



# Service Component Architecture JCA Binding Specification Version 1.1

**Committee Draft 03 Revision 3 plus proposals for issues 120, 121, 122, 123**

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### Chair(s):

Simon Holdsworth, IBM

### Editor(s):

Simon Holdsworth, IBM  
Khanderao Kand, Oracle  
Anish Karmarkar, Oracle  
Sanjay Patil, SAP  
Piotr Przybylski, IBM

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- Service Component Architecture JCA Binding Specification Version 1.00 20 September 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  
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**Abstract:**

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

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

**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.

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# 1 Introduction

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

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

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

## 1.1 Terminology

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

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

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

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

## 1.2 Normative References

- [RFC2119] S. Bradner, *Key words for use in RFCs to Indicate Requirement Levels*, <http://www.ietf.org/rfc/rfc2119.txt>, IETF RFC 2119, March 1997.
- [JCA15] J2EE Connector Architecture Specification Version 1.5  
<http://java.sun.com/j2ee/connector/>
- [WSDL] E. Christensen et al, *Web Service Description Language (WSDL) 1.1*, <http://www.w3.org/TR/2001/NOTE-wsdl-20010315>, W3C Note, March 15 2001.  
R. Chinnici et al, *Web Service Description Language (WSDL) Version 2.0 Part 1: Core Language*, <http://www.w3.org/TR/2007/REC-wsdl20-20070626/>, W3C Recommendation, June 26 2007.
- [SCA-Assembly] OASIS Committee Draft 03, "Service Component Architecture Assembly Model Specification Version 1.1", March 2009  
<http://docs.oasis-open.org/opencsa/sca-assembly/sca-assembly-1.1-spec-cd03.pdf>
- [SCA-Policy] OASIS Committee Draft 02, "SCA Policy Framework Specification Version 1.1", February 2009  
<http://docs.oasis-open.org/opencsa/sca-policy/sca-policy-1.1-spec-cd02.pdf>

## 1.3 Naming Conventions

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

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

## 2 JCA Binding

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

```
<binding.jca initialContextFactory="xs:anyURI"?
  jndiURL="xs:anyURI"?
  name="NCName"?
  requires="list of xs:QName"?
  policySets="list of xs:QName"?
  uri="xsd:anyURI"?>

  <outboundConnection managed="xs:boolean"?>
    <resourceAdapter name="NMTOKEN" type="NMTOKEN">
      <property name="NMTOKEN" type="NMTOKEN">*
    </resourceAdapter>?
    <connection jndiName="xs:anyURI"? type="NMTOKEN"
      create="always or never or ifNotExist"?>
      <property name="NMTOKEN" type="NMTOKEN">*
    </connection>
    <resAuth>container|application</resAuth>?
  </outboundConnection>?

  <inboundConnection>
    <resourceAdapter name="NMTOKEN"? type="NMTOKEN">
      <property name="NMTOKEN" type="NMTOKEN">*
    </resourceAdapter>
    <activationSpec jndiName="xs:anyURI"? type="NMTOKEN"
      create="always or never or ifNotExist"?>
      <property name="NMTOKEN" type="NMTOKEN">*
    </activationSpec>
  </inboundConnection>?

  <outboundInteraction>
    <connectionSpec type="NMTOKEN">
      <property name="NMTOKEN" type="NMTOKEN">*
    </connectionSpec>?
    <interactionSpec type="NMTOKEN">
      <property name="NMTOKEN" type="NMTOKEN">*
    </interactionSpec>?
    <operation name="NMTOKEN">
      <interactionSpec type="NMTOKEN"?>
      <property name="NMTOKEN" type="NMTOKEN">*
    </interactionSpec>?
  </operation>*
  </outboundInteraction>?

  <inboundInteraction>
    <listener type="NMTOKEN">?
    <inboundOperation name="NMTOKEN" selectedOperation="NMTOKEN">*
  </inboundInteraction>?
  <wireFormat ... />?
  <operationSelector ... />?
</binding.jca>
```

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

**Deleted:** native

Snippet 2-1: binding.jca Pseudo-Schema

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

- **/binding.jca/@uri** the binding's **@uri** attribute specifies the connection to the EIS. For a reference, it defines the endpoint allowing connecting to the target EIS by providing the JNDI name under which a ConnectionFactory is located. For a service, the **@uri** defines the endpoint to allow the EIS system to connect to the SCA system by defining the JNDI lookup name of an ActivationSpec, for example **@uri="java:comp/env/eis/TRAN\_EIS"**.

