



Service Component Architecture JMS Binding Specification Version 1.1

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Related work:

This specification replaces or **supersedes**:

- Service Component Architecture JMS Binding Specification Version 1.00, March 21 2007

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- Service Component Architecture Assembly Model Specification Version 1.1
- Service Component Architecture Policy Framework Specification Version 1.1

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Abstract:

This document defines the concept and behavior of a messaging binding, and a concrete JMS-based binding that provides that behavior.

The binding specified in this document applies to an SCA composite's services and references. The binding is especially well suited for use by services and references of composites that are directly deployed, as opposed to composites that are used as implementations of higher-level components. Services and references of deployed composites become system-level services and references, which are intended to be used by non-SCA clients.

The messaging binding describes a common pattern of behavior that may be followed by messaging-related bindings, including the JMS binding. In particular it describes the manner in which operations are selected based on message content, and the manner in which messages are mapped into the runtime representation. These are specified in a language-neutral manner.

The JMS binding provides JMS-specific details of the connection to the required JMS resources. It supports the use of Queue and Topic type destinations.

Status:

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.

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

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The non-normative errata page for this specification is located at <http://www.oasis-open.org/committees/sca-bindings/>.

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1 Introduction

This document defines the concept and behavior of a messaging binding, and a concrete JMS-based [JMS] binding that provides that behavior. The binding specified in this document applies to an SCA composite's services and references. The binding is especially well suited for use by services and references of composites that are directly deployed, as opposed to composites that are used as implementations of higher-level components. Services and references of deployed composites become system-level services and references, which are intended to be used by non-SCA clients.

The messaging binding describes a common pattern of behavior that may be followed by messaging-related bindings, including the JMS binding. In particular it describes the manner in which operations are selected based on message content, and the manner in which messages are mapped into the runtime representation. These are specified in a language-neutral manner.

The JMS binding provides JMS-specific details of the connection to the required JMS resources. It supports the use of Queue and Topic type destinations.

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
sca	"http://docs.oasis-open.org/ns/opencsa/sca/200903"	Defined by the SCA specifications

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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.
- [JMS] JMS Specification <http://java.sun.com/products/jms/>
- [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.
- [JCA15] Java Connector Architecture Specification Version 1.5 <http://java.sun.com/j2ee/connector/>

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- 32 [IETFJMS] IETF URI Scheme for Java™ Message Service 1.0
33 <http://www.ietf.org/internet-drafts/draft-merrick-jms-uri-05.txt>¹
34 [SCA-Assembly] <http://docs.oasis-open.org/opencsa/sca-assembly/sca-assembly-1.1-spec.html>

35 1.3 Non-Normative References

36 TBD TBD

37 1.4 Naming Conventions

38 This specification follows some naming conventions for artifacts defined by the specification. In addition
39 to the conventions defined by section 1.3 of the SCA Assembly Specification [SCA-Assembly], this
40 specification adds three additional conventions:

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

¹ Note that this URI scheme is currently in draft. The reference for this specification will be updated when the IETF standard is finalized

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50 2 Messaging Bindings

51 Messaging bindings form a category of SCA bindings that represent the interaction of SCA composites
52 with messaging providers. It is felt that documenting, and following this pattern is beneficial for
53 implementers of messaging bindings, although it is not strictly necessary.

54 This pattern is embodied in the JMS binding, described later.

55 Messaging bindings utilize operation selector and wire format elements to provide the mapping from the
56 native messaging format to an invocation on the target component. A default operation selection and
57 data binding behavior is identified, along with any associated properties.

58 In addition, each operation may have specific properties defined, that may influence the way native
59 messages are processed depending on the operation being invoked.

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3 JMS Binding Schema

The JMS binding element is defined by the following schema.

```
62 <binding.jms correlationScheme="QName"?
63     initialContextFactory="xs:anyURI"?
64     jndiURL="xs:anyURI"?
65     requestConnection="QName"?
66     responseConnection="QName"?
67     operationProperties="QName"?
68     name="NCName"?
69     requires="list of QName"?
70     policySets="list of QName"?
71     uri="xs:anyURI"?
72     ... >
73 <destination jndiName="xs:anyURI" type="queue or topic"?
74     create="always or never or ifNotExist"?>
75     <property name="NMTOKEN" type="NMTOKEN"?>*
76 </destination?>
77 <connectionFactory jndiName="xs:anyURI"
78     create="always or never or ifNotExist"?>
79     <property name="NMTOKEN" type="NMTOKEN"?>*
80 </connectionFactory?>
81 <activationSpec jndiName="xs:anyURI"
82     create="always or never or ifNotExist"?>
83     <property name="NMTOKEN" type="NMTOKEN"?>*
84 </activationSpec?>
85
86 <response>
87     <destination jndiName="xs:anyURI" type="queue or topic"?
88     create="always or never or ifNotExist"?>
89     <property name="NMTOKEN" type="NMTOKEN"?>*
90 </destination?>
91     <connectionFactory jndiName="xs:anyURI"
92     create="always or never or ifNotExist"?>
93     <property name="NMTOKEN" type="NMTOKEN"?>*
94 </connectionFactory?>
95     <activationSpec jndiName="xs:anyURI"
96     create="always or never or ifNotExist"?>
97     <property name="NMTOKEN" type="NMTOKEN"?>*
98 </activationSpec?>
99     <wireFormat/>?
100 </response?>
101
102 <resourceAdapter name="NMTOKEN"?>
103     <property name="NMTOKEN" type="NMTOKEN"?>*
104 </resourceAdapter?>
105
106 <headers type="string"?
107     deliveryMode="persistent or nonpersistent"?
108     timeToLive="long"?
109     priority="0 .. 9"?>
110     <property name="NMTOKEN" type="NMTOKEN"?>*
111 </headers?>
112
113 <messageSelection selector="string"?>
114     <property name="NMTOKEN" type="NMTOKEN"?>*
115 </messageSelection?>
116
117 <operationProperties name="string" nativeOperation="string"?>
118     <property name="NMTOKEN" type="NMTOKEN"?>*
```

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JMSDeliveryMode="PERSISTENT or NON_PERSISTENT"?
JMSTimeToLive="long"?
JMSPriority="0 .. 9"

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```
<headers type="string"?
  deliveryMode="persistent or nonpersistent"?
  timeToLive="long"?
  priority="0 .. 9"?>
  <property name="NMTOKEN" type="NMTOKEN"?>*>
</headers?>
</operationProperties>*>

