e-ScienceTalk

8TH E-INFRASTRUCTURE CONCERTATION MEETING REPORT

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1 INTRODUCTION

The 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 event described in this document was targeted at the e-Infrastructure' community in the new Distributed Computing Infrastructures era.

The 8th e-Infrastructure Concertation Meeting, organised in collaboration with the e-ScienceTalk project, took place at the Globe in CERN, Geneva on 4 and 5 November 2010. The programme for the event aimed to further the EC's objective to develop a world-class resource as part of a strategy to achieve European leadership in e-Science.

The two day meeting included discussions on the socio-economic evaluation of e-Infrastructures, the e-Infrastructure of simulation software as well as presentations from the new projects funded in Call 7 and a training session on OpenAIRE. Colleagues at CERN also arranged a visit of the ATLAS control room for conference delegates. The event provided an ideal opportunity for e-Infrastructure projects to learn more about each other, to network and build relationships that could lead to future collaborations.

This report gives an overview of the discussions and outcomes of the main sessions at the meeting, as well as providing information on the event dissemination and how the event was received.

2 SOCIO-ECONOMIC EVALUATION OF E-INFRASTRUCTURES

The EC, currently monitoring FP7 implementation and developing EU policy in the perspective on FP8, has declared a clear need for assessing the EC investments in the area of e-Infrastructures. The session on Socio-Economic Evolution of e-Infrastructures looked at this issue. The session was structured in three parts: the first part included a series of presentations, the second part consisted of a panel discussion and the third part wrapped-up the session. A more complete overview of the session is given in Annex 1.

2.1 Conclusions

The EC regularly evaluates the results and impacts of its policies and initiatives to improve decision making; evaluation has been vital to keep EU policies effective and ensure transparency and accountability. Evaluation can be both prospective (prior to implementation) and retrospective (post implementation).

The projects ERINA+, e.nventory and a study on development of impact measures for e-Infrastructure (currently being evaluated) will assist the EC in developing tools to evaluate-Infrastructures. ERINA+ for example will support 20 projects until December 2012 to assess their socio-economic impact.

All e-Infrastructure projects should develop a common understanding about evaluation, openly discuss the methodology, agree on indicators and data sources and contribute to the build-up of evaluation frameworks. e-Infrastructure has the ability to resolve the apparent disconnection between the ICT sector and the rest of the economy. Therefore evaluation of e-Infrastructures should take into account a holistic approach.

There are many ways to measure impact including: bibliometrics, collection of statistics, feedback from collaborators, case studies, peer review. Different projects use different indicators e.g. EGI compared to PRACE compared to OpenAIRE.

Challenges for assessing the impact of e-Infrastructures include:
   a) knowing who your users are;
   b) measuring the contribution of using the e-Infrastructure and its importance to the final science output;
   c) identifying the added value of the infrastructure investment;
   d) capturing the data over long periods of time.

2.2 Recommendations

The panel discussion aimed to reach a common understanding, to stimulate and engage key stakeholders and to raise awareness. The discussion aimed to gather feedback on the how and what of

upcoming socio-economic evaluation, specifically when assessing the impact of e-Infrastructures. It aspired to discuss how to:

- Build a common understanding of impact assessment of e-Infrastructures.
- Openly discuss methodologies for evaluation.
- Agree on indicators and data sources.

Recommendations included:

- Evaluation in this area should include a complex post-evaluation exercise to measure benefits to research, development, education, sustainability, economic, social and environmental impact.
- e-Infrastructure projects should develop a common understanding about evaluation and impact, including methodology, indicators, data sources and the evaluation framework.
- Evaluation should take a holistic approach that measures micro-meso-macro assessment and should apply to short, mid and long term.
- Impact assessment should not be over complicated but should not be built on a single indicator either.
- Data should be related to a real world scenario.
- Projects should start collecting qualitative and quantitative information from the start, and often beyond the life of a project, and know their user base to facilitate impact assessment.

3 E-INFRASTRUCTURE OF SIMULATION SOFTWARE

The session on the e-Infrastructure of Simulation Software debated the future of simulation software services in Europe and the creation of a pan-European computational software infrastructure for research. The session was structured around a set of motivating questions asked to the panel members. From their answers session recorders arrived at the following conclusions, recommendations and next steps.

3.1 Conclusions

It was clearly stated by the panel members that the provision of simulation software services (SSS) to the communities is essential and the Commission's initiative to make this evident in the previous call was the right decision to take.

Existing SSS service provision models from the HPC/DCI centres, such as simulation labs, can be developed further to make the service provision more universal and complete. For the HPC representatives the big centres are the ones who have to provide this service.

Alternative models for service provision driven by the user communities also exist, and provide results, but it is difficult to define which model is suitable for a pan-European software infrastructure. Both models can be suitable depending on the needs of each user community.

The creation of integrated teams with computational expertise blended into the scientific communities is a way to match up the scientific community's needs and the services provided by HPC/DCI. The new roles that could be created in the centres and the communities need to be defined so as to create a clear career path that will attract new professionals.

The communities shall focus on the development of SSS tools/libraries that will allow them to adjust the e-Infrastructure to their needs. Thus the infrastructure will behave "as a cloud" with seamless services for them. The focus shall be kept on the consolidation and maintenance of the services rather than the development of new services.

Sustainability cannot be maintained with EC funds only. National funds shall be joined under a European strategy for SSS provision in Europe.

The involvement of industry has not currently achieved a desirable level and participation by SME's is low.

The combination of open versus proprietary software is difficult to achieve in SSS provision. There is a need to investigate this issue further to progress towards the creation of the pan-European software infrastructure.

