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CONNECT

THE MAGAZINE FROM THE GÉANT COMMUNITY | ISSUE 45 2024

SPOTLIGHTING THE HEROINES BEHIND THE SCENES

WOMEN FOR STEM

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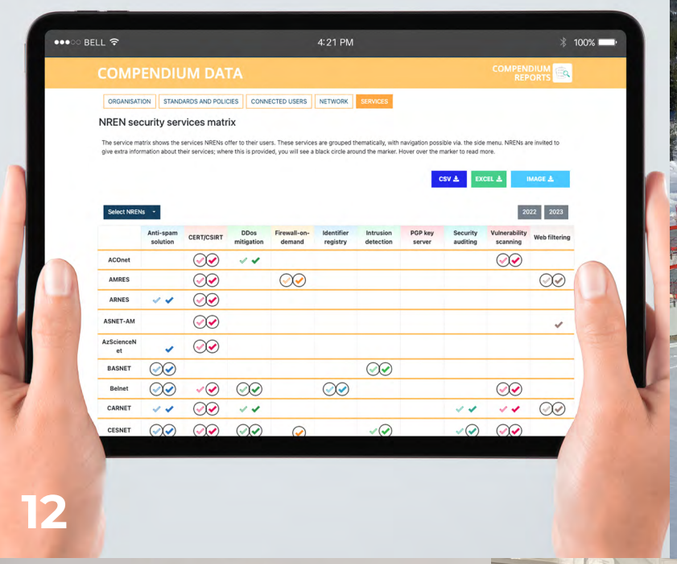

Editor's welcome

It's 2024. Why are we still talking about the need for gender equality and about raising visibility of women in – and supporting – STEM? It shouldn't still be an issue. But unfortunately, it is. And, until the day comes when we have true inclusiveness (and after that day as well!), we in the GÉANT community will continue to talk about it, loud and clear.

Our feature interview with Edith Heard, the first female Director General of the European Molecular Biology Laboratory, is an excellent read and highlights how the creation of EMBL, and indeed the subject of science itself, can open doors and remove borders in so many ways.

We continue the inclusivity conversation with our campaign to celebrate and support Women's History Month, this time looking more widely at the role of women in a range of roles that underpin and enable the work of our fantastic community. Although we kick this off each March, our campaign is year-round, and we'll once again be bringing you more stories on the many inspiring women throughout our community. I also urge you to take a look at our **Women in STEM focus area** for further inspiring stories!

Speaking of inspiration, where better to find it than TNC? Our look at the upcoming TNC24 in Rennes only serves to further whet the appetite for another unforgettable conference week. What are you looking forward to the most? The Lightning Talks, Emerging NREN Programme, Future Talent Programme, sessions, or social events? Or, maybe, you're most looking forward to catching up with friends and colleagues in what promises to be a unique environment. Whatever your preference, you can be sure of a warm welcome in Rennes in just a few short months.

Big anniversaries come round more and more often it seems, and in this issue, we help celebrate 40 years of Funet and 30 years of PSNC! They are both wonderful reminders of how fundamental this community is to the technology we often take for granted today.

Elsewhere in this issue, we look at how eduMEET itself has come of age; how the new Compendium of NRENs website has been created and what it offers the community; how we could address cyber security challenges by standardising cyber threat intelligence sharing; we look ahead to next month's Security Days conference; and we hear about the lessons learned from commercial cloud procurement via the OCRE and EOSC Future projects; and the upcoming OCRE2024 tender.

Another packed issue – we hope you enjoy it!

Paul Maurice, 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 GN5-1 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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Science without borders

CONNECT Interview:

Edith Heard, Director General of EMBL

In 2019, Edith Heard became the first female Director General of the European Molecular Biology Laboratory (EMBL). During her extensive academic career first in the UK and then in France, Edith's research has touched upon a variety of scientific topics in the field of molecular genetics and epigenetics, which has awarded her and her teams many prizes. A great advocate for European scientific collaboration, Edith holds different positions in many scientific boards and organisations around Europe, for example the French Academy of Science, one of the oldest science academies in the world that helps host scientists in exile from geopolitical crisis zones.

Interview by: Silvia Fiore, GÉANT

The Financial Times once called you "the epitome of a European scientist [...] running a quintessential international research organisation", and indeed EMBL has played an instrumental role in adapting existing data infrastructure to conduct genome analysis contributing to understanding and fighting the spread of the coronavirus infections. A true model of what can be achieved in very little time thanks to cross-country and cross-discipline science collaboration.

I am half British, half Greek, with British and French nationality. I was raised and educated in the UK. Then I moved to France for my post-doc and carried on my independent career there. And now I've moved to Germany to be in charge of EMBL, which has sites in five different countries but actually serve 29 - soon to be 30 – Member States across Europe as well as associates Member States, like Australia. So, yes, it is true that I feel that I have a very European perspective on life, not just on science, but the reason I took on the role is because, for me, EMBL represents a temple of molecular biology research and has a commitment to making science accessible to European scientists and globally, too.

I had only been at EMBL for one year when the pandemic hit us. There's nothing like a crisis to really show you the value of people and organisations. In fact, it became immediately obvious how important EMBL was going to be for Europe in the context of the COVID-19 pandemic. We provide services and infrastructure, as well as training, and we perform fundamental research. Our site in Hinxton, UK, the EMBL-EBI, had developed data portals and these were used to collect the virus' sequencing data, but also the data on the affected patients, and made it immediately accessible to facilitate tracking the spread of the virus. We also worked with the European Commission to use these portals as a basis to develop and deploy a pan-European COVID-19 research data platform.

Another type of infrastructure that we were able to deliver was at our site in Hamburg, where BioNTech were already testing mRNA delivery for vaccines, developed as a long-term collaboration, which contributed to the BioNTech/Pfizer vaccine. **Situations like the pandemic, when you already have tools and services that are up and running, show how infrastructures are so important as they are there to serve and deliver what's needed at the most urgent times; to immediately rise up and to help not just Europe, but the world**.

You said that you joined EMBL as Director General one year before the pandemic broke out. What can you tell us about leading a team through the pandemic in times when their research was most needed?

The pandemic was a very interesting yet challenging time. At EMBL we run everything - our research, our training, our services, our infrastructure, our technology development - from six institutes in Germany, UK, Spain, Italy, and France. When the coronavirus started to spread, each country that hosts us reacted differently and I had to make decisions about how to deal with the health and safety issues despite the urgency of our work. We did not shut down completely, but we did have to lockdown at all our sites to some extent, of course. For example, EMBL-EBI in the UK is one of our biggest institutes where it was critical that scientists and researchers continued to deliver both the research and services 24 hours a day, non-stop, because a lot of the bioinformatics tools that the research and science community were using to understand the spread of the virus were being developed there. Yet approximately 800 scientists had to work from home to deliver these databases and tools to the global community.

Picture
Edith Heard, Director General of EMBL. Credits to Kinga Lubowiecka, EMBL.

We had to try to make sure people remained connected and motivated.

Science only works if you have the curiosity and inspiration to keep going. It is not a regular 9 to 5 job. Scientists put so much of their time and passion in their work that you have to keep that motivation and inspiration going.

I witnessed a similar situation at our lab in Heidelberg. Despite the limitations imposed by the pandemic, some of the most crucial research on the coronaviruses came out of our laboratories. We also had to deliver virtual international courses and conferences from there. And I already mentioned EMBL Hamburg where users such as BioNTech needed access to beamlines for vaccine development. We had to keep all these places running, we had to keep morale up, and be very aware of the health and safety issues.

But I think that every crisis has a silver lining. At EMBL, we are spread across many countries, so we had to start using video conference tools more broadly and connect virtually, but more frequently, and that changed our connectivity culture. It was almost a bonding exercise, and actually helped to bring all of our sites on to an equal footing. However, we are still seeing the impact as we are finally coming out of it. Those years of not being able to meet in person, brainstorm physically and of having to cancel events for almost two years - that really had an impact, but we can see the scientific community starting to revive now finally.

In the same interview with the Financial Times, you mentioned that Brexit and its downside on science funding has kept you preoccupied. You've worked to secured EMBL's finances and formulated a new strategic plan for the years ahead. Now that the UK has finally rejoined Horizon Europe, what are your thoughts about the situation?

You cannot imagine how happy I was when the news was announced. A lot of people put a lot of effort into it, including the Nobel prize winner, Paul Nurse, who is a very firm advocate of European science. For him making sure that the British scientific landscape was not isolated but could still be connected to its continental European counterpart was crucial. For me, in charge of an organisation that has one of its sites in the UK, I could already start to see the impact of Brexit on British science. When collaborative EU projects were being set up at that time, we knew that the scientists in the UK had so much to contribute, yet there were doubts about being able to include them because of Brexit and the uncertainty around it.

Now, we are back to business, and I hope that this will prove how strong the scientific community is. For me one of the most beautiful things about science is that it has no frontiers – we all talk the same language (figuratively!), we are all striving to discover the truth and if we don't strive together it is usually much less impactful, so we have to be able to collaborate in the best and most efficient ways in order to make sure that the big and worthwhile investments that go into science – it is an expensive operation after all! – allow people to work together, to synergise. So, that was a really important historical moment for me.

This also opens our eyes to where other fragmentation might be happening.

Science is about bringing people together with shared values and goals, and in these times of war, it is really important that scientists realise that we have to stick together because the science we do today brings the solutions of tomorrow. I hope the fact that the impact of Brexit on science could be reversed will help to serve as a lesson for the power of collaboration in the future.

And talking about the instability of the many geopolitical crises we are witnessing today, as well as the impact of climate change, what do you make of the future of European science?

EMBL was created after a crisis (WWII), when the need to strengthen European science was stronger than ever. EMBL was set up to provide a cutting-edge research environment for young scientists, with the opportunity to become independent very quickly without the ties of hierarchy that you could find in individual European countries. Another goal when EMBL was established was to provide access to infrastructures that are open to scientists across Europe and which allow science to be accelerated. That was really one of the strongest elements in setting up EMBL: to try and make sure that we provide some of these complex and expensive infrastructures that bring the scientific community together, because no small country could set up alone the equivalent of, for example, a synchrotron. The objective was to coalesce the force of European science that was already there and to make it both collaborative and cost effective.

In my opinion, once more the current geopolitical and planetary crises highlight the urgent need to bring people together in science. This makes it even more important that organisations like EMBL remain strong in order to serve science through research, infrastructures and training and to bring countries together. Since I arrived at EMBL, the number of Member States has increased from 26 to almost 30. We strive to enable scientists to work across borders, to join forces and collaborate.

The other crises that society faces are climate change and the impact that man has had on the planet. When I became Director General, we decided that EMBL should think about what we can do as scientists that would help rise up to such challenges. Although EMBL cannot provide the solutions to all our environmental problems, at least our scientists can consider how the science we are doing may be relevant to help tackle the biggest challenges.

For this reason, we launched a new programme, Molecules to Ecosystems. The idea behind it is that we should carry out basic research and provide technologies not just to help the human population but the planet as well. When we launched this programme almost two years ago, our Member States were very enthusiastic about it. We were awarded an increase in our budget, and we were able to launch our flagship project, which was TREC, Traversing European Coastlines, to sample 120 different sites; land and water interfaces affected the most by environmental pollution and climate change. With our mobile labs, which are currently part of TREC, we bring cutting edge technologies to local scientists rendering our science more accessible and allowing scientists to sample in situ and explore life in context.

As part of TREC, we also teamed up with the Tara Ocean Foundation to sample plankton ecosystems with the TARA schooner. We launched this project with the idea that, for us, this is not just about explaining the science behind a certain topic but also a way to engage with the public and politicians to show that science can happen in a very dynamic way in places where we know that crisis is hitting. More than ever before, research organisations like EMBL should be present and will be vital to rise up to these challenges, be they geopolitical or geophysical.

You've mentioned many times the importance of doing fundamental research and the value of infrastructure for the research and science community. Why are these two so precious?

These are two things that are key to EMBL, and I think we have to protect them.

There is increasing pressure for science (particularly biology) to move towards applications where there is funding, and away from what is termed "blue sky research". This tendency is dangerous because strong fundamental research is essential for the applications of the future. EMBL is one of the few remaining bastions of fundamental science and curiosity and discovery-driven research. We are not asked to work on a particular topic, but we are given the freedom to explore with the best scientific minds in a very collaborative way, which is exciting. Thanks to this, our scientists come up with discoveries that provide the technologies that everyone is using today. An example is the technology that is the basis for cryo-electron microscopy (a revolutionary technique to visualise molecular structures in situ), which came about thanks to the explorations of the scientist Jacques Dubochet while he was at EMBL Heidelberg and that allowed him to discover the best way to cryo-preserve samples. This led him to the technology that got him the Nobel prize and he actually donated a copy of the medal to EMBL in gratitude for the support and freedom the organisation had given him! We should preserve and fund this kind of research and science.

Equally, allowing people to have access to top class infrastructures is crucial in order to nurture the science of the future. You need to invest in infrastructure so that they can evolve and bring people together. Not only it is cost-effective but collaboration is at the heart of success - getting people to talk to each other and do research with similar tools. One needs excellent, well-kept infrastructures for that.

As a woman scientific leader in STEM and EMBL's first female Director General, what is the one piece of advice on making our work environments more inclusive that you would like to share with our readers?

For me, being a woman in a leadership position is important to the extent that it shows that it is obviously possible! Every life is unique of course, and my particular path was unique as well, but just showing that you can be a leader and a scientist at the same time is what my experience proves. You can care deeply about science and yet step into a leadership role where you will be faced with new challenges (including unexpected crises!).

As a woman in science, one can find challenges along one's path, but one has to be willing to dare to take those steps and risks, without overcalculating these choices too much. I do think that there is a tendency now for people to try and be almost too careful about their career steps. I did not really calculate my trajectory too far in advance, but I did the things that mattered to me the most at the time I would make decisions. For example, changing from physics to biology when I was at university – that was a risk that I took as I had no background in biology at the time; or when I decided to do a PhD – that was also a choice that was not obvious at the time when most of my classmates were thinking of going into the private or financial sector. Also, in my later professional life, when I set up my lab I was not sure I wanted to be a group leader but I knew that what I was doing scientifically mattered to me so much that the only way to do it the way I thought it should be done was by running my own group. Similarly, when I took on the role at EMBL, I did it from a rather ideological perspective, because I care deeply about fundamental research and science, I care about Europe, and I care about making sure that scientists can work together. For me, EMBL represented all of that. Of course, I knew that taking the job would require me to step into a scene of senior leadership, but I accepted the role because I felt it was worth the effort, as long as I knew that I was doing it for the right reasons. This is the advice I would give – to really make sure that women dare to do what they want to do, for the right reasons!

I should also say that I feel quite strongly we should focus not just on women, but on full inclusiveness, to try and make sure that people from all backgrounds, ethnicities, and nationalities should have equal access to becoming scientists. Science is without frontiers – it is very important that we promote this concept, but I am still not convinced that we have found the right ways to do it. There is lots of work to be done.

