GÉANT
Networks • Services • People

CONNECT

THE MAGAZINE FROM THE GÉANT COMMUNITY

CYBER HERO @ HOME

CYBER SECURITY MONTH 2021

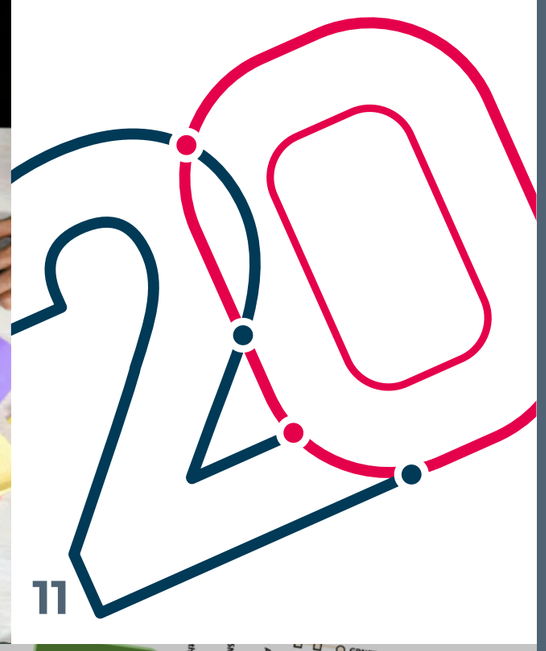
ALSO IN THIS ISSUE

RESEARCH ENGAGEMENT: HOW TO BETTER CONNECT INFRASTRUCTURE AND SERVICES WITH USER COMMUNITIES

THE GÉANT PROJECT: HOW 20 YEARS OF COLLABORATION SET THE TONE FOR THE FUTURE

CONNECT INTERVIEW: ADAM LEWIS OF DIGITAL EARTH AFRICA

EAPCONNECT: SPECTRUM LINK WITH GÉANT BREAKS NEW GROUND



Contents

02 The GÉANT community joins Cyber Security Month 2021 with Cyber Hero @ Home

09 Develop research engagement, with TF-RED

11 The GÉANT Project: How 20 years of collaboration set the tone for the future

15 CONNECT Interview: Adam Lewis

18 EaPConnect - GÉANT “spectrum” link breaks new ground

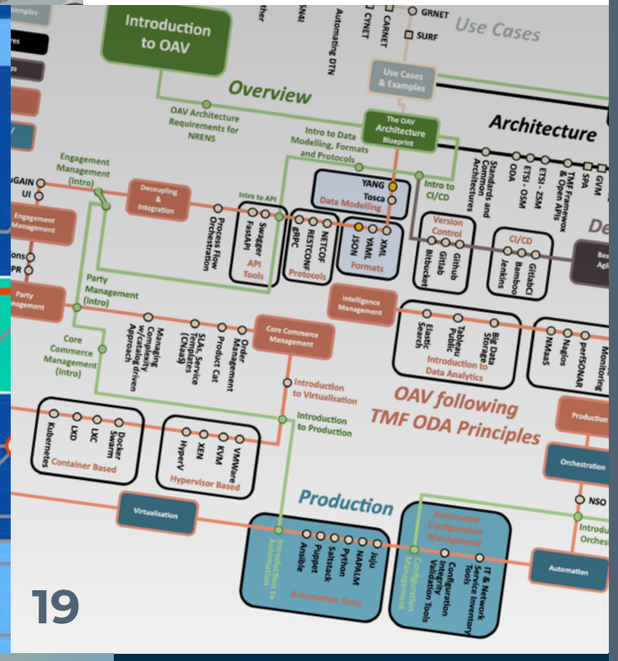
19 Network Automation e-Academy

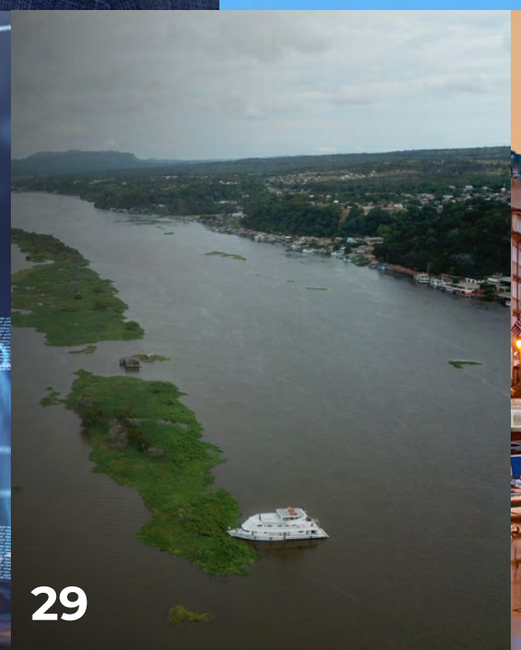
24 OCRE: Accelerating Cloud Adoption for Research and Education

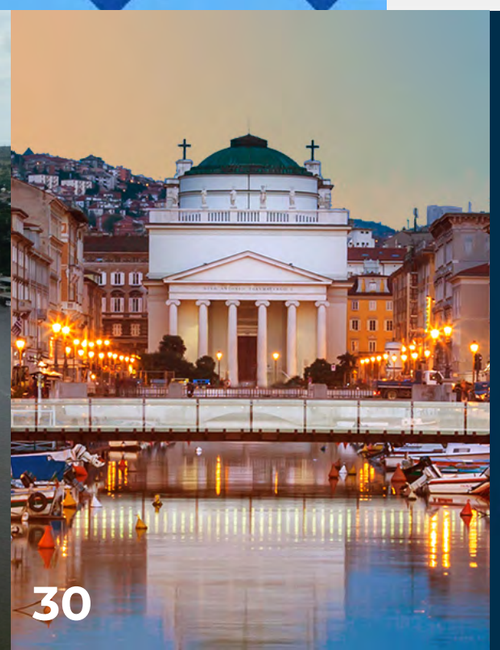
29 Amazon Region rivers receive fiber-optic cable

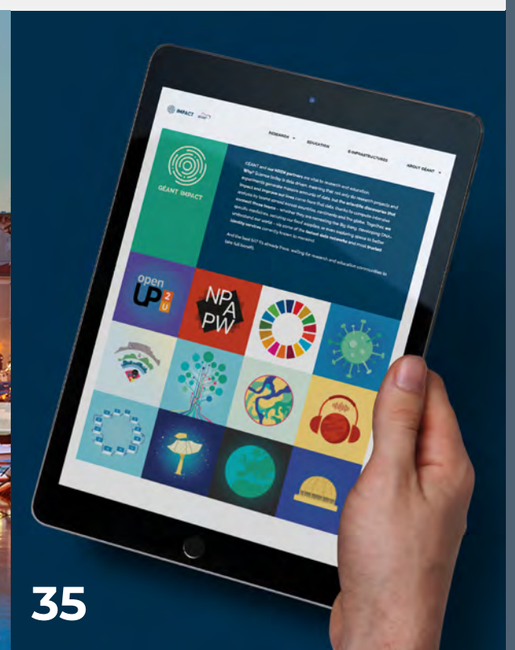
30 TNC22 Navigating the Unexplored

35 About GÉANT









Welcome from Cathrin Stöver

I like to think the CONNECT magazine brings together all that is great about our community: the network, services, community programme, the research and education communities we all serve, but most of all the people that make it happen. It was therefore so terribly sad when we heard the news in early September that our close friend and colleague, Miroslav Milinović, had passed away.

Miro was one of those people who seemed to have always been here, and with so many important roles over the years, that thought is understandable. In particular, he was heavily involved with the success of eduroam, most recently as Chair of the Global eduroam Governance Committee, Chair of the eduroam Operational Team, and service owner for eduroam. While he will be sorely missed, his legacy most certainly will live on, as millions of people across the world benefit from his work every day.

And so, I warmly welcome you to CONNECT 38 where – as ever – we showcase similar individuals, teams, and their collective efforts that help to shape the research and education community.

As you read this, October's Cyber Security Month campaign is coming to an end, having harnessed the efforts of so many to promote awareness and best practice so that together we can continue to push back against an ongoing threat. In this issue we bring you an overview of the campaign as well as featured articles from members of the community.

We also shine a light on the growing area of research engagement, where coordinated efforts and methodology, as well as a network of experts and a dedicated Task Force (TF-RED) are helping to connect user communities with the infrastructure and support they need – essentially connecting people to people.

The article on 20 years of the GÉANT Project really makes me stop and think, as I'm sure it does all of you. 20 years of continuous, successful GÉANT projects, funded throughout by the European Union, does not happen by chance. The interview with Matthew Scott of GÉANT, and Ann Harding of SWITCH, gives a flavour of what the past two decades (!) have taught us, and what the future might bring as we look towards the next phase.
Make sure also to read our CONNECT Interview with Adam Lewis of Digital Earth Africa, who many of you will recognise as a TNC21 keynote speaker. Leading the Digital Earth Africa programme, and working with global partners, Dr Lewis is helping to make Earth Observation data free and accessible to the whole African continent. Putting such information in the hands of decision-makers will not only bring visibility and help towards a more sustainable future, but ultimately improve lives. Which is surely why we're all here in this community.

Enjoy the issue.

Cathrin Stöver, GÉANT

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

The Team Behind CONNECT

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

Editor:
Paul Maurice, GÉANT

Production Editor:
Silvia Fiore, GÉANT

Regular contributors:
Cathrin Stöver, Laura Durnford,
Rosanna Norman, Silvia Fiore,
Karl Meyer, Leonardo Marino (GÉANT)

This magazine is published by GÉANT, as part of GÉANT Specific Grant Agreements: GN4-3 (No. 856726), GN4-3N (No. 856728), and BELLA-S1 (No.731505), which have received funding from the European Union's 2020 research and innovation programme under the GÉANT2020 Framework Partnership Agreement (No. 653998). The following projects mentioned throughout the magazine also receive funding from the European Union: AfricaConnect3, EaPConnect and BELLA (DG INTPA, EU4Digital & DG DEFIS).

The GÉANT community joins Cyber Security Month 2021 with Cyber Hero @ Home

For the third consecutive year GÉANT joins the European Cyber Security Month - an initiative launched by ENISA, EC DG CONNECT and a variety of partners - to raise cyber security awareness in the international Research & Education community in Europe and beyond. After the success of "Become a Cyber Hero" for Cyber Security Month 2020 (CSM2020) cyber heroes made another appearance with the campaign Cyber Hero @ Home in October 2021.

Words: Rosanna Norman, GÉANT

Working from home is becoming a standard arrangement for many organisations across the globe. Video conferencing tools and a plethora of online platforms continue to enable and support remote working: laptop and an internet connection is all we need. In addition, given the tangible benefits for employees and employers alike, hybrid work practices and distance learning are expected to become the norm going forward. But remote working can bring cyber security risks. Proper 'cyber hygiene' is necessary to protect our devices, our networks and our identity too.

Cyber Hero @ Home focuses on the importance of digitally safe home-working addressing four weekly themes in October 2021:

4-10 October
Be aware of cybercrime

11-17 October
Protect your network

18-24 October
Protect your devices

25-31 October
Protect your identity

Davina Luyten, Belnet from the CSM2021 team commented:

"One of our aims for CSM2021 is to build further on the strong collaboration with NRENs by co-creating this campaign with the R&E community. NRENs have been contributing and supporting Cyber Hero @ Home with content and materials sharing and exchanging expertise. It has been another phenomenal collaborative effort driven by a deep interest in cyber security, enthusiasm and the team is already gearing up for CSM22"

CSM21 also comprised a targeted **webinar programme** involving security experts from R&E and industry who captured the community's attention with talks on ransomware, digital hygiene, privacy and social media.

A comprehensive **awareness package**, including graphics, resource materials and translations into 18 languages to enable campaign localisation, were also publicly shared.

The campaign featured on social media the hashtag **#CyberHeroAtHome** and the general CSM hashtag **#CyberSecMonth**.

The content published during the Cyber Hero @ Home campaign can be accessed on the dedicated webpage **https://connect.geant.org/csm2021** and also on **https://connect.geant.org/security**. The marketing resources - including social media banners, vector files, animations and translations in 18 languages - are available for download via the specifically created awareness package.

For any questions, comments and feedback about the CSM initiative at GÉANT, contact the CSM2021 team at **csm2021@geant.org**

Raising awareness in the Swiss education, research and innovation community: interview with Katja Dörlemann

Security awareness is all about training and educating users. Strengthening the so-called 'human firewall' is a very powerful tool in the fight against cybercrime. Davina Luyten recently spoke with Katja Dörlemann, Awareness Specialist at SWITCH (the Swiss Research and Education network organisation), about awareness activities and main challenges.

Interview by: Davina Luyten, Belnet

How would you describe your role as Awareness Specialist at SWITCH?

Working in the field of security awareness is like building bridges between IT security and the rest of the world. Cybersecurity is everybody's business! We all have to deal with it: no day goes by where we don't have to enter a password. The security community struggles with building this connection and therefore we need people who translate this IT expert language to a language understandable by a broad public. As an awareness specialist in the SWITCH-CERT, I try to do that for our community: research institutions, universities, the Swiss internet community and also critical infrastructure organisations.

How do you raise awareness among your customers and end users?

First of all, we share expertise and knowledge and raise more 'awareness for awareness'. That's why we organise the SWITCH Security Awareness Day every year. We want to provide our community with a platform to exchange and connect with peers, gather new ideas and inspiration. We also travel around connecting internationally with other initiatives and experts, collecting knowledge and latest developments to share with our community.

Next to that, we provide support: we offer a security awareness workshop for organisations that want to start a programme. Together with an interdisciplinary team consisting of employees from IT security, communications, HR and finance, we define target groups, communication channels, pain points and formulate a broad plan including recommendations.

In order to offer something fun and a little bit special, we developed our SWITCH security awareness adventures, three security awareness training events based on game design. Organisations mostly use them to raise attention for their existing measures and get people engaged. It's a mix between fun and learning and so far, we have had only really good experiences!

We also provide our community with content, that's were iBarry comes into play. It's an initiative from the Swiss Internet Security Alliance, of which SWITCH is one of the founding members. The iBarry platform targets the whole Swiss population. We are developing the content in the community: everything is creative commons allowing universities to use the content for their own internal awareness measures.

What are the main challenges and difficulties in your community?

Definitely lack of resources, both financially and in terms of people. Security itself already lacks resources and there's even less time and budget for awareness. That's a huge issue. For something that's often considered to be the 'biggest threat', it seems very odd to have to fight constantly for more money and workforce.

On the other hand, there is lack of expertise. Interdisciplinary expertise is needed to set up a security awareness programme. Most people who are responsible for awareness have a background in IT. But all of a sudden, they are confronted with training and education people which requires a great deal of communication expertise. The collaboration between those two disciplines (IT and communication) is not always easy – and both sides are to blame. On the one hand, IT (Security) experts might not find the right way to explain their needs. But on the other hand, it very often happens that communications departments do not consider "security" as an important issue or something they could help with. However, they need to work together and collaborate to counteract the lack of resources and expertise.

What advice would you give to organisations / NRENs that want to start with security awareness?

I would definitely recommend to invest some time in making a plan.
Be clear on your motivation for security awareness measures: do you just want to tick the box in your compliance form or do you want to create impact? Then make a structured plan: who's your target group? Do you want to target the whole company, admins only, management? What are your pain points? Passwords? Tailgating? Data classification? What are your communication opportunities? Are their newsletters? A blog on the intranet? A good spot for posters? Those are a lot of questions but it is worth thinking about them before you start. That is how you can define priorities, ask for specific support and be efficient.

The next step will be to get support: you'll need to approach your comms or HR department, or whoever is responsible for e-learning. If you have some budget, you can also look for external support from a consultant, graphic designer or content developer for example.

Last but not least: look for free content to use and exchange knowledge and experience with your peers.

Could you tell us something about the podcast "Security awareness insider"?

A friend of mine – the podcast co-host - launched the idea to start a podcast. And I was immediately onboard!

For every possible topic you can find experts, famous people or entertainers talking about it. Among podcasts evolving around politics, sports, psychology, crime or history there are also some putting the topic of information security in the spotlight. If you are working in security awareness there is not much in it for you though. Most podcasts on security cover the topic by inviting one phishing simulation provider. But as you know, there is so much more to it!

Our target audience are the people who work behind the scenes in security awareness, not the end users. We invite experts on related fields, as well as professionals, to talk about their security awareness programmes. We recently published the 10th episode, we're a pretty good team and it's a lot of fun!

Useful Links

- SWITCH-CERT: **https://www.switch.ch/security/**
- SWITCH Security Awareness: **https://swit.ch/security-awareness**
- SWITCH Security Awareness Day: **https://swit.ch/security-awareness-day**
- SWITCH Security Awareness Adventures: **https://swit.ch/security-awareness-adventures**
- iBarry: **https://ibarry.ch**
- Podcast: **https://www.securityawarenessinsider.ch/**
- Article on podcast: **https://securityblog.switch.ch/2021/07/13/one-more-podcast-security-awareness-insider/**

How to make backups of your data – and why you should

The most unfortunate thing about backups is that we usually realise we need one when it's already too late. We want to recover data we lost, but – unless we made a backup copy beforehand – the data may already be gone. Even when recovery options are available, they can be very expensive and complex.

