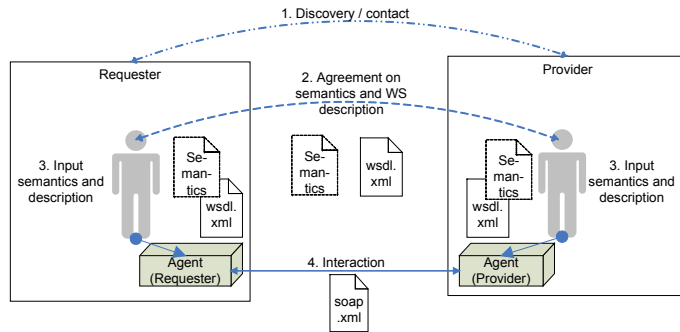


Webservices and SOAP – Quick Reference

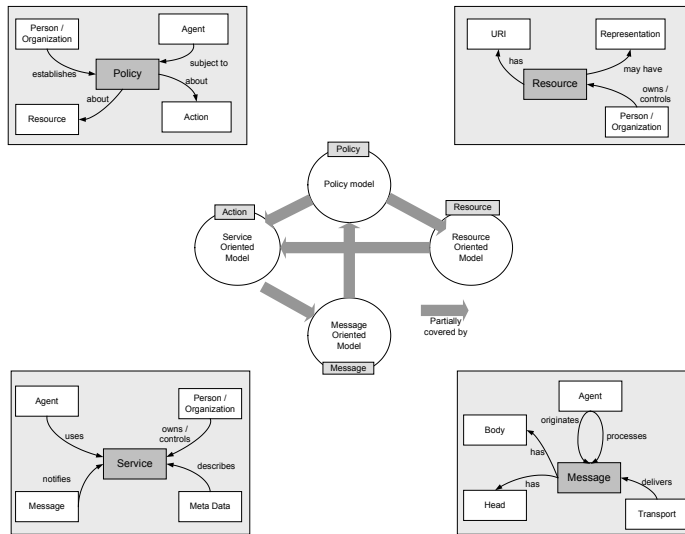
Definition

A Web service is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL). Other systems interact with the Web service in a manner prescribed by its description using SOAP messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards.

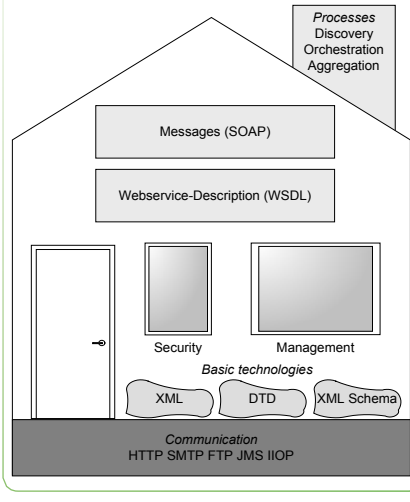
Process



Webservice models



Technologies



SOAP

Structure

- The root element is Envelope. It contains the namespaces of XML Schema and SOAP and typically includes at least one message-related and user-defined namespace.
- The Header element may contain up to four SOAP-standard attributes (such as mustUnderstand or encodingStyle) of the same namespace and additional attributes of a user-defined namespace.
- The Body element may contain attributes and elements of a foreign/user-defined namespace for the transmitted message.
- The Fault element contains the error message of a Web service. This may be a technical problem, a problem which occurred during the processing of the message, or an application-specific fault.

Child elements:

- A mandatory Code element containing an error number within a mandatory Value element as well as a sub error number in an optional Subcode element.
- A mandatory Reason element with an error message.
- An optional Node element with a reference to the SOAP-processing unit (URI of a node) in which the error occurred.
- An optional Role element indicating the role which was played by the node (predefined URIs as in the role attribute of the Header element).
- An optional Detail element containing attributes and child elements of a foreign namespace which contain additional application-specific information.

