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Abstract:

The SCA Web Service binding specified in this document applies to the services and references of an SCA composite. It defines the manner in which a service can be made available as a web service, and in which a reference can invoke a web service.

This binding is a WSDL-based binding; that means it either references an existing WSDL binding or allows one to specify enough information to generate one. When an existing WSDL binding is not referenced, rules defined in this document allow one to generate a WSDL binding.

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This document was last revised or approved by the OASIS Service Component Architecture / Bindings (SCA-Bindings) TC on the above date. The level of approval is also listed above. Check the "Latest Version" or "Latest Approved Version" location noted above for possible later revisions of this document.

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1 Introduction

The SCA Web Service binding specified in this document applies to the services and references of composites and components [**SCA-Assembly**]. It defines the manner in which a service can be made available as a web service, and in which a reference can invoke a web service.

This binding is a WSDL-based binding; that means it either references an existing WSDL binding or can be configured to specify enough information to generate one. When an existing WSDL binding is not referenced, rules defined in this document allow one to generate a WSDL binding. This specification only defines a binding using WSDL 1.1.

The Web Service binding can point to an existing WSDL [**WSDL11**] document, separately authored, that specifies the details of the WSDL binding to be used to provide or invoke the web service. In this case the SCA web services binding allows anything that is valid in a WSDL binding, including rpc-encoded style and binding extensions. It is the responsibility of the SCA system provider to ensure support for all options specified in the WSDL binding. Interoperation of such services is not guaranteed.

The SCA Web Service binding also provides attributes that can be used to provide the details of a WSDL SOAP binding. This allows a WSDL document to be synthesized in the case that one does not already exist. In this case only WS-I compliant mapping is supported.

The SCA Web Service binding can be further customized through the use of SCA Policy Sets. For example, a requirement to conform to a WS-I profile [**WSI-Profiles**]{**WSI-Profiles**}

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1.1 Terminology

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

This specification uses predefined namespace prefixes throughout; they are given in the following list. Note that the choice of any namespace prefix is arbitrary and not semantically significant.

Table 1-1 Prefixes and Namespaces used in this specification

Prefix	Namespace	Notes
xs	"http://www.w3.org/2001/XMLSchema"	Defined by XML Schema 1.0 specification
wsa	"http://www.w3.org/2005/08/addressing"	Defined by WS-Addressing 1.0
wsp	"http://www.w3.org/ns/ws-policy"	Defined by WS-Policy 1.5
wsrmp	"http://docs.oasis-open.org/ws-rx/wsrmp/200702"	Defined by WS-ReliableMessaging Policy 1.2
soap11	"http://schemas.xmlsoap.org/soap/envelope/"	Defined by SOAP 1.1
soap12	"http://www.w3.org/2005/08/addressing"	Defined by SOAP 1.2
wsdli	"http://www.w3.org/ns/wsdli-instance"	Defined by WSDL 2.0

wsoap11	"http://schemas.xmlsoap.org/wsdl/soap/"	Defined by WSDL 1.1 [WSDL11]
wsoap12	"http://schemas.xmlsoap.org/wsdl/soap12/"	Defined by [W11-SOAP12]
sca	"http://docs.oasis-open.org/ns/opencsa/sca/200903"	Defined by the SCA specifications

31

32 1.2 Normative References

- 33 **[RFC2119]** S. Bradner, *Key words for use in RFCs to Indicate Requirement Levels*,
34 <http://www.ietf.org/rfc/rfc2119.txt>, IETF RFC 2119, March 1997.
- 35 **[SCA-Assembly]** <http://docs.oasis-open.org/opencsa/sca-assembly/sca-assembly-1.1-spec.pdf>
- 36 **[SCA-Policy]** <http://docs.oasis-open.org/opencsa/sca-policy/sca-policy-1.1-spec.pdf>
- 37 **[SCA-JCAA]** <http://docs.oasis-open.org/opencsa/sca-j/sca-javacaa-1.1-spec.pdf>
- 38 **[WSDL11]** E. Christensen et al, *Web Service Description Language (WSDL) 1.1*,
39 <http://www.w3.org/TR/2001/NOTE-wsdl-20010315>, W3C Note, March 15 2001.
- 40 **[WSDL20]** Chinnici et al, *Web Service Description Language (WSDL) Version 2.0 Part 1: Core Language*, <http://www.w3.org/TR/2007/REC-wsdl20-20070626/>, W3C Recommendation, June 26 2007.
- 43 **[WSI-Profiles]** <http://www.ws-i.org/Profiles/BasicProfile-1.1.html>
44 <http://www.ws-i.org/Profiles/AttachmentsProfile-1.0.html>
45 <http://www.ws-i.org/Profiles/SimpleSoapBindingProfile-1.0.html>
46 <http://www.ws-i.org/Profiles/BasicSecurityProfile-1.0.html>
- 47 **[JAX-WS]** <http://jcp.org/en/jsr/detail?id=224>
- 48 **[SOAP11]** <http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>
- 49 **[SOAP]** <http://www.w3.org/TR/2003/REC-soap12-part1-20030624/>
50 <http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>
- 51 **[SOAP12Adjuncts]** SOAP Version 1.2 Part 2: Adjuncts (Second Edition)
52 <http://www.w3.org/TR/soap12-part2/>
- 53 **[WS-Addr]** <http://www.w3.org/TR/2006/REC-ws-addr-core-20060509/>
- 54 **[W11-SOAP12]** <http://www.w3.org/Submission/wsdl11soap12/>
- 55

56 1.3 Non-Normative References

- 57 **[WSI-AP]** <http://www.ws-i.org/Profiles/AttachmentsProfile-1.0.html>
- 58 **[MTOM]** <http://www.w3.org/TR/2005/REC-soap12-mtom-20050125/>

59 1.4 Naming Conventions

60 This specification follows some naming conventions for artifacts defined by the
61 specification. In addition to the conventions defined by section 1.3 of the Assembly
62 **[SCA-Assembly]** specification, this specification adds three additional conventions:

- 63 1. Where the names of elements and attributes consist partially or wholly of
64 acronyms, the letters of the acronyms use the same case. When the acronym
65 appears at the start of the name of an element or an attribute, or after a period,
66 it is in lower case. If it appears elsewhere in the name of an element or an
67 attribute, it is in upper case. For example, an attribute might be named "uri" or
68 "jndiURL".

- 69
70
71
72
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74
75
2. Where the names of types consist partially or wholly of acronyms, the letters of the acronyms are in all upper case. For example, an XML Schema type might be named "JCABinding" or "MessageID".
 3. Values, including local parts of QName values, follow the rules for names of elements and attributes as stated above, with the exception that the letters of acronyms are in all upper case. For example, a value might be "JMSDefault" or "namespaceURI".

