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CONNECT

ELIXIR AND GÉANT
SUPPORTING EUROPEAN LIFE SCIENCES
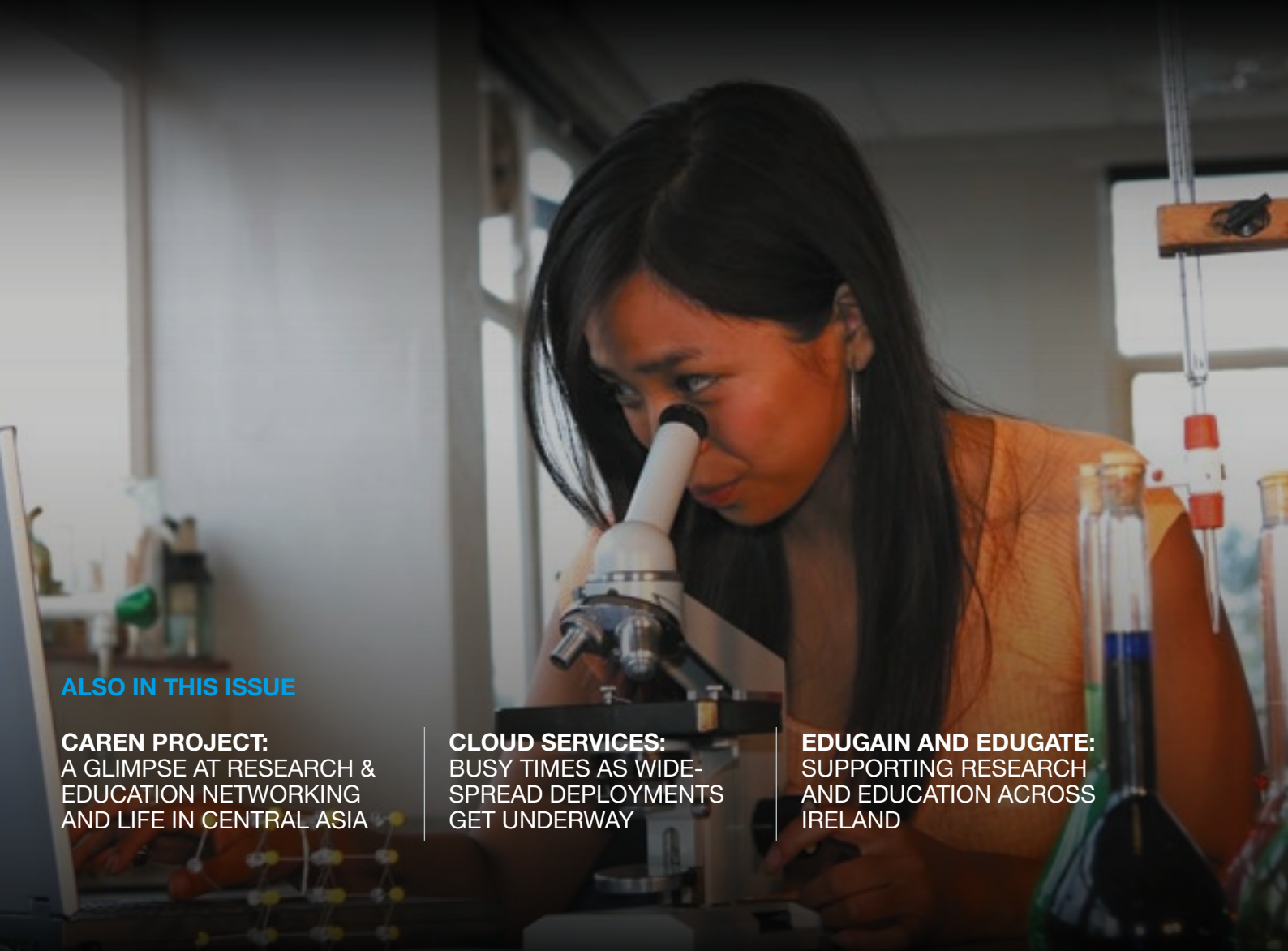
CONTENTS

CONNECT is the quarterly magazine from the GÉANT community; highlighting the activities of Europe's leading collaboration on e-infrastructure and services for Research and Education. We give insights into the users who depend on the network, and the community that makes GÉANT what it is. We welcome feedback at **paul.maurice@geant.org**

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REGULAR CONTRIBUTORS

Paul Maurice, GÉANT Senior Communications Officer: leads on project communications for the GÉANT Project and supports marketing and communications activities for the GÉANT organisation. These include overall responsibility for CONNECT magazine, messaging, PR and content creation.
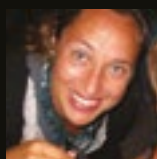
Helga Spitaler, GÉANT Senior Communications Officer: provides PR and marketing support to regional network projects (AfricaConnect2, CAREN, EUMEDCONNECT3, TEIN, EU-China link). Within the Global PR Network Helga facilitates communications activities of and for the global R&E networking community.

Karl Meyer, GÉANT Product Marketing and Management Officer: supports the development, roll-out and marketing of the GÉANT service portfolio. Karl has a background in IP network design and cloud service development.

Laura Durnford, GÉANT Senior Communications Officer: supports SIG-MSP, SIG-Marcomms and the GÉANT Community Programme as well as communications activities for other projects and services. With a background in biology and radio production, Laura holds a MSc in science communication.

Rosanna Norman, GÉANT Communications Officer: provides PR and marketing support to the communications and outreach activities within the GÉANT Project and the GÉANT organisation. Rosanna is a B2B marcomms specialist with experience in technology organisations and academia.

WELCOME FROM CATHRIN STÖVER

Welcome to CONNECT! We hope this finds you well rested after the summer break (at least in the northern hemisphere!) and ready for what promises to be a busy quarter for our community. However, before we look forward I encourage you to take a look back – via GÉANT's Annual Report, published in June and summarised on page 3, in which you can read how GÉANT continually strives to support our members and partners. It is this approach that underpins all that we do, and some of the success stories in this issue help to illustrate it further.

The first of these is the exciting CAREN Project (see pages 4-9) which continues to grow in importance and show real progress, a credit to all the people involved.

We also shine a light on some major European projects that are benefiting from not only the high speed networking provided by GÉANT and the NRENs, but also services such as eduGAIN that are empowering researchers. For instance you can read on pages 26-27 how ELIXIR is utilising the reach of eduGAIN to support the European life sciences sector, driving further collaboration.

We welcome RIPE NCC with an interesting article on internet address prefixes (pages 16-17) and also preview several upcoming events in the next quarter (pages 20-21).

We hear a lot about cloud services and their growing importance. On page 24 you can see how this is accelerating, with widespread deployments and much support work from GÉANT's clouds team to ensure NRENs and their customers benefit fully.

Elsewhere we hear the thoughts of ESnet's Joe Metzger, who has spent the past year with CERN (pages 14-15); learn more about the ongoing developments with the EaPConnect project (pages 30-31); and investigate several initiatives for working together in addressing security challenges faced by our community (pages 28-29).

Enjoy the issue!

Cathrin Stöver, GÉANT

GÉANT APPOINTS ERIK HUIZER AS INTERIM CEO

GÉANT has appointed Erik Huizer as Chief Executive Officer (CEO) effective immediately, replacing Steve Cotter who has left GÉANT by mutual agreement with the GÉANT Association Board.

"It has been an enormous privilege to have led GÉANT during an important period of transformation and growth," said Steve Cotter. "I am proud to have worked with remarkable colleagues who are so committed to advancing R&E technologies and services throughout the world."

"The Board is thankful for Steve's period of service and leadership," said Christian Grimm, Chairman of GÉANT. "Steve's leadership has been instrumental in making important steps to complete the merger process. He very professionally implemented necessary changes in the organisation to enhance the delivery of valued services to Members of the Association. Steve also established a new Executive team that will benefit the Association, its Members and users in the European R&E community in the forthcoming years."

Erik Huizer has a long-standing involvement with the NREN community and is currently CTO of SURFnet and he was a member of the GÉANT Association Board until he stepped down to take up the CEO position. Before SURFnet he served as Managing Director for ICT at the Netherlands Organisation for Applied Scientific Research (TNO). Erik has fulfilled various board-level functions of Internet related organisations and for over 30 years has been involved in education and research networking, Internet standardisation and Internet governance. For his contributions to the Internet he was inducted into the Internet Hall of Fame in 2014.

As Interim CEO Erik will ensure GÉANT continues to evolve, ensuring a smooth transition whilst a permanent CEO is recruited.

GÉANT 2016 ANNUAL REPORT – FOSTERING INNOVATION WITH COLLABORATION AND COMMITMENT

Earlier in June GÉANT announced the publication of its 2016 annual report. The report gives the organisation the opportunity to share news of the past year's successes with colleagues, partners and members of the dynamic R&E community in which it operates.

In addition, whilst highlighting the progress made towards GÉANT's four strategic goals announced in 2015, the report also sets the scene for the year ahead. By illustrating the organisation's major achievements in 2016, this document also brings to the fore the vital work that GÉANT plays to foster innovation globally.

As featured in the report, we have listed below GÉANT's strategic objectives and a brief summary of achievements for each area.

Running an Efficient, Highly Effective Organisation

GÉANT successfully delivered another phase of the GÉANT project, as well as a NREN survey and effective procurement to maintain its commitment to delivering value and serving the NREN community.

Providing World-Class Services

GÉANT distinguished itself through the successful development of Software Defined Networking capabilities, the effective integration of novel security programmes and the achievements of eduGAIN and eduroam.

Delivering Exceptional Value, Promoting Innovation and Seeking Opportunities

In line with its third strategic objective, GÉANT carried out with success a pan-European tender for Infrastructure-as-a-Service (IaaS) offerings, published the first AARC project blueprint architecture and utilised alien waves for the first time.

Growing the Community

GÉANT supported community expansion via events such as TNC16, DI4R, through the established international collaborations, plus new learning and development initiatives.

The new dynamic digital format of GÉANT's annual report is available here: **https://ar2016.geant.org/**

CAREN

CAREN PROJECT ON A ROLL IN CENTRAL ASIA

CAREN

1 Gbps

GÉANT

Frankfurt

Kazakhstan

Uzbekistan

Kyrgyzstan

Turkmenistan

Tajikistan

1 Gbps

1 Gbps

National R&E networks

Regional R&E networks

CAREN PoP

CAREN topology map April 2017

It's been a busy first half of the year for CAREN3: from deploying new circuits, through holding a second successful regional conference (CRNC 2017) to establishing the CAREN Cooperation Center (CAREN CC) as its future regional networking organisation.

Gigabit-speed connectivity – a first for Central Asia

Researchers, academics and students in Central Asia and Europe have welcomed the recent deployment of a ring of 1 Gbps circuits for research and education between the regions; the new connectivity is a key component of the EU-funded Central Asia Research and Education Network (CAREN) project which – now in its 3rd phase - sets out to create a sustainable, high-capacity data network for higher education and research institutions across Central Asia.

Initially, CAREN3 connects the Kyrgyz and Tajik R&E communities to their peers in Europe and the rest of the world via links from Bishkek (Kyrgyzstan) and Dushanbe (Tajikistan) to the CAREN network hub in Frankfurt, where they interconnect with the GÉANT network. In addition, for the first time, direct connectivity within the region has also been deployed between the Bishkek and Dushanbe sites, paving the way for a truly regional high-speed R&E backbone in Central Asia.

CRNC 2017: bringing the R&E community together in Bishkek

The arrival of the Gigabit-speed connectivity in Central Asia was celebrated during the 2nd CAREN Regional Networking Conference (CRNC 2017) which took place 25-26 April in Bishkek, Kyrgyzstan. Themed "Empowering the Central Asian research and education communities through global high-speed networking" and jointly hosted by KRENA, the Kyrgyz

Research and Education Network Association and Kyrgyz Turkish Manas University, CRNC 2017 attracted over 160 participants from 19 countries around the world: practitioners from the Central Asian research and higher education community, policy makers, connectivity providers, ICT vendors as well as representatives from other regional networks and organisations, such as GÉANT, EaPConnect (Eastern partnership countries), TEIN*CC (Asia-Pacific) and the UbuntuNet Alliance (Eastern and Southern Africa).

In line with the conference theme, the programme focussed on key areas such as cloud computing, network security, AAI and applications for science and education.

Voices from the field

Participants heard first-hand from scientists and academics how CAREN's high-speed links make a real difference in advancing collaborative research in areas such as environmental studies, seismology, astronomy, telemedicine and preservation of natural and cultural heritage. Prof. Hanno Schaumburg from Hamburg Technical University – a renowned figure in Central Asian academic circles – stressed the need of good internet connectivity to develop a vibrant solar energy industry in the region; telemedical training promotor Prof. Shuji Shimizu from Japan dwelt on opportunities for joint remote medical education activities with local hospitals (which he also paid a visit to whilst in Bishkek), whilst Alexander Zubovich from the Central-Asian Institute for Applied Geosciences (CAIAG) outlined the data transfer and connectivity requirements of geo-monitoring jointly undertaken with colleagues in Germany.

"We are involved in international programmes to identify and study hazardous asteroids," said Dr Gulchehra Kohirova, another conference speaker and Director of the Institute of Astrophysics of the Academy of Sciences of the Republic of Tajikistan which has recently been connected to TARENA, the Tajik NREN. "We transfer and receive large datasets to and from the Minor Planet Center in the US, which is the global focus for all information about the positions of the threats we monitor. Without TARENA's and CAREN's secure high-speed connectivity, we simply couldn't participate in the work of the centre," she concluded.

Various presentations outlined how e-learning and remote training opportunities are making education and knowledge transfer more accessible in Central Asia. Dr Max Meier from the Hanns Seidel Foundation for example, promoted in his presentation remote lectures and webinars over the CAREN network to foster capacity building of aspiring civil servants, whilst other speakers outlined the potential of ICT in improving the educational process at their own academic institutions.

CAREN CC: the new regional partner

CRNC 2017 also celebrated the official launch of the new CAREN Cooperation Center, to be known as CAREN CC. It has been established by the CAREN partners as a not-for-profit organisation based in Bishkek to maximise the impact of CAREN throughout the Central Asian region and support the participation of further NREN partners and users.

