Service Component Architecture JMS Binding Specification Version 1.1

Committee Draft 03 / Public Review 01

10 July 2009

Specification URIs:

This Version:
> http://docs.oasis-open.org/opencsa/sca-bindings/sca-jmsbinding-1.1-spec-cd03.html
> http://docs.oasis-open.org/opencsa/sca-bindings/sca-jmsbinding-1.1-spec-cd03.doc
> http://docs.oasis-open.org/opencsa/sca-bindings/sca-jmsbinding-1.1-spec-cd03.pdf
> (Authoritative)

Previous Version:
> http://www.oasis-open.org/committees/download.php/31233/sca-binding-jms-1.1-spec-cd02.doc
> http://www.oasis-open.org/committees/download.php/31234/sca-binding-jms-1.1-spec-cd02.pdf
> (Authoritative)

Latest Version:
> http://docs.oasis-open.org/opencsa/sca-bindings/sca-jmsbinding-1.1-spec.html
> http://docs.oasis-open.org/opencsa/sca-bindings/sca-jmsbinding-1.1-spec.doc
> http://docs.oasis-open.org/opencsa/sca-bindings/sca-jmsbinding-1.1-spec.pdf (Authoritative)

Technical Committee:
> OASIS Service Component Architecture / Bindings (SCA-Bindings) TC

Chair(s):
> Simon Holdsworth, IBM

Editor(s):
> Simon Holdsworth, IBM
> Khanderao Kand, Oracle
> Anish Karmarkar, Oracle
> Sanjay Patil, SAP
> Piotr Przybylski, IBM

Related work:
> This specification replaces or supersedes:

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

> This specification is related to:

- OASIS Committee Draft 03, "Service Component Architecture Assembly Model Specification Version 1.1", March 2009
  http://docs.oasis-open.org/opencsa/sca-assembly/sca-assembly-1.1-spec-cd03.pdf
- OASIS Committee Draft 02, "SCA Policy Framework Version 1.1", February 2009
  http://docs.oasis-open.org/opencsa/sca-policy/sca-policy-1.1-spec-cd02.pdf

Declared XML Namespace(s):
> http://docs.oasis-open.org/ns/opencsa/sca/200903

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/.

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

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

Notices

Copyright © OASIS® 2006, 2009. All Rights Reserved.

All capitalized terms in the following text have the meanings assigned to them in the OASIS Intellectual Property Rights Policy (the "OASIS IPR Policy"). The full Policy may be found at the OASIS website.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published, and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this section are included on all such copies and derivative works. However, this document itself may not be modified in any way, including by removing the copyright notice or references to OASIS, except as needed for the purpose of developing any document or deliverable produced by an OASIS Technical Committee (in which case the rules applicable to copyrights, as set forth in the OASIS IPR Policy, must be followed) or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by OASIS or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and OASIS DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY OWNERSHIP RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

OASIS requests that any OASIS Party or any other party that believes it has patent claims that would necessarily be infringed by implementations of this OASIS Committee Specification or OASIS Standard, to notify OASIS TC Administrator and provide an indication of its willingness to grant patent licenses to such patent claims in a manner consistent with the IPR Mode of the OASIS Technical Committee that produced this specification.

OASIS invites any party to contact the OASIS TC Administrator if it is aware of a claim of ownership of any patent claims that would necessarily be infringed by implementations of this specification by a patent holder that is not willing to provide a license to such patent claims in a manner consistent with the IPR Mode of the OASIS Technical Committee that produced this specification. OASIS may include such claims on its website, but disclaims any obligation to do so.

OASIS takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; neither does it represent that it has made any effort to identify any such rights. Information on OASIS' procedures with respect to rights in any document or deliverable produced by an OASIS Technical Committee can be found on the OASIS website. Copies of claims of rights made available for publication and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this OASIS Committee Specification or OASIS Standard, can be obtained from the OASIS TC Administrator. OASIS makes no representation that any information or list of intellectual property rights will at any time be complete, or that any claims in such list are, in fact, Essential Claims.

The names "OASIS", [insert specific trademarked names and abbreviations here] are trademarks of OASIS, the owner and developer of this specification, and should be used only to refer to the organization and its official outputs. OASIS welcomes reference to, and implementation and use of, specifications, while reserving the right to enforce its marks against misleading uses. Please see http://www.oasis-open.org/who/trademark.php for above guidance.

Table of Contents

1 Introduction

This document defines the concept and behavior of a messaging binding, and a concrete Java Message Service [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.

1.1 Terminology

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

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

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

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]	Java™ Message Service Specification v1.1 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]	J2EE Connector Architecture Specification Version 1.5 http://java.sun.com/j2ee/connector/

32 33 34	**[IETFJMS]**	M. Phillips, P. Easton, D. Rokicki, E. Johnson, *URI Scheme for Java™ Message Service 1.0* http://www.ietf.org/id/draft-merrick-jms-uri-06.txt, IETF Internet-Draft June 2009[1]
35 36 37 38	**[SCA-Assembly]**	OASIS Committee Draft 03, "Service Component Architecture Assembly Model Specification Version 1.1", March 2009 http://docs.oasis-open.org/opencsa/sca-assembly/sca-assembly-1.1-spec-cd03.pdf
39 40 41	**[SCA-Policy]**	OASIS Committee Draft 02, "SCA Policy Framework Specification Version 1.1", February 2009 http://docs.oasis-open.org/opencsa/sca-policy/sca-policy-1.1-spec-cd02.pdf

1.3 Non-Normative References

43 **TBD**   TBD

1.4 Naming Conventions

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

48 • Where the names of elements and attributes consist partially or wholly of acronyms, the letters of the
49   acronyms use the same case. When the acronym appears at the start of the name of an element or
50   an attribute, or after a period, it is in lower case. If it appears elsewhere in the name of an element or
51   an attribute, it is in upper case. For example, an attribute might be named "uri" or "jndiURL".

