European Grid Initiative
Design Study

Ludek Matyska
CESNET, Czech Republic
Member of the EGI_DS team
Current state

• Grids are becoming a base for new ways of scientific collaboration
• Some communities are using Grids on a daily basis
• This creates a dependability on Grid infrastructure(s)
• Also, industry is starting to become interested

• However, all this means that a Long Term Perspective is needed
EGEE Infrastructure

- > 200 sites in 40 countries
- > 40 000 CPUs
- > 5 PB storage
- > 100k jobs/day
- > 200 Virtual Organizations

Countries participating in EGEE:
- Baltic Grid
- DEISA
- See-Grid
- EUMedGrid
- EUChinaGrid
- EUIndiaGrid
- TERAGRID
- OSG
- EELA
- NAREGI

TERAGRID
OSG
EELA
Baltic Grid
DEISA
See-Grid
EUMedGrid
EUChinaGrid
EUIndiaGrid

Countries participating in EGEE
“...for Grids we would like to see the move towards long-term sustainable initiatives less dependent upon EU-funded project cycles”

• Viviane Reding, EU commissary, at the EGEE’06 conference, September 25th, 2006
Added value of Sharing

• Applications have very different requirements and may be broadly classified as
  – Provisioned
    • Large scale, long term “Grand Challenge”
  – Scheduled
    • Require large resources for short periods
  – Opportunistic
    • No real-time nor mission critical
• All can coexist on the same infrastructure
EGI Design Study

Project proposal:
• submitted to FP7-INFRASTRUCTURES-2007-1, 1.2.1 Design Studies

Goal:
• Conceptual setup and operation of a new organizational model of a sustainable pan-European grid infrastructure
• Consortium: 9 Partners → EGI Preparation Team
• NGI Representatives → EGI Advisory Board
• Person months: ~300
• Duration: 1 Sept 2007 – 30 Nov 2009 (27 Months)
EGI Design Study

• Define and find ways to create **sustainable** European e-Infrastructure
• Coordinate integration and interaction of National Grid Initiatives (NGI)
• Define conditions and organizational basis for the European (trans-national) level of production Grid infrastructure suitable for and shared by very large set of scientific disciplines (connecting National Grid Infrastructures)
EGI Preparation Team

Members:
- Johannes Kepler Universität Linz (GUP)
- Greek Research and Technology Network S.A. (GRNET)
- Istituto Nazionale di Fisica Nucleare (INFN)
- CSC – Scientific Computing Ltd. (CSC)
- CESNET, z.s.p.o. (CESNET)
- European Organization for Nuclear Research (CERN)
- Verein zur Förderung eines Deutschen Forschungsnetzes – DFN-Verein (DFN)
- Science & Technology Facilities Council (STFC)
- Centre National de la Recherche Scientifique (CNRS)
EGI

- EGI “the organization” is one of the planned results of EGI_DS
- EGI is expected to take over the EU Grid activities (like EGEE, DEISA etc.), coordinate the national Grid activities and operate the Sustainable European Grid Infrastructure

- We will use term EGI to represent both the EGI organization and NGIs together
• Provide global services and support that complement and/or coordinate national services (Authentication, VO-support, security, etc);
• Coordinate middleware development and standardization to enhance the infrastructure by soliciting targeted developments from leading EU and National Grid middleware development projects;
• Advise National and European Funding Agencies in establishing their programmes for future software developments based on agreed user needs and development standards;
• Integrate, test, validate and package software from leading Grid middleware development projects and make it widely available;
• Provide documentation and training material for the middleware and operations. (NGIs may wish to make the material available in turn in their local language);
• Take into account developments made by national e-science projects which were aimed at supporting diverse communities.
• Link the European infrastructure with similar infrastructures elsewhere;
• Promote Grid interface standards based on practical experience gained from Grid operations and middleware integration activities, in consultation with relevant standards organizations;
• Collaborate closely with industry as technology and service providers, as well as Grid users, to promote the rapid and successful uptake of Grid technology by European industry.

