



Grundlagen der Web-Entwicklung

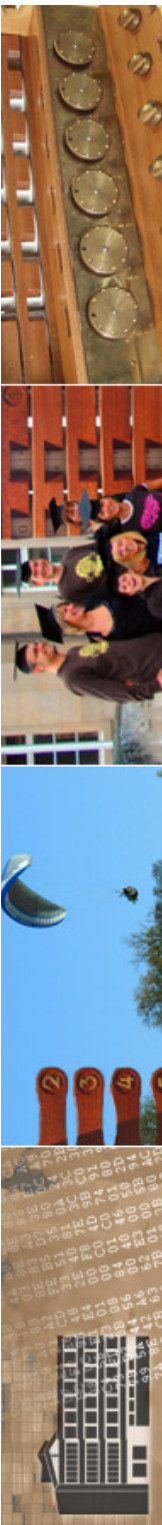
INF3172

Web-Services

Thomas Walter

01.02.2024

Version 1.0





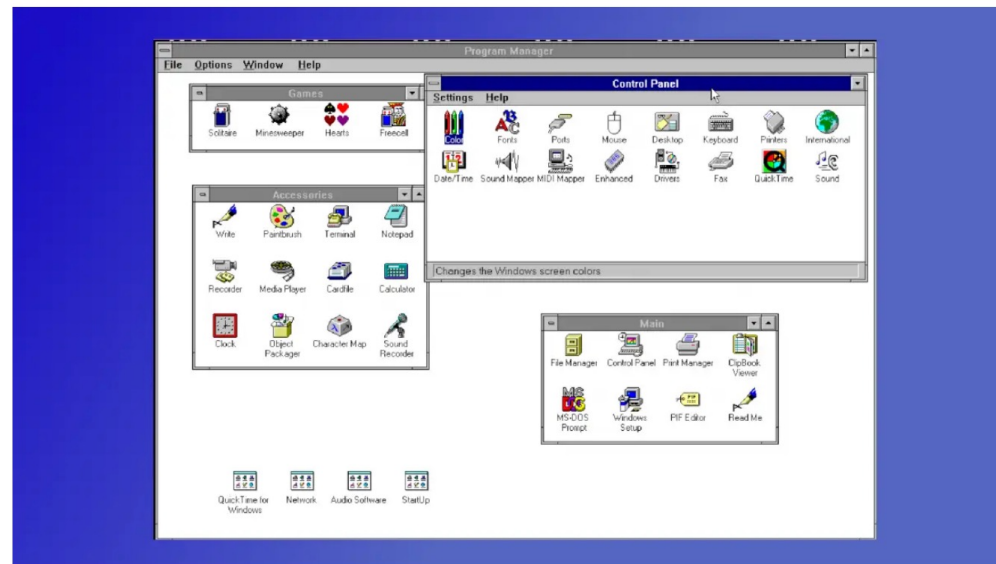
WTF

Bahnkonzern Siemens sucht Admin für Windows 3.11 for Workgroups

Der Bahnkonzern Siemens sucht in einer Stellenanzeige nach Administratoren für Windows 3.11 for Workgroups. Ja, die Bahn setzt es immer noch ein.

Lesezeit: 4 Min.  In Pocket speichern

   589



Der Windows 3.1-Desktop (Bild: Screenshot / dmk / archive.org)

UPDATE 29.01.2024 13:12 Uhr

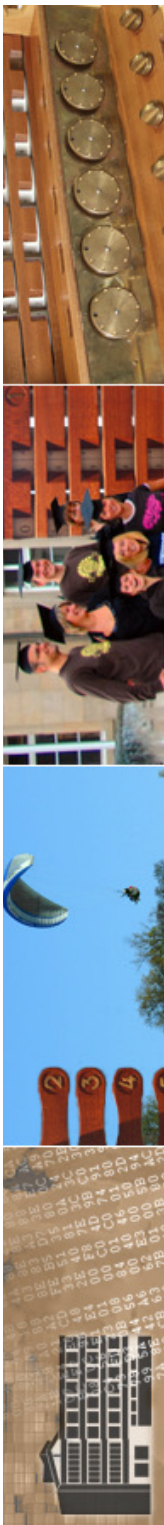
Von [Dirk Knop](#)

Eine Stellenanzeige mutmaßlich der Bahn oder des Bahnkonzerns Siemens wirkt auf den ersten Blick wie ein irrlaufender Wiedergänger aus der Vergangenheit. Darin suchte das Unternehmen nach Administratoren für Windows 3.11. Das Betriebssystem Windows 3.11 wird in wenigen Tagen 30 Jahre alt, es erschien im Februar 1994. Windows for Workgroups 3.11 erschien ein Quartal früher und



Webservice

- weitere grundlegende Architektur im Web:
Webservice (Web-Dienst)
- Zusammenarbeit verschiedener Anwendungsprogramme auf unterschiedlichen Plattformen
- primäre Quelle:
<http://www.w3.org/2002/ws/>



Web Services Activity

[Groups](#) · [News](#) · [Documents](#) · [Wiki and tools](#) · [Technical discussion](#) · [Events](#)

The World Wide Web is more and more used for application to application communication. The programmatic interfaces made available are referred to as **Web services**.

The goal of the Web Services Activity is to develop a set of technologies in order to lead Web services to their full potential. The [Web Services Activity Statement](#) explains the W3C's work on this topic in more detail.

