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## Milestone M5.2

### Service Roadmaps

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#### Abstract

The Trust and Identity Work Package (WP5) is responsible for delivering services from the T&I portfolio, for their operations, providing support and further development. This milestone captures the Trust & Identity service roadmaps for the first two years of the project, focusing on the plans for their development and enhancement.

## Table of Contents

Executive Summary	1
1 Introduction	2
2 eduroam	4
3 eduGAIN and Federation Services	7
4 eduTEAMS	10
5 InAcademia	11
6 T&I Incubator	13
7 Conclusions	15
References	16
Glossary	17

## Executive Summary

This milestone defines committed and aspirational goals for the operations and deployment, enhancement and development roadmaps of the T&I services delivered via the GN4-3 project's Work Package 5. The roadmaps are defined for the period of up to two years, and they are based on the consultation with the wider stakeholder community that was conveyed during the White Paper preparation for the project. These roadmaps are subject to the continual review and updates especially on the aspirational goals. During the progress of the GN4-3 project, two more snapshots of the roadmap will be published in the subsequent Milestone reports. Further stakeholder consultation will take place to update roadmaps for the project period after 2021. These roadmaps will be adapted for their use by the Partner Relations, Outreach and Business Development team in Task 4 in this work package, to ensure conveying the appropriate message about the service plans to the stakeholder community

# 1 Introduction

The Trust and Identity Work Package (WP5) is responsible for carrying out the innovation and development of T&I services, their operations and support, as well as for driving T&I services towards the anticipated maturity levels. From an operational perspective, WP5 ensures that T&I services in production are operated efficiently and securely, reach the availability and quality levels, with relevant procedures and documentation in place and provides the appropriate level of support. Services operations and support are performed as daily activities, following an agile approach when it comes to implementing improvements to processes and resources employed. The development of new features or major enhancements to services is performed according to the requirements gathered from the stakeholders, and plans are based on the available resources and prioritisation.

Services that are currently in the T&I portfolio are: eduroam, eduGAIN and federation services, eduTEAMS and InAcademia. Each service has an appointed service owner, who is responsible and accountable for the delivery of the service as a whole and for defining the service roadmaps. Service teams are internally organised to deliver operations, development and support functions for the services. For the new services, eduTEAMS and InAcademia, an agile approach is followed. This implies short sprints to frequently release software enhancements that address stakeholders requirements. The agile approach also requires a tighter integration between development, operation (hence the DevOps team) and support teams. For eduGAIN and eduroam, to ensure smooth transition and continuous integration (development), operational and development teams work closely together to use their full potential for enabling further service enhancement and deployment of new features.

During preparation for the GN4-3 project, wide-ranging stakeholder consultations were held in order to gather user requirements for further development and enhancement of the T&I services. Based on those findings, the developments that are in scope of the project are defined in the project proposal, and further work plans are due to individual services roadmaps.

This milestone summarises initial roadmaps for T&I services, for use during the first two years of the GN4-3 project. The purpose of these roadmaps is to define the timeline of further development and enhancement of the T&I services. They contain both committed and aspirational goals, and their content will be subject to ongoing evaluation and updates, based on the progress made and available resources. The roadmaps will be updated for subsequent milestones: M5.4 *Review and Updates of Service Roadmaps*, which is due August 2020, and M5.5 *Review and Updates of Service Roadmaps*, which is due November 2021. During the course of the project, periodic consultations with the stakeholder communities will be held in order to further inform and provide input for the roadmaps. Complementary to these service roadmaps, Task 2 in this work package is tasked with the incubation of new ideas or potentially disruptive T&I technologies that are considered sufficiently mature within the project TRL constraints. The Incubator is operating within predefined development cycles, and after each, the results of individual activities may be used by the service teams, therefore providing

another input for the service roadmaps. The methodology and plans for the work of incubator in Task 2 is subject to Milestone M 5.3 *Incubator Methodology and Plans*, which is due June 2019.

