

e-Infrastructures in support of the Digital Agenda

The Digital Agenda (http://ec.europa.eu/information_society/digital-agenda/documents/digital-agendacommunication-en.pdf) is a flagship of the EC's 2020 strategy. The e-IRG has long been involved in issues related to those of the Digital Agenda, and published a short guide "e-Infrastructures in support of the Digital Agenda" on the interplay and the support the e-Infrastructures can provide (http://www.e-irg.eu/images/stories/digital_agenda_a5_final.pdf).

In particular, although in the past innovation was led by the supply side of the ICT industry, the demands of the research and scientific communities have created a new status quo where e-Infrastructures are an enabler and a harbinger of ICT-related innovation in the society as a whole. For this to happen effectively, however, the governance structure of e-Infrastructures needs improvement to be able to support the realisation of the Digital Agenda. Specific actions would include:

- The establishment of a user-community-centric approach in strategic e-Infrastructure governance.
- The definition of a long-term financial strategy for e-Infrastructures aimed at a

sustainable operation of services in a flexible and open environment that includes offers from commercial service providers.

- Removing barriers to cross-border service delivery.
- The introduction of governance models that provide coordination mechanisms across different levels.
- The encouragement of important players like ESFRI, Virtual Research Communities, etc., to investigate changes in e-Infrastructure governance.
- The investigation of legal structures like ERIC for e-Infrastructures.

In its 2011 White Paper e-IRG concluded that changes in the governance system, its legal base and its financing mechanisms, will be necessary and should lead to strategic user empowerment, should guarantee the flexibility and internationalisation of the supply chain, and should safeguard the crucial role of e-Infrastructures in bringing ICT innovation to the users in its earliest stage. Other related e-IRG recommendations include:

- The creation of a vibrant digital single market.



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- Strong focus on interoperability and standards.
- Fast and Ultra-fast Internet access, while working rigorously to remedy the causes of the digital divide between European researchers.
- Internationalisation of research and innovation, enabled by a seamless cutting edge European e-Infrastructure.

The e-IRG makes a substantial and essential contribution to driving the European Digital Agenda forward. The relevant policy makers are encouraged to exploit better the knowledge, know-how and experience bundled in the e-IRG and expressed in its publications. The e-IRG is ready to play its role in this respect.



Summary of the 27th e-IRG Delegates Meeting in Warsaw

The 27th e-IRG delegates meeting in Warsaw on the 9th of December 2011 was the second one under the auspices of the Polish EU Presidency.

Future Organisation of e-IRG

e-IRG Chair Gudmund Høst started the first part of the meeting, where the future organisation of e-IRG was on the agenda and key representatives from major European e-infrastructures were invited to attend and contribute to the discussion. Representatives from EGI, OpenAIREplus, EUDAT, GÉANT and TERENA provided their views on strengths, weaknesses, opportunities and threats related to e-IRG. After the presentations, Høst invited the external participants to re-work the e-IRG SWOT analysis together with the delegates.

The e-IRG Roadmap 2012

Leif Laaksonen presented the ideas for the e-IRG Roadmap 2012. He proposed that the e-IRG Roadmap 2012 should assess the development of e-infrastructure service provision with focus on the next 3-5 years, taking into account economic and social impact as well as governance policy aspects.

In addition to the e-IRG delegates and the support programme major horizontal e-infrastructures initiatives will be invited to participate in the

Roadmap process.

Main focus points will be e-infrastructure trends and paradigm shifts. Some of the proposed topics so far are scientific and public data, cooperation with industry, the general direction, desiderata and open issues of e-Infrastructures as well as the “fourth layer”, the linking of user communities to the e-infrastructures.

News from the Commission

Pekka Karp gave a detailed presentation of HORIZON 2020, which will replace three programmes (FP7, CIP and EIT) and will have three priorities: Excellent Science, Industrial Leadership and Societal Challenges.

The proposed funding for Research Infrastructures is €2,802 million, which includes e-infrastructures. Karp presented the activities of HORIZON 2020, with a focus to the Research Infrastructure, which includes: 1. Developing the European RIs for 2020 and beyond, 2. Fostering the innovation potential of RIs and their human capital and 3. Reinforcing Europe’s RI policy and international cooperation. e-Infrastructures are mainly included under “Developing the European RIs for 2020”, while e-IRG is specifically mentioned under point three.

