

CONNECT

THE MAGAZINE FROM THE GÉANT COMMUNITY | **ISSUE 33 2019**

Cyber Security Matters

**How is the GÉANT
Community
Helping?**

ALSO IN THIS ISSUE

CONNECT INTERVIEW:

KERRIE POWER,
HEANET CEO

OCRE PROJECT:

MOVING CLOUD
SERVICES TO THE
NEXT LEVEL

MEETING TIM:

TRUST & IDENTITY
MENTORSHIP BRINGS
NEW IDEAS



04



06

Contents

04 CONNECT Interview:
Kerrie Power,
HEAnet CEO

06 David West: Helping
connect the R&E world

08 Cyber security matters

14 GÉANT to exhibit at SC19

20 What's next for
educational
technologies?

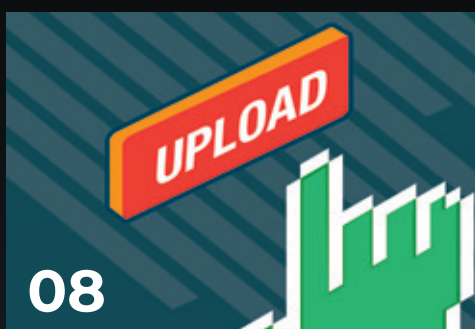
24 NREN support for
transnational education:
a Jisc success story

26 Connectivity price drop
to benefit South
Caucasus

30 CONNECT Interview:
Paola Arellano, Executive
Director of REUNA

34 GN4-3 Project news

44 About GÉANT



08



14



20



24



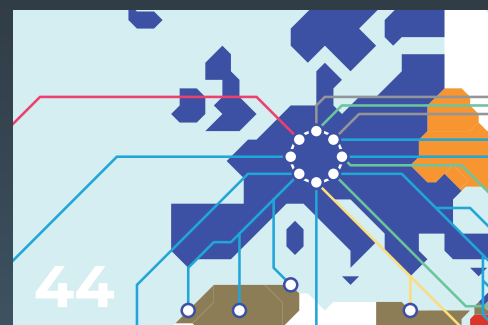
26



30



34



44



Welcome from Cathrin Stöver

Cyber security matters. Like never before, the world in which we live is subject to endless threats wherever we are and no matter how safe we feel within the confines of our institutions. It is up to all of us to be vigilant, but as always the GÉANT Community is at its best when working together and sharing best practice, and in this issue we see how the community is working towards a safer online future, together.

The CONNECT interviews have long been my favourite part of the magazine, where the passion and diversity of our community really comes to life. So I'm really pleased to see such a range of these in this issue. We hear from HEAnet CEO Kerrie Power, REUNA Executive Director Paola Arellano, and long-time friend of mine David West who has done so much behind the scenes for global connectivity.

The CONNECT magazine has been running for many years now and I'm very proud of what we've achieved with it, and highly appreciative of the positive comments we receive from partners around the world. So, I'm especially pleased to let you know that the CONNECT family now includes the printed magazine, the website (connect.geant.org) and a weekly newsletter so you can keep up to date with the GÉANT Community at all times.

Enjoy the magazine – and don't forget to visit the new CONNECT website and sign up to the newsletter!

Cathrin Stöver, GÉANT

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

The Team Behind CONNECT

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

Editor:

Paul Maurice, GÉANT

Sub-Editors:

Rosanna Norman, GÉANT (TNC and Community)

Karl Meyer, GÉANT (Technology and Services)

Regular contributors:

Cathrin Stöver, Bridget Hannigan, Dimple Sokartara, Laura Durnford, Helga Spitaler (GÉANT)

This magazine is published by GÉANT, as part of GÉANT Specific Grant Agreements: GN4-3 (No. 856726), GN4-3N (No. 856728), and BELLA-S1 (No. 731505), which have received funding from the European Union's 2020 research and innovation programme under the GÉANT2020 Framework Partnership Agreement (No. 653998).

The following projects mentioned throughout the magazine also receive funding from the European Union: AfricaConnect2, CAREN3, and Asi@Connect (DG DEVCO), EaPConnect and EUMEDCONNECT3 (DG NEAR).

The content of this document is the sole responsibility of GÉANT and can under no circumstances be regarded as reflecting the position of the European Union. Neither the editor, nor GÉANT necessarily endorse any opinion, real or implied, expressed by contributors to CONNECT. If you would like to reproduce articles from this publication, please contact the editor.

All brand, company and product names are trademarks of their respective owners.

Klaas Wierenga

Inducted into the Internet Hall of Fame



On 27 September 2019, in recognition of his invention of eduroam, the global Wi-Fi roaming service for academic and research communities in over 100 countries, Klaas Wierenga was inducted to the prestigious Internet Hall of Fame at a special ceremony held in Costa Rica.

CONNECT spoke with Klaas to find out why he invented eduroam...

Almost 20 years ago, employed by SURFnet, Klaas Wierenga wondered why he had to log on to the Wi-Fi network again and again, at every university he visited. He decided to challenge traditional business models and the inward-looking policies of universities and schools.

"I was getting annoyed that I was visiting universities around the country and having trouble getting online and wondered why, when we're all working together, it was so difficult to get online. So I began looking at technologies that were emerging that could solve these issues. Working with Paul Dekkers, we built a proof of concept that became eduroam.

The best thing is that eduroam is a grassroots movement where every university builds and makes its own infrastructure accessible to the community. In this way everyone benefits. Of course, in the early days it was difficult to persuade them to offer their infrastructure because there were so few universities taking part and the investment in time and resources was hard to justify.

Reaching that tipping point of adoption, when IT departments stopped needing to persuade management to adopt it and had to explain why they were not using it, the slow start ramped up to become massive.

eduroam could only work because of hundreds, and now thousands, of people believing in the idea and working together. This is a true sign of power of the worldwide research and education community."

With eduroam, Klaas introduced a new model based on resource sharing that gives students and employees easy and secure access to the Wi-Fi network, with one account on almost every campus in the world.

After a successful pilot in the Netherlands conducted under SURFnet, eduroam was adopted by GÉANT in 2003 and with the help of a grant from the EU made eduroam available for international use in several countries. eduroam is now available in 101 countries and has more than 4.3 billion authentications at educational

and research institutions around the world. There are more than 400 million national and over 100 million international roaming authentications per month, together with nearly 30,000 hotspots around the world.

Klaas's creation contributes to the mobility of students, teachers and researchers, and increases user-friendliness and safety for these users. In many countries, eduroam is also available in public places such as libraries, parks, train and bus stations, city centres and airports to provide researchers, academics, and students with secure Internet access.

It is with great pride that the GÉANT community celebrates the inclusion of Klaas in the Internet Hall of Fame, rightfully receiving recognition for his groundbreaking work in the field of identity, mobility and security as the developer of the eduroam service for Wi-Fi roaming in research and education.

Internet Hall of Fame

The purpose of the Internet Hall of Fame awards – launched by the Internet Society in 2012 – is to publicly honour visionaries and leaders who have made important contributions to the development and improvement of the global Internet. Part of the 2019 Class of Inductees, Klaas joins Internet greats such as Vint Cerf and Jon Postel (founders of the modern internet), Linus Torvalds (the inventor of Linux) and Tim Berners-Lee (inventor of the WWW).

The power of education and research networks

Klaas also joins other SURF and GÉANT employees (Kees Neggers, Erik Huizer and Dai Davies) in being inducted to the prestigious Internet Hall of Fame, a wonderful recognition of the innovative power of these closely cooperating organisations.

"I am overwhelmed," says Klaas. "I am very happy and very honoured with this recognition for me personally.

But mainly because it shows that it has not remained unnoticed that hundreds of members of the 'eduroam family' have committed themselves to build something extraordinary."

GÉANT CEO Erik Huizer commented, "This recognition for Klaas is justified and underlines the innovative character of the international community of networks for education and research as a whole, and organisations such as SURF and GÉANT in particular. The recognition will also be echoed by almost every student in the world who has experienced the convenience of eduroam. GÉANT is extremely proud and congratulates Klaas for his induction to the Internet Hall of Fame."

SURF Board Member Erwin Bleumink added, "We are extremely proud at SURF, because Klaas worked on eduroam while based at SURF. It is a great challenge for SURF to provide the education and research community with the resources they need to do their great work. Klaas has more than succeeded in this and we warmly congratulate him on his well-earned honour. eduroam has not been limited to the education and research community. In the Netherlands we have shared our experiences with third parties, creating initiatives based on the same principles, such as govroom for civil servants."

The GÉANT Community would also like to congratulate Michael Stanton of Brazilian NREN RNP, who is also a 2019 inductee. Michael was instrumental in bringing the Internet to Brazil, and continues to participate in the design and deployment of scalable optical networks in South America and around the world.

Internet Hall of Fame
<https://www.internethalloffame.org>

SURF
<https://www.surf.nl/en>

eduroam
<https://www.eduroam.org>

The CONNECT Interview: Kerrie Power, HEAnet CEO

CONNECT speaks with Kerrie Power, CEO of HEAnet, the Irish National Education and Research Network, to learn more about her vision for the future of HEAnet and its role in the European Open Science Cloud (EOSC).

Words: Interview by Rosanna Norman

What brought you to HEAnet?

HEAnet is unique in what it does in Ireland, I was attracted by its altruistic, 'bigger than me' mission. I had never worked for a publicly funded or not-for-profit organisation before and I do feel I am making a difference and doing something special for education and research in Ireland. When approached about the CEO role at HEAnet, I started researching the organisation and was very impressed by the talent within the organisation. For example, I reviewed some impressive talks given by remarkable colleagues such as Anna Wilson, who won this year's GÉANT Community Award at TNC19. These talks reflected a strong passion for technology which I thought were incredibly interesting and exciting. I love to work with people who are passionate in what they do, focussed on meaningful outcomes – this is an environment where I felt I could add value and learn. This is why HEAnet was a perfect fit for me.

In your first two years as CEO, what are you most proud of?

There are so many moments to be proud of, the very first one was becoming CEO of HEAnet! To take the reins and drive the organisation from a foundation of strength was such a proud moment. I inherited a great company from my predecessor John Boland who had established a strong relationship with the NREN community.

I am also proud of the core competencies we have developed in the areas of security, connectivity, identity and brokerage and how we leverage these competencies as an effective shared service for the benefit of the education sector in Ireland; in other

words, delivering common repeatable shareable solutions for all of education.

We are different from many NRENs in Europe in that we support primary and secondary education as well as higher education. This gives us a great opportunity to make an impact across all of education. We are building on our key stakeholder engagements and aligning with Ireland's National Shared Services Strategy where we are being asked to do more. I am delighted to see HEAnet at the decision-making tables, being involved in more strategic conversations with Government and other key stakeholders: this is really important to us and we need to continue to build these relationships.

When I joined the organisation two years ago, I took the opportunity to take stock of what we had collectively been doing well and consider what improvements were necessary to be more effective and become more agile. HEAnet was incorporated over 20 years ago, so it was appropriate to align the organisation with newer ways of working.

In my first year, I observed, listened, and encouraged the team to share their views. We then embarked on an organisation realignment, removing hierarchy and encouraging an open culture of collaboration and transparency. One of our key achievements has been to empower people to make decisions and change how we communicate by removing barriers and obstacles to getting things done. In essence, being a lot more agile in our approach.

We also created a new function, 'Strategy, Research & Development' that is focussed on exploring new opportunities and technological developments to support the research and education community in Ireland. It is headed up by our Chief Strategy Officer, Ronan Byrne, who is actively involved with GÉANT and the wider NREN community. This is a very exciting

Picture
Kerrie Power,
CEO of HEAnet.
Picture Credit:
'The Sunday
Business Post'



opportunity for us, as we never had a group dedicated to horizon scanning prior to this, with the objective of evaluating new service opportunities and partnerships. I am excited by the potential of this area. I am fortunate to take on a well-functioning team with whom I believe I can make meaningful impact and change. I believe we are well positioned for the future.

What is HEAnet's view on EOSC and how is HEAnet involved?

EOSC presents the opportunity to progress an open research agenda for Ireland. HEAnet are focussed on how to facilitate EOSC and how it best delivers on this national ambition. Open research has the potential to transform the research landscape.

The EOSC will offer 1.7 million European researchers and 70 million professionals in science, technology, the humanities and social sciences a virtual environment with open and seamless services for storage, management, analysis and re-use of research data, across borders and scientific disciplines by federating existing scientific data infrastructures, currently dispersed across disciplines and the EU Member States.

We have a privileged place on the EOSC Governance Board thanks to



our nomination by the Department of Business Enterprise and Innovation here in Ireland. This allows us to represent the needs of Irish researchers while also progressing a collective European objective.

EOSC has the potential for brilliant outcomes and enables us to solve real-world issues and grand challenges. Europe can lead the way in showing what can be achieved when we truly enable the sharing of research by collectively bringing our strengths together.

NRENs have always shown the value of working together – we are the conduit to local experiences, local challenges and local knowledge, and we need to leverage that to collectively meet the needs of EOSC. I think that GÉANT is in a unique position to support this in the future and I very much encourage its involvement in EOSC.

Why is GÉANT important for HEAnet?

We view our relationship with GÉANT as being mutually beneficial and we consider GÉANT a key partner in supporting us in the development of our strategic themes: Connectivity, Security, Identity and Brokerage.

GÉANT is our connectivity bridge to Europe and the rest of the world, but also a provider of other critical services, such as eduroam and eduGAIN.

