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www.enventory.eu

# Mapping the Impact of European e·Infrastructure landscape

## The European e·Infrastructures Observatory

e·IRG Workshop – Danish Presidency of the European Union
Copenhagen, 11-12.06.2012

Jorge-A. Sanchez-P.
Project inventor

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# Need

- **06.2009, Proceedings of Workshop "Role of Research Infrastructures for a Competitive Knowledge Economy", ESFRI:** *further reflection on impact assessment work of the different stakeholders, allowing hopefully for better management of the facilities as well as more efficient preparation of future actions", elaborating more explicitly that "[…] increased attention to the planning of new large scale facilities has led to requests for studies on the impact of research infrastructures. As well as bringing scientific benefits, funding bodies are increasingly interested to measure and maximise their economic and social benefits from their investment on large scale facilities", and concluding that "although there is some material from impact studies available, this is mainly of an 'anecdotal nature' and time might have come to provide more sophisticated evidence. This might require the definition of new methodologies to measure performance, impact and output of the new major facilities listed in the ESFRI Roadmap".*

- **09.2009, Study "Evaluation of pertinence and impact of Community Support for Research Infrastructures in the 6FP", commissioned by DG Research and DG INFSO:** *"it is recommended that concrete impact measures based on the sound evaluation of existing and potential data sources are developed. This includes establishing a set of indicators for which comparable time-series data can be collected. This will provide more specific and measurable impacts moving away from opinion-based indicators. This will enable impacts to be measured and evaluated more accurately in the*

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# Need

- **2010, Council of the European Union** invited the **Member States** and **stakeholders** to "*further monitor the digital and ICT related performance through indicators and scoreboard*".

- **11.2010, eConcertation meeting, Session on Socio-Economic Evaluation of e·Infrastructures:**
  - *The e-Infrastructures' impact should be analyzed in parallel both in the macroeconomic and microeconomic domains, e.g., developing methodologies of socio-economic evaluation at each level; finding complementary and proper indicators; using/creating ad hoc and official data sources; and enabling stakeholders and policy makers to access significant quantitative and qualitative macro and micro information and data.*
  - *All e-Infrastructure projects should develop a common understanding about evaluation and impact assessment, openly discuss the methodology, agree on indicators and data sources and contribute to the build-up of the evaluation framework.*
  - *Projects should start collecting both qualitative and quantitative information from the start (and often beyond the life of a project), and should know their user base to facilitate impact assessment.*
  - *The public at large is not aware of the electronic infrastructures, as they don't have access and therefore don't know about it. If one wants to "touch" them the data has to be related to their real world scenario. Impact assessment could have an impact on the public at large if used as a method to foster European pride.*

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# Need

- **02.2012, Workshop on development of impact measures for e·Infrastructures**
- A **periodic, project-based assessment that can be aggregated at overall Programme level** is necessary
  - Proposed approach of RI-Impact can help address that gap and provide a methodological framework for e·Infrastructures projects monitoring
- A **holistic approach and supporting tools** are still missing, able to
  - monitor e·Infrastructures impacts and trends at EU/MS (and beyond) level and reveal interrelations to macroscopic socio-economic indicators
  - utilise “factual”, unbiased metrics and data without subjective interpretations
  - apply a validation/curation process to ensure that the utilised data accurately represent the e·Infrastructures status quo
  - take into account owners, users, and sponsors of e·Infrastructures at both EU and National level
  - cover regions beyond EU with the same monitoring framework thus allowing for cross comparisons of EU e·Infrastructures to international ones

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# Initiatives

- Development and maintenance of international databases and repositories for e·Infrastructures-related components
  - GEANT/TERENA compendium
  - e-IRG knowledge base
  - CEENGINE knowledge base
  - EuroRIs-Net+ knowledge repository
  - EGI.eu databases
  - TOP500 supercomputers, etc
- Carrying out of surveys and assessments
  - RI-IMPACT study
  - ERINA+ assessment
  - e-FISCAL study, etc
- and other initiatives

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# e·nventory vision

- Establish the **European e·Infrastructures Observatory**
  - an online, single-entry-point platform
  - offering interactive, user-driven visualisation tools, and
  - an extensive set of benchmarking indicators
  - geographically addressing Europe in order to:
    - facilitate multidimensional and polymorphic monitoring and analysis
    - support fact-based policy and learning, and
    - disseminate achievements of e·Infrastructures in Europe and beyond

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# Current status

- Offers **7** **intuitive, interactive and user-friendly visualisation tools** based on best practices in visualisation and representation techniques
- Features a core set of more than **45** **benchmarking indicators** that are the baseline for **monitoring e·**Infrastructures development progress, usage, impact and investments
- Provides access to more than **10.000** individual figures and other related data and benchmarks
- Consolidates more than **18** **months** of **stakeholders' feedback and consensus** on the structure and functionality of a world-class **e·Infrastructures Observatory**

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# Feedback and consensus

- Advisory Board
  - *Prof. Vassilis Maglaris*
  - *Dr. Karel Vietsch*
  - *Dr. Aleksandar Belic*
  - *Prof. Heinz Gerd-Hegering*
  - *Dr. Robert Jones*
  - *Dr. Thibaut Lery*
  - *Dr. Norman Wiseman*
  - *Dr. John Martin*
  - *Dr. Robin Arak*
- Key European **e·**Infrastructure projects and policy bodies
  - *GN3/GEANT, DANTE, TERENA, EGI-Inspire, EGI.eu, PRACE, e-IRG, etc*
  - A targeted dissemination activity took place in November 2011, through a campaign that addressed more than 160 global champions in the field of e·Infrastructures, includind e-IRG members
- Fellow projects and initiatives such as

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# Numerical indicators

- **Performance/Capacity** *(What are we getting for what we pay?)*
  - **Networking infrastructure**:
    - NREN typical backbone capacity, direct IP connection to GEANT, IP access capacity
  - **Supercomputing infrastructure:**
    - National supercomputers maximum performance, peak performance, number of cores, number of processors, in the top500 list
  - **Grid infrastructure**:
    - NGI maximum performance, number of cores, number of processors, installed disk capacity, Number of Grid sites connected to the NGI
- **Usage/Utilisation** *(How many users are utilising/accessing it?)*
  - **Usage:**
    - NREN IP traffic from external networks, NREN backbone congestion index, National supercomputers core hours, NGI core hours, NGI number of jobs
  - **Users:**
    - Researchers, R&D personnel, Teaching staff in tertiary education, Teaching staff in secondary education, Students in tertiary education, Students in secondary education
- **Cost/Budget** *(How much are we paying for it?)*
    - NREN budget, National supercomputers cost of ownership, NGI budget

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# Numerical indicators

- **Other indicators**
  - **Scientific Impact**:
    - Patent applications, Publications, Citations
  - **Digital Agenda:**
    - Fixed broadband penetration, Mobile broadband penetration, Regular internet users, Population who have never used the internet, Fixed broadband internet connection charge, Fixed broadband internet monthly subscription, International commercial internet bandwidth
  - **Horizon 2020:**
    - Gross domestic expenditure on R&D, Total unemployment rate
- **Supporting:**
    - Gross domestic product, Gross domestic product per capita, Gross enrolment ratio, Population, Surface area

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# Non-numerical indicators

- Stakeholders Mapping: **43 NRENs**, **41 NGIs**, **59 Supercomputing centres** and **4 Pan-European coordinating entities** with information provided in 7 attributes (country, logotype, full name, abbreviation, website, address, description)
- Pan-European Networks : **GEANT network backbone links** and **Cross-border fibre connections**
- Chronology: establishment of **NRENs**, **NGIs, Supercomputers, major projects**, other milestones.

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# The observatory is becoming public (www.e-observatory.eu)

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# European e·Infrastructures Observatory

