

SAML V2.0 Identity Assurance Profiles Version 1.0

Committee Specification 01

5 November 2010

6	Specification URIs:
7 8	This Version: http://docs.oasis-open.org/security/saml/Post2.0/sstc-saml-assurance-profile-cs-01.html
9 10	http://docs.oasis-open.org/security/saml/Post2.0/sstc-saml-assurance-profile-cs-01.odt (Authoritative)
11	http://docs.oasis-open.org/security/saml/Post2.0/sstc-saml-assurance-profile-cs-01.pdf
12 13	Previous Version: http://docs.oasis-open.org/security/saml/Post2.0/sstc-saml-assurance-profile-cd-02.html
14 15	http://docs.oasis-open.org/security/saml/Post2.0/sstc-saml-assurance-profile-cd-02.odt (Authoritative)
16	http://docs.oasis-open.org/security/saml/Post2.0/sstc-saml-assurance-profile-cd-02.pdf
17 18	Latest Version: http://docs.oasis-open.org/security/saml/Post2.0/sstc-saml-assurance-profile.html
19	http://docs.oasis-open.org/security/saml/Post2.0/sstc-saml-assurance-profile.odt (Authoritative)
20	http://docs.oasis-open.org/security/saml/Post2.0/sstc-saml-assurance-profile.pdf
21 22	Technical Committee: OASIS Security Services TC
23 24 25	Chair(s): Nathan Klingenstein , Internet2 Thomas Hardjono, MIT Kerberos Consortium
26 27 28 29	Editor(s): RL "Bob" Morgan, Internet2 Paul Madsen, NTT Scott Cantor, Internet2
30 31 32 33 34	Related Work: This specification defines how to use existing SAML mechanisms to express identity assurance information - 1) the SAML 2.0 Authentication Context [SAMLAC] mechanisms in order to allow SAML authentication requests and assertions to carry assurance information and 2) extensions to SAML metadata [SAMLMA] to represent assurance certification information about a SAML entity within the corresponding metadata.

Declared XML Namespace(s):

37 N/A

36

38

39

40

41

42

43

44

45

46 47

48

49

50

51

52

53

Abstract:

This document specifies methods of representing assurance information in two different aspects of SAML. It provides guidelines for the use of SAML's Authentication Context [SAMLAC] mechanisms to express authentication assurance information within authentication requests and assertions. Separately, it defines an attribute suitable for inclusion in SAML Metadata [SAMLMeta] for enumerating an Identity Provider's assurance certifications.

Status:

This document was last revised or approved by the SSTC on the above date. The level of approval is also listed above. Check the current location noted above for possible later revisions of this document. This document is updated periodically on no particular schedule.

TC members should send comments on this specification to the TC's email list. Others should send comments to the TC by using the "Send A Comment" button on the TC's web page at http://www.oasis-open.org/committees/security.

For information on whether any patents have been disclosed that may be essential to implementing this specification, and any offers of patent licensing terms, please refer to the IPR section of the TC web page (http://www.oasis-open.org/committees/security/ipr.php.

