EGI AAI Platform Architecture and Roadmap

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On behalf of EGI-Engage JRA1.1

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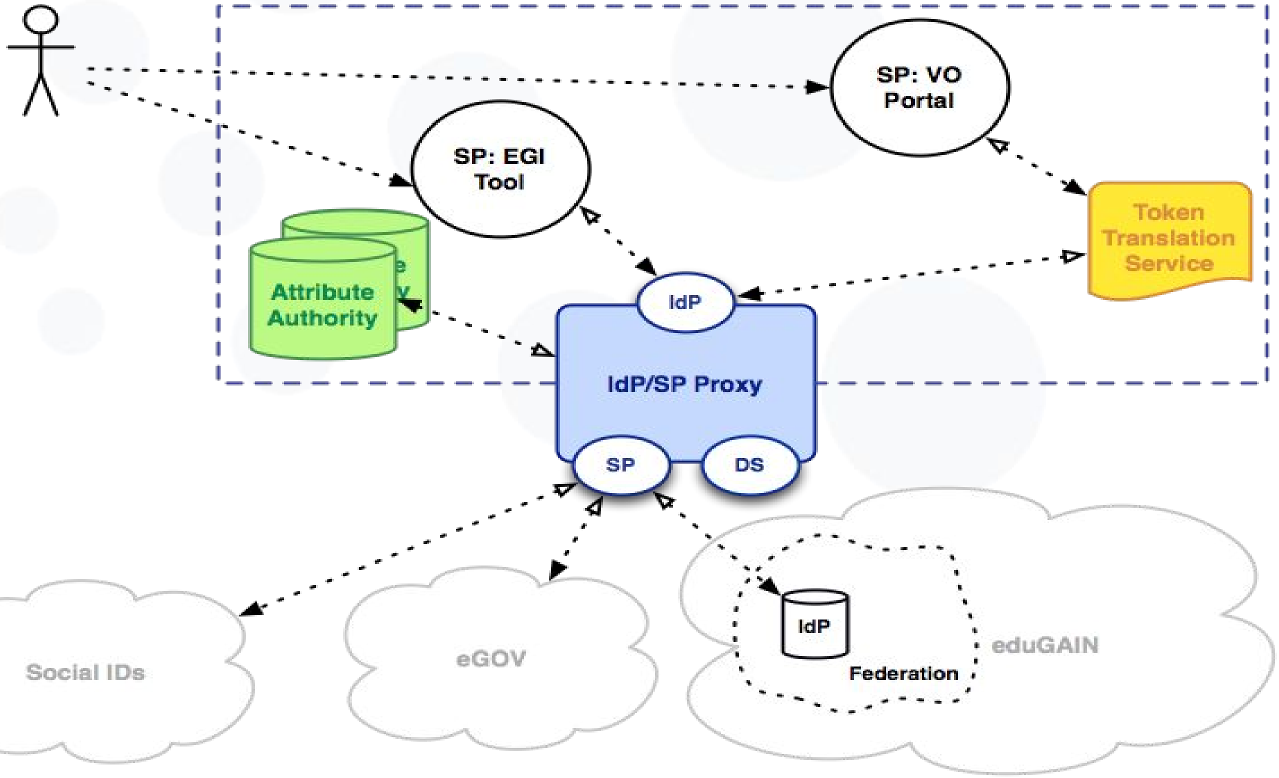
EGI AAI Goals

1. Users should be able to access the EGI Services using the credentials they have from their Home Organizations using eduGAIN when possible
   a. Users should be able to access the EGI services using credential from an IdP not part of the eduGAIN. As long as the IdP fulfills a certain set of requirements.
   b. Users that do not have account on one of the IdPs in the eduGAIN Federations, should still be able to access the EGI services as it is the case now.
2. EGI should expect to receive from the user's Home Organization at least an identifier that uniquely identifies the user coming from within the scope of that organization.
3. Within the EGI environment, a user should have one persistent non-reassignable non-targeted unique identifier.
4. EGI should define a set of minimum mandatory attributes, without which a user cannot exist within the EGI environment.
5. EGI should attempt to retrieve these attributes from the user's Home Organization. If this is not possible, then an alternate process should exist in order to acquire and verify the missing user attributes.
6. There should be a distinction (LoA) between self-asserted attributes and the attributes provided by the Home Organization/VO
7. Access to the various services should be granted based on the VO/EGI roles the user have.
8. EGI Services should not have to deal with the complexity of multiple IdPs/Federations/Attribute Authorities/technologies. This complexity should be handled centrally and should be hidden to the EGI Services.

