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**Process Interoperability
with Semantic Web Services**

Michael Stollberg
DERI Austria
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DERI ... About Us



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- DERI = Digital Enterprise Research Institute
- established in 2002
- Director: Dieter Fensel
- Mission: “make semantic technologies a reality”
 - Ontologies
 - Semantic Web Services
 - => Semantically Enabled Service-Oriented Architectures
- public funding & industrial cooperations
- 120 members world-wide

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DERI International – Status



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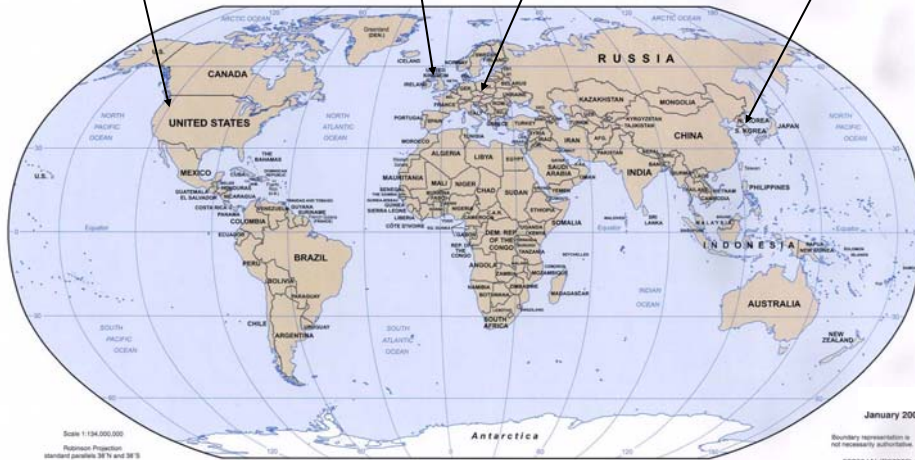
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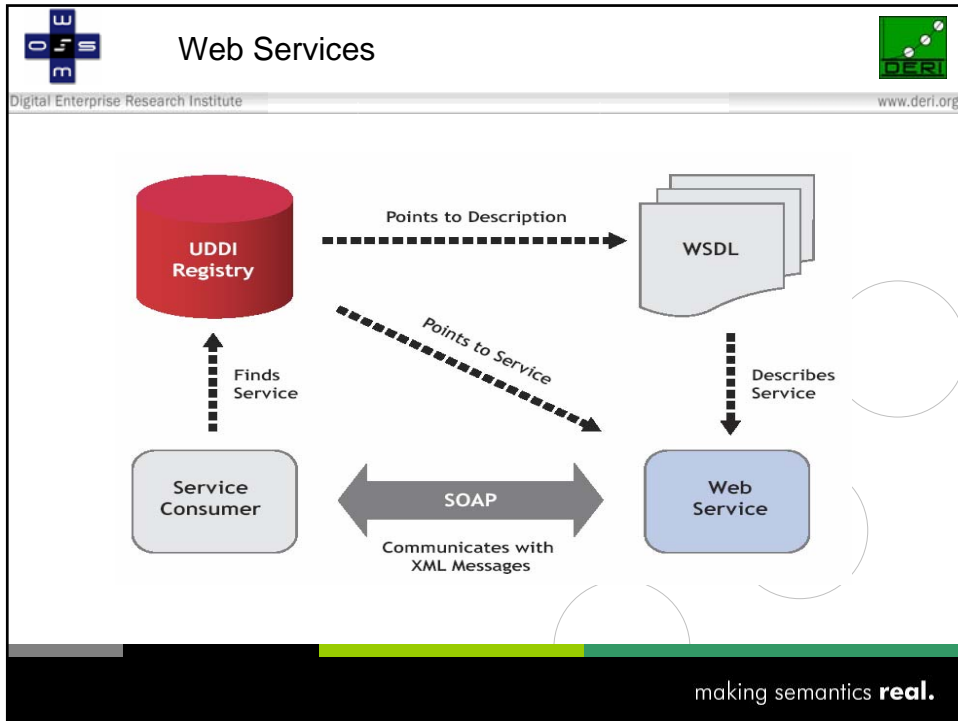