Brokerage of Cloud IaaS is also extremely valuable for us as it delivers real value for our client members who benefit from cost effective cloud pricing and superior service levels.

The collaborative efforts of GÉANT are also very important to us and reflect the collective strengths of NRENs working together. HEAnet consistently commit resources across a range of GÉANT projects and taskforces.

We embrace GÉANT's knowledge sharing principles, their 'bigger picture' and 'looking over the horizon' vision, thinking and approach.

How do you feel your commercial background (Google etc.) helps you in the GÉANT community?

I have been very fortunate to have such a broad career experience in technology. This has helped to support my role at HEAnet by enabling me to utilise and adapt the skills acquired in the commercial arena to the NREN, not-for-profit world.

One of the big differences between the two environments is the pace of change. Unlike what happens in very agile and fast-paced multinational organisations, I have found the pace of change is slower, but can achieve greater levels of collaboration and motivation where both environments complement each other well.

What is your vision of the future for HEAnet and for GÉANT?

The future is exciting! Our strategic vision is to enable Ireland's digital ambition and to make real positive impact.

HEAnet will be increasingly more strategic in its thinking in relation to education technology and shared services for Ireland. Like GÉANT, we are diverse, have many strengths and are geared up to face the future. We believe there are great opportunities to bring our collective strengths together and utilise our core competencies working closely with GÉANT, particularly in Cloud Brokerage and EOSC. The future is exciting for HEAnet, but moreover our entire community.

Kerrie, tell us a bit about yourself

Everyone at HEAnet knows that my biggest obsession is my dog, Milly. As a rescue dog who had been abandoned and treated cruelly, she was in a very poor state when she came to us. I have seen her flourish, grow and become a therapy dog (now retired); she has such a gentle temperament and a very loving and caring nature. I also enjoy playing badminton and this year I proudly represented Ireland in the female doubles at the European Gay Games in Rome, where we won bronze! I look forward to surpassing this result at the 2020 games in Dusseldorf.



David West: Helping Connect the R&E World

For almost two decades GÉANT's David West has been helping shape the global R&E networking landscape by applying GÉANT's experience to manage EU-funded networking projects for other world regions. In a role that needs a mix of business acumen, technical expertise and diplomacy, he has gained within our global community the reputation of being an influential and effective advocate of R&E networking.

Words: Interview by Helga Spitaler

For his tireless efforts and achievements David was honoured by GÉANT's CEO Erik Huizer at the TNC19 CEO dinner in Tallinn where he also announced his decision to scale back his work commitments.

We met up with David to take stock of his career and find out about his plans for the future.

At the forefront of GÉANT's international engagement since 2001... how did it all start?

Quite unpredictably actually. I had just joined what was then DANTE (before the merger to form GÉANT) after 15 years working for British Telecom's international division; not quite sure what my new role was going to be. On my third day I accompanied Howard Davies, one of the General Managers, to a meeting in Brussels with the EC and NRENs from around the Mediterranean region about starting a project to set up a regional R&E network there, like a mini version of GÉANT. Discussions on the first day were quite acrimonious and ended without any agreement, and I remember thinking it would never get off the ground. However, to my surprise, the EC were very creative overnight and on the following day secured consensus for setting up this new project with EU funding. Thus, EUMEDCONNECT was conceived, I was made its project manager and started working closely with European and the beneficiary NREN partners to coordinate it, and it is still going!

And then?

Although EUMEDCONNECT faced a lot of challenges in its early days, it broke new ground and the EC sufficiently liked what it was achieving to fund similar projects in other world regions.

My colleague Cathrin Stöver started up the ALICE project in Latin America, which paved the way for RedCLARA; and subsequently AfricaConnect. I took on additional regional projects serving the Asia-Pacific region (TEIN), which was successfully transferred on to TEIN*CC and became Asi@Connect, and then also for Central Asia (CAREN).

Culturally and politically the regional projects are of course extremely diverse, but they have all faced similar major challenges. I am thinking of things like having to secure and manage EU and partner co-funding, forging good working relationships between project partners and troubleshooting where necessary, building and operating high-quality regional R&E networks, and planning ahead for longer-term sustainability by nurturing regional partners, whilst at all times keeping within EU auditing, tendering and contracting rules.

As you might imagine, my role as project manager from the outset has been extremely varied and I can honestly say there has never been a dull or quiet moment!

What do you consider your biggest achievement over all those years?

It has to be the fact that the projects I have worked on have connected for the first time over 25 countries, many of them at early stages of their socio-economic development, to GÉANT and the global R&E community. Of course, all these projects are team efforts with many colleagues in GÉANT and the European and regional R&E communities, but I am proud of my personal contributions to them all.

Any regrets?

In these projects, where things are so uncharted, there is not always a right or wrong way of doing things, so rather than regret what I have done, I simply try to learn and move on. Over the years the most frustrating thing for me has been the slow pace of telecoms market change which has kept connectivity prices way too high for many of the developing countries in our projects, and the difficulties of persuading governments and others to provide their co-funding necessary for them to benefit.

Since August you have reduced your working hours, how is continuity being ensured?

I am fortunate in having excellent colleagues in GÉANT's International Relations team who are taking over some of my project work. Veronika di Luna has taken on the CAREN project and she is already working closely with Eastern Partnership countries which share some similar challenges and she has the great advantage over me of speaking Russian fluently.

Helga Spitaler now manages EUMEDCONNECT and the North African part of AfricaConnect which she has been working with me on for several years, so is already very familiar with these projects. She and I will continue to work together with our Asia Pacific partners and to advise and support the Asi@Connect project run by TEIN*CC. All in all, I am confident 'my' projects remain in safe hands.

Needless to say, although I am going to work fewer hours in future, I remain a fully committed member of the GÉANT team.

How will you fill the extra time on your hands?

Although as project manager I have travelled to many countries, I rarely travel far beyond the airports and hotels, so I am looking forward to travelling at leisure to explore more of the world. At home I also plan to devote more time to my interests in walking, gardening and live music. And I have recently taken up the ancient sport of croquet and am already hooked.

As a Brighton resident, what is your message to prospective TNC20 attendees?

Don't miss it! For those who haven't been there, Brighton is a very exciting and 'full-on' city on the south coast of England, sometimes called 'London by the Sea' – it is going to make for a very lively backdrop for TNC20!

Picture
Left to right:
Helga Spitaler,
David West,
Veronika di Luna

Cyber Security Month

October saw this year's European Cyber Security Month and NRENs across the GÉANT Community took part with a range of activities and events to raise awareness of the need for Cyber Security across research and education. At GÉANT, we are proud to support this important initiative and to highlight some of the fantastic activities from within our community.



Why Cyber Security Matters

Words: Sigita Jurkynaite, GÉANT (GN4-3) Security Work Package Leader

For many people, Cyber Security is something they think concerns others – something that governments, banks and big businesses have to worry about. Or they may think “why would anyone hack me or my small University network?”. Unfortunately, nothing could be further from the truth. Cyber Security affects us all and it most definitely affects the R&E community.

With 50 million users across more than 10,000 institutions, the European R&E sector offers an extremely tempting target for a whole range of cyber-attacks. These include areas such as hacking, phishing and DDoS attacks that could all affect the data and services we offer to our users. If you consider that this data could be the result of thousands of person years of research or could contain private or sensitive information you can understand why Cyber Security is a vital consideration for our community. This is why GÉANT has implemented a new Security work package (WP8) within the GÉANT (GN4-3) Project, to help coordinate and develop the tools and skills needed to ensure the community is able to meet the emerging cyber threats and continues to serve our users safely and securely.

Find out more about GÉANT's Security activities at geant.org/Security

Cyber Security Month @SURF

Words: Albert Hankel, SURF

Often, people are said to be the weakest link in Cyber Security – in the worst case they are seen by technicians as the enemy – but we in the SURF Security team believe that they can be an asset. For people in your organisation to become an asset, good awareness and tools that facilitate behavioural change are important. That is why we developed Cyber Save Yourself (CSY), an awareness campaign toolkit that can be used during the Cyber Security month and the rest of the year.

Cyber Save Yourself (CSY)

CSY is the Security and privacy awareness toolkit for education and research in the Netherlands. It includes Security tips, and games and videos about Security and privacy awareness. CSY first started as a project to run a national awareness campaign in 2009, organised together with our Security community SCIPR. After a few years we decided to change the approach and develop a toolkit that institutions can use to set up their own awareness programme. We provide the tools and materials so that they can run their programme whenever and how they want.

However, CSY is not just a toolkit but also a community platform where we stimulate our users to share their own materials and experiences regarding awareness. The more people that add to the toolkit, the richer the toolkit becomes, and that is beneficial to all our users.

Find out more about the full range of SURF's Security activities at <https://www.surf.nl/en/Security-communities-working-together-on-Security-and-privacy/scipr-community-working-on-better>



ARNES – Raising Awareness of Cyber Security

Words: Jasmina Mešić and Maja Vreča

ARNES has been raising awareness about Cyber Security and all other aspects of safe use of new technologies since it started. In 1995, ARNES increased its activity in these areas considerably and started to focus primarily on Cyber Security with the establishment of the Slovenian Computer Emergency Response Team SI-CERT.

The Spread of the Internet in Slovenia, its Use and Abuse

The same year, ARNES started working intensely on connecting schools and providing Internet access to both students and teachers. Users were able to access the Internet from any location, which of course meant that most of them accessed the network from home. While spreading the new technology and knowledge, this also led to new challenges: young users in particular turned out to be resourceful and innovative when using – and sometimes abusing – the new technology.

In response to this, SI-CERT has been coordinating the national Safe on the Internet program on information Security since 2011. The program was designed to educate the general Slovenian public on the basic principles of information Security and secure internet use, as well as to provide information on current online risks. We educate Slovenian web users with the answers to:

- How do I recognise and protect myself from online fraud?
- How do I use e-banking services and shop online securely?
- How do I secure my online identity and my user accounts?

Raising awareness is based on preventive action – alerting and educating online users on how to identify online risks, and protect their online identity and devices (PCs, smartphones, tablets) in a timely manner. The awareness program is combined with other SI-CERT activities, thereby ensuring that Internet users are always familiar with current risks, as the program relies on the incidents that SI-CERT is currently addressing.



European Cyber Security Month @ SWITCH

Words: Katja Dörlemann, SWITCH

SWITCH started the Cyber Security Month with the Security Awareness Day (<https://swit.ch/Security-awareness-day>) on 1 October. For the second time, participants working in education, law enforcement and industry were invited to exchange their knowledge about engaging users with information Security.

To showcase its many facets, the agenda was packed with talks and speakers with different approaches to Security awareness. The cantonal police of Zurich talked about their cybercrime prevention program, a linguist shared his point of view on how to make IT-Security compatible, and much more.

In addition, SWITCH continued to provide and offer its usual Security Awareness services to the community. The most successful and fun initiative here was “Hack the Hacker” (<https://swit.ch/hack-the-hacker>). In the style of an escape room, the participants had to solve puzzles in an analogue game environment as a team. An introduction provided the teams with basic knowledge about Security, which they needed to apply during the game. In a debriefing, the Security aspects that were addressed during the introduction and the game were further emphasised by reviewing the experience. Since the launch of the program we have trained more than 350 participants all over Switzerland and Germany.

For this year's Cyber Security Month, SWITCH conducted campaigns about controlling the distribution of personal data on social media. Fun graphics and text were published as Creative Commons, so they would be available and reusable for everybody (<https://ibarry.ch/en/digital-Security>). Postcards and stickers were sent out to the whole community together with the encouragement to share, reuse and distribute the material.



OCRE

— Moving Cloud Services to the Next Level

Cloud services are an increasingly important element in many fields of research. The ability to store, process and share data makes research activities much easier and more cost-effective. A particular benefit of cloud services is that they allow resource consumption throughout a project to vary without the risk of over- or under-provisioning. At the end of the project, resources can be freed up quickly and easily.

Words: Karl Meyer

However, research institutions often struggle to incorporate commercial digital services into their activities as the wide variety of available services makes service discovery and acquisition difficult and time consuming. This can lead to institutions deploying in-house, isolated and often monolithic services, which hamper cross-border and interdisciplinary collaboration.

The Open Clouds for Research Environments (OCRE) project aims to give the European research community access to commercial digital services (IaaS, SaaS and PaaS cloud services), as well as Earth Observation (EO) services. OCRE will address the challenges service providers face in reaching and meeting the needs of the research community in areas such as legal, financial and technical compliance (including supporting standards and offering data interoperability and portability).

OCRE will bridge the gap between the supply and demand sides, and enable and facilitate research institutions to use commercial digital services in a safe and easy manner to:

- Give the European research community easier access to commercially available digital services, with a focus on ESFRI (European Strategy Forum on Research Infrastructures) and ERIC (European Research Infrastructure Consortium) projects.
- Meet the requirements of the community.
- Offer procurement models which map to the financial structures of the community and explore different consumption models.



“OCRE aims to provide for some of the agility required by the European science community in order to drive research excellence across the region through data science. Digital services in support of R&E related activities will become easily accessible and consumable. The project will provide substantial incentive from the EC to stimulate the early adoption of these services.”

David Heyns, Senior Manager,
Cloud Services, GÉANT

“Eurodoc is working with the OCRE project to test and develop EOSC as a cross-discipline and easy-to-use access point for cloud services open to all European researchers. Our researchers from both the Earth Observation sciences and the ‘long tail’ of science will use OCRE to support and further their own research.”

