The European Grid Initiative Design Study - EGI_DS

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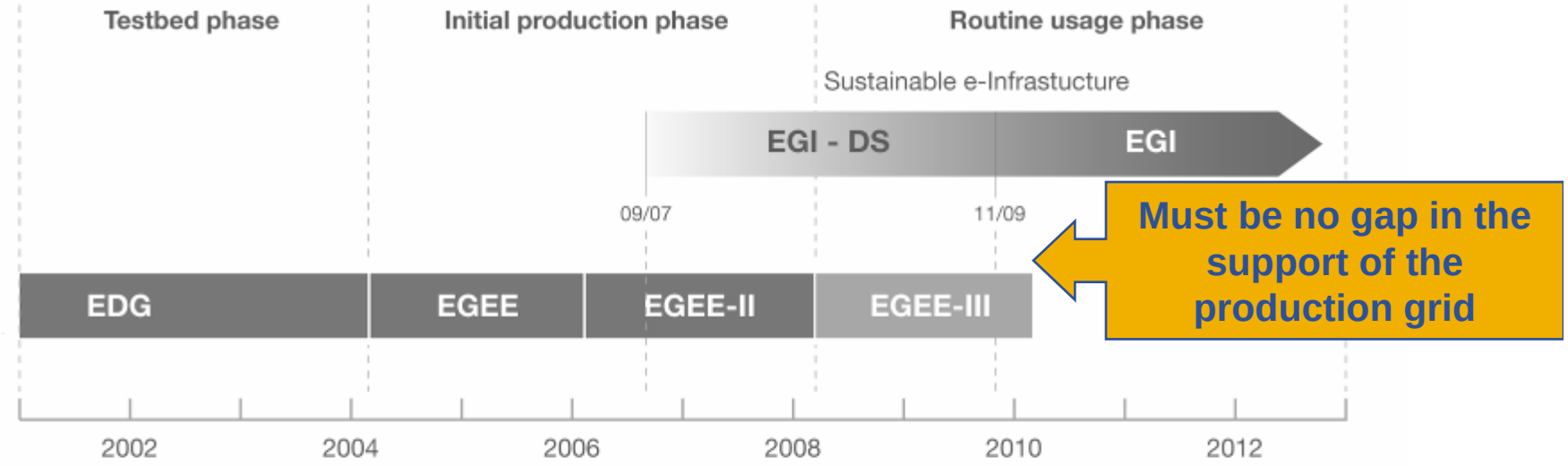
Introduction of Players

- WLCG Collaboration
- EGEE Consortia
- European Commission (EC)
- e-Infrastructure Reflection Group (e-IRG)

- European Grid Initiative (EGI) =
  National Grid Initiatives (NGIs) +
  EGI Organisation

European Grid Initiative

- **Need to prepare permanent, common Grid infrastructure**
- **Ensure the long-term sustainability of the European e-Infrastructure independent of short project funding cycles**
- **Coordinate the integration and interaction between National Grid Infrastructures (NGIs)**
- **Operate the production Grid infrastructure on a European level for a wide range of scientific disciplines**



A Permanent, Common Grid Infrastructure

- **Dependency**:
  Some **application domains depend** on grids already today by using them for production runs

- **Protection of Investment**:
  Investment in grids, both from funding organizations and from users, need to be **protected**

- **Perspective**:
  Today's grid users are **grid enthusiasts**, tomorrows grid users ask for a **longer term perspective**

European Grid Initiative

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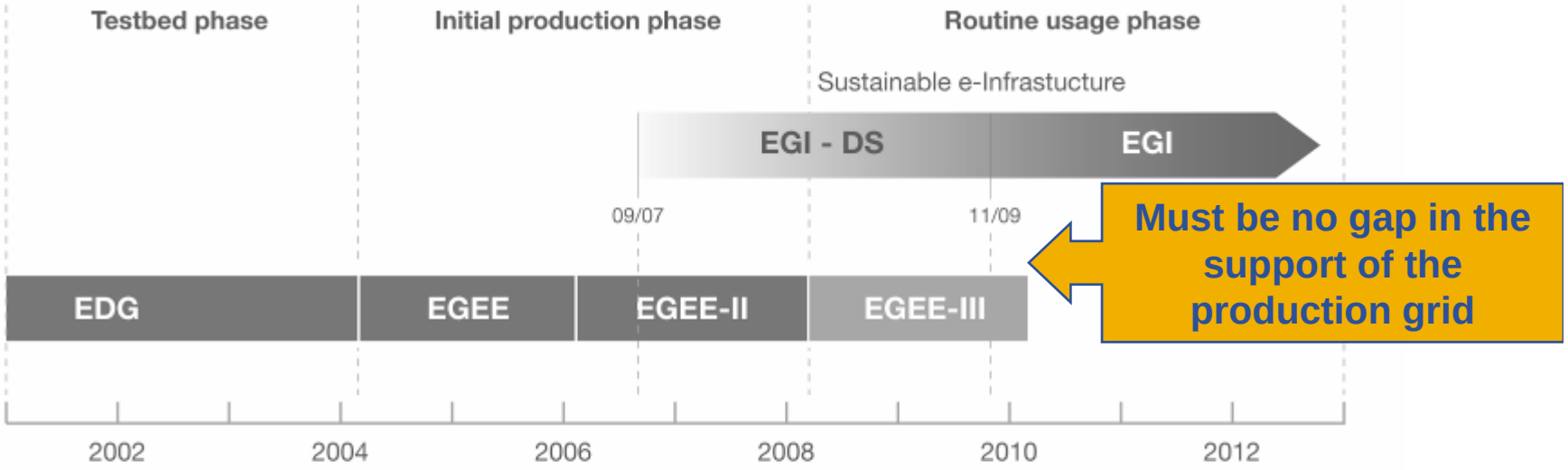


The EGEE Series of Projects

- **EGEE**
  - 01 April 2004 – 31 March 2006
  - 71 partners, 27 countries
  - EC Contribution: 32 Mio €
- **EGEE-II**
  - 01 April 2006 – 30 April 2008
  - 91 partners (11 JRU – 48 partners), 32 countries
  - EC Contribution: 36 Mio €
- **EGEE-III ab 1. Mai 2008**
  - 01 May 2008 – 30 April 2010
  - 42 partners (mostly JRUs)
  - EC Contribution: 32 Mio €

INFRA-2007-1.2.3:
e-Science Grid Infrastructures

Indicative budget: 50 Mio €

EGEE-III > 60 %

e-IRG Delegates Meeting, London, 12/2005

Recommendation:

"*The e-IRG recognises that the current **project-based financing model** of grids (e.g., EGEE, DEISA) presents **continuity and interoperability problems**, and that new financing and governance models need to be explored – taking into account the role of **national grid initiatives** as recommended in the Luxembourg e-IRG meeting.*"

e-IRG Recommendations on Sustainable e-Infrastructures

*I: governments and the Commission should develop policies and mechanisms to encourage increased investment in a **more coherent and interoperable way** across Europe*

