



An open e-Infrastructure enabling flexible cooperation and optimal use of all electronically available resources

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e-IRG
e-Infrastructure
Reflection Group

Contents

- Top-down: e-Infrastructure on the political map
- Bottom-up: emerging trends in e-Infrastructure use
- Tools we have: deployed infrastructure, organisations
- The role of e-IRG and its policy work
- Summary of future opportunities

e-Infrastructure services and functions

- GÉANT is the world's largest multigigabit communication network dedicated to research and education.
- e-Science Grids respond to the requirements of the most demanding scientific disciplines (e.g. high-energy physics, bioinformatics) to share and combine the power of computers and sophisticated, often unique scientific instruments.
- The scientific data domain tackles the accelerated proliferation of data elementary of the scientific discovery process.
- Supercomputing services address the data-intensive and complex scientific challenges requiring new computing and simulation capabilities.
- Global Virtual Research Communities, anticipating the advent of “research 2.0” paradigms, open new perspectives for cross-border multi-disciplinary collaboration among research communities.

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0108:FIN:EN:PDF>

The European Digital Agenda

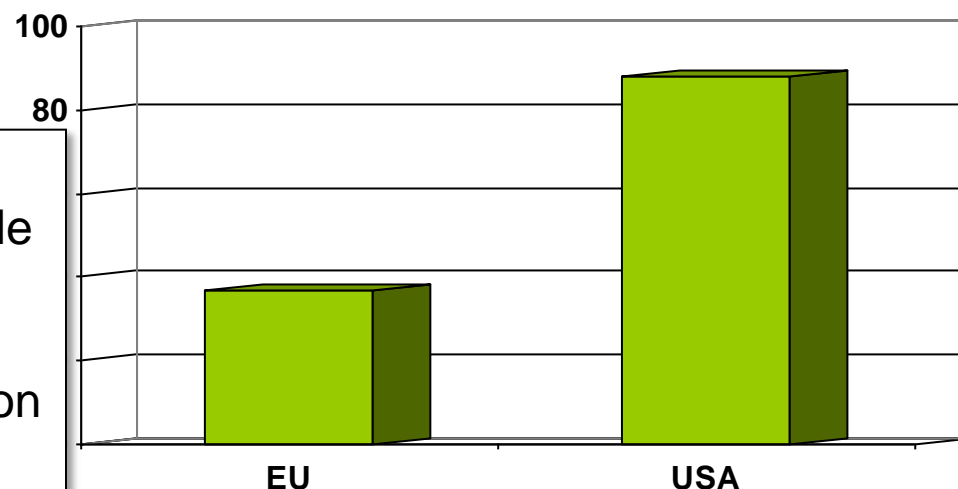
- The Digital Agenda for Europe is one of the seven flagship initiatives of the Europe 2020 Strategy
- Set out to define how the use of Information and Communication Technologies (ICT) will enable Europe to succeed in its ambitions for 2020

• Europe should also build its innovative advantage in key areas through reinforced e-Infrastructures and targeted

- Knowledge transfer activities should be managed effectively and supported by suitable financial instruments
- Publicly funded research should be widely disseminated through Open Access publication of scientific data and papers

http://ec.europa.eu/information_society/digital-agenda/index_en.htm

Figure: Total ICT R&D spending in billion € (2007)



Source: Eurostat and IPTS-JRC

Relevant policy bodies in Europe

ESFRI European Strategy Forum
on Research Infrastructures



- The European Strategy Forum on Research Infrastructures - ESFRI brings together representatives of EU Member States and Associated States, appointed by Ministers in charge of Research, and one representative of the European Commission.
- The role of ESFRI is to support a coherent approach to policy-making on research infrastructures in Europe, and to act as an incubator for international negotiations about concrete initiatives.
- <http://cordis.europa.eu/esfri/>
- The e-Infrastructure Reflection Group (e-IRG) was founded to define and recommend best practices for the (pan-) European distributed e-Infrastructure. Representatives appointed by Ministers in EU Member States, Associated States to the EU Research Framework Programme and the European Commission.
- The main objective of e-IRG is to support the creation of a framework (political, technological and administrative) for the easy and cost-effective shared use of distributed electronic resources across Europe.
- <http://www.e-irg.eu/>

