



Web Services Resource Properties 1.2 (WS-ResourceProperties)

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Abstract:

The relationship between Web services and stateful resources is defined in [WS-Resource]. This relationship is described as the WS-Resource Access Pattern [WS-Resource]. In the WS-Resource Access Pattern, messages to a Web service may include a component that identifies a stateful resource to be used in the execution of the message. We refer to the composition of a stateful resource and a Web service as a WS-Resource [WS-Resource].

This document standardizes the means by which the definition of the properties of a WS-Resource may be declared as part of a Web service interface. The declaration of the WS-Resource's properties represents a projection of or a view on the WS-Resource's state. This projection is defined in terms of a resource properties document. This resource properties document serves to define a basis for access to the resource properties through Web service interfaces.

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

Status:

implementations. Committee members should send comments on this specification to the wsrf@lists.oasis-open.org list. Others should subscribe to and send comments to the wsrf-comment@lists.oasis-open.org list. To subscribe, send an email message to wsrf-comment-subscribe@lists.oasis-open.org with the word "subscribe" as the body of the message.

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38

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87 1 Introduction

88 The relationship between Web services and stateful resources is defined in [WS-Resource]. This
89 relationship is described as the *WS-Resource Access Pattern*. In the *WS-Resource Access*
90 *Pattern*, messages to a Web service include a component that identifies a stateful resource to be
91 used in the execution of the message exchange. We refer to the composition of a stateful
92 resource and a Web service as a *WS-Resource*.

93 This specification standardizes the means by which the definition of the properties of a *WS-*
94 *Resource* may be declared as part of the Web service interface. The declaration of the *WS-*
95 *Resource*'s properties represents a projection of or a *view* on the *WS-Resource*'s state. The
96 projection is defined in terms of a resource properties document. This resource properties
97 document serves to define a basis for access to the resource properties through the Web service
98 interface.

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

103 In this document, we outline the goals and requirements for resource properties. We define the
104 means to declare resource properties as part of a Web service description. Following this, we
105 define the message exchanges for querying and updating resource property values. The
106 document concludes with a discussion of security considerations, including a discussion of
107 security considerations associated with resource properties. As an appendix, we provide
108 normative XML and WSDL descriptions of resource properties.

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

111 1.1 Goals and Requirements

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

116 1.1.1 Requirements

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

118 **This specification MUST:**

- 119 • Define the term "resource property" and its relationship to Web services and *WS-Resources*.
- 120 • Define the means by which a designer decorates a Web service description with the names
121 and types of properties associated with a *WS-Resource*.
- 122 • Define the means by which a requestor can:
 - 123 • Retrieve the values of one or more properties of a *WS-Resource*
 - 124 • Update the values of one or more properties of a *WS-Resource*
 - 125 • Query across the values of one or more properties of a *WS-Resource*
 - 126 • Subscribe for notification [WS-Notification] when the value of a *WS-Resource* property
127 changes.

128 The means by which resource property values are retrieved and updated **SHOULD** reflect a
129 document-oriented style and **MUST** provide the means to perform batched query and update

130 operations against the WS-Resource in a single message exchange. This will facilitate improved
131 performance over approaches requiring a separate request message exchange for each
132 individual resource property access.

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

143 1.1.2 Non-Goals

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

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

148 1.2 Notational Conventions

149 The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD",
150 "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be
151 interpreted as described in [RFC 2119].

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

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

- 158 • `?' denotes optionality (i.e. zero or one occurrences),
- 159 • `*` denotes zero or more occurrences,
- 160 • `+` denotes one or more occurrences,
- 161 • `[` and `]` are used to form groups,
- 162 • `|` represents choice.

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

```
165 <!-- sample pseudo-schema -->  
166 <element  
167   required_attribute_of_type_QName="xs:QName"  
168   optional_attribute_of_type_string="xs:string"? >  
169   <required_element />  
170   <optional_element />?  
171   <one_or_more_of_these_elements />+  
172   [ <choice_1 /> | <choice_2 /> ]*  
173 </element>
```

174 **1.3 Namespaces**

175 The following namespaces are used in this document:

Prefix	Namespace
s12	http://www.w3.org/2003/05/soap-envelope
xsd	http://www.w3.org/2001/XMLSchema
wsa	http://schemas.xmlsoap.org/ws/2003/02/addressing
wsrf-rp	http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.xsd
wsrf-rpw	http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wsdl
wsrf-bf	http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-BaseFaults-1.2-draft-03.xsd

176

177 2 Terminology and Concepts

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

180 **Resource Property:**

- 181 ○ A resource property is a piece of information defined as part of the state model of a WS-
182 Resource.
- 183 ○ A resource property may reflect a part of the resource's state, meta-data, manageability
184 information, etc.

185 **Resource Properties Document:**

- 186 ○ The XML document representing a logical composition of resource property elements.
187 The resource properties document defines a particular view or projection of the state data
188 implemented by the WS-Resource.
- 189 ○ The type (e.g. the XML Schema definition of the root element) of a resource properties
190 document is associated with the WSDL portType defining the Web service interface. This
191 association is the basis of the WS-Resource definition. Each instance of a particular WS-
192 Resource type MUST implement a logical resource properties document of the type
193 declared in the WSDL portType.

194 **Resource Property Element:**

- 195 ○ The XML representation of a resource property.
- 196 ○ A resource property element must appear as the immediate child of the root element of a
197 resource properties document.
- 198 ○ A resource property element must be an XML global element definition (GED), and is
199 uniquely identified by QName.

200 **Resource Property Value:**

- 201 ○ The value(s) associated with a resource property.

202

3 Example

203

The simple example below defines the GenericDiskDrive portType and the resource properties

204

document associated with GenericDiskDrive. The association of the resource properties

205

document with the portType defines the type of the WS-Resource.

206

```
<wsdl:definitions ... xmlns:tns="http://example.com/diskDrive" ...>
207 ...
208 <wsdl:types>
209   <xsd:schema targetNamespace="http://example.com/diskDrive" ... >
210
211     <!-- Resource property element declarations -->
212     <xsd:element name="NumberOfBlocks" type="xsd:integer"/>
213     <xsd:element name="BlockSize" type="xsd:integer" />
214     <xsd:element name="Manufacturer" type="xsd:string" />
215     <xsd:element name="StorageCapability" type="xsd:string" />
216
217     <!-- Resource properties document declaration -->
218     <xsd:element name="GenericDiskDriveProperties">
219       <xsd:complexType>
220         <xsd:sequence>
221           <xsd:element ref="tns:NumberOfBlocks"/>
222           <xsd:element ref="tns:BlockSize" />
223           <xsd:element ref="tns:Manufacturer" />
224           <xsd:any minOccurs="0" maxOccurs="unbounded" />
225           <xsd:element ref="tns:StorageCapability"
226             minOccurs="0" maxOccurs="unbounded" />
227         </xsd:sequence>
228       </xsd:complexType>
229     </xsd:element>
230 ...
231   </xsd:schema>
232 </wsdl:types>
233 ...
234 <!-- Association of resource properties document to a portType -->
235 <wsdl:portType name="GenericDiskDrive"
236   wsrf-rp:ResourceProperties="tns:GenericDiskDriveProperties" >
237
238   <operation name="start" .../>
239   <operation name="stop" .../>
240 ...
241 </wsdl:portType>
242 ...
243 </wsdl:definitions>
```

244

The following represents the request message used to retrieve two resource property elements

245

from the WS-Resource that implements the GenericDiskDrive portType:

246

```
...
247 <wsrf-rp:GetMultipleResourceProperties
248   xmlns:tns="http://example.com/diskdrive" ...>
```

```
249     <wsrf-rp:ResourceProperty>
250         tns:NumberOfBlocks
251     </wsrf-rp:ResourceProperty>
252     <wsrf-rp:ResourceProperty>
253         tns:BlockSize
254     </wsrf-rp:ResourceProperty>
255     <wsrf-rp:ResourceProperty>
256         tns:StorageCapability
257     </wsrf-rp:ResourceProperty>
258 </wsrf-rp:GetMultipleResourceProperties>
259 ...
```

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

```
261 ...
262 <wsrf-rp:GetMultipleResourcePropertiesResponse
263     xmlns:ns1="http://example.com/diskdrive"
264     xmlns:ns2="http://example.com/capabilities" ...>
265     <ns1:NumberOfBlocks>22</ns1:NumberOfBlocks>
266     <ns1:BlockSize>1024</ns1:BlockSize>
267     <ns1:StorageCapability>
268         <ns2:NoSinglePointOfFailure>true</ns2:NoSinglePointOfFailure>
269     </ns1:StorageCapability>
270     <ns1:StorageCapability>
271         <ns2:DataRedundancyMax>42</ns2:DataRedundancyMax>
272     </ns1:StorageCapability>
273
274 </wsrf-rp:GetMultipleResourcePropertiesResponse>
275 ...
```

276 **4 Declaring Resource Properties**

277 **4.1 Resource Properties Document**

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

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

292 There is an explicit relationship between the resource properties document and the message
293 exchanges defined in Section 5. Any Web service that implements an interface that includes a
294 resource properties document type declaration is a WS-Resource. A WS-Resource **MUST** accept
295 message requests declared by the GetResourceProperty message exchange defined in Section
296 5. Similarly, such a Web service **MAY** accept message requests declared by the other message
297 exchanges defined in Section 5.

298 However, there is no relationship, intended or implied by this specification, between the resource
299 properties defined in the resource properties document and any other message exchanges that
300 may be introduced as part of the Web service interface. Any relationships between the resource
301 properties and messages that comprise an interface are entirely under the purview of the
302 designer of that interface. For example, using the resource properties document described above
303 in Section 3, it would be legal for an interface designer to introduce a "getNumberOfBlocks"
304 message exchange. However, with respect to this specification, there is no relationship either
305 required or prohibited between such an operation and the properties declared in the resource
306 properties document.

307 **4.2 Resource Properties Document Type**

308 A *resource properties document* **MUST** be defined using the following rules:

- 309 1. The resource properties document **MUST** be a global element declaration (GED) in some
310 XML namespace. This GED defines the type of the root element of a resource properties
311 document and hence the type of the resource properties document itself.
- 312 2. The resource properties document **MUST** be uniquely identified by a QName.
- 313 3. The complexType defining the resource properties document **MUST** define element
314 children only; it **MUST NOT** define attributes. The child elements **MUST** be aggregated
315 using xsd:sequence or xsd:all. The order of appearance of the resource properties within
316 the resource properties document does not matter to WS-ResourceProperties.
- 317 4. The complexType defining the resource properties document **MUST** define a sequence
318 of one or more child elements, called *resource property elements*.
 - 319 a) Child elements **MUST** be defined using XML schema element reference (@ref).

- 320 b) This specification defines no additional restriction on the use of @minOccurs or
321 @maxOccurs or other information elements associated with the XML Schema
322 element definition.
- 323 5. The complexType defining the resource properties document MAY allow open element
324 content (xsd:any).

325 **4.3 Declaring the Resource Properties Document Type in WSDL**

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

```
328    <wsdl:definitions ...>  
329      <wsdl:portType ...  
330        wsrf-rp:ResourceProperties="xsd:QName"? ... >  
331      ...  
332    </wsdl:portType>
```

333 This definition is further constrained as follows:

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

335 If this attribute appears on a WSDL 1.1 portType element (using attribute extensibility
336 available in the WSDL 1.1 XML schema definition for the portType element) its value
337 MUST be a QName referring to a resource properties document as defined in Section
338 4.2.

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

343 **4.4 Resource Properties and Interface Aggregation**

344 Web service interface designers MAY define a collection of discrete interfaces (portTypes), each
345 of which defines a set of message exchange patterns (operations). A common design scenario is
346 one in which the designer combines these discrete interfaces to form a composed, *most-derived*
347 interface of a Web service. Examples of independently-specified interfaces designed for purposes
348 of aggregation into a most-derived interface include WS-Notification [WS-Notification], WS-
349 ResourceLifetime [WS-ResourceLifetime], and a large number of general-purpose or application-
350 domain-specific management interfaces. Further, there may be various dependencies between
351 these interfaces. That is, the messages defined by interface A may only be useful in a service
352 implementation when combined with those of interface B.

353 Within WSDL 1.1, there is no formally-defined interface extension mechanism¹. In WSDL 1.1 we
354 expect service designers to *copy-and-paste* operations from the various constituent interfaces
355 into a single, flat, most-derived service interface. In addition, we expect the service interface
356 designer to compose a resource property document for the most-derived Web service interface

¹ WSDL 2.0 is expected to define a mechanism to formally model interface aggregation /interface/@extends [WSDL 2.0].

357 that consists of all of the resource property element declarations from each of the constituent
358 interfaces used in the composition.

359 Consider the following example, wherein a designer extends the "GenericDiskDrive" WS-
360 Resource interface in a vendor-specific fashion.

```
361 <wsdl:definitions ...
362     xmlns:gen="http://example.com/diskDrive"
363     xmlns:ven="http://vendor.com/diskDrive"
364     ...>
365 ...
366 <wsdl:types>
367     <xsd:schema targetNamespace="http://vendor.com/diskDrive" ... >
368
369         <!-- Resource property element declarations -->
370         <xsd:element name="VendorExtension" type="xsd:string" />
371
372         <!-- Resource properties document declaration -->
373         <xsd:element name="VendorDiskDriveProperties">
374             <xsd:complexType>
375                 <xsd:sequence>
376                     <xsd:element ref="gen:NumberOfBlocks"/>
377                     <xsd:element ref="gen:BlockSize" />
378                     <xsd:element ref="gen:Manufacturer" />
379                     <xsd:element ref="gen:StorageCapability"
380                         minOccurs="0" maxOccurs="unbounded" />
381                     <xsd:element ref="ven:VendorExtension" />
382                     <xsd:any minOccurs="0" maxOccurs="unbounded" />
383                 </xsd:sequence>
384             </xsd:complexType>
385         </xsd:element>
386 ...
387     </xsd:schema>
388 </wsdl:types>
389 ...
390 <!-- Association of resource properties document to a portType -->
391 <wsdl:portType name="VendorDiskDrive"
392     wsrf-rp:ResourceProperties="ven:VendorDiskDriveProperties" >
393     <operation name="...
394 ...
395     <!-- copy/paste operations from genericDiskDrive -->
396     <operation name="start" .../>
397     <operation name="stop" .../>
398 ...
399     <!-- define Vendor-specific operations -->
400     <operation name="reset" .../>
401 ...
402 </wsdl:portType>
403 ...
404 </wsdl:definitions>
```

405

406 The VendorDiskDrive portType is an example of *manual* interface aggregation in WSDL 1.1 using
407 copy-and-paste. In this example, the designer of the VendorDiskDrive portType wishes to *extend*
408 the GenericDiskDrive portType.

409 WS-ResourceProperties specifies that this style of extension MUST be carried out in the following
410 fashion:

411 1. Define the new portType.

412 In this example the new portType is named "VendorDiskDrive". This portType extends
413 "GenericDiskDrive".

414 2. Copy all of the operation child elements from the portType being extended, and paste
415 them as child elements of the new portType; the order of the operations SHOULD be
416 preserved.

417 In this example, the "start" and "stop" operations are copied from the GenericDiskDrive
418 portType and pasted as child elements of the VendorDiskDrive portType.

419 3. Define additional, vendor-specific operations as child elements of the new portType.

420 In this example, the "reset" operation is a new operation defined by the VendorDiskDrive
421 portType.

422 4. Define a new resource properties document, as an XML global element declaration,
423 following the requirements defined in Section 4.2.

424 In this example, the element is named "VendorDiskDriveProperties" and defined in the
425 "http://vendor.com/diskDrive" namespace.

426 5. Copy all of the child elements (@ref and xsd:any) from the resource properties document
427 of the portType being extended, and paste them as child elements of the new resource
428 properties document; the order of the elements SHOULD be preserved. This step MUST
429 be repeated for each portType that is being extended by this new portType. Any duplicate
430 child elements MUST be removed.

431 In this example, the elements that reference (@ref) "gen:NumberOfBlocks",
432 "gen:Blocksize", and "gen:Manufacturer", "gen:StorageCapability" and the "xsd:any" are
433 copied from the GenericDiskDriveProperties declaration and pasted to the
434 VendorDiskDriveProperties declaration.

