



Service Component Architecture JCA Binding Specification Version 1.1

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- OASIS Committee Draft 02, "SCA Policy Framework Version 1.1", February 2009
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Abstract:

This document specifies the means by which SCA composites and components, as defined in the SCA Assembly Specification [**SCA-Assembly**], connect to and access services provided by Enterprise Information Systems (EIS). The connectivity is based on the Java EE Connector Architecture (JCA) specification version 1.5 [**JCA15**], and is provided via a `binding.jca` element which applies to the references and services of an SCA composite or SCA component.

The connection to exchange data with the EIS is characterized by two sets of configuration parameters, the connection and interaction parameters. The former set determines the location of the target system the latter determines characteristics that need to be specified to invoke one specific service available at the endpoint. JCA Binding model captures these parameters as separate sets to allow their reuse and reconfiguration.

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1 Introduction

This document specifies the means by which SCA composites and components, as defined in the SCA Assembly Specification [**SCA-Assembly**], connect to and access services provided by Enterprise Information Systems (EIS). The connectivity is based on the Java EE Connector Architecture (JCA) specification version 1.5 [**JCA15**], and is provided via a binding.jca element which applies to the references and services of an SCA composite or SCA component.

The connection to exchange data with the EIS is characterized by two sets of configuration parameters, the connection and interaction parameters. The former set determines the location of the target system the latter determines characteristics that need to be specified to invoke one specific service available at the endpoint. JCA Binding model captures these parameters as separate sets to allow their reuse and reconfiguration.

This binding places no requirement on SCA runtimes to support bidirectional interfaces as defined by the SCA Assembly Specification [**SCA-Assembly**], SCA runtimes can implement support for bidirectional interfaces using extensions to the binding element.

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 [RFC Keywords \[RFC2119\]](#).

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.

Prefix	Namespace	Notes
xs	"http://www.w3.org/2001/XMLSchema"	Defined by XML Schema 1.0 specification
sca	"http://docs.oasis-open.org/ns/opencsa/sca/200903"	Defined by the SCA specifications

Table 1-1: Prefixes and Namespaces used in this specification

1.2 Normative References

- [RFC2119] S. Bradner, *Key words for use in RFCs to Indicate Requirement Levels*, <http://www.ietf.org/rfc/rfc2119.txt>, IETF RFC 2119, March 1997.
- [JCA15] J2EE Connector Architecture Specification Version 1.5 <http://java.sun.com/j2ee/connector/>
- [WSDL] E. Christensen et al, *Web Service Description Language (WSDL) 1.1*, <http://www.w3.org/TR/2001/NOTE-wsdl-20010315>, W3C Note, March 15 2001.
R. 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.
- [SCA-Assembly] OASIS Committee Draft 03, "Service Component Architecture Assembly Model Specification Version 1.1", March 2009 <http://docs.oasis-open.org/opencsa/sca-assembly/sca-assembly-1.1-spec-cd03.pdf>
- [SCA-Policy] OASIS Committee Draft 02, "SCA Policy Framework Specification Version 1.1", February 2009 <http://docs.oasis-open.org/opencsa/sca-policy/sca-policy-1.1-spec-cd02.pdf>

40 1.3 Naming Conventions

41 The naming conventions used by artefacts defined in this specification are:

- 42 • The naming conventions defined by section 1.3 of the SCA Assembly Specification **[SCA-Assembly]**.
- 43 • Where the names of elements and attributes consist partially or wholly of acronyms, the letters of the
44 acronyms use the same case. When the acronym appears at the start of the name of an element or
45 an attribute, or after a period, it is in lower case. If it appears elsewhere in the name of an element or
46 an attribute, it is in upper case. For example, an attribute might be named "uri" or "jndiURL".
- 47 • Where the names of types consist partially or wholly of acronyms, the letters of the acronyms are in
48 all upper case. For example, an XML Schema type might be named "JCABinding" or "MessageID".
- 49 • Values, including local parts of QName values, follow the rules for names of elements and attributes
50 as stated above, with the exception that the letters of acronyms are in all upper case. For example, a
51 value might be "JMSDefault" or "namespaceURI".

52 2 JCA Binding

53 The JCA binding element is defined by the pseudo-schema in Snippet 2-1.

54

```
55 <binding.jca initialContextFactory="xs:anyURI"?
56     jndiURL="xs:anyURI"?
57     name="NCName"?
58     requires="list of xs:QName"?
59     policySets="list of xs:QName"?
60     uri="xsd:anyURI"?>
61
62     <outboundConnection managed="xs:boolean">
63         <resourceAdapter name="NMTOKEN" type="NMTOKEN">
64             <property name="NMTOKEN" type="NMTOKEN"*
65         </resourceAdapter?
66         <connection jndiName="xs:anyURI"? type="NMTOKEN"
67             create="always or never or ifNotExist"?>
68             <property name="NMTOKEN" type="NMTOKEN"*
69         </connection>
70         <resAuth>container|application</resAuth?
71     </outboundConnection?
72
73     <inboundConnection>
74         <resourceAdapter name="NMTOKEN"? type="NMTOKEN">
75             <property name="NMTOKEN" type="NMTOKEN"*
76         </resourceAdapter>
77         <activationSpec jndiName="xs:anyURI"? type="NMTOKEN"
78             create="always or never or ifNotExist"?>
79             <property name="NMTOKEN" type="NMTOKEN"*
80         </activationSpec>
81     </inboundConnection?
82
83     <outboundInteraction>
84         <connectionSpec type="NMTOKEN">
85             <property name="NMTOKEN" type="NMTOKEN"*
86         </connectionSpec?
87         <interactionSpec type="NMTOKEN">
88             <property name="NMTOKEN" type="NMTOKEN"*
89         </interactionSpec?
90         <operation name="NMTOKEN">
91             <interactionSpec type="NMTOKEN"?>
92                 <property name="NMTOKEN" type="NMTOKEN"*
93             </interactionSpec?
94         </operation*>
95     </outboundInteraction?
96
97     <inboundInteraction>
98         <listener type="NMTOKEN"?
99         <inboundOperation name="NMTOKEN" selectedOperation="NMTOKEN"*
100     </inboundInteraction?
101     <wireFormat ... />?
102     <operationSelector ... />?
103 </binding.jca>
```

Comment [SAJH1]: Part of resolution of issue BINDINGS-121

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104 Snippet 2-1: binding.jca Pseudo-Schema

