

# The European Grid Landscape – from 2010 onwards

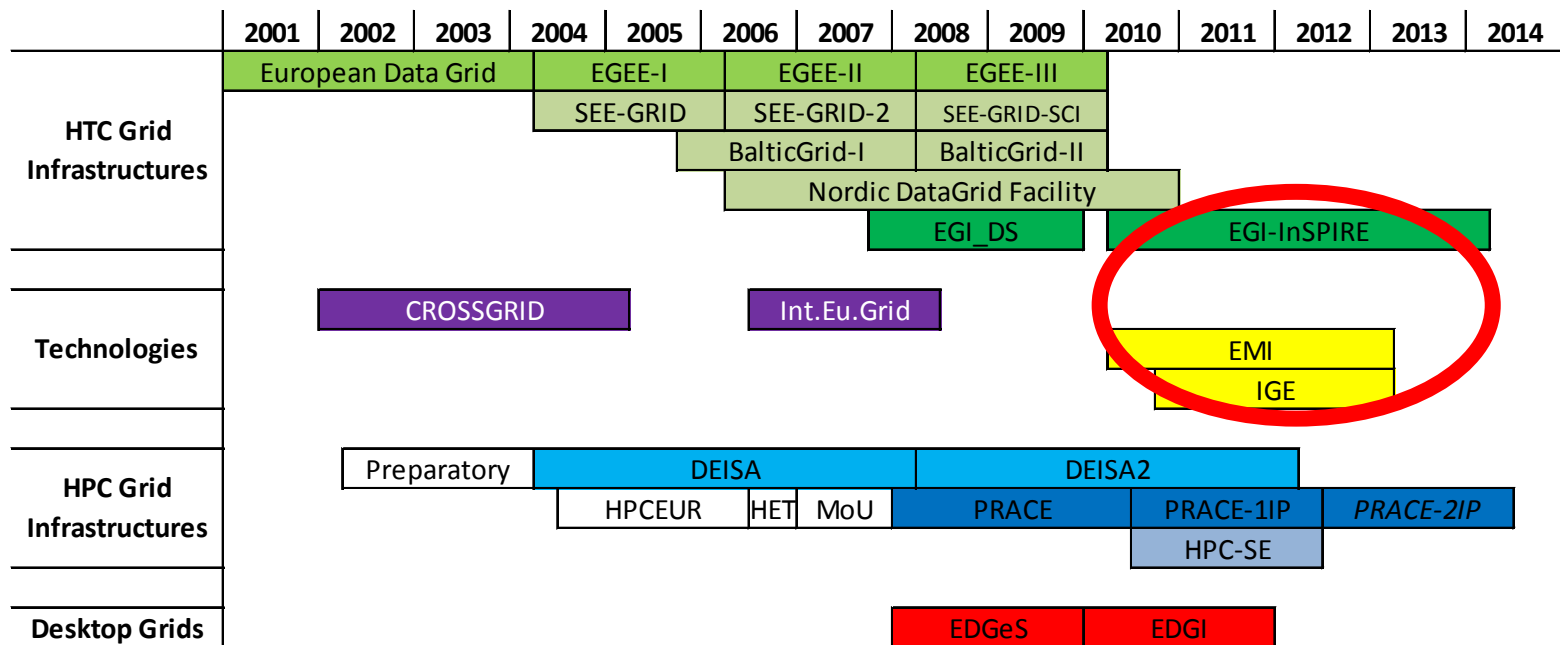
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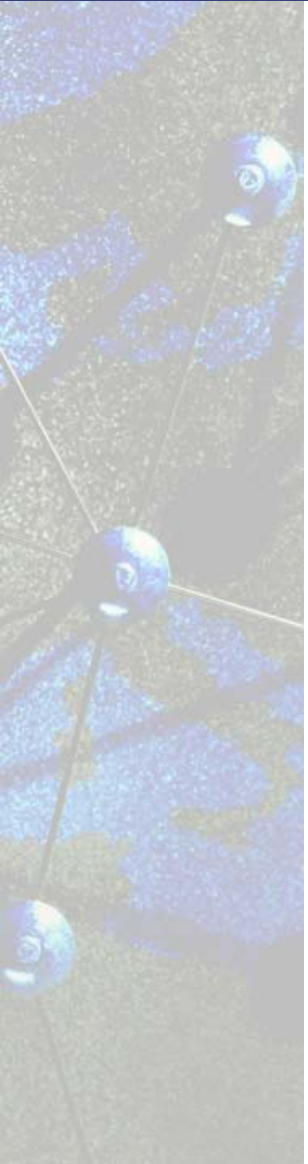
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# Grid Infrastructure projects in Europe