52 • Where the names of types consist partially or wholly of acronyms, the letters of the acronyms are in
53   all upper case. For example, an XML Schema type might be named "JCABinding" or "MessageID".

54 • Values, including local parts of QName values, follow the rules for names of elements and attributes
55   as stated above, with the exception that the letters of acronyms are in all upper case. For example, a
56   value might be "JMSDefault" 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

2 Messaging Bindings

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

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

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

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

3 JMS Binding Schema

The JMS binding element is defined by the following schema.

```
<binding.jms correlationScheme="QName"?
             initialContextFactory="xs:anyURI"?
             jndiURL="xs:anyURI"?
             requestConnection="QName"?
             responseConnection="QName"?
             operationProperties="QName"?
             name="NCName"?
             requires="list of QName"?
             policySets="list of QName"?
             uri="xs:anyURI"? >
    <destination jndiName="xs:anyURI" type="queue or topic"?
                 create="always or never or ifNotExist"?>
        <property name="NMTOKEN" type="NMTOKEN"?>*
    </destination>?
    <connectionFactory jndiName="xs:anyURI"
                       create="always or never or ifNotExist"?>
        <property name="NMTOKEN" type="NMTOKEN"?>*
    </connectionFactory>?
    <activationSpec jndiName="xs:anyURI"
                    create="always or never or ifNotExist"?>
        <property name="NMTOKEN" type="NMTOKEN"?>*
    </activationSpec>?

    <response>
        <destination jndiName="xs:anyURI" type="queue or topic"?
                     create="always or never or ifNotExist"?>
            <property name="NMTOKEN" type="NMTOKEN"?>*
        </destination>?
        <connectionFactory jndiName="xs:anyURI"
                           create="always or never or ifNotExist"?>
            <property name="NMTOKEN" type="NMTOKEN"?>*
        </connectionFactory>?
        <activationSpec jndiName="xs:anyURI"
                        create="always or never or ifNotExist"?>
            <property name="NMTOKEN" type="NMTOKEN"?>*
        </activationSpec>?
        <wireFormat/>?
    </response>?

    <resourceAdapter name="NMTOKEN">?
        <property name="NMTOKEN" type="NMTOKEN"?>*
    </resourceAdapter>?

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

    <messageSelection selector="string"?>
        <property name="NMTOKEN" type="NMTOKEN"?>*
    </headers>?

    <operationProperties name="string" nativeOperation="string"?>
        <property name="NMTOKEN" type="NMTOKEN"?>*
        <headers type="string"?
```

```
126                          deliveryMode="persistent or nonpersistent"?
127                          timeToLive="long"?
128                          priority="0 .. 9"?>
129                <property name="NMTOKEN" type="NMTOKEN"?>*
130            </headers>?
131        </operationProperties>*
132
133        <wireFormat ... />?
134        <operationSelector ... />?
135  </binding.jms>
```

The binding can be used in one of two ways, either identifying existing JMS [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:jndi:<jms-dest>?**
    jndiURL=<jndi-url> &
    jndiInitialContextFactory=<jndi-initial-context-factory> &
    jndiConnectionFactoryName=<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.

178 · **/binding.jms/@jndiURL** – the URL for the JNDI provider.

179 · **/binding.jms/@requestConnection** – identifies a **binding.jms** element that is present in a definition
180   document, whose **destination**, **connectionFactory**, **activationSpec** and **resourceAdapter** children
181   are used to define the values for this binding.
182   If the **@requestConnection** attribute is specified, the **binding.jms** element MUST NOT contain a
183   **destination**, **connectionFactory**, **activationSpec** or **resourceAdapter** element [BJM30007].

184 · **/binding.jms/@responseConnection** – identifies a **binding.jms** element that is present in a
185   definition document, whose **response** child element is used to define the values for this binding.
186   If the **@responseConnection** attribute is specified, the **binding.jms** element MUST NOT contain a
187   **response** element [BJM30008].

188 · **/binding.jms/@operationProperties** – identifies a **binding.jms** element that is present in a definition
189   document, whose **operationProperties** children are used to define the values for this binding.
190   If the **@operationProperties** attribute is specified, the **binding.jms** element MUST NOT contain an
191   **operationProperties** element [BJM30009].

192 · **/binding.jms/destination** – identifies the destination that is to be used to process requests by this
193   binding.

194 · **/binding.jms/destination/@type** - the type of the request destination. Valid values are "**queue**" and
195   "**topic**". The default value is "**queue**".
196   Whatever the value of the **destination/@type** attribute, the runtime MUST ensure a single response
197   is delivered for request/response operations [BJM30010].

