THE INNOVATION ECOSYSTEM
GN3PLUS YEAR 2 HIGHLIGHTS

This document presents highlights of the GÉANT Innovation Programme from Year 2 of the EC funded GN3plus project.

The GÉANT ecosystem – where innovative services are researched, developed and delivered with direct NREN and user input – connects and empowers research and education communities within Europe and across other world regions. This approach drives knowledge creation, innovation and learning; and continues to put Europe at the heart of global research and education.

The GÉANT Innovation Programme is an umbrella programme and a funding mechanism to provide a way for the wider community to pool resources and collaborate on innovative technologies that address the future needs of the GÉANT community and its users. It consists of the R&D work carried out within the GÉANT project by participants in the Joint Research Activities (JRAs); Task-Forces and Special Interest Groups, which include experts from outside the project; and the GÉANT Open Call projects.

In GN3plus Year 2 (Y2) efforts were focused on increased integration across innovation areas: to improve cross-pollination of ideas, increase stability and interoperability - and promote leaner, more joined-up collaboration. A high proportion of the work undertaken by the Open Call partners for the JRAs has already been integrated into the project or will be integrated into future projects - as the following highlights demonstrate.

Network Architectures for Horizon 2020

This activity looks at improving network architectural designs. The work aims to pave the way for the GÉANT and NREN architecture approach in the future.

- Y2 research was based on the study of papers, network technology studies, industry information, test and demonstration cases and NREN-based architectural workshops.

- Cross-activity work was established focusing on the Cloud and mobility support, including a Network Architecture Workshop, where the GÉANT community met to discuss network architecture and Open Calls. A second workshop is planned for later in 2015.

- A vision was proposed for Zero Touch Connectivity, where the user does not have to do anything to connect to the Internet.

- The GÉANT Open Cloud eXchange (gOCX) delivered demos at TNC2014 and Supercomputing 2014.

- Following the success of the pilot work, the gOCX team were accepted on the Amazon Educational Grant Program and will collaborate to further develop the concept and enhance the demonstration and test facilities.

TONY BREACH - NETWORK ARCHITECTURES FOR HORIZON 2020

"Our engagement with the IRINA Open Call project has brought a new level of research innovation to GÉANT. Furthermore, we are excited about research within Open Call projects that brings us closer to the ideal of zero-touch network access."

Technology Testing for Specific Service Applications

The purpose of this research is to deliver the next generation of innovative services, developing new capabilities in a rapidly changing landscape.

- Y2 activity achieved NSI-SDN interworking for multi-domain SDN. A very successful and globally pioneering demo of multi-domain SDN capabilities utilising NSI and SDN was presented at SC14 in New Orleans.

- Proof-of-concept for SDN-based monitoring support based on NetFlow by the Ryu OpenFlow controller has been delivered.

- Ethernet OAM code has been ported to the Open vSwitch codebase (the software switch widely used for non-commercial and commercial environments).

- Proofs-of-concept for Network-as-a-Service use cases were established, extended, tested and demonstrated in operational environments, with active dissemination.

AFRODITE SEVASTI – TECHNOLOGY TESTING FOR SPECIFIC SERVICE APPLICATIONS

"Several of the Open Call projects are making use of the GÉANT OpenFlow Facility (GOFF). Bringing together the GOFF and the Open Call research experts has facilitated novel SDN research. The strong two way exchange between JRA2 participants and the Open Flow SDN researchers has been very fruitful for all partners. For example, the JRA2 Subject Matter Experts have been able to work closely with the CEOVDS team to engineer specialised GOFF capabilities to meet their requirements."

Technology Testing for Specific Server Applications

- The proposal on Management as a Service (MaaS) has been delivered. The model put forward is based on TMF's eTOM and opens up the possibility to delegate/subcontract management resources in a market place by using normalised interactions between actors.

- A large number of technical papers submitted and published.

- Engagement with global partners, REN community and the industry on SDN activities (e.g. OpenDaylight).

Identity and Trust Technologies for GÉANT Services

Research and education is increasingly virtualised. Identity and trust are crucial for ensuring authorised users can access data and services, and that those services are trustworthy.

Attributes and Groups

- InAcademia Simple Validation Service first iteration completed. This new service simplifies the use of federation-provided information and the accompanying policies.

- Open Call partners and task members were brought together for a valuable day of Trust and Identity sessions at the GÉANT symposium in Athens. Discussions on integrating Open Call projects with ongoing and future work of the Joint Research Activities.

Identity and Trust Technologies

- A separate implementation of the Certificate Transparency log was created, ensuring at least two independent implementations of the (draft) IETF specification, needed to show

interoperability and a requirement before making it to an IETF standard specification.

- Multiple standardisation efforts achieved across OpenID Connect, UMA (User Managed Access) and Certificate Transparency.

- Contributed to the User-Managed Access (UMA) specifications and developed one of the first implementations.

- UMA won the "EIC2014 Award for Best Innovation in Information Security" at the European Identity & Cloud Conference 2014.

- OpenID Connect work resulted in the OpenID Foundation selecting the implementation and test tool as the official conformance test tool for OpenID Connect provider (OP) and relying party (RP) implementations.

GÉANT Testbeds

The goal of the GÉANT Testbeds Service (GTS) is to enable network researchers to experiment with and refine networking concepts at scale, in a secure and flexible environment, and in collaboration with colleagues and projects around the globe.

In Y2 GTS moved from pilot to full production status and began supporting a wide range of R&E projects including Open Call projects and Public Private Partnership research. GTS has rolled out to four cities, with three more planned; demos were performed at key industry events.

The combined infrastructure offers 64 virtual machines, 25 virtuals OpenFlow fabrics and over 50Gbps of network capacity to enable researchers to examine network behaviours in representative real-world scenarios.

GÉANT Open Calls

The first GÉANT Open Call was a resounding success, with 21 projects and 30 new participants adding new expertise to the GÉANT Innovation Programme.

A high proportion of the work undertaken for the JRAs has either been integrated directly into the project or will be integrated into future projects.

This integration of work feeds directly into the development of innovative new products and services to ensure that GÉANT continues to provide world-class connectivity and services to the Research and Education community.

GÉANT Open Call results exceeded expectations in all areas:

Sustainable

- Over 75% of the work will be carried forward and many participants will continue to work with GÉANT in GN4.

- The impact of the programme will be long lasting — over 90% of new GÉANT testbed users will continue to work with us in future.

Tangible

- Over 40 Scientific papers have been published as a result of the programme.

- Open Call projects participated in 100+ events, raising GÉANT's profile internationally – included presentations at Supercomputing, IETF and IEEE forums.

High Quality

- External evaluations confirmed the high quality of innovative research work undertaken with 70% of projects scoring very highly (13 or more out of 15) and 4 projects receiving maximum scores.

GÉANT standards

Y2 saw increased use and compliance of standards in the design and implementation work of all Activities and Tasks.

- Often services have been developed in accordance with pre-release standards to ensure they remain cutting-edge.

- Project members have continued to take global leadership roles in the Open Grid Forum (OGF) and Internet Engineering Task Force (IETF) standards organisations and to make significant contributions to the development, formation and authorship of these standards.

- The Open Calls added new partners and subject areas, increasing involvement with

standards bodies and the use of standards within the Open Calls work.

- Members of the project have also been active in lobbying standards organisations to ensure that new standards support the GÉANT services.

- In addition, GÉANT project activities have provided contributions to Open Source code and implementations. The standardisation process helps ensure that GÉANT is able to offer robust services that are interoperable with other suppliers and other world regions.

Special edition of CONNECT showcased Innovation with Impact: GÉANT's first Open Call.