

SUMMARY e-IRG BUDAPEST WORKSHOP 4-5 APRIL 2011

Around 70 participants attended the e-IRG workshop organized by the Hungarian NREN (NIIFI) under the auspices of the Hungarian EU Presidency at the Hungarian Academy of Sciences on 4-5 April 2011. Policy issues related to e-Infrastructures was the main focus of the workshop, with topics such as the role and challenges of e-Infrastructures in the ERA and the increased need for innovation through partnerships between the public and the private sector. The two panel sessions were devoted to the regional and cohesion aspects of e-Infrastructure development and to e-IRG recommendations focusing on the Green Paper of the European Commission on Common Strategic Framework for future EU Research and Innovation Funding.

The workshop was opened by the e-IRG co-chair **Lajos Balint**, NIIFI, Hungary, who welcomed everyone to a policy oriented e-IRG workshop. **Gudmund Høst**, e-IRG chair, updated the participants about e-IRG and in particular about the ongoing work of the White Paper 2011. He encouraged the participants to be provocative and bold and to remember to keep a European perspective in mind.

The first keynote speaker, **Norbert Kroó**, Vice President of the Hungarian Academy of Sciences and Member of the ERC Scientific Council, set the framework of the workshop by reflecting on the past, present and future of the ERA and by elaborating on the next European research programme and the role of Research Infrastructures, including e-Infrastructure. For the ERA to be strengthened, Kroó suggested a stronger role for the European Research Council and underlined the importance of EU-level support to both existing and new RIs. Kroó concluded that the European co-operation should be more effective in planning, building and exploiting common RIs and that the establishment of new, major European RIs and their operation should be included in the financing schemes beyond the FP7. He also suggested that the next funding instrument after FP7 should have a special role in the implementation of the roadmap projects of ESFRI.

The second keynote speaker, **Hervé Pero**, European Commission, DG Research and Innovation also highlighted the growing importance of RIs. About 10 ERIC applications are currently under preparation and by 2015 up to 30 new European RIs are expected. The impact of the ESFRI Roadmap 2010 was also underlined, as the Roadmap attracted the Member States attention to the importance of RIs. Examples of potential further impacts of the Roadmap were standardization of research procedures, data storage and exchange as well as developed coordination and optimization of national and European investments. The role of FP7 RIs actions was described as a catalyst for national efforts and European integration in this area. Pero ensured that the next Common Strategic Framework will contribute to fulfil the two key EU initiatives which put RIs and e-Infrastructure in focus; The Innovation Union and the Digital Agenda. He further elaborated on the 3 main pillars of the next Common Strategic Framework, which are the *Science for innovation* (horizontal bottom layer), *Innovation for society* and

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e-IRG secretariat
c/o Netherlands National Computer Facilities Foundation (NCF)
P.O. Box 93575
NL-2509 AN The Hague, The Netherlands
Phone: +31 (0)70 344 0526
secretariat@e-irg.eu

Visiting address
Anna van Saksenlaan 51
NL-2593 HW The Hague
The Netherlands

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Innovation for competitiveness (two vertical layers). RIs and e-Infrastructure are part of the horizontal bottom layer as one of the core drivers.

Neil Geddes, UK Science and Technology Facilities Council, made a presentation on what e-Infrastructures provide for the ERA and how to complete the service portfolio. Geddes described what e-Infrastructure provides in order of maturity, which is networking, distributed computing, HPC, open access, data infrastructures, community innovation, added-value middleware services (AAI, access from anywhere) and software. Geddes made clear that we still have a long way to go with data and referred to the recommendations in the e-IRG Data Management Task Force report. He underlined the importance of improving what already exists, since a full innovation cycle normally takes up 10-15 years. User engagement was seen as an essential success factor, but described as a two-way street; researchers need to be involved in the strategic planning and e-Infrastructure providers need to be equally engaged in the user's needs.

