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Implementation profile for using OASIS DSS in Central Signing services

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www.elegnamnden.se

Postadress	Besöksadress	Telefon växel	E-postadress
171 94 SOLNA	**Korta gatan 10**	**010-574 21 00**	**kansliet@elegnamnden.se**

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1 Introduction

This document specifies an implementation profile for exchange of sign requests and responses using the OASIS DSS protocol [DSS], enhanced by the Eid2 DSS Extensions for SAML based Central Signing service [Eid2-DSS].

Section 2 defines the sign request and response messages and section 3 defines the transport of these messages using HTTP POST.

1.1 Terminology

Term	Defined meaning
User	The entity requested to sign a document
Requesting service	The service requesting the signature on a particular document by a particular user
Signing Service	A centralized service that manages the process to authenticate the user that has been requested to sign a document, and the process to obtain the user's signature on the requested document.

1.2 Requirement key words

The key words **MUST**, **MUST NOT**, **REQUIRED**, **SHALL**, **SHALL NOT**, **SHOULD**, **SHOULD NOT**, **RECOMMENDED**, **MAY**, and **OPTIONAL** are to be interpreted as described in [RFC2119].

These keywords are capitalized when used to unambiguously specify requirements over protocol features and behavior that affect the interoperability and security of implementations. When these words are not capitalized, they are meant in their natural-language sense.

1.3 Name space references

Conventional XML namespace prefixes are used throughout the listings in this specification to stand for their respective namespaces as follows, whether or not a namespace declaration is present in the example:

Prefix	XML Namespace	Comments
eid2	http://id.elegnamnden.se/csig/1.0/dss-ext/ns	for the Eid2 DSS extension namespace [Eid2-DSS] (default namespace).
dss	urn:oasis:names:tc:dss:1.0:core:schema	the DSS core namespace [DSS].
ds	http://www.w3.org/2000/09/xmldsig#	The XML Signature Syntax and Processing specification [XMLSig] and its governing schema [XMLSig-XSD].
saml	urn:oasis:names:tc:SAML:2.0:assertion	The SAML V2.0 assertion namespace, defined in the schema [SAML-XSD].

1.4 Identification

The following URI identifier identifies this profile:

```
http://id.elegnamnden.se/csig/1.0/eid2-dss/profile
```

1.5 Structure

This specification uses the following typographical conventions in text: `<Eid2Element>`, `<ns:ForeignElement>`, `Attribute`, **Datatype**, `OtherCode`

2 Sign request and response messages

This section defines a profile for sign requests and responses using the OASIS DSS standard [DSS] in combination with Eid2 DSS extensions [Eid2-DSS].
In the following sections the OASIS DSS standard is referred to as “DSS” and the Eid2 DSS extensions are referred to as “Eid2-DSS”.

Conformance with this implementation profile requires full conformance with DSS and Eid2-DSS. In case of conflict between Eid2-DSS and DSS, Eid2-DSS is the normative one. In case of differences between this implementation profile and Eid2-DSS, this implementation profile is the normative one.

2.1 Sign Requests

Sign requests are carried in a `<dss:SignRequest>` element according to requirements and conditions of the following subsections.

The `<dss:SignRequest>` element MUST have a `Profile` attribute with the value “*http://id.elegnamnden.se/csig/1.0/eid2-dss/profile*”, which specifies conformance to this implementation profile.

The `<dss:SignRequest>` element MUST have a `RequestID` attribute with a value that uniquely identifies this request. The `RequestID` value MUST be a random generated value with at least 64 bit entropy.

2.1.1 Signature on sign requests

Sign requests MUST be signed. The signature MUST have a Same-Document URI-Reference (URI=””) to ensure that the signature covers the complete `<dss:SignRequest>` element.

The resulting `<ds:Signature>` element MUST be placed inside the `<dss:OptionalInputs>` element in accordance with section 5 of Eid2-DSS.

The Signature Service MUST NOT process the sign request unless the signature of the sign request can be authenticated as originating from a legitimate Requesting Service.

2.1.2 Data to be signed

A representation of the document to be signed MUST be provided in accordance with section 4.1 of Eid2-DSS. Data to be signed MUST be provided in a `<SignTaskData>` element.

The `<SignTasks>` element MAY contain one or more `<SignTaskData>` elements, representing one or more requested signatures.

2.1.3 Eid2-DSS extension

The `<dss:OptionalInput>` element of the sign request MUST contain a `<SignRequestExtension>` element according to requirements and conditions of the following subsections.

