



20 years
Anniversary
of e-IRG

e-IRG Workshop (21. - 22. June 2023)
organised in the framework of the
Swedish Presidency of the Council of the Union



Swedish
Research
Council



NORDUnet
Nordic Gateway for Research & Education

Recapitulation of 20 years of e-IRG

Fotis Karayannis, Jan Wiebelitz, Michalis Maragakis
e-IRG Support Programme

e-IRGSP7

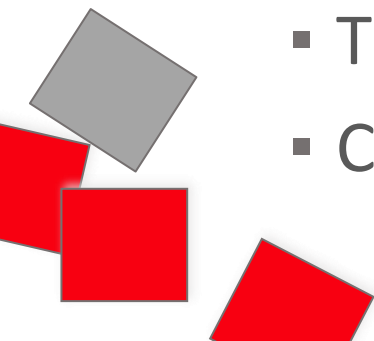
e-IRG Workshop
20 years anniversary session

Malmö, 21-22 June 2023



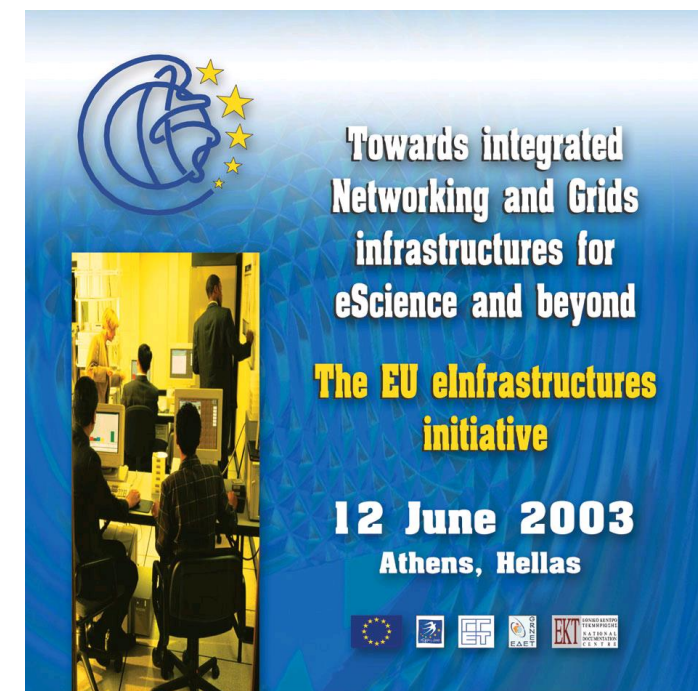
Content overview

- It all started...in 2003
- A plethora of documents..
- Highlights through a journey over the years...
- Main impact: the e-Infrastructure Commons → EOSC key component
- e-IRG Chairs
- Timeline
- Closing remarks



It all started...in June 2003

- Title: Towards **integrated** networking and grid infrastructures for **eScience** and **beyond** – The EU **eInfrastructures** initiative
- *The Workshop intends to stimulate at pan-EU level an open discussion & take actions for the new EU policy initiative on eInfrastructures aiming at:*
 - Providing a **framework** for an easier, faster and more cost-effective **access to all researchers in Europe** and all types of information resources (**networking, computing, data storage**) distributed across Europe.
 - Promoting a **best practice** implementation of such a model in the **research** area to facilitate and accelerate a later **commercial uptake** of the new paradigm.
- Mario Campolargo and Kyriakos Baxevanidis, EC DG CNECT, e-Infrastructures unit (HoU and deputy HoU)
- Greek presidency: GSRT + GRNET, Vasilis Maglaris, GRNET Chairman



It all started...in June 2003 (2)



V. Maglaris -
2003

Mission

Support the creation of a policy and administrative framework for the easy and cost effective shared use of ICT-resources in Europe (focusing on Grid-computing, data storage, and networking resources) across institutional and national domains (and stimulate international co-operation on these topics)



K. Baxevanidis



ΕΘΝΙΚΟ ΔΙΚΤΥΟ ΕΡΕΥΝΑΣ & ΤΕΧΝΟΛΟΓΙΑΣ

Athens Summary (3)



Key recommendations

- Establishment of eInfrastructures Reflection Group → **eIRG**:
 - Composed of nominated National Programme representatives
 - Working on:
 - end-to-end user-perceived quality provisioning and appropriate resource sharing policies amongst all user communities involved
- ERA → **ERIA**: European Research & **Innovation** Area
- Organisation into geographical regions → tool for co-operation
- Further work needed → next events: Italy, Ireland, Holland
- Rotating EU presidency Troikas → better planning & coordination

K. Baxevanidis - 2003



Roles, Interfaces



A plethora of documents!

- 10 e-IRG White Papers
- 5 e-IRG Roadmaps + 1 “Opportunities list” document
- 11 e-IRG Task Force reports
- 2 Blue Papers (ESFRI + Data Related) + 2 guides for ESFRI “e-Needs”
- 4 other documents (Reflections on GEANT, EOSC, EuroHPC, Digital Agenda)
- 30 e-IRG workshop reports/communiques

White Paper 2004



Areas of policy development

- Authentication, Authorization, Accounting (AAA) - EUGridPMA
- Acceptable Usage Policies (AUPs)
- User Support
- International Initiatives