GN4-3 project will through the work in this work package participate and follow other global initiatives that are in the domain of Trust and Identity, including:

- Resource Access for the 21st Century (RA21) project, aimed at optimising protocols across key stakeholder groups, with a goal of facilitating a seamless user experience for consumers of scientific communication. GÉANT participates in RA21 (to be renamed as the “Coalition for Seamless Access”) together with other organisations such as STM [[STM](#)] and NISO [[NISO](#)].
- Projects that expand the reach of eduGAIN to support student mobility use-cases as well as to enable the usage of eIDAS, such as MyAcademicID. These activities are carried out in close liaison with WP5 key people and its results will inform the development of eduGAIN beyond 2020.
- Key people in WP5 participates in several other relevant initiatives and projects namely: EOSC-Hub technical committee and the EOSC-Hub architecture work package, WISE community, REFEDS and IGTF. They report back to WP5 via the enabling community task (WP5 Task 4) and ensure that liaison and collaboration is ongoing.
- With the end of the AARC2 project, WP5 will continue to support some of the work to maintain and update the AARC architecture and policy results.

The following sections provide a summary of the T&I services delivered by Work Package 5, followed by the service roadmaps.

## 2 eduroam

**Service Owner:** Miroslav Milinović (SRCE/CARNET)

eduroam is a worldwide roaming access service for the international research and education community. GÉANT coordinates the worldwide operations, operates the European core infrastructure and a number of supporting services for global use, and provides the relevant support. These services include:

- European Top-Level Radius servers in Netherland and Denmark
- Monitoring, Diagnostics and Metering tools [[Monitor](#)]
- Database [[DB](#)]
- Configuration Assistant Tool [[CAT](#)]
- Managed eduroam IdP service [[Host](#)]

GÉANT also works on further development and enhancement of eduroam with objectives to increase the ease of deployment for institutions and national roaming operators (NROs), improve the user experience for end users, and ensure that the quality of eduroam national deployments is as prescribed in the eduroam service definition.

The roadmap for the eduroam **operations, support and deployment of enhancements** for the first two years of the GN4-3 project focuses on the following areas:

- **eduroam Database Version 2.0**

The eduroam database is a key element of the supporting infrastructure. It serves as the central, authoritative collection of data about the institutions (NROs, service providers (SPs) and identity providers (IdPs) participating in the eduroam service. It provides input to other services such as CAT and eduroam Managed IdP [[eduManIdP](#)], and is the source of data for build of the eduroam service locations map, etc. Version 2.0 of the database specification implements various improvements and brings novelties such as the ability to mark areas covered by eduroam's wireless signal. The plans are to finish the migration to v2.0 db format and to align the eduroam supporting tooling with the new format.
- **eduroam Audit**

With eduroam in more than 100 countries, thousands of IdPs and SPs, it is time to introduce an auditing system in order to regularly check if participating organisations are following the eduroam policies and recommendations. The audit system will promote those who are implementing eduroam according to the current best practices, and at the same time, warn those who are providing a substandard service level. The eduroam audit will be developed as

a combination of manual and automatic tests, partially run by the eduroam operations team and partially in a self-service assessment manner that will enable participating organisations to evaluate their deployments against the policies and best practices. The plans are to define the audit procedure and accompanying tools, run pilots for European NROs, adapt the audit process based on the pilot results, and finally, to perform first official NRO audits.

- **eduroam Policy Update**

eduroam service definition and policy are defined by the documents that originated in 2008. The last update of these documents was in 2012, and since then there have been changes in both technology and organisational aspects that require next update of these documents. It is planned to carry out the update by collecting the input from the stakeholders, drafting the new policy and finalising it after another round of consultations with the eduroam Steering Group (SG) and Global eduroam Governance Committee (GeGC).

- **Continuous Operations, Deployment of Enhancements, Support and Engagement**

The eduroam team will continue to operate eduroam core and supporting services, manage NRO membership for Europe and provide global support via official support channel. It will work on enhancing of the operational processes and resources in an agile manner. The work in supporting new NROs to join eduroam service will continue in collaboration with GÉANT **partners** relation, global outreach and business **development** teams. GÉANT Learning and Development Team (GLAD) will with the expertise from eduroam team support the community by together delivering eduroam trainings and learning materials. Engagement with NROs, wider community and standardisation bodies will be continued via engagement in European Confederation eduroam Steering Group (SG), Global eduroam Governance Committee (GeGC) and contribution to global standards and/or R&E community profiles.

