ZERO-IN
BUILDING INSIGHTS, BREAKING BOUNDARIES
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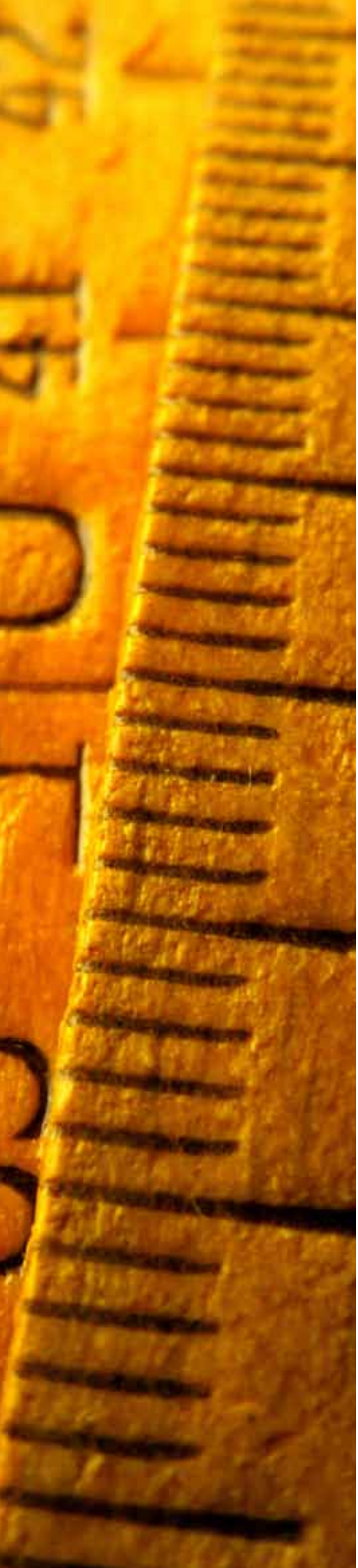
DISTANCE LEARNING, EDUCATION AND TRAINING

Adopting e-Infrastructures in the field of distance learning will have a tremendous impact on the future generations not only in Europe but worldwide.



ZERO-IN: BUILDING INSIGHTS, BREAKING BOUNDARIES

Dear Reader,

Welcome to this first edition of the Zero-In eMagazine. Its title is inspired by the concept of the Zero distance neighbourhood of global research. The Magazine brings together views and news from global virtual research communities, each edition of Zero-In will feature articles on the pioneering technology, applications and results of a specific e-Infrastructures theme, as well as cutting edge opinions and updates from other research communities.

It is often said that e-Infrastructures need to focus on user needs. But demographics are also key when we talk about applications of distance and e-learning – the theme of this issue. Just consider that India has 550 million people under 25, so has the potential to be a quarter of the global workforce by 2020. e-Infrastructures for e-learning are the sine qua non of fulfilling this potential. Using global the linkages of e-Infrastructures, learning applications can ensure these future workforces develop today thanks to the best education resources, regardless of frontiers. All articles in this issue evoke how important e-Infrastructures are in inking the knowledge of to-day for the value of tomorrow.

We thank all the authors for their valuable contributions and wish you an enriching read!

Stephen Benians
BELIEF II Project Coordinator

SEE-GRID-SCI'S TRAINING MODEL IN SOUTH EASTERN EUROPE

M. Kozlovszky, MTA SZTAKI

SEE-GRID-SCI and its predecessor projects have established a strong organized training scheme for grid users, developers and administrators, with a focus on further developing the solid grid community in the South Eastern European (SEE) region. SEE-GRID-SCI thus carries out multiple training events to raise the national-level and regional-level expertise and end-user adoption.

The project has had a catalytic and structuring effect on a variety of regional user groups, providing advanced capabilities to more researchers with an emphasis on strategic applications such as seismology, environmental protection and meteorology. The model is focused on narrowing the technology skills gap as well as enabling e-science.

The training model combines media-rich online curricula, classroom instruction, and hands-on labs. As part of this, SEE-GRID-SCI has established a central knowledge bank on grid technology, including ready-made training materials and educated trainers, designed to train different grid-user groups using a "train-the-trainer" concept. The project is consolidating the process of SEE regional e-Infrastructure and uses, leveraging the SEEREN and SEE-GRID infrastructures to reinforce scientific collaboration, and aiming to reach new as well as existing user communities.

TRAINER COMMUNITY

All SEE-GRID-SCI project partners are heavily involved in training activities: in total almost 40 trainers are qualified to deliver training in the SEE region. Establishing this stable trainer community has been an important milestone in the life of the project, enabling easy access to trainers and specialized knowledge.

TRAINING INFRASTRUCTURE

The training infrastructure was set up early in the project, and has proven to be a crucial tool for enabling flexible on-demand training. The training infrastructure offers a homogenous, reliable and grid-focused training environment with standardized access control. The training environment offers additional services, including an annotated training material repository, a training agenda system, and on-line surveys for training evaluation and to assure quality control.

The material created at previous training events is also an important knowledge resource; it has therefore been made accessible and can be reused for future training events. These materials are also freely available to the wider public.

TRAINING MODEL

The classification of training events by type, and of materials by category, has eased customization of the training model. The training model provides tailored training support for the main SEE-GRID-SCI Virtual Organization (VO) communities. There is also a project-defined "grid evolution path" that helps

guide potential grid clients as part of generic grid training courses (targeting end users, grid application developers and grid administrators). VO-specific training courses are also available, targeting VO-specific end users as well as application developers. In addition to these main targets, the project's training strategy tries to reach out from traditional academic communities to serve and interest younger generations and the business world. The strategy thus supports knowledge transfer to graduate students and small or medium enterprises using user- and service-oriented training materials and infrastructure.

CONCLUSIONS

SEE-GRID-SCI's training model aims to provide discipline-specific training opportunities for new SEE-GRID-SCI communities using a self-sustaining training environment. The project has created a trainer community and defined a "grid evolution path". It has also categorized training community targets and materials, established a training material repository, and provided support to trainers by creating information on how to use or reuse the training materials. The project is also producing multilingual training materials to facilitate knowledge transfer to a wider audience.

The overall quality of the SEE-GRID-SCI training model is assured by strict training policies, by the standardization of training materials, and via constant monitoring of training events using reports and questionnaires.

E-IRG EDUCATION AND TRAINING TASK FORCE REPORT

Malcolm Atkinson, David Fergusson and Elizabeth Vander Meer

The e-Infrastructure Reflection Group (e-IRG) Education and Training Task Force Report delves into specific motivations for increased investment in education and training in e-Infrastructure, presents challenges and opportunities for education, and defines strategies and policies to optimise e-Infrastructure use.

The rapid development of computational and digital resources and the pace of technological change open an immense number of opportunities for innovation every year. Adroit exploitation of these opportunities—in business, medicine, engineering, government and virtually all walks of life—depends on the ability of individuals to understand their potential and recognize new opportunities. New curricula, a significant evolution from present curricula, are needed to enable EU citizens to exploit these opportunities. These curricula must be available in on-site as well as distance learning formats to allow the greatest number of citizens to become proficient in the use of, and thus benefit from, e-Infrastructures.

Changes are needed in tertiary education to equip graduates to recognize and exploit the opportunities created by e-Infrastructure advances. Much needs to be done to enable educators to share material and resources, and to adapt the present curricula sufficiently quickly. Hands-on experience is essential. This requires a common platform, called t-Infrastructure, for classroom and distance learners. Such an approach has already been pioneered and used in web-enabled learning.1

The International Winter School on Grid Computing (IWSGC), first held from 6 February to 12 March 2008 and referenced in the ETTF Report, is an example of distance learning in the e-Infrastructure education and training, providing a template for others to follow when it comes to international multi-project and multi-technology collaboration on curriculum, t-Infrastructure, student support and the development of self-paced hands-on e-learning exercises. While the International Summer School on Grid Computing (ISSGC) series involved travel to a location to attend on-site classes, the IWSGC opened the learning experience to students who could not manage the time commitment and cost of summer school attendance. The winter school repurposed summer school materials and provided students with access to a comprehensive repository of resources in the ICEAGE digital library.2 Tutors were on hand to offer online assistance and support. The winter school also used summer school-tested t-Infrastructure GILDA to run teaching exercises for students, introducing example technologies such as g-Lite, UNICORE, OGSA-DAI, Condor and Globus. IWSGC successfully offered students the opportunity to learn distributed computing technologies via an online, distance-learning format.

