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Web Services Service Group 1.2 (WS-ServiceGroup)

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Editors:

Tom Maguire, IBM <tmaguire@us.ibm.com>
David Snelling, Fujitsu <David.Snelling@UK.Fujitsu.com>
Tim Banks, IBM <Tim_Banks@uk.ibm.com>

Abstract:

A ServiceGroup is a heterogeneous by-reference collection of Web services. ServiceGroups can be used to form a wide variety of collections of services or WS-Resources [**WS-Resource**], including registries of services and associated WS-Resources.

Members of a ServiceGroup are represented using components called *entries*. A ServiceGroup entry is a WS-Resource. The Web service associated with a ServiceGroup entry can be composed from a variety of Web services standards including WS-ResourceLifetime [**WS-ResourceLifetime**] which defines standard patterns by which resources can be destroyed, WS-BaseNotification [**WS-BaseNotification**] which defines how third parties may subscribe to be informed of changes to the ServiceGroup and WS-ResourceProperties [**WS-ResourceProperties**] which defines how the properties of a ServiceGroup and its entries are made accessible through a Web service interface.

Status:

This document is published by this TC as a "Committee Specification".

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1 Introduction

In this document, we consider a distributed computing environment consisting of Web services and resources. A pattern defining the relationship between Web services and resources is detailed in WS-Resource [**WS-Resource**]. The term WS-Resource is used to describe the relationship between a Web service and a resource.

This WS-ServiceGroup specification defines a means by which Web services and WS-Resources can be aggregated or grouped together for a domain specific purpose. In order for requestors to form meaningful queries against the contents of the ServiceGroup, membership in the group must be constrained in some fashion. The constraints for membership are expressed by intension using a classification mechanism. Further, the members of each intension must share a common set of information over which queries can be expressed.

In this specification, the ServiceGroup membership rules, membership constraints and classifications are expressed using the resource property model [**WS-ResourceProperties**]. Groups are defined as a collection of members that meet the constraints of the group. The ServiceGroupRegistration interface extends the basic ServiceGroup capabilities with message exchanges for managing the membership of a ServiceGroup.

The ServiceGroup and ServiceGroupRegistration interfaces defined in this document are commonly expected to be composed with other application domain specific interfaces, which define more specialized interaction with the service group and/or with the services that are members of the service group. For example, specialized interfaces may offer means of querying the contents of the ServiceGroup, and for performing collective operations across members of the ServiceGroup.

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

1.1 Goals and Requirements

The goal of WS-ServiceGroup is to standardize the terminology, concepts, message exchanges, WSDL and XML needed to express the aggregations of Web services and resources as defined by the WS-Resource [**WS-Resource**].

1.1.1 Requirements

This specification intends to satisfy the following requirements:

- Define the standard resource properties by which a requestor can query and retrieve contents of a service group.
- Define the standard resource properties by which a requestor can query and retrieve details of an entry in the service group.
- Define standard message exchanges and resource properties by which a requestor can add new entries for a member in a service group.

1.1.2 Non-Goals

The following topics are outside the scope of this specification:

- It is not an objective of this specification to define the message exchanges representing the function of a member.

1.2 Notational Conventions

119

120 The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD",
121 "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be
122 interpreted as described in [**RFC 2119**].

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

126 This specification uses a notational convention, refered to as "Pseudo-schemas" in a fashion similar
127 to the WSDL 2.0 Part 1 specification [**WSDL 2.0**]. A Pseudo-schema uses a BNF-style convention
128 to describe attributes and elements:

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

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

145 Where there is disagreement between the separate xml schema and wsdl files describing the
146 messages defined by this specification and the normative descriptive text (excluding any pseudo-
147 schema) in this document, the normative descriptive text will take precedence over the separate
148 files. The separate files take precedence over any pseudo-schema and over any schema and wsdl
149 included in the appendices.

1.3 Namespaces

150

151 The following namespaces are used in this document:

Prefix	Namespace
s11	http://schemas.xmlsoap.org/soap/envelope
xsd	http://www.w3.org/2001/XMLSchema
wsa	http://www.w3.org/2005/08/addressing
wsrf-bf	http://docs.oasis-open.org/wsrf/bf-2
wsrf-rp	http://docs.oasis-open.org/wsrf/rp-2
wsrf-rpw	http://docs.oasis-open.org/wsrf/rpw-2

wsrf-rl	http://docs.oasis-open.org/wsrf/rl-2
wsrf-rw	http://docs.oasis-open.org/wsrf/rw-2
wsnt	http://docs.oasis-open.org/wsn/b-2
wsrf-sg	http://docs.oasis-open.org/wsrf/sg-2
wsrf-sgw	http://docs.oasis-open.org/wsrf/sgw-2
wstop	http://docs.oasis-open.org/wsn/t-1

1.4 Fault Definitions

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

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

156   http://docs.oasis-open.org/wsrf/fault

157 2 Example

158 As an example of using a service group, let's consider a group containing services that one has
159 accessed recently. In effect, this is a Web services equivalent of a Web browser's "history" feature.
160 The services that have been accessed can implement any interface. They could be simple Web
161 services or Web services that are part of a WS-Resource, so they can have resource properties or
162 not.

163 The only constraint the group has on its members is that the membership information of the
164 members contains the date of last interaction with the service and whether the outcome or this
165 interaction was successful or not. This constraint is exposed by the following membership rule:

```
166  …
167  <wsrf-sg:MembershipContentRule
168    ContentElements="ns1:DateOfLastInvoke ns1:Outcome"/>
169  …
```

170 In the schema for the namespace referenced by prefix ns1, ns1:DateOfLastInvoke has been
171 defined as an xsd:dateTime representing when the member service was last invoked and
172 ns1:Outcome has been defined as either "success" or "failure" and is used to represent the
173 outcome of the last invocation.

174 Let us now modify the example to one where the services invoked can include one of two different
175 types: a catalog service or a purchase service. In addition, if the service invoked was a purchase
176 service, we want the amount of the purchase to be specified as a content element in the
177 membership. The set of rules to describe the constraints of this group now is:

```
178  …
179  <wsrf-sg:MembershipContentRule
180    ContentElements="ns1:DateOfLastInvoke ns1:Outcome"/>
181
182  <wsrf-sg:MembershipContentRule
183      MemberInterfaces="ns2:CatalogPortType"
184      ContentElements=""/>
185
186  <wsrf-sg:MembershipContentRule
187      MemberInterfaces="ns3:PurchasePortType"
188      ContentElements="ns3:PurchaseAmount"/>
189  …
```

190 As a result, the WS-Resource that represents the membership of a service of type
191 ns3:PurchasePortType in the service group is guaranteed to include the elements described by the
192 following pseudo-schema:

```
193  …
194  <wsrf-sg:Content>
195    <ns1:DateOfLastInvoke>xsd:dateTime</ns1:DateOfLastInvoke>
196    <ns1:Outcome>xsd:string</ns1:Outcome>
197    <ns3:PurchaseAmount>xsd:nonNegativeInteger</ns3:PurchaseAmount>
198  </wsrf-sg:Content>
199  …
```

200 The WS-Resource that represents the membership of a service of type ns2:CatalogPortType is not
201 required to contain the property ns3:PurchaseAmount.

202 Once this service group has been established, requestors can retrieve the composition of the
203 group, subscribe for notifications on modification of the group composition (if supported) and
204 retrieve content elements of the memberships by using the mechanisms described in this
205 specification.

3 Terminology and Concepts

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

Member:

- o   A Web service that belongs to a ServiceGroup. Note, this Web service may be a component of a WS-Resource as defined in "Web Services Resources" [**WS-Resource**].

ServiceGroup:

- o   A Web service that is a collection of other Web services or WS-Resources and the information that pertains to them. The purpose of the group is application domain specific. The means by which the membership in the ServiceGroup is formed may be through ServiceGroupRegistration, or through other means not defined by this specification.

ServiceGroupEntry:

- o   An atomic entry in a ServiceGroup which associates a member to a ServiceGroup. A ServiceGroupEntry also contains content information by which the member's participation in the ServiceGroup is advertised.