Europe has the lead in application software. The diversity of the existing communities gives Europe a competitive advantage but the underlying infrastructure falls behind.

Europe needs to invest in the infrastructure so that exascale computing can become the opportunity of the next era.

3.2 Recommendations

- SSS provision shall be supported by the EC and member states. These services shall be discovered, integrated, coordinated, operated and maintained at an EU level for the user communities.
- Integrated teams shall be created and the new roles within the communities shall be evident.
- Support to the "long tail" of user communities shall be continued and the EC has to ensure this happens.
- Develop new computational paradigms and architectures towards the exascale era to keep Europe in the lead.
- Work more on the involvement of industry and SME's and define appropriate licence schemes.
- Create target calls and initiatives for the consolidation of project results. Target an increase in the usage of existing DCI's and focus on user support.

3.3 Next steps

- Invest more in software development for exascale. This is a challenge for FP8. Follow up closely the results from the current exascale call.
- Anticipate the results of the current e-Infrastructures Call 9 to select a set of projects that demonstrate integration of existing infrastructures.
- Include in the next work programme specific objectives about consolidated SSS service provision and maintenance. This will result in setting the foundation of the pan-European software infrastructure.
- Continue the discussion in 2011 with the completion of the first pilot services of the SSS projects.

4 CONFERENCE DISSEMINATION

Along with the logistical organisation of these meetings e-ScienceTalk implemented a communications plan aiming to highlight the projects and discussions coming out of the meeting. This included the following:

- A website for the event was set up on the e-ScienceTalk site, http://www.e-sciencetalk.org/e-concertation/index.php. The event was also publicised on the e-ScienceTalk homepage http://www.e-sciencetalk.org and in the weekly online publication, *International Science Grid This Week* http://www.isgtw.org/?pid=1002817.

- The event was webcast online for those who were not invited or could not attend in person, http://webcast.cern.ch/.

- Project representatives attending the event had the opportunity to disseminate paper publications onsite as well as electronically through an online virtual goody bag, http://www.e-sciencetalk.org/e-concertation/e-concertation-goody-bag.php

- The e-ScienceTalk team, plus colleagues covered the event on our blog, GridCast, through written posts and web videos, http://gridtalk-project.blogspot.com/search/label/8th%20e-concertation.

- An area for online discussions was made available on the GridCafé forum, http://www.gridcafe.org/SMF/index.php.

- The tag #concertation was chosen for use on Twitter, so delegates and followers could track news from the conference online http://twitter.com/e_scitalk.

5   STATISTICS

The 8th e-Infrastructure Concertation meeting was attended in person by 110 delegates. This included representatives from the EC, as well as those involved in EC funded projects. In addition a further 80 visitors made use of the live streaming via the web on the first day of the conference. On the second day 73 visitors accessed the live webcast.

From 3 to 6 November there were 83 visits from 42 unique visitors to the e-ScienceTalk website, which contained information on the e-Infrastructure Concertation meeting. 30% of these visits were from new visitors to the site.

A total of 17 posts were uploaded to the GridCast blog over the two-day conference. These were contributed by four members of the e-ScienceTalk team as well as Owen Appleton from Emergence Tech Ltd and Sara Coelho from EGI. Posts gave brief summaries and opinions on the discussions from the conference as well as announcing the release of the latest e-ScienceTalk GridBriefing and a new competition from iSGTW. There were also photos of the conference posted to the blog as well as four video interviews with delegates at the conference.

From 3 to 6 November there were a total of 248 visits to the GridCast blog, from 165 unique visitors. On average visitors spent 3.5 minutes on the site when visiting. 57% of these visits were from new visitors.

The GridCafé Forum, set up for the event provided a chance for delegates to continue their discussions about the meeting online. The e-ScienceTalk team added three posts to the forum before the start of the meeting to encourage other guests to post to the forum. These included a general welcome to the meeting, information and a call for suggestions about the conference blog and a discussion on how to evaluate the impact of e-Infrastructures. However none of these three posts attracted replies either during or after the meeting, despite advertisement of the forum on the event website and in the opening plenary.

6 CONFERENCE FEEDBACK

In addition to the statistics gathered above the following anecdotal feedback on the 8th e-Concertation Meeting was also gathered in an effort to improve upon the meeting next year. This was as follows:

- Delegates liked the venue and thought that the tour of the ATLAS control room was enjoyable and informative.
- The sandwich lunch was rather limited and could be improved upon in the future.
- The webcasting of the event also went well. Quite a few delegates referred their colleagues towards it if they were not present at the meeting. A speaker also commented on the unobtrusive position of the video camera, making it much more comfortable for presenters at the meeting.
- The session on impact was well received and made for interesting discussions.
- The project sessions went on for rather a long time – Kyriakos suggested that this could be presented as a poster exhibition in the future, perhaps combined with a networking session and reception
- The virtual goody bag could have been promoted better, for example in emails sent out to the projects beforehand, or via a more prominent link to it on the conference website.
- The GridCafé Forum could have been better publicised, especially before the event. Discussions should have been encouraged in the lead-up to the meeting so that when the event started there would already be content for delegates to read. In the future it might be an idea to could combine the GridCast activity with the forum activity.

7 CONCLUSIONS

The 8th e-Infrastructure Concertation meeting was well-received and attended both in person and online via the live webcast and the GridCast blog. Delegates indicated that the session on impact assessment in particular was lively and interesting and a number of recommendations were made as a result of the discussions in this session, and the session on e-Infrastructure of simulation software.