<wireFormat/>?
<operationSelector/>?
</binding.jms>
```

The binding can be used in one of two ways, either identifying existing JMS resources using JNDI names, or providing the required information to enable the JMS resources to be created.

The **binding.jms** element has the following attributes:

- **/binding.jms** – This is the JMS binding element. The element is extensible so that JMS binding implementers can add additional JMS provider-specific attributes and elements although such extensions are not guaranteed to be portable across runtimes.
- **/binding.jms/@uri** – as defined in the SCA Assembly Specification [SCA-Assembly]. This attribute identifies the destination, connection factory or activation spec, and other properties to be used to send/receive the JMS message. There is an implicit @create="never" for the resources referred to in the @uri attribute.
 - The value of the @uri attribute MUST have the format defined by the IETF URI Scheme for Java™ Message Service 1.0 [IETFJMS] [BJM30001].
 - The following illustrates the structure of the URI and the set of property names that have specific semantics - all other property names are treated as user property names:
 - **jms:indi:<jms-dest?>**
indiURL=<indi-url> &
indiInitialContextFactory=<indi-initial-context-factory> &
indiConnectionFactoryName=<Connection-Factory-Name> &
deliveryMode=<Delivery-Mode> &
timeToLive=<Time-To-Live> &
priority=<Priority> &
<param-name>=<param-value> & ...
- When the @uri attribute is specified, the SCA runtime MUST raise an error if the referenced resources do not already exist [BJM30002].
- When the @uri attribute is specified, the destination element MUST NOT be present [BJM30034].
- An SCA runtime MUST use the values specified in the @uri attribute in preference to corresponding attributes and elements in the binding [BJM30035].
- **/binding.jms/@name** - as defined in the SCA Assembly Specification [SCA-Assembly].
- **/binding.jms/@requires** - as defined in the SCA Assembly Specification [SCA-Assembly].
- **/binding.jms/@policySets** - as defined in the SCA Assembly Specification [SCA-Assembly].
- **/binding.jms/@correlationScheme** – identifies the correlation scheme used when sending reply or callback messages, default value is "sca:messageID".
 - If the value of the @correlationScheme attribute is "sca:messageID" the SCA runtime MUST set the correlation ID of replies to the message ID of the corresponding request [BJM30003].
 - If the value of the @correlationScheme attribute is "sca:correlationID" the SCA runtime MUST set the correlation ID of replies to the correlation ID of the corresponding request [BJM30004].
 - If the value of the @correlationScheme attribute is "sca:none" the SCA runtime MUST NOT set the correlation ID [BJM30005].
 - SCA runtimes MAY allow other values of the @correlationScheme attribute to indicate other correlation schemes [BJM30006].
- **/binding.jms/@initialContextFactory** – the name of the JNDI initial context factory.

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JMSTimeToLive="long"?¶
JMSPriority="0 ..

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The value of the @uri attribute MUST have the following format, defined by the IETF URI Scheme

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<User-Property>=<User-Property-Value

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Deleted: . Possible values for the @correlationScheme attribute are "sca:MessageID" (the default) where the SCA runtime MUST set the correlation ID of replies to the message ID of the corresponding request; "sca:CorrelationID" where the SCA runtime MUST set the correlation ID of replies (... [63])

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- 172 • **/binding.jms/@jndiURL** – the URL for the JNDI provider.
- 173 • **/binding.jms/@requestConnection** – identifies a **binding.jms** element that is present in a definition
 174 document, whose **destination**, **connectionFactory**, **activationSpec** and **resourceAdapter** children
 175 are used to define the values for this binding.
 176 **If the @requestConnection attribute is specified, the binding.jms element MUST NOT contain a**
 177 **destination, connectionFactory, activationSpec or resourceAdapter element [BJM30007].**
- 178 • **/binding.jms/@responseConnection** – identifies a **binding.jms** element that is present in a
 179 definition document, whose **response** child element is used to define the values for this binding.
 180 **If the @responseConnection attribute is specified, the binding.jms element MUST NOT contain a**
 181 **response element [BJM30008].**
- 182 • **/binding.jms/@operationProperties** – identifies a **binding.jms** element that is present in a definition
 183 document, whose **operationProperties** children are used to define the values for this binding.
 184 **If the @operationProperties attribute is specified, the binding.jms element MUST NOT contain an**
 185 **operationProperties element [BJM30009].**
- 186 • **/binding.jms/destination** – identifies the destination that is to be used to process requests by this
 187 binding.
- 188 • **/binding.jms/destination/@type** - the type of the request destination. Valid values are “**queue**” and
 189 “**topic**”. The default value is “**queue**”.
 190 **Whatever the value of the destination/@type attribute, the runtime MUST ensure a single response**
 191 **is delivered for request/response operations [BJM30010].**
- 192 • **binding.jms/destination/@jndiName** – the JNDI name of the JMS Destination that the binding uses
 193 to send or receive messages. The behaviour of this attribute is determined by the value of the
 194 **@create** attribute as follows:
- 195 – **If the @create attribute value for a destination, connectionFactory or activationSpec element is**
 196 **“always” then the @jndiName attribute is optional; if the resource cannot be created at the**
 197 **specified location then the SCA runtime MUST raise an error [BJM30011].**
 198 **If the @jndiName attribute is omitted this specification places no restriction on the JNDI location**
 199 **of the created resource.**
- 200 – **If the @create attribute value for a destination, connectionFactory or activationSpec element is**
 201 **“ifNotExist” then the @jndiName attribute MUST specify the location of the possibly existing**
 202 **resource [BJM30012].**
 203 **If the destination, connectionFactory or activationSpec does not exist at the location identified by**
 204 **the @jndiName attribute, but cannot be created there then the SCA runtime MUST raise an error**
 205 **[BJM30013].**
 206 **If the destination, connectionFactory or activationSpec’s @jndiName attribute refers to an**
 207 **existing resource that is not a JMS Destination of the appropriate type, a JMS connection factory**
 208 **or a JMS activation spec respectively then the SCA runtime MUST raise an error [BJM30014].**
- 209 – **If the @create attribute value for a destination, connectionFactory or activationSpec element is**
 210 **“never” then the @jndiName attribute MUST specify the location of the existing resource**
 211 **[BJM30015].**
 212 **If the destination, connection factory or activation spec is not present at the location identified by**
 213 **the @jndiName attribute, or the location refers to a resource of an incorrect type then the SCA**
 214 **runtime MUST raise an error [BJM30016].**
- 215 • **/binding.jms/destination/@create** – indicates whether the destination should be created when the
 216 containing composite is deployed. Valid values are “**always**”, “**never**” and “**ifNotExist**”. The default
 217 value is “**ifNotExist**”.
- 218 • **/binding.jms/destination/property** – defines properties to be used to create the destination, if
 219 required.
- 220 • **/binding.jms/connectionFactory** – identifies the connection factory that the binding uses to process
 221 request messages. The attributes of this element follow [the rules](#), defined for the **destination**
 222 element.
 223 **A binding.jms element MUST NOT include both a connectionFactory element and an**

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Deleted: In this case this **binding.jms** element MUST NOT contain an **operationProperties** element

Deleted: In either case the runtime MUST ensure a single response is delivered for request/response operations

Deleted: If the **@create** attribute value is “**always**” then the **@jndiName** attribute is optional; if the destination cannot be created at the specified location then the SCA runtime MUST raise an error.

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Deleted: <#>If the **@create** attribute value is “**ifNotExist**” then the **@jndiName** attribute MUST specify the location of the possibly existing destination; if the destination does not exist at this location, but cannot be created there then the SCA runtime MUST raise an error. If the **@jndiName** refers to an existing resource other than a JMS Destination of the specified type then the SCA runtime MUST raise an error. ¶ <#>If the **@create** attribute value is “**never**” then the **@jndiName** attribute MUST specify the location of the existing destination; if the destination is not present at the location, or the location refers to a resource other than a JMS Destination of the specified type then the SCA runtime MUST raise an error.¶

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- 224 **activationSpec** element [BJM30017].
- 225 When the **connectionFactory** element is present, then the destination MUST be defined either by
- 226 the **destination** element or the **@uri** attribute [BJM30018].
- 227 • **/binding.jms/activationSpec** – identifies the activation spec that the binding uses to connect to a
 - 228 JMS destination to process request messages. The attributes of this element follow **the rules** defined
 - 229 for the **destination** element.
 - 230 If the **activationSpec** element is present and the destination is also specified via a **destination**
 - 231 element or the **@uri** attribute then it MUST refer to the same JMS destination as the **activationSpec**
 - 232 [BJM30019].
 - 233 The **activationSpec** element MUST NOT be present when the binding is being used for an SCA
 - 234 reference [BJM30020].
 - 235 • **/binding.jms/response** – defines the resources used for handling response messages (receiving
 - 236 responses for a reference, and sending responses from a service).
 - 237 • **/binding.jms/response/destination** – identifies the destination that is to be used to process
 - 238 responses by this binding. Attributes **follow the rules defined** for the parent's **destination** element.
 - 239 For a service, this destination is used to send responses to messages that have a null value for the
 - 240 **JMSReplyTo** destination. For a reference, this destination is used to receive reply messages
 - 241 • **/binding.jms/response/connectionFactory** – identifies the connection factory that the binding uses
 - 242 to process response messages. The attributes of this element follow those defined for the
 - 243 **destination** element.
 - 244 A **response** element MUST NOT include both a **connectionFactory** element and an **activationSpec**
 - 245 element [BJM30021].
 - 246 • **/binding.jms/response/activationSpec** – identifies the activation spec that the binding uses to
 - 247 connect to a JMS destination to process response messages. The attributes of this element follow
 - 248 those defined for the **destination** element.
 - 249 If a **response/destination** and **response/activationSpec** element are both specified they MUST
 - 250 refer to the same JMS destination [BJM30022].
 - 251 The **response/activationSpec** element MUST NOT be present when the binding is being used for an
 - 252 SCA service [BJM30023].
 - 253 • **/binding.jms/response/wireFormat** – identifies the wire format used by responses sent or received
 - 254 by this binding. This value overrides the **wireFormat** specified at the binding level.
 - 255 • **/binding.jms/headers** – this element specifies values for standard JMS headers.
 - 256 The SCA runtime MUST set JMS headers in messages that it creates to the values specified by the
 - 257 **headers** element unless overridden for the operation being invoked. [BJM30024].
 - 258 These values apply to requests from a reference and responses from a service.
 - 259 • **/binding.jms/headers/@type, @deliveryMode, @timeToLive, @priority** – specifies the value to
 - 260 use for the JMS header property **JMSType, JMSDeliveryMode, JMSTimeToLive or JMSPriority**
 - 261 **respectively**.
 - 262 If the **@uri** attribute includes values for the type, delivery mode, time to live or priority properties then
 - 263 the **@uri** values are used and the **@type, @deliveryMode, @timeToLive or @priority** attributes are
 - 264 ignored [BJM30025].
 - 265 Valid values for **@deliveryMode** are **"persistent"** and **"nonpersistent"**; valid values for **@priority**
 - 266 are **"0"** to **"9"**.
 - 267 • **/binding.jms/headers/property** – specifies the value for the given JMS user property.
 - 268 For each **header/properties** element the SCA runtime MUST set the named JMS user property to
 - 269 the given value in messages it creates unless overridden for the operation being invoked
 - 270 [BJM30026].
 - 271 • **/binding.jms/messageSelection** - this element allows JMS **message selection** options to be set.
 - 272 These values apply to a service **receiving messages from the request** destination or for a reference
 - 273 **receiving messages from the** callback or reply-to destination.
 - 274 • **/binding.jms/messageSelection/@selector** - specifies the value to use for the JMS selector. If the
 - 275 **@uri** attribute includes a value for the message selector then the **@uri** value is used and the
 - 276 **messageSelection/@selector** attribute is ignored [BJM30027].

Deleted: A **binding.jms** element MUST NOT include both this element and an **activationSpec** element. When this element is present, the **destination** element MUST also be present

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Deleted: If a **destination** element is also specified it MUST refer to the same JMS destination as the **activationSpec**. This element MUST NOT be present when the binding is being used for an SCA reference

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Deleted: A **response** element MUST NOT include both this element and an **activationSpec** element

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Deleted: that the SCA runtime MUST set to the given $\sqrt{\dots}$ [64]

Deleted: **JMSType, @JMSDeliveryMode,** \dots [65]

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Deleted: **JMSDeliveryMode** are **"PERSISTENT"** and $\sqrt{\dots}$ [67]

Deleted: **JMSPriority**

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Deleted: **subscriptionHeader s/@JMSSelector**

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- 277 • **/binding.jms/resourceAdapter** – specifies name, type and properties of the Resource Adapter Java
 278 bean.
 279 **The resourceAdapter element MUST be present when JMS resources are to be created for a JMS**
 280 **provider that implements the JCA 1.5 specification [JCA15], and is ignored otherwise [BJM30031].**
 281 **SCA runtimes MAY place restrictions on the properties of the resource adapter Java bean that can be**
 282 **set using the resourceAdapter element [BJM30028].**
 283 ¶ For JMS providers that do not implement the JCA 1.5 specification JCA15, information necessary for
 284 resource creation can be added in provider-specific elements or attributes allowed by the extensibility
 285 of the **binding.jms** element.
- 286 • **/binding.jms/operationProperties** – specifies various properties that are specific to the processing
 287 of a particular operation.
- 288 • **/binding.jms/operationProperties/@name** – The name of the operation in the interface.
- 289 • **/binding.jms/operationProperties/@selectedOperation** – The value generated by the
 290 **operationSelector** that corresponds to the operation in the service or reference interface identified
 291 by the **operationProperties/@name** attribute. If this attribute is omitted then the value defaults to
 292 the value of the **operationProperties/@name** attribute.
 293 **The value of the operationProperties/@selectedOperation attribute MUST be unique across the**
 294 **containing binding.jms element [BJM30029].**
- 295 • **/binding.jms/operationProperties/property** – specifies properties specific to this operation. These
 296 properties are intended to be used to parameterize the **wireFormat** identified for the binding for a
 297 particular operation.
 298 **The SCA runtime SHOULD make the operationProperties element corresponding to the**
 299 **selectedOperation available to the wireFormat implementation [BJM30030].**
- 300 • **/binding.jms/operationProperties/headers** – this element specifies values for standard JMS
 301 headers. These values apply to requests from a reference and responses from a service.
 302 **The SCA runtime MUST set JMS headers in messages it creates when the operation identified by the**
 303 **operationProperties/@name attribute is invoked to the values specified by the corresponding**
 304 **operationProperties/headers element [BJM30032].**
- 305 • **/binding.jms/operationProperties/headers/@type, @deliveryMode, @timeToLive, @priority** –
 306 specifies the value to use for the JMS header property **JMSType, JMSDeliveryMode, JMSTimeToLive**
 307 **or JMSPriority, respectively**
 308 **The SCA runtime MUST use values specified for particular operations in preference to those defined**
 309 **for all operations in the binding.jms/headers element or via the binding's @uri attribute.**
- 310 • **/binding.jms/operationProperties/headers/property** – specifies the value for the **given** JMS user
 311 property.
 312 **For each operationProperties/headers/property element the SCA runtime MUST set the named**
 313 **JMS user property to the given value in messages it creates when the operation identified by the**
 314 **operationProperties/@name attribute is invoked [BJM30033].**
- 315 • **/binding.jms/wireFormat** – identifies the wire format used by requests and responses sent or
 316 received by this binding.
- 317 • **/binding.jms/operationSelector** – identifies the operation selector used when receiving requests for
 318 a service. If specified for a reference this provides the default operation selector for callbacks if not
 319 specified via a callback service element.
- 320 • **/binding.jms/@{any}** - this is an extensibility mechanism to allow extensibility via attributes.
- 321 • **/binding.jms/any** – this is an extensibility mechanism to allow extensibility via elements.
- 322 Deployers/assemblers can configure **nonpersistent** for **@deliveryMode** in order to provide higher
 323 performance with a decreased quality of service. A **binding.jms** element configured in this way cannot
 324 satisfy either of the **"atLeastOnce"** and **"exactlyOnce"** policy intents. The SCA Runtime MUST raise an
 325 error for this invalid combination at deployment time.

Deleted: This element MUST be present when the JMS resources are to be created for a JMS provider that implements the JCA 1.5 specification

Deleted: JCA15

Deleted: , and is ignored otherwise. SCA runtimes MAY place restrictions on the properties of the RA Java bean that can be set.

Deleted: The value of this attribute MUST be unique across the containing **binding.jms** element.

Deleted: The SCA runtime SHOULD make the **operationProperties** element corresponding to the **selectedOperation** available to the **wireFormat** implementation

Deleted: that the SCA runtime MUST set to the given values for the given operation.

Deleted: **JMSType, @JMSDeliveryMode, @JMSTimeToLive, @JMSPriority**

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Comment [SAJH2]: I think that this is just repeating BJM30032, also this is subject to update following resolution to BINDINGS-67.

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Comment [SAJH3]: Pending move of this text for resolution to issue BINDINGS-48

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326

4 Operation Selectors and Wire Formats

327 In general messaging providers deal with message formats and destinations. There is not usually a built-
328 in concept of "operation" that corresponds to that defined in a WSDL portType [WSDL]. Messages have
329 a wire format which corresponds in some way to the schema of an input or output message of an
330 operation in the interface of a service or reference, however additional information is required in order for
331 an SCA runtime to know how to identify the operation and understand the wire format of messages.

332 The process of identifying the operation to be invoked is *operation selection*; the information that
333 describes the contents of messages is a *wire format*. The **binding** element as described in the SCA
334 Assembly [Specification](#), [SCA-Assembly] provides the means to identify specific operation selection via
335 the **operationSelector** element and the wire format of messages received and to be sent using the
336 **wireFormat** element.

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

339 This section describes the default **operationSelector** and **wireFormat** for a JMS binding.

340 **The SCA runtime MUST support the default JMS wire format and operation selector behavior, and MAY**
341 **provide additional means to override it [BJM40001].**

4.1 Default Operation Selection

343 **The following defines the default operation selection algorithm when** receiving a request at a service,
344 or a callback at a reference. **When using the default operation selection algorithm**, the selected operation
345 name is determined as follows:

- 346 • If there is only one operation on the service's interface, then that operation is **the selected operation**
347 **name**.
- 348 • Otherwise, if the JMS user property "**scaOperationName**" is present, then **the value of that user**
349 **property** is used as the selected operation name.
- 350 • Otherwise, if the message is a JMS text or bytes message containing XML, then the selected
351 operation name is **the local name of the root element of the XML payload**.
- 352 • Otherwise, the selected operation name is **"onMessage"**.

353 **When a *binding.jms* element specifies the *operationSelector.jmsDefault* element, the SCA runtime**
354 **MUST use the default operation selection algorithm to determine the selected operation [BJM40008].**

355 The selected operation name is then mapped to an operation in the service's interface via a matching
356 **operationProperties** element in the JMS binding. If there is no matching element, the operation name is
357 assumed to be the same as the selected operation name.

358 **If no *operationSelector* element is specified then SCA runtimes MUST use**
359 ***operationSelector.jmsDefault* as the default [BJM40002].**

4.2 Default Wire Format

361 The default wire format maps between a **JMSMessage** and the object(s) expected by the component
362 implementation. We encourage component implementers to avoid exposure of JMS APIs to component
363 implementations, however in the case of an existing implementation that expects a **JMSMessage**, this
364 provides for simple reuse of that as an SCA component.

365 **When using the default wire format, the** message body is mapped to the parameters or return value of the
366 target operation as follows:

- 367 • If there is a single parameter that is a **JMSMessage**, then the **JMSMessage** is passed as is.
- 368 • Otherwise, **if the JMSMessage is not** a JMS text message or bytes message containing XML **it is**
369 **invalid**.

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Comment [SAJH4]: These don't just apply to the default OS, they apply to all. Should these be moved outside this section and be made normative?

Deleted: The use of this operation selector can be explicitly specified in a **binding.jms** using the **operationSelector.jmsdefault** element; if no **operationSelector** element is specified then SCA runtimes MUST use this as the default.¶

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Deleted: ; an SCA runtime MUST be able to receive both forms. When sending messages either form may be used; an SCA runtime MAY provide additional configuration to allow one or other to be selected

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370 • Otherwise if, there is a single parameter, or for the return value, the JMS text or bytes XML payload is
371 the XML serialization of that parameter according to the WSDL schema for the message.

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372 • Otherwise the, multiple parameters, are encoded in XML using the document wrapped style, according
373 to the WSDL schema for the message.

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374 When a *binding.jms* element specifies the *wireFormat.jmsDefault* element, the SCA runtime MUST use
375 the default wire format [BJM40009].

376 When using the default wire format to send request messages, if there is a single parameter and the
377 interface includes more than one operation, the SCA runtime MUST set the JMS user property
378 "*scaOperationName*" to the name of the operation being invoked [BJM40003].

379 When using the default wire format an SCA runtime MUST be able to receive both JMS text and bytes
380 messages [BJM40005].

381 When using the default wire format an SCA runtime MUST send either a JMS text or a JMS bytes
382 message [BJM40006].

383 When using the default wire format an SCA runtime MAY provide additional configuration to allow
384 selection between JMS text or bytes messages to be sent [BJM40007].

385 If no *wireFormat* element is specified in a JMS binding then SCA runtimes MUST use
386 *wireFormat.jmsDefault* as the default [BJM40004].

387 4.2.1 Example of default wire format

388 For the following interface definition:

