GN3plus External Advisory Committee

White Paper on the Structure of GÉANT Research & Development

Executive Summary

The External Advisory Committee (EAC) of GN3plus is a consultative and advisory body providing an external perspective to the GN3plus Assembly to assist in the development of policy and practice.

The EAC understands that the EC is examining the integrated nature of the EC co-funded GÉANT programme, and considering the possibility of splitting the research and development (R&D) activities from the research networking service into individual calls for proposals in the Horizon 2020 Work Programme. This short white paper contains the views of the EAC on these possible changes.

The EAC considers that the organisation of pan-European research networking research, development, production and delivery in a single, integrated programme has proven to be the optimal structure to deliver the desired outcomes. For example, close NREN collaboration has already resulted in highly successful, user- and performance-driven innovations such as eduGAIN, eduroam and perfSONAR. This success can be attributed to the ability to adapt research and development efforts in an agile manner to address specific and unique user requirements as they emerge. In the EAC's view, this agility is best achieved when driven by a coherent overall strategy within an integrated GÉANT programme.

While it is acknowledged that individual user needs should set the direction of specific research activities and Open Call topics, allowing them to dictate the structure which organises those activities will lead to the inefficient allocation of resources and an inability to serve multiple user communities. Open Calls in particular have potential to encourage further proactive and innovative user input.

Already the existing network infrastructure includes components allowing a high level specialisation and the adaptation to specific user needs, e.g. dedicated light-paths, private networks, etc. A deeper analysis is required to understand if and how a ground-up, vertically integrated e-Infrastructure can cost-effectively meet the needs of its users, and what the requirements are of, and on, the existing horizontal infrastructure.

Moving away from the integrated development and delivery model of GÉANT towards vertical delivery of e-Infrastructures services to specific users will likely lead to duplicated efforts, increased costs, and poorer results, and could even prove to be fatal to GÉANT as the pan-European research and education network. The EAC does not believe it is possible to provide one-off research networking solutions for individual user disciplines in a scalable manner – unless the vertically integrated delivery model assumes the availability of some underlying (horizontal) infrastructure it risks an alternative, parallel construct to GÉANT

developing, resulting in less efficient use of EC funding and duplicated activity. Alternative, competing research network initiatives which have been attempted in the past have shown that these are not to be encouraged.

In the view of the EAC, the European Commission and the GÉANT partners should realise the full potential of the partnership nature of the Framework Partnership Agreement currently in preparation, and work closely together to develop a clear vision for European e-Infrastructures which will best serve the user community to 2020 and beyond.

The EAC recommends that the EC co-funded GÉANT activity should continue in an integrated manner encompassing both R&D and production services; Open Calls should continue to be used to widen participation (including user participation) and to address specific research issues; specific support should be provided for engagement with other e-infrastructures and industry; and resources made available for the commercialisation of research networking services and the protection of intellectual property rights (IPR).

Context

Organisation of pan-European research networking research, development, production and delivery in a single, integrated programme has proven to be a very successful model. This is evidenced in particular by:

- 3 successive “excellent” ratings for GN3 and GN3plus in the latest annual EC project reviews
- Providing a stable governance structure that implements a coherent strategy under which networking service R&D activities can take place
- Applying industry best practices leading to disciplined and flexible Product Lifecycle Management for services, ensuring innovative new activities are encouraged whilst efficient use of resource is also ensured
- Providing an umbrella under which a programme of Open Calls can be coordinated – the scale of the GÉANT (GN3plus) programme means the required administrative and technical support base to coordinate the calls is available.

The EAC understands that the EC is examining the integrated nature of the EC co-funded GÉANT programme, and considering the possibility of research networking service R&D activities being the subject of individual calls for proposals in the Horizon 2020 Work Programme.

Analysis

The EAC believes that the integration of networking R&D within the GEANT programme has measurable advantages, both commercially and for the end user. The EC has recently introduced the Framework Partnership Agreement for GÉANT as a vehicle for ensuring the realisation of the GÉANT 2020 European Communications Commons vision formulated by the GÉANT Expert Group (a high level advisory group formed by the EC). It is surely possible, within this construct, to perform activities which will further boost user input and increase involvement of industry and SMEs – in other words, continuing to adapt GÉANT to the priorities of EU strategy and the environment in which it operates. For example, the very successful GN3plus Open Calls could be leveraged in the future to encourage proactive and innovative user input in a structured manner. As research challenges often result in solutions with commercial applications, a greater emphasis should be placed on the commercial potential of proposals received in response to GÉANT Open Calls, with an explicit strategy goal of achieving commercial applications. These solutions can then be applied at sufficient scale across global networks serving various user communities to allow for refinement and optimisation, improving their likelihood for commercial success.