The last person to speak about roles and challenges of e-Infrastructures in the ERA was **John Dyer**, TERENA, The Netherlands. He presented ASPIRE - the third TERENA/GN3 foresight study (that started in April 2011). ASPIRE will explore future Internet developments over the next 5-10 years in the context of the research and education community and will be delivered in summer 2012.

Kostas Glinos, European Commission, DG Information Society and Media, gave an interesting presentation on the workshop theme *e-Infrastructures today and tomorrow: trends and perspectives*. Glinos suggested three vectors of a renewed European strategy regarding e-Infrastructure; Europe should be a hub of excellence in e-science; Europe should provide sustainable and continuous services, and Europe should remember to keep on innovating. Regarding HPC, he described a fragmentation of the HPC ecosystem in Europe and pointed out that even if PRACE unites efforts, it is only at the top of the pyramid. Glinos was still positive for Europe to win the race to exascale, but underlined that more investments are needed as well as deploying services for industry and SMEs. More extensive communication on HPC will be communicated by the European Commission in December 2011. Glinos also referred to the Digital Agenda which calls for a European strategy for cloud computing, notably for government and science. He concluded by reflecting on future perspectives, where the vision is "e-Infrastructure as a service" and users with more and more voice and impact. The services provided could go beyond research, such as education, public sector and citizens.

Service Level Management in e-Infrastructures was the topic presented by **Matti Heikkurinen**, gSLM project consortium. Heikkurinen suggested enabling service level management through organizational processes and spoke specifically about two main challenges; *the co-evolution* (users and providers re-organising their process; new users and use cases and the evolution of services) and *cross-organisational groups*. One of the key challenges mentioned regarding co-evolution was that although e-Infrastructure can provide an acceptable level of service, the model does not scale. Concerning cross-

organisational groups it was pointed out that there is high risk of misunderstandings due to the lack of a lingua franca to describe needs and services. Referring to the gSLM project, it was clarified that the focus is on grids, although the project aims to have a broader relevance as well.

Antonella Fresa, DC-NET Technical Coordinator, Italian Ministry of Culture, presented Data infrastructures for social sciences and humanities. Fresa described the growth of the digitized material in the European Cultural sector, and stated that the resulting data mainly need high-quality information technology management, access to facilities offered to the final users and also interoperation of cultural heritage data with other research data. She clarified the difference between DC-NET initiative and Europeana, where Europeana is a portal for final users, initiated by EC whereas DC-Net is initiated by the Member States and is working towards an infrastructure for research.

The last presentation on the workshop theme *e-Infrastructures today and tomorrow* was a joint effort by Péter Stefán, NIIFI, Péter Kacsuk, MTA-SzTAKI, and Imre Szeberényi, BME, all from Hungary, who gave an overview of e-Infrastructure development trends in the Area of grids, clouds, HPC, storage, virtualization and IaaS. The core challenge was described as how to serve scientific computing with compute and data storage infrastructure in more efficient ways. The importance of volunteering desktop grids was highlighted; 1 million computers are actively participating in volunteer computing, which supplies around 10 Petaflops of computing power. Regarding scientific computing on clouds, the IaaS benefits was mainly referred to. They also described infrastructure solutions for serving scientific computing, e.g. virtualization via the NIIF cloud, designed to be a private cloud that can be transformed to public. Referring to future trends of clouds, it was suggested that IaaS and scientific computing can coexist on the infrastructure as grid can connect geographically distant sites and allow a specific service on it and IaaS cloud pushes into the grid software stack below the operating system level and facilitates easy job migration, better resource utilization and computing environment.

Another important strategic theme; *Regional and cohesion aspects of e-Infrastructure development*, was initiated by Tamas Maray, NIIFI, Hungary, who put focus on e-Infrastructure development by using the Structural Funds. He summarised shortly the e-Infrastructure development in Hungary and stated that multiple operational programs (OPs) supported NIIF with significant funding. Despite some difficulties, a lot of achievements have been accomplished, for instance renewal of the NREN backbone and the national HPC infrastructure. Maray's conclusions were that structural funds resources have essential importance for e-Infrastructure development in less developed Member States and that advanced RIs play a key role in enhancing cohesion within Europe. He underlined that it is extremely important that FPs continue to support European level RIs (GEANT, PRACE, etc.) and he had high expectations regarding the new EU innovation funding mechanisms.