The project presentations followed a similar format to previous e-Infrastructure Concertation meetings, taking the form of five minute presentations through the day. However, feedback from the meeting indicates it might be useful to reconfigure these presentations into a conference exhibition to lighten the load of the sessions during the event.

With regard to conference dissemination and social networking, the GridCast blog and webcast gave a valuable insight into the conference and allowed those who were unable to attend to follow the meeting remotely. However the online forum was much less successful. This may be due to lack of publicity for the forum. Additionally conference delegates appear to make the most of their time networking face-to-face at these meetings and may not have the time or inclination to network online via the discussion forum as well. This is something the e-ScienceTalk project will look into for future events.

The organisation of the event went smoothly and delegates were happy with the venue as well as the opportunity to visit the ATLAS control room at CERN. The organisers will aim to ensure future events have similar opportunities.

APPENDIX 1

e·nventory
The European
eInfrastructures
Observatory
einfrastructuresobservatory.eu
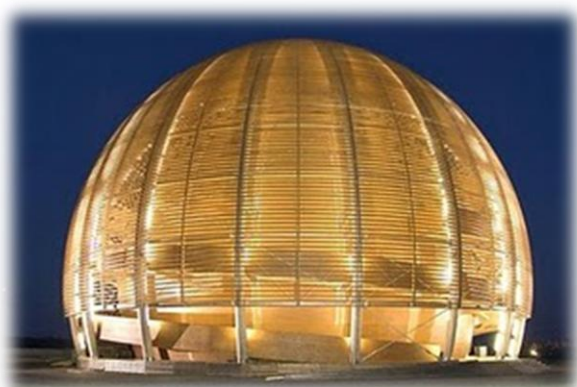
Seventh Framework Programme
Research Infrastructures
e·nventory - European e-Infrastructures Observatory
Grant Agreement no. RI-261554

Report from the session on
Socio-Economic Evaluation of e-Infrastructures
8th e-Infrastructure Concertation Meeting
04-05.11. 2010, Globe of Innovation, CERN, Geneva

Abstract: The 8th e-Infrastructure Concertation Meeting was organised by the Commission Services with the support of the e-ScienceTalk project on 04-05.11. 2010 at the Globe of Innovation building, CERN, Geneva. This event brought together key players in the e-Infrastructures community working towards a long term sustainable e-Infrastructure for scientific research in Europe. This document is the report of the session on Socio-Economic Evaluation of e-Infrastructures of that meeting.

Document Revision History

Date	Issue	Author/Editor/Contributor	Summary of main changes / Status
November 5, 2010	1.0	J.-A. Sanchez-P.	First Draft
November 6, 2010	1.1	N. Vogiatzis	Contribution to panel session questions
November 6, 2010	1.2	K. Baxevanidis	Contribution to wrap up remarks
November 10, 2010	1.3	E. Bohlin, J. Nicholson, T. Eickermann, N. Manola, S. Newhouse, A. Manieri, R. Cossu	Reviewed their sections
November 11, 2010	1.4	A. Passani K. Baxevanidis	Reviewed the panel discussion section Reviewed the wrap up remarks
November 15, 2010	1.5	R. Arak, M. Unterluggauer. T. Lery, A. Belic K. Marek	Reviewed the panel discussion section Reviewed her section
November 16, 2010	2.0	J.-A. Sanchez-P.	Final version submitted to the EC

Report from the session on Socio-Economic Evaluation of e-Infrastructures

This report has been compiled by **Jorge-A. Sanchez-P.**, JNP, assigned rapporteur of the session on Socio-Economic Evaluation of e-Infrastructures[1]. The chairman of the session was **Kyriakos Baxevanidis**, European Commission.

The high-level objective of the session, as defined by European Commission, was the following: *the EC, currently monitoring FP7 implementation and developing EU policy in the perspective of FP8, has declared a clear need for assessing the EC investments in the area of e-Infrastructures.*

Evaluation in the area of ICT for research, as indirect leverage to the economic growth, needs a complex quantitative ex-post evaluation to analyse and measure benefits to research, development and education, sustainability, economic, social and environmental impact and others. Starting from an ex-post evaluation, the importance of what has been achieved by implementing and using e-Infrastructures in research and other domains can be sufficiently perceived. This will give feedback to develop policies and to target new EU and member states investments in this area. In addition, it will help to build methodologies of ex ante feasibility and in itinere monitoring/evaluation in local, national and European perspectives.

In particular, the EC would like to drive the attention for evaluation both at project level (e.g. the e-Infrastructure EC-funded projects) as well as at territorial/geographic level (e.g. regional, national, European).

Furthermore, 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.

As highlighted in the Communication "*Responding to Strategic Needs: Reinforcing the use of evaluation*"[2], a rigorous evidence-based decision-making (contrary to an opinion-based) process is crucial for planning, designing and implementing the EU policies.

The session was structured in three parts: the first part included a series of presentations, the second part consisted of a panel discussion and the third part wrap-up the session. The following sections summarises the discussions.

1.   First part: Presentations

1.1.   Krystyna Marek, EC: Economic Evaluation – EC perspective

Krystyna Marek, Project Officer, European Commission said that the EC regularly evaluates the results and impacts of its policies and initiatives to improve decision making; evaluation has been vital to keep EU policies effective and ensure transparency and accountability.

She referred to two types of **evaluation**: *prospective* **(ex-ante evaluation or impact assessment)** to assess if the objectives correspond to the needs and if the proposed instruments attain the objectives effectively at a reasonable cost and *retrospective* **(interim, final and ex-post)** to improve the quality of the intervention and account for the results achieved.

