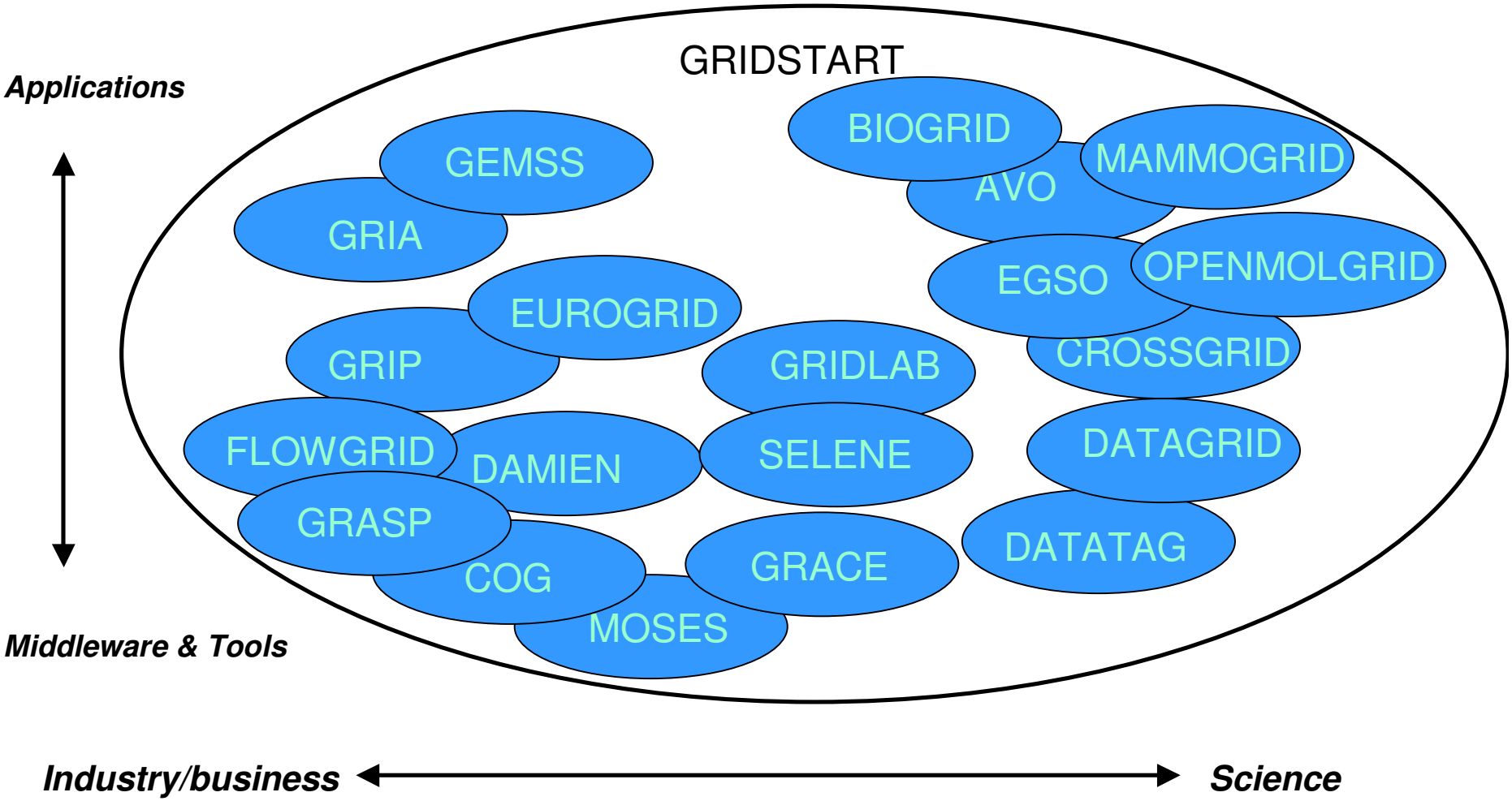
GRIDSTART goals

- An EU supported initiative to encourage interaction between EU Grid projects
- To identify synergies between different Grid application areas
- To consolidate technical advances
- To play a full role in setting Grid standards (in relation to GGF)
- To stimulate early take-up by industry and commerce
- To be inclusive