! News



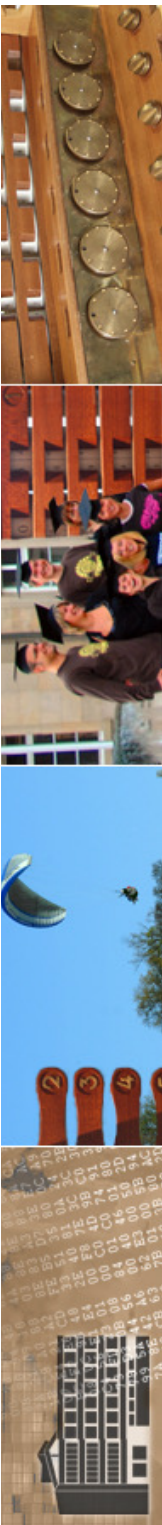
[Syndicate](#) this page via [RSS 1.0](#), an [RDF](#) vocabulary.

- **2011-04-28**: The [Web Services Resource Access Working Group](#) published seven Candidate Recommendations: [Enumeration \(WS-Enumeration\)](#), [Event Descriptions \(WS-EventDescriptions\)](#), [Eventing \(WS-Eventing\)](#), [Fragment \(WS-Fragment\)](#), [Metadata Exchange \(WS-MetadataExchange\)](#), [SOAP Assertions \(WS-SOAPAssertions\)](#), and [Transfer \(WS-Transfer\)](#). The review period ends 20 May 2011.
- **2009-09-24**: The [Web Services Resource Access Working Group](#) published five Working Drafts: [WS-Transfer](#), [WS-Resource Transfer](#), [WS-Enumeration](#), [WS-Metadata Exchange](#) and [WS-Eventing](#).
- **2009-07-10**: The [XML Schema Patterns for Databinding Working Group](#), the [Web Services Choreography Working Group](#) and the [XML Protocol Working Group](#) were closed.
- **2009-06-04**: The [SOAP-JMS Binding Working Group](#) published [SOAP over Java Message Service 1.0](#) as a Candidate Recommendation. The review period ends **31 August 2009**
- **2009-03-17**: The [Web Services Resource Access Working Group](#) published five Working Drafts: [WS-Transfer](#), [WS-Resource Transfer](#), [WS-Enumeration](#), [WS-Metadata Exchange](#) and [WS-Eventing](#).
- **2008-11-21**: The [SOAP-JMS Binding Working Group](#) published [SOAP over Java Message Service 1.0](#) as a Last Call Working Draft. The review period ends **13 January 2009**
- **2008-11-07**: The [Web Services Resource Access Working Group](#) has been created. See its [charter](#). The mission of the WS Resource Access WG is to produce W3C Recommendations for a set of Web Services specifications by refining the WS-Transfer, WS-ResourceTransfer, WS-Enumeration, WS-MetadataExchange and WS-Eventing Member Submissions, addressing existing issues in those specifications, implementation experience and interoperability feedback from implementers and considering composition with other Web services standards.



Idee

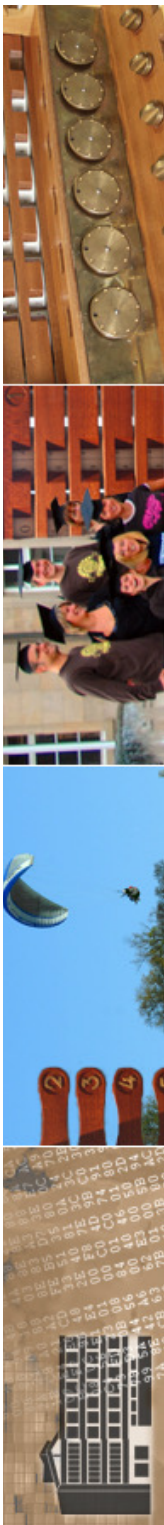
- Austausch von Daten und Funktionalität mit Web-Übertragungsmechanismen zwischen automatisierten Kommunikationspartnern
 - Maschine-Maschine-Kommunikation (Unterschied zum klassischen Web)
- Web-Services sind für die **maschinelle Nutzung**, sie bieten **keine Benutzerschnittstellen**





Definitionsversuch

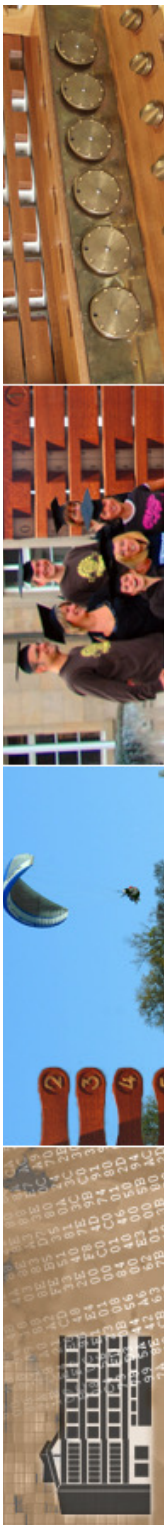
- ein Webservice ist ein Service, der von anderen Softwaresystemen über ein Netzwerk und möglicherweise auch dem Internet über SOAP aufrufbar ist.
 - die Schnittstelle eines Webservice wird mittels WSDL (Web Services Description Language) beschrieben.





Basics

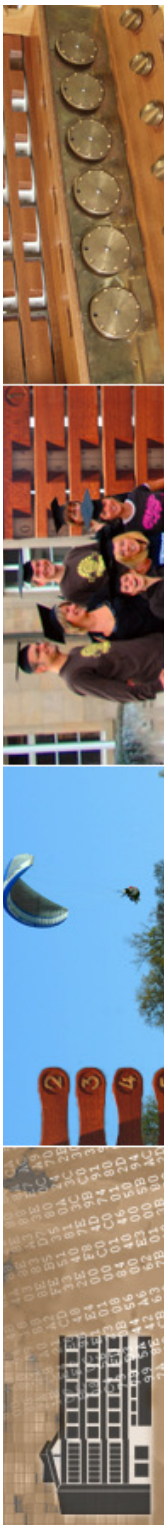
- Adressierung über Uniform Resource Identifier (URI)
- Schnittstellen XML
- Internet-Protokolle





