



# Web Services Service Group 1.2 (WS-ServiceGroup)

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### 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 "public review draft". It is possible that it may change during this process, but should nonetheless provide a stable reference for discussion and early adopters' implementations.

Committee members should send comments on this specification to the [wsrf@lists.oasis-open.org](mailto:wsrf@lists.oasis-open.org) list. Others may submit comments to the TC via the web form found on the TC's web page at <http://www.oasis-open.org/committees/wsrf>. Click the button for "Send A Comment" at the top of the page. Submitted comments (for this work as well as other works of that TC) are publicly archived and can be viewed at <http://lists.oasis-open.org/archives/wsrf-comment/>.

For information on whether any patents have been disclosed that may be essential to implementing this specification, and any offers of patent licensing terms, please refer to the

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Intellectual Property Rights section of the WSRF TC web page (<http://www.oasis-open.org/committees/wsrf/>).

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# 81 1 Introduction

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

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

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

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

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

## 104 1.1 Goals and Requirements

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

### 108 1.1.1 Requirements

109 This specification intends to satisfy the following requirements:

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

### 116 1.1.2 Non-Goals

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

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

## 1.2 Notational Conventions

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

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

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

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

```
<!-- sample pseudo-schema -->
<element
  required_attribute_of_type_QName="xs:QName"
  optional_attribute_of_type_string="xs:string"? >
  <required_element />
  <optional_element />?
  <one_or_more_of_these_elements />+
  [ <choice_1 /> | <choice_2 /> ]*
</element>
```

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

## 1.3 Namespaces

The following namespaces are used in this document:

Prefix	Namespace
s11	<a href="http://schemas.xmlsoap.org/soap/envelope">http://schemas.xmlsoap.org/soap/envelope</a>
xsd	<a href="http://www.w3.org/2001/XMLSchema">http://www.w3.org/2001/XMLSchema</a>
wsa	<a href="http://www.w3.org/2005/03/addressing">http://www.w3.org/2005/03/addressing</a>
wsrf-bf	<a href="http://docs.oasis-open.org/wsr/bf-1">http://docs.oasis-open.org/wsr/bf-1</a>
wsrf-rp	<a href="http://docs.oasis-open.org/wsr/rp-1">http://docs.oasis-open.org/wsr/rp-1</a>
wsrf-rpw	<a href="http://docs.oasis-open.org/wsr/rpw-1">http://docs.oasis-open.org/wsr/rpw-1</a>

wsrf-rl	<a href="http://docs.oasis-open.org/wsrf/rl-1">http://docs.oasis-open.org/wsrf/rl-1</a>
wsrf-rw	<a href="http://docs.oasis-open.org/wsrf/rw-1">http://docs.oasis-open.org/wsrf/rw-1</a>
wsnt	<a href="http://docs.oasis-open.org/wsrf/2004/06/wsn-WS-BaseNotification-1.2-draft-01.xsd">http://docs.oasis-open.org/wsrf/2004/06/wsn-WS-BaseNotification-1.2-draft-01.xsd</a>
wsrf-sg	<a href="http://docs.oasis-open.org/wsrf/sg-1">http://docs.oasis-open.org/wsrf/sg-1</a>
wsrf-sgw	<a href="http://docs.oasis-open.org/wsrf/sgw-1">http://docs.oasis-open.org/wsrf/sgw-1</a>
wstop	<a href="http://docs.oasis-open.org/wsn/2004/06/wsn-WS-Topics-1.2-draft-01.xsd">http://docs.oasis-open.org/wsn/2004/06/wsn-WS-Topics-1.2-draft-01.xsd</a>

153 **1.4 Fault Definitions**

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

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

157 `http://docs.oasis-open.org/wsrf/fault`

## 158 2 Example

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

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

```
167 ...  
168 <wsrf-sg:MembershipContentRule  
169   ContentElements="ns1:DateOfLastInvoke ns1:Outcome" />  
170 ...
```

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

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

```
179 ...  
180 <wsrf-sg:MembershipContentRule  
181   ContentElements="ns1:DateOfLastInvoke ns1:Outcome" />  
182  
183 <wsrf-sg:MembershipContentRule  
184   MemberInterfaces="ns2:CatalogPortType "  
185   ContentElements=" " />  
186  
187 <wsrf-sg:MembershipContentRule  
188   MemberInterfaces="ns3:PurchasePortType "  
189   ContentElements="ns3:PurchaseAmount" />  
190 ...
```

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

```
194 ...  
195 <wsrf-sg:Content>  
196   <ns1:DateOfLastInvoke>xsd:dateTime</ns1:DateOfLastInvoke>  
197   <ns1:Outcome>xsd:string</ns1:Outcome>  
198   <ns3:PurchaseAmount>xsd:nonNegativeInteger</ns3:PurchaseAmount>  
199 </wsrf-sg:Content>  
200 ...
```