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- **Semantic Web Services**
 - Aim & Approach
 - The Web Service Modeling Ontology WSMO
 - Semantic SOA
- **Process Interoperability**
 - Web Service Interfaces
 - Process Level Mediation
 - Process Mediation Patterns

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Deficiencies of WS Technology

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- current technologies allow usage of Web Services
- but:
 - only syntactical information descriptions
 - syntactic support for discovery, composition and execution
 - => Web Service usability, usage, and integration needs to be inspected manually**
 - no semantically marked up content / services
 - no support for the Semantic Web

=> current Web Service Technology Stack failed to realize the promise of Web Services as basis for SOA

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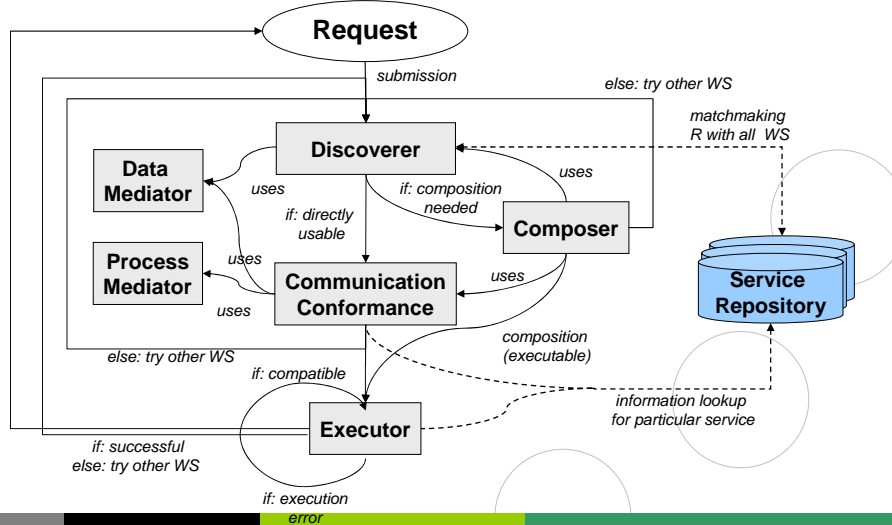


Semantic Web Services



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Web Service Modeling Ontology WSMO

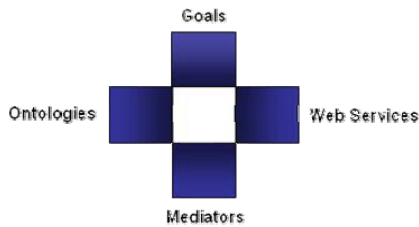


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Objectives that a client wants to achieve by using Web Services

