



GÉANT recent developments and opportunities to consider for the Western Balkans

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GEANT South-Eastern Europe Directors Forum Chair and Coordinator

Making the most of existing and underused Research Infrastructures in the Western Balkans,
Sarajevo
14.09.2023

Supporting collaboration and development amongst researchers, the dissemination of information & knowledge, and providing access to a portfolio of services and infrastructure resources:



Runs a membership association for Europe's National Research & Education Networks (NRENs)
GÉANT Association



Coordinates and participates in EC-funded projects
Under Horizon 2020, the Horizon Europe programme, and other EC funding programmes, aimed at securing Europe's global competitiveness.



Operates a pan-European e-infrastructure
GÉANT network



Manages a portfolio of services for research & education
eduX



Organises and runs community events & working groups
TNC, task forces & special interest groups

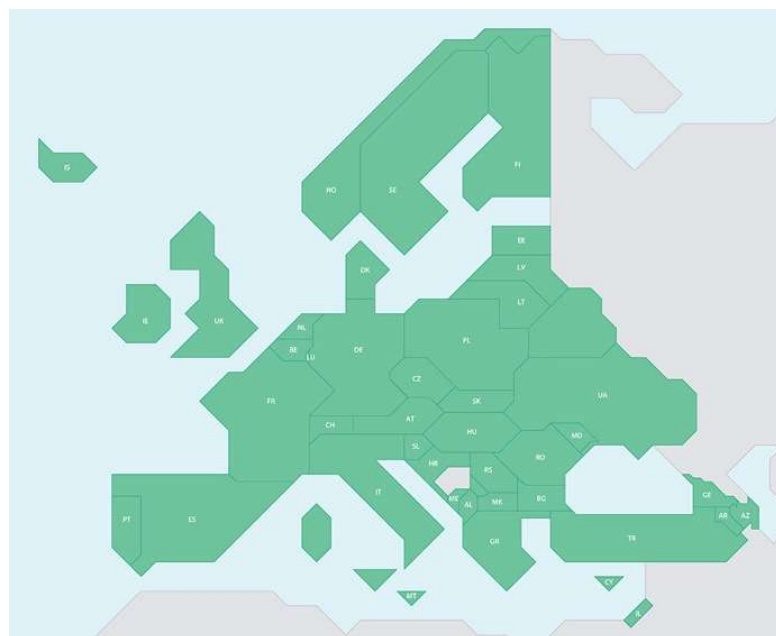
Membership Association

Mission: To empower Research and Education with an open, innovative, and trusted information ecosystem.

In Europe: 38 NRENs + NORDUnet, supporting 10,000 institutions and 50 million academic users



Membership Association



June 2023

NATIONAL MEMBERS

AL Albania	CZ Czech Republic	HU Hungary	ME Montenegro	SI Slovenia
AM Armenia	DE Germany	IE Ireland	MK FYR Macedonia	SK Slovakia
AT Austria	EE Estonia	IL Israel	MT Malta	TR Turkey
AZ Azerbaijan	ES Spain	IT Italy	NL Netherlands	UK United Kingdom
BE Belgium	FR France	LT Lithuania	PL Poland	UA Ukraine
BG Bulgaria	GA Georgia	LU Luxembourg	PT Portugal	
CH Switzerland	GR Greece	LV Latvia	RO Romania	
CY Cyprus	HR Croatia	MD Moldova	RS Serbia	

