



Web Services Resource Lifetime 1.2 (WS-ResourceLifetime)

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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 an OASIS standard. 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/>.

For information on whether any patents have been disclosed that may be essential to implementing this specification, and any offers of patent licensing terms, please refer to the Intellectual Property Rights section of the WSRF TC web page (<http://www.oasis-open.org/committees/wsrf/>).

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62

63 1 Introduction

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

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

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

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

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

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

92 1.1 Goals and Requirements

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

96 1.1.1 Requirements

97 This specification intends to meet the following requirements:

- 98 • Define the standard message exchange by which a requestor can request the immediate
99 destruction of a WS-Resource.
- 100 • Define the means by which a service requestor can set an initial termination time for the
101 scheduled termination of a WS-Resource.
- 102 • Define the means by which a service requestor can update the termination time
103 associated with a WS-Resource that is scheduled for termination.

- 104 • Define the means by which a service requestor can determine the current termination
105 time as known by a WS-Resource.

106 This specification MUST NOT require entities in the system to share synchronized clocks.

107 1.1.2 Non-Goals

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

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

112 1.2 Terminology

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

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

119

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

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

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

139

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

145

146 **1.3 Namespaces**

147 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

148

149 **1.4 Fault Definitions**

150

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

153

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

155 URI:

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

157 **2 Terminology and Concepts**

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

159

160 For definitions of the terms WS-Resource and WS-Resource Reference please refer to the WS-
161 Resource [WS-Resource] specification.

162

163 For definitions of the terms Resource Property, Resource Properties Document, Resource
164 Property Element and Resource Property Value, please refer to the WS-Resource Properties
165 [WS-ResourceProperties] specification.

166 .

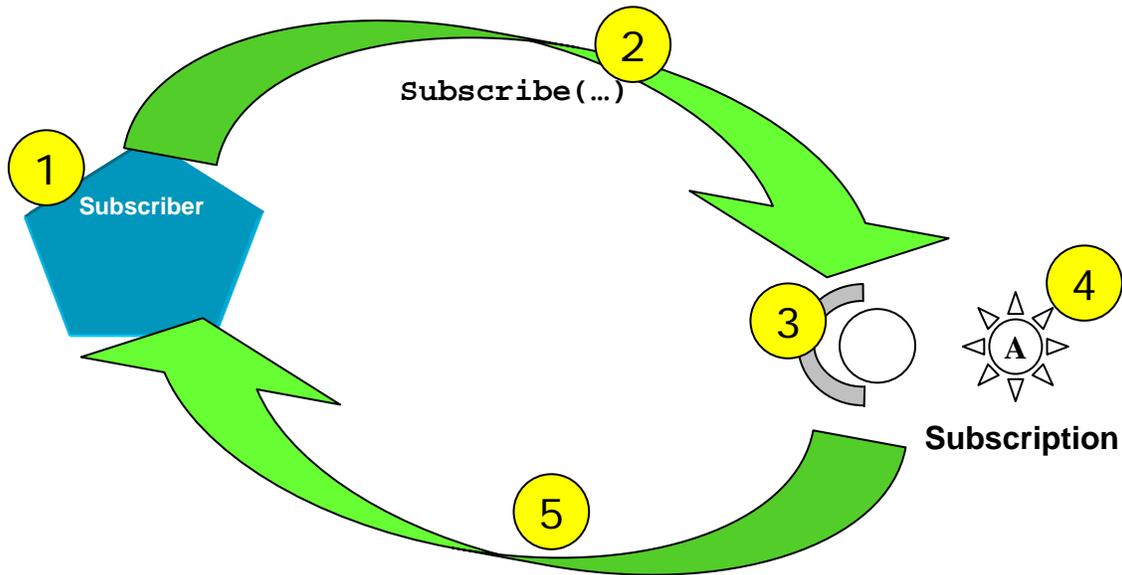
3 Example

167

168

169

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



170

Figure 1 - Example WS-Resource Creation

171

172

173

174

175

176

177

178

179

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

180

181

182

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184

185

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

186

187

188

189

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191

Subsequent to the creation of the subscription WS-Resource, the application-specific behavior of delivering notifications continues. Occasionally, the subscriber may examine the subscription WS-Resource using standard WS-ResourceLifetime resource properties to inquire about the remaining time before the subscription WS-Resource may be destroyed. If the subscriber wishes to extend the lifetime of the subscription WS-Resource beyond its scheduled termination time, it sends a specific WS-ResourceLifetime message to the subscription WS-Resource referenced by

