GÉANT

CONNECT

THE MAGAZINE FROM THE GÉANT COMMUNITY | ISSUE 9 OCTOBER 2012

THE EUROPE 2020 GROWTH STRATEGY RELIES ON GÉANT

READ OUR FEATURE ON WHY ICT IS VITAL TO SMART GROWTH

SMASHING THE GLASS CEILING AT GÉANT
CELEBRATING WOMEN IN ICT

SCHOOL'S OUT FOR SUMMER
GÉANT BRINGS ITS SOFTWARE DEVELOPERS TOGETHER

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CONNECT is the quarterly magazine from the GÉANT community. The aim is to highlight key areas of interest, provide updates on the project and its vital work in supporting European research and education, as well as give an insight into the users who depend on the network, and the community that makes GÉANT what it is. If you'd like to get in touch with us about anything CONNECT related, we'd love to hear from you at **connect@geant.net**

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WELCOME

The current quarter is once again proving an extremely busy one for the GÉANT project, and for the community as a whole. As always at this time of year the conference season is in full swing, and there is a great deal of travelling, (human) networking and the excitement of new challenges. Our annual project symposium in October will bring together around 250 participants from across Europe to 'connect, communicate and collaborate' – via cross-Activity meetings, workshops and discussions. As always the objective is to provide people with a broad appreciation of the project and how different Activities all contribute to achieving our goals.

This is timely, as we in GN3 are building on a highly successful 3rd year of the project, having just received the highest possible rating from the independent panel of experts that once a year reviews the project on behalf of the EC. All participants should feel extremely proud of this achievement. After all, GÉANT is a large project embracing in excess of 350 persons and this rating is a remarkable result. Particular praise was given to the collaborative spirit and team work amongst all the partners, and this is something the symposium is expressly designed to foster.

We felt that the following extract from the report sums up rather neatly both our achievements and our aspirations for the project, in how we will continue to support the research and education community.

"In summary the GN3 project provides excellent services and support to the research and education communities in Europe and is continuing to develop and improve its services to keep pace with the requirements of its current and new user communities. The project is also extending its outreach with links to many other regions of the world. Some of the services developed by the project are now being taken up in many other regions and collaboration with these regions is strengthening the support for collaborative global research."

Of course we are not resting on our laurels. In this final year of GN3, we are focusing our efforts on further improving product management; increasing our engagement with the EC's Future Internet Initiative (FII) as well as ensuring security and continuity remains high on the agenda.

GÉANT of course does not exist in isolation. Quite the opposite: we are an integral part of the Digital Agenda for Europe, a flagship initiative driving Europe 2020 – the EU's cohesive growth strategy. Many of our partners are facing increased pressures and challenges, and so it is imperative that we continue to operate as efficiently as possible, that we innovate and that we demonstrate the success of European research and education networking and the ground-breaking projects it enables – as well as the day to day requirements that GÉANT and the NRENs support, for millions of researchers and students across Europe. Our focus on the value of GÉANT is intended to remind readers of the changing environment we all operate in, as well as highlight some of the success stories.

We hope you find this issue of interest, and look forward to continuing to meet many of you over the coming months.

Best regards,

Matthew Scott and Niels Hersoug, Joint Project Managers of GN3.

FEATURE:
THE VALUE OF GÉANT

CONNECT INVESTIGATES GÉANT'S VITAL ROLE IN EUROPE 2020 AND HIGHLIGHTS SOME OF THE EUROPEAN SUCCESS STORIES IT IS SUPPORTING

SUPPORTING SMART GROWTH IN EUROPE

GÉANT has long been a vital part of European research and education, but how does this role support the Europe 2020 growth strategy?

GÉANT is a success story. For the past ten years, through the joined force of national research and education networks, it has been a vital element of Europe's e-infrastructure, providing the high speed connectivity needed to share, access and process massive volumes of data: data which is essential to the study of particle physics, bio-informatics, the advancing of medicine or simply enabling arts performers in different continents perform together in near real-time. Considered the most advanced research network in the world, GÉANT has helped put Europe at the heart of global research, benefiting over 40 million researchers and students across Europe who collaborate with peers across the world on ground-breaking discoveries and learning.

To quote Neelie Kroes, European Commission Vice President for the Digital Agenda, by "bringing together the brightest minds in the world, GÉANT not only benefits Europe's competitiveness but is also boosting collaboration between researchers on a global scale."

TALENT WILL FIND A WAY

If opposites really do attract, nobody has told researchers and academics: talent is attracted to other groups of talent, and when they are separated by distance they will find a way to collaborate. Perhaps in the past this would have meant physical relocation – witness the concentration of talent around hubs such as world-famous universities and institutes – but now of course this collaboration can take place virtually regardless of physical location thanks to e-infrastructure. GÉANT's role up to now has therefore been vital in positioning Europe at the forefront of research and education.

It was not always this way. In the 1990s Europe lagged behind North America in its research networking, suffering from high prices driven by telecommunications monopolies and poor access for the peripheral regions of Europe. Market liberalisation, major investment at national and European level and successful collaboration have all played their part in propelling Europe to a world leadership position.

A HIGHLY COMPETITIVE MARKET

Of course, the world doesn't stand still, and Europe is facing stiff competition from other regions. The United States and China are investing heavily in ICT (Information and Communications Technology) as a source of competitive advantage (around 5 or 6 times more than Europe over the next 7 years), putting Europe's position at serious risk. It is a complex issue including politics, priorities and long term strategy: those regions in a position to support their vision of ICT with continued – and increased – investment expect to reap the benefits of a well-equipped knowledge society. Others are in a more difficult situation, unable to ramp investment even though the vision is strong. Europe is expected to build on its notable success to date, and has put ICT at the heart of its plans.

MAINTAINING EUROPE'S LEAD

Addressing the crisis we are all aware of, the EU has responded with Europe 2020 – a cohesive growth strategy built around smart, sustainable and inclusive growth. Smart growth in this context means improving performance in education, research and innovation and the EU is targeting increased funding in research and innovation, as well as improved levels of employment and educational attainment.

Within the area of smart growth, the Digital Agenda for Europe is one of three flagship initiatives to deliver on this strategy. Aimed at making "Every European Digital", it is targeting high speed internet access for all, and can be viewed as a roadmap for bringing the benefits of a digital economy and society to Europe's citizens. GÉANT lies at the very heart of this initiative, continuing to address the digital divide – a prerequisite for Europe's continued economic and social development – and to provide researchers and students across all of Europe with access to world class connectivity and services.

However, with the world of research and education changing so drastically, and in the context of Europe 2020, the future role of GÉANT was re-evaluated by the GÉANT Expert Group (GEG), a group of independent experts set up by the EC to "articulate a 2020 vision for European Research and Education networking and identify an action plan for realising this vision." The GEG published its report in October 2011 to provide a vision and action plan for how European research networks should look in 2020 (to read the report online, visit the GÉANT website or search 'Cordis Knowledge Without Borders').

STEP UP FUNDING

Recognising the competition posed by other world regions, one of the key overall recommendations in the report was to 'step up funding'. In particular, several more specific recommendations were made in this area: member states must continue to invest in their research networks; high-end users must bear a greater share of the burden; budgets for innovation activities should increase significantly; funding on all levels should be properly planned for and stable. This last point – perhaps mindful of the current crisis – reminds us of the vital nature of e-infrastructure and the need to avoid short term funding volatility.

Many NRENs have had to quickly evolve to cope with the rapid growth in data heavy global research, offering a wider range of services to a growing number of users, who in turn are creating a greater volume of usage. In many countries, this trend is accompanied with an expansion and upgrading of connectivity to client institutions and in an ever widening range of countries, large users are being migrated to terabit networks.

The result of this new generation of networked services has also meant an increase in staff requirements, yet for many NRENs funding has remained static for the last five years. With the economic climate still in a state of flux, further cuts remain a risk, while the needs of the research community continue to grow exponentially.

ICT VITAL TO EUROPE'S SMART GROWTH

Research networks must remain at the forefront of technology and innovation. Our role is to lead the way and act as innovators whilst continuing to deliver a level of service not easily found elsewhere.

While NRENs are designed not just to support, but to stimulate research, innovation and flow of content, the ability to allocate resources for deploying new services for users and add value through services, such as brokerage and secondary education, is more important than ever.

It is essential that continued, adequate investment at local, national and European level is available to ensure users benefit from the highest quality services. Just as a well maintained road and railway infrastructure is needed to maintain an economy, so e-infrastructures need to be upgraded, serviced and supported to drive the digital economy. The risks of not doing so could be profound: without sustained and adequate funding, Europe risks not only losing its envious position at the heart of global research, but also failing to deliver the smart growth all our hopes are pinned on. And ultimately, that will only increase the pressure currently facing Europe.

Useful links:

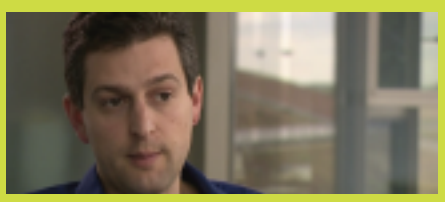
- Europe 2020
- Digital Agenda for Europe
- GÉANT Expert Group

SUCCESS STORIES

EMBL – EBI

Working in partnership, the GÉANT and JANET networks provide seamless, high-performance links between the European Bioinformatics Institute (EBI), part of the European Molecular Biology Laboratory (EMBL) EMBL-EBI and scientists located throughout the world, enabling real-time, global access to the world's largest collection of molecular databases.

"Our close working relationship with the JANET and GÉANT networks delivers the speed and capacity that we need, giving us confidence and allowing us to focus on sharing data to push forward scientific progress".



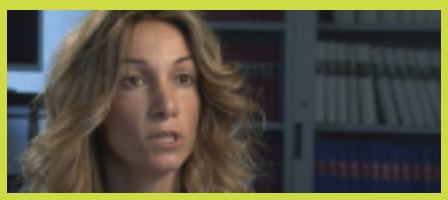
Dr Paul Flicek, Head of Vertebrate Genomics, EMBL-EBI.

DECIDE

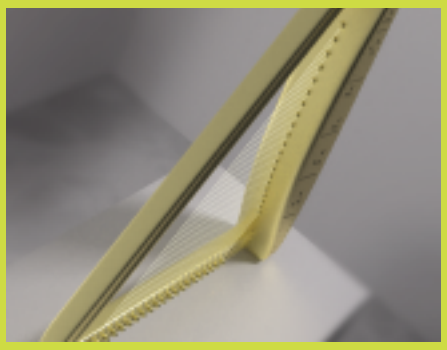
As part of a unique infrastructure of high speed networks, powerful computing resources and international databases, GÉANT is helping early diagnosis and treatment of Alzheimer's disease.

The Diagnostic Enhancement of Confidence by an International Distributed Environment (DECIDE) project aims to provide a secure and easy to use diagnostic tool, accessible by any doctor.

"GEANT has a crucial role in avoiding the fragmentation that currently is in the different research infrastructures and centres. It can help to bring together the research community to share, not only the way to proceed but also the vision of how to tackle the problem of pathologies in particular Alzheimer 's disease".



Dr Isabella Castiglioni, Researcher, Institute of Molecular Biology & Physiology, National Research Council (IBFM-CNR), Italy



ASTRA

GÉANT and EUMEDCONNECT provided the Ancient instruments Sound/Timbre Reconstruction Application (ASTRA) project with the fast and reliable connection needed for physical modelling of lost instruments.