Emanuele Storti (EOSC Officer
at Eurodoc)

OCRE and EOSC

OCRE will make these selected commercial digital services an integral part of the European Open Science Cloud (EOSC), ensuring compliance with EOSC requirements and visibility in the EOSC-hub Service Catalogue. It will also facilitate the adoption of these services by institutions and users, and enable substantial consumption of these services. 39 NRENs have signed up to participate in the framework, which demonstrates the relevance and value placed in this work across the R&E community.

OCRE plans to spend the majority of the funding on buying resources from the selected suppliers and distributing these amongst eligible research institutions to enable greater use of digital services. This will help to advance the development of the European Open Science Cloud and stimulate the adoption of commercial digital services by researchers. OCRE is working with EOSC, Eurodoc, the Marie Curie Association and ESA to help the initial funds distribution.

OCRE – Supporting Earth Observation Services

One of the initial focal points of OCRE will be the support of Earth Observation (EO) services. This is essential as EO services are often provided by small companies that struggle to scale and market their services widely, making it difficult for research institutions to be aware of them, let alone procure and access them.

The adoption of EO services by European researchers is also relatively low, compared to the use of these services in regions outside Europe.

OCRE will provide a range of commodity cloud services such as IaaS, PaaS and SaaS as well as specialised Earth Observation (EO) Services, which will include data collected by the European Earth Observation programme, Copernicus.

Who are OCRE?

OCRE are a consortium formed by the GÉANT Association (GÉANT), CERN, RHEA and Trust-IT. The OCRE consortium combines the expertise of these four partners to enable access to and drive the usage of commercial digital services by the European research community. Services which are safe and easy to use, accessible, affordable and interoperable.

Each of the four OCRE partners has extensive knowledge and prior expertise in this area of digital services procurement, adoption and delivery. In addition, five NRENs will be involved with GÉANT as third parties, providing cloud procurement expertise: CARNET, DFN, HEAnet, SURFnet and UNINETT. Trust-IT plans to involve two organisations as subcontractors, adding dedicated expertise on and connections to the Earth Observation (EO) community: EARSC and Evenflow Consulting.

Together these organisations have significant experience in procuring and supporting R&E-focused cloud services and procurement, and are ideally placed to help deliver effective cloud solutions for research.

“The OCRE project will be instrumental in procuring and developing commercial cloud services for EOSC. OCRE will not only engage cloud service providers but also directly involve researchers, the main end-users, in testing the available cloud services and proactively co-creating EOSC.”

Cathrin Stöver (CCO at GÉANT
and Co-Chair EOSC Executive
Board)

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



eduroam Managed IdP now available in 20 Countries



The benefits of eduroam are clear with over 11 million national or international roaming authentications every day and millions of users in over 100 countries. eduroam is designed to be easy to use but behind the scenes it is a very complex operation, relying on all participating institutions to manage a service that controls all their user identities and responds to connection requests from eduroam access points worldwide.

Words: Karl Meyer

This requires the management and support of an Identity Provider (IdP) service, a well-managed identity backend, and a RADIUS server to verify the credentials from that backend and grant user access to eduroam. Many smaller institutions may not have the in-house skills or resources to operate the required services and maintain their integrity.

This is why eduroam Managed IdP has been developed.

eduroam Managed IdP outsources the technical setup of eduroam IdP functions to the eduroam Operations Team, allowing institutions to focus on their users and freeing up valuable technical support resource.

The system includes:

- A web-based user management interface where end user credentials for access to eduroam can be created and revoked.
- A technical infrastructure (CA) which issues and revokes credentials for users to access eduroam.

- A technical infrastructure (RADIUS) which verifies access credentials and subsequently grants access to eduroam.

Using the service, National Roaming Operators (NROs) can invite their institutions to use eduroam Managed IdP. Once invited, institutions can use this system to create end user credentials (accounts) according to their local institution policy.

eduroam Managed IdP is designed using the latest cryptographic technology. It uses the Configuration Assistant Tool to securely configure user devices and reduce the support requirements.

There is no charge for NROs to use the services and so far 20 countries, including Sweden and New Zealand, have already adopted eduroam Managed IdP, with over 16,000 authentications taking place every month.

eduroam Managed IdP – eduroam user accounts managed from the cloud.

Find out more at <https://hosted.eduroam.org>

A webinar is scheduled for 20 November 2019 to introduce eduroam Managed IdP for National Roaming Operators. Registration is open at <https://eventr.geant.org/events/3201>

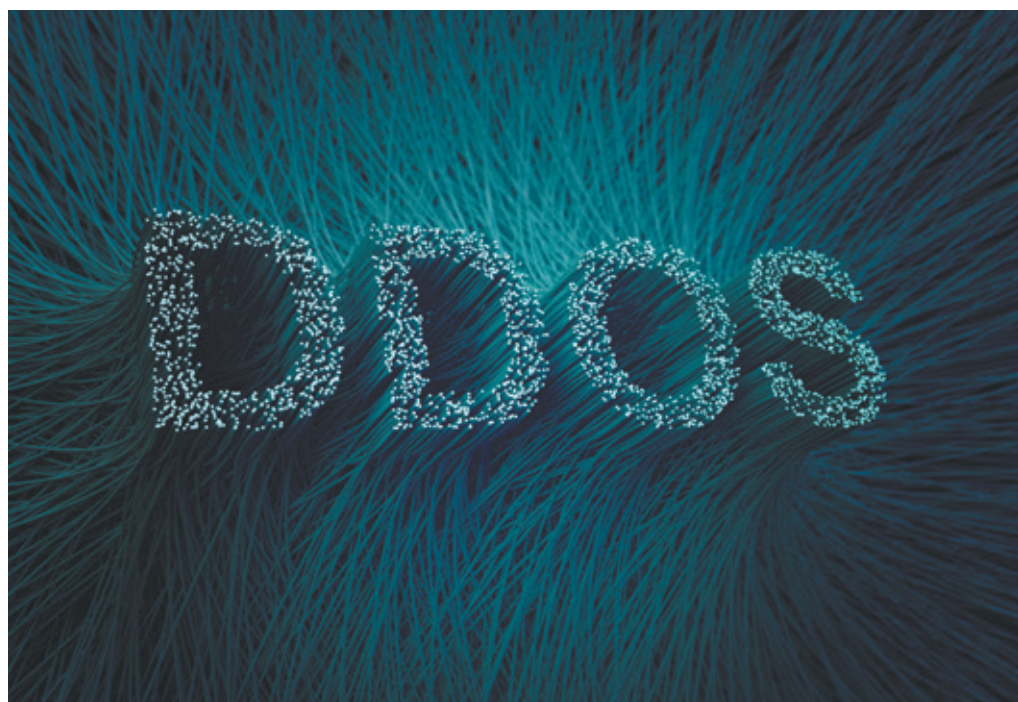
On 2 and 3 July, the Ukrainian NREN URAN Association connected their first two institutions to eduroam (global Wi-Fi roaming) using the newly released eduroam managed IdP service. It is used by the Institute of Magnetism in the National Academy of Sciences of Ukraine, with a team of 56 researchers, and the Mykolaiv Observatory, with a team of 20 researchers.

Picture
Mykolaiv
Observatory,
Ukraine.

GÉANT DDoS Cleansing and Alerting

Supporting GÉANT peering users with dynamic, fast responses to DDoS attacks

Words: Karl Meyer



Distributed Denial of Service (DDoS) is a major and growing problem within the networking community, with a large number of NRENs reporting attacks every month.

These attacks not only damage live services for end users but affect the reputation of the NREN amongst its users and consume significant amounts of manpower and resources to respond to and counter.

As the prevalence of botnet and other DDoS attacks increases, this workload will also increase and may begin to affect the ability of NRENs to support other activities.

Most DDoS responses can be relatively blunt tools in their operation, with the risk of false positive reports and the dropping of valid traffic sources. This is a particular problem for R&E networks, which have different traffic profiles compared with domestic or even business Internet usage (small numbers of very large, random traffic sources compared with a “typical” profile of large numbers of individually relatively small traffic sources).

Now GÉANT has developed a DDoS Cleansing and Alerting service, designed for users of GÉANT’s peering services (including indirect GÉANT World Service (GWS) clients), which allows GÉANT to dynamically detect and mitigate these attacks.

How it works

GÉANT has deployed A10 Networks’ Threat Protection System (TPS) hardware within the GÉANT backbone alongside Flowmon for DDoS traffic monitoring.

Using these two tools, GÉANT can monitor traffic flowing from external ISP connections and identify traffic that appears to be part of a DDoS attack. This traffic can then be dynamically diverted to the A10 TPS hardware, which inspects and dumps DDoS data whilst passing valid data traffic. This intelligent cleansing allows R&E traffic to continue to flow while removing DDoS traffic.

This process occurs automatically, with no NREN staff resource required.

With a maximum throughput of over 38 Gbit/s the A10 TPS will be able to support multiple GWS clients without noticeable degradation of service to R&E users.

Applicability

GÉANT DDoS Cleansing and Alerting supports NRENs using GÉANT peering (including indirect GWS clients) and so currently cannot protect direct ISP-to-NREN connections or ISP-to-institutional connections. However, with over 50% of identified DDoS attacks originating via GÉANT IP connections, the service should reduce dramatically the impact of DDoS on NREN support staff.

The service is a no-cost option for all peering users and requires only simple registration to receive alerts from the system.

The current Firewall on Demand tool remains available to support DDoS mitigation for other users and for inter-NREN DDoS attacks. https://www.geant.org/Networks/Network_Operations/Pages/Firewall-on-Demand.aspx

More information

www.geant.org/Services/Trust_identity_and_security/Pages/DDoS.aspx

GÉANT to Exhibit at SC19

For the eighth year in a row GÉANT will be joining the world's High Performance Computing (HPC) community at the international SC19 conference, held this year in Denver, Colorado. This renowned event for HPC, networking, storage and analysis is a great opportunity for the GÉANT community to strengthen existing global relationships, and discover new areas for collaboration with members of the HPC community. GÉANT will be part of the 'European Village', together with partners such as PRACE, PSNC, SURF, CSC, as well as several European supercomputing centres and universities. To learn more about the collaborative relationships between these organisations make sure to visit us all.

So, what can you expect from GÉANT this year?

Experience data from the moon through music: a NASA special

Ever wondered how data from space sounds and feels? GÉANT's Dr. Domenico Vicinanza will be at the NASA booth to take visitors on a virtual journey of the moon landing site, turning data into sounds and surface, and explaining how the GÉANT network has been essential to make this happen.

An ancient instrument coming back to life

Have you heard of the Epigonion? This ancient instrument has been revived with the help of the GÉANT network and visitors can experience the sound of the instrument and interact with it. Also, the BBC will be making a video about the instrument and will explore the important role the GÉANT community played in rediscovering it. Watch this space!

Network! In concert

Through a series of remote musical concerts, GÉANT's multi-talented Dr. Vicinanza will also demonstrate how the low latency offered by research and education networks enables musicians from different locations (Prague, Memphis and Troy) to improvise and duet together despite being separated by thousands of miles.

#love2eduroam

Showing how easy it is to roam with eduroam, GÉANT will be spreading eduroam love with free guest accounts for attendees. A live counter on the GÉANT booth will show how many users are accessing Wi-Fi around the world thanks to eduroam, and, if you'd like to show your eduroam love, you can pick up pins, stickers and luggage tags at the GÉANT booth!

perfSONAR

Also on the GÉANT booth will be an informative video on perfSONAR, the open-source, modular and flexible architecture for active network performance monitoring that provides a view of network performance across multiple domains. A valuable tool for NOC and PERT engineers, it helps to seamlessly analyse and diagnose network behaviours across entire end-to-end paths.



SC19
Denver, CO | **hpc is now.**

Keep an eye on the CONNECT community blog (connect.geant.org) and our social channels to stay up to date!

Digital Innovation Hubs – a PSNC Perspective

Launched by the EC in April 2016, the Digitising European Industry Initiative defined five pillars to bridge the digitisation divide across the EU.

Words: Adam Olszewski, PSNC

Digital innovation hubs (DIHs) are of particular interest, as there are strong differences in the level of digitisation across the EU, depending on the sector and region. DIHs can help to bridge the current divide and ensure that every company, irrespective of its size or technical prowess, can grasp the digital opportunities.

According to Max Lemke, Head of the EC's DG Connect Unit A2, the core mission of a DIH is to help ensure that "...every company, small or large, high-tech or not, can grasp the digital opportunities. With technical universities or research organisations at the core, DIHs act as one-stop-shops where companies — especially SMEs, startups and mid-caps — can get access to technology-testing, financing advice, market intelligence and networking opportunities."

Following the Digitising European Industry agenda, EU members states are developing their national Industry 4.0 strategies and planning new measures to boost the economic adoption of research-driven innovations.

HPC4POLAND

In 2016 PSNC launched HPC4Poland, the first DIH in CEE, following a survey which confirmed that more than 30% of Polish manufacturers were interested in developing advanced IT systems that were not available on the market. The survey also showed that the services expected by manufacturing companies went beyond PSNC's own competencies.

This became the driving force for PSNC to start HPC4Poland. Employing 300 IT professionals, PSNC had little expertise in industrial applications of FEM and CFD simulations, construction

engineering, pharmaceutical testing or vehicle design. Using external experts, PSNC started addressing the challenges in the manufacturing domain. Through continuous collaboration with area-specific experts, whose skills and contacts were key to launching business-driven services, PSNC paved its way to new opportunities and funding sources.