Open science has a role here, too. It is one of the pillars of EMBL and a way to be inclusive. For example EMBL recently produced the AlphaFold Protein Structure Database in collaboration with DeepMind. AlphaFold is a complete revolution that allows scientists to understand how proteins fold just by sitting at their computers, which had never been possible before. But it doesn't just mean that - it means that anyone, almost anywhere, can explore the beauty of science and use it to make discoveries. For me, it is a democratisation of science that is also inclusive.

Inclusiveness is not just about women, it's about everybody. The Open Science component is at the heart of everything we do, and this is what will allow inclusiveness in the future.

Women for STEM:

spotlighting the heroines behind the scenes

In previous years, GÉANT has celebrated Women's History Month each March by highlighting women within the community working in Science, Technology, Engineering, and Mathematics (STEM) roles and interviewing them in order to celebrate their achievements and discuss the barriers they face.

Words: Grace Cooper, GÉANT

However, this year we wish to raise visibility of those women who are usually perceived as working 'behind the scenes' but are actually at the forefront of Women for STEM and are women who, with their job role, work in support of the technical activities of our community, leading project milestones and successes. These supporting roles range from communications, project management, partner relations, to procurement and finance, to name a few. The focus is on job roles that, despite not being "technical" such as STEM, have the objective to support the successful planning, promotion, and execution of the GÉANT community's specialised activities. Through this new perspective on the roles of women in our community, we wish to expand the focus to include more of the contributing actors, to show the variety of non-technical professions and how they are all tied to each other and working towards the same goals.

The first woman we spoke to was **Tetiana Preobrazhenska**, who is the Marketing Communications Manager for URAN, the Ukrainian Research and Academic Network. Tetiana joined URAN in 2018 as a marketer. She is responsible for URAN's marketing communications, social networks, website, and international contacts.

Communicating during times of war

"My job is to keep the research and education (R&E) community in Ukraine informed about the benefits they can derive from GÉANT and URAN's network and digital services, as well as from participating in the GÉANT community. I communicate this through publications on URAN's social media, newsletter, and website. Since February 2022, following Russia's full-scale war against Ukraine, my role has become especially vital. The extraordinary circumstances have created new needs for R&E, making it extremely important for them to learn promptly about opportunities for addressing these needs through cooperation with URAN. I reported on the opportunity to secure institutional data in clouds of leading global providers, fundraising for a university struck by a Russian missile, and aiding universities relocating from Russian-occupied cities within Ukraine.

I had to work in a bomb shelter during air raids or in a dark room during blackouts caused by Russian missile attacks on Ukraine's energy infrastructure. Working under such conditions was challenging and frightening, but my motivation stemmed from the understanding of how important and welcomed such information is for researchers and educators, and how useful and timely URAN's and GÉANT's assistance is for them. In dark times, helping others and believing in the importance of your actions greatly aids in your resilience."

After talking with Tetiana, it is clear to see the importance of communications during such a catastrophic time, and as a community we will continue to show our love and support for URAN. Our global community can be filled with highs and lows, but we come together to support one another which is what makes us so unique, and why we value building genuine and meaningful global relationships.

To learn more about the importance of this from a different perspective, we spoke to **Helga Spitaler** who works within the International Relations team at GÉANT as Senior International Relations Project Manager. Helga operates in a complex project environment characterised by, among others, two very diverse communities as she supports and engages with Asia-Pacific and the Middle East. Establishing very meaningful connections within the community, she has supported several innovative breakthroughs, in particular GÉANT's involvement in the multi-million-Euro Medusa submarine cable project aimed at boosting trans-Mediterranean R&E connectivity. The European Union's first Global Gateway project also sees the participation of the European Commission, the European Investment Bank and Medusa promoter AFR-IX Telecom.

Around the world collaboration

"Coming up to my 20th (!) work anniversary at GÉANT, people (and quite frankly I myself) ask "what is it that keeps you there?". The answer is simple: having the feeling of making a difference, be it by bringing likeminded people together and facilitating fruitful collaborations across borders, or challenging difficult market conditions when connecting the unconnected.

While I was in charge of the promotional side of network projects around the world, I developed a passion for demonstrating particularly the societal impact of NRENs, such as helping a baby patient in Vietnam get better through teleconsultation, a rice farmer in India to save his livelihood thanks to resilient rice varieties as a result of data-intensive crop research, or enabling e-learning for children in remote areas.

Now that I have moved on to managing such projects myself, I can bring and show value in different ways. Medusa, for instance, is set to become a gamechanger in connectivity provision between Europe and North Africa, and I am proud that as coordinator among all stakeholders involved, and with the invaluable support of my more technically-minded colleagues, I am part of the conception and implementation of the EU's first digital Global Gateway project."

Helga describes and acknowledges the importance of collaborating with her fellow STEM colleagues. These collaborations are key in a STEM environment such as the GÉANT community to ensure we can work together to produce the best outcomes possible.

The next testimonial from **Marina Dimić Vugec** also focuses on the theme of collaboration. Marina is currently working as Head of the Department for Cyber Security Management in the National CERT which is a sector in CARNET – the Croatian Academic and Research Network. Marina describes herself as a "career butterfly". Her primary profession is a social worker, however during her student and professional life she was mostly involved in project management for social policy, civil society development, sustainable development, community organising, and from 2017, cyber security awareness raising and education.

Sparking interest in cyber security

"Our small team is dedicated to cyber security awareness raising activities and education, security policies advisory, maturity assessment, organisation of cyber security events and exercises, and trainings for children and youth. My work experience in cyber security, in what was still a technical field at the time, began six years ago with the design of the first national campaign to raise awareness about the importance of cyber security called 'Great Croatian Naifs / Veliki hrvatski naivci'. In that time, I was primarily a student and listener learning from engineers, software developers, system administrators, pentesters and incident handlers about malwares, phishing and ransomware attacks. This enabled me to explain these topics to an average user using non-technical language and it sparked an interest for cyber security.

It is a real challenge to find effective ways to impact the change of behaviour and habits of the various users of today's Internet-connected technology to act responsibly, correctly, and to protect themselves, and others, from potential financial harm or cybercrime. As we are different and unique in the real world, we are different in our expression and use of digital technologies and appearance in cyber space. It is challenging, but always driving, to use innovative approaches, methods, and words which can really make a difference and be heard from those to whom you are addressing."

Marina's genuine passion for her job and the joy she finds in carrying out this work is evident from her testimonial.

This is something Monique from GÉANT also relates to, and goes on to explain the importance of. **Monique Pellinkhof** is a Senior Procurement Manager at GÉANT, working as Task Lead in the Cloud procurement task on the GN5-1 project, and has played a key role in the OCRE and EOSC Future projects. She joined GÉANT at the time that the OCRE project needed to distribute EC adoption funding for Cloud services to individual research projects across Europe. She developed a highly innovative distribution mechanism which allowed GÉANT to procure Cloud and Earth Observation services via the OCRE framework on behalf of research institutes across Europe. Monique's enthusiasm and ability to innovate underpinned these efforts of distributing over €17 million of funding across 45 research projects in total.

Procuring for the community

"I find that there is never a dull moment in procurement! Being a contracting lawyer from origin, I love the fact that it adds negotiation, dynamics, and commercial and user perspective to contracting. As contracting authority, you actually have the opportunity to add more intrinsic value, being part of the bigger picture and facilitating collective interest. My favorite thing about my work at GÉANT is the fact that it gives me the opportunity to contribute to R&E and the greater good by providing aid in, and knowledge of, procurement and legal frameworks. Adding value and direction to the supply chain at the root. To get the best outcome on a procurement, it is essential to take all interests into account: supply, demand, competing solutions, legislation, make the conversion, and to come to a win-win situation in a continually changing environment. Being on top of innovation and development of all aspects is key and this is why it's important to break away from your desk and continuously engage with users, suppliers, and legislators, which is a perfect match with my personal need for motion."

The success of a project such as OCRE relies on people like Monique and her team working 'behind the scenes'.

Another example is the AfricaConnect3 project, a €37.5 million project co-funded by the European Union, where Beatrice is currently in charge of the financial and administration management.

Beatrice Ng'ambi has been working with the UbuntuNet Alliance from the very early stages of the organisation and contributed greatly to its success. She is currently the Acting Finance and Administration Manager, where she is in charge of the financial management and administration for not only the regional network for Eastern and Southern Africa but also for AfricaConnect3. Her role involves providing in-depth financial information to facilitate the delivery and monitoring of the project's objectives and costs. Her day-to-day activities cover management and administration of financial reporting, manpower reporting, timesheets and other regular tracking of costs and finance progress, as well as providing support for the project governance for the project and organisation.

Attention to details and comprehensive overviews

"As one of the inaugural members of the UbuntuNet Alliance, I have had the privilege of witnessing the organisation's remarkable growth. From its humble beginnings as a project at the University of Malawi-Kamuzu College of Nursing, now Kamuzu University of Health Sciences (KUHes), we have evolved into a robust force driving research and education networking across Africa. My role has undergone a significant transformation over the years, progressing from establishing foundational financial and administrative frameworks to navigating the complexities of multi-million-Euro projects like AfricaConnect3.

One of the most rewarding aspects of my job is maintaining a comprehensive overview of all organisational activities, ensuring meticulous recording and accounting for costs and progress. It brings me immense satisfaction to witness the tangible impact of our efforts on advancing education and research collaboration in the region. Establishing personal networks with colleagues from various NRENs within and outside the UbuntuNet Alliance, especially inspiring women in research and education networks like Margaret Ngwira, Dr Iman Abdelrahman and Cathrin Stöver, just mentioning a few, has been both enriching and motivating.

In my role, qualities such as attention to detail, strategic thinking, and effective communication are paramount. The dynamic nature of the work demands adaptability and a steadfast commitment to the organisation's vision. It's a privilege to contribute to the success of the UbuntuNet Alliance and play a part in shaping a connected and empowered future for African education and research communities."

Moving from Africa to Latin America, **Tania Altamirano**, like Beatrice, points out that the people within our community aid their drive to continue working hard and to push through various barriers they face in their working environments.

Tania is the Academic Relations Manager for RedCLARA, the Latin American Cooperation of Advanced Networks. She is Nicaraguan and has lived in Chile for 18 years. With a background in social communications, Tania joined RedCLARA in 2009, and is currently dedicated to articulating initiatives on priority areas such as eHealth, climate change, education, the development of engagement strategies for the BELLA II Project, and leading the regional work group for gender equality.

Creating pathways to connect and evolve

"I am deeply passionate about my work and have had the privilege to participate in impactful projects like ELCIRA and MAGIC, collaborating with colleagues worldwide. Great opportunities have come with my job (services, proposals, articulating initiatives), however what truly motivates me is contributing to ensure that the real impact of all the large infrastructure that is being developed for research is not just about laying cables and technical details, it´s about creating pathways to connect people and ideas to address common challenges. In 2023, we extended invitations to Latin American NRENs to explore opportunities to support gender equality and the participation of women in science and technology across the region. With representatives from Mexico, Costa Rica, Colombia, Ecuador, Chile, and Brazil, a working group was established to develop a regional gender policy (soon to be launched). Our aim? To bring the topic to the forefront and contribute to reducing the gender gap."

Gender policies are (rightly so) starting to become more of a focus for various organisations, which is especially important in STEM working environments. However, creating the policy is simply not enough. The only way we will see this long-awaited change is through the actual implementation of these polices, women and men educating themselves, taking accountability for their own actions, attitudes, and behaviour. As a CEO, Gitte can empathise with the challenges that women who work within a STEM environment experience.

Gitte Julin Kudsk has had various experience working in supporting roles, such as the former Head of Secretariat and Communications of DeiC, and is now leading the organisation as CEO of the Danish NREN since the beginning of 2021. She has been involved in, and jointly responsible for, the development of DeiC since 2012 but has over 20 years of experience in the realm of digital infrastructure, in addition to the ministerial and university political landscape. With a keen eye for both the theoretical and operational aspects of strategy work, Gitte ensures the realisation of the strategy and facilitates national and international cooperation.

On leading a technical community

"As CEO, my typical day is filled with a myriad of responsibilities, including numerous interactions with stakeholders ranging from employees and government officials to universities and collaborators. Additionally, serving on two boards further enriches my engagements within the community. Reflecting on achievements, I take pride in the strides made by DeiC under my leadership, particularly in strengthening our legal mandate and securing quantum funding, positioning us as a credible partner in delivering digital infrastructure to research and innovation.

Having navigated various roles within technical communities, from administration to CEO, I have encountered both challenges and opportunities that are unique to my gender. In many instances, I have found myself as the only woman in the room, whether in ministerial meetings, boardrooms, or professional gatherings. The awareness of this disparity has been highlighted by experiences such as being asked about how I managed to become a director, a question highly unlikely to be posed to a man in the same context, and which underscores the ongoing need for gender inclusivity and awareness in our professional spaces. As a leader, I am committed to fostering such inclusivity and progress and to empower women in similar roles within the technical community."

It is hoped that this article, and the insights provided by the women in supporting roles that we have featured, contribute to the discussion around this topic, sparking the initiation of these vital conversations and questions that you may not have considered before. Continue to support your fellow female colleagues who work in a STEM environment such as the GÉANT community as best you can, and consider this… is there anything more you could be doing to promote a positive change?

Take a look at previous blog posts and articles for our previous #WomeninSTEM campaigns visit: **https://connect.geant.org/womeninstem**

Driving the future of Advanced Computing: a female perspective on STEM

As a witness of the quick transformation in Advanced Computing over the years, it's necessary to highlight the role played by women in STEM, particularly in the Technology field.

Words: Elana Araújo, Advanced Computing at Fundação para a Ciência e a Tecnologia, through the FCCN unit

Evolution of Advanced Computing

In recent years, we have witnessed advances in Advanced Computing, driven by innovations in hardware and algorithms. Supercomputers, such as Deucalion in Portugal, exemplify the processing power we have acquired that was previously unimaginable. In the Portuguese context, the National Network for Advanced Computing (RNCA) plays a key role in connecting research, development, and people, facilitating collaborations, and ensuring that Portugal has a place at the vanguard of computational innovation.

As we embrace the future, we anticipate faster, more efficient, and more sustainable systems, promoting advances in different areas, from scientific simulations to artificial intelligence.

Advanced Computing in Everyday Life

The integration of advanced computing into our lives is inevitable. From weather forecast, supply chain optimization or the personalization of medical treatments, the applications are vast and reach all the scientific areas. The National Advanced Computing Network in Portugal - RNCA - plays a crucial role in facilitating access to these innovative technologies for the scientific and innovation community. This ensures that this community is equipped with the technology needed to effectively solve global challenges.