The **@uri** attribute, the **inboundConnection** and the **outboundConnection** element are mutually exclusive and the SCA runtime MUST raise an error if more than one is present [BJC20001].

For an SCA service with a **binding.jca** element with the **@uri** attribute value specified, if the resource is not present at the JNDI location identified by the **@uri** attribute or is not an ActivationSpec the SCA runtime MUST raise an error [BJC20021].

For an SCA reference with a **binding.jca** element with the **@uri** attribute value specified, if the resource is not present at the JNDI location identified by the **@uri** attribute or is not a ConnectionFactory the SCA runtime MUST raise an error [BJC20022].

**Deleted:** The **@uri** attribute, the **inboundConnection** and the **outboundConnection** element are mutually exclusive and the SCA runtime MUST raise an error if more than one is present

**Comment [SAJH2]:** Resolution to issue BINDINGS-120

- **/binding.jca/@initialContextFactory** – the name of the JNDI initial context factory.

The **@initialContextFactory** attribute MUST NOT be specified if the **@uri** attribute is not present [BJC20002].

**Deleted:** The **@initialContextFactory** attribute MUST NOT be specified if the **@uri** attribute is not present

- **/binding.jca/@jndiURL** – the URL for the JNDI provider.

The **@jndiURL** attribute MUST NOT be specified if the **@uri** attribute is not present [BJC20003].

**Deleted:** The **@jndiURL** attribute MUST NOT be specified if the **@uri** attribute is not present

- **/binding.jca/@name** - as defined in the SCA Assembly Specification [SCA-Assembly].
- **/binding.jca/@requires** - as defined in the SCA Assembly Specification [SCA-Assembly].
- **/binding.jca/@policySets** - as defined in the SCA Assembly Specification [SCA-Assembly].

- **/binding.jca/outboundConnection** defines the outbound connection characteristics.

The **outboundConnection** element MUST NOT be specified for services [BJC20004].

**Deleted:** The **outboundConnection** element MUST NOT be specified for services

- **/binding.jca/outboundConnection/@managed** attribute that determines whether the interaction with the EIS system is to be performed in the managed or non-managed mode. If the value is true (default), the JNDI name is used to obtain connection to the EIS and use adapter in the managed mode. If the value is false, the connection information is used to invoke adapter in the non-managed mode i.e. by creating instance of the ManagedConnectionFactory and using it to create Connection. For the full description of the managed and non-managed mode refer to section 6.9 of the JCA 1.5 specification [JCA15].

- **/binding.jca/outboundConnection/resourceAdapter** – specifies name, type and properties of the Resource Adapter Java bean.

The SCA runtime MAY restrict valid properties of the outbound connection's Resource Adapter Java bean depending on the deployment platform [BJC20005].

The **outboundConnection/resourceAdapter** element MUST NOT be specified when the **@managed** attribute value is **"false"** [BJC20006].

**Deleted:** The SCA runtime MAY restrict valid properties of the outbound connection's Resource Adapter Java bean depending on the deployment platform

**Deleted:** The **outboundConnection/resourceAdapter** element MUST NOT be specified when the **@managed** attribute value is **"false"**

- **/binding.jca/outboundConnection/resourceAdapter/@type** – the fully qualified name of the class implementing the JCA ResourceAdapter interface.  
If the **outboundConnection/resourceAdapter/@type** attribute is specified and the named Java class cannot be located or does not implement the **javax.resource.spi.ResourceAdapter** interface the SCA runtime MUST raise an error [BJC20028].
- **/binding.jca/outboundConnection/resourceAdapter/@name** – the optional name that uniquely identifies the existing instance of the resource adapter.

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

- **/binding.jca/outboundConnection/resourceAdapter/property** element contains the subset of the properties of the Resource Adapter Java Bean that need to be set in order to access specified EIS service. The full list of Resource Adapter properties can be obtained by introspecting the Java Bean.



- **/binding.jca/outboundConnection/connection** element specifies the properties of the connection factory used to create connections to the service endpoint.
- **/binding.jca/outboundConnection/connection/@type** – the fully qualified name of the class implementing the JCA ManagedConnectionFactory interface
- **/binding.jca/outboundConnection/connection/@jndiName** – the JNDI name of the connection factory that the binding uses to connection to the EIS. The behaviour of this attribute is determined by the value of the @create attribute:

– If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "always" and the @jndiName attribute is present and the resource cannot be created at the location specified by the @jndiName attribute, then the SCA runtime MUST raise an error. [BJC20007].