105

106 The **binding.jca** element has the attributes:

- 107 | • **/binding.jca/@uri** – the binding's **@uri** attribute specifies the connection to the EIS. For a
108 | reference, it defines the endpoint allowing connecting to the target EIS by providing the JNDI
109 | name under which a ConnectionFactory is located. For a service, the **@uri** defines the endpoint
110 | to allow the EIS system to connect to the SCA system by defining the JNDI lookup name of an
111 | ActivationSpec, for example **@uri="java:comp/env/eis/TRAN_EIS"**.
- 112 | The **@uri** attribute, the **inboundConnection** and the **outboundConnection** element are
113 | mutually exclusive and the SCA runtime MUST raise an error if more than one is present
114 | [BJC20001].
- 115 | For an SCA service with a **binding.jca** element with the **@uri** attribute value specified, if the
116 | JNDI location identified by the **@uri** attribute does not locate an Activation Spec the SCA runtime
117 | MUST raise an error [BJC20021].
- 118 | For an SCA reference with a **binding.jca** element with the **@uri** attribute value specified, if the
119 | JNDI location identified by the **@uri** attribute does not locate a Connection Factory the SCA
120 | runtime MUST raise an error [BJC20022].
- 121 | • **/binding.jca/@initialContextFactory** – the name of the JNDI initial context factory.
122 | The **@initialContextFactory** attribute MUST NOT be specified if the **@uri** attribute is not present
123 | [BJC20002].
- 124 | • **/binding.jca/@jndiURL** – the URL for the JNDI provider.
125 | The **@jndiURL** attribute MUST NOT be specified if the **@uri** attribute is not present [BJC20003].
- 126 | • **/binding.jca/@name** - as defined in the [SCA Assembly Specification \[SCA-Assembly\]](#).
127 | • **/binding.jca/@requires** - as defined in the [SCA Assembly Specification \[SCA-Assembly\]](#).
128 | • **/binding.jca/@policySets** - as defined in the [SCA Assembly Specification \[SCA-Assembly\]](#).
- 129 | • **/binding.jca/outboundConnection** – defines the outbound connection characteristics.
130 | The **outboundConnection** element MUST NOT be specified for services [BJC20004].
- 131 | • **/binding.jca/outboundConnection/@managed** – determines whether the interaction with the
132 | EIS system is to be performed in the managed or non-managed mode. If the value is true
133 | (default), the JNDI name is used to obtain connection to the EIS and use adapter in the managed
134 | mode. If the value is false, the connection information is used to invoke adapter in the non-
135 | managed mode i.e. by creating instance of the ManagedConnectionFactory and using it to create
136 | Connection. For the full description of the managed and non-managed mode refer to section 6.9
137 | of the [JCA 1.5 specification \[JCA15\]](#).
- 138 | • **/binding.jca/outboundConnection/resourceAdapter** – specifies **the** name, type and properties
139 | of the Resource Adapter Java bean.
140 | The SCA runtime MAY restrict valid properties of the outbound connection's Resource Adapter
141 | Java bean depending on the deployment platform [BJC20005].
- 142 | The **outboundConnection/resourceAdapter** element MUST NOT be specified when the
143 | **@managed** attribute value is **"false"** [BJC20006].
- 144 | • **/binding.jca/outboundConnection/resourceAdapter/@type** – the fully qualified name of the
145 | class implementing the JCA ResourceAdapter interface.
146 | If the **outboundConnection/resourceAdapter/@type** attribute is specified and the named Java
147 | class cannot be located or does not implement the [javax.resource.spi.ResourceAdapter](#) interface
148 | the SCA runtime MUST raise an error [BJC20028].
- 149 | • **/binding.jca/outboundConnection/resourceAdapter/@name** – the optional name that uniquely
150 | identifies the existing instance of the resource adapter.
- 151 | • **/binding.jca/outboundConnection/resourceAdapter/property** – contains the subset of the
152 | properties of the Resource Adapter Java Bean that need to be set in order to access specified
153 | EIS service. The full list of Resource Adapter properties can be obtained by introspecting the
154 | Java Bean.

Comment [SAJH2]: Resolution to issue BINDINGS-120

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Comment [SAJH3]: This and all the other @type statements added for issue BINDINGS-123

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- 155 | • **/binding.jca/outboundConnection/connection** ~~—~~ specifies the properties of the connection
156 | factory used to create connections to the service endpoint. Deleted: element
- 157 | • **/binding.jca/outboundConnection/connection/@type** – the fully qualified name of the class
158 | implementing the JCA ManagedConnectionFactory interface
- 159 | • **/binding.jca/outboundConnection/connection/@jndiName** – the JNDI name of the connection
160 | factory that the binding uses to connection to the EIS. The behaviour of this attribute is
161 | determined by the value of the @create attribute:
- 162 | – If the @create attribute value for an **outboundConnection/connection** or
163 | **inboundConnection/activationSpec** element is "always" and the @jndiName attribute
164 | is present and the resource cannot be created at the location specified by the
165 | @jndiName attribute, then the SCA runtime MUST raise an error [BJC20007].
- 166 | If the @create attribute value for an **outboundConnection/connection** or
167 | **inboundConnection/activationSpec** element is "always" and the @jndiName attribute
168 | is not present and the resource cannot be created, then the SCA runtime MUST raise an
169 | error [BJC20008].
- 170 | If the @jndiName attribute is omitted this specification places no restriction on the JNDI
171 | location of the created resource.
- 172 | – If the @create attribute value for an **outboundConnection/connection** or
173 | **inboundConnection/activationSpec** element is "ifNotExist" then the @jndiName
174 | attribute MUST specify the location of the possibly existing resource [BJC20013].
- 175 | If the @create attribute value for an **outboundConnection/connection** or
176 | **inboundConnection/activationSpec** element is "ifNotExist" and the resource does not
177 | exist at the location identified by the @jndiName attribute, but cannot be created there
178 | then the SCA runtime MUST raise an error [BJC20014].
- 179 | If the @create attribute value for an **outboundConnection/connection** or
180 | **inboundConnection/activationSpec** element is "ifNotExist" and the @jndiName
181 | attribute refers to an existing resource that is not a connection factory of the appropriate
182 | type or an activation spec of the appropriate type respectively then the SCA runtime
183 | MUST raise an error [BJC20018].
- 184 | – If the @create attribute value for an **outboundConnection/connection** or
185 | **inboundConnection/activationSpec** element is "never" then the @jndiName attribute
186 | MUST specify the location of the existing resource [BJC20019].
- 187 | If the @create attribute value for an **outboundConnection/connection** or
188 | **inboundConnection/activationSpec** element is "never" and the resource is not present
189 | at the location identified by the @jndiName attribute, or the location refers to a resource
190 | of an incorrect type then the SCA runtime MUST raise an error [BJC20020].
- 191 | • **/binding.jca/outboundConnection/connection/property** ~~—~~ contains the subset of the properties
192 | of the Managed Connection Factory Java Bean that need to be set in order to access specified
193 | EIS service. The full list of Managed Connection Factory properties can be obtained by
194 | introspecting the Java Bean. Deleted: element
- 195 | • **/binding.jca/outboundConnection/connection/@create** ~~—~~ indicates whether the element
196 | containing the attribute should be created when the containing composite is deployed. Valid
197 | values are "always", "never" and "ifNotExist". "always" indicates that new resources are
198 | created for use by this binding; "never" indicates that existing resources are used and none
199 | created; "ifNotExist" indicates that if the resources already exist those are used, otherwise new
200 | ones are created. Refer to the **outboundConnection/connection/@jndiName** attribute for a
201 | detailed definition of each case. The default value is "ifNotExist". Deleted: attribute
- 202 | • **/binding.jca/outboundConnection/connection/resAuth** ~~—~~ specifies the authentication
203 | mechanism used by the resource adapter in the managed environment. Valid values are
204 | "container" and "application". "container" indicates that the SCA runtime takes the
205 | responsibility for configuring and managing the EIS sign-on; "application" indicates that the Deleted: element