AAI Pilot & Architecture

- **May 2015:** Introduction of the EGI AAI Roadmap and Architecture



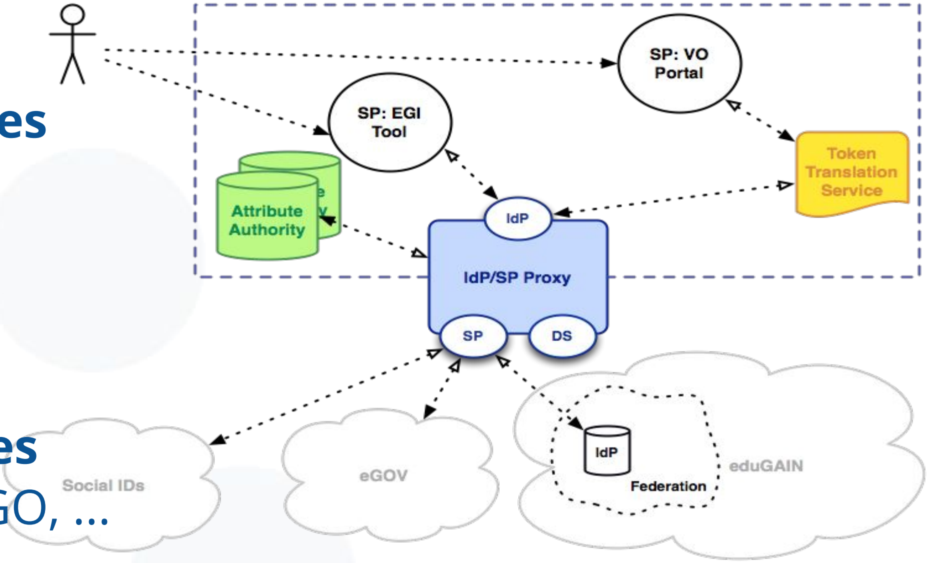
Why Proxy?

- All EGI SPs can have **one statically configured IdP**
- **No need to run an IdP Discovery Service** on each EGI SP
- Connected SPs get **consistent/harmonised user identifiers and accompanying attribute sets** from one or more AAs that can be interpreted in a uniform way for authZ purposes
- External IdPs only deal with a **single EGI SP** proxy

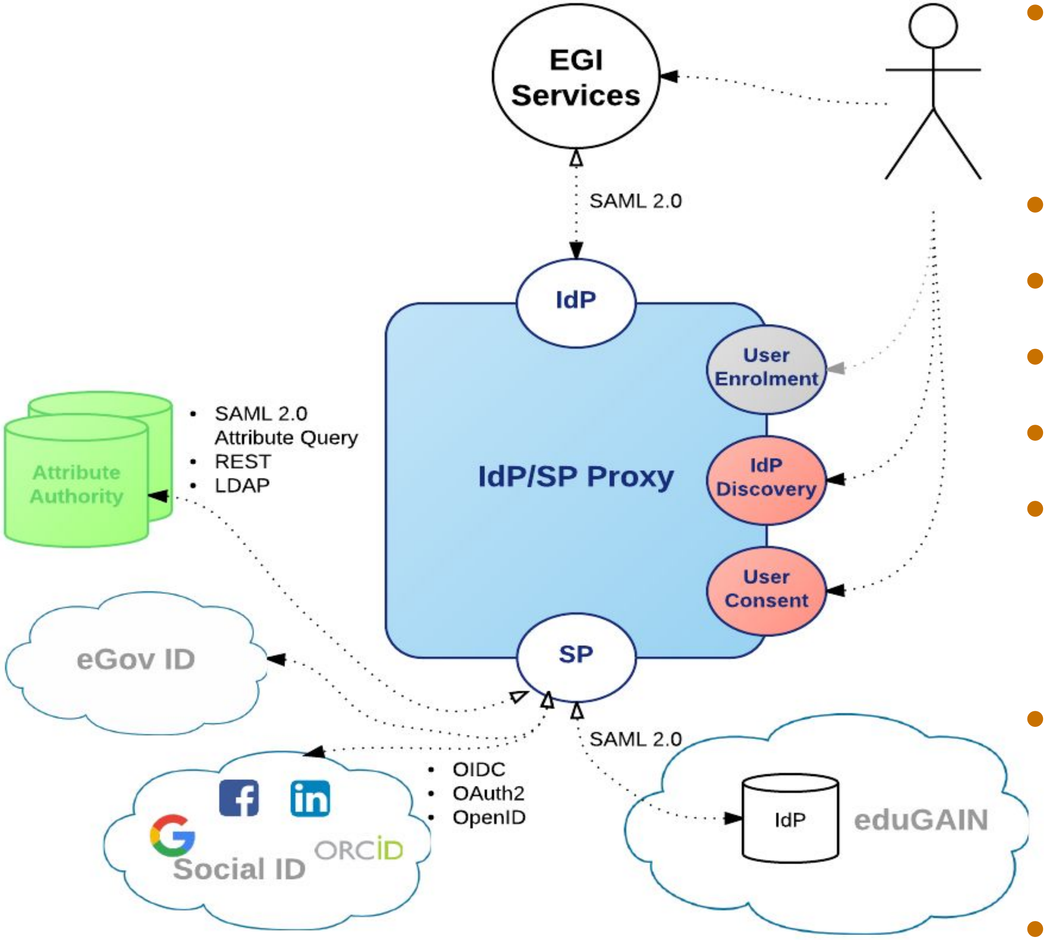
In a nutshell: EGI services will not have to deal with the complexity of multiple IdPs/Federations/Attribute Authorities/technologies. This complexity will be handled centrally by the proxy.