The ability to test at scale is important in the development of services. NREN collaboration has produced many innovations over the years, driven by their deep understanding of users’ network-related needs. Success has been enhanced by their ability to deploy services across multiple disciplines in their effort to deliver increasing and improving network services for the direct use or benefit of the research community. Examples of this are eduGAIN, eduroam and perfSONAR: production services whose development has benefited from NRENs’ understanding of diverse users’ needs for trustworthy international identity verification and mobility services, and the importance of multi-domain network performance monitoring facilities. GÉANT’s relationship with NRENs globally has allowed these services to set an international standard for the user community.

Clearly, to continue to advance research and drive economic competitiveness, e-Infrastructures like GÉANT must be adept at converting user requirements into new capabilities. The experience and knowledge resident in GÉANT for developing and delivering services that meets its users' needs should not be underestimated. While it is acknowledged that individual user needs should set the direction of specific research activities and Open Call topics, it is the opinion of the EAC that programmes like GÉANT are the appropriate structure to organise such activities, retaining flexibility to serve multiple communities as their needs evolve.

To address emerging research user requirements, it is critical that R&D efforts are able to adapt in an agile manner. In the EAC's opinion, the GÉANT programme's unique position affords it the ability to see across seemingly disparate communities to collaboratively develop integrated support services. With oversight of the entire service lifecycle, GÉANT is able to rapidly direct – and if necessary re-direct - R&D effort to address changing user requirements in an agile and responsive way. The GÉANT programme has developed these skills over the years as it has evolved and adapted with technological developments and user needs. Managed effectively within the coherent strategy of the GÉANT programme, this capability would be lost if R&D activity were performed within a series of separate projects, each with its own individual management.

The EAC is of the opinion that a downside of the de-integration of service R&D activities is that it will inevitably lead to increased administrative costs without a corresponding improvement in capability or outcomes. This decision would entail an increase in the overhead required to prepare project proposals, and a significant increase in the administrative and management overhead involved in coordinating or participating in projects. It would cause a disconnect between network development and production. The overall outcome, in the EAC's view, would be the inefficient application of EC co-funding because:

- for research networking, it is not scalable to provide solutions for individual user disciplines. Vertical delivery assumes the availability of an underlying (horizontal) common infrastructure, which could then be used to develop optimised solutions for delivery to individual verticals. The underlying infrastructure must develop, operate and be well maintained – and for this, funding is required
- a move to solely vertical delivery of research network services risks an alternative, parallel construct to GÉANT developing, resulting in the EC funding duplicated activity.

A deeper analysis is required in order to understand if and how to deliver vertically-integrated e-Infrastructures services cost-effectively, and what the requirements are of the existing horizontal infrastructure.

The European NRENs have recently re-organised their European-level collaborative activities into one single organisation, the GÉANT Association, building on the track record of stable pan-European governance. The maturity and stability of European research networking together with the research networking community's strong understanding and responsiveness to users' requirements, places them in a good position to advise the European Commission on how European e-Infrastructures can work together so as to best deliver services for users. In the view of the EAC, the European Commission and the

GÉANT partners should allow for time to realise the full potential of the partnership nature of the Framework Partnership Agreement currently in preparation, and work closely together to develop a vision for European e-Infrastructures which will best serve the user community to 2020 and beyond.

Recommendations

1. GÉANT should continue in its current capacity as developer of innovative advanced services **and** the operator of a production e-Infrastructure, as there are clearly mutual benefits for users and the field of research networking

2. GÉANT should continue to use Open Calls to widen participation (including user participation) and to address specific research issues. User needs should continue to inform the choice of Open Call topics

3. GÉANT should seek to provide specific support for collaborative engagement with other e-infrastructures, industry and the use of the infrastructure for commercial research.

4. Efforts should be made to ensure commercialisation of research developments and to develop an appropriate intellectual property rights (IPR) policy to facilitate these interactions.

About the EAC

The GN3plus External Advisory Committee provides an external perspective to the GN3plus Assembly to assist in the development of policy and practice.

The EAC members give independent and objective advice, aimed at assisting the GN3plus partners in deriving the best possible results on behalf of the Research and Education community they serve.