Beispiele

- Google:
Einbinden der Google-Suche in eigene Seite
- Amazon: Webservice Shop-Suche und
Partner-Programm
 - Beispiele für einseitige Kommunikation
 - kann auch bidirektional sein





University website interface showing navigation, news, and search options.

uni-tuebingen.de


EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN

STUDIENINTERESSIERTE | STUDIERENDE | BESCHÄFTIGTE | ALUMNI | PRESSE

UNIVERSITÄT | AKTUELLES | STUDIUM | FORSCHUNG | FAKULTÄTEN | EINRICHTUNGEN | INTERNATIONAL | SERVICE

Pressemitteilungen

Stärkung der Schulpsychologie in Baden-Württemberg: Start des Kompetenzzentrums an der Universität Tübingen 05.01.2012
Enge Zusammenarbeit zwischen dem Land Baden-Württemberg und der Universität Tübingen
[\[mehr\]](#)

Ausstellung „Weltmaschine“ an der Universität Tübingen 02.01.2012

Am gigantischen Teilchenbeschleuniger des CERN sollen die Geheimnisse der Entstehung des Universums aufgeklärt werden

Adventskalender der Universität Tübingen

Aktuelle Veranstaltungen an der Universität Tübingen

Personensuche (EPV)





The screenshot shows the homepage of the Eberhard Karls Universität Tübingen. At the top, there is a navigation bar with links for 'UNI A-Z', 'KONTAKT', 'SUCHEN' (highlighted with a red box), 'ANMELDEN', and 'LANGUAGE'. Below this is a dark navigation bar with 'UNIVERSITÄT', 'FAKULTÄTEN', 'STUDIUM', and 'INTERNATIONAL'. A search overlay is active, displaying 'SUCHE' and a search box with the placeholder text 'Ihre Suchanfrage'. A red 'Suchen' button with a right-pointing arrow is located below the search box. The main content area features a large banner image of an archaeological excavation site. The banner has a dark overlay with the text 'attempo! 49 - Erbe der Menschheit: Grabungen im Nordirak'. Navigation arrows and a play button are visible on the banner. Below the banner is a section titled 'AKTUELLES UND TERMINE'.

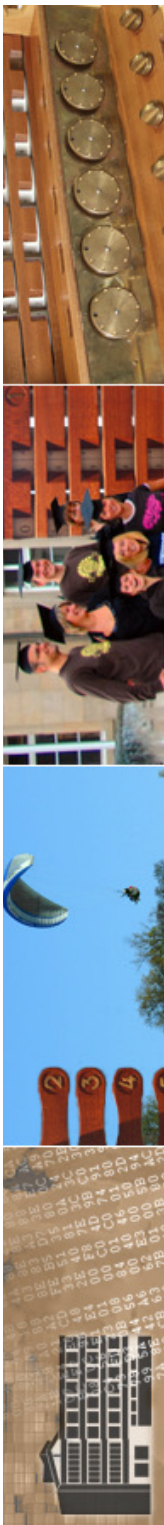




Architektur

- Client-Programm sendet Anfrage an Web-Service
 - Internet-Protokolle
- Web-Service verarbeitet Anfrage und sendet Antwort
- XML

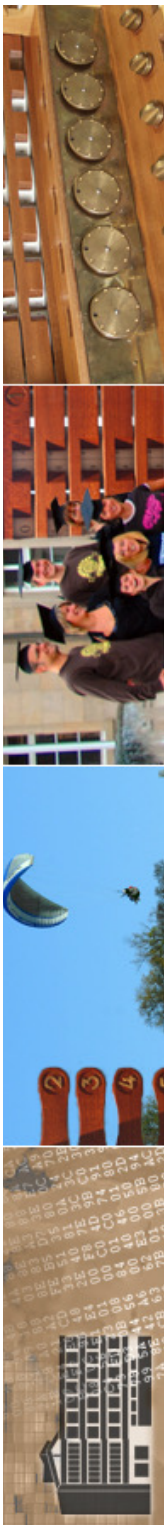
- Bestandteile:
 - Konsument
 - Anbieter
 - Verzeichnis: Veröffentlichung der Beschreibung des Dienstes durch den Anbieter





