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Table of Contents

41	1	Introduction.....	5
42	1.1	Goals and Requirements	5
43	1.1.1	Requirements.....	5
44	1.1.2	Non-Goals.....	6
45	1.2	Notational Conventions.....	6
46	1.3	Namespaces	7
47	1.4	Fault Definitions.....	7
48	2	Terminology and Concepts	8
49	3	Example	9
50	4	Declaring Resource Properties.....	11
51	4.1	Resource Properties Document.....	11
52	4.2	Resource Properties Document and Resource Properties.....	11
53	4.3	Declaring the Resource Properties Document Type in WSDL	12
54	5	Operations on Resource Properties	13
55	5.1	GetResourcePropertyDocument	13
56	5.1.1	Example SOAP Encoding of the GetResourcePropertyDocument Message	
57		Exchange	13
58	5.2	GetResourceProperty	15
59	5.2.1	Example SOAP Encoding of the GetResourceProperty Message Exchange	16
60	5.3	GetMultipleResourceProperties	17
61	5.3.1	Example SOAP Encoding of the GetMultipleResourceProperties Message	
62		Exchange	18
63	5.4	QueryResourceProperties	19
64	5.4.1	QueryExpressionDialect Resource Property	21
65	5.4.2	Example SOAP Encoding of the QueryResourceProperties Message Exchange... 21	
66	5.5	PutResourcePropertyDocument	22
67	5.5.1	Example SOAP Encoding of the PutResponsePropertyDocument Message	
68		Exchange	23
69	5.6	SetResourceProperties.....	24
70	5.6.1	Example SOAP Encoding of the SetResourceProperties Message Exchange..... 28	
71	5.7	InsertResourceProperties	29
72	5.7.1	Example SOAP Encoding of the InsertResourceProperties Message Exchange ... 30	
73	5.8	UpdateResourceProperties.....	32
74	5.8.1	Example SOAP Encoding of the UpdateResourceProperties Message Exchange. 33	
75	5.9	DeleteResourceProperties.....	34
76	5.9.1	Example SOAP Encoding of the DeleteResourceProperties Message Exchange .. 35	

77	6	Subscription.....	37
78	6.1	Individual Resource Property Value Changes	37
79	6.2	Value Changes on Any Resource Property	39
80	7	ACID Properties of Operations on WS-Resources.....	40
81	8	Security Considerations	41
82	8.1	Securing the message exchanges	41
83	8.2	Securing Resource Properties	41
84	9	References.....	42
85	9.1	Normative.....	42
86	9.2	Non-Normative	42
87		Appendix A. Acknowledgments	43
88		Appendix B. XML Schema.....	44
89		Appendix C. WSDL 1.1	53
90		Appendix D. Revision History	62
91		Appendix E. Notices.....	64
92			

93 1 Introduction

94 The relationship between Web services and stateful resources is defined in [\[WS-Resource\]](#) in
95 terms of a WS-Resource which represents the composition of a stateful resource and a Web
96 service as a WS-Resource.

97 One characteristic of a WS-Resource is the set of properties associated with the resource. This
98 specification standardizes the means by which the definition of the properties of a WS-Resource
99 may be declared as part of the Web service interface. The declaration of the WS-Resource's
100 properties represents a projection of or a *view* on the resource's state. The projection is defined in
101 terms of a resource properties document. This resource properties document serves to define a
102 basis for access to the resource properties through the Web service interface.

103 This specification also defines a standard set of message exchanges that allow a requestor to
104 query or update the resource property values. The set of properties defined in the resource
105 properties document, and associated with the service interface, defines the constraints on the
106 valid contents of these message exchanges.

107 In this document, we outline the goals and requirements for resource properties. We define the
108 means to declare resource properties as part of a Web service description. Following this, we
109 define the message exchanges for querying and updating resource property values. We also
110 define a standard means by which requestors can use WS-Notification to receive notification
111 messages related to changes in resource property values. The document concludes with a
112 discussion of security considerations associated with resource properties. As an appendix, we
113 provide normative XML and WSDL descriptions of resource properties.

114 WS-ResourceProperties is inspired by a portion of the Global Grid Forum's "Open Grid
115 Services Infrastructure (OGSI) Version 1.0" specification [\[OGSI\]](#).

116 1.1 Goals and Requirements

117 The goal of WS-ResourceProperties is to standardize the terminology, concepts, operations,
118 WSDL and XML needed to express the resource properties projection, its association with the
119 Web service interface, and the messages defining the query and update capability against the
120 properties of a WS-Resource.

121 1.1.1 Requirements

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

123 **This specification MUST:**

- 124 • Define the term "resource property" and its relationship to Web services and WS-Resources.
- 125 • Define the means by which a designer decorates a Web service description with the names
126 and types of properties associated with a WS-Resource.
- 127 • Define the means by which a requestor can:
 - 128 • Retrieve the values of one or more properties of a WS-Resource
 - 129 • Update the values of one or more properties of a WS-Resource
 - 130 • Query across the values of one or more properties of a WS-Resource
 - 131 • Subscribe for notification [\[WS-BaseNotification\]](#) when the value of a WS-Resource
132 property changes.

133 The means by which resource property values are retrieved and updated SHOULD reflect a
134 document-oriented style and MUST provide the means to perform batched query and update
135 operations against the WS-Resource in a single message exchange. This will facilitate improved

136 performance over approaches requiring a separate request message exchange for each
137 individual resource property access.

138 Web services are often described using a collection of message exchange sets (e.g. WSDL 1.1
139 portTypes). These message exchange sets may be aggregated (using manual cut-and-paste in
140 WSDL 1.1) to form the “final” composed interface definition for the Web service. The requestor’s
141 exposure to and interpretation of the Web service interface may be defined by a partial subset of
142 the constituent message exchange sets in the overall interface composition. Therefore, a
143 requestor will form resource property-related message requests based on this potentially partial
144 understanding of the overall composed interface to the Web service. It MUST be possible for a
145 requestor, having partial knowledge of the composed service interface, to form correct and
146 consistent resource property access message requests that execute properly on a Web service
147 that implements an extended message exchange set.

148 **1.1.2 Non-Goals**

149 The following topics are outside the scope of this specification:

150 General purpose XML document query and update: This specification is not meant to be used for
151 querying and updating generic XML documents, or to be used outside the context of modeling
152 stateful resources with Web services.

153 **1.2 Notational Conventions**

154 The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD",
155 "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be
156 interpreted as described in [RFC2119].

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

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

- 163 • '?' denotes optionality (i.e. zero or one occurrences),
- 164 • '*' denotes zero or more occurrences,
- 165 • '+' denotes one or more occurrences,
- 166 • '[' and ']' are used to form groups,
- 167 • '|' represents choice.

168 Attributes are conventionally assigned a value which corresponds to their type, as defined in the
169 normative schema.

```
170 <!-- sample pseudo-schema -->  
171 <element  
172   required_attribute_of_type_QName="xs:QName"  
173   optional_attribute_of_type_string="xs:string"? >  
174   <required_element />  
175   <optional_element />?  
176   <one_or_more_of_these_elements />+  
177   [ <choice_1 /> | <choice_2 /> ]*  
178 </element>
```

179 Where there is disagreement between the separate XML schema and WSDL files describing the
180 messages defined by this specification and the normative descriptive text (excluding any pseudo-

181 schema) in this document, the normative descriptive text will take precedence over the separate
182 files. The separate files take precedence over any pseudo-schema and over any schema and
183 WSDL included in the appendices.

184 **1.3 Namespaces**

185 The following namespaces are used in this document:

Prefix	Namespace
s11	http://schemas.xmlsoap.org/soap/envelope/
xsd	http://www.w3.org/2001/XMLSchema
wsa	http://www.w3.org/2005/08/addressing
wsnt	http://docs.oasis-open.org/wsn/b-2
wsrf-rp	http://docs.oasis-open.org/wsrp/rp-2
wsrf-rpw	http://docs.oasis-open.org/wsrp/rpw-2
wsrf-bf	http://docs.oasis-open.org/wsrp/bf-2
wsrf-rw	http://docs.oasis-open.org/wsrp/rw-2

186 **1.4 Fault Definitions**

187 All faults generated by a WS-Resource SHOULD be compliant with the WS-BaseFaults [[WS-](#)
188 [BaseFaults](#)] specification.

189 All faults defined by this specification MUST use the following wsa:Action URI [[WS-Addressing](#)]:

190 <http://docs.oasis-open.org/wsrp/fault>.

191 2 Terminology and Concepts

192 The following definitions outline the terminology and usage in this specification. This section gives
193 only brief description of these terms.

194 Resource Property:

- 195 • A resource property is a piece of information defined as part of the state model of a WS-
196 Resource.
- 197 • A resource property may reflect a part of the resource's state, meta-data, manageability
198 information, etc.

199 Resource Properties Document:

- 200 • The XML document representing a logical composition of resource property elements.
201 The resource properties document defines a particular view or projection of the state data
202 implemented by the WS-Resource.
- 203 • The type (e.g. the XML Schema definition of the root element) of a resource properties
204 document is associated with the WSDL portType defining the Web service interface. This
205 association is the basis of the WS-Resource definition. Each instance of a particular WS-
206 Resource type MUST implement a logical resource properties document of the type
207 declared in the WSDL portType.

208 Resource Property Element:

- 209 • The XML representation of a resource property.
- 210 • A resource property element must appear as the immediate child of the root element of a
211 resource properties document.
- 212 • A resource property element must be an XML global element definition (GED), and is
213 uniquely identified by QName.

214 Resource Property Value:

- 215 • The value(s) associated with a resource property.

216

3 Example

217 The simple example below defines the GenericDiskDrive portType and the resource properties
218 document associated with GenericDiskDrive. The association of the resource properties
219 document with the portType defines the type of the WS-Resource.

```
220 <wsdl:definitions ... xmlns:tns="http://example.com/diskDrive" ...>
221 ...
222 <wsdl:types>
223   <xsd:schema targetNamespace="http://example.com/diskDrive" ... >
224
225     <!-- Resource property element declarations -->
226     <xsd:element name="NumberOfBlocks" type="xsd:integer"/>
227     <xsd:element name="BlockSize" type="xsd:integer" />
228     <xsd:element name="Manufacturer" type="xsd:string" />
229     <xsd:element name="StorageCapability" type="xsd:string" />
230
231     <!-- Resource properties document declaration -->
232     <xsd:element name="GenericDiskDriveProperties">
233       <xsd:complexType>
234         <xsd:sequence>
235           <xsd:element ref="tns:NumberOfBlocks"/>
236           <xsd:element ref="tns:BlockSize" />
237           <xsd:element ref="tns:Manufacturer" />
238           <xsd:any minOccurs="0" maxOccurs="unbounded" />
239           <xsd:element ref="tns:StorageCapability"
240             minOccurs="0" maxOccurs="unbounded" />
241         </xsd:sequence>
242       </xsd:complexType>
243     </xsd:element>
244   ...
245 </xsd:schema>
246 </wsdl:types>
247 ...
248 <!-- Association of resource properties document to a portType -->
249 <wsdl:portType name="GenericDiskDrive"
250   wsrf-rp:ResourceProperties="tns:GenericDiskDriveProperties" >
251
252   <operation name="start" .../>
253   <operation name="stop" .../>
254 ...
255 </wsdl:portType>
256 ...
257 </wsdl:definitions>
```

258 The following represents the request message used to retrieve three resource property elements
259 from the WS-Resource that implements the GenericDiskDrive portType:

```
260 ...
261 <wsrf-rp:GetMultipleResourceProperties
```

```
262 xmlns:tns="http://example.com/diskdrive" ...>
263 <wsrf-rp:ResourceProperty>
264   tns:NumberOfBlocks
265 </wsrf-rp:ResourceProperty>
266 <wsrf-rp:ResourceProperty>
267   tns:BlockSize
268 </wsrf-rp:ResourceProperty>
269 <wsrf-rp:ResourceProperty>
270   tns:StorageCapability
271 </wsrf-rp:ResourceProperty>
272 </wsrf-rp:GetMultipleResourceProperties>
273 ...
```

274 The following is a sample response to the simple get request:

```
275 ...
276 <wsrf-rp:GetMultipleResourcePropertiesResponse
277   xmlns:ns1="http://example.com/diskdrive"
278   xmlns:ns2="http://example.com/capabilities" ...>
279   <ns1:NumberOfBlocks>22</ns1:NumberOfBlocks>
280   <ns1:BlockSize>1024</ns1:BlockSize>
281   <ns1:StorageCapability>
282     <ns2:NoSinglePointOfFailure>true</ns2:NoSinglePointOfFailure>
283   </ns1:StorageCapability>
284   <ns1:StorageCapability>
285     <ns2:DataRedundancyMax>42</ns2:DataRedundancyMax>
286   </ns1:StorageCapability>
287
288 </wsrf-rp:GetMultipleResourcePropertiesResponse>
289 ...
```

290 **4 Declaring Resource Properties**

291 **4.1 Resource Properties Document**

292 The resource properties document type associated with a Web service's WSDL 1.1 portType
293 definition provides the declaration of the exposed resource properties of the WS-Resource. It
294 represents a particular composed structural view or projection of the resource properties of the
295 WS-Resource, essentially exposing the stateful resource component within the WS-Resource
296 composition. This may be used by a service requestor to form an XML-based query or update
297 expression on the WS-Resource.

298 This specification does not dictate the means by which a service implements a resource
299 properties document. A given service implementation may choose to realize its implementation of
300 the resource properties document as an actual XML instance document, stored in memory, in the
301 file system, in a database or in some XML Repository. Other service implementations may
302 *dynamically* construct the resource property elements and their values, from data held in
303 programming language objects (such as a J2EE EJB Entity Bean) or by executing a command on
304 a private communications channel to a physical resource. Yet another implementation possibility
305 is a mapping layer to a standard management interface (such as CIM or SNMP).

306 There is an explicit relationship between the resource properties document and the message
307 exchanges defined in Section 5. Any Web service that implements an interface that includes a
308 resource properties document type declaration is a WS-Resource and MUST comply with the
309 definition of a WS-Resource in [WS-Resource]. A WS-Resource MUST accept message requests
310 declared by the GetResourceProperty message exchange defined in Section 5. Similarly, such a
311 Web service MAY accept message requests declared by the other message exchanges defined
312 in Section 5.

313 However, there is no relationship, intended or implied by this specification, between the resource
314 properties defined in the resource properties document and any other message exchanges that
315 may be introduced as part of the Web service interface. Any relationships between the resource
316 properties and messages that comprise an interface are entirely under the purview of the
317 designer of that interface. For example, using the resource properties document described in
318 Section 3, it would be legal for an interface designer to introduce a "ReformatSectorBlock"
319 message exchange. However, with respect to this specification, there is no relationship either
320 required or prohibited between such an operation and the properties declared in the resource
321 properties document.

322 **4.2 Resource Properties Document and Resource Properties**

323 A *resource properties document* MUST be defined in XML Schema as a global element
324 declaration (GED) in some XML namespace. This GED refers to the definition of the root element
325 of a resource properties document.

326 A resource properties document MAY contain *resource property elements*, also referred to as
327 simply *resource properties*. Resource properties appear as child elements of the root element of
328 a resource properties document. If a resource properties document contains resource properties,
329 its definition MUST be a complexType defining a collection of zero or more child elements, each
330 of these child elements defining a resource property element. Each resource property element
331 MUST be defined in XML Schema as a GED. The complexType defining the resource properties
332 document MAY allow open element content (xsd:any). Resource properties are the atomic unit
333 upon which many of the message exchanges defined in this document operate.

334 **4.3 Declaring the Resource Properties Document Type in WSDL**

335 The resource properties document definition is associated with a Web service WSDL 1.1
336 portType in the following manner:

```
337 <wsdl:definitions ...>  
338 <wsdl:portType ...  
339   wsrf-rp:ResourceProperties="xsd:QName"? ... >  
340 ...  
341 </wsdl:portType>
```

342 This definition is further constrained as follows:

343 /wsdl:portType/@wsrf-rp:ResourceProperties

344 If this attribute appears on a WSDL 1.1 portType element (using attribute extensibility
345 available in the WSDL 1.1 XML schema definition for the portType element) its value
346 MUST be a QName referring to a resource properties document as defined in Section
347 4.2.