Notices

- 55 Copyright © OASIS® 2010. All Rights Reserved.
- All capitalized terms in the following text have the meanings assigned to them in the OASIS Intellectual
- 57 Property Rights Policy (the "OASIS IPR Policy"). The full Policy may be found at the OASIS website.
- 58 This document and translations of it may be copied and furnished to others, and derivative works that
- 59 comment on or otherwise explain it or assist in its implementation may be prepared, copied, published.
- and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice
- and this section are included on all such copies and derivative works. However, this document itself may
- not be modified in any way, including by removing the copyright notice or references to OASIS, except as
- 63 needed for the purpose of developing any document or deliverable produced by an OASIS Technical
- 64 Committee (in which case the rules applicable to copyrights, as set forth in the OASIS IPR Policy, must be
- 65 followed) or as required to translate it into languages other than English.
- The limited permissions granted above are perpetual and will not be revoked by OASIS or its successors
- 67 or assigns.
- 68 This document and the information contained herein is provided on an "AS IS" basis and OASIS
- 69 DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY
- 70 WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY
- 71 OWNERSHIP RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A
- 72 PARTICULAR PURPOSE.
- OASIS requests that any OASIS Party or any other party that believes it has patent claims that would
- necessarily be infringed by implementations of this OASIS Committee Specification or OASIS Standard,
- 75 to notify OASIS TC Administrator and provide an indication of its willingness to grant patent licenses to
- such patent claims in a manner consistent with the IPR Mode of the OASIS Technical Committee that
- 77 produced this specification.
- OASIS invites any party to contact the OASIS TC Administrator if it is aware of a claim of ownership of
- any patent claims that would necessarily be infringed by implementations of this specification by a patent
- 80 holder that is not willing to provide a license to such patent claims in a manner consistent with the IPR
- 81 Mode of the OASIS Technical Committee that produced this specification. OASIS may include such
- claims on its website, but disclaims any obligation to do so.
- 83 OASIS takes no position regarding the validity or scope of any intellectual property or other rights that
- might be claimed to pertain to the implementation or use of the technology described in this document or
- the extent to which any license under such rights might or might not be available; neither does it
- 86 represent that it has made any effort to identify any such rights. Information on OASIS' procedures with
- 87 respect to rights in any document or deliverable produced by an OASIS Technical Committee can be
- 88 found on the OASIS website. Copies of claims of rights made available for publication and any
- assurances of licenses to be made available, or the result of an attempt made to obtain a general license
- or permission for the use of such proprietary rights by implementers or users of this OASIS Committee
- 91 Specification or OASIS Standard, can be obtained from the OASIS TC Administrator. OASIS makes no
- 92 representation that any information or list of intellectual property rights will at any time be complete, or
- that any claims in such list are, in fact, Essential Claims.
- The name "OASIS" is a trademark of OASIS, the owner and developer of this specification, and should be
- used only to refer to the organization and its official outputs. OASIS welcomes reference to, and
- 96 implementation and use of, specifications, while reserving the right to enforce its marks against
- 97 misleading uses. Please see http://www.oasis-open.org/who/trademark.php for above guidance.

Table of Contents

99	1 Introduction	5
100	1.1 Motivation [Non-Normative]	5
101	1.2 Limitations [Non-Normative]	5
102	1.3 Terminology	5
103	1.4 Normative References	6
104	1.5 Non-normative References	7
105	2 AuthnContext Identity Assurance Guidelines	8
106	2.1 AuthnContext Schema Guidelines	8
107	2.2 Example	8
108	3 Identity Assurance Certification Attribute Profile	10
109	3.1 Required Information	10
110	3.2 Profile Overview	10
111	3.3 SAML Attribute Naming	10
112	3.4 Profile-Specific XML Attributes	10
113	3.5 SAML Attribute Values	10
114	3.6 Example	11
115	4 Conformance	12
116	4.1 Identity Assurance Certification Attribute Profile Conformance	12
117	Appendix A.Acknowledgments	13
118	Appendix B.Revision History	14

1 Introduction

- 120 This specification defines conventions for parties using SAML to exchange information regarding identity
- assurance. First, it provides guidelines for the definition of SAML Authentication Context [SAMLAC]
- classes corresponding to different assurance criteria thereby allowing the corresponding URIs for those
- assurance-based classes to be inserted within authentication requests and responses. Secondly, it
- defines a SAML attribute profile that may be used to represent the certification status of an issuer of
- authentication statements (i.e., an Identity Provider) regarding its conformance with the requirements of
- an identity assurance framework.