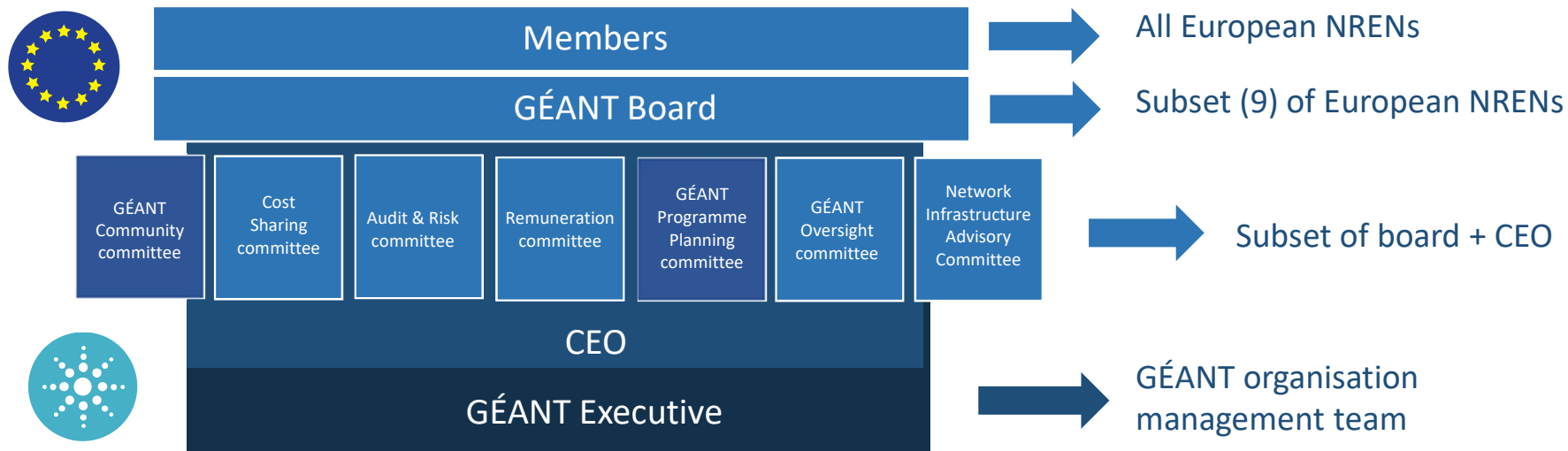
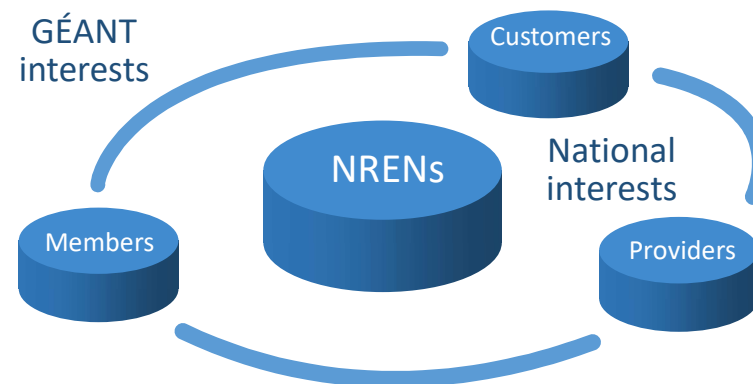
REPRESENTATIVE MEMBER (NORDUnet)

DK Denmark
FI Finland
IS Iceland
NO Norway
SE Sweden

ASSOCIATES

CERN
 DnIC (Denmark)
 European Space Agency
 CSC:FUNET (Finland)
 HNet (Iceland)
 KREN (Kosovo Research and Education)
 SUNET (Sweden)
 Sit (Norway)

Governance



Projects

GEANT's long-standing project relationship with the European Union (EU) has benefited research, education, and innovation around the world for over 25 years.