Words: Altieres Rohr, Security Analyst at CAIS

The good news is that creating and maintaining backups for personal use has never been easier. From online services to physical media, there are many affordable (and free) options to make sure you never lose your essays, spreadsheets or photos.

Backups are a process – a habit. Seemingly complicated at first, they are fast after you become familiar with your tools. You'll only need to start your backup solution and let it do its job.

Be prepared for anything

Backups are a last line of defence against a wide range of risks. It's understandable that many of us associate data loss with threats like ransomware or other malware attacks, but backups can come into play much more often.

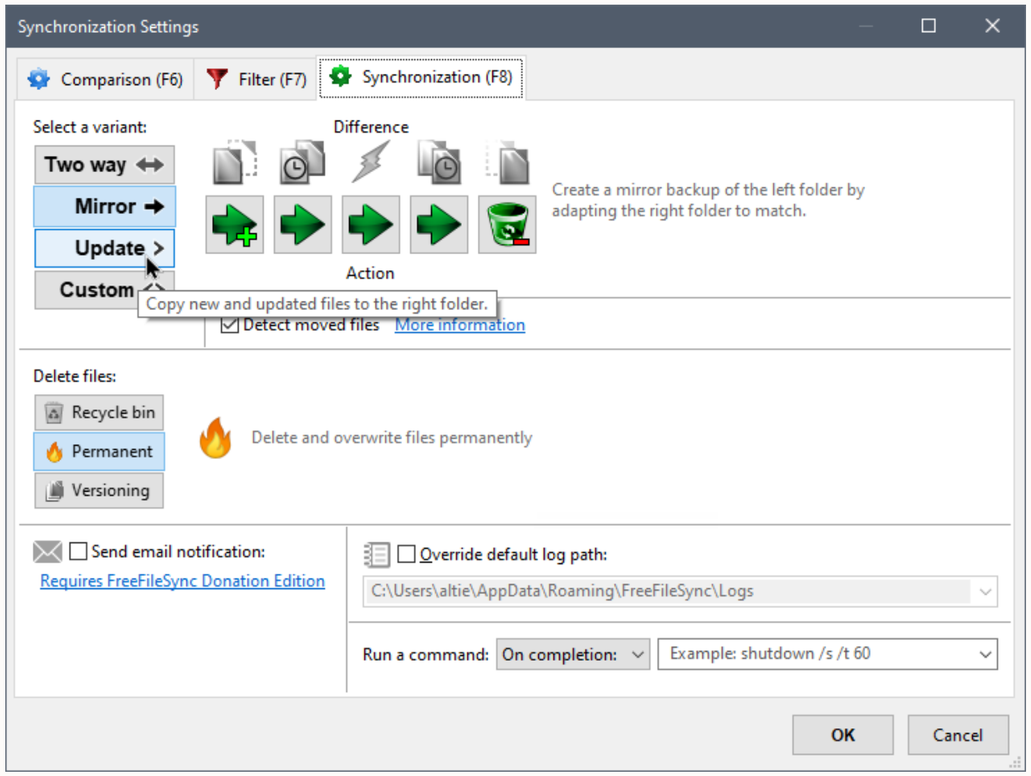
- **Malware**. Anti-virus solutions help prevent malicious code from stealing your passwords or doing other bad things, but it's a reliable backup that will make sure your data is safe at the end of the day.
- **Physical accidents**. If someone bumps into your laptop charging cable or you drop your phone, the damage can cause data loss.
- **Lost or stolen devices**. If you forget your devices somewhere or they get stolen, you will need a backup copy of your data.
- **Service issues**. If all your data is stored on a PC, a power failure will make it inaccessible. If everything is online, internet or service hiccups (a forgotten password or temporary security lockout) may also make your data unavailable to you – at least for a time.
- **Hardware and electrical failures**. Storage devices will eventually fail, and so will certain electrical components they are attached to.

The strengthened security of modern devices also makes backups more important. Many recent laptops and all smartphones have their storage built into their logic boards, and these memory chips are not made to be removed or read outside of the device. In other words: if any component fails, your data cannot be accessed.

This may seem like an unwanted design, but it can be a feature. When the storage is tied to the device and encrypted, a password will always be required for access. Because computers are able to hold so much information despite becoming smaller and lighter, we end up carrying our data everywhere – if it could be accessed without a password, it would be at risk.

While the protections that are built into your mobile devices protect your privacy, it's up to you to make additional copies to prevent loss.

Picture
Altieres Rohr, CAIS/RNP - Centro de Atendimento a Incidentes de Segurança / Brazilian Academic and Research Network CSIRT



Pictures
Left: File syncing and backup tools give you options to make file copies smarter and faster.

Right: External drive cases allow you to keep using old laptop hard disks through USB, making a great budget option for your backups.

Pick the right backup solution

If you can't find or obtain your backup files, then it's pretty much the same as not having one at all. Selecting the right way to back up your data is key.

- **Be aware of mandatory storage**. Your project or organisation may already have a storage system tied to a backup routine, and there may be legal requirements (such as data retention and privacy) that must be observed. Before you use your personal storage for corporate or project files, make sure it's okay to do so.
- **Consider how often you will need it**. Some files can wait a little to be backed up, while others require more immediate attention. It's OK to use a different service for each case – focus on a process you can actually follow through.
- **Cloud storage**. Cloud storage is usually more about data syncing between devices than backups, but there are providers that specialise in backups. This usually means allowing you to rollback your data easily and encouraging you to upload everything without deleting local copies. If you're on a budget, you can create your own strategy by using the free tier of one provider just for backups.

  If you just realised you don't have a copy of all the data you've uploaded to the cloud, don't worry – there's usually an easy way to fix that. For instance, you can use Google Takeout or Facebook's download option.
- **External media and tools**. You can use a USB drive to back up your files. When using your own media, it helps to have a tool to make your life easier – while a "copy/paste" operation will do the job at first, you'll quickly realise you want the process to be smarter and faster. Windows 10 has a built-in backup feature to save file history, and Macs have Apple's TimeMachine. If you don't need file history, look into sync tools like FreeFileSync (available for Macs, Windows and Linux) or rsync (for advanced users only).
- **App-specific backups**. Some apps have their own backup feature. This is the case for some messaging services like WhatsApp and Signal. Be careful when backing up app settings – they may contain passwords or other sensitive information. If you're a gamer, be aware not all games have a cloud save functionality (some may require specific tools).

Backups also need security

Even safety measures create some risks. When it comes to backups, every new copy of your data is one more place where it can be accessed without your authorisation.

The appropriate measures to secure your data will vary, but there are two key features you should keep your eyes out for.

- **Two-factor authentication**. Any kind of online service should have additional authentication factors, and you need to use them!

  The best options require you to own a hardware key, but you can also generate codes with a free app on your phone. Avoid using SMS for this purpose – there are several documented cases of attacks against SMS messages. Most importantly, remember to create and safely store your backup access codes – these will be required if something happens to your phone.
- **Encryption and media control**. If you opted to use physical media, consider enabling password protection with encryption. BitLocker is a good option, but it's only available on Windows 10 Pro. However, some external drives on the market have their own encryption technology. Once your data is encrypted, handle passwords and recovery keys with care – if they are lost, your files will be impossible to recover.

  If you have many files that you will no longer make changes to, there are options (such as SD cards and optical disks) with write-once functionality for additional integrity protection.

Learn to back up your phone

If you have an Android phone with a card slot, keep in mind that the card should not be used as a backup solution.

By default, the card is not protected by the same encryption that prevents access to the internal storage. The benefits of encryption are negated when you copy encrypted files to an unencrypted storage medium on the same device.

While you can encrypt the card to prevent this, this comes with a caveat: if the phone fails, the card will become unreadable. In other words, it won't be there as a backup when you need it.

To properly back up your phone, you need to connect it to your computer with a cable or use an app that can send data over the network. iPhones have iTunes, but things can get trickier on Android – especially if you like to delete your photos after you send them to the cloud. You need to download and save them somewhere else.

Your secure vault

A backup is a secondary storage that is maintained exclusively for recovery purposes. Any data or service used daily is at higher risk of data corruption, attacks, or accidents.

I've heard from people who had all their photos on their phone backed up to the cloud, yet lost everything because they couldn't recover the account after having a problem with their mobile device.

Our data can be invaluable – they hold our work and memories. Sometimes you may want to be able to access it easily, but certain information needs to be put in a vault like a jewel. A secondary copy is more similar to a vault, so don't mix up your data for daily use and your backups.

EU4Digital

EaPConnect engages with Eastern research communities

Eight research institutions or projects connected with Eastern Partnership (EaP) NREN networks and services in the past year or so, thanks to a coordinated research engagement effort in the EU-funded EaPConnect project. As the network infrastructure and services provided through the project continue to grow and improve, one challenge is to maximise the number of people using them. The increasing focus on reaching out to user communities, and equipping partners to do it effectively, builds on experiences within EaPConnect and the wider GÉANT community.

Words: Laura Durnford, GÉANT

A university in Moldova, two physics institutes in Armenia, the Institute of Biophysics in Azerbaijan, the National Scientific Library and an experimental biomedicine centre in Georgia are among the research and education institutions now served by EaP NRENs, and more are in the pipeline.

EaPConnect added research engagement as a focus of its work in its 2nd 5-year phase, now in year two, with the support of Chris Atherton, Senior Research Engagement Officer at GÉANT. Step 1 in the new, more systematic approach he introduced was a Needs Assessment Survey, sent by partners to gauge user communities' demand for NREN networks and services.

For GRENA (Georgia), the most common demand is to jointly prepare and implement projects and to support research teams with its Cloud facility. Since the EaPConnect research engagement work began, GRENA has signed Memoranda of Cooperation with the National Environmental Agency and with Tbilisi State University High Energy Physics Institute, providing resources for weather and climate studies and for local participation in the KM3NET neutrino telescope project.

Events are a significant way for all partners to get their messages across. Past EaPConnect conferences (EaPEC) proved effective in gaining both national visibility and for signing up universities for host NREN networks and services, most notably for RENAM (Moldova) and BASNET (Belarus). In smaller events such as workshops and seminars, GRENA, RENAM, ASNET-AM (Armenia) and AzScienceNet (Azerbaijan) have highlighted the opportunities of EOSC, Open Science, Copernicus Earth Observation Programme as well as their own portfolio. URAN (Ukraine) has upped its game, using the COVID era's enforced online way of living to reach 120-200 participants in three webinars since December 2020, with three more planned before April 2021.

Most recently, a scientific conference held by BASNET, PRIP 2021 on pattern recognition and information processing, included a session that highlighted the GÉANT, EaPConnect and NREN offer, and featured speakers from among GÉANT research engagement team contacts.

Within the GÉANT (GN4-3) Project, Olga Popcova of RENAM is a member of this research engagement team. She is also on the steering committee of TF-RED, the GÉANT Task Force on Research Engagement Development, which shares best practices and develops methods for NRENs to engage with researchers and collaborations on a national and international scale. "It is so enlightening to see how other people are tackling their challenges and what is specific in their NREN work," Olga says. "One of my TF-RED presentations was on RENAM research engagement and marketing communication synergies, as these are very interconnected activities."

Picture
Olga Popcova (RENAM) joined the TF-RED steering committee in 2019 after the TNC19 conference and is a member of the GN4-3 Research Engagement team. (©RENAM)

ASNET-AM, BASNET and AzScienceNet are also following TF-RED discussions. AzScienceNet has been supporting research institutes with its Data Center and cloud services for storage of research project results, and is now planning to establish a research engagement group to more proactively introduce its services to more institutes and universities. ASNET-AM plans to increase its activities to bring in new user communities and foster collaboration in interdisciplinary scientific domains.

Whether it's through mailing lists, workshops, calls for proposals, demonstrating the NREN portfolio at externally-organised events, collaboration with the National Science Foundation (GRENA) or "the everyday work to communicate one-to-one with users" (BASNET), the EaP NRENs are increasingly reaching out to potential user communities to understand and promote what they can do on a technical, organisational or operational level to better support optimal R&E outcomes.

For all the EaPConnect partners, the Needs Assessment Survey was an important first step in estimating demand and improving what the NRENs can do to engage with and empower their R&E communities. For RENAM in particular, the survey has provided a significant boost to its activities. Endorsed by the Ministry of Education, Culture and Research, the survey produced responses from 170 users across diverse fields of expertise – plenty to follow up on in building new relationships: "It is very good that the 2nd EaPConnect project develops our research engagement activities in a more systematic and comprehensive way," says Olga. "This allows us to focus on new thematic areas and attract different research communities we can support."

The EU4Digital: Connecting Research and Education Communities (EaPConnect) project is funded by the EU within the EU4Digital initiative

eapconnect.eu
eufordigital.eu
TF-RED

COMMUNITY PROGRAMME

Develop research engagement, with TF-RED

TF-RED wants you! It's a great time to join the GÉANT Task Force on Research Engagement Development. The group is creating a range of foundation materials and methodologies to facilitate the most effective use of available tools and technologies by research and education collaborations. Scientists, librarians, research support staff at universities, high-performance computing, e-infrastructures or NRENs - anyone from the wider R&E community with a relevant interest or role is welcome to explore, learn and contribute.

Words: Laura Durnford, GÉANT

Part of the GÉANT Community Programme, TF-RED is a place where ideas are shared and can be developed to become new services. But what does 'research engagement' mean and how do you do it? Since its start in February 2017 the group has doubled in size. Some came equipped with experience in technical business development, others only with interest and the recognition that this work helps to expand the user base for networks, research and e-infrastructures, and services. Having defined the group's strategy early in 2021, TF-RED is now creating a framework within which all participants can proceed according to common understanding and benchmarks.

The first element in this framework is a 'blueprint' which can be used as advice or as a checklist. "If you're new to the field you can read this for an overview of what research engagement is about, different ways to do it, and practical tips," says Chris Atherton, Senior Research Engagement Officer within GÉANT and chair of TF-RED. "At a basic level, how do you determine who you need to talk to, what you are trying to achieve, how to segment the world of research so you can target specific groups of interest, and what kinds of things to take with you when you talk to them." This blueprint document provides a step towards being able to validate research engagement teams through an accreditation process, which is a current topic of discussion in the group.

Another significant element is to agree a common model for the 'research data lifecycle'. This will clarify the number of steps in the lifecycle and allow TF-RED to map which current NREN services support which steps, and where gaps could be filled - which could lead to new work in future iterations of the GÉANT Project (currently GN4-3). This focus on the research data lifecycle is being pursued in close cooperation with RDA (Research Data Alliance). Developing a relationship with RDA, as well as with library communities, was part of the TF-RED strategic plan. By participating in RDA events, TF-RED members are not only contributing to co-creation activities there, they are building bridges between the two communities.

A second route through which TF-RED is building dialogue with RDA is 'the data movement challenge'. "Data movement is so ubiquitous it just happens in the background and the NREN world is not well known or understood by some researchers. Although the network connectivity is there, it's not always optimised for the new types of science flows we're seeing now, especially big data flows," explains Chris. "Apart from the big research projects, we don't have an easy, seamless way for researchers to use the network to move data from data-generating sources to their storage and compute infrastructures. Unless you understand the network, it's difficult to get the best possible performance. We want to look at integrating networks and data movement into the storage and processing systems, and assist in the underlying infrastructure, without everyone who uses it having to be a network engineer."

A further challenge to this line of enquiry is the integration of national R&E networks with other infrastructures and elements such as Cloud computing, storage and high-performance computing (HPC). "We have always focused on the underlying IT telecoms infrastructure, but want to look at links between the IT side and the research lifecycle side through the lens of HPC, especially now that the EuroHPC project is coming on stream," says Chris. "How will researchers use HPC facilities and the underlying IT infrastructures for it all to link in and work together?" To help explore this aspect, Chris is particularly keen to attract people with HPC backgrounds to join TF-RED and its work in the relevant RDA group.

In discussing how best to tackle the data movement challenge, an idea was born. Published as a white paper earlier this year, the idea is to create a semi-production environment where research groups could perform science experiments while the NREN community implements lab-developed data movement technologies to move data between the different data-generating, storage and compute equipment. By controlling this facility as a community, NRENs would gain a real understanding of needs at a practical level and be able to tackle the challenges – particularly for smaller research groups – helping to integrate research data movement into different scientific workflows. Although this facility is only a concept, publication of the white paper has resulted in some enquiries from researchers who are keen to try.

If you wish to discuss these challenges and develop research engagement with TF-RED, the **mailing list** is open all year round!

For further information please visit the webpages of **TF-RED** and the **Blueprint**

CONNECT Interview: Peter Bogatencov

Peter Bogatencov is Chair of the Management Board at RENAM, the Research and Educational Networking Association of Moldova. Since co-founding RENAM in 1999, Peter has seen the NREN's relationship with its users develop and grow. Most recently, RENAM has become active in research engagement through the GN4-3 project team, the GÉANT task force TF-RED, and in the EaPConnect project. So, when and why did RENAM first decide to invest more in its relationships with user communities?

