

# WebServices - Axis

## 1. Axis #####

##### 1.2

#####: axis-dev@ws.apache.org

### 1.1. ##

- #####
  - SOAP #####?
  - Axis #####?
  - #####
  - #####
- Axis #####
- Axis #Web#####
  - ## - ###
  - #####
  - "###" #####
- Axis #####Web#####
  - JWS (Java Web Service) #### - #####
  - ##### - WSDD ###
  - ##### - RPC#Document#Wrapped#Message
- XML <-> Axis #### Java #####
  - Java ## SOAP/XML #####
  - ##
  - #####Axis # SOAP #####
  - Axis # SOAP #####
  - Bean ##### - BeanSerializer
  - Bean ##### - #####
- Axis # WSDL #####
  - ?WSDL: ##### WSDL #####
  - WSDL2Java: WSDL ## #####
  - Java2WSDL: Java ## WSDL ###
- Axis #####
- #####: #####

- #####
- #####
- ## : Axis TCP ### (tcpmon) #####
- ##: SOAP Monitor #####
- ###

## 1.2. ####

Axis#Apache SOAP #####!

### 1.2.1. SOAP #####?

SOAP ##### XML #####  
 Microsoft # Userland software ##### SOAP 1.1 [##] #  
 #####W3C # XML Protocol working group [##] # SOAP #####  
 #####1.1 ##### SOAP 1.2 # working draft #####

SOAP #####Web#####

### 1.2.2. Axis #####?

Axis ##### SOAP ##### -- ##### SOAP #####Axis  
 ##### Java #####Axis ##### C++ #####

###Axis ##### SOAP ##### -- #####

- #####
- Tomcat #####
- Web Service Description Language (WSDL) #####
- WSDL ## Java #####
- #####
- TCP/IP #####

Axis # (IBM ## "SOAP4J" #####) Apache SOAP #####2000#### Apache SOAP v2 #  
 #####SOAP # W3C ##### XML #####  
 #####

#####2#####  
 ##### "####" ##### "####" #####

#####Axis #####

- ##### Axis # SAX (#####) #####Apache SOAP #####  
 #####
- ### Axis #####

## WebServices - Axis

```
#####  
• ### Axis ##### Axis #####  
###  
• #####  
#####  
• ##### Axis ##### (#####SMTP#FTP#####  
# SOAP #####) #####  
• WSDL ##### Axis # Web Service Description Language [##] #####1.1#####  
#####  
#####  
Axis #####Axis ##### Axis #####  
#####Axis #####Axis #####  
#####Axis # Apache EXtensible Interaction System (Apache #####  
####) ##### SOAP #####  
#####  
Axis ##### "axis-user@ws.apache.org" #####Axis # Apache #####  
##### jira [##] #####
```

### 1.2.3. #####

```
#####  
• SOAP 1.1/1.2 #####  
• ##### / #####  
• SOAP ##### "drop-in" ##### (JWS)  
• #####/#####  
• ##### XML ##/#####Java Beans #####/#####  
• Java Collection # SOAP #####  
• RPC ##### SOAP #####  
• ##### WSDL #####  
• WSDL ##### Java ##### WSDL2Java ###  
• Java ##### WSDL ##### Java2WSDL ###  
• Servlet 2.2 #####/#####  
• HTTP ##### SOAP #####  
• SOAP with Attachments #####  
• Web##### EJB ##### EJB #####  
• HTTP #####  
• JMS #####  
• ##### (HTTP #####)  
• SoapBuilders ##### TCP#JMS#####
```

###

### 1.2.4. #####

##### [##] #####  
#####

### 1.3. Axis #####

Axis # J2EE #####Web##### Axis #####

#####CLASSPATH ##### (## CVS #####  
Axis #####axis-1\_1/lib ##### xml-axis/java/build/lib #####)#

- axis-1\_2/lib/axis.jar
- axis-1\_2/lib/jaxrpc.jar
- axis-1\_2/lib/saaj.jar
- axis-1\_2/lib/commons-logging.jar
- axis-1\_2/lib/commons-discovery.jar
- axis-1\_2/lib/wsdl4j.jar
- axis-1\_2/ (#####)
- JAXP-1.1 ### XML ##### Xerces # Crimson ##Xerces #####  
#####

### 1.4. Axis #Web#####

#### 1.4.1. ## - ###

#####Apache ##### Axis ##### echoString #####Web#####

```

1  import org.apache.axis.client.Call;
2  import org.apache.axis.client.Service;
3  import javax.xml.namespace.QName;
4
5  public class TestClient {
6      public static void main(String [] args) {
7          try {
8              String endpoint =
9                  "http://ws.apache.org:5049/axis/services/echo";
10
11             Service service = new Service();
12             Call call = (Call) service.createCall();
13
14             call.setTargetEndpointAddress( new java.net.URL(endpoint) );
15             call.setOperationName(new QName("http://soapinterop.org/", echoString));
16
17             String ret = (String) call.invoke( new Object[] { "Hello!" } );

```

## WebServices - Axis

```
18
19     System.out.println("Sent 'Hello!', got '" + ret + "'");
20     } catch (Exception e) {
21         System.err.println(e.toString());
22     }
23 }
24 }
```

(##### samples/userguide/example1/TestClient.java [##] #####)

#####

```
% java samples.userguide.example1.TestClient
Sent 'Hello!', got 'Hello!'
%
```

```
#####11#12#####Service#####Call##### JAX-RPC #####
#####14##### URL (SOAP #####)####
####15###Web##### (####) #####17##### (#####1#####) #####
#####
```

```
##### SOAP ##### (#####)
#####)
```