EGI Vision Paper

http://www.eu-egi.org/vision.pdf
38 European NGIs
+ Asia, US, Latin America
+ PRACE
+ OGF-Europe
+ …
ISGC Taipei, Taiwan, April 11, 2008

Evolution

Testbeds

Routine Usage

Utility Service

National

European e-Infrastructure

Global
<table>
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<tr>
<th>No.</th>
<th>Country</th>
<th>Institution</th>
<th>AB member(s)</th>
<th>Date</th>
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<td>1</td>
<td>Austria</td>
<td>GUP, Joh. Kepler University, Federal Ministry of Science and Research</td>
<td>Jens Volkert, Stefan Hanslik, Ihar A. Mklashevich</td>
<td>April 24, 2007</td>
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<td>Belgium</td>
<td>BELNET</td>
<td>Ludek Matysova</td>
<td>April 17, 2007</td>
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<td>Croatia</td>
<td>SRCE, University computing centre, University of Zagreb</td>
<td>Panayiotis Tsamakas, Fotis Karagiannis</td>
<td>April 25, 2007</td>
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<td>Cyprus</td>
<td>University of Cyprus, Dept. of Computer Science</td>
<td>Tamás Márty</td>
<td>April 27, 2007</td>
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<td>CESNET z.s.p.o.</td>
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<td>8</td>
<td>Denmark</td>
<td>DCSC - Danish Center for Scientific Computing, NDGF - Nordic Data Grid Facility</td>
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<td>9</td>
<td>Estonia</td>
<td>NICPB - National Institute for Chemical Physics and Biophysics</td>
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<td>12</td>
<td>Germany</td>
<td>DFN-Verein - Deutsches Forschungsnetz (on behalf of D-Grid)</td>
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<td>Greece</td>
<td>GRNET S.A. - Greek Research &amp; Technology Network</td>
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<td>14</td>
<td>Hungary</td>
<td>NIIF - National Information Infrastructure Development Institute</td>
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EGI_DS Schedule

Duration 27 months:

- Develop EGI Proposal
  - Submission of EGEE-III
  - Start of EGI Design Study
- NGIs signing Proposal
  - Start of EGEE-III
  - Final Draft of EGI Blueprint Proposal
  - EGI Blueprint Proposal
  - EGEE-III transition to EGI-like structure
  - EU Call Deadline for EGI Proposal
  - EGI Entity in place

EGEE-II (2YEARS)  |  EGEE-III (2YEARS)  |  EGI operational

2008  |  2009  |  2010
EGI_DS Work Distribution

- **WP2**: EGI Requirements Consolidation
  (Fotis Karayannis, GRNET)

- **WP3**: EGI functionality definition
  (Laura Perini, INFN)

- **WP4**: Study of EGI legal and organisational options
  (Beatrice Merlin, CNRS)

- **WP5**: Establishment of EGI
  (Jürgen Knobloch, CERN)

- **WP6**: EGI Promotion and Links with Other Initiatives
  (Per Öster, CSC)
WELCOME TO EGI

The European Grid Initiative (EGI) Design Study represents an effort to establish a sustainable grid infrastructure in Europe. Driven by the needs and requirements of the research community, it is expected to enable the next leap in research infrastructures, thereby supporting collaborative scientific discoveries in the European Research Area (ERA).

The main foundations of EGI are the National Grid Initiatives (NGIs), which operate the grid infrastructures in each country. EGI will link existing NGIs and will actively support the setup and initiation of new NGIs.

The goal of the EGI Design Study (EGI_DS) is to evaluate use cases for the applicability of a coordinated effort, to identify processes and mechanisms for establishing EGI, to define the structure of a corresponding body, and ultimately to initiate the construction of the EGI organization.

The EGI Design Study is a project funded by the European Commission’s 7th Framework Program.

 EGIs Webpage
www.eu-egi.org
EGI DS Chronology

- **February 26-27, 2007**: EGI Workshop Munich
- **May 2, 2007**: Proposal submitted to the EC within FP7-INFRA-2007-1, 1.2.1 Design Studies
- **Sept. 1, 2007**: Project start
- **Oct. 2, 2007**: EGI Workshop, Budapest, Hungary
- **March 13/14, 2008**: 2nd EGI Workshop, Rome, Italy
EGI Workshop Budapest

- Presentation of the EGI_DS project to all NGI representatives
- Requirements Analysis and Uses Cases
  ➔ Summary Budapest EGI Workshop
- First information on Functional Definition
- Convention and Legal Aspects
EGI_DS Use Cases