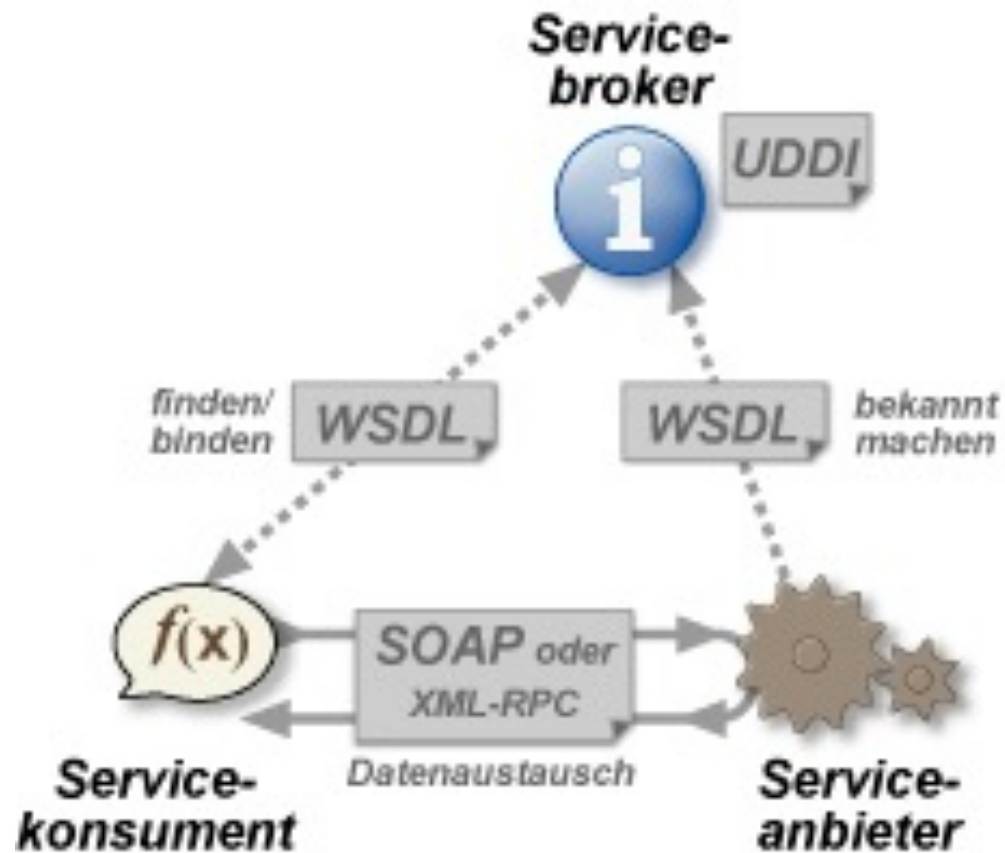
zugrundeliegende Standards

- **SOAP** oder **XML-RPC**: Kommunikation
- **WSDL** (Web Services Description Language): Sprache zur Beschreibung der unterstützten Methoden und ihrer Parameter
- **UDDI** (Universal Description, Discovery and Integration): Verzeichnisdienst zum Registrieren von Web-Services





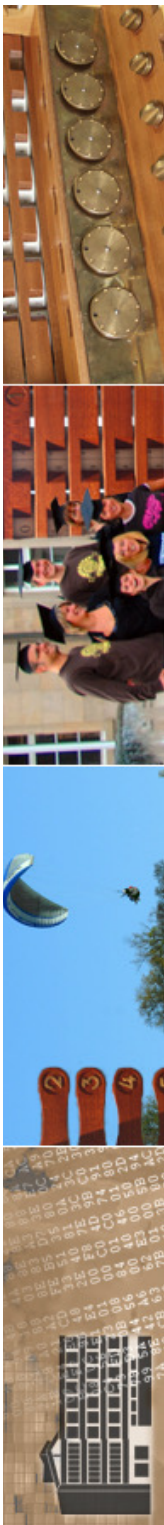
Prinzip





Prinzip der Webservices

- Service-Anbieter stellt Service zur Verfügung
- Service-Verzeichnis zum Publizieren des Service
- Service-Konsument sucht und findet Service in Service-Verzeichnis
- Service-Konsument fragt über URL Service nach
- weitere Kommunikation auf Basis von HTTP-Requests in XML





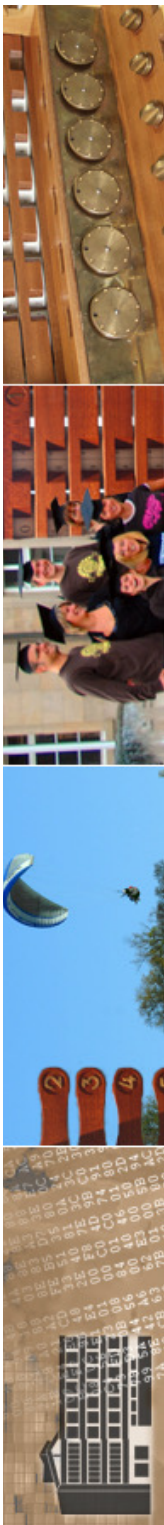
Bewertung

Vorteile

- offene Standards, keine Lizenzkosten
- verschiedene Protokolle wie HTTP, Java-RMI, CORBA, ...
- offene und flexible Architektur
- einfacher Einstieg

Nachteile

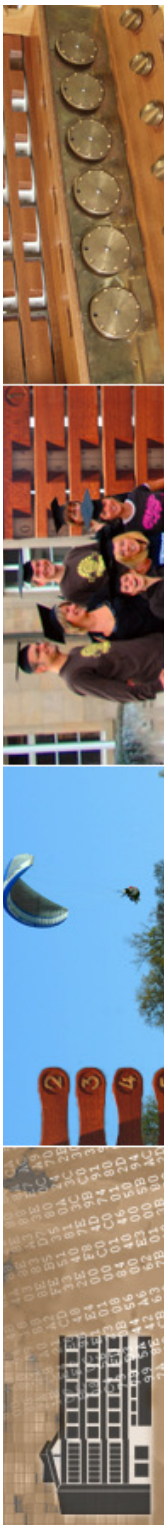
- Sicherheit
- Performance
- einzelne Techniken sind komplex





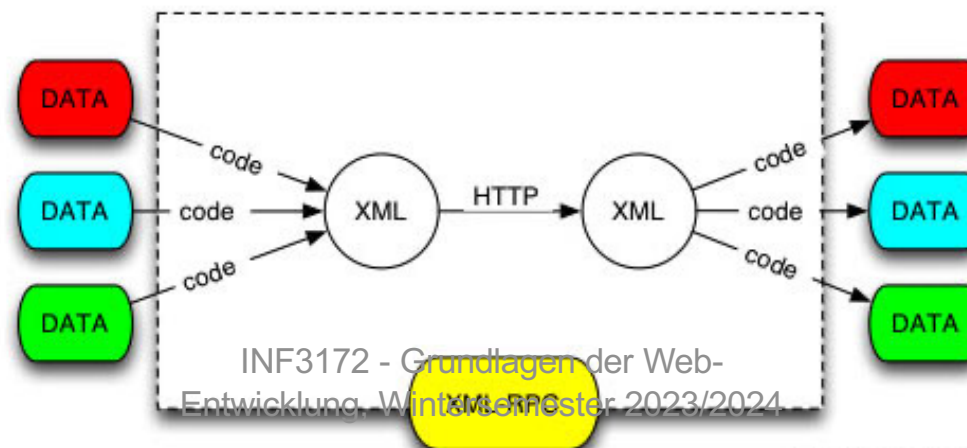
Kernbegriff: SOA

- SOA: service-oriented architecture
 - Idee 1999 von HP (e-Speak-Plattform)