348 Any service that implements a portType annotated with @wsrf-rp:ResourceProperties MUST be a
349 component of a WS-Resource and MUST provide the interface to resource properties via a
350 document whose root element is defined by the XML global element declaration associated with
351 the portType.

352 5 Operations on Resource Properties

353 This section defines a collection of message exchanges that standardize the means by which a
354 requestor can retrieve values of resource properties, update values of resource properties, and
355 issue queries against resource properties.

356 Any interface that includes a resource properties document type declaration
357 (/wsdl:portType/@ResourceProperties) MUST also include the GetResourceProperty message
358 exchange (operation) defined in this section. Any Web service that implements an interface that
359 includes a resource properties document type declaration MAY also support the other message
360 exchanges defined in this section.

361 5.1 GetResourcePropertyDocument

362 A WS-Resource MAY support the message exchange defined in this section that allows a
363 requestor to retrieve the values of all resource properties associated with the WS-Resource.

364 The format of this request message MUST be:

```
365 <wsrf-rp:GetResourcePropertyDocument />
```

366 The wsa:Action MUST contain the URI

```
367 http://docs.oasis-open.org/wsrf/rpw-  
368 2/GetResourcePropertyDocument/GetResourcePropertyDocumentRequest.
```

369 The response of the GetResourcePropertyDocument request message is a message of the
370 following form:

```
371 <wsrf-rp:GetResourcePropertyDocumentResponse>  
372 {any}  
373 </wsrf-rp:GetResourcePropertyDocumentResponse>
```

374 The wsa:Action MUST contain the URI

```
375 http://docs.oasis-open.org/wsrf/rpw-  
376 2/GetResourcePropertyDocument/GetResourcePropertyDocumentResponse.
```

377 The contents of the GetResourcePropertyDocumentResponse message are further described as
378 follows:

```
379 /wsrf-rp:GetResourcePropertyDocumentResponse/{any}
```

380 An XML element that MUST correspond to the resource properties document of the WS-
381 Resource.

382 If the WS-Resource does not respond to the GetResourcePropertyDocument request message
383 with the GetResourcePropertyDocumentResponse message, then it MUST send a fault. This
384 specification does not define any additional faults for this operation other than those defined for
385 all WS-Resources in [WS-Resource]. One of these faults, or a specialization thereof, SHOULD be
386 sent upon failure although other fault messages MAY be returned instead.

387 5.1.1 Example SOAP Encoding of the 388 GetResourcePropertyDocument Message Exchange

389 Consider the following resource properties document defining resource properties for a WS-
390 Resource defined by the GenericDiskDrive portType:

```
391 <tns:GenericDiskDriveProperties
```

```

392     xmlns:tns="http://example.com/diskDrive"
393     xmlns:cap="http://example.com/capabilities">
394     <tns:NumberOfBlocks>22</tns:NumberOfBlocks>
395     <tns:BlockSize>1024</tns:BlockSize>
396     <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
397     <tns:StorageCapability>
398     <cap:NoSinglePointOfFailure>true</cap:NoSinglePointOfFailure>
399     </tns:StorageCapability>
400     <tns:StorageCapability>
401     <cap:DataRedundancyMax>42</cap:DataRedundancyMax>
402     </tns:StorageCapability>
403 </tns:GenericDiskDriveProperties>

```

404 The following is a non-normative example of a GetResourcePropertyDocument request message
405 using SOAP 1.1:

```

406 <s11:Envelope ...>
407   <s11:Header>
408     <wsa:Action>
409     http://docs.oasis-open.org/wsrf/rpw-
410     2/GetResourcePropertyDocument/GetResourcePropertyDocumentRequest
411     </wsa:Action>
412     ...
413   </s11:Header>
414   <s11:Body>
415     <wsrf-rp:GetResourcePropertyDocument/>
416   </s11:Body>
417 </s11:Envelope>

```

418 The following is an example GetResourcePropertyDocumentResponse message using SOAP
419 1.1:

```

420 <s11:Envelope ...>
421   <s11:Header>
422     <wsa:Action>
423     http://docs.oasis-open.org/wsrf/rpw-
424     2/GetResourcePropertyDocument/GetResourcePropertyDocumentResponse
425     </wsa:Action>
426     ...
427   </s11:Header>
428   <s11:Body>
429     <wsrf-rp:GetResourcePropertyDocumentResponse
430     xmlns:tns="http://example.com/diskDrive"
431     xmlns:cap="http://example.com/capabilities">
432     <tns:GenericDiskDriveProperties>
433     <tns:NumberOfBlocks>22</tns:NumberOfBlocks>
434     <tns:BlockSize>1024</tns:BlockSize>
435     <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
436     <tns:StorageCapability>
437     <cap:NoSinglePointOfFailure>true</cap:NoSinglePointOfFailure>
438     </tns:StorageCapability>

```

```

439     <tns:StorageCapability>
440     <cap:DataRedundancyMax>42</cap:DataRedundancyMax>
441     </tns:StorageCapability>
442     </tns:GenericDiskDriveProperties>
443     </wsrf-rp:GetResourcePropertyDocumentResponse>
444   </s11:Body>
445 </s11:Envelope>

```

5.2 GetResourceProperty

446 A WS-Resource whose portType includes the resource properties document type declaration
 447 (/wsdl:portType/@ResourceProperties) MUST support the message exchange defined in this
 448 section that allows a requestor to retrieve the value of a single resource property of a WS-
 449 Resource.
 450 Resource.

451 The format of this request message MUST be:

```

452     <wsrf-rp:GetResourceProperty>
453       QName
454     </wsrf-rp:GetResourceProperty>
455
456

```

457 The wsa:Action MUST contain the URI

```

458     http://docs.oasis-open.org/wsrf/rpw-
459     2/GetResourceProperty/GetResourcePropertyRequest.

```

460 The components of the GetResourceProperty request message are further described as follows:
 461 /wsrf-rp:GetResourceProperty/QName

462 This MUST correspond to the QName of a resource property element (child of the root of
 463 the WS-Resource's resource properties document).

464 The response of the GetResourceProperty request message is a message of the following form:

```

465     <wsrf-rp:GetResourcePropertyResponse>
466       {any}*
467     </wsrf-rp:GetResourcePropertyResponse>
468
469

```

470 The wsa:Action MUST contain the URI

```

471     http://docs.oasis-open.org/wsrf/rpw-
472     2/GetResourceProperty/GetResourcePropertyResponse.

```

473 The contents of the GetResourceProperty response message are further described as follows:
 474 /wsrf-rp:GetResourcePropertyResponse/{any}

475 The resource property value, as XML element(s), that corresponds to the QName in the
 476 GetResourceProperty request. Note: in the case where the resource property element is
 477 defined with minOccurs="0" and the resource properties document does not contain any
 478 value for that resource property, the response MUST be an empty wsrf-
 479 rp:GetResourcePropertyResponse element. If an implementation cannot return all of the
 480 resource property values associated with the request, due to, for example, security
 481 considerations, then it MUST fault.

482 If the WS-Resource does not respond to the GetResourceProperty request message with the
483 GetResourcePropertyResponse message, then it MUST send a fault. This specification defines
484 the following faults associated with failure to process the GetResourceProperty request message,
485 in addition to those faults defined for all WS-Resources in [\[WS-Resource\]](#):

486 InvalidResourcePropertyQNameFault

- 487 • The QName in the request message did not correspond to a resource property element
488 of the WS-Resource referred to in the request message.

489 One of these faults, or a specialization thereof, SHOULD be sent upon failure, although other
490 fault messages MAY be returned instead.

491 **5.2.1 Example SOAP Encoding of the GetResourceProperty Message** 492 **Exchange**

493 Consider the resource properties document defining resource properties for a WS-Resource as
494 shown in section 5.1.1. The following is a non-normative example of a GetResourceProperty
495 request message using SOAP 1.1:

```
496 <s11:Envelope ...>  
497   <s11:Header>  
498     <wsa:Action>  
499     http://docs.oasis-open.org/wsrf/rpw-2/GetResourceProperty/GetResourcePropertyRequest  
500     </wsa:Action>  
501     ...  
502   </s11:Header>  
503   <s11:Body>  
504     <wsrf-rp:GetResourceProperty  
505       xmlns:tns="http://example.com/diskDrive">  
506       tns:NumberOfBlocks  
507     </wsrf-rp: GetResourceProperty>  
508   </s11:Body>  
509 </s11:Envelope>
```

510 The following is an example GetResourcePropertyResponse message using SOAP 1.1:

```
511 <s11:Envelope ...>  
512   <s11:Header>  
513     <wsa:Action>  
514     http://docs.oasis-open.org/wsrf/rpw-2/GetResourceProperty/GetResourcePropertyResponse  
515     </wsa:Action>  
516     ...  
517   </s11:Header>  
518   <s11:Body>  
519     <wsrf-rp:GetResourcePropertyResponse  
520       xmlns:ns1="http://example.com/diskDrive">  
521       <ns1:NumberOfBlocks>22</ns1:NumberOfBlocks>  
522     </wsrf-rp:GetResourcePropertyResponse>  
523   </s11:Body>  
524 </s11:Envelope>
```

525 **5.3 GetMultipleResourceProperties**

526 A WS-Resource MAY support the message exchange defined in this section that allows a
527 requestor to retrieve the values of multiple resource properties of a WS-Resource.

528 The format of this request message MUST be:

```
529 <wsrf-rp:GetMultipleResourceProperties>  
530 <wsrf-rp:ResourceProperty>QName <wsrf-rp:ResourceProperty>+  
531 </wsrf-rp:GetMultipleResourceProperties>
```

532 The wsa:Action MUST contain the URI

```
533 http://docs.oasis-open.org/wsrf/rpw-  
534 2/GetMultipleResourceProperties/GetMultipleResourcePropertiesRequest.
```

535 The components of the GetMultipleResourceProperties request message are further described as
536 follows:

537 /wsrf-rp:GetMultipleResourceProperties/wsrf-rp:ResourceProperty+

538 This component MAY appear one or more times. Each ResourceProperty element
539 contains an xsd:QName which MUST correspond to the QName of a resource property
540 element child of the root of the WS-Resource's resource properties document.

541 The response of the GetMultipleResourceProperties request message is a message of the
542 following form:

```
543 <wsrf-rp:GetMultipleResourcePropertiesResponse>  
544 {any}*  
545 </wsrf-rp:GetMultipleResourcePropertiesResponse>
```

546 The wsa:Action MUST contain the URI

```
547 http://docs.oasis-open.org/wsrf/rpw-  
548 2/GetMultipleResourceProperties/GetMultipleResourcePropertiesResponse.
```

549 The contents of the GetMultipleResourcePropertiesResponse message are further described as
550 follows:

551 /wsrf-rp:GetMultipleResourcePropertiesResponse/{any}

552 A collection of resource property values, as XML elements that correspond to the
553 QNames given in the GetMultipleResourceProperties request message. This collection is
554 formed in the following fashion. For each QName in the request message, the resource
555 must add to the collection all child elements of the root of the resource properties
556 document whose name corresponds to that QName. Note: in the case where the
557 resource property element is defined with minOccurs="0" and the resource properties
558 document does not contain any value for that resource property, no child element is
559 added to the collection for that QName. If an implementation cannot return all of the
560 resource property values associated with the request, due to, for example, security
561 considerations, then it MUST fault.

562 If the XML schema definition of the resource properties document root element does not
563 permit the root element to contain a child element with that QName the processing of the
564 GetMultipleResourceProperties request message MUST terminate with an
565 InvalidResourcePropertyQName fault message.

566 The collection of resource property values SHOULD be formed in the same order as the
567 resource property element QNames were specified in the GetMultipleResourceProperties
568 request message.

569 If the WS-Resource does not respond to the GetMultipleResourceProperties request message
570 with the GetMultipleResourcePropertiesResponse message, then it MUST send a fault. This
571 specification defines the following faults associated with failure to process the
572 GetMultipleResourceProperties request message, in addition to those faults defined for all WS-
573 Resources in [WS-Resource]:

574 InvalidResourcePropertyQNameFault

- 575 • One or more of the QNames in the request message did not correspond to a resource
576 property element of the WS-Resource referred to in the request message.

577 One of these faults, or a specialization thereof, SHOULD be sent upon failure, although other
578 fault messages MAY be returned instead.

579 Note: the functionality provided by the GetResourceProperty message exchange is a strict subset
580 of that provided by GetMultipleResourceProperties. WS-ResourceProperties defines two
581 message exchange sets to provide implementation flexibility. GetResourceProperty is a simple,
582 required message exchange that allows simple Web service implementations to be compliant
583 with WS-ResourceProperties. The optional GetMultipleResourceProperties, while more
584 sophisticated, allows efficient retrieval of multiple resource property values using a single
585 message exchange.

586 An example use of the GetMultipleResourceProperties operation is shown in Section 3. Note: it is
587 the responsibility of the requestor to correlate the elements of the response message that
588 correspond to the QNames contained in the request message.

589 **5.3.1 Example SOAP Encoding of the GetMultipleResourceProperties** 590 **Message Exchange**

591 Consider the resource properties document defining resource properties for a WS-Resource as
592 shown in section 5.1.1. The following is a non-normative example of a
593 GetMultipleResourceProperties request message using SOAP 1.1:

```
594 <s11:Envelope ...>  
595   <s11:Header>  
596     <wsa:Action>  
597     http://docs.oasis-open.org/wsrf/rpw-  
598     2/GetMultipleResourceProperties/GetMultipleResourcePropertiesRequest  
599     </wsa:Action>  
600     ...  
601   </s11:Header>  
602   <s11:Body>  
603     <wsrf-rp:GetMultipleResourceProperties  
604       xmlns:tns="http://example.com/diskdrive">  
605       <wsrf-rp:ResourceProperty>  
606         tns:NumberOfBlocks  
607       </wsrf-rp:ResourceProperty>  
608       <wsrf-rp:ResourceProperty>  
609         tns:BlockSize  
610       </wsrf-rp:ResourceProperty>  
611     </wsrf-rp:GetMultipleResourceProperties>  
612   </s11:Body>  
613 </s11:Envelope>
```

614 The following is an example GetMultipleResourcePropertiesResponse message using SOAP 1.1:

```

615 <s11:Envelope ...>
616   <s11:Header>
617     <wsa:Action>
618     http://docs.oasis-open.org/wsrf/rpw-
619     2/GetMultipleResourceProperties/GetMultipleResourcePropertiesResponse
620     </wsa:Action>
621     ...
622   </s11:Header>
623   <s11:Body>
624     <wsrf-rp:GetMultipleResourcePropertiesResponse
625       xmlns:ns1="http://example.com/diskdrive" ...>
626       <ns1:NumberOfBlocks>22</ns1:NumberOfBlocks>
627       <ns1:BlockSize>1024</ns1:BlockSize>
628     </wsrf-rp:GetMultipleResourcePropertiesResponse>
629   </s11:Body>
630 </s11:Envelope>

```

5.4 QueryResourceProperties

A WS-Resource MAY support the message exchange defined in this section that allows a requestor to query the resource properties document of a WS-Resource using a query expression such as XPath [XPATH].

The format of this request message MUST be:

```

636 <wsrf-rp:QueryResourceProperties>
637   <wsrf-rp:QueryExpression Dialect="xsd:anyURI">
638     xsd:any
639   </wsrf-rp:QueryExpression>
640 </wsrf-rp:QueryResourceProperties>

```

The wsa:Action MUST contain the URI

```

642 http://docs.oasis-open.org/wsrf/rpw-
643 2/QueryResourceProperties/QueryResourcePropertiesRequest.

```

The components of the QueryResourceProperties request message are further described as follows:

/wsrf-rp:QueryResourceProperties/wsrf-rp:QueryExpression

The context of the expression is to be evaluated against the resource properties document of the WS-Resource identified by the request. The results of evaluating the QueryExpression are returned in the response to this request message.

