Inspired

Spring 2012

European Grid Infrastructure

News from the EGI community

This Issue

Welcome to the Inspired Spring 2012 issue!

In this edition...

> Neasan O'Neill profiles IberGrid
> Agnes Szeberenyi writes about the integration of Desktop Grids in EGI
> Tiziana Ferrari compiles the latest infrastructure figures
> Gonçalo Borges introduces the new EGI Customer Relationship Management tool
> Sergio Andreozzi unveils EGI's strategy for Europe 2020
> Nuno Ferreira catches up with the state-of-the-art on Science Gateways
> and I present the 'Stories from the Grid' series of videos, featuring grid computing applications to science

As always, your comments/feedcak and ideas for stories are very welcome.

Sara Coelho
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In Holland, Spring is tulip season!
(Illustration: Ralf Roletschek / wikicommons)

How to build a grid

Neasan O'Neill reviews a book about PL-Grid

Over two years ago the European grid embarked on a new era, with national initiatives replacing regional federations. This meant that countries had to start looking at how they would each support the infrastructure from both a technological and political viewpoint. Poland kick-started the preparations for their National Grid Infrastructure (PL-Grid) in 2007 and they have recently published a book on the experience.

"Building a National Distributed e-Infrastructure - PL-Grid" is the story of how an NGI was born from close cooperation with the scientific community. Containing 26 scientific papers, five stand alone chapters and a glossary of terms, the book covers a wide range of topics from integration of grid middleware and service operations to security mechanisms and integration of service level agreements as well as training and dissemination.

As well as a chapter on the foundations of PL-Grid and a brief history of the project, the book discusses what is required to create a stable national infrastructure based on the experiences from previous and current EU grid projects. To complement these discussions there are also descriptions of the science PL-Grid supports from computational chemistry and nanotechnology to protein folding and molecular dynamics simulations. To round it all off the chapter on outreach and dissemination looks at what the project has done to attract users and publicise their work.

“When we started the project we knew that we had to create something that would work not only within the European grid model but also for our local users”, says Jacek Kitowski, director of PL-Grid. “I think we have achieved that and being able to collect all of that in one single place is brilliant. I also hope that it gives an insight to how we approached things and perhaps inspire others.” •

More Information

"Building a National Distributed e-Infrastructure - PL-Grid", Bubak, Marian; Szepieniec, Tomasz; Wiatr, Kazimierz (Eds.) is published by Springer.

Stories from the Grid - the premiere

Sara Coelho introduces the first season of EGI video documentaries

As part of the new outreach strategy, EGI asked the film company 'Een van de jongens' to produce a series of videos about grid computing applications for science. The result of this partnership is first three episodes of 'Stories from the grid'.

Each five-minute episode focuses on a specific application of grid computing in a different research field. The videos were filmed as documentaries and feature the people actively involved in the research explaining the goals and outcomes of the work.

The videos are publicly available on YouTube and on the EGI website.

Episode 1 - The cone snail

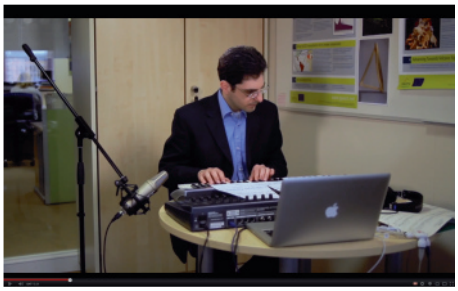
In its natural habitat, the cone snail deploys powerful toxins to paralyse the fish it eats. In the lab, researchers are studying how these toxins can be used to block pain signals to the brain. This work could lead to a new generation of anaesthetics for hospital patients and could also alleviate the muscle spasms caused by the condition dystonia.

Alexandre Bonvin (pictured) and Henry Hocking from the University of Utrecht explain how grid services lend the extra computing power they need for efficient analysis and interpretation of the data. Without grid computing, the team would need months to perform all the necessary calculations and the whole research project would be unfeasible.

Released February 2012

http://go.egi.eu/conco

Episode 2 - The epigonion



The epigonion was the guitar of Ancient Greece but since none survived the passing of time, it hadn't been heard for centuries. Until now.

Using a technique called physical modelling, Domenico Vincinanza recreated the sound of the instrument's 48 strings as digital files. With the help of grid computing, it took him just a few hours. In a single core computer he would need a month. The epigonion's sounds can now be downloaded and played by any musician using a simple keyboard.