some remarks – food for thought

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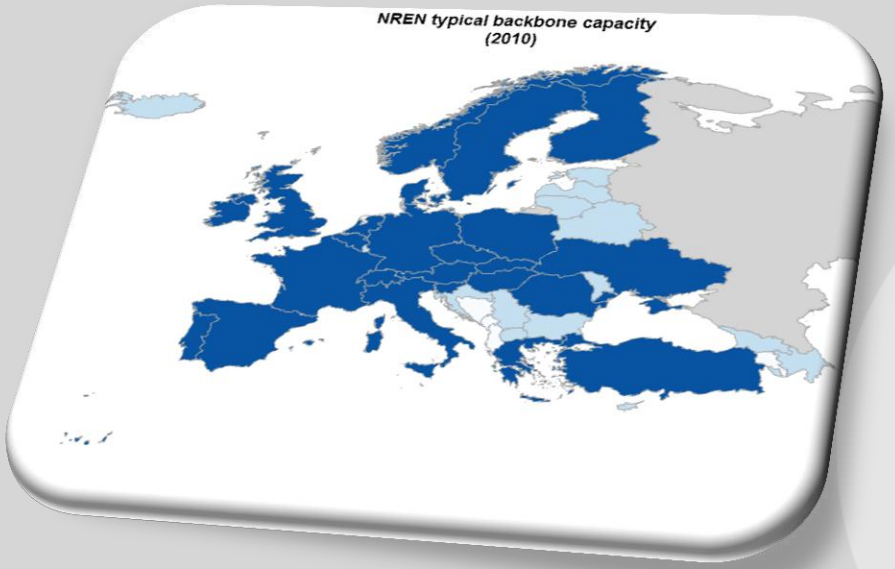
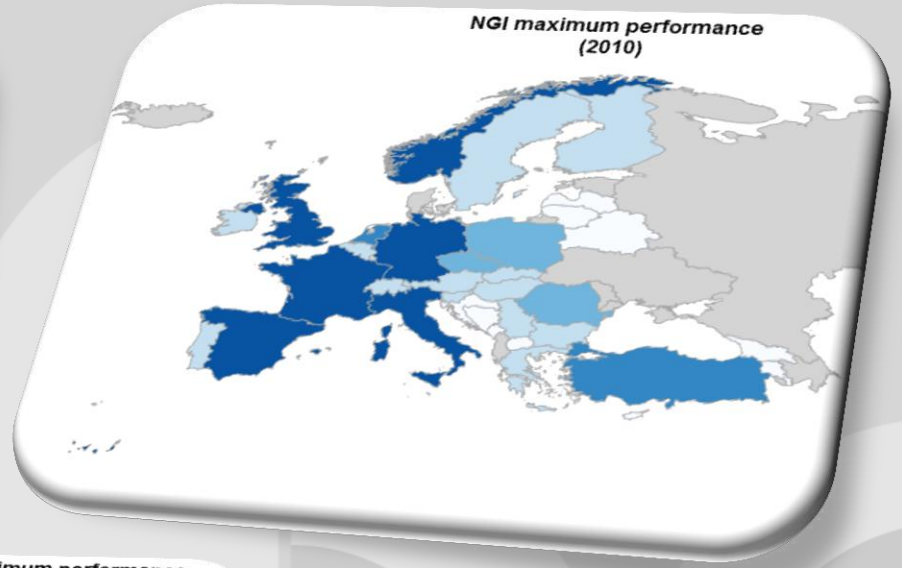
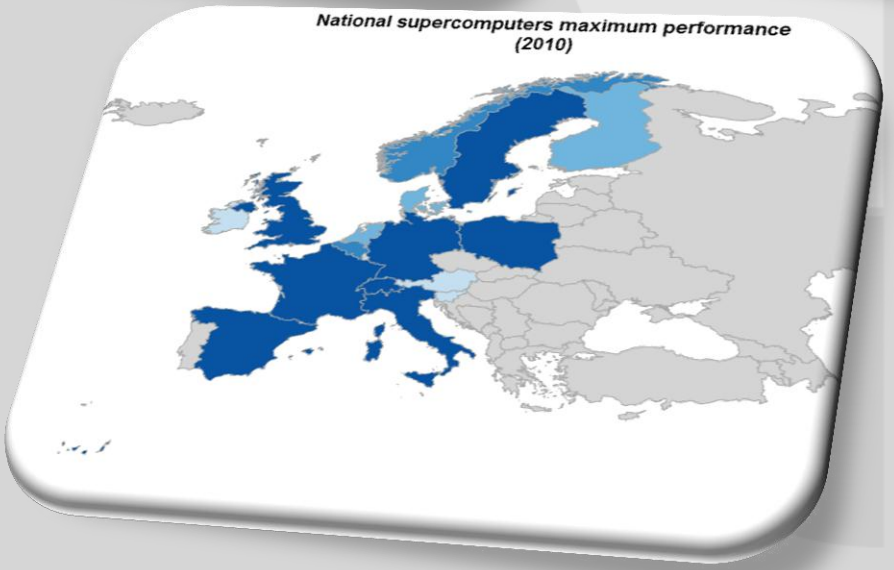
# Networking, Supercomputing & DCI



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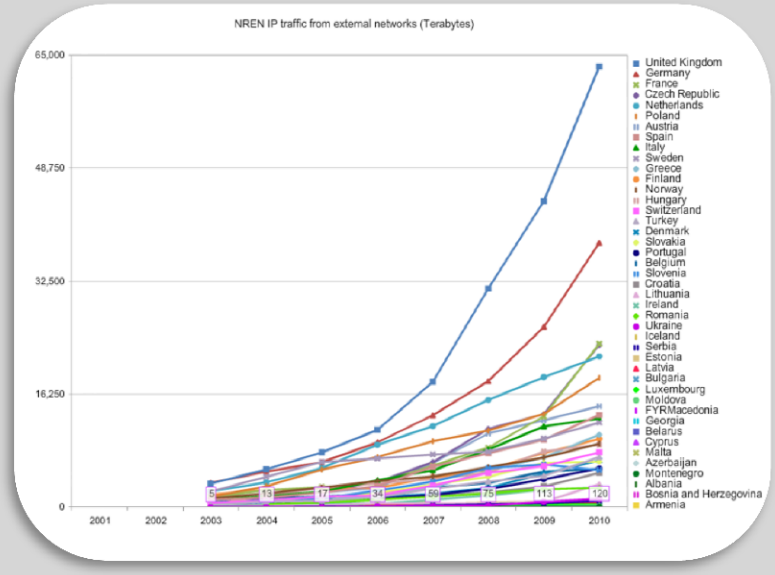
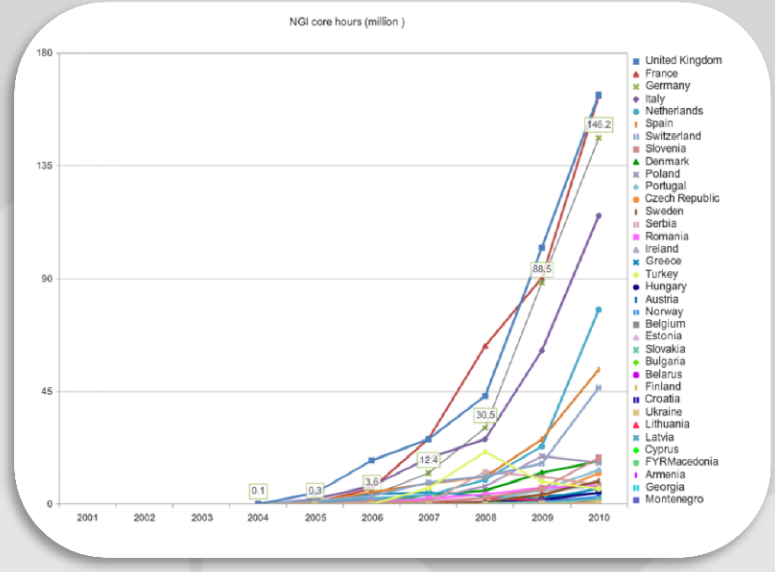
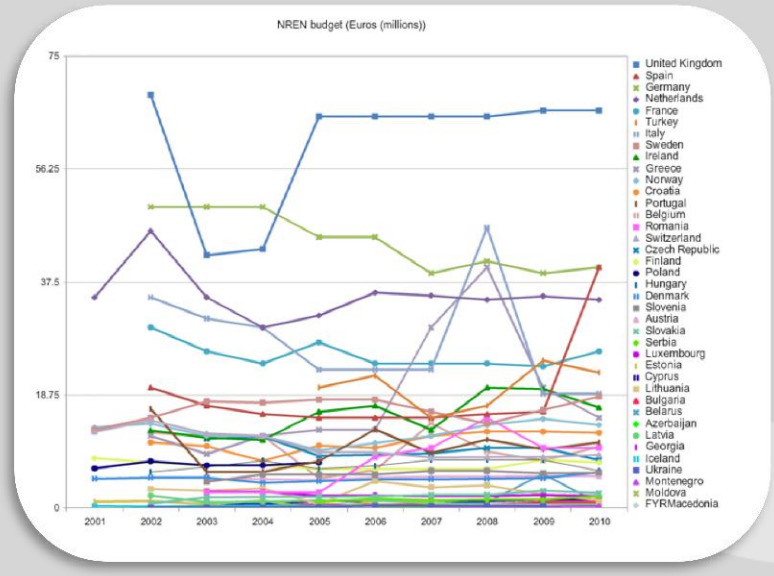
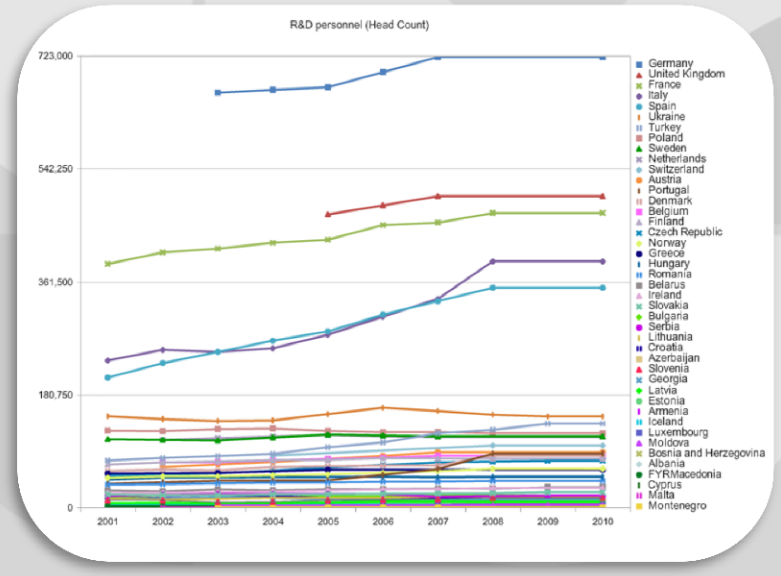
# Usage vs. Users vs. Budget