- 206 security details specified via the **outboundConnection/connectionSpec** element are used
 207 instead. If this element is omitted then no authentication is required by this binding definition.
- 208 • **/binding.jca/outboundInteraction** – defines characteristics of the outbound interaction.
 - 209 The **outboundInteraction** element MUST NOT be specified for services [BJC20009].
 - 210 • **/binding.jca/outboundInteraction/connectionSpec** → specifies client-level connection
 211 properties to be used when creating a connection. The ConnectionSpec object is used in several
 212 patterns that justify its definition in the interaction binding.
 - 213 • **/binding.jca/outboundInteraction/connectionSpec/@type** → the **fully qualified** name of the
 214 class implementing javax.resource.cci.ConnectionSpec interface to be used when creating a
 215 connection.
 216 If the **outboundInteraction/connectionSpec/@type** attribute is specified and the named Java
 217 class cannot be located or does not implement the javax.resource.cci.ConnectionSpec interface
 218 the SCA runtime MUST raise an error [BJC20030].
 - 219 • **/binding.jca/outboundInteraction/connectionSpec/property** – specifies the set of client-level
 220 connection properties to be used when creating a connection, e.g. user name or password.
 - 221 • **/binding.jca/outboundInteraction/interactionSpec** – specifies the interaction properties that
 222 apply to all operations that do not have one defined via an **operation** element.
 223 When an operation is invoked via a reference with a **binding.jca** element, if there is an
 224 **outboundInteraction/operation** element whose **@name** attribute matches the name of the
 225 operation being invoked, the SCA runtime MUST use the values supplied by the **interactionSpec**
 226 child of the operation element instead of the **interactionSpec** child of the **binding.jca** element, if
 227 any [BJC20025].
 - 228 • **/binding.jca/outboundInteraction/interactionSpec/@type** – the **fully qualified** name of the
 229 class implementing the javax.resource.cci.InteractionSpec interface.
 230 If the **outboundInteraction/interactionSpec/@type** attribute is specified and the named Java
 231 class cannot be located or does not implement the javax.resource.cci.InteractionSpec interface
 232 the SCA runtime MUST raise an error [BJC20032].
 - 233 • **/binding.jca/outboundInteraction/interactionSpec/property** – specifies the set of interaction
 234 properties.
 - 235 • **/binding.jca/outboundInteraction/operation** → specifies interactionSpec properties for
 236 individual operations in the interface associated with the binding.
 - 237 • **/binding.jca/outboundInteraction/operation/@name** → the name of the operation in the
 238 interface for which the interactionSpec properties apply.
 239 The value of the **outboundInteraction/operation/@name** attribute MUST be unique within the
 240 **outboundInteraction** element and MUST match the name of one of the operations in the
 241 containing service's or reference's interface [BJC20026].
 - 242 • **/binding.jca/outboundInteraction/operation/interactionSpec** → specifies the interaction
 243 properties for the named operation.
 - 244 • **/binding.jca/outboundInteraction/operation/interactionSpec/@type** – the fully qualified name
 245 of the class implementing the javax.resource.cci.InteractionSpec interface.
 246 If the **outboundInteraction/operation/interactionSpec/@type** attribute is specified and the
 247 named Java class cannot be located or does not implement the
 248 javax.resource.cci.InteractionSpec interface the SCA runtime MUST raise an error [BJC20033].
 249
 - 250 • **/binding.jca/inboundConnection** – defines the inbound connection characteristics.
 - 251 The **inboundConnection** element MUST NOT be specified for references [BJC20010].
 - 252 • **/binding.jca/inboundConnection/resourceAdapter** – specifies the name, type and properties
 253 of the Resource Adapter Java bean.
 254 The SCA runtime MAY restrict valid properties of the inbound connection's Resource Adapter
 255 Java bean depending on the deployment platform [BJC20011].

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Comment [SAJH5]: Part of resolution to issue BINDINGS-122

