



# 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/wsr/>. 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/wsr-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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37 Intellectual Property Rights section of the WSRF TC web page ([http://www.oasis-](http://www.oasis-open.org/committees/wsf/)  
38 [open.org/committees/wsf/](http://www.oasis-open.org/committees/wsf/)).  
39

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## 82 1 Introduction

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

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

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

98 The ServiceGroup and ServiceGroupRegistration interfaces defined in this document are  
99 commonly expected to be composed with other application domain specific interfaces, which define  
100 more specialized interaction with the service group and/or with the services that are members of  
101 the service group. For example, specialized interfaces may offer means of querying the contents of  
102 the ServiceGroup, and for performing collective operations across members of the ServiceGroup.  
103 WS-ServiceGroup is inspired by a portion of the Global Grid Forum's "Open Grid Services  
104 Infrastructure (OGSI) Version 1.0" specification [OGSI 1.0].

### 105 1.1 Goals and Requirements

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

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#### 109 1.1.1 Requirements

110 This specification intends to satisfy the following requirements:

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

#### 117 1.1.2 Non-Goals

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

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

121 **1.2 Notational Conventions**

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

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

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

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

```

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

```

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

152 **1.3 Namespaces**

153 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/2005/08/addressing">http://www.w3.org/2005/08/addressing</a>
wsrf-bf	<a href="http://docs.oasis-open.org/wsr/bf-2">http://docs.oasis-open.org/wsr/bf-2</a>
wsrf-rp	<a href="http://docs.oasis-open.org/wsr/rp-2">http://docs.oasis-open.org/wsr/rp-2</a>
wsrf-rpw	<a href="http://docs.oasis-open.org/wsr/rpw-2">http://docs.oasis-open.org/wsr/rpw-2</a>

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wsrfl	<a href="http://docs.oasis-open.org/wsrfl/rl-2">http://docs.oasis-open.org/wsrfl/rl-2</a>
wsrfrw	<a href="http://docs.oasis-open.org/wsrfrw-2">http://docs.oasis-open.org/wsrfrw-2</a>
wsnt	<a href="http://docs.oasis-open.org/wsn/b-2">http://docs.oasis-open.org/wsn/b-2</a>
wsrfg	<a href="http://docs.oasis-open.org/wsrfg-2">http://docs.oasis-open.org/wsrfg-2</a>
wsrfgw	<a href="http://docs.oasis-open.org/wsrfgw-2">http://docs.oasis-open.org/wsrfgw-2</a>
wstop	<a href="http://docs.oasis-open.org/wsn/t-1">http://docs.oasis-open.org/wsn/t-1</a>

154  
155  
156  
157  
158

## 1.4 Fault Definitions

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

All faults defined by this specification MUST use the following wsa:Action URI:  
http://docs.oasis-open.org/wsrfl/fault

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- Deleted: wsrf/2004/06/wsn-WS-BaseNotification-1.2-draft-01.xsd
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- Deleted: 1
- Deleted: wsn/2004/06/wsn-WS-Topics-1.2-draft-01.xsd
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## 159 2 Example

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

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

```
168 ...  
169 <wsrf-sg:MembershipContentRule  
170   ContentElements="ns1:DateOfLastInvoke ns1:Outcome"/>  
171 ...
```

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

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

```
180 ...  
181 <wsrf-sg:MembershipContentRule  
182   ContentElements="ns1:DateOfLastInvoke ns1:Outcome"/>  
183  
184 <wsrf-sg:MembershipContentRule  
185   MemberInterfaces="ns2:CatalogPortType"  
186   ContentElements=""/>  
187  
188 <wsrf-sg:MembershipContentRule  
189   MemberInterfaces="ns3:PurchasePortType"  
190   ContentElements="ns3:PurchaseAmount"/>  
191 ...
```

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

```
195 ...  
196 <wsrf-sg:Content>  
197   <ns1:DateOfLastInvoke>xsd:dateTime</ns1:DateOfLastInvoke>  
198   <ns1:Outcome>xsd:string</ns1:Outcome>  
199   <ns3:PurchaseAmount>xsd:nonNegativeInteger</ns3:PurchaseAmount>  
200 </wsrf-sg:Content>  
201 ...
```