/wsrf-rp:QueryResourceProperties/wsrf-rp:QueryExpression/@Dialect

This attribute contains a URI specifying the type of expression contained by the element. If the implementation does not recognize the URI identified by @Dialect, it MUST fault. There is one well-known dialect identified by this specification, corresponding to the current stable version of the XPath [XPATH] language.

```

655 http://www.w3.org/TR/1999/REC-xpath-19991116

```

This URI identifies the XPath 1.0 language. The contents of the QueryExpression MUST be a string containing a valid XPath 1.0 expression. The namespace URI prefixes for the in-scope namespace

659 declarations of the QueryExpression element may be used in the XPath
660 expression. The actual namespace declaration may be on any of the
661 ancestors of the QueryResourceProperties element.

662 Note: It is RECOMMENDED that users avoid the use of previously-
663 defined namespace prefixes when there is a chance the message could
664 traverse intermediaries or when encryption is applied to the message, as
665 there is a chance that an intermediary will modify the namespace
666 prefixes. In such cases the expression will become incoherent with
667 respect to the namespace-prefix to namespace-URI mapping intended
668 by the requestor.

669 A WS-Resource that supports the QueryResourceProperties message exchange MUST
670 support QueryExpressions that contain a Dialect with value
671 "<http://www.w3.org/TR/1999/REC-xpath-19991116>". Such a WS-Resource MAY also
672 support other dialects.

673 /wsrf-rp:QueryResourceProperties/QueryExpression/{any}

674 The QueryExpression MUST contain an expression in an expression language specified
675 by the dialect attribute. Note: this element may contain mixed content.

676 The response of the QueryResourceProperties request message MUST be a message of the
677 following form:

```
678 <wsrf-rp:QueryResourcePropertiesResponse>  
679 {any}  
680 </wsrf-rp:QueryResourcePropertiesResponse>
```

681 The wsa:Action MUST contain the URI

682 [http://docs.oasis-open.org/wsrf/rpw-
683 2/QueryResourceProperties/QueryResourcePropertiesResponse](http://docs.oasis-open.org/wsrf/rpw-2/QueryResourceProperties/QueryResourcePropertiesResponse).

684 The contents of the QueryResourcePropertiesResponse message are further described as
685 follows:

686 /wsrf-rp:QueryResourcePropertiesResponse/{any}

687 The response of the QueryResourceProperties request is variable, depending on the
688 nature of the QueryExpression component of the QueryResourceProperties request. The
689 response MUST contain an XML serialization of the results of evaluating the
690 QueryExpression against the resource properties document. Note: this element has
691 mixedContent, to allow for the case where the QueryExpression evaluates to a simple
692 type (such as a Boolean, a string or an integer) as well as the case where a node-set of
693 elements is returned.

694 If the WS-Resource does not respond to the QueryResourceProperties request message with the
695 QueryResourcePropertiesResponse message, then it MUST send a fault. This specification
696 defines the following faults associated with failure to process the QueryResourceProperties
697 request message, in addition to those faults defined for all WS-Resources in [WS-Resource]:

698 UnknownQueryExpressionDialectFault

- 699 • The given QueryExpression has a dialect that is unknown to the Web service.

700 InvalidQueryExpressionFault

- 701 • The given QueryExpression is not valid within the QueryExpression language identified
702 by the dialect attribute.

703 QueryEvaluationErrorFault

- 704 • The QueryExpression failed during evaluation.

705 One of these faults, or a specialization thereof, SHOULD be sent upon failure, although other
706 fault messages MAY be returned instead.

707 5.4.1 QueryExpressionDialect Resource Property

708 If a WS-Resource supports the QueryResourceProperty operation and supports dialects in
709 addition to the required XPath 1.0 dialect, then it MUST include a wsrf-rp:QueryExpressionDialect
710 resource property within its resource property document definition. Such a WS-Resource MAY
711 include this resource property if it supports only the XPath 1.0 dialect. The form of the wsrf-
712 rp:QueryExpressionDialect resource property is:

```
713 <wsrf-rp:QueryExpressionDialect>  
714   xsd:anyURI  
715 </wsrf-rp:QueryExpressionDialect>
```

716 Furthermore, this reference MUST reflect the minOccurs and maxOccurs properties as follows:

```
717 <xsd:element ref="wsrf-rp:QueryExpressionDialect"  
718   minOccurs="0" maxOccurs="unbounded" />
```

719 This resource property element is further constrained as follows:

720 /wsrf-rp:QueryExpressionDialect

721 This resource property declares one or more QueryExpression dialects that are
722 supported by the Web service.

723 /wsrf-rp:QueryExpressionDialect/{anyURI}

724 If a requestor sends a QueryResourceProperties request message using a
725 QueryExpression with Dialect matching the URI contained in this resource property
726 element, the WS-Resource MUST NOT issue an *UnknownQueryExpressionDialect* fault.
727 The value of this element is a URI that MUST correspond to a QueryExpression dialect.

728 5.4.2 Example SOAP Encoding of the QueryResourceProperties 729 Message Exchange

730 Consider the resource properties document defining resource properties for a WS-Resource as
731 shown in Section 5.1.1. The following is a non-normative example of a QueryResourceProperties
732 request message using SOAP 1.1:

```
733 <s11:Envelope ...>  
734   <s11:Header>  
735     <wsa:Action>  
736       http://docs.oasis-open.org/wsrf/rpw-  
737       2/QueryResourceProperties/QueryResourcePropertiesRequest  
738     </wsa:Action>  
739     ...  
740   </s11:Header>  
741   <s11:Body>  
742     <wsrf-rp:QueryResourceProperties>  
743       <wsrf-rp:QueryExpression  
744         Dialect="http://www.w3.org/TR/1999/REC-xpath-19991116" >
```

```
745     boolean(/*/NumberOfBlocks > 20 and */BlockSize=1024)
746     </wsrf-rp:QueryExpression>
747     </wsrf-rp:QueryResourceProperties>
748     </s11:Body>
749 </s11:Envelope>
```

750 The following is an example QueryResourcePropertiesResponse message using SOAP 1.1,
751 containing the results of evaluating that XPath [XPATH] expression against the root element of
752 the resource's resource properties document:

```
753 <s11:Envelope ...>
754   <s11:Header>
755     <wsa:Action>
756       http://docs.oasis-open.org/wsrf/rpw-
757       2/QueryResourceProperties/QueryResourcePropertiesResponse
758     </wsa:Action>
759   </s11:Header>
760   <s11:Body>
761     <wsrf-rp:QueryResourcePropertiesResponse>
762       true
763     </wsrf-rp:QueryResourcePropertiesResponse>
764   </s11:Body>
765 </s11:Envelope>
```

766 5.5 PutResourcePropertyDocument

767 A WS-Resource MAY support the message exchange defined in this section that allows a
768 requestor to completely replace the values of a WS-Resource's properties with an entirely new
769 resource property document. This message exchange is symmetric to the
770 GetResourcePropertyDocument message exchange defined in Section 5.1.

771 The format of the PutResourcePropertyDocument request message MUST be:

```
772 <wsrf-rp:PutResourcePropertyDocument>
773   {any}
774 </wsrf-rp:PutResourcePropertyDocument>
```

775 The wsa:Action MUST contain the URI

```
776     http://docs.oasis-open.org/wsrf/rpw-
777     2/PutResourcePropertyDocument/PutResourcePropertyDocumentRequest.
```

778 The contents of the PutResourcePropertyDocument request message are further described as
779 follows:

780 /wsrf-rp:PutResourcePropertyDocument/{any}

781 An XML element that MUST correspond to the element declared in the value of the
782 ResourceProperties attribute of the portType defining the PutResourcePropertyDocument
783 operation. This is the value the requestor intends to be the new resource property
784 document for the WS-Resource.

785 The response of the PutResourcePropertyDocument request message is a message of the
786 following form:

```
787 <wsrf-rp:PutResourcePropertyDocumentResponse>
```

```
788 {any} ?
789 </wsrf-rp:PutResourcePropertyDocumentResponse>
```

790 The wsa:Action MUST contain the URI

```
791 http://docs.oasis-open.org/wsrf/rpw-
792 2/PutResourcePropertyDocument/PutResourcePropertyDocumentResponse.
```

793 The contents of the PutResourcePropertyDocumentResponse message are further described as
794 follows:

```
795 /wsrf-rp:PutResourcePropertyDocumentResponse/{any}
```

796 If, after processing the PutResourcePropertyDocument request, the XML Infoset of the
797 WS-Resource's resource properties document is identical to the XML Infoset of the
798 contents of the PutResourcePropertyDocument request itself, then the contents of the
799 PutResourcePropertyDocumentResponse MUST be empty.

800 If, after processing the PutResourcePropertyDocument request, the XML Infoset of the
801 WS-Resource's resource properties document is **not** identical to the XML Infoset of the
802 contents of the PutResourcePropertyDocument request itself, then the contents of the
803 PutResourcePropertyDocumentResponse MUST contain the updated resource property
804 document. If an implementation cannot return all of the resource property values
805 associated with the request, due to, for example, security considerations, then it MUST
806 fault.

807 If the WS-Resource does not respond to the PutResourcePropertyDocument request message
808 with the PutResourcePropertyDocumentResponse message, then it MUST send a fault. If the
809 request results in a fault for any reason, such as read-only property changed or some other
810 update fault, none of the resource properties are modified. This specification defines the following
811 faults associated with failure to process the PutResourcePropertyDocument request message, in
812 addition to those faults defined for all WS-Resources in [WS-Resource]:

813 UnableToPutResourcePropertyDocumentFault

- 814 • The WS-Resource was unable to complete the processing of the
815 PutResourcePropertyDocument for some reason.

816 One of these faults, or a specialization thereof, SHOULD be sent upon failure, although other
817 fault messages MAY be returned instead.

818 5.5.1 Example SOAP Encoding of the 819 PutResponsePropertyDocument Message Exchange

820 Consider the resource properties document defining resource properties for a WS-Resource as
821 shown in Section 5.1.1. The following is a non-normative example of a
822 PutResourcePropertyDocument request message using SOAP 1.1:

```
823 <s11:Envelope ...>
824   <s11:Header>
825     <wsa:Action>
826       http://docs.oasis-open.org/wsrf/rpw-
827       2/PutResourcePropertyDocument/PutResourcePropertyDocumentRequest
828     </wsa:Action>
829     ...
830   </s11:Header>
831   <s11:Body>
```

```

832 <wsrf-rp:PutResourcePropertyDocument>
833   <tns:GenericDiskDriveProperties
834     xmlns:tns="http://example.com/diskDrive"
835     xmlns:cap="http://example.com/capabilities">
836     <tns:NumberOfBlocks>22</tns:NumberOfBlocks>
837     <tns:BlockSize>1024</tns:BlockSize>
838     <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
839     <tns:StorageCapability>
840       <cap:NoSinglePointOfFailure>true</cap:NoSinglePointOfFailure>
841     </tns:StorageCapability>
842     <tns:StorageCapability>
843       <cap:DataRedundancyMax>42</cap:DataRedundancyMax>
844     </tns:StorageCapability>
845   </tns:GenericDiskDriveProperties>
846 </wsrf-rp:PutResourcePropertyDocument>
847 </s11:Body>
848 </s11:Envelope>

```

849 The following is an example PutResourcePropertyDocumentResponse message using SOAP
850 1.1:

```

851 <s11:Envelope ...>
852   <s11:Header>
853     <wsa:Action>
854     http://docs.oasis-open.org/wsrf/rpw-
855     2/PutResourcePropertyDocument/PutResourcePropertyDocumentResponse
856     </wsa:Action>
857     ...
858   </s11:Header>
859   <s11:Body>
860     <wsrf-rp:PutResourcePropertyDocumentResponse />
861   </s11:Body>
862 </s11:Envelope>

```

863 5.6 SetResourceProperties

864 A WS-Resource MAY support the message exchange defined in this section that allows a
865 requestor to modify the values of multiple resource properties of a WS-Resource.

866 The SetResourceProperties message allows the processing of a single request message to make
867 multiple changes to the resource properties document. There are three types of changes, each
868 modeled as separate types of component (called SetRequestComponent) of a
869 SetResourceProperties request message:

- 870 • Insert: wherein a new resource property element is inserted into the resource properties
871 document;
- 872 • Update: wherein existing resource property element(s) are modified; and
- 873 • Delete: wherein existing resource property element(s) are removed.

874 The format of this request message MUST be:

```

875 <wsrf-rp:SetResourceProperties>
876 [

```

```

877 <wsrf-rp:Insert >
878   {any}*
879 </wsrf-rp:Insert> |
880
881 <wsrf-rp:Update >
882   {any}*
883 </wsrf-rp:Update> |
884
885 <wsrf-rp:Delete ResourceProperty="QName" />
886 ]+
887 </wsrf-rp:SetResourceProperties>

```

888 The wsa:Action MUST contain the URI

889 <http://docs.oasis-open.org/wsrf/rpw-2/SetResourceProperties/SetResourcePropertiesRequest>.

891 The contents of the SetResourceProperties request message are further described as follows:

892 /wsrf-rp:SetResourceProperties

893 This element contains a collection of one or more components called
894 SetRequestComponents. Each of the SetRequestComponents must be processed
895 against the WS-Resource's resource properties document. These
896 SetRequestComponents MUST appear to be processed in the order in which they are
897 listed in the request. Each request component MUST be processed to completion in this
898 conceptual sequence before a subsequent SetRequestComponent is processed. The
899 result of processing a given SetRequestComponent MUST be observable to the
900 processing of a subsequent SetRequestComponent, and to subsequent message
901 exchanges with the same WS-Resources.

902 If a service fails to process a SetRequestComponent, it MUST cease processing the
903 SetResourceProperties request message. The values of the resource properties
904 associated with this SetRequestComponent MAY reflect partial processing of this
905 SetRequestComponent. An implementation MAY restore the contents of the resource
906 properties document to a state as if no processing of the failed SetRequestComponent
907 had occurred. The implementation MAY additionally choose to restore the resource
908 properties document as if none of the SetRequestComponents had been processed.
909 Refer to Section 7 for additional information of resource recovery.

910 /wsrf-rp:SetResourceProperties/wsrf-rp:Insert

911 The intent of this component is to insert the contents of the component into the resource
912 properties document. The exact placement of the element insertion is implementation-
913 dependent. If, as a result of processing the Insert component, the resource properties
914 document is no longer able to validate, the processing of the component MUST fault. The
915 implementation may be unable to accept the insertion of an element because it does not
916 allow the requestor to insert a resource property (or its value) of that given name. In such
917 circumstances, the resource MUST fault the processing of the component.

918 /wsrf-rp:SetResourceProperties/wsrf-rp:Insert/{any}

919 This component identifies the element(s) to be inserted into the resource properties
920 document. If there are multiple child elements of the Insert component, each MUST have
921 the same namespace and name (i.e. the same QName). The QName MUST correspond
922 to the QName of a resource property element associated with the WS-Resource (i.e. an

923 element that is a valid child element of the root element of the resource properties
924 document). Note, for those resource properties documents that allow open element
925 content, the set of valid content types can be very large.

926 `/wsrf-rp:SetResourceProperties/wsrf-rp:Update`

927 The intent of this component is to change the value of the resource property by removing
928 any and all resource property element(s) of the given QName and replacing them with
929 the contents of this component. If, as a result of processing the Update component, the
930 resource properties document is no longer able to validate, the processing of the
931 component MUST fault. The resource may be unable to accept the update of an element
932 because it does not allow the requestor to update a resource property (or its value) of
933 that given name. In such circumstances, the resource MUST fault the processing of the
934 component.

935 `/wsrf-rp:SetResourceProperties/wsrf-rp:Update/{any}`

936 This identifies the element(s) to be inserted into the resource properties document,
937 replacing all element children of the root of the resource properties document with the
938 same QName. If there are multiple child elements of the Insert component, each MUST
939 have the same namespace and name (i.e. the same QName). The QName MUST
940 correspond to the QName of a resource property element associated with the WS-
941 Resource (i.e. an element that is a valid child element of the root element of the resource
942 properties document). Note, for those resource properties documents that allow open
943 element content, the set of valid content types can be very large.

944 `/wsrf-rp:SetResourceProperties/wsrf-rp>Delete`

945 The intent of this component is to remove all element children of the root of the resource
946 properties document whose QNames correspond to the value of `@ResourceProperty`. If
947 the resource is unable to remove all identified elements, the processing of the component
948 MUST fault. If, as a result of processing the Delete component, the resource properties
949 document is no longer able to validate, the processing of the component MUST fail. The
950 resource may be unable to accept the delete of an element because it does not allow the
951 requestor to delete a resource property (or its value) of the given name. In such
952 circumstances, the resource MUST fault the processing of the component.