Continued EU support

With €10M EU funding up to 2019, the third project phase started in June 2016, initially with Kyrgyzstan and Tajikistan as beneficiaries following the signing of co-funding agreements between their governments and the European Commission. Work is underway to also re-establish project participation for Kazakhstan and Turkmenistan and also include Uzbekistan.

CRNC 2017 was organised by the CAREN project and hosted by the Kyrgyz Research and Education Network Association (KRENA) in conjunction with Kyrgyz Turkish Manas University. The conference was further supported by the local ISP Elcat.

For further information please visit **https://crnc2017.icaren.org/en/**

"The development of a high-capacity, yet cost-effective data-communications infrastructure for research and education is high on the EU agenda as it is key to bringing the best minds together. In this context, we welcome the CAREN project that has recently entered its third phase and, for the first time, brings connectivity at Gigabit speed to Central Asia. In partnership with the NRENs, we look forward to extending CAREN's benefits to the research and education communities across the whole region."

Ambassador Cesare De Montis, Head of the Delegation of the European Union to the Kyrgyz Republic

"GÉANT has been given the mandate by the European Union to help build digital bridges between Europe and other world regions to strengthen existing and catalyse new collaborative research and education activities. EU funding, combined with the expertise of GÉANT and its NREN partners in Central Asia, puts CAREN in a unique position to turn the ancient Silk Road into a high-speed digital highway."

David West, CAREN project manager, GÉANT

VOICES FROM THE CAREN COMMUNITY

EMPOWERING NETWORK ENGINEERS

NSRC
Network Startup Resource Center

Technical capacity building is a key component of the CAREN project. Teaming up with the University of Oregon-based Network Startup Resource Center (NSRC), CAREN provides training to develop a critical mass of savvy network engineers across Central Asia.

Last April the CAREN NOC in Bishkek hosted the CAREN Campus Network Design and Operations Workshop, run by an enthusiastic NSRC team of instructors who over 5 days equipped current and aspiring campus and NREN network and systems engineers in the region with hands-on advice and best practice for managing and monitoring the campus network infrastructure. We caught up with **Alisher Davlatov** (pictured, middle) from the Tajik NREN **TARENA** who attended the workshop.

What is your role at TARENA and what challenges do you face in your job?

As technical director I have the overall responsibility for the TARENA network; this ranges from network design, server administration, monitoring, back-up of data and configurations to budget planning and procurement. I am also an IT instructor at the Cisco Net Academy in Dushanbe.

The TARENA network is expanding continuously and new high-speed technologies are being applied to connect new institutions. Actually, the plan is to connect all Tajik R&E institutions to the TARENA network, but unfortunately, there is a lack of specialists in our team. Furthermore there is a shortage of funds which means that we have to purchase used equipment. Also, to expand the TARENA network to the regions, it is necessary to lease capacity from other ISPs at a very expensive cost.

So expanding our network is challenging, but we will persist! Another priority for me and my team is the establishment of CERT in Tajikistan to handle cyber security incidents.

What made you sign up for the recent CAREN Campus Network Design & Operations Workshop?

So far I have participated in three NSRC courses. And they were all great: highly qualified instructors who always accompany theory with practical sessions. For the Campus Network Design and Operations Workshop my learning focus was on network monitoring systems and servers. I expected to receive information about the design of a campus networks, cable systems, the selection of the required equipment, routing protocols as well as on monitoring systems.

Did the training live up to your expectations?

Absolutely. I have already had opportunities to apply my newly acquired skills and services are working. Next time we need to ensure that more campus network administrators from our universities and research institutes of the Academy of Sciences of Republic of Tajikistan will attend.

In future I would also like to participate in courses on security, data backup and virtualisation.

PROTECTING THE EARTH FROM HAZARDOUS ASTEROIDS

One day in 2013, shortly after dawn broke over the Russian city of Chelyabinsk, a violent explosion in the air above the town caused a flash as bright as the sun, a shockwave that injured more than a thousand people and extensive damage to property. A single large meteoroid had entered the Earth's atmosphere, where it exploded with a force of around 30 times that of the Hiroshima bomb.

Protecting against such hazards begins with monitoring these objects to calculate their precise orbits. We met **Dr Gulchehra Kokhirova, Director of the Institute of Astrophysics of the Academy of Sciences of the Republic of Tajikistan** in Dushanbe, to learn more about the worldwide efforts to track and study them and the role R&E networks can play in facilitating such endeavours.

Please outline briefly the focus of your research

The Chelyabinsk meteoroid was one of around 14,000 known 'near-Earth asteroids', of which some 1,700 are classified as 'potentially hazardous asteroids' (PHA). In other words, objects that represent a real danger to the entire biosphere and all human activity.

This meteoroid's diameter was 17m; we know of at least one PHA – called Apophis – which is due to make a close approach to Earth in 2029 that is about twenty times bigger.

These PHAs are the object of my research. The aim is to track their orbits and study their properties to devise mitigation strategies for a potential impact. With our observations we contribute to the data held by the International Astronomical Union's Minor Planet Centre (MPC) in the USA – which is the global focus for all information about the positions of the PHAs we monitor.

What are the challenges you face in terms of effectively collaborating with partners around the world?

For the observations we rely on powerful telescopes. To minimise the effects of light pollution, the telescopes need to be sited well away from population centres; they are located in Tajikistan's mountainous regions – one in Gissar

(730 m), and in Sanglokh (2300 m). However, the necessary remoteness of these locations creates a problem: transferring the huge volume of observation data to our Institute's facility in Dushanbe. For the time being we have to transfer the data manually on USB sticks. However, thanks to the recent connection of our Institute to the TARENA network we are now able to reliably and speedily transmit and receive large datasets to and from the MPC in Cambridge, Massachusetts. Also, thanks to the good internet connection we can now effectively access and feed into the master database of the MCP which keeps the research community abreast of important developments and discoveries via daily electronic circulars. In other words: our observational data now become known to the international astronomical community very quickly which, in turn, increases the international rating and reputation of our Institute.

How did you hear about the TARENA and CAREN network?

I first heard about TARENA when several years ago various research institutes of the Tajikistan Academy of Sciences were connected to internet services for the first time - via TARENA. I learned about the CAREN network attending a CAREN workshop organised in Dushanbe two years ago. I subsequently gave a presentation at the second TARENA-CAREN workshop last year in Dushanbe and was also a speaker at CRNC 2017 last April in Bishkek. The benefits of these networks are obvious: instant access to international databases, online exchange and discussion with colleagues, submission of observations results and papers for publications in professional journals. This undoubtedly catalyzes the international reputation of our Institute as well as of the Tajik astronomy community at large.

What are the plans for the future?

Work is currently underway to also connect the telescopes to TARENA. This will complete the picture: a fast, seamless and reliable real-time link between telescopes in our mountains and scientists at our institute in Dushanbe, the USA and other parts of the world. This, in turn, will also enable us to operate these telescopes remotely from our office in Dushanbe.

A GLIMPSE OF LIFE IN BISHKEK

Arianna Akmatova from the CAREN support office in Bishkek, Kyrgyzstan is one of the key faces of the CAREN project. While she operates predominately behind the scenes, she is instrumental in administrating and promoting CAREN and its benefits across Central Asia, with the CAREN management team heavily relying on her. We asked Arianna to tell us about her working day and life in Bishkek.

My working day

It is separated into two parts, pretty much before and after noon, because of the 4 hour time difference between mainland Europe and Central Asia. The morning is usually dedicated to local tasks whilst most of the international calls are completed in the afternoon. As a member of the CAREN support office I assist Prof. Askar Kutanov and the rest of GÉANT's CAREN project management team in the day-to-day running of CAREN. I am in charge of preparing the draft budget for CAREN events, translating and disseminating project activity information, providing support for financial and activity reporting and helping implement the project communication plan, which means I don't miss an opportunity to spread the word about CAREN!

I believe in CAREN

I've learned many things working on the CAREN project. CAREN gives me the self-discipline and understanding that motivates me to develop. And most importantly, CAREN allows me to progress: I am now more actively involved in planning and implementing marketing activities, I speak more confidently to our users, am actually very keen to dig around and find leads for potential case studies ; this year I also accepted invitations to promote CAREN at TNC17 in Linz and at APAN44 in Dalian. Being involved in the organisation of CRNC 2017 last April I gained invaluable experience and access to professional networking.

Yes, CAREN has had its ups and downs, but I believe in CAREN and the current phase is developing really well. It is opening doors for our researchers and students and through the newly formed CAREN Cooperation Center I will do my utmost to help realise its potential.

I want to be a role model for my kids

Like any human being, I have good days and bad days. The secret of overcoming the bad ones and the source of motivation are my three wonderful kids, my family. I always remember that they see me as their role model and this gives me an energy and new inspirations. Also, sometimes the challenges we face are created by poor communication between people. I believe in the power of communication and try to live up to it (both in Russian and English) in my own interactions – be they personal or professional.

I love my city and country

Life in Bishkek is interesting with many cultural and social events. I love hiking weekends in the mountains. Last Saturday I headed up to the Kegeti Gorge – a stunning place with a turquoise mountain lake named Kol Tor at 2200 meters above sea level. It was a wonderful day in a nice group, a great mix of local people and international students from Germany, Czech Republic and USA. Since we live in a mountainous region for us it is a good way to recharge our batteries, relax, get some fresh air and start a new working week with full energy and interesting ideas.

HIGH PERFORMANCE GLOBAL NETWORKING – SUPPORTING GLOBAL PERFORMING ARTS

Often high-speed Research and Education networking is seen as a technology focused on supporting "Big Science" such as CERN, Radio Astronomy, Space research and other huge, expensive projects but the reality couldn't be further from the truth.

While large research projects have often been the driving force behind the advanced networking technologies used by the National Research and Education Networks (NRENs), these services are available to the whole R&E community and many other faculties are taking advantage of the opportunities to revolutionise the way they work. Marianne Løkke Jakobsen, Director of International Affairs at the Royal Danish Music Academy explains how high performance networking can transform their work.

Music and Performance have always been international with musicians, conductors, singers and tutors coming together across countries and even continents to work together. However this constant travelling takes its toll on everyone and is of course extremely expensive. It also limits the ability of emerging artists to work together as they have limited resources to travel to work with coaches or to attend auditions.

The Royal Danish Music Academy has been using high performance network services to support high quality international teaching.

Within a normal skype call or even a business to business video conferencing session there are delays in communication often with noticeable lag within a conversation. We can cope with these delays in a meeting context but if an artist is practising with an orchestra in a different country then any significant lag makes performing impossible. Also most services use compression techniques to minimise the cost or maximise the revenues and these reduce the quality of the audio as well as add extra delays. By using high performance networking services it is possible to reduce these delays to within acceptable limits for live performance.

But of course the staff using this technology are not IT experts and so much effort is needed to make the services easy to use.

"The focus of the staff should always be on the teaching not on the technology. The staff are using technology to help them do their jobs and so it should be as invisible as possible" explains Marianne.

"When dealing with world-class performers or coaches it is vital that we don't waste time trying to get the network working – reliability and dependability are essential".

Moving a physical art form into a digital platform

The performing arts are, of course, a physical art and there are still some limitations to what technology can do. For example a voice coach can't feel how a singer is using their diaphragm while singing if they are 2,000 miles away but technology can support new, exciting ways to help.

For example, using high resolution cameras a coach can zoom into within inches of a singer's throat without distracting them – far closer than they could get while standing beside them and multiple camera angles can be used to show the entire performer.

"The important aspect is not necessarily to try and replicate exactly what is done at the moment but to look at the opportunities of the technology rather than focus on any limitations."

High Performance Networking supporting on-line auditions

One of the projects the Royal Danish Academy of Music is working on is a series of international auditions using R&E networks to bring the performers, orchestra and jury together.

Rather than all the performers having to travel around the world only their image and their voice needs to make the journey.

Linking up 5 sites in 3 continents the network allows the Copenhagen Jury to audition performers without the time and expense of travelling. This makes the audition process quicker to organise and complete as it is no longer necessary to synchronise the diaries of all the attendees or block out many days of travelling.

"The situation of travelling is even worse for singers as they often need many days after a flight for their vocal cords to adjust so even a half day audition may take a week out of their schedule. By using these network auditions we can produce a shortlist very quickly and much more cost-effectively."

Pictures
Royal Danish
Music Academy

Quality is key

The important factor of all these activities is the quality of experience for all the participants to ensure that everyone gets the best possible experience and that the coaching is not affected by the technology. The use of high performance networking is not a way to reduce the costs of teaching but a way to improve access to experts and experiences from around the world.

Network Performing Arts Production Workshops (NPAPWS)

The development and delivery of these innovative uses of networking is a complex and challenging activity and since 2003 NPAPWS have been held to help support the use of these services. Initiated by Internet2 and now supported by GÉANT and GARR, the 2017 workshop was held in Copenhagen on 3-5 April and featured many workshops and seminars to help advance the use of network technologies in the performing arts.

For more information visit:

http://www.dkdm.dk/

https://npapws.org

https://www.geant.org/People/ research_communities/Pages/ NPAP_workshops.aspx

CLARIN AND EDUGAIN: COLLABORATION, SYNERGY AND GROWTH

The active collaboration between CLARIN - the European research network working in the field of archiving and processing of language-related resources in the humanities and social sciences – and eduGAIN – GÉANT's service that interconnects identity federations around the world - delivers a service that, whilst addressing the specific requirements of a system capable of dealing with the access and identification of a large number of distributed users across several countries, benefits also the entire R&E trust and identity community.

CLARIN

CLARIN, the Common Language Resource and Technology Infrastructure, is a European research infrastructure for social sciences and humanities focusing on language resources. It is a distributed network, made up of the CLARIN Governance and Coordination body (CLARIN ERIC), national consortia, centres of expertise and online services. It is being implemented at leading institutions in a large and growing number of European countries, and aims at improving Europe's multi-linguality competence. CLARIN was initiated from the vision that all digital language resources and tools from all over Europe and beyond, are accessible through a single sign-on online environment for the support of researchers in the humanities and social sciences. CLARIN's mission is to create and maintain an infrastructure to support the sharing, use and sustainability of language data and tools for research in such fields.