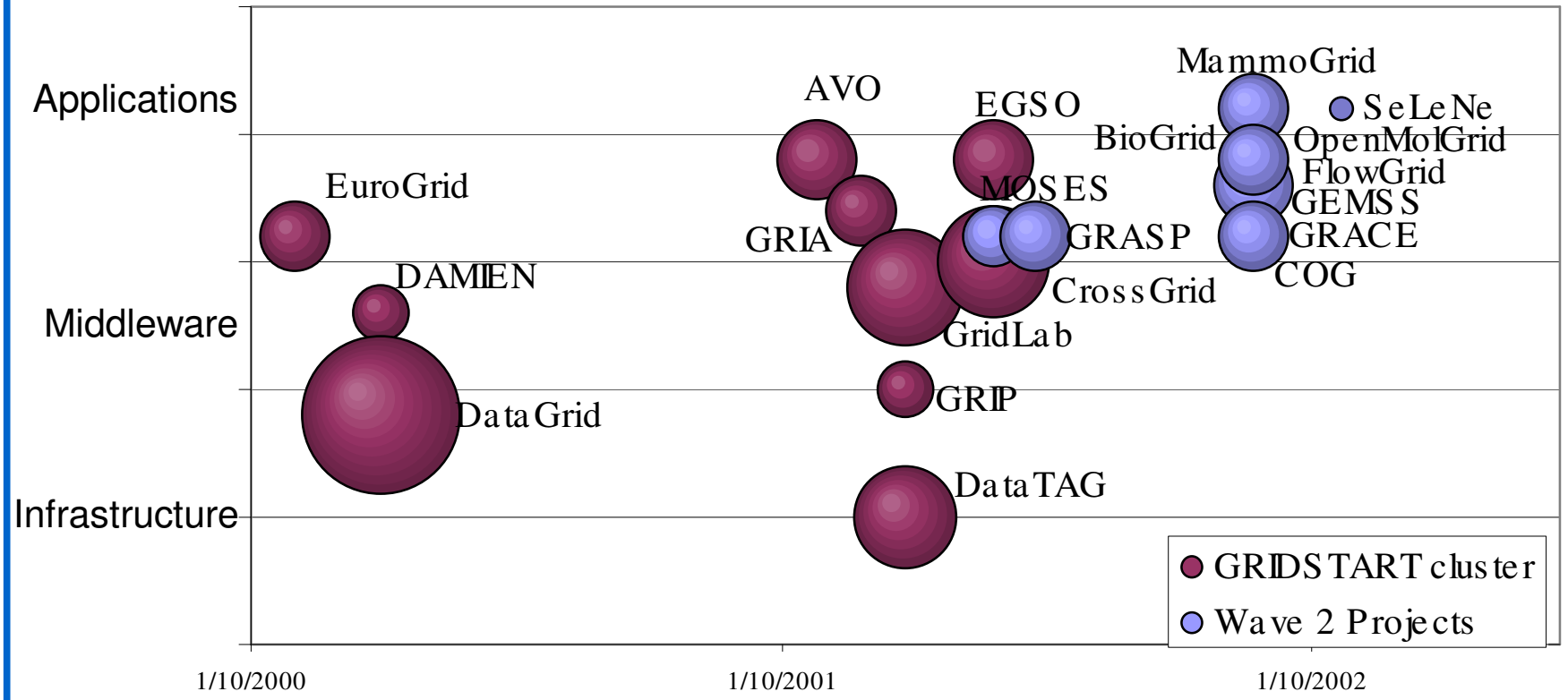
GRIDSTART Partners

- Formal
  - EPCC + CO partners of 10 EU IST Grid projects
  - DATAGRID, DATATAG, EUROGRID, GRIP, EGSO, CROSSGRID, AVO, DAMIEN, GRIA, GRIDLAB
- Informal
  - CO partners of all 10 FP5 IST CPA9 EU Grid projects
  - BIOGRID, COG, FLOWGRID, GEMSS, GRACE, GRASP, MAMMOGRID, MOSES, OPENMOLGRID, SELENE

