
spring
boot

Overview

1. Introduction to Web Service?
2. Restful Web Services with Spring Boot
3. Spring Boot Programming & Basics
4. Spring Data JPA

What is Web Service?

A service which is delivered over the web/internet

User Management Portal

Users

Users | Settings | Welcome, Rick

Search users... | +New User | ↻

Photo	User ID	First Name	Last Name	Username	Email	Status	Actions
	1091961105	Rick	Richarson	rick	rick@email.com	Active	✎ 🗑
	2527123140	John	Doe	johnny	john@email.com	Active	✎ 🗑
	6394024156	Vaishnavi	Hiwase	vaisnavi	vaish@gmail.com	Active	✎ 🗑

Search users...

+New User

Photo	User ID	First Name	Last Name	Username	Email	Status	Actions
	1091961105	Rick	Richarson	rick	rick@email.com	Active	

User Management Portal

Rick Richarson

Rick Richarson

rick

Status: Active

Last Login:

Joined Apr 6, 2021, 9:28:18 PM

1091961105

rick@email.com

SUPER_ADMIN

Account Unlocked

Close

User Management Portal

Edit Rick Richarson

First Name

Rick

Last Name

Richarson

Username

rick

Email

rick@email.com

Role

SUPER ADMIN

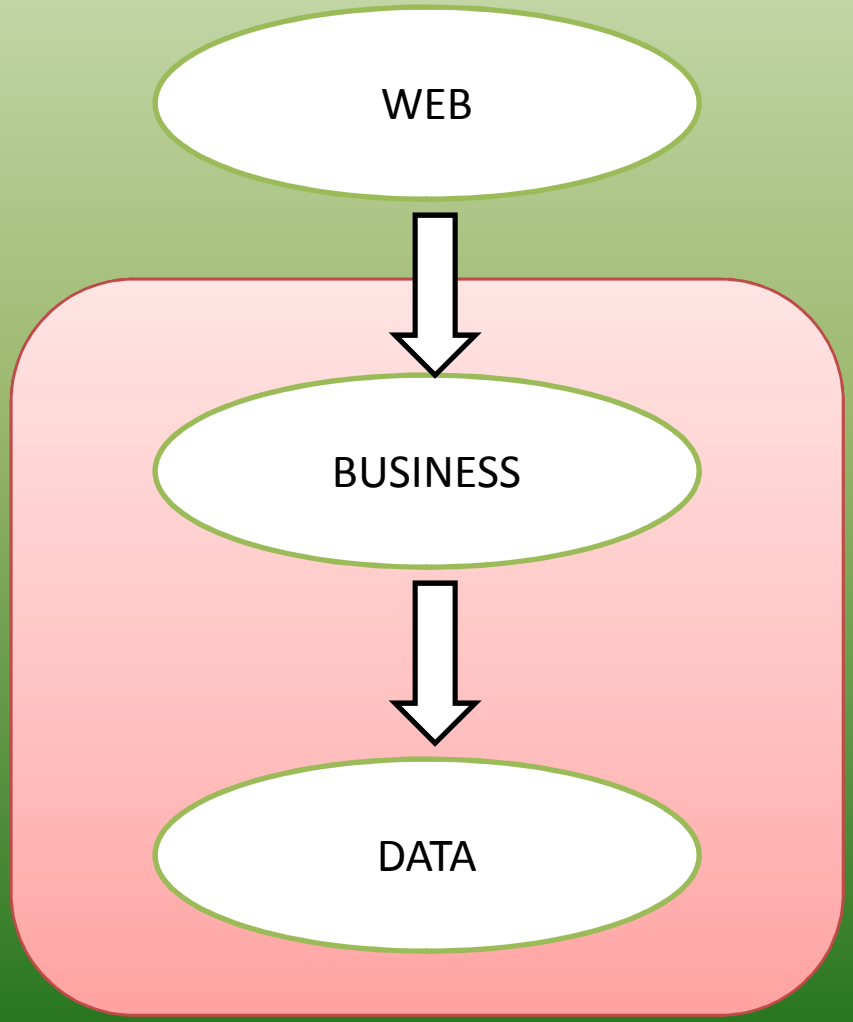
Profile Picture | Choose File | Browse

Active

Unlocked

Close | Save changes

Application Layers

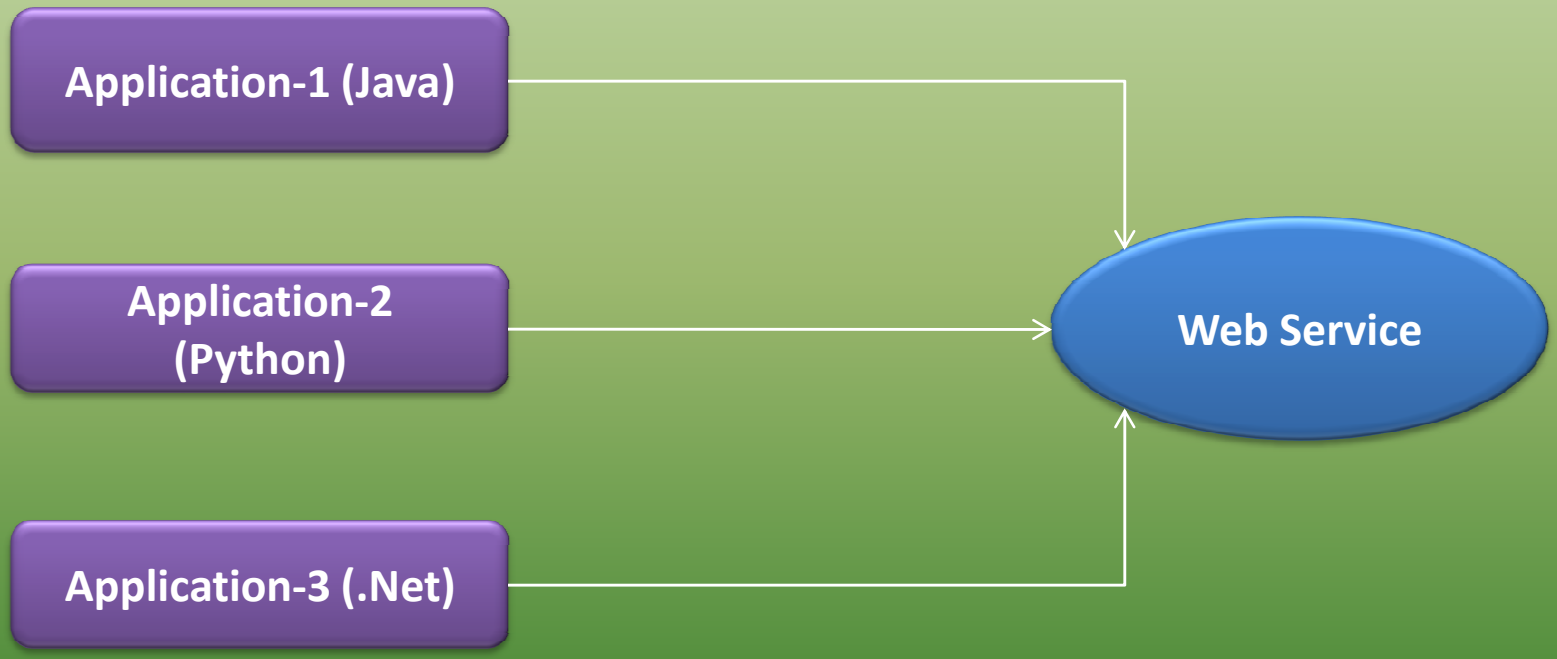


Web Service – W3C Definition

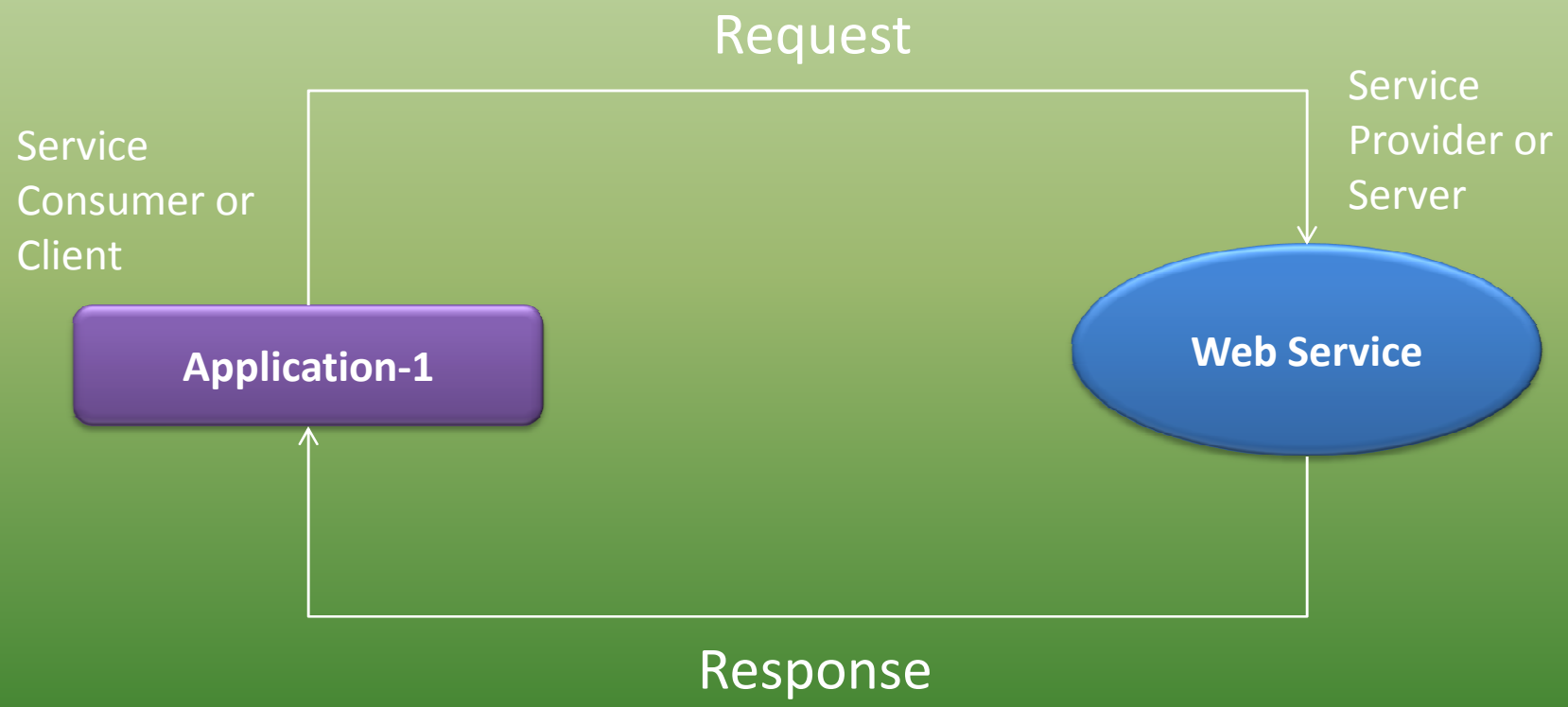
A web service is a software system designed to support interoperable machine-to-machine interaction over a network

1. Design for Machine to machine (or application to application) interaction.
2. It should be Interoperable (Not platform dependent)
3. Should allow communication over network