The CLARIN infrastructure is fully operational in a variety of countries, and over 30 participating centres offer access services to data, tools and expertise. All this is enabled through a networked federation of centres such as language data repositories, service and knowledge centres with single sign-on access for all members of the academic community in all participating countries.

www.clarin.eu/

Opportunities for change

CLARIN's ambition was and still is to connect all European countries to its services, but as the number of institutes and countries joining CLARIN started increasing, there was a concern that the costs would grow excessively, hence slowing down the uptake of new users, institutes and countries

Every time a new service provider joined the CLARIN infrastructure, further work was required to enable the participating institute to conform to the Authentication, Authorisation and Identification (AAI) management processes and procedures. This often meant that if a new service provider institute required an AAI attribute to be released by other institutes - and that attribute had not been released before - CLARIN would then need to contact and negotiate the release of that attribute from the other centres, causing a significant management overhead. For this reason, CLARIN chose to operate its own service provider framework (SPF), which involves coordinating and curating the identity providers of all of its users with over 30 service providers.

Another challenge CLARIN faced was represented by the need to gain agreement of all of the identity providers in each country to join its in-house developed SPF, in order to reach all of its target users. This procedure would have required extensive negotiations with a large number of identity providers - often not present in every country. It was with these challenges in mind that GÉANT approached CLARIN to collaborate on improvements to eduGAIN.

CLARIN and eduGAIN

In 2012 when CLARIN ERIC was launched - at that time eduGAIN was not yet ready to meet CLARIN's trust and identity requirements - the organisation decided to create its own SPF to meet the requirements of a system that was able to deal with the access and identification of a large number of distributed users across several countries. This made CLARIN – compared to other research communities – one of the early adopters of the federated identity management technology.

In January 2015, GÉANT approached CLARIN to offer support and collaboration around AAI. During these early interactions, the organisations decided to work together in several areas such as the improvement of user error messages and on an attribute release check that could be operated as an eduGAIN reference service for attribute release, hence benefiting the wider trust and identity community.

Martin Matthiesen from CLARIN said: *"The collaboration has proven very useful at least from FIN-CLARIN's perspective. Users can now quickly inform their home organisations about their AAI needs without having to understand the technical details. Operators are also much more willing to release attributes when they are contacted by their own users, rather than by the Service Provider as this process often required great efforts with limited possibilities of success".*

eduGAIN and CLARIN's collaboration delivers benefits to the global community

The adoption of eduGAIN by CLARIN was very beneficial and led to numerous improvements in the trust and identity area. It enabled trustworthy exchange of information between identity federations without the need for additional bilateral agreements and reduced operational and development costs. It also improved the security and end-user experience of services whilst enabling CLARIN to expand its user base when compared with its own SPF.

The wider community has also been strengthened and improved through the increased number of services now available to identity providers and their end-users. The attribute release check also provides a much more advanced level of service within the wider trust and identity community. This service opens up eduGAIN making it one of the R&E community leading trust and identity frameworks.

What the future holds

With the development of the attribute release check, identity federations and identity providers received a helpful tool, which allows the verification that attributes to eduGAIN services – like those from CLARIN – are released according to the best common practices. Due to the complexities in the area of data security and the jurisdictions in which each country operates, this will always be a work in progress that will become much more streamlined and much more user-friendly as time goes by.

The CLARIN solution in a nutshell

Although CLARIN had made some headway in developing its own SPF, it became increasingly challenging as the amount of identity providers increased. This increase in its own workload, in line with its desire to reach as many users as possible at global level, led to an operational adjustment.

With the rapid uptake and expansion of eduGAIN, as well as the offer to collaborate on developing an attribute release check, eduGAIN became for CLARIN a workable and attractive solution. This collaborative work lasted 18 months and culminated in the delivery of a service that benefits also the entire R&E trust and identity community.

About eduGAIN

eduGAIN interconnects research and education identity federations around the world simplifying access to content, services and resources for the global research and education community. It enables the trustworthy exchange of information, related to identity, authentication and authorisation (AAI), between service providers and research and education institutions or other identity providers. EduGAIN achieves this by coordinating elements of the federations' technical infrastructure and providing a policy framework that controls this information exchange. This exchange of information contributes to the seamless operation of services, whether they are developed within the GÉANT Project, provided by other communities represented by, or associated with, the GÉANT partners, or provided by commercial Service Providers, which benefit collaboration in the research and education community.

eduGAIN provides access to all the online services that students, researchers and educators need while minimising the number of accounts users and service providers have to manage - reducing costs, complexity and security risks; giving service providers access to a larger pool of users internationally, and allows users to access resources of peer institutions or commercial or cloud services using their one trusted identity.

With eduGAIN participants from more than 2,390 identity providers accessing services from over 1,520 service providers, eduGAIN has fast become the primary mechanism to inter-federate for research and education collaboration around the world.

An identity federation, in the case of eduGAIN, works by having a group of institutions and organisations signing up to an agreed set of policies for exchanging information about users and resources, so as to enable access to and use of the resources. Many organisations use AAI to build a trusted environment where users can be identified electronically using a single identity. These systems can also contain information about a user's access right based on attributes characterising their role. Resource owners (service providers) may use these federated environments to control federation participants' access to the provided resources.

The existence of multiple AAIs and multiple identity federations makes it technically and administratively arduous when a user attempts to gain access to protected resources and services from other federations. The user must first be successfully authenticated by his/her home AAI and then authorised by the visited service provider.

For further information on eduGAIN, visit: **https://www.geant.org/Services/Trust_identity_and_security/eduGAIN**

JOE METZGER, ESNET

Joe Metzger, Senior Network Engineer at Lawrence Berkeley National Laboratory and member of the ESnet network engineering team, has spent the past year working at CERN. CONNECT caught up with him to hear about his experiences, and talk science support.

Joe, please tell us a little about ESnet

In the late 1970s and early 1980s the U.S. Department of Energy (DOE) funded HEPnet for high energy physics research as well as MFEnet for the magnetic fusion community. At one point it became clear that not every DOE science program could have their own network and ESnet was founded in 1986 with the mission to support whatever science DOE funds. Be that high energy physics (HEP), fusion, genomics, climate, bioscience or other physical sciences. ESnet supports the science which is carried out by a group of DOE-funded labs and their collaborators.

Can you describe your role in ESnet?

Well, I have only been in ESnet for 20 years! I missed the entire first decade. Before I joined ESnet, I was at an ESnet customer site. My first team in ESnet was the Information Services Group. At the time, we were supporting mail, gopher, usenet news and were running an ISDN-based video-conferencing service. About 16 years ago, I switched to the Network Engineering Group and have been a part of network engineering ever since.

Initially I was focused on typical inward facing network engineering efforts, including designing, deploying and operating the ESnet network. But over time I started to spend more time looking at the big picture. Undetected soft errors that didn't impact local connectivity but prevented wide area end-to-end high performance were very common. So I got involved in the perfSONAR effort to help build a framework and community to find and fix those errors. High Energy Physics (HEP) is responsible for a large percentage of ESnet's traffic, so I started trying to figure out how ESnet could better meet their needs. Early on I was focused on how we should support CERN's Large Hadron Collider (LHC) within the ESnet network. But that quickly evolved into

participating in the effort to define the LHCOPN (LHC Optical Private Network) and LHCONE (LHC Open Network Environment) frameworks used by networks around the world to support the LHC community.

How do you see big project user support developing over the next three to five years? What would you say the GÉANT community needs to do?

Really, I think that supporting big science is actually the easy task. Big science normally has excellent facilities, long-term planning, sufficient resources and in-house experts. We find it straightforward to work with them to figure out where they are going and how we can support them best. It is much trickier when it comes to small and mid-size projects. Here we see large data-sets being produced, but in many cases there is a lack of certain skills, tools and a reduced network expert base available, so they are not effectively using the network. Over the years, ESnet has approached this through our science engagement efforts, including the fasterdata.es.net website and Operating Innovative Networks workshops. This train-the-trainers approach, with the objective to push the networking knowledge and skills needed to support modern science workflows deeper into our community, is important for all of us. But here is the crux: what happens to ESnet or say GÉANT, if all our engagement efforts actually translate into traffic growth – are we ready for this?

I realised over the years that one of the bigger challenges for GÉANT is how removed you are from the scientists and end users. You have to work through the layers of NRENs, regional (national) connectors and campus networks to communicate with end-users. But I have also seen significant improvements, the most striking of which

is around performance. We now get great response times from all the layers across Europe when we discover a performance problem. It is good to see that perfSONAR is increasingly standard across Europe. It makes a real difference in how we can jointly tackle performance issues end-to-end.

What would you really like to say to scientists so that we could support them better?

I think we are in the middle of some interesting times for networking support of science. Every day, more science teams are adopting automated workflow engines, distributed or cloud computing models, and experimental designs that depend on resources at multiple locations. At the same time, our regional, national, and international networks are growing more complex and more dynamic. But I don't think anyone fully understands the end-to-end paths. There are going to be challenges when changes by one party take the others by surprise.

So scientists, when the network providers describe their future plans, please listen, and don't hesitate to keep asking questions until you understand how it is going impact you. Also, please talk to your network providers early when you are thinking about making significant changes to your workflows or designing new experiments that will require significant network resources. Finally please speak up if the networks are not meeting your needs. We can't build the right network infrastructure and services if end users don't tell us what they need.

You have been in Geneva now for almost a year - what was that like?

I came to Geneva to work for a year based at CERN. My wife Laura and I moved from Ames, Iowa, which is a small university town where half of the population disappears when the students leave campus in the summer, to the city centre of Geneva. It makes for quite a difference! From Ames I can drive 250km in almost any direction and mostly what I will see is flat fields of corn and soybeans. In Geneva there are different mountain ranges, countries and cultures, all less than two hours away.

But it is the little things that are most striking. Public transport is great. Grocery stores are closed in the evenings and on Sundays, but interestingly the barber shop is open past 9:30 on Saturday nights. What I like about Geneva is that it is so varied. There are so many festivals – sometimes when I open the window, I can hear music playing from a festival by the lake, but other times it is so quiet and I can actually hear birds singing. That surprised me.

NO SHORTCUTS TO LONG PREFIXES

As we squeeze IPv4 address space ever further, we ought to revisit the question of how prefixes longer than a /24 propagate across the internet. The obvious risk with longer prefixes is the potential for an explosion in routing table sizes. At the same time, ARIN has an address block -- 23.128.0.0/10 -- from which it will allocate blocks as small as a /28.
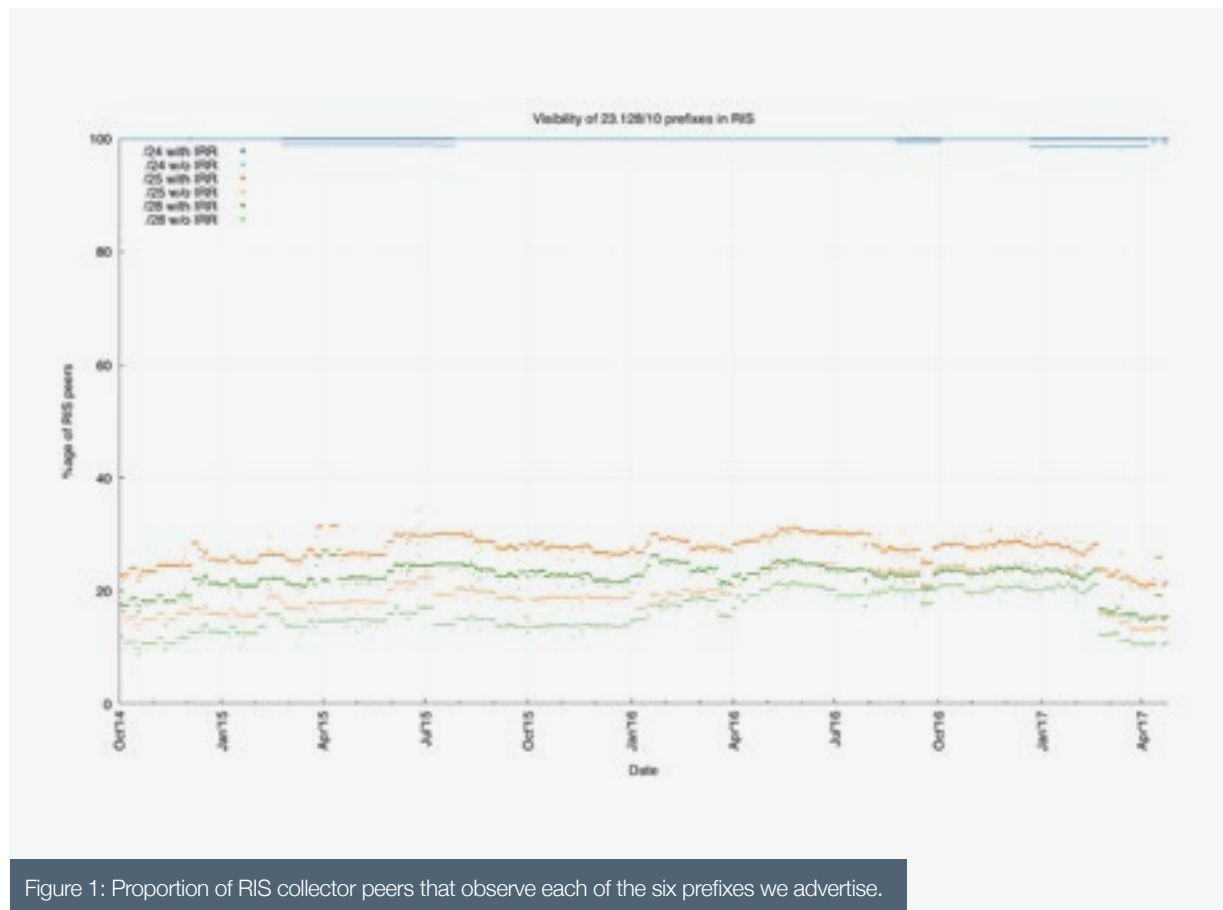
Figure 1: Proportion of RIS collector peers that observe each of the six prefixes we advertise.