435 6. Define any additional resource property elements that are specific to the newly-defined
436 resource properties document type.

437 In this example, VendorDiskDriveProperties resource document defines an additional
438 resource property named VendorExtension.

5 Operations on Resource Properties

439

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

443 Any interface that includes a resource properties document type declaration
444 (`/wsdl:portType/@ResourceProperties`) MUST also include the `GetResourceProperty` message
445 exchange (operation) defined in this section. Any Web service that implements an interface that
446 includes a resource properties document type declaration MAY also support the other message
447 exchanges defined in this section.

5.1 GetResourcePropertyDocument

448
449 A Web service that implements a portType that includes the resource properties document type
450 declaration (`/wsdl:portType/@ResourceProperties`) is a component of a WS-Resource, and MAY
451 support the message exchange defined in this section that allows a requestor to retrieve the
452 values of all resource properties associated with the WS-Resource.

453 The format of this request message MUST be:

454

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

455 The `GetResourcePropertyDocument` request message MUST follow the WS-Resource Access
456 Pattern. If a SOAPAction URI is included in the transport portion of the
457 `GetResourcePropertyDocument` message, it MUST contain the URI `http://docs.oasis-
458 open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-
459 05.wSDL/GetResourcePropertyDocument/GetResourcePropertyDocumentRequest`.

460 The response of the `GetResourcePropertyDocument` request message is a message of the
461 following form:

462

```
<wsrf-rp:GetResourcePropertyDocumentResponse>  
463   {any}  
464 </wsrf-rp:GetResourcePropertyDocumentResponse>
```

465 If a SOAPAction URI is included in the transport portion of the
466 `GetResourcePropertyDocumentResponse` message, it MUST contain the URI `http://docs.oasis-
467 open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-
468 05.wSDL/GetResourcePropertyDocument/GetResourcePropertyDocumentResponse`. The
469 contents of the `GetResourcePropertyDocumentResponse` message are further described as
470 follows:

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

472 An XML element that MUST correspond to the element declared in the value of the
473 `ResourceProperties` attribute of the portType defining the
474 `GetResourcePropertyDocument` operation. The contents of the element comprise all the
475 resource property values contained in the WS-Resource's resource properties document.

476 If the WS-Resource does not respond to the `GetResourcePropertyDocument` request message
477 with the `GetResourcePropertyDocumentResponse` message, then it MUST send one of the
478 following fault messages:

- 479 • `ResourceUnknownFault`
 - 480 ○ The resource identified in the message (which follows the WS-Resource Access
481 Pattern) is not known to the Web service.

482 OtherFaults: tbd

483 Note: All faults generated must be compliant with the WS-BaseFaults [WS-BaseFaults]
484 specification.

485 **5.1.1 Example SOAP Encoding of the** 486 **GetResponsePropertyDocument Message Exchange**

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

```
489 <GenericDiskDriveProperties  
490     xmlns:tns="http://example.com/diskDrive"  
491     xmlns:cap="http://example.com/capabilities">  
492     <tns:NumberOfBlocks>22</tns:NumberOfBlocks>  
493     <tns:BlockSize>1024</tns:BlockSize>  
494     <tns:Manufacturer>DrivesRUs</tns:Manufacturer>  
495     <tns:StorageCapability>  
496         <cap:NoSinglePointOfFailure>true</cap:NoSinglePointOfFailure>  
497     </tns:StorageCapability>  
498     <tns:StorageCapability>  
499         <cap:DataRedundancyMax>42</cap:DataRedundancyMax>  
500     </tns:StorageCapability>  
501 </GenericDiskDriveProperties>
```

502 The following is a non-normative example of a GetResourcePropertyDocument request message
503 using SOAP 1.2 [SOAP 1.2]:

```
504 <s12:Envelope  
505     xmlns:s12="http://www.w3.org/2003/05/soap-envelope"  
506     xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"  
507     xmlns:wsrp="http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-  
508 ResourceProperties-1.2-draft-05.xsd"  
509     xmlns:ex="http://example.com/exampleNS">  
510     <s12:Header>  
511         <wsa:Action>  
512 http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-ResourceProperties-1.2-  
513 draft-  
514 05.wsd1/GetResourcePropertyDocument/GetResourcePropertyDocumentRequest  
515     </wsa:Action>  
516     <wsa:To s12:mustUnderstand="1">  
517         http://www.provider.org/ProviderEndpoint  
518     </wsa:To>  
519     <ex:ResourceDisambiguator>  
520         uuid:84decd55-7d3f-65ad-ac44-675d9fce5d22  
521     </ex:ResourceDisambiguator>  
522     </s12:Header>  
523     <s12:Body>  
524     <wsrf-rp:GetResourcePropertyDocument/>  
525     </s12:Body>  
526 </s12:Envelope>
```


528 The following is an example GetAllResourcePropertiesResponse message using SOAP 1.2
529 [SOAP 1.2]:

```
530 <s12:Envelope
531     xmlns:s12="http://www.w3.org/2003/05/soap-envelope"
532     xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
533     xmlns:wsrp="
534     "http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-
535 ResourceProperties-1.2-draft-05.xsd"
536     xmlns:resp="http://www.other.org/otherNS">
537   <s12:Header>
538     <wsa:Action>
539     http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-ResourceProperties-1.2-
540     draft-
541     05.wsd/GetResourcePropertyDocument/GetResourcePropertyDocumentResponse
542     </wsa:Action>
543     <wsa:To s12:mustUnderstand="1">
544       http://www.requestor.org/someEndpoint
545     </wsa:To>
546     <resp:SomeResourceRef>
547       uuid:9fef5fec-6dc3-44a2-ba32-8680cace43f9
548     </resp:SomeResourceRef>
549   </s12:Header>
550   <s12:Body>
551     <wsrp-rp:GetResourcePropertyDocumentResponse
552     xmlns:tns="http://example.com/diskDrive"
553     xmlns:cap="http://example.com/capabilities">
554       <tns:GenericDiskDriveProperties>
555         <tns:NumberOfBlocks>22</tns:NumberOfBlocks>
556         <tns:BlockSize>1024</tns:BlockSize>
557         <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
558         <tns:StorageCapability>
559           <cap:NoSinglePointOfFailure>true</cap:NoSinglePointOfFailure>
560         </tns:StorageCapability>
561         <tns:StorageCapability>
562           <cap:DataRedundancyMax>42</cap:DataRedundancyMax>
563         </tns:StorageCapability>
564       </GenericDiskDriveProperties>
565     </wsrp-rp:GetResourcePropertyDocumentResponse>
566   </s12:Body>
567 </s12:Envelope>
```

568 5.2 GetResourceProperty

569 A Web service that implements a portType that includes the resource properties document type
570 declaration (/wsdl:portType/@ResourceProperties) is a component of a WS-Resource, and
571 MUST support the message exchange defined in this section that allows a requestor to retrieve
572 the value of a single resource property of a WS-Resource.

573 The format of this request message MUST be:

574

```
575 <wsrf-rp:GetResourceProperty>
576   QName
577 </wsrf-rp:GetResourceProperty>
578
```

579 The GetResourceProperty request message MUST follow the WS-Resource Access Pattern. If a
580 SOAPAction URI is included in the transport portion of the GetResourceProperty message, it
581 MUST contain the URI [http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-](http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wsdl/GetResourceProperty/GetResourcePropertyRequest)
582 [draft-05.wsdl/GetResourceProperty/GetResourcePropertyRequest](http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wsdl/GetResourceProperty/GetResourcePropertyRequest).

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

585 This MUST correspond to the QName of a resource property element child of the root of
586 the WS-Resource's resource properties document.

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

```
588
589 <wsrf-rp:GetResourcePropertyResponse>
590   {any}*
591 </wsrf-rp:GetResourcePropertyResponse>
592
```

593 If a SOAPAction URI is included in the transport portion of the GetResourcePropertyResponse
594 message, it MUST contain the URI [http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-](http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wsdl/GetResourceProperty/GetResourcePropertyResponse)
595 [ResourceProperties-1.2-draft-05.wsdl/GetResourceProperty/GetResourcePropertyResponse](http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wsdl/GetResourceProperty/GetResourcePropertyResponse).
596 The contents of the GetResourceProperty response message are further described as follows:

597 /wsrf-rp:GetResourcePropertyResponse/{any}

598 The resource property value, as an XML element, that corresponds to the QName in the
599 GetResourceProperty request. Note: in the case where the resource property element is
600 defined with minOccurs="0" and the resource properties document does not contain any
601 value for that resource property, the response MUST be an empty wsrf-
602 rp:GetResourcePropertyResponse element.

603 If the WS-Resource does not respond to the GetResourceProperty request message with the
604 GetResourcePropertyResponse message, then it MUST send one of the following fault
605 messages:

- 606 • ResourceUnknownFault
 - 607 ○ The resource identified in the message (which follows the WS-Resource Access
 - 608 Pattern) is not known to the Web service.
- 609 • InvalidResourcePropertyQName
 - 610 ○ The QName in the request message did not correspond to a resource property
 - 611 element of the WS-Resource referred to in the request message.

612 OtherFaults: tbd

613 Note: All faults generated must be compliant with the WS-BaseFaults [WS-BaseFaults]
614 specification.

615 **5.2.1 Example SOAP Encoding of the GetResourceProperty Message**

616 **Exchange**

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

```

619 <GenericDiskDriveProperties
620     xmlns:tns="http://example.com/diskDrive"
621     xmlns:cap="http://example.com/capabilities">
622 <tns:NumberOfBlocks>22</tns:NumberOfBlocks>
623 <tns:BlockSize>1024</tns:BlockSize>
624 <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
625 <tns:StorageCapability>
626     <cap:NoSinglePointOfFailure>true</cap:NoSinglePointOfFailure>
627 </tns:StorageCapability>
628 <tns:StorageCapability>
629     <cap:DataRedundancyMax>42</cap:DataRedundancyMax>
630 </tns:StorageCapability>
631 </GenericDiskDriveProperties>

```

632 The following is a non-normative example of a GetResourceProperty request message using
633 SOAP 1.2 [SOAP 1.2]:

```

634 <s12:Envelope
635     xmlns:s12="http://www.w3.org/2003/05/soap-envelope"
636     xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
637     xmlns:wsrf-rp=
638     "http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-
639 1.2-draft-05.xsd"
640     xmlns:ex="http://example.com/exampleNS">
641 <s12:Header>
642     <wsa:Action>
643         http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-
644 ResourceProperties-1.2-draft-
645 05.wsd/GetResourceProperty/GetResourcePropertyRequest
646     </wsa:Action>
647     <wsa:To s12:mustUnderstand="1">
648         http://www.provider.org/ProviderEndpoint
649     </wsa:To>
650     <ex:ResourceDisambiguator>
651         uuid:84dec55-7d3f-65ad-ac44-675d9fce5d22
652     </ex:ResourceDisambiguator>
653 </s12:Header>
654 <s12:Body>
655     <wsrf-rp:GetResourceProperty
656         xmlns:tns="http://example.com/diskDrive">
657         tns:NumberOfBlocks
658     </wsrf-rp: GetResourceProperty>
659 </s12:Body>
660 </s12:Envelope>

```

661 The following is an example GetResourcePropertyResponse message using SOAP 1.2 [SOAP
662 1.2]:

```

663 <s12:Envelope
664     xmlns:s12="http://www.w3.org/2003/05/soap-envelope"
665     xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"

```

```

666     xmlns:wsrf-rp=
667     "http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-
668 ResourceProperties-1.2-draft-05.xsd"
669     xmlns:resp="http://www.other.org/otherNS">
670     <s12:Header>
671     <wsa:Action>
672 http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-
673 draft-05.wsdl/GetResourceProperty/GetResourcePropertyResponse
674     </wsa:Action>
675     <wsa:To s12:mustUnderstand="1">
676         http://www.requestor.org/someEndpoint
677     </wsa:To>
678     <resp:SomeResourceRef>
679         uuid:9fef5fec-6dc3-44a2-ba32-8680cace43f9
680     </resp:SomeResourceRef>
681 </s12:Header>
682 <s12:Body>
683     <wsrf-rp:GetResourcePropertyResponse
684         xmlns:ns1="http://example.com/diskDrive">
685         <ns1:NumberOfBlocks>22</ns1:NumberOfBlocks>
686     </wsrf-rp:GetResourcePropertyResponse>
687 </s12:Body>
688 </s12:Envelope>

```

689 5.3 GetMultipleResourceProperties

690 A Web service that implements a portType that includes the resource properties document type
691 declaration (/wsdl:portType/@ResourceProperties) is a component of a WS-Resource, and MAY
692 support the message exchange defined in this section that allows a requestor to retrieve the
693 values of multiple resource properties of a WS-Resource.

694 The format of this request message MUST be:

```

695 <wsrf-rp:GetMultipleResourceProperties>
696     <wsrf-rp:ResourceProperty>QName <wsrf-rp:ResourceProperty>+
697 </wsrf-rp:GetMultipleResourceProperties>

```

698 The GetMultipleResourceProperties request message MUST follow the WS-Resource Access
699 Pattern.. If a SOAPAction URI is included in the transport portion of the
700 GetMultipleResourceProperties message, it MUST contain the URI http://docs.oasis-
701 open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-
702 05.wsdl/GetMultipleResourceProperties/GetMultipleResourcePropertiesRequest.

703 The components of the GetMultipleResourceProperties request message are further described as
704 follows:

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

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

709 The response of the GetMultipleResourceProperties request message is a message of the
710 following form:

711
712
713

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

714 If a SOAPAction URI is included in the transport portion of the
715 GetMultipleResourcePropertiesResponse message, it MUST contain the URI [http://docs.oasis-](http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wSDL/GetMultipleResourceProperties/GetMultipleResourcePropertiesResponse)
716 [open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-](http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wSDL/GetMultipleResourceProperties/GetMultipleResourcePropertiesResponse)
717 [05.wSDL/GetMultipleResourceProperties/GetMultipleResourcePropertiesResponse](http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wSDL/GetMultipleResourceProperties/GetMultipleResourcePropertiesResponse). The contents
718 of the GetMultipleResourcePropertiesResponse message are further described as follows:

719 /wsrf-rp:GetMultipleResourcePropertiesResponse/{any}

720 A collection of resource property values, as XML elements that correspond to the
721 QNames given in the GetMultipleResourceProperties request message. This collection is
722 formed in the following fashion. For each QName in the request message, the resource
723 must add to the collection all child elements of the root of the resource properties
724 document whose name corresponds to that QName. Note: in the case where the
725 resource property element is defined with minOccurs="0" and the resource properties
726 document does not contain any value for that resource property, no child element is
727 added to the collection for that QName.

728 If the XML schema definition of the resource properties document root element does not
729 permit the root element to contain a child element with that QName the processing of the
730 GetMultipleResourceProperties request message MUST terminate with a fault message.

731 The collection of resource property values SHOULD be formed in the same order as the
732 resource property element QNames were specified in the GetMultipleResourceProperties
733 request message.

734 If the WS-Resource does not respond to the GetMultipleResourceProperties request message
735 with the GetMultipleResourcePropertiesResponse message, then it MUST send one of the
736 following fault messages:

- 737 • ResourceUnknownFault
 - 738 ○ The resource identified in the message (which follows the WS-Resource Access
 - 739 Pattern) is not known to the Web service.
- 740 • InvalidResourcePropertyQName
 - 741 ○ One or more of the QNames in the request message did not correspond to a
 - 742 resource property element of the WS-Resource referred to in the request message.

743 OtherFaults: tbd

744 Note: All faults generated must be compliant with the WS-BaseFaults [WS-BaseFaults]
745 specification.

746 Note: the functionality provided by the GetResourceProperty message exchange is a strict subset
747 of that provided by GetMultipleResourceProperties. WS-ResourceProperties defines two
748 message exchange sets to provide implementation flexibility. GetResourceProperty is a simple,
749 required message exchange that allows simple Web service implementations to be compliant
750 with WS-ResourceProperties. The optional GetMultipleResourceProperties, while more
751 sophisticated, allows efficient retrieval of multiple resource property values using a single
752 message exchange.