ServiceGroupRegistration:

- o   A ServiceGroup that provides the means to allow users of the service to explicitly insert new members.

4 Grouping Services

225   A ServiceGroup maintains information about a collection of Web services. Each of the Web
226   services represented in the collection may be a component of a WS-Resource. These Web
227   services may be members of a ServiceGroup for a specific reason, such as being part of a
228   federated service, or they may have no specific relationship, such as the Web services contained in
229   an index or registry operated for Web service discovery purposes.

230   Three sets of message exchanges provide the interface to service groups ServiceGroup,
231   ServiceGroupEntry and ServiceGroupRegistration. The member interface is not a part of the WS-
232   ServiceGroup specification but is included for completeness. The depiction below details the
233   interfaces relevant to ServiceGroups.
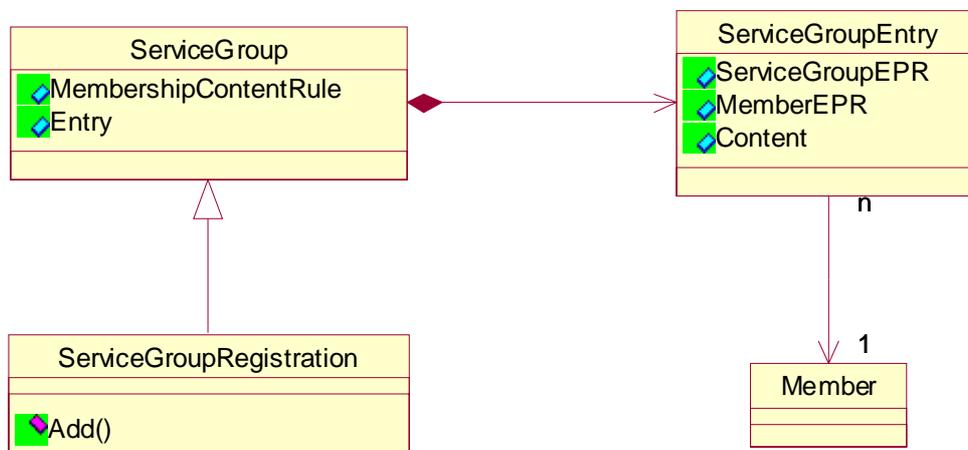
234

5 ServiceGroup

235

236 A ServiceGroup is a WS-Resource and MUST comply with the definition of a WS-Resource in [WS-
237 Resource]; the ServiceGroup represents a collection of other Web services. The individual services
238 represented within the ServiceGroup are the ServiceGroup's members, or its membership. The
239 model for membership of a ServiceGroup is an *entry* resource property of the ServiceGroup. An
240 entry WS-Resource also represents an association with a given member in the ServiceGroup and
241 is used to manage the membership relationship. Additionally a ServiceGroup has the following
242 characteristics:

243 o When a ServiceGroup WS-Resource is destroyed, all of the ServiceGroupEntry WS-
244   Resources are also RECOMMENDED to be destroyed. Note however, that the actual
245   member Web services or WS-Resources are not affected.

246 o Once a ServiceGroup is destroyed, a requestor MUST make no assumptions about either
247   the existence of the entry WS-Resources or the validity of the contents of those WS-
248   Resources.

249 o A member MAY belong to several ServiceGroups.

250 o A member MAY belong to the same ServiceGroup more then once.

251 o The member of a ServiceGroup MAY implement message exchanges from various
252   interfaces.

253 o If a member WS-Resource is destroyed, the ServiceGroup MAY destroy the corresponding
254   entry WS-Resource.

255 o A ServiceGroupEntry in isolation has no semantic meaning.

5.1 ServiceGroup ResourceProperties

257 In addition to the message exchanges described in this specification, a ServiceGroup MUST also
258 support the required message exchanges defined in the WS-ResourceProperties specification and
259 MAY support the optional message exchanges defined in the WS-ResourceProperties
260 specification. The resource property document defined by the ServiceGroup MUST include the
261 following resource property elements.

5.1.1 MembershipContentRule Resource Property

263 The resource property document contains a potentially empty set of MembershipContentRule
264 elements that specify the intensional constraints on *membership* of the *service group*. That is,
265 membership can be restricted to members that implement particular interfaces and/or it can require
266 the presence of particular child elements in the wsrf-sg:Content resource property of the
267 ServiceGroupEntry representing the membership in the group.

268 The ServiceGroup resource property document MAY contain zero MembershipContentRule child
269 elements. When no MembershipContentRule elements are specified, the members of the
270 ServiceGroup are unconstrained. When the ServiceGroup is unconstrained any member MAY be
271 present in the ServiceGroup.

272 When at least one MembershipContentRule element specification exists, the members of the
273 ServiceGroup are constrained. When the ServiceGroup is constrained, the ServiceGroup MUST
274 NOT include a member that does not conform to at least one MembershipContentRule element. If
275 more than one rule applies to a given member all rules that apply MUST be satisfied. Membership
276 conformance to an individual MembershipContentRule is described below in the
277 MembershipContentRule component constraints.

278   The general form of a MembershipContentRule resource property element is:

```
279   <wsrf-sg:MembershipContentRule
280       MemberInterfaces="list of QName"?
281       ContentElements="list of QName"
282   />
```

283   (see Appendix I: MembershipContentRule element definition & Appendix II: ServiceGroup resource
284   property)

285   This resource property element is further constrained as follows:

286   /wsrf-sg:MembershipContentRule

287   The MembershipContentRule constrains the ServiceGroup membership to those members
288   that implement the interfaces described below in /wsrf-
289   sg:membershipContentRule/@MemberInterfaces if present. A MembershipContentRule is
290   further satisfied according to the rules defined below in wsrf-
291   sg:membershipContentRule/@ContentElements.

292   /wsrf-sg:membershipContentRule/@MemberInterfaces

293   This optional attribute, when present, specifies the members to which this
294   MembershipConentRule applies according to the interface (WSDL 1.1 portType) of the
295   member Web service.

296   A MembershipContentRule applies to a member if, for each QName in the value of
297   @MemberInterfaces, there is a corresponding interface (WSDL 1.1 portType) of the
298   member Web service whose name matches that QName. Two QNames are equivalent
299   when they have the same local part and they have prefixes which have been bound to
300   namespace names that are identical [**XML-Names**]. If this attribute is not present, all
301   members MUST satisfy the enclosing MembershipContentRule's @ContentElements
302   constraint.

303   /wsrf-sg:membershipContentRule/@ContentElements

304   This attribute specifies the content restrictions according to the list of QNames, each of
305   which refer to a XML Schema global element declaration. This list defines the constraints
306   on the wsrf-sg:Content resource property of the ServiceGroupEntry that MUST be satisfied
307   for membership. The list MAY be an empty list. When an empty list is specified there are
308   no content constraints on the resource properties of the ServiceGroupEntries that match
309   the enclosing MembershipContentRule.

310   A member satisfies a MembershipContentRule if, for each QName in the value of
311   @ContentElements, there is at least one child element of the wsrf-sg:Content of the
312   ServiceGroupEntry's resource properties document whose name matches that QName.
313   Two QNames are equivalent when they have the same local part and they have prefixes
314   which have been bound to namespace names that are identical [**XML-Names**].

315   Note: It is possible to construct a MembershipContentRule without a MemberInterface and with an
316   empty list for the ContentElements. Such a MembershipContentRule would have no effect on the
317   membership as per the normative semantics described for this component.