953 `/wsrf-rp:SetResourceProperties/wsrf-rp>Delete/@ResourceProperty`

954 This attribute contains the QName of a resource property to be deleted by this
955 component.

956 The response of the SetResourceProperties request message, all of whose components were
957 successfully processed, MUST be a message of the following form:

```
958 <wsrf-rp:SetResourcePropertiesResponse>  
959 </wsrf-rp:SetResourcePropertiesResponse>
```

960 The `wsa:Action` MUST contain the URI

961 `http://docs.oasis-open.org/wsrf/rpw-
962 2/SetResourceProperties/SetResourcePropertiesResponse`.

963 If the WS-Resource does not respond to the SetResourceProperties request message with the
964 SetResourcePropertiesResponse message, then it MUST send a fault message. This
965 specification defines the following faults associated with failure to process the
966 SetResourcePropertyDocument request message, in addition to those faults defined for all WS-
967 Resources in [WS-Resource]:

968 InvalidModificationFault

- 969 • The contents of the SetResourceProperties request component cause the resource
970 properties document to no longer be able to validate.

971 UnableToModifyResourcePropertyFault

- 972 • A resource property identified by one of the SetResourceProperties request components
973 is read-only.

974 InvalidResourcePropertyQNameFault

- 975 • A resource property QName does not identify a resource property.

976 SetResourcePropertyRequestFailedFault

- 977 • One or more components of the SetResourceProperties request failed.

978 One of these faults, or a specialization thereof, SHOULD be sent upon failure, although other
979 fault messages MAY be returned instead.

980 Any fault message indicating a failure during the update of the resource properties document
981 MUST also indicate whether the document was restored or not by using the
982 ResourcePropertyChangeFailure element of the fault. This fault element indicates the resource
983 property element change associated with the fault and indicates if the resource property
984 document as a whole was restored. The format of this element is indicated as follows:

```
985 <wsrf-rp:ResourcePropertyChangeFailure Restored=xsd:boolean?>  
986   <wsrf-rp:CurrentValue>{any}*</wsrf-rp:CurrentValue> ?  
987   <wsrf-rp:RequestedValue>{any}*</wsrf-rp:RequestedValue> ?  
988 </wsrf-rp:ResourcePropertyChangeFailure>
```

989 This element is further constrained as follows:

990 /wsrf-rp:ResourcePropertyChangeFailure

991 The contents of this element provide more information about the element associated with
992 a failed modification to a resource property document.

993 /wsrf-rp:ResourcePropertyChangeFailure/@Restored

994 If the value of this optional attribute is “true”, then the resource property document was
995 restored to its state prior to the attempt to process the request message. The absence of
996 this attribute is identical to this attribute having the value “false”, indicating that no attempt
997 was made to restore the resource property document.

998 /wsrf-rp:ResourcePropertyChangeFailure/wsrf-rp:CurrentValue

999 If present, this component contains the current value(s) of the resource property
1000 elements associated with the fault.

1001 /wsrf-rp:ResourcePropertyChangeFailure/wsrf-rp:RequestedValue

1002 If present, this component contains the value(s) of the resource property elements
1003 associated with the fault as found within the request message.

1004 Note: There is no isolation policy implied, for either modifications to the resource properties
1005 document resulting from the processing of the request or the modifications implemented by the
1006 restore. See Section 7 for more discussion.

1007 5.6.1 Example SOAP Encoding of the SetResourceProperties 1008 Message Exchange

1009 Consider the resource properties document defining resource properties for a WS-Resource as
1010 shown in Section 5.1.1.: The following is a non-normative example of a SetResourceProperties
1011 request message using SOAP 1.1:

```
1012 <s11:Envelope ...>  
1013   <s11:Header>  
1014     <wsa:Action>  
1015       http://docs.oasis-open.org/wsrf/rpw-2/SetResourceProperties/SetResourcePropertiesRequest  
1016     </wsa:Action>  
1017     ...  
1018   </s11:Header>  
1019   <s11:Body>  
1020     <wsrf-rp:SetResourceProperties  
1021       xmlns:tns="http://example.com/diskdrive">  
1022       <wsrf-rp:Update>  
1023         <tns:NumberOfBlocks>143</tns:NumberOfBlocks>  
1024       </wsrf-rp:Update>  
1025  
1026       <wsrf-rp>Delete ResourceProperty="tns:StorageCapability" />  
1027  
1028       <wsrf-rp:Insert>  
1029         <tns:someElement>42</tns:someElement>  
1030       </wsrf-rp:Insert>  
1031  
1032     </wsrf-rp:SetResourceProperties>  
1033   </s11:Body>  
1034 </s11:Envelope>
```

1035 The following is an example SetResourcePropertiesResponse message using SOAP 1.1:

```
1036 <s11:Envelope ...>  
1037   <s11:Header>  
1038     <wsa:Action>  
1039       http://docs.oasis-open.org/wsrf/rpw-2/SetResourceProperties/SetResourcePropertiesResponse  
1040     </wsa:Action>  
1041     ...  
1042   </s11:Header>  
1043   <s11:Body>  
1044     <wsrf-rp:SetResourcePropertiesResponse>  
1045   </wsrf-rp:SetResourcePropertiesResponse>  
1046 </s11:Body>  
1047 </s11:Envelope>
```

1048 The new contents of the resource properties document after successful processing of the request
1049 message will be:

```
1050 <tns:xmlns:tns="http://example.com/diskDrive" >  
1051   <tns:NumberOfBlocks>143</tns:NumberOfBlocks>
```

```
1052 <tns:BlockSize>1024</tns:BlockSize>
1053 <tns:someElement>42</tns:someElement>
1054 <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
1055 </tns:GenericDiskDriveProperties>
```

1056 Now consider the situation wherein it is illegal to change the value of the resource property
1057 tns:Manufacturer, for example because the resource property is not modifiable. If a
1058 SetResourceProperties operation contained a component that attempted to modify this resource
1059 property value, then a fault message would be returned in response to the
1060 SetResourceProperties request, and that fault message would contain the following XML
1061 fragment:

```
1062 ...
1063 <wsrf-rp:ResourcePropertyChangeFailure Restored="true">
1064 <wsrf-rp:CurrentValue>
1065 <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
1066 </wsrf-rp:CurrentValue>
1067 <wsrf-rp:RequestedValue>
1068 <tns:Manufacturer>BogusName</tns:Manufacturer>
1069 </wsrf-rp:RequestedValue>
1070 </wsrf-rp:ResourcePropertyChangeFailure>
```

1071 **5.7 InsertResourceProperties**

1072 A WS-Resource MAY support the message exchange defined in this section that allows a
1073 requestor to insert new values of a resource property of a WS-Resource.

1074 The InsertResourceProperties message is used to request the insertion of one or more element
1075 values of a single resource property into the resource properties document of a WS-Resource.

1076 The format of this request message MUST be:

```
1077 <wsrf-rp:InsertResourceProperties>
1078 <wsrf-rp:Insert>
1079 {any}*
1080 </wsrf-rp:Insert>
1081 </wsrf-rp:InsertResourceProperties>
```

1082 The wsa:Action MUST contain the URI

```
1083 http://docs.oasis-open.org/wsrf/rpw-
1084 2/InsertResourceProperties/InsertResourcePropertiesRequest.
```

1085 The contents of the InsertResourceProperties request message are further described as follows:

1086 /wsrf-rp:InsertResourceProperties/wsrf-rp:Insert

1087 The intent of this component is to insert the contents of the component into the resource
1088 properties document. The exact placement of the element insertion is implementation-
1089 dependent. If, as a result of processing the InsertResourceProperties request, the
1090 resource properties document is no longer able to validate, the processing of the request
1091 MUST fault. The implementation may be unable to accept the insertion of an element
1092 because it does not allow the requestor to insert a resource property (or its value) of that
1093 given name. In such circumstances, the resource MUST fault the processing of the
1094 request message.

1095 /wsrf-rp:InsertResourceProperties/wsrf-rp:Insert/{any}
1096 This component identifies the element(s) to be inserted into the resource properties
1097 document. If there are multiple child elements of the wsrf-rp:Insert element, each MUST
1098 have the same namespace and name (i.e. the same QName). The QName MUST
1099 correspond to the QName of a resource property element associated with the WS-
1100 Resource (i.e. an element that is a valid child element of the root element of the resource
1101 properties document). Note, for those resource properties documents that allow open
1102 element content, the set of valid content types can be very large.

1103 When an InsertResourceProperties request message has been successfully processed, the
1104 response message MUST have the following form:

```
1105 <wsrf-rp:InsertResourcePropertiesResponse>  
1106 </wsrf-rp:InsertResourcePropertiesResponse>
```

1107 The wsa:Action MUST contain the URI

1108 http://docs.oasis-open.org/wsrf/rpw-
1109 2/InsertResourceProperties/InsertResourcePropertiesResponse.

1110 If the WS-Resource does not respond to the InsertResourceProperties request message with the
1111 InsertResourcePropertiesResponse message, then it MUST send a fault. This specification
1112 defines the following faults associated with failure to process the InsertResourceProperties
1113 request message, in addition to those faults defined for all WS-Resources in [WS-Resource]:

1114 InvalidModificationFault

- 1115 • The contents of the InsertResourceProperties request component cause the resource
1116 properties document to no longer be able to validate.

1117 UnableToModifyResourcePropertyFault

- 1118 • A resource property identified by the InsertResourceProperties request is not modifiable.

1119 InvalidResourcePropertyQNameFault

- 1120 • A resource property QName does not identify a resource property.

1121 InsertResourcePropertiesRequestFailedFault

- 1122 • The InsertResourceProperties request failed for some reason.

1123 One of these faults, or a specialization thereof, SHOULD be sent upon failure, although other
1124 fault messages MAY be returned instead.

1125 Any fault message indicating a failure during the update of the resource properties document
1126 MUST also indicate whether the document was restored by using the
1127 ResourcePropertyChangeFailure element of the fault. This fault element indicates the resource
1128 property element change associated with the fault and indicates if the resource property
1129 document as a whole was restored. The format of this element is described in Section 5.6.

1130 **5.7.1 Example SOAP Encoding of the InsertResourceProperties** 1131 **Message Exchange**

1132 Consider the following resource properties document defining resource properties for a WS-
1133 Resource defined by the GenericDiskDrive portType:

```
1134 <tns:GenericDiskDriveProperties xmlns:tns="http://example.com/diskDrive" >  
1135 <tns:NumberOfBlocks>22</tns:NumberOfBlocks>  
1136 <tns:BlockSize>1024</tns:BlockSize>  
1137 <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
```

1138 </tns:GenericDiskDriveProperties>

1139 The following is a non-normative example of an InsertResourceProperties request message using
1140 SOAP 1.1:

```
1141 <s11:Envelope ...>
1142   <s11:Header>
1143     <wsa:Action>
1144     http://docs.oasis-open.org/wsrf/rpw-
1145     2/InsertResourceProperties/InsertResourcePropertiesRequest
1146     </wsa:Action>
1147     ...
1148   </s11:Header>
1149   <s11:Body>
1150     <wsrf-rp:InsertResourceProperties
1151       xmlns:tns="http://example.com/diskdrive">
1152       <wsrf-rp:Insert>
1153         <tns:StorageCapability>
1154           <tns:NoSinglePointOfFailure>true</tns:NoSinglePointOfFailure>
1155         </tns:StorageCapability>
1156         <tns:StorageCapability>
1157           <tns:DataRedundancyMax>42</tns:DataRedundancyMax>
1158         </tns:StorageCapability>
1159       </wsrf-rp:Insert>
1160     </wsrf-rp:InsertResourceProperties>
1161   </s11:Body>
1162 </s11:Envelope>
```

1164 The following is an example InsertResourcePropertiesResponse message using SOAP 1.1:

```
1165 <s11:Envelope ...>
1166   <s11:Header>
1167     <wsa:Action>
1168     http://docs.oasis-open.org/wsrf/rpw-
1169     2/InsertResourceProperties/InsertResourcePropertiesResponse
1170     </wsa:Action>
1171     ...
1172   </s11:Header>
1173   <s11:Body>
1174     <wsrf-rp:InsertResourcePropertiesResponse>
1175     </wsrf-rp:InsertResourcePropertiesResponse>
1176   </s11:Body>
1177 </s11:Envelope>
```

1178 The new contents of the resource properties document after successful processing of the request
1179 message will be:

```
1180 <tns:GenericDiskDriveProperties xmlns:tns="http://example.com/diskDrive" >
1181   <tns:NumberOfBlocks>22</tns:NumberOfBlocks>
1182   <tns:BlockSize>1024</tns:BlockSize>
1183   <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
```

```

1184 <tns:StorageCapability>
1185 <tns:NoSinglePointOfFailure>true</tns:NoSinglePointOfFailure>
1186 </tns:StorageCapability>
1187 <tns:StorageCapability>
1188 <tns:DataRedundancyMax>42</tns:DataRedundancyMax>
1189 </tns:StorageCapability>
1190 </tns:GenericDiskDriveProperties>

```

1191 5.8 UpdateResourceProperties

1192 A WS-Resource MAY support the message exchange defined in this section that allows a
1193 requestor to replace the existing values of a resource property with new values.

1194 The UpdateResourceProperties message is used to request the replacement of all the element
1195 values of a single resource property in the resource properties document of a WS-Resource with
1196 a new set of values.

1197 The format of this request message MUST be:

```

1198 <wsrf-rp:UpdateResourceProperties>
1199 <wsrf-rp:Update>
1200 {any}*
1201 </wsrf-rp:Update>
1202 </wsrf-rp:UpdateResourceProperties>

```

1203 The wsa:Action MUST contain the URI

```

1204 http://docs.oasis-open.org/wsrf/rpw-
1205 2/UpdateResourceProperties/UpdateResourcePropertiesRequest.

```

1206 The contents of the UpdateResourceProperties request message are further described as
1207 follows:

1208 /wsrf-rp:UpdateResourceProperties/wsrf-rp:Update

1209 The intent of this request is to change the value of the elements of a resource property by
1210 removing any and all resource property element(s) of the given QName and replacing
1211 them with the contents of this component. If, as a result of processing the entire
1212 UpdateResourceProperties request, the resource properties document is no longer able
1213 to validate, the processing of the request MUST fault. The resource may be unable to
1214 accept the update of an element because it does not allow the requestor to update a
1215 resource property (or its value) of that given name. In such circumstances, the resource
1216 MUST fault the processing of the request message.

1217 /wsrf-rp:UpdateResourceProperties/wsrf-rp:Update/{any}

1218 This identifies the element(s) to be inserted into the resource properties document,
1219 replacing all element children of the root of the resource properties document with the
1220 same QName. If there are multiple child elements of the wsrf-rp:Update component, each
1221 MUST have the same namespace and name (i.e. the same QName). The QName MUST
1222 correspond to the QName of a resource property element associated with the WS-
1223 Resource (i.e. an element that is a valid child element of the root element of the resource
1224 properties document). Note: for those resource properties documents that allow open
1225 element content, the set of valid content types can be very large.

1226 When an UpdateResourceProperties request message has been successfully processed, the
1227 response message MUST have the following form:

1228 <wsrf-rp:UpdateResourcePropertiesResponse>

1229 </wsrf-rp:UpdateResourcePropertiesResponse>

1230 The wsa:Action MUST contain the URI

1231 http://docs.oasis-open.org/wsrf/rpw-

1232 2/UpdateResourceProperties/UpdateResourcePropertiesResponse.

1233 If the WS-Resource does not respond to the UpdateResourceProperties request message with
1234 the UpdateResourcePropertiesResponse message, then it MUST send a fault. This specification
1235 defines the following faults associated with failure to process the UpdateResourceProperties
1236 request message, in addition to those faults defined for all WS-Resources in [WS-Resource]:

1237 InvalidModificationFault

1238 • The contents of the UpdateResourceProperties request component cause the resource
1239 properties document to no longer be able to validate.