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SOAP-ENV:Body>
    <ns1:echoString xmlns:ns1="http://soapinterop.org/">
      <arg0 xsi:type="xsd:string">Hello!</arg0>
    </ns1:echoString>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

##### XML #####

```
##: ##### XML ##### tcpmon ##### SOAP #####
#####
```

### 1.4.2. #####

```
#####Axis # SOAP ##### XML ##### "arg0"#"arg1" #####
##### (##### "arg0" ####)#####invoke() #####
addParameter ##### setReturnType #####
```

```
call.addParameter("testParam",
  org.apache.axis.Constants.XSD_STRING,
  javax.xml.rpc.ParameterMode.IN);
call.setReturnType(org.apache.axis.Constants.XSD_STRING);
```

```
#####1 (#####) ##### testParam #####
(org.apache.axis.Constants.XSD_STRING) #####
```

#####

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SOAP-ENV:Body>
    <ns1:echoString xmlns:ns1="http://soapinterop.org/">
      <testParam xsi:type="xsd:string">Hello!</testParam>
    </ns1:echoString>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

##### "testParam" #####

**1.4.3. "####" #####**

#####invoke() ##### Object #### "####" ##### echoString ##### String #  
#####client.invoke() ### String #####  
##### (#####)#

echoString #####

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SOAP-ENV:Body>
    <ns1:echoStringResponse xmlns:ns1="http://soapinterop.org/">
      <result xsi:type="xsd:string">Hello!</result>
    </ns1:echoStringResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

#####Axis #####  
Java # String ##### XML #####"  
#####

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <SOAP-ENV:Body>
    <ns1:echoStringResponse xmlns:ns1="http://soapinterop.org/">
      <result>Hello, I'm a string!</result>
    </ns1:echoStringResponse>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

##### <result> ##### Java #####  
##### Axis #####  
#####

## WebServices - Axis

```
call.setReturnType( org.apache.axis.Constants.XSD_STRING );
##### xsi:type ##### SOAP String #####
#####Axis #####(#####samples/echo/TestClient.java ##
#####)
##### Java #####
call.setReturnClass(String.class);
##### SOAP #####?
```

### 1.5. Axis #####Web#####

```
#####
```

```
public class Calculator {
    public int add(int i1, int i2) {
        return i1 + i2;
    }

    public int subtract(int i1, int i2) {
        return i1 - i2;
    }
}
```

```
(##### samples/userguide/example2/Calculator.java [##] #####)
```

```
##### SOAP #####? #####Axis #####
#####
```

#### 1.5.1. JWS (Java Web Service) ##### - #####

```
#####1##### .java ##### webapp ##### "Calculator.jws" #####
#####
```

```
% copy Calculator.java <your-webapp-root>/axis/Calculator.jws
```

```
#####2##### URL ##### (Axis #####
#####8080#####)#
```

```
http://localhost:8080/axis/Calculator.jws
```

```
Axis #####SOAP ##### Java #####
samples/userguide/example2/CalcClient.java #####
###
```

```
% java samples.userguide.example2.CalcClient -p8080 add 2 5
```

```
Got result : 7
```

```
% java samples.userguide.example2.CalcClient -p8080 subtract 10 9
```

Got result : 1  
%

("-p8080" ##### J2EE #####)

##: JWS Web#####Web#####  
#####Web##### Java #####

1.5.2. ##### - WSDD ##

JWS #####Web#####  
#####(#####  
##: Axis #### Java SOAP #####  
#####!)

1.5.2.1. #####

Axis #####Axis Web Service Deployment Descriptor (WSDD) #####  
#####Axis ##### Axis #####  
#####Web##### (#####  
### samples/userguide/example3/deploy.wsdd [##] ##)#

```
<deployment xmlns="http://xml.apache.org/axis/wsdd/"
  xmlns:java="http://xml.apache.org/axis/wsdd/providers/java">
  <service name="MyService" provider="java:RPC">
    <parameter name="className" value="samples.userguide.example3.MyService"/>
    <parameter name="allowedMethods" value="*" />
  </service>
</deployment>
```

##### WSDD #####"java" #####  
##service ##### (#####)#####  
##### ("#####)#####  
##### "java:RPC" ##### Axis #####Java RPC #####  
##### org.apache.axis.providers.java.RPCProvider #####  
#####

RPCProvider ##### (#####samples.userguide.example3.MyService) #####  
##### <parameter> #####service #####  
### public ##### SOAP ##### ("\*" #####  
##### SOAP #####)

1.5.2.2. ## WSDD - #####

WSDD #####"#####" ##### Axis #####



## WebServices - Axis

#####

### 1.5.2.3. #####

```
Axis ##### (##### Java #####) #3#####  
"request" ##### SOAP #####"application" #####  
#####"session" #####  
##### <parameter> ##### ("#" #  
request#session#application#####)#
```

```
<service name="MyService"...>  
  <parameter name="scope" value="value"/>  
  ...  
</service>
```