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



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

## 207 **3 Terminology and Concepts**

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

210 **Member:**

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

213 **ServiceGroup:**

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

218 **ServiceGroupEntry:**

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

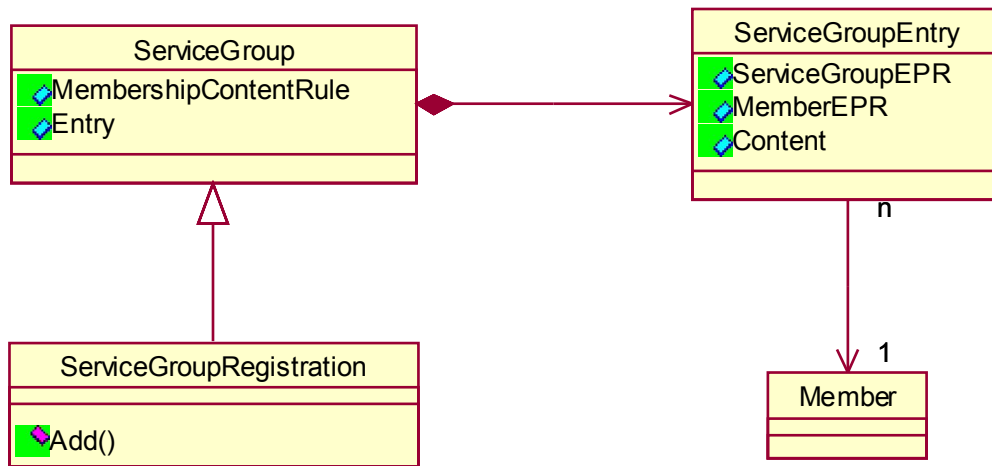
222 **ServiceGroupRegistration:**

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

225 **4 Grouping Services**

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

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



235

## 5 ServiceGroup

237 A ServiceGroup is a WS-Resource, following the WS-Resource access pattern **[WS-Resource]**,  
238 which represents a collection of other Web services. The individual services represented within the  
239 ServiceGroup are the ServiceGroup's members, or its membership. The model for membership of a  
240 ServiceGroup is an *entry* WS-Resource. An entry WS-Resource represents an association with a  
241 given member in the ServiceGroup. Additionally a ServiceGroup has the following characteristics:

- 242     o When a ServiceGroup WS-Resource is destroyed, all of the ServiceGroupEntry WS-  
243       Resources, modeling the membership of the ServiceGroup, are also RECOMMENDED to  
244       be destroyed. Note however, that the actual member Web services or WS-Resources are  
245       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 that represent the ServiceGroup membership or  
248       the validity of the contents of those WS-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 that represents the membership of that WS-Resource in the  
255       ServiceGroup.
- 256     o The grouping and membership aspects of a ServiceGroup are only manifest in the linkage  
257       between a ServiceGroup and a ServiceGroupEntry. Accordingly, a ServiceGroupEntry in  
258       isolation has no semantic meaning.

### 259 5.1 ServiceGroup ResourceProperties

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

#### 265 5.1.1 MembershipContentRule Resource Property

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

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

275 When at least one MembershipContentRule element specification exists, the members of the  
276 ServiceGroup are constrained. When the ServiceGroup is constrained, the ServiceGroup MUST  
277 NOT include a member that does not conform to at least one MembershipContentRule element. If  
278 more than one rule applies to a given member all rules that apply MUST be satisfied. Membership

279 conformance to an individual MembershipContentRule is described below in the  
280 MembershipContentRule component constraints.

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

```
282 <wsrf-sg:MembershipContentRule  
283     MemberInterfaces="list of QName"?  
284     ContentElements="list of QName"  
285 />
```

286 (see [Appendix I: MembershipContentRule element definition](#) & [Appendix II: ServiceGroup resource  
287 property](#))

288 This resource property element is further constrained as follows:

289 /wsrf-sg:MembershipContentRule

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

295 /wsrf-sg:membershipContentRule/@MemberInterfaces

296 This optional attribute, when present, specifies the members to which this  
297 MembershipContentRule applies according to the interface (WSDL 1.1 portType) of the  
298 member Web service.