192 its WS-Resource Reference, prior to the expiration of its current scheduled termination time. The
193 response to this message contains the (potentially unchanged) termination time associated with
194 the subscription WS-Resource.

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

200 4 Immediate Destruction

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

203 The format of the destroy request message is:

```
204 ...  
205 <wsrf-rl:Destroy/>  
206 ...
```

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

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

```
212 ...  
213 <wsrf-rl:DestroyResponse />  
214 ...
```

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

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

224

- 225 • `ResourceNotDestroyedFault`

- 226 ○ The WS-Resource could not be destroyed for some reason.

227

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

230 The `wsa:Action` MUST contain the URI: “`http://docs.oasis-open.org/wsrf/rlw-`
231 `2/ImmediateResourceTermination/DestroyResponse`”.

232

233 4.1 Example SOAP Encoding of the Destroy Message Exchange

234 The following is a non-normative example of a `DestroyRequest` message using SOAP 1.1 [SOAP
235 1.1]:

```
236 <s11:Envelope . . .>  
237 <s11:Header>  
238 . . .  
239 <wsa:Action>  
240 http://docs.oasis-open.org/wsrf/rlw-  
241 2/ImmediateResourceTermination/DestroyRequest  
242 </wsa:Action>
```

```
243     . . .
244     </s11:Header>
245     <s11:Body>
246         <wsrf-rl:Destroy/>
247     </s11:Body>
248 </s11:Envelope>
```

249 The following is an example DestroyResponse message using SOAP 1.1 [[SOAP 1.1](#)]:

```
250 <s11:Envelope . . .>
251     <s11:Header>
252         . . .
253         <wsa:Action>
254             http://docs.oasis-open.org/wsrf/rlw-
255 2/ImmediateResourceTermination/DestroyResponse
256         </wsa:Action>
257         . . .
258     </s11:Header>
259     <s11:Body>
260         <wsrf-rl:DestroyResponse />
261     </s11:Body>
262 </s11:Envelope>
```

263

5 Scheduled Destruction

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

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

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

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

5.1 Regarding Time

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

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

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

5.2 Querying Current Time

300 In order to assist the service requestor in inspecting and setting a WS-Resource's termination
301 time without requiring a specific accuracy of clock synchronization between the service requestor
302 and the service provider, the WS-Resource must provide information about its local time. If the
303 SetTerminationTime request is supported, the resource properties document MUST include a
304 resource property element that provides the current time as it is known by the WS-Resource. The
305 form of this resource property element is:

306

```
307 ...
308 <wsrf-rl:CurrentTime>xsd:dateTime</wsrf-rl:CurrentTime>
309 ...
```

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

312 /wsrf-rl:CurrentTime

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

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

317 5.3 Determining Current Termination Time

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

```
321 ...
322 <wsrf-rl:TerminationTime xsi:nil="xsd:boolean"?>xsd:dateTime</wsrf-
323 rl:TerminationTime>
324 ...
```

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

327 /wsrf-rl:TerminationTime

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

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

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

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

337 5.4 Requesting Change to Termination Time

338 The SetTerminationTime request message MUST be implemented by a WS-Resource supporting
339 scheduled destruction in order to allow a requestor to change its scheduled termination time.