198 · **binding.jms/destination/@jndiName** – the JNDI name of the JMS Destination that the binding uses
199   to send or receive messages. The behaviour of this attribute is determined by the value of the
200   **@create** attribute as follows:

201   – If the **@create** attribute value for a destination, connectionFactory or activationSpec element is
202   "**always**" then the **@jndiName** attribute is optional; if the resource cannot be created at the
203   specified location then the SCA runtime MUST raise an error [BJM30011].
204   If the **@jndiName** attribute is omitted this specification places no restriction on the JNDI location
205   of the created resource.

206   – If the **@create** attribute value for a destination, connectionFactory or activationSpec element is
207   "**ifNotExist**" then the **@jndiName** attribute MUST specify the location of the possibly existing
208   resource [BJM30012].
209   If the destination, connectionFactory or activationSpec does not exist at the location identified by
210   the **@jndiName** attribute, but cannot be created there then the SCA runtime MUST raise an error
211   [BJM30013].
212   If the destination, connectionFactory or activationSpec's **@jndiName** attribute refers to an
213   existing resource that is not a JMS Destination of the approprate type, a JMS connection factory
214   or a JMS activation spec respectively then the SCA runtime MUST raise an error [BJM30014].

215   – If the **@create** attribute value for a destination, connectionFactory or activationSpec element is
216   "**never**" then the **@jndiName** attribute MUST specify the location of the existing resource
217   [BJM30015].
218   If the destination, connection factory or activation spec is not present at the location identified by
219   the **@jndiName** attribute, or the location refers to a resource of an incorrect type then the SCA
220   runtime MUST raise an error [BJM30016].

221 · **/binding.jms/destination/@create** – indicates whether the destination should be created when the
222   containing composite is deployed. Valid values are "**always**", "**never**" and "**ifNotExist**". The default
223   value is "**ifNotExist**".

224 · **/binding.jms/destination/property** – defines properties to be used to create the destination, if
225   required.

226 · **/binding.jms/connectionFactory** – identifies the connection factory that the binding uses to process
227   request messages. The attributes of this element follow the rules defined for the **destination**
228   element.
229   A **binding.jms** element MUST NOT include both a **connectionFactory** element and an

230   *activationSpec* element [BJM30017].
231   When the *connectionFactory* element is present, then the destination MUST be defined either by
232   the *destination* element or the *@uri* attribute [BJM30018].

233   •   */binding.jms/activationSpec* – identifies the activation spec that the binding uses to connect to a
234   JMS destination to process request messages. The attributes of this element follow the rules defined
235   for the *destination* element.
236   If the *activationSpec* element is present and the destination is also specified via a *destination*
237   element or the *@uri* attribute then it MUST refer to the same JMS destination as the *activationSpec*
238   [BJM30019].
239   The *activationSpec* element MUST NOT be present when the binding is being used for an SCA
240   reference [BJM30020].

241   •   */binding.jms/response* – defines the resources used for handling response messages (receiving
242   responses for a reference, and sending responses from a service).

243   •   */binding.jms/response/destination* – identifies the destination that is to be used to process
244   responses by this binding. Attributes follow the rules defined for the parent's *destination* element.
245   For a service, this destination is used to send responses to messages that have a null value for the
246   *JMSReplyTo* destination. For a reference, this destination is used to receive reply messages

247   •   */binding.jms/response/connectionFactory* – identifies the connection factory that the binding uses
248   to process response messages. The attributes of this element follow those defined for the
249   *destination* element.
250   A *response* element MUST NOT include both a *connectionFactory* element and an *activationSpec*
251   element [BJM30021].

252   •   */binding.jms/response/activationSpec* – identifies the activation spec that the binding uses to
253   connect to a JMS destination to process response messages. The attributes of this element follow
254   those defined for the *destination* element.
255   If a *response/destination* and *response/activationSpec* element are both specified they MUST
256   refer to the same JMS destination [BJM30022].
257   The *response/activationSpec* element MUST NOT be present when the binding is being used for an
258   SCA service [BJM30023].

259   •   */binding.jms/response/wireFormat* – identifies the wire format used by responses sent or received
260   by this binding. This value overrides the *wireFormat* specifed at the binding level. Wire formats for
261   this binding are described in Section 4.

262   •   */binding.jms/headers* – this element specifies values for standard JMS headers.
263   The SCA runtime MUST set JMS headers in messages that it creates to the values specified by the
264   *headers* element unless overridden for the operation being invoked. [BJM30024].
265   These values apply to requests from a reference and responses from a service.

266   •   */binding.jms/headers/@type, @deliveryMode, @timeToLive, @priority* – specifies the value to
267   use for the JMS header property JMSType, JMSDeliveryMode, JMSTimeToLive or JMSPriority
268   respectively.
269   If the *@uri* attribute includes values for the type, delivery mode, time to live or priority properties then
270   the @uri values are used and the *headers* and *operationProperties/headers* *@type*,
271   *@deliveryMode*, *@timeToLive* or *@priority* attributes are ignored [BJM30025].
272   Valid values for *@deliveryMode* are "*persistent*" and "*nonpersistent*"; valid values for *@priority*
273   are "*0*" to "*9*".