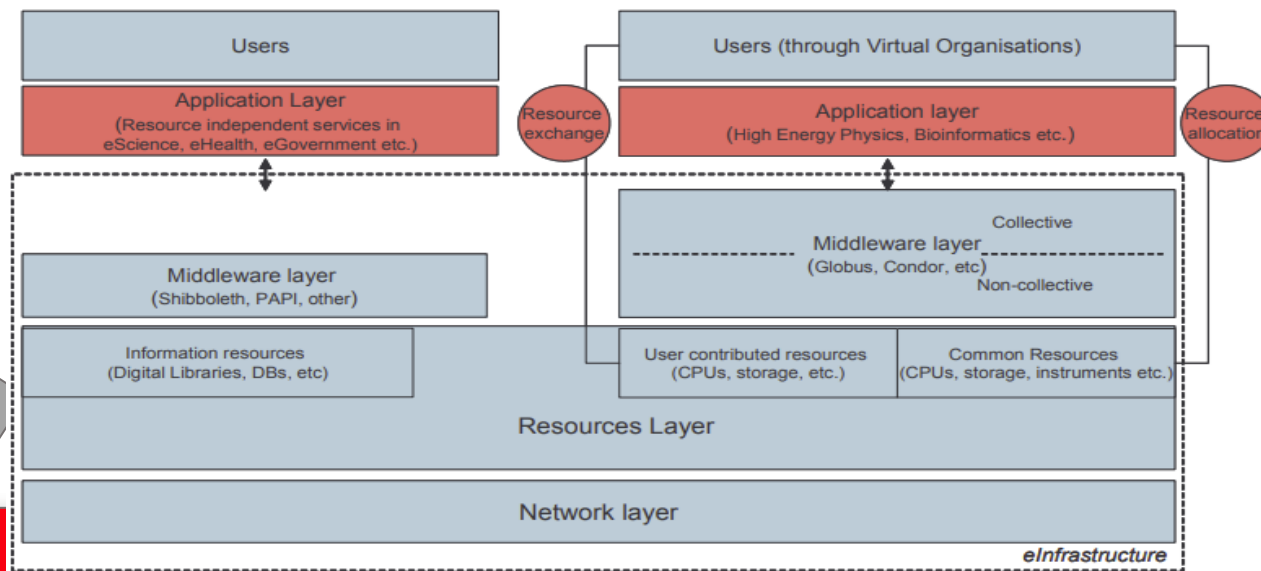


figure 4-1- Policy Architecture

Irish Presidency

The two main issues were endorsed by the e-IRG during the Irish presidency as follows:

“The e-IRG notes the timely operation of the EUGridPMA in conjunction with the TACAR CA Repository and it expresses its satisfaction for a European initiative that serves e-Science Grid projects.”

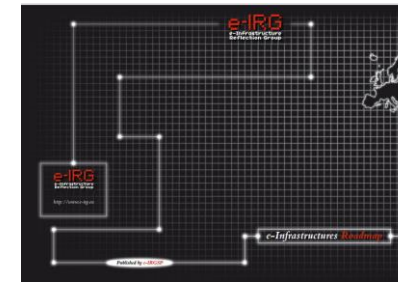
“The e-IRG endorses the principle of the EUGridPMA and TACAR. The e-IRG welcomes this development which positions Europe in the forefront of Grid and e-Science interoperability. The e-IRG strongly encourages the EUGridPMA / TACAR to continue their valuable work and recommends that they be supported by the relevant EU / national projects and agencies.”

Dutch Presidency

The issues endorsed by the e-IRG during the Dutch presidency are as follows:

“The e-IRG stresses the importance of deploying flexibly configurable and reliable end-to-end optical connections for research and education end-users (e.g. e-Science experiments). This provision should coexist with IP-routed services and build upon the European 3-tier hierarchical model consisting of the campus, NRENs and pan-European GÉANT networks.”

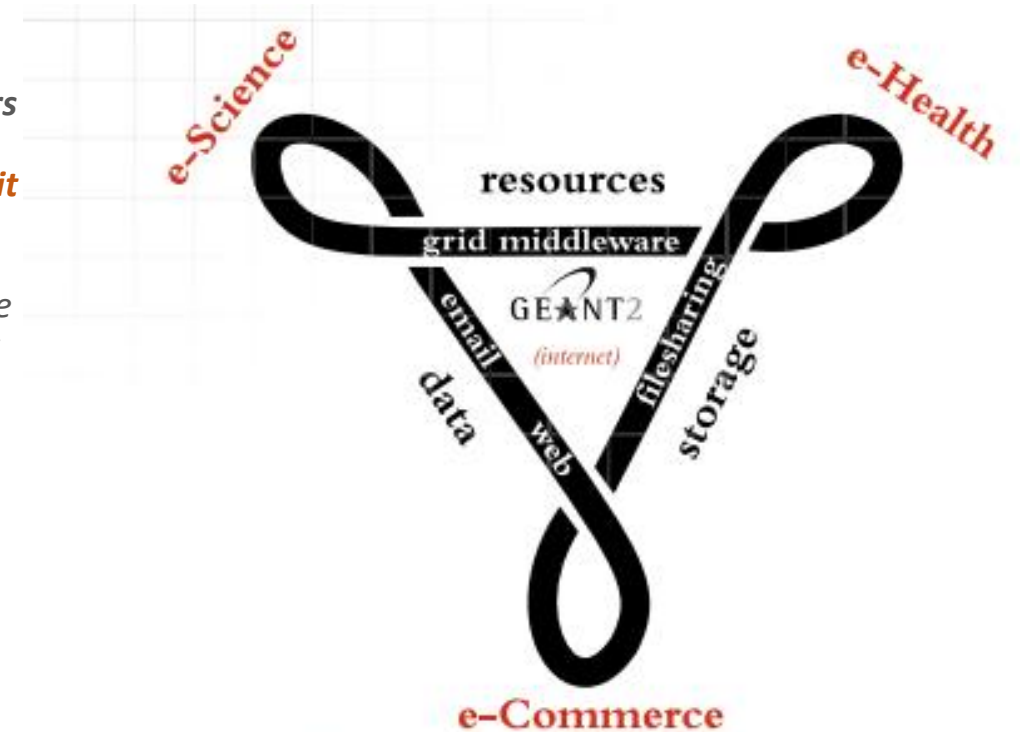
First Roadmap (2005)



