



# Web Services Resource Lifetime 1.2 (WS-ResourceLifetime) Committee Draft 01, 19 May 2005

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**Abstract:**

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. 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 [WS-RAP].

**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](mailto: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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# 1 Introduction

66

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-RAP].

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].

## 1.1 Goals and Requirements

95

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-RAP].

### 1.1.1 Requirements

99

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  
106 associated with a WS-Resource that is scheduled for termination.

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

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:

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

## 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 [WSDL 2.0]. A Pseudo-schema uses a BNF-style  
125 convention to describe attributes and elements:

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

```
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 wsd lfiles describing the  
144 messages defined by this specification and the normative descriptive text (excluding any pseudo-  
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 wsd l included in the appendices.

148

149 **1.3 Namespaces**

150 The following namespaces are used in this document:

Prefix	Namespace
s11	<a href="http://schemas.xmlsoap.org/soap/envelope/">http://schemas.xmlsoap.org/soap/envelope/</a>
wsa	<a href="http://www.w3.org/2005/03/addressing/">http://www.w3.org/2005/03/addressing/</a>
wsrf-rp	<a href="http://docs.oasis-open.org/wsrf/rp-1">http://docs.oasis-open.org/wsrf/rp-1</a>
wsrf-rpw	<a href="http://docs.oasis-open.org/wsrf/rpw-1">http://docs.oasis-open.org/wsrf/rpw-1</a>
wsrf-bf	<a href="http://docs.oasis-open.org/wsrf/bf-1">http://docs.oasis-open.org/wsrf/bf-1</a>
wsrf-bfw	<a href="http://docs.oasis-open.org/wsrf/bfw-1">http://docs.oasis-open.org/wsrf/bfw-1</a>
wsrf-rl	<a href="http://docs.oasis-open.org/wsrf/rl-1">http://docs.oasis-open.org/wsrf/rl-1</a>
wsrf-rlw	<a href="http://docs.oasis-open.org/wsrf/rlw-1">http://docs.oasis-open.org/wsrf/rlw-1</a>
wstop	<a href="http://docs.oasis-open.org/wsn/2004/06/wsn-WS-Topics-1.2-draft-01.xsd">http://docs.oasis-open.org/wsn/2004/06/wsn-WS-Topics-1.2-draft-01.xsd</a>
xsd	<a href="http://www.w3.org/2001/XMLSchema">http://www.w3.org/2001/XMLSchema</a>
xsi	<a href="http://www.w3.org/2001/XMLSchema-instance">http://www.w3.org/2001/XMLSchema-instance</a>

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/wsrf/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, WS-Resource Reference and WS-Resource Access  
164 Pattern, please refer to the WS-Resource [WS-RAP] 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 .

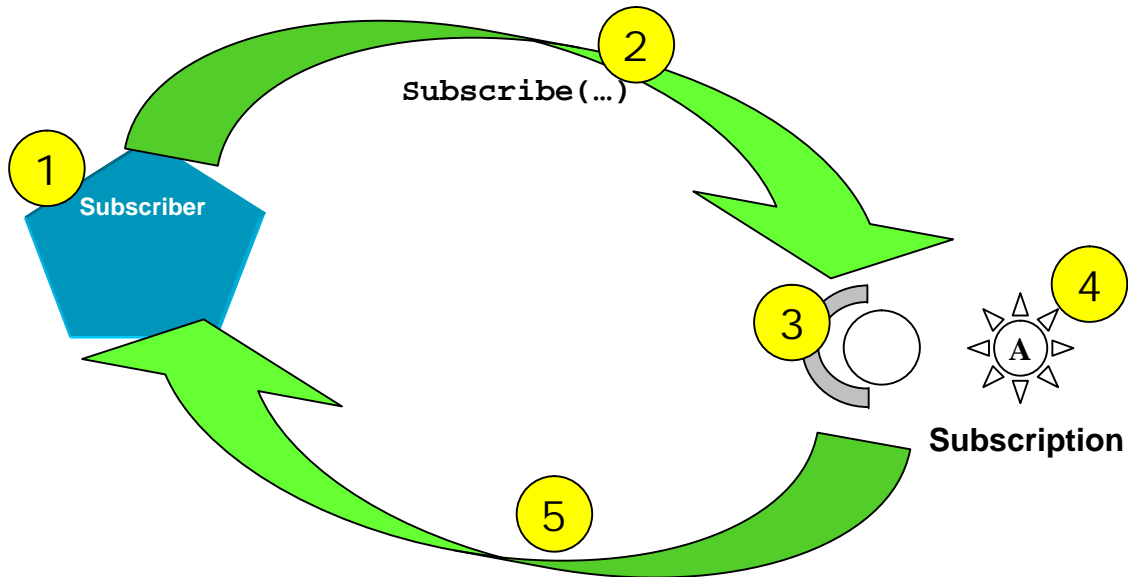
### 3 Example

170

171

172

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:



173

Figure 1 - Example WS-Resource Creation

174

175

176

177

178

179

180

181

182

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-RAP] 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.

183

184

185

186

187

188

The reference that is returned as a result of the subscribe message is a WS-Resource Reference as described in [WS-RAP]. 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.

189

190

191

192

193

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



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 Destroy message MUST follow the resource access pattern, as defined in [WS-RAP]. The  
211 wsa:Action MUST contain the URI: "http://docs.oasis-open.org/wsrf/rlw-1  
212 /ImmediateResourceTermination/DestroyRequest".

213 If the WS-Resource accepts the DestroyRequest message, upon receipt of this message the WS-  
214 Resource MUST either (1) destroy the resource component of the WS-Resource and return the  
215 following DestroyResponse message to acknowledge successful destruction, or (2) return a fault  
216 message indicating failure. Note that the destruction of the resource component of the WS-  
217 Resource effectively destroys the WS-Resource.

