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CONNECT

THE MAGAZINE FROM THE GÉANT COMMUNITY

The SOTEU and Why it Matters

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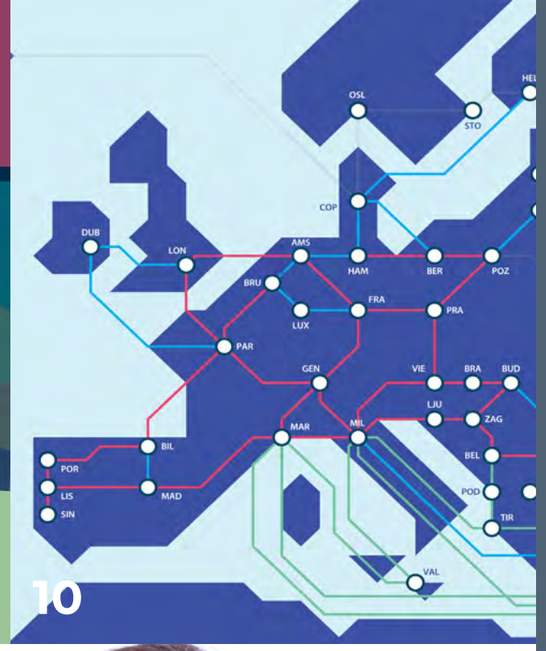

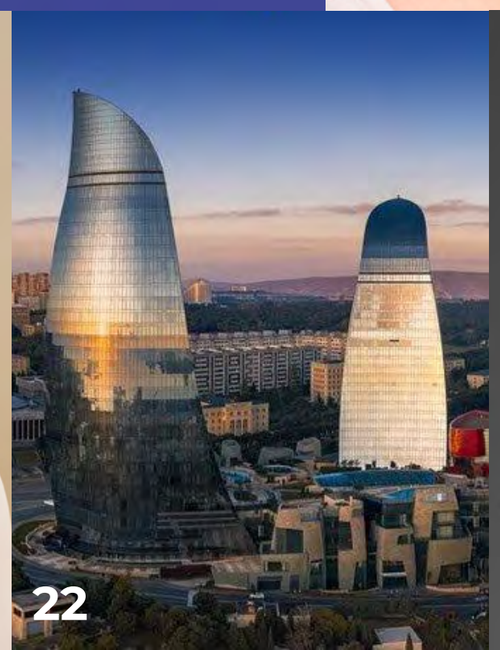

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Welcome from Cathrin Stöver

In a similar way to many in our community, GÉANT is on a path from a very engineering driven organisation, having first successfully adopted a procurement and project management focus, and more recently towards an organisation which increasingly keeps an eye on policy developments. In our case, the developments happen mainly in Brussels, with very visible spill-overs into national policy environments. We follow, among many others, the Data Act, Secure Connectivity, EU Digital Identity, NIS2, CER, and the Digital Decade initiative.

So, it was a natural next step for my colleague, Hendrik Ike, to watch Ursula von der Leyen's State of the European Union Address last month and to consider why this speech was actually far more important to GÉANT and the R&E networking community than one might think. Hendrik's thought-piece can be found on page 2. In a similar vein, Nicky Wako (page 4) asks African NRENs to take their long-overdue seat at the policy table, following the recent African Union calls for the development of NRENs in every country on the continent. It's a real call to action now.

We have been interviewing our community pioneers for various recent publications in CONNECT, and I am very pleased that in this issue we catch up with Margaret Ngwira in Malawi - an early pioneer of the MALICO VSAT network and of course the UbuntuNet Alliance (page 5) - and with Jan Gruntorad, whose career is dedicated to R&E networking in the Czech Republic, being the father of the Czech internet and of course in Europe serving as a reminder that we all stand on the shoulders of giants (page 6).

Another set of articles that have caught my attention are on the state and constant progress of the GN4-3N network rollout (following the launch of this latest generation of the GÉANT backbone in June during TNC22), the incredible speed that eduGAIN is increasing its geographic coverage, and a view on how Artficial Intelligence will be changing our children's class-rooms.

As always, the GÉANT CONNECT magazine wonderfully highlights the breadth and the depth of activities in the European and global R&E networking community.

I hope you enjoy reading this issue!

Cathrin Stöver, GÉANT

CONNECT is the magazine from the GÉANT community; highlighting the activities of Europe's leading collaboration on e-infrastructure and services for Research and Education.

The Team Behind CONNECT

Reflecting the breadth of our community, the articles you read in CONNECT are contributed by a wide range of people from the GÉANT Association, the GN4-3 project, and from our NREN and regional partners. The planning, production and editing is performed by a small team highlighted below.

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The SOTEU and Why It Matters

On 14 September 2022, European Commission (EC) President Ursula von der Leyen delivered the annual State of the European Union address, or SOTEU. It was arguably one of the most important speeches delivered this year for European citizens, businesses, organisations, and Member States, due to an increasingly hostile geo-political environment and major economic challenges. It also delivered not just key messages for GÉANT and National Research and Education Networks (NRENs) to consume and understand but also highlighted the growing relevancy and salience of our community within Europe.

Words: Hendrik Ike, GÉANT

From the outset, the speech was governed by three overriding themes: the Ukrainian conflict, the global energy crisis, and safeguarding democracy, with a particular focus on their impact and effect on today's generation of children and youth. Combined with a package of legislative interventions released on 18 October, the EC is aiming to protect and develop the continent in several ways. This is not the first time that von der Leyen has had to deal with crisis, and whilst she has already reached the third year of her premiership, legislative interventions are only on the increase. But why do these interventions matter to our community?

A Europe fit for the Digital Age – definitions and demarcations

In her original Political Guidelines, von der Leyen stressed the need for Europe to lead the transition to a healthy planet and a new digital world. Since then, many files have been set in motion and are close to finalisation – the Data Act, Secure Connectivity, EU Digital Identity, NIS2, CER, and the Digital Decade initiative, as examples. The brisk implementation of these initiatives will be the primary task of the Commission.

Picture
Top right: General view of the European Parliament hemicycle with Ursula von der Leyen, in the centre.
© European Union, 2022.

Bottom right: Hendrik Ike, Public Affairs Officer, GÉANT

However, new proposals are forthcoming that were matched and published alongside the SOTEU address. These include the Cyber Resilience Act, an Artificial Intelligence Liability Directive, and a proposal for an EU cyber defence policy. There are also plans for an upcoming Connectivity Infrastructure Act.

The EC's attempts to shore up and secure its ongoing digital initiatives are increasing in speed due to global volatility. A part of this means securing current European assets, including digital ones. The aforementioned legislation will bring in rules and standards for organisations to increase their level of digital security, and GÉANT and the NRENs will be included within that fold. To what extent, is being closely monitored by the EU Liaison team at GÉANT.

Although already in motion, external-facing initiatives will also be prioritised in the name of digital sovereignty. The Global Gateway, the EC's trade strategy to form hubs at the corners of Europe where trusted connections are to be made with partner countries, will be hugely important in this area. In the digital sector, the original aim was to help partner countries address the digital divide and help further integrate them into the global digital ecosystem. But between the

lines, it is clear to see that this is a strategy designed to form a secure number of inter-regional doorways that will augment European data security and access methods. As such, there is the desire from the Commission to begin the demarcation of Europe's digital boundaries to protect the Digital Single Market, and it is inevitable that this will affect GÉANT and the NRENs over the coming years, when the concern of research and education comes into play – be that from a security services perspective or when looking at future connectivity projects.

The Digital Single Market – a 'Schengen for data'

The SOTEU address also firmly recognised the economic hardship enveloping the continent. Numerous plans were announced to help citizens and business cope with the rising cost of living crisis, which aim to bolster the already active Recovery and Resilience Facility that came into force last year, a key funding feature that was originally designed to finance reforms and investments in Member States during and following the COVID-19 pandemic. But more importantly, the Commission stated that considering recent events, it would review the way it coordinates and distributes funding. An example of this is a potential mid-term revision of the Multi-annual Financial Framework (MFF) – the key seven-year funding mechanism by which all European Union money is spent. There is also going to be an Economic Governance review that will impact the Stability and Growth Pact with more simplified rules and possibly increase the debt ceiling.

Also introduced is a European Sovereignty Fund and increased contributions to Important Projects of Common European Interest (IPCEI) such as batteries, hydrogen, semiconductors and their raw materials, and solar energy. The fund would complement the MFF (i.e. be outside of it) and is planned to be financed by common debt.

So, the Commission has economic plans, and digitisation is a key element of them. As the single market has been realised, so now is the beginning of the realisation of the Digital Single Market. A conceptual 'Schengen for data', the Commission is looking to pool both public and private data within Europe more effectively. As data is being viewed as less of an output and more of a resource with value, the Commission is looking to enhance the hybrid data created in Europe in order to stimulate the European economy at large. It hopes that this vision will be enabled via the creation of the Common European Data Spaces – or CEDS – that are thematically grouped in different 10 areas: the Green Deal, Health, Energy, Manufacturing, etc. The European Open Science Cloud (EOSC) is also classed as one of these spaces. Questions on how these spaces will be implemented, and to what extent our community is or will be involved, are growing.

As the sands of European digital and economic policy shift, so are the conversations being held across GÉANT and NRENs on such matters. Where do our connectivity and services sit? How do these policies translate nationally? Is the digital single market an opportunity for our R&E community, or a threat? Unfortunately, the answer is normally both, and things remain far from clear. What is clear, however, is the need to carefully monitor how these policies develop.

Pictures
Top left: State of the Union Address 2022 by Ursula von der Leyen, President of the European Commission. © European Union, 2022.

Protecting Democracy and the Role of Our Institutions

Ursula von der Leyen has made it clear that the institutions and governments that protect the European way of life are vulnerable. This is particularly relevant for GÉANT and NREN end-users – for example, research centres and universities have never faced so much pressure in remaining independent to the interests of third parties. In the boldly titled Defence of Democracy package, there are measures designed to protect European institutions, and that will include universities and research centres. Some existing legislation complements and arguably already falls under the package. The Digital Services Act is one, a regulation that, among other things, aims to ensure that online intermediaries and online platforms in particular are covered by one set of horizontal rules across the EU. The DSA includes rules on content moderation, as well as specific obligations for the transparency and accountability of the advertising systems of online platforms.

Clearly, NRENs and the services they provide to end-users can be affected by this. As per usual, it is ***the unknown*** that brings about guesswork and speculation. Von der Leyen also called for a new European Convention during her speech. Treaty change is serious, and especially so when it deals with the rights of European citizens. She understands that the balance between our real and digital lives is shifting and is therefore looking to safeguard planned European Digital Rights and Principles. How NRENs and GÉANT play a role in protecting these from an R&E perspective will need to be understood and illustrated in order to complement the Commission's efforts in this area in the future. This is also in line with the European Research Area's actions on academic freedom and numerous indicators and targets that fall under the United Nations' Sustainable Development Goals.

Conducting such measures are also a useful exercise with regards to risk avoidance. To understand how our community will play its part in safeguarding the rights of researchers and educators also negates future reputational damage should our end-institutions face third party threats. And so the subject of security returns – the subject that coursed within Ursula von der Leyen's address and throughout the European Parliament.

More Than a Feeling – a Matter of Perspective

Listening to or reading von der Leyen's address will mean many different things to many different people. It will also mean different things to different Member States. As easy as it could be for one to become emotional over the subjects she raised during the speech, it was clear throughout that the work of our community is very much aligned with the greater good that von der Leyen described. Thematically, the areas covered highlighted how invaluable NRENs and RENs are. Whether it is the urgent need to find new energy solutions, researching the impact of climate change on our planet, or investing in education for the next generation (another strong aspect of her speech), it was at moments hard to imagine how many of the Commission's ambitions could be met ***without*** the infrastructure provided by our community for end-users.

As such, this was therefore a speech that not only highlighted what initiatives will impact NRENs and GÉANT, but also re-affirmed how valuable the community is – if you are aware of it. Hence, the speech also brought about a question of perspective. A policymaker in the Commission who is aware of the GÉANT/NREN ecosystem will be at ease in knowing how and where our infrastructure aids their vision. If they're not, they're not, and that can be harmful when we see planned future work programmes or projects that have the potential to duplicate the community's work for little extra benefit. It is therefore in our joint interest that NRENs and GÉANT invest an appropriate amount of effort when attempting to understand future requirements, initiatives and projects, and relay feedback and concerns back to policy makers, both at the national and European level. This is already seen at different levels of our ecosystem and is directed at different actors or ideas. Be the focus on EOSC, EuroHPC, Quantum, International Connectivity, or our own GN5 project, all tiers of interaction are necessary, and so engagement is needed on policy, with partners, and with engineers and scientists on the ground. This 'upstream' – 'midstream' – 'downstream' approach can help ensure the sustainability of GÉANT and the NRENs for decades to come.

To End on the Future

It could be easy to interpret von der Leyen's speech as reactive – or misconstrue it as a holding action for what is a very complicated regional crisis. Yet it also demonstrated that the need for NRENs and GÉANT has never been greater. To ensure continued success, a combination of hard work, reciprocal trust, and community spirit will be needed from both within our ecosystem and when working with external partners and policy makers. Should that be the case, and that GÉANT and the NRENs voice their importance to key constituents and stakeholders, then our future has been plainly laid out by Ursula von der Leyen to our community – it can be as promising as we wish it to be.

A seat at the policy table

African Union calls for development of National Research and Education Networks in all member states.

