Service Oriented Architecture Reference Model

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Abstract:
> This Service Oriented Architecture Reference Model is an abstract framework for understanding significant entities and relationships amongst them within a service-oriented environment, and for the development of consistent standards or specifications supporting that environment. It is based on unifying concepts of SOA and may be used by architects developing specific services oriented architectures or for education and explaining SOA. A reference model is not directly tied to any standards, technologies or other concrete implementation details, but it does seek to provide a common semantics that can be used unambiguously across and between different implementations.
>
> While service orientation may be a concept in architectures for a vast array of applications, this reference model scopes itself to the field of software architecture.

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43   open.org/committees/xxx/).

44   The errata page for this specification is at http://www.oasis-open.org/committees/xxx/yyy.

45

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72 1 Introduction

73 Service Oriented Architecture (SOA) as a term is being used in an increasing number of contexts
74 and specific technology implementations, sometimes with differing - or worse, conflicting -
75 understandings of implicit terminology and components. This Reference Model was developed to
76 encourage the continued growth of different and specialized SOA implementations whilst
77 preserving a common layer of understanding about what SOA is. The Reference Model allows
78 this knowledge to be shared and understood between multiple SOA implementations. This
79 Reference model is abstract in nature and does not contain the necessary level of detail to be
80 implemented.

81

82 1.1 Audience

83 1.2 How to Use the Reference Model

84 1.3 Notational Conventions and Terminology

85 The key words *must*, *must not*, *required*, *shall*, *shall not*, *should*, *should not*, *recommended*, *may*,
86 and *optional* in this document are to be interpreted as described in **[RFC2119]**.

87 1.4 Relationships to Other Standards

88

89 Due to its nature, this reference model may have an implied relationship with any group that: a/
90 considers its' work "Service Oriented"; and/or b/ declares an adoption statement to use the SOA
91 reference model of this TC as a base for their work when complete.

92

93 Additionally, there are a large number of standards and technologies that are related by the fact
94 they claim to be or are "service oriented".

95

96 Any work that aligns with the functional areas of SOA such as the service, service description,
97 advertising mechanism, service data model or service contract are likely to be directly related.

98

99 2 The Reference Model

100

101 The following figure introduces the core elements of service oriented architecture. NOTE: This is
102 draft and subject to change.

103
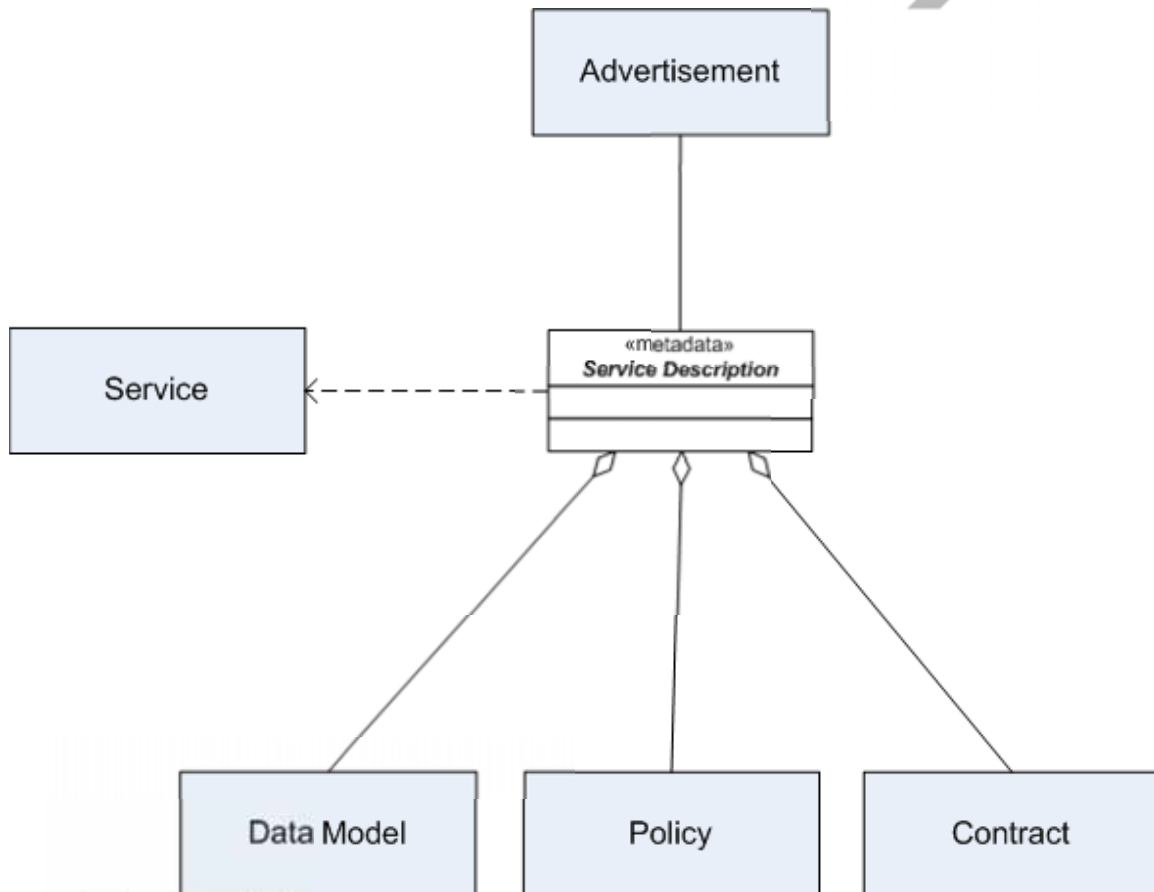
104
105 *Figure 1 - SOA Architectural Model*