AAI Pilot & Architecture

- **Milestone 0 - IdP/SP proxy**
- **Milestone 1 - Attribute Authorities (Internal)**
  - COManage, GOCDB, Perun
- **Milestone 2 - Token Translation**
  - CILogon (X509v3 certs, PUSP)
- **Milestone 3 - Onboard EGI Services**
  - GOCDB, AppDB, FedCloud, ARGO, ...
- **Milestone 4 - Onboard RC/CCs**
- **Milestone 5 - Hybrid stack SAML / OpenID Connect**



IdP/SP Proxy



- Based on SimpleSAMLphp/OpenConext modules
- IdP Discovery
- User Enrolment
- User Consent
- Support for LoA
- Attribute Aggregation
  - SAML2.0 Attribute Query, REST, LDAP
- Support for OIDC/OAuth2
  - Google, Facebook, LinkedIn, ORCID
- Support for SAML STORK
  - eGOV IDs (Experimental)

IdP/SP Proxy

Levels of Assurance

- EGI AAI proposal for 3 levels of assurance. Each level is represented by a URI:
  - Low: Authentication through a social identity provider → https://aai.egi.eu/LoA#Low
  - Substantial: Password/X.509 authentication at the user's home IdP → https://aai.egi.eu/LoA#Substantial
  - High: Substantial + multi-factor authn (not yet supported, TBD) → https://aai.egi.eu/LoA#High
- TODO: Create an appropriate document for each LoA (this may be, but does not have to be, referenced by the URI above).

IdP/SP Proxy

Levels of Assurance | 3 Use cases

- allow an IdP to advertise those LoAs for which it is able to meet the associated requirements
- allow an IdP to indicate the actual LoA in its responses
- allow a SP to express its expectations for the LoA at which a user should be authenticated

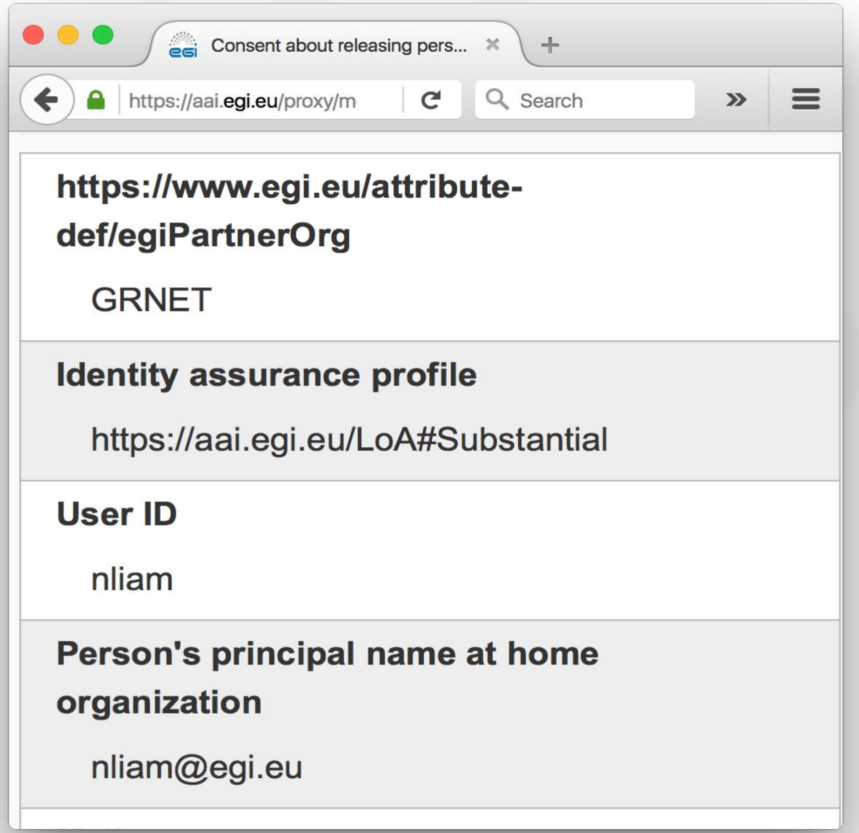
Levels of Assurance: IdP SAML2 Metadata

```
<md:EntityDescriptor xmlns:md="urn:oasis:names:tc:SAML:2.0:metadata" [...] entityID="https://aai.egi.eu/proxy/saml2/idp/metadata.php">
  <md:Extensions>
    <mdattr:EntityAttributes xmlns:mdattr="urn:oasis:names:tc:SAML:metadata:attribute">
      <saml:Attribute xmlns:saml="urn:oasis:names:tc:SAML:2.0:assertion" Name="urn:oasis:names:tc:SAML:attribute:assurance-certification" NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri">
        <saml:AttributeValue xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xs="http://www.w3.org/2001/XMLSchema" xsi:type="xs:string">https://aai.egi.eu/LoA#Low</saml:AttributeValue>
        <saml:AttributeValue xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xs="http://www.w3.org/2001/XMLSchema" xsi:type="xs:string">https://aai.egi.eu/LoA#Substantial</saml:AttributeValue>
        <saml:AttributeValue xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xs="http://www.w3.org/2001/XMLSchema" xsi:type="xs:string">https://aai.egi.eu/LoA#High</saml:AttributeValue>
      </saml:Attribute>
    </mdattr:EntityAttributes>
  </md:Extensions>
```