One of the resulting business cases is the 3D immersion system PSNC developed for VOX Meble, a local manufacturer of premium furniture. It took the input of more than five external companies to inspire the concept, design the system and finance experiments. Consequently, VOX Meble has become the cutting-edge innovator on the market, while PSNC has started a follow-up project, exploring machine learning algorithms for the company.

In addition to the collaboration with VOX Meble, during its three years of operation, HPC4Poland DIH has been involved in seven other DIH-related projects, such as I4MS, MIDIH, Smart Factories and AI DIH Network. The involvement with DIH has also increased the prospect of proposals in the digital transformation chapter of Horizon 2020 ICT calls (from DT-ICT-01 to DT-ICT-13), allowing PSNC to win Shop4CF and DIH4CPS projects. Consequently, via EU projects, PSNC has gained more than 30 new partnerships, including companies such as VW Poznan, Bosch and Siemens.

"Working within the DIH structure is fabulous, because it keeps all stakeholders involved and acutely interested in results. It keeps our development teams so motivated it often becomes personal. The ability to outsource elements of the project, like trainings, UX testing, business or



legal advisory to external professionals gives you peace of mind and the chance to really focus on what you're best at. The development of innovative systems for and with industry has become PSNC's strategic objective. The DIH developments, like the one with VOX convince us to follow this path. I believe our DIH model can be helpful in proposing DIH mechanisms across other NRENs, whose mission embraces science-to-business collaboration", says Cezary Mazurek, Director of PSNC.

Opportunities may exist for all NRENs, with the upcoming Digital Europe Programme 2021-2027 promising €1.3 billion for "ensuring the wide use of digital technologies across the economy and society", by means of "... building up and strengthening the network of European Digital Innovation Hubs, aiming to have a Hub in every region, to help companies benefit from digital opportunities."

Picture
The 5 pillars
of the EC's
Digitising
European
Industry
initiative

Let's Talk about the Trust & Identity Mentorship Programme

The Trust & Identity Mentorship (TIM) programme aims to bring together early career researchers and subject matter experts with the objective to pioneer and prototype new ideas in the Trust & Identity (T&I) field.

Words: Nadia Sluer





DEVELOPING THE NEXT GENERATION OF T&I PRODUCTS AND SERVICES FOR THE EUROPEAN NREN COMMUNITY

TO FIND OUT MORE CONTACT GLAD@GEANT.ORG



The programme is a collaboration between experts within the GÉANT project, the GÉANT Learning and Development team (GLAD), National Research & Education Networks (NRENs) and researchers from across Europe. Its overall aim is to contribute to a viable and sustainable pipeline of T&I products and services for the GÉANT project and ultimately for the European NREN community.

Once nominated by the local NREN, participants will be automatically integrated into the organisation with the support of local mentors. The local TIM team will then collaborate with the subject matter experts of the GÉANT Project on selected topics and will also receive support from GLAD. All participants will present their work (either final or in progress) at an international event or conference as advised by TIM experts.

Benefits for researchers

TIM offers participants the fantastic opportunity to join the development of cutting-edge solutions in the field of computer networking with a strong focus on T&I. It is a truly unique learning and professional development opportunity. Here are some of the benefits on offer:

- A paid professional internship that can be combined with thesis writing.
- Networking opportunities with a wide range of network experts and NRENs.
- Training and skills development in the fields of public speaking and agile software development (SCRUM technique).

Benefits for NRENs

TIM strengthens collaboration across European NRENs in the development of new T&I products and services. It's an opportunity for NRENs to foster local T&I expertise, learn from subject matter experts, expand their services portfolio, strengthen relationships with other member institutions and enrich the community with the introduction of promising new talents.

Role of GLAD

GLAD is passionate about building, diversifying and strengthening the capabilities of the European NREN community. "With the TIM programme, we hope to enhance and disseminate T&I competencies across Europe and build the workforce of the future. GLAD will work to develop and deliver the following sets of skills for the programme: mentorship, public speaking and agile software development/ SCRUM training", says Irina Mikhailava, Head of GLAD, GÉANT.

For more details about the TIM programme, requirements, deadlines and how to apply, please contact GLAD@geant.org





Future Talent Programme Goes from Strength to Strength

When Agnese Sbröllini – a PhD student at Università Politecnica delle Marche in Italy, who is researching sport-related sudden cardiac death - was approached by Consortium GARR with the opportunity to take part in speaker training and the possibility to present at TNC19, she did not hesitate for a moment.

The opportunity was provided through GÉANT's Future Talent Programme (FTP), which aims to bring up-and-coming professionals like Agnese in touch with the GÉANT community and vice versa. Why? Because they are our future.

Words: Nadia Sluer

“We have been very happy that this kind of opportunity has been raised to a European level”

Federico Ruggieri, Director of GARR and member of the GÉANT Board

Designed by GÉANT Learning and Development (GLAD) the Future Talent Programme is benefiting an ever-increasing number of NREs and students. It is built on three pillars: professional development, networking and mentorship. These elements are woven consistently into engaging programmes such as ‘Lightning Talk Challenge’, ‘Trust and Identity Mentorship Programme’ (TIM) and in the past ‘Poster Pursuit’.

Professional development of young professionals is always at the core of these programmes. The Learning and Development team wants every participant to be prepared for their next step, whatever that may be. Through various skills workshops the programme develops soft skills which will stay with them for the rest of their lives, as will their experience with GÉANT.

“During this course I learnt how to do a wonderful lightning talk, and, in this conference, I presented my research on monitoring athletes. I want to thank GÉANT, GARR and my mentor, because everything I have learnt gave me confidence about my research and the skills to convince people about it!”

Agnese Sbröllini, Student

Networking is another aspect that plays an important role in the Future Talent Programme. It provides an opportunity for young professionals to meet GÉANT community experts, learn about their work in the R&E field, and present their own ideas and work.

“Thanks to this programme I made some awesome friendships and I am excited to see where it takes me in the future”

Era Adjaraga, Student

However, key to the success of the FTP is the mentorship offered by the NREN. NREN mentors play a crucial role by reaching out and staying close to their protégées throughout the programme to provide guidance, support and encouragement.

“At FCCN we know that to continue to push the possibilities of technology, we need people who are smart thinkers, good speakers and willing to be curious and make brave decisions. It is very rewarding to see them getting new skills about presenting in public in such an important conference like TNC”

Salomé Branco, HR manager at FCCN

Until now, TNC is the biggest event the FTP takes part in. With the ‘Lightning Talk Challenge’, its participants compete for a place in the TNC Lightning Talks sessions, where they deliver their talk to the conference’s plenary audience. So far 21 students had a taste of this amazing experience in the past three years and impressed the audiences with outstanding talks.

“TNC has been a fantastic experience for me because it allowed me to overcome my fear in public speaking. I met new incredible people and it allowed me to present my work in a fun and interesting way”

Pierre van Houtryve, Student

The ‘TIM’ Trust and Identity Mentorship Programme, a collaboration between GLAD and the Trust & Identity team, is the newest initiative of the Future Talent Programme. As its name suggests, the emphasis is on mentorship. Young researchers work with their NREN mentor and with subject matter experts on new ideas in the Trust and Identity space during a 6 months internship. The TIM programme runs 1-2 times a year with the next run starting June 2020.

However, NREs interested in GÉANT young talent programmes do not have to wait until June. Registration for the Lightning Talk Challenge for TNC20 is now open until the end of February, and registration for the next TIM run is coming up soon.

GLAD invites NREs to offer the young professionals in their communities the same opportunities that were given to Agnese, Era and Pierre and the other future talents who took part in this programme.

For more information about participation in Future Talent Programme, contact nadia.sluer@geant.org or glad@geant.org

Picture
Clockwise from top left:
Era Adjaraga,
Enrico
Pietrocola,
Pierre van
Houtryve,
Agnese Sbröllini,



What's Next for Educational Technologies?

Words: Gyöngyi Horváth

As part of a wider initiative to explore the evolving use of technology in education and how NRENs can support it, GÉANT is hosting an NREN Educational Technologies and Services Workshop in Budapest in November. The second workshop of its type, the workshop will address a number of topics:

- Edu services in NRENs and organisational aspects
- Stimulating the adoption of open standards
- eduID

Edu services in NRENs and organisational aspects

NRENs are expanding their education service portfolio and many of the new services are quite different from traditional services offered by NRENs. The focus is on joint procurement, follow-up of major international suppliers, influence and development of major solutions for an international education market, risk management, work process collaboration, facilitation of collaboration on training and experience sharing between universities, development of joint integrations, etc.

The workshop will seek to answer questions such as:

- What tasks should NRENs tackle within edu services?
- What distinguishes these from the core NREN activities?
- Where to draw the line between traditional NREN services and edu services, e.g. media services?
- What are the advantages and disadvantages of organising edu services in a separate body or company?

Stimulating the adoption of open standards

In higher education, ICT is increasingly used for collaboration and communication purposes. But not every institution uses the same software. Interoperability provides improved compatibility between different systems, and makes it easier to share data.

Therefore, using standards allows data to be exchanged easily, securely and reliably, which benefits the quality of the exchange. It is also more economical and efficient to create and maintain a single interface and to avoid supplier dependency. Reaping the full benefits of standards requires widespread adoption; applications can only be interfaced easily if as many parties as possible commit to the standards.

As NRENs we can play an important role in stimulating the adoption of standards: firstly, by encouraging the adoption of standards by suppliers who work across borders, and secondly by promoting the standards that are important for future-proofing education to institutions.

eduID

In the society of the future, boundaries between institutions fade. Students want to study outside of their own institutions, even internationally. They are interested in a variety of different courses and want to combine subjects that cannot be found within a single institution. Moreover, educational organisations are offering joint programmes.

To facilitate mobility, students must be uniquely identifiable across institutions. This allows different organisations to be certain that they are dealing with the same student and can, for example, share a student's academic results.

In the Netherlands, the Dutch NREN SURF is creating a disruptive concept called eduID. eduID is lifelong available, owned by the student and starts out as a (self-created) basic identity. Assurance can be increased and enhanced by authoritative sources, such as institutions or the government.

Besides the Trust & Identity aspects of such an identity, eduID has a deep impact on many educational processes inside and between organisations. The workshop will explore the possibilities of cooperating within GÉANT to align international eduID initiatives.

eduBadges

Badges are digital symbols (images) that show that an individual has acquired certain skills or knowledge. Open Badges enable micro-credentialing and therefore are the new digital currency for learning, which fits well within a rapidly changing educational system. There is an increasing demand for a more transparent and flexible curriculum, which better suits the personal ambition and qualification level of the individual student and meets the needs of employers. SURF, the Dutch NREN, is currently running a pilot on eduBadges with selected universities in the Netherlands.

Why is this important for all NRENs? Why should NRENs discuss this and collaborate internationally? How can collaboration help to build a healthier and more sustainable service? What should be our next steps? These are some of the questions that the workshop will endeavour to address.

To learn more about the workshop visit: <https://edu.nl/j3cre>

Focus on Special Interest Groups and Task Forces

CONNECT meets Martin Bech, who chairs the Special Interest Group - Management of Service Portfolios (SIG-MSP) to talk about his role within this very dynamic group and its impact on the European Research and Education Community.

Words: Interview by Rosanna Norman

What does your involvement with SIG-MSP mean to you?

NRENs are unique, we cannot compare ourselves to other service providers in every single country in which we operate. We are unique, there are no other organisations like ours. Groups like SIG-MSP bring the community together by providing an excellent forum to learn from each other, share ideas and best practices. Groups like ours help to bring the community forward.

I have been leading the Danish NREN (part of DeIC – Danish e-Infrastructure Cooperation) for many years and have been participating in

SIG-MSP since its launch in 2006, under the name TF-LCPM and later TF-MSP. This group has always focussed on the management of service portfolios, which is about almost anything concerned with the development and betterment of NRENs, from the point of view of all the services that we offer.

In your opinion, what are the main achievements of this group?

We were the first to instigate the mapping of service portfolios (as a kind of standard ontology or categorisation of services) of all participating NRENs, now known as the service matrix part of the GÉANT Compendium, which has

Picture
Martin Bech

become a reference source for anyone with an interest in the development of European NRENs and the organisations behind them.

We started to create the first service matrix with the objective to categorise the available services, trying to make them comparable. I like to believe that we planted the seeds for this part of the Compendium project further developed by GÉANT.

We were the first group to start discussions that were subsequently expanded by the community, such as the rules of engagement for the provision of services between NRENs at an international level. Today this work is continuing as part of the rules of engagement element for the service provision section of the EOSC programme.





What are the benefits that SIG-MSP brings to the R&E community?

I will start by considering this perspective: “What would happen if our group didn’t exist?”

Often a good idea and a specific need determine the creation of a service; if this group didn’t exist then probably there would be a multitude of separate, unconnected, but overlapping services across the community.

Before any service becomes part of the GÉANT project or of any other collaborations between NRENs, awareness needs to be raised and discussions need to take place. I can proudly say that as a group we’ve been

able to start some discussions that became precursors to many international initiatives and collaborations. We strive to align, unify and make the community aware of all available services. For me an example of the beneficial role played by SIG-MSP coincides with the instance when representatives from the Infrastructure as a Service (IaaS) approached us for advice on how to improve and increment the adoption of this service in a variety of countries.

What I really love about this group is its openness. We are constantly trying to bring on board new blood and new participants who don’t even need to be part of NREN management. To join this group you just need to be interested in new services and in the future of your NREN.

