



Asynchronous Processing Abstract Profile of the OASIS Digital Signature Services Version 1.0

OASIS Standard

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Abstract:

This document defines protocol profiles and processing profiles for the purpose of creating and verifying German Signature Law signatures.

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1 Introduction

This is an *abstract profile*. Further profiles will build on this one to provide a basis for implementation and interoperability.

This draft profiles the OASIS DSS core protocol for asynchronous processing. Although most applications of the OASIS Digital Signature Service supply the results immediately there is a demand for deferred delivering of results. E.g. the German Signature Law explicitly requires the commitment of the certificate holder or at least a time slot for the certificate holder to deny the signing request [**SigG**].

Another use case for a asynchronous protocol may arise in a verification request if a minimum latency between creation and verification has to be respected.

This profile is intended to be generic, so it may be combined with other profiles freely.

A protocol for asynchronous processing is already defined in the XML Key Management Specification [**XKMS**]. This profile borrows ideas from the XKMS protocol for the OASIS Digital Signature Service.

The following sections describe how to understand the rest of this document.

1.1 Terminology

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this specification are to be interpreted as described in IETF RFC 2119 [**RFC 2119**]. 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.

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

1.2 Normative References

[**Core-XSD**] S. Drees et al. *DSS Schema*. OASIS, February 2007

[**DSSCore**] S. Drees et al. *Digital Signature Service Core Protocols and Elements*. OASIS, February 2007

[**RFC 2119**] S. Bradner. Key words for use in RFCs to Indicate Requirement Levels. <http://www.ietf.org/rfc/rfc2119.txt>, IETF RFC 2119, March 1997. .

[**XML-ns**] T. Bray, D. Hollander, A. Layman. *Namespaces in XML*. <http://www.w3.org/TR/1999/REC-xml-names-19990114>, W3C Recommendation, January 1999.

[**XMLSig**] D. Eastlake et al. *XML-Signature Syntax and Processing*. <http://www.w3.org/TR/1999/REC-xml-names-19990114>, W3C Recommendation, February 2002.

[**SigG**] Framework for Electronic Signatures, Amendment of Further Regulations Act (Signaturgesetz – SigG), 21 May 2001. http://www.regtp.de/imperia/md/content/tech_reg_t/digisign/119.pdf

[**XKMS2**] Phillip Hallam-Baker *XML Key Management Specification (XKMS 2.0)* <http://www.w3.org/TR/2004/CR-xkms2-20040405/>, W3C Candidate Recommendation, 5 April 2004.

1.3 Non-Normative References

1.4 Namespaces

The structures described in this specification are contained in the schema file [**XYZ-XSD**]. All schema listings in the current document are excerpts from the schema file. In the case of a disagreement between the schema file and this document, the schema file takes precedence.

42 This schema is associated with the following XML namespace:

43 `urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:1.0`

44 If a future version of this specification is needed, it will use a different namespace.

45

46 Conventional XML namespace prefixes are used in this document:

- 47 • The prefix `async:` stands for this profiles namespace **[Core-XSD]**.
- 48 • The prefix `dss:` (or no prefix) stands for the DSS core namespace **[Core-XSD]**.
- 49 • The prefix `ds:` stands for the W3C XML Signature namespace **[XMLSig]**.

50 Applications MAY use different namespace prefixes, and MAY use whatever namespace
51 defaulting/scoping conventions they desire, as long as they are compliant with the Namespaces in XML
52 specification **[XML-ns]**.

53 **1.5 Overview (Non-normative)**

54 This profile defines a simple mechanism for asynchronous signing and verification requests. This profile is
55 similar to the asynchronous processing protocol defined in the XKMS spec **[XKMS]**.

56 In the first call the client supplies its input values as defined in the core and the applied profiles. The server
57 may reply synchronously with the appropriate result.

