GÉANT Strategy 2020

Over the Horizon

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Foreword

This document is the result of the work in the Strategy and Innovation Committee (SIC). This GN3plus working group was set up to provide a long-term vision, strategy and innovation agenda for GÉANT.

The work in SIC has been governed by the Terms of Reference set by the GN3plus Assembly.

As part of the work in the SIC group, a number of hearings, surveys and debate sessions with various stakeholders have been held, in order to involve as broad an audience in the strategy as possible and to ensure that no question or position is forgotten in the process.

However, many of the stakeholders may not recognise their own contribution in the document due to the sheer number of inputs. It is, however, the hope of the committee to have landed on the right balance between general principles and more specific focus areas.

The Strategy and Innovation Committee (SIC)

Chair:
  Erik Huizer
Members:
  Claudio Allocchio
  Martin Bech
  Josh Howlett
  Janos Mohacsi
  Alberto Perez Gomez
  Stanislav Sima

Executive Summary

The GÉANT community consists of Europe's National Research and Educational Networks (NRENs) working together, currently supported by DANTE and TERENA. This collaboration develops and operates the large network infrastructures and related services, enabling excellence in research and education and helps close "the digital divide" across Europe.

Towards 2020, the GÉANT community will provide an open, innovative and trusted information infrastructure for the European knowledge economy and

- Maintain the position as a provider of infrastructure services clearly ahead of the commodity market.
- Focus on the collaborative effort to innovate the service portfolio, creating more advanced services.
- Organise the whole ecosystem of service delivery from NRENs to other NRENs.
- Harness the services of the NRENs to create a one-stop-shop for international organisations.

Contents

GÉANT today

Before talking about a future for GÉANT, let's establish what GÉANT is today, as a starting point for our thinking.

Examples of the use of the term 'GÉANT' are given on page 15.

What is GÉANT?

The GÉANT community consists of Europe's National Research and Educational Networks (NRENs) working together, currently supported by DANTE and TERENA. (Note: The GÉANT community is currently reviewing its organisational support structure to best fit the strategy outlined in this document.)

Together, they connect to over 50 million users at 10 000 education and research institutions across Europe.

- The GÉANT community is an alliance of NRENs to allow the global business of research and education to span between the NRENs' national constituencies. It enables NRENs to share assets, supported by an underlying framework of contracts and reimbursement models, enabling a rapid response to the needs of international projects and organisations. The GÉANT community functions sufficiently effective in this respect that even the largest and best-resourced NRENs choose to use it as their preferred vehicle to support their interests at the European or international levels.

- The GÉANT community is a consensus-driven collaboration. Within our community, real progress is achieved through democratic processes. We focus on strategic objectives that are universally shared, or not at all. This does not imply unanimity is needed on specific issues that are subordinate to the strategy (for example, deployment architectures, technology choices, or pricing models), where compromise is often necessary, or where multiple approaches can be completed in parallel.

- The strategic objectives GÉANT community have to resonate strongly with the NRENs' own strategic objectives as buy in from the NRENs is essential for it to succeed. The strategic objectives also consider other stakeholders, including the R&E community and the European Union. In the long run, generous funding is no substitute for intelligent, engaged, and aligned partners; collaboration should therefore take precedence above securing subsidies.

- The GÉANT project, serving the GÉANT community by offering networks and services and coordination of initiatives, is not just another ISP. The GÉANT project is fundamentally driven by its community. Innovative ideas percolate up from NRENs and their constituencies, coalescing into propositions that are delivered back to, and by, the community, in an agile manner and without red tape. This is a key differentiator from commercial ICT providers.

- The GÉANT community is committed to a long-term collaboration. An endeavour of the scale and complexity of GÉANT has to be sustained over long cycles. We may not know all the details of the general environment in 2020, but we can be specific about our long- term aspirations. By acting as a coherent community, organised around common long-term goals, we can realistically think about shaping the future that we jointly aspire to.