1.1 Motivation [Non-Normative]

- 128 Many organizations using federated service access have found it useful to define or adopt "identity
- assurance frameworks," such as [KIIAF]. Such frameworks offer a model for categorizing the large
- number of possible combinations of registration processes, security mechanisms, and authentication
- methods that underlie authentication processes into a smaller, more manageable set. The term "levels of
- assurance" (LOA) is often used to refer to this concept, or to a particular set of criteria ("assurance profile"
- is also used). Different combinations of processes and technology are rated according to the quality of
- assurance they can provide. Typically, a framework defines 3-5 levels or profiles, ranging from low to high
- 135 assurance.

119

127

137

138

139

140

143

146

- 136 Two key use cases for assurance are:
 - Allowing an IdP to advertise those LOA for which it has been certified able to meet the associated requirements.
 - 2. Allowing an RP to express its expectations for the LOA at which a user should be authenticated and, conversely, allow an IdP to indicate the actual LOA in its responses.
- 141 This document profiles SAML Metadata to satisfy the first use case, and provides guidelines for using
- SAML's Authentication Context class mechanism to address the second.

1.2 Limitations [Non-Normative]

- 144 The URIs representing LOA must be configured into every system in a deployment, and the relative
- ordering of the levels, if any, must be decided and configured out-of-band.

1.3 Terminology

- The keywords "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]:
- 150 ...they MUST only be used where it is actually required for interoperation or to limit behavior 151 which has potential for causing harm (e.g., limiting retransmissions)...
- These keywords are thus capitalized when used to unambiguously specify requirements over protocol and application 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.
- 155 Listings of XML schemas appear like this.
- 156
- 157 Example code listings appear like this.

Prefix	XML Namespace	Comments
attr:	urn:oasis:names:tc:SAML:metadata:attribute	This is the namespace defined in the SAML V2.0 Metadata Extension for Entity Attributes Version 1.0 specification [SAMLMA].
md:	urn:oasis:names:tc:SAML:2.0:metadata This is the SAML V2.0 metadata nam defined in the SAML V2.0 Metadata specification [SAMLMeta].	
saml: urn:oasis:names:tc:SAML:2.0:assertion		This is the SAML V2.0 assertion namespace defined in the SAML V2.0 core specification [SAMLCore].
samlp:	urn:oasis:names:tc:SAML:2.0:protocol This is the SAML V2.0 protocol na defined in the SAML V2.0 core specification [SAMLCore].	
xs:	http://www.w3.org/2001/XMLSchema	This namespace is defined in the W3C XML Schema specification [Schema1]. In schema listings, this is the default namespace and no prefix is shown.

This specification uses the following typographical conventions in text: <SAMLElement>,

1.4 Normative References

158

159

160

161

164 165	[RFC 2119]	S. Bradner. Key words for use in RFCs to Indicate Requirement Levels. IETF RFC 2119, March 1997. http://www.ietf.org/rfc/rfc2119.txt
166 167 168	[SAMLAC]	OASIS Standard, Authentication Context for the OASIS Security Assertion Markup Language (SAML) V2.0, March 2005. http://docs.oasis-open.org/security/saml/v2.0/saml-authn-context-2.0-os.pdf
169 170 171	[SAMLCore]	OASIS Standard, Assertions and Protocols for the OASIS Security Assertion Markup Language (SAML) V2.0, March 2005. http://docs.oasis-open.org/security/saml/v2.0/saml-core-2.0-os.pdf
172 173 174	[SAMLMA]	OASIS Committee Specification 01, SAML V2.0 Metadata Extension for Entity Attributes. August 2009. http://docs.oasis-open.org/security/saml/Post2.0/sstc-metadata-attr-cs-01.pdf
175 176 177	[SAMLMeta]	OASIS Standard, <i>Metadata for the OASIS Security Assertion Markup Language</i> (SAML) V2.0, March 2005. http://docs.oasis-open.org/security/saml/v2.0/saml-metadata-2.0-os.pdf
178 179 180 181	[Schema1]	H. S. Thompson et al. <i>XML Schema Part 1: Structures.</i> World Wide Web Consortium Recommendation, May 2001. See http://www.w3.org/TR/2001/REC-xmlschema-1-20010502/ . Note that this specification normatively references [Schema2], listed below.
182 183 184	[Schema2]	Paul V. Biron, Ashok Malhotra. <i>XML Schema Part 2: Datatypes</i> . World Wide Web Consortium Recommendation, May 2001. See http://www.w3.org/TR/2001/REC-xmlschema-2-20010502/

^{162 &}lt;ns:ForeignElement>, Attribute, **Datatype**, OtherCode.