Übertragung I

- XML-RPC
 - siehe <http://www.xmlrpc.com>
 - u.a. Implementierung in PHP
 - Prinzip:
 - HTTP-POST-Request
 - Request enthält Methodenaufruf und übergibt optionale Parameter
 - Antwort in einen der acht xml-rpc-Typen in XML-Struktur





Request und Response

```

• <?xml version="1.0" ?>
  <methodCall>
    <methodName>
      Berechnung
    </methodName>
    <params>
      <param>
        <value>
          <string>
            Tuebingen
          </string>
        </value>
      </param>
    </params>
  </methodCall>

```

```

• <?xml version="1.0" ?>
  <methodResponse>
    <params>
      <param>
        <value>
          <string>
            Reutlingen
          </string>
        </value>
      </param>
    </params>
  </methodResponse>

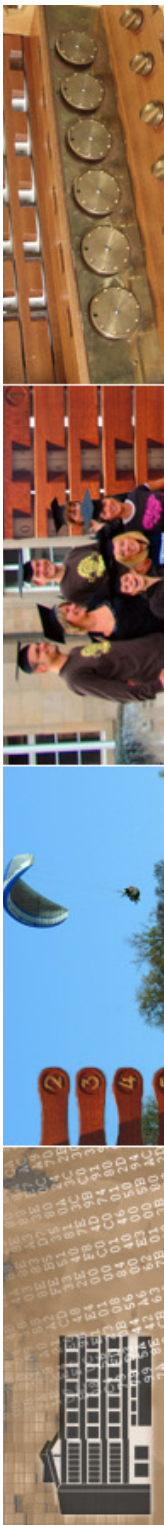
```

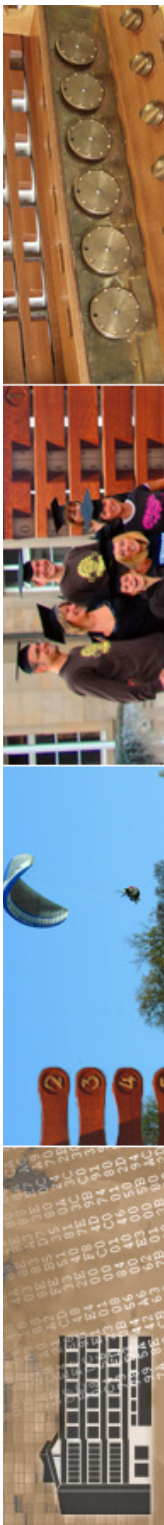




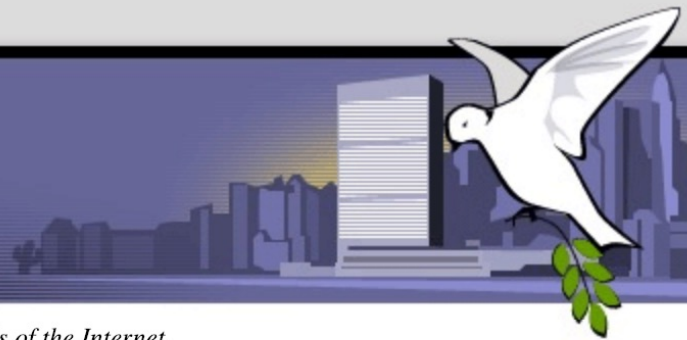
Datentypen von XML-RPC

- XML-RPC bietet acht Datentypen
 - Integer (32 bit)
 - Double (64 bit)
 - String
 - Boolean
 - dateTime
 - Base64
 - Array
 - Struktur





XML-RPC.Com



Simple cross-platform distributed computing, based on the standards of the Internet.

Home

[Spec](#)

[Mail List](#)

[Directory](#)

[C/C++](#)

[RSS](#)

[OPML](#)

[XML](#)

[Dave](#)

"Does distributed computing have to be any harder than this? I don't think so." -- [Byte](#).

What is XML-RPC? ↵

It's a [spec](#) and a set of implementations that allow software running on disparate operating systems, running in different environments to make procedure calls over the Internet.

It's remote procedure calling using HTTP as the transport and XML as the encoding. XML-RPC is designed to be as simple as possible, while allowing complex data structures to be transmitted, processed and returned.

The XML-RPC community ↵

The [implementations page](#) lists the accomplishments of the community, a set of compatible XML-RPC implementations that span all operating systems, programming languages, dynamic and static environments, open source and commercial, for Perl, Python, Java, Frontier, C/C++, Lisp, PHP, Microsoft .NET, Rebol, Real Basic, Tcl, Delphi, WebObjects and Zope, and more are coming all the time.

The [services page](#) lists the next-level-up, public applications, or "web services" that are accessible through XML-RPC.

The [communities page](#) tries to organize all the activity around XML-RPC on mail lists, websites and search engines.

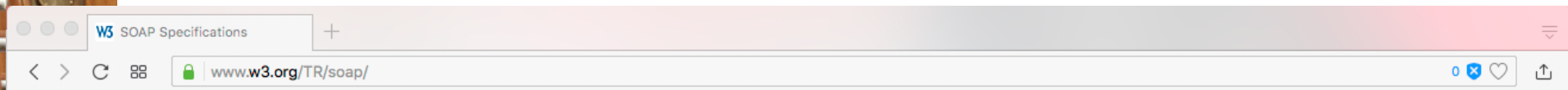
Finally, the [tutorials/press page](#) points to articles written about XML-RPC.