2.1.3.1 Version

The version of the Eid2-DSS specification MUST be version 1.0 (default). The version attribute MUST either be absent (default value) or MUST specify the value “1.0”.

2.1.3.2 Conditions

A `<saml:Conditions>` element MUST be present. This element MUST NOT contain any information in addition to what is defined in section 3.1 of Eid2-DSS.

2.1.3.3 Signer

The <Signer> element MUST contain at least the SAML attributes that are necessary in order to uniquely identify the signer. The present attributes MUST match the attributes that are provided for this signer when authenticating the signer using the identity provider specified in the <IdentityProvider> element.

The signature service MUST match all attribute values provided in the <Signer> element with SAML attributes provided for this signer subject in a valid assertion obtained from the specified identity provider.

If any of the attributes specified in the <Signer> element can't be found or matched with a corresponding attribute value from an obtained assertion from the specified identity provider, the Signing Service MUST reject the sign request.

2.1.3.4 IdentityProvider

This element MUST be present, specifying the SAML EntityID of the identity provider that MUST be used to authenticate the signer. The Signature Service MUST NOT generate the requested signature unless the signer is successfully authenticated through this identity provider.

2.1.3.5 Sign Requester

This element MUST be present, specifying the identity of the Requesting Service in the form of its SAML EntityID.

2.1.3.6 SignService

This element MUST be present, specifying the SAML EntityID of the Signing Service that is the target of this sign request.

2.1.3.7 RequestedSignatureAlgorithm

This element MAY be present, specifying a URI that identifies a signature algorithm that the Requesting Service prefers to be used when generating the requested signature.
When this element is absent, the default signing algorithm is RSA with SHA-256.

2.1.3.8 SignMessage

This element MAY be present to provide an optional message to the user that the Signing Service MAY present to the user before obtaining the user's consent to sign. When present, this element MUST provide a string in HTML form. The message string MUST NOT contain any JavaScript. The Signing Service MUST filter the message string before using it to remove any present JavaScript.

2.1.3.9 CertRequestProperties

This element MAY be present to provide requested properties of generates signature certificates according with section 3.1.1 of Eid2-DSS

2.1.3.9.1 RequestedCertAttributes

This element MAY be present to specify any number of attributes that the Requesting Service requires or requests to be included as a representation of the subject in the signature certificate that is generated with the requested signature.

The Signature Service MUST NOT generate the requested signature unless it can obtain attribute values from an authoritative source for all requested attributes that is marked as "required". The Signature service SHOULD attempt to provide all "requested" attributes.

The Signing Service MAY use an attribute authority as complementary source to obtain requested attribute values, as long as the identity assertion provided by the specified identity provider is sufficient to uniquely identify the signer. The Sign Requester MAY provide one or more SAML EntityID identifiers of Attribute Authorities in

<AttributeAuthority> elements, which could be used to obtain an attribute value for the requested attribute.

It is left to local policy of the Signature Service whether it accepts any DefaultValue attribute value for any requested attributes as being provided by an authoritative source. If a DefaultValue is accepted as authoritative, it MUST NOT conflict with any attributes received by the specified identity provider or attribute authority when authenticating the signer. If the requested attribute is provided by the identity provider or any attribute authority used by the Signing Service, then these values MUST be used over the DefaultValue.

2.2 Sign Responses

Sign responses are carried in a <dss:SignResponse> element according to requirements and conditions of the following subsections.

The <dss:SignResponse> element MUST have a Profile attribute with the value "*http://id.elegnamnden.se/csig/1.0/eid2-dss/profile*", which specifies conformance to this implementation profile.

The <dss:SignResponse> element MUST have a RequestID attribute with a value that is identical to the sign request that is being serviced through this sign response.

2.2.1 Signature on sign responses

Sign responses MUST be signed. The signature MUST have a Same-Document URI-Reference (URI="") to ensure that the signature covers the complete <dss:SignResponse> element.

The resulting <ds:Signature> element MUST be placed inside the <dss:OptionalOutputs> element in accordance with section 5 of Eid2-DSS.

2.2.2 Sign response status information

Implementations of this specification MUST return a <dss:ResultMajor> value and MAY return a <dss:ResultMinor> value. Implementations of this specification are released from the requirement to return any of the listed values of <dss:ResultMinor>, specified in the DSS standard, when returning the <dss:ResultMajor> value "urn:oasis:names:tc:dss:1.0:resultmajor:Success", since all the listed <dss:ResultMinor> values relates to signature validation and not signature creation.

With the exception above, the response values defined in section 2.6 of the DSS standard, amended by status identifiers defined in section 4.1.5 of [Eid2-Identifiers], SHOULD be used.