"The success of the ASTRA project is testament to how e-Infrastructure can bring researchers and academics from across a multitude of disciplines together with artists, facilitating their creative collaboration on a global level. In addition, it provides an innovative use for research data, making this important work accessible to the general public".

Dr La Rocca Co-ordinator of ASTRA gridification

ACCELERATING AND ENRICHING RESEARCH AND EDUCATION

GÉANT and its NREN partners support many research projects, across many disciplines. In several cases, these projects simply would not be possible without GÉANT. This page highlights just a few of the projects we have worked with, helping to enable global user communities. Further information can be found at **www.geant.net/users**

"Without GÉANT, there could not be free mobility of knowledge, researchers and information throughout the European Union. From that perspective, GÉANT is a very important enabler and contributor for creating the European Research Area."

Zoran Stančič , Deputy Director-General of the European Commission's Communications Networks, Content and Technology DG

"The power and scope of GÉANT ensure Europe remains a central hub for research and education, offering the best infrastructure to the brightest minds in the world."

Neelie Kroes, European Commission Vice President for the Digital Agenda

"The EBI would not exist without GÉANT, because our primary goal is to collect and distribute biological data... without GÉANT we could not do that."

Professor Janet Thornton, Director of EMBL-EBI

ShanghAI Lectures

The ShanghAI Lecture series uses the power of research networks to provide high quality connections that enable advanced, real-time e-learning in a virtual global lecture hall, using online knowledge transfer tools.

"Artificial Intelligence is a truly global research area, crossing many different disciplines and cultures. Bringing this community together would be impossible through traditional means, but the use of advanced technology and high speed research networks has enabled us to create an interactive, vibrant collaboration between hundreds of students and researchers on four continents. This means that the ShanghAI Lectures have become much more than a series of videoconferences, and are serving as the foundation of a cross-disciplinary, worldwide community that continues to expand and grow, enabled by the power of research networks."

Professor Rolf Pfeifer, University of Zurich

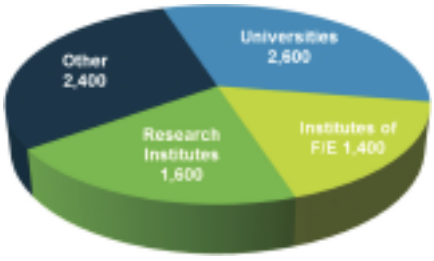
Green ICT

The GreenStar Network project was created to prove the viability of using green energy sources, initially in research networking, that can reduce ICT's carbon footprint. GSN uses GÉANT's high-speed Bandwidth on Demand links to create an interactive green network, which includes advanced middleware to maximise how renewable-powered resources are used.

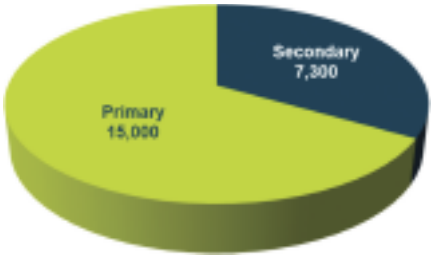
"None of this would be possible without flexible, high performance international research networks, such as GÉANT that provide real time monitoring and control to deliver a virtualised green architecture."

Mohamed Cheriet, Project Instigator, GreenStar Network.

DID YOU KNOW?



GÉANT and its partners connect over 8,000 institutions. 'Other' institutions include libraries, government departments, hospitals and museums.



Many of Europe's NRENs provide connectivity to primary and secondary schools, giving over 20,000 schools access to GÉANT.

SUMMER SCHOOL BRINGS GÉANT SOFTWARE DEVELOPERS TOGETHER

By Pawel Kedziora, Software Designer, Poznan Supercomputing and Networking Center

Advanced software is central to delivering GÉANT's innovative, high quality services, meaning there are a growing number of developers working within the project, using leading edge tools and techniques in their work. However with developers split between different teams and countries, connecting them is important to driving the project forward.

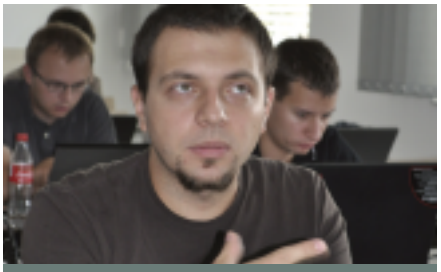
INTRODUCTION

Bringing together developers from across Europe to share best practice, network and learn new skills is the mission of the GÉANT Summer School for Developers (SDS). Now in its third year, over 20 people from the AutoBAHN, cNIS, GENUS and perfSONAR MDM teams attended the latest Summer School, which was held in early September at the AGH University of Science and Technology in Kraków, Poland and was organised by SA4 Software Governance Task 1.

The SDS focused on key topics relevant to all GÉANT developers, including Software Continuous Integration and Delivery and Testing. On day one attendees heard from expert speaker Tomasz Kaczanowski on the process and tools behind software continuous delivery, while on the second day Rade Martinovi from Serbian NREN AMRES presented on DevOps methodology and how it aids software testing. During the workshop attendees had the chance to put their new skills to the test through hands-on coding challenges designed to showcase agile programming practices and object-oriented design.

By bringing together developers involved in GÉANT Service (SAs) and Joint Research (JRAs) Activities the event also aimed to increase the adoption of SA4-T3 software development and QA testbed infrastructure among the growing GÉANT developer community.

CONNECT caught up with Rade Martinović of AMRES and Damian Mierzwiński of PSNC to get his views on the event:



Rade Martinović, AMRES

Damian Mierzwiński, PSNC

WHY DID YOU DECIDE TO ATTEND THE SUMMER SCHOOL FOR DEVELOPERS (SDS)?

Rade: The first year I came along because I found the topics interesting and relevant and it seemed like a good opportunity to really get to know what other people in the GÉANT project are doing and how. As I'd had such a positive experience last time and really benefited I wanted to return - the combination of people and topics covered is what brought me back to SDS and Poland.

WAS IT THE FIRST TIME YOU'D BEEN TO A GÉANT SUMMER SCHOOL?

Rade: This was my second time as I participated in SDS2010 in Gdansk.

Damian: This was my third time at SDS.

DID YOU LEARN NEW SKILLS AND TECHNIQUES?

Rade: That would be for sure Test Driven Development (Behaviour Driven Development), Pair Programming and using mocks in test. Also my horizons have been widened by the excellent lectures from Tomasz Kaczanowski – those on TestNG and Gradle especially made an impression.

DID YOU LEARN MORE ABOUT THE GÉANT PROJECT AND THE IMPORTANCE OF SOFTWARE WITHIN IT?

Rade: Yes. Visiting SDS and meeting developers from different GÉANT subprojects in simulated work environments made me better appreciate the work they are doing and the difficulties they are facing in their day to day jobs.

DID GOING ALONG BENEFIT YOUR DAY TO DAY JOB?

Damian: Yes, it benefited me a lot. I'm now using the Test First approach and our software is becoming more reliable than ever before as the code is self-descriptive and understood by all members of the team.

WHAT AREA/SESSION DID YOU FIND MOST USEFUL?

Damian: Definitely it was the Code Retreat. I learned that communication is very important as we swapped partners every 45 minutes. I've also shifted from working on the solution to working on the problem description using tests. This second approach is beneficial, while the first just consumed time we were short on.

DID YOU ENJOY THE WHOLE SUMMER SCHOOL EXPERIENCE AND CHANCE TO NETWORK WITH OTHER DEVELOPERS?

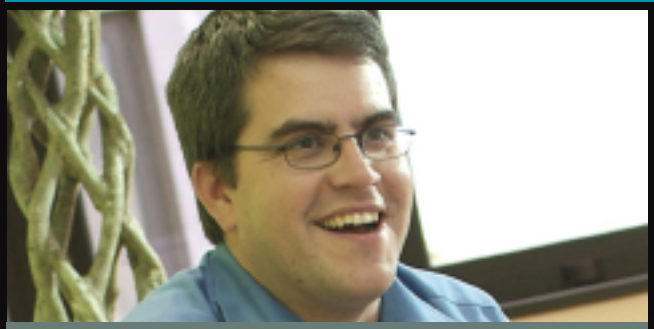
Damian: It was very joyful and this friendly atmosphere is a strong part of every SDS. Then, when we are back to our desks, spread around Europe, it is very valuable that we previously met face to face. It is easier to work together and talk when you know each other personally.

WILL YOU ATTEND FUTURE SUMMER SCHOOLS?

Rade: If the circumstances allow, definitely! I'd really recommend it to other software developers on the GÉANT project.

Damian: Certainly!

Q&A
WITH MICHAEL ENRICO AND GUY ROBERTS



MICHAEL ENRICO
CHIEF TECHNOLOGY OFFICER, DANTE

GUY ROBERTS
SENIOR TRANSPORT NETWORK ARCHITECT, DANTE

Earlier this year, DANTE – the organisation that on behalf of Europe's NRENs has built and operates the GÉANT network – created a function called 'Office of the CTO', headed by Michael Enrico, Chief Technology Officer and supported by a team of experts. CONNECT caught up with Michael, and Guy Roberts – Senior Transport Network Architect – and asked them what this means for the GÉANT project and the wider research networking community.

WHY HAS DANTE ESTABLISHED A CTO OFFICE?

Michael Enrico: Networks such as GÉANT have always been at the leading edge of innovation, introducing new technologies, such as bandwidth on demand and IPv6 far in advance of commercial providers. We want to build on this leadership and by creating the CTO Office we've brought together experts with a wealth of knowledge and years of experience from other roles so that they can focus on emerging technologies and services. This will allow us to create strategies for DANTE's mid to long term technology direction and make valued contributions to individual projects such as GÉANT.

Obviously the communications technology sector has never stood still, but the rate of change is increasing as new areas such as those arising from the EC-funded 'Future Internet' programme, the Cloud Services arena and advanced middleware affect all of our operations.

HOW DOES THIS HELP INTERNATIONAL RESEARCH NETWORKING?

ME: The requirements of international research networking are changing rapidly, driven by major expansion in data volumes and the need for interoperable, global services. By having a visible focus on technology innovation it should make early collaboration with both vendors and research projects more straightforward.

WHAT MAKES GÉANT SUCH AN INNOVATIVE NETWORK?

ME: Throughout its existence, GÉANT has been a network built on innovation. Thanks to its unique hybrid architecture we're able to support the early deployment of cutting-edge technologies and services that benefit both users and our NREN partners. This flexibility, combined with high capacity, enables the project to meet user requirements, whatever they are looking for.

ARE THERE PARTICULAR AREAS OF THE NETWORK THAT DEMONSTRATE THIS INNOVATION?

ME: I'd pick three specific areas. Firstly we're an early commercial customer of Infinera for its latest DTN-X equipment, which gives us a route to a future terabit network that will meet the ever-expanding requirement for higher speed transmission of more and more data.

Secondly, we're involved in Software Defined Networking (SDN), which essentially makes it possible for various actors (not just the network operator) to control equipment such as routers and switches at an intimate and granular level using protocols such as OpenFlow. Interestingly, this is being driven by Internet researchers and research networks but the concepts are now moving into the commercial mainstream. We've invested in infrastructure to make OpenFlow enabled networks available to interested user groups and Afrodite Sevasti (GÉANT Activity Leader for JRA2: Multi-Domain Network Services Research) and myself are speaking at the SDN and OpenFlow World Congress in October 2012, discussing the role and growth of SDN in research networks.

