Spring SOAP vs REST Web Services

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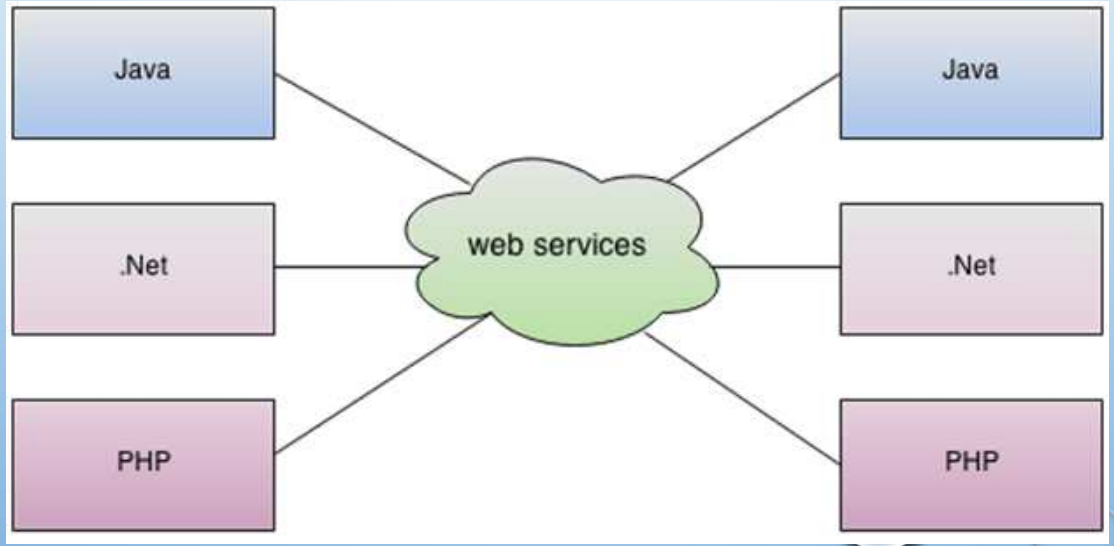
Web Service ?

- It is a client-server application or application component for communication
- Defines the basic set of rules for communication between two devices over the network
- Used for interoperable machine to machine communication
- Primarily comprises of a collection of standards or protocols for exchanging information between two devices or application



Types ?

- SOAP (Simple Object Access Protocol)
- REST (Representational State Transfer)

Typically a Web Service comprises of :-

- SOAP (Simple Object Access Protocol)
  - Used for accessing a web service using XML
  - Based on W3C standards
- WSDL (Web Service Description Language)
  - Contains information about web services such as method name, method parameter and how to access it.
  - Forms a part of the UDDI
- UDDI (Universal Description, Discovery and Integration)
  - Is a framework for describing, discovering and integrating web services.
  - Is a directory of web service interfaces described by WSDL, containing information about web services

Simple Object Access Protocol - SOAP

- SOAP is a Messaging Protocol specification
- Released in June 1998 as part of Frontier 5.1 by Dave Winer, Don Box, Bob Atkinson, and Mohsen Al-Ghosein for Microsoft
- It was designed to ensure programs built on different platforms and programming languages could exchange data easily
- Used for exchanging structured information in the implementation of web services in computer networks
- uses XML Information Set for its message format, and relies on application layer protocols, most often Hypertext Transfer Protocol (HTTP), although some legacy systems communicate over Simple Mail Transfer Protocol (SMTP), for message negotiation and transmission.
- It is an XML-based protocol consisting of three parts:
  - an envelope, which defines the message structure and how to process it
  - a set of encoding rules for expressing instances of application-defined datatypes
  - a convention for representing procedure calls and responses

Eg of a SOAP request

```
POST /InStock HTTP/1.1
Host: www.example.org
Content-Type: application/soap+xml; charset=utf-8
Content-Length: 299
SOAPAction: "http://www.w3.org/2003/05/soap-envelope"


<?xml version="1.0"?>
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope" xmlns:m="http://www.example.org">
  <soap:Header>
  </soap:Header>
  <soap:Body>
    <m:GetStockPrice>
      <m:StockName>T</m:StockName>
    </m:GetStockPrice>
  </soap:Body>
</soap:Envelope>
```

Representational state transfer (REST)

- **REST** is a software architectural style that defines a set of constraints to be used for creating Web services
- Web services that conform to the REST architectural style, called *RESTful* Web services
- RESTful Web services allow the requesting systems to access and manipulate textual representations of Web resources by using a uniform and predefined set of stateless operations.
- Roy Fielding defined REST in his 2000 PhD dissertation "Architectural Styles and the Design of Network-based Software Architectures“

The constraints of the REST architectural style affect the following architectural properties:

- performance in component interaction
- scalability allowing the support of large numbers of components and interactions among components
- simplicity of a uniform interface;
- modifiability of components to meet changing needs (even while the application is running)
- visibility of communication between components by service agents;
- portability of components by moving program code with the data;
- reliability in the resistance to failure at the system level in the presence of failures within components, connectors, or data

Summarizing SOAP vs REST

SOAP	REST
SOAP stands for Simple Object Access Protocol	REST stands for Representational State Transfer
SOAP is a protocol. SOAP was designed with a specification. It includes a WSDL file which has the required information on what the web service does in addition to the location of the web service.	REST is an Architectural style in which a web service can only be treated as a RESTful service if it follows the constraints of being • Client Server • Stateless • Cacheable • Layered System • Uniform Interface
SOAP cannot make use of REST since SOAP is a protocol and REST is an architectural pattern.	REST can make use of SOAP as the underlying protocol for web services, because in the end it is just an architectural pattern.
SOAP uses service interfaces to expose its functionality to client applications. In SOAP, the WSDL file provides the client with the necessary information which can be used to understand what services the web service can offer.	REST use Uniform Service locators to access to the components on the hardware device.

contd….

Summarizing SOAP vs REST contd…

SOAP	REST
SOAP requires more bandwidth for its usage. Since SOAP Messages contain a lot of information inside of it, the amount of data transfer using SOAP is generally a lot. <?xml version="1.0"?> <SOAP-ENV:Envelope xmlns:SOAP-ENV ="http://www.w3.org/2001/12/soap-envelope" SOAP-ENV:encodingStyle =" http://www.w3.org/2001/12/soap-encoding"> <soap:Body> <Demo.guru99WebService xmlns="http://tempuri.org/"> <EmployeeID>int</EmployeeID> </Demo.guru99WebService> </soap:Body> </SOAP-ENV:Envelope>	REST does not need much bandwidth when requests are sent to the server. REST messages mostly just consist of JSON messages. Below is an example of a JSON message passed to a web server. You can see that the size of the message is comparatively smaller to SOAP. {"city":"Mumbai","state":"Maharastra"}
SOAP can only work with XML format. As seen from SOAP messages, all data passed is in XML format.	REST permits different data format such as Plain text, HTML, XML, JSON, etc. But the most preferred format for transferring data is JSON.

How should a REST app look like ?