



Web Services Resource Lifetime 1.2 (WS-ResourceLifetime)

Public Draft 02, 7 October 2005

Document identifier: [wsrf-WS-ResourceLifetime-1.2-spec-pr-02](#)

Location:

[wsrf-ws_resource_lifetime-1.2-spec-pr-02.pdf](#)

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Abstract:

The relationship between Web services and stateful resources is defined in [WS-Resource].

This specification defines message exchanges to standardize the means by which a WS-Resource may be destroyed, and resource properties [WS-ResourceProperties] that may be used to inspect and monitor the lifetime of a WS-Resource. This specification defines two means of destroying a WS-Resource: immediate destruction and time-based, scheduled destruction.

Status:

This document is published by this TC as a committee draft. Committee members should send comments on this specification to the wsrf@lists.oasis-open.org list. Others may submit comments to the TC via the web form found on the TC's web page at <http://www.oasis-open.org/committees/wsrf>. Click the button for "Send A Comment" at the top of the page. Submitted comments (for this work as well as other works of that TC) are publicly archived and can be viewed at <http://lists.oasis-open.org/archives/wsrf-comment/>.

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- Deleted: Committee
- Deleted: 01
- Deleted: 19 May 2005
- Deleted: wsrf-ws_resource_lifetime-1.2-spec-cd-01
- Deleted: <http://docs.oasis-open.org/wsrf/>
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Deleted: The definition of a WS-Resource, which is expressed in terms of a stateful resource and its relationship with a Web service, is defined in the WS-Resource specification []

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66 1 Introduction

67 In this document, we consider a distributed computing environment consisting of WS-Resources.
68 The definition of WS-Resource, in terms of its relationship with a Web service, is detailed in the
69 WS-Resource specification [WS-Resource].

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70 The lifetime of a WS-Resource is defined as the period between its instantiation and its
71 destruction. The WS-ResourceLifetime specification standardizes the means by which a WS-
72 Resource can be destroyed. The specification also defines the means by which the lifetime of a
73 WS-Resource can be monitored. However, this specification does not prescribe (nor proscribe)
74 the means by which a WS-Resource is created.

75 Normally, a service requestor's interest in a WS-Resource is for some period of time - rarely is it
76 indefinite. In many scenarios, it is appropriate for clients of a WS-Resource to cause its
77 immediate destruction. The immediate destruction of a WS-Resource may be accomplished using
78 the message exchanges defined in this specification.

79 In addition, this specification defines the means by which a resource may be destroyed after a
80 period of time. In a distributed computing environment, a client may become disconnected from
81 the service provider's endpoint and therefore may be unable to, or unwilling to, cause the
82 immediate destruction of the WS-Resource. This specification defines the means by which any
83 client of a WS-Resource may establish and extend the scheduled termination time of a WS-
84 Resource. If that time expires, the WS-Resource may *self-destruct* without the need for an explicit
85 destroy request message from a client. Periodically extending the termination time of a WS-
86 Resource can serve to extend its lifetime. WS-ResourceLifetime defines a standard message
87 exchange by which a service requestor can establish and renew a scheduled termination time for
88 the WS-Resource, and defines the circumstances under which a service requestor can determine
89 that this termination time has elapsed.

90 A service requestor may want to determine the current time and the termination time of a WS-
91 Resource. WS-ResourceLifetime defines resource properties, as defined in [WS-
92 ResourceProperties], for accessing this information.

93 WS-ResourceLifetime is inspired by a portion of the Global Grid Forum's "Open Grid Services
94 Infrastructure (OGSI) Version 1.0" specification [OGSI].

95 1.1 Goals and Requirements

96 The goal of WS-ResourceLifetime is to standardize the terminology, concepts, message
97 exchanges, WSDL and XML needed to monitor the lifetime of, and destroy, WS-Resources as
98 defined in [WS-Resource].

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99 1.1.1 Requirements

100 This specification intends to meet the following requirements:

- 101 • Define the standard message exchange by which a requestor can request the immediate
102 destruction of a WS-Resource.
- 103 • Define the means by which a service requestor can set an initial termination time for the
104 scheduled termination of a WS-Resource.

- 105
- Define the means by which a service requestor can update the termination time associated with a WS-Resource that is scheduled for termination.
- 106
- Define the means by which a service requestor can determine the current termination time as known by a WS-Resource.
- 107
- 108
- 109 This specification MUST NOT require entities in the system to share synchronized clocks.

110 1.1.2 Non-Goals

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

- It is not an objective of this specification to define the message exchanges representing the function of a WS-Resource factory. Factory requirements are too varied to allow a general-purpose factory message exchange to be usefully defined.
- 112
- 113
- 114

115 1.2 Terminology

116 The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD",
117 "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be
118 interpreted as described in RFC 2119.

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

122

123 This specification uses a notational convention, referred to as "Pseudo-schemas" in a fashion
124 similar to the WSDL 2.0 Part 1 specification. A Pseudo-schema uses a BNF-style convention to
125 describe attributes and elements:

- '?' denotes optionality (i.e. zero or one occurrences),
 - '*' denotes zero or more occurrences,
 - '+' one or more occurrences,
 - '[' and ']' are used to form groups,
 - '|' represents choice.
 - Attributes are conventionally assigned a value which corresponds to their type, as defined in the normative schema.
- 126
- 127
- 128
- 129
- 130
- 131
- 132

```
133 <!-- sample pseudo-schema -->  
134 <element  
135   required_attribute_of_type_QName="xs:QName"  
136   optional_attribute_of_type_string="xs:string"? >  
137   <required_element />  
138   <optional_element />?  
139   <one_or_more_of_these_elements />+  
140   [ <choice_1 /> | <choice_2 /> ]*  
141 </element>
```

142

143 Where there is disagreement between the separate xml schema and wsdl files describing the
144 messages defined by this specification and the normative descriptive text (excluding any pseudo-

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145 schema) in this document, the normative descriptive text will take precedence over the separate
146 files. The separate files take precedence over any pseudo-schema and over any schema and
147 wsdl included in the appendices.
148