She also emphasised that **comprehensive quantitative ex-post evaluation of the impact of EU support to e-Infrastructures is lacking** while in certain areas of DG INFSO this is already happening on a larger scale.

She stressed that the **EC is bind to communicate to the Member States and the European Parliament the impact of their actions**.

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[1] http://www.e-sciencetalk.org/e-concertation/

[2] http://ec.europa.eu/budget/documents/evaluation_en.htm

She referred to the study that evaluated the impact of the EU support to Research Infrastructures in the 6th Framework Programme[3], which recommended developing: a) **concrete impact measures based on existing and new data sources**, b) **a set of indicators for which comparable time series data can be collected**, c) **evidence specific for e-Infrastructures** and d) **awareness in the research consortia about their wider relevance to society, industry and European policy making**.

Then, she mentioned two projects: ERINA+ and e·nventory (funded under call 7 of FP7) and a study on development of impact measures for e-Infrastructures (currently being evaluated[4]) that will assist the EC in developing the tools for the evaluation of e-Infrastructures.

She called all e-Infrastructure projects to develop a common understanding about evaluation, openly discuss the methodology and agree on indicators and data sources and invited all projects to contribute to the build-up of the evaluation framework.

The presentation slides are available at:

http://indico.cern.ch/materialDisplay.py?contribId=4&sessionId=0&materialId=slides&confId=108791

1.2. *Erik Bohlin, Chalmers University of Technology: Socio-Economic evaluation on e-Infrastructures: Why and how to implement it?*

Erik Bohlin, Head of Division of Technology and Society, Chalmers University of Technology, said that **by 2010 most of the Lisbon Strategy goals set out by the European Council in 2000 were not achieved.**

He stressed that **in Europe and in the ICT sector the challenge is not the lack of investment, but rather the disconnection between the ICT sector and the rest of the economy.**

He emphasised that **e-Infrastructures have the ability to resolve the disconnection and explained that evaluation of e-Infrastructures should take into account a holistic approach that measures micro-meso-macro assessment.**

The evaluation can be implemented in a way that: a) micro analysis measures the welfare change in the consumer level assuming that e-infrastructures generate efficiency level, lower cost, variety of product with more affordable price especially in the related industries auto, aerospace, digital media, electronic and semi conductor, insurance, etc and b) the meso and macro analysis (employing the Input-Output method) enables the verification of the multiplier impact (direct and indirect) to the economy.

The presentation slides are available at:

http://indico.cern.ch/getFile.py/access?contribId=26&sessionId=0&resId=2&materialId=slides&confId=108791

1.3. *Jane Nicholson, EPSRC: Experience of funding agencies*

Jane Nicholson, Head of Infrastructure & International, Engineering and Physical Sciences Research Council, UK, referred to many success stories and case studies from EPSRC and the UK.

She listed ways of measuring impact: bibliometrics (citations, etc), collection of statistics (support of next generation skills, how many graduates from e-Infrastructure related institutions/initiatives found jobs in industry sector, average salaries of graduates, etc), feedback from collaborators, case studies, peer review (theme days, international reviews, etc).

Then, she mentioned that the 2009 international panel review of the e-Science Programme in the UK identified **three ways in which projects had a substantial economic impact: a) direct involvement of**

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[3] Evaluation of the Pertinence ad Impact of the EU Support Actions to Research Infrastructures in the 6th Framework Programme, DRAFT Synthesis Report , Matrix Knowledge Group in association with Rambøll Management and PREST/ Manchester Institute of Innovation Research, Evaluation for the European Commission BUDG 06/PO/01/Lot 3, March 2009

[4] CALL FOR TENDERS SMART 2010/0051

industry from the inception of the project, b) university led linkages with industry during and after development of new technologies and c) entrepreneurial investigators.

Then, she referred to **the challenges for assessing impact of e-Infrastructures:** a) **knowing who your "users" are,** b) **measuring the importance of the contribution of the use of the e-infrastructure to the final science output,** c) **identifying the added value of the infrastructure investment and** d) **capturing the data over long time periods.**

The presentation slides are available at:

http://indico.cern.ch/materialDisplay.py?contribId=6&sessionId=0&materialId=slides&confId=108791

1.4. Roberto Cossu, ESA: User perspective - Example of Federated Earth Science Research infrastructures

Roberto Cossu, Project Engineer, European Space Agency, introduced the Global Earth Observation System of Systems (GEOSS) that is composed of contributing earth observation systems, ranging from primary data collection systems to systems concerned with the creation and distribution of information products and emphasised on its nine societal benefit areas: disasters, health, energy, climate, water, weather, ecosystems, agriculture and biodiversity. He also presented the GENESI-DEC project (INFRA-2010-1.2.3) that is adding up on the Earth Science e-Infrastructure connecting Digital Repositories spread all over Europe and worldwide and listed the specific socio-economic benefits in the aforementioned nine areas.

The presentation slides are available at:

http://indico.cern.ch/materialDisplay.py?contribId=14&sessionId=0&materialId=slides&confId=108791

1.5. Andrea Manieri, Engineering Ingegneria Informatica: ERINA+ project - Towards long term sustainable e-Infrastructures

Andrea Manieri, ERINA+ Project Director, Engineering Ingegneria Informatica S.p.A, introduced the project fact sheet and the reasoning behind the ERINA+ project: a) Investments in e-Infrastructures constitute a significant portion of the EU R&D grants and b) the financial crisis and more mature understanding of e-Infrastructure perspectives impose to assess the related investments.