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



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

## 208 3 Terminology and Concepts

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

### 211 **Member:**

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

### 214 **ServiceGroup:**

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

### 219 **ServiceGroupEntry:**

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

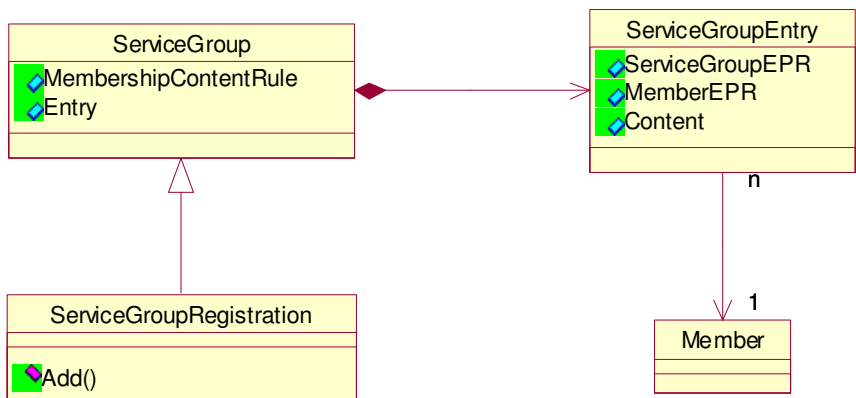
### 223 **ServiceGroupRegistration:**

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

226 **4 Grouping Services**

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

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



236

## 5 ServiceGroup

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

- 245 ○ When a ServiceGroup WS-Resource is destroyed, all of the ServiceGroupEntry WS-  
 246 Resources are also RECOMMENDED to be destroyed. Note however, that the actual  
 247 member Web services or WS-Resources are not affected.
- 248 ○ Once a ServiceGroup is destroyed, a requestor MUST make no assumptions about either  
 249 the existence of the entry WS-Resources or the validity of the contents of those WS-  
 250 Resources.
- 251 ○ A member MAY belong to several ServiceGroups.
- 252 ○ A member MAY belong to the same ServiceGroup more than once.
- 253 ○ The member of a ServiceGroup MAY implement message exchanges from various  
 254 interfaces.
- 255 ○ If a member WS-Resource is destroyed, the ServiceGroup MAY destroy the corresponding  
 256 entry WS-Resource.
- 257 ○ A ServiceGroupEntry in isolation has no semantic meaning.

**Deleted:** A ServiceGroup is a WS-Resource, following the WS-Resource access pattern [WS-Resource], which represents a collection of other Web services. T

**Deleted:** WS-Resource

**Deleted:** , modeling the membership of the ServiceGroup,

**Deleted:** that represent the ServiceGroup membership

**Deleted:** that represents the membership of that WS-Resource in the ServiceGroup

**Deleted:** The grouping and membership aspects of a ServiceGroup are only manifest in the linkage between a ServiceGroup and a ServiceGroupEntry. Accordingly, a

### 5.1 ServiceGroup ResourceProperties

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

#### 5.1.1 MembershipContentRule Resource Property

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

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

273 When at least one MembershipContentRule element specification exists, the members of the  
 274 ServiceGroup are constrained. When the ServiceGroup is constrained, the ServiceGroup MUST  
 275 NOT include a member that does not conform to at least one MembershipContentRule element. If  
 276 more than one rule applies to a given member all rules that apply MUST be satisfied. Membership  
 277 conformance to an individual MembershipContentRule is described below in the  
 278 MembershipContentRule component constraints.  
 279

**Deleted:** t

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

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

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

287 This resource property element is further constrained as follows:

288 /wsrf-sg:MembershipContentRule

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

294 /wsrf-sg:membershipContentRule/@MemberInterfaces

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

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

305 /wsrf-sg:membershipContentRule/@ContentElements

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

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

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

## 320 5.1.2 Entry Resource Property

321 An Entry resource property is a projection of the aggregation of the resource property documents of  
322 the ServiceGroup's entry [WS-Resources](#). An Entry resource property has the following form:

```
323 <wsrf-sg:Entry>
324   <wsrf-sg:ServiceGroupEntryEPR>
```

Deleted: resources

```

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

```

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

This resource property element is further constrained as follows

339 /wsrf-sg:Entry

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

**Deleted:** entry

346 /wsrf-sg:Entry/ServiceGroupEntryEPR

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

**Deleted:** . This WS-Resource is the representation of the membership of the member in the group. Existence of this WS-Resource is the definitive test that the member is indeed part of the group. If the WS-Resource referenced by ServiceGroupEntryEPR is not available, the consumer MUST NOT assume that the Web service referenced by the @MemberServiceEPR is a member of the service group.

