

e-IRG's new strategy

e-IRG has adapted its strategic objectives. The new strategy aims to an open and innovating e-Infrastructure that enables flexible cooperation and optimal use by international user communities of all electronically available resources. A special focus is put on data-intensive science. The two main lines of action are to establish e-IRG as the main advisory body on e-Infrastructures internationally, and to develop e-IRG as the coordination platform for all components of European e-Infrastructures.

e-IRG has the knowledge and experience within its group of delegates and external experts and has a view (with a wide technical, functional and geographical scope) on the pan-EU problems concerning e-Infrastructures. e-IRG is perfectly positioned to develop its advisory role to become a world-respected think-tank. When preparing its views, e-IRG will give ample room to discussion on different options or scenarios, and give a voice to the challenging visions of external experts, which may still be contestable. e-IRG will strive to obtain consensus on recommendations that arise from its discussions.

e-IRG can act as an external and neutral advisor and expert by producing reports and analysis as well as pinpointing the strengths, weaknesses, opportunities and threats of any given project or initiative, and by giving solutions and revealing possible synergies of cooperation



with other projects and/or initiatives. In doing this it can build on its successful track record of promoting emerging solutions to governments and funding agencies, striking a balance between user needs and policy makers' views.

More emphasis on data-intensive science

A strengthened advisory role within e-Infrastructures requires fully embracing the challenges of data-intensive science (d-Science) and infrastructures for data services. The data challenges have a considerable impact on the oth-

er e-Infrastructure components. Therefore e-IRG must also be able to provide advice on the consequences of these data challenges for those components, such as on management, sustainability, legal issues, access, security, interoperability, etc.

Embracing the data area will also strengthen the links between e-Infrastructures and the data-generating research facilities and infrastructures, again underlining the special ties to ESFRI and its roadmap projects. e-IRG should cultivate its relationship with



ESFRI by providing timely and concrete advice on issues of importance to research infrastructures. Of equal importance is the engagement of e-IRG with end users of the data-producing research infrastructures. They may require advanced e-Infrastructure services but not yet have any organisations that can take care of their common interest.

By aiming for the nomination of one person per country with a background in science policy and one person per country with a technical background, e-IRG will strengthen the communica-

tion with national governments, increase its impact and pave the way for harmonised national policy making.

the drive to create new growth and jobs in Europe. By actively engaging in the shaping of HORIZON 2020, e-IRG can, with its insights, assist the EC and the Member States in their efforts to make e-Infrastructures a catalysing and enabling vehicle for reaching the overall aims of the programme.

By promoting e-IRG and its agenda within the Member States, e-IRG will stimulate the national focus on e-Infrastructures and help to align national policies between Member States and with the EU.

and innovation. e-IRG sees its task as supporting and facilitating the structuring of the demand side by stimulating user community-building. This can also be pursued through strengthening the contacts with research authorities at a national, European and global level.

Relations with other e-Infrastructure organisations are important for developing e-IRG's role as a multi-stakeholder coordination platform. This involves projects like GN3 (GÉANT), EGI-InSPIRE, PRACE, EUDAT and OpenAIREplus, but also organisations such as TERENA, EGI and PRACE AISBL. Engagement with these groups is mainly cultivated through the e-IRG workshops and participation in other events related to e-Infrastructures. Furthermore, e-IRG draws on these communities in working groups and in the development of e-IRG documents.

The new strategy document can be downloaded at:

http://www.e-irg.eu/images/stories/publ/e-irg_strategy_a5.pdf

Ari Turunen



tion with national governments, increase its impact and pave the way for harmonised national policy making.

Engaging with HORIZON 2020

Running from 2014 to 2020 with a proposed budget of €80 billion, HORIZON 2020, the EU's new programme for research and innovation is part of

A stronger link to the user communities (researchers, research infrastructures) will strengthen the uptake of e-IRG and ensure the relevance of e-IRG's work. Such a 'demand side' of the e-Infrastructure world (high-end users, universities, ESFRI-projects, etc.) needs to become more organised if it is to play an indispensable role in strategy setting



Blue Paper on Data Management published for public consultations

e-IRG has published a Blue Paper on data management. It provides an assessment of Europe's e-Infrastructure service portfolio, and identifies the opportunities and challenges involved. The Blue Paper reports on current trends and issues and sets out policy recommendations for several key areas, especially for ESFRI (*European Strategy Forum on Research Infrastructures*) projects. e-Infrastructure tools and resources must be developed in a global context to support researchers' global endeavours.

The Blue Paper identifies the most important areas of data management addressing the following topics:

- **Data e-Infrastructure** by Peter Wittenburg, Damien Lecarpentier, Norbert Meyer
- **Reliability and Replications** by Johannes Reetz, John Kennedy, Maciej Brzeźniak
- **Metadata** by Gera Pronk, Daan Broeder
- **Unified Access and interoperability** by Angelos Bilas
- **Security** by Steven Newhouse, Sergio Andreozzi



with contributions from the e-IRG Data Management task force.