The ETTF Report stresses that EU Member States should increase their investment in relevant education and training, perhaps by repurposing existing programmes. Academic institutions should build on pioneering work—such as the ISSGC series and IWSGC—and engage professional bodies in all disciplines. International collaboration should develop mutually recognised standards and programmes that promote the mobility of learners, teachers and graduate workers. Policy and technical agreements are necessary to underpin sharing, mobility and trustworthy qualifications. For more details or infomation, please see the e-IRG ETTF Report.3

USING THE FULL PALETTE: INTEGRATED SERVICES FOR LEARNING IN COMMUNITIES OF PRACTICE

Christine Vanoirbeek, L. Esnault and S.Sire

PALETTE - or Pedagogically sustained Adaptive Learning Through the exploitation of Tacit and Explicit knowledge - is a project aimed at enhancing learning within Communities of Practice (CoPs), i.e networks of professionals who share knowledge and practices in a common domain.

Collaborative learning is inherent in such communities: members learn informally by sharing their explicit knowledge and practices, thus adding to their collective pool of ability and experience. Such a process is increasingly important as organizations and individuals are challenged to innovate to maintain their position at the leading edge.

To this end, a growing number of companies and public institutions are implementing and "cultivating" CoPs, capitalizing on informal learning processes to increase organizational and employee experience and knowledge, thus empowering their employees to increase their value to the company.

To support such learning practices, PALETTE has designed an interoperable and extensible set of web-enabled services and usage scenarios, now used by CoPs in a variety of contexts.

In CoPs, learning is collaborative and peer-oriented. The efficacy of such learning relies on offering members variety in information, applications, and environments, a functionality PALETTE now offers in the Web 2.0 spirit.

Specifically, PALETTE has developed a learning portal that allows CoPs to access networked applications using interactive user interfaces and Rich Internet Application technologies, all tailored to provide high-level support for CoP learning.

As is fitting with Web 2.0-style applications, the underlying challenge is to develop an online environment that fosters the idea that e-Infrastructure provides a social, interactive service, or at least a place for living conversation between its users.

STANDARDISATION AND INTEROPERABILITY

The success of this portal is inherent to PALETTE ability to turn diverse applications into a set of interoperable components. The PALETTE project followed a multidimensional approach to interoperability challenges, using standards-based formats to enhance information sharing between sets of services, providing platform-independent Web services that clearly separate data from the user interface, and integrating services at the presentation level using their customizable Web portal. Within this portal, services are provided as mini-applications or "widgets", linked using simple drag-and-drop operations. The portal can be customized to suit specific communities, individuals or tasks.

The PALETTE project also provided a set of support services that add value to this integrated environment: the ability to manage end user identities and provide transparent access, to search for content across service boundaries, to reuse or advertise content to the outside world, to embed subsets of other services into a single service (such as the portal) and finally, to trace the presence of users and hence build a group memory. Further, since data access and business logic have been decoupled, associated services are reusable and scalable, thus easing the introduction of new services.

In summary, businesses or groups keen to optimise informal learning and development within CoPs can now benefit from the tools on offer through the PALETTE portal. Users are able to exchange information and meta-information, developers have a platform for the publication of services with search engines and browser applications, and community animators and end users are free to compose their environment via the customizable portal, all providing unparalleled and easy access to services that complement and enhance the CoP learning process. The PALETTE service users community will be accessible through the portal.

The PALETTE portal (and much of its support services) is available Open Source: http://palette.ercim.org

THE DAWN OF DISTANCE LEARNING e-INFRASTRUCTURE

Wolfgang Gentzsch, DEISA and the Open Grid Forum

When the Lisbon Agenda was released in 2000, it called upon Europe "to improve quality and effectiveness of EU education systems; ensure that they are accessible to all students and educators; open up education to the wider world."

Further to this, the European Commission appointed a High Level Group on Human Resources for Science and Technology, chaired by José Mariano Gago. This group found that Europe needs to find an additional 600,000 science, engineering and technology experts, resulting in an increase in the average European GDP dedicated to research from 2% in 2004 to 3% by 2010. The subsequent Gago Report identified specific actions or policy measures that, within the context of the European Research Area, could help towards this goal.

Increased spending by government and industry on R&D is one way to combat the skills shortage; another approach is to focus on science education itself. Whether you look at higher or secondary education, schools are increasingly challenged by rapid developments—facilitated by dramatic advances in information technology—in natural sciences, engineering and technology. Education theory has not yet adjusted to this digital trend of the information age. The result is an ever-growing disparity between standard educational methods and tools, and the new 'digital' abilities of modern learners, who live in a world of exploding knowledge. Today's students communicate using MSN, share their media on YouTube and meet new friends on FaceBook. Is it unusual that they expect a similar experience from their school or university?

Key to improving the image of science and technology, especially among young people, is the integration of education with e-Infrastructures: 'Virtual classrooms' will allow students and educators to collect and link information and training sources; students will then choose and use their preferred tools to work with this information, enabling personalised learning and producing the desired educational results. In modern e-Classrooms, students and scientists will be able to access Web portals for scientific compute and data infrastructures, accessing large collections of data and digital objects using metadata, knowledge management techniques, and specific data services. Students and teachers will apply existing scalable Web and grid technologies to access and share scientific data, using educational and computing resources to run scientific application simulations. Such an approach will allow the creation of interactive and multimedia-enriched learning modules that interactively support the exploration of scientific phenomena. Advanced repository and collaboration services will allow students to remotely and securely up- and download science and engineering learning objects. The larger science community will add new learning modules and computer simulation-based learning objects as they come available. An open and Web-based community will capitalize on the 'collective intelligence' of students, educators, and scientists, using Web 2.0 communication and collaboration tools.

In this new world of personalised and interactive e-learning, teachers will play the essential role of cooperatively guiding students as they identify and use the new tools of their education: these tools will be well devised, edutaining, and able to provide deep insight in specific areas of science. Only then, when the digital world is fully integrated into the education system, will our young people feel an increased motivation to learn. Only then, will they become interested in and attracted to the many fields of science and engineering.

INTO THE KNOWLEDGE ECONOMY: AN INDIAN KNOWLEDGE NETWORK PERSPECTIVE

B.B. Tiwari, Dipak Singh, ERNET, India

Global information technology and communication capacity is escalating, and India, with its population of more than a billion, is fast emerging as a knowledge hub.

The growth of Indian telecom and of IT skills subsequently developed leave India well-placed to use e-infrastructures to create centers of excellence that unite universities and research institutes. The National Knowledge Network (NKN) is an initiative in this direction, aiming to leapfrog India into the global knowledge economy.

The Indian Government's National Knowledge Commission (www.knowledgecommission.gov.in/) recommended the creation of the NKN as absolutely necessary to India's development. The project's ultimate aim is to unite stakeholders in science, technology, higher education, R&D and governance using network speeds of tens of gigabits per second coupled with extremely low latencies. Ten thousand institutions will be connected at varying bandwidths of 100 to 1000 megabits per second (Mbps). The initial phase—to be commissioned in next two years—will cover over 1000 institutions with funding of 1000 million US dollars.

The NKN is expected to encourage collaboration and the creation of new national intellectual assets, enabling the sharing of high-performance computing facilities, e-libraries, virtual classrooms, and more. The NKN will also provide access to global content on emerging technologies; allow close coordination among different institutions across nations.

PROPOSED NETWORK ARCHITECTURE

The proposed special purpose network will have gigabit capabilities providing the backbone and network infrastructure. It will have a Next Generation Network (NGN) format, where access and core layers will be based on the Internet Protocol (IP) on top of an optical layer based mainly on wavelength division multiplexing (DWDM). The Internet layer will be enhanced for quality of service and control by deploying Multi-Protocol Label Switching (MPLS).

The architecture will be scalable and able to provide on-demand bandwidth. The network will consist of an ultra-high speed core (multiples of 10 gigabits per second), with distribution layers at appropriate speeds. Institutions at the edge will connect at speeds of 1Gbps or more. Network governance structure will allow user institutions to connect to the distribution layer through a last mile connectivity bandwidth. The NKN is designed to support dedicated, overlay and virtual networks as well as grid computing infrastructures. It will provide a critical infrastructure for the nation, supporting scientific work of tremendous potential value to the country and fulfilling a long-felt need for synergy and critical mass in pursuit of modern science.