1240 UnableToModifyResourcePropertyFault

1241 • A resource property identified by the UpdateResourceProperties request is not
1242 modifiable.

1243 InvalidResourcePropertyQNameFault

1244 • A resource property QName does not identify a resource property.

1245 UpdateResourcePropertiesRequestFailedFault

1246 • The UpdateResourceProperties request failed for some reason.

1247 One of these faults, or a specialization thereof, SHOULD be sent upon failure, although other
1248 fault messages MAY be returned instead.

1249 Any fault message indicating a failure during the update of the resource properties document
1250 MUST also indicate whether the document was restored by using the
1251 ResourcePropertyChangeFailure element of the fault. This fault element indicates the resource
1252 property element change associated with the fault and indicates if the resource property
1253 document as a whole was restored. The format of this element is described in Section 5.6.

1254 5.8.1 Example SOAP Encoding of the UpdateResourceProperties 1255 Message Exchange

1256 Consider the resource properties document defining resource properties for a WS-Resource as
1257 shown in Section 5.7.1. The following is a non-normative example of an
1258 UpdateResourceProperties request message using SOAP 1.1:

```
1259 <s11:Envelope ...>  
1260   <s11:Header>  
1261     <wsa:Action>  
1262       http://docs.oasis-open.org/wsrf/rpw-  
1263       2/UpdateResourceProperties/UpdateResourcePropertiesRequest  
1264     </wsa:Action>  
1265     ...  
1266   </s11:Header>  
1267   <s11:Body>  
1268     <wsrf-rp:UpdateResourceProperties  
1269       xmlns:tns="http://example.com/diskdrive">  
1270     <wsrf-rp:Update>
```

```
1271     <tns:NumberOfBlocks>143</tns:NumberOfBlocks>
1272   </wsrf-rp:Update>
1273 </wsrf-rp:UpdateResourceProperties>
1274 </s11:Body>
1275 </s11:Envelope>
```

1276 The following is an example UpdateResourcePropertiesResponse message using SOAP 1.1:

```
1277 <s11:Envelope ...>
1278   <s11:Header>
1279     <wsa:Action>
1280     http://docs.oasis-open.org/wsrf/rpw-
1281     2/UpdateResourceProperties/UpdateResourcePropertiesResponse
1282     </wsa:Action>
1283     ...
1284   </s11:Header>
1285   <s11:Body>
1286     <wsrf-rp:UpdateResourcePropertiesResponse>
1287     </wsrf-rp:UpdateResourcePropertiesResponse>
1288   </s11:Body>
1289 </s11:Envelope>
```

1290 The new contents of the resource properties document after successful processing of the request
1291 message will be:

```
1292 <tns:GenericDiskDriveProperties xmlns:tns="http://example.com/diskDrive" >
1293   <tns:NumberOfBlocks>143</tns:NumberOfBlocks>
1294   <tns:BlockSize>1024</tns:BlockSize>
1295   <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
1296 </tns:GenericDiskDriveProperties>
```

1297 **5.9 DeleteResourceProperties**

1298 A WS-Resource MAY support the message exchange defined in this section that allows a
1299 requestor to remove all values of a resource property of a WS-Resource.

1300 The DeleteResourceProperties message is used to request the removal of all values of a single
1301 resource property from the resource properties document of a WS-Resource.

1302 The format of this request message MUST be:

```
1303 <wsrf-rp>DeleteResourceProperties>
1304   <wsrf-rp>Delete ResourceProperty="QName" />
1305 </wsrf-rp>DeleteResourceProperties>
```

1306 The wsa:Action MUST contain the URI

```
1307   http://docs.oasis-open.org/wsrf/rpw-
1308   2/DeleteResourceProperties/DeleteResourcePropertiesRequest.
```

1309 The contents of the DeleteResourceProperties request message are further described as follows:

```
1310 /wsrf-rp>DeleteResourceProperties/wsrf-rp>Delete
```

1311 The intent of this message is to remove all element children of the root of the resource
1312 properties document whose QNames correspond to the value of @ResourceProperty. If
1313 the resource is unable to remove all identified elements, the processing of the message

1314 MUST fault. If, as a result of processing the DeleteResourceProperty request, the resource
1315 properties document is no longer able to validate, the processing of the request MUST
1316 fault. The resource may be unable to accept the deletion of an element because it does
1317 not allow the requestor to delete a resource property (or its value) of the given name. In
1318 such circumstances, the resource MUST fault the processing of the request message.

1319 /wsrf-rp:DeleteResourceProperties/wsrf-rp:Delete/@ResourceProperty

1320 This attribute contains the QName of a resource property to be deleted by this request.

1321 When a DeleteResourceProperties request message has been successfully processed, the
1322 response message MUST have the following form:

```
1323 <wsrf-rp:DeleteResourcePropertiesResponse>  
1324 </wsrf-rp:DeleteResourcePropertiesResponse>
```

1325 The wsa:Action MUST contain the URI

1326 http://docs.oasis-open.org/wsrf/rpw-
1327 2/DeleteResourceProperties/DeleteResourcePropertiesResponse.

1328 If the WS-Resource does not respond to the DeleteResourceProperties request message with the
1329 DeleteResourcePropertiesResponse message, then it MUST send a fault. This specification
1330 defines the following faults associated with failure to process the DeleteResourceProperties
1331 request message, in addition to those faults defined for all WS-Resources in [WS-Resource]:

1332 InvalidModificationFault

1333 • The contents of the DeleteResourceProperties request component cause the resource
1334 properties document to no longer be able to validate.

1335 UnableToModifyResourcePropertyFault

1336 • A resource property identified by the DeleteResourceProperties request is not modifiable.

1337 InvalidResourcePropertyQNameFault

1338 • A resource property QName does not identify a resource property.

1339 DeleteResourcePropertiesRequestFailedFault

1340 • One or more components of the DeleteResourceProperties request failed.

1341 One of these faults, or a specialization thereof, SHOULD be sent upon failure, although other
1342 fault messages MAY be returned instead.

1343 Any fault message indicating a failure during the update of the resource properties document
1344 MUST also indicate whether the document was restored by using the
1345 ResourcePropertyChangeFailure element of the fault. This fault element indicates the resource
1346 property element change associated with the fault and indicates if the resource property
1347 document as a whole was restored. The format of this element is described in Section 5.6.

1348 **5.9.1 Example SOAP Encoding of the DeleteResourceProperties** 1349 **Message Exchange**

1350 Consider the resource properties document defining resource properties for a WS-Resource as
1351 shown in Section 5.7.1. The following is a non-normative example of a DeleteResourceProperties
1352 request message using SOAP 1.1:

```
1353 <s11:Envelope ...>  
1354 <s11:Header>  
1355 <wsa:Action>
```

```
1356 http://docs.oasis-open.org/wsrf/rpw-
1357 2/DeleteResourceProperties/DeleteResourcePropertiesRequest
1358 </wsa:Action>
1359 ...
1360 </s11:Header>
1361 <s11:Body>
1362 <wsrf-rp:DeleteResourceProperties
1363 xmlns:tns="http://example.com/diskdrive">
1364 <wsrf-rp:DeleteResourceProperty="tns:Manufacturer" />
1365 </wsrf-rp:DeleteResourceProperties>
1366 </s11:Body>
1367 </s11:Envelope>
```

1368 The following is an example DeleteResourcePropertiesResponse message using SOAP 1.1:

```
1369 <s11:Envelope ...>
1370 <s11:Header>
1371 <wsa:Action>
1372 http://docs.oasis-open.org/wsrf/rpw-
1373 2/DeleteResourceProperties/DeleteResourcePropertiesResponse
1374 </wsa:Action>
1375 ...
1376 </s11:Header>
1377 <s11:Body>
1378 <wsrf-rp:DeleteResourcePropertiesResponse>
1379 </wsrf-rp:DeleteResourcePropertiesResponse>
1380 </s11:Body>
1381 </s11:Envelope>
```

1382 The new contents of the resource properties document after successful processing of the request
1383 message will be:

```
1384 <tns:GenericDiskDriveProperties xmlns:tns="http://example.com/diskDrive" >
1385 <tns:NumberOfBlocks>22</tns:NumberOfBlocks>
1386 <tns:BlockSize>1024</tns:BlockSize>
1387 </tns:GenericDiskDriveProperties>
```

1388 **6 Subscription**

1389 The WS-Notification [[WS-BaseNotification](#)] [[WS-Topics](#)] family of specifications describes the
1390 patterns, concepts, standard message exchanges, and protocols of a topic-based, publish-
1391 subscribe messaging pattern in Web services. In the notification model, a service creates
1392 messages that are delivered to other services that had previously registered interest in the
1393 situation associated with that message.

1394 With WS-ResourceProperties, it is a common pattern for Web service requestors to request
1395 notification of inserts, updates and deletions made to the values of one or more resource property
1396 elements of a given WS-Resource. This suggests the need for the WS-Resource to encapsulate
1397 the stateful resource to ensure all changes made to the stateful resource (those made by Web
1398 services invocations, or those that happen to the resource by other means) are *observed* by the
1399 WS-Resource implementation. To the extent that encapsulation is not provided, and changes to
1400 the stateful resource are made outside of the knowledge of the associated WS-Resource
1401 implementation, the WS-Resource may not be able to provide notifications reflecting those
1402 changes.

1403 If a WS-Resource supports the resource property value-change notification pattern, and if it uses
1404 WS-Notification to implement this feature, then it **MUST** implement the message exchanges for
1405 the NotificationProducer role, as specified in [[WS-BaseNotification](#)]. The WS-Resource **MAY**
1406 accept subscriptions to only a subset of the resource properties defined for a WS-Resource. If an
1407 implementation does not use WS-Notification, then it **MAY** ignore the requirements outlined in this
1408 section.

1409 **6.1 Individual Resource Property Value Changes**

1410 One notification message artifact is created for each change to each resource property observed
1411 by the WS-Resource implementation. For example, a SetResourceProperties request message
1412 might contain five SetRequestComponents. Each of these components would result in the
1413 creation of a separate message artifact. A PutResourcePropertyDocument request might result in
1414 the change of most of the WS-Resource's resource properties, in which case each resource
1415 property changed by the PutResourcePropertyDocument request would result in a separate
1416 message artifact.

1417 WS-ResourceProperties defines the Notification TopicExpressions and TopicNamespace
1418 elements [[WS-Topics](#)] that **MUST** be used to express the organization of the WS-Resource
1419 property element value change notifications. By understanding the relationship between
1420 TopicExpressions and resource properties, and examining the set of TopicExpressions supported
1421 by the NotificationProducer Web service, the service requestor can determine which of the
1422 resource properties are able to participate in the value-change notification pattern. The
1423 TopicExpression and TopicNamespace elements associated with resource property value-
1424 change notification are described as follows:

- 1425 1. The WS-Resource's resource properties document **MAY** be defined using resource
1426 properties declared in multiple XML namespaces. For each of these XML namespaces, an
1427 associated TopicNamespace element **MUST** be defined. The TopicNamespace element
1428 defines a namespace intended to contain topics related to value changes of resource
1429 properties declared in that XML namespace.
 - 1430 ○ The value of the TopicNamespace element's targetNamespace attribute **MUST** be
1431 the same as the URI of the namespace in which the resource property element is

- 1432 defined. The name attribute of the TopicNamespace element SHOULD have the
1433 value "ResourcePropertiesTopicNamespace".
- 1434 2. For each resource property participating in the value-change notification pattern, a
1435 TopicExpression element MUST be defined as a child of the TopicNamespace element
1436 defined in 1.
- 1437 ○ Notification messages reflecting changes to the resource property are associated
1438 with this TopicExpression.
 - 1439 ○ The value of the TopicExpression element's name attribute MUST be the same as
1440 the NCName of the resource property element.
 - 1441 ○ The value of the TopicExpression element's messageTypes attribute MUST include
1442 wsrf-rp:ResourcePropertyValueChangeNotification (defined later in this section). In
1443 addition, it MAY include QNames of other message elements.
 - 1444 ○ A designer MAY introduce additional child sub-topic elements to the TopicExpression
1445 element that represent application-specific needs.
- 1446 3. The WS-Resource acting as the NotificationProducer MUST include TopicExpressions as
1447 defined in 2 above, as part of the value of its "wsnt:TopicExpression" resource property
1448 element. One such TopicExpression MUST be included for each resource property element
1449 offered as a target for a value-change subscription.
- 1450 4. When a WS-Resource observes a resource property value change, it SHOULD create a
1451 notification message that expresses the situation, and associate the notification message
1452 with the TopicExpression associated with that resource property. Note: there are many
1453 circumstances in which a change to a resource property might not result in the generation of
1454 a notification message. For example, a resource property value may change frequently,
1455 making generation of notification messages too expensive for the service. In this situation, a
1456 WS-Resource may choose to never generate notification message artifacts to record value
1457 change, or it may choose to generate notification message artifacts for a subset of the
1458 value-change situations.

1459 The wsrf-rp:ResourcePropertyValueChangeNotification element MUST appear as a component
1460 of the notification message associated with resource property value change topics. This element
1461 is defined as follows:

```
1462 <wsrf-rp:ResourcePropertyValueChangeNotification>  
1463 <wsrf-rp:OldValues> xsd:any *</wsrf-rp:OldValues>?  
1464 <wsrf-rp:NewValues> xsd:any *</wsrf-rp:NewValues>  
1465 </wsrf-rp:ResourcePropertyValueChangeNotification>
```

1466 This element may appear as the root element of the notification message, or it may appear as a
1467 descendent of the root, accommodating patterns where the notification message itself is
1468 contained in an enveloping mechanism. The form of the
1469 ResourcePropertyValueChangeNotification is further constrained as follows:

1470 /wsrf-rp:ResourcePropertyValueChangeNotification

1471 One ResourcePropertyValueChangeNotification element is created for each resource
1472 property value-change situation detected and acted upon by the WS-Resource. This
1473 component records the value change of the affected resource property.

1474 /wsrf-rp:ResourcePropertyValueChangeNotification/OldValues

1475 This element, if it appears, MUST contain the resource property elements of the affected
1476 WS-Resource property immediately prior to when the value change was applied. If the

1477 resource property did not have any value prior to the value change (for example, this
1478 notification represents an insertion of a new resource property element) then this element
1479 is empty and will contain the attribute xsi:nil with value "true". If this component does not
1480 appear in the message, then the WS-Resource was unable or unwilling to record the
1481 resource property elements prior to the value change.

1482 /wsrf-rp:ResourcePropertyValueChangedNotification/NewValues

1483 This element MUST contain the resource property elements of the affected WS-Resource
1484 property after the value-change condition was detected. If the WS-Resource property
1485 does not have any value after the value change (for example, this notification represents
1486 a deletion of the resource property element) then this element is empty and will contain
1487 the attribute xsi:nil with value "true".

1488 **6.2 Value Changes on Any Resource Property**

1489 In addition to the TopicExpressions defined for value-change notification to individual resource
1490 properties (described in the previous section), the WS-Resource MAY also support subscription
1491 for changes to *any* resource property. This specification defines a distinguished topic, named
1492 "AnyResourcePropertyValueChanged" in a distinguished Topic Namespace corresponding to the
1493 WS-ResourceProperties specification namespace.

1494 If the WS-Resource supports the NotificationProducer interface (as defined by WS-
1495 BaseNotification) and it supports subscriptions on the wsrf-rp:AnyResourcePropertyValueChanged
1496 topic, then it MUST include this TopicExpression's QName in the value of its
1497 wsnt:TopicExpression resource property. Furthermore, for any ResourcePropertyValueChanged
1498 notification message published on any Topic, the WS-Resource MUST also publish the
1499 notification message on the wsrf-rp:AnyResourcePropertyValueChanged Topic.

1500 **7 ACID Properties of Operations on WS-** 1501 **Resources**

1502 The ability to associate a transactional recovery policy to the execution of a Web service
1503 message exchange is a quality of service the designer would compose into the definition of a
1504 WS-Resource. In the presence of a transactional unit of work, a Web service capable of
1505 participating in the transactional protocol must abide by the rules of two-phase-commit
1506 transaction management. However, in the absence of a transaction management policy, the Web
1507 service is under no obligation to recover the state of the WS-Resource in the event of a failure
1508 during message processing.

