

CONNECT

THE MAGAZINE FROM THE GÉANT COMMUNITY | **ISSUE 36 2021**

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ERIK HUIZER,
GÉANT CEO

GN4-3N:
PUSHING AHEAD
DESPITE CHALLENGES

EDUGAIN AT 10:
THE STAR AT THE HEART
OF A CONSTELLATION



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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 GÉANT Association, the GN4-3 project, and from our NREN and regional partners. The planning, production and editing is performed by a small team highlighted below.

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Welcome from Cathrin Stöver

It's been pretty much a year since COVID-19 tumbled us all into the new normal of working from home, where we have more than ever to balance our working lives with caring for children, family members and friends. We now spend our days in video meetings, hoping our kids pay attention in theirs. We shop online, we order to eat in, and if we are lucky then we have a garden to sit in when the sun is out. Some of us revel in the consistency of the rhythm, we cook more, we exercise more, and our pets have never been happier.

For the global R&E networking community which thrived on global events and conferences until the pandemic hit us – we have a new normal indeed. Gone are the days in which we flew to another continent to meet colleagues at a conference, or the days spent in Brussels or any other EU capital for a one-day get-together. No more coffee breaks and hallway conversations. It very much changed the dynamics of our community. Some of us feel meetings are more efficient now, but we share concerns around what such long absences mean for a community that is inherently one that is built on trust, on personal relationships and very often friendships. I believe we will all need to keep working hard, taking the time to appreciate the views of others, ensuring we give others the benefit of the doubt, to ensure the spirit of this amazing community pulls us through these times, so that R&E networking will remain as strong as it must be for the challenges in the upcoming years.

So, how does a CEO deal with a year of pandemic? I talked to GÉANT's CEO, Erik Huizer, about his experience over the last 12 months. Make sure to read his words on page 4 – they show again that, as well as being a good CEO, Erik is simply a really good man. We are lucky to have him.

I also enjoyed reading about the ongoing GÉANT network upgrade, against all odds and ensuring the future-proofing of our infrastructure. And of course, now is the time to register and plan for our online TNC21 from 21 to 25 June 2021 – make sure to come along, we promise a great week!

Enjoy the issue!

Cathrin Stöver, GÉANT

Full steam ahead with EOSC

As a previous member of the EOSC Executive Board and one of the new directors for the EOSC Association, it's fantastic to see how progress continues and to witness the level of engagement demonstrated by the NREN community.

Words: Sarah Jones, EOSC Engagement Manager at GÉANT and member of the EOSC Board of Directors

Following the EOSC Association General Assembly in December 2020, work is progressing full steam on coordinating the infrastructure to support researchers to share data across Europe. 187 Members and Observers joined the Association and a Board of Directors was elected, chaired by Professor Karel Luyben as President. The Board elected Professor Marialuisa Lavitrano as Vice-president and Professor Klaus Tochtermann as Treasurer. The GÉANT Association is well represented with two Board positions and seven NRENs being appointed as Mandated Organisations to represent national interests.

Since the new year, the EOSC Association has been busy drafting proposals for Advisory Groups. These will take forward the recommendations of the previous EOSC Working Groups and act as a conduit to help solicit community input and help steer the

activities of EOSC projects. I ran a couple of webinars in late February to consult on the proposals and amended these in light of community feedback. It is anticipated that charters for groups will be drafted over the coming months so they can be established by Summer 2021. I really look forward to seeing the outputs of the Executive Board being progressed further.

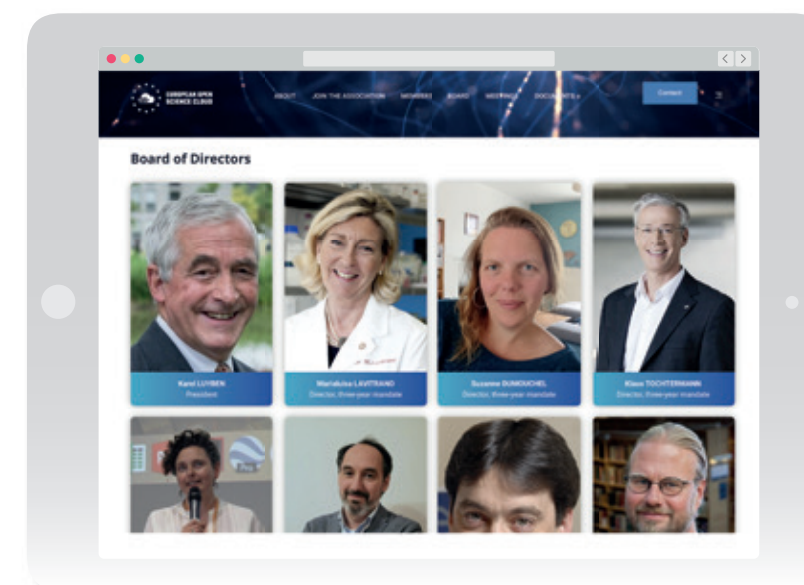
The EOSC Association has also been busy recruiting roles for its Secretariat. It's in the final stages of negotiating the Secretary General post and has drafted a job description for a Chief Technology Officer to provide a steer on the technical architecture and implementation of EOSC. Further recruitment to support office management, communications and engagement is anticipated once these posts are appointed.

A critical stakeholder that the Association will liaise with is the forthcoming EOSC Future project. This proposal is now in the final stages of revision with the European Commission and is anticipated to start in late Spring / early Summer. The project will focus on advancing the system of systems approach, enabling the federation of Research Infrastructures and composability of data and services from different domains. The five research cluster projects are members of the consortium and have developed science use cases which will be pursued to address societal challenges. In my view, bringing the research infrastructures and e-infrastructures together is one of the most critical factors for the success of EOSC.



Many other new EOSC-related projects have also started and again the NREN community is well represented within these. Five projects have been funded under the INFRAEOSC-07 call which aims to increase the use of services within the EOSC Portal. These include the DICE project, EGI-ACE, OpenAIRE-Nexus, RELIANCE and C-SCALE. A close collaboration between these projects and EOSC Future is envisaged.

Much is happening, and we will continue to share updates and invite community inputs via our programme of infoshares and coordination meetings. Skip to page 36 of this magazine to read all about the GÉANT Infoshare series and learn about upcoming events.



Check the **profiles** of the newly elected members of the EOSC Association Board of Directors

CONNECT Interview: Erik Huizer, GÉANT CEO

Let's talk about managing in a pandemic

Interview by: Cathrin Stöver, GÉANT

Erik, when this issue is published at the end of March 2021, it will be exactly a year since the world was struck by the COVID-19 pandemic and GÉANT closed its offices in Amsterdam and in Cambridge. Let's talk about managing an organisation from the home office. What are your major reflections after one year?

We were lucky in the sense that at GÉANT we had robust remote working tools in place and, more importantly, in constant use pre-pandemic. The GÉANT community is European, even global, so in order to avoid too much travel, we had stable videoconferencing systems in place and also services that enable instant messaging, that way we could easily continue our conversations with our partners and internally. We also already had a functioning working from home policy. So, when COVID-19 struck a year ago, we were in a relatively lucky position and did reasonably well moving to a working from home environment. Our business continuity was good, and we had minimal disruptions related to the pandemic.

However, GÉANT as an organisation and the GÉANT community thrive on trust. We are a trust-based organisation. We value community over transactional

relationships or money. I find that building trust or even maintaining it, is almost impossible via videoconferencing. Humans need to regularly be around each other to establish and maintain trust and rapport. Also, what I see – and what really worried me – is the potential loneliness that our members of staff are struggling with. We are very proud to be an organisation that employs staff from almost 40 different countries, but after one year of pandemic it is clear that many expats have built their lives in Amsterdam or Cambridge around the premise and promise of easy travel home. It continues to be a difficult time for many members of staff and as the CEO, I have to ensure that I continuously balance physical health of staff with mental well-being.

What measures did GÉANT take to make the working from home easier for staff?

I felt that I needed to ensure that there is a continuous feeling of togetherness across the organisation and we have tried to stimulate that throughout the year. This started when staff collaborated in our video message stating how proud we are as GÉANT to be supporting the COVID-19 research and being part of the solution. We also made sure that the Easter Bunny delivered eggs to everybody at home! Once we saw that the pandemic had settled in for good, we changed our staff contracts and gave an allowance to cover the extra internet use

at home, as well as a specific allowance for office furniture to ensure people could comfortably work from home with good connectivity. And at Christmas we had a joint online dinner. So, we did our best to ensure that staff felt considered.

I organised regular meetings with all team leads to get a feeling whether there are issues I should be aware of and I also took to writing bi-weekly emails to staff – nothing long or difficult, but a regular check-in in everybody's mailbox with the reminder: I am here for you, if you need me, please let me know. Whenever there was a need, I would follow up on Slack or via VC.

One thing that I know staff in Amsterdam very much appreciate is your Walk and Talk initiative – can you tell us a little more what is behind it?

As soon as it became evident that COVID-19 infections are much less likely to occur outdoors (<https://pubmed.ncbi.nlm.nih.gov/33307081/>) I decided to meet with staff members based in the Netherlands in the form of a Walk and Talk. This means that we meet outside and take a walk for about an hour and talk about work and about how we are experiencing the pandemic. This is the one way I can at least keep a direct contact with my staff here in the Netherlands, and as a people person myself – I can tell you these are regular highlights of my week. It is so good to just be able to see people and talk.



Picture
GÉANT's Vidya
Ambadipudi and
Erik Huizer on a
Walk and Talk

Of course, it is unfortunate that I have not been able to travel to Cambridge now for a year and I cannot do these Walk and Talks in Cambridge. I have been very vocal encouraging staff to take the time both in Amsterdam and Cambridge to also organise their own Walk and Talks and I am very happy every time a picture is shared showing two members of staff meeting and walking together.

What is the biggest challenge for you when managing your organisation from afar?

It's simple: I get the information that I know exists, but I do not get the information I don't know exists! As we are working from home, I am cut off from the chance encounters, the hallway, water cooler and pass-by-my-desk brief encounters that give me valuable background information and, very importantly, a sense of the atmosphere in the office. We now have new members of staff that I have never met in person. We have a new Board and that I

cannot meet in person. This long-term dependence on video conferencing is just not a good enough solution. We have seen that conflicts appear and do not resolve because people cannot see each other, teams cannot get together.

On top of this, our community is our lifeline. We run projects in which many people of our community participate. We have Task Forces, Special Interest Groups and conferences. All of these are now online, leading to less personal interactions and more potential misunderstandings and conflicts. So, the challenge is not just inside GÉANT but also to work together with all the NRENs to make sure we manage the challenges in the whole of our community.

How do you see the times after COVID-19? In your view, what is the future of the office space?