Female representation in STEM

As a woman in STEM - Science, Technology, Engineering, and Mathematics, I have witnessed a significant change in the dynamics of research, development, and innovation teams. The increase in female representation has brought different perspectives, driving not only the opportunity to promote equality, but also to challenge and deconstruct the disparities that have been historically entrenched. As more women assume key roles in Technology, we are not only building a more equitable workforce, but also helping to deconstruct the barriers that have limited women's advancement over time.
This transformation is not just limited to the professional sphere, it extends to the personal, impacting society as a whole. Innovative approaches to complex problems faced by society emerge precisely when diverse voices are properly represented in teams.

In line with the March theme dedicated to celebrating women in STEM, it is impe=rative to recognize the crucial role that women have played in the evolution of these fields, often without due recognition.

In addition to promoting equal opportunities, we are actively committed to relieving the discrepancies built up over the years. The multiplicity of ideas and experiences not only stimulates creativity and problem-solving but also ensures that Advanced Computing benefits society as a whole, promoting an authentic transformation towards a fairer and more equal society.

FCCN UNIDADE DA FCT
Tecnologia para o Conhecimento

Viewpoint:

Framework Programme 10 must avoid overlaps and reduce fragmentation

This article was first published on Science|Business. Read the original version on their **website**.

The next research and innovation programme should be designed to dovetail into other EU funding streams, says Erik Huizer, chief executive of the pan-European research and education data network GÉANT.

Words: Erik Huizer, GÉANT

One of the greatest shortcomings of EU framework research programmes is they are not usually designed with appropriate due care or consideration of the other funding mechanisms managed by the European Commission.

Let's take for example the Digital Europe Programme (DEP) and the second iteration of the Connecting Europe Facility (CEF2). These two programmes make funding available for projects under policy objectives that are also covered by Horizon Europe.

The same applies to the European High Performance Computing Joint Undertaking (EuroHPC JU) and the European Quantum Communication Infrastructure Initiative (EuroQCI).

Then there are initiatives within Horizon Europe that give out funding for Common European Data Spaces, which are primarily funded from DEP.

Last but not least, the overarching policy ambition of delivering the digital and green transformation of the EU's economy is being implemented through a plethora of funding programmes.

All these programmes have different funding rates, different indirect cost provisions and different eligibility requirements. As a result, this agglomeration of schemes presents a considerable bureaucratic burden for any organisation working on a specific project or in a particular field that wants to engage thematically and tap these different funding streams.

In view of this, FP10 needs to be carefully designed with reference to other new programmes, such as the future DEP2 and CEF3. Taking this comprehensive and cohesive approach, the aim should be to reduce the complexity of supporting a science or research related project via different programmes and to make the work of research- and e-infrastructures less bureaucratic.

There are also national contributions to certain programmes, which results in added complexity, notably when the money is coming from Cohesion Funding or the Recovery and Resilience Facility. Here, the financial engineering needed to match the aims of these two schemes is convoluted - to say the least.

The same problem is replicated in the research Missions – one of a handful of new policy initiatives in Horizon Europe – but which draw funding from many other sources. For example, projects contributing to the objectives of the mission to restore oceans and waters are getting money from **16 different EU funding programmes**, from the Maritime, Fisheries and Aquaculture Fund (EMFAF), to the LIFE programme for climate action, and Erasmus+. This has only added to the confusion of ownership when more straightforward ambitions could have been realised.

All of this underlines the importance of single policy objectives being funded by single instruments, in order to reduce the ongoing fragmentation of the sources of funding for EU policies - which we have seen increasing in number across the European budget in the current and previous multiannual financial frameworks.

For organisations that do run cross-programme projects it would be very helpful if there was some harmonisation in criteria and reporting requirements between the various programmes.

Improve e-infrastructures for research

Under the current circumstances, matching programmes and policies is not always straightforward.

Looking at the future digital initiatives backed by the EU: the EuroHPC, the Digital twins and Destination Earth, the Common European Data Spaces, and the predicted boom of the Digital Single Market, the requirement for future data capacity and secure data connectivity is set to increase considerably.

How can an optimised FP10 best serve this development in the interest of European research, science and education?

Simplifying rules and ensuring sustainable funding for established e-infrastructures over a long period can cement Europe's competitive edge in this area. Well-functioning public e-infrastructures complement private infrastructures to ensure that European research, science and innovation remains world-leading.

Directorate generals within the European Commission should realise that existing public digital service providers such as GÉANT are essential to enact developments in public policy. Therefore, e-infrastructures should be recognised and continue to be sustainably funded in FP10 to maximise the chances of reaching the programme's vision and enabling the Digital Decade.

This should preferably be done in such a way that e-infrastructures for research remain flexible and fit for purpose and are not restricted by rules that make perfect sense for other, more narrowly defined public and private infrastructures.

Inclusive international participation

It is well-known that Horizon Europe has inclusive eligibility criteria. The association mechanism, which gives non-EU countries access to funding from parts of the programme, provides opportunities for international collaboration.

It also provides essential support to the infrastructures that support it. For example, the GÉANT Association comprises national research networks in over 40 countries in Europe, going beyond the EU-27. This is an example of European soft power, but also a fine illustration of how European values and norms can spill over to further strengthen a reciprocal neighbourhood and produce a world-leading infrastructure for research and education. Societal issues are sustainably improved through science diplomacy, not by creating barriers to participation for like-minded countries.

In a time of geopolitical instability and uncertainty, the ability to enable inclusive association to the EU research programme should be continued and protected in FP10.

RENDEZVOUS À RENNES **FOR TNC24**

TNC24 is fast approaching. From 10 to 14 June, the community will gather in the picturesque city of Rennes, France for a unique collaborative experience. The event will be hosted by RENATER, the French National Telecommunications Network for Technology, Education and Research. .

Words: Silvia Fiore, GÉANT

RENATER
CONNECTEUR DE SAVOIRS

ABOUT THE HOST

Founded in 1993 as a public interest group, RENATER is the digital expert at the service of the research and education (R&E) community in France. Its members include the French Ministry for National Education, Youth and Sports, the French Ministry of Higher Education, Research and Innovation, and a number of prestigious national research organisations.

RENATER designs and operates a reliable, secure, high-speed network guaranteeing national and international connectivity for the exclusive use of the R&E community comprising over 2 million users in France. RENATER aims to help its users meet the challenges of digital transformation by constantly innovating in the technologies that stimulate progress and performance.

THE PROGRAMME

The TNC24 Programme Committee met in Amsterdam in January to finalise the event schedule. This year, there will be 42 sessions, including side meetings, offering a thorough overview of the projects and trends of the international R&E community. Take a peek at the schedule on tnc24.geant.org/programme.

"It's an honour to chair the Programme Committee. It feels amazing to work with a team eager to craft a perfect programme for TNC24 in Rennes. The community submitted so many good proposals that making decisions was not an easy task, but we nailed it! We put a greater emphasis this year on how the programme reflects the NREN community. That means a good spread of countries, young and enthusiastic professionals on stage and, of course, a good selection of topics from technological to more organisational challenges that we all work on every day."

says Alexander van der Hill, SURF, and Chair of the TNC24 Programme Committee.

THERE WILL BE TWO KEYNOTE SPEAKERS DELIVERING PRESENTATIONS ON THE TNC24 STAGE IN RENNES.

The Call for Lightning Talks and BoFs closed on 11 March and selected proposals will be announced in the coming weeks.

Research Scientist, Massachusetts Institute of Technology | on Brain Computer Interfaces

Professor of Open Innovation & Business Venturing, School of Business and Economic, Maastricht University | on Brilliant Failures

2024 GÉANT Community Award

2024 GÉANT COMMUNITY AWARD

The GÉANT Community Award was created to recognise individuals who have made a real impact to the GÉANT community. The focus is on the people within our community and how they work on a global scale to further the role and value of research and education networking. The award ceremony is carried out annually on the TNC stage.

After collecting the community's nominations through an online form on the **GÉANT Community Website**, the award panel selected the final nominees. Now, the community can cast their vote for their favourite shortlisted nominee. Voting for the winner closes 29 March 2024. For more information about the award and visit the website or contact the organisers at **communityawards@list.geant.org**.

DO YOU WANT A SNEAK PEEK OF WHAT'S TO COME FOR THE TNC24 SOCIAL EVENTS?

MORNING RUN,
TUESDAY 11 JUNE

A gentle 5km run will take place around the streets and squares of Rennes and follow the river Vilaine which flows right through the historic city centre.

OPENING RECEPTION,
TUESDAY 11 JUNE

The Opening Reception will take place at the Couvent des Jacobins, TNC24's main venue, right after the last parallel session of the day. This is your first chance to socialise with other delegates, meet the speakers and engage with our exhibitors.

KICK OFF PARTY,
TUESDAY 11 JUNE

The TNC24 Kick Off party is where you mingle with old friends, colleagues, and create new connections. The Delirium Café has space to relax inside and out, and with a DJ providing the music it promises to be a night to remember.

CONFERENCE DINNER,
WEDNESDAY 12 JUNE

The dinner, hosted by RENATER at La Halle Martenot in Rennes, will recreate the authentic and vibrant atmosphere of a local market, and there will be a glittering collection of Gault Millau and Michelin star rated Chefs who will prepare local delicacies before your very eyes.

EMERGING NREN PROGRAMME

The Emerging NREN Programme (ENP), funded by the GÉANT Project, has been taking place alongside the previous editions of TNC starting in 2018. Since its launch, the programme has aimed to integrate representatives from emerging NRENs from around the globe into the TNC community and to create further synergies and connections at different organisational levels between European and international NRENs. Also, this year, the ENP team invites regional Research and Education Networks to nominate up to three representatives to join the programme, on a regional funding availability basis. GÉANT will waive the TNC24 conference fees and organise with RENATER, the French NREN and TNC24 host, a dedicated ENP track on the last day of the conference. But, what's NEW for the ENP this year?

- **Women in STEM track sponsored by GÉANT**: GÉANT will sponsor two to three female participants from any of the countries and territories listed by the OECD DAC as official development assistance recipients.
- **ENP Network Track**: In addition to the standard ENP Track, GÉANT will also open two extra participation slots for a Network Engineer track adding to the opportunity, for chosen participants, to focus on network planning and building alongside experienced engineers from the GÉANT community. Selected participants will be required to join a virtual meeting prior to TNC24 and to be in Rennes on the Saturday and Sunday before the conference to help with the set-up of the conference network. This hands-on experience is supported by NORDUnet and will be particularly beneficial to more experienced network engineers.

"We firmly believe that the experience of joining the ENP could have a multiplier effect and selected candidates will not only benefit from ENP personally, but also gain the opportunity to act as change makers for their NRENs."

Leila Dekkar, International Relations Project Manager, GÉANT

THE VIETSCH FOUNDATION'S MEDAL OF HONOUR

Every year, the Vietsch Foundation awards a medal of honour to people who have contributed to the development of services or technologies of lasting value that are used by the networking community and its users in research, development and education. The award, delivered on the TNC stage, is part of the Foundation's mission to promote research and development of advanced Internet technology for scientific research and higher education. To achieve its mission, the Foundation also contributes funding to specific research and development projects that demonstrate potential value to progress European and global research and education networking. The Foundation was created through the last will and testament of Willem Karel Vietsch (1952–2014), a Dutch expert, a leader of the international Internet community, and also the Secretary-General of TERENA, a former association of European national research and education networks. For details visit: **www.vietsch-foundation.org**

FUTURE TALENT PROGRAMME

The Future Talent Programme (FTP) provides an opportunity for students and young professionals, nominated by GÉANT project partners, to develop their public speaking skills, learn how to pitch proposals and deliver a powerful presentation. There will be practical and interactive workshops for participants to learn and practise together and build a new network of peers. The participants selected to deliver a Lightning Talk at TNC24 will receive additional one to one coaching. The FTP has grown in success each year, as a great opportunity to discover and support new talent within the community. For further information about the FTP, please contact the GÉANT Learning and Development Team: **glad@geant.org**.

For more information about TNC24, visit **tnc24.geant.org**

A New Compendium Website

The Compendium website is many things to many people: it is the place where NREN representatives fill in the survey every autumn; it is the database that holds previous responses; it is the place you go to find Compendium Reports; and it is once again the best place to see the data collected.

Interview by: Silvia Fiore, GÉANT
Words: Jennifer Ross and Daniel Wüstenberg, GÉANT

The Compendium Report has always served its purpose of showing the "State-of-the NREN Nation" – the big trends and changes sweeping across the GÉANT community. Now, the new Compendium Data Explorer section of the website allows users to really narrow in on a specific question or a small subset of NRENs at a time, to see how they have evolved.

We spoke to Jennifer Ross and Daniel Wustenberg of the GÉANT Partner Relations team, to understand more about the site.

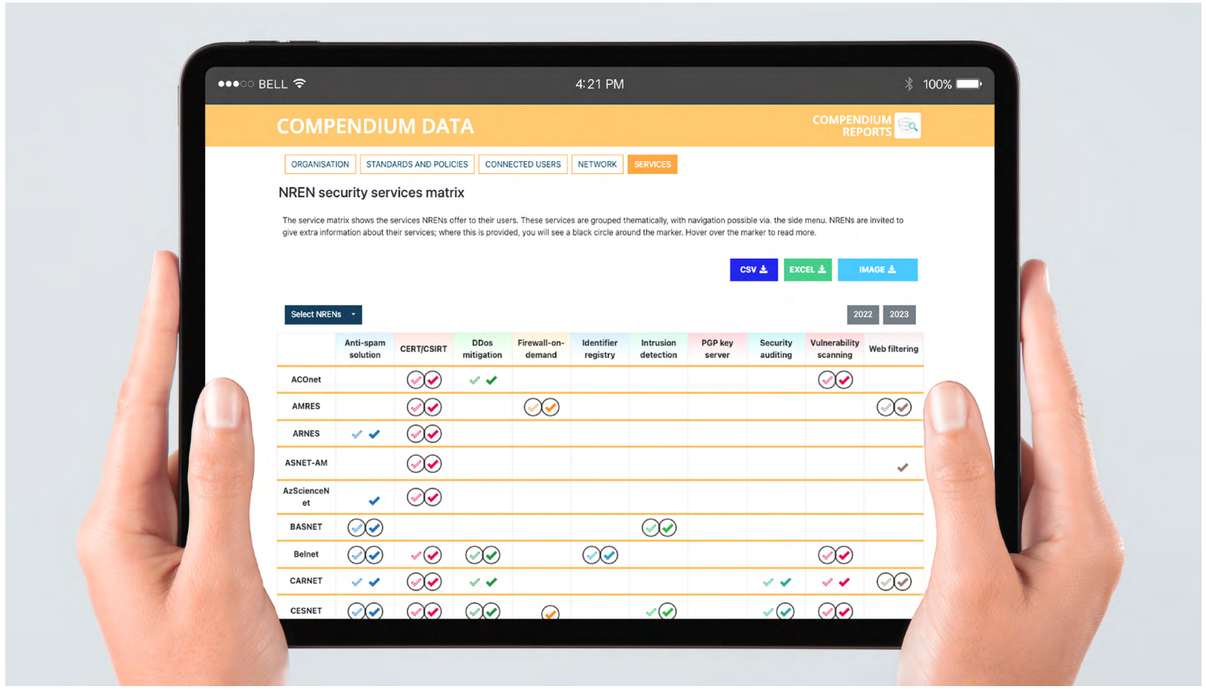
Jennifer, what are you trying to achieve with the new site?