Since October 2014, the RIPE NCC has been advertising six IPv4 prefixes drawn from this range (two /24s, two /25s, and two /28s) to better understand how they propagate across the network, to determine how they behave in the wild, and to assist decision-making for policy on smaller allocations. Currently, less than 1% of this /10 has been allocated

and none of those allocations were smaller than a /24. If smaller allocations were made, how useful would they be for public routing?

Fig. 1 shows the fraction of RIS (RIPE Routing Information Service) peers that observe the six prefixes. The first thing to note is that visibility of the longer prefixes hasn't changed much

over the years: at best, we might expect a /25 to be visible by 20-25% of our peers. Next, we see a drop in visibility between 21 and 22 of February 2017. This drop stems from stronger filtering after switching to new route servers at ASN3333. The trend, in any case, is definitely not increasing.
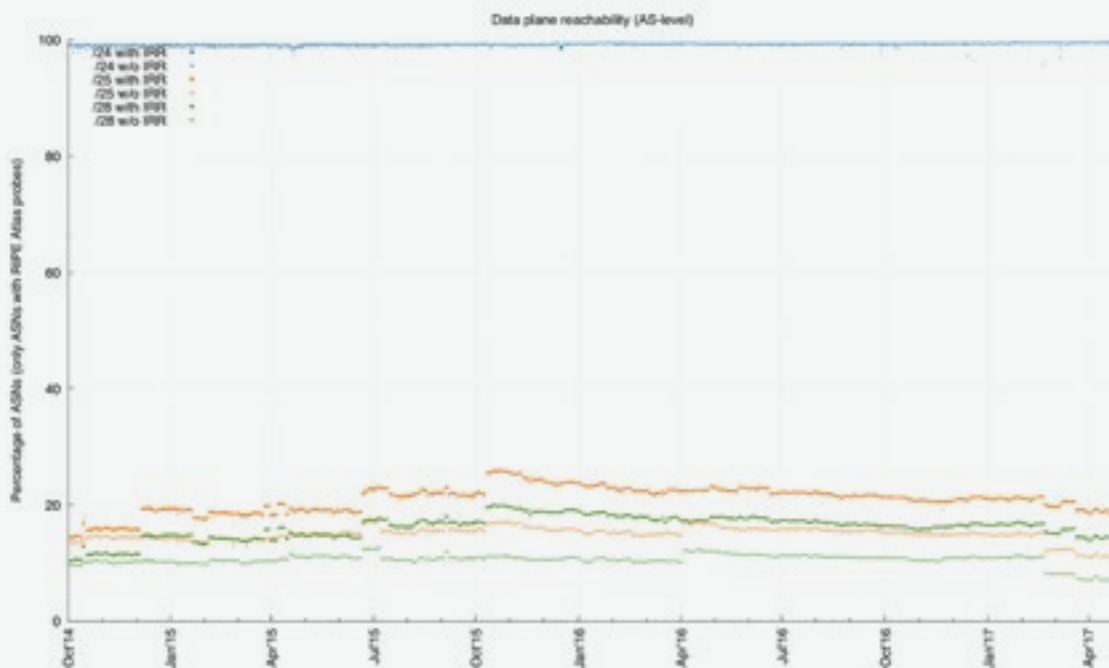
Figure 2: Traceroute reachability of all six prefixes from all RIPE Atlas probes

We are able to corroborate this with other datasets:

- The Route Views project is another source of archived BGP data, offering additional vantage points from which to observe prefix propagation. On 1 May 2017, Route Views collectors observe similar visibility to RIS collectors: /24s propagate widely, but the /25s and /28s have limited visibility. The longer prefixes that have route objects in the routing registry propagate further than those that don't, a slight advantage for networks when they want to advertise a longer prefix onto the public network.

- Packet Clearing House (PCH) provides BGP table dumps for route collectors located in IXPs around the world. Many of these are not full tables: 89 out of 135 observe fewer than 100,000 unique prefixes; 8 see more than 300,000 unique prefixes, and only one appears to have a full table. Given this, on 1 May the PCH dataset shows the /24 with the route object in 11 of the BGP table dumps, but seven see the longer prefixes with route objects, and only 1 BGP table contains all six. So the pattern is similar, in that there

are common cases where a route object will assist the propagation of a long prefix, even if they will not propagate as widely as a /24.

We are also able to use RIPE Atlas to conduct long-running active measurements. Within each BGP advertisement, we have one address which is responsive for exactly this purpose, giving us insight into reachability from a broad sample of the public network. Fig. 2 shows the data-plane reachability from RIPE Atlas probes. What we observe matches the above: most probes cannot reach addresses within the longer prefix.

The received wisdom is that we should not advertise IPv4 prefixes longer than a /24 to the global network because they won't achieve full coverage. The data bears this out. Further, the lack of path diversity makes reachability less stable. From this, it's clear a /25 is still not very useful if you want global reachability. But there are some differences, and it's clear that an appropriate route object in the IRR helps, and perhaps strong RPKI and IRR filters as requirements for long prefixes in specific ranges (such as this one) may be the way towards permitting widespread advertisements longer than a /24.

For more details, please see BGP Even More Specifics in 2017 on RIPE Labs: **https://labs.ripe.net/Members/stephen_strowes/bgp-even-more-specifics-in-2017**

About the RIPE NCC

The RIPE NCC is the Regional Internet Registry for Europe, the Middle East and parts of Central Asia. As such, we allocate and register blocks of Internet number resources to Internet service providers (ISPs) and other organisations. We're a not-for-profit organisation that works to support the RIPE (Réseaux IP Européens) community and the wider Internet community. The RIPE NCC membership consists mainly of Internet service providers, telecommunication organisations and large corporations.

TNC17: THE BEST YET?

The GÉANT community's flagship conference, TNC, enjoyed its 33rd edition earlier this year with TNC17 held in the beautiful UNESCO city of Linz, Austria.

A great opening keynote by Artistic and Managing Director of Ars Electronica, Gerfried Stocker, set the scene for what many considered to be the best TNC yet. Delegates enjoyed an extensive programme of sessions, with plenary speakers from Google, GigaScience and many others; six students delivered some of the 30+ lightning talks, as part of the new GÉANT Future Talent Fund initiative; another 20 sessions covered topics such as Software Defined Networking, cloud adoption and federated identity. And a further 30+ side events included BoFs, demos, workshops and meetings.

At-a-glance
- **69** countries were represented;
- **we heard from 124** speakers and sessions chairs;
- **we welcomed 721** participants;
… and had nearly **2,500** views of our video streams!

Our thanks go to the teams behind this successful event, from the Programme Committee to ACOnet, NORDUnet, PSNC, to the Events team and to all our sponsors and exhibitors who made this such a collaborative week.

TNC17 ended with an invitation from Norwegian NREN UNINETT to visit Trondheim next year for TNC18, which will be held from 10-15 June. We cannot wait!

In the meantime, you can revisit your memories at **www.geant.org/TNC** with links to photo albums, sponsor websites, previous conferences and a link to our TNC17 video (see below).

Thank you to the GÉANT community for helping to make TNC17 such a success!

Picture
GÉANT Community Award winners (left to right) Massimo Parovel, Hannah Short, Tomasz and Maja Górecka-Wolniewicz (pictured with Christian Panigl and Christian Grimm)

TNC17 THROUGH THE EYES OF OUR COMMUNITY

A Short Video

During the conference, GÉANT approached a selection of international partners, collaborators and sponsors and asked them all the following question: "What does TNC17 mean to you?"

The answers were filmed and collated in a short video that captures some enthusiastic statements and exciting quotes. These highlight the importance of TNC for the global R&E community: GÉANT's flagship event is about meeting face to face, networking and learning in a unique and inspirational setting.

You can find the video on GÉANT's website and on GÉANT's youtube channel:

https://www.geant.org/

https://www.youtube.com/watch?v=b6SaletV9K0&t=6s

DI4R 2017: CONNECTING THE BUILDING BLOCKS FOR OPEN SCIENCE

From 30 November to 1 December 2017 Europe's leading e-infrastructures will host the second edition of the Digital Infrastructures for Research (DI4R) conference, which will be held this year in Brussels, Belgium, at the SQUARE meeting centre, and to which all researchers, developers and service providers are invited to participate. DI4R 2017 is jointly organised by EGI, EUDAT, GÉANT, OpenAIRE, PRACE and RDA Europe.

Under the theme of "Connecting the building blocks for Open Science", DI4R 2017 will showcase the policies, processes, best practices, data and services that, leveraging today's initiatives – national, regional, European and international – are the building blocks of the European Open Science Cloud (EOSC) and European Data Infrastructure (EDI).

The conference will demonstrate how open science, higher education and innovators can benefit from these building blocks, and will contribute to advance integration and cooperation between initiatives. The event's programme will be available at the beginning of September. Registration and a call for participation for lightning talks, posters and demonstrations will open at the same time. All participants to the DI4R are invited to a welcome evening cocktail on 29 November at SQUARE in Brussels, organised by the EOSCpilot project as part of the EOSC Stakeholder Forum.

"The DI4R event is gaining real traction, with significant interest from the research community in how the e-infrastructures can jointly support their needs and work with them to improve open science and collaboration for all. GÉANT is proud to be one of the major organisers, with DI4R 2017 following on from a successful joint e-infrastructure booth at TNC17 earlier this year."

Annabel Grant, GÉANT

Please follow the event's website (**www. digitalinfrastructures. eu/**) and Twitter feed (**@ DI4R_eu**) for more news and updates. We look forward to greeting you all at the DI4R 2017 event in Brussels!

BUSY SCHEDULE OF INTERNATIONAL EVENTS AHEAD

GÉANT is preparing for some major international events that will take place before the end of the year, here's a brief overview.

OPEN SCIENCE FAIR 2017
6-8 SEPTEMBER, ATHENS

The Open Science Fair will showcase all the elements required for the transition to Open Science: e-infrastructures and services, policies as guidance for good practices, research flows, new types of activities, and the roles of the respective players and their networks.

GÉANT, EGI and OpenAIRE will host a workshop on National and European E-infrastructure Cooperation for Open Science. This collaborative workshop features in the context of coordinating EOSC related activities across large European infrastructures at European and national level. The workshop will offer an opportunity for cross-pollination on issues ranging from open scholarship to technical service provision, training, community engagement and support. OpenAIRE NOADs, EGI NGIs, GÉANT, NRENs and other national e-Infrastructure representatives will also discuss gaps, synergies, coordination and service integration opportunities.

For further information visit:
http://www.opensciencefair.eu/

SUPERCOMPUTING 2017 – HPC CONNECTS
13-16 NOVEMBER, COLORADO CONVENTION CENTER, DENVER, COLORADO, USA

Between the 13th and 16th of November the international supercomputing community will gather in Denver for the International Conference for High Performance Computing (HPC), Networking, Storage and Analysis.

GÉANT is exhibiting in the research area at booth 267 of the Colorado Convention Center. Visitors will have the chance to view inspiring demonstrations and pioneering collaborations, and speak to the experts directly.

GÉANT will showcase a 100Gbps performance demo as well as give perfSONAR Small Nodes, GÉANT Testbeds and Network Management as a Service demonstrations.

For further info visit:
http://sc17.supercomputing. org/exhibitors/

CLOUD SERVICES GETTING INTO TOP GEAR

The last several months have been very active for the GÉANT Clouds team as the efforts for national rollouts and trials of the GÉANT Cloud offerings enter high gear. While there is still much to be done in to formalise the package and develop suitable delivery and integration methods, serious deployment efforts are well underway.

The GÉANT Clouds team is actively working with both vendors and NRENs (and their institutions), helping to understand the needs of all groups and users, and ensuring the arrangements meet these needs and support the R&E communities across Europe.

Working with Suppliers

On the vendor side, the completion of the IaaS Framework Agreement in September 2016 was an important milestone. The team worked tirelessly with many vendors and legal advisors to ensure compliance with EU regulations and more. Once that was completed and made public, work began collating and publicising data each vendor wished to communicate to the community. These efforts are ongoing and results, up to date additions and revisions, as they come in, can be seen in the GÉANT Cloud Catalogue (**https://clouds. geant.org/services/geant-cloud-catalogue/**).

GÉANT Support for NRENs

To facilitate and stimulate adoption and roll-out, the GÉANT project is now offering additional manpower resources to support promotion of the IaaS services portfolio and ensure a synchronized, collaborative approach.

"This initiative expresses GÉANT's commitment to advancing efforts toward a European Digital Single Market and the European Open Science Cloud," says Andres Steijaert, Activity leader for the GÉANT project's Application Services Delivery Development team. "I am confident that this resource will accelerate uptake by our NREN partners."

For more information on applying for this manpower allocation, please visit **https://clouds.geant.org/nren-support/#manpower**

Spotlight on Portugal: Computação em nuvem

Fundação para a Ciência e a Tecnologia, through its FCCN unit that manages the Portuguese NREN, has made considerable progress to date amongst its institutions. Two Service Commencement Forms were already signed, four are in the final stages of signing, and negotiations are ongoing to sign another three. Initial plans for a subsidized test pilot are underway, with six institutions expressing interest, and three have already assigned a pilot manager and agreed on terms. João Pagaime and his team have made considerable investment in outreach to achieve these impressive results. Three video casts have taken place, two of which were in cooperation with a Portuguese supplier. Another video cast is planned by year-end 2017. The IaaS framework agreement was also presented at the annual event "Jornadas FCCN" that took place in Vila Real in April 2017.

Pagaime acknowledges that the uptake of this offering is complex, and therefore it may take some time. In addition to the bureaucratic challenges, there are integration and other pricing obstacles to overcome. "But despite the long implementation process, we have no doubt that this is the way to go," says João. "An almost 'off-the-shelf' public cloud procurement model, that is uniform in quality and custom-designed for researchers and favourably priced, is the solution that is going to complement, and possibly redefine, national e-infrastructures here in Portugal."

How does the GÉANT Framework Agreement work?

To find out how the GÉANT Framework Agreement works and how NRENs and Institutions can take advantage of the savings and integration benefits the clouds team have created a short video.
https://clouds.geant.org/resources/

If you, your NREN or your institution have any questions, please contact the Clouds Team at **clouds@geant.org**

EDUGAIN AND EDUGATE – SUPPORTING R&E ACROSS IRELAND

Although Ireland's higher education sector is vibrant and dynamic its relatively small size (220,000 students from a population of 4,000,000) gives it some challenges when compared to much larger countries. The global reach of eduGAIN helps level this playing field –allowing Ireland to benefit from access to international resources.

