Web Services Resource 1.2 (WS-Resource)

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Abstract:

This specification defines a WS-Resource, which describes the relationship between a Web service and a resource in the WS-Resource Framework. This document also defines the pattern by which resources are accessed through Web services, and the means by which WS-Resources are referenced.

Deleted: the term WS-Resource Access Pattern, the concept of how

Status:

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1 Introduction

This specification defines a WS-Resource, which describes the relationship between a Web service and a resource in the WS-Resource Framework. This document also defines the pattern by which resources are accessed through Web services, and the means by which WS-Resources are referenced.

Deleted: term WS-Resource Access Pattern, the abstract concept of how

1.1 Goals and Requirements

The goal of WS-Resource is to standardize the terminology and concepts needed to express the relationship between Web services and resources.

1.1.1 Requirements

In meeting this goal, the specification MUST address the following specific requirements:

- Define the term “resource”
- Define the term “WS-Resource”, describing the relationship between Web services and resources.
- Define the means by which a resource can be distinguished in a message exchange between a requestor and a Web service.
- Define the means by which a WS-Resource is referenced

Deleted: term “WS-Resource Access Pattern”, the

1.2 Terminology

The keywords "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 2119].

When describing abstract data models, this specification uses the notational convention used by the [XML Infoset]. Specifically, abstract property names always appear in square brackets (e.g., [some property]).

This specification uses a notational convention, refered to as “Pseudo-schemas” in a fashion similar to the WSDL 2.0 Part 1 specification. A Pseudo-schema uses a BNF-style convention to describe attributes and elements:

- `?' denotes optionality (i.e. zero or one occurrences),
- `*' denotes zero or more occurrences,
- `+' one or more occurrences,
- `[' and `]' are used to form groups,
- `|' represents choice.
- Attributes are conventionally assigned a value which corresponds to their type, as defined in the normative schema.

```
<!-- sample pseudo-schema -->
<element
    required_attribute_of_type_QName="xs:QName"
```


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```
    optional_attribute_of_type_string="xs:string"? >
  <required_element />
  <optional_element />?
  <one_or_more_of_these_elements />+
  [ <choice_1 /> | <choice_2 /> ]*
</element>
```

Where there is disagreement between the separate xml schema and wsdl files describing the messages defined by this specification and the normative descriptive text (excluding any pseudo-schema) in this document, the normative descriptive text will take precedence over the separate files. The separate files take precedence over any pseudo-schema and over any schema and wsdl included in the appendices.

1.3 Namespaces

The following namespaces are used in this document:

Prefix	Namespace
s11	http://schemas.xmlsoap.org/soap/envelope/
xs	http://www.w3.org/2001/XMLSchema
wsa	http://www.w3.org/2005/08/addressing
wsdl	http://schemas.xmlsoap.org/wsdl
wsrf-r	http://docs.oasis-open.org/wsrf/r-2
wsrf-rw	http://docs.oasis-open.org/wsrf/rw-2
wsrf-bf	http://docs.oasis-open.org/wsrf/bf-2

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1.4 Fault Definitions

All faults generated by a WS-Resource SHOULD be compliant with the WS-BaseFaults [WS-BaseFaults] specification.

All faults defined by this specification MUST use the following wsa:Action URI:

http://docs.oasis-open.org/wsrf/fault

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2 WS-Resource Terminology

The following terms are important to define the relationship between a Web service and one or more resources.

2.1 Resource

A resource is a logical entity that has the following characteristics:

- It MUST be identifiable
- It MUST have a set of zero or more properties, which are expressible in XML infoset.
- It MAY have lifecycle.

2.2 WS-Resource

A WS-Resource is a Web service through which a resource can be accessed. A WS-Resource is further defined as follows:

- A reference to a WS-Resource is represented by an endpoint reference (EPR), or more precisely an XML element whose type is, or is derived (by extension) from the complexType named EndpointReferenceType defined by the [WS-Addressing] specification. Such EPRs MUST reference exactly one WS-Resource.
- The set of properties of the resource MUST be expressed using an XML Infoset described by XML schema. The WS-Resource MUST support accessing resource properties through message exchanges defined by the WS-Resource Properties specification [WS-ResourceProperties].
- A WS-Resource MAY support the message exchanges defined by the WS-Resource Lifetime specification [WS-ResourceLifetime].

For a given WS-Resource there may be many references. The way two references are compared for equality is implementation-specific and not defined by this specification.

2.2.1 Example SOAP encoding of a message to a WS-Resource

The following diagram illustrates an example set of components that comprise a small collection of WS-Resources:

Deleted: ; a resource has at least one resource identifier (see Section 2.2).

Deleted: **<#>Resource Identifier¶**
A resource identifier embodies sufficient information required to distinguish one resource from all other resources within its scope of identification.¶

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Deleted: If access to the lifecycle of the resource is exposed through the WS-Resource, the

Deleted: RF-RL

Deleted: Note: there are circumstances under which the resource identifier of the resource also appears as application data in the message. A message which otherwise satisfies the WS-Resource Access Pattern, and in which a resource identifier *also* appears in the message does not violate the WS-Resource Access Pattern.¶

Deleted: r

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Deleted: **WS-Resource Reference**

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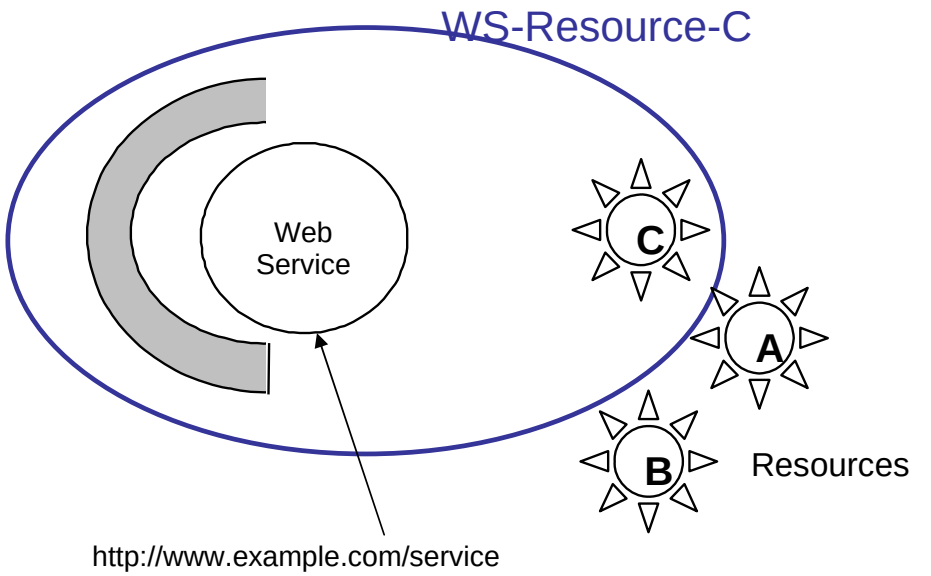

In the example above, there is one Web service that has a URL address of "http://www.example.com/service". This Web service provides access to three resources, identified as "A", "B" and "C". WS-Resource-C is the composition of the Web service and the resource identified by "C" and a reference to WS-Resource-C may appear as follows:

```
<wsa:EndpointReference>
    <wsa:Address>
        http://www.example.com/service
    </wsa:Address>
    <wsa:ReferenceParameters>
        <tns:SomeDisambiguatorElement>C</tns:SomeDisambiguatorElement>
    </wsa:ReferenceParameters> ?
    …
</wsa:EndpointReference>
```

A message to the WS-Resource, so referenced, that uses a SOAP 1.1 binding would look as follows:

```
<s11:Envelope…>
   <s11:Header>
        <wsa:To> http://www.example.com/service </wsa:To>
        <tns:SomeDisambiguatorElement wsa:isReferenceParameter='true'>
                C
        </tns:SomeDisambiguatorElement>
        ...
   </s11:Header>
```


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```
   <s11:Body>
      ...
   </s11:Body>
</s11:Envelope>
```

Deleted: A WS-Resource reference (or just reference) is a construct through which a single WS-Resource can be accessed. It is represented by an endpoint reference, or more precisely an XML element whose type is, or is derived (by extension) from the complexType named EndpointReferenceType defined by the [WS-Addressing] specification. The address of the Web service endpoint part of the WS-Resource is contained in the wsa:Address element information item of the endpoint reference. The resource identifier may appear either in the contents of the wsa:ReferenceParameter element information item of the endpoint reference or embedded as part of the wsa:Address element information item of the endpoint reference. ¶
For a given resource identifier there may be many references. The way two references are compared for equality is implementation-specific and not defined by this specification.¶

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3 Faults

A WS-Resource may respond to any message with the following fault message:

wsrf-rw:ResourceUnknownFault

The resource identified in the message is not known to the Web service. The fault may contain additional application-specific information in it.

Deleted: (which follows the WS-Resource Access Pattern)

wsrf-rw:ResourceUnavailableFault

The resource identified in the message is unavailable. This fault SHOULD indicate a transient condition. A requester may respond to this fault by resending the message.

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4 References

4.1 Normative

[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.

[URI] T. Berners-Lee, R. Fielding, L. Masinter, "Uniform Resource Identifiers (URI): Generic Syntax," RFC 2396, MIT/LCS, U.C. Irvine, Xerox Corporation, August 1998.