Web Service


Application-1 (Java)
Application-2 (Python)
Application-3 (.Net)
Web Service

Web Service

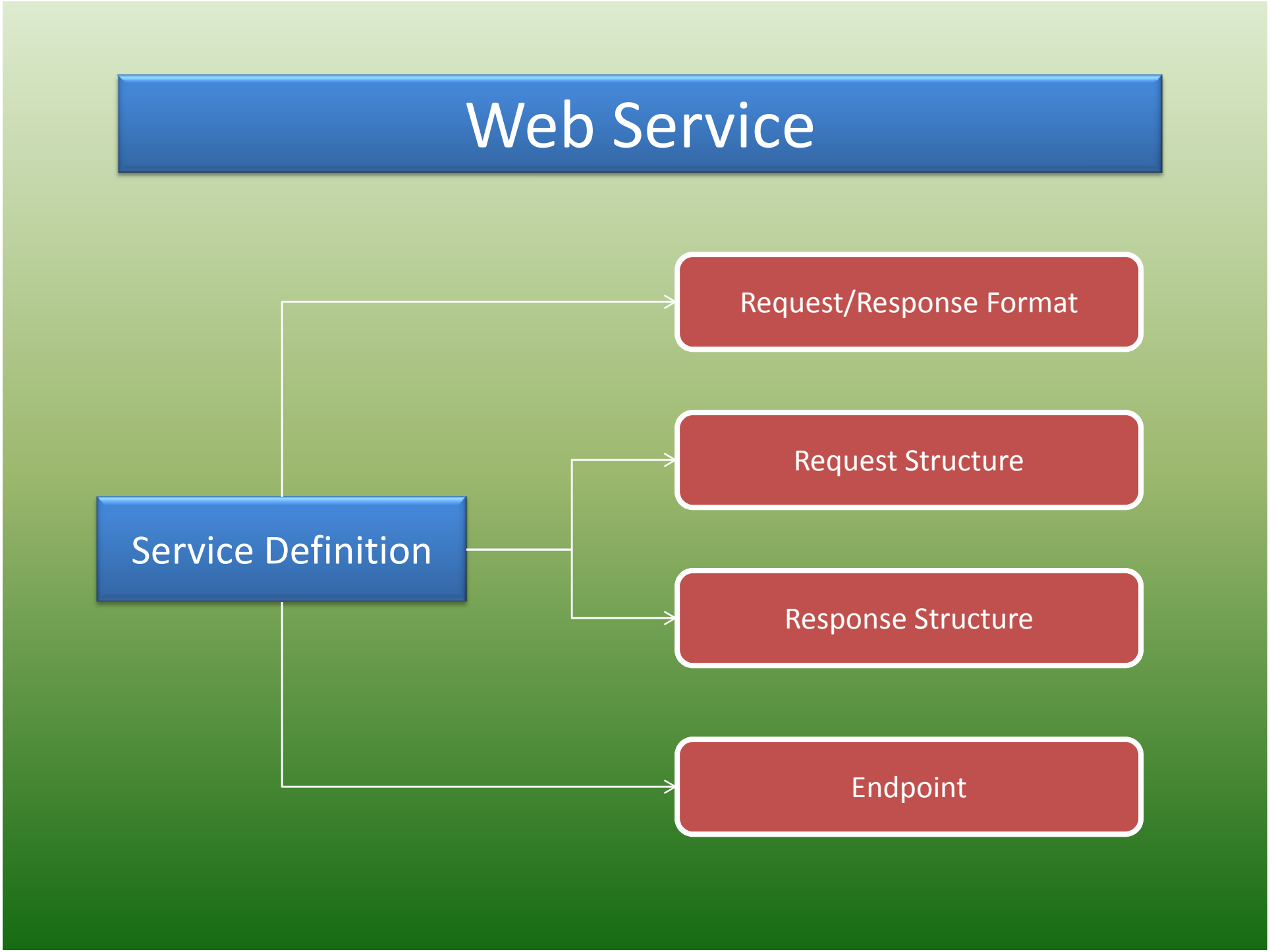

Request
Service Consumer or Client
Service Provider or Server
Application-1
Web Service
Response

Request / Response Formats

1. XML (Extensible Markup Language)
2. JSON (Java Script Object Notation)

```
- <Parts>
  - <Part>
      <Id>4478</Id>
      <Part_Name>1000 Ohm Resistor</Part_Name>
      <Total_Available>25000</Total_Available>
      <Price>0.01</Price>
    </Part>
  - <Part>
      <Id>3328</Id>
      <Part_Name>15000 Ohm Resistor</Part_Name>
      <Total_Available>75000</Total_Available>
      <Price>0.02</Price>
    </Part>
  - <Part>
      <Id>4725</Id>
      <Part_Name>555 Timer IC</Part_Name>
      <Total_Available>1500</Total_Available>
      <Price>0.25</Price>
    </Part>
  </Parts>
```

```
{
    "orders": [
        {
            "orderno": "748745375",
            "date": "June 30, 2088 1:54:23 AM",
            "trackingno": "TN0039291",
            "custid": "11045",
            "customer": [
                {
                    "custid": "11045",
                    "fname": "Sue",
                    "lname": "Hatfield",
                    "address": "1409 Silver Street",
                    "city": "Ashland",
                    "state": "NE",
                    "zip": "68003"
                }
            ]
        }
    ]
}
```