With a total population the size of a large European city, it can be hard for Irish education establishments to get access to educational resources such as library and research databases. HEAnet operates a highly successful Identity Federation service – edugate - which covers all 45 large undergraduate institutions in Ireland and this federation is Interfederated via eduGAIN to the wider R&E community. This provides HEAnet (and the institutions and students) with significant advantages. In order to access cloud services, international publishers and library services without eduGAIN, HEAnet would need to negotiate access between each Institution and the publisher on an individual basis. This would have involved complex three-way legal agreements which are time-consuming and expensive.

Using eduGAIN makes these agreements much simpler as all parties have pre-agreed most of the access rules and procedures.This saves huge amounts of time for all parties and makes the negotiating position of smaller NRENs such as HEAnet much stronger. "Whilst larger Institutions and NRENs can compel providers to invest in providing access, institutions in smaller countries are in a weaker position. If a Service Provider has to do extra work to provide access to small numbers of users then this becomes either uneconomic or a very low priority. Therefore anything that reduces the costs and speeds up the process is beneficial"

edugate – serving Irelands Students and Researchers

HEAnet's edugate federation service is a key element in this approach by enabling all institutions in Ireland to have federated access to academic and commercial Service Providers.

HEAnet's Identity & Access Management (IAM) services supplement campus IAM through services such as the edugate federation and our hosted & managed Shibboleth Identity Providers. HEAnet also develops the JAGGER federation management tool to manage a Shibboleth Identity Provider or SAML federation.By engaging with service providers to join edugate it assists institutions availing of such member services at no charge to the institution.

Where service providers do not wish to join edugate and support SAML, HEAnet can configure a bilateral trust between the institutions identity provider service and the service provider. HEAnet has configured bilateral configurations for a range of cloud services including;

- Google Apps for Education
- Office 365 (incl. Yammer & Azure)
- Adobe Creative Cloud
- Amazon Web Services
- Ezproxy
- Sharepoint
- TCS iON
- Teamwork.com
- Freshdesk.com
- Workday.com
- Athens

"Edugate is becoming central to a lot of our services. It's vital for UCC student email and VLE log-in.

The last thing we want are multiple sets of credentials. Federated access is the way forward, and allows us to leverage credentials across all our services. We will be looking at providing more and more student services via Edugate in the future."

Barry O'Sullivan IT Services, University College Cork

Together edugate and eduGAIN provide an essential link between students, researchers, institutions and Service Providers

For more information visit
https://www.heanet.ie/ services/identity-access/ edugate
https://edugain.org

Words
Glenn Wearen
HEAnet

ELIXIR – ENHANCING AAI SERVICES FOR THE LIFE SCIENCES COMMUNITY

The use of eduGAIN across the research and education community has dramatically improved access to services and data across the world, enabling the academic community to use their institutional ID to sign in to thousands of educational resources.

However in some cases, eduGAIN does not provide the granularity of identity attributes that are needed for some sensitive services. For example, within the life science community it is often necessary to enhance the identity services provided by eduGAIN to fit the usage models of data and services in the community. Additionally, two different researchers in the same university department may require access to completely different data from the same service provider and, because of the nature of these data, they should not have access to each other's data. This is particularly important within the life science community as many data may contain sensitive information that needs to be carefully controlled.

This is where ELIXIR is able to support these needs.

- Elixir acts as an eduGAIN Service Provider
- Adds context and attributes and proxies as IdP for Services

What is ELIXIR?

ELIXIR unites Europe's leading life-science organisations in managing and safeguarding the massive amounts of data being generated in publicly funded research. It coordinates, integrates and sustains bioinformatics resources across its Member States and enables users in academia and industry to access vital data, tools, standards, computational and training services for their research.

The goal of ELIXIR is to help researchers take advantage of the huge amounts of data produced in the life sciences so that they can gain new insights into how living organisms work in health and disease.

The 20 countries in ELIXIR work together through a "Hub and Nodes" model:

- **ELIXIR Hub**: The ELIXIR Hub coordinates collaboration across ELIXIR. The Hub is based at the Wellcome Genome Campus, near Cambridge, UK.
- **ELIXIR Nodes**: Each member state of ELIXIR establishes a national 'Node'. An ELIXIR Node is usually a network of organisations that work within that country. The 20 ELIXIR Member States are complemented by the European Bioinformatics Institute (EMBL-EBI), an international organisation based in the UK, which operates many of the major databases in the life sciences.

Each Node runs the resources and services that are part of ELIXIR: these includes databases, analysis tools and software, services for making data interoperable, training courses and computing services.

How ELIXIR supports AAI services for its researchers

Life science research is complex and collaborative with researchers accessing data from many services from different providers. In order to ensure easy and secure access to these data it is necessary to enhance the capabilities of eduGAIN interfederation.

To do this ELIXIR acts as both a Service Provider within the eduGAIN model and as a Proxy IdP (Identity Provider) to the underlying ELIXIR services. This allows ELIXIR to create extended user attributes for researchers to increase the granularity of access to data and services. Teams of researchers can be dynamically created to support projects and mapped across ELIXIR services.

This approach controls access to sensitive data while preserving the ability of researchers to use their existing Institutional Identities.

The ability to use these existing identities is crucial and not just because it means researchers don't have to remember a new username and password combination. It offers:

- **Reduced bureaucracy and costs** - Reusing existing identities means ELIXIR doesn't have to create and manage its own Identity provider (IdP).
- **Improved vetting** – Institutional identities are usually personally vetted at creation with face-to-face checking of identity (such as photo or government identities). As a distributed network this face-to-face vetting would be cost-prohibitive. Using eduGAIN federated identities provides greater confidence to the service and data providers.

- **Regular updates** – As researchers join or leave institutions their affiliation information is maintained regularly. This ensures that staff who leave an institution have their identities pro-actively modified rather than the user having to contact ELIXIR. This increases security of access and confidence that only authorised researchers have access to critical data.
- **Improved access to usage metrics** – The consistent use of accounts and attributes allows service providers to better analyse the take-up and use of their services.

Without the wide reach of eduGAIN and the support of all member institutions, ELIXIR would not be able to provide cost-effective identity management and control.

> "Within the life science sector it is fair to say that ELIXIR needs eduGAIN just as much as eduGAIN needs ELIXIR. Together they produce a solution that is fit for Europe's life science sector and enables successful research collaborations".
>
> Mikael Linden, CSC Finland (ELIXIR Finland).

About ELIXIR

ELIXIR unites Europe's leading life-science organisations in managing and safeguarding the massive amounts of data being generated in publicly funded research. It coordinates, integrates and sustains bioinformatics resources across its Member States and enables users in academia and industry to access vital data, tools, standards, computational and training services for their research. **https://www.elixir-europe.org/**

WE NEED TO TALK ABOUT SECURITY

The growing importance of the security related topics in the international R&E community resulted in launching several new international initiatives for working together in addressing security challenges faced by NERNs and e-infrastructures, in addition to groups that have already been working together for years.

In our recent blog post Security is 'the new black' of the R&E community, https://wise-community.org/2017/07/31/security-is-the-new-black-of-the-re-community/ , we gave an overview of Research and Education International Security Communities. Now we want to bring this message to the printed word. Because we still need to talk about security and those conversations are ongoing and everyone interested are invited to join.

It can be understandably confusing: what are those international communities? What do they do and for whom? To get a sense on what is out there, let's look at four groups NRENs and GÉANT operate in: TF-CSIRT, SIG-ISM, WISE & the Global Security Group.

TF-CSIRT

TF-CSIRT started in 2000 to provide a forum for NREN Computer Security Incident Response Teams (CSIRTs). The Task Force has evolved in its 17 years and now welcomes CSIRT teams for industry, government, national and military teams as well as continuing to provide a home for organisations from the research and education sector.

TF-CSIRT currently has over 200 member teams that meet three times year, demonstrating the importance of building trust through face-to-face engagement. One of the yearly meetings is combined with the FIRST Regional Symposium.

The main service of TF-CSIRT is Trusted Introducer - a registry of CSIRT/CERT teams combined with a maturity model for these teams: teams can be listed, accredited or certified, demonstrating different levels of maturity as they advance through the stages. Another TF-CSIRT initiative is TRANSITS: a set of trainings for incident response teams, created and run by the security experts from the community.

More information: **https://tf-csirt.org/**

SIG-ISM

The GÉANT Special Interest Group on Information Security Management is a community for security officers of mainly European NRENs, focused on security management, implementation of security, and risk management. SIG-ISM has at least two workshops a year with a mix of information sharing and policy development. Since the group got together in 2014, its main purpose has been community building and providing a platform for sharing experiences and expertise in security management. It has produced white papers on security management and risk management. Currently SIG-ISM

Words
Alf Moens &
Sigita Jurkynaite

workgroups are working on a baseline for security for NRENs, an inventory and an NREN risk register. SIG-ISM has recognized that sharing detailed information on security management of a NREN can only be done in a trusted setting. In 2017, a new initiative is started to promote regional detailed exchanges between neighbouring countries. SIG-ISM currently has 3 regional exchanges: The Nordic countries (Norway, Finland, Sweden, Denmark, Iceland), UK-Ireland, and Benelux.

More information: **https://www.geant.org/Innovation/SIG_TF/Pages/SIG-ISM.aspx**

WISE

WISE started in autumn 2015, initiated by the members of SIG-ISM and SCI, the 'Security for Collaboration among Infrastructures' - a group of staff from several large-scale distributed computing infrastructures. Participating e-infrastructures in WISE are EGI, EUDAT, GÉANT (and NRENs), PRACE, XSEDE and organizations like CERN, Human Brain Project, LIGO, OSG and

others. The subjects that WISE focusses on are related to security management for the large e-infrastructures. Currently WISE is working on 4 subjects: Updating the SCI framework, security awareness and training, risk assessment and security in big and open data.

WISE organizes both separate workshops and sessions adjacent to conferences globally.
More information: **https://wise-community.org/**

Global Security Group

The Global NREN Security Group is an international forum for senior NREN security professionals, sponsored by the Global NREN CEO Forum. Established in 2017, it aims to coordinate security resources globally, including people and knowledge, and promote collaboration around addressing security requirements and challenges across our Research and Science communities.

Members of the group will work together to help NRENs manage security risk in several ways, including promoting confidentiality, availability and integrity of information to meet operational, legal and evidential requirements; aiding with identifying and managing information needs, risks and responsibilities; assisting with reviews of IT security policies and procedures and making recommendations to strengthen information controls; and coordinating the sharing of security resources and research between NRENs around the globe.

The Security Group is currently working on four initiatives to support NRENs, including establishing a security baseline for NRENs, developing advanced tools for Filtering and DDOS scrubbing; developing an automated threat information system, and developing and rehearsing global cyber crisis exercises.

Participation is open to all NRENs and currently includes representation from AARNet (Australia), CANARIE (Canada), CERNET (China), DFN (Germany), ESnet (USA), GÉANT (Europe), Internet2 (USA), JISC (UK), NORDUnet (Nordics), REANNZ (New Zealand), RNP (Brazil), SANREN (South Africa) and SURFnet (The Netherlands).

If you'd like to know more about or join this group, please contact the chairs Louise Schuster (Director of Cyber Security, AARNet) **Louise.Schuster@ aarnet.edu.au** and Renier Van Heerden (Science and Education Engagement Officer, SANREN) **renier@sanren.ac.za**

We need to talk about Security – internationally, in trusted environments, willing to share and collaborate. The power of collaboration is undeniable. Join the conversation!

All of the groups and events mentioned are supported by the CSO team within GÉANT. Through this shared management support and through shared memberships, the communities tune their agenda's and exchange results. If you would like to get more information or join, please contact **sigita.jurkynaite@geant.org**

KNOWLEDGE WITHOUT BORDERS: EAPCONNECT

Now around halfway through its 5-year run, the Eastern Partnership Connect (EaPConnect) project is not only providing promised network connectivity between Europe and its Eastern Partnership neighbours (Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine), it is also building the human networks that are vital if research and education collaborations are to flourish and grow.

These human networks are formed through events where knowledge is exchanged, such as training events, conferences and workshops. To date eight workshops have been held, where project partners and associate partners mix, learn about and from each other. More workshops are in the planning, and a larger, regional conference is having its second edition on 27-28 September.

EaPEC 2017
Eastern Partnership E-infrastructure Conference

The second Eastern Partnership E-infrastructure Conference (EaPEC 2017) will be hosted in Minsk by the Belarusian NREN, BASNET. EaPEC brings together researchers, policy-makers, students and other interested parties from the EaP region to hear the latest about how network and computing infrastructures support Open Science.

Putting theory into practice, EaPConnect offers practical support to the wider research and education community from the EaP region through the Enlighten Your Research programme, which culminates at EaPEC 2017. The EYR outreach activity was the brainchild

of the Dutch NREN, SURFnet, which still leads the programme and contributes to EaPConnect as an associate partner.

Researchers, invited to submit EYR proposals for research projects that would make use of infrastructures and associated technologies and services, this year submitted a record 30-plus proposals. And that's a record not only for the EaP region – where the programme is being run for the second time (EYR@EaP 2017) – but also across all EYR initiatives globally.

"We have seen a great response from the EaP countries for the EYR programme. Researchers working on HPC, Open Data, and digitisation have submitted final projects from every country, requesting resources from and collaborating with PRACE, SURFsara, and PSNC, for example. We look forward to collaborating with the EaP NRENs to support these projects and enable the research," says Mary Hester of SURFnet, coordinator EYR programme.

Selecting the winning EYR@EaP 2017 proposals from among so many was a challenge, but winners will be presented in an award ceremony during the EaPEC 2017 conference. Then the real work will begin, as the project leaders and the infrastructure and service providers work together so the projects can get started.

EaPEC 2017 will also feature keynote speeches from the flagship Human Brain Project and the HPC-Project PRACE, as well as mini-workshops, lightning talks and poster presentations.