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- 256 The ***inboundConnection/resourceAdapter*** element MUST NOT be specified when the
 257 ***@managed*** attribute is ***false*** [BJC20012].
- 258 • ***/binding.jca/inboundConnection/resourceAdapter/@type*** – the fully qualified name of the
 259 class implementing the ResourceAdapter interface.
 260 If the ***inboundConnection/resourceAdapter/@type*** attribute is specified and the named Java
 261 class cannot be located or does not implement the ***javax.resource.spi.ResourceAdapter*** interface
 262 the SCA runtime MUST raise an error [BJC20029].
 - 263 • ***/binding.jca/inboundConnection/resourceAdapter/@name*** – the optional name that uniquely
 264 identifies the existing instance of the resource adapter.
 - 265 • ***/binding.jca/inboundConnection/activationSpec*** – identifies the activation spec that the
 266 binding uses to connect to an EIS. The attributes of this element follow the rules defined for the
 267 ***outboundConnection/connection*** element.
 - 268 • ***/binding.jca/inboundConnection/activationSpec/@type*** – the fully qualified name of the class
 269 implementing the ActivationSpec interface.
 270 If the ***inboundConnection/activationSpec/@type*** attribute is specified and the named Java
 271 class cannot be located or does not implement the ***javax.resource.spi.ActivationSpec*** interface
 272 the SCA runtime MUST raise an error [BJC20031].
 - 273 • ***/binding.jca/inboundConnection/activationSpec/@jndiName*** – the JNDI name of the
 274 activation. The behaviour of this attribute is determined by the value of the ***@create*** attribute as
 275 defined for the ***outboundConnection/connection/@jndiName*** attribute
 - 276 • ***/binding.jca/inboundConnection/activationSpec/@create*** – indicates whether the element
 277 containing the attribute should be created when the containing composite is deployed. Valid
 278 values are ***always***, ***never*** and ***ifNotExist***. ***always*** indicates that new resources are
 279 created for use by this binding; ***never*** indicates that existing resources are used and none
 280 created; ***ifNotExist*** indicates that if the resources already exist those are used, otherwise new
 281 ones are created. Refer to the ***outboundConnection/connection/@jndiName*** attribute for a
 282 detailed definition of each case. The default value is ***ifNotExist***.
 - 283 • ***/binding.jca/inboundInteraction*** – defines characteristics of the inbound interaction.
 284 The ***inboundInteraction*** element MUST NOT be specified for references [BJC20015].
 - 285 • ***/binding.jca/inboundInteraction/listener/@type*** – the fully qualified name of the listener
 286 interface supported by this group of interactions.
 287 If the ***inboundInteraction/listener*** element is not specified, the SCA runtime MUST use the
 288 default ***javax.resource.cci.MessageListener*** interface from the JCA specification [BJC20016].
 289 If the ***inboundInteraction/listener/@type*** attribute is specified and the named Java class cannot
 290 be located or does not implement the ***javax.resource.cci.MessageListener*** interface the SCA
 291 runtime MUST raise an error [BJC20034].
 - 292 • ***/binding.jca/inboundInteraction/inboundOperation*** – maps the name of the EIS event
 293 received by ResourceAdapter to the name of the operation in the interface.
 - 294 • ***/binding.jca/inboundInteraction/inboundOperation/@name*** – the name of the operation in the
 295 interface.
 296 The value of the ***inboundInteraction/inboundOperation/@name*** attribute MUST match the
 297 name of one of the operations in the containing service's or reference's interface [BJC20023].
 - 298 • ***/binding.jca/inboundInteraction/inboundOperation/@selectedOperation*** – the value
 299 generated by the ***operationSelector*** that corresponds to the operation in the service or reference
 300 interface identified by the ***operationProperties/@name*** attribute.
 301 The value of the ***inboundInteraction/inboundOperation/@selectedOperation*** attribute MUST
 302 be unique across the ***inboundInteraction*** element [BJC20024].
 - 303 • ***/binding.jca/wireFormat*** – identifies the wire format used by requests and responses sent or
 304 received by this binding as defined in the ***SCA Assembly Specification [SCA-Assembly]***.
 - 305 • ***/binding.jca/operationSelector*** – identifies the operation selector used when receiving requests
 306 for a service as defined in the ***SCA Assembly Specification [SCA-Assembly]***.

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307 The ***binding.jca*** element MUST conform to the XML schema defined in `sca-binding-jca-1.1.xsd`
308 [BJC20017].

309 **2.1 Extensibility**

310 The JCA Binding allows further customization of the binding element and its subelements with vendor
311 specific attributes or elements. This is done by providing extension points in the schema; refer to
312 Appendix A, "JCA XML Binding Schema: `sca-binding-jca-1.1.xsd`" for the locations of these extension
313 points.

314 3 Policy

315 The JCA Specification **[JCA15]** does not define generic Resource Adapter characteristics that could be
316 set using standard policy intents as defined in the SCA Policy Specification **[SCA-Policy]**. This
317 specification places no requirements on the intents that are listed as either **@alwaysProvides** or
318 **@mayProvides** in the **bindingType** for **binding.jca**.

319

4 Operation Selectors and Wire Formats

320 In general JCA resource adapters deal with records. There is not usually a built-in concept of “operation”
321 that corresponds to that defined in a [WSDL \[WSDL\]](#) portType. Records have a format which corresponds
322 in some way to the schema of an input or output message of an operation in the interface of a service or
323 reference, however additional Resource Adapter-specific information is required in order for an SCA
324 runtime to know how to identify the operation and understand the format of records.

325 The process of identifying the operation to be invoked is **operation selection**; the information that
326 describes the contents of messages is a **wire format**. The binding element as described in the [SCA
327 Assembly Specification \[SCA-Assembly\]](#) provides the means to identify specific operation selection via
328 the **operationSelector** element and the format of messages received and to be sent using the
329 **wireFormat** element.

330 When a service with a JCA binding receives a message, the SCA runtime resolves the name of the
331 operation in the service’s interface that is to be invoked by using the **operationSelector** and
332 **inboundInteraction** elements defined for the binding. The resolved operation name is defined as follows:

- 333 • If the selected operation name generated by the **operationSelector** matches the value of an
334 **inboundInteraction/inboundOperation/@selectedOperation** attribute then the resolved
335 operation name is the value of the **inboundInteraction/inboundOperation/@name** attribute.
- 336 • Otherwise the resolved operation name is the selected operation name generated by the
337 **operationSelector**.

338 When a message is received at an SCA service with JCA binding, the SCA runtime MUST invoke the
339 target component using the resolved operation name [BJC40001].

340 When a message is received at an SCA service with JCA binding and the resolved operation name is not
341 in the target component’s interface the SCA runtime MUST raise an error [BJC40002].

342 This specification does not define default behavior for the operation selection or wire format of a JCA
343 binding. This choice had been made because the implementations of generic Record interfaces that
344 define the data exchanged between JCA adapter and its client are specific to a particular adapter and,
345 unlike JMS, cannot be used in a generic manner.

346 No standard means is provided for linking the **wireFormat** or **operationSelector** elements with the
347 runtime components that implement their behavior.