- **What is an e-Infrastructure?**

The term **e-Infrastructure** is used to indicate the **integrated ICT-based Research Infrastructure** in Europe. Of course, such an infrastructure builds on many ICT components that have been around for quite a while, **such as networks, supercomputers and storage**. There are many **interdependencies** between these components, so their future should be planned coherently. The e-Infrastructure viewpoint allows to **join and fit all interrelated infrastructures together and start to think of them as a system** – and **optimise not for each individual part, but for the whole**. The prime goal of the e-Infrastructure may be to support **e-Science, e-Health and e-Culture**, but at the same time opportunities are created for many other application domains that contribute to society such as **e-Commerce, e-Government, e-Training and e-Education**.

A competitive e-Infrastructure is indispensable for the numerically oriented branches of the **sciences**. Well known examples are climate and earth system research, water management, fluid dynamics, biophysics, theoretical chemistry, astrophysics, quantum chromodynamics, nanostructure physics and high-energy physics.



1.1 A schematic overview of e-Infrastructure components.



White Paper 2006 and Task Force on Sustainable e-Infrastructures



e-Infrastructure Reflection Group (e-IRG) Task Force on Sustainable e-Infrastructures (SeI)

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

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

Recommendation 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

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

Recommendation 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

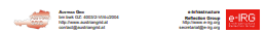
- **AUTHENTICATION AND AUTHORISATION** POLICIES
- RESEARCH **NETWORKING** POLICY CHALLENGES FOR E-INFRASTRUCTURES
- **INCENTIVES** FOR RESOURCE PROVISION IN SCIENTIFIC GRIDS
- **USAGE** POLICIES
- **EDUCATION AND TRAINING**
- **GRID ECONOMY** - ALLOCATION AND ACCOUNTING
- **MIDDLEWARE INTEROPERABILITY AND REPOSITORIES**
- **USER SUPPORT**
- **SUPERCOMPUTING AND GRID HARMONISATION** POLICIES
- **RESPONSIVE GRIDS** - SHORT JOBS AND POLICY ISSUES
- **LEGAL ISSUES** IN E-INFRASTRUCTURES
- **INTEGRATED DATA MANAGEMENT**



e-Infrastructure
Reflection Group

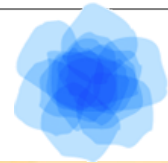
White Paper
Version 1.2, 30/6/2008

This document contains the White Paper composed during the Austrian Presidency of the European Union and the Austrian Chairmanship of the e-IRG. It provides an updated view of the entire area covered by infrastructure research and development by the e-IRG, which will serve as a basis for future decision and possible action. The paper contains contributions on: Authentication and Authorisation Policies, Incentives for Resource Provision in Scientific Grids, Usage Policies, Training and Education, Grid Economy - Allocation and Accounting, Middleware Interoperability and Repositories, User Support, Supercomputing and Grid Harmonisation Policies, Response Grids, Short Jobs and Policy Issues, and Legal Issues. The material was elaborated and edited following the discussion that took place in the e-IRG meeting in June and other ongoing activities from the e-IRG meeting in Vienna.



Roadmap update 2007

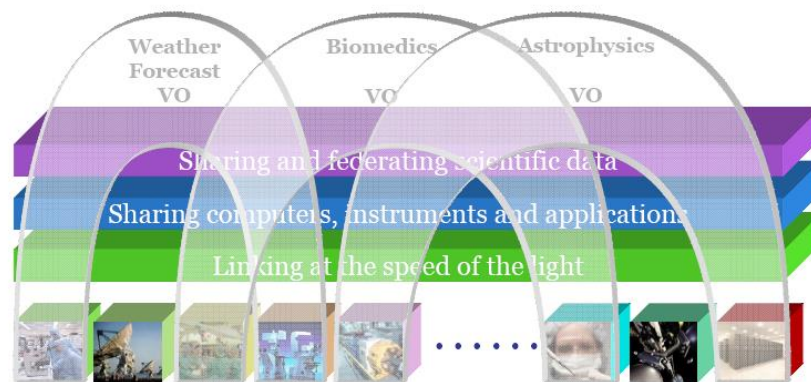
EU 2007 DE



PORTUGAL 2007

e-Infrastructures: strategy

Connecting the finest minds
Sharing the best scientific resources
Building global virtual communities



e-infrastructure

... 7



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e-IRG updated vision and mission (2007)

- *Updated vision / mission proposed during e-IRG board and excom joint meeting, Amsterdam 2 April 2007*

VISION:

*“To realise an **open user-centric** multi-disciplinary e-Infrastructures ecosystem that is able to transparently facilitate **intersectoral cooperation** and the optimal use of all available resources”*

MISSION:

*“To support the advancement of Research and Innovation in Europe through **coordination of efforts** to provide a competitive and adequate e-Infrastructure across Europe”*

Task Forces (2008-2009)



EDUCATION AND TRAINING TASK FORCE Report 9 June, 2008*

Motivations for increased investments in e-Infrastructure education and training

Coordinated development of e-Infrastructure across the EU is vital to maintain Europe's competitive edge in the knowledge-based economy, supporting advances in science, industry and education. Four key motivations associated with this point and providing the impetus for increased investments in education and training have been identified by the ETTF and presented in the report:

- 1) a skills and knowledge shortage
- 2) optimisation of the use of e-Infrastructure
- 3) benefits to industry and academia
- 4) the relationship of e-Infrastructure education and development to EU policy provisions



2. SUMMARY OF RECOMMENDATIONS

All recommendations and proposed guidelines are embedded in the full texts of the various annexes. They can, however, be summarised as follows:

2.1. METADATA

R1: Usage Providing metadata describing any kind of research resources and services is an urgent requirement for service providers and resource repositories.

