



## Web Services PS 703128

# WSDL Web Services

### Required software:

- Java JDK: <http://www.oracle.com/technetwork/java/javase/downloads/>
- Eclipse: <http://www.eclipse.org/downloads/>
- Eclipse WTP: <http://www.eclipse.org/webtools/>

### Exercise 1 – Invoking WSDL Web Services

Select an online WSDL Web Service<sup>1</sup> and using the “Web Service Client” from Eclipse WTP create a test client for one method of the service.

#### WSDL Description

```
<?xml version="1.0" encoding="utf-8"?>
<wsdl:definitions
  xmlns:tm="http://microsoft.com/wsdl/mime/textMatching/"
  xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:mime="http://schemas.xmlsoap.org/wsdl/mime/"
  xmlns:tns="http://www.w3schools.com/xml/"
  xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:s="http://www.w3.org/2001/XMLSchema"
  xmlns:soap12="http://schemas.xmlsoap.org/wsdl/soap12/"
  xmlns:http="http://schemas.xmlsoap.org/wsdl/http/"
  targetNamespace="http://www.w3schools.com/xml/"
  xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">
  <wsdl:types>
```

<sup>1</sup> You can find services at <http://webservicex.net/> or other available services repository on the Internet

```

    <s:schema elementFormDefault="qualified"
targetNamespace="http://www.w3schools.com/xml/">
    <s:element name="FahrenheitToCelsius">
        <s:complexType>
            <s:sequence>
                <s:element minOccurs="0" maxOccurs="1" name="Fahrenheit"
type="s:string" />
            </s:sequence>
        </s:complexType>
    </s:element>
    <s:element name="FahrenheitToCelsiusResponse">
        <s:complexType>
            <s:sequence>
                <s:element minOccurs="0" maxOccurs="1"
name="FahrenheitToCelsiusResult" type="s:string" />
            </s:sequence>
        </s:complexType>
    </s:element>
    <s:element name="CelsiusToFahrenheit">
        <s:complexType>
            <s:sequence>
                <s:element minOccurs="0" maxOccurs="1" name="Celsius"
type="s:string" />
            </s:sequence>
        </s:complexType>
    </s:element>
    <s:element name="CelsiusToFahrenheitResponse">
        <s:complexType>
            <s:sequence>
                <s:element minOccurs="0" maxOccurs="1"
name="CelsiusToFahrenheitResult" type="s:string" />
            </s:sequence>
        </s:complexType>
    </s:element>
    <s:element name="string" nillable="true" type="s:string" />
</s:schema>
</wsdl:types>
<wsdl:message name="FahrenheitToCelsiusSoapIn">
    <wsdl:part name="parameters" element="tns:FahrenheitToCelsius" />
</wsdl:message>
<wsdl:message name="FahrenheitToCelsiusSoapOut">