This new website is an opportunity to ensure that key information from EU NRENs is readily available in an easy, accessible, and enduring way. Planning this new website allowed us to really think about how we could use it to support understanding and transparency within the NREN community, and ensure that the great deal of time and effort dedicated to responding to the Compendium survey each year is put to good use.

As a member of the Partner Relations team, every now and again over the years, someone from an NREN would send me a little message saying, "I'm writing a proposal seeking funding for X or Y, and I'm sure I remember filling in a question in the Compendium at some point about this... can you tell me if you have data from other NRENs about this?". Of course, I could find out pretty quickly whether we did indeed have the relevant Compendium data, but it got me thinking that only people who've filled in the Compendium questionnaire know which questions are asked. Are there other people out there struggling to develop a case for new developments or additional funding simply because they don't know that there are comparable examples elsewhere in the community?

We hope the new site will help NRENs get to know their peers, provide insight, and spark new connections. As the Compendium Advisory Board member Hank Nussbacher of IUCC says, "The GÉANT Compendium is the preeminent source for understanding the technical and economic situation of academia in Europe." It is our intention that with the new website, even more people can benefit.

Picture
Tables showing different categories of institutions served by NRENs, the actual number of such institutions connected, the % market share this represents, and the actual number of end users served in the category



How is it more user friendly now?

The new site presents visitors with two choices: the historical Compendium Reports and the Compendium Data. In the Data side of the site, visitors can see at a glance all the different topics covered by the survey, arranged by thematic areas – Organisation, Standards and Policies, Connected Users, Network, and Services. These themes can be expanded to show every question asked, and the responses. Users can choose to see the data from as many or as few NRENs as they like. A new feature is that, conveniently, if you've made a selection of a few comparable NRENs the site remembers and shows you the curated data as you move from question to question.

The website is also the new home of the Compendium Reports, which go back to 2004. Some of the data from early surveys was no longer in a format that could be included in the new data explorer but can be shared on request. We are also working on sharing graphs and tables from previous Reports in an easy-to-use format. However, we are looking forward to users generating their own graphs, by choosing a subset of NRENs and/or years, then downloading them in a variety of formats, to be included neatly in their own reports, presentations, and publications.

Daniel, the new website was used to run the 2023 survey, how did that go? Will it have an impact on the Compendium Report?

Around 130 contributors from 41 of Europe's 44 NRENs have been using the new site for the last half year. We opened the 2023 survey in the autumn on the new platform, and since early March the responses have been available in the data section of the site.

In the past, interested parties had to wait for the publication of the Compendium Report in the late spring to see what changes had occurred in the NREN landscape but, with the new site, the data is available far quicker.

With users being able to access the data directly and to generate their own graphs, we are now also thinking about possible changes to the Compendium Report. We know NRENs really like having a physical report to share, to explain the main trends sweeping the community and gives clues as to the next "big thing" in the NREN world. This year, the Compendium Report will still have its familiar format, but for the future we might pivot towards a more slimline report. However, despite the data being available to everyone, we still think that the Report can add value by carrying out deeper analysis and by making connections between the information NRENs share in the survey and other sources of data.

Pictures

Top left: The new NREN Service Matrix, showing the services NRENs offer their users

Top left: Top right: Find responses to specific survey questions via the Data section

Bottom right: Jennifer Ross, Website Product Owner

GÉANT's Software Development Manager Erik Reid, and colleagues Saket Agrahari and Bjarke Madsen of NORDUnet were the technical team behind the site. Here, Erik explains the process:

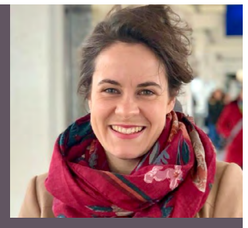
Redeveloping the Compendium website was a great opportunity to address a couple of long-standing problems with this service. First, the platform stack had become outdated and difficult to maintain or extend. We took the dual approach of using a more mature tech stack while also integrating with some modern third-party solutions to replace large libraries of custom code, all with the intention of allowing for future extensions and maintenance.

But most importantly, this project helped to formalise the processes and the working relationship between the developers and our 'customers' in partner relations. The goal was to make the development roadmap transparent and maintainable, which has allowed the work and responsibility to be shared and documented at the team level instead of being siloed and opaque. The amount of information that's now available on the site and the capacity for future enhancements, particularly when compared with what's being replaced, hopefully validates this new approach.

Overall, we feel the best part of this project was transforming a site that was run by one person into something sustainable and scalable that we could all work on together across multiple teams.

The whole team working on the site are enormously proud of the end result, and hope that the Community finds it a user friendly, trusted source of information for years to come.

Visit the new Compendium website at **compendium.geant.org**!



Jennifer Ross is a member of the Partner Relations team, and project manager of the new website. Daniel Wüstenberg, as Community Insights Manager, runs the Compendium survey and edits the Compendium Report.

"The GÉANT Compendium database offers comprehensive development of research and education networking in Europe and beyond. The new website enables a more comprehensible and reusable presentation of the data, reflecting the enormous work accomplished by the NRENs. I am glad, that this can lead to a better visibility of work of the GÉANT community."

János Mohácsi, KIFÜ, member of the Compendium Advisory Board

FUNET EST. 1983

Funet
- 40 years of telecommunications

2023 marked the 40th anniversary of Funet (Finnish University and Research Network) and the 35th anniversary of Finland's connection to the global internet. CSC's Funet can be proud of its many achievements and the future also looks bright; Funet and online services have become even more important in enabling Finnish science and the development of higher education.

Words: Tommi Kutilainen, CSC

Picture
Funet, together with Sikt in Norway and Sunet in Sweden, provided the Eiscat3D research project with 4 Tbit/s connections between the data center and three antenna sites. Credits to Johan Svensson / EISCAT Scientific Association.

In Finland, the need for a network connecting universities was identified in the early 1980s. In 1983, the Ministry of Education set up the Funet project, in which a small group of IT experts with an interest in telecommunications was given the task of developing a data network linking universities. Funet was founded on 29 December 1983, and in the following year Funet connected the universities' mainframe computers.

Here we highlight some of the major milestones in Funet's 40-year journey.

First message on the internet

On Thursday 1 December 1988, the first routing test was carried out, allowing IP packets to pass from Finland via NORDUnet to the USA. This connected Finland to the international Internet via the Funet network. The following message can be seen as the beginning of the Finnish Internet.

"This is a first test, please disable if there any problems. We now have 250 more nets in the RIP updates, thats about 10 packets being broadcast every 30th second..."

Electronic identification

As the number of online services increased, the need for electronic identification of the individual emerged. The project for electronic identification in universities was launched in 2000 with funding from the Ministry of Education and universities of applied sciences joined a little later. This led to the creation of the Haka trust network, which provides an authentication service that allows users to log in with their home organisation's IDs to services provided by other organisations.

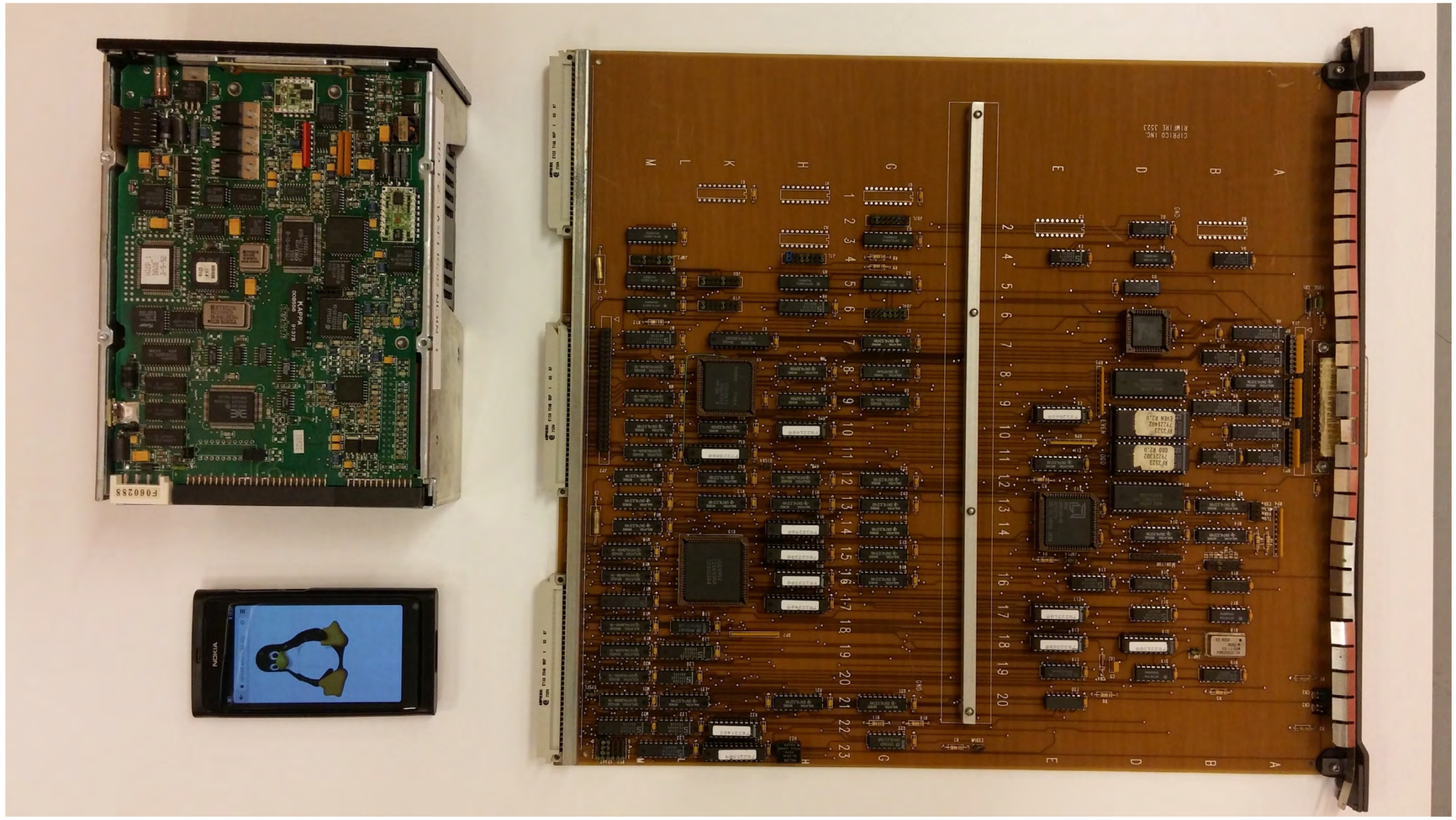
Nic.funet.fi and the Linux world conquest

Linux is the most famous and probably the most important open-source software success story.

The Linux family of operating systems can now be found on everything from home appliances and Android phones to home computers, from servers running people's common services to supercomputers grinding out heavy scientific computing. Even in data networks, servers and routers run on Linux.

Linux's birthday is 24 August 1991, when Linus Torvalds wrote in the comp.os.minix newsgroup that he was doing a free operating system: "I'm doing a (free) operating system (just a hobby, won't be big and professional like gnu)."

On 17 September 1991, Torvalds made Linux version 0.01 openly available to everyone via the CSC file server nic.funet.fi. The file server is still in use today and one of the longest running internet services in Finland.



At this time, electronic identification was being developed by many organisations and Funet was a major contributor. Early experiments with electronic identification have enabled a wide range of online services in what we consider to be our everyday life.

Picture
Funet file server's controller drive. Credits to Harri Salminen, CSC.

Funet CERT and information security

The growth in the number of users and new services made the internet more vulnerable. Computer Emergency Response Teams (CERTs) were set up in different countries to respond quickly to various network security threats. In 1995 Funet set up Finland's first CERT to share information about network security threats and guidelines for responding to them.

Quantum technology

The quantum computer is seen not only as a revolutioniser in computational science, but also as a very powerful crypto-breaker, so the preparations for the quantum age are also underway in the field of network technology. Funet is involved in building the first experimental network for quantum encryption.

High-capacity data connections

In the early 2000s, Funet introduced high-speed connections known as 'light paths', which are separate connections designed for the specific needs of research. One of the first users was the Metsähovi radio observatory in Kirkkonummi, Finland. The 10 Gbit/s light path was used to transfer measurement data collected by the Metsähovi radio telescope to research centers in Central Europe and the US. Previously, data had been transferred by mailing hard disks. Funet has also tested the network's performance over ultrafast data connections. In 2021, bits could be transmitted at 800Gbit/s over a distance of more than 2,000 km. In 2022, Funet and Sweden's Sunet were able to transmit data at 400 Gbit/s over a distance of 10,000 km.

In 2023 and 2024, Funet will deploy the first 400 Gbit/s backbone connections, among the first NRENs in the world to do so.

In 2023, Funet, together with Sikt in Norway and Sunet in Sweden, provided the Eiscat3D research project with 4 Tbit/s connections between the data center in Kalix, Sweden and three antenna sites located at Kaaresuvanto in Finland, Skibotn in Norway and Kaiseniemi in Sweden.

The EISCAT 3D radar system provides three-dimensional views of the atmosphere and ionosphere phenomena.

120,000 students on the path to becoming “white hat hackers” in Brazil

Information security requires professionals to constantly learn and be able to adapt to new technologies, solve new problems and foresee new risks, having to protect and monitor systems from end to end.

Words: Ana Carolina Landi, RNP

However, there is a gap between the demand for cybersecurity professionals and the qualified training of this workforce. In Brazil alone, according to data from the International Information Systems Security Certification Consortium (ISC²), there are at least 300,000 unfilled vacancies in the cybersecurity area.

In this context, the White Hat Hackers (Hackers do Bem in Portuguese) program was born, working on several fronts to revolutionize the area of security in the country, fostering the ecosystem with creative solutions and connecting professionals ready to work in cybersecurity with opportunities in the most different market niches. The program has the National Education and Research Network (RNP) and Senai São Paulo as executors in Softex’s National Priority Innovation Program, with resources from the ICT Law.

One of Hackers do Bem’s proposals is to reduce the gap between vacancies and trained cybersecurity professionals. The training is open to technical, secondary and higher education students, technology professionals looking for specialization and professionals looking to move into another area. Hackers do Bem aims to develop human resources in cybersecurity, so you don’t need to have any experience to sign up for the course.

Initially, the program was going to offer at least 30,000 students the opportunity to become professionals free of charge. However, around 120,000 students were already enrolled when the course opened on January 22, 2024.