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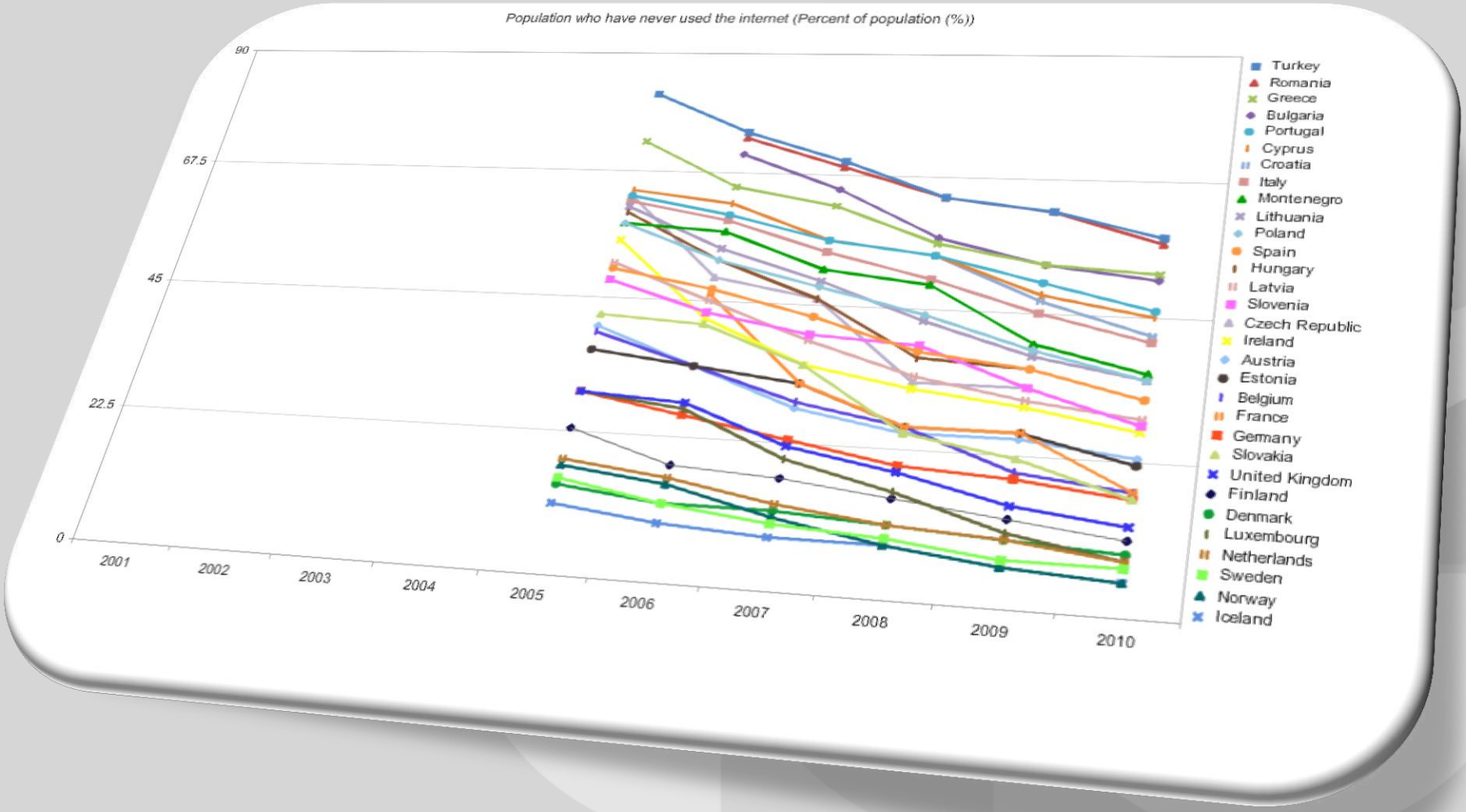
# Surroundings (1/4)

## Population who have never used the internet



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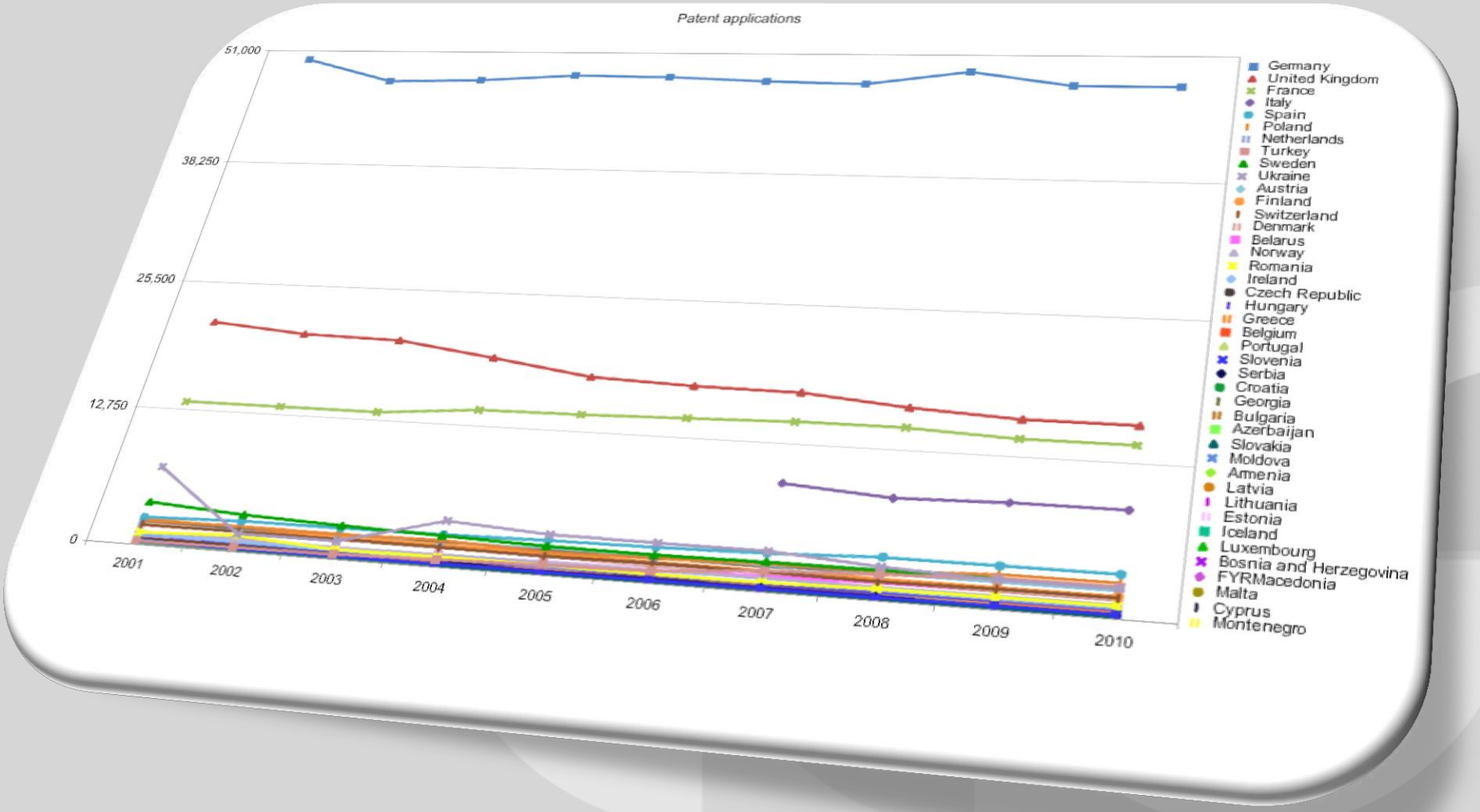
# Surroundings (2/4)