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

306 /wsrf-sg:membershipContentRule/@ContentElements

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

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

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

## 321 **5.1.2 Entry Resource Property**

322 An Entry resource property is a projection of the aggregation of the resource property documents of  
323 the ServiceGroup's entry resources. An Entry resource property has the following form:

```

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

```

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

339 This resource property element is further constrained as follows

340 /wsrf-sg:Entry

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

347 /wsrf-sg:Entry/ServiceGroupEntryEPR

348 Endpoint reference as defined in **[WS-Addressing]** to the ServiceGroupEntry WS-  
349 Resource with which the entry is associated. This WS-Resource is the representation of  
350 the membership of the member in the group. Existence of this WS-Resource is the  
351 definitive test that the member is indeed part of the group. If the WS-Resource referenced  
352 by ServiceGroupEntryEPR is not available, the consumer **MUST NOT** assume that the  
353 Web service referenced by the @MemberServiceEPR is a member of the service group.

354 /wsrf-sg:Entry/MemberServiceEPR

355 Endpoint reference as defined in **[WS-Addressing]** to the member to which the entry  
356 refers.

357 /wsrf-sg:Entry/Content

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

367 /wsrf-sg:Entry/Content/RPDoc

368 This optional element, if present, **MUST** be conformant to the schema associated with the  
369 wsrf-rp:ResourceProperties extensibility attribute from the portType associated with the

370 @MemberServiceEPR. The contents of this element SHOULD be identical to the contents  
371 returned by the GetResourcePropertyDocument message exchange with the WS-  
372 Resource, referenced by @MemberServiceEPR.

## 373 **5.2 ServiceGroup: Operations**

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

## 377 6 ServiceGroupEntry

378 The representation of a member Web service within the ServiceGroup is a WS-Resource. The  
379 Web service component of this WS-Resource implements the ServiceGroupEntry interface. The  
380 ServiceGroupEntry interface describes the requirements on the Web service through which  
381 management of the entry occurs.

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

385 A ServiceGroupEntry interface MAY provide additional management functions for a  
386 ServiceGroupEntry WS-Resource. In particular, it MAY provide independent lifetime management  
387 functions for individual ServiceGroupEntry WS-Resources (if it implements message exchanges  
388 defined in WS-ResourceLifetime). In the case where the ServiceGroupEntry Web service  
389 implements one of the message exchange sets defined in WS-ResourceLifetime, a  
390 ServiceGroupEntry WS-Resource MAY be removed from a ServiceGroup by managing the lifetime  
391 of the ServiceGroupEntry WS-Resource. Additional message exchanges MAY be defined to  
392 provide more advanced ServiceGroupEntry capabilities.

### 393 6.1 ServiceGroupEntry: Resource Property Declarations

394 In addition to the message exchanges described in this specification, a ServiceGroupEntry MUST  
395 also support the required message exchanges defined in the WS-ResourceProperties specification  
396 and MAY support the optional message exchanges defined in the WS-ResourceProperties  
397 specification.

#### 398 6.1.1 ServiceGroupEPR

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

```
400 <wsrf-sg:ServiceGroupEPR>  
401   wsa:EndpointReferenceType  
402 </wsrf-sg:ServiceGroupEPR>
```

403 (see [Appendix I: ServiceGroupEPR element definition](#) & [Appendix II: ServiceGroupEntry resource  
404 property](#))

405 This resource property element is further constrained as follows:

406 /wsrf-sg:ServiceGroupEPR

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

#### 410 6.1.2 MemberEPR

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

```
412 <wsrf-sg:MemberEPR>  
413   wsa:EndpointReferenceType  
414 </wsrf-sg:MemberEPR>
```

415 (see [Appendix I: MemberEPR element definition](#) & [Appendix II: ServiceGroupEntry resource  
416 property](#))

417 This resource property element is further constrained as follows:

418 /wsrf-sg:MemberEPR



419 Contains an endpoint reference **[WS-Addressing]** to the member to which this entry  
420 pertains. This endpoint reference MUST refer to the same Web service or WS-Resource  
421 throughout the lifetime of the ServiceGroupEntry.

### 422 6.1.3 Content

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

```
424 <wsrf-sg:Content>  
425   <wsrf-sg:RPDoc>  
426     {any}  
427   </wsrf-sg:RPDoc> ?  
428   {any} *  
429 </wsrf-sg:Content>
```

430 (see [Appendix I: Content element definition](#) & [Appendix II: ServiceGroupEntry resource property](#))

431 This resource property element is further constrained as follows:

432 /wsrf-sg:Content

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

437 /wsrf-sg:Content/RPDoc

438 This optional element, if present, MUST be conformant to the schema associated with the  
439 wsrf-rp:ResourceProperties extensibility attribute from the portType associated with the  
440 @MemberEPR. The contents of this element SHOULD be identical to the contents  
441 returned by the GetResourcePropertyDocument message exchange with the WS-  
442 Resource, referenced by @MemberEPR.