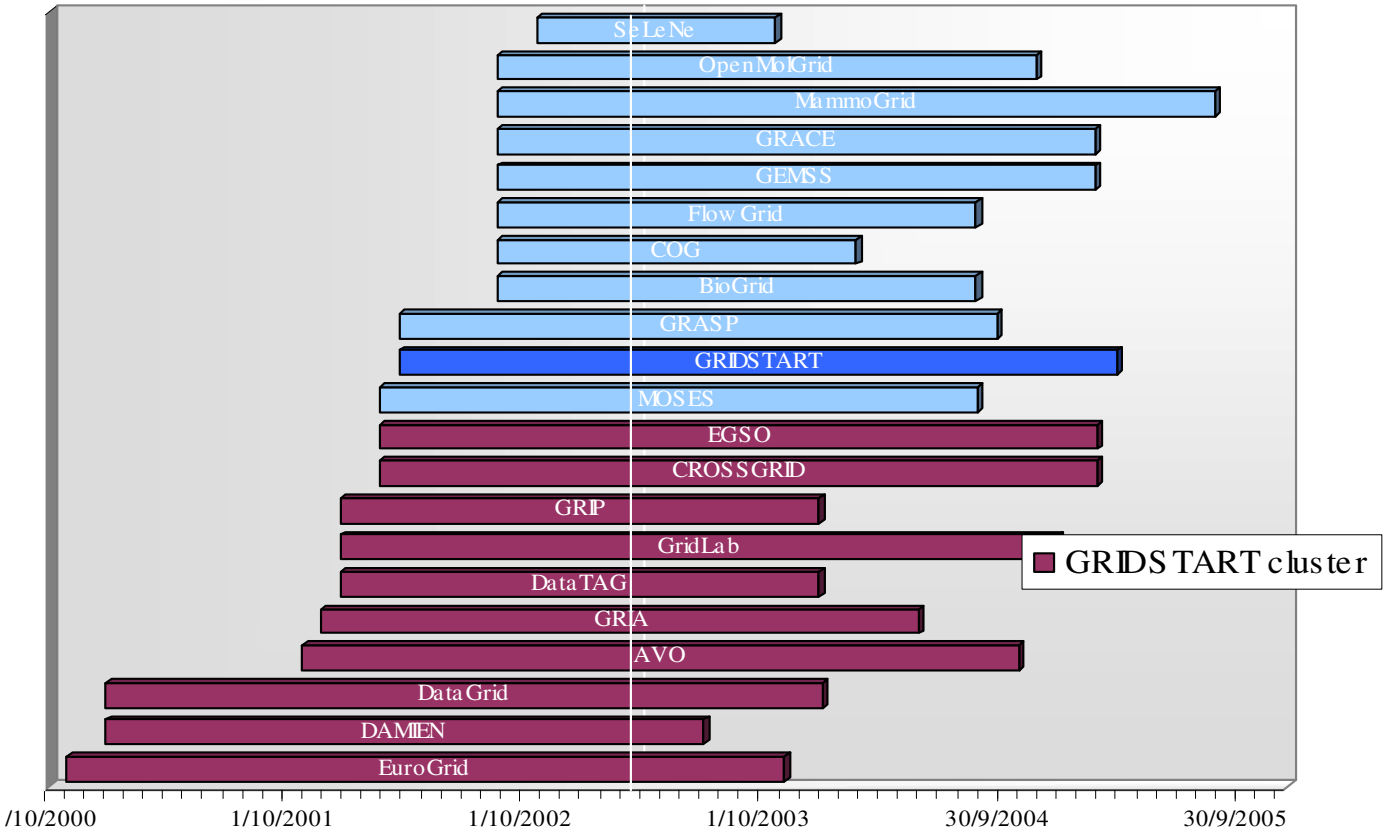
The EU Grid Space



IST Grid Projects



Project lifetimes



Technologies

- Globus vs. UNICORE
  - Globus 11 projects, UNICORE 5 projects
  - GRIP provides interoperability between them
- Local Resource Management Systems
  - Condor, LSF, PBS, SGE, LoadLeveler, Maui, ...
- Other tools, languages, protocols
  - CondorG, DAGMan, gridmapdir, NWS, ...
  - ClassAds, XML, ...
  - SOAP, Globus and UNICORE protocols, ...

