



SAML V2.0 Information Card Token Profile

Working Draft 01, 22 June 2008

Specification URIs:

TBD

Technical Committee:

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Abstract:

This profile describes a set of rules for identity providers and relying parties to follow when using SAML 2.0 assertions as managed information card security tokens, so that interoperability and security is achieved commensurate with other SAML authentication profiles.

Status

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1 Introduction

Microsoft has defined a set of profiles for acquiring and delivering security tokens, collectively referred to as "Information Card" technology. These profiles are agnostic with respect to the format and semantics of a security token, but interoperability between issuing and relying parties cannot be achieved without additional rules governing the creation and use of the tokens exchanged. This document describes a set of rules for the use of SAML 2.0 assertions, as defined in [SAML2Core], as security tokens within the Information Card architecture.

1.1 Notation

This specification uses normative text.

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 [RFC2119]:

...they MUST only be used where it is actually required for interoperation or to limit behavior 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.

Listings of XML schemas appear like this.

Example code listings appear like this.

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
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 [SAML2Core].
md:	urn:oasis:names:tc:SAML:2.0:metadata	This is the SAML V2.0 metadata namespace defined in the SAML V2.0 metadata specification [SAML2Meta].
ic:	http://schemas.xmlsoap.org/ws/2005/05/identity	This is the Infocard namespace defined in the Identity Selector Interoperability Profile [ISIP].
wsa:	http://www.w3.org/2005/08/addressing	This is the WS-Addressing namespace defined in the WS-Addressing specification [WS-Addr].
wsp:	http://schemas.xmlsoap.org/ws/2004/09/policy	This is the WS-Policy namespace defined in the March 2006 WS-Policy specification [WS-Policy].
sp:	http://schemas.xmlsoap.org/ws/2005/07/securitypolicy	This is the WS-SecurityPolicy namespace defined in the July 2005 WS-SecurityPolicy specification [WS-SecPol].
wst:	http://schemas.xmlsoap.org/ws/2005/02/trust	This is the WS-Trust namespace defined in the February 2005 WS-Trust specification [WS-Trust].

Prefix	XML Namespace	Comments
ds:	http://www.w3.org/2000/09/xmldsig#	This is the XML Signature namespace [XMLSig].
xsd:	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.
xsi:	http://www.w3.org/2001/XMLSchema-instance	This is the XML Schema namespace for schema-related markup that appears in XML instances [Schema1].