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

756 5.3.1 Example SOAP Encoding of the GetMultipleResourceProperties 757 Message Exchange

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

```
760 <GenericDiskDriveProperties  
761     xmlns:tns="http://example.com/diskDrive"  
762     xmlns:cap="http://example.com/capabilities">  
763     <tns:NumberOfBlocks>22</tns:NumberOfBlocks>  
764     <tns:BlockSize>1024</tns:BlockSize>  
765     <tns:Manufacturer>DrivesRUs</tns:Manufacturer>  
766     <tns:StorageCapability>  
767         <cap:NoSinglePointOfFailure>true</cap:NoSinglePointOfFailure>  
768     </tns:StorageCapability>  
769     <tns:StorageCapability>  
770         <cap:DataRedundancyMax>42</cap:DataRedundancyMax>  
771     </tns:StorageCapability>  
772 </GenericDiskDriveProperties>
```

773 The following is a non-normative example of a GetMultipleResourceProperties request message
774 using SOAP 1.2 [SOAP 1.2]:

```
775 <s12:Envelope  
776     xmlns:s12="http://www.w3.org/2003/05/soap-envelope"  
777     xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"  
778     xmlns:wsrp="http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-  
779 ResourceProperties-1.2-draft-05.xsd"  
780     xmlns:ex="http://example.com/exampleNS">  
781     <s12:Header>  
782         <wsa:Action>  
783 http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-ResourceProperties-1.2-  
784 draft-  
785 05.wsd/GetMultipleResourceProperties/GetMultipleResourcePropertiesRequ  
786 est  
787         </wsa:Action>  
788         <wsa:To s12:mustUnderstand="1">  
789             http://www.provider.org/ProviderEndpoint  
790         </wsa:To>  
791         <ex:ResourceDisambiguator>  
792             uuid:84dec55-7d3f-65ad-ac44-675d9fce5d22  
793         </ex:ResourceDisambiguator>  
794     </s12:Header>  
795     <s12:Body>  
796         <wsrf-rp:GetMultipleResourceProperties  
797             xmlns:tns="http://example.com/diskdrive">  
798             <wsrf-rp:ResourceProperty>  
799                 tns:NumberOfBlocks  
800             </wsrf-rp:ResourceProperty>  
801             <wsrf-rp:ResourceProperty>  
802
```

```

803         tns:BlockSize
804     </wsrf-rp:ResourceProperty>
805 </wsrf-rp:GetMultipleResourceProperties>
806 </s12:Body>
807 </s12:Envelope>

```

808 The following is an example GetMultipleResourcePropertiesResponse message using SOAP 1.2
809 [SOAP 1.2]:

```

810 <s12:Envelope
811     xmlns:s12="http://www.w3.org/2003/05/soap-envelope"
812     xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
813     xmlns:wsrf-rp=
814     "http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-
815 ResourceProperties-1.2-draft-05.xsd"
816     xmlns:resp="http://www.other.org/otherNS">
817 <s12:Header>
818     <wsa:Action>
819 http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-
820 draft-
821 05.wsd/GetMultipleResourceProperties/GetMultipleResourcePropertiesResp
822 onse
823     </wsa:Action>
824     <wsa:To s12:mustUnderstand="1">
825         http://www.requestor.org/someEndpoint
826     </wsa:To>
827     <resp:SomeResourceRef>
828         uuid:9fef5fec-6dc3-44a2-ba32-8680cace43f9
829     </resp:SomeResourceRef>
830 </s12:Header>
831 <s12:Body>
832     <wsrf-rp:GetMultipleResourcePropertiesResponse
833         xmlns:ns1="http://example.com/diskdrive" ...>
834         <ns1:NumberOfBlocks>22</ns1:NumberOfBlocks>
835         <ns1:BlockSize>1024</ns1:BlockSize>
836     </wsrf-rp:GetMultipleResourcePropertiesResponse>
837 </s12:Body>
838 </s12:Envelope>

```

839 **5.4 QueryResourceProperties**

840 A Web service that implements a portType that includes the resource properties document type
841 declaration (/wsdl:portType/@ResourceProperties) is a component of a WS-Resource, and MAY
842 support the message exchange defined in this section that allows a requestor to query the
843 resource properties document of a WS-Resource using a query expression such as XPath
844 [XPath].

845 The format of this request message MUST be:

```

846 <wsrf-rp:QueryResourceProperties>
847     <wsrf-rp:QueryExpression Dialect="URI">
848         xsd:any

```

```
849     </wsrf-rp:QueryExpression>
850 </wsrf-rp:QueryResourceProperties>
```

851 The QueryResourceProperties request message MUST follow the WS-Resource Access Pattern.
852 If a SOAPAction URI is included in the transport portion of the QueryResourceProperties
853 message, it MUST contain the URI <http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wsd/QueryResourceProperties/QueryResourcePropertiesRequest>.

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

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

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

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

863 This attribute contains a URI specifying the type of expression contained by the element.
864 If the implementation does not recognize the URI identified by @Dialect, it MUST fault.
865 There are two well known dialects identified by this specification, corresponding to two
866 versions of the XPath language.

867 <http://www.w3.org/TR/1999/REC-xpath-19991116>

868 This URI identifies the XPath 1.0 language. The contents of the
869 QueryExpression MUST be a string containing a valid XPath 1.0
870 expression.

871 <http://www.w3.org/TR/2003/WD-xpath20-20031112>

872 This URI identifies the Xpath 2.0 (working draft) language. The contents
873 of the QueryExpression MUST be a string containing a valid XPath 2.0
874 expression. Note: an additional URI will be added to represent the W3C
875 Recommendation form of the XPath 2.0 language.

876 For XPath dialects, the namespace URI prefixes for the in-scope namespace
877 declarations of the QueryResourceProperties element may be used in the XPath
878 expression. The actual namespace declaration may be on any of the ancestors of the
879 QueryResourceProperty element.

880 Note: it is RECOMMENDED that users avoid the use of previously-defined namespace
881 prefixes when there is a chance the message could traverse intermediaries or when
882 encryption is applied to the message, as there is a chance that an intermediary will
883 modify the namespace prefixes. In such cases the expression will become incoherent
884 with respect to the namespace prefix to namespace URI mapping intended by the
885 requestor.

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

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

889 The response of the QueryResourceProperties request message MUST be a message of the
890 following form:

```
891 <wsrf-rp:QueryResourcePropertiesResponse>
892 {any}
```


893

```
</wsrf-rp:QueryResourcePropertiesResponse>
```

894 If a SOAPAction URI is included in the transport portion of the
895 QueryResourcePropertiesResponse message, it MUST contain the URI `http://docs.oasis-
896 open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-
897 05.wSDL/QueryResourceProperties/QueryResourcePropertiesResponse`. The contents of the
898 QueryResourcePropertiesResponse message are further described as follows:

899 `/wsrf-rp:QueryResourcePropertiesResponse/{any}`

900 The response of the QueryResourceProperties request is variable, depending on the
901 nature of the QueryExpression component of the QueryResourceProperties request. The
902 response MUST contain an XML serialization of the results of evaluating the
903 QueryExpression against the resource properties document. Note: this element has
904 mixedContent, to allow for the case where the QueryExpression evaluates to a simple
905 type (such as a Boolean, a string or an integer) as well as the case where a node-set of
906 elements is returned.

907 If the WS-Resource does not respond to the QueryResourceProperties request message with the
908 QueryResourcePropertiesResponse message, then it MUST send one of the following fault
909 messages:

- 910 • ResourceUnknownFault
 - 911 ○ The resource identified in the message (which follows the WS-Resource Access
912 Pattern) is not known to the Web service.
- 913 • UnknownQueryExpressionDialect
 - 914 ○ The given QueryExpression has a dialect that is unknown to the Web service.
- 915 • InvalidQueryExpression
 - 916 ○ The given Query Expression is not valid within the QueryExpression language
917 identified by the dialect attribute.
- 918 • QueryEvaluationError
 - 919 ○ The Query Expression failed during evaluation.

920 OtherFaults: tbd

921 Note: All faults generated must be compliant with the WS-BaseFaults [WS-BaseFaults]
922 specification.

923 **5.4.1 QueryExpressionDialect Resource Property**

924 When a portType includes the definition of the QueryResourceProperties operation, it MUST also
925 include a reference to the `wsrf-rp:QueryExpressionDialect` Resource Property. The form of the
926 `wsrf-rp:QueryExpressionDialect` Resource Property is:

```
927 <wsrf-rp:QueryExpressionDialect>  
928   xsd:anyURI  
929 </wsrf-rp:QueryExpressionDialect>
```

930

931 This resource property element is further constrained as follows:

932 `/wsrf-rp:QueryExpressionDialect`

933 This resource property declares one or more QueryExpression dialects that are
934 supported by the Web service. This resource property must be referenced with
935 `minOccurs="1"` and `maxOccurs="unbounded"`.

936 /wsrf-rp:QueryExpressionDialect/{anyURI}
937 If a requestor sends a QueryResourceProperties request message, using a
938 QueryExpression with Dialect matching the URI contained in this resource property
939 element, the WS-Resource MUST NOT issue an *UnknownQueryExpressionDialect* fault.
940 The value of this element is a URI that MUST correspond to a QueryExpression dialect.

941 5.4.2 Example SOAP Encoding of the QueryResourceProperties 942 Message Exchange

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

```
945 <GenericDiskDriveProperties  
946     xmlns:tns="http://example.com/diskDrive"  
947     xmlns:cap="http://example.com/capabilities">  
948   <tns:NumberOfBlocks>22</tns:NumberOfBlocks>  
949   <tns:BlockSize>1024</tns:BlockSize>  
950   <tns:Manufacturer>DrivesRUs</tns:Manufacturer>  
951   <tns:StorageCapability>  
952     <cap:NoSinglePointOfFailure>true</cap:NoSinglePointOfFailure>  
953   </tns:StorageCapability>  
954   <tns:StorageCapability>  
955     <cap:DataRedundancyMax>42</cap:DataRedundancyMax>  
956   </tns:StorageCapability>  
957 </GenericDiskDriveProperties>
```

958 The following is a non-normative example of a QueryResourceProperties request message using
959 SOAP 1.2 [SOAP 1.2]:

```
960 <s12:Envelope  
961     xmlns:s12="http://www.w3.org/2003/05/soap-envelope"  
962     xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"  
963     xmlns:wsrf-rp=  
964     "http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-  
965     1.2-draft-05.xsd"  
966     xmlns:ex="http://example.com/exampleNS">  
967   <s12:Header>  
968     <wsa:Action>  
969     http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-  
970     draft-05.wsdl/QueryResourceProperties/QueryResourcePropertiesRequest  
971     </wsa:Action>  
972     <wsa:To s12:mustUnderstand="1">  
973       http://www.provider.org/ProviderEndpoint  
974     </wsa:To>  
975     <ex:ResourceDisambiguator>  
976       uuid:84dec55-7d3f-65ad-ac44-675d9fce5d22  
977     </ex:ResourceDisambiguator>  
978   </s12:Header>  
979   <s12:Body>  
980     <wsrf-rp:QueryResourceProperties>  
981       <wsrf-rp:QueryExpression  
982         Dialect="http://www.w3.org/TR/1999/REC-xpath-19991116" >
```

```
983         boolean(/*/NumberOfBlocks > 20 and */BlockSize=1024)
984     </wsrf-rp:QueryExpression>
985 </wsrf-rp:QueryResourceProperties>
986 </s12:Body>
987 </s12:Envelope>
```

988 The following is an example QueryResourcePropertiesResponse message using SOAP 1.2
989 [SOAP 1.2], containing the results of evaluating that XPath expression against the root element of
990 the resource's resource properties document:

```
991 <s12:Envelope
992     xmlns:s12="http://www.w3.org/2003/05/soap-envelope"
993     xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
994     xmlns:wsrf-rp=
995 "http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-
996 1.2-draft-05.xsd"
997     xmlns:resp="http://www.other.org/otherNS">
998 <s12:Header>
999     <wsa:Action>
1000 http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-
1001 draft-05.wsdl/QueryResourceProperties/QueryResourcePropertiesResponse
1002 </wsa:Action>
1003 <wsa:To s12:mustUnderstand="1">
1004     http://www.requestor.org/someEndpoint
1005 </wsa:To>
1006 <resp:SomeResourceRef>
1007     uuid:9fef5fec-6dc3-44a2-ba32-8680cace43f9
1008 </resp:SomeResourceRef>
1009 </s12:Header>
1010 <s12:Body>
1011 <wsrf-rp:QueryResourcePropertiesResponse>
1012     true
1013 </wsrf-rp:QueryResourcePropertiesResponse>
1014 </s12:Body>
1015 </s12:Envelope>
```

1016 **5.5 SetResourceProperties**

1017 A Web service that implements a portType that includes the resource properties document type
1018 declaration (/wsdl:portType/@ResourceProperties) is a component of a WS-Resource, and MAY
1019 support the message exchange defined in this section that allows a requestor to modify the
1020 values of multiple resource properties of a WS-Resource.

1021 The SetResourceProperties message allows the processing of a single request message to make
1022 multiple changes to the resource properties document. There are three types of changes, each
1023 modeled as separate types of component (called SetRequestComponent) of a
1024 SetResourceProperties request message:

- 1025 a) Insert: wherein a new resource property element is inserted into the resource properties
1026 document;
- 1027 b) Update: wherein existing resource property element(s) are modified; and
- 1028 c) Delete: wherein existing resource property element(s) are removed.

1029 The format of this request message MUST be:

```
1030 <wsrf-rp:SetResourceProperties>
1031 {
1032   <wsrf-rp:Insert >
1033     {any}*
1034   </wsrf-rp:Insert> |
1035
1036   <wsrf-rp:Update >
1037     {any}*
1038   </wsrf-rp:Update> |
1039
1040   <wsrf-rp:Delete ResourceProperty="QName" />
1041 }+
1042 </wsrf-rp:SetResourceProperties>
```

1043 The SetResourceProperties request message MUST follow the WS-Resource Access Pattern. If
1044 a SOAPAction URI is included in the transport portion of the SetResourceProperties message, it
1045 MUST contain the URI <http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wsdl/SetResourceProperties/SetResourcePropertiesRequest>.

1047 The contents of the SetResourceProperties request message are further described as follows:

1048 /wsrf-rp:SetResourceProperties

1049 This element contains a collection of one or more components called
1050 SetRequestComponents. Each of the SetRequestComponents must be processed
1051 against the WS-Resource's resource properties document. These
1052 SetRequestComponents MUST appear to be processed in the order in which they are
1053 listed in the request. Each request component MUST be processed to completion in this
1054 conceptual sequence before a subsequent SetRequestComponent is processed. The
1055 result of processing a given SetRequestComponent MUST be observable to the
1056 processing of a subsequent SetRequestComponent, and to subsequent message
1057 exchanges with the same WS-Resources.

1058 If a service fails to process a SetRequestComponent, it MUST cease processing the
1059 SetResourceProperties request message. The values of the resource properties
1060 associated with this SetRequestComponent MAY reflect partial processing of this
1061 SetRequestComponent. An implementation MAY restore the contents of the resource
1062 properties document to a state as if no processing of the failed SetRequestComponent
1063 had occurred. The implementation MAY additionally choose to restore the resource
1064 properties document as if none of the SetRequestComponents had been processed.
1065 Refer to Section 7 for additional information of resource recovery.

1066 /wsrf-rp:SetResourceProperties/wsrf-rp:Insert

1067 The intent of this component is to insert the contents of the component into the resource
1068 properties document. The exact placement of the element insertion is implementation-
1069 dependent. If, as a result of processing the Insert component, the resource properties
1070 document is no longer able to validate, the processing of the component MUST fault. The
1071 implementation may be unable to accept the insertion of an element because it does not
1072 allow the requestor to insert a resource property (or its value) of that given name. In such
1073 circumstances, the resource MUST fault the processing of the component.

1074 /wsrf-rp:SetResourceProperties/wsrf-rp:Insert/{any}

1075 This component identifies the element(s) to be inserted into the resource properties
1076 document. If there are multiple child elements of the Insert component, each MUST have
1077 the same namespace and name (i.e. the same QName). The QName MUST correspond
1078 to the QName of a resource property element associated with the WS-Resource (i.e. an
1079 element that is a valid child element of the root element of the resource properties
1080 document). Note, for those resource properties documents that allow open element
1081 content, the set of valid content types can be very large.

