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# Introduction to the eduGAIN Policy Framework

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# 1 Introduction to the eduGAIN Policy Framework

This document is intended to explain the key concepts and structure of the eduGAIN Policy Framework. The audience of this document is expected to be someone who is seeking an understanding of the eduGAIN Policy Framework.

This document has also an appendix which provides further background for the readers who may already be somewhat familiar with the Policy Framework and would like to obtain a greater understanding of the factors that have shaped the eduGAIN Policy Framework.

This document, and its appendix, is not part of the Policy Framework.

## 1.1 Main Concepts of eduGAIN

The eduGAIN Policy describes the eduGAIN service as an **interfederation<sup>1</sup> service** that allows parts of the Participant Federations to interoperate on a voluntary basis.

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<sup>1</sup> *Interfederation* was preferred to *Confederation* because the latter suggests a more centralised approach than the Policy actually prescribes.

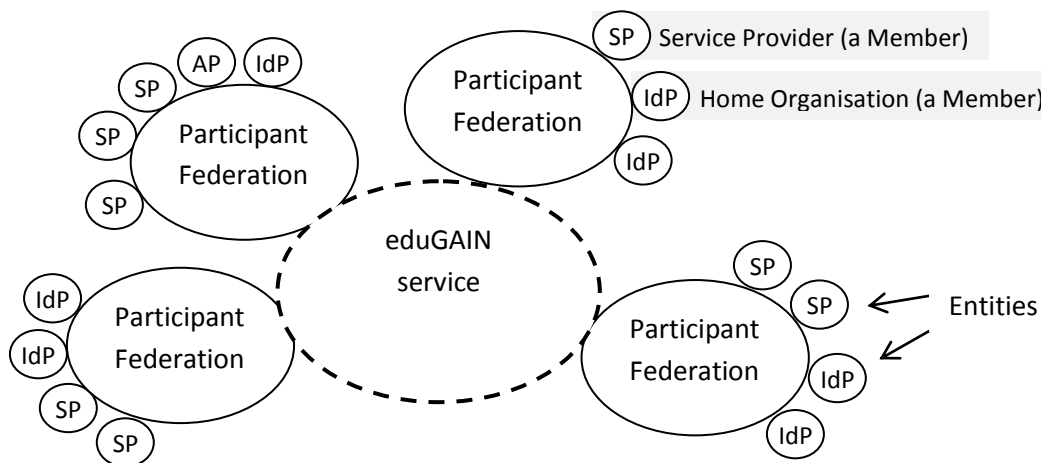


Figure 1.1: eduGAIN concept

In the Policy Framework, the eduGAIN service interconnects **the Participant Federations**, which, in turn, have contracts with their **Members**. A **Home Organisation** is a Member (e.g. a university) which the end users are affiliated to. The Home Organisation is responsible for setting up and operating an **Identity Provider (IdP)**, either by itself or as an outsourced service. An Identity Provider is a server acting in an Identity Provider role as defined in SAML 2.0 specifications. A **Service Provider (SP)** is the organisation responsible for the service to which the end user requires access. The term also describes the server acting in a Service Provider role as defined in SAML 2.0 specifications. The word **Entity** describes Identity Providers, Service Providers and other servers (such as, Attribute Providers, AP) registered to eduGAIN. More exact definitions are available in the Policy Framework.

Technically, the purpose of eduGAIN is to exchange technical descriptions (called SAML 2.0 metadata) of the Entities. The Entities are then able to exchange protocol messages (e.g. SAML 2.0 assertions) directly.

## 1.2 Structure of the eduGAIN Policy Framework

Each applicant federation signs the **eduGAIN Policy Declaration**, which is a relatively short legal document that binds the applicant. This document addresses the most fundamental issues of the eduGAIN Policy Framework. The intention is that there should be no need to update the Policy Declaration in the future, as this would require all of the Participant Federations to approve and sign the new document.

The Policy Declaration is a unilateral signed announcement in which the applicant federation declares that it commits to the eduGAIN Policy Framework. The declaration is made in respect of the other Participant Federations and provided to eduGAIN's Operational Team (OT). The intention is that all applicant federations sign a similar declaration as part of the joining process, defined in the following Constitution.