149 **1.3 Namespaces**

150 The following namespaces are used in this document:

Prefix	Namespace
s11	http://schemas.xmlsoap.org/soap/envelope/
wsa	http://www.w3.org/2005/08/addressing
wsrf-rp	http://docs.oasis-open.org/wsrf/rp-2
wsrf-rpw	http://docs.oasis-open.org/wsrf/rpw-2
wsrf-bf	http://docs.oasis-open.org/wsrf/bf-2
wsrf-bfw	http://docs.oasis-open.org/wsrf/bfw-2
wsrf-rl	http://docs.oasis-open.org/wsrf/rl-2
wsrf-rlw	http://docs.oasis-open.org/wsrf/rlw-2
wstop	http://docs.oasis-open.org/wsn/t-1
xsd	http://www.w3.org/2001/XMLSchema
xsi	http://www.w3.org/2001/XMLSchema-instance

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- Deleted: 1
- Deleted: 1
- Deleted: 1
- Deleted: 1
- Deleted: http://docs.oasis-open.org/wsn/2004/06/wsn-WS-Topics-1.2-draft-01.xsd

151

152 **1.4 Fault Definitions**

153

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

156

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

158 | URI:

159 | <http://docs.oasis-open.org/wsr/fault>

2 Terminology and Concepts

160

161 This section specifies the notations, namespaces, and terminology used in this specification.

162

163 For definitions of the terms WS-Resource ~~and WS-Resource Reference~~, please refer to the WS-
164 Resource ~~[WS-Resource]~~ specification.

165

166 For definitions of the terms Resource Property, Resource Properties Document, Resource
167 Property Element and Resource Property Value, please refer to the WS-Resource Properties
168 ~~[WS-ResourceProperties]~~ specification.

169

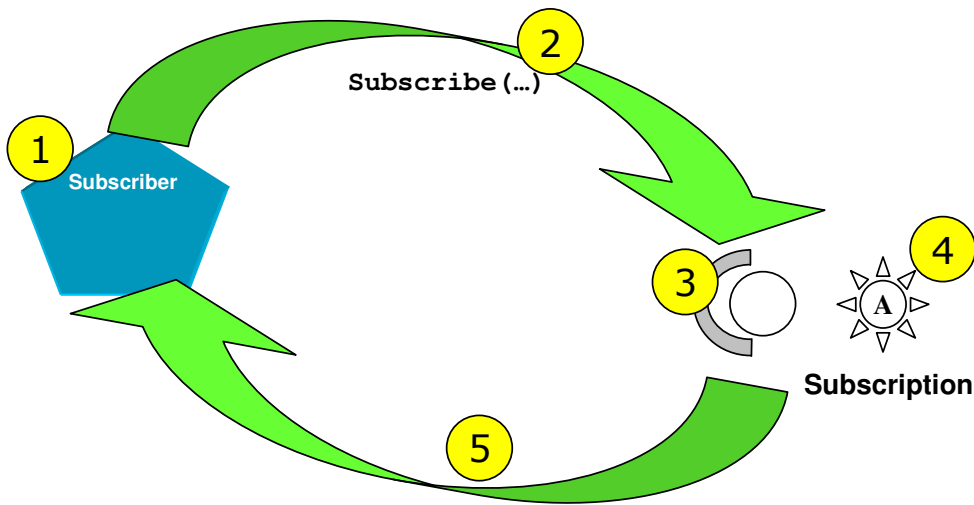
Deleted: ,

Deleted: and WS-Resource
Access Pattern,

Deleted: WS-RAP

170 **3 Example**

171 Consider the case of a subscription entity within a notification system such as WS-
172 BaseNotification [WS-BaseNotification]. This situation is depicted in the following figure:



173 *Figure 1 - Example WS-Resource Creation*

174 A service requestor (1), playing the role of a subscriber, sends a subscribe message (2) to a
175 NotificationProducer (3) because it wishes to receive notifications related to a particular situation
176 such as a failure of a component. A subscription WS-Resource (4) is created as a result of the
177 subscribe message, and a WS-Resource Reference (5) [WS-Resource] is returned to the
178 requestor. As part of the application-specific understanding of the subscribe message exchange,
179 both the requestor and provider understand that part of the semantics of processing a subscribe
180 message is the creation (usually for a limited period of time) of a subscription WS-Resource. The
181 subscribe request message contains the initial scheduled termination time of the subscription
182 WS-Resource.

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183 The reference that is returned as a result of the subscribe message is a WS-Resource Reference
184 as described in [WS-Resource]. It contains a reference that refers to the newly-created
185 subscription state represented by the WS-Resource. The endpoint reference (as enumerated by
186 the WS-Addressing embodiment) also contains the address of the Web service component of the
187 WS-Resource that implements the message exchanges defined by WS-BaseNotification's
188 SubscriptionManager interface.

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189 Subsequent to the creation of the subscription WS-Resource, the application-specific behavior of
190 delivering notifications continues. Occasionally, the subscriber may examine the subscription WS-
191 Resource using standard WS-ResourceLifetime resource properties to inquire about the
192 remaining time before the subscription WS-Resource may be destroyed. If the subscriber wishes

193 to extend the lifetime of the subscription WS-Resource beyond its scheduled termination time, it
194 sends a specific WS-ResourceLifetime message to the subscription WS-Resource referenced by
195 its WS-Resource Reference, prior to the expiration of its current scheduled termination time. The
196 response to this message contains the (potentially unchanged) termination time associated with
197 the subscription WS-Resource.

198 When the subscriber no longer wishes to receive notifications, it may cause the immediate
199 destruction of the subscription WS-Resource by sending another WS-ResourceLifetime message
200 to the WS-Resource through use of its WS-Resource Reference. As another option, it may simply
201 allow the termination time of the subscription WS-Resource to expire, at which time the
202 subscription WS-Resource may be destroyed.

203 4 Immediate Destruction

204 A WS-Resource MAY support a message exchange pattern that allows a service requestor to
205 request its immediate destruction.

206 The format of the destroy request message is:

```
207 ...  
208 <wsrf-rl:Destroy/>  
209 ...
```

210 The `wsa:Action` MUST contain the URI: “`http://docs.oasis-open.org/wsrf/rlw-2`
211 `/ImmediateResourceTermination/DestroyRequest`”.

212 If the WS-Resource accepts the DestroyRequest message, upon receipt of this message the WS-
213 Resource MUST either return the following DestroyResponse message to acknowledge
214 successful destruction, or return a fault message indicating failure.

```
215 ...  
216 <wsrf-rl:DestroyResponse />  
217 ...
```

218 The receipt of the DestroyResponse message serves as a confirmation of the destruction of the
219 WS-Resource. Once it has sent a DestroyResponse message, any further message exchanges
220 directed at the subject WS-Resource MUST respond with a fault. In the absence of any other fault
221 conditions that may take precedence this MUST be the “ResourceUnknownFault” fault message
222 enumerated in the WS-Resource [WS-Resource] specification.