[WS-Addressing] **WS-Addressing 1.0,** http://www.w3.org/TR/ws-addr-core/

[WSDL 1.1] http://www.w3.org/TR/wsdl

[WS-ResourceLifetime] http://docs.oasis-open.org/wsrf/wsrf-ws_resource_lifetime-1.2-spec-pr-02.pdf

[WS-ResourceProperties] http://docs.oasis-open.org/wsrf/wsrf-ws_resource_properties-1.2-spec-pr-02.pdf

[XML-Infoset] http://www.w3.org/TR/xml-infoset/

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4.2 Non-Normative

[WSA-SOAP] **WS-Addressing 1.0 – SOAP Binding,** http://www.w3.org/TR/ws-addr-soap/

[WS-I Basic Profile 1.1] http://www.ws-i.org/Profiles/BasicProfile-1.1.html

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Appendix A. Acknowledgments

The following individuals were members of the committee during the development of this specification:

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Appendix B. XML Schema

The XML types and elements used in this specification are included here for convenience. The authoritative version of this schema document is available at: http://docs.oasis-open.org/wsrf/r-2.xsd

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```
<?xml version="1.0" encoding="UTF-8"?>
<!--

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-->
```


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```
<xsd:schema
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:wsrf-r="http://docs.oasis-open.org/wsrf/r-2"
  xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-2"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  elementFormDefault="qualified" attributeFormDefault="unqualified"
  targetNamespace="http://docs.oasis-open.org/wsrf/r-2"
>

  <xsd:import
     namespace=
  "http://docs.oasis-open.org/wsrf/bf-2"
     schemaLocation="http://docs.oasis-open.org/wsrf/bf-2.xsd"
  />

<!-- ====================== WS-Resource fault types ============= -->

      <xsd:complexType name="ResourceUnknownFaultType">
         <xsd:complexContent>
            <xsd:extension base="wsrf-bf:BaseFaultType"/>
         </xsd:complexContent>
      </xsd:complexType>
      <xsd:element name="ResourceUnknownFault"
                   type="wsrf-r:ResourceUnknownFaultType"/>

      <xsd:complexType name="ResourceUnavailableFaultType">
         <xsd:complexContent>
            <xsd:extension base="wsrf-bf:BaseFaultType"/>
         </xsd:complexContent>
      </xsd:complexType>
      <xsd:element name="ResourceUnavailableFault"
                   type="wsrf-r:ResourceUnavailableFaultType"/>
</xsd:schema>
```

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Appendix C. WSDL 1.1

The WSDL 1.1 for the Web service methods described in this specification is compliant with [WS-I Basic Profile 1.1] and is included here for convenience. The authoritative version of this WSDL is available at: http://docs.oasis-open.org/wsrf/rw-2.wsdl

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```
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-->
```


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```
<wsdl:definitions name="WS-Resource"
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:wsrf-r="http://docs.oasis-open.org/wsrf/r-2"
  xmlns:wsrf-rw="http://docs.oasis-open.org/wsrf/rw-2"
  targetNamespace="http://docs.oasis-open.org/wsrf/rw-2"
>

<!-- ====================== Types Definitions ====================== -->
   <wsdl:types>
     <xsd:schema
        xmlns:xsd="http://www.w3.org/2001/XMLSchema"
        targetNamespace="http://docs.oasis-open.org/wsrf/rw-2"
        elementFormDefault="qualified"
        attributeFormDefault="unqualified">

       <xsd:import
         namespace="http://docs.oasis-open.org/wsrf/r-2"
         schemaLocation="http://docs.oasis-open.org/wsrf/r-2.xsd"
       />

     </xsd:schema>
   </wsdl:types>

<!-- ================= WS-Resource faults ========================== -->
  <wsdl:message name="ResourceUnknownFault">
     <part name="ResourceUnknownFault"
           element="wsrf-r:ResourceUnknownFault" />
  </wsdl:message>

  <wsdl:message name="ResourceUnavailableFault">
     <part name="ResourceUnavailableFault"
           element="wsrf-r:ResourceUnavailableFault" />
  </wsdl:message>

</wsdl:definitions>
```

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Appendix D. Revision History

Rev	Date	By Whom	What
wd-01	2004-08-27	Steve Graham	Initial version created based on 08/23 and 08/24 meeting amongst the authors.
wd-02	2004-09-02	sgg	Modifications per feedback on 09/01 telecon, and email from Anish and Igor.
wd-01.a-f	Various	sgg	Reflected various progress
wd-01g	2004-09-29	sgg	Reflected final agreements
wd-02a	2004-10-07	ir	Editorial and TC issues
Wd-02.b	2004-11-22	sgg	Resolved WSRF75 and WSRF76
Wd-02	2004-12-09	ir	Editorial
wd-03.a	2005-02-17	ir	Issues 50, 62, 77, 81, 86, 93, 96
Wd-03.b	2005-03-08	Jem Treadwell	Fixed minor typos.
Wd-03.c	2005-04-19	ir	Added reference to WS-I in 5.1.
Wd-04	2005-05-10	ir	Issues: 91, 92, 99, 101
wd-05	2005-05-16	ir	Issue WSRF 100
wd-06	2005-05-18	ir	Issues WSRF109, 113, 114, 116
pr-01	2005-06-10	ir	Change status to PR
wd-07	2005-09-06	ir	127
wd-08	2005-09-15	ir	Issues 141, 152, 148, 147
wd-09	2005-09-15	ir	TC review comments

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