European
e-infrastructure
projects



Trust & identity
projects



Network
projects



Collaborative
projects



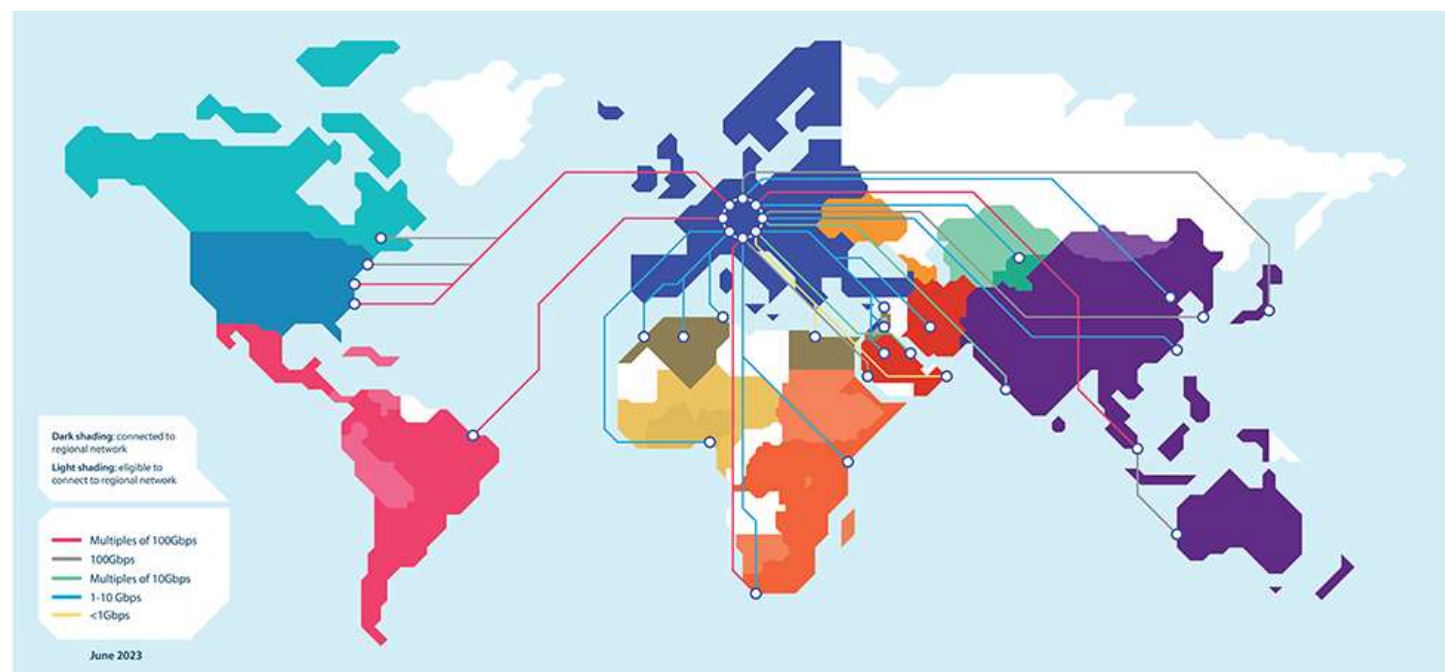
OPENCLOUDMESH



Network

The GÉANT network interconnects research, education and innovation communities worldwide, with secure, high-capacity networks.

We design, plan, build and operate the large-scale, high-performance GÉANT network that connects European NRENs to each other and the rest of the world for sharing, accessing and processing the high data volumes generated by research and education communities and for testing innovative technologies and concepts.



Network

A separate ultra-high-speed internet, only for research & education

Robustness

Over 1,000 terabytes of data are transferred every day via the GÉANT IP backbone.

Total reliability

99.999% average monthly access availability.

Flexibility

Services and infrastructure can be tailored to individual user requirements.

Capacity and rapid upscale

100Gbps (gigabits per second) services are now available across the core network, with a network design that will support up to 8Tbps (terabits per second), ensuring the network remains ahead of user demand and the data deluge.

Efficient operations

The dedicated GÉANT Operations Centre ensures 99% of cases are reported within 15 minutes of any outage being detected, leading to rapid resolution.

Services

A wide range of services including IP and dedicated circuits, testbeds and virtualised resources, authentication and roaming, monitoring and troubleshooting, advisory and support services.

Specialist Services

GÉANT develops the specialist services members need to support researchers, educators and innovators – at national, European and international levels.

GÉANT's portfolio of advanced services covers:



Network-centric
services



Trust, identity,
and security



Clouds and
Real-time
Communications

Network Services

GEANT operates an advanced, high-performance network supporting Europe's NRENs with cost-effective, highly available, high-capacity services customised for and dedicated to research and education

GEANT network services

GEANT IP – Ultra-high performance uncontended IP connectivity at up to 100Gbps or multiple 100Gbps connections

GEANT VPN – VPN services for NRENs and institutions supporting private networking needs

GEANT Point-to-Point – High performance dedicated connectivity up to 100Gbps for the most demanding applications

GEANT Open – Allows NRENs and approved commercial organisations to exchange connectivity in a highly efficient and flexible manner



Network Performance and Management

Supporting High Performance Networking



- TimeMap is an open-source weather map-like platform which provides per-segment latency/jitter measurements on a network.
- network.geant.org/timemap



- Argus is a tool for NOCs and service centers to aggregate incidents from all their monitoring applications into a single, unified dashboard and notification system.
- network.geant.org/argus



- The cost and complexity of developing and integrating in-house network management may be too high for many NRENs and institutions. NMaaS supports these users to provide an effective, efficient network and service management platform.
- network.geant.org/nmaas

