GÉANT
Networks • Services • People

CONNECT

THE MAGAZINE FROM THE GÉANT COMMUNITY | ISSUE 28 2018

THE TRUST AND IDENTITY ISSUE

AARC AND EDUGAIN WORKING TOGETHER TO EXPAND FEDERATED ACCESS

EDUVPN SECURING YOUR PRIVACY ON PUBLIC WI-FI

AARC PILOTS AAI SOLUTIONS FOR RESEARCH

SURFCONEXT AND EDUGAIN CONNECTING PEOPLE TO RESOURCES WORLDWIDE

ALSO IN THIS ISSUE

CLOUD SERVICES: DELIVERING VALUE AND SAVING MONEY

CONNECT INTERVIEWS: MICHAEL FOLEY AND WACREN'S BOUBAKAR BARRY

ENGAGING WITH RESEARCH: MEET THE TEAM SUPPORTING INTERNATIONAL USER COMMUNITIES

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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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WELCOME FROM CATHRIN STÖVER

Trust and Identity are in full focus in this latest issue of the CONNECT magazine. I specifically enjoyed reading the piece about eduVPN – ultra-secure access through the quick and easy creation of an eduVPN tunnel when enjoying free Wi-Fi in a café or on a train.

I was equally impressed by how the AARC project creates a blueprint architecture to ensure that multi-institutional research collaborations no longer need to develop their own AAI, thus increasing the AAI interoperability across the fields. The case studies from the CTA and CORBEL research infrastructures show impressive efficiency gains.

For the CONNECT interviews, we have had the pleasure of talking to Michael Foley and Boubakar Barry, both champions for NREN development around the world. While Michael takes a global view, Boubakar invites us to celebrate the long-awaited connectivity to West and Central Africa when the WACREN network is launched at the WACREN conference in mid-March in Togo.

And we hear from the new GÉANT research engagement and support team - meet the team around Enzo Capone, learn more about the way the team works with NRENs around the world to support a diverse group of international user projects and check out why they like spending their days in Space.

I hope you enjoy this issue, which is again bursting with the diverse success stories and news of our ever growing community.

Cathrin Stöver, GÉANT

TNC18 - AT THE COOL EDGES OF INTERNATIONAL NETWORKING

TNC18, Trondheim, Norway, 10-14 June 2018

The largest European research networking conference is preparing for another inspiring community event. With its stimulating title "Intelligent networks, cool edges?" the TNC18 programme, with its sessions, demonstrations and talks will certainly get your synapses firing.

Over the years, Research and Education networks have evolved from dedicated connectivity providers to pioneering above the net service architects and innovation enablers. Empowering future generations to shape their success and solving global challenges is at the heart of our shared mission.

TNC18 will present ideas and concepts across a variety of thought provoking sub-themes from the responsibility of sustainability and delivery, to the power of data analytics, the creation of intelligent complexity, and networking at the speed of science.

THE WORD OF THE HOST

Ingrid Melve, Technical Director, ICT Services for Research and Education for UNINETT and Chair of TNC18 Programme Committee, is looking forward to welcoming you in Trondheim. Here are her reasons why you should come to TNC18:

TNC18 in Trondheim, Norway, presents a unique opportunity to meet all key stakeholders in Research and Education networking; from e-infrastructure to data intensive research activity and network suppliers or funding bodies: all your peers will be there. The conference is a mixture of plenary sessions, parallel sessions, workshops, meetings and informal discussions; the programme will update you on international trends and opportunities in Research and Education networking. Trondheim is the tech capital of Norway, and home of UNINETT: we welcome you to the edge of Europe, where summer nights are light, and technology evolves.

Learn more at: **tnc18.geant.org**
Contact: **tnc18@lists.geant.org**

KEYNOTE SPEAKERS

Through keynote speeches TNC18 presents participants with a unique overview of the latest developments in Research and Education networking, both in the technical field and in the area of application management. Ranging from networking in extreme environments to security of connected medical implants and quantum technology, TNC18 covers a wide variety of inspiring topics by renowned experts in their fields.

This year's keynote speakers are:

STEPHANIE WEHNER

Professor in quantum information at the Technical University of Delft, Stephanie is one of the founders of QCRYPT, the largest conference in quantum cryptography. From 2010 to 2014, her research group was located at the Centre for Quantum Technologies, National University of Singapore, where she was first Assistant and later Associate Professor. Stephanie's presentation will introduce us to the world of quantum internet. What is a quantum-based Internet good for? Why is quantum communication so powerful? What does quantum communication change about the way we communicate?

MARIE MOE

Research Manager at SINTEF, the largest independent research organisation in Scandinavia, Marie has a PhD in information security. She is also an Associate Professor at the Norwegian University of Science and Technology. She has experience as a team leader at the Norwegian Cyber Security Centre NorCERT. Marie's keynote speech focuses on her current research on the security of her own personal critical infrastructure, an implanted pacemaker that is generating every single beat of her heart.

HELGE STRANDEN

Senior Advisor on ICT & HPC physical infrastructure at UNINETT, Helge will give us an insight on the challenges faced in the deployment and management of optical networks for research purposes in arctic environments. Helge's keynote address will feature live video footage from UNINETT's subsea cable project where 2x270 kilometres of optic cable was laid on the seabed outside Svalbard, an arctic archipelago located between mainland Norway and the North Pole.

MEOLI KASHORDA

Executive Director of Kenya Education Network (KENET), the National Research and Education Network of Kenya. Meoli is also a Professor of information systems at United States International University - Africa (USIU) in Kenya. Meoli's keynote presentation will describe how KENET has been able to overcome the obstacles of lack of adequate road/electricity infrastructures, limited penetration of fibre networks, and low network engineering skills to build a high-speed network.

INSIDE THE PROGRAMME COMMITTEE

The TNC18 Programme Committee is an international group of experts in Research and Education networking committed to providing a forum for our community to collaborate and advance science for the benefit of all. All members had the difficult task of structuring the conference programme and designing the final sessions after co-reviewing the submitted papers online and were also faced with tough decisions due to the high calibre of all the submitted proposals, received in record number this year.

Here are some interesting facts and figures:

- 50 Side meeting requests submitted
- 20 Demonstrations submitted
- 121 Proposals for sessions / presentations submitted
- 6 Confirmed keynote speakers
- 24 Sessions created

Earth Observations, Privacy, Responsible Education, Intelligent Networks, Orchestration, Security, Cloud Futures are just some of the subject areas included in TNC18's session themes. Such a wealth of themes and talent promises to generate stimulating debates, create new international collaborations, strengthen the networking community and enhance the prestige of GÉANT's flagship conference as a result.

Mirjam Kühne, Senior Community Builder at the RIPE NCC, remembers how the Regional Internet Registry first found a home at what is now GÉANT:

"The RIPE NCC was originally born out of the NREN community in the early 1990s, and it's great to see that our collaboration with GÉANT and TNC continues to this day. Even though the RIPE community has evolved and grown significantly since those early days, NRENs remain an integral part of our community and we're increasingly reaching out to the academic world, particularly during TNC. What I especially like about TNC is the mix of academia and networking, science and operations, and the occasional oddball topic - a great place for a community builder!"

ALEXANDRA BECH GJØRV

President and CEO of SINTEF, the largest independent research institution in Scandinavia. In addition to playing leadership roles at organisations such as Statoil and Norsk Hydro, Alexandra has also served on the board of a range of industry, energy and media companies in Norway and internationally. Alexandra's keynote presentation focuses on the impact of the digital transformation on research organisations and the everyday research of all its scientists and researchers.

ANDREW WOODS

Senior Research fellow at Curtin University in Western Australia, Andrew is an experienced engineer and a technical manager with a strong background in stereoscopic 3D imaging, visualisation, 3D reconstruction, 3D cameras and displays. Andrew's keynote address presents the Sydney-Kormoran Project, a multidisciplinary project combining deep-water imaging, supercomputing, image processing, advanced visualisation and history to tell the story of two of Australia's most significant shipwrecks.

tnc18 Trondheim, Norway 10 -14 June 2018
Intelligent networks, cool edges?


Trondheim

2018 GÉANT COMMUNITY AWARD

2018 GÉANT COMMUNITY AWARD

Nominations are now open for the 2018 GÉANT Community Award. The winner will be selected by a panel of judges from within the GÉANT community and will be announced at TNC18.

AWARD CATEGORIES

The GÉANT Community Award welcomes submissions in the following three award categories:

- Initiators of significant new ideas or improvements which have had lasting impact on the organisation, project or community.
- Impactful contributors to the GÉANT project or wider community activities over a sustained period of time.
- Outstanding contributions to the project or community which have immediately led to significant and recognisable new ideas, developments or improvements over the last 12 months.

HOW TO NOMINATE

A maximum of two submissions per person will be accepted; if more nominations are submitted, only the first two complete forms will be taken into account. The nomination form is available online: **https://www.surveymonkey.com/r/2018communityaward**.

Deadline for nominations is midnight CET on Friday 16 March, we encourage you to take this opportunity and nominate a colleague or a member of your community that you think deserves recognition for their contributions to Research and Education networking in Europe and further afield.

THE PORT HACKATHON – SUPPORTING HUMANITARIAN INNOVATION

Complementary skills for a great cause

CONNECT meets Domenico Vicinanza from GÉANT and Anglia Ruskin University and Genevieve Williams from the University of Exeter to learn about their project created to support the work of Red Cross International and Handicap International presented at THE Port Humanitarian Hackathon in October last year: the development of an affordable smart wobble-board for lower limb amputees.

Domenico, a physicist and sensor specialist, and Genevieve, a biomechanical and human movement scientist, combined their complementary skills and expertise when they started developing the concept for a technological physiotherapy solution for lower limb amputees at the initial stage of their rehabilitation process. Their vision was a device to support gait retraining for lower limb amputees.

Lower limb amputation as consequence of war and conflict, has catastrophic effects in terms of an individual's basic movements and functions, their mental and physical well-being and their societal contribution. The consequences of this terrible man-made catastrophe inspired both scientists who presented their project plan about the creation of a portable, affordable and «smart» wobble-board. The wobble board uses on-board sensors to provide visual and auditory feedback to patients that helps them to re-learn to balance and start to walk on their new prosthetic limb.

In war-stricken zones around the globe the widespread presence of land mines is one of the main causes of incidents requiring lower limb amputation. One of the regions mainly affected is Sub-Saharan Africa, a territory featuring one of the highest densities of landmines on our planet. In order to support an inordinate number of lower limb amputees in the region, each year NGOs from around the world organise shipments of more than 5,000 prostheses to this vast area. Recent improvements in technology, culminating with the use of 3D printing, have facilitated the production of custom-made prostheses tailored to the specific needs of every single amputee.

Paired with the high numbers of amputees requiring assistance, the territory in question features also one of the lowest density of physicians in the world, approximately one for every 2,000 inhabitants. As a consequence, contacts between patients and health professionals are extremely limited, inevitably delaying the rehabilitation process with often devastating psychological and financial consequences for the affected individuals, their families and their communities.

Pictures
Left; Final wobble board presentation. Top right; Wobble board in action. Bottom right; Domenico Vicinanza

A simple, but effective device

The Red Cross had issued a detailed booklet in English language with gait retraining exercises for lower limb amputees, which was an important step forward and a very useful initiative, but it required the presence of an English-speaking health professional during the rehabilitation process and constant, expert supervision.

After the 60-hour Hackathon a multidisciplinary team of experts from around the world, lead by Domenico and Genevieve, developed a working prototype of a special, smart wobble-board that basically brought the Red Cross booklet to life. The board is modular, flat-packable, programmable, network-enabled and shippable. The device uses real-time data sonification, a process where sound is created from the movements of the board. While the patient performs the exercises, a customisable, audible feedback is generated according to an algorithm designed for the patients' specific needs enabling them to follow specific physiotherapy exercises. In addition, the device has a memory card to store data and measurements related to the re-training exercises and is Bluetooth and Wi-Fi enabled, making it possible for physicians and therapists located anywhere in the world to access the data, monitor the progress of the patient, provide feedback in real time and adjust the therapy. Thanks to network connectivity the therapist can listen to the real time sonification and identify issues based on variations of melody patterns; whilst thanks to the local storage of data, expert professionals can access the measurements at anytime from anywhere, track progress and compare performances.

The future

Combining research and education networking - for example connecting the wobble-board to a hospital or a research centre using eduroam - with expertise and remote support, would turn the smart wobble board into a powerful rehabilitation tool for isolated communities or in war-stricken zones. It could also work as a prototype for an entire new way of approaching physical therapy; in fact the smart wobble board developed by Genevieve and Domenico's team is at the cross-road of science, technology and arts/humanities. With the use of smart sensors and networking it can enable remote support and can connect to similar devices in the same region. This revolutionary device can contribute to bringing the focus back to the patient, placing him or her at the very heart of the therapy and to making the rehabilitation process more engaging and effective for patients and practitioners.

The Hackathon 2017 team who worked on the wobble board prototype:

Genevieve Williams (GB)
Domenico Vicinanza (GB)
Enrico Bassi (IT)
Joao Guerra (PT)
Joe Gaylord (US)
Lamia Benaouali (DZ)
Maurizio Ali (IT)
Miguel Gómez-Escolar (ES)
Samuel Örn (SE)
Stella Orfanelli (GR)
Zim Hang (US)

About THE Port

THE Port is an independent Swiss non-profit association ruled by its members and based on volunteer working. It is supported via in-kind donations from CERN and the Globe of Science and Innovation for holding the Humanitarian Hackathon.

THE Port Humanitarian Hackathon
THE Port Humanitarian Hackathon, organised by THE Port Association, hosted by IdeaSquare, CERN with partners from non-governmental organisations, is a 60 hour brainstorming workshop devoted to humanitarian, social and public interest topics. Interdisciplinary teams of selected participants work together in the fields of communication, transport, health, science, learning, culture and data.

This unique event aims to demonstrate how fundamental science can benefit to society through the creation of tangible and cost-efficient technological solutions to humanitarian issues. Challenges tackled within the hackathons result in the creation of working prototypes which are then promoted to be implemented in the field. This year the Hackathon took place on 6 to 8 October at CERN: 60 participants from around the globe, 12 mentors and field workers and 10 coaches from THE Port worked on 5 humanitarian challenges. Final presentations were delivered to an audience of 250 guests from NGOs, private sector, social entrepreneurship, academia and the media. The following organisations collaborated to make it happen: Terre des Hommes, Global Humanitarian Lab, Hôpitaux Universitaires de Genève, Changemakers Lab, MIT D-Lab, Impact Hub Geneva, Global Shapers Community.

For further information on THE Port Humanitarian Hackathon 2017:
http://theport.ch/home/the-port-2017/

For the Hackathon video visit:
https://vimeo.com/239013780/8a008ab8a6

GÉANT COMPENDIUM

PAINTING AN 'ON-DEMAND' PICTURE OF NREN EVOLUTION

The GÉANT Compendium of National Research and Education Networks in Europe (The Compendium) has, since 2001, collated information about NRENs in areas such as network, funding and services via an annual survey.

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Words
Sabrina McCollum, Community Research Officer

It is the result of a broad, collective effort to portray the networks of the research and education community in Europe and beyond. Almost 500 people participate in the joint effort by providing facts and figures to populate the rich and colourful picture it presents. It is then members of this same community who comment on findings via a report which is produced annually.

NRENs are a large and diverse family. Each national organisation reflects the specific environment in which it grew, with country-specific peculiarities such as the political situation, the history of the organisation and its relations with user groups, funding agencies, and the status of research and education in that country all woven into its fabric. The diversity and complexity of the NREN community can make comparison challenging, but it is the Compendium's ambition to help provide an insight into this thriving community.

By harnessing the understanding we have of the past and current NREN landscape, the Compendium offers an informed look at ways to further support the research and education sector.

"The Compendium is a living picture of what we, the NRENs, do every day to meet our users' requirements and help them in their research, teaching and learning activities,"

adds Elis Bertazzon of GARR.

Within the NREN community it is used as a reference source; to guide strategic planning; and as support material when negotiating with national funding bodies. For those outside, this self-portrait is for anyone with an interest in the development of national research and education networks and the organisations behind them.

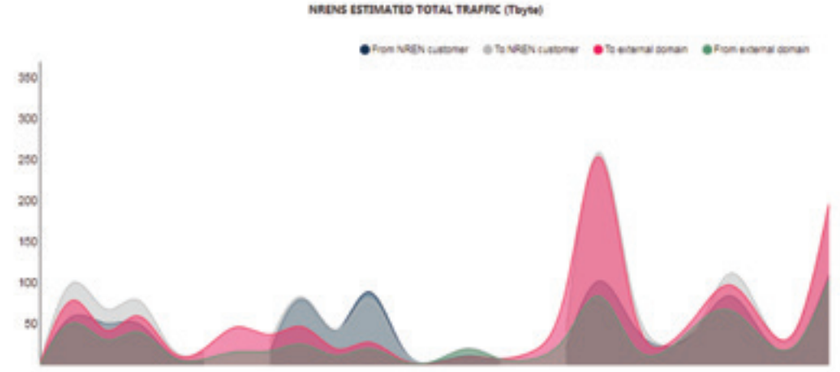
You can find electronic copies of the reports at **https://compendium.geant.org** "Download Print Edition" button.