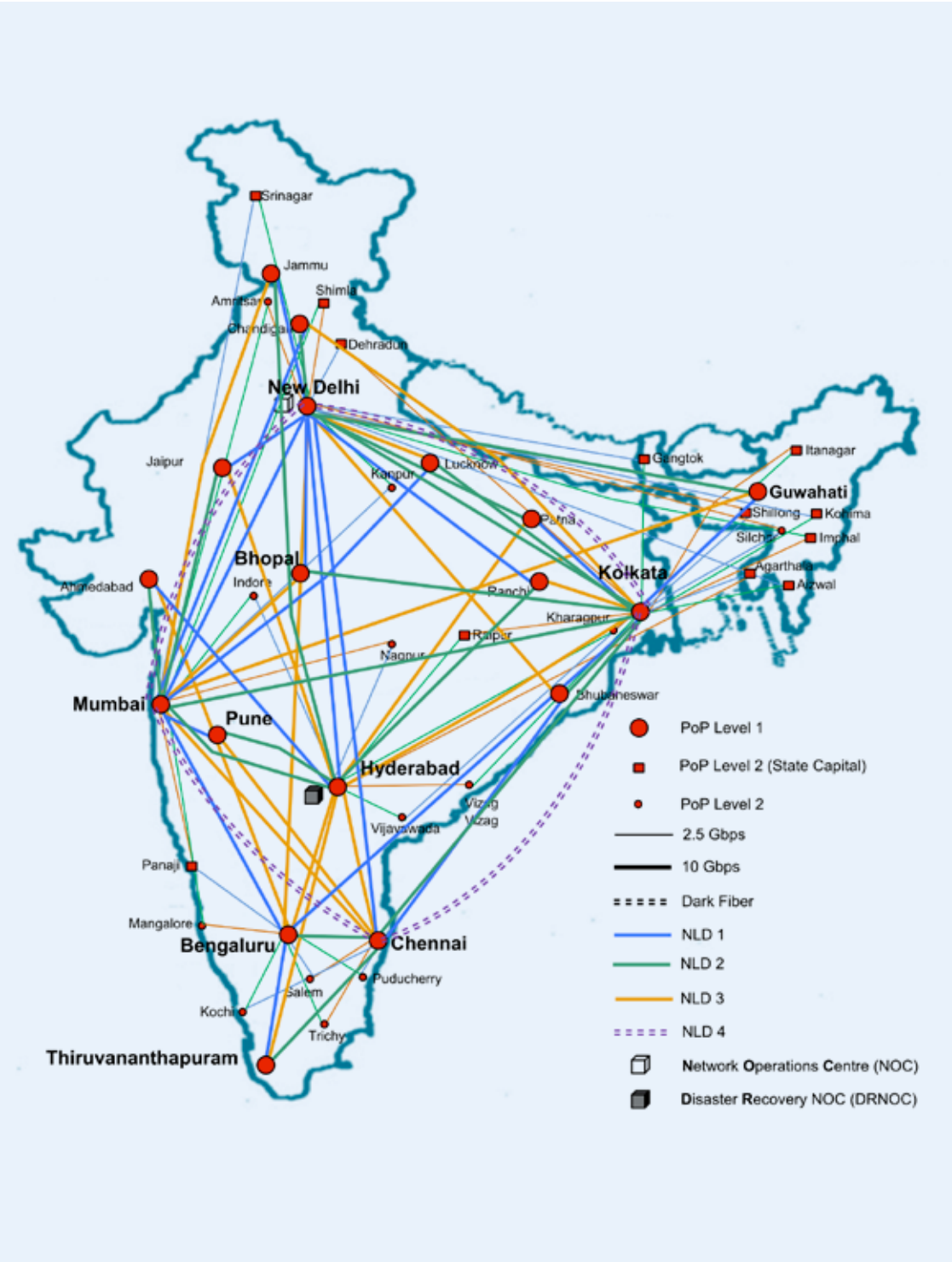
TARGET APPLICATIONS

NKN is designed with applications in agriculture, health, education, bioinformatics, genetics, governance and more in mind. Many target applications require very high and guaranteed bandwidth, and will have a direct impact on the quality of life and education in India. For example, the "Country-wide Classroom" application allows planners to create a common calendar of lectures offered across India, exploiting synergies to consolidate similar lectures and broadcast them nationally. Until now, interaction between different institutes has been mainly limited to conferences.

CURRENT AND EXISTING INITIATIVES

S&T and higher education institutions within India have facilities of varying capacity, with many far below the required levels. NKN is an attempt to redeem the situation, using of fibres already laid by various government-owned public sector entities.

There are two government-owned decade-old networking initiatives within India: the National Informatics Centre (for e-governance) and ERNET India (the national education and research network). The GARUDA (www.garudaindia.in/) initiative is also working to provide proof-of-concept for national grid computing. The Tata Institute of Fundamental Research is connected to CERN in Geneva via a dedicated link for high volume data transfer to LHC Tier II centers across India. All these networks will be able to use the NKN backbone for connectivity and to run applications.
ERNET is also connected to the European Research Network through GEANT. ERNET participates in European e-infrastructure projects like BELIEF-II (focusing on the development of reliable and robust e-Infrastructures worldwide), EU-India Grid (aimed at interconnecting the European and the Indian Grid Infrastructures GARUDA), and 6CHOICE (focusing on the promotion of IPv6 adoption in India). Since ERNET will be part of the NKN, ERNET-GEANT connectivity will be available all NKN users for global research, bringing Indian researchers in to the global research community. ERNET is also working to connect India with TEIN3 in Singapore as well as GEANT in Europe, thus providing access to Internet2, APAN and Australian Research Network AARNET.



TOWARDS MAXIMISING THE PRACE e-INFRASTRUCTURE

Tim Stitt, Swiss National Supercomputing Centre

Expanding Scientific Frontiers through a pan-European Supercomputing Research Infrastructure

The beginning of the 21st century has seen the emergence of a global supercomputing arms race to deliver 'Petascale' computing. This is the computer equivalent of WMD - Weapons of Mass Discovery: Computing hardware with a peak performance measured in petaflop/s (10^{15} mathematical operations per second). To put this into perspective, 10^{15} strands of hair laid side-by-side would stretch 50,000,000 km. With such an affluence of raw computing power, computational scientists can begin to investigate physical problems from the very large (e.g. cosmological scale) to the very small (atomic and subatomic scales) that would have seemed intractable just a few years earlier.

One European initiative - PRACE (Partnership for Advanced Computing in Europe) - has been established to catapult European scientists into the petascale computing arena by introducing a permanent pan-European High Performance Computing research infrastructure. PRACE will be comprised of many interconnected 'petaflop' machines, to rival the computational resources of scientists in the U.S.A, Japan and China.

This massive undertaking will only be achievable through an ongoing programme of high-quality, cutting-edge training material and education. PRACE has, thanks to a recent survey, developed a programme of training and education to ensure its vision can be realised.

THE PRACE HPC TRAINING PORTAL

The PRACE training programme is hoping to implement a pan-European HPC training portal in association with the currently available PRACE project website. This portal will provide a diverse collection of high-quality training and educational material including HPC Educational Material, Podcasts, webinars, Technology Briefings, Discussion Forums and much more. This helps develop new knowledge but also keeps users abreast of news and cutting-edge developments which complement their training experiences. As experts in the PRACE community continue to develop their own training, the best material will be selected and made available through the training portal via links and downloadable content.

E-learning allows PRACE users to receive training "on demand" to provide uninterrupted training excellence to complement that provided at organized PRACE training events. In many cases users may be unable to attend specific face-to-face PRACE training workshops due to location, cost or academic duties. PRACE users will benefit from remote training tools to receive training support outside the scope of hosted training events. These Remote learning tools (such as the Access Grid) will be of particular value to those otherwise unable to travel distances to receive training.

INVESTMENT IN TRAINING IS JUST AS IMPORTANT AS THE HARDWARE

For PRACE to build its vision of a world-class computing platform, it needs trained users. The EU is not alone in this realisation - recent Presidential reports in the US have described a worrisome decline in highly-qualified Computational Science professionals. If Europe continues to invest time and funding in competing with the U.S. on a purely petaflop/s basis, it is paramount that it also competes on delivering excellence in HPC training and education. The Prace HPC training eco-system will be the foundation of such an endeavour in Europe.