5.1.2 Entry Resource Property

319   An Entry resource property is a projection of the aggregation of the resource property documents of
320   the ServiceGroup's entry WS-Resources. An Entry resource property has the following form:

```
321   <wsrf-sg:Entry>
322       <wsrf-sg:ServiceGroupEntryEPR>
323         wsa:EndpointReferenceType
```

```
324        </wsrf-sg:ServiceGroupEntryEPR>
325        <wsrf-sg:MemberServiceEPR>
326          wsa:EndpointReferenceType
327        </wsrf-sg:MemberServiceEPR>?
328        <wsrf-sg:Content>
329          <wsrf-sg:RPDoc>
330            {any}
331          </wsrf-sg:RPDoc> ?
332          {any} *
333        </wsrf-sg:Content> ?
334      </wsrf-sg:Entry>
```

335 (see [Appendix I: Entry type and element definition](#) & [Appendix II: ServiceGroup resource property](#))

336 This resource property element is further constrained as follows

337 /wsrf-sg:Entry

338   The entry provides the logical structure of the constituent members of the ServiceGroup.
339   There is one entry element for each member in the ServiceGroup. In the event of an entry's
340   removal or destruction from a ServiceGroup, the corresponding element in the
341   ServiceGroup's resource property MUST also be removed. The removal of the element
342   from the ServiceGroup's resource property SHOULD occur temporally near the removal or
343   destruction of the entry.

344 /wsrf-sg:Entry/ServiceGroupEntryEPR

345   Endpoint reference as defined in [**WS-Addressing**] to the ServiceGroupEntry WS-
346   Resource with which the entry is associated.

347 /wsrf-sg:Entry/MemberServiceEPR

348   This optional element is the endpoint reference as defined in [**WS-Addressing**] to the
349   member to which the entry refers.

350 /wsrf-sg:Entry/Content

351   The optional Content element contains the resource property values that conform to the
352   wsrf-sg:MembershipContentRule/@ContentElements of the ServiceGroup. In the absence
353   of concurrency controls a requestor MUST NOT assume that this element will be identical
354   to the element that the WS-Resource, referenced by @ServiceGroupEntryEPR, contains in
355   its wsrf-sg:Content resource property. In the case that wsrf-sg:Entry/Content is not
356   identical to the wsrf-sg:Content resource property of the WS-Resource referenced by the
357   @ServiceGroupEntryEPR then the wsrf-sg:Content is assumed to be authoritative. (For
358   further discussion reference "ACID Properties of Operations on WS-Resources" [**WS-
359   ResourceProperties**])

360 /wsrf-sg:Entry/Content/RPDoc

361   This optional element, if present, MUST be conformant to the schema associated with the
362   wsrf-rp:ResourceProperties extensibility attribute from the portType associated with the
363   member service. The contents of this element SHOULD be identical to the contents of the
364   member's ResourcePropertyDocument.

5.2 ServiceGroup: Operations

366 The ServiceGroup interface defines no message exchanges. A ServiceGroup SHOULD implement
367 one of the message exchange sets defined in WS-ResourceLifetime if it needs to support either
368 immediate resource destruction or scheduled resource destruction.

369 6 ServiceGroupEntry

370 The representation of a member Web service within the ServiceGroup is a managed by a WS-
371 Resource. The Web service component of this WS-Resource implements the ServiceGroupEntry
372 interface. The ServiceGroupEntry interface describes the requirements on the Web service
373 through which management of the entry occurs.

374 A member MAY appear in a ServiceGroup multiple times. A separate ServiceGroupEntry WS-
375 Resource represents each appearance of that member in a ServiceGroup. A ServiceGroupEntry
376 WS-Resource MUST belong to exactly one service group.

377 A ServiceGroupEntry interface MAY provide additional management functions for a
378 ServiceGroupEntry WS-Resource. In particular, it MAY provide independent lifetime management
379 functions for individual ServiceGroupEntry WS-Resources (if it implements message exchanges
380 defined in WS-ResourceLifetime). In the case where the ServiceGroupEntry Web service
381 implements one of the message exchange sets defined in WS-ResourceLifetime, a
382 ServiceGroupEntry WS-Resource MAY be removed from a ServiceGroup by managing the lifetime
383 of the ServiceGroupEntry WS-Resource. Additional message exchanges MAY be defined to
384 provide more advanced ServiceGroupEntry capabilities.

385 6.1 ServiceGroupEntry: Resource Property Declarations

386 In addition to the message exchanges described in this specification, a ServiceGroupEntry MUST
387 also support the required message exchanges defined in the WS-ResourceProperties specification
388 and MAY support the optional message exchanges defined in the WS-ResourceProperties
389 specification.

390 6.1.1 ServiceGroupEPR

391 The general form of a ServiceGroupEPR resource property element is:

```
392     <wsrf-sg:ServiceGroupEPR>
393       wsa:EndpointReferenceType
394     </wsrf-sg:ServiceGroupEPR>
```

395 (see Appendix I: ServiceGroupEPR element definition & Appendix II: ServiceGroupEntry resource
396 property)

397 This resource property element is further constrained as follows:

398 /wsrf-sg:ServiceGroupEPR

399   Contains an endpoint reference [**WS-Addressing**] to the ServiceGroup of which this entry
400   represents membership. This endpoint reference MUST refer to the same Web service or
401   WS-Resource throughout the lifetime of the ServiceGroupEntry.

402 6.1.2 MemberEPR

403 The general form of a MemberEPR resource property element is:

```
404     <wsrf-sg:MemberEPR>
405       wsa:EndpointReferenceType
406     </wsrf-sg:MemberEPR>?
```

407 (see Appendix I: MemberEPR element definition & Appendix II: ServiceGroupEntry resource
408 property)

409 This resource property element is further constrained as follows:

410 /wsrf-sg:MemberEPR

411 This optional element contains an endpoint reference [**WS-Addressing**] to the member to
412 which this entry pertains. If present, this endpoint reference MUST refer to the same Web
413 service or WS-Resource throughout the lifetime of the ServiceGroupEntry.

6.1.3 Content

415 The general form of the Content resource property element is:

```
<wsrf-sg:Content>
  <wsrf-sg:RPDoc>
    {any}
  </wsrf-sg:RPDoc> ?
  {any} *
</wsrf-sg:Content>
```

422 (see Appendix I: Content element definition & Appendix II: ServiceGroupEntry resource property)

423 This resource property element is further constrained as follows:

424 /wsrf-sg:Content

425 This XML element contains information pertinent to the group membership represented by
426 the ServiceGroupEntry. The Content elements conform to the XSD element declarations
427 listed (by QName) in the membershipContentRule resource property of the ServiceGroup
428 containing this ServiceGroupEntry.

429 /wsrf-sg:Content/RPDoc

430 This optional element, if present, MUST be conformant to the schema associated with the
431 wsrf-rp:ResourceProperties extensibility attribute from the portType associated with the
432 member service. The contents of this element SHOULD be identical to the contents of the
433 member's ResourcePropertyDocument.

6.2 ServiceGroupEntry: Message Exchanges

435 The ServiceGroupEntry interface defines no operations. The service implementing the
436 ServiceGroupEntry interface SHOULD implement the message exchanges and resource properties
437 from one of the interfaces described in WS-ResourceLifetime if it supports immediate destruction
438 and scheduled destruction of ServiceGroupEntry resources. In addition, the service implementing
439 the ServiceGroupEntry interface SHOULD implement the message exchanges and resource
440 properties for the NotificationProducer interface [**WS-BaseNotification**]. The service implementing
441 the ServiceGroupEntry SHOULD also support resource property value change notification as
442 defined in [**WS-ResourceProperties**]. In particular, it SHOULD include wsrf-sg:Content as a value
443 of its Topics resource property.

7 ServiceGroupRegistration

The ServiceGroupRegistration interface is an extension of the ServiceGroup interface.
ServiceGroupRegistration defines the message exchanges that allow a requestor to add entries to
a ServiceGroup WS-Resource explicitly. Third party controlled aggregations of services are made
possible by the ServiceGroupRegistration extension of ServiceGroup.

7.1 ServiceGroupRegistration: Resource Property Declarations

The ServiceGroupRegistration interface defines no resource properties. The resource properties
defined by the interfaces in WS-ResourceLifetime SHOULD be included in the ResourceProperty
document of a ServiceGroupRegistration. The resource properties defined in the ServiceGroup
interface MUST be included in the resource property document of a ServiceGroupRegistration.