GRIDSTART Roadmap

- Split into 4 sections from the General to the specific
  - Global issues and challenges
  - Architecture
  - Key areas
  - Synergies and possible Working Groups

Global issues and challenges

- Collaborations between developer and user communities must be strengthened
- Infrastructure should exhibit robustness, resilience and reliability – the 3R's
- Grids must reach out to new applications areas
- Strengthen industrial and commercial uptake
- National Grid infrastructures should be supported and integrated by promoting complementary work at EU level

Global issues (cont)

- Other global issues include
  - tools development and support
  - testing for quality and reliability
    - directly related to the 3R's
  - take-up by industry
  - interoperability among projects
  - licensing
  - semantic Grid and workflow
  - there are many more …!

Future architecture

- There is considerable agreement that OGSA will be the standard future architecture
  - use within the FP5 Grid projects is determined by the age of the project
  - this will increase the relevance of hosting environments like J2EE and .NET
- Overall architecture will probably look like
  - portals (specific to application) -> toolkits (OGSA compliant) -> OGSA (standard middleware) -> fabric including network services

Key areas

- These areas are driven by the GRIDSTART inventory
  - management of VOs and Security
    - we must aim for dynamic secure VOs
  - data management
    - there is lots of work going on in this area which is key to many projects
  - scheduling and job distribution
    - main focus here should be on stability and performance
  - accounting systems
    - we need to sort out who pays for what/when/where/why

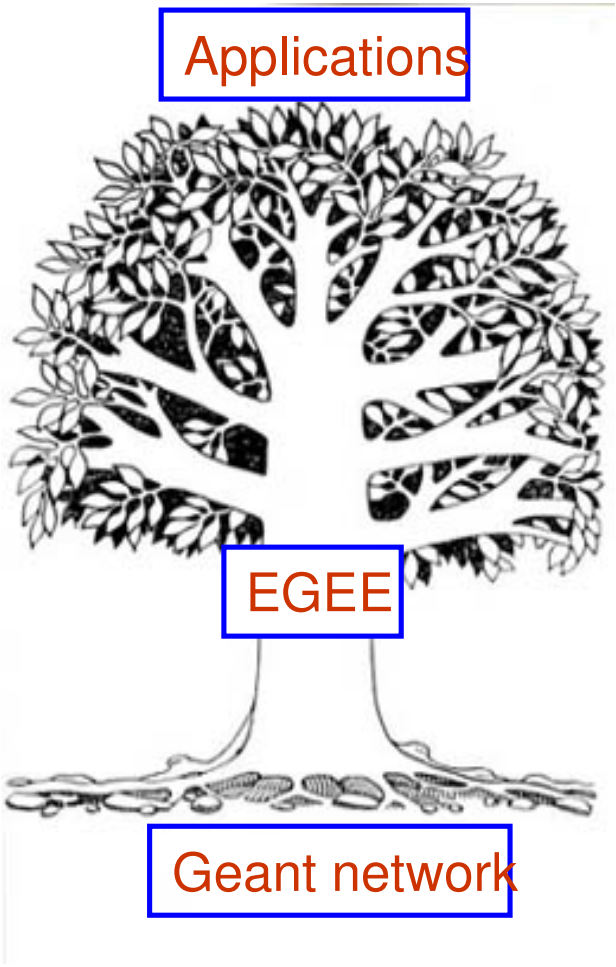
Enabling Grids for
E-science in Europe

Next steps in EU FP6

- To address the overall need for a production quality Grid infrastructure for European science the EU launched in 2002 a CFP for
  "Communication Network Development – Grids"
- Overwhelming response by all Grid national and regional Grid initiatives
- Establishment of the EGEE consortium to respond to the CFP