### 1.5.2.4. AdminClient ###

```
WSDD ##### Axis ### WSDD #####  
AdminClient#### "org.apache.axis.client.AdminClient" ##### Tomcat #####  
Axis ##### -p <port> #####8080##### AdminClient #####  
#####
```

```
% java org.apache.axis.client.AdminClient deploy.wsdd  
<Admin>Done processing</Admin>
```

```
##### SOAP #####Client #####
```

```
% java samples.userguide.example3.Client  
-lhttp://localhost:8080/axis/services/MyService "test me!"  
You typed : test me!  
%
```

```
#####example3/  
##### "undeploy.wsdd" ##### deploy.wsdd #####  
undeploy.wsdd ##### AdminClient ##### Client #####
```

```
AdminClient #####
```

```
% java org.apache.axis.client.AdminClient list  
<big XML document returned here>
```

```
##### "server-config.wsdd" #####  
#####
```

### 1.5.2.5. ##### - #####

```
Axis #####  
# samples/log #####  
##### deploy.wsdd #### (### samples/userguide ### example4 ##) ##
```

####

```
<deployment xmlns="http://xml.apache.org/axis/wsdd/"
  xmlns:java="http://xml.apache.org/axis/wsdd/providers/java">
  <!-- define the logging handler configuration -->
  <handler name="track" type="java:samples.userguide.example4.LogHandler">
    <parameter name="filename" value="MyService.log"/>
  </handler>

  <!-- define the service, using the log handler we just defined -->
  <service name="LogTestService" provider="java:RPC">
    <requestFlow>
      <handler type="track"/>
    </requestFlow>

    <parameter name="className" value="samples.userguide.example4.Service"/>
    <parameter name="allowedMethods" value="*/>
  </service>
</deployment>
```

##### samples.userguide.example4.LogHandler ##### "track" #####  
#####

#####LogTestService ##### RPC ##### <service>  
### <requestFlow> ##### "track"  
#####

**1.5.2.6. #####**

Axis #####  
#AdminService # "enableRemoteAdmin" ##### true #####webapp #  
WEB-INF ##### "server-config.wsdd" #####

```
<service name="AdminService" provider="java:MSG">
  <parameter name="className" value="org.apache.axis.util.Admin"/>
  <parameter name="allowedMethods" value="*/>
  <parameter name="enableRemoteAdmin" value="true"/>
</service>
```

##: #####  
#####

**1.5.3. ##### - RPC#Document#Wrapped#Message**

Axis #####4### "####" #####RPC #####SOAP RPC ##### SOAP "5#" #####  
#####Document ##### (##### multiref #####  
##### SOAP #####) ##### XML<->Java #####  
Wrapped ##### document #####SOAP #####  
##### "unwrap" #####Message #####SOAP #

```
##### XML ##### SOAP ##### XML #####  
message #####
```

### 1.5.3.1. RPC #####

```
Axis ## RPC #####<service ... provider="java:RPC"> ### <service ...  
style="RPC"> ##### RPC #####RPC ##### SOAP RPC #####  
#####RPC ##### XML ##### "echoString" ##### RPC #####  
#####Axis ##### XML  
# Java ##### Java ##### XML #####RPC #####  
# SOAP 5##### "multi-ref" #####  
#####(multi-ref ##### SOAP #####)
```

### 1.5.3.2. Document / Wrapped #####

```
document ##### wrapped ##### SOAP ##### XML #####  
#####Axis # Java ### XML # "####" ##### (### #####  
# #####)### XML #####Java #####
```

```
document ##### wrapped ##### SOAP #####
```

```
<soap:Envelope xmlns="http://xml.apache.org/axis/wsdd/"  
  xmlns:java="http://xml.apache.org/axis/wsdd/providers/java">  
  <soap:Body>  
    <myNS:PurchaseOrder xmlns:myNS="http://commerce.com/PO">  
      <item>SK001</item>  
      <quantity>1</quantity>  
      <description>Sushi Knife</description>  
    </myNS:PurchaseOrder>  
  </soap:Body>  
</soap:Envelope>
```

```
PurchaseOrder #####
```

```
<schema targetNamespace="http://commerce.com/PO">  
  <complexType name="POType">  
    <sequence>  
      <element name="item" type="xsd:string"/>  
      <element name="quantity" type="xsd:int"/>  
      <element name="description" type="xsd:string"/>  
    </sequence>  
  </complexType>  
  <element name="PurchaseOrder" type="POType"/>  
</schema>
```

```
document #####
```

```
public void method(PurchaseOrder po)
```

```
#####<PurchaseOrder> #####3##### bean #####wrapped #####
#####

public void purchaseOrder(String item, int quantity, String
description)

"wrapped" #####<PurchaseOrder> ##### "wrapper (###)" ## (#####
)##### "unwrap (#####)" #####

document ##### wrapped ##### WSDD #####

<service ... style="document"> for document style
<service ... style="wrapped"> for wrapped style

WSDL ##### document ##### wrapped #####(#####
#)#
```

### 1.5.3.3. message ####

```
### "message" #####Axis #####XML # Java #####
### XML ##### message #####message #####4#####
#####

public Element [] method(Element [] bodies);
public SOAPBodyElement [] method (SOAPBodyElement [] bodies);
public Document method(Document body);
public void method(SOAPEnvelope req, SOAPEnvelope resp);

###2##### DOM Element ##### SOAPBodyElement #####
<soap:body> ##### XML #####1#####

3##### <soap:body> ##### DOM Document ##### DOM Document #####

4#####2## SOAPEnvelope #####
#####
#####

message ##

message ##### samples/message/MessageService.java [##] #####
MessageService ##### public ##### echoElements #####4#####
#####

public Element[] echoElements(Element [] elems)
```