Hackers do Bem has five mapped tracks: the leveling, basic, fundamental, specialized and technological residency courses. The program’s virtual learning platform includes video lessons, quizzes, animations, live classes and theoretical and practical exercises using simulators.

Another front of the initiative is support for innovation projects. The program opens calls for RD&I projects in cybersecurity, so that research laboratories and startups can develop new products and services.

“We’re going to create a cybersecurity hub to connect trained professionals with companies and their job opportunities. We’re also promoting capture the flags (CTFs), i.e. competitions in the area, as well as hackathons and workshops to bring this topic into the curricula of schools and universities.”

Iara Machado, the director of Research, Development and Innovation of RNP.

Poznan Supercomputing and Networking Center – Thirty years have passed...

For thirty years now, we have been collaborating with research institutions to explore new areas of scientific challenges in joint projects, but also with business partners – both those just starting out in the market and large companies – who see our competence and experience as a strong asset for the development of competitive innovation.

Words: Cezary Mazurek, Maciej Stroiński, PSNC

Poznan Supercomputing and Networking Center

PSNC provides access to world-class e-Infrastructure for the scientific community, thus creating a specific research and development environment - DIGITAL SCIENCE - for proof-of-concept, prototyping and large-scale pilot projects. The second branch of our activity is DIGITAL ECONOMY that is oriented to the creation of innovations based on information and communication technologies (ICT). An equally important element is our mission activity in the context of SOCIAL INNOVATION by spreading knowledge and awareness of modern technological opportunities among various social groups, as well as actively fighting the problem of digital exclusion.

PSNC is a unique institution that has been building its position and relationships in a similar model for 30 years, resulting in our participation in many regional, national and international projects. We successfully apply this style of operation to build long-lasting and good relationships with business partners in Poland and abroad. This is evidenced by business partnerships in the construction of research infrastructures, the beginning of EDIH activities or close cooperation with companies in the technological areas of quantum computing and communications, aerospace and autonomy, and cyber security.

How did it all start?

In April 1993, the College of Rectors of the City of Poznań designates the Institute of Bioorganic Chemistry of the Polish Academy of Sciences as the Leading Unit for the Metropolitan Area Network (MAN) and supercomputers (HPC center). The Poznan Supercomputing and Networking Center was established at the Institute to carry out this task as of 1 November 1993. At that time, the Center's staff consisted of 6 people: Prof. Jan Węglarz as a scientific supervisor, Dr. Maciej Stroinski as a technical manager, and three young graduate students: Artur Binczewski, Cezary Mazurek, and Norbert Meyer as those responsible for network development, services and data processing, respectively, as well as Elżbieta Łobaza, who was responsible for administrative support.

Thirty years have passed. Five of those six people are still working at the PSNC today, and its current staff numbers more than 500 employees. Over the years, we have completed 344 international projects. In the Horizon Europe/ Digital Europe program, which has been running for three years, we have already obtained 30 projects. Of all these project activities, we have coordinated as many as 26. A distinguishing feature of PSNC's activities is also the wide range of various financial instruments to which we successfully apply. Programs such as eContent+, Active Assisted Living, Erasmus, Norwegian Funds, COST and many others represent a total of 44 projects evaluated and implemented according to various criteria and rules.

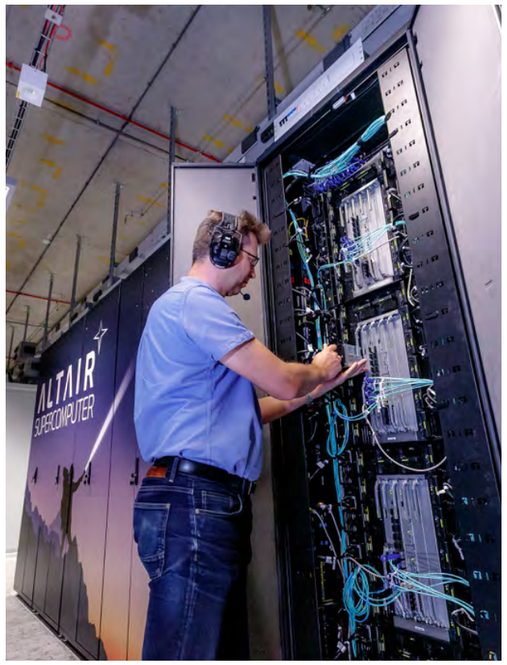
Three decades of the PSNC

Each of the three decades was crowned with a spectacular success that defined activities in the following years. The end of the first decade brought the establishment of the PIONIER national fiber-optic network and the PIONIER Consortium. The second decade witnessed the construction of the CBPIO laboratory complex (Research Center for the Polish Optical Internet) and Future ICT (Development of a competence center for next-generation networks and services). The third ends with the implementation of quantum computing and communications technologies and the launch of the Digital Airport laboratory.

The first years of operation were a time of fascination with the new development opportunities that emerged following the political changes in the early 1990s. The establishment of the Scientific Research Committee and its initiative to build the information infrastructure for science, and the lifting of COCOM (Coordinating Committee for Multilateral Export Control) restrictions allowed us

Pictures
Far left: PSNC crew in front of the headquarters in Poznań

Above: Cezary Mazurek, Ph.D. Director of PSNC (CEO)



to join the global development race and realize the dream of partnerships in Europe and the world. Bold decisions on the implementation of metropolitan networks in FDDI, ATM, Gigabit Ethernet technologies, as well as DWDM in the national network, coupled with the implementation of the paradigm of our own scientific fiber optics in metropolitan networks and in the national network, resulted in creating a unique system of information infrastructure for science links in Poland.

Users (universities, scientific institutes) connected to metropolitan computer networks and HPC centers, and the national fiber-optic network connecting this structure together, obtained a developmental impetus for the construction of campus networks and thus for providing researchers with access to the opportunities offered by the entire information infrastructure for science to support their work.

These activities are crowned by the creation of the program "PIONIER: Polish Optical Internet - Advanced Applications, Services and Technologies for the Information Society" (September 2000), the construction of the PIONIER network under this program and the formation of the PIONIER Consortium (2003). The continuation and development of these ideas today results in the 20th anniversary of this Consortium.

The second decade is a time of development of the information infrastructure for science. The period brings the first joint R&D projects with PSNC's significant contribution (iTVP and Clusterix). Furthermore, PSNC defines and implements environmental programs for the development of services in the network (projects: FBC, KMD, PLATON, KMD2, MAN-HA), as well as the expansion of 21 MANs and the PIONIER national network (projects: NewMAN, 100net). The final years of this decade are marked by the progressive digital revolution through the so-called Disruptive Technologies, which leads to the creation of a "digital vortex."

All areas of academic, economic and social life are given a new dimension by integrating digital support processes into their field. For PSNC, this was an important signal of the need to expand the functionality of e-Infrastructure with new services, applications and algorithms for digital transformation processes. After all, if science is expected to creatively participate in these processes, it must have the appropriate tools and capabilities. In this spirit, the concept of building a complex of laboratories linked to the construction of the headquarters of the PSNC (CBPIO project - 2008), as well as science open to innovation (Future ICT project - 2013) is being developed. The decade ends with the launch of these projects and already in 2015, they are put into operation, and their mission begins.

The third decade saw the entry of the PSNC into the mainstream of digital transformation in a number of vital areas including digital humanities, personalized medicine, smart cities, smart agriculture, new media, quantum technologies, time and frequency metrology, or energy transformation with our participation in European nuclear fusion projects.

The establishment of a complex of digital transformation laboratories in the CBPIO and Future ICT projects influenced the formation of a unique communications and services ecosystem around MANs, HPCs and PIONIER networks. Many of these laboratories were transferred to the national dimension in the implementation of projects with PMIB: PIONIER-LAB, PRACE-LAB, PRACE-LAB2, KMD, DARIAH-PL, led by PSNC, as well as five PMIB projects: EuroHPC PL and 5G-PL, NEBI, MOSAIC, NLPQT, in which PSNC actively participated.

Pictures
Top left: CBPIO (Research Center of the Polish Optical Internet), headquarters of PSNC

Second from left: Altair supercomputer

Third from left: Anniversary cake during the celebration of the 30th anniversary of PSNC

Fourth from left: Cezary Mazurek, Ph.D. Director of PSNC (CEO) (left) and former Director of PSNC Maciej Stroiński Ph.D. (right) during the celebration of the 30th anniversary of PSNC.

The end of the third decade is an opening for new technologies that have the potential to revolutionize global digital transformation. These are the technologies of quantum communication and processing and autonomous machines, which, in conjunction with artificial intelligence and digital twins, will provide the impetus and set the R&D directions for the fourth decade. We are entering it with the PIONIER-Q network, the Center for Quantum Processing and the Digital Airport.

A development phenomenon of three decades

Every achievement of the decade is developed in the consecutive years. And the final years of a decade bring some anxiety and search for new development impulses. This is a good model of development by continuity.

An essential element of this model is people. Their intelligence and enthusiasm make it possible to take on any job and face any challenge. This is accompanied by a genuine passion for finding the best solutions and boldly implementing them.

Undertaking innovative development theses is always fraught with risk. At PSNC, this risk has been minimized through extensive use of proof-of-concept approaches. A general reflection inspired by the 30th anniversary of the PSNC and many other Leading Entities, as well as the 20th anniversary of the PIONIER Consortium, is the observation that in the beginning, the information infrastructure for science was perceived as an "add-on to science." Today, the infrastructure is at the center of science, and access to it is a prerequisite for cognitive and scientific processes. One can even say that it is a catalyst for the processes undertaken to solve the great challenges of humanity in the 21st century.

"The services developed in the PIONIER consortium and implemented within the metropolitan networks on the basis of a whole course of previous projects and thanks to the finishing PIONIER-LAB project are entering the next stage of maturity of the joint IT infrastructure, distributed nationally in a federated model. Acting as the operator of this network, PSNC will always associate all its development capabilities with the growth of PIONIER significance for science and the economy."

Cezary Mazurek, Ph.D. Director of PSNC (CEO)

CARNET

CARNET's Cutting-Edge Projects:

Empowering Education for all and building a Secure Communication Infrastructure

In the pursuit of an inclusive and digitally advanced education landscape, the Croatian Academic and Research Network - CARNET – is leading the way with transformative projects. ATTEND, e-Universities, BrAIn, and CroQCI demonstrate a commitment to innovation, accessibility, and the integration of emerging technologies.

Words: Anja Korda, CARNET

e-Sveučilišta

ATTEND – Bridging Gaps for Pupils with Disabilities

The Enhanced Tools for Creating Equal Opportunities in Education for Pupils with Disabilities – ATTEND project addresses the unique needs of students with disabilities in Croatia. By equipping Centres for the upbringing and education of students with disabilities with assistive technology, ATTEND aims to provide a high-quality and inclusive education. The project, worth 4.2 million Euro, spans three years (2021-2024) and encompasses key segments such as technology deployment, staff training, and a public awareness campaign.

e-Universities - Digital Transformation of Higher Education

CARNET's e-Universities 84 million Euro project plays a pivotal role in the digital transformation of higher education in Croatia. With a comprehensive approach, the project aims to improve digital teaching infrastructure, introduce advanced teaching tools, and enhance teachers' digital competencies. e-Universities seek to foster flexibility and innovation within public higher education institutions through investments in network infrastructure, cybersecurity, and educational support.

BrAIn - Nurturing AI Education

The BrAIn project includes the development of a new curriculum on digital technologies and artificial intelligence for 7th and 8th-grade primary school students and 2nd and 3rd-year high school students, and the education program for teachers. By integrating AI curricula into academic institutions, this 15 million Euro project equips students and teachers with the skills needed to navigate the evolving digital landscape. BrAIn's overarching goal is to empower students by providing them with a profound understanding of AI concepts, preparing them for the future. Specific objectives include continuous monitoring of digital technology impacts, developing a system of smart recommendations, and ensuring high availability of digitized educational services through efficient network and cybersecurity management.

CroQCI - Croatia's Quantum Leap in Communication

Recognizing the significance of the European Quantum Communication Infrastructure (EuroQCI) initiative, Croatia, through the CroQCI Consortium, is taking its first steps towards building a secure quantum communication network. Coordinated by CARNET, the 10 million Euro project is financed through the Digital Europe program and the National Recovery and Resilience Plan 2021-2026. This initiative reflects Croatia's commitment to advancing quantum communication capabilities across the European Union providing the network architecture and design usage scenarios that will enable the integration of ground infrastructure with the future space component into a fully functional quantum communication network.

From providing assistive technology for students with disabilities to spearheading quantum communication initiatives and enhancing digital teaching infrastructure, CARNET is shaping the future of education in Croatia. These projects in total worth of over 110 million euros not only bridge gaps but also open doors to new possibilities, ensuring that every student, regardless of abilities or circumstances, has the opportunity to thrive in the digital age.

Bridging Continents, Igniting Innovations: The APAN Journey

The APAN Consortium, officially formed in June 1997 is aimed at advancing networking technologies and promoting high-performance broadband applications, fostering innovation and collaboration across the Asia-Pacific region and beyond.

Words: Liana Jacinta Jaganathan, APAN General Manager and Shaan Sivagurunathan, Head of APAN Secretariat

A non-profit international alliance, APAN set out to create a human collaboration platform dedicated to the research and development of next-generation applications and services. At its core, APAN aims to provide an advanced environment tailored to the unique needs of the research and education community in the Asia-Pacific region. Beyond regional boundaries, APAN champions global collaboration, recognising the transformative power of shared knowledge and expertise.

As we reflect on APAN's journey, it becomes evident that collaboration and innovation are fundamental to addressing the challenges facing NRENs and similar organizations. We encourage entities such as GÉANT and other NRENs to prioritise community engagement and capacity building within the research and education community. In striving to overcome the obstacles ahead, it is crucial to draw upon the lessons learned, emphasising the importance of collective effort and partnership.

Together, let us collectively embrace the responsibility of shaping a more connected and collaborative future, one that empowers researchers, innovators, educators, students and industry to tackle the challenges of our time with determination and partnership.

For more information on the APAN and its initiatives, visit the **APAN's official website**

Pictures
Top left: Agriculture WG at APAN55, Nepal

Above: Opening ceremony at APAN55, Nepal

APAN Asia Pacific Advanced Network
Connecting People, Cultures, Research and Education

How cyber threat sharing can improve security and resilience for research and education

We met with David Heed, senior IT-security practitioner from the Swedish NREN Sunet, and joint task-lead for security products and services (including cyberthreat intelligence and security threat landscape) in the GN5-1 Work Package 8 on Security. David talked to us about the growing need for a common platform to facilitate and standardise cyber threat intelligence sharing in order to overcome the evolving cybersecurity challenges faced by the R&E sector.

Interview by: Rosanna Norman, GÉANT

David, what are the main cybersecurity challenges that the R&E sector is facing and how do you think that cyber threat intelligence sharing could address them?