ESFRI invited the e-IRG to produce a report, on e-Infrastructure services and Data Management, enabling more efficient e-Infrastructure support for the science that is done by the ESFRI projects. The blue paper is now ready for consultation and can be downloaded here: <http://www.e-irg.eu/publications/blue-papers.html>

Grand Challenges and ESFRI Requirements

The ESFRI projects will play an important role on information delivery for the entire scientific community worldwide. Therefore the way how the access to data will be achieved is important. The access to data requires consolidation and integration into one infrastructure, which will allow access to information quickly, without delay, comprehensive, and above all quick access to relevant data. Data management including data access and large data sets support is still struggling with several unsolved problems.

For example ITER aims to demonstrate that it is possible to produce energy from fusion at a commercial level. The project gathers 3000–4000 remote participants from all over the world. In ITER, the fusion reaction will be achieved in a **tokamak** device that uses magnetic fields to contain and control the hot plasma. The experiments require a distributed computing infrastructure with very large operational memory, data access and storage (distributed exploitation), data provenance and quality assurance and data integration from

multiple sources. The results are available via an international user data base accessible for participating parties.

Other ESFRI-projects of importance are:

- **BioMedBridges** – Infrastructure to provide research and data links between the ESFRI Bio Molecular Sciences Research Infrastructures
- **DASISH** – The harmonization of five ESFRI Infrastructures within Social Sciences and Humanities
- **PaNdata** – Towards an Open Data Infrastructure for Sciences with Photon and Neutron Sources
- **DC-NET** – A data infrastructure for digital cultural heritage: characteristics, requirements and priority services.

The requirements mentioned by ESFRI created a list of problems awaiting a solution from infrastructure and application providers. Thus an INTEGRATED e-Infrastructure is needed. This infrastructure includes co-operating high-performance computing services, grids, clouds and data management.

Data e-Infrastructure

The arising importance of data itself and the amount of data requires a solid e-Infrastructure in Europe which would support the whole process of the workflow from the data viewpoint: collection, processing, visualisation, searching and long term preservation. It concerns all groups of users, those who want to keep the raw data, visualisation results and the end results, e.g. publications, digital data or graphics.



The infrastructure providers in scientific communities are data centres equipped with big capacity storage, including these with very fast access (mainly disk arrays, SSD) and lower but cheaper tape libraries. A major role is reserved for e-Infrastructure policy makers and funders. It is especially important when long term preservation is concerned. The data owner wants to have guarantee of the infrastructure sustainability and price policy. It is important to define requirements for each ES-FRI community related to data access and data archiving

CERN laboratory near Geneva Switzerland. The challenge faced by the WLCG was how to distribute and manage the estimated 15PB of data to be produced yearly at the LHC. The chosen solution was a tiered hierarchy of data centres which were federated using grid technologies

One project which aims to consider the big picture, incorporating all aspects of data management, is EUDAT. EUDAT will provide a multi-disciplinary Collaborative Data Infrastructure whose design and development is driven by the

tern of the user communities. To make the most of data replication the needs of the communities have to be specified when designing and implementing data infrastructures. Experience has shown that data infrastructures which aim to deliver scalable and configurable data replication solutions need to provide:

- Reliable end-to-end data transfer tools – fire and forget data transfer
- True logical data replication
- Efficient scalable Persistent Identifier services
- Replication policy and rule integration



With these core components in place and by working together, communities and service providers can use data replication to realize more reliable, faster and safer data infrastructures.

Reliability and Replications

Data replication is an important function of data infrastructures for at least one of the four reasons: the *reliability* of the data infrastructure, the *availability* of service, ensuring data *persistency* and the *performance* of the services.

Without doubt one of the major actors in the domain of data replication is the WLCG project which supports the particle physics experiments located at the

needs of various user communities. The infrastructure of data services is implemented by recognized data centres and service providers who can ensure practically a long term future of their data storages.

Data replication is an important function of a data infrastructure. But technologically, there this is no single “best solution”. The best ways to replicate data are highly dependent on the application, the workflows and the usage pat-

Metadata

Metadata is regarded by the user community as one of the highest valued requirements in data collection and services. It is important to enhance the cross disciplinary collaboration by means of enlarging the visibility of the metadata community. It is equally important to make clear who to approach for metadata expertise. The best best practices, considering metadata value and quality and interoperability, should be provided as well as sorting out new techniques.

Unified Access and interoperability

Unified access and interoperability have attracted a lot of attention due to the data-centric nature of many applications: Most applications and services today are in some fundamental way dependent on data access in a way that surpasses the capabilities of existing infrastructures.



Future research infrastructures, platforms, and services need to provide fundamental support for unified access and interoperability in collaboration with user and application communities. In particular, there is a need for APIs and semantics. An ESFRI task force should be formed to force on common interfaces across infrastructures to examine both client-to-infrastructure and infrastructure-to-infrastructure APIs and semantics. The task force should examine the current situation and make recommendations about areas of priority for the needs of the research community. For instance, there is a need for access and management APIs for each level of access (IaaS, PaaS, SaaS) and a process to review suggestions and recommendations in a timely manner. For example, VRE (Virtual Research Environments) need to be available to give researchers access to integrated data and interoperability mechanisms.