Marko Bonac, Arnes, Slovenia, focused on cost sharing principles and practice in developing and using e-Infrastructure facilities and services. He explained cost sharing among partners in the GEANT project consortium, (32 NRENs). The problem of the small countries was highlighted - Purchasing Power Parity is one of the factors which influence the subscription, and this benefits the small countries. Small countries usually need larger access since their research is more international, which creates higher costs. Bonac summarised that in the end it becomes a good compromise; all the NRENs participate and European Commission is co-funding.

An SEE case study was presented by **Aneta Karaivanova**, BAS Institute of ICT, Bulgaria, as an example of a successful model for regional development of e-Infrastructures. The SEE project model with joint communication & service infrastructure initiatives for South-East Europe has facilitated the integration of SEE countries to European initiatives in multiple e-Infrastructure components, such as network, grid and HPC. The SEERA-EI is a three year policy project (started April 2009) which aims at developing the coordination of national e-Infrastructures programmes in South-East Europe, to set the framework for a common regional agenda. Karaivanova concluded that so far this regional technical cooperation has brought forward significant results and a stable, sustainable Research Infrastructure.

An inspiring non-European perspective of using e-Infrastructures was presented by **Bernard Marechal**, CETA-CIEMAT, Spain, who spoke about grid computing in Latin America. He underlined the importance of building a bridge between consolidated e-Infrastructure initiatives in Europe and emerging ones in LA. The current project GISELA is working to ensure the long-term sustainability of the LA e-Infrastructure and provides full support to VRCs, spanning LA and Europe. Marcheal highlighted training as a crucial element for the uptake of e-Infrastructures and concluded that the continuity of the EC support is of most importance, since LA must guarantee the long-term sustainability of its e-Science in collaboration with Europe.

The first part of the second day was devoted to the theme *partnerships and relations in developing and using e-Infrastructures*. **Mauro Campanella**, GARR, Italy, spoke about the role of e-Infrastructures in PPP activities in ICT and in Future Internet R&D. To reach the ERA and Future Internet goal of a 'smarter' environment, all the layers (communication, computing, data and services) must be used. The e-Infrastructure for research has to evolve in a time scale typical of ICT market (one or two years) to offer a constantly up-to date service and Campanella emphasised that a research and development perspective has to be devoted to the e-Infrastructure itself as well, due to this complexity of layers. Campanella noted that the specific requirements of an RI, with its constant need for evolution and a long set-up period, make the establishment and management of a PPP a high risk for the private partners. He concluded that sustainability is the main issue for a successful PPP and advised to agree on the main principles like openness, transparency, neutrality and IPR before a PPP is set-up.

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e-IRG secretariat
c/o Netherlands National Computer Facilities Foundation (NCF)
P.O. Box 93575
NL-2509 AN The Hague, The Netherlands
Phone: +31 (0)70 344 0526
secretariat@e-irg.eu

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Alfons Hoekstra, University of Amsterdam, The Netherlands, presented the MAPPER project (Multiscale applications on European e-Infrastructures) and pointed out that he spoke from a user's point of view. The three-year MAPPER project (started in October 2010) will develop computational strategies, software and services for distributed multiscale simulations across disciplines, using existing and evolving European e-Infrastructures. For the project to be successful there is a need for integrated computing, storage, networks and services - a need which current HPC's policy prevents from happening, according to Hoekstra, since there are currently no coordinated allocations policies in the EU. Hoekstra concluded that there is a need to change a range of policies related to access and use of e-Infrastructures to support Distributed Multiscale Computing DMC. More information can be found in a MAPPER report which deals with the policy framework needed to support MAPPER applications, and in a broader sense, to support DMC.

