

# CONNECT

THE MAGAZINE FROM THE GÉANT COMMUNITY | **ISSUE 30 2018**



## **DI4R2018: CHALLENGES FOR RESEARCH COMMUNITIES AROUND OPEN SCIENCE**



**CONNECT INTERVIEW:**  
AUGUSTO BURGUEÑO ARJONA,  
EUROPEAN COMMISSION

### **ALSO IN THIS ISSUE**

**SQUARE KILOMETRE ARRAY:**  
SIGNAL AND DATA TRANSPORT  
HITS MAJOR MILESTONE

**EDUGAIN EXPANDING:**  
MOROCCO AND MOZAMBIQUE  
LATEST TO JOIN

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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](mailto:paul.maurice@geant.org)

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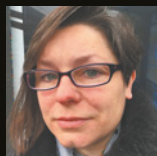
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# **WELCOME FROM CATHRIN STÖVER**



CONNECT 30 is the DI4R2018 conference edition and I would like to take the opportunity to wish you all a great conference in Lisbon. We are very pleased that for the first time the CONNECT interview series has taken us to the European Commission. Augusto Burgueño Arjona talks to us about Horizon 2020, the European Open Science Cloud (EOSC) and European Data Infrastructure (EDI) and the level of expectation he has towards GÉANT and our community. I hope this interview will stimulate even more conversations during the coffee breaks at DI4R!

Many of you will know our colleague, the Director of the Oregon based NSRC, Steve Huter. Steve was inducted into the Internet Hall of Fame in 2014 and recently was presented by the Internet Society with

the Jonathan B. Postel Service Award. Congratulations to you, Steve! In our interview Steve talks about the NSRC, its work and impact around the globe and allows us to understand how it feels to be a truly globetrotting parent.

This edition is full of service updates. Please read about the GÉANT Testbeds Service (GTS), past, present and future, as well as the eduroam Managed IdP service and the wonderful news that eduGAIN is now reaching also Morocco and Mozambique. With an estimated 27 million users in 3,000 institutions accessing more than 2,000 different services around the world, eduGAIN continues to be an incredible success story!

Enjoy the magazine!

Cathrin Stöver, GÉANT

The background is a high-angle, wide-view photograph of a city, likely Lisbon, Portugal, during the 'blue hour' or sunset. The sky is a mix of orange, pink, and light blue. In the foreground and middle ground, there are dense clusters of buildings with red-tiled roofs. A large, modern building with a glass facade and a curved roof is prominent in the lower center. In the background, a suspension bridge (the 25 de Abril Bridge) spans a body of water. The overall atmosphere is warm and urban.

# DI4R2018: CHALLENGES FOR RESEARCH COMMUNITIES AROUND OPEN SCIENCE

The third edition of the annual Digital Infrastructures for Research (DI4R) conference is being held this year at the University of Lisbon campus in Lisbon, Portugal from 9-11 October. Building on the success of DI4R2016 (Krakow) and DI4R2017 (Brussels), DI4R2018 promises to be the best yet. Jointly organised by EOSC-hub, GÉANT, OpenAIRE and PRACE, the event brings a packed programme of sessions, posters and networking opportunities to Europe's researchers, developers and service providers – leading to brainstorming and discussions on how best to serve the user base.

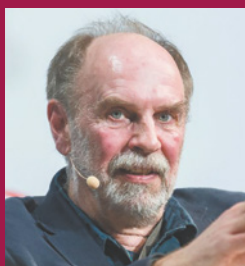


## Programme Committee

The DI4R Programme Committee (PC) is responsible for not only defining a balanced programme based on the event objectives and targets but also for defining the type of sessions that will make up the programme (e.g. workshops, presentation-lead sessions, posters, demonstrations). The PC also defines the content of the Call for Abstracts, reviews the proposals submitted, makes final decisions regarding acceptance of proposals, defines the content of plenary sessions and the list of keynote speakers and defines the event's timetable. For DI4R 2018 the PC is co-chaired by Volker Guelzow of DESY (Deutsches Elektronen-Synchrotron - one of the world's leading accelerator centres) and Sinéad Ryan of Trinity College Dublin. We spoke with Volker to learn more about his involvement.

### Volker, what expectations do you have for DI4R2018?

We consider DI4R as a very important conference since users, providers and large infrastructure organisations get together and can discuss cross-disciplinary approaches and solutions for the burning problems of scientific work. In particular, the 'globalisation' of science requires new way of collaboration and for example access to resources and data. All of this needs new solutions which will be discussed during DI4R.



### How does DESY contribute to the conference?

DESY contributes with a couple of talks, such as about the data management solutions we've developed at DESY for our large accelerators like PETRA III and the European XFEL. We will describe our ideas and solutions and hope for lively discussions and competing ideas. This is how scientific work has to go.

### What additional value does DI4R add to research? And perhaps in your case, in terms of HPC development?

The key feature of DI4R is the exchange of ideas and this happens through networking the people. Take for example HPC computing. We have the traditional approach hooking up thousands of nodes through appropriate network topologies. But will this bring us into the future? So we will have a talk on quantum computing as well, which may not fit with everything, but which will make an impact. Do we understand for example what the needs are for the physical networks, what the technology will deliver in the future and how this may change computing models of large experiments? So, all of these discussion apply to all the fields covered by DI4R, and hopefully will set up new relationships between sites.

## Keynote Speakers

The DI4R conference series is focused on Europe's researchers, and the list of invited keynote speakers reflects this:

- Prof. Dalia A. Conde Ph.D., Director of Science, Species360, SDU (University of Southern Denmark)
- Jose Manuel Gutierrez, CSIC Research Professor; IPCC Coordinating Lead Author
- Alexis Joly, INRIA Sophia-Antipolis – ZENITH Team
- Dr. Kristel Michielsen, Group leader of the research group 'Quantum Information Processing' at the Jülich Supercomputing Centre, Forschungszentrum Jülich; Professor in Quantum Information Processing at RWTH Aachen University
- Mike Payne, Professor of Computational Physics, TCM Group at The Cavendish Laboratory, University of Cambridge
- Dr. Michael W. Wise, Head of the Astronomy Group, ASTRON (Netherlands Institute for Radio Astronomy)



We spoke with keynote speaker Jose Manuel Gutierrez, who works at the Spanish Research Council (CSIC) as a research professor and has been appointed as IPCC coordinating lead author for the next four years. In his keynote, Gutierrez will touch on the current data-centric challenges that are posed to climate prediction.

### Your keynote speech will address current data-centric challenges in relation to climate prediction. What makes DI4R an interesting event for you to share your insights?

Climate prediction relies on digital infrastructures not only for running computationally expensive multi-model simulations using global and regional climate models (e.g. HPC infrastructures), but also for storing and making freely available the resulting scientific data and metadata (e.g. GRID infrastructures). For instance, the Earth System Grid Federation (ESGF) is a key international effort building on different national infrastructures to provide a distributed data platform enabling world wide access to climate data (moving from Peta- to Exa-scale), including the climate projections obtained in successive Climate Model Intercomparison Projects (CMIPs and CORDEX) which are the basis for studying the impacts of climate change (including IPCC reports). These studies typically require accessing and post-processing huge amounts of data, for instance to distil climate change information for a particular region and, therefore, require new data-centric infrastructures facilitating postprocessing services (e.g. calibration or machine learning). Some ongoing initiatives are exploring the use of cloud computing to deploy a computing (post-processing) layer for efficient data accessing and processing. An example is the cloud-based Climate Data Storage (CDS) being developed by the Copernicus Climate Change Service (C3S). Therefore, the different experiences shared at DI4R both on new advances of digital infrastructures and on experiences from different user communities would be informative for the climate community, and the other way around, experiences and needs from the climate community may help to design the future developments of digital infrastructures in Europe.



### What concrete knowledge do you hope to share and gain during the 3-day conference?

I am particularly interested in the new advances of data clouds and computing cloud services for scientific data processing, including machine learning. There are several ongoing initiatives developing user-friendly tools for intense data cloud computing services and I look forward to see the new advances and the share experiences with users from other disciplines.

### How can Europe's leading e-infrastructures support IPCC in terms of these challenges?

Europe has a long experience in the development and maintenance of e-infrastructures for distributed climate computing, and climate data/metadata storage and curation. Currently, the Infrastructure for the European Network for Earth System Modelling (IS-ENES) plays a key role in the coordination of international distributed data and metadata infrastructures, such as the ESGF. Thus, besides supporting the simulations of the different groups contributing to the next CMIP experiments (CMIP6, which will feed the next IPCC report, AR6), IS-ENES contributes to the coordination of the worldwide distributed infrastructure for data/metadata storage and the development of services for data provision. The experience from Copernicus may help to boost new developments in this field, particularly in computing services for data post-processing, since some of the IS-ENES partners are contributing to this initiative led by ECMWF.

# ABOUT THE ORGANISERS



**EOSC-hub** is a €33 million project bringing together multiple service providers to create the Hub: an integration and management system of the future European Open Science Cloud (EOSC). It will be a single contact point for European researchers and innovators to discover, access, use and reuse a broad spectrum of resources for advanced data-driven research in the EOSC. By mobilising e-Infrastructures comprising more than 300 data centres worldwide and 18 pan-European infrastructures, this project is a ground-breaking milestone for the implementation of the EOSC.

## What does DI4R mean to you?

DI4R is the place where the Digital Infrastructures - scientists, data practitioners, service providers and innovators - meet to better collaborate both in Europe and beyond. It is a unique event in the European landscape, open to scientists from all scientific disciplines and providers of digital infrastructures from both e-Infrastructures and Research Infrastructures.

## What are your hopes for this year's DI4R?

The EOSC-hub project partners - including EGI, EUDAT CDI and INDIGO-DataCloud - are looking forward to contributing to the 2018 edition of DI4R. The project is creating the first integrated service catalogue bringing data and services from multiple providers across Europe and beyond. For this reason, DI4R gives us the opportunity to meet partners who are willing to contribute to the implementation of the Hub with their requirements, resources and services. We are looking for researchers and service providers...

## How does this event help to support Europe's researchers?

There is a strong push for Europe's researchers towards open science and cross-border collaboration. Events such as DI4R help our researchers get acquainted with the latest developments and infrastructures available that can help achieve this, and provide an opportunity to have their voice heard.

**"We see the Hub as an access and delivery channel for the services, software and data provided e-Infrastructures and research communities across Europe. DI4R allows us to realise the project mission."**

Tiziana Ferrari, EOSC-hub Coordinator



**GÉANT** is Europe's leading collaboration on e-infrastructure and services for research and education. Our vision is to ensure equal high performance network access for all scientists across Europe to the research infrastructures and the e-infrastructure resources available to them.

## What does DI4R mean to you?

Involved in DI4R from the start, GÉANT values DI4R as a unique opportunity to meet with and hear from many of our users in one place, and to better understand not only their needs but also their challenges around research and collaboration.

## What are your hopes for this year's DI4R?

This conference should continue to drive not just the discussion around how e-infrastructures can best work together and further support open science, but also the successful delivery of services jointly delivered through the European Open Science Cloud.

## How does this event help to support Europe's researchers?

By bringing together the e-infrastructure partners and the end users in jointly organised sessions it ensures an open dialogue to understand needs, highlight challenges, and to ensure a roadmap to achieving a successful delivery of joint services that benefit researchers.

**"GÉANT has been an organising partner in all the DI4R conferences and will continue to do so, underlining our ongoing commitment to collaborating with our e-infrastructure partners to benefit researchers, industry and society. We look forward to continuing our contribution to both the European Open Science Cloud (EOSC) and the European Data Initiative (EDI) and see DI4R as an integral part of that."**

Annabel Grant, Senior Stakeholder Engagement Manager, GÉANT





**OpenAIRE - Open Access Infrastructure for Research in Europe** is a human and technical network supporting and monitoring the implementation of European Open Science policies. It relies on a well-established network of National Open Access Desks found in 34 countries that connect research stakeholders at a national level, enabling the responsive implementation of Open Science driven policies and OpenAIRE services throughout Europe's heterogeneous research landscape. OpenAIRE offers a range of tools and large-scale enabling services for all major Open Science stakeholders throughout the research life cycle, sets the bar for the Open Science agenda, links up European research infrastructures, as well as reaches out to and liaise with similar bodies worldwide, pushing Open Science best practices forward globally.

## What does DI4R mean to you?

For OpenAIRE, DI4R is a unique and valuable venue to discuss the ideal future implementation of research infrastructures in Europe, and how we can this year understand and serve our users - whether for example funders or research offices - better. In addition to this, the conference is an occasion for OpenAIRE to meet, discuss new ideas and collaborate with many stakeholders, especially researchers, to work alongside them and to showcase our existing services - we want to encourage their adaptation and re-use for doing of Open Science where it really matters (join our booth to discover more!). Additionally, we will be launching our new Open Science as-a-Service initiative for research communities and a Community of Practice for training coordinators and training managers. We will also be discussing Open Science skills and credits. And we would like to get your feedback on the way we are repackaging OpenAIRE services.

## What are your hopes for this year's DI4R?

We expect this year's conference to be fully participated by research communities and forthcoming users of the EOSC. We also hope it would be not just supporting but truly enabling Open Science. As said, the focus on the EOSC will develop especially around integrating and promoting national research infrastructures for the benefit of all researchers.

## How does this event help to support Europe's researchers?

DI4R brings together all the participants of the research lifecycle, and it gives the chance to present projects and results and discuss future perspectives and expectations with peers. Many wish to transform how they do research to make it more fully open - we want to give them the tools and advice so that they can make it happen, as individual researchers, as scholarly communities, and as citizen scientists.

**"Science is moving towards open, and research infrastructures provide the means and the methods to get there: help create greater interest, dissemination and impact for Open Science communities, whether in the academy or in the wider society, by joining us at DI4R!"**

Mike Mertens, Scientific Manager, OpenAIRE



**The Partnership for Advanced Computing in Europe (PRACE)** is an international non-profit association with its seat in Brussels. The PRACE Research Infrastructure provides a persistent world-class high performance computing service for scientists and researchers from academia and industry in Europe. The computer systems and their operations accessible through PRACE are provided by 5 PRACE members (BSC representing Spain, CINECA representing Italy, ETH Zurich/ CSCS representing Switzerland, GCS representing Germany and GENCI representing France). The Implementation Phase of PRACE receives funding from the EU's Horizon 2020 Research and Innovation Programme (2014-2020) under grant agreement 730913.

## What does DI4R mean to you?

DI4R is an excellent possibility to extend the reach of PRACE to researchers not aware of the possible relevance of HPC for their research, and to further enhance collaboration with partners to improve support to research through a consistent set of services offered. We already work together with all the organising partners in other ways, and the event is an opportunity to deepen that collaboration, as well as expand it to others present.

## What are your hopes for this year's DI4R?

This is the third year for DI4R and the second edition that PRACE supports as an organiser; this time we also took on the role of Programme Manager. Of course we hope for a larger audience, more interactions, and more connections between the various communities.

## How does this event help to support Europe's researchers?

Bringing so many actors together, and allowing them to present their projects and results, will foster links between stakeholders and will hopefully lead to new partnerships and networks that would otherwise be (much) harder to achieve.

**"DI4R provides an important platform for the main European research infrastructures to come together and deepen connections with their users and each other. PRACE of course supports this co-operation which will ultimately benefit science, industry and society and help us move towards the implementation of EDI."**

Serge Bogaerts, PRACE Managing Director





# AUGUSTO BURGUEÑO ARJONA

Augusto BURGUEÑO ARJONA is Head of the Infrastructure and Science Cloud Unit at the Directorate C – Digital Excellence and Science Infrastructure, part of the European Commission Directorate General for Communication Networks, Content and Technology.

After completing a PhD in Computer Science, Augusto joined the EC in 1998 and progressed through management roles in IT and finance units supporting the implementation of the EU's research programmes. In 2014, he moved to his current post, which he describes as his first operational unit, where he sees things from the outside, from the view of the grant beneficiaries. GÉANT spoke with Augusto to learn more about the EDI, EOSC, and the GÉANT community's role in the changing environment of research.

### **How has the environment changed during Horizon 2020, and how is this reflected in the objectives of your Unit?**

Taking stock of the last five years, we can see that we have had to adapt to changes, mostly technological, to ensure we continue to serve researchers in the best way possible. For example, the arrival of cloud technologies has had a huge impact on the way we fund e-infrastructure projects within Horizon 2020. Before this, funding streams were defined by technology area, including: networking, distributing computing,

data, and high performance computing. Projects reflected this approach, for example GÉANT, EGI, EUDAT, OpenAIRE, and PRACE, and, as a result, communities of beneficiaries emerged around those projects. With recent technology change, vertical integration is the predominant way forward, technologies cannot be separated and communities cannot work in isolation.

As this technological shift called for greater integration, engineers adapted to those changes to continue supporting their users. Overlap in the scope of different initiatives was inevitable and different organisations ended up working on the same things. We had to rethink

the way funding worked to avoid creating artificial borders.

To eliminate the overlap, we started to progressively change the funding architecture, moving away from independent projects focused on independent technologies, and bringing all the actors and expertise under one initiative. This transition was done in an all-inclusive fashion – nobody should be left outside.

This is where the European Open Science Cloud (EOSC) started, with integration and consolidation of e-infrastructure projects.

**"One of  
GÉANT's biggest  
strengths is its  
community -  
the relationship  
between the  
GÉANT project,  
Association and  
the NRENs."**

## **Where are we now?**

In the early stages of bringing together different communities, there were inevitably some inefficiencies. However, all the participants have now made excellent progress, and I'm proud to say we are very close to launching the first version of the EOSC portal, which will benefit many researchers, before the end of 2018. The EOSC-hub project, in which GÉANT plays a role, has been key to implementing the EOSC initiative, and by 2020 we will be in a very solid position to demonstrate how wide availability of scientific data and data analysis services for European researchers can be ensured through a pan-European access infrastructure.

One of GÉANT's biggest strengths is its community – the relationship between the GÉANT project, Association and the NRENs, and the clear vision that the NRENs and GÉANT have developed together. This is a fantastic asset, however, it sometimes can present an issue where the GÉANT community is encouraged to engage in an initiative, and some members of the community do not see a direct advantage of doing so. When we look at the implementation of EOSC projects, GÉANT plays a role in trust and identity and access services, and there is potential for further engagement in areas such as procurement. But this is not enough. The GÉANT community needs to reposition itself to strongly support the EOSC vision.

For example, there are a number of above-the-net services (tools and services on top of network connectivity) from NRENs that we also see are services provided by other beneficiaries involved in the EOSC. If we want to avoid duplication and fully leverage NRENs' expertise, it is important to take a strategic approach to integrate the above-the-net services in the EOSC vision. That does not mean that we would neglect our support we provide to networking services, or the networking structure. On the contrary, we want to reinforce this support as it is integral to the strategic vision – without the GÉANT

network there is no EOSC. But we need to tap into the potential of the community to fully support EOSC.