58 On the other hand the server may reply with an 'empty' result, giving the `<ResultMajor>` code
59 'Pending' and a `<async:ResponseID>` element as an `<OptionalOutput>`. The server generates the
60 value of the `<async:ResponseID>` on its own.

61 The client may initiate a `<PendingRequest>` call from time to time with the `<async:ResponseID>` of the
62 initial response included in the `<async:ResponseID>` element within the `<dss:OptionalInputs>`.

63 When the server finally succeeds with its processing the results will be delivered to the client with its next
64 polling call. In this case the `<ResultMajor>` must not be 'Pending' but the `<ResultMajor>`
65 resulting from the request processing.

66 A notification mechanism isn't defined yet, but may be subject to following versions of this profile.

67

68 2 Profile Features

69 2.1 Identifier

70 urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing

71 Add an <AdditionalProfile> element containing this URI to use this profile.

72 2.2 Scope

73 This document profiles the DSS signing and verifying protocols defined in [DSSCore].

74 2.3 Relationship To Other Profiles

75 This profile is based directly on the [DSSCore].

76 This profile is an abstract profile which is not implementable directly.

77 This profile is intended to be combined with other profiles freely.

78 2.4 Signature Object

79 This profile does not specify or constrain the type of signature object.

80 2.5 Transport Binding

81 This profile does not specify or constrain the transport binding.

82 2.6 Security Binding

83 This profile does not specify or constrain the security binding.

84 3 Polling Protocol

85 The polling protocol extends the core protocol using the `<PendingRequest>` element for initiating a
86 polling request. This is different from the initial request because the request specific data was already
87 transmitted.

88 3.1 Element `<PendingRequest>`

89 The `<PendingRequest>` element is sent by the client to request the result from a pending signature or
90 verification initiated earlier. It contains the following attributes and elements inherited from

91 `<RequestBaseType>` :

92 `RequestID` [Optional]

93 This attribute is used to correlate requests with responses. When present in a request, the server
94 MUST return it in the response.

95 `Profile` [Optional]

96 This attribute indicates a particular DSS profile. It may be used to select a profile if a server supports
97 multiple profiles, or as a sanity-check to make sure the server implements the profile the client
98 expects. In this special case of a `<PendingRequest>` the required profile information is already
99 defined within the initial call to the server. So `Profile` MUST be omitted in a `<PendingRequest>`.

100 Consequently there MUST NOT be any `<AdditionalProfile>` optional input elements in a
101 `<PendingRequest>`.

102 `<OptionalInputs>` [Optional]

103 Any additional inputs to the request. This element may be used e.g. for authentication data.

104 In addition to `<RequestBaseType>` the `<PendingRequest>` element defines the following
105 `<ResponseID>` element :

106 3.1.1 Element `<OptionalInputs>`

107 This profile defines the new input element of `<async:ResponseID>`.

108
109 `<async:ResponseID>`

110 To correlate subsequent `<PendingRequest>` calls to the initial request the `<async:ResponseID>`
111 element is introduced by this profile. The client MUST take care of the value returned by the initial
112 `<SignRequest>` in `<async:ResponseID>`.

113 3.2 Element <Response>

114 The <PendingRequest> may response with a generic <Response> in cases where the service is unable
115 to specialise down to <SignResponse> or <VerificationResponse> .

116 This will happen when the service doesn't recognise the given ResponseID. The <ResultMinor> is
117 set to the special value of ResponseIdUnknown .

118

```
119 urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:resultminor:ResponseIdU  
120 nknown
```

121

122 The <ResultMajor> code in this case is RequesterError . This result code shows up only in response
123 to a <PendingRequest> .

124 In the case of successful interpretation of the ResponseID attribute the service returns a
125 <SignResponse> or <VerifyResponse> as intended by the initial request.