Released May 2012

http://go.egi.eu/epigonion

Episode 3 - The topquark

The Large Hadron Collider (LHC) is the world's largest and most complex experiment, at the cutting edge of High Energy Physics. Particle physicists use the LHC to study variations from the Standard Model and discover potential new laws of physics. The particle known as the top quark is a window to this weird and wonderful world.

The LHC produces enormous amounts of data, enough to fill piles of DVDs. Marcel Vreeswijk and Hurng-Chun Lee from NIKHEF explain how customised grid computing workflows are key to filtering and sieving the dataset down to a manageable size. Without these tools, it would be impossible to pick out the collision event that could hold the clues to top quark behaviour.

Coming soon....

http://go.egi.eu/topquark

EGI infrastructure: figures and trends

At the end of the first half of EGI-InSPIRE, Tiziana Ferrari looks at the infrastructure's trends and performance

The project's first two years were dominated by the evolution of the large regional operational structures of EGEE into a set of national operations centres or small-scale federations, and by an impressive and steady increase in capacity and use of the infrastructure.

The federation

EGI brings together 27 national and 9 federated operations centres encompassing multiple NGIs in Europe (IberGrid, NGI_NL and NGI_IT) and in the Asia Pacific and Latin America regions. During the past year, EGI engaged with two new partner infrastructures the South African Grid Initiative and the Ukrainian National Grid. In both cases integration is expected to be completed during the third project year.

EGI comprises resources provided by 56 countries and one European Intergovernmental Research Organisation (CERN). Twelve countries contribute resources through Resource Infrastructure Providers that are non-EGI-InSPIRE partners but are fully integrated with the EGI service infrastructure (Fig.1).