GÉANT is a people organisation, we value our people, our staff and we need a place to regularly meet and interact. So, our office spaces in Amsterdam and

Cambridge will remain very important for us. The way I see it, we already had a mix of working in the office and from home prior to the pandemic. So, this will remain, but I think there will be a stronger focus on working from home.

Once the restrictions are lifted, what is the first thing you plan to do for the organisation? And maybe you can also tell us, what it is you are looking forward to most for yourself?

I really do believe we deserve a party – a real party, with laughter and music and dancing, maybe even Karaoke. So, I hope that at some point a GÉANT get together for all staff will happen, and I cannot wait for it!

I so miss the handshakes and the hugs, so for me personally it's getting that physical connection back – and being able to once again travel to Cambridge to meet with UK staff.



Making Waves | 21-25 June 2021 | Online Event

TNC21 Goes Online

Earlier on this year GÉANT announced the decision that TNC21 will take place on 21-25 June and will be completely online and free of charge for all participants.

Words: Rosanna Norman, GÉANT

Cathrin Stöver, CCO for GÉANT commented: "We would first like to thank Jisc for their unwavering support and commitment to host TNC21 and for all the time they have given us over the last two years. Counting pebbles with the community on Brighton beach would have been wonderful, but the TNC team is now ready to embrace another challenge and looks forward to making waves with the community online and delivering another unforgettable show."

Registrations opened on 1 March with the announcement of the preliminary programme, which, over the course of five days, will feature an interesting selection of live and on-demand content. From keynotes and demos, to lightning talks and fun virtual networking activities, the programme will cover a wide range of topics and provide a snapshot of the activities in the global Research & Education community.

Sabine Jaume Rajaonia from RENATER, TNC21 Programme Committee Chair said: "We are honoured to announce this year's prestigious keynote speakers who will bring to TNC21 a global perspective across a variety of fields".

Keynotes



Sue Black, Professor of Computer Science and Technology Evangelist at Durham University, UK

Keynote title: **If I can do it, so can you**



Paulo Artaxo, Professor of Atmospheric Physics, University of São Paulo, Brazil

Keynote title: **Climate Change research and policies: the urgency of international interdisciplinary collaboration**



Serge Fdida, Professor Computer Science Dept, Vice-President International Development, Sorbonne University, Paris, France

Keynote title: **Digital transformation of research-intensive universities**



Adam Lewis, Managing Director of Digital Earth Africa Establishment Team, Australia

Keynote title: **Digital Earth Africa: Transformation Powered by Networks**

More information about the keynote speakers and their presentations will be shared via all of GÉANT's communication channels in the coming weeks. TNC21 will, of course, host regular favourites such as the GÉANT Community Award, the Vietsch Foundation Medal of Honour, the Emerging NRENs Programme and the Future Talent Programme.

Cathrin Stöver concluded: "The TNC21 team is committed to delivering a highly enjoyable and memorable networking event for all our participants, and with the chosen conference platform we strive to provide a virtual experience that is very different from our day to day online meetings."

If you haven't yet registered, you can do it now. It takes just a minute.

GÉANT will be welcoming sponsors to the conference's new format, the TNC21 conference platform will include a virtual exhibition section. Each exhibitor will have a dedicated page in the virtual event website and the opportunity to enhance their page with a variety of materials. To find out more about TNC21 sponsorship programme and opportunities **contact tnc-sponsorship@lists.geant.org**.

For further information about TNC21 visit the TNC21 website or contact **tnc@geant.org**

Making Waves

Waves can build up and break down shorelines, their impact is transformative and powerful. Similarly digital technologies impact Research & Education with their transformative and disruptive capabilities. NRENs across the globe connect the teams delivering discoveries that impact and improve our lives via some of the fastest data networks, the most trusted identity services and collaboration initiatives. NRENs inspire, disrupt, make waves and enable progress.

TNC for the first time?

TNC, GÉANT's flagship event, is the largest and most prestigious Research & Education networking conference. TNC presents participants with a unique overview of the latest developments in research networking, both in the technical field and in the area of application and management. Every year TNC brings together a wide cross section of specialists from a variety of roles in the areas of networking, Trust & Identity, access management and more from all NRENs, universities, research organisations and institutions, and industry. TNC21, the conference's 36th edition, will take place on 21-25 June 2021 and will be fully online for the first time in the history of TNC due to restrictions caused by the COVID pandemic.

InAcademia: proven and open for business

Launching a new service just as a global pandemic is emerging is an ‘interesting’ challenge. But for InAcademia, which was launched as a production service in early February 2020, it did not prove too much of an obstacle. As the world suddenly adapted to life online, InAcademia began its mission to help students and staff from participating research and education institutions to access or buy online services and products, while protecting their privacy. By validating their academic affiliation in real time, InAcademia builds on eduGAIN to confirm eligibility for relevant services and discounts.

Words: Laura Durnford, GÉANT

For merchants, InAcademia provides a quick, easy, reliable and secure way to verify that users are affiliated with a research and education institution. Having worked with a small number of service providers to prove the concept during the earlier pilot phase, the InAcademia team set its sights on attracting a major commercial service provider to use the technology ‘for real’. By April, they had succeeded in signing up one of the world’s largest identity verification aggregator companies, which gives access to a range of well-known online brands and services. After completing tests and pilots, real-world validations could begin. By the autumn, user validations were taking place in four countries. When the first invoice was generated, it was a milestone moment – though it’s early days in the life of

the service, any future surplus will be ploughed back into GÉANT community activities.

In the Netherlands, the national library, Koninklijke Bibliotheek (KB) uses InAcademia to give access to more than 400,000 scholarly e-books, databases about history, politics, arts and more, and a selection of recent magazines and newspapers from around the world, with only lightweight validation requirements. “We love the service,” says Johanneke van Dorp. “Implementation was simple and quick. From now on our student customers can prove they are a student just by authenticating like they are used to doing in their own institution.”

The Netherlands, Germany, Denmark and Spain were the first to adopt the service. As well as attracting

more countries to adopt it, the InAcademia team is seeking federations and NRENs to collaborate on national promotion, and on getting more commercial and community service providers to sign up. An online workshop on 11 February 2021 provided a push in that direction. A decision by the French NREN, RENATER, to refer all commercial service providers to InAcademia from 1 March 2021 is also expected to have a positive impact – a development that will be keenly watched as year 2 of the service unfolds.

Learn more at
<https://inacademia.org/>



A human-centric internet is possible: NGI_Trust projects showcase their impact on privacy and trust technologies

Since January 2019, the NGI_Trust project has funded and supported 57 third-party projects developing innovative solutions in the field of privacy and trust enhancing technologies, as part of the larger Next Generation Internet (NGI) initiative. Throughout the period, the selected initiatives received technical coaching, intellectual property and business mentoring support.

Several projects have now reached completion and worked with the NGI_Trust team to produce case studies demonstrating their impact on the Next Generation Internet.



Data sovereignty: PyGuard protects your privacy online

Current business models relying on the sale of our personal data represent a risk for privacy, freedom of choice and free-will. Furthermore, phishing and cyberattacks are increasing, while we introduce numerous yet vulnerable connected devices into our homes.

PyGuard is a cybersecurity project that protects individuals from online tracking. Thanks to the support received by NGI_Trust, the project developed a prototype for an all-in-one hardware platform with embedded software, protecting and managing locally personal data and credential information, and acting as a central checkpoint for all connected devices.

The prototype filters at the network level third-party connections and unwanted data flows that happen automatically when a device is connected to the internet. Through a user-friendly interface, the system provides an overview of all network activities and personal data interceptions and allows non-technical users to easily set their own security and privacy settings.

NGI_Trust renewed its trust in the project and 2021 will be the year for productisation and commercialisation for PyGuard.

PyGuard was developed by the French startup Panga, in collaboration with MyDataBall, the XLIM and L3i research laboratories and with support by the Fondation MAIF.

For further information visit PyGuard: <https://www.pyguard.fr/en/>

Picture
Visual
representation
of the PyGuard
solution

SensioID: Solving ownership and copyright for the digital creative market

Kelp.Digital (ex. Sensio) is open-source software for content creators (for now, mainly, photographers) to manage, protect and license their work. Within the 9 months of NGI_Trust project funding, Kelp.Digital worked on the development of a web application for professional photographers that would allow them to create legally valid and verifiable digital copyright statements for their work in a simple and straightforward way.

Kelp's approach is different from other projects that are tackling this issue as – in order to claim copyright of a photo – their solution asks to prove ownership of a physical asset by going through an equipment/device verification workflow.

Throughout the implementation stage the project's initial concept expanded significantly and ultimately grew into Anagolay Network, a decentralised protocol built on Substrate framework. On top of it, the team built a web-application, currently available under private Beta, and soon expected to open to the wider community under the new name "Kelp.Digital".

In the long run, Kelp's ambitious goal is to form a creative market where content creators are not bound to any platform and can set the terms for others to use their work without much effort, and where publishers, marketers and other creatives can acquire quality content directly from its authors in a few clicks.

If successfully scaled, Kelp.Digital has the potential to become a key infrastructure for the new transparent market of creative content in the human-centric internet.

The Kelp.Digital team is formed by Daniel Maricic (7Signals.io) and Elena Tairova (Sensio.Group).

For further information visit:

Sensio.Group: <https://www.sensio.group/>

Anagolay.Network: <https://anagolay.dev/>

Kelp.Digital: <https://kelp.digital/>



Cap-A: A Community-driven Approach to Privacy Awareness

Solid legal regulations and technical countermeasures are not always sufficient to achieve society-wide impact on privacy protection; data protection can also be powered by the society itself.

The CAP-A project is offering socio-technical tools to promote collective awareness and informed consent, whereby data collection and use by digital products are driven by the expectations and needs of the consumers.

The project developed a suite of ICT tools and implemented a gamification/rewarding strategy, allowing users to rate the privacy friendliness of apps of specific categories, annotate their Privacy Policy documents, and generate informative statistics about the behaviour and mindset of citizens and the privacy-consciousness of mobile apps. Pilots in the form of thematic events were also organised throughout the project, centred around specific categories of apps.

Users' contributions resulted in the expression of personal expectations for over 560 apps and in 1181 annotations, providing a wealth of privacy-related statistics that can be used by developers, social scientists, and policy makers to conduct analyses.

To achieve long-term sustainability, the team is now considering establishing a Non-Profit Organisation (NPO) and seeking additional funding for a follow-up project.

The CAP-A project is part of the CAPrice initiative (<https://www.caprce-community.net/>) and it is driven by the Foundation for Research and Technology – Hellas (FORTH) and IN2 Digital Innovations.