For information on SIG-MSP and on how to join this group, please contact:

sig-msp@lists.geant.org

NREN Support for Transnational Education

A Jisc success story



Every year, an increasing number of education institutions around the world are getting involved in transnational education (TNE) providing education and qualifications to students based in other countries via partnerships, branch campuses and online/distance and blended learning. Getting involved in TNE benefits the institutions as well as the local community. It can also have a positive impact on a national research and education network (NREN). Here's how NRENs got involved in a request from Queen Mary University of London and its medical school, Barts and The London School of Medicine and Dentistry, when looking to open a branch campus in Malta.

Transnational education – not a ‘flash in the pan’

Since the early 2000s, global education providers have been involved in the provision of education to students based in other countries. TNE is known around the world by different terms: borderless, cross-border, transnational or offshore education. For example, the number of UK institutions, registered students

and geographical reach continues to grow year on year, with over 700,000 students on UK TNE courses (1.6 times the number of international students studying in the UK). At present, 84% of UK universities provide some form of TNE to 180 different countries. TNE is increasingly being seen not as a side project but as a core part of an institution's programme of education, tied in with a wider international strategy and future plans. Other governments are also keen to support TNE.

Picture
Credit: ‘Priscilla
Du Preez on
Unsplash’

There is a multitude of reasons an institution gets involved in TNE: as part of a wider international strategy, to improve access to higher education, and improve global rankings. One such institution is Queen Mary University of London, which established a branch campus of Barts and The London School of Medicine and Dentistry on the Maltese island of Gozo. There were four key goals: providing an equivalent student experience, including ‘real-time’ teaching; ensuring continuity of service; delivering this to a tight deadline in order for the campus to open on time; and offering flexibility in the solution to meet future requirements.

NRENs working together to deliver connectivity across borders

Queen Mary got in touch with Jisc, asking for assistance with delivering connectivity from its London campus to the branch campus in Malta. Using Jisc's experience in education and research



connectivity and the organisation's strong global partner relations, Jisc was able to identify a solution: providing connectivity from London to Malta via the GÉANT network, which allowed the branch campus in Malta to 'plug into' an existing robust and resilient international network in a quick and cost-effective manner.

Working with the Maltese NREN at the University of Malta, Jisc delivered door-to-door connectivity to Queen Mary between its campus in London and in Malta. This proved useful when, following a successful first year of teaching, the school needed to double the bandwidth to 400Mbps in anticipation of increased student numbers and also to provide a secondary connection to support the move to a more permanent location.

TNE benefits for NRENs

Currently there is no one body or organisation responsible for developing and supporting TNE at a global level. Support may be available within particular countries but due to the

international nature of TNE, establishing relationships and joining up institutions across borders, time zones and cultures is tricky. This is a key area in which an NREN can get involved to strengthen relationships with its members. Engaging and collaborating with an institution's plans for international expansion allow a unique value proposition that can differentiate an NREN from commercial providers. Getting involved in TNE can also lead to building relationships with other NRENs and global stakeholders, becoming part of the international community of research and education networks that is making NRENs more visible on the world stage. Revenue from supporting TNE by expanding the host country user base can be reinvested into improving the research and education network, allowing an NREN to improve both local and global connectivity and offer more services.

Supporting TNE also benefits the wider community by removing barriers that impede access to higher education and provides local graduates with skills suitable for the local job market, which improves the local economy.

About the Jisc TNE Support Programme

Jisc established the TNE Support Programme in 2013, in response to a member's need for assistance to provide connectivity to UK higher education institutions that were establishing branch campuses in Malaysia. Now in its sixth year, the programme has expanded to assist UK institutions, no matter where their TNE provisions are based.

Jisc is keen to work with and help other NRENs put together TNE support programmes for their members. You can get in touch with the TNE team by emailing transnational@jisc.ac.uk



Picture
István Tétényi
and Paul Rouse
of the GÉANT
procurement
team

Connectivity price drop to benefit South Caucasus

Students, researchers and academics in Armenia, Azerbaijan and Georgia will be better able to collaborate internationally thanks to improved Internet connectivity with more competitive market prices, achieved in the EU-funded EaPConnect project.

Words: Laura Durnford



Connectivity prices for research and education communities in South Caucasus countries have dropped by more than 80% since the project first tendered in 2016.

Procurement activities by EaPConnect, led by GÉANT, helped to achieve this reduction. The money saved can now be invested in the development of services and skills that will strengthen their NRENs, improving support of the countries' R&E communities and their ability to collaborate with peers in Europe and other world regions.

Veronika Di Luna (GÉANT), who co-leads EaPConnect, says: "By helping to reduce prices in the Eastern Partnership (EaP) region, the project aims to offer better value to users, to reduce the

digital divide between EaP and other countries, and to maintain these positive effects in the long term."

István Tétényi (pictured), of the EaPConnect procurement team, said that geopolitical constraints, difficult terrain and a limited number of suppliers previously kept market prices high in these countries. But the markets responded to the EaPConnect project's buying capacity when tendering for Armenia, Azerbaijan and Georgia for the third time.

"Other significant factors have been a growth in demand for bandwidth across these populations, the improved capacity of the pre-existing Black Sea fibre-optic link to Georgia that is run by Caucasus Online, and the entry of a new competitor to these markets – TransTeleCom – opening up a new geographical route."

Across Armenia, Azerbaijan and Georgia, there has been an 83% drop in total price per Mbps (megabits per second) of network connectivity since

2016. The greatest decrease has been in Azerbaijan, where the original monthly price was the highest across the six EaP countries – including Belarus, Moldova and Ukraine.

The latest monthly price in Azerbaijan is around 7% of that, making it the third cheapest of the six countries. The monthly price per Mbps in Georgia has dropped by 78.5%, and in Armenia the decrease is around 62.5%.

"I am proud that GÉANT's procurement team has supported these achievements and we hope the trend towards more affordable network connectivity will continue," says Erik Huizer, CEO of GÉANT. "International R&E collaboration depends on good connections – between networks and between people – and GÉANT is pleased to help strengthen both of these sorts of bonds, allowing ever greater opportunities for EaP R&E communities to work with their peers in Europe and other world regions."

EaPEC 2019 Connects with Culture

A cultural-technological 'first' in Armenia, distinguished speakers and diverse international experts came together in Yerevan at the 4th Eastern Partnership E-infrastructures Conference – EaPEC 2019 – on 25-26 September.

Words: Laura Durnford



Organised by the EU-funded Eastern Partnership Connect (EaPConnect) project, under the theme Connecting with Culture, the event started with a 'distributed' concert for invited guests. The Hovhannesian Chamber Choir in Yerevan and the Solisti della Cappella Marciana choir in Venice, Italy, performed together in real time, despite a distance of around 5000 km. Connected by dedicated, high-capacity research and

education networks and using Low Latency (LoLa) data transmission technology, this was the first concert of its kind in Armenia.

The theme featured in a session that discussed the 'myth' of connectivity in cases of mobile digital storytelling for cultural heritage, and explained why CLARIN, which makes digital language resources available, relies on research and education networks.

Picture
Erik Huizer (left), Hoa-Binh Adjemian (centre) and Arayik Harutyunyan (right) cut the anniversary cake at EaPEC 2019

Distinguished speakers

Around 135 participants from 23 countries were welcomed by Hoa-Binh Adjemian, Head of Sector at the European Commission's Directorate General for Neighbourhood and Enlargement Negotiations (DG NEAR); the Armenian Minister of Education, Science, Culture and Sport, Arayik Harutyunyan; and the Vice President of the National Academy of Sciences of the Republic of Armenia (NAS RA), Yuri Shoukourian. The keynote presentation, "The Transformative Power of Research and Education Networks" was delivered by GÉANT CEO, Erik Huizer.

Anniversaries galore!

A celebratory cake was cut to mark several significant anniversaries: 10 years of the Eastern Partnership, 20 years of EaPConnect partners from Georgia (GRENA) and Moldova (RENAM), and 25 years of the EaPEC 2019 host, ASNET-AM, successfully serving the Armenian research and education community.

Other highlights

Technological, ethical, societal and policy aspects of cyber security and artificial intelligence were discussed, as well as opportunities for Armenia in EU funding programmes and in the European Open Science Cloud (EOSC). Examples of real-life uses and benefits to research and society of research and education networks and other e-infrastructures were shown.

Seven winners of the 2019 Enlighten Your Research programme for the Eastern Partnership, from Armenia, Moldova and Ukraine, gave short presentations and received awards for their project proposals.

Further information

EaPEC 2019 and the Connecting with Culture concert were hosted by ASNET-AM, the Armenian NREN. LoLa technology was developed by the Conservatorio di Musica Giuseppe Tartini in Trieste, Italy, in collaboration with Consortium GARR, a non-profit association founded under the auspices of the Ministry of Education, University and Research. The concert was organised in collaboration with GARR, Komitas State Conservatory of Yerevan and ASNET-AM.

EaPEC 2019 slides and videos via: www.eapconnect.eu/conferences

Join the EaPEC mailing list: <http://eepurl.com/dvZ0PL>



Madagascar Here We Come!

From one Island to another, after a highly successful conference last year on Zanzibar, an island of rich heritage, UbuntuNet-Connect returns this year to visit yet another island, Madagascar.

Words: Hastings Ndebvu (UbuntuNet Alliace)

UbuntuNet-Connect 2019, the 12th edition of the UbuntuNet Alliance annual networking conference will be held 31 October – 1 November 2019 at the Carlton Hotel in Antananarivo, Madagascar. This year's theme is: "NRENs: Facilitating Research and Education Collaboration in the Digital Space."

The conferences will be hosted by The Research and Education Network for Academic and Learning Activities (iRENALA), the NREN of Madagascar.

The UbuntuNet-Connect conference attracts over 300 participants from across the global research and education community, including researchers, students, policy makers,

telecom regulators and operators, and more recently vice-chancellors.

Over 30 papers that focus on different areas, mainly in Information Technology, are expected to be presented at the 2 day event which is also co-located with other events including a 3 day NREN engineer training workshop.



e-AGE19: Ground-breaking research and education networks

Time flies when you're having fun and before you know it, we are approaching the end of 2019 which can only mean one thing: time for e-AGE.

Words: Dimple Sokartara

The flagship event of the Arab States Research and Education Network (ASREN) is a launchpad for research and education connectivity and cooperation. It brings together not only stakeholders in North Africa and the Eastern Mediterranean represented by the AfricaConnect2 and EUMEDCONNECT3 EU-funded projects, but also players from the Gulf region and further afield. It provides a platform to discuss the integration of research and education

e-infrastructures and deployment of advanced services, to support research in addressing today's most pressing problems in climate change, food and water scarcity, renewable energy, and environment.

This year's conference theme is "Ground-breaking research and education networks" which falls perfectly in line with the move to increase the knowledge of R&E networks and the role they play in finding solutions to regional and global problems.

Ankabut, UAE's advanced NREN will host the e-AGE19 conference on 11 and 12 December at Khalifa University in Abu Dhabi. Keep an eye on ASREN's social media channels as well as our AfricaConnect2 and EUMEDCONNECT3 Twitter pages to follow the conference remotely.

CONNECT Interview: Paola Arellano, Executive Director of REUNA



REUNA is the National Research and Education Network of Chile. In conjunction with the celebrations of REUNA's 25th anniversary, CONNECT speaks with Paola Arellano about the Chilean NREN's role within the Latin American network RedCLARA and the global Research & Education community.

Words: Paola Arellano and Rosanna Norman

Paola, tell us about life at REUNA

Today, at REUNA, we are working on a major technological upgrade of the high-speed optical networks for R&E in Chile. We aim to reach all the country's geographical areas: from the driest desert in the world in the north, to the south, very close to Antarctica. This major initiative is being carried out by REUNA's professional, committed and gender-balanced team. From

this standpoint, I like to think that our organisation is quite disruptive if one considers the prevalence of male leadership roles in the ICT sector. In fact, at REUNA, 50% of the workforce is made up of women and several of them are in senior management roles. I am also convinced that diversity, as well as gender balance, plays an important part in the enrichment of any organisation by bringing creativity and variety, some of the fundamental values that we need in order to face the digital revolution.

I believe that Chile has every attribute to become a world-class platform for scientific development, and this is why at REUNA we are working solidly to ensure that every researcher, teacher and student in the country has access to optimal technological conditions to allow them to collaborate, interact and, above all, be the protagonists of ambitious projects about global reach.



This year marks REUNA's 25th anniversary, how are you planning to celebrate?

We started celebrating our anniversary in April, with the launch of the second phase of the new Super Digital Highway with the addition of new fibre to the first segment launched in 2018. We have now reached a total of 1,650 km of lit optical network with 100Gbps channels that allow us unlimited growth potential, covering a distance equivalent to half the length of Chile, reaching a total of network length of 8,500 km across the country. This makes REUNA a leader in Latin America for high-quality connectivity for R&E.

We hosted an intimate ceremony in the home of REUNA and aim to close this cycle of celebrations with the General Assembly of Partners event which will be held later in the year in the beautiful city of Valdivia, in southern Chile.

On an infrastructure level, we want to celebrate the start of the next quarter of a century with the expansion of our new optical network to Antofagasta in the north, where the European Southern Observatory's (ESO) main equipment and the ALMA radio telescope are located.

You can learn more about our anniversary celebrations on a special edition of our magazine at: <https://www.reuna.cl/publicaciones/>

What does it mean for REUNA to be part of RedCLARA and the global R&E community?