It is worth remembering that the EOSC initiative reflects the way researchers are doing research. EOSC has emerged from the needs of researchers, it has not been imposed. My responsibility is to ensure funds are managed in the optimal way, and are distributed to best support researchers.

We are engaging all communities in a common approach to defining what EOSC is, and how it supports future research. Indeed, the communities have written the proposal – through the EOSC-hub project – that is constructing the path to how the communities work together.

## **How will DI4R help?**

The DI4R conference is a very welcome initiative that came from the community, to bring together and build bridges amongst all the different H2020 project participants. We have seen clear progress through DI4R – in its first edition we saw individual representations of former partnerships, in the second it was a far more integrated approach showing how partners all work together. This year should be a continuation – the NRENs that go to the conference will see how all the players are collaborating.

I would like to see a clear consensus in the way forward, with commitment from all communities and understanding that the funding will continue, but that some communities may need to alter direction and focus in order to continue serving their own communities.

## **With global research collaboration set to increase in the future, how will the role of European research change in this context, and will this influence the requirements of Europe's e-infrastructures?**

Our approach is relatively stable in areas such as networking. We have always been internationally focused, so when there are opportunities to exploit extra funding we are willing to contribute and share expertise in mobilising our beneficiaries to engage in international research collaborations. This is the case of the BELLA project, for example, which enables the construction of a direct link between the EU and South America.

In terms of e-infrastructures, our international strategy is centred around the Research Data Alliance (RDA), and we would like to make sure that solutions that are built in Europe to address research collaboration can be implemented worldwide. Our challenges

now include how to improve the technological and organisational aspects related to where data is sitting and where it is being used.

Horizon 2020 allows international partners to engage with European projects, and to utilise what is made available for the projects. If the number of projects increases, we will of course allow these partners to continue to take part, and RDA will also make interoperability possible across the globe.

## **So far the focus of the European Commission has been supporting research e-infrastructures, however recent developments and policy announcements by Commissioners have shown that there is a strong push to internationalise the education aspect across Europe. How do you see the involvement of your unit with this aspect of e-infrastructure strategy?**

In the same way that distinctions were made between technologies and communities developed around those, historically, the Commission has also considered research and education communities as distinct groups. While the current allocation of responsibilities within the European Commission means that infrastructure to support primary and secondary education is currently out of our scope, these two areas should not be viewed as separate.

Instead, we should aim to demonstrate how the work we do encourages alignment of research and education. A good example is the European Student Card initiative that will enable every student to easily and safely identify and register themselves electronically at higher education institutions within the EU – and which is compatible with eduGAIN standards. This can show that borders between research and education only exist because of funding streams, not because that is how they are seen by our users.

The next Framework Programme from 2021 retains the distinction between research and education, so

**"Without the  
GÉANT network  
there is no  
EOSC"**





unless there is progress with clear examples this split may continue.

We see a similar issue with infrastructures for innovation, to apply outcomes to industrial use. We see that some research infrastructures cannot be used for industrial innovation. In practical terms, we need to see how to combine the two areas. These distinctions can be addressed by all of us.

### How do you see the relationship between EDI and EOSC? Are the two initiatives set to interact more closely in the future?

A researcher may have a data source in one location, the software will exist somewhere else, and the computing power will be somewhere else again. We are looking for a situation where the software can catch this data, analyse it through the supercomputing facilities and deliver results – and for this all to be available and configurable by the researcher from a single location.

The European Data Infrastructure (EDI) is focused on high performance computing and GÉANT is about to play a vital role in this, connecting physical supercomputing centres to create a distributed facility of supercomputers. The supercomputing centres have a range of services, developed by on-site software engineers and available online.

The EOSC aims to enable remote access to existing facilities through a

**Picture**  
Europe's  
researchers will  
benefit greatly  
from the EOSC  
and EDI initiatives

single marketplace. As EDI progresses and more services are available online, so the EOSC marketplace will expand to include those services.

Therefore, researchers will be able to go to the EOSC marketplace, compose their service requirements – including those from the EDI – and achieve their results remotely. There is clear integration in the sense that EDI acts as the distributed facility that will provide services, through the EOSC marketplace.

### What would be the ideal way for GÉANT and the NRENs to contribute to the goal of European Research being the most advanced in the world?

We want to make services available to researchers through EOSC and GÉANT, and the NRENs have a big role to play in both EOSC and EDI initiatives. There are also other dimensions that are not so infrastructure-orientated, for example, bridging the gap between research and innovation. To achieve this, a greater proportion of research results must lead to actual societal benefit, such as growing the economy, improving health, and so on, and for that there must be closer links to industry. NRENs could develop stronger links with industry to increase knowledge transfer or facilitate implementation. We again see here

**“GÉANT will play a vital role in the European Data Infrastructure (EDI)”**

the occasional challenges in a pan-European approach when there is not consensus about how industry or even other public entities can use the GÉANT infrastructure.

### And how do you see GÉANT and the NRENs contributing over the next 5 years?

Both EDI and EOSC initiatives have likely timeframes of around five years. It will take this time for EDI to interconnect the supercomputers, and for EOSC to consolidate the services.

GÉANT could also contribute in the areas where it has strong experience – such as pan-European governance structure. GÉANT has lessons to share with other communities on how to combine national and European funding for common purposes.

# GDPR AND THE GÉANT COMMUNITY

And the award for hottest topic of 2018 goes to... GDPR! The General Data Protection Regulation, implemented on 25 May, has opened our eyes to a variety of unexplored questions and given us insights into the fields of privacy and data protection. Every piece of information that could identify a European citizen became a delicate piece of property that couldn't be stored and processed without being GDPR compliant anymore.

How did GÉANT prepare for this and what has happened since? What are the future prospects of dealing with privacy and data protection? CONNECT spoke with Ana Alves, Data Protection Officer at GÉANT, to answer these questions.

## What is GDPR and what measures did GÉANT take to protect users?

GDPR, as we like to abbreviate the General Data Protection Regulation, has its main goal to protect citizens' privacy, and give them full ownership of their rights. The right to access, to correct or to delete their own personal data, the right to know how their personal data will be processed, stored and for how long it will be retained.

With GÉANT running services and projects with educational institutions and other related areas, it was important to ensure that all the GDPR requirements were in place to safeguard users' rights and, most importantly, to keep the transparency in all processes and actions that we take with users' personal data.

To achieve this the GDPR team worked closely with the Security and Software Development teams, under the management of Chief Development Officer Shaun Cairns, to guarantee the right security controls and privacy by design for our services.

The development and enforcement of significant procedures has also been important to consolidate the knowledge gained with internal methodologies and support areas such as Incident Management or Privacy Risk Assessment. Equally, the work done around the GÉANT events, conferences

and training sessions has also been highly important, ensuring the best of our services to our attendees, speakers or trainees and always concerned with their privacy.

In June this year, Magdalena Rzaca joined the GDPR team and is working on revising agreements and ensuring that contractual relationships with third parties are protected by data protection clauses. Across the GÉANT services, a tremendous amount of work has been completed to put in place the privacy notices and the subject Access Request Procedure for our services as well, to create an efficient communication channel and promote the awareness needed to protect user's personal data.

For GÉANT the most important thing is to maintain the trust of our community in our services and professionalism, with the certainty that we are giving our best to achieve it.

## Can GÉANT support the community with GDPR related issues, and if so, how?

I like to think that both sides are supporting each other. We are extremely conscious of our role and responsibilities towards the community. During my time at GÉANT, I could see that a lot of work was done, in particular by Nicole Harris, Head of Trust and Identity Operations. With years of experience and GDPR knowledge, she has been supporting and providing the best advice to the community. It is also amazing to understand the magnitude of cooperation between parties involved, sharing information, case studies, latest news about this hot subject



**Picture**  
Ana Alves,  
Data Protection  
Officer

and participating in the TF-DPR (Task Force on Data Protection Regulation) meetings coordinated by GÉANT, where GDPR specialists from the community debate real issues in their daily work and present useful information about their experiences.

The Task Force meetings represent a significant measure to spread information through the community. GDPR is not over, so it is important to keep these initiatives up, involving more people interested in learning more about it.

The GDPR team can be reached at [gdpr@geant.org](mailto:gdpr@geant.org).



# BELLA TO BRING 25 YEARS OF DIRECT TRANSATLANTIC CONNECTIVITY BETWEEN EUROPE AND LATIN AMERICA

In August this year GÉANT and RedCLARA, the Latin American Research and Education Network, announced the signing of an Indefeasible Right of Use (IRU) contract with EllaLink for spectrum on a direct submarine cable connecting Europe and Latin America.



Picture  
Bella network  
map

The BELL IRU will provide for the transatlantic data-sharing and collaboration needs of the European and Latin American R&E communities for the next quarter of a century in a wide range of areas including astronomy, particle physics, earth observation, development goals, crop research and the arts and humanities.

Bella, a collaboration involving GÉANT, RedCLARA and the NRENs of Brazil, Chile, Colombia, Ecuador, France, Germany, Italy, Portugal and Spain, is a significant achievement as it will enable research and education traffic to flow directly between the two regions for the first time, reducing latency by up to 60%, improving data protection, and providing cost-effective and scalable connectivity at significantly higher speeds than have previously been possible.

The Bella objective to obtain long-term, high-speed capacity builds on the results of the ELLA project (Feasibility Study for a direct Europe Link with Latin America), led by GARR (the Italian NREN). ELLA established that investment to obtain spectrum for R&E purposes on a submarine cable made technical and economic sense. From ELLA came

the commitment from the European Commission to provide funding via DG CONNECT and DG GROWTH to support R&E connectivity on a new transatlantic cable between the two regions, with additional funding from DG DEVCO to assure the long-term sustainability of the RedCLARA backbone in South America at speeds of 100Gbps and above, and provide seamless access for Latin American NRENs to the transatlantic Bella connectivity to GÉANT.

The need to scale connectivity was recently highlighted by some exciting discoveries in the area of astronomy – an important part of the Latin American research community – such as the merger of two neutron stars (known as a ‘Kilonova’) and the detection of ‘Oumuamua’, the most elongated asteroid known to science, that required collaboration involving infrastructure and scientists in Europe and Latin America. Such collaborations between the two continents are set to expand significantly in the coming years, and with programmes such as Copernicus – the EU’s earth observation programme – and collaborations on earth sciences and high-energy physics, to name a few, the

importance of Bella connectivity will only increase.

Tom Fryer, Senior International Relations Officer for GÉANT and member of the Bella team, said: “When construction of the EllaLink cable is completed in late 2020, Europe-Latin America R&E connectivity will finally be on an equal footing with connectivity between other world regions. None of this would be possible without the commitment of the EC, and what is perhaps a funding first, with three separate DGs collaborating closely to achieve one overall objective. And of course, the connectivity that Bella will provide will act as a backbone for other areas of collaboration between GÉANT and RedCLARA, including the extension of the reach of services for R&E and targeted user support, such as the Enlighten Your Research programme which will be jointly announced by the two organisations later this year.”

Luis Eliécer Cadenas, Executive Director of RedCLARA, and co-chair of the Bella Consortium, said: “This milestone is a key achievement for the Latin American research and education community. We are opening a direct collaboration channel with Europe, guaranteeing security and quality of service for the many scientific and educational applications that we expect to offer. RedCLARA is engaged in building the data communications infrastructure for research and education that will foster regional development. The Bella subsea cable is a first stone in building this capacity”.

Fernando Liello of GARR, co-chair of the Bella Consortium and coordinator of the feasibility study that led to the Bella programme, said: “This milestone is the first major step towards the completion of efforts of several years by a large group of people brought together by the vision of a closer and more efficient interaction between European and Latin American research communities. This link will strengthen the many historic, social and scientific research links that already exist between the European and Latin American communities. Notwithstanding its importance, this achievement is only the first step on the strategic path of the Bella programme whose final objective is to overcome the digital divide between these two regions”.

For more information, visit  
[www.bella-programme.eu](http://www.bella-programme.eu)



# TNC18 RAISING THE BAR EVER HIGHER: A RECORD YEAR?

TNC18, the 34th edition of the GÉANT community's flagship conference, was held in June this year in the beautiful city of Trondheim, Norway.

**Pictures**  
This page:  
Top: The TNC18 events team consisting of colleagues from PSNC, NORDUnet and GÉANT  
Above: Vietsch Foundation's Medal of Honour awardees Licia Florio of GÉANT and Ingrid Melve of Unit

Opposite page:  
Above right: Helga Spitaler of GÉANT giving her Lightning Talk  
Far right: Keynote speaker Dr. Marie Moe of SINTEF





As we look back over TNC18 there are too many highlights to list, so we are selecting just a few.

Approximately **780 participants** from **73 countries**, including:

**16 attendees** from **14 countries** supported by the GÉANT Emerging NREN Programme

**14 students** from the GÉANT Future Talent Programme

**24 sessions** and **5 plenaries**

**50 side events** including BoFs, demos, workshops and meetings

Our video streams also attracted nearly **1250 unique viewers** from **45 countries**, and on social media we have had great engagement with over **1500 tweets** and **1000 photographs**!

Delegates enjoyed an extensive programme whose impressive daily plenary sessions, presentations, demonstrations, lightning talks and posters focussed on a variety of thought provoking sub-themes ranging 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 fascinating opening keynote by Research Scientist Dr. Marie Moe of SINTEF, Scandinavia's largest independent research organisation, kicked off TNC18. Exploring the issue of medical implants that are connected to networks, and their potential vulnerability to cyber security, the keynote aimed to raise awareness and to inspire others to do more research on the security of connected medical implants.

TNC18 ended with an impressive and touching closing plenary featuring Andrew Woods from Curtin University, Australia. Andrew talked passionately about the Sydney - Kormoran Project, a multi-disciplinary project combining deep-water imaging, supercomputing, image processing, advanced visualisation and history, to tell the story of two of Australia's most significant shipwrecks – the HMAS Sydney (II) and HSK Kormoran.

You can view his presentation, together with all the other TNC18 archived streams at: [tnc18.geant.org/web/media/archive](http://tnc18.geant.org/web/media/archive)

Our huge thanks go to the teams behind this successful event, from the programme committee to the local host Uninett team, to the events team and technical support from PSNC and NORDUnet, and all our sponsors, exhibitors and participants who made this such a fantastic week.

In particular, our most heartfelt thanks go to this wonderful community for helping to make TNC18 such a success!

## Looking to the future

As the (visible for almost 20 hours!) sun had barely set on another successful conference, Kristina Lillemets from EENet of HITSA invited all participants to look towards next year with an invitation to TNC19 in Tallinn, Estonia, from 16-20 June 2019. To learn more visit: [tnc19.geant.org/](http://tnc19.geant.org/)



# EMERGING NRENS PROGRAMME: STRENGTHENING THE COMMUNITY

“Meeting new people is never time wasted, especially when it broadens the whole NREN community and us as individuals.”



## Participating NRENs in the Emerging NREN Programme

Albania, Afghanistan, Armenia, Belarus, Benin, France, Georgia, Ireland, Italy, Kosovo, Kyrgyzstan, Macedonia, Madagascar, Montenegro, Morocco, Mozambique, Myanmar, Netherlands, Nigeria, Poland, Portugal, Serbia, Tajikistan, UK, Ukraine

The first Emerging NREN Programme (ENP) event took place at TNC, GÉANT's flagship conference in June this year. Sixteen programme participants from fourteen countries - with very diverse backgrounds - not only joined the conference, but were also actively involved in the event - together with professionals operating in similar fields of interest - through specifically designed sessions and networking activities.

Each ENP participant was paired up with a representative from a European NREN or a GÉANT member of staff who shared a similar professional background. This aimed to facilitate relationship building and provide a point of reference during the very busy TNC18 that welcomed over 750 participants from across the globe and featured multiple presentations, meetings and demonstrations.

Some of the programme participants embarked on long journeys from Africa and Asia - one of the delegates had never left their country before - to reach TNC18 in Trondheim, Norway, while others travelled from the immediate European NREN neighbourhood. Some of them were fairly new to the community, but there was also a small contingent of long-standing community members. The different starting points in the experience of each participant never represented an obstacle, as one of the programme's main objectives was to create a special and unique experience for every single attendee.

**Picture**  
ENP attendees  
group photos

Top row from  
left to right:

Dzmitry Dzenisiuk,  
BASNET, Belarus

Alisher Davlatov,  
TARENA, Tajikistan

Zarlyk Jumabek  
uulu, CAREN  
NOC, Kyrgyzstan

Qazim Tahiri,  
University of  
Prishtina, Kosovo

Aleksandra  
Radulovic, MREN,  
Montenegro

Ruslan  
Karimberdiev,  
KRENA,  
Kyrgyzstan

Maxim Orbu,  
RENAM, Moldova

Sanja Simonova,  
MARNET,  
Macedonia

Bottom row from  
left to right:

Samia El  
Haddouti,  
MARWAN,  
Morocco

Vitalina Morais  
Baptista,  
MoRENet,  
Mozambique

Harimino  
Rakotondrainibe,  
i RENALA,  
Madagascar

Joke Atinuke  
Badejo, Covenant  
University, Nigeria

Veronika Di Luna,  
GÉANT

Temitope Mercy  
John, Covenant  
University, Nigeria

Iza Advadze,  
GRENA, Georgia

## Busy programme of activities at TNC18

Three ENP participants were selected to take part in the Lightning Talks presentations and were also able to benefit from speakers' training sessions prior to the event; three more were selected for the poster sessions. On the first day of the conference, an informal dinner brought all participants together and was the official kick off of the programme's activities. Other events specifically organised for the ENP included a walk through Trondheim, led by an engineer from Uninett, the Norwegian NREN, following the network's physical traceroute of the city's infrastructure. ENP delegates also attended a specifically organised session on The Case for NRENs and a day at the Uninett office and NOC packed with presentations and talks on relevant topics. The ENP specific activities were complementary to the overall TNC18 programme, which meant that delegates were able to attend all plenary and parallel sessions, demonstrations, side meetings and social events to which they were all invited as fully fledged TNC18 delegates.

Ultimately all ENP participants had the opportunity to get to know each other in person, bond and widen their networks within the programme itself and the community at large.