349 /wsrf-sg:Entry/MemberServiceEPR

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

**Deleted:** Endpoint

352 /wsrf-sg:Entry/Content

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

362 /wsrf-sg:Entry/Content/RPDoc

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

**Deleted:** @MemberServiceEPR

**Deleted:** returned by the GetResourcePropertyDocument message exchange with the WS-Resource, referenced by @MemberServiceEPR.

367 **5.2 ServiceGroup: Operations**

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

## 371 6 ServiceGroupEntry

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

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

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

### 387 6.1 ServiceGroupEntry: Resource Property Declarations

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

#### 392 6.1.1 ServiceGroupEPR

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

```
394 <wsrf-sg:ServiceGroupEPR>  
395   wsa:EndpointReferenceType  
396 </wsrf-sg:ServiceGroupEPR>
```

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

399 This resource property element is further constrained as follows:

400 /wsrf-sg:ServiceGroupEPR

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

#### 404 6.1.2 MemberEPR

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

```
406 <wsrf-sg:MemberEPR>  
407   wsa:EndpointReferenceType  
408 </wsrf-sg:MemberEPR>
```

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

411 This resource property element is further constrained as follows:

412 /wsrf-sg:MemberEPR



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

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### 416 | 6.1.3 Content

417 | The general form of the Content resource property element is:

```
418 | <wsrf-sg:Content>  
419 |   <wsrf-sg:RPDoc>  
420 |     {any}  
421 |   </wsrf-sg:RPDoc> ?  
422 |   {any} *  
423 | </wsrf-sg:Content>
```

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

425 | This resource property element is further constrained as follows:

426 | /wsrf-sg:Content

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

431 | /wsrf-sg:Content/RPDoc

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

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GetResourcePropertyDocumen  
t message exchange with the  
WS-Resource, referenced by  
@MemberEPR.

## 436 | 6.2 ServiceGroupEntry: Message Exchanges

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

## 446 7 ServiceGroupRegistration

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

### 451 7.1 ServiceGroupRegistration: Resource Property Declarations

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

### 456 7.2 Add

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

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

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

471 /wsrf-sg:Add/MemberEPR

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

475 /wsrf-sg:Add/Content

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

480 /wsrf-sg:Add/InitialTerminationTime

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

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

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

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

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

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

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

507 The wsa:Action MUST contain the URI <http://docs.oasis-open.org/wsrf/sgw-2/ServiceGroupRegistration/AddRequest>.

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

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

Deleted: endpointReferenceType

522 Further constraints on the AddResponse message are as follows:

523 /wsrf-sg:AddResponse/wsrf-sg:ServiceGroupEntryReference

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

530 /wsrf-sg:AddResponse/wsrf-sg:TerminationTime

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

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

536 This value MUST also be reflected through the value of the TerminationTime resource  
537 property.

538 /wsrf-sg:AddResponse/wsrf-sg:CurrentTime

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

541

542 The wsa:Action MUST contain the URI [http://docs.oasis-open.org/wsrf/sgw-  
543 2/ServiceGroupRegistration/AddResponse](http://docs.oasis-open.org/wsrf/sgw-2/ServiceGroupRegistration/AddResponse).

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

549 ContentCreationFailedFault:

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

553 UnsupportedMemberInterfaceFault:

554 The member service referred to by the MemberEPR argument is not conformant with the  
555 MembershipContentRule.

556 AddRefusedFault:

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

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

561

## 562 7.2.1 Example SOAP Encoding of the Add Message Exchange

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

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

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

Deleted: ResourceUnknownFault:¶  
The ServiceGroupRegistration WS-Resource, which is the target of the Add message, is unknown. The enumeration of this fault and the conditions under which it may occur appear in the [WS-Resource] specification.¶

