THE GÉANT PROJECT (GN3PLUS)
YEAR 1 HIGHLIGHTS

This document presents Year 1 highlights of the EC funded GN3plus project from April 2013 to March 2014.

GÉANT, the pan-European communications infrastructure serving Europe's research and education (R&E) community, delivers advanced multi-domain services and facilitates joint-research activity that drives innovation. Together with Europe's National Research and Education Networks (NRENs), the GÉANT network reaches over 50 million users in 10,000 institutions.

Working with NRENs and users

By interconnecting Europe's NRENs and facilitating high speed links with other global regions, GÉANT connects schools, universities and the world's largest research projects, helping to deliver real societal benefit. This demands close collaboration with NREN partners, data-intensive pan-European user projects, and international networks and standards bodies. Year 1 saw several key achievements working with NRENs and users.

Engagement with a large number of projects from strategically important research communities, notably ITER (sustainable energy), EUMETSAT and Copernicus (earth observation) and EMBL-EBI and Elixir (life sciences).

- The new architecture for CERN's LHCONE network has continued to progress, and the EPIC feasibility study to investigate network infrastructure possibilities for the Eastern Partnership region was successfully completed.

- The International User Advisory Committee (IUAC) was established to ensure European research projects have a direct channel to the GÉANT Project management, to influence the future direction of GÉANT's network and services. Committee members are from CERN, CLARIN, ELIXIR, EMBL, ESA, ENES & EUDAT, EUMETSAT, Human Brain Project, ITER, JIVE and PRACE – together representing user communities and e-infrastructure that are vitally important to European research networking.

- Increased support of and engagement with NREN project partners resulted in a 97% satisfaction rating in the annual "NREN Satisfaction Survey" which also showed an improvement in 5 out of 6 key areas.

EUMETSAT and GÉANT:
Ensuring delivery of critical data

An External Advisory Committee has been created to provide strategic advice and support, assisting in development of policy and practice.

The Strategy and Innovation Committee has been created to develop long-term vision, strategy and innovation agenda.

Growing the network for the user community

The migration to the new network architecture was completed, benefiting users with increased capacity, faster service provision and self-healing resiliency. This keeps GÉANT ahead of the data deluge, offering 500Gbps to users now and rapid scalability up to 2Tbps and beyond.
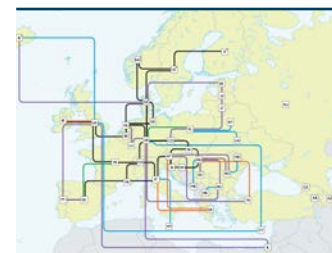
- The migration project was achieved with minimal disruption to the network, despite more than 900 migrations taking place and over 13,500km of fibre being re-procured and tested.

- GÉANT and equipment supplier Infinera won a Guinness World Record for the fastest provisioning of multi-terabit long haul optical transmission capacity across a production network - demonstrating the benefit of rapid provisioning.

- Close liaison with international networks is keeping Europe at the heart of global R&E networking, with 65 countries outside Europe now reached by GÉANT, and global interconnection capacity increased to 109Gbps.

GÉANT topology January 2014

Re-procurement of leased circuits resulted in annual saving of €3m

Service development and delivery

With several new services launched and strong growth in existing services, Year 1 saw excellent progress across the service portfolio, offering flexible and secure network access options to NRENs and their users.

- **eduGAIN** is the core of GÉANT's AAI platform, supporting European and global collaboration. Over the year, it experienced a 33% growth in Member Federations and doubled the number of Joining Federations. For those NRENs and other entities that want to participate, FaaS (Federation as a Service) which moved from analysis to pilot and will provide a pathway for eduGAIN participation.

- **eduroam**, the roaming access service, grew to over 9300 service locations in Europe alone; 294 IdPs registered with the eduroam Configuration Assistant Tool (CAT), and 89 million national authentications were achieved each month, an increase of 94%.

- **Layer 3 VPN** is a high performance IP-VPN connectivity service, offering users with multiple sites a cost-effective solution to their need for increased security and assured performance. It provides automated re-routing and recovery and is ideally suited to one-to-many or many-to-many connectivity requirements.

- **GÉANT Open** successfully completed its testing phase and has now entered full production. This adds to GÉANT's portfolio of collaboration services, to enable NRENs and researchers to interconnect with international partners and third party organisations quickly and easily without the need for dedicated circuits or networking.

- **eduCONF** VC Directory offers an international directory of VC systems that are available to NRENs around the world, populated by VC managers who add their rooms for verification and a certificate issued for display in the VC room. In its first month, 7 NRENs have joined the directory and promotion is rapidly underway.

- **Cloud Services** facilitates joint NREN cloud brokerage efforts and sharing of expertise and resources to bring a range of public and community cloud services to the R&E community. This is helping NRENs to fulfil a cloud distribution role and will help R&E users to consume these services with the right conditions of use. As part of the Cloud Services work, GRNET have successfully launched the ~Okeanos Global cloud computing service to the wider GÉANT community, integrating eduGAIN authentication as a core element of the implementation.

Driving innovation

Part of GÉANT's role is pushing the boundaries of networking technology to help shape the internet of the future. The 'GÉANT Innovation Programme' umbrella concept was developed in Year 1 to facilitate recognition and promotion of the research activities encompassing the joint research, the Open Call projects, standards work and testbed offerings.

- **Network architectures for Horizon 2020** – white papers prepared on Network Architectures for Cloud Services, which proposes an initial GÉANT Open Cloud Exchange (gOCX) architecture; and on Network Architecture for aggregating high speed mobile networking. Both offer solutions to help the projects and its partners diversify the portfolio of networking services.

- **Technology testing for advanced applications** – roadmaps have been delivered for Software Defined Networking (SDN) and Network as a Service (NaaS) with direct relevance to future network services. The GÉANT Open Flow Facility (GOFF – the first operational testbed implemented over the GÉANT backbone) was moved into production and is being used by several Open Call projects.

- **Identity and trust technologies** – work continued towards the goal of creating a bridge between SAML2 (the standard used by R&E Identity Federations) and OAuth2 as well as OpenID (the preferred choice of the commercial providers) in order to enhance public/private interoperability and security.

- **Open Call** – €3.3m is being invested into 21 independent projects for research into advanced networking technologies. In support of the Horizon 2020 aims, each project is aligned to one of the GÉANT Joint Research Activities to ensure innovation is fed through the project. The Open Call added 30 new beneficiaries to the project's partners.

- **Standards** – ensuring interoperability with other networking organisations is essential to effective collaboration, and this involvement has been highly productive, especially with OpenID Connect, User Managed Access (UMA) and OAuth2.

99.99% Average monthly access availability for dual-homed NRENs
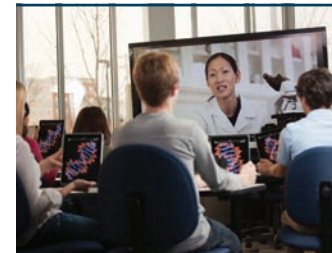
Over 50 news stories disseminated achieving 270 items of coverage, reaching an unprecedented audience of over 200m and supporting an 82% rise in Twitter Followers.

BBC NEWS **Google news** **the guardian** **WIRED.CO.UK** **The Telegraph** **THE HUFFINGTON POST**

Showcased the project at major events: TNC2013 in Holland, SC13 in Denver, USA and ICT2013 in Vilnius with ITER (sustainable energy) and EMBL-EBI (life sciences) as booth guests.

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