Words: Laura Durnford, GÉANT

We started organising annual users' conferences as soon as the RENAM network was operational and connectivity with GÉANT was established, in 2003. At this stage, we formed working relationships with IT staff and departments at universities and research institutes. In 2007, RENAM initiated activities to create the Moldovan national distributed computing infrastructure, which united six national institutions, their computing resources and associated services and made them available for all interested organisations and research teams from Moldova. In 2009, RENAM received 'Special Partner' status in the GN3 project and signed a Cooperation Agreement with GÉANT, giving access to project documents, community groups, training courses and materials. This allowed RENAM and connected institutions' staff to attend events, participate in task forces and special interest groups, invite qualified GÉANT community trainers to Moldova, and to participate in other activities.

What has been the most successful way for RENAM to approach new user communities?

The annual users' conferences have been very useful for forming our user community. We could directly approach users to ask for feedback, what they want from us, or how they see the NREN's development. In 2012, RENAM began organising thematic seminars to promote our services and we regularly disseminate information about them and opportunities, such as calls for proposals, for researchers, including 'Enlighten Your Research' proposal calls through the EaPConnect project. And the RENAM user engagement team follows up on cases of interest, discussing one-to-one with researchers or educators to clarify their needs.

In 2018 RENAM hosted EaPEC, the EaPConnect project's conference. What benefits did that bring?

EaPEC 2018 was very useful for RENAM. It allowed us to establish closer relations with the Ministry of Education, Culture and Research, and several R&E and medical institutions expressed interest in cooperating with us. One new contract was signed during the event and two other institutions initiated negotiations, then successfully connected in 2019-2020. Afterwards, individual researchers and teams contacted us about accessing services or specific computing and other resources needed for their research.

How does participation in EaPConnect, GN4-3, NI4OS-Europe and other international projects help your user communities and your relationships with them?

Participation in international projects is essential for our NREN and our community. For RENAM staff it's important to have access to new technologies, services and best practices. This creates new opportunities for resources, services and technologies to become available nationally.

The mentioned projects have another dimension – they promote international cooperation that is very important for modern research and for creating an educational environment without borders. And e-infrastructures and related applications have practical added value that contributes to societal development as a whole.

What are the current challenges for RENAM?

Economic instability, e.g. due to COVID-19, creates real challenges for the whole National Research, Education and Innovation sector. This directly and/or indirectly influences the NREN's general wellbeing and activities. The pandemic break has negatively influenced our relations with users. In these conditions we don't expect increased requests for services adaptation, new services implementation, or additional resource allocation from our user community, but we continue informing users about our services and supporting them in online conferencing as much as possible.

What are RENAM's ambitions for the coming 5-10 years?

Taking into account that we recently achieved significant results in upgrading our connectivity to GÉANT, the next steps must comprise developments in the area of new e-infrastructures and deployment of services that need extended basic connectivity. This can be related to integrating national computing infrastructure with European High Throughput Computing resources, developing multimedia services and tools for educational content delivery and interactive education, promoting participation of national research teams in large European research projects like ESFRI projects, or implementing platforms and tools to support Open Science that will allow inter-relation with EOSC and contribute to EOSC development.

What do you see on the horizon for RENAM and the NREN community?

We are sure that collaboration between Moldovan research and educational institutions and colleagues from Europe and other countries will develop, and that there will be increasing demand for e-infrastructures that support international cooperation and are needed to realise international projects.

Working with colleagues from GÉANT and partner NRENs contributed to raising awareness among RENAM's users about the role of NRENs, the NREN ecosystem, and available services and perspectives of GÉANT. I consider that the support provided by GÉANT and international colleagues is very important for achieving real success of NRENs at a national level.

For further information please visit:
renam.md
eapconnect.eu

The GÉANT Project: How 20 years of collaboration set the tone for the future

The GÉANT Project over its many generations (GN1, GN2, GN3, GN3plus, GN4-1, GN4-2, GN4-3) has been supporting Europe's Research and Education (R&E) communities for over 20 years. As we look to the potential next phase of the project, CONNECT took the opportunity to speak with two of the project's key figures, Matthew Scott (GÉANT) and Ann Harding (SWITCH), to understand what has led to such long-term success in a project environment that spans all of Europe and boasts over 400 participants, multiple Task Leaders (TLs), and Work Package Leaders (WPLs, formerly Activity Leaders).

Interview by: Paul Maurice, GÉANT

Matthew Scott is Chief Programmes Officer for the GÉANT Association and has overseen several generations of the GÉANT Project with the help and support of the Project Management Office, and bodies such as the GÉANT Project Planning Committee (GPPC).

Ann Harding spent ten years as Activity Leader for Multi-domain Services and then Trust and Identity Activities. In 2020 she was honoured in the GÉANT Community Award for her work in the Trust and Identity field specifically for overseeing the growth of two services that are synonymous with GÉANT: eduroam and eduGAIN. She now leads the Infrastructure and Platform team at SWITCH.

Matthew, excellence in the project has consistently been achieved, so what is it that shapes the project so positively in such a consistent way?

Right from the early days, the GÉANT project has received tremendous support from its key stakeholders and consortium partner NRENs, and of course from the European Commission (EC).

One particular feature of the project consortium is in the natural desire of the participants to collaborate. I say 'natural' because by definition the community of R&E Networks rely on each other, not only to ensure that the value of an international research network and associated service can be realised and appreciated by their own stakeholders and users, but also because the desire or passion to achieve this is a key motivator for all the contributors who really believe in the collaborative cooperative federated model that these projects encompass.

The continued support from the EC is also a long-standing factor, and one that acts very practically with their financial support that enables the project to function. This is an operational model that really exemplifies a truly European success story.

The governance of the GÉANT Association as the coordinator is also strongly based on a membership association, with nearly all the higher-level non-Executive positions being held by NREN staff, and their ability to secure consensus and find a common path even if it needs some compromises on occasion.

Ann, what do you see as the benefits and challenges for NREN staff taking leading roles in a project such as GÉANT?

You will never in your NREN life have such an opportunity for impact. You will never be as surrounded by people with such wonderful ideas and energy, with such diverse perspectives.

You will have to learn to say no, and to occasionally disappoint people. Small, simple changes will be much harder than you expect because nothing is small or simple with over 30 countries involved.

You don't have traditional authority so your soft skills will become your most effective tool. Trends in organisational development for most agile organisations are increasingly trending away from hierarchy and command/control structures, to loosely coupled teams with autonomy, and you'll never have a better training ground for leading in this kind of environment.

In short, almost every aspect of what you do and how you can do it will have both benefits and challenges, and sometimes it is the challenge itself that is the benefit.

Matthew, how important has training for WPLs and TLs been?

It is hugely important. Ann pointed to that in the previous question, but possibly one of the most impactful measures taken at the start of the GÉANT projects was to engage a very inciteful coach (Isobel Heaton – who I'm sure some readers remember). Isobel understood the challenges faced by the WPLs and TLs in managing virtual teams and helped us all develop many of the soft skills needed for working in such a diverse and distributed structure.

But that is just one of many examples where the human networking and knowledge sharing through workshops and training has brought so much benefit to us all as individuals and to the community as a whole.

Ann, what was your best moment in the last 20 years of GÉANT Projects?

This is an impossible question. Firstly, they're not 'my' moments, they belong to the Task and Activity/Work Package members. Sometimes I was the face of them (as in the successful independent project reviews), sometimes very peripheral, but loving being part of something bigger (such as watching eduroam CAT take off).

But a lot of the time it was the deep professional working relationships with amazing people like Afrodite Sevasti (of Greek NREN GRNET) in my multidomain network days where you're really taking a look at the future and trying to reach it.

Matthew, what was the proudest moment of the project so far?

As Ann says, it's important to consider this from the perspective of the project rather than an individual view. There are so many fine achievements of the projects over the 20 years, so it is really hard to pick out any single moment.

Perhaps the best way to answer this is to reflect on the sustainability and growth of the overall programme, as evidenced not only by the commitments shown by the EC in now funding 7-year framework programmes rather than single projects. Signing the first Framework Partnership Agreement with the EC was a real milestone that recognised our joint consortium's well-earned reputation as the project that keeps delivering across such a wide spectrum of technologies and services for R&E.

Signing the second FPA, which we hope to do very shortly, will be another significant moment of course.

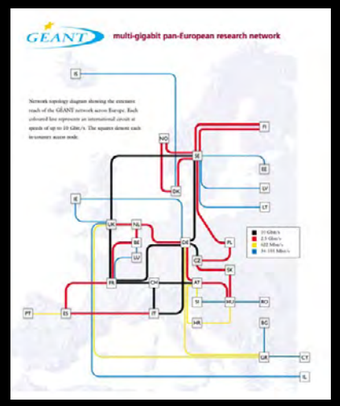
When we are all able to gather at one of our 'all hands' symposia, the vital energy and enthusiasm is really palpable and is a strong reminder that it's the human network that makes the network work!

However, perhaps just eclipsing these moments, a personal favourite of mine would be when our first dark fibre was handed over, lit, and the traffic flowed on the new infrastructure. It was a major milestone in being able to secure, own, deliver, and sustain such a large-scale network and really demonstrated what a collaborative effort across many disciplines and organisations is able to achieve.

2000

As part of its 5th Framework Programme (FP) the EC co-funds the new GÉANT project. Building on the TEN-155 network, the objective is to provide an infrastructure to support researchers, as well as provide a research infrastructure for information technology and telecommunications innovation.

2001



EC-funded GÉANT network becomes fully operational on 1 December, connecting NRENs in 31 countries. Built using the latest DWDM technology operating at 10 Gbps, GÉANT is one of the most advanced networks in the world. With total network capacity of 120 Gbps, it represents a 20x increase over predecessor network TEN-155.

2002

GÉANT officially inaugurated in Brussels in May and launched in cooperation with the Global Research Networking Summit. Since its launch, continuous discussions have taken place with North America, the Asia-Pacific region, Australia, South Africa, Russia, and other countries to develop and improve global connectivity for GÉANT. Initiatives to develop global connectivity to GÉANT led to conclusion of CAESAR and EUMEDCONNECT feasibility studies, planning connectivity to GÉANT from the Latin American and southern Mediterranean regions respectively.

2003

With increasing demand particularly from large-scale user such as Europe's radio-astronomers and particle physicists, GÉANT's second year of operation proved stable, and uninterrupted service was maintained throughout the year. The GÉANT PoP in New York is relocated, and transatlantic connectivity and accesses to North American partner networks are improved and upgraded. Reciprocal US capacity is provided for the first time by the National Science Foundation.

2004

In September the EC signs a €93 million contract funding 50% of GÉANT2 with 50% provided by European NRENs. GÉANT2 takes a user-focused approach to networks which aims to create production services for improved usability.

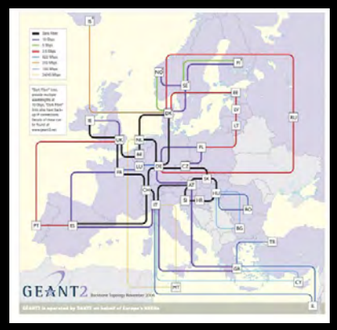
The ALICE project – co-funded by the EU – creates RedCLARA, the first pan-Latin-American network for research and education.

2005

Build of the GÉANT2 network nears completion, creating the world's most advanced R&E network and overcoming huge technical challenges through close collaboration with all partners.

The GÉANT2 research and service programme shows promising results in the areas of Performance Monitoring, Bandwidth Provisioning, and Mobility and Roaming.

2006



In the 7th FP for Research and Technological, EU states that GÉANT2 is "the fundamental underlying enabler for the realisation of e-Science and the European Research Area." GÉANT2 now offers 50,000km of installed network, innovative technology, unrivalled geographical coverage, and high bandwidth capacity to more than 30 million researchers in Europe via its partner NRENs.

Ann, what are your hopes for GN5?

I hope in GN5 we can show how our innovations and services offer a needed alternative to those of the big players. I don't mean in terms of simple take-up, as that's limited only to our community, but also that we can and should try to influence the large providers and lawmakers for the benefit of R&E and show there are other valid ways of doing things.

If you think about something like the ethical and fairness basis of eduroam compared to Uber or similar platforms, we have valuable stories to tell. This is especially important in the areas of privacy and ethics but also as a direct challenge to de facto market monopolies where an outage in one big player can damage everyone. In my opinion, only through collective action will we have the weight to make a difference.

I also hope that in GN5 we start to foster the next generation of NREN engineers and developers of all stripes (technical and business), particularly those in their 20s.

Matthew, how do you expect the project environment to develop in GN5?

We have some ambitious plans for GN5, which is coming at almost a perfect time with our community's new 2021-2026 Strategy having been agreed earlier this year and a series of consultations and implementation planning workshops held already, that will help us in selecting the way ahead for the upcoming series of projects in the next Framework Partnership Agreement (FPA).

In terms of the project environment, I would like to see an increasingly seamless transition from one project to the next, and to rely much more on an ongoing and more frequent assessment of progress and adjustments necessary, to ensure we are agile enough to meet the users' needs and to adapt to the constantly changing environment. This can be a challenge to fit in with the more formal structures needed for EC-funded projects, but we have made a good step forward in GN4-3 and I expect we can make further progress in the next framework programme.

Ann, what is the most important advice you would now give your younger self – how to approach such a project?

Ooh, evil question! I think actually I would not like to give myself too much info, in case I scared myself off! But if I have to come up with the top three tips it would be:

1. Honesty and transparency – there will be things you don't know, be open about that as others do know and they appreciate being part of the answer.
2. Don't have regrets for what you can't change – a wide range of small things can have a really big impact at scale.
3. Never accept a smaller than 1-hour transit at Frankfurt airport.

Matthew, what is the most important advice you would now give your younger self – how to approach such a project?

Not sure quite what you are implying here…? OK, it's fair to say I have been around for some time (just last week I discovered that the father of one of our project managers was younger than me, which was a little depressing!).

I joined this community in my mid-30s having worked in a few engineering roles and then re-training as an accountant for a hard-nosed, profit-obsessed US firm. Joining this community – especially following that experience of the really commercial world dominated only by a focus on the bottom line – required quite some adjustment, but my advice for anyone coming in new is not to be put off by the project's apparent complexity, and to give yourself plenty of time to understand the mission we have, and to appreciate the benefits this community brings to R&E globally. If you have doubts as to whether this the right thing for you, remind yourself of the uniqueness of this not-for-profit, truly international collaboration, that delivers vital infrastructure and services and enables the scientific discoveries the world desperately needs. Then ask yourself if this isn't a worthwhile career path to follow.

Ann, Matthew, thank you so much for your words – and thank you to everybody who has been involved with the success of the GÉANT Project. Here's to the next 20 years!

2007

GÉANT and partner NRENs now interconnect an estimated 40 million users in 40 countries across the continent; funding for the ongoing operation and maintenance of the European eduroam facilities is provided through the GÉANT project in order to help bridge the digital divide and widen access to services.

2008

Showing commitment to the environment, an internal "GÉANT Green Team" is established with the objective to work towards greener networks, services, policies and practice across the project.

2009

Third generation of GÉANT Project (GN3) welcomes multi-domain and federated services to all countries, creating a platform for European research needs: the GÉANT Service Area. GN3 launch in Stockholm showcases low latency benefits: Domenico Vicinanza plays music from recreated ancient Barbiton instrument, supported by the Lost Sound Orchestra with Arts Exchange dancers performing live in Kuala Lumpur.

2010

"GÉANT ensures that Europe is the central hub for R&E, bringing together the brightest minds in the world," says Neilie Kroes, VP of the EC for the Digital Area. "GÉANT not only benefits Europe's competitiveness, but collaboration among researchers on a global scale."

The FEAST feasibility study is delivered and solidifies the EC's plans for funding for dedicated research and education networking and connectivity across the African continent.

2011

eduGAIN interfederation service launched - connecting identity federations around the world, simplifying access to content, services and resources for the global research and education community. eduGAIN now comprises over 70 participant federations connecting more than 8,000 Identity and Service Providers.

2012

Campus Best Practice aims to address key challenges for European campus networks. Working groups and an evolving and to-the-point set of best practice documents for the community are developed with dissemination across all of Europe.

2013

GÉANT's terabit upgrade gives European science the data network of the future. Nellie Kroes states: "With this upgrade supporting capacity of up to 2Tbps across the core network, this project is essentially future proofing GÉANT until 2020."

2014

Berlin, 7 October: DANTE and TERENA become the GÉANT Association under a unified governance structure. This restructuring marks a new phase in almost thirty years of collaborative research and education networking in Europe.

2015

The EC and GÉANT sign a €13M contract to expand connectivity in the Eastern Partnership (EaP) countries. It creates EaPConnect, interconnecting and integrating NRENs in Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine in the pan-European GÉANT network.

GÉANT Project receives highest possible rating in an EC review for the 4th year in a row.

2016

GN4-2 starts, supporting scientific excellence, access, and re-use of research data and support to Open Science.

Demonstrating the success of international collaboration, eduroam celebrates one billion roaming authentications – helping create the global village for R&E.

GN4-2 delivers the game changer for cloud-computing, ensuring easy consumption of IaaS cloud services across Europe, and conducts pan-European tender for IaaS services.

2017

With the Advanced North Atlantic collaboration, GÉANT and partners in Europe and North America together reach a total of 740Gbps transatlantic connectivity.

Erik Huizer joins as (initially interim) CEO of the GÉANT Association.