## 443 6.2 ServiceGroupEntry: Message Exchanges

444 The ServiceGroupEntry interface defines no operations. The service implementing the  
445 ServiceGroupEntry interface SHOULD implement the message exchanges and resource properties  
446 from one of the interfaces described in WS-ResourceLifetime if it supports immediate destruction  
447 and scheduled destruction of ServiceGroupEntry resources. In addition, the service implementing  
448 the ServiceGroupEntry interface SHOULD implement the message exchanges and resource  
449 properties for the NotificationProducer interface **[WS-BaseNotification]**. The service implementing  
450 the ServiceGroupEntry SHOULD also support resource property value change notification as  
451 defined in **[WS-ResourceProperties]**. In particular, it SHOULD include wsrf-sg:Content as a value  
452 of its Topics resource property.

## 453 7 ServiceGroupRegistration

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

### 458 7.1 ServiceGroupRegistration: Resource Property Declarations

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

### 463 7.2 Add

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

```
466 <wsrf-sg:Add>  
467   <wsrf-sg:MemberEPR>  
468     wsa:EndpointReferenceType  
469   </wsrf-sg:MemberEPR>  
470   <wsrf-sg:Content>  
471     {any}  
472   </wsrf-sg:Content>  
473   <wsrf-sg:InitialTerminationTime>  
474     [xsd:dateTime | xsd:duration]  
475   </wsrf-sg:InitialTerminationTime?>  
476 </wsrf-sg:Add>
```

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

478 /wsrf-sg:Add/MemberEPR

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

482 /wsrf-sg:Add/Content

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

487 /wsrf-sg:Add/InitialTerminationTime

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

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

496 The duration form is used to “compute” the “absolute time” form in the following fashion.  
497 The value of this element in “absolute time” form is computed by adding the xsd:duration  
498 value to the current time value of the ServiceGroup.

499 The “absolute time” form (whether computed from a duration, or contained within the  
500 request message) is used to initialize the value of the TerminationTime resource property  
501 of the Subscription resource.

502 If the ServiceGroup is unable or unwilling to set the TerminationTime resource property of  
503 the ServiceGroupEntry resource to the given value of the “absolute time” form or a value  
504 greater, then the Add request MUST fault. If the value is not “in the future” relative to the  
505 current time as known by the ServiceGroup, the Add request MUST fault. The use of the  
506 xsi:nil attribute with value “true” indicates there is no scheduled termination time requested  
507 for the ServiceGroupEntry. If the element does not include the time zone designation, the  
508 value of the element MUST be interpreted as universal time (UTC) time.

509 If this element is not included, the initial value of the TerminationTime resource property is  
510 dependent on the implementation of the ServiceGroup.

511 If a ServiceGroupRegistration accepts the Add request it MUST update the  
512 TerminationTime resource property of the resulting ServiceGroupEntry WS-Resource to the  
513 value specified in the message or to a value “in the future” relative to the requested time.

514 The wsrf:Action MUST contain the URI <http://docs.oasis-open.org/wsrf/sgw-1/ServiceGroupRegistration/AddRequest>.

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

```
518 <wsrf-sg:AddResponse>  
519   <wsrf-sg:ServiceGroupEntryReference>  
520     wsrf:endpointReferenceType  
521   </wsrf-sg:ServiceGroupEntryReference>  
522   <wsrf-sg:TerminationTime xsi:nil="xsd:boolean"?>  
523     xsd:dateTime  
524   </wsrf-sg:TerminationTime>  
525   <wsrf-sg:CurrentTime>  
526     xsd:dateTime  
527   </wsrf-sg:CurrentTime>  
528 </wsrf-sg:AddResponse>
```

529 Further constraints on the AddResponse message are as follows:

530 /wsrf-sg:AddResponse/wsrf-sg:ServiceGroupEntryReference

531 An EndpointReference as described in [WS-Addressing]. This endpoint reference refers  
532 to the ServiceGroupEntry WS-Resource created by the ServiceGroup to represent the  
533 association of the member within the ServiceGroup. The Web service associated with the  
534 ServiceGroupEntry returned by the AddResponse MUST implement the message  
535 exchanges and resource properties specified by the ScheduledResourceTermination  
536 interface and the ImmediateResourceTermination interface [WS-ResourceLifetime].

537 /wsrf-sg:AddResponse/wsrf-sg:TerminationTime

538 This value MAY be “in the future” relative to the xsd:dateTime requested by the service  
539 requestor in the wsrf-sg:AddRequest/wsrf-sg:InitialTerminationTime.

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

543 This value MUST also be reflected through the value of the TerminationTime resource  
544 property.

545 /wsrf-sg:AddResponse/wsrf-sg:CurrentTime

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

548

549 The wsa:Action MUST contain the URI <http://docs.oasis-open.org/wsrf/sgw-1/ServiceGroupRegistration/AddResponse>.

551 Instead of the AddResponse message, the Web service MUST send a fault. This specification  
552 defines the following faults associated with failure to process the Add message.