Making the community's data work for the community

To make the survey data as accessible as possible, and easy to visualise and customise, we soft-launched in November 2017 a custom-built website that allows users to compare data from different countries and regions across an extended period as well as look at various aspects of specific countries like staffing levels in a graphical way.

Traffic Volumes

Data on the traffic flowing to and from external networks as well as to and from institutions connected to the NREN.



From **https://compendium.geant.org** users can explore current and past network traffic statistics, the type of organisations that connect, and funding and staffing levels and sources as well as links out to service portfolios and the full list of responses given by each respondent organisation. In addition, the website users have the opportunity to download the relevant subset of the data they are interested in to further look at the numbers.

The site is very much in development and we are keen to gather feedback on it so please get in touch if you've any thoughts at **info@geant.org**

What is the data showing?

Taking into account the latest survey which closed in December 2017, the stories emerging are positive. The picture is clearly very different in the different countries and regions but we are broadly seeing an increase in budgets and personnel, the diversification of the NRENs' user base and service portfolio, and growing network usage.

For example, the number of schools connected to NREN networks surged by 28% from 25,460 (2016) to 32,543 (2017). In addition, it has been noted that where a local NREN's acceptable usage policy allows it to connect, the number of government institutions grew by 75% and for-profit organisations by 57%. In terms of what additional connectors means for the network, over half of the NRENs who responded forecast the average traffic growth to be circa 49% by 2020 – with schools coming out at 61% expected growth.

VOICE OF THE BOARD: RAIMUNDAS TUMINAUSKAS

Continuing our series of Board member interviews, CONNECT spoke to Raimundas Tuminauskas, Head of the LITNET computer network centre in Lithuania, and GÉANT Board member since 2015, about the GÉANT Programme Planning Committee (GPPC) and his hopes for the GÉANT Board.

Raimundas joined the Kaunas University of Technology as a full time network engineer in July 1997 and soon became responsible for high capacity switching and routing in the Lithuanian NREN LITNET. He currently heads the computer network centre, in charge of coordination of the LITNET programme and the university network and services. Being deeply involved in the creation of long-term plans, he is directing efforts towards optical communications, future networking, open architectures, open network technologies, federated use of network infrastructure, and integrated radio access. Raimundas is the Chair of the GÉANT Programme Planning Committee (GPPC).

Raimundas, what is the main purpose of the GPPC?

The GPPC is a committee of NREN representatives elected by the General Assembly (GA). For me the committee's responsibilities could be summarised into two main points: to provide guidance and assistance to the GÉANT staff in planning and writing the project proposals to the EC and to balance the NRENs' position within the GÉANT programme as a whole and within each project in particular. Ultimately, the value of the GPPC lies in the transparent and inclusive planning within known budgetary limits. Currently GÉANT activities are not limited to the "flagship" GN4 project, but include other activities involving the European research e-infrastructures, most notably the European Open Science Cloud (EOSC).

What is the GPPC working on now?

Currently the GPPC is deeply involved in the preparation of the GN4 successor project proposals with the aim to maximise coherency of activities and accuracy of resource planning. Nevertheless, the committee is also looking at other Horizon2020 projects calls. The NRENs are also involved in many parallel activities and have expressed their interest in a variety of initiatives that cannot be covered by the GN4 project alone.

Can you describe the process the GPPC is taking as it plans for a GN4-2 successor project?

There will be two GN4-2 successor projects: a "normal" GN4-3 project with activities and tasks, and a separate proposal for EC-funded network infrastructures, currently known in the community as the IRU (or SGA-3b) proposal. The process has three parallel tracks: definition of GÉANT network strategy, estimation of infrastructure deployment feasibility, and planning of GN4-2 successor activities and tasks. The process is defined by the timeline of the decision points that will be discussed during the meetings of the Board and of the General Assembly (GA).

For the "normal" GN4-3 project the planning process is an iterative community consultation. Currently the GÉANT community experts have prepared their views of the proposed operational directions in white papers apportioned to seven specific thematic areas. The open consultation with NRENs has already started and has produced the initial indication of the priorities that will be taken into account in the actual composition and budgeting of the proposal.

What is your main area of responsibility on the GÉANT Board?

My main area of responsibility focuses on the planning of the GÉANT's programmes. I have also worked on the organisation's governance, or rather on the inter-relations of the various components within GÉANT: in particular, after the DANTE and TERENA merger, I focused on the relation between the committees and the governance triangle represented by the BOARD, the CEO and the General Assembly.

How do you think the Board can best support the work of the GPPC?

As you know, I am in a special position as an elected member of the GÉANT Board and head of the GPPC, so whilst wearing both hats, I can objectively say that the GPPC and the Board have so far established positive understanding and communication flows.

I think that receiving regular updates on the Board's interaction between the EC and the players of the EOSC arena, as well as guidance in the definition of the various activity areas' operational strategies, would definitely ease the work of the GPPC. My vision of the interaction between the GPPC and the Board is based on a mutual and continuous exchange of strategic guidance.

According to new terms of reference submitted to the GA, the GPPC reporting line and liaison with the Board will soon be formalised and the GPPC will report directly to the CEO. The GPPC has been constituted from elected NREN members in order to give NRENs the opportunity to input into the GÉANT planning process. The interaction between NRENs, the CEO and the Board, operating in a fast changing environment, is a balancing act that requires continuous adjustments, and as a keen cyclist, I am very aware of this requirement!

NEW AMSTERDAM OFFICE FOR GÉANT

Following the relocation of the GÉANT Amsterdam office in December 2017, February's GÉANT Board meeting offered the perfect opportunity to mark the office opening in style!

Board members, GÉANT staff and many invited guests enjoyed a great informal evening with welcoming words from Chair of the Board Christian Grimm and Interim CEO Erik Huizer.

The new office is well located in Amsterdam-Zuidoost, Bijlmer, and for our growing Amsterdam based staff the modern, open space located right opposite the Amsterdam Bijlmer ArenA train station brings a collaborative and exciting feel. For visitors and staff travelling between offices, it also offers fast and easy transport connections to Schiphol airport.

Our new address is:
GÉANT
Hoekenrode 3
1102 BR Amsterdam
The Netherlands

GÉANT CLOUD SERVICES: YEAR IN REVIEW

Andres Steijaert, GÉANT Cloud Services Activity leader, looks back at the successes of 2017 and forward to 2018.

The New Year is traditionally a time for reflection. On the year gone by of course, but also with a view toward the future.

The GN4-2 Project's Joint Research Activity for Cloud Application Services Delivery Development (JRA4) has had a very active year and recorded a number of significant achievements. Building on work carried out previously, the team has continued to expand the NREN collaboration on clouds and strengthen GÉANT's position as an efficient service delivery gateway and single route to market.

During the year, the first version of the service delivery channel was applied and 25 new services were added to the GÉANT cloud service portfolio. These include IaaS services, private cloud file storage products, and web-conferencing and video-conferencing offerings.

IaaS tender

The IaaS tender was perhaps the most significant achievement. 36 NRENs participated in the tender, 27 NRENs activated a delivery role (Referrer, Reseller and/or Underwriter) and now use the GÉANT cloud support resources. 18 NRENs have been allocated 6 man-months of GÉANT funding to deliver the IaaS portfolio in their countries via many avenues. 16 NRENs have organised national cloud events related to the IaaS portfolio.

This investment has delivered the goods! Here are some highlights:

- 56 institutions from nine countries use cloud services via the IaaS offering: Croatia, Denmark, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain and Sweden.
- A community of NREN cloud delivery managers (CDM) and support team members numbers 125. The community manages meetings, seminars, workshops, weekly conferences, an active e-mail list, a public clouds website and an intranet workspace for information sharing.
- Tailor-made offerings for use below national tender thresholds were also negotiated with file storage providers Nextcloud and ownCloud.
- JRA4 teams are developing components for open source video-conferencing infrastructures based on the 2016-2017 tender. This tender evaluated multi-tenant on-premises solutions in managed and unmanaged scenarios. The vendors selected are available for 43 NRENs in Europe, plus NORDUnet and GÉANT.

While the achievements are impressive and met, or exceeded, all goals and KPIs, the teams are already busy on the next steps.

Looking to 2018

This year, plans are already underway to ensure the portfolio's General Data Protection Regulation (GDPR) compliance. In addition, work continues to further develop and improve the delivery platform, to make it as easy as possible for institutions to use the available services.

Additions to the portfolio itself are also planned. In the area of educational services, priorities are to assess the feasibility of running a pan-European call-for-competition (tender) for Virtual Learning Environments (Learning Management Systems). In the area of web- and video-conferencing the team will evolve the STUN/TURN server backend infrastructure, launch the WebRTC based front-end client and establish monitoring and statistics modules.

Whilst the consensus is clear on how cloud services empower institutions to obtain the IT services they need in an easy, intuitive and cost-effective way, migration is still a daunting task for many. Thanks to the GÉANT cloud offering, NRENs are more agile and uniquely able to offer a wider range of relevant services at a faster pace than commercial providers in order to facilitate the dynamic collaboration that academic research needs. We are now seeing NRENs maximizing the benefits of the single digital market for their institutions to ensure best-value services.

Stay tuned for more updates!

Picture
Andres Steijaert presenting at DI4R 2017

For more information on the GÉANT Clouds Services Activities visit **https://clouds.geant.org**

HEAnet
Ireland's National Education & Research Network

QQI
Quality and Qualifications Ireland
Dearbhú Cáilíochta agus Cáilíochtaí Éireann

QQI USES THE CLOUD TO DELIVER RELIABLE SERVICES FOR IRISH EDUCATION

QQI – Quality and Qualifications Ireland is an independent, State agency responsible for promoting quality and accountability in education and training services in Ireland. Established in 2012, their mission is to promote the enhancement of quality in Ireland's further and higher education and training, and quality assure providers; and to support and promote a qualifications system that benefits learners and other stakeholders.

QQI needed to improve a vital, mission-critical legacy application that was operating on outdated hardware, inefficient software and overburdened databases. The application was highly visible: spanning multiple systems, educational course information, public data and a high traffic public interface.

QQI decided to move away from the costly data centre-based solution and embark on a gradual migration of the application to the cloud with Microsoft Azure, alongside the adoption of Office 365. The Azure model gave them the flexibility and scalability they needed. While the software application remained the same QQI was able to refine and gradually upgrade components, move from a single front-end to three, and manage the significant peaks and valleys in capacity demand.

QQI evaluated more methods to simplify infrastructure and support models, and to reduce costs. The launch of the GÉANT IaaS Cloud Framework in 2017 brought even more advantages. HEAnet helped QQI realign their existing contractual arrangement with Microsoft. Using GÉANT's framework agreement brought significant cost savings, through usage discounts and data traffic arrangements.

Microsoft's licensing plans were further optimised by transferring existing on-premise educational license agreements into the Azure cloud. The 'Bring Your Own License' element of the GÉANT framework, which Microsoft offers through their Azure Hybrid Benefit programme, helped maximise value from existing server licenses.

Lessons Learned

QQI's use of the GÉANT IaaS framework, with usage discounts, reduction of data traffic costs and transfer of existing on-premise server licenses, brought the actual total costs down by 33%. With the deployment of other services on Azure, the cost savings are probably even higher.

NREN Support

HEAnet played an important role helping QQI maximise the GÉANT framework. HEAnet is more than just QQI's connectivity provider; they are considered a trusted advisor. "Using GÉANT's framework agreement with Microsoft brought QQI significant cost savings," says Garvan McFeeley, HEAnet's Brokerage Services Manager. "Usage discounts and data traffic arrangements led to a significant reduction in costs."

"After moving 98% of our infrastructure in Azure, we don't have to worry about the physical hardware and administrative and contract costs are much lower. Taking all this into consideration, the value of HEAnet facilitating our migration to the cloud is really immeasurable."

Dr. Ray O'Neill, Head of ICT and Procurement

About Microsoft Azure

Microsoft Azure is the perfect choice for research and education. It allows swift and easy access to very powerful computing environments where complex data can be analysed, stored and shared efficiently and securely. It also gives researchers access to tools which can turn data into insights and enable them to collaborate with others quickly and securely to accelerate discovery.
Coupled with the benefits of the GÉANT Framework, Microsoft Azure and Hybrid use benefits along with reserved instances provide education customers with the lowest pricing and cost flexibility when moving mission critical workloads or an entire DataCenter to Microsoft Azure.

Further information

To contact a Microsoft Approved Partner to find out more about Microsoft Azure on the GÉANT Framework, visit the Clouds Catalogue at **https://clouds.geant.org/IaaS/Azure**

Picture
Image courtesy of Microsoft

AARC AND EDUGAIN: WORKING TOGETHER TO EXPAND FEDERATED ACCESS TO ONLINE RESOURCES

Today, online services are crucial to research and education. Students, teachers and researchers rely on them for collaboration, analysing and sharing data, and for accessing journals and libraries. And some of the most exciting research is performed in international collaborations, where researchers need to share data and software between institutions and across borders.

To manage access to all these resources, institutions and research collaborations need a way to digitally identify their users. Once they know who is who, they need to give the right users access to the rights tools, data and resources. This relies on Authentication and Authorisation Infrastructures (AAIs).

However, nationally-based institutions and international research collaborations have different AAI needs and challenges. And these are being addressed through the eduGAIN service and through the AARC project respectively.

How does eduGAIN address the AAI needs of institutions?

Many research and education institutions provide their users with a single online identity. This gives users access to all the services that are available locally within the institution. To bring together a wider pool of users and services, R&E identity federations were created to build trust between the identity-providing institutions and providers of services such as e-learning platforms and clouds infrastructures.

By participating in a national federation, institutions can rapidly and cheaply expand the range of services they offer to users, making them more attractive places to work or study. They also control which user data to share with services, preserving data privacy. The users need only the one trusted identity from their institution to access participating services instead of juggling multiple passwords, making for greater security. And participating services get a larger audience of users: with the identity providers handling the users' accounts, there's reduced overhead for accounts and user support so the cost per user is lowered.

eduGAIN connects federations at an international level, enabling the trustworthy exchange of information related to AAI by coordinating elements of the federations' technical infrastructure and providing a policy framework that controls this information exchange. This contributes to the seamless operation of services provided through the GÉANT (GN4-2) Project, other communities or commercial service providers.

Through eduGAIN, participating institutions can further expand their service offer to include trusted services from other federations around the world. Participating services can access an international audience, again at a lower cost per user. And these users are trusted by their identity-providing institution. Service providers need sign up with only one federation instead of with them all separately, which saves more time, effort and money, and is the most efficient way to reach global users. Commercial providers can also offer aggregated pricing or special access at an institutional level.

eduGAIN is provided by GÉANT and partners. With over 2,500 participating identity providers and more than 1,800 service providers, eduGAIN is the primary mechanism for enabling R&E collaboration around the world.

How does AARC address the AAI needs of research collaborations?

While eduGAIN primarily operates at an institutional level, research fields are typically structured in a different way, with researchers organising themselves into collaborative groups driven by common research goals and grants. The individuals within these groups may be in different institutions, countries or continents. Such collaborations function as virtual communities or organisations, which must offer and manage services for their members. Typically, services are delivered based on 'membership' information rather than on which institution a researcher is affiliated with.

Until recently, each time a new research collaboration began, it developed its own AAI, meaning its own technical architecture and tools, its own policies and training materials. This approach hinders AAI interoperability and reduces the capacity of researchers in different countries, organisations or research teams to cooperate. For some of these collaboration communities eduGAIN has helped, but a lot of collaborations have AAIs that cannot connect with eduGAIN, if they have one at all.

The AARC (Authentication and Authorisation for Research and Collaboration) project is creating a common AAI framework - one blueprint architecture, one set of policies and one collection of training materials that should work for all research collaborations. AARC is also working with research collaborations to pilot and improve specific technical and policy aspects.

AARC relies on the federated approach and infrastructure championed by eduGAIN and its participating national federations. AARC expands the adoption of federated access to services in a far more granular and flexible manner: researchers can log in using their own institutional identity while membership to different research collaborations is managed in line with AARC guidelines. So AARC means that research collaborations need spend less time and money on reinventing the AAI wheel, and it provides more connections between solutions and between research communities. This all means safe and more reliable access for more researchers to more services, data and software. So researchers can focus on research.

