The Team

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(i) Quick Overview
Motivation

- “It is not the strongest of the species that survive, nor the most intelligent, but the ones most responsive to change” *Charles Darwin*

- Software systems too complex
- Distributed Systems
  - Dealing with legacy systems
  - Heterogeneity
  - Complexity
  - Different owners
- Service-oriented Architecture (SOA)
Example:
A Car Brokerage Application

Definitions

- **What is a Service?**
  - “The performance of work (a function) by one for another” [4]

- **What is a Web Service?**
  - “A Web Service is a platform-independent programmable module with standard interface descriptions that provide universal accessibility through standard communication protocols” [5]
The Role of Web Services

- Technical realizing of Service-oriented Architecture (SOA)
- Service-oriented Architecture is
  - “a business-centric IT architectural approach that supports integrating business as linked, repeatable business tasks, or services. SOA helps users build composite applications, which are applications that draw upon functionality from multiple sources within and beyond the enterprise to support horizontal business processes.” [5]
### Web Services Standards Stack

<table>
<thead>
<tr>
<th>Service Composition</th>
<th>WS-Service Group</th>
<th>WS-Notification</th>
<th>BPEL4WS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Service (QoS)</td>
<td>WS-Security</td>
<td>WS-Transaction</td>
<td>WS-Resource Lifetime</td>
</tr>
<tr>
<td>Description/Publishing/Discovery</td>
<td>WS-Resource Properties</td>
<td>WS-Base Faults</td>
<td>UDDI</td>
</tr>
<tr>
<td></td>
<td>XSD</td>
<td>WSDL</td>
<td>WS-Policy</td>
</tr>
<tr>
<td>Messaging</td>
<td>XML</td>
<td>SOAP</td>
<td>WS-Addressing</td>
</tr>
<tr>
<td>Transports</td>
<td>HTTP/HTTPS</td>
<td>SMTP</td>
<td>RMI / IIOP</td>
</tr>
</tbody>
</table>

Source: Dr. Daniel Sabbah, Vice President of Strategy & Technology, IBM Software Group, Globus World 2004
Triangular SOA Operational Model
Triangular SOA Operational Model

1. Discover
2. Publish
3. Bind

Service Registry

Service Consumer

Service Provider

WSDL
Triangular SOA Operational Model

1. UDDI (Unstructured Directory Directory Interface) - Discover
2. Service Registry
3. Bind

4. Service Provider
5. WSDL (Web Services Description Language) - Publish

Service Consumer
Triangular SOA Operational Model
Triangular SOA Operational Model

Service Consumer

Service Provider

Service Registry

UDDI

Discover

Bind

WSDL

SOAP

Publish

WSDL

SOAP

XML code snippet:

```
<definitions name="StockQuoteService"

targetNamespace="http://www.getquote.com/StockQuoteService"

xmlns:interface="http://www.getquote.com/StockQuoteService-interface"

xmlns:xsd="http://www.w3.org/2001/XMLSchema"

xmlns:soap="http://schemas.xmlsoap.org/soap/

xmlns:xmsoap="http://schemas.xmlsoap.org/wsdil/"

</documentation>

This service provides an implementation of a standard stock quote service. The Web service uses the live stock quote service provided by XMLtoday.com. The XMLtoday.com stock quote service uses an HTTP GET interface to request quote, and returns an XML string as a response.

For additional information on how this service obtains stock quotes, go to the XMLtoday.com web site: http://www.xmltoday.com/examples/soap/stock.psp.

<service name="StockQuote SERVICE">

<port name="SingleSymbolServicePort" binding="http://schemas.xmlsoap.org/soap/

<documentation>Single Symbol Stock Quote Service</documentation>

<soap:address location="http://www.getquote.com/stockquoteservice"/>
</port>

</service>
```
Triangular SOA Operational Model

![Diagram of Triangular SOA Operational Model]

- Service Consumer
- Service Provider
- UDDI
- WSDL
- SOAP
Triangular SOA Operational Model

