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## 80 1 Introduction

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

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

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

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

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

### 103 1.1 Goals and Requirements

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

#### 107 1.1.1 Requirements

108 This specification intends to satisfy the following requirements:

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

#### 115 1.1.2 Non-Goals

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

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

119 **1.2 Notational Conventions**

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, referred 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.

150 **1.3 Namespaces**

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/wsr/bf-2
wsrf-rp	http://docs.oasis-open.org/wsr/rp-2
wsrf-rpw	http://docs.oasis-open.org/wsr/rpw-2

wsrf-rl	<a href="http://docs.oasis-open.org/wsr/rl-2">http://docs.oasis-open.org/wsr/rl-2</a>
wsrf-rw	<a href="http://docs.oasis-open.org/wsr/rw-2">http://docs.oasis-open.org/wsr/rw-2</a>
wsnt	<a href="http://docs.oasis-open.org/wsn/b-2">http://docs.oasis-open.org/wsn/b-2</a>
wsrf-sg	<a href="http://docs.oasis-open.org/wsr/sg-2">http://docs.oasis-open.org/wsr/sg-2</a>
wsrf-sgw	<a href="http://docs.oasis-open.org/wsr/sgw-2">http://docs.oasis-open.org/wsr/sgw-2</a>
wstop	<a href="http://docs.oasis-open.org/wsn/t-1">http://docs.oasis-open.org/wsn/t-1</a>

152 **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/wsr/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 of 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.

## 206 3 Terminology and Concepts

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

209 **Member:**

- 210     ○ A Web service that belongs to a ServiceGroup. Note, this Web service may be a  
211     component of a WS-Resource as defined in “Web Services Resources” [WS-Resource].

212 **ServiceGroup:**

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

217 **ServiceGroupEntry:**

- 218     ○ An atomic entry in a ServiceGroup which associates a member to a ServiceGroup. A  
219     ServiceGroupEntry also contains content information by which the member’s participation  
220     in the ServiceGroup is advertised.

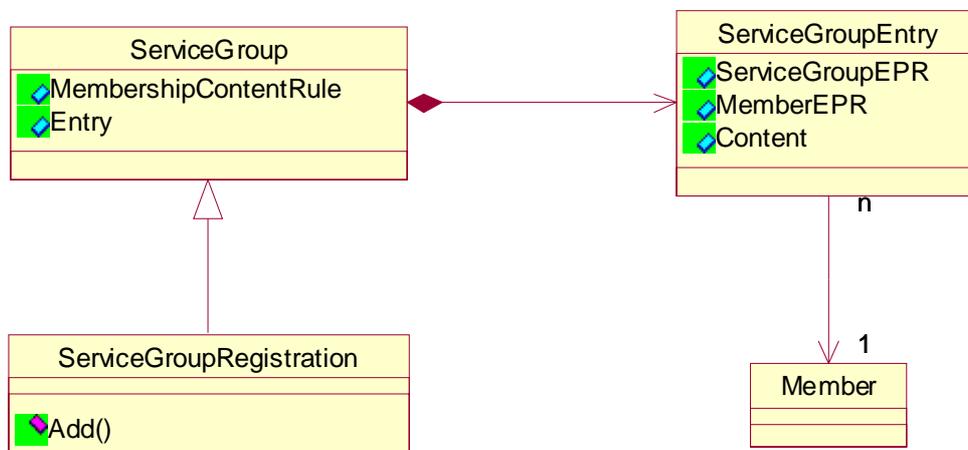
221 **ServiceGroupRegistration:**

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

## 224 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

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 than 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.

### 256 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.

#### 262 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 property](#))

284  
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 MembershipContentRule 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.

## 318 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.

## 365 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 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.

### 414 6.1.3 Content

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

```
416 <wsrf-sg:Content>  
417   <wsrf-sg:RPDoc>  
418     {any}  
419   </wsrf-sg:RPDoc> ?  
420   {any} *  
421 </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.

## 434 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.

## 444 7 ServiceGroupRegistration

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

### 449 7.1 ServiceGroupRegistration: Resource Property Declarations

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

### 454 7.2 Add

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