Words: Nicky Wako, GÉANT

With exponential population growth, Africa is projected to reach 2.4 billion people by 2050 whilst plagued by many challenges, including unequal access to quality education. According to UNICEF, more than 15 million children are out of school in the Horn of Africa alone: a staggering figure with a ripple effect impacting employment, migration, health, and research output.

The African Union (AU) notes that although there is a significant increase in enrolment due to the global prioritisation of, and investment in, education it "masks huge disparities and system dysfunctionalities and inefficiencies" in education subsectors such as technical, vocational, and research, which are severely underdeveloped. These dysfunctionalities and inefficiencies also contribute to Africa's present statistic of having 350 researchers per million people compared to more than 4,000 for North America and Western Europe[1] - a statistic that clearly leads to Africa having less than 5% of the world's research output.

The availability of connectivity, and access to it, has significantly progressed over recent years thanks in part to the European Union-funded AfricaConnect3 project, supported by GÉANT and implemented by project partners the Arab States Research and Education Network (ASREN), the UbuntuNet Alliance, and the West and Central African Research and Education Network (WACREN).

These three Regional Research and Education Networks (RRENs) have over a decade of experience in providing a growing number of Higher Education institutions with connectivity and helping to expand the number of end-users. Together with 38 National Research and Education Networks (NRENs) across Africa, they interconnect over 1,900 institutions and over five million end-users, and are instrumental to unlocking the digitalisation of Africa's research and education (R&E) sectors.

However, tertiary education and research institutions in Africa are still among the least connected in the academic world, a situation that is particularly critical for landlocked countries as their R&E communities are burdened by the excessive cost of connectivity, a problem compounded by the presence of telecom monopolies or market dominance by a single player, and a weak regulatory environment.

The long overdue seat at the policy table

To address the imminent challenges the African continent faces and to achieve the targets of the African Union Agenda 2063, investing in human capital is paramount in order to lift people out of poverty and enable African citizens to contribute to the global quest for solutions through tertiary education and research sectors.

In the past year, the AfricaConnect3 project partners - ASREN, the UbuntuNet Alliance, WACREN, and GÉANT have contributed to the Continental Education Strategy for Africa through meetings and by reviewing documents. The strategy establishes a framework for the digitalisation and acceleration of adoption of digital technologies for Education in Africa, including the development, strengthening, and sustainability of 54 NRENs.

The strategy was finalised on 15 July 2022, with the African Union convening the 4th Ordinary Session of the Specialized Technical Committee (STC) on Education, Science and Technology with the African Ministers responsible for Education. During the meeting, the African Union Digital Education Strategy was adopted and launched alongside the Transform Education Summit in New York on 20 September 2022. The strategy document calls for ASREN, the UbuntuNet Alliance, and WACREN as partners to provide expertise and experience in implementing the NREN objective.

The way forward

The RRENs and NRENs consistently prove that on a continent where so many issues are too often a priority, they are the lifeline for the R&E community. Their agility, innovative solutions, and ability offer an attempt to level the global playing field and they deserve political, social, and economic support.

However, a lack of political recognition and support has long hindered the progress of the NRENs on the African continent and the securing of a sustainable funding pipeline. With the strategy and its adoption by the Heads of State and national agencies, the African RRENs and NRENs now have pan-African political recognition that can be leveraged not only to cultivate inroads to funding, but to engage in high-level policy discussion, and to claim their rightful seat at a policy table where multi-sectoral, multi-stakeholder discussions and decisions take place.

For the RRENs and NRENs, accessibility, affordability, adaptability, and connectivity must be at the centre of the dialogue to ensure that African students do not fall behind and that the African R&E community continues to contribute to the global quest for the betterment of humanity.

More information about the activities and objectives of the AfricaConnect3 project and its Partner RRENs and NRENs can be found on **https://africaconnect3.net/**

[1] UNESCO Institute for Statistics Fact Sheet No. 53, June 2019 FS/2019/SCI/53, data from 2016

CONNECT Interview:

Margaret Ngwira,

former Head of Secretariat of the UbuntuNet Alliance

Margaret Ngwira, former librarian and founding member of the Malawi Library and Information Consortium (MALICO) and MAREN, the NREN for Malawi, has been at the forefront of the establishment of the UbuntuNet Alliance (UA) – the only woman in a team of five pioneers – and is now running a small fruit winery in Malawi. Her most recent achievement is the Presidential Zikomo Award from the Malawian State House for her dedication and work in ICT for a librarian foundation.

Here she tells us about her career achievements and her role in establishing the region's network infrastructure.

Interview by: Silvia Fiore, GÉANT

Margaret, after an innovative career in agricultural librarianship which culminated in the installation of the MALICO VSAT network, you became College Librarian at Kamuzu College of Nursing in Lilongwe and then Head of Secretariat as well as Director of the Board of the UbuntuNet Alliance. Here, you played a key role in establishing the Regional Research and Education network for Eastern and Southern Africa, UA.

Tell us about this successful career of yours, and what it meant to you to be at the very heart of building the region's network infrastructure.

Since the very start of automation in libraries in Malawi in the late 80s, I was immersed in applying it to enhance information services for our academic and research community. We had one of the first agricultural databases on CD-ROMs in Africa, the first fax machine in the University of Malawi, and funds started coming in to build databases in areas like soil fertility in maize-based cropping systems.

After a short stay in Namibia, where I led a talented team working to establish the University's new Agriculture Library Network, I returned to Malawi. By then, through the International Network for the Availability of Scientific Publications (INASP), we had access to almost the same amount of online scientific literature as the best universities in the northern hemisphere. However, connectivity was fragile and just too costly to allow for the users to fully benefit from the available resources! And so, I joined a project with the Open Society Initiative for Southern Africa (OSISA) to build the MALICO VSAT network from the north to the south of Malawi to improve connectivity for academia. This took two demanding years working with policy makers, ministers, electricity providers and institutions but we succeeded! I was not at all a techie but had a passion for linking users in need of information with useful resources in a time-saving and efficient way.

Things started evolving quickly across the continent, and by then the EASSy submarine fibre cable was being laid down the East African coast, opening doors to a new way of doing things much more cost effectively! Thanks to my work on the VSAT network, I was identified as a potential founder of UA, which planned on harnessing the potential benefits of the fibre networks that were being laid to give our African academic and research community fair access to this amazing resource that was being taken for granted in other parts of the world!

At that time, the UA had no funding and no home. My College Principal Dr Diana Jere said, "Put us on the map, Margaret". So, for the next two years, the University of Malawi College of Nursing College Library was home to the Alliance, and we obtained early funding from the Open Society Institute (now the Open Society Foundations) and the International Development Research Centre (IDRC).

Throughout your roles at the UA, you have seen the network and the organisation expanding and including always more member NRENs and institutions. How do you see the roles of NRENs and RRENs growing in the near future?

I paraphrase the words of the Swedish Professor Bjorn Pehrson when he made an impassioned appeal for the development of African NRENs around 2005: *"The African student deserves access to the same connectivity at the same price as his/her peer elsewhere."*

Huge strides have been made but there is still a long way to go. The UA members will continue to work nationally, regionally, and globally building on the strength of the network and the developing services. The terrain has changed with the massive growth of social media and handheld smart devices. Therefore, there must be constant awareness and adjustment where necessary to address changing needs. Also, other user communities such as schools may be considered but not at the expense of the core clientele. The unique collaborative nature of the NREN community is a huge strength, not bound by geopolitical boundaries but built on collaboration and cooperation.

In recent years, the African RRENs and NRENs have been focusing on open science and open access initiatives, such as LIBSENSE, with the aim of transforming the way research is done and circulated. This impacts library communities and their work directly. How do you think that these initiatives contribute to the NRENs' mission of facilitating the digital transformation of the continent?

Of course, the NRENs exist to support their user community – academics, researchers, students, and others. Libraries are their partners and their consumers, and greedy bandwidth users! Collaboration is at the heart of all library research and product development. Open science and open access have been a hot topic for 20 years now and it is good to see the NREN community collaborate with the Electronic Information for Libraries (EIFL) organisation that played a significant role in developing library consortia and helping them access e-resources, develop digital collections, and challenge restrictive copyright laws.

Not only are you a pioneer at the UA but also the only woman of the group who spearheaded its formation. What would be your advice to aspiring women interested in pursuing a career in the field?

I was not always the only woman. Professor Iman Abdelrahman of University of Khartoum was Vice Chairperson of the Alliance for several years. She wrote on the UA's newsletter in 2015: *"Home isn't our country! It is our Continent, Africa"*. It was a privilege working with a woman of such wisdom and brilliance. On the same newsletter issue, Dr. Francis Tusubira – former CEO of the UA - reflected on 10 years of the Alliance by pointing out: *"I found a team of five with fire in their bellies!"*. So, it was not about men or women but finding the right people with a passion for change and innovation!

I still follow NREN and RREN activities with interest but no longer have much contact with libraries. My husband passed away in 2018 leaving me with the great challenge of running our small fruit winery! Therefore, my advice would be: "Go for it, ladies! You have all that is needed."

Picture
Margaret Ngwira was awarded in June 2022 the "Zikomo Excellency Award" by His Excellency Dr. Lazarus McCarthy Chakwera the State President, for her distinguished contributions to the ICT sector in Malawi.

CONNECT Interview: Jan Gruntorad, former CEO of CESNET

As part of our interview series on the GÉANT community's internet pioneers, CONNECT reached out to former CEO of the Czech Education and Scientific Network (CESNET), Jan Gruntorad, to learn more about how he became the "father of the Czech internet" and to know more about his legacy at CESNET.

Jan initiated the country's connection to the European Academic and Research Network (EARN) in the early 1990s and, shortly after, established CESNET. In this interview, he gives us an insight into his impressive professional achievements.

Interview by: Silvia Fiore, GÉANT

Jan, because of your work introducing and improving internet services for the research and education community in Czech Republic, you are often called the "father of the Czech internet". We are curious to know how you first became interested in this field and, given the status of Czech networks at the time, if you would have ever dreamed of being at the forefront of such innovations!

After graduation, I worked at the Computer Centre of the Czech Technical University where I focused on data communications. I was working with the mainframe computer of the Soviet Union, with limited communication capability despite the demand from the users pushing to extend these facilities. When I started focusing on this field, in my country there was no other means of communicating and transferring data than by means of telephone network. In 1984, while working full time, I started my PhD studies at the Faculty of Electrical Engineering, where I focused on the digital transmission of data via telephone network using digital modems. When in 1988 I had the opportunity to do a 4-month exchange programme at the Technical University in Copenhagen, Denmark, I was confronted with a whole new reality!

At the beginning it was tricky to integrate there as they thought I was a spy! They were always watching what I was working on, and I didn't even have my own personal work station! I depended on other employees to use their computers. It was here that I saw, for the first time, people typing on terminals during a lecture at a conference, they were answering emails! So, of course, I wanted to get an email address for myself, but unfortunately my stay in Copenhagen was almost coming to an end and, in my country, we didn't have access to the internet yet. This was my introduction to the internet and the start of what then became my life-long commitment!

Fascinating! You started the team that connected the mainframe computer at the Czech Technical University in Prague to the internet, which eventually led to the official opening of internet services in the country in 1992. Can you tell us more about that moment?

It was on my way back from Copenhagen that my team and I started this process. Due to the political turmoil that my region was experiencing in the late 1980s, getting the authorisation to connect our computer to the internet proved challenging. But after a couple of applications, we were finally able to get the authorisation to make that happen in 1990. We got a leased line provided by Czechoslovak Telecom that connected our mainframe computer to Linz, Austria. It was a very slow line (9.6 kbit/sec) which didn't allow the sharing of images and videos, but it opened the door to international connections.

Thanks to some additional funding, eventually we were able to expand the network buying faster modems and more routers year after year! In 1992, we hosted a meeting at the University to inaugurate the connection to all the major cities in the country at the very modest speed of 19.2 kbit/sec and eventually it expanded countrywide in 1993.

Unfortunately, we didn't get any pictures at the inauguration because we really didn't realise the magnitude of what was happening and the impact it would have had in the years to come.

30 years have passed since then, and you are still committed to supporting the Community in Czech Republic and beyond. What keeps you motivated to stay in this field?

I have always liked to work on data communications, modems, and routers. It is my technical background after all. And I cannot stop being impressed by the endless achievements in the field in our community. Since we connected the first line in Czech Republic, the internet speed is now 10 million times faster! I enjoy being part of the evolution of the internet.

From 2003 to 2009, you were part of the Board of Directors of DANTE (later merging with TERENA to form the GÉANT Association). What was your and CESNET's role in this transformation?

My time on the Board of DANTE was really interesting. Our mission was to lay out the scene for a simpler and more transparent research and education community, as by then there were too many actors involved. First, we designed the GÉANT network with a speed of 10 Gbit/sec. Then we moved to the second phase of this project, GN2 network, which was the first generation of network using dark fibre networks offering switched point-to-point connections in addition to normal IP traffic.

My role was bringing in my experience working at CESNET, as Czech Republic was one of the first countries in Europe that got access to dark fibre networks in 2000 and enabled a connection of 2.5 Gbit/sec between Prague and Brno. CESNET might be a small NREN, but we have significant research capacity, and we are working to make use of our work on a pan-European level.

Just last year, CESNET celebrated its 25th anniversary with some main achievements in the e-infrastructure landscape. Can you tell us more about it?