Security

The paradigm shift from managing data in a local and dedicated infrastructure to a distributed and shared infrastructure built using resources in both public and private organisations spanning

different countries worldwide is raising new challenges in the area of security at different levels: technological, operational and regulatory. The first challenge to address is about provenance information: how to judge the reliability and authenticity of data that is stored somewhere in a shared infrastructure? Who generated the data, how and when? How has the data been transformed? Data provenance information is essential in order to evaluate the quality of data based on its initial source and derivations, track back sources of errors, and provide attribution of data sources. Provenance is also relevant at the business level, e.g., to track the creation of intellectual property or to provide an audit trail for regulatory purposes.

Identity and access management therefore becomes a critical issue in a shared distributed infrastructure. Defining digital credentials, evaluating the degree of confidence that this is associated to the related entity (a.k.a. level of assurance), making credentials portable across heterogeneous systems are key aspects for many entities such data, data-set, users, groups or organisations.

A Federated authentication process is suggested. This should be user-friendly, simple and intuitive. The mapping of authentication or attribute assertions across different protocol and schemes in use within systems used by stakeholders of data infrastructures should be defined in order to minimise the burden on end-users for the lack of common mechanisms.

The movement and storage of personal data across national borders within Europe and outside is becoming a concern for many research communities and their resource providers. Clear advice is needed to the community on the impact of national and European legislation and the use of data encryption to protect the confidentiality of data stored remotely. Furthermore, the EU Data Protection directive under revision should address the following aspects in order to build trust in the online environment, which is good for individuals and businesses.

Data-centric, file-level encryption that is portable across all computing platforms and operating systems should be available to users as a way to increase data protection, confidentiality and integrity in transit and at rest.

Data owners should have control or knowledge on the physical location where their data are maintained (country level) and the related level of data protection and privacy from regulations.

The blue paper is now ready for consultation and can be downloaded here: <http://www.e-irg.eu/publications/blue-papers.html>



Public Summary - 29th e-IRG Delegates Meeting

Copenhagen, Denmark, June 13th, 2012

The 29th e-IRG delegates meeting took place in Copenhagen under the auspice of the Danish EU Presidency. Main topics discussed were the new strategy of the e-IRG and the upcoming policy documents of the e-IRG.

Report from the e-IRG chair and board

In his opening talk **Gudmund Høst**, chair of e-IRG, summarized his activities since the last meeting. He was invited to the EC's Horizon 2020 consultations on e-Infrastructures for Open Science and on Skills and Human Resources for e-Infrastructures. Furthermore Dr Høst visited the department for business innovation and skills of the UK Research Council, the STFC/RAL eScience Centre, DANTE and JANET, the UK NREN. He also participated in the eIPF meeting in Brussels and the ESFRI meeting in Ispra. As an insight of these visits Mr Høst said that there is an increasingly strong focus on dealing with the data deluge and implementing "Open Science". In combination these two issues might be changing the way in which science is done in the future. The challenges for e-IRG itself are the development towards a think-tank on e-infrastructures on global scale, which should be more ambitious and should produce more high-level policy papers.

News from the Commission

Pekka Karp updated the delegates about the three action lines for Research Infrastructures under Horizon 2020. Mr Karp said that decisions on the total Horizon 2020 package would be taken by July 2013. Furthermore Pekka Karp informed about the EC Communications in progress. The Communication "A re-



inforced European Research Area Partnership for Excellence and Growth" addresses optimal circulation and transfer of scientific knowledge and lists short-term actions for the Members States and the EC to accomplish by 2014. The Communication "Towards Better Access to Scientific Information – Boosting the Benefits of Public Investments in Research" and the recommendation "Access to and Preservation of Scientific Information" are both in consultation phase.

Pekka Karp informed that DG INFSO will change into DG for Communications Networks, Content and Technology (DG CNECT, pronounced as DG connect).

News from ESFRI

Bjørn Henrichsen reported the status of ESFRI projects and said that the ministries have given ESFRI the target to implement at least 60% of its projects as institutions by the end of 2015, which is a challenging goal that needs sev-

eral support activities. Mr Henrichsen said that a proposed new and extended mandate for ESFRI includes follow-up of the implementation and prioritisation of the ESFRI Roadmap projects.

Mr Henrichsen said that all projects need e-infrastructures (national or European) but that the current issues are more organisational and funding issues than technical issues.

Report from the e-IRGSP3 support programme

Rosend Llurba reported that the main support activities are related to policy support, i.e. support of: Task Force on Cloud Computing, Blue Paper on Data Management, Reaction on GEG report, Roadmap 2012, Task Force on Scientific Software, and e-IRG Strategy. The other regular activities were support of Chair and Executive Board, support of workshop and delegates meeting, dissemination activities and secretariat activities.



e-IRG Strategy

The e-IRG strategy development process aims at strengthening the role of e-IRG as advisory body but also to establish e-IRG as a coordination platform. Particular attention will initially be given to the use and management of data. In its advisory role, e-IRG should be more ambitious and extend its focus beyond Europe. It was suggested to involve external experts and users in the policy document process. Furthermore e-IRG should be a coordination platform for e-infrastructures, which should facilitate international coordination, integrated services for the users, operational structures to support merging new services and innovation in the data area. The implementation of the new strategy needs further discussion with the EC.

Procedure for election e-IRG Chair

Gudmund Høst explained that his term as e-IRG Chair will end at the 31. December 2012. According to the by-laws a search committee has been established. **Kees Neggers** (Committee Chair), **Norbert Meyer** and **Fiorenzo Scaroni** are nominated as search committee for the election of the next e-IRG Chair.