7.2 Add

When a requestor wishes to add a new entry to a ServiceGroup WS-Resource, the requestor must
issue a request message of the following form:

```
<wsrf-sg:Add>
  <wsrf-sg:MemberEPR>
    wsa:EndpointReferenceType
  </wsrf-sg:MemberEPR>
  <wsrf-sg:Content>
    {any}
  </wsrf-sg:Content>
  <wsrf-sg:InitialTerminationTime>
    [xsd:dateTime | xsd:duration]
  </wsrf-sg:InitialTerminationTime>?
</wsrf-sg:Add>
```

The components of the Add message are further described as follows:

/wsrf-sg:Add/MemberEPR

> This component contains the endpoint reference of the member Web service to include in
> the ServiceGroup. It MUST satisfy the semantics as specified by the ServiceGroup
> resource property /wsrf-sg:MemberhipContentRules.

/wsrf-sg:Add/Content

> This component contains information to associate with the MemberEPR in the
> ServiceGroup. This component represents input for the ServiceGroupEntry content
> element. This input MAY be augmented or modified with other information that the
> ServiceGroup may derive. This allows the ServiceGroup to tailor or modify the content.

/wsrf-sg:Add/InitialTerminationTime

> An optional element, indicating the requestor's suggestion for the initial setting of the
> termination time resource property [**WS-ResourceLifetime**] of the ServiceGroupEntry WS-
> Resource.

> There are two forms of this element, absolute time and duration. If the type of this element
> is xsd:dateTime, the value of the element is to be interpreted as an "absolute time". If the
> type of this element is xsd:duration, the value of the element is to be interpreted as a
> "relative time" or "duration". Regardless of the form, time is relative to the time source used
> by the ServiceGroup.

487	The duration form is used to "compute" the "absolute time" form in the following fashion.
488	The value of this element in "absolute time" form is computed by adding the xsd:duration
489	value to the current time value of the ServiceGroup.

490	The "absolute time" form (whether computed from a duration, or contained within the
491	request message) is used to initialize the value of the TerminationTime resource property
492	of the ServiceGroupEntry resource.

493	If the ServiceGroup is unable or unwilling to set the TerminationTime resource property of
494	the ServiceGroupEntry resource to the given value of the "absolute time" form or a value
495	greater, then the Add request MUST fault. If the value is not "in the future" relative to the
496	current time as known by the ServiceGroup, the Add request MUST fault. The use of the
497	xsi:nil attribute with value "true" indicates there is no scheduled termination time requested
498	for the ServiceGroupEntry. If the element does not include the time zone designation, the
499	value of the element MUST be interpreted as universal time (UTC) time.

| 500 | If this element is not included, the initial value of the TerminationTime resource property is |
| 501 | dependent on the implementation of the ServiceGroup. |

502	If a ServiceGroupRegistration accepts the Add request it MUST update the
503	TerminationTime resource property of the resulting ServiceGroupEntry WS-Resource to the
504	value specified in the message or to a value "in the future" relative to the requested time.

| 505 | The wsa:Action MUST contain the URI http://docs.oasis-open.org/wsrf/sgw- |
| 506 | 2/ServiceGroupRegistration/AddRequest. |

| 507 | If the ServiceGroupRegistration accepts the request to add a member, it MUST respond with an |
| 508 | AddResponse message of the following form: |

```
509    <wsrf-sg:AddResponse>
510      <wsrf-sg:ServiceGroupEntryReference>
511        wsa:EndpointReferenceType
512      </wsrf-sg:ServiceGroupEntryReference>
513      <wsrf-sg:TerminationTime xsi:nil="xsd:boolean"?>
514        xsd:dateTime
515      </wsrf-sg:TerminationTime>
516      <wsrf-sg:CurrentTime>
517        xsd:dateTime
518      </wsrf-sg:CurrentTime>
519    </wsrf-sg:AddResponse>
```

| 520 | Further constraints on the AddResponse message are as follows: |

| 521 | /wsrf-sg:AddResponse/wsrf-sg:ServiceGroupEntryReference |

522	An EndpointReference as described in [**WS-Addressing**]. This endpoint reference refers
523	to the ServiceGroupEntry WS-Resource created by the ServiceGroup to represent the
524	association of the member within the ServiceGroup. The Web service associated with the
525	ServiceGroupEntry returned by the AddResponse MUST implement the message
526	exchanges and resource properties specified by the ScheduledResourceTermination
527	interface and the ImmediateResourceTermination interface [**WS-ResourceLifetime**].

| 528 | /wsrf-sg:AddResponse/wsrf-sg:TerminationTime |

| 529 | This value MAY be "in the future" relative to the xsd:dateTime requested by the service |
| 530 | requestor in the wsrf-sg:AddRequest/wsrf-sg:InitialTerminationTime. |

531   This value reflects the new date and time at which the ServiceGroupEntry WS-Resource is
532   scheduled to be destroyed. If the value is xsi:nil, it implies that the resource will not be
533   destroyed for an indefinite period of time.

534   This value MUST also be reflected through the value of the TerminationTime resource
535   property.

536   /wsrf-sg:AddResponse/wsrf-sg:CurrentTime

537   This value MUST be the time, as it is known by the ServiceGroup, at which the WS-
538   Resource processed this AddRequest message.

539

540   The wsa:Action MUST contain the URI http://docs.oasis-open.org/wsrf/sgw-
541   2/ServiceGroupRegistration/AddResponse.

542

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

547   ContentCreationFailedFault:

548   The operation was unable to create a valid Content element (as defined by the
549   membershipContentRule resource property) from the provided Content and MemberEPR
550   components of the Add request message.

551   UnsupportedMemberInterfaceFault:

552   The member service referred to by the MemberEPR argument is not conformant with the
553   MembershipContentRule.

554   AddRefusedFault:

555   The ServiceGroupRegistration refused to create a new entry for the member service based
556   the semantics of the ServiceGroupRegistration (or subtype).

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

559

560   7.2.1 Example SOAP Encoding of the Add Message Exchange

561   The following is a non-normative example of an Add request message using SOAP 1.1 [**SOAP 1.1**].

```
562      <s11:Envelope xmlns…>
563        <s11:Header>
564          <wsa:Action>
565            http://docs.oasis-open.org/wsrf/sgw-
566      2/ServiceGroupRegistration/AddRequest
567          </wsa:Action>
568        </s11:Header>
569        <s11:Body>
570          <wsrf-sg:Add>
571            <wsrf-sg:MemberEPR>
572              <wsa:Address>
573                  http://www.producer.org/ProducerEndpoint
574              </wsa:Address>
575              <wsa:ReferenceParameters>
```

```
576            <npex:ResourceDisambiguator>
577                uuid:84decd55-7d3f-65ad-ac44-675d9fce5d22
578            </npex:ResourceDisambiguator>
579          </wsa:ReferenceParamenters>
580        </wsrf-sg:MemberEPR>
581        <wsrf-sg:Content>
582          <wsn:TopicExpression>
583            wsrf-rp:ResourcePropertyValueChangeNotification
584          </wsn:TopicExperssion>
585        </wsrf-sg:Content>
586        <wsrf-sg:InitialTerminationTime>
587            2003-12-25T00:00:00.00000Z
588        </wsrf-sg:InitialTerminationTime>
589      </wsrf-sg:Add>
590    </s11:Body>
591  </s11:Envelope>
```

The following is a non-normative example of an Add response message using SOAP 1.1 [**SOAP 1.1**]:

```
594  <s11:Envelope xmlns… >
595    <s11:Header>
596      <wsa:Action>
597          http://docs.oasis-open.org/wsrf/sgw-
598  2/ServiceGroupRegistration/AddResponse
599      </wsa:Action>
600    </s11:Header>
601    <s11:Body>
602      <wsrf-sg:AddResponse>
603        <wsrf-sg:ServiceGroupEntryReference>
604          <wsa:Address>
605              http://www.producer.org/ServiceGroupEndpoint
606          </wsa:Address>
607          <wsa:ReferenceParameters>
608            <npex:ResourceDisambiguator>
609                uuid:95fefeb3-f37d-5dfe-44fe-675d9fce12df
610            </npex:ResourceDisambiguator>
611          </wsa:ReferenceParameters>
612        </wsrf-sg:ServiceGroupEntryReference>
613        <wsrf-sg:TerminationTime>
614            2003-12-31T12:00:00Z
615        </wsrf-sg:TerminationTime>
616        <wsrf-sg:CurrentTime>
617            2003-12-20T11:00:00Z
618        </wsrf-sg:CurrentTime>
619      </wsrf-sg:AddResponse>
620    </s11:Body>
621  </s11:Envelope>
```