Network Performance and Management

Supporting High Performance Networking

- perfSONAR**
- Network performance monitoring
 - Joint venture with Internet2, ESnet and Indiana University
 - Over 1650 measurement points deployed globally
 - Helping measure and diagnose performance issues for the R&E community



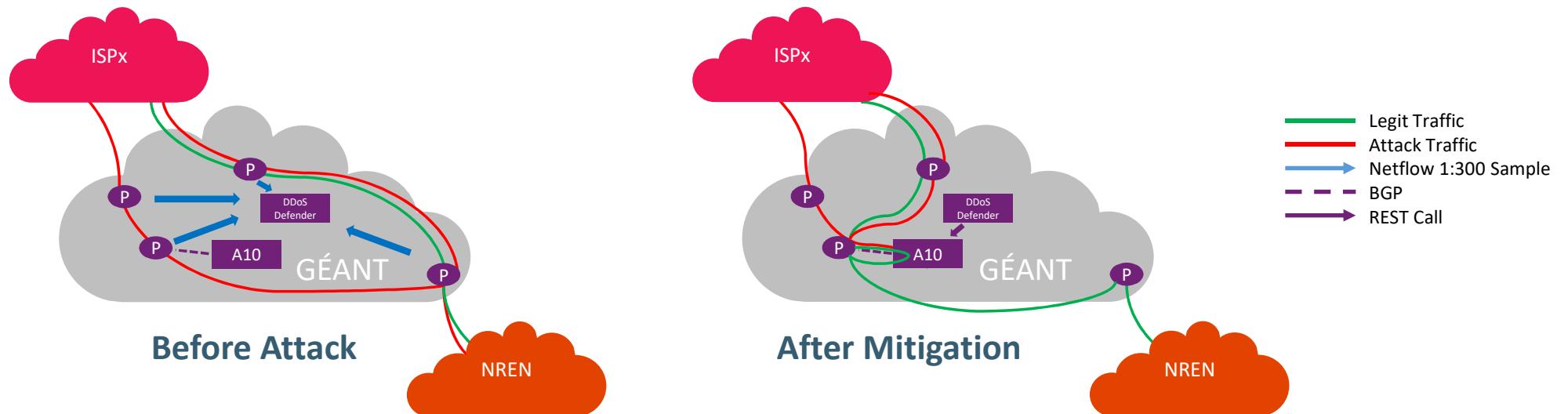
- Performance Measurement Platform**
- Performance Measurement Platform (PMP) is a successor of perfSONAR Small Nodes, successfully completed in the GÉANT project. It consists of Low-cost hardware nodes with pre-installed perfSONAR software
 - Deployed in GÉANT collaborating organisations in Europe and Africa.



- GÉANT CERT**
- Pan-European Computer Security Incidence Response Team coordination and a suite of network security tools (Distributed Denial of Service (DDOS) attack mitigation tools etc.)

GÉANT DDoS Cleansing and Alerting

- Distributed Denial of Service (DDoS) is a large and growing problem
- GÉANT DDoS Cleansing provides a dynamic, automated detection and mitigation service



- DDoS Cleansing uses Flowmon monitoring to divert DDoS traffic to A10 TPS service.
 - Can support up to 38Gbps throughput of attack data
 - No NREN staff resource required
 - No-cost option to add service to peering users
- Firewall on Demand remains to support inter-NREN DDoS

Trust & Identity

Supporting users and enabling secure access to services



eduroam - secure global roaming access service **250+ million authentications per month** in 101 territories



eduGAIN - interconnects identity federations around the world, simplifying access to content, services and resources ~ 3500 identity providers accessing services



InAcademia - Lightweight student validation service



eduTEAMS - Making managing virtual teams easy

Trusted Certificate Service – delivering cost-effective digital certificates.

Trust & Identity

Supporting users and enabling secure access to services



REFEDs – supporting identity federations worldwide



Trusted Introducer – services for security and incident response teams

Transits Training - Providing training and support for network security teams



GÉANT Security

Helping protect and secure vital Research and Education resources

- Production Services
 - **Trusted Certificate Services** - The Trusted Certificate Service gives NRENs and their constituents easy access to high quality certificates of the most used types: SSL, grid, client, code signing and document signing.
 - **DDoS Protection** - A combination of detection and mitigation tools protects the connection of an NREN from unwanted excessive traffic coming through the GÉANT network
 - **Firewall on Demand** - A BGP-FlowSpec-based (RFC5575, RFC7674) DDoS mitigation solution which was previously developed in earlier phases of the GÉANT project and is currently provided in the GÉANT core network