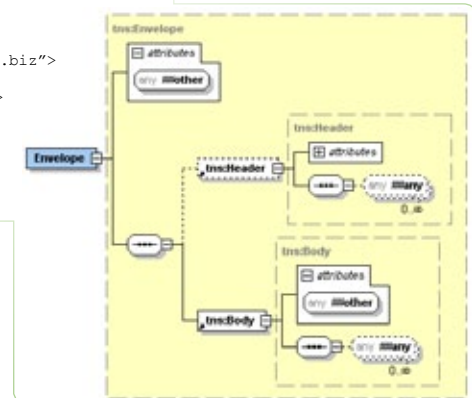
Example

Request

```
<env:Envelope
  xmlns:env="http://www.w3.org/2003/05/
  soap-envelope">
  <env:Header>
    <fp:Request xmlns:fp="http://www.fl-phone.biz"
      env:role="http://www.w3.org/2003/05/
      soap-envelope/role/next"
      env:mustUnderstand="true">
      <fp:Session>093a2dal-q345</fp:Session>
      <fp:Time>2003-11-29T13:20:00.000-05:00</fp:Time>
    </fp:Request>
  </env:Header>
  <env:Body>
    <fp:CustomerListRequest
      xmlns:fp="http://www.fl-phone.biz">
      <fp:DateFilter>
        <fp:Start>2003-10-01</fp:Start>
        <fp:End>2003-10-30</fp:End>
      </fp:DateFilter>
      </fp:CustomerListRequest>
    </env:Body>
  </env:Envelope>
```

Response

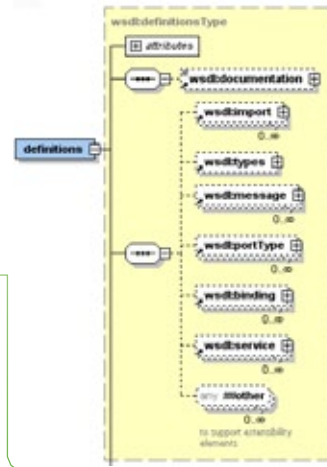
```
<env:Envelope
  xmlns:env="http://www.w3.org/2003/05/
  soap-envelope">
  <env:Body>
    <fp:CustomerListResponse
      xmlns:fp="http://www.fl-phone.biz">
      <fp:Customer Nr="238" Salutation="Mr"
        Start="2003-10-08">
        <fp:Name>
          <fp:FirstName>Anton</fp:FirstName>
          <fp:Surname>Ebenhof</fp:Surname>
        </fp:Name>
        ...
      </fp:Customer>
      <fp:Customer Nr="239" Salutation="Mrs"
        Start="2003-10-19">
        <fp:Name>
          <fp:FirstName>Tina</fp:FirstName>
          <fp:Surname>Bullock</fp:Surname>
        </fp:Name>
        ...
      </fp:Customer>
    </fp:CustomerListResponse>
  </env:Body>
</env:Envelope>
```



Framework

Structure

```
<wsdl:definitions>
  <wsdl:types>
  <wsdl:message>
  <wsdl:portType>
  <wsdl:binding>
  <wsdl:service>
</wsdl:definitions>
```



Ports

```
<wsdl:portType>
  <wsdl:operation name="nmtoken" parameterOrder="nmtokens"?>
    <!-- One way operation -->
    <wsdl:input name="nmtoken"? message="qname"/>
    <!-- Request-response operation -->
    <wsdl:input name="nmtoken"? message="qname"/>
    <wsdl:output name="nmtoken"? message="qname"/>
    <wsdl:fault name="nmtoken" message="qname"/>*
    <!-- Solicit response operation -->
    <wsdl:output name="nmtoken"? message="qname"/>
```

Messages

```
<wsdl:message name="nmtoken"> *
  <wsdl:documentation ... />?
  <part name="nmtoken"
    element="qname"?
    type="qname"? /> *
</wsdl:message>
```