223 If the WS-Resource does not respond to the Destroy request with the DestroyResponse message
224 then it MUST send a fault. This specification defines the following faults associated with failure to
225 process the Destroy request message, in addition to those faults defined for all WS-Resources in
226 [WS-Resource].

- 227
- 228 • ResourceNotDestroyedFault
 - 229 ○ The WS-Resource could not be destroyed for some reason.
- 230

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

233 The `wsa:Action` MUST contain the URI: “`http://docs.oasis-open.org/wsrf/rlw-`
234 `2/ImmediateResourceTermination/DestroyResponse`”.

236 4.1 Example SOAP Encoding of the Destroy Message Exchange

237 The following is a non-normative example of a DestroyRequest message using SOAP 1.1 [SOAP
238 1.1]:

```
239 <s11:Envelope . . .>  
240 <s11:Header>  
241 . . .  
242 <wsa:Action>
```

Deleted: The Destroy message MUST follow the resource access pattern, as defined in [WS-RAP].

Deleted: 1

Deleted: (1) destroy the resource component of the WS-Resource and

Deleted: (2)

Deleted: Note that the destruction of the resource component of the WS-Resource effectively destroys the WS-Resource.

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Deleted: Instead of the

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Deleted: age, the Web service MUST send a fault.

Deleted: This specification defines the following faults associated with failure to process the DestroyRequest message¶ ResourceUnknownFault¶ The WS-Resource identified in the message is not known to the Web service.

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```
243     http://docs.oasis-open.org/wsrflrlw-
244 | 2/ImmediateResourceTermination/DestroyRequest
245     </wsa:Action>
246     . . .
247 </s11:Header>
248 <s11:Body>
249     <wsrf-rl:Destroy/>
250 </s11:Body>
251 </s11:Envelope>
```

Deleted: 1

252 | The following is an example DestroyResponse message using SOAP 1.1 [SOAP 1.1]:

```
253 <s11:Envelope . . .>
254 <s11:Header>
255     . . .
256     <wsa:Action>
257         http://docs.oasis-open.org/wsrflrlw-
258 | 2/ImmediateResourceTermination/DestroyResponse
259     </wsa:Action>
260     . . .
261 </s11:Header>
262 <s11:Body>
263     <wsrf-rl:DestroyResponse />
264 </s11:Body>
265 </s11:Envelope>
```

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266 **5 Scheduled Destruction**

267 A time-based approach MAY be used for managing the destruction of a WS-Resource. In this
268 case, the WS-Resource has an associated termination time that defines the time after which the
269 WS-Resource is expected to be destroyed and thus before which the WS-Resource can
270 reasonably be expected to be available. As defined in the following subsections, a WS-
271 Resource's termination time may be inspected through the TerminationTime resource property,
272 and may be changed using the SetTerminationTime request message.

273 Typical use of scheduled destruction is to allow a service requestor to keep a WS-Resource
274 active by adjusting the WS-Resource's termination time to some appropriate point in time using
275 the SetTerminationTime request message.

276 Note that termination time is not required to monotonically increase, nor is a service required to
277 accept a requested termination time. An implementation MAY refuse a request to adjust
278 termination time for various reasons, including, for example, to enforce a policy that allows
279 termination time to only change monotonically.

280 If a WS-Resource wishes to provide support for scheduled WS-Resource destruction, it MUST
281 support all of the message exchanges and resource properties specified in this section.

282 **5.1 Regarding Time**

283 This specification assumes that services and clients use the UTC global time standard,
284 expressed as type dateTime from XML Schema. Note that xsd:dateTime includes an optional
285 designation of a time zone. The use of the time zone designation is RECOMMENDED. In the
286 absence of the time zone designation, the xsd:dateTime value MUST be interpreted as universal
287 time (UTC).

288 The approach allows operations and resource properties to refer unambiguously to absolute
289 times. However, assuming the UTC time standard to represent time does *not* imply any particular
290 level of clock synchronization between clients and services. No specific accuracy of
291 synchronization is specified or expected by this specification, as this is a service-quality issue.

292 The scheduled destruction operations and resource properties have been designed to allow for
293 tolerance of lack of clock synchronization between clients and services. The CurrentTime
294 resource property may be used by a client to determine the clock skew between the client and the
295 service, within a margin of error determined by the round-trip latency of the message exchange to
296 retrieve that value. This clock skew and margin of error can then be factored into subsequent
297 decisions of when to send subsequent requests to change the termination time, and what
298 termination times to request. The skew can also be monitored and adjusted with each
299 SetTerminationTime message exchange, based on the CurrentTime that is returned from this
300 request. This approach can also be used, to a limited extent, to accommodate clocks that "jump"
301 either forward or backward in time.

302 **5.2 Querying Current Time**

303 In order to assist the service requestor in inspecting and setting a WS-Resource's termination
304 time without requiring a specific accuracy of clock synchronization between the service requestor
305 and the service provider, the WS-Resource **must** provide information about its local time. If the
306 SetTerminationTime request is supported, the resource properties document MUST include a

Deleted: MUST

307 resource property element that provides the current time as it is known by the WS-Resource. The
308 form of this resource property element is:

309

310

```
311 <wsrf-rl:CurrentTime>xsd:dateTime</wsrf-rl:CurrentTime>
```

312

313 The resource properties definition of the WS-Resource MUST contain exactly one element of
314 QName wsrf-rl:CurrentTime. The constraints on this element are as follows:

315 /wsrf-rl:CurrentTime

316 A WS-Resource MUST NOT allow the CurrentTime resource property to be modified by a
317 SetResourceProperties request message as defined in [WS-ResourceProperties].

318 If the element does not include the time zone designation, the value of the element MUST be
319 interpreted as universal time (UTC).

320 5.3 Determining Current Termination Time

321 If the SetTerminationTime request is supported, the WS-Resource MUST provide a resource
322 property element that indicates the current termination time of the WS-Resource. The form of this
323 resource property element is:

324