```
389 <wsdl:definitions name="Coordinates"  
390 targetNamespace="http://tempuri.org/coordinates"  
391 xmlns:tns="http://tempuri.org/coordinates"  
392 xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"  
393 xmlns:xsd="http://www.w3.org/2001/XMLSchema">  
394 <wsdl:types>  
395 <xsd:schema targetNamespace="http://tempuri.org/coordinates">  
396 <xsd:element name="setCoordinates">  
397 <xsd:complexType>  
398 <xsd:sequence>  
399 <xsd:element name="x" type="xsd:int"/>  
400 <xsd:element name="y" type="xsd:int"/>  
401 </xsd:sequence>  
402 </xsd:complexType>  
403 </xsd:element>  
404 </xsd:schema>  
405 </wsdl:types>  
406  
407 <wsdl:message name="setCoordinatesRequestMsg">  
408 <wsdl:part element="tns:setCoordinates" name="setCoordinatesParameters"/>  
409 </wsdl:message>  
410  
411 <wsdl:portType name="Coordinates">  
412 <wsdl:operation name="setCoordinates">  
413 <wsdl:input message="tns:setCoordinatesRequestMsg"  
414 name="setCoordinatesRequest"/>  
415 </wsdl:operation>  
416 </wsdl:portType>  
417 </wsdl:definitions>
```

Deleted: <#>When sending request messages, if there is a single parameter and the interface includes more than one operation, the SCA runtime MUST set the JMS user property "*scaOperationName*" to the name of the operation being invoked.¶ The use of this wire format can be explicitly specified in a *binding.jms* using the *wireFormat.jmsdefault* element; if no *wireFormat* element is specified then SCA runtimes MUST use this as the default. ¶

Deleted: example, for

418 When the *setCoordinates* operation is invoked via a reference with a JMS binding that uses the default
419 wire format, the message sent from the JMS binding is a JMS text or bytes message with the following
420 content:

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```
421 <setCoordinates xmlns="http://tempuri.org/coordinates">  
422 <x>10</x>  
423 <y>5</y>
```

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</setCoordinates>

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425 **5 Policy**

426 The JMS binding provides attributes that control the sending of messages, requests from references and
427 replies from services. These values can be set directly on the binding element for a particular service or
428 reference, or they can be set using policy intents. An example of setting these via intents is shown later.