106

107 2.1 Services

108

109 A Service is a set of functionality provided by one entity for the use of others.

110

111 There is no need to make architectural distinctions between services that are consumed as part
112 of a process vs. ones that are not.

113

114 Services are autonomous (self sufficient) by nature.

115

116 There is not a one to one correlation between requests to invoke a service and instances of a
117 service being consumed.

118

2.1.1 Service Composition

119

120

121 Since services are opaque, a Service Consumer cannot see anything beyond it. If one service is
122 actually consuming and aggregating two other services, the Service Consumer cannot and
123 should not know such. Whether a Service's functions are mapped to a set of classes in some
124 native language or another service is not important or relevant (other than the service metadata
125 stating what invoking the service means or does)

126

127

128 *Figure 2 - Service Composition*

129

130 Examining Figure 2 - Service Composition above, the service function (for service A) is described
131 in the service description specific to that service. If completing the function depends on two or
132 more serial or parallel paths of execution successfully completing behind the service interface
133 (like calling services B and C) within a certain time frame, that is not relevant to state in the
134 service description for service A. The service consumer is only concerned with the service's
135 ultimate success or failure. Mapping the functionality to success and failure is the responsibility of
136 the service provider. This is necessary to preserve the axiom of opaqueness.

137

138 The functionality described above is mandatory to comply with the notion of service autonomy. A
139 service alone must determine whether an invocation request succeeds or fails.

140

141 Note (non-normative) If a service consumer can see any specifics behind the service, this violates
142 several of the core principles of SOA. If visibility beyond the offered service is required, then the
143 service does not meet the demand of the service consumer. Accordingly, the service provider and
144 consumer should discuss and re engineer the service.

145

146 Note

147   When implementing, more complex patterns of service invocation can be
148   facilitated while keeping these three axioms. If a transaction sequence is needed,
149   a service interface can offer two services - a put() and a commit().

150

151 2.1.2 Service Description

152   Each logical Service has exactly one canonical Service Description.

153

154   A Service Description is comprised of three logical parts

155

156   a.   Data Model - The logical expression of a set of information items associated with the
157   consumption of a service or services;
158   b.   Policy - Assertions and obligations that service consumers and/or providers must adhere
159   to or provide; and
160   c.   Contract (and/or offer thereof) - the syntactic, semantic and logical constraints governing
161   on the use of a service.