R2: Scope There is increasing pressure for disciplines to agree on a set of semantically specific enough elements that allows researchers to describe their services and resources.

R3: Provenance Descriptive metadata should include or refer to provenance information to support long-term preservation and further processing.

R4: Persistence Metadata descriptions need to be persistent, to be identified by persistent identifiers and also to refer to the resources and services they represent by using persistent identifiers.

R5: Aggregations Descriptive metadata have an enormous potential to describe various forms of groupings and can give them an identity, i.e. making them citeable.

R6: Standardisation Descriptive metadata need to be based on well-defined element semantics and a schema-based format to cater for presentations for humans and machine operations. Where fixed schema solutions are given up, elements need to be re-used which are registered in open registries.

R7: Interoperability Descriptive metadata needs to be open and offered for harvesting via widely accepted mechanisms to cater for interdisciplinary usage.

R8: Quality Researchers need to be urged to produce high quality metadata descriptions.

R9: Earliness Researchers should be motivated to create metadata immediately and tool developers should add those descriptors that can be created automatically.

R10: Availability It is a MUST for all resource and service providers to create and provide quality metadata descriptions.

2.1. QUALITY

Recommendations for quality of data are a synthesis of various contributions such as OECD, ICSU and RIN and various other sources. The reader will find all details and references in Chapter 2.

2.3. INTEROPERABILITY

R11 Actively encourage programmes that support cross-disciplinary access to digital objects and related services.

White paper 2009

- Key topics:
 - *Global collaboration*
 - *Education and Training in the use of e-Infrastructure*
 - *Grid and **Cloud** Computing*
 - *Security: a holistic approach*
 - ***Service-centric e-Infrastructures*** through virtualization
 - *Remote instrumentation, incl. of Ris and fair **access***
 - *Towards **sustainability** of the **computing**-related e-Infrastructure*

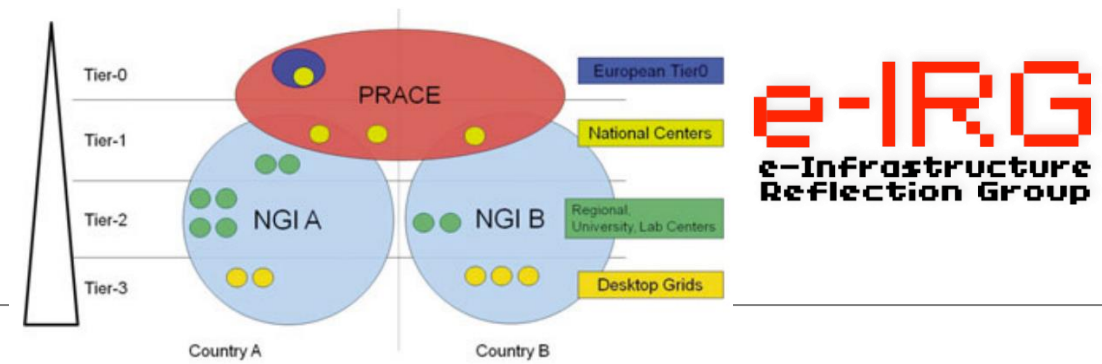
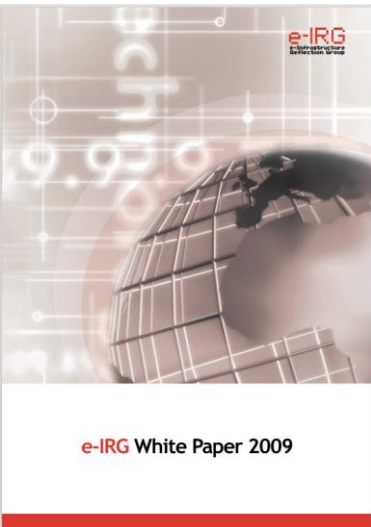


