HIGHLIGHTS

GÉANT

This document presents the highlights of the EC-funded GN5-1 project from 1 January to 31 December 2024 (GN5-1 Period 2). GN5-1 is the first phase implementing the actions defined in the 72-month GN5 Framework Partnership Agreement established between the GÉANT Consortium and the European Commission in 2021.

GÉANT aims to provide Europe's research and education (R&E) community with the connectivity, collaboration, trust and identity, and security services needed to support evidence-based decision making and effective knowledge exchange with their peers around the world.

The GÉANT projects are a fundamental element of the European e-infrastructure. Through its integrated catalogue of connectivity, collaboration, identity and security services, GÉANT, together with its National Research and Education Network (NREN) partners, provides users with reliable, secure, unconstrained access to communication, computing, analysis, storage, applications and other resources, whenever and wherever needed.

GÉANT aims to provide Europe's research and education (R&E) community with the connectivity, collaboration, trust and identity, security, training and educational services needed to support evidence-based decision making and effective knowledge exchange with their peers around the world.

GN5-1 delivered excellence in connectivity and related services, extending its reach to strategically important and emerging areas such as high-performance computing, quantum key distribution (QKD) and time and frequency (T&F), evolving the Communication Commons towards data-driven research and education, supporting open science and strengthening Europe as a global research hub. The demands of the R&E community are evolving faster than ever in terms of quantity and types of data and diversity of disciplines, and GÉANT's flexible, agile, and long-term approach remains vital to ensuring they are met.

195+FTEs
600+ contributors
38 partners
43 countries

GÉANT
9 Work Packages
42 Tasks
36 Deliverables
45 Milestones

See highlights from past GÉANT projects →

Strengthening the R&E community

By interconnecting Europe's NRENs and facilitating high-speed links with other regions across the globe, GÉANT connects schools, universities, and the world's largest research infrastructures, enabling scientific discoveries, supporting remote learning, and upskilling communities. GN5-1 Period 2 furthered human connections through:

Aligning with societal goals: Stakeholder interviews, recommendations and monitoring of project alignment with the UN's Sustainable Development Goals, and digital rights and principles, defined best practices and recommendations, as reported in D2.3.

Strengthening relationships: TNC24 welcomed 842 attendees from 69 nations, 100 speakers, hundreds of online participants and 18 exhibiting commercial partners. The Community Hub supported 42 separate sessions, drawing a total audience of over 600 people.

Nurturing talent: The Future Talent Programme brought 17 students, 9 of whom presented a Lightning Talk, to TNC24. The Emerging NREN Programme drew 7 participants from Algeria, Montenegro, Philippines, South Africa, Tanzania, Uganda and Zambia.

Looking ahead: Foresight 2030: Navigating Change, was published, following extensive engagement with various community groups from GN5-1.

Increasing visibility: The CONNECT website achieved its best results to date, its 46,000 visitors representing a 25% increase over P1. With the changing social media landscape, GÉANT's shift in focus to rising platforms such as LinkedIn and Mastodon has been positive, with strong growth in followers on both platforms.

Promoting gender equality: GÉANT's annual Women in STEM campaign, run in parallel with Women's History Month, showcased the diversity, depth and breadth of female representation in the GÉANT community, featuring women who support STEM behind the scenes (Women for STEM).

Driving innovation: 66 Innovation Programme applications from 20 countries submitted proposals to the Innovation Programme, the highest number since the programme's launch in 2021.

Sharing knowledge: 40 events took place within the GÉANT Community Programme, totalling 3,312 registered participants: 35 Task Force and Special Interest Group meetings, 1 one-off workshop and 4 collaborative project meetings.

New SIGs: Four new GCP groups were launched, including SIG-Sustainability, SIG-Procurement, SIG-Time and Frequency (SIG-TFN) and SIG-Artificial Intelligence (SIG-AI).