AN EDUCATIONAL GRID OF A MILLION PROCESSORS? "COOL!"

Ad Emmen, Almere-Grid

EGEE is a big grid, with 90,000 processor cores available to European scientists. DEISA is even bigger, with 120,000 processor cores. Impressive science can be done on these grid e-Infrastructures. But what if we had a grid of a million processors? Or even of tens of millions?

PEOPLE POWER

A dream? No. Actually, there are millions of computers out there, just waiting to become part of the European science e-Infrastructure. Take an average European town, like Krakow in Poland, or Nice in France. In each of these urban areas, there are about a million PCs at home and in small and medium businesses. And the good news? People are willing to donate unused computing time to science. This was one of the results of a survey conducted by the e-Infrastructures FP7 project EDGeS. This result highlights an opportunity to further strengthen computational e-Infrastructures in Europe.

The chance to run an application on an even larger grid might make many scientists excited. But if that means learning to compose and submit jobs in a new way, their happiness might dwindle. Luckily, the EDGeS project solves this challenge too. EDGeS aims to build a bridge between EGEE-type grids and BOINC or XtremWeb-based "desktop grids", allowing seamless exchange of jobs and job results.

So what kind of applications are people willing to run on their PCs? According to the EDGeS survey, three scientific fields clearly stand out. The first is medical applications, an area that affects us all. The same is true for the second category: environmental applications. The third application area, also scoring very highly, was educational applications.

BRIDGING THE GAP

Educational applications on a grid e-Infrastructure? Perhaps not something that immediately comes to mind. Yet grid-powered education is a "perfect match". Let us illustrate this with an example: Engineers must learn how to build a bridge. Today's bridges often have to look like an art object. That's fine, but it's difficult to immediately see whether such a construction might also be stable. You need to run complex programs to do the stress analysis. By providing grid-enabled training software for engineers, engineering students can design a bridge and then press a button that will start calculating the success of their design. Applications that combine two of the aforementioned popular grid application areas are also possible. For instance, surgical training can be carried out in a simulated virtual reality environment, where medical students can plan and practice using grid-powered calculations.

FROM THE CLASSROOM TO THE FUTURE

Kids certainly would find it "cool" to have access to a grid of a million processors during their math, physics or gaming classes. One thing is sure: by the time they reach university, they won't find it cool anymore; grids will be an ordinary, but integral, part of their educational science e-Infrastructure.

e-INFRASTRUCTURES IN SCIENCE AND BUSINESS

Fabrizio Gagliardi, Microsoft Research

In the last ten years, grid infrastructures have made significant contributions to the scientific, business and political arenas. This is especially true in Europe, where European Union-supported grid initiatives have combined with national grid initiatives to support major scientific research: scientific undertakings otherwise impossible with more traditional computing. More crucially, grids have united—physically and virtually—researchers from around the world, providing the opportunity to seamlessly collaborate.

This pioneering grid experience has given a strategic visibility to the EU's excellence in information and communication technologies (ICT); well beyond the European borders, grid-powered technologies are considered a major social and political success.

Yet in terms of business and government, the grid experience has been mixed. Several excellent examples of the use of grid technology exist in the finance, automotive and civil protection arenas, yet grids have failed to become the prevailing and dominating technology. This failure stems from issues of cost and complexity of operation, as well as business models and the total cost of ownership.

Therefore, although grids are today a reality—and one capable of answering the needs of vast segments of the research and business communities—they should not be regarded as the panacea to every computing need.

Today's grid technology, on which most e-Infrastructures are based, is not "the final and perfect solution" for several reasons. First, and most importantly, the requirements of grid users are swiftly evolving, and grid technologies must keep pace or give way to more suitable alternatives. Grid will, however, continue to effectively answer many of the scientific community's needs, at least for the next few years. Further, grids will remain a concrete, cost-effective alternative to supercomputing, especially for developing countries, where large investments in large computing clusters are most unlikely to occur.

However, if we look at grid technology from a broader perspective, a few limitations that prevent it from achieving universal uptake become apparent. First, its usability is far from being immediate, and, as a consequence, grids remain a niche experience: they simply are not the right solution for an important segment of users, especially when the total cost of ownership is properly taken into account.

Small and medium enterprises as well as private users with a low level of IT knowledge need more "plug-and-play" technologies. This market segment—which is, by the way, interesting to software companies—demands transparent resource provision and cannot afford the long training required to master and manage complex grid infrastructures. Thus, grids will either evolve or, sooner or later, they will be replaced by a new generation of e-Infrastructures.

The next challenge in e-Infrastructures is two-fold: we must make the most of grid infrastructures and, at the same time, move in new directions. The grid experience is not only creating a strong base for new and next-generation e-Infrastructures, it also offers an immense capital of technical know-how and expertise on which to build.

e-Infrastructures usually evolve alongside scientific and industrial applications; thus, with so many variables involved, it is extremely difficult to foresee their future. On the other hand, newer approaches—the most significant contemporary examples of which are cloud computing and data centres—are focused more on improving usability, increasing cost effectiveness, reducing environmental impact, virtualization of resources, and providing on-demand facilities to end users. In particular, virtualization allows different computing centers, each with different hardware/software configurations, to be operated as a homogeneous environment, connected to the same local network as a single "virtual" computing centre.

In conclusion, decision makers should be aware that their investments in e-Infrastructures have generated—and continue to generate—revenues, both in terms of improving scientific research and progressing technological development. However, they should also be prepared to invest further—and be confident that this investment will further progress to date and involve larger sectors of society.

This progress will always occur, even where technologies change, because what remains is knowledge: a valuable heritage of the Information Society, and the key to wisely driving technology change.

EGI: SHAPING THE FUTURE EUROPEAN GRID INFRASTRUCTURE

Per Öster and Katja Rauhansalo

The European Grid Initiative (EGI) establishes a sustainable, pan-European grid infrastructure to support leading edge collaborative e-Science in Europe. National Grid Initiatives (NGI) are the building blocks of the future European grid, which according to current plans, will begin operations in 2010.

Today's research has international and interdisciplinary dimensions and does not stop at national borders. Countries are linking their national grid infrastructures in the service of international scientific collaborations. The creation of a distributed, sustainable pan-European grid infrastructure is essential in maintaining Europe as a leader of the international competition. This is done through EGI.

What does EGI bring?

EGI will provide a flexible and reliable computing grid resource with long-term benefits for participating countries. EGI unites European computing and storage resources and creates a resource that pushes scientific progress towards new and innovative solutions. It will improve coordination by establishing a coordinated grid computing and data storage solution that reduces efforts required in maintaining multiple national solutions. EGI will also offer improved compatible, interoperating technologies much needed in European grid computing. Additionally, EGI improves collaboration not only in computing, but also in human and intellectual resources.

Scalability and interoperability are the biggest future challenges for EGI. The infrastructure must be able to provide an operations model with flexibility, a low cost of entry, and scalability. The interoperability and interactions of NGI grid technologies must be ensured by identifying best practices. Also, after the transition to EGI, all NGIs must be autonomous and fully responsible for sustaining support for their own user communities, technical operations and middleware requirements.

The transition to EGI

Currently, thousands of scientist rely on the Enabling Grids for E-sciencE (EGEE) grid and other similar grid infrastructures. Thus, it is essential that an operating large-scale production grid continues to serve scientific communities throughout the transition to EGI, with at least the same quality and level of satisfaction as today. The transition period from the current European grids to EGI began in May 2008 and will continue through the initial three years of EGI. The number of NGIs contributing to EGI is expected to steadily increase over this time. The main changes experienced by users and administrators of EGI's new distributed model will be organizational, as the emphasis moves from interested individual institutions to national initiatives, and from central supervision to central coordination.

Management and funding of EGI

EGI will be composed of NGIs and an EGI Organization (EGI.org). EGI.org will serve as a "glue", enabling coherence between NGIs for the benefit of users. It will link existing NGIs and actively support the setup and initiation of new NGIs. EGI.org will provide central functions to address primary coordination of infrastructure operations, user support, application development, middleware interfaces, final certification, and management. The main funding for EGI is expected to come from the European Union and fees collected from the participating NGIs.

GENESI-DR: PAVING THE WAY FOR ACCESS TO ALL EARTH SCIENCE DATA

Luigi Fusco, European Space Agency

Petabytes of data about our planet exist, but are distributed at different locations; services for analysis of this data, as well as analysis results, applications and tools are also available, but only in a scattered and uncoordinated way. For earth scientists, this presents a major logistical problem that must be addressed.