2.2.3 Generated signature

The generated signature result data SHALL be provided in <SignTaskData> element according to section 4.1.1 of Eid2-DSS.

One <SignTaskData> element shall be provided for each successfully generated signature as a result of the corresponding request.

2.2.4 Eid2-DSS Extension

The <dss:OptionalInput> element of the sign response MUST contain a <SignResponseExtension> element according to requirements and conditions of the following subsections.

2.2.4.1 Version

The version of the Eid2-DSS specification MUST be version 1.0 (default). The version attribute MUST either be absent (default value) or MUST specify the value "1.0".

2.2.4.2 ResponseTime

The `<ResponseTime>` element MUST be present in the response.

2.2.4.3 Request

The `<Request>` element MUST be present in all responses where a corresponding request could be parsed and authenticated to originate from a legitimate requester.

2.2.4.4 SignerAssertionInfo

The `<SignerAssertionInfo>` element MUST be present if the signer has been successfully authenticated using the specified Identity Provider. The present `<ContextInfo>` child element MUST include an `<AssertionRef>` child element. The `<AssertionRef>` child element MUST contain the value of the `ID` attribute of the root element of the SAML assertion used to authenticate the signer.

2.2.4.5 SignatureCertificateChain

The `<SignatureCertificateChain>` element MUST be present if a certificate was issued to the signer. This element MUST provide a complete chain of certificate up to a self-signed root certificate.

All signature values according to section 2.2.3 MUST be verifiable using the signer certificate provided in this element.

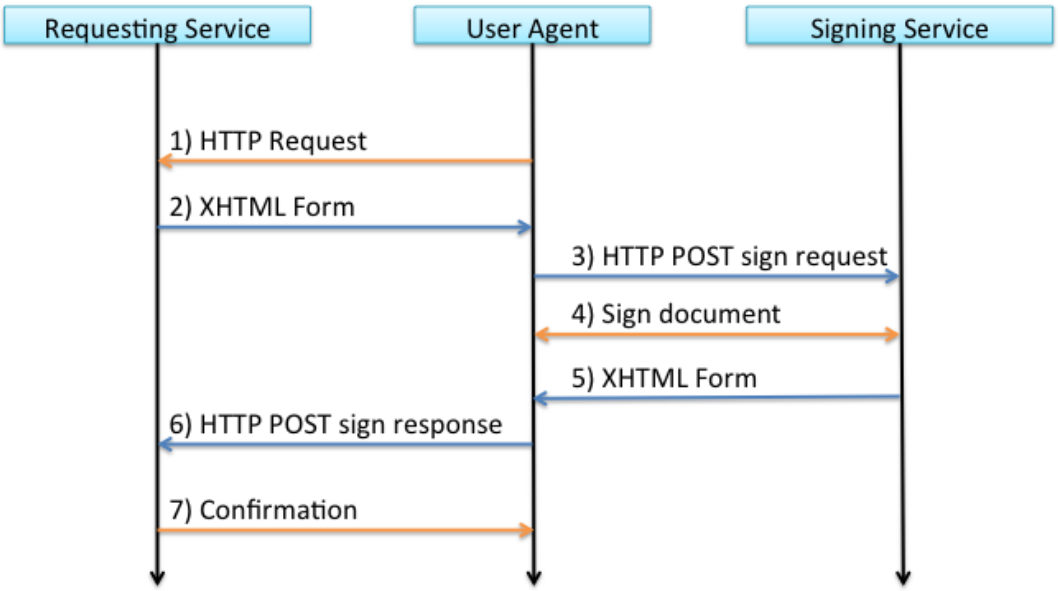
3 HTTP POST binding

This section specifies the protocol binding for transport of sign request and sign response using HTTP POST. This protocol binding implements the message exchange model in section 3.1.

This process is technically equivalent to the procedures implemented by SAML HTTP POST bindings [SAML2Bind], section 3.5.

3.1 Message exchange model

Sign request and response messages are exchanged between the Requesting Service and the signing service with the user acting as an intermediary through a user agent (typically a web browser) according to the following message flow:



1. The user agent initiates the signing process by an HTTP request to the service provider, for example caused by the user clicking on some button on a web page.
2. The service provider responds to the user agent with an XHTML form, containing a Base64 encoded sign request.
3. A JavaScript in the XHTML form causes the user agent to send the sign request to the signing service using HTTP POST.
4. The user interacts with the signing service to complete the requested signature.
5. The signing service responds to the user agent with an XHTML form, containing a Base64 encoded sign response.
6. A JavaScript in the XHTML form causes the user agent to send the sign response to the service provider using HTTP POST.
7. The service provider processes the sign response and a confirmation or status message is returned to the user agent.

