



Fraunhofer IPK

Applying Standards

2014

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Agenda

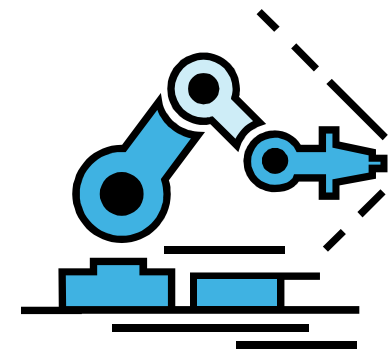
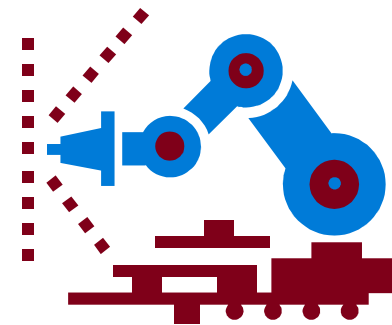
- **USDL / Linked USDL / WSDL**
- **SOAP/RESTFUL**

Invocation of manufacturing IT services

Generic Function
e.g. take(...)

Invocation

Different machinery



Precondition: Use of standards

Approach: USDL and WSDL

Unified Service Description Language (USDL)

- Holistic description of services: „USDL is used for describing business, operational and technical parameters of services”
- “Includes information like pricing, legal, service provider, interaction methods, service level agreements and so on”
- follows a modular approach

Unified Service Description Language (USDL)

Service Module	
Legal	Legal Conditions
Service Level	Service Levels, Guarantees, QoS
Pricing	Prices/ Price Plans
Participants	Information and dependancies between service participants
Service	Publication time, classifications, certifications, documentation, release stage, exposed resources,...
Functional/ Technical	What does the service do? How can the service be accessed (WSDL/ REST/..)?
Interaction	In what order should functions of the service be invoked? By whom?

USDL – Findings – Difficult to find information

- 2010 – 2011: W3C Incubator Group working on USDL (after SAP Research developed USDL)
- W3C Incubator Activity fosters rapid development of innovative ideas for specifications that are not (or not yet) clear candidates as Web standards
- Proposals for W3C Recommendations
- Not clear if it is intended to make USDL an official standard
- Currently there is no information about USDL on SAPs webpage
- Very difficult to find information about USDL. The homepage (www.internet-of-services.com) was not accessible
- Paper from 2014: „**[USDL] has received limited adoption due to its complexity [..]**“ („Linked USDL: A Vocabulary for Web-scale Service Trading“, Pedrinaci et. al.)

Search for alternatives but persistence of the standards is not transparent

WSMO-Lite	<ul style="list-style-type: none">• Adds Semantic Annotations to WSDL, enabling automatic discovery and invocation of a web service• W3C Recommendation
Linked USDL	<ul style="list-style-type: none">• Tries to reduce the complexity of USDL• Tries to build upon existing technology• Still in development• No standard
OWL-S	<ul style="list-style-type: none">• Enables automatic discovery and invocation of a web service• No standard

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- **SOAP/RESTFUL**

Introduction

- **Web Services Description Language (WSDL)**
 - WSDL is an XML-based interface description language that is used for describing the functionality offered by a Web service.
 - The current version of the WSDL is 2.0.
 - Version 1.1 has not been endorsed by the W3C but version 2.0 is a W3C recommendation.
- **Web Application Description Language (WADL)**
 - WADL is a machine-readable XML description of HTTP-based web applications (typically REST Web services).
 - WADL is the REST equivalent of SOAP's WSDL
 - WADL was submitted to the World Wide Web Consortium by Sun Microsystems on 31 August 2009, but the consortium has no current plans to standardize it and it is not yet widely supported.

Evaluation matrix

Requirements		WSDL & Soap-based		WADL & RESTful	
	Weighting	Assigned	Weighted	Assigned	Weighted
Performance	8	7	56	8	64
Security	8	8	64	6	48
Usability	6	7	42	7	42
Maintenance	6	7	42	8	48
Cost	6	8	48	7	42
Risk	8	8	64	7	56
Total			316		300

Why we choose WSDL & Soap-based

- WSDL is more standardize and widely supported.
- WSDL 2.0 can describe both Soap-based and RESTful Web services.
- In SOAP-based Web services, ws-security policy can be applied to guarantee the security.
- Soap-based is generally transport-agnostic, meaning you don't necessarily need to use HTTP.