- The GÉANT community is a European collaboration. Our geographical proximity, a similar regulatory environment, with common users, shared values and funding possibilities are powerful incentives to work together rather than alongside or against each other.

- Within the framework of the GÉANT community, people are working in collaboration across Europe and across the World. These engaged and enthusiastic subject matter experts are the foundation for everything GÉANT is today. These people are the key core raw material that built the present prominent position and the sole raw material that can secure GÉANT in a central role in the realisation of the 2020 European "Communication Commons".

Note: The GÉANT community is currently reviewing its organisational support structure to best fit the strategy outlined in this document.

European GÉANT

GÉANT connects Europe's National Research and Education Network (NRENs). Together, they connect to over 50 million users at 10 000 institutions across Europe.

In terms of network coverage, GÉANT operates one of the world's largest research and education networks, comprising 25 European POPs, 24 000km of dark fibre on 18 routes, and 50 000km of network infrastructure on 44 routes.

The GÉANT Consortium in 2014 consists of 70 partners: 37 National Research and Education Networks, NORDUnet (representing five Nordic countries), 30 Open Call beneficiaries, TERENA and with DANTE as the coordinator.

The European members of the GÉANT Consortium and NRENs that GÉANT serves are as diverse in their make-up and organisational structures as our users. They include: Armenia (ASNET-AM), Austria (ACOnet), Azerbaijan (AzRENA), Belarus (BASNET), Belgium (Belnet), Bulgaria (BREN), Croatia (CARNet), Cyprus (CyNet), Czech Republic (CESNET), Estonia (HITSA), France (RENATER), Georgia (GRENA), Germany (DFN), Greece (GRNET), Hungary (NIIFI), Ireland (HEAnet), Israel (IUCC), Italy (GARR), Latvia (SigmaNet), Lithuania (LITNET), Luxembourg (RESTENA), Macedonia (MARnet), Malta (UoM), Moldova (RENAM), Montenegro (MREN), the Netherlands (SURFnet), the Nordic countries (NORDUnet, representing Denmark – DEiC, Finland – Funet, Sweden SUNET, Norway – UNINETT and Iceland – RHnet), Poland (PSNC), Portugal (FCT), Romania (RoEduNet), Serbia (UoB / AMRES), Slovakia (SANET), Slovenia (ARNES), Spain (RedIRIS), Switzerland (SWITCH), Turkey (ULAKBIM), Ukraine (URAN) and the UK (Janet).