1509 This specification is not prescriptive with respect to policy that governs concurrent read or write
1510 access to a WS-Resource. The definition of specific policy governing concurrent updates,
1511 whether or not separate message executions targeting the same WS-Resource may be
1512 interleaved, and whether partially-completed WS-Resource updates within a given message
1513 execution may be observed by other concurrent requests is beyond the scope of this definition.
1514 The scope and extent of the isolation of changes made to the WS-Resource is an implementation
1515 dependent responsibility of the WS-Resource itself. The WS-Resource must also take on the
1516 responsibility for the scope and extent to which notifications of changes to the WS-Resource are
1517 isolated and made observable. If WS-Resource update isolation is needed, we suggest the use of
1518 a transaction to provide a context within which isolation of WS-Resource updates can be
1519 provided. In the absence of a transactional unit of work, the level of WS-Resource update
1520 atomicity, recovery, isolation, and durability provided is implementation-dependent.

1521 The ability to declare and attach isolation-level policy to the definition of a Web service message
1522 exchange, whether or not a transactional unit of work is present, represents a general
1523 requirement not met by the current Web service architecture. In the future, isolation-level policy
1524 declarations may be introduced as a formal part of the WS-Resource definition.

1525 **8 Security Considerations**

1526 This specification defines the resource properties document and also the set of message
1527 exchanges that **MUST** be supported by a WS-Resource. In this context, there are two categories
1528 of security aspects that need to be considered: (a) securing the message exchanges and (b)
1529 securing the resource properties.

1530 **8.1 Securing the message exchanges**

1531 When messages are exchanged between a requestor and a WS-Resource in order to access or
1532 act upon one or more resource properties, it is **RECOMMENDED** that the communication
1533 between the services be secured using the mechanisms described in WS-Security [WS-Security].

1534 **8.2 Securing Resource Properties**

1535 Since WS-ResourceProperties defines a mechanism to expose properties of a WS-Resource,
1536 security policies should be established that ensure that only authorized requestors can access
1537 the value of a resource property. In order to secure access to the resource properties, the
1538 message exchanges that provide the access should be appropriately controlled. Authorization
1539 policies should be put in place so that the implications of providing the state information (through
1540 GetResourceProperty, GetMultipleResourceProperties, GetResourcePropertyDocument, or
1541 QueryResourceProperties messages or through notification of value change and modification of
1542 the resource properties), are taken into account. These policies should also take into account the
1543 semantic difference between components of the SetResourceProperties message – i.e. that an
1544 Update component updates a *value* of a resource property, whereas Insert and Delete
1545 components modify whether the WS-Resource actually *contains* the resource property values.

1546 The authorization policies may also reflect the sensitivity of the resource property(ies) that are
1547 accessible from a WS-Resource. Policies can be set at the coarse granularity of the message
1548 exchange (e.g., Get(Multiple)ResourceProperty(ies) vs SetResourceProperty), but finer-grained
1549 control at the level of individual resource properties may be desired in some scenarios (e.g. user
1550 Bob can access value of “Manufacturer” but not “NumberOfBlocks”).

1551 Given that a requestor will be able to access a resource property value by subscribing to state
1552 changes, care should be taken to set up security policies so that a consistent policy is in effect
1553 irrespective of whether the resource property value is accessed through direct message
1554 exchanges (e.g., GetResourceProperty) or indirectly through subscription for state changes (i.e.,
1555 subscription to “ResourcePropertyValueChangeNotification” topic). It should also be noted that a
1556 requestor will be able to query the value of a property through the QueryResourceProperties
1557 operation, or by using a domain-specific operation corresponding to a resource property (e.g.,
1558 getNumberOfBlocks) if one exists. Therefore, the authorization policy on
1559 QueryResourceProperties operation (and the getXXX operation, if one is declared on the Web
1560 service for resource property named XXX) should be set so that a requestor who is not
1561 authorized to get a value of a resource property through a GetResourceProperty request is not
1562 able to deduce the value indirectly through the QueryResourceProperties request (or the getXXX
1563 operation on the Web service).

1564 Even if the requestor is authorized to access the requested resource properties, it is
1565 **RECOMMENDED** that the resource properties that are exchanged between a requestor and a
1566 Web service are secured to ensure integrity and/or confidentiality of the resource property values.
1567 This will prevent unauthorized alteration of and/or access to the property values while in transit.
1568 This would mean that the specific resource property elements are signed and/or encrypted within
1569 the message by leveraging WS-Security as discussed in the previous section.

1570 9 References

1571 9.1 Normative

- 1572 **[RFC2119]** S. Bradner, *Key words for use in RFCs to Indicate Requirement*
1573 *Levels*, <http://www.ietf.org/rfc/rfc2119.txt>, IETF RFC 2119, March 1997.
- 1574 **[WS-Addressing]**
1575 <http://www.w3.org/TR/ws-addr-core>
- 1576 **[WS-BaseFaults]**
1577 http://docs.oasis-open.org/wsr/wsr/wsrf/wsrf-ws_base_faults-1.2-spec-os.pdf
- 1578 **[WS-BaseNotification]**
1579 http://docs.oasis-open.org/wsn/wsn-ws_base_notification-1.3-spec-pr-02.pdf
- 1580 **[WS-Resource]**
1581 http://docs.oasis-open.org/wsr/wsr/wsrf/wsrf-ws_resource-1.2-spec-os.pdf
- 1582 **[WS-Topics]**
1583 http://docs.oasis-open.org/wsn/wsn-ws_topics-1.3-spec-pr-01.pdf
- 1584 **[XML-Infoset]**
1585 <http://www.w3.org/TR/xml-infoset/>
- 1586 **[XPath]**
1587 <http://www.w3.org/TR/xpath>

1588 9.2 Non-Normative

- 1589 **[OGSI 1.0]** Open Grid Services Infrastructure (OGSI) V1.0
1590 <http://forge.gridforum.org/projects/ggf-editor/document/draft-ogsi-service-1/en/1>
- 1591 **[WS-Security]**
1592 <http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf>
- 1593 **[WSDL 2.0]**
1594 <http://www.w3.org/TR/wsd20/>
- 1595 **[WS-I]**
1596 <http://www.ws-i.org/Profiles/BasicProfile-1.1.html>

1597

Appendix A. Acknowledgments

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1599 which defined the OGS v1.0 [OGS] specification which was a large inspiration for the ideas
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1606 (IBM), John Fuller (Individual), Stephen Graham (IBM), Anish Karmarkar (Oracle), Hideharu Kato
1607 (Hitachi), David Levine (IBM), Paul Lipton (Computer Associates), Mark Little (Arjuna
1608 Technologies Limited), Lily Liu (WebMethods, Inc.), Tom Maguire (IBM), Susan Malaika (IBM),
1609 Mark Mc Keown (University of Manchester), David Martin (IBM), Samuel Meder (Argonne
1610 National Laboratory), Jeff Mischkin (Oracle), Roger Menday (Forschungszentrum Jlich
1611 GmbH), Bryan Murray (Hewlett-Packard), Mark Peel (Novell), Alain Regnier (Ricoh Company,
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1624 (IBM).

1625 Appendix B. XML Schema

1626 The XML types and elements used in this specification are included here for convenience. The
1627 authoritative version of this schema document is available at

1628 <http://docs.oasis-open.org/wsrf/rp-2.xsd>

```
1629 <?xml version="1.0" encoding="UTF-8"?>
```

```
1630 <!--
```

```
1631
```

```
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1665 PARTICULAR PURPOSE.
```

```
1666
```

```
1667 -->
```

```
1668 <xsd:schema
```

```
1669   xmlns:xsd="http://www.w3.org/2001/XMLSchema"
```

```
1670   xmlns:wsrf-rp="http://docs.oasis-open.org/wsrf/rp-2"
```

```

1671 xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-2"
1672 elementFormDefault="qualified" attributeFormDefault="unqualified"
1673 targetNamespace="http://docs.oasis-open.org/wsrf/rp-2"
1674 >
1675 <xsd:import
1676     namespace="http://docs.oasis-open.org/wsrf/bf-2"
1677     schemaLocation="http://docs.oasis-open.org/wsrf/bf-2.xsd"
1678 />
1679 <!-- ===== Resource Property Related ===== -->
1680 <!-- ===== Resource Properties for QueryResourceProperties ===== -->
1681 <xsd:element name="QueryExpressionDialect" type="xsd:anyURI"/>
1682
1683 <xsd:element name="QueryExpressionRPDocument">
1684     <xsd:complexType>
1685         <xsd:sequence>
1686             <xsd:element ref="wsrf-rp:QueryExpressionDialect"
1687                 minOccurs="0" maxOccurs="unbounded" />
1688         </xsd:sequence>
1689     </xsd:complexType>
1690 </xsd:element>
1691
1692 <!-- ===== Global Attribute Declaration for WSDL 1.1 portType===== -->
1693 <xsd:attribute name="ResourceProperties" type="xsd:QName" />
1694
1695 <!-- = Notification Message for ResourceProperties value change === -->
1696 <xsd:complexType name="ResourcePropertyValueChangeNotificationType">
1697     <xsd:sequence>
1698         <xsd:element name="OldValues" nillable="true"
1699             minOccurs="0" maxOccurs="1" >
1700             <xsd:complexType>
1701                 <xsd:sequence>
1702                     <xsd:any minOccurs="1" maxOccurs="unbounded" />
1703                 </xsd:sequence>
1704             </xsd:complexType>
1705         </xsd:element>
1706         <xsd:element name="NewValues" nillable="true"
1707             minOccurs="1" maxOccurs="1" >
1708             <xsd:complexType>
1709                 <xsd:sequence>
1710                     <xsd:any minOccurs="1" maxOccurs="unbounded" />
1711                 </xsd:sequence>
1712             </xsd:complexType>
1713         </xsd:element>
1714     </xsd:sequence>
1715 </xsd:complexType>
1716
1717 <xsd:element name="ResourcePropertyValueChangeNotification"
1718     type="wsrf-rp:ResourcePropertyValueChangeNotificationType" />
1719

```

```

1720 <xsd:complexType name="QueryExpressionType" mixed="true">
1721   <xsd:sequence>
1722     <xsd:any minOccurs="0" maxOccurs="1" processContents="lax" />
1723   </xsd:sequence>
1724   <xsd:attribute name="Dialect" type="xsd:anyURI" />
1725 </xsd:complexType>
1726
1727 <xsd:element name="QueryExpression" type="wsrf-rp:QueryExpressionType" />
1728
1729 <!-- ===== Message Types for GetResourcePropertyDocument ===== -->
1730
1731 <xsd:element name="GetResourcePropertyDocument">
1732   <xsd:complexType/>
1733 </xsd:element>
1734
1735 <xsd:element name="GetResourcePropertyDocumentResponse">
1736   <xsd:complexType>
1737     <xsd:sequence>
1738       <xsd:any minOccurs="1" maxOccurs="1"/>
1739     </xsd:sequence>
1740   </xsd:complexType>
1741 </xsd:element>
1742
1743 <!-- ===== Message Types for GetResourceProperty ===== -->
1744
1745 <xsd:element name="GetResourceProperty"
1746   type="xsd:QName" />
1747
1748 <xsd:element name="GetResourcePropertyResponse" >
1749   <xsd:complexType>
1750     <xsd:sequence>
1751       <xsd:any minOccurs="0" maxOccurs="unbounded" />
1752     </xsd:sequence>
1753   </xsd:complexType>
1754 </xsd:element>
1755
1756 <xsd:complexType name="InvalidResourcePropertyQNameFaultType">
1757   <xsd:complexContent>
1758     <xsd:extension base="wsrf-bf:BaseFaultType"/>
1759   </xsd:complexContent>
1760 </xsd:complexType>
1761 <xsd:element name="InvalidResourcePropertyQNameFault"
1762   type="wsrf-rp:InvalidResourcePropertyQNameFaultType"/>
1763
1764 <!-- ===== Message Types for GetMultipleResourceProperties ===== -->
1765 <xsd:element name="GetMultipleResourceProperties">
1766   <xsd:complexType>
1767     <xsd:sequence>
1768       <xsd:element name="ResourceProperty" type="xsd:QName"

```

```

1769         minOccurs="1" maxOccurs="unbounded" />
1770     </xsd:sequence>
1771 </xsd:complexType>
1772 </xsd:element>
1773
1774 <xsd:element name="GetMultipleResourcePropertiesResponse">
1775     <xsd:complexType>
1776         <xsd:sequence>
1777             <xsd:any minOccurs="0" maxOccurs="unbounded" />
1778         </xsd:sequence>
1779     </xsd:complexType>
1780 </xsd:element>
1781
1782 <!-- ===== Message Types for PutResourceProperty ===== -->
1783
1784 <xsd:element name="PutResourcePropertyDocument">
1785     <xsd:complexType>
1786         <xsd:sequence>
1787             <xsd:any minOccurs="1" maxOccurs="1"/>
1788         </xsd:sequence>
1789     </xsd:complexType>
1790 </xsd:element>
1791
1792 <xsd:element name="PutResourcePropertyDocumentResponse">
1793     <xsd:complexType>
1794         <xsd:sequence>
1795             <xsd:any minOccurs="0" maxOccurs="1"/>
1796         </xsd:sequence>
1797     </xsd:complexType>
1798 </xsd:element>
1799
1800 <xsd:complexType name="ResourcePropertyChangeFailureType">
1801     <xsd:sequence>
1802         <xsd:element name="CurrentValue" minOccurs="0" maxOccurs="1">
1803             <xsd:complexType>
1804                 <xsd:sequence>
1805                     <xsd:any minOccurs="1" maxOccurs="unbounded" />
1806                 </xsd:sequence>
1807             </xsd:complexType>
1808         </xsd:element>
1809         <xsd:element name="RequestedValue" minOccurs="0" maxOccurs="1">
1810             <xsd:complexType>
1811                 <xsd:sequence>
1812                     <xsd:any minOccurs="1" maxOccurs="unbounded" />
1813                 </xsd:sequence>
1814             </xsd:complexType>
1815         </xsd:element>
1816     </xsd:sequence>
1817     <xsd:attribute name="Restored" type="xsd:boolean"/>

```

```

1818 </xsd:complexType>
1819
1820 <xsd:complexType
1821   name="UnableToPutResourcePropertyDocumentFaultType">
1822   <xsd:complexContent>
1823     <xsd:extension base="wsrf-bf:BaseFaultType">
1824       <xsd:sequence>
1825         <xsd:element name="ResourcePropertyChangeFailure" type=
1826           "wsrf-rp:ResourcePropertyChangeFailureType"/>
1827       </xsd:sequence>
1828     </xsd:extension>
1829   </xsd:complexContent>
1830 </xsd:complexType>
1831 <xsd:element name="UnableToPutResourcePropertyDocumentFault"
1832   type=
1833   "wsrf-rp:UnableToPutResourcePropertyDocumentFaultType"/>
1834
1835 <!-- ===== Message Types for SetResourceProperties ===== -->
1836
1837 <xsd:complexType name="InsertType">
1838   <xsd:sequence>
1839     <xsd:any processContents="lax"
1840       minOccurs="1" maxOccurs="unbounded" />
1841   </xsd:sequence>
1842 </xsd:complexType>
1843 <xsd:element name="Insert" type="wsrf-rp:InsertType"/>
1844
1845 <xsd:complexType name="UpdateType">
1846   <xsd:sequence>
1847     <xsd:any processContents="lax"
1848       minOccurs="1" maxOccurs="unbounded" />
1849   </xsd:sequence>
1850 </xsd:complexType>
1851 <xsd:element name="Update" type="wsrf-rp:UpdateType"/>
1852
1853 <xsd:complexType name="DeleteType">
1854   <xsd:attribute name="ResourceProperty"
1855     type="xsd:QName" use="required" />
1856 </xsd:complexType>
1857 <xsd:element name="Delete" type="wsrf-rp:DeleteType"/>
1858
1859 <xsd:element name="SetResourceProperties">
1860   <xsd:complexType>
1861     <xsd:choice minOccurs="1" maxOccurs="unbounded">
1862       <xsd:element ref="wsrf-rp:Insert"/>
1863       <xsd:element ref="wsrf-rp:Update"/>
1864       <xsd:element ref="wsrf-rp:Delete"/>
1865     </xsd:choice>
1866   </xsd:complexType>