security.geant.org



GÉANT Security

Helping protect and secure vital Research and Education resources

- Training and Awareness
 - **CLAW** – The annual CLAW event supplies training and exercises for participants from NRENs for both communication teams as for technical (ICT, Security) teams as well as management.
 - **Training** - A range of security training services available, both classroom based and online.
 - Transits I and II: flagship classroom training for incident response team
 - Operational network security: Online training, 4 modules of 4 to 5 1-hour webinars
 - Forensics Online training 2 modules of webinars
 - Blue team training: A small scale online hands-on training for incident response teams focused on analysis and forensics.
 - Security awareness made easy with a library of materials and a full annual campaign every October - Cybersecurity month.

security.geant.org



GÉANT Security

Helping protect and secure vital Research and Education resources

- Research Activities
 - Tools for SOCs – Modular toolset tuneable for NREN needs
 - Vulnerability Assessment as a Service – A range of solutions (commercial and open-source) to support NRENs
 - DDoS tools – A set of tools to protect NRENs from external DDoS Threats
 - Business Continuity Frameworks – A set of frameworks to foster best practice
 - Cyber Threat Intelligence – Combining the power of NREN SOCs to build a Cybersecurity Intelligence Hub
 - Securing High Speed Networks – Assessing tools and methods for high speed networks

security.geant.org



GÉANT Security

Helping protect and secure vital Research and Education resources

- Security Baseline and Benchmarking
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eduroam

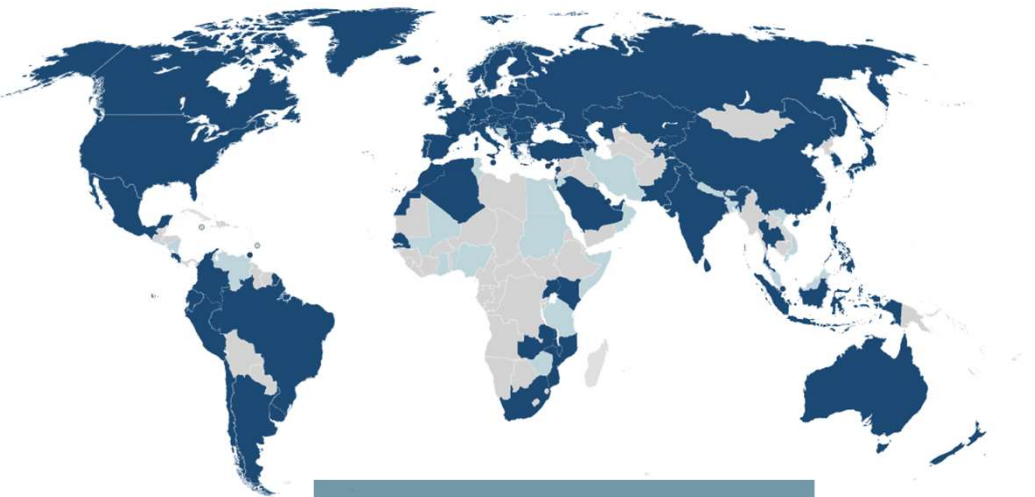
Linking students to the global community

eduroam provides a secure global roaming infrastructure for the research and education; users authenticate locally and get online in eduroam-enabled locations

**A global network of users across 106 territories.
More than 4 billion national and international authentications a year.**

A worldwide success story

From its early beginnings as a joint venture between a few European universities to today – with millions of users in more than 100 territories worldwide, eduroam has been an amazing success story and an example of research and education collaboration.



NEW

eduroam Managed IdP service to simplify onboarding of smaller institutions

eduroam.org

@eduroam

eduVPN

Open-Source, Free VPN solution for NRENs and Institutions

Institutions can build their own eduVPN service quickly and easily

Ideal for remote learning

17 Countries and over 100 Institutions using eduVPN



The screenshot shows the homepage of the eduVPN website. The header features the eduVPN logo (a graduation cap) and the GEANT logo. Navigation links include 'Participate', 'Documentation', 'Contact', 'Download', 'Join', 'About eduVPN', and 'Blog'. The main content area has an orange background with the text 'Access your institute's network or the Internet using an encrypted connection'. Below this are two buttons: 'Download eduVPN' and 'Join as a Participant'. An illustration of a person at a desk with a laptop and a whiteboard is on the right. The lower section, titled 'What eduVPN does', contains two columns: 'Institute Access' with an icon of a laptop and a building, and 'Secure Internet Access' with an icon of a laptop and a globe. Each column has a brief description of the service.

eduVPN

Participate | Documentation | Contact

Download | Join | About eduVPN | Blog

Access your institute's network or the Internet using an encrypted connection

[Download eduVPN](#)

[Join as a Participant](#)

What eduVPN does

Institute Access
Institute Access provides access to private networks where end-users can access internal resources within the internal network of their institute.