The GENESI-DR project (Ground European Network for Earth Science Interoperations-Digital Repositories) is focused on this data challenge, aiming to facilitate improved collaboration and discovery for earth scientists across the globe. GENESI-DR aims to provide scientists with reliable, easy and long-term access to more—if not all—earth science data and tools via the Internet, facilitating access to and use of historical and new Earth-related data from space, airborne and in-situ sensors.

Basic functionalities

To address this challenge, GENESI-DR requires the following basic functionalities:

Ability for users to transparently access data from different European earth science Digital Repositories (DR) using a homogenous interface;

Ability for users to quickly and easily access large volumes of coherently maintained distributed data;

Ability for DR owners to easily make available their data to a significantly increased audience with no need for duplication to a different storage system.

The first requirement is reflected in the GENESI-DR Central Discovery Service, which allows users and applications to query information about data collections and products existing in heterogeneous catalogues at federated DR sites. This service will be accessible via a web interface—the GENESI-DR Web Portal—or by external applications via open standardized interfaces exposed by the system.

To meet the second requirement, flexibility and performance are taken into consideration by making use of different data transfer technologies, including HTTPS, GridFTP and BitTorrent.

And to cope with the third requirement, the GENESI-DR Architecture enables DR owners to produce a metadata catalogue by simply harvesting metadata from their storage systems.

Targeted user communities

The GENESI-DR e-Infrastructure will be validated against specific applications in the land, atmosphere and marine domain:

- Near real-time alignment of aerial images taken to monitor agricultural crops or map urban areas in support of emergency response;
- GlobModel (www.globmodel.info), a tool for real-time data assimilation, addressing major environmental and health issues in Europe, with a particular focus on air quality;
- SeaDataNet (www.seadatanet.org/), a tool aiding near real-time environmental assessments and forecasting of the physical state of oceans.

These applications, and their associated DRs, were selected based on analysis of required data types as well as technical and policy-based attributes.

Future steps and conclusions

Moving forward, GENESI-DR aims to increase the number of integrated DRs and validation applications, as well as to integrate new features required for applications and by DR owners. It will also work with other EU projects to validate the system.

GENESI-DR aims to soon provide initial services to expert users, enabling them to input data to a web-based processing service, or to use grid resources to run a user application for specified data sets.

GENESI-DR is also analysing common approaches to the preservation of historical archives and the effect that changes in software and hardware will have on this. It is also investigating the potential for grid-based e-infrastructures to pave the way for new scientific and commercial services in the earth science domain.

The GENESI-DR project is funded by the European Commission through the Seventh Framework Programme. GENESI-DR brings together 13 partners. Full information is available at http://www.genesi-dr.eu.

ENABLING INTEROPERABLE e-INFRASTRUCTURES WITH COMMON OPEN STANDARDS

Morris Riedel, OGF - Grid Interoperation Now and Jülich Supercomputing Centre

E-science projects increasingly require resources in more than one e-Infrastructure, especially when combining high throughput computing and high performance computing concepts in one scientific workflow. Alongside this evolution, adoption of the Open Grid Services Architecture (OGSA) concept (defined by Foster et al. in 2002 [OGSA]) is still slow. While OGSA represents a good architectural blueprint for a wide variety of infrastructures, its scope may be too broad to be realistically implementable for today's e-Infrastructures. This is perhaps due to the slow emergence of OGSA-* standards and the slow deployment of standard implementations on production e-Infrastructures.
The absence of a realistically implementable standards-based reference model has led to the deployment of numerous different and non-interoperable protocols and interfaces on worldwide e-Infrastructures. For example, in Europe, the EGEE infrastructure uses gLite middleware while DEISA uses UNICORE. In the U.S., Open Science Grid uses VDT while TeraGrid is based on Globus. Although OGSA aims to facilitate the interoperability of different infrastructures, interoperability between e-Infrastructures requires more precision. To this end, the Open Grid Forum "Grid Interoperation Now" (GIN) community are working on a so-called "interoperability reference model" (IRM) that is more focused on interoperability between e-Infrastructures than OGSA. The IRM does not replace OGSA, but rather trims its functionality, dropping several parts and refining other parts relevant to the interoperability of e-Infrastructures today. IRM is thus a mid-term milestone towards long-term OGSA conformance in the future and is fundamentally based on the production experiences gained by the GIN community.

Popularity in simplicity

The history of computer science has shown that complex architectures often receive less use than their trimmed-down versions. For instance, the complex SGML is less popular than the smaller and simpler XML. Instead of the seven-layer ISO/OSI model, the four-layer TCP reference model has became the de-facto standard. The same principles can be applied with OGSA by defining a more limited, but more usable, reference model. This is increasingly important in the context of economic constraints, since the IRM can significantly reduce maintenance costs until commercial providers become involved.
We have therefore worked on adoption and refinement of the IRM, based on lessons learned from worldwide GIN interoperation efforts [GIN]. In fact, many parts of the IRM are going to be standardized in the recently formed OGF "Production Grid Infrastructure" (PGI) working group. In short, PGI standards will be based upon numerous already available open standards but will standardize the missing links between them specifically tuned to the demands of production e-Infrastructures.

IRM in action

By adopting the IRM, we have shown that the WISDOM project can benefit from jointly using the high throughput computing resources of EGEE and the high performance computing resources within DEISA in one scientific workflow [WISDOM]. Users thus benefit from seamless access to a wider variety of resources and services, significantly improving their productivity. At the Supercomputing 2008 conference in Austin, we also have demonstrated a pre-production IRM adoption in the context of the Virtual Physiological Human project. This project actually demonstrated interoperability between TeraGrid, DEISA, and the UK's National Grid Service by using large-scale HPC simulations. This satisfies increasing application demands of end users by harnessing worldwide interoperable e-Infrastructures.
IRM users also benefit from better access to special and therefore rare resources, as well as load-balancing that make use of different cycle availability on days/nights across worldwide e-Infrastructures. We are thus looking forward to the standardization of the IRM in the PGI group and its adoption in other world-wide e-Infrastructures so that end-users can truly use a "United Federation of e-Infrastructures" as a tool in daily work.

DYNAMIC CIRCUITS FOR GLOBAL RESEARCH: RESERVE YOUR SPACE ON THE AUTOBAHN

Afrodite Sevasti, GRNET

Modern researchers grow evermore demanding in their use of research and education network infrastructures. Collaborative work means they increasingly need to transport large volumes of scientific data at fast speeds and with guaranteed levels of service. The GÉANT2 "Automated Bandwidth Allocation across Heterogeneous Networks"—or AutoBAHN—is a system designed with just that in mind.

AutoBAHN ensures that demanding network users and next generation applications can get guaranteed access to service of a guaranteed quality, overcoming the challenges presented by today's physically and technically disjointed networks.

Still in its pilot stage, AutoBAHN is already delivering results: users can access a fully operational circuit of guaranteed quality within minutes of submitting their request (subject to resource availability).

The case for dynamic circuit services

Although Internet Protocol (IP) networks provide "always-on" data transfer services, they face many ongoing challenges, especially when it comes to ensuring quality of service. IP networks simply cannot guarantee that adequate resources will be available to scientists who must transfer large amounts of data within specific time constraints. This is a regular problem for researchers who are data streaming from different locations to a cluster for real-time correlation.

These limitations are inherent: the networks are heterogeneous, and their open nature means a large user base must compete for access. The alternative—to provide fixed circuits that exclusively service demanding research applications—is costly and often results in underutilised e-Infrastructures. A dynamic circuit service is one way of overcoming these limitations in certain use cases. Such services identify and reserve resources over existing infrastructures, thus guaranteeing quantity and quality for a limited, yet tailored, set of conditions. When reserved resources are no longer required, they are released and become available to the next user.

Dynamic success

Automation is crucial to the success of a dynamic circuit service: middleware must manage much of the process, automatically reserving resources and assigning service levels. Availability and functionality are equally essential: the service must be

end-to-end and cover multiple network domains. Users must be able to reserve resources in advance, and monitor their work as it progresses. This level of service requires coordination across domains, a service provided by the AutoBAHN system.
AutoBAHN complements, but does not necessarily replace existing network signaling and provisioning capabilities. Instead, it integrates new services for coordinated inter-domain provisioning, including AAI, inter-domain routing functionality, inter-domain monitoring, and so on.
The system is simple: AutoBAHN interprets user requests and translates them into network requests. The networks automatically update AutoBAHN as to what services are available, their quality, and their policies for dynamic circuit delivery. AutoBAHN instances at each network then use Web Services to accept dynamic circuits requests based on their currently supported topology.

