Unified Service Description Language (USDL) Participants Module

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Abstract. This document describes what is called the Participants module in the third version of the Unified Service Description Language (USDL). USDL was developed as a holistic approach to describe entities provisioned into service networks, which considers and connects business, operational (functional) and technical aspects of service description. The Participants module covers concepts that relate to the actors participating in the network provisioning, delivery and consumption of services and service bundles.

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1 Introduction

As outlined in the central document of this series *"USDL Technical Overview Paper"*, services are becoming the backbone for electronic commerce. Especially the trend to provision IT-based services outside company "firewalls" with the help of intermediaries is on the increase, as it allows organizations to take new opportunities relatively quickly. In this context services are seen as tradable entities that constitute a well defined, encapsulated, reusable and business-aligned set of capabilities. The term business service is used for such services, in order to distinguish them from other types, e.g., those that are provided in a service-oriented IT infrastructure within an organization.

The Unified Service Description Language (USDL) defines a way to describe services from a business and operational point of view and align this with the technical perspective. While the latter is captured quite well by existing service description languages, USDL explicitly enables to express business characteristics set by an organization for the purpose of providing means for consumers to invoke and use business services and for intermediaries to (re)use and repurpose services. A detailed explanation of the scope and objectives of USDL is given in *"USDL Technical Overview Paper"*.

USDL on a whole is made up of a set of modules, each addressing different aspects of the overall service description. Modularization was introduced to improve readability of the model, which drastically grew in size compared to its predecessor. The modules have dependencies among each other (shown in Figure 1), as they may reuse concepts from other modules. Currently, there are 8 modules in the set that constitutes USDL version 3.0.

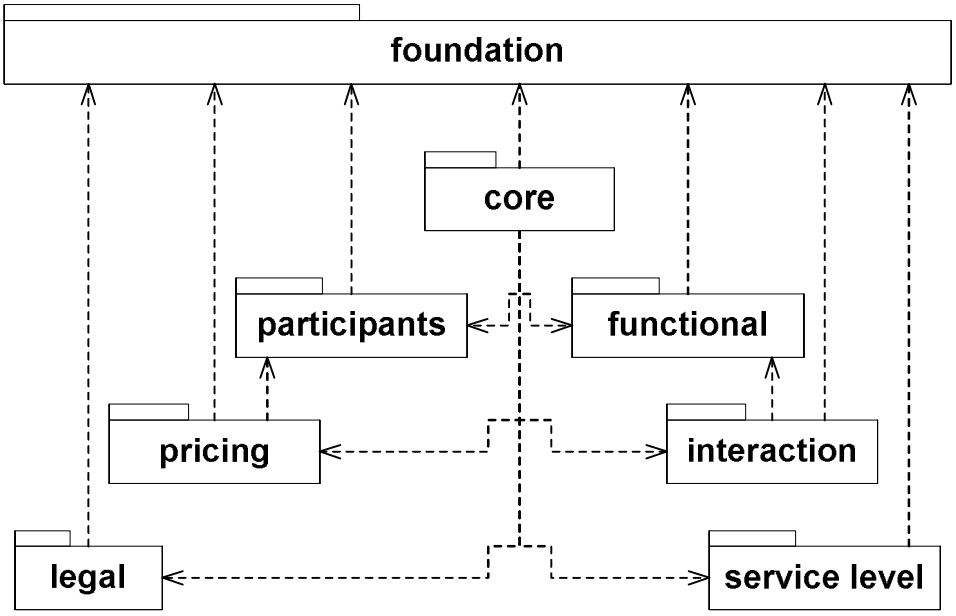

Figure 1 Packages comprising the USDL model and their dependencies (represented as arrows)

1.1 About this document

The USDL meta-model is formally defined in Ecore (the meta-modeling language of EMF), with each USDL module being captured in a separate package. This document is one in a series of USDL documents and covers the Core module defined in package “core”. The series also includes:

- *USDL Technical Overview Paper*
- Module-specific documentation of the modules *Foundation*, *Core*, *Functional*, *Interaction*, *Pricing*, *Service Level* (includes geographical and temporal availability) and *Legal*

The document only provides insights into the concepts of the Participants module. For a complete overview of USDL it is necessary to go through all documents of the series.