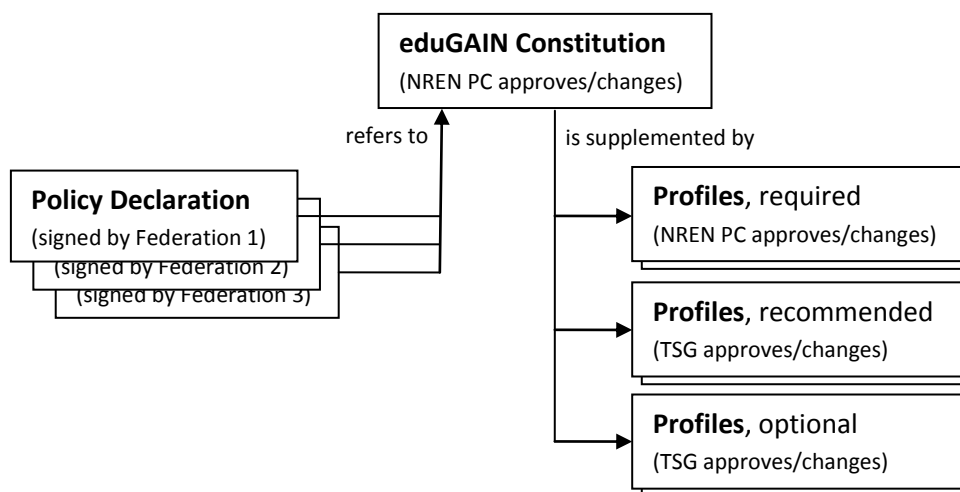


Figure 1.2: eduGAIN governance

The **eduGAIN Constitution** defines the governance of the eduGAIN service and the requirements for the Participant Federations. To permit the possibility of future changes that may be necessary to accommodate future requirements that may emerge, the NREN PC <sup>2</sup> can approve an amendment to the Constitution.

Additional profiles and other documents supplement the Policy Declaration and Constitution. They are approved and updated by:

- NREN PC, if they are required for the Participant Federations. However, because some of the standards are still being developed actively and new versions are expected, the GÉANT Executive<sup>3</sup> is able to approve minor updates to the profiles and document approved by the NREN PC
- eduGAIN Technical Steering Group (TSG), if they are recommended or optional for the Participant Federations (i.e. not required).

The words “required”, “recommended” and “optional”, are used in the sense of RFC2119:

- **MUST**: This word or the terms "REQUIRED" or "SHALL" mean that the definition is an absolute requirement of the specification.
- **SHOULD**: This word or the adjective "RECOMMENDED" mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and weighed before choosing a different course.
- **MAY**: This word or the adjective "OPTIONAL" mean that an item is truly optional.

<sup>2</sup> The NREN PC is the governing body of the European consortium of NRENs which owns the GN3 project. In the GN3 project, the eduGAIN task (formally, GN3 Service Activity 3, Task 3) aims at rolling out the eduGAIN service.

<sup>3</sup> The NREN PC has delegated the authority for supervision of the GN3 project to the GÉANT Executive Committee which runs the project at an executive level.

Currently, the following profiles are proposed:

- **Metadata profile (REQUIRED)**, which defines the contents of the SAML 2.0 metadata elements exchanged by the eduGAIN service.
- **WebSSO profile (OPTIONAL)**, which defines the SAML 2.0 protocol message exchange for web single-sign on (Web SSO) in eduGAIN. In the beginning, Web SSO will be the primary use of eduGAIN.
- **Attribute profile (RECOMMENDED)**, which facilitates interoperability by defining the syntax and semantics for end users' attributes exchanged between Entities in eduGAIN. Some of the attributes are recommended, which means that the Identity Providers should populate them with appropriate values for the end users.
- **Data protection good practice profile (OPTIONAL)**, which introduces policies and practices that adapt the European law on data protection to the attribute exchange in the eduGAIN interfederation service.