If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "always" and the @jndiName attribute is not present and the resource cannot be created, then the SCA runtime MUST raise an error. [BJC20008].

If the @jndiName attribute is omitted this specification places no restriction on the JNDI location of the created resource.

– If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "ifNotExist" then the @jndiName attribute MUST specify the location of the possibly existing resource. [BJC20013].

If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "ifNotExist" and the resource does not exist at the location identified by the @jndiName attribute, but cannot be created there then the SCA runtime MUST raise an error. [BJC20014].

If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "ifNotExist" and the @jndiName attribute refers to an existing resource that is not a connection factory of the appropriate type or an activation spec of the appropriate type respectively then the SCA runtime MUST raise an error. [BJC20018].

– If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "never" then the @jndiName attribute MUST specify the location of the existing resource. [BJC20019].

If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "never" and the resource is not present at the location identified by the @jndiName attribute, or the location refers to a resource of an incorrect type then the SCA runtime MUST raise an error. [BJC20020].

- **/binding.jca/outboundConnection/connection/property** element contains the subset of the properties of the Managed Connection Factory Java Bean that need to be set in order to access specified EIS service. The full list of Managed Connection Factory properties can be obtained by introspecting the Java Bean.
- **/binding.jca/outboundConnection/connection/@create** attribute indicates whether the element containing the attribute should be created when the containing composite is deployed. Valid values are "always", "never" and "ifNotExist". "always" indicates that new resources are created for use by this binding; "never" indicates that existing resources are used and none created; "ifNotExist" indicates that if the resources already exist those are used, otherwise new ones are created. Refer to the **outboundConnection/connection/@jndiName** attribute for a detailed definition of each case. The default value is "ifNotExist".
- **/binding.jca/outboundConnection/connection/resAuth** element specifies the authentication mechanism used by the resource adapter in the managed environment. Valid values are "container" and "application". "container" indicates that the SCA runtime takes the responsibility for configuring and managing the EIS sign-on; "application" indicates that the

**Deleted:** If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "always" and the @jndiName attribute is present and the resource cannot be created at the location specified by the @jndiName attribute, then the SCA runtime MUST raise an error. [BJC20007].

**Deleted:** If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "always" and the @jndiName attribute is not present and the resource cannot be created, then the SCA runtime MUST raise an error. [BJC20008].

**Deleted:** If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "ifNotExist" then the @jndiName attribute MUST specify the location of the possibly existing resource. [BJC20013].

**Deleted:** If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "ifNotExist" and the resource does not exist at the location identified by the @jndiName attribute, but cannot be created there then the SCA runtime MUST raise an error. [BJC20014].

**Deleted:** If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "ifNotExist" and the @jndiName attribute refers to an existing resource that is not a connection factory of the appropriate type or an activation spec of the appropriate type respectively then the SCA runtime MUST raise an error. [BJC20018].

**Deleted:** If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "never" then the @jndiName attribute MUST specify the location of the existing resource. [BJC20019].

**Deleted:** If the @create attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "never" and the resource is not present at the location identified by the @jndiName attribute, or the location refers to a resource of an incorrect type then the SCA runtime MUST raise an error. [BJC20020].

security details specified via the **outboundConnection/connectionSpec** element are used instead. If this element is omitted then no authentication is required by this binding definition.