```

```

1867 </xsd:element>
1868
1869 <xsd:element name="SetResourcePropertiesResponse" >
1870 <xsd:complexType />
1871 </xsd:element>
1872
1873 <xsd:complexType
1874     name="InvalidModificationFaultType">
1875 <xsd:complexContent>
1876 <xsd:extension base="wsrf-bf:BaseFaultType">
1877 <xsd:sequence>
1878 <xsd:element name="ResourcePropertyChangeFailure" type=
1879     "wsrf-rp:ResourcePropertyChangeFailureType"/>
1880 </xsd:sequence>
1881 </xsd:extension>
1882 </xsd:complexContent>
1883 </xsd:complexType>
1884 <xsd:element name=
1885     "InvalidModificationFault"
1886     type=
1887     "wsrf-rp:InvalidModificationFaultType"/>
1888
1889 <xsd:complexType name="UnableToModifyResourcePropertyFaultType">
1890 <xsd:complexContent>
1891 <xsd:extension base="wsrf-bf:BaseFaultType">
1892 <xsd:sequence>
1893 <xsd:element name="ResourcePropertyChangeFailure" type=
1894     "wsrf-rp:ResourcePropertyChangeFailureType"/>
1895 </xsd:sequence>
1896 </xsd:extension>
1897 </xsd:complexContent>
1898 </xsd:complexType>
1899 <xsd:element name="UnableToModifyResourcePropertyFault"
1900     type="wsrf-rp:UnableToModifyResourcePropertyFaultType"/>
1901
1902 <xsd:complexType name="SetResourcePropertyRequestFailedFaultType">
1903 <xsd:complexContent>
1904 <xsd:extension base="wsrf-bf:BaseFaultType">
1905 <xsd:sequence>
1906 <xsd:element name="ResourcePropertyChangeFailure" type=
1907     "wsrf-rp:ResourcePropertyChangeFailureType"/>
1908 </xsd:sequence>
1909 </xsd:extension>
1910 </xsd:complexContent>
1911 </xsd:complexType>
1912 <xsd:element name="SetResourcePropertyRequestFailedFault"
1913     type=
1914     "wsrf-rp:SetResourcePropertyRequestFailedFaultType"/>
1915

```

```

1916 <xsd:complexType name="InsertResourcePropertiesRequestFailedFaultType">
1917 <xsd:complexContent>
1918 <xsd:extension base="wsrf-bf:BaseFaultType">
1919 <xsd:sequence>
1920 <xsd:element name="ResourcePropertyChangeFailure" type=
1921 "wsrf-rp:ResourcePropertyChangeFailureType"/>
1922 </xsd:sequence>
1923 </xsd:extension>
1924 </xsd:complexContent>
1925 </xsd:complexType>
1926 <xsd:element name="InsertResourcePropertiesRequestFailedFault"
1927 type=
1928 "wsrf-rp:InsertResourcePropertiesRequestFailedFaultType"/>
1929
1930 <xsd:complexType name="UpdateResourcePropertiesRequestFailedFaultType">
1931 <xsd:complexContent>
1932 <xsd:extension base="wsrf-bf:BaseFaultType">
1933 <xsd:sequence>
1934 <xsd:element name="ResourcePropertyChangeFailure" type=
1935 "wsrf-rp:ResourcePropertyChangeFailureType"/>
1936 </xsd:sequence>
1937 </xsd:extension>
1938 </xsd:complexContent>
1939 </xsd:complexType>
1940 <xsd:element
1941 name="UpdateResourcePropertiesRequestFailedFault"
1942 type="wsrf-rp:UpdateResourcePropertiesRequestFailedFaultType"/>
1943
1944 <xsd:complexType name="DeleteResourcePropertiesRequestFailedFaultType">
1945 <xsd:complexContent>
1946 <xsd:extension base="wsrf-bf:BaseFaultType">
1947 <xsd:sequence>
1948 <xsd:element name="ResourcePropertyChangeFailure" type=
1949 "wsrf-rp:ResourcePropertyChangeFailureType"/>
1950 </xsd:sequence>
1951 </xsd:extension>
1952 </xsd:complexContent>
1953 </xsd:complexType>
1954 <xsd:element
1955 name="DeleteResourcePropertiesRequestFailedFault"
1956 type="wsrf-rp:DeleteResourcePropertiesRequestFailedFaultType"/>
1957
1958 <!-- ===== Message Types for InsertResourceProperties ===== -->
1959 <xsd:element name="InsertResourceProperties">
1960 <xsd:complexType>
1961 <xsd:sequence>
1962 <xsd:element ref="wsrf-rp:Insert"/>
1963 </xsd:sequence>
1964 </xsd:complexType>

```

```

1965 </xsd:element>
1966
1967 <xsd:element name="InsertResourcePropertiesResponse" >
1968 <xsd:complexType />
1969 </xsd:element>
1970
1971 <!-- ===== Message Types for UpdateResourceProperties ===== -->
1972 <xsd:element name="UpdateResourceProperties">
1973 <xsd:complexType>
1974 <xsd:sequence>
1975 <xsd:element ref="wsrf-rp:Update"/>
1976 </xsd:sequence>
1977 </xsd:complexType>
1978 </xsd:element>
1979
1980 <xsd:element name="UpdateResourcePropertiesResponse" >
1981 <xsd:complexType />
1982 </xsd:element>
1983
1984 <!-- ===== Message Types for DeleteResourceProperties ===== -->
1985 <xsd:element name="DeleteResourceProperties">
1986 <xsd:complexType>
1987 <xsd:sequence>
1988 <xsd:element ref="wsrf-rp:Delete"/>
1989 </xsd:sequence>
1990 </xsd:complexType>
1991 </xsd:element>
1992
1993 <xsd:element name="DeleteResourcePropertiesResponse" >
1994 <xsd:complexType />
1995 </xsd:element>
1996
1997 <!-- ===== Message Types for QueryResourceProperties ===== -->
1998
1999 <xsd:element name="QueryResourceProperties" >
2000 <xsd:complexType>
2001 <xsd:sequence>
2002 <xsd:element ref="wsrf-rp:QueryExpression"
2003 minOccurs="1" maxOccurs="1"/>
2004 </xsd:sequence>
2005 </xsd:complexType>
2006 </xsd:element>
2007
2008 <xsd:element name="QueryResourcePropertiesResponse" >
2009 <xsd:complexType>
2010 <xsd:complexContent mixed="true">
2011 <xsd:restriction base="xsd:anyType">
2012 <xsd:sequence>
2013 <xsd:any processContents="lax"

```

```

2014         minOccurs="1" maxOccurs="unbounded"/>
2015     </xsd:sequence>
2016 </xsd:restriction>
2017 </xsd:complexContent>
2018 </xsd:complexType>
2019 </xsd:element>
2020
2021 <xsd:complexType name="UnknownQueryExpressionDialectFaultType">
2022 <xsd:complexContent>
2023 <xsd:extension base="wsrf-bf:BaseFaultType"/>
2024 </xsd:complexContent>
2025 </xsd:complexType>
2026 <xsd:element name="UnknownQueryExpressionDialectFault"
2027     type="wsrf-rp:UnknownQueryExpressionDialectFaultType"/>
2028
2029 <xsd:complexType name="InvalidQueryExpressionFaultType">
2030 <xsd:complexContent>
2031 <xsd:extension base="wsrf-bf:BaseFaultType"/>
2032 </xsd:complexContent>
2033 </xsd:complexType>
2034 <xsd:element name="InvalidQueryExpressionFault"
2035     type="wsrf-rp:InvalidQueryExpressionFaultType"/>
2036
2037 <xsd:complexType name="QueryEvaluationErrorFaultType">
2038 <xsd:complexContent>
2039 <xsd:extension base="wsrf-bf:BaseFaultType"/>
2040 </xsd:complexContent>
2041 </xsd:complexType>
2042 <xsd:element name="QueryEvaluationErrorFault"
2043     type="wsrf-rp:QueryEvaluationErrorFaultType"/>
2044
2045 </xsd:schema>

```

2046

Appendix C. WSDL 1.1

2047

The WSDL 1.1 for the Web service methods described in this specification is compliant with WS-I Basic Profile 1.1 [WS-I] and is included here for convenience. The authoritative version of this

2048

WSDL is available at:

2049

2050

<http://docs.oasis-open.org/wsrf/rpw-2.wsdl>

2051

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

2052

```
<!--
```

2053

2054

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```
-->
```

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```
<wsdl:definitions name="WS-ResourceProperties"
```

```

2092   xmlns="http://schemas.xmlsoap.org/wsdl/"
2093   xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
2094   xmlns:xsd="http://www.w3.org/2001/XMLSchema"
2095   xmlns:wsa="http://www.w3.org/2005/08/addressing"
2096   xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-2"
2097   xmlns:wsrf-rp="http://docs.oasis-open.org/wsrf/rp-2"
2098   xmlns:wsrf-rpw="http://docs.oasis-open.org/wsrf/rpw-2"
2099   xmlns:wsrf-rw="http://docs.oasis-open.org/wsrf/rw-2"
2100   targetNamespace="http://docs.oasis-open.org/wsrf/rpw-2"
2101 >
2102
2103 <!-- ===== Imports ===== -->
2104
2105 <wsdl:import
2106   namespace="http://docs.oasis-open.org/wsrf/rw-2"
2107   location="http://docs.oasis-open.org/wsrf/rw-2.wsdl" />
2108
2109 <!-- ===== Types Definitions ===== -->
2110 <wsdl:types>
2111   <xsd:schema>
2112     <xsd:import
2113       namespace="http://docs.oasis-open.org/wsrf/rp-2"
2114       schemaLocation="http://docs.oasis-open.org/wsrf/rp-2.xsd" />
2115   </xsd:schema>
2116 </wsdl:types>
2117
2118 <!-- ===== GetResourcePropertyDocument =====
2119   GetResourcePropertyDocument()
2120   returns: any
2121 -->
2122 <wsdl:message name="GetResourcePropertyDocumentRequest">
2123   <wsdl:part name="GetResourcePropertyDocumentRequest"
2124     element="wsrf-rp:GetResourcePropertyDocument"/>
2125 </wsdl:message>
2126
2127 <wsdl:message name="GetResourcePropertyDocumentResponse">
2128   <wsdl:part name="GetResourcePropertyDocumentResponse"
2129     element="wsrf-rp:GetResourcePropertyDocumentResponse"/>
2130 </wsdl:message>
2131
2132 <!-- ===== GetResourceProperty =====
2133   GetResourceProperty(QName)
2134   returns: any
2135 -->
2136 <wsdl:message name="GetResourcePropertyRequest">
2137   <wsdl:part name="GetResourcePropertyRequest"
2138     element="wsrf-rp:GetResourceProperty" />
2139 </wsdl:message>
2140

```

```

2141 <wsdl:message name="GetResourcePropertyResponse">
2142   <wsdl:part name="GetResourcePropertyResponse"
2143     element="wsrf-rp:GetResourcePropertyResponse" />
2144 </wsdl:message>
2145
2146 <wsdl:message name="InvalidResourcePropertyQNameFault">
2147   <part name="InvalidResourcePropertyQNameFault"
2148     element="wsrf-rp:InvalidResourcePropertyQNameFault" />
2149 </wsdl:message>
2150
2151 <!-- =====GetMultipleResourceProperties =====
2152 GetMultipleResourceProperties(list of QName)
2153 returns: sequence of any
2154 -->
2155 <wsdl:message name="GetMultipleResourcePropertiesRequest">
2156   <wsdl:part name="GetMultipleResourcePropertiesRequest"
2157     element="wsrf-rp:GetMultipleResourceProperties" />
2158 </wsdl:message>
2159
2160 <wsdl:message name="GetMultipleResourcePropertiesResponse">
2161   <wsdl:part name="GetMultipleResourcePropertiesResponse"
2162     element="wsrf-rp:GetMultipleResourcePropertiesResponse" />
2163 </wsdl:message>
2164 <!-- ===== PutResourcePropertyDocument =====
2165 PutResourcePropertyDocument(any)
2166 returns: any?
2167 -->
2168 <wsdl:message name="PutResourcePropertyDocumentRequest">
2169   <wsdl:part name="PutResourcePropertyDocumentRequest"
2170     element="wsrf-rp:PutResourcePropertyDocument"/>
2171 </wsdl:message>
2172
2173 <wsdl:message name="PutResourcePropertyDocumentResponse">
2174   <wsdl:part name="PutResourcePropertyDocumentResponse"
2175     element="wsrf-rp:PutResourcePropertyDocumentResponse"/>
2176 </wsdl:message>
2177
2178 <wsdl:message name="UnableToPutResourcePropertyDocumentFault">
2179   <part name="UnableToPutResourcePropertyDocumentFault"
2180     element="wsrf-rp:UnableToPutResourcePropertyDocumentFault" />
2181 </wsdl:message>
2182
2183 <!-- ===== SetResourceProperties =====
2184 SetResourceProperties(
2185 { insert (any)* |
2186   update (any)* |
2187   delete@QName } +
2188 )
2189 returns: empty