Then, he mentioned that **ERINA+ will be supporting 20 projects (requiring an MoU) until 12/2012 to assess their socio-economic impact** through: a) **dedicated consultancy service**, b) **focus and working groups**, and c) **various events and a final conference**. He explained the process that will be deployed for each project and gave examples of key performance indexes that could be employed.

He highlighted **the benefits** (measuring impact may attract more investments, a step toward sustainability) **and threats** (going beyond the project boundaries, generate data and analyse metrics) **in assessing projects' impact and explained the interconnection of impact assessment and sustainability**. He informed that already 11 projects have joined the process and called other projects to join.

The presentation slides are available at:

http://indico.cern.ch/materialDisplay.py?contribId=11&sessionId=0&materialId=slides&confId=108791

1.6. Jorge-A. Sanchez-P., JNP: e·nventory project – The European e-Infrastructures Observatory

Jorge-A. Sanchez-P., e·nventory Project Coordinator, JNP, introduced the project fact sheet and the project vision: **the formation of a European e-Infrastructures Observatory, a single entry-point / one-stop-shop data warehouse, capable of representing multiple primary as well as convoluted benchmarking indicators, through intuitive, interactive and user-friendly mappings, plots and graphics, addressing geographically primarily EU MS while being expandable for global coverage.**

Then he gave details on the action plan and the areas where the project will go beyond the current state-of-the-art. He emphasised the importance of the project Advisory Board and the required community consensus.

He presented examples of existing observatories and the main issues and challenges they face; the project will try to overcome those and deliver a yardstick tool/service for prospective (ex-ante evaluation or impact assessment) and retrospective (interim or ex-post evaluation) to the e-Infrastructure stakeholders.

The presentation slides are available at:

http://indico.cern.ch/materialDisplay.py?contribId=12&sessionId=0&materialId=slides&confId=108791

1.7. Dai Davies, DANTE: GÉANT - Making the Difference

Dai Davies, GN3 Project Manager, DANTE, presented the main features of the pan-European e-Infrastructure, the global interconnections and the GÉANT service portfolio. He followed with the project challenges: a) regional differences and geographic divide, b) common service concept in the GÉANT service area, c) balancing service delivery and continuous innovation, d) shaping a new architecture, e) providing a common support interface for European and global organisations, and f) defining appropriate identity service components and trust models for remote access and distributed virtual organisations.

The presentation slides are available at:

http://indico.cern.ch/getFile.py/access?contribId=13&sessionId=0&resId=4&materialId=slides&confId=108791

1.8. Steven Newhouse, EGI.eu: Digital Agenda for Research

Steven Newhouse, EGI-InSPIRE Project Director, EGI.eu, said that the data deluge will impact our lives; this will go beyond the ESFRI projects and across society. He mentioned that **the European e-Infrastructures are moving towards offering borderless interoperable services, supporting innovation and removing barriers to the free movement of knowledge**. Emphasized on the way that EGI is contributing to the research communities collaboration and showed the virtuous service cycle on which it operates. Finally he presented the **indicators that are monitored by EGI: users, LCPU (cores), disk and tape storage, jobs submitted, sites, countries and virtual organisations.**

The presentation slides are available at:

http://indico.cern.ch/getFile.py/access?contribId=13&sessionId=0&resId=6&materialId=slides&confId=108791

1.9. Thomas Eickerman, Jülich Supercomputing Centre: PRACE - Experiences of an e-Infrastructure Flagship Project

Thomas Eickerman, PRACE Project, Jülich Supercomputing Centre, presented the main characteristics of the European HPC e-Infrastructure, the scientific case behind it and the status and achievements so far. **The PRACE impact assessment is based on: a) measuring the provision of high-end HPC services to the European research communities (amount of resources granted, # projects granted, # countries,# companies, # relevant codes enabled , results produced by the grants, participation in PRACE training events), b) fostering the European HPC industry (# and volume of joint projects stimulated).**

The presentation slides are available at:

http://indico.cern.ch/getFile.py/access?contribId=13&sessionId=0&resId=8&materialId=slides&confId=108791

1.10. Natalia Manola, NKUA: OpenAIRE - Implementing & measuring the FP7 OA pilots

Natalia Manola, Department of Informatics & Telecommunications, NKUA, presented the open access initiatives worldwide and the OpenAIRE project that implements the EC open access pilot. Then she listed the expected impact of those initiatives to the researchers (guarantee maximum exploitation and impact), the funders (avoid wasting time and valuable resources on duplicative research) and the SMEs (speed up commercialisation and innovation).

Then, she explained **how the project measures the open access pilot success: % rate of OA deposition and research output of EC funding per FP7 programmes/projects, FP7 scientific area, countries/institutions and which metrics have been identified to measure the impact: # of national infrastructures on board, # of repositories that become compliant (IRs of large research organizations, thematic vs. institutional repositories), # of new repositories, # of identified (harvested) FP7 publications, # of depositions in the Orphan (OA & non-OA), # of identified FP7 publications**.

The presentation slides are available at:

http://indico.cern.ch/getFile.py/access?contribId=13&sessionId=0&resId=9&materialId=slides&confId=10
8791

2. Report from the panel discussion on socio-economic evaluation of e-Infrastructures

Jorge-A. Sanchez-P. introduced to the audience the scope of the panel discussion, the topics to be covered and the panelists. The moderators of the panel discussion were **Nikos Vogiatzis**, **e·nventory**, and **Antonella Passani**, ERINA+. The moderators introduced each respective topic and highlighted the main points addressed by the panelists. The panelists took turns to comment and state their views on the discussed topics. When all topics were tackled the audience asked supplementary questions that were also discussed by the panel.