Formally specified terminology of the information used by all other components



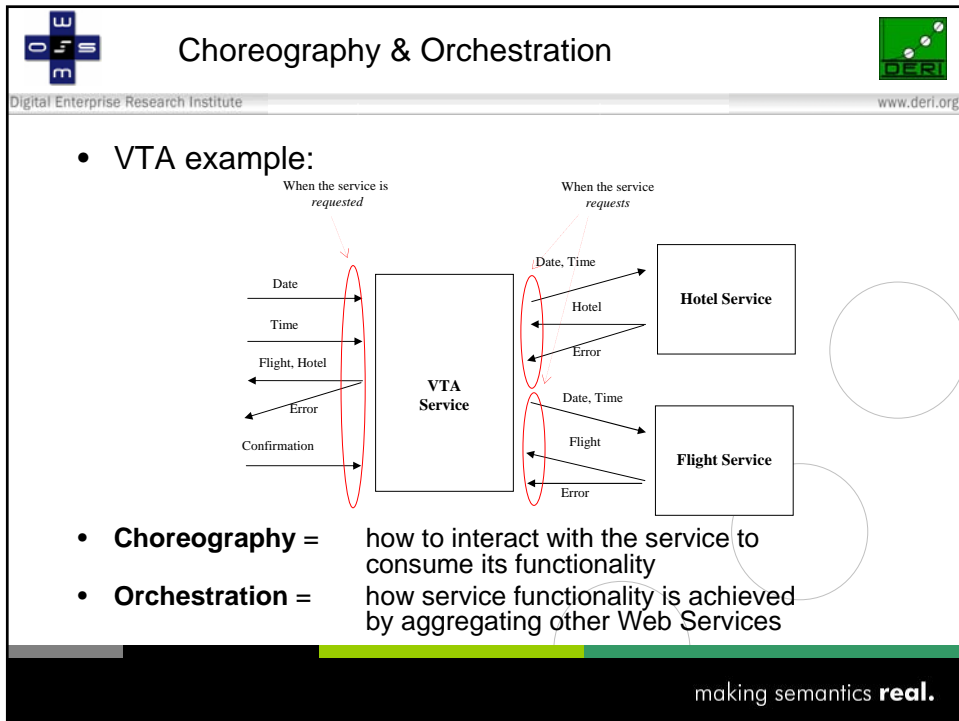
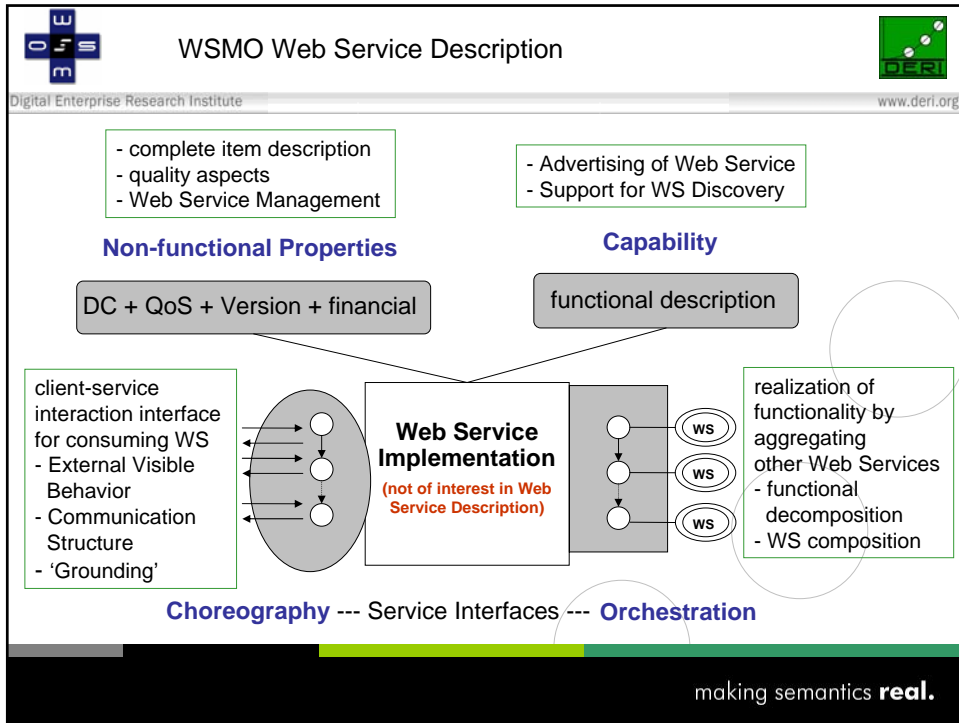
Semantic description of Web Services:
- **Capability** (functional)
- **Interfaces** (usage)

Connectors between components with mediation facilities for handling heterogeneities