The research and education (R&E) sector is vital for every country's national interest as it contributes to the advancement of knowledge, innovation and economic growth. However, the sector is also facing increasing cyber threats from various players, such as state-sponsored hackers, cybercriminals, hacktivists and often insiders. These threats can compromise the confidentiality, integrity and availability of the sector's data, systems and services, as well as harm its reputation and trust.

To address these challenges, the R&E sector needs to adopt a proactive and collaborative approach to cybersecurity, by sharing information about cyber threats and incidents with relevant stakeholders, such as institutions, government agencies, industry partners and research networks. Cyber threat sharing can help R&E to improve its collective security and resilience, as well as to enhance its situational awareness and intelligence capabilities. By exchanging and analysing cyber threat indicators and defensive measures, the sector can gain insights into the tactics, techniques and procedures of the adversaries, as well as the vulnerabilities and risks of the systems and processes. In addition, it can enable the sector to detect, prevent, respond and recover from cyber-attacks more effectively and efficiently, as well as to inform and influence its strategic and operational decision making.

However, cyber threat sharing is not a straightforward or simple practice, as it involves various technical, organisational and social challenges, such as ensuring the quality, relevance and timeliness of the shared information, protecting the privacy and confidentiality of the sources and targets and establishing trust and cooperation among all parties.

What can be shared through MISP?

- Scanners. The frequent requests for a large number of sessions that seldom lead to interaction or data transfer. Being able to share IP-numbers is just an indicator that this is a common occurrence and not targeted threats to organisations.
- Phishing senders and information. These could include infrastructure (SMTP hosts), IP-numbers or used addresses. Webservices linked through these messages are often useful to keep track of and to identify potential victims of an attack.
- Bots such as attacking and overtaken infrastructure. Most communication to and from these hosts is to be considered malicious in some way.
- Collecting information from other sources such as malware protection and sharing Indicators of compromise (IOCs) from Sandboxes and antivirus. This could include strings, addresses and hash values.
- Various indicators of attribution. Although accuracy might be an issue here, there could be indicators of repeating behaviour, processes and tools used in a specific order or other forms of references.
- Additional sources of information defined by your use-case.

How can cyber threat sharing be managed?

To overcome these challenges, the R&E sector needs to use a platform that facilitates and standardises cyber threat intelligence sharing, as well as to build a trusted shared environment, where parties can collaborate and communicate with each other in a secure and respectful manner.

So, let's talk about MISP (Malware Information Sharing Platform). MISP is an open-source project that allows users to store, correlate, analyse and share cyber threat indicators and defensive measures in a structured and machine-readable way.

MISP supports various data formats and protocols (STIX, OpenIOC, TAXII, and MISP JSON) to enable interoperability and integration with other tools and systems. MISP also provides various features and functionalities, such as visualisation, tagging, feeds and automation, to help users make sense of the large amount of threat information available.

What else do you think should be considered alongside a common platform for cyber threat intelligence sharing?

A platform like MISP is not enough to ensure effective and efficient cyber threat sharing. There is also the opportunity to improve detection in log platforms and filtering devices with threat feeds. There are both community and commercial alternatives available. Users also need to build a trusted shared environment, where they can collaborate and communicate with each other in a secure and respectful manner. Trust building is a complex and dynamic process that depends on a variety of factors, including goals, interests, values, norms and expectations of the parties, as well as the context, frequency and quality of their interactions. Engagement with trusted partners and vendors is needed at the start of the process as openly shared information can contain a great deal of noise or old information.

Activities to build trust in a cyber threat sharing environment could include:

1. Definitions and agreement on the objectives, scope and rules of cyber threat sharing, such as what type of information, how to share it, when and with whom.
2. Establish and maintain a clear and transparent governance structure, such as roles, responsibilities and accountability mechanisms for cyber threat sharing activities and processes.
3. Develop and implement common standards and best practices for cyber threat sharing, such as data formats, protocols, taxonomies and quality criteria, to ensure consistency, compatibility and reliability of the shared information.
4. Provide and seek feedback and recognition for cyber threat sharing contributions and outcomes, such as acknowledgment of sources, information validation, reporting the impact, reward of efforts.
5. Foster and sustain a culture of trust and cooperation among cyber threat sharing participants, such as promoting mutual respect, understanding and learning, as well as resolving conflicts and disputes in a constructive and timely manner.

Sharing agreements, for instance, are formal or informal arrangements that specify the terms and conditions of cyber threat sharing among the parties involved. Sharing agreements can help to establish trust and confidence among participants, as well as to clarify expectations, obligations and responsibilities of each party. Sharing agreements can also help to address some of the legal and regulatory issues that may arise from cyber threat sharing, such as liability, consent, disclosure and compliance. Sharing agreements can vary in their scope, level of detail and enforceability, depending on the involved parties' needs and preferences. Examples of sharing agreements are Memoranda of understanding (MOUs) or memoranda of agreement (MOAs), Non-disclosure agreements (NDAs), Data sharing agreements (DSAs), Service level agreements (SLAs) and Terms of use (TOUs) or terms of service (TOS).

What's next?

Cyber threat sharing is a valuable and necessary practice for the enhancement of cybersecurity in organisations and society as a whole. However, this practice also requires a careful and deliberate approach to ensure its effectiveness and efficiency. By using a platform like MISP and by building a trusted shared environment, users can leverage benefits and overcome relevant challenges. Within the academic European space GÉANT has started coordinating the creation of an R&E Security Intelligence Hub – a virtual organisation that aims to create, collect, analyse, classify and share actionable security intelligence for the international R&E sector.

Picture
David Heed, Sunet

Planning a more secure internet

We met with Professor Roland van Rijswijk-Deij from the University of Twente, who will present the keynote 'Moving the goal to post quantum' at GÉANT's Security Days conference that will take place in Prague on 9-11 April 2024.

Interview by: Rosanna Norman, GÉANT

Professor Roland van Rijswijk-Deij's keynote will officially kick off the conference in the opening plenary on Wednesday 10 April. From the complexities presented by the transition of the internet to post-quantum cryptography, to the role of academia in the development of quantum-safe algorithms, the insightful conversation also highlights the specific challenges for R&E networking in the context of post-quantum internet and the urgent need to standardise post-quantum cryptographic algorithms.

Roland, in your keynote, you'll discuss the challenges of transitioning the entire internet to post-quantum cryptography. Could you elaborate on the basic need for post-quantum cryptography and how it differs from classical cryptographic methods? What are the key challenges we'll face during this transition?

We need post-quantum cryptography to keep the internet secure in a future where quantum computers can crack all public key cryptography in a matter of hours. "Post-quantum" is a bit of a misnomer in that sense, as the "post" refers to "the time after powerful quantum computers become a reality". In actual fact, we need to transition to these algorithms well before quantum computers become available; this is because we need to protect data that is stored long-term, think years or decades, including data that may be collected without consent (e.g., intelligence services storing encrypted internet traffic). Experts therefore also refer to PQC as "quantum-safe" or "quantum-resistant".

The biggest challenges we will face are likely due to the different nature of PQC algorithms. They may, for example, require significantly more memory, have much larger keys or signatures, or require more computational power. Combine that with the ubiquitous use of public key cryptography in anything from mainstream internet protocols, such as the Web, to the internet of Things and, e.g., Industrial Control Systems and you quickly realise this is a daunting task. On top of all this, as with many security improvements on the internet, it is likely that the incentives for deploying PQC may be misaligned, with those bearing the cost not reaping the immediate benefits.

Quantum computers pose a significant threat to current public key cryptography. How close are we to practical quantum computers, and what impact could they have on our existing security infrastructure? What role can academia play in developing quantum-safe cryptographic algorithms?

The "when" in "when will we have a practical quantum computer" really is the million-euro question. Nobody really knows, and this includes the physicists that are developing the circuits for quantum computers. At the same time, experts increasingly agree that, yes, there will be a practical quantum computer in the future, and maybe even more importantly, the time horizon when they think this will happen is shrinking. Michele Mosca, a well-known expert in the field of quantum computing, conducts a survey among experts on a regular basis. In the most recent edition, from 2023, more than half the experts say that they put the likelihood of a practical quantum computer at 70% or more within the next 20 years.

To answer the other question: academia plays a major role in developing quantum-safe cryptography. Academics both develop new algorithms and perform cryptanalysis to test the strength of candidate algorithms. So, I would say the role of academia in developing quantum-safe algorithms is vital. A number of European academics are at the forefront of these developments, so we also have a significant European finger in this pie.

You'll be using examples from R&E networking to highlight challenges. Could you share specific instances where R&E networks face unique security concerns? How can we address these challenges effectively?

R&E networks have a number of key challenges: they are very open, in the sense that there is lightweight control over who does what on the network. This is vital for research and for students and staff to be able to explore and experiment. At the same time, this can pose risks. One key challenge with post-quantum cryptography is that it might be abused in denial-of-service attacks, for example because keys and signatures are much larger and can be abused in so-called amplification attacks. Similarly, higher computational requirements may be abused for resource-exhaustion attacks.

Another thing that R&E networks do very well is federated identity. For network access we have eduroam, which relies on public key cryptography during the authentication phase. This will obviously have to be migrated to quantum-safe cryptography, which may pose challenges in the constrained environments in which such authentications take place. Similarly, web identity federations such as eduGAIN are a powerful tool for collaboration. Yet they too rely extensively on public key cryptography and will need to be migrated to quantum-safe alternatives. Given the number of transactions these federations process, especially at the start of academic terms, we will need to pay special attention to the performance of the algorithms we choose.

Given the global nature of the internet, collaboration and standardisation are crucial. How can international cooperation help accelerate the adoption of post-quantum cryptographic algorithms? What efforts are underway to standardise these algorithms?

The US currently plays a key role in standardising algorithms. The US National Institute for Standards and Technology (NIST) has been running a competition for PQC algorithms for a number of years now, and the rest of the world seems happy to follow. I would argue that we could exercise a bit more independence as Europe here. At the same time, the global nature of the internet requires us to pick standards globally. The internet Engineering Task Force is also exploring PQC algorithms for the use in internet protocols. I personally still miss a sense of urgency among many people in the IETF. We know from experience - and research - that transitioning to new cryptographic algorithms can easily take a decade or more. Given that we still need to start standardisation for most internet protocols, I think it's high time we get going.

As we transition to new cryptographic methods, how do we strike a balance between security and usability? What considerations should organisations keep in mind when implementing post-quantum cryptography?

That is a tricky question. One thing I would say is: design for cryptographic agility. What I mean by that is that many systems we use today are intimately tied to a single choice of cryptographic algorithm. Then, if you need to migrate to some other algorithm this may be a major task as replacing entire systems is not trivial. What we will likely see with PQC is that sometimes new algorithms turn out to not be as secure as we had hoped, and we will need to replace them in a hurry. If your applications are more agile, this is then an easy job.

Prestigious Vidi funding

Professor van Rijswijk-Deij is one of the 2023 recipients of the prestigious Vidi funding from the Dutch Research Council. Vidi is part of the Council's Talent Programme and is aimed at experienced researchers with an already established and successful research career since obtaining their PhD. This grant will help Roland and his team to develop a systematic approach for transitioning to a quantum-safe internet.

A completely new eduMEET: Version 4 marks coming of age of GÉANT's videoconferencing platform

Over the past few years, throughout the pandemic and major societal changes that followed, the research and education (R&E) community has seen a huge increase in videoconferencing demand. With a global shift towards remote work, online education, and virtual collaboration, eduMEET – the open-source videoconferencing platform developed within the GÉANT project – has emerged as an increasingly attractive and cost-effective videoconferencing solution, tailored for the needs of R&E, and highly focused on security and privacy.

Words: Leonardo Marino, GÉANT

In response to this increased demand and the needs of the community, we are delighted to announce that eduMEET is now evolving into a completely new and improved version, with re-built architecture and a series of innovative features. This release, combined with the ongoing process to launch eduMEET as a community-supported solution, opens the way towards many opportunities and possible scenarios for the future of eduMEET.

Evolving eduMEET

The new eduMEET version 4 is completely rewritten from scratch, simplifying its code (thus making it easier for volunteer developers to familiarise with it), using the latest implementation standards, and refreshing its look and feel.

With the release of its latest version, eduMEET moves past being limited only to small and medium meetings. In version 4, new, distributed, and scalable architecture now allows collaboration of distant media nodes to serve large and very large meeting rooms.

Furthermore, eduMEET's user interface has been refreshed and simplified, resulting in a clean and intuitive layout and a smoother user experience. Developers also worked to introduce a set of new features, which now bring eduMEET on par with the most popular commercial offerings. These include:

- Breakout rooms – facilitating discussions in smaller groups and collaboration.
- Transcription engines – a rare feature in the context of free videoconferencing software.
- Background blur – providing a professional and polished look for your videoconferences, while at the same time enhancing security by removing unnecessary elements in the background.
- Dynamic and user-controlled layout – up to 49 visible participants.
- Improved performance – faster load times and flawless streaming experience.

In the backend, a dedicated service for eduMEET instance management was developed to facilitate administration of large deployments. Among backend updates, it's worth noting:

- Multi tenancy support.
- Complete individual configuration per room (owners, available modules, background, access control).
- PBRC (Policy Based Role-set Control) per room.
- Management-server-client for administration (web-UI).

Finally, the scalability of the media backbone is now improved and as such, the maximum size of the rooms can be scaled just by adding media-nodes.

These features add to the already delivered advancements such as the synchronous playback of high-quality videos (VoDsync), which was funded via the GÉANT Innovation Programme, and of particular interest for use cases in the areas of telemedicine, education, and performing arts.

Read how eduMEET's high quality and low-latency streaming enabled a live performance of music from seismographic data recorded in real time: **https://impact.geant.org/music-storytelling/**

What's next for eduMEET?

Supported by the service incubator in the GN5-1 project, further developments of eduMEET are currently ongoing, with two more versions planned for release at 6-month intervals, in Q2 2024 and towards the end of the GN5-1 project in Q4 2024. The development process will be based on requests from the community and on market analysis and is set to focus mostly on the release of new features, on continuous improvement of stability and security aspects, and on keeping the software up to date in line with new browser versions and new standards.

However, eduMEET's future will not be solely limited to its technical developments. The release of version 4 aligns with the ongoing work to spin-out eduMEET from a project-based and project-funded initiative into a self-sustaining, community-financed open-source software. Currently being progressed in collaboration with The Commons Conservancy foundation and planned by 2024, the spin-out of eduMEET aims to provide a solid base for future efforts, and attract external funding and new participants.

In this context, eduMEET invites all interested developers and institutions to contribute by joining **https://github.com/edumeet**.