EaPEC 2017 is open for anyone who wishes to attend: see the conference schedule and register online via **www.eapec.eu**.

Workshops

EaPConnect workshops are primarily targeted at the six project beneficiary partners, to share knowledge in a wide range of areas, including NRENs' business support activities, implementation of new services and specific technical competences. Added together, these events have supported knowledge exchange among around 100 participants from 15 countries. Topics covered to date include:

- robotics
- digitisation of cultural heritage
- business models
- clouds
- real-time communication / Low Latency (LoLA)

The Georgian NREN GRENA has the highest participation record from among the EaP NRENs: "Participation of GRENA staff in workshops organised by EaPConnect has been very useful for obtaining information about new developments in specific areas," says Ramaz Kvatadze, Executive Director of GRENA." In particular, the workshops devoted to clouds, digitisation of cultural heritage and to business models featured experts from the European NRENs who provided their experience and expertise to workshop participants in a very valuable way."

Workshops in the pipeline will cover:

- e-health
- cyber security
- Software Defined Networking
- marketing and communications
- clouds

By developing skills and services across this wide range of areas, EaPConnect and its EU partner NRENs are ultimately helping the EaP NRENs to diversify their business offer and thus to attract new users. In this way they will be in a better position to support of research and education activities. This can only benefit the Eastern Partnership region and its peers and partners in Europe and beyond.

www.eapconnect.eu

PROFILE: LEONIE SCHÄFER (DFN) – EAPCONNECT TRAINING AND EVENTS COORDINATOR

Within DFN, the German NREN, I am responsible for International Liaisons - i.e. fostering collaboration with GÉANT members and international partners. DFN has a good working relationship with the major GÉANT NRENs, but there are upcoming or newly-established NRENs that also deserve attention as these countries can present emerging economies with lots of expertise and human power. I heard about the EaPConnect project when it just had started and was intrigued by the combination of countries involved. I believe that the EC's Eastern Neighbourhood Programme is an important policy opportunity for previously closed countries such as Belarus to strengthen ties with EC countries. Also, I was interested to learn more about the EaP countries, their challenges and what expertise they bring with them. So the EaPConnect project fits very well with my DFN work. One benefit has been to learn more about EC Directorates General. Within the context of GÉANT, DFN's working relationship with the EC had focused mainly on collaboration with DG Connect. Now with EaPConnect, other DGs such as DG NEAR, DG EAC, and DG RTD come into play. EaPConnect activities take on a high policy level; EaPConnect is an important project for DG NEAR and has a high visibility. We are asked to present at EC EaP summits, which gives us high visibility even at Commissioner level. Furthermore, the project allows its project members to collaborate with each other intensively and this way to establish new ties and work relationships and this also opens up new opportunities for DFN towards Eastern Europe. The broader value of this project, I would say, is to bring together researchers, scientists and NREN members from EaP and EC countries. As a convinced European I value the opportunity to promote the advantages and benefits of the European Union to its neighbours and to foster cooperation between these different parties. The design of all the different EaPConnect workshops, diagnosing what is needed, developing an interesting programme and inviting suitable presenters, is a challenging task. The most challenging experience to date was to organise a conference within 3 months at a place where I had never been, more than 3000 km away. That was our first EaPEC conference, in Tbilisi, Georgia, and it was a huge success. We will continue organising these conferences in the EaP partner countries, which promises new challenges and adventures to look forward to.

EINFRACENTRAL - THE EUROPEAN E-INFRASTRUCTURE SERVICES GATEWAY

eInfraCentral's mission is to ensure that by 2020 a more varied set of users (including industry) benefits from European e-infrastructures. This should take place by creating a common approach to defining and monitoring e-infrastructures services and discover where improvements can be made in delivering such services.

eInfraCentral is built around three core objectives: 1) structure an open and guided discussion between e-infrastructures to consensually define a common catalogue for their services; 2) develop a single-entry point (the eInfraCentral portal) for end users to browse the service catalogue, and enhance the monitoring of key performance indicators (KPIs); and 3) draw policy and sustainability lessons for the future development of a European e-infrastructure 'market place' as an extension of the common service catalogue and portal so that it includes a much broader range of e-infrastructures and services.

Along with the EOSC Pilot project, the eInfraCentral project is a 'foundation stone' of the future 'European Open Science Cloud' (EOSC) initiative of the European Commission which aims to provide European science, industry and public authorities with world-class digital infrastructure that bring state of the art computing and data storage capacity to scientists and engineer in the European Union.

GÉANT and eInfraCentral

As one of the foundational e-infrastructure services, GÉANT plays a key role in both enabling other e-infrastructure projects and providing the access to those services from their users. GÉANT is coordinating the participation of NREN partners from across Europe into promote the use of NREN services to institutions. The eInfraCentral portal will be key element in service promotion and outreach for GÉANT and the wider NREN community.

Survey on e-infrastructure service catalogue

In order to ensure the eInfraCentral portal is designed to support its most important stakeholders – the users it was decided to undertake a comprehensive survey on the needs and requirements from the portal. The survey was open from 29 April until 30 June 2017 and promoted at events and through relevant online communication channels. In total 140 valid replies to the survey have been received, almost half of which come from service providers (46%) and the remaining from the current customers/users (26%) and interested stakeholders (28%).

The replies from e-infrastructure customers/users indicate that findability and accessibility of digital services for research has been a problem. Around 59% of users/customers answering to this survey have faced difficulties in finding the right service for their needs. This demonstrates the need for such a portal and allows the team to focus on supporting users.

The answers from service providers flag that they face challenges for increasing the visibility of e-infrastructure services. An overwhelming majority of service providers (79%) also underline the effort in reaching out to new customer segments. There is a clear indication that responding providers are willing to go beyond the academic user community and try to encourage also businesses to make use of the service offering. Yet, it is acknowledged that this remains a difficult task. As other avenues for expanding the existing user base the respondents pointed to more internationalisation and widening the circle of research domains to which the digital services may be applied.

eInfraCentral Consortium

Service Catalogue

A key objective of the project is the development of a common Service Catalogue to present in a homogeneous and harmonised way the available services offered by the wide range of European e-infrastructures to the European researchers and public-at-large. This will help address the need for both a unified list of services being available online as well as a standard and user-friendly description of all related services.

During the spring 2017, the project partners, in collaboration with flagship European e-infrastructures, have assembled a first draft catalogue of services currently available and have also performed an initial classification of available service catalogues as part of their current state-of-play. In parallel, global marketplaces and their respective services have been systematically assessed and contacts have been initiated with e-infrastructures beyond European borders, in order to collect best practices from various market segments as well as regions from all over the world.

eInfraCentral Portal – prototype

The eInfraCentral portal will be one of the major outcomes of the project, with the aim to offer a common harmonised catalogue of e-infrastructure services, a "one-stop shop" for end users to access, browse, search, compare and visualise services, a single point of reference for researchers and the broad community to provide access and make services and resources discoverable. The portal will also provide a holistic data validation/curation process for e-Infrastructure operators to register their services empowered by service exchange formats and protocols for automatic population of service information and associated KPIs. Furthermore, the platform will realise flexible and novel visualisation tools for capturing the e-Infrastructure evolution and revealing pan-European collaboration and impact. The first prototype will be released early September 2017 and will offer a browsing functionality for the catalogue of services.

Meet the Team

The eInfraCentral team will be organising, co-locating or participating to a number of events during the autumn of 2017. Come and meet us to find out more and contribute to the development of the service catalogue and the European E-Infrastructure Services Gateway portal.

3 - 4 October e-IRG Workshop - under the auspices of the Estonian EU Presidency of the EU, Tallinn (Estonia). eInfraCentral will be participating and we are planning to co-located a workshop to discuss the draft service catalogue with users and service providers.

28 - 29 November EOSCpilot 1st stakeholder engagement event, Brussels (Belgium) eInfraCentral will be participating to this event organised by the related EOSC Pilot project.

30 November - 1 December Di4R - Digital Infrastructures for Research 2017, Brussels (Belgium)

eInfraCentral will organise a session presenting the Service Catalogue and the formal launch of the Portal (early release).

To find out more about eInfraCentral and for more information on the planned workshops check out our website or follow us on Twitter:
www.einfracentral.eu @eInfraCentral

arne5

let povezujemo znanje

ARNES 25 YEARS' ANNIVERSARY: WE CREATED AN INTERNET OF PEOPLE

ARNES recently celebrated its 25th anniversary. Director Marko Bonač explained that it is impossible to predict what type of technologies and services we will offer in the future, but we do know that: "We will always respond to the wishes and needs of our users."

The participants of the event were addressed by the Minister of Education, Science and Sport Maja Makovec Brenčič, who highlighted a series of important projects focusing on e-learning and e-knowledge. The Minister of Public Administration Boris Koprivnikar added that the society of the future will be digital, the major foundations for which will also be contributed by ARNES. Dorte Olesen, a member of the Board of Directors of GÉANT, who was a special guest at the event added: "Congratulations to all of you at ARNES for your splendid achievements and the positive difference you make to education and research in Slovenia and all over Europe."

The pioneer of the Slovenian Internet

During its 25 years of operation ARNES, which was established by the Slovenian government in May 1992, has made a significant contribution to the digitalisation of Slovenian society. Today, the Academic and Research Network of Slovenia connects over 1,400 research, educational and cultural organisations and roughly 250,000 users through its reliable and high capacity infrastructure.

Drawing on past experience for a digital future

In the past ARNES was best known to the general public for its email addresses @guest.arnes.si and access to the Internet via a dial-up connection. Today it offers cutting-edge network services, supercomputer infrastructure, cloud computing, multimedia services, various online applications and a connection to the pan-European GÉANT network. ARNES will continue to strive to provide services that accelerate the development of Slovenia's digital society.

Responsibility for the operation and security of the Slovenian Internet

The registry Register.si and SI-CERT centre operate within the scope of ARNES. The Register.si manages the .si domain and is therefore responsible for the operation of the Slovenian Internet. The .si domain also celebrated its quarter century in April this year, with almost 124,000 domains already registered today. SI-CERT is the main contact point for reporting network security incidents involving systems and networks located in Slovenia; owing to the increasing prevalence of cyber-attacks, its role is becoming increasingly important.

Keeping up with technological development

"ARNES helped Slovenia join the group of countries that developed and expanded Internet connections for academic and educational purposes very early on, which later spread to business, public administration, media, etc. ARNES has always kept up with technological development. It also holds a pivotal role in providing for cybersecurity", were the words serving as justification for ARNES receiving the Order of Merit for its services, which was presented to Director Marko Bonač in 2014 by Slovenia's President Borut Pahor.

Connecting knowledge

ARNES also received the honourable Valvasor Award on 15 May for setting up optical connections for museums and galleries as part of its IR optics project, which provided 754 educational, science and cultural institutions with high-performance optical connections.

This year ARNES will commence with the implementation of its SIO-2020 programme, which will involve setting up wireless networks and purchasing new ICT equipment at almost 950 educational institutes and developing new advanced e-services and e-content.

25 years of building a network of people

ARNES has been primarily building an Internet of People and not an Internet of Things for over 25 years now, putting great emphasis on sharing its knowledge of ICTs. Technology makes it increasingly easier to work with each other, but also comes with certain risks. ARNES plays a major role in raising public awareness about modern technologies.

ARNES therefore not only encourages the use of technology but also warns of abuse, helps to prevent incidents and educates users on how to make best use of technological features and use them safely.

Internet of People

To see the ARNES video go to
http://url.sio.si/25arnes

Picture
Top right:
ARNES Director
Marko Bonač

CARRIER-GRADE ORCHESTRATION: TOWARDS SMARTER AND MORE EFFICIENT NETWORK MANAGEMENT

More flexible, more scalable and faster: carrier-grade network services need to meet ever-increasing demands. The availability of more and more open and programmable platforms is making it easier to automate and optimise business processes. When programmable operations support systems and business support systems are connected, tasks no longer need to be performed manually. This offers many new network infrastructure opportunities.

The automation and orchestration architecture SURFnet is working on, ensures that services can be managed dynamically from a central environment. The goal is to make simple APIs available to students, lecturers, staff and researchers so they can leverage the dynamic network services of SURFnet. These APIs can be used by (research and education) applications and/or (research and education) instruments to be able to easily set up private high-bandwidth connections with, for example, other research or computing facilities.

Automation and orchestration

As all management and technology domains in the SURFnet network will soon have APIs, various tasks can be automated in each domain ('automation'). The combination of these actions allows us to connect systems and to manage them intelligently as a whole ('orchestration'). A well-documented workflow and good information architecture with known authoritative sources is key to ensure that the systems exchange information correctly.