274   •   */binding.jms/headers/property* – specifies the value for the given JMS user property.
275   For each *header/properties* element the SCA runtime MUST set the named JMS user property to
276   the given value in messages it creates unless overridden for the operation being invoked
277   [BJM30026].

278   •   */binding.jms/messageSelection* - this element allows JMS message selection options to be set.
279   These values apply to a service receiving messages from the request destination or for a reference
280   receiving messages from the callback or reply-to destination.

- **/binding.jms/messageSelection/@selector** - specifies the value to use for the JMS selector. If the @*uri* attribute includes a value for the message selector then the @*uri* value is used and the *messageSelection/@selector* attribute is ignored [BJM30027].

- **/binding.jms/resourceAdapter** – specifies name, type and properties of the Resource Adapter Java bean.
  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] specification, and is ignored otherwise [BJM30031].
  SCA runtimes MAY place restrictions on the properties of the resource adapter Java bean that can be set using the *resourceAdapter* element [BJM30028].
  For JMS providers that do not implement the JCA 1.5 specification [JCA15], information necessary for resource creation can be added in provider-specific elements or attributes allowed by the extensibility of the *binding.jms* element.

- **/binding.jms/operationProperties** – specifies various properties that are specific to the processing of a particular operation.

- **/binding.jms/operationProperties/@name** – The name of the operation in the interface.

- **/binding.jms/operationProperties/@selectedOperation** – The value generated by the *operationSelector* that corresponds to the operation in the service or reference interface identified by the *operationProperties/@name* attribute. If this attribute is omitted then the value defaults to the value of the *operationProperties/@name* attribute.
  The value of the *operationProperties/@selectedOperation* attribute MUST be unique across the containing *binding.jms* element [BJM30029].

- **/binding.jms/operationProperties/property** – specifies properties specific to this operation. These properties are intended to be used to parameterize the *wireFormat* identified for the binding for a particular operation.
  The SCA runtime SHOULD make the *operationProperties* element corresponding to the *selectedOperation* available to the *wireFormat* implementation [BJM30030].

- **/binding.jms/operationProperties/headers** – this element specifies values for standard JMS headers. These values apply to requests from a reference and responses from a service.
  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* element [BJM30032].

- **/binding.jms/operationProperties/headers/@type, @deliveryMode, @timeToLive, @priority** – specifies the value to use for the JMS header property JMSType, JMSDeliveryMode, JMSTimeToLive or JMSPriority, respectively,

- **/binding.jms/operationProperties/headers/property** – specifies the value for the given JMS user property.
  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 [BJM30033].

- **/binding.jms/wireFormat** – identifies the wire format used by requests and responses sent or received by this binding. Wire formats for this binding are described in Section 4.

- **/binding.jms/operationSelector** – identifies the operation selector used when receiving requests for a service. If specified for a reference this provides the default operation selector for callbacks if not specified via a callback service element. Operation selectors for this binding are described in Section 4.

The *binding.jms* element MUST conform to the XML schema defined in sca-binding-jms.xsd [BJM30036].

Deployers/assemblers can configure *nonpersistent* for @*deliveryMode* in order to provide higher performance with a decreased quality of service. A *binding.jms* element configured in this way cannot satisfy either of the "*atLeastOnce*" and "*exactlyOnce*" policy intents. The SCA Runtime MUST raise an error for this invalid combination at deployment time.

3.1 Extensibility

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

4 Operation Selectors and Wire Formats

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

343 The process of identifying the operation to be invoked is *operation selection*; the information that
344 describes the contents of messages is a *wire format*. The **binding** element as described in the SCA
345 Assembly Specification [SCA-Assembly] provides the means to identify specific operation selection via
346 the **operationSelector** element and the wire format of messages received and to be sent using the
347 **wireFormat** element.

348 When the service with a JMS binding receives a message, the SCA runtime resolves the name of the
349 operation in the service's interface that is to be invoked by using the **operationSelector** and
350 **operationProperties** elements defined for the binding. The *resolved operation name* is defined as
351 follows:

352 • If the selected operation name generated by the **operationSelector** matches the value of an
353   **operationProperties/@selectedOperation** attribute then the resolved operation name is the value of
354   the **operationProperties/@name** attribute.

355 • Otherwise the resolved operation name is the selected operation name generated by the
356   **operationSelector**.

357 **Error! Not a valid bookmark self-reference.** [BJM40010].

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

360 The following sections describe the default **operationSelector** and **wireFormat** for a JMS binding.

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

4.1 Default Operation Selection

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

367 • If there is only one operation on the service's interface, then that operation is the selected operation
368   name;

369 • Otherwise, if the JMS user property "**scaOperationName**" is present, then the value of that user
370   property is used as the selected operation name;

371 • Otherwise, if the message is a JMS text or bytes message containing XML, then the selected
372   operation name is the local name of the root element of the XML payload;

373 • Otherwise, the selected operation name is "**onMessage**".

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

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

4.2 Default Wire Format

379 The default wire format maps between a **JMSMessage** and the object(s) expected by the component
380 implementation. We encourage component implementers to avoid exposure of JMS [JMS] APIs to

381 component implementations, however in the case of an existing implementation that expects a
382 *JMSMessage*, this provides for simple reuse of that as an SCA component.

