

# THE GÉANT PROJECT (GN3PLUS) YEAR 2 HIGHLIGHTS

This document presents Year 2 highlights of the EC funded GN3plus project from April 2014 to March 2015.

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.

## An ecosystem for innovation

GÉANT's carefully evolved ecosystem – where innovative services are researched, developed and delivered with direct NREN and user input – connects and empowers research and education communities within Europe and across other world regions. This approach drives knowledge creation, innovation and learning; and continues to put Europe at the heart of global research and education.

In Year 2 GÉANT attracted 30 new partners from industry and academia through a GÉANT Open Call programme that has been an outstanding success, with 75% of those projects continuing to work with GÉANT beyond GN3plus. Their work and results are led by, and integrate directly with, the Joint Research Activities in areas such as network architectures for Horizon 2020; technology testing for specific service applications; and identity and trust technologies for GÉANT services. Together with Task Forces and Special Interest Groups, this work all feeds into the GÉANT Innovation Programme, integrating with service development and delivery activities.

This ecosystem is set to evolve further, widening its reach to include close collaboration with other e-Infrastructures in the pursuit of an ever stronger European research and education community.

## Service development and delivery

The GÉANT ecosystem is supported by the continued development and delivery of a portfolio of innovative services covering network support, trust and identity, mobility, security and clouds. Year 2 brought further success as new services moved to production; and existing services grew in their coverage.

- Multi-domain monitoring:** the converged perfSONAR multi-domain monitoring service has brought wider deployment (over 1000 end points) and reduced operating costs for each partner; whilst CMon – the Multi-Domain Circuit Monitoring System – has moved from design to pilot phase, with deployments in 4 NRENs.
- Multi-domain security services:** the Firewall on Demand tool has been deployed on the GÉANT network; training was provided on secure coding; and security audits undertaken.
- Application areas:** eduroam authentications have doubled to 180m/month; eduGAIN has grown to 32 federations and the number of Identity Providers and Service Providers has grown by 700%; Federation as a Service moved from design to pilot stage with 7 NRENs; the eduCONF VC directory was successfully re-launched across 30 countries and moved to full production.
- Support to clouds:** a collective NREN cloud strategy guide has been completed with NRENs as trusted advisors, brokers and providers; the GÉANT cloud catalogue is now available with 14 services listed; and collaboration on clouds with other e-Infrastructures is set to expand.



The External Advisory Committee and the International User Advisory Committee provide valuable contributions to the GÉANT strategy and governance process



## Improving the network for the user community

The GÉANT network continues to set the standard for speed, service availability, security and reach: 500Gbps super-channels are on offer to users now with rapid scalability to 2Tbps and far beyond; 100% availability was delivered for IP, Plus, Lambda, L3 VPN and GÉANT Open services; and GÉANT reaches over 100 countries worldwide. Year 2 efforts focused on optimising the network for cost efficiencies and to stay ahead of user needs; tools to increase network performance and operational effectiveness; and supporting network innovation for the development of future network enhancements. A range of flexible connectivity services provide users with access to the GÉANT network to suit their specific needs. Achievements over the year include:

- IP access bandwidth increased by 19%: four NRENs upgraded their access connection to 100Gbps, five NRENs upgraded to 10Gbps; and five new 100G connections were added to GÉANT Open.
- Network optimisation achieved per annum cost-efficiencies of €400k with a further €580k saved through re-procurement of routes; plans are already being actioned that are set to deliver network savings in GN4 of €2.1m per annum.
- The Multi-Domain Virtual Private Network (MD-VPN) service successfully completed its pilot stage and moved into full production.
- GÉANT Testbeds Service (GTS) completed the first phase in its development, and has rolled out to four cities with three more planned; demos were performed at key industry events.
- Terabit line card and alien wave trials supported network innovation for the development of future network enhancements.
- Service management was enhanced with the deployment of a new service desk and OTRS ticketing system; 100% uptime achieved for software development support systems.

**100%** Average monthly access availability for dual-homed NRENs

The GÉANT Testbeds Service (GTS) is at the leading edge of advanced network services, offering network researchers a unique platform to undertake experimentation in Software Defined Networking (SDN) over a high performance, geographically distributed facility.



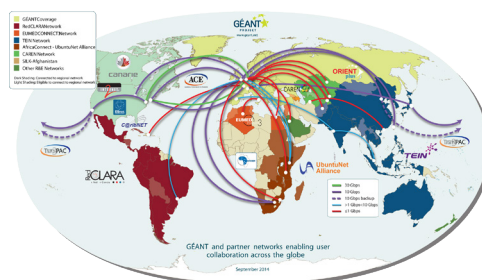
Network optimisation and re-procurements led to annual saving of €1m



Showcased the project at major events: TNC14 in Ireland; and SC14 in New Orleans with SKA as invited co-exhibitor



Highlighted large users' reliance on GÉANT in quarterly CONNECT magazine



## 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 deliver real societal benefit. This demands close collaboration with NRENs, large user projects, international networks and e-Infrastructures. Year 2 saw improved mechanisms for knowledge collation and sharing to support this collaboration, and progress is clearly demonstrated in certain key achievements:

- The Increased support of, and engagement with, NREN project partners helped to strengthen partnerships and led to year-on-year improvements in 5/6 categories in the Annual NREN Satisfaction Survey.
- Signed EUMETSAT contract to provide terrestrial (as opposed to satellite) network to distribute European meteorological data; contract subsequently extended to include Korea and USA.
- Large Hadron Collider (LHC) continues to be biggest collaboration supported by GÉANT, providing dedicated 100Gbps links; network is now used for BELLE II traffic and expanding into Asia and Latin America.
- Agreement with North America's ESnet has increased potential transatlantic capacity by 340Gbps and further strengthened global relationships.
- Significant progress made with GÉANT's global interconnections –specifically work has focused on improved connectivity to China, India, Latin America, Japan and Qatar.
- Deeper collaboration with other e-Infrastructures leading to coordination of two joint user workshops – for Bioscience and Earth Sciences – and plans to align user services.



GÉANT and ESnet: Strengthening global relationships

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