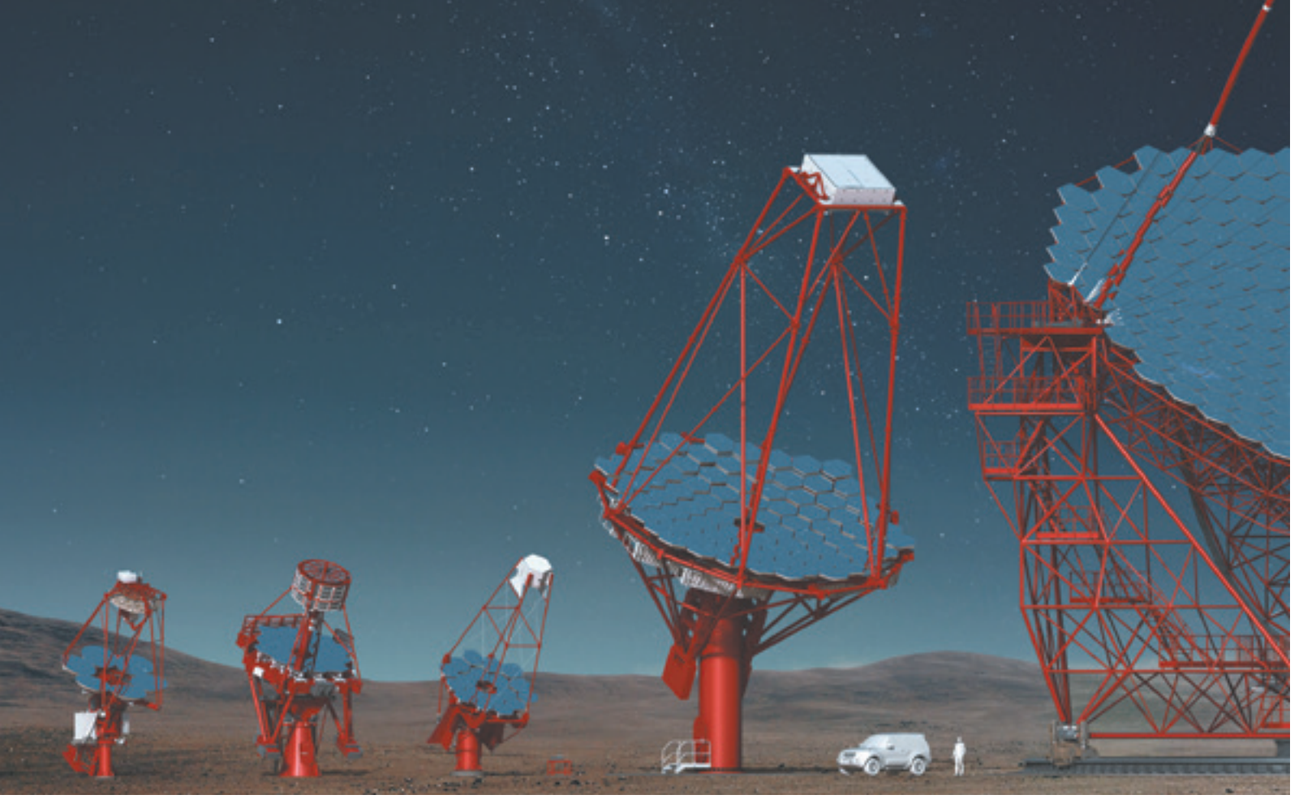
Who is using the AARC blueprint architecture?

GÉANT eduTEAMS
EGI CheckIn
EUDAT b2access
DARIAH-eu
INDIGO IAM
ELIXIR
CTA & Life Science AAI (see p16-17)

Who endorses AARC policies through AEGIS (AARC Engagement Group for Infrastructures)?

GÉANT
EGI
EUDAT
DARIAH-eu
ELIXIR
PRACE
Xsede

www.aarc-project.eu/
- see the video: **https://goo.gl/6qz5jY**
www.edugain.org/
- see the video: **https://goo.gl/ZcYwVU**



AARC PILOTS AAI SOLUTIONS FOR RESEARCH

The Authentication and Authorisation for Research and Collaboration (AARC) project is creating an authentication and authorisation infrastructure (AAI) framework for research communities. This includes a blueprint architecture that should work for everyone. AARC is also working with research collaborations to pilot and improve specific technical and policy aspects. Two new pilots are about to come to fruition...

Astronomy - a custom solution for CTA

The Cherenkov Telescope Array (CTA) will be the major global observatory for very high-energy gamma-ray astronomy in the next decade and beyond. The CTA's array of more than 100 telescopes is scheduled for construction in La Palma in Spain and Paranal in Chile. It will be operated as an open, proposal-driven observatory, with all data available on a public archive after a predefined proprietary period. CTA will collect data addressing a wide range of major questions in and beyond astrophysics, which can be grouped into three broad themes: understanding the origin and role of relativistic cosmic particles, probing extreme environments, and exploring new frontiers in physics.

Preparing the IT infrastructure necessary to process, distribute, analyse and store the petabytes of data expected annually from the CTA is a huge challenge.

With 1350 scientists and engineers from 32 countries involved in the CTA collaboration, getting an AAI in place to serve them is not simple either.

For the CTA team, working with the AARC project means that they don't have to invent an AAI service from scratch. They can save time building a custom system based on best practices and tried and tested solutions.

The CTA AAI team is represented in AARC by Alessandro Costa from INAF, the National Institute for Astrophysics in Italy. He and AARC pilot team members set up a pilot to improve the CTA AAI service using elements of AARC's blueprint architecture. This will expand capabilities to secure CTA resources and digital assets through role-based authorisation, and allow federated authentication based on a central SAML (Security Assertion Markup Language) service and on eduGAIN. The first release is planned for the summer of 2018.

"The AARC blueprint architecture, as well as being an architectural design, represents the possibility for us to speak with other technological partners using a common language that describes AAI and its complex world," says Alessandro Costa.

Another advantage for CTA in joining forces with AARC is the opportunity to be part of a large community and witness the development of AAIs for a wide set of requirements. "This allows us to observe real-world implementations and their advantages and disadvantages," concludes Costa.

Life Science – a single platform for CORBEL

CORBEL is an initiative of 13 biological and medical research infrastructures, which aims to create a platform for harmonised user access to biological and medical technologies, samples and data services. In 2017 they called e-infrastructure organisations to propose and operate an AAI solution that would work for all of them, to ensure a sustainable and cost-effective way for researchers to access life science services.

A pilot with the life science community was already planned in AARC and some science research infrastructures had joined the AARC project and acted as liaison points with the rest of the CORBEL life science infrastructures. The e-infrastructure providers EGI, GÉANT and EUDAT were also represented in AARC by a number of partners. So it was obvious to pilot an AAI solution for CORBEL based on the blueprint and the AARC partners.

"In December an AARC pilot was launched to demonstrate the suitability of a collaborative solution by GÉANT, EGI and EUDAT for CORBEL.

This was the first time that a cluster of different research infrastructures active in the same field agreed on their AAI requirements and called for the e-infrastructures to deliver an AAI solution. This was also the first time that EGI, EUDAT and GÉANT collaborated to deliver and jointly operate a customised, discipline-specific AAI.

The AARC pilot uses existing infrastructure components, which is in line with the project's approach to take advantage of existing solutions as 'building blocks' to achieve higher benefits. The pilot has been structured in three phases:

- Phase 1: December - end January 2018 - bootstrapped the AAI solution by putting components together and defining the user registration process, attributes required by service providers and the authorisation flow.
- Phase 2: February - end May 2018 - aims to operate the dedicated AAI components according to the agreed service level and to provide technical integration of identity providers and service providers. In particular, this phase improves security and trust and provides security incident response capabilities.
- Phase 3: will consider all aspects of sustainability and drive the pilot to full production and operation.

AARC is organising a specific training module for life science service providers that will show how their services are connected to the AAI and guide them through connecting their services. This training is scheduled to be available from the end of April and will help life science communities to better understand the AARC Life Science pilot's achievements.

Pictures
Top left; Cherenkov Telescope Array - proposed CTA telescopes
Credit: Gabriel Pérez Diaz, IAC

Bottom; Alessandro Costa of INAF

"We aim to build bridges and provide resources to research collaborations so that they can leverage existing AAI solutions and focus energy instead on their research," says Licia Florio, AARC project leader, GÉANT. "The pilot for life sciences shows how AARC can help in implementing a consistent and functional AAI to support different communities and research areas."

aarc-project.eu/pilots/

SURFCONEXT – CONNECTING THE NETHERLANDS FOR 10 YEARS

Since its inception 10 years ago SURFconext, the Identity Federation of The Netherlands, has been helping students, teachers and researchers to connect to a wide range of systems and resources, not only in The Netherlands but, thanks to eduGAIN interfederation, around the world.

Last year SURFconext enabled over 90 million log-ins from more than 1,300,000 unique users across 154 Identity Providers. With almost 1,500,000 potential users in the Netherlands nearly 93% of the student and researcher population are now able to use SURFconext.

Not only are the number of users continuing to grow but the number of affiliated services is also on the increase. With 730 connected services, SURFconext grew strongly last year. There were a number of reasons why 260 new services joined:

- a large number of senior secondary vocational education (MBO) institutions started using SURFconext;
- there was a sharp increase in connected electronic learning environments and many new international services were linked by means of eduGAIN.

For these reasons, the number of Service Providers connected in 2017 increased by more than 56% compared to 2016.

Strong Authentication growing explosively

Many institutions rely on SURFconext to enable their users to securely log in to cloud services. Using SURFconext Strong Authentication, this can be done even more securely. In 2017, it also became possible to link services that are not connected to SURFconext to Strong Authentication. The second factor is used to complement an existing service within the institution that is not linked to SURFconext. As a result, usage increased explosively from around 1,000 logins per quarter via Strong Authentication in early 2016 to over 165,000 in the second quarter of 2017.

This ability is a very strong selling point for SURFconext in the R&E sector as concerns grow about security and data safety on-line.

As Arnout Terpstra, Product Manager at SURFconext, explains:

"SURFconext and eduGAIN provide a reasonably strong level of assurance within the Service Provider community because the underlying identities have been authenticated by the original 'home' institutions and are up-to-date (unlike a 'self-declared' identity through a public website). In the era of fake news and fake users this assurance is very important to Service Providers. Strong authentication provides even greater assurance for Service Providers particularly when accessing sensitive data or services."

Ease of use is key to adoption

SURFconext uses the hub and spoke model for its Identity Federation. This makes the connection between an IdP and Service Provider a simple point and click action using the SURFconext IdP dashboard. Again this simplicity makes SURFconext extremely popular and cost-effective for Service Providers and IdPs alike which underscores the extremely high adoption rates and growth.

SURFconext - looking forward with eduGAIN and AARC

Federated Identity management makes collaboration across R&E simpler – particularly international collaborations - and it is for this reason that SURFconext is an active participant in international projects such as AARC as well as being a key participant in GÉANT's Trust and Identity activities. The AARC project is designed to closely collaborate with existing research collaborations and e-Infrastructure providers to help develop identity policies and technical frameworks based on actual community requirements. This benefits research collaborations worldwide by producing unified policies and technical frameworks between users and services whilst still meeting the needs of security and privacy.

With Federated Identity becoming an essential component of national and international collaboration and the growth in acceptance of these technologies both in R&E and across the commercial sector, it looks like SURFconext will have another busy and exciting 10 years ahead of it.

https://www.surf.nl/binaries/content/assets/surf/en/knowledgebase/2018/surfconext_2017_eng.pdf

https://edugain.geant.org

https://aarc-project.eu/

EDUVPN – SECURING YOUR PRIVACY WHEN YOU ARE OUT AND ABOUT

Many of us enjoy taking our smartphone or laptop down to our local café, grabbing a cup of our favourite hot beverage and sitting down to surf the web. Free Wi-Fi is no longer a luxury but an essential commodity when on the move. But are you actually aware of how vulnerable you are when you are using a public Wi-Fi hotspot?

Wi-Fi convenience vs security

Most Wi-Fi networks that are created for home and business use are password-protected and encrypted. However, most public Wi-Fi hotspots are set up strictly for convenience, not security! When you are using an unprotected public hotspot, whatever you do online is potentially open to the eyes of prying hackers. If you allow file-sharing across such a network, hackers can easily plant infected software on your computer.

eduVPN – a shield to protect your privacy

As public Wi-Fi becomes increasingly common, you can expect risks to grow over time. But this doesn't mean you have to stay away from free Wi-Fi and tether yourself to a desk again.

A group of developers from across research and education have joined forces to develop eduVPN, a technology for ultra-secure access, designed for the research and education community. VPN stands for Virtual Private Network, and by using eduVPN a tunnel is created that shields your data traffic from prying eyes, even when you are in your favourite café or riding the train.

"Through the eduVPN app, students and researchers can access their applications and resources from anywhere, without having to worry about security," explains Tangui Coulouarn, chair of the eduVPN board and project manager at the Danish e-infrastructure Cooperation (DeiC).

He is developing eduVPN jointly with colleagues from Australia (AARNet), The Netherlands (SURFnet), as well as the Nordics (NORDUnet), and GÉANT. He hopes the novel privacy technology will spread as widely as eduroam, the secure, worldwide roaming access for research and education.

"We want to make VPN technology easily available by building better and more user-friendly tools", adds Tangui. "There are other VPN solutions out there. But they are either very expensive or you can have them for free, but then you have to be exposed to advertising. Also, many of them have quality and pricing issues."

A variety of uses for eduVPN are being considered at the moment: safe web browsing; access to campus resources from outside a campus; and establishing secure campus-to-campus connections. For example GÉANT itself is looking into eduVPN to connect staff to its offices in Cambridge and Amsterdam.

The next steps - federated VPN usage

But that's not all. The eduVPN development team has another ambitious goal in mind – a federated VPN model.

Just like eduroam provides federated trust between users from other institutions then eduVPN can leverage this same level of trust to offer a distributed VPN service.

This would provide secure eduVPN gateways that end-users can access when using unsecured networks. By separating the ownership and operation of the gateways from the operation of user identity components (using eduGAIN federated identity), eduVPN offers privacy-by-design in a way that is not attainable by other commercial VPN operators. Users can then select which eduVPN gateway to use to best suit their requirements and location.

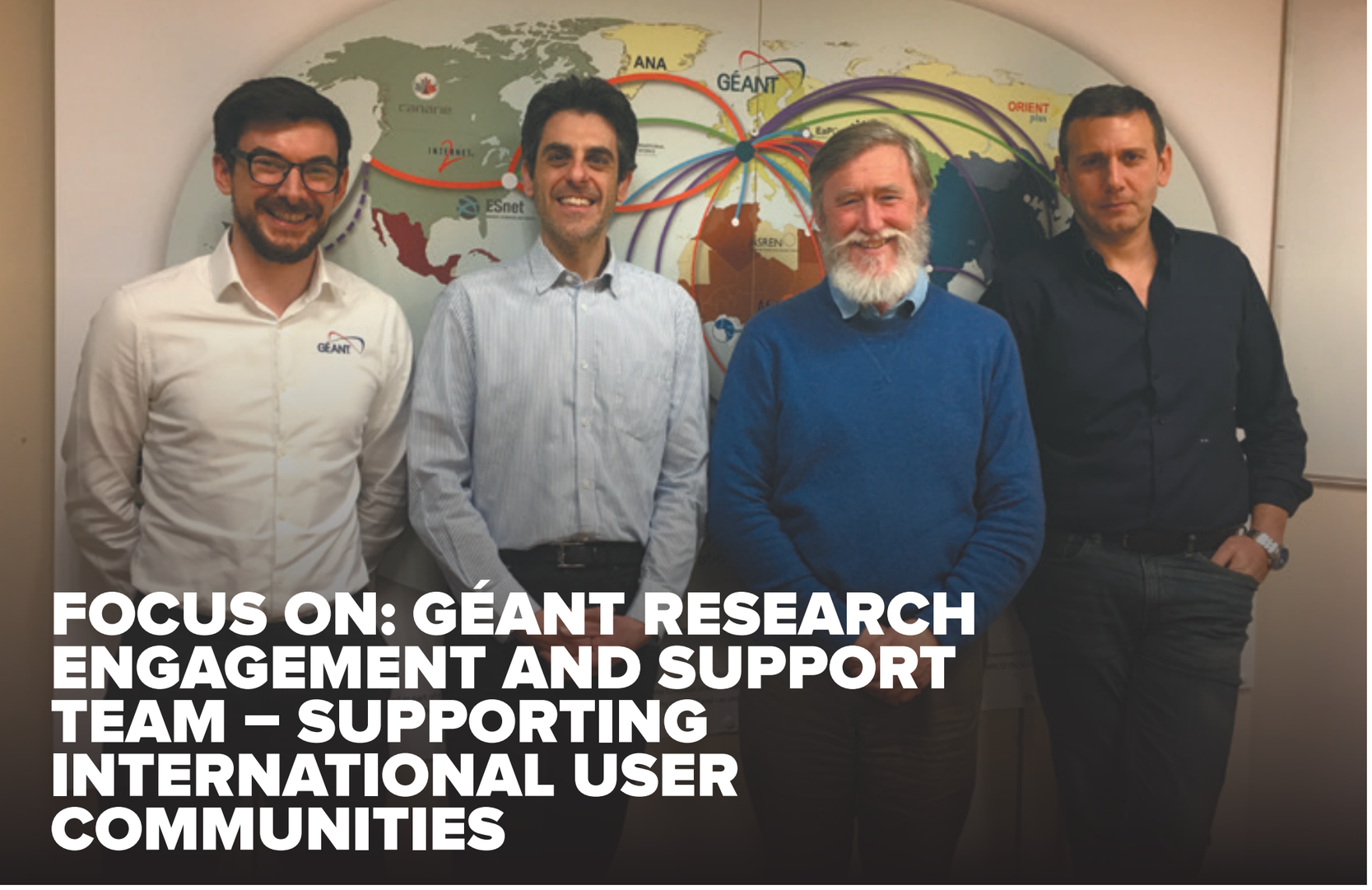
Success depends on universities

Ultimately, the success of eduVPN will depend on securing a critical mass of R&E networks that incorporate the technology in their service offering, and on universities using it to connect students and staff to campus resources.