2 Web Service Binding Schema

The Web Service binding element is defined by the following pseudo-schema.

```
<binding.ws name="xs:NCName"?
  requires="list of xs:QName"?
  policySets="list of xs:QName"?
  uri="xs:anyURI"?
  wsdlElement="xs:anyURI"?
  wsdl:wsdlLocation="list of xs:anyURI pairs"?
  ...>
  <wireFormat/>?
  <operationSelector/>?
  <endpointReference>...</endpointReference>*
  ...
</binding.ws>
```

- ***/binding.ws/@name*** - as defined in the SCA Assembly Specification [SCA-Assembly].
- ***/binding.ws/@requires*** - as defined in the SCA Assembly Specification [SCA-Assembly].
- ***/binding.ws/@policySets*** - as defined in the SCA Assembly Specification [SCA-Assembly]SCA-Assembly.
- ***/binding.ws/@uri*** - the resolution algorithm of Section 2.2 below describes how this attribute is interpreted. For an SCA reference, the @uri attribute MUST be an absolute value. [BWS20001]
- ***/binding.ws/@wsdlElement*** - when present this attribute specifies the URI of a WSDL element. The value of the @wsdlElement attribute MUST identify an element in an existing WSDL 1.1 document. [BWS20002]The value of the @wsdlElement attribute MUST identify an element in an existing WSDL 1.1 document. The URI can have the following forms:
 - Service:
`<WSDL-namespace-URI>#wsdl.service(<service-name>)`
If the binding is for an SCA service, the wsdlElement attribute MUST NOT specify the wsdl.service form of URI. If the binding is for an SCA service, the wsdlElement attribute MUST NOT specify the wsdl.service form of URI. [BWS20003]
If the binding is for an SCA reference, the set of available ports for the reference consists of the ports in the WSDL service that have portTypes which are compatible supersets of the SCA reference as defined in the SCA Assembly Model specification [SCA-Assembly] and satisfy all the policy constraints of the binding.
If the wsdl.service form of wsdlElement is used on an SCA reference binding, the set of available ports for the reference MUST contain at least one port. If the wsdl.service form of wsdlElement is used on an SCA reference binding, the set of available ports for the reference MUST contain at least one port. [BWS20004]
The set of available ports represents a single SCA reference binding with respect to the multiplicity of that SCA reference. **If the wsdl.service form of wsdlElement is used on an SCA reference binding, the SCA runtime MUST raise an error if there are no available ports that it supports. If the wsdl.service form of**

123 *wSDL*Element is used on an SCA reference binding, the SCA runtime MUST raise
124 an error if there are no available ports that it supports. [BWS20005] When an
125 invocation is made using an SCA reference binding with the *wSDL.service* form of
126 *wSDL*Element, the SCA runtime MUST use exactly one port from the set of
127 available ports for the reference (with port selection on a per-invocation basis
128 permitted). When an invocation is made using an SCA reference binding with the
129 *wSDL.service* form of *wSDL*Element, the SCA runtime MUST use exactly one port
130 from the set of available ports for the reference (with port selection on a per-
131 invocation basis permitted); [BWS20006]

- Port:

132 <WSDL-namespace-URI>#wSDL.port(<service-name>/<port-name>)

133
134 If the binding is for an SCA service, the portType associated with the specified
135 WSDL port MUST be compatible with the SCA service interface as defined in
136 section 2.1, and the port MUST satisfy all the policy constraints of the
137 binding. [BWS20007] The SCA runtime MUST expose an endpoint for the specified
138 WSDL port, or raise an error if it does not support the WSDL port. [BWS20008] If
139 the binding is for an SCA reference, the portType associated with the specified
140 WSDL port MUST be a compatible superset of the SCA reference interface as
141 defined in the SCA Assembly Model specification [SCA-Assembly], and the port
142 MUST satisfy all the policy constraints of the binding. If the binding is for an SCA
143 reference, the portType associated with the specified WSDL port MUST be a
144 compatible superset of the SCA reference interface as defined in the SCA
145 Assembly Model specification [SCA-Assembly], and the port MUST satisfy all the
146 policy constraints of the binding. [BWS20009] The SCA runtime MUST use the
147 specified WSDL port for invocations made using the SCA reference, or raise an
148 error if it does not support the WSDL port. [BWS20010]

- Binding:

149
150 <WSDL-namespace-URI>#wSDL.binding(<binding-name>)

151 If the binding is for an SCA service, the portType associated with the specified
152 WSDL binding MUST be compatible with the SCA service interface as defined in
153 section 2.1, and the WSDL binding MUST satisfy all the policy constraints of the
154 binding. [BWS20011] The SCA runtime MUST expose an endpoint for the
155 specified WSDL binding, or raise an error if it does not support the WSDL binding.
156 [BWS20012]

157 If the binding is for an SCA reference, the portType associated with the specified
158 WSDL binding MUST be a compatible superset of the SCA reference interface as
159 defined in the SCA Assembly Model specification [SCA-Assembly], and the
160 WSDL binding MUST satisfy all the policy constraints of the binding. If the binding
161 is for an SCA reference, the portType associated with the specified WSDL binding
162 MUST be a compatible superset of the SCA reference interface as defined in the
163 SCA Assembly Model specification [SCA-Assembly], and the WSDL binding
164 MUST satisfy all the policy constraints of the binding. [BWS20013] The SCA
165 runtime MUST use the specified WSDL binding for invocations made using the
166 SCA reference, or raise an error if it does not support the WSDL binding.
167 [BWS20014]

168 When the *wSDL.binding* form of *wSDL*Element is used, the endpoint address URI
169 for an SCA reference MUST be specified by either the @uri attribute on the
170 binding or a WS-Addressing EndpointReference element, except where the SCA
171 Assembly Model specification [SCA-Assembly] states that the @uri attribute can
172 be omitted. When the *wSDL.binding* form of *wSDL*Element is used, the endpoint

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173 address URI for an SCA reference MUST be specified by either the @uri attribute
174 on the binding or a WS-Addressing EndpointReference element, except where the
175 SCA Assembly Model specification [SCA-Assembly] states that the @uri
176 attribute can be omitted. [BWS20015]

177 • **/binding.ws/@wsdl:wsdlLocation** – when present this attribute specifies the
178 location(s) of the WSDL document(s) associated with specific namespace(s).