The roadmap for the eduroam **development** for the first two years of the GN4-3 project focuses on following areas:

- **eduroam Managed Service Provider (SP)**

eduroam Managed SP is being developed with the goal to take away the complexity of operating an eduroam RADIUS server from Service Providers. eduroam Managed SP is a multi-level, multi-tenant system operated by the eduroam operations team. It allows the creation of an eduroam SP without the deployer requiring any knowledge of the eduroam architecture. It is planned to develop and implement the prototype of the service, run the service pilot, and in 2021, to transition the service to production.

- **Certificate Provisioning Redesign**

The current eduPKI certificate provisioning that is used to enable RadSec deployments has proven to be a heavy and unscalable solution for the global eduroam community. The WP5 team aims to redesign the process so that it will provide a simple click-through browser experience to issue certificates. It will also action semi-automated eligibility checks, exploiting data structures of the official eduroam database, and issue certificates in near-real-time using eduPKI SOAP API.

- **eduroam Diagnostics**

The main goal of this activity is to bring the monitoring and diagnostics tools as close to the end-user experience as possible. The team combines the data acquired via the eduroam database, current monitoring and measurement services with other supporting tools, like CAT. This is complemented with the design and development of monitoring probes that verify the health of the eduroam service at individual service locations.

- **Continuous Service Improvements**

eduroam supporting services use in-house developed solutions. These require maintenance through continuous development and enhancement to the tooling and software, which will be delivered in an agile manner.

The timeline for the eduGAIN roadmap is available online [[Roadmap](#)].

### 3 eduGAIN and Federation Services

**Service Owner:** Davide Vagheti (GAAR)

eduGAIN is one of GÉANT's key Trust and Identity services, allowing trusted digital identities to be used to securely access available web resources. GÉANT operates a number of core and supporting global-level services, and also provides the relevant support. These services include:

- Metadata Service (MDS) [[MDS](#)]
- Metadata Validator [[Validator](#)]
- Technical site, including various tools and status information [[Tech](#)]
- Entities database [[Entities](#)]
- Federation as a Service (FaaS)

GÉANT also works on the further development and enhancement of eduGAIN with the objective to improve ease of deployment for institutions and identity federations, enhance user experience and ensure that identity federations are operating in accordance with the defined eduGAIN profiles and best practices. This work also scales the service for future demands in terms of quality, usability, security and growth.

The roadmap for eduGAIN **operations, support and deployment of enhancements** for the first two years of the GN4-3 project focuses on the following areas:

- **eduGAIN Operations**

The current certificate holding the eduGAIN signing key expires on 1 July 2019. This may cause verification problems for some federations depending on the verification method in use. To address this, at a minimum a new certificate needs to be issued. Long-term the eduGAIN signing key should also be replaced as it currently has a key length of 2048 bits which is less than the minimal length of 3072 bits recommended to new eduGAIN participants. The central service should conform to the same restrictions. To address these issues, a team will be formed comprising the eduGAIN Service Owner, the eduGAIN-OT and subject experts from the R&E community. This team will define the plan for redesigning the metadata signing practice and put together a proposal for the short- and long-term strategy for different scenarios. The short-term plan will address the upcoming key expiration, while in the long-term redesigned metadata service practices will be proposed to reach the required security levels in eduGAIN key management and signing. This work is expected to be done in cooperation with the entire eduGAIN community and will result in a new procedure for signing the eduGAIN aggregate.

Improvements to eduGAIN operations will be continually introduced, starting with the following plan at beginning of 2019: switch from a country-centric eduGAIN database to a federation-centric one, enable the automatic warning system for metadata issues, introduce

versioned metadata feeds and establish a public registry of incidents for the core eduGAIN services.

- **eduGAIN Support**

eduGAIN support was established in 2018 as a first level support, separate from the eduGAIN operational team that provides higher support levels when needed. Early in 2019, the support team will start an extensive training activity to get new team members up to speed and independent within the current year. Support is reactive, responding to enquiries that are sent to [support@edugain.org](mailto:support@edugain.org). To monitor compliance with the eduGAIN profiles, support also works in a proactive manner, reacting to errors and warnings that are identified by various eduGAIN checking tools. The support team will gradually widen the scope of the proactive support by adding other eduGAIN checking tools and services (such as eduGAIN Connectivity Check and the eduGAIN Code of Conduct), and react to errors and warnings following processes that still need to be defined.