And thirdly, we're heavily involved in standards bodies as we look to ensure interoperability of services across federated networks.

HOW ARE YOU INVOLVED IN STANDARDS WORK?

Guy Roberts: Firstly we're part of three working groups within the Open Grid Forum (OGF), co-chairing two of them. We are also involved in other standards bodies such as the Internet Engineering Task Force (IETF) and are members of the TM Forum and the International Telecommunications Union (ITU) Study Group 15.

Within the GÉANT project the NA4/T4 task was created to provide a focus in this area. As well as liaising with industry and standards bodies it provides resources for project members, such as funding for travel to meetings and a task to allocate hours to.

(Continued)

WHAT WORK ARE YOU INVOLVED IN WITH THE OPEN GRID FORUM?

GR: We co-chair the OGF's Network Service Interface (NSI) and Network Markup Language (NML) groups.

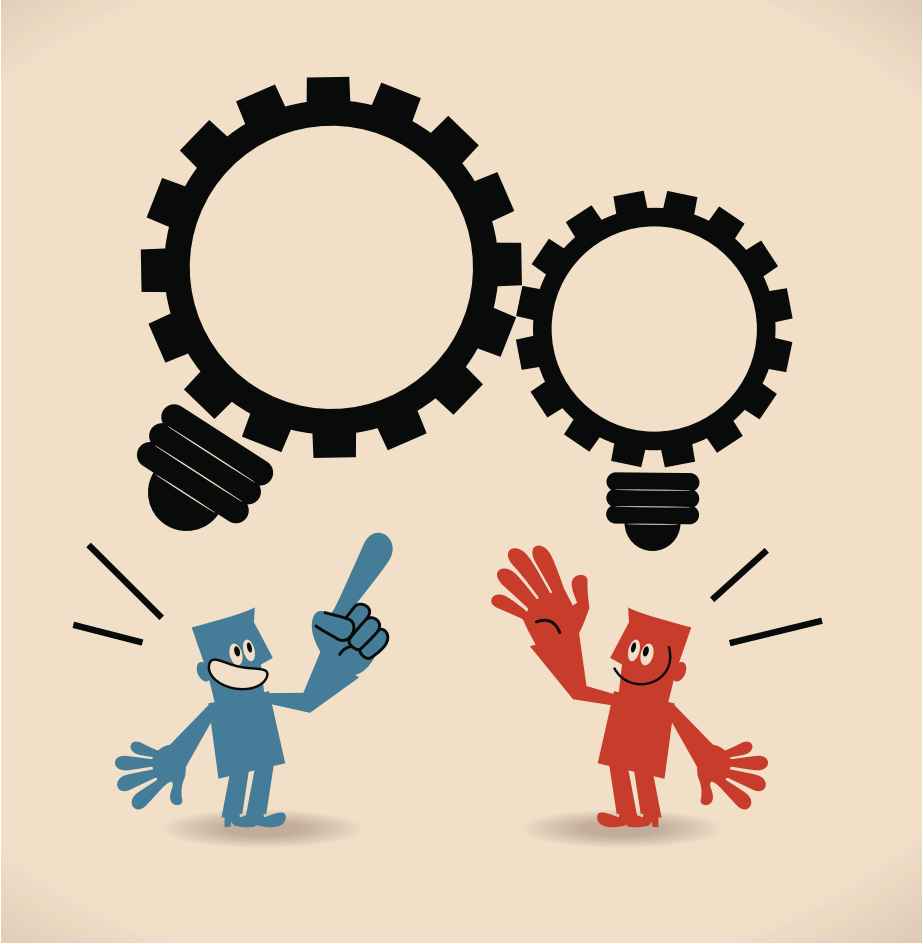
The NML group looks at creating a language for describing network topology standard networks to make it easier to exchange information while NSI is a new protocol developed to make it simple and seamless to quickly provision dynamic circuits that span different networks across the world. It will do this by enabling full interoperability between the different technologies behind services such as GÉANT's Bandwidth on Demand and ESnet's OSCARS. We're currently in the final stages of v2 of the NSI protocol, with a public announcement expected at the SuperComputing event in November (SC12).

WHY ARE STANDARDS NOW SO IMPORTANT?

GR: Research projects are increasingly global, whereas by their nature research and education networks tend to be national or regional. Obviously every network is independent and makes its own technology choices but needs to be able to communicate and provide interoperable services with other networks. In this federated model, standards are the best way of achieving this, ensuring seamless collaboration for users.

WHAT PLANS ARE THERE FOR FUTURE INNOVATION IN THE NETWORK OVER THE NEXT 1-2 YEARS?

ME: One of the reasons for implementing GÉANT's new terabit network structure is that it provides a platform for innovation in the near term. As well as further research into SDN we're looking to expand services such as bandwidth on demand up to 100Gbps for individual users. As we have direct access to fibre we can provide access for specialist research communities, such as those working in metrology, at a photonic level. This means that labs across Europe can link



and run very detailed measurement comparisons and this directly helps increase accuracy in areas such as geo-location services. In addition to this, we must not forget that innovation continues apace in the higher layers of the network stack – especially in the area of middleware which is increasingly of importance as consumption of Cloud Services become more relevant to the R&E sector.

LOOKING FURTHER INTO THE FUTURE, ARE THERE PARTICULAR AREAS OR TRENDS THAT YOU ARE INVESTIGATING?

ME: At present there are three areas that we're looking at. Firstly, we're engaging closely with the EC's Future Internet (FI) programme – through the INFINITY (FI-PPP) project – and we're aiming to increase GÉANT's involvement with FI activities such as the FI-WARE (FI-PPP) foundation network infrastructure project. We're looking to deepen collaboration in a number of FI areas where it will create value for the NREN community.

Secondly, we're aiming to work closely with Infinera and look forward to trialling the next generation of Terabit Photonic Integrated Circuits (PICs). These provide the next step up in capacity as you can double performance through the same equipment – we want to be an early user of this technology as we can see the benefits it will provide to users in the longer term.

Finally, we can see the opportunity in applying the concepts of Virtualisation and, more recently, Software Defined Networking to optical networks. Traditionally this has been difficult because it has taken some time for optical networking equipment to gain sufficient agility (whilst remaining affordable) but we're monitoring ways that look to make links between the optical and packet worlds more efficient and hope to gain some valuable hands-on experience in this area.

GÉANT HELPING TO SMASH THE GLASS CEILING

By Tamsin Henderson, Marketing Officer, GÉANT

ICT IS OFTEN CHARACTERISED AS A MAN'S WORLD, YET HALF OF GÉANT'S SENIOR MANAGEMENT ARE WOMEN

The Information and Communications Technology (ICT) world is traditionally a male-oriented industry, with women making up less than a third of its European workforce and even fewer in senior management. As a world leader in networking, GÉANT sees things differently: in a team of 12 senior leaders (known as Activity Leaders) 6 are female, and between them they handle the majority of the project's budget. But why should this be unusual? More to the point is it important and what does it mean for the industry?

THE WORLD OF TECHNOLOGY IS CHANGING

ICT has undergone massive transformation in recent years with services and software becoming fundamental to business and the way we work and live today. The evolution of technology and its modern-day, user-facing role is such that it now requires a completely new level of creativity for how that technology interfaces with its users, and this in turn requires new approaches to problem solving, multitasking and the development of innovation. So whereas previously a career in ICT was seen as the preserve of the 'techie' hidden behind rows of code - a preconception which may have perpetuated a male centric workforce - today technology is seen as a much more vibrant and creative environment, making a career in ICT an even more attractive proposition for intelligent, creative people – irrespective of gender.

A FOCUS ON TALENT

GÉANT focuses on recruiting human talent based on enthusiasm and skill set to foster a lively and diverse culture with a good gender mix. Studies into gender balance show that more evenly balanced teams make better informed decisions, leading to less risk-taking and more successful outcomes for companies. In fact, studies exploring gender balance in high value ICT jobs in both management and at Board level have shown that a gender-balanced team can improve business performance and competitiveness. GÉANT's strength and success is in the efficient collaboration between its partners and stakeholders, a fact highlighted in the independent review of the GN3 project's 3rd year, which reported teamwork and communication between the GÉANT project participants as excellent.

CATHRIN STÖVER
GN3 ACTIVITY LEADER FOR NA4: LIAISON AND SUPPORT

Working for DANTE (Delivery of Advanced Network Technology) which built and operates GÉANT on behalf of Europe's NRENs, Cathrin's successful career spans nearly 15 years and several continents. Having created the first regional research and education network in Latin America as well as helping set up high speed e-infrastructures in Europe, the US, Asia and the rest of the world, she is now project managing the AfricaConnect project, exporting and adapting the GÉANT model to interconnect the sub-Saharan African NRENs.

Along with Neelie Kroes, Cathrin is keen to spread the word about the high number of female senior managers in GÉANT and thanks several of her female colleagues for her success today, citing the relationships as both inspiring and beneficial for the business. "It was a very lucky coincidence that the International Relations Director for Internet2 (the US networking consortium) was a woman exactly my age. I had lived in America, she had lived in Germany during our studies, so we clicked, and that made it easier for me in the R&E community from the start."

MARIAN GARCIA VIDONDO
GN3 ACTIVITY LEADER FOR SA1: NETWORK BUILD & OPERATIONS

Marian is responsible for the operation and performance of the GÉANT network, leading a large team of staff covering IP, transport networking and security with a budget of around €103 million over the 4 year duration of GN3. Her rapid rise within DANTE began in 2000 when she joined straight after finishing university.

Marian's priority is the implementation of the new Terabit network infrastructure which will future proof the GÉANT network to 2020.

Leading a predominantly male operations and planning team, Marian says, "Although the gender balance in ICT remains in favour of men, I always tell women who are interested in a career in ICT that they should not see that as any barrier. The work is so rewarding and I really enjoy it – in fact facilitating this kind of collaboration makes me feel that our work has the potential to make a real difference to people's lives."

MELANIE PANKHURST
GN3 ACTIVITY LEADER FOR NA2: COMMUNICATIONS & PROMOTION

Melanie leads the Activity that is responsible for promoting the network, service and values of GÉANT to the different stakeholders across Europe and beyond, including researchers, university IT managers and the project's NREN partners.

With a degree in Business Studies and Diploma in Marketing, she went straight into the fast-changing ICT sector which she enjoys immensely. Melanie's career is rooted in the Internet service provision sector, having worked for a number of high-tech start-ups that emerged along with the commercial Internet.

She says, referring to the independent Year 3 review of the project, "I feel proud that we have been recognised for the 'excellent' communication and working spirit between the GÉANT teams, and that such a high number of women have been involved in making the project a world leader in research and education networking. I look forward to us working together to take the network and services to the next level."

Managing the vast majority (approximately €135 million) of the four year GN3 budget, GÉANTs female Activity Leaders manage complex, remote teams consisting of operations and support staff from across their NREN partners. Strong team leadership as well as a strong vision for the Activity are prerequisites for such a successful project.

CONNECT caught up with GÉANT's female Activity Leaders to ask about their role within the project and their thoughts on being a female in the ICT world.