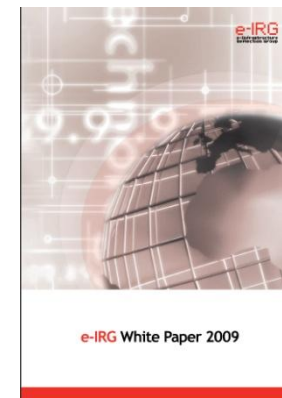
Mission and Vision of the e-IRG

- ***The e-Infrastructure Reflection Group is an inter-governmental policy body comprising national delegates from more than 30 European countries***
- ***The e-IRG mission is to pave the way towards a general-purpose European e-Infrastructure***
- ***The vision for the future is an open e-Infrastructure enabling flexible cooperation and optimal use of all electronically available resources***



Key publications in 2009-2010:

- **e-IRG Data Management Task Force report 2009** (jointly approved by ESFRI and e-IRG); **e-IRG White Paper 2009**; **e-IRG roadmap 2010**;
- **e-IRG Blue Paper 2010 for ESFRI**; **e-IRG White Paper 2011**



- The Digital Agenda launched in March creates a **surrounding policy framework** around the work of e-IRG by fundamentally shaping the European ICT landscape - an anchoring point for the e-IRG action plan.
- The Digital Agenda has an overall aim of delivering sustainable economic and social benefits from a **digital single market** based on **ultra-fast Internet** and **interoperable** applications.
- The **e-Infrastructure community** - as **pioneers** of the high-end networking, interoperable applications and platforms - sees as its duty to contribute in all possible ways to the realisation of this vision.

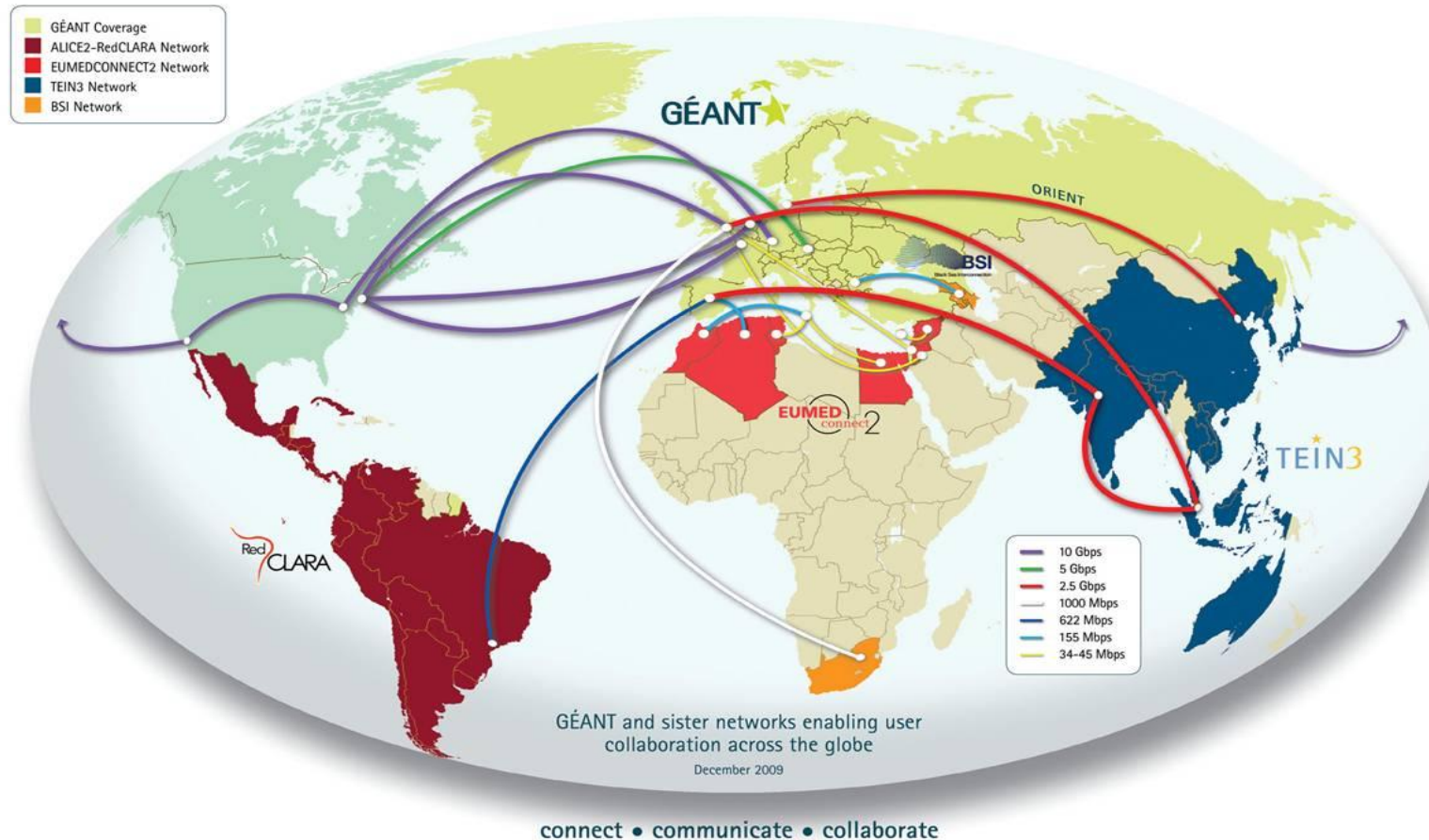
e-IRG aims at global challenges with a high societal impact