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

125 1.2 Normative References

- 126 **[ISIP]** A. Nanda. *Identity Selector Interoperability Profile V1.0*. Microsoft, April 2007.
127 [http://www.microsoft.com/downloads/details.aspx?](http://www.microsoft.com/downloads/details.aspx?FamilyID=b94817fc-3991-4dd0-8e85-b73e626f6764)
128 [FamilyID=b94817fc-3991-4dd0-8e85-b73e626f6764](http://www.microsoft.com/downloads/details.aspx?FamilyID=b94817fc-3991-4dd0-8e85-b73e626f6764).
- 129 **[RFC2119]** S. Bradner. *Key words for use in RFCs to Indicate Requirement Levels*. IETF
130 RFC 2119, March 1997. <http://www.ietf.org/rfc/rfc2119.txt>.
- 131 **[SAML2Core]** S. Cantor et al. *Assertions and Protocols for the OASIS Security Assertion
132 Markup Language (SAML) V2.0*. OASIS Standard, March 2005. Document ID
133 saml-core-2.0-os. See [http://docs.oasis-open.org/security/saml/v2.0/saml-](http://docs.oasis-open.org/security/saml/v2.0/saml-core-2.0-os.pdf)
134 [core-2.0-os.pdf](http://docs.oasis-open.org/security/saml/v2.0/saml-core-2.0-os.pdf).
- 135 **[SAML2Meta]** S. Cantor et al. *Metadata for the OASIS Security Assertion Markup Language
136 (SAML) V2.0*. OASIS Standard, March 2005. Document ID saml-metadata-2.0-
137 os. See <http://docs.oasis-open.org/security/saml/v2.0/saml-metadata-2.0-os.pdf>.
- 138 **[SAML2Prof]** S. Cantor et al. *Profiles for the OASIS Security Assertion Markup Language
139 (SAML) V2.0*. OASIS Standard, March 2005. Document ID saml-profiles-2.0-os.
140 See <http://docs.oasis-open.org/security/saml/v2.0/saml-profiles-2.0-os.pdf>.
- 141 **[Schema1]** H. S. Thompson et al. *XML Schema Part 1: Structures*. World Wide Web
142 Consortium Recommendation, May 2001. See [http://www.w3.org/TR/2001/REC-](http://www.w3.org/TR/2001/REC-xmldata-1-20010502/)
143 [xmldata-1-20010502/](http://www.w3.org/TR/2001/REC-xmldata-1-20010502/). Note that this specification normatively references
144 [Schema2], listed below.
- 145 **[Schema2]** Paul V. Biron, Ashok Malhotra. *XML Schema Part 2: Datatypes*. World Wide Web
146 Consortium Recommendation, May 2001. See [http://www.w3.org/TR/2001/REC-](http://www.w3.org/TR/2001/REC-xmldata-2-20010502/)
147 [xmldata-2-20010502/](http://www.w3.org/TR/2001/REC-xmldata-2-20010502/).
- 148 **[WS-Addr]** M. Gudgin et al. *WS-Addressing 1.0 Core*. World Wide Web Consortium
149 Recommendation, May 2006. See [http://www.w3.org/TR/2006/REC-ws-addr-](http://www.w3.org/TR/2006/REC-ws-addr-core-20060509/)
150 [core-20060509/](http://www.w3.org/TR/2006/REC-ws-addr-core-20060509/).
- 151 **[WS-Policy]** *Web Services Policy Framework, Version 1.2*. March 2006. See
152 <http://specs.xmlsoap.org/ws/2004/09/policy/ws-policy.pdf>.
- 153 **[WS-SecPol]** *Web Services Security Policy Language*. July 2005. See
154 <http://specs.xmlsoap.org/ws/2005/07/securitypolicy/ws-securitypolicy.pdf>.
- 155 **[WS-Trust]** *Web Services Trust Language*. February 2005. See [http://specs.xmlsoap.org/ws/](http://specs.xmlsoap.org/ws/2005/02/trust/WS-Trust.pdf)
156 [2005/02/trust/WS-Trust.pdf](http://specs.xmlsoap.org/ws/2005/02/trust/WS-Trust.pdf).
- 157 **[XMLSig]** D. Eastlake et al. *XML-Signature Syntax and Processing*. World Wide Web
158 Consortium Recommendation, February 2002. See
159 <http://www.w3.org/TR/xmldsig-core/>.

160 **1.3 Conformance**

161 **1.3.1 SAML 2.0 Information Card Token Profile**

162 An identity provider implementation conforms to this profile if it can produce assertions consistent with the
163 normative text in section 2.3.

164 A relying party implementation conforms to this profile if it can accept assertions consistent with the
165 normative text of section 2.4.

166 Use of SAML 2.0 metadata per section 2.5 is OPTIONAL.

167 2 SAML 2.0 Information Card Token Profile

168 2.1 Required Information

169 **Identification:** urn:oasis:names:tc:SAML:2.0:profiles:Infocard

170 **Contact information:** security-services-comment@lists.oasis-open.org

171 **Description:** Given below.

172 **Updates:** None.

173 2.2 Profile Overview

174 Identity providers and relying parties employing the Identity Selector Interoperability Profile [ISIP] to
175 request and exchange security tokens are able to use arbitrary token formats, provided there is
176 agreement on the token's syntax and semantics, and a way to connect the token's content to the
177 supported protocol features.