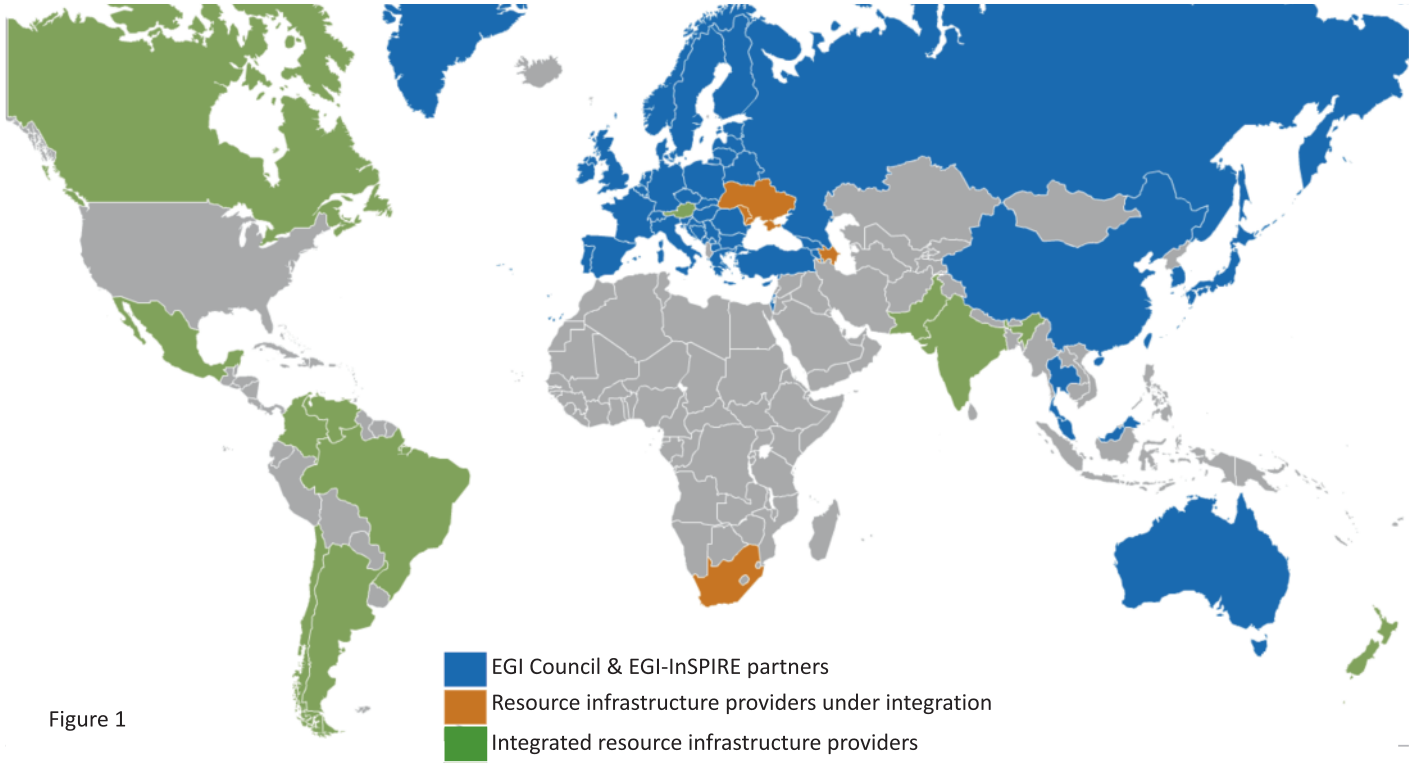


Figure 1

Compute capacity

The overall HEP-SPEC06 compute capacity provided by EGI-InSPIRE partners and the integrated infrastructures is increasing at the remarkable yearly rate of +50%.

The total amount of CPU cores contributed by EGI-InSPIRE partners and EGI Council participants was 270,800 (30.7% increase) and amounted to 2.96 million HEP-SPEC06 (49.5% increase; Table 1). Storage capacity also increased considerably: installed disk capacity amounts to 139 PB (+31.4% yearly increase), while the tape capacity is 134.3 PB (+50% yearly increase). The computation of these figures relies on the availability of accurate data extracted from the Information Discovery System (the top-BDII service) or manually specified by the partners where necessary, and subsequently validated by resource infrastructure providers.

The provided capacity is distributed across 352 Resource Centres (March 2012), of which: 326 are contributed by European NGIs/EIROs that are EGI-InSPIRE partners or Council members (including 27 contributed by Asia Pacific NGIs), and 26 by integrated Resource infrastructure Providers.

Capacity	April 2010	March 2011	March 2012
Logical CPUs (increase)	192,000	207,203 (+7.9%)	270,800 (+30.7%)
million HEP-SPEC06	1.34	1.98 (+47.7%)	2.96 (+49.5%)

Table 1

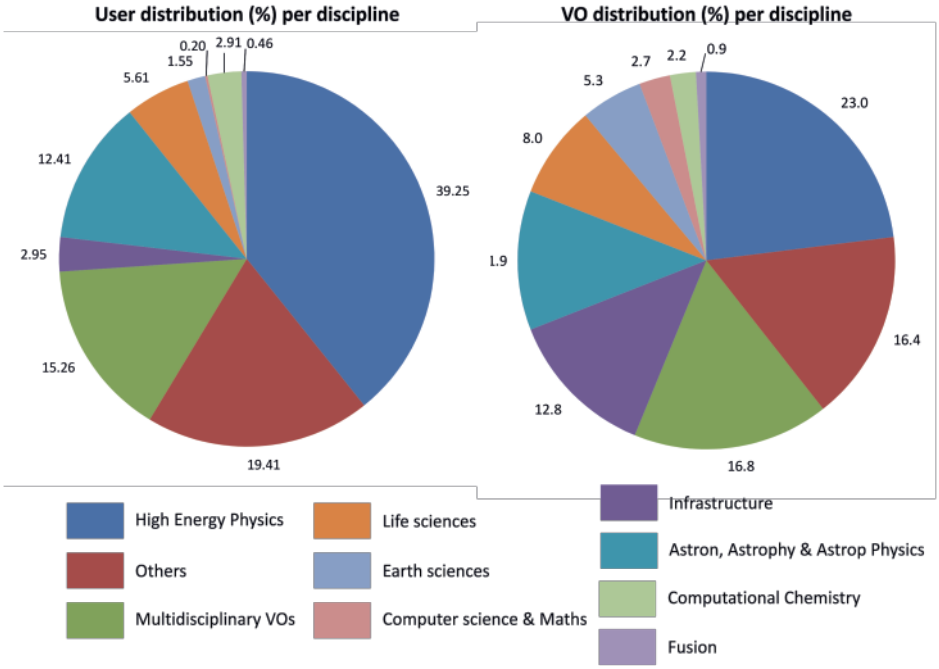
HEP-SPEC06 is the EGI reference performance benchmark of compute resources. It was defined by the HEPiX Benchmarking Working Group and it is based on SPEC CPU2006. One HEP-SPEC06 corresponds approximately to 250 SI00 (as tested with HEP applications).

