Quick Tutorial about Web Services
# Table of Contents

**Part I Introduction**  
1 Welcome ......................................................................................................................... 2

**Part II Web Services in Java**  
1 Pre-requisites in Windows ................................................................................................. 3  
   Installing JVM .................................................................................................................. 4  
   Installing Apache ............................................................................................................ 5  
   Installing Tomcat ............................................................................................................ 5  
   Installing Apache Axis .................................................................................................... 5  
2 Deploy an existing Web Services ....................................................................................... 6  
3 Create and deploy a new Web Services ............................................................................. 6  
4 Related Links .................................................................................................................. 8

**Part III Web Services in PHP**  
1 Pre-requisites in Windows ................................................................................................. 8  
   Installing Apache and PHP .............................................................................................. 8  
   Installing NuSOAP ........................................................................................................ 9  
2 Create and deploy a new Web Services ............................................................................. 9  
   Example for sum numbers ............................................................................................. 9  
   Example for LDAP .......................................................................................................... 10  
3 Related Links .................................................................................................................. 13

**Part IV Web Services in .NET**  
1 Pre-requisites in Windows ................................................................................................. 13  
   Installing IIS ................................................................................................................... 14  
   Installing Framework .NET ............................................................................................ 15  
   Installing Visual Studio .NET ........................................................................................ 15  
2 Create and deploy a new Web Services ............................................................................. 15  
3 Related Links .................................................................................................................. 18

**Part V Web Services with Lavadora**  

**Part VI Java vs PHP vs .NET**  

Index
1 Introduction

1.1 Welcome

This quick tutorial pretends to teach:

- How to install the pre-requisites for Web Services
- How to create and deploy a simple Web Services using WSDL

This tutorial is an output about Web Services of Taverna/Web Services workshop given on November 2004.

Tutorial created by: Edwin Rojas and Enver Tarazona

Expositor: Martin Senger

On top from left to right: Reinhard Simon, Enver Tarazona, Cristian Solis, Saúl Rodríguez, Luis Avila and Martin Senger.

On middle from left to right: Edwin Rojas, Miguel Blancas and Diana Zevallos

On bottom from left to right: Vanessa Domínguez, Ysabel Orosco, Magna Schmitt, Sara Villanueva and Jackie Puchuri.
We welcome any comments and/or suggestions. Please mail to cip-RIU@cgiar.org

Copyright 2004 International Potato Center (CIP)
www.cipotato.org

2 Web Services in Java

2.1 Pre-requisites in Windows

Theses pre-requisites was installed in a Windows 2000 with Service pack 4.

After installing the pre-requisites, the structure should see as fallow:
2.1.1 Installing JVM

For this tutorial we used the Java Virtual Machine SDK Standard Edition version 1.4.2 (j2sdk-1_4_2_05-windows-i586-p.exe)

Download from: http://java.sun.com/j2se/1.4.2/download.html
2.1.2 Installing Apache

For this tutorial we used the Apache XAMPP for Windows version 1.4.9 (xampp-win32-1.4.9-installer.exe)


Note: After download and when the installer require a path we used: d:\apachefriends

2.1.3 Installing Tomcat

For this tutorial we used the Tomcat Add-Ons for XAMPP for Windows version 5.0.28 (xampp-tomcat-addon-1.4.9-installer.exe)


After download and when the installer require a path use: d:\apachefriends\xampp

To test the installation of Tomcat follow the next steps:
- Run Apache from: D:\apachefriends\xampp\xampp_start.exe
- Run Tomcat from: D:\apachefriends\xampp\tomcat_start.bat
- Go to: http://localhost:8080/, If the installation went ok, you should see the default Tomcat page.

2.1.4 Installing Apache Axis

For this tutorial we used the Apache Axis Add-Ons for XAMPP for Windows version 1.1 (xampp_axis-1.1-addon-0.1.zip)

Download from: http://addons.xampp.org/cgi-bin/search.pl?pid=17 or http://research.cip.cgiar.org/docs/ws/downloads/xampp_axis-1.1-addon-0.1.zip

For installing Apache Axis Addon in XAMPP for Windows:

- Unpack the Apache Axis Addon in your valid XAMPP directory (D:\apachefriends\xampp) and use(check) the default folder name of the .ZIP file.
- When ask replace the existing file catalina.bat, select "No".
- After unpack copy the file "D:\apachefriends\xampp\axis\lib\activation.jar" to "D:\apachefriends\xampp\tomcat\common\lib"
- Stop and restart Tomcat.
- Verify that Axis is installed correctly by typing the following line in your browser: "http://localhost:8080/axis"
- If the installation went ok, you should see the default Apache-AXIS page. You should not see any error in "Needed Components".
2.2 Deploy an existing Web Services