429 JMS binding implementations MAY support the following standard intents, as defined by the JMS
430 binding's **bindingType**:

```
431 <bindingType type="binding.jms"  
432     alwaysProvides="JMS",  
433     mayProvide="atLeastOnce atMostOnce ordered"/>
```

434 The atLeastOnce, atMostOnce and ordered intent are defined in the SCA Policy Specification document
435 in section 8, "Reliability Policy".

Comment [SAJH5]: Pending update to this text for resolution to issue BINDINGS-48

Deleted: `jms`

Deleted: `conversational`

Deleted: The conversational intent is defined in the SCA Assembly Specification document in section 8.3, "Conversational Interfaces".

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436

6 Message Exchange Patterns

437 This section describes the message exchange patterns that are possible when using the JMS binding,
438 including one-way, request/response and callbacks. JMS has a looser concept of message exchange
439 patterns than WSDL, so this section explains how JMS messages that are sent and received by the SCA
440 runtime relate to the WSDL input/output messages. Each operation in a WSDL interface is either one-
441 way or request/response. Callback interfaces may include both one-way and request/response
442 operations.

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6.1 One-way message exchange (no Callbacks)

444 A one-way message exchange is one where a request message is sent that does not require or expect a
445 corresponding response message. These are represented in WSDL as an operation with an **input**
446 element and no **output** elements and no **fault** elements.

447 For an SCA reference with a JMS binding, when a request message is sent as part of a one-way MEP,
448 the SCA runtime SHOULD NOT set the **JMSReplyTo** destination header in the JMS message that it
449 creates, regardless of whether the JMS binding has a **response** element with a **destination** defined
450 [BJM60001].

Comment [SAJH6]: Should this also say that there is no bidirectional interface?

451 For an SCA service with a JMS binding, when a request message is received as part of a one-way MEP,
452 the SCA runtime MUST ignore the **JMSReplyTo** destination header in the JMS message, and not raise
453 an error [BJM60002].

454 The use of one-way exchanges when using a bidirectional interface is described in section 6.4.

Deleted: When a request message is sent by a reference with a JMS binding for a one-way MEP, the SCA runtime SHOULD NOT set the **JMSReplyTo** destination header in the JMS message that it creates, regardless of whether the JMS binding has a **response** element with a **destination** defined. ¶
When a request message is received by a service with a JMS binding for a one-way MEP, the SCA runtime MUST ignore the **JMSReplyTo** destination header in the JMS message, and MUST NOT raise an error. ¶

6.2 Request/response message exchange (no Callbacks)

456 A request/response message exchange is one where a request message is sent and a response
457 message is expected, possibly identified by its correlation identifier. These are represented in WSDL as
458 an operation with an **input** element and an **output** and/or a **fault** element.

459 For an SCA reference with a JMS binding, when a request message is sent as part of a request/response
460 MEP, the SCA runtime MUST set a non-null value for the **JMSReplyTo** header in the JMS message it
461 creates for the request [BJM60003].

462 For an SCA reference with a JMS binding, when a request message is sent as part of a request/response
463 MEP, and the JMS binding has a **response** element with a **destination** defined, then the SCA runtime
464 MUST use that destination for the **JMSReplyTo** header in the JMS message it creates for the request
465 [BJM60004].

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Comment [SAJH7]: This now looks like it just reiterates the following two items.

466 For an SCA reference with a JMS binding, when a request message is sent as part of a request/response
467 MEP, and the JMS binding does not have a **response** element with a **destination** defined, the SCA
468 runtime MUST provide an appropriate destination on which to receive response messages and use that
469 destination for the **JMSReplyTo** header in the JMS message it creates for the request [BJM60005].

470 For an SCA reference with a JMS binding, the SCA runtime MAY choose to receive response messages
471 on the basis of their correlation ID as defined by the binding's **@correlationScheme** attribute, or use a
472 unique destination for each response [BJM60006].

473 For an SCA service with a JMS binding, when a response message is sent as part of a request/response
474 MEP where the request message included a non-null **JMSReplyTo** destination, the SCA runtime MUST
475 send the response message to that destination [BJM60007].

476 For an SCA service with a JMS binding, when a response message is sent as part of a request/response
477 MEP where the request message included a null **JMSReplyTo** destination and the JMS binding includes
478 a **response/destination** element the SCA runtime MUST send the response message to that destination
479 [BJM60008].

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480 For an SCA service with a JMS binding, when a response message is sent as part of a request/response
481 MEP where the request message included a null **JMSReplyTo** destination and the JMS binding does not
482 include a **response/destination** then an error SHOULD be raised by the SCA runtime [BJM60009].

483 For an SCA service with a JMS binding, when a response message is sent as part of a request/response
484 MEP the SCA runtime MUST set the correlation identifier in the JMS message that it creates for the
485 response as defined by the JMS binding's **@correlationScheme** attribute [BJM60010].

486 The use of request/response exchanges when using a bidirectional interface is described in section 6.4.

487 6.3 JMS User Properties

488 This protocol assigns specific behavior to JMS user properties:

- 489 • "**scaCallbackDestination**" holds the name of the JMS Destination to which callback messages are
490 sent.

491 6.4 Callbacks

492 Callbacks are SCA's way of representing bidirectional interfaces, where messages are sent in both
493 directions between a client and a service. A callback is the invocation of an operation on a service's
494 callback interface. A callback operation can be one-way or request/response. Messages that correspond
495 to one-way or request/response operations on a bidirectional interface use either the
496 **scaCallbackDestination** user property or the **JMSReplyTo** destination, or both, to identify the
497 destination to which messages are to be sent when operations are invoked on the callback interface. The
498 use of **JMSReplyTo** for this purpose is to enable interaction with non-SCA JMS applications, as
499 described below.

500 SCA runtimes MUST follow the behavior described in section 6.4 and its subsections when **binding.jms**
501 is used in both the forward and callback directions [BJM60018].

502 SCA runtimes can use different bindings for forward calls and callbacks, however the behavior and
503 requirements on messages is vendor-specific.

504 6.4.1 Invocation of operations on a bidirectional interface

505 **Error! Reference source not found.** [BJM60011].

506 For an SCA reference with a JMS binding and bidirectional interface, when a request message is sent the
507 SCA runtime MAY set the **JMSReplyTo** destination to the same value as the **scaCallbackDestination**
508 user property [BJM60012].

509 For an SCA reference with a JMS binding and bidirectional interface, when a request message is sent as
510 part of a request/response MEP, the SCA runtime MUST set the **JMSReplyTo** header in the message it
511 creates as described in section 6.2 [BJM60013].

512 For both one-way and request/response operations, the reference's callback service can be used to
513 identify the destination to which callback messages are to be sent.

514 For an SCA reference with a JMS binding and bidirectional interface, the SCA runtime MUST identify the
515 callback destination from the reference's callback service binding if present, or supply a suitable callback
516 destination if not present [BJM60014].

517 6.4.2 Invocation of operations on a callback interface

518 An SCA service with a callback interface can invoke operations on that callback interface by sending
519 messages to the destination identified by the **scaCallbackDestination** user property in a message that it
520 has received, the **JMSReplyTo** destination of a one-way message that it has received, or the destination
521 identified by the service's callback reference JMS binding.

522 For an SCA service with a JMS binding, the **callback destination** is identified as follows, in order of
523 priority:

- 524 • The **scaCallbackDestination** identified by an earlier request, if not null;

Deleted: When a request message is sent by a reference with a JMS binding for a request/response MEP, the SCA runtime MUST set a non-null value for the **JMSReplyTo** header in the JMS message it creates for the request. If the JMS binding has a **response** element with a **destination** defined, then the SCA runtime MUST use that destination for the **JMSReplyTo** header value, otherwise the SCA runtime MUST provide an appropriate destination on which to receive response messages. The SCA runtime MAY choose to receive the response message on the basis of its correlation ID as defined by the binding's **@correlationScheme** attribute, or use a unique destination for each response.¶ [69]

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<#>"scaConversations" ... [70]

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Deleted: element with a JMS binding with a request ... [74]

Deleted: , otherwise the SCA runtime MUST provide { ... [75]

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Deleted: When a callback request message is sent by a

Deleted: for either a one-way or request/response MEP

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- 525 • the **JMSReplyTo** destination identified by an earlier one-way request, if not null;
- 526 • the request destination of the service's callback reference JMS binding, if specified.