GÉANT pan–European R&E Network
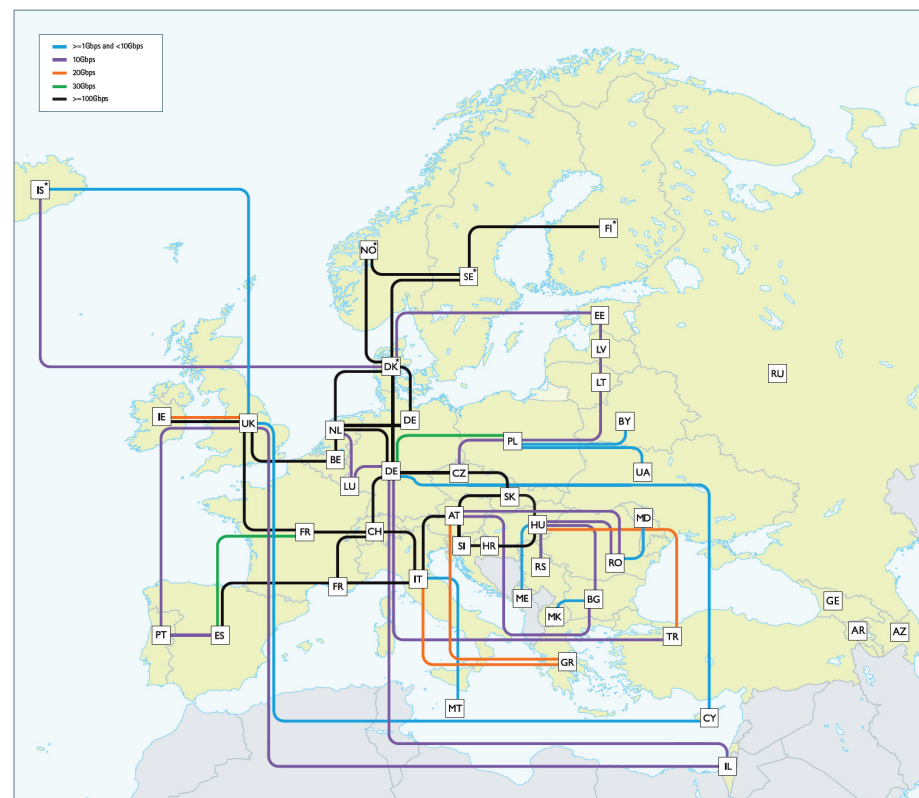
GÉANT connectivity as at January 2014. GÉANT is operated by DANTE on behalf of Europe's NRENs.
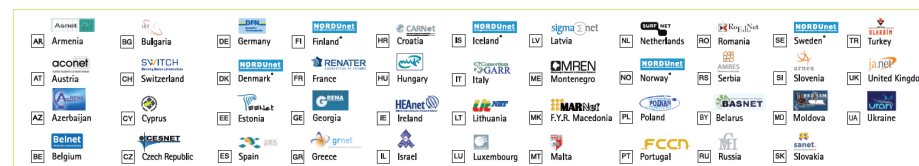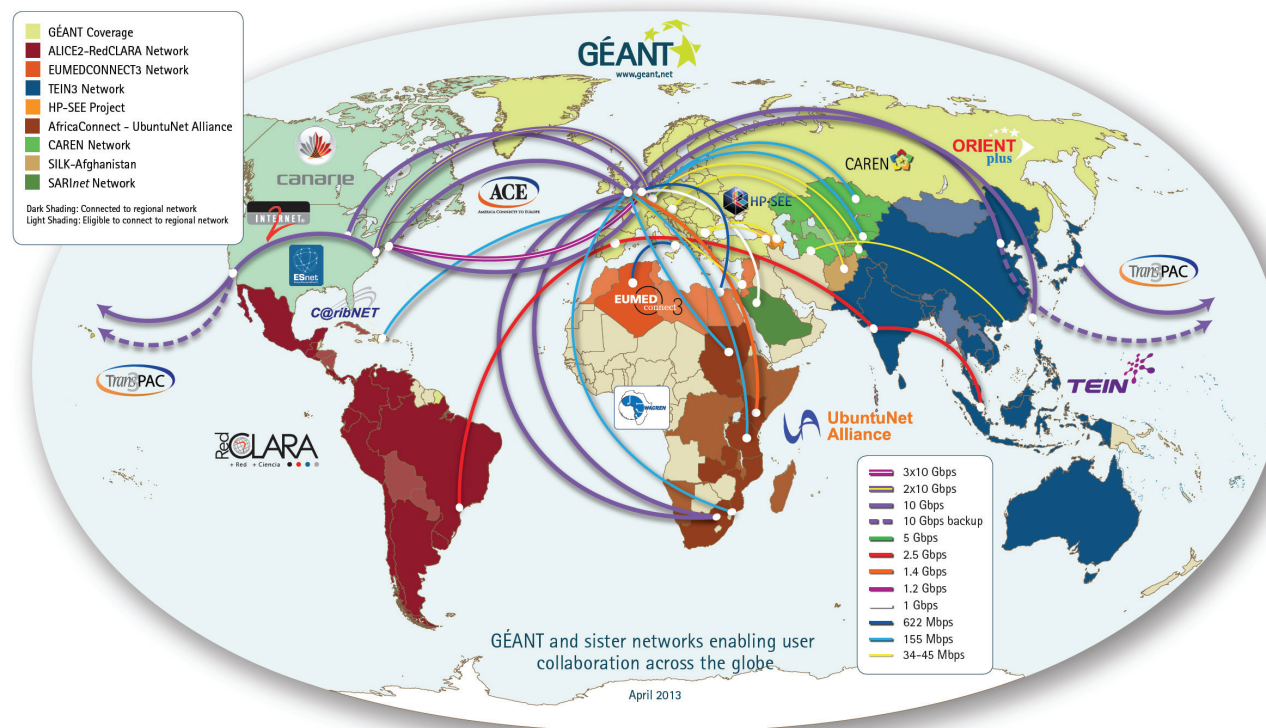
Global GÉANT