1082 /wsrf-rp:SetResourceProperties/wsrf-rp:Update

1083 The intent of this component is to change the value of the resource property by removing
1084 any and all resource property element(s) of the given QName and replacing them with
1085 the contents of this component. If, as a result of processing the Update component, the
1086 resource properties document is no longer able to validate, the processing of the
1087 component MUST fault. The resource may be unable to accept the update of an element
1088 because it does not allow the requestor to update a resource property (or its value) of
1089 that given name. In such circumstances, the resource MUST fault the processing of the
1090 component.

1091 /wsrf-rp:SetResourceProperties/wsrf-rp:Update/{any}

1092 This identifies the element(s) to be inserted into the resource properties document,
1093 replacing all element children of the root of the resource properties document with the
1094 same QName. If there are multiple child elements of the Insert component, each MUST
1095 have the same namespace and name (i.e. the same QName). The QName MUST
1096 correspond to the QName of a resource property element associated with the WS-
1097 Resource (i.e. an element that is a valid child element of the root element of the resource
1098 properties document). Note, for those resource properties documents that allow open
1099 element content, the set of valid content types can be very large.

1100 /wsrf-rp:SetResourceProperties/wsrf-rp>Delete

1101 The intent of this component is to remove all element children of the root of the resource
1102 properties document whose QNames correspond to the value of @ResourceProperty. If
1103 the resource is unable to remove all identified elements, the processing of the component
1104 MUST fault. If, as a result of processing the Delete component, the resource properties
1105 document is no longer able to validate, the processing of the component MUST fail. The
1106 resource may be unable to accept the delete of an element because it does not allow the
1107 requestor to delete a resource property (or its value) of the given name. In such
1108 circumstances, the resource MUST fault the processing of the component.

1109 /wsrf-rp:SetResourceProperties/wsrf-rp>Delete/@ResourceProperty

1110 This attribute contains the QName of a resource property to be deleted by this
1111 component.

1112 The response of the SetResourceProperties request message, all of whose components were
1113 successfully processed, MUST be a message of the following form:

```
1114 <wsrf-rp:SetResourcePropertiesResponse>  
1115 </wsrf-rp:SetResourcePropertiesResponse>
```

1116 If a SOAPAction URI is included in the transport portion of the
1117 QueryResourcePropertiesResponse message, it MUST contain the URI [http://docs.oasis-
1118 open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-
1119 05.wSDL/SetResourceProperties/SetResourcePropertiesResponse](http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wSDL/SetResourceProperties/SetResourcePropertiesResponse).

- 1120 If the WS-Resource does not respond to the SetResourceProperties request message with the
1121 SetResourcePropertiesResponse message, then it MUST send one of the following fault
1122 messages. For those faults associated with failure to process a SetResourceProperties request
1123 component, the offending component MUST be identified in the fault message:
- 1124 • ResourceUnknownFault
 - 1125 ○ The resource identified in the message is not known to the Web service.
 - 1126 • InvalidSetResourcePropertiesRequestContent:
 - 1127 ○ The contents of the SetResourceProperties request component causes the resource
1128 properties document to no longer validate.
 - 1129 • UnableToModifyResourceProperty:
 - 1130 ○ A resource property identified by one of the SetResourceProperties request
1131 components is read-only.
 - 1132 • InvalidResourcePropertyQName:
 - 1133 ○ A resource property QName does not identify a proper number of resource
1134 properties.
 - 1135 • SetResourcePropertyRequestFailed
 - 1136 ○ One or more components of the SetResourceProperties request failed.

1137 OtherFaults: tbd

1138 Note: All faults generated must be compliant with the WS-BaseFaults [WS-BaseFaults]
1139 specification.

1140 The fault message MUST also indicate whether the effects of processing previous components
1141 were restored or not. Note: There is no isolation policy implied, for either modifications to the
1142 resource properties document resulting from the processing of the request or the modifications
1143 implemented by the restore. See Section 7 for more discussion.

1144

1145 **5.5.1 Example SOAP Encoding of the SetResourceProperties** 1146 **Message Exchange**

1147 Consider the following resource properties document defining resource properties for a WS-
1148 Resource defined by the GenericDiskDrive portType:

```
1149 <GenericDiskDriveProperties
1150     xmlns:tns="http://example.com/diskDrive"
1151     xmlns:cap="http://example.com/capabilities">
1152   <tns:NumberOfBlocks>22</tns:NumberOfBlocks>
1153   <tns:BlockSize>1024</tns:BlockSize>
1154   <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
1155   <tns:StorageCapability>
1156     <cap:NoSinglePointOfFailure>true</cap:NoSinglePointOfFailure>
1157   </tns:StorageCapability>
1158   <tns:StorageCapability>
1159     <cap:DataRedundancyMax>42</cap:DataRedundancyMax>
1160   </tns:StorageCapability>
1161 </GenericDiskDriveProperties>
```

1162 The following is a non-normative example of a SetResourceProperties request message using
1163 SOAP 1.2 [SOAP 1.2]:

```

1164 <s12:Envelope
1165     xmlns:s12="http://www.w3.org/2003/05/soap-envelope"
1166     xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
1167     xmlns:wsrp=
1168     "http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-
1169 ResourceProperties-1.2-draft-05.xsd"
1170     xmlns:ex="http://example.com/exampleNS">
1171   <s12:Header>
1172     <wsa:Action>
1173 http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-ResourceProperties-1.2-
1174 draft-05.wsdl/SetResourceProperties/SetResourcePropertiesRequest
1175   </wsa:Action>
1176   <wsa:To s12:mustUnderstand="1">
1177     http://www.provider.org/ProviderEndpoint
1178   </wsa:To>
1179   <ex:ResourceDisambiguator>
1180     uuid:84dec55-7d3f-65ad-ac44-675d9fce5d22
1181   </ex:ResourceDisambiguator>
1182 </s12:Header>
1183 <s12:Body>
1184   <wsrf-rp:SetResourceProperties
1185     xmlns:tns="http://example.com/diskdrive">
1186     <wsrf-rp:Update>
1187       <tns:NumberOfBlocks>143</tns:NumberOfBlocks>
1188     </wsrf-rp:Update>
1189
1190     <wsrf-rp>Delete ResourceProperty="tns:StorageCapability" />
1191
1192     <wsrf-rp:Insert>
1193       <tns:someElement>42</tns:someElement>
1194     </wsrf-rp:Insert>
1195
1196   </wsrf-rp:SetResourceProperties>
1197 </s12:Body>
1198 </s12:Envelope>

```

1199 The following is an example SetResourcePropertiesResponse message using SOAP 1.2 [SOAP
1200 1.2]:

```

1201 <s12:Envelope
1202     xmlns:s12="http://www.w3.org/2003/05/soap-envelope"
1203     xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
1204     xmlns:wsrp=
1205     "http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-ResourceProperties-
1206 1.2-draft-05.xsd"
1207     xmlns:resp="http://www.other.org/otherNS">
1208   <s12:Header>
1209     <wsa:Action>
1210 http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-ResourceProperties-1.2-
1211 draft-05.wsdl/SetResourceProperties/SetResourcePropertiesResponse

```

```

1212     </wsa:Action>
1213     <wsa:To s12:mustUnderstand="1">
1214         http://www.requestor.org/someEndpoint
1215     </wsa:To>
1216     <resp:SomeResourceRef>
1217         uuid:9fef5fec-6dc3-44a2-ba32-8680cace43f9
1218     </resp:SomeResourceRef>
1219 </s12:Header>
1220 <s12:Body>
1221     <wsrf-rp:SetResourcePropertiesResponse>
1222     </wsrf-rp:SetResourcePropertiesResponse>
1223 </s12:Body>
1224 </s12:Envelope>

```

1225 The new contents of the resource properties document after successful processing of the request
1226 message MUST be:

```

1227 <GenericDiskDriveProperties xmlns:tns="http://example.com/diskDrive" >
1228     <tns:NumberOfBlocks>143</tns:NumberOfBlocks>
1229     <tns:BlockSize>1024</tns:BlockSize>
1230     <tns:someElement>42</tns:someElement>
1231     <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
1232 </GenericDiskDriveProperties>

```

1233 5.6 InsertResourceProperties

1234 A Web service that implements a portType that includes the resource properties document type
1235 declaration (/wsdl:portType/@ResourceProperties) is a component of a WS-Resource, and MAY
1236 support the message exchange defined in this section that allows a requestor to insert new
1237 values of a resource property of a WS-Resource.

1238 The InsertResourceProperties message is used to request the insertion of one or more element
1239 values of a single resource property into the resource properties document of a WS-Resource.

1240 The format of this request message MUST be:

```

1241 <wsrf-rp:InsertResourceProperties>
1242     <wsrf-rp:Insert>
1243         {any} *
1244     </wsrf-rp:Insert>
1245 </wsrf-rp:InsertResourceProperties>

```

1246 The InsertResourceProperties request message MUST follow the WS-Resource Access Pattern.
1247 If a SOAPAction URI is included in the transport portion of the InsertResourceProperties
1248 message, it MUST contain the URI <http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wsdl/InsertResourceProperties/InsertResourcePropertiesRequest>.

1251 The contents of the InsertResourceProperties request message are further described as follows:
1252 /wsrf-rp:InsertResourceProperties/wsrf-rp:Insert

1253 The intent of this component is to insert the contents of the component into the resource
1254 properties document. The exact placement of the element insertion is implementation-
1255 dependent. If, as a result of processing the InsertResourceProperty request, the resource
1256 properties document is no longer able to validate, the processing of the request MUST

1257 fault. The implementation may be unable to accept the insertion of an element because it
1258 does not allow the requestor to insert a resource property (or its value) of that given
1259 name. In such circumstances, the resource MUST fault the processing of the request
1260 message.

1261 /wsrf-rp:InsertResourceProperties/wsrf-rp:Insert/{any}

1262 This component identifies the element(s) to be inserted into the resource properties
1263 document. If there are multiple child elements of the wsrf-rp:Insert element, each MUST
1264 have the same namespace and name (i.e. the same QName). The QName MUST
1265 correspond to the QName of a resource property element associated with the WS-
1266 Resource (i.e. an element that is a valid child element of the root element of the resource
1267 properties document). Note, for those resource properties documents that allow open
1268 element content, the set of valid content types can be very large.

1269 When an InsertResourceProperties request message has been successfully processed, the
1270 response message, MUST have the following form:

```
1271 <wsrf-rp:InsertResourcePropertiesResponse>  
1272 </wsrf-rp:InsertResourcePropertiesResponse>
```

1273 If a SOAPAction URI is included in the transport portion of the
1274 InsertResourcePropertiesResponse message, it MUST contain the URI [http://docs.oasis-
1275 open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-
1276 05.wsd/InsertResourceProperties/InsertResourcePropertiesResponse](http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wsd/InsertResourceProperties/InsertResourcePropertiesResponse). If the WS-Resource does
1277 not respond to the InsertResourceProperties request message with the
1278 InsertResourcePropertiesResponse message, then it SHOULD send one of the following fault
1279 messages:

- 1280 • ResourceUnknownFault:
 - 1281 ○ The resource identified in the message is not known to the Web service.
- 1282 • InvalidInsertResourcePropertiesRequestContent:
 - 1283 ○ The contents of the InsertResourceProperties request cause the resource
1284 properties document to no longer validate.
- 1285 • UnableToModifyResourceProperty:
 - 1286 ○ A resource property identified by the InsertResourceProperties request is not
1287 modifiable.
- 1288 • InvalidResourcePropertyQName:
 - 1289 ○ A resource property QName does not identify a resource property.
- 1290 • InsertResourcePropertyRequestFailed:
 - 1291 ○ The InsertResourceProperty request failed for some reason.
- 1292 • OtherFaults: tbd

1293 Note: All faults generated must be compliant with the WS-BaseFaults [WS-BaseFaults]
1294 specification.

1295 **5.6.1 Example SOAP Encoding of the InsertResourceProperties** 1296 **Message Exchange**

1297 Consider the following resource properties document defining resource properties for a WS-
1298 Resource defined by the GenericDiskDrive portType:

```
1299 <GenericDiskDriveProperties xmlns:tns="http://example.com/diskDrive" >
1300   <tns:NumberOfBlocks>22</tns:NumberOfBlocks>
1301   <tns:BlockSize>1024</tns:BlockSize>
1302   <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
1303 </GenericDiskDriveProperties>
```

1304 The following is a non-normative example of an InsertResourceProperties request message using
1305 SOAP 1.2 [SOAP 1.2]:

```
1306 <s12:Envelope
1307   xmlns:s12="http://www.w3.org/2003/05/soap-envelope"
1308   xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
1309   xmlns:wsrf-rp=
1310     "http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-
1311 ResourceProperties-1.2-draft-05.xsd"
1312   xmlns:ex="http://example.com/exampleNS">
1313   <s12:Header>
1314     <wsa:Action>
1315 http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-
1316 draft-05.wsdl/InsertResourceProperties/InsertResourcePropertiesRequest
1317     </wsa:Action>
1318     <wsa:To s12:mustUnderstand="1">
1319       http://www.provider.org/ProviderEndpoint
1320     </wsa:To>
1321     <ex:ResourceDisambiguator>
1322       uuid:84decd55-7d3f-65ad-ac44-675d9fce5d22
1323     </ex:ResourceDisambiguator>
1324   </s12:Header>
1325   <s12:Body>
1326     <wsrf-rp:InsertResourceProperties
1327       xmlns:tns="http://example.com/diskdrive">
1328       <wsrf-rp:Insert>
1329         <tns:StorageCapability>
1330           <tns:NoSinglePointOfFailure>true</tns:NoSinglePointOfFailure>
1331         </tns:StorageCapability>
1332         <tns:StorageCapability>
1333           <tns:DataRedundancyMax>42</tns:DataRedundancyMax>
1334         </tns:StorageCapability>
1335       </wsrf-rp:Insert>
1336     </wsrf-rp:InsertResourceProperties>
1337   </s12:Body>
1338 </s12:Envelope>
```

1340 The following is an example InsertResourcePropertiesResponse message using SOAP 1.2
1341 [SOAP 1.2]:

```
1342 <s12:Envelope
1343   xmlns:s12="http://www.w3.org/2003/05/soap-envelope"
1344   xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
1345   xmlns:wsrf-rp=
```

```

1346 "http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-
1347 1.2-draft-05.xsd"
1348   xmlns:resp="http://www.other.org/otherNS">
1349   <s12:Header>
1350     <wsa:Action>
1351     http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-
1352     draft-05.wsdl/InsertResourceProperties/InsertResourcePropertiesResponse
1353     </wsa:Action>
1354     <wsa:To s12:mustUnderstand="1">
1355       http://www.requestor.org/someEndpoint
1356     </wsa:To>
1357     <resp:SomeResourceRef>
1358       uuid:9fef5fec-6dc3-44a2-ba32-8680cace43f9
1359     </resp:SomeResourceRef>
1360   </s12:Header>
1361   <s12:Body>
1362     <wsrf-rp:InsertResourcePropertiesResponse>
1363     </wsrf-rp:InsertResourcePropertiesResponse>
1364   </s12:Body>
1365 </s12:Envelope>

```

1366 The new contents of the resource properties document after successful processing of the request
1367 message MUST be:

```

1368 <GenericDiskDriveProperties xmlns:tns="http://example.com/diskDrive" >
1369   <tns:NumberOfBlocks>22</tns:NumberOfBlocks>
1370   <tns:BlockSize>1024</tns:BlockSize>
1371   <tns:Manufacturer>DrivesRUs</tns:Manufacturer>
1372   <tns:StorageCapability>
1373     <tns:NoSinglePointOfFailure>true</tns:NoSinglePointOfFailure>
1374   </tns:StorageCapability>
1375   <tns:StorageCapability>
1376     <tns>DataRedundancyMax>42</tns>DataRedundancyMax>
1377   </tns:StorageCapability>
1378 </GenericDiskDriveProperties>

```

1379 **5.7 UpdateResourceProperties**

1380 A Web service that implements a portType that includes the resource properties document type
1381 declaration (/wsdl:portType/@ResourceProperties) is a component of a WS-Resource, and MAY
1382 support the message exchange defined in this section that allows a requestor to replace the
1383 existing values of a resource property with new values.