- Since many years (almost a decade) the European Commission (EC) is funding Grid infrastructure projects
  - Aim at building up and operating large Grid infrastructures for users
  - Recently also called **Distributed Computing Infrastructure (DCI)** projects





# The European Grid Infrastructure

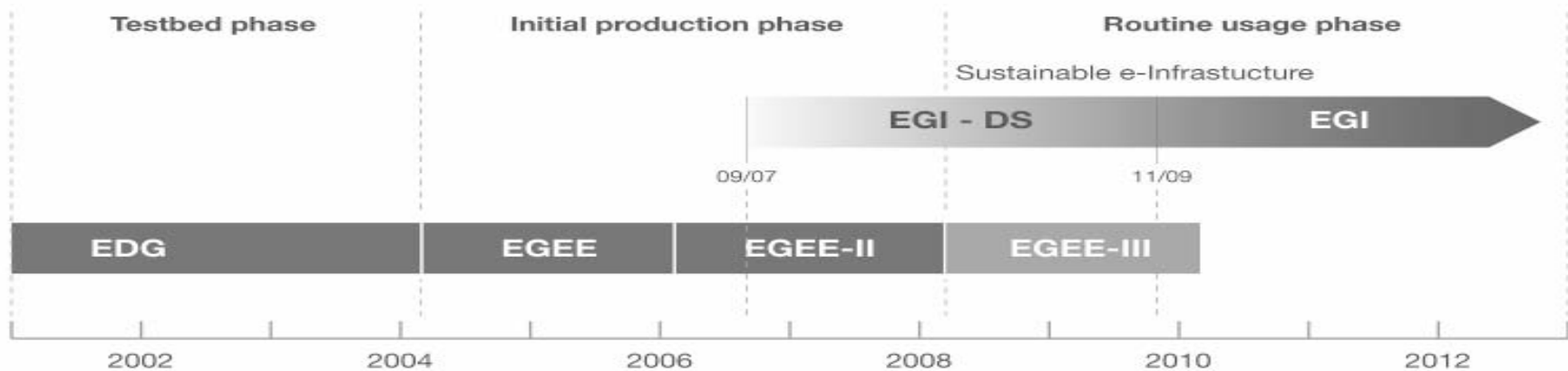
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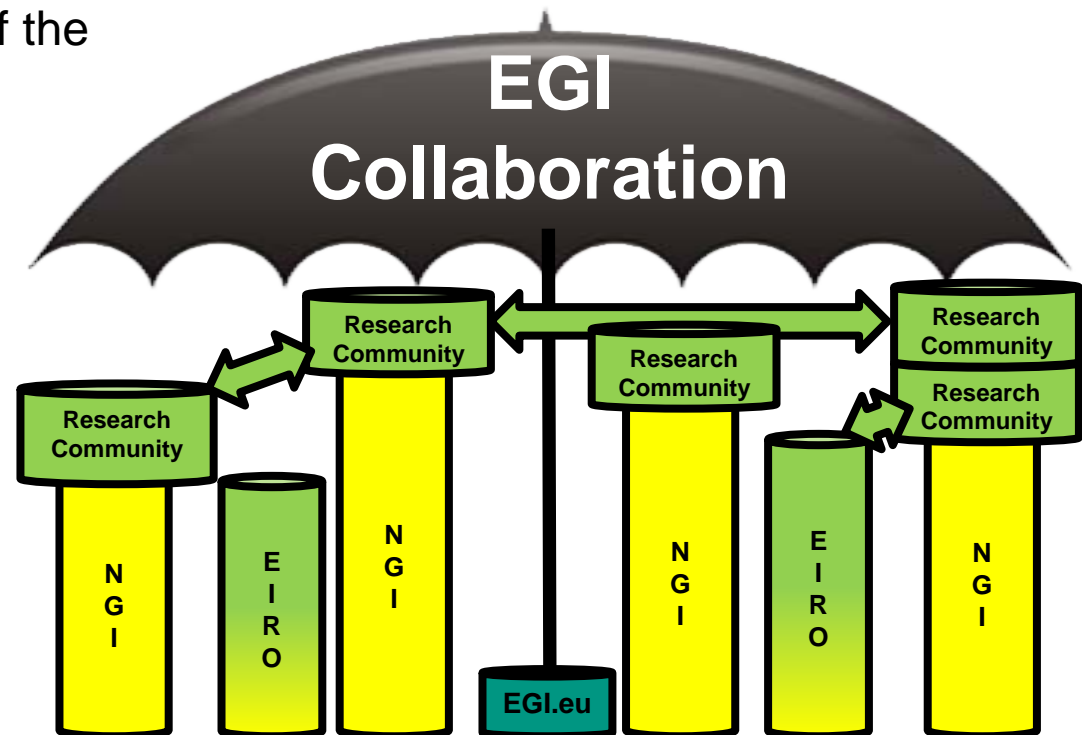
# The path to EGI