## Patent applications



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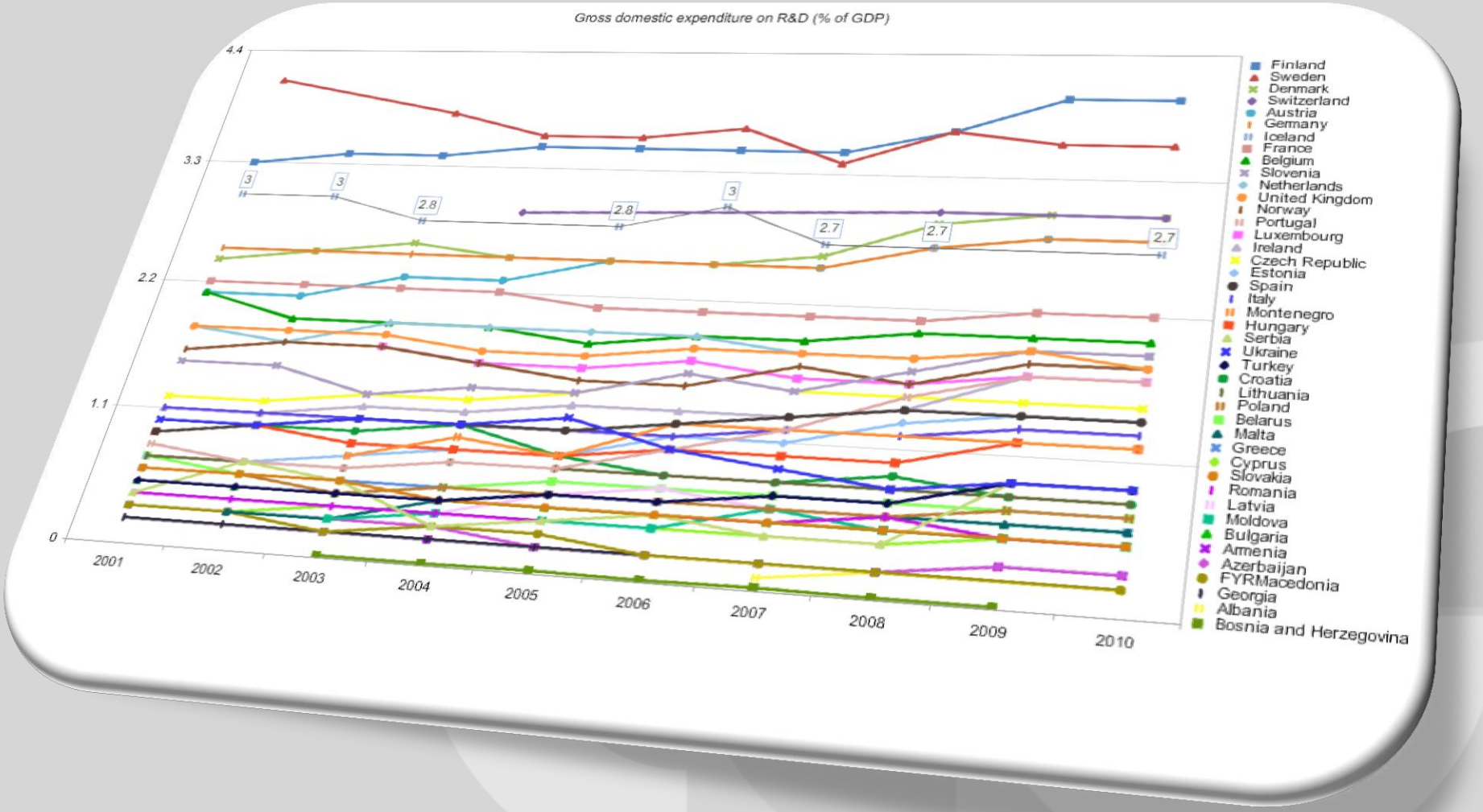
# Surroundings (3/4)

## Gross domestic expenditure on R&D



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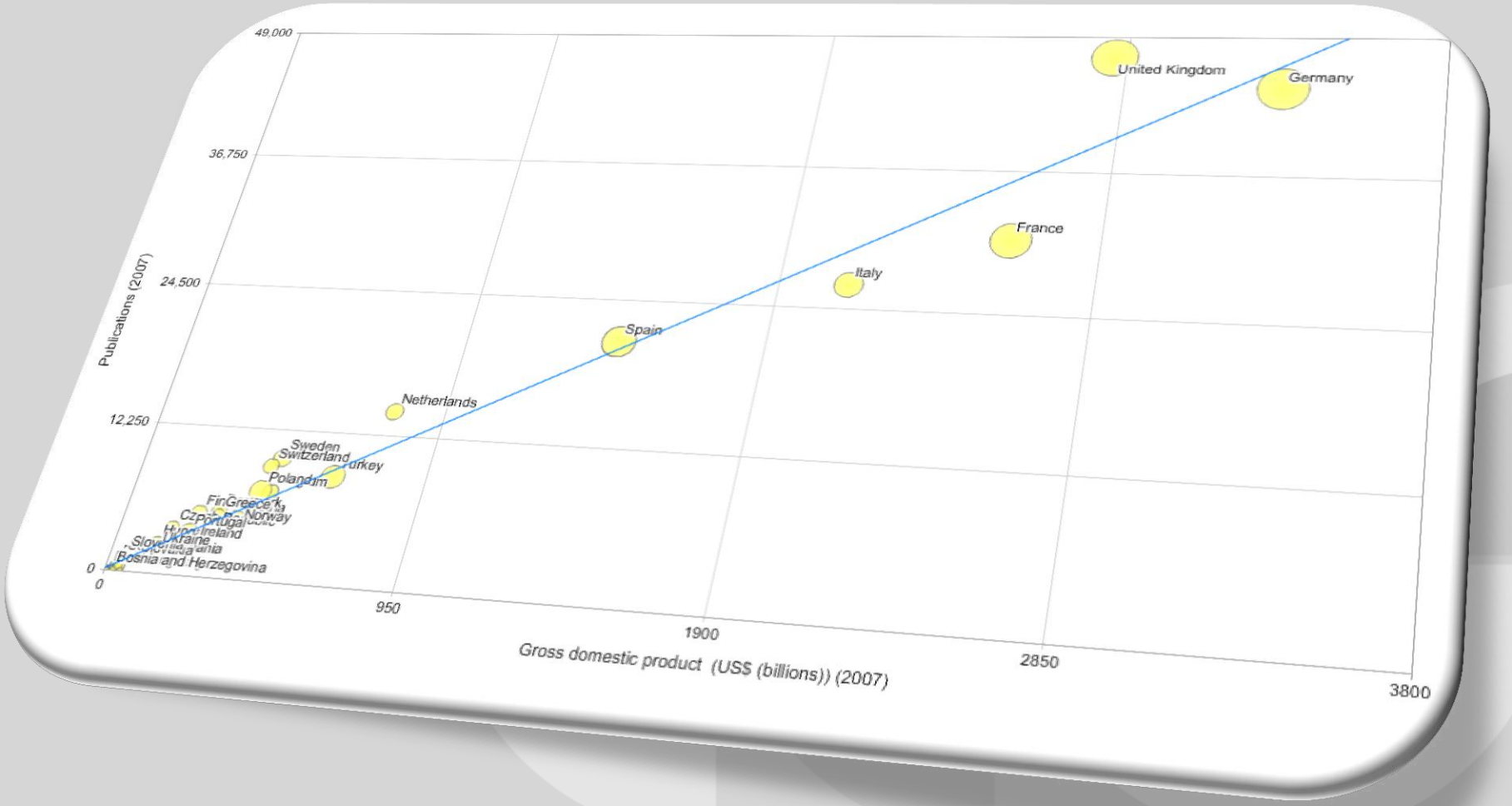
# Surroundings (4/4)

## Publications vs. GDP



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# European e·Infrastructures Observatory

## the future

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# Future goal

- The **European e·Infrastructures Observatory** aspires to
  - be enjoyed by all e·Infrastructures stakeholders and assist them with a solid tool for monitoring the development progress, usage, impact and investments-drawn;
  - expand to emerging themes of e·Infrastructures across the European Union and global regions of interest to the EU;
  - become an online collaboration platform, a virtual library of e·Infrastructures champions and components, bringing closer e·Infrastructures stakeholders and supporting community-building;
  - empower international cooperation of e·Infrastructure organisations and individuals;
  - become a unique dissemination platform of European success stories and new initiatives.

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# The challenges

- A **periodic**, **project-based assessment** that can be aggregated at overall EU Programme level.
- A holistic approach for consistently applying **data validation/curation** in order to ensure that the collected data accurately represent the e·Infrastructures status quo.
- A set of data points that would enable to cover **regions beyond EU** with the same monitoring framework thus allowing for cross-comparisons of EU e·Infrastructures to international ones.
- A set of indicators and benchmarks to monitor **emerging e·Infrastructures** such as data infrastructures, cloud, as well as other areas of interest.
- A universal framework for monitoring e·Infrastructures impacts and trends at EU/MS (and beyond) level and revealing interrelations to **macroscopic socio-economic indicators** by utilising “factual”, unbiased metrics and data without subjective interpretations.
- A **collaboration framework** that would be able to accommodate the views of owners, users, and sponsors of e·Infrastructures at both EU and National level.

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# The challenges

- on the **networking** side
- on the **grid** computing side
- on the **supercomputing** side
- on other emerging **e·**Infrastructures

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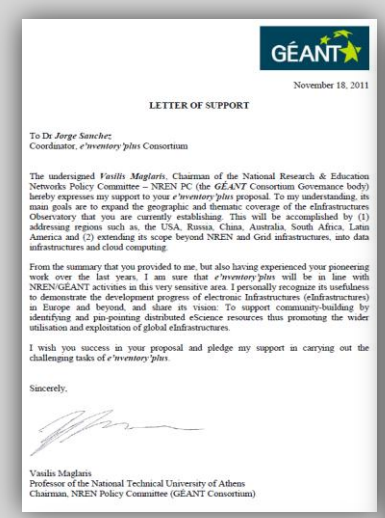
# Stakeholders Endorsement


GÉANT

November 18, 2011

LETTER OF SUPPORT

To Dr *Jorge Sanchez*;
Coordinator, *e'nventory'plus* Consortium

The undersigned *Vasilis Maglaris*, Chairman of the National Research & Education Networks Policy Committee – NREN PC (the *GÉANT* Consortium Governance body) hereby expresses my support to your *e'nventory'plus* proposal. To my understanding, its main goals are to expand the geographic and thematic coverage of the eInfrastructures Observatory that you are currently establishing. This will be accomplished by (1) addressing regions such as, the USA, Russia, China, Australia, South Africa, Latin America and (2) extending its scope beyond NREN and Grid infrastructures, into data infrastructures and cloud computing.