1384 The UpdateResourceProperties message is used to request the replacement of all the element
1385 values of a single resource property in the resource properties document of a WS-Resource with
1386 a new set of values.

1387 The format of this request message MUST be:

```

1388 <wsrf-rp:UpdateResourceProperties>
1389   <wsrf-rp:Update>
1390     {any} *
1391   </wsrf-rp:Update>

```

1392

```
</wsrf-rp:UpdateResourceProperties>
```

1393 The UpdateResourceProperties request message MUST follow the WS-Resource Access
1394 Pattern. If a SOAPAction URI is included in the transport portion of the
1395 UpdateResourceProperties message, it MUST contain the URI [http://docs.oasis-
1396 open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-
1397 05.wSDL/UpdateResourceProperties/UpdateResourcePropertiesRequest](http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wSDL/UpdateResourceProperties/UpdateResourcePropertiesRequest).

1398 The contents of the UpdateResourceProperties request message are further described as
1399 follows:

1400 /wsrf-rp:UpdateResourceProperties/wsrf-rp:Update

1401 The intent of this request is to change the value of the elements of a resource property by
1402 removing any and all resource property element(s) of the given QName and replacing
1403 them with the contents of this component. If, as a result of processing the entire
1404 UpdateResourceProperty request, the resource properties document is no longer able to
1405 validate, the processing of the request MUST fault. The resource may be unable to
1406 accept the update of an element because it does not allow the requestor to update a
1407 resource property (or its value) of that given name. In such circumstances, the resource
1408 MUST fault the processing of the request message.

1409 /wsrf-rp:UpdateResourceProperties/wsrf-rp:Update/{any}

1410 This identifies the element(s) to be inserted into the resource properties document,
1411 replacing all element children of the root of the resource properties document with the
1412 same QName. If there are multiple child elements of the wsrf-rp:Update component, each
1413 MUST have the same namespace and name (i.e. the same QName). The QName MUST
1414 correspond to the QName of a resource property element associated with the WS-
1415 Resource (i.e. an element that is a valid child element of the root element of the resource
1416 properties document). Note, for those resource properties documents that allow open
1417 element content, the set of valid content types can be very large.

1418 When an UpdateResourceProperties request message has been successfully processed, the
1419 response message MUST have the following form:

1420

```
<wsrf-rp:UpdateResourcePropertiesResponse>
```

1421

```
</wsrf-rp:UpdateResourcePropertiesResponse>
```

1422 If a SOAPAction URI is included in the transport portion of the SetResourceProperties message,
1423 it MUST contain the URI [http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-
1424 1.2-draft-05.wSDL/UpdateResourceProperties/UpdateResourcePropertiesResponse](http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wSDL/UpdateResourceProperties/UpdateResourcePropertiesResponse). If the WS-
1425 Resource does not respond to the UpdateResourceProperties request message with the
1426 UpdateResourcePropertiesResponse message, then it SHOULD send one of the following fault
1427 messages:

- 1428 • ResourceUnknownFault:
 - 1429 ○ The resource identified in the message is not known to the Web service.
- 1430 • InvalidUpdateResourcePropertiesRequestContent:
 - 1431 ○ The contents of the UpdateResourceProperties request cause the resource
1432 properties document to no longer validate.
- 1433 • UnableToModifyResourceProperty:
 - 1434 ○ A resource property identified by the UpdateResourceProperties request is not
1435 modifiable.

- 1436 • InvalidResourcePropertyQName:
 - 1437 ○ A resource property QName does not identify a resource property.
- 1438 • UpdateResourcePropertiesRequestFailed:
 - 1439 ○ The UpdateResourceProperties request failed for some reason.
- 1440 • OtherFaults: tbd

1441 Note: All faults generated must be compliant with the WS-BaseFaults [WS-BaseFaults]
1442 specification.

1443 5.7.1 Example SOAP Encoding of the UpdateResourceProperties 1444 Message Exchange

1445 Consider the following resource properties document defining resource properties for a WS-
1446 Resource defined by the GenericDiskDrive portType:

```
1447 <GenericDiskDriveProperties xmlns:tns="http://example.com/diskDrive" >  
1448   <tns:NumberOfBlocks>22</tns:NumberOfBlocks>  
1449   <tns:BlockSize>1024</tns:BlockSize>  
1450   <tns:Manufacturer>DrivesRUs</tns:Manufacturer>  
1451 </GenericDiskDriveProperties>
```

1452 The following is a non-normative example of a UpdateResourceProperties request message
1453 using SOAP 1.2 [SOAP 1.2]:

```
1454 <s12:Envelope  
1455   xmlns:s12="http://www.w3.org/2003/05/soap-envelope"  
1456   xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"  
1457   xmlns:wsrp="http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-  
1458 ResourceProperties-1.2-draft-05.xsd"  
1459   xmlns:ex="http://example.com/exampleNS">  
1460   <s12:Header>  
1461     <wsa:Action>  
1462     http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-ResourceProperties-1.2-  
1463     draft-05.wsdl/UpdateResourceProperties/UpdateResourcePropertiesRequest  
1464     </wsa:Action>  
1465     <wsa:To s12:mustUnderstand="1">  
1466       http://www.provider.org/ProviderEndpoint  
1467     </wsa:To>  
1468     <ex:ResourceDisambiguator>  
1469       uuid:84dec55-7d3f-65ad-ac44-675d9fce5d22  
1470     </ex:ResourceDisambiguator>  
1471   </s12:Header>  
1472   <s12:Body>  
1473     <wsrp-rp:UpdateResourceProperties  
1474       xmlns:tns="http://example.com/diskdrive">  
1475       <wsrp-rp:Update>  
1476         <tns:NumberOfBlocks>143</tns:NumberOfBlocks>  
1477       </wsrp-rp:Update>  
1478     </wsrp-rp:UpdateResourceProperties>  
1479   </s12:Body>
```

1481

```
</s12:Envelope>
```

1482
1483

The following is an example UpdateResourcePropertiesResponse message using SOAP 1.2 [SOAP 1.2]:

1484
1485
1486
1487
1488
1489
1490
1491
1492
1493
1494
1495
1496
1497
1498
1499
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1505
1506
1507

```
<s12:Envelope
  xmlns:s12="http://www.w3.org/2003/05/soap-envelope"
  xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
  xmlns:wsrp="
"http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-ResourceProperties-
1.2-draft-05.xsd"
  xmlns:resp="http://www.other.org/otherNS">
  <s12:Header>
    <wsa:Action>
http://docs.oasis-open.org/wsrp/2004/11/wsrp-WS-ResourceProperties-1.2-
draft-05.wsdl/UpdateResourceProperties/UpdateResourcePropertiesResponse
    </wsa:Action>
    <wsa:To s12:mustUnderstand="1">
      http://www.requestor.org/someEndpoint
    </wsa:To>
    <resp:SomeResourceRef>
      uuid:9fef5fec-6dc3-44a2-ba32-8680cace43f9
    </resp:SomeResourceRef>
  </s12:Header>
  <s12:Body>
    <wsrf-rp:UpdateResourcePropertiesResponse>
  </wsrf-rp:UpdateResourcePropertiesResponse>
  </s12:Body>
</s12:Envelope>
```

1508
1509

The new contents of the resource properties document after successful processing of the request message MUST be:

1510
1511
1512
1513
1514

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

1515

5.8 DeleteResourceProperties

1516
1517
1518
1519

A Web service that implements a portType that includes the resource properties document type declaration (/wsdl:portType/@ResourceProperties) is a component of a WS-Resource, and MAY support the message exchange defined in this section that allows a requestor to remove all values of a resource property of a WS-Resource.

1520
1521

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

1522

The format of this request message MUST be:

1523
1524

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

1525

```
</wsrf-rp:DeleteResourceProperties>
```

1526 The DeleteResourceProperties request message MUST follow the WS-Resource Access Pattern.
1527 If a SOAPAction URI is included in the transport portion of the DeleteResourceProperties
1528 message, it MUST contain the URI <http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wSDL/DeleteResourceProperties/DeleteResourcePropertiesRequest>.

1531 The contents of the DeleteResourceProperties request message are further described as follows:
1532 /wsrf-rp:DeleteResourceProperties/wsrf-rp:Delete

1533 The intent of this message is to remove all element children of the root of the resource
1534 properties document whose QNames correspond to the value of @ResourceProperty. If
1535 the resource is unable to remove all identified elements, the processing of the message
1536 MUST fault. If, as a result of processing the DeleteResourceProperty request, the resource
1537 properties document is no longer able to validate, the processing of the request MUST
1538 fault. The resource may be unable to accept the deletion of an element because it does
1539 not allow the requestor to delete a resource property (or its value) of the given name. In
1540 such circumstances, the resource MUST fault the processing of the request message.

1541 /wsrf-rp:DeleteResourceProperties/wsrf-rp:Delete/@ResourceProperty

1542 This attribute contains the QName of a resource property to be deleted by this request.

1543 When a DeleteResourceProperties request message has been successfully processed, the
1544 response message MUST have the following form:

```
1545 <wsrf-rp:DeleteResourcePropertiesResponse>  
1546 </wsrf-rp:DeleteResourcePropertiesResponse>
```

1547 If a SOAPAction URI is included in the transport portion of the UpdateResourceProperties
1548 message, it MUST contain the URI <http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-draft-05.wSDL/DeleteResourceProperties/DeleteResourcePropertiesResponse>.

1551 If the WS-Resource does not respond to the DeleteResourceProperties request message with the
1552 DeleteResourcePropertiesResponse message, then it SHOULD send one of the following fault
1553 messages:

- 1554 • ResourceUnknownFault:
 - 1555 ○ The resource identified in the message is not known to the Web service.
- 1556 • UnableToModifyResourceProperty:
 - 1557 ○ A resource property identified by the DeleteResourceProperties request is not
1558 modifiable.
- 1559 • InvalidResourcePropertyQName:
 - 1560 ○ A resource property QName does not identify a resource property.
- 1561 • DeleteResourcePropertiesRequestFailed:
 - 1562 ○ One or more components of the DeleteResourceProperties request failed.
- 1563 • OtherFaults: tbd

1564 Note: All faults generated must be compliant with the WS-BaseFaults [WS-BaseFaults]
1565 specification.

1566 5.8.1 Example SOAP Encoding of the DeleteResourceProperties 1567 Message Exchange

1568 Consider the following resource properties document defining resource properties for a WS-
1569 Resource defined by the GenericDiskDrive portType:

```
1570 <GenericDiskDriveProperties xmlns:tns="http://example.com/diskDrive" >  
1571   <tns:NumberOfBlocks>22</tns:NumberOfBlocks>  
1572   <tns:BlockSize>1024</tns:BlockSize>  
1573   <tns:Manufacturer>DrivesRUs</tns:Manufacturer>  
1574 </GenericDiskDriveProperties>
```

1575 The following is a non-normative example of a DeleteResourceProperties request message using
1576 SOAP 1.2 [SOAP 1.2]:

```
1577 <s12:Envelope  
1578   xmlns:s12="http://www.w3.org/2003/05/soap-envelope"  
1579   xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"  
1580   xmlns:wsrf-rp=  
1581     "http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-  
1582 ResourceProperties-1.2-draft-05.xsd"  
1583   xmlns:ex="http://example.com/exampleNS">  
1584   <s12:Header>  
1585     <wsa:Action>  
1586     http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-1.2-  
1587     draft-05.wsdl/DeleteResourceProperties/DeleteResourcePropertiesRequest  
1588     </wsa:Action>  
1589     <wsa:To s12:mustUnderstand="1">  
1590       http://www.provider.org/ProviderEndpoint  
1591     </wsa:To>  
1592     <ex:ResourceDisambiguator>  
1593       uuid:84decd55-7d3f-65ad-ac44-675d9fce5d22  
1594     </ex:ResourceDisambiguator>  
1595   </s12:Header>  
1596   <s12:Body>  
1597     <wsrf-rp:DeleteResourceProperties  
1598       xmlns:tns="http://example.com/diskdrive">  
1599       <wsrf-rp:Delete ResourceProperty="tns:Manufacturer" />  
1600     </wsrf-rp:DeleteResourceProperties>  
1601   </s12:Body>  
1602 </s12:Envelope>
```

1603 The following is an example DeleteResourcePropertiesResponse message using SOAP 1.2
1604 [SOAP 1.2]:

```
1605 <s12:Envelope  
1606   xmlns:s12="http://www.w3.org/2003/05/soap-envelope"  
1607   xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"  
1608   xmlns:wsrf-rp=  
1609     "http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-  
1610     1.2-draft-05.xsd"  
1611   xmlns:resp="http://www.other.org/otherNS">
```



```
1612 <s12:Header>
1613   <wsa:Action>
1614 http://docs.oasis-open.org/wsr/2004/11/wsr-WS-ResourceProperties-1.2-
1615 draft-05.wsdl/DeleteResourceProperties/DeleteResourcePropertiesResponse
1616   </wsa:Action>
1617   <wsa:To s12:mustUnderstand="1">
1618     http://www.requestor.org/someEndpoint
1619   </wsa:To>
1620   <resp:SomeResourceRef>
1621     uuid:9fef5fec-6dc3-44a2-ba32-8680cace43f9
1622   </resp:SomeResourceRef>
1623 </s12:Header>
1624 <s12:Body>
1625   <wsrf-rp>DeleteResourcePropertiesResponse>
1626   </wsrf-rp>DeleteResourcePropertiesResponse>
1627 </s12:Body>
1628 </s12:Envelope>
```

1629 The new contents of the resource properties document after successful processing of the request
1630 message MUST be:

```
1631 <GenericDiskDriveProperties xmlns:tns="http://example.com/diskDrive" >
1632   <tns:NumberOfBlocks>22</tns:NumberOfBlocks>
1633   <tns:BlockSize>1024</tns:BlockSize>
1634 </GenericDiskDriveProperties>
```

6 Subscription

1635

1636 The WS-Notification [WS-Notification] family of specifications describes the patterns, concepts,
1637 standard message exchanges, and protocols of a topic-based, publish-subscribe messaging
1638 pattern in Web services. In the notification model, a service creates messages that are delivered
1639 to other services that had previously registered interest in the situation associated with that
1640 message.

1641 With WS-ResourceProperties, it is a common pattern for Web service requestors to request
1642 notification of changes (inserts, updates and deletions) made to the values of one or more
1643 resource property elements of a given WS-Resource. It is the Web service component of the WS-
1644 Resource that is responsible for executing or observing the messages. This suggests the need
1645 for encapsulation of the stateful resource to ensure all changes made to the stateful resource are
1646 *observed* by the WS-Resource implementation. To the extent that encapsulation is not provided,
1647 and updates to the stateful resource are made outside of the knowledge of the associated WS-
1648 Resource implementation, the WS-Resource may not be able to provide notifications reflecting
1649 those updates.

1650 If a WS-Resource supports the resource property value-change notification pattern, and if it uses
1651 WS-Notification to implement this feature, then it MUST implement the message exchanges for
1652 the NotificationProducer role, as specified in [WS-BaseNotification]. The WS-Resource MAY
1653 accept subscriptions to only a subset of the resource properties defined for a WS-Resource. If an
1654 implementation does not use WS-Notification, then it MAY ignore the requirements outlined in this
1655 section.

1656 One notification message artifact is created for each change to each resource property observed
1657 by the WS-Resource implementation. For example, a SetResourceProperties request message
1658 may contain five SetRequestComponents. Each of these components would result in the creation
1659 of a separate message artifact.