In 2004, in a joint initiative with the Latin American countries and the European Commission, we actively participated in the creation of the Latin American network, RedCLARA, where Chile was the first country to connect to this new regional digital infrastructure.

This regional effort, led by RedCLARA, not only represents an achievement in communications, but is a key milestone in the collaboration between the countries in the region and the rest of the world. And it is not by chance that Latin America has an enormous potential in global research: subjects such as climate change, earthquakes, biodiversity and natural disasters, to name just a few, make our continent a great natural laboratory.



It is critical to have digital bridges for big data that bring together researchers from the same region and around the world. I still remember the words of ESO's former Director General Tim de Zeeuw on the launch of Evalso, 10 years ago: "Our world-class scientific observatories need a state-of-the-art infrastructure." Mario Campolarigo, Deputy Director-General, DG Informatics, European Commission said: "It is strategically important that the astronomy community in Europe has the best possible access to ESO observatories: this is one of the reasons why the European Union supports the deployment of regional e-infrastructures for science in Latin America and connects to GÉANT and other e-infrastructures in EU countries".

Today, 10 years later, we are in a new phase, directly connecting two continents through the BELLA Programme.

Can you talk to us about REUNA's involvement in BELLA and its impact in Chile?

REUNA is strongly committed to the implementation of this impressive initiative, which seeks to reduce the digital divide, deliver strategic infrastructure for the development and expansion of education, and strengthen the possibilities for our communities to carry out outstanding research. Particularly in areas where Chile has a comparative advantage such as astronomy (by 2025 Chile will host 70% of the world's astronomical infrastructure in terms of investment with ESO as one of the major players), Antarctic sciences (Chile is only 1,000 km from the Antarctic peninsula), glaciology, oceanography, climate change, and natural disasters, to name just a few.

Pictures

Left:
Paola Arellano

Above: REUNA Team

Within this framework, some of the objectives we seek with BELLA are: support the creation of nodes of the Copernicus project in Chile, strengthen the participation of our country in the CERN ATLAS project, promote the installation of new telescopes, deploy new and innovative services developed with a global vision such as eduroam and opening unprecedented research possibilities for our scientists, regardless of their geographical location.

About Paola

With an MBA from the University of Chile, and a degree in Industrial Engineering from the Pontifical Catholic University of Chile, I acquired extensive experience working in the management of national and international R&D & Innovation and ICT projects in science and academia for more than 15 years. In 2005 I was appointed the Executive Director of the National University Network Corporation, REUNA. I was soon faced with the challenges of strengthening the use of advanced technologies and networks for the development of science and education in Chile and REUNA's consolidation. I am proud to say that today REUNA connects the best universities in the country, the main astronomical observatories, and many other research centres and higher education organisations. Most importantly, I am the lucky mother of two beautiful teenagers, Rafaella and Bruno. I really enjoy trekking and hiking in Chile's beautiful mountains.

Asia and Europe Get a Little Bit Closer

A new secure 100 Gbps link is boosting research and education collaboration between the Asia Pacific region and Europe with shorter, faster, cheaper connectivity, and a backup ring for reliable resilience.

An international consortium of six R&E networks, AARNet (Australia), GÉANT (Europe), NORDUnet (European Nordics), SingAREN (Singapore), SURF (The Netherlands) and TEIN*CC (Asia-Pacific), joined forces to launch Collaboration Asia Europe-1 (CAE-1), a high performing 100 Gbps link between Singapore and London. The link went into production in May 2019 and was officially announced at TNC19 in Tallinn, Estonia.

The CAE-1 link provides the additional capacity needed to meet the rapidly growing bandwidth requirements of trans-national education and data-intensive science collaborations between Europe and the Asia Pacific region. Operating across 11 time zones, the consortium was able to procure far beyond what a single R&E network could procure across the vast 13,000 kilometre distance.

Shorter, faster, cheaper

The CAE-1 link is a significant step forward in closing the high-speed connectivity gap between Asia and Europe. It is routed via the Red Sea and Indian Ocean, a more direct route than via the North Atlantic Ocean, across North America and across the Pacific Ocean that have carried much of the R&E traffic until now. This secures lower latency and reduced costs.

Remarkable collaboration. Remarkable resilience

A month after the official launch of CAE-1, a memorandum of understanding was signed at the 6th Asi@Connect project meeting held during APAN48 in Putrajaya, Malaysia between the CAE-1 consortium partners and Japanese networking organisations NII and NICT. The goal: establish fast,



stable and extensive backup links to ensure network resilience and boost connectivity with a network ring using the CAE-1 link and the 100 Gbps terrestrial Trans-Siberian cable system, connecting Tokyo to Amsterdam deployed by NII (Japan). The initial term of this MoU is for a period of three years.

These two intercontinental links, along with SURF and NORDUnet's Amsterdam-London link and NII, NICT and SingAREN's Tokyo-Hong Kong-Singapore network now form the Asia-Pacific-Europe Ring (AER). The AER comprises eight R&E networks agreeing to contribute their own 100 Gbps links to provide a backup path for each other in the event of any link failure, creating an extremely robust and resilient network ring.

Towards a Global Network Architecture

CAE-1 and the AER ring are closely connected to other intercontinental R&E network collaborations, such as the ANA (Advanced North Atlantic) Collaboration, a collaboration across the North Atlantic Ocean and the APR (AsiaPacific Ring), a collaboration between Asia and the USA.

These initiatives are all implementations of GNA (Global Network Architecture) initiatives. This is an international effort to develop a set of global collaboration principles, on a technical level, as well as to address sharing costs and aligning investments. The GNA has defined a reference architecture and created a roadmap for both national and regional R&E networks to seamlessly support bandwidth for research and education. These collaborative implementations are referred to as the GREN, the Global R&E Network.

"CAE-1 is a novel collaboration which will give economies of scale for high-capacity direct connectivity between Europe and Asia Pacific and will improve the experience of researchers worldwide. Joining forces with our Japanese partners to secure mutual back-up complements and enhances the CAE-1 endeavour."

Erik Huizer, CEO, GÉANT



All Varsity News Network - A Smart Move to Promote NRENs in WACREN

Words: Effah Amponsah (WACREN)

The West and Central African Research and Education Network (WACREN) is mobilising tertiary students across the region to build a solid front to promote National Research and Education Networks (NRENs) in the area. The Regional Research and Education Network (RREN) is aiming to raise an appealing, strong voice for NRENs, to draw attention to their potential and impact on research and education (R&E) in the region. This effort reflects a bigger move towards making NRENs more visible and strengthening their case within local institutions, governments and regional bodies. This mobilisation also complements other medium to long-term efforts by WACREN to gain support for NRENs in various jurisdictions.

Labelled the All Varsity News Network (AVNN), the initiative is earmarked to be an online news-sharing and broad subjects discussion platform for mass communication and journalism students across a variety of higher learning institutions in West and Central Africa. While exchanging knowledge and sharing on the platform, users will help promote the activities and developments of NRENs and WACREN.

To take the first step of this journey, WACREN, in collaboration with the Ghanaian Academic Research Network (GARNET), held a two-day international stakeholders' workshop on the future of student media and journalism in Accra, Ghana, in June 2019. With participation of representatives from selected tertiary institutions, the workshop was intended to collate ideas to define and refine the AVNN concept and chart a course for the way forward for its implementation and sustainability. After an intellectual trading of thoughts and ideas, AVNN was widely accepted by all 40 participants as a germane concept which would mutually benefit institutions of higher learning, students and NRENs.

At the workshop, content development and contextualisation, governance and gatekeeping, and business models were among key subjects discussed by the participants, who included scholars, student media advisors, lecturers and students. The main take-home message was that the continual stakeholders' engagement is key to the implementation, sustenance and enhancement of AVNN.

The AVNN platform will be created by WACREN in partnership with relevant strategic partners in and outside the region, especially with the sister RRENs - UbuntuNet Alliance and ASREN, but also with other organisations such as GÉANT. It will offer a number of functionalities including audio-visual features, messaging, forum and archiving. These will afford users the latitude to fully engage and optimise the platform.

WACREN foresees a day when the final users of the network – students and researchers, are empowered through AVNN to join the discourse and even set the agenda for conversations in the areas of modern tech for R&E in the region. For WACREN, the ultimate goal is to use AVNN users' voices to get government and regional decision-makers to invest more in exploring NRENs' potential and how their services can benefit a variety of tertiary institutions and research centres in West and Central African countries. AVNN would discover and prepare the next generation of engineers, strategists, decision-makers and advocates of the power of NRENs.

Picture
Group photo:
Seminar on
the Future of
Journalism
and Mass
Communication
Education
in West and
Central Africa
and Student
Media Workshop

GN4-3 Project News

GN4-3 PROJECT STRUCTURE

There are three sets of Work Packages in GN4-3:

Support Work Packages

WP1: Project Management
WP2: Marketing Communications and Events
WP3: User and Stakeholder Engagement



Service DevOps Work Packages

WP4: Online Services
Development and Delivery
WP5: Trust and Identity
WP6: Network Technologies and
Services Development
WP7: Network Core Infrastructure
and Core Service Evolution
and Operations
WP8: Security



Operations Work Packages

WP9: Operations Support

Start date	1 January 2019
Duration	48 months
Total budget	€119M
EC contribution	€77.5M

GN4-3N PROJECT STRUCTURE

WP1: Project Management



WP2: Infrastructure Implementation

Start date	1 January 2019
Duration	48 months
Total budget	€63.125M
EC contribution	€50.5M

GN4-3 and GN4-3N have over **500 participants** and **39 Project Partners**
37 NRENs, NORDUnet (representing 5 Nordic countries) and GÉANT Association



OpenAIRE and GÉANT Expand Collaboration to Support Europe's Researchers

The OpenAIRE Advance and GÉANT GN4-3 projects have signed an agreement to expand their existing collaboration to optimise synergies across the projects and ensure the seamless delivery of their services to Europe's researchers.

Areas of work included in the joint activity plan to which resources and personnel are committed, include:

- Aligning: National structures, Service Portfolios, Roadmaps
- Communication, Events, Training and Engagement
- AAI Interoperability and Sustainability

Natalia Manola, Managing Director of OpenAIRE, signed the agreement on behalf of the OpenAIRE Advance project: "This agreement is notably strengthening technical cooperation in areas such as AAI and alignment of existing structures that are critical to the development of a strong European Open Science Cloud." She added: "Thanks to this collaboration between OpenAIRE Advance and the GÉANT GN4-3 project, we will deliver more value to researchers and innovators across Europe."

GÉANT CEO Erik Huizer commented: "We're delighted with today's signing as it demonstrates our ongoing commitment to collaborate with all our partners to best support research communities across Europe. We look forward to continuing this collaboration and ensuring Europe remains at the forefront of research."



Registrations Open for GÉANT Symposium 2020

We are pleased to announce that the GÉANT Symposium 2020 will take place in the beautiful city of Ljubljana, Slovenia, on Tuesday, 4 and Wednesday, 5 February 2020. As in previous years, the GÉANT Symposium will offer the opportunity to organise adjacent meetings before and after the event.

The Symposium will aim to present an overview of the GN4-3 and GN4-3N projects, recognising the challenges and celebrating the successes of the first year and setting the foundation for future work. It also seeks to improve understanding of the broader and changing environment in which the work packages are operating, as well as to enable and foster cross-activity collaboration.

Registration for the Symposium opens on 14 October 2019. The relevant information and programme for the GÉANT Symposium 2020 will continue to be updated in the coming months.

For more information please contact symposium@lists.geant.org.

GN4-3/GN4-3N Grant Agreements signed 10 July 2019

The European Commission has signed the grant agreements for the latest phase of the GÉANT projects, GN4-3 and GN4-3N, which run to December 2022, with a combined funding of €128m.

These projects mark the final stage in the existing Framework Partnership Agreement that began with GN4-1 in May 2015. They follow on from the successful GN4-2 (May 2016 to December 2019) and GN4-1 projects (May 2015 to August 2016), and

continue their commitment to ensuring all researchers across Europe have equal high-performance network access to the research infrastructures and e-infrastructure resources available to them.

Together with Europe's National Research and Education Networks (NRENs), GÉANT has a long history of meeting the diverse needs of a European research and education community that includes organisations

such as CERN, EUMETSAT and the EMBL-EBI.

GÉANT's superfast pan-European network and integrated suite of security, authentication, authorisation and identity services provide the level of trust and confidence essential to large-scale research collaboration, data-intensive science, HPC and cloud computing, helping to achieve the EC's Open Science objectives.

Introducing the GÉANT Software Catalogue (GSC)

GÉANT's first ever Software Catalogue (GSC), designed to provide an up-to-date repository of information about software development projects within GN4-3, has been launched. The catalogue has been created with the needs of software development teams in mind to support collaboration within the GÉANT software engineering community.

Growing the GSC will enable collation of data on GÉANT software

development efforts for the purposes of further analysis and reporting to work package and task leaders, the Product Lifecycle Management (PLM), Software Governance and Support and other stakeholders, which will both benefit development teams and positively impact project outcomes.

GN4-3 and GN4-3N software development teams are invited to access the catalogue to view and explore the

options offered and to add projects not currently listed.

Project participants can access the catalogue at <https://sc.geant.org/>.

For more information and contact details for the catalogue team see <https://learning.geant.org/introducing-geant-software-catalogue-gsc-and-how-it-can-work-for-you/>.

SIG-NOC Tools Survey 2019

The GÉANT Special Interest Group on Network Operation Centres (SIG-NOC) is inviting responses from NRENs to let them know about the software tools that their NOCs use to operate networks and services, to enable the creation of reports that are tailored and useful to the community.