Additionally, the Policy Framework introduces:

- **Metadata terms of access and use.** Most consumers of the eduGAIN metadata will be covered, via their organisation, by the rules of a Participant Federation. However, since the metadata will be available to anyone, the Terms of Access and Use are attached to it, like an open source software licence, to establish a minimal set of expectations ("use at own risk") for anyone outside the Participant Federations. The Terms ensure, so far as is legally possible, that anyone publishing metadata through eduGAIN does not have to worry about being found liable to a federation, organisation or individual they have never heard of.

In the future, further development of the eduGAIN Policy Framework will focus, at least, on:

- **Level of assurance profile (OPTIONAL)**, which introduces enhanced levels of trust for end user identities and authentication.

## 1.3 Obligations and Rights for the Participant Federations

This paragraph highlights the key obligations and rights that the Policy Framework sets to the Participant Federations. The reader is directed to the Policy Framework itself to obtain a complete description of these.

### 1.3.1 Obligations

- Declaration's clauses 1-5 set the obligations on the **metadata exchange** itself.
- Declaration's clause 2 introduces an **opt-in principle for entities** that become exposed to eduGAIN through their local federation.
- Declaration's clause 3 and the Constitution's section 3.3, however, imply that an entity, in being exposed to eduGAIN, is not automatically able to communicate with any other entity within eduGAIN.

- Declaration's clause 6 introduces a requirement **to assist other Participant Federations** in issues related to its metadata. Constitution's section 3.1. extends this by requiring a process for handling complaints and incidents involving their Members.
- Declaration's clause 7 makes the Federation a subject to the checks, undertaken by the eduGAIN Operational Team on application, that ensure compliance with the basic and enhanced **levels of trust**. These checks include (but are not limited to) requirements such as the publishing of a Metadata Registration Practice statement, as introduced in section 3.1. of the Constitution.
- Declaration's clause 14 obligates the Participant Federation to give a timely advance notice if it wishes **to leave eduGAIN**. This is further specified in section 3.4 of the Constitution.
- Constitution's section 3.1 requires that the Participant Federations primarily serve the interests of **the educational and research sectors**.
- Constitution's section 3.1 also requires that the Participant Federation has a point of contact for their Members for **dealing with technical issues**. The intention is that the eduGAIN Operations Team focuses on interfederation-related issues and does not provide a helpdesk for the ordinary issues in setting up and configuring SAML 2.0 Entities.
- Constitution's section 3.1 requires that the Participant Federations have an appropriate mechanism to ensure that **only Entities conforming to eduGAIN's Policy Framework** are exposed to eduGAIN. This includes, among other things, that Home Organisations have the technical and organisational means to resolve disputes relating to authenticated users and that Home Organisations provide only up-to-date information on their users (Constitution's section 6).
- The Metadata Profile is the only required profile supplementing the Declaration and Constitution and introduces requirements which are **mostly technical**. This includes, among other things, the names, contact addresses and technical endpoints (URLs) of the Entities published in the eduGAIN metadata.

### 1.3.2 Rights

- Declaration's clauses 8-10, as well as clause 1, ensure that **the Participant Federation's local rules** remain intact, and any complaints on a Member are dealt with according to the rules of the Member's Participant Federation.
- Constitution's section 2.2 introduces the Participant Federation a right to nominate a delegate and deputy to the Technical Steering Group (TSG) of eduGAIN.
- Constitution's section 3.5 and 9.1 enables the Participant Federation to appeal to the body who nominated OT if it is not satisfied with OT and its resolution.

## 1.4 eduGAIN Policy Enforcement

When a federation joins eduGAIN (as described in section 3.2 of the Constitution), the Operational Team ensures that the federation fulfils the Participant Federation requirements (as described in sections 3.1 of the Constitution). However, it is also useful to have a mechanism to enforce the policy later by reacting to potential policy violations.