178 This profile provides a set of requirements and guidelines for the use of SAML 2.0 assertions as security
179 tokens that, where possible, emulates existing SAML 2.0 authentication profiles [SAML2Prof] so as to limit
180 the amount of new work that must be done by existing software to support the use of Information Cards. It
181 also provides for the use of SAML assertions in this new context that is safe, and consistent with best
182 practices in similar contexts.

183 This profile does not seek to alter the required behavior of existing identity selector software, or conflict
184 with the profiles defined by [ISIP].

185 2.3 Identity Provider Requirements

186 While the SAML V2.0 specification [SAML2Core] defines an identity provider solely in terms of the SAML
187 Authentication Request protocol, the term is generally applicable to an entity that issues authentication
188 assertions by means of other, similar protocols. In this case, the identity provider functions as an IP/STS in
189 the Information Card vocabulary, and issues assertions in response to
190 `<wst:RequestSecurityToken>` messages [WS-Trust].

191 As defined by [ISIP], the request contains information that provides input into the assertion creation
192 process. The following sections outline requirements for interpreting this input and the resulting assertion
193 content.

194 2.3.1 Token Type

195 The token type string used with SAML 2.0 assertions MUST be
196 urn:oasis:names:tc:SAML:2.0:assertion.

197 This string appears in various content produced and consumed by an identity provider, such as (but not
198 limited to) the `<wst:TokenType>` element.

199 2.3.2 Identifying Token Issuers

200 Information cards produced by identity providers MUST contain the identity provider's unique name as the
201 value of the `<ic:Issuer>` element. This name corresponds to the SAML concept of an "entityID" and
202 may correspond to an actual entityID in the SAML sense of the term, or a logically equivalent name for the
203 identity provider.

204 **2.3.3 General Assertion Requirements**

205 Assertions issued in accordance with this profile MUST contain a single `<saml:AuthnStatement>` that
206 reflects the authentication of the token requester to the identity provider. It MAY contain a single
207 `<saml:AttributeStatement>` that carries one or more `<saml:Attribute>` elements reflecting the
208 claims requested by the relying party, in the manner specified by [ISIP].

209 When satisfying these requested claims, the resulting `<saml:Attribute>` element's `NameFormat` XML
210 attribute MUST be `urn:oasis:names:tc:SAML:2.0:attrname-format:uri` and its `Name` XML
211 attribute MUST correspond to the requested claim type's URI value (e.g. in `<ic:ClaimType>` elements).

212 A `<saml:NameID>` element MAY be included in the assertion's `<saml:Subject>` element. If the
213 requested claim types include a claim type with a URI corresponding to a SAML name identifier format
214 known to the identity provider, it may satisfy that claim request by including a `<saml:NameID>` element of
215 the proper format in the assertion's subject. If more than one claim type corresponding to a name identifier
216 format is requested, the identity provider MAY fault the request or choose any requested format, at its
217 discretion. If two such claim types are "required" by the relying party, a fault MUST be generated.

218 The assertion's `<saml:Subject>` element MUST contain at least one
219 `<saml:SubjectConfirmation>` element, the details of which are defined in section 2.3.4 below.

220 **2.3.4 Proof Keys and Subject Confirmation**

221 [ISIP] defines three classes of "proof keys" that bind the issued token to key material controlled by the
222 client: symmetric, asymmetric, and no key. The notion of a proof key maps directly to a
223 `<saml:SubjectConfirmation>` element in the issued assertion.

224 If a token request does not include a `<wst:KeyType>` element, the identity provider SHOULD assume
225 that an asymmetric proof key is required.

226 Both symmetric and asymmetric proof key types correspond to the "Holder of Key" confirmation method
227 defined in section 3.1 of [SAML2Prof]. The resulting assertion MUST contain a
228 `<saml:SubjectConfirmation>` element with a `Method` of
229 `urn:oasis:names:tc:SAML:2.0:cm:holder-of-key`, as defined in that section. The
230 accompanying `<ds:KeyInfo>` element MUST identify the proof key. In the case of an asymmetric proof
231 key, the key SHOULD be represented as a `<ds:RSAKeyValue>` element within a `<ds:KeyValue>`
232 element.