```
325 <wsrf-rl:TerminationTime xsi:nil="xsd:boolean"?>xsd:dateTime</wsrf-  
326 rl:TerminationTime>
```

327

328 The resource properties definition of the WS-Resource MUST contain exactly one element of
329 QName wsrf-rl:TerminationTime. The constraints on this element are as follows:

330 /wsrf-rl:TerminationTime

331 The time, relative to the time source used by the WS-Resource, after which the WS-
332 Resource MAY be destroyed.

333 If the value of this resource property element contains the xsi:nil attribute with value "true"
334 then the lifetime of the WS-Resource is considered to be *indefinite*; that is, there is no
335 scheduled destruction time.

336 A WS-Resource MUST NOT allow the TerminationTime resource property to be modified
337 by a SetResourceProperties request message as defined in [WS-ResourceProperties].

338 If the element does not include the time zone designation, the value of the element MUST
339 be interpreted as universal time (UTC).

340 5.4 Requesting Change to Termination Time

341 The SetTerminationTimeRequest message MUST be implemented by a WS-Resource supporting
342 scheduled destruction in order to allow a requestor to change its scheduled termination time.

343 There are two forms of the SetTerminationTime message described by the 'choice' in the
344 following pseudo-schema:

345

```
346 <wsrf-rl:SetTerminationTime>  
347   [<wsrf-rl:RequestedTerminationTime xsi:nil="xsd:boolean"?>  
348     xsd:dateTime  
349   </wsrf-rl:RequestedTerminationTime>]  
349   /
```

Deleted: In order to allow the service requestor to determine the current termination time of a WS-Resource

Deleted: , the WS-Resource MUST provide a resource property element that indicates the current termination time of the WS-Resource.

```
350     [<wsrf-rl:RequestedLifetimeDuration>
351         xsd:duration
352     </wsrf-rl:RequestedLifetimeDuration>]
353 </wsrf-rl:SetTerminationTime>
```

354 The `wsa:Action` MUST contain the following URI: "<http://docs.oasis-open.org/wsrf/rlw-2/ScheduledResourceTermination/SetTerminationTimeRequest>".

356 Further constraints on the processing of the `SetTerminationTimeRequest` message are as follows:

358 `/wsrf-rl:SetTerminationTime/wsrf-rl:RequestedTerminationTime`

359 This is the new WS-Resource termination time that is being requested by the client. This value is interpreted relative to the time source known to the WS-Resource. If the element does not include the time zone designation, the value of the element MUST be interpreted as universal time (UTC).

363 If the value is "in the past" relative to the current time as known by the WS-Resource, then the WS-Resource MAY be destroyed immediately. This facility provides the ability to support an asynchronous form of immediate destruction.

366 If the value is `xsi:nil`, then the intent of the service requestor is to specify there is no scheduled termination time for the WS-Resource. In such situations it is RECOMMENDED that the WS-Resource support the immediate WS-Resource destruction operations described in Section 4.

370 `/wsrf-rl:SetTerminationTime/wsrf-rl:RequestedLifetimeDuration`

371 The new `TerminationTime` requested by the client is to be calculated by adding the duration of time specified in the message to the `CurrentTime` known to the WS-Resource.

373 If a zero or negative duration is specified then the WS-Resource MAY be destroyed immediately. This facility provides the ability to support an asynchronous form of immediate destruction.

376

377 A WS-Resource that receives this message MAY reject the request to change the WS-Resource's termination time for any reason (e.g. policy). In this case, a fault message MUST be returned to the service requestor.

380 If a WS-Resource accepts the request to set the WS-Resource's termination time, it MUST update the `TerminationTime` resource property of the WS-Resource to the value specified in the message or to a value "in the future" relative to the requested time. If the `SetTerminationTime` request message is accepted, the WS-Resource MUST respond with the following message:

```
384 <wsrf-rl:SetTerminationTimeResponse>
385   <wsrf-rl:NewTerminationTime xsi:nil="xsd:boolean"?>
386     xsd:dateTime
387   </wsrf-rl:NewTerminationTime>
388   <wsrf-rl:CurrentTime>
389     xsd:dateTime
390   </wsrf-rl:CurrentTime>
391 </wsrf-rl:SetTerminationTimeResponse>
```

392 Further constraints on the `SetTerminationTimeResponse` message are as follows:

393 `/wsrf-rl:SetTerminationTimeResponse/wsrf-rl:NewTerminationTime`

394 This value MAY be "in the future" relative to the `xsd:dateTime` requested by the service requestor in the `SetTerminationTime` request message.

Deleted: The `SetTerminationTime` message MUST follow the WS-Resource Access Pattern, as defined in [WS-RAP].

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396 This value reflects the new date and time at which the WS-Resource is scheduled to be
397 destroyed. If the value is xsi:nil, it implies that the resource will not be destroyed for an
398 indefinite period of time. In such situations, it is RECOMMENDED that the WS-Resource
399 support the immediate WS-Resource destruction operations outlined in Section 4.

400 This value MUST also be reflected through the value of the TerminationTime resource
401 property.

402 /wsrf-rl:SetTerminationTimeResponse/wsrf-rl:CurrentTime

403 This value MUST be the time, as it is known by the WS-Resource, at which the WS-
404 Resource processed this SetTerminationTimeRequest.

405 If the WS-Resource does not respond to the SetTerminationTime request with the
406 SetTerminationTimeResponse message then it MUST send a fault. This specification defines the
407 following faults associated with failure to process the SetTerminationTimeRequest
408 message, in addition to those faults defined for all WS-Resources in [WS-Resource].

- 409 • UnableToSetTerminationTimeFault
 - 410 ○ The request for termination time could not be changed for some reason.
- 411 • TerminationTimeChangeRejectedFault
 - 412 ○ In the case where a WS-Resource is willing to update its TerminationTime, but only
413 with a value “in the past” relative to the requested termination time, then the WS-
414 Resource MAY include a “hint” in the TerminationTimeRejectedFault message
415 indicating the time to which it is willing to extend its TerminationTime.

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

418 The wsa:Action MUST contain the following URI: “http://docs.oasis-open.org/wsrf/rlw-
419 2/ScheduledResourceTermination/SetTerminationTimeResponse”.

421

Deleted: Instead of the SetTerminationTimeResponse message, the Web service MUST send a fault.¶ This specification defines the following faults associated with failure to process the SetTerminationTimeRequest message¶ ResourceUnknownFault¶ The WS-Resource identified in the message (which follows the WS-Resource Access Pattern) is not known to the Web service. This fault is enumerated in the WS-Resource [WS-RAP] specification.

Deleted: 1

422 5.5 Example SOAP Encoding of the SetTerminationTime 423 Message Exchange

424 The following is a non-normative example of a SetTerminationTime request message using
425 SOAP 1.1 [SOAP 1.1]:

```
426 <s11:Envelope . . .>  
427   <s11:Header>  
428     . . .  
429     <wsa:Action>  
430       http://docs.oasis-open.org/wsrf/rlw-  
431 2/ScheduledResourceTermination/SetTerminationTimeRequest  
432   </wsa:Action>  
433     . . .  
434   </s11:Header>  
435   <s11:Body>  
436     <wsrf-rl:SetTerminationTime>  
437       <wsrf-rl:RequestedTerminationTime>  
438         2001-12-31T12:00:00Z
```

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```
439     </wsrf-rl:RequestedTerminationTime>
440     </wsrf-rl:SetTerminationTime>
441   </s11:Body>
442 </s11:Envelope>
```

443 The following is an example SetTerminationTimeResponse message using SOAP 1.1 [SOAP
444 1.1]:

```
445 <s11:Envelope . . . >
446   <s11:Header>
447     . . .
448     <wsa:Action>
449       http://docs.oasis-open.org/wsrflw-
450 | 2/ScheduledResourceTermination/SetTerminationTimeResponse
451     </wsa:Action>
452     . . .
453   </s11:Header>
454   <s11:Body>
455     <wsrf-rl:SetTerminationTimeResponse>
456       <wsrf-rl:NewTerminationTime>
457         2001-12-31T12:00:00Z
458       </wsrf-rl:NewTerminationTime>
459       <wsrf-rl:CurrentTime>
460         2001-12-31T11:00:00Z
461       </wsrf-rl:CurrentTime>
462     </wsrf-rl:SetTerminationTimeResponse>
463   </s11:Body>
464 </s11:Envelope>
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465 5.6 Termination Time Expiration

466 If the service requestor fails to successfully update the termination time of a WS-Resource before
467 the termination time expires, the WS-Resource MAY be destroyed and therefore no longer be
468 accessible. Termination time has expired when the termination time of the WS-Resource (as
469 reflected by the value of the WS-Resource's TerminationTime resource property element) is "in
470 the past" relative to the current time as expressed in the value of the WS-Resource's CurrentTime
471 resource property element.

472 The specific mechanisms employed to destroy the WS-Resource after termination time has
473 expired is implementation dependent. An implementation MAY delay destruction of the WS-
474 Resource at its own discretion. The requestor MUST NOT depend on the destruction of the WS-
475 Resource occurring at termination time expiration but SHOULD assume that the WS-Resource is
476 no longer accessible after termination time has expired.

477

478

6 Notification of Resource Destruction

479 A WS-Resource MAY choose to support the pattern of notifying interested parties when it is
480 destroyed. If a WS-Resource chooses to support this pattern and if the WS-Resource uses WS-
481 BaseNotification [WS-BaseNotification] to implement this pattern, then it MUST follow the
482 approach described in this section. An implementation MAY choose to not support this pattern, or
483 it MAY choose to do so using some means other than WS-BaseNotification; in such
484 circumstances, the implementation MAY ignore the approach described in this section.

485 If the WS-Resource is also a NotificationProducer, according to the WS-BaseNotification
486 specification [WS-BaseNotification], then it SHOULD provide a topic [WS-Topics] to allow
487 requestors to subscribe for notification of its destruction. The notification applies to both
488 immediate and scheduled destruction. The form of the topic is:

```

489 <wstop:Topic namespace_name="ResourceLifetime"
490   targetNamespace=
491   "http://docs.oasis-open.org/wsrf/rl-2"
492 ... >
493   <wstop:Topic name="ResourceTermination" ...>
494     <wstop:MessagePattern>
495       <wsrf-rp:QueryExpression
496         dialect="http://www.w3.org/TR/1999/REC-xpath-19991116" >
497         boolean(//*[TerminationNotification])
498       </wsrf-rp:QueryExpression>
499     </wstop:MessagePattern>
500   </wstop:Topic>
501 </wstop:Topic namespace>
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503 The value of /wstop:Topic/@MessageTypes is implementation-dependent; this specification does
504 not define the exact content of the notification messages produced on this topic. However, the
505 notification message associated with this topic MUST contain the following element:

```

506 <wsrf-rl:TerminationNotification>
507   <wsrf-rl:TerminationTime xsi:nil="xsd:boolean"?>xsd:dateTime</wsrf-
508   rl:TerminationTime>
509   <wsrf-rl:TerminationReason>xsd:any</wsrf-rl:TerminationReason?>
510 </wsrf-rl:TerminationNotification>

```

511 This constraint is specified in the /wstop:Topic/wstop:MessagePattern element. The
512 TerminationNotification element is further constrained as follows:

513 /wsrf-rl:TerminationTime

514 This element contains the date and time when the WS-Resource was destroyed.

515 /wsrf-rl:TerminationReason

516 This OPTIONAL element contains an explanation of the situation surrounding the
517 destruction of the WS-Resource. This element is specific to the type of the WS-Resource
518 that was destroyed.

519 A requestor would send a subscribe request message, following the WS-BaseNotification
520 specification, specifying the "ResourceTermination" topic and referencing a chosen WS-Resource
521 using a WS-Resource Reference [WS-Resource].

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7 Security Considerations

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This specification defines the message exchanges used to request the destruction of a WS-Resource, or to obtain information about the termination time of the WS-Resource. In this context, there are two categories of security aspects that need to be considered: (a) securing the message exchanges and (b) securing the operations that perform the WS-Resource destruction.

527

7.1 Securing the Message Exchanges

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

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7.2 Securing Resource Destruction

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Given that WS-ResourceLifetime defines a mechanism to destroy WS-Resources, security policies should be established to ensure that only authorized requestors can destroy a WS-Resource. Authorization policies should be defined so that the implications of destroying a WS-Resource either through immediate requests or by setting termination time, are considered. The two approaches for destruction may be considered equivalent for authorization reasons. In other words, an authorization policy that describes the ability to perform a Destroy operation on a WS-Resource, conforming to the ImmediateResourceTermination portType, may also need to be applied when the SetTerminationTime operation is performed on the same resource.

It should be noted that this specification does not allow modifications to the CurrentTime and TerminationTime resource properties through the SetResourceProperty request message of WS-ResourceProperties. Therefore, there should be no authorization enforcement performed when these resource properties are accessed using the Set request message; however, it should be left to the runtime to enforce the requirement as specified. Given a requestor can subscribe for notification of the destruction of the resource using "ResourceLifetime" topic, the security considerations specified in WS-BaseNotification specification are applicable to this topic.