GÉANT invited to European Open Science Clouds summit, an important milestone towards further commitment to the implementation of a digital, rich, reliable and innovative environment for all researchers in Europe, across diverse scientific disciplines.

2018

Through close alignment with e-infrastructure partners, GÉANT secures key roles in EOSC Executive Board, EOSC Secretariat, EOSCpilot and EOSC-hub, and in PRACE 6IP project and HPC governance.

As demand continues to grow, total traffic on the GÉANT network reaches 3.2 exabytes alongside a 50% growth in global traffic.

2019

As part of the BELLA Programme, construction of the EllaLink fibre optic cable system (which will go on to link landing stations in Sines, Portugal, and Fortaleza, Brazil) begins in early 2019. The process starts with a survey of the ocean floor to determine the cable route and the manufacture of the system.

100Gbps ring connection around the globe supercharges EU-Japanese science collaborations in Europe and Japan. The upgrade is between the GÉANT network and the Japanese Science Information Network (SINET), operated by the National Institute of Informatics (NII).

TNC19 is the biggest yet, welcoming over 800 participants from 70 countries, and wins multiple awards from the Estonian Convention Bureau.

2020

When COVID-19 strikes, GÉANT and the NRENs are ready to support the increased needs of the R&E community. Together, we actively support the EU's COVID-19 research platform and Manifesto.

IaaS framework services now consumed by 340 institutions to a value of over €27M.

GN4-3 supports the EU's Cyber Security Month with a campaign including 19 NRENs and continues to raise the profile of this vital area.

2021

Alongside the rollout of the most significant refresh of the GÉANT network in a decade, planning for the next phase of the GÉANT Project is underway to ensure GÉANT and the NRENs continue to support the rapidly growing needs of Europe's R&E community.

CONNECT Interview: Adam Lewis,

Digital Earth Africa on the Digital Transformation of Africa

Adam Lewis is the Managing Director of the Digital Earth Africa Establishment Team. With his mission and vision, Dr Lewis is transforming the way spatial data is organised, prepared and analysed, leading to changes in the way satellite images are processed. Dr Lewis leads the Digital Earth Africa (DE Africa) programme, an open platform led and governed by Africans, that is working with global partners to make Earth Observation data free and accessible to the whole of the continent. The data can be used to inform crucial decision-making that will improve lives and contribute towards a more sustainable future for the continent.

Interview by: Silvia Fiore, GÉANT

The AfricaConnect3 team spoke to Dr. Lewis about the immense power of EO in building a better future for Africa and the critical role that effective networks like NRENs have in making this happen.

Dr Lewis, why is EO data so important for Africa's digital transformation and what are some of the real problems that satellites have been tackling on the continent?

Earth Observation data is a unique and powerful source of information for understanding and managing our environment, from oceans to rangelands, rainforests to cities. The data is unique because satellites cover whole continents and they do it consistently, providing free and open data. This information is valuable to all countries, but especially to large countries or in areas where other sources of data are difficult to obtain. Globally, EO data are used to map and monitor land cover, crops, agricultural areas, water bodies, floods, wildfires, coastlines, geology and minerals, the development of human settlements, and so on. With DE Africa we are positioning Africa as a continent to leverage all that international experience and fast-track African countries to be leaders in the use of EO data. The DE Africa platform also gives policymakers, researchers, and industry leaders the information they need to help address some of Africa's greatest sustainability challenges, like food insecurity, water management and effectively managing urban growth.

At your keynote speech at TNC21, you mentioned that NRENs play a key role in providing connectivity for the end users to access and make use of satellite data. Could you explain in more detail why and how you see NRENs harnessing the potential of EO to make data-driven decisions for the public good?

NRENs act as 'data highways' that connect data with people, and data with data. In recent years there has been a complete transformation in the way that people work with EO data. The data volumes have grown so rapidly that seemingly overnight we have moved from a model where the experts normally keep a copy of the data, to a model where no-one keeps a copy of the data – only cloud providers, major computing facilities and official archives have that capacity. In this world, experts – often in scientific and academic institutions - have to be able to connect to the data over networks, and NRENs are often out there as the pathfinders, so they are critical.

Furthermore, science is now a collaborative activity, at least in EO. So, networks are the way we connect people to work together.

In your experience, which methods have worked best to facilitate governmental institutions and organisations to collaborate with scientists to maximise the benefits of satellite data in Africa?

We all want our information to have impact. Looking back on my career, the key ingredients seem to be:

- An issue of importance and a high-level decision maker who is tasked with that issue.
- A recognised information shortage.
- Relevant data in a reasonably usable form and the technical expertise close to the issue, to work with the data to produce important information to inform the decision process.

We need to try to produce simple, reliable, decision-ready information with wide application that connects directly to issues. With DE Africa we are trying to do that through continental products such as water observations from space.

What are some of the key challenges that you are encountering in your work in Africa right now? And what viable solutions do you foresee for these challenges?

Internet connectivity is the biggest challenge. Some of our users are connecting from remote locations and have challenges in accessing the platform. DE Africa is exploring how to optimise some of the tools, adding more memory for some power users and caching of some of the data for quick access. The COVID-19 pandemic is making it even more challenging for some users to connect from different countries. In this field, DE Africa is working with six Implementing Partners in Africa to bridge this gap. These partners are:

- Regional Centre for Mapping of Resources for Development (RCMRD) based in Nairobi, Kenya.
- L'Observatoire du Sahara et du Sahel (OSS - based in Tunisia).
- African Regional Institute for Geospatial Information Science and Technology (AFRIGIST - based in Nigeria) and AGRHYMET (based in Niger).
- Centre de Suivi Écologique (CSE based in Dakar, Senegal).
- South African National Space Agency (SANSA).

In concrete terms, how could NRENs and their regional counterparts collaborate with DE Africa to overcome these challenges?

One way that NRENs could work together with DE Africa is to map out which of our users are experiencing internet difficulties that prevent them from engaging fully with DE Africa training or tools, and then to highlight those as areas for network improvement.

With the global COVID-19 pandemic having a big toll on the African economy, how do you see the importance of EO for the continent's ability to be resilient amid the effects of the pandemic, especially in the effort to achieve some of the Sustainable Development Goals?

DE Africa has provided the outcomes through a report to the World Economic Forum (January 2021) titled **Unlocking the potential of Earth Observation to address Africa's critical challenges**.

- **Countries are empowered**, with EO data about land, water resources, and human settlements enabling them to make evidence-based policy decisions.
- **Lives are improved**, through access to information that empowers governments, individuals and communities to make informed choices.
- **Development activities are more effective** through access to information that provides insights to better understand the root cause of issues and develop impactful solutions. Development of decision ready products, and analysis ready services to support African Union Agenda 2063 and the UN SDGs.
- **Digital transformation is advanced** through industry uptake and innovation using products and services from DE Africa. Increased economic development and job creation, through access to data for commercial products and services development.
- **Over $2bn of benefits** to the African continent are possible through accelerated industry growth, improvements in agricultural productivity and the detection and prevention of unregulated mining.

Where do you see the field of EO data in Africa 10 years from now?

Technical change tends to be slower than we would like, but I think there are trends in play around EO data in Africa that will play out over the next decade. In 2032, DE Africa will be a global showcase on how to organise and apply EO data for sustainability and climate. The ARD collections from Landsat and Sentinel will be 10-15 petabytes in size. I hope there will be hundreds of African scientists working with these data to produce information of value. I hope that DE Africa as an institution will be producing accurate, operational continental products to help to monitor surface water, coastlines, wetlands, urbanisation and forests.

Satellite data contribute to achieving sustainable development goals (SDGs) and environmental challenges.

"The advancement of satellite sensors and open access of data are playing significant role in achieving sustainable development goals and provide solution to critical environmental challenges. Radar satellite data (Sentinel 1) is significantly used to monitor oil pollution in the marine environment of the Mediterranean Sea and Red Sea due maritime shipping tankers or/and oil production platforms. It enabled to generate robust service to environment agency to keep an eye on the marine environment and take the necessary actions. Otherwise, optical satellite data and geophysical data are integrated to quantify the wastes in a large landfill in Cairo to re-develop the area."

Prof. Islam Abou El-Magd, VP of the National Authority for Remote Sensing and Space Sciences (NARSS), Egypt

To learn more about AC3 activities visit **africaconnect3.net**

Enlighten Your Research BELLA: Boosting International Research Cooperation

The Enlighten Your Research BELLA (EYR-BELLA) team are now accepting submissions!

Are you interested in incorporating open science platforms, high performance computing, data storage, data transfer tools, and/or trust and identity services into your research process?

Are you a researcher in Latin America collaborating with European research institutions or European universities? Are you a European researcher collaborating with research institutions in Latin America? Or are you a Latin American researcher collaborating with research institutions or universities in at least one another Latin American country?

Then you are invited to submit a support request proposal to the EYR-BELLA Programme, whether already in implementation or planned.

About EYR-BELLA

Enlighten Your Research (EYR) is a programme designed to increase the use and awareness of e-infrastructure resources in various fields of research. The goal of EYR-BELLA is to provide access and support for network, compute, storage and trust and identity resources to meet the growing data and collaboration needs of research. It also aims to inspire new and understand existing collaborations between Latin America and Europe.

Picture
Bottom Right: BELLA high capacity and low latency demonstrated at TICAL2021

How can I apply?

The submission process is simple and lightweight: the support request proposal is submitted electronically by answering a series of questions relating to the project, including its scientific domain and the project partners, and your support needs (e.g. network services, computing, storage and data, trust and identify, security) in an online form. Support request applications can be made in English, Portuguese or Spanish:

- English: **https://es.surveymonkey.com/r/EYR_EN**
- Portuguese: **https://es.surveymonkey.com/r/EYR_PT**
- Spanish: **https://es.surveymonkey.com/r/EYR_ES**

The deadline is Midnight on Friday, 1 December 2021.

See the **BELLA website** for more details.

BELLA sees first traffic carried on EllaLink submarine cable

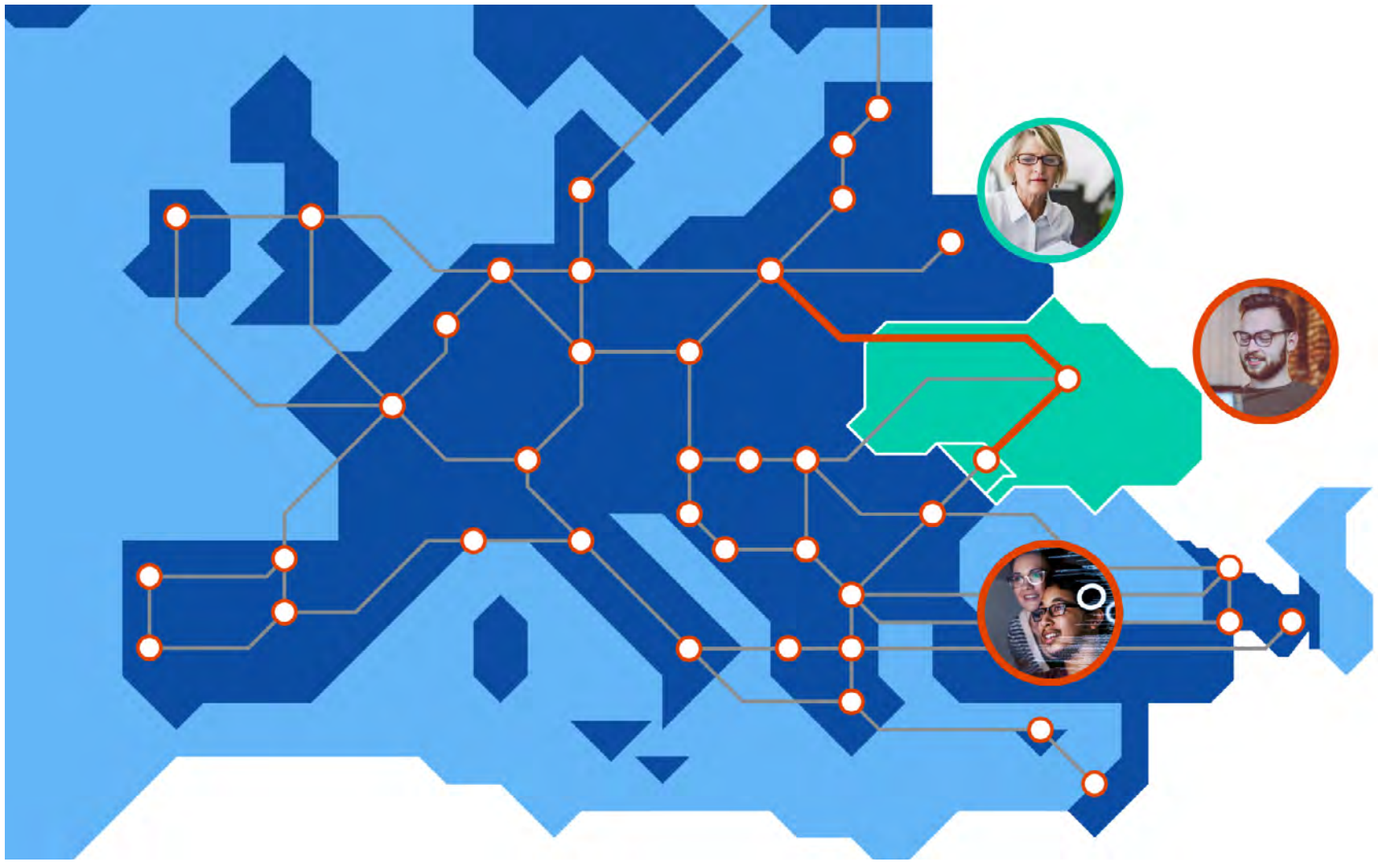
At the end of August, during the TICAL2021 conference, the **BELLA Programme** celebrated the first transfer of data between the **GÉANT** and **RedCLARA** networks across the 6,000km **EllaLink** submarine cable that runs between Lisbon, Portugal and Fortaleza, Brazil, bringing to life a 10-year dream held by governments and partner organisations from the research and education networking communities across Europe and Latin America.

With the **EllaLink cable inaugurated earlier this year at the Leading the Digital Decade event in Portugal**, TICAL2021 provided the perfect stage to launch the BELLA Programme's dedicated connectivity for research and education on the world's first high-capacity submarine cable between Europe and Latin America to the very user communities who will benefit so much from it.

With connectivity now online and providing the high capacity and low latency needed for data-intensive research and education use, this highly celebrated milestone could be considered a final step for the BELLA Programme's transatlantic activities, but in reality, it marks the beginning of a new era of collaboration between Europe and Latin America in research fields such as Earth observation, radio astronomy, particle physics and medicine.

EU4Digital

EaPConnect – GÉANT 'spectrum' link breaks new ground



A new GÉANT network link with Moldova and Ukraine marks significant milestones and first-time achievements for GÉANT, the EU-funded EaPConnect project and its partners. The new connectivity supports EaPConnect objectives to reduce the digital divide and connect Eastern Partnership (EaP) R&E sectors with GÉANT, and helps achieve EaPConnect, GÉANT and EU4Digital initiative goals to sustain long-term digital development and its benefits to society.

Words: Laura Durnford, GÉANT

The new network is the first commercially procured spectrum-capable infrastructure to be used in the GÉANT network. Procured by GÉANT and partners in EaPConnect with funding in the EU's EU4Digital initiative, this infrastructure has been secured under a 15-year Indefeasible Rights of Use contract, with reduced costs in price/Gbps/Km/year for the Moldovan and Ukrainian NRENs, RENAM and URAN.

The new Chisinau-Kyiv and Kyiv-Poznan connectivity completes a Bucharest-Chisinau-Kyiv-Poznan half ring. These sections have a 100 Gbps (Gigabits per second) capacity – already a significant increase for Moldova and Ukraine. Because this infrastructure can be used with cutting-edge 'spectrum' technology, which enables even greater data flow by transmitting it as multiple wavelengths of light, these sections could handle around 400 Gbps or more, simply by upgrading transmission modules.

"Increased connectivity to GÉANT will contribute to deployment of new services for the R&E community of Moldova, enhance cooperation of Moldovan researchers and educators with colleagues from Europe, and promote their participation in joint international projects."

Peter Bogatencov, Chair of the RENAM Management Board

This development brings Moldova and Ukraine in line with Europe's most advanced NRENs, and with improvements across the GÉANT network that are being undertaken in the GN4-3N project.

The new connectivity includes the first direct link between EaP countries plus two new GÉANT network PoPs (Points of Presence), in Chisinau and Kyiv. These connect with pre-existing PoPs in Bucharest and Poznan, creating additional backbone routes that extend the pan-European network. Integrating Moldova and Ukraine also strengthens the network, by improving the reliability and redundancy of connectivity to/from those countries. Furthermore, Moldova's new second route brings the country in line with GÉANT best practices.

The strategic significance of Moldova and Ukraine is elevated by the new connectivity: research data flowing between EU countries can now transit through these EaP countries; and as Ukraine is a gateway for interconnection with more eastern carriers, connectivity via Kyiv is of even greater significance for the whole GÉANT community.