Would you like to try the new version? Take a test drive at **https://edumeet-v4-demo.geant.org**

Keep an eye on eduMEET's website for future developments and news: **https://edumeet.geant.org/**

How GÉANT Cloud Frameworks outline the cloudscape* of European R&E – A panoramic view

In the rapidly evolving global landscape of Research and Education, cloud-based services have become a driving force for innovation, tapping into every digitised field and in all areas. The increasing adoption of commercial cloud services in parallel with community cloud is helping to advance research globally, fostering the digitisation of education, and transforming the way institutions access resources and utilise them.

Words: Leonardo Marino, GÉANT

Picture
Study of Clouds over the Sea by Eckersberg, C.W. - 1826 - National Gallery of Denmark, Denmark - CC0.
https://www.europeana.eu/item/2020903/KMS6433

In this context, the GÉANT cloud frameworks – the 2016 IaaS and 2020 IaaS+ (aka OCRE) frameworks, supported by the GN4-2, GN4-3 and GN5-1 projects – were and continue to be a fundamental propelling and shaping force for this digital transformation in European Research and Education. Now at their second iteration and actively procuring the third one, these ground-breaking frameworks have enabled easy, agile, and compliant consumption of a wide portfolio of cloud services across European R&E, while reducing costs and bureaucratic burdens.

The impact of these initiatives continues to make ripples and expand across the skies of European R&E. As of February 2024, nearly 900 institutions in 28 countries were reported to be actively consuming commercial cloud services via the frameworks, with a 30% increase in yearly consumption in 2023 alone – a trend only expected to grow.

The aggregating potential of GÉANT and NRENs in action on European R&E clouds

The impressive accomplishments of the GÉANT cloud frameworks would hardly be possible without the aggregating power, profound knowledge of R&E communities, collaborative approach, and broad expertise of GÉANT and of the European NRENs, and without the efforts and continuous support of GÉANT projects.

Due to their nature and mission, GÉANT and the NRENs are uniquely positioned to collectively procure and distribute commercial cloud services towards the pan-European R&E community. Through its frameworks, GÉANT consolidates the requirements and demand of R&E into unified public procurements, bridging the demand and supply sides and thus making it easier for commercial suppliers to deliver their services and for the Research and Education institutions to procure them.

Additionally, the added value of the frameworks extends way beyond the bridging role. Through the pan-European procurements, GÉANT and the NRENs represent and advance the interests of Research and Education communities, leveraging their collective market aggregation to procure at scale and advocate for favourable conditions from cloud service providers, significant discounts, and offerings tailored to the specific needs and requirements of R&E.

While commercial cloud services have now become an important part of the researcher's toolkit and are being progressively embraced by research and education institutions, often their usage takes place without due consideration of terms and conditions. GÉANT Cloud Frameworks address this issue by implementing a gated process, in which GÉANT and the NRENs act as intermediaries between the R&E communities they serve and the cloud service providers, ensuring that the procured cloud services are compliant with relevant rules and regulations and aligned with the community's needs and values. In this sense, particular attention is given to standards and certifications, public procurement regulations, identity management requirements (including support to eduGAIN), peering with the GÉANT network, minimised ingress/egress charges, cost control, and to the aspects of data security, sustainability, interoperability, data autonomy and privacy.

Finally, the coordinated work of GÉANT, the NRENs and the "Above-the-Net Services" Work Package in GÉANT projects (GN4-2, GN4-3, and currently GN5-1), provides continuous support to the frameworks and enables the service delivery chain, both facing suppliers and users. In particular, a dedicated contract management team within the Work Package is responsible for handling the extensive number of framework contracts, working closely with suppliers and consuming institutes and collecting quarterly data for reporting purposes, while a separate user-facing team takes care of engaging NRENs and institutions, organising bi-weekly forums with NRENs Cloud Service Delivery Managers (CSDMs), trainings and workshops, collecting requirements, and managing communications. With the GN5-1 project, the Work Package now expanded its activities around the frameworks, re-introducing cloud procurement activities under the umbrella of GÉANT projects and introducing a new strategic function in the form of a Cloud Strategy Forum.

On the horizon – Towards OCRE 2024

Currently being re-procured via the GN5-1 project and expected to be in place by December 2024, the upcoming OCRE 2024 framework is set to extend the scope and ambition of previous GÉANT Cloud frameworks. The aim is to procure a broad and varied portfolio of services, expanding beyond Infrastructure-as-a-Service (IaaS) into Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS), while achieving the best terms and conditions and costs for the R&E community, increasing compliance, and further easing service consumption.

Preparations towards the tendering phase for OCRE 2024 took place throughout all the first year of the GN5-1 project and included both market consultation and user engagement in collaboration with the GÉANT Partner Relations Team. In this regard, GÉANT published in August 2023 a Prior Information Notice (PIN) to consult economic operators on the proposed tender requirements and criteria and then to inform – based on the market's response – the development of the procurement. NRENs were also extensively consulted, in particular to seek case-by-case solutions to the complex legal issues that up to this point were hindering the active participation in the framework of GÉANT consortium partners outside the EU. This engagement led to the successful onboarding of 39 NRENs into the next framework, with their signature of a Declaration of Participation in OCRE 2024.

Following the tender, an intensive phase of evaluation, bidding and scoring of all the received responses will commence, with the support of a team of procurement experts and subject matter experts from European NRENs. Promising to broaden and further define the horizon of cloud services for European R&E, the OCRE 2024 framework is expected to launch by the end of 2024 and to run for a period of 5 years.

*In art, a cloudscape is the depiction of a view of clouds or the sky.

From the OCRE project to EOSC Future - lessons learned in commercial cloud procurement

Words: Leonardo Marino, GÉANT

Since 2016, GÉANT and the European NRENs – both via GÉANT projects and other EC-funded projects – have played an instrumental role in unlocking the innovative potential of commercial cloud services for the European Research and Education community.

The joint procurement and delivery of two very large-scale cloud framework agreements to all of Europe's R&E institutions has been widely recognised as ground-breaking (see previous pages). However, in a parallel line of activities, it also worked to stimulate commercial cloud adoption across Europe, experiment with new sustainable business models, scalable funding and procurement mechanisms, and distribute cloud funding to support impactful and innovative research projects.

In this article we explore how two initiatives led by GÉANT – the OCRE project (2019-2022) and Work Package 8 of the EOSC Future project (2021-2024) – made lasting contributions to commercial cloud procurement for research and catalysed innovation by stimulating cloud adoption, and we discuss their main challenges and lessons learned with some of the GÉANT members involved.

The OCRE project (2019-2022): demonstrating demand for commercial cloud, accelerating procurement mechanisms, fostering innovation

Following the successful delivery of the 2020 IaaS+ (aka OCRE) Framework, the OCRE project moved its focus onto stimulating cloud adoption, by engaging both the demand side (research and education community) and supply side (commercial cloud and Earth Observation – EO – suppliers) and involving them in procurement activities. To this aim, the project set to distribute more than €8 million in adoption funding for Cloud and EO services to researchers and to research projects across Europe, procuring vouchers, through mini-competitions, and open calls.
The astounding response registered by OCRE open calls between 2020 and 2022 demonstrated significant demand from the research community for the consumption of commercial cloud services. Overall, the calls received 120 proposals from research projects across 22 countries in Europe, and from a wide range of research disciplines. This resulted in the funding of 37 research projects showcasing the beneficial impact of commercial cloud services on research outcomes. Success stories highlighting some of these projects are available on the OCRE website: **https://www.ocre-project.eu/success-story**.

David Heyns: *"Although the extensive response from the research community was both distributed across the region and diverse in terms of thematic focus, with regard to services we registered particular demand for the immediately scalable compute and storage capabilities available within commercial TREs/VREs (Trusted/Virtual Research Environments). These incorporate bespoke platforms and software services in support of Machine Learning (ML) and AI workloads."*

OCRE open calls also allowed the project to test procurement and funding procedures and to come up with an accelerated model, introduced in the second round of calls and then also adopted in EOSC Future. This innovative solution eliminated the dual step required in the first round, in favour of a streamlined and simplified procedure involving the direct collaboration between institutions/research projects and OCRE Framework suppliers, teaming up into joint proposals. This resulted in a significantly more effective distribution process, while also generating a pipeline of leads for suppliers and offering research projects a clearer pathway to identify the ideal solutions to their challenges.

Picture
From left to right: Veronika Di Luna, GÉANT, Work Package lead for the commercial cloud procurement activities in the EOSC Future project (WP8); David Heyns, GÉANT, Project Manager of the OCRE project and Task Lead within EOSC Future WP8; Jan Meijer, Sikt, Task Lead in the OCRE project and part of EOSC Future WP8; Monique Pellinkhof, GÉANT, leading procurement activities in OCRE and Task Lead within EOSC Future WP8.

Monique Pellinkhof: *"Both in OCRE and in EOSC Future we had the opportunity to use the lessons learned from EC-funded procurements as a basis for improvements. We increased efficiency, used gained knowledge on EU regulations and towards our objectives, simplified procedures, and as such we were able to focus more on the requirements and needs of the research and education community. On the other hand, the cloud market also gained understanding of our community and started proactively reaching out, stimulated by the EC-funded cloud adoption mini-competitions."*

Commercial cloud procurement in the EOSC Future project (2021-2024): taking OCRE's results to the next level

Commercial cloud procurement was also one of the key focus areas of EOSC Future, which (through its WP8 Commercial Services action, led by GÉANT) picked up and consolidated the legacy and work of the OCRE project, as well as of the activities within the GÉANT GN4-2 and GN4-3 projects in support of GÉANT Cloud frameworks.

Veronika Di Luna: *"The main objective of our team within EOSC Future was the enablement of innovation through the interaction with the commercial sector. To that end, two tasks within the WP looked after different types of industry engagement: delivery of commercial cloud services though collective framework agreements and other procurement mechanisms, as well as a single point of contact for SMEs and start-ups as part of the Digital Innovation Hub activities. Specifically, we looked at how framework agreements such as OCRE can more quickly reach a wider user-base, not the least through the EOSC marketplace, as well as whether other commercial services would benefit from a large-scale framework."*

As a first logical step and towards the end of the OCRE project, the EOSC Future WP8 team – in collaboration with GÉANT – worked to expand access to services procured via the IaaS+/OCRE framework to an even wider audience of European researchers, by integrating them into the EOSC Marketplace. This served as a first iteration of a tested, practical, and sustainable approach to establishing and maintaining a portfolio of commercial cloud services into EOSC.

Jan Meijer: *"Commercial services complement the researcher's toolkit yet accessing them for public sector researchers usually requires public procurements, which are time consuming and expensive. Thanks to EOSC effectively creating a unified context for public sector research data and services in Europe, we can conceptualise a collective portfolio of agreements with research-relevant commercial services. Researchers can immediately use services that are part of this portfolio, because their institution's procurement officers can trust that the agreements in it are compliant - e.g. with GDPR and procurement legislation - and represent good value for money, due to the large-scale demand aggregation. With most commodity services moving to a cloud delivery model, institutions will meet ever larger suppliers. The research community benefits from aggregating its demand to be able to get good concessions, and thanks to EOSC we now have a context to do this. However, this is very much a non-trivial exercise."*

While OCRE had focused on distributing cloud adoption funding to distinct research projects, EOSC Future adopted a different, more sustainable, approach in order to make agreements with commercial services available to all European researchers, at scale, in a reasonable amount of time. As such, the project introduced the concept of digital aggregators (e.g. non-profit entities, NRENs, Research Infrastructures and e-Infrastructures, HPC centres, etc.), as new distribution channels, able to reach thousands of institutions and a million end users.

In particular, the team published two EOSC Future calls worth €4M aiming to distribute commercial cloud services through the digital aggregators collaborating with OCRE cloud service providers, which had to craft a new approach on the distribution of commercial cloud services and make them available via EOSC. Once again building on the experience and lessons learned of the OCRE project, the EOSC Future calls used OCRE's accelerated model to streamline procurement procedures.

Monique Pellinkhof: *"From a procurement point of view, we had the opportunity to explore what it really meant to fulfil the assignment within EC terms. Of course, it wasn't as simple as just 'buying cloud services for researchers': for instance, we needed to buy vouchers and explore what this implicated from a VAT perspective. However, we were also fortunate to have a certain level of harmonisation within the EU (and UK), that was essential to make the procurement possible. Overall, it was enriching to overcome the challenges we encountered along the way, and I would recommend treasuring these learnings for possible future EC-funded EOSC procurements."*

As with the OCRE calls, EOSC Future procurement calls registered consistent demand – in this case from research infrastructures. Across the two calls, EOSC Future received 22 detailed, innovative, and compelling proposals from diverse teams of digital aggregators and cloud service providers based in 11 European countries. While all proposals met minimum requirement and high-quality standards, funding allowed the project to award a total of €4 million to seven projects, based on value added to related research activities, an innovative distribution model to the end users, sustainability of the service, potential availability via the EOSC marketplace beyond exhaustion of the adoption funds.

David Heyns: *"The distribution of adoption funding in the EOSC Future project demonstrated not only the ambitions of the European Research Infrastructures (RIs) to operate hybrid platforms, harnessing the bespoke services distributed by the commercial Trusted/Virtual Research Environments (TREs/VREs), but also the willingness of the cloud providers to partner and collaborate with these entities on hybrid services."*

The awarded projects – bringing advancements to diverse areas of research and enabling cloud access to valuable resources as Quantum computing, HPC, and Virtual Research Environments – are described in detail in a series of EOSC in Practice stories: ***https://zenodo.org/communities/eosc-in-practice-stories/records?q=&l=list&p=1&s=10***.

Jan Meijer: *"A collective portfolio of agreements with commercial services for thousands of public-sector research-performing organisations requires scalable processes for demand assessment, joint procurement and agreement delivery. Thanks to OCRE and EOSC Future we have shown how to tackle the latter two, OCRE demonstrating the successful 2nd iteration of a Europe-wide joint procurement and EOSC Future showcasing the use of aggregators to unburden researchers from the financial-administrative aspects of using the agreements. While self-financed purchases remain easier than turning EC-funding into procurement-compliant service use, we managed to demonstrate viable mechanisms to do the latter. However, as these were quite hands-on, it will be a challenge to scale them. Another challenge yet without a clear solution is assessing joint demand for services other than infrastructure-cloud, substantial enough across thousands of institutions in dozens of countries and with enough consensus on what to procure to warrant a joint procurement exercise. Infrastructure-cloud represents a collection of foundational services everyone needs and where service offerings are not too diverse, but for other service types the picture is much more varied."*

Further insights into the lessons learned in EOSC Future commercial cloud services procurement will feed into the work of the GN5-1 WP4 team that is working on OCRE 2024, the next iteration of the collectively procured framework agreements for infrastructure-cloud services.