Users and usage

The overall number of Virtual Organisations (VO) listed in the EGI Operations Portal is 226 (+3.20% from March 2011). The EGI VOs have in total 20,883 users (+14.30%). All disciplines registered an increase of users during the previous year, from High-Energy Physics (HEP) (+39.25% of new users registered) to Computational Chemistry (+ 2.91% users).

The overall quantity of computing resources used during the second project year was 10.5 billion HEP-SPEC06 hours (+ 54.5%). The workload was generated by 492.5 million successful jobs (1.35 million jobs/day on average).

The overall resource utilisation confirms the trends of the first year. The total number of jobs saw an yearly increase of +46.42%, and the normalised CPU wallclock time (HEP-SPEC06 hours) increased +52.91%.



High-Energy Physics (39.25% of the user community) is still expanding in resource utilisation, consuming 93.60% of the normalized CPU wall time available in EGI (up from 91.13% in April 2011). Astronomy, Astrophysics and Astro-particle Physics are the second community in terms of usage, consuming 2.25% of the overall EGI used CPU wall clock time (a +117.79% yearly increase from April 2011).

Performance

Availability / Reliability averages per quarter are increasing steadily by approximately +1% per year, from 91.9% and 93.3%, respectively, in 2009-2010, to 94.50% and 95.42% in 2011-2012.

As of January 2012 NGI performance is reported monthly to check the availability and reliability of critical core services operated by NGIs and EIROs to provide access to site services.

Availability of a service or a site represents the percentage of time that the services or sites were up and running ([uptime / total time]x100).

Reliability of a service or a site represents the percentage of time that the services or sites were supposed to be up and running, excluding scheduled downtime for maintenance and other purposes ([uptime / (total time – scheduled time)]x100).

Middleware

ARC, gLite, GLOBUS, and UNICORE are the four grid middleware stacks currently fully deployed in the infrastructure. gLite continues to be the predominant middleware, but the number of operations centres supporting non-gLite stacks has been increasing.

Staged Rollout activities provide clear EGI added value to the software released by mainstream technology providers. During year two, 196 individual tests were performed in preparation to the UMD releases. The number of participating Early Adopters has been progressively increasing to test a growing set of products from EMI, IGE and EGI-InSPIRE JRA1 (operational tools). Staged Rollout is a community effort which is currently contributed by 56 distributed teams.

The EGI integrated infrastructure consists of 359 core services: 150 WMS, 104 Top-BDII, 64 VOMS instances and 41 LFC.

Key numbers

> Operations Centres : 36, of which 9 are federated
> Resource Centres : 352 in 56 countries and CERN
> CPU cores : 270,800
> HEP-SPEC06 : 2.96 million
> Disk capacity : 139 PB
> Tape capacity : 134.3 PB

> 226 VOs with 20,883 users

> Computing resources (year 2) : 10.5 billion HEP-SPEC06 hours
> Successful jobs : 492.5 million (1.35 million jobs/day on average)

> Availability : 94.5%
> Reliability : 95.4%

More information

Annual Report on the EGI Production Infrastructure (D4.5)
http://go.egi.eu/1059

EGI : Envisioning the Future

Sergio Andreozzi, on the strategy plan and EGI's role in the European Research Area

> *It is not the strongest of the species that survive, nor the most intelligent, but the one most responsive to change (Charles Darwin)*

Today, EGI is an ecosystem of national and European funding agencies, research communities, technology providers, resource providers, operations and resource centres and coordinating bodies serving over 21,000 researchers in their intensive data analysis research by running over 1.2 million jobs a day.

Where will we be in 2020?

Strategy is about choice, focus and positioning to serve a defined market or community. In envisioning the future, what is the EGI target community? What problems does EGI want to solve? How does EGI adapt to the evolving technology landscape to innovate its solutions? What are the viable revenue streams to sustain EGI in providing its unique value?