8 Notification of ServiceGroup Modification

If the Web service component of the ServiceGroup WS-Resource also implements the NotificationProducer interface defined by the WS-BaseNotification specification [**WS-BaseNotification**], then it MUST provide a topic [**WS-Topics**] to allow requestors to subscribe for notification of the modification of the ServiceGroup. The form of the TopicNamespace [**WS-Topics**] is:

```
<wstop:TopicNamespace name="ServiceGroupTopicNamespace"
   targetNamespace="http://docs.oasis-open.org/wsrf/sg-2"
   xmlns:wsrf-rp="http://docs.oasis-open.org/wsrf/rp-2"
   xmlns:wstop="http://docs.oasis-open.org/wsn/t-1" >
   <wstop:Topic name="ServiceGroupModification" >
      <wstop:MessagePattern>
         <wsrf-rp:QueryExpression
           dialect="http://www.w3.org/TR/1999/REC-xpath-19991116"
>
            boolean((/*/*EntryAdditionNotification
              \[namespace-uri()='http://docs.oasis-
open.org/wsrf/sg-2']) |
              (/*/*EntryRemovalNotification
              \[namespace-uri()='http://docs.oasis-
open.org/wsrf/sg-2']))
           boolean(/*/EntryAdditionNotification |
                   /*/ EntryRemovalNotification)
         </wsrf-rp:QueryExpression>
      </wstop:MessagePattern>
   </wstop:Topic>
</wstop: TopicNamespace>
```

This TopicNamespace defines the TopicNamespace associated with the WS-ServiceGroup XML namespace (http://docs.oasis-open.org/wsrf/sg-2). The TopicNamespace is further constrained as follows:

/wstop: TopicNamespace/@name

> The name of the TopicNamespace associated with the WS-ServiceGroup XML namespace MUST be "ServiceGroupTopicNamespace".

/wstop:Topic

> This topic is associated with notification messages when a ServiceGroupEntries are added or removed from a ServiceGroup. A Web service that supports the message exchanges associated with the NotificationProducer role as specified in WS-BaseNotification and that wishes to support subscriptions and notifications related to ServiceGroup modifications SHOULD include this topic in its list of supported topics. When a ServiceGroup detects that the contents of the group have been modified, it SHOULD create a notification message artifact recording the situation and, if the message artifact is generated, it MUST associate this notification message with this topic. Note: there are many circumstances in which a modification of a ServiceGroup does not result in the generation of a notification message.

/wstop:Topic/@name

667	The name of the Topic representing ServiceGroup modifications MUST be named
668	"ServiceGroupModification". The namespace property of this topic MUST be the WS-
669	ServiceGroup XML namespace (http://docs.oasis-open.org/wsrf/sg-1).

670 /wstop:Topic/wstop:MessagePattern

671	This topic is associated with messages that MUST contain an wsrf-
672	sg:EntryAdditionNotification element or an wsrf-sg:EntryRemovalNotification element.
673	These elements and their corresponding complexTypes are described later in this section.

674 8.1 EntryAdditionNotification Message

| 675 | The wsrf-sg:EntryAdditionNotification element is a form of notification message associated with the |
| 676 | wsrf-sg:ServiceGroupModification topic. This element is defined as follows: |

```
677     <wsrf-sg:EntryAdditionNotification>
678        <wsrf-sg:ServiceGroupEntryEPR>
679          wsa:EndpointReferenceType
680        </wsrf-sg:ServiceGroupEntryEPR>
681        <wsrf-sg:MemberServiceEPR>?
682          wsa:EndpointReference
683        </wsrf-sg:MemberServiceEPR>
684        <wsrf-sg:Content>
685          <wsrf-sg:RPDoc>
686            {any} *
687          </wsrf-sg:RPDoc> ?
688          {any} *
689        </wsrf-sg:Content> ?
690     </wsrf-sg:EntryAddtionNotification>
```

691 The form of the EntryAdditionNotification is further constrained as follows:

692 /wsrf-sg:EntryAdditionNotification

693	One EntryAdditionNotification element is created for each ServiceGroupEntry addition
694	situation detected by the service associated with ServiceGroup resource. This artifact
695	records the addition of an entry to the ServiceGroup.

696 /wsrf-sg:EntryAdditionNotification/ServiceGroupEntryEPR

| 697 | This element MUST contain the EndpointReference of the ServiceGroupEntry that was |
| 698 | added to the ServiceGroup. |

699 /wsrf-sg:EntryAdditionNotification/MemberServiceEPR

700	This optional element, if present, MUST contain the EndpointReference of the member
701	service that the WS-Resource referenced by @ServiceGroupEntryEPR contains in its
702	MemberEPR resource property.

703 /wsrf-sg:EntryAdditionNotification/Content

| 704 | If this optional element is present, it MUST contain a copy of the Contents resource |
| 705 | property element of the ServiceGroupEntry referenced by @ServiceGroupEntryEPR. |

706 8.2 EntryRemovalNotification Message

| 707 | The wsrf-sg:EntryRemovalNotification element is a form of notification message associated with the |
| 708 | wsrf-sg:ServiceGroupModification topic. This element is defined as follows: |

```
709     <wsrf-sg:EntryRemovalNotification>
710        <wsrf-sg:ServiceGroupEntryEPR>
```

```
711        wsa:EndpointReferenceType
712      </wsrf-sg:ServiceGroupEntryEPR>
713      <wsrf-sg:MemberServiceEPR>
714        wsa:EndpointReferenceType
715      </wsrf-sg:MemberServiceEPR>?
716      <wsrf-sg:Content>
717        <wsrf-sg:RPDoc>
718          {any} *
719        </wsrf-sg:RPDoc> ?
720        {any} *
721      </wsrf-sg:Content> ?
722      <wsrf-sg:Reason>xsd:string</wsrf-sg:Reason> ?
723    </wsrf-sg:EntryRemovalNotification>
```

724   The form of the EntryRemovalNotification is further constrained as follows:

725   /wsrf-sg:EntryRemovalNotification

726   One EntryRemovalNotification element is created for each ServiceGroupEntry removal
727   situation detected by the service associated with ServiceGroup resource. This artifact
728   records the removal of an entry to the ServiceGroup.

729   /wsrf-sg:EntryRemovalNotification/ServiceGroupEntryEPR

730   This element MUST contain the EndpointReference of the ServiceGroupEntry that was
731   removed to the ServiceGroup. Note: The EndpointReference for the ServiceGroupEntry will
732   not be a valid reference since the removal mechanism from a ServiceGroup is removal of
733   the ServiceGroupEntry.

734   /wsrf-sg:EntryRemovalNotification/MemberServiceEPR

735   This optional element, if present, MUST contain the EndpointReference of the member
736   service that the WS-Resource referenced by @ServiceGroupEntryEPR contains in its
737   MemberEPR resource property.

738   /wsrf-sg:EntryRemovalNotification/Content

739   If this optional element is present, it MUST contain a copy, from some point prior to the
740   removal, of the Contents resource property element of the ServiceGroupEntry referenced
741   by @ServiceGroupEntryEPR.

742   /wsrf-sg:EntryRemovalNotification/Reason

743   If this optional element is present it will contain human readable text regarding the reason
744   for the removal for the ServiceGroup.

9 Security Model

In the context of this specification, there are two categories of security aspects that need to be considered: (a) securing the message exchanges and (b) securing the resource properties.

9.1 Securing the message exchanges

When messages exchanges occur between a requestor and a Web service in order to access or act on one or more resource properties, it is RECOMMENDED that the communication between services be secured using the mechanisms described in WS-Security.