NEELIE KROES, EUROPEAN COMMISSION VICE-PRESIDENT FOR THE DIGITAL AGENDA FOR EUROPE

"As a passionate advocate for women to hold leading roles in science and technology, I am hugely proud of the GÉANT women for their outstanding technological achievements. GÉANT plays a large role in the EC's vision to develop a flourishing digital economy and a powerful unified research body. That so many women are involved in delivering this makes me immensely honoured and it is my hope to encourage more women in to the science and technology arena."

ANN HARDING
GN3 ACTIVITY LEADER FOR SA2: MULTI-DOMAIN NETWORK SERVICES

Like Cathrin, Ann comes from a non-technical background. Her interest in technology began in 1996 after she received a detailed technical response to a question posed about an email problem. This sparked a curiosity in how information is sorted and transmitted and she went on to study computer science. Today she manages the largest Activity in the GN3 project in terms of manpower and is responsible for GÉANT's multi-domain network services.

"It's great that there are a significant number of women leading Network Operations positions throughout Europe. Of course there is always room for more women in decision making roles, but GÉANT helps to address this by appointing experienced operations managers as Activity Leaders. This reflects the flexible, cooperative approach of the GÉANT environment which is mirrored in their offering to users. There is no one boilerplate, one size fits all approach to anything we do. Everything we do is based around responding to the needs of others and innovating."

AFRODITE SEVASTI
GN3 ACTIVITY LEADER FOR JRA2: MULTI-DOMAIN NETWORK SERVICES RESEARCH

Working for the Greek NREN GRNET, Afrodite has a PhD in communication networks and is responsible for research and development of network services, to better support end-to-end collaboration in a multi-domain and multi-layer environment across GÉANT and the European NRENs.

As a young child, Afrodite was particularly interested in the science fields, and particularly computer science as a rapidly evolving field. After gaining her degrees, she worked and managed projects and services in IT and telecommunications.

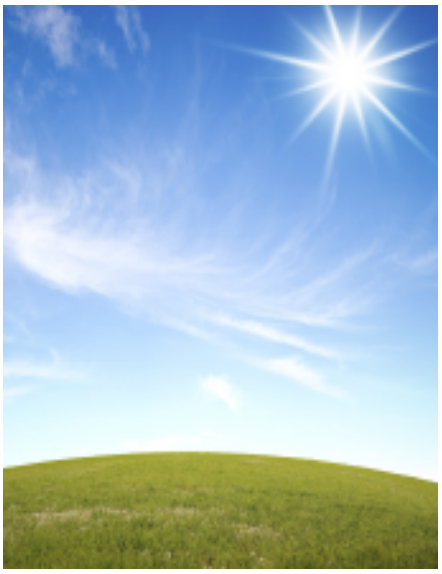
She admits that her leadership position as a woman does raise eyebrows. "While women do hold positions in industry, and especially within GÉANT, it is not common to meet women in the higher echelons within the wider ICT industry. But that is changing." She loves the multi-cultural, multi-disciplinary environment offered by GÉANT and the feeling of giving something back to her country.

LICIA FLORIO
GN3 ACTIVITY LEADER FOR JRA3: MULTI-DOMAIN USER APPLICATION RESEARCH

Licia is employed by TERENA, the Trans-European Research and Education Networking Association, one of GÉANT's key partners, and is responsible for research into and development of users' authentication and authorisation. Having always been interested in science, she was curious to know how things worked and switched from wanting to become a physicist to studying computer science.

"Working in the ICT sector can be exciting for a woman and there are many opportunities for them. I have been lucky to meet so many good people, to keep learning new things and hopefully there will be more women that get interested in technology. Women in GÉANT have proved to be as talented and capable as men."

ENVIRONMENTAL IMPACT: BEST PRACTICE FOR NRENs AND CAMPUS



The GÉANT "Green" Team has delivered a third report which describes a wide range of initiatives undertaken by a number of NREN partners, aimed at reducing the environmental impact of networks, in particular addressing the emission of greenhouse gases. The report investigates and recommends best practice for NRENs and Campus networks in a number of areas, including: power usage efficiency, virtualisation, energy-aware traffic engineering, videoconferencing, distance working, green public purchasing, and purchasing green electricity.

The overall conclusion is that the role of NRENs and Campus networks, in using ICT intelligently, can indeed make a big impact on reduction of global carbon emissions. So, just as GÉANT and its NREN partners have developed world-class e-infrastructure for research and education, so too can we show the way in harnessing smart networking to combat climate change. The Green Team will be holding follow-on workshops at NREN national conferences and relevant conferences addressing energy conservation and carbon emissions – so look out for them or email **connect@geant.net** to find out how you can get involved.

The "Study of Environmental Impact: ICT Best Current Practice" available at **www.geant.net** or **here**.

WHAT DOES THE FUTURE HOLD FOR R&E NETWORKING?

That's what the ASPIRE research is finding answers to. ASPIRE has been "A Study on the Prospects of the Internet for Research and Education", involving a programme of outreach and consultation across the research and education community, led by TERENA as part of the GÉANT project. The research will culminate in a final, deliverable report this autumn, which will be made available in PDF download and printed formats.

After the first ASPIRE workshop (May 2011), four panels of invited experts and the ASPIRE team consulted widely, used surveys, interviews and their own specialist knowledge to develop a set of preliminary reports and recommendations on four subjects: adoption of cloud services; adoption of mobile services; middleware and managing data and knowledge in a data-rich world; and the future roles of NRENs. These served as input to the second ASPIRE stakeholder workshop, held 13 September in Brussels, at which the final ASPIRE Report was defined.

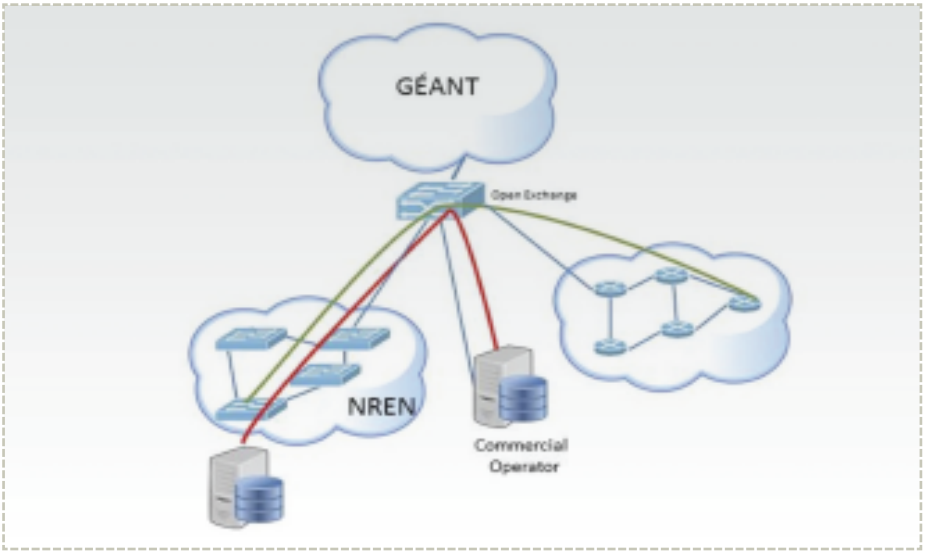
A summary of key recommendations and PDF downloads of the reports can be found at **www.terena.org** or by clicking **here**.

GÉANT OPEN EXCHANGE PILOT ANNOUNCED

By Karl Meyer, Product Marketing and Communications Officer, DANTE

Collaboration and connectivity have long been the cornerstones of GÉANT and with the launch of the GÉANT Open Exchange pilot these facilities have been further enhanced.

The need for multi-Gigabit international connectivity between organisations has dramatically increased, placing accelerated demands on research and education networks. Many of these connections may only be required for short periods of time or intermittently, making the provision of dedicated international circuits expensive, complex and hard to manage.



The new exchange, based in Telecity, London, allows interconnection between organisations present at the Open Exchange without the need for data to be transferred across the main GÉANT network, which simplifies the process and frees up capacity. GÉANT Open is completely protocol neutral and allows organisations to interconnect at the Layer 2 or Layer 3 interface without any constraints.

GÉANT Open allows each participant to connect to the exchange at up to 10Gbps. This connection can be logically subdivided into separate VLANs allowing the participant to connect with many other members of the exchange simultaneously. By using the latest MX480 switch equipment connectivity can be made using 1/10Gigabit Ethernet over LAN-PHY and/or WAN-PHY framing. Connections can also be made from GÉANT Open through the GÉANT network – this will allow onward connectivity to organisations that are unable to connect directly to GÉANT Open and further increase the flexibility of interconnections.

The selection of Telecity was made as a result of its highly available infrastructure and the presence of a multitude of national and international service providers. This will allow GÉANT Open to be used to interconnect international capacity in a highly flexible manner to maximise the return on investment in these international circuits.

Uniquely, and as a first within Europe, approved commercial organisations will be able to connect to GÉANT Open. This enhancement will help the research and education community to access a wide variety of commercial third parties either as part of private/public research projects or to provide cloud based services, private VPNs or any application the organisation needs.

In order to maintain the research and education philosophy of GÉANT, commercial organisations will only be permitted to interconnect at GÉANT Open with the support and approval of an NREN. This ensures that investment within the GÉANT project is focused on its core principles. GÉANT Open will operate as a pilot for the first 12 months whilst GÉANT define and refine the operational aspects of the facility and develop a long term business structure for its operation.

For more details on how GÉANT Open can benefit your organisation and to apply to join the pilot contact **karl.meyer@dante.net**

The GÉANT project is a collaboration between 34 project partners: 32 European NRENs, DANTE and TERENA; and four Associate NRENs. Through the NREN partners, GÉANT delivers a range of services across the network for institutions, projects and researchers. In this regular section we take a closer look at some of those NRENs. All information is provided by the NREN partners.

PARTNER PROFILE: THE PIONIER NETWORK

A NATIONAL INFRASTRUCTURE FOR APPLIED RESEARCH

By: Prof. Jan Węglarz, Academician, Professor (Ph.D. 1974, Habilitation 1977), in the years 1978–1983 Associate Professor and then Professor in the Institute of Computing Science, Poznań University of Technology, member of the Polish Academy of Sciences (PAS), Director of the Institute of Computing Science, Poznań University of Technology, Director of Poznań Supercomputing and Networking Center.

OVERVIEW OF PIONIER

PIONIER – Polish Optical Network is a nationwide high speed optical network and the most important part of e-infrastructure for Polish research community. The PIONIER consortium consists of 21 Metropolitan Area Networks (MANs) and 5 High Performance Computing Centers (HPCs) which connect more than 700 universities and research institutions and offer advanced services by over 2 million researchers and students. The operator and owner of the PIONIER network is Poznań Supercomputing and Networking Center (PSNC).

ABOUT THE NETWORK:

PIONIER is based on its own fiber infrastructure (around 7 200 km) built in a topology of closed rings with fiber connections to borders of all neighboring countries. The hybrid architecture of PIONIER consists of DWDM optical and IP/MPLS transport network layers.