553 ContentCreationFailedFault:

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

557 UnsupportedMemberInterfaceFault:

558 The member service referred to by the MemberEPR argument is not conformant with the  
559 MembershipContentRule.

560 AddRefusedFault:

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

563 ResourceUnknownFault:

564 The ServiceGroupRegistration WS-Resource, which is the target of the Add message, is  
565 unknown. The enumeration of this fault and the conditions under which it may occur  
566 appear in the **[WS-Resource]** specification.

567

## 568 **7.2.1 Example SOAP Encoding of the Add Message Exchange**

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

570 Note: The presence of ReferenceParameters in the following example represents the special case  
571 when the member is a WS-Resource with a WS-Addressing embodiment **[WS-Resource]**

```
572 <s11:Envelope xmlns...>  
573   <s11:Header>  
574     <wsa:Action>  
575       http://docs.oasis-open.org/wsrf/sgw-  
576 1/ServiceGroupRegistration/AddRequest  
577     </wsa:Action>  
578   </s11:Header>  
579   <s11:Body>  
580     <wsrf-sg:Add>  
581       <wsrf-sg:MemberEPR>  
582         <wsa:Address>  
583           http://www.producer.org/ProducerEndpoint  
584         </wsa:Address>
```

```

585     <wsa:ReferenceParameters>
586         <npex:ResourceDisambiguator>
587             uuid:84decd55-7d3f-65ad-ac44-675d9fce5d22
588         </npex:ResourceDisambiguator>
589     </wsa:ReferenceParameters>
590 </wsrf-sg:MemberEPR>
591 </wsrf-sg:Content>
592     <wstop:Topic>wsrf-
593 rp:ResourcePropertiesValueChanges</wstop:Topic>
594 <wsrf-sg:Content>
595     <wsrf-sg:InitialTerminationTime>
596         2003-12-25T00:00:00.00000Z
597     </wsrf-sg:InitialTerminationTime>
598 </wsrf-sg:Add>
599 </s11:Body>
600 </s11:Envelope>

```

601 The following is a non-normative example of an Add response message using SOAP 1.1 [SOAP  
602 1.1]:

```

603 <s11:Envelope xmlns... >
604     <s11:Header>
605         <wsa:Action>
606             http://docs.oasis-open.org/wsrf/sgw-
607 1/ServiceGroupRegistration/AddResponse
608         </wsa:Action>
609     </s11:Header>
610     <s11:Body>
611         <wsrf-sg:AddResponse>
612             <wsrf-sg:ServiceGroupEntryReference>
613                 <wsa:Address>
614                     http://www.producer.org/ServiceGroupEndpoint
615                 </wsa:Address>
616                 <wsa:ReferenceParameters>
617                     <npex:ResourceDisambiguator>
618                         uuid:95fefeb3-f37d-5dfe-44fe-675d9fce12df
619                     </npex:ResourceDisambiguator>
620                 </wsa:ReferenceParameters>
621             </wsrf-sg:ServiceGroupEntryReference>
622             <wsrf-sg:TerminationTime>
623                 2003-12-31T12:00:00Z
624             </wsrf-sg:TerminationTime>
625             <wsrf-sg:CurrentTime>
626                 2003-12-20T11:00:00Z
627             </wsrf-sg:CurrentTime>
628         </wsrf-sg:AddResponse>
629     </s11:Body>
630 </s11:Envelope>

```

631

## 8 Notification of ServiceGroup Modification

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

```

636 <wstop:TopicSpace name="ServiceGroupTopicSpace"
637     targetNamespace="http://docs.oasis-open.org/wsrf/sg-1"
638     xmlns:wsrf-rp="http://docs.oasis-open.org/wsrf/rp-1"
639     xmlns:wstop=
640         "http://docs.oasis-open.org/wsn/2004/06/wsn-WS-Topics-1.2-
641     draft-01.xsd" >
642     <wstop:Topic name="ServiceGroupModification" >
643         <wstop:MessagePattern>
644             <wsrf-rp:QueryExpression
645                 dialect="http://www.w3.org/TR/1999/REC-xpath-19991116"
646             >
647                 boolean((/*/*EntryAdditionNotification
648                     \[namespace-uri()='http://docs.oasis-
649     open.org/wsrf/sg-1']) |
650                     (/*/*EntryRemovalNotification
651                     \[namespace-uri()='http://docs.oasis-
652     open.org/wsrf/sg-1']))
653                 boolean(/*/EntryAdditionNotification |
654                     /*/ EntryRemovalNotification)
655             </wsrf-rp:QueryExpression>
656         </wstop:MessagePattern>
657     </wstop:Topic>
658 </wstop:TopicSpace>
  
```

659

660 This TopicSpace defines the TopicSpace associated with the WS-ServiceGroup XML namespace  
 661 (<http://docs.oasis-open.org/wsrf/sg-1>). The TopicSpace is further constrained as follows:

662 /wstop:TopicSpace/@name

663 The name of the TopicSpace associated with the WS-ServiceGroup XML namespace  
 664 MUST be "ServiceGroupTopicSpace".