Karp invited e-IRG to co-organise two of the HORIZON 2020 consultation meetings during the spring 2012.

e-IRG Policy Papers

Norbert Meyer reported the status of the e-IRG Blue Paper on Data Management and informed that selected ES-FRI projects will contribute to the Blue Paper. The topics of the Blue Paper will be data infrastructure, reliability and replications, metadata, unified access and security.

The e-IRG document “e-Infrastructures in support of the Digital Agenda” has been finalized and printed.

Rosette Vandebroucke presented the status of the report of the Task Force on Cloud Computing, which soon will go into the consultation phase.

Activities during the Danish EU Presidency

Rene Belsø reaffirmed that the first delegates meeting during the Danish EU Presidency will take place in Copenhagen on March 20th, 2012 preceding the International Conference on Research Infrastructures (ICRI 2012). The e-IRG workshop will be held on 11-12 June and mainly organised by Nordforsk. The second delegates meeting will take place on June 13th.

Enabling the Online ERA through EGI

The full implementation of the European Research Area (ERA) can only be achieved through the acceleration of e-Infrastructures development, which will enable the accomplishment of the 'fifth freedom' and free circulation of researchers knowledge and technology across Europe.

The European Grid Infrastructure (EGI) is committed to this vision by offering (and continuously innovating) an open, collaborative, sustainable e-Infrastructure to support distributed data analysis. EGI is coordinated by the EGI.eu foundation, who monitors the implementation of the Europe 2020 strategy and contributes with focused actions to reach the overall targets. In the context of the Innovation Union, 'Delivering the ERA' chapter, EGI.eu submitted a position paper to influence the design of the ERA Framework - http://go.egi.eu/EGI_ERA. This paper contains 15 key recommendations for the ERA success. Some of them are:

- To provide information. How many researchers need access to distributed digital resources as part of their daily professional activities? How many researchers could benefit from improved access to digital resources?
- To develop a long-term roadmap for integrated e-Infrastructures with an aim of achieving sustainable operation and evolution of services.
- To support EGI in leading the development of the development of a European cloud built from federated virtualised resources from public and commercial providers.
- To fund applied science communities to develop domain-specific platforms to be deployed on e-Infrastructures. This will lead to new innovative services that can be offered to researchers in other disciplines.
- To recommend that ESFRI projects formally evaluate the services, capacity and data they need from e-Infrastructures for their research needs and to report back this information.
- To build an ERA Compendium/Knowledge base with all European RIs, national and European research groups. Having this structured collection of information would help research communities to build collaborations and e-Infrastructures and other stakeholders to support their needs.
- To address legislative uncertainties around commercial use of e-Infrastructures and industrial collaboration with.
- To strengthen the development of policies to stimulate the definition of joint standardisation roadmaps encompassing the full development life-cycle.
- To enable stakeholders' participation in the ERA governance and policy development. In addition, the EC should establish an ERA stakeholders' platform and dedicated working group that will discuss policy issues to help remove the potential barriers and bottlenecks that hinder collaboration between RIs and e-Infrastructures.

Through a network of federated data centres, EGI aims to provide researchers the means to deploy the software environments they need flexibly – where and when they need them. Virtualisation technologies will provide the foundation for this operational model, enabling the research community to access a cloud environment that is tuned to their ever-changing requirements for data-intensive analysis. e-Infrastructures are now an essential foundation for research and innovation and they are a vital resource for the entire ERA.

Damir Marinovic, Strategy and Policy Officer, EGI.eu



PRACE news



CURIE Grand Opening on March 1st, 2012

The Research Infrastructure PRACE (Partnership for Advanced Computing in Europe) welcomes the full installation of the French supercomputer CURIE, the second Tier0 system for PRACE, which is completely opened to scientists on March 1st, 2012. Made available by GENCI, which represents France - one of the four hosting members in PRACE, and provided by Bull, the supercomputer CURIE has been installed in two phases since the end of 2010 and is now fully operational. During this period, CURIE has been gradually accessible for research purposes through the PRACE Regular and Preparatory Access Calls. Altogether, CURIE will deliver a global peak performance of 2 Petaflop/s (2 million billion operations a second).