527 **For an SCA service with a JMS binding, when a callback request message is sent for either a one-way or**
 528 **request/response MEP, the SCA runtime MUST send the callback request message to the callback**
 529 **destination. [BJM60015].**

530 **For an SCA service with a JMS binding, when a callback request message is sent and no callback**
 531 **destination can be identified then the SCA runtime SHOULD raise an error, and MUST throw an**
 532 **exception to the caller of the callback operation [BJM60016].**

533 **For an SCA service with a JMS binding, when a callback request message is sent the SCA runtime**
 534 **MUST set the *JMSReplyTo* destination and correlation identifier in the callback request message as**
 535 **defined in sections 6.1 or 6.2 as appropriate for the type of the callback operation invoked [BJM60017].**

536 6.4.3 Use of JMSReplyTo for callbacks for non-SCA JMS applications

537 When interacting with non-SCA JMS applications, the assembler can choose to model a
 538 request/response message exchange using a bidirectional interface. In this case it is likely that the non-
 539 SCA JMS application does not support the use of the **scaCallbackDestination** user property. To support
 540 this, for one-way messages the **JMSReplyTo** header can be used to identify the destination to be used to
 541 deliver callback messages, as described in sections Q and Q.

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Deleted: If no destination is identified then the SCA runtime SHOULD raise an error, and MUST throw an exception to the caller of the callback operation. ¶
 The SCA runtime MUST set the **JMSReplyTo** destination and correlation identifier in the callback request message as defined in sections 7.1 or 7.2 as appropriate for the type of the callback operation invoked. ¶

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Deleted: <#>Conversations ¶
 A conversation is a sequence of operations between two parties that have a common context. The conversation can include a mixture of operations in either direction between the two parties, if the interface is also bidirectional. Interfaces are marked as conversational in order to ensure that the runtime manages the lifecycle of this context. Component implementation specifications define the manner in which the context that is associated with the conversation identifier is made available to component implementations. ¶

<#>Starting a conversation ¶
 A conversation is started when an operation is invoked on a conversational interface and there is no active conversation with the target of the invocation. When this happens the SCA runtime MUST supply an identifier for the conversation, if the client component has not already supplied an identifier, and the SCA runtime MUST set the **scaConversationStart** user property to this value in the JMS message that it sends for the request, and associate a new runtime context with this conversation identifier. ¶
 When a message is received that contains a value for the **scaConversationStart** user property, the SCA runtime MUST associate a new runtime context with the given conversation identifier. ¶
 The SCA runtime MAY include in the message that starts the conversation the **scaConversationMaxl**(... [76]

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543 7 Examples

544 The following snippets show the *sca.composite* file for the *MyValueComposite* file containing the
545 **service** element for the *MyValueService* and a **reference** element for the *StockQuoteService*. Both the
546 service and the reference use a JMS binding.

547 7.1 Minimal Binding Example

548 The following example shows the JMS binding being used with no further attributes or elements. In this
549 case, it is left to the deployer to identify the resources to which the binding is connected.

```
550 <?xml version="1.0" encoding="ASCII"?>  
551 <composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"  
552         name="MyValueComposite">  
553  
554     <service name="MyValueService">  
555         <interface.java interface="services.myvalue.MyValueService"/>  
556         <binding.jms/>  
557     </service>  
558  
559     <reference name="StockQuoteService">  
560         <interface.java interface="services.stockquote.StockQuoteService"/>  
561         <binding.jms/>  
562     </reference>  
563 </composite>
```

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564 7.2 URI Binding Example

565 The following example shows the JMS binding using the *@uri* attribute to specify the connection type and
566 its information:

```
567 <?xml version="1.0" encoding="ASCII"?>  
568 <composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"  
569         name="MyValueComposite">  
570  
571     <service name="MyValueService">  
572         <interface.java interface="services.myvalue.MyValueService"/>  
573         <binding.jms uri="jms:MyValueServiceQueue?  
574             activationSpecName=MyValueServiceAS&  
575             ... "/>  
576     </service>  
577  
578     <reference name="StockQuoteService">  
579         <interface.java interface="services.stockquote.StockQuoteService"/>  
580         <binding.jms uri="jms:StockQuoteServiceQueue?  
581             connectionFactoryName=StockQuoteServiceQCF&  
582             deliveryMode=1&  
583             ... "/>  
584     </reference>  
585 </composite>
```

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586 7.3 Binding with Existing Resources Example

587 The following example shows the JMS binding using existing resources:

```
588 <?xml version="1.0" encoding="ASCII"?>  
589 <composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"  
590         name="MyValueComposite">  
591  
592     <service name="MyValueService">
```

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```
<interface.java interface="services.myvalue.MyValueService"/>
<binding.jms>
  <destination jndiName="MyValueServiceQ" create="never"/>
  <activationSpec jndiName="MyValueServiceAS" create="never"/>
</binding.jms>
</service>
</composite>
```

Comment [SAJH10]: Is there a more realistic example of a JNDI name?

600 7.4 Resource Creation Example

601 The following example shows the JMS binding providing information to create JMS resources rather than
602 using existing ones:

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```
<?xml version="1.0" encoding="ASCII"?>
<composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"
  name="MyValueComposite">

  <service name="MyValueService">
    <interface.java interface="services.myvalue.MyValueService"/>
    <binding.jms>
      <destination jndiName="MyValueServiceQueue" create="always">
        <property name="prop1" type="string">XYZ</property>
        <property name="destName" type="string">MyValueDest</property>
      </destination>
      <activationSpec jndiName="MyValueServiceAS" create="always"/>
      <resourceAdapter jndiName="com.example.JMSRA"/>
    </binding.jms>
  </service>

  <reference name="StockQuoteService">
    <interface.java interface="services.stockquote.StockQuoteService"/>
    <binding.jms>
      <destination jndiName="StockQuoteServiceQueue"/>
      <connectionFactory jndiName="StockQuoteServiceQCF"/>
      <resourceAdapter name="com.example.JMSRA"/>
    </binding.jms>
  </reference>
</composite>
```

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628 7.5 Request/Response Example

629 The following example shows the JMS binding using existing resources to support request/response
630 operations. The service uses the **JMSReplyTo** destination to send response messages, and does not
631 specify a response queue:

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648
649

```
<?xml version="1.0" encoding="ASCII"?>
<composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"
  name="MyValueComposite">

  <service name="MyValueService">
    <interface.java interface="services.myvalue.MyValueService"/>
    <binding.jms correlationScheme="sca:messageId">
      <destination jndiName="MyValueServiceQ" create="never"/>
      <activationSpec jndiName="MyValueServiceAS" create="never"/>
    </binding.jms>
  </service>

  <reference name="StockQuoteService">
    <interface.java interface="services.stockquote.StockQuoteService"/>
    <binding.jms correlationScheme="sca:messageId">
      <destination jndiName="StockQuoteServiceQueue"/>
      <connectionFactory jndiName="StockQuoteServiceQCF"/>
      <response>

```

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```
<destination jndiName="MyValueResponseQueue"/>
<activationSpec jndiName="MyValueResponseAS"/>
</response>
</binding.jms>
</reference>
</composite>
```

656 7.6 Use of Predefined Definitions Example

657 This example shows the case where there is common connection information shared by more than one
658 reference.

659 The common connection information is defined in a separate definitions file:

660
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667

```
<?xml version="1.0" encoding="ASCII"?>
<definitions targetNamespace="http://acme.com"
  xmlns="http://docs.oasis-open.org/ns/opencsa/sca/2007903">
  <binding.jms name="StockQuoteService">
    <destination jndiName="StockQuoteServiceQueue" create="never"/>
    <connectionFactory jndiName="StockQuoteServiceQCF" create="never"/>
  </binding.jms>
</definitions>
```

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668 Any *binding.jms* element may then refer to that definition:

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674
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```
<?xml version="1.0" encoding="ASCII"?>
<composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"
  xmlns:acme="http://acme.com"
  name="MyValueComposite">
  <reference name="MyValueService">
    <interface.java interface="services.myvalue.MyValueService"/>
    <binding.jms requestConnection="acme:StockQuoteService"/>
  </reference>
</composite>
```

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678 7.7 Subscription with Selector Example

679 The following example shows how the JMS binding is used in order to consume messages from existing
680 JMS infrastructure. The JMS binding subscribes using selector:

681
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```
<?xml version="1.0" encoding="ASCII"?>
<composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"
  name="MyValueComposite">
  <service name="MyValueService">
    <interface.java interface="services.myvalue.MyValueService"/>
    <binding.jms>
      <destination jndiName="MyValueServiceTopic" create="never"/>
      <connectionFactory jndiName="StockQuoteServiceTCF"
        create="never"/>
      <messageSelection selector="Price>1000"/>
    </binding.jms>
  </service>
</composite>
```

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ers JMSSelector

694 7.8 Policy Set Example

695 A policy set defines the manner in which intents map to JMS binding properties. The following illustrates
696 an example of a policy set that defines values for the *@priority* attribute using the *"priority"* intent, and
697 also allows setting of a value for a user JMS property using the *"log"* intent.

698
699
700

```
<policySet name="JMSPolicy"
  provides="priority log"
  appliesTo="binding.jms">
```

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```
<intentMap provides="priority" default="medium">  
  <qualifier name="high">  
    <headers priority="9"/>  
  </qualifier>  
  <qualifier name="medium">  
    <headers priority="4"/>  
  </qualifier>  
  <qualifier name="low">  
    <headers priority="0"/>  
  </qualifier>  
</intentMap>  
  
<intentMap provides="log">  
  <qualifier>  
    <headers>  
      <property name="user_example_log">logged</property>  
    </headers>  
  </qualifier>  
</intentMap>  
</policySet>
```

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Deleted: JMSPriority
Deleted: JMSPriority

722 Given this policy set, the intents can be required on a service or reference:

723
724
725
726
727
728
729

```
<reference name="StockQuoteService" requires="priority.high log">  
  <interface.java interface="services.stockquote.StockQuoteService"/>  
  <binding.jms>  
    <destination name="StockQuoteServiceQueue"/>  
    <connectionFactory name="StockQuoteServiceQCF"/>  
  </binding.jms>  
</reference>
```

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730

8 Conformance

731

Any SCA runtime that claims to support this binding MUST abide by the requirements of this specification [BJM80001].