Core Elements for SESA

W3C Member Submission 04/2005

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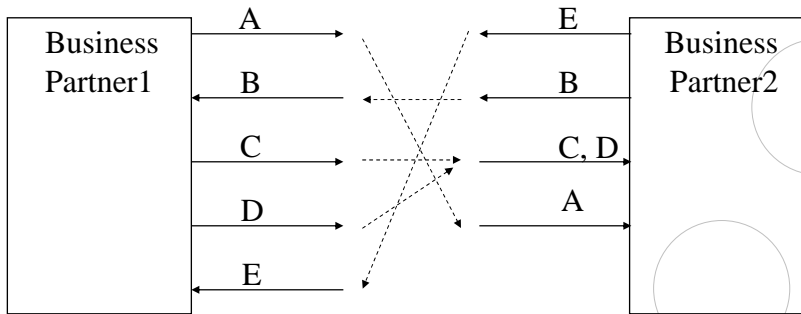
Process Level Mediation



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- Only if the two match precisely, a direct communication may take place
- not a priori compatible behavior interfaces for communication & information interchange => **behavioral incompatibility**



- partially resolvable by **process mediation patterns**

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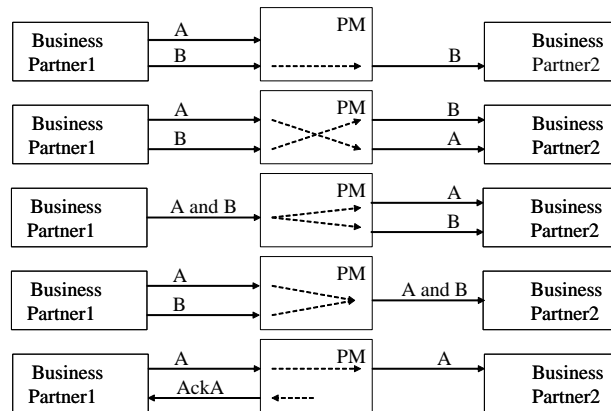


Patterns for Resolvable Mismatches



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can resolve about 80 % of process level mismatches

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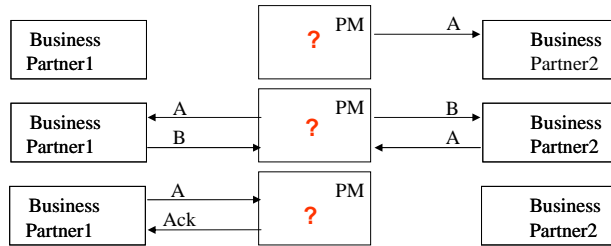


Unresolvable Mismatches



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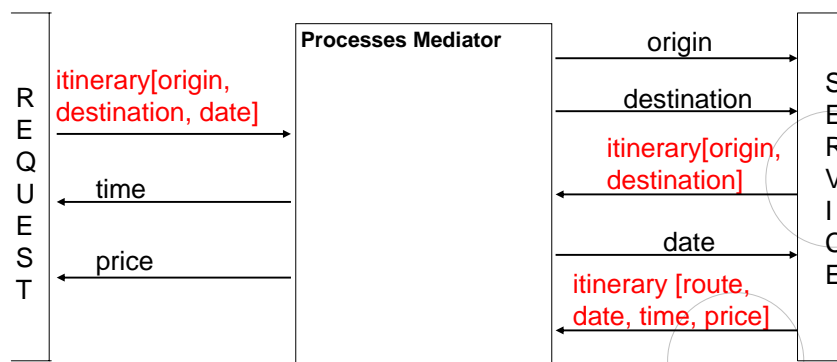