For further information visit:

CAP-A portal: <https://www.cap-a.eu/portal>

CAP-A mobile app: https://play.google.com/store/apps/details?id=com.in2.cap_a

Read the complete case studies here: <https://wiki.geant.org/display/NGITrust/Case+Studies>

eduGAIN at 10 – the star at the heart of a constellation

From a lone star to a whole constellation: in 10 years, eduGAIN has evolved from a single-problem solution to a central point in an array of services. In providing an underlying foundation, eduGAIN has become deeply embedded in today's Trust and Identity (T&I) landscape. But participation in the interederation service has also spread widely, with 70+ federations, 4,000+ organisations and 3,000+ services around the world now on board. So, as it marks its 10 year anniversary, we reflect on the past and future of eduGAIN.

Words: Laura Durnford, GÉANT

“eduGAIN in the first place is policy and metadata validation, aggregation and exchange; the rest is monitoring, statistics, support and PR,” says Tomasz Wolniewicz of PSNC, who won a GÉANT Community Award in 2017 jointly with Maja Górecka-Wolniewicz - who was instrumental in technical developments - in part for their commitment to eduGAIN over many years.

They were in the service team with Mikael Berglund (SUNET) and Wojbor Bogacki, led by Valter Nordh (SUNET), when eduGAIN became a full production service on 27 April 2011. This followed a successful pilot phase led by the late Jürgen Rauschenbach (DFN). Leadership later switched to Josh Howlett (then at Jisc), then Brook Schofield (GÉANT) with Ann Harding (SWITCH), who together supervised the addition of a large number of new participants and extensive technical

support. Other significant contributors to the early days were Diego Lopez and Lukas Hämmerle, then at RedIRIS and SWITCH.

The number of federations participating in eduGAIN soon grew from the 13 in the pilot phase. The first members, SIR (Spain) and DFN (Germany), formally declared their participation in June 2011, signing the policy framework declaration that had been devised by Mikael Linden (CSC), Shannon Milsom and Andrew Cormack (Jisc). In 2012, the service went global, adding the Canadian and Brazilian federations. By March 2016, 38 were participating, supported with web-based technical information and tools, from January 2015.

The early federation operators turned their member organisations “upside down” to implement the eduGAIN technology, which was “pretty

complex” at the beginning, according to Nicole Harris (GÉANT), who was responsible for establishing the UK Access Management Federation, one of the early contributors to eduGAIN, and who has worked with research and education identity federations through REFEDS for many years. Federations’ commitment has been key to eduGAIN’s success.

This point was echoed in a 2017 blog by Ann Harding, highlighting why strategic investment in identity management provides value in the scope and reach of services for research and education. As research communities began to understand the potential use and impact of federated identity, they “identified requirements and needs for which eduGAIN was not originally considered”. To address this challenge, GÉANT and the federations began working with research communities in

the GÉANT Project (GN3plus) and the AARC (Authentication and Authorisation for Research Collaborations) project. This led to SIRTFI (Security Incident Response Trust Framework for Federated Identity) and the AARC Blueprint Architecture, in which eduGAIN is a vital component, and which allows technical decision makers in research collaborations to build custom AAI solutions for their communities.

Using the AARC architecture, the eduTEAMS service provides a ‘turn-key solution for creating and managing community AAls’, enabling the creation and management of virtual teams and secure access and sharing of resources and services, using federated identities from eduGAIN and trusted identity providers. As eduTEAMS is now delivering AAI services for ESFRI cluster research infrastructures in the EOSC context; HPC infrastructures in the context of EuroHPC and the wider HPC community; and digitisation of student mobility in the European Student Card Initiative context, it’s fair to say that eduGAIN’s impact is becoming wide-sweeping.

Picture
Torsten Kersting (left) of DFN and Ajay Daryanani (right), then of RedIRIS, handing over the eduGAIN declaration to Tomasz Wolniewicz in June 2011.

When you consider that by integrating eduGAIN in solutions for student e-identity and working with the Erasmus+ programme, the MyAcademicID project and its recent successor EDSSI will be supporting international mobility for around half a million students each (non-COVID) year, the impacts become even more impressive.

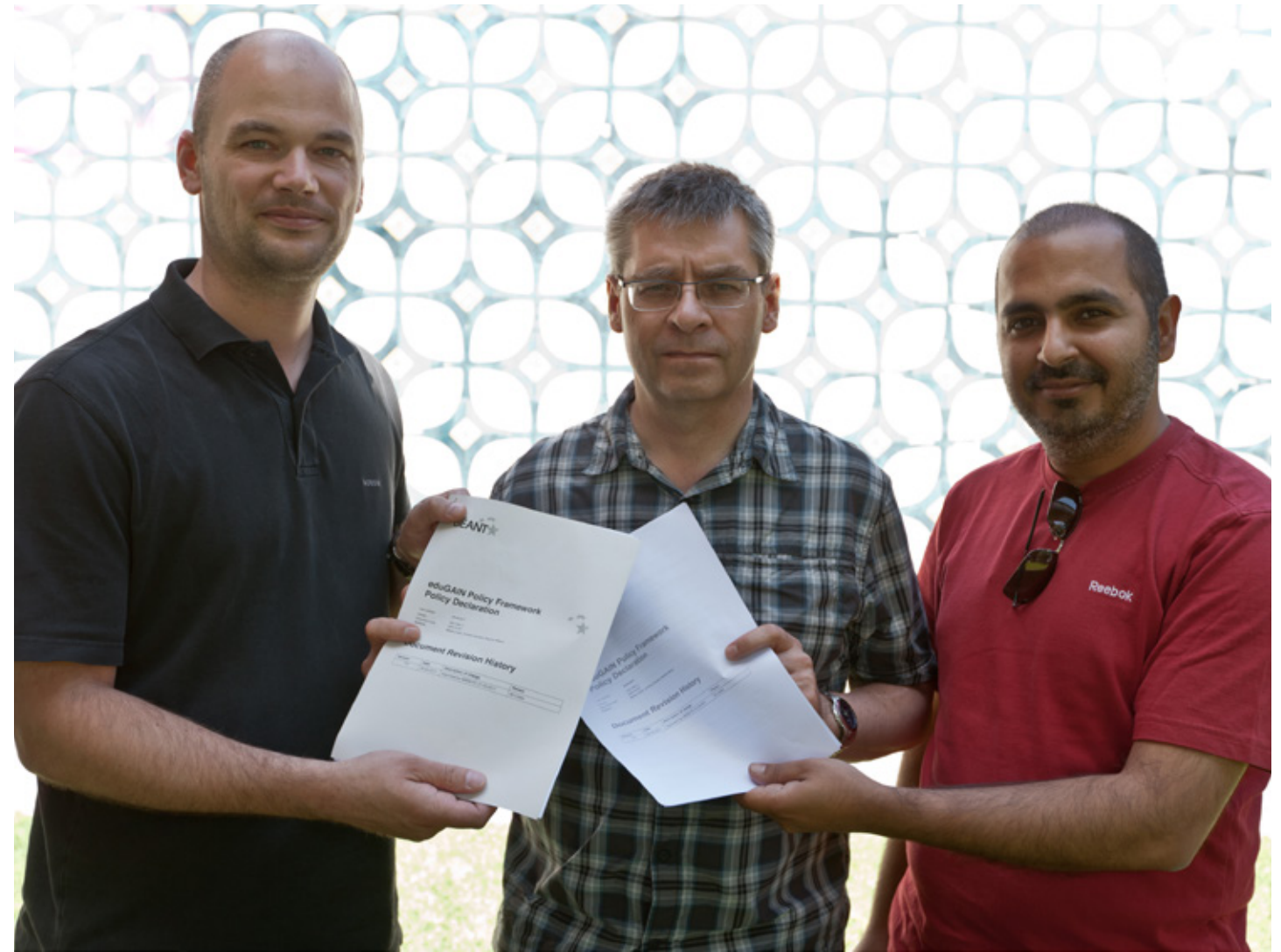
The newest comer to the eduGAIN constellation is InAcademia, which launched as a production service around a year ago and is allowing students and staff from participating institutions to access or buy online services and products, while protecting their privacy (see page 8). With the advent of the European Union’s General Data Protection Regulations in May 2018, the need for privacy-protecting technology such as eduGAIN became more pressing.

In October 2020, eduGAIN welcomed one of its latest new participants, the China Science and Technology Cloud (CSTCloud), which

supports over 100,000 researchers in a variety of fields. So, it’s easy to see how the service is rapidly growing – and that well-coordinated technical support is essential to keep it working smoothly into the next 10 years.

Davide Vagheti (GARR) now leads eduGAIN activities in the GÉANT (GN4-3) Project: “Today’s eduGAIN is a success story thanks to the community stars who worked so hard in the past and to the federation operators that supported the project in each participating federation. Without their continuous support, eduGAIN wouldn’t have been possible. We’re now developing technical support tools and training materials to ensure that eduGAIN continues to safely grow, along with the constellation of services that depend on it.”

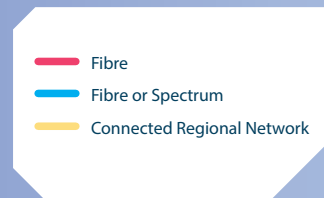
Learn more at
<https://edugain.org/>



GN4-3N pushing ahead despite challenges

Despite the best efforts of COVID-19 and the resultant national lockdowns and travel restrictions, the €63.125m GÉANT GN4-3N Project – representing the most significant refresh of the pan-European GÉANT network in a decade – continues apace.

Words: Paul Maurice, GÉANT



At the time of writing in March 2021:

- Six routes (Lisbon-Porto, Lisbon-Madrid, Porto-Bilbao, Paris-Bilbao, Madrid-Marseille and Marseille-Milan2) have been completed and either formally accepted or are close to acceptance.
- The first IP traffic has been sent across the Lisbon-Porto route as part of testing.
- Three further routes (Milan1-Milan2, Milan2-Vienna and Geneva1-Milan1) are currently in the implementation phase.
- Ten routes are currently in the connectivity delivery phase from contracted providers.
- Five routes are in the active tendering phase.
- Eight routes have been endorsed by the Network Infrastructure Advisory Committee (NIAC) that provides guidance and advice and comprises representatives from a range of NREs.

This project – ambitious enough without the additional challenges presented over the past 12 months – is progressing well thanks to the tireless efforts and commitment of the GN4-3N project team, GÉANT's network implementation team, our NREN partners, and our close partner suppliers.

Virtual implementation

For example, the network implementation team – more used to spending their time in planes, trains and PoP (Point of Presence) locations around Europe building, maintaining and updating the network – have had to radically rearrange their working practices to ensure project progress is uninterrupted. So, rather than being on-site, they are now far more reliant on sub-contractors, sharing their knowledge and documenting processes to ensure network PoP infrastructure is

ready for new equipment deployment. For GN4-3N this means the re-engineering of 37 PoPs and setting up of several new sites.

Valuable partnerships

Partner suppliers also report challenges – from careful coordination of project, travel, and testing schedules; ensuring staff are safe despite their travel, work, and isolation requirements; arranging and re-arranging travel at short notice; to dealing with the more extreme winter weather experienced in recent months. Understandably some countries are less experienced at dealing with snow than others, with some remote sites difficult to reach due to uncleared roads and the lack of 4x4 or winter-tyred rental vehicles. The supposed glamour of business travel certainly has another side!