## Enriching experience

The final assessment by all those who took part was unanimously positive, all delegates felt that the ENP generated a great deal of thought-provoking discussions, stimulated ideas for further collaborations and training and produced some concrete agreements between NRENs, plus future planned visits and helped to broaden horizons. From ideas for personal development to practical improvements of NOC logistics and processes, each participant was undoubtedly enriched by the experience. The following testimonials show the impact of the ENP in the words of its participants:

***"The programme gave me the motivation to further develop BASNET's network and infrastructure of my city and the entire country."***

***"The visit of the Uninett office was really helpful and gave me a good insight of how an NREN works and the technical improvements that can be carried out."***

***"It was quite a surprise that the infrastructure we struggle or make great efforts to access in Nigeria is so readily available in Europe and other parts of the world."***

***"As part of the Uninett visit, I had the opportunity to witness first-hand how a modern, technically advanced NREN operates. I picked up some ideas for our future developments e.g. circular air ventilation in the server room and use of information screens in the NOC."***

The programme was also praised by the participants from European NRENs who found it as useful for the Emerging NRENs as rewarding for the entire community.

Veronika Di Luna, International Relations Officer for GÉANT, who coordinated the programme, commented: "The programme was a success; we will continue to develop it and plan to take it to TNC19. In the meanwhile, we are making good progress with all discussions started at TNC18 and are strengthening the newly established contacts. We will combine new ideas for the next phase with all lessons learned in 2018 and will apply them to next year's programme planning".

# THE GÉANT FUTURE TALENT PROGRAMME SHINES AT TNC18



## Picture

From left to right:  
Jorge Mendes  
( FCT/FCCN),  
Simone Ferretti  
(GARR),  
Antonio Angel  
Cruzado  
(RedIRIS),  
Davide Michelino  
(GARR),  
José Brito  
(FCT/FCCN),  
Ilaria Bortolotti  
(GARR),  
Melchor Alejo  
Garau Madrigal  
(RedIRIS),  
Rüdiger Birkner  
(SWITCH),  
Gijs Rijnders  
(SURFnet),  
Nadia Sluer  
(GÉANT),  
Tom Fryer  
(GÉANT).

This year the Future Talent Programme (FTP), in partnership with a number of European NRENs and supported by the European Commission, selected nine students to present at TNC18.

Each year GÉANT seeks to discover young inspiring talents from the European NREN community to take part in its Future Talent Programme. This initiative offers these talents an intense learning track giving them the opportunity to showcase their projects in an impactful manner to a target audience, using specific skills.

Finalists are invited to TNC – GÉANT's flagship conference - to present to an audience of over 750 GÉANT community members.

This year the registration for the FTP received fifteen entries from GÉANT NREN partner organisations including BELNET, FCT/FCCN, GARR, SWITCH, RedIRIS, Restena and Surfnet.

All fifteen registered students received professional training and coaching on how to build an abstract, present a topic in five minutes, engage the audience and also control pre-presentation anxiety. Poster presenters were paired up with creative students from MOME University in Hungary to improve their preparation and visualisation techniques.

A total of nine entries were selected for the lightning talk plenary and poster sessions at TNC18 in Trondheim, Norway. All finalists delivered outstanding talks and were commended by the audience for their performances.

For the majority of the young talents TNC18 was – in their own words –

“the most amazing experience in their lives” whilst, some of them, forged new friendships, overcame fear or public speaking and seized brand new opportunities.

Special thanks go to top speaker coach Barbara Rogoski of Successfulspeakersnow, to data visualisation coach Lennaert Jonkert of Developminded.com and to experienced presenters from GÉANT such as Tom Fryer and Annabel Grant; plus to all dedicated mentors and supporters from the participating NRENs, the GÉANT events team, the TNC Programme Committee and finally the GÉANT Learning and Development (GLAD) team.



## What did the Future Talent Programme mean to the students who took part? How did it affect them and influence their plans for the future? Learn about it in the following short testimonials.



### The connection among us was immediate

**Name:** Rüdiger Birkner  
**University:** ETHZ - ETH Zurich  
**Activity:** Lightning Talks  
**Title:** Hey network, what's going on?  
-- Virtual assistants for networks  
**NREN:** SWITCH, Switzerland

As a PhD student at ETH Zürich doing research on network monitoring and management, I am always eager to meet network operators and engineers. When I was approached by SWITCH, our national NREN, with the opportunity to take part in a selection to attend TNC18, I did not hesitate for one moment to seize the opportunity.

During the months leading up to the conference, we attended several webinars lead by a professional speakers' coach. Organised in small groups, the coach guided us through the entire process from identifying the main points to writing the speech's full script. Through these webinars and one-to-one coaching, I learned several new techniques to enable me to effectively convey my message and engage the audience.

Before the start of the conference we received the invitation to the FTP WhatsApp group set up by GÉANT. Through this we could all follow each other on our journeys from all over Europe to Trondheim. And finally, it was great to meet everybody in person: the connection among us was immediate.

The conference started with an inspiring keynote and soon after it was already my turn to take on the stage and present my lightning talk on Net2Text. Being able to present my current work in front of several hundred people, discuss my ideas with network operators, gather feedback and better understand the challenges and problems they face, has been an invaluable experience for me.

My participation in the FTP certainly helped me improve my speaking skills and offered me the great opportunity to present in front of large audiences. In addition, it enabled me to connect with like-minded students from all over Europe and explore together the beautiful Trondheim.



### The moment I stepped on the stage will stay in my mind forever

**Name:** Jorge Miguel Mendes  
**University:** University of Trás-os-Montes and Alto Douro (UTAD)  
**Activity:** Lightning Talks  
**Title:** mySense - AI and Big Data for agricultural applications  
**NREN:** FCT/FCCN, Portugal

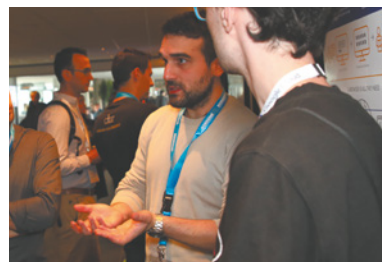
I had just started my doctoral thesis when I was made aware of the GÉANT Future Talent Programme (FTP) via the Computer and Communications Services of my university.

After being selected at national level by the FCCN unit of FCT I had the opportunity to attend a series of e-workshops held by a professional speaker coach. The lessons and coaching sessions were an enrichment for my career as I learned a variety of techniques to improve my communication skills and to successfully present my ideas to a target audience. Among my many memories of TNC18, the moment I stepped on the stage and faced the audience, will stay in my mind forever. The initial emotion was strong, but as soon as I began to feel the connection with the public, just as I had been taught in the e-workshops, everything started to flow naturally.

To present for the first time to a global audience of over 750 people, made up of delegates from many different fields of research, and with English not being my native language, it certainly was my biggest challenge at TNC18.

I was able to benefit from professional training, meet people from all over the world, get out of my comfort zone, grow up as a researcher and broaden my horizons. It was amazing to be able to share my work so widely and I was also so proud to represent my country.

It was an incredible event and I hope it is just the beginning of a journey that will be filled with many more experiences like this.



### I feel truly grateful for this wonderful opportunity

**Name:** Simone Ferretti  
**University:** INFN Sezione di Roma Tor Vergata  
**Activity:** Poster Pursuit  
**Title:** V-Labs  
**NREN:** GARR, Italy

I knew about TNC, but I had never heard of the GÉANT Future Talent Programme (FTP) until I was approached by GARR, as I hold one of their scholarships.

I really enjoyed the e-workshops offered by the FTP as these gave me the chance to improve my presentation and communication skills plus the ability to focus on my project and to visualize it.

I remember the first day of the conference, I was confused and amazed at the same time: people from every part of the world were there to cooperate and reach new heights in research networking. The initial overwhelming feeling disappeared and I started to feel at ease as soon as I became aware that we were all there to achieve the same goals whilst trying to solve different problems. And this is also what TNC meant to me, we are all brought together by the need to learn more about the issues our world is facing and collaborate to find solutions. TNC also enabled me to bond with a great group of individuals and professionals, and I feel truly grateful for this wonderful opportunity.

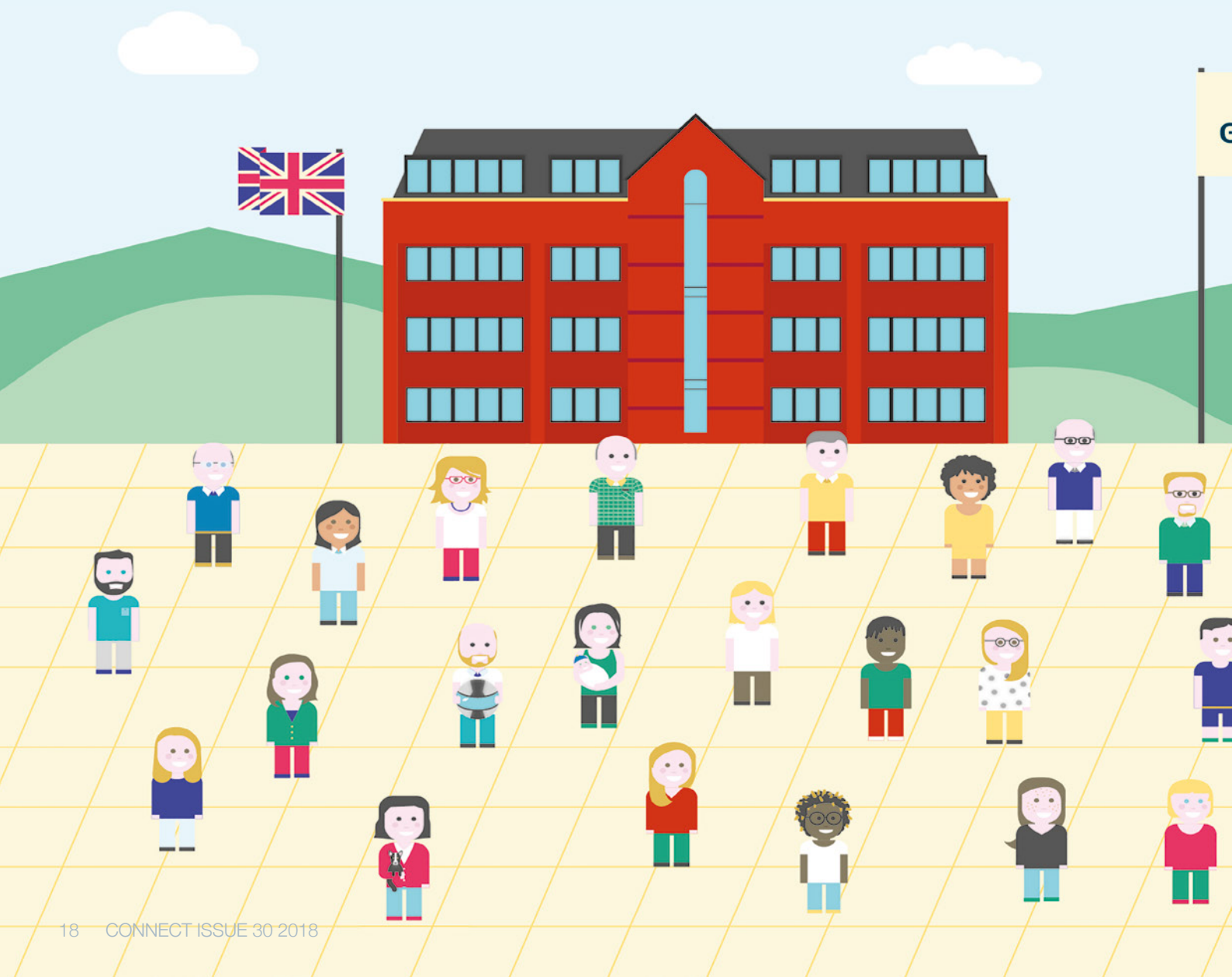
My initial biggest challenge was having to share my project and my vision, but thanks to the training and preparation undergone with GÉANT coaches, it wasn't as traumatic as I had originally feared.

In the future I'd like to cooperate with the inspiring people I met at TNC in order to continue using all the knowledge I acquired from this experience, coupled with my transformed communication and visualisation skills.

The Lightning Talks sessions were my favourite part of TNC18, they gave all participants the opportunity to tell their story in a very impactful and concise way and to the audience to learn about different cultures, places and problems.

# THE GÉANT ASSOCIATION – A TRULY INTERNATIONAL ORGANISATION

It's often said that, when walking through GÉANT's offices you will more likely hear Italian being spoken than English! But just how international is GÉANT? An informal survey in May 2018 found that we have 32 countries represented within the GÉANT offices, which in an organisation of 130 people, is an amazing figure - and goes to show exactly how diverse our workforce is.





The majority of employees, in both the Amsterdam and the Cambridge offices, are bilingual, with a good percentage of polyglots fluent in three or even four languages. This further enriches our already multicultural working environment, giving it a unique dimension. In addition, most members of staff have lived and worked in a variety of locations across the globe and have brought to GÉANT a wealth of professional backgrounds, experience and expertise.

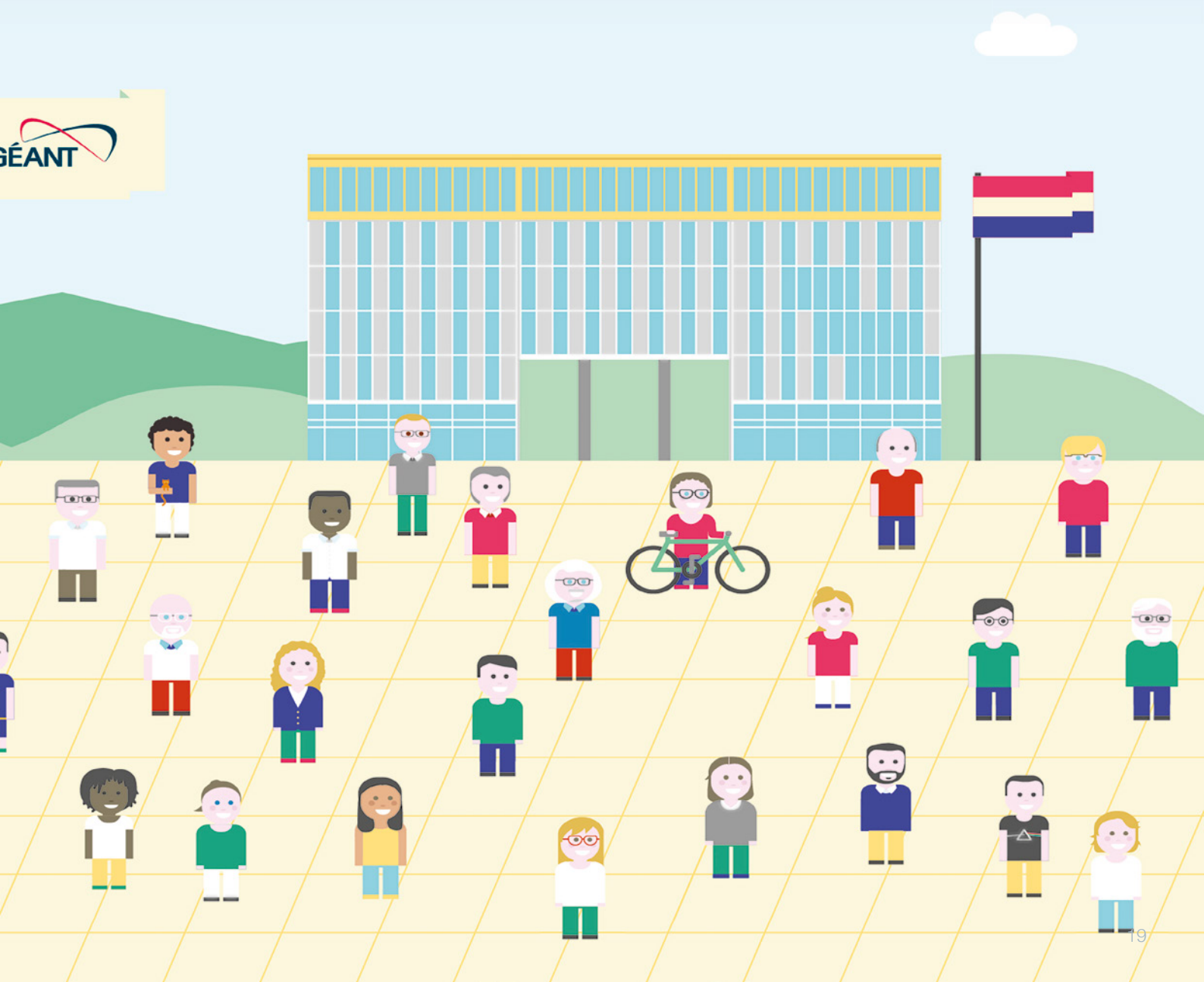
This spread of nationalities is a reflection of the community we serve. The diversity in cultures amongst NRENs, as well as international collaborations from researchers, all demand a wide range of viewpoints and cultural insights: which makes

diversity one of the strengths of GÉANT. It also shows how research and education networking is breaking down national barriers - not only via the physical network and the myriad of international collaborations across a plethora of fields, but also within the people network dedicated and committed to the smooth running of these.

What do GÉANT employees have in common more than anything else? Almost certainly, it's the buzz and the enjoyment of working in a truly stimulating and authentic international non-profit environment. To find out more, you can learn directly from some of our colleagues' personal experience and read about it in Life at GÉANT on [geant.org](http://geant.org).

Would you like to see the list of nationalities in full? Here it is (in alphabetical order)

- |               |                  |
|---------------|------------------|
| 1. Algeria    | 17. Netherlands  |
| 2. Australia  | 18. New Zealand  |
| 3. Belarus    | 19. Nigeria      |
| 4. Belgium    | 20. Pakistan     |
| 5. Czechia    | 21. Poland       |
| 6. Estonia    | 22. Portugal     |
| 7. Germany    | 23. Romania      |
| 8. Ghana      | 24. Russia       |
| 9. Greece     | 25. Slovakia     |
| 10. Hungary   | 26. South Africa |
| 11. India     | 27. Spain        |
| 12. Indonesia | 28. Sri Lanka    |
| 13. Ireland   | 29. UK           |
| 14. Italy     | 30. USA          |
| 15. Jordan    | 31. Venezuela    |
| 16. Lithuania | 32. Zimbabwe     |



# VOICE OF THE BOARD: CHRISTIAN GRIMM

At a pivotal time for GÉANT and the NREN community, CONNECT spoke with Christian Grimm, CEO of the German NREN DFN, and since 2015, Chairman of the GÉANT Board. Already a director of the DANTE Board since 2013, following the merger with TERENA in 2014, Christian became one of the first members of the GÉANT Board of Directors. We approached him to talk about the micro- and macro-economic changes during his time in his current role and the Board's priorities for the coming years.