Observers from data infrastructure projects

Representatives from OpenAIREplus and EUDAT projects will be invited to the next e-IRG delegates meetings as experts. This was decided because data will be the next main topic on the delegates meetings.

e-IRG Action Plan

Christian Straube (e-IRGSP3) presented the status of the e-IRG Action reporting on the changes and the on-going and upcoming actions except for actions being addressed in other agenda items. Three new proposed actions are: Task force on Legal Issues, Social Media and Emerging new directions of ICT infrastructures.

e-IRG Policy Papers

Norbert Meyer reported on the status of the Blue Paper on Data Management. He recapitulated that the ESFRI cluster projects BioMedBridges, DASISH and ENVRI and the projects DC-NET, ITER and PaNdata provided requirements. The aim is to release and present the Blue Paper to the ESFRI council in their meeting on 28.9.2012.

Anton Frank (e-IRGSP3) reported on the progress of e-IRG's Roadmap 2012. The roadmap was aligned with the new e-IRG strategy (in particular being more forward looking and bold in some areas) and covers all current e-Infrastructures (integration aspect) to be in line with e-IRG's mission and strategy. It is planned to approve the final Roadmap 2012 at the December Amsterdam meeting.

e-IRG Task Forces

Rosette Vandenbroucke informed that the current version of the Task Force on Cloud Computing has to be short-

ened while at the same time many new documents appear that have to be taken into account. She informed that the aim is to have by the end of July a new version of the report with bolder recommendations.

Sverker Holmgren presented the status of the Task Force on Scientific Software report. He explained that software is essential to exploit e-Infrastructures in an efficient way and that investments in software are comparable to those for hardware, massive parallelism is the near future.

Rosend Llurba introduced the background for putting in place Task Force on Legal Issues for the use of e-infrastructures. According to Mr Llurba there is an urgent need to identify legal and regulatory issues related to the commercial use of (public) e-Infrastructures and for a strategy to address these issues.

Activities during the Cyprus and next EU Presidency

Panos Argyrakis informed that the delegates meeting in Athens could be held on Friday 14.9.2012.

Patrick Aerts explained the ideas for the e-IRG events in December. The workshop will be on 3-4.12.2012 and the delegates meeting on 5.12.2012. A Programme Committee has been established for the workshop that will focus on DATA in all its forms and contexts.

The Chair pointed out that this was **Patrick Aerts** last participation as delegate since he will leave e-IRG on 1.7.2012. He commended Patrick's important contributions to e-IRG since 2004 and thanked him for his engagement.

Jan Wiebelitz



US and Europe collaborate to deliver 70Gbps of transatlantic bandwidth

Introduction

Over the last 18 months the America Connects to Europe (ACE) project and DANTE have together installed 70Gbps of integrated network capacity between Europe and the US.

It is the first time that the major US research networks and GÉANT in Europe have come together to benefit from fully transparent, organised and operationally integrated transatlantic circuit procurement and implementation. This has enormous advantages for collaboration between the European and US research and education communities.

The partnership has many aspects, including the joint circuit planning, “other party aware” tendering, joint delivery of services and diverse physical circuit routing. The partners have also had joint service discussions with an emphasis on interoperable multi-domain bandwidth on demand and monitoring services, as well as on security, OpenFlow deployment and other, bilateral service discussions.

Developing the partnership architecture

The five year ACE Project was officially funded by the US National Science Foundation in June 2010 and aims to provide US scientists with the network connectivity and services above the network (such as end-to-end measurement and file transfer support) that they need to develop and enhance their global collaboration efforts.



Network Engineering

As of 1st July 2012 the bandwidth supplied by the ACE-DANTE partnership is:

- AMS-NYC – 3x10Gbps bonded, flow-based circuit. One 10Gbps supplied by ACE and two by GÉANT.
- FFT-DC-WIX – 2x10Gbps bonded, flow-based circuit. One 10Gbps supplied by ACE and one by GÉANT.
- AMS-CHI – 1x10Gbps circuit used for point-to-point applications. Supplied by ACE
- PAR-NYC – 1x 10Gbps circuit used for point-to-point applications. Supplied by GÉANT

Based on the balanced partnership understanding for circuit deployment, the ACE project (US side) will deploy the next 10Gbps circuit. Exact origination and landing sites are yet to be determined.

Services across the Atlantic

The partnership, via work done in the DICE Collaboration, has deployed the multi-domain perfSONAR measurement framework through the network. It also has deployed software developed within the DICE collaboration to provide a

multidomain dynamic circuit capability between the US (the Internet2 ION infrastructure) and Europe (the GÉANT Bandwidth on Demand Service).

Broadening the partnership

One of the difficult challenges in operating a research and education network is balancing the demands for production quality services and the necessity of developing/permitting innovative services and opportunities. The partnership understands these challenges and seeks to find the correct balance. It is also collaborating actively within the OGF towards the development of the NSI protocol and closely tracking the work of the GLIF group.

To serve global science effectively, networks must communicate closely and offer deep operational integration. This has commenced with short term staff exchanges which help the partners understand more clearly the operational character of both networks and the potential areas for in-depth collaboration such as tool development. These operational exchanges will then be broadened to include development activities in select areas.