Picture
Illustrative map showing planned fibre

Lest we forget

These challenges fall into the background when it's remembered why GN4-3N is so important, and what it means for so many of our NREN partners and their research and education communities. Designed to make the most of changes in technologies, and opportunities presented by a changing landscape of network procurement, GN4-3N is

set to give research and education communities improved performance, increased flexibility, and reduced expense alongside long term platform stability. It is enabling fairly priced, high-capacity connectivity across all of Europe: a Europe where a gigabit of capacity will cost virtually the same across the network and in turn bring consistent and predictable pricing for the benefit of NREs and their customers.

GN4-3N is therefore not 'just' a network project: it is helping to narrow the digital divide, stimulating the market in cross-border communications, and supporting greener ICT. And with an average annualised increase in network traffic of 30% per annum for each of the past five years, there is no time to waste, pandemic or not.

Digital Divide



+50%

Bringing fibre connectivity to more of Europe

Data Growth



+30%

Average annual increase in network traffic over last five years

Investing in Europe



€60m+

GN4-3N is stimulating the market in cross-border communications



GÉANT Wi-Fi Mon

– Crowdsourced Wi-Fi Monitoring for Research and Education

WiFi and eduroam in particular is the most popular network access method for students, researchers and staff. Outside the eduroam community, pretty much every meeting or visit starts with “Hi, great to see you, what’s the WiFi password?”

Words: Karl Meyer, GÉANT



However, poor WiFi performance is a very common complaint. Poor connections, poor download performance, frequent dropping out are the most frustrating issues we have all faced with WiFi. However, measuring WiFi Performance is difficult for IT teams. It uses a shared medium in complex environments across a range of hardware and software. Lecture theatres can show great performance when installed but vastly different performance when filled with students. This is compounded by the growth in multiple devices. We now have laptops, phones, tablets and more – so a 200-seat lecture theatre can often have 400 or 500 WiFi devices all competing for access.

Existing vendor-based solutions usually focus on measures such as signal strength and the operation of their equipment. They are mostly proprietary, focusing on their products, not users. The access point may register 200 connections but if those connections have negligible capacity, the users might as well be disconnected.

This is why Wi-Fi Mon was created. It offers a user-focused monitoring service which is vendor independent, open-source and 100% transparent to the users. It is designed to have a low network overhead, while capturing the users’ perception of network quality and provides metrics such as throughput, latency, and signal strength.

Wi-Fi Mon uses custom HTML code on a website managed by the institution, for example the mail services, Moodle etc. As users connect to this site, Wi-Fi Mon measures the end-to-end performance, and reports to the Wi-Fi Mon Test Servers to provide tracking and analysis.

For high impact areas where regular tracking is required then dedicated probes based on small-form devices can be implemented to provide baseline performance.

Wi-Fi Mon can be used by any research and education institution, with each installation controlled by the institution, and with zero data sharing. Wi-Fi Mon is perfect for large-scale campus implementations and is 100% compatible with eduroam services.

Learn more at
www.geant.org/wifimon

One procurement to (over)rule them all:

Why OCRE is a revolution for cloud consumption in the European research community

Cloud services are vital in order to store, process and re-use the huge data workload used by academia and research. Their agility, scalability, and considerable cost reductions are only some of the reasons why over the past few years – and even more so during the COVID-19 era – research organisations have been progressively moving activities to the cloud. However, identifying, understanding, and procuring available cloud services can be quite a complex matter for institutions.

Words: Leonardo Marino, GÉANT



Now, with the launch of its Cloud Framework and Catalogue, the Open Clouds for Research Environments (OCRE) project is breaking down barriers to the agile consumption of cloud services for the European research community.

Since January 2021, thanks to the 473 IaaS+ framework agreements awarded by OCRE through a public tender, more than 10,000 universities and research institutions in 40 countries across Europe can easily access a large selection of commercial cloud platforms and services, benefiting from advantageous pricing whilst avoiding bureaucratic obstacles.

Within the new framework, services are made available through NRENs, either in the role of referrers – acting as intermediaries and facilitating the direct purchase from suppliers – or in some cases underwriters – procuring cloud services centrally, aggregating the demand and then distributing resources to their institutions and end-users. Unlocking the full potential of cloud services for European research and finally bridging the gap between supply and demand, OCRE is an unprecedented project that promises to elevate clouds above Europe to new heights.

Infrastructure as a Service Plus More

Labelled as “IaaS+”, The OCRE Cloud Framework expands and supersedes the previous GÉANT IaaS Cloud Framework, offering a wider and even more varied portfolio, going beyond the Infrastructure as a Service and commodity cloud, into SaaS and PaaS offerings and research-specific solutions for the adoption of Earth Observation (EO) services based on Copernicus data.

When we talk about Cloud there is no one-size-fits-all solution, but with 37 different commercial cloud-based platforms, the OCRE Cloud Catalogue covers all the possible requirements of European researchers. From hyperscale platforms to custom services, both from overseas and Europe, and all with a single reseller in each country, the catalogue makes it easy to identify the available suppliers in each country and access their services.

OCRE and EOSC

OCRE is set to become a fundamental building block for the European Open Science Cloud (EOSC), with the integration of the procured commercial cloud services in the EOSC Portal Catalogue and Marketplace.

By providing practical and ready-to-use solutions, entirely compliant with EOSC requirements, OCRE will foster the engagement of researchers in EOSC, support Open Science and FAIR principles and ultimately advance European research.

Boosting European Research

With the framework in place and with the completion of its catalogue, OCRE will now continue to drive and accelerate the adoption of cloud services in the European research community, through training, webinars and support activities (organised by NRENs and by suppliers), marketing and dissemination, distribution of cloud vouchers, and through an already ongoing series of adoption funding calls.

As a result of the first funding call in the series, fifteen innovative research projects have already received OCRE's support for a total of €1.17 million, and will be able to use the procured cloud services to conduct outstanding research using machine learning and artificial intelligence (AI) in the fields of healthcare, materials science, astrophysics, climate research, economics, and synchrotron radiation research. All these projects support the FAIR principles and aim to use OCRE services to make their data reusable.

More calls and opportunities for NRENs and for research institutes will follow in the coming months, including specific funding to procure Earth Observation services and get access to Copernicus data. Keep an eye on all OCRE channels and stay up to date.



Browse the OCRE Cloud Catalogue here: <https://www.ocre-project.eu/services/cloud-suppliers>

The OCRE team

Launched in January 2019, OCRE is coordinated by GÉANT, while consortium partners include CERN, the RHEA Group and Trust-IT Services, and subcontractors specialised in the Earth Observation field such as EARSC, Evenflow and SixSq.

To stimulate service adoption, OCRE is working with projects and organisations including the European Space Agency (ESA), Eurodoc, the Marie Curie Association, the EOSC-hub project and the ARCHIVER project.

Finally, several NRENs have also been actively involved since the project's inception and helped shape the tender and the procurement process, making OCRE's achievements a true team effort of the European research community.

To find out more visit <https://www.ocre-project.eu>



Innovation Programme

YOUR_IDEA_HERE

Supporting innovative ideas

GÉANT Innovation Programme: funding new ideas from and for the Research and Education Community

On 23 February, the GÉANT Association launched the Innovation Programme: a one-of-a-kind opportunity for GÉANT community members, to enable initial development, establish a proof of concept or test their new ideas, with lightweight administrative constraints.

Words: Silvia Fiore, GÉANT



What is the Innovation Programme about?

The Innovation Programme was introduced to prospective applicants by Gyöngyi Horváth (Community Support Office at GÉANT) and Claudio Allocchio (Chairman of the GÉANT Community Committee and Senior Technical Officer at GARR) at a well-attended infoshare.

From a total programme fund of EUR300k, a maximum of EUR30k is available per project to support innovative ideas. Work can be carried out by any legal entities belonging to the GÉANT Community: for example, NREs and any not-for-profit organisation served by the NREs, such as universities and research institutes. Projects must have a duration of no more than nine months, with all projects completed no later than the end of December 2021.

When can you apply?

The programme remains open until the total programme fund has been allocated. However, keep in mind the key dates mentioned on the webpage! Evaluations are carried out by subject matters experts, followed by a final evaluation by the GÉANT Innovation Programme evaluation committee.

Why should you apply?

The Innovation Programme gives GÉANT community members the chance to develop their ideas and to test them in a real environment, with flexibility to focus on any subject area or topic to support technological evolution, and potentially having scientific, societal or economic impact and providing that it falls within the GÉANT community's remit. For example, proposals can draw upon areas such as Research and Education networking, cloud, security, Trust & Identity, education and eHealth. Any proposals that demonstrate strong impact and create benefit for the European Research and Education community are welcome.

How will it benefit the GÉANT Community?

The programme is part of the GÉANT Community Programme, whose Task Forces, Special Interest Groups, workshops and training events assist GÉANT, NREs and other research and education bodies to collaborate and share experiences. A grassroots, voluntary initiative built by world experts from NREs, user organisations, research institutions, commercial and industrial sectors, the Community Programme has already developed great services, now widely adopted, such as eduRoam, eduVPN and eduMEET. All these ideas were designed to fix a problem that the Community itself experienced.

The programme committee particularly encourages ambitious and novel research proposals addressing new concepts and techniques and those with the potential for significant scientific or societal and economic impact. New ideas help progress the community as a whole, supporting its members to strive and try new directions.

To check the guidelines on how to apply to the Innovation Programme, visit <https://www.geant.org/Innovation/Pages/Innovation-Programme.aspx>.

Celebrating ten years of software training excellence

On the occasion of the 10th anniversary of the Secure Code Training (SCT) and the School of Software Engineering (SSE), CONNECT met with the masterminds of these successful and lasting training initiatives, Gerard Frankowski and Maciej Łabędzki from PSNC in Poland, to look at how these evolved through the years and at the benefits they brought to the European NREN community.

Words: Rosanna Norman, GÉANT



Tell us about these initiatives, and their objectives. How did it all start?

The first SCT and SSE took place at PSNC in Poznan in 2010.

Their content was defined by the survey we launched to better understand and address the professional requirements of the software development teams in the GÉANT community.

Did the objectives change from day one to the present day?

Our aim from day one, for the SCT, has been to raise awareness of secure coding patterns to limit the number of security vulnerabilities in the code; for the SSE it has been to improve the wide scope of 'software engineering' skills across the GN4-3 Project. The programmes have evolved keeping up pace with the technological developments in the relevant fields.

SCT and SSE training courses deliver a balanced mix of theory and practice and bring closer software professionals from across the community through the social activities, included in the events programmes, which have always been very much valued by all participants.