The newest DWDM transmission system enables the use of 80 10/40/100 Gbit/s optical channels. It covers the whole of Poland and interconnects all MAN nodes, including branch lines to state borders. The transmission system offers the following functionalities: directionless, colorless, and connectionless with GMPLS control which guarantees top level QoS and fast restoration of services. Currently the network is equipped with more than 400 10 Gbps transponders; a new backbone dedicated for coherent 100 Gbps transmissions is under development.

The international connectivity is achieved by interconnecting PIONIER to GÉANT, GLIF and other NRENs with Cross Border Fibers.

SERVICES:

The PIONIER network offers a broad range of advanced and versatile services for academic and institutional users:

- Internet access and services (mail, DNS, IPv6, multicasts, etc.)
- Private VPNs (based on dedicated optical lambdas or L3/MPLS connections)
- Federation of digital libraries
- HD Videoconference services
- Eduroam services
- Cloud services
- Archiving services
- Science interactive HDTV services.

Moreover, PIONIER offers numerous advanced application services designed for LHC, radioastronomy, telemedicine, e-education or e-government areas.

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PARTNER PROFILE: SURFNET

By: Jan Michielsen, Technical writer, SURFnet

SURFNET IN BRIEF

SURFnet operates the national research and education network in the Netherlands, to which approximately 180 Dutch higher education and research institutions are connected. These include research universities, universities of applied sciences [hogescholen], senior secondary vocational schools, university medical centres and research institutions.

Almost one million people access SURFnet's optical fibre network each day. Annually, the network processes some 48,000 TB of incoming and 36,000 TB of outgoing IP traffic. SURFnet's main objective is to ensure that researchers, instructors, and students can work together simply and effectively with the aid of ICT. SURFnet therefore promotes, develops, and operates both a network infrastructure and a collaboration infrastructure.

SURFnet puts in a sustained effort to continuously improve the infrastructure and to develop new applications and services for its users. It is therefore the driving force behind ICT-based innovation in higher education and research in the Netherlands. SURFnet also collaborates with its international peers and is one of the leaders among research and education networks worldwide.

NETWORK INFRASTRUCTURE

SURFnet7 – the latest generation of the SURFnet network – was rolled out in 2012. SURFnet7 uses 11,000 km of optical fibre connections within the Netherlands and for connections with neighbouring countries. The connections between the 21 core locations throughout the country are illuminated with CPL (Common Photonic Layer) optical equipment. CPL makes it possible to illuminate the optical fibre connections with a maximum of 88 different wavelengths that can transport 10 Gbit/s.

Institutions can be connected directly to these core locations. "GigaMan" connections and/or region rings also run from these locations, connecting smaller points of presence with the core locations so as to connect institutions there.

Major features of the SURFnet7 network:

- Fast and secure IP connections for 1, 10, or 100 Gbit/s.
- On-demand lightpaths. Lightpaths are direct data connections between two endpoints, bypassing routers and providing guaranteed bandwidth, high reliability, low delay, and very low jitter. Lightpaths are available from 250 Mbit/s to 10 Gbit/s (soon also 40 Gbit/s and 100 Gbit/s). Researchers can make flexible use of these lightpaths, setting up a connection themselves. This can be done manually but also automatically, for example if a researcher in Leiden wants weekly access to a supercomputer in Amsterdam. Lightpaths can extend beyond a single domain, spanning various international NREN boundaries.
- Multi-service port (MSP): using Carrier Ethernet technology makes it possible to provide a number of network services from a single physical port. Separation of the traffic on an MSP is based on Virtual LAN (VLAN) tagging. This requires less equipment, and makes it easier to increase the number of ports, i.e. if an institution wishes to use a lightpath in addition to an IP connection.

COLLABORATION INFRASTRUCTURE: SURFCONEXT

SURFconext is a flexible, open-standards-based infrastructure that allows students, instructors, and researchers to work together online:

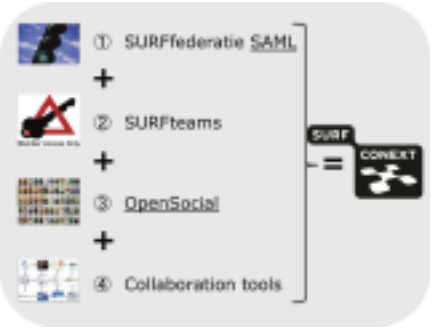
- using a combination of applications from different providers;
- across institutional boundaries.

SURFconext has been developed for and in collaboration with the higher education and research sector in the Netherlands. For institutions, the launch of SURFconext offers an occasion to join forces and to draw up a common strategy for online collaboration. At the same time, it facilitates lightweight integration of self-hosted institutional services with (commercial) cloud services.

The core building blocks of the SURFconext infrastructure are:

- federated authentication based on the SAML standard, so that users can securely access all kinds of available services via the same account that they use at their own institution;
- central group management, making it possible for access to content and functionalities, for example for a project team, to be managed centrally;
- a standard data interface for exchanging activities, reports, and group information (OpenSocial) with cloud applications;
- cloud applications offered by various providers (for example Google Apps, Office 365, Liferay Social Office).

More information:
http://www.surfconext.nl



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PARTNER PROFILE: AGENCY ARNIEC/ROEDUNET

By: Dr. Octavian RUSU, Deputy General Director, Agency ARNIEC / RoEduNet

Octavian RUSU has a PhD in Electronic Physics and is Associate Professor at the Alexandru Ioan Cuza University in Iasi, Romania. He has published around 40 scientific articles and was involved in several national and international research projects in computer networking.

OVERVIEW

RoEduNet (the Romanian Academic Network) offers connectivity to more than 100 universities and research institutes, 350 secondary schools and many other cultural institutions and governmental departments. The Romanian NREN officially started to provide services in 1998 and now has one million users, supporting international research collaboration through GÉANT. RoEduNet facilitates research in its own right in the field of data communication, participates in research projects and provides experimental test beds to implement new services and advanced network technologies. The academic network is operated by Agency for Administration of National Research and Education Network (Agency ARNIEC / RoEduNet) and in 1998 was named RoEduNet2.

NETWORK

The communication infrastructure of Romanian NREN is based on dark fiber (5636 km owned by the state company Telecomunicatii CFR) enlighten by Ciena DWDM equipment connecting 40 counties capitals using multiple 1 Gbps circuits to seven regional NOCs. As backup for this backbone infrastructure, 100 Mbps leased lines from telecom operators also connect all counties. Some technical figures: 69 DWDM sites, 3 100Gbps circuits (National NOC to Iasi, Cluj Napoca and Bucharest NOC), 35 10 Gbps lambdas, 3 lambdas STM-64, and 54 lambdas 10 x 1Gbps. The calculated metric, according with TERENA compendium for the whole RoEduNet2 network is 137135 Gbps*km calculated by summing all circuits bandwidth multiplied by each circuit length.

International connectivity for Romanian NREN consists of one 10 Gbps link to the GEANT POP in Bucharest hosted by RoEduNet and two DWS connections (2.5 Gbps each) provided by Telia Sonera and Cogent. RoEduNet is also connected, using multiple 1 Gbps and 10 Gbps links, to various local exchanges, the traffic through theses points is over 10 Gbps.

INTERNATIONAL COLLABORATION

Agency ARNIEC/RoEduNet is a member of TERENA and CEENet and participates in various international projects (GÉANT – since 2001, SEEREN, SEEFIRE, CEENGINE, SEEREA-EI, NATO grants).

RoEduNet provides support for all research and academic communities in Romania to participate in various international research projects. Examples of collaborative research projects at European and worldwide level are ATLAS, ALICE, HONE, LHCb, SEE, SEEGRID, BIOMED, developed on the RoEduNet infrastructure by the academic community.

SERVICES

A full range of IP services are provided to all connected institutions, including IPv6. Special circuits were installed and tested for the Romanian GRID community (Romanian Tier 2 Federation); at this moment there are five 10 Gbps and two 1Gbps links in production service for GRID communities (directly connected to the NREN infrastructure).

CONTACT

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office@roedu.net

GLOBAL NEWS

By Tom Fryer, International Relations Officer, DANTE and Helga Spitaler, Senior Communications Officer, DANTE

AFRICACONNECT PROJECT TO LAUNCH IN DAR ES SALAAM AND LISBON

AfricaConnect, the EC-funded project to establish a high-capacity network for research and education in Southern and Eastern Africa will be launched at two events to be held in November 2012, one in Africa and the other in Europe.

The African launch will take place at UbuntuNet-Connect 2012, the annual conference of the UbuntuNet Alliance, in Dar es Salaam, Tanzania, November 15-16. The conference focuses on research and education networking activities in Africa and though organised by the UbuntuNet Alliance, it is hosted by member NRENs. The conference brings together practitioners in the research and education networking community, researchers, policy makers, academics, connectivity providers, and a pool of expertise from across Africa and beyond. More information on UbuntuNet-Connect 2012 can be found **here**.

In Europe, AfricaConnect will be launched at the EuroAfrica-ICT Cooperation Forum which will be held in Lisbon, Portugal, November 28-29. The "2012 Africa-EU Cooperation Forum on ICT" will be an event filled with discussion and debate, networking opportunities and knowledge-sharing among key stakeholders in the field and policymakers coming from all over Europe and Africa. The conference will represent a unique opportunity for all parties interested in the ICT domain to increase the visibility and impact of their activities, to network and expand their knowledge. In addition to the launch of AfricaConnect, the event will see a workshop led by AfricaConnect with the UbuntuNet Alliance and one led by WACREN, the West and Central African Research and Education Network.

More information can be found at **www.euroafrica-ict.org**

ELCIRA – CREATING COLLABORATION TOOLS AND SERVICES FOR EUROPE-LATIN AMERICAN RESEARCH COMMUNITIES

On July 4 in Lima, Peru, the kick-off meeting of the EC-funded ELCIRA (Europe Latin America Collaborative e-Infrastructure for Research Activities) project was held. ELCIRA is an EC-funded project, led by the Latin American research and education networking organisation, RedCLARA, and partnered by DANTE and TERENA and the NRENs of Brazil, Colombia, Italy and Spain.

Over the two year duration of the project ELCIRA will seek to establish collaboration agreements between Latin American NRENs and their peers in Europe so as to jointly develop technological environments and tools that can be used to promote interaction among researchers across the two regions. Through coordination between the partners and the GÉANT community, the project will build upon the tools developed in the EuropeAid-funded ALICE2 Project to create a shared collaboration platform. This platform will be coordinated with tools developed within the GÉANT (GN3) project in order to ease collaboration via a portal of services, for example a pilot web-conferencing service and Web 2.0 tools for group work.

ELCIRA will drive specific actions to determine the scope of a future High Quality Video Conference Service (HQVCS) between Europe and Latin America. The project will also foster the development of a Latin American AAI (Authentication, Authorisation and Identity) Federation based upon the Brazil CaFE Federation and its interoperation with eduGAIN to provide seamless access to information services and tools. ELCIRA will also seek to increase the implementation of eduroam® in Latin America.

