5.1.1 - Service Classification Schemes

Summary

Description of the profile

A classification scheme for organizing services based on business objectives, domain, and usage

The Service Metadata makes use of defined semantics, where the semantics may be used for categorization or providing other property and value information for description classes. This requires the following capabilities:

- semantic models that provide normative descriptions of the utilized terms, where the models may range from a simple dictionary of terms to an ontology showing complex relationships and capable of supporting enhanced reasoning;
- mechanisms to support the storage, referencing, and access to these semantic models;
- configuration management mechanisms to capture the normative description of each semantic model and to apply a unique identifier in a manner consistent with an identified versioning scheme;
- one or more mechanisms to support the storage, referencing, and access to conversion relationships between semantic models, and the mechanisms to carry out such conversions.

The SOA concept of awareness defines capabilities related to service classification definition and usage:

- classification of Description elements according to standardized classification schemes.

Service Classification Schemes specializes capabilities architecturally implied by its associated concepts of Artifact, Awareness. The implied architectural capabilities are described in the following paragraphs.

Artifact An artifact is a managed resource within the Semantic Infrastructure.
An artifact is associated with the following capabilities:

- descriptions to enable the artifact to be visible, where the description includes a unique identifier for the artifact and a sufficient, and preferably a machine processable, representation of the meaning of terms used to describe the artifact, its functions, and its effects;
- one or more discovery mechanisms that enable searching for artifacts that best meet the search criteria specified by the service participant; where the discovery mechanism will have access to the individual artifact descriptions, possibly through some repository mechanism;
- accessible storage of artifacts and artifact descriptions, so service participants can access, examine, and use the artifacts as defined.

**Awareness**

A service participant is aware of another participant if it has access to a description of that participant with sufficient completeness to establish the other requirements of visibility.

Awareness is inherently a function of a participant; awareness can be established without any action on the part of the target participant other than the target providing appropriate descriptions. Awareness is often discussed in terms of consumer awareness of providers but the concepts are equally valid for provider awareness of consumers.

Awareness can be decomposed into the creation of descriptions, making them available, and discovering the descriptions. Discovery can be initiated or it can be by notification. Initiated discovery for business may require formalization of the required capabilities and resources to achieve business goals.

Mechanisms providing support for awareness will likely have the following minimum capabilities:

- creation of Description, preferably conforming to a standard Description format and structure;
- publishing of Description directly to a consumer or through a third party mediator;
- discovery of Description, preferably conforming to a standard for Description discovery. This capability is a specialization of the inherited discovery capability of Artifact;
- notification of Description updates or notification of the addition of new and relevant Descriptions;
- classification of Description elements according to standardized classification schemes.

**Capabilities**

- classification
- creation
- discovery
- identity
- metadata
- notification
- provenance
- publication
- serviceClassificationModel
- store

**Requirements traceability**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Source</th>
<th>Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>The use of well defined service metadata promotes better discovery and reuse of services during design and run time. Service metadata includes information about service interactions and dependencies. It also includes a classification scheme for organizing services based on business objectives, domain, and usage. It also links services to all the supporting artifacts in the specification and provides a placeholder for conformance statements. This enables better reuse across the enterprise and eliminates redundancy.</td>
<td>Semantic Infrastructure</td>
<td>serviceClassificationModel</td>
</tr>
<tr>
<td>Service Oriented Architecture is an architectural paradigm for organizing and utilizing distributed capabilities that may be under the control of different ownership domains. Consequently, it is important that organizations that plan to engage in service interactions adopt governance policies and procedures sufficient to ensure that there is standardization across both internal and external organizational boundaries to promote the effective creation and use of SOA-based services. SOA governance requires numerous architectural capabilities on the Semantic Infrastructure. Governance is expressed through policies and assumes multiple use of focused policy modules that can be employed across many common circumstances. This is elaborated in the inherited Policy profile. Governance requires that the participants understand the intent of governance, the structures created to define and implement governance, and the processes to be followed to make governance operational. This is provided by capabilities specialized from the inherited Management Profile. Governance policies are made operational through rules and regulations. This is provided by the following capabilities, most of which are specializations of the inherited Artifact Profile: descriptions to enable the rules and regulations to be visible, where the description includes a unique identifier and a sufficient, and preferably a machine processable, representation of the meaning of terms used to describe the rules and regulations; one or more discovery mechanisms that enable searching for rules and regulations that may apply to situations corresponding to the search criteria specified by the service participant; where the discovery mechanism will have access to the individual descriptions of rules and regulations, possibly through some repository mechanism; accessible storage of rules and regulations and their respective descriptions, so service participants can understand and prepare for compliance, as defined.</td>
<td>Semantic Profile: OASIS SOA: Governance Model</td>
<td>discovery from inherited abstract profile Artifact</td>
</tr>
<tr>
<td>A service description is an artifact, usually document based, that defines or references the information needed to use, deploy, manage and otherwise control a service. This includes not only the information and behavior models associated with a service to define the service interface but also includes information needed to decide whether the service is appropriate for the current needs of the service consumer. Thus, the service description will also include information such as service reachability, service functionality, and the policies and contracts associated with a service. A service description artifact may be a single document or it may be an interlinked set of documents. Architectural implications of service description on the Semantic Infrastructure are reflected in the following functional decomposition: Description will change over time and its contents will reflect changing needs and context. This is elaborated in the inherited Change profile. Description makes use of defined semantics, where the semantics may be used for categorization or providing other property and value information for description classes. This is elaborated in the inherited Semantic Model profile. Descriptions include reference to policies defining conditions of use and optionally contracts representing agreement on policies and other conditions. This is elaborated in the inherited Policy profile. Descriptions include references to metrics which describe the operational characteristics of the subjects being described. This is elaborated in the inherited Metrics profile. Descriptions of the interactions are important for enabling auditability and repeatability, thereby establishing a context for results and support for understanding observed change in performance or results. This is elaborated in the inherited Interaction profile. Descriptions may capture very focused information subsets or can be an aggregate of numerous component descriptions. Service description is an example of a likely aggregate for which manual maintenance of all aspects would not be feasible. This is elaborated in the inherited Composition profile. Descriptions provide up-to-date information on what a resource is, the conditions for interacting with the resource, and the results of such interactions. As such, the description is the source of vital information in establishing willingness to interact with a resource, reachability to make interaction possible, and compliance with relevant conditions of use. This is elaborated in the inherited Interoperability profile. Policy capabilities are specialization of Artifact capabilities.</td>
<td>Semantic Profile: OASIS SOA: Service Description Model</td>
<td>discovery from inherited abstract profile Artifact</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Source</th>
<th>Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>discovery from inherited abstract profile Artifact</td>
<td>discovery from inherited abstract profile Artifact</td>
<td></td>
</tr>
<tr>
<td>metadata from inherited abstract profile Artifact</td>
<td>metadata from inherited abstract profile Artifact</td>
<td></td>
</tr>
</tbody>
</table>
One of the key requirements for participants interacting with each other in the context of a SOA is achieving visibility: before services can interoperate, the participants have to be visible to each other using whatever means are appropriate. The Reference Model analyzes visibility in terms of awareness, willingness, and reachability. Visibility in a SOA ecosystem has the following architectural implications on mechanisms providing support for awareness, willingness, and reachability:

- **Creation of Description**: Preferably conforming to a standard Description format and structure.
- **Publishing of Description**: Directly to a consumer or through a third-party mediator.
- **Discovery of Description**: Preferably conforming to a standard for Description discovery.
- **Notification of Description Updates**: Or notification of the addition of new and relevant Descriptions.
- **Classification of Description Elements**: According to standardized classification schemes.

In a SOA ecosystem with complex social structures, policies that awareness may be provided for specific communities of interest. The architectural mechanisms for providing awareness to communities of interest will require support for:

- Policies that allow dynamic formation of communities of interest.
- Trust that awareness can be provided for and only for specific communities of interest, the bases of which is typically built on keying and encryption technology.

The architectural mechanisms for determining willingness to interact will require support for:

- The location or address of an endpoint.
- Verification and use of a service interface by means of a communication protocol.

The architectural mechanisms for establishing reachability will require support for:

- Determination of presence with an endpoint which may only be determined at the point interaction but may be further aided by the use of a presence protocol for which the endpoints actively participate.

### Classification

**Description**

Classification of Description elements according to standardized classification schemes.

**Requirements addressed**

- **Service Visibility Model**

**Overview of possible operations**

**creation**

**Description**

Creation of Description, preferably conforming to a standard Description format and structure;

**Requirements addressed**

- **Service Visibility Model**

**Discovery**

**Description**

One or more discovery mechanisms that enable searching for artifacts that best meet the search criteria specified by the service participant; where the discovery mechanism will have access to the individual artifact descriptions, possibly through some repository mechanism.

**Requirements addressed**

- **Service Visibility Model**
- **Service Description Model**
- **Governance Model**

**Identity**

**Description**

Descriptions which include a unique identifier for the artifact.

**Requirements addressed**

- **Governance Model**
- **Service Description Model**

**Metadata**

**Description**

A representation of the meaning of terms used to describe the artifact, its functions, and its effects.

**Requirements addressed**
Governance Model

Service Description Model

Overview of possible operations

notification

Description

Notification of Description updates or notification of the addition of new and relevant Descriptions;

Requirements addressed

- Service Visibility Model

Overview of possible operations

provenance

Description

While the Resource identity provides the means to know which subject and subject description are being considered, Provenance as related to the Description class provides information that reflects on the quality or usability of the subject. Provenance specifically identifies the entity (human, defined role, organization, ...) that assumes responsibility for the resource being described and tracks historic information that establishes a context for understanding what the resource provides and how it has changed over time. Responsibilities may be directly assumed by the Stakeholder who owns a Resource or the Owner may designate Responsible Parties for the various aspects of maintaining the resource and provisioning it for use by others. There may be more than one entity identified under Responsible Parties; for example, one entity may be responsible for code maintenance while another is responsible for provisioning of the executable code. The historical aspects may also have multiple entries, such as when and how data was collected and when and how it was subsequently processed, and as with other elements of description, may provide links to other assets maintained by the Resource owner.

Requirements addressed

Overview of possible operations

publication

Description

Publishing of Description directly to a consumer or through a third party mediator.

Requirements addressed

- Service Visibility Model

Overview of possible operations

serviceClassificationModel

Description

Service Classification Model with capabilities to create, destroy, edit, maintain service descriptions.

A classification scheme for organizing services based on business objectives, domain, and usage

The ServiceClassification Model implementation includes the following capabilities:

- metamodels and semantic annotations that provide normative descriptions of the utilized service description terms, where the models may range from a simple dictionary of terms to an ontology showing complex relationships and capable of supporting enhanced reasoning; Specific semantic concepts to be used include business objectives, domain, and usage.
- mechanisms to support the storage, referencing, and access to these semantic models;
- configuration management mechanisms to capture the normative description of each semantic model and to apply a unique identifier in a manner consistent with an identified versioning scheme;
- one or more mechanisms to support the storage, referencing, and access to conversion relationships between semantic models, and the mechanisms to carry out such conversions.

Requirements addressed

- Administer Services

Overview of possible operations

store

Description

Accessible storage of artifacts and artifact descriptions, so service participants can access, examine, and use the artifacts as defined.
Requirements addressed

- Service Description Model
- Governance Model

Overview of possible operations