



Open e-IRG Workshop

13-14 October 2010, Brussels

Around 70 participants attended the e-IRG workshop organized at the Royal Library of Belgium, Brussels, on 13-14 October 2010, by BELNET under the auspices of the Belgian Presidency of the European Union. The workshop focused on e-Infrastructure governance and also included parallel sessions on e-Infrastructure services, energy and green IT, exascale computing, data Infrastructures, and keynotes on authorization and authentication infrastructure, and public-private partnerships for e-Infrastructures. The workshop provided important inputs for the coming e-IRG White paper that will be published at the beginning of 2011.

The e-IRG was much honored to welcome Prof. **S. V. Raghavan**, from the Indian Institute of Technology Madras. Raghavan offered an overview of the current status of ICT in India, and presented the National Knowledge Network (NKN), recently established by the Indian Government to connect all educational institutions. NKN is going to be implemented by the National Informatics Centre (NIC), and will connect about 1500 knowledge institutions. According to Raghavan, NKN will be a very important instrument of social change in India. It creates the ambience to bring together Science, Technology, and Higher Education.

Two other keynote speakers gave a presentation in the workshop: **Anastasius Gavras** from EURESCOM discussed Public-Private Partnerships for Future Internet, and presented the European Future Internet Alliance (EFIA), a European industrial led alliance facilitating research, development and innovation towards the Future Internet and promoting the uptake of the advanced technologies and business models for the future internet. **Diego Lopez** from redIRIS presented the draft version of the AAI report produced in the framework of the e-IRG Blue paper. Lopez emphasized the need to accelerate the process of the continued convergence of different identity infrastructures, and that future pan-European e-infrastructures and ESFRI projects define their access control policies and mechanisms from the beginning, and promote the application of standards methods for identity data integration with their services.

Efficient governance for an efficient research eco-system

Governance was one of the key themes of the workshop with two sessions chaired by **Frans de Bruijne**, a former Director in DG INFSO, focusing on management and international practices, and legal and financial issues.

Herve Péro, Head of Unit for Research Infrastructures within the Directorate General for Research of the EC, presented the European policy developments in the field of research infrastructures and the Innovation Union, a cornerstone of Europe 2020 strategy, and pointed out that European Innovation will be facilitated by new legal tools like, for instance, ERIC, which came into place in August 2009. Péro also presented data management as one of the major challenges research infrastructures face, and urged the scientific communities and the actors on e-Infrastructures to collaborate on this issue, in order to help the EU developing an efficient management of an efficient research "eco-system".

Steven Newhouse, EGI.eu Director, presented the EGI governance model which is driven by the EGI Council where the number of votes is proportional to the amount of fee paid by the different participants. In terms of technical governance, Newhouse also described how various community requirements can be taken

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into account by EGI.eu through the User Community Board and Operations Management Board, and how EGI.eu produces as output the technology requirements via the Technology Coordination Board.

Mark Jacobs (Lifewatch office) addressed the issue of governance in the case of LifeWatch distributed research infrastructure. LifeWatch is organised as an ERIC, governed by a Governing Board, in which countries are represented. One of the challenges for LifeWatch is to coordinate the work of the distributed independent entities which are crucial for its operations (such as the National History Museum, Sensor Networks, Observatory sites, etc.), with its “own” distributed entities which it controls (Service centre, R&D centre, Technical Operations support centre, etc.), and its common facilities (Executive Management, Technical Operations Support, Service Centres, R&D centres, etc.). The collaboration is done through Formal Agreements and Operational Relations (e.g., SLAs). The main governance issues are related to the distributed aspect of the research infrastructure and to the empowerment of the user community.

René Belsø, from the Danish Center for Scientific Computing, presented the evolving relationship between providers and users in Denmark and the Danish funding model in which money is allocated to the researchers (who decide where to invest it) instead of computer centres. According to Belsø, this has resulted in more efficiency. This represents one example, albeit an extreme one, of how to empower users and set up user-driven e-Infrastructures.