- European Data Grid (EDG)
  - Explore concepts in a testbed
- Enabling Grids for E-science (EGEE)
  - Moving from prototype to production
- European Grid Initiative (EGI)
  - Routine usage of a sustainable e-infrastructure



# The Structure of EGI

- EGI is formed by
  - National Grid Initiatives/Infrastructures (NGI) in the European countries
    - Operate and provide the computational resources
    - Perform major parts of the operational duties
  - European International Research Organisation (EIRO)
    - CERN (European Organization for Nuclear Research)
    - EMBL (European Molecular Biology Laboratory)



# The Structure of EGI

- EGI is serving
  - European and International Research Communities
    - High-Energy Physics, Life Sciences, etc.
  - ESFRI Projects (European Strategy Forum on Research Infrastructures)
    - ELIXIR (European Life-Science Infrastructure for Biological Information)
    - DARIAH (Digital Research Infrastructure for the Arts and Humanities)
- EGI is made up of
  - An organization **EGI.eu**, located in Amsterdam
  - An EU-funded project **EGI-InSPIRE**
  - The **NGIs** in the members states
  - Its technology projects **EMI** and **IGE**

# EGI.eu

- Established on February 8, 2010 under Dutch law
- Objective
  - To create and maintain a pan-European Grid Infrastructure
  - In collaboration with National Grid Initiatives (NGIs)
  - To guarantee the long-term availability of a generic e-infrastructure
  - For all European research communities and their international collaborators
- Approx. 20 people at headquarter in Amsterdam
- Tasks
  - Coordination of European Grid resources with central policies and services

# EGI-InSPIRE

- EGI-InSPIRE (**I**ntegrated **S**ustainable **P**an-European **I**nfrastructure for **R**esearchers in **E**urope)
  - To boot-strap EGI
  - To facilitate the Europe-wide coordination of the various national activities and tasks
- 4 year project with €25M EC contribution (project cost 72M)
  - Started on 1.5.2010
  - Effort: 9261PMs (= 771 PY), i.e. per year ~ 190 people
  - 50 project partners: EGI.eu, 39 NGIs, 2 EIROs, 8 Asia-Pacific + further unfunded partners