179 The @wsdl:wsdlLocation attribute MAY be specified by the binding in the event that
180 the <WSDL-namespace-URI> in the 'endpoint' attribute is not dereferencable, or
181 when the intended WSDL document is to be found at a different location than the
182 one pointed to by the <WSDL-namespace-URI>. The @wsdl:wsdlLocation attribute
183 MAY be specified by the binding in the event that the <WSDL-namespace-URI> in
184 the 'endpoint' attribute is not dereferencable, or when the intended WSDL document
185 is to be found at a different location than the one pointed to by the <WSDL-
186 namespace-URI>. [BWS20016]

187 If the @wsdl:wsdlLocation attribute is used the @wsdlElement attribute MUST also
188 be specified. If the @wsdl:wsdlLocation attribute is used the @wsdlElement attribute
189 MUST also be specified. [BWS20017] The semantics of this attribute are specified in
190 Section 7.1 of WSDL 2.0 [WSDL20]. The value of the @wsdl:wsdlLocation attribute
191 MUST identify an existing WSDL 1.1 document. The semantics of this attribute are
192 specified in Section 7.1 of WSDL 2.0 [WSDL20]. The value of the
193 @wsdl:wsdlLocation attribute MUST identify an existing WSDL 1.1 document.
194 [BWS20018]

195 • **/binding.ws/wireFormat** – as defined in the SCA Assembly Specification [SCA-
196 Assembly]. This specification does not define any new wireFormat elements.

197 • **/binding.ws/operationSelector** – as defined in the SCA Assembly Specification
198 [SCA-Assembly]. -This specification does not define any new operationSelector
199 elements.

200 • **/binding.ws/endpointReference** – when present this element provides the WS-
201 Addressing [WS-Addr] EndpointReference that specifies the endpoint for the service
202 or reference.

203 • **/binding.ws/@{any}** - this is an extensibility mechanism to allow extensibility via
204 attributes.

205 • **/binding.ws/any** – this is an extensibility mechanism to allow extensibility via
206 elements.

207 A binding.ws element MUST NOT contain more than one of any of the following: the
208 @uri attribute; the @wsdlElement attribute referring to a WSDL port or to a WSDL
209 service; the endpointReference element. [BWS20019]

210 The endpoint address URI for an SCA service or the callback element of an SCA
211 reference is determined as specified in section 2.2. For the callback element of an SCA
212 service, the binding MUST NOT specify an endpoint address URI or a WS-Addressing
213 EndpointReference. For the callback element of an SCA service, the binding MUST NOT
214 specify an endpoint address URI or a WS-Addressing EndpointReference. [BWS20020]

215 The SCA runtime MUST support all the attributes of the <binding.ws> element, namely
216 @name, @uri, @requires, @policySets, @wsdlElement, and
217 @wsdl:wsdlLocation. [BWS20021]

218 The SCA runtime SHOULD support the element <endpointReference>. [BWS20022] If an
219 SCA runtime does not support the element <endpointReference>, then it MUST reject

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220 an SCA WS Binding XML document (as defined in Section 5.1) that contains the element.
221 [BWS20023]
222 The <binding.ws> element MUST conform to the XML schema defined in sca-binding-
223 webservice.xsd. [BWS20024]

224 2.1 Compatibility of SCA Service Interfaces and WSDL portTypes

225 A WSDL portType is compatible with an SCA service interface if and only if all of the
226 following conditions are satisfied:

- 227 1. The SCA service interface is remotable.
- 228 2. The operations on the portType are the same as the operations on the SCA
229 service interface, with the same operation name, same input types (taking order
230 as significant), same output types (taking order as significant), and same
231 fault/exception types. If the SCA service interface is not a WSDL portType, it is
232 mapped to a WSDL portType for the purposes of this comparison. The mapping
233 is defined in the relevant SCA specification for the interface type. If the interface
234 cannot be mapped to WSDL, the SCA service interface is not compatible with the
235 WSDL portType.
- 236 3. WSDL 1.1 message parts can point to an XML Schema element declaration or an
237 XML Schema type. When determining compatibility between two WSDL
238 operations, a message part that points to an XML Schema element is considered
239 to be incompatible with a message part that points to an XML Schema type.
- 240 4. If either the portType or the SCA service interface declares an SCA callback
241 interface, then both the portType and the SCA service interface declare callback
242 interfaces and these callback interfaces are compatible according to points 1
243 through 3 above.

244 2.2 Endpoint URI resolution

245 This specification does not mandate any particular way to determine the URI for a web
246 services binding on an SCA service. An absolute URI can be indicated by the @uri
247 attribute, by the URI in a wsa:Address element within an endpointReference element, or
248 by the URI indicated in a WSDL Port via a @wsdlElement attribute. Implementations
249 can use the specified URI as the service endpoint URI or they can use a different URI
250 which might include portions of the specified URI. For example, the service endpoint
251 URI might be produced by modifying any or all of the host name, the port number, and
252 a portion of the path.

253 Note that if no absolute URI is indicated by any of these elements, implementations can
254 use the structural URI for the binding as a portion of the URI for the eventual deployed
255 endpoint. In addition, the @uri attribute value could be relative; implementations are
256 encouraged to combine this value with the structural URI for the service in determining
257 a deployed URI.

258 The target address for a reference binding is defined as one of the following:

- 259 A. The value of the @uri attribute
- 260 B. The value of the wsa:Address element of the endpointReference element
- 261 C. The value of the address element of the WSDL port referenced by the
262 @wsdlElement attribute

263 D. The value of the address element of one of the set of available WSDL ports as
264 specified under the definition of the @wsdlElement attribute when it references a
265 WSDL service element

266 **If there is no target address for a reference binding, the SCA runtime MUST raise an**
267 **error. [BWS20025]**

268 **For a reference binding, the SCA runtime MUST use the target address. For a reference**
269 **binding, the SCA runtime MUST use the target address. [BWS20026]**

270 2.3 Interface mapping

271 **When *binding.ws* is used on a service or reference with an interface that is not defined**
272 **by *interface.wsdl*, the SCA runtime MUST derive a WSDL portType for the service or**
273 **reference from the interface using the rules defined for that SCA interface type. When**
274 ***binding.ws* is used on a service or reference with an interface that is not defined by**
275 ***interface.wsdl*, the SCA runtime MUST derive a WSDL portType for the service or**
276 **reference from the interface using the rules defined for that SCA interface type.**
277 **[BWS20027]**

278 **An SCA runtime MUST raise an error if the interface on a service or reference element**
279 **with a *binding.ws* element does not map to a WSDL portType. An SCA runtime MUST**
280 **raise an error if the interface on a service or reference element with a *binding.ws***
281 **element does not map to a WSDL portType. [BWS20028]**

282 For example, for *interface.java*, the mapping to a WSDL portType is as defined in the
283 SCA Java Common Annotations and API Specification **[SCA-JCAA]**.