9.2 Securing the resource properties

Given WS-ServiceGroup defines a mechanism to expose properties about its member WS-Resources through its "Content" resource property on ServiceGroupEntry, security considerations specified in WS-ResourceProperties are applicable to ServiceGroupEntry. Therefore, security policies should be established that ensure that only authorized requestors can access the value of a resource property of a member WS-Resource. It should also be noted that the authorization policies on the properties of a WS-Resource accessible through a ServiceGroup should be consistent with the authorization policies that are applicable when those properties are accessed directly form the resource itself. Similarly, the security policies about message exchanges (e.g., requiring the resource property value to be encrypted when sent in a response) should be equivalent in order to provide the same protection irrespective of the access point.

9.2.1 A Note on MembershipContentRules

The MembershipContentRules resource property along with Entry resource property provide a mechanism to allow for requestors to query about the members of a service group based on their interface or a resource property that is contained in member Ws-Resource's resource properties document, as well as the value of a resource property itself. There may need to be privacy considerations with respect to exposing those values. Therefore, authorization policies as well as message protection policies should be consistent between these values retrieved through ServiceGroup, and those values retrieved through the WS-Resource itself. It is not a good practice to form membership rules based on properties whose values are to remain confidential.

Appendix A. Acknowledgments

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10 References

10.1 Normative

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[WS-BaseFaults]
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[WS-BaseNotification]
http://docs.oasis-open.org/wsn/wsn-ws_base_notification-1.3-spec-pr-02.pdf

[WS-Resource]
http://docs.oasis-open.org/wsrf/wsrf-ws_resource-1.2-spec-cs-01.pdf

[WS-ResourceLifetime]
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[XML-Infoset]
http://www.w3.org/TR/xml-infoset/

[XML-Names]
http://www.w3.org/TR/REC-xml-names/

[XPATH]
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10.2 Non-Normative

[OGSI 1.0]
Open Grid Services Infrastructure (OGSI) V1.0
http://forge.gridforum.org/projects/ggf-editor/document/draft-ogsi-service-1/en/1

[SOAP 1.1]
http://www.w3.org/TR/2000/NOTE-SOAP-20000508

[WS-Basic Profile 1.1]
http://www.ws-i.org/Profiles/BasicProfile-1.1.html

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

[WSDL 2.0]
http://www.w3.org/TR/wsdl20

Appendix B. XML Schema

843

844 The XML types and elements used in this specification are included here for convenience. The
845 authoritative version of this schema document is available at
846 http://docs.oasis-open.org/wsrf/sg-2.xsd,
847 The XML types and elements used in this specification are defined in the following XML Schema

```
848    <?xml version="1.0" encoding="UTF-8"?>
849    <!--
850
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```
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 894       WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
 895
 896       -->
 897       <xsd:schema
 898         xmlns="http://www.w3.org/2001/XMLSchema"
 899         xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 900         xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 901         xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-2"
 902         xmlns:wsrf-sg="http://docs.oasis-open.org/wsrf/sg-2"
 903         xmlns:wsa="http://www.w3.org/2005/08/addressing"
 904         elementFormDefault="qualified"
 905         attributeFormDefault="unqualified"
 906         targetNamespace="http://docs.oasis-open.org/wsrf/sg-2" >
 907       <!-- ======================= Imports ===========================
 908       -->
 909
 910           <xsd:import
 911             namespace="http://www.w3.org/2005/08/addressing"
 912             schemaLocation="http://www.w3.org/2005/08/addressing/ws-
 913       addr.xsd"/>
 914           <xsd:import
 915             namespace="http://docs.oasis-open.org/wsrf/bf-2"
 916             schemaLocation="http://docs.oasis-open.org/wsrf/bf-2.xsd"
 917       />
 918
 919       <!-- =============== Resource Property Related
 920       =================== -->
 921       <!-- =========== Resource Properties for ServiceGroup
 922       ============ -->
 923         <xsd:simpleType name="AbsoluteOrRelativeTimeType">
 924           <xsd:union memberTypes="xsd:dateTime xsd:duration"/>
 925         </xsd:simpleType>
 926
 927         <xsd:simpleType name="ContentElementsType">
 928           <xsd:list itemType="xsd:QName"/>
 929         </xsd:simpleType>
 930
 931         <xsd:simpleType name="MemberInterfacesType">
 932           <xsd:list itemType="xsd:QName"/>
 933         </xsd:simpleType>
 934
 935         <xsd:element name="MembershipContentRule">
 936           <xsd:complexType>
 937             <xsd:attribute name="MemberInterfaces"
```

```
938                             type="wsrf-sg:MemberInterfacesType"/>
939            <xsd:attribute name="ContentElements"
940                           type="wsrf-sg:ContentElementsType"
941                           use="required"/>
942            <xsd:anyAttribute namespace="##other"
943                           processContents="lax"/>
944        </xsd:complexType>
945      </xsd:element>
946
947      <xsd:complexType name="RPDocType">
948        <xsd:sequence>
949          <xsd:any namespace="##any" processContents="lax"
950                 minOccurs="1" maxOccurs="1" />
951        </xsd:sequence>
952        <xsd:anyAttribute namespace="##other"
953                          processContents="lax"/>
954      </xsd:complexType>
955
956      <xsd:complexType name="ContentType">
957        <xsd:sequence>
958          <xsd:element name="RPDoc"
959                       type="wsrf-sg:RPDocType"
960                       minOccurs="0" maxOccurs="1" />
961          <xsd:any namespace="##other" processContents="lax"
962                 minOccurs="0" maxOccurs="unbounded" />
963        </xsd:sequence>
964        <xsd:anyAttribute namespace="##other"
965                          processContents="lax"/>
966      </xsd:complexType>
967
968      <xsd:complexType name="EntryType">
969        <xsd:sequence>
970          <xsd:element name="ServiceGroupEntryEPR"
971                       type="wsa:EndpointReferenceType"
972                       minOccurs="1" maxOccurs="1"