**Recent years have seen many changes for GÉANT, the NREN community and the European environment. Which of these do you think will have the biggest impact in 2019?**

We had to deal with several challenges since the birth of GÉANT in November 2014. The first obvious one was the completion of the TERENA and DANTE merger. During that process, although additional resources needed to be reassigned to handle the unexpected outcome of the British referendum in 2016, I believe we successfully managed the change of priorities required by this event. In the same year, the EC unveiled its European Cloud Initiative and we were able to overcome our initial skepticism

- also shared by other organisations - about this EC ambition, further to our investment of time and resources to better understand the implications for GÉANT. In retrospect, I am glad that we embraced this initiative and delighted to have achieved an almost optimal position with regards to this matter. Without the shadow of a doubt EOSC and EDI have become important factors for the development of GÉANT! Today, GÉANT is a partner in key EOSC and EDI related projects, it will lead the "Open Clouds for Research Environments" (OCRE) project starting in 2019 and is engaged with other e-Infrastructures more than ever before.

I am also confident - and this is a view that I share with the entire Board - that the growing positive impact of GÉANT's management team has given life to a more harmonious atmosphere - both within the organisation and the community - since the merger, and this bodes very well for the future.

So, in simple terms, although I do not expect significant or radical changes for GÉANT in 2019, I believe that we



may be affected by the EC's plans for Horizon Europe: these are rapidly developing and we are working side by side with the EC to learn more and gain a better insight into these plans. There is a possibility that around 2020 we might find ourselves relying more than ever on the support of our members to agree on the best approaches and courses of action.

Instability in the European political environment is another major unknown that may cause some unpredictable developments for NRENs and ultimately, in my opinion, undermine the relationship between society and research. One possible scenario which, albeit fictional at present should not be ignored, could feature the growing isolation of some European countries with a consequent negative impact on such a consensus- and collaboration-driven community. On a more optimistic note, I still firmly expect Research & Education to continue to collaborate beyond borders in the years to come. This is where we build the networks!



## Do you feel that GÉANT and the community are ready to deal with the changes ahead?

GÉANT is established, respected and recognised at a global level, so in my opinion, as long as we keep having a say and are involved in all relevant international discussions, changes in this arena do not represent a major cause for concern. It's fair to say that work in all NRENs is dominated by constant change and the same applies to GÉANT. We do not trigger change for the sake of it; our job is to address the developing needs of R&E globally and to better support this, we often succeed in experimenting with and deploying the most recent technologies and services. One of the strengths we share with the community is the experience and expertise in dealing with change, and I am confident that with continuous support from the EC we will continue to handle change management successfully.

## What should be the Board's priorities for the coming year?

In 2019, with the planned kick-off of the GN4-3\* and Indefeasible Right of Use (IRU) (to be referred to as GN4-3N\*) projects, we might need to develop further the successful cost-sharing concept we established over many years. This is likely to become a major challenge as it requires all members' solidarity, which relies on the principle that our community can survive only if all NRENs flourish! GÉANT must be in the position to facilitate this forthcoming change and work hard to keep the community's core spirit of collaboration and solidarity alive.

Over the last years we had to deal with unplanned events, both internal and external, but now, thanks to the stability achieved, the GÉANT Board is in the position to better fulfill its role and focus on more strategic priorities. My expectation is that we will present our members with a new GÉANT vision and strategy, which will of course address, among other areas, what is happening at the EC level, in the short term regarding EOSC and EDI, and in the longer term regarding Horizon Europe.

Notwithstanding GÉANT's impeccable management of public funds, I believe we need clearer and more effective communications to demonstrate to our members the cost benefit impact of GÉANT and gain from them stronger support and trust. The objective is to manage and demonstrate

cost efficiency, but also to be in a position to mitigate the impact of a possible future reduction of funds, which could be the outcome of shifted priorities at the EC or budget pressure within the NRENs.

## From the perspective of DFN, how is GÉANT catering for the science and education needs worldwide?

DFN has for many years been carrying out most of its global science and education activities via GÉANT, which is irrefutable proof that the relationship and the service offered is very successful. In addition, it strengthens my confidence knowing that the science and education needs and expectations of many other member organisations are fulfilled in a similar way.

## Looking further ahead, where would you like to see GÉANT in 2025?

2025 is not as far as it may appear, although by then Horizon Europe will already be in its fourth year of life and some of our activities and initiatives under this programme may already be well underway. My view for GÉANT in 2025 is to be an even more stable, reliable, acknowledged and trusted pan-European organisation supporting R&E with future-proof services, governed by a strong European NREN membership, well-embedded in the EU ecosystem and a significant and influential player in global collaborations.

## Tell us something personal about you: a memorable book, your favourite hobby.

It's not surprising that GÉANT has had an impact even on one of my most recent reads, "The Capital" by the famous Austrian writer Robert Menasse. The book is a satire, an essay and a crime story about the EC and revolves around the question of whether Brussels and, by extension the European Union, can be more than just the sum of their parts. I received this book from a member of our community with

deep insight into the European Union, who described it as a very precise observation of how it all works. On a more serious note, in conjunction with last year's celebrations of the Treaties of Rome's 60th anniversary, I had been trying to read as much as I could on how the constitutional basis of the EU was established, and what really happened behind the scenes. To me this is an astonishing lesson on how different political systems – only six at that time, but open from the start to incorporate more – agreed on a common vision, managed to set very high level objectives and build consensus on specific actions towards that vision. Being part of that process must have been an amazing and exhausting experience at the same time, taking place only a little over ten years after Europe's darkest times. What was achieved since then is immense, and also helps to illustrate a strong parallel and correlation with GÉANT, whose members and associates represent over 40 countries of Europe.

GÉANT currently takes a great deal of my spare time, so, when my Chairman mandate terminates, it will be difficult to find a more reasonable hobby to keep me busy and occupy my time with the same intensity and a similar purpose.

## About GN4-3

In GN4-3, the GÉANT Partnership will continue to contribute to the effective European Research Area by making Europe the best-connected region in the world. GÉANT must offer European researchers the network, communications facilities and application access that ensure the digital continuum necessary to allow them to conduct world-class research in collaboration with their peers.

Throughout GN4-3, GÉANT will maintain the operational excellence of the established GÉANT services, while still achieving economies on the costs of the backbone network. The overall reliable, secure and state-of-the-art network services offered to researchers and other network users across Europe will remain exceptional. Planned developments are also guided by the vision of a future where a set of coherent and integrated European e-infrastructure services will offer convenient, seamless access for the end users through a common service catalogue, which will facilitate the adoption of services offered by einfrastructure developments, such as the European Open Science Cloud (EOSC).

## About GN4-3N

The aim of GN4-3N is to go beyond the state-of-the-art by restructuring the backbone network through exploration and procurement of long-term Indefeasible rights of use (IRUs) and associated equipment to increase the footprint, stimulating the market in cross-border communications infrastructure whilst decreasing the digital divide and reducing costs.



# SKA PROJECT UPDATE - SIGNAL AND DATA TRANSPORT CONSORTIUM DELIVERS A KEY MILESTONE

Signal and Data Transport (SADT) is the backbone of the SKA telescope project ensuring both effective operation of the telescope and transportation of the science data from the receptors to the users and data archives.





The two SKA instances in Australia and South Africa have similar signal and data transport requirements and have generated significant design challenges for the team.

This consortium, led by the University of Manchester in the UK and supported by teams around the world consists of three separate, but equally vital, networks each focused on different aspects of the operation of the telescope and each with their particular requirements and specifications. The networks are:

## Science Data Network

This is probably the most visible of the three elements and as the name suggests is dedicated to the delivery of data from the distributed antenna. This in itself is comprised of three different elements:

1. Shipping data from the distributed antenna to the local correlators
2. Transporting that data to the locally sited SKA supercomputer centre
3. Providing access to this data to users around the world

This third element is outside the consortium's remit but the team have taken the overall needs for onward global data transport into account within the overall design of the SADT work.

One of the key constraints of the Science Data Network is the environment in which the network will operate, with long distance, high data rate connectivity requirements within facilities with limited power and cooling ability, and the need to be extremely quiet across the RF spectrum used by the antenna.

Once the data is transported to the local correlators the data needs to be sent to the remote supercomputer facilities. For SKA Low (in Australia) this requires a data network supporting over 8Tb/s from Murchison to Perth – a distance of 820Km. For SKA Mid (in South Africa) the network will transport 9.5Tb/s from Karoo to Cape Town - a distance of 912Km. These data requirements are extremely challenging and are at the current limits of networking technology – particularly when taking into account the terrain involved.

## Non-Science Data Network

The antenna for each telescope are distributed across an extremely wide area and have to be a long distance from areas of population to avoid RF noise affecting the signals. Mobile phones and Wi-Fi are of course banned locally to the antenna. Therefore there is a need to monitor and manage the equipment at the antenna and correlators remotely and this is where the Non-Science Data Network is involved.

Unlike the Science Data Network which is a largely one-way, high capacity network, the NSDN is a relatively low capacity two-way network enabling support teams to monitor and hopefully fix problems remotely without the need to physically visit the antenna. Again reliability, low power and quietness are essential constraints for this network.

## Frequency and Time Distribution

The design of the SKA relies upon many hundreds of distributed antenna working together to provide data that is equivalent to one huge antenna. In order for this to work it is essential that the individual data streams from the antenna are coherent or 'synchronised'. This 'synchronisation' requires that each antenna knows not only the time but also the phase of that time signal so that the data can be correctly combined.

This time and frequency synchronisation will allow data with a very low signal to noise ratio to be extracted – essential when these telescopes are listening to the most distant and ancient signals in our universe.

Two different technologies have been developed to support this time distribution (one for each telescope) and this ability to distribute extremely accurate time information over long distances is likely to be one of the first technological advances from the SKA to benefit the wider commercial world. All three of these data elements have been delivered across separate networks but each uses the same fibre-optic infrastructure to reduce costs to the SKA.

The Signal and Data Transport consortium has shown a great deal of excellent collaboration across the team in three very different and equally challenging design elements and in particular the experience of and collaboration with the local NRENs (SANReN and TENET in Africa and AARnet in Australia) has been key to the design and delivery of high capacity networking services in extreme environments.

In collaboration with AARnet, CSIRO and SANReN, GÉANT has led the design of the long haul Science Data Network from the core of the telescopes to their supercomputer centres, provided experience and advice for the network connecting the distributed antenna, assisted with the Non-Science Data Network, and provided concepts and an architecture to the SKAO for the Global connectivity that will be required by SKA. GÉANT is proud to be a key member of this consortium and to have been able to use the skills and experience acquired over many years in designing and operating the GÉANT network to support this leading-edge network design and to support the design, build and operation of the SKA.

**The Square Kilometre Array (SKA) is a large multi-radio telescope project to be built in Australia and South Africa. When built, it will have a total collecting area of approximately one square kilometre. It will operate over a wide range of frequencies and its size would make it 50 times more sensitive than any other radio instrument. It would require very high performance central computing engines and long-haul links with a capacity greater than the global Internet traffic as of 2013. It will be able to survey the sky more than ten thousand times faster than before.**

**With receiving stations extending out to a distance of at least 3,000 kilometres (1,900 mi) from a concentrated central core, it exploits radio astronomy's ability to provide the highest resolution images in all astronomy.**



## CONNECT INTERVIEW:

# STEVE HUTER, DIRECTOR OF THE NETWORK STARTUP RESOURCE CENTER (NSRC)

For more than a quarter of a century Steve Huter has been part of an energetic training team at the University of Oregon-based Network Startup Resource Center (NSRC), providing technical capacity development to thousands of network engineers to strengthen the infrastructure, partnerships and networking expertise around the world. For his contributions to the global internet community he was inducted into the Internet Hall of Fame in 2014 and, more recently, was presented by the Internet Society with the 2018 Jonathan B. Postel Service Award. CONNECT caught up with Steve at TNC18 in Trondheim for a chat about the driving force behind the NSRC and his passion to connect the unconnected.



# NSRC GLOBAL INTERNET DEVELOPMENT ACTIVITIES



## Tell us more about the NSRC model and why it has been working all these years?

A fundamental tenet of the NSRC model is to listen first. We want to be sure we are helping people solve the right problems to achieve their objectives. Listening carefully to what local internet developers request in terms of assistance, based on their respective conditions and challenges, is vital for a successful outcome. Once we are clear on the needs established with an NREN or its member universities, we provide technical training to build up human capacity and/or direct engineering assistance to help improve operational infrastructure or performance. To build sustainable networks it is essential to empower those who take ownership of the problems they are trying to solve, in other words, work with local hands cultivating local expertise.

The winning formula is a hands-on, request-driven approach that is grassroots in nature, and employs a bottom-up train-the-trainer philosophy, so outreach and training can continually expand. This allows for creative and hard-working young people to enter the scene and bring new ideas to build new internet services beyond what exists today.

## In earlier years, as a globetrotting father, how did you explain to your children why you had to hit the road again?

When they were young, I would always try to tell them well in advance of an upcoming trip, and simply explain that I was going to country x to help my friends there build better and faster internet access to help their children. They clearly understood and valued the importance of helping friends.

We also hosted many people at our house in Eugene, Oregon, over the years, from Uganda, Ghana, Congo, Ecuador, Kenya, Senegal, Togo, Nepal, Mozambique, Bangladesh, and other countries, so they were accustomed to the discussions around the dinner table about internet infrastructure and making plans for building more. They have also travelled with me internationally for work, and on their own, have engaged in international community service projects. My daughter Maya worked in northern Senegal a couple of years ago, and my son Emilio spent this summer in Morocco with AMESIP - Association Marocaine d'aide aux Enfants en Situation Précaire. Emilio lived with the family of a friend I've worked with for twenty years - Redouane Merrouch, the director of the Moroccan network

MARWAN - and became good friends with his son, Mohamed, who is studying computer science in Ifrane, Morocco.

## How do you join forces with GÉANT?

NSRC is currently part of the National Science Foundation's International Research Network Connections (IRNC) program, as we help facilitate infrastructure development to interconnect national and regional R&E networks across the globe. The NSRC plays an effective support role for the international science community.

This explicitly shared objective has resulted in a strong working relationship between GÉANT and the NSRC, as well as many friendships among the organisations. By providing network engineering assistance and hands-on technical training at many NRENs and their member university networks, the NSRC complements GÉANT's expertise in procuring and implementing R&E networks around the world in the context of EU-funded projects: GÉANT provides the regional network infrastructure working with the regional organisations and NREN partners in each country; NSRC's primary focus is to train campus network and NREN engineers to optimize the performance of their network capabilities in support of the research and education community.

## NSRC support in a nutshell:

Data for 2016



**2135**  
ENGINEERS  
TRAINED  
(OVER 20%  
WOMEN)



at  
**60**  
EVENTS



through  
**95**  
ACTIVITIES



in  
**23**  
COUNTRIES



**34**  
NRENS/RENS  
ASSISTED



**378<sup>000</sup>**  
IN EQUIPMENT &  
BOOKS DONATED

## What is your fondest memory of working in the R&E networking community?

Building great friendships with thousands of people in 100+ countries over the decades who have invited me along with my family and many NSRC colleagues into their homes to break bread together and enjoy meals with their families is a wonderful benefit that I cherish deeply.

## What are the major challenges the NSRC faces today?

About half of the people on Earth still don't have access to the internet. The R&E community collectively makes many valuable contributions to humanity, but we've barely scratched the surface on the potential of the internet and its myriad of potentially useful applications.

One key focus area for NSRC to address this challenge is to support producers of data and new content, not just consumers of existing internet content. The creation of culturally appropriate and educationally useful content in more countries around the world is also of great importance for enriching the global internet and increasing its utility value for all. The combination of improving infrastructure, which creates more supply, and people working together to deliver relevant platforms and services, which drives demand, is good for the whole internet ecosystem.

Success for NSRC is a sustainable community of internet-savvy engineers and local operators that can enable continuous progress in their countries to bring more affordable internet access and better network performance for their respective communities. We're not there yet, there is a considerable amount of unfinished work in many places around the world. NSRC people like working at the frontiers and helping connect internet developers from all countries and cultures to work together more effectively.

## Where are you heading next?

My friend Tim O'Reilly inspired me to start asking my internet development colleagues around the world - WTF? What's the Future? What can we do with this newly built infrastructure that was not previously possible?

For example, Zipline is a California start-up company operating in Rwanda, using small robot airplanes to deliver vaccines, medicine and blood to rural area health clinics in a 30-minute flight from hospitals in Kigali to villages that are often a three-day drive on dirt roads. Lives are literally being saved by this new utilization and hybridization of technologies, leveraging internet communication systems, on-demand and drones.

I am interested in thinking beyond building core networks to how we can collectively make good use of new technologies. By engaging the internet's technical wizards and the global R&E community to help government agencies understand that they are positioned to improve the lives of their citizenry if they embrace the future and reshape government policies rather than put up obstacles, there is a lot of good work we can do together in the coming years.

## Who is the NSRC?

- 6 NSRC employees at the University of Oregon (UO), plus 4 UO student employees
- distributed, multi-lingual team of contractors from: Australia, Canada, Colombia, Denmark, Dominican Republic, Ecuador, Estonia, France, Gambia, Germany, New Zealand, Nigeria, Senegal, Spain, Sri Lanka, Tanzania, Togo, Uganda, Ukraine, United Kingdom
- hundreds of long-time volunteers all over the world
- NSRC instructor-trainees in all regions of the globe to lead internet development in their countries



**"NSRC's Virtualized Training Platform helps us run our training in a much simpler way. In the past we had to come with huge equipment, this small box can do so much and it even fits in our handbags!"**

Maureen Wanja and Michelle Opiyo from KENET at the Train the Trainer workshop held in 2013 in Kigali, Rwanda

**"I have known Steve to provide very well-balanced leadership to a globally distributed team, supporting very diverse communities, which I find both inspirational, principled and ultimately transformative and I have derived many leadership lessons from interacting with him."**

Isaac Kasana, CEO of RENU, Uganda

**"NSRC played a key role in the establishment of Druk Research & Education Network in Bhutan. Philip Smith helped us design and configure DrukREN. He and his colleagues also helped us build the R&E community competence by carrying out training workshops and donating equipment to DrukREN members to help them connect to the network."**

Karma Jamyang, Senior ICT Officer, DrukREN, Bhutan

Find out more about the NSRC at <https://nsrc.org/>



# INTERNATIONAL RESEARCHERS CAN NOW MAP THE UNIVERSE WITH MURCHISON



Located 360 km northeast of Geraldton, Western Australia, lies the Murchison Widefield Array (MWA), one of Australia's leading radio telescopes. While situated in Australia, a team of partners from Canada, India, Japan, China, New Zealand and the United States are behind the design and ongoing maintenance of the MWA. The vast, radio-silent landscape of Australia's outback offers ideal conditions to house this internationally significant equipment. Enabling astronomers from around the world to explore the universe, the MWA is a critical part of Australia's astrophysical research infrastructure.

As an internationally accessible telescope, global collaboration is integral to the success of the MWA and researcher outputs. To ensure this collaboration is seamless and secure the MWA has connected to eduGAIN. The Australian Access Federation (AAF) connected to eduGAIN in 2017 and have made it possible for global facilitates to share research services and tools with over 50 federations around the world. Professor Melanie Johnston-Hollitt, MWA Director, said, "The eduGAIN connection is a vital service for an international collaboration like the MWA making it

simple for our team of global researchers to access data from the telescope."