*II: the existing e-Infrastructure projects must be superseded by **integrated sustainable services** at national and European levels*

*III: e-Infrastructures must be **application-neutral and open to all user communities and resource providers**. National funding agencies should be encouraged to fund multi-disciplinary and inclusive infrastructures rather than disciplinary-specific alternatives*

e-IRG Recommendations on Sustainable e-Infrastructures

*IV: e-Infrastructures must **inter-operate and adopt international standard services and protocols** in order to qualify for funding*

*V: the Commission should, within the seventh Framework Programme, develop a pan-European e-Infrastructure which **explicitly encourages the further integration of national e-Infrastructure initiatives***

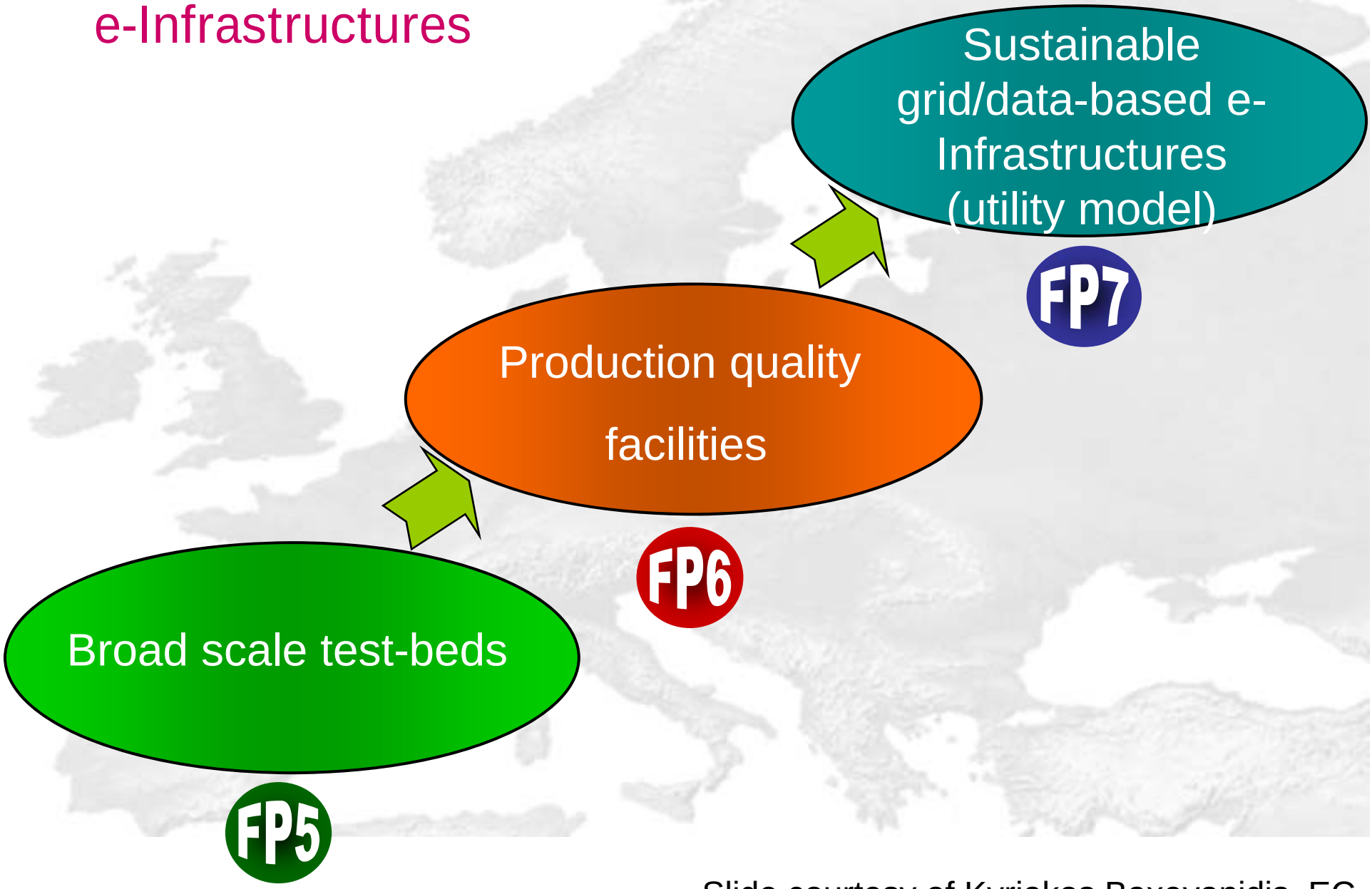
e-IRG Task Force on Sustainable e-Infrastructures (SeI)
http://www.e-irg.org/publ/2006-Report_e-IRG_TF-SEI.pdf

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, Commissioner, European Commission, at the EGEE'06 Conference, September 25, 2006

