European Grid Initiative Design Study

Ludek Matyska
CESNET, Czech Republic
Member of the EGI_DS team
Long Term Perspective

• Scientific communities are using Grids on a daily basis, being dependent on the infrastructure
• Industry starts to become interested
• However, Grids are funded either
  – Within application oriented projects – no external sharing
  – Or as short term infrastructure projects – no guarantees on sustainability

• This creates a risk of Grid refusal on basis of its short term existence and/or too narrow focus
EGEE Infrastructure

- > 250 sites in 48 countries
- > 50,000 CPUs
- > 13 PB storage
- > 140k jobs/day
- > 200 Virtual Organizations

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

“…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
EGI Design Study

Project proposal:

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

European Grid Initiative

Goal:

• Conceptual setup and operation of a new organizational model of a sustainable pan-European grid infrastructure

• **Consortium:** 9 Partners È **EGI Preparation Team**
  • NGI Representatives È **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
  – Rich set of services, covering compute and storage, too
• Based on the assumption of existence 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, interconnecting **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
38 European NGIs
+ Asia, US, Latin America
+ PRACE
+ OGF-Europe
+ …
Evolution

National

Global

Testbeds

Routine Usage

Utility Service

European e-Infrastructure
# National Grid Initiatives

## EGI Advisory Board Chairman

**Prof. Gaspar Barreira**  
LIP, Portugal  
ab-chair(at)eu-egi.org

## EGI Advisory Board

<table>
<thead>
<tr>
<th>No.</th>
<th>Country</th>
<th>Institution</th>
<th>AB member(s)</th>
<th>Date</th>
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</table>
| 1   | Austria   | GUP, Joh. Kepler University  
Federal Ministry of Science and Research | Jens Volkert  
Stefan Hanslik                  | April 24, 2007               |
| 2   | Belarus   | Research Division of Belarusian National Technical University              | Ihar A. Miklashevich         | August 15, 2007 |
| 3   | Belgium   | BELNET                                                                       | Rosette  
Vandenbroucke                  | April 16, 2007               |
| 4   | Bulgaria  | Institute for Parallel Processing, Bulgarian Academy of Sciences            | Kiril Boyanov  
Ivan Maric                     | March 6, 2007                |
| 5   | Croatia   | SRCE, University computing centre, University of Zagreb                     | Marios Dikalakos  
Ivan Maric                     | April 13, 2007               |
| 6   | Cyprus    | University of Cyprus, Dept. of Computer Science                             | Ludek Matyska                | February 24, 2007 |
| 7   | Czech Republic | CESNET z.s.p.o.                           |                              | April 17, 2007 |
| 8   | Denmark   | DCSC - Danish Center for Scientific Computing  
NDGF - Nordic Data Grid Facility | Rene Belso  
Michael Groninger              | April 27, 2007               |
| 9   | Estonia   | NICPB - National Institute for Chemical Physics and Biophysics              | Matti Raidel                 | April 26, 2007 |
| 10  | Finland   | CSC - Scientific Computing Ltd.                                             | Leif Laaksonen               | March 11, 2008  
Guy Wormser                   |
| 11  | France    | CNRS - Centre National De La Recherche Scientifique                        | Klaus Ullmann                | April 10, 2007  
Panayiotis Tzanakas           |
| 12  | Germany   | DFN-Verein - Deutsches Forschungsnetz (on behalf of D-Grid)                 | Fotos Karagiannis            | April 25, 2007  
Tamás Máray                   |
| 13  | Greece    | GRENET S.A. - Greek Research & Technology Network                           |                              | April 27, 2007 |
| 14  | Hungary   | NIIF - National Information Infrastructure Development Institute           |                              |              |
## EGI_DS Schedule

**Duration 27 months:**

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<th>Time Frame</th>
<th>Event Description</th>
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CE SA1, Bartislava, SK, April 29, 2008

www.eu-egi.org
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.

Objectives of EGI Design Study
National Grid Initiatives
Press releases
Contact us

EGI 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:
  Æ EGI Workshop, Budapest, Hungary
• March 13/14, 2008:
  Æ 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 Workshop Budapest
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](http://knowledge.eu-egi.org))
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.

Contents [hide]
1 National Grid Initiatives in Europe
2 The General EGI Area
3 Editing Help

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
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 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?

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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-Infrastructure(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)
  – Not accepted at the Rome workshop
• 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
Management Structure of the EGI organisation

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

Director + staff

EGI organisation

EGI Council

EGI
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 Reserach 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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2008 | 2009 | 2010
Upcoming Event

• June 30-July 1, 2008:
  Œ 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