1660 WS-ResourceProperties defines the Notification Topic and TopicSpace elements [WS-Topics]
1661 that MUST be used to express the organization of the WS-Resource property element value
1662 change notifications. By understanding the relationship between Topics and resource properties,
1663 and examining the set of Topics supported by the NotificationProducer Web service, the service
1664 requestor can determine which of the resource properties are able to participate in the value-
1665 change notification pattern. The Topic and TopicSpace elements associated with resource
1666 property value-change notification are described as follows:

- 1667 1. The WS-Resource's resource properties document MAY be defined using resource
1668 properties declared in multiple XML namespaces. For each of these XML namespaces,
1669 an associated TopicSpace element MUST be defined. The TopicSpace element defines
1670 a topic space intended to contain topics related to value changes of resource properties
1671 declared in that XML namespace.
 - 1672 o The value of the TopicSpace element's targetNamespace attribute MUST be the
1673 same as the URI of the namespace in which the resource property element is
1674 defined. The name attribute of the TopicSpace element SHOULD have the value
1675 "ResourcePropertiesTopicSpace".
- 1676 2. For each resource property participating in the value-change notification pattern, a Topic
1677 element MUST be defined as a child of the TopicSpace element defined in 1.
 - 1678 o Notification messages reflecting changes to the resource property are associated
1679 with this Topic.

- 1680 ○ The value of the Topic element's name attribute MUST be the same as the
1681 NCName of the resource property element.
- 1682 ○ The value of the Topic element's messageTypes attribute MUST include wsrf-
1683 rp:ResourcePropertyValueChangeNotification (defined later in this section). In
1684 addition, it MAY include QNames of other message elements.
- 1685 ○ A designer MAY introduce additional child sub-topic elements to the topic
1686 element that represent application-specific needs.
- 1687 3. The WS-Resource acting as the NotificationProducer MUST include Topics defined in 2,
1688 as part of the value of its "Topics" resource property element. One such Topic MUST be
1689 included for each resource property element offered as a target for a value-change
1690 subscription.
- 1691 4. When a WS-Resource observes a resource property value change, it SHOULD create a
1692 notification message that expresses the situation, and associate the notification message
1693 with the Topic associated with that resource property. Note: there are many
1694 circumstances in which a change to a resource property might not result in the generation
1695 of a notification message. For example, a resource property value may change
1696 frequently, making generation of notification messages too expensive for the service. In
1697 this situation, a WS-Resource may choose to never generate notification message
1698 artifacts to record value change, or it may choose to generate notification message
1699 artifacts for a subset of the value change situations.

1700 The wsrf-rp:ResourcePropertyValueChangeNotification element MUST appear as a component
1701 of the notification message associated with resource property value change topics. This element
1702 is defined as follows:

```
1703    <wsrf-rp:ResourcePropertyValueChangeNotification>
1704    <wsrf-rp:OldValue> xsd:any </wsrf-rp:OldValue>?
1705    <wsrf-rp:NewValue> xsd:any </wsrf-rp:NewValue>
1706    </wsrf-rp:ResourcePropertyValueChangeNotification>
```

1707 This element may appear as the root element of the notification message, or it may appear as a
1708 descendent of the root, accommodating patterns where the notification message itself is
1709 contained in an enveloping mechanism. The form of the
1710 ResourcePropertyValueChangeNotification is further constrained as follows:

1711 /wsrf-rp:ResourcePropertyValueChangeNotification

1712 One ResourcePropertyValueChangeNotification element is created for each resource
1713 property value change situation detected and acted upon by the WS-Resource. This
1714 component records the value change of the affected resource property.

1715 /wsrf-rp:ResourcePropertyValueChangeNotification/OldValue

1716 This element, if it appears, MUST contain the value of the affected WS-Resource
1717 property immediately prior to when the value change was applied. If the resource
1718 property did not have a value prior to the value change (for example, this notification
1719 represents an insertion of a new resource property element) then this element is empty
1720 and will contain the attribute xsi:nil with value "true". If this value does not appear in the
1721 message, then the WS-Resource was unable or unwilling to record the value prior to the
1722 value change.

1723 /wsrf-rp:ResourcePropertyValueChangeNotification/NewValue

1724 This element MUST contain the value of the affected WS-Resource property after the
1725 value change condition was detected. If the WS-Resource property does not have a
1726 value after the value change (for example, this notification represents a deletion of the
1727 resource property element) then this element is empty and will contain the attribute xsi:nil
1728 with value "true".

1729

7 ACID Properties of Operations on WS-Resources

1730

1731 The ability to associate a transactional recovery policy to the execution of a Web service
1732 message exchange is described in the Web Services Atomic Transaction specification [WS-
1733 AtomicTransaction]. In the presence of a transactional unit of work, a Web service capable of
1734 participating in the transactional protocol must abide by the rules of two-phase-commit
1735 transaction management. However, in the absence of a transaction management policy, the Web
1736 service is under no obligation to recover the state of the WS-Resource in the event of a failure
1737 during message processing.

1738 This specification is not prescriptive with respect to policy that governs concurrent read or write
1739 access to a WS-Resource. The definition of specific policy governing concurrent updates,
1740 whether or not separate message executions targeting the same WS-Resource may be
1741 interleaved, and whether partially-completed WS-Resource updates within a given message
1742 execution may be observed by other concurrent requests is beyond the scope of this definition.
1743 The scope and extent of the isolation of changes made to the WS-Resource is an implementation
1744 dependent responsibility of the WS-Resource itself. The WS-Resource must also take on the
1745 responsibility for the scope and extent to which notifications of changes to the WS-Resource are
1746 isolated and made observable. If WS-Resource update isolation is needed, we suggest the use of
1747 a transaction [WS-AtomicTransaction] to provide a context within which isolation of WS-Resource
1748 updates can be provided. In the absence of a transactional unit of work, the level of WS-
1749 Resource update atomicity, recovery, isolation, and durability provided is implementation-
1750 dependent.

1751 The ability to declare and attach isolation-level policy to the definition of a Web service message
1752 exchange, whether or not a transactional unit of work is present, represents a general
1753 requirement not met by the current Web service architecture. In the future, isolation-level policy
1754 declarations may be introduced as a formal part of the WS-Resource definition. Refer to [State
1755 Paper] for a general discussion of these requirements.

1756 8 Security Considerations

1757 This specification defines the resource properties document and also the set of message
1758 exchanges that MUST be supported by a WS-Resource. In this context, there are two categories
1759 of security aspects that need to be considered: (a) securing the message exchanges and (b)
1760 securing the resource properties.

1761 8.1 Securing the message exchanges

1762 When messages are exchanged between a requestor and a WS-Resource in order to access or
1763 act on one or more resource properties, it is RECOMMENDED that the communication between
1764 services be secured using the mechanisms described in WS-Security. In order to properly secure
1765 messages, the message body and all relevant headers need to be included in the digital
1766 signature so as to prove the integrity of the message. In addition the ReferenceProperties from an
1767 EndpointReference, used as part of any message exchange, may be encrypted to ensure their
1768 privacy. In the event that a requestor communicates frequently with a Web service to access
1769 resource properties, either directly through a query or accomplished through notification of state
1770 change, it is RECOMMENDED that a security context be established using the mechanisms
1771 described in WS-Trust [WS-Trust] and WS-SecureConversation [WS-SecureConversation],
1772 allowing for potentially more efficient means of authentication.

1773 It is common for communication between requestors and the WS-Resource to exchange multiple
1774 messages. As a result, the usage profile may be susceptible to key attacks. For this reason it is
1775 RECOMMENDED that the keys used to secure the channel be changed frequently. This "re-
1776 keying" can be effected a number of ways. The following list outlines four common techniques:

- 1777 • Attaching a nonce to each message and using it in a derived key function with the shared
1778 secret
- 1779 • Using a derived key sequence and switch "generations"
- 1780 • Closing and re-establishing a security context
- 1781 • Exchanging new secrets between the parties

1782 It should be noted that the mechanisms listed above are independent of the security context
1783 token (SCT). That is, the keys used to secure the channel during message exchanges may be
1784 independent of the key used to prove the right to access WS-ResourceProperties.

1785 The security context MAY be re-established using the mechanisms described in WS-Trust and
1786 WS-SecureConversation. Similarly, secrets can be exchanged using the mechanisms described
1787 in WS-Trust. Note, however, that the current shared secret SHOULD NOT be used to encrypt the
1788 new shared secret. Derived keys, the preferred solution from this list, can be specified using the
1789 mechanisms described in WS-SecureConversation.

1790 The following list summarizes common classes of attacks that apply to this protocol and identifies
1791 the mechanism to prevent/mitigate the attacks:

- 1792 • **Message alteration** – Alteration is prevented by including signatures of the message
1793 information using WS-Security.
- 1794 • **Message disclosure** – Confidentiality is preserved by encrypting sensitive data using WS-
1795 Security.
- 1796 • **Key integrity** – Key integrity is maintained by using the strongest algorithms possible (by
1797 comparing secured policies – see WS-Policy [WS-Policy] and WS-SecurityPolicy [WS-
1798 SecurityPolicy]).

- 1799 • **Authentication** – Authentication is established using the mechanisms described in WS-
1800 Security and WS-Trust. Each message is authenticated using the mechanisms described in
1801 WS-Security.
- 1802 • **Accountability** – Accountability is a function of the type of and string of the key and
1803 algorithms being used. In many cases, a strong symmetric key provides sufficient
1804 accountability. However, in some environments, strong PKI signatures are required.
- 1805 • **Availability** – Many services are subject to a variety of availability attacks. Replay is a
1806 common attack and it is RECOMMENDED that this be addressed as described in the Replay
1807 bullet item below. Other attacks, such as network-level denial of service attacks, are harder to
1808 avoid and are outside the scope of this specification. That said, care should be taken to
1809 ensure that minimal processing be performed prior to any authenticating sequences.
- 1810 • **Replay** – Messages may be replayed for a variety of reasons. To detect and eliminate this
1811 attack, mechanisms should be used to identify replayed messages such as the
1812 timestamp/nonce outlined in WS-Security and the sequences outlined in WS-
1813 ReliableMessaging [WS-ReliableMessaging].

1814 8.2 Securing Resource Properties

1815 Since WS-ResourceProperties defines a mechanism to expose properties of a WS-Resource,
1816 security policies should be established that ensure that only authorized requestors can access
1817 the value of a resource property. In order to secure access to the resource properties, the
1818 message exchanges that provide the access should be appropriately controlled. Authorization
1819 policies should be put in place so that the implications of providing the state information (through
1820 GetResourceProperty, GetMultipleResourceProperties, or QueryResourceProperties messages
1821 or through notification of value change and modification of the resource properties), are taken into
1822 account. These policies should also take into account the semantic difference between
1823 components of the SetResourceProperties message – i.e. that an Update component updates a
1824 *value* of a resource property, whereas Insert and Delete components modify whether the WS-
1825 Resource actually *contains* the resource property values.

1826 The authorization policies may also reflect the sensitivity of the resource property(ies) that are
1827 accessible from a WS-Resource. Policies can be set at the coarse granularity of the message
1828 exchange (e.g., Get(Multiple)ResourceProperty(ies) vs SetResourceProperty), but finer-grained
1829 control at the level of individual resource properties may be desired in some scenarios (e.g. user
1830 Bob can access value of “Manufacturer” but not “NumberOfBlocks”).

1831 Given that a requestor will be able to access a resource property value by subscribing to state
1832 changes, care should be taken to set up security policies so that a consistent policy is in effect
1833 irrespective of whether the resource property value is accessed through direct message
1834 exchanges (e.g., GetResourceProperty) or indirectly through subscription for state changes (i.e.,
1835 subscription to “ResourceChangePropertyValueNotification” topic). It should also be noted that a
1836 requestor will be able to query the value of a property through the QueryResourceProperty
1837 operation, or by using a domain-specific operation corresponding to a resource property (e.g.,
1838 getNumberOfBlocks) if one exists. Therefore, the authorization policy on QueryResourceProperty
1839 operation (and the getXXX operation, if one is declared on the Web service for resource property
1840 named XXX) should be set so that a requestor who is not authorized to get a value of a resource
1841 property through a GetResourceProperty request is not able to deduce the value indirectly
1842 through the QueryResourceProperty request (or the getXXX operation on the Web service).

1843 Even if the requestor is authorized to access the requested resource properties, it is
1844 RECOMMENDED that the resource properties that are exchanged between a requestor and a
1845 Web service are secured to ensure integrity and/or confidentiality of the resource property values.

- 1846 This will prevent unauthorized alteration of and/or access to the property values while in transit.
1847 This would mean that the specific resource property elements are signed and/or encrypted within
1848 the message by leveraging WS-Security as discussed in the previous section.

1849 9 References

1850 9.1 Normative

- 1851 [RFC2119] S. Bradner, *Key words for use in RFCs to Indicate Requirement Levels*, <http://www.ietf.org/rfc/rfc2119.txt>, IETF RFC 2119, March 1997.
- 1852
- 1853
- 1854 [SOAP 1.2] <http://www.w3.org/TR/soap12-part1/>
- 1855 [URI] T. Berners-Lee, R. Fielding, L. Masinter, "Uniform Resource Identifiers (URI): Generic Syntax," RFC 2396, MIT/LCS, U.C. Irvine, Xerox Corporation, August 1998.
- 1856
- 1857
- 1858 [WS-Addressing] <http://www.w3.org/Submission/2004/SUBM-ws-addressing-20040810>
- 1859
- 1860 [WS-BaseNotification] <http://docs.oasis-open.org/wsn/2004/06/wsn-WS-BaseNotification-1.2-draft-03.pdf>
- 1861
- 1862 [WS-Notification] <http://www.oasis-open.org/committees/download.php/6661/WSNpubsub-1-0.pdf>
- 1863
- 1864 [WS-Resource] <http://docs.oasis-open.org/wsr/2004/11/wsr-WS-Resource-1.2-draft-02.pdf>
- 1865
- 1866 [WS-ResourceLifetime] <http://docs.oasis-open.org/wsr/2004/06/wsr-WS-ResourceLifetime-1.2-draft-03.pdf>
- 1867
- 1868 [WS-Topics] <http://docs.oasis-open.org/wsn/2004/06/wsn-WS-Topics-1.2-draft-01.pdf>
- 1869
- 1870 [XML-Infoset] <http://www.w3.org/TR/xml-infoset/>
- 1871 [XPath] <http://www.w3.org/TR/xpath>

1872 9.2 Non-Normative

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- 1874 <http://forge.gridforum.org/projects/ggf-editor/document/draft-ogsi-service-1/en/1>
- 1875
- 1876 [State Paper] <http://www.oasis-open.org/committees/download.php/6795/ws-modelingresources.pdf>
- 1877
- 1878 [WS-AtomicTransaction] <http://www.ibm.com/developerworks/webservices/library/ws-atomtran/>
- 1879
- 1880 [WS-Policy] <http://www-106.ibm.com/developerworks/library/specification/ws-polfram/>
- 1881
- 1882 [WS-ReliableMessaging] <http://www.ibm.com/developerworks/webservices/library/ws-rm/>
- 1883 [WS-SecureConversation] <http://www-106.ibm.com/developerworks/library/specification/ws-secon/>
- 1884
- 1885 [WS-Security] <http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf>
- 1886
- 1887 [WS-SecurityPolicy] <http://www-106.ibm.com/developerworks/webservices/library/ws-secpol/>
- 1888

1889	[WS-Trust]	http://www-106.ibm.com/developerworks/webservices/library/specification/ws-trust/
1890		
1891		
1892	[WSDL 2.0]	http://www.w3.org/TR/wsd12/

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1920 (IBM).