Web Service
Request/Response Format
Request Structure
Service Definition
Response Structure
Endpoint

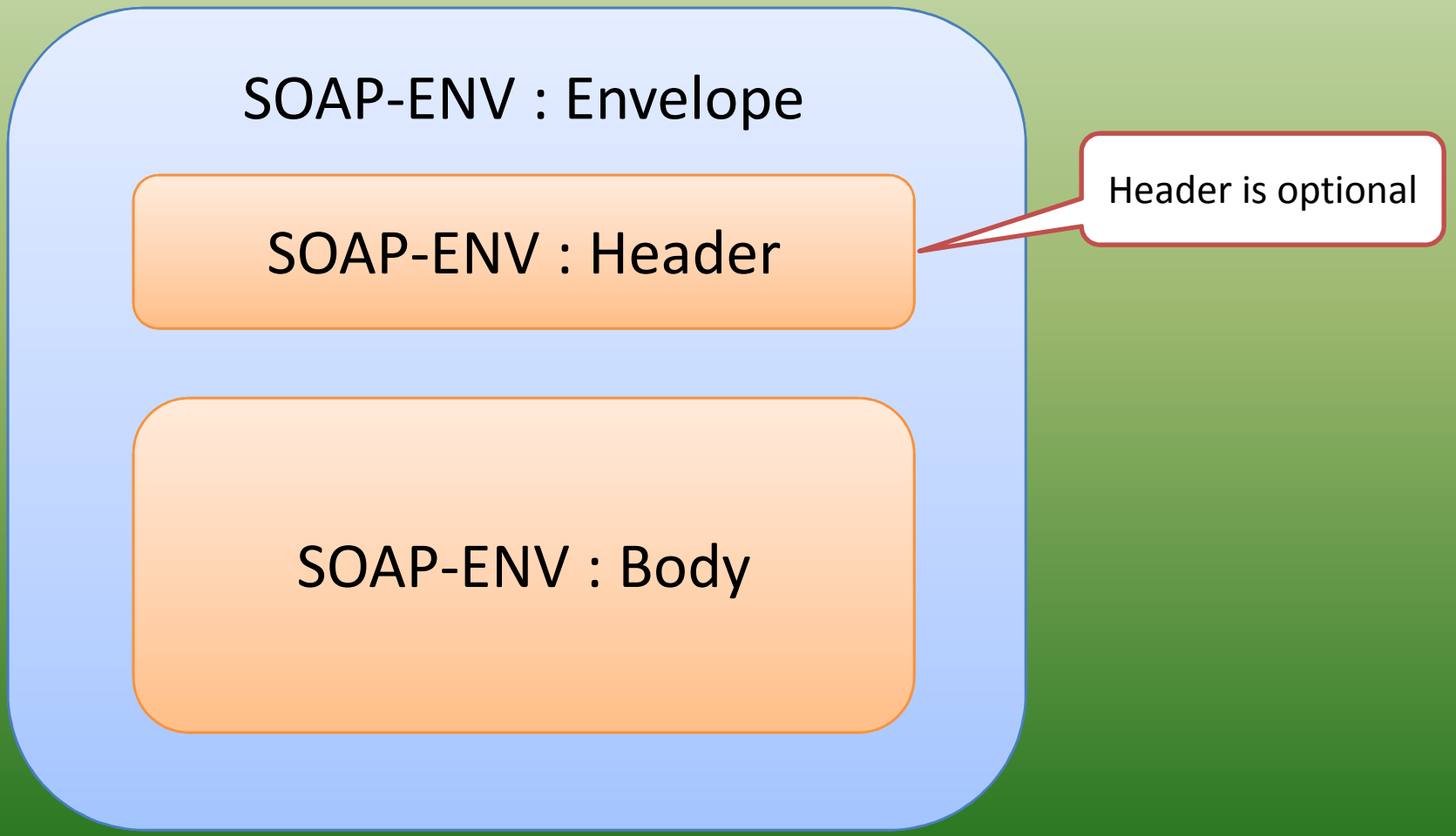
Web Services Group

- SOAP Base Web Services (XML)
- Restful Web Services (Architectural approach)