EGEE:
Enabling Grids for E-science in Europe

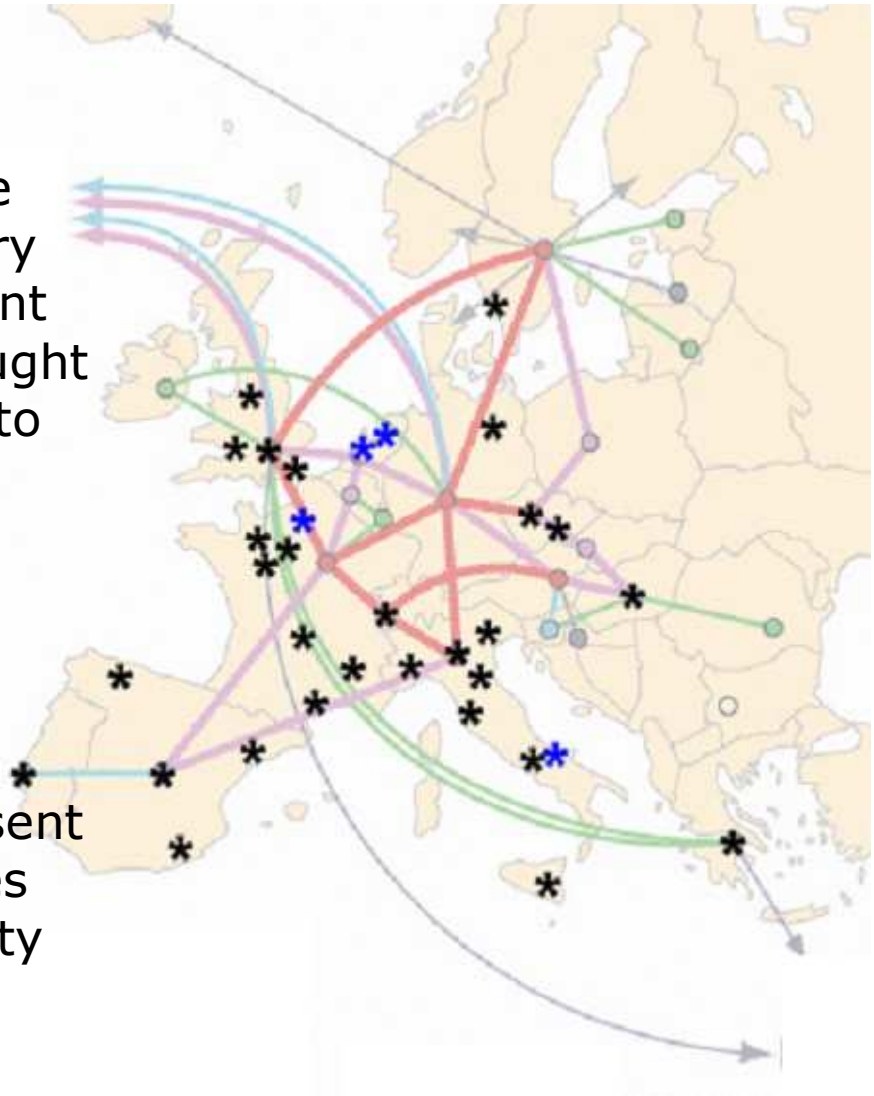
- **Goal**
  - Create a general European Grid production quality infrastructure on top of present and future EU RN infrastructure
- **Build on**
  - Several pioneering prototype results
  - Large Grid development teams in Europe
  - EU and EU member states have made major investments in Grid Technology
  - International connections (US and AP)
- **Approach**
  - Leverage current and planned national and regional Grid programmes
  - Work closely with relevant industrial Grid developers, NRENs and US-AP projects



Why EGEE? The Historical Analogy

- Prior to the **EU Geant** program ,there was in Europe a multitude of exploratory projects in networking technology. Geant was truly production oriented, and brought European telecom operators actively into the picture

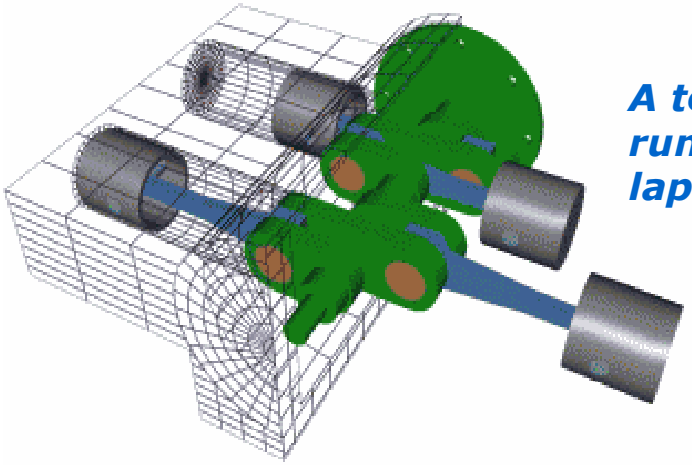
- In a similar way, **EGEE** can ensure preservation of current investments in European Grid R&D, extending the present infrastructure and focussing all activities towards establishing a production quality Grid



Why EGEE? The Societal Impact

Access to a production quality GRID will change the way science and much else is done in Europe

An international network of scientist will be able to model a new flood of the Danube in real time, using meteorological and geological data from several centers across Europe.