- Target audiences:
 - Policy makers on the governmental and inter-governmental levels
 - Dealing with funding, privacy and other issues that are becoming more and more crucial due to the broader uptake of the e-Infrastructure-enabled technologies and processes.
 - Service-providers on the e-Infrastructure domain
 - Such as organizations operating research networks or computing centres – or projects that build on this base and provide higher-level multidisciplinary services.
 - Existing and new user communities, looking for a broad overview of the capacities and capabilities that the current and near-future e-Infrastructure can provide.

Trends driving the research

- System level science
 - The integration of diverse sources of knowledge about the constituent parts of a complex system with the goal of obtaining an understanding of the system's properties as a whole [Ian Foster]
- Transdisciplinary research
 - Each discipline can solve only part of a problem
 - Collaboration between different research groups
 - Distributed across states, countries, continents
- Research driven by (distributed) data
 - Data explosion, both in volume and complexity
 - Simulation and experiment combined
 - Exploring data-sets with no up-front hypothesis
- Research carried out using simulation and modelling
 - HPC and Grid computing together with high speed networks enable totally new visions in simulations of complex phenomenon

GÉANT global connectivity



GÉANT global connectivity – November 2009

Source: Dante

Roadmap to an ESFRI Research Infrastructure eco-system (update 2008)

ESFRI addressing fields of Research and major research challenges

e-IRG building the e-Science

E-INFRASTRUCTURE

SOCIAL SCIENCES & HUMANITIES

ENVIRONMENTAL SCIENCES

ENERGY

BIOMEDICAL AND LIFE SCIENCES

MATERIALS AND ANALYTICAL FACILITIES

PHYSICAL SCIENCES AND ENGINEERING

Crossing the boundaries of science with collaborative computing

Resources/services (capability & capacity computing, sensors, data)