Yes, we are undergoing a significant integration process. In 2020, the Ministry of Education decided that e-infrastructure services would need to be integrated and, therefore, CESNET slowly transformed from being just an NREN to becoming an e-infrastructure provider. Now, we are working to integrate the cloud centre and the HPC centre. The process will run until 2028 and is a very complex task to integrate them to be a one-stop shop for researchers looking for applications in AAI or user support for example.

So, 2021 was a year to remember! Not only for CESNET's anniversary, but also because you were introduced to the Internet Hall of Fame. This was extra special as you are the first personality from Central and Eastern Europe to be awarded. Now that you have wrapped up your responsibilities as CESNET CEO, what does the future have in store for you, Jan?

Until the end of 2022, I will still be working at CESNET part-time on two big projects. This year, I was also re-elected to CESNET Board of Directors and therefore will still be around for the next few years but on a more limited scale! On a personal level, I will be focusing on my family. I have six grandchildren and plan to spend as much time with them as possible, playing chess and sports while they still want to hang out with their grandfather!

tnc23

Planning TNC23: getting to know the Programme Committee

For the first time in three years, the TNC Programme Committee met in person in Amsterdam to discuss the content and layout for TNC23 that will take place in Tirana, Albania on 5-9 June 2023. CONNECT took the opportunity to sit down with GÉANT's Nicole Harris, who supports the Programme Committee (PC), and TNC23 PC Chair Ann Harding from SWITCH. We talked about the role of the PC, its decision-making process and the rationale behind the choices during the conference planning stage - from location, theme, and title to content, keynotes, and much more.

Pictures
Left: TNC23 PC Chair Ann Harding from SWITCH

Middle: Nicole Harris, TNC23 Programme Content Support from GÉANT

What is the role of the PC?

Ann: TNC is a community event for and by the community. As the PC it is our job to make sure that the interests and expectations of the community are reflected. This is not only selecting papers but deciding the programme balance across the week and of course the theme. We don't get involved in the choice of the location, of course, but every location and also its venue influences our decision-making process, as the location influences the theme. And of course, the venue also influences the programme. We had to take into account hybrid and full remote options in the past. Remember that in Tallinn for example, we had to have a split screen for the opening plenary, as the main auditorium wasn't big enough for our audience. That led to a very innovative and creative way of opening the conference.

How is a PC formed? How are members chosen?

Nicole: We normally have around 20 members, and we aim to make the PC as inclusive as possible. So, there needs to be a good mix of experts across the main content areas – network, trust and identity, security, clouds, and community. While the GÉANT Association membership is of course European, we recognise that TNC is a global favourite, so we also always invite experts from the global NREN community. We look at age and gender and also make sure that new members to our community are represented. Staff from the GÉANT organisation also support us regularly. Most members of the PC stay for longer than just one year, but that to a certain extent is self-selective. In the end, being a member of the TNC PC is a lot of hard work, so it requires a real level of dedication and commitment for people to continue doing it over the years.

What are the main challenges faced in the conference preparation phase?

Ann: It's what Nicole just mentioned: the time necessary to bring the conference together. We are all volunteers and have regular jobs of course. The response to the TNC Call for Proposals can be quite overwhelming and has to be handled in a very condensed window! But a good PC has the expertise, distributes the workload well, and works together as a team, so in the end it is a lot of fun bringing the programme together. There are some lively bargaining sessions sometimes between the different themes. And at least this year, we can meet again in person. For TNC21 and TNC22, we could only meet via VC and that was just another level of complication as all the interactive building of the programme had to happen online. Hats off to my predecessors Sabine Jaume-Rajaonia and Anna Wilson for overcoming these extra-hurdles! We also often struggle with securing keynote speakers. As we are all in a not-for-profit environment and speakers increasingly wish to be paid, we have to do a lot of work and persuasion for really good keynote speakers to agree to support us.

What does the PC take into consideration when planning TNC? What drives its choices and decisions?

Nicole: As we said earlier, we very much are guided by the location and the venue. The other element here is the participants' feedback we receive after each TNC. For example, one issue identified by participants to TNC22 in Trieste was that BoFs took place in the evenings and people felt that the days were just too long. We will look into changing that. Or, we have seen that again at TNC22, the poster sessions have not been very successful. We have been discussing how to increase the attractiveness of the poster sessions for years now, but still haven't been able to fully crack it. For TNC23, we are toying with the idea of creating more of a 'community-hub', so watch this space.

Ann: We want to make sure that we maintain the core nature of TNC. Our community is unique, and it's important that all of our community is fully represented on the programme. We are not looking for every talk to be a slick production. We want to give the opportunity for speakers who might not normally present, to be on stage telling us about their work on their new idea and we want to hear what people are really doing. Authenticity is important. For some of our speakers, English is a third, fourth, or even fifth language and it can be daunting to stand up in front of a huge crowd and present even though their work is of great interest. Real and engaged is better than perfectly polished any time.

What is the essence of TNC?

Ann: Community, Collaboration, Coffee and loads of Fun! You know you've had a good TNC when you can't speak properly the next week.

Nicole: Completely agree, Ann. And I would add the participants. All we do here in the PC is prepare the conference as best we can – once we get there, really it is the participants who make and shape TNC!

To find out more about TNC23 visit **tnc23.geant.org**

Programme Committee

Ann Harding, SWITCH (chair), Switzerland

Marina de Giorgi, GÉANT, Netherlands

Chris Atherton, GÉANT, Netherlands

Ivana Golub, PSNC, Poland
Charlie van Genuchten, SURF, Netherlands

Maria Isabel Gandia, CSUC, Spain

Maria Ristkok, EEnet, Estonia
Tangui Coulouarn, DEIC, Denmark

Davide Vaghetti, GARR, Italy

Tania Altamirano, RedClara, Chile

Maarten Kremers, SURF, Netherlands

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Cynthia Wagner, Restena, Luxemburg

Dragana Kupres, CARNET, Croatia

Wenche Backman-Kamila, CSC, Finland

Jan Meijer, Sikt, Norway

Nick Buraglio, ESnet, USA

TNC23, 5-9 June, 2023, Tirana, Albania - Digital Generations

We often hear the term digital natives to describe a person who has grown up in the information age, but we are all living in that age – we are Digital Generations. Tirana, awarded the European Youth Capital for 2022, is the perfect juxtaposition of these generations, with a vibrant community of students and young workers.

Serving all digital generations is a challenge that NRENs must face, from building innovative educational experiences to supporting advanced research projects that have panned decades. Our meeting in Tirana will be the perfect opportunity to reflect on how we engage our digital generations and to reflect on how we are integrating future generations into our own organisations and infrastructure.

10 unique and innovative projects supported by the GÉANT Innovation Programme in 2022

You've heard about the GÉANT Innovation Programme and its potential to fund unique ideas by and for the Community. But what are these ideas and how can they benefit the Community? We take a closer look at the proposals that were awarded in this year's edition.

Words: Silvia Fiore, GÉANT

During this year's successful edition of the GÉANT Innovation Programme, the GÉANT Association supported the development and implementation of a total of ten research projects carried out by and for the benefit of the Community. Each winning proposal was funded up to EUR30k, for a maximum duration of 6 months and possible extensions up to 9 months.

Awarded projects from 2022 edition

In April 2022, the Programme awarded funds to ten projects in the areas of eHealth, multimedia, cloud, networking, T&I and education. Here's an overview of what the ten winning projects proposed and are working on.

eHealth

The University of L'Aquila, Italy, is working on a new generation of intelligent and contactless monitoring systems for tele-rehabilitation, tele-monitoring and well ageing. These systems provide new data interpretation and data sharing paradigms, in response to the increasing number of diseases connected to ageing and the complexity of the existing assistive electromechanical devices.

Multimedia

The Poznańskie Centrum Superkomputerowo -Sieciowe is developing drawOnMeet, a unique tool which allows all participants in a videoconference to draw on any video stream to highlight relevant items. drawOnMeet is intended to encourage collaboration and will be made freely available.

Cloud

The University of Rome, Italy, is working on a tool called eCLAT, Chains Language And Toolset based on eBPF (eXtensive Berkley Packet Filter). eBPF has become a common programming solution for more efficient networking services but is, however, complex to use. eCLAT will make eBPF applications easier to build.

Masaryk University in Brno, Czech Republic, is working on a connector between PBSPro scheduling system (commonly used by NRENs in the Community) and container-platform Kubernetes. The connector will enhance the possibilities of computational pipelines in Kubernetes without rewriting HPC-tailored code into containers and will provide users with a single entry point for accessing the data.

Also in the area of cloud, the Politecnico of Turin, Italy, is developing the BORDES project which leverages the open-source Liqo.io framework to demonstrate that a cloud-based technology can dynamically create flexible data spaces upon request. In these spaces, a data producer is able to offer its data to potential consumers without giving up on security and data ownership, and without affecting the possibility for consumers to read and process arbitrary data.

Networking

The Université Catholique de Louvain, Belgium, is creating a new approach to lower and more stable latency applications, called TCPLS. It revises the Transmission Control Protocol (TCP) and Transport Layer Security (TLS) to extend transport services with a mechanism to probe and select a network path given a latency criterion.

In the same field, the Budapest University of Technology and Economics is developing a software framework that provides a common platform for computer network traffic flow measurement and feature computation, and federated model learning, sharing and deployment. This new approach can improve the quality and reliability of the Community's future computer networks and services.

Trinity College Dublin, instead, proposes a new innovation strategy for developing NRENs by using the case study of an NREN-to-be in Cape Verde. Their strategy is to aggregate proven solutions from past and current NREN research and development projects (RARE, eduroam, etc.) with the private cloud-based network function virtualisation (NFV) developed in NosFVeraTO from the Brazilian NREN, RNP.

T&I and Education

Vytautas Magnus University in Lithuania is working on the SMART campus project addressing the re-use of digital identities of students and employees for better integration and wider usability of digital services in higher education institutions. More specifically, the University will deliver a solution for campus dormitory access with a safer tap-in student identification card model.

The Internet Research Centre in Spain, i2CAT, proposes the SIEVA tool to assess the security state of an information system and monitor a satisfactory range of threat occurrences. The main outcome is expected to be a tool that utilises widely used tools in the GÉANT Community.

Read more about **all the awarded projects** from the past two editions of the GÉANT Innovation Programme.

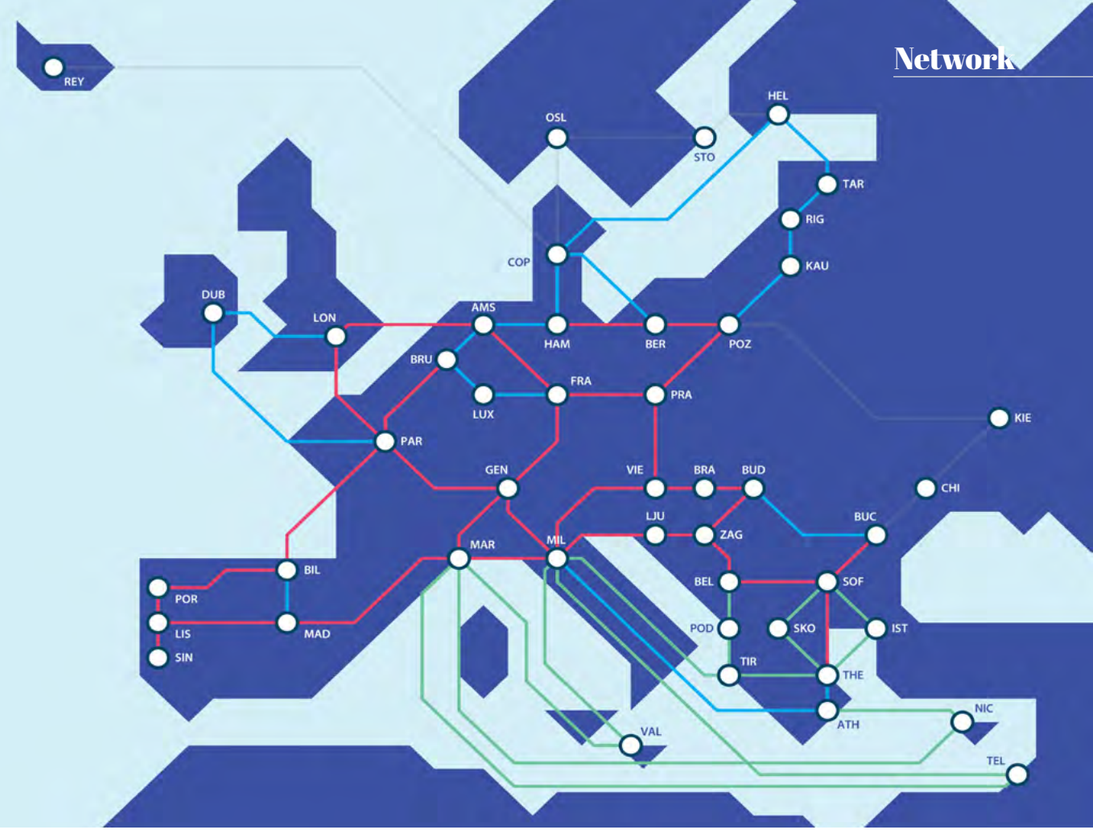
This is just a snapshot of the new solutions and ideas that the Community will be developing in the coming months.