SOAP Based Web Services

- Simple Object Access Protocol
- No longer used this abbreviation, now its simple SOAP
- SOAP defines specifics way of building web services
- SOAP used XML based request formats (XML request and response)

SOAP Structure



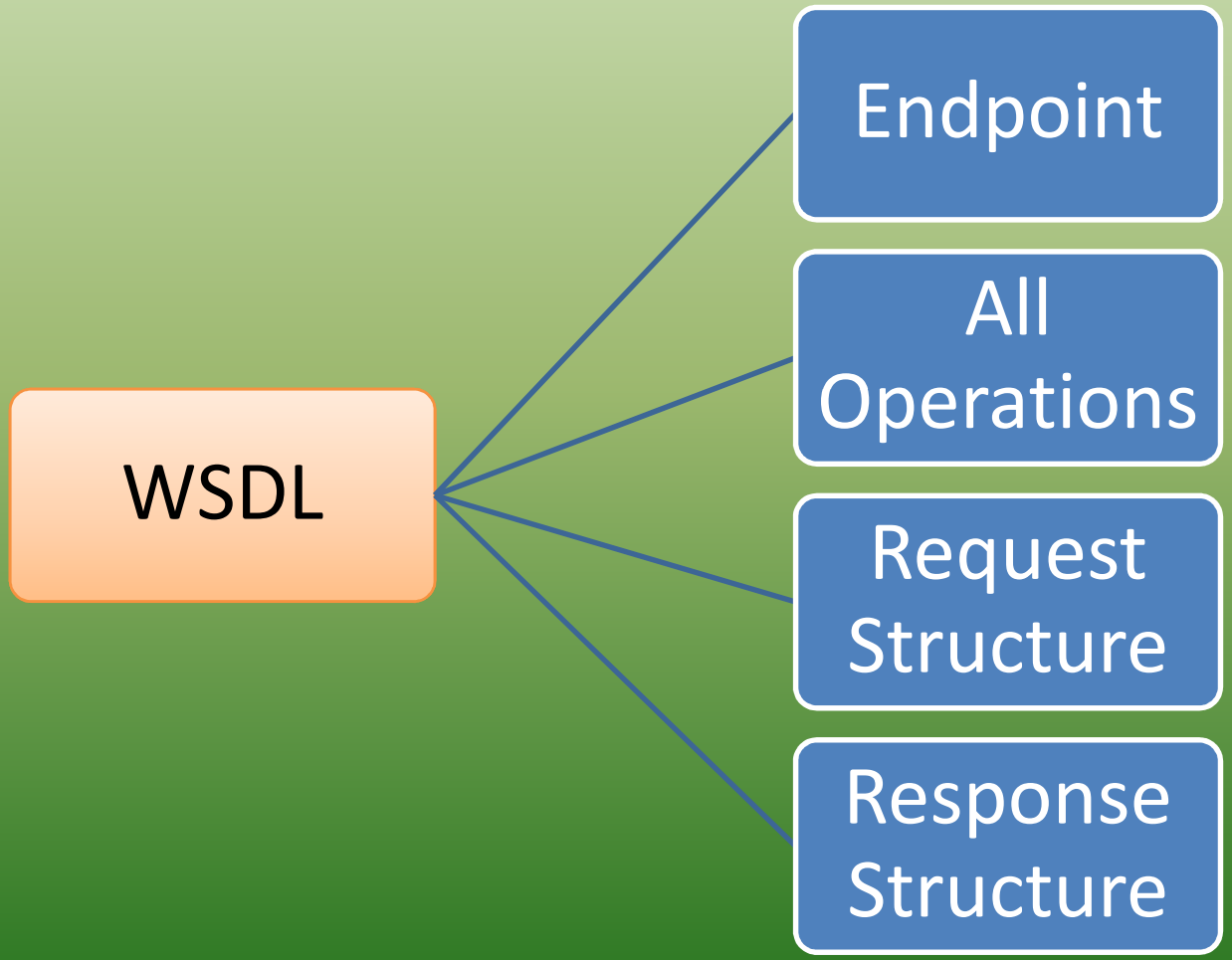
SOAP Structure

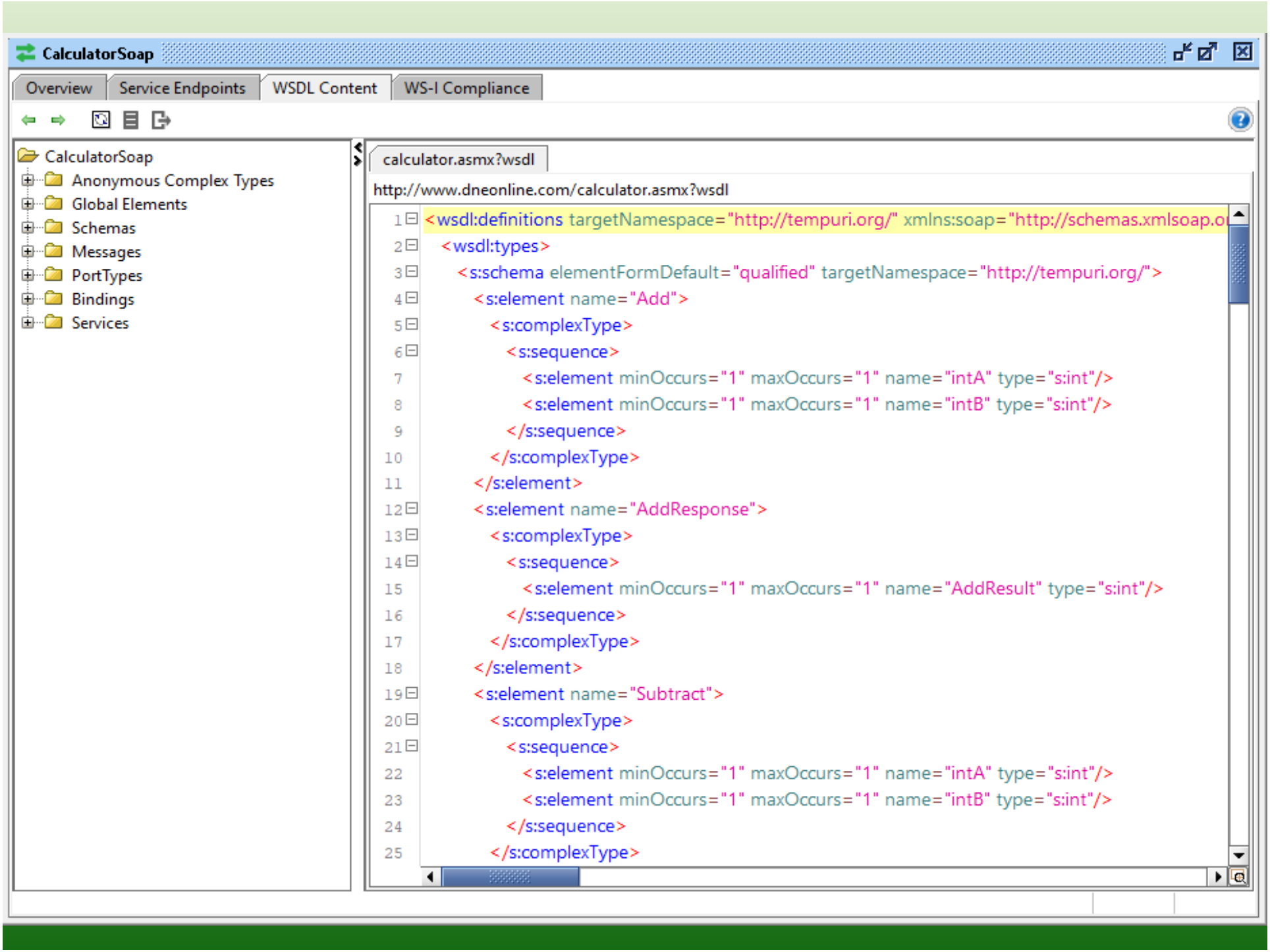
```
POST http://www.webservicex.com/globalweather.asmx HTTP/1.1
Host: www.webservicex.com
Content-Length: 341
Content-Type: application/soap+xml

<?xml version="1.0"?>
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope">
  <soap:Header></soap:Header>
  <soap:Body>
    <ns1:GetWeather xmlns:ns1='http://www.webserviceX.NET'>
       <ns1:CityName>Montreal</ns1:CityName>
       <ns1:CountryName>Canada</ns1:CountryName>
    </ns1:GetWeather>
  </soap:Body>
</soap:Envelope>
```