The mechanism to react to policy violations is described in section 3.5 of the Constitution. The Operational Team will, in accordance with its obligations, respond to severe policy violations. The Operational Team will also respond to less severe violations that have not been resolved after a dialogue with the relevant parties. The policy leaves the interpretation of "severe" to the Operational Team. If a Participant Federation is not satisfied with OT's interpretation, it can always appeal to the body who nominated OT.

The Operational Team can respond to a policy violation in three ways. First, it may issue a notice to the Technical Steering Group. Alternatively it may also propose to GÉANT Executive that the Participant Federation is either temporarily suspended or permanently disqualified from the eduGAIN service.

A temporary suspension or a permanent disqualification results in the removal of the Participant Federation's Entities from the eduGAIN metadata, disconnecting these Entities from eduGAIN. Consequently these Entities will not be able to use the eduGAIN service to communicate with Entities in other federations.

## 1.5 Liability

The eduGAIN Policy Framework excludes liability to the fullest possible extent in the law. The diagram illustrates the scenario.

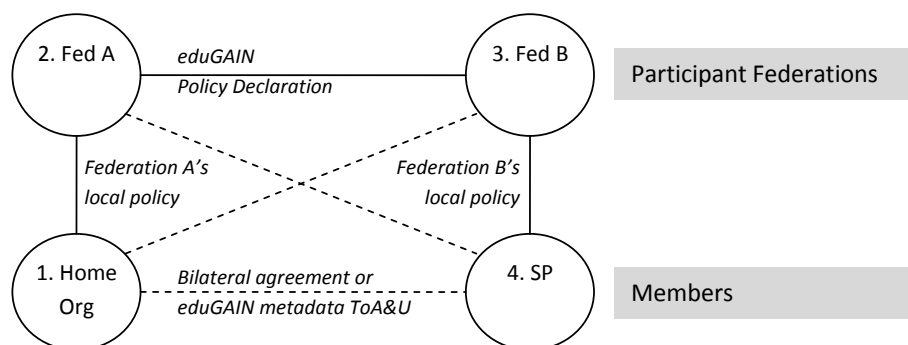


Figure 1.3: eduGAIN liability scenario

- The relationship **between the Member and the Participant Federation** (1-2 and 3-4) to which the Member belongs (called the Home Federation) is covered in the Participant Federation's local policies, which eduGAIN does not affect (see eduGAIN Policy Declaration's clause 10). Liability may or may not be excluded in the Participant Federation's policy, but it does not affect eduGAIN.
- The relationship **between the Participant Federations** (2-3) is covered in the eduGAIN Policy Declaration, which explicitly does not create any new legal obligations (such as liability) between the Participant Federations (see eduGAIN Policy Declaration's clause 10).
- The relationship between the Members of different Participant Federations (1-4) may be covered by a licence for access to content; the eduGAIN Policy Framework does not alter this agreement.

- Relationships where there is no direct agreement, e.g. **between a member and the “other” Participant Federation** (1-3 and 2-4) or between two **members of different Participant Federations (1-4)** are covered by the Metadata Terms of Use, which exclude liability and are attached to any eduGAIN metadata file.
- There is a small possibility that **a state body might hold a federation or member liable** for some breach of law: this cannot be excluded by any federation or inter-federation contract. However it is rare for such laws to extend jurisdiction across international borders, so the introduction of eduGAIN is not considered to significantly increase this risk.

## Appendix A **eduGAIN Policy Framework Background**

### A.1 **A Pragmatic View on Policy**

Throughout the eduGAIN policy work, three particular issues have been kept in mind:

- **Should there be a policy?** eduGAIN will interconnect various heterogeneous federations in Europe and beyond, and it is important to understand precisely which issues the Policy Framework needs to consider. Addressing more than what is necessary may impede national federations' participation in eduGAIN, due to incompatibilities with the national federations' existing policies and practices.
- **Are the parties committed to the policy?** Having a policy to which the parties concerned are not committed is of little use. This is an issue in eduGAIN, because individual Home Organisations and Service Providers do not sign the eduGAIN Policy Framework themselves. If there are mandatory requirements for Home Organisations and Service Providers, they must be introduced via the Participant Federation's policy.
- **Is the policy enforced?** If there is a policy, and the parties are committed to it, there must also be means and willingness to enforce the policy when necessary. Otherwise, the policy becomes a dead letter which is eventually ignored by everyone.