1.2 Acknowledgements

Work on USDL has been mainly carried out in the context of the THESEUS TEXO– a project in the frame of the THESEUS Lighthouse research program initiated by the German Ministry of Information and Technology.

Several European, German and Australian research projects also contributed to the development of USDL. Naturally, there is an extensive number of people that have contributed to conceptualization and documentation of USDL either directly or through feedback. Rather than giving the full list of individuals, it shall suffice to name the institutions they work for. The full list is available in the *USDL Technical Overview Paper* and on http://www.internet-of-services.com.

SAP Research

European Research Center for Information Systems (ERCIS), University of Muenster

Queensland University of Technology, Brisbane, Australia

University of New South Wales, Sydney, Australia

2 Participants Module

The provisioning, trade, delivery and consumption of services and service bundles through service networks potentially involve a multitude of actors. The one actor that holds governance and operational responsibility for a service is commonly referred to as service provider. It controls how the service is provisioned to consumers, e.g. what are the organizational and system resources used, or how it is implemented. In most cases the provider will also act as the trading partner to consumers and define business aspects of delivery. However, there are scenarios in which this function is performed by another legal entity – a business owner. This could be, for example, a national subsidiary of a multi-national organization.

Especially in diversified service networks, there is often more than one entity with stakes in a service. For example, composite services are aggregations that comprise services from different providers. Each aggregated provider performs part of the composite service and hence becomes a stakeholder of the composite. This is due to the fact that it is the providers, who largely control the terms of engagement with aggregators concerning the re-use or re-purposing of their services. In other words, they have a certain influence on the composite service. Further examples of stakeholders include regulation bodies, like governments, that have the authority to prescribe aspects of service delivery, as well as third-party providers of delivery functions (e.g. billing or authentication) that are orchestrated with a service enabling the outsourcing of these functions. All these actors associated with parts of the delivery of a service are summarized under the term stakeholder.

A group of actors similar to stakeholders are so-called intermediaries. Like providers of delivery functions, they, too, provide value-added services. The difference is that they are involved in the

provisioning and delivery of the service on a holistic level, i.e. the operations they perform encompass the entire service, not just a partial function.

Finally, USDL also offers the possibility to relate services to taxonomies of user groups/profiles. This allows for the definition of general target consumers, as well as fine-grained customization of service offers (by limiting them to certain groups). It is left open who defines the taxonomies, though. Most probably there will be application or domain specific taxonomies, which have to be incorporated into an individual service description when the service is provisioned in the specific environment.

2.1 Module Info

Parameters of the package that captures the module

- Namespace: *http://internet-of-services.com/usdl/modules/participants*
- Name: *participants*

The remainder of this section describes the classes and enumerations that are part of the package. Figure 2 depicts a class diagram of the package.

Note: Example fragments are provided for some of the classes. In order to improve readability they are presented in XML-based pseudo syntax. This is **NOT** the official USDL syntax, which is still under development. However, there currently exists a serialization format that is XMI-based and supported through a USDL editor developed by SAP Research.

2.2 Module Dependencies

In order to understand concepts from referenced modules in detail, it is recommended to go through the following documents describing other USDL modules:

- Foundation
- Core

A quick overview of the concepts most widely used in the Core module is given below. This will avoid extensive jumping between documents.

Name	Type	Module	Description
IdentifiableElement	Interface EClass	Foundation	Serves as the super type of all elements of USDL that can be uniquely identified, either globally or within a certain namespace
ElementDescription	EClass	Foundation	A generic concept that provides various information elements to describe USDL concepts
Agent	EClass	Foundation	Serves as the super type of all concrete entities that can participate in the delivery of a network provisioned entity
Organization	EClass	Foundation	A concept that represents institutional legal entities
NaturalPerson	EClass	Foundation	A concept that represents human legal entities
ResourceAgent	EClass	Foundation	A concept that represents concrete incarnations of (otherwise abstract) resources
Resource	EClass	Foundation	A generic concept to represent real-world objects of various types, e.g. an application, a system, a tool used to perform a service, or an object a service is performed on
Classification	EClass	Foundation	A generic concept that can be used to classify description elements into defined taxonomies