From the summary that you provided to me, but also having experienced your pioneering work over the last years, I am sure that *e'nventory'plus* will be in line with NREN/GÉANT activities in this very sensitive area. I personally recognize its usefulness to demonstrate the development progress of electronic Infrastructures (eInfrastructures) in Europe and beyond, and share its vision: To support community-building by identifying and pin-pointing distributed eScience resources thus promoting the wider utilisation and exploitation of global eInfrastructures.

I wish you success in your proposal and pledge my support in carrying out the challenging tasks of *e'nventory'plus*.

Sincerely,

Vasilis Maglaris
Professor of the National Technical University of Athens
Chairman, NREN Policy Committee (GÉANT Consortium)


PARTNERSHIP FOR ADVANCED COMPUTING IN EUROPE

Jorge Sanchez-Papaspilliou
JNPartners Co.
Xanthou 17,
GR-15238 Xalandri, Attica,
Greece

Jülich, November 21st, 2011

**Letter of Support for e-Infrastructures Observatory**

Dear Sr. Sanchez,

As a follow-up of the letter of support of November 19, 2009 to the European **eInfrastructures Observatory** developments, I recognize its usefulness, through the collection and utilization of appropriate indicators, to assess the impact of High Performance Computing infrastructure for Research in Europe and beyond.

In my capacity as Chair of the PRACE Council, I express my support for the **e'nventory'plus** proposal that will expand the geographic and thematic coverage of the **eInfrastructures Observatory**, addressing global regions of interest, such as, the USA, Russia, China, Australia, South Africa, and Latin America.

I express hereby PRACE's intent for collaboration in the framework of its international collaboration activities.

Yours sincerely,

(Prof. Dr. A. Bachem)
Chair of the PRACE Council

www.prace-ri.eu

Partnership for Advanced Computing (PRACE) A.I.S.B.L.
Rue du Trône 98
1050 Brussels
Belgium


egi European Grid Infrastructure

22nd November 2011

To Whom it may concern:

One of the key challenges facing e-Infrastructure providers such as EGI.eu, which represents the European Grid Infrastructure of 350 resource centres organised through over 35 national resource infrastructure providers, is to report the diversity and scope of its resources and their usage to funders and decision makers at national and European levels. Currently, we have limited resources to structure and present the raw data that is collected as part of the operational infrastructure.

The work being proposed within the e'nventory'plus project is that e'Infrastructures stakeholders will see through the e'Infrastructures Observatory a comprehensive monitoring and dissemination framework that will allow EGI's stakeholders to keep overall track of the development and prospects in e'Infrastructures for Europe and beyond, including especially a frame of reference for assessing over time Europe towards other global regions of interest, and disseminating worldwide e'Infrastructures success stories of European-led and European-supported initiatives. Such a facility is of great interest to EGI and its stakeholders of national and domain specific resource providers.

If the project is funded EGI.eu would be willing to establish a MoU with the project to arrange for the automatic insertion of data into the e-Infrastructure Observatory – the current manual mechanisms have many drawbacks – and to participate in a project advisory board to guide the evolution of the project to ensure it meets the needs of EGI's stakeholders. We would work through any project advisory board to expand the observatory into new technical areas such as cloud computing and geographical regions with which we are collaborating.

Yours sincerely,

Steven Newhouse

Director
EGI.eu

EGI.eu, Science Park 140, 1098 XG Amsterdam
email: director@egi.eu, Phone: +31 20 592 5016, Fax: +31 20 592 5155


EUDAT

CSC

Helsinki, 22 November 2011

**Letter of Support**

I am aware of the **European eInfrastructures Observatory** developments and I recognize its usefulness to demonstrate the development progress of electronic Infrastructures in Europe and beyond, and its capacity to support community-building by identifying and pin-pointing distributed eScience resources thus promoting the wider utilisation and exploitation of eInfrastructures.
On behalf of the EUDAT Project consortium, I express my support for the **e'nventory'plus** proposal that will expand the geographic and thematic coverage of the **eInfrastructures Observatory**, addressing global regions of interest, such as, the USA, Russia, China, Australia, South Africa, and Latin America, as well as emerging eInfrastructures, such as, data infrastructures and cloud computing.
I express my intent for cooperation in the framework of its international collaboration activities.

Yours sincerely,

Dr. Kimmo Koski
EUDAT Project Coordinator

CSC - IT Center for Science Ltd.
P.O. Box 405 (Keilaranta 14)
FI-02101 Espoo, Finland
Kimmo.Koski@csc.fi
+358 50 381 9777-


OpenAIRE

To: Jorge-A. Sanchez-P.

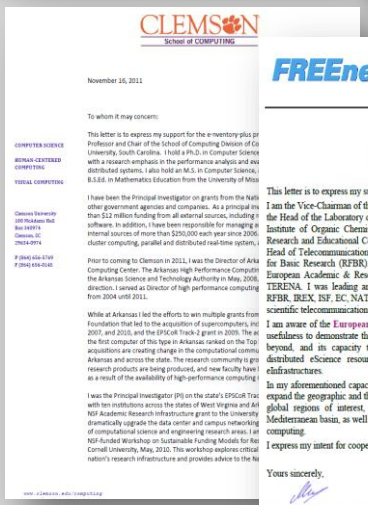
Athens, Greece
Date: 21-11-2011

**Letter of Support**

I am aware of the **European eInfrastructures Observatory** developments and I recognize its usefulness to demonstrate the development progress of electronic Infrastructures in Europe and beyond, and its capacity to support community-building by identifying and pin-pointing distributed eScience resources thus promoting the wider utilisation and exploitation of eInfrastructures.
In my capacity as project coordinator of OpenAire, I express my support for the **e'nventory'plus** proposal that will expand the geographic and thematic coverage of the **eInfrastructures Observatory**, addressing global regions of interest, such as, the USA, Russia, China, Australia, South Africa, and Latin America, as well as emerging eInfrastructures, such as, data infrastructures and cloud computing.
I express my intent for cooperation in the framework of its international collaboration activities.

Yours sincerely

Prof.M.Chatzopoulos


CLEMSON
School of COMPUTING

November 16, 2011

To whom it may concern:

This letter is to express my support for the e-nventory-plus pr
Professor and Chair of the School of Computing Division of Co
University, South Carolina. I hold a Ph.D. in Computer Science
with a research emphasis in the performance analysis and eva
distributed systems. I also hold an M.S. in Computer Science,
B.S.Ed. in Mathematics Education from the University of Miss

I have been the Principal Investigator on grants from the Nati
other government agencies and companies. As a principal in
than $12 million funding from all external sources, including t
software. In addition, I have been responsible for managing a
internal sources of more than $250,000 each year since 2006.
cluster computing, parallel and distributed real-time system,

Prior to coming to Clemson in 2011, I was the Director of Arka
Computing Center. The Arkansas High Performance Computin
the Arkansas Science and Technology Authority in May, 2006,
direction. I served as Director of high performance computing
from 2004 until 2011.

While at Arkansas I led the efforts to win multiple grants from
Foundation that led to the acquisition of supercomputers, inc
2007, and 2010, and the EPSCoR Track-2 grant in 2009. The a
the first computer of this type in Arkansas ranked on the Top
acquisitions are creating changes in the computational comm
Arkansas and across the state. The research community is gro
research products are being produced, and new faculty have
as a result of the availability of high-performance computing

I was the Principal Investigator (PI) on the state's EPSCoR Trac
with ten institutions across the states of West Virginia and Ari
NSF Academic Research Infrastructure grant to the University
dramatically upgrade the data center and campus networking
of computational science and engineering research areas. I an
NSF-Funded Workshop on Sustainable Funding Models for Res
Cornell University, May, 2010. This workshop explores critical
nation's research infrastructure and provides advice to the Na

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HUMAN-CENTERED COMPUTING
VISUAL COMPUTING

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Clemson, SC
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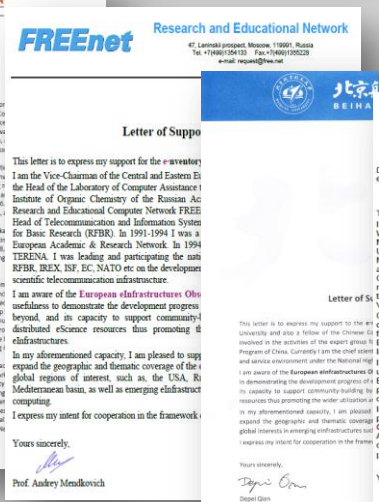
www.clemson.edu/computing


FREEnet Research and Educational Network

47, Leninskii prospect, Moscow, 119001, Russia
Tel.: +7(495)1354133 Fax:+7(495)1355229
e-mail: request@free.net

**Letter of Suppo**

This letter is to express my support for the e-nventory
I am the Vice-Chairman of the Central and Eastern E
the Head of the Laboratory of Computer Assistance
Institute of Organic Chemistry of the Russian Ac
Research and Educational Computer Network FREE
Head of Telecommunication and Information System
for Basic Research (RFBR). In 1991-1994 I was a
European Academic & Research Network. In 1994
TERENA, I was leading and participating the nati
RFBR, IREX, ISF, EC, NATO etc on the developmen
scientific telecommunication infrastructure.
I am aware of the European eInfrastructures Obs
usefulness to demonstrate the development progress
beyond, and its capacity to support community-
distributed eScience resources thus promoting t
eInfrastructures.
In my aforementioned capacity, I am pleased to sup
expand the geographic and thematic coverage of the
global regions of interest, such as, the USA, R
Mediterranean basin, as well as emerging eInfrastruc
computing.
I express my intent for cooperation in the framework