348

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349 5 Examples

350 5.1 Minimal JCA Binding

351 | The minimal JCA Binding [in](#) Snippet 5-1 only contains the binding's *@uri* attribute with the JNDI name of
352 the connection factory, which allows the binding runtime to obtain a Connection to execute requests
353 against the EIS. Since no interaction properties are specified, it is assumed that Resource Adapter
354 accepts null values for the invocation methods.

```
355 <!-- JCA reference, connection is configured in JNDI context -->  
356 <reference name="EISHelloWorldReference">  
357   <binding.jca uri="java:comp/env/eis/EISMCF"/>  
358 </reference>
```

359 *Snippet 5-1: Example Minimal Binding*

360 5.2 Existing resources

361 In the example reference with JCA Binding in Snippet 5-2 the binding's *@uri* attribute specifies the
362 existing resource - the JNDI name under which the connection factory object is located. The interaction
363 properties are specified explicitly in the inlined *outboundInteraction* element.

```
364 <reference name="EISHelloWorldReference">  
365   <binding.jca uri="java:comp/env/eis/EISMCF">  
366     <outboundInteraction>  
367       <connectionSpec>  
368         <property name="userid">SYSAD</property>  
369       </connectionSpec>  
370       <operation name="hello">  
371         <interactionSpec>  
372           <property name="dir">temp</property>  
373           <property name="fileMode">read</property>  
374         </interactionSpec>  
375       </operation>  
376     </outboundInteraction>  
377   </binding.jca>  
378 </reference>
```

382 *Snippet 5-2: Example Binding Using Existing Resources*

383 5.3 Resource Creation

384 Snippet 5-3 presents a reference with a JCA binding where the connection resources do not exist and
385 need to be created.

```
386 <reference name="JCAHelloWorldReference">  
387   <binding.jca>  
388     <outboundConnection managed="true">  
389       <resourceAdapter  
390         name="connector.file.FAResourceAdapter">  
391           <property name="logDrive">D</property>  
392         </resourceAdapter>  
393         <connection jndiName="FAManagedConnectionFactory"  
394           create="always">  
395           <property name="host">localhost</property>  
396           <property name="drive">C</property>  
397         </connection>  
398       </outboundConnection>
```

399 </binding.jca>
400 </reference>

401 *Snippet 5-3: Example Binding that Creates a Resource*

402

Deleted: *Snippet 5f*

403 6 Conformance

404 The XML schema pointed to by the RDDDL document at the namespace URI, defined by this specification,
405 are considered to be authoritative and take precedence over the XML schema defined in the appendix of
406 this document. There are two categories of artifacts for which this specification defines conformance:

- 407 a) SCA JCA Binding XML Document
- 408 b) SCA Runtime

409 6.1 SCA JCA Binding XML Document

410 An SCA JCA Binding XML document is an SCA Composite Document or an SCA ComponentType
411 Document, as defined by the [SCA Assembly specification Section 13.1 \[SCA-Assembly\]](#), that uses the
412 *binding.jca* element.

413 An SCA JCA Binding XML document MUST be a conformant SCA Composite Document or an SCA
414 ComponentType Document, as defined by the [SCA Assembly Specification \[SCA-Assembly\]](#), and MUST
415 comply with all statements in Appendix B: "Conformance Items" related to elements and attributes in an
416 SCA JCA Binding XML document, notably all "MUST" statements have to be implemented.

417 6.2 SCA Runtime

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

- 420 1. The implementation MUST comply with all statements in Appendix B: "Conformance Items"
421 related to an SCA Runtime, notably all "MUST" statements have to be implemented
- 422 2. The implementation MUST conform to the [SCA Assembly Model Specification Version 1.1 \[SCA-](#)
423 [Assembly\]](#), and to the [SCA Policy Framework Version 1.1 \[SCA-Policy\]](#)
- 424 3. The implementation MUST reject an SCA JCA Binding XML Document that is not conformant per
425 Section 6.1

A. JCA XML Binding Schema: sca-binding-jca-1.1.xsd

```

427 <?xml version="1.0" encoding="UTF-8"?>
428 <!-- Copyright(C) OASIS(R) 2005,2009. All Rights Reserved.
429 OASIS trademark, IPR and other policies apply. -->
430 <schema xmlns="http://www.w3.org/2001/XMLSchema"
431 targetNamespace=" http://docs.oasis-open.org/ns/opencsa/sca/200903"
432 xmlns:sca=" http://docs.oasis-open.org/ns/opencsa/sca/200903"
433 elementFormDefault="qualified">
434
435 <include schemaLocation="sca-core-1.1-cd03.xsd" />
436
437 <complexType name="JCABinding">
438 <complexContent>
439 <extension base="sca:Binding">
440 <sequence>
441 <element name="outboundConnection"
442 type="sca:JCAOutboundConnection" minOccurs="0" />
443 <element name="inboundConnection"
444 type="sca:JCAInboundConnection" minOccurs="0" />
445 <element name="outboundInteraction"
446 type="sca:JCAOutboundInteraction" minOccurs="0" />
447 <element name="inboundInteraction"
448 type="sca:JCAInboundInteraction" minOccurs="0" />
449 <element name="property" type="sca:Property" minOccurs="0"
450 maxOccurs="unbounded" />
451 <any namespace="##other" processContents="lax" minOccurs="0"
452 maxOccurs="unbounded" />
453 </sequence>
454 <attribute name="initialContextFactory" type="anyURI"
455 use="optional"/>
456 <attribute name="jndiURL" type="anyURI" use="optional"/>
457 </extension>
458 </complexContent>
459 </complexType>
460
461 <simpleType name="JCACreateResource">
462 <restriction base="string">
463 <enumeration value="always" />
464 <enumeration value="never" />
465 <enumeration value="ifNotExist" />
466 </restriction>
467 </simpleType>
468 <simpleType name="ResAuth">
469 <restriction base="string">
470 <enumeration value="container" />
471 <enumeration value="application" />
472 </restriction>
473 </simpleType>
474 <complexType name="JCAOutboundConnection">
475 <sequence>
476 <element name="resourceAdapter" type="sca:ResourceAdapter"
477 minOccurs="0" />
478 <element name="connection" type="sca:Connection" />
479 <element name="resAuth" type="sca:ResAuth" minOccurs="0" />
480 <any namespace="##other" processContents="lax" minOccurs="0"
481 maxOccurs="unbounded" />
482 </sequence>
483 <attribute name="managed" type="boolean" use="optional"
484 default="true" />
485 <anyAttribute namespace="##other" processContents="lax" />