Using eduGAIN to further streamline international collaboration is "fundamental to the continued success of the project", Johnston-Hollitt claims. In Australia, organisations can connect to eduGAIN through the Australian Access Federation (AAF) an eResearch infrastructure capability enabling single sign-on nationally and now internationally.

Not only does the MWA benefit the education and research sector, the commercial sector benefits through

multiple joint projects. The discovery of new and fundamental astrophysics by the MWA and partnering organisations can lead to new technology in the coming decades.

Connecting the MWA to eduGAIN not only enhances and accelerates innovation in astrophysics, it enables borderless research. A global initiative and a world leading data advantage, Australia's role in eduGAIN is becoming solidified as more national research and infrastructure is shared globally.

**Words**  
Jacinta Rebelo,  
Communications  
Officer for  
the Australian  
Access  
Federation Inc

# THE EVOLUTION OF THE GÉANT TESTBEDS SERVICE (GTS)

Since its inception in 2012, GTS has developed significantly and the latest iteration is planned for release in early 2019 as a supported production service. Bram Peeters, Chief Network Operations Officer gives CONNECT a brief overview of the GTS R&D evolution and considers where application opportunities lie within the GÉANT ecosystem.

The first iteration of GTS was the GÉANT OpenFlow Facility (GOFF). It consisted of 5 nodes with a fully meshed 1Gbps network supporting 2 servers in each node, one supporting computational VMs, the other providing an OpenFlow switching fabric. This enabled the testing of complete OpenFlow based networking environments, in a facility that more closely matched real world scenarios than lab environments. Even in this early experimental phase, GTS was of considerable value for the network researcher community. More importantly, GTS itself provides a 'testbed' functionality to GÉANT to help understand and focus on identifying what capabilities a service like GTS should have and what impact it could subsequently contribute.

Multiple GTS iterations have allowed GTS technology to become more robust, scalable and secure to, for example, allow multiple users to concurrently use the testbed without these impacting on each other. GTS became usable for much broader experimental research, beyond and above the pure networking fabric. GTS has now developed into an open test facility for a wide range of distributed systems and network based concepts. This is important because applications and systems have moved away from being tied to specified

hardware into orchestrated, virtualised environments that can - depending on requirements - be hosted anywhere and by anyone.

From IoT services, integrated supercomputing facilities to distributed business automation tools, these systems all need to be able to work across real-world networking infrastructures with real network delays, noise, latency and other impact factors. Although software simulations and lab setups can provide a lot of insight, system architectures and concepts need to be exposed to a real network. GTS can provide a safe and geographically distributed incubator facility that:

- Provides configurations to simulate a wide range of networks from high bandwidth, low latency networks to less than perfect configurations. This means that network behaviours can be studied under varying yet controllable conditions.
- Ensures the user's network is isolated from other users, ensuring that any problems or extreme network behaviour can be safely contained, fully insulated and therefore do not affect other users.

As an example, the testing of a new DDOS mitigation concept would be impractical on a live network architecture.



It could be tested using GTS technology without any disruption risk to underlying R&E traffic.

In its current iteration (v6) GTS can be an infrastructure for at least two use case scenarios:

- It can be a platform for network research on the scale of a real network.
- It can also be used as a platform that enables proof of concept (PoC) testing of distributed environments.

But in the future GTS has the potential to offer much more:

- Connecting GTSv6 to other environments will be important. We are already in the process of providing the required compatibility to be able to connect to the Fed4Fire federated community of testbeds (SFA Interoperability Wrapper).



- Connecting GTS to multi-domains enables it to play a significant role in enabling advanced network researchers to develop the next generation of multi-domain services for R&E. Such a multi-domain, cross-border, collaborative approach is a typical key strength as well as a key challenge for the global R&E community.
- Once accredited as a Fed4Fire federated testbed, that can be selected by users via Open Calls, GTS can play a key role amongst other key enablers of advanced research prototyping, incubating and can play a role within the developing visualisation paradigm.

These abilities will help to increase the potential of GTS for the whole community.

## Help Guide the Future of GTS - The 4th GTS Tech and Futures Forum 29-30 October 2018

We are seeking input from a range of current and potential users in the fields of:

- Advanced Network Technology Researchers
- Advanced Network Technology Developers
- Network Architecture Teaching Modules teaching in HE / class room environments
- Network Managers / Administrators
- Heads of Network Infrastructure Departments at NRENs and NREN end user communities

Please reserve a place in your diary for the 4th GTS Tech and Futures Forum to take place Monday 29 October, 12pm to Tuesday 30 October, 2pm, 2018 at BELNET's Offices in Brussels.

If you are currently involved using any aspect of GTS technology and are able to share an interesting use case please contact [anke.russell@geant.org](mailto:anke.russell@geant.org)

### GTS v6 Key capabilities:

- User Oriented: User defined networks, under user control!
- Simple: Minimal user learning curve, intuitive user interface(s)
- Rich: Broad portfolio and inventory of resources
- Flexible: Supports a wide range of projects/communities
- Agile: Rapid prototyping, rapid reconfiguration
- Secure: Support high risk experiments, contain blast radius
- Scalable: Support global experimentation, full 'line rate' performance, large experiments, many users/projects
- Reliable: 24x7 availability, robust predictable/repeatable behaviour
- GTS Web based 'Point-n-Click' Graphical User Interface (GUI)
- Drag and drop editor

[gts.geant.org](http://gts.geant.org)





# EDUROAM MANAGED IDP

## MAKING EDUROAM EASY

The benefits of eduroam for institutions and users are clear – the ability to provide secure, easy-to-use local and global Wi-Fi roaming to students, researchers and staff is a major plus for any organisation and when added to managing access for visiting students and staff makes a compelling case. But for smaller institutions it may be hard to dedicate resources to implementing and supporting eduroam. eduroam Managed IdP can get your users on-line quickly and securely.





## Why do you need eduroam Managed IdP?

eduroam relies on all participating institutions to manage a service that controls all their user identities and responds to connection requests from eduroam access points worldwide. This requires the management and support of an Identity Provider (IdP) Service, a well-managed identity backend, and a RADIUS Server to verify the credentials from that backend and grant user access to eduroam.

Many smaller institutions may not have the in-house skills or resources to operate the required services and in particular to maintain their integrity. This is why eduroam Managed IdP has been developed.

## Product Description

eduroam Managed IdP outsources the technical setup of eduroam IdP functions to the eduroam Operations Team. The system includes:

- A web-based user management interface where user accounts and access credentials can be created and revoked.
- A technical infrastructure ("CA") which issues and revokes credentials
- A technical infrastructure ("RADIUS") which verifies access credentials and subsequently grants access to eduroam

This leaves the institution only having to focus on the users and frees up valuable technical support resource.

## How eduroam Managed IdP works

eduroam Managed IdP will provide you with a simple web-based management interface to add, remove and manage eduroam accounts. All internal processes are handled on your behalf.

As an eduroam IdP administrator using this system, you are authorised to create user accounts according to your local institution policy. You are fully responsible for the accounts you issue. In particular, you:

- only issue accounts to members of your institution, as defined by your local policy.
- must make sure that all accounts that you issue can be linked by you to individual human end users of eduroam
- have to immediately revoke accounts of users when they leave or otherwise stop being a member of your institution
- will act upon notifications about possible network abuse by your users and will appropriately sanction them

For more information on eduroam Managed IdP visit [eduroam.org/eduroam-managed-idp/](https://eduroam.org/eduroam-managed-idp/)

# RESEARCH LIBRARIES - SUPPORTING OPEN SCIENCE ACROSS EUROPE



Valentino Cavalli is well known throughout the research and education community through his work and leadership of TERENA. CONNECT spoke with him to find out how to find out how LIBER is supporting research across Europe.



## What is LIBER?

LIBER is Europe's largest association of research libraries. The organisation was established in 1971 and is currently based in The Hague. Our work supports the interests of LIBER's wide community of more than 400 national, university and special libraries across Europe.

## What is your role?

I've been working since July 2017 as LIBER's Open Science Officer. Open Science is currently high on the agenda of the European Commission but has been around as a movement for several years. Research libraries are at the forefront of Open Science as it makes science more collaborative, reproducible, transparent and impactful. However, research is still far from being fully open and significant changes are required to open-up processes and change mindsets in favour of a world where policies, tools and infrastructures universally support the growth and sharing of knowledge. Research libraries are well placed to make and support such changes.

At LIBER, I've been involved in policy and stakeholder engagement activities and am heavily involved with the EU-funded project EOSCpilot<sup>1</sup>. The European Open Science Cloud, with its ambition to establish a trusted environment for cross-disciplinary



research collaboration in Europe, is a very natural and stimulating development from my previous job and my involvement in research infrastructures has now got a step closer to the researchers and their work. Recently, I also contributed to LIBER's Open Science Roadmap<sup>2</sup>.

## **Libraries are often considered to be stuffy and irrelevant in the age of the Internet, how do you see libraries moving into the 21st Century and how they have an enduring role in research (things like expertise, trust, access being key to quality research, the move to open science)?**

Libraries are already transforming their services for the modern age, and they're definitely not 'stuffy and irrelevant'. The Fake News era has shown very well that it's one thing to find information on the internet, and quite another to decide if that information is credible. Libraries have a key role to play here, becoming – as you put it – an access point for quality research. Of course, libraries have many other roles. The libraries we represent don't simply offer access to information. They also offer training to researchers, they provide access to tools and technology through various innovative programs, and they run the repositories that safely store today's research data for the scientists of tomorrow.

At LIBER, we're supporting our libraries in this process via our 2018-2022 strategy, which was launched shortly after I joined the organisation. It sets out a vision for 2022 in which:

- Open Access is the predominant form of publishing;
- Research Data is Findable, Accessible, Interoperable and Reusable (FAIR);
- Digital Skills underpin a more open and transparent research life cycle;
- Research Infrastructure is participatory, tailored and scaled to the needs of the diverse disciplines;
- The cultural heritage of tomorrow is built on today's digital information.

## **What Digital Initiatives is LIBER undertaking?**

LIBER is a community-based organisation and its work is undertaken in two ways, via working groups and international projects, which all map the three directions defined in our strategy: Innovative Scholarly Communication, Digital Skills & Services and Research Infrastructure. At the moment, we have around 200 volunteers serving on our working groups. They're focusing on a wide range of topics, from technical issues such as Linked Open Data to "softer" topics such as leadership and skills, policy developments, advocacy and communication, which are particularly important to strengthen engagement with our stakeholders.

## **How do you see initiatives like the EOSC helping LIBER's work?**

Whilst research libraries have a clear role in enabling the EOSC, the EOSC promises to facilitate integration and harmonisation of access to shared data, services and resources, which are crucial for research libraries. Collaboration with research infrastructures is one of LIBER's strategic priorities with the following aspects playing a very important role for research libraries:

- Moving to shared services and Cloud services and contributing to building them on a solid foundation in terms of funding, governance, trust and an evolving technical and social infrastructure;
- Build on their expertise in metadata and ontologies, take a leadership role and engage with other stakeholders to ensure interoperability and accessibility of content;
- Help developing criteria and guidelines for data stewardship and data curation.
- Help translating requirements of diverse scientific disciplines into scalable infrastructure to enable cross-disciplinary collaboration.

Thank you Valentino – looks like LIBER has an exciting future ahead.

For more information on LIBER's work visit: <https://libereurope.eu>



Many people will know Valentino from his leadership of TERENA and his work with Karel Vietsch, and this legacy is continuing within the Vietsch Foundation where Valentino is chairman of the board of trustees.

The mission of the Vietsch Foundation is to promote research and development of advanced Internet technology for scientific research and higher education.

The Vietsch Foundation fulfills its goals in two ways.

- Awarding an annual medal of honour to people who contributed to the development of a service, technology or approach that will be of lasting value to the research and education networking community and its users. This year the medal was awarded to Ingrid Melve, of Unit (the Norwegian Directorate for ICT and Joint Services in Higher Education and Research) and Licia Florio of GÉANT.
- Contributing funding to specific research and development projects that demonstrate potential value to progress European and global research and education networking. Recently the foundation has funded projects to support the Research and Education community including the Referoo<sup>3</sup> Project which aims to create a set of tools to address some of the most critical inefficiencies of the traditional peer-reviewing process of scientific publications and the eduVPN<sup>4</sup> an initiative to make VPN technology commonly available, by building better and more user-friendly tools.

To find out more about the work of the Vietsch Foundation visit <http://www.vietsch-foundation.org>

[1] <https://eoscpilot.eu/>  
[2] <https://libereurope.eu/blog/2018/07/03/liber-launches-open-science-roadmap>  
[3] <http://www.referoo.org/>  
[4] <https://eduvpn.org/>

# THE RETURN OF CLAW IN 2018

How well is your organisation prepared for a network or cyber crisis? Do you have crisis management procedures in place? And do you know how to reach out to – and work with - other organisations, in the eventuality of a pan-European crisis?



We will help you explore these questions and many more during the second CLAW - Crisis Management Event in Malaga, Spain on 12 – 13 November 2018.

The workshop will comprise a crisis simulation exercise, undoubtedly the most exciting part of the event and, to whet your appetite, here's a brief overview of what it will entail.

Picture the NREN of an imaginary European country whose crisis management team needs to deal with an unexpected and urgent security problem. Information starts pouring in about a serious and unexplained situation, universities from around the country are calling, demanding answers and raising alarms, the crisis is rapidly escalating and high profile government representatives

start to get involved ... The teams taking part in the workshop will have to investigate the crisis, formulate updates and statements for employees, clients and the media whilst trying to solve the complex issue at the same time.

CLAW invites NRENs to send representatives from Communications, NOC, CSIRT and Information Security Management teams to exchange knowledge and best practices and work on skills to deal with crisis scenarios successfully.

To register for CLAW 2018, go to: [eventr.geant.org/events/2899](https://eventr.geant.org/events/2899)

## PROGRAMME (CET time)

### Monday, 12 November

Time	What
9.00 – 9.30	Welcome
9.30 – 12.30	Crisis Management Exercise
12.30 – 14.00	Lunch
14.00 – 14.30	Reflecting on the Crisis Management Exercise
14.30 – 15.30	Cultural differences training
15.30 – 16.00	Coffee break
16.00 – 16.30	Lightning Talks
16.30 – 17.00	Closing remarks
20.00 – 23.00	Food and Drinks

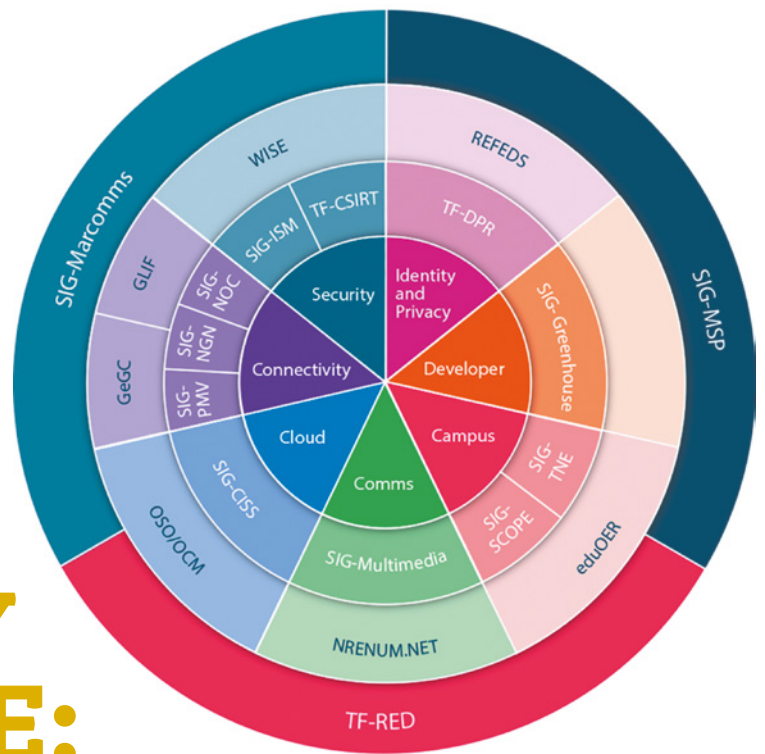
### Tuesday, 13 November

Time	What
9.00 – 9.30	Lightning Talks
9.30 – 11.00	Train the Trainer: How to build a Crisis Exercise for NRENs
11.00 – 11.30	Coffee break
11.30 – 13.00	Parallel Sessions: <ul style="list-style-type: none"><li>How to define the scope of a crisis for your organisation</li><li>Show and tell: where are you at with crisis management?</li></ul>
13.00 – 14.00	Lunch
14.00 – 15.30	Parallel Sessions: <ul style="list-style-type: none"><li>How to define the scope of a crisis for your organisation</li><li>Show and tell: where are you at with crisis management?</li></ul>
15.30 – 16.00	Closing remarks

Contact Charlie van Genuchten  
[Charlie.Genuchten@geant.org](mailto:Charlie.Genuchten@geant.org)  
for more information about CLAW 2018.



# GÉANT COMMUNITY PROGRAMME: BACK IN FULL SWING AFTER THE SUMMER BREAK



Collaboration across teams in different geographic locations and disciplines is crucial to the GÉANT community. Task Forces (TFs) and Special Interest Groups (SIGs) help GÉANT, NRENs and other Research & Education bodies to collaborate, share experience and guide future developments of networking services, technology and also a variety of non-technical topics.

Are you new to the community? Have you ever heard about the Community Programme? Would like to learn more about the SIGs and TFs? Here's an overview of some of these busy groups, their roles, plus dates and locations of their forthcoming meetings. Most of these groups' calendars are full with events scheduled to take place in the next couple of months, giving all participants something exciting to look forward to after their summer vacations.

**SIG-CISS**, the Cloudy Interoperable Software Stacks team that shares and collaborates on infrastructure stacks, platforms and research workflows, will meet in Berlin, at DFN's premises, on 16 November.

**SIG-ISM**, the Information Security Management team that develops security expertise and excellence within the NREN community, will meet in Luxembourg on 15-16 October.

**SIG-MSP**, the Management of Service Portfolios team supporting management across the product life cycle and sharing service ideas, will meet in Belgrade, Serbia on 3-4 October.

**SIG-NGN**, the Next Generation Networks team that promotes and facilitates knowledge exchange and collaboration on developments in networking technologies, will hold its first official meeting in Rome, hosted by GARR, on 22-23 November.

**SIG-NOC**, the Network Operations Centres team that shares and creates common best practices for the organisation and management of Network Operations Centres will meet in Rome, hosted by GARR, on 21-22 November.