The steps 1,4 and 7 are part of the service infrastructure and are outside the scope of this HTTP POST binding specification.

3.1.1 Sign request XHTML form

The sign request XHTML form SHALL have functional properties that are equivalent to the following implementation example:

```
<?xml version='1.0' encoding='UTF-8'?>
<!DOCTYPE html PUBLIC '-//W3C//DTD XHTML 1.1//EN'
'http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd'>
<html xmlns='http://www.w3.org/1999/xhtml' xml:lang='en'>
<body onload='document.forms[0].submit()'>
  <noscript>
    <p><strong>Note:</strong> Since your browser does not support JavaScript,
    you must press the Continue button once to proceed.</p>
  </noscript>
  <form action='https://eid2csig.konki.se/signrequest' method='post'>
    <div>
      <input type='hidden' name='Binding' value='POST/XML/1.0'/>
      <input type='hidden' name='RelayState' value='56345145a482995d'/>
      <input type='hidden' name='EidSignRequest' value='PD94bWw…WVzdD4='/>
    </div>
    <noscript>
      <div>
        <input type='submit' value='Continue'/>
      </div>
    </noscript>
  </form>
</body>
```

The form's action attribute specifies the URL to the signing service and the form MUST have a method attribute with the value "post".

The form MUST provide the following parameters:

Parameter	Value
Binding	"POST/XML/1.0" Identifying implementation of this binding specification
RelayState	This parameter MUST contain the value of the RequestID attribute of the dss:SignRequest element that are present in the base64 encoded sign request.
EidSignRequest	Base64 encoded sign request.

Sign Response XHTML form

The sign response XHTML form SHALL have functional properties that are equivalent to the following implementation example:

```
<?xml version='1.0' encoding='UTF-8'?>
<!DOCTYPE html PUBLIC '-//W3C//DTD XHTML 1.1//EN'
'http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd'>
<html xmlns='http://www.w3.org/1999/xhtml' xml:lang='en'>
<body onload='document.forms[0].submit()'>
  <noscript>
    <p><strong>Note:</strong> Since your browser does not support JavaScript,
    you must press the Continue button once to proceed.</p>
  </noscript>
  <form action='https://sp.example.com/sigResponseHandler' method='post'>
    <div>
      <input type='hidden' name='Binding' value='POST/XML/1.0'/>
```

```
      <input type='hidden' name='RelayState' value='56345145a482995d'/>
      <input type='hidden' name=' EidSignResponse' value='PD94bWw…WVzdD4='/>
    </div>
    <noscript>
      <div>
        <input type='submit' value='Continue'/>
      </div>
    </noscript>
  </form>
</body>
```

The form's action attribute specifies the URL to the requesting service provider. This URL MUST specify a URL from the `<saml:AudienceRestriction>` element that was provided in the corresponding sign request. The form MUST have a method attribute with the value "post".

The form MUST provide the following parameters:

Parameter	Value
Binding	"POST/XML/1.0" Identifying implementation of this binding specification
RelayState	This parameter MUST contain the value of the `RequestID` attribute of the `<dss:SignResponse>` element that are present in the base64 encoded sign request.
EidSignResponse	Base64 encoded sign response.

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4 References

4.1 Normative References

[RFC2119]
Bradner, S., Key words for use in RFCs to Indicate Requirement Levels, March 1997.

[Eid2-DSS]
Eid2 DSS Extension for SAML based Central Signing service - Version 0.1, 13 Nov 2012.

[DSS]
OASIS Standard - Digital Signature Service Core Protocols, Elements, and Bindings Version 1.0, April 11, 2007.

[SAML-XSD]
S. Cantor et al., SAML assertions schema. OASIS SSTC, March 2005. Document ID: saml-schema-assertion-2.0. See http://www.oasisopen.org/committees/security/.

[XMLSig]
D. Eastlake et al, XML-Signature Syntax and Processing, W3C Recommendation, February 2002.

[XMLSig-XSD]
XML Signature Schema. World Wide Web Consortium. See http://www.w3.org/TR/2000/CR-xmldsig-core-20001031/xmldsig-coreschema.xsd.

[Eid2-Identifiers]
Registry for identifiers assigned by the Swedish e-identification board

4.2 Informative References

[SAML2Bind]
OASIS Standard, Bindings for the OASIS Security Assertion Markup Language (SAML) V2.0, March 2005.