FERMI ready for launch in PRACE

FERMI is the new supercomputing system in CINECA, the Italian supercomputing centre. This new system, based on IBM BG/Q architecture, will replace the IBM SP6 supercomputer and will be installed this spring and becoming fully operational in August 2012.

EU-U.S. Summer School

The U.S. National Science Foundation's Extreme Science and Engineering Discovery Environment (XSEDE) project and PRACE announces the third International Summer School on High Performance Computing (HPC) Challenges in Computational Sciences, June 24-28, 2012, in Dublin, Ireland.

Establishment of six advanced HPC training centres

PRACE has selected six of its members sites: Barcelona Supercomputing Center (Spain), CINECA - Consorzio Interuniversitario (Italy), CSC - IT Center for Science Ltd (Finland), EPCC at the University of Edinburgh (UK), Gauss Centre for Supercomputing (Germany) and Maison de la Simulation (France) as the first PRACE Advanced Training Centres.

The mission of the PRACE Advanced Training Centres (PATCs) is to carry out and coordinate training and education activities that enable the European research community to utilise the computational

infrastructure available through PRACE. The long-term vision is that such centres will become the hubs and key drivers of European high-performance computing education. The training centres are also the main bodies responsible for producing materials for the PRACE training portal: www.prace-ri.eu/training

Three new PRACE members

PRACE got three new member countries as Denmark, Israel and Slovenia joined the PRACE Research Infrastructure in the beginning of January 2012. The overall number of partners in the PRACE Research Infrastructure has now increased to 24 countries.

The following countries collaborate in PRACE: Austria, Bulgaria, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, The Netherlands, Norway, Poland, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Tiina Leiponen, CSC



e-ScienceTalk update

Citizen Cyberscience Summit

e-ScienceTalk attended the 2012 Citizen CyberScience Summit, held at the Royal Geographic Society and University College in London from 16–18 February. Attendance at the event exceeded expectations, with 150 delegates present, twice the number than initially anticipated.

With a growing interest in this area as the public becomes more engaged with and enthusiastic about participating in science, there were talks on volunteer computing, crowd-sourcing and the relationship between citizen science and peer production. Proving that citizen science isn't just about donating spare computing cycles, the summit was the perfect place to launch Extreme Citizen Science, which aims to empower communities to undertake science on subjects that concern them across the globe: v.gd/ccs2012_excites. More information can also be found here: v.gd/sciencecitizens

ISGC2012

The International Symposium on Grids and Clouds was held in Taipei from 26 February to 2 March. From ocean science to the abyss of deep space through the Sloan digital sky



Research networks: global connectivity

As science becomes increasingly global and collaborative, researchers' dependence on fast and reliable data and communication links continues to grow. Research and Education (R&E) networks are designed to meet these demands, providing high-speed and reliable internet links to support applications and experiments crucial to research.

In the next decade, the demand for computationally driven data collection and information-sharing will escalate dramatically. GEANT and other R&E networks will inevitably play a central role in enabling interconnectivity and collaboration across Europe and the world.

Enabling research and innovation

Networking is an essential part of the e-infrastructure connecting people around the world to global ICT services. Without reliable access to scientific instruments, data, collaborators, and other resources many international research experiments would not be possible.

Within Europe, the dedicated pan-European R&E network, GEANT, transfers huge quantities of data (over 1,000 terabytes per day) for fields as diverse as radio-astronomy and drug research. In the past moving such large datasets may have taken days or would not have been possible, but now with high-bandwidth technology, transmission can take seconds.

 Neelke Kroes, Vice-President of the European Commission responsible for the Digital Agenda – "The power and scope of GEANT ensure Europe remains a central hub for research and education, offering the best infrastructure to the brightest minds in the world. Rich with these successes, GEANT must now position itself to face the challenges of the next decade such as the upcoming 'blue design', connecting at world scale, and providing a seamless service to all EU scientists to build an online European Research Area."