EGI-Engage

IdP/SP Proxy

Levels of Assurance: User Attribute Assertions



https://www.egi.eu/attribute-def/egiPartnerOrg

GRNET

Identity assurance profile

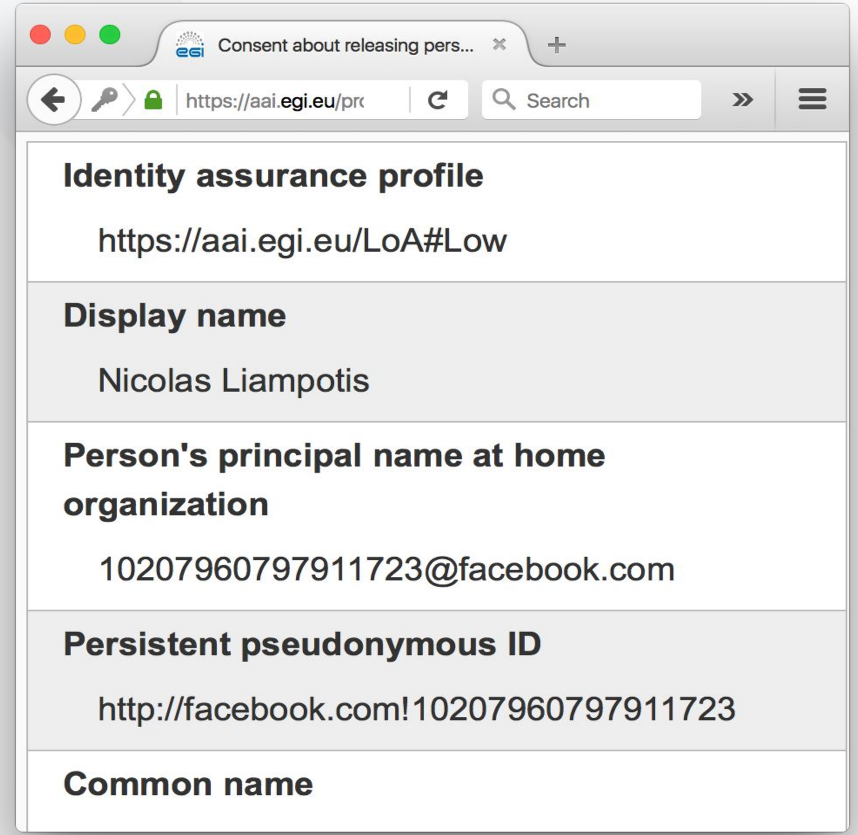
https://aai.egi.eu/LoA#Substantial

User ID

nliam

Person's principal name at home organization

nliam@egi.eu



Identity assurance profile

https://aai.egi.eu/LoA#Low

Display name

Nicolas Liampotis

Person's principal name at home organization

10207960797911723@facebook.com

Persistent pseudonymous ID

http://facebook.com!10207960797911723

Common name

IdP/SP Proxy

Levels of Assurance: AuthnContextClassRef

```
<saml:AuthnStatement AuthnInstant="2016-03-02T16:11:05Z"
SessionNotOnOrAfter="2016-03-03T00:11:05Z"                  SessionIndex="
_a7f1c5f62cc2df3c99ba5bbc4c2dc1aad2adcc8b8a">
  <saml:AuthnContext>
    <saml:AuthnContextClassRef>
      https://aai.egi.eu/LoA#Substantial
    </saml:AuthnContextClassRef>  <saml:AuthenticatingAuthority>https://www.
egi.eu/idp/shibboleth</saml:AuthenticatingAuthority>
  </saml:AuthnContext>
</saml:AuthnStatement>
<saml:AttributeStatement>
```