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

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```

578     <npex:ResourceDisambiguator>
579         uuid:84dec55-7d3f-65ad-ac44-675d9fce5d22
580     </npex:ResourceDisambiguator>
581 </wsa:ReferenceParameters>
582 </wsrf-sg:MemberEPR>
583 <wsrf-sg:Content>
584     <wsn:TopicExpression>
585         wsrf-rp:ResourcePropertyValueChangeNotification
586     </wsn:TopicExpression>
587 </wsrf-sg:Content>
588 <wsrf-sg:InitialTerminationTime>
589     2003-12-25T00:00:00.000000Z
590 </wsrf-sg:InitialTerminationTime>
591 </wsrf-sg:Add>
592 </s11:Body>
593 </s11:Envelope>

```

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esValueChanges

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594 The following is a non-normative example of an Add response message using SOAP 1.1 [SOAP  
595 1.1]:

```

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

```

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1.1SOAP 1.1

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1.1SOAP 1.1

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624

## 8 Notification of ServiceGroup Modification

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

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

- Deleted: TopicSpace
- Deleted: TopicSpace
- Deleted: ServiceGroupTopicSpace
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- Deleted: 1
- Deleted: 1
- Deleted: /2004/06/wsn-WS-Topics-1.2-draft-01.xsd
- Deleted: 1
- Deleted: 1
- Deleted: TopicSpace

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

/wstop:TopicNamespace/@name  
The name of the TopicNamespace associated with the WS-ServiceGroup XML namespace MUST be "ServiceGroupTopicNamespace".

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

/wstop:Topic/@name

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- Deleted: TopicSpace
- Deleted: TopicSpace

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

## 676 8.1 EntryAdditionNotification Message

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

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

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

694 /wsrf-sg:EntryAdditionNotification

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

698 /wsrf-sg:EntryAdditionNotification/ServiceGroupEntryEPR

699 This element MUST contain the EndpointReference of the ServiceGroupEntry that was  
700 added to the ServiceGroup.

701 /wsrf-sg:EntryAdditionNotification/MemberServiceEPR

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

705 /wsrf-sg:EntryAdditionNotification/Content

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

## 708 8.2 EntryRemovalNotification Message

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

```
711 <wsrf-sg:EntryRemovalNotification>  
712   <wsrf-sg:ServiceGroupEntryEPR>
```

```

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

```

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

727 /wsrf-sg:EntryRemovalNotification

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

731 /wsrf-sg:EntryRemovalNotification/ServiceGroupEntryEPR

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

736 /wsrf-sg:EntryRemovalNotification/MemberServiceEPR

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

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R

740 /wsrf-sg:EntryRemovalNotification/Content

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

744 /wsrf-sg:EntryRemovalNotification/Reason

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



## 747 **9 Security Model**

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

### 750 **9.1 Securing the message exchanges**

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

### 754 **9.2 Securing the resource properties**

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

#### 765 **9.2.1 A Note on MembershipContentRules**

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

## 774 **Appendix A. Acknowledgments**

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802

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- 815 [WS-BaseNotification] [http://docs.oasis-open.org/wsn/wsn-WS-BaseNotification-1.3-pr-](http://docs.oasis-open.org/wsn/wsn-WS-BaseNotification-1.3-pr-02.pdf)
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- 819 [WS-ResourceLifetime] [http://docs.oasis-open.org/wsrf/wsrf-ws\\_resource\\_lifetime-1.2-](http://docs.oasis-open.org/wsrf/wsrf-ws_resource_lifetime-1.2-spec-pr-02.pdf)
- 820 [spec-pr-02.pdf](http://docs.oasis-open.org/wsrf/wsrf-ws_resource_lifetime-1.2-spec-pr-02.pdf)
- 821 [WS-ResourceProperties] [http://docs.oasis-open.org/wsrf/wsrf-ws\\_resource\\_properties-1.2-](http://docs.oasis-open.org/wsrf/wsrf-ws_resource_properties-1.2-spec-pr-02.pdf)
- 822 [spec-pr-02.pdf](http://docs.oasis-open.org/wsrf/wsrf-ws_resource_properties-1.2-spec-pr-02.pdf)
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- 825 [XML-Names] <http://www.w3.org/TR/REC-xml-names/>
- 826 [XPATH] <http://www.w3.org/TR/xpath>

### 827 10.2 Non-Normative

- 828 [OGSI 1.0] Open Grid Services Infrastructure (OGSI) V1.0
- 829 [http://forge.gridforum.org/projects/ggf-editor/document/draft-ogsi-](http://forge.gridforum.org/projects/ggf-editor/document/draft-ogsi-service-1/en/1)
- 830 [service-1/en/1](http://forge.gridforum.org/projects/ggf-editor/document/draft-ogsi-service-1/en/1)
- 831 [SOAP 1.1] <http://www.w3.org/TR/2000/NOTE-SOAP-20000508>
- 832 [WS-Basic Profile 1.1] <http://www.ws-i.org/Profiles/BasicProfile-1.1.html>
- 833 [WS-Security] [http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-](http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf)
- 834 [message-security-1.0.pdf](http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-soap-message-security-1.0.pdf)
- 835
- 836 [WSDL 2.0] <http://www.w3.org/TR/wsdl20>
- 837

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

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

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838 **Appendix B. XML Schema**

839 The XML types and elements used in this specification are included here for convenience. The  
840 authoritative version of this schema document is available at [http://docs.oasis-open.org/wsrf/sg-  
842 2.xsd](http://docs.oasis-open.org/wsrf/sg-<br/>841 2.xsd).

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

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

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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-2"
  xmlns:wsrf-sg="http://docs.oasis-open.org/wsrf/sg-2"
  xmlns:wsa="http://www.w3.org/2005/08/addressing"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified"
  targetNamespace="http://docs.oasis-open.org/wsrf/sg-2" >
<!-- ===== Imports =====
-->

  <xsd:import
    namespace="http://www.w3.org/2005/08/addressing"
    schemaLocation="http://www.w3.org/2005/08/addressing/ws-
addr.xsd"/>
  <xsd:import
    namespace="http://docs.oasis-open.org/wsrf/bf-2"
    schemaLocation="http://docs.oasis-open.org/wsrf/bf-2.xsd"
  />

<!-- ===== 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"
```

```

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