A SOAP request:

```xml
                   xmlns:xsd="http://www.w3.org/2001/XMLSchema"
                   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SOAP-ENV:Body>
    <GetStockPrice>
      <symbol>IBM</symbol>
      <n1:StockName>IBM</n1:StockName>
    </GetStockPrice>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```
Triangular SOA Operational Model
Semantic Web Services on 1 slide

1. Publish
2. Discover
3. Bind

Service Registry

Service Consumer

Service Provider

WSDL
Semantic Web Services on 1 slide

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WSDL

Keywords, human negotiation

Syntactical information
Semantic Web Services on 1 slide

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Service Provider

Publish

Discover

Bind

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Semantic Web Services on 1 slide

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WSDL

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Service Consumer

Discover

Bind

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Publish
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Keywords, human negotiation

Syntactical information

Semantic information

Service Registry

WSDL

Ontology A

ID="FlightBookingService"

subclassOf ref="TravelBookingService">

<hasInput type="OntA#DeptAirport">

"DeptAirport" ∈ Ontology A

Service Consumer

Service Provider

Discover

Publish

Bind

HPI Hasso Plattner Institut
Semantic Web Services on 1 slide

Service Registry

WSDL

Service Consumer

Service Provider

Ontology A

Ontology B

Syntactical information

Semantic information

Human negotiation

Discover

Bind

Publish

<class ID="FlightBookingService">
  <subclassOf ref="TravelBookingService">
    ...
    <hasInput type="OntA#DeptAirport">
      ...
      "DeptAirport" ∈ Ontology A
    "Airfield1" ∈ Ontology B
  </hasInput>
</subclassOf>

Keywords, human negotiation

Semantic Matchmaking

Human negotiation
Semantic Web Services on 1 slide

Keywords, human negotiation

Semantic Matchmaking

WSDL

Syntactical information

Semantic information

Ontology A

Ontology B

Semantic Service

Consumer

Service Registry

Service Provider

Service

Discover

Publish

Bind

Negotiation/Mediation
OntA vs. OntB
DeptAirport ?= Airfield1

Human negotiation

:class ID="FlightBookingService">

<subclassOf ref="TravelBookingService">

...<hasInput type="OntA#DeptAirport">

...
Topics Areas

1 Service Management
Topics Areas

1. Service Management
2. Service Discovery and Selection
Topics Areas

1. Service Management
2. Service Discovery and Selection
3. Service Composition
Topics Areas

1. Service Management
2. Service Discovery and Selection
3. Service Composition
4. Quality of Service
Topics Areas

1 Service Management
2 Service Discovery and Selection
3 Service Composition
4 Quality of Service
5 Applications
6 Applications
Topics Areas

1. Service Management
2. Quality of Service
3. Service Composition
4. Tools and Use-cases
5. Applications
6. Service Discovery and Selection
Yu et al. **Deploying and managing Web services: issues, solutions, and directions.**
- Research problems, solutions, and directions to deploying Web services that are managed by an integrated Web Service Management System (WSMS)

Repp et al. **A cross-layer approach to performance monitoring of web services.**
- Detect bad performance and service interruptions much earlier rather than waiting for their propagation through the full protocol stack

Schröpfer et al. **A Flexible Approach to Service Management-Related Service Description in SOAs.**
- Describe a service description approach that is based on OWL-S and focuses on non-functional criteria, such as price, availability.

Kaminski and Perry. **Employing intelligent agents to automate SLA creation.**
- System that the parties can use to facilitate both fast and flexible agreements.

Gunarathne et al. **BPEL-Mora: Lightweight Embeddable Extensible BPEL Engine.**
- Embeddable, scalable and extensible WSBPEL compliant process engine
- Stein et al. **Enabling business experts to discover web services for business process automation.**
  - A structural and a semantic matching algorithm as well as a tool for Web service assessment by non-IT people.

- Baldoni et al. **Service selection by choreography-driven matching.**
  - Retrieving a web service, which can play a given choreography role, preserving at the same time a condition of interest