162

163
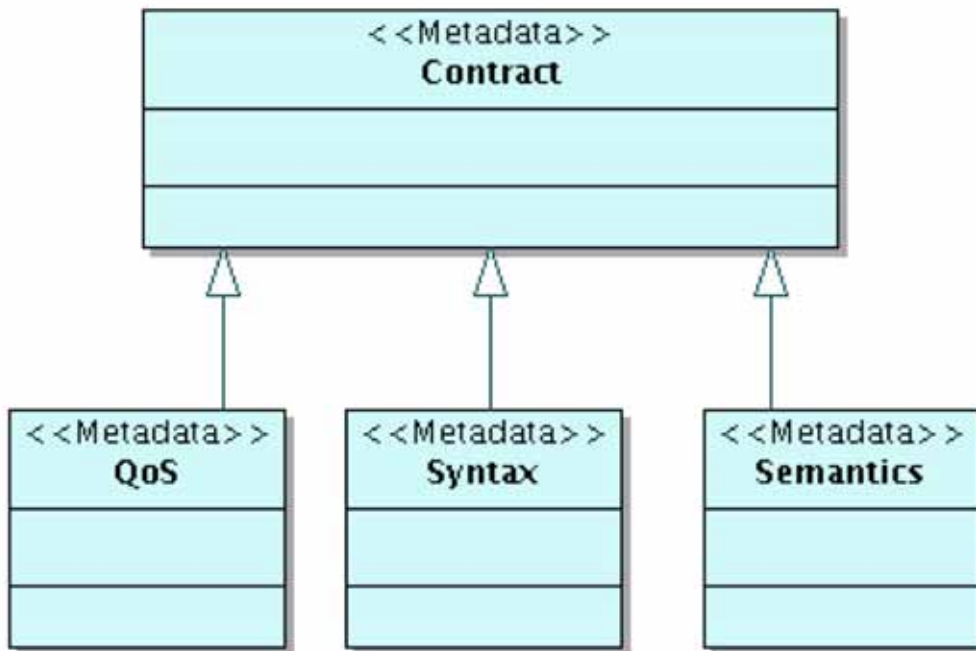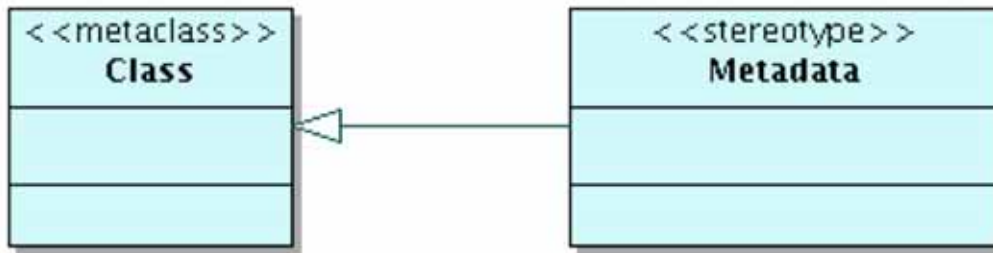
Figure 3 - Service Description

165

166

167

2.2 Advertising and Discovery

169

170 The main concept is a methodology or mechanism to convey awareness of (the existence of) a
171 service(s) to all consumers on a fabric.

172

173 Advertising makes discovery possible.

174

175 A Service Description is advertised to consumers on a fabric to make it discoverable.

176

177 Discovery does not constitute authorization to execute against the service.

178

179 [from W3C WSA] Discovery is the act of locating a resource description

180

181 Discovery involves matching a set of functional and other criteria with a set of resource
182 descriptions.

183

184 Discovery may be performed by an agent, or by an end-user

185

186 Discovery may be realized using a discovery service [end W3C WSA]

187

2.3 Policy

189

190 A Service Policy is a subset of the Service's Metadata (aka "Service Description")

191

192 A services' Policy is the set of logical assertions that service consumers and/or providers must
193 adhere to.

194

195 Policies may be set by the requester or provider and may require or permit negotiation.

196

197 Policies may be in the form of permissions or obligations.

198

199 A null security policy is still logically considered a policy.

200

201 A security policy is a specialized type of the Service Description policy noted above. Service
202 Policy may mandate security requirements to be met, and if they are not, interaction (with the
203 service) may be refused.

204

205 [RebekahMetz] Operational Description, Terms of Use, Method of Use, Required Security, etc
206 [end RebekahMetz?]