Astronomically useful

AutoBAHN has already attracted a number of pilot use cases. A recent joint demonstration with the SCARIe project used AutoBAHN-enabled dynamic circuits to send pre-recorded data from radio telescopes across Europe to the DAS-3 cluster at the University of Amsterdam for correlation. This demonstration used the e-VLBI network.

This application serves to demonstrate a number of AutoBAHN's salient points:

- dynamic circuits provide an effective way of working with the e-VLBI network, which does not operate continuously
- the locations of the telescopes vary, thus there is a need for data transfer from a wide variety of locations
- in an advanced software-based correlator setup, the software can be run on many distributed clusters, so dynamic circuits are needed to interconnect those clusters on a case-by-case basis.

AutoBAHN was developed as a pilot within the GÉANT2 project, which is co-funded by the European Commission as part of the Sixth R&D Framework Programme (FP6).
The SCARIe project is a collaboration between the JIVE (the Joint Institute for Very Long Baseline Interferometry (VLBI) in Europe), the University of Amsterdam and SARA, and is funded by the Netherlands Organization for Scientific Research. SCARIe aims to develop a distributed software correlator for real-time e-VLBI in conjunction with advanced networking technologies.

TAMING DEVELOPMENT COMPLEXITY IN SERVICE-ORIENTED e-INFRASTRUCTURES

P. Pagano, F. Simeoni, M. Simi and L. Candela, CNR-ISTI

e-Infrastructure is the term coined for innovative research environments that provide modern scientists with seamless access to shared, distributed and heterogeneous resources. Within this domain, service-orientation is a common assumption where it provides a common abstraction to hardware, data and even application services as shareable resources. This approach, however, complicates resource management, since deployment, configuration, staging, scoping, monitoring and secure operation of services become fully dynamic and a responsibility of the infrastructure.
To fulfill this responsibility, infrastructures must be clear as to the description and run-time behaviour of services. This adds to the complexity typically associated with service development, whether generically related to distributed programming (e.g. concurrency, performance-awareness, and tolerance to partial failure) or specifically introduced

by open technologies (e.g. reliance upon multiple standards, limited integration and documentation of development tools). This complexity challenges the operation, maintenance, evolution and third-party extension of the infrastructure, ultimately threatening its adoption.

gCube in DILIGENT and D4Science

DILIGENT and D4Science, two grid-based e-infrastructures for sharing resources within Virtual Research Environments (VREs), have faced these complexity issues. Both the infrastructures promote applications – the VREs – whose constituents are dynamically borrowed from the infrastructure, bound (and deployed) instantly, just at the time and for the period they are needed.

These infrastructures operate under the control of gCube, an open platform of about 140 software components (services and associated software libraries) for interactive inclusion and orchestration within VREs. gCube manages its services dynamically and offers a range of solutions to reduce the costs induced by its requirements. Most noticeably, support concentrates in the "gCore Distribution for gCube", or gCore for short. gCore includes a sophisticated Java-based service framework entirely dedicated to the development of gCube Services, a dedicated container providing a runtime environment for gCube services, and the minimal sets of gCube components required to operate in a gCube infrastructure.

Built as an extension of Globus technology, the gCore Framework (gCF) aims to simplify and standardise all systemic aspects of service development, as well as promote the adoption of best practices in multiprogramming and distributed programming. In particular, gCF:

- manages the entire lifecycle of gCube services, engaging in autonomous interactions with the infrastructure and local environment, and allowing customisation of deployment, initialization, activation and failure response;
- enforces the scoping and security rules associated with shareable resources, handling the acquisition and renewal of service credentials, the delegation of caller credentials, and the propagation of scope and credentials from incoming to outgoing service calls;
- implements Web Services Resource Framework standards for publication, access, and notification of change to service state, offering a rich set of abstractions for modelling it, governing transparently its full lifetime, and managing its persistence on different storage media, including its recovery from remote media upon service migrations;
- standardises the use of systemic faults within service interfaces and implementations, transparently supporting retry-same and retry-equivalent semantics and converting faults into equivalent lighter-weight exceptions at service boundaries;
- mediates access to configuration resources on classpath and local file system, redirecting read failures to backups created prior to write operations and exposing object bindings for all aspects of service and container configuration;
- simplifies resource discovery via object bindings, templating, and XPath inspection for a range of queries to the information services of the infrastructure;
- simplifies multiprogramming via arbitrary combinations of event-based synchronisation, scheduling, parallelisation, and sequencing of local processes;
- simplifies distributed programming through the customisation of best-effort discovery and interaction strategies with stateless and stateful services.

Widely adopted within gCube infrastructures, the gCF guarantees a uniform quality of systemic behaviour across all its services, as well as a convenient basis for infrastructural evolution. As requirements for gCube compliance stem from a general model of shareable resources, we believe that the support offered by gCF can be exported to other infrastructures that make a similar commitment to service-orientation.

This work is partially funded by the European Commission in the context of the D4Science (FP7) project.

11.5 TERAFLOPS FOR AFRICA: THE BLUE GENE®/P SYSTEM

Jeff Chen, Meraka Institute, South Africa

Opportunities for economic development in Africa have been at the forefront of recent scientific discussion. As part of its Global Innovation Outlook, computer giant IBM recently donated a Blue Gene supercomputer to South Africa's Centre for High Performance Computing. The donation was part of a USD 120 million investment in sub-Saharan Africa, announced by IBM in December 2007.

The Blue Gene®/P system is capable of 11.5 Teraflops and is currently the fastest scientific computer in Africa. This donation has given impetus to "Blue Gene for Africa" (BG4A), an initiative that aims to build high-end computing capacity in Africa. The project aims to develop infrastructure, promote collaborative science that will impact Africa, and develop Africa's human capital.

At the launch of the "Blue Gene for Africa" project, Dr Mark Dean, IBM Fellow and Vice President of IBM's Technical Strategy and Worldwide Operations, called attention to the importance of research and development in giving organisations and countries a competitive edge. He suggested that Africa needs more R&D to spur further socio-economic development, and that investment in the development of human capital as well as infrastructure was therefore crucial. Blue Gene is thus part of IBM's contribution to sparking scientific and socio-economic progress in the African continent.

Deputy Minister of Science and Technology, Derek Hanekom, shared Dr Dean's view, emphasising the role that a tool like the Blue Gene supercomputer can and should play in addressing some of the major needs and challenges of the African continent. Johan Eksteen, Manager of Technology Research Programme at the Meraka Institute also agreed that the Blue Gene would be a holistic addition to the present cyberinfrastructure of the DST as implemented by the CSIR.

Flagships will find super-support

The BG4A supercomputer will predominantly be used to run Flagship projects, which are awarded following a stringent selection process. Frontrunners include a mineral beneficiation project, a project on the large-scale impact of climate change, and a project on food security and the nutritional values of cassava root. The potential Bue Gene user community is even more broad, including those interested in environmental simulations, agricultural modelling, energy generation and usage, information analytics and complex systems modelling for business systems, risk management, financial models, transportation management, health and more.

The Blue Gene system is a resource for all of Africa, and Dr Dean has invited African higher education and research institutions to take advantage of its high performance computing facilities to conduct cutting-edge, socially relevant research. Researchers who wish to access what is now the fastest research supercomputer on the continent are encouraged to contact the Centre for High Performance Computing to find the optimal fit for their requirements.

International partnerships and potential

President and CEO of the Council for Scientific and Industrial Research (CSIR), Dr Sibusiso Sibisi, linked the research enabled by the "Blue Gene for Africa" initiative with prospects for improving quality of life of ordinary African citizens, particularly through poverty alleviation. Such outcomes are relevant in the context of the CSIR's mandate. At the same time, however, Dr Sibisi stressed the importance of the "Blue Gene for Africa" initiative in promoting collaborative research internationally.

One such collaboration already exists between the Meraka Institute and the European Commission-funded BELIEF-II consortium; it is envisaged that BELIEF-II will make a significant contribution to the development of the "Blue Gene for Africa" project and subsequently foster a wider range of eScience partnerships between African and international institutions.