SOAP Structure

- Format
  - SOAP XML Request
  - SOAP XML Response
- Transport
  - SOAP over MQ
  - SOAP over HTTP
- Service Definition
  - WSDL (Web Service Description Language)

SOAP - WSDL


WSDL
Endpoint
All Operations
Request Structure
Response Structure


CalculatorSoap
Overview
Service Endpoints
WSDL Content
WS-I Compliance
CalculatorSoap
Anonymous Complex Types
Global Elements
Schemas
Messages
PortTypes
Bindings
Services
calculator.asmx?wsdl
http://www.dneonline.com/calculator.asmx?wsdl
<wsdl:definitions targetNamespace="http://tempuri.org/" xmlns:soap="http://schemas.xmlsoap.o
<wsdl:types>
<s:schema elementFormDefault="qualified" targetNamespace="http://tempuri.org/">
<s:element name="Add">
<s:complexType>
<s:sequence>
<s:element minOccurs="1" maxOccurs="1" name="intA" type="s:int"/>
<s:element minOccurs="1" maxOccurs="1" name="intB" type="s:int"/>
</s:sequence>
</s:complexType>
</s:element>
<s:element name="AddResponse">
<s:complexType>
<s:sequence>
<s:element minOccurs="1" maxOccurs="1" name="AddResult" type="s:int"/>
</s:sequence>
</s:complexType>
</s:element>
<s:element name="Subtract">
<s:complexType>
<s:sequence>
<s:element minOccurs="1" maxOccurs="1" name="intA" type="s:int"/>
<s:element minOccurs="1" maxOccurs="1" name="intB" type="s:int"/>
</s:sequence>
</s:complexType>

Restful Web Services

- **RE**presentational **S**tate **T**ransfer
- Use only HTTP (Hyper Text Transfer Protocol)
- Browser sends HTTP Request & get HTTP Response back
- HTTP Methods (GET, PUT, POST, DELETE)
- HTTP Response Code (200, 404 …)

Restful Web Services

- **Resource** is anything that you want to exposed through your application
- For example User or Task is resource in User Management Application
- We assign URI's to each resource
  - /user/John
  - /user/John/task
  - /user/John/task/101

Restful Web Services

- **Resource** can use any representation
  - XML
  - HTML
  - JSON
- Example
  - Create a User : POST /users
  - Delete a User : DELETE /users/101
  - Get all Users : GET /users
  - Get one User : GET /users/101

Restful Web Services

- Data Exchange Format
  - No restrictions on data format
  - JSON is popular
- Transport
  - HTTP only
- Service Definition
  - No standards as SOAP
  - WADL (Web Application Definition Language)
  - Swagger

SOAP vs REST

SOAP	REST
Format based on XML	Architectural approach
Data Exchange : XML only	Data Exchange : Can be anything (XML, JSON etc)
Service Definition : WSDL	Service Definition : No standards defined (WADL but not widely used)
Transport : HTTP, MQ	Transport : HTTP only
Ease of Implementation : Difficult to implement. Requires to follow WSDL	Ease of Implementation : Easy to implement. No need to follow any WSDL

QUESTIONS ?