**SOAP or Simple Object Access Protocol**

SOAP is a protocol for exchanging XML-based messages over the network using application protocols like **http, smtp**, etc as carrier. SOAP message comprises of a SOAP envelope. The envelope can be broken into a header and a body. Header contains context related definitions like security while the body contains actual application data. A typical SOAP message looks like

<?xml version="1.0"?>

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

</soap:Header>

<soap:Body>

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

</m:GetStockPrice>

</soap:Body>

</soap:Envelope>

WSDL or Web Services Description Language

WSDL is a standard based XML Language which is used to describe a web service. A WSDL completely describes what public interface an web service exposes, what parameter it expects, structure of output it returns, location of web service. A WSDL defines a web service as collection of communication end points that are capable of exchanging messages. These communication end points are called ports. Port are composed of two parts.

1. Contains the public interface exposed by the web service. The interface contains all the methods, parameter needed to invoke them and response structure returned by them.
2. The second part binds the public interface to network protocol like http. The binding comprises of information like location of the public interface and message format for the service.

**SOAP communication styles**

There exist two types of communication styles

1. Document
2. RPC

The communication style used by SOAP web service is defined in its WSDL.

In the **Document style** the application data which is part of soap body is sent as XML document. This document can be validated completely by a xml schema which is also part of WSDL. As XML can contain structure as per wish of service developer hence the responsibility of marshaling and unmarshaling xml payload lies at end of provider and consumer code.

In **RPC style** as the name suggests the consumer invokes the methods of service as if he were invoking a local method. To facilitate this the RPC message consists of list of public interface methods that a consumer can invoke. These methods are listed by names as xml elements.  The method parameters needed by these method forms sub elements of the method element. The responsibility of marshaling/unmarshaling lies with the web service framework. The framework contains its own marshaling/unmarshaling libraries. RPC style results in tightly coupled code between application code and the web service framework, hence norm is create document style services. With Key concepts in place let see an example of how to write a soap web service using Apache CXF.