Previous work in the GÉANT project, the Sirtfi working group and in REFEDS revealed a strong requirement for a central role to support the Sirtfi framework and coordinate the resolution of security incidents that involve entities from multiple federations. The plans foresee the development and introduction of a security support function for eduGAIN by defining procedures and putting relevant tooling in place, piloting the function and then making it fully operational.

- **eduGAIN Policy**

Documents that define the eduGAIN constitution, governance, procedural and technical requirements as well as technical profiles used within the eduGAIN services are part of the eduGAIN policy framework. The metadata aggregation practice statement is an addition to the eduGAIN SAML Profile document [[eduGAIN-Profile](#)] and describes the methods used to facilitate interfederation. Technical operational details about metadata signing, publication and other procedures are part of the eduGAIN Operational Practice statement. These two documents are available in draft versions and will be finalised by 2019. As decided by the eduGAIN SG, it is planned to enforce the new Metadata Registration Practice Statement, which defines the joining process and the management of the membership in the Identity Federations that are part of eduGAIN, and the new eduGAIN SAML profile.

- **Continuous Operations, Support and Deployment of Enhancements, Support and Engagement**

The eduGAIN team will continue to operate eduGAIN core and supporting services, and FaaS, manage identity federation membership of eduGAIN and provide support via an official support channel. It will work on enhancing operational processes and resources in an agile manner. The work in supporting new identity federations to join eduGAIN service will continue in collaboration with GÉANT partners relation, global outreach and business development teams. Using the eduGAIN team's expertise, the GÉANT Learning and Development team (GLAD) will support the community by together delivering relevant trainings and learning materials. Engagement with identity federations and the wider community will be continued via participating in the eduGAIN Steering Group (SG) and the activities of REFEDS, AEGIS, FIM4L, FIM4R, CACTI, etc. More specifically, the eduGAIN service will collaborate with the REFEDS working groups to maintain and develop all the policy frameworks relevant to eduGAIN, such as the GEANT Code of Conduct Version 2 (this will also cover the investigation of establishing

a monitoring body as required by GDPR Article 41), the Research and Scholarship Entity Category and Sirtfi. The eduGAIN service will also engage with the OpenID Connect community through participation in the activities of the OIDF Research and Education working group.

The roadmap for the eduGAIN **development** for the first two years of the GN4-3 project focuses on the following areas:

- **F-ticks for eduGAIN**

Authentication statistics and measurements enabled via eduGAIN interfederation provide important metrics for quantifying and understanding the service usage and patterns. This is necessary to fully comprehend the eduGAIN value and drive further improvements. The F-ticks format, database for collection and visualisation mock-up was developed during GN4-2, which lead to a pilot with first adopting identity federations. The technical work will be completed by implementing the final data collection setup and visualisation using an off-the-shelf platform. In parallel, a plan will be defined and executed for the adoption of the F-ticks service by identity federations and IdPs with the goal to reach a critical mass of entities sending the data. Finally, in 2020, the service is planned to start running based on the adoption.

- **Campus IdP Toolkit**

To ease the burden of deploying technical infrastructure for IdPs, GN4-2 developed a campus IdP toolkit and provisioning platform. The campus IdP toolkit technology is ready to be used and the plan is to test the product by using it within an identity federations hosting service. After the testing period, the toolkit offering will be prepared for wider use by compiling the necessary manuals and documentation and setting up support, with the goal to productise the offering.

- **Sirtfi checking tool**

For entities claiming support for Sirtfi, a regular response test exercise needs to be undertaken. In a previous project phase, a tool with basic functionalities to perform the response test was developed. It is planned to define the workflows for automatic and manual use of the tool in collaboration with the Sirtfi working group. These workflows will be implemented within the tool, and use of the tool is planned to start as soon as a basic workflows becomes available.

- **Continuous Service Improvements**

eduGAIN technical site and checking tools use in-house developed solutions. These require maintenance through continuous development, and enhancements to the tooling and software, which will be delivered in an agile manner. Moreover, some of the checks that are performed will be updated according to the specification or the policy to which they relate, such as the GEANT Data Protection Code of Conduct (CoCo) v1 monitoring tool, which will be updated once version 2 of the CoCo is issued.

The timeline for the eduGAIN roadmap is available online [[Roadmap](#)].

During the course of the next two years, additional items may be added to the roadmap, based on the available resources in the eduGAIN team. Those items include input from the Incubator task (see Section 6) and input from REFEDS, such as the service catalogue for the interfederation context etc.