Secure Internet Access
Secure Internet provides secure and privacy preserving access from public networks by providing secure gateways to trusted networks.

eduVPN.org

eduMEET

Open-Source, Video Conferencing Software

Institutions can build their own eduMEET service quickly and easily

No client software – 100% web-based

Ideal for remote learning

eduMEET web-based videoconferencing platform

WHY EDUMEET TECHNICAL OVERVIEW INSTALL EDUMEET PRIVACY NOTICE CONTACT US

eduMEET is an interactive, web-based videoconferencing platform, supporting distance learning

Build Your Own eduMEET Service

Platform Overview

Clientless VC platform - No app downloads required

The eduMEET platform has been developed by the Research and Education community for the community. Enabling Institutions to build a low-cost, easy-to-use VC platform for small to medium sized groups.

As part of the GEANT 2020 Framework Partnership Agreement (FPA), the project receives funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 101017724

Cookies
Disclaimer
GEANT Anti-Slavery Policy

eduMEET.org

eduGAIN



Enabling secure Single Sign On services to global research and educational resources

Federated identities enable users to access a wide range of services using their account managed by their 'home' institution

- Improves access
- Improves security
- Reduces management overhead and costs.



eduGAIN.org

July 2023:

79 Federations active

9036 entities

5418 Identity Providers

3618 Service Providers

eduTEAMS

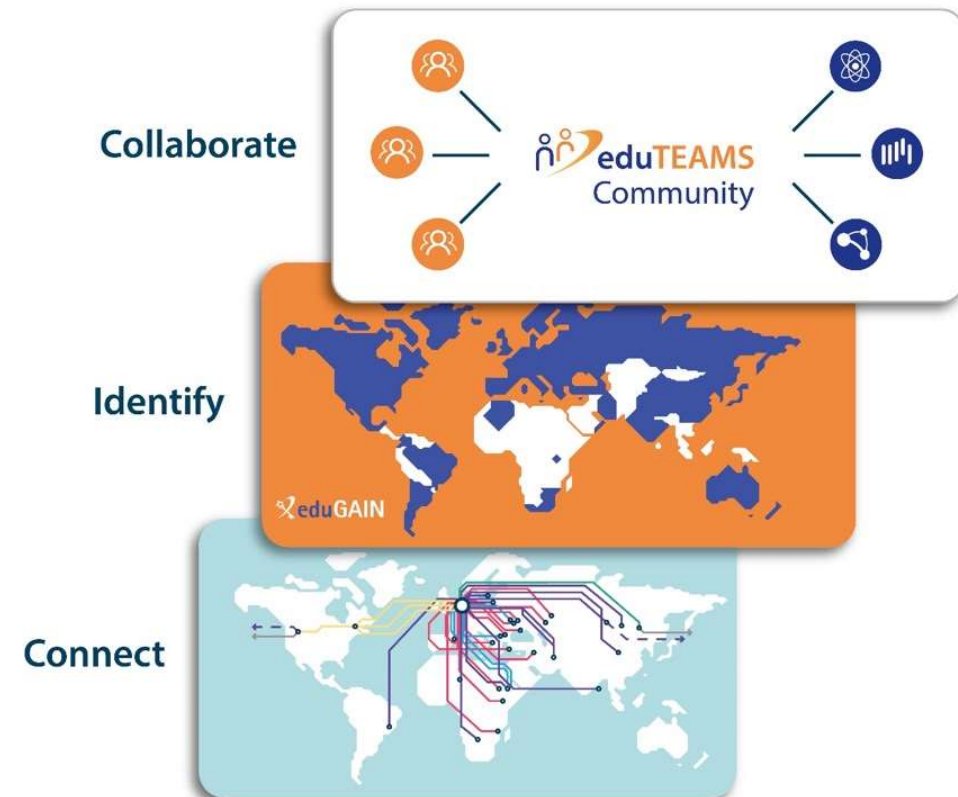
Making managing virtual teams easy

eduTEAMS leverages eduGAIN federated identities to support Virtual Organisation (VO) collaboration.