These and other key questions have been addressed in two recent documents that have been published as part of the EGI-InSPIRE project work-plan: the 'EGI Strategic Plan' and the 'Evolving the EGI Business Models'.

EGI is committed to the European Commission's goals outlined in the Europe 2020 vision. With this in mind, EGI's strategy for the future is to develop its activities in order to be a key enabling foundation of the digital European Research Area (ERA), supported by continued investment from national and European funding bodies. In this context, the EGI mission is to connect researchers from all disciplines with the reliable and innovative ICT services they need to undertake their collaborative world-class and world-spanning research.

According to the identified strategic directions, EGI will develop strengths in three key areas:

Community building & coordination

To open the ecosystem to promote better competitive cooperation, collaboration and interaction at local, national and European level. Engagement with technical users and researchers can be enhanced through the support of local 'community champions', national and European events and workshops that promote EGI and its activities within the ERA.

Operational infrastructure

While continuing to support the services for the currently supported research communities, the operational infrastructure needs to evolve to allow other European scale research communities to monitor and manage their own services operating at their distributed facilities. In addition, the operational infrastructure needs to support the federation of virtualised resources (such as institutional private clouds) in the public sector and public clouds from the commercial sector to support uniform standards-based transnational cloud access as a new capability to increase flexibility.

Virtual Research Environments (VREs)

Research communities need VREs that connect the users to the e-infrastructure and reduce technical barriers to accessing EGIs resources. This software should be personalised to the users' needs and should be composed of open extensible software solutions that can be reused across communities.

The EGI Strategic Plan defines in more detail the initiatives that will take place within the EGI community over the next few years by also identifying future coordinated investment in innovation from national and European funding bodies. This will allow the rapid evolution of EGI's activities to become a key enabling foundation of the digital ERA. It will support the transnational deployment and uniform operation of virtual research environments for simulation, data sharing and data analysis activities, customised for the needs of individual multi-disciplinary research collaborations of all sizes and at a European scale. •

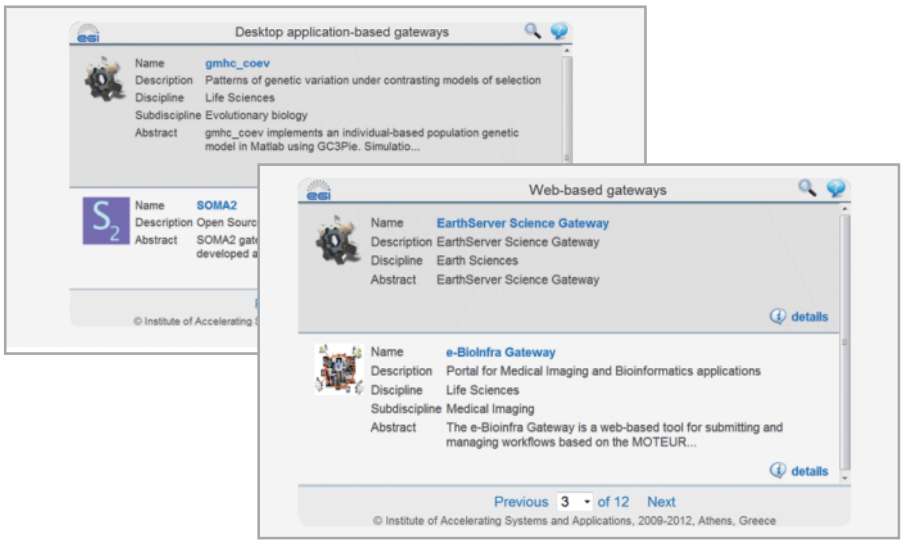
More Information

EGI Strategic Plan
http://go.egi.eu/EGI2020

Evolving the EGI Business Models
http://go.egi.eu/1040

Gateways for science

Nuno Ferreira on the state of the art of EGI science gateways



EGI Science Gateways are registered and available to the community through the Applications Database.

Researchers are being pushed to their limits as the society and their peers demand fast answers and high throughput. E-infrastructures offer new possibilities and new avenues of research, but they can be difficult to master, especially by scientists not familiar with a command line interface, the typical grid front-end.

What if there is a way to increase productivity by bringing e-infrastructures closer to the researchers' working environment?

Science gateways do just that. They are emerging as promising tools, which offer a collaborative environment and enable access to computing and data storage resources, helping scientists to engage more actively with the e-infrastructure.