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8 References

8.1 Normative

[WS-Addressing]

<http://www.w3.org/TR/ws-addr-core/>

[WS-BaseNotification]

<http://docs.oasis-open.org/wsn/wsn-WS-BaseNotification-1.3-pr-02.pdf>

[WS-BaseFaults]

http://docs.oasis-open.org/wsrf/wsrf_ws-base_faults-1.2-spec-pr-02.pdf

[WS-Resource]

http://docs.oasis-open.org/wsrf/wsrf_ws_resource-1.2-spec-pr-02.pdf

[WS-ResourceProperties]

http://docs.oasis-open.org/wsrf/wsrf_ws_resource_properties-1.2-spec-pr-02.pdf

[WS-Topics]

<http://docs.oasis-open.org/wsn/wsn-WS-Topics-1.3-pr-01.pdf>

[XML]

<http://www.w3.org/TR/REC-xml>

[XML-Infoset]

<http://www.w3.org/TR/xml-infoset/>

8.2 Non-Normative

[OGSI]

GGF GFD.15 "Open Grid Services Infrastructure (OGSI) Version 1.0". Available at <http://forge.gridforum.org/projects/ogsi-wg>

[SOAP 1.1]

<http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>

[WS-Security]

<http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf>

[WS-I Basic Profile 1.1]

<http://www.ws-i.org/Profiles/BasicProfile-1.1.html>

Deleted: <http://www.w3.org/TR/2005/WD-ws-addr-core-20050331>

Deleted: <http://docs.oasis-open.org/wsn/2004/06/wsn-WS-BaseNotification-1.2-draft-03.pdf>

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Appendix A. Acknowledgments

581 Special thanks to the Global Grid Forum's Open Grid Services Infrastructure working group,
582 which defined the OGSF v1.0 [OGSI] specification which was a large inspiration for the ideas
583 expressed in this specification.

584

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

587

588 Mario Antonioletti (EPCC, The University of Edinburgh), Akhil Arora (Sun Microsystems), Tim
589 Banks (IBM), Jeff Bohren (OpenNetwork), Fred Carter (AmberPoint), Martin Chapman (Oracle),
590 Glen Daniels (Sonic Software), David De Roure (University of Southampton), Thomas Freund
591 (IBM), John Fuller (Individual), Stephen Graham (IBM), Anish Karmarkar (Oracle), Hideharu Kato
592 (Hitachi), David Levine (IBM), Paul Lipton (Computer Associates), Mark Little (Arjuna
593 Technologies Limited), Lily Liu (WebMethods, Inc.), Tom Maguire (IBM), Susan Malaika (IBM),
594 David Martin (IBM), Samuel Meder (ArgonneNational Laboratory), Jeff Mischkinsky (Oracle),
595 Roger Menday (Forschungszentrum Jlich GmbH), Bryan Murray (Hewlett-Packard), Mark Peel
596 (Novell), Alain Regnier (Ricoh Company, Ltd.), Ian Robinson (IBM), Tom Rutt (Fujitsu), Matsunori
597 Satomi (Hitachi), Igor Sedukhin (Computer Associates), Hitoshi Sekine (Ricoh Company, Ltd.),
598 Frank Siebenlist (ArgonneNational Laboratory), Alex Sim (Lawrence Berkeley National
599 Laboratory), David Snelling (Fujitsu), Latha Srinivasan (Hewlett-Packard), Jem Treadwell
600 (Hewlett-Packard), Steve Tuecke (ArgonneNational Laboratory), William Vambenepe (Hewlett-
601 Packard), Katy Warr (IBM), Alan Weissberger (NEC Corporation), Pete Wenzel (SeeBeyond
602 Technology Corporation), Kirk Wilson (Computer Associates) and Umit Yalcinalp (SAP).

603

604 In addition, the following people made contributions to this specification:

605

606 Karl Czajkowski (Globus / USC/ISI), Donald F Ferguson (IBM), Ian Foster (Globus /
607 Argonne), Jeffrey Frey (IBM), Frank Leymann (IBM), Nataraj Nagaratnam (IBM), Martin Nally
608 (IBM), Tony Storey (IBM), Sanjiva Weerawarana (IBM)

Appendix B. XML Schema

609

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

612 <http://docs.oasis-open.org/wsrf/rl-2.xsd>

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<?xml version="1.0" encoding="UTF-8"?>
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<xsd:schema
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xmlns="http://www.w3.org/2001/XMLSchema"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:wsrf-rl="http://docs.oasis-open.org/wsrf/rl-2"
xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-2"
elementFormDefault="qualified" attributeFormDefault="unqualified"
targetNamespace="http://docs.oasis-open.org/wsrf/rl-2">

  <xsd:import namespace="http://docs.oasis-open.org/wsrf/bf-2"
  schemaLocation="http://docs.oasis-open.org/wsrf/bf-2.xsd" />
  <!--
    ===== Resource Property Related =====
  -->
  <!--
    ==== Resource Properties for ScheduledResourceTermination ====
  -->

  <xsd:element name="CurrentTime" >
    <xsd:complexType>
      <xsd:simpleContent>
        <xsd:extension base="xsd:dateTime" >
          <xsd:anyAttribute namespace="##other"
processContents="lax"/>
        </xsd:extension>
      </xsd:simpleContent>
    </xsd:complexType>
  </xsd:element>

  <xsd:element name="TerminationTime" nillable="true">
    <xsd:complexType>
      <xsd:simpleContent>
        <xsd:extension base="xsd:dateTime" >
          <xsd:anyAttribute namespace="##other"
processContents="lax"/>
        </xsd:extension>
      </xsd:simpleContent>
    </xsd:complexType>
  </xsd:element>

  <!-- ==== Resource Properties for ScheduledResourceTermination ==== -
->
  <xsd:element name="ScheduledResourceTerminationRP">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element maxOccurs="1" minOccurs="1"
ref="wsrf-rl:CurrentTime" />
        <xsd:element maxOccurs="1" minOccurs="1"
ref="wsrf-rl:TerminationTime" />
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>

  <!-- ===== Message Types for ImmediateResourceTermination ===== -
->
  <xsd:element name="Destroy">
    <xsd:complexType />
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</xsd:element>