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

385 • If there is a single parameter that is a *JMSMessage*, then the *JMSMessage* is passed as is.

386 • Otherwise, if the *JMSMessage* is not a JMS text message or bytes message containing XML it is
387 invalid.

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

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

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

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

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

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

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

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

4.2.1 Example of default wire format

406 For the following interface definition:

```
407 <wsdl:definitions name="Coordinates"
408 targetNamespace="http://tempuri.org/coordinates"
409 xmlns:tns="http://tempuri.org/coordinates"
410 xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
411 xmlns:xsd="http://www.w3.org/2001/XMLSchema">
412   <wsdl:types>
413     <xsd:schema targetNamespace="http://tempuri.org/coordinates">
414       <xsd:element name="setCoordinates">
415         <xsd:complexType>
416           <xsd:sequence>
417             <xsd:element name="x" type="xsd:int"/>
418             <xsd:element name="y" type="xsd:int"/>
419           </xsd:sequence>
420         </xsd:complexType>
421       </xsd:element>
422     </xsd:schema>
423   </wsdl:types>
424
425   <wsdl:message name="setCoordinatesRequestMsg">
426     <wsdl:part element="tns:setCoordinates" name="setCoordinatesParameters"/>
427   </wsdl:message>
428
429   <wsdl:portType name="Coordinates">
430     <wsdl:operation name="setCoordinates">
431       <wsdl:input message="tns:setCoordinatesRequestMsg"
432 name="setCoordinatesRequest"/>
433     </wsdl:operation>
434   </wsdl:portType>
```

```
435    </wsdl:definitions>
```

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

```
439    <setCoordinates xmlns="http://tempuri.org/coordinates">
440       <x>10</x>
441       <y>5</y>
442    </setCoordinates>
```

5 Policy

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

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

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

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

6 Message Exchange Patterns

454

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

6.1 One-way message exchange (no Callbacks)

461

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

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

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

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

6.2 Request/response message exchange (no Callbacks)

473

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

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

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

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

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

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

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

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

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

6.3 JMS User Properties

503 This protocol assigns specific behavior to JMS user properties:

504 • "**scaCallbackDestination**" holds the name of the JMS Destination to which callback messages are
505   sent.

6.4 Callbacks

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

515 SCA runtimes MUST follow the behavior described in section 6.4 and its subsections when **binding.jms**
516 [BJM60018].

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

6.4.1 Invocation of operations on a bidirectional interface

520 For an SCA reference with a JMS binding and a bidirectional interface, when a request message is sent
521 the SCA runtime MUST set the destination to which callback messages are to be sent as the value of the
522 **scaCallbackDestination** user property in the message it creates [BJM60011].

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

526 For an SCA reference with a JMS binding and bidirectional interface, when a request message is sent as
527
528 [BJM60013].

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

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

6.4.2 Invocation of operations on a callback interface

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

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

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

542 • the **JMSReplyTo** destination identified by an earlier one-way request, if not null;

543   •   the request destination of the service's callback reference JMS binding, if specified

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

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

550 For an SCA service with a JMS binding, when a callback request message is sent the SCA runtime
551
552   [BJM60017].

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

554 When interacting with non-SCA JMS applications, the assembler can choose to model a
555 request/response message exchange using a bidirectional interface. In this case it is likely that the non-
556 SCA JMS application does not support the use of the *scaCallbackDestination* user property. To support
557 this, for one-way messages the *JMSReplyTo* header can be used to identify the destination to be used to
558 deliver callback messages, as described in sections 6.4.1 and 6.4.2.

7 Examples

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

7.1 Minimal Binding Example

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

```xml
<?xml version="1.0" encoding="UTF-8"?>
<composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"
           name="MyValueComposite">

    <service name="MyValueService">
        <interface.java interface="services.myvalue.MyValueService"/>
        <binding.jms/>
    </service>

    <reference name="StockQuoteService">
        <interface.java interface="services.stockquote.StockQuoteService"/>
        <binding.jms/>
    </reference>
</composite>
```

7.2 URI Binding Example

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

```xml
<?xml version="1.0" encoding="UTF-8"?>
<composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"
           name="MyValueComposite">

    <service name="MyValueService">
        <interface.java interface="services.myvalue.MyValueService"/>
        <binding.jms uri="jms:MyValueServiceQueue?
                             activationSpecName=MyValueServiceAS&
                             ... "/>
    </service>

    <reference name="StockQuoteService">
        <interface.java interface="services.stockquote.StockQuoteService"/>
        <binding.jms uri="jms:StockQuoteServiceQueue?
                             connectionFactoryName=StockQuoteServiceQCF&
                             deliveryMode=1&
                             ... "/>
    </reference>
</composite>
```

7.3 Binding with Existing Resources Example

The following example shows the JMS binding using existing resources:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"
           name="MyValueComposite">
```

```
608        <service name="MyValueService">
609            <interface.java interface="services.myvalue.MyValueService"/>
610            <binding.jms
611                <destination jndiName="MyValueServiceQ" create="never"/>
612                <activationSpec jndiName="MyValueServiceAS" create="never"/>
613            </binding.jms>
614        </service>
615    </composite>
```

7.4 Resource Creation Example

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