732

733

Conformance to this specification requires conformance to the SCA Assembly and SCA Policy specifications

734

735

The XML schema available at the namespace URI, defined by this specification, is considered to be authoritative and takes precedence over the XML Schema defined in the appendix of this document.

736

737

Within this specification, the following conformance targets are used:

738

• XML document elements and attributes, including *binding.jms* and its children, and *bindingType*

739

• The SCA runtime – this refers to the implementation that provides the functionality to support the SCA specifications, including that specific to the JMS binding as well as other SCA capabilities

740

741

• JMS objects, including Destinations, ConnectionFactories and ActivationSpecs

742

• WSDL documents

Deleted: Any SCA runtime that claims to support this binding MUST abide by the requirements of this specification.¶

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A. JMS Binding Schema

744	<?xml version="1.0" encoding="UTF-8"?>	
745	<!-- Copyright (C) OASIS (R) 2005, 2009. All Rights Reserved.	Deleted: (c)
746	OASIS trademark, IPR and other policies apply. -->	Deleted: 2006, 2008
747	<schema xmlns="http://www.w3.org/2001/XMLSchema"	
748	targetNamespace="http://docs.oasis-open.org/ns/opencsa/sca/200903"	Deleted: 200712
749	xmlns:sca="http://docs.oasis-open.org/ns/opencsa/sca/200903"	Deleted: 200712
750	elementFormDefault="qualified">	
751		
752	<include schemaLocation="sca-core-1.1-cd03.xsd"/>	
753		
754	<complexType name="JMSBinding">	
755	<complexContent>	
756	<extension base="sca:Binding">	
757	<sequence>	
758	<element name="destination" type="sca:JMSDestination"	Deleted: <sequence> ¶
759	minOccurs="0"/>	<element name="destination" type="sca:JMSDestination"/> ¶
760	<choice minOccurs="0" maxOccurs="1">	Deleted: </sequence> ¶
761	<element name="connectionFactory"	<sequence> ¶
762	type="sca:JMSConnectionFactory"/>	<element name="destination" type="sca:JMSDestination" minOccurs="0"/> ¶
763	<element name="activationSpec" type="sca:JMSActivationSpec"/>	Deleted: </sequence> ¶
764	</choice>	<sequence> ¶
765	<element name="response" type="sca:JMSResponse" minOccurs="0"/>	<element name="destination" type="sca:JMSDestination" minOccurs="0"/> ¶
766	<element name="headers" type="sca:JMSHeaders" minOccurs="0"/>	Deleted: </sequence> ¶
767	<element name="messageSelection" type="sca:JMSMessageSelection"	<sequence> ¶
768	minOccurs="0"/>	<element name="destination" type="sca:JMSDestination" minOccurs="0"/> ¶
769	<element name="resourceAdapter" type="sca:JMSResourceAdapter"	Deleted: </sequence> ¶
770	minOccurs="0"/>	<sequence> ¶
771	<element name="operationProperties"	<element name="destination" type="sca:JMSDestination" minOccurs="0"/> ¶
772	type="sca:JMSOperationProperties"	Deleted: </sequence> ¶
773	minOccurs="0" maxOccurs="unbounded"/>	<sequence> ¶
774	<any namespace="##other" processContents="lax"	<element name="destination" type="sca:JMSDestination" minOccurs="0"/> ¶
775	minOccurs="0" maxOccurs="unbounded"/>	Deleted: ¶
776	</sequence>	</sequence> ¶
777	<attribute name="correlationScheme" type="QName"	Deleted: ¶
778	default="sca:messageId"/>	</sequence> ¶
779	<attribute name="initialContextFactory" type="anyURI"/>	Deleted: subscriptionHeaders "
780	<attribute name="jndiURL" type="anyURI"/>	Deleted: type="sca:JMSSubscriptionHeaders" ¶
781	<attribute name="requestConnection" type="QName"/>	Deleted: ="
782	<attribute name="responseConnection" type="QName"/>	Deleted: "
783	<attribute name="operationProperties" type="QName"/>	Deleted: MessageId
784	<anyAttribute/>	Deleted: ifnotexist
785	</extension>	
786	</complexContent>	
787	</complexType>	
788		
789	<simpleType name="JMSCreateResource">	
790	<restriction base="string">	
791	<enumeration value="always"/>	
792	<enumeration value="never"/>	
793	<enumeration value="ifNotExist"/>	
794	</restriction>	
795	</simpleType>	
796		
797	<complexType name="JMSDestination">	
798	<sequence>	
799	<element name="property" type="sca:BindingProperty"	Deleted: 1-rev4 . .
800	minOccurs="0" maxOccurs="unbounded"/>	Deleted: 21 st January
801	</sequence>	Deleted: 2008.
802	<attribute name="jndiName" type="anyURI" use="required"/>	

```

803 <attribute name="type" use="optional" default="queue">
804 <simpleType>
805 <restriction base="string">
806 <enumeration value="queue"/>
807 <enumeration value="topic"/>
808 </restriction>
809 </simpleType>
810 </attribute>
811 <attribute name="create" type="sca:JMSCreateResource"
812 use="optional" default="ifNotExist"/>
813 </complexType>
814
815 <complexType name="JMSConnectionFactory">
816 <sequence>
817 <element name="property" type="sca:BindingProperty"
818 minOccurs="0" maxOccurs="unbounded"/>
819 </sequence>
820 <attribute name="jndiName" type="anyURI" use="required"/>
821 <attribute name="create" type="sca:JMSCreateResource"
822 use="optional" default="ifNotExist"/>
823 </complexType>
824
825 <complexType name="JMSActivationSpec">
826 <sequence>
827 <element name="property" type="sca:BindingProperty"
828 minOccurs="0" maxOccurs="unbounded"/>
829 </sequence>
830 <attribute name="jndiName" type="anyURI" use="required"/>
831 <attribute name="create" type="sca:JMSCreateResource"
832 use="optional" default="ifNotExist"/>
833 </complexType>
834
835 <complexType name="JMSResponse">
836 <sequence>
837 <element name="wireFormat" type="sca:WireFormatType" minOccurs="0"/>
838 <element name="destination" type="sca:JMSDestination" minOccurs="0"/>
839 <choice minOccurs="0">
840 <element name="connectionFactory" type="sca:JMSConnectionFactory"/>
841 <element name="activationSpec" type="sca:JMSActivationSpec"/>
842 </choice>
843 </sequence>
844 </complexType>
845
846 <complexType name="JMSHeaders">
847 <sequence>
848 <element name="property" type="sca:BindingProperty"
849 minOccurs="0" maxOccurs="unbounded"/>
850 </sequence>
851 <attribute name="type" type="string"/>
852 <attribute name="deliveryMode">
853 <simpleType>
854 <restriction base="string">
855 <enumeration value="persistent"/>
856 <enumeration value="nonpersistent"/>
857 </restriction>
858 </simpleType>
859 </attribute>
860 <attribute name="timeToLive" type="long"/>
861 <attribute name="priority">
862 <simpleType>
863 <restriction base="string">
864 <enumeration value="0"/>
865 <enumeration value="1"/>
866 <enumeration value="2"/>

```

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867         <enumeration value="3"/>
868         <enumeration value="4"/>
869         <enumeration value="5"/>
870         <enumeration value="6"/>
871         <enumeration value="7"/>
872         <enumeration value="8"/>
873         <enumeration value="9"/>
874     </restriction>
875 </simpleType>
876 </attribute>
877 </complexType>
878
879 <complexType name="JMSMessageSelection">
880     <sequence>
881         <element name="property" type="sca:BindingProperty"
882             minOccurs="0" maxOccurs="unbounded"/>
883     </sequence>
884     <attribute name="selector" type="string"/>
885 </complexType>
886
887 <complexType name="JMSResourceAdapter">
888     <sequence>
889         <element name="property" type="sca:BindingProperty"
890             minOccurs="0" maxOccurs="unbounded"/>
891     </sequence>
892     <attribute name="name" type="string" use="required"/>
893 </complexType>
894
895 <complexType name="JMSOperationProperties">
896     <sequence>
897         <element name="property" type="sca:BindingProperty"
898             minOccurs="0" maxOccurs="unbounded"/>
899         <element name="headers" type="sca:JMSHeaders"/>
900     </sequence>
901     <attribute name="name" type="string" use="required"/>
902     <attribute name="nativeOperation" type="string"/>
903 </complexType>
904
905 <complexType name="BindingProperty">
906     <simpleContent>
907         <extension base="string">
908             <attribute name="name" type="NMTOKEN"/>
909             <attribute name="type" type="string" use="optional"
910                 default="xs:string"/>
911         </extension>
912     </simpleContent>
913 </complexType>
914
915 <element name="binding.jms" type="sca:JMSBinding"
916     substitutionGroup="sca:binding"/>
917
918 <element name="wireFormat.jmsDefault" type="sca:WireFormatType"
919     substitutionGroup="sca:wireFormat"/>
920
921 <element name="operationSelector.jmsDefault" type="sca:OperationSelectorType"
922     substitutionGroup="sca:operationSelector"/>
923 </schema>

