

Delivering user services across borders

International networking services for the research and education communities



connect • communicate • collaborate

What is GÉANT?

GÉANT is the pan-European research and education network that interconnects Europe's National Research and Education Networks (NRENs). Together we connect over 40 million researchers and students across Europe, facilitating collaborative research in a diverse range of disciplines, including high-energy physics, radio astronomy, bio-medicine, climate change, earth observation and arts & culture.

GÉANT is part-funded by, and works in close cooperation with the European Commission (EC). GÉANT is fundamental to realising the EU's vision for the European Research Area (ERA), and is a key part of the Digital Agenda for Europe, a flagship initiative driving Europe 2020.

What is the GÉANT Services Portfolio?

GÉANT's goal is to make collaboration seamless and straightforward for European researchers. To achieve this, we are working with Europe's NRENs to develop and deliver user-focussed, multi domain services and tools that build on the power of the pan-European network. The GÉANT Services Portfolio aims to make it simple for researchers to collaborate by delivering seamless network performance across borders and domains, tailored to their particular needs.

To deliver these services, the GÉANT backbone and Europe's NRENs combine to create the GÉANT Service Area (GSA), a vast multi-domain, service infrastructure that enables NRENs to provide network services and applications at a local level by standardising procedures, security and development practices. The GSA aims to create an infrastructure that appears as a single, seamless resource to users, wherever they are located.



Connectivity Services

Through its range of connectivity services, GÉANT enables users to choose the bandwidth and performance that matches their needs. With options ranging from high speed IP connections to dynamic circuits, GÉANT works closely with users to identify the best fit for their project. Delivered together with Europe's NRENs, these provide an end-to-end service across the GÉANT Service Area.

High performance collaboration - GÉANT IP

The GÉANT IP service provides a robust high-bandwidth solution to the international connectivity requirements of the majority of academic users. Stretching across the continent, the GÉANT IP backbone network connects Europe's NRENs, allowing millions of users to collaborate seamlessly.

Dedicated end-to-end connectivity – GÉANT Plus

Aimed at users who need guaranteed high performance between specific locations, GÉANT Plus provides dedicated network to network circuits at bandwidths between 155 Mbps and 10 Gbps. GÉANT Plus combines the privacy and availability advantages of a private circuit with the cost efficiency of a shared network.

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An important task for an NREN like us is to provide our user community with the new tools and infrastructures which



of what is technologically available. Bandwidth on Demand is at the moment the paramount example of what our network infrastructures can produce.

Martin Bech, UNI–C, Forskningsnettet, Denmark

User controlled links for demanding projects – GÉANT Lambda

GÉANT Lambda has been created for Europe's most demanding, data intensive projects. It provides full 10 Gbps wavelengths between any two GÉANT NRENs connected to the GÉANT dark fibre cloud. A fully transparent service, it puts the user in control at the network transport layer and offers ultimate flexibility regarding how the circuit is used. As part of GÉANT's programme of improvement, 100Gbps services are due to be rolled out across the network shortly.

Dynamic flexible circuits - Bandwidth on Demand

A powerful service for automatic bandwidth provisioning across multiple networks, GÉANT Bandwidth on Demand (BoD) enables NRENs to automatically create multi-domain international connections in minutes. This means they can quickly and cost-effectively provide guaranteed bandwidth to their users, exactly when they need it.

GÉANT's connectivity services are underpinned by a growing range of software tools. The Common Network Information Service (cNIS) tool collects and shares network topology data while AutoBAHN's dynamic provisioning software provides the ability to create on demand circuits quickly and simply.

Network Performance

GÉANT's high speed connectivity is supported by a comprehensive range of network monitoring and management services. These enable consistent, secure, end-to-end performance that delivers a successful user experience across Europe. Deployed with NREN partners, these services optimise network performance by providing 24x7 monitoring across the GÉANT Service Area infrastructure, allowing the fast identification and remedy of issues as well as delivering powerful security features that prevent and detect malicious attacks.

Performance monitoring - perfSONAR MDM

As research collaboration has grown, it involves more and more different networks, locally, nationally and internationally. In this complicated, multi-domain infrastructure tracking down potential issues and ensuring consistent performance can be difficult. This led to the creation of perfSONAR Multi-Domain Monitoring (MDM). This tool enables NREN engineers to access standardised performance information from monitoring points across multiple domains worldwide through a single screen making it simple to pinpoint and troubleshoot performance issues.

Enhancing performance - eduPERT

eduPERT enables network users to get the best performance from their connections. It combines information from independent Performance Enhancement Response Teams (PERTs) from local institutions, NRENs and GÉANT, fostering knowledge-sharing across the GÉANT Service Area. Working together through eduPERT, response teams provide an end-to-end investigation and consulting service to academic and research users on any network performance issues.

Keeping GÉANT secure – CERT Portal

In an online world, network security is of vital importance. GÉANT takes a proactive approach to security to maintain the integrity of the network, implementing advanced defences that offer sophisticated handling of network incidents. Built on a common approach and processes for coordinating responses to security issues the GÉANT CERT portal allows users to report security events direct to their NREN, enabling knowledge sharing and fast responses across the GÉANT Service Area.

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Having perfSONAR MDM allows us to more efficiently debug network issues, especially to identify overloaded network segments/links.



It is a huge advantage to be able to test an end-to-end connection, segment by segment.

Gerard Bernabeu, PIC, (Tier-1 LHC centre), Spain

User Access and Applications

Mobility and openness are crucial to achieving a truly connected European Research Area. Consequently researchers, academics and others need to be able to move freely across network boundaries, securely accessing their own home network as well as the research resources of any institution they are located in within the GÉANT Service Area. To achieve this, GÉANT has developed interoperable services that allow secure roaming access by verifying users' identities and rights, and granting access to resources as appropriate.

Accessing remote resources - eduGAIN

eduGAIN enables users to access vital resources such as research databases and tools at institutions in participating countries, without needing to re-register or apply for additional permissions. By removing geographical and technical barriers to sharing information, eduGAIN makes it as simple to access remote resources as if they were in a user's home institution.

Secure roaming connectivity – eduroam®

eduroam is a global service that provides secure roaming connectivity to users across Europe and many regions worldwide. With authentication handled by the home institution and authorisation by the visited institution, eduroam also allows academics and researchers to visit and access networks at other participating institutions without needing to reconfigure their laptop or request new passwords.

Underpinning digital security - eduPKI

Digital certificates are widely used to guarantee secure and reliable communication across the internet. eduPKI helps the cost-effective adoption of digital certificates within the GÉANT project, addressing the security requirements of other services by helping them define their needs and to then provide them with digital certificates and support.

End to end videoconferencing - eduCONF

eduCONF supports and facilitates the use and adoption of videoconferencing, simplifying the user experience and reducing operational costs. Through a certified directory of videoconferencing facilities across the GÉANT Service Area it makes it simple for users to access high quality videoconferencing resources reducing travel costs and environmental impact..

Global research initiatives, like the International Cancer Genome Consortium, depend on the ability of far-flung users to transmit, access, and manipulate huge amounts of data. CANARIE is committed to supporting access to data and tools for our increasingly borderless communitythrough CAF and its participation in eduGAIN.



Jim Roche, President and CEO of CANARIE



Further Information

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Enabling global user communities

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BR/SVC/0912