"The R&E needs for digital services are constantly growing and our network capacity should keep pace and even stay ahead. Because 'spectrum' channels can change capacity gradually, they will achieve this. Spectrum technology will not only allow our scientists to work with big data at sub-terabit speeds and access advanced European resources, it will help URAN improve its services and further integrate Ukrainian researchers and educators into the European R&E community."

Yevhenii Preobrazhenskii, Executive Director of URAN

Further information

EaPConnect's new 'spectrum' connectivity was launched on 28 September 2021 as part of EU4Digital's Steering Committee week: **bit.ly/EaP-s**

eapconnect.eu

eufordigital.eu

renam.md

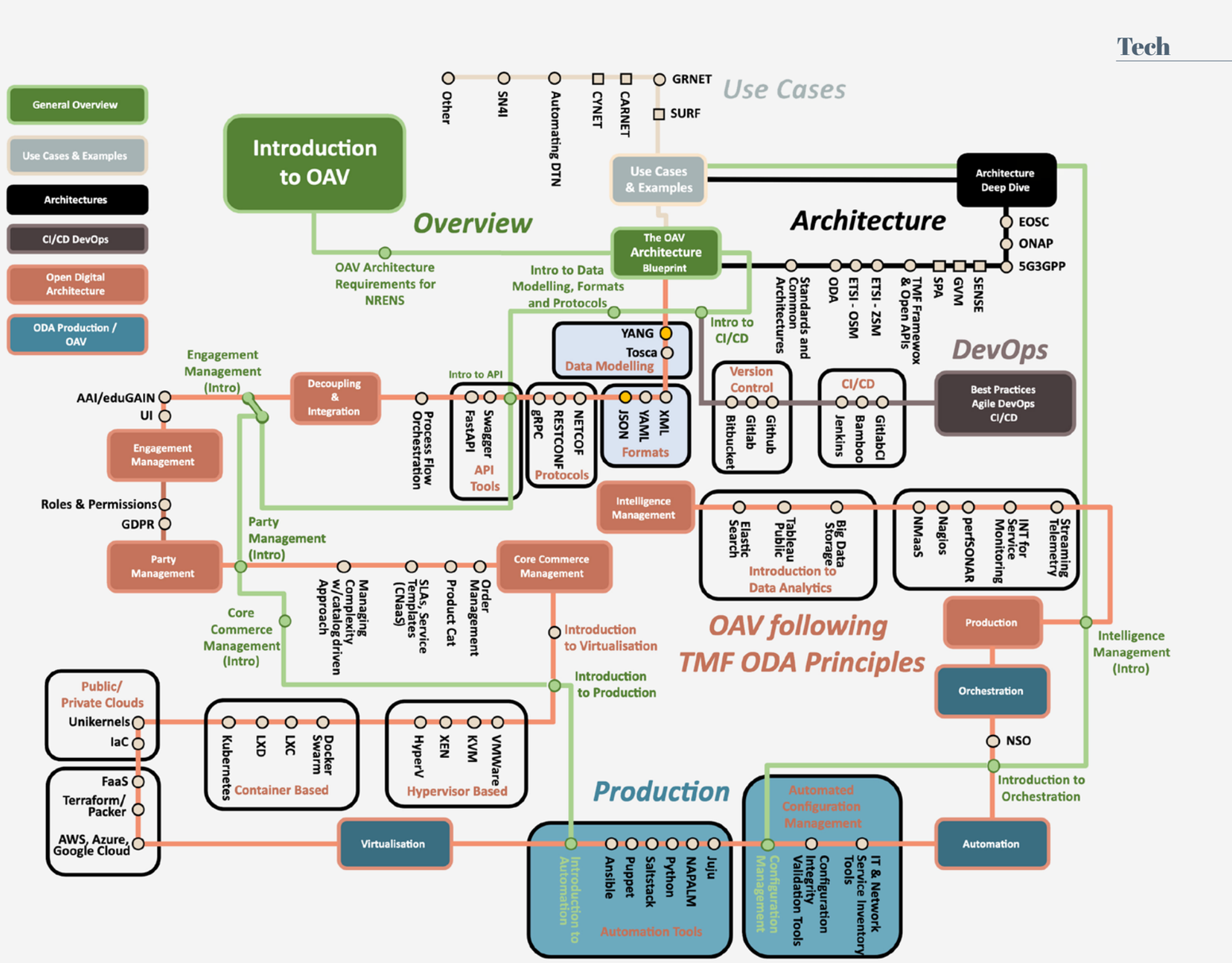
uran.ua

Picture
A video about the new 'spectrum' connectivity is on the EaPConnect YouTube playlist: **bit.ly/EaP-YT**

Network Automation eAcademy

Get ready to offer new and flexible services on demand with Orchestration, Automation, and Virtualisation (OAV)

Orchestration, automation, and virtualisation (OAV) is an increasingly important solution to the challenges modern network operators face, not least to support users who demand self-service in a digital platform. Network Automation does not just replace something you do manually with something automatic, it's a complete mindset change, from the company management to the network and software engineers.



Words: Maria Isabel Gandia, CSUC

The GÉANT (GN4-3) Project has created a training programme 'by the community and for the community', for engineers, managers, researchers, and members of the R&E networking community who want to know more about OAV.

As the experience and knowledge of teams may vary, the training programme has different learning paths to suit different needs, and includes real-life examples and resources from the research and education world to help provide context and provoke innovation.

To help users get started, a Metro map has been created so that all the learning units are easily visible. Users can follow the lines and find their preferred units, or the OAV team can help to determine the best path depending on needs in the Network Automation eAcademy. The team is available to help identify the best learning experience and answer questions at **oav@lists.geant.org**.

Navigating the Metro

The Metro map was built with the functional blocks of the TM Forum Open Digital Architecture (ODA) in mind as a blueprint where users can map other architectures keeping their independence, tools, and processes. Each line is focused on a different topic and provides a structure of learning units. For example, there is an introductory line which provides a general overview, including the ODA functional blocks. Users can then switch to other lines to gain more knowledge on specific OAV topics. The training programme is flexible and can be adapted and customised to individual needs. In particular, different students can take different paths to build on their existing knowledge and skills and develop in-depth expertise as the needs of their OAV projects develop. Just like a real Metro map, there is no single route through or one route everyone has to take, rather it customises the learning experience to the needs of the user.

All the learning units contain subtitled videos (between 5 min and 20 min long) and the corresponding PDFs with the script, so users can follow either the video or download the PDF, with the same information. This is followed by a quiz at the end of each unit to test knowledge gained, as well as a feedback form. When a learning unit is completed, users receive their certificate of completion to demonstrate the knowledge they have gained and that they have mastered the area.

New learning units will appear in the Network Automation eAcademy regularly, while the publication of new units can change depending on user requests through the feedback forms.

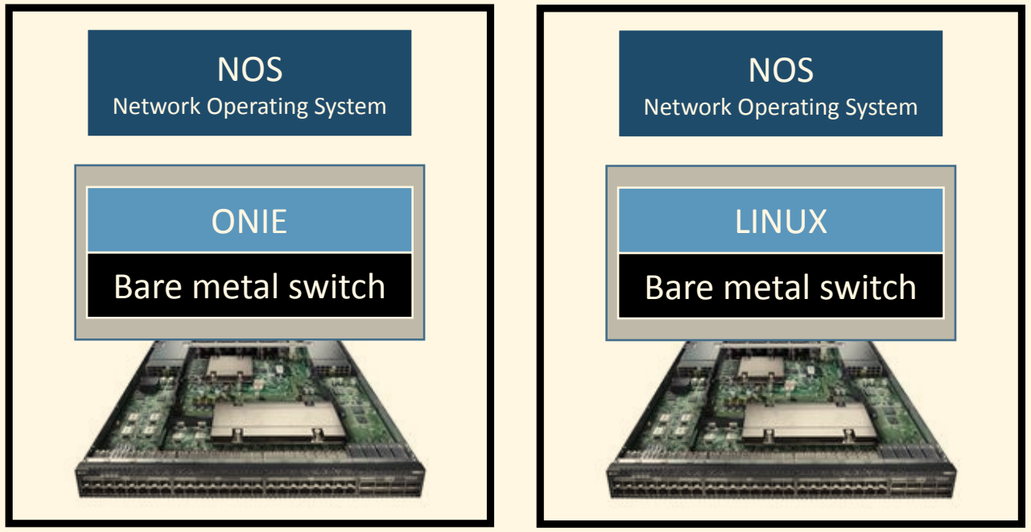
You can find the Network Automation eAcademy in the OAV Training portal **https://wiki.geant.org/display/NETDEV/OAV+Training+Portal** and the GEANT eAcademy (**https://e-academy.geant.org/moodle/**)

Learn more about OAV

Further information on OAV is available at:

- **OAV Video**
- **Brochure**
- **GÉANT Infoshare**
- **TNC21 BoF**

You can also find out more at the **OAV wiki**, or contribute to the **OAV Community portal**.



Picture
White box architecture

White box for research and education

The networking industry landscape is evolving fast, and the market trend is now directed towards data centres and cloud-based services. The strategy of new players who want to enter this market is to seek solutions not only at lower prices and a higher port density ratio, but also to decouple the network operating system (NOS) from the hardware in order to remove their potential customers' dependency on the traditional monolithic vendor router/switch market. Moreover, programmable solutions are emerging based on DPDK (Data Plane Development Kit), FPGA (Field Programmable Gate Arrays) and P4 chipset forwarding (Intel® Tofino™).

Words: Xavier Jeannin (RENATER), Ivana Golub (PSNC), Tim Chown (Jisc)

What about white box?

A white box is a switch/router manufactured from commodity components that allows different NOSs to be run on the same piece of commodity hardware, decoupling the NOS software from the hardware. White boxes, first deployed widely in data centres, offer an impressive forwarding capacity for a very competitive price. The white box chipset forwarding characteristics (forwarding capacity, internal memory, size of buffers) determine the scenarios in which it can be used, for example, Internet Exchange switch, data centre, Customer Premise Equipment, etc.

To evaluate whether white box technology is a real opportunity for the GÉANT community, WP6, the Work Package for Network Technologies and Services Development in the GÉANT (GN4-3) Project performed tests to validate white box solutions in the context of NREN use cases, which were then put into production if the outcome was acceptable to the NREN.

Aspects for consideration

The aspects to consider for the deployment of such white boxes included routing features, network management (monitoring, authentication, maintenance model, etc.), security and the license model. The business decision whether to go into production was based on technical considerations; total cost of ownership (as described in a white paper produced by the project) [TCO]; on the internal organisational constraints; and on the NREN's strategy. The different use cases studied are documented in white papers: three production use cases RENATER ([**IX**] and [**CPE**]) and GRNET ([**Data Centre**]), performance validation [**Perf**], and FUNET's CPE use case [**CPE-FUNET**].

There are four main conclusions of this work:

1. White boxes can be used in production for many NREN use cases.
2. Implementing a white box solution does not require different knowledge and expertise than that which already exists in NRENs.
3. The decision to use white boxes in production depends on technical and cost aspects, as well as on organisational aspects, such as previous knowledge and experience, constraints, and strategy. Thus, some would choose to stay with more complex, more expensive solutions from a vendor they trust, others choose specific use case-based white box solutions focused primarily on the functionalities they need for that use case.
4. Validation of any white box device should include detailed and thorough performance testing of the chosen hardware and NOS combination. The set of functionalities to be tested has to match the target use case, protocols, and parameters set of this use case (number of BGP routes, LSP, VRF, etc). Considering the number of control plane features and their interoperability, an automatic test process is highly desirable.

In parallel to this work, another WP6 team extended the white box paradigm further and developed an open-source RARE Operating System (ROS) [**RARE**] running over a programmable white box. ROS is now sufficiently mature and available for production use on DPDK, BMv2 and Intel® Trofino™ ASIC P4 platforms, greatly enhancing the benefits of using white box platforms.

Want to learn more?

More detail about this work will be presented during the upcoming infoshare "**White Box in NREN context**" on 8 December 2021.

References

[CPE]
White Paper: White Box CPE

[CPE-FUNET]
White Paper: Funet CPE – White Box Edge Router

[GIX]
White Paper: GIX Implementation Based on White Box

[Data-Centre]
White Paper: White Box - GRNET Data Centre Use Case

[TCO]
White Paper: White Box Total Cost of Ownership

[Perf]
White Box Performance Testing and Evaluation

[RARE]
Router for Academia, Research & Education

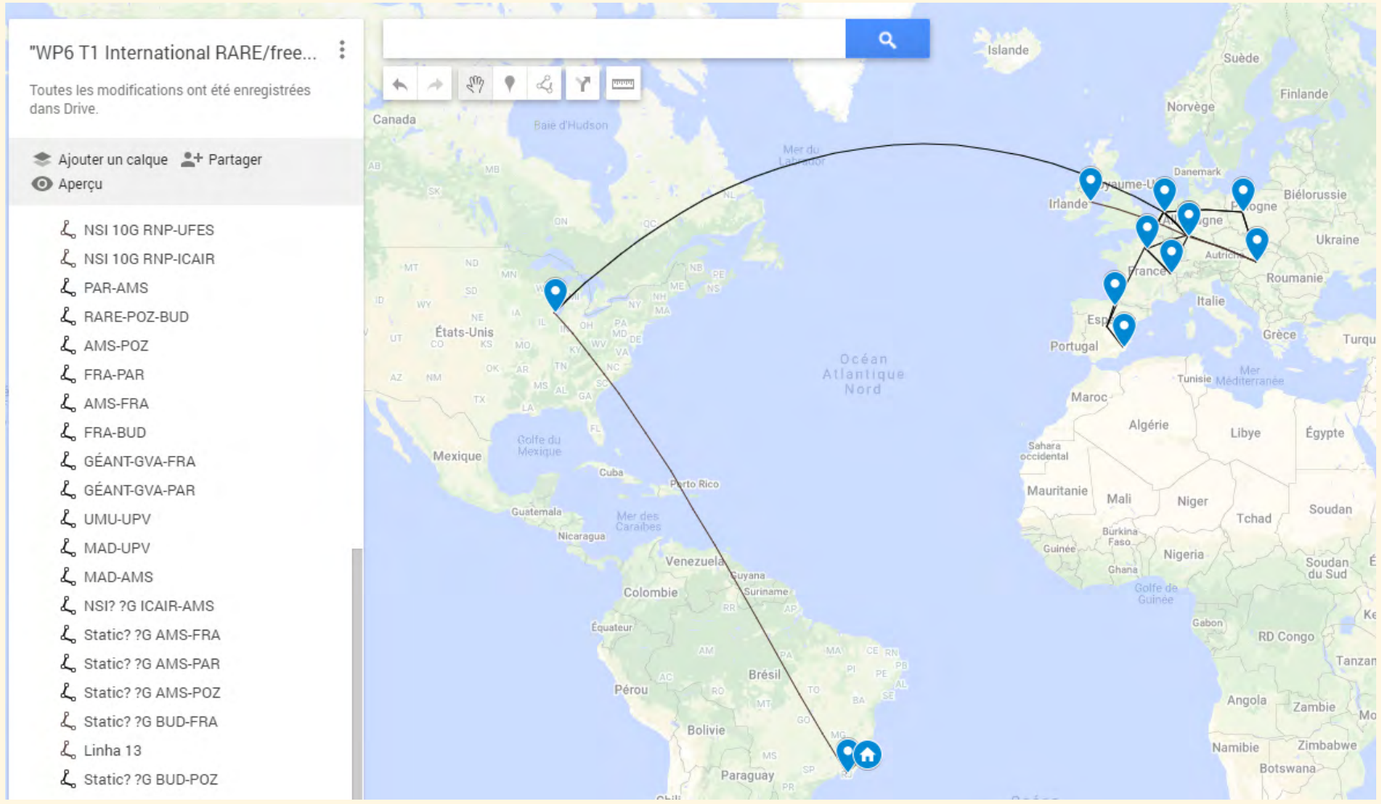


Figure
The GÉANT P4 lab with its international connections

Open-Source Router for Academia, Research & Education and FreeRtr

RARE/FreeRtr is an open-source programmable routing platform. It provides several data planes (Libpcap, DPDK, BMv2, INTEL TOFINO ASIC) that can be controlled by a unique common open-source control plane: FreeRtr.

Words: Mate Csaba (KIFU), Ivana Golub (PSNC), Tim Chown (Jisc)

RARE/FreeRtr provides solutions for NREN use cases such as an MPLS core router, MPLS provider edge, a BGP RR, a switch/router in an IXP, Spine/Leaf/Tor router in DC environment, for SOHO, small campuses, and medium-size regional networks.

FreeRtr development follows standardisation body recommendations such as IETF RFCs and is interoperable with standards-compliant routers of the public market. New features and protocols are continuously added (see the rich list of features available on the **RARE project portal**).

All these features pass thousands of regression and interoperability tests before being added to the official version. FreeRtr was used in production as a route-reflector by KIFU, the Hungarian NREN, and acts as an Interior Gateway Protocol (ISIS) probe in GÉANT, HEAnet and PSNC.

The GÉANT P4 Lab (GP4L) has been implemented with a core of four RARE P4 switches powered by Intel® Tofino™ ASIC hosted at GÉANT PoPs. With RARE and GP4L attracting strong interest from the worldwide R&E community, now also non-European sites (STARLIGHT, RNP) are connected and additional sites Caltech and KREONET plan to connect soon (see figure).