973                       nillable="true"/>
974          <xsd:element name="MemberServiceEPR"
975                       type="wsa:EndpointReferenceType"
976                       minOccurs="0" maxOccurs="1"/>
977          <xsd:element ref="wsrf-sg:Content"
978                       minOccurs="0" maxOccurs="1"/>
979        </xsd:sequence>
980        <xsd:anyAttribute namespace="##other" processContents="lax"/>
981      </xsd:complexType>
982
983  <!-- ========= Resource Properties for ServiceGroupEntry
984  ========= -->
985
986      <xsd:element name="Entry"
```

```
987                         type="wsrf-sg:EntryType"/>
988
989       <xsd:element name="Content"
990                         type="wsrf-sg:ContentType"/>
991
992       <xsd:element name="MemberEPR"
993                         type="wsa:EndpointReferenceType"/>
994
995       <xsd:element name="ServiceGroupEPR"
996                         type="wsa:EndpointReferenceType"/>
997
998    <!-- ============== Resource Property Related
999    =================== -->
1000   <!-- =========== Resource Properties for ServiceGroup
1001   ============ -->
1002           <xsd:element name="ServiceGroupRP">
1003             <xsd:complexType>
1004               <xsd:sequence>
1005                 <xsd:element ref="wsrf-sg:MembershipContentRule"
1006                             minOccurs="0" maxOccurs="unbounded"/>
1007                 <xsd:element ref="wsrf-sg:Entry"
1008                             minOccurs="0" maxOccurs="unbounded"/>
1009               </xsd:sequence>
1010             </xsd:complexType>
1011           </xsd:element>
1012
1013   <!-- ========= Resource Properties for ServiceGroupEntry
1014   ========= -->
1015           <xsd:element name="ServiceGroupEntryRP">
1016             <xsd:complexType>
1017               <xsd:sequence>
1018                 <xsd:element ref="wsrf-sg:ServiceGroupEPR"
1019                             minOccurs="1" maxOccurs="1"/>
1020                 <xsd:element ref="wsrf-sg:MemberEPR"
1021                             minOccurs="0" maxOccurs="1"/>
1022                 <xsd:element ref="wsrf-sg:Content"
1023                             minOccurs="0" maxOccurs="1"/>
1024               </xsd:sequence>
1025             </xsd:complexType>
1026           </xsd:element>
1027
1028   <!-- ================ Message Specific Types
1029   =================== -->
1030   <!-- ======= Message Types for ServiceGroupRegistration
1031   ========= -->
1032           <xsd:element name="Add">
1033             <xsd:complexType>
1034               <xsd:sequence>
1035                 <xsd:element name="MemberEPR"
```

```
1036                                      type="wsa:EndpointReferenceType" />
1037                  <xsd:element ref="wsrf-sg:Content" />
1038                  <xsd:element name="InitialTerminationTime"
1039                               type="wsrf-
1040    sg:AbsoluteOrRelativeTimeType"
1041                                       nillable="true"
1042                               minOccurs="0" maxOccurs="1" />
1043              </xsd:sequence>
1044            </xsd:complexType>
1045          </xsd:element>
1046
1047          <xsd:element name="AddResponse">
1048            <xsd:complexType>
1049              <xsd:sequence>
1050                <xsd:element name="ServiceGroupEntryReference"
1051                        type="wsa:EndpointReferenceType"
1052                        minOccurs="1" maxOccurs="1" />
1053                <xsd:element name="TerminationTime"
1054                        nillable="true"
1055                        type="xsd:dateTime"
1056                        minOccurs="1" maxOccurs="1" />
1057                <xsd:element name="CurrentTime"
1058                        type="xsd:dateTime"
1059                        minOccurs="1" maxOccurs="1" />
1060              </xsd:sequence>
1061            </xsd:complexType>
1062          </xsd:element>
1063
1064          <xsd:complexType name="ContentCreationFailedFaultType">
1065            <xsd:complexContent>
1066              <xsd:extension base="wsrf-bf:BaseFaultType"/>
1067            </xsd:complexContent>
1068          </xsd:complexType>
1069          <xsd:element name="ContentCreationFailedFault"
1070                        type="wsrf-
1071    sg:ContentCreationFailedFaultType"/>
1072
1073          <xsd:complexType
1074    name="UnsupportedMemberInterfaceFaultType">
1075            <xsd:complexContent>
1076               <xsd:extension base="wsrf-bf:BaseFaultType"/>
1077            </xsd:complexContent>
1078          </xsd:complexType>
1079          <xsd:element name="UnsupportedMemberInterfaceFault"
1080                        type="wsrf-
1081    sg:UnsupportedMemberInterfaceFaultType"/>
1082
1083          <xsd:complexType name="AddRefusedFaultType">
1084            <xsd:complexContent>
```

```
1085              <xsd:extension base="wsrf-bf:BaseFaultType"/>
1086           </xsd:complexContent>
1087         </xsd:complexType>
1088         <xsd:element name="AddRefusedFault"
1089                      type="wsrf-sg:AddRefusedFaultType"/>
1090
1091   <!-- = Messages Related to ServiceGroup Change Notification
1092   ======= -->
1093      <xsd:complexType
1094   name="ServiceGroupModificationNotificationType">
1095         <xsd:sequence>
1096           <xsd:element name="ServiceGroupEntryEPR"
1097                        type="wsa:EndpointReferenceType"
1098                        minOccurs="1" maxOccurs="1"
1099                        nillable="true"/>
1100           <xsd:element name="MemberServiceEPR"
1101                        type="wsa:EndpointReferenceType"
1102                        minOccurs="0" maxOccurs="1"/>
1103           <xsd:element ref="wsrf-sg:Content"
1104                        minOccurs="0" maxOccurs="1"/>
1105         </xsd:sequence>
1106      </xsd:complexType>
1107
1108      <xsd:complexType name="ServiceGroupRemovalNotificationType">
1109         <xsd:complexContent>
1110           <xsd:extension
1111               base="wsrf-
1112   sg:ServiceGroupModificationNotificationType">
1113             <xsd:sequence>
1114               <xsd:element name="Reason"
1115                            type="xsd:string"
1116                            minOccurs="0" maxOccurs="1"/>
1117             </xsd:sequence>
1118           </xsd:extension>
1119         </xsd:complexContent>
1120      </xsd:complexType>
1121
1122      <xsd:element name="EntryAdditionNotification"
1123                   type="wsrf-
1124   sg:ServiceGroupModificationNotificationType" />
1125
1126      <xsd:element name="EntryRemovalNotification"
1127                   type="wsrf-sg:ServiceGroupRemovalNotificationType"
1128   />
1129
1130   </xsd:schema>
```