665 /wstop:Topic

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

675 /wstop:Topic/@name

676 The name of the Topic representing ServiceGroup modifications MUST be named  
 677 "ServiceGroupModification". The namespace property of this topic MUST be the WS-  
 678 ServiceGroup XML namespace (<http://docs.oasis-open.org/wsrf/sg-1>).  
 679 /wstop:Topic/wstop:MessagePattern  
 680 This topic is associated with messages that MUST contain an wsrf-  
 681 sg:EntryAdditionNotification element or an wsrf-sg:EntryRemovalNotification element.  
 682 These elements and their corresponding complexTypes are described later in this section.

## 683 8.1 EntryAdditionNotification Message

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

```
686 <wsrf-sg:EntryAdditionNotification>
687   <wsrf-sg:ServiceGroupEntryEPR>
688     wsa:EndpointReferenceType
689   </wsrf-sg:ServiceGroupEntryEPR>
690   <wsrf-sg:MemberServiceEPR>
691     wsa:EndpointReference
692   </wsrf-sg:MemberServiceEPR>
693   <wsrf-sg:Content>
694     <wsrf-sg:RPDoc>
695       {any} *
696     </wsrf-sg:RPDoc> ?
697     {any} *
698   </wsrf-sg:Content> ?
699 </wsrf-sg:EntryAdditionNotification>
```

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

701 /wsrf-sg:EntryAdditionNotification

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

705 /wsrf-sg:EntryAdditionNotification/ServiceGroupEntryEPR

706 This element MUST contain the EndpointReference of the ServiceGroupEntry that was  
 707 added to the ServiceGroup.

708 /wsrf-sg:EntryAdditionNotification/MemberServiceEPR

709 This element MUST contain the EndpointReference of the member service that the WS-  
 710 Resource referenced by @ServiceGroupEntryEPR contains in its MemberEPR resource  
 711 property.

712 /wsrf-sg:EntryAdditionNotification/Content

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

## 715 8.2 EntryRemovalNotification Message

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

```
718 <wsrf-sg:EntryRemovalNotification>
719   <wsrf-sg:ServiceGroupEntryEPR>
```

720	wsa:EndpointReferenceType
721	</wsrf-sg:ServiceGroupEntryEPR>
722	<wsrf-sg:MemberServiceEPR>
723	wsa:EndpointReferenceType
724	</wsrf-sg:MemberServiceEPR>
725	<wsrf-sg:Content>
726	<wsrf-sg:RPDoc>
727	{any} *
728	</wsrf-sg:RPDoc> ?
729	{any} *
730	</wsrf-sg:Content> ?
731	<wsrf-sg:Reason>xsd:string</wsrf-sg:Reason> ?
732	</wsrf-sg:EntryRemovalNotification>

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

734 /wsrf-sg:EntryRemovalNotification

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

738 /wsrf-sg:EntryRemovalNotification/ServiceGroupEntryEPR

739 This element MUST contain the EndpointReference of the ServiceGroupEntry that was  
740 removed to the ServiceGroup. Note: The EndpointReference for the ServiceGroupEntry will  
741 not be a valid reference since the removal mechanism from a ServiceGroup is removal of  
742 the ServiceGroupEntry.

743 /wsrf-sg:EntryRemovalNotification/MemberServiceEPR

744 This element MUST contain the EndpointReference of the member service that the WS-  
745 Resource referenced by @serviceGroupEntryEPR contains in its MemberEPR resource  
746 property.

747 /wsrf-sg:EntryRemovalNotification/Content

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

751 /wsrf-sg:EntryRemovalNotification/Reason

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



## 754 **9 Security Model**

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

### 757 **9.1 Securing the message exchanges**

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

### 761 **9.2 Securing the resource properties**

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

#### 772 **9.2.1 A Note on MembershipContentRules**

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

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808 (IBM).

809

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## 846 Appendix B. XML Schema

847 The XML types and elements used in this specification are included here for convenience. The  
848 authoritative version of this schema document is available at [http://docs.oasis-open.org/wsrif/sg-](http://docs.oasis-open.org/wsrif/sg-1.xsd)  
849 [1.xsd](http://docs.oasis-open.org/wsrif/sg-1.xsd).

