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# Web Services Resource Lifetime 1.2

# (WS-ResourceLifetime)

# OASIS Standard, 1 April 2006

**Document identifier:  wsrf-WS-ResourceLifetime-1.2-spec-os**

**Location:**
wsrf-ws_resource_lifetime-1.2-spec-os.pdf

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

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

**Status:**
This document is 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/).

# Table of Contents

# 1 Introduction

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

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

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

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

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

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

## 1.1 Goals and Requirements

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

### 1.1.1 Requirements

This specification intends to meet the following requirements:

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

### 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.

## 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, refered 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  wsdl 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

## 1.4 Fault Definitions

149

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/wsrf/fault

# 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 .

## 167 3 Example

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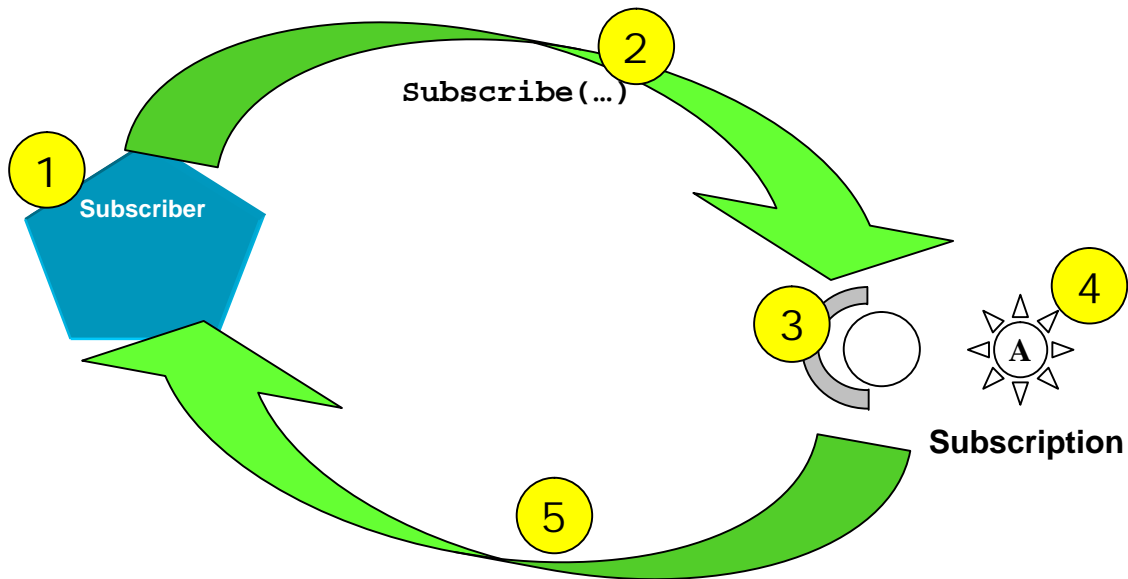169 BaseNotification [WS-BaseNotification]. This situation is depicted in the following figure:

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

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

186 Subsequent to the creation of the subscription WS-Resource, the application-specific behavior of
187 delivering notifications continues. Occasionally, the subscriber may examine the subscription WS-
188 Resource using standard WS-ResourceLifetime resource properties to inquire about the
189 remaining time before the subscription WS-Resource may be destroyed. If the subscriber wishes
190 to extend the lifetime of the subscription WS-Resource beyond its scheduled termination time, it
191 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.

## 4  Immediate Destruction

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

The format of the destroy request message is:

```
…
   <wsrf-rl:Destroy/>
…
```

The wsa:Action MUST contain the URI:  "http://docs.oasis-open.org/wsrf/rlw-2 /ImmediateResourceTermination/DestroyRequest".

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

```
…
   <wsrf-rl:DestroyResponse />
…
```

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

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


- ResourceNotDestroyedFault

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


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

The wsa:Action MUST contain the URI:  "http://docs.oasis-open.org/wsrf/rlw-2/ImmediateResourceTermination/DestroyResponse".


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

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

```
<s11:Envelope . . .>
  <s11:Header>
   . . .
    <wsa:Action>
       http://docs.oasis-open.org/wsrf/rlw-
2/ImmediateResourceTermination/DestroyRequest
    </wsa:Action>
```

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

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>
```

# 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).

## 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).

## 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     o The request for termination time could not be changed for some reason.

408 • TerminationTimeChangeRejectedFault

409     o 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

## 5.5 Example SOAP Encoding of the SetTerminationTime
419
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/wsrf/rlw-
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>
```

## 5.6 Termination Time Expiration

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

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

# 6 Notification of Resource Destruction

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/wsrf/rl-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

# 8 References

## 8.1 Normative

**[WS-Addressing]**

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

**[WS-BaseNotification]**

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

**[WS-BaseFaults]**

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


**[WS-Resource]**

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

**[WS-ResourceProperties]**

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

**[WS-Topics]**

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

**[XML]**

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

**[XML-Infoset]**

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


## 8.2 Non-Normative

**[OGSI]**

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

**[SOAP 1.1]**

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

**[WS-Security]**

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

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

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

578

# Appendix A. Acknowledgments

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.