Towards sustainable grid-empowered e-Infrastructures



Slide courtesy of Kyriakos Baxevanidis, EC

European Grid Initiative

- Need to prepare permanent, common Grid infrastructure
- Ensure the long-term sustainability of the European e-Infrastructure independent of short project funding cycles
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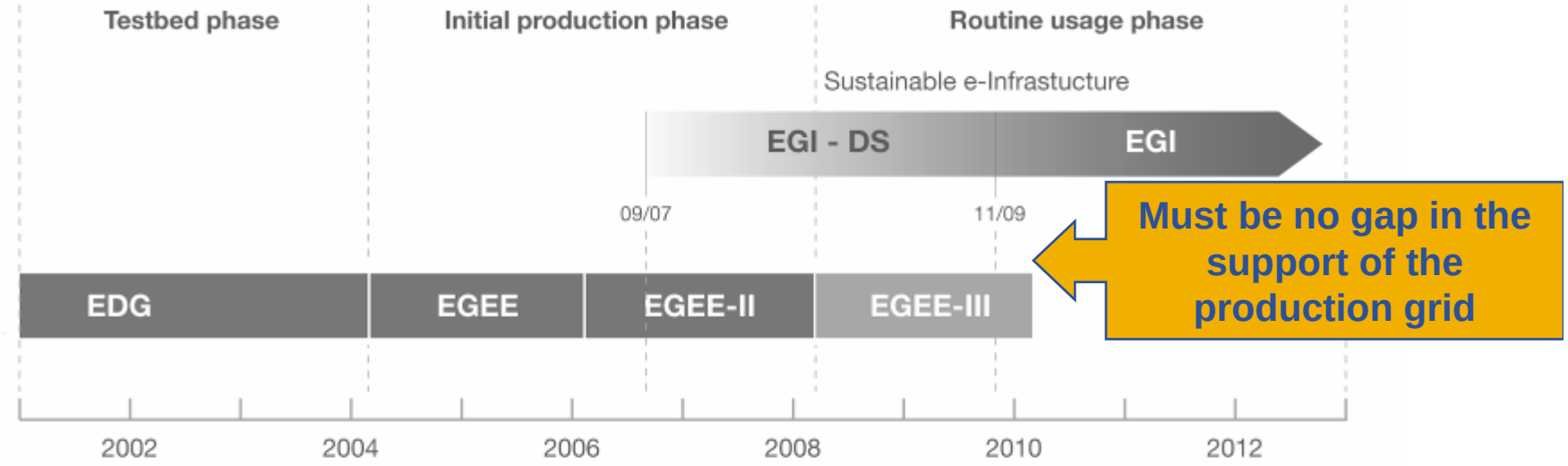
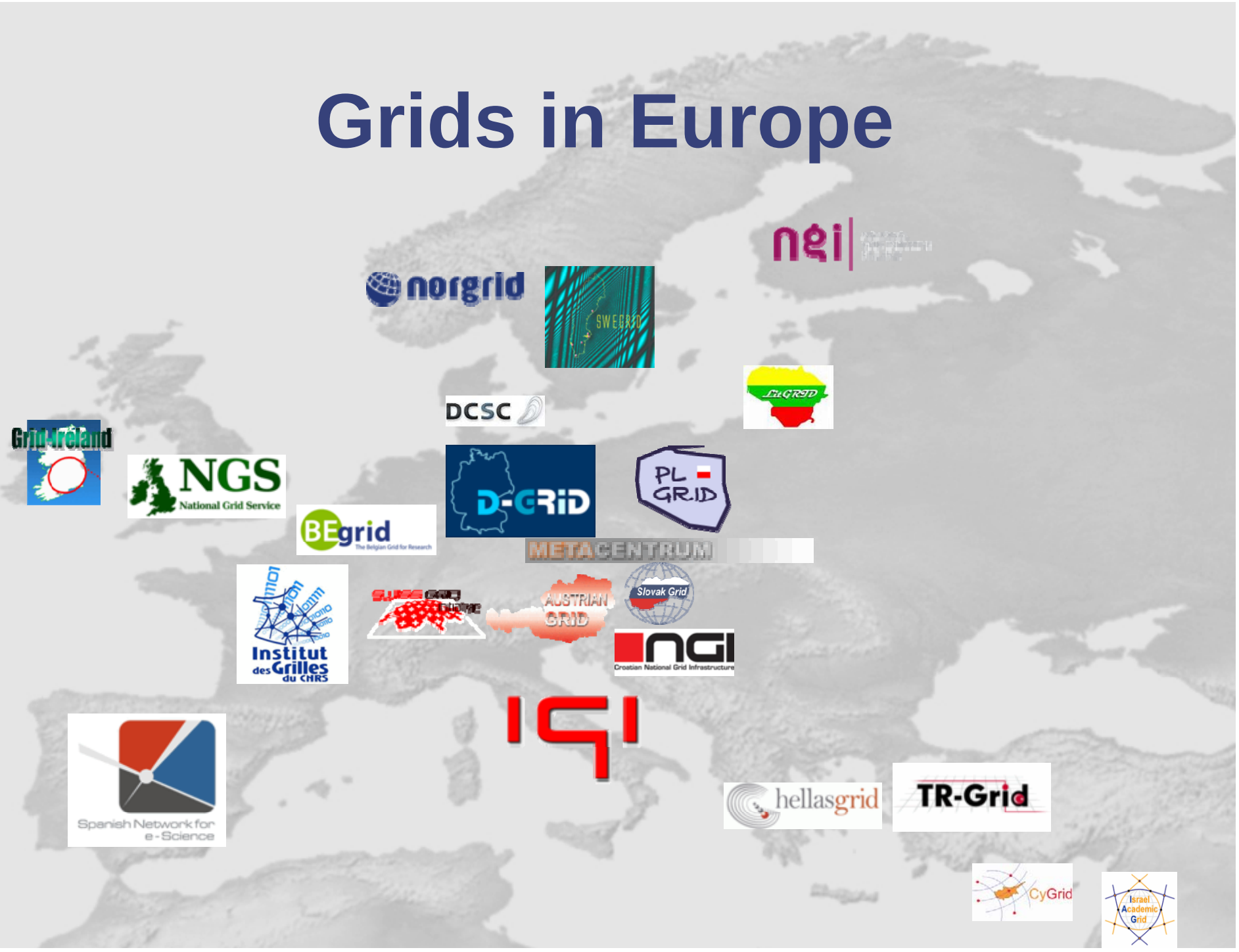
- Operate the production Grid infrastructure on a European level for a wide range of scientific disciplines



Grids in Europe



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

Evolution


National
Global
European e-Infrastructure
Testbeds
Routine Usage
Utility Service
BEgrid
open middleware infrastructure institute
grid.it project
e-Toile
NGS National Grid Service
core production computational and data grid
D-GRID
GridPP
UNICORE FORUM
Grid-Ireland
HELLAS GRID Task Force
AUSTRIAN GRID
INFN GRID
NORDUGRID
Grid Solution for Wide Area Computing and Data Handling
ACI GRID
DutchGrid
euchinagrid
EUMED grid
SEE-GRID
eGee
Enabling Grids for E-sciencE
omii europe
DataGRID
Diligent
DEISA
BEinGRID
ISSeG
BioinfoGRID
eTICS
Belief
Health-e-Child

European Grid Initiative

Goal:

- Long-term sustainability of grid infrastructures in Europe

Approach:

- Establishment of a new federated model bringing together NGIs to build the EGI Organisation

EGI Objectives

- Ensure the long-term sustainability of the European e-infrastructure
- Coordinate the integration and interaction between National Grid Infrastructures
- Operate the European level of the production Grid infrastructure for a wide range of scientific disciplines to link National Grid Infrastructures