Enables teams to be created and managed flexibly and securely.

Provides consistent access and sharing policies across VOs.

Single Point of Management for community managers to add and remove users and services.



eduTEAMS.org

InAcademia

Online student validation

A lightweight federated identity process with minimal attribute release (essentially a simple yes/no).

Easy for Service Providers to implement.

Removes need for scans of ID cards or primitive e-mail address-based 'authentication'.

eduGAIN based identity verification for student offers/discounts



Welcome to InAcademia
InAcademia provides real-time, secure validation of student identities. Service Providers can now offer students special offers quickly, easily and cost-effectively.

How it works
InAcademia leverages the authentication technologies of eduGAIN to provide real-time verification for over 17,000,000 students across Europe.

Who is it for?
If you're an online service provider and want to offer services to education then InAcademia provides confidence in their academic credentials.

InAcademia Pricing
InAcademia has a range of flexible pricing plans to support all business types including not-for-profit, local and multinational service providers.

inacademia.org



Cloud Services

Cloud services offer NRENs and Institutions improved flexibility and the ability to access a wider range of services and technologies to support their users;

- Infrastructure as a Service
- File Storage & Sync
- Collaboration
- Real-time Communications
- E-learning and Education
- Software as a Service

Cloud Connectivity

GÉANT works with major Cloud Service Providers to enable interconnectivity facilities (shared or per project) to support high performance cloud services



Outsourced clouds



In-house clouds

clouds.geant.org



GÉANT 2020 Cloud Framework by OCRE

OCRE (Open Clouds for Research Environments) is an EC funded project to provide research and education users easier access to cloud services across Europe. It supports 40 European countries with a framework of 473 commercial cloud contracts to ease access and provide volume discounts to research and education institutions.

Working in conjunction with members of the GÉANT project, this framework offers substantial benefits to the R&E community.

Reduced Cost and Complexity

The framework reduces the cost and complexity of cloud service procurement

- No institutional tendering is required
- Significant discounts are available thanks to pan-European aggregation and the economies of scale
- Advantageous terms and conditions on offer

The frameworks are in compliance with all relevant EU Regulations (Procurement, VAT, GDPR etc.). Call-off Contracts with supplier are under local laws and local in-country platform support and call-off is provided as standard.

clouds.geant.org/OCRE

Users We Work With



Scientific User Groups We Liaise With

Physical Sciences

Exploring the universe, e.g. SKA, LIGO-VIRGO and CERN, Neutrino observation



e-Infrastructures

e.g. PRACE, EGI, EUDAT, EOSC-hub, EuroHPC-JU



Health and Food

Pharmaceutical research, e.g. EMBL-EBI, Human Brain Project



Earth and Environmental Sciences

Earth observation, climate monitoring, sustainable development, e.g. EUMETSAT, Copernicus, ESA, Group on Earth Observation, WMO



Arts & Humanities

Music, art, language, e.g. CLARIN, ASTRA, LoLa



Energy

Nuclear power, fusion energy research, e.g. ITER



Community Events & Clusters

GÉANT invests in the research and development of network architectures, technologies and paradigms to develop into the services, processes, tools and network capabilities of tomorrow.