For further information, contact **tom.fryer@dante.net**

CANARIE
Canada's advanced research and innovation network
www.canarie.ca

EUMEDCONNECT3
Southern and Eastern Mediterranean research networking
www.eumedconnect3.net

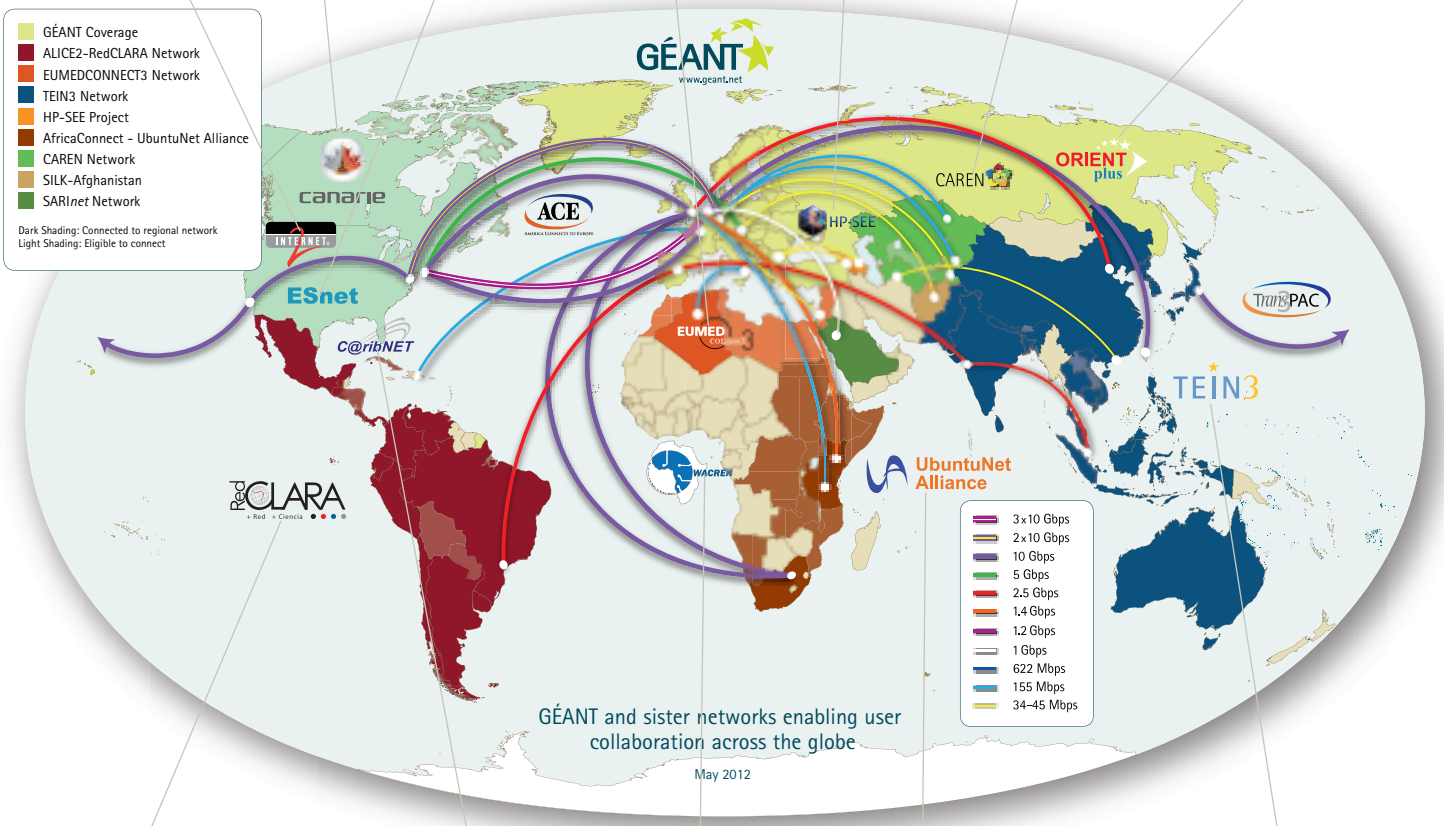
CAREN
Central Asian Research and Education Network
www.caren.dante.net

Internet2®
Research and education connectivity for US universities
www.internet2.edu

ESnet
The Energy Sciences Network
www.es.net

HP-SEE
High-Performance Computing Infrastructure for South East Europe's Research Communities
www.hp-see.eu

ORIENT plus
Linking European and Chinese Infrastructures and Communities
http://www.orientplus.eu



RedCLARA
The Latin American Research and Education Network
www.redclara.net

C@ribNET
The Caribbean Research and Education Network
www.ckln.org

UbuntuNet Alliance
Regional Research and Education Network for Eastern and Southern Africa
www.ubuntunet.net

TEIN3
The Trans-Eurasia Information Network
www.tein3.net

WACREN
West and Central African Research and Education Network
www.wacren.net

GLOBAL COMMUNITY IS ESTABLISHED TO PROMOTE SCHOOL COLLABORATIONS

In numerous countries around the world, connectivity for primary and/or high schools is provided, directly or indirectly, by National Research and Education Networks (NRENs). By using research and education connectivity, the ability of classroom teachers and their students to interact with other schools and classes around the world is greatly enhanced by providing them with the reliability and bandwidth required for collaboration tools such as videoconferencing. Bringing students together in such ways can help break down cultural barriers and bring about greater understanding of other peoples around the world.

However, for teachers wishing to set up an e-exchange with another school elsewhere in the world, it is not easy to find potential project partners. Often, the ability to find a suitable class depends on the teacher already having a contact.

On September 20, a videoconference, organised by the GN3 Task on International Cooperation (NA4 Task 1), JANET (the UK NREN), Internet2 and NYSERnet (the New York State Research and Education Network) was held for interested NRENs and other organisations to discuss platforms which could be used by schools to help them identify suitable partners across the world. With participants from Bulgaria, the United Kingdom, Spain, the United States, Canada, Guatemala, El Salvador and Rwanda as well as the UbuntuNet Alliance, the group discussed a variety of on-line platforms which can meet the group's objectives and considered ways for those platforms to be promoted to schools and teachers around the world.

A final conclusion will be reached through further discussion in the coming weeks, which the group hopes will include more NRENs from around the world where schools benefit from research and education connectivity. An additional decision of the meeting was to set up a global interest group to continue discussion in the future on how to promote and assist schools in increasing global collaboration.

For further information or to participate in the group, contact **tom.fryer@dante.net**

DANTE AND TEIN*CC SET TO COLLABORATE TO CONTINUE THE TEIN SUCCESS STORY

As part of a ceremonial handover of management responsibility for the TEIN network from DANTE to TEIN*CC, the two organisations signed an MoU (Memorandum of Understanding) at the recently held APAN Meeting in Colombo, Sri Lanka to collaborate on projects to benefit the research and education communities across Asia-Pacific and Europe.

They plan to capitalise on TEIN4 activities and promote the long-term sustainability of research and education networking in areas of mutual interest in the Asia-Pacific region. As part of the ceremonial handover from TEIN3/DANTE to TEIN4/TEIN*CC, David West, DANTE's TEIN3 project manager, was awarded a plaque from the TEIN community in recognition for his efforts to make TEIN a regional success story.

ORIENTPLUS ENABLES ITALIAN AND CHINESE ASTROPHYSICISTS TO STUDY ONE OF THE MOST PUZZLING PHENOMENA KNOWN TO SCIENCE: COSMIC SHOWERS

The power of ORIENTplus has been harnessed as an essential element in enabling a cutting-edge international scientific collaboration between scientists in a remote Tibetan location and in Italy, aimed at providing insights into the mysteries of the universe.

Gamma –ray showers are violently energetic eruptions of high-frequency electromagnetic radiation, caused predominately by the explosion of massive stars in distant galaxies billions of light-years away. They may have a role in cloud formation and climate change, radiation exposure on long-distance high-altitude flights and can potentially affect the sensitive electronics on-board the large number of satellites circling our planet – responsible for important communications and geo-monitoring.

As with all research in astrophysics, studying gamma-ray showers produces terabytes of data every year. Only research networks can provide the extremely stable, high-capacity connections necessary for the reliable transfer of these large volumes of data in real time from where the data is collected, to where it is analysed. In response to growing capacity demands from end users such as astrophysicists, the ORIENTplus link is to be upgraded to 10 Gbps, providing an additional boost to collaborative research and education.

To view the full case study visit:
www.orientplus.eu

CAREN HELPS HARNESS TURKMENISTAN'S SUNSHINE

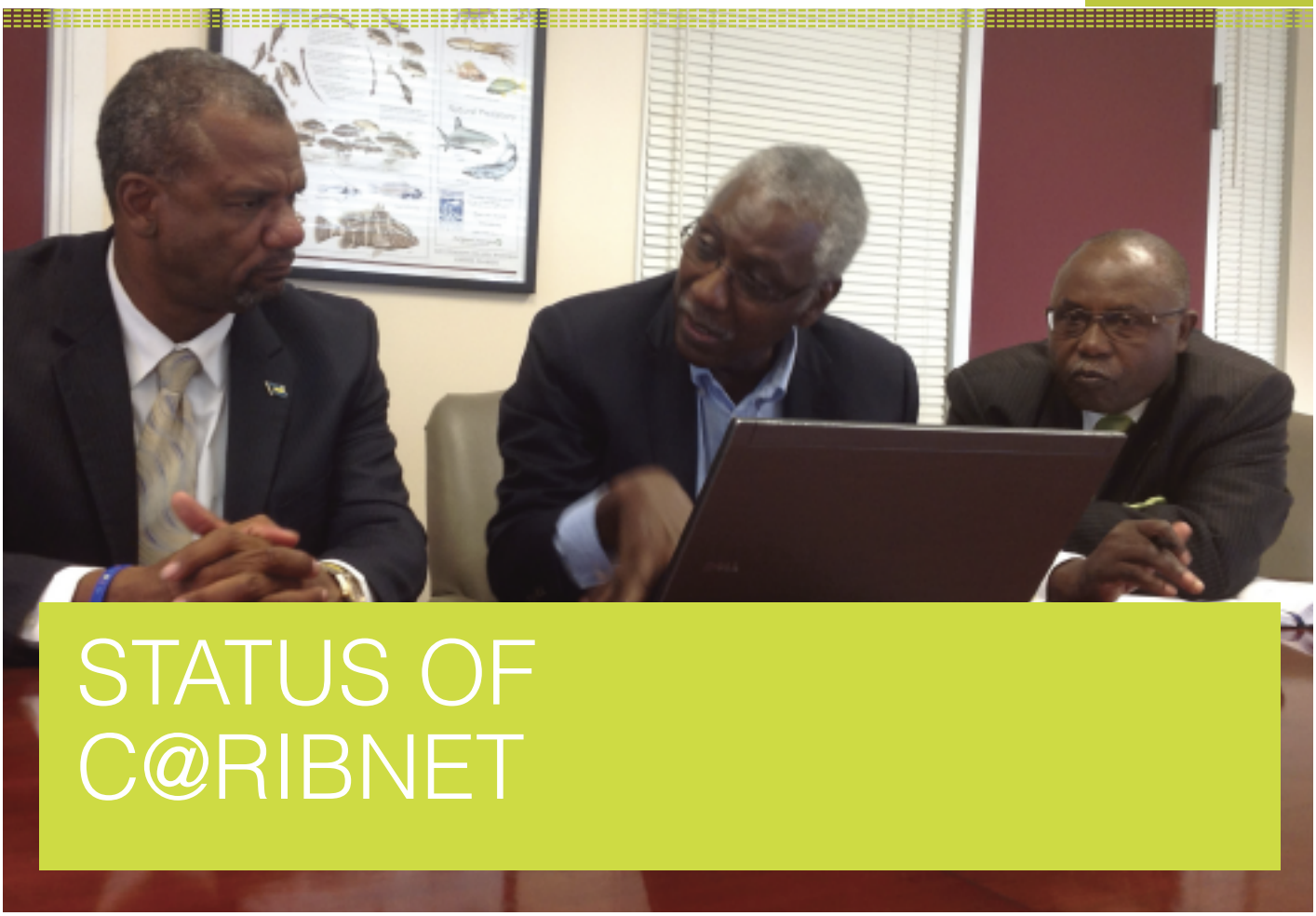
The high-speed networks of GÉANT and CAREN (Central Asia Research and Education Network) enable close collaboration between European and Turkmen institutions, helping to develop a vibrant solar power industry in Turkmenistan through e-training of local engineers and enabling real-time transmission of solar performance monitoring data.