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

```
342 <wsrf-rl:SetTerminationTime>
343   [<wsrf-rl:RequestedTerminationTime xsi:nil="xsd:boolean"?>
344     xsd:dateTime
345   </wsrf-rl:RequestedTerminationTime>]
346   /
347   [<wsrf-rl:RequestedLifetimeDuration>
348     xsd:duration
349   </wsrf-rl:RequestedLifetimeDuration>]
350 </wsrf-rl:SetTerminationTime>
```

351 The wsa:Action MUST contain the following URI: "http://docs.oasis-open.org/wsrf/rlw-
352 2/ScheduledResourceTermination/SetTerminationTimeRequest".

353 Further constraints on the processing of the SetTerminationTimeRequest message are as
354 follows:

355 /wsrf-rl:SetTerminationTime/wsrf-rl:RequestedTerminationTime

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

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

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

367 /wsrf-rl:SetTerminationTime/wsrf-rl:RequestedLifetimeDuration

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

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

373

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

377 If a WS-Resource accepts the request to set the WS-Resource’s termination time, it **MUST**
378 update the TerminationTime resource property of the WS-Resource to the value specified in the
379 message or to a value “in the future” relative to the requested time. If the SetTerminationTime
380 request message is accepted, the WS-Resource **MUST** respond with the following message:

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

389 Further constraints on the SetTerminationTimeResponse message are as follows:

390 /wsrf-rl:SetTerminationTimeResponse/wsrf-rl:NewTerminationTime

391 This value **MAY** be “in the future” relative to the xsd:dateTime requested by the service
392 requestor in the SetTerminationTime request message.

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

397 This value **MUST** also be reflected through the value of the TerminationTime resource
398 property.

399 /wsrf-rl:SetTerminationTimeResponse/wsrf-rl:CurrentTime

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

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

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

413

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

416 The wsa:Action MUST contain the following URI: “http://docs.oasis-open.org/wsrf/rlw-
417 2/ScheduledResourceTermination/SetTerminationTimeResponse”.

418

419 **5.5 Example SOAP Encoding of the SetTerminationTime** 420 **Message Exchange**

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

```
423 <s11:Envelope . . . >  
424   <s11:Header>  
425     . . .  
426     <wsa:Action>  
427       http://docs.oasis-open.org/wsrf/rlw-  
428 2/ScheduledResourceTermination/SetTerminationTimeRequest  
429     </wsa:Action>  
430     . . .  
431   </s11:Header>  
432   <s11:Body>  
433     <wsrf-rl:SetTerminationTime>  
434       <wsrf-rl:RequestedTerminationTime>  
435         2001-12-31T12:00:00Z  
436       </wsrf-rl:RequestedTerminationTime>  
437     </wsrf-rl:SetTerminationTime>  
438   </s11:Body>  
439 </s11:Envelope>
```

440 The following is an example SetTerminationTimeResponse message using SOAP 1.1 [SOAP
441 1.1]:

```
442 <s11:Envelope . . . >  
443   <s11:Header>  
444     . . .  
445     <wsa:Action>
```

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

462 **5.6 Termination Time Expiration**

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

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

474

6 Notification of Resource Destruction

475

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

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

```
486 <wstop:TopicNamespace name="ResourceLifetime"  
487   targetNamespace=  
488     "http://docs.oasis-open.org/wsrfl-2"  
489 ... >  
490   <wstop:Topic name="ResourceTermination" ...>  
491     <wstop:MessagePattern>  
492       <wsrf-rp:QueryExpression  
493         dialect="http://www.w3.org/TR/1999/REC-xpath-19991116" >  
494         boolean( /*/TerminationNotification )  
495       </wsrf-rp:QueryExpression>  
496     </wstop:MessagePattern>  
497   </wstop:Topic>  
498 </wstop:TopicNamespace>  
499
```

500 The value of /wstop:Topic/@MessageTypes is implementation-dependent; this specification does
501 not define the exact content of the notification messages produced on this topic. However, the
502 notification message associated with this topic MUST contain the following element:

```
503 <wsrf-rl:TerminationNotification>  
504   <wsrf-rl:TerminationTime xsi:nil="xsd:boolean"?>xsd:dateTime</wsrf-  
505   rl:TerminationTime>  
506   <wsrf-rl:TerminationReason>xsd:any</wsrf-rl:TerminationReason?>  
507 </wsrf-rl:TerminationNotification>
```

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

510 /wsrf-rl:TerminationTime

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

512 /wsrf-rl:TerminationReason

513 This OPTIONAL element contains an explanation of the situation surrounding the
514 destruction of the WS-Resource. This element is specific to the type of the WS-Resource
515 that was destroyed.