```
619    <?xml version="1.0" encoding="UTF-8"?>
620    <composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"
621                name="MyValueComposite">
622
623        <service name="MyValueService">
624            <interface.java interface="services.myvalue.MyValueService"/>
625            <binding.jms>
626                <destination jndiName="MyValueServiceQueue" create="always">
627                    <property name="prop1" type="string">XYZ</property>
628                    <property name="destName" type="string">MyValueDest</property>
629                </destination>
630                <activationSpec jndiName="MyValueServiceAS" create="always"/>
631                <resourceAdapter jndiName="com.example.JMSRA"/>
632            </binding.jms>
633        </service>
634
635        <reference name="StockQuoteService">
636            <interface.java interface="services.stockquote.StockQuoteService"/>
637            <binding.jms>
638                <destination jndiName="StockQuoteServiceQueue"/>
639                <connectionFactory jndiName="StockQuoteServiceQCF"/>
640                <resourceAdapter name="com.example.JMSRA"/>
641            </binding.jms>
642        </reference>
643    </composite>
```

7.5 Request/Response Example

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

```
648    <?xml version="1.0" encoding="UTF-8"?>
649    <composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"
650                name="MyValueComposite">
651
652        <service name="MyValueService">
653            <interface.java interface="services.myvalue.MyValueService"/>
654            <binding.jms correlationScheme="sca:messageId">
655                <destination jndiName="MyValueServiceQ" create="never"/>
656                <activationSpec jndiName="MyValueServiceAS" create="never"/>
657            </binding.jms>
658        </service>
659
660        <reference name="StockQuoteService">
661            <interface.java interface="services.stockquote.StockQuoteService"/>
662            <binding.jms correlationScheme="sca:messageId">
663                <destination jndiName="StockQuoteServiceQueue"/>
664                <connectionFactory jndiName="StockQuoteServiceQCF"/>
```

```
665              <response>
666                  <destination jndiName="MyValueResponseQueue"/>
667                  <activationSpec jndiName="MyValueResponseAS"/>
668              </response>
669          </binding.jms>
670      </reference>
671  </composite>
```

7.6 Use of Predefined Definitions Example

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

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

```
676  <?xml version="1.0" encoding="UTF-8"?>
677  <definitions targetNamespace="http://acme.com"
678              xmlns="http://docs.oasis-open.org/ns/opencsa/sca/2007903">
679      <binding.jms name="StockQuoteService">
680          <destination jndiName="StockQuoteServiceQueue" create="never"/>
681          <connectionFactory jndiName="StockQuoteServiceQCF" create="never"/>
682      </binding.jms>
683  </definitions>
```

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

```
685  <?xml version="1.0" encoding="UTF-8"?>
686  <composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"
687              xmlns:acme="http://acme.com"
688              name="MyValueComposite">
689      <reference name="MyValueService">
690          <interface.java interface="services.myvalue.MyValueService"/>
691          <binding.jms requestConnection="acme:StockQuoteService"/>
692      </reference>
693  </composite>
```

7.7 Subscription with Selector Example

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

```
697  <?xml version="1.0" encoding="UTF-8"?>
698  <composite xmlns="http://docs.oasis-open.org/ns/opencsa/sca/200903"
699              name="MyValueComposite">
700      <service name="MyValueService">
701          <interface.java interface="services.myvalue.MyValueService"/>
702          <binding.jms>
703              <destination jndiName="MyValueServiceTopic" create="never"/>
704              <connectionFactory jndiName="StockQuoteServiceTCF"
705  create="never"/>
706              <messageSelection selector="Price&gt;1000"/>
707          </binding.jms>
708      </service>
709  </composite>
```

7.8 Policy Set Example

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

```
714  <policySet name="JMSPolicy"
715              provides="priority log"
```

```
716              appliesTo="binding.jms">
717
718         <intentMap provides="priority" default="medium">
719             <qualifier name="high">
720                 <headers priority="9"/>
721             </qualifier>
722             <qualifier name="medium">
723                 <headers priority="4"/>
724             </qualifier>
725             <qualifier name="low">
726                 <headers priority="0"/>
727             </qualifier>
728         </intentMap>
729
730         <intentMap provides="log">
731             <qualifier>
732                 <headers>
733                     <property name="user_example_log">logged</property>
734                 </headers>
735             </qualifier>
736         </intentMap>
737     </policySet>
```

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

```
739     <reference name="StockQuoteService" requires="priority.high log">
740         <interface.java interface="services.stockquote.StockQuoteService"/>
741         <binding.jms>
742             <destination name="StockQuoteServiceQueue"/>
743             <connectionFactory name="StockQuoteServiceQCF"/>
744         </binding.jms>
745     </reference>
```

8 Conformance

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

a) SCA JMS Binding XML Document

b) SCA Runtime

8.1 SCA JMS Binding XML Document

An SCA JMS Binding XML document is an SCA Composite Document, an SCA Definitions Document or an SCA ComponentType Document, as defined by the SCA Assembly Specification [SCA-Assembly] Section 13.1 that uses the **binding.jms** element.

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

8.2 SCA Runtime

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

1. The implementation MUST comply with all statements in Appendix B: "Conformance Items" related to an SCA Runtime, notably all "MUST" statements have to be implemented

2. The implementation MUST conform to the SCA Assembly Model Specification Version 1.1 [SCA-Assembly], and to the SCA Policy Framework Version 1.1 [SCA-Policy]

3. The implementation MUST reject an SCA JMS Binding XML Document that is not conformant per Section 8.1

A. JMS XML Binding Schema: sca-binding-jms.xsd