The programmability of RARE allows not only the handling of R&E use cases but also the ability to develop and rapidly validate a new idea. For example, the PolKa project used the GP4L for its validation demonstration and received a Google Research Scholar Program award [**IEEE_Polka**]. Another example is the RARE team collaborating with engineers from Juniper, Cisco and Akamai on testing the FreeRtr implementation of the BIER multicast protocol to carry video content, adding an AMT (RFC 7450) implementation on FreeRtr to support relaying multicast content to unicast-only receivers.

RARE/FreeRtr is in production for the Gaia networking laboratory at the University of Murcia. With respect to network management, a monitoring system based on Prometheus has been developed.

RARE/FreeRtr allows you to deploy SOHO solutions (DPDK) (several 10Gbps) as well as core network use cases where a very high amount of traffic switching is needed (thanks to the Intel® Tofino™ chipset 6.4 Tbps packet forwarding capability). Beyond being an affordable solution, RARE/FreeRtr also provides a certain level of independence from traditional networking vendors' models. RARE/FreeRtr is a programmable routing platform that makes it: a "highly customisable free open-source solution", especially when deployed in a CI/CD model.

The **RARE code** is available together with step-by-step guides for RARE, P4 and all aspects of network programming using RARE on the [**RARE_Blog**], with FreeRtr documentation published at [**FreeRtr_Doc**].

If you wish to discuss RARE with the team, please email **rare@lists.geant.org**.

References

[**RARE_Wiki**]
Router for Academia, Research & Education

[**FreeRtr_Doc**]
Free Router documentation

[**RARE_Code**]
RARE source code

[**RARE_Blog**]
RARE Blog

[**IEEE_Polka**]
PolKA: Polynomial Key-based Architecture for Source Routing in Network Fabrics

[**Google_Award**]
Networking section at the Google Award Winning Recipient page

WiFiMon

WiFiMon: an essential tool for testing WiFi on the Campus

Find out how WiFiMon can help support Campus WiFi Installations

Words: Kurt Baumann, SWITCH

What is WiFiMon?

WiFi access (and in particular eduroam access) is now accepted as an essential part of the wider campus experience. Not being able to connect to network resources can damage user experiences and can result in users having to use mobile 4G data connections rather than WiFi. A poorly performing WiFi service affects user experiences. But how can performance monitoring work in a situation where users are by definition mobile?

GÉANT WiFiMon is a distributed WiFi network monitoring and network performance verification solution. WiFiMon uses a crowdsourced approach through JavaScript code that is installed on destination sites commonly visited by users (for example a college email website or intranet) providing a performance measurement when students access the website.

This light touch approach requires no client software or applications while significantly increasing the number of measurement points across the campus.

In addition, dedicated hardware probes can be implemented for high impact areas to identify issues before they become visible to the users. Measurements are gathered from dedicated small form factor hardware devices (currently Raspberry Pi devices). Fixed WiFiMon measurements capture objective measurements of WiFi network quality (signal strength, link quality, bit rate etc.).

WiFiMon is technology agnostic and can be easily deployed on any WiFi-Network-Stack. It monitors opportunistic, crowd source based and deterministic measurements, network performance per end-users, and per access points.

Fine-grained information on network performance

WiFiMon shows the end-user (mobile client) behaviour on a network, its perception about the responsiveness of the network and the speed of web resource downloads, correlation of the performance data with end-user data, and data analysis with an effective query builder.

WiFiMon is capable of detecting performance issues, visualising the network workload, and providing technical information including signal strength, link quality, bit rate, etc. Campus Network administrators can download and install all WiFiMon components locally within their site or use a central GÉANT WiFiMon component instance from the GÉANT NMaaS service. WiFiMon is technology agnostic, easy to deploy and enables network administrators to edit fine-grained information on network performance.

Documentation and resources

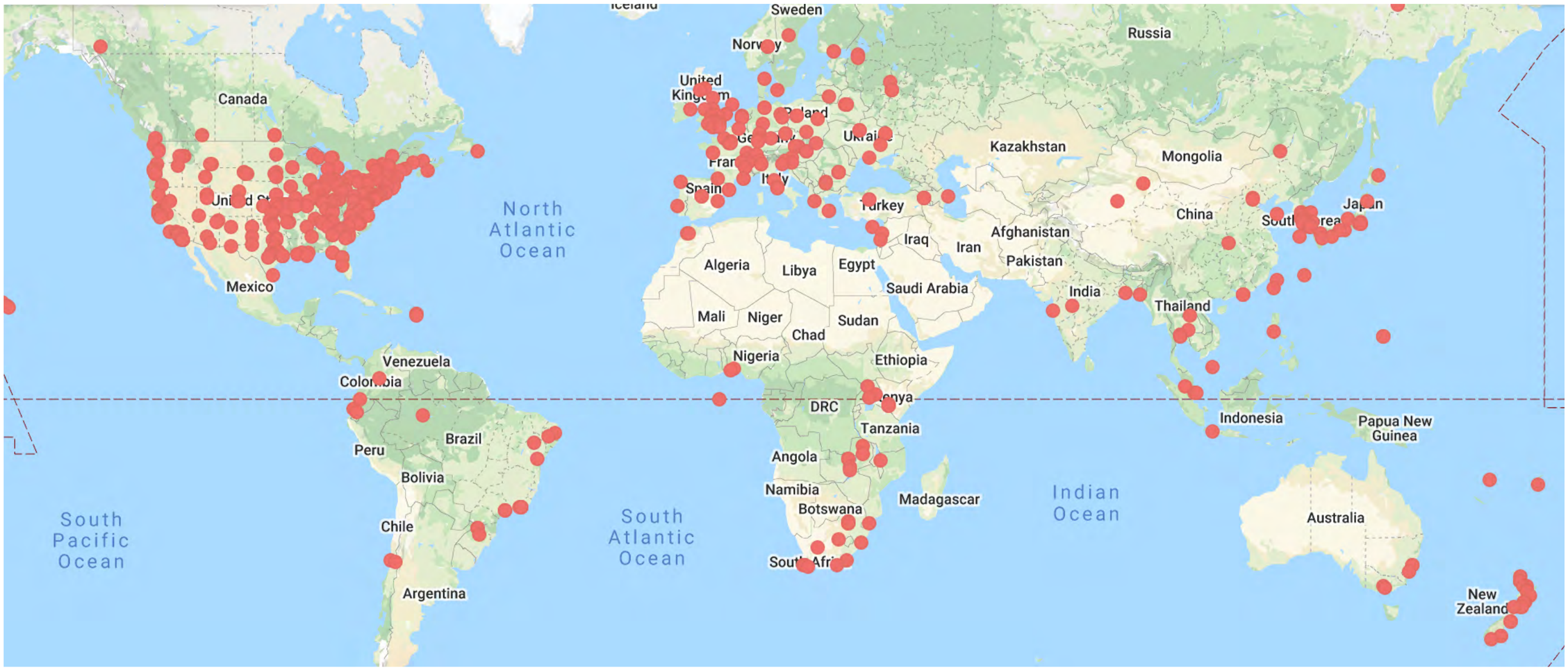
For a detailed description of WiFiMon, as well as all the technical documentation, see:

- WiFiMon Service page: **https://www.geant.org/wifimon**
- WiFiMon at TNC2021: **https://www.youtube.com/watch?v=mP2l1RDQoOc**

The latest release of WiFiMon is WiFiMon v.1.4.0:

- User documentation for version 1.4.0 is now available here: **https://wiki.geant.org/display/WIF/User+documentation+-+WiFiMon+version+1.4.0**

We encourage you to contact us if you have any questions. The development team will be happy to introduce you to WiFiMon, to support you in the system installation and to discuss your new ideas. Questions or discussions can be initiated by mailings on **wifimon-ops@lists.geant.org**



Picture
Global map of the perfSONAR project

perfSONAR, the ever evolving performance toolkit

The perfSONAR project celebrates 20 years of international collaboration this year. Since the first line of code written in 2001 it has become a world-wide network performance monitoring infrastructure thanks to a successful collaboration of international partners (ESnet, GÉANT, Indiana University, Internet2 and University of Michigan). Recently RNP (the Brazilian NREN) rejoined the development efforts.

Words: A. Delvaux, I. Golub, Sz. Trocha (PSNC)

Chosen for its flexibility, modularity and continuous support, perfSONAR is extensively used by multiple communities including the WLCG to measure performance of the networking infrastructure used for CERN experiments, GÉANT to measure core network performance and NRENs to asses their connections.

The GN4 project not only participates in this open source software development but also delivers the Performance Measurement Platform (PMP) service based on low-cost hardware nodes with pre-installed perfSONAR software and deployed in GÉANT collaborating organisations in Europe and Africa. The project is also contributing to global training and documentation efforts and providing users' support and expert consultancy.

With its modular architecture and a key component called pScheduler, used for scheduling, supervising and archiving measurements, new test types, tools or archiving mechanisms can be easily integrated. Extensions can be added by the community to support specific use cases, even without extensive knowledge of perfSONAR internals. Latest new plugins include DNS and HTTP tests to measure DNS lookup and HTTP request time, helping administrators control the reachability of such services. Among coming developments we can enumerate tools for scanning WiFi's SSIDs or testing 802.1x network authentication.

On our Performance Measurement Platform we use these features to perform regular testing and provide historical data visualization available at https://pmp-central.geant.org/. The platform is open to NRENs and partners, giving a starting point in performance testing and verification between PMP service instances in NRENs and GÉANT PoPs, as well as stimulating deployment of new perfSONAR infrastructure and measurements. PMP is also continuously exploring new hardware types, currently with Raspberry Pi 4 deployments and automation techniques to effectively manage such a distributed infrastructure.

Aiming at reducing maintenance work and shifting to well established components, the next major version of perfSONAR, 5.0, will be running with an ElasticSearch backend. This move will enable users to build versatile dashboards containing information coming from different monitoring sources, thereby facilitating correlation of data and events for improved performance troubleshooting. Version 5.0 will be available running on CentOS 7, Debian 10 and Ubuntu 18, while the developers are working on supporting newer operating systems like Alma, Rocky Linux and Ubuntu 20. The currently released production level perfSONAR software is 4.4.1, from early September 2021.

For more information visit:
http://www.perfsonar.net

OCRE Open Clouds for Research Environments

OCRE: Accelerating Cloud Adoption for Research and Education

The Open Clouds for Research Environments project (OCRE) is accelerating cloud adoption in the European research community, by bringing together cloud providers, Earth Observation (EO) organisations, and the research and education community, through ready-to-use service agreements and €9.5 million in adoption funding.

Words: Zachary Smith, Trust IT Services

The Open Clouds for Research Environments project (OCRE) is accelerating cloud adoption in the European research community, by bringing together cloud providers, Earth Observation (EO) organisations, and the research and education community, through ready-to-use service agreements and €9.5 million in adoption funding.

Cloud-based services offer the European research community a wealth of powerful tools, but for many researchers, these are currently out of reach, with suitable services difficult to find and select.

OCRE, which was launched in January 2019, has addressed this by running a pan-European tender and establishing framework agreements with cloud service providers that meet the specific requirements of the research community, saving institutions the time-consuming and complex process of doing this themselves.

In January 2021, OCRE announced the award of a total of 473 OCRE IaaS+ framework agreements, easing access to commercial cloud services for researchers and research institutions in 40 European countries. The framework includes 27 different commercial cloud-based platforms that were sourced through the OCRE IaaS+ Tender concluded mid-2020 and have been made available through the National Research and Education Networks (NRENs) and in the OCRE Cloud Catalogue.

Over 10,000 research and education institutions are able to directly consume these offerings, with ready-to-use agreements via the NRENs. Moreover, they will be able to use the CERN Validation Test Suite to understand which of the commercial platforms offered is best for their specific research needs.

Furthermore, OCRE is exploring pan-European cloud adoption funding distribution mechanisms with €9.5 million available for the research community.

Researchers and research institutes who are looking for Cloud and Earth Observation suppliers will be able to use the OCRE Business Management Platform, developed by SixSq, to manage their vouchers. Using the platform, users will have an overall view of their resource usage integrate including resource monitoring and accounting functionalities across a range of clouds.

OCRE has already announced that €1.175m in Cloud Funding will be awarded to 15 innovative research projects who responded to the 2020 open call, and these projects can become showcases for the benefits of using cloud services to positively impact research outcomes. Among the topics covered by the 15 projects are machine learning, healthcare, materials science, energy, climate, economics and astrophysics.

OCRE will make further funding available to research projects which can clearly showcase the benefits of using Earth Observation services to positively impact research outcomes. A tender for Earth Observation services suppliers will also be run based on the requirements of the specific research projects selected.

For More Information **visit https://www.ocre-project.eu/**

Google Cloud

Global Solutions for Higher Education

Bring out the best in your students, researchers and staff with innovative solutions from Google Cloud. Our higher education solutions meet your unique needs: they integrate with your existing infrastructure and are available through our predictable pricing model.

Student Success Services

Attract and retain your current students and the next generation

- **Reimagine enrollment and admissions management**. Enable intelligent admission processing and optimize financial aid distribution to achieve your target recruiting goals around tuition revenue, academic performance, and diversity.
- Maximize academic outcomes and student retention with an **AI-powered tutor or virtual agents for 24/7 personalized support** in more than 120 languages.
- Break down silos and get actionable **insights from your teaching and learning data** by pulling insights from data across your LMS, SIS and LTI systems. Take advantage of Google's smart analytics and AI to predict academic performance and intervene to prevent drop-outs.
- **Ensure student safety and campus health** with contact tracing, vaccine distribution, digital immunization credential management, and isolation services. Empower your teams with self-service real-time analytics to make data-driven decisions at anytime.

Michigan State University
Enrollment increase by over 20% and generated +$5M in additional net tuition revenue in the first year of launch

University of Minnesota Rochester
Building NXT GEN MED on Student Success Services to reimagine the education of future healthcare leaders.

Strategic Education
24/7 virtual agents handles +93% of live chat volume, suggests learning paths, handles enrollment operations

Infrastructure Modernization

Optimize operations and ensure the best experience for remote working and hybrid learning

- **Improve collaboration**, streamline instruction, and **keep your learning environment secure** with Google Workspace for Education.
- **Automate business processes without coding** with AppSheet. Improve your TCO from IT Operations with **fully-managed hybrid cloud services**. Avoid vendor lock-in & licensing fees.
- **Reduce costs, increase agility, and foster innovation** by modernizing and migrating your mainframe applications, virtual desktop instances and other legacy systems.

The relationship with Google Cloud is a key step in Georgetown's strategy to continuously modernize its information technology infrastructure to support the evolving needs of our students, faculty and researchers.

Judd Nicholson
Vice President & CIO

University College Dublin
Switching to Google Workspace sparked better collaboration between students and staff & helped saved significant time and resources.

Brown University
Uses Google Workspace for Education to maximize collaboration and assure secure information sharing yielding lower IT cost

Georgetown University
Migrated Central IT and HPC infrastructure to Google Cloud and save $xM/year in TCO

Google Cloud

High Performance Computing (HPC)

Accelerate time to insight, reduce cost of reproducibility, and integrate easily with schedulers

- **Cut the queues** by gaining dynamic access to storage, computing and machine learning services. Leverage pre-emptible VMs with a fixed 80% discount for vCPUs and up to 50% off for GPUs and TPUs.
- **Integrate with the most common schedulers** for research like Slurm, PBS, HTCondor, GridEngine. Use Google Kubernetes Engine (GKE) for f**ully-managed containerization**.
- Provision a "**HPC-in-a-box**" environment with CloudyCluster for a user-friendly implementation that provides the power of Google Cloud with simplicity.

Clemson University
Dynamically bursts 2.1 million Pre-emptible vCPUs to process 210TB of video within 8 hours for climate research

Rubin Observatory
First ever cloud-based data facility processing 500 petabytes of data to unlock greater insights of the universe

Broad Institute
Replaced its in-house genome sequence analysis with GCP to process data +400% faster

Life Science Research

Drive breakthroughs and attract top research talent

- Use Cloud Healthcare APIs to accelerate your healthcare solution development with **fully managed, enterprise-scale, HL7® FHIR®, HL7® v2, and DICOM® APIs**.
- Leverage the Healthcare Natural Language API to **derive insights from medical text** and the Life Sciences API to **process bioinformatics data** with low total cost.
- Protect your healthcare data while meeting industry-specific security compliance requirements.
- **Ingest, store, and aggregate all types of healthcare data in its original format**. Leverage Cloud Healthcare API's NLP to **de-identify your data** for analytics and AI applications.
- Build your next-generation Clinical Data Warehouse (CDW) with us to accelerate processing times and save costs.

The combination of genotype information and health data enables genetic discoveries that improve our understanding of disease mechanisms, creating medical breakthroughs.

Mari Kaunisto Communication Director & Geneticist

FIMM

ETH Zurich
Developed largest-ever search index for DNA sequences known as the Metagraph project.