In 2021, the first edition of the Innovation Programme awarded funds to ten other winning projects which have the potential of bringing more innovation to the Community! In particular, the Dutch NREN, SURF, started to explore the connection between NRENs and the EU digital identity wallets which facilitate cross-border students' mobility. The analysis from this innovation project helped understanding of the ecosystem and the possible roles for GÉANT and the NRENs and resulted in the participation of GÉANT, SURF and a number of other NRENs in a bid for the ongoing EU wallet large-scale pilot call.

Keep an eye on the GÉANT Community **website** to stay informed on the next Call for Proposals.

The next generation GÉANT network – a revolution in technology and funding

Delivering higher capacities to more countries at a lower cost



The traffic on the GÉANT IP network has seen sustained long-term growth of over 30% per annum. Even with the COVID-19-related restrictions, where commercial traffic saw a dip, big science users' traffic largely remained unchanged. The traffic on the packet layer saw a decrease of 8% in 2020 followed by an increase of 17% in 2021. Clearly, supporting this long-term growth with a policy of business (and technology) as usual would not be sustainable even in the medium term.

Words: Karl Meyer, GÉANT

The GN4-3N project represents a revolution in the method of both procuring and operating the GÉANT network. The fibre network is being replaced with long-term IRU-based contracts for connectivity and the Optical Line System (OLS) is being replaced with a disaggregated OLS. The next-generation GÉANT network, launched to the GÉANT community at TNC22 in Trieste, has understandably been a long-term endeavour with planning started during the previous GN4-2 project and the project continuing until December 2023.

Rethinking Procurement

The previous GÉANT network was built using traditional networking vendor hardware and software and communication service provider infrastructure. At this time, the leased fibre for the GÉANT network was procured approximately every seven years on short-medium term leases. This placed a significant cost and implementation burden on GÉANT as services needed to be migrated frequently. This burden is being addressed through the GN4-3N project to procure fibre on long-term, 15-year contracts.

The GÉANT Fibre (and Spectrum) network will eventually triple in length to ~30,000km, connecting almost double the number of countries (at least 24, up from 14 connected pre-GN4-3N) while at the same time reducing operating costs. However, cost reduction is not the only reason for this network revolution.

Disaggregation – the new model for optical network development

At a technology level, the optical system of the GÉANT network is being replaced as a result of a detailed re-evaluation of the requirements, and an alternative approach for the transport layer infrastructure using an open OLS was implemented to ensure efficient and effective use of the fibre resources. Much of this new technology has been developed by the cloud service industries using equipment focused on data centre environments and the needs of these organisations for more focused feature sets and hardware profiles designed from the ground up for the new data centre facilities.

The disaggregation trend in optical systems has brought in significant new changes in how networks are built. GÉANT is moving to optical layer desegregation with the disaggregation of the optical layer in transponders, Data Centre Interconnects (DCIs) and line systems.

The flexibility offered by the open OLS has enabled GÉANT to build its pan-European Dense Wavelength-Division Multiplexing (DWDM) network in nearly all European countries at a significantly lower cost than would otherwise have been possible. Disaggregation of the line system allows slices of spectrum to be purchased on a dark fibre pair rather than whole fibre pair. This provides improved flexibility in procuring services and opens up connectivity to more locations at a lower cost. In 2022, we have seen an increase in the number of network providers that are prepared to sell spectrum to GÉANT.

In this way, GÉANT is blazing a trail across Europe to demonstrate a new way to procure and build networks for the future, not only for Research and Education but for the networking industry as a whole. GÉANT is therefore increasing the backbone network footprint while decreasing the digital divide within Europe.

In 2023, GÉANT will conclude the tender for the renewal of the packet layer, with the roll-out of the new packet layer devices planned to start by the end of that year. The new infrastructure, once fully rolled out, will enable GÉANT to offer 100Gbps everywhere and the ability to support transmission rates up to Terabits per second (Tbps) where needed.

To find out more about the new GÉANT network visit: **network.geant.org**

In Numbers

The Fibre (and Spectrum) network is expected to triple in length to ~30,000km, connecting almost double the number of countries (at least 24 compared to 14 pre-GN4-3N) including:

- **18,000 km already fully deployed and equipped.**
- **Several additional PoPs in key locations, improving the GÉANT network's topology.**

Fibre costs are expected to be reduced by almost 50% on a per metre per annum basis.

- **The annual substrate cost vs 2018 (pre-GN4-3N) will be reduced by over 40%.**
- **The final GN4-3N reference topology includes usage of 7,000km of NREN fibre infrastructure.**

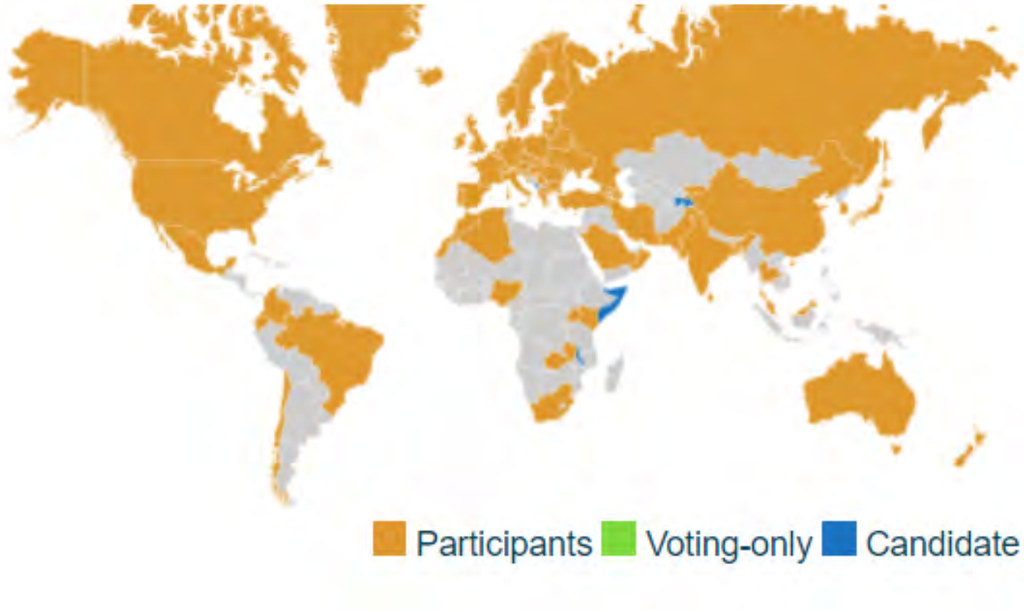
In 2021 GÉANT transferred over 2.5 exabytes of data across the GÉANT network, with over 2 exabytes transferred across the GÉANT IP backbone.

The new infrastructure, when fully rolled out, will offer 100Gbps everywhere and the ability to support Tbps where needed.

eduGAIN from Bangladesh to Serbia and from Kenya to Azerbaijan: connecting entities across the globe

In 2021, we celebrated 10 years of eduGAIN and, despite the changing technical landscape, the need for eduGAIN shows no sign of slowing down. eduGAIN has welcomed eight new members since then and as of September 2022 we are in the process of onboarding four new members - the most we have welcomed at one time since eduGAIN was established.

Words: Casper Dreef, GÉANT



So why is eduGAIN so important?

At its heart, eduGAIN is a technically simple service - it is a process for exchanging metadata so two entities can connect. It can be compared to a phonebook - allowing university staff and students to connect to services but with added support for ensuring that the connection is safe and secure, and allowing people to verify their rights to access services at the same time.

This simple technical design hides a series of complex processes where universities support and protect their users in making those connections. When using an eduGAIN connected identity provider rather than registering locally with every service, users can simply reduce the number of passwords they have to manage and be assured that their personal data is being protected.

eduGAIN now has 81 members across the globe. Our new members represent that diversity, coming from all corners of the world. From Bangladesh to Serbia and from Kenya to Azerbaijan.

Leveraging the successful outcome of dedicated training events, including specific lectures on Federation Management tools and an introduction to Federated Identity Management and SAML-based Identity federations, support has been provided to some NRENs and organisations willing to start their new national or regional Identity Federation.

In particular, the eduGAIN training team has targeted the South-East Europe region and Africa. Two main training events have been organised in 2021 and 2022, which have both seen participation from around 40-50 people belonging to the technical IT staff of NRENs or related organisations.

This hands-on approach helped new federations establish from scratch in a short time, in countries where nothing was available before the technical staff had been involved in the training events. Successful examples involved Azerbaijan, Kenya, Somalia, and the African catch-all federation (eduID.africa). Additional work is currently ongoing at the Arab States Research and Education Network organisation ASREN, which is in the process of setting up a regional catch-all federation for their stakeholders.

It is clear that eduGAIN is seen as a valuable service for the R&E community and its membership is expected to continue to grow. No one can say what the future will bring, but we are confident that eduGAIN has a bright future ahead.

More information on the eduGAIN website:
https://edugain.org/

eduGAIN

Cybersecurity Month 2022: A Community of Cyber Heroes

On 1 October, GÉANT launched this year's cybersecurity month campaign: CSM22 – A Community of Cyber Heroes. October is cybersecurity month, the European initiative coordinated by ENISA and by the European Commission to raise cybersecurity awareness in Europe.

The main objective of CSM22 is to increase knowledge and awareness of cybersecurity in the broad international Research & Education community by providing its members and users with targeted and tailor-made content and useful tools in the fight against cybercrime.

Collaboration and information sharing are at the heart of the R&E community. Only by working together can we make a difference and improve the cyber resilience of the entire community.

CSM22 – A Community of Cyber Heroes focuses on four main target groups during each week of October: Decision Makers, Cybersecurity Professionals, Home workers, and Students and Researchers.

Webinar Programme and collaboration with RedCLARA

The CSM22 campaign also includes a programme of four webinars held by security experts from industry and the wider GÉANT community, and there's something new this year. GÉANT welcomes the collaboration with RedCLARA, the Latin American space for collaboration and development in education, science and innovation, which gives CSM22 a truly global dimension.

Rosanna Norman, Communications Officer from GÉANT comments: "We're excited to work with our friends and colleagues from RedCLARA: security affects users globally, security is everybody's concern and cross-border collaboration is needed more than ever in the fight against international cybercrime".

The collaboration between the two international organisations comprises contributions from Latin American NRENs, the participation as a speaker by Emilio Nakamura CISO from RNP, the Brazilian NREN, and the availability of live interpretation services in three languages (English, Spanish and Portuguese).

The webinar programme

Prime Crime – ransomware has grown up, and we should too
Charl van der Walt (Orange Cyberdefense)

Multi-Factor-Authentication (MFA) for Universities and Research Institutions
Klaus Möller (DFN-CERT)

To do or not to do: dangers of simulated phishing campaigns
Melanie Volkamer, SECUSO, Karlsruhe Institute of Technology | KIT

Strengthening security and privacy culture in Latin American NRENs
Emilio Nakamura (RNP)

For more information about CSM 2022 contact **csm@geant.org** or get in touch with the virtual cross-NREN team behind the campaign:

BELNET: Davina Luyten, Laetitia Lagneau
GÉANT: Leonardo Marino, Rosanna Norman
MARnet: Zoran Zdravev
SURF: Charlie van Genuchten

CONNECT Interview:

Charlie van Genuchten, SURF

CONNECT meets Charlie van Genuchten, Product Manager Security from SURF to talk about CLAW, the Crisis Management workshop for the GÉANT community. Launched in 2017, the CLAW event has progressively gathered momentum within the European NRENs, and beyond, with record participation also during the pandemic years. This year CLAW will take place in person at PSNC in Poznan, Poland on 29 and 30 November.

Words: Rosanna Norman, GÉANT

The importance of crisis management has been growing exponentially within the NREN community in recent years, could you summarise some of the main causes?

I think there are a few different reasons behind this. It all began in 2016 when different community groups started raising awareness of this subject. I know that the Special Interest Group for Marcomms was one of the first groups to discuss the need for better crisis management, then other SIGs and Task Forces followed suit. Our collaboration with members from these communities gave life to CLAW in 2017.

The second reason, I think, is that 'crisis' has become a much less theoretical concept for everybody since the COVID-19 pandemic. We used to have a slide or two on the definition of the term crisis at the first couple of CLAW events, as people luckily did not have a lot of personal experience in this matter. Nowadays, we all instinctively understand what a crisis is, as we just lived through one, and we have seen how good and bad crisis preparation and communication can affect individuals and organisations.

Why do crisis management planning and preparedness matter?

When a crisis hits, you will always encounter and experience situations for the very first time, finding yourself in very stressful settings and under time pressure. The only way to make sure that you can keep thinking clearly and work well together is to have a process in place that you have practiced and tested a few times. This way, everyone knows what their role and responsibility are and which first steps to take. In the end, it will not prepare you for everything a crisis might throw at you, but it gives you a head start during those first few hours of a crisis that are always so crucial.

For those unfamiliar with CLAW, could you provide a brief overview of the event? How do you explain its popularity?

CLAW is a two-day crisis management event for all the people from NRENs who are (or could be) part of their organisation's crisis procedure. During CLAW, participants gain new insights through the keynote presentations, acquire new skills in parallel training sessions, exchange experiences and materials and ultimately test all their new-found skills and knowledge in the crisis exercise at the end of the event. I think the popularity of CLAW is due to the involvement and dedication of many people from different parts of our community. We have no other event where we successfully and actively manage to engage both techies, comms people, and management in the same discussion. Another factor is that we have an amazingly creative team that make the crisis exercises very fun and inspiring each year.