GÉANT At the Heart of Global R&E Networking

GÉANT has an incredibly diverse international footprint, and today connects with more than half the countries in the world. This position will be retained in order to facilitate macroeconomic growth in Europe and facilitate European exports of Higher Education to the fast-growing, emerging economies. A continued global leading position is also needed in order to meet the coming requirements from CERN, ITER, Square Kilometre Array (SKA) and other mega-sized science projects.

Legend:
- GÉANT Coverage
- ALICE2-RedCLARA Network
- EUMEDCONNECT3 Network
- TEIN3 Network
- HP-SEE Project
- AfricaConnect – UbuntuNet Alliance
- CAREN Network
- SILK-Afghanistan
- SARInet Network

Dark Shading: Connected to regional network
Light Shading: Eligible to connect to regional network

Bandwidth legend:
- 3x10 Gbps
- 2x10 Gbps
- 10 Gbps
- 10 Gbps backup
- 5 Gbps
- 2.5 Gbps
- 1.4 Gbps
- 1.2 Gbps
- 1 Gbps
- 622 Mbps
- 155 Mbps
- 34–45 Mbps

GÉANT and sister networks enabling user collaboration across the globe

April 2013

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DANTE www.dante.net GÉANT www.geant.net

SEVENTH FRAMEWORK PROGRAMME

Co-funded by the European Union

Setting the Scene

The GÉANT community is set up to create the European "communication commons" for research, education and culture, with advanced services for European users to access talent and resources anywhere in the world. In short, this means that talents anywhere are able to collaborate with their peers around the world and to have instantaneous and unlimited access to any resource for knowledge creation, innovation and learning, unconstrained by the barriers of the pre-digital world.

The GÉANT community collaboration is seen as a great success and wants to continue to be successful in supporting R&E towards the future. European NRENs have identified the need for a single, overarching, shared strategic vision of their collaboration in the GÉANT community to drive the common effort among participating organisations and central coordination bodies to share policies and services inside the Community. Based on that strategic vision GÉANT and its community will move forward.

This document reflects that strategic vision. It should allow viable operating plans to be constructed and executed in pursuit of specific shared strategic objectives, including projects to submit to the EU in this period under a Framework Proposal Agreement (FPA).

The strategy takes into account where GÉANT is, today, and where opportunities for further innovation and improvement lay, and will consider the changing global context where market and technology trends that relate to GÉANT are taking place. It is building on work done by the GÉANT Expert Group, and by projects such as ASPIRE, and the discussions that have taken place within the GÉANT community over the past half year.

The world in which GÉANT operates

- Emergence of a global, networked, knowledge economy, typified by:
  - Explosion of data.
  - Real-time services.
  - Mobile and location based services
  - New ways of production and collaboration, enabled by digital technologies and networking.
  - Access to (and sharing of) new resources such as 3D printing.
  - Increased awareness of and need to deal with privacy issues.
  - Changes the way research and education is organised.
- The Internet is increasingly global in the way it connects (with global governance, standards and services); national borders become less significant when it comes to networking and use of ICT.
- The global economy has suffered from recession and lack of access to investment funds, and seems to be slowly recovering. Governments in Europe are generally focused at keeping a tight budget regime, which affects the willingness/ability to invest in research networks, as well as in making budget available to the European Union.