## WebServices - Axis

```
MsgProvider ##### SOAP ##### org.w3c.dom.Element #####  
##### Element (##### XML #####  
) #####SOAP ##### SOAP #####  
## Element[] #####
```

```
message ##### WSDD ##### MessageService ##### WSDD #  
#####
```

```
<deployment name="test" xmlns="http://xml.apache.org/axis/wsdd/"  
  xmlns:java="http://xml.apache.org/axis/wsdd/providers/java"  
  xmlns:xsi="http://www.w3.org/2000/10/XMLSchema-instance">  
  <service name="MessageService" style="message">  
    <parameter name="className" value="samples.message.MessageService"/>  
    <parameter name="allowedMethods" value="echoElements"/>  
  </service>  
</deployment>
```

```
"style" ### RPC #####"message" #####  
org.apache.axis.providers.java.RPCProvider # # #  
org.apache.axis.providers.java.MsgProvider ##### Axis #####
```

```
#####samples.message.TestMsg ##### (#####)#
```

### 1.6. XML <-> Axis ##### Java #####

#### 1.6.1. Java ## SOAP/XML #####

```
##### (interoperability#### interop) # SOAP #####  
#####Axis #####  
Java ## WSDL/XSD/SOAP ##### JAX-RPC ##### [##] #4##5#####  
#####
```

#### 1.6.1.1. WSDL ## Java #####

xsd:base64Binary	byte[]
xsd:boolean	boolean
xsd:byte	byte
xsd:dateTime	java.util.Calendar
xsd:decimal	java.math.BigDecimal
xsd:double	double
xsd:float	float

xsd:hexBinary	byte[]
xsd:int	int
xsd:integer	java.math.BigInteger
xsd:long	long
xsd:QName	javax.xml.namespace.QName
xsd:short	short
xsd:string	java.lang.String

##### nillable ##### WSDL ##### nil #####  
##### (Byte#Double#Boolean ##) #####

**1.6.1.2. SOAP #####**

XSD ##### nillable ### SOAP 5#####  
##### "ID" # "HREF" ##### RPC ##### multi-ref ##  
#####

**1.6.2. ##**

#####  
#####JAX-RPC ###5.5.5##14#####

**1.6.2.1. RemoteExceptions ## SOAP Fault #####**

##### java.rmi.RemoteException ##### SOAP Fault #####  
faultcode #####

##### WSDL #####  
#####  
java.rmi.RemoteException #####

##### faultCode #####  
#####

**1.6.2.2. ### wsdl:fault #####**

##### java.rmi.RemoteException ##### Exception  
##### SOAP Fault ##### WSDL #  
wsdl:fault #####JAX-RPC #####Exception #####

```
##### (#####) #####  
##### JavaBean [##] #####WSDL #####  
#####
```

```
##### WSDL #####  
#####
```

```
#####  
##### Java #####
```

### 1.6.3. #####Axis # SOAP #####

#### 1.6.3.1. Java # Collection

```
Hashtable #####Collection ##### SOAP #####  
# SOAP #####Java ##  
SOAP ##### .NET #####
```

### 1.6.4. Axis # SOAP #####

#### 1.6.4.1. #####

```
##### Java #####RMI #####  
Serializable # Java ##### Java #####Axis ##  
#### Axis #####BeanSerializer #####  
#### JavaBean ##### BeanSerializer ###  
##### Axis #####
```

#### 1.6.4.2. #####

```
##### SOAP ### JAX-RPC ##### SOAP #####  
#####  
#####HashMap #####
```

### 1.6.5. Bean ##### - BeanSerializer

```
Axis ###get/set ##### JavaBean [##] ##### Java #####/###  
##### Java ##### XML Schema ##### Axis #####  
#####bean #####
```

```
<beanMapping qname="ns:local" xmlns:ns="someNamespace"  
  languageSpecificType="java:my.java.thingy"/>
```

```
<beanMapping> ### Java ### (#### bean) # XML QName #####2#####
qname # languageSpecificType #####"my.java.thingy" ### XML
QName [someNamespace]:[local] #####

#####samples/userguide/example5/BeanService.java [##] #####
##### Order #####Order # Axis #####
#####(#####example5 #####
bad-deploy.wsdd #####) ##### beanMapping #####
##### (example5 #####) #####

% java org.apache.axis.client.AdminClient -llocal:///AdminService deploy.wsdd
<Admin>Done processing</Admin>

% java samples.userguide.example5.Client -llocal://
Hi, Glen Daniels!

You seem to have ordered the following:

1 of item : mp3jukebox
4 of item : 1600mahBattery

If this had been a real order processing system, we'd probably have charged
you about now.
%
```

**1.6.6. Bean ##### - #####**

```
JWS ##### bean #####
#####XML ##### XML #####bean ### Java ### (#####) ###
##### Java ##### XML #####Axis #####
#####/##### Axis #####

## - ##### (samples/encoding ###) DataSer/DataDeser #####
# BeanSerializer # BeanDeserializer # ArraySerializer # ArrayDeserializer #
org.apache.axis.encoding.ser #####
```

**1.6.6.1. ##### - <typeMapping> ##**

```
##### Axis ##### WSDD ###
typeMapping #####

<typeMapping qname="ns:local" xmlns:ns="someNamespace"
languageSpecificType="java:my.java.thingy"
serializer="my.java.Serializer"
deserializer="my.java.DeserializerFactory"
encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" />
##### <beanMapping> #####3#####1### serializer ##### Java
```



```
### (### my.java.thingy) ##### XML ##### Serializer factory
# Java #####2### deserializer ##XML #### Java #####
Deserializer factory #####3##### encodingStyle # SOAP #####

(<beanMapping>          #          #          #          ##
serializer="org.apache.axis.encoding.ser.BeanSerializerFactory"
#
deserializer="org.apache.axis.encoding.ser.BeanDeserializerFactory"
#encodingStyle="http://schemas.xmlsoap.org/soap/encoding/" # ##
<typeMapping> #####)
```