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

519 **7 Security Considerations**

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

524 **7.1 Securing the Message Exchanges**

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

528 **7.2 Securing Resource Destruction**

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

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

544

545 **8 References**

546 **8.1 Normative**

547

548 **[WS-Addressing]**

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

550 **[WS-BaseNotification]**

551 http://docs.oasis-open.org/wsn/wsn-ws_base_notification-1.3-spec-pr-02.pdf

552 **[WS-BaseFaults]**

553 http://docs.oasis-open.org/wsrf/wsrf-ws_base_faults-1.2-spec-os.pdf

554 **[WS-Resource]**

555 http://docs.oasis-open.org/wsrf/wsrf-ws_resource-1.2-spec-os.pdf

556 **[WS-ResourceProperties]**

557 http://docs.oasis-open.org/wsrf/wsrf-ws_resource_properties-1.2-spec-os.pdf

558 **[WS-Topics]**

559 http://docs.oasis-open.org/wsn/wsn-ws_topics-1.3-spec-pr-01.pdf

560 **[XML]**

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

562 **[XML-Infoset]**

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

564

565 **8.2 Non-Normative**

566 **[OGSI]**

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

569 **[SOAP 1.1]**

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

571 **[WS-Security]**

572 [http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-](http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf)
573 [1.0.pdf](http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf)

574 **[WS-I Basic Profile 1.1]**

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

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Appendix A. Acknowledgments

579

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

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582

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

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586

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602

603

604

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605

606

607

Appendix B. XML Schema

608

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

609

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

610

```
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<!--
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-->

<xsd:schema
xmlns="http://www.w3.org/2001/XMLSchema"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
```

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```

664 xmlns:wsrf-rl="http://docs.oasis-open.org/wsrf/rl-2"
665 xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-2"
666 elementFormDefault="qualified" attributeFormDefault="unqualified"
667 targetNamespace="http://docs.oasis-open.org/wsrf/rl-2">
668
669   <xsd:import namespace="http://docs.oasis-open.org/wsrf/bf-2"
670     schemaLocation="http://docs.oasis-open.org/wsrf/bf-2.xsd" />
671   <!--
672     ===== Resource Property Related =====
673   -->
674   <!--
675     ==== Resource Properties for ScheduledResourceTermination ====
676   -->
677
678   <xsd:element name="CurrentTime" >
679     <xsd:complexType>
680       <xsd:simpleContent>
681         <xsd:extension base="xsd:dateTime" >
682           <xsd:anyAttribute namespace="##other"
683 processContents="lax"/>
684         </xsd:extension>
685       </xsd:simpleContent>
686     </xsd:complexType>
687   </xsd:element>
688
689   <xsd:element name="TerminationTime" nillable="true">
690     <xsd:complexType>
691       <xsd:simpleContent>
692         <xsd:extension base="xsd:dateTime" >
693           <xsd:anyAttribute namespace="##other"
694 processContents="lax"/>
695         </xsd:extension>
696       </xsd:simpleContent>
697     </xsd:complexType>
698   </xsd:element>
699
700   <!-- ===== Resource Properties for ScheduledResourceTermination ===== -
701   -->
702   <xsd:element name="ScheduledResourceTerminationRP">
703     <xsd:complexType>
704       <xsd:sequence>
705         <xsd:element maxOccurs="1" minOccurs="1"
706 ref="wsrf-rl:CurrentTime" />
707         <xsd:element maxOccurs="1" minOccurs="1"
708 ref="wsrf-rl:TerminationTime" />
709       </xsd:sequence>
710     </xsd:complexType>
711   </xsd:element>
712
713   <!-- ===== Message Types for ImmediateResourceTermination ===== -
714   -->
715   <xsd:element name="Destroy">
716     <xsd:complexType />
717   </xsd:element>
718
719   <xsd:element name="DestroyResponse">
720     <xsd:complexType />
721   </xsd:element>
722
723   <xsd:complexType name="ResourceNotDestroyedFaultType">
724

```