Übertragung II

- SOAP: Simple Object Access Protocol
 - ...ist weder simple noch dient es dem Objektzugriff
 - Akronym wird nicht mehr verwendet
 - siehe <http://www.w3c.org/TR/SOAP>
 - flexibler als XML-RPC
 - auch asynchrone Kommunikation
 - Peer-to-Peer-Kommunikation
 - nicht nur Request-Response, sondern auch Nachrichtenversand





Do not link to this page - Use dated versions of the documents

Latest SOAP versions

This page (<http://www.w3.org/TR/soap/>) contains links to the SOAP/1.1 Note and the SOAP Version 1.2 Recommendation documents.

For information about the latest work on SOAP and a full list of SOAP specifications, please refer to the [W3C XML Protocol Working Group](#) and the list of [W3C Technical Reports](#).

SOAP Version 1.2

Latest version of SOAP Version 1.2 specification: <http://www.w3.org/TR/soap12>

W3C Recommendation (Second Edition) 27 April 2007

SOAP Version 1.2 Part0: Primer

<http://www.w3.org/TR/2007/REC-soap12-part0-20070427/> (errata)

SOAP Version 1.2 Part1: Messaging Framework

<http://www.w3.org/TR/2007/REC-soap12-part1-20070427/> (errata)

SOAP Version 1.2 Part2: Adjuncts

<http://www.w3.org/TR/2007/REC-soap12-part2-20070427/> (errata)

SOAP Version 1.2 Specification Assertions and Test Collection

<http://www.w3.org/TR/2007/REC-soap12-testcollection-20070427/> (errata)

Please refer to the **errata** for these documents, which may include some normative corrections.

This document is a [Recommendation](#) of the W3C. This document has been produced by the [XML Protocol Working Group](#), which is part of the [Web Services Activity](#). It has been reviewed by W3C Members and other interested parties, and has been endorsed by the Director as a W3C Recommendation. It is a stable document and may be used as reference material or cited as a normative reference from another document. W3C's role in making the Recommendation is to draw attention to the specification and to promote its widespread deployment. This enhances the functionality and interoperability of the Web.

Simple Object Access Protocol (SOAP) 1.1

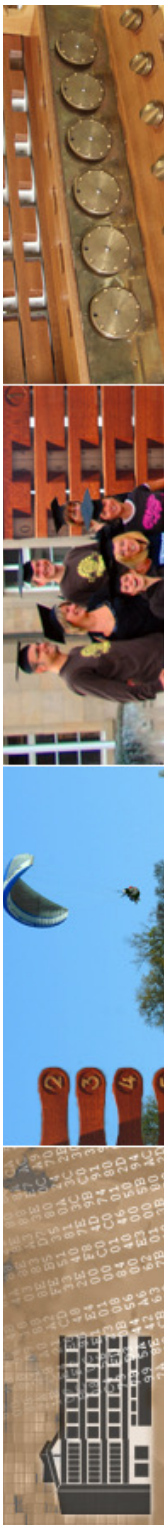
W3C Note 08 May 2000





Beschreibung von Webservices

- Webservices werden mit **WSDL** beschrieben:
Web Services Description Language
 - Bestandteile des Webservices
 - welche Daten werden ausgetauscht
 - wie ist der Webservice aufgebaut
 - siehe <http://www.w3.org/TR/wsdl>
- Beschreibung ist nicht zwingend notwendig





W3 SOAP Specifications W3 Web Services Description Language

www.w3.org/TR/2007/REC-wsdl20-20070626/

W3C

Web Services Description Language (WSDL) Version 2.0 Part 1: Core Language

W3C Recommendation 26 June 2007

This version:
<http://www.w3.org/TR/2007/REC-wsdl20-20070626>

Latest version:
<http://www.w3.org/TR/wsdl20>

Previous version:
<http://www.w3.org/TR/2007/PR-wsdl20-20070523>

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Arthur Ryman, IBM
Sanjiva Weerawarana, WSO2

Please refer to the [errata](#) for this document, which may include some normative corrections.
This document is also available in these non-normative formats: [XHTML with Z Notation](#), [PDF](#), [PostScript](#), [XML](#), and [plain text](#).
See also [translations](#).

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Abstract

This document describes the Web Services Description Language Version 2.0 (WSDL 2.0), an XML language for describing Web services. This specification defines the core language which can be used to describe Web services based on an abstract model of what the service offers. It also defines the conformance criteria for documents in this language.

Status of this Document

This section describes the status of this document at the time of its publication. Other documents may supersede this document. A list of current W3C publications and the latest revision of this technical report can be found in the [W3C technical reports index](#) at <http://www.w3.org/TR/>.

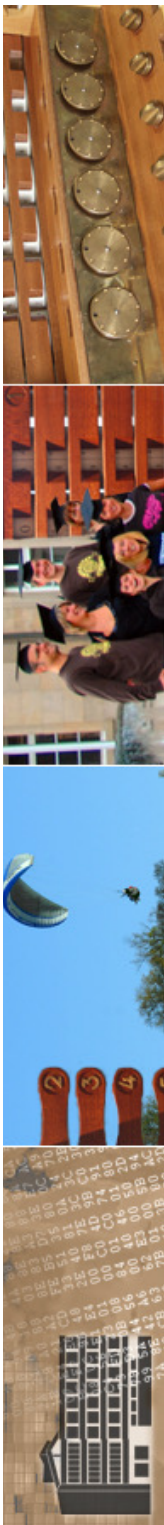
This is the [W3C Recommendation](#) of Web Services Description Language (WSDL) Version 2.0 Part 1: Core Language for review by W3C Members and other interested parties. It has been produced by the [Web Services Description Language Working Group](#), which is part of the [W3C Web Services Activity](#).