233 The "no key" proof key type corresponds to the "Bearer" confirmation method defined in section 3.3 of
234 [SAML2Prof]. The resulting assertion MUST contain a `<saml:SubjectConfirmation>` element with a
235 `Method` of `urn:oasis:names:tc:SAML:2.0:cm:bearer`, as defined in that section.

236 In the case of bearer assertions, the `<saml:SubjectConfirmation>` element MUST include a
237 `<saml:SubjectConfirmationData>` element containing a `NotOnOrAfter` XML attribute to limit its
238 use, typically to a very short window of time, although the exact duration may be use case dependent. The
239 attribute MAY be included for "Holder of Key" assertions, at the discretion of the identity provider.

240 The `<saml:SubjectConfirmationData>` element, if present, MUST NOT contain a `NotBefore` XML
241 attribute. The `Address` XML attribute MAY be included to indicate the expected network address of the
242 client to the relying party.

243 If the location of the relying party's endpoint (STS or otherwise) is known to the identity provider, a
244 `<saml:SubjectConfirmationData>` element MUST be included with its `Recipient` XML attribute
245 set to that location. This location may be communicated to the identity provider directly in a
246 `<wsp:AppliesTo>` element, or derived from some other source. However, it SHOULD NOT be included
247 unless the identity provider is certain of the location.

248 Finally, note that other `<saml:SubjectConfirmation>` elements MAY be included at the discretion of
249 the identity provider.

250 **2.3.5 Conditions**

251 Assertions MAY contain a `<saml:Conditions>` element with `NotBefore` and `NotOnOrAfter`
252 attributes. This validity period can be independent of the window during which the client can present the
253 assertion to a relying party as a security token (see section 2.3.4).

254 If the identity of the relying party is known to the identity provider, then a
255 `<saml:AudienceRestriction>` containing a `<saml:Audience>` element MUST be included
256 containing the unique name of the relying party. This name corresponds to the SAML concept of an
257 "entityID" and may correspond to an actual entityID in the SAML sense of the term, or a logically
258 equivalent name for the relying party.

259 This name may be communicated to the identity provider directly in a `<wsp:AppliesTo>` element, or, if
260 the element instead contains a location, it may be derived from the location in some fashion.

261 **2.3.6 Encryption**

262 If a suitable key belonging to the relying party is known, the identity provider SHOULD encrypt the
263 resulting assertion before returning it to the requester. The encryption is performed in accordance with
264 section 6 of [SAML2Core]. The result MUST be returned in the form of a
265 `<saml:EncryptedAssertion>` element.

266 If a public key belonging to the relying party is communicated to the identity provider in the
267 `<wst:RequestSecurityToken>` request message in the `<wsp:AppliesTo>` element, this key
268 SHOULD be used in preference to any other key known to the identity provider through other means (e.g.
269 SAML 2.0 metadata).

270 **2.4 Relying Party Requirements**

271 A relying party uses the mechanisms defined by [ISIP] to request security tokens in the form of SAML2.0
272 assertions issued by particular or arbitrary identity providers. The following sections outline requirements
273 for describing a relying party's needs based on this profile.

274 **2.4.1 Token Type**

275 The token type string used with SAML 2.0 assertions MUST be
276 `urn:oasis:names:tc:SAML:2.0:assertion`.

277 This string appears in various content produced by a relying party, such as (but not limited to) the
278 `<wst:TokenType>` element.

279 **2.4.2 IdentifyingToken Issuers**

280 When identifying a requirement for a specific token issuer, the relying party SHOULD use the identity
281 provider's unique name (i.e. its "entityID").