Scope of the panel discussion:

Reach a common understanding, stimulate and engage key stakeholders, raise awareness and get feedback on the "how" and "what" of upcoming socio-economic evaluation and specifically of impact assessment of e-Infrastructures.

Topics discussed:

The panel discussion aspired to create a lively, brainstorming discussion on impact assessment in order to:

Build a common understanding of impact assessment of e-Infrastructures, i.e.:

- Better understand and advance the concept and the effectiveness of impact assessment to the e-Infrastructures constituency;
- Identify and discuss existing techniques and Scientific-Technology-Innovation (STI) indicators which could be applicable to e-Infrastructures;
- Suggest what benefits the projects can gain when performing evaluation.

Openly discuss methodologies for evaluation, i.e.:

- Through the e·nventory project, present existing experiences of macro-economic indicators to be discussed and eventually implemented in terms of use, meaning and effectiveness;
- Through the ERINA+ project, present a draft methodology of project assessment to be discussed in terms of meaning and effectiveness;
- Discuss on how and which macro data could be used to facilitate normalisation and optimisation of socio-economic project analysis and vice versa.

Agree on indicators and data sources, i.e.:

- From the previous experiences present existing data sources and indicators;
- From the outcomes of the methodology discussion, try to identify new possible indicators;
- Discuss with e-Infrastructures projects the data gathering needed for the implementation of impact assessment of e-Infrastructures;

- Data mining for policy-makers, stakeholders, governmental institution: how project impact assessment might contribute to foster a common e-Infrastructures data warehouse.

Panelists:

- *Robin Arak*: Ex-CEO of JANET in the UK, has contributed to the development of research and networking in the UK and Europe since 1980. He is the currently an entrepreneur and independent ICT consultant. He brought to the panel the view of an (ex) e-Infrastructure manager.
- *Aleksandar Belic*: Former vice minister of science and technological development of the Republic of Serbia. Today he is the director of the Institute of Physics in Belgrade, chairman of the Serbian Physics Society and national focal point for HPC. He brought to the panel the view of an (ex) policy maker.
- *Thibaut Lery*: Science Officer of the Physical and Engineering Sciences Unit of the European Science Foundation in Strasbourg. He manages European foresight initiatives, Research Networking Programmes and peer review activities. He brought to the panel the view of the researcher/user of the e-Infrastructure.
- *Mariann Unterluggauer*: Freelance tech- and science journalist since 1994. From 1997-2000 she was producer of the radio program "m@trix – computer and new media" in OE1, one of the broadcasting channels of the national Austrian broadcasting corporation. Today her work covers all area of computing and its effect on politics and society and is broadcasted and printed in Spain, Italy, Germany, Austria and Switzerland. She chairs NetAffair, a non for profit organisation to inform the public about the developments of internetworking in Europe. To describe her work in one phrase she prefers to use a term used by computer scientists already in the 1970s: "gossip carrier".

Detailed discussion:

The panel session kicked-off with ERINA+ panel moderator, **Antonella Passani,** posing the first question and setting the introductory topic for impact assessment by seeking to perform a sort of SWOT analysis for impact assessment. In particular, the question to the panellists was "**What Strengths, Weaknesses, Opportunities and Threats could be identified while performing impact assessment in the context of the e-Infrastructures domain?**"

- *Mariann Unterluggauer*: She clarified that she will give a view of the public at large and not the public sector. The public at large is not aware of the electronic infrastructures discussed (PRACE, Géant, etc), as they don't have access and therefore don't know about it. **If you want to "touch" them the data has to be related to their real world scenario.** Thus, there is a significant opportunity to raise awareness in this target-group.
- *Robin Arak*: People are aware of infrastructures only when they stop working/operating. An example comes from the UK, when JANET was in discussions to extend the NREN to service the schools and health sectors and **the central question was "what will happen if it does not work?"** That one is the significant question; **impact assessment should not be over complicated** because there is a threat that a dinosaur is built.

- *Thibaut Lery*: Assessment is very valuable for policy makers, however, there is a significant **threat if the impact assessment results or is based on a single indicator**; we may loose some significant details that may reveal the innovation or the European diversity.

- *Aleksandar Belic*: The opportunity is huge. Expressing the view of an ex-policy maker, he stressed that policy makers are eager to do the "right things" in order to maximise the value of the impact assessment process, however, an **inherent threat to this might be to overdo it**. Furthermore, he argued that in **flagship projects they should most probably already have the relevant data to feed into the assessment process, yet they may not have the time to be involved in such a process** (especially a "heavy" one), since their core business is to run the infrastructure. As such, specialized support projects, like the ones presented earlier that date, can address this gap.

After the first topic, the e·nventory panel moderator, **Nikos Vogiatzis** led the discussion into more specific topics of impact assessment. It was first elaborated that impact assessment can be safely considered to be an effective tool, a means to achieve the desired objective of monitoring and benchmarking e-Infrastructures progress. As such, it can be modelled as per the principles and elements of a "process" and represented likewise. In that respect, as a process, it comprises primarily of three blocks: Input "vectors" of the process, "methodology" of the process, and output vectors of the process.

Following that, it was first made clear that as far as the e·nventory and ERINA+ projects were concerned, the methodology that they have chosen to follow is already decided at proposal level and will be applied through-out each respective project implementation.