207

2.4 Data/Information Model

2.5 Semantics

2.6 Relationships between Elements

3 Defining an SOA

3.1 Basic Activities

3.2 Use Cases

The SOA Reference Model was written to be used by software systems architects to aid in the development and design of specific Service Oriented Architectures.

This SOA RM can also be used to facilitate a common understanding of what SOA is.

219 # 4 Conclusions

DRAFT

5 Conformance

DRAFT

6 References

6.1 Normative

[RFC2119]   S. Bradner, *Key words for use in RFCs to Indicate Requirement Levels*,
http://www.ietf.org/rfc/rfc2119.txt, IETF RFC 2119, March 1997.

226 Appendix A. Glossary

227 Several terms are used within this Reference Model are also used in other specifications. This
228 glossary locally scopes the semantics of those terms where ambiguity exists or overrides those
229 definitions.
230

231 **Advertising**
232

233 A methodology to convey awareness of (the existence of) a service(s) to all consumers on a
234 fabric. Advertising makes discovery possible.
235

236 **Agent (requester or provider)**
237

238 An entity acting on behalf of another entity to fulfill a task.
239

240 **Architecture**
241

242 Software architecture for a system is the structure or structures of the system, which consist of
243 elements and their externally visible properties, and the relationships among them.
244

245 **Service Consumer**
246

247 An entity which makes use of a service.
248

249 **Contract**
250

251 The syntactic, semantic and logical constraints governing on the use of a service.
252

253 **Data Model**
254

255 The logical expression of a set of information items associated with the consumption of a service.
256

257 **Discovery**
258

259 The act of gaining knowledge of a logical service, its existence and details of how to use it.
260
261

Interface

Named set of operations that characterize the behaviour of an entity.

Message

A serialized set of data that is used to convey a request or response from one party to another.

Policy

Assertions that service consumers and/or providers must adhere to.. Policies may be set by the requester or provider and may require or permit negotiation. Policies may be in the form of permissions or obligations.

Requester or provider

Person or organization involved in an SOA transaction an agent that interacts with a service in order to achieve a goal

Security

Computer security is the effort to create a secure computing platform, designed so that agents (users or programs) can only perform actions that have been allowed. This involves specifying and implementing a security policy. The actions in question can be reduced to operations of access, modification and deletion. Computer security can be seen as a subfield of security engineering, which looks at broader security issues in addition to computer security. (from Wikipedia)

Semantics

Shared conceptualization of the implied meaning of information. Represents a contract governing the meaning and purpose.

Service

A behavior, or set of behaviors provided for use by another entity.

Service description

A specification of the information necessary to a) allow a potential consumer to determine whether or not this service is applicable, and b) facilitate invocation.

Service Oriented Architecture (SOA)

A form of Enterprise Architecture. The difference between Enterprise Architecture and SOA lies mostly in the fact that EA is specific to an enterprise, while SOA can be abstracted out of a given Enterprise, and collected along with other SOA components so abstracted to form a registry of available services SOA is potentially a specialization of a combination of many things - interface based design (IBD), component architecture (CA), OO methodology etc.

Service Oriented Architecture Reference Model (SOA-RM)

A reference model is an abstract framework for understanding significant relationships among the entities of some environment, and for the development of consistent standards or specifications supporting that environment. A reference model is based on a small number of unifying concepts. A reference model is not directly tied to any standards, technologies or other concrete implementation details, but it does seek to provide a common semantics that can be used unambiguously across and between different implementations. Is not architecture for a single implementation. Is a model for developing a range of Service Oriented Architectures and analysis/comparison thereof. Is a framework for understanding significant relationships among the entities in an SOA environment. DISCUSSION POINT: should the word "elements" be used in place of "entities" above? Is based on a small number of unifying concepts of all SOAs. A Reference Model is the best mechanism to define SOA.

Appendix B. Acknowledgments

330 The following individuals were members of the committee during the development of this
331 specification:
332 [TODO: insert cte. Members]

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333 # Appendix C. Revision History

Rev	Date	By Whom	What
wd-01	2005-04-25	C.M. MacKenzie	Initial version

334

Appendix D. Notices

₃₃₅

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