<xsd:element name="DestroyResponse">
  <xsd:complexType />
</xsd:element>

<xsd:complexType name="ResourceNotDestroyedFaultType">
  <xsd:complexContent>
    <xsd:extension base="wsrf-bf:BaseFaultType" />
  </xsd:complexContent>
</xsd:complexType>
<xsd:element name="ResourceNotDestroyedFault" type="wsrf-
rl:ResourceNotDestroyedFaultType" />
<!-- ===== Message Types for ScheduledResourceTermination ===== -
->
<xsd:element name="SetTerminationTime">
  <xsd:complexType>
    <xsd:choice>
      <xsd:element name="RequestedTerminationTime"
nillable="true" type="xsd:dateTime" />
      <xsd:element name="RequestedLifetimeDuration"
type="xsd:duration" />
    </xsd:choice>
  </xsd:complexType>
</xsd:element>

<xsd:element name="SetTerminationTimeResponse">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="NewTerminationTime"
nillable="true" type="xsd:dateTime" />
      <xsd:element name="CurrentTime"
type="xsd:dateTime" />
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
<xsd:complexType name="UnableToSetTerminationTimeFaultType">
  <xsd:complexContent>
    <xsd:extension base="wsrf-bf:BaseFaultType" />
  </xsd:complexContent>
</xsd:complexType>

<xsd:element name="UnableToSetTerminationTimeFault" type="wsrf-
rl:UnableToSetTerminationTimeFaultType" />
<xsd:complexType name="TerminationTimeChangeRejectedFaultType">
  <xsd:complexContent>
    <xsd:extension base="wsrf-bf:BaseFaultType" />
  </xsd:complexContent>
</xsd:complexType>
<xsd:element name="TerminationTimeChangeRejectedFault" type="wsrf-
rl:TerminationTimeChangeRejectedFaultType" />

<!--
===== Notification Message Related =====
-->
<xsd:element name="TerminationNotification">
```

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```
<xsd:complexType>
  <xsd:sequence>
    <xsd:element name="TerminationTime"
type="xsd:dateTime" minOccurs="1" maxOccurs="1" nillable="true" />
    <xsd:element name="TerminationReason"
type="xsd:anyType" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
</xsd:complexType>
</xsd:element>
</xsd:schema>
```

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Appendix C. WSDL 1.1

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

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

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<?xml version="1.0" encoding="UTF-8"?>
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version="1.0"
encoding="UTF-8"?>
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-->
<wsdl:definitions name="WS-ResourceLifetime"
targetNamespace="http://docs.oasis-open.org/wsrf/rlw-2"
xmlns="http://schemas.xmlsoap.org/wsdl/"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-2"
xmlns:wsrf-rl="http://docs.oasis-open.org/wsrf/rl-2"
xmlns:wsrf-rlw="http://docs.oasis-open.org/wsrf/rlw-2"
xmlns:wsrf-rp="http://docs.oasis-open.org/wsrf/rp-2"
xmlns:wsrf-rw="http://docs.oasis-open.org/wsrf/rw-2"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/">

  <wsdl:import namespace="http://docs.oasis-open.org/wsrf/rw-2"
    location="http://docs.oasis-open.org/wsrf/rw-2.wsdl"/>
  <wsdl:types>
    <xsd:schema attributeFormDefault="unqualified"
    elementFormDefault="qualified"
    xmlns="http://www.w3.org/2001/XMLSchema">
      <xsd:import namespace="http://docs.oasis-
open.org/wsrf/rl-2"
        schemaLocation="http://docs.oasis-
open.org/wsrf/rl-2.xsd" />
    </xsd:schema>
  </wsdl:types>

  <wsdl:message name="SetTerminationTimeRequest">
    <wsdl:part element="wsrf-rl:SetTerminationTime"
name="SetTerminationTimeRequest" />
  </wsdl:message>
  <wsdl:message name="DestroyResponse">
    <wsdl:part element="wsrf-rl:DestroyResponse"
name="DestroyResponse" />
  </wsdl:message>
  <wsdl:message name="SetTerminationTimeResponse">
    <wsdl:part element="wsrf-rl:SetTerminationTimeResponse"
name="SetTerminationTimeResponse" />
  </wsdl:message>

  <wsdl:message name="DestroyRequest">
    <wsdl:part element="wsrf-rl:Destroy" name="DestroyRequest" />
  </wsdl:message>
  <wsdl:message name="ResourceNotDestroyedFault">
    <wsdl:part element="wsrf-rl:ResourceNotDestroyedFault"
name="ResourceNotDestroyedFault" />
  </wsdl:message>

  <wsdl:message name="UnableToSetTerminationTimeFault">
    <wsdl:part element="wsrf-rl:UnableToSetTerminationTimeFault"
name="UnableToSetTerminationTimeFault" />
  </wsdl:message>
```