Bindings

```
<wsdl:binding name="nmtoken" type="qname">*
  <wsdl:documentation ... />?
  <wsdl:operation name="nmtoken">*
    <wsdl:documentation ... />?
    <wsdl:input>?
      <wsdl:documentation ... />?
    </wsdl:input>
    <wsdl:output>?
      <wsdl:documentation ... />?
    </wsdl:output>
    <wsdl:fault name="nmtoken"> *
      <wsdl:documentation ... />?
    </wsdl:fault>
  </wsdl:operation>
</wsdl:binding>
```

Service

```
<wsdl:service name="nmtoken"> *
  <wsdl:documentation ... />?
  <wsdl:port name="nmtoken" binding="qname"> *
    <wsdl:documentation ... />?
  </wsdl:port>
</wsdl:service>
```

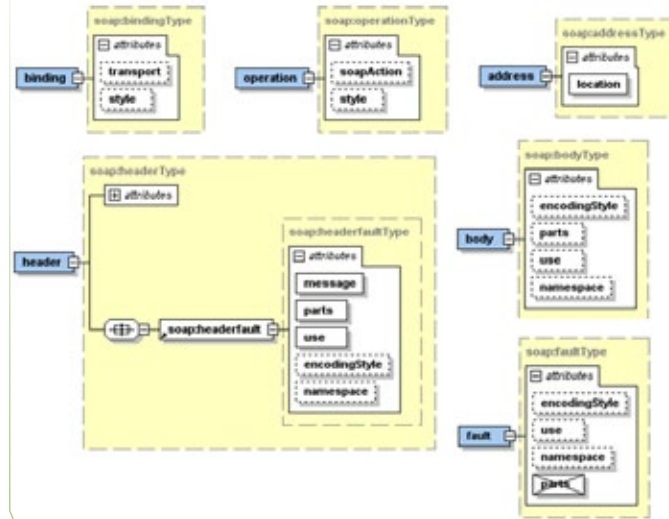
Datatypes (XML Schema structures)

```
<wsdl:types>?
  <wsdl:documentation ... />?
  <xsd:schema ... />*
</wsdl:types>
```

Address references

```
<port ... >
  <binding ... >
    <soap:address location="uri"/>
  </binding>
</port>
```

SOAP extensions for WSDL



SOAP use

The mandatory binding element specifies that the binding defined in WSDL corresponds to the SOAP protocol and therefore contains Envelope, Header and Body.

```
<binding ... >
  <soap:binding transport="uri"?
    style="rpc|document"?>
</binding>
```

Operation

The operation element defines the operation which is provided by the service.

```
<binding ... >
  <operation ... >
    <soap:operation soapAction="uri"?
      style="rpc|document"?>
  </operation>
</binding>
```

Contents

The body element defines the message parts by referencing the identifiers (names) of elements or global complex types in the related XML Schema.

```
<binding ... >
  <operation ... >
    <input>
      <soap:body parts="nmtokens"?
        use="literal|encoded"?
        encodingStyle="uri-list"?
        namespace="uri"?>
    </input>
    <output>
      <soap:body parts="nmtokens"?
        use="literal|encoded"?
        encodingStyle="uri-list"?
        namespace="uri"?>
    </output>
  </operation>
</binding>
```

Header information

The element header contains the transmitted header information whereas headerfault contains error messages in the header part. Both SOAP elements may relate to message parts.

```
<binding ... >
  <operation ... >
    <input>
      <soap:header message="qname" part="nmtoken"
        use="literal|encoded" encodingStyle="uri-list"?
        namespace="uri"?>*
      <soap:headerfault message="qname" part="nmtoken"
        use="literal|encoded" encodingStyle="uri-list"?
        namespace="uri"? />*
    </input>
    <output>
      <soap:header message="qname" part="nmtoken"
        use="literal|encoded" encodingStyle="uri-list"?
        namespace="uri"?>*
      <soap:headerfault message="qname" part="nmtoken"
        use="literal|encoded" encodingStyle="uri-list"?
        namespace="uri"? />*
    </output>
  </operation>
</binding>
```

Error

```
<binding ... >
  <operation ... >
    <fault>*
      <soap:fault name="nmtoken" use="literal|encoded"
        encodingStyle="uri-list"? namespace="uri"?>
    </fault>
  </operation>
</binding>
```

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