- **/binding.jca/outboundInteraction** defines characteristics of the outbound interaction.  
**The *outboundInteraction* element MUST NOT be specified for services** [BJC20009].
- **/binding.jca/outboundInteraction/connectionSpec** - specifies client-level connection properties to be used when creating a connection. The ConnectionSpec object is used in several patterns that justify its definition in the interaction binding.  
**If the *outboundInteraction/connectionSpec/@type* attribute is specified and the named Java class cannot be located or does not implement the *javax.resource.cci.ConnectionSpec* interface the SCA runtime MUST raise an error** [BJC20030].
- **/binding.jca/outboundInteraction/connectionSpec/property** – specifies the set of client-level connection properties to be used when creating a connection, e.g. user name or password.
- **/binding.jca/outboundInteraction/interactionSpec** – specifies the interaction properties that apply to all operations that do not have one defined via an **operation** element.  
**When an operation is invoked via a reference with a *binding.jca* element, if there is an *outboundInteraction/operation* element whose *@name* attribute matches the name of the operation being invoked, the SCA runtime MUST use the values supplied by the *interactionSpec* child of the operation element instead of the *interactionSpec* child of the *binding.jca* element, if any** [BJC20025].
- **/binding.jca/outboundInteraction/interactionSpec/@type** – specifies the name of the class implementing the *javax.resource.cci.InteractionSpec* interface.  
**If the *outboundInteraction/interactionSpec/@type* attribute is specified and the named Java class cannot be located or does not implement the *javax.resource.cci.InteractionSpec* interface the SCA runtime MUST raise an error** [BJC20032].
- **/binding.jca/outboundInteraction/interactionSpec/property** – specifies the set of interaction properties.
- **/binding.jca/outboundInteraction/operation** - specifies *interactionSpec* properties for individual operations in the interface associated with the binding.
- **/binding.jca/outboundInteraction/operation/@name** - specifies the name of the operation in the interface for which the *interactionSpec* properties apply.  
**The value of the *outboundInteraction/operation/@name* attribute MUST be unique within the *outboundInteraction* element** [BJC20026].  
**The value of the *outboundInteraction/operation/@name* attribute MUST match the name of one of the operations in the containing service's or reference's interface** [BJC20027].
- **/binding.jca/outboundInteraction/operation/interactionSpec** - specifies the interaction properties for the named operation.
- **/binding.jca/outboundInteraction/operation/interactionSpec/@type** – specifies the name of the class implementing the *javax.resource.cci.InteractionSpec* interface.  
**If the *outboundInteraction/operation/interactionSpec/@type* attribute is specified and the named Java class cannot be located or does not implement the *javax.resource.cci.InteractionSpec* interface the SCA runtime MUST raise an error** [BJC20033].
- **/binding.jca/inboundConnection** defines the inbound connection characteristics.  
**The *inboundConnection* element MUST NOT be specified for references** [BJC20010].
- **/binding.jca/inboundConnection/resourceAdapter** – specifies name, type and properties of the Resource Adapter Java bean.  
**The SCA runtime MAY restrict valid properties of the inbound connection's Resource Adapter Java bean depending on the deployment platform** [BJC20011].

**Deleted:** The ***outboundInteraction*** element MUST NOT be specified for services

**Comment [SAJH4]:** Part of resolution to issue BINDINGS-122

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

**Deleted:** The ***inboundConnection*** element MUST NOT be specified for references

**Deleted:** The SCA runtime MAY restrict valid properties of the inbound connection's Resource Adapter Java bean depending on the deployment platform

The ***inboundConnection/resourceAdapter*** element MUST NOT be specified when the ***@managed*** attribute is ***"false"*** [BJC20012].  
 If the ***inboundConnection/resourceAdapter/@type*** attribute is specified and the named Java class cannot be located or does not implement the ***javax.resource.spi.ResourceAdapter*** interface the SCA runtime MUST raise an error [BJC20029].

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- ***/binding.jca/inboundConnection/resourceAdapter/@type*** – the fully qualified name of the class implementing the ResourceAdapter interface
- ***/binding.jca/inboundConnection/resourceAdapter/@name*** – the optional name that uniquely identifies the existing instance of the resource adapter.
- ***/binding.jca/inboundConnection/activationSpec*** – identifies the activation spec that the binding uses to connect to an EIS. The attributes of this element follow the rules defined for the ***outboundConnection/connection*** element.

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- ***/binding.jca/inboundConnection/activationSpec/@type*** – the fully qualified name of the class implementing the ActivationSpec interface.

If the ***inboundConnection/activationSpec/@type*** attribute is specified and the named Java class cannot be located or does not implement the ***javax.resource.spi.ActivationSpec*** interface the SCA runtime MUST raise an error [BJC20031].

- ***/binding.jca/inboundConnection/activationSpec/@jndiName*** – the JNDI name of the activation. The behaviour of this attribute is determined by the value of the ***@create*** attribute as defined for the ***outboundConnection/connection/@jndiName*** attribute
- ***/binding.jca/inboundConnection/activationSpec/@create*** attribute indicates whether the element containing the attribute should be created when the containing composite is deployed. Valid values are ***"always"***, ***"never"*** and ***"ifNotExist"***. ***"always"*** indicates that new resources are created for use by this binding; ***"never"*** indicates that existing resources are used and none created; ***"ifNotExist"*** indicates that if the resources already exist those are used, otherwise new ones are created. Refer to the ***outboundConnection/connection/@jndiName*** attribute for a detailed definition of each case. The default value is ***"ifNotExist"***.