• Collection of information started already in August
• First set of EGI use cases gathered and summarized for the Budapest workshop:
  – Invitation distributed to NGIs, application communities, related projects, operators, etc.
  – Total: 26 replies
    (11 out 37 NGIs replied, plus 15 other replies from projects, application communities, institutes)
  – The actual use cases are much more
    (around 160, as there was 1 to 8 use cases each reply)
• Summary of use cases available in the EGI Knowledge Base (http://knowledge.eu-egi.org)
EGI Knowledge Base - Main

Main Page

The EGI Knowledge Base is intended to provide up to date information on National Grid Initiatives (NGIs), and increasingly detailed plans for the future European Grid Infrastructure. For questions or comments, please write us at knowledge@eu-egi.org.

NEW! We have a new survey tool! See it at work with the NGIs in numbers page, which records data from the "Users and Resources" boxes in the NGI pages.

National Grid Initiatives in Europe

To view an article about an individual NGI, click on its country or type the country name in the search box to the left.

http://knowledge.eu-egi.org/index.php/Croatia

http://knowledge.eu-egi.org/index.php/ISRAEL

http://knowledge.eu-egi.org/index.php/Cyprus

NGI Representatives to provide their input and update their local information

http://knowledge.eu-egi.org

NEW!
EGI Knowledge Base

Use Cases: Main

This area has been built to contain an overview and links to the use cases gathered in relation to e-Infrastructures. Following distinct areas have been identified:

- The list of previously collected original use cases obtained as results from an EGEE project survey.
- The current list of individual use cases gathered by the EGI preparation team in 2007. The list of individual use cases obtained from NGIs, projects, institutes and VOs within the EGI DS project phase in the preprocessed (txt) form retaining the original information provided and mapped to corresponding proposed EGI functions.
- The suggested list of derived clustered information based on detailed analysis of individual contributions.
- Moreover, there is also a list of either individual or clustered use cases mapped into EGEE activities to easily allow identification of areas not covered by individual use case obtained.

You are welcome to either send us a new specific use case describing your way of grid environment utilization and/or you are invited to provide us your comments/suggestions concerning the current list of individual use case. For those willing to send us their new, specific use case an example template is available. The template can be used as an illustration of the information that we are looking for, however, it is not mandatory if its structure does not match your view on the topic. Free-form use case descriptions are welcome. Please, contact us at usecase@eu-egi.org.

EGI DS Use Case Letter with Template
EGI Workshop Rome

• Practically all NGIs represented
  – Plus up to 2 experts per NGI
• Presentation of different EGI aspects:
  – Grid Operations
  – User Oriented Functions (Application support)
  – Middleware
  – Management of the EGI organization
  – Legal Structures
• All were drafts for discussion
Grid Operations

Key assumptions

• Continuity requirement:
  – As some large communities are using Grids already in a production way, the transition to EGI must be non-disruptive

• Functionality requirement:
  – The key functionality must not change because of the transitions
What is EGI Operations?

- To answer this question, we need a much better idea of what “the EGI Grid” will be…

Is it:

- A large-scale, production Grid infrastructure – build on National Grids that interoperate seamlessly at many levels, offering reliable and predictable services to a wide range of applications, ranging from “mission critical” to prototyping and research?
- A loosely coupled federation of NGIs with little or no cross-grid activity, heterogeneous and sometimes incompatible middleware stacks, no cross-grid accounting, no need for coordinated operations or management
What is EGI Operations?

• To answer this question, we need a much better idea of what “the EGI Grid” will be…

Focus on:

- A large-scale, production Grid infrastructure – build on National Grids that interoperate seamlessly at many levels, offering reliable and predictable services to a wide range of applications, ranging from “mission critical” to prototyping and research

- A loosely coupled federation of NGIs with little or no cross-grid activity, heterogeneous and sometimes incompatible middleware stacks, no cross-grid accounting, no need for coordinated operations or management
How is Operation to be achieved

• **Multi-level** Operation Model
• Definition of **set of services** that must be operated on a **coherent** way
• **Federated approach**, delegation of responsibilities to NGIs
• Support for **multiple middleware systems**
• The EGI core team will be primary responsible for **planning and coordination**
User Oriented Functions