```
218 ...  
219 <wsrf-rl:DestroyResponse />  
220 ...
```

221 The receipt of the DestroyResponse message serves as a confirmation of the destruction of the  
222 WS-Resource. Once it has sent a DestroyResponse message, any further message exchanges  
223 directed at the subject WS-Resource MUST respond with a fault. In the absence of any other fault  
224 conditions that may take precedence this MUST be the "ResourceUnknown" fault message  
225 enumerated in the WS-Resource [WS-RAP] specification.

226 Instead of the DestroyResponse message, the Web service MUST send a fault.

227 This specification defines the following faults associated with failure to process the  
228 DestroyRequest message

- 229 • ResourceUnknownFault
  - 230 ○ The WS-Resource identified in the message is not known to the Web service.
- 231 • ResourceNotDestroyedFault
  - 232 ○ The WS-Resource could not be destroyed for some reason.

233

234 The wsa:Action MUST contain the URI: "http://docs.oasis-open.org/wsrf/rlw-  
235 1/ImmediateResourceTermination/DestroyResponse".

236

### 237 4.1 Example SOAP Encoding of the Destroy Message Exchange

238 The following is a non-normative example of a DestroyRequest message using SOAP 1.1 [SOAP  
239 1.1]:

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

```
244     http://docs.oasis-open.org/wsr/rlw-
245 1/ImmediateResourceTermination/DestroyRequest
246     </wsa:Action>
247     . . .
248 </s11:Header>
249 <s11:Body>
250     <wsrf-rl:Destroy/>
251 </s11:Body>
252 </s11:Envelope>
```

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

```
254 <s11:Envelope . . .>
255   <s11:Header>
256     . . .
257     <wsa:Action>
258       http://docs.oasis-open.org/wsr/rlw-
259 1/ImmediateResourceTermination/DestroyResponse
260     </wsa:Action>
261     . . .
262   </s11:Header>
263   <s11:Body>
264     <wsrf-rl:DestroyResponse />
265   </s11:Body>
266 </s11:Envelope>
```

267

## 5 Scheduled Destruction

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

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

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

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

283

### 5.1 Regarding Time

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

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

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

303

### 5.2 Querying Current Time

304 In order to assist the service requestor in inspecting and setting a WS-Resource's termination  
305 time without requiring a specific accuracy of clock synchronization between the service requestor  
306 and the service provider, the WS-Resource MUST provide a resource property element that  
307 provides the current time as it is known by the WS-Resource. The form of this resource property  
308 element is:

309

310

```
...  
<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 In order to allow the service requestor to determine the current termination time of a WS-  
322 Resource, the WS-Resource MUST provide a resource property element that indicates the  
323 current termination time of the WS-Resource. The form of this resource property element is:

324

```
...  
<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 <wsrf-rl:SetTerminationTime>  
346   [ <wsrf-rl:RequestedTerminationTime xsi:nil="xsd:boolean"?>  
347     xsd:dateTime  
348   </wsrf-rl:RequestedTerminationTime> ]  
349   /  
350   [ <wsrf-rl:RequestedLifetimeDuration>  
351     xsd:duration  
352   </wsrf-rl:RequestedLifetimeDuration> ]  
353 </wsrf-rl:SetTerminationTime>
```

354 The SetTerminationTime message MUST follow the WS-Resource Access Pattern, as defined in  
355 [WS-RAP]. The wsa:Action MUST contain the following URI: . "http://docs.oasis-  
356 open.org/wsrf/rlw-1/ScheduledResourceTermination/SetTerminationTimeRequest".