Process Mediation Example

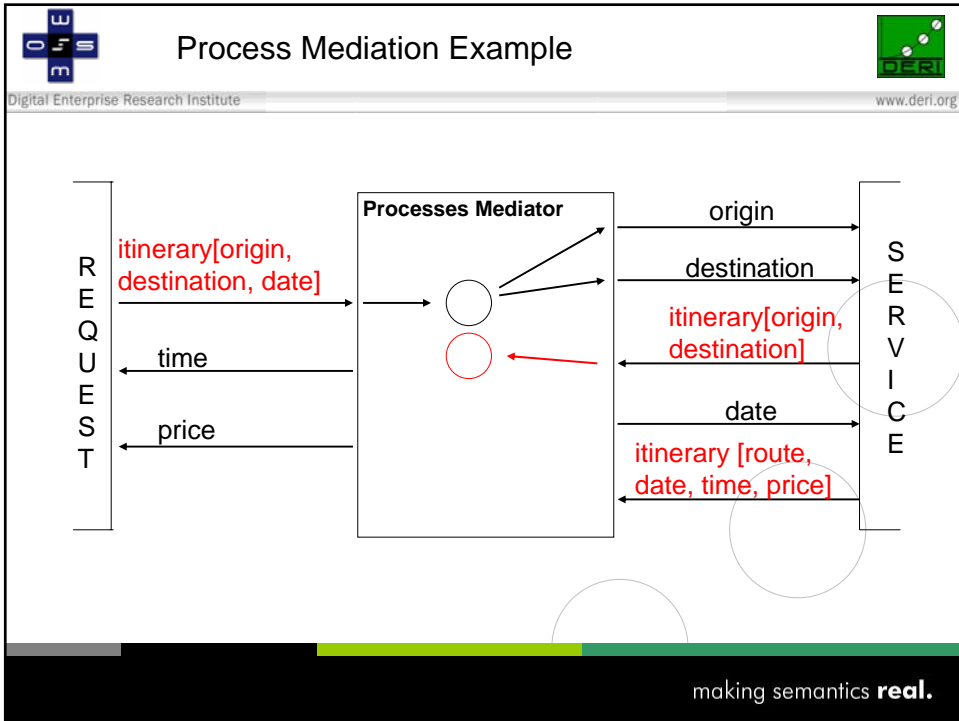
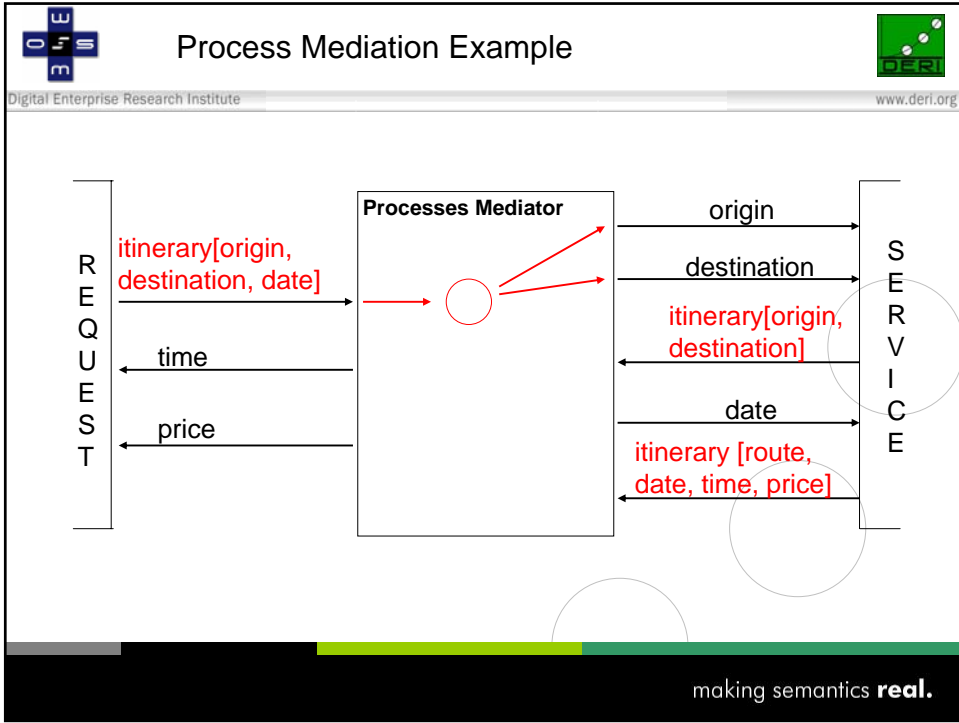