As we firmly believe that in cyber security we need to prepare to defend by knowing how to attack, in 2014 the SCT launched "HackMe" a type of hackathon where participants were given the opportunity to test acquired skills and abilities by attacking an existing application. To make the event more memorable and enjoyable we included fun elements such as appealing challenges and final prizes.

Training sessions focus on specific topics and aspects of software development with the overarching goal of enabling access to good practice, effective tools and harmonising skills development for all.

Engagement with the community has always been a key factor and special area of focus; therefore we have been constantly working on improving the format and range of activities for both of the training programmes.

For instance, in order to open the SSE (originally called Summer School of Software Engineering) to a wider audience and encourage participation

from the entire community we shortened its duration to three days and populated them with hands-on only workshops, skill acquisition and practical exercises. The formula has been successful; in addition, every year (in the pre-COVID times) training events took place in a different central European location easily reachable by all participants.

In 2020, due to the COVID pandemic restrictions, we held SSE online for the first time and used a collaborative platform to enable the distributed teams to work effectively together.

Who are the people and organisations behind these initiatives?

Both initiatives are part of the Operations Support Work Package in GN4-3, specifically that area related to software governance. The programmes success is the outcome of the fruitful collaboration between PSNC and AMRES with the valuable support of GÉANT Learning & Development (GLAD), and, of course, the dedication and commitment of the entire team involved in both initiatives.

How did these training programmes evolve through the years? You must have seen some changes since the start, what are the most significant?

Although the content changes each year, we intend to maintain its tested and successful format consisting of two to three days (to allow for travel time) face-to-face intensive workshops and the use of Java enables us to focus only on language independent issues. The target audience has evolved too, for instance no specific knowledge is now required to attend SSE training events.

Development skills are a set requirements to attend SCT notwithstanding the school's agnostic approach regarding the participants' experience and background. SCT is for developers and we expect only developers to participate.

How did these schools benefit the GÉANT Project and the community?

The NREN community has benefited from the overall quality of software development and a consequent and associated increase in productivity.

Regular secure code reviews have led to a general growth in relevant skills and abilities.

By bringing together software developers from the European NRENs our training activities have contributed to creating a community of like-minded people.

The programme longevity, popularity, consistent repeat attendance and interest are also testament to its value for the professional community.



About Gerard

Gerard Frankowski joined PSNC in 2003 and is the Head of PSNC Cybersecurity Department. Gerard has participated in numerous European and national research projects involving security of networks and systems. He has been involved in various iterations of the GÉANT project since 2008 and has been leading the Secure Code Training since 2010. His areas of interest comprise: vulnerability research, secure programming and penetration tests techniques.

SSE in numbers:

201 attendees in total
22 institutions
11 events

What does the future hold for these programmes?

As much as we look forward to meeting face-to-face again, we plan to host 2021 events online.

There may be a change in the training format, but we firmly believe in the importance of staying connected with the community and fostering these connections by listening, engaging, making improvements, bringing new topics and cutting-edge techniques that are relevant and beneficial to our audience.

For these reasons we believe that with the ongoing community support the programme have a long and successful life ahead.



About Maciej

Maciej Łabędzki joined PSNC in 2006 as a Java software engineer. Since 2007 Maciej has been involved in multiple software projects through the various iterations of the GÉANT Project. Maciej is currently leading the Software Catalogue initiative (sc.geant.org) and the School of Software Engineering.

STC in numbers:

184 participants in total
22 institutions
12 events

SCT and SSE web page for GÉANT community:
<https://wiki.geant.org/display/GSD/Software+trainings>

Into the White Rabbit hole

Packets are not all: first results for the field trials by GARR and INRIM for transporting a time and frequency signal over the R&E network.

Words: Paolo Bolletta, Andrea Salvati and Gloria Vuagnin, GARR



The old dichotomy between circuit and packet switching does not tell the whole story of possible uses of optical networks: fibre-optics are far more flexible and allow the transport of all sorts of information. With INRIM, the Italian National Institute of Metrology, we tested a very specific application: the distribution of a synchronisation signal over a WAN.

Synchronising time and frequency is a requirement for all scientific and industrial applications where high levels of accuracy in time measurement are critical. Italian research in this domain is top-notch, also thanks to the implementation of LIFT, a dedicated fibre-optic backbone interconnecting INRIM to facilities that require very accurate time reference in Italy for the specific purpose of delivering a synchronisation signal.

Implemented with GARR support, LIFT is owned and managed by INRIM which is quite a unique institute in Europe. It serves research users with the highest requirements in this field, including some CNR facilities, INAF, ASI, Alenia Space and Telespazio, and its accuracy is so high that it's also used for metrological research.

However, reaching users with fibre solely dedicated to synchronisation applications is costly, and it is only viable for large facilities with very demanding requirements.

But what if we used an infrastructure that is already there? That's how we started our Proof-of-Concept to test whether we could convey the synchronisation signal over the GARR optical network to other potential users.

With INRIM we designed field trials for the definition of a time and frequency distribution service over R&E networks, based on the White Rabbit protocol and alien wavelengths. Developed at CERN, White Rabbit is based on an open framework which facilitates further developments and performs well in comparison with competing technologies offered by telcos.

We tested this technology on Dense Wavelength Division Multiplexing (DWDM) equipment, first in laboratory conditions and then on a geographical path over the GARR production network. We used alien wavelengths to transport the signal, as we consider it the most promising technology in terms of performance, and results did not disappoint. In the field trials, accuracy was below a nanosecond, which would suit typical scientific applications in physics, electronics, robotics, and IoT where atomic clocks are used. Typically, their calibration is done by using GPS, but with our approach these applications could refer directly to UTC-IT (official Italian time), while using a more open, robust and not easily jammable technology.

While these results are promising, some issues are still open, the most relevant being one-way transmission. White Rabbit needs a symmetric channel, thus if we use two fibres, as we should for the GARR infrastructure, we need to account for any small differences between them and recalibrate if changes to the infrastructure occur.

The upcoming evolution of the GARR network towards a partially disaggregated model based on Open Line System (OLS) is however expected to offer new opportunities to overcome this problem and implement transport on a single fibre.

See also:

www.garr.it

www.inrim.it



edusources makes digital educational resources widely available

The Dutch education sector has recently acquired an online platform that lecturers can use to easily share digital educational resources so that other lecturers can easily find and reuse them. edusources is a new service from SURF, the Dutch NREN. We spoke to Martine Teirlinck, Product Manager of edusources.

Words: Jan Michielsen, SURF

SURF

Don't keep reinventing the wheel

edusources is a platform for digital educational resources by and for the Dutch education community. It is possible to share resources openly with the whole world, as well as semi-openly with a specific group. Martine: "In recent years, we have seen an increasing need among lecturers for high-quality educational resources that they can use in their teaching practice. They don't want to have to keep reinventing the wheel or to search for resources using a general search engine. This need for high-quality resources has only increased as a result of the coronavirus crisis."

Targeted search

In edusources, lecturers and students can search for digital educational resources such as knowledge clips, e-modules and mock exam papers. Because edusources focuses specifically on educational resources, you can search in a very targeted way. And you

can be sure that the resources you find there are of good quality. Most of the resources have been peer-reviewed by other lecturers before they find their way into edusources. What's more, edusources users can rate the resources.

International standards

The resources are made available by lecturers from the Dutch education community. Martine explains how this works: "They do this by filling a repository that is part of the edusources network. Most of the resources are now located in SURF's repository, which is part of edusources. But we have developed edusources in such a way that you can easily access other repositories too. For example, we work in accordance with the international OAI-PMH (Open Archives Initiative Protocol for Metadata Harvesting) standard."

Encouraging collaboration

edusources is an initiative by SURF to promote cross-institutional collaboration in the field of high-quality digital educational resources, most commonly within professional communities of lecturers. Martine: "For now, edusources is focusing primarily on these professional communities to enable us to increase the impact of open and semi-open educational resources. Furthermore, we have observed that professional communities are often also focused on European collaboration and international content. This requires collaboration at a European and a global level. Our aim for this platform is to make it easier to enter into these collaborative partnerships."

More than just a fancy platform

SURF offers affiliated professional communities not just cutting-edge infrastructure, but also broader support to enable easier sharing of resources. Martine: "Individual lecturers find this quite a daunting process. We therefore consider the overall implementation of sharing resources in or from their professional community, integration with digital learning environments, but also issues such as policies and user privileges. And equally importantly: how, as a lecturer, do you find the best way to work together with academic support staff and library staff? These actors have an invaluable role to play in sharing high-quality digital educational resources. All these things can be best facilitated centrally by SURF."



Picture
Martine Teirlinck,
Product Manager
of edusources
at SURF

Visit edusources.nl/en to get started right away. To find out more about the edusources service, visit www.surf.nl/en/edusources

edusources in practice

Harrie van der Meer, chair of the Information Literacy professional community: "We were among the first to use edusources. And we are pleased about that because distance learning as a result of the coronavirus situation has only served to underline the importance of the availability of high-quality digital educational resources. So far, we have made 400 quality-assessed resources available, and this is only set to increase."



The Swiss Research Data Connectome

Scientists across disciplines generate increasing amounts of valuable data as part of their daily research activities. Being able to reuse or even combine such scientific data opens the door to many exciting possibilities. Until now, research data in Switzerland has been collected in domain or institutional silos and could not be easily connected. The Research Data Connectome tackles these challenges.

Words: Sebastian Sigloch, SWITCH



SWITCH

The Research Data Connectome interconnects, aligns and organises (open) scientific (meta)data sustainably across data providers and disciplines to make it widely accessible, interoperable and valuable.

Building the Connectome is a joint effort by the Connectome Partnership DaSCH, FORS, EPFL, Blue Brain, eXascale Infolab, SATW, SAGW and SWITCH. To add value to the research, education and innovation community in Switzerland, the Connectome Partnership harvests,

extends (e.g. keywords from abstracts), harmonises (through providing a common, extendable data structure) and links metadata from decentralised data providers into an Open Research Data Knowledge Graph using open standards and Best-Practices (see image). The key benefit of this interconnection of metadata (e.g. metadata on Projects, Persons, Datasets, Publications, Articles, Events etc.) across Sciences and their disciplines is that it can really enable researchers to explore, find and merge information that was hidden in decentralisation before.

Reusing Linked Open Research metadata in various tools and services can, therefore, enable much needed serendipitous moments in research.