Technology domains

Important components in our automation and orchestration architecture are the connected technology domains. Each domain, with accompanying APIs, controls the functionality that is available in that specific technological area. This includes the technology used to actually provide the services to our institutions and end users. Examples of the technology domains are; the optical layer that we for instance use to provide our end users with bandwidth as alien waves – and the service layer we use to offer Ethernet and IP services. We are also looking at the possibility of offering virtual network functions in the technology domain.
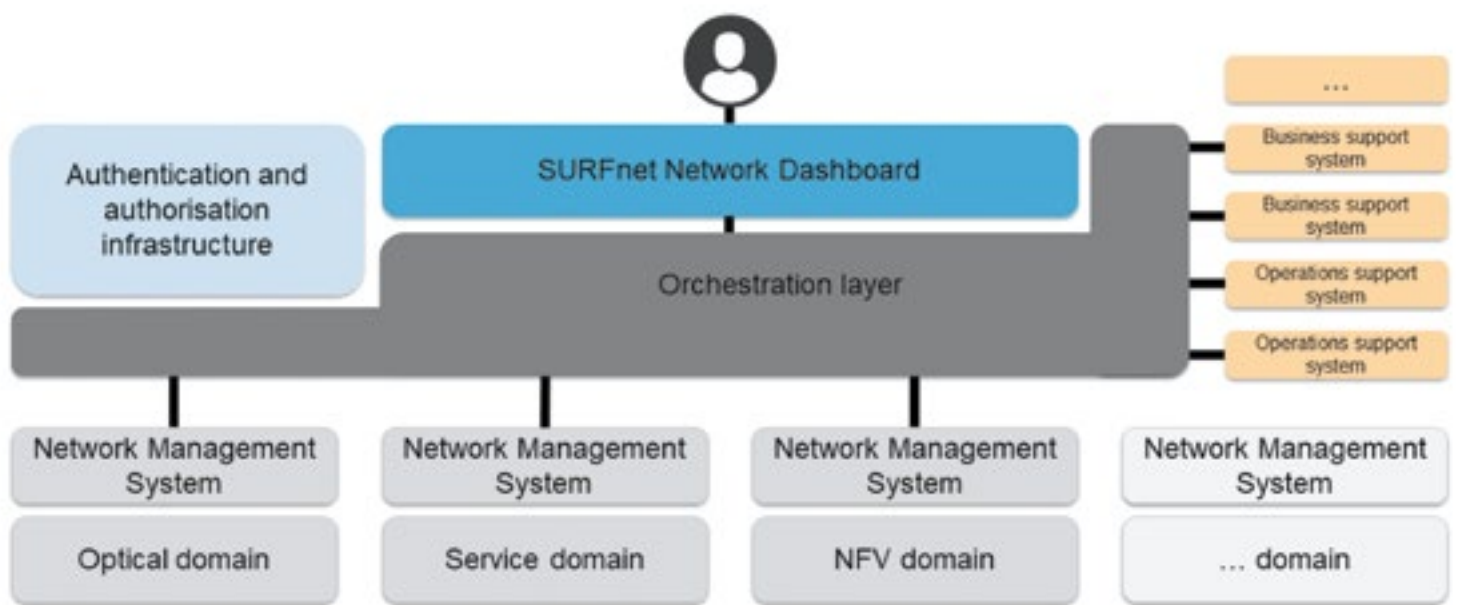
Network function virtualisation

Network function virtualisation (NFV) allows us to replace some of the network's physical hardware components with an unlimited number of virtual, software-based components. Virtual network functions perform the same tasks as traditional network hardware, such as switches, routers and firewalls, but are infinitely scalable and can be provisioned just in time.

We are currently working on a proof-of-concept environment with NFV. Several network functions can be offered on this platform in the future. These functions can be scaled up or down at any given time, depending on the wishes and requirements of the research and education institutions. The first function we are testing in this regard is a virtual firewall.

SURFnet Network Dashboard

Dutch research and education institutions can use our automation and orchestration architecture via the SURFnet Network Dashboard (Figure 1). This dashboard is offering more and more self-service features. Authorised users of research and education institutions can already set up their own on-demand network services between customer service ports. In the future, the SURFnet Network Dashboard (providing GUIs and APIs) will become a thin shell on top of the automation and

orchestration architecture. The goal is to provide an intent-based networking solution, where we will execute the 'how' based on some simple 'what' questions from users and/or applications.

Agile process

The automation and orchestration team regularly consults the various stakeholders to determine where the priorities lie and what we will be working on. We try to deliver new functionality every few weeks. Finished functionalities are tested and then go live. For example, after just a few weeks of work, it was possible to completely automated, deliver a service port to a research or education institution. A subsequent step for the future will be to make available new customer service port requests via the SURFnet Network Dashboard as well.

International cooperation

In recent years, SURFnet, various other NRENs and GÉANT have all contributed to our ability to set up and remove international high-performance multi-domain connections (using the NSI). Our automation and orchestration architecture will continue to support this. We hope to collaborate on orchestration together with other NRENs and we would like to share knowledge on the software infrastructure, design and programs where possible.

Words
Migiel de Vos

Picture
SURFnet
Network
Dashboard

What does SURFnet's work on automation, orchestration and NFV mean to students, lecturers, staff and researchers? Our vision for the future is that in a few years' time, the SURFnet network will set up network services and connections itself based on the applications required by Dutch students, lecturers, staff and researchers. For example, if a student wants to share graduate research data with a student from another university, they can open a support application and indicate what they want. If necessary, the system will ask some additional questions (on the size of the data set, for example). The orchestration system will automatically provide the right settings (endpoints, bandwidth, etc.). In just a few moments, the student will have shared their own research data, which can then be analysed further. Not only students, but also researchers and other research and education professionals will be able to use this environment in the future.

GÉANT TASK FORCES AND SPECIAL INTEREST GROUPS: A VERY BUSY SEASON AHEAD

After a well-deserved summer break, the GÉANT Task Forces and Special Interest Groups are preparing for a busy September of meetings. If you are new to the community and have never attended a meeting before, or have been absent from them for a while, there is now a great opportunity to get on board with one of your favourite topic areas.

General Data Protection Regulation (GDPR) Meeting

A planning group for a proposed Task Force focussing on GDPR issues launched its activities at the DFN offices in Berlin on the 28th August. But earlier this year, SIG Marcomms was the first GÉANT group to start debating on the importance of the impact of GDPR.

SIG - Management of Service Portfolios (MSP)

SIG-MSP will meet at the HEAnet offices in Dublin on the 20th – 21st September. With such a popular subject, this meeting started attracting a great deal of interest as soon as it was announced in the beginning of the year. The event will focus on a specific topic each day. Day one will look at NRENs and schools - covering best practice, network connectivity for schools and the new UP2U project. Day two will look at current and new NREN Services, including Jisc Liberate, ASPERA and eduVPN.

TF - Computer Security Incident Response Team (CSIRT)

The TF-CSIRT members will get together in Stockholm on the 21st – 22nd September, the meeting will be hosted by the Swedish CERT-forum. The event is now booked-up and the waiting list keeps growing as the Task Force continues to welcome an ever increasing number of NREN representatives. The meeting will also focus on GDPR from a CSIRT perspective, in particular on operational issues such as shared taxonomies and the results of recent scanning efforts by CSIR Teams.

SIG - Cloudy Interoperable Software Stacks (CISS)

SIG-CISS will meet for the very first time on 25th and 26th September in Amsterdam. CISS (to be pronounced with a hard c) is the follow up to the previous TF-Storage group. Hosted by SURFSara, it will take place alongside the Second International Open Research Cloud Congress. Community members who want to get involved in SIG-CISS and help plan its future, are invited to register for the event via the GÉANT eventr pages.

SIG - Information Security Management (ISM)

SIG-ISM's fifth workshop will take place at the BELNET offices in Belgium on the 5th – 6th October. The event participants will receive updates from two recently established working groups that have been busy developing inventories for security officers and guidance for NRENS in setting up ISMS. There will also be an opportunity to learn from other international initiatives in the ISM arena – including the WISE Community. SIG-ISM brings together security teams and Chief Information Security Officers (CISOs) from NREN organisations.

The sixth SIG-NOC (Network Operations Centre) and SIG-PMV (Performance Monitoring and Verification) meetings will take place in November in Utrecht and Copenhagen respectively, setting the scene for another very busy month for SIGs and TFs.

GÉANT SIGs and TFs are grateful to all the kind hosts for helping make these meetings happen and look forward to welcoming more and more members of the community at their future events.

For more information on the full range of Task Forces and Special Interest Groups visit: **https://www.geant.org/Innovation/SIG_TF**

To find out more about GÉANT's Special Interest Groups and Task Forces, please contact Nicole Harris **nicole.harris@geant.org**

CLAW – THE FIRST CRISIS MANAGEMENT WORKSHOP FOR THE GÉANT COMMUNITY

AN OPEN INVITE

Crisis management is becoming an increasingly urgent topic for organisations across the globe. For National Research and Education Networks (NRENs) a crisis can either be an intentional (e.g. cyber-attack) or an unintentional (e.g. network failure due to natural disasters) disruption of their business continuity. For instance, attacks like WannaCry have shown that a large-scale incident is not a question of if, but of when this will take place, and we are also very aware that unintentional failures can occur throughout our

community at any time. To ensure that the GÉANT community is prepared to deal with these types of crisis, a selection of Special Interest Groups and Task Forces are organising the CLAW crisis management event that will take place in **Malaga on 20-21 November 2017**. Registration is open!

The aim of the event is to better develop the crisis management plans and skills of individual NREN organisations and the way the community as a whole can deal with a larger European cyber/network crisis.

At CLAW we will:

- Share successes and failures in lightning talks;
- Learn new crisis communication skills and management techniques in targeted workshops;
- Experience a crisis through a simulation exercise;
- Develop shared vocabulary, templates and procedures to help NRENs to shape their crisis management plans in an explorers and receivers exercise.

All NRENs are invited to send to CLAW representatives from their NOC, marketing-communications, CSIRT and/or information security management teams.

Join CLAW in Malaga whether your organisation is just starting to formulate a crisis management plan or it has been working in this area for many years!

This event is organised by (in alphabetical order):

- Charlie van Genuchten, GÉANT / SURFnet
- Damian Niemir, PSNC – SIG-Marcomms
- Dick Visser, GÉANT

- Francisco Monserrat, RedIRIS – TF-CSIRT
- Giovanni Sorenti, Jisc – SIG-NOC
- Jordi Guijarro, CSUC – TF-CSIRT
- Joze Hanc, ARNES – SIG-NOC
- Laetitia Lagneau, Belnet – SIG-Marcomms
- Nicole Harris, GÉANT
- Robert Haymon-Collins, Jisc – SIG-Marcomms
- Robert Tofte, Nordunet – SIG-ISM
- Sigita Jurkynaitė, GÉANT
- Steffie Bosman, GÉANT
- Victoriano Giralt, University of Malaga
- Wojciech Bohdanowicz, PSNC – SIG-Marcomms

Any questions? Please contact Charlie van Genuchten:
charlie.genuchten@geant.org

To register for CLAW go to:
https://eventr.geant.org/events/2691

![Microsoft logo]

MICROSOFT AZURE & GÉANT ENABLING TRANSFORMATION ACROSS THE RESEARCH AND EDUCATION COMMUNITY

Microsoft Azure is now available through the GÉANT cloud catalogue

Microsoft Azure is a cloud computing service for building, testing, deploying, and managing applications and services through a global network of Microsoft-managed datacenters.

Find out more at **https://azure.microsoft.com/en-us/overview/datacenters/**.

Microsoft Azure combines massively scalable pools of compute, networking and storage resources into a computing environment from which customers can draw resources on-demand and pay only for the usage therefore helping customers avoid upfront capital outlays

and allow the growth of IT capabilities on an as-needed basis.

We believe that Microsoft Azure can enable the Research and Education Community to transform and embrace the many benefits of cloud computing in key areas such as student engagement, operations optimization and research enhancement. Following a highly competitive and successful pan-European IaaS tender, carried out by GÉANT and the NRENs, Microsoft Azure is now offered via the GÉANT Cloud Catalogue through 10 Microsoft resellers across EMEA.

Why Microsoft Azure for Education and Research?

Microsoft Azure is a powerful tool for research and education, and Microsoft provides a number of programs to meet the needs of academic and research institutions. It delivers access to powerful computing environments quickly, enables the expansion of an existing data center with Microsoft Cloud and delivers durable, highly available and massively scalable cloud storage for research data.

Read more about our Cloud computing guide for researchers at **https://blogs.msdn.microsoft.com/ azure_4_research/tag/guide/**.

With Microsoft Azure, researchers can access the cloud with a highly useful and accessible set of features including:

- **Agility** – on-demand with no queuing; high throughput computing to get results faster; and the ability to use it as overflow from on premise HPC clusters
- **Flexibility** – use Virtual Machines to match the job you need done exactly, multi-core, fast CPU with big memory, and be the administrator on your own machine
- **Scalability** – Azure for Research is massively scalable with no upfront investment

Find out more about how Microsoft Azure is being used to propel Research at **https://www.microsoft.com/en-us/research/academic-program/microsoft-azure-for-research/**.

Microsoft Azure is now available through the GÉANT cloud catalogue

Microsoft Azure is now offered via the GÉANT Cloud Catalogue through 10 Microsoft resellers across EMEA. The 10 resellers awarded under the Framework are: Atea, Cacttus, Comparex, Dom-Daniel, Infosoft, Micromail, Nextsense, Axians, SoftwareOne and Span.

The framework agreements with these resellers benefits educational institutions and research organizations using Microsoft Azure in the following ways:

- Institutions can buy and use Microsoft Azure directly, without the need for complex and time-consuming tenders and contract procedures; and benefit from volume discounts.
- Framework contracts are compliant with EU privacy and data security regulations.
- Users can login to the Microsoft Azure services using single sign-on (SSO), via their institutional identity management solutions.
- Significantly reduced network traffic costs, with Microsoft Azure services connected to the high – performance data networks provided by GÉANT and its NREN partners.
- Support in moving workloads to Microsoft Azure.
- Leverage existing Microsoft licensing arrangements for BYOL (bring your own licensing).
- Enterprise cloud management tools enabling control, oversight and delegation to a community of users and group.