• Application Support
  – Based on the support centres and activities at national level
  – Coordinate to increase synergies
  – Reduce the users’ cost to use the Grid

• Training
  – Sharing t-Inrastructure(s), materials and experience
  – Cross border synergies

• Dissemination
  – PR and support for broad scientific publishing
Middleware

• No Grid without a middleware

• Not forcing one middleware system
  – However, a clear road towards a convergence of functions and services necessary
  – And must be strongly driven by EGI

• Proposed support for three stacks:
  – gLite (EGEE), UNICORE (DEISA), ARC (NorduGRID)

• Still a lot of discussion ahead
  – The model of interaction between middleware development and EGI not clear
Management of the EGI organization

- **Light-weight** schema
- Focused mainly on **coordination** and planning
  - Actual services outsourced to NGIs
- However, responsibility for smooth operation at the European level
  - Cost models and money flow
  - Contribution (fees), Service charges, collocated development grants
EGI Management and its Environment

**Membership:**
NGIs, ass. members

**Political environment:**
eIRG, ESFRI, EU...

**Other Ext. Relations:**
Media, ...

**Unit 1:**
EGI Operations

**Unit 2:**
EGI Developments

**Unit 3:**
EGI Administration

**EGI Council:**
Governing body of EGI

**EGI Organisation Management:**
Director + staff + Heads of Units (CTO, COO, CAO)
Management Structure of the EGI organisation

Director + staff

EGI Council

Political Bodies such as:
• eIRG,
• EU,
• ESFRI,
• Ntl. Bodies,
• ...

Strategy Cttee

Advisory Committees

CTO (Developments)
Dev. Group

CAO (Admin.+ PR)
Adm.+PR Group

COO (Operations)
Oper. Group

EGI organisation
Legal Structures

• The basic requirements
  – Autonomous legal entity
  – Fastness of creation
  – Not for profit organisation but ability to provide services to third parties
  – Open to public and private NGI organisations
  – …residing in any European country
  – Limited liability

• Either national or international entity
  – European Research Infrastructure (ERI)
    • To be adopted by EU Council in December 2008

• Tender for location
EGI Functionality Overview

• **Management**, Outreach & Dissemination - Representation of EU Grid Efforts
• **Operations** & Resource Provisioning & Security
• **Application Support** & Training
• **Middleware** (Build&Test, Component Selection/Validation/Deployment)
• Standardisation & Policies
• Industry take-up
Definition of EGI Organisation

• Initial **functions** and **services** provided by EGI
• Estimation of **resource requirements** for executing the **functions**
• **Relationships** with NGIs and **global communities** and resource centres
• Description of **functions and scope** of NGIs
• **Transition process** to EGI model
Resource Estimation

- FTEs needed to carry out each function
- Distinction: core functions, middleware functions
- Workload distribution: EGI Organisation, NGIs
- First draft proposal:
  - Core functions: 82 FTEs
  - Middleware development: 155 FTEs
Characteristics of NGIs

Each NGI

• … should be a recognized national body with a single point-of-contact
• … should mobilise national funding and resources
• … should operate the national e-Infrastructure
• … should support user communities (application independent, and open to new user communities and resource providers)
• … should contribute and adhere to international standards and policies

Responsibilities between NGIs and EGI are split to be federated and complementary
# EGI_DS Schedule

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[ISGC Taipei, Taiwan, April 11, 2008](www.eu-egi.org)
Upcoming Event

• June 30-July 1, 2008:
  ➔ EGI Workshop, Geneva, Switzerland
    “Draft Papers on the EGI Structure”

• To present a coherent proposal to
  – EGI organization management and legal structure
  – Dealing with middleware
  – Clear roadmap both for
    • EGI constitution adoption
    • Transition of contemporary Grid infrastructures into European Grid Infrastructure
EGI – European Grid Initiative

• The EGI Organisation is a “Glue” between various grid communities in Europe and beyond
• EGI_DS defines required mechanisms and functionalities of the EGI Organisation
• EU NGIs (or NGI forming teams) expressed strong support to this idea

➔ Towards a sustainable environment for the application communities utilizing grid infrastructures for their everyday work