- 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.eu/vision.pdf

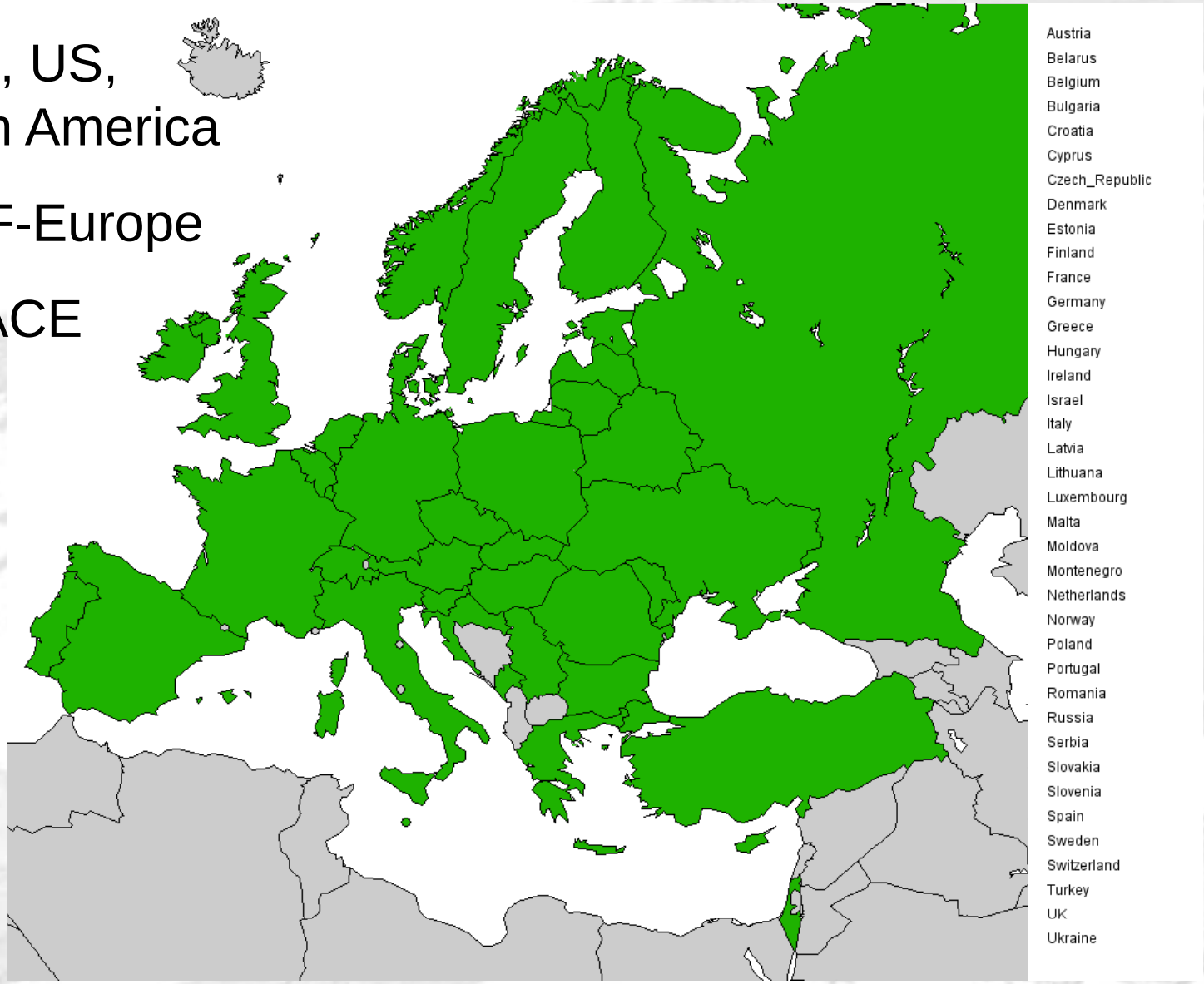
38 European NGIs

+ Asia, US, Latin America

+ OGF-Europe

+ PRACE

+ …



European Grid Initiative

Goal:

- Long-term sustainability of grid infrastructures in Europe

Approach:

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EGI Organisation:

- Coordination and operation of a common multi-national, multi-disciplinary Grid infrastructure
  - To enable and support international Grid-based collaboration
  - To provide support and added value to NGIs
  - To liaise with corresponding infrastructures outside Europe

European Grid Initiative

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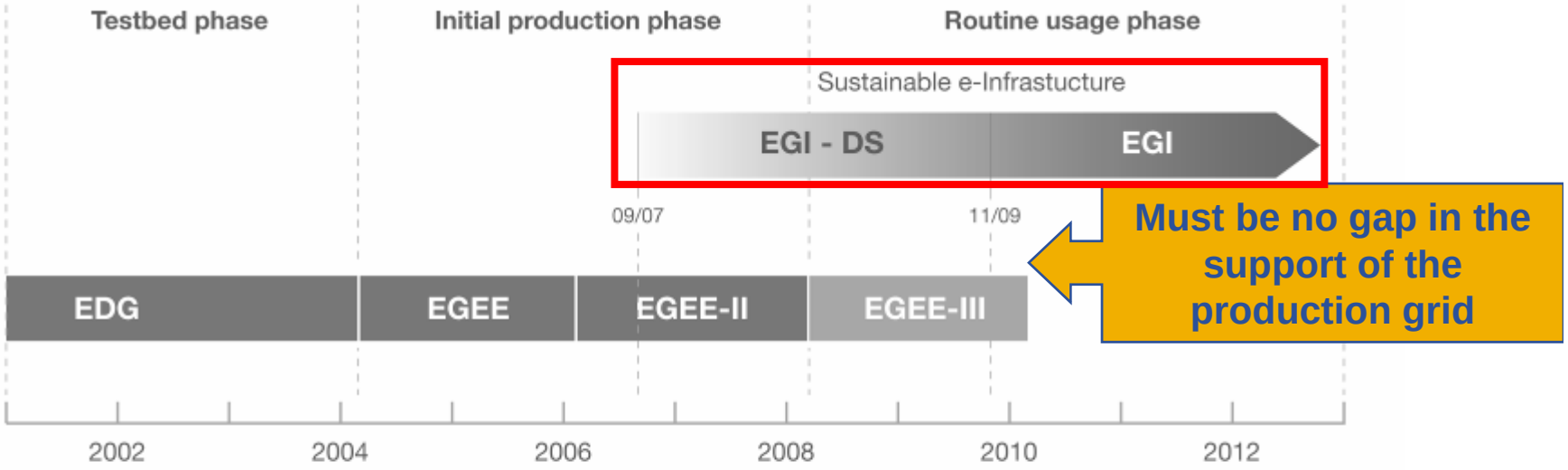


The first e-Infrastructure Call in FP7

Year 2007

Publication: early 2007
Closure: spring 2007

1. e-Science Grid Infra
2. Scientific Digital Re
3. Deployment of e-Int
   Scientific Communi
4. New Research Infrastructures – Design studies
5. New Research Infrastructures – Preparatory phase
6. Support measures (studies, policy initiatives, international co-operation,…)

- Support conceptual design studies for new RI (or major upgrades of existing ones) of clear European dimension and interest; such studies will help to assess technical and financial feasibility of proposed new RI
- *Action should also foster emergence of new organisational models to consolidate a sustainable approach to e-Infrastructures, in particular in the domain of grids and data repositories*
- *New service provisioning schemes to be more neutral and open to all user communities and resource providers*

Slide courtesy of Kyriakos Baxevanidis, EC

EGI Design Study

Project proposal:

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

Goal:

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

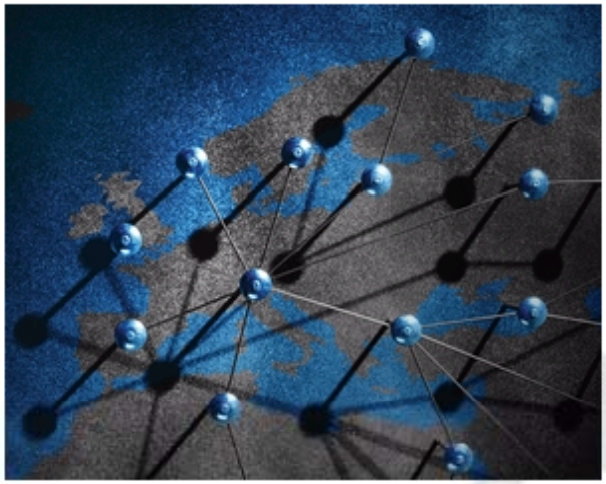
Home

European Grid Initiative

»Towards a sustainable production grid infrastructure«

About EGI | EGI_DS Partners | Events | Documents | Press corner | Internal

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 collaborativescientific 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.eu

e-infrastructure

Website hosted by GUP, Linz; created 2007 by webmaster@eu-egi.org

Last update: December 13, 2007

EGI Design Study

Project proposal:

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

Goal:

- Conceptual setup and operation of a new organisational model of a sustainable pan-European grid infrastructure
- **Consortium**: 9 Partners → **EGI Preparation Team**

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 Design Study

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- **Consortium**: 9 Partners → **EGI Preparation Team**
- NGI Representatives → **EGI Advisory Board**

EGI Advisory Board

Home » EGI_DS Partners » NGIs - EGI Advisory Board

European Grid Initiative

»Towards a sustainable production grid infrastructure«

About EGI | EGI_DS Partners | Events | Documents | Press corner | Internal

National Grid Initiatives

EGI Advisory Board Chairman

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

EGI Advisory Board

No.	Country	Institution	AB member(s)	Date[1]
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	March 6, 2007
5	Croatia	SRCE, University computing centre, University of Zagreb	Ivan Maric	April 13, 2007
6	Cyprus	University of Cyprus, Dept. of Computer Science	Marios Dikaiakos	February 24, 2007
7	Czech Republic	CESNET z.s.p.o.	Ludek Matyska	April 17, 2007
8	Denmark	DCSC - Danish Center for Scientific Computing NDGF - Nordic Data Grid Facility	Rene Belso Michael Gronager	April 27, 2007 March 11, 2008
9	Estonia	NICPB - National Institute for Chemical Physics and Biophysics	Martti Raidal	April 26, 2007
10	Finland	CSC - Scientific Computing Ltd.	Leif Laaksonen	March 5, 2007
11	France	CNRS - Centre National De La Recherche Scientifique	Guy Wormser	April 30, 2007
12	Germany	DFN-Verein - Deutsches Forschungsnetz (on behalf of D-Grid)	Klaus Ullmann	April 10, 2007
13	Greece	GRNET S.A. - Greek Research & Technology Network	Panayiotis Tsanakas Fotis Karagiannis	April 25, 2007
14	Hungary	NIIF - National Information Infrastructure Development Institute	Tamás Máray	April 27, 2007

EGI Design Study

Project proposal:

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

Goal:

- Conceptual setup and operation of a new organisational 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)

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)

EGI_DS Chronology

- **October 2006:** EGEE appoints EGI Coordinator
- **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**:

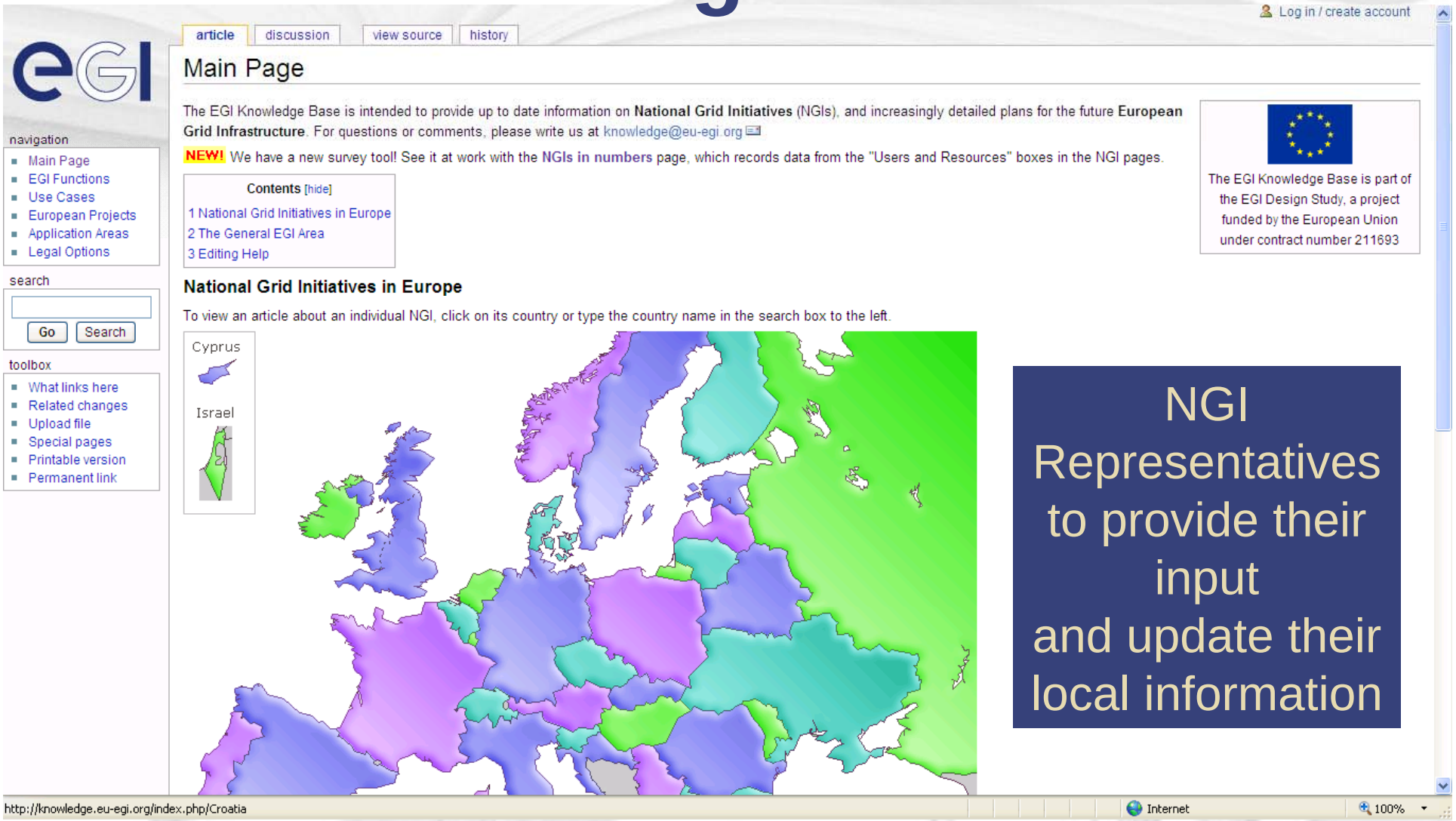
➔**EGI Workshop**, Budapest, Hungary
"*Requirements consolidation and use case definition*"

http://www.eu-egi.eu/workshop/oct07

EGI Budapest Workshop Summary: Use Cases

- Attended by NGI representatives and other communities
- **First set of EGI use cases** gathered and summarised:
  - 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
    (1 to 8 use cases each reply)
- **Summary of use cases** available in the EGI Knowledge Base (http://knowledge.eu-egi.eu)

