What is a Webservice?

Why do we need Webservice and what is an API i.e. Rest or SOAP API?

- Webservices are services spread over the web.

- Enables the communication between applications over the web and provides a standard protocol or format for communication

- Using webservices two different applications designed in different languages can talk to each other share information and exchange data

- Platform Independent

SOAP

REST

Now, if we talk about how the webservice are implemented, so the answer will be in two ways:-

• **SOAP (Simple Object Access Protocol):-** Where the Medium HTTP(POST) and FORMAT XML.

 • **REST (Representational State Transfer):-** Where Medium HTTP(GET, POST,PUT,DELETE, etc.) and FORMAT XML/JSON/TEXT etc

A SOAP request:

```
POST /InStock HTTP/1.1
Host: www.example.org
Content-Type: application/soap+xml; charset=utf-8
Content-Length: nnn

<?xml version="1.0"?>

<soap:Envelope
xmlns:soap="http://www.w3.org/2003/05/soap-envelope/"
soap:encodingStyle="http://www.w3.org/2003/05/soap-encoding">

<soap:Body xmlns:m="http://www.example.org/stock">
  <m:GetStockPrice>
    <m:StockName>IBM</m:StockName>
  </m:GetStockPrice>
</soap:Body>

</soap:Envelope>
```

The SOAP response:

```
HTTP/1.1 200 OK
Content-Type: application/soap+xml; charset=utf-8
Content-Length: nnn

<?xml version="1.0"?>

<soap:Envelope
xmlns:soap="http://www.w3.org/2003/05/soap-envelope/"
soap:encodingStyle="http://www.w3.org/2003/05/soap-encoding">

<soap:Body xmlns:m="http://www.example.org/stock">
  <m:GetStockPriceResponse>
    <m:Price>34.5</m:Price>
  </m:GetStockPriceResponse>
</soap:Body>

</soap:Envelope>
```

Skeleton SOAP Message

```xml
<?xml version="1.0"?>

<soap:Envelope
xmlns:soap="http://www.w3.org/2003/05/soap-envelope/"
soap:encodingStyle="http://www.w3.org/2003/05/soap-encoding">

<soap:Header>
...
</soap:Header>

<soap:Body>
...
  <soap:Fault>
  ...
  </soap:Fault>
</soap:Body>

</soap:Envelope>
```

A SOAP message is an ordinary XML document containing the following elements:
- An Envelope element that identifies the XML document as a SOAP message
- A Header element that contains header information
- A Body element that contains call and response information
- A Fault element containing errors and status information
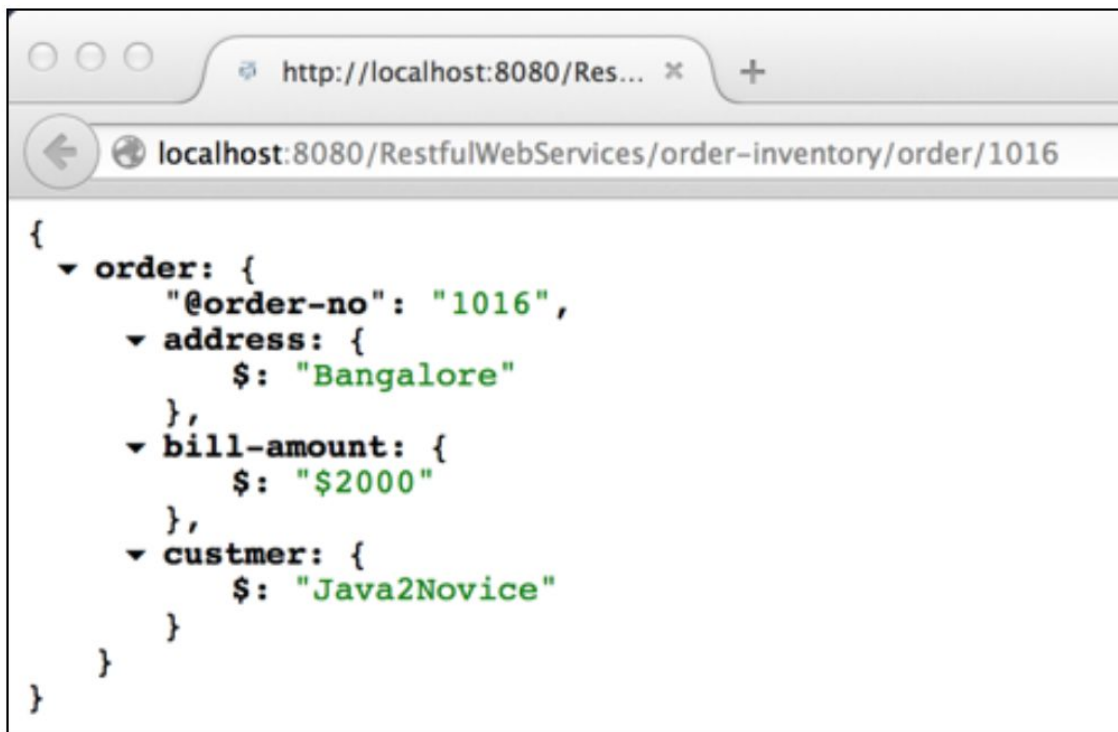
Syntax Rules