An EGI science gateway is a community-specific set of tools, applications, and data collections that are integrated together via a web portal or a desktop application, providing access to resources and services from the European Grid Infrastructure. These gateways support a variety of capabilities including workflows, virtualisation software and hardware, visualisation as well as resource discovery, job execution services, access to data collections, applications, and tools for data analysis.

The research community can already browse the available science gateways coupled to EGI resources. Each of the gateways targets a particular research audience and offers tools and interfaces that are specific to their community's use cases. The gateways have their own guidelines for access as these are provided by separate projects, scientific communities, and National Grid Infrastructures (NGIs).

The enabling technologies and the underlying capabilities that provide the required functionality for science gateways, are also listed. Several EGI stakeholders offer reusable components or frameworks for developers to build custom products, saving time and effort when developing new gateways.

EGI science gateways and their enabling technologies are registered in the EGI Applications Database (AppDB). By registering them in AppDB, your service will be visible to the EGI community and to the general public, not only through the EGI website but also through numerous user community and NGI websites that use the AppDB web gadget.

Science gateways offer a unique opportunity to engage more researchers with the possibilities of e-infrastructures. As more and more communities take up the challenge and start building their own solutions, the diversity of available gateways grows. This diversity becomes strength, as sets of best practices start to emerge and to be re-used by gateway developers.

Because we believe science gateways are a strong asset to researchers, EGI.eu and the Hungarian NGI will steer a virtual team to produce a state-of-the-art primer on science gateways. We aim to provide developers with the basic blocks to build powerful cutting-edge 'science making tools', while incorporating EGI's established policies (security, accounting, operations) and evaluating how sustainability could be achieved.

The success of bringing new communities into novel ways of making science relies heavily on the user-friendliness and robustness of the available interfaces. Otherwise, it could be a step too far for researchers.

Are science gateways part of the solution?

I certainly hope so! •

More Information

http://go.egi.eu/sciencegateways
http://go.egi.eu/science.gateways.developers

AppDB : *http://appdb.egi.eu*

IberGrid: A Tale Of Two Countries

Neasan O'Neill profiles the Operations Centre that brings Portugal & Spain together

Optimising resources: Spain & Portugal join forces to make the most of what they have (Illustration: the Iberian peninsula as published in Robert Wilkinson's General Atlas, circa 1794)

On the western edge of Europe, on the Iberian Peninsula, sit Spain and Portugal. The two countries have many things in common and one of them is their grid infrastructure. Since the early days of the European grid they have shared responsibility for the infrastructure, combining expertise to provide the best support to their users. In 2007 they officially created IberGrid to formalise the arrangement and five years on they are still going strong.

Back in 2007 both Portugal and Spain had built up a lot of experience and expertise in providing resources through the grid infrastructure. Throughout they had worked very closely together offering advice and help to each other when necessary. Launching a joint plan for providing the infrastructure across Iberia as a single organisation seemed the logical next step.

One of the people who helped draft that document was Isabel Campos, who still works on IberGrid today, from the Spanish side of the border. "It made sense for us to combine our efforts together we would be stronger and more effective," she explains. "Over the last five years I think we have really proven that what we laid out in that document was both achievable and of a real benefit to both countries."

"If there is one thing we can take from IberGrid it is that it has allowed us to build on our early success to create what our users need," says Gonçalo Borges, who is based in Lisbon, Portugal. "The breadth of research we support is a testament to that, from the big guys in the LHC experiments to the individual users in computational chemistry - people doing work that would not be possible without what we provide."

With a combined population of over 56 million people, the two countries have world-class universities and IberGrid provides them with a usable and useful computing environment for scientists. The combined effort has been very successful in getting priority research areas onboard with IberGrid. These include astrophysics, materials science, environment risk control, civil protection and emergency response, meteorology, satellite remote detection, seismology and biomedical research.

The numbers speak for themselves: IberGrid's generic physics Virtual Organisation (phys.ibergrid), for example, is the only regional VO to appear within the top 10 users of CPU in EGI. And there is more than just physics: while the average CPU consumed by non-LHC VOs is 10% across EGI, it is 23% for IberGrid.

The research been done on IberGrid stretches from protecting national landmarks like the Aveiro lagoon in Portugal (http://go.egi.eu/eco-selfe) and investigating chemical reactions (http://go.egi.eu/gem), to helping model nuclear fusion experiments and supporting the Pierre Auger Observatory.