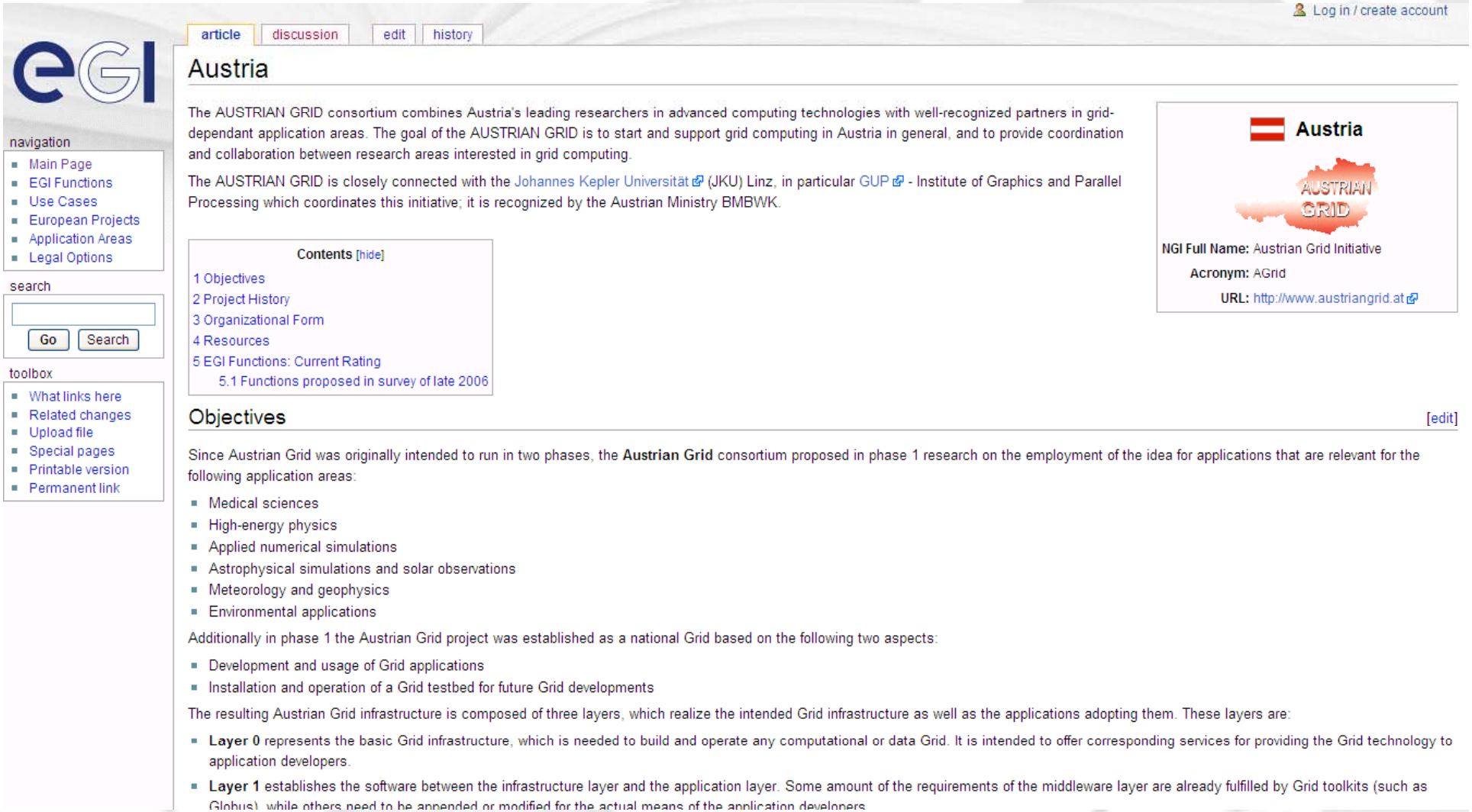
EGI Knowledge Base - Main



NGI Representatives to provide their input and update their local information

http://knowledge.eu-egi.eu

EGI Knowledge Base Austria



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Austria

The AUSTRIAN GRID consortium combines Austria's leading researchers in advanced computing technologies with well-recognized partners in grid-dependant application areas. The goal of the AUSTRIAN GRID is to start and support grid computing in Austria in general, and to provide coordination and collaboration between research areas interested in grid computing.

The AUSTRIAN GRID is closely connected with the Johannes Kepler Universität (JKU) Linz, in particular GUP - Institute of Graphics and Parallel Processing which coordinates this initiative; it is recognized by the Austrian Ministry BMBWK.

Austria

NGI Full Name: Austrian Grid Initiative
Acronym: AGrid
URL: http://www.austriangrid.at

navigation
- Main Page
- EGI Functions
- Use Cases
- European Projects
- Application Areas
- Legal Options

search
Go Search

toolbox
- What links here
- Related changes
- Upload file
- Special pages
- Printable version
- Permanent link

Contents [hide]
1 Objectives
2 Project History
3 Organizational Form
4 Resources
5 EGI Functions: Current Rating
5.1 Functions proposed in survey of late 2006

Objectives [edit]

Since Austrian Grid was originally intended to run in two phases, the **Austrian Grid** consortium proposed in phase 1 research on the employment of the idea for applications that are relevant for the following application areas:

- Medical sciences
- High-energy physics
- Applied numerical simulations
- Astrophysical simulations and solar observations
- Meteorology and geophysics
- Environmental applications

Additionally in phase 1 the Austrian Grid project was established as a national Grid based on the following two aspects:

- Development and usage of Grid applications
- Installation and operation of a Grid testbed for future Grid developments

The resulting Austrian Grid infrastructure is composed of three layers, which realize the intended Grid infrastructure as well as the applications adopting them. These layers are:

- **Layer 0** represents the basic Grid infrastructure, which is needed to build and operate any computational or data Grid. It is intended to offer corresponding services for providing the Grid technology to application developers.
- **Layer 1** establishes the software between the infrastructure layer and the application layer. Some amount of the requirements of the middleware layer are already fulfilled by Grid toolkits (such as Globus), while others need to be appended or modified for the actual means of the application developers

EGI Knowledge Base

NGIs in numbers

Country	Users	Sites	CPUs	Storage space in TB
Austria	220	5	around 800	around 10 TB
Belarus				
Belgium	301	6	800	3
Bulgaria	40	5	140	3
Croatia	33	5	136	2.5
Cyprus				
Czech Republic	around 150	5	~1000 CPUs in clusters, 100+ other (SGI, ...)	~50TB directly online + 0,4 PT tape
Denmark				
Estonia				
Finland	75	8	1212	1 TB
France				
Germany	currently over 250	30	3000 - 5000	2000
Greece	170	14	850	90
Hungary				
Ireland	50	18	~800 Grid attached	<2TB
Israel	120	4	100	1
Italy	a few hundred	50	3000	1 PB
Latvia				
Lithuania	160	10	340	21