850 The XML types and elements used in this specification are defined in the following XML Schema

```
851 <?xml version="1.0" encoding="UTF-8"?>
852 <!--
853
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-->
<xsd:schema
  xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-1"
  xmlns:wsrf-sg="http://docs.oasis-open.org/wsrf/sg-1"
  xmlns:wsa="http://www.w3.org/2005/03/addressing"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified"
  targetNamespace="http://docs.oasis-open.org/wsrf/sg-1" >
<!-- ===== Imports =====
-->
  <xsd:import
    namespace="http://www.w3.org/2005/03/addressing"
    schemaLocation="http://www.w3.org/2005/03/addressing/" />
  <xsd:import
    namespace="http://docs.oasis-open.org/wsrf/bf-1"
    schemaLocation="http://docs.oasis-open.org/wsrf/bf-1" />

<!-- ===== Resource Property Related
===== -->
<!-- ===== Resource Properties for ServiceGroup
===== -->
  <xsd:simpleType name="AbsoluteOrRelativeTimeType">
    <xsd:union memberTypes="xsd:dateTime xsd:duration"/>
  </xsd:simpleType>

  <xsd:simpleType name="ContentElementsType">
    <xsd:list itemType="xsd:QName"/>
  </xsd:simpleType>

  <xsd:simpleType name="MemberInterfacesType">
    <xsd:list itemType="xsd:QName"/>
  </xsd:simpleType>

  <xsd:element name="MembershipContentRule">
    <xsd:complexType>
      <xsd:attribute name="MemberInterfaces"
        type="wsrf-sg:MemberInterfacesType"/>
      <xsd:attribute name="ContentElements"
```

```

941         type="wsrf-sg:ContentElementsType"
942         use="required" />
943     <xsd:anyAttribute namespace="##other"
944         processContents="lax" />
945 </xsd:complexType>
946 </xsd:element>
947
948 <xsd:complexType name="RPDocType">
949     <xsd:sequence>
950         <xsd:any namespace="##any" processContents="lax"
951             minOccurs="1" maxOccurs="1" />
952     </xsd:sequence>
953     <xsd:anyAttribute namespace="##other"
954         processContents="lax" />
955 </xsd:complexType>
956
957 <xsd:complexType name="ContentType">
958     <xsd:sequence>
959         <xsd:element name="RPDoc"
960             type="wsrf-sg:RPDocType"
961             minOccurs="0" maxOccurs="1" />
962         <xsd:any namespace="##any" processContents="lax"
963             minOccurs="0" maxOccurs="unbounded" />
964     </xsd:sequence>
965     <xsd:anyAttribute namespace="##other"
966         processContents="lax" />
967 </xsd:complexType>
968
969 <xsd:complexType name="EntryType">
970     <xsd:sequence>
971         <xsd:element name="ServiceGroupEntryEPR"
972             type="wsa:EndpointReferenceType"
973             minOccurs="1" maxOccurs="1"
974             nillable="true" />
975         <xsd:element name="MemberServiceEPR"
976             type="wsa:EndpointReferenceType"
977             minOccurs="1" maxOccurs="1" />
978         <xsd:element ref="wsrf-sg:Content"
979             minOccurs="0" maxOccurs="1" />
980     </xsd:sequence>
981     <xsd:anyAttribute namespace="##other" processContents="lax" />
982 </xsd:complexType>
983
984 <!-- ===== Resource Properties for ServiceGroupEntry
985 ===== -->
986
987     <xsd:element name="Entry"
988         type="wsrf-sg:EntryType" />
989