Yours sincerely,

Prof. Andrey Mendkovich


北京航空航天大学
BEIHANG UNIVERSITY

Letter of Su

This letter is to express my support to the e
University and also a fellow of the Chinese C
involved in the activities of the expert group f
Program of China. Currently I am the chief scient
and service environment under the National Hig
I am aware of the European eInfrastructures O
in demonstrating the development progress of
its capacity to support community-building by
resources thus promoting the wider utilization a
In my aforementioned capacity, I am pleased
expand the geographic and thematic coverag
global interests in emerging eInfrastructures tod
I express my intent for cooperation in the frame

Yours sincerely,

Dayi Qian
Prof. Director of Sino-German Joint Software Ins

http://www.buaa.edu.cn


CSIR

Dr Jorge-A Sanchez-P
e.nventory Co-ordinator

**Letter of Support/Intent**

This letter is to express my support for the **e.nventory plus** proposa
I am an Emeritus Research Professor in Computational Mathemati
Witwatersrand, Johannesburg where I was previously full Pro
Mathematics, Department Chair and also Dean of the Faculty of S
University. After my term as Dean, I took on the role of Head o
Meraka Centre for High Performance Computing (CHPC), Cape T
appointed Manager: Cyberinfrastructure at the CSIR Meraka Institu
Cyberinfrastructure embraces the Centre for High Performance
national Data initiative (VLDB), the South African National Research
the SA Grid initiative. I had successively motivated for the estal
VLDB data initiative.
Currently I focus on leading the South African NREN (SANReN
connectivity to all higher education and research institutions and na
facilitates and supports e-Science and research initiatives. I closel
EU e-Infrastructure initiatives and am also a member of the G8+C
Infrastructures Working Group.
I am aware of **European eInfrastructures Observatory** develop
usefulness to demonstrate the development and progress of ele
Europe and beyond, and its capacity to support community-buildi
pointing distributed e-Science resources thus promoting the wider
of e-Infrastructures.
In my various capacities mentioned above, I am pleased to suppo
proposal that will expand the geographic and thematic coverage
**Observatory**, addressing global regions of interest, such as, t
Australia, South Africa, and Latin America, as well as emerging e
data infrastructures and cloud computing.
I express my intent to cooperate in the framework of its international

Yours sincerely,

Professor Colin J Wright
Manager: Cyberinfrastructure, CSIR Meraka Institute, Pretoria, &
Emeritus Research Professor: Computational Mathematics, University of the Witw
South Africa

Professor PW Petersen, N Behrens, Professor DR Hall, M Sibinga, M Sibanda,
Professor MJ Wingfield, K Thaka, A Knott-Craig, P Benade and Dr SP Sibisi


RedCLARA

CLARA
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Tel (5982) 6042222

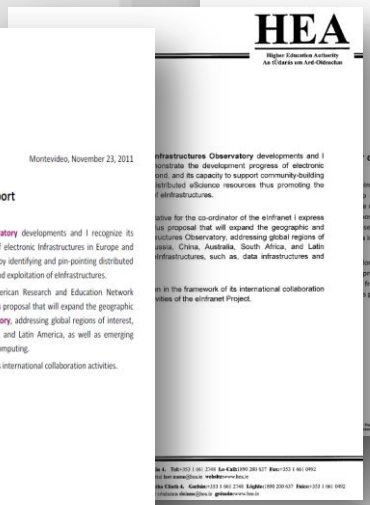
Montevideo, November 23, 2011

**Letter of Support**

I am aware of the **European eInfrastructures Observatory** developments and I recognize its usefulness to demonstrate the development progress of electronic Infrastructures in Europe and beyond, and its capacity to support community-building by identifying and pin-pointing distributed eScience resources thus promoting the wider utilisation and exploitation of eInfrastructures.
In my capacity as Executive Director of the Latin American Research and Education Network (RedCLARA) I express my support for the **e'nventory'plus** proposal that will expand the geographic and thematic coverage of the **eInfrastructures Observatory**, addressing global regions of interest, such as, the USA, Russia, China, Australia, South Africa, and Latin America, as well as emerging eInfrastructures, such as, data infrastructures and cloud computing.
I express my intent for cooperation in the framework of its international collaboration activities.

Yours sincerely,

Florencio I. Utreras
Executive Director


HEA
Higher Education Authority
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23 November 2011

of Support

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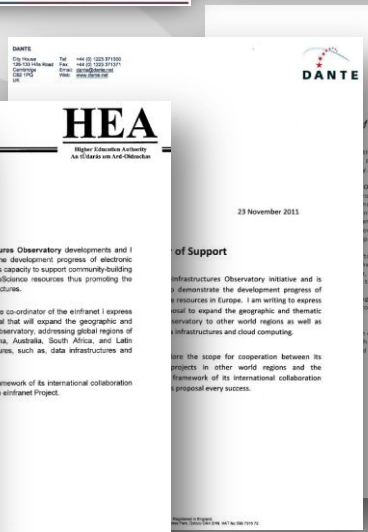
DANTE

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f Support

the Australian National Data Service (ANDS). In
Prior to that I held a number of management

Observatory developments and I recognize its
ogress of electronic Infrastructures in Europe
munity-building by identifying and pin-pointing
ntribute to better measures of capacity and
and exploitation of eInfrastructures. The
ould be increased if an extension to the project
pacity and usage.

to indicate that ANDS would be interested in
at will expand the geographic and thematic
, addressing global regions of interest, such as,
the Mediterranean basin.

g with the proposal, if successful, on emerging
to cooperate in the framework of its

established in Australia to ensure researchers
n data is international in scope we see that
be ideal, and that this approach would enable


ands

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Research Universal

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The European eInfrastructures Observatory
www.enventory.eu

# The Roadmap

- **The Commission and e·Infrastructure policy bodies** shall explore possibilities how to support a holistic framework for monitoring e·Infrastructures development, capitalising on and expanding the results of the European e·Infrastructures Observatory, to:
  - **Cover global regions** of interest where significant e·Infrastructures actions are taking place and/or international cooperation initiatives have been supported by the EU;
  - **Address emerging e·Infrastructures** and related initiatives that will be key enablers of the European Digital Agenda 2020, such as data infrastructures, cloud computing and broadband access initiatives;
  - **Standardise and automate data harvesting** and repository processes, in an manner interoperable with existing data repositories, in order to support updating as new data becomes available at the data source;
  - **Deploy novel visualisation tools and techniques** for representing the development of new e·Infrastructures themes, revealing Pan-European as well as Trans-Continental collaborations and impacts of e·Infrastructures that are key enabling pillars of international e·Science.

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# The Roadmap

- **The Commission** should facilitate consultation and consensus processes at a global level towards the establishment of a global **e·**Infrastructures Observatory via the engagement of international **e·**Infrastructures experts, representing both regions of interest as well as themes of interest.

- **Running flagship e·Infrastructure initiatives/projects** should strengthen the collection and aggregation of data values for selected indicators, through a systematic and well-defined framework, for each of the **e·**Infrastructure fields (networking, DCI, HPC, etc.) by the organisations/structures that coordinate the respective initiatives (e.g. DANTE/TERENA, EGI.eu, PRACE AISBL, etc); wherever possible this process should build up a time series including past events.

- **The Commission and National Governments** should pursue a holistic approach for consistently applying data validation/curation to ensure that the collected data accurately represent the **e·**Infrastructures status quo.

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# The Roadmap

- **The Commission** should ensure that future flagship **e·**Infrastructure initiatives/projects incorporate appropriate monitoring and assessment procedures according to relevant indicators suitable for the long-term **e·**Infrastructures assessment and benchmarking, which if not in the project proposal should be incorporated into projects at the project negotiation phase.

- **The Commission** should pursue, in close cooperation with **National Governments**, its efforts to support the maintenance and update of a European **e·**Infrastructures Observatory to keep up-to-date with the on-going developments in this field at international level.

- **Major e·Infrastructure stakeholders** should facilitate, in close cooperation with **pan-European coordinating organizations and national bodies**, the collection of indicators in two emerging, important aspects of the development of European **e·**Infrastructures: sustainability and human capacity of **e·**Infrastructures. In neither case is there any information gathered consistently at present, if at all.

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# Call you to

- Use the **European e·Infrastructures Observatory** and provide feedback
  - **www.e-observatory.eu**

- Provide feedback on the **Copenhagen e·Infrastructures Observatory White Paper - *Towards a European strategy for an e·Infrastructures Observatory***
  - ***tbd***

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# Thank you for your attention!

The European e·Infrastructures Observatory has been developed by the **e·nventory** project, co-financed by EU's 7th Framework programme for R&D under Grant Agreement no RI-261554.