EGI Knowledge Base

navigation

- Main Page
- EGI Functions
- Use Cases
- European Projects
- Application Areas
- Legal Options

search

Go Search

toolbox

- What links here
- Related changes
- Upload file
- Special pages
- Printable version
- Permanent link

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 preprocsesed (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** concering 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_DS Chronology

- **Oct. 2, 2007**:

  ➔**EGI Workshop**, Budapest, Hungary
  "*Requirements consolidation and use case definition*"

- **March 2008**: Draft Definition and Convention of EGI Organisation

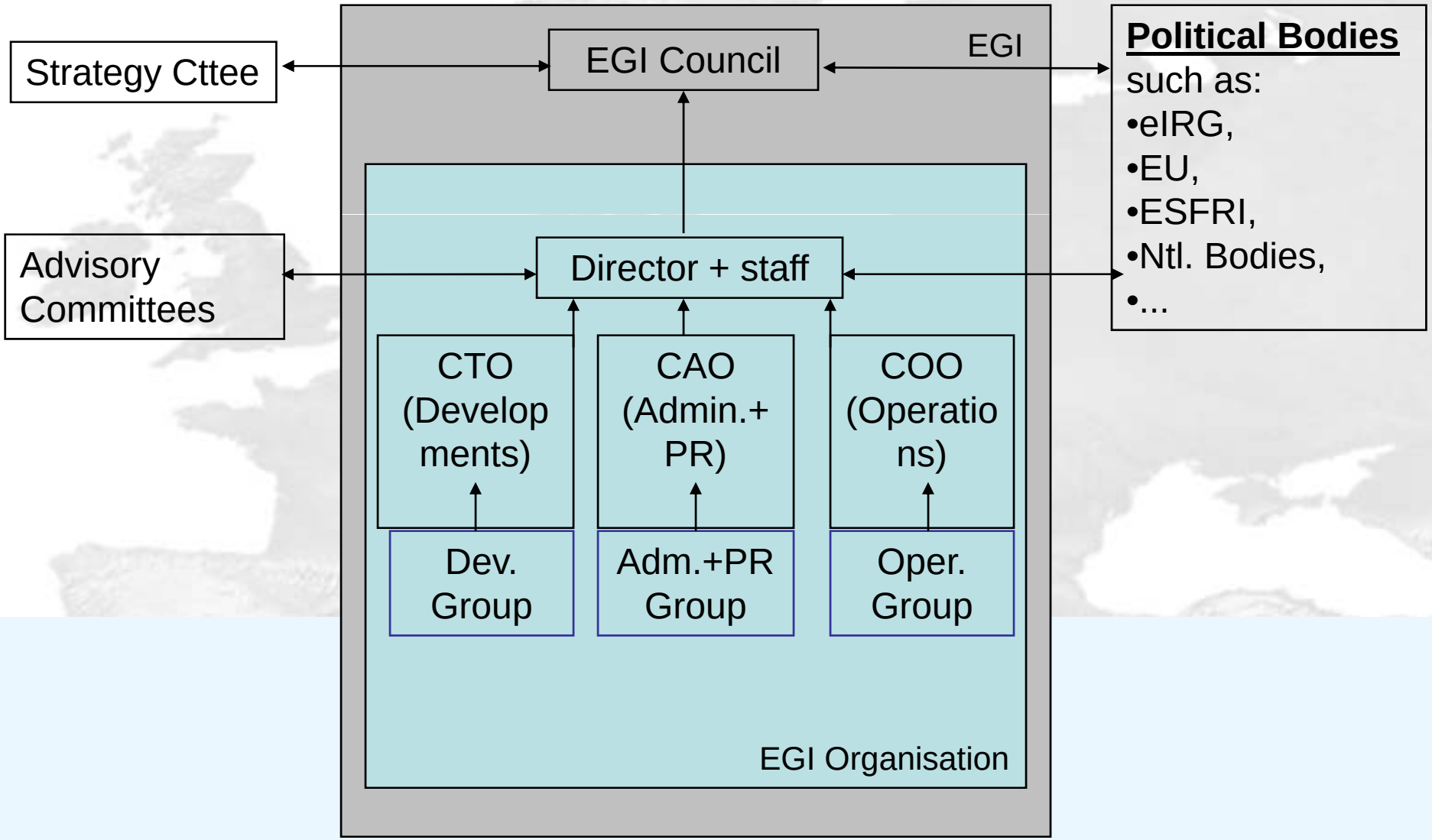
- **March 13-14, 2008**:

  ➔**EGI Workshop**, Rome, Italy
  "*List of EGI functions and working model*"
  http://www.eu-egi.eu/workshop/mar08

EGI Functionality Overview

- **Management**, Outreach & Dissemination, Representation of European Grid Efforts, Industry take-up
- **Operations** & Resource Provisioning & Security
- **Middleware** Coordination: Build&Test, Component Selection & Validation & Deployment, Standardisation & Policies
- **Application Support**, User Support & Training

EGI Management Structure



EGI Organisation Finances

- 3 major and separate cost centres:
  - **General central services**, funded through contributions
  - **Service provisioning**, funded through service charges
  - **Developments**, funded through project grants
- There are in general no cross-subsidies possible between these cost centres.

EGI Operations

- **Non-disruptive & timely transition** from current operations scenarios to EGI+NGIs

EGI Transition Scenario

Important: **Human Expertise**

- Many developments and operational tasks are performed by highly skilled staff, which has built up their expertise through the lifetime of the current grid projects.
- Care must be taken that this expertise can be retained during and after the transition period.

EGI Operations

- **Non-disruptive & timely transition** from current operations scenarios to EGI+NGIs
- Ensuring "**value-for-money**":
  - Applications Communities
  - NGIs
  - Funding agencies
- Everybody must be convinced that any money involved is not only well but also **optimally** spent!