SURFnet is the first NREN to deploy eduVPN, starting 1 January 2018. NORDUnet is running a test application, and the other eduVPN partners are preparing deployments in the near future.

eduVPN has recently become an official part of the GÉANT (GN4-2) Project, and has received financial support from the Vietsch Foundation, the SIDN Fund, RIPE, NORDUnet and SURFnet. Also, eduVPN recently won the Internet Society of the Netherlands´ "Innovation Award 2018".

To find out more and to take part visit the eduVPN website at **www.eduvpn.org**



FOCUS ON: GÉANT RESEARCH ENGAGEMENT AND SUPPORT TEAM – SUPPORTING INTERNATIONAL USER COMMUNITIES

CONNECT catches up with Vincenzo Capone, Head of the newly formed GÉANT Research Engagement and Support Team, to talk about the work carried out by his group to support international user organisations, their networks and associated service requirements.

Enzo, what is the rationale behind the creation of this new team?

At GÉANT we have always worked closely with our NREN partners to support international users communities and cater for their varied and complex requirements. The recent creation of a Community Support function within GÉANT is enabling us to address, in a more structured manner, the needs of these pivotal research and education communities by dedicating a highly-specialised team with complementary skills and extensive experience and expertise.

What is the remit of your team?

We work on behalf of GÉANT's European NREN partners and endeavour to provide a streamlined, professional approach to the support of research communities with an international presence. The team's service offering focuses around three main areas: account management, technical customer support and commercial management. The account management function ensures that a single point-of-contact, for project management purposes, takes responsibility for the technical and commercial support to the communities and projects, and the proactive anticipation of the user organisation's needs. The technical customer support aims to propose the best services based on the knowledge and understanding of the user's requirements. The commercial management endeavours to provide a coherent, pan-European response to commercial enquiries.

Pictures
From left to right; Chris Atherton, Domenico Vicinanza, Richard Hughes-Jones, Vincenzo Capone

How do you engage with users?

The team has devised a process that follows specific steps: requirement gathering, design, proposal, implementation, operation and support.

Interactions between users, account managers and a lead NREN define the potential service required - the NREN is typically designated according to the country where the headquarters of the user organisation reside. For the design phase, the team draws a technical proposal that includes an overview of the solution's development, implementation and of its technical capabilities, with the collaboration of relevant technical representatives from GÉANT and/or the NREN involved. The proposal is subsequently reviewed in conjunction with the relevant NREN to ensure that it is fit for purpose and all the parties involved have operational visibility. Upon acceptance of the proposal and the involvement of relevant operational teams, the solution is implemented and enters into the operation and support phase. Following completion of a specific project, we continue monitoring its progress to ensure that all agreed requirements are regularly being met over of the lifetime of the project.

Overview of research areas and organisations supported by the Research, Engagement and Support Team

Energy

Nuclear power, future energy research, anything to do with the science behind the juice that keeps the lights and computers turned on around the world. We work directly with ITER, for example.

Earth and Environmental Sciences

Earth observation, climate monitoring, water quality, volcanoes, and sustainable development. These are just some of the subject areas that we cover while assisting organisations such as Group on Earth Observation, WMO, ESA and EUMETSAT. We are the primary partner in the R&E community of the COPERNICUS project.

Social Sciences

Music, art, languages. We've worked with the likes of CLARIN, ASTRA and LoLa to cater for their specific requirements.

Health and Food

Pharmaceutical research, EMBL-EBI, Human Brain project, ARES have all been assisted through our account management and support to their communities.

Physical Science

Exploring the universe and corner stones of our existence, we're assisting the likes of SKA, JIVE, NEXPReS, LIGO-VIRGO and CERN.

e-infrastructures

We also assist and provide services to the infrastructures who deliver complimentary services to research communities: PRACE, EUDAT, EGI and others.

Meet the Team

Vincenzo Capone, Head of the Research Engagement and Support Team

Prior to joining GÉANT, Enzo worked at the Department of Physics of the University of Naples, where he was the network architect and manager in charge of computing for physics experiments, he was also Technical Associate to the ATLAS experiment collaboration at CERN and to the National Institute for Nuclear Physics (INFN).

Richard Hughes-Jones, Senior Network Advisor

Richard is the network architect in the SKA Signal and Data Transport consortium with responsibility for the long-haul data transmission within the telescopes and the connectivity of the telescopes to the world-wide academic networks. He worked on the ATLAS LHC experiment at CERN and is the area director for infrastructure in the Open Grid Forum (OGF) and a co-chair of the Network Measurements Working Group.

Domenico Vicinanza, Senior Research Engagement Officer

Domenico is a Senior Lecturer in Electronics at Anglia Ruskin University in Cambridge, where he leads the Intelligent Systems, Software Engineering and Gaming research group. In addition to a PhD in physics, he also holds a degree in orchestration for cinema and television and is a qualified argentine tango instructor. As a musician he has worked with CERN and NASA using music to communicate science.

Chris Atherton, Research Engagement Officer

Chris has over 10 years' experience working in the IT and Space industry and holds a BSc (Hons) in Computer Networks and Security; he joined GÉANT in 2017. In his spare time, Chris used to send balloons to the edge of space: a hobby that soon became a small business. Chris' fascination with Space started in his infant school days.

VISITING THE CONFERENCE ON EUROPEAN SPACE POLICY

Tim Peake, ESA astronaut (left) and Chris Atherton (right)

European Space Policy Conference

Words
Chris Atherton, Research Engagement Officer, GÉANT

The dust has settled after the New Year's celebrations as everyone is getting back to work in earnest for 2018 and for the space industry this is no different. Every year in the third week of January, the Annual Conference on European Space Policy takes place in Brussels. Here, around 1,000 industry representatives and high-level invited guests set out their stalls to the European Commission and the world. This is the conference that sets the tone in the European space industry for the year. Given the disruption that the UK Referendum could cause and the new Multiannual Financial Framework (MFF) being worked on by the EC and the European Council, this year's conference had a funding theme weaving its way through the vast majority of the speeches.

But why was GÉANT there?

Strategically, the data derived from space is one of the important growth areas for GÉANT. Both in terms of the network traffic passing over the backbone, but also the trust and identity services that allow students and researchers access to this data more easily. Last year, over 13 TB of data per day passed across the GÉANT network for the Copernicus programme alone. And with ESA planning to launch 28 earth observation satellites over the next few years, it is expected that this stream of data will increase at an exponential rate. As such, space organisations are one of the focus areas for the research engagement and support team within the GN4-2 project (NA3 T2).

Two of GÉANTs biggest non-NREN users, ESA and EUMETSAT, account for the vast majority of the current space-derived traffic on the GÉANT network. Their presence at the conference offered the perfect opportunity to gain a good understanding of where this industry is heading and to make contact with people in this sector.

I had the privilege to meet the new ESA Astronaut head of crew office, Tim Peake; the ESA director of the Galileo programme, Paul Verhoef; Martin Ditter, policy officer for DG GROW specialising in space data (Copernicus); and Cristina Martinez, deputy head of unit at e-infrastructures and open science cloud from DG-CNECT. The event offered also an opportunity to talk about the European Open Science Cloud and the OCRE project focusing on the Earth Observation industry.

Key messages from the conference were that 5G is now a big focus for the space telecoms side of the industry as well as quantum computing and communications from and to satellites. Defence research is a new focus area along with the announcement that a new space policy is to be developed for the EU over the next few years with dedicated funding from the EC.

NEWS FROM THE GÉANT COMMUNITY PROGRAMME

GÉANT welcomes the new Task Force-Data Protection Regulation (TF-DPR)

Working with NRENs to meet data protection regulation requirements

The objective of TF-DPR is to gather information, discuss and develop tools and best practices to be able deal with the requirements of data protection regulation, with a focus on the General Data Protection Regulation (GDPR) and how National Research and Education Networks (NRENs) and GÉANT's shared services can prepare for its introduction.

The Task Force aims at collaborating on the implementation of the GDPR and other privacy regulations in the following ways:

- To build up a trusted forum with members who actively participate and are involved in the results of the Task Force.
- To provide a platform to promote the sharing of best practices, tools and policies related to data protection and privacy regulations.
- To discuss, share ideas and give feedback that lead to a better understanding of the privacy regulations. Shared opinions can result into policies that provide guidance.

The Task Force aims to gather individuals, within the GÉANT community, such as legal privacy experts and privacy officers who are working on data protection regulation within their organisations. The outcomes of this Task Force will be shared with the wider GÉANT community.

Steering Committee

Chair:
Morten Eeg Ejrnæs Nielsen – DeiC

Members:
Evelijn Jeunink – SURFnet
Andrew Cormack – Jisc
David Foster – CERN
Pål Axelsson – SUNET

Secretary:
Charlie van Genuchten – GÉANT
Charlie.Genuchten@geant.org

Mailing lists:
tf-dpr@lists.geant.org;
ta-legal@lists.geant.org

THE CONNECT INTERVIEW

MICHAEL FOLEY

Lifetime spent on researching, promoting and using ICT tools to provide access to knowledge and learning to those less advantaged. This sentence in Michael Foley's LinkedIn profile aptly sums up the man. For all of his career Michael has been an enthusiastic explorer of how ICT can transform education's effectiveness and accessibility. As Lead Distance Learning Specialist with the World Bank in Washington DC, Michael became a champion of R&E connectivity, raising awareness about the transformational effect of NRENs as enabler of learning and knowledge exchange in the developing world.

His recent retirement has not abated this interest and, combining Irish wit with a remarkable ability to bring complex matters unequivocally to the point, he continues to argue the case for NRENs with passion, most recently during his keynote speech at e-AGE2017. We caught up with Michael in Cairo to find out more about what fuels this passion and his views on the NREN world.

Tell us more about your background and what attracted you to the world of NRENs.

I've worked all my life as an educational technologist, first in University College Dublin (UCD) and later at the World Bank Institute in Washington DC. It was an opportunity to explore the potential of satellite broadcasting in the mid eighties that led me to see that these tools could open access to education and knowledge for those excluded. That led us into collaborative R&D programmes, funded by the European Union, that researched a whole range of technologies in what became known as 'blended learning': satellite broadcasting, videoconferencing, early web support tools, virtual classrooms etc. Applying that experience at the World Bank from 1997 led to the Global Development Learning Network (GDLN), a partnership programme with learning centres in developing countries. We used satellite links (VSAT) due to poor telecoms infrastructure in the Bank's client countries. Our pedagogical design called for two-way videoconferencing because of our audience (mainly senior civil servants) and the emphasis on knowledge sharing between countries. But this required decent bandwidth and we also wanted to reach beyond capital cities. Therefore NRENs made excellent partners.

Pictures
Top right; Keynote at e-AGE 2017 in Cairo on the role of NREN

Images courtesy of Michael Foley

How did you sell NRENs to your World Bank managers?

The World Bank's lending programmes in education were at one time mostly concerned with basic education. Therefore much of the discussion of ICTs in education was in relation to secondary education. However, I believed that the digital revolution in education in developing countries had a greater chance of success in higher education. It was also was more vital there too. When the Bank projects eventually moved into that area the funding was aimed at improving the quality of teaching and the stimulation of research - two goals where connectivity was vital. So I jumped in and tried to persuade the project managers that NRENs were the way to manage the connectivity, and that support for them should be part of these projects. In another part of the Bank operations, in ICT and telecoms, we did similar, you could say, 'lobbying'.

In parallel to that effort we ran a number of GDLN knowledge sharing programmes to raise awareness among decision makers in some countries on the benefits of NRENs. Our most successful effort, I believe, was the SERENE programme (South-south Exchange of Research and Education Experience). All World Bank lending is based on requests from client countries, and so it was important that the key decision makers participating in the study programme could see for themselves the benefits and workings of NRENs in similar countries. My aim at the end of the programme, a mix of videoconferences, web and a study tour, was for the ministry and university management people to say 'I want one of those'. And we largely succeeded. After the NRENs of Pakistan, Sri Lanka, Thailand and Vietnam generously shared their experiences, Bangladesh now has BdREN, Bhutan has DrukREN, and Afghanistan has AfgREN.

In your view, what are the main challenges NRENs face?

They need to get government support, and in turn, donor support if necessary. Their biggest challenge is lack of awareness and understanding of what an NREN does and how it is different from commercial ISPs. Therefore raising awareness is vital. It is also important to show that an NREN exists in a global ecosystem, a grand 'club' if you will, that brings with it readymade access and inclusion in global partnerships that help to alleviate academic isolation. In addition, and while it may have little intellectual rigour, the argument that 'everyone else is doing it' is quite persuasive.

In making their case NRENs should argue that connectivity is an integral part of the infrastructure of the public good that is education and health. To be sustainable does not mean that it has to fund itself by fees alone. NRENs need the courage to ask for government support.

Next, you cannot have a functioning NREN with poor campus infrastructures and services. This is not an NREN's responsibility, but their service will be judged by the quality of the last mile and the services that go with that last mile.

What is your fondest memory of working with NRENs?

Working on the SERENE programme – the goodwill in the NREN community for emerging NRENs that was demonstrated there was inspiring. Governments should know that this help is available.

What is on top of your wish list when it comes to connecting the world?

That decision makers who can make things happen are fully aware of the need for NRENs – that they 'get it'. Not enough of them get it – there's work to be done!

Finally, is there any advice you can give to the GÉANT community – what can we do better?

Your 'Case for NRENs' website is excellent. It would be useful to add an update and global version of the GÉANT Compendium. And maps – maybe a global map in the style of the GÉANT connectivity map. On the advocacy side you could lobby with donors for a global trust fund to help emerging NRENs.

Michael authored a report on the status and role of NRENs in Africa. Check it out, along with his e-AGE2017 keynote address, on the Case for NRENs portal **www.casefornrens.org**

EaPConnect
Eastern Partnership Connect

EAPCONNECT: COLLABORATION WITHOUT BORDERS

Providing high-capacity internet and services for research and education in the European Eastern Partnership (EaP) region is a key focus of the EaPConnect project. But EaPConnect also stimulates collaboration between EaP researchers and educators and their peers in Europe. In 2017, the project partnership grew to eighteen NRENs, including six main project beneficiaries. Relationships between them continue to develop and bring new opportunities for cooperation, as six partners explain:

AMRES (Serbia – associate partner)

Miloš Cvetanović, Director

"Opportunities to collaborate, share knowledge and experience are extremely helpful and can significantly ease the learning curve or shorten the time for overcoming issues.

The Armenian and Serbian NRENs collaborated on eduroam service operations and management. ASNET-AM was interested in an easy-to-use solution for analysing and managing usage. AMRES is using such software, so several knowledge-sharing meetings were organised. This later connected with the GÉANT Learning & Development team, resulting in an eduroam workshop hosted by ASNET-AM in conjunction with the international CSIT 2017 conference held in Yerevan.

Participating in events helps AMRES to share knowledge, but also to gather valuable feedback. This information enriches training materials for AMRES member institutions, and is a starting point for future trainings under the GÉANT or EaPConnect umbrellas.

Topics of interest for AMRES for potential cooperation between Serbian R&E institutions and counterparts from peer NRENs are: eduroam, federated identity services, DDoS attack mitigation, digital libraries and clouds."