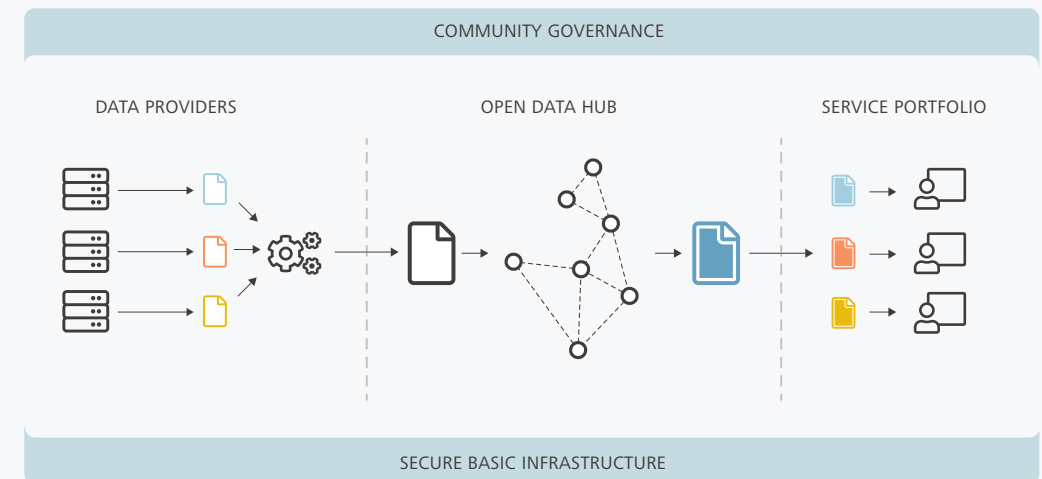
Picture
Research Data Connectome – The Connectome Knowledge Graph will enable the exploitation of Open Data through a variety of services and tools.

Moreover, the linking of metadata improves the interoperability and interconnectedness of decentralised datasets. This enables interdisciplinary reuse, since enriched metadata is made reusable through an open standard interface (API) that empowers a broad spectrum of innovative features for both, existing and new tools and services in the ORD ecosystem.

As such, the Research Data Connectome aims to provide a “glue” to seamlessly interconnect, align and improve metadata, research tools and services in the ORD ecosystem. The Connectome Partnership does not aim to replace any existing infrastructures, tools or services.

The first pilot sprint of the Research Data Connectome has been successfully completed. Architecture, a knowledge graph and a design prototype with four user-validated use cases show how researchers could search for, discover and organise linked data better in the future. Building on the successful pilot phase that demonstrated the feasibility of the vision, the Connectome Partnership aims to realise a Minimum Viable Ecosystem by the end of 2021.

Drop us a line, if you have questions about specific aspects of this project:
connectome@switch.ch





20 years of Restena Foundation

In 2020, the Restena Foundation - the Luxembourg NREN comprising one of the smallest research and education communities within GÉANT - celebrated its 20th anniversary, even though its story actually started in the late 1980s as a project for Education and Research.

Words: Interview to Gilles Massen, Director of the Restena Foundation, by Christine Glaser, Comms and Marketing Manager, Restena

What makes Restena so particular as an NREN?

The initial idea in the late 1980s was to build a network and services for secondary schools and teachers working from home. However very quickly higher education and the nascent research centres were integrated into the plans, and we ended up with a network serving all areas of education and research in Luxembourg, while most other NRENs have a more focused approach. While at first motivated by the need to assemble a critical mass, this global approach enabled high quality network access to all kind of schools and showed its full potential during the pandemic when networks became the lifeline for education. Our network supported the whole national education system that made the move to home schooling in just two weeks and we hosted schouldoheem.lu, a platform specifically targeting home schooling launched by the national authorities at the beginning of lockdown.

What is the link between Restena and NRENs?

Our story with the European NREN community started well before the official foundation date in 2000... our work in fact started around 30 years ago. We first connected with European research and education networks in the early 1990s. Throughout the years, the central role of a European community of research and education has always been obvious - and the collaboration the natural behaviour of this community. We have always been actively involved in the subsequent networks and projects and will keep up with their development in the future.

Picture
Gilles Massen,
Director of
the Restena
Foundation.

Can we say that collaboration is of vital importance for you?

Vital, essential, crucial, these are the adjectives we could use - but let's not forget interesting, rewarding and fun. Without the GÉANT community, we could not have gained access to such a wide range of knowledge and experiences and built the network and services on which our community relies today. And we are able to give something back: our active contribution to the development of eduroam is one of the most rewarding experiences.

Research and education infrastructure is not your only focus at Restena?

As an NREN, we grew in the 1990s by bringing internet resources to Luxembourg and helping companies and organisations to connect when no commercial offers existed. And we keep serving the internet community within our country. Today we are operating two essential infrastructures: we manage the registry for domain names under the .lu country code extension and operate Luxembourg's internet exchange point (LU-CIX) backbone. Our latest collaboration with LU-CIX is the joint set-up and operation of a national centre for volumetric DDoS attacks, a crisis management tool. Ensuring both stability and robustness of each of our infrastructures is essential.

What next?

Our core ambition remains to provide the education and research community with the infrastructure and services that support their efforts and helps to fulfil their goals. With the imminent connection of Luxembourg's HPC "MeluXina" - part of the EuroHPC network - we will step up our game considerably. Rock-solid infrastructures are also what the larger environment expects from us. Then combine this with the ever-increasing security considerations that our communities need and deserve, and I don't expect us to be bored any time soon.

Restena's 20th anniversary publication '*RESTENA: the story of an infrastructure*' is available on restena.lu/publications



CS3MESH4EOSC

– Uniting European Data Services for Seamless Data driven Science through a Global Collaboration Platform

Words: Jakub Moscicki (CERN), Pedro Ferreira (CERN), Anna Manou (CERN) and Rita Meneses (Trust-IT Services)

The EU-funded CS3MESH4EOSC project is connecting locally- and institutionally- provided sync and share services and scaling them up to the European level and beyond. The project is delivering the Science Mesh, an interoperable platform to easily sync and share data, deploy applications and software components, while extending functionalities.

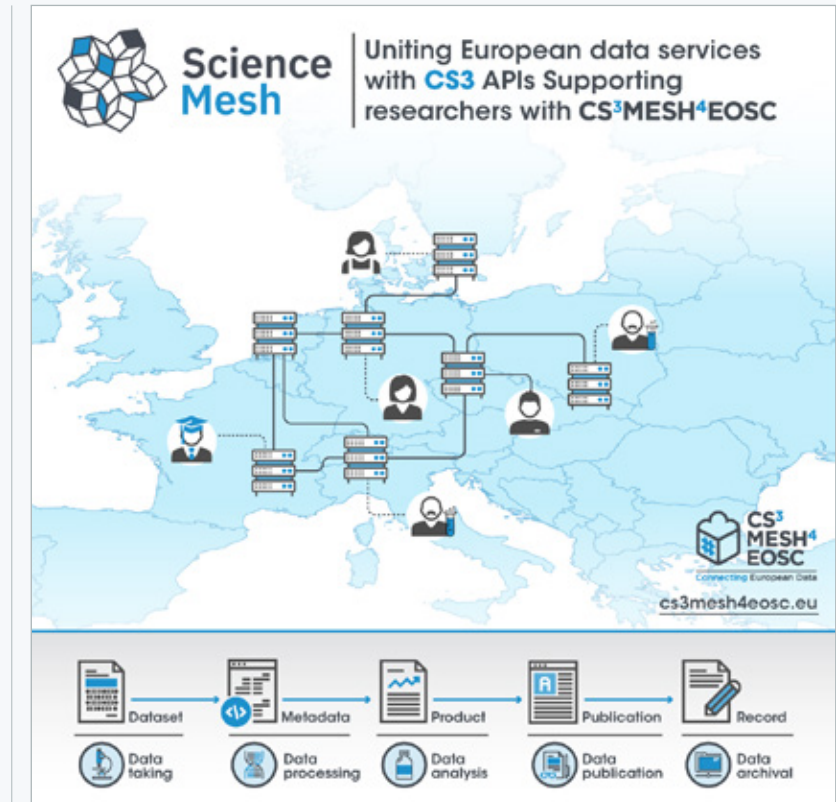
The usage of EFSS (Enterprise File Sync&Share) platforms for sharing files is increasing, with a global market expected to reach \$17 billion by 2025. Within the research and education sector, the Cloud Storage Services for Synchronisation and Sharing (CS3) community brings together vendors, service providers and users of EFSS platforms. CS3 provides services which are indispensable for the daily user workflows, allowing researchers, scientists and engineers to backup, share, transfer and synchronise data in seamless yet powerful ways.

However, these services are largely disconnected and deployed in isolation from one another and other research services, preventing an effective global collaboration and exploitation of data towards scientific and economic progress. Users need to be able to globally share and collaborate on datasets, as well as use higher-level services, such as computing services for data analysis. This is where Science Mesh comes into play.

A Science Mesh to unlock scientific collaboration through technology

Science Mesh will provide the aforementioned players with an interoperable platform with data, applications and computation combined, enabling them to easily synchronise, share and collaborate through applications and software components across Mesh-powered sites.

Jakub Moscicki, CS3MESH4EOSC coordinator and Deputy Group Leader for Storage at CERN: “Science Mesh allows the best of both worlds: users do not need to leave the well-known interfaces of their institutional services to be able to efficiently collaborate with users in other institutions. Its unique functionalities may be easily customised to the needs of particular research disciplines. And it is leveraging a fully-Open-Source development model in close collaboration with the



Open-Source software industry, while improving the Technology Readiness Level of contributing technologies (e.g. OpenCloudMesh).”

Science Mesh users will gain the ability to share their datasets widely according to FAIR principles, without losing control over them. It will be an integral part of the European Open Science Cloud (EOSC), offering researchers opportunities to assemble an efficient, reliable, collaborative and transparent research tool chain. Bob Jones, Director of EOSC Association adds, “The project has the potential to deliver a collaborative cloud-based data sharing service for Europe, linking different communities and enabling cross-disciplinary research.”

Science Mesh is being developed in close contact with pilot research communities, including Earth Observation (JRC), High Energy Physics (LHC), Astronomy (LOFAR) and Cultural Heritage Studies (PARADISEC). Future market opportunities for its commercial

use are under study with global IT service companies (e.g. Aileron/SoftwareMind). The federated testbed already exists, connecting eight initial sites.

Join the CS3MESH4EOSC and become one of the first Science Mesh adopters!

Instructions to deploy software and rules of participation are available at <https://sciencemesh.io>

For further information, visit the website <https://cs3mesh4eosc.eu>

Australian Researchers Collaborate to Model Effects of Climate Change on Biodiversity

The Biodiversity Climate Change Virtual Lab (BCCVL) is one of the most accessed services in Australia via the Australian Access Federation (AAF). The AAF is the national provider for federated single sign-on enabling users to login to the BCCVL and other international and national research services.

Words: Jacinta Rebelo, Australian Access Federation



BCCVL's almost 4,000 registered users originate from around the world, including Australian universities, research organisations and government agencies. The AAF facilitates global collaboration and data sharing for this service irrespective of technical and physical boundaries.