NRENs are all different in terms of maturity, resources, size etc. How can CLAW help address an NREN's specific needs?

One of the people in my team once made this comparison to define the way CLAW helps individual NRENs: CLAW is like a football camp. Individual footballers can come to that camp to enhance their skills and play matches with other players from different teams to see how they all play. After the camp, everyone goes home to their own team and is able show them their new tricks and gameplays.

However, just like a football camp, CLAW does not go into the specific NREN team's needs and procedures. In the end, teams will have to perform some additional exercises and play more matches to ensure the home-team is well prepared in their own environment. That is why we will be organising regional workshops (in addition to CLAW) from next year onwards, to help NRENs with their specific crisis management procedures.

What is in store for the participants of CLAW 2022?

CLAW 2022 will start with a keynote from Dmitry Kohmanyuk about the struggle to keep the .ua top domain running during the first days of the attacks on Ukraine. Then, all participants will split into groups to attend a session on either Leadership in Crisis, How to Deal with the Media, or Crisis Analysis. We will end the first day with a crisis management procedure sharing session and a working dinner. On day two, participants will be put to the test in our exciting crisis exercise.

For further information about CLAW 2022 visit: **https://security.geant.org/claw-2022/**. To register go to: **https://events.geant.org/event/1193/**

CONNECT Interview:

Gyöngyi Horváth,

Coordinator of the Task Force on Educational Activities and Services of the GÉANT Community Programme

Interview by: Silvia Fiore, GÉANT

Gyöngyi, you have been working in the GÉANT Community Programme for five years now. You created and are coordinating the Task Force on Educational Activities and Services (TF-EDU) since 2020. Tell us in a nutshell what TF-EDU is about and why education experts and professionals across the R&E community should join it.

When I started working on GÉANT's activities related to education in 2018, it was very clear that our community and many NRENs were actively offering various services to educational institutions and there was a need to collaborate to help coordinate and enhance further developments in the field. The TF was created to respond to this need and grew to be a platform where experts meet on a voluntary basis to reflect on and discuss about the educational technologies landscape in the NREN community and to support the development of tools and best practices to address shared issues. Infrastructure is not enough anymore, but ICT has become a crucial part of education and NRENs need to be part of the strategic debate. The TF is committed to supporting the higher educational institutions that GÉANT and the NRENs connect with the right services to face ever-changing technological advances. In fact, beyond being just a discussion forum, the activities of TF-EDU have resulted in great community projects and tools for NRENs to use.

And these experts come from all around world! How did this community come together to work on common issues and to identify shared trends when COVID-19 put a stop to in-person meetings?

The TF officially started in February 2020, just before the COVID-19 pandemic broke out. Together with the Steering Committee, we quickly realised the need for our community to share knowledge to support the continuation of services in the switch to online learning. Throughout the pandemic, we saw a record number of virtual meetings covering topics such as NREN strategies, remote collaboration tools and platforms, etc. The community also came together to create an open platform for those institutions without an alternative solution to rapidly address the need for remote education: openUp2U. It was incredible to see how everyone in our community got together and collaborated on a voluntary basis and shared their experiences and knowledge.

Speaking of COVID-19, with the sudden switch to online learning the focus of TF-EDU was and still is more relevant than ever. Can you tell us a bit more about how the work and achievements of TF-EDU have been beneficial to the community during these difficult times?

The number of educational services offered by NRENs has increased since the pandemic started, and more and more organisations extended their educational support activities and teams. It was clear that the community was focusing on supporting higher education institutions to continue to be able to offer their services during the pandemic. TF-EDU helped to raise awareness on the value of NRENs when it comes to knowledge, impartiality, as well as protecting the privacy and security of the users. There were several initiatives that started from TF-EDU: the up2Digischools project, the eduMEET community, Moodle experience changes, and more recently focusing on our involvement in a European educational digital infrastructure.

Every year, TF-EDU runs the annual educational survey to gather an overview of what the member NRENs are working on and are interested in exploring. How have the results of this survey been useful to the whole community in the improvement and development of their educational activities and services?

The survey is a precious tool for NRENs to explore possibilities for collaborative projects and activities and find a collaborative partner. For example, the latest survey highlighted that the community is interested in exploring collaboration in the areas of Trust & Identity, Learning Management Systems, video-conferencing, and public values. There has been a significant uptake in these services and thanks to the survey, NRENs working on one of these fields are informed of the status of similar activities in the rest of the community, can identify common goals and challenges, and also put in place working groups to work together!

So, what's next on the agenda for TF-EDU?

Next on our agenda is focusing on working towards a European Educational Digital Infrastructure and identifying where the urgent and also long-term needs are for the educational institutions that our NREN community can support. NRENs have the knowledge, the trust, and together also the capability to do great things in education!

To learn more about TF-EDU activities, visit: **https://community.geant.org/tf-edu/**

Katowice Declaration – Increased Collaboration to support Earth Observation efforts

On 16 June 2022, senior representatives of ASREN, GÉANT and RedCLARA convened in order to sign the Katowice Declaration during TNC22 in Trieste, Italy. The document affirms the continued collaboration between the three regional research and education networks in the thematic area of Earth Observation. This is a concluding agreement following a previous roundtable on the subject held at the Internet Governance Forum, in Katowice, Poland, in December 2021.

Words: Hendrik Ike, GÉANT

To meet the UN Sustainable Development Goals (SDGs), tackle climate change and prepare for and respond to disasters (man-made or otherwise), data is required. This data is increasingly being centralised into large data sets from a variety of different sources and at varying volumes. The GEO communities focus on the transmission and exchange of such data which is utilised in the realm of geospatial research.

Geospatial research is the investigation into the various aspects of earth science, but with a focus on particular locations, and this relies upon a number of communication layers and distribution systems. In some respects, these layers are operated by a number of Private (commercial), Non-Profit, Governmental and Nongovernmental Organisations (NGOs) to form a communications commons which the GEO community relies upon for its systems and services to work. The Katowice Declaration solidifies and commits future collaboration between the three regional R&E networks in this area and enables a blueprint for strategic engagement in the future.

You can read the full declaration here.

Picture
Senior representatives from RedCLARA, ASREN, and GÉANT sign the Katowice Declaration during TNC22 in Trieste, Italy

"ASREN has been engaging successfully with science communities in Africa, namely the African Group on Earth Observations (AfriGEO), through the EU co-funded AfricaConnect3 project, and this cooperation with GÉANT and RedCLARA is a concrete step forward into supporting the international Group on Earth Observation towards integrating scientific collaboration across the three continents."

Yousef Torman, Managing Director, ASREN

"GÉANT stands by its commitments to tackle climate change and support the European Green Deal. We see the Katowice declaration as an expression of our determination to collaborate with our partners in the global research and education community to tackle climate change and work towards seeing the realisation of the UN's Sustainable Development Goals."

Chris Atherton, Senior Research Engagement Officer, GÉANT

"Bringing together the National Research and Education Networks of Latin America, RedCLARA coordinates the Regional Working Group in Climate Change, enhancing regional activities related to environmental sciences. RedCLARA is a member of the Group on Earth Observations (GEO) and the Group on Earth Observations for the Americas (AmeriGEO). RedCLARA has been actively seeking opportunities for further collaborations that would leverage engagement in climate change action through the optimisation and capacity building in the use of digital tools and development of further innovations in those fields."

Mark Urban, Director for International Cooperation, Academic Relations and Communication, RedCLARA

How AI will shape the future of education

The impact of digital transformation in education is central to our future. Increasingly, educational practices are formed and changed by the technologies that enable them. Artificial Intelligence (AI) is one of these technologies, but how will AI shape the future of education? That is the main question behind SURF's recently published 'Promises of AI in Education' report.

With its multifaceted set of methods, AI opens up new fields of application. And while there are many exciting potential applications of AI in education, it is important to be proactive in the discussion about its use, so that it will transform our education to best suit the needs of students and teachers.

Words: Bertine van Deyzen, Duuk Baten and Matthieu Laneuville (SURF)

Impact of AI in different educational contexts

The effects of AI applications can only be seen in its context of application. When we look at the teacher-classroom environment (the micro level of education), AI transforms the way education takes place. As we can see in the use of the learning platform[1], AI transforms student engagement by holding students accountable for their annotations and comments on academic literature. Additionally, it changes the classroom discussion from a 'monologue' by the teacher to a two-way conversation between students among themselves, and between students and the teacher.

In the context of educational administration and support (at meso level), AI transforms services. Natural-language processing (NLP) applications such as Jill Watson help institutions offload repetitive student desk questions and requests to a conversational agent to save time and keep the more complex requests to human agents. Moreover, Jill Watson[2] is available 24/7 and there are fewer chances of encountering contradictory information.

Finally, AI also emerges in broader society (at macro level), outside the control of educational institutions. GPT-3[3] and other modern language generating tools are good illustrations of AI transforming our relation to written texts, which are often still the standard method of assessment of student qualifications. Using these tools to answer course assignments questions or generate essay texts is hard to distinguish from that written by humans. Even so, these technologies can also be used to support learning by reducing time spent on correcting grammar mistakes by teachers or even train students' writing skills.

Going forward together

As AI systems enter the classroom or institution, it will give rise to new and challenging questions for students, teachers, staff and school leaders. As education communities, we have to be proactive in this discussion to control how AI enters the education process and not simply be spectators of its increasing influence. To be able to retain our public values (such as autonomy, humanity, and justice) it is important to undertake this journey of discovery together. We need to keep experimenting and learning together, while not creating unjust expectations within the AI hype. This means building an increasing understanding of AI in education and focusing on evidence of working applications.

Learn more about the promise of AI in education and download the 'Promises of AI in Education' report at **https://edu.nl/ddanf**

If you know of any additional AI tools, please fill in our form using the following link **https://edu.nl/e44qu**

bertine.vandeyzen@surf.nl

[1] Perusall | Every student prepared for every class

[2] Goel, A. K., & Polepeddi, L. (2018). Jill Watson: A virtual teaching assistant for online education. In Learning engineering for online education (pp. 120-143). Routledge

[3] GPT-3 Powers the Next Generation of Apps (openai.com)

HEAnet
Ireland's National Education & Research Network

HEAnet – celebrating 25 years

Supporting education and research in Ireland

HEAnet provides essential infrastructure and services enabling Irish education to engage with, collaborate and compete on the global stage

Words: Barbara Carroll and Ronan Byrne, HEAnet

Picture
HEAnet's management team, from left: David Stafford, Katie Harris, Brian Boyle, Ronan Byrne, Dónal Ó Cearbhaill, Karen Thornton and John Creaven

HEAnet, Ireland's National Education and Research Network, provides high-speed Internet connectivity and ICT shared services to all levels of education and research throughout Ireland. Over one million students, researchers and staff rely on the HEAnet network every day.

HEAnet's national and international reach provides Irish learners, educators and researchers with access to educational resources and research infrastructure located across Ireland, Europe, and the rest of the world. In essence, HEAnet enables the Irish education and research community to both collaborate and compete on the world stage.

This year, HEAnet celebrates its 25th year of delivering valued ICT shared services to Ireland's education and research community. Ronan Byrne, chief executive of HEAnet, recounts the HEAnet journey and shares its future plans.

"The origins of HEAnet can be traced back to the 1980s when the then seven universities came together under a project collaboration to explore the provision of network and compute resources under a shared services model. The success of this model subsequently attracted funding from the Higher Education Authority (HEA), with HEAnet formally incorporated in 1997 with the mission of managing and developing this shared service success."

HEAnet has since evolved from being a provider of connectivity services to the University sector to one that now provides connectivity to all education levels. HEAnet has extended its shared service model beyond the University sector to publicly funded third-level colleges, Institutes of Technology (now merging as Technological Universities), Educational Training Boards, research institutions and other associated organisations, in addition to all 4,000 primary and post-primary schools across the length and breadth of Ireland.

"The ICT landscape is unrecognisable from when HEAnet was incorporated 25 years ago", Byrne said. "The Internet, and the myriad of services it carries, is now an integral part of our everyday life and a critical supply chain for businesses worldwide. We've witnessed an ever-increasing appetite for bandwidth, accompanied by a demand for ubiquitous coverage. Mobile device affordability really took

hold from 2008 which, together with increasing global bandwidth supply, has enabled the exponential age of cloud computing and cloud platforms that we know today. This digital revolution has also coloured how education and research are delivered."

In its 25 years since incorporation, HEAnet has responded to ever-changing client needs as they continually seek to incorporate greater digital infrastructure and digital services into their teaching, research, and operating models.

In parallel to a widening client base, the breadth of the HEAnet services portfolio has also expanded over the intervening twenty-five years. Where once connectivity was its core offering, clients now look to HEAnet for identity, security, procurement, and other ICT services.

"We also provide managed SaaS (software-as-a-service) business applications covering Student Administration, HRM & Payroll, Finance, and Student Credentials via our subsidiary company, EduCampus Services, which we established in 2015. EduCampus Services is a further success story and is now also expanding its client base on foot of strong demand for its managed cloud services."

This summer, HEAnet upgraded its network provision to UCD, which is now receiving resilient 100Gbit/s connections. This capacity level would have been considered breathtaking 25 years ago.

HEAnet is also very active in supporting the Irish research community, leading in emerging areas such as open science and the development of quantum communications infrastructure. More generally at a research engagement level, HEAnet continually strives to meet the future networking capacity needs of research – both at national and international level – to enable greater research impact and innovation.