EGI Grid Infrastructure

… should be

a large-scale, production Grid infrastructure built 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

EGI_DS Chronology

- **March 13-14, 2008**:

  ➔**EGI Workshop**, Rome, Italy

  "*List of EGI functions and working model*"

- **April 2008**: Guidelines for NGIs
- **June 2008**: EGI Blueprint publication

- **June 30-July 1, 2008**:

  ➔**EGI Workshop**, Geneva, Switzerland

  "*EGI Blueprint Presentation*"

  http://www.eu-egi.eu/workshop/jun08

Summary & Conclusion

- **WLCG**: Largest existing grid collaboration and best example for exploiting the benefits of grids

- **EGEE**: Worlds largest existing project-based production grid infrastructure

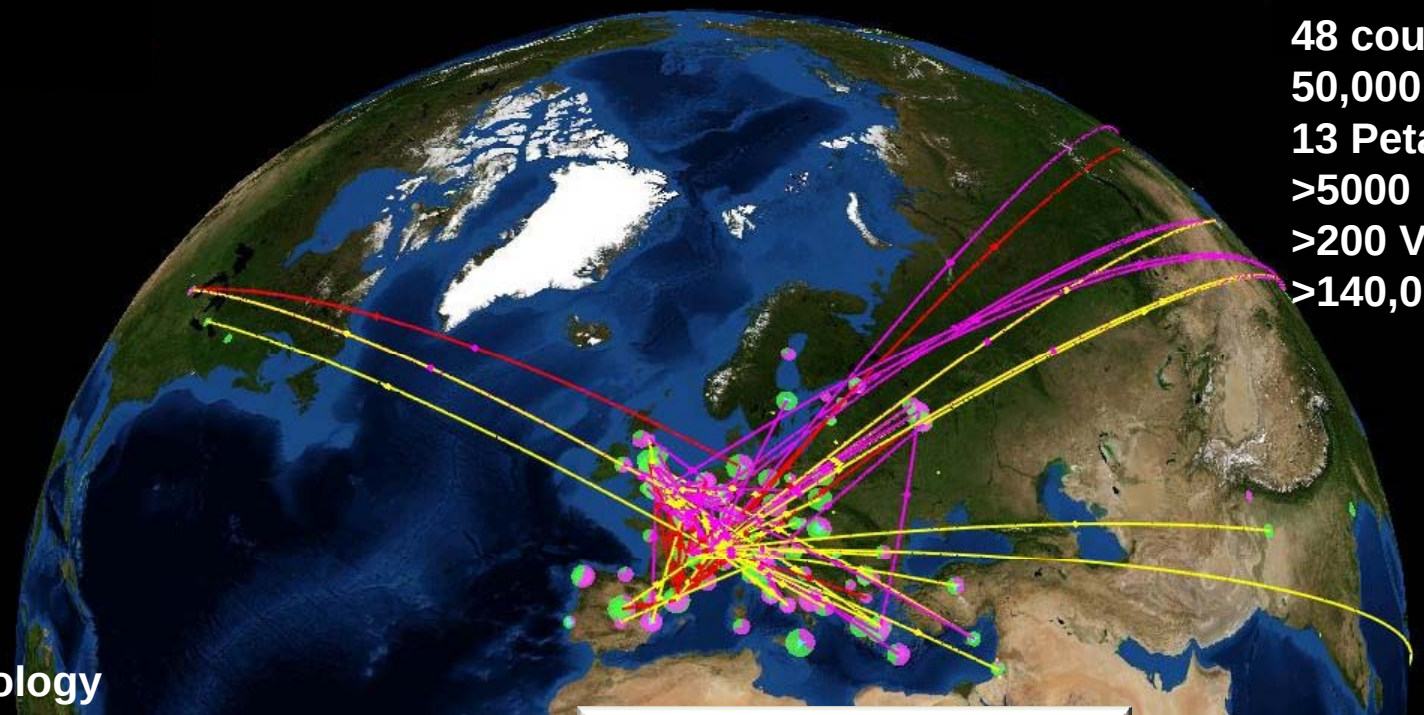
- **EGI_DS**: Project to design the future EGI organisation and its relations to the NGIs

Actions

Contribute to the **EGI design**:

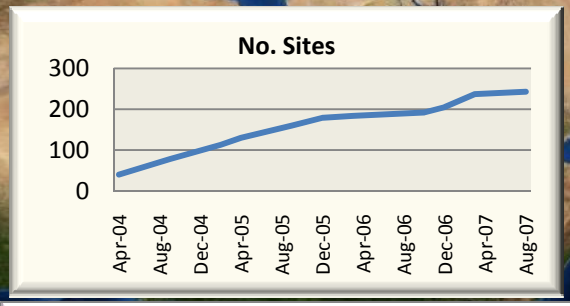
- Specify **services** and their **evolution** available for all application communities
- Specify service **requirements** from the LCG Collaboration
- Provide input on **cost estimates** for the EGI organisation: initially, short term, medium term

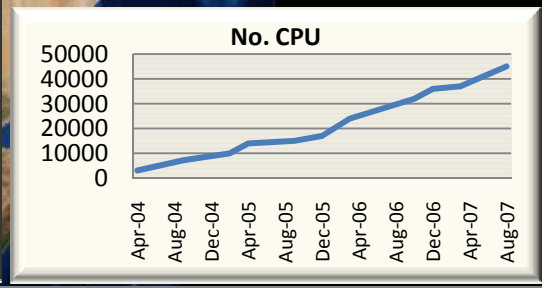
Enabling Grids for E-sciencE

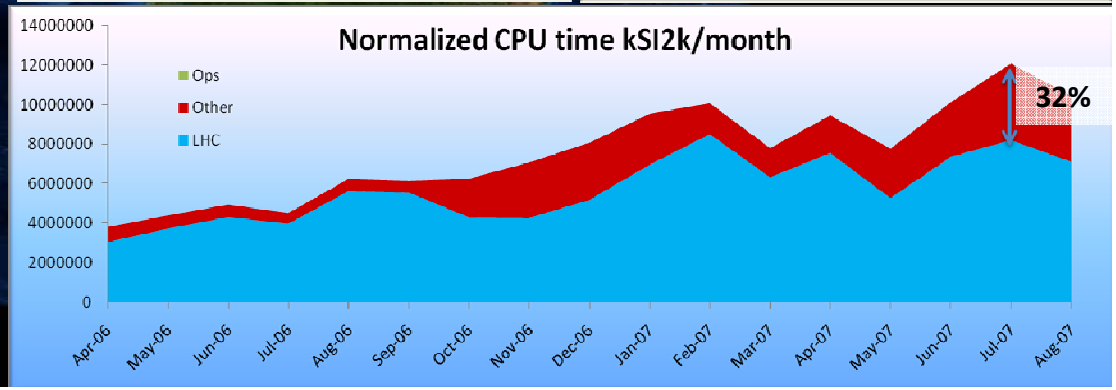


250 sites
48 countries
50,000 CPUs
13 PetaBytes
>5000 users
>200 VOs
>140,000 jobs/day

Archeology
Astronomy
Astrophysics
Civil Protection
Comp. Chemistry
Earth Sciences
Finance
Fusion
Geophysics
High Energy Physics
Life Sciences
Multimedia
Material Sciences
…







Actions

Convince the **NGIs** that

(4) benefits experienced by LCG/HEP are also possible/likely for other application communities

(5) funding a permanent, common grid infrastructure is essential for **international scientific collaboration**

(6) sustainable, reliable grid services provide **value for money**

EGI – European Grid Initiative

- **Future EGI Organisation = "Glue"** between various grid communities in Europe and beyond
- **EGI_DS** defines required mechanisms and functionalities of the EGI Organisation

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

European Grid Initiative

e-infrastructure

CAPACITIES

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