284 *binding.ws* implementations can use appropriate standards, for example WS-I AP 1.0
285 **[WSI-AP]** or MTOM **[MTOM]**, to map interface parameters to binary attachments
286 transparently to the target component.

287

288 2.4 Production of WSDL description for an SCA service

289 **Any service hosted by an SCA runtime with one or more web service bindings with HTTP**
290 **endpoints SHOULD return a WSDL description of the service in response to an HTTP GET**
291 **request with the "?wsdl" suffix to that HTTP endpoint. Any service hosted by an SCA**
292 **runtime with one or more web service bindings with HTTP endpoints SHOULD return a**
293 **WSDL description of the service in response to an HTTP GET request with the "?wsdl"**
294 **suffix to that HTTP endpoint. [BWS20029]**

295 **If none of the web service bindings for an SCA service have HTTP endpoints, then the**
296 **SCA runtime SHOULD provide some other means of obtaining the WSDL description of**
297 **the service. If none of the web service bindings for an SCA service have HTTP endpoints,**
298 **then the SCA runtime SHOULD provide some other means of obtaining the WSDL**
299 **description of the service. [BWS20030]** This can include out of band mechanisms, for
300 example publication to a UDDI registry.

301 Refer to section 4 for a detailed definition of the rules that are used for generating the
302 WSDL description of an SCA service with one or more web service bindings.

303

304 2.5 Additional binding configuration data

305 **SCA runtime implementations MAY provide additional metadata that is associated with a**
306 **web service binding. SCA runtime implementations MAY provide additional metadata that**
307 **is associated with a web service binding.** [BWS20031]

308 This can be used for example to enable JAX-WS **[JAX-WS]** handlers to be executed as
309 part of the target component dispatch. The specification of such metadata is SCA
310 runtime-specific and is outside of the scope of this document.

311

312 2.6 Web Service Binding and SOAP Intermediaries

313 The Web Service binding does not provide any direct or explicit support for SOAP
314 intermediaries **[SOAP]**.

315

316 2.7 Support for WSDL extensibility

317 When a binding.ws element uses the @wsdlElement attribute, the details of the binding
318 are specified by the WSDL element referenced by the value of the attribute. Per the
319 WSDL specification, WSDL allows for extensibility via elements as well as attributes, and
320 it specifies rules for processing such elements. This specification does not constrain the
321 use of such extensibility in WSDL and relies on the rules specified in the WSDL
322 specification for processing such extended elements.

323 **An SCA runtime MUST support the WSDL extensions defined in the namespace**
324 **associated with the prefix "sca" (as defined in section 1.1). An SCA runtime MUST**
325 **support the WSDL extensions defined in the namespace associated with the prefix "sca"**
326 **(as defined in section 1.1).** [BWS20032]

327 **The SCA runtime MUST support the WSDL 1.1 binding extension for SOAP 1.1 over HTTP**
328 **[WSDL11], as identified by the WSDL element wsoap11:binding that has the**
329 **@transport attribute with a value of "http://schemas.xmlsoap.org/soap/http". The SCA**
330 **runtime MUST support the WSDL 1.1 binding extension for SOAP 1.1 over HTTP**
331 **[WSDL11], as identified by the WSDL element wsoap11:binding that has the**
332 **@transport attribute with a value of "http://schemas.xmlsoap.org/soap/http".**
333 **[BWS20033]**

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334 **The SCA runtime SHOULD support the WSDL 1.1 binding extension for SOAP 1.2 over**
335 **HTTP [W11-SOAP12], as identified by the WSDL element wsoap12:binding that has**
336 **the @transport attribute with a value of "http://schemas.xmlsoap.org/soap/http". The**
337 **SCA runtime SHOULD support the WSDL 1.1 binding extension for SOAP 1.2 over HTTP**
338 **[W11-SOAP12], as identified by the WSDL element wsoap12:binding that has the**
339 **@transport attribute with a value of "http://schemas.xmlsoap.org/soap/http".**
340 **[BWS20034]**

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341 Because a WSDL document might contain extension elements that cannot be supported
342 by the SCA runtime, when using the @wsdlElement form of binding.ws it is not possible
343 to determine whether the binding is supported by the SCA runtime without parsing the
344 referenced WSDL element and its dependent elements.

345 2.8 Intents listed in the bindingType

346 This specification places no requirements on the intents that are listed as either
347 **@alwaysProvides** or **@mayProvides** in the bindingType for *binding.ws*.

348 **2.9 Intents and binding configuration**

349 This binding mandates support for SOAP 1.1 and encourages SOAP 1.2 support. The
350 <bindingType> element associated with this binding MUST include the SOAP.1_1 intent
351 in its @mayProvides or @alwaysProvides attributes. [BWS20035] The <bindingType>
352 element associated with this binding SHOULD include the SOAP.1_2 intent in its
353 @mayProvides attribute. [BWS20036] For more details on the <bindingType> element
354 see [SCA-Policy].

355 ~~The SCA runtime MUST raise an error if a web service binding is configured with a policy~~
356 ~~intent(s) that conflicts with the binding instance's configuration. The SCA runtime MUST~~
357 ~~raise an error if a web service binding is configured with a policy intent(s) that conflicts~~
358 ~~with the binding instance's configuration. [BWS20037]~~

359 For example, it is an error to use the SOAP policy intent in combination with a WSDL
360 binding that does not use SOAP.

361 3 Web Service Binding Examples

362 The following snippets show the sca.composite file for the MyValueComposite file
363 containing the service element for the MyValueService and reference element for the
364 StockQuoteService. Both the service and the reference use a Web Service binding.
365

366 3.1 Example Using WSDL documents

367 This example shows a service and reference using the SCA Web Service binding, using
368 existing WSDL documents in both cases. In each case there is a single binding element,
369 whose name defaults to the service/reference name.

370 The service's binding is defined by the WSDL document associated with the given URI.
371 This service conforms to WS-I Basic Profile 1.1.