"Our evolution has always been informed by listening and collaborating with our clients and stakeholders. Our strategic vision is 'Enabling Ireland's Digital Ambition', which we achieve by aligning to client requirements and national strategy. Our current strategy orients around five strategic themes of connectivity, security, identity, brokerage, and research engagement," he said.

Connectivity

Quality broadband is the lifeblood of today's business operation and the business of education is no exception. Connectivity is fundamental to creating, accessing, and sharing information. The ability of Irish education institutions to do this effectively, at scale, is realised by the nationwide connectivity that HEAnet provides. The HEAnet network links teachers, learners, and researchers to each other, but also to digital resources that can be hosted at any location across the world. Connecting learners and researchers through accessible, reliable, high-quality infrastructure is one of HEAnet's principal obligations.

"We are constantly improving the connections we offer to clients across all levels of the education system. For example, we are currently working on providing enhanced broadband connectivity to approximately 900 primary schools that are in areas that don't yet have access to high-speed commercial broadband provision and that fall outside the National Broadband Plan (NBP) intervention area. This project is managed by HEAnet on behalf of the Department of Education and will result in these primary schools receiving a 100 Mbit/s symmetrical connection from HEAnet."

Off-campus connectivity is a natural pre-requisite to the blended learning model, where education is delivered via remote and on-campus teaching. Blended learning infers that a student has access to a suitable laptop or access device. However, this is not always the case.

Ahead of the academic year 2020-21 commencement, HEAnet was proud to play its part in expediting the delivery of 16,700 laptops to disadvantaged students as part of the Irish government's Covid-19 response.

Security

The relentless battle against malware and cyber attacks is a particular challenge, as the education and research sector has become the most targeted, compared to other business and public service sectors. The increased incidence of high-profile ransomware attacks in the early summer of 2021 has firmly set mitigation of cyber-security attacks as the highest client priority.

In response, HEAnet is assisting the sector with two new initiatives. One being the provision of cyber security advisory and awareness training, and the other being the development of a Security Operations Centre (SOC) and Security Incident & Event Management (SIEM) service for the higher and further education sector.

"As a trusted shared services provider, HEAnet is uniquely positioned to provide security services to our client community. Last year's high-profile cyber attacks across Ireland have brought heightened attention to the area of cybersecurity investment. And in response to client priority, our team is now working closely with clients and stakeholders in establishing a SOC and SIEM service for the higher and further education sector".

Identity

HEAnet has been providing a national federated identity service to the higher education sector since 2010. This service enables easier sharing and access to online resources using just your assigned college user account. This solution works nationally, but also internationally, managed by HEAnet and its network peers across the globe.

This identity management solution also enables access to the HEAnet eduroam service.

eduroam is a wi-fi service that enables students, researchers, and staff to securely access the internet at their home institution, but also at any other eduroam-enabled location. The eduroam brand is well recognised by the student population as it gives them free internet access wherever eduroam is available.

Against the backdrop of remote access challenges arising due to Covid-19 constraints, HEAnet has strived to ameliorate evident gaps in broadband coverage, with the expansion of the eduroam wi-fi roaming service beyond the campus perimeter. HEAnet has brought eduroam to almost 500 new locations since the advent of the Covid-19 pandemic in 2020.

"HEAnet initiated an 'eduroam Everywhere' project upon the advent of Covid-19 restrictions in 2020, which had the objective of ameliorating poor broadband coverage and so enable students to stay connected to the education system from their remote location. I am very proud to report that this initiative has now made eduroam available at almost 500 new locations around Ireland, bringing the service to every county across Ireland," Byrne said. "This success is on foot of excellent support from Minister Simon Harris, which helped foster great collaboration with other public infrastructure providers across government departments."

Brokerage

HEAnet Brokerage Services, in partnership with the Department of Education and the Office of Government Procurement (OGP), assists clients in streamlining their ICT procurement processes by running aggregated procurements, including framework agreements, and mini-tender competitions via the OGP. HEAnet also collaborates with peer organisations across Europe and via international partners such as GÉANT. These partnerships deliver very significant savings for the Irish education and research sector.

An independent value for money study conducted in 2021 reported that HEAnet Brokerage Services generates savings of more than €7 million annually across the education and research sector.

"Our Brokerage Services Team are driven by saving our clients both time and money. The team is determined to secure the best possible deals for the sector when it comes to procurement frameworks and community agreements. In addition, they have established a 'HEAnet Store', accessible via the HEAnet website, which provides access to an array of discounted software and hardware products for both students and staff."

Research Engagement

A specific focus under the current HEAnet strategy is to develop a deeper engagement with the Irish research community. HEAnet works closely with the research community to support the development of research infrastructures, foster collaborations, and identify funding opportunities. HEAnet is also a key contributor in the advancement of open science and research data management in Irish universities, institutes of technology and research centres. HEAnet capacity planning anticipates increasing demands ahead, particularly in the areas of high-end computing and quantum communications infrastructure.

"HEAnet has made significant progress in the research engagement space by collaborating with clients and stakeholders around Ireland, but also globally via our participation in GÉANT and other European programmes. Research is driving innovation and our goal is to work even closer with the research community to enable more impactful outcomes in the years ahead."

Picture
Ronan Byrne, chief executive of HEAnet

Looking into the future

Collaboration remains key and HEAnet will continue to develop its infrastructure and enable greater digital transformation in consultation with its clients and stakeholders. HEAnet is a trusted shared service provider which enables it to harness the collective strengths of the community.

"In terms of strengths, our greatest strength is our people. Within HEAnet, I am surrounded by highly talented colleagues who share a collective passion for making a difference. It is a privilege and a pleasure to work with them every day.

"I am particularly proud of how we have navigated, and continue to navigate, the Covid-19 pandemic together. Our attention to wellbeing during these pandemic times has won external recognition in the guise of winning a 'Best in Health & Wellbeing' award from InBusiness Recognition Awards 2021 (run by Chambers Ireland), and just in October 2022, we have again secured the IBEC Keep Well Mark accreditation", Byrne said.

"In a time of the pandemic, I am proud that we can provide evidence that we value each employee, care for their wellbeing, and that this has been recognised in the wellness awards that we have secured over this past year.

Looking ahead, HEAnet will progress greater digital advances by continuing to work closely with its client members, the Department of Education, the Department of Further & Higher Education, Research & Innovation, as well as other Departments and governmental agencies. HEAnet will also participate in European programmes via its membership of GÉANT and the European Open Science Cloud (EOSC) Association.

"We will also work closely with our talented colleagues at EduCampus Services to build on our collective successes as we devise strategies at a Group level, leveraging our collective strengths for greater impact."

"As we arrive at our 25th anniversary, HEAnet stands as an exemplar shared service organisation, and custodian of an essential national asset. This has only been achieved via sustained investment in people and technology. Our responsibility now is to leverage this asset for greater impact in an ever changing, ever challenging, but exciting technology landscape."

HEAnet is publicly funded through the Department of Education, the Department of Further and Higher Education, Research, Innovation & Science, and its client charges.

For details:

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Web: **www.heanet.ie**

AMRES members contribute to cultural excellence in Serbia

Novi Sad is the European Capital of Culture in 2022 together with Esch (Luxembourg) and Kaunas (Lithuania). Key to achieving this result were local members of Serbian Academic Network AMRES.

Words by: Andrijana Todosijević and Katarina Simonović, AMRES

Pictures
Train Station Novi Sad (Picture taken by Katarina Simonović);

Top right: Petrovaradin Fortress Novi Sad (Picture taken by Katarina Simonović);

Bottom right: New Bridges concept (Source https://novisad2022.rs/en).

Developed in 1985, the initiative of nominating European Capitals of Culture every year is designed to celebrate the richness and diversity of cultures in Europe and promote the key role of culture to the development of cities. It is not only an opportunity to boost tourism, but also to regenerate cities, raise their international profile, and involve local entities in the process.

From designation to implementation the process takes four years. Four years of strategic planning, local engagement, and putting the right infrastructure in place. Soon after the announcement, the Government of the Republic of Serbia established the Novi Sad 2022 Foundation aiming to leave Novi Sad firm legacies that improve the cultural life of the city: new programmes, new processes, involved citizens, and new spaces for culture events. And here is where AMRES comes into place.

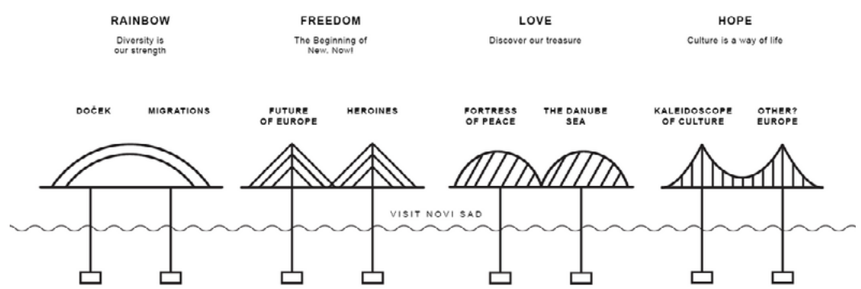
Proving that NRENs across the globe are not just connectivity providers but are committed to highlighting cultural excellence and local innovation, the Serbian NREN together with many of its member institutions are contributing greatly to the transformation of Novi Sad in the European Capital of Culture in 2022.

Thanks to the dedicated services that AMRES offers to its institutions, the NREN facilitated the smooth execution of numerous initiatives celebrating the city's nomination to European Capital of Culture in 2022. These initiatives foster cooperation among local and international artists and innovators and strengthen the capacity of the cultural scene. Schools and museums are taking part in the celebrations by supporting the organisation of and hosting local events, workshops, exhibitions, and concerts.

One of AMRES' members, the Special Education School, has been running the project 'Zvučni snop (Soundbeam)' which makes use of laser and sensory technology to help people with disabilities create music using the most modern global standards and techniques in the field.

"4 New Bridges" is the slogan under which Novi Sad won the most significant title in the field of culture in the European Union. The Love Bridge, the Freedom Bridge, the Hope Bridge, and the Rainbow Bridge symbolise the balance between the available resources and the trials that the city is working to achieve. Each bridge contains two program arcs that raise questions about the contemporary social context of the city, its heritage and creativity in the light of current European and world events.

If you are interested in learning more about that AMRES offers to its institutions and end users, visit the website: **https://www.amres.ac.rs/en**



Ten years of research software collaboration in the Netherlands

Academic research in almost any discipline is impossible without software. But universities and research institutes do not always have the expertise to develop this specific kind of research software. That is why the Netherlands eScience Center was founded ten years ago by the Dutch Research Council (NWO) and SURF, the collaborative organisation for IT in Dutch education and research. Raúl Zurita Milla (University of Twente) approached the Center a few years ago because he needed big data solutions.

Words: Josje Spinhoven, SURF

Studying the green wave

"As we are approaching fall, plants are losing their leaves. In spring, we will see them bloom. The science that studies these cyclical biological events is called phenology," explains Raúl Zurita Milla, a professor of Spatio-temporal analytics at the University of Twente. "We call the transition from winter to spring the 'green wave'. We make maps that show this green wave moving from south to north. In the Netherlands, spring comes later than in southern Spain, where I am from, and it arrives even later in Norway."

These models are based on millions of phenological observations from volunteers. Zurita Milla and his team combine this information with environmental data such as temperature and day length to map the arrival of spring. "Seeing how the green wave changes over time, gives us insight into the impact of climate change."

Learn from each other

Because he wanted to do large-scale phenological studies over Europe and the continental US, Zurita Milla approached the eScience Center. "I had a lot of data. Our models were also relatively slow, and we wanted to speed them up by running them on distributed systems." Zurita Milla, the eScience Center and SURF worked on a project that enabled them to learn from each other. "They wanted to know more about geospatial data, and we wanted to acquire knowledge about big data solutions." With the insights from this project and similar ones, the eScience Center and SURF have now developed ready-to-use tools, infrastructure and storage for Earth Observation data. Zurita Milla adds, "This has lowered the entry barrier to big data for the geospatial community."

Pictures
Top left: Joris van Eijnatten, Director of the Netherlands eScience Center

Top: Raul Zarita Mila, Professor of Spatio-temporal analytics at the University of Twente

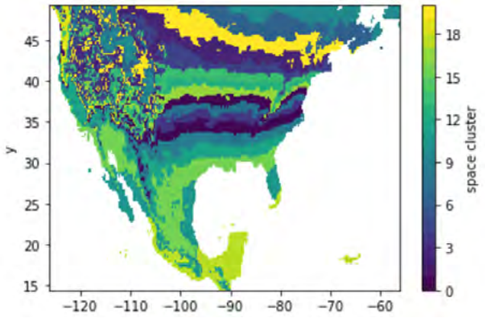
Bottom right: Example of aggregated (clustered) green wave over North America

Founded to make itself redundant

"A centre of excellence for research software as a national organisation is unique in the world," says Joris van Eijnatten, director of the Netherlands eScience Center. The centre employs scientists with digital expertise, who help researchers develop research software. "Besides the collaborative projects we do with research institutions, we want to expand our training programme in the coming years. Such as deep learning, parallel programming and online collaboration. So that this expertise also lands within institutions and among researchers."

The eScience Center was intended as a temporary entity when it was set up. "We do not have a deadline, but it is conceivable that our mission will be accomplished at some point. At the same time, technology is constantly changing. Universities cannot keep up with all that. We research new things, such as Artificial Intelligence, quantum technology, and digital twins. So, for now, there is plenty for us to do."

