

Web Services: SOAP

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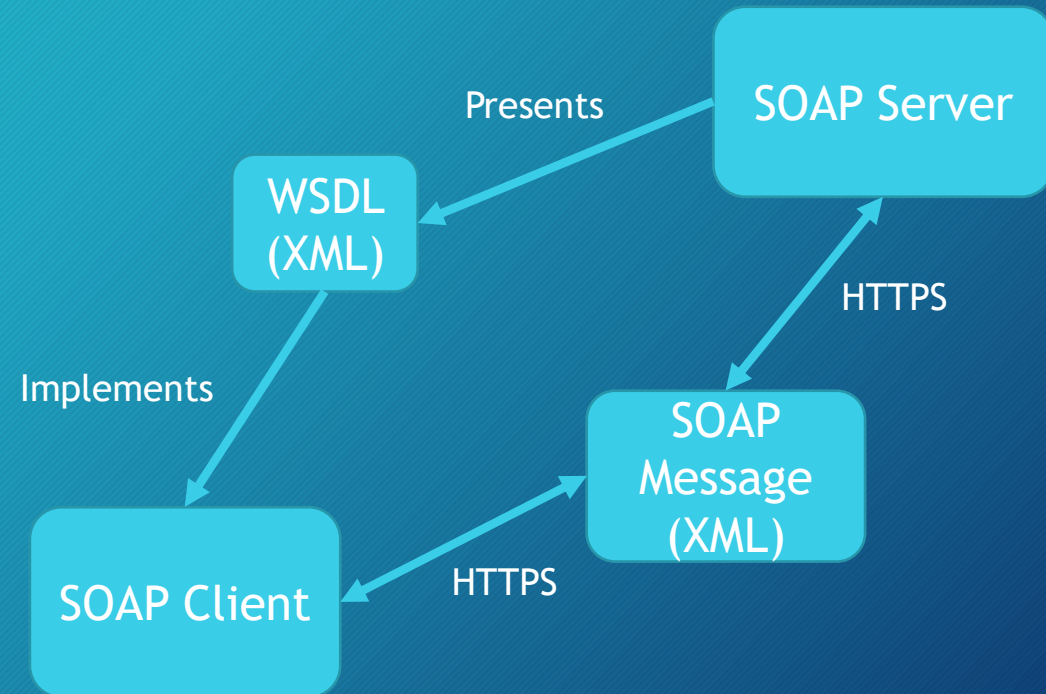


Simple Object Access Protocol (SOAP)



One of the types of web services.

- XML messaging protocol.
 - Standard well-formed communication.
- Uses **contract** known as WSDL.
 - To make itself available.
- **Structured** message format.
 - SOAP Message.
- **Multi-protocol**.
 - HTTP, HTTPS, FTP, SMTP.
- Built-in **security** and **transactions**.
 - Message encryption.



Web Service Description Language (WSDL)

WSDL

SOAP contract XML file that describes the web service. It contains:

- **<types>**
 - Defines the XML Schema (xsd) data types used by the web service.
- **<message>**
 - Maps parameters and return types of web service methods.
- **<portType>**
 - Describes the operations that can be performed and the messages involved.
- **<binding>**
 - Encoding type and transport protocol.
 - SOAP can use almost any application protocol (layer 7).
- **<service>**
 - URL locator of web service.

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

SOAP Binding



In SOAP, WSDL binding can be either an **RPC** (Remote Procedure Call) **style binding** or a **document style binding**. There are four (4) types:

- RPC/encoded.
- RPC/literal.
- Document/encoded.
 - Not used.
- Document/literal.



WSDL Styles

SOAP Message



Ordinary **XML** file used for communication in **SOAP**. It contains:

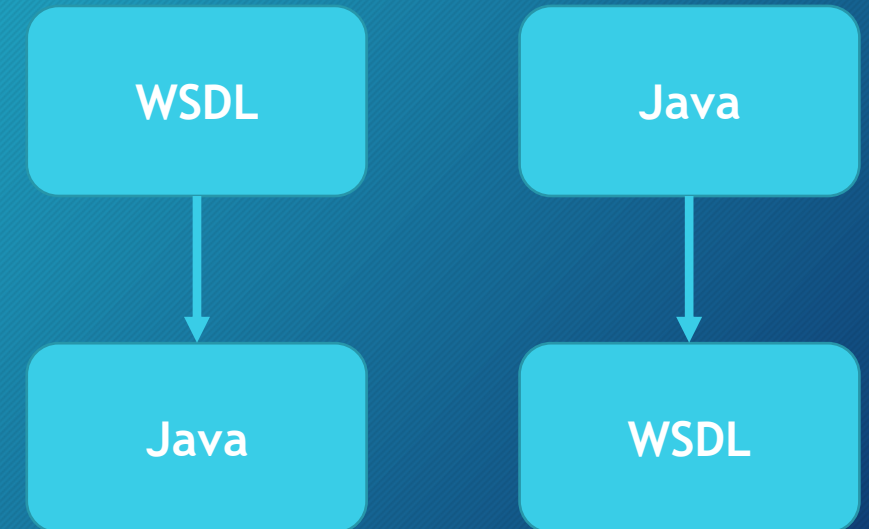
- **Envelope** (Mandatory).
 - Defines the **start** and the **end** of the **message**.
- **Header** (Optional).
 - Used to turn on **security** (double encryption if **HTTPS**) or **transactions**.
- **Body** (Mandatory).
 - Contains the data of the message.
- **Fault** (Optional).
 - Provides information about errors that occur while processing the message.

```
<SOAP-ENV:Envelope>
  <SOAP-ENV:Header>
    ...
  </SOAP-ENV:Header>
  <SOAP-ENV:Body>
    ...
    <SOAP-ENV:Fault>
      ...
    </SOAP-ENV:Fault>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

Contract First - Contract Last



- **Contract First.**
 - Write implementation code from the WSDL.
- **Contract Last.**
 - Write WSDL from the implementation.
- Both ways can be automatically generated with a **SOAP engine tool** and **JAX-WS**.
 - Apache Axis I.
 - Apache Axis III.
 - Apache CXF.
 - Spring.



SOAP: Exception Handling (Java)



WSDL's fault tags provide a **platform independent** way to **describe** an error within a **SOAP message**. There are two (2) types:

- **Modeled.**
 - Maps to an **exception** that is **explicitly thrown** from the business logic of the Java code.
- **Unmodeled.**
 - Maps to a generic **runtime exception** that is generated at runtime when no business logic fault is defined in the **WSDL**.
 - For example: *javax.xml.ws.soap.SOAPFaultException*.

Materials



- SOAP: <https://msdn.microsoft.com/en-us/library/ms995800.aspx>
- Binding: <https://www.ibm.com/developerworks/library/ws-whichwsdl/>
- SOAP Exception Handling: https://docs.oracle.com/cd/E24329_01/web.1211/e24965/faults.htm#WSADV624