- European priorities have been to move decisively beyond the crisis and create the conditions for a more competitive economy with higher employment. The Europe 2020 strategy is about delivering growth that is: smart, through more effective investments in education, research and innovation; sustainable, thanks to a decisive move towards a low-carbon economy; and inclusive, with a strong emphasis on job creation and poverty reduction. Justification for European investment in GÉANT projects and research networks is based on its expected contribution to these overall goals. The strategy towards smart growth rests on three flagship initiatives, one of them being "Innovation Union" in which Europe seeks refocusing of R&D on major societal challenges, and strengthening every link in the innovation chain.

GÉANT Vision

World-leading knowledge communities need access to trusted, effective and efficient information services and products that enable and enrich collaboration, and which also provide new and innovative possibilities to users. These must be delivered in an environment where providing value to the user at the same or even decreasing cost will be increasingly essential.

In order to deliver these to their national constituencies, NRENs move forward by working together within a flexible and agile framework for collaboration that delivers services in the most efficient way; and that facilitates the development of new services needed for the future.

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GÉANT Mission

To provide an open, innovative and trusted information infrastructure for the European knowledge economy.

GÉANT Ambition

To be a successful collaboration delivering to the needs of the NRENs, and to have the GÉANT community networks and services as the preferred-choice supplier to the European R&E community.

- To deliver services in the most efficient way.
- To drive innovation by facilitating the development of services needed by R&E users for the production of, and access to, trusted and fit-for-purpose services and products.
- To promote new and innovative possibilities for the World's leading knowledge communities.

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Strategic Vision

The Challenge

The challenge for the GÉANT community will be to maintain its lead in excellence in the world, by making best use of its assets and stepping forward to address new challenges. It is key that priorities for international collaboration are made in such a way that the community as a whole is best served, and that contributions are delivered by those members in the community (i.e. NRENs, DANTE or TERENA) that can best deliver.

The Vision

The strategic vision for 2020 is inspired by how the stakeholders would like GÉANT to look in 2020, and takes into account the strengths and weaknesses that are currently part of GÉANT's project (but not limited to) operations, and the opportunities and threats that are the result from changes in the world that cannot be controlled by the GÉANT community.

World leading knowledge communities need access to trusted, effective and efficient information services and products that enable and enrich collaboration, and which also provide new and innovative possibilities to users. These must be delivered in an environment where providing value to the user at the same or even decreasing cost will be increasingly essential.

In order to deliver these to their constituencies, NRENs will need to move forward by working together within a flexible and agile framework for collaboration that delivers services in the most efficient way; and that facilitates the development of new services needed for the future.

The GÈANT community will be the place where innovation and collaboration are important drivers. Significant resources will be dedicated to research and to support new ideas and requirements coming from the users. Key principles in achieving this vision are:

In 2020 ...

In 2020, GÉANT collaboration is a public-interest body that provides information logistics to global knowledge communities. In doing this, the GÉANT environment facilitates the free movement of knowledge and information within the Knowledge Economy. The GÉANT community achieves this by building and integrating abundant advanced e-infrastructure services from both commercial and non-commercial providers, building on the advanced data network and services developed over the course of its first decade.

In 2020, GÉANT provides value to the R&E community through a set of advanced (but fit for purpose) services. These are delivered through advanced data-networks (optical, wirefree etc.), operated by the GÉANT community, including a transparent combination with commercial services. The GÉANT community will strike the balance between innovative and advanced services on one hand and the specific needs of the knowledge communities it serves on the other hand. The GÉANT community has an important role in managing the transaction costs and barriers associated with issues such as trust, intellectual property rights, and information security implied by a heterogeneous environment.

Innovating by collaboration

NREN services within the European Research Area need to remain distinctive and of continuing value to those consuming them. This means that there must be a framework for rapid, agile and responsive innovation. Collaboration is vital in harnessing the skills, expertise and enthusiasm of the whole NREN community and – vitally – more widely as the services to be delivered broaden in scope.