1.5 Non-normative References

185

186 **[KIIAF]** Russ Cutler, ed., Kantara Initiative Identity Assurance Framework 1.0, Kantara Initiative, 2010.

2 AuthnContext Identity Assurance Guidelines

- 189 It is useful for parties using SAML to express in SAML authentication messages the assurance level or
- criteria (LOA) requested by a relying party, and the LOA that is applicable to an authentication assertion.
- 191 Both constructs have a parameter to carry such information, specifically the
- 192 <saml:AuthnContextClassRef> element.

188

202

212

213

215

216

217

218

219

220

223

- 193 The SAML Authentication Context specification [SAMLAC] requires that XML schemas be created to
- define the various criteria for a given authentication context class. The approach suggested below
- represents each LOA in an assurance framework as a separate authentication context class. Each LOA is
- characterized by a URI that defines the authentication context class, and the body of the schema contains
- a reference to the external documentation that defines the LOA.
- 198 These LOA/class URIs can be conveyed in the <samlp:RequestedAuthnContext> element of an
- 199 authentication request and the <saml : AuthnContext> element in an assertion via the
- 200 <saml: AuthnContextClassRef> element just as for the authentication context classes defined by
- the original Authentication Context specification.

2.1 AuthnContext Schema Guidelines

- 203 An authentication context class schema uses XML schema constructs to stipulate the requirements of the
- 204 corresponding class (e.g., to stipulate that the user authenticate to the IdP with an OTP credential). As the
- requirements of a given LOA are generally defined within some existing human-readable policy
- document, the class schema for that LOA will, rather than try to duplicate the requirements as
- documented, simply point to the appropriate document (or section within).
- 208 The <GoverningAgreements> element within the Authentication Context schema will be used to refer
- to the LOA documentation.
- 210 Therefore, to define class schemas for a set of LOA:
- Define a URI for each LOA.
 - 2. Determine a URL to an appropriate document (or section) for each LOA (this may be, but does not have to be, the same as the URI in the previous step).
- Create an XML schema for each LOA:
 - a) The schema should redefine the base authentication context types schema (saml-schemaauthn-context-types-2.0.xsd) as per the class schemas in the SAML Authentication Context specification.
 - b) The schema's target namespace should be the URI from step 1.
 - c) The schema should restrict the **AuthnContextDeclarationBaseType** complex type so that only a single <GoverningAgreements> element, with no other children, is allowed.
- d) The value of the governingAgreementRef should be fixed to point to the corresponding URL from step 2.

2.2 Example

- To demonstrate how the above model might be used in practice, we show here a class schema for a
- 225 fictional FAF (Foo Assurance Framework) with three different levels of assurance. The 3 LOA will each
- 226 have a corresponding schema, each referencing the appropriate section of the FAF documentation.
- 227 We define the following URIs to represent the 3 LOA

- http://foo.example.com/assurance/loa1
 - http://foo.example.com/assurance/loa2
 - http://foo.example.com/assurance/loa3

The schema for LOA1 might look like:

229

230

```
232
         <?xml version="1.0" encoding="UTF-8"?>
233
          <xs:schema</pre>
234
              targetNamespace="http://foo.example.com/assurance/loa1"
235
              xmlns:xs="http://www.w3.org/2001/XMLSchema"
236
              xmlns="http://foo.example.com/assurance/loa1"
              finalDefault="extension"
237
238
             blockDefault="substitution"
              version="2.0">
239
240
241
              <xs:redefine schemaLocation="saml-schema-authn-context-types-2.0.xsd">
242
243
                  <xs:annotation>
244
                      <xs:documentation>
245
                          Class identifier:
246
                              http://foo.example.com/assurance/loa1
247
248
                               Defines Level 1 of FAF
249
                      </xs:documentation>
250
                  </xs:annotation>
251
252
                    <xs:complexType name="AuthnContextDeclarationBaseType">
253
                     <xs:complexContent>
254
                       <xs:restriction base="AuthnContextDeclarationBaseType">
255
                         <xs:sequence>
                          <xs:element ref="GoverningAgreements"/>
256
257
                         </xs:sequence>
258
                         <xs:attribute name="ID" type="xs:ID" use="optional"/>
259
                       </xs:restriction>
260
                     </xs:complexContent>
261
                    </xs:complexType>
262
263
                    <xs:complexType name="GoverningAgreementRefType">
264
                      <xs:complexContent>
265
                        <xs:restriction base="GoverningAgreementRefType">
266
                           <xs:attribute name="governingAgreementRef"</pre>
                              type="xs:anyURI"
267
268
                              fixed="http://foo.example.com/assurance.pdf#section1"
                              use="required"/>
269
270
                        </xs:restriction>
271
                      </xs:complexContent>
272
                    </xs:complexType>
273
274
              </xs:redefine>
275
          </xs:schema>
```

276 3 Identity Assurance Certification Attribute Profile

- 277 This profiles defines a SAML attribute to represent the certification status of an Identity Provider regarding
- its conformance to the requirements of an identity assurance framework.

279 3.1 Required Information

- ldentification: urn:oasis:names:tc:SAML:2.0:attribute:profiles:assurance-certification
- 281 Contact Information: security-services-comment@lists.oasis-open.org
- 282 **Description**: Given below.
- 283 Updates: None.

284

302

309

3.2 Profile Overview

- In some relatively simple scenarios where identity assurance is used, a relying party may have a direct
- business relationship with an organization operating an Identity Provider that satisfies the relying party
- that the practices of the Identity Provider conform to the requirements of an assurance framework. In a
- larger-scale scenario, a relying party may wish to rely on a third party (a "certification service") to certify
- the practices of the Identity Provider organization. In this scenario, it is useful for the IdP's certification
- status as determined by that certification service to be represented in a standard fashion, in a way that
- can be communicated securely among the various parties involved. The SAML Metadata specification
- 292 [SAMLMeta] defines a means for information about SAML entities to be represented and communicated
- 293 securely.
- This profile defines a SAML attribute that can be applied to entities in a SAML metadata instance to
- express certification status. To indicate that an Identity Provider (or group of Identity Providers) is certified
- as conformant with an LOA, the attribute defined in this profile is added to that Identity Provider's
- 297 <md:EntityDescriptor> element (or a parent <md:EntitiesDescriptor> element) using the
- 298 <attr:EntityAttributes> extension element defined in [SAMLMA]. This extension permits the use
- of a <saml:Attribute> element alone, or its inclusion within an <saml:Assertion> element. A
- 300 <saml:Assertion> element can be used to include an assurance certification attribute that is signed
- independently from the enclosing metadata.

3.3 SAML Attribute Naming

- 303 The NameFormat XML attribute in <saml: Attribute > elements MUST be
- 304 urn:oasis:names:tc:SAML:2.0:attrname-format:uri.
- 305 This profile defines a single SAML attribute name:
- 306 urn:oasis:names:tc:SAML:attribute:assurance-certification

307 3.4 Profile-Specific XML Attributes

No additional XML attributes are defined for use with this attribute.

3.5 SAML Attribute Values

- Values of this attribute are URIs representing LOAs as suggested in section 2 of this document. Multiple
- values MAY be present. This document does not define any relationship between LOAs or define relying
- party behavior if specific value(s) are, or are not, present. It is the responsibility of assurance framework

documentation to specify whether, for example, certification at a "higher" LOA implies approval to assert a "lower" LOA.