Future plans

Over the course of the next 30 months the collaboration expects to:

1. Incrementally expand bandwidth of the bonded circuits in 2012 and 2013, at a rate of 10Gbps per year based on expected demand.
2. Investigate the use of 100Gbps bonded circuits in 2014 based on demand and also cost of 100G transatlantic capacity services.
3. Be well-positioned to support Big Data and new science demands such as a more powerful LHC in 2014, the development of the SKA

and ITER projects and the expected significant increase in genomics related data flows.

Much has been achieved in the past 2 years due to the close partnership between ACE and DANTE. As this partnership deepens new services and links will be deployed, ensuring that researchers in Europe and the US have the vital capacity and tools that they need to collaborate effectively across the Atlantic.

James G. Williams, Indiana University/ ACE project and Cathrin Stöver, DANTE

For more information, see:

GÉANT

<http://www.geant.net>

Indiana University

<http://www.indiana.edu/>

ACE

<http://internationalnetworking.iu.edu/>

ACE



The European Grid: Telling Tales & Supporting Communities

The European Grid Infrastructure has recently launched the latest video in their 'Stories from the grid' series and invites you to take part in their annual meeting in September in Prague.

The 'Stories from the grid' are a series of short videos focusing on research enabled by the European grid's pan-continental computing infrastructure. The latest in the series looks at the impressive research being done by scientists working in high energy particle physics, and in particular by those using the Large Hadron Collider (LHC) to study the top quark.

The Large Hadron Collider (LHC) is a massive particle accelerator based at the European Organization for Nuclear Research (CERN) colliding protons in a 27km ring buried 100m underground. It is the world's largest machine and is a powerful tool for understanding our universe. The top quark is one of the elementary particles that make up the world around us and a

key area of research for the LHC. The work could potentially hold the key to discovering new laws of physics, governing everything from dark matter to extra dimension. In the video, researchers from NIKHEF, the Dutch National Institute for Subatomic Physics, explain their work and how the grid is key to analysing and managing the massive sets of data.

What the video highlights is the importance of IT in modern research. Without the grid and related technologies many areas of interest would go untouched. Even more important than the technology, though, is the community needed to provide it. Each year EGI hosts the Technical Forum, an opportunity for the people supporting the science to meet, discuss and plan. This year it is being held in Prague between the 17th and 21st of September 2012.

The theme of the event focuses on how EGI is developing an open and

sustainable ecosystem to support Open Science in the digital European Research Area. There are 5 tracks running throughout the week: Operations; Resource Infrastructure services; Virtualised Resources – challenges and opportunities; Virtual Research Environments; and Community & Co-ordination. Registration has just opened for the event and is open to anyone with an interest in the future direction of the project.

Stories from the grid, Episode 3: the Top Quark can be seen on YouTube at

<http://go.egi.eu/topquark>

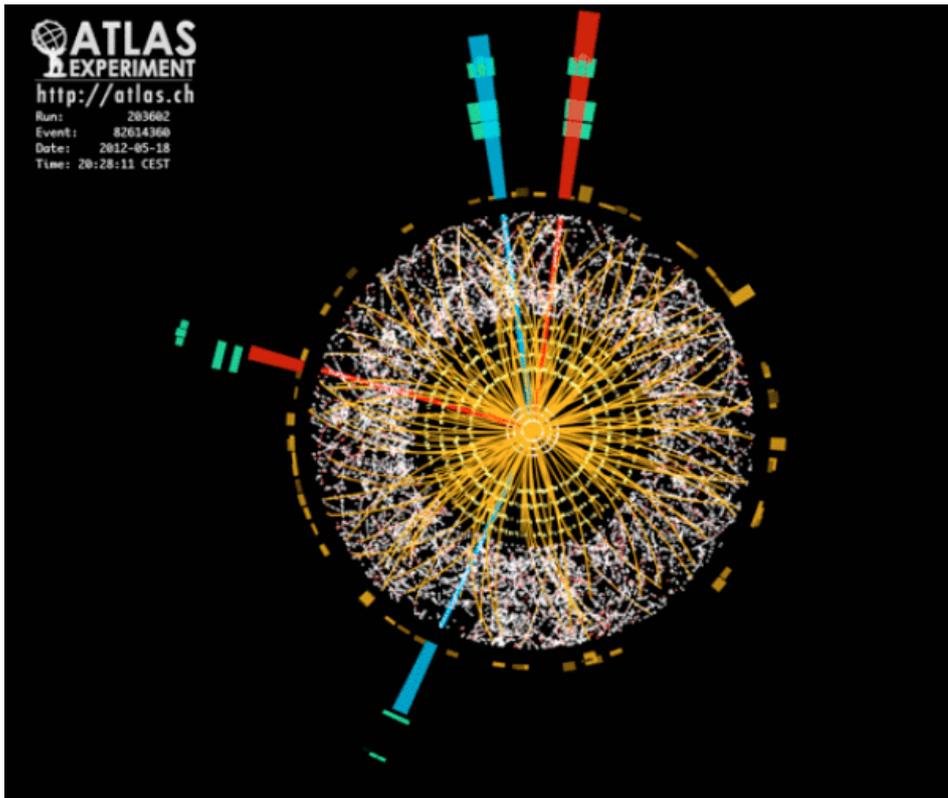
The EGI Technical Forum 2012 will take place at the Clarion Congress Hotel in Prague, Czech Republic from the 17th to the 21st of September 2012. For more information visit <http://tf2012.egi.eu/>

Neasan O'Neill



Sonification enables world to hear new Higgs Boson-like particle

Discovery now music to everybody's ears



Through a combination of high speed research networks, advanced sonification techniques and grid computing the world can now 'hear' the newly discovered Higgs Boson-like particle.