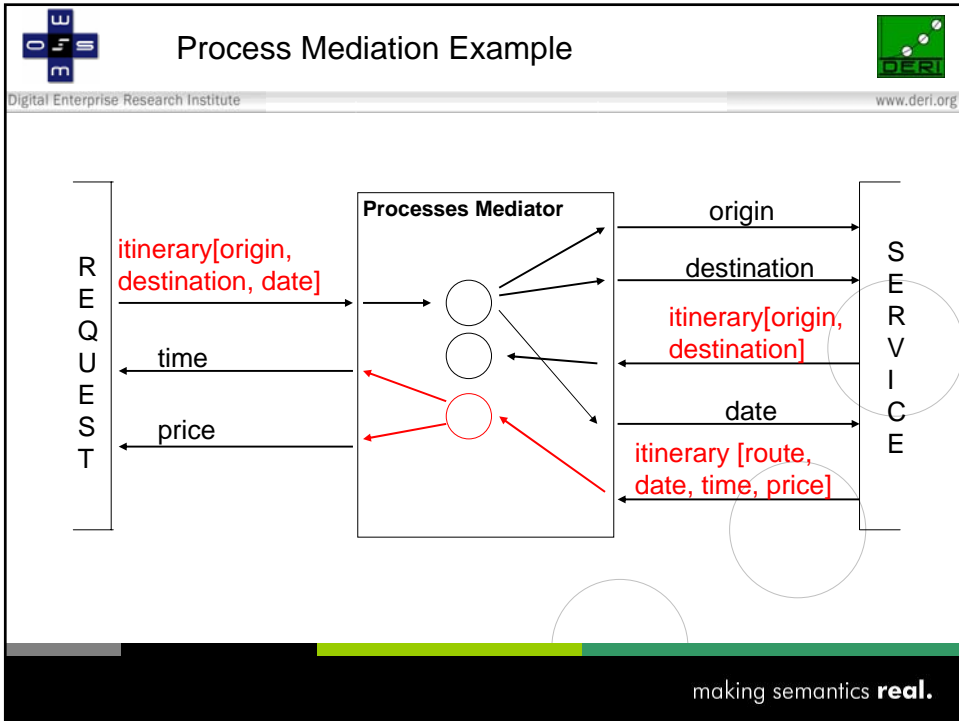
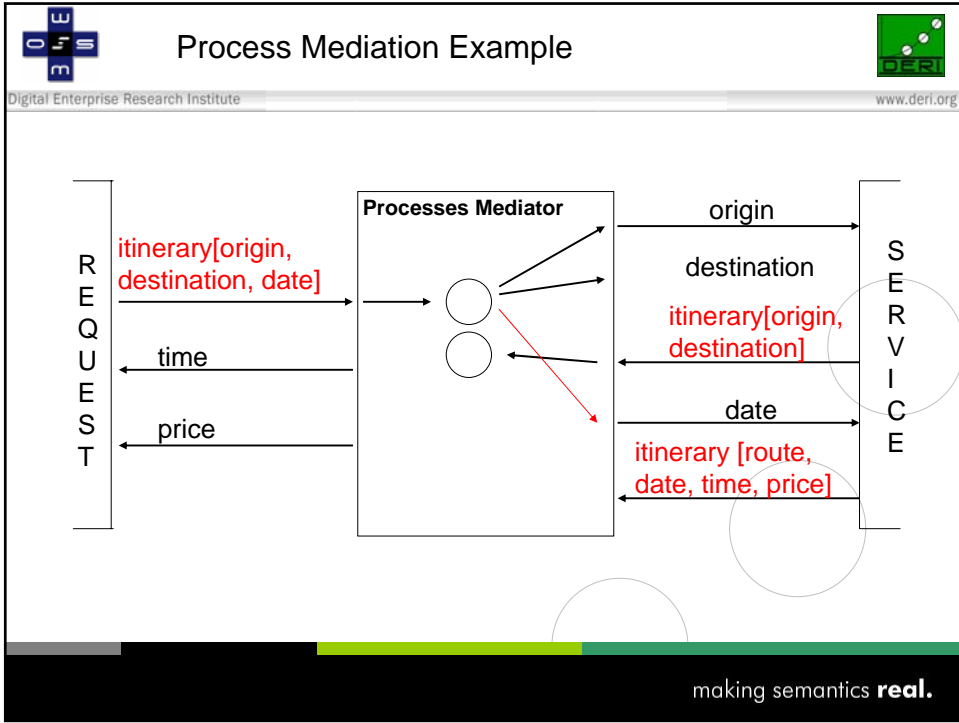
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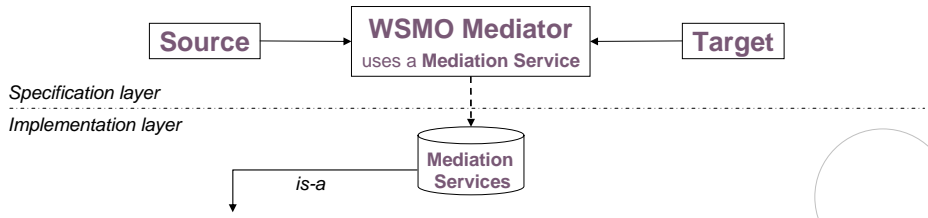