```

```

    <wsdl:part name="parameters"
element="tns:FahrenheitToCelsiusResponse" />
  </wsdl:message>
  <wsdl:message name="CelsiusToFahrenheitSoapIn">
    <wsdl:part name="parameters" element="tns:CelsiusToFahrenheit" />
  </wsdl:message>
  <wsdl:message name="CelsiusToFahrenheitSoapOut">
    <wsdl:part name="parameters"
element="tns:CelsiusToFahrenheitResponse" />
  </wsdl:message>
  <wsdl:message name="FahrenheitToCelsiusHttpPostIn">
    <wsdl:part name="Fahrenheit" type="s:string" />
  </wsdl:message>
  <wsdl:message name="FahrenheitToCelsiusHttpPostOut">
    <wsdl:part name="Body" element="tns:string" />
  </wsdl:message>
  <wsdl:message name="CelsiusToFahrenheitHttpPostIn">
    <wsdl:part name="Celsius" type="s:string" />
  </wsdl:message>
  <wsdl:message name="CelsiusToFahrenheitHttpPostOut">
    <wsdl:part name="Body" element="tns:string" />
  </wsdl:message>
  <wsdl:portType name="TempConvertSoap">
    <wsdl:operation name="FahrenheitToCelsius">
      <wsdl:input message="tns:FahrenheitToCelsiusSoapIn" />
      <wsdl:output message="tns:FahrenheitToCelsiusSoapOut" />
    </wsdl:operation>
    <wsdl:operation name="CelsiusToFahrenheit">
      <wsdl:input message="tns:CelsiusToFahrenheitSoapIn" />
      <wsdl:output message="tns:CelsiusToFahrenheitSoapOut" />
    </wsdl:operation>
  </wsdl:portType>
  <wsdl:portType name="TempConvertHttpPost">
    <wsdl:operation name="FahrenheitToCelsius">
      <wsdl:input message="tns:FahrenheitToCelsiusHttpPostIn" />
      <wsdl:output message="tns:FahrenheitToCelsiusHttpPostOut" />
    </wsdl:operation>
    <wsdl:operation name="CelsiusToFahrenheit">
      <wsdl:input message="tns:CelsiusToFahrenheitHttpPostIn" />
      <wsdl:output message="tns:CelsiusToFahrenheitHttpPostOut" />
    </wsdl:operation>
  </wsdl:portType>

```

```

</wsdl:portType>
<wsdl:binding name="TempConvertSoap" type="tns:TempConvertSoap">
  <soap:binding transport="http://schemas.xmlsoap.org/soap/http" />
  <wsdl:operation name="FahrenheitToCelsius">
    <soap:operation
soapAction="http://www.w3schools.com/xml/FahrenheitToCelsius"
style="document" />
    <wsdl:input>
      <soap:body use="literal" />
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
  <wsdl:operation name="CelsiusToFahrenheit">
    <soap:operation
soapAction="http://www.w3schools.com/xml/CelsiusToFahrenheit"
style="document" />
    <wsdl:input>
      <soap:body use="literal" />
    </wsdl:input>
    <wsdl:output>
      <soap:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
</wsdl:binding>
<wsdl:binding name="TempConvertSoap12" type="tns:TempConvertSoap">
  <soap12:binding transport="http://schemas.xmlsoap.org/soap/http"
/>
  <wsdl:operation name="FahrenheitToCelsius">
    <soap12:operation
soapAction="http://www.w3schools.com/xml/FahrenheitToCelsius"
style="document" />
    <wsdl:input>
      <soap12:body use="literal" />
    </wsdl:input>
    <wsdl:output>
      <soap12:body use="literal" />
    </wsdl:output>
  </wsdl:operation>
  <wsdl:operation name="CelsiusToFahrenheit">

```

```

        <soap12:operation
soapAction="http://www.w3schools.com/xml/CelsiusToFahrenheit"
style="document" />
        <wsdl:input>
            <soap12:body use="literal" />
        </wsdl:input>
        <wsdl:output>
            <soap12:body use="literal" />
        </wsdl:output>
    </wsdl:operation>
</wsdl:binding>
<wsdl:binding name="TempConvertHttpPost"
type="tns:TempConvertHttpPost">
    <http:binding verb="POST" />
    <wsdl:operation name="FahrenheitToCelsius">
        <http:operation location="/FahrenheitToCelsius" />
        <wsdl:input>
            <mime:content type="application/x-www-form-urlencoded" />
        </wsdl:input>
        <wsdl:output>
            <mime:mimeType part="Body" />
        </wsdl:output>
    </wsdl:operation>
    <wsdl:operation name="CelsiusToFahrenheit">
        <http:operation location="/CelsiusToFahrenheit" />
        <wsdl:input>
            <mime:content type="application/x-www-form-urlencoded" />
        </wsdl:input>
        <wsdl:output>
            <mime:mimeType part="Body" />
        </wsdl:output>
    </wsdl:operation>
</wsdl:binding>
<wsdl:service name="TempConvert">
    <wsdl:port name="TempConvertSoap" binding="tns:TempConvertSoap">
        <soap:address
location="http://www.w3schools.com/xml/tempconvert.asmx" />
        </wsdl:port>
    <wsdl:port name="TempConvertSoap12"
binding="tns:TempConvertSoap12">
        <soap12:address