BCCVL accelerates research and simplifies the process of biodiversity and climate change modelling by bringing together multiple environmental, biological, climate change datasets, algorithms and experiments. It provides researchers with access to a standardised set of tools and data sources for analysis. For researchers who understand the systems they are working on but may not have the technical skill-sets or hardware to properly answer their questions, BCCVL can help.

High user demand for this cloud-modelling platform demonstrates the success of the BCCVL as a national research service, which connects the broader research community. BCCVL integrates modelling tools and datasets with high-performance compute and major data storage facilities, to enable more efficient investigation of biological systems. The demand also shows the importance the AAF plays in providing the access to BCCVL, enabling researchers to conduct modelling experiments and related analysis far more efficiently and effectively.

Prof. Brendan Mackey, Director of the BCCVL at Griffith University states that the BCCVL provides a "cutting edge cloud platform with a wide array of pre-modelling and post-modelling analytical tools". Originally developed and supported by five leading Australian universities and other national research infrastructure, the BCCVL has progressed beyond the academic domain into real world applications.

Enabled by the AAF, researchers from different Australian universities and research organisations can perform data

analysis and modelling using the BCCVL with their organisational login details. The federation, "facilitates the use and uptake of the system and people's access to it" adds Prof. Mackey.

A pilot project in partnership with State and Federal Government environmental departments is currently underway to generate state-of-the-science protocols, tools and data for modelling Australia's threatened species. Outputs from this project will be world-leading and assist with global research collaboration.

The BCCVL has proven to be a vital service for advancing environmental research and is working towards being self-sustaining. AAF will continue to support and work with services like the BCCVL to advance Australian research.

Contact enquiries@aaf.edu.au for more information on making global collaboration easier.

GÉANT Infoshares: part of the 'new normal' that we like!

How do you share valuable knowledge and expertise within the community during a global pandemic? And how do you keep information flowing?

To address these questions, in October 2020 GÉANT launched a series of Infoshares - weekly virtual events covering topics of strategic relevance for the GÉANT community.

Coordinated by the GÉANT Partner Relations team, infoshares are an important and complementary part of the GÉANT Community Programme (GCP). Their aim is to create a space to engage, improve knowledge sharing, foster discussion and strengthen the human network across the community.

Registration to public infoshares is open to everyone. Sessions take place regularly each Wednesday, and occasionally also on other weekdays.

With more than 1,500 total registrants for 26 sessions to date, weekly appointments with GÉANT Infoshares recorded vast interest and stood out as an emerging and well-appreciated dimension of the "new normal" within our community.

Words: Leonardo Marino, GÉANT



DISCOVER

Presenting a varied and busy schedule, GÉANT Infoshares provide general updates on projects and Services Development, focus on key areas as Network Technology and Future Readiness and explore specific topics as Open Science and Quantum Key Distribution through thematic mini-series.

Throughout the past few months, these online events kept attracting an increasingly wide audience, registering higher attendance at service-oriented sessions and a peak at the recent launch-event for the GÉANT Innovation Programme.

The programme is also open for suggestions from the community: to propose future topics, contact the partner relations team at partner-relations@geant.org.

To learn more about upcoming infoshares, keep an eye on <https://connect.geant.org> for monthly updates or visit the dedicated page on the GÉANT Wiki (requiring authentication): <http://bit.ly/GÉANTInfosharesWiki>.

(RE)PLAY

Did you miss a session? Is Wednesday not the best day for you? Are you simply planning a full re-watch? You can always catch up, as public infoshares are recorded and made available within two days on:

GÉANT's eAcademy
<https://e-academy.geant.org>

GÉANT Learning And Development (GLAD) website: <https://learning.geant.org/infoshares>

GEANTtv YouTube Channel:
<http://bit.ly/GEANTInfoshares>

CONNECT

For further information or if you have any questions, please contact partner-relations@geant.org



WACREN 2021: Insightful Conversations, Actionable Ideas

It was a rendezvous of bright minds engaging in insightful conversations and sharing actionable ideas at the 6th edition of the WACREN Annual Conference. Close to 400 registered participants from more than 50 countries, coming from research and education space, education technology, and policy and government sectors participated in the maiden virtual event. They converged to rub their minds and share perspectives on 'Digital Transformation for Development' – the theme for the virtual event, and other pertinent subjects such as open science, e-learning, pandemic response, cybersecurity and network management.

Words: Effah Amponsah, WACREN



Participants had their sweet and memorable tastes of the Conference in different forms. They participated in the nine-panel sessions, three workshops, a poster presentation and a side event from March 15 to 19, 2021. The 53 speakers and presenters gave hundreds of participants contents worth their time spent and ideas for actions.

Her Excellency Prof. Sarah Anyang-Agbor (Commissioner for Human Resource, Science and Technology for the African Union Commission), while giving the keynote, said the continental body recognised the importance of digital transformation in education. Evidenced to this, the AUC had begun implementing the Digital Transformation Strategy (DTS), which is expected to help improve connectivity and content for the R&E space. She said the AUC is inclined to exploring the use of high-tech methods to realise digitalisation since "Traffic has now shifted from the roads onto digital networks, making high-speed, reliable network connection vital for education and working from home."

At the Conference, open science and open access subject experts and practitioners demonstrated the need to build national roadmaps and policies to advance the knowledge advancement in our side of the world being pushed by **LIBSENSE**. There were perspectives and model cases from Asia, Europe, and Africa within and outside the WACREN region.

During the cybersecurity session, WACREN introduced the **TrustBroker Africa** service to support CSIRTs across the region and beyond to handle computer threats and security issues.

Fascinating perspectives were shared by technocrats, technologists and accomplished health practitioners on how countries in our region respond to the pandemic. Prof. Christian Happi of the African Centre of Excellence for Genomes of Infectious Diseases (ACEGID) shared how the Centre, through their novel activities, is helping Nigeria and many other countries across Africa to plan their responses to the pandemic. "We have been working with the Africa Centre for Disease Control to help shape the response across the continent. We provided the necessary advice and helped countries sequence samples to know exactly the types of viruses and help manage the situation." It was clear from panellists' perspectives that governments across Africa need to leverage the 'positives' of the pandemic to advanced research and education.

Dr. Boubakar Barry – CEO of WACREN, said, "The Conference achieved its intended goal of stirring insightful conversations, inspiring useful and actionable ideas to advance research and education in our region."

"We believe the seeds needed for new partnerships and collaborations have been sown, and we hope to see the results in the coming weeks, months and years," Dr Boubakar Barry, CEO of WACREN, said.

The **recorded sessions** and **slides** are available. WACREN requests all users to respect copyrights and avoid plagiarism by giving clear attribution when using any of the slides.

WACREN is grateful to all speakers, presenters and participants for making the maiden virtual edition a success. WACREN thanks the Conference Organising and the sponsors. The Annual Conference was organised with funding support from the European Commission under the **AfricaConnect3 project**.

WACREN is the West and Central African Research and Education Network and an implementing partner of the AfricaConnect3 project. To read more about the RREN, visit the website at <https://www.wacren.net/>.



Uganda's National Research and Education Network (RENU) is a member NREN of the AfricaConnect3 project. To learn more about the project, visit <https://africconnect3.net/>. To read about RENU, go to <https://renu.ac.ug/>

RENU powers surgical operations in Uganda

Thanks to the Internet connectivity provided by the Research and Education Network of Uganda (RENU), the Mount Sinai Health System in New York, USA can offer remote surgical services assistance to the Kyabirwa Surgical Facility Centre in the East African Nation.

Words: Hastings Ndebvu, UbuntuNet Alliance



Dr. Michael Marin, a vascular surgeon and Chief of Surgery for Mount Sinai, heralded the establishment of the surgical facility in Uganda as one way of extending surgical services to millions of people around the world, that are in dire need of surgical services. "The initiative is focused on sharing surgery knowledge from one part of the world to another efficiently. Currently, over five billion people around the world do not have access to safe and affordable surgery. After considerations, we opted to build a surgical centre in Kyabirwa, Uganda due to the stability of the country and the presence of many NGOs working in healthcare in the area," says Dr. Marin.

Building the surgical centre involved heavy participation of the community, which the surgeon says helped instil a sense of ownership and pride in the local people. The design has already won the 2020 AIA healthcare design award, a very prestigious architectural award. Since the surgical centre opened in November 2019, the facility has performed close to 450 surgeries with

remote assistance from Mount Sinai in New York and attended to over 1,000 patients in need of surgical services.

RENU Network

To be able to share the knowledge and skills between Mount Sinai in New York and Kyabirwa in Uganda, robust and high-speed internet connectivity was needed and the hunt for a reliable Internet provider commenced. "RENU has been a game-changer in providing the internet connectivity as well as the network contacts to make the program come true," adds Dr. Marin.

Connection to the RENU network is enabling Kyabirwa to conduct live surgical operations with surgeons from the Mount Sinai, a feat Dr. Marin agrees would not be feasible in the absence of such a strong internet provision. "We needed Ugandan surgeons to take care of Ugandan patients. With access to a high-speed internet, there is no need to bring skilled surgeons and support personnel to Uganda from New York,

which is very expensive and not always done in a timely way. Our internet connection allows teaching and tutorials online. As long as the doctor's hands are visible on the screen, this is enough for knowledge share, but it will not work if there is a delay – hence the need for high-speed internet."

Dr. Joseph Okello, a resident surgeon at Kyabwira Surgical Centre agrees that RENU's Internet connectivity has made operations at the facility smoother and easier.

"Our internet has been our most important asset here at Kyabwira. Luckily, we have reliable internet connectivity from RENU that allows for many important transactions, including live surgical operations. We can send live feeds from here to our colleagues at Mount Sinai who are very experienced and have a lot of knowledge crucial for our operations. So far we have also been able to carry out live endoscopy operations with our colleagues from New York."

EUMEDCONNECT3: catalysing research and education in the Eastern Mediterranean

The EU-funded EUMEDCONNECT programme has been providing support to research and education (R&E) networking in the Mediterranean region since 2004. Now in its 3rd phase, the project is run by GÉANT in partnership with its regional counterpart ASREN to support R&E networking in Jordan, Lebanon and Palestine. The NRENs of Cyprus, France, Greece, Italy and Spain are also actively involved. EUMEDCONNECT3 partner countries connect at the ASREN PoP in London (Slough) where they interconnect with the GÉANT network.

In this article, we highlight the key achievements in the areas of networks, education, healthcare research, and capacity building.

Words: Silvia Fiore, GÉANT

A catalyst for NRENs

EUMEDCONNECT3 catalysed the formation of the Lebanese NREN, TechCARE. The TechCare Consortium was formed in 2018 and now counts 10 member universities. Thanks to the project funding the bandwidth, the institutions leveraged bulk purchasing power and reached a framework agreement with a single internet service provider, which eventually enabled free peering between the universities. Starting off with 10Mbps in 2016, Lebanon's international R&E connectivity is now at 5.26Gbps.