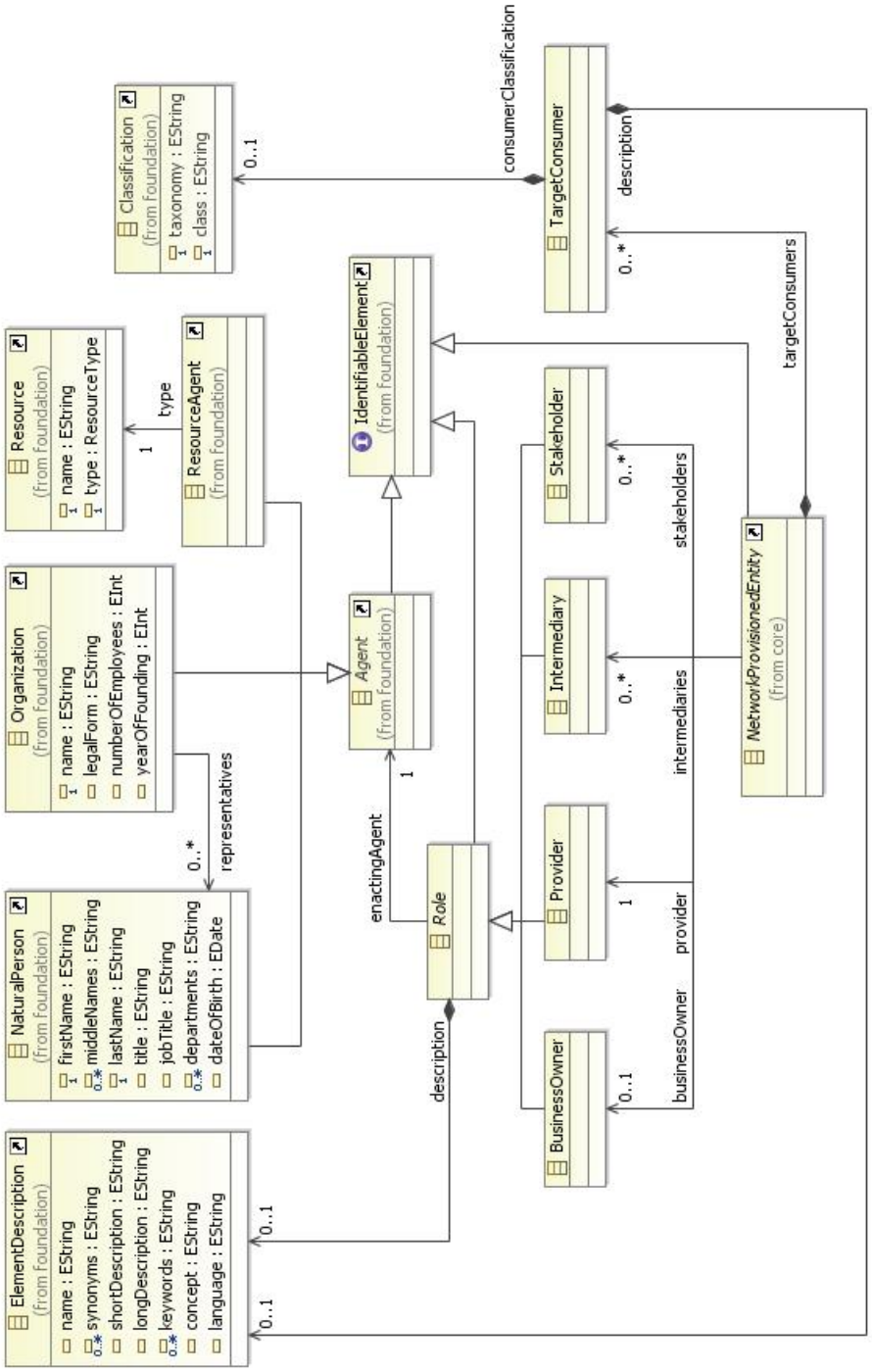

Figure 2 Class diagram of the package that captures the Core module

2.3 NetworkProvisionedEntity

There are a number of agents that possibly take part in the delivery of a network provisioned entity, i.e. service or service bundle exposed on a service network. Only network-level agents are considered here, as USDL is limited to network-level aspects of service description. Agents assume a specific role when participating.