```

892     <wsdl:message name="TerminationTimeChangeRejectedFault">
893         <wsdl:part element="wsrf-
894 rl:TerminationTimeChangeRejectedFault"
895 name="TerminationTimeChangeRejectedFault" />
896     </wsdl:message>
897     <wsdl:portType name="ImmediateResourceTermination">
898         <wsdl:operation name="Destroy">
899             <wsdl:input name="DestroyRequest" message="wsrf-
900 rlw:DestroyRequest" />
901             <wsdl:output name="DestroyResponse" message="wsrf-
902 rlw:DestroyResponse" />
903             <wsdl:fault message="wsrf-
904 rlw:ResourceNotDestroyedFault" name="ResourceNotDestroyedFault" />
905             <wsdl:fault name="ResourceUnknownFault" message="wsrf-
906 rlw:ResourceUnknownFault" />
907             <wsdl:fault name="ResourceUnavailableFault"
908 message="wsrf-rw:ResourceUnavailableFault"/>
909         </wsdl:operation>
910     </wsdl:portType>
911     <wsdl:portType name="ScheduledResourceTermination"
912         wsrf-rp:ResourceProperties="wsrf-
913 rl:ScheduledResourceTerminationRP">
914         <wsdl:operation name="SetTerminationTime">
915             <wsdl:input name="SetTerminationTimeRequest"
916 message="wsrf-rlw:SetTerminationTimeRequest" />
917             <wsdl:output name="SetTerminationTimeResponse"
918 message="wsrf-rlw:SetTerminationTimeResponse" />
919             <wsdl:fault message="wsrf-
920 rlw:UnableToSetTerminationTimeFault"
921 name="UnableToSetTerminationTimeFault" />
922             <wsdl:fault name="ResourceUnknownFault" message="wsrf-
923 rlw:ResourceUnknownFault" />
924             <wsdl:fault name="ResourceUnavailableFault"
925 message="wsrf-rw:ResourceUnavailableFault"/>
926             <wsdl:fault message="wsrf-
927 rlw:TerminationTimeChangeRejectedFault"
928 name="TerminationTimeChangeRejectedFault" />
929         </wsdl:operation>
930     </wsdl:portType>
931 </wsdl:definitions>

```

Appendix D. Revision History

935 [This appendix is optional, but helpful. It should be removed for specifications that are at OASIS
936 Standard level.]

Rev	Date	By Whom	What
wd-01	2004-05-21	Latha Srinivasan	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	2004-06-01	Latha Srinivasan	Modification to Acknowledgments section to reflect TC list as per WS-RP draft spec. v 1.2
Wd-03	2004-06-08	Latha Srinivasan	Fixed namespaces to reflect 2004/06; replaced rogue verdana fonts with Arial; updated Acknowledgments section; added ElementFormDefault and attributeFormDefault to schema and XSD files; updated references to point to pdf versions of files; Fixed reference for WS-BaseNotification and replaced references to "lifecycle" with lifetime
wd-04	2004-11-04	Latha Srinivasan	Addressed issues WSRF6, WSRF30, WSRF43, WSRF49, WSRF53 and WSRF56 in addition to changes suggested by Ian Robinson in email dated Nov 6, 2004
wd-05	2004-12-22	Latha Srinivasan	Addressed issues 84 and 85 to keep the doc in sync with the WSDL and XSD files of rev. 05. Also updated namespaces for WSRF-BF and WSRF-RP.
wd-05a	2005-02-15	Tim Banks & Latha Srinivasan	Reflects resolutions for Issues 19, 62, 63, 81, 84, 85, 86, 93 and 96
wd-06.a	2005-04-18	Tim Banks	Resolution of issue 99 (and corrections to examples), 92
wd-07	2005-05-11	Latha Srinivasan	Resolution of issues 91, 101 and 103 and change of namespaces and document identifiers
wd-08	2005-05-17	Tim Banks	Resolution of issues 100, 109, 113

Rev	Date	By Whom	What
wd-09	2005-05-18	Latha Srinivasan	Resolution of issue #:114 and updated Acknowledgements section per lan's mail
cd-01	2005-05-19	Latha Srinivasan	First Committee draft
wd-10	2005-09-15	Tim Banks	Resolution of issues 127 141, 152, 147, 150.

937

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-->

```
<wsdl:definitions name="WS-ResourceLifetime"
targetNamespace="http://docs.oasis-open.org/wsrf/rlw-1"
xmlns="http://schemas.xmlsoap.org/wsdl/"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-1"
xmlns:wsrf-rl="http://docs.oasis-open.org/wsrf/rl-1"
```

```

xmlns:wsrf-rlw="http://docs.oasis-open.org/wsrf/rlw-1"
xmlns:wsrf-rp="http://docs.oasis-open.org/wsrf/rp-1"
xmlns:wsrf-rw="http://docs.oasis-open.org/wsrf/rw-1"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/">

    <wsdl:import namespace="http://docs.oasis-open.org/wsrf/rw-1"
location="http://docs.oasis-open.org/wsrf/rw-1" />
    <wsdl:types>
        <xsd:schema attributeFormDefault="unqualified"
elementFormDefault="qualified" xmlns="http://www.w3.org/2001/XMLSchema">
            <xsd:import namespace="http://docs.oasis-open.org/wsrf/rl-1"
                schemaLocation="http://docs.oasis-open.org/wsrf/rl-1"
            />
        </xsd:schema>
    </wsdl:types>

    <wsdl:message name="SetTerminationTimeRequest">
        <wsdl:part element="wsrf-rl:SetTerminationTime"
name="SetTerminationTimeRequest" />
    </wsdl:message>
    <wsdl:message name="DestroyResponse">
        <wsdl:part element="wsrf-rl:DestroyResponse"
name="DestroyResponse" />
    </wsdl:message>
    <wsdl:message name="SetTerminationTimeResponse">
        <wsdl:part element="wsrf-rl:SetTerminationTimeResponse"
name="SetTerminationTimeResponse" />
    </wsdl:message>

    <wsdl:message name="DestroyRequest">
        <wsdl:part element="wsrf-rl:Destroy" name="DestroyRequest" />
    </wsdl:message>
    <wsdl:message name="ResourceNotDestroyedFault">
        <wsdl:part element="wsrf-rl:ResourceNotDestroyedFault"
name="ResourceNotDestroyedFault" />
    </wsdl:message>

    <wsdl:message name="UnableToSetTerminationTimeFault">
        <wsdl:part element="wsrf-rl:UnableToSetTerminationTimeFault"
name="UnableToSetTerminationTimeFault" />
    </wsdl:message>
    <wsdl:message name="TerminationTimeChangeRejectedFault">
        <wsdl:part element="wsrf-rl:TerminationTimeChangeRejectedFault"
name="TerminationTimeChangeRejectedFault" />
    </wsdl:message>
    <wsdl:portType name="ImmediateResourceTermination">
        <wsdl:operation name="Destroy">
            <wsdl:input name="DestroyRequest" message="wsrf-
rlw:DestroyRequest" />

```

```

        <wsdl:output name="DestroyResponse" message="wsrf-
rlw:DestroyResponse" />
        <wsdl:fault message="wsrf-rlw:ResourceNotDestroyedFault"
name="ResourceNotDestroyedFault" />
        <wsdl:fault name="ResourceUnknownFault" message="wsrf-
rlw:ResourceUnknownFault" />
    </wsdl:operation>
</wsdl:portType>
<wsdl:portType name="ScheduledResourceTermination"
        wsrf-rp:ResourceProperties="wsrf-
rl:ScheduledResourceTerminationRP">
    <wsdl:operation name="SetTerminationTime">
        <wsdl:input name="SetTerminationTimeRequest"
message="wsrf-rlw:SetTerminationTimeRequest" />
        <wsdl:output name="SetTerminationTimeResponse"
message="wsrf-rlw:SetTerminationTimeResponse" />

        <wsdl:fault message="wsrf-
rlw:UnableToSetTerminationTimeFault" name="UnableToSetTerminationTimeFault"
/>
        <wsdl:fault name="ResourceUnknownFault" message="wsrf-
rlw:ResourceUnknownFault" />
        <wsdl:fault message="wsrf-
rlw:TerminationTimeChangeRejectedFault"
name="TerminationTimeChangeRejectedFault" />
    </wsdl:operation>
</wsdl:portType>
</wsdl:definitions>

```