TU Munich
Created ProtTrans, an innovative way to use ML to analyze protein sequences.ProtTrans makes protein sequencing easier and faster

FIMM
Large-scale collaboration that integrates genomic data with clinical health records

Benefits of Google Cloud through OCRE

The OCRE framework aims to encourage adoption of cloud services and ease the transition to the cloud with benefits like:

- Streamlined procurement process with ready-made agreements that can be tailored to each institution's needs
- Up-to-date compliance requirements and built-in data protections
- For members of the GÉANT NRENs (National research and education network) through OCRE, Google waives internet egress fees calculated at list prices, up to a maximum of 15% of the total monthly Google Cloud fees. This applies to Internet egress SKUs for App Engine, API Gateway, Artifact Registry, Cloud Bigtable, Cloud Functions, Cloud Healthcare API, Cloud Run, Cloud Spanner, Cloud SQL, Cloud Storage, Cloud Tasks, Compute Engine, Pub/Sub, and Remote Build Execution.
- Computas, Revolgy, Telefonica, and Sparkle, a division of Telecom Italia, are chosen partners to distribute Google Cloud solutions to GÉANT's member institutions in their move to the cloud.
- 7 existing EU countries with a Google Cloud datacenter region: UK, Belgium, Netherlands, Switzerland, Germany, Poland, Finland, with 3 more EU countries announced: France, Italy and Spain.

Get Started
https://www.ocre-project.eu/

orange™ Business Services

Introducing Orange Business Services

As an official partner in the Open Cloud for Research Environments (OCRE), we are excited to offer our cloud services to the GÉANT community.

Flexible Engine is a high-performance and scalable cloud infrastructure from Orange Business Services, one of Europe's largest digital services providers.

Data is at the heart of research, and Flexible Engine provides all of the tools necessary for your research needs: A wide array of virtual machines, including high performance GPU flavours.

- Database, data management and AI platforms, to help you store, manage and extract key insights.
- Access to earth observation data collected from the Copernicus European Satellite programme.
- With over 50 features and services already available, and more to come, Flexible Engine empowers teams with all the features and services they need to build, analyse and collaborate.

A trusted cloud for Europe

At Orange Business Services we understand that data security can be a key concern. We are here to help you navigate this dynamic terrain. You can be safe in the knowledge that your most sensitive data is safe with us. We offer European hosting via 6 data centers located in Europe, European contact, and European compliance, and all the features you need to ensure your data security.

Orange is also a founding member of GAIA-X and a pivotal contributor to developing guidelines and core services for a new federated, open data infrastructure in Europe.

Innovate out of the box with AI

AI can transform scientific research by sifting through vast amounts of data and analyzing data sets for invaluable insight. ModelArts is a one-stop AI platform that offers research teams all the tools needed to:

- Prepare and label data, across multiple data types including video.
- Train models on GPU enabled computing flavours.
- Manage and deploy models as a service.
- ModelArts is accessible to all expertise levels, with a no-code graphical interface as well as support for jupyter notebooks and AI development frameworks.

Built for research

Flexible Engine is fully aligned with the OCRE initiative, and offers members access to special discounts, workshops and webinars, direct connectivity with GEANT network as well as professional services, on-site support and cloud coaches.

Learn more at **www.ocre-orangecloud.com**, or contact our teams at **ocre.orange@orange.com** for a free trial.

Oracle Cloud Advances Research Computing

Cloud computing accelerates research, and at Oracle, we are committed to putting the power of the cloud into the hands of researchers, including supporting the use of open data and the computational tools researchers prefer. Oracle is proud to be part of the OCRE framework.

ORACLE

All Oracle cloud technology services—Oracle Cloud Infrastructure (OCI)—are available in the 40 countries under the OCRE framework, via 6 value-added reseller partners. The Oracle partners provide consultation, implementation, training and other added-value services. Oracle also offers:

- Direct public IP peering and private FastConnect network connectivity to the GÉANT network
- Built-in compliance with Single-Sign-On, national access federations, data privacy, GDPR, and other legal requirements
- Free Internet egress traffic up to 10 TB per month, with the lowest fees in the industry for additional egress

Go "True" Bare Metal, Run HPC Workloads and Get to Faster, AI-Driven Outcomes

Research is data driven, and in the modern era, access to computational resources and collaborations is critical to research success. Oracle Cloud Infrastructure is a deep and broad suite of cloud services that enable researchers to build and run a wide range of applications—including open source—in a scalable, secure, highly available, and high-performance environment.

- Bare metal compute instances, low latency cluster networks for RDMA, high-performance storage solutions and filesystems, network traffic isolation, and the tools to automate and run jobs seamlessly
- Bare metal servers support applications that require high core counts, large amounts of memory, and high bandwidth—scaling up to 160 cores (the largest in the industry), 2 TB of RAM, and up to 1 PB of block storage
- Process tens of thousands of possibilities and outcomes and get answers quickly; machine learning models that took hours or days to run can now finish in just minutes

A Cloud to Support Research Innovation

Researchers **around the world** are already getting faster and better results with Oracle Cloud. At the **University of Bristol**, an international research team models virus proteins to find COVID-19 treatments using Oracle Cloud. Computer science researchers at Politecnico di Milano use Oracle Cloud GPUs to develop a new polyglot API. Digital humanities researchers at **Rice University** use Oracle Cloud to store, share and visualize the world's largest repository of data related to the transatlantic slave trade. Researchers at the **San Francisco Estuary Institute** use Oracle Cloud high performance computing to manage and reduce waste materials flowing into the ocean.

Join the Oracle for Research Community

Through the OCRE framework, it's now easy for researchers across Europe to join the growing community of Oracle Cloud research users.

Oracle is looking forward to engaging with, and supporting, even more institutions, through the framework; to explore and expand services and partnerships, with OCRE consortium organisations, National Research and Education Networks, partners and institutions.

Learn more about **Oracle Cloud and what it can do for research**

Read about **research projects that used Oracle Cloud**

Find your country's **OCRE - Oracle Cloud partner**

A new Task Force on eHealth joins the GÉANT Community Programme

Digital health is a hot topic at the European level at the moment, and one of the most important initiatives in the field is the discussion on how best to attain a common European Health Data Space (EHDS). In light of the COVID-19 pandemic, the value of cooperation in medical research has become even more prominent and, with it, the demand for a supporting e-infrastructure and services.

Words: Silvia Fiore, GÉANT

Picture
Screenshot taken during the eHealth Birds of Feather (BoF) event at TNC21

As such, eHealth is a wide thematic area very relevant to the GÉANT community, and there is a clear need to investigate eHealth and discuss the challenges and potential benefits.

On 27 January 2021, the GÉANT Community organised the first eHealth baselining event, to assess for the first time the needs of this specific community. The event managed to produce a list of first work items which could be taken into account by the Task Force in the definition of its work plan. A particular focus was given to health services made available in a ubiquitous and user-friendly way by relying on e-infrastructures; and telemedicine as the tool to provide patient care remotely.

The GÉANT community have already been supporting eHealth projects or offer eHealth-related services to their customers. EOSC-Life, a multi-million Euro project funded by the European Commission, tackles several aspects of general relevance related to eHealth and e-infrastructures.

Now fully operational and supported by several European NRENs, the eHealth TF aims primarily at enhancing coordination, exchange of best practices, and sharing knowledge among the NRENs (and their implied eHealth institutions & projects) in the activities they are individually carrying out to support their eHealth user communities.

In accomplishing this primary task, aimed at building useful synergies by gathering and exchanging experiences, it will act by mandate from the NRENs and with their consensus the TF will address the needs of eHealth NREN users, spotting gaps and proposing solutions to overcome them, and focusing on the specific benefits and exploitable outcomes for NRENs in their end-user facing support role. The overarching TF objective will be to support access to eHealth data by enabling the required network, AAI, Cloud, and Security services in the eHealth domain, boosting the potential exploitation of eHealth services by the GÉANT community.

To learn more about the Task Force on eHealth, including its work plan, and check upcoming meetings, visit the dedicated wiki page: **https://wiki.geant.org/display/EHE/eHealth+-+Home**

Amazon Region rivers receive fiber-optic cable

Project coordinated by RNP is the start of the challenge to bring more inclusivity to the region

The Amazon Rainforest is a world heritage site covering a good part of northwest Brazil, extending into Colombia, Peru and other South American countries. It is a universe of biodiversity and also represents a challenge for connectivity.

Words: Stela Tsirakis, REDE NACIONAL DE ENSINO E PESQUISA (RNP)

To expand the communications infrastructure in the region, the *Norte Conectado* (Connected North) program was created, which is launching close to 10,000 kilometers of fiber-optic cables on the riverbeds of Amazon rivers (*Negro, Solimões, Madeira, Purus, Juruá and Rio Branco*). The objective is to interconnect 60 municipalities and serve a population of close to 9.2 million people.

This program begins with the installation of *Infovia 00*, pilot project of the *Norte Conectado* Program, with 770 km of underwater fiber-optic cable on the river bed and will connect five municipalities: Macapá (Amapá), Almeirim (Pará), Monte Alegre (Pará), Santarém (Pará) and Alenquer (Pará). During September, the transshipping phase took place, a manual 24-hour-a-day, seven-days-a-week task which lasted six days. During the trans-shipment process, the cable was taken off the vessel which brought it from Germany and loaded onto the barge responsible for launching the cable on the Amazon River bed, in the stretch between Macapá and Santarém.

The high capacity, reliability and availability of this infrastructure will help solve a problem of restrained communications demand, including expanded access to the internet, improved security and redundancy for the few land-based networks in the region, allowing flows of data traffic from public education, health care, law enforcement and legal institutions, Municipal, State and Federal Government organs, as well as Telecommunication carriers and local broadband internet providers, who will share this infrastructure.

"We are immensely proud that RNP was selected to develop a pilot project of this magnitude and responsibility, and with such a great potential impact for the Brazilian population. And if we look specifically to our educational and research community, it will obtain better services at its campuses and scalable opportunities to collect, process and distribute research project data, with the possibility of generating more results for science, research and innovation in the region, in addition to placing them alongside their domestic and international partners", highlighted RNP's Director of Engineering and Operations, Eduardo Grizendi.

Norte Conectado is a program led by the Brazilian Ministry of Communications, with the support of the Ministries of Science, Technology and Innovation and Education, in addition to the National Justice Council (*"Conselho Nacional de Justiça"*) and the Brazilian Senate. RNP is executing this program's pilot project, the Macapá-Santarém Infovia 00.

tnc22

TNC22 Navigating the Unexplored

As announced on the last day of TNC21, the 38th edition of GÉANT's flagship conference, **TNC22**, will be hosted by **GARR**, the Italian Research and Education Network, and will take place in Trieste, Italy from June 13-17, 2022.

Words: Rosanna Norman, GÉANT

The community is invited to navigate the unexplored in the beautiful historic city of Trieste! Throughout the centuries, Trieste has been the departure point for many explorations and expeditions and it's also renowned for its spectacular international sailing regatta, the Barcolana.

For the last two years we have all been navigating the unexplored as we have learned to manage new ways of working, new ways of living and new ways of interacting. As we look to the future and beyond the pandemic, the ways in which we interact will be forever changed. TNC22 is an opportunity to reflect on how we will reconnect with each other, on ways to explore and manage our changed environment, and on how we can emerge stronger together.

Whilst the organising team continues to monitor the development of the pandemic, our plans are to host a face-to-face event for the GÉANT community to meet in person. Basic remote participation will also be offered for those unable to travel.

Anna Wilson, HEAnet, Chair of TNC22 Programme Committee, comments: "Let's face it, the last couple of years have taken a bite out of us. We've been working hard through everything that's happened, and it's been tough. We've become amazingly good at getting together remotely, but I can't wait to see my colleagues and friends in person once more."

Call for Proposals

On 12 October the TNC22 Call for Proposals for Single Presentations and Demonstrations opened with an invite to the community to dig deep into the collective experience of these unusual recent times and create proposals that will shape the content of TNC22.

All proposals can be submitted **here**.

Submission Deadlines

- 30 November 2021 – (23.59 CET) Single presentations
- 15 February 2022 – (23.59 CET) Demonstrations

The TNC22 organising team comprising representatives from GÉANT, PSNC, NORDUnet, and with the support of the local host GARR, is already enthusiastically hard at work behind the scenes with the drive to deliver another unforgettable conference for the international R&E community.

Follow TNC22 on Twitter **@TNC_GEANT** for news and updates and contact **tnc@geant.org** for any further information about the conference.

If you are interested in receiving TNC updates directly in your inbox you can subscribe **here** to join the TNC mailing list.

TNC22 Programme Committee

Anna Wilson
HEAnet (Chair)

Ann Harding
SWITCH

Branka Vuk
Central State Office for the Development of Digital Society

Carina Kemp
AARnet

Charlie van Genuchten
SURF

Claudio Allocchio
GARR

Cynthia Wagner
Restena

Gloria Vuagnin
GARR

Hannah Short
CERN

Heather Flanagan
Spherical Cow Consulting

Helga Spitaler
GÉANT

Ieva Muraskiene
LITNET

Magreth Mushi
North Carolina State University

Maria Isabel Gandia
CSUC

Maria Ristkok
EENet

Sarah Jones
GÉANT

Nicole Harris
GÉANT (Programme Content Support)

Picture
Anna Wilson, HEAnet, Chair of the TNC22 Programme Committee

Picture
Ronan Byrne, HEAnet new CEO

HEAnet announces the appointment of Ronan Byrne as its new CEO

Ronan Byrne commenced in the role on Monday 16 August 2021 and has succeeded Kerrie Power who led HEAnet for 4 years.

Words: Barbara Carroll, HEAnet

Ronan's career at HEAnet extends back to 2004 and he has overseen many large-scale programmes over this time, including the development of the Schools Broadband Network, migration of the Institute of Technologies from ITNet, the establishment of the Edugate National Federated Identity Service, delivery of a 100Gb network backbone, and building a high performing Brokerage Services unit that delivers more than €7m savings for the sector annually.

Ronan is a member of the Board of Directors of the EOSC (European Open Science Cloud) Association, and a member of the Irish Government's National Open Research Forum steering group. Ronan also represents HEAnet at the GÉANT General Assembly and is Chair of a GÉANT Network Infrastructure Advisory Committee advising on the upgrade of the pan-European GÉANT network.

Prior to joining HEAnet, Ronan established a successful track record of large-scale ICT programme delivery, having led engagements with some of the most respected organisations in Ireland, across both private and public sectors. Previous employers include Fujitsu, Via Networks, ICL Computers, and Aer Lingus.

Ronan holds an MSc in Business Leadership & Management Practice from the Smurfit Business School at University College Dublin and an MSc in Internet Systems from Dublin City University. Ronan is also an Associate Member of The Governance Institute.

In making the announcement, Professor Anne Scott, Chair of the HEAnet Board of Directors, said:

"HEAnet is a real asset to Ireland's education system, delivering common, repeatable and shareable solutions for the sector. Given Ronan's extensive experience and strong record of accomplishments, I am confident in his ability to lead HEAnet. On behalf of the HEAnet's Board of Directors, I would like to congratulate Ronan, as we look forward to working with him over the coming years."

Ronan Byrne, HEAnet's newly appointed CEO said:

"It is truly an honour to be appointed as HEAnet CEO. In my role as the Chief Technology Officer, I have had the pleasure to work with great people and I am proud of how far we have come. While recognising our achievements, I also see many opportunities for the future, and I look forward to this next chapter. We will continue to work on behalf of our clients and together with our clients, leveraging our collective strengths in a trusted way."

About HEAnet

HEAnet is Ireland's National Education and Research Network (**www.heanet.ie**). We deliver high-speed internet connectivity and associated ICT services to all levels of the Irish education sector.

GARR-T: a new generation of network

Boosting capacity, resilience and capillarity: the Italian research and education network is ready for the paradigm shift

To be technologically advanced, widespread over the national territory and at the same time tailored on research and ducation users: this is the challenge for the new generation of the Italian Research and Education Network, GARR-T . The “T” in the name is an hint to the Terabit, the reference point for the project. GARR-T is the new generation of a more capable and resilient network, that has got into the thick of things with the field trials and the first installations. The numbers of the new network speak for themselves: 700 km of new fibre optic sections, 42 optical PoPs distributed over approximately 6,000 km of fibre and 9 new metropolitan PoPs. 6 more cities will boast a double PoP, which will ensure redundancy and increase reliability.