```

725         <xsd:complexContent>
726             <xsd:extension base="wsrf-bf:BaseFaultType" />
727         </xsd:complexContent>
728     </xsd:complexType>
729     <xsd:element name="ResourceNotDestroyedFault" type="wsrf-
730 rl:ResourceNotDestroyedFaultType" />
731     <!-- ===== Message Types for ScheduledResourceTermination ===== -
732 -->
733     <xsd:element name="SetTerminationTime">
734         <xsd:complexType>
735             <xsd:choice>
736                 <xsd:element name="RequestedTerminationTime"
737 nillable="true" type="xsd:dateTime" />
738                 <xsd:element name="RequestedLifetimeDuration"
739 type="xsd:duration" />
740             </xsd:choice>
741         </xsd:complexType>
742     </xsd:element>
743
744     <xsd:element name="SetTerminationTimeResponse">
745         <xsd:complexType>
746             <xsd:sequence>
747                 <xsd:element name="NewTerminationTime"
748 nillable="true" type="xsd:dateTime" />
749                 <xsd:element name="CurrentTime"
750 type="xsd:dateTime" />
751             </xsd:sequence>
752         </xsd:complexType>
753     </xsd:element>
754     <xsd:complexType name="UnableToSetTerminationTimeFaultType">
755         <xsd:complexContent>
756             <xsd:extension base="wsrf-bf:BaseFaultType" />
757         </xsd:complexContent>
758     </xsd:complexType>
759
760     <xsd:element name="UnableToSetTerminationTimeFault" type="wsrf-
761 rl:UnableToSetTerminationTimeFaultType" />
762     <xsd:complexType name="TerminationTimeChangeRejectedFaultType">
763         <xsd:complexContent>
764             <xsd:extension base="wsrf-bf:BaseFaultType" />
765         </xsd:complexContent>
766     </xsd:complexType>
767     <xsd:element name="TerminationTimeChangeRejectedFault" type="wsrf-
768 rl:TerminationTimeChangeRejectedFaultType" />
769
770
771     <!--
772         ===== Notification Message Related =====
773 -->
774     <xsd:element name="TerminationNotification">
775         <xsd:complexType>
776             <xsd:sequence>
777                 <xsd:element name="TerminationTime"
778 type="xsd:dateTime" minOccurs="1" maxOccurs="1" nillable="true" />
779                 <xsd:element name="TerminationReason"
780 type="xsd:anyType" minOccurs="0" maxOccurs="1" />
781             </xsd:sequence>
782
783         </xsd:complexType>
784     </xsd:element>
785

```

786
787

```
</xsd:schema>
```

788

Appendix C. WSDL 1.1

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

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

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

794 <!--

795

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838

839 -->

840 <wsdl:definitions name="WS-ResourceLifetime"