Some particular distinct characteristics of the two projects were mentioned:

e·nventory leans more towards...	ERINA+ leans more towards...
...geographical-oriented impact assessment	...project-oriented impact assessment
...assessing metrics of the e-Infrastructure/service per se, as well as, indirect impact assessment indicators	...assessing e-Infrastructures projects on their own merit, as well as direct impact assessment metrics
...macro-economic indicators and metrics	...micro-economic indicators and metrics

Details on the above characteristics can be found on the project fact-sheets

- http://dl.dropbox.com/u/11907735/e.nventory-FactSheet.pdf

- http://dl.dropbox.com/u/11907735/ERINAplus-FactSheet.pdf

In any case, it was stressed that **there is no such thing as a "one-size-fits-all" impact assessment methodology** and many other variations can be applied. With the methodology out of the equation, two process blocks remained to be elaborated upon: input and output vectors.

In that respect, the e·nventory moderator first raised the following question: **"What is the most important input to the impact assessment process and why?"**

To trigger the discussion, the moderator introduced several examples, such as:

- Strictly quantitative input vectors, e.g. Scientific-Technology-Innovation (STI) as well as Socio-Economic (SE) indicators. In this respect it was referenced that e·nventory had already identified four distinctive groups of such indicators, including:
    - **Infrastructure-related indicators** (networking connectivity, processing power, storage space capacity, etc)
    - **Usage-related indicators** (networking traffic, CPU-utilisation, etc)
    - **Affordability-related indicators** (GDP per capita, R&D expenditures, cost of commercial vs. research infrastructures, e-Infrastructure organisations' annual budget, etc.)
    - **Knowledge-related indicators**, (# of patents, scientific papers, PhD theses, # and/or % of researchers, etc.)
- Quasi (or hybrid) quantitative-qualitative input vectors, e.g. e-Infrastructures users' or even wider public perspective and feedback on the usefulness, necessity, and overall awareness as well as quality of experience of e-Infrastructures. It was mentioned that such input can be efficiently collected via surveys/questionnaires, where both qualitative as well as quantitative impact assessment metrics can be defined.
- Strictly qualitative input vectors, e.g. assessments performed via qualitative evaluations of e-Infrastructures such as in ex-post and/or ex-ante evaluations carried out by policy bodies and organisations.

- *Mariann Unterluggauer*: One important input vector is **"quality of experience"**, a term introduced by the wireless performance group recently instead of "quality of service". To start with and keeping public at large in mind.
- *Robin Arak*: He reiterated that the important questions are: what if it wasn't there? Who would be upset? Combined with the sustainability issue, **the input vector has to measure the impact if the e-Infrastructure was not there**.
- *Thibaut Lery*: He said that **to design the best input you need to know the output and the target audience**, in other words, what is the expectation.

- *Aleksandar Belic*: He stressed that **an e-Infrastructure is consisted of hardware plus software plus people. The important thing is to empower people and the input vector has to take that into account**, especially since (eInfrastructure) users are never fully content and always seek "Citius, Altius, Fortius". Furthermore, **the input has to assess the business model on which an e-Infrastructure is operating.**

Following the discussion on input vectors, the e·nventory moderator, **Nikos Vogiatzis** set the scene in order to discuss potential outputs of the impact assessment process. Before going into examples in order to trigger discussion of the panellists, the moderator first made a position that **"there is no such thing as a good or a bad [output of] impact assessment"**. Instead, being a tool on its own right, impact assessment is what one makes out of it and how can he/she make impact assessment serve development objectives and strategies. To exemplify this, one could have e.g., an average or even a poor score of an impact assessment result but use this as incentive for taking action and improving the respective metrics. In the opposite, even a top score of an impact assessment results could cause e.g. lack of interest/incentive for further progress and thus lead to less e-Infrastructure efforts and investments taking place. After the above intro, the moderator set the following question: **"What is the most important output of the impact assessment process and why?"**

To trigger the discussion, the moderator introduced several examples, such as:

- Indexes, either raw or convoluted, absolute or relative, etc.

- Rankings, either across projects, across regions, and/or across time, represented in linear or logarithmic scale, mapped and visualised, etc.

- Qualitative analyses that state facts and findings related to the e-Infrastructure impact assessment.

- Policy guidelines that give specific recommendations and calls-for-action.

- *Mariann Unterluggauer*: in regard to ranking: danger of too creative formulation i.e., e-government. Every nation finds some creative argumentation to be ranked first, if needed. **It makes sense if data is not seen in isolation.** One example of using data to tell the story right is to explain the bigger picture: e.g., recent study of NAS: "In the 2009 rankings of the Information Technology and Innovation Foundation the U.S. was in sixth place in global innovation-based competitiveness, but ranked 40th in the rate of change over the past decade."

- *Robin Arak*: More qualitatively measures need to be made and assessed. **The output has to reveal the unique selling point and the indirect impact spillovers.**

- *Thibaut Lery*: **More important are the gradients and the success of calls or bunch of projects all together instead of single projects.**

- *Aleksandar Belic*: He stated that assessing impact on a project-level is quite feasible. However, **the real challenge (but also added-value) is to derive a "convoluted" impact at "higher-level", e.g. real macroeconomic and regional development indicators**. He added further that it must be also demonstrated what would be the case if the activity/eInfrastructure was not present and, especially for policy makers, to exhibit the produced/associated societal benefits.

- *Mariann Unterluggauer*: **So yes rankings but not alone, combine data, difference from previous years.**

For the last question of the session, the ERINA+ panel moderator, **Antonella Passani** set the following challenge to the panellists: **"Is Impact Assessment related to the sustainability of e-Infrastructures and to what extent?"** This statement, albeit a controversial one, was meant to associate the impact assessment process and results with what is essentially the ultimate objective of this exercise: to achieve sustainability of the deployed e-Infrastructures. To trigger the discussion, the moderator challenged the panellists by asking if impact assessment could be a metric/label in order to attract (more easily) public or private funding?