Developing skills: GÉANT Learning and Development (GLAD): Delivered and supported 38 bespoke Learning events for 458 participants from 40 NRENs. Network eAcademy delivered 4,146 individual training sessions in 230 organisations. The project continues to value, maintain and develop the exceptional skills and experiences of its human resources.

Shaping policy: A new annual report showing how GÉANT contributes to the European Research Area Policy Agenda was completed. The third iteration of the CEO Track was held at TNC24, welcoming NREN and RREN directors from the international community, enabling strategic discussions at a global level. Regular coordination meetings were also held, including EOSC and EuroHPC.

Assuring quality and relevance: The PLM process continues to provide effective support to GÉANT products and services throughout their lifecycle.

TNC24
842 event attendees
100 speakers
18 commercial partners

COMMUNITY PROGRAMME
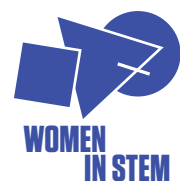35 TF and SIG meetings
23 infoshares

SC24
World's first quantum-classical communication and computing demo, collaboration of 12 partners (6 R&E, 3 from EU, 3 from USA, 6 vendors)

Innovation Programme
66 programme applications from 20 countries

NPAPW hosted by the LMTA in Vilnius, Lithuania

WOMEN IN STEM

eosc

Delivering tomorrow's network today

The GÉANT network continues to deliver world-leading connectivity services and extremely high performance for all users, while the largest infrastructure refresh in a generation has future-proofed European and international high-speed networking beyond the next decade, empowering research and education without constraints or boundaries.

Community-centric strategic planning: Network evolution studies and workshops, the CTO workshop, and Network Infrastructure Advisory Committee (NIAC) meetings ensured community engagement and strategic alignment in defining the roadmap that sets out how the GÉANT infrastructure will evolve.

Next-generation network: The GÉANT network fibre footprint trebled following the GN4-3N project, from just over 11,000km to nearly 31,000 km of fibre/spectrum across Europe, including 7-fold increase of NREN fibre/spectrum, demonstrating commitment to using existing partner infrastructure rather than building a parallel infrastructure.

OLS foundation: The Optical Line System is now deployed, with Infinera FlexILS as the basis of the next generation optical network for the next decade. This reduces dependency on the market, increases capabilities to introduce emerging technologies and services (e.g. the new GÉANT Spectrum Service, QKD and Time and Frequency distribution), and is well placed to support big science users. This deployment has enhanced the stability and flexibility of the network, allowing GÉANT to use third-party transponder/DCIs to cost-effectively add capacity.

Packet layer: Delivered 400G high-speed network availability to the edges of Europe. Global partners are also able to connect at or near landing stations. Migration to new Nokia platform commenced in 2024, enabling GÉANT to offer 800Gbps now and Terabit services in future.

Effective network management: GÉANT's fully open-source automation platform (GAP), enabled migration of live IP backbone traffic to new platform, showcasing the network's innovation.

Service innovation: Four PLM gates were passed by three services: Time and Frequency (Pathfinder link and Northern network route); GÉANT MD-VPN and WiFiMon were retired.

Enhanced security: Progress was made to protect the network and users in a rapidly evolving threat landscape. Security Operations Centre (SOC) made substantial progress in enhancing GÉANT's security and service offerings, new stats page for NRENs; NeMo-based DDoS detection and mitigation solution upgraded; Advanced DNS added, and successful migration of management and telemetry interfaces to the new SNM platform.

Time and Frequency Network: The successful deployment of the TFN pathfinder link has demonstrated the feasibility of cross-border time and frequency distribution. This link lays the foundation for further development of Time and Frequency Networks in collaboration with the National Metrology Institutes (NMIs) and the NRENs.