Kyriakos Baxevanidis, Deputy Head of Unit, GÉANT & e-Infrastructure Unit, European Commission, DG-INFISO, gave the first presentation of the second session and addressed legal and financial aspects of e-Infrastructure governance in an international perspective. How to finance investment in international e-Infrastructures, without creating barriers for international use? How to remove artificial national (legal) barriers for international e-Infrastructure service provision? How to balance national and European contributions to e-Infrastructure ecosystem? Baxevanidis emphasized that there is no “one size fits all” approach. He mentioned the examples of GÉANT, EGI, DEISA and PRACE, the special (and easier) case of Software-based e-Infrastructures in terms of co-funding and openness, and the challenges related to highly localized facilities – ESFRI-Roadmap RI are typical examples. According to Baxevanidis, international agreements are easier to make when infrastructures are highly distributed. The EC, however, can play a catalytic role through the regulations (e.g. ERIC) and procedures and funding.

Uwe Schwiegelshohn (D-Grid GmbH) discussed financial and legal aspects of grid and cloud computing. He presented the organizational structure consisting in a shared liability in civil code companies of a federation of providers, and the need for a “Broker corporation” interacting between the providers and the users. In this model, providers become associates and customers of the Broker Corporation but not partners. Providers can enter and leave the broker corporation. Shall we establish a European broker corporation? What is an appropriate legal representation of users? How will we fund international use of infrastructures? These are some open questions that we need to address.

Steven Newhouse (EGI.eu) presented some legal and financial aspects of EGI and detailed the costs related to the running of EGI, including EGI Global Tasks (EGI-InSPIRE, EGI.eu activity) and NGI activity.

Erwin Bleumink, SURFnet Managing Director, reflected on the e-Infrastructure ecosystems, its accompanying financing model and its requirements in terms of governance., emphasizing the need to have user-driven e-Infrastructures and investments in e-Infrastructures.

Outcomes of the parallel sessions on Green ICT, e-Infrastructure services, data infrastructures and exascale computing

Four parallel sessions were organised on the first day of the workshop. This setup was meant to encourage simultaneous discussion of different topics and provide some input for the coming e-IRG White Paper.

Dany Vandromme (e-IRG delegate for France) chaired a session on *Data infrastructures*. **Rossend Llubra** (e-IRGSP2/NCF) presented the work of the e-IRG Data Management Task Force (DMTF), as well as its new planned activities (e.g. the creation of a discussion paper which will analyse the post-DMTF developments and identify the key issues, the inclusion in the next White Paper of the topic e-infrastructure services for scientific data, etc.).

In addition, **Fotis Karagiannis** (e-IRGSP2/AUEB-RC) presented the GRDI2020 initiative which works on a 10-year vision for Global Research Data Infrastructures. The complexity of handling data in this global and multi-disciplinary environment was particularly highlighted. Other topics such as governance, funding and sustainability approaches for data as well as the adoption of specific measures on data management and preservation by the EC in all FP8 projects in-line with the Digital Agenda strategy, were also brought up. In the discussion following the presentations several additional issues were discussed such as the quality of data and the importance to curate data, the willingness to share information and how to stimulate it, open access to curated data repositories and the role of the European Commission and other funding agencies in promoting openness.

The session on *Energy and Green IT* was chaired by **Radek Januszewski** (e-IRGSP2/PSNC). The impact of energy prices on data centres was discussed in particular. Data centres are large consumers of electricity, partly because of the large cooling facilities required. There are opportunities here in terms of exploring alternative energy sources (energy from 100% renewable sources), reusing heat energy and finding more efficient methods of cooling.

Rene Belso (DSCS) presented a Scandinavian three year pilot (1MEUR) between Sweden (SNIC), Norway (UNINETT) and Denmark (DCSC) to investigate the possibility of hosting a shared Nordic HPC installation in a third country enjoying cheap and green energy prices. The challenges identified are both political (national universities are often reluctant to outsource their HPC hardware) technical (staff, bandwidth limitations, latency), and organizational (organizational and management model, etc.).

Another option in terms of Green HPC is to focus on improving the energy efficiency of the machines. **Daniel Ahlin** (KTH, Sweden) presented two PDS power efficiency projects in this area, a first done within PRACE to explore power efficiency with commodity hardware; and a second on pragmatic heat reuse.