The survey is available online at <https://www.surveymonkey.com/r/72QL6HS>. It can be completed by NOCs that are either responsible for network operations or for both network and service operations but, as it is

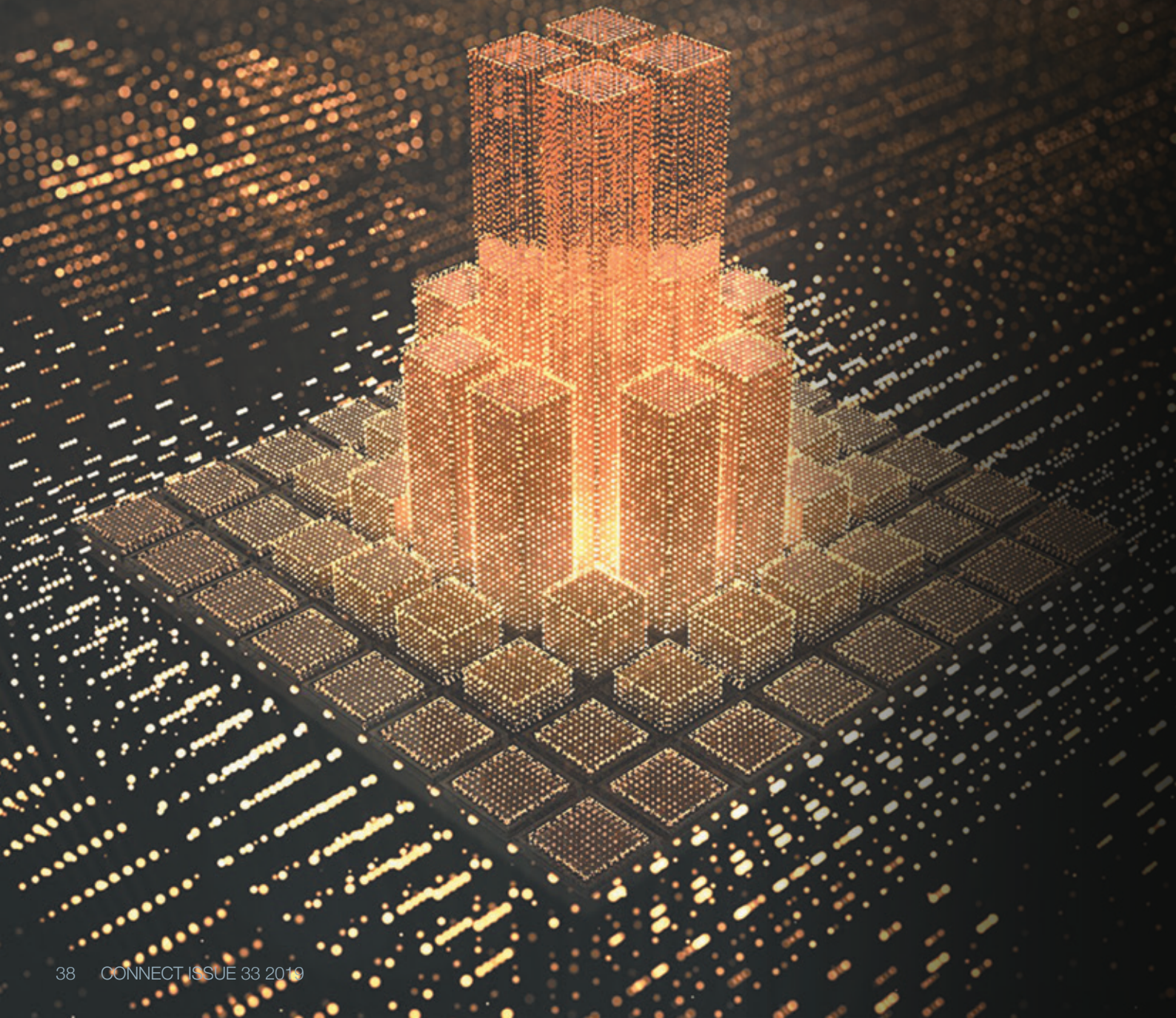
mainly focused on tools and operations practices, should be filled in by personnel who have a complete overview of NOC operations.

The survey covers the following NOC functions: Monitoring, Problem Management, Ticketing, Performance Management, Reporting & Statistics, Configuration Management & Backup, Communication, Coordination & Chat, Knowledge Management/Documentation, Change Management, Out-of-Band Access, Security

Management, Inventory Management, DDoS Mitigation, Resources Management, Data Aggregation, Representation & Visualisation, and Automation and Orchestration. This SIG-NOC survey builds on the previous surveys run by the former TERENA TF-NOC and later by GÉANT SIG-NOC.

For more information about SIG-NOC activities: <https://wiki.geant.org/display/SIGNOC/SIG-NOC+Special+Interest+Group++Network+Operations+Centre>.

What's Nokia got to do with R&E Networks?



When hearing the Nokia name, many think of 1990s mobile handsets, and the iconic ringtone, Grande Valse. Yet Nokia's been at the forefront of technological innovation for over 150 years. Originally a 19th century Finnish paper mill, Nokia branched into rubber products and electrical cables which eventually led to electronics and communications equipment. As networking technology evolved, so did Nokia through a series of acquisitions, including Alcatel-Lucent in 2015. This brought an impressive research capability to Nokia through Bell Labs, including nine Nobel prizes, three Turing prizes and thousands of annual patent applications. Today, Nokia provides innovative technology to service providers, governments, utilities, enterprises and Research & Education networks.



Research & Education networks have long been a proving ground for emerging networking technology. Many national R&E networks were the first to trial technologies such as IPv6, 100G core routing and coherent optical detection, well before commercial service providers put these components into their production networks. Nokia Bell Labs research has contributed greatly to the evolution of these technologies into systems, now deployed by all type of network operators, including global NREs.

Nokia's 1830 PSS photonic switching system is built upon decades of learning and patented invention. Most recently, the Photonic Service Engine (PSE) is the DSP at the core of Nokia's optical transport systems power. The third generation, PSE-3, implements Probabilistic Constellation Shaping (PCS) to maximise capacity over any distance and on any fiber — from metro to subsea. A concept pioneered by Nokia Bell Labs, PCS pushes optical performance towards the Shannon limit, the maximum possible information transfer rate. Engineered with the only algorithm proven to approach the theoretical capacity limit of optical fiber, it combines the latest in electronics and software to offer performance never seen before.

Coherent transmission ordinarily uses all constellation points with the same frequency. PCS uses constellation points with high amplitude less frequently than those with lesser amplitude to transmit signals that are, on average, more resilient to noise and other impairments. This enables tailoring the transmission rate to the special optical channel delivering up to 30% greater reach while also significantly improves spectral efficiency. This technology allows networks to attain maximum capacity over practical, real-life optical spans. In February 2019, M-net (Germany) started to trial PCS, allowing them to exceed 500Gbps over existing optical spans. Further trials on production networks with Netia (Poland) and TIM (Italy) demonstrated the ability to maximise span reach and capacity with the 600Gbps-capable PSE-3. Future generations of PSE will utilise yet smaller silicon fabrication geometry, pushing spectral efficiency even closer to the Shannon limit.

PCS is but one innovation available to help R&E networks push existing research boundaries. Nokia's unique technology set extends through optical transport to layer 2 and 3 switching and routing. Combining OTN switching, GMPLS control plane, CDC-F ROADM, layer 2 switching and powerful IP/MPLS routing into a family of solutions, allows NREs to deliver a wide set of resilient services to their institutional network users.

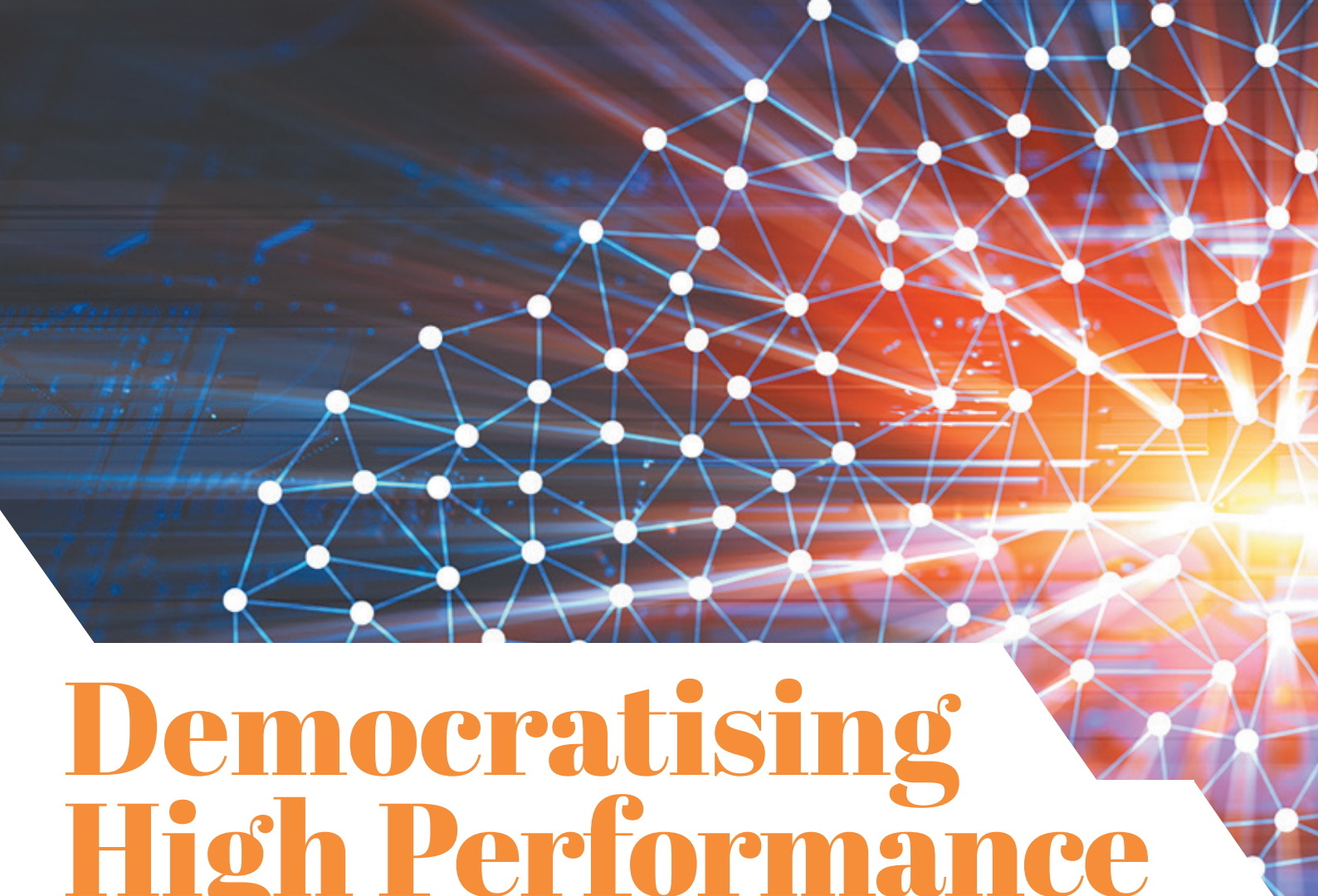
Find out more on:

Nokia Optical Networking
<https://networks.nokia.com/solutions/optical-networking>

Nokia Photonic Service Engine 3
<https://networks.nokia.com/technology/photonic-service-engine-3>

Further information:

helene.zalkind@nokia.com



Democratising High Performance Computing:

HPC Clusters – When You Need Them, How You Need Them and Where You Need Them

Words: Bala Thekkedath, Global HPC Marketing Lead, Amazon Web Services

When it comes to High Performance Computing (HPC), it is still a world of haves vs. have-nots for all practical purposes. And it does not matter whether you work for a Fortune 100 company or an upstart startup. You either have an HPC cluster when you need it or you don't. It is as simple as that. If you are among the haves, then you get to test your ideas and run your simulations on the zealously guarded, well-utilised and efficiently operated HPC infrastructure that was "state of the art" when it was procured. The thought of asking for a refresh to the latest CPU and some GPUs does cross your mind, but you don't act on it, for you know very well how that conversation ends. If you are among the have-nots, you wait in line for your chance to test your latest idea or to run your next simulation. But, it does not have to be that way.



There is a solution to this supply and demand issue that will make both HPC users and the HPC infrastructure owners happy. Move your HPC workloads to the cloud. If you are a user of HPC infrastructure, you can get instant access to the HPC infrastructure of your choice, and the latest technologies by leveraging HPC clusters in the cloud. If you are an HPC Infrastructure owner, leveraging the virtually unlimited HPC resources in the cloud can finally help you meet the backlog of demands. You no longer have to be the gatekeeper who always says, “get in the queue.”

There can be no better example of this than the recent announcement from Descartes Labs that it had nabbed the 136th spot on the top 500 list of the world’s fastest publicly known supercomputers – with \$5,000 and an Amazon Web Services (AWS) account. You can read this amazing story [here](#).