126 4 Profile of Signing Protocol

127 4.1 Element <SignRequest>

128 No additional elements of <SignRequest> defined by this profile.

129 4.2 Element <SignResponse>

130 4.2.1 Element <ResultMajor>

131 This profile defines the additional <ResultMajor> code, which may show up in response to a
132 <SignRequest> or <PendingRequest>:

133 `urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:resultmajor:Pending`

134 This result value means that the operation did not finish yet. Subsequent requests may return this result
135 code again. After the server has finished the operation the call will return the signing result indicated by
136 the `urn:oasis:names:tc:dss:1.0:resultmajor:Success` value or an error code.

137 In case an asynchronous service is unable to reply in a synchronous manner and a requests to this
138 service is made without profiling the call as asynchronous (using the given profile identifier within the
139 `Profile` attribute or the <AdditionalProfiles> element), the service returns a <ResultMajor>
140 of `RequesterError` and a <ResultMinor> of:

141 `urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:resultminor:asynchronousOnly`

142

143 4.2.2 Element <OptionalOutputs>

144 This profile defines the new optional output element of <async:ResponseID>.

145
146 <async:ResponseID>

147 To correlate subsequent <PendingRequest> calls to the initial request the <async:ResponseID>
148 element is introduced by this profile. The service will generate a suitable value on its own behalf. So the
149 client MUST take care of the value returned in <async:ResponseID> for subsequent
150 <PendingRequest>.

151
152 If the server returns the <ResultMajor> code

153 `urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:resultmajor:Pending`
154 the contents of the <OptionalOutputs> element children other than <async:ResponseID> are
155 undefined.

156
157 If the server returns the <ResultMajor> code

158 `urn:oasis:names:tc:dss:1.0:resultmajor:Success`
159 the <OptionalOutputs> MUST contain the results defined by the accompanying profiles as expected
160 in synchronous operation.

161

162 **4.2.3 Element <SignatureObject>**

163 If the server returns the <ResultMajor> code

164 urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:resultmajor:Pending
165 the content of the <SignatureObject> element is undefined.

166

167 If the server returns the <ResultMajor> code

168 urn:oasis:names:tc:dss:1.0:resultmajor:Success

169 the <SignatureObject> **MUST** contain the results defined by the accompanying profiles as expected
170 in synchronous operation.

171 5 Profile of Verifying Protocol

172 5.1 Element <VerifyRequest>

173 5.1.1 Element <OptionalInputs>

174 This profile doesn't interfere with the element defined from [DSSCore].

175 5.1.2 Element <SignatureObject>

176 This profile doesn't interfere with the element defined from [DSSCore].

177 5.1.3 Element <InputDocuments>

178 This profile doesn't interfere with the element defined from [DSSCore].

179 5.2 Element <VerifyResponse>

180 5.2.1 Element <ResultMajor>

181 This profile defines the additional <ResultMajor> code, which may show up in response to a
182 <SignRequest> or <PendingRequest>:

183 `urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:resultmajor:Pending`

184 This result value means that the operation did not finish yet. Subsequent requests may return this result
185 code again. After the server has finished the operation the call will return the verification result indicated
186 by the `urn:oasis:names:tc:dss:1.0:resultmajor:Success` value or an error code.

187 In case an asynchronous service is unable to reply in a synchronous manner and a requests to this
188 service is made without profiling the call as asynchronous (using the given profile identifier within the
189 `Profile` attribute or the <AdditionalProfiles> element), the service returns a <ResultMajor>
190 of `RequesterError` and a <ResultMinor> of:

191 `urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:resultminor:asynchronousOnly`

192

193 5.2.2 Element <OptionalOutputs>

194 This profile defines the new optional output element of `<async:ResponseID>`.

195
196 `<async:ResponseID>`

197 To correlate subsequent <PendingRequest> calls to the initial request the `<async:ResponseID>`
198 element is introduced by this profile. The service will generate a suitable value on its own behalf. So the
199 client MUST take care of the value returned in `<async:ResponseID>` for subsequent
200 <PendingRequest>.