```

```
location="http://www.w3schools.com/xml/tempconvert.asmx" />
  </wsdl:port>
  <wsdl:port name="TempConvertHttpPost"
binding="tns:TempConvertHttpPost">
  <http:address
location="http://www.w3schools.com/xml/tempconvert.asmx" />
  </wsdl:port>
</wsdl:service>
</wsdl:definitions>
```

Using your implementation and the TCP/IP Monitor<sup>2</sup> integrated in Eclipse capture a SOAP request and response to the method you have selected.

<b>SOAP Request</b>
POST /WSDL/services/TempConvertSoap HTTP/1.0 Content-Type: text/xml; charset=utf-8 Accept: application/soap+xml, application/dime, multipart/related, text/* User-Agent: Axis/1.4 Host: localhost:8081 Cache-Control: no-cache Pragma: no-cache SOAPAction: "http://www.w3schools.com/xml/CelsiusToFahrenheit" Content-Length: 363  <?xml version="1.0" encoding="UTF-8"?><soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema- instance"><soapenv:Body><CelsiusToFahrenheit xmlns="http://www.w3schools.com/xml/"><Celsius>25</Celsius></CelsiusToFahrenheit></soap env:Body></soapenv:Envelope>
<b>SOAP Response</b>
HTTP/1.1 200 OK Server: Apache-Coyote/1.1 Content-Type: text/xml; charset=utf-8 Date: Mon, 18 Jan 2016 21:29:17 GMT Connection: close  <?xml version="1.0" encoding="utf-8"?><soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://www.w3.org/2001/XMLSchema- instance"><soapenv:Body><CelsiusToFahrenheitResponse xmlns="http://www.w3schools.com/xml/"><CelsiusToFahrenheitResult>77.0</CelsiusToFahren heitResult></CelsiusToFahrenheitResponse></soapenv:Body></soapenv:Envelope>

<sup>2</sup>Info: <http://www.avajava.com/tutorials/lessons/how-do-i-monitor-http-communication-in-eclipse.html>

## Exercise 2 – WSDL Web Service Design

Based on the following RemotePrinter interface, define a WSDL 2.0 service description. It is sufficient to define just one binding SOAP/HTTP.

You can use the WSDL editor from Eclipse WTP for assistance.

```
public interface RemotePrinter {  
  
    /**  
     * Submit a new print job.  
     *  
     * @param text the text to be printed  
     * @return the id of the print job.  
     */  
    public int submitJob(String text);  
  
    /**  
     * Check the job's completion status.  
     *  
     * @param id the job id  
     * @return <code>true</code> if the job is complete and  
     *         <code>false</code> otherwise.  
     */  
    public boolean isComplete(int id);  
  
    /**  
     * Queries the printer status.  
     *  
     * @return printer status in a human readable form.  
     */  
    public String getPrinterStatus();  
}
```

### WSDL Description

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>  
<wsdl:definitions xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"  
  xmlns:tns="http://www.example.org/PrinterWSDL/"  
  xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"  
  xmlns:xsd="http://www.w3.org/2001/XMLSchema" name="PrinterWSDL"  
  targetNamespace="http://www.example.org/PrinterWSDL/">  
  <wsdl:types>  
    <xsd:schema targetNamespace="http://www.example.org/PrinterWSDL/">  
      <xsd:element name="submitJob">  
        <xsd:complexType>
```