```

```

486 </complexType>
487 <complexType name="JCAInboundConnection">
488   <sequence>
489     <element name="resourceAdapter" type="sca:ResourceAdapter" />
490     <element name="activationSpec" type="sca:ActivationSpec" />
491     <any namespace="##other" processContents="lax" minOccurs="0"
492         maxOccurs="unbounded" />
493   </sequence>
494   <anyAttribute namespace="##other" processContents="lax" />
495 </complexType>
496 <complexType name="JCAOutboundInteraction">
497   <sequence>
498     <element name="connectionSpec" type="sca:ConnectionSpec"
499         minOccurs="0" />
500     <element name="interactionSpec" type="sca:InteractionSpec"
501         minOccurs="0" />
502     <element name="operation" type="sca:Operation" minOccurs="0" />
503     <any namespace="##other" processContents="lax" minOccurs="0"
504         maxOccurs="unbounded" />
505   </sequence>
506   <anyAttribute namespace="##other" processContents="lax" />
507 </complexType>
508 <complexType name="JCAInboundInteraction">
509   <sequence>
510     <element name="listener" type="string" minOccurs="0" />
511     <element name="inboundOperation" type="sca:InboundOperation"
512         minOccurs="0" maxOccurs="unbounded" />
513     <any namespace="##other" processContents="lax" minOccurs="0"
514         maxOccurs="unbounded" />
515   </sequence>
516   <anyAttribute namespace="##other" processContents="lax" />
517 </complexType>
518 <complexType name="ResourceAdapter">
519   <sequence>
520     <element name="property" type="sca:Property" minOccurs="0"
521         maxOccurs="unbounded" />
522     <any namespace="##other" processContents="lax" minOccurs="0"
523         maxOccurs="unbounded" />
524   </sequence>
525   <attribute name="name" type="NMTOKEN" use="optional" />
526   <attribute name="type" type="NMTOKEN" use="required" />
527   <anyAttribute namespace="##other" processContents="lax" />
528 </complexType>
529 <complexType name="Connection">
530   <sequence>
531     <element name="property" type="sca:Property" minOccurs="0"
532         maxOccurs="unbounded" />
533     <any namespace="##other" processContents="lax" minOccurs="0"
534         maxOccurs="unbounded" />
535   </sequence>
536   <attribute name="jndiName" type="anyURI" use="optional" />
537   <attribute name="type" type="NMTOKEN" use="required" />
538   <attribute name="create" type="sca:JCACreateResource" use="optional"
539       default="ifNotExist" />
540   <anyAttribute namespace="##other" processContents="lax" />
541 </complexType>
542 <complexType name="ActivationSpec">
543   <sequence>
544     <element name="property" type="sca:Property" minOccurs="0"
545         maxOccurs="unbounded" />
546     <any namespace="##other" processContents="lax" minOccurs="0"
547         maxOccurs="unbounded" />
548   </sequence>
549   <attribute name="jndiName" type="anyURI" use="optional" />

```

```

550     <attribute name="type" type="NMTOKEN" use="required" />
551     <attribute name="create" type="sca:JCACreateResource" use="optional"
552             default="ifNotExist"/>
553     <anyAttribute namespace="##other" processContents="lax" />
554 </complexType>
555 <complexType name="Operation">
556   <sequence>
557     <element name="interactionSpec" type="sca:InteractionSpec"
558             minOccurs="0" />
559     <any namespace="##other" processContents="lax" minOccurs="0"
560         maxOccurs="unbounded" />
561   </sequence>
562   <attribute name="name" type="NMTOKEN" use="required" />
563   <anyAttribute namespace="##other" processContents="lax" />
564 </complexType>
565 <complexType name="InboundOperation">
566   <sequence>
567     <any namespace="##other" processContents="lax" minOccurs="0"
568         maxOccurs="unbounded" />
569   </sequence>
570   <attribute name="name" type="NMTOKEN" use="required" />
571   <attribute name="selectedOperation" type="string" use="required" />
572   <anyAttribute namespace="##other" processContents="lax" />
573 </complexType>
574 <complexType name="ConnectionSpec">
575   <sequence>
576     <element name="property" type="sca:Property" minOccurs="0"
577             maxOccurs="unbounded" />
578     <any namespace="##other" processContents="lax" minOccurs="0"
579         maxOccurs="unbounded" />
580   </sequence>
581   <attribute name="type" type="NMTOKEN" use="required" />
582   <anyAttribute namespace="##other" processContents="lax" />
583 </complexType>
584 <complexType name="InteractionSpec">
585   <sequence>
586     <element name="property" type="sca:Property" minOccurs="0"
587             maxOccurs="unbounded" />
588     <any namespace="##other" processContents="lax" minOccurs="0"
589         maxOccurs="unbounded" />
590   </sequence>
591   <attribute name="type" type="NMTOKEN" use="required" />
592   <anyAttribute namespace="##other" processContents="lax" />
593 </complexType>
594
595   <element name="binding.jca" type="sca:JCABinding"
596           substitutionGroup="sca:binding" />
597 </schema>