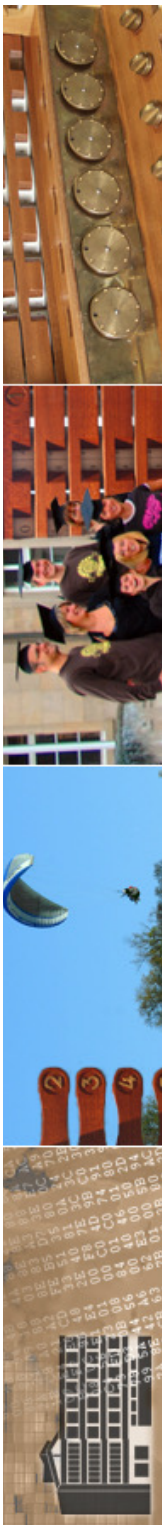




Konzept

- WSDL-Beschreibung: XML-Dokument, das den Dienst korrekt beschreibt
 - Struktur: Elemente
 - `definitions` : Name des Services, ...
 - `types` : Datentyp-Definitionen
 - `message` : Informationen über Daten in einer Nachricht
 - `portType` : Methoden
 - `binding` : Protokoll der Methoden
 - `service` : Endpunkte des Dienstes (URI)





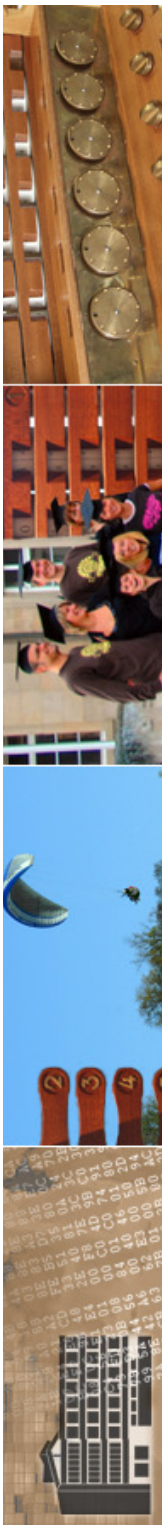
```
<?xml version="1.0" ?>
<definitions name="WeatherReport"
targetNamespace="http://www.example.org/weather.wsdl"
  xmlns:tns="http://www.example.org/weather.wsdl"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns="http://schemas.xmlsoap.org/wsdl/">
<types>
  <schema xmlns="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://www.example.org/xsd">
</schema>
</types>
  <message name="getWeatherRequest">
    <part name="forCountryCode" type="string" />
    <part name="fromDate" type="date" />
    <part name="toDate" type="date" />
  </message>
  <message name="getWeatherResponse">
    <part name="forCountryCode" type="string" />
    <part name="fromDate" type="date" />
    <part name="toDate" type="date" />
  </message>
  <portType name="PortForGetWeather">
    <operation name="getWeather">
      <input message="tns:getWeatherRequest"/>
      <output message="tns:getWeatherResponse"/>
    </operation>
  </portType>
  <binding name="getWeatherSOAPBinding"
type="tns:PortForGetWeather">
<soap:binding style="document"
transport="http://schemas.xmlsoap.org/soap/http" />
<operation name="getWeather">
<soap:operation
soapAction="http://www.example.org/soap/Weather"/>
<input>
  <soap:body use="literal"/>
</input>
<output>
  <soap:body use="literal"/>
</output>
</operation>
</binding>
  <service name="Weather Report">
    <port name="PortForGetWeather"
binding="tns:getWeatherSOAPBinding">
      <soap:address
location="http://www.example.org/Weather"/>
    </port>
  </service>
</definitions>
```





Verzeichnisdienste

- Auffinden von Webservices
- **UDDI: Universal Description, Discovery and Integration of Web Services**
 - Standard für diesen Zweck
 - aktuell Version 3.0.2
- Anbieter publiziert Webservice im Verzeichnis
- Konsument findet Webservice im Verzeichnis





UDDI Spec TC

UDDI Version 3.0.2

UDDI Spec Technical Committee Draft, Dated 20041019

Document identifier:

uddi_v3

Current version:<http://uddi.org/pubs/uddi-v3.0.2-20041019.htm>**Latest version:**http://uddi.org/pubs/uddi_v3.htm**Previous version:**<http://uddi.org/pubs/uddi-v3.0.1-20031014.htm>**Editors:**

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Pete Wenzel, SeeBeyond Technology
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Abstract:

The UDDI Version 3.0.2 Specification describes the Web services, data structures and behaviors of all instances of a UDDI registry.

Status:

This specification has attained the status of Committee Draft. This document is updated periodically on no particular schedule.

Committee members should send comments on this Committee Specification to the uddi-spec@lists.oasis-open.org list. Others should subscribe to and send comments to the uddi-spec-comment@lists.oasis-open.org list. To subscribe, send an email message to uddi-spec-comment-request@lists.oasis-open.org with the word "subscribe" as the body of the message.

UDDI Shutdown

- Unterstützung von UDDI geht zurück

UDDI Business Registr x +

← → ↻ 🏠 🌐 uddi.microsoft.com/about/FAQshutdown.htm ☆ 🔧

UBR Shutdown FAQ

1. Why are IBM, Microsoft and SAP discontinuing the operation of the UDDI Business Registry?

The UDDI Business Registry (UBR) was part of the UDDI Project announced in September 2000. The project goals were to define a set of specifications to enable description, discovery and integration and to prove interoperability through a shared implementation of those specifications and provide feedback to refine the specifications through operational experience. The specifications were contributed to the OASIS international standards consortium in 2002. In May of 2003 and February 2005, respectively, the UDDI version 2 and UDDI Version 3 specifications were approved as OASIS standards. The primary goal of the UBR was to prove the interoperability and robustness of the UDDI specifications through a public implementation. This goal was met and far exceeded. The UBR ran for 5 years, demonstrating live, industrial strength UDDI implementations managing over 50,000 replicated entries. The practical demonstration provided by the UBR helped in the ratification of UDDI specifications as OASIS standards and several software vendors now include UDDI support as a key feature in their software products. UDDI registries are being broadly deployed to solve application and service integration challenges.