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eaders

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924

B. Conformance Items

925

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

Conformance ID	Description
[BJM30001]	The value of the <i>@uri</i> attribute MUST have the format defined by the IETF URI Scheme for Java™ Message Service 1.0 [IETFJMS]
[BJM30002]	When the <i>@uri</i> attribute is specified, the SCA runtime MUST raise an error if the referenced resources do not already exist
[BJM30003]	If the value of the <i>@correlationScheme</i> attribute is " <i>sca:messageID</i> " the SCA runtime MUST set the correlation ID of replies to the message ID of the corresponding request
[BJM30004]	If the value of the <i>@correlationScheme</i> attribute is " <i>sca:correlationID</i> " the SCA runtime MUST set the correlation ID of replies to the correlation ID of the corresponding request
[BJM30005]	If the value of the <i>@correlationScheme</i> attribute is " <i>sca:none</i> " the SCA runtime MUST NOT set the correlation ID
[BJM30006]	SCA runtimes MAY allow other values of the <i>@correlationScheme</i> attribute to indicate other correlation schemes
[BJM30007]	If the <i>@requestConnection</i> attribute is specified, the <i>binding.jms</i> element MUST NOT contain a <i>destination</i> , <i>connectionFactory</i> , <i>activationSpec</i> or <i>resourceAdapter</i> element
[BJM30008]	If the <i>@responseConnection</i> attribute is specified, the <i>binding.jms</i> element MUST NOT contain a <i>response</i> element
[BJM30009]	If the <i>@operationProperties</i> attribute is specified, the <i>binding.jms</i> element MUST NOT contain an <i>operationProperties</i> element
[BJM30010]	Whatever the value of the <i>destination/@type</i> attribute, the runtime MUST ensure a single response is delivered for request/response operations
[BJM30011]	If the <i>@create</i> attribute value for a destination, connectionFactory or activationSpec element is " <i>always</i> " then the <i>@jndiName</i> attribute is optional; if the resource cannot be created at the specified location then the SCA runtime MUST raise an error
[BJM30012]	If the <i>@create</i> attribute value for a destination, connectionFactory or activationSpec element is " <i>ifNotExist</i> " then the <i>@jndiName</i> attribute MUST specify the location of the possibly existing resource
[BJM30013]	If the destination, connectionFactory or activationSpec 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
[BJM30014]	If the destination, connectionFactory or activationSpec's <i>@jndiName</i> attribute refers to an existing resource that is not a JMS Destination of the appropriate type, a JMS connection factory or a JMS activation spec respectively then the SCA runtime MUST raise an error
[BJM30015]	If the <i>@create</i> attribute value for a destination, connectionFactory or

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	activationSpec element is " never " then the @jndiName attribute MUST specify the location of the existing resource
[BJM30016]	If the destination, connection factory or activation spec 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
[BJM30017]	A binding.jms element MUST NOT include both a connectionFactory element and an activationSpec element
[BJM30018]	When the connectionFactory element is present, then the destination MUST be defined either by the destination element or the @uri attribute
[BJM30019]	If the activationSpec element is present and the destination is also specified via a destination element or the @uri attribute then it MUST refer to the same JMS destination as the activationSpec
[BJM30020]	The activationSpec element MUST NOT be present when the binding is being used for an SCA reference
[BJM30021]	A response element MUST NOT include both a connectionFactory element and an activationSpec element
[BJM30022]	If a response/destination and response/activationSpec element are both specified they MUST refer to the same JMS destination
[BJM30023]	The response/activationSpec element MUST NOT be present when the binding is being used for an SCA service
[BJM30024]	The SCA runtime MUST set JMS headers in messages that it creates to the values specified by the headers element unless overridden for the operation being invoked.
[BJM30025]	If the @uri attribute includes values for the type, delivery mode, time to live or priority properties then the @uri values are used and the @type , @deliveryMode , @timeToLive or @priority attributes are ignored
[BJM30026]	For each header/properties element the SCA runtime MUST set the named JMS user property to the given value in messages it creates unless overridden for the operation being invoked
[BJM30027]	If the @uri attribute includes a value for the message selector then the @uri value is used and the messageSelection/@selector attribute is ignored
[BJM30028]	SCA runtimes MAY place restrictions on the properties of the resource adapter Java bean that can be set using the resourceAdapter element
[BJM30029]	The value of the operationProperties/@selectedOperation attribute MUST be unique across the containing binding.jms element
[BJM30030]	The SCA runtime SHOULD make the operationProperties element corresponding to the selectedOperation available to the wireFormat implementation
[BJM30031]	The resourceAdapter element MUST be present when JMS resources are to be created for a JMS provider that implements the JCA 1.5 specification [JCA15], and is ignored otherwise
[BJM30032]	The SCA runtime MUST set JMS headers in messages it creates when the operation identified by the operationProperties/@name attribute is invoked to the values specified by the corresponding operationProperties/headers

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	element
[BJM30033]	For each operationProperties/headers/property element the SCA runtime MUST set the named JMS user property to the given value in messages it creates when the operation identified by the operationProperties/@name attribute is invoked
[BJM30034]	When the @uri attribute is specified, the destination element MUST NOT be present
[BJM30035]	An SCA runtime MUST use the values specified in the @uri attribute in preference to corresponding attributes and elements in the binding
[BJM40001]	The SCA runtime MUST support the default JMS wire format and operation selector behavior, and MAY provide additional means to override it
[BJM40002]	If no operationSelector element is specified then SCA runtimes MUST use operationSelector.jmsDefault as the default
[BJM40003]	When using the default wire format to send request messages, if there is a single parameter and the interface includes more than one operation, the SCA runtime MUST set the JMS user property " scaOperationName " to the name of the operation being invoked
[BJM40004]	If no wireFormat element is specified in a JMS binding then SCA runtimes MUST use wireFormat.jmsDefault as the default
[BJM40005]	When using the default wire format an SCA runtime MUST be able to receive both JMS text and bytes messages
[BJM40006]	When using the default wire format an SCA runtime MUST send either a JMS text or a JMS bytes message
[BJM40007]	When using the default wire format an SCA runtime MAY provide additional configuration to allow selection between JMS text or bytes messages to be sent
[BJM40008]	When a binding.jms element specifies the operationSelector.jmsDefault element, the SCA runtime MUST use the default operation selection algorithm to determine the selected operation
[BJM40009]	When a binding.jms element specifies the wireFormat.jmsDefault element, the SCA runtime MUST use the default wire format
[BJM60001]	For an SCA reference with a JMS binding, when a request message is sent as part of a one-way MEP, the SCA runtime SHOULD NOT set the JMSReplyTo destination header in the JMS message that it creates, regardless of whether the JMS binding has a response element with a destination defined
[BJM60002]	For an SCA service with a JMS binding, when a request message is received as part of a one-way MEP, the SCA runtime MUST ignore the JMSReplyTo destination header in the JMS message, and not raise an error
[BJM60003]	For an SCA reference with a JMS binding, when a request message is sent as part of a request/response MEP, the SCA runtime MUST set a non-null value for the JMSReplyTo header in the JMS message it creates for the request
[BJM60004]	For an SCA reference with a JMS binding, when a request message is sent as part of a request/response MEP, and the JMS binding has a response element with a destination defined, then the SCA runtime MUST use that destination for the JMSReplyTo header in the JMS message it creates for the

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	request
[BJM60005]	For an SCA reference with a JMS binding, when a request message is sent as part of a request/response MEP, and the JMS binding does not have a response element with a destination defined, the SCA runtime MUST provide an appropriate destination on which to receive response messages and use that destination for the JMSReplyTo header in the JMS message it creates for the request
[BJM60006]	For an SCA reference with a JMS binding, the SCA runtime MAY choose to receive response messages on the basis of their correlation ID as defined by the binding's @correlationScheme attribute, or use a unique destination for each response
[BJM60007]	For an SCA service with a JMS binding, when a response message is sent as part of a request/response MEP where the request message included a non-null JMSReplyTo destination, the SCA runtime MUST send the response message to that destination
[BJM60008]	For an SCA service with a JMS binding, when a response message is sent as part of a request/response MEP where the request message included a null JMSReplyTo destination and the JMS binding includes a response/destination element the SCA runtime MUST send the response message to that destination
[BJM60009]	For an SCA service with a JMS binding, when a response message is sent as part of a request/response MEP where the request message included a null JMSReplyTo destination and the JMS binding does not include a response/destination then an error SHOULD be raised by the SCA runtime
[BJM60010]	For an SCA service with a JMS binding, when a response message is sent as part of a request/response MEP the SCA runtime MUST set the correlation identifier in the JMS message that it creates for the response as defined by the JMS binding's @correlationScheme attribute
[BJM60011]	For an SCA reference with a JMS binding and a bidirectional interface, when a request message is sent the SCA runtime MUST set the destination to which callback messages are to be sent as the value of the scaCallbackDestination user property in the message it creates
[BJM60012]	For an SCA reference with a JMS binding and bidirectional interface, when a request message is sent the SCA runtime MAY set the JMSReplyTo destination to the same value as the scaCallbackDestination user property
[BJM60013]	For an SCA reference with a JMS binding and bidirectional interface, when a request message is sent as part of a request/response MEP, the SCA runtime MUST set the JMSReplyTo header in the message it creates as described in section 6.2
[BJM60014]	For an SCA reference with a JMS binding and bidirectional interface, the SCA runtime MUST identify the callback destination from the reference's callback service binding if present, or supply a suitable callback destination if not present
[BJM60015]	For an SCA service with a JMS binding, when a callback request message is sent for either a one-way or request/response MEP, the SCA runtime MUST send the callback request message to the callback destination.
[BJM60016]	For an SCA service with a JMS binding, when a callback request message is sent and no callback destination can be identified then the SCA runtime

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	SHOULD raise an error, and MUST throw an exception to the caller of the callback operation
[BJM60017]	For an SCA service with a JMS binding, when a callback request message is sent the SCA runtime MUST set the <i>JMSReplyTo</i> destination and correlation identifier in the callback request message as defined in sections 6.1 or 6.2 as appropriate for the type of the callback operation invoked
[BJM60018]	SCA runtimes MUST follow the behavior described in section 6.4 and its subsections when <i>binding.jms</i> is used in both the forward and callback directions
[BJM80001]	Any SCA runtime that claims to support this binding MUST abide by the requirements of this specification

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927

C. Acknowledgements

928 The following individuals have participated in the creation of this specification and are gratefully
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930 **Participants:**

<u>Participant Name</u>	<u>Affiliation</u>
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Khanderao Kand	Oracle Corporation
Anish Karmarkar	Oracle Corporation
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Prasad Yendluri	Software AG, Inc.