Middleware and organization

Networking Infrastructure

Data Management Task Force report 2009

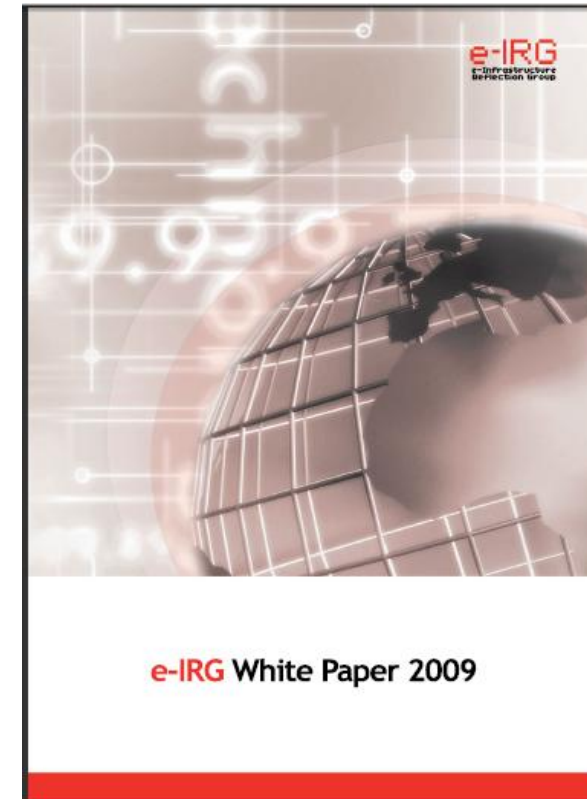
- A collaborative effort between e-IRG and ESFRI carried out during 2009.
- The report is divided into three parts:
 - a survey of existing data management initiatives;
 - metadata and quality;
 - interoperability issues in data management.
- The report ends with conclusions of the study and a set of proposed recommendations for further analysis and discussion by the e-IRG.
- The findings will also be presented to the e-IRG and to ESFRI to create a final set of recommendations endorsed by the two bodies.
- Finalized and endorsed by the e-IRG and ESFRI during 2009!

http://www.e-irg.eu/images/stories/publ/task_force_reports/dmtfjointreport.pdf

- One of e-IRG's main publications dealing with e-Infrastructure technologies and projects **requiring policy-level actions**
- A collection of independent and self-sustained topics from different e-Infrastructure areas; Examples:
 - **Grid and Cloud computing**
 - A “holistic” approach to **Security** (seen “as a whole”)
 - **Sustainability** of the computing related e-Infrastructure
 - Service-centric e-Infrastructures through **Virtualization**
 - **Remote instrumentation** (and its integration with e-Infrastructures)
- Topics selected and content produced by e-IRG delegates and experts in a multi-stage consultation process
- Studying technological, economical, societal and policy developments and limitations requiring appropriate actions
- Targeting different audiences:
 - Policy makers, e-Infrastructure providers and users

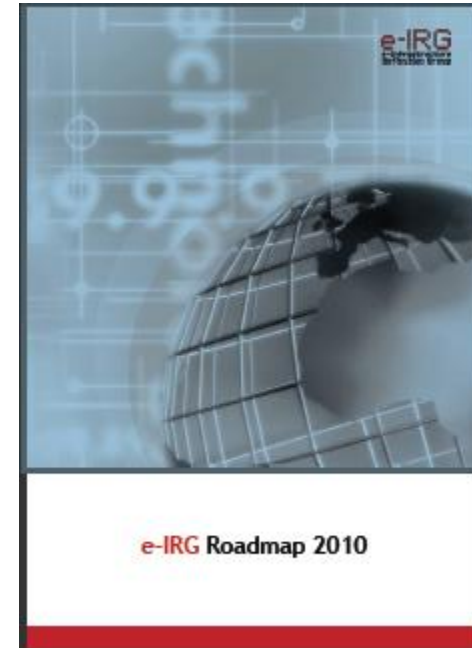
<http://www.e-irg.eu/> -->

Publications

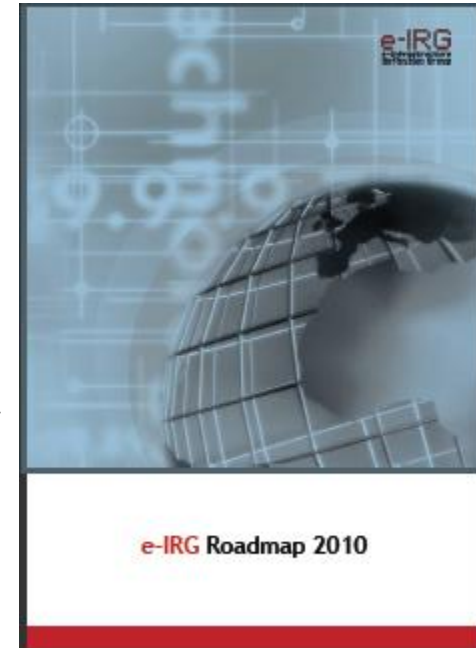


e-IRG Roadmap 2010 (1/2)