1921 **Appendix B. XML Schema**

1922 The XML types and elements used in this specification are defined in the following XML Schema:

```
1923 <?xml version="1.0" encoding="UTF-8"?>
1924 <!--
1925
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1927 intellectual property or other rights that might be claimed to pertain
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1961 revoked by OASIS or its successors or assigns.
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-->
<xsd:schema
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:wsrf-rp=
    "http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-
1.2-draft-05.xsd"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  elementFormDefault="qualified" attributeFormDefault="unqualified"
  targetNamespace=
    "http://docs.oasis-open.org/wsrf/2004/11/wsrf-WS-ResourceProperties-
1.2-draft-05.xsd"
>
<!-- ===== Resource Property Related ===== -->
<!-- ===== Resource Properties for QueryResourceProperties ===== -->
  <xsd:element name="QueryExpressionDialect" type="xsd:anyURI"/>
<!-- ===== Global Attribute Declaration for WSDL 1.1 portType===== -->
  <xsd:attribute name="ResourceProperties" type="xsd:QName" />
<!-- = Notification Message for ResourceProperties value change == -->
  <xsd:complexType name="ResourcePropertyValueChangeNotificationType">
    <xsd:sequence>
      <xsd:element name="OldValue" nillable="true"
        minOccurs="0" maxOccurs="1" >
        <xsd:complexType>
          <xsd:sequence>
            <xsd:any minOccurs="1" maxOccurs="1" />
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
      <xsd:element name="NewValue" nillable="true"
        minOccurs="1" maxOccurs="1" >
        <xsd:complexType>
          <xsd:sequence>
            <xsd:any minOccurs="1" maxOccurs="1" />
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>
  <xsd:element name="ResourcePropertyValueChangeNotification"
```

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        type="wsrf-rp:ResourcePropertyValueChangeNotificationType" />  
  
<xsd:complexType name="QueryExpressionType" mixed="true">  
  <xsd:sequence>  
    <xsd:any minOccurs="0" maxOccurs="1" processContents="lax" />  
  </xsd:sequence>  
  <xsd:attribute name="Dialect" type="xsd:anyURI" />  
</xsd:complexType>  
  
<xsd:element name="QueryExpression" type="wsrf-  
rp:QueryExpressionType" />  
</xsd:schema>
```

2025

Appendix C. WSDL 1.1

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The following illustrates the WSDL 1.1 for the Web service methods described in this specification:

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```
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2070 INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE
2071 INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED
2072 WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
2073
2074 -->
2075
2076 <wsdl:definitions name="WS-ResourceProperties"
2077 xmlns="http://schemas.xmlsoap.org/wsdl/"
2078 xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
2079 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
2080 xmlns:wsbf=
2081 "http://docs.oasis-open.org/wsrif/2004/11/wsrif-WS-BaseFaults-1.2-
2082 draft-03.xsd"
2083 xmlns:wsrf-rp=
2084 "http://docs.oasis-open.org/wsrif/2004/11/wsrif-WS-ResourceProperties-
2085 1.2-draft-05.xsd"
2086 xmlns:wsrf-rpw=
2087 "http://docs.oasis-open.org/wsrif/2004/11/wsrif-WS-ResourceProperties-
2088 1.2-draft-05.wsdl"
2089 targetNamespace=
2090 "http://docs.oasis-open.org/wsrif/2004/11/wsrif-WS-ResourceProperties-
2091 1.2-draft-05.wsdl "
2092 >
2093
2094 <!-- ===== Types Definitions ===== -->
2095 <wsdl:types>
2096 <xsd:schema
2097 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
2098 targetNamespace=
2099 "http://docs.oasis-open.org/wsrif/2004/11/wsrif-WS-ResourceProperties-
2100 1.2-draft-05.xsd"
2101 elementFormDefault="qualified"
2102 attributeFormDefault="unqualified">
2103
2104 <xsd:include schemaLocation=
2105 "http://docs.oasis-open.org/wsrif/2004/11/wsrif-WS-ResourceProperties-
2106 1.2-draft-05.xsd"
2107 />
2108
2109 <xsd:import
2110 namespace=
2111 "http://docs.oasis-open.org/wsrif/2004/11/wsrif-WS-BaseFaults-1.2-
2112 draft-03.xsd"
2113 schemaLocation=
2114 "http://docs.oasis-open.org/wsrif/2004/11/wsrif-WS-BaseFaults-1.2-
2115 draft-03.xsd"
2116 />


```

2117
2118 <!-- ===== Message Types for GetResourcePropertyDocument ===== -->
2119
2120     <xsd:element name="GetResourcePropertyDocument">
2121         <xsd:complexType/>
2122     </xsd:element>
2123
2124     <xsd:element name="GetResourcePropertyDocumentResponse">
2125         <xsd:complexType>
2126             <xsd:sequence>
2127                 <xsd:any minOccurs="1" maxOccurs="1"/>
2128             </xsd:sequence>
2129         </xsd:complexType>
2130     </xsd:element>
2131
2132 <!-- ===== Message Types for GetResourceProperty ===== -->
2133
2134     <xsd:element name="GetResourceProperty"
2135         type="xsd:QName" />
2136
2137     <xsd:element name="GetResourcePropertyResponse" >
2138         <xsd:complexType>
2139             <xsd:sequence>
2140                 <xsd:any minOccurs="0" maxOccurs="unbounded" />
2141             </xsd:sequence>
2142         </xsd:complexType>
2143     </xsd:element>
2144
2145     <xsd:complexType name="ResourceUnknownFaultType">
2146         <xsd:complexContent>
2147             <xsd:extension base="wsbf:BaseFaultType" />
2148         </xsd:complexContent>
2149     </xsd:complexType>
2150     <xsd:element name="ResourceUnknownFault"
2151         type="wsrf-rp:ResourceUnknownFaultType" />
2152
2153     <xsd:complexType name="InvalidResourcePropertyQNameFaultType">
2154         <xsd:complexContent>
2155             <xsd:extension base="wsbf:BaseFaultType" />
2156         </xsd:complexContent>
2157     </xsd:complexType>
2158     <xsd:element name="InvalidResourcePropertyQNameFault"
2159         type="wsrf-
2160 rp:InvalidResourcePropertyQNameFaultType" />
2161
2162
2163 <!-- ===== Message Types for GetMultipleResourceProperties ===== -->
2164     <xsd:element name="GetMultipleResourceProperties">
2165         <xsd:complexType>

```

```

2166         <xsd:sequence>
2167             <xsd:element name="ResourceProperty" type="xsd:QName"
2168                 minOccurs="1" maxOccurs="unbounded" />
2169         </xsd:sequence>
2170     </xsd:complexType>
2171 </xsd:element>
2172
2173     <xsd:element name="GetMultipleResourcePropertiesResponse">
2174         <xsd:complexType>
2175             <xsd:sequence>
2176                 <xsd:any minOccurs="0" maxOccurs="unbounded" />
2177             </xsd:sequence>
2178         </xsd:complexType>
2179     </xsd:element>
2180
2181 <!-- ===== Message Types for SetResourceProperties ===== -->
2182
2183     <xsd:complexType name="InsertType">
2184         <xsd:sequence>
2185             <xsd:any processContents="lax"
2186                 minOccurs="1" maxOccurs="unbounded" />
2187         </xsd:sequence>
2188     </xsd:complexType>
2189     <xsd:element name="Insert"
2190         type="wsrf-rp:InsertType"/>
2191
2192     <xsd:complexType name="UpdateType">
2193         <xsd:sequence>
2194             <xsd:any processContents="lax"
2195                 minOccurs="1" maxOccurs="unbounded" />
2196         </xsd:sequence>
2197     </xsd:complexType>
2198     <xsd:element name="Update"
2199         type="wsrf-rp:UpdateType"/>
2200
2201     <xsd:complexType name="DeleteType">
2202         <xsd:attribute name="ResourceProperty"
2203             type="xsd:QName" use="required" />
2204     </xsd:complexType>
2205     <xsd:element name="Delete"
2206         type="wsrf-rp>DeleteType"/>
2207
2208     <xsd:element name="SetResourceProperties">
2209         <xsd:complexType>
2210             <xsd:choice minOccurs="0" maxOccurs="unbounded">
2211                 <xsd:element ref="wsrf-rp:Insert"/>
2212                 <xsd:element ref="wsrf-rp:Update"/>
2213                 <xsd:element ref="wsrf-rp>Delete"/>
2214             </xsd:choice>

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2215         </xsd:complexType>
2216     </xsd:element>
2217
2218     <xsd:element name="SetResourcePropertiesResponse" >
2219         <xsd:complexType />
2220     </xsd:element>
2221
2222     <xsd:complexType
2223 name="InvalidSetResourcePropertiesRequestContentFaultType">
2224         <xsd:complexContent>
2225             <xsd:extension base="wsbf:BaseFaultType" />
2226         </xsd:complexContent>
2227     </xsd:complexType>
2228     <xsd:element
2229 name="InvalidSetResourcePropertiesRequestContentFault"
2230         type="wsrf-
2231 rp:InvalidSetResourcePropertiesRequestContentFaultType" />
2232
2233     <xsd:complexType name="UnableToModifyResourcePropertyFaultType">
2234         <xsd:complexContent>
2235             <xsd:extension base="wsbf:BaseFaultType" />
2236         </xsd:complexContent>
2237     </xsd:complexType>
2238     <xsd:element name="UnableToModifyResourcePropertyFault"
2239         type="wsrf-
2240 rp:UnableToModifyResourcePropertyFaultType" />
2241
2242     <xsd:complexType
2243 name="SetResourcePropertyRequestFailedFaultType">
2244         <xsd:complexContent>
2245             <xsd:extension base="wsbf:BaseFaultType" />
2246         </xsd:complexContent>
2247     </xsd:complexType>
2248     <xsd:element name="SetResourcePropertyRequestFailedFault"
2249         type="wsrf-
2250 rp:SetResourcePropertyRequestFailedFaultType" />
2251
2252     <xsd:complexType
2253 name="InsertResourcePropertyRequestFailedFaultType">
2254         <xsd:complexContent>
2255             <xsd:extension base="wsbf:BaseFaultType" />
2256         </xsd:complexContent>
2257     </xsd:complexType>
2258     <xsd:element name="InsertResourcePropertyRequestFailedFault"
2259         type="wsrf-
2260 rp:InsertResourcePropertyRequestFailedFaultType" />
2261
2262

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```

2263     <xsd:complexType
2264 name="InvalidInsertResourcePropertiesRequestContentFaultType">
2265     <xsd:complexContent>
2266     <xsd:extension base="wsbf:BaseFaultType" />
2267     </xsd:complexContent>
2268     </xsd:complexType>
2269     <xsd:element
2270 name="InvalidInsertResourcePropertiesRequestContentFault"
2271     type="wsrf-
2272 rp:InvalidInsertResourcePropertiesRequestContentFaultType" />
2273
2274     <xsd:complexType
2275 name="InvalidUpdateResourcePropertiesRequestContentFaultType">
2276     <xsd:complexContent>
2277     <xsd:extension base="wsbf:BaseFaultType" />
2278     </xsd:complexContent>
2279     </xsd:complexType>
2280     <xsd:element
2281 name="InvalidUpdateResourcePropertiesRequestContentFault"
2282     type="wsrf-
2283 rp:InvalidUpdateResourcePropertiesRequestContentFaultType" />
2284
2285     <xsd:complexType
2286 name="UpdateResourcePropertyRequestFailedFaultType">
2287     <xsd:complexContent>
2288     <xsd:extension base="wsbf:BaseFaultType" />
2289     </xsd:complexContent>
2290     </xsd:complexType>
2291     <xsd:element name="UpdateResourcePropertyRequestFailedFault"
2292     type="wsrf-
2293 rp:UpdateResourcePropertyRequestFailedFaultType" />
2294
2295     <xsd:complexType
2296 name="DeleteResourcePropertyRequestFailedFaultType">
2297     <xsd:complexContent>
2298     <xsd:extension base="wsbf:BaseFaultType" />
2299     </xsd:complexContent>
2300     </xsd:complexType>
2301     <xsd:element name="DeleteResourcePropertyRequestFailedFault"
2302     type="wsrf-
2303 rp>DeleteResourcePropertyRequestFailedFaultType" />
2304
2305 <!-- ===== Message Types for InsertResourceProperties ===== -->
2306     <xsd:element name="InsertResourceProperties">
2307     <xsd:complexType>
2308     <xsd:sequence>
2309     <xsd:element ref="wsrf-rp:Insert" />
2310     </xsd:sequence>
2311     </xsd:complexType>

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2312     </xsd:element>
2313
2314     <xsd:element name="InsertResourcePropertiesResponse" >
2315         <xsd:complexType />
2316     </xsd:element>
2317
2318 <!-- ===== Message Types for UpdateResourceProperties ===== -->
2319     <xsd:element name="UpdateResourceProperties">
2320         <xsd:complexType>
2321             <xsd:sequence>
2322                 <xsd:element ref="wsrf-rp:Update"/>
2323             </xsd:sequence>
2324         </xsd:complexType>
2325     </xsd:element>
2326
2327     <xsd:element name="UpdateResourcePropertiesResponse" >
2328         <xsd:complexType />
2329     </xsd:element>
2330
2331 <!-- ===== Message Types for DeleteResourceProperties ===== -->
2332     <xsd:element name="DeleteResourceProperties">
2333         <xsd:complexType>
2334             <xsd:sequence>
2335                 <xsd:element ref="wsrf-rp:Delete"/>
2336             </xsd:sequence>
2337         </xsd:complexType>
2338     </xsd:element>
2339
2340     <xsd:element name="DeleteResourcePropertiesResponse" >
2341         <xsd:complexType />
2342     </xsd:element>
2343
2344 <!-- ===== Message Types for QueryResourceProperties ===== -->
2345
2346     <xsd:element name="QueryResourceProperties" >
2347         <xsd:complexType>
2348             <xsd:sequence>
2349                 <xsd:element ref="wsrf-rp:QueryExpression"
2350                     minOccurs="1" maxOccurs="1"/>
2351             </xsd:sequence>
2352         </xsd:complexType>
2353     </xsd:element>
2354
2355     <xsd:element name="QueryResourcePropertiesResponse" >
2356         <xsd:complexType>
2357             <xsd:complexContent mixed="true">
2358                 <xsd:restriction base="xsd:anyType">
2359                     <xsd:sequence>
2360                         <xsd:any processContents="lax"

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2361             minOccurs="1" maxOccurs="unbounded" />
2362         </xsd:sequence>
2363     </xsd:restriction>
2364 </xsd:complexContent>
2365 </xsd:complexType>
2366 </xsd:element>
2367
2368 <xsd:complexType name="UnknownQueryExpressionDialectFaultType">
2369     <xsd:complexContent>
2370         <xsd:extension base="wsbf:BaseFaultType" />
2371     </xsd:complexContent>
2372 </xsd:complexType>
2373 <xsd:element name="UnknownQueryExpressionDialectFault"
2374             type="wsrf-
2375 rp:UnknownQueryExpressionDialectFaultType" />
2376
2377 <xsd:complexType name="InvalidQueryExpressionFaultType">
2378     <xsd:complexContent>
2379         <xsd:extension base="wsbf:BaseFaultType" />
2380     </xsd:complexContent>
2381 </xsd:complexType>
2382 <xsd:element name="InvalidQueryExpressionFault"
2383             type="wsrf-rp:InvalidQueryExpressionFaultType" />
2384
2385 <xsd:complexType name="QueryEvaluationErrorFaultType">
2386     <xsd:complexContent>
2387         <xsd:extension base="wsbf:BaseFaultType" />
2388     </xsd:complexContent>
2389 </xsd:complexType>
2390 <xsd:element name="QueryEvaluationErrorFault"
2391             type="wsrf-rp:QueryEvaluationErrorFaultType" />
2392
2393
2394 </xsd:schema>
2395 </wsdl:types>
2396
2397 <!-- ===== GetResourcePropertyDocument =====
2398     GetResourcePropertyDocument()
2399     returns: any
2400 -->
2401 <wsdl:message name="GetResourcePropertyDocumentRequest">
2402     <wsdl:part name="GetResourcePropertyDocumentRequest"
2403         element="wsrf-rp:GetResourcePropertyDocument" />
2404 </wsdl:message>
2405
2406 <wsdl:message name="GetResourcePropertyDocumentResponse">
2407     <wsdl:part name="GetResourcePropertyDocumentResponse"
2408         element="wsrf-rp:GetResourcePropertyDocumentResponse" />
2409 </wsdl:message>

```