```

```

990 <xsd:element name="Content "
991         type="wsrf-sg:ContentType" />
992
993 <xsd:element name="MemberEPR"
994         type="wsa:EndpointReferenceType" />
995
996 <xsd:element name="ServiceGroupEPR"
997         type="wsa:EndpointReferenceType" />
998
999 <!-- ===== Resource Property Related
1000 ===== -->
1001 <!-- ===== Resource Properties for ServiceGroup
1002 ===== -->
1003     <xsd:element name="ServiceGroupRP">
1004         <xsd:complexType>
1005             <xsd:sequence>
1006                 <xsd:element ref="wsrf-sg:MembershipContentRule"
1007                     minOccurs="0" maxOccurs="unbounded" />
1008                 <xsd:element ref="wsrf-sg:Entry"
1009                     minOccurs="0" maxOccurs="unbounded" />
1010             </xsd:sequence>
1011         </xsd:complexType>
1012     </xsd:element>
1013
1014 <!-- ===== Resource Properties for ServiceGroupEntry
1015 ===== -->
1016     <xsd:element name="ServiceGroupEntryRP">
1017         <xsd:complexType>
1018             <xsd:sequence>
1019                 <xsd:element ref="wsrf-sg:ServiceGroupEPR"
1020                     minOccurs="1" maxOccurs="1" />
1021                 <xsd:element ref="wsrf-sg:MemberEPR"
1022                     minOccurs="1" maxOccurs="1" />
1023                 <xsd:element ref="wsrf-sg:Content"
1024                     minOccurs="0" maxOccurs="1" />
1025             </xsd:sequence>
1026         </xsd:complexType>
1027     </xsd:element>
1028
1029 <!-- ===== Message Specific Types
1030 ===== -->
1031 <!-- ===== Message Types for ServiceGroupRegistration
1032 ===== -->
1033     <xsd:element name="Add">
1034         <xsd:complexType>
1035             <xsd:sequence>
1036                 <xsd:element name="MemberEPR"
1037                     type="wsa:EndpointReferenceType" />
1038                 <xsd:element ref="wsrf-sg:Content" />

```

```

1039         <xsd:element name="InitialTerminationTime"
1040             type="wsrf-
1041 sg:AbsoluteOrRelativeTimeType"
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>

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```
<xsd:element name="AddRefusedFault"
              type="wsrf-sg:AddRefusedFaultType"/>

<!-- = Messages Related to ServiceGroup Change Notification
===== -->
<xsd:complexType
name="ServiceGroupModificationNotificationType">
  <xsd:sequence>
    <xsd:element name="ServiceGroupEntryEPR"
                  type="wsa:EndpointReferenceType"
                  minOccurs="1" maxOccurs="1"
                  nillable="true"/>
    <xsd:element name="MemberServiceEPR"
                  type="wsa:EndpointReferenceType"
                  minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="wsrf-sg:Content"
                  minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="ServiceGroupRemovalNotificationType">
  <xsd:complexContent>
    <xsd:extension
      base="wsrf-
sg:ServiceGroupModificationNotificationType">
      <xsd:sequence>
        <xsd:element name="Reason"
                      type="xsd:string"
                      minOccurs="0" maxOccurs="1"/>
      </xsd:sequence>
    </xsd:extension>
  </xsd:complexContent>
</xsd:complexType>

<xsd:element name="EntryAdditionNotification"
              type="wsrf-
sg:ServiceGroupModificationNotificationType" />

<xsd:element name="EntryRemovalNotification"
              type="wsrf-sg:ServiceGroupRemovalNotificationType"
/>

</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-**  
1133 **Basic Profile 1.1** and is included here for convenience. The authoritative version of this WSDL is  
1134 available at <http://docs.oasis-open.org/wsrf/sgw-1.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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```

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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/2005/03/addressing"
1192   xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-1"
1193   xmlns:wsrf-rp="http://docs.oasis-open.org/wsrf/rp-1"
1194   xmlns:wsrf-rpw="http://docs.oasis-open.org/wsrf/rpw-1"
1195   xmlns:wsrf-rw="http://docs.oasis-open.org/wsrf/rw-1"
1196   xmlns:wsrf-sg="http://docs.oasis-open.org/wsrf/sg-1"
1197   xmlns:wsrf-sgw="http://docs.oasis-open.org/wsrf/sgw-1"
1198   targetNamespace="http://docs.oasis-open.org/wsrf/sgw-1">
1199
1200 <!-- ===== Imports
1201 ===== -->
1202   <wsdl:import
1203     namespace="http://docs.oasis-open.org/wsrf/rpw-1"
1204     location="http://docs.oasis-open.org/wsrf/rpw-1" />
1205
1206   <wsdl:import
1207     namespace="http://docs.oasis-open.org/wsrf/rw-1"
1208     location="http://docs.oasis-open.org/wsrf/rw-1" />
1209
1210 <!-- ===== Types Definitions
1211 ===== -->
1212   <wsdl:types>
1213     <xsd:schema>
1214       <xsd:import
1215         namespace="http://docs.oasis-open.org/wsrf/sg-1"
1216         schemaLocation="http://docs.oasis-open.org/wsrf/sg-1" />
1217
1218       <xsd:import
1219         namespace="http://docs.oasis-open.org/wsrf/rp-1"
1220         schemaLocation="http://docs.oasis-open.org/wsrf/rp-1" />
1221
1222       <xsd:import
1223         namespace="http://docs.oasis-open.org/wsrf/bf-1"
1224         schemaLocation="http://docs.oasis-open.org/wsrf/bf-1" />
1225     </xsd:schema>

```

```

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

```

```

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

```

1324  
1325  
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```
</wsdl:portType>  
</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 info set.</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

1328

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