```

```

982         type="wsrf-sg:EntryType"/>
983
984     <xsd:element name="Content"
985         type="wsrf-sg:ContentType"/>
986
987     <xsd:element name="MemberEPR"
988         type="wsa:EndpointReferenceType"/>
989
990     <xsd:element name="ServiceGroupEPR"
991         type="wsa:EndpointReferenceType"/>
992
993 <!-- ===== Resource Property Related
994 ===== -->
995 <!-- ===== Resource Properties for ServiceGroup
996 ===== -->
997     <xsd:element name="ServiceGroupRP">
998         <xsd:complexType>
999             <xsd:sequence>
1000                 <xsd:element ref="wsrf-sg:MembershipContentRule"
1001                     minOccurs="0" maxOccurs="unbounded"/>
1002                 <xsd:element ref="wsrf-sg:Entry"
1003                     minOccurs="0" maxOccurs="unbounded"/>
1004             </xsd:sequence>
1005         </xsd:complexType>
1006     </xsd:element>
1007
1008 <!-- ===== Resource Properties for ServiceGroupEntry
1009 ===== -->
1010     <xsd:element name="ServiceGroupEntryRP">
1011         <xsd:complexType>
1012             <xsd:sequence>
1013                 <xsd:element ref="wsrf-sg:ServiceGroupEPR"
1014                     minOccurs="1" maxOccurs="1"/>
1015                 <xsd:element ref="wsrf-sg:MemberEPR"
1016                     minOccurs="0" maxOccurs="1"/>
1017                 <xsd:element ref="wsrf-sg:Content"
1018                     minOccurs="0" maxOccurs="1"/>
1019             </xsd:sequence>
1020         </xsd:complexType>
1021     </xsd:element>
1022
1023 <!-- ===== Message Specific Types
1024 ===== -->
1025 <!-- ===== Message Types for ServiceGroupRegistration
1026 ===== -->
1027     <xsd:element name="Add">
1028         <xsd:complexType>
1029             <xsd:sequence>
1030                 <xsd:element name="MemberEPR"