```

2410
2411 <!-- ===== GetResourceProperty =====
2412 GetResourceProperty(QName)
2413 returns: any
2414 -->
2415 <wsdl:message name="GetResourcePropertyRequest">
2416   <wsdl:part name="GetResourcePropertyRequest"
2417     element="wsrf-rp:GetResourceProperty" />
2418 </wsdl:message>
2419
2420 <wsdl:message name="GetResourcePropertyResponse">
2421   <wsdl:part name="GetResourcePropertyResponse"
2422     element="wsrf-rp:GetResourcePropertyResponse" />
2423 </wsdl:message>
2424
2425 <wsdl:message name="ResourceUnknownFault">
2426   <part name="ResourceUnknownFault"
2427     element="wsrf-rp:ResourceUnknownFault" />
2428 </wsdl:message>
2429
2430 <wsdl:message name="InvalidResourcePropertyQNameFault">
2431   <part name="InvalidResourcePropertyQNameFault"
2432     element="wsrf-rp:InvalidResourcePropertyQNameFault" />
2433 </wsdl:message>
2434
2435 <!-- =====GetMultipleResourceProperties =====
2436 GetMultipleResourceProperties(list of QName)
2437 returns: sequence of any
2438 -->
2439 <wsdl:message name="GetMultipleResourcePropertiesRequest">
2440   <wsdl:part name="GetMultipleResourcePropertiesRequest"
2441     element="wsrf-rp:GetMultipleResourceProperties" />
2442 </wsdl:message>
2443
2444 <wsdl:message name="GetMultipleResourcePropertiesResponse">
2445   <wsdl:part name="GetMultipleResourcePropertiesResponse"
2446     element="wsrf-rp:GetMultipleResourcePropertiesResponse"
2447 />
2448 </wsdl:message>
2449
2450 <!-- ===== SetResourceProperties =====
2451 SetResourceProperties(
2452   { insert (any)* |
2453     update (any)* |
2454     delete@QName } +
2455   )
2456 returns: empty
2457 -->
2458 <wsdl:message name="SetResourcePropertiesRequest">

```

```

2459     <wsdl:part name="SetResourcePropertiesRequest"
2460           element="wsrf-rp:SetResourceProperties" />
2461 </wsdl:message>
2462
2463 <wsdl:message name="SetResourcePropertiesResponse">
2464   <wsdl:part name="SetResourcePropertiesResponse"
2465     element="wsrf-rp:SetResourcePropertiesResponse" />
2466 </wsdl:message>
2467
2468 <wsdl:message name="InvalidSetResourcePropertiesRequestContentFault">
2469   <part name="InvalidSetResourcePropertiesRequestContentFault"
2470     element="wsrf-
2471 rp:InvalidSetResourcePropertiesRequestContentFault" />
2472 </wsdl:message>
2473
2474 <wsdl:message name="UnableToModifyResourcePropertyFault">
2475   <part name="UnableToModifyResourcePropertyFault"
2476     element="wsrf-rp:UnableToModifyResourcePropertyFault" />
2477 </wsdl:message>
2478
2479 <wsdl:message name="SetResourcePropertyRequestFailedFault">
2480   <part name="SetResourcePropertyRequestFailedFault"
2481     element="wsrf-rp:SetResourcePropertyRequestFailedFault" />
2482 </wsdl:message>
2483
2484 <!-- ===== InsertResourceProperties =====
2485   InsertResourceProperties((any)* )
2486   returns: empty
2487 -->
2488 <wsdl:message name="InsertResourcePropertiesRequest">
2489   <wsdl:part name="InsertResourcePropertiesRequest"
2490     element="wsrf-rp:InsertResourceProperties" />
2491 </wsdl:message>
2492
2493 <wsdl:message name="InsertResourcePropertiesResponse">
2494   <wsdl:part name="InsertResourcePropertiesResponse"
2495     element="wsrf-rp:InsertResourcePropertiesResponse" />
2496 </wsdl:message>
2497
2498 <wsdl:message name="InsertResourcePropertyRequestFailedFault">
2499   <part name="InsertResourcePropertyRequestFailedFault"
2500     element="wsrf-rp:InsertResourcePropertyRequestFailedFault"
2501 />
2502 </wsdl:message>
2503
2504 <wsdl:message
2505 name="InvalidInsertResourcePropertiesRequestContentFault">
2506   <part name="InvalidInsertResourcePropertiesRequestContentFault"

```



```

2507         element="wsrf-
2508 rp:InvalidInsertResourcePropertiesRequestContentFault" />
2509     </wsdl:message>
2510
2511     <!-- ===== UpdateResourceProperties =====
2512     UpdateResourceProperties((any)* )
2513     returns: empty
2514     -->
2515     <wsdl:message name="UpdateResourcePropertiesRequest">
2516         <wsdl:part name="UpdateResourcePropertiesRequest"
2517             element="wsrf-rp:UpdateResourceProperties" />
2518     </wsdl:message>
2519
2520     <wsdl:message name="UpdateResourcePropertiesResponse">
2521         <wsdl:part name="UpdateResourcePropertiesResponse"
2522             element="wsrf-rp:UpdateResourcePropertiesResponse" />
2523     </wsdl:message>
2524
2525     <wsdl:message name="UpdateResourcePropertyRequestFailedFault">
2526         <part name="UpdateResourcePropertyRequestFailedFault"
2527             element="wsrf-rp:UpdateResourcePropertyRequestFailedFault"
2528         />
2529     </wsdl:message>
2530
2531     <wsdl:message
2532 name="InvalidUpdateResourcePropertiesRequestContentFault">
2533         <part name="InvalidUpdateResourcePropertiesRequestContentFault"
2534             element="wsrf-
2535 rp:InvalidUpdateResourcePropertiesRequestContentFault" />
2536     </wsdl:message>
2537
2538     <!-- ===== DeleteResourceProperties =====
2539     DeleteResourceProperties( ResourceProperty )
2540     returns: empty
2541     -->
2542     <wsdl:message name="DeleteResourcePropertiesRequest">
2543         <wsdl:part name="DeleteResourcePropertiesRequest"
2544             element="wsrf-rp:DeleteResourceProperties" />
2545     </wsdl:message>
2546
2547     <wsdl:message name="DeleteResourcePropertiesResponse">
2548         <wsdl:part name="DeleteResourcePropertiesResponse"
2549             element="wsrf-rp:DeleteResourcePropertiesResponse" />
2550     </wsdl:message>
2551
2552     <wsdl:message name="DeleteResourcePropertyRequestFailedFault">
2553         <part name="DeleteResourcePropertyRequestFailedFault"
2554             element="wsrf-rp:DeleteResourcePropertyRequestFailedFault"
2555     />

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```

2556     </wsdl:message>
2557
2558 <!-- ===== QueryResourceProperties =====
2559     QueryResourceProperties(QueryExpression)
2560     returns: any
2561 -->
2562     <wsdl:message name="QueryResourcePropertiesRequest">
2563         <wsdl:part name="QueryResourcePropertiesRequest"
2564             element="wsrf-rp:QueryResourceProperties" />
2565     </wsdl:message>
2566
2567     <wsdl:message name="QueryResourcePropertiesResponse">
2568         <wsdl:part name="QueryResourcePropertiesResponse"
2569             element="wsrf-rp:QueryResourcePropertiesResponse" />
2570     </wsdl:message>
2571
2572     <wsdl:message name="UnknownQueryExpressionDialectFault">
2573         <part name="UnknownQueryExpressionDialectFault"
2574             element="wsrf-rp:UnknownQueryExpressionDialectFault" />
2575     </wsdl:message>
2576
2577     <wsdl:message name="InvalidQueryExpressionFault">
2578         <part name="InvalidQueryExpressionFault"
2579             element="wsrf-rp:InvalidQueryExpressionFault" />
2580     </wsdl:message>
2581
2582     <wsdl:message name="QueryEvaluationErrorFault">
2583         <part name="QueryEvaluationErrorFault"
2584             element="wsrf-rp:QueryEvaluationErrorFault" />
2585     </wsdl:message>
2586
2587 <!-- ===== PortType Definitions ===== -->
2588     <wsdl:portType name="GetResourcePropertyDocument">
2589         <wsdl:operation name="GetResourcePropertyDocument">
2590             <wsdl:input name="GetResourcePropertyDocumentRequest"
2591                 message="wsrf-rpw:GetResourcePropertyDocumentRequest" />
2592             <wsdl:output name="GetResourcePropertyDocumentResponse"
2593                 message="wsrf-rpw:GetResourcePropertyDocumentResponse" />
2594             <wsdl:fault name="ResourceUnknownFault"
2595                 message="wsrf-rpw:ResourceUnknownFault" />
2596         </wsdl:operation>
2597     </wsdl:portType>
2598
2599     <wsdl:portType name="GetResourceProperty">
2600         <wsdl:operation name="GetResourceProperty">
2601             <wsdl:input name="GetResourcePropertyRequest"
2602                 message="wsrf-rpw:GetResourcePropertyRequest" />
2603             <wsdl:output name="GetResourcePropertyResponse"
2604                 message="wsrf-rpw:GetResourcePropertyResponse" />

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2605     <wsdl:fault name="ResourceUnknownFault"
2606             message="wsrf-rpw:ResourceUnknownFault" />
2607     <wsdl:fault name="InvalidResourcePropertyQNameFault"
2608             message="wsrf-rpw:InvalidResourcePropertyQNameFault"
2609 />
2610     </wsdl:operation>
2611 </wsdl:portType>
2612
2613     <wsdl:portType name="GetMultipleResourceProperties">
2614     <wsdl:operation name="GetMultipleResourceProperties">
2615     <wsdl:input name="GetMultipleResourcePropertiesRequest"
2616             message="wsrf-
2617 rpw:GetMultipleResourcePropertiesRequest" />
2618     <wsdl:output name="GetMultipleResourcePropertiesResponse"
2619             message="wsrf-
2620 rpw:GetMultipleResourcePropertiesResponse" />
2621     <wsdl:fault name="ResourceUnknownFault"
2622             message="wsrf-rpw:ResourceUnknownFault" />
2623     <wsdl:fault name="InvalidResourcePropertyQNameFault"
2624             message="wsrf-rpw:InvalidResourcePropertyQNameFault"
2625 />
2626     </wsdl:operation>
2627 </wsdl:portType>
2628
2629     <wsdl:portType name="SetResourceProperties">
2630     <wsdl:operation name="SetResourceProperties">
2631     <wsdl:input name="SetResourcePropertiesRequest"
2632             message="wsrf-rpw:SetResourcePropertiesRequest" />
2633     <wsdl:output name="SetResourcePropertiesResponse"
2634             message="wsrf-rpw:SetResourcePropertiesResponse" />
2635     <wsdl:fault name="ResourceUnknownFault"
2636             message="wsrf-rpw:ResourceUnknownFault" />
2637     <wsdl:fault
2638 name="InvalidSetResourcePropertiesRequestContentFault"
2639             message="wsrf-
2640 rpw:InvalidSetResourcePropertiesRequestContentFault" />
2641     <wsdl:fault name="UnableToModifyResourcePropertyFault"
2642             message="wsrf-
2643 rpw:UnableToModifyResourcePropertyFault" />
2644     <wsdl:fault name="InvalidResourcePropertyQNameFault"
2645             message="wsrf-rpw:InvalidResourcePropertyQNameFault"
2646 />
2647     <wsdl:fault name="SetResourcePropertyRequestFailedFault"
2648             message="wsrf-
2649 rpw:SetResourcePropertyRequestFailedFault" />
2650     </wsdl:operation>
2651 </wsdl:portType>
2652
2653     <wsdl:portType name="InsertResourceProperties">

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```

2654     <wsdl:operation name="InsertResourceProperties">
2655         <wsdl:input name="InsertResourcePropertiesRequest"
2656             message="wsrf-rpw:InsertResourcePropertiesRequest"
2657     />
2658         <wsdl:output name="InsertResourcePropertiesResponse"
2659             message="wsrf-rpw:InsertResourcePropertiesResponse"
2660     />
2661         <wsdl:fault name="ResourceUnknownFault"
2662             message="wsrf-rpw:ResourceUnknownFault" />
2663         <wsdl:fault
2664 name="InvalidInsertResourcePropertiesRequestContentFault"
2665             message="wsrf-
2666 rpw:InvalidInsertResourcePropertiesRequestContentFault" />
2667         <wsdl:fault name="UnableToModifyResourcePropertyFault"
2668             message="wsrf-
2669 rpw:UnableToModifyResourcePropertyFault" />
2670         <wsdl:fault name="InvalidResourcePropertyQNameFault"
2671             message="wsrf-rpw:InvalidResourcePropertyQNameFault"
2672     />
2673         <wsdl:fault name="InsertResourcePropertyRequestFailedFault"
2674             message="wsrf-
2675 rpw:InsertResourcePropertyRequestFailedFault" />
2676     </wsdl:operation>
2677 </wsdl:portType>
2678
2679 <wsdl:portType name="UpdateResourceProperties">
2680     <wsdl:operation name="UpdateResourceProperties">
2681         <wsdl:input name="UpdateResourcePropertiesRequest"
2682             message="wsrf-rpw:UpdateResourcePropertiesRequest"
2683     />
2684         <wsdl:output name="UpdateResourcePropertiesResponse"
2685             message="wsrf-rpw:UpdateResourcePropertiesResponse"
2686     />
2687         <wsdl:fault name="ResourceUnknownFault"
2688             message="wsrf-rpw:ResourceUnknownFault" />
2689         <wsdl:fault
2690 name="InvalidUpdateResourcePropertiesRequestContentFault"
2691             message="wsrf-
2692 rpw:InvalidUpdateResourcePropertiesRequestContentFault" />
2693         <wsdl:fault name="UnableToModifyResourcePropertyFault"
2694             message="wsrf-
2695 rpw:UnableToModifyResourcePropertyFault" />
2696         <wsdl:fault name="InvalidResourcePropertyQNameFault"
2697             message="wsrf-rpw:InvalidResourcePropertyQNameFault"
2698     />
2699         <wsdl:fault name="UpdateResourcePropertyRequestFailedFault"
2700             message="wsrf-
2701 rpw:UpdateResourcePropertyRequestFailedFault" />
2702     </wsdl:operation>

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2703 </wsdl:portType>
2704
2705 <wsdl:portType name="DeleteResourceProperties">
2706 <wsdl:operation name="DeleteResourceProperties">
2707 <wsdl:input name="DeleteResourcePropertiesRequest"
2708 message="wsrf-rpw:DeleteResourcePropertiesRequest"
2709 />
2710 <wsdl:output name="DeleteResourcePropertiesResponse"
2711 message="wsrf-rpw:DeleteResourcePropertiesResponse"
2712 />
2713 <wsdl:fault name="ResourceUnknownFault"
2714 message="wsrf-rpw:ResourceUnknownFault" />
2715 <wsdl:fault name="UnableToModifyResourcePropertyFault"
2716 message="wsrf-
2717 rpw:UnableToModifyResourcePropertyFault" />
2718 <wsdl:fault name="InvalidResourcePropertyQNameFault"
2719 message="wsrf-rpw:InvalidResourcePropertyQNameFault"
2720 />
2721 <wsdl:fault name="DeleteResourcePropertyRequestFailedFault"
2722 message="wsrf-
2723 rpw:DeleteResourcePropertyRequestFailedFault" />
2724 </wsdl:operation>
2725 </wsdl:portType>
2726
2727 <wsdl:portType name="QueryResourceProperties">
2728 <wsdl:operation name="QueryResourceProperties">
2729 <wsdl:input name="QueryResourcePropertiesRequest"
2730 message="wsrf-rpw:QueryResourcePropertiesRequest" />
2731 <wsdl:output name="QueryResourcePropertiesResponse"
2732 message="wsrf-rpw:QueryResourcePropertiesResponse"
2733 />
2734 <wsdl:fault name="ResourceUnknownFault"
2735 message="wsrf-rpw:ResourceUnknownFault" />
2736 <wsdl:fault name="InvalidResourcePropertyQNameFault"
2737 message="wsrf-rpw:InvalidResourcePropertyQNameFault"
2738 />
2739 <wsdl:fault name="UnknownQueryExpressionDialectFault"
2740 message="wsrf-
2741 rpw:UnknownQueryExpressionDialectFault" />
2742 <wsdl:fault name="InvalidQueryExpressionFault"
2743 message="wsrf-rpw:InvalidQueryExpressionFault" />
2744 <wsdl:fault name="QueryEvaluationErrorFault"
2745 message="wsrf-rpw:QueryEvaluationErrorFault" />
2746 </wsdl:operation>
2747
2748 </wsdl:portType>
2749
2750 </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.

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