Figure 7.2: PRACE view of the computing ecosystem¹⁴

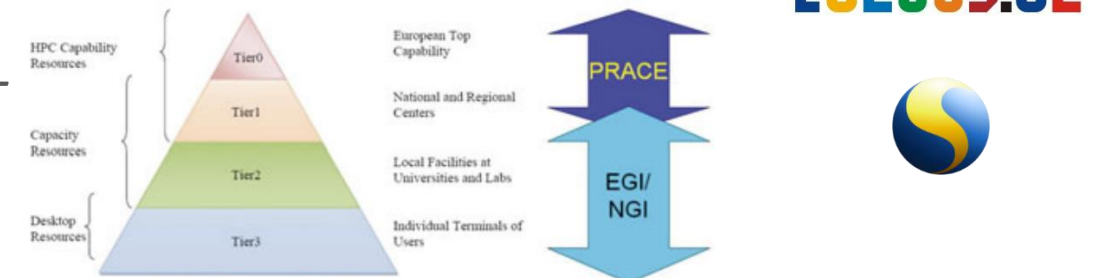


Figure 7.3: PRACE view of the cc

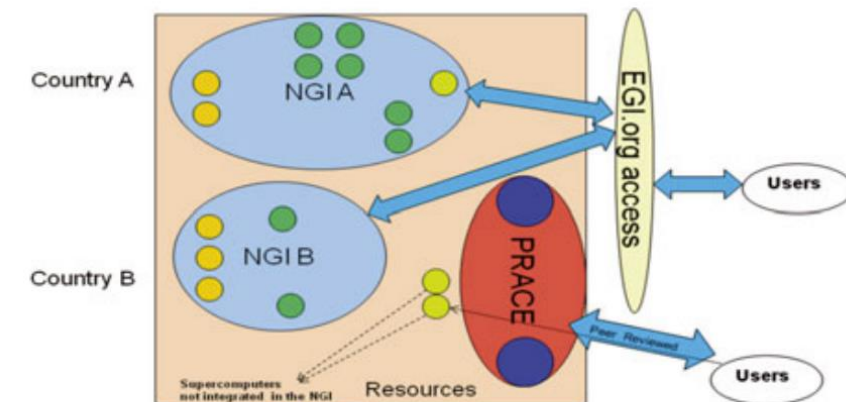


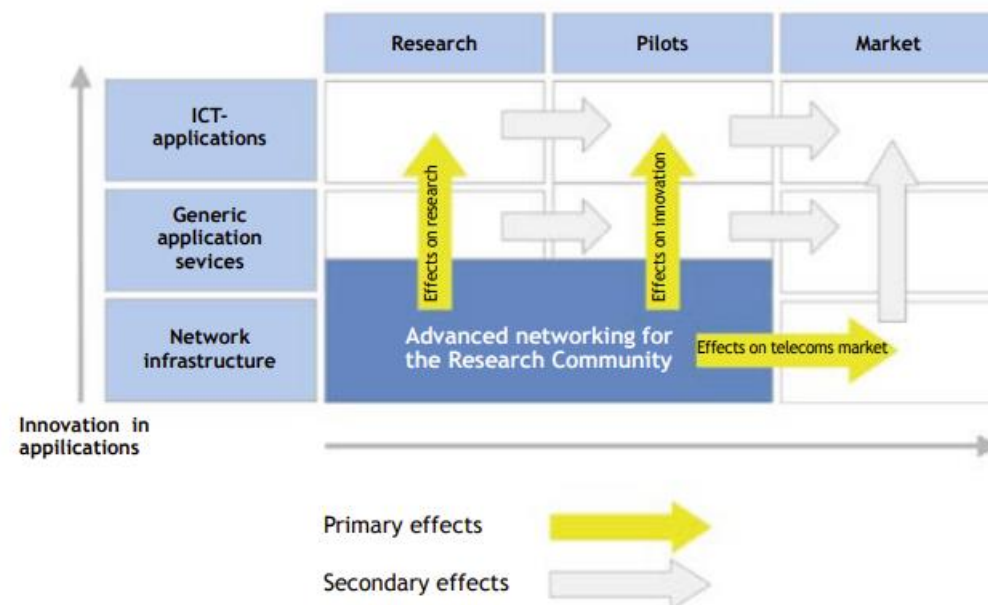
figure 7.4: A possible interaction scenario¹⁶

Roadmap 2010 – Updated mission

- The e-IRG mission is to ***pave the way towards a general-purpose European e-Infrastructure***
- **Other points:**
 - Move to ***service-orientation***
 - ***Data deluge*** – Data-related services & sustainable data management infra
 - New user communities
 - ***Commodity computing***
 - International collaboration



e-IRG Roadmap 2010



EU2009.CZ



Blue Paper 2010 (for ESFRI)

2010.es

trio.be

e-IRG
e-Infrastructure
Reflection Group

- In October 2009 ESFRI invited the e-IRG to produce a report, or “Blue Paper”, on e-Infrastructure services, *enabling more efficient e-Infrastructure support for the science that is done by the ESFRI Roadmap projects*. This “Blue Paper” was delivered to ESFRI at the beginning of July 2010, and endorsed by the ESFRI plenum at the ESFRI delegates meeting, on Friday 24 September 2010.

Topics:

- Data e-Infrastructure** (generic data layer with horizontal data services for thematic ESFRI RIs, below the thematic ones)
- Reliability and replications (reliable e2e transfer tools, data replication, **PIDs**, related policies)
- Metadata** (quality, schemas-standards, guidance for interoperability, best practices, automatic metadata extraction)
- Unified access and interoperability (RI requirements, APIs and semantics,
- Security (for ESFRI RIs, including requirements, federated AAI, encryption, influence EU Data Protection directive)

ESFRI Projects’ requirements prioritisation for accessing/managing data.

0 not important : 4 – highly appreciated/critical for the user community

Functionality /feature	Description	User Community Project Name						
		BioMed Bridges	DASISH	ENVRI	DC-NET	PaNdata	CRISP	ITER
Replication	Increase reliability by replicating data sources Increase accessibility by copying source to several places	2	3	2	3 3	1 0	3	4 for both
Federated AAI	Enable single sign-on in multi-domain environment	2	3		3	3	4	1 (more of an issue for simulations /not so for data access)
Accounting	Allow to monitor and check resource usage	2	2		2	2	4	3
Data provenance		3	3	3	3		4	3
Integration	Provide the same set of services understandable between domains	3	2	4	2	2	3	3
Interoperation	Interoperation through common standard schemes	4	2	4	4	4	4	3
High trust and security of accessing data	Provide unique and persistent authentication to all users	3	2	0	4	3	4	3
Reliability	Increase the QoS and SLA of data infrastructure	3	2	2	3	2	4	3
Access	Broadband data access Allow transparent and secure remote access to data	4	3	3	3 3	4 4	4	4 for both
Advanced search	Provide advanced search functionality	3	3	3	4	2	4	3