372 The first reference's binding is defined by the specified WSDL service in the WSDL
373 document at the given location. The reference can use any of the WSDL service's ports
374 to invoke the target service. The second reference's binding is defined by the specified
375 WSDL binding. The specific endpoint URI to be invoked is provided via the *@uri*
376 attribute.
377

```
378 <?xml version="1.0" encoding="ASCII"?>  
379 <composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"  
380   name="MyValueComposite">  
381   <service name="MyValueService">  
382     <interface.java interface="services.myvalue.MyValueService"/>  
383     <binding.ws wsdlElement="http://www.example.org/MyValueService#  
384  
385 wsdl.binding(MyValueService/MyValueServiceSOAP)"/>  
386     ...  
387   </service>  
388  
389   ...  
390  
391   <reference name="StockQuoteReference1">  
392     <interface.java interface="services.stockquote.StockQuoteService"/>  
393     <binding.ws wsdlElement="http://www.example.org/StockQuoteService#  
394       wsdl.service(StockQuoteService) "  
395       wsdl:wsdlLocation="http://www.example.org/StockQuoteService  
396       http://www.example.org/StockQuoteService.wsdl"/>  
397   </reference>  
398  
399   <reference name="StockQuoteReference2">  
400     <interface.java interface="services.stockquote.StockQuoteService"/>  
401     <binding.ws wsdlElement="http://www.example.org/StockQuoteService#  
402       wsdl.binding(StockQuoteBinding) "  
403       wsdl:wsdlLocation="http://www.example.org/StockQuoteService  
404       http://www.example.org/StockQuoteService.wsdl"  
405       uri="http://www.example.org/StockQuoteService5"/>  
406   </reference>  
407 </composite>
```

408 3.2 Examples Without a WSDL Document

409 The next example shows the simplest form of the binding element without WSDL
410 document, assuming all defaults for portType mapping and SOAP binding synthesis. The
411 service and reference each have a single binding element, whose name defaults to the
412 service/reference name.

413 The service is to be made available at a location determined by the deployment of this
414 component. It will have a single port address and SOAP binding, with a simple WS-I
415 BasicProfile 1.1 compliant binding, and using the default options for mapping the Java
416 interface to a WSDL portType.

417 The reference indicates a service to be invoked which has a SOAP binding and portType
418 that matches the default options for binding synthesis and interface mapping. One
419 particular use of this case would be where the reference is to an SCA service with a web
420 service binding which itself uses all the defaults.

```
421  
422 <?xml version="1.0" encoding="ASCII"?>  
423 <composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"  
424     name="MyValueComposite">  
425  
426     <service name="MyValueService">  
427         <interface.java interface="services.myvalue.MyValueService"/>  
428         <binding.ws/>  
429         ...  
430     </service>  
431  
432     ...  
433  
434     <reference name="StockQuoteService">  
435         <interface.java interface="services.stockquote.StockQuoteService"/>  
436         <binding.ws uri="http://www.example.org/StockQuoteService"/>  
437     </reference>  
438 </composite>
```

439 The next example shows the use of the binding element without a WSDL document, with
440 multiple SOAP bindings with non-default values. The SOAP 1.2 binding name defaults to
441 the service name, the SOAP 1.1 binding is given an explicit name. The reference has a
442 web service binding which uses SOAP 1.2, but otherwise uses all the defaults for SOAP
443 binding. The reference binding name defaults to the reference name.
444

```
445  
446 <?xml version="1.0" encoding="ASCII"?>  
447 <composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"  
448     name="MyValueComposite">  
449  
450     <service name="MyValueService">  
451         <interface.java interface="services.myvalue.MyValueService"/>  
452         <binding.ws name="MyValueServiceSOAP11" requires="SOAP.1_1"/>  
453         <binding.ws requires="SOAP.1_2"/>  
454         ...  
455     </service>  
456  
457     ...  
458  
459     <reference name="StockQuoteService">  
460         <interface.java interface="services.stockquote.StockQuoteService"/>  
461         <binding.ws uri="http://www.example.org/StockQuoteService"  
462             requires="SOAP.1_2"/>  
463     </reference>
```


464

```
</composite>
```

465

466 4 Transport Binding

467 The binding.ws element provides numerous ways to specify exactly how messages ought
468 to be transmitted from or to the reference or service. Those ways include references to
469 WSDL binding elements from the @wsdlElement attribute, policy intents, and even
470 vendor extensions within the binding.ws element. This section describes the defaults to
471 be used if the specific transport details are not otherwise specified.

472 4.1 Intents

473 So as to narrow the range of choices for how messages are carried, the following policy
474 intents affect the transport binding:

- 475 • SOAP
476 **When the SOAP intent is required, the SCA runtime MUST transmit and receive**
477 **messages using SOAP. One or more SOAP versions can be used. When the SOAP**
478 **intent is required, the SCA runtime MUST transmit and receive messages using**
479 **SOAP. One or more SOAP versions can be used. [BWS40001]**
- 480 • SOAP.1_1
481 **When the SOAP.1_1 intent is required, the SCA runtime MUST transmit and receive**
482 **messages using only SOAP 1.1. When the SOAP.1_1 intent is required, the SCA**
483 **runtime MUST transmit and receive messages using only SOAP 1.1. [BWS40002]**
- 484 • SOAP.1_2
485 **When the SOAP.1_2 intent is required, the SCA runtime MUST transmit and receive**
486 **messages using only SOAP 1.2. When the SOAP.1_2 intent is required, the SCA**
487 **runtime MUST transmit and receive messages using only SOAP 1.2. [BWS40003]**

488 4.2 Default Transport Binding Rules

489 4.2.1 WS-I Basic Profile Alignment

490 To align to WS-I Basic Profile, the resulting WSDL port needs to be all document-literal,
491 or all rpc-literal binding (per WS-I Basic Profile 1.1 R2705 **[WSI-Profiles]**). This means,
492 for any given portType, for all messages referenced by all operations in that portType,
493 either

- 494 • that every message part references an XML Schema type (rpc-literal pattern)
- 495 • or that every message references exactly zero or one XML Schema elements
496 (document-literal pattern)

497 **For an SCA service or reference element, the portType from the service's or reference's**
498 **interface or derived from that interface MUST follow either the rpc-literal or document-**
499 **literal pattern. For an SCA service or reference element, the portType from the service's**
500 **or reference's interface or derived from that interface MUST follow either the rpc-literal**
501 **or document-literal pattern. [BWS40004]**

502 The rest of this section assumes the short-hand reference of a "rpc-literal" or
503 "document-literal" pattern, depending on which of the two bullet points above it
504 matches.

505 4.2.2 Default Transport Binding Rules

506 The following defines the **default transport binding rules** for the Web Service binding:

- 507 • HTTP-based transfer protocol;
- 508 • SOAP 1.1 binding;
- 509 • "literal" format as described in section 3.5 of **[WSDL11]**;
- 510 • Either the document literal or rpc literal pattern, depending on the service or
511 reference interface as described in section 4.2.1;
 - 512 ○ For document literal pattern, each message uses "document" style, as per
513 section 3.5 of **[WSDL11]**;
 - 514 ○ For rpc-literal pattern, each message uses "rpc" style, as per section 3.5
515 of **[WSDL11]** and the child elements of the SOAP Body element are
516 namespace qualified with a non-empty namespace name;
- 517 • For SOAP 1.1 messages, the SOAPAction HTTP header described in section 6.1.1
518 of "Simple Object Access Protocol (SOAP) 1.1" **[SOAP11]** represents the empty
519 string, in quotes ("");
- 520 • For SOAP 1.2 messages, the SOAP Action feature described in section 6.5 of
521 **[SOAP12Adjuncts]** does not appear;
- 522 • All WSDL message parts are carried in the SOAP body.