This breadth of research demonstrates IberGrid's commitment to regional and global science. They are one of the many success stories within EGI, but their focus is on helping their local users as Isabel explains: "EGI is extremely important for us. It is great to have a central organising body, but we are here for our users and we plan to continue to support them for as long as we can, in whatever way they want."

IberGrid will host its annual meeting on Lisbon later this year. Dates will be announced soon.•

More Information

> INGRID (Iniciativa Nacional de Grid) *http://wiki.ncg.ingrid.pt*

> NGI-ES (Iniciativa Grid Nacional española) *http://www.es-ngi.es/*

> IberGrid meetings *http://www.ibergrid.eu/2012/*

> IberGrid Annual Report *http://go.egi.eu/ibergrid*

Desktop Grids as middleware

Agnes Szeberenyi introduces a new way to extend available resources for user communities

There is a growing demand for computing power and disk storage amongst scientists. On the other hand, there are over a billion personal computers (PCs) in the world, most of them in private homes and universities and idle for most of the time.

BOINC is an open source middleware for volunteer and grid computing that enables researchers to access the huge processing power of PCs (desktop grids) around the world. About 1 million PCs are already active in supporting science and use their idle time to run scientific applications through volunteer computing grids.

The European Desktop Grid Initiative (EDGI) has developed a bridge between Desktop Grids and EGI grids that consolidates the results achieved in previous projects. It enables integration of Desktop Grids (DGs) in Service Grids like EGI, to support user communities that are heavy users of Distributed Computing Infrastructures (DCIs) and require an extremely large number of CPUs and cores.

The EDGI project provides a workflow-oriented science gateway to enable easier access to the e-infrastructure and has established the International Desktop Grid Federation (IDGF) to coordinate DG-related activities in Europe and to attract more volunteers to donate resources.

Thanks to Desktop Grid monitoring, EDGI already fulfills the availability and reliability requirements of EGI. The main activity of the joint workplan between EGI and EDGI (agreed in November 2011) is to integrate Desktop Grids into EGI's monitoring and accounting activities to guarantee seamless operation.

As it was announced at the EGI Operations Management Board meeting during the Community Forum 2012, the EDGI production infrastructure is already offered as a service for EGI, opening the possibilities of desktop grid computing to a wider scientific user community. The EDGI production infrastructure adds 130,000 CPUs to the EGI resources.

The activities in EDGI will be carried on by the IDGF Support Project (funded by the European Commission) starting in September 2012 to broaden scientific user communities of Desktop Grids on a local (private grids), national (NGI) and European (EGI) level. The project will help universities' e-infrastructures to connect otherwise idle PCs from their classrooms and offices to the European Grid Infrastructure. In addition, IDGF-SP will collect and analyze data that will help deploying idle PCs in an effective and energy efficient way.•

More Information

European Desktop Grid Initiative
http://edgi-project.eu/

International Desktop Grid Federation
http://desktopgridfederation.org/

About Volunteer Computing
http://www.volunteer-computing.org/

How can EDGI help your VO?

For VO managers:
> Why? To provide more computing power to your VO users by extending the available resources with EDGES@home volunteers. This will add an extra 18k CPU to your VO.
> How? If you are interested please contact the EDGI VO administrators at edgiadmin@lpds.sztaki.hu.

For scientists:
> Why? You can access an extra 18k CPU under your usual VO's resources. Shorter queue, less waiting time for your job to be executed, faster results.
> How? Ask your VO manager of your ARC, gLite or UNICORE virtual organization to contact the contact the EDGI VO administrators at edgiadmin@lpds.sztaki.hu .

EGI Customer Relationship Management - Hows and Whys

Gonçalo Borges introduces the new community-building tool

The new EGI Customer Relationship Management (CRM) system has been presented to NGIs during the Community Forum in Munich. This platform will track the status of relationships between NGIs and prospective leads in their region, so that information can be shared among EGI partners, and opportunities for engaging new user communities can emerge.

What if you could learn from the experience and have a look at the insights collected by colleagues all across EGI? The CRM system allows just that! (Illustration: Dvortygirl / wikicommons)

Why a CRM?

The EGI ecosystem needs to optimise the relationships between project members and potential user communities because:

> EGI partners and their 'clients' are distributed.