- ***/binding.jca/inboundInteraction*** defines characteristics of the inbound interaction.

The ***inboundInteraction*** element MUST NOT be specified for references [BJC20015].

Deleted: The ***inboundInteraction*** element MUST NOT be specified for references

- ***/binding.jca/inboundInteraction/listener/@type*** - specifies the listener interface supported by this group of interactions.

If the ***inboundInteraction/listener*** element is not specified, the SCA runtime MUST interpret it as a listener implementing ***javax.resource.cci.MessageListener*** interface from the JCA specification [BJC20016].

If the ***inboundInteraction/listener/@type*** attribute is specified and the named Java class cannot be located or does not implement the ***javax.resource.cci.MessageListener*** interface the SCA runtime MUST raise an error [BJC20034].

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- ***/binding.jca/inboundInteraction/inboundOperation*** - maps the name of the EIS event received by ResourceAdapter to the name of the operation in the interface.

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- ***/binding.jca/inboundInteraction/inboundOperation/@name*** – the name of the operation in the interface.

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The value of the ***inboundInteraction/inboundOperation/@name*** attribute MUST match the name of one of the operations in the containing service's or reference's interface [BJC20023].

- ***/binding.jca/inboundInteraction/inboundOperation/@selectedOperation*** – The value generated by the ***operationSelector*** that corresponds to the operation in the service or reference interface identified by the ***operationProperties/@name*** attribute.

The value of the ***inboundInteraction/inboundOperation/@selectedOperation*** attribute MUST be unique across the ***inboundInteraction*** element [BJC20024].

Comment [SAJH6]: Part of resolution to issue BINDINGS-121

- ***/binding.jca/wireFormat*** – identifies the wire format used by requests and responses sent or received by this binding as defined in the ***SCA Assembly Specification [SCA-Assembly]***.

- ***/binding.jca/operationSelector*** – identifies the operation selector used when receiving requests for a service as defined in the ***SCA Assembly Specification [SCA-Assembly]***.

309 | The *binding.jca* element MUST conform to the XML schema defined in sca-binding-jca-1.1.xsd.  
310 [BJC20017].

**Deleted:** The *binding.jca* element MUST conform to the XML schema defined in sca-binding-jca-1.1.xsd

## 311 2.1 Extensibility

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

---

### 316 3 Policy

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

## 4 Operation Selectors and Wire Formats

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

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

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

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

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

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

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

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

**Comment [SAJH7]:** Part of resolution to issue BINDINGS-121

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## 5 Examples

### 5.1 Minimal JCA Binding

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

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

*Snippet 5-1: Example Minimal Binding*

### 5.2 Existing resources

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

```
<reference name="EISHelloWorldReference">
  <binding.jca uri="java:comp/env/eis/EISMCF">
    <outboundInteraction>

      <connectionSpec>
        <property name="userid">SYSAD</property>
      </connectionSpec>

      <operation name="hello">
        <interactionSpec>
          <property name="dir">temp</property>
          <property name="fileMode">read</property>
        </interactionSpec>
      </operation>

    </outboundInteraction>
  </binding.jca>
</reference>
```

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

### 5.3 Resource Creation

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

```
<reference name="JCAHelloWorldReference">
  <binding.jca>
    <outboundConnection managed="true">
      <resourceAdapter
        name="connector.file.FAResourceAdapter">
          <property name="logDrive">D</property>
        </resourceAdapter>
      <connection jndiName="FAManagedConnectionFactory"
        create="always">
          <property name="host">localhost</property>
          <property name="drive">C</property>
        </connection>
    </outboundConnection>
  </binding.jca>
</reference>
```

401

402

```
</binding.jca>
</reference>
```

403

Snippet 5-3: Example Binding that Creates a Resource

404

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## 6 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 JCA Binding XML Document
- b) SCA Runtime

### 6.1 SCA JCA Binding XML Document

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

An SCA JCA Binding XML document MUST be a conformant SCA Composite Document or an 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 JCA Binding XML document, notably all "MUST" statements have to be implemented.