- High-level action plan to promote e-IRG's vision
- e-Infrastructure trends:
 - Service orientation
 - data intensive science
 - number of cores in multi-core architectures growing which also entails software issues
 - integration of different e-Infrastructure components



- Recommendations:
 - *e-Infrastructure as a Service!* (e-laaS)
 - **Computing:** Work on **organisational and financial models**
 - Promote **interoperability and standards**
 - Work towards a blueprint for a **sustainable data management infrastructure**
 - **Networking:** Work on **innovative technologies and policies** to maximise the user impact
 - Promote **commercial uptake** for broader societal benefit
 - **Involve new user communities**
 - **International collaboration** to maximise global impact



- Scope:
 - Summarises ways **ESFRI Research Infrastructures** and their **users** can exploit e-Infrastructure services to satisfy their needs
 - Provides an **assessment of Europe's e-Infrastructure service portfolio**, and identifies the **opportunities** and **challenges** involved
- Topics
 - Generic issues:
 - Business and Governance Models, Digital Divide, New user induction, Cost effectiveness, Green IT, Software issues
 - Towards service orientation
 - Network, computing, middleware, data
 - e-Infrastructure Service Areas:
 - Networking, Authentication, Authorisation and Accounting, Grid, Cloud and Virtualisation, High Performance Computing, Remote Access and Remote Instrumentation, Data infrastructures and persistent storage, Virtual Research Communities and collaboration, Generic Issues

- The e-IRG is working during the Belgian EU Presidency on a White Paper for 2011 including the topics:
 - Research Networking topics
 - Authentication-Authorization (AAI)
 - Energy and Green IT
 - HPC software / Exascale computing
 - e-Infrastructure governance / Legal-Financial issues (MAIN TOPIC)
 - e-Infrastructure services (software, hardware, clouds)
 - Cooperation with industry/Public Private Partnership
 - e-Infrastructure services for scientific data
- Any possible recommendations have to be endorsed by the e-IRG plenum!

Future opportunities

- No geographic region has a monopoly on intelligence or creativity.
- Computing and modeling are driving a new trend - how will the scientific software evolution keep up to the programming paradigm? Software lives longer than hardware.
- The development and maintenance of software is an essential, integral component of e-Infrastructure to support research. Software development and life cycle management needs improvement and support.
- Education and training is urgently required to be able to utilize the benefits from the investments in e-Infrastructure. A thorough dissemination of already available e-infrastructure knowledge to a much wider workforce and potential user community is required.
- Challenges in having (open) access to data and information resources.
- e-Infrastructure provision must be directed by the needs of the research community and be based on its requirements to carry out major global research efforts.

e-IRG Knowledge Base

- Contains information on European e-Infrastructures
 - HPC, grids and storage resources for science and research
 - National and European policies and policy organizations
 - National and European research networks
 - Projects and initiatives
 - Funding programmes
 - Contact points
- Calendar of events
- Project lookup

knowledgebase.e-irg.eu

The screenshot shows the e-IRG Knowledge Base website. The header features the e-IRG logo and the text 'Knowledge Base'. A left sidebar contains a navigation menu with categories: Europe, Countries, Projects, Computer centres, Grid Organisations, Funding Programmes, General, Documents, Applications, and Experimental features. The main content area displays a list of countries with their respective flags: Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, and Luxembourg. A right sidebar shows a detailed view for 'Greece GR', including sections for Summary, Projects, E-IRG, and Comments. The 'Comments' section contains a text input field with the prompt 'Comment or suggestion on this topic? Let us know.'

Thank you!

e-IRG secretariat

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