EGI-Engage

IdP/SP Proxy

EGI User Identifier

The EGI User ID should be:

- **personal** - used by a single person (as opposed to shared user accounts)
- **persistent** - used for an extended period of time across multiple sessions
- **non-reassignable** - assigned exclusively to a specific person, and never reassigned to another individual
- **non-targeted** - not intended for a specific relying party (or parties), i.e. should be shared
- **globally unique** - unique beyond the namespace of the IdP and the namespace of the SP(s) with which the ID is shared
- **opaque** - should (by itself) provide no information about the user, i.e. should be privacy-preserving

Available identifiers

- **eduPersonPrincipalName (ePPN)** - A name-based identifier for a person in the form "user@scope" where the "scope" portion is the administrative domain of the identity system where the identifier was created and assigned.
- **eduPersonTargetedID (ePTID)** - A persistent, non-reassigned, opaque identifier for a principal.
- **eduPersonUniqueId (ePUID)** - A long-lived, non re-assignable, omnidirectional identifier suitable for use as a principal identifier by authentication providers or as a unique external key by applications.

	ePPN	ePTID	ePUID
personal	✔	✔	✔
persistent	✔	✔	✔
non-reassignable	✘	✔	✔
non-targeted	✔	✘	✔
globally unique	✔	✔	✔
opaque	✘	✔	✔

EGI Unique User Id Generation

The IdP/SP Proxy adds (or replaces) the eduPersonUniqueId (urn:oid:1.3.6.1.4.1.5923.1.1.1.13) attribute, based on the first non-empty value from this attribute list:

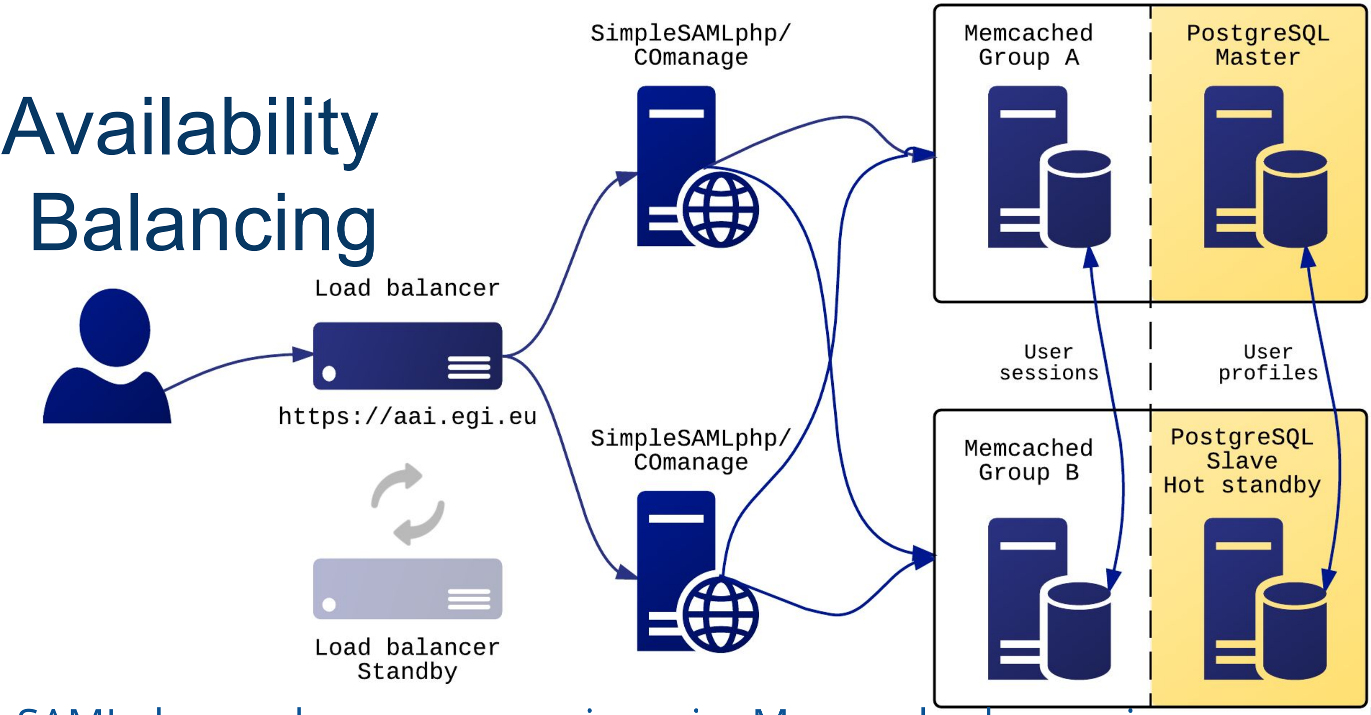
- ePUID
- ePPN
- ePTID

The selected attribute value is hashed and the “egi.eu” scope portion is added to the generated ePUID, e.g.:

```
ef72285491ffe53c39b75bdcef46689f5d26ddfa00312365cc4fb5ce97e9ca87@egi.eu
```

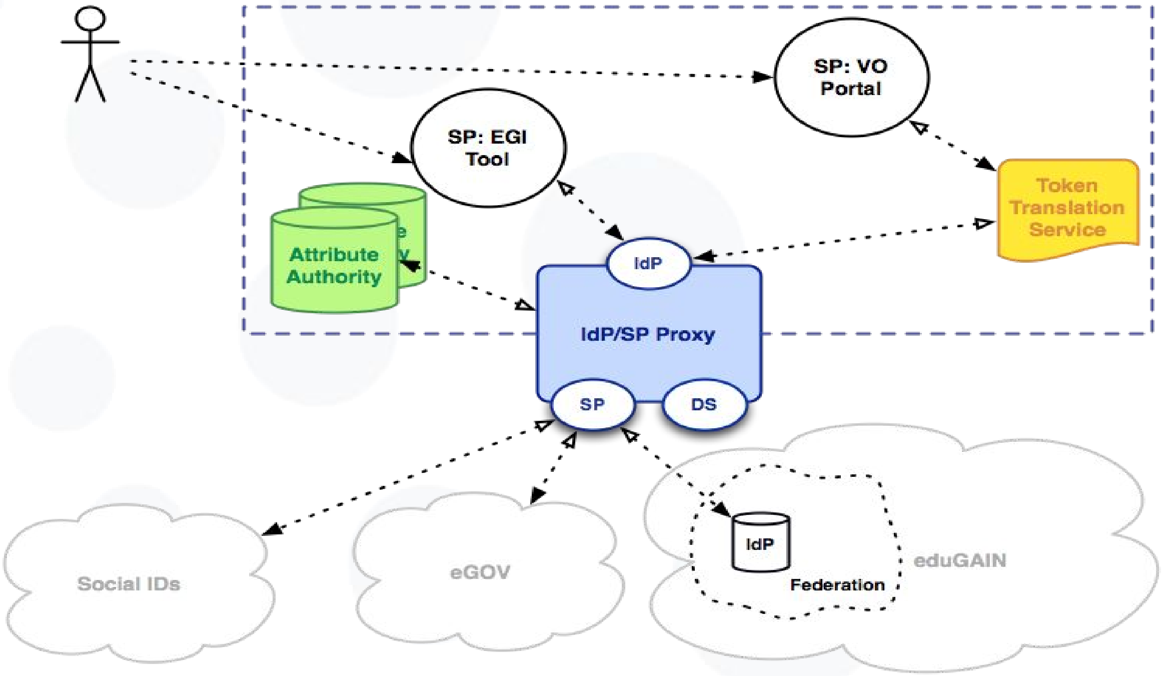
IdP/SP Proxy

High Availability & Load Balancing



- SimpleSAMLphp caches user sessions in Memcached, an in-memory key-value store for small chunks of arbitrary data
- COmanage maintains EGI user profile information in PostgreSQL DB cluster; Data are synced between *master* (read/write) and *hot standby slave* (read-only queries)
- Sessions are distributed and replicated among different Memcached servers, enabling load-balancing and fail-over
- User requests are load balanced among multiple SimpleSAMLphp web front-ends that use the back-end matrix of Memcached servers

Attribute Authorities



- Use case 1.1 - Connection with Perun - **DONE**
- Use case 1.2 - Connection with GOCDB - **DONE**
- Use case 1.3 - Connection with COmanage - **DONE**
- Use case 1.4 - Connection with the new OpenConnext Attribute Aggregator - **In progress**

Attribute Authorities

The EGI SP proxy supports attribute aggregation through:

- **SAML 2.0 AttributeQuery Attribute Aggregator**
  - SimpleSAMLphp module
  - Enables SSP to issue SAML 2.0 attribute queries to Attribute Authorities that support SAML 2.0 SOAP binding
- **LDAP Attribute Aggregator**
  - SimpleSAMLphp module
  - Allows SSP to issue LDAP queries for retrieving attributes
- **REST Attribute Aggregator**
  - SimpleSAMLphp module
  - Allows SSP to retrieve attributes from a RESTful web service
- **OpenConext attribute aggregation**
  - Java application
  - Handles attribute aggregation and provides REST API for accessing attribute information

Attribute Profile

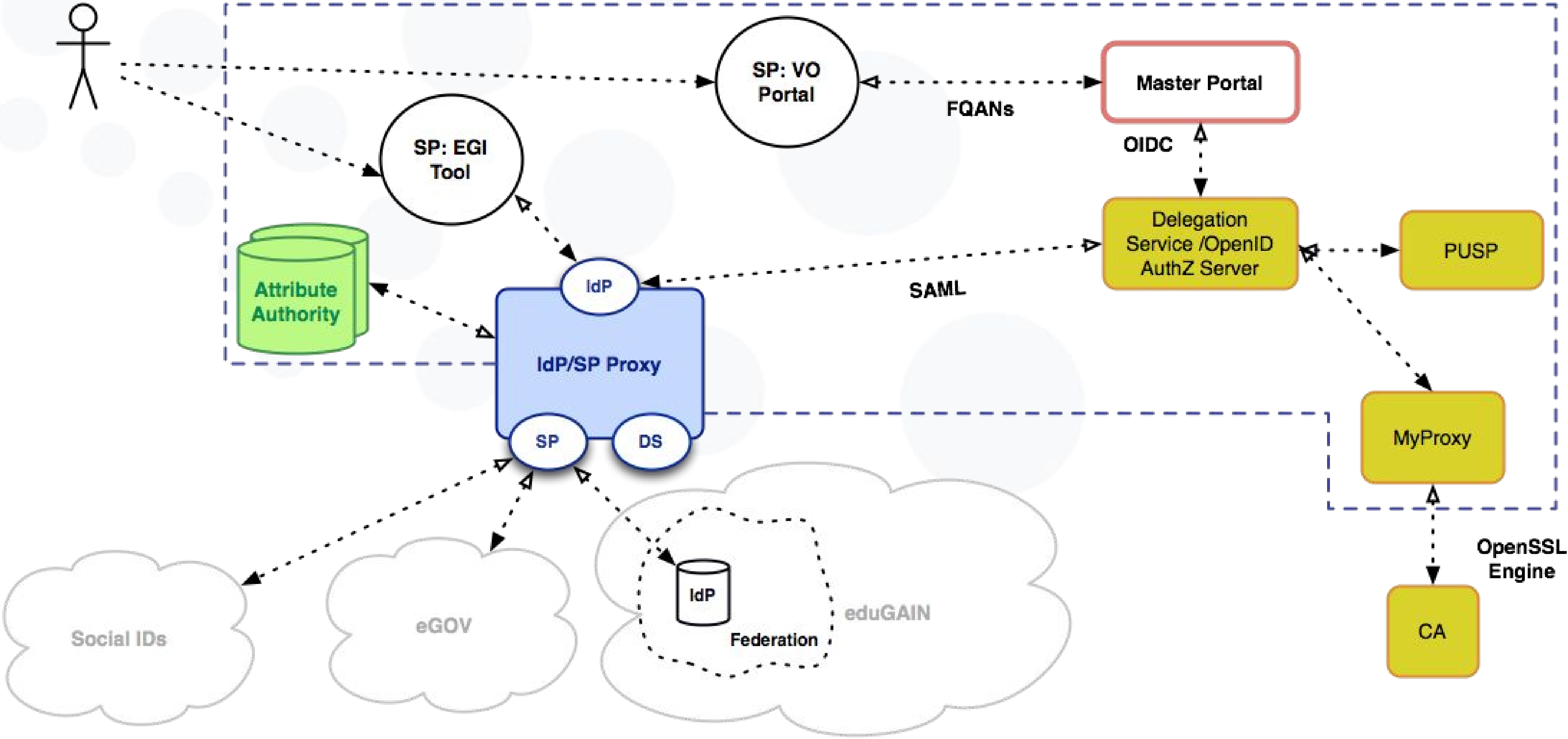
eduPersonUniqueId	urn:oid:1.3.6.1.4.1.5923.1.1.1.13	✔
eduPersonPrincipalName	urn:oid:1.3.6.1.4.1.5923.1.1.1.6	✔
eduPersonTargetedID	urn:oid:1.3.6.1.4.1.5923.1.1.1.10	✔
displayName	urn:oid:2.16.840.1.113730.3.1.241	✔
sn	urn:oid:2.5.4.4	✔
givenName	urn:oid:2.5.4.42	✔
mail	urn:oid:0.9.2342.19200300.100.1.3	✔
eduPersonAssurance	urn:oid:1.3.6.1.4.1.5923.1.1.1.11	✔
eduPersonEntitlement	urn:oid:1.3.6.1.4.1.5923.1.1.1.7	✔
eduPersonScopedAffiliation	urn:oid:1.3.6.1.4.1.5923.1.1.1.9	?