Intercontinental Connectivity: Collaboration with the GN5-IC1 project in transitioning from leased capacity circuits to a long-term spectrum and fibre ownership model for intercontinental connectivity, enhancing resilience and long-term stability and reducing reliance on the market.
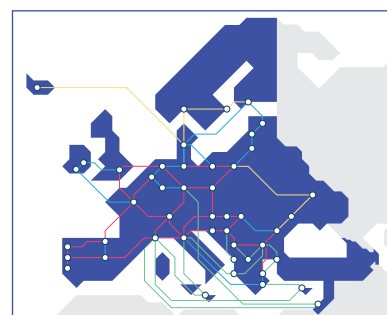
EuroHPC Joint Undertaking

Connectivity to all EuroHPC sites

GAP
GÉANT Automation Platform

Network Development Incubator:
4 projects in Period 2, led to a new service (C-TFN), new subtask in GN5-2 (fibre sensing), new modules (WFO telemetry module), and a new GenAI-based tool

OTFN eAcademy

See highlights from past GÉANT projects →

Meeting changing needs with service excellence

GÉANT's range of user-focused connectivity, collaboration, trust and identity, above-the-net and security services remains vitally important to research, education, and an evolving European e-infrastructure. An agile development approach ensures services continue to meet user needs in a rapidly changing environment, while the PLM framework ensures their quality and relevance.

Expanding above-the-net services: The OCRE 2024 Framework was executed and completed in 2024, with Framework contracts available February 2025. Recommendations for collective Above-the-Net Services & Cloud strategy were published. NREN interest in the eduMEET software service spin-out to an independent, community-financed open-source project grew, especially with a future federated approach. Collaboration with global partners including EUNIS and NII/SINET also continued.

eduroam: Record-breaking 8.4 billion national and international authentications; 5,400+ IdPs using CAT (6% growth); new geteduroam clients released.

eduGAIN: 78 identity federations, and a total of 5,790+ IdPs participating (10% growth); operations team implemented fully automated deployment strategy; new governance model implemented (eduGAIN members signed the new eduGAIN declaration); CSIRT created and ran security exercise; OpenID Federation pilot prepared.

Core AAI Platform: 500k+ users of services delivered on top of Core AAI Platform; 23 deployments in total, serving GÉANT community, e-science, HPC community, EOSC and student mobility; development and implementation work on advanced services (e.g. federated SSH solution and identity validation) progressed.

InAcademia: 3 new identity federations, resulting in a total of 13 federations in which inAcademia is actively used; 1,093 IdPs; 3.1M validations in 2024; implemented and launched the innovative plugin for SME e-commerce platform.

Network eAcademy: 12 new learning units published (48 learning units in total: 39 OAV, 6 Quantum, 3 OFTN); 4,146 individual trainings from 230 organisations in 55+ countries; 3 new Quantum learning units; new AI track defined; 2 OAV architecture analyses published.

Innovation: Above-the-Net, T&I and NetDev incubators continued to deliver innovative projects (Above-the-Net: 2 projects with 2 partners, T&I: 8 projects with 7 partners, and NetDev: 5 projects with 15 partners).

New GNA-G working groups: Securing GREN, Global LEOsat, and GREN Resilience WG.

Security services outreach: The first European Security Days conference was held in Prague, attracting 150 participants. CLAW 2024 held both online (May) and face-to-face (December) for a training exercise, with around 70 NREN participants.

Security Baseline: comparison with ISO27002 and NIS2 was published; awareness raised through successful Cyber Security Month, 3 NIS2 infoshares and three Security Bootcamps.

eduGAIN
78 Identity Federations
5,790+ IdPs

IaaS+ Frameworks
469 contracts
1010 institutions
28 countries
416 OCRE 2024 frameworks signed
€346M cumulative spend

CSM24
23 NRENs and RRENs took part
26 articles published
4 webinars
4 animated videos

Core AAI Platform
Supporting European Research Infrastructures, HPC and Student Mobility

8.4 BILLION USER AUTHENTICATIONS

106 TERRITORIES

10,000+ INSTITUTIONS

39,100+ LOCATIONS

#love2eduroam
#love2eduroam
#love2eduroam