- *Mariann Unterluggauer*: **Impact assessment should apply to short, mid and long term.** Taking into account evolutionary process: i.e., virtualization was developed already in the 1960s, cloud computing can be traced back to timesharing, etc. pp. What impact would one have measured in the years the original idea was still in developing stage?

- *Robin Arak*: He said that this is a difficult one. Some projects need to be sustainable; in others the outcome may just need to make a change and ongoing sustainability is not important; **in most projects the potential impact analysis has to be performed at the beginning of the project**.

- *Thibaut Lery*: **Sustainability is related to a killer application or service.**

- *Aleksandar Belic*: He claimed that **impact assessment has effectively to do with the roadmap** *towards* **sustainability and not with sustainability** *per se*. He then elaborated on this statement by saying that **an impact assessment metric can be an** *indication / trend*, **portraying (in a quantitative and/or qualitative viewpoint) the** *likelihood* **of the service/infrastructure achieving (long-term) sustainability, but is by no means a definitive "go/no-go" of future-forecasting of how the service/infrastructure will eventually turn out**. To further strengthen his argument, he gave as an example that a convoluted indicator may hide ("absorb") several "highs"/"lows" of individual development indicators, thus not revealing a dimension which could a potentially significant effect (positive or negative) on future sustainability.

- *Mariann Unterluggauer*: **Impact assessment of e-infrastructure projects could have an impact on the public at large if used as a method to foster European pride**.

3. Wrap up

The chairman of the session, **Kyriakos Baxevanidis**, European Commission said that it was a long day, fully adapted to the realities of impact assessment which is a long process.

First message is that measuring the impact is not an easy job (direct and indirect impact or more short term and longer term impact). Furthermore, it is not only a matter of indicators but a matter of (change of) culture as well. It is also not (always) a matter of investment in Europe but (many times) a matter of interlinking of the ICT and the non-ICT sectors and in particular on the low externalisation of ICT to non-ICT-sectors and the low feedback of the non-ICT sectors to the ICT one. This presents an opportunity for e-Infrastructures to liaise even better with the users and to maximise its impact.

Two frameworks for the impact analysis of e-Infrastructures were presented: a) micro (e.g. effect on the price of a service as a result of the deployment of a new technology) and b) meso-macro (effect on GDP etc). Concerning the meso-macro impact-framework, it was highlighted in the panel session that sustainability was important to achieve the longer term impact of e-Infrastructures. It was in parallel considered important, however, to deploy for every e-Infrastructure initiative a process for the continuous measurement of its impact with the objective to ensure a continuous adaptation of the infrastructure to the changing/emerging user-needs and realities.

An overview was also provided on ongoing initiatives on impact assessment by the EC: currently in the process of development high-level impact indicators for the ERA and the on-going initiatives on e-Infrastructure notably ERINA+, e·nventory, and a new study on impact of e-Infrastructures (currently under evaluation).

The EC will analyse the results together with the main efforts in the field (ERINA+, e·nventory, new study on impact whenever a project emerges) with the objective to: a) develop/further elaborate on the definition of relevant impact indicators and b) launch a process for the systematic collection of relevant information by the projects.

The projects on their side are asked to further contribute to the process of definition of impact indicators and to be prepared to regularly provide in the future the relevant information.

Summary of recommendations:

• Evaluation in the area of ICT for research, as indirect leverage to the economic growth, needs a complex quantitative ex-post evaluation to analyse and measure benefits to research, development and education, sustainability, economic, social and environmental impact and others.

• 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.

• Evaluation of e-Infrastructures should take into account a holistic approach that measures micro-meso-macro assessment and should apply to short, mid and long term.

• Impact assessment should not be over complicated because there is a threat that a dinosaur is built and results should not be based on a single indicator, since we may loose sight of significant details. Furthermore, there is no such thing as a "one-size-fits-all" impact assessment methodology.

• There are distinctive groups of indicators related to impact assessment, including: infrastructure-related (networking connectivity, processing power, storage space capacity, etc), usage-related indicators (networking traffic, CPU-utilisation, etc), affordability-related indicators (GDP per capita, R&D expenditures, cost of commercial vs. research infrastructures, e-Infrastructure organisations' annual budget, etc), knowledge-related indicators, (# of patents, scientific papers, PhD theses, # and/or % of researchers, etc).

• The input vector of impact assessment has to measure the "quality of experience", the impact if the e-Infrastructure was not there and the way that the e-Infrastructure empowers people (researchers, etc).

• The output of impact assessment should not be seen in isolation (combined data and difference from previous years), should expose gradients, has to reveal the unique selling point and the indirect impact spillovers and the real challenge (but also added-value) is to derive a "convoluted" impact at "higher-level", e.g. real macroeconomic and regional development indicators.

• Impact assessment has effectively to do with the roadmap towards sustainability and not with sustainability per se.

• According to the 2009 review of the UK e-Science Programme there are three ways in which projects had a substantial economic impact: a) direct involvement of industry from the inception of the project, b) university led linkages with industry during and after development of new technologies and c) entrepreneurial investigators.

• The challenges for assessing impact of e-infrastructures are: a) knowing who your "users" are, b) measuring the importance of the contribution of the use of the e-infrastructure to the final science output, c) identifying the added value of the infrastructure investment and d) capturing the data over long time periods.

• 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.

• 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.

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