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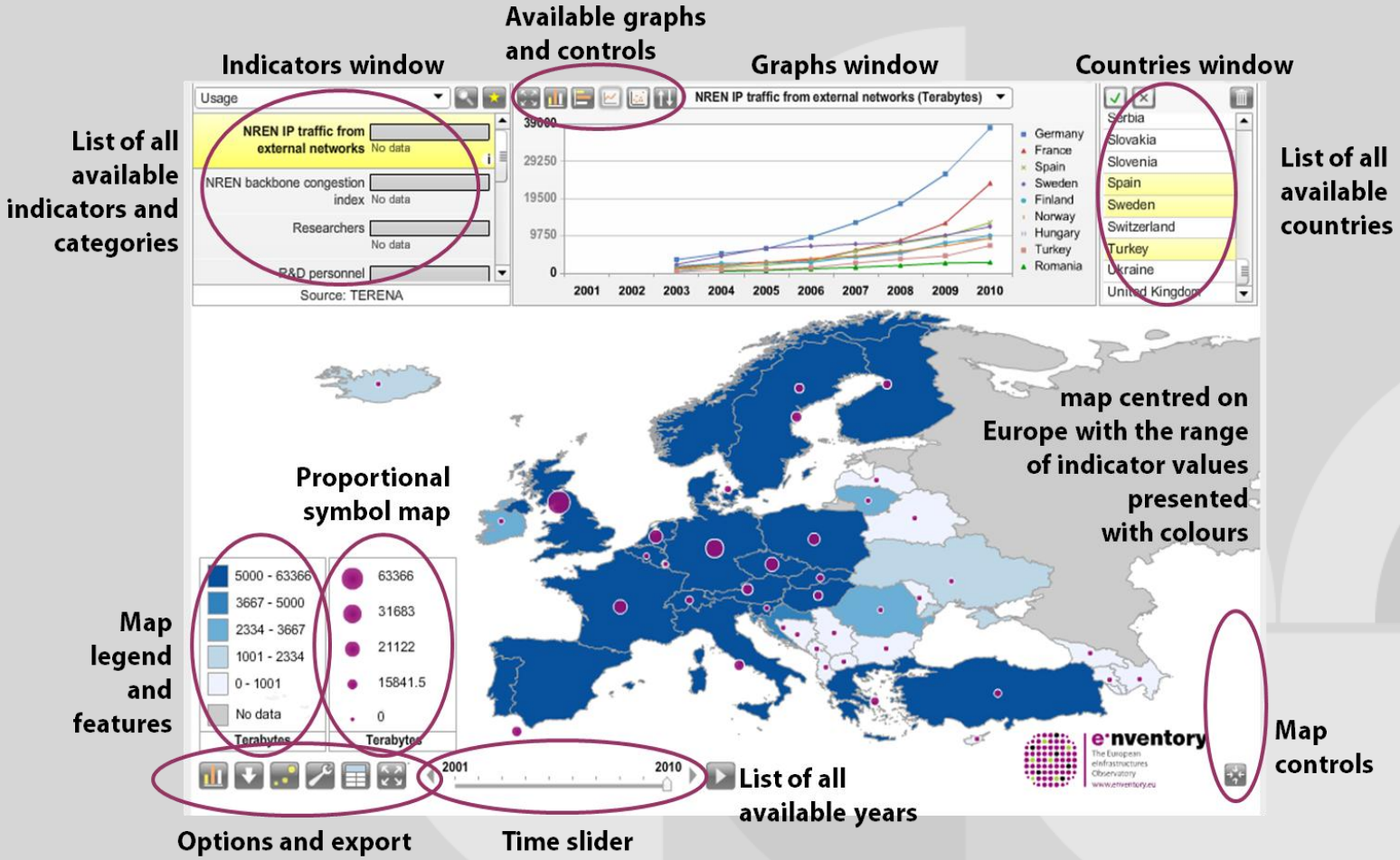
# The *Indicators on Maps* service



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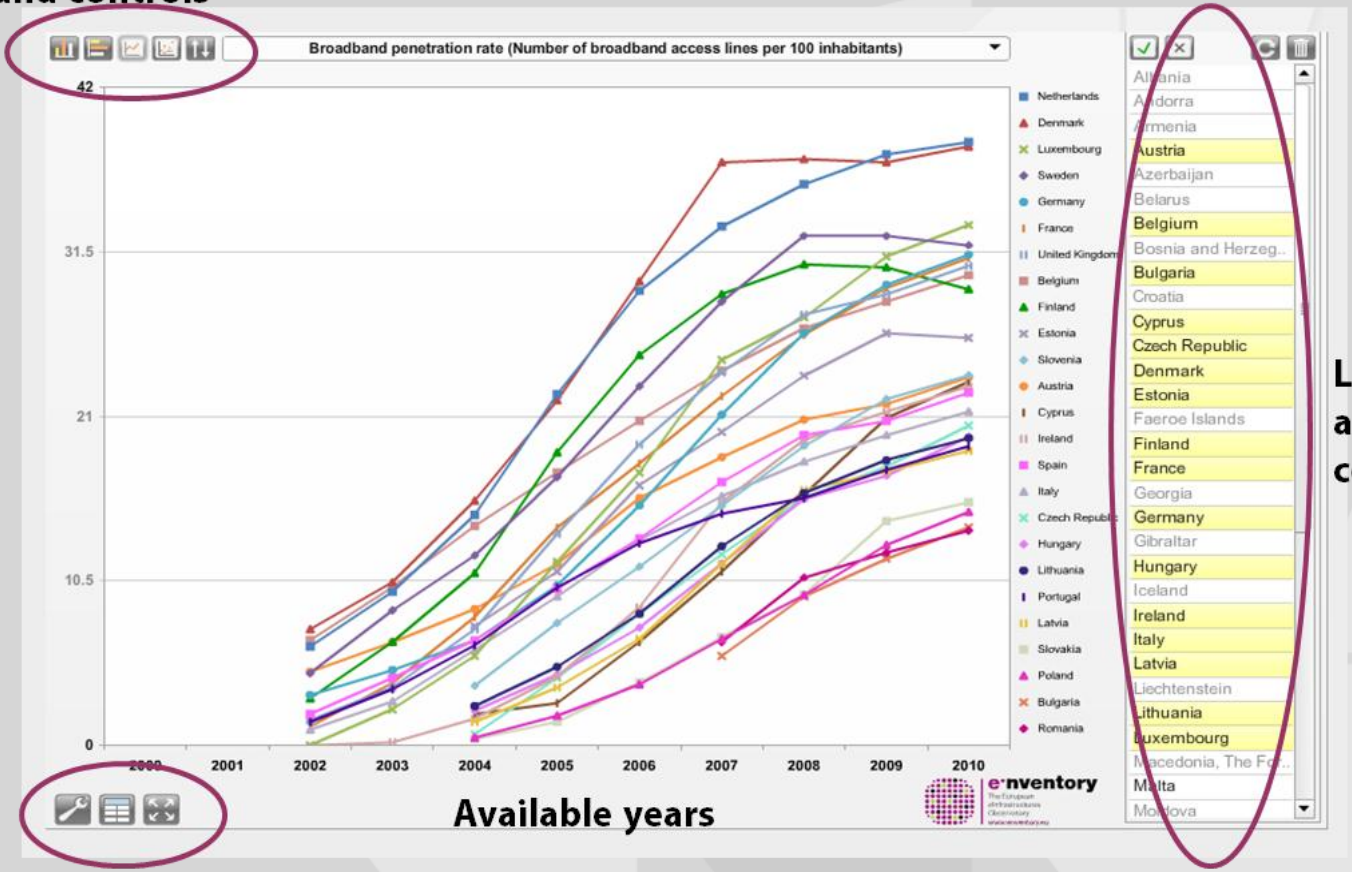
# The *Trends* service



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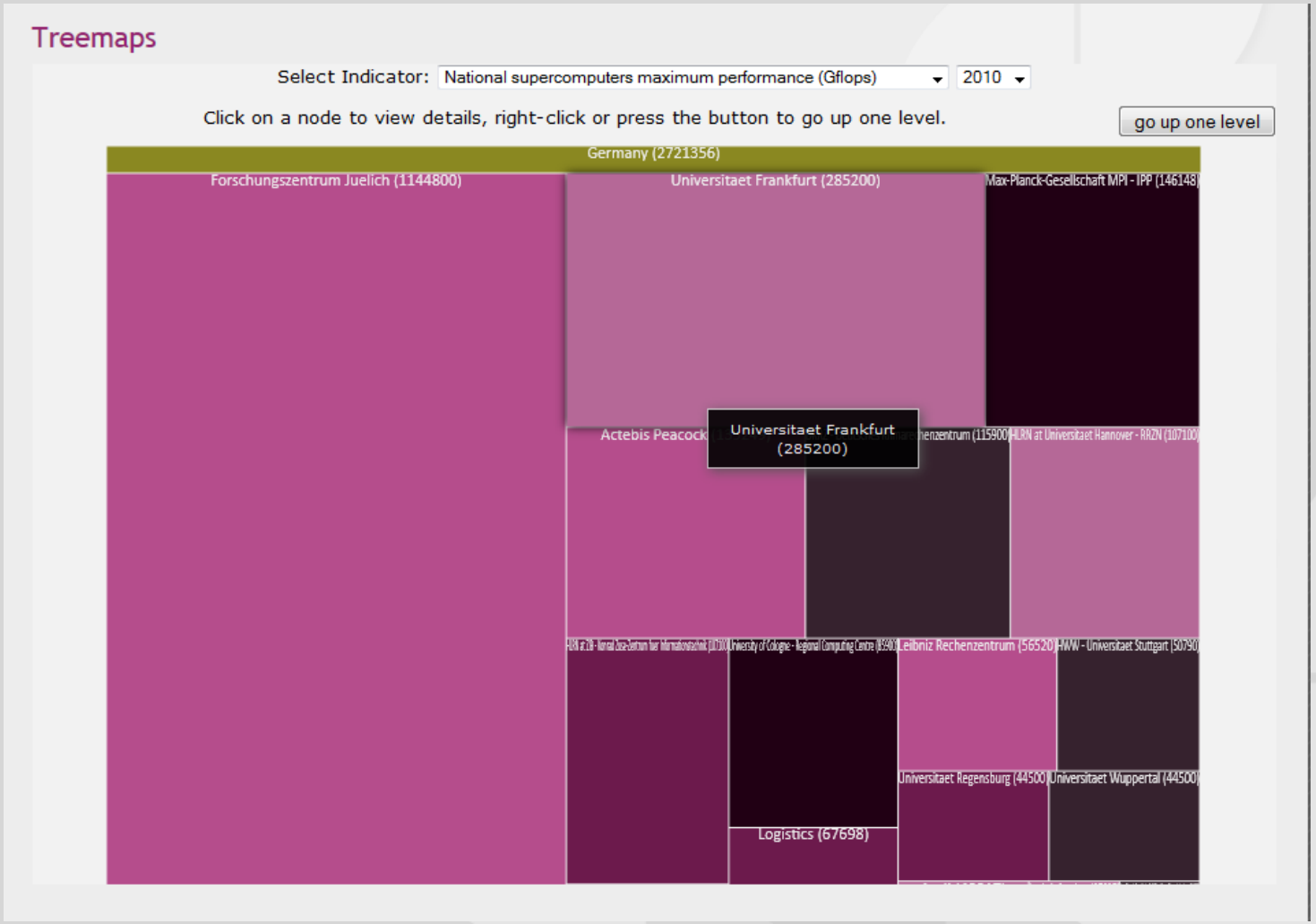
# The *Treemaps* service