Knowledge without borders

The GEANT network is fundamental to the European Commission's vision of providing equal opportunities and access for European researchers irrespective of their location within Europe.

In October 2011, a report entitled "Knowledge without Borders: GEANT 2020" provided an action plan to serve the needs of the community and help maintain and strengthen Europe's research agenda. Among its

Helping radio-astronomers see further back in time

Reliable and robust links also allow researchers to share data in real-time. Astronomers are using networks to connect multiple radio telescopes across Europe and beyond. Using a technique called e-VLBI or real-time, electronic Very Long Baseline Interferometry, astronomers can collect their data almost immediately. The technique relies on GEANT and other networks to connect telescopes to a central data processor in supercomputers, which correlates the data from the telescopes synchronously.

Expanding e-infrastructure such as the GEANT network, data can be transferred from each telescope and correlated in real-time. The updated technique only results in a matter of hours, rather than the weeks it takes with the traditional technique of recording data to disk and physically shipping them for processing. The fast turnaround provides astronomers with a better tool for studying supernovas, gamma-ray bursts and other so-called transient activity that might otherwise be missed.



survey, visualizing science was high on the agenda. Alexandre Bonvin discussed how visual tools are helping his research turn snail venom into a powerful anaesthetic. A video on the subject can be found on: go.egi.eu/conco

e-ScienceTalk's project coordinator Catherine Gater gave a talk on the importance of dissemination in crossing the digital divide: v.gd/crossingthedivide

New e-Science Briefings

February also saw the publication of a new edition of e-ScienceBriefings, focusing on how vast quantities of data produced by computational science are being tackled to stave off the threat of the data deluge. e-Infrastructures like the pan-European network

GEANT allow the transmission of petabytes (millions of gigabytes) of data per day, helping scientists with everything from finding new medicines to uncovering the structure of the Universe. Radio-astronomers are using the GEANT network to stream data from radio telescopes across Europe, allowing them to correlate this information in real time. In the clinic, DECIDE – a neurological diagnostic tool – makes use of GEANT's high-speed research links to enable doctors to quickly compare brain scans across the grid, bringing better treatment to patients at a time when healthcare budgets are being squeezed.

With the potential to impact significantly on global development, AfricaConnect takes advantage of GEANT to deliver international information networks to researchers in sub-Saharan Africa. By providing the infrastructure for video conferencing and distance learning, it has the power to unlock intellectual potential and drive forward social and economic growth.

Subscribe and pick up a copy of the latest and all previous e-ScienceBriefings on the web at: v.gd/esciencebriefings or let us know what you'd like to see in future issues at: v.gd/esciencesurvey

Stefan Janusz, e-Science-Talk Impact Reporter

Summary of the 9th e-Infrastructure Concertation meeting

EC's *e-Infrastructure Concertation Meetings* are a series of events that bring together key players in the community who are working towards a long term sustainable *e-Infrastructure* for scientific research in Europe. The 9th *e-Infrastructure Concertation Meeting*, organised in collaboration with the *e-ScienceTalk* project, took place in Lyon, France on the 22nd and 23rd of September and was targeted at the *e-Infrastructures* community in the new *Distributed Computing Infrastructures* era.

This summary is a shortened version of the 9th *e-Infrastructure* concertation report by *e-ScienceTalk*. The full report can be found at: <https://documents.egi.eu/public/ShowDocument?docid=885>

The two day meeting brought together 150 representatives and subjects included taking stock of progress and discussing future perspectives on data, cloud technologies, HPC, software and *e-Science* environments, as well as future prospects under the Horizon 2020 funding programme.

Session on scientific data

The discussion on scientific data was focused on establishing a European data

infrastructure and a global Data Access Interoperability Task Force (DAITF). It was also considered how to ensure that the areas of open publications, open data, open software and open education are more productively integrated.

One recommendation from the session was that the flexibility of funding sources should be enhanced, to enable the rapid scaling of promising solutions. It was also noted that funding bodies should support the development of collaborative models and actions to create synergies and exchange opportunities between the private/commercial sector and scientific sector.