In Palestine, with support from the regional REN, ASREN, and GÉANT, EUMEDCONNECT3 is working towards the re-establishment of a local NREN and the development of R&E infrastructures. Thanks to the community's support, Palestine is now officially listed as national eduroam roaming operator and plans are underway for local institutions to join eduGAIN.

Support to Education

The EUMEDCONNECT3 co-funded bandwidth played a key role in the survival of education institutions in the light of the COVID-19 pandemic in the region. It facilitated the swift transition to distance learning and working from home with a series of real-time communications and videoconferencing tools for students and teachers. These tools provided the opportunity to remove barriers to education by enabling inclusive delivery methods accessible for all. The project also lobbied for a reduction of 4G charges for students in Lebanon.

The project is also supporting students in the Erasmus+ programme, which gives NRENs the opportunity to expand the reach of eduGAIN and eduroam and enable access to these services anytime and anywhere.



The Research and Education Network for the Eastern Mediterranean



Support to Healthcare

Specifically in Lebanon, the access to reliable connectivity was vital to coordinate multidisciplinary efforts for combatting COVID-19 by raising awareness and collecting research data through a shared portal; to enable international collaboration for virtual surgical support; and to ensure secure accessibility to remote consultations.

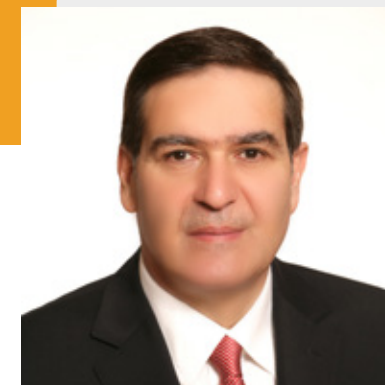
Support to Research

The EUMEDCONNECT3 project supports SESAME, the synchrotron-light for experimental science and applications in the Middle East. The particle accelerator can be used to study the properties of materials with unrivalled opportunities for international collaborative research in areas such as developing new materials, designing pharmaceuticals, probing the structure of DNA, assessing archaeological artefacts, measuring soil pollution to name but a few. It is set to become the scientific hub in the region for tackling the data deluge in the years to come.

EUMEDCONNECT3 also provides connectivity to 40 currently running Horizon2020 projects in total in the region on agriculture resilience, food and water management, energy research, and refugee protection.

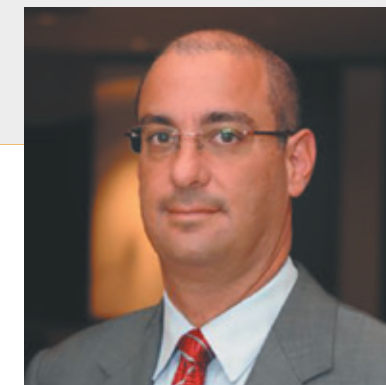
Support to Capacity Building

As part of the EUMEDCONNECT3 project, ASREN is facilitating a blended Identity Federation training course, from Nov 2020 to March 2021 in conjunction with GÉANT and assistance from RENATER and GARR. The course focuses on developing the skills required to create national Identity Federation infrastructure for eduGAIN. This, in turn, is key to enabling collaborative access to digitized online content and resource sharing against the backdrop of accelerated plans to move towards online teaching, collaboration and virtual operability.



“Advanced connectivity is essential for regional and international interdisciplinary research and for scientists to fully reap the benefits of SESAME. The ASREN connection prepares the ground for SESAME to become the scientific hub in the Middle East and for tackling the data deluge in the years to come.”

Dr. Khaled Toukan, Director, SESAME



“The network co-funding received from the EU was the catalyst that got the TechCARE - the Lebanese NREN started. Without this funding, Lebanon would still be without an NREN.”

Dr. Yousif Asfour Chief Innovation and Transformation Officer and CIO, American University of Beirut (AUB) President of CIO Lebanon Association

Check EUMEDCONNECT3 website to read the latest news.



The BELLA Programme prepares for the big moment

In early March 2021, after several years of planning, procurement, preparation, building, and most importantly collaboration, the BELLA Programme achieved an incredible milestone: the final splice – and therefore completion – of the new 6,000km EllaLink submarine cable system that directly links Europe and Latin America.

Words: Rosanna Norman, GÉANT

What does it mean?

When fully operational in the coming months, BELLA will transform European and Latin American research and education opportunities for the next 25 years.

Earth Observation

High-capacity connectivity and low latency together open up new possibilities – for example, for Latin American users BELLA will enable rapid access to Copernicus Earth Observation data, boosting climate research collaboration between the two continents and in times of emergencies helping to save lives: without connectivity to an NREN, an emergency worker in Latin America mapping a region of 500km² could wait 60 minutes to download critical data. With the completion of BELLA in 2021, high-speed NREN connectivity will deliver that same data in just 7 minutes.

Radio Astronomy

The Cherenkov Telescope Array (CTA), the world's largest and most sensitive ground-based observatory for gamma-ray astronomy at very high energies, will open a new window to the Universe. With over 100 telescopes located on two sites – La Palma in the Canary Islands (Spain), and Mount Paranal, Chile – and data management in further European locations, the data transfer requirements are enormous. BELLA connectivity will enable fast transfer to data centres for event reconstruction and rapid access to science data for a global community of researchers.

These are just two examples of the enormous positive impact BELLA is set to deliver. The latest milestone is just the start of an incredible journey!



Between December 2020 and February 2021 EllaLink completed four cable landing operations in Fortaleza (Brazil), Sines (Portugal), Funchal (Madeira, Portugal) and Praia (Cape Verde). The final splice operation took place on the ASN vessel Ile de Sein before the cable's final deployment at a sea depth of 4,500m in the middle of the Atlantic Ocean.

Work is now underway to bring BELLA connectivity online, providing the high capacity and low latency necessary for data-intensive research and education use.

What is BELLA?

The BELLA Programme provides for the long-term interconnectivity needs of European and Latin American research and education communities, achieved through two projects: BELLA-S which secures rights to spectrum on the EllaLink submarine cable and ensures future-proof connectivity requirements; and BELLA-T which sees the completion of fibre connectivity for Latin American NRENs – bringing much needed high-speed connectivity and equality of access for research and education communities across the continent. BELLA is also supported by funding from DG DEFIS to support Copernicus traffic.



Eastern Partnership countries open up to Open Science

When a scientist spends a lot of time and energy planning, conducting and analysing research, there is sometimes a desire to share the results as widely as possible and Open Science initiatives have become popular. NRENs in Eastern Partnership countries are better prepared to enable Open Science nationally following events organised in the EU-funded EaPConnect project - and several have been developing Open Science activities with other European initiatives.

Words: Naira Kocharyan, ASNET-AM and Laura Durnford, GÉANT

In 2019, the first EaPConnect project held two workshops that brought Open Science to the forefront for its partners in Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine. In September, in Yerevan, EOSC (European Open Science Cloud) and services in it were spotlighted, along with relevant EGI (European Grid Infrastructure) tools. In June, in Kiev, the OpenAIRE project, portals and tools were showcased. OpenAIRE featured again most recently, in a February 2021 event for researchers at the

Institute of Information Technology of the Azerbaijanian National Academy of Sciences, organised by AzScienceNet and the second EaPConnect project. "GÉANT and our partners support the Open Science FAIR principles that make data more accessible for research communities: when we plan project activities, we keep these principles in mind to ensure our partners can contribute to Open Science in their national context," says Veronika Di Luna (GÉANT), EaPConnect Project Manager.

Picture
Participants of
EaPConnect's
OpenAIRE
workshop in 2019.
©URANAssociation



National capacity-building events in Armenia, Moldova and Georgia went ahead in recent months in conjunction with the National Initiatives for Open Science in Europe (NI4OS-Europe) project. These promoted the Open Science concept and raised awareness of EOSC, adding to the construction of the EOSC service portfolio. In September 2020, RENAM (Moldova) and IIAP NAS RA (Armenia) held national capacity-building events and GRENA (Georgia) followed suit in November. The Armenian OpenAIRE NOAD (National Open Access Desk)

was presented: thanks to support from EaPConnect, NI4OS and Horizon2020, this already linked to the pan-European OpenAIRE infrastructure. Representatives of universities and research institutions, librarians and policy makers heard about Open Science and FAIR data (findability, accessibility, interoperability, reusability) principles and about NI4OS-Europe, EOSC and OpenAIRE. Debate and discussion among the participants revealed a high level of interest in taking these topics further.

A face frequently seen at these events was Dr. Iryna Kuchma of EIFL (Electronic Information for Libraries) who presented Open Science policies and OpenAIRE activities and services. "It is great to see Eastern Partnership countries so open to the Open Science message. I look forward to seeing how this develops into active participation in these initiatives that will allow these countries to really contribute to the wider adoption of Open Science principles around Europe and the world."

The EU4Digital: Connecting Research and Education Communities (EaPConnect) project is funded by the European Union within the EU4Digital initiative. Visit <https://eufordigital.eu/>, <https://eapconnect.eu/> and ni4os.eu



OCRE framework expands Google Cloud access globally

Open Clouds for Research Environment (OCRE) now offers Google Cloud access through regional suppliers Computas, Revolgy, Sparkle, and Telefonica

Words: Nicole DeSantis, Google

Cloud computing offers compelling advantages to researchers—from accelerating the speed of processing massive datasets to improving collaboration through shared tools and data storage. But it also presents some administrative hurdles in a complex legal and regulatory environment. 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.
- Special discount pricing and funding opportunities.

As part of our commitment to supporting pioneering research globally, Google Cloud is proud to announce that its services are now available to participants in the OCRE (Open Clouds for Research Environment) framework. Four EU resellers - Computas, Revolgy, Telefonica, and Sparkle, a division of Telecom Italia - have been chosen as partners to distribute Google Cloud solutions to GÉANT's members in their move to the cloud. Sparkle, for example, offers procurement consulting, technical support, and training to regional customers in 27 EU countries.

"Sparkle collaborates with GÉANT since 2016 to offer the best cloud solutions to the research and education community and reduce the costs and complexity of the transition to the cloud," says Paola Crobu, Product Manager Multicloud solutions. "With a multicloud offering, a global fiber backbone, local consultancy services and expert customer support, Sparkle is the ideal partner for R&E institutions looking for reliable and secure cloud solutions."

Getting started with OCRE and Google Cloud

OCRE's Cloud Catalogue lists all the compliant digital services providers for every participating EU nation, as well as contacts at local National Research and Education Networks (NRENs) to fast-track cloud adoption.

To join the OCRE community and take advantage of special cloud access, discount pricing, and funding opportunities it offers, visit the Computas, Revolgy, Telefonica, and Sparkle websites depending on your country. To find out more about Google Cloud programs and initiatives for Higher Education and Research, including our Cloud Research Credits program, click [here](#).

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.