ASNET-AM (Armenia – beneficiary partner)

Hrachya Astsatryan, Head - Center for Scientific Computing, National Academy of Sciences

"EaPConnect organised a series of workshops, trainings and site visits to EU associate partners to help ASNET-AM develop sustainable cutting-edge services.

Knowledge transfer from Dutch NREN SURFnet and AMRES was important for us to increase eduroam sustainability and visibility. In 2017 the number of service locations increased from 5 to 29.

In April we participated in a Network Performing Arts Production Workshop, then in October was the 'Music Without Borders' concert between Minsk and Tallinn. Knowledge transfer from the Italian NREN GARR helped us to master and implement the LoLa service. Thanks to this service, ASNET-AM made contact with the Armenian National Philharmonic Orchestra and Komitas State Conservatory of Yerevan.

Participation in GARR's Clouds Workshop in June was crucial for us to deploy an experimental 'Infrastructure-as-a-Service' platform. This allows us to increase our level of collaboration with the National Library of Armenia by providing customised VMs for its needs.

Supercomputing and data analytics are interesting topics for the upcoming year."

Pictures
Left main image; Miloš Cvetanović and the AMRES eduroam team.

Left below images; Hrachya Astsatryan, Sergei Kozlov, Kristina Lillemets, Ramaz Kvatadze.

Above; Georgian musicians Reso Kiknadze and Khatia Koridze rehearsing for 'Music Without Borders'.

BASNET (Belarus – beneficiary partner)

Sergei Kozlov, Head of network administration sector, UIIP, National Academy of Sciences

"There was a 100% increase of access capacity to GÉANT for BASNET customers in 2017, following an external connectivity upgrade to 10 Gbps in August.

As the result of increased visibility hosting the EaPConnect conference, EaPEC 2017, BASNET received a request from the Belarusian State University's Center for Particles and High-Energy Physics to increase its access link bandwidth to LHC resources in CERN. This work is planned for 2018.

In 2017, the Belarusian National Technical University provided eduroam to its users with the support of BASNET. Currently BASNET is working on providing it for the Belarusian State University of Informatics and Radioelectronics.

With the support of EaPConnect we installed and tested LoLa devices with the network connection, and involved Belarusian musicians to perform in 'Music Without Borders'. This positive experience gives us hope for future adventures. We expect that LoLa will be in Slovakia and, with SANET, we will be able to organise a public concert of folk, classical and jazz, with audiences in Minsk and Bratislava."

Picture
Participants of GARR's Clouds Workshop

EENet of HITSA (Estonia – associate partner)

Kristina Lillemets, Director

"We are looking forward to new collaboration possibilities with the EAP countries in future.

Through the 'Music Without Borders' concert in Tallin in October, we got wonderful new partners and good national media coverage. Internationally, we showed we are a reliable partner. The biggest benefit is the contacts and experience. I think there will be many more LoLa collaborations and we will be part of it.

We are delighted to support music, arts and humanities, especially when I see how important it is for the Estonian Academy of Music and Theatre. They have new ideas for using the technology and actively try to get financing. They won a contest with an idea of using LoLa with 5G technology and, although we as an NREN would not want to be replaced by 5G, we wish the best for LoLa technology and its users because we have seen the wonderful things it can do. NRENs should show more support for music and the arts."

GARR (Italy – associate partner)

Claudio Allocchio, Senior Technical Officer

"We share, thus we create. Projects like EaPConnect are perfect for bringing the GÉANT Community together.

GARR cloud services ensure many features (privacy, security, data portability) through a federated internal approach. The Armenians at GARR's Clouds Workshop understood this powerful paradigm was 'the solution' for them. They are progressing fast, and we could include them in a 'European cloud federated service', which we are discussing with some NRENs.

With the LoLa collaboration the international links were leased circuits from other companies. This was useful to test LoLa in an environment close to 'the open internet', and explore how LoLa could be brought to a wider public. The partners have been proposing new activities; some have already happened other collaborations are getting started.

e-Health is a subject of growing interest. In GARR we support medical research with the same quality of services as for all disciplines. Our model could help EaP countries to approach e-Health."

GRENA (Georgia – beneficiary partner)

Ramaz Kvatadze, Executive Director

"GRENA supports around 10 Horizon 2020 projects and 80 projects funded by the Georgian National Science Foundation as well as international cooperation in various fields. GRENA is a partner of EC and GNSF projects related to climate modelling, and provides computational resources.

EaPConnect plays an important role in the development of cooperation between the European and EaP NRENs. It was especially useful to include EU NRENs as partners in the project.

The LoLa concert for European ministers and ambassadors was well received by the Georgian officials. This was important for GRENA publicity. We developed contacts with the Estonian Academy of Music and Theatre and the Italian NREN, GARR. A proposal involving musicians and NRENs from Estonia, Italy, Armenia and Georgia is being discussed.

GRENA is developing cybersecurity services and close contacts with EU computer security teams (CSIRTs) and the Georgian governmental CSIRT. GRENA will upgrade its Trusted Introducer status from 'Listed' to 'Accredited', and a Cybersecurity Workshop in June will be important."

Further information:
www.eapconnect.eu

EAPCONNECT'S 'ENLIGHTEN YOUR RESEARCH' STRETCHES COLLABORATION BOUNDARIES

For the third consecutive year, the EaPConnect project has invited Eastern Partnership (EaP) research and education communities to 'Enlighten Your Research'. As well as collaboration in scientific research fields, EaPConnect added the possibility for cooperation in the area of musical performance, artistic research and education.

ENLIGHTEN YOUR RESEARCH @ EAP

EaPConnect Eastern Partnership Connect

By proposing a project that would use computer network resources and services to foster international collaborations and accelerate the research and discovery process, selected researchers can secure those resources and present their proposals at this year's Eastern Partnership E-infrastructures Conference, EaPEC 2018.

EaPEC 2018 will be hosted by RENAM in Chisinau, Moldova:
www.eapconnect.eu/conference

EaPEC 2018

Winners of EYR@EaP2017:

The 2017 Enlighten Your Research (EYR) call in the Eastern Partnership region (EYR@EaP2017) was a great success: a record-breaking 30-plus proposals were submitted on a wide range of topics and six were selected to go ahead. They were presented with awards during the EaPEC 2017 conference in Minsk, Belarus:

- **Tigran Zargaryan, National Library of Armenia** for "Online Armenian digital library for research based on the e-infrastructure facilities of the National Academy of Sciences of Armenia".
- **Igbal Safarov, University of Utrecht, the Netherlands** for "Open Government Data adoption: A multi-level framework for data sharing and utilization in EaP countries".
- **Grusha Alexander Ivanovich, Central Scientific Library Yakub Kolas of the National Academy of Sciences of Belarus** for "Heritage Digital Data" .
- **Boris Hincu & Elena Calmis, Moldova State University** for "Elaboration of the Task Oriented Instrumental Support (TOIS) for Integration of MSU and IMI HPC Clusters into a Cloud Computing System".
- **Maryna Druchenko, Scientific and Technical Library, National Technical University of Ukraine** for "KPI Digitization Center: Center for digitization of cultural heritage for the Ukrainian libraries, museums and archives".
- **Yevhen Plotnikov, Nizhyn State University named after Mykola Gogol** for "Through Research to Perfection: New Approaches to Continuous Professional Development of In-Service Teachers".

Picture
Winners of the 2017 Enlighten Your Research EaP call

The EYR programme is led by the Dutch NREN SURFnet, which is an associate partner in the EaPConnect project. The programme promotes the benefits of computer network resources to researchers, challenging them to stretch the boundaries of their research and collaborate with other countries to perform experiments enabled by NREN infrastructures, services and support.

The EYR@EaP2018 call for proposals has been open to all science, arts and humanities disciplines, with a particular interest in high-performance computing users and researchers working in eHealth and cybersecurity based in the project partner countries Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine. The call closes on 16 March 2018.

We look forward to seeing this year's winners in Chisinau at EaPEC 2018!

www.eapconnect.eu/research

WHAT MAKES GÉANT TICK

GÉANT is a unique organisation that plays a pivotal role for research and education worldwide. In one of our previous issues we presented Life at GÉANT, an initiative that is helping to attract new talent with a closer look at the people inside the organisation and what excites them about their working lives. CONNECT has selected two new employee stories to give you a flavour of Life at GÉANT. Visit **www.geant.org** for more!

MUNYARADZI SHAHWE, SENIOR PROJECT ACCOUNTANT, CAMBRIDGE

What do you do at GÉANT?

I am the Financial Management and Administration task leader within the established and extensive GÉANT Project (GN4-2) that has delivered the 500Gbps pan-European network, as well as a series of advanced, user-focused services, and a successful programme of innovation in networking technology.

My job entails financial reporting on GN4-2 and also regular tracking of costs/finance progress, as well as providing support to the programme managers, activity and task leaders with day-to-day budget and cost management within their respective areas.

Tell us about your experience at GÉANT

As soon as I joined GÉANT I felt part of the team. I love my job and I am impressed by the sheer scale of the projects that I report on; I never stop learning! Some of the projects are incredibly complex and I am intrigued by their full scope and impact. I also find cross-functional collaborations and initiatives very stimulating; I believe that such activities create a great buzz in the office.

Working at GÉANT has given me the opportunity to travel to Malaysia, Malawi and other remote countries to support, train and mentor the local finance teams collaborating with us on specific projects involving developing countries. It is for me a very rewarding experience to be involved in initiatives aimed at supporting and facilitating Research & Education around the globe hence helping to bridge the gap between the developed and developing world.

Here everyone is valued and given the space and the chance to thrive. It offers a truly international environment that values and embraces diversity and its atmosphere is genuinely welcoming and open.

About Munya

I was born and raised in Zimbabwe where I started my career working for the Mining Industry Pension Fund before moving to the United Kingdom in 2005. I was initially based in London where I worked in banking and finance and in 2009 I moved to Cambridge to join a non-governmental organisation as a Finance Manager. In 2013 I started at GÉANT as a Senior Project Accountant.

CHRISTIAN GIJTENBEEK, SOFTWARE DEVELOPMENT ENGINEER, AMSTERDAM

What do you do and what do you most enjoy about your job at GÉANT?

I am a software engineer, I work with code, but I never forget that the outcome of my programming work will be used by people, so code is not cold or lifeless. I like to think strategically, understand what our NREN members need, and combine data that adds value to them: a process I thoroughly enjoy. An example of this, is the work I carried out for the Compendium, a project that delivered to NREN members at a glance information of the entire and up-to-date map of GÉANT services in use by the whole NREN community.

In my job, I have the great opportunity to engage with our customers directly, understand their real requirements and deliver services that they are not yet aware they need. I am lucky to collaborate with so many clever and driven people within GÉANT's impressive international community.

What is special about GÉANT?

At GÉANT, everybody's contribution is part of a collective effort to benefit the overall NREN community. We truly endeavour to provide value to customers in everything we do. The organisation promotes an atmosphere of partnership, trust and mutual respect. I am amazed by how much I am learning every day at a professional and personal level from such a diverse group of people from all over the world. In particular, what makes me really proud is to belong to an organisation that is also raising the bar of education for our society, globally.

About Christian

I used to be a middle-distance runner, I rarely won, but I always had the drive to succeed. I am enthusiastic and inspired by innovation and I can openly say that I am not afraid of failure. I endeavour to achieve the ideal balance between passion and drive. I always try to put myself in my customers' shoes and deliver for them valuable and useful bite-size wins that they can use quickly and successfully.

To read all the interviews featured in Life at GÉANT visit: **https://www.geant.org/About/Joining_GEANT/life-at-GEANT**
Happy reading!

THE CONNECT INTERVIEW

BOUBAKAR BARRY, CEO, WACREN

Boubakar Barry, CEO of the West and Central African Research and Education Network (WACREN), starts the year full of excitement. Preparations for the 4th annual WACREN conference, the WOMEN in WACREN workshop and the launch of the new WACREN network are highlights that fill up his calendar at least until March. Fortunately, he found some time to answer some questions we had regarding these highlights and the impact of WACREN in the pan-Africa R&E landscape.

What will be the main themes the WACREN 2018 conference will focus on?

The main theme of this year's WACREN annual conference is "WACREN – Unleashing Potentials". There are 3 subthemes associated with that main theme. These cover important subjects such as advanced network technologies and services, building and strengthening user communities, and NREN business models and use cases. We have received a good number of high quality papers on these topics and we can expect a very exciting conference.

What concrete outcomes do you expect from WACREN 2018?

The annual WACREN conference has always provided the opportunity of bringing together the WACREN community as well as WACREN friends for face to face interactions and exploration of collaboration opportunities. It is a unique opportunity to strengthen the relationships between members of our community and between them and friends from other world regions. This has a high value for us. This year's conference will also feature a special event: we will be launching the WACREN network. We are currently working frenetically to establish the first WACREN links and the interconnection with GÉANT.

Looking back at the previous conferences, what has been the biggest development this edition of the WACREN conference will offer?

The feedback we receive from the participants since we started organizing our annual conference is that they are of high quality and that improvements are noticed every year. This is despite the low-level of staffing we currently have. This means that besides the efforts of the staff, we also get a lot of support from our local hosts and the community at large. The number of participants is also increasing year after year, and we expect to witness the same pattern this year. And as I said earlier, there is a very important highlight at this year's conference: the official launch of the WACREN network.

What will the new WACREN network have to offer in terms of incremental changes for the W&C Africa R&E sector?

Higher education and research institutions in West and Central Africa are among if not the least connected in the academic world. This is not due to lack of infrastructure, but rather due to poor regulation of the telecommunications sector leading to very high connectivity prices. Some institutions pay as much as more than 1,000€ per Mbps per month! Yes, 1,000€. In these conditions, no institution can sustain the provision of broadband connectivity to its community. Some institutions with tens of thousands of students have a total bandwidth of less than 100 Mbps.

WACREN and its members are here to change this, so that the education and research community in the region finally enjoys high capacity connectivity that allows them to learn, teach and do research under unprecedented favourable conditions.

How can other NRENs in the W&C African region benefit from the network?

The network is actually for the NRENs in the region and their constituencies. We currently have 12 member NRENs but all countries in West and Central Africa can benefit from the infrastructure we are putting in place.

Fortunately, the AfricaConnect2 (AC2) project funded by the European Union and that WACREN is implementing in collaboration with GÉANT for West and Central Africa gives us a huge opportunity to speed up the deployment of our regional network. The backbone is being deployed and the first NRENs will be connected to it before the end of the first quarter of 2018. Users of these NRENs will notice a huge difference from what they are experiencing today.

Are there more countries that have the potential to be linked to the countries in the region and/or Europe?

AfricaConnect2 and other projects funded by the European Union under the H2020 framework (TANDEM, SciGaIA and MAGIC) have helped the WACREN community a lot. Today, we are on the eve of launching our regional network. As of today, 6 NRENs have made contributions to the counter funding that WACREN has to provide for the implementation of the project. These NRENs will be connected in priority, and we expect that they will all be connected within the next 3 to 6 months. Other NRENs are close to also contribute to the AC2 counter funding. We are confident that by the end of this year, at least 10 NRENs will be connected to the WACREN backbone.

It is however worth mentioning that WACREN is an open, inclusive organization. Even NRENs that have not contributed to the building of the backbone under AC2 can still benefit from connectivity and other services from WACREN, though not under the same preferential conditions than for the NRENs that have contributed to the effort of building the backbone.

How do you see WACREN work in a bigger context of the pan-Africa R&E landscape?

WACREN works hand in hand with its sister organizations ASREN and UbuntuNet Alliance. Today, if we want to communicate among us, the traffic has to go through Europe. One of the objectives of the AfricaConnect2 project is not only to facilitate the connection of these three clusters to GÉANT, but to also facilitate direct interconnections.

It is therefore planned that the three regional networks covering Africa interconnect, so that traffic between them won't have to transit through Europe or the US. I am confident that this will happen soon.

Women in WACREN workshop: 22-26 Jan 2018, Lagos, Nigeria.

Leveraging a broader promotion of maker culture and hackerspaces in NRENs, this event is part of a programme aimed at reducing current imbalances in gender participation. It aims to support female students and staff to improve STEM skills through experimentation with robots and electronics and learning to program these devices.

The participants wound down at the end of the 5-day training workshop in the "ICT for Girls" community day, a networking opportunity open to faculty and guests from other women tech hubs with representation from government and industry.

Were the expected outcomes of the workshop met?

Definitely. The workshop was over-subscribed, but this is not new, as all of our workshops are over-subscribed, sometime more than 300%. This shows the huge demand in capacity building in our region.

We had this excellent female-only workshop in Lagos with 30 participants from 5 countries, facilitated by three instructors, two from WACREN and GÉANT's Head of Software Development Mandeep Saini.