COLLABORATION TO TRANSFER SOLAR TECHNOLOGY SKILLS

Given its climate, with an average of 7.4 hours of sunshine per day, the government of Turkmenistan has made solar power its strategic focus. To develop the engineering skills and technology needed to harness the power of the sun, Turkmenistan is working closely with European experts to deliver distance learning, skills transfer and solar cell performance monitoring.

All of this information and data exchange relies on the speed, capacity and reliability of the Central Asian CAREN and pan-European GÉANT research networks, enabling seamless intercontinental collaboration.

To view the full case study visit:
http://caren.dante.net



STATUS OF C@RIBNET

EARLIER THIS YEAR THE CARIBBEAN KNOWLEDGE AND LEARNING NETWORK (CKLN) COMPLETED THE FIRST PHASE OF ITS PROJECT TO IMPLEMENT AND OPERATE THE CARIBBEAN RESEARCH AND EDUCATION NETWORK, C@RIBNET. **HERE KEN SYLVESTER, CEO OF CKLN TALKS ABOUT THE REGION'S FIRST DEDICATED RESEARCH AND EDUCATION NETWORK.**

We are grateful to the European Union and all those who helped make C@ribNET a reality. Now that it's here the possibilities are endless and we are working hard to inform key stakeholders about the benefits of having access to such a network.

Many of these benefits are in teaching and learning - with more opportunities for Caribbean citizens to access tertiary education at significantly reduced costs and taking advantage of new and diverse programmes and educational opportunities. There are also greater prospects for tertiary institutions to expand joint degree programs, to develop more collaborative, joint distance programmes, such as the Early Childhood Education Diploma programme now in production between Shortwood Teacher's College of Jamaica and the T.A. Marryshow Community College of Grenada.

Research in the Caribbean also stands to greatly benefit - by providing remote access to resources not readily available in the region (e.g. specialized instruments, super computers, etc.) there is the potential to greatly enable and enhance the research initiatives of Caribbean research and knowledge centres, such as the Tropical Metabolism Research Institute (TMRI), the Caribbean Disaster Emergency Response Agency (CDERA) or the Caribbean Institute for Meteorology and Hydrology (CIMH) and many others.

It's important to say that this network belongs to the governments and people of the region, to the teaching and learning institutions, to research departments and institutions, libraries, healthcare, cultural, sporting, agricultural, disaster management and many other entities that contribute to the public good. C@ribNET represents a strategic response to the global imperatives CARICOM member states have endorsed, such as the Millennium Development Goals (2015) and the World Summit on the Information Society (WSIS), which we are all feverishly working to advance.

I want to stress that C@ribNET is for the public good which means that no one can be excluded from consuming it, just as we are entitled to national defence, sewer systems, public parks, roads etc. Notwithstanding our respective views on how these are delivered, they are rights that the people of the Caribbean and worldwide, have come to expect. Therefore, the transfer and sharing of knowledge is also an entitlement, and C@ribNET is a vehicle that can be utilized to share knowledge, between and among our people in the region, and with people in the rest of the world.

For the full article, visit **www.ckln.org**

C@ribNET

GÉANT AND EMSA - PROTECTING EUROPE'S SEAS FROM POLLUTION

CleanSeaNet uses GÉANT and its NREN partners to transmit satellite data in real-time to detect and monitor maritime oil spills

Cutting marine pollution, such as oil spills, is central to safeguarding the environment. However the sheer size of European seas, stretching south from the Arctic to the Canary Islands in the Atlantic and east to the Black Sea combined with the number of vessels travelling through them makes detecting and collecting evidence on polluters similar to finding a needle in a haystack.

To help meet this need for faster and more detailed monitoring the European Maritime Safety Agency (EMSA) developed the CleanSeaNet service. This combines satellite data with powerful Geographic Information Systems (GIS) to provide a real-time service for monitoring oil pollution and collecting evidence of potential polluting vessels. These results can then be used by authorities in the relevant country to take action to clean up spills and prosecute offenders. CleanSeaNet was created through an EU directive as part of on-going efforts to decrease maritime pollution.

Oil spills change rapidly depending on wind and tidal conditions, so it is vital that satellite data is transmitted as quickly as possible. CleanSeaNet aims to provide alerts to relevant member states within 30 minutes, enabling them to react quickly and to reduce the environmental impact.

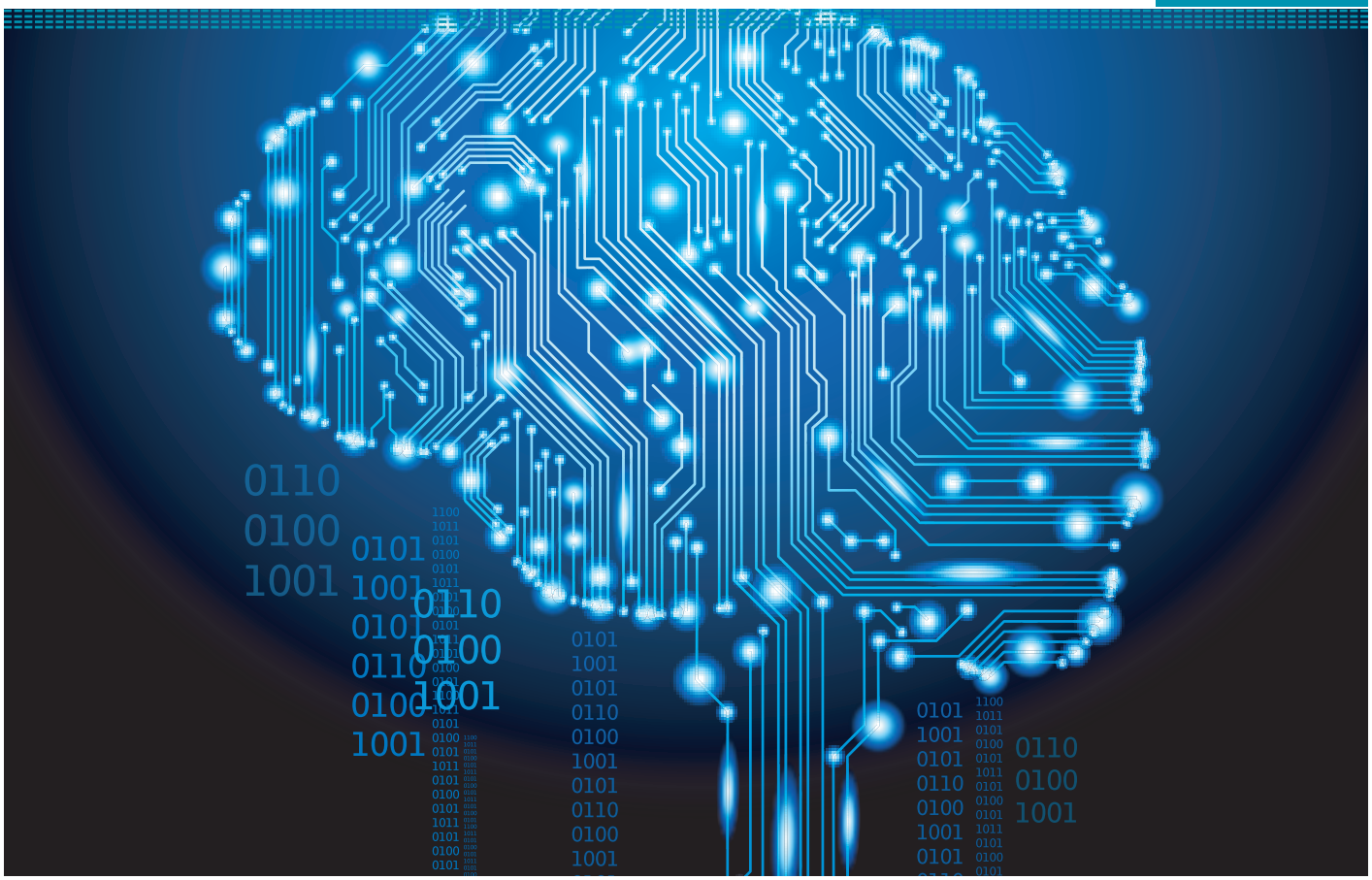
Given the enormous range of satellite images, which cover up to 250,000 km2 and can reach sizes of over 1 Gb, it is difficult to send these files economically through commercial networks in near real-time. CleanSeaNet relies upon GÉANT and National Research and Education Networks (NRENs) to deliver this vital data within strict time limits.

Since CleanSeaNet went live in 2007 the number of oil spills detected on the images taken in European waters has decreased by half. While this is due to a range of factors including better ship design and greater environmental awareness, CleanSeaNet has proved to be a strong deterrent tool in safeguarding the European maritime environment.

"Speed is of the essence when it comes to reducing the effects of oil spills in European waters which is why CleanSeaNet has been created, enabling EMSA to provide fast warnings of potential pollution to coastal states. Given the need to transmit huge files in extremely tight timeframes CleanSeaNet uses the high speed and high bandwidth provided by GÉANT and Europe's national research networks. They support our CleanSeaNet service, helping to protect European seas from pollution."

Olaf Trieschmann, Senior Project Officer, CleanSeaNet

For the full case study, please visit **www.geant.net**



CREATING A GLOBAL PLATFORM TO COMBAT ALZHEIMER'S

outGRID and GÉANT are enabling scientists and doctors across the globe to share vital neuroscience data, helping accelerate research into Alzheimer's.

With a new case of dementia every 24 seconds in Europe, Alzheimer's disease is the most common form of neurodegenerative dementia. Yet with no current cure, scientists and doctors around the world are working closely together to research these damaging neurodegenerative brain conditions, both to help faster diagnosis and to pinpoint causes and potential treatments.

The outGRID project used high bandwidth research networks to demonstrate the feasibility of connecting global neuroscience infrastructures from Europe and North America, laying the foundations for future interoperability. Together with GÉANT and its partners, the project is laying the foundations for dramatic changes in global scientific collaboration in neurodegenerative diseases, promising to accelerate research and treatment methods for Alzheimer's and potentially easing suffering for millions of people across the globe.

For the full case study, visit **www.geant.net**

"Neurodegenerative diseases are one of the biggest challenges for global human health, predicted to affect over 115 million people by 2050. With no known cure, concerted research collaboration is absolutely vital if we are to better understand conditions such as Alzheimer's and begin to create drugs to combat them. Research networks such as GÉANT are at the heart of this collaboration – without their combination of robust, high speed connectivity and global reach we simply couldn't exchange the enormous amounts of information that these initiatives are collecting."