CoCo & R&S compliance

- **Identifiers**
  - eduPersonUniqueId
  - eduPersonPrincipalName
  - eduPersonTargetedID
- **Mail attribute**
  - mail
- **Name attributes**
  - displayName
  - givenName
  - sn (surname)
- **Authorization attribute**
  - eduPersonEntitlement
  - eduPersonScopedAffiliation

```
<md:EntityDescriptor entityID="https://aai.egi.eu/proxy/module.php/saml/sp/metadata.php/sso">
  <md:Extensions>
    <mdattr:EntityAttributes xmlns:mdattr="urn:oasis:names:tc:SAML:metadata:attribute">
      <saml:Attribute xmlns:saml="urn:oasis:names:tc:SAML:2.0:assertion" Name="http://macedir.org/entity-category" NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri">
        <saml:AttributeValue xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xs="http://www.w3.org/2001/XMLSchema" xsi:type="xs:string">http://www.geant.net/uri/dataprotection-code-of-conduct/v1</saml:AttributeValue>
        <saml:AttributeValue xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xs="http://www.w3.org/2001/XMLSchema" xsi:type="xs:string">http://refeds.org/category/research-and-scholarship</saml:AttributeValue>
      </saml:Attribute>
    </mdattr:EntityAttributes>
  </md:Extensions>
```

Token Translation: CILogon + PUSP



AAI Interoperability requirements

Interconnecting IdPs with EGI AAI SP proxy:

- **SAML2**
  - Provide the SAML2 metadata of the IdP (served over HTTPS using a CA-signed SSL cert)
  - The SAML2 metadata of the EGI SP proxy are available from:

    https://aai.egi.eu/proxy/module.php/saml/sp/metadata.php/sso
  - Release user identifier; must be any of `ePUID`, `ePPN`, or `ePTID`
  - Release authorisation information denoting VO/(sub)group membership/role, encapsulated in `eduPersonEntitlement` attribute
- **OpenID Connect/OAuth2**
  - Standard OIDC/OAuth2 flows supported (two/three-legged). More “exotic” flows can be supported if needed
  - Unique, persistent, non-reassignable user identifier (e.g. `sub` claim in the case of OIDC)

Pilot roadmap

Timeline	Expected Result	Required Technical Components	Status
2015-Q4	EGI IdP/SP deployed	SimpleSamlPHP / OpenConnext	Done
2015-Q4	Interconnect the EGI IdP/SP with a SAML 2.0 IdP	SAML 2.0	Done
2015-Q4	Interconnect the EGI IdP/SP with a SAML 2.0 SP	SAML 2.0	Done
2015-Q4	Interconnect the EGI IdP/SP with Perun as attribute provider	PERUN, SimpleSAMLphp LDAP Connector	Done

Pilot roadmap

Timeline	Expected Result	Required Technical Components	Status
2016-Q1	EGI IdP/SP OIDC input interface (OIDC → SAML)	OIDC Connector	DONE
2016–Q1	Interconnect the EGI IdP/SP with GOCDB as attribute provider	GOCDB, GOCDB connector	DONE
2016–Q1	Interconnect the EGI IdP/SP with CILogon based Token Translation Services	CILogon, MyProxy	DONE
2016–Q1	Interconnect the EGI IdP/SP with PUSPs based Token Translation Services	eToken Server and/or MyProxy	DONE
2016–Q1	First pilot with EGI operational tools (AppDB, GOCDB)	N.A.	DONE

Pilot roadmap

Timeline	Expected Result	Required Technical Components	Status
2016–Q2	EGI AAI published in eduGAIN		In progress
2016–Q2	EGI AAI Enrollment Service	COmanage	In progress
2016–Q2	EGI IdP/SP Proxy Attribute Aggregation	OpenConext	In progress
2016–Q2	Pilot with selected use cases from the EGI-Engage Competence Centers (ELIXIR, DARIAH)		In progress
2016–Q2	EGI AAI OpenID Connect Provider		In progress
2016–Q3	Interconnect the EGI IdP/SP proxy with an OIDC service (OneData?)		Planning
2016–Q3	Second pilot with selected use cases from the EGI-Engage Competence Centers		Planning
2016–Q3	Technology reassessment and definition of the roadmap until the end of the EGI-Engage project		

Thank you for your attention.

Questions?

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