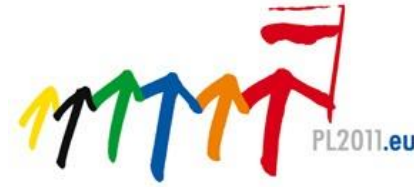


e-IRG “Blue Paper”
on Data Management

White Paper 2011

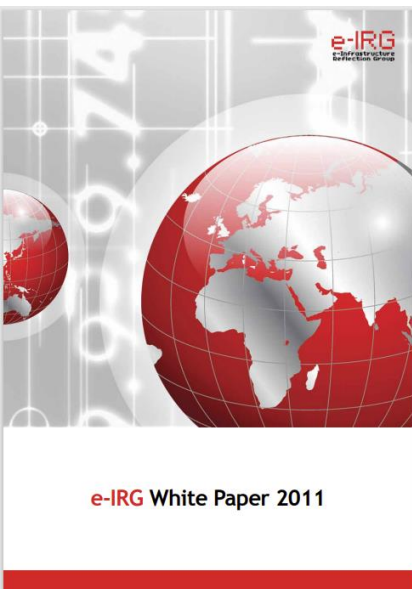


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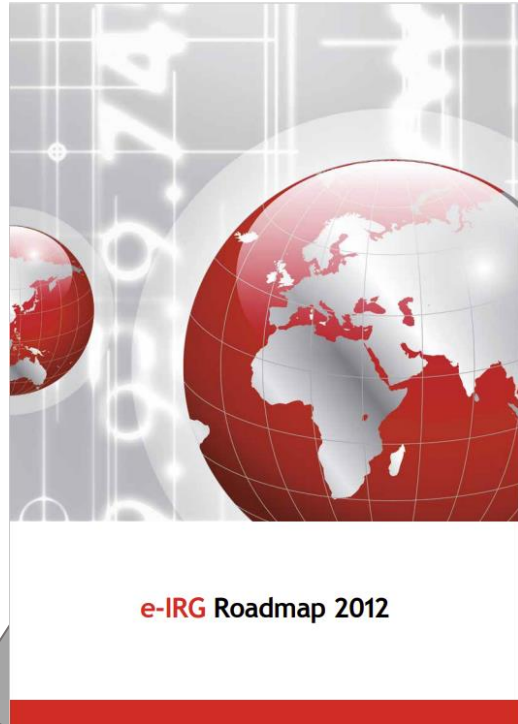


■ Topics:

- *e-Infrastructure **governance**: From management and international aspects, to legal and financial issues*
- *Future of research networking (draft innovation agenda)*
- *Authentication, authorization, and accounting (technical interop across AAls, new IdP technologies, access by design, create roadmap)*
- ***Energy and Green IT!** (efficient energy use and cooling, analyse environment impact, promote R&D on Green IT, locate data centres at optimum locations)*
- ***Exascale computing and related software!** (development of EU H/W tech, new programming models/algorithms, partnership with industry and users, training)*
- *e-Infrastructure services (involve users, user virtualization, collaborations with public sector (health, government) for economies of scales, boost innovation with public-private partnerships)*
- ***Data Infrastructures** (step-by-step strategy for developing the European data infrastructure, involve all stakeholders)*



Roadmap 2012 [?] e-IRG e-Infra Commons



- Topics:
 - *Changing world: need for integrated services and interoperable e-Infras, new social and technical developments and user requirements in science)*
 - ***A vision towards e-Infrastructure Commons 2020***
 - *The consequence: Reorganise for Change*

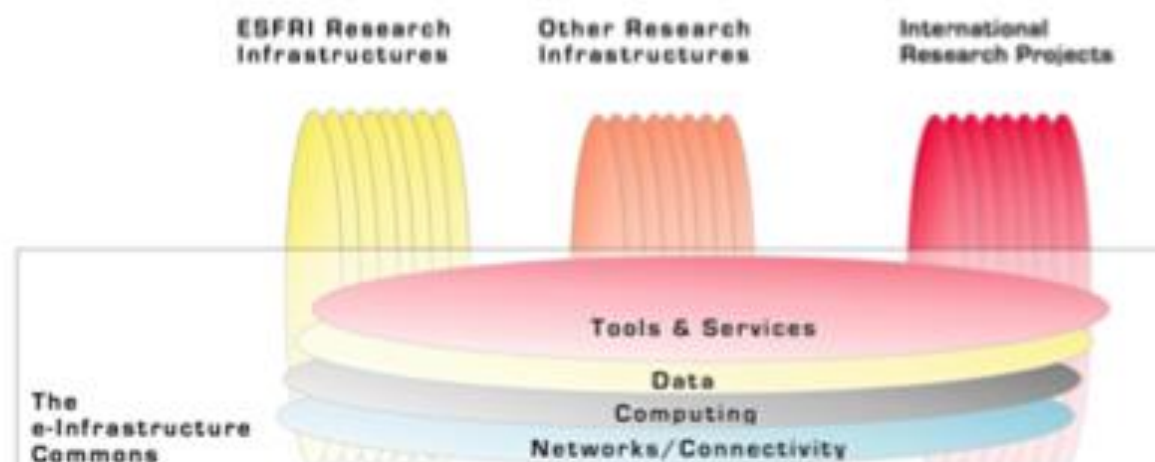
The e-IRG e-Infrastructure Commons (1)

→ Foundation of EOSC

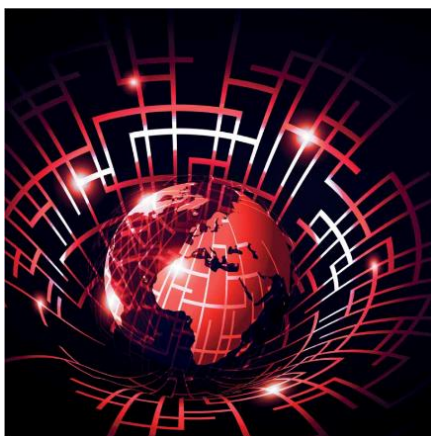
e-IRG e-Infrastructure Commons

(e-IRG Roadmap 2012 -> e-IRG White Paper 2013 -> e-IRG Roadmap 2016)