The members are

- Steve Cotter, CEO of the Research and Education Advanced Network New Zealand Ltd. (REANNZ)
- Didier Bourse, Director, European Research Cooperation at Alcatel Lucent
- Per Oster, Director, Research Infrastructure at CSC, IT Center for Science, Finland
- Bernhard Plattner, Professor of Computer Engineering at ETH Zurich, the Swiss Federal Institute of Technology
- Richard Schilizzi, Professor of Astrophysics, University of Manchester; former Director of the Square Kilometre Array (SKA) project

Appendix

Additional Information

An integrated GÉANT programme provides the opportunity for groups of NRENs to collaborate together to develop services of common interest within a shared technical environment, linked by GÉANT. Services are developed on NREN and GÉANT infrastructure, enabling efficient and effective delivery. Services are developed with the requirements of the research and education community in mind, ensuring user needs are met. The skills to develop specialist, leading edge networking services are in very short supply globally, so pooling resource within GÉANT to achieve common goals makes the most of scarce talent, and benefits multiple NREN partners – and their users – simultaneously.

Examples of services which have benefited from development within GÉANT are eduGAIN, eduroam and perfSONAR.

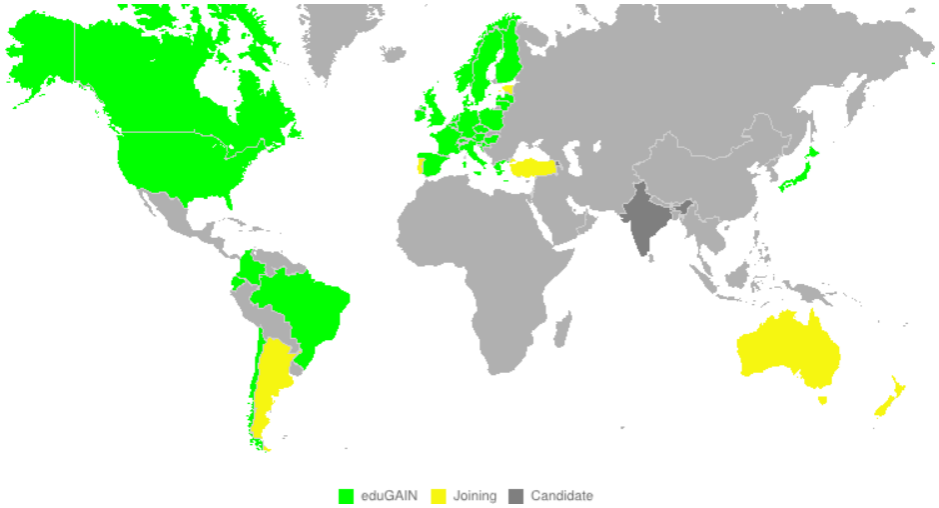
eduGAIN

The eduGAIN service enables the interconnection of identity federations around the world, simplifying access to content, services and resources for the global research and education community and enabling the trustworthy exchange of information related to identity, authentication and authorisation (AAI) across borders. With just one trusted identity, provided by their campus institution, users seamlessly benefit from the wider range of services made available via eduGAIN. Through eduGAIN, service providers can offer their services to users in different federations, increasing their target market without requiring a presence in multiple countries.

Building on a firm foundation of more than ten years of operational federated identity services at NRENs and campuses throughout Europe and globally, eduGAIN is delivered by GÉANT and participant federations in a truly collaborative environment which is scalable to reach hundreds of thousands of users yet tailored to local expectations.

Using this wealth of experience and knowledge, GÉANT and eduGAIN also collaborate with complex eResearch and eInfrastructure projects to help them meet their advanced federated identity needs, and support deployment of federated identity services in less developed regions.

The map below shows eduGAIN global membership status – countries whose identity managers have federated using eduGAIN:

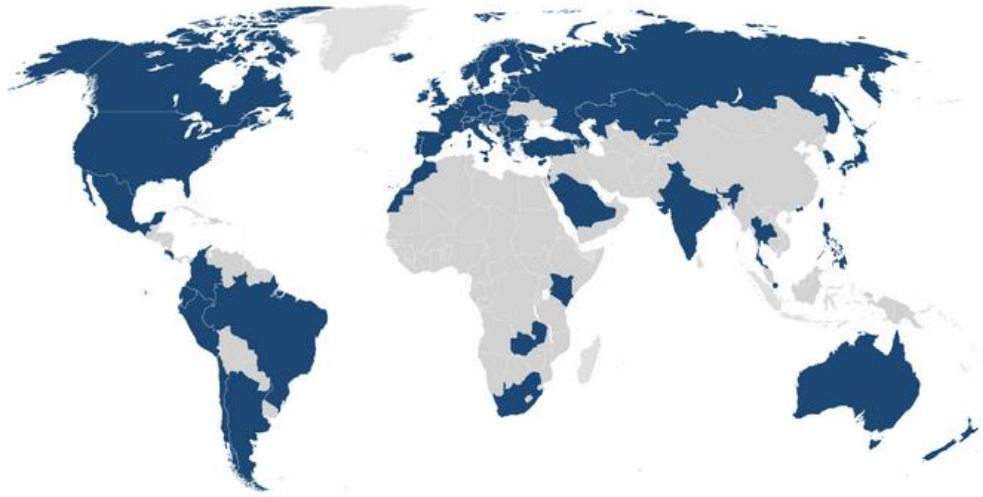


See more information about eduGAIN and its use cases at http://services.geant.net/edugain/Pages/Home.aspx