Exploiting available resources

The current economic and financial pressures across Europe will have two consequences for the continued provision of services. There will be downward pressure on the levels of central funding from governments and from the European Commission, and so any shortfalls will need to be made up by charging the users of the services directly. This will fundamentally change the relationship between the provider and the consumer of these services, requiring new cost allocation approaches.

Towards 2020

We will need to be clear on where the priorities are, in terms of investment of creative energy and money. And it means making the very best use of the joint resources available: both those that are and will be available to the participating NRENs, and those that have been put in place and are to be put in place to complement the resources already available to the participating NRENs.

This also means that GÉANT project(s) will need to be clear on the offerings towards its community. The R&E community will need to know what it can expect, in terms of advanced trusted connectivity and services today and towards the future; and what GÉANT will do to ensure delivery.

Strategic goals:

- GÉANT provides value to the R&E community through a set of advanced networks (optical, wirefree etc.) and services, operated by the GÉANT community, in combination with commercial services at competitive costs
- GÉANT ensures a trusted, secure and safe digital environment to serve the R&E community that is by its nature open. This is achieved by ensuring that the values and character of the R&E community are understood and respected operationally within the infrastructure;
- GÉANT is a critical enabler in achieving Europe's Horizon 2020 vision and

maintaining an open, trusted and accessible Internet, directly contributing to "the free movement of knowledge" as ratified in the Lisbon Treaty, December 2009.

- GÉANT is to lead the market with innovation and services that are ahead of the market, taking the next frontier, making best use of the excellence of the NRENs.

Way of working

In order to pursue these strategic goals, operating plans need to be developed. These operating plans may involve different combinations of partners, appropriate to the task in hand. As a general principle, execution will be devolved to those charged with delivery within the federated model, with accountability demanded in return. The following elements are important in driving these operating plans:

Federated approach

Rather than choosing a centralised vs. decentralised model of governance, the choice is to combine the advantages from both by working in a federated way. Some services will be provided "from the centre" and other services will be provided in a decentralised, or a federated way, as successfully demonstrated with "eduroam". This "federated model" forms the basis of the strategy for GÉANT outlined in this document. This is also in line with the European Subsidiarity principle.

Ecosystem in which innovation is stimulated and facilitated

It does imply the creation and maintenance of an ecosystem in which innovation is stimulated and facilitated by ensuring a framework that allows ideas to come to full fruition, and by ensuring the emergence of a transparent internal market that will allow users to make the best use of what is on offer. To remain leading-edge innovative, public funding is a prerequisite.

Diversified strategies

Working together does not imply a single common strategy for all NRENs at the national level. This is neither feasible nor desirable, as each NREN is driven by its own national priorities. Different approaches will therefore be both possible and welcomed within the strategic vision. Such differences will allow for a comparison of different approaches, by trying multiple approaches in parallel.

Transparent costs

Services offered within the GÉANT community deliver mainly features and benefits that cannot be obtained from the market, yet as costs matter, this will require a transparent calculation and charging of costs to users.

Leverage collective purchase power

In general, NRENs collectively represent a powerful level of purchasing power that has not yet been fully explored. GÉANT as one

collaborative entity will seek to leverage the collective purchasing power of the NRENs in all aspects where it can create business and service value for the NRENs.

Engaging with relevant standardisation bodies and international NRENs

As solutions increasingly need to be global, global collaboration needs to be sought in order to ensure global connectivity. Europe's communication commons cannot be excellent in isolation, and we need to have the external parties, including industry, to adopt good ideas and solutions that the GÉANT community creates.

Public-Private partnerships

In order to transfer knowledge, and to benefit from developments in industry, working closely with commercial partners in public-private partnerships is an important tool.

Addressing the "Digital divide"

GÉANT will seek to build on past successes and present capabilities by delivering innovative, trusted, secure and reliable services to all. Services will continue to be provided to bridge the digital divide and enable the free circulation of researchers, information and technology. This is in support of the EU's 'fifth freedom' – the free movement of knowledge – as ratified in the Lisbon Treaty, December 2009.