357 Further constraints on the processing of the SetTerminationTimeRequest message are as  
358 follows:

359 /wsrf-rl:SetTerminationTime/wsrf-rl:RequestedTerminationTime

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

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

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

371 /wsrf-rl:SetTerminationTime/wsrf-rl:RequestedLifetimeDuration

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

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

377

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

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

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

393 Further constraints on the SetTerminationTimeResponse message are as follows:

394 /wsrf-rl:SetTerminationTimeResponse/wsrf-rl:NewTerminationTime

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

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

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

403 /wsrf-rl:SetTerminationTimeResponse/wsrf-rl:CurrentTime

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

406 Instead of the SetTerminationTimeResponse message, the Web service MUST send a fault.

407 This specification defines the following faults associated with failure to process the  
 408 SetTerminationTimeRequest message

- 409 • ResourceUnknownFault
  - 410 ○ The WS-Resource identified in the message (which follows the WS-Resource Access  
 411 Pattern) is not known to the Web service. This fault is enumerated in the WS-  
 412 Resource [WS-RAP] specification.
- 413 • UnableToSetTerminationTimeFault
  - 414 ○ The request for termination time could not be changed for some reason.
- 415 • TerminationTimeChangeRejectedFault
  - 416 ○ In the case where a WS-Resource is willing to update its TerminationTime, but only  
 417 with a value “in the past” relative to the requested termination time, then the WS-  
 418 Resource MAY include a “hint” in the TerminationTimeRejectedFault message  
 419 indicating the time to which it is willing to extend its TerminationTime.

420 The wsa:Action MUST contain the following URI: “http://docs.oasis-open.org/wsrf/rlw-  
 421 1/ScheduledResourceTermination/SetTerminationTimeResponse”.

422

## 423 5.5 Example SOAP Encoding of the SetTerminationTime 424 Message Exchange

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

```

427 <s11:Envelope . . .>
428   <s11:Header>
429     . . .
430     <wsa:Action>
431       http://docs.oasis-open.org/wsrf/rlw-
432 1/ScheduledResourceTermination/SetTerminationTimeRequest
433     </wsa:Action>
434     . . .
435   </s11:Header>
436   <s11:Body>
437     <wsrf-rl:SetTerminationTime>
438       <wsrf-rl:RequestedTerminationTime>
439         2001-12-31T12:00:00Z
440       </wsrf-rl:RequestedTerminationTime>
441     </wsrf-rl:SetTerminationTime>
442   </s11:Body>
443 </s11:Envelope>
  
```

444 The following is an example SetTerminationTimeResponse message using SOAP 1.1 [SOAP  
445 1.1]:

```
446 <s11:Envelope . . . >  
447   <s11:Header>  
448     . . .  
449     <wsa:Action>  
450       http://docs.oasis-open.org/wsrflw-  
451 1/ScheduledResourceTermination/SetTerminationTimeResponse  
452     </wsa:Action>  
453     . . .  
454   </s11:Header>  
455   <s11:Body>  
456     <wsrf-rl:SetTerminationTimeResponse>  
457       <wsrf-rl:NewTerminationTime>  
458         2001-12-31T12:00:00Z  
459       </wsrf-rl:NewTerminationTime>  
460       <wsrf-rl:CurrentTime>  
461         2001-12-31T11:00:00Z  
462       </wsrf-rl:CurrentTime>  
463     </wsrf-rl:SetTerminationTimeResponse>  
464   </s11:Body>  
465 </s11:Envelope>
```

## 466 **5.6 Termination Time Expiration**

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

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

478



---

## 6 Notification of Resource Destruction

479

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

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

```
490 <wstop:TopicSpace name="ResourceLifetime"  
491   targetNamespace=  
492     "http://docs.oasis-open.org/wsrf/rl-1"  
493   ... >  
494   <wstop:Topic name="ResourceTermination" ...>  
495     <wstop:MessagePattern>  
496       <wsrf-rp:QueryExpression  
497         dialect="http://www.w3.org/TR/1999/REC-xpath-19991116" >  
498         boolean(/*/TerminationNotification)  
499       </wsrf-rp:QueryExpression>  
500     </wstop:MessagePattern>  
501   </wstop:Topic>  
502 </wstop:TopicSpace>  
503
```