```
771  <?xml version="1.0" encoding="UTF-8"?>
772  <!-- Copyright(C) OASIS(R) 2005,2009. All Rights Reserved.
773      OASIS trademark, IPR and other policies apply.  -->
774  <schema xmlns="http://www.w3.org/2001/XMLSchema"
775          targetNamespace="http://docs.oasis-open.org/ns/opencsa/sca/200903"
776          xmlns:sca="http://docs.oasis-open.org/ns/opencsa/sca/200903"
777          elementFormDefault="qualified">
778
779     <include schemaLocation="sca-core-1.1-cd03.xsd"/>
780
781     <complexType name="JMSBinding">
782        <complexContent>
783           <extension base="sca:Binding">
784              <sequence>
785                 <element name="destination" type="sca:JMSDestination"
786                         minOccurs="0"/>
787                 <choice minOccurs="0" maxOccurs="1">
788                    <element name="connectionFactory"
789                            type="sca:JMSConnectionFactory"/>
790                    <element name="activationSpec" type="sca:JMSActivationSpec"/>
791                 </choice>
792                 <element name="response" type="sca:JMSResponse" minOccurs="0"/>
793                 <element name="headers" type="sca:JMSHeaders" minOccurs="0"/>
794                 <element name="messageSelection" type="sca:JMSMessageSelection"
795                         minOccurs="0"/>
796                 <element name="resourceAdapter" type="sca:JMSResourceAdapter"
797                         minOccurs="0"/>
798                 <element name="operationProperties"
799                         type="sca:JMSOperationProperties"
800                         minOccurs="0" maxOccurs="unbounded"/>
801                 <any namespace="##other" processContents="lax"
802                     minOccurs="0" maxOccurs="unbounded"/>
803              </sequence>
804              <attribute name="correlationScheme" type="QName"
805                      default="sca:messageId"/>
806              <attribute name="initialContextFactory" type="anyURI"/>
807              <attribute name="jndiURL" type="anyURI"/>
808              <attribute name="requestConnection" type="QName"/>
809              <attribute name="responseConnection" type="QName"/>
810              <attribute name="operationProperties" type="QName"/>
811           </extension>
812        </complexContent>
813     </complexType>
814
815     <simpleType name="JMSCreateResource">
816        <restriction base="string">
817           <enumeration value="always"/>
818           <enumeration value="never"/>
819           <enumeration value="ifNotExist"/>
820        </restriction>
821     </simpleType>
822
823     <complexType name="JMSDestination">
824        <sequence>
825           <element name="property" type="sca:BindingProperty"
826                   minOccurs="0" maxOccurs="unbounded"/>
827        </sequence>
828        <attribute name="jndiName" type="anyURI" use="required"/>
829        <attribute name="type" use="optional" default="queue">
```

```
830              <simpleType>
831                 <restriction base="string">
832                    <enumeration value="queue"/>
833                    <enumeration value="topic"/>
834                 </restriction>
835              </simpleType>
836           </attribute>
837           <attribute name="create" type="sca:JMSCreateResource"
838                      use="optional" default="ifNotExist"/>
839     </complexType>
840
841     <complexType name="JMSConnectionFactory">
842        <sequence>
843           <element name="property" type="sca:BindingProperty"
844                      minOccurs="0" maxOccurs="unbounded"/>
845        </sequence>
846        <attribute name="jndiName" type="anyURI" use="required"/>
847        <attribute name="create" type="sca:JMSCreateResource"
848                      use="optional" default="ifNotExist"/>
849     </complexType>
850
851     <complexType name="JMSActivationSpec">
852        <sequence>
853           <element name="property" type="sca:BindingProperty"
854                      minOccurs="0" maxOccurs="unbounded"/>
855        </sequence>
856        <attribute name="jndiName" type="anyURI" use="required"/>
857        <attribute name="create" type="sca:JMSCreateResource"
858                      use="optional" default="ifNotExist"/>
859     </complexType>
860
861     <complexType name="JMSResponse">
862        <sequence>
863           <element name="wireFormat" type="sca:WireFormatType" minOccurs="0"/>
864           <element name="destination" type="sca:JMSDestination" minOccurs="0"/>
865           <choice minOccurs="0">
866              <element name="connectionFactory" type="sca:JMSConnectionFactory"/>
867              <element name="activationSpec" type="sca:JMSActivationSpec"/>
868           </choice>
869        </sequence>
870     </complexType>
871
872     <complexType name="JMSHeaders">
873        <sequence>
874           <element name="property" type="sca:BindingProperty"
875                      minOccurs="0" maxOccurs="unbounded"/>
876        </sequence>
877        <attribute name="type" type="string"/>
878        <attribute name="deliveryMode">
879           <simpleType>
880              <restriction base="string">
881                 <enumeration value="persistent"/>
882                 <enumeration value="nonpersistent"/>
883              </restriction>
884           </simpleType>
885        </attribute>
886        <attribute name="timeToLive" type="long"/>
887        <attribute name="priority">
888           <simpleType>
889              <restriction base="string">
890                 <enumeration value="0"/>
891                 <enumeration value="1"/>
892                 <enumeration value="2"/>
893                 <enumeration value="3"/>
```