> Conversations with 'clients' happen at different places, contexts and times, and EGI partners should be able to share that information.

> EGI needs to construct a portfolio of prospective user communities to explore the opportunities that they offer.

The EGI CRM will ease the process of identifying, contacting, following-up and evaluating user community needs and satisfaction, improving communication among the different actors and increasing productivity and efficiency.

How does it work?

The EGI CRM is operated by IberGrid using vTiger, a well-known open source LAMP technology widely used in business environments. The tool was deployed and customised according to the requirements identified by the 'Intelligence Collection & Analysis Process' and the 'ESFRI Contact List' Virtual Team Projects earlier this year. The main concepts around EGI CRM are:

> Accounts: A record for a 'client' endpoint. Examples are ESFRI projects, national projects, international projects, research institutes, universities.

> Contact: A record for a person associated under an account, used to record conversations.

What should be recorded?

Big user communities are usually organised under the umbrella of high-level initiatives (ESFRI or other international / national projects) working as frontends for the community. The CRM purpose is to allow the NGI International Liaisons (NILs) and their colleagues, who engage with potential new users, to capture and record information about:

> which projects are active in the region

> which persons should be contacted while approaching those projects

> which research institutions are working in those projects

> which persons should be contacted while approaching those research institutes

> start discussions with those contacts and record that information in the system.

We have 596 ESFRI institutional leads already recorded in this system, waiting for the NILs to validate them, identify contacts at these institutes, talk to these contacts and then record the conversations. From this information it will be possible to build up intelligence about multinational scientific communities; identify common needs; and find topics for collaboration between these communities and the NGIs. •

More Information

The EGI CRM system is available at http://crm.egi.eu and its manual at https://wiki.egi.eu/wiki/CRM.

If you have further questions about the usage please email the CRM helpdesk (egicrm.helpdesk@lip.pt).

Technical Forum 2012: It's time to submit your abstract!

The deadline for online submission is 11 June

The organisers of the EGI Technical Forum 2012 (TF 2012) are pleased to announce that online abstract submission is now open.

The event will be held in Prague, Czech Republic between 17-21 September in partnership with CESNET, the consortium of Czech universities and the Czech Academy of Sciences that represents the country in the EGI Council.

The main theme of the Technical Forum will be to reflect on the progress of the project at its mid-point in incorporating different resource types and technologies to provide a sustainable European e-Infrastructure to meet the needs of the international user communities.

Contributors are welcome to submit abstracts for presentations, workshops, training events, demonstrations, posters and sessions to be grouped to the following five tracks:

> EGI Operations
> Resource Infrastructure services
> Virtualised Resources: challenges and opportunities
> Virtual Research Environments
> Community and Coordination

The five tracks reflect a continuing evolution of the infrastructure towards a sustainable layered model but authors should also think in terms of the values that underpin Open Science – the public availability and reusability of both scientific data and experimental methodologies.

"I am looking forward to the Prague Forum being a lively marketplace where technology designers, resource managers and service providers will be able to interact with user community representatives to create open and sustainable solutions for distributed research computing across the EGI landscape," says Steve Brewer, chair of the Programme Committee. •

More Information

> Technical Forum website
http://tf2012.egi.eu

> Call for participation
http://go.egi.eu/TF12-CfP

> Online submission (Indico)
http://go.egi.eu/tf12

Upcoming events: Summer schools

Summer School on Workflows and Gateways for Grids and Clouds

2-6 July, Budapest, Hungary

Recommended for PhD students with an interest on grid, desktop grid and cloud technologies, sysadmnis and developers of applications, workflows and science gateways.

http://www.lpds.sztaki.hu/summerschool2012

Gridka School 2012

27-31 August, Karlsruhe, Germany

The GridKa School provides a forum for scientists and technology leaders, experts and novices to facilitate knowledge sharing and information exchange. The target audiences are different groups like grid and cloud newbies, advanced users as well as site administrators, graduate and PhD students in computing and physics disciplines.

http://gridka-school.scc.kit.edu

Introduction to HPC - PDC Summer School

20-31 August, Stockholm, Sweden

The course focusses on high performance computing resources, including an introduction to HPC programming languages, libraries and tools, modern computer architectures, parallel algorithms, and optimisation of serial and parallel programs.

http://www.pdc.kth.se/education/summer-school