- Sirbu et al. **A logic-based approach for service discovery with composition support.**
  - A logic based approach for service discovery with composition support

- Küster et al. **Evaluation of semantic service discovery-a survey and directions for future research.**
  - Discuss the applicability of well-known evaluation methodologies from information retrieval and provide an exhaustive survey of the current evaluation approaches
Topics

3. Service Composition

- Lau and Tran. **Composite web services.**
  - Approach where entire services are composed into composite services

- Lécué et al. **A framework for dynamic web services composition.**
  - A framework for performing dynamic service composition by exploiting the semantic matchmaking between service parameters to enable their interconnection and interaction

- Quintero et al. **Model Centric Approach of Web Services Composition.**
  - A Web service composition modeling solution, following the MDA approach, considering both structural and dynamic properties enriched with semantic constraints

- Ruiz and Pelechano. **Model Driven Design of Web Service Operations using Web Engineering Practices.**
  - Approach that allows identifying the operations of Web services following a model driven approach, taking the OO-Method / OOWS conceptual models as the source

- She et al. **The SCIFC Model for Information Flow Control in Web Service Composition.**
  - An access control model to empower the services in a service chain to control the flow of their sensitive information
- Le-Hung Vu. *Towards Probabilistic Estimation of Quality of Online Services*
  - A framework that uses domain knowledge on service structure and related constraints, to effectively get accurate estimation of quality of online services

- Pahl et al. *Model-Driven Performance Evaluation for Service Engineering*
  - An approach for the empirical, model-based performance evaluation of services and service compositions in the context of Model-driven service engineering

- Nepal et al. *Reputation Propagation in Composite Services*
  - A method of distribution of reputation received by a composite service to its component services, which guarantees “fair share” of reputation
- Fei et al. **A MapReduce-Enabled Scientific Workflow Composition Framework**
  - A MapReduce-enabled scientific workflow composition framework, which deals with both the world of tasks and the world of workflows
- Dasgupta et al. **An Abstraction Framework for Service Composition in Event-Driven SOA Systems**
  - A proactive event-driven model where user activities and services are treated as events
- Yu and Rege. **A Relational approach for efficient service selection**
  - A systematic approach for efficiently service selection by using QoWS as the major criterion, by adopting a relational approach QoWS information in a relational DBMS
Topics

6 Semantic Web Services Tools and Use-cases

- Ankolekar et al. **Tools for Semantic Web Services**
  - 5 tools: Java ↔ WSDL → OWL-S → UDDI

- Ljiljaba Stojanovic. **Ontology-based Change Management**
  - How to handle changes while bypassing inconsistencies

- Drumm and Cabral. **An eGovernment Case Study**
  - How to integrate services across different service providers

- Della Valle et al. **An eHealth Case Study**
  - Discovery of second opinion services and mediation and record linkage between health care datasets
(iii) Organization
Organization

- **Web page:** [http://www.hpi.uni-potsdam.de/naumann/lehre/ws_0910/ws.html](http://www.hpi.uni-potsdam.de/naumann/lehre/ws_0910/ws.html)
- ECTS credit points: 3.
- **Time:** **Thursday 09:15 – 10:45.**
- **Location:** **HPI A-2.2.**
- **Registration:**
  - Email with your favorite **3-topics** from *distinct areas* to (Mohammed AbuJarour) before **26.10.2009**.
- **Prerequisites:**
- Session on “Foundations of Web Services” next week.
- Papers will be available / accessed online or in the library.
Requirements to pass the seminar:

- Attendance:
  - Show up in all sessions.
  - If you cannot attend for some reason, let us know per email beforehand.

- Give a talk in English:
  - 30 minutes: talk.
  - 15 minutes: discussion and comments.

- Participation:
  - In all talks.
  - Discussion and challenging questions.

- Report
  - The report should discuss (not summarize) the assigned work/material.
  - Show strengths, weaknesses, suggestions and comments ...
  - Due in 3 weeks from the date of the talk.
  - Around 8-10 pages
The End