Dr Giovanni Frisoni, outGRID

GÉANT is a vital part of the European research e-infrastructure, which includes high performance networking, distributed computing infrastructures, supercomputing and data storage. Here we welcome our many partners to shed light on their activities.

NEW STRATEGY AND POLICY PAPERS FOR E-IRG

By Ari Turunen, Communications Manager, Cloud Software Program

Research and innovation are strategic elements for European competitiveness in the world. The European e-Infrastructures are developing into an interrelated ecosystem of networking and high-throughput/high-performance computing components that interact with virtual research communities worldwide. Other important constituents of the e-Infrastructure ecosystem, such as infrastructures for data and software-related services, are rapidly emerging in projects and informal international collaborations.

e-IRG'S NEW STRATEGY: INSPIRING FUTURE e-INFRASTRUCTURES IN EUROPE AND BEYOND

The continuing internationalisation of the user community requires clarification of the roles of local, national, European and global initiatives, especially at the organisational, political and financial levels.

e-IRG has to continuously re-engineer its role if it is to carry on providing high quality, well-founded input with an unique added-value for the further development of the e-Infrastructure that can best serve European research purposes. e-IRG will adapt its strategic objectives along two main lines: Establish e-IRG as the main advisory body on e-Infrastructures internationally and develop e-IRG as the coordination platform for all components of European e-Infrastructures

ESTABLISH e-IRG AS THE MAIN ADVISORY BODY ON e-INFRASTRUCTURES INTERNATIONALLY

When preparing its views, e-IRG will give ample room to discussion on different options or scenarios, and give a voice to the challenging visions of external experts.

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

A strengthened advisory role within e-Infrastructures requires fully embracing the challenges of data-intensive science (d-Science) and infrastructures for data services. The data challenges have a considerable impact on the other e-Infrastructure components. Therefore e-IRG must also be able to provide advice on the consequences of these data challenges for those components, such as on management, sustainability, legal issues, access, security, interoperability, etc.

Embracing the data area will also strengthen the links between e-Infrastructures and the data-generating research facilities and infrastructures, again underlining the special ties to ESFRI and its roadmap projects. Of equal importance is the engagement of e-IRG with end users of the data-producing research infrastructures. They may require advanced e-Infrastructure services but not yet have any organisations that can take care of their common interest.

DEVELOP e-IRG AS THE COORDINATION PLATFORM FOR ALL COMPONENTS OF EUROPEAN e-INFRASTRUCTURES

e-IRG should strongly facilitate the international coordination of e-Infrastructure activities and the presentation of all different components to users as integrated e-Infrastructure services. This is vital for users. Facilitating the coordination of e-Infrastructure components should definitely include the data infrastructures, in view of their growing importance for enabling e-Science. e-IRG should also stimulate the development of policies, structures and services to facilitate the creation of value from data (d-Science).

The strategy document includes an action plan to realise the strategic goals.

BLUE PAPER ON DATA MANAGEMENT 2012

ESFRI invited e-IRG to produce this report to enable more efficient e-Infrastructure support for the science that is done by the ESFRI projects.

In the emerging era of Open Science, research infrastructures play a fundamental role as major data production factories. e-Infrastructures provide the tools for creating the added value from data, as well as the technologies for implementing appropriate security and data protection policies. e-IRG has published a Blue Paper on Data Management. It describes some basic data management principles for research infrastructures and focuses on cross-cutting themes for all research infrastructures related to data management. It provides an assessment of Europe's e-Infrastructure service portfolio, and identifies the opportunities and challenges involved.

The Blue Paper reports on current trends and issues and sets out policy recommendations for several key areas, especially for ESFRI projects.

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

- Data e-Infrastructure
- Reliability and Replications
- Metadata
- Unified Access and interoperability
- Security

e-IRG POLICY PAPER ON SCIENTIFIC SOFTWARE

With the successful establishment of a European e-Infrastructure ecosystem, how to maintain and improve the scientific software base has become an urgent issue. Many applications depend on legacy software that is difficult to maintain and difficult to run efficiently on current and future e-Infrastructures. There is a clear need for a coherent process and major efforts targeted towards enhancing the European software base for efficient use of European e-Infrastructures to increase the scientific output while ensuring the best value for money.

In view of the upcoming Horizon2020 program there is a clear need to develop a consistent framework and related policies for establishing a European Software Strategy taking a holistic view of the national, European, and international ecosystem.

This e-IRG Policy Paper aims to laying the ground for a European software strategy. The focus is on "scientific software", that is software that is primarily used in research and development, both within academic and industrial environments.

The report proposes as its main recommendation that to address the software crisis, the EC and the member states should provide support and funding for the establishment of Centres of Excellence for Scientific Software (CESS), currently focusing on scientific software on the application layer using a holistic approach and building up and retaining the necessary competence of future European software developers.
The strategy and policy papers are available at **www.e-irg.eu**.

THEY ARE THE EGI CHAMPIONS

By Neasan O'Neill,
NGI Communications Coordinator

The European Grid Infrastructure (EGI) has announced a new initiative to help researchers get up to speed with the grid and start using it. Officially announced at the EGI Technical Forum in Prague the scheme will establish a network of pioneering researchers, called EGI Champions, promoting the use of grid in their field.

In the last decade the European grid has seen an amazing increase in capability and users. Many researchers have benefited, with areas as diverse as High Energy Physics and Humanities being supported by EGI to do cutting edge work. For EGI this is not enough and they want many more scientists to make use of their services. This is where the Champions come in.

One of the main benefits of a 10-year-old infrastructure is the expertise and experience that has been built up alongside the technical tools and solutions. Through the Champions, EGI hopes to be able to offer not only middleware but also this peopleware. "The community is king in EGI, that's why we are here; to provide computing resources for our growing community" explains Steve Brewer, EGI's Chief Community Officer "the Champions will enable us to further expand our userbase and we're now looking for the right people for us to support to do that."

But what is a Champion and what is expected of them? Firstly, and importantly, they need to be enthusiastic users of EGI computing resources, and secondly, willing to go out and talk to others in their discipline about grid. "We want people to get out there and tell their peers about us. We can't go to every conference or meeting but the Champions can" says Steve "We will provide support with access to technical briefings, the latest news and cover travel costs for relevant meetings."

EGI hopes that the Champions scheme will grow into a pan-European network with researchers from all corners of the academic world helping EGI and their community. If you are interested in learning more, visit the scheme's **webpage** or watch a **video** from the e-ScienceTalk team of Steve talking about the EGI Champions.

NORDIC NRENS TOWARDS THE FUTURE

By Mattis Daae, UNINETT

The NORDUnet conference is the biannual meeting place for the “Networkers of the North” where interested parties in the Nordic countries come together to discuss the current and future challenges that the Nordic NRENs are facing. Over the years the Nordic focus has been seasoned with global news and views which was also true for this 27th NORDUnet conference in Oslo, Norway.

CHANGES IN EDUCATION

Several of the speakers at the conference focused on the changes we are seeing in education. Research and education is shifting out of the classroom and onto the net. An estimate predicts that in 2020, 80 per cent or more of the lectures will take place via the net.

This also gives the NRENs new challenges. For one the increase in capacity can never stop if we are going to be able to cope with the increased demand. Furthermore the NRENs also have to look at what other roles it is important to play in the future. We should provide more than just connectivity. “Users are choosers” was one of the key principles of the conference. Identifying the user, and not least, identifying its needs becomes more and more vital, in order to be able to provide the right type and range of services.

AMERICAN PERSPECTIVES

One interesting aspect that was discussed at the conference is the difference in American and European perspectives. In the US most of the innovation focuses on the core network and is trying to simplify the infrastructure by (among other things) building a 10 gigabit network, based on SDN and open flow.

EDUROAM

eduroam is one of the really big European success stories. So far Eduroam has been limited to universities and colleges, but the evidence points to a more widespread use. Sweden has so far made eduroam available at train stations, airports and hotels.

IDENTITY MANAGEMENT

There is no doubt that identity management will be one of the main areas for the NRENs in the future. Creating, using and maintaining middleware will be crucial. In this field we also saw examples of new types of cooperation between the public and commercial interests.

NUMBERS

The conference gathered 220 participants from 23 countries. In addition more than 400 people from 27 countries followed the video stream. More than 80 people gave presentations.

We registered 625 unique communications devices on the conference SSID, roughly 3 gadgets per person. 480 of these were connected via eduroam and 83 percent of these requested IPv6.

The next conference will be held in Sweden in 2014. We hope to see you there.

GÉANT is the pan-European research and education network that interconnects Europe's National Research and Education Networks (NRENs). Together we connect over 40 million researchers and students across Europe, facilitating collaborative research in a diverse range of disciplines, including high-energy physics, radio astronomy, bio-medicine, climate change, earth observation and arts & culture.

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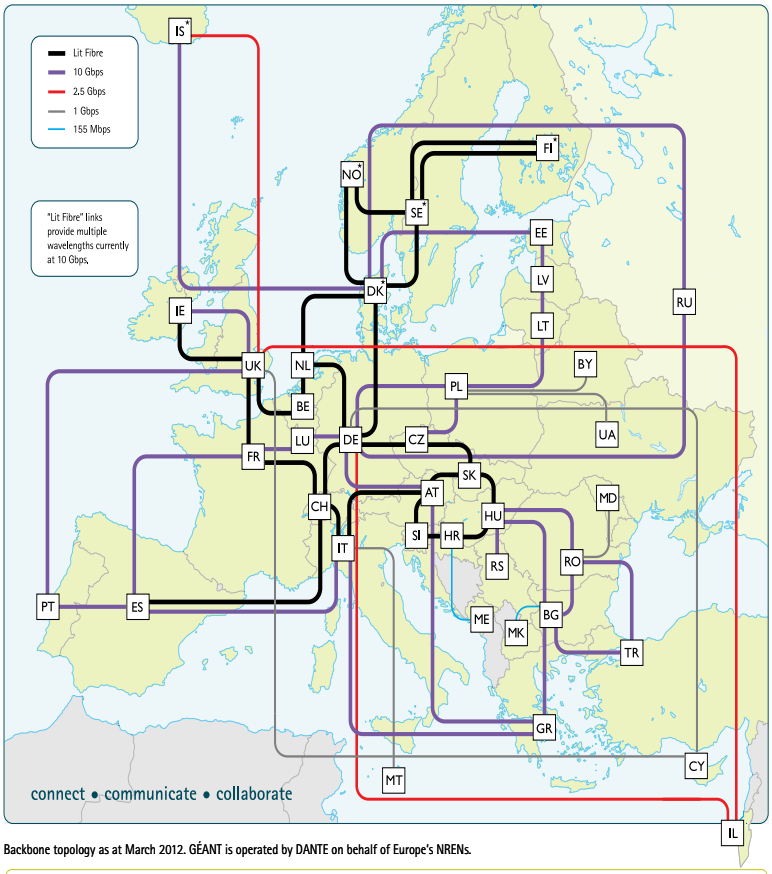

Backbone topology as at March 2012. GÉANT is operated by DANTE on behalf of Europe's NRENs.

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UPCOMING EVENTS

CARNet Users Conference 2012
12 – 14 November, Croatia

Super Computing 2012
10 – 15 November, Salt Lake City

HEAnet National Conference 2012
7 – 9 November, Co Westmeath

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