# User Support & Service Activities

- Support user communities
  - Researchers in international collaborations
  - National research collaborations through the NGI
  - Scale up from the single VO (a few users in one institution) to an international community
- Provide a federated helpdesk linking
  - Discipline specific support (e.g. Bio Apps)
  - General infrastructure support
  - National Grid Infrastructures
  - Generic services (e.g. Training)
  - Technology used: **GGUS from KIT**
- Provide core services to support users
  - Manage VOs, application DB, training DB



# Technology Innovation Activities

## ■ Deploy Technology Innovation

- Distributed Computing continues to evolve (to include: Grids, Desktops, Virtualisation, Clouds, ...)
- Technology Innovation will come from outside EGI

## ■ Enable Software Innovation

- Provide reliable persistent technology platform (tools built on Grid Middleware technologies gLite, UNICORE, ARC, Globus)

## ■ Partnership with technology projects

- EMI and IGE



## ■ Partnership with other distributed computing projects

- EDGI (European Desktop Grid Initiative), StratusLab, VenusC



# Other Activities

- Dissemination
  - With NGIs, the research communities, and other projects
- Support for heavy user communities
  - General & community specific services
- Events
  - Two annual meetings: user forum & technical forum
- Technology assessment and integration
- Liaison with software providers
- Definition and verification of requirements

# NGI-DE – The German NGI in EGI

- 8 partners
  - BADW/LRZ, DESY, DFN, FZJ, Fraunhofer ITWM + SCAI, KIT, LUH/RRZN, D-Grid GmbH
- Tasks in EGI
  - Central ticket system GGUS (operation & enhancements)
  - Infrastructure support (Globus, UNICORE, gLite, dCache)
  - User support
  - Operations (local and central services)
  - Security
  - Dissemination
- <http://www.ngi-de.eu/>



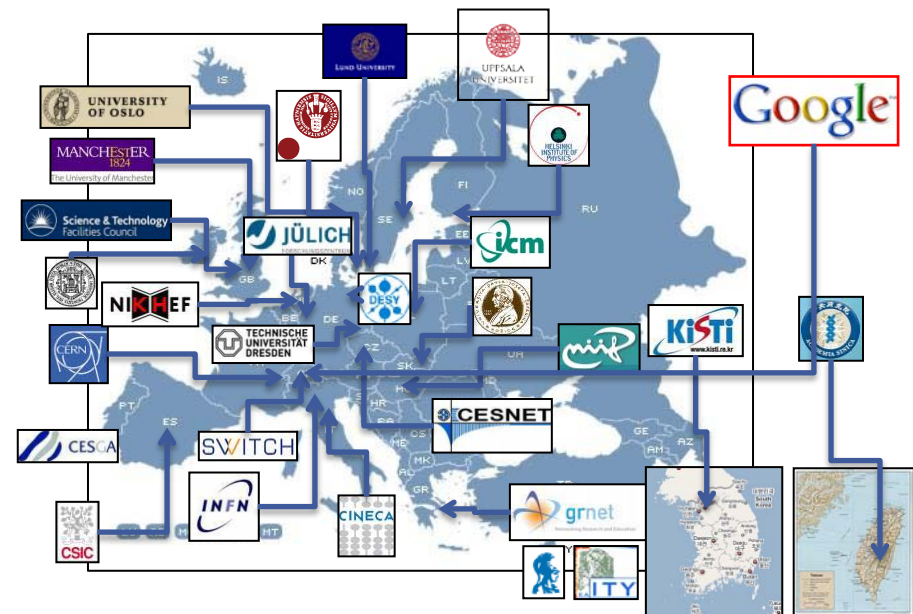


# European Middleware Initiative (EMI)

Alberto Di Meglio (CERN)  
Project Director

# The EMI Project

- Brings together the major European middleware providers (ARC, gLite, UNICORE, dCache)
- Deliver a consolidated set of middleware components for deployment in EGI, PRACE and other Distributed Computing Infrastructures (DCIs)
  - 3 year project with 12 M€ EC contribution (project costs 23 M€)
  - Started on 1.5.2010
  - Effort: 1115 PM (= 92PY), i.e. per year ~ 31 people
  - 26 project partners from the middleware consortia
  - Interest from Google