- Ecore Type: Abstract EClass
- Interfaces: IdentifiableElement, Composable, DependencyTarget
- Superclass: N/A

NetworkProvisionedEntity			
Relations			
Name	Type	Cardinality	Description
provider	Provider	1	The provider of the service or service bundle
businessOwner	Business Owner	0..1	The optional business owner of the service or service bundle
intermediaries	Intermediary	0..*	The optional set of intermediaries that participate in the service delivery/provisioning
stakeholders	Stakeholder	0..*	The optional set of stakeholders that can influence the delivery/provisioning of the service or service bundle
targetConsumers	Target Consumer	0..*	The optional set of user groups at which the service or service bundle is targeted
Examples (in pseudo concrete syntax)			
<service> … <provider xmlns:bsn=”http://www.moonbank.com/BankingServicesNetwork/”> bsn:PROV-1234-9876 </provider> … </service>			

2.4 Role

Role serves as the super type of all concrete USDL elements/concepts that represent roles found in a service network (e.g. service provider). Agents participating in the provisioning/delivery of a network provisioned entity perform distinct functions in this context, which defines their role.

- Ecore Type: EClass
- Interfaces: IdentifiableElement
- Superclass: N/A

Role			
Relations			
Name	Type	Cardinality	Description
enactingAgent	Agent	1	Reference to the agent that assumes a role
description	Element Description	0..1	Reference to a description of the enacting agent in the context of the role

Examples (in pseudo concrete syntax)
<role xsi:type="participants:Provider" xmlns:bsn="http://www.moonbank.com/BankingServicesNetwork/"> <guid> PROV-1234-9876 </guid> <namespace> http://www.moonbank.com/BankingServicesNetwork/ <namespace> <enactingAgent> bsn:ORG-X37578-456 </enactingAgent> <description> <name> Moonbank Services </name> </description> </role>

2.5 Provider

Provider represents the entity that has governance and operational responsibility for a service in terms of organizational structures and other business aspects, as well as systems and other implementation artifacts.

- Ecore Type: EClass
- Interfaces: N/A
- Superclass: Role

2.6 BusinessOwner

BusinessOwner represents an entity that shares some of the responsibilities of the provider regarding interaction between provider and consumer. Business owners can be understood as sales channels with custodial ownership for services.

Example: A Software-as-a-Service provider that operates globally sells its services through national subsidiaries, which are different legal entities. Consumers interact with the subsidiaries (business owner) but services are delivered by the parent company (provider). A subsidiary is the main partner in sales contracts, provides support and is addressed in case of liabilities.

- Ecore Type: EClass
- Interfaces: N/A
- Superclass: Role

2.7 Intermediary

Intermediary represents entities that do not have ownership of a service, but which have a delivery or third-party provisioning role for the whole service. Examples of intermediaries include: service brokers, service marketplaces, B2B gateway providers for service mediation, cloud service providers hosting services, and channel partners enabling services to be delivered into new contexts of consumption.

- Ecore Type: EClass
- Interfaces: N/A
- Superclass: Role

2.8 Stakeholder

Stakeholder represents entities that do not have ownership of a service. They either have a vested interest in influencing or regulating the service's delivery, or are involved in the provision and delivery of parts of the service. Examples of service stakeholders include the following:

- Providers of services that are aggregated into a composite service
- Governmental authorities that regulate how a service has to be delivered
- Providers of third-party services that are concerned with dedicated outsourced delivery functions, e.g. billing, invoicing, authentication

- Ecore Type: EClass
- Interfaces: N/A
- Superclass: Role

2.9 TargetConsumer

TargetConsumer is used to capture information about user groups that are targeted to consume the service. Besides informal description, a target consumer can be associated with a classification of consumers. The idea behind this concept is to reference taxonomies of consumers that are created by a governing body of the service network where the service is provisioned to. This would then enable machine processing of this information, e.g. to assign a price model only to certain user groups.

- Ecore Type: EClass
- Interfaces: N/A
- Superclass: N/A

TargetConsumer			
Relations			
Name	Type	Cardinality	Description
consumerClassification	Classification	0..1	The reference to an entry in a user group taxonomy
description	Element Description	0..1	A description of the target consumer group
Examples (in pseudo concrete syntax)			