1131 **Appendix C. WSDL 1.1**

1132 The WSDL 1.1 for the Web service methods described in this specification is compliant with WS-I
1133 Basic Profile 1.1 [WS-I Basic Profile 1.1] and is included here for convenience. The authoritative
1134 version of this WSDL is available at http://docs.oasis-open.org/wsrf/sgw-2.wsdl,

1135 The following illustrates the WSDL 1.1 for the Web service methods described in this specification:

```
1136    <?xml version="1.0" encoding="utf-8"?>
1137    <!--
1138
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1182      WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
1183
1184      -->
1185
1186      <wsdl:definitions name="ServiceGroup"
1187        xmlns="http://schemas.xmlsoap.org/wsdl/"
1188        xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
1189        xmlns:xsd="http://www.w3.org/2001/XMLSchema"
1190        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
1191        xmlns:wsa="http://www.w3.org/2005/08/addressing"
1192        xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-2"
1193        xmlns:wsrf-rp="http://docs.oasis-open.org/wsrf/rp-2"
1194        xmlns:wsrf-rpw="http://docs.oasis-open.org/wsrf/rpw-2"
1195        xmlns:wsrf-rw="http://docs.oasis-open.org/wsrf/rw-2"
1196        xmlns:wsrf-sg="http://docs.oasis-open.org/wsrf/sg-2"
1197        xmlns:wsrf-sgw="http://docs.oasis-open.org/wsrf/sgw-2"
1198        targetNamespace="http://docs.oasis-open.org/wsrf/sgw-2">
1199
1200      <!-- ========================= Imports
1201      ========================= -->
1202         <wsdl:import namespace="http://docs.oasis-open.org/wsrf/rpw-2"
1203           location="http://docs.oasis-open.org/wsrf/rpw-2.wsdl" />
1204
1205         <wsdl:import namespace="http://docs.oasis-open.org/wsrf/rw-2"
1206           location="http://docs.oasis-open.org/wsrf/rw-2.wsdl" />
1207
1208      <!-- ==================== Types Definitions
1209      ===================== -->
1210         <wsdl:types>
1211           <xsd:schema>
1212            <xsd:import namespace="http://docs.oasis-open.org/wsrf/sg-
1213      2"
1214                 schemaLocation="http://docs.oasis-open.org/wsrf/sg-
1215      2.xsd" />
1216
1217            <xsd:import namespace="http://docs.oasis-open.org/wsrf/rp-
1218      2"
1219                 schemaLocation="http://docs.oasis-open.org/wsrf/rp-
1220      2.xsd" />
1221
1222            <xsd:import namespace="http://docs.oasis-open.org/wsrf/bf-
1223      2"
1224                 schemaLocation="http://docs.oasis-open.org/wsrf/bf-
1225      2.xsd" />
```

```
1226          </xsd:schema>
1227        </wsdl:types>
1228
1229    <!-- =================== Message Definitions
1230    ===================== -->
1231    <!-- =============== ServiceGroupRegistration::Add
1232    ================
1233        Add(MemberEPR, Content, [InitialTerminationTime])
1234        returns: EPR to ServiceGroupEntry
1235    -->
1236        <wsdl:message name="AddRequest">
1237          <wsdl:part name="AddRequest" element="wsrf-sg:Add"/>
1238        </wsdl:message>
1239
1240        <wsdl:message name="AddResponse">
1241          <wsdl:part name="AddResponse" element="wsrf-sg:AddResponse"/>
1242        </wsdl:message>
1243
1244        <wsdl:message name="ContentCreationFailedFault">
1245          <wsdl:part name="ContentCreationFailedFault"
1246                  element="wsrf-sg:ContentCreationFailedFault" />
1247        </wsdl:message>
1248
1249        <wsdl:message name="UnsupportedMemberInterfaceFault">
1250          <wsdl:part name="UnsupportedMemberInterfaceFault"
1251                  element="wsrf-sg:UnsupportedMemberInterfaceFault"
1252    />
1253        </wsdl:message>
1254
1255        <wsdl:message name="AddRefusedFault">
1256          <wsdl:part name="AddRefusedFault"
1257                  element="wsrf-sg:AddRefusedFault" />
1258        </wsdl:message>
1259
1260    <!-- =================== PortType Definitions
1261    ===================== -->
1262        <wsdl:portType name="ServiceGroup"
1263                  wsrf-rp:ResourceProperties="wsrf-sg:ServiceGroupRP">
1264          <wsdl:operation name="GetResourceProperty">
1265            <wsdl:input name="GetResourcePropertyRequest"
1266                  message="wsrf-rpw:GetResourcePropertyRequest" />
1267            <wsdl:output name="GetResourcePropertyResponse"
1268                  message="wsrf-rpw:GetResourcePropertyResponse" />
1269            <wsdl:fault name="InvalidResourcePropertyQNameFault"
1270                  message="wsrf-rpw:InvalidResourcePropertyQNameFault"
1271    />
1272            <wsdl:fault name="ResourceUnknownFault"
1273                  message="wsrf-rw:ResourceUnknownFault" />
1274          <wsdl:fault name="ResourceUnavailableFault"
```

```
1275                        message="wsrf-rw:ResourceUnavailableFault" />
1276        </wsdl:operation>
1277      </wsdl:portType>
1278
1279      <wsdl:portType name="ServiceGroupEntry"
1280                     wsrf-rp:ResourceProperties="wsrf-
1281    sg:ServiceGroupEntryRP">
1282        <wsdl:operation name="GetResourceProperty">
1283          <wsdl:input name="GetResourcePropertyRequest"
1284                      message="wsrf-rpw:GetResourcePropertyRequest" />
1285          <wsdl:output name="GetResourcePropertyResponse"
1286                       message="wsrf-rpw:GetResourcePropertyResponse"
1287    />
1288          <wsdl:fault name="InvalidResourcePropertyQNameFault"
1289                      message="wsrf-
1290    rpw:InvalidResourcePropertyQNameFault" />
1291          <wsdl:fault name="ResourceUnknownFault"
1292                 message="wsrf-rw:ResourceUnknownFault" />
1293         <wsdl:fault name="ResourceUnavailableFault"
1294                  message="wsrf-rw:ResourceUnavailableFault" />
1295        </wsdl:operation>
1296      </wsdl:portType>
1297
1298      <wsdl:portType name="ServiceGroupRegistration"
1299                     wsrf-rp:ResourceProperties="wsrf-
1300    sg:ServiceGroupRP">
1301        <wsdl:operation name="GetResourceProperty">
1302          <wsdl:input name="GetResourcePropertyRequest"
1303                      message="wsrf-rpw:GetResourcePropertyRequest" />
1304          <wsdl:output name="GetResourcePropertyResponse"
1305                       message="wsrf-rpw:GetResourcePropertyResponse"
1306    />
1307          <wsdl:fault name="InvalidResourcePropertyQNameFault"
1308                      message="wsrf-
1309    rpw:InvalidResourcePropertyQNameFault" />
1310          <wsdl:fault name="ResourceUnknownFault"
1311                 message="wsrf-rw:ResourceUnknownFault" />
1312         <wsdl:fault name="ResourceUnavailableFault"
1313                  message="wsrf-rw:ResourceUnavailableFault" />
1314        </wsdl:operation>
1315        <wsdl:operation name="Add">
1316          <wsdl:input name="AddRequest"
1317                      message="wsrf-sgw:AddRequest" />
1318          <wsdl:output name="AddResponse"
1319                       message="wsrf-sgw:AddResponse" />
1320          <wsdl:fault name="ContentCreationFailedFault"
1321                       message="wsrf-sgw:ContentCreationFailedFault"/>
1322          <wsdl:fault name="UnsupportedMemberInterfaceFault"
1323                       message="wsrf-
```

```
1324    sgw:UnsupportedMemberInterfaceFault"/>
1325         <wsdl:fault name="AddRefusedFault"
1326                     message="wsrf-sgw:AddRefusedFault"/>
1327         <wsdl:fault name="ResourceUnknownFault"
1328              message="wsrf-rw:ResourceUnknownFault" />
1329      <wsdl:fault name="ResourceUnavailableFault"
1330                 message="wsrf-rw:ResourceUnavailableFault" />
1331      </wsdl:operation>
1332    </wsdl:portType>
1333
1334    </wsdl:definitions>
```

Appendix D. Revision History

Rev	Date	By Whom	What
wd-01	2004-06-05	Tom Maguire	Initial version created from submission by contributing companies. Minor modifications made to reflect OASIS formatting.
wd-02	2004-06-07	Tom Maguire	Updated to include elementFormDefault and attributeFormDefault. Changed URI from 2004/05 to 2004/06. Updated acknowledgements section.
wd-02	2004-06-11	Ian Robinson	Consistency edit for status, acknowledgements and references sections.
wd-03	2004-11-10	Tom Maguire	Issue resolutions from October F2F: o WSRF30, WSRF43, WSRF49, WSRF53, WSRF56 o Replaced refs to [State Paper] o Update to use "WS-Resource Access Pattern" o Changed doc identifier to "Summary Info Title" o Added missing wsdl:import for WS-Addressing in wsdl o Fixed selector for "UniqueInterfaces" in wsdl (WSRF60 & WSRF70) o Fixed namespace prefix errors in wsdl o Fixed namespace prefix errors in SOAP examples o Updated UML diagram o Removed erroneous wsa:to in AddResponse example
wd-04	2005-02-18	Tom Maguire	Corrected concrete message element namespaces. Updated OASIS copyright to 2005. Issue resolutions from February F2F: o Updated namespace declarations to latest 2005/03 o WSRF62 Basic profile 1.1 statement

Rev	Date	By Whom	What
			o WSRF96 Statement specifying the authoritative versions of wsdl and xsd o WSRF63 add attribute extensibility o WSRF86 add ResourceUnknown fault to all operations o WSRF81 remove xsd:include in favor of xsd:import. Move all schema definitions to xsd.
wd-05	2005-05-16	Tom Maguire	Updated namespaces to CD levels Issue resolutions o WSRF-44 change MembershipContentRule MemberInterface to be a list of QName. Changed name to MemberInterfaces and updated normative infoset. o WSRF58 remove unnecessary imports to resource lifetime o WSRF59 inconsistencies o WSRF69 Content element of ServiceGroupEntry needs to be minOccurs=0 o WSRF87 InitialTerminationTime on Add request strengthed. o WSRF91 updates for Last call of WS-Addressing o WSRF92 update examples for Last call of WS-Addressing o WSRF99 use SOAP 1.1 instead of SOAP 1.2 o WSRF101 remove non-normative specifications without SDO standing o WSRF104 Content rule applies in two ways. Delete line 453 o WSRF103 wsa:action updates
wd-05a	2005-05-17	Tom Maguire	Updates for Example SOAP headers Fixes to schema

Rev	Date	By Whom	What
wd-05b	2005-05-17	Tom Maguire	WSRF100 – Fix for faults must be BaseFaults WSRF109 – Artifact precedence for authoritativeness WSRF113 – namespace updates for separation WSRF114 – wsa:action for faults WSRF115 – RP Document in SGE/@Content Update acknowledgements
pr-01	2005-06-10	Tom Maguire	Change status to PR
wd-06	2005-09-15	David Snelling	Change status to WD-6 Update references for PR2 WSRF124 - back slash in WS-Addressing location. WSRF127 - Remove reference to "access pattern".
pr-02.a	2005-11-22	Tim Banks	Fixed broken links in references which appear after pdf processing.
pr-02.b	2005-12-13	Tim Banks	Updates Schema in appendix B to fix issues 157 and 164
cs-01	2006-01-11	Tim Banks	Change front page for Committee Spec

1336

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