```
894                    <enumeration value="4"/>
895                    <enumeration value="5"/>
896                    <enumeration value="6"/>
897                    <enumeration value="7"/>
898                    <enumeration value="8"/>
899                    <enumeration value="9"/>
900                </restriction>
901            </simpleType>
902        </attribute>
903    </complexType>
904
905    <complexType name="JMSMessageSelection">
906        <sequence>
907            <element name="property" type="sca:BindingProperty"
908                    minOccurs="0" maxOccurs="unbounded"/>
909        </sequence>
910        <attribute name="selector" type="string"/>
911    </complexType>
912
913    <complexType name="JMSResourceAdapter">
914        <sequence>
915            <element name="property" type="sca:BindingProperty"
916                    minOccurs="0" maxOccurs="unbounded"/>
917        </sequence>
918        <attribute name="name" type="string" use="required"/>
919    </complexType>
920
921    <complexType name="JMSOperationProperties">
922        <sequence>
923            <element name="property" type="sca:BindingProperty"
924                    minOccurs="0" maxOccurs="unbounded"/>
925            <element name="headers" type="sca:JMSHeaders"/>
926        </sequence>
927        <attribute name="name" type="string" use="required"/>
928        <attribute name="nativeOperation" type="string"/>
929    </complexType>
930
931    <complexType name="BindingProperty">
932        <simpleContent>
933            <extension base="string">
934                <attribute name="name" type="NMTOKEN"/>
935                <attribute name="type" type="string" use="optional"
936                        default="xs:string"/>
937            </extension>
938        </simpleContent>
939    </complexType>
940
941    <element name="binding.jms" type="sca:JMSBinding"
942            substitutionGroup="sca:binding"/>
943
944    <element name="wireFormat.jmsDefault" type="sca:WireFormatType"
945            substitutionGroup="sca:wireFormat"/>
946
947    <element name="operationSelector.jmsDefault" type="sca:OperationSelectorType"
948            substitutionGroup="sca:operationSelector"/>
949 </schema>
```

B. Conformance Items

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

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

	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 *headers* and *operationProperties/headers* *@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] specification, 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* 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
[BJM30036]	The *binding.jms* element MUST conform to the XML schema defined in sca-binding-jms.xsd
[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
[BJM40010]	**Error! Not a valid bookmark self-reference.**
[BJM60001]	For an SCA reference with a JMS binding and unidirectional interface, 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
[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 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
[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 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
[BJM60018]	SCA runtimes MUST follow the behavior described in section 6.4 and its

952

953 C. Acknowledgements

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

956 **Participants:**

Participant Name	Affiliation
Bryan Aupperle	IBM
Ron Barack	SAP AG
Michael Beisiegel	IBM
Henning Blohm	SAP AG
David Booz	IBM
Martin Chapman	Oracle Corporation
Jean-Sebastien Delfino	IBM
Laurent Domenech	TIBCO Software Inc.
Jacques Durand	Fujitsu Limited
Mike Edwards	IBM
Billy Feng	Primeton Technologies, Inc.
Nimish Hathalia	TIBCO Software Inc.
Simon Holdsworth	IBM
Eric Johnson	Software Inc.
Uday Joshi	Oracle Corporation
Khanderao Kand	Oracle Corporation
Anish Karmarkar	Oracle Corporation
Nickolaos Kavantzas	Oracle Corporation
Mark Little	Red Hat
Ashok Malhotra	Oracle Corporation
Jim Marino	Individual
Jeff Mischkinsky	Oracle Corporation
Dale Moberg	Axway Software
Simon Nash	Individual
Sanjay Patil	SAP AG
Plamen Pavlov	SAP AG
Peter Peshev	SAP AG
Piotr Przybylski	IBM
Luciano Resende	IBM
Tom Rutt	Fujitsu Limited
Vladimir Savchenko	SAP AG
Scott Vorthmann	TIBCO Software Inc.
Tim Watson	Oracle Corporation
Owen Williams	Avaya, Inc.
Prasad Yendluri	Software AG, Inc.

957 D. Revision History

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

959

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 27th 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: 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
cd02-rev4	2009-06-19	Simon Holdsworth	Updates to resolve following issues BINDINGS-74 Some editorial updates Fixed normative statement missed in application of BINDINGS-67
cd02-rev5	2009-06-24	Simon Holdsworth	Updates to resolve following issues BINDINGS-77 Renamed document to old form Removed editorial commentary Editorial fixes around external references; changed all links to hyperlinks
cd02-rev6	2009-06-24	Simon Holdsworth	Fixed application of BINDINGS-74 Fixed broken cross reference Changed ASCII to UTF-8 in examples
cd03	2009-06-29	Simon Holdsworth	Updates to resolve following issues BINDINGS-80 BINDINGS-81

960