**SIG-PMV**, the Performance Monitoring and Verification team that identifies and establishes best practices for wired/wireless networks, will meet in Manchester, UK on 23-24 October.

For further information on the GÉANT Community Programme, visit [https://www.geant.org/People/Community\\_Programme/Pages/Home.aspx](https://www.geant.org/People/Community_Programme/Pages/Home.aspx)

If you are interested in joining any of these groups or the GÉANT Community Slack workspace, please contact Nicole Harris at [nicole.harris@geant.org](mailto:nicole.harris@geant.org).



# STEERING SIG-MARCOMMS THROUGH 15 YEARS OF SUCCESS!

If longevity, satisfied participants, a proactive steering committee, and emulation by your peers are indicators of a successful community working group, then SIG-Marcomms can rightfully claim success.

September marked the 15th anniversary of the Special Interest Group on Marketing Communications, as well as its 45th face-to-face meeting, making it the second oldest activity in the GÉANT Community Programme of SIGs, Task Forces, workshops and small projects.

In June 2018 group members met with other marketing communications staff from NRENs around the world. They discussed the progress in other world

regions of similar groups and celebrated 5 years of the 'Global PR Network', which had been inspired by the SIG-Marcomms approach.

Although the name has changed over the years – originally TF-PR, then TF-CPR – the main objective of SIG-Marcomms has remained constant; to provide a forum for the exchange of ideas, experiences and best practices in order to develop skills among the group's

participants and raise the game in NREN marketing communications activities. Although marketing communications is not NRENs' core business, it is a core support to their business goals and sustainability.

"The NREN community and its stakeholders and users are special, compared to what you learn in business school," explains Gitte Kudsk of the Danish NREN DeiC, who is a founder





#### Photos

Top left:  
SIG-Marcomms  
and Global  
PR Network  
members at  
TNC18

Top right: The  
SIG-Marcomms  
Steering  
Committee: Gitte  
Kudsk (DeiC),  
Maria Ristkok  
(EENet of HITSA)  
and Lonneke  
Walk (SURFnet).

Middle right:  
Happy birthday  
SIG-Marcomms  
(15) and Global  
PR Network (5)!



and current member of the SIG. "You have to communicate through the universities and their IT departments. There are the technical aspects and the special advantages of NRENs. Mutual inspiration about practical communications is for me the biggest advantage of participating in the group. What we do now in DeiC and NORDUnet is very much inspired by what I have learned during the years at the meetings."

Maria Ristkok of the Estonian NREN, EENet of HITSA is another founder and current participant. Unlike Gitte, she had no professional marcomms background when she joined the group. "Users need to understand that the services and structures we offer will make their work life easier. SIG-Marcomms helps NRENs with planning and managing such communications. If you are a small organisation you can't spend your time and resources on everything you would like to. The experiences of others are a big help because you can skip the trial and error. My interest in different ways of marketing and communications has just grown as a result of my participation, and through the years I completed an MA in communications management."

Participants have typically come from diverse backgrounds; some with relevant professional training, others being assigned marcomms work as an aside to their main NREN technical or admin role. But the benefits of the group's information exchange don't just flow in one direction.

"SIG-Marcomms meetings give me inspiration to think outside my own daily job," says Lonneke Walk of SURFnet, who has a solid professional marcomms background. "One part of being a marcomms professional is being creative and thinking outside the theory and daily routine. It's inspiring to hear



how international colleagues are handling the challenges we face. It gives me new insights and it keeps me sharp. The work I do for our users in the Netherlands doesn't stop at the border; if our target group is working internationally then we should too."

Lonneke, Maria, and Gitte had all chaired the group when it was a Task Force. When it became a Special Interest Group two years ago they joined together as the steering committee. They have proved a great team in generating topics and sharing the work to secure presenters, finalise agendas and agree on key points to be reported in blogs to the wider community. They have made meetings as interactive and hands-on as possible, with training and workshops, and ensured a friendly welcome to new participants so they feel comfortable at the events and following up via the mailing list.

With a satisfaction survey about each meeting and each year, the steering committee gets plenty of feedback.

"The best thing is to think about how we can make each meeting even better than the last one. How can we make it useful for everybody? When

you get the positive feedback from the participants, I always know why I do this," says Lonneke.

"I believe in change to make things better and I'd rather be active than passive. Although it takes some time and dedication, it's definitely worth it," agrees Maria.

"The more engaged you are in an activity the more you gain from it," adds Gitte. "Being in the SIG and its steering committee has given me the valuable possibility to be an active member of the international NREN community, even as a non-technical person. Being able to influence the directions the SIG is taking and the overall themes of the meetings ensures for me that participating in the SIG keeps adding value to my own job."

More about SIG-Marcomms:  
[www.geant.org/SIG-Marcomms](http://www.geant.org/SIG-Marcomms)

Blogs about SIG-Marcomms  
via: [blog.geant.org/category/marketing-communications](http://blog.geant.org/category/marketing-communications)





# THE LEAP OF FAITH INTO EDUCATIONAL INNOVATION

**SURF**

## INTERVIEW WITH LAUREN HERCKIS

How to preserve the tradition of the ‘hallowed halls on the hill’ at universities while at the same time innovate your education with new tools and techniques? That’s a challenge says Lauren Herckis, anthropologist at Carnegie Mellon University in Pennsylvania and keynote at the SURF Education conference in the Netherlands. “Give people time to experiment, to fail, to try again, to learn and to rearrange the pieces of the puzzle. And make meaningful learning experiences for students your key driver.”



**Words**  
Johan Vlasblom  
– author at  
Big Easy  
Communicatie

If you'd like more  
information  
about the SURF  
Education  
conference you  
can email  
owd@surf.nl

## First let's go back 20 years. What was the situation in 1998?

Universities started providing email addresses for their students. Computing moved from punch cards to zip disks and cd's, and powerful tools in research were mainly used for the analysis of data. There was a lot of potential and great expectations regarding technical possibilities.

## Did they also find their way into the field of education?

Yes and no. The adoption and integration into teaching, as opposed to research, was very uneven. To rapidly see the potential and translate these tools into meaningful learning experiences, depended very much on the ability on an organisational level and on that of the individual instructors. You really have to take a leap of faith when you integrate new technologies.

## And are they willing to take that leap?

I think the university model is very much about tradition. About deeply held ideas of form and structure, and strong cultural and social values. Think of the hallowed halls on the hill: a place where knowledge is valued above everything. In such an environment, change that gets at the heart of these things is very challenging.

## This means universities are conservative?

Well that depends. For individual researchers, experimentation with new tools and techniques is a second nature. But a systemic, integrated and sustained change is a very different story. In higher education there is a long tradition to populate classrooms with passionate leaders in their field. Think of the brilliant biologist who loves teaching and knows everything about her subject but nothing about teaching effectively.

## So teach them to do so

Most universities in America don't have extensive requirements for their faculty to learn the skills associated with instructions. And while the heart may be in the right place when it comes to teaching, a lot of professors still work in the old-fashioned model of expert and disciples.

## And that's not very effective when it comes to teaching?

No, because students all learn differently, and some need different kinds of support than others. Some faculty teach students to solve problems by throwing them into the deep end of the pool. But that doesn't automatically go well for all students. Some might even drown! They might learn better from personalised, guided feedback and support. And that's not always on top of the mind of most professors.

## A good student experience is important?

Absolutely. As a matter of fact it's one of the main key drivers for educational innovations. Bad student experiences are a big concern, therefore it's important that universities give their students meaningful learning experiences. And that also means experimenting with new tools and techniques to meet the demand and the expectations of young people who are already very at ease with state of the art techniques.

## Time to go to work

Sure, but it's also a matter of believing. Sometimes even people who believe in evidence based research can be skeptical about education innovation. Why? Because the new ideas don't resonate with their own and they don't see clear benefits for their own course.

## How can you change this mindset?

Give people time. Time to experiment, to fail, to try again, to learn, to feel comfortable and to rearrange the pieces of the puzzle of your course. And it's better and easier to experiment when developing new courses instead of adjusting present ones.

## You make it sound simple and easy!

The truth is more complex. In a large institution you need a top down approach for some basic technologies that can bring integration for a long period of time. Then you need to identify a clear and limited set of pedagogical challenges. But you also need a bottom up and collaborative approach that will integrate the specific needs, expectations and experiences of staff and students. That can be very successful. But it also takes a lot of time, work and meetings.

## And how do you tackle organisational problems when they pop up?

Very carefully! Haha! You need a lot of agility and versatility on the organisational and individual level. But overall it remains a challenge. Educational technologies have to be tailor made and at the same time potentially customisable and adoptable on the fly.

## What do you foresee for the future?

First of all an enormous potential for simulations in education. Realistic recreations of events, reactions, problems and challenges that are almost impossible to present to students directly. New technologies will make this possible. And then there is distance education. That will explode and will have a great impact. Students of all stripes and with all kinds of backgrounds and goals will be able to join in. Over the next 10 years this inclusive and diverse community will create new modes of education, with different global perspectives, cultural frameworks and value systems. Education not only for but also by people from all over the world. Absolutely wonderful!

Lauren Herckis is an anthropologist at Carnegie Mellon University (Pittsburgh, USA). She is specialised in organisational and contextual barriers and affordances to the adoption of innovative tools and practices in higher education. She applies anthropological methods and theory to analyse human engagement with the material world in her field research, and applies lessons from implementation science to bridge the gap between research and practice.

[www.laurenherckis.com](http://www.laurenherckis.com)

# CONNECTIVITY, CONTENT AND INSIGHTS: A SUITE OF SOLUTIONS FOR STUDENT SUCCESS

UK transnational education (TNE) programmes are not new, although they have seen unprecedented growth in the past decade. According to a 2018 report from Universities UK, the number of students studying on TNE programmes equates to 1.6 times the number of international students coming to the UK to study, in the same year.

The global increase in TNE activity – with over 700,000 students studying offshore for UK degrees – presents huge opportunities for universities, but it also presents some new challenges, and for network providers like Jisc.

A key challenge to meet at the outset is to ensure access to seamless connectivity between sites at home and overseas, as well as access to content and administration systems; to create a fully equitable and high-quality experience for TNE students, and those staff delivering it.

Jisc has been working to create a portfolio of TNE services, not just for UK members, but all potential beneficiaries. By working with global NRENs we are able to ease the issues of connectivity, access to content and monitoring student experience - wherever that may be in the world.

One of our services, Global Connect, is already successfully linking UK institutions with branch campuses in Malaysia and Malta, providing students and staff with the connectivity they expect. The service ensures students

can access course materials in real time, not be waiting for better bandwidth out of hours, and it too is available to institutions who are not Jisc members.

At Queen Mary University of London (QMUL) and Beijing University of Posts and Telecommunications, a unique partnership combines the academic expertise of two international institutions to create one jointly taught programme. A major issue in delivering this course was the internet delay and packet loss, as public networks route via the US to Europe. By connecting to Jisc's Janet network, connectivity has greatly improved as traffic through CERNET is now routed westward from China.

Our network is one of the only NRENs in the world to offer dedicated services to support transnational education. We're encouraged by the ongoing requests for collaboration and looking forward to working closely with in-country NRENs to deliver some of our new services to member universities. One of these potential services, specifically designed to help institutions support students, is based on the

success of a service with UK universities, so this year we're piloting Jisc's Digital experience insights survey but for TNE students.

We know from the last two years of running this pilot service (with more than 22,000 UK participants in 2017) that 80% of HE students believed reliable Wi-Fi to be critical to accessing digital services. With TNE, the connectivity needs of students are no less, and these students are more likely to be reliant on virtual learning environments (VLEs), powered by their internet service. As it's so important to our members that they get the learning environment right - to deliver a seamless student experience - we're piloting this service for TNE. Some of our other UK based findings from this year's digital experience survey were:

- 62% of HE learners access their VLE on their mobile phone
- 79% would collaborate online with fellow learners
- 95% of HE students search online for content once a week or more

**Words**  
Esther Wilkinson,  
Jisc





Content is key to student success and one of the areas where inefficiencies emerge in providing a TNE offer. The current TNE licensing pilot, will launch as a further new service later this academic year, and by using the experience of Jisc Collections in engaging with publishers and aggregators of content, we're establishing agreements with publishers to support the pricing and licensing requirements of TNE providers. Without the duplication from individual negotiations, universities will see efficiencies and cost savings that ensure they can keep pace with the expectations of TNE students and support their success.

We are also listening to our global community and as part of the work of the GÉANT TNE Special Interest Group (SIG) we have issued a short survey to European NRENs on their current and planned TNE support activities. We plan to extend this globally in the medium term, and the initial results will inform our data collection on TNE; a draft report can be found at: <https://wiki.geant.org/pages/>

Global Connect, the student digital experience tracker and the TNE licensing pilot were developed as pilot projects with Jisc members, through the TNE support programme. We hope that more services will be developed through global collaborations with other NRENs and education providers to be able to support our globally mobile students, and staff.

For further information about all these services, or the work of the GÉANT SIG-TNE, visit <https://www.jisc.ac.uk/rd/projects/transnational-education> or contact [transnational@jisc.ac.uk](mailto:transnational@jisc.ac.uk)

*Esther Wilkinson is responsible for driving the development and delivery of Jisc's international strategy, coordinating and providing a leadership role for international activities across the Jisc portfolio, and positioning these within Jisc's vision and overall strategy. A key part of this role includes the strategic and business development of Jisc's transnational education support programme. Esther also leads the GÉANT SIG-TNE.*

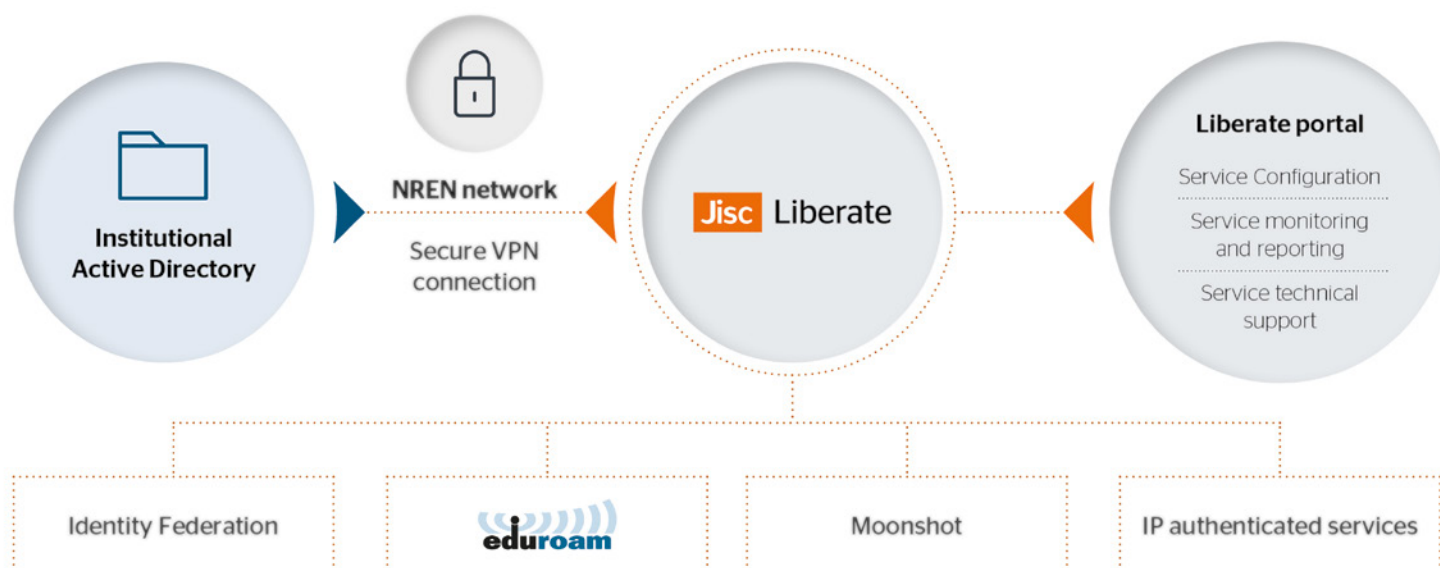


# **LIBERATE: AN ACCESS MANAGEMENT SOLUTION THAT FREES UP TIME AND SAVES MONEY**

Secure access management underpins research and education. A robust approach to it is vital and, in the UK, institutions are starting to use Liberate, Jisc's new access management solution. We developed it for users of our community and it is a technologically advanced, comprehensive service that provides a range of benefits that aren't available from commercial providers of outsourced solutions.



## Liberate provides a gateway between the institution's active directory and NRENs access management services



At TNC18 in June we reached an agreement with GÉANT that paved the way for Liberate to be included in the GÉANT partner services portfolio. Now, we want to partner with operators of other NRENs to offer Liberate to their communities.

## Shared services

We are developing a portfolio of shared services to give research and education proven, reliable and value-for-money solutions that can be deployed quickly. Liberate is one of these.

We have worked closely with universities and research organisations to design and build this fully managed access management solution, making sure it meets their needs. For users, it eliminates the hassle of having to deploy, configure and manage IdP and SP solutions such as Shibboleth, RADIUS and Moonshot for themselves.

The University of Glasgow's John Watt, IT manager for identity management, has found that Liberate offers significant cost and efficiency savings both during set-up and afterwards:

"Deploying Shibboleth from scratch can take weeks or even months but with Liberate someone with experience could get it all up and running in an hour."

Once it's set up, he says, "the time needed for ongoing management is negligible. The only time interaction might be necessary would be when you are changing your federation-wide configuration. You only need to alter the portal parameters to do this, which would take a matter of seconds."

## Liberate

Liberate provides a gateway between an organisation's active directory and their NREN's access management services. It's fully interoperable with all the access management solutions that NRENs promote, including Identity Federation, eduroam and Moonshot and it also offers an authenticated web proxy to support services that use IP address authentication. It is the only access management solution that supports all four.

We deliver Liberate from public cloud provider Amazon Web Services (AWS) using our own platform. It will:

- **Authenticate** an individual's credentials against their institution's Microsoft Active Directory or other lightweight directory access protocol (LDAP) directory

- **Authorise** individuals via membership of groups that are defined in the institution's directory
- **Provide** user attributes to services based on policies that have been determined by group membership
- **Support** reporting of user authentications and use of services

**Words**  
Justin Knight,  
Jisc

As a partnering NREN, you'll offer the service to your own users, maintaining control of your customer relationship and all customer-facing activities including first-line technical support. We will deliver the service and provide you with second and third level support - and also keep Liberate patched and updated to ensure that security is maintained at all times.

