



4 Web Service Architecture

4.1 Definition

The definition of W3 published in the Web Services Architecture Requirements:¹

« A Web service is a software system identified by a URI [[RFC 2396](#)], whose public interfaces and bindings are defined and described using XML. Its definition can be discovered by other software systems. These systems may then interact with the Web service in a manner prescribed by its definition, using XML based messages conveyed by Internet protocols. »

4.2 Basic Concept

The basic components of a SOA are:

- Communication
- Service Description
- Directory Service

The W3 recommends for the communication of Web Services the use of SOAP, its specification defines the XML-based message format and how it is embedded into a transport protocol. SOAP is mostly transported over HTTP but is not at all dependent on this transport protocol.

WSDL, also XML-based, is used to describe the Web Service.

The directory service specifies a standardized structure for the management of Web Service metadata. This service is optional.

4.3 Standardization

W3C

OASIS

IETF

WS-I

¹ Source: <http://www.w3.org/TR/wsa-reqs/>



5 Web Service Description

In the following paragraphs we will introduce the Web Service Description Language WSDL and link it to the interface of the MileGate we want to describe.

5.1 Introduction

WSDL is an XML language for describing Web Service interfaces. The language is standardized by the W3C.

The specification of the version 1.1 exists since 2001. The following version (2.0) reached the status of a 'W3C Recommendation' in March 2006 but most of the current Web Services still use the previous version.

The description of the service is split into two parts, we have an abstract and a concrete description. The abstract view focuses on the functionality and the concrete enters more into the technical description. Like this we have a separation between the technical details and the manner our service is offered.

The components of the description are:

Abstract: Operation
 Messages Exchange Pattern
 Interface

Concrete: Binding
 Endpoint
 Service

The main difference of WSDL according to other description languages for interfaces (e.g. IDL, Interface Description Language) is that everything is concentrated in one file. We are able to communicate with the service just on the basis of the WSDL file. Of course we have also the possibility to write the description modular (include, import) to provide better legibility and maintainability.

5.2 Structure of the description

We want to introduce briefly the elements used to describe the Web Service and show afterwards a few more details using the description of our interface.

If two elements are used to describe one single element, this is due to the different versions of WSDL. The first element belongs to the version 1.1 and the second to the standard 2.0.

definitions / description (root element)



This XML element represents the root element of the WSDL file and defines the different name spaces.

documentation

The section documentation contains a textual annotation to the service.

types

Defines the usable data types.

message

This element contains the possible messages and the types they are allowed to use.

port type / interface

Describes the interfaces and the provided operations on this interface. For each operation the corresponding input and output messages are listed.

binding

With the element binding we declare which transport protocol is used for which interface. For inputs or outputs of operations we need to assign the messages to the elements of the transport protocol (for the example SOAP, this will be SOAP:body or SOAP:header)

service

Describes where the service is located. 'Services' can be subdivided into 'ports' with different addressing parameters

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5.3 Interface description



6 Web Service Concepts

6.1 Addressing

6.1.1 WS-Addressing

- How to address the MileGate
- Binding of the transport protocol
- SOAP Fault Binding
- Metadata, WS-Policy, WDSL Binding (indicate support of WS-Addressing)

6.1.1.1 Endpoint Reference

- Concept of Endpoint Reference.
- Send/Receive EPR
<http://svn.apache.org/repos/asf/cxf/trunk/testutils/src/main/resources/wsd/locator.wsdl>

6.1.2 WS-Management

- Addressing the resource
- Addressing the management function

6.1.3 WS-Transfer

- Specification of the actions (get, set, put, delete, ..)



6.2 Resource

6.2.1 WS-Discovery

- Search a ressource (e.g. discover a ldap directory)

6.2.2 WS-Resource Properties

- Uses an additional file describing which <operation> is possible on which source (e.g. /unit-11: setLabel, getLabel, Info2,..) → similar to ADF

6.2.3 WS-Notification

- Event-driven notifications

6.2.4 WS-Topics

- Subscription for notifications

WANTED

MARCEL: Interconnection between concepts