David Heyns: *"In addition, GÉANT is working to ensure that all entities participating in the EOSC, who potentially have an interest in underpinning their services with hybrid infrastructure cloud procured via the OCRE 2024 framework within the next 5 years, are listed as eligible to use the framework via their local NREN."*

EOSC in Practice Stories demonstrate the impact of EOSC, showcasing its collaborative essence and transformative capabilities across disciplines. Read some of the most recent EOSC in Practice stories, covering in detail the projects awarded by EOSC Future procurement calls:

Empowering Research Communities through cross-sector data sharing

By Constanze Roedig, Head of the Austrian DataLAB and the Austrian Open Cloud Community, Vienna Scientific Cluster

https://doi.org/10.5281/zenodo.8340080

GWDG Trusted Research Environment (TRE): Empowering European Research through AWS Cloud Services

By Piotr Kasprzak, Cloud Engineer at GWGD - Gesellschaft für wissenschaftliche Datenverarbeitung mbH Göttingen

https://doi.org/10.5281/zenodo.8340057

QCloud - Ireland's quantum cloud environment

By Hazel Murray, PhD and Cybersecurity Lecturer at MTU – Munster Technological University

https://doi.org/10.5281/zenodo.8340089

The lessons learned regarding the concept of a collective EOSC portfolio of agreements with commercial services fed instead into the advancement of EOSC through the EOSC-Association Task Force for financial sustainability.

Jan Meijer: *"The OCRE and EOSC-Future projects have given the GÉANT community a great basis to take up the role as THE provider of the EOSC's portfolio of procurement-compliant agreements; GÉANT has the reach, the required legal basis and the experience to act as a central purchasing body for all European public-sector institutions and their researchers, providing easy access to good deals."*

Veronika Di Luna: *"In conclusion, I would like to give credit to the great team involved, which brought in very broad expertise and a diverse set of personal skills. In particular, we married the specific procurement knowledge in the area of commercial cloud together with the solid understanding of the research community needs, its ways of operating, and strong relationships, mixed with an understanding of the commercial cloud market, a good grasp of the EC grant environment, and with the experience in the GÉANT and OCRE projects."*





Computer Aid delivers IT equipment to Ukrainian universities

We spoke with Ludovic Gautier, Head of Programmes at Computer Aid, to find out about the initiative to supply laptops to universities in Ukraine via GÉANT's partner URAN, the Ukrainian national research and education network. The shipment consists of 65 laptops that will help the academic community to carry out remote teaching, access online resources, conduct research and communicate with peers. All parties involved hope that this is the first shipment as work continues to provide more IT equipment for Ukrainian universities in 2024. Our conversation with Ludovic also gave us insight into how Computer Aid is making a difference in people's lives around the world.

Interview by Rosanna Norman, GÉANT

Pictures
Computer Aid equipment arrives in Kyiv

Picture
Ludovic Gautier, Head of Programmes at Computer Aid

So, Ludovic, how and when did it all start?

For the benefit of your readers let me start by saying that Computer Aid is a UK based charity that aims to provide high quality refurbished IT equipment to NGOs, NFP organisations, universities, schools, community centres etc. In the past 25 years, we have developed a network of reliable partners in the United Kingdom that donate their IT equipment. We are using it worldwide in a range of projects that bring social value. The recent COVID pandemic brought out the importance of new technologies in our lives and made our services even more relevant.

In June 2023 we were approached by GÉANT about investing funds raised for URAN by the international research and education community. We had already established some connections with trusted partners in Poland since the full-scale invasion of Ukraine and the devastating consequences for its population. We have been collaborating with World Vision and CORE to provide support to Ukrainian refugees fleeing to Poland. GÉANT put us in touch with URAN to find the best way to deliver IT equipment to their doorstep. We rarely work in Europe or in war zones, so the local partnerships were paramount for the success of the project. For this initiative, we reached out to four local knowledgeable partners that brought their specific expertise.

What is the mission and vision of Computer Aid and how does it align with the needs of the Ukrainian academic community?

Computer Aid is a charity organisation that aims to reduce the digital divide by providing access to technology and enhancing educational experiences. Our mission is to help bridge the digital gap, which has become increasingly important in our lives, especially after the pandemic.

We have provided over 300,000 IT items in more than 100 countries since 1998, but we do not only provide access to new technologies. We have also been developing local partnerships worldwide to provide training, connectivity and find relevant content to our end-users. We work mostly in the educational sector, but we have also developed projects in health, agriculture, biodiversity and gender equality. We use solar power to run our computers in areas where the electricity supply is either non-existent or unreliable. Our projects are determined by the needs of local communities, our partners also help us to ensure sustainability once the project timeline ends. Our aim is to create long-term, measurable results.

Which challenges did you face while implementing this initiative and how did you overcome them?

The most difficult part of the project was to find an easy way to deliver the IT equipment directly to Ukraine. We contacted CORE that had already delivered goods in the country, and who we knew well, and they put us in touch with local transport companies that were able to take the equipment safely from our warehouse in Manchester to URAN in Kyiv.

How did you select and prepare the laptops for the donation and how did you ensure the safe and timely delivery?

The equipment donated to us is professionally refurbished to the highest UK standard, any equipment below that standard is recycled. On average we keep 65% of the equipment received. So, the selection very much depends on the equipment we receive. If possible, for each project we try to provide similar models as it's better for the recipients. For URAN we selected only one type of laptop to make things easier for customs and to have a more standardised approach. We sent them to Ukraine via GEPALogistics, a Polish partner which knows the local environment very well.

Our objective was to deliver the laptops before the festive season, and we are proud to say that we succeeded. The equipment, 65 laptops and charging cables, was delivered to URAN's Charitable Found in Kyiv on 15 December 2023.

How can people outside Ukraine support Computer Aid and URAN in their mission and vision and what are the donation opportunities?

Computer Aid receives equipment donation mostly in the UK, but we can also refurbish equipment on site in other countries so any company can approach us. As an individual, anyone can promote our main message in line with our carbon neutral policy: Use or Reuse your IT equipment as long as possible. Take care of it, fix it, it's economically viable and good for the environment. A three-year-old computer is often as good as a new one.

How does Computer Aid plan to measure the success of this initiative, are there any plans to expand this initiative to other countries?

Throughout 2024 we will stay in touch with URAN to gather feedback from them and understand how they use the machines and the impact they will have on their work. We hope to keep supporting the Ukrainian population through further donations next year.

"We are immensely grateful to the GÉANT Community, the Vietsch Foundation and Computer Aid for their unwavering support to Ukrainian universities during the Russian invasion of Ukraine. Their generous donations of refurbished computers, services and connectivity have enabled universities to continue their educational role in these challenging times. They are truly our vital partners."

Yevhenii Preobrazhensky, Executive Director, URAN Association

To find out about the impact of Computer Aid's equipment donation on the Ukrainian universities affected by the war, keep an eye on the **GÉANT CONNECT** website in the coming months.

About GÉANT and the Vietsch Foundation

In April 2022 GÉANT and the **Vietsch Foundation** launched an initiative to support URAN, this project, legally and financially managed by the Vietsch Foundation aims to gather and channel funds donated by European NRENs to URAN during the Russian invasion.

For further information about this initiative, please contact **Irina Matthews** EaPConnect Project Manager, **GÉANT**.

URAN
Ukrainian Research and Academic Network

URAN, the National Research and Education Network of Ukraine, is one of the beneficiary partners of the Eu-funded project **EaPConnect**.

SPARKLE

Networking in the era of cloud

Research and educational institutions are among the most eager consumers of the cloud environments, massively adopting the most advanced features and resources of private and public providers. Research programs, like many corporate organizations, highly benefit from the flexibility of cloud resources, that are consumed “as-a-service”. Moreover, while organizations increasingly migrate their operations to the cloud, the integration of networking with cloud services has become imperative to remain competitive and agile in the digital era.

Words: Paola Crobu, Multicloud Solutions and Cloud Connect Product Manager at Sparkle

The increase in cloud connections and the implications that the “cloud approach” has on global connectivity can dramatically change the networking landscape for Research and Education. Looking at the evolution of networks in the past decade, we see clear trends related to increased capacity, wider coverage, advanced security, Software-Defined technologies, virtualization and automation.

The “as a service” (aaS) concept in the context of cloud computing refers to the provision of various services, allowing users to access them without the need to directly own or manage the underlying infrastructure. It is characterized by on-demand availability of resources and a pay-as-you-go pricing model. The same trend has also occurred in telecommunications, with the advent of Software Defined architectures, where the hardware and the software are decoupled, thus optimizing cost and performance; network virtualization functions have been deployed worldwide, enabling service providers to extend their infrastructure without huge investments.

The next steps for networking are further advanced “on-demand” features through which end users can “buy” their connectivity in the same way they buy cloud: logging on to a portal, selecting the desired destinations, setting the capacity and click! This is the future of connecting to cloud services since the traditional approach of fixed circuits – with contracts of several years - is incompatible with the new requirements.

For network operators, the “Self “modality implies some complexities. First, an end-to-end circuit is composed of segments of different vendors, that must be activated in a synchronized way: all actors must speak the same standard language to automatically set-up the circuit. Once this is done then, end-to-end Service Levels Agreements (SLAs) must be guaranteed and monitored throughout the service duration. All this, without considering the new contractual aspects that this “network cloudification” mode entails. These functions, altogether, are called NaaS (Network as a Service): such cloud-like modes applied to network services will further facilitate the activities of the R&E community reducing costs, ordering and provisioning times and allowing them to focus on their core activity, to the benefit of the entire society.

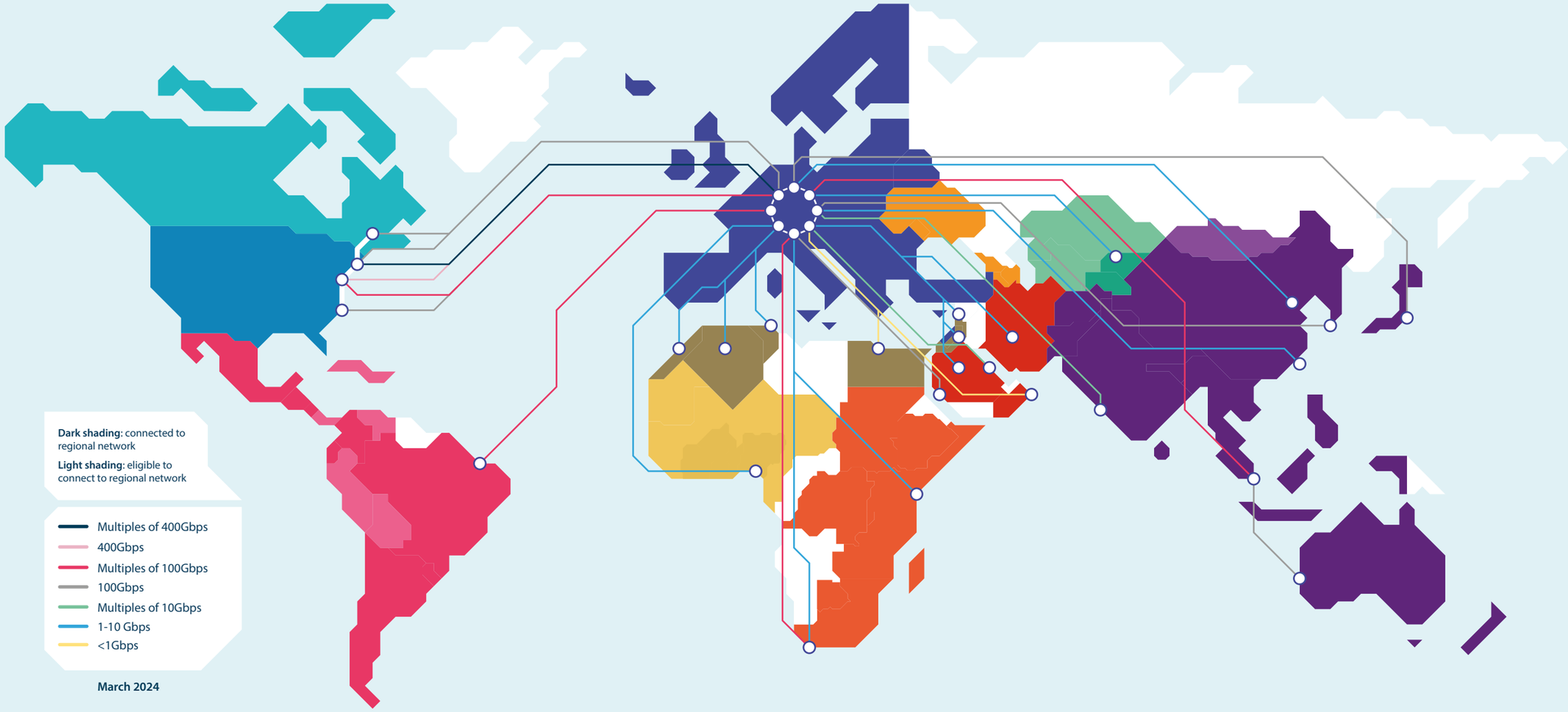
As users increasingly rely on digital technologies, global service providers like Sparkle can combine their cloud and telecommunication expertise and transfer the cloud experience to networks, embracing a future-proof seamless compute infrastructure and allowing researchers to thrive in an ever-evolving technology landscape.

For more information contact **Sparkle Communication**

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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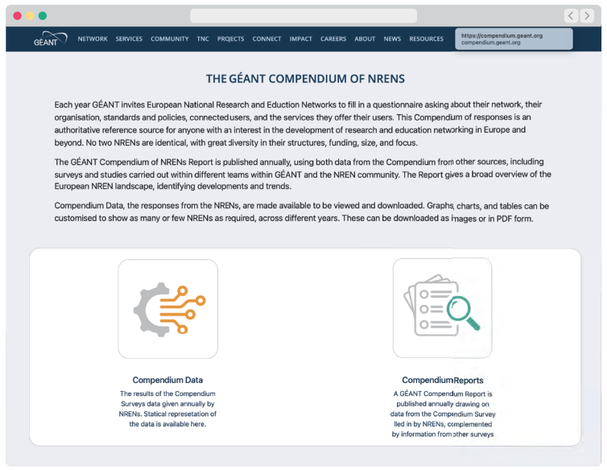

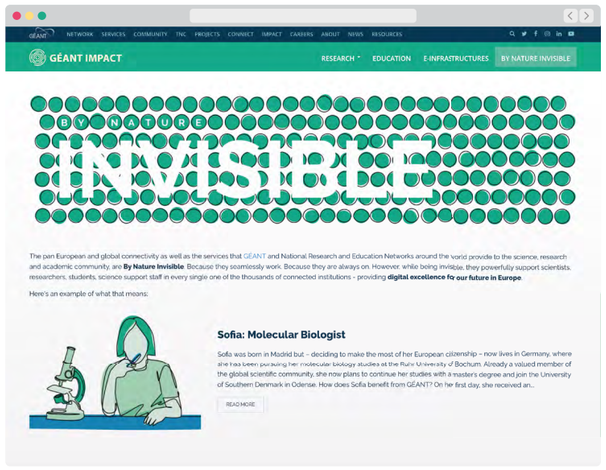

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