Top Workloads on Microsoft Azure and more:

(Find a full list at **https://azure. microsoft.com/en-us/solutions/**)

Virtual Machines - Access to powerful computing environments, fast

- We make it easy to swap workloads from on premise to the cloud
- Avoid limitations or failure of older hardware and connectivity
- Don't worry about storage and backup
- Multiple varieties of Linux supported
- Pay only for what you use

Storage - Durable, highly available and massively scalable cloud storage for your research data

- Optimize storage for different data types
- Hyperscale repository for big data analytics workloads
- Premium Storage Disks option: SSD-based, high IOPs, low latency
- StorSimple – hybrid cloud storage reduces costs, optimizes access times and improves data security

Network Connectivity - Expanding existing data center with Microsoft Cloud and simpler management

- Azure AD provides a comprehensive identity and access management cloud solution in the public cloud
- Enables streamlined sign-in capabilities to all of institution's domains and thousands of partner applications
- Self-service Password Reset saves a lot of time and costs
- Multi-Factor Authentication increases security for critical workloads

Website and WebApp Hosting - Build, deploy and maintain Websites and Apps

- Save Money by Auto-Scaling up and down
- Ensure Website Availability and maintain performance
- Cross-Platform capabilities - support favourite publishing tools and languages

Data Sharing - Collaborate, build communities around research results and accelerate the speed of discovery

- Easy to set up
- Post data publicly for external consumption
- Federated authorization
- Massive amounts of data can be processed
- Comply with publicly posted data requirements

Backup and Disaster Recovery - Ensure work continuity without the expense of secondary infrastructure

- Compressed to minimize impact on bandwidth
- Backed up in off-peak hours not to take up bandwidth
- No backup hardware or compute costs
- Only backs up the difference for efficiency

Cortana Intelligence Suite - Turn Research data into Insights

- Utilize the latest in Machine Learning platform
- Leverage and Analyze Data with SQL, HDInsight (Hadoop) and Power BI
- Leverage Cognitive Services (Computer vision, speech recognition, hearing)

IoT Suite - Fully realize benefits of a connected world

- Build on the infrastructure you already have
- Collect data from widely separated devices and sensors
- Get more from your data with analysis, modelling and sharing
- Secure your devices and data

Security - 20 years of experience and expertise

- Largest global footprint of data centers in the industry
- Security – the server farms have 3 layers of physical security
- Institutions get their encryption key so Microsoft does not keep it
- Find out more about Azure Trust Center at **https://www.microsoft. com/en-us/TrustCenter/Privacy/ gdpr/default.aspx**

Privacy and Compliance - The largest compliance portfolio in the industry

- Microsoft Azure helps customers achieve and remain GDPR compliant. Find out more at **https://azure. microsoft.com/en-us/blog/gdpr-questions-azure-has-answers/**
- Security goals set in context of business and industry requirements
- Security analytics & best practices deployed to detect and respond to threats
- Benchmarked to a high bar of certifications and accreditations to ensure compliance
- Continual monitoring, test and audit
- Ongoing update of certifications for new services
- 24 regions available and 8 announced
- 38 compliance certifications

To find out more about Microsoft Azure through the GÉANT Framework visit **https://clouds. geant.org/geant-cloud-catalogue/ geant-cloud-catalogue-iaas/ microsoft-azure/**

ATEA – BUILD THE FUTURE WITH MICROSOFT AZURE

Who is Atea

Atea with its 6800 employees and presence in 86 cities in Europe delivers IT products from leading vendors and assists its customers with specialist competencies within IT infrastructure and cloud services. Atea had revenue of approximately EUR 3.3 billion in 2016 and is listed on Oslo Stock Exchange.

Why should you join the cloud?

Cloud computing gives a list of benefits when it comes to Research and Education institutions. That includes: flexibility – scales alongside your business; disaster recovery – avoid large up-front investment and roll up third-party expertise as part of the deal; automatic software updates; increased collaboration – all involved parties can access/edit all data anytime from anywhere; high-level security and many others.

Azure Expert Center model since 2014	TP2B The Place to Be for NRENs and their members	ATEA AND EUROPEAN COVERAGE
22 Countries in GÉANT deal	6 800 employees	
8 Years of ISO 20000 and ISO27001	350+ Azure managed services resources	
Microsoft Partner of the Year 2016 Cloud Productivity	Rethink Portal with eduGAIN support	

ATEA

What we do

According to Atea's experience, the most common reason that can hold back Research and Education institutions from migrating existing infrastructure to the cloud is lack of knowledge and necessary resources to fully operate the environment and monitor multiple Microsoft Azure subscriptions.

By using the competence and knowledge of Atea's Azure experts, Atea is helping researchers and educators to make their first steps toward the cloud solutions in a safe, easy and cost-efficient way, providing full support and technical assistance.

Atea is utilizing its extensive staffing with 350+ highly skilled Microsoft Azure architects, experts and technicians to support GÉANT and its members. Service offerings range from Service Desk services over consultancy to operational services, where Atea takes responsibility for deployed workloads (IaaS, PaaS and/or SaaS) in Microsoft Azure, including:

- Micorsoft Azure Expert Center
- Microsoft Azure Managed Services
- 24/7 Technical Support
- Billing Support and Cost Control Services
- Cloud Sales Platform with eduGAIN support

Being a Microsoft Cloud Solution Provider, ATEA's aim is to support Microsoft Cloud service users with the best possible level of quality, availability and speed.

Atea is the service provider that can help Research and Educational institutions around Europe that are embarking on the cloud journey, with knowledge sharing and transforming Europe's educational sector into the digital world.

How we will do it

Having the means without direction is like having a range of airports but not the fleet of planes to connect people faster around the world. The same can be said about having a cloud platform. Without the applications built on top that utilizes Micorsoft Azure capabilities, the platform itself doesn't serve a purpose. This is why we in Atea are working closely with the ISV (Independent Software Vendor) community in enabling their solutions for Education and Research. With top level expertize in enabling the actual solutions that will drive forward collaboration between universities and reseachers we wish to improve the way research and knowledge can be shared and worked on. We are on top of that going to assist in in automating solutions developed by GÉANT members so that they can be shared and utilized by other members.

Participation in GÉANT IaaS

It is an honour to have been selected as one of Microsoft's approved resellers of Microsoft Azure in 22 countries around Europe as part of the GÉANT IaaS Framework, as it helps to work with Atea's vision and mission: that cloud computing will advance Europe even further in technology developments and prosperity. It is Atea's mission to

"Enable Research and Academia to collaborate and share knowledge across countries – sharing solutions and software".
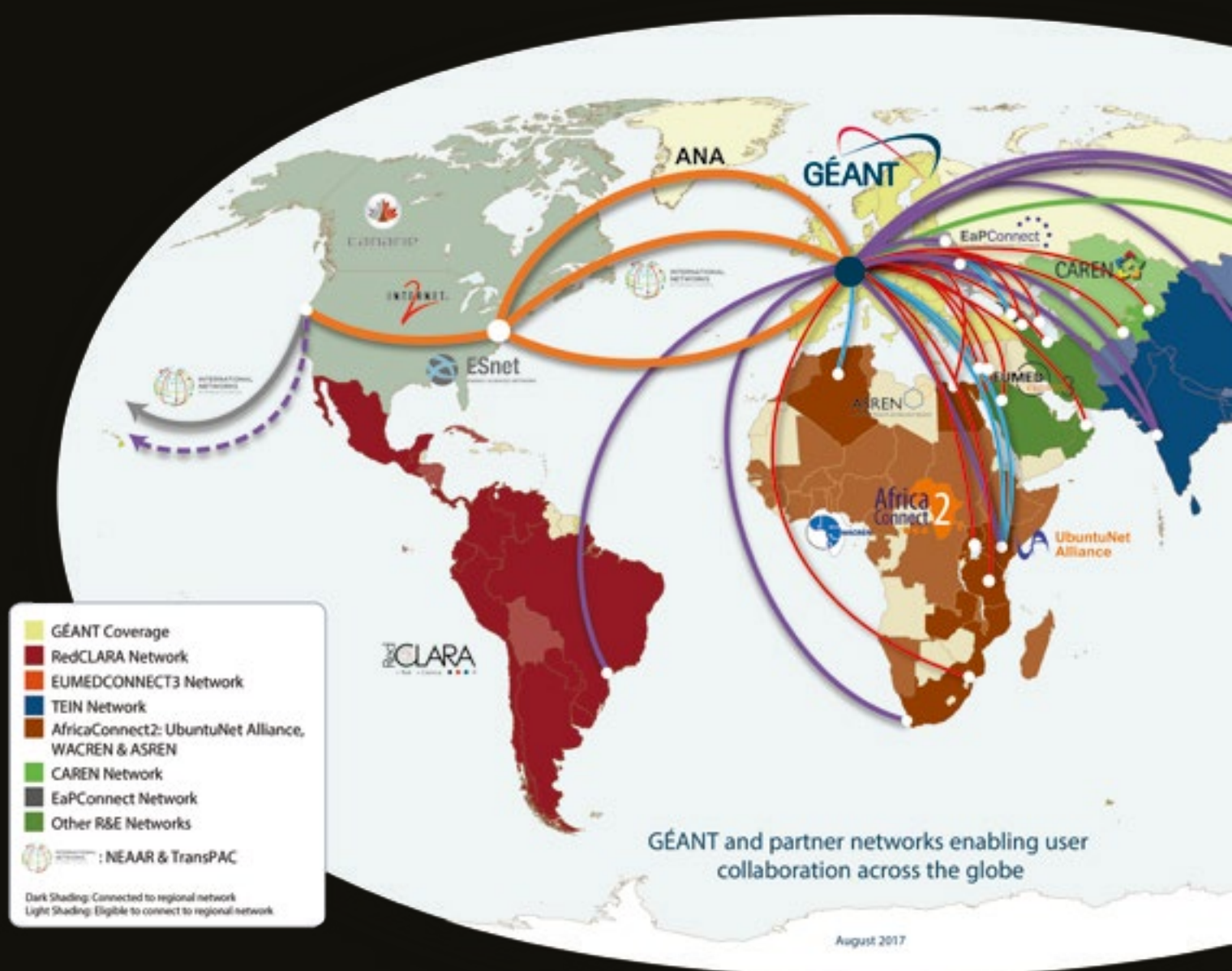
Pictures
ATEA

More information:

For more information please visit **http://www.atea.com**

Regarding GÉANT IaaS project or any cloud related questions please feel free to contact **AGS-GÉANT@atea.com**

GÉANT AT A GLANCE

GÉANT is the leading collaboration on network and related infrastructure and services for the benefit of Research and Education, contributing to Europe's economic growth and competitiveness.

GÉANT has 41 member countries and is owned by its core NREN membership, and also has Associate members including commercial organisations and multi-national research infrastructures and projects.

GÉANT and partner networks enabling user collaboration across the globe

August 2017

Legend:
- GÉANT Coverage
- RedCLARA Network
- EUMEDCONNECT3 Network
- TEIN Network
- AfricaConnect2: UbuntuNet Alliance, WACREN & ASREN
- CAREN Network
- EaPConnect Network
- Other R&E Networks
- : NEAAR & TransPAC

Dark Shading: Connected to regional network
Light Shading: Eligible to connect to regional network

Join the conversation

www.geant.org

www.facebook.com/GEANTcommunity

Networks

GÉANT interconnects research, education and innovation communities worldwide, with secure, high-capacity networks. We plan, procure and build the large-scale, high-speed networks that are essential for sharing, accessing and processing the high data volumes generated by Research and Education communities, and for testing innovative technologies and applications.

GÉANT also provides network and collaboration services that facilitate international cooperation between researchers and educators, and brings people together for the human networking that drives innovation.

Services

GÉANT develops the services its members need to support researchers, educators and innovators - at national, European and international levels.

Our portfolio of advanced services covers connectivity and network management, trust identity and security, real-time communications, storage and clouds and professional services.
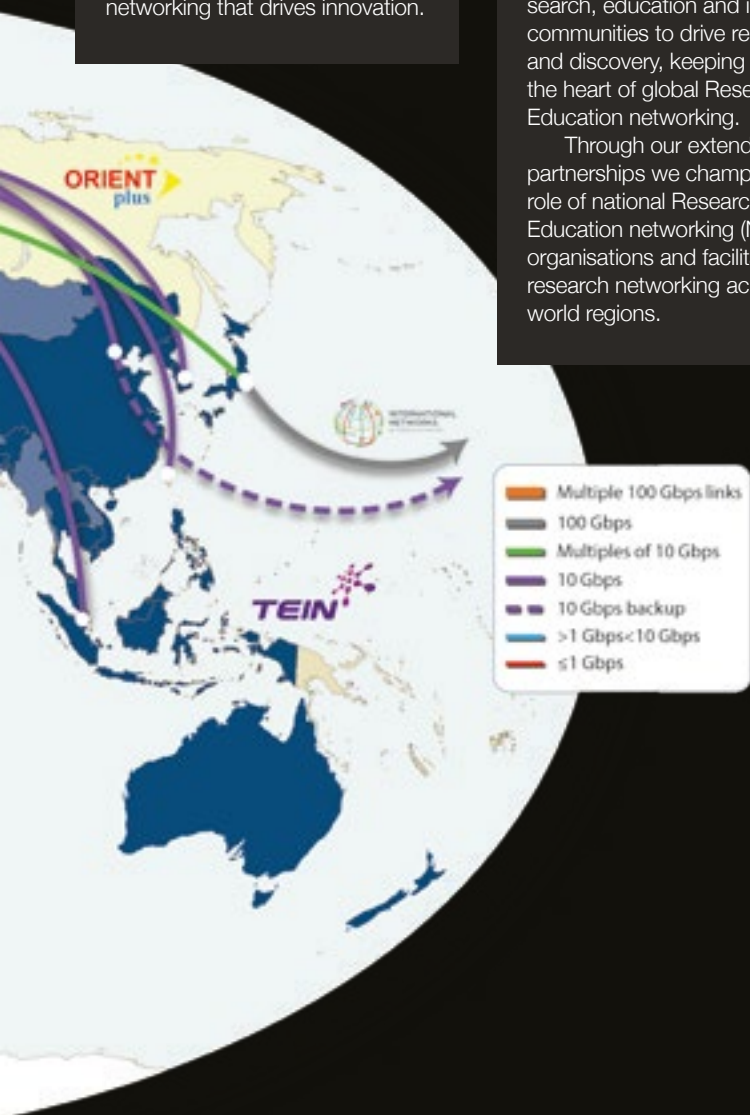
People

GÉANT collaborates with its members, partners and their re search, education and innovation communities to drive research and discovery, keeping Europe at the heart of global Research and Education networking.

Through our extended global partnerships we champion the role of national Research and Education networking (NREN) organisations and facilitate research networking across all world regions.

Innovation

GÉANT invests in the research and development of network architectures, technologies and paradigms to develop into the services, processes, tools and network capabilities of tomorrow.

GÉANT facilitates community collaboration that pushes the boundaries of networking possibilities. Fresh ideas from task forces, special interest groups and open calls are applied through specific research activities and initiatives, informed by foresight studies and future user needs to achieve and promote innovation.

Projects

GÉANT is a trusted European Commission (EC) partner in many global collaboration projects and initiatives through our special relationship with the European Union.

We have built up our depth of network expertise and leadership over two decades, and excel in managing and participating in highly successful projects, delivering Research and Education networks and services, and coordinating innovation.

Learn more at
www.geant.org

ORIENT plus

TEIN

Multiple 100 Gbps links
100 Gbps
Multiples of 10 Gbps
10 Gbps
10 Gbps backup
>1 Gbps<10 Gbps
≤1 Gbps

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