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D. Revision History

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

935

Revision	Date	Editor	Changes Made
1	2007-09-25	Anish Karmarkar	Applied the OASIS template + related changes to the Submission
2	2008-03-12	Simon Holdsworth	Updated text for RFC2119 conformance Updates to resolve following issues: BINDINGS-1 BINDINGS-5 BINDINGS-6 BINDINGS-12 BINDINGS-14 BINDINGS-18 BINDINGS-26 Applied updates discussed at Bindings TC meeting of 27 th March
3	2008-06-19	Simon Holdsworth	* Applied most of the editorial changes from Eric Johnson's review
cd01	2008-08-01	Simon Holdsworth	Updates to resolve following issues: BINDINGS-13 (JMS part) BINDINGS-20 (complete) BINDINGS-30 (JMS part) BINDINGS-32 (JMS part) BINDINGS-33 (complete) BINDINGS-34 (complete) BINDINGS-35 (complete) BINDINGS-38 (JMS part)
cd01-rev1	2008-10-16	Simon Holdsworth	Updated text for RFC2119 conformance throughout Updates to resolve following issues: BINDINGS-41 BINDINGS-46 BINDINGS-47
cd01-rev2	2008-12-01	Simon Holdsworth	Added comments identifying those updates that relate to RFC2119 language (issue 52)
cd01-rev3	2008-12-02	Simon Holdsworth	Final RFC2119 language updates BINDINGS-52
cd01-rev4	2009-01-09	Simon Holdsworth	Updates to resolve following issues:

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			BINDINGS-7 BINDINGS-31 BINDINGS-40 BINDINGS-42 BINDINGS-44 BINDINGS-50
cd02	2009-02-16	Simon Holdsworth	Rename and editorial updates
cd02-rev1	2009-05-22	Simon Holdsworth	Updates to resolve issue BINDINGS-62 (conformance statement numbering) Updated assembly namespace to 200903 Fixed errors in schema
cd02-rev2	2009-05-22	Simon Holdsworth	Updates to resolve following issues: BINDINGS-39 BINDINGS-59 BINDINGS-65 BINDINGS-66 BINDINGS-67 BINDINGS-68 BINDINGS-70 BINDINGS-71
cd02-rev3	2009-06-18	Simon Holdsworth	Editorial concerns addressed Added acknowledgements appendix

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[3 JMS Binding Schema.....](#)

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4 [Operation Selectors and Wire Formats](#).....

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[4.1 Default Operation Selection](#)

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[6](#).....[Message Exchange Patterns](#)

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[6.1 One-way message exchange \(no Callbacks\)](#)

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[6.2 Request/response message exchange \(no Callbacks\)](#)

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[6.3 JMS User Properties](#)

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[6.4.1 Invocation of operations on a bidirectional interface](#)

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[6.4.2 Invocation of operations on a callback interface](#)

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[6.4.3 Use of JMSReplyTo for callbacks for non-SCA JMS applications](#)

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[6.5.1 Starting a conversation](#)

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[6.5.2 Continuing a conversation](#)

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- . Possible values for the **@correlationScheme** attribute are "**sca:MessageID**" (the default) where the SCA runtime MUST set the correlation ID of replies to the message ID of the corresponding request; "**sca:CorrelationID**" where the SCA runtime MUST set the correlation ID of replies to the correlation ID of the corresponding request, and "**sca:None**" which indicates that the SCA runtime MUST NOT set the correlation ID. SCA runtimes MAY allow other values to indicate other correlation schemes

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that the SCA runtime MUST set to the given values for all operations.

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JMSType, @JMSDeliveryMode, @JMSTimeToLive, @JMSPriority

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- . The value of the **@uri** attribute MUST NOT include values for these properties if they are specified using these attributes.

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JMSDeliveryMode are "**PERSISTENT**" and "**NON_PERSISTENT**"

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The value of the **@uri** attribute MUST NOT include values for this property if it is specified using this attribute

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When a request message is sent by a reference with a JMS binding for a request/response MEP, the SCA runtime MUST set a non-null value for the **JMSReplyTo** header in the JMS message it creates for the request. If the JMS binding has a **response** element with a **destination** defined, then the SCA runtime MUST use that destination for the **JMSReplyTo** header value, otherwise the SCA runtime MUST provide an appropriate destination on which to receive response messages. The SCA runtime MAY choose to receive the response message on the basis of its correlation ID as defined by the binding's **@correlationScheme** attribute, or use a unique destination for each response.

When a response message is sent by a service with a JMS binding for a request/response MEP, the SCA runtime MUST send the response message to the destination identified by the request message's **JMSReplyTo** header value if it is not null, otherwise the SCA runtime MUST send the response message to the destination identified by the JMS binding's **response** element if specified. If there is no destination defined by either means then an error SHOULD be raised by the SCA runtime. The SCA runtime MUST set the correlation identifier in the JMS message that it creates for the response as defined by the JMS binding's **@correlationScheme** attribute.

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"**scaConversationStart**" indicates that a conversation is to be started, its value is the identifier for the conversation.

"**scaConversationMaxIdleTime**" defines the maximum time that should be allowed between operations in the conversation.

"**scaConversationId**" holds the identifier for the conversation.

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When a request message is sent by a reference with a JMS binding for a one-way MEP with a bidirectional interface, the SCA runtime MUST set the destination to which callback messages are to be sent as the value of the **scaCallbackDestination** user property in the message it creates. The SCA runtime MAY also set the **JMSReplyTo** destination to this value.

When a request message is sent by a reference with a JMS binding for a request/response MEP with a bidirectional interface, the SCA runtime MUST set the **scaCallbackDestination** user property in the message it creates to identify the destination from which it will read callback messages. The SCA runtime MUST set the **JMSReplyTo** header in the message it creates as described in section

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This conflicts with the SHOULD NOT in BJM60001.

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Is it OK to have a normative statement refer to a section in the doc?

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element with a JMS binding with a request destination, then the SCA runtime MUST use that destination as the one

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, otherwise the SCA runtime MUST provide an appropriate destination for this purpose.

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Conversations

A conversation is a sequence of operations between two parties that have a common context. The conversation can include a mixture of operations in either direction between the two parties, if the interface is also bidirectional. Interfaces are marked as conversational in order to ensure that the runtime manages the lifecycle of this context. Component implementation specifications define the manner in which the context that is associated with the conversation identifier is made available to component implementations.

Starting a conversation

A conversation is started when an operation is invoked on a conversational interface and there is no active conversation with the target of the invocation. When this happens the SCA runtime MUST supply an identifier for the conversation, if the client component has not already supplied an identifier, and the SCA runtime MUST set the **scaConversationStart** user property to this value in the JMS message that it sends for the request, and associate a new runtime context with this conversation identifier.

When a message is received that contains a value for the **scaConversationStart** user property, the SCA runtime MUST associate a new runtime context with the given conversation identifier.

The SCA runtime MAY include in the message that starts the conversation the **scaConversationMaxIdleTime** user property; if this value is not present the SCA runtime MUST derive the maximum idle time for the conversation by subtracting the current time from the value

of the **JMSExpiration** property, unless the **JMSExpiration** property value is zero, in which case the maximum idle time is unlimited.

The SCA runtime MUST consider operations invoked on or by other parties to be outside of a conversation with a given party, and MUST use different conversation identifiers if those operations are conversational.

Continuing a conversation

When creating messages for subsequent operations between the sender and receiver that are part of this conversation, the SCA runtime MUST include the **scaConversationId** user property in the JMS message, set to the conversation identifier. The SCA runtime MAY also include an updated value of the **scaConversationMaxIdleTime** property. Once a conversation has been started, the SCA runtime MUST use the initial value of the **scaCallbackDestination** user property for all messages in the conversation, and MUST ignore the value of the **scaCallbackDestination** user property in subsequent messages in the same conversation.

The SCA runtime MUST deal with messages received either containing a conversation identifier that does not correspond to a started conversation, or containing the **scaConversationStart** user property with a conversation identifier that matches an active conversation, by raising an error, and MUST NOT deliver such messages.

Ending a conversation

When an operation is invoked by either party that is marked as “**endsConversation**”, or the maximum idle time is exceeded, then the SCA runtime MUST discard the conversation identifier and associated context after the operation has been processed. The idle time is defined as the amount of time since the SCA runtime last completed processing of an operation that is part of the conversation. There may be times when one party ends the conversation before the other does. In that case if one party does invoke an operation on the other, the SCA runtime MUST NOT deliver the message and SHOULD raise an error.

The SCA runtime MAY reuse conversation identifiers. In particular, the SCA runtime does not have to guarantee unique conversation identifiers and does not have to be able to identify an ended conversation indefinitely, although it MAY do so for some period after the conversation ends. Due to the long-running nature of conversations, the SCA runtime SHOULD ensure conversation context is available across server restarts, although it MAY choose to treat a server restart as implicitly ending the conversation.