We intend to replicate this workshop in other countries of the WACREN region.

How do you predict the current imbalance of gender participation in IT will change in the coming 5 years, based on the last workshop and its participants?

We cannot develop our region without more than half of our population. The fact is that we have a big challenge involving women in our activities, because they are technical, and there are few women in science and technology in our region. But we are committed to contributing to change this. From the high demand we saw in this first female-only training event, we see that there is a big potential to progress.

WACREN is highly committed to this. That's why we have instituted the Women in WACREN initiative, to empower women and encourage them to be involved in scientific and technical activities. We do our best to encourage them, for example through incentives. This event was the first that WACREN organises with full sponsorship for international participants (travel, accommodation, etc.). Generally, for all of our capacity building workshops, we provide partial sponsorship only. This shows how committed WACREN is in promoting and encouraging the involvement of women in science and technology in general and in IT in particular.

Given the success of the Lagos workshop, I am quite sure that we will make a substantial and noticeable progress in the next couple of years.

On January 15 it has been announced that following a tender call in June 2016, GÉANT has awarded a 15-year contract to MainOne for connectivity services. This means that WACREN joins the global R&E networking community through a network that provides a 10Gbps link from Lagos to London where it connects with the GÉANT network. West and Central Africa are therefore provided with access to R&E collaborations with over 50 million researchers, academics and students across Europe. As part of the contract, an additional link will go out from Lagos to Accra. Not only will this contract connect the first two countries in West and Central Africa, but it will also form the building block for the WACREN backbone support of R&E communities across the entire Central and Western part of the African continent.

"When the first connections will be up in the first quarter of 2018, the big hole that currently exists in the global research and education networking map will finally be closed."

Boubakar Barry, CEO WACREN.

AFRICACONNECT2 AND EUMEDCONNECT3 TAKE TO THE STAGE AT HQ OF LEAGUE OF ARAB STATES

The 7th Arab States Research and Education Network (ASREN) flagship event - e-AGE 2017 – took place on 3-4 December 2017 in the palatial setting of the Headquarters of the League of Arab States (LAS) in Cairo – usually where Arab Head of States meet and Arab politics is made.

Securing an enduring place on the global R&E map

Held under the patronage of HE Ahmed Aboul-Gheit, LAS Secretary General, the event attracted over 80 delegates from 21 countries and offered a high-quality programme with updates on R&E developments across the Arab region and on new opportunities for international cooperation.

During the opening session, ministers and senior officials stressed the importance of technological literacy as a key factor for socio-economic and scientific progress and recognised the role of initiatives such as AfricaConnect2 and EUMEDCONNECT3 in enabling international collaboration and in forging citizens of the world. Ambassador Ivan Surkoš, Head of the European Union Delegation to Egypt, gave a positive keynote speech about GÉANT and its role in regional projects, considered as reflecting the EU's efforts to integrate the Arab region into the global R&E map.

Pictures
Main image; e-AGE 2017 opening session at League of Arab States

Top right (clockwise;
- David West (GÉANT and Dina Barakat (EUN) in conversation with representatives from Bibliotheca Alexandrina
- Ambassador Ivan Surkoš, Head of the EU Delegation to Egypt
- Iman Abuel Maaly, EIFL
- Participants at joint AfricaConnect2 cluster 3 & EUMEDCONNECT3 project meeting

Voices from the field

In his keynote address, Michael Foley, former Lead Distance Learning Specialist at the World Bank, made a passionate plea for NRENs acting as access pathways to global knowledge, which was reiterated in various user presentations, such as from Iman Abu El Maaly, EIFL (Electronic Information For Libraries) representative from Sudan, who stressed the role of NRENs in enabling libraries to live up to their mandate of being curators of knowledge.

Attendees also heard first-hand accounts of data communications requirements from within the user communities, among others, from SESAME, the first synchrotron radiation facility in the Middle East, the Egyptian earth observation institution NARSS and the VI-SEEM project which offers training and data management services for the HPC communities in the Eastern Mediterranean and South-East Europe.

Representing ASREN's sister organisation in AfricaConnect2, WACREN, Omo Oaiya focused on challenges and opportunities in changing the R&E networking landscape in Western and Central Africa, stressing that AfricaConnect2 and its seamless continuation post 2018 is the only game in town to make such change happen. In a remote presentation, Karl Meyer from GÉANT gave an overview of the GÉANT service portfolio which resulted in increased interest in deploying particularly eduroam and eduGAIN across the region.

CSRIT training

A TRANSITS-I training course for new or potential computer security incident response team (CSIRT) personnel was arranged by GÉANT and ASREN and successfully delivered on 5-6 December at Cairo University.

Positive developments

e-AGE2017 provided an effective platform to spread the word about R&E networking across the Arab and African world. In addition, the day prior to e-AGE2017, combined project meetings for EUMEDCONNECT3 and the North African cluster of AfricaConnect2 took place jointly with Internet2's Middle East SIG chaired by John Chapman. The meeting was hosted by the Egyptian AfricaConnect2 partner EUN (Egyptian Universities Network) at Cairo University and saw the following key updates and developments:

AfricaConnect2:

- In North Africa, GÉANT and ASREN are discussing plans with the partners for upgrading Egypt's connectivity and for re-connecting Tunisia and Morocco;
- a further phase of AfricaConnect for the whole of Africa is being planned by the European Union after the current phase ends in November 2018.

EUMEDCONNECT3:

- Lebanon's connectivity was recently further upgraded from 800Mbps to 1.4Gbps to accommodate increasing demand from universities;
- Jordan's connectivity is upgraded to 1Gbps for the SESAME project and has reconnected the Jordan NREN JUNet;
- re-connection of Palestine was discussed with representatives from its Ministry of Education.

Gulf Region:

- UAE NREN Ankabut announced that their regional AGE-OX exchange point in Fujairah is now operational and is again being actively promoted as a regional hub. GÉANT has agreed to re-open discussions with Ankabut about bringing GÉANT connectivity to AGE-OX in the light of significant demand for connecting EU remote campuses there.

Many thanks again to ASREN and EUN for a productive week in Cairo!

Further information

For further information on e-AGE 2017 please visit **http://asrenorg.net/eage2017**

NEW LOOK OF "IN THE FIELD (ITF)" BLOG UNVEILED

BOOKMARK THIS SITE!

What's new?

- Home page: redesigned to encourage visitors to explore more of the content on the site that is relevant to them
- Value proposition content – "Why R&E Networks?"
- Slider featuring latest 3 stories published
- Prominent description of what the site is about
- Lots of ways to explore content, via search, all stories, topics, country, and region

Why R&E Networks?

(**https://www.inthefieldstories.net/why-re-networks/**): This page features NREN value proposition content and links to external resources, including the Case for NRENs and GNA sites.

About R&E Networks page

(**https://www.inthefieldstories.net/about-re-networks/**) also allows visitors to explore content via featured topics, provides links to external resources and features a map that highlights all countries with operational NRENs (information sourced from GÉANT Compendium).

Enjoy exploring the new site

www.inthefieldstories.net

The editorial team:

Jane Gifford (AARNet)
Helga Spitaler (GÉANT)
Dimple Sokartara (GÉANT)
Audrey Gerber (IUCC)
Arne Vollertsen (NORDUnet)

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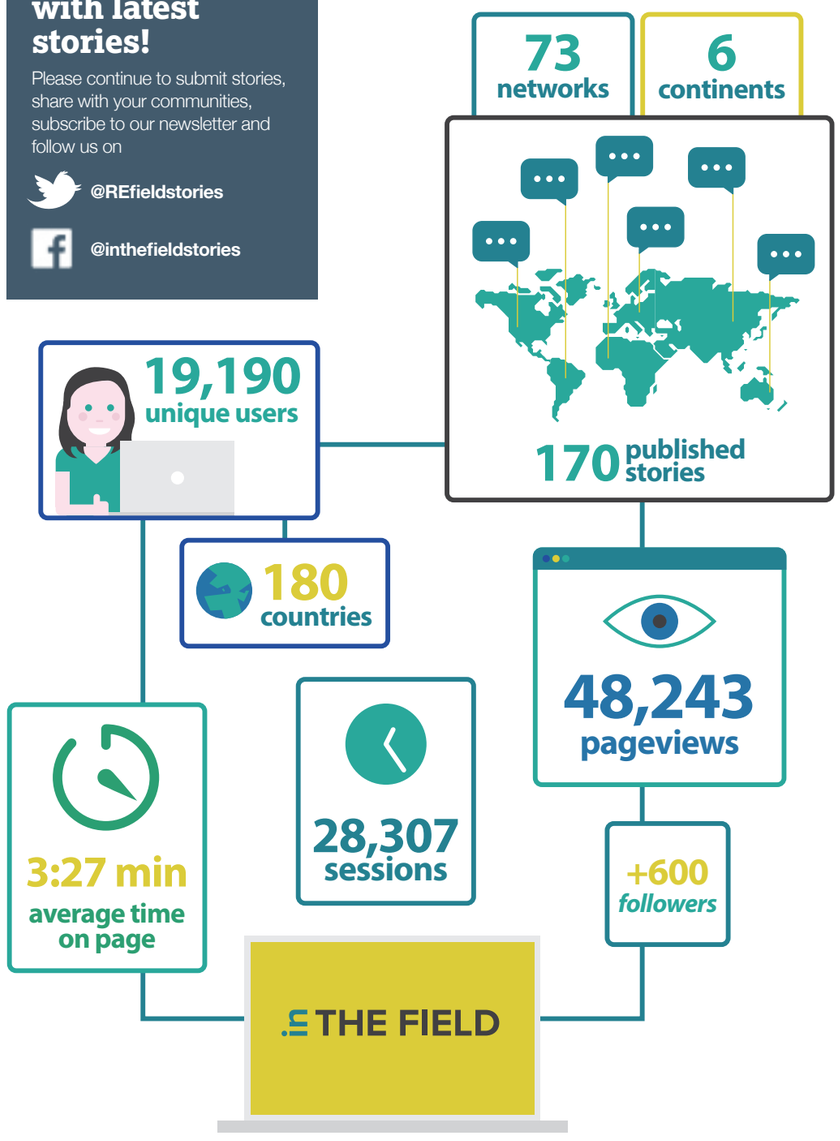


ITF BLOG: SPOTLIGHT ON AFRICA

UGANDAN STUDENTS ENHANCE UNIVERSITY SERVICES AND CREATE JOBS

The power of empowering

One of the latest additions to the In The Field blog is a story about a student start-up that originated from a project at Kyambogo University in Uganda. The case study was produced in the form of a video by the AfricaConnect2 project specifically for the 5th African Union - European Union Summit of Heads of State and Government held last November in Abidjan, Côte d'Ivoire. Themed "Investing in youth for a sustainable future", the Summit offered a great opportunity to showcase the impact of R&E networks on sustainable development and job creation.

The video tells the story of a group of students who, by utilising their software development and data management skills, created a suite of management software to optimise the day-to-day running and thus the student experience at Kyambogo University. On the back of that, a start-up company, ZeeNode, was founded to manage the software which is now being adopted by an ever growing number of institutions across Uganda.

RENU: key to the success

This is undoubtedly a success story of students who have created jobs and a future not only for themselves but also for the wider community. ZeeNode currently employs people in software development, engineering, finance, marketing and legal services. But this is also a success story of RENU, the Ugandan NREN. From the video you will find out how RENU was instrumental at every stage of ZeeNode's development – from offering a cloud platform accessible to all its users to the uncapped traffic between members of the NREN which fosters local collaboration.

"The role of NRENs is to serve as the catalyst for innovation, for education and for development," – says Isaac Kasana, the CEO of RENU in the video and indeed the Kyambogo University case study is a living proof of that.

Joining forces

The beauty of R&E networks is that collaboration is happening on various levels. The video production brought together people at RENU, the UbuntuNet Alliance and GÉANT who joined forces to tell this success story and gained new skills and a deeper mutual understanding in the process.

Read the blog post written by RENU and watch the video at **https://www.inthefieldstories.net/ugandan-students-enhance-university-services-and-create-jobs/**

2ND TEIN-CAREN WORKSHOP: FOCUS ON EURASIAN KNOWLEDGE BELT

Natural bond

Representatives of the Central Asian and Asian R&E and NREN communities gathered last December in Tashkent, Uzbekistan for the 2nd TEIN-CAREN Workshop. Hosted by Tashkent University of Information Technologies (TUIT), the workshop offered an ideal platform to explore new collaboration opportunities and to consolidate the natural bond given the geographical proximity of the two regions.

Eurasian knowledge belt

Prof. Askar Kutanov, CEO of the CAREN Cooperation Center (CAREN CC) and Ms Hye Joo Yoon, President of the Korea-based TEIN Cooperation Center (TEIN*CC) reinforced their commitment to supporting trans-regional research and education collaboration through the EU-funded CAREN and Asi@Connect projects and to increasing utilisation of the CAREN and TEIN network connectivity. They further recognised the role of Central Asia as vital part of the 'knowledge belt' across Eurasia.

Uzbekistan

Emphasizing the strong bond between Korea and Uzbekistan, Prof. Botir Usmanov, Vice-Rector for Scientific Affairs at TUIT, highlighted the collaboration potential of the local R&E community and welcomed the efforts underway for Uzbekistan to join the CAREN project which aims to create a regional R&E network across Central Asia and to interconnect it with the pan-European GÉANT backbone.

Collaboration is a must, good connectivity is key!

A strong will to collaborate was also the common denominator in presentations by user representatives from Korea and Central Asia, with focus on telemedicine, e-learning, e-government and natural risk management. The message was sound and clear: scientists, educators and the medical community want to collaborate, and good connectivity is essential!

Find out more:

CAREN: **https://caren.geant.org**
https://icaren.org/
TEIN/Asi@Connect:
http://www.tein.asia

Pictures
Top; Workshop attendees at TUIT in Tashkent, Uzbekistan, 13-14 Dec 2017

Right; Prof. Botir Usmanov (TUIT) and Prof. Askar Kutanov (CAREN CC)

EOSC-HUB: INTEGRATED SERVICES FOR THE EUROPEAN OPEN SCIENCE CLOUD

How GÉANT is contributing to this significant new project

The EC-funded EOSC-hub project started on 1 January 2018, bringing together an extensive group of national and international service providers to create the Hub: a central contact point for European researchers and innovators to discover, access, use and reuse a broad spectrum of resources for advanced data-driven research.

GÉANT is one of the key partners of the consortium as are several members of the NREN community including CSC, the host institution of Finland's FUNET; CESNET from the Czech Republic; GRNET from Greece; PSNC from Poland; SRCE from Croatia; and Uninett from Norway.

Together the partners will develop the vision of the Hub as the integration and management system of the future European Open Science Cloud. The EOSC-hub project mobilises providers from the EGI Federation, EUDAT CDI, INDIGO-DataCloud and other major European research infrastructures to deliver a common catalogue of research data, services and software for research.

For researchers, this will mean a broader access to services supporting their scientific discovery and collaboration across disciplinary and geographical boundaries.

GÉANT will contribute directly to the work package focussing on Business Models and Procurement, bringing on board expertise and best practices on procurement and purchasing frameworks. Specifically, GÉANT will lead the development of framework agreements and structures that simplify the purchasing process and reduce the administrative cost from the buyers while ensuring access to suitable offers.

In parallel, the GÉANT (GN4-2) Project will establish a collaboration agreement with EOSC-hub project building on existing Memorandums of Understanding. This cooperation is a positive next step towards the alignment of both projects in areas of common interest, such as AAI or Service and Operations Management.

Annabel Grant, Senior Stakeholder Engagement Manager at GÉANT, says: "The EOSC-hub project will support European researchers through easier and broader access to the services of e-infrastructure providers; GÉANT looks forward to a close collaboration with the project and its partners."

The EOSC-hub project (full title: Integrating and managing services for the European Open Science Cloud) will run for 36 months, through to December 2020 with funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 777536.

Contact points

Email: **info@eosc-hub.eu**

EOSC-hub website:
www.eosc-hub.eu
(under construction)

Twitter: **@EOSC_eu**

CHARTING THE COURSE TOWARDS A CONCRETE EUROPEAN OPEN SCIENCE CLOUD: THE EUDAT CONFERENCE "PUTTING THE EOSC VISION INTO PRACTICE", PORTO, 22-25 JANUARY 2018

What does EOSC mean in practice? What are the key factors for success? What is the role of research communities? What are the common goals for EDI & EOSC and how should they work together?

These are few of the questions that over 230 participants of EUDAT's Conference ***"Putting the EOSC vision into practice"*** strived to answer at the 3-day meeting in Porto. Attendees included policy makers, service providers and research community representatives from 25 countries working on various data challenges and disciplines.