Official launch of the Blue Gene for Africa Project

Europeana website overwhelmed on its first day by interest of millions of users

Source: EC Rapid Press Releases

On the first day of its launch on 21 November 2008, Europe's digital library Europeana was overwhelmed by the interest shown by millions of users in this new project. On the basis of expert advice, Europeana had anticipated up to 5 million hits per hour on the site. The real interest was 3 times as strong. This massive interest slowed down the service so much that after having already doubled server capacity yesterday at noon, the Europeana management in The Hague (Netherlands) and the European Commission last night had to temporarily take down the site to take pressure off it. This is an unexpected difficulty, but it is also an encouraging sign that citizens in Europe and around the world have great interest in Europe's digital library. It also provides strong motivation for the Europeana team and the experts from the Commission working on the project to intensify their efforts and the site's technical back-up even further. Europeana must now be made more robust to deal with peak hour requests as they happened yesterday – thousands of users searching in the very same second for famous cultural works like the Mona Lisa or books from Kafka, Cervantes or James Joyce. The European Commission and the experts from the Europeana project are working on this day and night to make a fully functional Europeana service available as soon as possible. The Commission and the Europeana management are confident that Europeana will be up and running again by December. For the time being, a demo version of Europeana will be available at http://dev.europeana.eu/.

What is Europeana?

Europeana rolls multimedia library, museum and archive into one digital website combined with Web 2.0 features. It offers direct access to digitised books, audio and film material, photos, paintings, maps, manuscripts, newspapers and archival documents that are Europe's cultural heritage. Visitors to www.europeana.eu can search and explore different collections in Europe's cultural institutions in their own language in virtual form, without having to visit multiple sites or countries.

Who is Europeana aimed at?

Europeana offers anyone interested in literature, history, art or cinema a simple route to access European cultural resources. For every citizen, it offers a simple way to find cultural material from across Europe in digitised format. Europeana is also expected to attract students and researchers with its vast virtual collection of material from all disciplines. That said, it will be just as easy for school children to use it, for homework or for fun.

How does Europeana work?

Europeana functions like a multimedia Internet portal with content from different sources. The digital objects that users can find in Europeana are not stored on a central computer, but remain with the cultural institution and hosted on their network. Europeana collects contextual information about the items, including a small picture. Users will search this contextual information. Once they find what they are looking for, a simple click provides them with access to the full content – inviting them to read a book, play a video or listen to an audio recording – that is stored on the servers of the respective content contributing institutions. Cultural institutions collaborating with Europeana organise their digitised content in such a way that this search is possible. At the same time they keep full control over their content.

How does a cultural digital object wend up in Europeana?

First, the cultural object has to be digitised. Digitisation is the transformation into digital format of text and photos from paper, films from reels, music from vinyl or videos from tape, so it can be (dis)played and used from a computer. For text and photos this involves scanning. Then the cultural institution that has digitised the object has to make it available for search and retrieval through Europeana. To make it searchable from a single entry point, the institution has to add the right contextual information to the digital object, such as the name of the author/creator, the place and date of creation, etc.

How many digital objects are available through Europeana and where do they come from?

The Europeana prototype gives direct access to more than 2 million digitised items from museums, libraries, audiovisual and other archives across Europe. Over 1,000 cultural organisations from across Europe have provided materials to Europeana. The digitised objects come from all 27 Member States, although for some of them the content may be very limited at this stage.

Three reports by the Finnish Research Infrastructure Survey and Roadmap Project

The Steering Group of the Finnish Research Infrastructure Survey and Roadmap Project has published recommendations for national research infrastructures and proposals for the national roadmap.

- Survey & Roadmap for Research Infrastructures in FinlandReport of the Physical Sciences, e-Science

and Engineering Assessment Panel. 3 October, 2008.
- Survey and Roadmap for Research Infrastructures In FinlandSocial Sciences and Humanities Assessment Panel Report. 7 October, 2008
- Survey & Roadmap for Research Infrastructures in Finland Life Sciences and Medicine & Environmental Sciences Assessment Panel Report. 8 October, 2008.

CoreGRID European Grid Roadmap

The latest version of the CoreGRID European Grid Roadmap is now finalised and available for download.
This document gives a good overview on all running Grid R&D activities between 2005-2008 added with a SWOT analyses of Grid working areas.
For futher information, please visit the CoreGRID website - http://www.coregrid.net/mambo/ - or contact Wolfgang Ziegler (ziegler@scai.fraunhofer.de) or Stephan Springstubbe (stephan.springstubbe@scai.fraunhofer.de)

The ETICS System improves its services!

The ETICS system offers software build, test and quality certification services to its user community. In the past months the ETICS 2 project (eInfrastructure for Testing, Integration and Configuration of Software - Phase 2) has worked on the improvement of its system following the feedback received from the users and building on the experience of the previous ETICS project. The new versions of the Repository service, the Client and the APIs are now available offering higher performance, improved availability and accessibility of the user artifacts and additional capabilities dedicated to software developers.
Keep tuned for the next releases from the ETICS 2 project team which will also include the implementation of the A-QCM (Automated-Quality Certification Model previously known as Grid-QCM) to certify the quality of your software in an automated way.
If you would like to become an ETICS system user or you are interested in issuing your software with the A-QCM certificate contact: etics-support@cern.ch. For more information: http://www.eticsproject.eu

EVENTS

FP7 - ICT Proposers' Day

22 January 2009, Budapest, Hungary
http://ec.europa.eu/information_society/events/budapest_2009/index_en.htm
Organised by The European Commission's Information Society and Media Directorate-General, in cooperation with the Hungarian National Office for Research and Technology.

Distance Learning as an e-Infrastructures application

28-29 January 2009, Habitat Centre, New Delhi, India,
http://www.beliefproject.org/events/belief-indian-symposium
This event is a joint conference between two e-Infrastructures projects: BELIEF and 6CHOICE with the support of GLOBAL and 6DEPLOY.
During the two days participants with various backgrounds and from diverse disciplines and regions will exchange information and ideas on the adoption of e-Infrastructures for Distance Learning. The latter forms a priority issue not only for the Indian Society, but also for the Learning Society of the future as a whole.

5th Italian Research Conference on Digital Libraries - IRCDL 2009

29-39 January 2009, Padova, Italy
http://ims.dei.unipd.it/events/2009/ircdl/
IRCDL is a yearly deadline for Italian researchers on DL related topics. The aim of this 5th Italian Research Conference on Digital Libraries is to bring together researchers interested in the different methods and techniques that allow to design and build digital library systems, with a particular focus on the design of innovative personalized services for the final users of the future European Digital Library (Europeana).
The IRCDL conferences have been launched and sponsored by DELOS, an EU FP6 Network of Excellence on digital libraries (DELOS Web site) from 2005 to 2008.

INGRID 2009 4th International Workshop

1-3 April 2009, Alghero, Sardinia, Italy
http://www.ingrid.cnit.it/
The current edition of the Workshop focuses on all aspects related to the effective exploitation of remote instrumentation on the Grid. These include middleware architecture, high-speed networking in support of Grid applications, wireless Grid for acquisition devices and sensor networks, Quality of Service (QoS) provisioning for real-time control, measurement instrumentation and methodology
The Annual Conference on Distance Teaching & Learning is recognized internationally for the quality and integrity of its program. Each year the conference provides an exchange of current resources, research, and best practices from around the world that are relevant to the design and delivery of distance education/training.

eLearning Africa 2009: Learn, Share, Network

27-29 May 2009, Dakar, Senegal
http://www.elearning-africa.com/
In May 2009, the Continent's largest annual assembly of eLearning and education professionals from Africa and beyond will convene in the capital, Dakar. Moving to Senegal in 2009, eLearning Africa continues to build and expand a worldwide network for people involved in all aspects of technology-enhanced education and training in Africa, including management and policymaking

23rd ICDE/EADTU World Conference on Open Learning and Distance Education

7-10 June 2009, Maastricht, The Netherlands.
http://www.icde.org/oslo/icde.nsf/
The event whose theme is "Flexible Education for All: Open - Global - Innovative" is hosted by the Open Universiteit Nederland.