```

```

1031         type="wsa:EndpointReferenceType" />
1032     <xsd:element ref="wsrf-sg:Content" />
1033     <xsd:element name="InitialTerminationTime"
1034         type="wsrf-
1035 sg:AbsoluteOrRelativeTimeType"
1036         minOccurs="0" maxOccurs="1" />
1037     </xsd:sequence>
1038 </xsd:complexType>
1039 </xsd:element>
1040
1041 <xsd:element name="AddResponse">
1042     <xsd:complexType>
1043         <xsd:sequence>
1044             <xsd:element name="ServiceGroupEntryReference"
1045                 type="wsa:EndpointReferenceType"
1046                 minOccurs="1" maxOccurs="1" />
1047             <xsd:element name="TerminationTime"
1048                 nillable="true"
1049                 type="xsd:dateTime"
1050                 minOccurs="1" maxOccurs="1" />
1051             <xsd:element name="CurrentTime"
1052                 type="xsd:dateTime"
1053                 minOccurs="1" maxOccurs="1" />
1054         </xsd:sequence>
1055     </xsd:complexType>
1056 </xsd:element>
1057
1058 <xsd:complexType name="ContentCreationFailedFaultType">
1059     <xsd:complexContent>
1060         <xsd:extension base="wsrf-bf:BaseFaultType"/>
1061     </xsd:complexContent>
1062 </xsd:complexType>
1063 <xsd:element name="ContentCreationFailedFault"
1064     type="wsrf-
1065 sg:ContentCreationFailedFaultType"/>
1066
1067 <xsd:complexType
1068 name="UnsupportedMemberInterfaceFaultType">
1069     <xsd:complexContent>
1070         <xsd:extension base="wsrf-bf:BaseFaultType"/>
1071     </xsd:complexContent>
1072 </xsd:complexType>
1073 <xsd:element name="UnsupportedMemberInterfaceFault"
1074     type="wsrf-
1075 sg:UnsupportedMemberInterfaceFaultType"/>
1076
1077 <xsd:complexType name="AddRefusedFaultType">
1078     <xsd:complexContent>
1079         <xsd:extension base="wsrf-bf:BaseFaultType"/>

```



```

1080         </xsd:complexContent>
1081     </xsd:complexType>
1082     <xsd:element name="AddRefusedFault"
1083         type="wsrf-sg:AddRefusedFaultType"/>
1084
1085 <!-- = Messages Related to ServiceGroup Change Notification
1086 ===== -->
1087     <xsd:complexType
1088 name="ServiceGroupModificationNotificationType">
1089         <xsd:sequence>
1090             <xsd:element name="ServiceGroupEntryEPR"
1091                 type="wsa:EndpointReferenceType"
1092                 minOccurs="1" maxOccurs="1"
1093                 nillable="true"/>
1094             <xsd:element name="MemberServiceEPR"
1095                 type="wsa:EndpointReferenceType"
1096                 minOccurs="0" maxOccurs="1"/>
1097             <xsd:element ref="wsrf-sg:Content"
1098                 minOccurs="0" maxOccurs="1"/>
1099         </xsd:sequence>
1100     </xsd:complexType>
1101
1102     <xsd:complexType name="ServiceGroupRemovalNotificationType">
1103         <xsd:complexContent>
1104             <xsd:extension
1105                 base="wsrf-
1106 sg:ServiceGroupModificationNotificationType">
1107                 <xsd:sequence>
1108                     <xsd:element name="Reason"
1109                         type="xsd:string"
1110                         minOccurs="0" maxOccurs="1"/>
1111                 </xsd:sequence>
1112             </xsd:extension>
1113         </xsd:complexContent>
1114     </xsd:complexType>
1115
1116     <xsd:element name="EntryAdditionNotification"
1117         type="wsrf-
1118 sg:ServiceGroupModificationNotificationType" />
1119
1120     <xsd:element name="EntryRemovalNotification"
1121         type="wsrf-sg:ServiceGroupRemovalNotificationType"
1122 />
1123 </xsd:schema>

```

## 1124 Appendix C. WSDL 1.1

1125 The WSDL 1.1 for the Web service methods described in this specification is compliant with and is  
1126 included here for convenience. The authoritative version of this WSDL is available at  
1127 <http://docs.oasis-open.org/wsr/sgw-2.wsdl>,

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1128 The following illustrates the WSDL 1.1 for the Web service methods described in this specification:

```
1129 <?xml version="1.0" encoding="utf-8"?>
1130 <!--
1131
1132 OASIS takes no position regarding the validity or scope of any
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-->