```
457 <wsrf-sg:Add>  
458   <wsrf-sg:MemberEPR>  
459     wsa:EndpointReferenceType  
460   </wsrf-sg:MemberEPR>  
461   <wsrf-sg:Content>  
462     {any}  
463   </wsrf-sg:Content>  
464   <wsrf-sg:InitialTerminationTime>  
465     [xsd:dateTime | xsd:duration]  
466   </wsrf-sg:InitialTerminationTime?>  
467 </wsrf-sg:Add>
```

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

469 /wsrf-sg:Add/MemberEPR

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

473 /wsrf-sg:Add/Content

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

478 /wsrf-sg:Add/InitialTerminationTime

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

482 There are two forms of this element, absolute time and duration. If the type of this element  
483 is xsd:dateTime, the value of the element is to be interpreted as an "absolute time". If the  
484 type of this element is xsd:duration, the value of the element is to be interpreted as a  
485 "relative time" or "duration". Regardless of the form, time is relative to the time source used  
486 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-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-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:ReferenceParameters>
580 </wsrf-sg:MemberEPR>
581 <wsrf-sg:Content>
582     <wsn:TopicExpression>
583         wsrf-rp:ResourcePropertyValueChangeNotification
584     </wsn:TopicExpression>
585 </wsrf-sg:Content>
586 <wsrf-sg:InitialTerminationTime>
587     2003-12-25T00:00:00.000000Z
588 </wsrf-sg:InitialTerminationTime>
589 </wsrf-sg:Add>
590 </s11:Body>
591 </s11:Envelope>

```

592 The following is a non-normative example of an Add response message using SOAP 1.1 [SOAP  
593 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-675d9fcel2df
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>

```

622

## 8 Notification of ServiceGroup Modification

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

```
628 <wstop:TopicNamespace name="ServiceGroupTopicNamespace"
629   targetNamespace="http://docs.oasis-open.org/wsrf/sg-2"
630   xmlns:wsrf-rp="http://docs.oasis-open.org/wsrf/rp-2"
631   xmlns:wstop="http://docs.oasis-open.org/wsn/t-1" >
632   <wstop:Topic name="ServiceGroupModification" >
633     <wstop:MessagePattern>
634       <wsrf-rp:QueryExpression
635         dialect="http://www.w3.org/TR/1999/REC-xpath-19991116"
636       >
637         boolean( ( /*/*EntryAdditionNotification
638           \[namespace-uri()='http://docs.oasis-
639 open.org/wsrf/sg-2'] ) |
640           ( /*/*EntryRemovalNotification
641           \[namespace-uri()='http://docs.oasis-
642 open.org/wsrf/sg-2'] ) )
643         boolean( /*/EntryAdditionNotification |
644           /*/ EntryRemovalNotification )
645       </wsrf-rp:QueryExpression>
646     </wstop:MessagePattern>
647   </wstop:Topic>
648 </wstop: TopicNamespace>
```

649

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

653 /wstop: TopicNamespace/@name

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

656 /wstop:Topic

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

666 /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:EntryAdditionNotification>
```

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.

## 745 **9 Security Model**

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

### 748 **9.1 Securing the message exchanges**

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

### 752 **9.2 Securing the resource properties**

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

#### 763 **9.2.1 A Note on MembershipContentRules**

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

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800

## 801 10References

### 802 10.1 Normative

803

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809 Syntax," RFC 2396, MIT/LCS, U.C. Irvine, Xerox Corporation, August 1998.

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

812 **[WS-BaseFaults]**

813 [http://docs.oasis-open.org/wsr/wsr/ws\\_base\\_faults-1.2-spec-os.pdf](http://docs.oasis-open.org/wsr/wsr/ws_base_faults-1.2-spec-os.pdf)

814 **[WS-BaseNotification]**

815 [http://docs.oasis-open.org/wsn/wsn-ws\\_base\\_notification-1.3-spec-pr-02.pdf](http://docs.oasis-open.org/wsn/wsn-ws_base_notification-1.3-spec-pr-02.pdf)

816 **[WS-Resource]**

817 [http://docs.oasis-open.org/wsr/wsr/ws\\_resource-1.2-spec-os.pdf](http://docs.oasis-open.org/wsr/wsr/ws_resource-1.2-spec-os.pdf)

818 **[WS-ResourceLifetime]**

819 [http://docs.oasis-open.org/wsr/wsr/ws\\_resource\\_lifetime-1.2-spec-os.pdf](http://docs.oasis-open.org/wsr/wsr/ws_resource_lifetime-1.2-spec-os.pdf)