25th Annual Conference on Distance Teaching & Learning

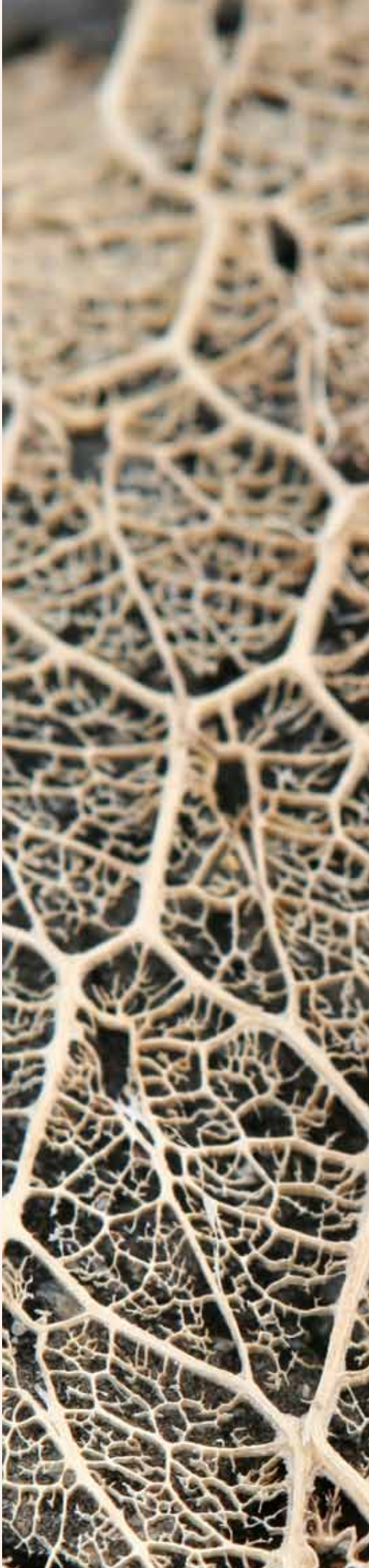
August 4-7, 2009, Madison, Wisconsin.
http://www.uwex.edu/disted/conference/
The Annual Conference on Distance Teaching & Learning is recognized internationally for the quality and integrity of its program. Each year the conference provides an exchange of current resources, research, and best practices from around the world that are relevant to the design and delivery of distance education/training.

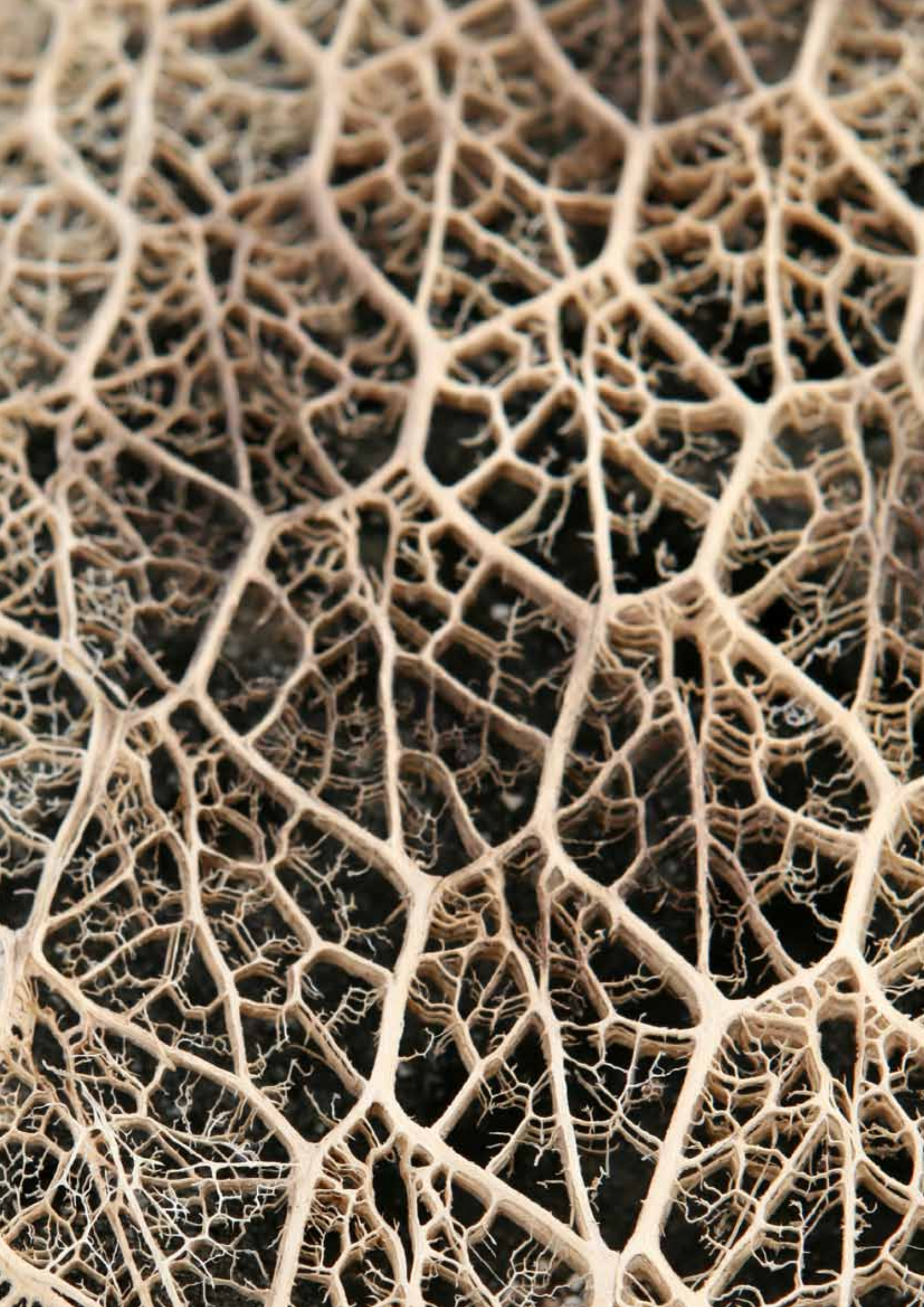
2nd BELIEF-II International Symposium

16th & 17th July 2009, São Paulo, Brazil
Future trends and e-Infrastructures for Sustainable Development http://www.beliefproject.org/events/2nd-belief-international-symposium.
This 2nd BELIEF Symposium will address the theme of e-Infrastructures and Sustainability Development.
For further information please visit the BELIEF portal: www.beliefproject.org.

Please send us your articles!

Each issue of Zero-In will have a call for articles, which will also announce the theme of the edition. For dates of the future calls, please check http://www.beliefproject.org/media-corner/e-magazine and sign up to the BELIEF community to be informed the moment when the call is launched – http://www.beliefproject.org !
Feel free to send us your comments, and 'letters' for future editions of Zero-In, to info@beliefproject.org.





E-INFRASTRUCTURE

The new generation of integrated ICT-based infrastructure. E-Infrastructures, which exploit and seamlessy interconnect several separate components and layers, such as networks, supercomputers and other computing resources, storage, and other remote resources.

E-SCIENCE

An innovative approach to research, thanks to the use of advanced technologies of communication and regardless to geographical location of instruments, resources and last but not least, brains. Today, the paradigm is used in several application fields: Astrophysics, High Energy Physics, Computational Chemistry, Biomedicine, Earth Sciences, Metereology, Environmental Sciences but also Finance, Cognitive Sciences and Archaeology.

GRID

Grids are a set of services over the Internet, allowing geographically dispersed users to share computer power, data storage capacity and remote instrumentation. The term Grid was coined in the mid-1990's to indicate the "coordinated resource sharing and problem solving in dynamic, multi institutional virtual organisations". Although Grids are still in a prototype phase, experts believe that they will have a dramatic impact, comparable to WWW, in the next few years.

MIDDLEWARE

A software layer able to manage and allocate resources in an optimal way to all users and applications that need them, just like the Operative System does with programs running on your PC.

NREN – NATIONAL RESEARCH AND EDUCATION NETWORK

A NREN is a unique organization that plans, manages and operates the IP telecommunication network infrastructure devoted to R&E in a country. They implement the network requirements of the scientific and academic community and are the privileged partner for dealing with Telecom operators and provider of apparatuses on their behalf.

NGI – NATIONAL GRID INITIATIVE

An NGI is an organization that coordinates on a national basis the Grid projects and initiative and is entitled to deal with counterparts worldwide on themes such as standardization and interoperability of middleware and procedures. It is the NREN-equivalent at a Grid level.

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