### 6.2 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 JCA Binding XML Document that is not conformant per Section 6.1

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

```

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

```

```

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

```

```

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

```

**Comment [SAJH8]:** Part of resolution to issue BINDINGS-121

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## 600 B. Conformance Items

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

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

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Deleted: [BJC20016]

	javax.resource.cci.MessageListener interface from the JCA specification
[BJC20017]	The <b>binding.jca</b> element MUST conform to the XML schema defined in sca-binding-jca-1.1.xsd
<del>[BJC20018]</del>	If the <b>@create</b> attribute value for an <b>outboundConnection/connection</b> or <b>inboundConnection/activationSpec</b> element is "ifNotExist" and the <b>@jndiName</b> attribute refers to an existing resource that is not a connection factory of the appropriate type or an activation spec of the appropriate type respectively then the SCA runtime MUST raise an error
[BJC20019]	If the <b>@create</b> attribute value for an <b>outboundConnection/connection</b> or <b>inboundConnection/activationSpec</b> element is "never" then the <b>@jndiName</b> attribute MUST specify the location of the existing resource
[BJC20020]	If the <b>@create</b> attribute value for an <b>outboundConnection/connection</b> or <b>inboundConnection/activationSpec</b> element is "never" and the resource is not present at the location identified by the <b>@jndiName</b> attribute, or the location refers to a resource of an incorrect type then the SCA runtime MUST raise an error
[BJC20021]	For an SCA service with a <b>binding.jca</b> element with the <b>@uri</b> attribute value specified, if the resource is not present at the JNDI location identified by the <b>@uri</b> attribute or is not an Activation Spec the SCA runtime MUST raise an error
[BJC20022]	For an SCA reference with a <b>binding.jca</b> element with the <b>@uri</b> attribute value specified, if the resource is not present at the JNDI location identified by the <b>@uri</b> attribute or is not a Connection Factory the SCA runtime MUST raise an error
[BJC20023]	The value of the <b>inboundInteraction/inboundOperation/@name</b> attribute MUST match the name of one of the operations in the containing service's or reference's interface
[BJC20024]	The value of the <b>inboundInteraction/inboundOperation/@selectedOperation</b> attribute MUST be unique across the inboundInteraction element
[BJC20025]	When an operation is invoked via a reference with a <b>binding.jca</b> element, if there is an <b>outboundInteraction/operation</b> element whose <b>@name</b> attribute matches the name of the operation being invoked, the SCA runtime MUST use the values supplied by the <b>interactionSpec</b> child of the operation element instead of the <b>interactionSpec</b> child of the <b>binding.jca</b> element, if any
[BJC20026]	The value of the <b>outboundInteraction/operation/@name</b> attribute MUST be unique within the <b>outboundInteraction</b> element
[BJC20027]	The value of the <b>outboundInteraction/operation/@name</b> attribute MUST match the name of one of the operations in the containing service's or reference's interface
[BJC20028]	If the <b>outboundConnection/resourceAdapter/@type</b> attribute is specified and the named Java class cannot be located or does not implement the javax.resource.spi.ResourceAdapter interface the SCA runtime MUST raise an error
[BJC20029]	If the <b>inboundConnection/resourceAdapter/@type</b> attribute is specified and the named Java class cannot be located or does not implement the javax.resource.spi.ResourceAdapter interface the SCA runtime MUST raise an error

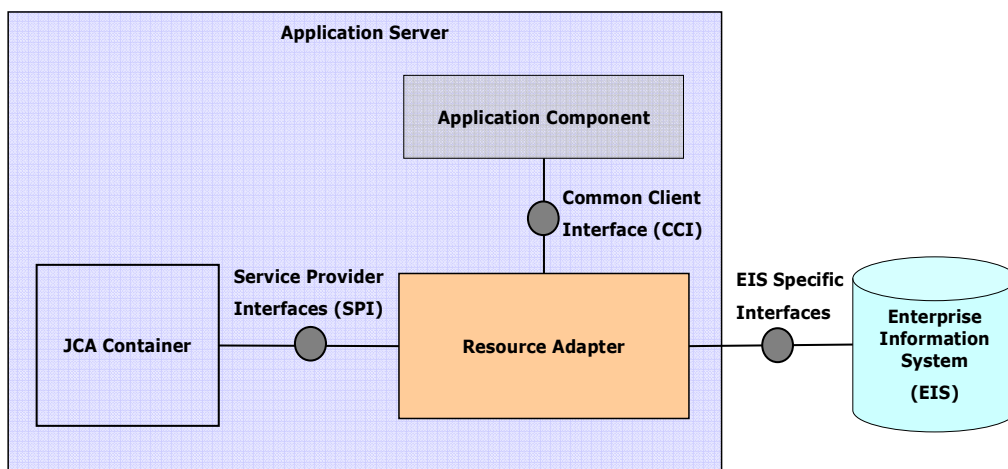
Deleted: [BJC20018]