523 ~~In the event that the transport details are not otherwise determined, an SCA runtime~~
524 ~~MUST enable the default transport binding rules.~~~~In the event that the transport details~~
525 ~~are not otherwise determined, an SCA runtime MUST enable the default transport~~
526 ~~binding rules.~~ [BWS40005]→

527 • ~~When using the default transport binding rules, the SCA runtime MAY provide~~
528 ~~additional WSDL bindings, unless policy is applied that explicitly restricts this.~~~~When~~
529 ~~using the default transport binding rules, the SCA runtime MAY provide additional WSDL~~
530 ~~bindings, unless policy is applied that explicitly restricts this.~~ [BWS40006]

531 • ~~When using the default transport binding rules with the rpc-literal pattern, the SCA~~
532 ~~runtime SHOULD use the structural URI associated with the binding as the namespace of~~
533 ~~the child elements of the SOAP body element.~~~~When using the default transport binding~~
534 ~~rules with the rpc-literal pattern, the SCA runtime SHOULD use the structural URI~~
535 ~~associated with the binding as the namespace of the child elements of the SOAP body~~
536 ~~element.~~ [BWS40007]

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537 **5 Conformance**

538 The XML schema pointed to by the RDDDL document at the namespace URI, defined by
539 this specification, are considered to be authoritative and take precedence over the XML
540 schema defined in the appendix of this document.

541 There are two categories of artifacts for which this specification defines conformance:

- 542 a) SCA WS Binding XML Document
- 543 b) SCA Runtime

544 **5.1 SCA WS Binding XML Document**

545 An SCA WS Binding XML document is an SCA Composite Document, or an SCA
546 ComponentType Document, as defined by the SCA Assembly specification Section 13.1
547 **[SCA-Assembly]**, that uses the <binding.ws> element.

548 An SCA WS Binding XML document **MUST** be a conformant SCA Composite Document or
549 a SCA ComponentType Document, as defined by the SCA Assembly specification **[SCA-**
550 **Assembly]**, and **MUST** comply with all the applicable requirements specified in this
551 specification.

552 **5.2 SCA Runtime**

553 An implementation that claims to conform to the requirements of an SCA Runtime
554 defined in this specification has to meet the following conditions:

- 555 1. The implementation **MUST** comply with all statements in Appendix B:
556 Conformance Items related to an SCA Runtime, notably all "MUST" statements
557 have to be implemented.
- 558 2. The implementation **MUST** conform to the SCA Assembly Model Specification
559 Version 1.1 **[SCA-Assembly]**, and to the SCA Policy Framework Version 1.1
560 **[SCA-Policy]**.
- 561 3. The implementation **MUST** reject a SCA WS Binding XML Document that is not
562 conformant per Section 5.1.

563
564

A. Web Services XML Binding Schema: sca-binding-webservice.xsd

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```
<?xml version="1.0" encoding="UTF-8"?>
<!-- Copyright (C) OASIS 2005, 2009. All Rights Reserved.
      OASIS trademark, IPR and other policies apply.-->

<schema xmlns="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://docs.oasis-open.org/ns/opencsa/sca/200903"
  xmlns:sca="http://docs.oasis-open.org/ns/opencsa/sca/200903"
  xmlns:wsdl="http://www.w3.org/ns/wsdl-instance"
  xmlns:wsa="http://www.w3.org/2005/08/addressing"
  elementFormDefault="qualified">

  <import namespace="http://www.w3.org/ns/wsdl-instance"
    schemaLocation="http://www.w3.org/2007/05/wsdl/wsdl20-
instance.xsd"
  />

  <import namespace="http://www.w3.org/2005/08/addressing"
    schemaLocation="http://www.w3.org/2006/03/addressing/ws-addr.xsd"
  />