```
<wsdl:definitions name="ServiceGroup"
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:wsa="http://www.w3.org/2005/08/addressing"
  xmlns:wsrf-bf="http://docs.oasis-open.org/wsrf/bf-2"
  xmlns:wsrf-rp="http://docs.oasis-open.org/wsrf/rp-2"
  xmlns:wsrf-rpw="http://docs.oasis-open.org/wsrf/rpw-2"
  xmlns:wsrf-rw="http://docs.oasis-open.org/wsrf/rw-2"
  xmlns:wsrf-sg="http://docs.oasis-open.org/wsrf/sg-2"
  xmlns:wsrf-sgw="http://docs.oasis-open.org/wsrf/sgw-2"
  targetNamespace="http://docs.oasis-open.org/wsrf/sgw-2">
```

<!-- ===== Imports

===== -->

```
<wsdl:import namespace="http://docs.oasis-open.org/wsrf/rpw-2"
  location="http://docs.oasis-open.org/wsrf/rpw-2.wsdl" />
```

```
<wsdl:import namespace="http://docs.oasis-open.org/wsrf/rw-2"
  location="http://docs.oasis-open.org/wsrf/rw-2.wsdl" />
```

<!-- ===== Types Definitions

===== -->

```
<wsdl:types>
```

```
<xsd:schema>
```

```
<xsd:import namespace="http://docs.oasis-open.org/wsrf/sg-2"
  schemaLocation="http://docs.oasis-open.org/wsrf/sg-2.xsd" />
```

```
<xsd:import namespace="http://docs.oasis-open.org/wsrf/rp-2"
  schemaLocation="http://docs.oasis-open.org/wsrf/rp-2.xsd" />
```

```
<xsd:import namespace="http://docs.oasis-open.org/wsrf/bf-2"
  schemaLocation="http://docs.oasis-open.org/wsrf/bf-2.xsd" />
```

```
<xsd:import namespace="http://docs.oasis-open.org/wsrf/bf-2"
  schemaLocation="http://docs.oasis-open.org/wsrf/bf-2.xsd" />
```

```
<xsd:import namespace="http://docs.oasis-open.org/wsrf/bf-2"
  schemaLocation="http://docs.oasis-open.org/wsrf/bf-2.xsd" />
```