Web Services Search Engine x

webservices.seekda.com

login register home help contact

Seek Services News Consumers Providers About

What is seekda?

seekda™ is the free search engine for **Web API** (Web Services at the moment) and their **providers**.

We run a **focused crawled** that gathers information about services available on the Web and we **monitor** these services daily. We also allow our users to **edit certain data** regarding providers or their services.

Insemtives

insemtives
Incentives for Semantics

seekda! Web Services in development! Browse through service categories, seek for RESTful services, and more!

Within the context of the research project Insemtives, seekda! is working on the further development of its Web Services search engine. Check out new features, such as support for Web APIs (a.k.a. RESTful services), classification of services, enhanced service

Web Services Search Engine

Web Services

seekda's Web Services portal provides a direct access to a robust technology platform **search for public Web Services**, and in the near future a **one-stop-shopping market** for services offered by providers from all around the world.

With Web Services technologies you enable, convert and enhance your applications to true based solutions. By using Web Services, you can plug-in and immediately use new components as easily as you already use software libraries today. The only difference in comparison to the traditional programming model is the ability to access functions and exchange messages not only within your local system, but with computer systems from all around the world. Web Services overcome problems of integration, as they were specifically developed to address problems of interoperability between applications.

The seekda **Web Services Search Engine** helps you to find Web Services based on a catalogue of more than 28,000 service descriptions. Services listed at seekda cover a wide range of functionality. For example, we have identified services that can send messages via fax or sms, validate addresses or allow you to translate some text. To find Web Services just type the keyword or the whole phrase into seekda Web Services Search Engine or alternatively browse Web Services and their providers by several other criteria defined by us.

Get in Touch

Questions or suggestions about seekda Web Services Search Engine? Contact us via [mail](#). (no free agent available to chat)

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📁 Andere Lesezeichen

Web Service Search

A web service is a network accessible interface to application functionality, built using standard Internet technologies. The features that web services are published through UDDI registration nodes; that web services have standard description documents, WSDL documents; and that each web service is made up of particular operations, and each operation has particular input and output parameters, distinguish web service search from other web contents search. Therefore, instead of crawling the web for web services, we obtain web services from UDDI registration nodes, and focus on (1) extracting the semantic meaning of web services based on WSDL descriptions; (2) performing composition of web services to form a web service repository; and (3) presenting the users a search interface that exposes the semantic relationship of web services to the largest extent.

Project Members

- [Alon Halevy](#)
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- Ema Nemes
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Related Projects

[Woogle -- Web Service Search Engine](#)

Features in v1.0 (2003/10):

- Web service category browse
- Keyword search
- Input/output parameter search
- Web service on-site try
- Web service status report (whether the web service is down or malfunctioned)

Features in v2.0 (2004/3):

- Similarity search for web services. Given a web-service operation, return
 - operations with similar functionalities
 - operations with similar inputs/outputs
 - operations that compose

Features in v3.0 (2004/6):

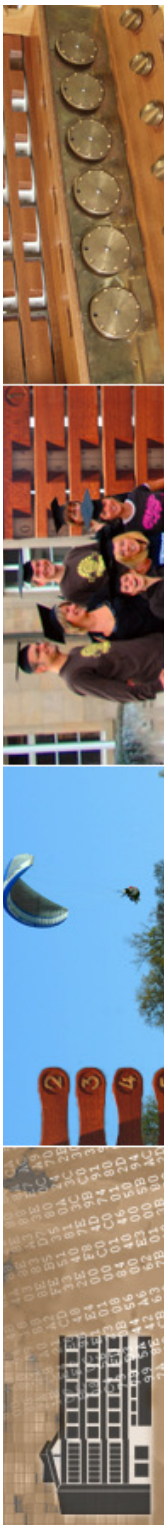
- Template search: Search web-service operations by specifying the input, output, and functionality description.
- Composition search: Search compositions of operations that fulfill the user's requirement.
- Composition similarity search: Given a web-service operation, return compositions of operations with similar functionality.





Webservice und Sicherheit

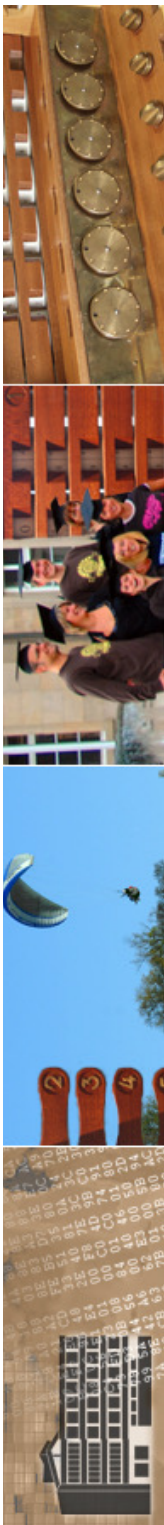
- Webservices gelten als *besonders kritisch in Hinsicht auf die Sicherheit*
 - Angreifer von außen hat viele Angriffspunkte
 - Teillösungen
 - SSL
 - IPsec und VPN
 - Firewalls





Standards für Sicherheit

- XML-Signature: digitale Signatur in XML
- XML-Encryption: Verschlüsselung von Daten
- XKMS: XML Key Management Specification
- SAML: Secure Assertion Markup Language
- WS-Security





...und nun...

- kennen wir das Prinzip von Webservices als weiteres Architekturbeispiel im Internet