One of the biggest advantage of moving HPC workloads to the cloud

is the freedom to get started when you want it, and with the resources you want. The days of submitting your request for time on a cluster, months in advance, and then adjusting your development / research schedules based on the allocation you receive can be a memory of the past. If you work for an organisation that has moved HPC workloads to the cloud or has at least started the process by bursting to the cloud when demand spikes, you have experienced the agility and flexibility benefits afforded by the cloud. You either have an individual account to access and request resources in the cloud or you request it via your HPC admin. In both cases, you start building “your” cluster when you are ready. When the cluster is built, you submit your jobs. And when the jobs are done, you shut down your cluster and stop paying for it. When you request your cluster, unlike your old on-premises environment, you can specify what type of CPUs (or GPUs, or FPGAs) you would like to run a particular application on. Ever wonder how much faster your application would run if you had the latest CPU or GPU? Well, now you can try it out without going through a cumbersome procurement process. Then, there is the scale. It does not matter if you request 100 cores for 8 hours or 800 cores for 1 hour. You

essentially pay the same. So, if your application supports it, why not scale up your resources and get results faster? Western Digital did exactly that when they built a cloud-scale HPC cluster on AWS and used it to simulate crucial elements of upcoming head designs for their next-generation hard disk drives (HDD). Their simulation encompassed a little over 2.5 million tasks, and ran to completion in just 8 hours on **a million-vCPU Amazon EC2 cluster**.

HPC in the cloud is the democratisation of high performance computing – giving researchers the freedom to ask the questions and explore the ideas they have always wanted to, and infrastructure owners the resources to meet their users’ needs. HPC in the cloud is the great equaliser – lowering the barriers to entry for startups and small universities and schools to harness the power of advanced computing to advance science and engineering. At AWS, we have combined the latest compute, networking, storage, security, cloud orchestration, and visualisation technologies with a vibrant partner and ISV community to offer you a highly customisable computing platform to run a broad range of compute intensive workloads. Take us for a test ride. **Build your first HPC cluster on AWS.**



Digital Age Networking in Education

ALE Digital Age Networking provides a state-of-the-art network infrastructure that enables digital transformation for education. It empowers educators with next-generation digital learning tools to help improve student success, provide a superior experience, help with retention, and achieve education excellence. Improve your campus operations by enabling IoT systems, simplifying staff activities, reducing the overall cost per student, and improving school and campus security.



Digital Age Networking is based on 4 pillars:

1. Connectivity
2. Internet of Things
3. Augmented intelligence
4. Cloud economics

Connectivity

Your students, educators and staff have different needs requiring access to the latest education technologies, grade systems, student information, administration and security systems, and collaboration tools.

ALE Service Defined Network simplifies diverse connectivity needs by ensuring that only authorized individuals have access to applications and systems. It leverages Shortest Path Bridging (SPB) to simply create a wide variety of network services

to maximize available links and uses automation so IT configurations can be up and running in a few minutes. This frees your highly skilled professionals to work on new strategic initiatives.

Internet of Things

The use of the Internet of Things (IoT) in education spans multiple areas where many devices support learning and research (smart boards, 3D printers, projectors). Student's personal devices (video games, Apple TV), university IoT devices (digital signage, vending machines), and connected and intelligent systems (HVAC, lighting and sprinkler systems) ensure a superior experience for students and staff. IoT enabled devices (surveillance cameras, door locks) provide significant benefits in campus safety.

These IoT devices must be onboarded and then require network resources for proper operation and monitoring. IoT enablement technology automates these activities and ensures the network is secure to minimize exposure to cyber-attacks.

Augmented intelligence

Augmenting human intelligence uses big data, proactive analytics and artificial intelligence (AI) to provide quantifiable information about user connectivity experience and application access and develops recommendations for improvement.

ALE Digital Age Networking can contribute to the process of understanding what determines student's success by collecting this combined variety of information - where students congregate, with whom, class attendance, applications' usage, and devices used - comparing with benchmarks from other institutions and feeding it into an AI system to help assess which students are more likely to succeed or drop out.

Cloud economics

Cloud technology can be used to enable new business models, simplify operations, increase flexibility and scalability, and create new innovative services.

Today, schools require that every student have access to a tablet or laptop. This explosion of connected devices and access to high-definition educational content is making current network infrastructures obsolete, but many institutions do not have enough funds for a network refresh. Alcatel-Lucent Network on Demand (NoD) provides a financial alternative allowing institutions to upgrade by paying a monthly fee for cloud-based services.

Cloud-based network management solutions, location-based services and WLAN can simplify deployment and operations. And, it's always kept up-to-date with the latest software releases, licenses and support.

Digital Age Networking

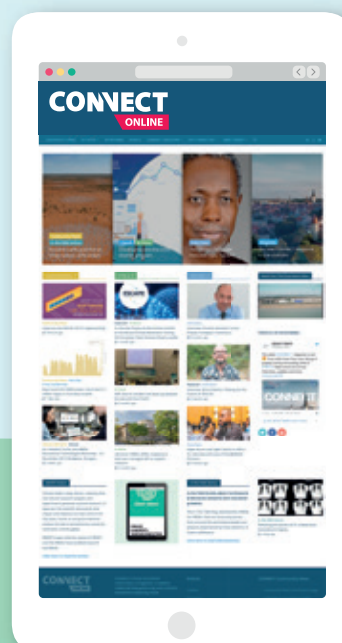
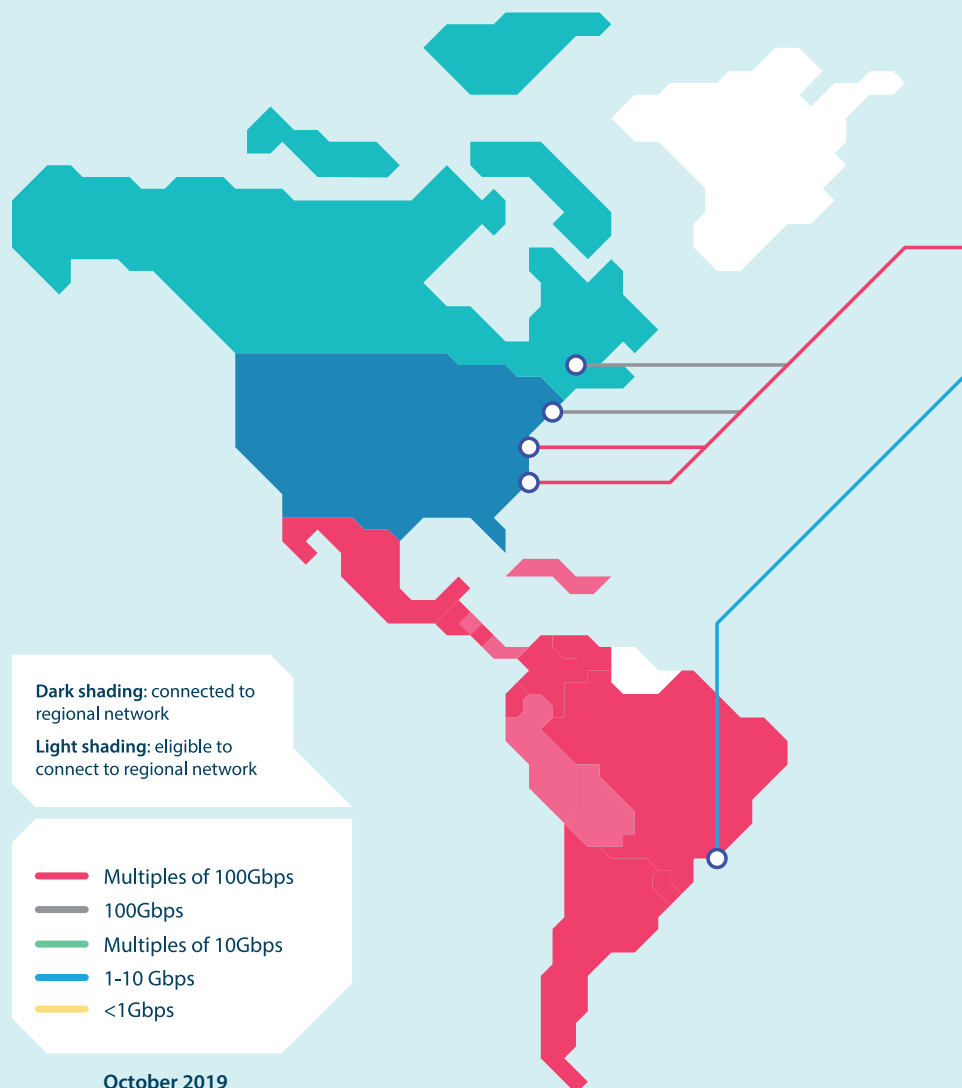
ALE Digital Age Networking provides a foundation for education institutions to digitally transform without restrictions and enables the adoption of new technology to help deliver excellence in education.

www.al-enterprise.com/en/industries/education

Alcatel • Lucent 
Enterprise

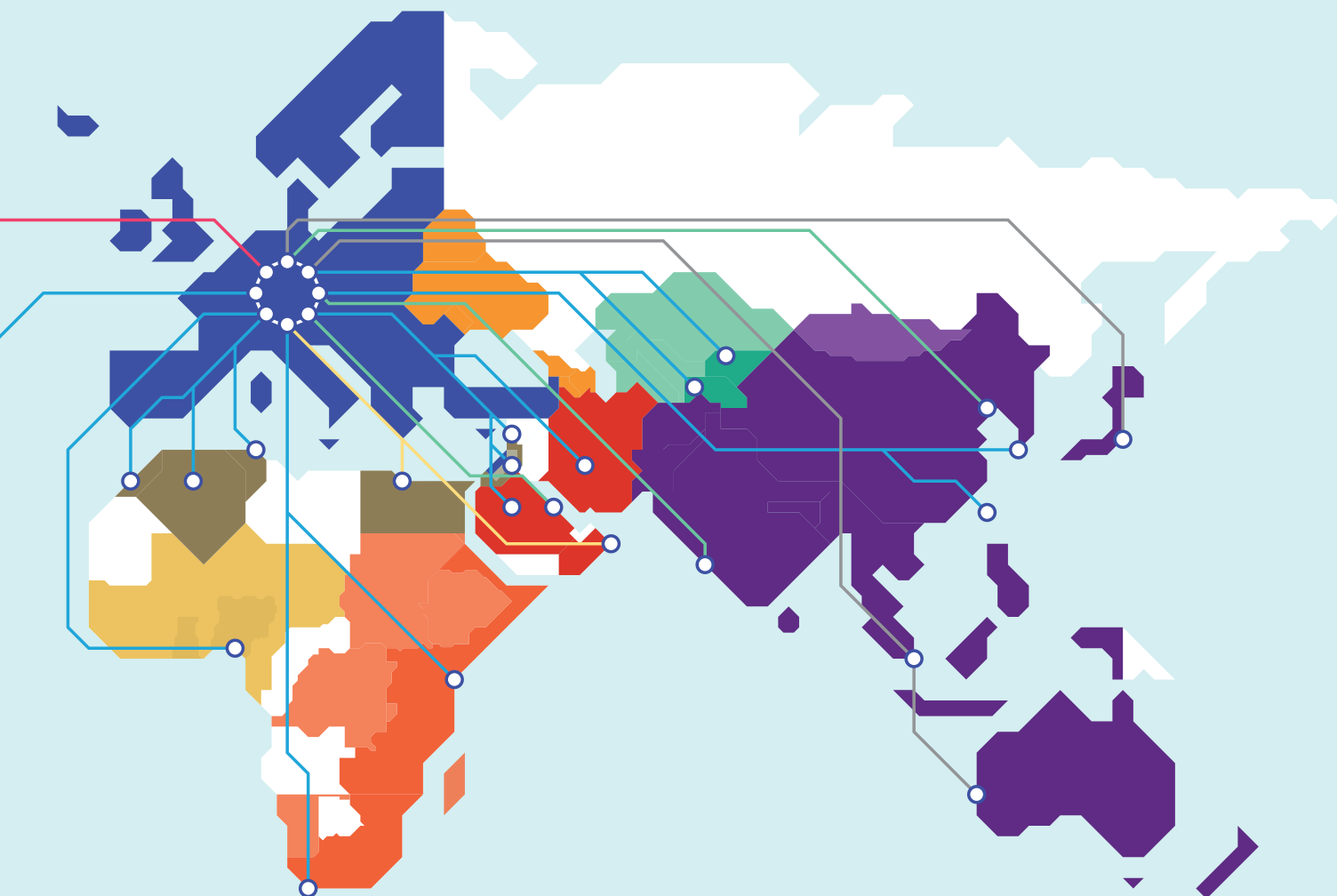
GÉANT at a Glance

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.



Canada & USA



Latin America

Europe



North Africa & Eastern Med

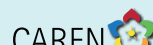


West & Central Africa

Eastern & Southern Africa



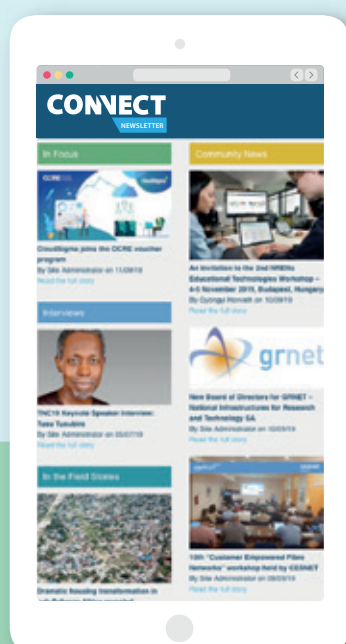
Central Asia



Asia-Pacific



Other R&E Networks



GEANT.ORG



@GEANTCOMMUNITY



@GEANTNEWS



GEANTtv



GEANT_COMMUNITY



LINKEDIN.COM/COMPANY/GEANTNETWORKS