Further reading:
https://www.surf.nl/en/ten-years-of-research-software-collaboration



A new IPR Policy for the GÉANT Project

CONNECT interview with Magdalena Rzaca, GDPR & IPR Legal Advisor at GÉANT

Intellectual Property Rights (IPR) management is a crucial element for the GÉANT Project. CONNECT spoke with Magdalena Rzaca, GÉANT's GDPR & IPR Legal Advisor about the new Intellectual Property Rights (IPR) policy which will apply to the GÉANT GN5 Project and to any other future EU-funded GÉANT projects.

Words: Leonardo Marino, GÉANT

Magdalena, what will this new IPR policy mean for the GÉANT community and why was it important to implement it now?

With the new GÉANT project - GN5 - starting in January 2023, the timing for updating the intellectual property framework was perfect. The new IPR policy provides simplified steps for project participants and – more importantly – it will be revised on a bi-annual basis, ensuring its ongoing relevance for our community. Having simpler IPR rules is also essential for boosting international cooperation and that is fundamental for the project and its partners.

What are the main differences with the previous IPR policy?

The old policy, created in 2011, was quite outdated and as a very long document it was not user-friendly. The new IPR policy is much shorter, but at the same time more specific when it comes to the description of the different IPR requirements.

Just to name a few changes: the new policy recommends the use of permissive Open-Source Software (OSS) licences for the software. For OSS, the new policy is also introducing a new step which aims to ensure OSS licence compliance. For other types of materials (papers, presentations) a non-commercial creative commons licence was recommended. The new policy also clarifies actions connected with the recording of results in the IP register and highlights the importance of IP training, which will be provided with the help of the IPR Coordinator – a role supporting project partners and participants in the area of Intellectual Property.

Can you tell us more about the process that led to the new policy?

The process included extensive consultations with our community, carried out via several infoshares to explain both the policy as well as the various changes that were made. This result wouldn't be possible without the support from the community and from GÉANT CEO Erik Huizer.

As part of the process of updating the IPR policy, I collected the detailed feedback and carefully analysed it. The questions raised by our partners added great value and I feel extremely lucky to be a part of such an amazing community! A subsequent phase of feedback collection took place in the form of a survey.

Finally, after two years of dedicated effort, the new policy was approved by the GÉANT General Assembly (GA) in June 2022 at TNC22 in Trieste. It's worth mentioning here that the approval of the IPR Policy was a matter requiring a special resolution of the GA (as per article 10 of the Consortium Agreement: "The members of each Consortium, through the General Assembly, shall determine the intellectual property right policies").

What are the next steps?

Preparing and getting the approval for the new policy was an important step, but now providing policy-related training is the priority! Hence, for the GÉANT Project, we are planning to introduce IPR onboarding in order to create proper awareness of IP topics. Also, additional topic-specific training will be provided, for example on licence compliance in Open-Source Software, which is already broadly used in almost all software development activities in the GÉANT Project. On the topic of OSS, we also plan to carry further consultations with our community to identify the most common problems and to provide further support.

The first infoshare focused on explaining the main differences and key points of the new IPR Policy will take place on 25 November 2022. You can register here: **https://events.geant.org/event/1314/**

Picture
Magdalena Rzaca, GDPR & IPR Legal Advisor at GÉANT. Picture by Nabeel Ashraf, GÉANT

EaPEC 2022

EaPEC 2022 – Digital transformation and the power of network and human connections

In the packed conference hall of the Marriott Absheron Hotel in Baku over 200 delegates from scientific institutions from Azerbaijan, the EaPConnect member countries and beyond, gathered for the opening plenary ceremony where Azerbaijani government representatives, senior management from the Azerbaijan National Academy of Sciences (ANAS), a European Commission delegation, DG NEAR representatives, and GÉANT colleagues were invited on stage for the welcome address.

Words: Rosanna Norman, GÉANT

Arif Hashimov, Acting President of ANAS opened: "EaPEC 2022 will accelerate the integration of the scientific community of Azerbaijan into the European environment, as well as allow Azerbaijani scientists to conduct joint research with foreign colleagues and universities and strengthen international scientific cooperation."

Erik Huizer, CEO of GÉANT, in his brief address included some recommendations: using the expertise of AzScienceNet to create a unified network for Research & Education (R&E) in Azerbaijan, taking a proactive approach in becoming more sustainable, and increasing the uptake of the services available in the international GÉANT Community for the benefits of R&E in the country.

Thibault Charlet, Programme Manager, Digital and Economic Cooperation with Eastern Partnership countries, DG NEAR, European Commission added: "Building a brighter future together, a resilient economy and the digital transformation are the objectives of the renewed agenda for the EaPConnect region. Our focus is on infrastructure and people: providing affordable and secure high-speed connectivity in the region and connecting people. In order to achieve digital transformation, we need to build on a unified ecosystem to ensure that innovation flows across all sectors of the economy."

"The EaPConnect project delivers resources for important outcomes focussed on the expansion of infrastructure to ensure that scientific exchange and knowledge can be scaled up, to make research and education communities stronger and to communicate at national and international level. In Azerbaijan data traffic increased six-fold since the start of the project and doubled in the last two years as more people and institutions use the network in the country. Network infrastructure is important as it ensures sustainability and growth, connectivity itself doesn't have an impact, but the available services and how they are used make an impact."

Irina Matthews, EaPConnect Project Manager, GÉANT

Rasim Alguliev, Vice President of ANAS talked about the full renovation of the e-infrastructure in the country and the deriving benefits since joining the EapConnect project: "Today, the main issues faced by Azerbaijani scientists, teachers and students is not access to the internet, but qualitative scientific and educational online content to reduce the knowledge gap with the rest of Europe."

Picture
Irina Matthews, EaPConnect Project Manager, GÉANT

The conference continued with sessions on e-learning, open science, cybersecurity, and big data; all talks registered active audience participation and involvement in busy and informative Q&A sessions. Here are some highlights.

In the e-learning session Sara Di Giorgio from the Italian NREN GARR, presented SKILLS4EOSC, a new ambitious project: a training ecosystem for Open and FAIR science in Europe. Anster Woerds, from SURF talked about the National Digitization Impulse Programme which is "inspired by the wish that universities should take back control of education". The programme's main objective is to build a knowledge infrastructure as a source of knowledge and local centres to develop teaching and learning. Eli Shmueli, from IUCC MEITAL, from Israeli started his talk How can NRENs accelerate the Adoption of Learning Technologies: "Our primary objective is to promote an advanced learning technology in higher education in Israel through national and international collaboration to make sure that universities can adapt to 21st century technologies".

In the Open Science session Mehmet Mirat Satoglu, Director of TÜBİTAK ULAKBIM in Turkey, spoke about the adoption process of Open Science in the country highlighting concerns, questions and his organisation's experience in providing research e-infrastructure, and summarised their plans for the next 10 years. Zisis Kozlakidis from IARC talked about the promotion of Open Science from an institutional and inter-governmental perspective: "Open Science is a policy priority for the European Commission, and it improves the quality, efficiency and responsiveness of research". Babak Nabiyev Head of the AzScienceNet NOC shared an update on the stages of development of the national R&E network's technical capabilities, on the connected research institutes and universities, and the services provided to users, highlighting the benefits of being connected to the GÉANT community.

Research, science, scientific wisdom and the societal impact of technology

For two days, 30 speakers from 15 countries gave a series of engaging talks on innovative projects at the 5th Eastern Partnership Einfrastructures Conference. Irina Matthews, EaPConnect Project Manager, in her closing plenary summarised what the conference aimed to achieve: “The end of this conference is a beginning, continuation of the growth of human connections. When the power of technology is multiplied by the size of the human network – only then technology delivers impact on human lives. None of the projects or research initiatives presented here is possible without technology and technology-based tools for research. None of these projects happen in isolation – they all are enabled by the collaboration between people and organisations. Our strength is in harnessing the power of technology through building human networks – this is what this conference aimed to highlight and enable”.

Day 2 provided further insights into the diverse works of science and research presented in sessions on ICT innovation, Earth observation, e-Health and digital humanities, here’s a snapshot of some talks.

In the ICT Innovation session, Juraj Bilic, Vice CEO of CARNET, Croatia, gave a talk about BRAIN, a ground-breaking project about the adoption of Artificial Intelligence (AI) by the education sector in Croatia that will kick off officially in March 2023. “AI is here to stay, the only question that we need to ask ourselves is, what type of ethical aspects should be considered around the use of AI? We need critical thinking, we need to prepare society for life-long learning about AI.’”

In the Earth Observation session Anca Hienola from FMI in Finland gave a thought-provoking talk with the title Open Science in climate research: the good the bad and the ugly. “Access does not equal accessibility. Open Data is not enough, if combined with scientific illiteracy. For this we need to trust science – the only tool humanity developed to tackle Climate Change. Open Science is a state of mind, it is not only about big initiatives: it’s all about people. The main work resides on the shoulders of scientists as they transition to a new routine, requiring systemic cultural change, infrastructural solutions and innovation”. Yegana Muradova from the Bureau of Earthquake Research in Azerbaijan closed this session with a presentation on the structure of the seismic network in Azerbaijan and explained how seismic data is stored, processed and shared with relevant national and more than 30 international organisations.

Pictures
Top right: Conference hall of the Marriott Absheron Hotel in Baku

Bottom right: Professor Bilge Demirkoz from Middle East Technical University of Ankara

Scientists from the Vladimir Andrunachievici Institute of Mathematics and Computer Science in Moldova presented an innovative paper about mass casualty management using an AI based approach developed to support decision makers on disaster sites.

In the digital humanities session Irmak Güneş Yüceil from the Ministry of culture of Turkey presented an exemplary project about cultural heritage management, MUES, National Museum inventory system of Turkey, whose objective is “to bring Anatolian cultural heritage into the future”.

The closing keynote by Professor Bilge Demirkoz from Middle East Technical University of Ankara, with the title A prelude to a long journey: from Big data to scientific wisdom with its uplifting message gave the audience so much food for thought and delivered a very inspirational, moving and motivational finale to the EaPEC 2022 conference. Professor Demirkoz talked with passion about her work at CERN on the Large Hadron Collider, her involvement in space research and science diplomacy activities. The concept of scientific wisdom whereby science touches the mind, the heart, and the soul, thus revealing the true meaning and significance of the scientific research.

All presentations can be downloaded from the **EaPEC 2022 conference website** and the conference recordings are available on the **GÉANT YouTube Channel**

Putting FAIR into practice to support the EOSC vision

Since 2015, the EOSC concept has put on the table the idea of realising an open and trusted environment for accessing and managing a wide range of publicly funded research data and related services. One of the priorities highlighted in the EOSC Strategic Research and Innovation Agenda (SRIA) is the establishment of the Web of FAIR data and a Minimum Viable EOSC by 2027, featuring the core components and functions to enable EOSC to operate.

Words: Marialetizia Mari, Trust-IT

The mission of helping researchers and scientists to reap the full benefits of data-driven science paved the way for the EOSC implementation phase (2021-2027), which requires active engagement and support to ensure widespread implementation and adoption of the FAIR (Findable, Accessible, Interoperable, Reusable) principles. Defining and sharing standards, and developing tools and services to allow researchers to find, access, reuse and combine research results more easily would reach that goal.

FAIRCORE4EOSC and FAIR-IMPACT, two new Horizon Europe projects which kicked off in June 2022, started to work together in supporting the realisation of this web of FAIR data and services by delivering new core infrastructure components as well as by supporting the implementation of FAIR-enabling practices, tools, and services.

Both projects will contribute to the implementation of the FAIR principles across EOSC in close collaboration with other actors in the EOSC ecosystem, including the EOSC Association, the H2020 project EOSC-Future and the Horizon Europe projects funded to enable an operational, open and FAIR EOSC ecosystem[1].

A FAIR Collaboration

The collaboration between FAIRCORE4EOSC and FAIR-IMPACT is ensured both at coordination and technical levels.

Communication meetings will secure information exchange, especially via the six organisations, CSC, CNR, DANS, INRIA, SURF, and Trust-IT, that are partnering in both projects. A Technical Bridging Team, led by DANS and SURF, is establishing a technical alignment between the two projects and with the broader technical EOSC infrastructure. The technical leads, as well as the project coordinators of FAIRCORE4EOSC, and FAIR-IMPACT, are setting the ground for this crucial bridge, together with the EOSC Future and the CTO of the EOSC Association.

Mechanisms to boost FAIR Implementation

FAIR-IMPACT has also set up a FAIR Implementation Team to foster a coherent approach toward stakeholders in different use cases. It establishes a joined-up approach with the FAIR-IMPACT leaders of the pillar action lines, who will be working to identify and adapt approaches, tools and solutions suitable for wider adoption of interoperable FAIR practices, with the partners leading the integrated use cases to support the adoption and implementation of FAIR-enabling practices.

A targeted landscape analysis of existing tools, approaches, and solutions will lay the ground for the FAIR implementation framework of resources, which will be instrumental for the delivery of in-kind support to research-performing organisations (RPOs), repositories and data service providers, and national level initiatives. Among these resources there will also be the nascent set of nine EOSC-Core components developed by the FAIRCORE4EOSC project, necessary to enable a FAIR EOSC ecosystem, improving the discoverability and interoperability of an increased amount of research outputs.

The framework, periodically updated, will be openly available to support adoption by a wider range of stakeholders across Europe and globally through a series of open calls offering financial support to interested parties to implement a selection of the tools and methods identified.