```

```

2190 -->
2191 <wsdl:message name="SetResourcePropertiesRequest">
2192   <wsdl:part name="SetResourcePropertiesRequest"
2193     element="wsrf-rp:SetResourceProperties" />
2194 </wsdl:message>
2195
2196 <wsdl:message name="SetResourcePropertiesResponse">
2197   <wsdl:part name="SetResourcePropertiesResponse"
2198     element="wsrf-rp:SetResourcePropertiesResponse" />
2199 </wsdl:message>
2200
2201 <wsdl:message name="InvalidModificationFault">
2202   <part name="InvalidModificationFault"
2203     element="wsrf-rp:InvalidModificationFault" />
2204 </wsdl:message>
2205
2206 <wsdl:message name="UnableToModifyResourcePropertyFault">
2207   <part name="UnableToModifyResourcePropertyFault"
2208     element="wsrf-rp:UnableToModifyResourcePropertyFault" />
2209 </wsdl:message>
2210
2211 <wsdl:message name="SetResourcePropertyRequestFailedFault">
2212   <part name="SetResourcePropertyRequestFailedFault"
2213     element="wsrf-rp:SetResourcePropertyRequestFailedFault" />
2214 </wsdl:message>
2215
2216 <!-- ===== InsertResourceProperties =====>
2217 InsertResourceProperties((any)* )
2218 returns: empty
2219 -->
2220 <wsdl:message name="InsertResourcePropertiesRequest">
2221   <wsdl:part name="InsertResourcePropertiesRequest"
2222     element="wsrf-rp:InsertResourceProperties" />
2223 </wsdl:message>
2224
2225 <wsdl:message name="InsertResourcePropertiesResponse">
2226   <wsdl:part name="InsertResourcePropertiesResponse"
2227     element="wsrf-rp:InsertResourcePropertiesResponse" />
2228 </wsdl:message>
2229
2230 <wsdl:message name="InsertResourcePropertiesRequestFailedFault">
2231   <part name="InsertResourcePropertiesRequestFailedFault"
2232     element="wsrf-rp:InsertResourcePropertiesRequestFailedFault" />
2233 </wsdl:message>
2234
2235 <!-- ===== UpdateResourceProperties =====>
2236 UpdateResourceProperties((any)* )
2237 returns: empty
2238 -->

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2239 <wsdl:message name="UpdateResourcePropertiesRequest">
2240   <wsdl:part name="UpdateResourcePropertiesRequest"
2241     element="wsrf-rp:UpdateResourceProperties" />
2242 </wsdl:message>
2243
2244 <wsdl:message name="UpdateResourcePropertiesResponse">
2245   <wsdl:part name="UpdateResourcePropertiesResponse"
2246     element="wsrf-rp:UpdateResourcePropertiesResponse" />
2247 </wsdl:message>
2248
2249 <wsdl:message name="UpdateResourcePropertiesRequestFailedFault">
2250   <part name="UpdateResourcePropertiesRequestFailedFault"
2251     element="wsrf-rp:UpdateResourcePropertiesRequestFailedFault" />
2252 </wsdl:message>
2253
2254 <!-- ===== DeleteResourceProperties =====
2255 DeleteResourceProperties( ResourceProperty )
2256 returns: empty
2257 -->
2258 <wsdl:message name="DeleteResourcePropertiesRequest">
2259   <wsdl:part name="DeleteResourcePropertiesRequest"
2260     element="wsrf-rp:DeleteResourceProperties" />
2261 </wsdl:message>
2262
2263 <wsdl:message name="DeleteResourcePropertiesResponse">
2264   <wsdl:part name="DeleteResourcePropertiesResponse"
2265     element="wsrf-rp:DeleteResourcePropertiesResponse" />
2266 </wsdl:message>
2267
2268 <wsdl:message name="DeleteResourcePropertiesRequestFailedFault">
2269   <part name="DeleteResourcePropertiesRequestFailedFault"
2270     element="wsrf-rp:DeleteResourcePropertiesRequestFailedFault" />
2271 </wsdl:message>
2272
2273 <!-- ===== QueryResourceProperties =====
2274 QueryResourceProperties(QueryExpression)
2275 returns: any
2276 -->
2277 <wsdl:message name="QueryResourcePropertiesRequest">
2278   <wsdl:part name="QueryResourcePropertiesRequest"
2279     element="wsrf-rp:QueryResourceProperties" />
2280 </wsdl:message>
2281
2282 <wsdl:message name="QueryResourcePropertiesResponse">
2283   <wsdl:part name="QueryResourcePropertiesResponse"
2284     element="wsrf-rp:QueryResourcePropertiesResponse" />
2285 </wsdl:message>
2286
2287 <wsdl:message name="UnknownQueryExpressionDialectFault">

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2288     <part name="UnknownQueryExpressionDialectFault"
2289         element="wsrf-rp:UnknownQueryExpressionDialectFault" />
2290 </wsdl:message>
2291
2292 <wsdl:message name="InvalidQueryExpressionFault">
2293     <part name="InvalidQueryExpressionFault"
2294         element="wsrf-rp:InvalidQueryExpressionFault" />
2295 </wsdl:message>
2296
2297 <wsdl:message name="QueryEvaluationErrorFault">
2298     <part name="QueryEvaluationErrorFault"
2299         element="wsrf-rp:QueryEvaluationErrorFault" />
2300 </wsdl:message>
2301
2302 <!-- ===== PortType Definitions ===== -->
2303 <wsdl:portType name="GetResourcePropertyDocument">
2304     <wsdl:operation name="GetResourcePropertyDocument">
2305         <wsdl:input name="GetResourcePropertyDocumentRequest"
2306             message="wsrf-rpw:GetResourcePropertyDocumentRequest"/>
2307         <wsdl:output name="GetResourcePropertyDocumentResponse"
2308             message="wsrf-rpw:GetResourcePropertyDocumentResponse"/>
2309         <wsdl:fault name="ResourceUnknownFault"
2310             message="wsrf-rw:ResourceUnknownFault"/>
2311         <wsdl:fault name="ResourceUnavailableFault"
2312             message="wsrf-rw:ResourceUnavailableFault"/>
2313     </wsdl:operation>
2314 </wsdl:portType>
2315
2316 <wsdl:portType name="GetResourceProperty">
2317     <wsdl:operation name="GetResourceProperty">
2318         <wsdl:input name="GetResourcePropertyRequest"
2319             message="wsrf-rpw:GetResourcePropertyRequest" />
2320         <wsdl:output name="GetResourcePropertyResponse"
2321             message="wsrf-rpw:GetResourcePropertyResponse" />
2322         <wsdl:fault name="ResourceUnknownFault"
2323             message="wsrf-rw:ResourceUnknownFault"/>
2324         <wsdl:fault name="ResourceUnavailableFault"
2325             message="wsrf-rw:ResourceUnavailableFault"/>
2326         <wsdl:fault name="InvalidResourcePropertyQNameFault"
2327             message="wsrf-rpw:InvalidResourcePropertyQNameFault" />
2328     </wsdl:operation>
2329 </wsdl:portType>
2330
2331 <wsdl:portType name="GetMultipleResourceProperties">
2332     <wsdl:operation name="GetMultipleResourceProperties">
2333         <wsdl:input name="GetMultipleResourcePropertiesRequest"
2334             message="wsrf-rpw:GetMultipleResourcePropertiesRequest" />
2335         <wsdl:output name="GetMultipleResourcePropertiesResponse"
2336             message="wsrf-rpw:GetMultipleResourcePropertiesResponse" />

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2337 <wsdl:fault name="ResourceUnknownFault"
2338     message="wsrf-rw:ResourceUnknownFault"/>
2339 <wsdl:fault name="ResourceUnavailableFault"
2340     message="wsrf-rw:ResourceUnavailableFault"/>
2341 <wsdl:fault name="InvalidResourcePropertyQNameFault"
2342     message="wsrf-rpw:InvalidResourcePropertyQNameFault" />
2343 </wsdl:operation>
2344 </wsdl:portType>
2345
2346 <wsdl:portType name="PutResourcePropertyDocument">
2347 <wsdl:operation name="PutResourcePropertyDocument">
2348 <wsdl:input name="PutResourcePropertyDocumentRequest"
2349     message="wsrf-rpw:PutResourcePropertyDocumentRequest" />
2350 <wsdl:output name="PutResourcePropertyDocumentResponse"
2351     message="wsrf-rpw:PutResourcePropertyDocumentResponse" />
2352 <wsdl:fault name="ResourceUnknownFault"
2353     message="wsrf-rw:ResourceUnknownFault"/>
2354 <wsdl:fault name="ResourceUnavailableFault"
2355     message="wsrf-rw:ResourceUnavailableFault"/>
2356 <wsdl:fault name="UnableToPutResourcePropertyDocumentFault"
2357     message="wsrf-rpw:UnableToPutResourcePropertyDocumentFault" />
2358 </wsdl:operation>
2359 </wsdl:portType>
2360
2361 <wsdl:portType name="SetResourceProperties">
2362 <wsdl:operation name="SetResourceProperties">
2363 <wsdl:input name="SetResourcePropertiesRequest"
2364     message="wsrf-rpw:SetResourcePropertiesRequest" />
2365 <wsdl:output name="SetResourcePropertiesResponse"
2366     message="wsrf-rpw:SetResourcePropertiesResponse" />
2367 <wsdl:fault name="ResourceUnknownFault"
2368     message="wsrf-rw:ResourceUnknownFault"/>
2369 <wsdl:fault name="ResourceUnavailableFault"
2370     message="wsrf-rw:ResourceUnavailableFault"/>
2371 <wsdl:fault name="InvalidModificationFault"
2372     message="wsrf-rpw:InvalidModificationFault" />
2373 <wsdl:fault name="UnableToModifyResourcePropertyFault"
2374     message="wsrf-rpw:UnableToModifyResourcePropertyFault" />
2375 <wsdl:fault name="InvalidResourcePropertyQNameFault"
2376     message="wsrf-rpw:InvalidResourcePropertyQNameFault" />
2377 <wsdl:fault name="SetResourcePropertyRequestFailedFault"
2378     message="wsrf-rpw:SetResourcePropertyRequestFailedFault" />
2379 </wsdl:operation>
2380 </wsdl:portType>
2381
2382 <wsdl:portType name="InsertResourceProperties">
2383 <wsdl:operation name="InsertResourceProperties">
2384 <wsdl:input name="InsertResourcePropertiesRequest"
2385     message="wsrf-rpw:InsertResourcePropertiesRequest" />

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```

2386 <wsdl:output name="InsertResourcePropertiesResponse"
2387     message="wsrf-rpw:InsertResourcePropertiesResponse" />
2388 <wsdl:fault name="ResourceUnknownFault"
2389     message="wsrf-rw:ResourceUnknownFault"/>
2390 <wsdl:fault name="ResourceUnavailableFault"
2391     message="wsrf-rw:ResourceUnavailableFault"/>
2392 <wsdl:fault name="InvalidModificationFault"
2393     message="wsrf-rpw:InvalidModificationFault" />
2394 <wsdl:fault name="UnableToModifyResourcePropertyFault"
2395     message="wsrf-rpw:UnableToModifyResourcePropertyFault" />
2396 <wsdl:fault name="InvalidResourcePropertyQNameFault"
2397     message="wsrf-rpw:InvalidResourcePropertyQNameFault" />
2398 <wsdl:fault name="InsertResourcePropertiesRequestFailedFault"
2399     message="wsrf-rpw:InsertResourcePropertiesRequestFailedFault" />
2400 </wsdl:operation>
2401 </wsdl:portType>
2402
2403 <wsdl:portType name="UpdateResourceProperties">
2404 <wsdl:operation name="UpdateResourceProperties">
2405 <wsdl:input name="UpdateResourcePropertiesRequest"
2406     message="wsrf-rpw:UpdateResourcePropertiesRequest" />
2407 <wsdl:output name="UpdateResourcePropertiesResponse"
2408     message="wsrf-rpw:UpdateResourcePropertiesResponse" />
2409 <wsdl:fault name="ResourceUnknownFault"
2410     message="wsrf-rw:ResourceUnknownFault"/>
2411 <wsdl:fault name="ResourceUnavailableFault"
2412     message="wsrf-rw:ResourceUnavailableFault"/>
2413 <wsdl:fault name="InvalidModificationFault"
2414     message="wsrf-rpw:InvalidModificationFault" />
2415 <wsdl:fault name="UnableToModifyResourcePropertyFault"
2416     message="wsrf-rpw:UnableToModifyResourcePropertyFault" />
2417 <wsdl:fault name="InvalidResourcePropertyQNameFault"
2418     message="wsrf-rpw:InvalidResourcePropertyQNameFault" />
2419 <wsdl:fault name="UpdateResourcePropertiesRequestFailedFault"
2420     message="wsrf-rpw:UpdateResourcePropertiesRequestFailedFault" />
2421 </wsdl:operation>
2422 </wsdl:portType>
2423
2424 <wsdl:portType name="DeleteResourceProperties">
2425 <wsdl:operation name="DeleteResourceProperties">
2426 <wsdl:input name="DeleteResourcePropertiesRequest"
2427     message="wsrf-rpw:DeleteResourcePropertiesRequest" />
2428 <wsdl:output name="DeleteResourcePropertiesResponse"
2429     message="wsrf-rpw:DeleteResourcePropertiesResponse" />
2430 <wsdl:fault name="ResourceUnknownFault"
2431     message="wsrf-rw:ResourceUnknownFault"/>
2432 <wsdl:fault name="ResourceUnavailableFault"
2433     message="wsrf-rw:ResourceUnavailableFault"/>
2434 <wsdl:fault name="InvalidModificationFault"

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2435     message="wsrf-rpw:InvalidModificationFault" />
2436 <wsdl:fault name="UnableToModifyResourcePropertyFault"
2437     message="wsrf-rpw:UnableToModifyResourcePropertyFault" />
2438 <wsdl:fault name="InvalidResourcePropertyQNameFault"
2439     message="wsrf-rpw:InvalidResourcePropertyQNameFault" />
2440 <wsdl:fault name="DeleteResourcePropertiesRequestFailedFault"
2441     message="wsrf-rpw:DeleteResourcePropertiesRequestFailedFault" />
2442 </wsdl:operation>
2443 </wsdl:portType>
2444
2445 <wsdl:portType name="QueryResourceProperties"
2446     wsrf-rp:ResourceProperties="wsrf-rp:QueryExpressionRPDocument">
2447 <wsdl:operation name="QueryResourceProperties">
2448 <wsdl:input name="QueryResourcePropertiesRequest"
2449     message="wsrf-rpw:QueryResourcePropertiesRequest" />
2450 <wsdl:output name="QueryResourcePropertiesResponse"
2451     message="wsrf-rpw:QueryResourcePropertiesResponse" />
2452 <wsdl:fault name="ResourceUnknownFault"
2453     message="wsrf-rw:ResourceUnknownFault"/>
2454 <wsdl:fault name="ResourceUnavailableFault"
2455     message="wsrf-rw:ResourceUnavailableFault"/>
2456 <wsdl:fault name="InvalidResourcePropertyQNameFault"
2457     message="wsrf-rpw:InvalidResourcePropertyQNameFault" />
2458 <wsdl:fault name="UnknownQueryExpressionDialectFault"
2459     message="wsrf-rpw:UnknownQueryExpressionDialectFault" />
2460 <wsdl:fault name="InvalidQueryExpressionFault"
2461     message="wsrf-rpw:InvalidQueryExpressionFault" />
2462 <wsdl:fault name="QueryEvaluationErrorFault"
2463     message="wsrf-rpw:QueryEvaluationErrorFault" />
2464 </wsdl:operation>
2465
2466 </wsdl:portType>
2467
2468 </wsdl:definitions>

```

Appendix D. Revision History

Rev	Date	By Whom	What
wd-01	2004-05-18	Steve Graham	Initial version created from submission by contributing companies. Minor modifications made to reflect OASIS formatting and the following issues: WSRF2, WSRF3, WSRF14, WSRF33.
wd-02	2004-05-31	Steve Graham, Jem Treadwell	Mods to draft 01, including hyphenation, clarification of acknowledgements section
wd-03	2004-06-04	Steve Graham	Reformat rogue Veranda text with Arial.
wd-04	2004-06-07	Steve Graham	Base faults comment on faults (align with ResourceLifetime), update date URIs to 2004/06, update URLs in references to point to .pdfs, update Acknowledgements
wd-05	2004-07-19	Jem Treadwell	Changed [State Paper] & [WS-Notification] references to public URLs.
wd-06 (wd-05.b)	2004-09-17	Steve Graham	WSRF15, WSRF16, WSRF21
wd-05.c	2004-11-22	Jem Treadwell Steve Graham	Confirm WSRF15. WSRF16, WSRF21, fix up some small typos (Jem), verify typos fixes are correct and reversion to 05.c (sgg)
wd-05.d	2004-11-22	Steve Graham	Incorporate Chairman's editorial modifications (from Ian Robinson) on Title page, namespace URIs and References section. Incorporate changes due to adoption of WS-Resource specification. Addresses: WSRF4, WSRF24, WSRF27, WSRF30, WSRF43, WSRF49, WSRF53, WSRF56
wd-05.e	2004-11-26	Ian Robinson	Handful of typos corrected.
wd-05	2004-11-30	Steve Graham	Final typos accepted, PDF generated.
wd-06.a	2005-02-18	Steve Graham	WSRF25, WSRF51, WSRF55, WSRF62, WSRF63, WSRF68, WSRF72, WSRF79, WSRF81, WSRF83, WSRF86, WSRF93, WSRF95, WSRF96

Rev	Date	By Whom	What
wd-06.b	2005-02-25	Jem Treadwell	Few minor typos etc. corrected.
wd-06.c	2005-03-07	Jem Treadwell	Updated wsa namespace reference.
wd-06.d	2005-03-24	Ian Robinson	Added ResourcePropertyChangeFailure type to schema
wd-07.a	2005-05-16	Steve Graham	91, 92 (no changes required), 97, 98, 99, 101, 102, 103
wd-07.c	2005-05-17	Steve Graham	100, 109
wd-07.d	2005-05-17	Steve Graham	113
wd-07.e	2005-05-18	Steve Graham	Updates to 114, per Ian Robinson and F2F discussion.
wd-07.f	2005-05-18	Steve Graham	WSRF 91,97,99,100,101,102, 103
wd-07.g	2005-06-10	Steve Graham	Minor typos as reported by Hideharu Kato, a few additional related typos, update references to WS-Notification, update Acknowledgements.
pr-01	2005-06-10	Steve Graham	Change status to PR
wd-08	2005-09-06	Ian Robinson	127. TopicSpace->Topic Namespace
wd-09	2005-09-15	Steve Graham	Remove unused references and use hyperlinks for references, namespace URIs from -1 to -2, namespace locations now include .xsd and .wsdl WSRF 141, 152, 125, 126 (no action due to WSRF 140), 132, 133, 134, 135, 136, 138, 140, 143, 144, 146, 147
pr-02.a	2005-11-18	Jem Treadwell	158: Added wsnt prefix and fixed a few nits.
pr-02.b	2005-11-28	Jem Treadwell	Fixed minor typos.
pr-02.c	2006-01-11	Ian Robinson	Fixed wsnt namespace reference

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