### 1.7. Axis # WSDL #####

Web Service Description Language [##] # IBM # Microsoft #####  
#####WSDL ###Web##### WSDL #####  
#####WSDL #####  
(1#####) #####

Axis # WSDL #3#####

1. Axis ##### URL #### "?"WSDL" ##### URL ###  
##### WSDL #####
2. WSDL ##### Java ##### "WSDL2Java" #####
3. Java ##### WSDL #### "Java2WSDL" #####

#### 1.7.1. ?WSDL: ##### WSDL #####

Axis ##### URL #####JWS #####URL ###  
JWS #####JWS ##### URL # "http://<###>/axis/services/<#####  
>" #####

##### URL ##### Axis ##### SOAP #####  
##### URL #### "?"wsdl" #####Axis #####  
#####XML ##### (#####)#####  
##### WSDL ## URL ##### .NET#  
SOAP::Lite ##### WSDL #####

### Java ##### WSDL ##### (Java2WSDL: Java ## WSDL #####)#

#### 1.7.2. WSDL2Java: WSDL ## #####

##### 1.7.2.1. #####

```
"org.apache.axis.wsdl.WSDL2Java" # Axis # WSDL-to-Java #####
#####
% java org.apache.axis.wsdl.WSDL2Java (WSDL-file-URL)
#####WSDL ## Java #####Axis #
JAX-RPC #####
% cd samples/addr
% java org.apache.axis.wsdl.WSDL2Java AddressBook.wsdl
##### "AddressFetcher2" #####AddressFetcher2 # WSDL #####
#####Java #####
```

WSDL #	##### Java ###
type #####	java ###
	(## type #####) ####
# portType #####	java #####
# binding #####	#####
# service #####	#####
	##### (locator)

```
##### Ant ##### Ant ### [##] #####
```

### 1.7.2.2. Types

```
WSDL ##### Java ##### WSDL ##### Java #####
## bean ##### WSDL (WSDL2Java ##### WSDL # Address Book ##### [##] ###
##) #####
```

```
<xsd:complexType name="phone">
  <xsd:all>
    <xsd:element name="areaCode" type="xsd:int"/>
    <xsd:element name="exchange" type="xsd:string"/>
    <xsd:element name="number" type="xsd:string"/>
  </xsd:all>
</xsd:complexType>
```

```
WSDL2Java ##### Java #####
```

```
public class Phone implements java.io.Serializable {
  public Phone() {...}
  public int getAreaCode() {...}
  public void setAreaCode(int areaCode) {...}
  public java.lang.String getExchange() {...}
  public void setExchange(java.lang.String exchange) {...}
  public java.lang.String getNumber() {...}
}
```

## WebServices - Axis

```
public void setNumber(java.lang.String number) {...}
public boolean equals(Object obj) {...}
public int hashCode() {...}
}
```

### 1.7.2.3. XML ## Java ##### : #####

```
#####XML ### "phone" ##### Java #### "Phone" #####
# Java ##### XML #####
Java ##### "phone" ##### "new" ##### "new" #
## Java #####

##### XML #####/#####
##### Java #####

WSDL2Java ##### Phone ##### bean #####WSDL2Java #####
### Java ##### WSDL2Java #####
##### Java #
####/##### XML #####

#####Axis ##### "test.encoding.AttributeBean" #####Java ####
##### XML ##### bean #####
```

### 1.7.2.4. Holders

```
#####Java #####JAX-RPC #
holder #####holder ##### Phone #### holder #
#####
```

```
package samples.addr.holders;

public final class PhoneHolder implements javax.xml.rpc.holders.Holder {
    public samples.addr.Phone value;

    public PhoneHolder() {
    }

    public PhoneHolder(samples.addr.Phone value) {
        this.value = value;
    }
}
```

```
##### holder ##### holder #####
"Holder" #####"holders" #####
```

```
##### holder #### javax.xml.rpc.holders #####
```

### 1.7.2.5. PortTypes

##### (Service Definition Interface: SDI) # WSDL # portType #####  
##### WSDL #####

```
<message name="empty">
<message name="AddEntryRequest">
  <part name="name" type="xsd:string"/>
  <part name="address" type="typens:address"/>
</message>
<portType name="AddressBook">
  <operation name="addEntry">
    <input message="tns:AddEntryRequest"/>
    <output message="tns:empty"/>
  </operation>
</portType>
```

WSDL2Java #####

```
public interface AddressBook extends java.rmi.Remote {
  public void addEntry(String name, Address address) throws
    java.rmi.RemoteException;
}
```

SDI #####SDI ##### portType ##### WSDL2Java # SDI #####  
##portType # binding ##### (#####WSDL #####2#####)

JAX-RPC ##### (4.3.3#): "Java ##### wsdl:portType ### name #####  
#####... #####wsdl:binding #####... #####  
#### wsdl:binding #####"

##### "RPC" ##### WSDL2Java ##portType #####  
##### RPC ##### binding ##### (#####  
wsdl:binding #####)##### binding #####

#####1## portType (pt #####) #2## binding (bRPC # bDoc #####) #####  
document/literal ##### binding #####  
#####2##### (1## pt #####1## bDoc) #2##### (pt ##### bRPCStub # bDoc ##  
### bDocStub) #####