Watch the two video interviews recorded at the kickoff meeting to learn more about the FAIR collaboration at the project and technical levels.

- A FAIR collaboration explained by Ingrid Dillo (FAIR-IMPACT) & Tommi Suominen (FAIRCORE4EOSC) **https://www.youtube.com/watch?v=VUOeMA725Rw**
- Bridging the gap between technical development and user communities in EOSC **https://www.youtube.com/watch?v=c4_kpiR4naE**

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[1] Resulting from the HORIZON-INFRA-2021-EOSC-01-06 call

Protecting NRENs against growing DDoS threats

Alex Pavlovic, Director of Product Marketing, Nokia Deepfield

As the intensity of new distributed denial of service (DDoS) attacks climbs to terabit levels daily, everyone is being affected. Everyone from the gaming industry to educational institutions are seeing rapid growth in the frequency, complexity and size of DDoS attacks. National research and education networks (NRENs) are not immune with many reporting attacks every month.

Attack complexity is also increasing. New botnets such as Mantis, are using powerful web servers to achieve much higher requests per second (26 million/s in June). The largest and fastest growing, however, are DDoS attacks – over 60% coming from botnets alone, which exploit vulnerabilities in IoT devices such as routers and security cameras. These account for the majority of the 250,000+ active bots globally, many of them operating from within the network.

Network administrators have long used specialized and expensive systems called scrubbers to remove DDoS attack traffic. With highly distributed, complex attacks, however, the ability to identify affected traffic becomes more difficult, especially as these attacks are based on real devices, not spoofed IP addresses from well-known attack domains. False positive rates of five to ten percent are now normal. Given the expense of operating scrubbers and the problems associated with scrubbing good traffic, many admins are choosing to pass bad traffic rather than risk removing good traffic.

These kinds of security solutions are bolt-on approaches, but there are other nework-based approaches that are showing more promise. Big data solutions can direct powerful routers at the edge of the network to provide real-time protection against attacks. These solutions track, map and analyze billions of endpoints and flows, essentially providing a dynamic supply map of the entire Internet. They can pinpoint which bots are participating in the attack and then instruct edge routers to block traffic from those IP addresses. They reduce false positives and cost-effectively remove most of the bad traffic.

These big data solutions employ AI and machine learning to comb the data from router logs and, using a library of known attack patterns, are able to parse out the attack vectors and isolate the sources. As with all AI/ML, the power of the solution is based on how much data it has been trained on. The most powerful solutions have the greatest historical depth, with some solutions having a clear head start.

With the proliferation of IoT botnets, NRENs are now exposed to attacks from within their networks, so traditional perimeter defenses are no longer sufficient. As attacks grow in volume, frequency and complexity, big data approaches to countering DDoS need to be part of a sound security approach.

zoom

Looking Forward: How Users Around the World Feel About the Future of Video Communications

Whether shopping, learning, socialising, working, or even visiting the doctor, video calls have simplified speaking face-to-face and sharing content with others. Although we all appreciate and recognise the value of this new way of communicating, many of us wonder how big of a role video communication will play in the future — and how people feel about taking different aspects of their lives into the virtual space.

We've prepared and commissioned a new report based on survey data and findings provided by Qualtrics Research that examines the impact of video communications on our lives. The report explores a variety of use cases in ten different countries across the globe, as well as how everyday users, including employees, teachers, students, and others, feel about video conferencing.

Here are some of the key takeaways from the report:

Hybrid work is overwhelmingly preferred over in-person only

Employees demand more freedom in how and where they work, so hybrid work has become increasingly popular in organisations worldwide. According to the report, most countries heavily favoured a hybrid business environment, with about two-thirds (66%) of survey takers reporting they preferred a mix of virtual and in-person work environments.

Employees are also looking to create a healthier work-life balance, and hybrid work provides more opportunities to create that balance. Most respondents believe that working in a hybrid environment will allow employees to fit work around their life, giving them more freedom to take care of their personal lives and creating happier workers.

- Singapore, Brazil, and Australia showed the most enthusiasm for a future involving a mix of in-person and video communications for business.
- Respondents from Japan mostly believed business travel would look much different, with 79% expecting less travel for work going forward.

In-person remains a priority for education, but virtual has a role

Although educators worried about creating a real connection and fostering engagement with their communities during the pandemic, schools, colleges, and universities around the world were able to keep teaching students using virtual conferencing. However, many countries are eager to return to in-person education. For example, about half of respondents in France (53%) and the United Kingdom (50%) prefer in-person education-related activities only going forward.

But that doesn't mean there isn't a space for virtual education, as 1 in 10 respondents from the United States, Japan, India, and Singapore were more receptive to virtual-only learning scenarios. Many respondents were also open to virtual learning experiences when in-person learning wasn't available, providing educators with a valuable tool for teaching students who couldn't attend in person.

Technology plays an important role in hybrid work and learning

Many useful features, including screen sharing, in-meeting chat, and more, have transformed how we meet and collaborate. And while the global health challenges that catalysed the video calling revolution begin to subside, most survey respondents believe that video communication is here to stay.

However, many respondents also reported that hybrid work had its downsides, including a poor connection, a lack of personal connection, and other technology issues. To help ensure students and workers have an engaging and effective hybrid experience, organisations should pay special attention to the hardware and software solutions they provide and how they construct their technology policies.

Empower flexible work and learning environments with Zoom

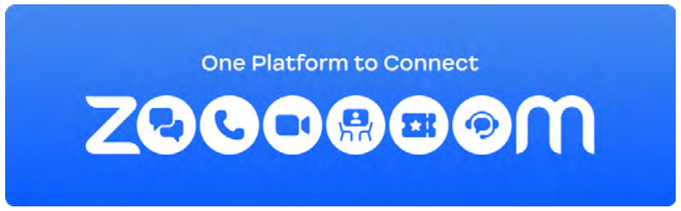
With schools now offering online, hybrid, or in-person classes more frequently and workers becoming more distributed, it can be difficult to keep your organisation and community united. But never fear, for Zoom is here! With a range of intuitive solutions, the Zoom platform has the features and functionality you need to stay connected.

Zoom Team Chat

Zoom Team Chat, our free messenger app located in the Zoom client, is included with your school's or organisation's Zoom license. With the ability to instantly message other users, create chat groups, send files and other resources, and much more, Zoom Team Chat offers a straightforward and effortless way to communicate and collaborate with students, coworkers, teachers, and other community members.

Zoom Whiteboard

And with Zoom Whiteboard, our new **visual collaboration solution** built right into the Zoom platform, educators and organisations can bring ideas to life, visually break down concepts, and empower students and employees to collaborate with each other to solve problems. And not only that, faculty can brainstorm and collaborate with each other on lesson plans and curriculum development. At the same time, managers and senior leadership can easily create roadmaps, product boards, training materials, and more.



Zoom Events

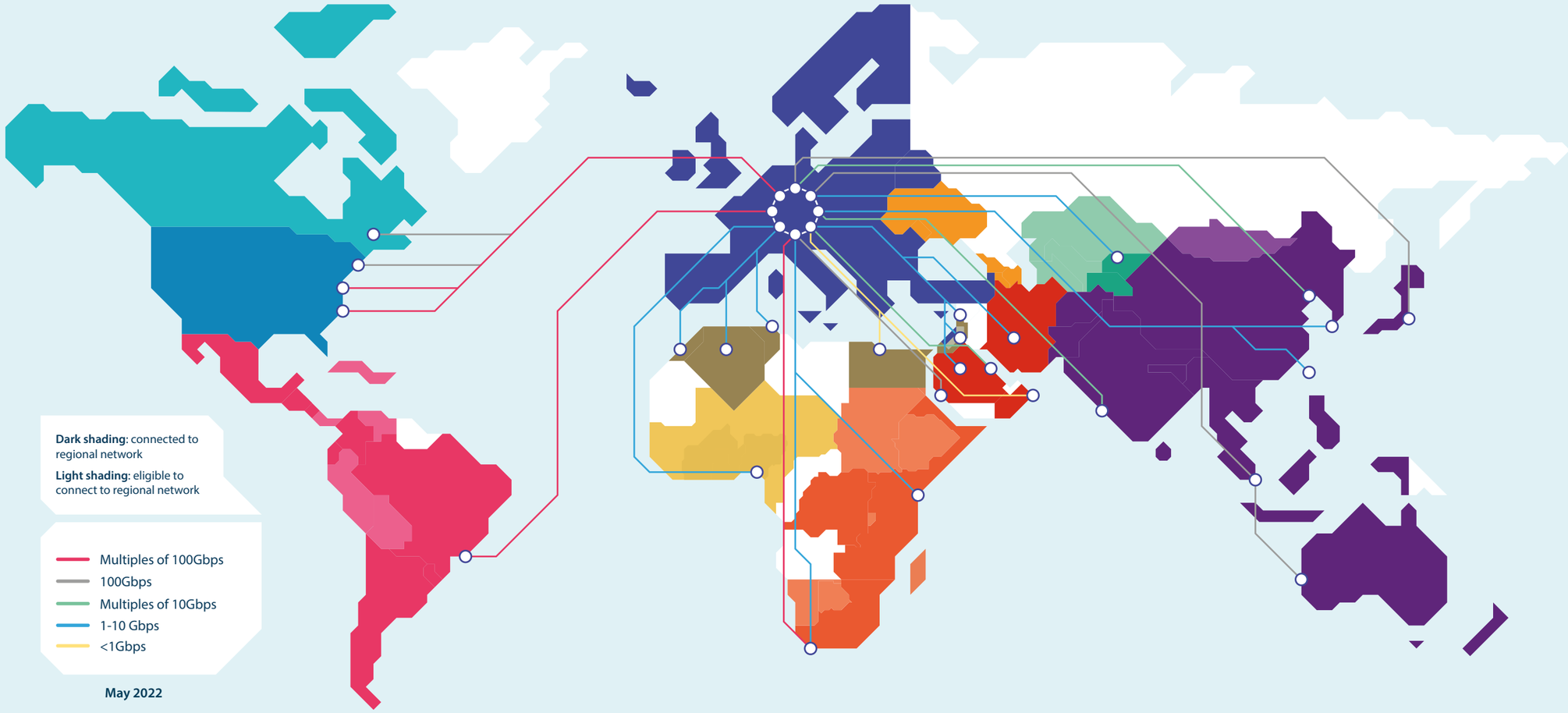
Whether preparing for end-of-year festivities like commencement or alumni gatherings or hosting onboarding sessions for new employees, many organisations are looking to reach a wider audience through virtual and hybrid event experiences. **Zoom Events, our all-in-one event solution**, provides a reliable and intuitive platform for campus and professional event planners to create, market, manage, and host multi-session, multi-day conferences or single-session events of any size or scale.

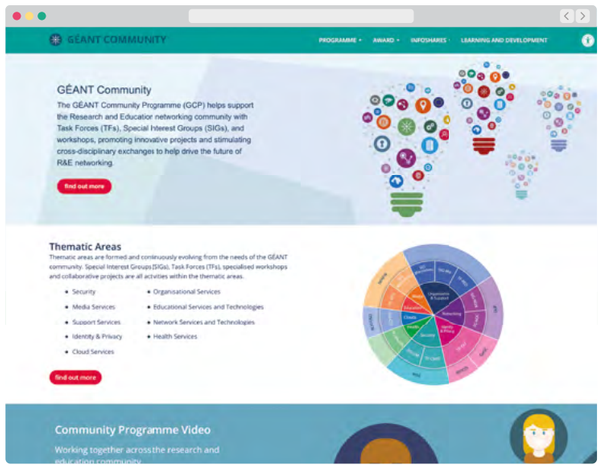
To discover how Zoom's platform can transform your organisation and provide intuitive collaboration solutions for your students and employees, visit our blog.

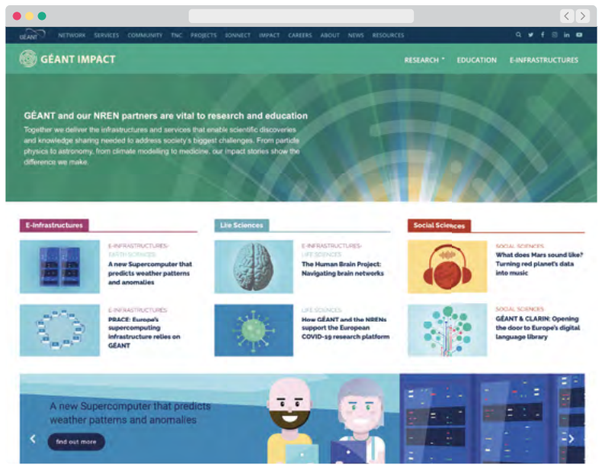
GÉANT at a Glance

We're bringing you greater content across a wider range of channels: from our Annual Report to showcasing the amazing research projects the GÉANT community supports. And CONNECT is online (connect.geant.org) and you can sign up to our weekly newsletter. You can also get involved on social media – see you online!

GÉANT is Europe's leading collaboration on network and related infrastructure and services for the benefit of research and education, contributing to Europe's economic growth and competitiveness. We develop, deliver and promote advanced network and associated e-infrastructure services, and support innovation and knowledge-sharing amongst our members, partners and the wider research and education networking community. Together with our NREN partners, we interconnect 50 million users at 10,000 research and education institutions; and via extensive global partnerships and GÉANT-managed networking projects, reach over 100 countries worldwide.







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