Here are some important syntax rules you must follow:
- A SOAP message MUST be encoded using XML
- A SOAP message MUST use the SOAP Envelope namespace
- A SOAP message MUST use the SOAP Encoding namespace

SOAP is a W3C Recommendation for communication between two applications

SOAP services are little slow and consume more bandwidth and resources

Here's an Example for REST webservices built in JSON:

XML Output looks like this:

```
−<students>
  −<student>
      <student_id>0</student_id>
      <student_name>Ricky</student_name>
      <student_rollnumber>AOHP451</student_rollnumber>
  </student>
  −<student>
      <student_id>1</student_id>
      <student_name>Mayer</student_name>
      <student_rollnumber>DKLP987</student_rollnumber>
  </student>
</students>
```

What is SOAP webservice: -

A webservice, which complies with the SOAP Web Service Specification, is a SOAP Webservice.

However, the question is what are these specifications /standards? Moreover, who defines these standards?

So here is the Answer:- •

Who defines:- W3C (World Wide Web Consortium) •

What are those specification:-

A **SOAP webservice** must compile with following specs:-

• SOAP
• WSDL
 • UDDI

Now what are SOAP specs:-

• All information exchange should happen over a common format: XML
• XML must have a defined structure : SOAP Message
• SOAP Message consists of :

        • **Envelope** − Defines the start and the end of the message. It is a mandatory element.
         • **Header** − Contains any optional attributes of the message used in processing the message, either at an intermediary point or at the ultimate end-point. It is an optional element.

• **Body** − Contains the XML data comprising the message being sent. It is a mandatory element.

• **Fault** – An optional Fault element that provides information about errors that occur while processing the message.

WSDL: - WSDL stands for Web Services Description Language.

It is the standard format for describing a web service. Microsoft and IBM developed WSDL jointly.

 • **Features of WSDL**

• WSDL is an XML-based protocol for information exchange in decentralized and distributed environments.
 • WSDL definitions describe how to access a web service and what operations it will perform.
• WSDL is a language for describing how to interface with XML-based services.
• WSDL is an integral part of Universal Description, Discovery, and Integration (UDDI), an XML-based worldwide business registry.
• WSDL is the language that UDDI uses.
• WSDL is pronounced as 'wiz-dull' and spelled out as 'W-S-D-L'.

Constraints for RESTFul Webservices

- Client-server
- Stateless
- Cache
- Uniform Interface
- Layered System
- Code on Demand (Optional)

Now the question is how a service consumer can get the WSDL from a Service provider.

The Answer is - Either the service provider can directly share the WSDL with the consumer or A webservice provider published his webservice on an online directory from where consumer can query and search the webservices. This online registry or directory is known as UDDI.