A team of engineering students will be able to run the latest 3D rendering programs from their laptops using the Grid.

A geneticist at a conference, inspired by a talk she hears, will be able to launch a complex biomolecular simulation from her mobile phone.

Why EGEE? The Political Context

- Current EU Grid R&D projects run out within 18 months

- The EGEE partners have already made major progress in aligning national and regional Grid R&D efforts, in preparation for EGEE

- Launching EGEE now will preserve the current strong momentum of the European Grid community, and the enthusiasm of the hundreds of young European researchers already involved in EU Grid projects **most of these people available for a quick start in EGEE**

EGEE Approach

- Most of partners building national and regional Grid consortia to participate in EGEE
- Condition to participate in EGEE is to have already an established Grid activity or be an established Grid technology centre

  and be able to demonstrate it!
- EGEE overall project (100 M Euros requested for 4 years) will need to submit staggered proposals to respond to several separate EU calls **we need to be realistic, cannot overload present proposal!**
- Communication Network Development Call opened on December 17th and closed on May 6th
- Participation to EGEE through national or regional Grid consortia

  the regional coordinators must coordinate!

Integrated Infrastructure Initiative

Response to FP6 call "Communication Network Development – Grids"

Three lines of EU funding (with current funding breakdown):

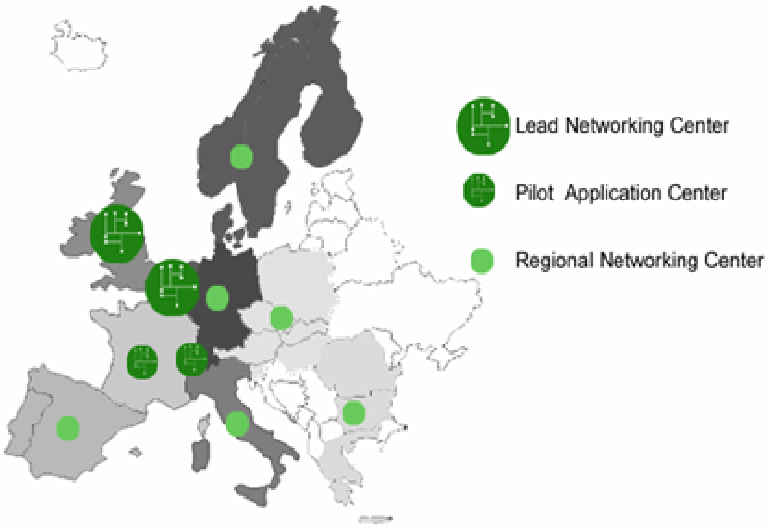
- Networking Activities:
  - Management & coordination (7% of total funding)
  - Dissemination and outreach (7% of total funding)
  - Application support (10% of total funding)
- Specific Service Activities:
  - Provision and procurement of Grid services (52% of total funding)
- Joint Research Activity
  - Engineering development to improve the services provided by the Grid infrastructure (24% of total funding)