## Like to find out more?

Read more about Liberate on our website: [jisc.ac.uk/liberate](https://jisc.ac.uk/liberate)

Contact the project team:  
[liberate@jisc.ac.uk](mailto:liberate@jisc.ac.uk)



**EaPConnect** ★  
Eastern Partnership Connect ★

**EaPEC 2018**

Winners of the 2018 EYR@EaP call will be announced at this year's Eastern Partnership E-Infrastructure Conference, EaPEC 2018, in Chisinau, Moldova on 17-18 October.  
[www.eapconnect.eu/eapec/](http://www.eapconnect.eu/eapec/)

# OPEN DATA IN THE EASTERN PARTNERSHIP – AN ENLIGHTEN YOUR RESEARCH PROJECT





#### Pictures

Far left: Iqbal Safarov holding a workshop with the Belarusian open data community in Minsk

Left: Iqbal Safarov was a winner of the 2017 call for Enlighten Your Research project proposals in the Eastern Partnership region: [www.eapconnect.eu/research-eap/eyreap2017/](http://www.eapconnect.eu/research-eap/eyreap2017/)

The opportunity to collect and use data from various stages of activity by governments and public organisations has increased massively since the advent of e-government and digital infrastructures. The philosophy that promotes transparency, accountability and value creation in a country by making government data available to all is known as Open Government Data (OGD).

OGD is a very significant source for policymakers and academics to apply data analytics tools and study various fields including (but not limited to) education, healthcare, economy and other areas of social activity.

Supported by the Eastern Partnership Connect project, EaPConnect, Enlighten Your Research programme (EYR@EaP), a study of OGD in Eastern Partnership countries has been carried out by Iqbal Safarov, a researcher at the University of Utrecht in the Netherlands.

Safarov's research investigates frameworks for describing an open data policy portfolio that establishes and improves open data adoption and use in the EaP countries. OGD adoption, data sharing and use are estimated to have positive impact on good governance, economic development and society.

In May and July, Safarov organised five open data workshops in the Eastern Partnership countries, where he met high-level representatives from academic institutions, along with researchers, government officials, open data activists and other relevant stakeholders to discuss the potential of open data, open science data, open data-driven research and evidence-based policy making, and ideas for further cooperation.

"Despite the fact that the open data concept is new in Eastern Partnership countries, and there are very few successful projects," says Iqbal Safarov, "the communities, governments and scholars have strong motivation to increase open data use and re-use. Among the six countries, Ukraine has the most developed open data adoption, thanks to the intention of the Ukrainian government, very strong open data community and international donor organisations. The positive progress in some countries encourages us to pay more efforts for promoting open data, sharing the benefits of data-driven approach in research and policy-making."

Iqbal will send a country report to open data operators and will publish an article in 'Government Information Quarterly'. His initial results will be presented at an upcoming conference at the earliest opportunity and this research will form the basis for his further activities to develop a framework for improving open data adoption and usage in EaP countries.

# WE MET REDOUANE MERROUCH

Head of the Moroccan Academic and Research Wide Area Network (MARWAN) at Centre National pour la Recherche Scientifique et Technique (CNRS)



MARWAN's recent connection to GÉANT via a 1 Gbps ASREN link marks Morocco's re-joining the international R&E networking community with the support of the EU-funded AfricaConnect2 project. We asked Redouane about what this means for his country and for collaborative research in the Mediterranean - and further afield.

## Félicitations Redouane! How does it feel to be connected again?

It's worth remembering that in 2004 Morocco was the first country in the South Mediterranean region to get connected to GÉANT, so it feels a bit like a homecoming after a short absence. I would like to thank all my colleagues at GÉANT and ASREN who have helped us through the AfricaConnect2 project to make this happen. I also give special thanks to the director of CNRS, Prof.

Mohamed Khalfaoui, for his support and engagement: it reflects our strong belief that this connection is essential for Morocco's R&E community to thrive and to consolidate even further the bond with peers in other parts of the world, especially in Europe. In a nutshell: we are back on the global R&E scene!

## Tell us more about MARWAN

MARWAN is the Moroccan national research and education network that was created in 1998. Over the years it has evolved - slowly but steadily - despite significant governance and funding constraints.

Today we are at the 4th edition of our network - MARWAN 4 - which is built on a VPLS / L2 telecom operator backbone and connects all of the 200 universities and research institutes across Morocco with a bandwidth speed of up to 5 Gbps.

MARWAN provides access to the commodity internet, nationwide R&E connectivity across Morocco and, thanks to the recent reconnection, to GÉANT and the global R&E networking community. In addition, we have a solid service offering, including HPC, eduroam, identity federation - just recently we joined eduGAIN, IPv6 and collaboration tools, such as the Colaboratorio platform.

## Can you give some examples of users that will benefit from the new connectivity?

As mentioned before, our scientists collaborate with European colleagues on several research programmes, some of which are large-scale ones, such as the high-energy physics ATLAS experiment and the undersea ANTARES neutrino telescope. Each of these projects involves researchers at several sites across Morocco, all connected to MARWAN and now onwards to GÉANT. The new connectivity will also boost collaborative research into issues facing the Mediterranean - on both shores - such as climate change, desertification and sustainable agriculture to name but a few.

## What are MARWAN's main priorities for the next 2-3 years?

We set ourselves the goal of rolling out and increasing the uptake of our service portfolio at the universities and research centres; this includes optimising the HPC capabilities offered by MARWAN through the MaGrid infrastructure and providing cloud services for higher education. Another focus is the improvement of campus networks to enable our universities to fully benefit from the high capacity MARWAN offers.

It won't always be plain sailing, but we are determined to place our researchers and students in the best position to leave a mark - both nationally and internationally.

Find out more at:  
[www.marwan.ma](http://www.marwan.ma)



# EDUGAIN CONTINUES TO EXPAND WITH MOROCCO AND MOZAMBIQUE JOINING

Within the research and education community, collaboration is crucial. From high energy physics and astronomy through to medical research and environmental studies, the ability for teams from around the world to work together and share data and services has resulted in incredible advances across a wide spectrum of fields.

eduGAIN has been instrumental in enabling these kinds of collaboration. With an estimated 27 million users in 3,000 institutions accessing more than 2,000 different services around the world, eduGAIN has been an incredible success story.

Member countries joining eduGAIN are helping to accelerate this success and becoming part of the eduGAIN family benefits both their students, staff and researchers in gaining access to worldwide services but also improves the ability of the entire R&E community to work together.

This is why eduGAIN is delighted to welcome Mozambique and Morocco as members of eduGAIN, to further strengthen the opportunities for African students and researchers to work with their colleagues from around the world.

## CAF-Moz joins eduGAIN

The CAFMoz (Federated Academic Community of Mozambique) was approved as an eduGAIN member on 29 July, 2018, becoming the 59th member.

The eduGAIN interederation service connects identity federations around the world, simplifying access to content, services and resources for the global research and education.

The work for the establishment of CAF-Moz began in 2016 and was officially recognized in 2017 as the Identity federation of MoRENet, the Network of Higher Education and Research Institutions of Mozambique,



in a process that was supported by the Brazilian National Research and Educational Network (RNP).

This milestone represents a breakthrough for Mozambique's academic and research community by allowing them to access to international interederation services through the sharing of information with other eduGAIN members. Only the institutions connected to the MoRENet network can benefit from this service.

This achievement was the result of the hard work done by MoRENet's technical team to comply with all the

necessary requirements for membership and approval by the eduGAIN teams.

The MoRENet CEO, Lourino Chemane congratulated his technicians for the effort and dedication in reaching an international milestone for MoRENet. "We in MoRENet are delighted to be joining eduGAIN and hope that our users will greatly benefit from the opportunities for increased global collaboration that it offers our community."

<http://cafmoz.morenet.ac.mz>

# SOMALIREN CONNECTS TO THE UBUNTUNET NETWORK UNDER AFRICAConnect2

The UbuntuNet Alliance is pleased to announce that it has successfully connected SomaliREN to the UbuntuNet network. The connectivity to the regional backbone follows the award of a 10 year contract to the telecom network provider SomCast Networks LLC to provide an STM 1 circuit from the UbuntuNet Alliance's PoPs between Dar es Salaam and Mogadishu.

The UbuntuNet Alliance is the regional Research and Education Networking organisation for Eastern and Southern Africa. It operates UbuntuNet, the data communications network that connects member NRENs in the region to other Regional Research and Education Networks worldwide and to the general internet.

**"We are pleased that SomaliREN is finally connected to the UbuntuNet Alliance regional backbone. It is a dream come true for our NREN as well as the Somali higher education and research community and institutions. This marks the beginning of the realisation of a grand vision to connect all our research and education institutions to each other and to their global partners."**

Abdullahi Bihi Hussein,  
CEO of SomaliREN.



Find out more at:  
[www.somaliren.org](http://www.somaliren.org)  
<https://ubuntunet.net/>

# TERNET OVERCOMES BARRIERS TO GLOBAL TEACHING AND LEARNING

## The challenge of a local university operating globally

What does a modern teaching and learning facility, which is part of a global institution of higher learning, need to have to stay in touch with its partner campuses in other parts of the world? The internet of course; no prizes for guessing! But if you were to ask officials at Aga Khan University (AKU) of Tanzania, it is not just the internet, but what matters is the source of the service.

## Making the difference

Since 2012 when AKU, a private university chartered in Tanzania with a presence in other countries including Kenya, Uganda, the UK, Pakistan and Afghanistan, was connected to the Tanzania Education and Research Network (TERNET), collaboration between the university and its sister

institutes flourished, enabling students, researchers, staff and faculty members to share teaching and learning resources in real time and cost-effectively.

In Tanzania alone, AKU has four entities: the Institute for Education Development East Africa (IEDEA), the School of Nursing and Midwifery (SONAM), Faculty of Arts and Sciences (FAS) in Arusha and the Medical College (MC). The availability of a reliable internet service provider (ISP) was fundamental to enable these entities to coordinate their activities, but not easily attainable for AKU.

## Seamless communication and learning across borders

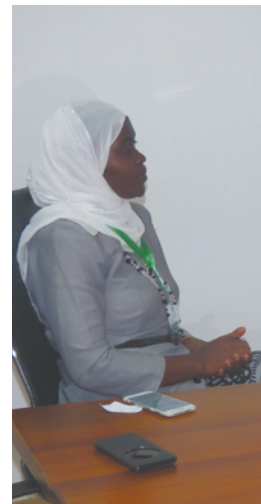
Now boasting at least 10Mbps of fast, dedicated and reliable bandwidth from TERNET, Fabian says that research and education networking and collaboration at AKU Tanzania is no longer the

same, as TERNET's connectivity is seamlessly supporting the university's IT infrastructure, allowing teachers and students to virtually traverse across universities and collaborate through applications such as Zoom, Skype and Moodle - something completely unthinkable prior to 2012. Switching from commercial ISPs to not-for-profit organisation TERNET has also reduced the bandwidth costs by 90%!

Aga Khan University is one of the 67 member institutions of the Tanzanian NREN, a member of the UbuntuNet Alliance which operates the UbuntuNet Network in Eastern and Southern Africa, interconnecting NRENs across the region and to other regional backbones, such as GÉANT.

TERNET was connected to the UbuntuNet network in November last year under the €26.6m EU co-funded AfricaConnect2 project which aims to create a pan- African research and education network by interconnecting the three regional research and education networks of Arab States Research and Education Network (ASREN), West and Central Africa Research and Education Network (WACREN) and the UbuntuNet Alliance in Eastern and Southern Africa.

Find out more at:  
[www.ternet.or.tz](http://www.ternet.or.tz)



**Picture**  
Magreth Mushi  
(CEO TERNET)  
and Arbogast  
Fabian (AKU  
Tanzania IT  
Manager)





**“Before connecting to the TERNET network we were struggling to collaborate effectively with our key partners in other countries – we were getting only 2Mbps from our ISP and were paying at least \$800 per megabyte per month. Despite the high price, the bandwidth speed was so slow and we were lagging behind our partner universities. It was also hard for us to reach out to our colleagues abroad,”** says Arbogast Fabian, AKU Tanzania IT Manager who has been at the institution since 2011.



# THE REBIRTH OF GARNET – RECONSTITUTED BOARD INAUGURATED

The idea of creating a Research and Education Network in Ghana was conceived in 1995 by the Association of Vice Chancellors of Public Universities. The REN was to be named the Ghanaian Academic and Research Network (GARNET) and was officially incorporated as a legal entity on 24 August 2010, as a not-for-profit Company Limited by Guarantee. The idea however, remained dormant until 2016 when it was revived with the objective to facilitate effective integration of ICT into higher education's core mandate of teaching, learning, research and information management.

Just this summer, a reconstituted governing board of GARNET was inaugurated in Ghana's capital city Accra. The board is chaired by Professor Clifford Nii Boye Tagoe, Former Vice Chancellor of the University of Ghana and also former Chairman of the Governing Council of the National Council for Tertiary Education (which is the regulatory body of tertiary educational institutions in Ghana).

Inaugurating the Board, the Minister of Communications, Mrs. Ursula Owusu-Ekuful, underlined the need for universities and tertiary institutions to put in place the right information and communication technology as well as ICT infrastructure to take advantage of opportunities being created by the government in the digital space. She announced that the National Communications Authority (NCA) has resolved to pay all the membership due by all universities that would subscribe to the International Telecommunications Union (ITU) platform, to facilitate the sharing of ideas and experiences with other researchers across the world. Mrs. Owusu-Ekuful urged the GARNET board to work hard to bring many more institutions and researchers onto its network to consolidate the achieved gains.

Professor Salifu, the Executive Secretary of the National Council for Tertiary Education (NCTE), who deputised for the Minister of Education, announced that the government is sourcing USD 120 million from the World Bank to establish centres of learning in tertiary institutions in Ghana. The initiative will be implemented over the next five years and will run alongside the National Research and Innovation Fund.

In his acceptance speech, the incoming chairman emphasised the importance of education and research as key to the development of every nation.



He described education as the universal equaliser which the United Nations consider a right and must be accessible to all. He expressed his delight that GARNET comes at an opportune time to help address the connectivity and access challenges to global education and research resources. He also sees it as an opportunity for institutions to adopt more virtual teaching and learning techniques to address the anticipated large increases in student enrolment in the wake of the Government of Ghana's Free Senior High School Education Policy.

The current membership of GARNET includes 10 public universities. Efforts are underway to encourage all other accredited public and private tertiary education and research institutions to become members. Negotiations with selected service providers are in the final stages to establish a 10Gbps pipe between the GARNET POPs in the capital Accra and Kumasi, about 300 kilometers apart. In addition, connectivity from GARNET members to the POPs will be via dark fiber. GARNET has established a 10Gbps link to WACREN to receive services for members. The WACREN testing of the link is currently ongoing.

On 8 August 2018 GARNET CEO Peter Kaba and WACREN CEO Boubakar Barry signed an MoU to formalise the hosting of the next annual WACREN Conference which will be held in Accra, Ghana. The NREN also connected the GARNET network to the WACREN backbone and became the first country in the region to establish a path for its community to the global R&E networking community.

## Words

Peter Kaba,  
GARNET CEO

## Picture

Boubakar Barry,  
WACREN CEO  
(left) and Peter  
Kaba, GARNET  
CEO

Find out more at:  
[www.wacren.net](http://www.wacren.net)  
[www.garnet.edu.gh](http://www.garnet.edu.gh)



# TECHCARE: MEET LEBANON'S NREN

## Joining the global R&E networking community

In 2016, Lebanon established access to international R&E connectivity: with support from GÉANT and the Arab States Research and Education Network (ASREN), the American University of Beirut (AUB) allocated 10 Mbps of its existing internet bandwidth to an ASREN link terminating in London, from

where it interconnected with GÉANT, thus providing AUB with international R&E connectivity. Driven by demand and with support from the EU-funded EUMEDCONNECT3 project, that link has been progressively upgraded to 1.4 Gbps with plans of a further boost to 5 Gbps.

AUB has also been the driving force behind efforts to establish an academic network infrastructure in Lebanon, culminating in five academic institutions recently reaching an agreement on

the creation of a Lebanese NREN. On 28 May, the five universities - AUB, Beirut Arab University (BAU), Lebanese American University (LAU), Holy Spirit University Kaslik (USEK) and University of Saint Joseph (USJ) - signed the Technology Cooperation Agreement for Research and Education (TechCARE), taking a significant step on the rather complex journey towards the creation of an NREN in the country.





## Thinking outside the box

The traditional NREN approach of creating first the network and subsequently building in services to create momentum and facilitate cooperation among participating universities proved impractical in Lebanon – not least against the backdrop of prohibitive bandwidth tariffs and competing communal and political interests.

To Yousif Asfour, AUB's chief information officer – the driver of the TechCARE initiative – it was clear that the process needed to be reversed to secure the commitment of a critical mass of institutions across the country. Thus, taking the services development road was the answer, with value-added services such as eduroam and eduGAIN being deployed successfully and at low cost since 2015. Discussions are now underway with GÉANT and ASREN to further expand the services offering to member universities and their researchers and learners.

**Picture**  
TechCARE agreement signatories: Father Prof. Georges Hobeika, President of Holy Spirit University of Kaslik (USEK); Dr. Amr El-Adawi, President of Beirut Arab University (BAU); Dr. Fadlo Khuri, President of the American University of Beirut (AUB); Prof. Salim Daccache s.j., Rector of Saint Joseph University (USJ); Roy Majdalani, Vice President for Human Resources and University Services of the Lebanese American University (LAU).



**“Instead of trying to build the physical network so that we can build the services and then collaborate, we decided to start collaborating so that we can build the services, and then we can build the network. We flipped it around.”**

Dr. Yousif Asfour, AUB's Chief Information Officer

## An NREN in action

Since the agreement signing a network backbone for exchanging data and services between the TechCARE members was established. One of the first collaboration projects is the interconnection of the five universities' libraries and their services, including the development of a shared library catalogue.

A cross-university team is also looking at sharing “expensive research resources” among the universities. Their first task is to explore how the Beirut Arab University telescope can be connected to the NREN so that researchers across TechCARE can utilize this resource. Another focus is providing access to shared HPC resources over the backbone.

TechCARE is also a learning and sharing community. Efforts are underway to build a centre of excellence between the members to pool and share development resources in order to build capacity for missing talent, such as Banner skills.

Last but not least – TechCARE is chasing the rest of the universities in Lebanon, including the Lebanese University - the country's largest and only public university - to join the group, so that it can grow into a truly inclusive NREN.

## Securing a place on the global research map

TechCARE has still some mileage ahead before it can effectively support bandwidth-hungry national and international R&E collaborations, such as in astrophysics. However, putting an NREN in place has the potential to enhance Lebanon's academic research standing in the region and the rest of the world and to enable and expose talent among students and researchers.

To deliver on the connectivity front, TechCARE will be able to continue benefitting from the EUMEDCONNECT3 funding support.