Research networks, including the pan-European GÉANT network, were critical components in the global infrastructure that helped find the new particle, delivering immense volumes of experimental data from the Large Hadron Collider (LHC) to thousands of scientists around the world for analysis and then providing the connectivity for them to share their results amongst the entire research community.

On Wednesday 4th July 2012, scientists at CERN announced that they had found a Higgs-like particle after analysing results from the Large Hadron Collider. Researchers detected a "bump" in their data corresponding to a particle weighing in at 126 gigaelectronvolts (GeV), consistent with the Higgs Boson, which is believed to give mass to all other particles. This consequently proves the Standard Model, which is the dominant theory of how the universe works at the subatomic level.

Building on this achievement, the same research networks have now been a central part of turning these scientific findings into music using data sonifica-

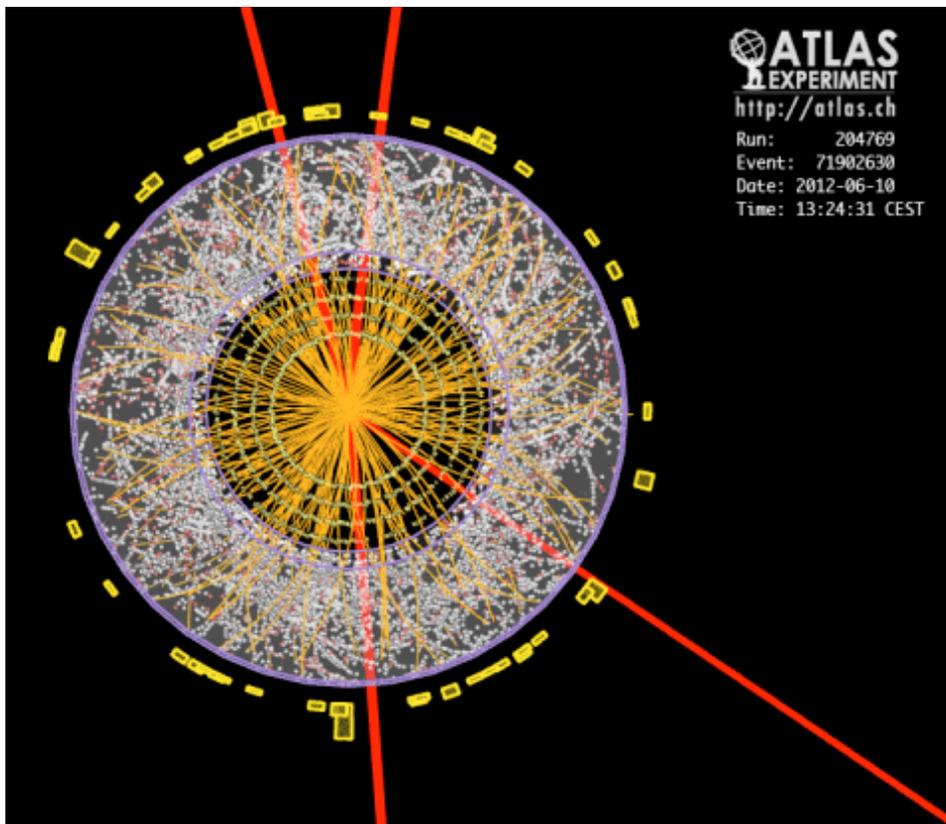
tion. Working from results supplied by the Atlas experiment at the Large Hadron Collider (LHC), researchers have created melodies that make the results easier to understand.

Sonification requires enormous amounts of networking and processing power to produce results. Creating the Higgs melody consequently relied on high-speed research networks including the pan-European GÉANT network, which operates at speed of up to 10Gbps and the EGI grid computing infrastructure. Grid computing works by linking together multiple computers in different locations via high speed networks, combining their processing power to deliver faster results when analysing enormous volumes of data.

The project was coordinated by Domenico Vicinanza of DANTE (the UK-based organisation that operates the GÉANT network on behalf of European national research and education networks (NRENs)), in collaboration with Mariapaola Sorrentino of ASTRA Project, Cambridge, who contributed to the sonification process and Giuseppe La Rocca from INFN Catania, responsible for the computing framework.

In the music the peak of high notes in the second bar is the appearance of the Higgs-like particle (about 3.5 seconds into the recording). The researchers created two versions, one as a piano solo, and the second with added bass, percussion, marimba and xylophone.

"The discovery of the Higgs-like particle is a major step forward in our knowl-



edge of the world around us,” said Domenico Vicinanza, DANTE. “By using sonification we are able to make this breakthrough easier to understand by the general public, highlighting the depth and breadth of the enormous research efforts by the thousands of scientists around the world involved with the Large Hadron Collider. Neither the discovery of the particle or this sonification process would have been possible without the high speed research networks that connect scientists across the world, enabling them to collaborate, analyse data and share their results.”