### A.2 **Why a Policy Framework? What Purpose Does It Serve?**

In general, having a policy in place increases trust in the eduGAIN service. The need and difficulty of establishing trust increases as we move from the level of a national federation to an international interfederation service.

- **Home Organisations and end users need to trust the Service Providers** not to infringe end user's privacy when processing his/her personal data. In practice, European law (data protection directive) is authoritative for questions of privacy. During the deliberations of the eduGAIN policy, a very significant amount of effort was directed towards these data protection considerations, resulting in the optional eduGAIN data protection good practice profile. More details can be found at the end of the Annex in the "On the optional data protection good practice profile" section.

- **Service Providers need to trust the Home Organisations** to carefully maintain end users' identities and their attributes, and that the end user's authentication is performed reliably. The eduGAIN Policy Framework is relatively light in this respect (which is known as Level of Assurance or LoA) because the national federations have reported that strong use cases for higher LoA (especially, strong authentication) do not exist for the existing interfederation use-cases. The current Policy Framework only requires that end-users' attributes are accurate. For example, the Policy Framework does not introduce requirements on initial proof of identity for new users, strength of authentication or even that the identity belongs to an individual (i.e. there are no group accounts). This formulation, for example, enables University libraries to have eduGAIN-enabled kiosk machines for library walk-ins.

However, the demand for LoA issues may grow as more expensive (e.g. research instruments) or sensitive (e.g. bioinformatics data) Service Providers appear. In this case, the eduGAIN Policy Framework may be later updated by an LoA profile(s).

- **Everyone needs to trust the operations of eduGAIN and the Participant Federations.** The distributed technical architecture of eduGAIN has no single points of failure, but the operational procedures and practices of eduGAIN and its Participant Federations must be implemented in a manner that maintains eduGAIN's reputation as a reliable and trustworthy service. However, the eduGAIN policy subtask adopted the view that the Policy Framework should focus mostly on the requirements, obligations and rights for the Participant Federations and the governance of the service. The eduGAIN operations (including Operational Team, OT) and audits, if any, are covered elsewhere, for instance, in the eduGAIN Service description and other operational practice documentation.

The policy subtask found that national federations were reluctant to set audit requirements for Participant Federations. The door is left open to introduce them in a Policy Framework amendment later.

### A.3 Dilemma: What is the Essence of eduGAIN?

- **To “just” interconnect the Participant Federations**, by providing a SAML 2.0 metadata exchange service (c.f. eduGAIN Constitution section 1.3). This is an analogue of the traditional view of the traffic exchange for the Internet Service Providers.
- **To provide Service Providers with a service** that authenticates an end user and brings his/her attributes from his/her Home Organisation in an easy way, irrespective of which country/federation the end user comes from. This functionality probably addresses the Service Provider's requirements more fully, but also requires non-trivial harmonisation of the Participant Federations and Home Organisations. For example:
  - Concept and traceability of identities (no group accounts, an audit trail requirement to keep end users accountable for actions done using their identities).
  - Level of assurance (initial proof of identity, strength of authentication).
  - Attribute syntax and semantics (eduPersonAffiliation, recommended attributes).
  - Do the Home Organisations opt-in new Service Providers, i.e. do the Service Provider administrators need to ask the Home Organisations to enable access to it?
  - How to brand the eduGAIN login to provide a familiar look-and-feel for end users.

The choice made for the eduGAIN Policy Framework is somewhere between the two: those issues that are relevant for metadata exchange are mandatory; and recommended or optional profiles are or will be introduced to facilitate Service Providers' use of eduGAIN.

## A.4 Design Criteria of the eduGAIN Policy Framework

**The participating federations and the eduGAIN service just exchange metadata**, but do not take any responsibility on the content of the metadata and the service the metadata describes. The Home Organisation or Service Provider is responsible for its service, including any associated security and privacy issues. This does not preclude Participant Federations enforcing federations' rules towards the Home Organisations or Service Providers, if it turns out that they have given false statements on their service.