#####document/literal #####  
portType #####2#### binding #####2#####

### 1.7.2.6. Bindings

Stub #### SDI ##### binding ##### "Stub" #####Stub #####  
Axis # Service # Call ##### SOAP #####Stub #####

## WebServices - Axis

```
# proxy (#####) #####  
##### Service ##### Call ##### URL#####  
#####
```

```
### WSDL #####
```

```
<binding name="AddressBookSOAPBinding" type="tns:AddressBook">  
  ...  
</binding>
```

WSDL2Java will generate:

```
public class AddressBookSOAPBindingStub extends org.apache.axis.client.Stub  
  implements AddressBook {  
  public AddressBookSOAPBindingStub() throws org.apache.axis.AxisFault {...}  
  
  public AddressBookSOAPBindingStub(URL endpointURL,  
    javax.xml.rpc.Service service) throws org.apache.axis.AxisFault {...}  
  
  public AddressBookSOAPBindingStub(javax.xml.rpc.Service service)  
    throws org.apache.axis.AxisFault {...}  
  
  public void addEntry(String name, Address address)  
    throws RemoteException {...}  
}
```

### 1.7.2.7. Services

```
##### get #####  
##### WSDL # service #####WSDL2Java #1#####2#####  
WSDL #####
```

```
<service name="AddressBookService">  
  <port name="AddressBook" binding="tns:AddressBookSOAPBinding">  
    <soap:address location="http://localhost:8080/axis/services/AddressBook"/>  
  </port>  
</service>
```

```
WSDL2Java #####
```

```
public interface AddressBookService extends javax.xml.rpc.Service {  
  public String getAddressBookAddress();  
  
  public AddressBook getAddressBook() throws javax.xml.rpc.ServiceException;  
  
  public AddressBook getAddressBook(URL portAddress)  
    throws javax.xml.rpc.ServiceException;  
}
```

```
#####
```

```
public class AddressBookServiceLocator extends org.apache.axis.client.Service  
  implements AddressBookService {  
  ...  
}
```

```
##### WSDL # service ##### get #####
##### get #####Service ####
WSDL ##### URL ### Stub #####PortType ##### URL
#####
```

```
#####
```

```
public class Tester {
    public static void main(String [] args) throws Exception {
        // Make a service
        AddressBookService service = new AddressBookServiceLocator();

        // Now use the service to get a stub which implements the SDI.
        AddressBook port = service.getAddressBook();

        // Make the actual call
        Address address = new Address(...);
        port.addEntry("Russell Butek", address);
    }
}
```

**1.7.2.8. #####**

```
#### Java #####Web##### Java #####
#### WSDL2Java ##### "--server-side --skeletonDeploy true" #####
# AddressBook.wsdl #####
```

```
% java org.apache.axis.wsdl.WSDL2Java --server-side
--skeletonDeploy true AddressBook.wsdl
```

```
WSDL2Java #####
```

WSDL #	##### Java ###
# binding ####	#####
	#####
### service ####	### deploy.wsdd ####
	### undeploy.wsdd ####

```
"--skeletonDeploy true" ##### deploy.wsdd #####
#####deploy.wsdd #####
##### WSDL2Java #####
```

```
% java org.apache.axis.wsdl.WSDL2Java --server-side AddressBook.wsdl
#####
```

WSDL #	##### Java ###
# binding ####	#####

### service ###	#####1## deploy.wsdd ###
	1## undeploy.wsdd ###

### 1.7.2.9. Bindings

#### 1.7.2.10. (#####) #####

##### Axis ##### binding #####  
"Skelton" #####AddressBook ##### WSDL2Java #####

```
public class AddressBookSOAPBindingSkeleton implements AddressBook,
    org.apache.axis.wsdl.Skeleton {
    private AddressBook impl;

    public AddressBookSOAPBindingSkeleton() {
        this.impl = new AddressBookSOAPBindingImpl();
    }

    public AddressBookSOAPBindingSkeleton(AddressBook impl) {
        this.impl = impl;
    }

    public void addEntry(java.lang.String name, Address address)
        throws java.rmi.RemoteException {
        impl.addEntry(name, address);
    }
}
```

(#####)

##### AddressBook #####  
#####Axis ##### addEntry #####  
addEntry #####

#### 1.7.2.11. #####

WSDL2Java #####

```
public class AddressBookSOAPBindingImpl implements AddressBook {
    public void addEntry(String name, Address address)
        throws java.rmi.RemoteException {
    }
}
```

#####  
#####

(--server-side #####) WSDL2Java #####  
#####

**1.7.2.12. Services**

```
##### AdminClient ##### "deploy.wsdd" # "undeploy.wsdd" #####Implementation ##
#####Axis #####
"deploy.wsdd" # "undeploy.wsdd" #####
```

**1.7.3. Java2WSDL: Java ## WSDL ###**

```
Java2WSDL # WSDL2Java #####Web##### Java #####
#Web#####
```

**1.7.3.1. ##### 1: Java ##### Java #####**

```
Web##### Java ##### (#####) #####
##### Web #####
(samples/userguide/example6/WidgetPrice.java [##]):
```

```
package samples.userguide.example6;

/**
 * Interface describing a web service to set and get Widget prices.
 */
public interface WidgetPrice {
    public void setWidgetPrice(String widgetName, String price);
    public String getWidgetPrice(String widgetName);
}
```

```
##: #####Java2WSDL #####
```