Process Level Mediation in WSMO Mediators



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Process Mediation Service

design time

- analyzes formal interface descriptions
- defines process mediation schema

runtime

- executes process mediation
- integrated with data mediator

Properties

- implemented for WSMO interface description language (ontologized Abstract State Machines)
- computationally very expensive
 - EXP time
 - many reasoning steps

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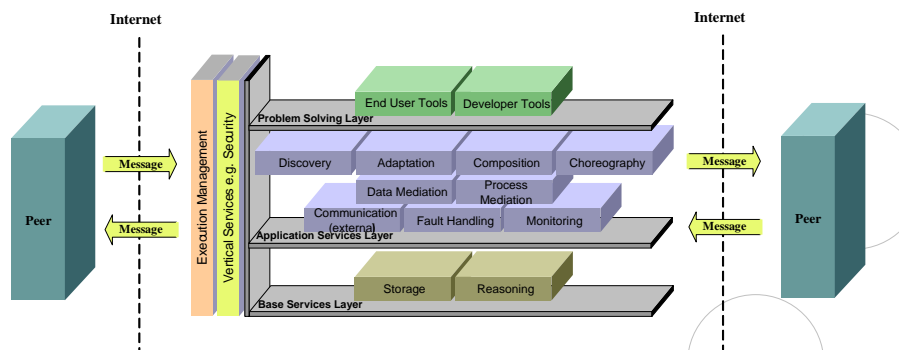


WSMX (WSMO Reference Implementation)



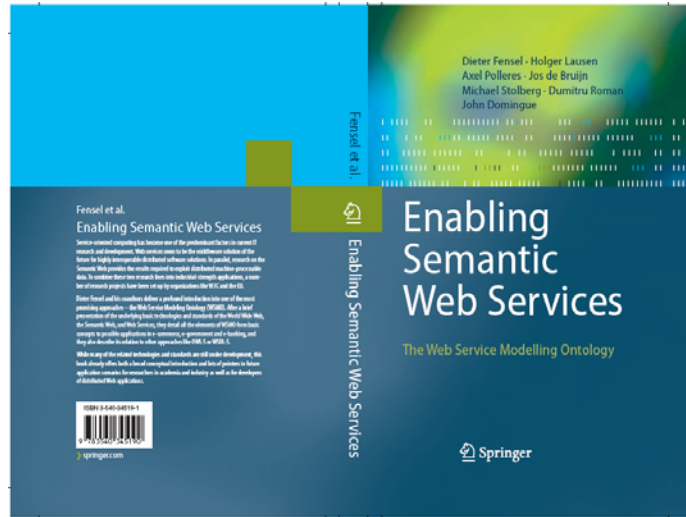
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Open source code base at SourceForge: <http://sourceforge.net/projects/wsmx/>

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