**The requirements mandatory for all Home Organisations and Service Providers are minimised** and the remainder of the requirements are placed within recommended or optional profiles. The only mandatory functional requirement for Home Organisations' identity management practices is that the attributes provided are accurate (e.g. students' or employees' accounts are closed or at least eduPersonAffiliation values updated when they depart). When a new federation joins eduGAIN, the eduGAIN service's Operations Team ensures that the Participant Federation claims possession of the necessary instruments to enforce this towards its Home Organisations.

**The existing national federations' policies need not be changed** when they join eduGAIN. Requiring all existing federations to change their current policies would impede adoption of eduGAIN considerably, because most federations would need to negotiate and sign new agreements with their members. This does not stop Participant Federations from informing their members that when they expose a service to eduGAIN, certain additional practices (such as technical, attribute or privacy profiles) may be applied.

**The existing attribute semantics need not to be changed.** The eduGAIN service's recommended attribute profile is designed in a way that minimises incompatibility with existing federations.

## A.5 Whom Will eduGAIN Serve?

The starting point for the policy work has been that eduGAIN should serve two user communities

- **"The narrow GÉANT community"**, including GÉANT activities and services, NRENs and network administrators within the NRENs' customer organisations. This includes Service Providers such as the GÉANT Intranet, the eduroam trouble ticket system and wiki, AutoBAHN, PerfSONAR and other services. In these cases, the end users are typically NREN employees or otherwise closely affiliated.
- **"The wider research and education community"**, including researchers, teachers, students, administrative staff and other end users in universities and institutes connected to the GÉANT network. This includes Service Providers such as research infrastructure (databases and repositories, instruments, collaboration tools), e-Learning (learning management systems, tools to support learning) and digital libraries. E-infrastructure Reflection Group (e-IRG) has identified access to research data as one of the key challenges in research data management [1].

## A.6 Which Home Organisations and Service Providers Are Eligible?

The scopes of the existing federations within European Research and Education vary. For instance,

- **Some national federations serve only the Higher Education and Research community**, implying that only higher education and research institutes are accepted as a Home Organisation; and also that any Service Providers must be related to an employee doing his/her job or a student conducting studies in a higher education or research institute. In some of these federations other Service Providers (such as a website selling student discount tickets to rock concerts) are not eligible (not even if they pay for it).
- **Some national federations serve the whole educational sector**, including further education and schools. Even parents may have accounts in the schools.
- **Some federations have less strict rules** and accept any Home Organisations (for instance the government's citizen authentication service) and Service Providers (for instance, on-line shops).

The eduGAIN policy subtask has adopted the view that eduGAIN serves the NRENs' constituencies and does not try to limit which kinds of Home Organisations and Service Providers that a Participant Federation may expose to eduGAIN. The type of Home Organisation or end user is expressed in attributes (e.g. schacHomeOrganizationType, eduPersonAffiliation). There is, however, a requirement that the Participant Federations must primarily serve the interests of education and research sector.

This leaves the door open for a situation in which a Participant Federation that has rejected a Service Provider from joining its own federation directly, and that the same Service Provider is registered to another Participant Federation, and then exposed to the former Participant Federation via eduGAIN. To address this issue, the former Participant Federation may need to apply an opt-in policy for new Service Providers coming via eduGAIN. However, opt-in may lead to other problems, which are discussed next.

## A.7 On eduGAIN's Size and Administrational Scalability

Presently there are 19 identity federations or federation projects within the European NREN community, having in aggregate 1300 Home Organisations and 1500 Service Providers [2]. Some Service Providers (most notably library content providers) are registered to multiple federations (and are represented multiple times in the numbers) but a vast majority of Service Providers are registered only to one federation.

It is expected that, to be exposed to eduGAIN, Home Organisations and Service Providers will need to opt-in (use an appropriate mechanism to express their willingness to their Home Federation). Not all Service Providers will be interested to be exposed to eduGAIN. To make eduGAIN useful, it is probably desirable to have the majority of the Home Organisations exposed to it.