## 4 eduTEAMS

**Service Owner:** Christos Kanellopoulos (GÉANT Association)

The eduTEAMS service enables research and education communities to securely access and share common resources and services. Leveraging the ubiquitous presence of eduGAIN federated identities, eduTEAMS enables communities to securely authenticate and identify their users, organise them in groups, assign them roles and centrally manage access rights for using community resources. As research is not confined to research institutes and universities, eduTEAMS caters also for users coming from the industry or citizen scientists who may not have access to eduGAIN. eduTEAMS is a TRL9 service.

In the beginning of the GN4-3 project, eduTEAMS is a fairly new service and therefore, the work focuses on ensuring the service adoption by the R&E communities. The technical development of the eduTEAMS service is driven by the priorities of the early adopter communities, and is done in an agile manner, following ongoing updates of the technical development roadmap.

The roadmap for the eduTEAMS for the first two years of GN4-3 project focuses in following areas:

- **Service adoption and Business Development**

Work with various R&E communities who are early adopters of the eduTEAMS offerings. At the moment of writing this document, eduTEAMS works with a number of research communities such as : Life Sciences (EOSC-Life), Photon and Neutron Community (PaNOSC), Earth Sciences (NextGEOSS) and with SURFnet Science Collaboration Zone on the national deployment for the eduTEAMS. In plan is to continue active engagement with the R&E communities via different forums, and to bring in new communities that will use the service.

- **Technical Development**

The plan is to continue the development of new features, such as the introduction of the step-up authentication service, improved registration flows for service providers, active role selection, support for the AARC project outcomes ( specifically the AARC-G021 "Exchange of specific assurance information between Infrastructure" and AARC-G031 "Guidelines for evaluating the combined assurance of linked identities") and improved handling of user identifiers. Since eduTEAMS employs an agile approach of development, the development roadmap is also frequently updated, which is why it is available for public at [\[eduTEAMS roadmap\]](#).

- **Continuous Operations and Support**

Operate the service and provide support on a daily basis. The plan is to scale up the operational team and resources so that they are fit to operate and deploy new eduTEAMS instances for dedicated and bespoke service offerings.

## 5 InAcademia

InAcademia is a service that allows online retailers and other SPs not connected to an identity federation and eduGAIN the means to easily validate if a customer is a student or is affiliated to an educational institute in another way. For user authentication, InAcademia uses the Identity Providers available in eduGAIN. At the beginning of the GN4-3 project, InAcademia has already passed the technical pilot and reached TLR8. The service continues with a business pilot for the first merchants to use the service. The development of InAcademia follows a stronger agile approach that utilises short sprints to frequently release software enhancements that address stakeholders' requirements.

The roadmap for the InAcademia for the first two years of GN4-3 project focuses in following areas:

- **Launch of the service to production**

At the beginning of the GN4-3 project, InAcademia is running the Phase 1 Pilot with merchants, at no cost at point-of-service use. The purpose of the pilot is to validate the anticipated business model and prepare for next phase of the pilot that will involve a pay-to-use model. Based on the outcomes of this Phase 1 Pilot, it is planned to launch Phase 2 Pilot for two editions of the service: the Commercial Edition, which is targeting commercial entities and will be a pay-to-use version, and the Community Edition, which is targeting the non-commercial services for R&E, which will be free-of-charge. The plan is to move both service editions to production.

- **Service and Business Development**

In order to support the initial goal of launching service to production, it is necessary to continue with the areas of business development that are necessary for the success of the service. This includes ongoing engagement with merchants and federation operators, identifying and clarifying any potential liabilities with running the service such as: taxation, preparing for income, etc.

- **Technical Development**

The plan is to continue the development of new features that will improve administration, reporting, etc. The InAcademia Portal will be developed in order to enable efficient administration of the service. The InAcademia Community Edition plans for a delegated management model where federation operators would be approving non-commercial R&E Service Providers from their constituency that are entitled to use the InAcademia service. The addition of this feature is planned for second release of the InAcademia Portal. Development that will improve the collection of the statistical usage data and reporting on that data is also in the roadmap.

- **Continuous Operations and Support**

Continue the operations of the service that is used in pilot and later in production service.