```

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598

B. Conformance Items

599 This section contains a list of conformance items for the SCA JCA Binding specification.

Conformance ID	Description
[BJC20001]	The <i>@uri</i> attribute, the <i>inboundConnection</i> and the <i>outboundConnection</i> element are mutually exclusive and the SCA runtime MUST raise an error if more than one is present
[BJC20002]	The <i>@initialContextFactory</i> attribute MUST NOT be specified if the <i>@uri</i> attribute is not present
[BJC20003]	The <i>@jndiURL</i> attribute MUST NOT be specified if the <i>@uri</i> attribute is not present
[BJC20004]	The <i>outboundConnection</i> element MUST NOT be specified for services
[BJC20005]	The SCA runtime MAY restrict valid properties of the outbound connection's Resource Adapter Java bean depending on the deployment platform
[BJC20006]	The <i>outboundConnection/resourceAdapter</i> element MUST NOT be specified when the <i>@managed</i> attribute value is "false"
[BJC20007]	If the <i>@create</i> attribute value for an <i>outboundConnection/connection</i> or <i>inboundConnection/activationSpec</i> element is "always" and the <i>@jndiName</i> attribute is present and the resource cannot be created at the location specified by the <i>@jndiName</i> attribute, then the SCA runtime MUST raise an error
[BJC20008]	If the <i>@create</i> attribute value for an <i>outboundConnection/connection</i> or <i>inboundConnection/activationSpec</i> element is "always" and the <i>@jndiName</i> attribute is not present and the resource cannot be created, then the SCA runtime MUST raise an error
[BJC20009]	The <i>outboundInteraction</i> element MUST NOT be specified for services
[BJC20010]	The <i>inboundConnection</i> element MUST NOT be specified for references
[BJC20011]	The SCA runtime MAY restrict valid properties of the inbound connection's Resource Adapter Java bean depending on the deployment platform
[BJC20012]	The <i>inboundConnection/resourceAdapter</i> element MUST NOT be specified when the <i>@managed</i> attribute is "false"
[BJC20013]	If the <i>@create</i> attribute value for an <i>outboundConnection/connection</i> or <i>inboundConnection/activationSpec</i> element is "ifNotExist" then the <i>@jndiName</i> attribute MUST specify the location of the possibly existing resource
[BJC20014]	If the <i>@create</i> attribute value for an <i>outboundConnection/connection</i> or <i>inboundConnection/activationSpec</i> element is "ifNotExist" and the resource does not exist at the location identified by the <i>@jndiName</i> attribute, but cannot be created there then the SCA runtime MUST raise an error
[BJC20015]	The <i>inboundInteraction</i> element MUST NOT be specified for references
[BJC20016]	If the <i>inboundInteraction/listener</i> element is not specified, the SCA runtime MUST use the default <code>javax.resource.cci.MessageListener</code> interface from the

Deleted: interpret it as a listener implementing

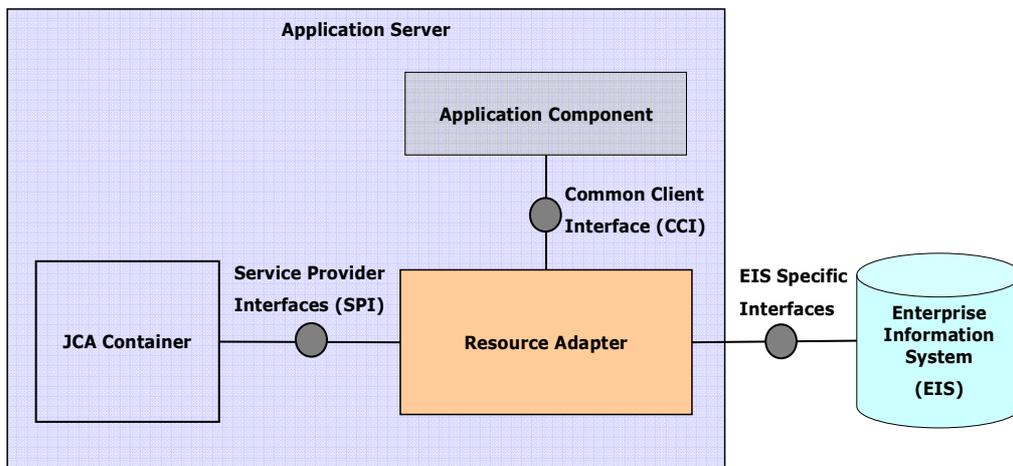
	JCA specification
[BJC20017]	The binding.jca element MUST conform to the XML schema defined in sca-binding-jca-1.1.xsd
[BJC20018]	If the @create attribute value for an outboundConnection/connection or inboundConnection/activationSpec element is "ifNotExist" and the @jndiName attribute refers to an existing resource that is not a connection factory of the appropriate type or an activation spec of the appropriate type respectively then the SCA runtime MUST raise an error
[BJC20019]	If the @create attribute value for an outboundConnection/connection or inboundConnection/activationSpec element is "never" then the @jndiName attribute MUST specify the location of the existing resource
[BJC20020]	If the @create attribute value for an outboundConnection/connection or inboundConnection/activationSpec element is "never" and the resource is not present at the location identified by the @jndiName attribute, or the location refers to a resource of an incorrect type then the SCA runtime MUST raise an error
[BJC20021]	For an SCA service with a binding.jca element with the @uri attribute value specified, if the JNDI location identified by the @uri attribute does not locate an Activation Spec the SCA runtime MUST raise an error
[BJC20022]	For an SCA reference with a binding.jca element with the @uri attribute value specified, if the JNDI location identified by the @uri attribute does not locate a Connection Factory the SCA runtime MUST raise an error
[BJC20023]	The value of the inboundInteraction/inboundOperation/@name attribute MUST match the name of one of the operations in the containing service's or reference's interface
[BJC20024]	The value of the inboundInteraction/inboundOperation/@selectedOperation attribute MUST be unique across the inboundInteraction element
[BJC20025]	When an operation is invoked via a reference with a binding.jca element, if there is an outboundInteraction/operation element whose @name attribute matches the name of the operation being invoked, the SCA runtime MUST use the values supplied by the interactionSpec child of the operation element instead of the interactionSpec child of the binding.jca element, if any
[BJC20026]	The value of the outboundInteraction/operation/@name attribute MUST be unique within the outboundInteraction element and MUST match the name of one of the operations in the containing service's or reference's interface
[BJC20028]	If the outboundConnection/resourceAdapter/@type attribute is specified and the named Java class cannot be located or does not implement the javax.resource.spi.ResourceAdapter interface the SCA runtime MUST raise an error
[BJC20029]	If the inboundConnection/resourceAdapter/@type attribute is specified and the named Java class cannot be located or does not implement the javax.resource.spi.ResourceAdapter interface the SCA runtime MUST raise an error
[BJC20030]	If the outboundInteraction/connectionSpec/@type attribute is specified and the named Java class cannot be located or does not implement the javax.resource.cci.ConnectionSpec interface the SCA runtime MUST raise an

	error
[BJC20031]	If the <i>inboundConnection/activationSpec/@type</i> attribute is specified and the named Java class cannot be located or does not implement the <code>javax.resource.spi.ActivationSpec</code> interface the SCA runtime MUST raise an error
[BJC20032]	If the <i>outboundInteraction/interactionSpec/@type</i> attribute is specified and the named Java class cannot be located or does not implement the <code>javax.resource.cci.InteractionSpec</code> interface the SCA runtime MUST raise an error
[BJC20033]	If the <i>outboundInteraction/operation/interactionSpec/@type</i> attribute is specified and the named Java class cannot be located or does not implement the <code>javax.resource.cci.InteractionSpec</code> interface the SCA runtime MUST raise an error
[BJC20034]	If the <i>inboundInteraction/listener/@type</i> attribute is specified and the named Java class cannot be located or does not implement the <code>javax.resource.cci.MessageListener</code> interface the SCA runtime MUST raise an error
[BJC40001]	When a message is received at an SCA service with JCA binding, the SCA runtime MUST invoke the target component using the resolved operation name
[BJC40002]	When a message is received at an SCA service with JCA binding and the resolved operation name is not in the target component's interface the SCA runtime MUST raise an error

600 **C. Java EE Connector Architecture**

601 **C.1 Introduction**

602 The connector architecture specification defines set of contracts that allow interoperability of the resource
603 adapters and application server environments. The specification also defines set of client interfaces that
604 can be optionally supported by the adapter and allow the use of adapter functionality by the application
605 clients. The following figure illustrates the relationships of these interfaces.
606



607
608 The SPI defines the following management contracts that give adapter consistent view of the
609 infrastructure provided by the server and give sever consistent view of all the adapters thus helping with
610 integration of adapters and servers.