# Primary Objectives

- Consolidate the existing middleware distributions **simplifying services and components** to make them **more sustainable** (including the use of off-the-shelf and commercial components whenever possible)
- Evolve the middleware services/functionality **following the requirement of infrastructures and communities**, mainly focusing on operational, standardization and interoperability aspects
- **Reactively and proactively maintain** the middleware distribution to keep it in line with the growing infrastructure usage

Consolidate

Evolve

Support

# Technical Working Areas

- Improved Usability
  - Deployment, configuration, service management, interoperability, security mechanisms, flexibility, etc.
- Security
  - Usability, Reliability, Interoperability
- Interoperability
  - HTC / HPC, different infrastructures (in Europe and worldwide)
- Standardization
  - Interoperability, integration, extensibility and evolution, commercial usage
  - Actively pushing standards in collaboration with SIENA, the other DCI projects and the Standardisation Organisations (OGF, OASIS, etc.)



# Technical Areas in EMI

## Compute Services

A-REX, UAS-Compute, WMS, CREAM,  
MPI, etc

## Data Services

dCache, StoRM, UAS-Data, DPM, LFC,  
FTS, Hydra, AMGA, etc

## Security Services

UNICORE Gateway, UVOS/VOMS/VOMS-  
Admin, ARGUS, SLCS, glExec, Gridsite,  
Proxyrenewal, etc

## Infrastructure Services

Logging and Bookkeeping, Messaging,  
accounting, monitoring,  
virtualization/clouds support,  
information systems and providers



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# Vision & Aims

- Adapt US-based Globus Toolkit to European requirements
  - Bundle European input to Globus Toolkit development
  - Enable protection of European investments
  - Aide with maintenance
- Act as an interface
  - Towards European efforts
  - Towards the Globus Alliance
  - Provide adaptation between them
- Central point of contact in Europe for Globus Toolkit
- Add the European perspective to Globus Toolkit
- Globus service provider for European e-Infrastructures such as DEISA, EGI, PRACE



# The IGE project

- IGE serves as a comprehensive service provider for the European e-infrastructures regarding the development, customization, provisioning, support including training, and maintenance of Globus Toolkit components
  - 2.5 year project with 2.35 M€  
EC contribution (project costs 3.7 M€)
  - Starts on 1.10.2010
  - Effort: 276.5 PM (= 23 PY),  
i.e. per year ~ 9 people
  - 10 project partners from Europe  
+ University of Chicago



# Objectives

- Coordination of European Globus activities
- Bundle European input to US-based Globus core
- Introduce adjustments critical for Europe into Globus code base (e.g. metrics collection)
- Measure Globus software quality
- Support interoperability efforts for job submission, security, accounting, job description, etc.
- Maintain binary packages for European users
- Support batch systems used in Europe
- Be the Globus software provider to EGI

# Summary

- The future of the European Grid Infrastructure Landscape is made up of
- **EGI** with its organization EGI.eu in Amsterdam, the EGI-InSPIRE project and the National Grid Initiatives (NGI) in the countries
- **EMI** project as the provider of the European technologies ARC, gLite, UNICORE and dCache
- **IGE** project as the provider of US-based Globus Toolkit

# Acknowledgement

## ■ Special thanks to

- **Steven Newhouse**, Project Director EGI-InSPIRE & Director EGI.eu

- **Steve Brewer**, Chief Community Officer EGI.eu

- **Alberto di Meglio**, Project Director EMI

- **Helmut Heller**, Project Director IGE



## ■ Links:

- <http://www.egi.eu/>, <http://www.eu-emi.eu/>, <http://www.ige-project.eu/>

**Thank you for your attention.**

**Any Questions?**

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