Community
Conference



Special Interest
Groups and
Task Forces



Research
Programmes



Service
Development

community.geant.org

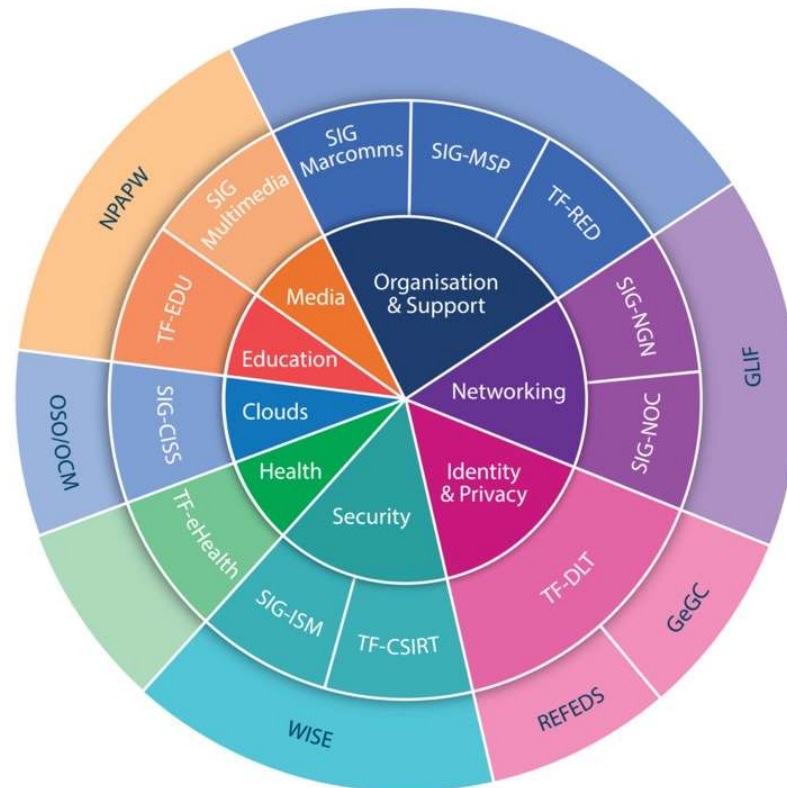
Special Interest Groups & Task Forces

Special Interest Groups (SIGs) & Task Forces (TFs)

- Enable collaboration across the community for the development of the next generation of networking technologies and services.
- Explore emerging issues in research and education networking, develop strategies and solutions to address them.
- Produce and test fresh and innovative ideas applied through specific research activities and initiatives.
- Welcome grass roots and world experts.
- SIGs and TFs receive secretariat support from GÉANT with funding through the (GN5-1) GÉANT Project

community.geant.org

Special Interest Groups & Task Forces



community.geant.org

GEANT and the NRENs

- Working toward strengthening the role of the NRENs in the SEE
- SEE Directors Forum
 - GEANT places particular focus on monitoring and proactively supporting SEE NRENs, as well as monitoring potentially at-risk NRENs who need further assistance
 - A platform for regional collaboration
- Deliverable on the developing NRENs in the SEE region (available to the NRENs)
- SEE Users Forum
 - Increasing the research engagement of the NRENs by addressing the end-users

An on-going collaboration : SEE Directors Forum

1. Overcome network gap
2. Harmonize regional infrastructure
3. Bridge the digital divide



SEE Users Forum

- Co-organized event by GEANT, NI4OS-Europe and EOSC-Future
- More than 270 registered participants
 - Researchers
 - Service providers
 - NRENs
- Two-day online event
- Topics
 - Open science and supporting infrastructure
 - EOSC from the perspective of users and service providers
 - Regional EOSC services onboarded through NI4OS Europe
 - AAI and federated identities
 - Regional best practices

SEE Users Forum takeaways

- End-users are the most important element of the Open Science ecosystem
- GEANT and NRENs enable digital excellence in the R&E community. NRENs meet users' demands to leverage economies of scale, bring down network costs nationally, and connect with the wider R&E community across the world to share expertise and best practices.
- In order to enable the wider adoption of Open Science practices we need a change of mentality among researchers, we need to reassure researchers that sharing data sets will not jeopardise or compromise their research efforts, but on the contrary it will boost their visibility, discoverability and networking/collaboration opportunities
- The research environment and the NREN domain are changing fast, identity federations and Open Science are changing the way we work. Sharing and learning are vital, we are in the middle of a fundamental transition, let's start collaborating!
- Make Open Science the right way to do science!

<https://see-userforum2021.geant.org/>

What's next

- Regional collaboration has proven to be highly effective in the WB
 - Helping each other
- Joining forces on multiple levels
 - policy
 - technical
 - organisational
- GEANT's commitment toward the region is strong and ongoing
- Significant network upgrade through GN4-3N (100G multiple connections)
- The support continues in the GN5-1
- Leave no one behind!

GN5-1 in numbers



37 Partners (including GÉANT Association), 2 Associated Partners (SWITCH, JISC), 43 Countries
200+ FTEs (average per year over project duration)

GN5-1 total costs: € 82.64M; EC funding: € 55M



9 Work Packages, 42 Tasks
36 Deliverables
46 Milestones



Thank You

Any questions?

www.geant.org



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the European Union