	error
[BJC20030]	If the <b>outboundInteraction/connectionSpec/@type</b> attribute is specified and the named Java class cannot be located or does not implement the <code>javax.resource.cci.ConnectionSpec</code> interface the SCA runtime MUST raise an error
[BJC20031]	If the <b>inboundConnection/activationSpec/@type</b> attribute is specified and the named Java class cannot be located or does not implement the <code>javax.resource.spi.ActivationSpec</code> interface the SCA runtime MUST raise an error
[BJC20032]	If the <b>outboundInteraction/interactionSpec/@type</b> attribute is specified and the named Java class cannot be located or does not implement the <code>javax.resource.cci.InteractionSpec</code> interface the SCA runtime MUST raise an error
[BJC20033]	If the <b>outboundInteraction/operation/interactionSpec/@type</b> attribute is specified and the named Java class cannot be located or does not implement the <code>javax.resource.cci.InteractionSpec</code> interface the SCA runtime MUST raise an error
[BJC20034]	If the <b>inboundInteraction/listener/@type</b> attribute is specified and the named Java class cannot be located or does not implement the <code>javax.resource.cci.MessageListener</code> interface the SCA runtime MUST raise an error
[BJC40001]	When a message is received at an SCA service with JCA binding, the SCA runtime MUST invoke the target component using the resolved operation name
[BJC40002]	When a message is received at an SCA service with JCA binding and the resolved operation name is not in the target component's interface the SCA runtime MUST raise an error

## C. Java EE Connector Architecture

### C.1 Introduction

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



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

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

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



## C.2 Selected JCA CCI Interfaces

### Record

```
public interface javax.resource.cci.Record
    extends java.lang.Cloneable, java.io.Serializable {

    public String getRecordName();
    public void setRecordName(String name);
    public void setRecordShortDescription(String description);
    public String getRecordShortDescription();
    public boolean equals(Object other);
    public int hashCode();
    public Object clone() throws CloneNotSupportedException;
}
```

### Interaction

```
public interface javax.resource.cci.Interaction {

    public Connection getConnection();
    public void close() throws ResourceException;
    public boolean execute(InteractionSpec ispec,
        Record input, Record output) throws ResourceException;
    public Record execute(InteractionSpec ispec,
        Record input) throws ResourceException;
}
```

### MessageListener

```
interface javax.resource.cci.MessageListener {

    Record onMessage(Record inputData) throws ResourceException;
}
```

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## D. Acknowledgements

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

**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 Kavantzaz	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.

## E. Revision History

[optional; should not be included in OASIS Standards]

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

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

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If the **@create** attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "always" and the **@jndiName** attribute is present and the resource cannot be created at the location specified by the **@jndiName** attribute, then the SCA runtime MUST raise an errorIf the **connection/@create** attribute is "always", the **@name** value MUST be unique within the domain

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If the **@create** attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "always" and the **@jndiName** attribute is not present and the resource cannot be created, then the SCA runtime MUST raise an errorThe SCA runtime SHOULD raise an error if the **connection/@create** attribute value is "always" and the element with the given name already exists

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If the **@create** attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "ifNotExist" then the **@jndiName** attribute MUST specify the location of the possibly existing resourceIf the **activationSpec/@create** attribute is "always", the **@name** value MUST be unique within domain

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If the **@create** attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "ifNotExist" and the resource does not exist at the location identified by the **@jndiName** attribute, but cannot be created there then the SCA runtime MUST raise an errorThe SCA runtime SHOULD raise an error if the **activationSpec/@create** attribute value is "always" and the element with the given name already exists

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If the **@create** attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "ifNotExist" and the **@jndiName** attribute refers to an existing resource that is not a connection factory of the appropriate type or an activation spec of the appropriate type respectively then the SCA runtime MUST raise an error

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If the **@create** attribute value for an **outboundConnection/connection** or **inboundConnection/activationSpec** element is "never" and the resource is not present at the location identified by the **@jndiName** attribute, or the location refers to a resource of an incorrect type then the SCA runtime MUST raise an error