The conference was opened by Dr. Augusto Burgueño Arjona, Head of the Unit "eInfrastructure & Science Cloud", DG CONNECT who presented EOSC as an important instrument to support collaboration between e-Infrastructures & research infrastructures, and to promote open science: ***"EOSC has to be an inclusive ecosystem where horizontal and thematic service providers work together to meet the user needs."***

The discussion on transforming the EOSC vision into practice continued with a panel moderated by Annabel Grant, Senior Stakeholder Engagement Manager, GÉANT with Françoise Genova, Researcher at Centre de Donnees astronomiques de Strasbourg (CDS), Per Öster, Director, CSC & EOSC-hub Project Director, Grazia Pavoncello, ministerial representative at the Italian Ministry of Education, University and Research (MIUR) and Alex Vermeulen, Carbon Portal Director of ICOS ERIC, participating, together with Augusto Burgueño Arjona.

The conference continued with an inspiring keynote by Michael Wise, Head of Astronomy, ASTRON - the Netherlands Institute for Radio Astronomy, on the data challenges behind the Square Kilometer Array (SKA) Project. **"Based on current projections, the SKA Observatory, once operational, is expected to produce an archive of standard data products with a growth rate on the order of 300 petabytes per year. Any further processing and subsequent science extraction by users will require significant, additional computing and storage resources"**.

Pictures
Top left; Panel Plenary Session 1: The European Open Science Cloud - Putting the Vision into Practice

Top right; Augusto Burgueño Arjona

This presentation set the scene for a second panel discussion "The European Data Infrastructure (EDI) and the Data Challenge" which focused on understanding the role of HPC in the EOSC and EDI landscape and was chaired by Rob Baxter, EPCC, University of Edinburgh with Serge Bogaerts, PRACE, Giuseppe Fiameni, CINECA, Kimmo Koski, CSC, Sinead Ryan, Trinity College Dublin, and Michael Wise, ASTRON.

These recommendations were further discussed in breakout sessions which explored the crucial aspects in creating a thriving data economy, such as legal issues, interoperability of services, the role of research infrastructures as thematic service providers, and business models and sustainability of data infrastructures. Nine complementary events organised by ENVRI, EOSCpilot, the EUDAT Working Groups on Sensitive Data, Semantic and Array Databases, GÉANT, LIBER and SeaDataCloud allowed participants to deepen specific topics and to establish new collaborations.

Finally, the conference enabled stakeholders to discuss the future of EUDAT and the EUDAT Collaborative Data Infrastructure (CDI). The EUDAT CDI will continue developing and operating an interoperable layer of common data services to support research in Europe and will allow EUDAT to play a concrete role in the EOSC-hub project (**www.eosc-hub.eu**) and wider EOSC ecosystem. This will guarantee a continuous interaction with user communities that have been at the heart of the EUDAT strategy since its start in 2013.

About the EUDAT CDI

With a network of more than 20 European research organisations, data and computing centres in 14 countries, the EUDAT Collaborative Data Infrastructure (CDI) is one of the largest infrastructures of integrated data services and resources supporting research in Europe. It is designed to address the full lifecycle of research data, representing a strategic solution to the challenge of data proliferation in Europe's scientific and research communities and it is realised through an ongoing collaboration between Service Providers and Research Communities working as part of a common framework for developing and operating an interoperable layer of common data services. The CDI services cover data access, data storage, data discovery and metadata, persistent identification, data management, authentication & authorisation, service management infrastructure and Research Data Management (RDM) training & consultancy. More information at **www.eudat.eu**

Pictures
Top left; Panel Plenary Session 2: The European Data Infrastructure (EDI) and the Data Challenge

Top right; Michael Wise, Head of Astronomy, ASTRON

Middle right; The EUDAT community at work

OUTREACH & EVENTS

PRACE has a number of outreach activities targeted at the current and next generation of computational scientists and PRACE users.

Below are two of our ongoing and upcoming activities.

Outreach to Universities

The PRACE Outreach to Universities programme, is a one-stop shop for the latest student-centric information, educational opportunities and more. These activities are especially designed to encourage advanced HPC, Computational Science, Simulation and Data Science studies and highlight their benefits and value.

Sign up to the PRACE Outreach to Universities programme mailing list to be kept informed of all PRACE activities which are aimed for students.

http://www.prace-ri.eu/outreach-to-universities

PRACEdays18 and European HPC Summit Week 2018

The European HPC Summit Week 2018 in Ljubljana will gather together the main HPC stakeholders in Europe.
Similar to previous years, this edition will also offer a wide variety of workshops covering a number of application areas where supercomputers are key, as well as HPC technologies and infrastructures. PRACEdays18 is the central event of the European HPC Summit Week, and is hosted by PRACE's Slovenian Member ULFME – University of Ljubljana, Faculty of Mechanical Engineering.

The conference will bring together experts from academia and industry who will present their advancements in HPC-supported science and engineering.

Registration for the European HPC Summit Week 2018 and PRACEdays18 is open.
The deadline to register is 7 May 2018.

http://www.prace-ri.eu/pracedays18

A SOFTWARE SOUL FOR TOMORROW'S NETWORK

Consortium GARR

HOW AI AND AUTOMATION WILL CHANGE NETWORKING

We cannot talk about automation in telecommunications without considering the important changes that are ongoing across the industry. In the wake of the paradigm-shift introduced by the cloud revolution, networking is evolving too. This is because there is growing need for scalability.

There are different reasons behind this request, including the continuous need for larger bandwidth connections, an exponential rise of devices on the network, a larger amount of data to manage and, finally, an ever-increasing user mobility and a need for services to be accessed anywhere in the "cloud" mode.

In this context, the software component, automation and artificial intelligence will be strategic for managing processes and ensuring support for decisions. This will expand our ability to get data and information on the network functioning and to plan developments in real-time.

A new paradigm in networking layers or "bricks"?

The current network model is based on a multi-level architecture. For each level there is a corresponding element (fibres, amplification and transmission equipment, IP routers, etc.) strictly connected in a hierarchical way. It is almost a static system, which requires manual configurations, and presents rigid points of demarcation. It works and it is resilient, but this network stability is paid in terms of adaptability. Today, however, we observe a different trend: from a vertical organisation in layers we are moving to a "brick" model, where a service is no longer composed by organising the components in a logical sequence, but by accessing the resources in a direct way. It is a disaggregated model and we can represent networks, apparatuses and network functions as different resources that produce different services when they are combined.

Software Defined Services vs hardware constrained networks

In this scenario, the software element acquires an increasing importance, while hardware is increasingly considered as a simple and inexpensive commodity, which has to be first of all flexible and easy to set up. This change is already underway and the OTTs are benefiting of it. From a "layered" model we are moving to a "functional" model, where the concept of service to the end user is completely modified because every single component (transmission, storage, computing, firewall ...) becomes a service to be combined with others as needed. How do you put the different components together? How is this complexity managed? At this stage an important role is played by automation and in particular by the so-called "declarative" model: In this model we first declare (describe) the service architecture, and then the software decides how to carry out the process to achieve the goal. Introducing the concept of "zero touch networking", Bikash Koley, director of Google network architecture, said that 70% of network malfunctions are due to human interventions, since the human mind is unable to record the complexity of the "state of the art" of the network, which is made up of different variables and functions: this is why software intervention is absolutely essential. We are therefore advancing towards an intent-based networking, as stated by Gartner.

Fault finding via AI

In the current model it is easier to solve a dysfunction because you can just identify the level where the dysfunction happens, access it and act on it, while in the functional model it is necessary to access different information from all components involved and make correlations to understand where the problem is. For sure, a key role will be played by artificial intelligence that can analyse the different components, in support of decision models. The business organisation will still be based on functions, thus the roles of the network specialist, the software specialist and the IT specialist won't disappear, but

the services will involve different functions so we can suppose that this will affect in some way the organisational model.

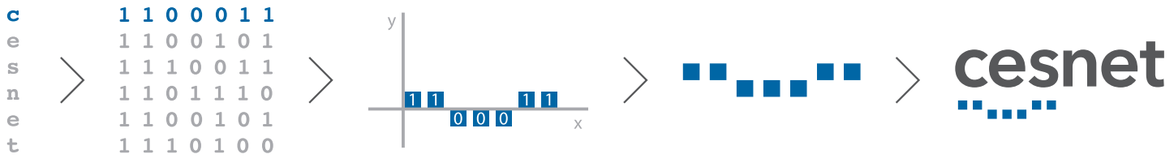
Accelerated Service Development

Why did we get to this model? A very strong reason is that the speed in producing innovation is increasingly required.Thanks to the high flexibility of this new model, it is possible to create more services and to reduce the implementation time: in the first model it takes 2-3 years for developing a service (which remains operational for 7 years) while in the disaggregated model it takes only a few months to build new services (with a shorter life cycle and calibrated on real needs).

Reducing costs

But there is also an economic motivation: the cost of the layered model is no longer affordable because in order to increase performance, the whole infrastructure needs to be modified, while in the new model it is possible to operate only on a specific element, for example by setting up the optic part to achieve a bandwidth upgrade. Of course there are some risks, above all in relation to the responsibility models and the definition of communication channels between the different elements, but also in security management, which requires an increasingly widespread control and faster operations to mitigate the effects of a vulnerability. In relation to that, AI becomes a very important enabling tool. As part of GARR research network, we have developed a White Paper available online (see www.garr.it) and analysed all these issues together with our research community, with the purpose of anticipating changes. Making a smart network will be the end result, just because I think that nobody would like a dumb network...

Words
Massimo Carboni, GARR, the Italian academic and research network



CESNET HAS A NEW LOGO

CESNET, an association of Czech universities and the Academy of Sciences, represents the Czech Republic in GÉANT. Since the end of last year, CESNET has presented itself under a new logo and the visual style based on it.

CESNET, an association of Czech universities and the Academy of Sciences, represents the Czech Republic in GÉANT. Since the end of last year, CESNET has presented itself under a new logo and the visual style based on it.

Binary code – a kind of DNA of computer science – was the chief inspiration behind the new logotype. Together with the new logo, CESNET started to use a new typeface – Avenir, which is French for 'future'.

"Undoubtedly, CESNET is an organisation that helps form the future. We provide our services to academic, scientific and research communities as well as other experts. This allows them to get ahead in their fields. That's why we have chosen Avenir, or Future, as our new typeface. We think it's highly symbolic," says Gabriela Krčmařová, Head of Communication at CESNET.

The new logo consists of the Association's name and seven blue squares, which are a graphic representation of the letter 'c' in binary-coded ASCII. The authors Petr and Michal Stupka of Radical Design carried out conversion utilising the principle of a Cartesian plane coordinate system with x- and y-axes.

If both axes have the same unit of length, we get a square grid in which we can move – a one will always be one row higher than a zero. The transcription of the letter 'c' produced a 'binary smiley', which has become the Association's basic graphic symbol.

New logos have been created in the same manner for each of the Association's services, which used diverse graphic styles before. The form of these graphic marks has also been determined by binary code, or more precisely the representation of the initial letter of the service in the code. Examples include:

- m for MetaCentrum (high-performance computing)
- d for DataCare (date storage)
- c for CzechLight (unique photonic devices)
- p for Perun (system for user, group and access management for services of the national e-infrastructure CESNET)
- f for FLAB (forensic laboratory)

Affiliation of the services to the CESNET brand is highlighted by the new graphic concept.

See more at **www.cesnet.cz**

cesnet metacentrum

cesnet datacare

cesnet czechlight

cesnet perun

cesnet flab

DATA PRIVACY DAY CONFERENCE

On the 29th of January around 150 participants from research and private sector found their way to the half-day Data Privacy Day conference organised by the RESTENA Foundation and the University of Luxembourg hosted at the university premises. The aim of the yearly Data Privacy Day is to raise awareness about privacy and data protection practices at international level.

Words
Dr Cynthia Wagner, Fondation RESTENA

To spread this word, the conference sessions focussed on the General Data Protection Regulation (GDPR) that takes effect on May 25 this year and about security threats in daily life.

In presence of the National Authority for Data Protection (CNPD-Luxembourg), participants were informed about this new regulation and its compliance control processes in general. Since research projects are concerned by GDPR too, a dedicated session was given about the changes in data protection for future research projects, providing advise and how to adapt to this new regulation.

Besides these GDPR sessions, another one focussed on the need for protecting data. For this, the audience was shown daily threats in information security for raising awareness next to the users to care for their data by illustrating the facility of acquiring data on most different ways. One major factor in the given examples was the human being. Social engineering attacks for stealing valuable information are observed on a daily basis in organization, ranging from phishing to dedicated attacks. Besides these attack, data can also be leaked involuntarily due to badly configured devices, may this be a wrongly configured printer communicating outside of its network or badly configured antennas, routers...

More information and the streamed sessions are available on the University of Luxembourg Twitter account: **https://twitter.com/i/moments/957956658134683648** .

This was the first conference organized by the University of Luxembourg and the RESTENA Foundation in the framework of the Data Privacy Day and another one will follow next year, so stay tuned!

More information about this year's Data Privacy Day conference: **http://dataprivacyday.lu**

HARMONISING THE SOFTWARE DEVELOPMENT PROCESS IN THE GÉANT COMMUNITY

Introduction

The GÉANT software community takes part in the collaborative development of applications and products which support services delivery. Along with the progressive delivery of services, the importance of reliable and resilient software components has increased to meet the demands of users.

Every service in GÉANT has to be developed with the highest quality attainable in order to fulfill the demands of the research and education community, and on the other hand to complement services provided by member NRENs. Efforts described in this article are tackling the challenge of keeping up with the quality standards while maintaining a large number of software projects developed in a distributed environment with the effort and expertise of skilled staff coming from all member NRENs.

Who we are and what we are about

The software management (SWM) team in the GÉANT (GN4-2) Project's Service Transition and Software Management task is assigned to support the software development teams (SDTs) in harmonisation of software management and development practices, as well as to help in the adoption of consistent software management practices across GÉANT services.

Additionally, the SWM team performs secure code and quality code audits of services in transition and in production and organisation of trainings (School of Software Engineering, Secure Code Training) for the GÉANT software community.

Harmonisation and improvement of software management and development practices in GN4-2 aims to help software development teams to:

- Keep to the project budget.
- Minimise project delays.
- Improve product quality.
- Improve the probability of project success.

This can be achieved by improving the awareness of the effective software development methodologies (SDMs) and/or best practices. The SWM team started by exploring the current development practices, with the aim to learn what could be done to improve the efficiency of SDTs, what obstacles they have faced etc.

In that process, the SWM team encourages the developers to share their experiences and discuss methodologies applied in day-to-day work. The current situation in GÉANT regarding the software development methodologies usage was taken into consideration to build solid grounds and determine the list of required activities for future actions.

Words
Zarko Stanisavljevic, University of Belgrade

Marcin Wolski, Maciej Labedzki, Szymon Kupinski, Poznan Supercomputing and Networking Center, Poland

Andrijana Todosijevic, Marina Adomeit, Academic Network of Republic of Serbia – AMRES

GÉANT software catalogue

More than 30 software projects are being developed by around 20 software development teams of highly skilled professionals originating from different member NRENs. There is a number of retired software projects as well. A central and complete project catalogue is a must-have feature for federated community of software developers, to gain maximum benefits for collaborative work and alleviate some negative effects of team distribution, partial involvement to the project and similar. Such information repositories are present in large software communities (e.g. Apache Projects Directory), and evolve together with a growing portfolio of software projects.

The GÉANT Software Catalogue is a web-based service acting as a front-end for existing databases and services spread over the whole GÉANT software development ecosystem. This new system will deliver an overview of GÉANT software development in a clear and comprehensive way. The new service won't introduce yet another information repository by duplicating existing records - it will retrieve the data from existing sources consolidating the information in a unified and harmonised way.

The GÉANT Software Catalogue is in its initial phase at the moment. This phase aims to release a new service, which can complement the existing GÉANT product portfolio i.e. GÉANT toolset - Intranet, wiki pages, and software development infrastructure. The functional requirements for the Catalogue come from software teams, GÉANT coordinators, project managers and GÉANT activity/task leaders. A proof of concept implementation was successfully presented during GÉANT Symposium 2017 during a session on software development. As a result an active discussion on its target shape has started.

More information about this idea can be found at **https://wiki.geant.org/display/timops/Indexing+the+GEANT+software+projects**

Supporting the software community

GÉANT Symposium 2017 – side meeting

The objective of the side meeting was to gather software developers from across GN4-2 as a forum for exchanging ideas and identifying any issues and obstacles that they are facing in their day-to-day work. The usage of the SDM was a focal point of the meeting. Participants were encouraged to engage in a discussion about software development methodologies they are using. The most important points that were highlighted during the meeting were:

- There is an awareness about the SDMs within GÉANT teams and some have observed tangible benefits from using SDMs selectively.
- The teams that have applied selected SDM practices rely on Scrum, Kanban or XP and are often adjusting processes (e.g. extending time periods) to their abilities.
- Most of the attendees confirmed their interest in participating in a workshop about practical implementation of SDM.
- Most of the attendees also expressed their interest in participating in a new task force on this matter.