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

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

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

514 /wsrf-rl:TerminationTime

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

516 /wsrf-rl:TerminationReason

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

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

523

---

## 7 Security Considerations

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

### 528 7.1 Securing the Message Exchanges

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

### 532 7.2 Securing Resource Destruction

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

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

548

---

549 **8 References**

550 **8.1 Normative**

551

552 **[WS-Addressing]**

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

554 **[WS-BaseNotification]**

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

556 **[WS-BaseFaults]**

557 [http://docs.oasis-open.org/wsrf/wsrf\\_ws-base\\_faults-1.2-spec-cd-01.pdf](http://docs.oasis-open.org/wsrf/wsrf_ws-base_faults-1.2-spec-cd-01.pdf)

558 **[WS-RAP]**

559 [http://docs.oasis-open.org/wsrf/wsrf\\_ws\\_resource-1.2-spec-cd-01.pdf](http://docs.oasis-open.org/wsrf/wsrf_ws_resource-1.2-spec-cd-01.pdf)

560 **[WS-ResourceProperties]**

561 [http://docs.oasis-open.org/wsrf/wsrf\\_ws\\_resource\\_properties-1.2-spec-cd-01.pdf](http://docs.oasis-open.org/wsrf/wsrf_ws_resource_properties-1.2-spec-cd-01.pdf)

562 **[WS-Topics]**

563 <http://docs.oasis-open.org/wsn/2004/06/wsn-WS-Topics-1.2-draft-01.pdf>

564 **[XML]**

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

566 **[XML-Infoset]**

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

568 **8.2 Non-Normative**

569 **[OGSI]**

570 GGF GFD.15 "Open Grid Services Infrastructure (OGSI) Version 1.0". Available at

571 <http://forge.gridforum.org/projects/ogsi-wg>

572 **[SOAP 1.1]**

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

574 **[WS-Security]**

575 [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)

576 [1.0.pdf](http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf)

577

578

## Appendix A. Acknowledgments

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

582

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584 specification:

585

586 Mario Antonioletti(EPCC, The University of Edinburgh), Akhil Arora (Sun Microsystems), Tim  
587 Banks (IBM), Jeff Bohren (OpenNetwork), Fred Carter (AmberPoint), Martin Chapman (Oracle),  
588 Glen Daniels (Sonic Software), David De Roure (University of Southampton), Thomas Freund  
589 (IBM), John Fuller (Individual), Stephen Graham (IBM), Anish Karmarkar (Oracle), Hideharu Kato  
590 (Hitachi), David Levine (IBM), Paul Lipton (Computer Associates), Mark Little (Arjuna  
591 Technologies Limited), Lily Liu (WebMethods, Inc.), Tom Maguire (IBM), Susan Malaika (IBM),  
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601

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603

604 Karl Czajkowski (Globus / USC/ISI), Donald F Ferguson (IBM), Ian Foster (Globus /  
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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