  <include schemaLocation="sca-core-1.1-cd03.xsd"/>

  <element name="binding.ws" type="sca:WebServiceBinding"
    substitutionGroup="sca:binding"/>
  <complexType name="WebServiceBinding">
    <complexContent>
      <extension base="sca:Binding">
        <sequence>
          <element ref="sca:wireFormat"
            minOccurs="0" maxOccurs="1" />
          <element ref="sca:operationSelector"
            minOccurs="0" maxOccurs="1" />
          <element name="endpointReference"
            type="wsa:EndpointReference"
            minOccurs="0" maxOccurs="unbounded"/>
          <any namespace="##other" processContents="lax"
            minOccurs="0" maxOccurs="unbounded"/>
        </sequence>
        <attribute name="wsdlElement" type="anyURI" use="optional"/>
        <attribute ref="wsdl:wsdlLocation" use="optional"/>
        <anyAttribute namespace="##any" processContents="lax"/>
      </extension>
    </complexContent>
  </complexType>
</schema>
```

611

B. Conformance Items

612 This section contains a list of conformance items for the SCA Web Service Binding specification.

Conformance ID	Description
[BWS20001][BWS20004]	For an SCA reference, the @uri attribute MUST be an absolute value.
[BWS20002]	The value of the @wsdlElement attribute MUST identify an element in an existing WSDL 1.1 document.
[BWS20003]	If the binding is for an SCA service, the wsdlElement attribute MUST NOT specify the wsdl.service form of URI.
[BWS20004]	If the wsdl.service form of wsdlElement is used on an SCA reference binding, the set of available ports for the reference MUST contain at least one port.
[BWS20005]	If the wsdl.service form of wsdlElement is used on an SCA reference binding, the SCA runtime MUST raise an error if there are no available ports that it supports.
[BWS20006]	When an invocation is made using an SCA reference binding with the wsdl.service form of wsdlElement, the SCA runtime MUST use exactly one port from the set of available ports for the reference (with port selection on a per-invocation basis permitted).
[BWS20007][BWS20007]	If the binding is for an SCA service, the portType associated with the specified WSDL port MUST be compatible with the SCA service interface as defined in section 2.1, and the port MUST satisfy all the policy constraints of the binding.
[BWS20008]	The SCA runtime MUST expose an endpoint for the specified WSDL port, or raise an error if it does not support the WSDL port.
[BWS20009]	If the binding is for an SCA reference, the portType associated with the specified WSDL port MUST be a compatible superset of the SCA reference interface as defined in the SCA Assembly Model specification [SCA-Assembly][SCA-Assembly], and the port MUST satisfy all the policy constraints of the binding.
[BWS20010]	The SCA runtime MUST use the specified WSDL port for invocations made using the SCA reference, or raise an error if it does not support the WSDL port.
[BWS20011]	If the binding is for an SCA service, the portType associated with the specified WSDL binding MUST be compatible with the SCA service interface as defined in section 2.1, and the WSDL binding MUST satisfy all the policy constraints of the binding.
[BWS20012]	The SCA runtime MUST expose an endpoint for the specified WSDL binding, or raise an error if it does not support the WSDL binding.
[BWS20013]	If the binding is for an SCA reference, the portType associated with the specified WSDL binding MUST be a compatible superset of the SCA reference interface as defined in the SCA Assembly Model specification [SCA-Assembly][SCA-Assembly], and the WSDL binding MUST satisfy all the policy constraints of the binding.

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[BWS20014]	The SCA runtime MUST use the specified WSDL binding for invocations made using the SCA reference, or raise an error if it does not support the WSDL binding.
[BWS20015]	When the <i>wSDL.binding</i> form of <i>wSDLElement</i> is used, the endpoint address URI for an SCA reference MUST be specified by either the <i>@uri</i> attribute on the binding or a WS-Addressing <i>EndpointReference</i> element, except where the SCA Assembly Model specification [SCA-Assembly][SCA-Assembly] states that the <i>@uri</i> attribute can be omitted.
[BWS20016]	The <i>@wsdl:wsdlLocation</i> attribute MAY be specified by the binding in the event that the <i><WSDL-namespace-URI></i> in the 'endpoint' attribute is not dereferencable, or when the intended WSDL document is to be found at a different location than the one pointed to by the <i><WSDL-namespace-URI></i> .
[BWS20017]	If the <i>@wsdl:wsdlLocation</i> attribute is used the <i>@wSDLElement</i> attribute MUST also be specified.
[BWS20018]	The semantics of this attribute are specified in Section 7.1 of WSDL 2.0 [WSDL20]. The value of the <i>@wsdl:wsdlLocation</i> attribute MUST identify an existing WSDL 1.1 document.
[BWS20019]	A binding.ws element MUST NOT contain more than one of any of the following: the <i>@uri</i> attribute; the <i>@wSDLElement</i> attribute referring to a WSDL port or to a WSDL service; the <i>endpointReference</i> element.
[BWS20020]	For the <i>callback</i> element of an SCA service, the binding MUST NOT specify an endpoint address URI or a WS-Addressing <i>EndpointReference</i> .
[BWS20021]	The SCA runtime MUST support all the attributes of the <i><binding.ws></i> element, namely <i>@name</i> , <i>@uri</i> , <i>@requires</i> , <i>@policySets</i> , <i>@wSDLElement</i> , and <i>@wsdl:wsdlLocation</i> .
[BWS20022]	The SCA runtime SHOULD support the element <i><endpointReference></i> .
[BWS20023]	If an SCA runtime does not support the element <i><endpointReference></i> , then it MUST reject an SCA WS Binding XML document (as defined in Section 5.1) that contains the element.
[BWS20024]	The <i><binding.ws></i> element MUST conform to the XML schema defined in <i>sca-binding-webservice.xsd</i> .
[BWS20025]	If there is no target address for a reference binding, the SCA runtime MUST raise an error.
[BWS20026]	For a reference binding, the SCA runtime MUST use the target address.
[BWS20027]	When <i>binding.ws</i> is used on a service or reference with an interface that is not defined by <i>interface.wSDL</i> , the SCA runtime MUST derive a WSDL portType for the service or reference from the interface using the rules defined for that SCA interface type.
[BWS20028]	An SCA runtime MUST raise an error if the interface on a service or reference element with a <i>binding.ws</i> element does not map to a WSDL portType.
[BWS20029]	Any service hosted by an SCA runtime with one or more web service bindings with HTTP endpoints SHOULD return a WSDL description of the service in response to an HTTP GET request with the "?wSDL" suffix to that HTTP endpoint.

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[BWS20030]	If none of the web service bindings for an SCA service have HTTP endpoints, then the SCA runtime SHOULD provide some other means of obtaining the WSDL description of the service.