Examples of services delivered by GÉANT in 2020

- High-speed networks that are abundant and easy to access. General-purpose networks will not be optimised for scientific Big Data flows and real-time high precision interaction. This is precisely where GÉANT network(s) can make the difference.

- Learning and researching everywhere, anytime with any device is vital for our community. End-user access to the GÉANT environment will be enhanced by a highly available, trusted and robust wire-free infrastructure. This cannot be provided by a single institute or NREN; GÉANT needs to play a lead role as coordinator, facilitator and service coordinator.

- Collaboration is the basis of every modern scientific endeavour. eScience is enabling that collaboration by allowing groups of scientists around the globe to share networking, resources, data and services. The GÉANT project and its NRENs should support this with robust Authentication and Authorisation Infrastructures (AAIs), with group collaboration and by providing advanced services.

- Cloud and programmable networks will be the default model for distributing online services. A generation of users in R&E has grown up choosing their own devices and services and cloud services seem natural to them.

- Trust is a basic requirement for the users of our networks. The recent debate about unlawful interception by foreign agencies has shown how fragile trust in networks can become. We have a duty of care to our constituencies to safeguard this trust. This means guaranteeing privacy through policy and technology and ensuring the robustness and trustworthiness of systems by continuous security improvements.

The term 'GÉANT'

Examples for the use of the term 'GÉANT'

The table shows how 'GÉANT' may be used and combined with another word to convey a particular meaning. GÉANT is an international trademark.

Further information on the background and the appropriate use of the GÉANT name, together with other elements of 'house style' are to be made available on the GÉANT project intranet.

Note that individual authors or a group of authors responsible for a document should not claim to speak on behalf of GÉANT: the term must be used only when expressing an officially approved position of the community.

DANTE and TERENA
GÉANT should not be used to refer to the DANTE or TERENA organisations: these are essential GÉANT shareholders but they are distinct entities in their own right.

Term	Meaning	Note
GÉANT	Can be used as a short version of: 'GÉANT community", 'GÉANT network' or 'GÉANT project' (but see Note).	Used for brevity only when the meaning has been established (e.g. in the same paragraph or in a footnote).
GÉANT network, or GÉANT infrastructure	The pan-European R&E network and multidomain service platform that interconnects Europe's NRENs plus circuits related to other projects having the GÉANT backbone as terminating point.	The network co-funded by the active EC project. It may include some cross-border fibres and resources provided by the NRENs.
GÉANT Consortium	The 70 project partners – DANTE, TERENA, 37 European NRENs, NORDUnet (representing five Nordic countries) and 30 Open Call beneficiaries.	
GÉANT community	The 70 project partners – DANTE, TERENA, 37 European NRENs, NORDUnet (representing five Nordic countries), 30 Open Call beneficiaries, *plus* the many users of GÉANT services or cascaded services.	'GÉANT community' should be explicitly used in many cases for clarity.
GÉANT footprint	The geographic reach of the GÉANT network and its NRENs' networks (as described by the topology map).	
GÉANT environment	The sphere of research, innovation and learning of which the GÉANT community is a key component.	
GÉANT landscape	The distinctive features of the environment/communities in which the GÉANT community operates.	
GÉANT stakeholders	All those groups with a vested interest in the project and its activities including the project partners, EC and national funding bodies, the R&E community including large user groups and projects. Arguably, it even includes the general public as it is their money being spent.	
GÉANT multidomain Services	The service offered by the GÉANT network and the NRENs or end-user networks acting as a single domain. These include GÉANT connectivity services, GÉANT network performance services, GÉANT user access and application services.	The services working in a multi-domain environment, which may include the end-user.
GÉANT project	The GÉANT network and associated programme of activities, which is made up of the GÉANT Consortium and co-funded by the European Commission.	The term should be used for all external communication, unless a particular project (GNx) needs to be identified for administrative purposes.
GN3plus	The administrative name for the current instance of the GÉANT project, which runs from 1 April 2013 to 31 March 2015.	Use is confined to internal audiences, administrative, legal and policy communications.