Networking activities

General management and coordination of the project

User groups, Industry Forum

Dissemination, outreach, training and pilot applications



Networking activities

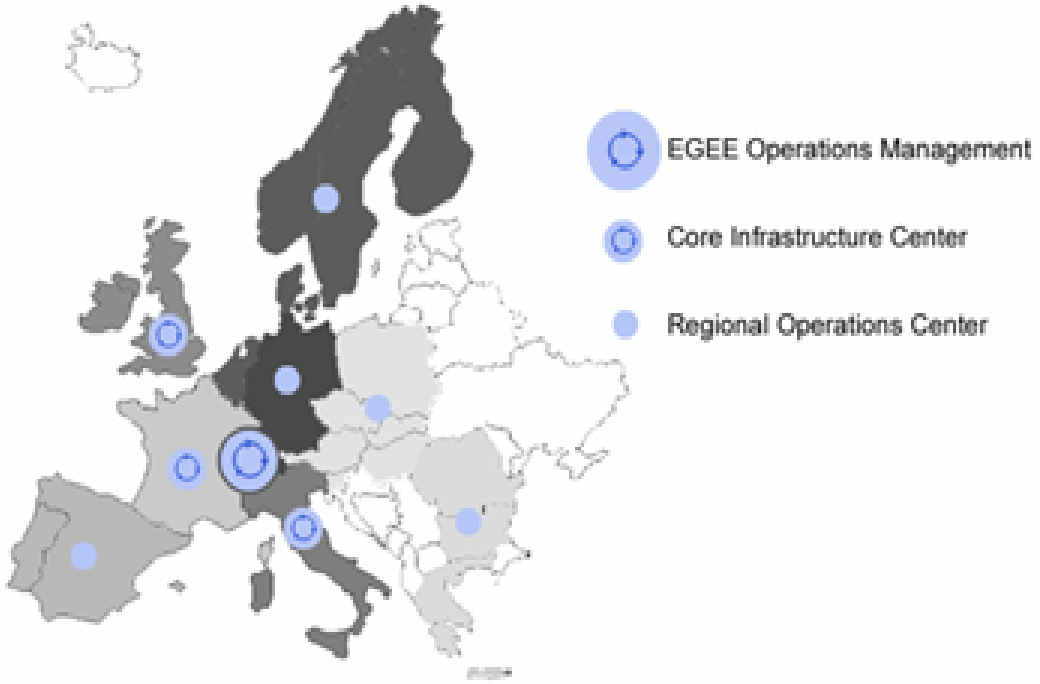
- User Training and Induction; User Support and Consultancy; Applications Interface. The lead partner for the Training activity is the UK (Edinburgh).
- Dissemination and Outreach; The lead partner for the Dissemination activity is the European Research Network organisation Terena (based in Amsterdam/NL).
- Both lead partners will rely on a supporting network in the partner regions, partially funded by the project. The User Support and Consultancy is envisaged as a distributed effort, with coordination provided by the lead partner, on the basis that many aspects of such support need to be adapted to regional needs, and this is best done locally.

Networking activities

- The Applications Interface Activity has three components:
  - two Pilot Application Centres – for high energy physics and bio/medical –
  - one more generic component dealing with the longer term recruitment of other communities.
- The Pilot Application Centres are based at CERN and in France, with participation to their activities by other partners envisaged.
- The third, more generic component is distributed more evenly among the partners, in order to ensure as broad a contact with scientific communities as possible.