820 **[WS-ResourceProperties]**

821 [http://docs.oasis-open.org/wsr/wsr/ws\\_resource\\_properties-1.2-spec-os.pdf](http://docs.oasis-open.org/wsr/wsr/ws_resource_properties-1.2-spec-os.pdf)

822 **[WS-Topics]**

823 [http://docs.oasis-open.org/wsn/wsn-ws\\_topics-1.3-spec-pr-01.pdf](http://docs.oasis-open.org/wsn/wsn-ws_topics-1.3-spec-pr-01.pdf)

824 **[XML-Infoset]**

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

826 **[XML-Names]**

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

828 **[XPath]**

829 <http://www.w3.org/TR/xpath>

### 830 10.2 Non-Normative

831 **[OGSI 1.0]**

832 Open Grid Services Infrastructure (OGSI) V1.0  
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837 <http://www.ws-i.org/Profiles/BasicProfile-1.1.html>

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

840 **[WSDL 2.0]**

841 <http://www.w3.org/TR/wsdl20>

842

843

## Appendix B. XML Schema

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/wsrfg-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/wsr/sgw-2.wsdl>,

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

1136  
1137  
1138  
1139  
1140  
1141  
1142  
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1159  
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1161  
1162  
1163  
1164  
1165  
1166  
1167  
1168  
1169  
1170  
1171  
1172  
1173  
1174  
1175  
1176

```
<?xml version="1.0" encoding="utf-8"?>
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1181 THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED
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: <ul style="list-style-type: none"> <li>o WSRF30, WSRF43, WSRF49, WSRF53, WSRF56</li> <li>o Replaced refs to [State Paper]</li> <li>o Update to use "WS-Resource Access Pattern"</li> <li>o Changed doc identifier to "Summary Info Title"</li> <li>o Added missing wsdl:import for WS-Addressing in wsdl</li> <li>o Fixed selector for "UniqueInterfaces" in wsdl (WSRF60 &amp; WSRF70)</li> <li>o Fixed namespace prefix errors in wsdl</li> <li>o Fixed namespace prefix errors in SOAP examples</li> <li>o Updated UML diagram</li> <li>o Removed erroneous wsa:to in AddResponse example</li> </ul>
wd-04	2005-02-18	Tom Maguire	Corrected concrete message element namespaces. Updated OASIS copyright to 2005. Issue resolutions from February F2F: <ul style="list-style-type: none"> <li>o Updated namespace declarations to latest 2005/03</li> <li>o WSRF62 Basic profile 1.1 statement</li> </ul>

Rev	Date	By Whom	What
			<ul style="list-style-type: none"> <li>○ WSRF96 Statement specifying the authoritative versions of wsdl and xsd</li> <li>○ WSRF63 add attribute extensibility</li> <li>○ WSRF86 add ResourceUnknown fault to all operations</li> <li>○ WSRF81 remove xsd:include in favor of xsd:import. Move all schema definitions to xsd.</li> </ul>
wd-05	2005-05-16	Tom Maguire	<p>Updated namespaces to CD levels</p> <p>Issue resolutions</p> <ul style="list-style-type: none"> <li>○ WSRF-44 change MembershipContentRule MemberInterface to be a list of QName. Changed name to MemberInterfaces and updated normative infoset.</li> <li>○ WSRF58 remove unnecessary imports to resource lifetime</li> <li>○ WSRF59 inconsistencies</li> <li>○ WSRF69 Content element of ServiceGroupEntry needs to be minOccurs=0</li> <li>○ WSRF87 InitialTerminationTime on Add request strengthened.</li> <li>○ WSRF91 updates for Last call of WS-Addressing</li> <li>○ WSRF92 update examples for Last call of WS-Addressing</li> <li>○ WSRF99 use SOAP 1.1 instead of SOAP 1.2</li> <li>○ WSRF101 remove non-normative specifications without SDO standing</li> <li>○ WSRF104 Content rule applies in two ways. Delete line 453</li> <li>○ WSRF103 wsa:action updates</li> </ul>
wd-05a	2005-05-17	Tom Maguire	<p>Updates for Example SOAP headers</p> <p>Fixes to schema</p>

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
os	2006-01-11	Tim Banks	Change front page, footers & references for OASIS standard

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