Previous sonification projects from the team include the creation of music from volcanic activity around the world, making it easier to spot potential eruptions by listening to changes in musical pitch.

ERF Workshop, DESY, 30-31 May

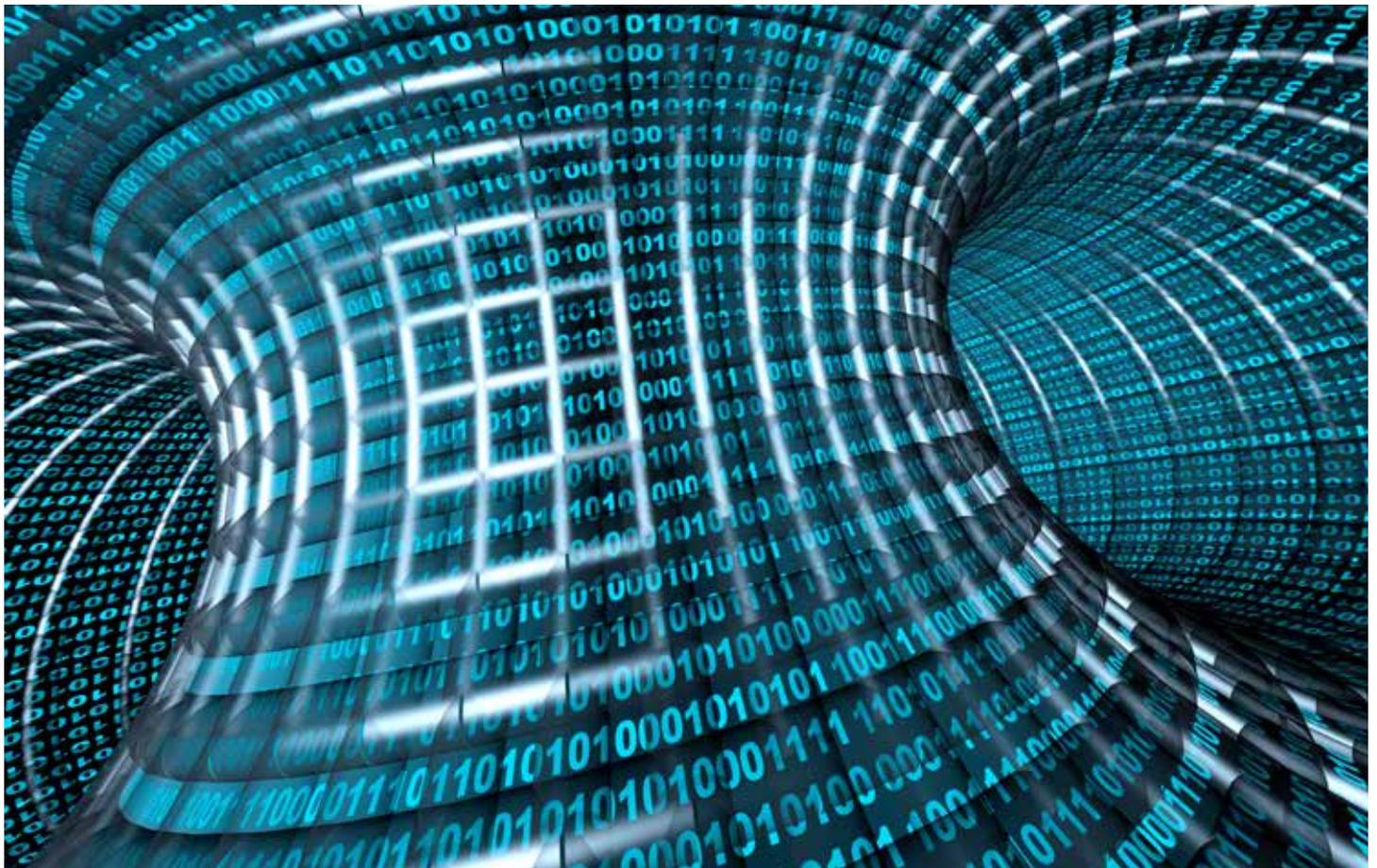
Research infrastructures are fundamental to the activities of modern science. They are, at once, institutes of innovation and knowledge transfer, they are also national and international institutions. They can transcend geographic locale, such as is the case for e-infrastructures, but even so they remain areas of focus for turning financial and human capital into information and invention. Of course, even e-science has its hubs – research infrastructure manifested in bricks and mortar, and located in specific geographical locations: CERN, Daresbury here in the UK, and DESY in Hamburg. Which is perhaps why the last site was chosen for the ERF

Workshop on the Socioeconomic Impact of Research Infrastructures on 30–31 May, a meeting that attracted scientists from astronomical observatories, museums and e-infrastructures, as well as those working in policy and dissemination, and a fair few economists and delegates from the private sector.