eduroam

eduroam (**edu**cation **roam**ing) is the secure, world-wide roaming access service developed for the international research and education community. eduroam allows students, researchers and staff from participating institutions to obtain Internet connectivity across campus and when visiting other participating institutions by simply opening their laptop.

Having started in Europe, eduroam has gained momentum throughout the research and education community worldwide and is now available in 70 territories around the world:



More than 150 million eduroam authentications (logins) are now made per month nationally and internationally.

More information about eduroam is available from
http://www.geant.net/Services/UserAccessAndApplications/Pages/eduroam.aspx

perfSONAR

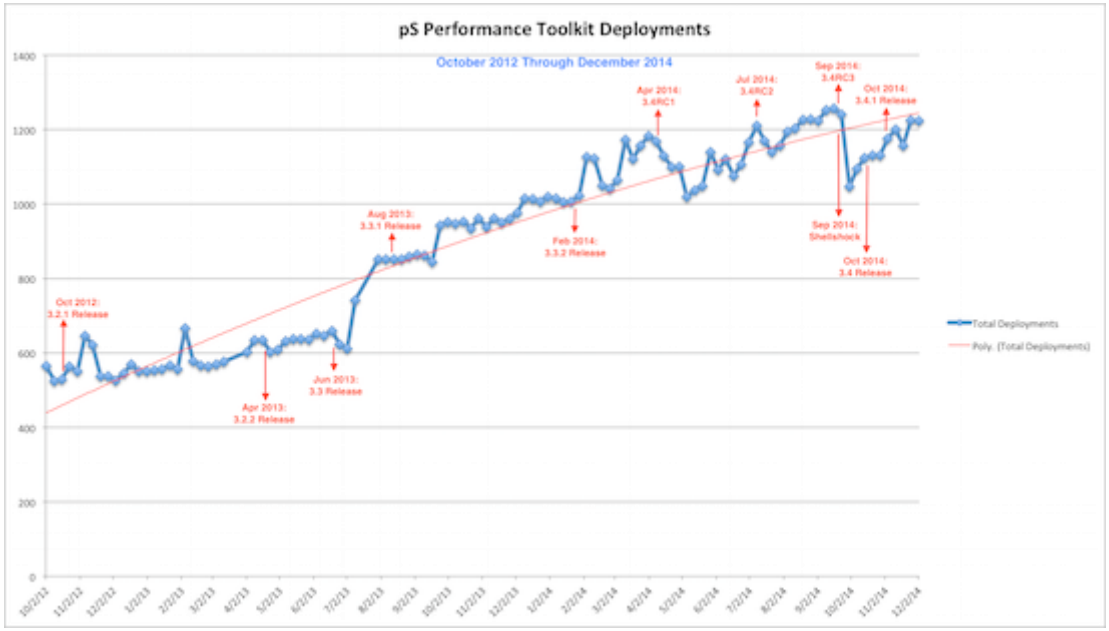
perfSONAR is the multi-domain monitoring service for the GÉANT Service Area (GSA). It enables NREN NOCs and PERTs to collaborate in providing seamless network performance, working together to identify, prevent and solve performance issues for network users.

perfSONAR provides easy, transparent end-to-end monitoring, giving its users - primarily NOC and PERT engineers - access to network measurement data from multiple network domains. Monitoring data is collated from all those domains where the perfSONAR service is deployed, in order to visualise network characteristics, present the information in a standardised format and enable troubleshooting of related issues.

It can operate at local level or around the globe and is scalable to provide at-a-glance information about multiple network paths simultaneously. Compatible with single domain monitoring tools, the service will also be interoperable on a global level with similar services offered by international partners.

perfSONAR tools are deployed on approximately 1200 hosts, and more than 300 domains around the world. The distribution of the hosts can be seen on the following map:

Deployment of perfSONAR is growing rapidly, as shown by the following graph:



More information about perfSONAR is available from
http://www.geant.net/Services/NetworkPerformanceService/Pages/perfSONAR.aspx