282 **2.4.3 Identifying Relying Parties**

283 If the relying party provides security policy metadata (see section 3.1 of [ISIP]), it MAY include a
284 `<wsp:AppliesTo>` element inside a `<sp:RequestSecurityTokenTemplate>` element that refers
285 to its own unique name (i.e. its "entityID") in the `<wsa:Address>` element.

286 If it does include a `<wsp:AppliesTo>` element, it SHOULD NOT identify itself using the location of its
287 endpoint, as this complicates the identity provider's ability to identify the relying party. A logical name
288 SHOULD be used instead.

289 **2.4.4 Identifying Claim Types**

290 SAML attributes required or desired by the relying party are identified by using the SAML attribute's `Name`
291 XML attribute in various places, such as the `<ic:ClaimType>` element's `Uri` XML attribute. Such SAML
292 attributes MUST have a `NameFormat` XML attribute of `urn:oasis:names:tc:SAML:2.0:attrname-`
293 `format:uri`.

294 A claim type URI corresponding to a SAML name identifier format MAY be used to request a particular
295 type of `<saml:NameID>` element in the resulting assertion. A relying party MUST NOT request more than
296 one "required" claim type corresponding to a name identifier format.

297 **2.4.5 Assertion Validity**

298 Relying parties SHOULD evaluate assertions using the rules defined by [SAML2Core] (and [SAML2Prof]
299 in the case of the defined subject confirmation methods). Invalid assertions SHOULD NOT be used to
300 authenticate clients that present them.

301 **2.5 Use of SAML Metadata**

302 While not required, sites exchanging SAML assertions based on this profile MAY rely on SAML 2.0
303 metadata [SAML2Meta] as a way of deriving information about endpoints and keys, as a supplement for
304 mechanisms that exist within [ISIP]. Where similarities or overlaps exist, precedence MUST be given to
305 metadata information exchanged using the mechanisms defined by [ISIP].

306 When referring to token issuers or relying parties by "logical" names, in the manner described by [ISIP],
307 the names used SHOULD correspond to the "entityID" values used in SAML metadata.

308 The value `urn:oasis:names:tc:SAML:2.0:profiles:Infocard` MUST be used in the
309 `protocolSupportEnumeration` attribute to identify support for this profile within a
310 `<md:IDPSSODescriptor>` or `<md:SPSSODescriptor>` role.

311 If `<md:SingleSignOnService>` or `<md:AssertionConsumerService>` endpoints supporting this
312 profile are included, the same value MUST be used as the value of the `Binding` attribute. In addition, a
313 `<wsa:EndpointReference>` element MAY be included within an endpoint element to describe the
314 endpoint and its security policy in accordance with [ISIP].

315 **2.6 Security Considerations**

316 The Information Card model's support for hiding the identity of the relying party from the identity provider,
317 combined with constraints on the implementation of the model for use with web browsers, leads to
318 requests for "unconstrained" bearer assertions with no audience or subject confirmation conditions on
319 use. This is **extremely** dangerous and insecure, even if assertion validity is extremely short term. This
320 profile recommends against such a practice and urges implementations, if they do support such behavior,

321 to enable deployers to disable it by requiring requests for bearer assertions be accompanied by the
322 identity of the relying party.

323 Identity providers should make every attempt to encrypt the assertions they produce if a key for the relying
324 party can be established. Caution, however, should be exercised in relying solely on the TLS/SSL
325 certificate found at a relying party's endpoint to identify the key. In particular, the key has to be
326 authenticated in order to ensure that it actually belongs to the eventual endpoint used by the client.
327 Furthermore, there can be no guarantee that the software responsible for decrypting the security token will
328 have access to the corresponding private key.

329 **Appendix A. Acknowledgements**

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

- 332 • TBD

333 The editor would also like to acknowledge the following contributors:

- 334 • Jim Fox, University of Washington

335 **Appendix B. Revision History**

- 336 ● Draft 01.