Find out more:  
[www.eumedconnect3.net](http://www.eumedconnect3.net)



# SEAMLESS IT FOR LIMITLESS RESEARCH





# INTEGRATED INFRASTRUCTURE PLATFORMS FOR DEMANDING RESEARCH PROJECTS

Dimension Data is a leading global systems integrator and managed services provider that can provide integrated cloud platforms, connectivity, security, and operational management for even the largest, most technically demanding research programmes.

Think of us as integrators and orchestrators of multi-domain research ecosystems. We can integrate your on-premise high-performance computing (HPC) resources with open research clouds, our own cloud, and hyperscale public clouds to form a seamless IT environment for your research.

## Ecosystem management

Our management capability uses microservices and open APIs to orchestrate hybrid environments and automate workloads, independent of the underlying infrastructure. We can secure data at rest and in motion in every domain, and we operate automatic backup and disaster recovery services across multi-cloud environments. Our own cloud platform is provided in conjunction with our parent company NTT. It offers highly secure private and virtual private platforms, and holds numerous information security and data protection accreditations.

With Flash technology for rapid data retrieval, it constitutes an ideal repository for securely storing reusable data under the FAIR principle, on a cost-effective consumption-based commercial model. We can control the physical location of data across our global cloud platform, assuring researchers of compliance with data sovereignty regulations.

## High performance connectivity

Our global WAN is integrated with our data centres by software-defined everything (SDx) technology. This can be extended to computing resources on a research institute's own premises as well as to the hyperscale public cloud providers in their ecosystem. This capability allows research communities to enjoy flexible allocation of IT resources, in an automated manner.

We can connect multi-domain HPC environments with high capacity, low latency networks, and for less-extreme environments, we offer highly efficient and economical software-defined hybrid WAN.

### Words

Dave Heyns,  
Group Sales  
Director  
Education and  
Research —  
Global Business,  
Dimension Data

### Picture

Alma radio  
telescope.  
Image credit:  
ESO/B, Tafreshi  
(twanight.org)

## Everywhere you are

We have data centres in 140 countries and our global network reaches 190. In Europe, our services are accessible through the GÉANT framework, and our platforms have a direct connection to national research and education network (NREN) organisations.

In Europe, we operate cloud platforms in Germany, the Netherlands, and the UK, and so are able to guarantee data sovereignty to researchers in these particular jurisdictions.

We invite institutions in Europe and throughout the world to engage directly with us. We have local teams in every region and sector specialists available to help. Email us at [educcloud@dimensiondata.com](mailto:educcloud@dimensiondata.com) to discuss how our services could help you achieve your institution's research ambitions.

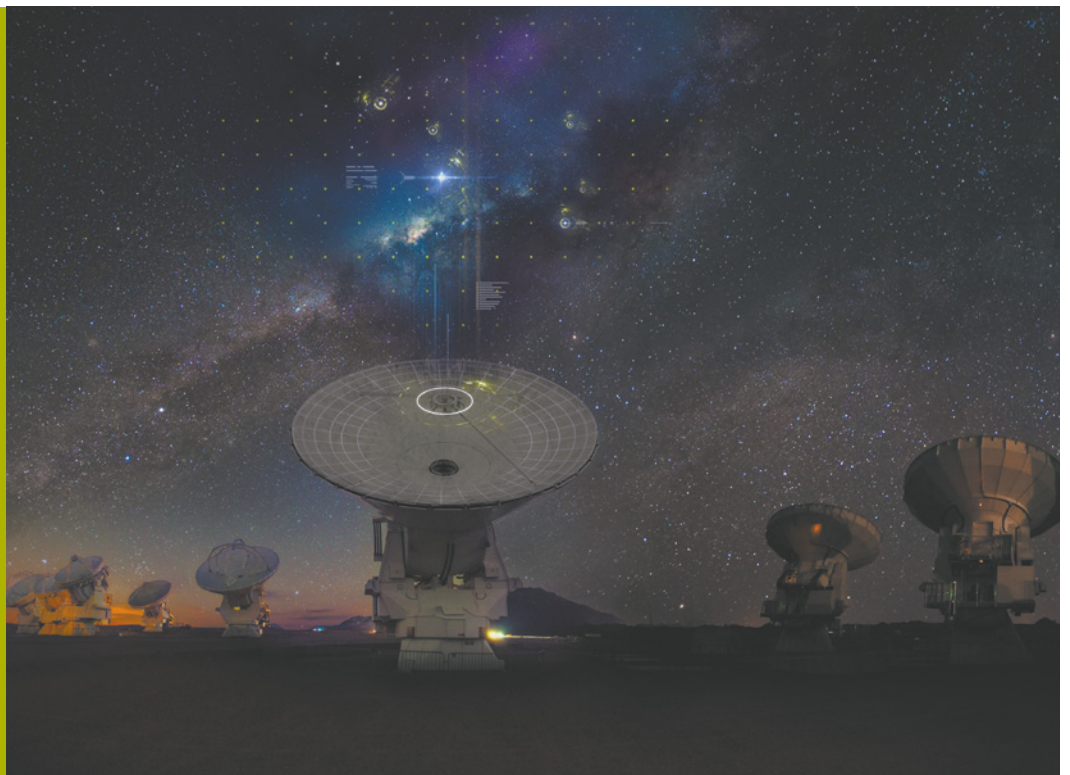
## Connecting researchers to data

The Atacama Large Millimeter/submillimeter Array (ALMA) is the most complex astronomical observatory ever built.

Dimension Data provided ALMA with a managed network to securely relay the massive amounts of data generated by the telescope from its remote location 5,000m above sea level in the Atacama Desert in Chile to scientists across the globe.

'Our goal is to provide the best data possible to the scientific community, and Dimension Data helped us to achieve our goal.'  
Christian Saldia, IT Manager,  
ALMA.

**Watch what our services  
can make possible**



# WHAT'S WRONG WITH THE SWISS ARMY KNIFE?



## HOW SDN CAN DELIVER FLEXIBLE, FUTURE-PROOF NETWORK SECURITY ARCHITECTURE

Swiss Army knives are the quintessential symbol for an all-in-one device. But really they are only as good as the functions that were thought up ahead of time, then added once and for all to the knife.

If you don't buy the one with the scissors, then there's no adding scissors later on when you need them. Network security is no different. Fixed function firewalls, fixed function routers, load balancers and packet brokers are all feature rich but only if the manufacturer designed the feature in (and you pay to turn it on). Handy up until now but not sustainable going forward.

**Words**  
Carolyn Raab,  
CORSA

### Enter the Software-defined Firewall Solution

What we need is a better way to add flexible, dynamic, adjustable security to the network. It's all built on SDN principles and harnesses the dynamic power of SDN service chaining to build out network security that provisions functions virtually – at any scale. It's called a software-defined firewall solution

and it makes you think about the practicality of Swiss Army knives going forward.

### But recall Simply Defined Networking (SDN) core principles

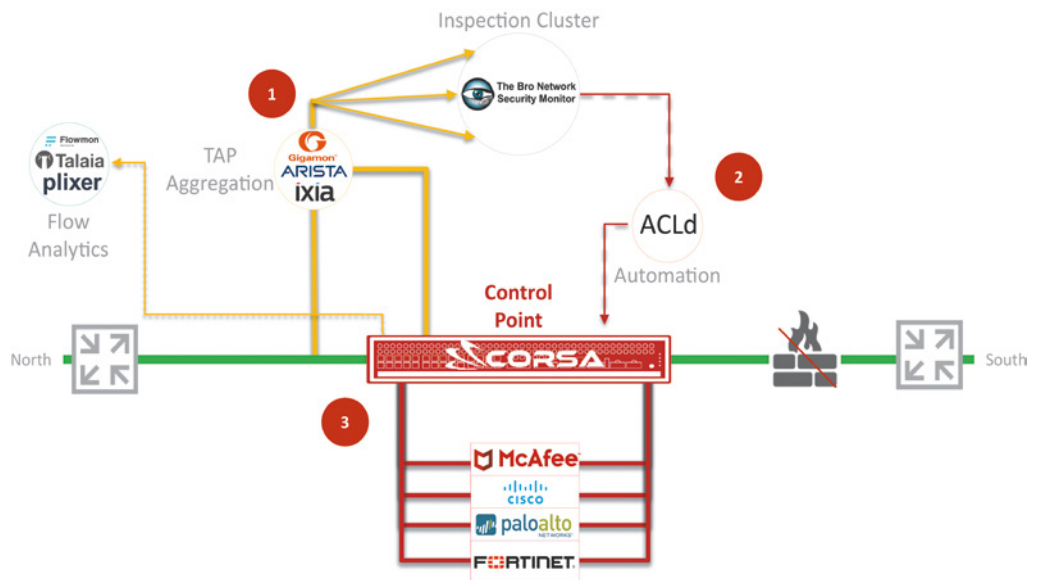
It has to be simple to start. If you have been embroiled in NFV, you know the despair of the sinkhole of service



chaining. We need to avoid that and learn from the important lessons of SDN in the networking space. So before creating the Nirvana of network security function service chaining that will ultimately be your software-defined firewall architecture, begin with basic firewall offload. Take your network gateway as an example where, in so many cases, the firewall is running hot and there is no relief in sight. Adding more deny rules is not an option. Because it's more or less a fixed function, your choices currently are to keep rushing from emergency to emergency as your firewall overheats, or to spend money and move to the next size of firewall. But consider moving to software-defined firewalling, where Step 1 is to offload your current firewall with a programmable, in-line control point sitting just ahead of your firewall that acts as a pre-filter to the firewall (you can call it 'The Hammer'). And then over time evolve your network security capacity by adding dynamic software-defined security functions as an extension of that same programmable control point.

## Steps 1 and 2 of a Programmable Network Security Architecture

Too much time in SDN and NFV is spent on theory. Let's consider a specific software-defined firewall architecture and start with Step 1 which is the simplest, most economical approach to vastly reducing your network exposure to the Internet's badness. For this step you need traffic inspection and it can be what you currently have in place. Bro Network Security Monitor provides an effective, scalable open-source inspection engine that is able to horizontally scale to any size network. Typically, traffic is replicated in the network using simple and economical optical taps. Then it is fed into a Bro cluster via tap aggregation infrastructure. For those wanting more information, there are multiple existing solutions on the market and best practices for building tap aggregation infrastructure as well as deploying Bro clusters. If desired, other inspection technologies can be used, both open-source and commercially available. Next is step 2 when you need the ability to block traffic ID'd as malicious by your BRO analytics. CorsaNSE7000 is a unique device on the market that is able to block every possible IPv4 entry using its GigaFilter ACL without compromising speed or performance. NSE7000 is controlled via simple REST API which allows for full automation of enforcement from a Bro cluster using ACLd. This two part approach is a high performance yet cost effective way to protect any size network without compromising throughput that works for high speed links with or without existing firewalls.



## Evolve at your own pace

Steps 1 and 2 get you extremely effective gateway enforcement while you begin your next phase of network security. Optionally, there is a mid-step for network and security architects looking to improve the accuracy of their anomaly detection and analytics. The NSE7000 Control Point is able to feed unsampled IPFIX data to up to 4 collectors simultaneously. This provides additional visibility for security teams at the level they haven't had before at no additional cost.

### 3-Steps to a Software-Defined Firewall Architecture

Step 3 is where the major benefit of this new security architecture really takes hold. It is the ability to horizontally scale other in-line inspection devices. You no longer need to buy a bigger in-line device every few years, but rather you can add more devices as needed. NSE7000 supports service chaining of both physical and virtual appliances. It can redirect traffic into up to 512 different service chains based on any Layer3/Layer4 policy. At the same time, NSE7000 can symmetrically load balance the traffic in both directions between up to 128 instances of the inspection appliance within each service chain. So physical and virtual IPS, NGFW or SSL Visibility appliances can all be incorporated into this architecture without compromising speed or performance of the network.

## Start Simple, Stay Simple: 1-2-3

The NSE7000 acts as an enforcement point, a traffic visibility and monitoring point as well as a redirection point for service chaining. Because it sits as a transparent in-line device inserted into the network, these different

functions can be turned on separately and independently over time, without requiring any redesign, or network re-architecture.

When network security is built up on a software-defined platform, it is inherently programmable. This programmability can start simply with a pre-filter function and be expanded over time to increase functionality and add new features in service chains. This is the beauty of a software-defined firewall architecture because it eliminates the need to define all your features up front and have them baked in to the Swiss Army Knife. It allows for dynamic, scalable security that evolves programmatically with changing threats.

Find out more at [corsa.com](http://corsa.com)

## Carolyn Raab

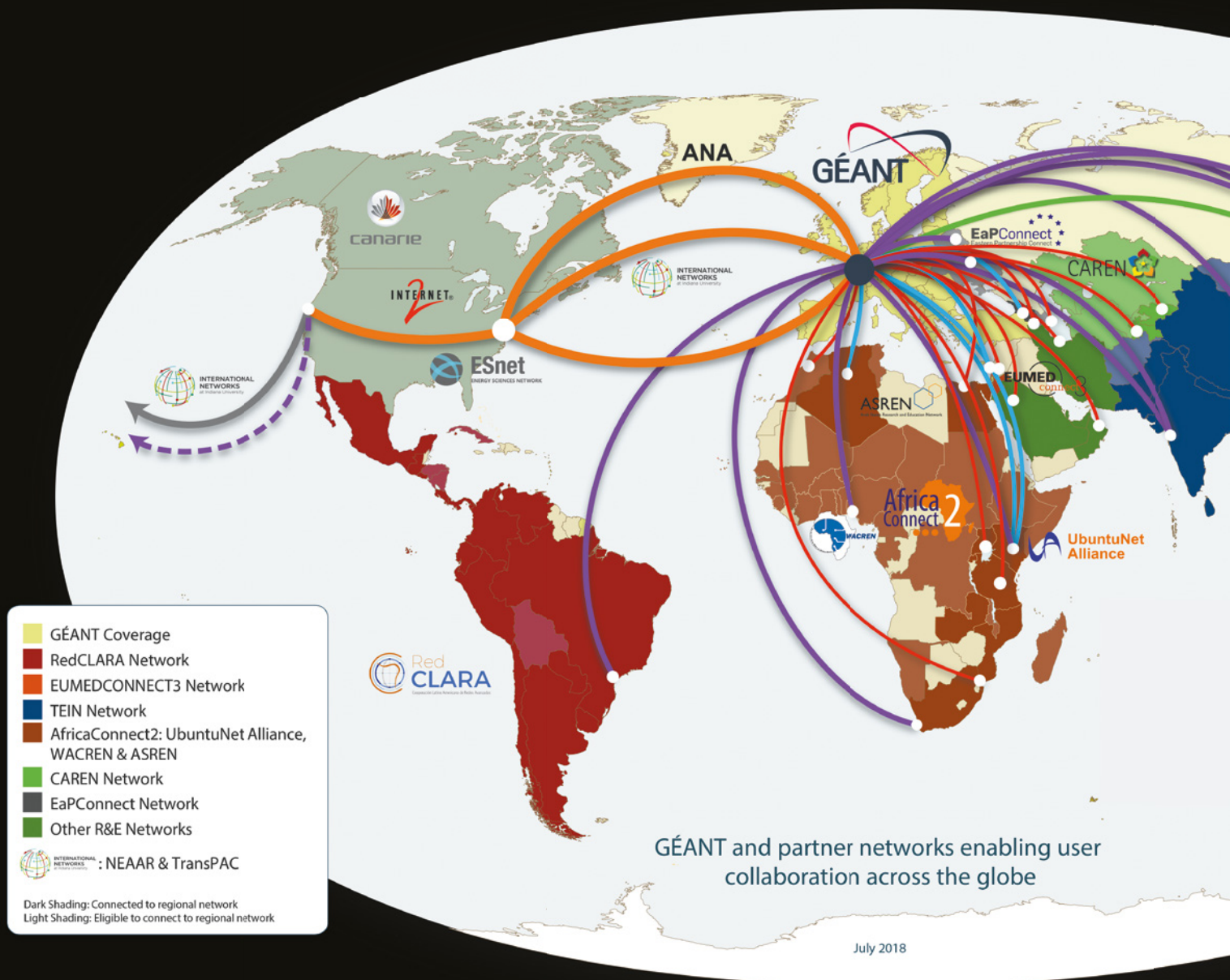
With over 25 years industry experience in the networking and communications industry, Carolyn brings to CorsaNSE7000 product management, sales, marketing and business development experience in networking and security markets. As a co-founder at CorsaNSE7000, Carolyn has enjoyed all the twists and turns 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.

# 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.



**Join the  
conversation**



[www.geant.org](http://www.geant.org)



[www.facebook.com/GEANTcommunity](https://www.facebook.com/GEANTcommunity)



## Networks

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

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

## Services

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

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

## 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.

## People

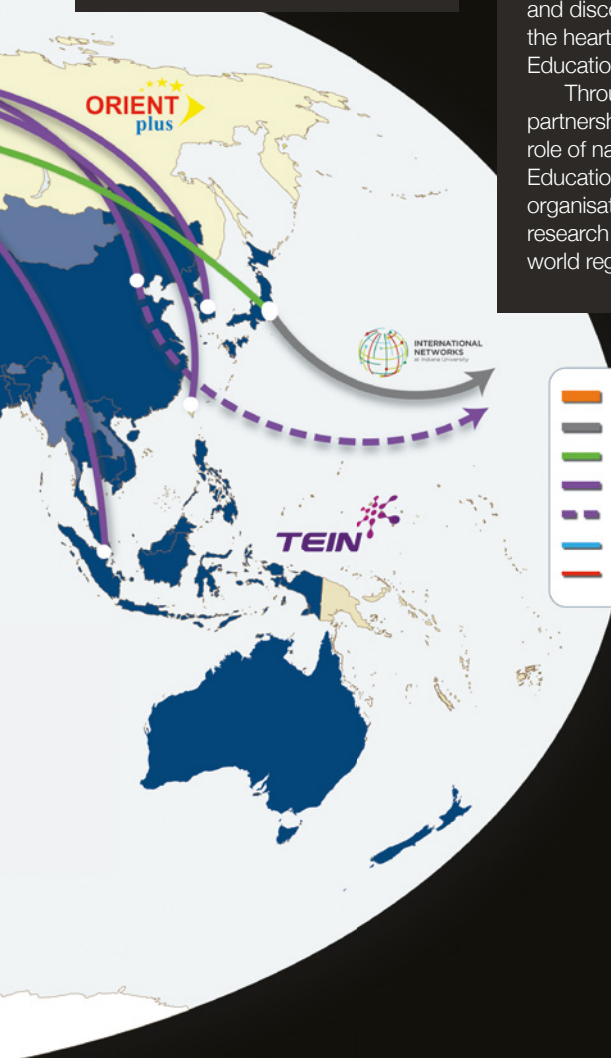
GÉANT collaborates with its members, partners and their research, education and innovation communities to drive research and discovery, keeping Europe at the heart of global Research and Education networking.

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.

## 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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