The timeline for the InAcademia roadmap is available online [[Roadmap](#)].

## 6 T&I Incubator

The roadmaps that were presented in previous sections are concentrating on plans within each of the T&I services delivered via the GÉANT project. Another important area of development in the T&I area is within the T&I Incubator task. While the methodology and plans for the Incubator will be published in a separate Milestone document, for the sake of giving the complete overview of the T&I developments, the activities that will be part in the first development cycle of the Incubator are briefly described here.

The Incubator task was conceived to facilitate work on new ideas or potentially disruptive T&I technologies that are considered sufficiently mature within the project's TRL constraints. The requirement was for the incubator to deliver in an agile manner, therefore it functions by running a limited number of activities within incubator cycles that typically last six months.

Activities that are part of the first incubator cycle in 2019 are:

- **Community Tagging (Pixie Dust)**

Research communities need to express and potentially share certain trust marks on identity and service providers. These trust marks may differ from existing trust marks issued by identity federations or may be put in to complement existing ones. The objective of this activity is to propose and implement a technical solution that matches the requirements as described by the Sirtfi community, and investigate the usability of the solution for research communities and the impact of the solution on identity federations.

- **Cryptech HSM**

The Cryptech Hardware Security Module devices are of interest as these intend to offer a HSM where all components, both hard- and software, are open source. It is also expected that these devices will be significantly cheaper compared to existing commercial offerings. This activity investigates the usability of recently developed Cryptech HSM modules for various T&I use cases in eduGAIN, eduroam, eduTEAMS, InAcademia and generally for federation operations.

- **Discovery Pilot**

This activity is a continuation of the IdP discovery work that was started in GN4-2 in the eduTEAMS and IdP Discovery subtask. It gathers requirements and works with the RA21 initiative towards an implementation that can become a service in the GÉANT project.

- **IdP as a Service Business case**

The GN4-2 project developed a prototype to offer an IdP-as-a-Service solution for hosted IdPs. This incubator activity investigates the business case of this solution to determine if this solution could be made into a sustainable service offering.

- **ORCID as IdP of last resort**

Many research collaborations and campus services need a solution to deal with guest identity, as in many cases not all users are members of the academic identity federations. This activity aims to continue the work started in eduTEAMS (during the GN4-2 project), where a guest IdP solution, IDhub, was piloted. A new aspect of this approach is close collaboration with the eduTEAMS team and ORCID. As a side-effect of the discussion with ORCID, GÉANT has joined the ORCID consortium.

- **Second Factor Authentication - Distributed Vetting**

The GN4-2 eduTEAMS project conducted a pilot with the deployment of a Step-up Authentication Solution for the LifeScience community. However, one of the challenges identified in GN4-2 was the process of vetting second factor tokens in case the participants of a research community are distributed across the EU or further. This activity investigates together with research communities how the token registration can be scaled for scenarios where participants are distributed across the EU and beyond.

- **Shibboleth OIDC Extension**

The Shibboleth OIDC Extension was developed as an extension to the Shibboleth IdP to allow the OpenID Connect (OIDC) protocol to be used in addition to the SAML2 protocol. This activity invests in further support and development of this extension, and in parallel will begin a dialog with GÉANT service activities and the Shibboleth Consortium to fully sustain the current product.

## 7 Conclusions

This milestone document has collected the roadmaps for the T&I services that are delivered via WP5. It has also demonstrated how the service delivery is supported by other teams in the GÉANT project. The document has presented the position on services delivery and evolution for 2019 and 2020, including committed and aspirational goals. These will be periodically reviewed, and the roadmap will be updated to track the goals, and to add inputs from the incubator activity and requirements from the community via the consultation activities that are planned.

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## Glossary

<b>API</b>	Application Programming Interface
<b>CAT</b>	Configuration Assistant Tool
<b>GeGC</b>	eduroam Governance Committee
<b>GN4-3</b>	GÉANT Network 4 Phase 3
<b>IdP</b>	Identity Provider
<b>NRO</b>	National Roaming Operator
<b>PLM</b>	Product Lifecycle Management
<b>R&amp;E</b>	Research and Education
<b>SG</b>	Steering Group
<b>SP</b>	Service Provider
<b>T&amp;I</b>	Trust and Identity
<b>TRL</b>	Technology Readiness Level
<b>WP</b>	Work Package