Words: Carlo Volpe, GARR

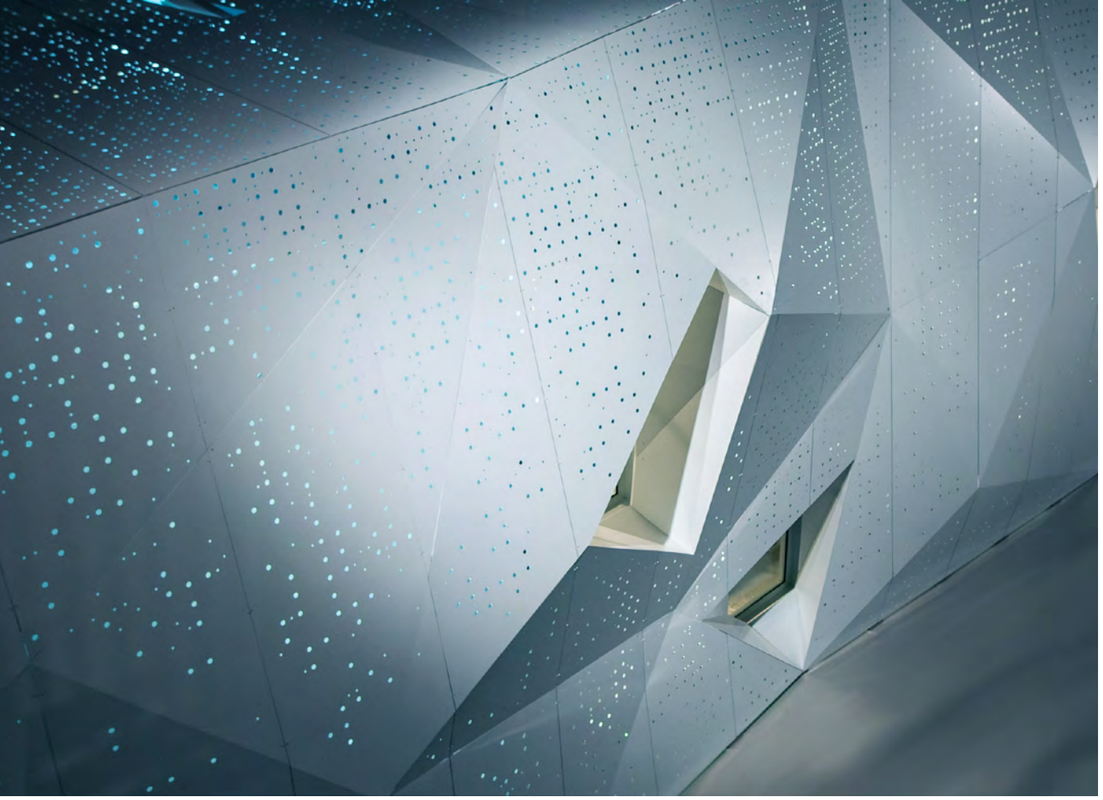
GARR-T is a network built with a clear vision of the future and, for this reason, it will be equipped with scalable capabilities and manageability that go beyond the current traffic and features. It is an infrastructure ten times more powerful: in relation to the packet network, the backbone will go from a total capacity of 3.5 Tbps to 40 Tbps, while for the user access, it will go from 2 to 10 Tbps.

The GARR-T network project is expected to be completed by the end of 2022. A total upgrade is planned for the packet network, with the replacement of all equipment. The activation of the transmission network will be operated in continuity with the production network, without disruptions in the service. The architecture of the packet network recalls the one generally used for the interconnection of data centres,The optical network, is based on a partially disaggregated model and the adoption of an open line system (OLS, Open Line System). . This technology enables a flexible management of the optical spectrum for spectrum sharing and the development and dissemination of applications such as time and frequency transport or Quantum Key Distribution.

One of the most innovative feature available is the Data Centre Interconnect (DCI) , a technology used to connect two or more data centres together over short, medium, or long distances using high-speed packet-optical connectivity. This model maximises power efficiency and cost savings, while providing ultra-high capacity and scalability; it has automation as a key element and is able to respond to the computing needs of large scientific collaborations (Data Lakes), where management and access to data take place locally, while computing resources can be geographically distributed. Another GARR-key feature that will be made available with GARR-T is the spectrum-sharing capacity. Fibre optical cables are expensive resources : the spectrum sharing capacity makes it possible for users to take advantage of part of an existing infrastructure, such as ,a submarine cable or a fibre cable in remote areas, in order to increase the potential of the network in a cost-effective way.

Last, but not least, one of GARR core values is collaboration with and within its community. GARR-T offers new opportunities to foster cooperation with the network experts in the community, being built to provide an environment for experimentation and collaborative development. While developing the GARR-T project, we launched two initiatives: the GARR Lab and an optical laboratory, both of which are examples of an open environment for the community to work together and find new solutions for the Italian research and education community.

Picture
Credit to Edoardo Angelucci



Danish project will explore the boundaries of quantum chemistry with LUMI

One of the very first projects to ever run on LUMI will be a Danish project exploring the boundaries in quantum chemistry. In such a ground-breaking trial run, everything can fail, and everything can succeed.

Two scientists from Aarhus University will be among the very first researchers let loose on LUMI. Their pilot project is chosen to run on the giant supercomputer as one of the first.

Words: Cecilie Maagaard Winther, DeiC

Picture Credits: Marko Vasara

The Danish scientists will be doing a project that is officially named "High Performance Computing Quantum Chemistry". Which basically means they will be conducting an explorative study and testing the boundaries and limits of quantum chemistry, when using a supercomputer the size of LUMI.

LUMI is an abbreviation for "Large Unified Modern Infrastructure", and also means "snow" in Finnish. It is located in CSC's data center in Kajaani, Finland and is one of three pre-exascale supercomputers to be built as part of the EuroHPC Declaration. The countries in the LUMI consortium are Finland, Belgium, the Czech Republic, Denmark, Estonia, Norway, Poland, Sweden and Switzerland.

Closing the gap

Professor Ove Christiansen and Assistant professor Jonas Elm are the two Danish scientists responsible for the Danish pilot project. Where Ove is especially interested in the method development, and how we can use computers to accelerate quantum chemistry, Jonas is trying to answer some of the numerous unknown questions in atmospheric chemistry.

"What I'm interested in," states Jonas, "is trying to figure out how particles are formed in the atmosphere. In atmospheric chemistry we are limited to accurate calculations on more or less eight to ten molecules. We cannot really handle more than that."

If it is more than that, it simply becomes too complex. As a scientist you want accuracy so you can say something with certainty from your computations, and that limits for instance how large a cluster of molecules you can compute.

Jonas adds, "But given this new facility, we would actually be able to push the boundaries for how large systems we can model. What we can accurately calculate today is not something you can easily measure, it is simply too small for state-of-the-art experiments. We can aid in closing this annoying gap between calculations and experiments that has been persisting for a long time by having more computational resources available."

Front-runners

More than concrete results, Ove and Jonas also hope to get themselves in the pipeline and up front to use this kind of infrastructure in the future.

"This is a completely new playground. And it is important for Danish science, that some Danish scientists get on that, and see what we can do with it and get some experience. And then we will be able to tell other people about it," adds Ove.

They want to test the boundaries of what can be done in quantum chemistry and explore what the difference is from their normal computer environment. At the same time Ove emphasizes that this is a pilot project, with all that entails. "Everything can fail," he says.

Taking a chance on new infrastructure

There can be technical issues, the access can be difficult, they need the code to run, and run correctly and efficiently. All these things are absolutely non-trivial and are not guaranteed to play out as planned.

As Ove says, "But this is the type of challenge that you have to try to take. When you want to exploit new research infrastructure, you need to take the chance and try it out. And if it doesn't work the first time, you try again, and if that doesn't work, you try one more time. And one thing is sure, that on the way, you get wiser."

To be the very first

But if they thought they would have anyone to ask for help or look to for guidance, they were dead wrong. LUMI is brand-new in the never-been-used-before kinda way. When they signed up for the project Ove admits he thought there would be several rounds of pilot projects, and therefore also scientists before him, that they could learn from, but that is not the case.

"The support team that are going to help us, are also only getting access to the computer at the same time as we are. So, we can't really ask for support before we actually get access," he says.

Limited preparation

In that regard preparing for the use of LUMI has been different and difficult. The team have tried to prepare different codes and have different sorts of projects lined up.

Ove explains, "We have our own codes and then we use also a number of existing standard codes out there. And for our own code we have tried to test it on similar systems."

The problem is that there are no other computers like LUMI right now, so they have had to test the code on similar types of computers where the technique and process should be similar, but on a much smaller scale.

"There are limits to how much we can prepare ourselves, and we can simply not do as much preparing as we would like to," he adds.

A hook into one of the world's fastest supercomputers

From the outside it will look like any normal day at the Department of Chemistry at Aarhus University, and in practice the team will just access LUMI from their regular laptop.

As Ove says, "The fun part of it is probably going to be very simple. You open your screen and gain access and suddenly you are sitting with a hook into one of the world's fastest supercomputers. That's going to be awesome."

And when the team at Aarhus University push the start button, they will also warm up the Finnish city of Kajaani, where the energy of the excessive heat of the computers will be exploited to warm the town.

Ove and Jonas will be given access to LUMI for approximately one month. The job will not require them to watch the computer 24/7, but they are not planning any major vacation in the middle of the computing time, that is for sure.

Calculating with superpowers

Besides Ove and Jonas, another Danish pilot project and several other chosen projects from the consortium countries will gain access to LUMI at the same time, so that the projects will run parallel. Ove adds, "We can in principle get our hands on the full computer power, but only in a very restricted time. Of course, others may have similar wishes, so we need to compromise somewhat. But likely compromises will be less restraining in the pilot run than in normal operation. "

Actually, running the computations will probably be similar to what the scientist are used to, with one big difference: "It is like being given superpowers," he says.

Science driven by research infrastructure

With regard to results, the Danish scientists hope to learn a lot from using LUMI. They hope to gain insight into what works, what doesn't, how the code should look, what kind of bottlenecks there are, and how they can be avoided in the future. And as such, be able to help the next users for LUMI. There will probably also be room for regular research results from the calculation time at LUMI.

"There are a lot of unknowns in atmospheric chemistry. So just getting a lot of new data is usually enough to do some new conclusions," says Jonas.

Breaking new ground requires risk

They hope to test the boundaries of what can be done in quantum chemistry with LUMI, but Ove also thinks that the real gain of the project is for the future: "This is an exploration. And honestly, it's also high risk because we can be overblown by technical issues, both on the computers, by the computers and also on our side by the codes. But this is what you do in science. If you want to break new ground, you take some risks and you invest significant time and effort. And if it works, great. But it could also be that we are in the midst of several months of manpower and a lot of computer powers being spent and nothing really comes to work."

Such is the progress of science, and such is also the role of the pilot projects for the LUMI system.

The start date for calculations on LUMI has been moved several times already, but Ove and Jonas are expected to start in late October.

2021 SEE User Forum

The South East Europe region in the era of Open Science

(N)RENs in the South East Europe region will soon come together to showcase their efforts in the arena of Open Science and present them to their end-users at the 2021 SEE User Forum that will take place on 3 – 4 November, fully online and free of charge.

Words: Rosanna Norman, GÉANT

NRENs play a crucial role for Research & Education communities around the world. They enable researchers and scientists to carry out their work and reach their projects' milestones. Connectivity, identity federations and security are only a few examples of how NRENs can support open science activities. The Forum, jointly hosted by GÉANT with **NI4OS** Europe and **EOSC Future**, aims to be a platform where NRENs can present and explain their role and the services that they provide (and will provide in the future) to enable their end-users to operate with secure, safe and efficient connectivity.

The Forum's programme welcomes speakers and experts from across the region and features talks on the relation between NRENs, pan-European research and academic collaboration within the EOSC ecosystem with discussions on the evolution of the education ecosystem within Erasmus+ project and more and a selection of use case experiences by hand-on experts and researchers.

The brief videos testimonials created for the occasion by the SEE Directors offer a great introduction to the concept, ideas and motivation that have led to the launch of the first User Forum for the region.

Anastas Mischev, Professor at UKIM, Skopje and member of the board of MARnet comments: 'The Forum's goal is to showcase Open Science services and user engagement along with users' technical challenges and their needs for these services, and how GÉANT can help address them. This event will further emphasise the important role of (N)RENs as key EOSC enablers and supporters whilst further clarifying their overall remit for all participants.'

NI4OS Europe

National Initiatives for Open Science in Europe – NI4OS Europe, aims to be a core contributor to the European Open Science Cloud (EOSC) service portfolio, commit to EOSC governance and ensure inclusiveness on the European level for enabling global Open Science.

EOSC Future

is an EU-funded H2020 project that is implementing the European Open Science Cloud (EOSC). This EOSC will give European researchers access to a wide variety of research data and professionally provided services.

2021 User Forum programme: **https://see-userforum2021.geant.org/**

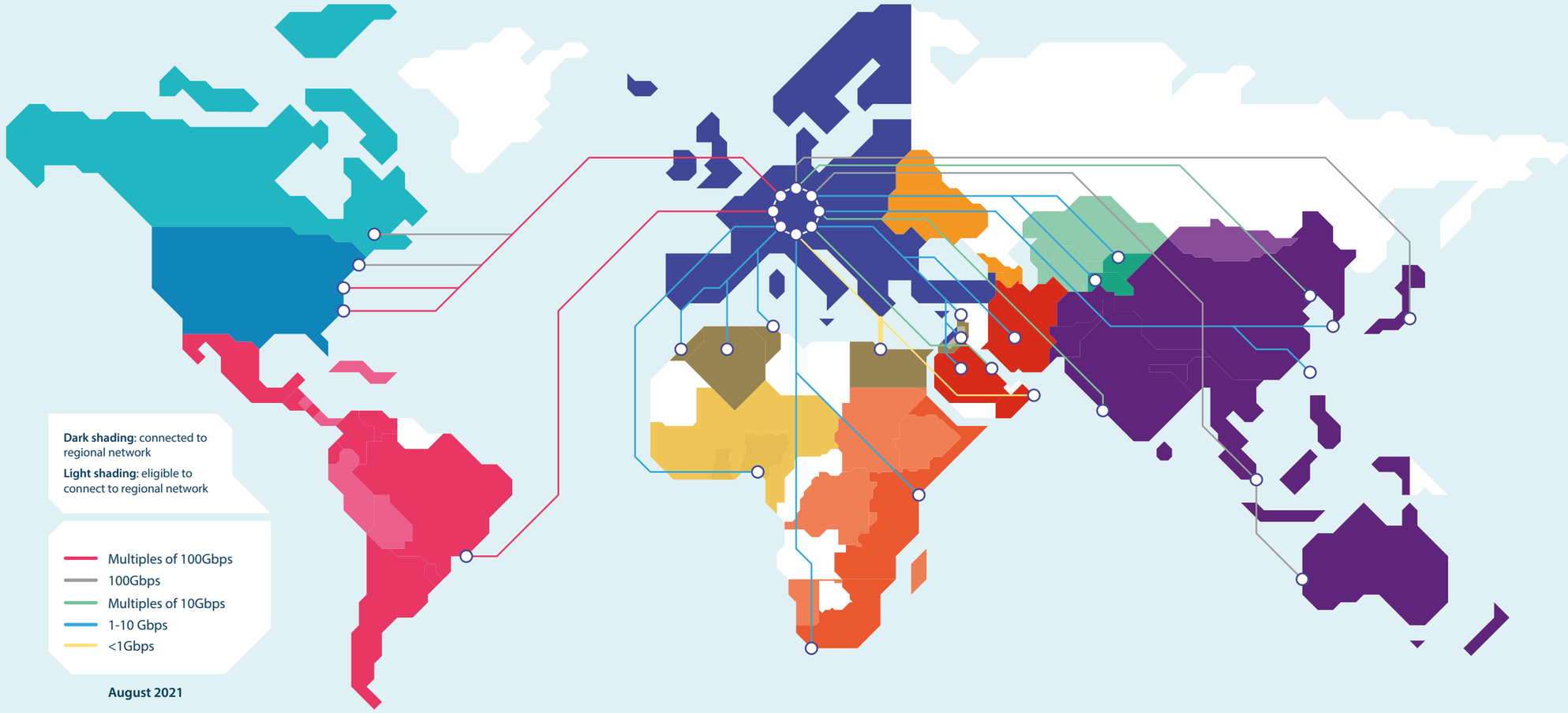
How to register **https://events.geant.org/event/904/**

Registrations close on 2 November at CEST 12.00pm

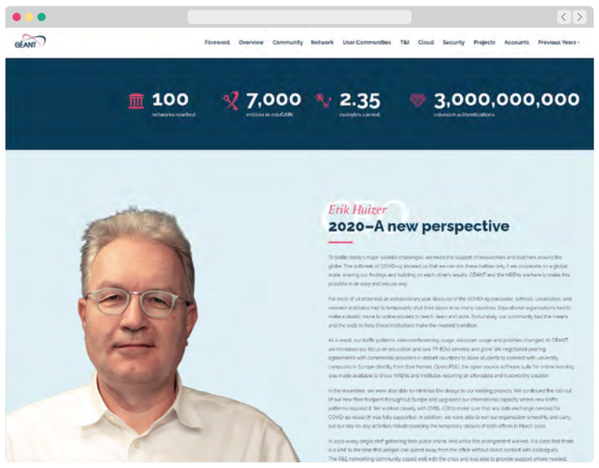
GÉANT at a Glance

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 now CONNECT is online with a new website (connect.geant.org) and 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.



August 2021



Canada & USA

Latin America

Europe

North Africa & Eastern Mediterranean

West & Central Africa

Eastern & Southern Africa

Central Asia

Asia-Pacific

Other R&E Networks

GEANT.ORG

@GEANTCOMMUNITY

@GEANTNEWS

GEANTtv

GEANT_COMMUNITY

LINKEDIN.COM/COMPANY/GEANTNETWORKS

GÉANT
Networks • Services • People

www.geant.org

This magazine is produced as part of the GÉANT Specific Grant Agreement GN4-3 (No. 856726), that has received funding from the European Union's 2020 research and innovation programme under the GÉANT2020 Framework Partnership Agreement (No. 653998). The content of this document is the sole responsibility of GÉANT and can under no circumstances be regarded as reflecting the position of the European Union.

CONNECT/1021