

***Bringing Semantics to Web
Services: The OWL-S Approach***
Martin et al.

CS690 – Week 3 Slides

Jordan Osecki

Summary

- Provide an initial roadmap towards the development of Semantic Web services, using OWL-S in conjunction with WSDL and related standards and also trying to motivate the benefits of providing richer semantics when specifying web services
- Builds on the movement that is creating standards like WSDL in order for web services to be interoperable, by adding richer semantics to it which will allow for the automation of and more complex tools for the enactment, discovery, and composition of heterogeneous web services
- Provides the example of Amazon.com as it describes how to use OWL-S in conjunction with WSDL and related standards in order to automate the three processes of web service interoperability just mentioned

Example – simplified OWL-S Declaration of atomic process

- This grounding establishes its correspondence to a particular WSDL operation

```
<AtomicProcess ID="AuthorSearch">
  <hasInput>
    <Input ID="Author">
      <parameterType resource="#Human">
    </Input>
  </hasInput>
  <hasInput>
    <Input ID="Title">
      <parameterType resource="#BookTitle">
    </Input>
  </hasInput>
  <hasOutput>
    <Output ID="BookID">
      <parameterType resource="#ISBN">
    </Output>
  </hasOutput>
</AtomicProcess>
```

Example – Enactment, simplified process model for Amazon

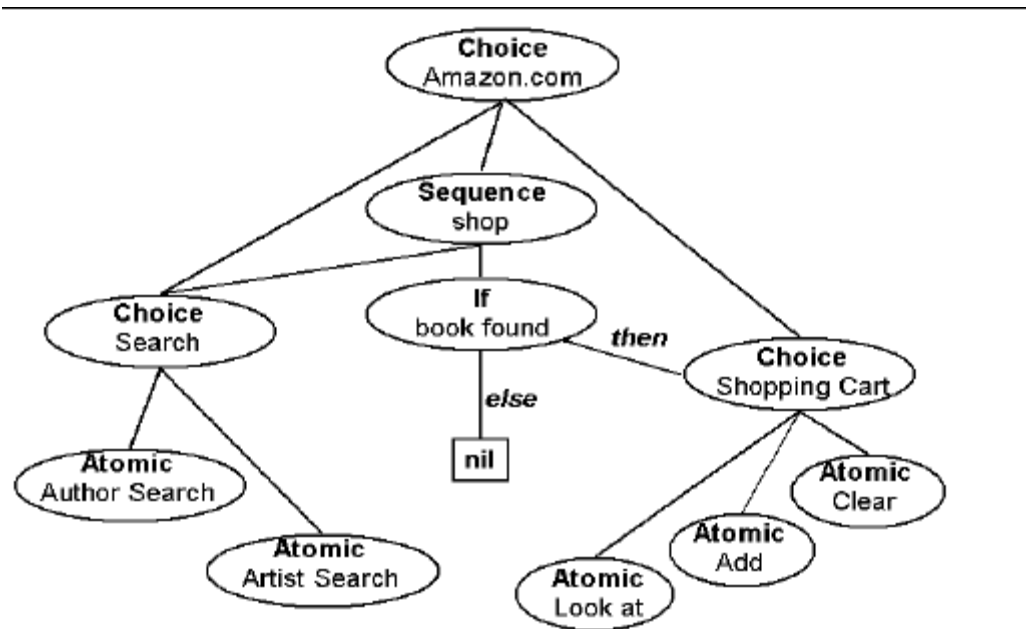


Fig. 1: Simplified Process Model for Amazon Web Service

Example - Discovery

- Two ways: Provide an extensive ontology of functions, with each class a class of homogeneous functionalities OR Provide a generic description of function in terms of its state transformations

```
<owl:Class rdf:ID="e_Service">

<owl:Class rdf:ID="Information_Service">
  <rdfs:subClassOf rdf:resource="e_Service"/>
</owl:Class>

<owl:Class rdf:ID="SellingService">
  <rdfs:subClassOf rdf:resource="e_Service"/>
</owl:Class>

<owl:Class rdf:ID="BookSelling">
  <rdfs:subClassOf
    rdf:resource="SellingService"/>
</owl:Class>

<owl:Class rdf:ID="AirlineTicketing">
  <rdfs:subClassOf
    rdf:resource="SellingService"/>
</owl:Class>
```

Example – Discovery, match to UDDI

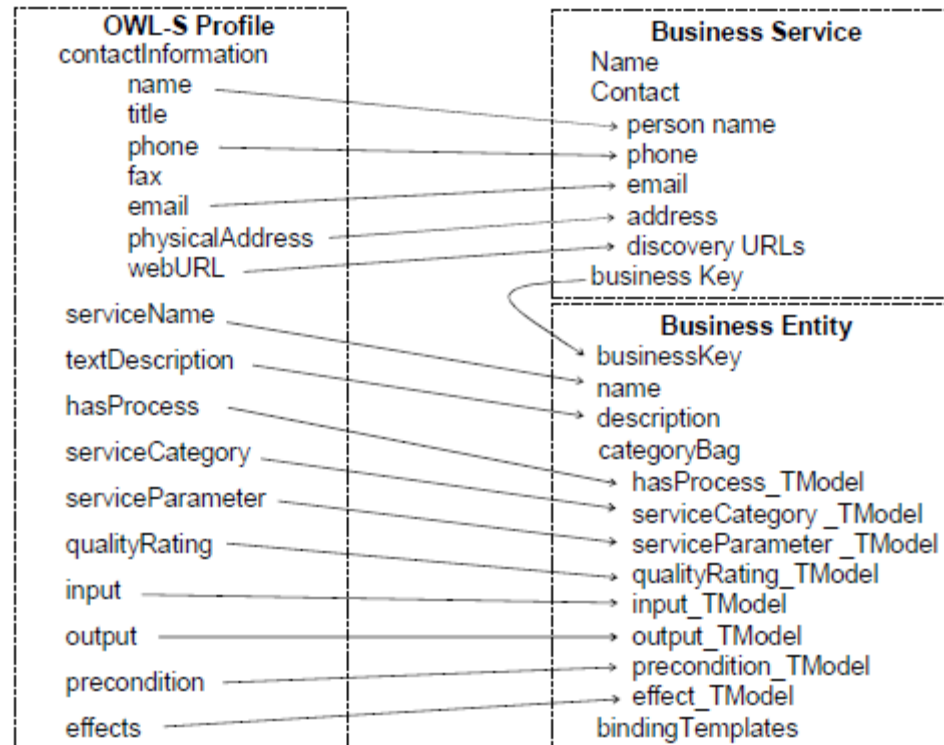


Fig. 2: OWL-S to UDDI mapping

Example - Composition

- Need rich representations of web services in a language with a well-defined semantics to enable automated composition
- Need declarative descriptions of web service inputs, outputs, pre-conditions, and effects to determine a composition
- Need rich representations of the properties, capabilities, and functioning of services to do selection during the composition (iPod)