**1.7.3.2. ##### 2: Java2WSDL ##### WSDL ###**

```
Java2WSDL ##### WSDL #####
```

```
##### wsdl ##### (wp.wsdl) #####
```

```
% java org.apache.axis.wsdl.Java2WSDL -o wp.wsdl
-l"http://localhost:8080/axis/services/WidgetPrice"
-n "urn:Example6" -p"samples.userguide.example6" "urn:Example6"
samples.userguide.example6.WidgetPrice
```

####

- -o ##### WSDL #####
- -l #####
- -n #WSDL ##### ##
- -p #####

##### WSDL #####SOAP rpc #####Web##### WSDL # types#



## WebServices - Axis

```
message#portType#binding#service #####  
Java2WSDL #####/##### xml #####Java2WSDL #####  
JAX-RPC ### (bean ###)#####Holder #####  
  
Java2WSDL ##### Ant #####  
##### Ant ### [##] #####
```

### 1.7.3.3. #### 3: WSDL2Java #####

```
##### WSDL #####Web#####/#####(WSDL2Java #####  
):
```

```
% java org.apache.axis.wsdl.WSDL2Java -o . -d Session -s -S true  
-Nurn:Example6 samples.userguide.example6 wp.wsdl
```

```
#####
```

- WidgetPriceSoapBindingImpl.java : WidgetPrice Web##### Java ##  
##  
##### \*SoapBindingImpl #####  
(samples/userguide/example6/WidgetPriceSoapBindingImpl.java [##] #####)#
- WidgetPrice.java: ### java.rmi.Remote #####
- WidgetPriceService.java: ##### Java #####
- WidgetPriceServiceLocator.java: ##### Java #####
- WidgetPriceSoapBindingSkeleton.java: #####
- WidgetPriceSoapBindingStub.java: #####
- deploy.wsdd: #####
- undeploy.wsdd: #####
- (####): Web##### holder ##### Java #####WidgetPrice Web####  
#####

```
#####/#####Web#####
```

### 1.8. Axis #####

```
Axis #####  
#####Axis ##### Axis #####
```

```
##### published (##) #####Axis #####  
###Axis #####
```

```
#####Axis #####  
#####  
axis-user #####
```

#####

• JAX-RPC ##### JAX-RPC 1.0 #####  
#####

- javax.xml.messaging.Endpoint
- javax.xml.messaging.URLEndpoint
- javax.xml.rpc.Call
- javax.xml.rpc.FaultException
- javax.xml.rpc.JAXRPCException
- javax.xml.rpc.ParameterMode
- javax.xml.rpc.Service
- javax.xml.rpc.ServiceException
- javax.xml.rpc.ServiceFactory
- javax.xml.rpc.Stub
- javax.xml.rpc.encoding.DeserializationContext
- javax.xml.rpc.encoding.Deserializer
- javax.xml.rpc.encoding.DeserializerFactory
- javax.xml.rpc.encoding.SerializationContext
- javax.xml.rpc.encoding.Serializer
- javax.xml.rpc.encoding.SerializerFactory
- javax.xml.rpc.encoding.TypeMapping
- javax.xml.rpc.encoding.TypeMappingRegistry
- javax.xml.rpc.handler.Handler
- javax.xml.rpc.handler.HandlerChain
- javax.xml.rpc.handler.HandlerInfo
- javax.xml.rpc.handler.HandlerRegistry
- javax.xml.rpc.handler.MessageContext
- javax.xml.rpc.handler.soap.SOAPMessageContext
- javax.xml.rpc.holders.BigDecimalHolder
- javax.xml.rpc.holders.BigIntegerHolder
- javax.xml.rpc.holders.BooleanHolder
- javax.xml.rpc.holders.BooleanWrapperHolder
- javax.xml.rpc.holders.ByteArrayHolder
- javax.xml.rpc.holders.ByteHolder
- javax.xml.rpc.holders.ByteWrapperArrayHolder
- javax.xml.rpc.holders.ByteWrapperHolder
- javax.xml.rpc.holders.CalendarHolder
- javax.xml.rpc.holders.DateHolder
- javax.xml.rpc.holders.DoubleHolder
- javax.xml.rpc.holders.DoubleWrapperHolder
- javax.xml.rpc.holders.FloatHolder

## WebServices - Axis

- javax.xml.rpc.holders.FloatWrapperHolder
- javax.xml.rpc.holders.Holder
- javax.xml.rpc.holders.IntHolder
- javax.xml.rpc.holders.IntegerWrapperHolder
- javax.xml.rpc.holders.LongHolder
- javax.xml.rpc.holders.LongWrapperHolder
- javax.xml.rpc.holders.ObjectHolder
- javax.xml.rpc.holders.QNameHolder
- javax.xml.rpc.holders.ShortHolder
- javax.xml.rpc.holders.ShortWrapperHolder
- javax.xml.rpc.holders.StringHolder
- javax.xml.rpc.namespace.QName
- javax.xml.rpc.server.ServiceLifecycle
- javax.xml.rpc.soap.SOAPFault
- javax.xml.rpc.soap.SOAPHeaderFault
- javax.xml.transform.Source
- Axis #####
  - org.apache.axis.AxisFault
  - org.apache.axis.Handler
  - org.apache.axis.DefaultEngineConfigurationFactory
  - org.apache.axis.EngineConfiguration
  - org.apache.axis.EngineConfigurationFactory
  - org.apache.axis.Message
  - org.apache.axis.MessageContext
  - org.apache.axis.SOAPPart
  - org.apache.axis.client.Call
  - org.apache.axis.client.Service
  - org.apache.axis.client.ServiceFactory
  - org.apache.axis.client.Stub
  - org.apache.axis.client.Transport
  - org.apache.axis.description.TypeDesc
  - org.apache.axis.description.AttributeDesc
  - org.apache.axis.description.ElementDesc
  - org.apache.axis.encoding.DeserializationContext
  - org.apache.axis.encoding.Deserializer
  - org.apache.axis.encoding.DeserializerFactory
  - org.apache.axis.encoding.DeserializerTarget
  - org.apache.axis.encoding.FieldTarget
  - org.apache.axis.encoding.MethodTarget
  - org.apache.axis.encoding.SerializationContext