```
</xsd:schema>
```

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1219     </xsd:schema>
1220 </wsdl:types>
1221
1222 <!-- ===== Message Definitions
1223 ===== -->
1224 <!-- ===== ServiceGroupRegistration::Add
1225 =====
1226     Add(MemberEPR, Content, [InitialTerminationTime])
1227     returns: EPR to ServiceGroupEntry
1228 -->
1229     <wsdl:message name="AddRequest">
1230         <wsdl:part name="AddRequest" element="wsrf-sg:Add" />
1231     </wsdl:message>
1232
1233     <wsdl:message name="AddResponse">
1234         <wsdl:part name="AddResponse" element="wsrf-sg:AddResponse" />
1235     </wsdl:message>
1236
1237     <wsdl:message name="ContentCreationFailedFault">
1238         <wsdl:part name="ContentCreationFailedFault"
1239             element="wsrf-sg:ContentCreationFailedFault" />
1240     </wsdl:message>
1241
1242     <wsdl:message name="UnsupportedMemberInterfaceFault">
1243         <wsdl:part name="UnsupportedMemberInterfaceFault"
1244             element="wsrf-sg:UnsupportedMemberInterfaceFault"
1245         />
1246     </wsdl:message>
1247
1248     <wsdl:message name="AddRefusedFault">
1249         <wsdl:part name="AddRefusedFault"
1250             element="wsrf-sg:AddRefusedFault" />
1251     </wsdl:message>
1252
1253 <!-- ===== PortType Definitions
1254 ===== -->
1255     <wsdl:portType name="ServiceGroup"
1256         wsrf-rp:ResourceProperties="wsrf-sg:ServiceGroupRP">
1257         <wsdl:operation name="GetResourceProperty">
1258             <wsdl:input name="GetResourcePropertyRequest"
1259                 message="wsrf-rpw:GetResourcePropertyRequest" />
1260             <wsdl:output name="GetResourcePropertyResponse"
1261                 message="wsrf-rpw:GetResourcePropertyResponse" />
1262             <wsdl:fault name="InvalidResourcePropertyQNameFault"
1263                 message="wsrf-rpw:InvalidResourcePropertyQNameFault"
1264             />
1265             <wsdl:fault name="ResourceUnknownFault"
1266                 message="wsrf-rw:ResourceUnknownFault" />
1267             <wsdl:fault name="ResourceUnavailableFault"

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```

1268         message="wsrf-rw:ResourceUnavailableFault" />
1269     </wsdl:operation>
1270 </wsdl:portType>
1271
1272     <wsdl:portType name="ServiceGroupEntry"
1273         wsrf-rp:ResourceProperties="wsrf-
1274 sg:ServiceGroupEntryRP">
1275         <wsdl:operation name="GetResourceProperty">
1276             <wsdl:input name="GetResourcePropertyRequest"
1277                 message="wsrf-rpw:GetResourcePropertyRequest" />
1278             <wsdl:output name="GetResourcePropertyResponse"
1279                 message="wsrf-rpw:GetResourcePropertyResponse"
1280 />
1281             <wsdl:fault name="InvalidResourcePropertyQNameFault"
1282                 message="wsrf-
1283 rpw:InvalidResourcePropertyQNameFault" />
1284             <wsdl:fault name="ResourceUnknownFault"
1285                 message="wsrf-rw:ResourceUnknownFault" />
1286             <wsdl:fault name="ResourceUnavailableFault"
1287                 message="wsrf-rw:ResourceUnavailableFault" />
1288         </wsdl:operation>
1289     </wsdl:portType>
1290
1291     <wsdl:portType name="ServiceGroupRegistration"
1292         wsrf-rp:ResourceProperties="wsrf-
1293 sg:ServiceGroupRP">
1294         <wsdl:operation name="GetResourceProperty">
1295             <wsdl:input name="GetResourcePropertyRequest"
1296                 message="wsrf-rpw:GetResourcePropertyRequest" />
1297             <wsdl:output name="GetResourcePropertyResponse"
1298                 message="wsrf-rpw:GetResourcePropertyResponse"
1299 />
1300             <wsdl:fault name="InvalidResourcePropertyQNameFault"
1301                 message="wsrf-
1302 rpw:InvalidResourcePropertyQNameFault" />
1303             <wsdl:fault name="ResourceUnknownFault"
1304                 message="wsrf-rw:ResourceUnknownFault" />
1305             <wsdl:fault name="ResourceUnavailableFault"
1306                 message="wsrf-rw:ResourceUnavailableFault" />
1307         </wsdl:operation>
1308         <wsdl:operation name="Add">
1309             <wsdl:input name="AddRequest"
1310                 message="wsrf-sgw:AddRequest" />
1311             <wsdl:output name="AddResponse"
1312                 message="wsrf-sgw:AddResponse" />
1313             <wsdl:fault name="ContentCreationFailedFault"
1314                 message="wsrf-sgw:ContentCreationFailedFault" />
1315             <wsdl:fault name="UnsupportedMemberInterfaceFault"
1316                 message="wsrf-

```

```
1317 | sgw:UnsupportedMemberInterfaceFault"/>
1318 |     <wsdl:fault name="AddRefusedFault"
1319 |         message="wsrf-sgw:AddRefusedFault"/>
1320 |     <wsdl:fault name="ResourceUnknownFault"
1321 |         message="wsrf-rw:ResourceUnknownFault" />
1322 |     <wsdl:fault name="ResourceUnavailableFault"
1323 |         message="wsrf-rw:ResourceUnavailableFault" />
1324 | </wsdl:operation>
1325 | </wsdl:portType>
1326 |
1327 | </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>○ WSRF30, WSRF43, WSRF49, WSRF53, WSRF56</li> <li>○ Replaced refs to [State Paper]</li> <li>○ Update to use "WS-Resource Access Pattern"</li> <li>○ Changed doc identifier to "Summary Info Title"</li> <li>○ Added missing wsdl:import for WS-Addressing in wsdl</li> <li>○ Fixed selector for "UniqueInterfaces" in wsdl (WSRF60 &amp; WSRF70)</li> <li>○ Fixed namespace prefix errors in wsdl</li> <li>○ Fixed namespace prefix errors in SOAP examples</li> <li>○ Updated UML diagram</li> <li>○ 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>○ Updated namespace declarations to latest 2005/03</li> <li>○ 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
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".

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