Radek Januszewski also discussed energy efficiency in HPC from the PRACE perspective.

The session of *e-Infrastructure services* was introduced by **Lajos Balint** (e-IRG delegate for Hungary) and provided an overview of the wide range of e-Infrastructure services with respect to role, function, methods, tools, features, and possible future perspectives. Special emphasis was put on the latest developments regarding completeness of coverage, complexity of structure, attempts of harmonisation, emergence of cloud techniques, and possible widening of the exploitation.

Vasilis Maglaris (European NREN Policy Committee) presented the role of NRENs and GÉANT. The challenge of NRENs and GÉANT is to provide stable environments to the user communities. Increasingly, this means managing converging e-Infrastructures as a High Performance Computing & Networking (HPCN) Cloud, involving Infrastructure as a Service (IaaS), Future Internet (FI) Services and Applications. At the moment, the main weak points are the campuses (which are sometime lacking the network technology), rather than the GÉANT network.

David Wallom (UK NGS & University of Oxford) gave a presentation on building e-Infrastructure services and meeting diverse demands. The UK National Grid Service involves universities and institutes directly in its organisation structure, through the NGS Collaboration Board. NGS user services include compute services (all current available middleware, including gLite, Unicore, Globus), data services (data storage,

remote relational DB, metadata catalogues, etc.), access services (exemplar instances for methods to use) and support services (user access, control, management). According to Wallom, support, training, outreach, collaborations are as important as the infrastructure itself.

Martin Bech (UNI-C) discussed e-Infrastructure service portfolios and presented the Nordic approach illustrated by NORDUnet. NORDUnet is the Nordic Infrastructure for Research & Education. It is a joint collaboration by the 5 Nordic National Research and Education Networks in Denmark (Forskningsnettet), Finland (Funet), Iceland (RHnet), Norway (Uninett) and Sweden (SUNET) and operates a world-class Nordic and International network and e-Infrastructure service for the Nordic research and educational community. NORDUnet also acts as the Nordic representative towards GÉANT and DANTE bodies. The service portfolio does not involve GÉANT, as this (networking) is considered basic, on which other advanced services are to be built. According to Bech, in order to exchange services internationally a number of obstacles must be overcome: knowledge of what is available, cost, inter-NREN service exchange put down in calls for tenders and contracts, federated AAI, IPR cleaning, etc. NORDUnet experience could be used to develop this approach at European level.

Finally **Imre Szeberényi** (BME IK) addressed the topic of e-Infrastructure services for R&E and beyond, and highlighted that heterogeneity is a key aspect of e-Infrastructures, which brings us to the Service Oriented Architecture (SOA) concept. A second key player is Virtualization (SaaS, IaaS, PaaS). SOA and Virtualization could improve significantly workflow and processes. Traditional NREN services are already structured as SOA (e.g., AAI). The concept should be extended to form a truly Federated e-Infrastructure. Beyond Research and Education, there are also opportunities for e-Government and e-Health that could benefit from similar approaches as they have similar requirements with the ones we have in research and education e-Infrastructures (for instance, e-Identification, e-Authentication, patient records, mobile monitors, etc.). Large savings could be made through administrative modernisation, which could be facilitated by learning from R&E e-Infrastructures.

The fourth session focused on *Exascale computing and related software* and was chaired by **Sergi Girona** (e-IRG delegate for Spain). Exascale computing will probably be available before the end of the decade. At the time where it becomes obvious that the apex of supercomputer research will not be limited to the United States, it is essential that Europe does not stay behind. The supercomputing community and the e-Infrastructure community in general have to decide on how to prepare the transition to exascale over significant technical hurdles, and to explain to the public, industry and policy makers how work towards exascale computing will benefit European economies, creating jobs, innovation, and cutting-edge research.

Sebastian von Alftan (CSC – IT Center for Science) presented a technical point of view on exascale software. Topics discussed in this session included the need and motivation for exascale computing performance, scaling issues, applications and software engineering, and training the users and specific communities.

These various presentations on key e-Infrastructure-related topics allowed in-depth discussions and consultations with the different communities, and will provide an important source of input for the next e-IRG White paper that will be published in the beginning of 2011.