The Data Access Interoperability Task Force panel focused on interoperability challenges. The scope of the discussion was around how to achieve interoperability in data access across disciplines, projects, regions and continents. Both technical and organizational aspects were considered. It was highlighted that researchers need to be able to use the infrastructure without necessarily having knowledge of the software behind it. It was also considered important to address questions such as: How do we motivate research-



ers to manage their research? What can be delivered through institutions and what at a national level? Will researchers recognise data at citation level? What does an individual researcher need in terms of for instance training how will it be administered?

Session on e-Science environments

e-Science environments can allow scientists to connect to their peers, share scientific resources and collaborate on research across organisational boundaries. The EC has supported the development of these through a number of calls and this session looked at the developments so far as well as best practices for *e-science* environments.

One vision for the *e-Science* environment is to create a European Cloud Computing Infrastructure to store and access data, as well as for data processing and analysis. The project would be led by the European Space Agency together with CERN, EMBL, EGI.eu, national space agencies and European big



commercial ICT players. Initial actions for implementing a European Cloud Computing Infrastructure are to:

- Identify and adopt suitable policies for trust, security and privacy on a European level.
- Create a light-weight governance structure that involves all stakeholders and can evolve over time
- Define a short- and mid-term funding scheme base with a Public-Private-Partnership model

Session on HPC state of play

Over the past years the European Commission has invested in HPC infrastructures across Europe particularly through the DEISA and PRACE projects. This session looked at HPC infrastructure as well as software in the HPC community.

In the HPC arena PRACE is going well. Calls to date have addressed issues such as more effective solar cells, bio-chemistry, particle and plasma physics, weather and climate models. Even though the HPC market is healthy, the EU is still behind. In the last two years Europe has lost 10% of its HPC capabilities while Asia and the US have increased their capabilities. There is currently fragmentation of European HPC efforts across

many countries. PRACE can help to combine and reinforce the efforts of national and EU funding authorities. There is also a need to develop a new HPC strategy for industry involvement.

Investments in HPC infrastructures require a long-term perspective. For example the transition to petascale and exascale computing can offer new opportunities for both science and computing.

In Europe it is more likely that efforts in HPC will pay off in the software not the hardware side. Key policy actions from the European Commission in HPC are for instance to develop EU-level governance, spend more (both Member States, EU, industry) and the development of EU native capability.

Session on infrastructures future prospects under Horizon 2020

This session looked at the future plans of e-science infrastructures and projects under the next Framework Programme (Horizon 2020), which will run from 2014 to 2020.

e-Infrastructures need greater attention according to the discussions in this session. This can be fostered through for example better engagement with industry. There is also a need to close the gap between what the e-infrastructure com-

munity is doing and what the computing services organisations in higher education institutes and research institutes are doing for general research teaching and learning support.

Connections between researchers and providers are of vital importance, there is a need to build trust between them. For example e-infrastructure providers need to be clearer about the services they provide for researchers.

It was also considered important that software is seen as an infrastructure alongside computing and data. Scalable application development will be important for exascale computing – the focus is moving from an HPC data approach to a software development approach.

Another issue discussed was that national agencies are often seen as obstructive because researchers have to get past them to get funded. The OSIRIS initiative is collecting information for public authorities on players in the field, which is useful for new e-Infrastructures and for comparison of existing ones.



NEWS AND UPCOMING EVENTS

e-IRG delegates meeting, by invitation
Copenhagen, Denmark, 20 March 2012

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

ICRI2012, by invitation
Copenhagen, Denmark, 21-23 March 2012

<http://www.icri2012.dk>

EGI Community Forum
Garching-Munich, Germany, 26-30 March 2012

<http://cf2012.egi.eu/>

PRACE 4th Industrial seminar
Bologna, Italy, 16-17 April 2012

<http://www.prace-ri.eu/>

TERENA networking conference, TNC2012
Reykjavík, Iceland, 21-24 May 2012

<https://tnc2012.terena.org/>

e-IRG workshop and meeting
Copenhagen, Denmark, 11-13 June 2012

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

ISC 2012
Hamburg, Germany, 17-21 June 2012

<http://www.isc-events.com/isc12/>

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