Specific service activities

Integration of national and international Grid infrastructures

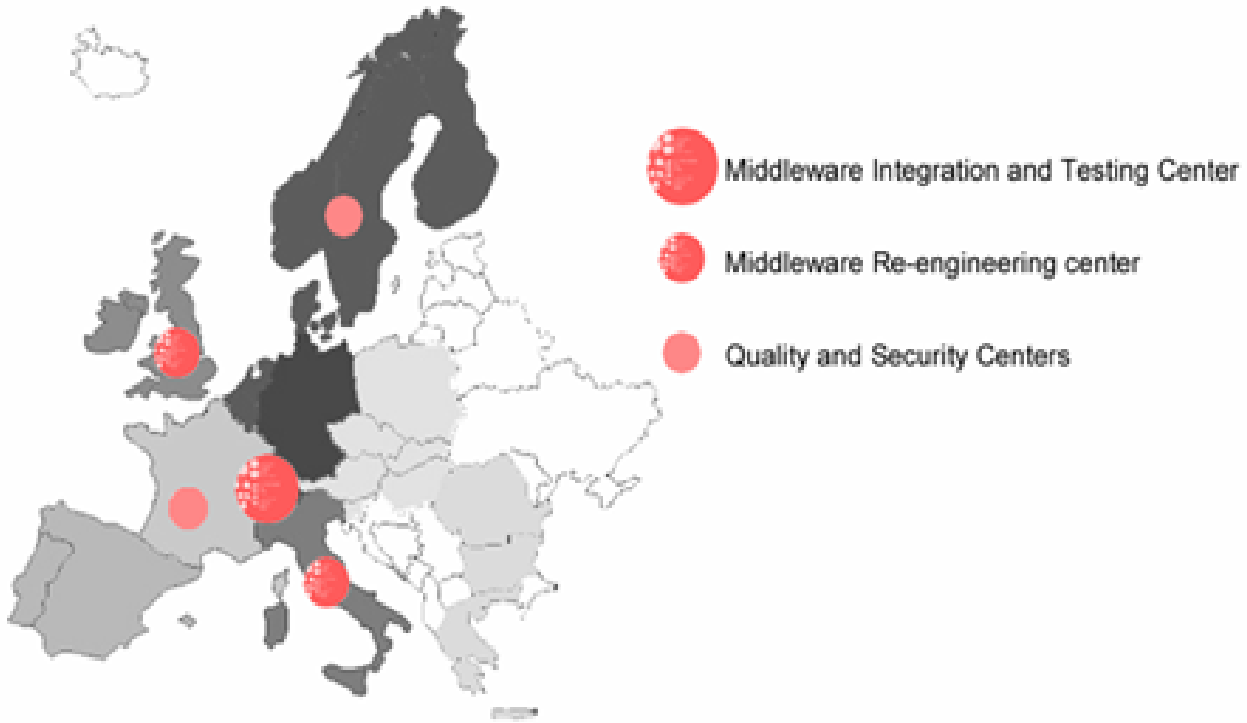


Specific service activities

The structure of the Grid services will comprise an EGEE Operations Management at CERN, EGEE Core Infrastructure Centers in the UK, France, Italy and at CERN (according to LCG plans), responsible for managing the overall Grid infrastructure, and Regional Operations Centers, responsible for coordinating regional resources, regional deployment and support of services.

Joint research activity

Hardening and re-engineering of Middleware



Joint research activity

- The middleware Re-engineering Centres will take responsibility for key services: Resource Access and Brokering (Italy); Data Management (CERN); Information Services (UK); Closely connected to middleware development is a Quality Assurance team (France) and a Grid Security team (Northern Europe Consortium), which also has responsibility for a User ID and Authentication Service. A Middleware Integration team and Middleware Testing Centre will be located at CERN.
- Middleware services and related support teams listed above requires 10-12 persons to provide critical mass. On the basis of matching funding from the host institutions, this translates to 5-6 FTEs per middleware service area to be funded by the project, summing to over 40 FTEs for all middleware activities (compare with about 60 FTEs in EDG).

Project Management

- Needs to integrate with J/R and Specific Service activity management (LCG in particular)
- Needs authority and flexibility
  - Technical activity managers 100% dedicated and reporting directly to project execution board
  - Project funding allocated and reviewed on performance and timely delivery
  - 18 months plan with 12 month review and possible reallocation of resources
- External advisory board, internal reviewers
- User groups, Industry Forum

EGEE and Industry

- Industrial participation encouraged both as potential end-users and IT technology and service suppliers
- Normally through national and regional Grid EGEE federations
- Also links through CERN Openlab for DataGrid applications
- EGEE will maintain an Industry Forum to keep selected Industrial and Commercial interested parties in close contact
- Services developed in first EGEE 2 years phase (2004-5) might be tendered to Industry in second phase (2006-7)
- EGEE interested collecting expressions of interest from industry and commerce to be appended to project proposal submission

EGEE proposal history

- **Submitted on May 6th 2003**
- **First feedback (positive) received on June 11th (10 questions to answer)**
- **Proposal hearing in Brussels on July 1st**
- **Informal first negotiation at the end of July (24th)**
- **Negotiation meeting(s) in September-October**
- **Contract signature by the end of this year, early '04**
- **Project start Q1-Q2 '04**

Next actions

Schedule in 2003:

- **Establish administrative and technical management team**
- **Prepare technical annex to EU contract**
- **Open new posts**
- **Start preparatory activity (core service deployment, M/Ware evaluation, s/w development process, training and dissemination plans, administrative procedures and support in place)**

Everything ready in time for project start in Q1 2004