However, the Policy Framework does not require that every Home Organisation must communicate with every Service Provider that is exposed to eduGAIN. In fact, there is a three step approach for a Service Provider:

1. The Service Provider opts-in with its Home Federation to get its metadata exposed to eduGAIN.

2. The Service Provider may need to ensure that the other Participating Federations distribute its metadata. In general, there is little idea for a federation to join eduGAIN if it is not willing to distribute eduGAIN metadata, but sometimes Participant Federations may have good reasons (e.g. the local law) to not allow distribution of metadata for some Entities.
3. The Service Provider may need to convince individual Home Organisations to accept its metadata and configure the attribute release for it.

On the other hand, eduGAIN's scalability becomes poor if each Home Organisation needs to opt-in each new Service Provider to its Identity Provider. Assume that some day there are 500 Home Organisations and 500 Service Providers in eduGAIN. If exposing a new Service Provider to eduGAIN means that the Service Provider needs to have bilateral discussions with 500 Home Organisations one-by-one, the administrative overhead becomes extensive and eduGAIN will probably become a very "sparse" interfederation. There are hundreds of Home Organisations and Service Providers, but only few of them are actually configured to talk to each other. Discussions with the Service Provider communities have shown that the need to talk to each Home Organisation separately makes eduGAIN less useful for them.

In general, a Home Organisation takes a risk and bears the responsibility with regards to the data protection laws, when it releases end user's personal data to a Service Provider. The eduGAIN policy subtask has prepared an optional data protection good practice profile, which Home Organisations may use when deciding whether to release personal data to a particular Service Provider. Conformance to the optional profile signals that the Service Provider has done its own side well, which lowers the Home Organisation's bar to release attributes to it.

## A.8 On the Optional Data Protection Good Practice Profile

The most lengthy part of eduGAIN Policy is the optional data protection good practice profile.

The eduGAIN policy subtask has done its best to design a set of good practices that may help Home Organisations and Service Providers to comply with their duties under the EU Data Protection Directive (95/46/EC). The directive and its implementations in the national laws need to be followed, if either the Home Organisation or the Service Provider is in EU/EEA. The profile is optional. Home Organisations and Service Providers may also decide to use any other framework, instead.

The data protection good practice profile essentially defines a framework where the Service Provider uses SAML 2.0 metadata to express its privacy-related properties to the Home Organisation. The profile then defines the set of steps that the Identity and Service Provider need to do together to fulfil the directive's requirements. This includes:

- **Minimal disclosure.** The Service Provider lists the attributes it needs of the end users and the Identity Provider respects the list.
- **Personal data.** The Service Provider makes a statement if any of the attributes listed counts as personal data. If not, releasing the attributes from the Identity Provider is much less risky.
- **Informing the end user.** The Service Provider provides a link to its Privacy Policy, and the Identity Provider provides the clickable link to the end user before any attribute release takes place.

- **Legal grounds.** The Service Provider proposes and the Home Organisation decides if processing personal data is based on necessity or the end user's consent.
- **Attribute release to 3rd countries.** The Service Provider affirms that it resides in EU/EEA or in a country with adequate level of data protection.

eduGAIN and the Participant Federations just intermediate this information as part of the Service Provider's SAML 2.0 metadata, without taking any responsibilities. The responsibility is in the Home Organisations and Service Providers who process personal data. However, if it turns out that a Home Organisation is sued because it has relied on a false statement a Service Provider has given on its privacy related properties, the Home Organisation may try to use the Service Provider's statement as evidence that the Home Organisation has done its own side with due care. The eduGAIN policy subtask believes that this arrangement lowers the bar for the Home Organisations to release attributes to the Service Providers.

The objective of the data protection directive is a free flow of personal data between the Member States, but its national implementations and interpretations differ. For instance, in some jurisdictions, IP addresses count as personal data and in others they don't. To be on the safe side, the data protection good practice profile proposes a conservative interpretation, where necessary.

## References

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