201

202 If the server returns the <ResultMajor> code

203 `urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:resultmajor:Pending`

204 the contents of the <OptionalOutputs> element children other than <async:ResponseID> are
205 undefined.

206

207 If the server returns the <ResultMajor> code

208 urn:oasis:names:tc:dss:1.0:resultmajor:Success

209 the <OptionalOutputs> **MUST** contain the results defined by the accompanying profiles as expected

210 in synchronous operation.

211

212 **A. Acknowledgements**

213 The following individuals have participated in the creation of this specification and are gratefully
214 acknowledged:

215 **Participants:**

216 Trevor Perrin, individual
217 Pieter Kasselmann, Betrusted
218 Tommy Lindbert, individual

219

220

B. Example – (Non-Normative)

221

Example of an initial signing request :

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```
<dss:SignRequest Profile="urn:oasis:names:tc:dss:1.0:profile:dss_interop"
  RequestID="I0d2f1de663c75dc52f468e678af1bfd6"
  xmlns:dss="urn:oasis:names:tc:dss:1.0:core:schema">
  <dss:OptionalInputs>
  <dss:SignatureType>...</dss:SignatureType>
  <dss:AdditionalProfile>
    urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing
  </dss:AdditionalProfile>
  </dss:OptionalInputs>
  <dss:InputDocuments>
    <dss:Document ID="..." RefType="..." RefURI="...">
    ...
  </dss:Document>
  </dss:InputDocuments>
</dss:SignRequest>
```

237

238

The request above may result in an response like this :

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```
<dss:SignResponse RequestID="I0d2f1de663c75dc52f468e678af1bfd6"
  Profile="urn:oasis:names:tc:dss:1.0:profile:dss_interop"
  xmlns:dss="urn:oasis:names:tc:dss:1.0:core:schema"
  xmlns:async="urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:1.0">
  <dss:Result>
  <dss:ResultMajor>
    urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:resultmajor:Pending
  </dss:ResultMajor>
  </dss:Result>
  <dss:OptionalOutputs>
    <async:ResponseID>I517f0e98752098c7245f2892f59ef9fc</async:ResponseID>
  </dss:OptionalOutputs>
</dss:SignResponse>
```

252

The server return a <dss:ResultMajor> value 'Pending' with no Signature returned. So the client will send a PendingRequest using the value of <async:ResponseID> from this response. A PendingRequest may look like this :

253

254
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261
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264

```
<async:PendingRequest RequestID="If82506cfa678bedf2cdc1549f5970641"
  xmlns:dss="urn:oasis:names:tc:dss:1.0:core:schema"
  xmlns:async="urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:1.0">
  <dss:OptionalInputs>
  <dss:AdditionalProfile>
    urn:oasis:names:tc:dss:1.0:profiles:asynchronousprocessing:1.0
  </dss:AdditionalProfile>
  <async:ResponseID>I517f0e98752098c7245f2892f59ef9fc</async:ResponseID>
  </dss:OptionalInputs>
</async:PendingRequest>
```

265

266

The server may respond with a <dss:ResultMajor> value 'Pending' again. But finally server side processing will be finished and the server replies such a Response :

267

268
269
270
271
272
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274
275
276
277
278

```
<dss:SignResponse RequestID="If82506cfa678bedf2cdc1549f5970641"
  Profile="urn:oasis:names:tc:dss:1.0:profile:dss_interop"
  xmlns:dss="urn:oasis:names:tc:dss:1.0:core:schema">
  <dss:Result>
  <dss:ResultMajor>
    urn:oasis:names:tc:dss:1.0:resultmajor:Success
  </dss:ResultMajor>
  </dss:Result>
  <dss:SignatureObject>
    <ds:Signature xmlns:ds="http://www.w3.org/2000/09/xmlsig#">
    ...
  </dss:SignatureObject>
</dss:SignResponse>
```

279
280
281

```
</ds:Signature>  
</dss:SignatureObject>  
</dss:SignResponse>
```

282
283
284