- org.apache.axis.encoding.Serializer
- org.apache.axis.encoding.SerializerFactory
- org.apache.axis.encoding.SimpleType
- org.apache.axis.encoding.Target
- org.apache.axis.encoding.TypeMapping
- org.apache.axis.encoding.TypeMappingRegistry
- org.apache.axis.encoding.ser.BaseDeserializerFactory
- org.apache.axis.encoding.ser.BaseSerializerFactory
- org.apache.axis.encoding.ser.BeanPropertyTarget
- org.apache.axis.encoding.ser.SimpleSerializer
- org.apache.axis.encoding.ser.SimpleDeserializer
- org.apache.axis.session.Session
- org.apache.axis.transport.http.SimpleAxisServer
- org.apache.axis.transport.jms.SimpleJMSListener
- org.apache.axis.utils.BeanProperty
- org.apache.axis.wsdl.WSDL2Java
- org.apache.axis.wsdl.Java2WSDL

**1.9. #####: #####**

```
##### .jws #####  
#####Axis #####  
#####  
##
```

**1.9.1. #####**

- ```
#####
```
- ##### [##]#####
  - Javadoc##### Javadoc ##### Javadoc #####  
#####
  - ##### Axis #####  
#####Axis #####
  - Axis ##### (FAQ) ##### Axis Wiki#####  
#####
  - WSDL2Java#####Web##### WSDL2Java #####  
#####Web#####  
##### <http://www.xmethods.net/> [##] #####

**1.9.2. #####**

### 1.9.2.1. org.apache.axis.MessageContext

Axis Web##### "### ... #####?" ##### "MessageContext ####" ###  
#####/##### Axis #####MessageContext #####  
## Axis #####

- AxisEngine ####
- ##### (getter ##### setter ##### org.apache.axis.Message #####  
#####)
- ##### (#####)
- ##### ("pivot" #####)
- ##### (#####)
- ##### MessageContext.getProperty() #####  
#####  
org.apache.axis.transport.http.HTTPConstants #####  
Axis ##### ServletContext #####  
((HttpServlet)msgC.getProperty(HTTPConstants.MC\_HTTP\_SERVLET)).getServletContext();  
#####static #### MessageContext.getCurrentContext() ##### MessageContext ####  
##### MessageContext ##### RPC #####  
#####

### 1.9.2.2. org.apache.axis.Message

org.apache.axis.Message ##### SOAP ##### Axis #####  
##### MessageContext #####Message #####

- MIME ### (##### MIME #####)
- ## (#####)
- SOAPPart (##SOAPPart # SOAPEnvelope #####)#SOAPPart #####  
# SOAP #"#" (<soap:Envelope> #####) #####

### 1.9.2.3. org.apache.axis.SOAPEnvelope

#####MessageContext #####API #####/#####  
#####MessageContext ##2## Message ##### SOAPEnvelope #####  
SOAPPart #####SOAPEnvelope ##### SOAP #####  
SOAPEnvelope ###SOAP ### SOAP #####  
##### Javadocs #####

## 1.10. ## : Axis TCP ### (tcpmon) #####

### "tcpmon" ##### org.apache.axis.utils #####

```
% java org.apache.axis.utils.tcpmon [listenPort targetHost targetPort]
```

```
##### gui #####
```

```
#####tcpmon ##### tcpmon #####"###  
###"##### "add" #####  
#####
```

```
##### SOAP #####"Request" #####"Response" #####  
#####tcpmon #####/#####  
#####
```

```
"resend" ##### XML #####  
##### SOAP ##### XML #####  
HTTP #### content-length #####
```

### 1.11. ##: SOAP Monitor #####

```
Web#####Web##### SOAP #####SOAP  
Monitor ##### SOAP #####  
#####
```

```
#####SOAP #####SOAP #  
##### SOAP #####
```

```
SOAP ##### http://localhost:<port>/axis/SOAPMonitor (<port> #####  
#####) #####
```

```
SOAP ##### SOAP #####  
##### Java ##### 1.3 #####  
#####
```

```
SOAP #####Axis Web#####  
# web.xml #####: SOAP Monitor #####
```

```
##: #####SOAP ##### SOAP #####  
#####
```

### 1.12. ###

#### Handler

```
##### MessageContext #####  
#####Axis ##### Handler #####
```

#### SOAP

```
Simple Object Access Protocol (##### (simple) ##### (object) #####  
#####...) ###http://www.w3.org/TR/soap [##] # SOAP 1.1 #####  
#W3C # XML Protocol Group [##] ##### SOAP 1.2 #####  
#####  
##### SOAP ###"#####"#####"## Handler #####  
#####2##### RPCProvider #  
MsgProvider ##### org.apache.axis.providers.java #####
```