GÉANT Software Development Infrastructure

The intention of the GÉANT Software Development Infrastructure talk, which was a part of the "Software Development in GÉANT" session during the GÉANT Symposium was devoted to presenting selected services of GÉANT Software Development Infrastructure with a focus on new or updated functions of provided services.

Jakub Gutkowski, who is the technical leader of NMaaS (Network Management as a Service), presented how the life-cycle software with continuous deployment implemented in their project was implemented with the use of services provided by SWDSD.

More information about SWD services are available on **http://software.geant.net**

Planned activities

In accordance with the aforementioned, the SWM team took suggestions for the creation of a proposal for a Task Force on Software Management and Development (TF-SMD) in order to support the development and service provision for GÉANT and NREN software development teams and promote the use of best practices for software development. TF-SMD would create the opportunity to introduce the industry practices and standards as well as lessons learned from other institutions. Additionally, TF-SMD would get familiar with NRENs' experiences in building the SDTs, help to include the NRENs practices into GN4-2 and act as a connection between GÉANT, NRENs and industry in the field of software development.

Contact us

The SA2 T1 team is waiting for your comments and questions regarding the harmonisation of the software development process in GÉANT community.

Please send any message to Zarko Stanisavljevic, SA2 T1 subtask leader, **zarko.stanisavljevic@rcub.bg.ac.rs**

SPONSORED CONTENT

ARE YOU STILL TALKING ABOUT SDN? WE'RE DOING IT.

But it's a very different creature from when software defined networking was first discussed and (glibly) defined as open, programmable networking. In its life it's gone through some troubling moments (too complicated, not enough vendor support, incomplete ecosystem). And been the brunt of some (lame) jokes: what does SDN stand for? Still Does Nothing. Or twisted into Security Defined Networking – what is that?

Carolyn Raab, co-founder of Corsa Technology puts forward the case for SDN

I want to put forth the definitive SDN acronym standing for "Simply Defined Networking". We all have learned a tremendous amount over the last few years. And I believe it has lead us to this very important point where we actually do understand SDN properly and we have identified that a crucial underpinning of the success of SDN is to keep things very, very simple. Whether you are dealing with routing at the core of the network or network security at the perimeter, open programmable networking must be synonymous with simplicity. I'd like to highlight a couple examples of this simplified networking in action.

Deriving Flexible, Dynamic Networks and Services

Let me start with the success of GÉANT's Testbed as a Service offering as a prime example of SDN.

"GTS is designed to support research teams investigating innovative SDN solutions and needing a high performance distributed infrastructure. GTS can simultaneously support multiple projects and isolates them from each other and from the production GÉANT network to provide security and safety. The network testbed resources are dynamically allocated from real e-infrastructure distributed throughout the GÉANT core service area allowing researchers to define, build, test and rebuild highly scalable, high capacity virtual networks quickly, easily and cost-effectively."

In essence, GTS is a very programmable, dynamic network. What is running in behind the scenes (the real infrastructure) is perfectly simple, openly programmable, high capacity SDN hardware with virtual forwarding contexts that can be spun and down via compact, dedicated controllers for each defined service offering.

Instead of trying to create one overlord controller that can do all things for all people, GTS took an SDN approach that allowed them to cut down the problem space into simplified, bite-size chunks that could be readily implemented, were logically isolated from one another and (as important) maintained over time.

When a researcher requires network resources, GTS provides dynamically provisioned network environments consisting of computational servers, data transport circuits, and switching/forwarding elements. These environments become unique testbeds for each researcher which can be scheduled in advance and are selected from any of the GEANT core points of presence that have GTS services available. Each testbed constitutes an isolated and insulated virtual environment that can function autonomously from other testbeds or other production services. Keeping it simple for the user of the service, they need only create controller software for their particular network environment, independent of other services and functions on the network.

Securing Networks with Disaggregated Network Security

If we turn to network security, SDN is also able to play an important role in evolving how networks are protected. Instead of trying to force everything into monolithic, complicated platforms, disaggregate network security the SDN way. Rethink network security built on a performant yet simplified flow-forwarding hardware appliance that excels at traffic export for data acquisition and network statistics as well as traffic enforcement for precision traffic filtering to maintain integrity of the network. And put all the best, super capable analytics, policy and smarts into the software cloud (where they should be).

In this context, we call the flow-based appliance a Network Security Control Point and it follows the SDN evolution seen in networking architectures of separating data plane (for network security, it's data export for visibility and filtering for enforcement) from control plane (software analytics). The control point is a transparent, in-line L3/L4 network security device that is simple to use and universal in that you can place it anywhere in your network, to perform any security action, and that it uses open interfaces for everything it does.

We can then use the foundation of a SDN control point for network security service chaining that works at scale, in a manageable way. We all acknowledge that true dynamic security service chaining for the network core is proving to be challenging. Network architects and security engineers are challenged to develop real-time defenses that ensure their networks always operate with integrity and are properly protected. They are looking to create dynamic security service chains in the network to be able to spin up and down the right type of network security, at the right time and for the right segment of the network.

A network security control point drops into any existing network today with no reliance on changes to the control plane whatsoever, and it uses simple vlan tag switching for forwarding. It is elegant in its simplicity, which has pushed the complexity of previous attempts out of the problem. And at the same time it is a really powerful architecture that allows you to service chain virtual security instances or existing appliances to do pretty much anything you like when it comes to securing and protecting your perimeter.

I believe simplified networking is on the cusp of becoming broad spread. I look to initiatives beyond GEANT's testbed service that are destined for the production side of the network that are part of this trend. Network operators' efforts will focus on the applications and the underlying network and its security mustn't be a distraction. Keeping next generation networks simple will be very important for that. We need to all pull together to make this happen.

Corsa is proud to be a sponsor of TNC 2018. We will be there to share real 100G network security service chaining learnings, perimeter security concepts and SDN routing examples. We are actually doing it and will show live demonstrations of (perfectly simple) SDN!

Carolyn Raab

With over 25 years industry experience in the networking and communications industry, Carolyn brings to Corsa product management, sales, marketing and business development experience in networking and security markets. As a co-founder at Corsa, Carolyn has enjoyed all the twists and turns of SDN in the last years and has presented at previous industry conferences on various topics around SDN.

With the growth of cloud and network traffic, network security is taking a front and center seat and this is where Carolyn now spends most of her attention.

SPONSORED CONTENT

THE IMPACT OF SOFTWARE DEFINED NETWORKING ON WIDE AREA NETWORKS

dimension data

How Software Defined Networking will affect the current WAN paradigm is one of the hottest topics in the world of networking. Mark Holmes, EU Business Development Manager at Dimension Data, explains;

I want to start by sharing the thoughts of Raoul Tecala, Global Business Development Director at Dimension Data on why and how "Wide Area Networks" (WAN) strategies are being challenged by the emergence of Hybrid WAN architectures, utilising "Software Defined Networking" (SDN) and specifically on the current WAN cornerstone technology Multiprotocol Label Switching (MPLS).

Are hybrid Wide Area Networks the nail in the coffin for MPLS?

A maturing Internet and the increasing adoption of cloud computing are changing the face of data management and delivery for good. Organisations are gradually moving to a more dispersed data model because not all workloads need to be hosted in a single, centralised facility anymore. Data sets can now be divided among owned or hosted data centres across a wide geography, as well as across different cloud providers situated, potentially, anywhere in the world.

R&E connectivity was, in most cases, provided by a dedicated, wide area network (WAN). In the great majority of cases, this network was based on multiprotocol label switching (MPLS) technology. MPLS networks are still popular today, however, as R&E increasingly uses dispersed services, several other connectivity alternatives may make sense from a cost and efficiency standpoint. Working together as a hybrid WAN, these alternatives may not only save on connectivity costs, but also provide greater capacity and performance. So does this spell the beginning of the end for MPLS as we know it?

Adding up the numbers

One of the main problems that a dispersed data model causes for the traditional

MPLS WAN is application performance. For example, there's the issue of "tromboning". This occurs when remote users access their cloud-hosted applications via the NREN network to the institution, and then back out over same connection to the cloud provider. Depending on the physical location of the cloud service provider, potentially thousands of miles could be added to the round-trip time, which could cause application performance degradation. Applications that run on dispersed data centre infrastructures can therefore become slow and cumbersome to use. In addition an institution's connection is being used on both the inbound and outbound route for traffic that doesn't need to go anywhere near the university resulting in the need for expensive upgrades.

By tuning the routing of each application's traffic via the best available channel NRENs can deliver the necessary quality of service. In addition, organisations may improve overall network availability thanks to the real-time selection of diverse routes, where each link can serve as a backup for the other.

Slowing the process

Despite the obvious benefits, there are still factors holding organisations back from the immediate adoption of a more cost-effective hybrid WAN strategy. Most NRENs have large investments in services and equipment which ties them to using the MPLS in the short to medium term. Adding alternatives to the connectivity mix would only add to their cost. The overall conclusion is that MPLS probably won't die out completely, but it will certainly need to be far more cost-competitive in order to survive. MPLS will probably also become just one of several ways in which organisations connect, rather than the only or most important way.'

Knowing what's on your network

To take advantage of the cost benefits offered by alternative connectivity models, Tecala advises to start with an understanding of the applications you have running over your network, and what traffic volumes and patterns they create in terms of their peaks and troughs. With this application traffic information, you can design a hybrid network that utilises the types and amounts of connectivity that's right for your environment. A hybrid WAN enables you to take a real-time, application-centric approach to network traffic management. But you also need to design the environment more carefully by picking the right primary and backup recovery routes, so that you're able to use the network effectively and with confidence,' concludes Tecala.

So my summary of what Raoul is saying here is that "yes" there are significant cost and performance opportunities in adopting SDN, however it is not just a simple case of replacing your current WAN services. Effort must be invested in addressing the "service operations architecture" to encompass SDN facets including that of software engineering. Software engineering itself will play a significant role in "tuning" networks not only to specific applications but even down to single client instances. The "security architecture" will have to evolve to ensure continuity and integrity of the agreed risk profile and to meet ongoing governance obligations.

SDN is now in its 2nd level of maturity, enterprises are and have adopted the technology. They have realised the potential and are benefiting from it. The vendor landscape is moving a pace with best in breed start-ups being acquired by large scale traditional players who have ambitions to take SDN to scale.

How Dimension Data can help

Today's digital service models are built on information technology that provides greater strategic value. Our services-led approach creates efficiencies and optimises your IT, for better outcomes. Through our global reach of world-class people, process and platforms, we maximise your existing infrastructure. We help you drive and manage your innovation through our enterprise-grade consulting, technical and support, and managed services. Delivered efficiently, reliably, and consistently anywhere in the world by people who care.

Dimension Data's services strategy is built around four pillars, which are: Consulting, Technical, Support, Cloud and Manage. By using this model we are able to offer value at every stage of the lifecycle from inception through to implementation and operation.

Consulting Services:

Leveraging our consulting services and technology expertise can accelerate your network transformation and innovation strategies. We help you create and execute strategies to unlock opportunities, optimise processes, and uncover cost savings. Our expert security consultants can help you to secure your technologies by putting the right policies, processes, and architectures in place. Our Architecture Consulting Services can use existing and estimated future application traffic patterns to design a technology architecture for your organisation.

Technical & Support Services:

We help you maintain your environment through our technology and support services, proactively supporting and accelerating your network optimisation.

Cloud Services:

Our network-centric, highly secure private and public cloud services meet today's service and IT challenges, speed up development and transformation, and lower costs. They also mitigate risks by providing secure, responsive, high-availability infrastructure which can respond to unexpected demand. We deliver our cloud services on our fully managed delivery platform, hosted within your data centre or ours, the Managed Cloud Platform comprises industry-leading hardware and software, coupled with virtualisation technology, operating system software, and CloudControl. CloudControl is - our cloud management system which provides operational control and automation of cloud resource provisioning, orchestration, administration, and billing.

Managed Services:

Our managed services help you with the operations of your technology environments. We provide you with technical expertise, service consistency, and flexibility across multiple vendors, technologies, and geographies. Reduce your overheads and improve efficiency by leveraging our scale, methodologies, and high levels of standardisation.

Dimension Data and GÉANT

Dimension Data provides Public Cloud and related services to the education and research communities through the GEANT cloud framework agreement. Many of the NRENs and institutes in Europe are legacy clients. For more information, please find out how we can help you at dimensiondata.com – or alternatively find us on the GEANT cloud catalogue or that of your local NREN.

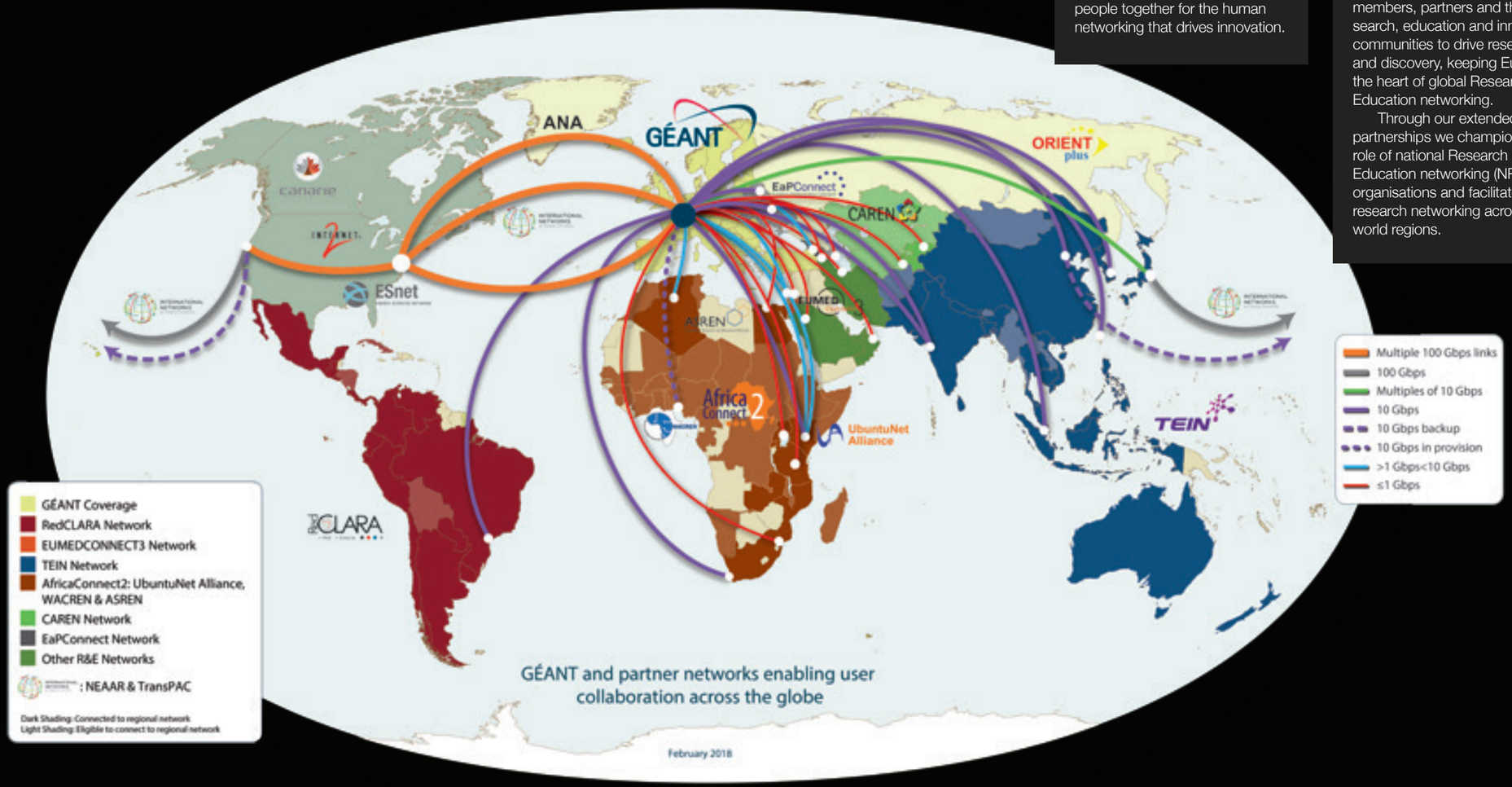
https://clouds.geant.org/dimension-data/

http://www.dimensiondata.com/Global/Solutions/Cloud/

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.



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.

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