Such a broad range of backgrounds in an only medium-sized group of delegates made for some excellent discussions in the networking sessions. The plenaries too approached the impacts – hopefully positive – that research infrastructures have, not only economically, but also socially. Later

the two parallel session strands tackled these two aspects in isolation from each other – although the separation was exacerbated by the unseasonable rain befalling much of Europe, which made traversing even the short distance between buildings at the DESY campus a less inviting prospect. Some excellent closing remarks by handpicked rapporteurs made sure that those – including myself – who were not keen on getting soaked felt that they didn’t miss too much of what was said in the other session.

Stefan Janusz



Open Data, Open Science

e-infrastructures have multiplied knowledge generation, and scientists – just like the rest of societies across the globe – are now more connected than ever, through email, the Web and through social media. But in many ways, science, the ultimate collaborative endeavour, has been slow to adapt its working methods to technological changes. In terms of open science, the shift towards open access publishing models has made data, in the relatively processed form of scientific papers, more accessible to those previously excluded by

high journal subscription costs, often scientists in developing countries. At the same time, scientists – some at least – have been increasingly happy to share their unprocessed ideas and sometimes their daily lab results, through social media and blogs. The next step, arguably much more important, is the drive for open data. Raw data being intelligently recorded, shared and categorised for posterity. It's a challenge with plenty of pitfalls and complex issues to navigate. In the latest e-Science Briefing, we try to distil some of these major issues to

look at how open science and open data are changing the way research is being done. Ultimately, sharing data can only be to the benefit of humankind, as we face the environmental, technological and health challenges of the 21st century.

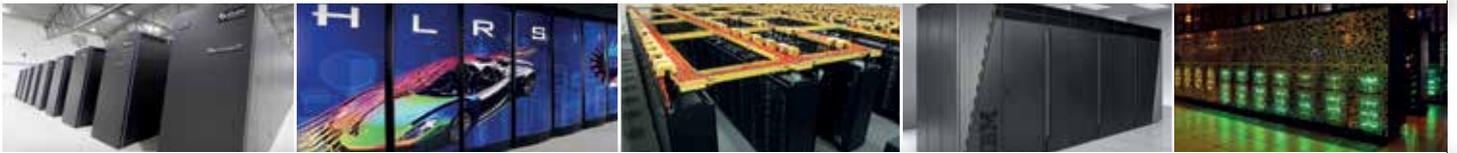
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<http://www.e-sciencetalk.org/briefings.php>

Stefan Janusz



PRACE and XSEDE call for Expressions of Interest for Joint Access by International Teams



The Partnership for Advanced Computing in Europe (PRACE) and the National Science Foundation-funded Extreme Science and Engineering Discovery Environment (XSEDE) team up to foster collaborations among U.S. and European scientists and engineers.

PRACE and XSEDE issued a joint call for Expressions of Interest (Eoi): U.S. and European researchers who wish to work together using PRACE and XSEDE resources and services to advance scientific discoveries are invited to reply.

“XSEDE and PRACE have been collaborating for several years, most visibly with the joint summer school series,” said John Towns, XSEDE principal investigator and project director. “This call for Expressions of Interest is a precursor to supporting science and engineering collaborations in an unprecedented way.”

“We are looking forward to receiving feedback on the needs and expectations from the user communities of the major HPC infrastructures on both sides of the Atlantic,” adds Maria Ramalho, Managing Director of PRACE.

Expressions of Interest should be submitted to prace-xsede@prace-ri.eu or prace-xsede@xsede.org before 15 September 2012.

For more information, visit:

<https://www.xsede.org/xsede-and-prace-eoi>

<http://www.prace-ri.eu/Expressions-of-Interest>

About PRACE

The Partnership for Advanced Computing in Europe (PRACE) is an international non-profit association with its seat in Brussels. The PRACE Research Infrastructure (RI) provides a persistent world-class High Performance Computing (HPC) service for scientists and researchers from academia and industry. The Implementation Phase of PRACE receives funding from the EU's Seventh Framework Programme (FP7/2007-2013) under grant agreements n° RI-261557 and n° RI-283493.

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

About XSEDE

XSEDE is the most advanced, powerful and robust collection of integrated digital resources and services in the world. It is a single virtual system that scientists can use to interactively share computing resources, data and expertise. XSEDE is a partnership of more than a dozen institutions engaged in providing HPC resources, software, extended support, education, outreach, and training to help more scientists and

engineers use the resources. The five-year project is supported by the National Science Foundation.

XSEDE: <https://xsede.org>



www.prace-ri.eu

NEWS AND UPCOMING EVENTS

17–21 September 2012
The EGI Technical Forum 2012
Prague, Czech Republic
<http://tf2012.egi.eu/>

18–20 September 2012
The 27th NORDUnet Conference
Oslo, Norway
<https://events.nordu.net/display/ndn2012web/Welcome>

17–19 October 2012
e-Challenges e-2012 Conference and Exhibition
Lisboa, Portugal
<http://www.echallenges.org/e2012/>

22–24 October 2012
Cracow Grid Workshop '12
Cracow, Poland
<http://www.cyfronet.krakow.pl/cgw12/>

22–24 October 2012
EUDAT 1st Conference
Barcelona, Spain
<http://www.eudat.eu/eudat-1st-conference>

3–4 December 2012
e-IRG workshop
Amsterdam, The Netherlands
<http://www.e-irg.eu/e-irg-events.html>