```

841 targetNamespace="http://docs.oasis-open.org/wsrfl-2"
842 xmlns="http://schemas.xmlsoap.org/wsdl/"
843 xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
844 xmlns:wsrf-bf="http://docs.oasis-open.org/wsrfl-2"
845 xmlns:wsrf-rl="http://docs.oasis-open.org/wsrfl-2"
846 xmlns:wsrf-rlw="http://docs.oasis-open.org/wsrfl-2"
847 xmlns:wsrf-rp="http://docs.oasis-open.org/wsrfl-2"
848 xmlns:wsrf-rw="http://docs.oasis-open.org/wsrfl-2"
849 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
850 xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
851
852 <wsdl:import namespace="http://docs.oasis-open.org/wsrfl-2"
853 location="http://docs.oasis-open.org/wsrfl-2.wsdl" />
854 <wsdl:types>
855 <xsd:schema attributeFormDefault="unqualified"
856 elementFormDefault="qualified"
857 xmlns="http://www.w3.org/2001/XMLSchema">
858 <xsd:import namespace="http://docs.oasis-
859 open.org/wsrfl-2"
860 schemaLocation="http://docs.oasis-
861 open.org/wsrfl-2.xsd" />
862 </xsd:schema>
863 </wsdl:types>
864
865 <wsdl:message name="SetTerminationTimeRequest">
866 <wsdl:part element="wsrf-rl:SetTerminationTime"
867 name="SetTerminationTimeRequest" />
868 </wsdl:message>
869 <wsdl:message name="DestroyResponse">
870 <wsdl:part element="wsrf-rl:DestroyResponse"
871 name="DestroyResponse" />
872 </wsdl:message>
873 <wsdl:message name="SetTerminationTimeResponse">
874 <wsdl:part element="wsrf-rl:SetTerminationTimeResponse"
875 name="SetTerminationTimeResponse" />
876 </wsdl:message>
877
878 <wsdl:message name="DestroyRequest">
879 <wsdl:part element="wsrf-rl:Destroy" name="DestroyRequest" />
880 </wsdl:message>
881 <wsdl:message name="ResourceNotDestroyedFault">
882 <wsdl:part element="wsrf-rl:ResourceNotDestroyedFault"
883 name="ResourceNotDestroyedFault" />
884 </wsdl:message>
885
886 <wsdl:message name="UnableToSetTerminationTimeFault">
887 <wsdl:part element="wsrf-rl:UnableToSetTerminationTimeFault"
888 name="UnableToSetTerminationTimeFault" />
889 </wsdl:message>
890 <wsdl:message name="TerminationTimeChangeRejectedFault">
891 <wsdl:part element="wsrf-
892 rl:TerminationTimeChangeRejectedFault"
893 name="TerminationTimeChangeRejectedFault" />
894 </wsdl:message>
895 <wsdl:portType name="ImmediateResourceTermination">
896 <wsdl:operation name="Destroy">
897 <wsdl:input name="DestroyRequest" message="wsrf-
898 rlw:DestroyRequest" />
899
900 <wsdl:output name="DestroyResponse" message="wsrf-
901 rlw:DestroyResponse" />

```

```

902         <wsdl:fault message="wsrf-
903 rlw:ResourceNotDestroyedFault" name="ResourceNotDestroyedFault" />
904         <wsdl:fault name="ResourceUnknownFault" message="wsrf-
905 rw:ResourceUnknownFault" />
906         <wsdl:fault name="ResourceUnavailableFault"
907 message="wsrf-rw:ResourceUnavailableFault" />
908     </wsdl:operation>
909 </wsdl:portType>
910 <wsdl:portType name="ScheduledResourceTermination"
911         wsrp:ResourceProperties="wsrf-
912 rlw:ScheduledResourceTerminationRP">
913     <wsdl:operation name="SetTerminationTime">
914         <wsdl:input name="SetTerminationTimeRequest"
915 message="wsrf-rlw:SetTerminationTimeRequest" />
916         <wsdl:output name="SetTerminationTimeResponse"
917 message="wsrf-rlw:SetTerminationTimeResponse" />
918     </wsdl:operation>
919     <wsdl:fault message="wsrf-
920 rlw:UnableToSetTerminationTimeFault"
921 name="UnableToSetTerminationTimeFault" />
922     <wsdl:fault name="ResourceUnknownFault" message="wsrf-
923 rw: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

[This appendix is optional, but helpful. It should be removed for specifications that are at OASIS 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
wd-09	2005-05-18	Latha Srinivasan	Resolution of issue #:114 and updated Acknowledgements section per Ian's

Rev	Date	By Whom	What
			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.
pr-02.a	2005-11-18	Latha Srinivasan	Minor updates to references per lan's mail
cs-01	2006-01-10	Latha Srinivasan	Committee spec version
os	2006-04-01	Latha Srinivasan	Open Standard version

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