[BWS20031]	SCA runtime implementations MAY provide additional metadata that is associated with a web service binding.
[BWS20032]	An SCA runtime MUST support the WSDL extensions defined in the namespace associated with the prefix "sca" (as defined in section 1.1).
[BWS20033]	The SCA runtime MUST support the WSDL 1.1 binding extension for SOAP 1.1 over HTTP [WSDL11] [WSDL14] , as identified by the WSDL element wsoap11:binding that has the @transport attribute with a value of "http://schemas.xmlsoap.org/soap/http".
[BWS20034]	The SCA runtime SHOULD support the WSDL 1.1 binding extension for SOAP 1.2 over HTTP [W11-SOAP12] [W11-SOAP12] , as identified by the WSDL element wsoap12:binding that has the @transport attribute with a value of "http://schemas.xmlsoap.org/soap/http".
[BWS20035]	The <bindingType> element associated with this binding MUST include the SOAP.1_1 intent in its @mayProvides or @alwaysProvides attributes.
[BWS20036]	The <bindingType> element associated with this binding SHOULD include the SOAP.1_2 intent in its @mayProvides attribute.
[BWS20037]	The SCA runtime MUST raise an error if a web service binding is configured with a policy intent(s) that conflicts with the binding instance's configuration.
[BWS40001]	When the SOAP intent is required, the SCA runtime MUST transmit and receive messages using SOAP. One or more SOAP versions can be used.
[BWS40002] [BWS40002]	When the SOAP.1_1 intent is required, the SCA runtime MUST transmit and receive messages using only SOAP 1.1.
[BWS40003] [BWS40003]	When the SOAP.1_2 intent is required, the SCA runtime MUST transmit and receive messages using only SOAP 1.2.
[BWS40004]	For an SCA service or reference element, the portType from the service's or reference's interface or derived from that interface MUST follow either the rpc-literal or document-literal pattern.
[BWS40005]	In the event that the transport details are not otherwise determined, an SCA runtime MUST enable the default transport binding rules.
[BWS40006]	When using the default transport binding rules, the SCA runtime MAY provide additional WSDL bindings, unless policy is applied that explicitly restricts this.
[BWS40007]	When using the default transport binding rules with the rpc-literal pattern, the SCA runtime SHOULD use the structural URI associated with the binding as the namespace of the child elements of the SOAP body element.

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613 C. Appendix - WSDL Generation

614 Due to the number of factors that determine how a WSDL might be generated, including
615 compatibility with existing WSDL uses, precise details cannot be specified. For example,
616 implementation decisions can affect the way WSDL might be generated. For reference,
617 and consistency, this section suggests non-normative choices for some of the various
618 details involved in generating WSDL. For brevity, the following definitions apply:

- 619 • component name = the value of the @name attribute of the component element
620 containing the binding.ws element
- 621 • service name = the value of the @name attribute of the service element
622 containing the binding.ws element
- 623 • binding name = the value of @name attribute of the binding.ws element, or the
624 default if no @name attribute is present
- 625 • SOAP version = either "SOAP11" or "SOAP12" as appropriate

626 With those definitions in place, here are the suggested choices:

- 627 • wsdl:definitions/@name = <component name> + "." + <service name>
- 628 • wsdl:definitions/@targetNamespace = <structural URI for the service>
- 629 • import each WSDL 1.1 portType, rather than putting them inline
- 630 • wsdl:binding/@name = <binding name> + <SOAP version> + "Binding"
- 631 • wsdl:service/@name = <service name>
- 632 • wsdl:port/@name = <binding name> + <SOAP version> + "Port"

633 **D. Acknowledgements**

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

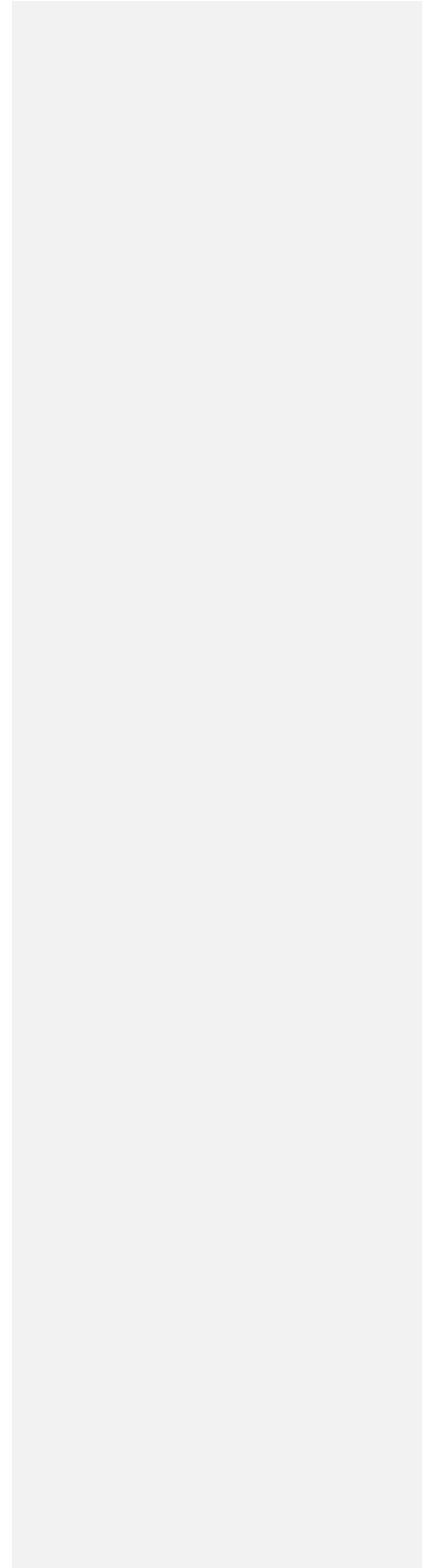
636 **Participants:**

637 [Participant Name, Affiliation | Individual Member]

638 [Participant Name, Affiliation | Individual Member]

639

E. Non-Normative Text



641

F. Revision History

642 [optional; should not be included in OASIS Standards]

Revision	Date	Editor	Changes Made
1	2007-09-25	Anish Karmarkar	Applied the OASIS template + related changes to the Submission
2	2008-04-02	Anish Karmarkar	<ul style="list-style-type: none"> * Partially applied the resolution of issue 14 in the conformance section. * Applied resolution to issue 9. * Applied resolution to issue 15. * Applied resolution to issue 16. * Applied resolution to issue 10. * Applied resolution to issue 8. * Applied resolution to issue 3.
3	2008-06-12	Simon Holdsworth	<ul style="list-style-type: none"> * Completed application of resolution to issue 10 * Applied most of the editorial changes from Eric Johnson's review
4	2008-08-13	Anish Karmarkar	<ul style="list-style-type: none"> * Applied rest of Eric Johnson's ed review comments. * Applied resolution of issue 13. * Reapplied resolution of issue 15 (it was not applied correctly before) * Applied resolution of issue 19. * Applied resolution of issue 30. * Applied resolution of issue 32. * Applied resolution of issue 36. * Applied resolution of issue 38.
cd01-rev1	2008-10-16	Simon Holdsworth	Applied resolution of issue 41.
cd01-rev2	2008-10-20	Anish Karmarkar	Added rfc2119 statements.
cd01-rev3	2008-11-19	Anish Karmarkar	Incorporated feedback from Bryan, Eric & Dave
cd01-rev3	2008-12-02	Anish Karmarkar	Removed 'required' word associated with description of pseudo-schema + changed section 2.6 (wsdl extensibility) per the TC decision. Both of these were associated with issue 51 (2119 stmts)
cd01-rev5	2009-02-06	Simon Holdsworth	<ul style="list-style-type: none"> Applied resolution of issue 11 Applied resolution of issue 49 Applied action item 20080904-1
cd02	2009-02-16	Simon Holdsworth	Renamed, applied editorial issues
cd02-rev1	2009-06-02	Anish Karmarkar	* Applied resolution of issue 61 by using the

			<p>document at http://www.oasis-open.org/apps/org/workgroup/sca-bindings/download.php/32160/sca-binding-ws-1.1-spec-cd02-issue61-rev3.doc as the base document.</p> <ul style="list-style-type: none"> * Updated NS URI (Applied action item 20090311-2). * Updated Copyright statement in various places. * Updated schema per http://lists.oasis-open.org/archives/sca-bindings/200903/msg00057.html (Applied action item 20090312-1). * Applied resolution of issue 23, 25, 43, 54, 55, 64. * Replaced 3 occurrences of 'required' with 'specified'. * Recreated all bookmarks, cross-references, and conformance item table.
cd02-rev2	2009-06-09	Anish Karmarkar	Ed. fixes. Changed the way the crossrefs/bookmarks for RFC2119 keywords work. Fixed a few references.
cd02-rev3	2009-06-11	Anish Karmarkar	<ul style="list-style-type: none"> * Removed ':' from 40005, reformatted 40006/40007. * minor ed changes pointed out by SimonN. * minor formatting changes. * modified BWS20018 to remove the first sentence.

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