- 611 • Lifecycle management allows application server to control the startup of the adapter and
612 notification to allow it to shutdown in an orderly fashion
- 613 • Work management allows the adapter to use the server resources such as threads in an efficient
614 way and allows server to manage system resources appropriately.
- 615 • Connection management lets the server control the pooling, reusing and caching of the physical
616 connections to the EIS system thus allowing for better scalability.
- 617 • Transactions allow the server to control EIS resource managers and provide application clients
618 with the transactional access to external resources.
- 619 • Security contract allow for secure access to the EIS systems with security information configured
620 and provided by the application server
- 621 • Message inflow contract allows Resource Adapter to deliver events initiated by the EIS system to
622 the application component executing on the application server.
- 623 • Transaction inflow contract allow the application server to participate and execute in the context
624 of the transaction initiated by the EIS system.

625 The CCI defines set of interfaces to access EIS functionality, through the resource adapter, from the
626 application client. The CCI also provides access to some of the SPIs for transactions and security
627 management to allow for executions of clients running in the non-managed mode, without the presence of
628 the Application Server.

629 C.2 Selected JCA CCI Interfaces

630 Record

```
631     public interface javax.resource.cci.Record
632         extends java.lang.Cloneable, java.io.Serializable {
633
634     public String getRecordName();
635         public void setRecordName(String name);
636     public void setRecordShortDescription(String description);
637     public String getRecordShortDescription();
638         public boolean equals(Object other);
639         public int hashCode();
640         public Object clone() throws CloneNotSupportedException;
641     }
```

642

643 Interaction

```
644
645     public interface javax.resource.cci.Interaction {
646
647         public Connection getConnection();
648         public void close() throws ResourceException;
649         public boolean execute(InteractionSpec ispec,
650             Record input, Record output) throws ResourceException;
651         public Record execute(InteractionSpec ispec,
652             Record input) throws ResourceException;
653     }
654
```

655 MessageListener

```
656
657     interface javax.resource.cci.MessageListener {
658
659         Record onMessage(Record inputData) throws ResourceException;
660     }
```

661 **D. Acknowledgements**

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

664 **Participants:**

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Billy Feng	Primeton Technologies, Inc.
Nimish Hathalia	TIBCO Software Inc.
Simon Holdsworth	IBM
Eric Johnson	Software Inc.
Uday Joshi	Oracle Corporation
Khanderao Kand	Oracle Corporation
Anish Karmarkar	Oracle Corporation
Nickolaos Kavantzias	Oracle Corporation
Mark Little	Red Hat
Ashok Malhotra	Oracle Corporation
Jim Marino	Individual
Jeff Mischkinsky	Oracle Corporation
Dale Moberg	Axway Software
Simon Nash	Individual
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Plamen Pavlov	SAP AG
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Luciano Resende	IBM
Tom Rutt	Fujitsu Limited
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Tim Watson	Oracle Corporation
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E. Revision History

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

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Revision	Date	Editor	Changes Made
1	2008-01-16	Anish Karmarkar	Applied the OASIS template + related changes to the Submission
2	2008-08-06	Piotr Przybylski	Updates for consistency with JMS Binding and to resolve the following: BINDINGS-13 BINDINGS-14 BINDINGS-28 BINDINGS-30 BINDINGS-32 BINDINGS-38
cd01-rev1	2008-10-16	Simon Holdsworth	Updates to resolve following issues: BINDINGS-41
cd01-rev2	2008-10-20	Piotr Przybylski	Update for RFC2119 conformance Updated to resolve following issues: BINDINGS-53
cd02	2009-02-16	Simon Holdsworth	Renamed and applied editorial issues
cd02-rev1	2009-05-22	Simon Holdsworth	Updates to resolve issue BINDINGS-63 (conformance statement numbering) Updated assembly namespace to 200903
cd02-rev2	2009-05-22	Simon Holdsworth	Updates to resolve following issues: BINDINGS-22 BINDINGS-45 BINDINGS-58 BINDINGS-69 Fixed errors in schema
cd02-rev3	2009-06-19	Simon Holdsworth	Updates to resolve following issues: BINDINGS-75 Added acknowledgements
cd02-rev4	2009-06-24	Simon Holdsworth	Updates to resolve following issues BINDINGS-78 Renamed document to old form Editorial fixes around external references; changed all links to hyperlinks

cd02-rev5	2009-06-24	Simon Holdsworth	Fixed broken cross-reference
cd03	2009-06-29	Simon Holdsworth	Update name to cd03
cd03-rev1	2010-01-24	Simon Holdsworth	Editorial fix to schema name Updates to resolve issues: BINDINGS-88 BINDINGS-89 BINDINGS-107
cd03-rev2	2010-02-17	Bryan Aupperle	Added captions for figures
cd03-rev3	2010-02-22	Simon Holdsworth	Updated for resolutions to issues: BINDINGS-101 BINDINGS-102 Updated assembly namespace Updates for editorial action items: 20091015-3: no change to copyright (currently consistent with all other SCA specs) 20091015-4: clarified the text describing the JCA binding 20091015-5: removed "further specification" text 20091015-7: duplication in abstract and introduction: no changes made 20091015-8: removed non-normative references section 20091015-9: cleaned up naming conventions section 20091015-10: cleaned up some phrases that used "allows" 20091015-11: clarified uses of the @uri attribute 20091015-12: no changes made (currently consistent with all other SCA specs) Fixed documentation of connectionSpec, interactionSpec and inboundOperation elements to include explicit bullets for the elements' children