3.6 Example

315

316

317

318

319

347

In this example a metadata publisher places the <saml:Attribute> element in the IdP's <md:EntityDescriptor> to indicate that the practices of the IdP have been certified as conformant with the requirements of the stated LOA. A party relying on this metadata could use this value as input to policy as to whether to accept SAML authentication assertions from this IdP.

```
<EntityDescriptor xmlns="urn:oasis:names:tc:SAML:2.0:metadata"</pre>
320
321
            xmlns:saml="urn:oasis:names:tc:SAML:2.0:assertion"
322
            xmlns:attr="urn:oasis:names:tc:SAML:metadata:attribute"
323
            xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
            entityID="https://IdentityProvider.example.com/SAML">
324
325
             <Extensions>
326
               <attr:EntityAttributes>
327
                 <saml:Attribute</pre>
328
                      NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
329
                      Name="urn:oasis:names:tc:SAML:attribute:assurance-certification">
330
                    <saml:AttributeValue>
331
                      http://foo.example.com/assurance/loa1
332
                    </saml:AttributeValue>
333
                 </saml:Attribute>
334
                </attr:EntityAttributes>
335
             </Extensions>
336
             <IDPSSODescriptor WantAuthnRequestsSigned="true"</pre>
337
                protocolSupportEnumeration="urn:oasis:names:tc:SAML:2.0:protocol">
                <KeyDescriptor use="signing"> ... </KeyDescriptor>
338
339
               <NameIDFormat>...</NameIDFormat>
340
                <SingleSignOnService
                 Binding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-Redirect"
341
342
                 Location="https://IdentityProvider.example.com/SAML/SSO/Browser"/>
343
344
             </IDPSSODescriptor>
345
346
         </EntityDescriptor>
```

4 Conformance

4.1 Identity Assurance Certification Attribute Profile Conformance

- 350 An metadata publisher conforms to this profile if it can generate SAML metadata instances containing the
- 351 SAML attribute defined in section 3.
- 352 A metadata consumer (typically a relying party) conforms to this profile if it can process the SAML
- attribute defined in section 3 and make the results available for further processing.
- All parties must also meet the conformance requirements in [SAMLMA].

Appendix A. Acknowledgments

The editors would like to acknowledge the contributions of the OASIS Security Services (SAML) Technical Committee, whose voting members at the time of publication were:

- John Bradley, Individual
- Scott Cantor, Internet2

355

360

361

- George Fletcher, AOL
- Phil Hunt, Oracle Corporation
- Nate Klingenstein, Internet2
- Bob Morgan, Internet2
- Thomas Hardjono, M.I.T.
- Anthony Nadalin, Microsoft Corporation
- Frederick Hirsch, Nokia Corporation
- Thinh Nguyenphu, Nokia Siemens Networks Gmb
 - Ari Kermaier, Oracle Corporation
- Federico Rossini, Telecom Italia S.p.a.
- Hal Lockhart, Oracle Corporation
- Emily Xu, Oracle Corporation
- Anil Saldhana, Red Hat
- David Staggs, Veterans Health Administration

Appendix B. Revision History

- Draft 01 first draft of sstc-saml-loa-authncontext-profile
- Draft 02 minor tweaks to text. Removed editorial comments. Removed example class derived
 from base class.
- Draft 03 removed the NIST 800 63 specific references and schema.
 - Draft 00 sstc-saml-assurance-profile: renamed to reflect added material. Added certification motivation and specification.
 - Draft 01 sstc-saml-assurance-profile: added attribute profile conformance, added attribute profile example, more description of certification usage, reorganized section numbering, put conformance material in section 1.
 - Committee Draft 01, cosmetic edits.

379

380

381

382

383

384

385

386

- Draft 02 sstc-saml-assurance-profile: authncontext pieces reworked as guidelines rather than profile, editorial pass
- Committee Draft 02, editorial process changes only