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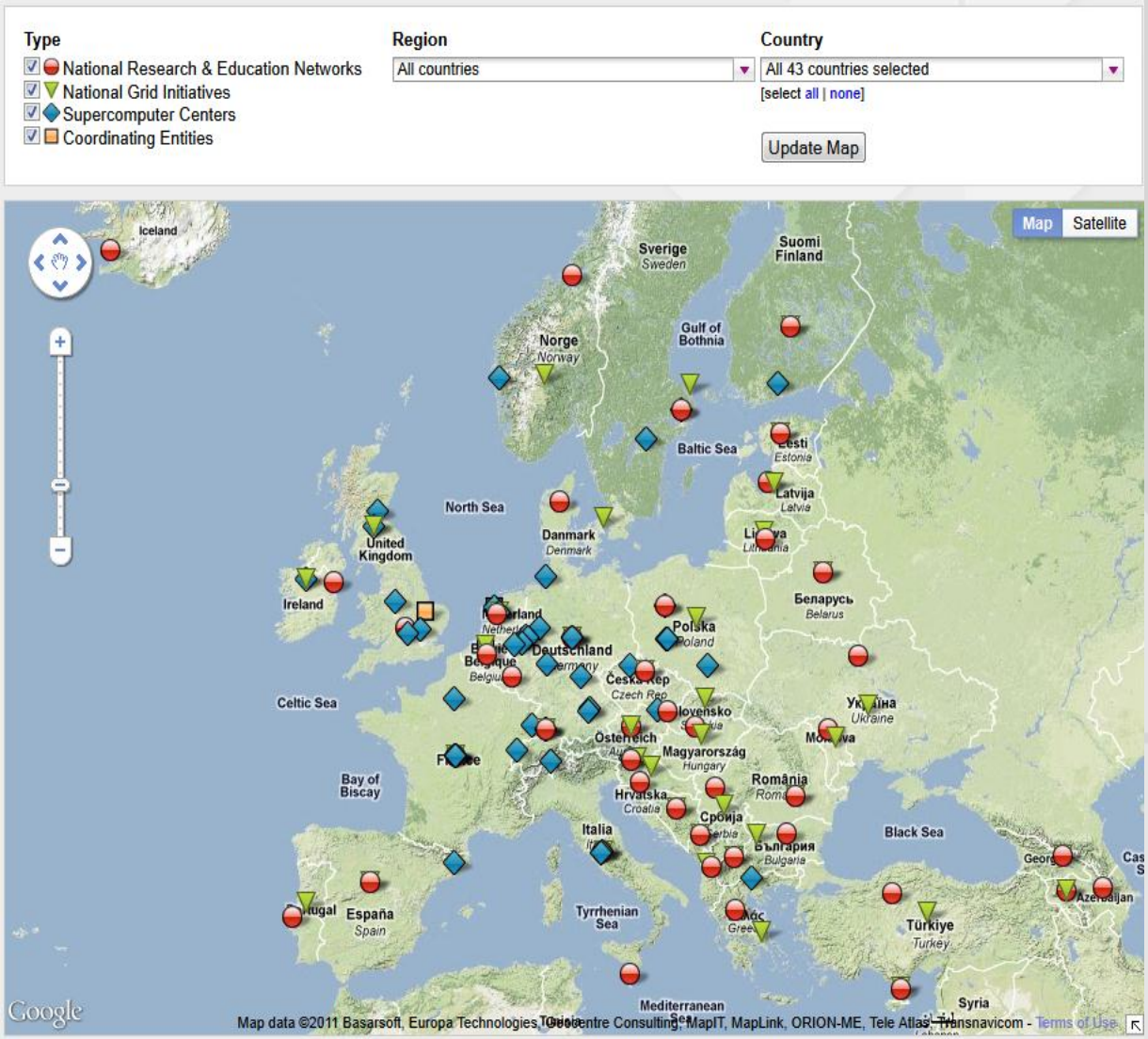
# The *Organisation Mapping* service



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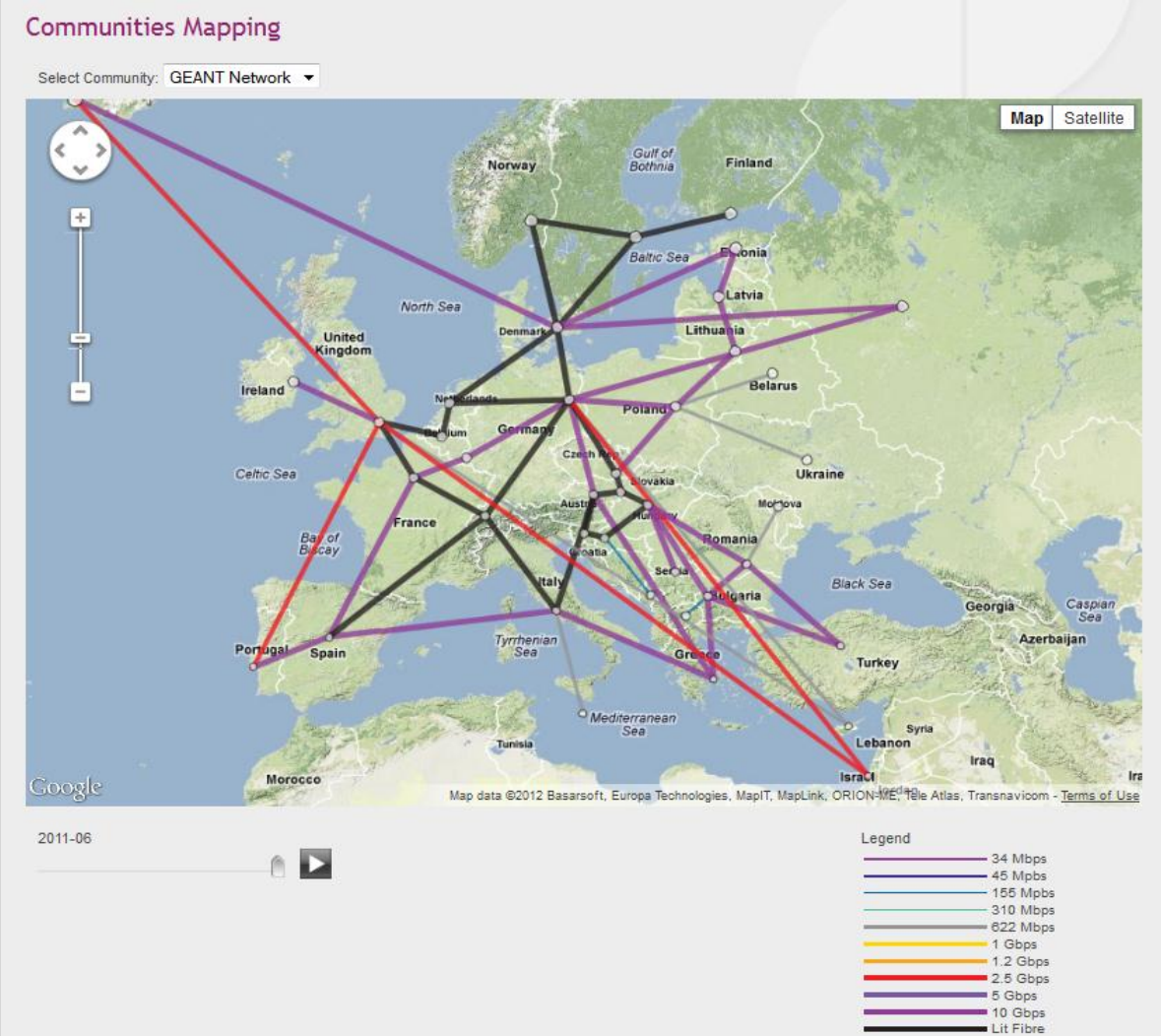
# The *Communities Mapping* service



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# The *Chronology* service