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

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

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

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

# Appendix B. XML Schema

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

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

```
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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"
```

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

```
726              <xsd:complexContent>
727                      <xsd:extension base="wsrf-bf:BaseFaultType" />
728              </xsd:complexContent>
729     </xsd:complexType>
730     <xsd:element name="ResourceNotDestroyedFault" type="wsrf-
731 rl:ResourceNotDestroyedFaultType" />
732     <!-- ====== Message Types for ScheduledResourceTermination  ======= -
733 ->
734     <xsd:element name="SetTerminationTime">
735             <xsd:complexType>
736                     <xsd:choice>
737                             <xsd:element name="RequestedTerminationTime"
738 nillable="true" type="xsd:dateTime" />
739                             <xsd:element name="RequestedLifetimeDuration"
740 type="xsd:duration" />
741                     </xsd:choice>
742             </xsd:complexType>
743     </xsd:element>
744
745     <xsd:element name="SetTerminationTimeResponse">
746             <xsd:complexType>
747                     <xsd:sequence>
748                             <xsd:element name="NewTerminationTime"
749 nillable="true" type="xsd:dateTime" />
750                             <xsd:element name="CurrentTime"
751 type="xsd:dateTime" />
752                     </xsd:sequence>
753             </xsd:complexType>
754     </xsd:element>
755     <xsd:complexType name="UnableToSetTerminationTimeFaultType">
756             <xsd:complexContent>
757                     <xsd:extension base="wsrf-bf:BaseFaultType" />
758             </xsd:complexContent>
759     </xsd:complexType>
760
761     <xsd:element name="UnableToSetTerminationTimeFault" type="wsrf-
762 rl:UnableToSetTerminationTimeFaultType" />
763     <xsd:complexType name="TerminationTimeChangeRejectedFaultType">
764             <xsd:complexContent>
765                     <xsd:extension base="wsrf-bf:BaseFaultType" />
766             </xsd:complexContent>
767     </xsd:complexType>
768     <xsd:element name="TerminationTimeChangeRejectedFault" type="wsrf-
769 rl:TerminationTimeChangeRejectedFaultType" />
770
771
772     <!--
773         ============ Notification Message Related  ==================
774     -->
775     <xsd:element name="TerminationNotification">
776             <xsd:complexType>
777                     <xsd:sequence>
778                             <xsd:element name="TerminationTime"
779 type="xsd:dateTime" minOccurs="1" maxOccurs="1" nillable="true" />
780                             <xsd:element name="TerminationReason"
781 type="xsd:anyType" minOccurs="0" maxOccurs="1" />
782                     </xsd:sequence>
783
784             </xsd:complexType>
785     </xsd:element>
786
```

```
787
788    </xsd:schema>
```

# Appendix C. WSDL 1.1

789

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

793 http://docs.oasis-open.org/wsrf/rlw-2.wsdl

```
794  <?xml version="1.0" encoding="UTF-8"?>
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838  WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
839
840  -->
841  <wsdl:definitions name="WS-ResourceLifetime"
```

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

```
903              <wsdl:fault message="wsrf-
904    rlw:ResourceNotDestroyedFault" name="ResourceNotDestroyedFault" />
905              <wsdl:fault name="ResourceUnknownFault" message="wsrf-
906    rw:ResourceUnknownFault" />
907                   <wsdl:fault name="ResourceUnavailableFault"
908    message="wsrf-rw:ResourceUnavailableFault"/>
909          </wsdl:operation>
910      </wsdl:portType>
911      <wsdl:portType name="ScheduledResourceTermination"
912                   wsrf-rp:ResourceProperties="wsrf-
913    rl:ScheduledResourceTerminationRP">
914          <wsdl:operation name="SetTerminationTime">
915              <wsdl:input name="SetTerminationTimeRequest"
916    message="wsrf-rlw:SetTerminationTimeRequest" />
917              <wsdl:output name="SetTerminationTimeResponse"
918    message="wsrf-rlw:SetTerminationTimeResponse" />
919
920              <wsdl:fault message="wsrf-
921    rlw:UnableToSetTerminationTimeFault"
922    name="UnableToSetTerminationTimeFault" />
923              <wsdl:fault name="ResourceUnknownFault" message="wsrf-
924    rw:ResourceUnknownFault" />
925                   <wsdl:fault name="ResourceUnavailableFault"
926    message="wsrf-rw:ResourceUnavailableFault"/>
927              <wsdl:fault message="wsrf-
928    rlw:TerminationTimeChangeRejectedFault"
929    name="TerminationTimeChangeRejectedFault" />
930          </wsdl:operation>
931      </wsdl:portType>
932    </wsdl:definitions>
```

# Appendix D. Revision History

934 *[This appendix is optional, but helpful. It should be removed for specifications that are at OASIS*
935 *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 Ian'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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