The workshop theme *Beyond FP7 - stability and sustainability of leading edge e-Infrastructure services in the ERA*, was initiated by **Vasilis Maglaris**, NTUA, Greece. Maglaris focused on "NRENs and GÉANT - Europe's Research & Education Community Road towards ICT Convergence". The key challenge of NRENs and GÉANT is the data deluge. NRENs/GÉANT are about to merge the Next Generation Networks to Future Internet platforms and Maglaris elaborated on the sustainability of FI experimental platforms. Among a number of factors he mentioned the active endorsement of diverse user communities (beyond ICT researchers) as one key aspect of sustainability. Users need to understand the benefits and economic incentives in using multifaceted, holistic FI platforms. Maglaris also presented the FEDERICA project and the FIRE research project NOVI and summarised that Europe is ready for FI but there is a need for concerted planning at European & global levels.

Peter Wittenburg, Max Planck Institute for Psycholinguistics, The Netherlands, gave a description on how humanities and social sciences join forces to link with e-Infrastructures. He presented the DASISH cluster proposal between DARIAH, CESSDA, SHARE, ESS and CLARIN - all Social Science and Humanities ESFRI Roadmap projects. One shared topic is the lack of quality of data; how to improve the quality of data to enable advanced and cross-disciplinary access? Wittenburg described DASISH as part of an ecosystem where there is a need to build on common services, although it will take time to come to a seamless and cost efficient setup.

Fotis Karayannis, Independent consultant, on behalf of GRDI2020 consortium, presented GRDI2020 - towards a 10-Year Vision for Global Research Data Infrastructures. GRDI2020 contributes to defining a future Roadmap on GRDIs in close collaboration with the European Commission, policy groups and research user communities. The goal is to identify and address the open research problems (technical as well as organizational) which currently hinder the development of theoretically founded Global Research Data Infrastructures, and to indicate new research directions necessary in order to address these problems. This should be done as a complementary vision, with respect to other

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roadmap reports. Karayannis showed a list of Roadmap topics which span from data interoperability, storage and management to data security and data policy, to mention a few technical and organisational examples. The GRDI2020 final roadmap is to be delivered in January 2012. Some initial recommendations are that future GRDIs must support data-intensive research as well as multi-/inter-disciplinary research. It was also recommended to create a new international research community, composed of both end-users and computer scientists/engineers. The roadmap can be found on <http://pakag.it/roadmap>.

The panel discussion on e-IRG recommendations regarding the CSF Green Paper mainly reflected on previous presentations. **Neil Geddes** commented that cloud computing “only” is a technology, and that we should be careful to be too occupied with it. **Mauro Campanella** underlined the globalisation issue and stressed that we need to be more active in understanding this and simplify access to the services for the user, which is most important for non-traditional scientific communities. **Vasilis Maglaris** concluded that multi-scale application is important, and agreed with Alfons Hoekstras call for streamlined policy for applications. **John Dyer** stressed the need for collaboration with industries, openness, sustainability and federated access. **Norbert Kroó** stated that he was happy to hear presentations which were less about dreams and more about actual actions needed, since the future should not be forecasted - it should be made. Regarding comments on the CSF Green Paper, **Neil Geddes** pointed out that the development should not be too industry-lead - that science and e-Infrastructure have to develop hand in hand. **Gudmund Høst** commented on the capabilities of big capacity and asked if the Member States should fund big capacities, which lead to a discussion where multi-scale thinking and multi-scale innovation was promoted, instead of locking into a particular scale.

In the closing session Gudmund Høst stated that innovation is not easy and that we now have a new concept: “multi-scale policies for research’. He remarked that the users were not very abundant in the workshop, which will be picked up on in the next workshops.

Norbert Meyer closed the e-IRG workshop in Budapest by informing about the plan for the next e-IRG workshop 12-13 October in Poznan, during the Polish presidency. He also gave the participants some suggestions of interesting topics for the next workshop, such as regional and European sustainability, technology support for local/regional infrastructures, and data infrastructures.