The e-Infrastructure Commons can be defined as the integrated living ecosystem of resources and services (along with its policies and governance) that is open, user friendly and accessible to European researchers and scientists, and continuously adapts to the changing requirements of research and science.



e-Infrastructure Commons (2)



e-IRG
White Paper 2013

e-IRG White Paper 2013

Three core functions:



eu2013.ie



EU2013.LT

1. **Community building, high level strategy and coordination:** a coherent governance model with a central role for user communities
2. **Service provisioning:** a flexible, open, and competitive approach to national, European, and global service provision; with advanced collaboration among the interested public and commercial service providers.
3. **Innovation:** Implementation of major innovation projects through the best consortia including e-Infrastructure suppliers, industry, users and academia.

EOSC= e-IRG e-Infra Commons + Open Science

Towards the e-Infrastructure Commons 2020:

**A marketplace for e-
Infrastructure services**

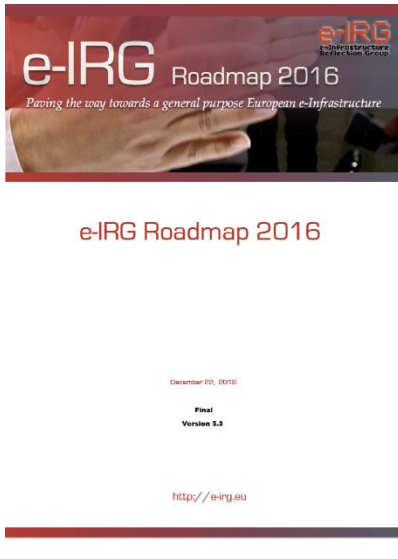
A concrete step towards e-Infrastructure
services integration



In Dec 2014, related doc published by e-IRGSP:

- <https://zenodo.org/record/406356>
- Expanding the e-IRG Infrastructure Commons idea
- **Contributing to the definition of EOSC and several of its key concepts (portal)**
 - Point of access, catalogue of services, search, research + commercial services, compliance (rules of participation), AAI, multiple views (national, regional, EU..)

Roadmap 2016



- “*..**an emphatic co-operation** among all main stakeholders is required: **the providers** (the e-Infrastructure developers and operators), **the users** (the scientific communities, both big users including Research Infrastructures and the long tail), **and the funders** (the EC and the national governments and their agencies).*
- *A joint EU e-Infrastructure ERIC still seems to be far away, and thus the only way forward **is good coordination through a formal coordination platform** among all stakeholders in-line with the Commons, implementing a distributed multi-stakeholder model of governance”.*

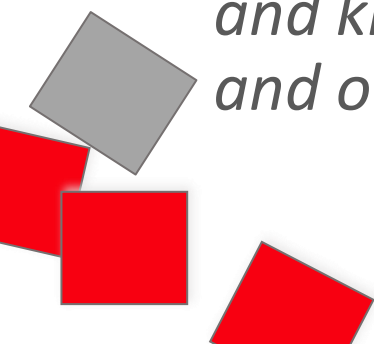
<https://zenodo.org/record/4048805>

e-IRG impact at national/EU levels

Competitive Council Conclusions on EOSC (2018)

*Encourages Member States (MS) to invite their relevant communities, such as **e-infrastructures, RIs**, Research Funding Organisations and Research Performing Organisations, to **get organized** so as to prepare them for connection to the EOSC,*

*CALLS ON the EC to make optimal use of ongoing projects, existing expertise and knowledge available via existing initiatives, such as **ESFRI, eIRG**, GO FAIR and others;"*



National Nodes document (2019)

In response to the Council Conclusions:
e-IRG report published in **June 2019**



- Based on analysis of the responses by 28 countries to related questionnaire
- Reflections on the national e-Infra landscape
 - Coordination and governance at national level
 - Funding and national policies
 - Integration of vertical (domain-specific) with national horizontal (generic) e-Infrastructures
- Diversity among countries; still patterns and approaches identified; Recommendations



e-IRG impact at national/EU levels (2)

CC conclusions on the new ERA (2020)

encourages the EC and the MSs/ACs ***“to increase the level of **national and European coordination**, in particular on RIs and e-infrastructures”.***

CC conclusions on the Pact for R&I (2021)

“connection of existing and new European and national research infrastructures, including e-infrastructures”

CC conclusions on ERA Governance & Policy Agenda: ERA Action 8 on RIs

“increased cooperation between RIs, e-infrastructures and stakeholders, including through EOSC”



e-IRG White Paper 2021

Coordination at institutional, national and regional level(s)

Main message

- **Coordination is continuously needed at national level** among all players
 - Both among generic (horizontal) e-Infrastructure providers
 - Across generic (horizontal) and thematic (vertical) RI providers
- ***Coordination should be expanded within and across countries***
 - At *institutional* level
 - At *regional* level
 - At **EU level** (already treated at multiple fora, but only within an area, e.g. GEANT, EOSC, EuroHPC)
 - ***Good practices identified!***
 - *Coordination across GEANT, EOSC, EuroHPC is part of White Paper 2022*

<https://zenodo.org/record/5741971> (two files, main part + annexes)

e-IRG White Paper 2022

Coordination and collaboration at EU level

Main recommendations:

- **To European and national e-Infrastructure providers**
 - Appropriate **coordination** among all stakeholders required through a coordination platform
 - e-IRG recommends to the e-Infrastructure providers to **form a Forum or Assembly**
 - e-IRG is willing to have a facilitating/neutral role
 - Coordination is continuously needed at national level among all players
- **To the European Commission**
 - e-IRG recommends that in future Work Programmes the EC provides strong incentives for **cross platform innovations** (across e-Infras, across thematic RIs, across horizontal-thematic RIs)
 - e-IRG recommends to **recognise the importance of e-Infrastructures in the realisation of EOSC**, and provide a **clear definition of EOSC** with its e-Infrastructure components/boundaries
- **To Thematic infrastructures, communities, users**
 - e-IRG recommends to the thematic infrastructures and representatives of communities to actively follow the discussions of the e-Infrastructure Forum or Assembly, and to agree on some **rotating representation in the Forum**, inline with the Forum views. This will allow the **provision of needs from the user side** and balance the top-down with bottom-up approaches.

e-IRG Chairs - country - profile

Patrick Aerts - NL - e-Infrastructure/computing

Leif Laaksonen - FI - e-Infrastructure/computing - data

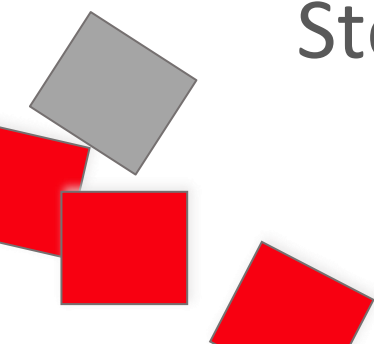
Gudmund Host - NO - Ministry

Sverker Holmgren - SE - e-Infrastructure/computing

Gabriele von Voigt - DE - e-Infrastructure/computing

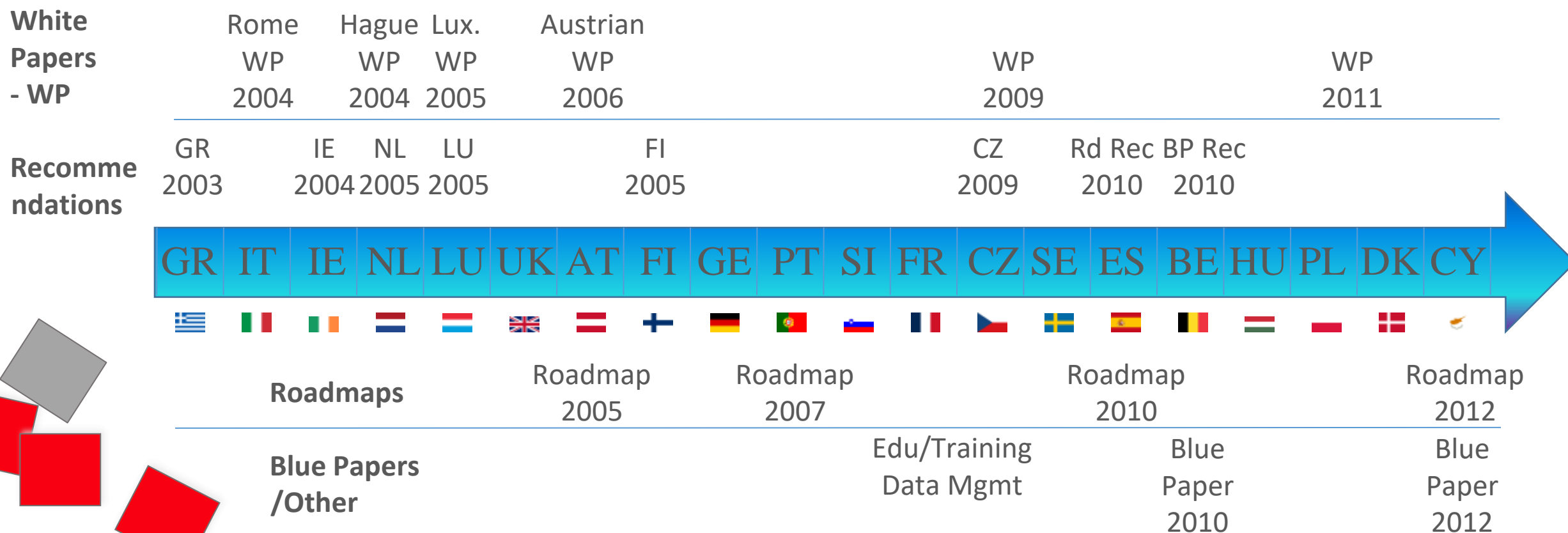
Paolo Budroni - AT - e-Infrastructure/data

Stefan Hanslik - AT - Ministry



e-IRG Timeline (2003-2013)

Dates of major documents produced by e-IRG, over EU presidencies



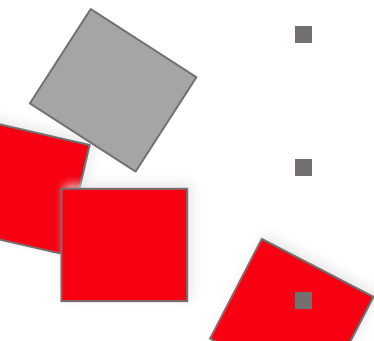
e-IRG Timeline (2013-2023)

Dates of major documents produced by e-IRG, over EU presidencies



Closing remarks

- Plethora of documents/recommendations!
 - Several reached highest political level!
- Current topics already discussed many years ago
 - Exascale, AAI, education/training, user support, incentives, metadata, interoperability..
- Several old recommendations more timely than ever!
 - Coordination of e-Infras, data management, ..
- EOSC as an instantiation of the e-IRG Infrastructure Commons
- 20 years of voluntary work for the e-IRG delegates!
 - Still relevant, although not linked with funding decisions
- e-IRG brought together all stakeholders/communities:
 - Policy makers/funders, e-Infrastructure providers, users
- Impact at institutional, national, (regional), European



Acknowledgement

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