610

<http://docs.oasis-open.org/wsrf/rt-1>

611

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

612

```
<!--
```

613

614

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652

653

654

655

656

```
-->
```

657

658

659

660

```
<xsd:schema
```

661

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

662

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

```

663 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
664 xmlns:wsrf-rl="http://docs.oasis-open.org/wsrf/rl-1"
665 xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-1"
666 elementFormDefault="qualified" attributeFormDefault="unqualified"
667 targetNamespace="http://docs.oasis-open.org/wsrf/rl-1">
668
669   <xsd:import namespace="http://docs.oasis-open.org/wsrf/bf-1"
670     schemaLocation="http://docs.oasis-open.org/wsrf/bf-1" />
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
701   <!-- ===== Resource Properties for ScheduledResourceTermination ===== -
702   -->
703   <xsd:element name="ScheduledResourceTerminationRP">
704     <xsd:complexType>
705       <xsd:sequence>
706         <xsd:element maxOccurs="1" minOccurs="1"
707 ref="wsrf-rl:CurrentTime" />
708         <xsd:element maxOccurs="1" minOccurs="1"
709 ref="wsrf-rl:TerminationTime" />
710       </xsd:sequence>
711     </xsd:complexType>
712   </xsd:element>
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     <xsd:complexType name="ResourceNotDestroyedFaultType">
723         <xsd:complexContent>
724             <xsd:extension base="wsrf-bf:BaseFaultType" />
725         </xsd:complexContent>
726     </xsd:complexType>
727     <xsd:element name="ResourceNotDestroyedFault" type="wsrf-
728 rl:ResourceNotDestroyedFaultType" />
729     <!-- ===== Message Types for ScheduledResourceTermination ===== -
730 -->
731     <xsd:element name="SetTerminationTime">
732         <xsd:complexType>
733             <xsd:choice>
734                 <xsd:element name="RequestedTerminationTime"
735 nillable="true" type="xsd:dateTime" />
736                 <xsd:element name="RequestedLifetimeDuration"
737 type="xsd:duration" />
738             </xsd:choice>
739         </xsd:complexType>
740     </xsd:element>
741
742     <xsd:element name="SetTerminationTimeResponse">
743         <xsd:complexType>
744             <xsd:sequence>
745                 <xsd:element name="NewTerminationTime"
746 nillable="true" type="xsd:dateTime" />
747                 <xsd:element name="CurrentTime"
748 type="xsd:dateTime" />
749             </xsd:sequence>
750         </xsd:complexType>
751     </xsd:element>
752
753     <xsd:complexType name="UnableToSetTerminationTimeFaultType">
754         <xsd:complexContent>
755             <xsd:extension base="wsrf-bf:BaseFaultType" />
756         </xsd:complexContent>
757     </xsd:complexType>
758
759     <xsd:element name="UnableToSetTerminationTimeFault" type="wsrf-
760 rl:UnableToSetTerminationTimeFaultType" />
761     <xsd:complexType name="TerminationTimeChangeRejectedFaultType">
762         <xsd:complexContent>
763             <xsd:extension base="wsrf-bf:BaseFaultType" />
764         </xsd:complexContent>
765     </xsd:complexType>
766     <xsd:element name="TerminationTimeChangeRejectedFault" type="wsrf-
767 rl:TerminationTimeChangeRejectedFaultType" />
768
769     <!--
770         ===== Notification Message Related =====
771 -->
772     <xsd:element name="TerminationNotification">
773         <xsd:complexType>
774             <xsd:sequence>
775                 <xsd:element name="TerminationTime"
776 type="xsd:dateTime" minOccurs="1" maxOccurs="1" nillable="true" />
777                 <xsd:element name="TerminationReason"
778 type="xsd:anyType" minOccurs="0" maxOccurs="1" />
779             </xsd:sequence>
780

```

781  
782  
783  
784  
785  
786  
787

```
        </xsd:complexType>  
    </xsd:element>  
  
</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 and is included here for convenience. The authoritative  
791 version of this WSDL is available at:

792 <http://docs.oasis-open.org/wsrf/r1w-1>

793 <?xml version="1.0" encoding="UTF-8"?>  
794 <!--

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838

```

839 -->
840 <wsdl:definitions name="WS-ResourceLifetime"
841 targetNamespace="http://docs.oasis-open.org/wsrf/rlw-1"
842 xmlns="http://schemas.xmlsoap.org/wsdl/"
843 xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
844 xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-1"
845 xmlns:wsrf-rl="http://docs.oasis-open.org/wsrf/rl-1"
846 xmlns:wsrf-rlw="http://docs.oasis-open.org/wsrf/rlw-1"
847 xmlns:wsrf-rp="http://docs.oasis-open.org/wsrf/rp-1"
848 xmlns:wsrf-rw="http://docs.oasis-open.org/wsrf/rw-1"
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/wsrf/rw-1"
853         location="http://docs.oasis-open.org/wsrf/rw-1" />
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/wsrf/rl-1"
860                 schemaLocation="http://docs.oasis-
861 open.org/wsrf/rl-1" />
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 rlw:ResourceUnknownFault" />
906     </wsdl:operation>
907 </wsdl:portType>
908 <wsdl:portType name="ScheduledResourceTermination"
909     wsrf-rp:ResourceProperties="wsrf-
910 rl:ScheduledResourceTerminationRP">
911     <wsdl:operation name="SetTerminationTime">
912         <wsdl:input name="SetTerminationTimeRequest"
913 message="wsrf-rlw:SetTerminationTimeRequest" />
914         <wsdl:output name="SetTerminationTimeResponse"
915 message="wsrf-rlw:SetTerminationTimeResponse" />
916
917         <wsdl:fault message="wsrf-
918 rlw:UnableToSetTerminationTimeFault"
919 name="UnableToSetTerminationTimeFault" />
920         <wsdl:fault name="ResourceUnknownFault" message="wsrf-
921 rlw:ResourceUnknownFault" />
922         <wsdl:fault message="wsrf-
923 rlw:TerminationTimeChangeRejectedFault"
924 name="TerminationTimeChangeRejectedFault" />
925     </wsdl:operation>
926 </wsdl:portType>
927 </wsdl:definitions>
928

```

## Appendix D. Revision History

930 [This appendix is optional, but helpful. It should be removed for specifications that are at OASIS  
931 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

<b>Rev</b>	<b>Date</b>	<b>By Whom</b>	<b>What</b>
			Acknowledgements section per Ian's mail
cd-01	2005-05-19	Latha Srinivasan	First Committee draft

---

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