```

        <xsd:sequence>
            <xsd:element name="text" type="xsd:string"/>
        </xsd:sequence>
    </xsd:complexType>
</xsd:element>
<xsd:element name="submitJobResponse">
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name="id" type="xsd:int"/>
        </xsd:sequence>
    </xsd:complexType>
</xsd:element>
<xsd:element name="isComplete">
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name="id"
type="xsd:int"/></xsd:element>
        </xsd:sequence>
    </xsd:complexType>
</xsd:element>
<xsd:element name="isCompleteResponse">
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name="complete"
type="xsd:boolean"/></xsd:element>
        </xsd:sequence>
    </xsd:complexType>
</xsd:element>
<xsd:element name="getPrinterStatus">
    <xsd:complexType>
        <xsd:sequence>
            </xsd:sequence>
        </xsd:complexType>
</xsd:element>
<xsd:element name="getPrinterStatusResponse">
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name="status"
type="xsd:string"/></xsd:element>
        </xsd:sequence>
    </xsd:complexType>

```

```

        </xsd:element>
    </xsd:schema>
</wsdl:types>
<wsdl:message name="submitJobRequest">
    <wsdl:part element="tns:submitJob" name="parameters"/>
</wsdl:message>
<wsdl:message name="submitJobResponse">
    <wsdl:part element="tns:submitJobResponse" name="parameters"/>
</wsdl:message>
<wsdl:message name="isCompleteRequest">
    <wsdl:part name="parameters"
element="tns:isComplete"></wsdl:part>
</wsdl:message>
<wsdl:message name="isCompleteResponse">
    <wsdl:part name="parameters"
element="tns:isCompleteResponse"></wsdl:part>
</wsdl:message>
<wsdl:message name="getPrinterStatusRequest">
    <wsdl:part name="parameters"
element="tns:getPrinterStatus"></wsdl:part>
</wsdl:message>
<wsdl:message name="getPrinterStatusResponse">
    <wsdl:part name="parameters"
element="tns:getPrinterStatusResponse"></wsdl:part>
</wsdl:message>
<wsdl:portType name="PrinterWSDL">
    <wsdl:operation name="submitJob">
        <wsdl:input message="tns:submitJobRequest"/>
        <wsdl:output message="tns:submitJobResponse"/>
    </wsdl:operation>
    <wsdl:operation name="isComplete">
        <wsdl:input message="tns:isCompleteRequest"></wsdl:input>
        <wsdl:output message="tns:isCompleteResponse"></wsdl:output>
    </wsdl:operation>
    <wsdl:operation name="getPrinterStatus">
        <wsdl:input message="tns:getPrinterStatusRequest"></wsdl:input>
        <wsdl:output
message="tns:getPrinterStatusResponse"></wsdl:output>
    </wsdl:operation>
</wsdl:portType>
<wsdl:binding name="PrinterWSDLSOAP" type="tns:PrinterWSDL">

```

```

    <soap:binding style="document"
transport="http://schemas.xmlsoap.org/soap/http"/>
    <wsdl:operation name="submitJob">
        <soap:operation
soapAction="http://www.example.org/PrinterWSDL/submitJob"/>
        <wsdl:input>
            <soap:body use="literal"/>
        </wsdl:input>
        <wsdl:output>
            <soap:body use="literal"/>
        </wsdl:output>
    </wsdl:operation>
    <wsdl:operation name="isComplete">
        <soap:operation
soapAction="http://www.example.org/PrinterWSDL/isComplete"/>
        <wsdl:input>
            <soap:body use="literal"/>
        </wsdl:input>
        <wsdl:output>
            <soap:body use="literal"/>
        </wsdl:output>
    </wsdl:operation>
    <wsdl:operation name="getPrinterStatus">
        <soap:operation
soapAction="http://www.example.org/PrinterWSDL/getPrinterStatus"/>
        <wsdl:input>
            <soap:body use="literal"/>
        </wsdl:input>
        <wsdl:output>
            <soap:body use="literal"/>
        </wsdl:output>
    </wsdl:operation>
</wsdl:binding>
<wsdl:service name="PrinterWSDL">
    <wsdl:port binding="tns:PrinterWSDL SOAP" name="PrinterWSDL SOAP">
        <soap:address location="http://www.example.org/">
    </wsdl:port>
</wsdl:service>
</wsdl:definitions>

```