Deploy the stock quote demo web service that come with Apache Axis:

- Open, edit and save the file: `d:\apachefriends\xampp\axis\adminclient.bat`, set the path of Java Virtual Machine and Apache Axis home.

  ```
  set JAVA_HOME=D:\j2sdk1.4.2_04
  set AXIS_HOME=D:\apachefriends\xampp\axis
  cd d:\apachefriends\xampp\axis\ 
  adminclient.bat samples\stock\deploy.wsdd
  ```

  You should see the following output:
  ```
  Processing file samples/stock/deploy.wsdd
  <Admin>Done processing</Admin>
  ```

- Check if the stock quote demo web service was deployed correctly by accessing the AxisServlet or click on the “View” link from the default Apache-AXIS page:

  ```
  http://localhost:8080/axis/servlet/AxisServlet
  ```

  You should see the two new services "urn:cominfo" and "urn:xmltoday-delayed-quotes"

- Test the deployed stock quote web service by getting a sample stock quote: 
  "get_stock_quote_demo.bat", repeat the open and edit the file as done in "adminclient.bat"

  As a result of the demo script you should see the following line: XXX: 55.25

- Finally you can undeploy the stock quote demo web service with the adminclient script:
  ```
  adminclient.bat samples\stock\undeploy.wsdd
  ```

2.3 Create and deploy a new Web Services

We will develop a simple Web Services that sum two numbers.

- In "d:\apachefriends\xampp\axis\samples\" create the directory named "arithmetic"

- Copy the three files (sumImpl.java, sum.java, deploy.wsdd) into 
  "d:\apachefriends\xampp\axis\samples\arithmetic"

- cd "d:\apachefriends\xampp\axis\samples\arithmetic"

- Compile "sumImpl.java": javac sumImpl.java

- Compile "sum.java": javac sum.java

- In "d:\apachefriends\xampp\tomcat\webapps\axis\WEB-INF\classes\samples\" create the directory named "arithmetic"

- Copy the files "sumImpl.class" and "sum.class" into 
  "d:\apachefriends\xampp\tomcat\webapps\axis\WEB-INF\classes\samples\arithmetic"
· cd "d:\apachefriends\xampp\axis\"

· open, edit and save the file: d:\apachefriends\xampp\axis\adminclient.bat, set the path of Java Virtual Machine and Apache Axis home.
  set JAVA_HOME=D:\j2sdk1.4.2_04
  set AXIS_HOME=D:\apachefriends\xampp\axis

· Run: "adminclient.bat samples\arithmetic\deploy.wsdd" in the command line
  You should see the following output:
  Processing file samples/arithmetic/deploy.wsdd
  <Admin>Done processing</Admin>

· Check if the sum web service was deployed correctly by accessing the AxisServlet or click on the "View" link from the default Apache-AXIS page:
  http://localhost:8080/axis/servlet/AxixServlet

<table>
<thead>
<tr>
<th>File</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>sumImpl.java</td>
<td></td>
</tr>
<tr>
<td></td>
<td>package samples.arithmetic;</td>
</tr>
<tr>
<td></td>
<td>public class sumImpl {</td>
</tr>
<tr>
<td></td>
<td>public static void main(String [] args) {</td>
</tr>
<tr>
<td></td>
<td>try {</td>
</tr>
<tr>
<td></td>
<td>float ret =sumnumbers(5,10);</td>
</tr>
<tr>
<td></td>
<td>System.out.println(ret);</td>
</tr>
<tr>
<td></td>
<td>}</td>
</tr>
<tr>
<td></td>
<td>}</td>
</tr>
<tr>
<td></td>
<td>public static float sumnumbers(float first, float second)</td>
</tr>
<tr>
<td></td>
<td>{</td>
</tr>
<tr>
<td></td>
<td>return (first+second);</td>
</tr>
<tr>
<td></td>
<td>}</td>
</tr>
<tr>
<td></td>
<td>}</td>
</tr>
<tr>
<td>sum.java</td>
<td></td>
</tr>
<tr>
<td></td>
<td>package samples.arithmetic;</td>
</tr>
<tr>
<td></td>
<td>public interface sum {</td>
</tr>
<tr>
<td></td>
<td>Float sumnumbers(Float first, Float second);</td>
</tr>
<tr>
<td></td>
<td>}</td>
</tr>
</tbody>
</table>
2.4 Related Links

<table>
<thead>
<tr>
<th>Related Link</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taverna</td>
<td><a href="http://taverna.sourceforge.net/">http://taverna.sourceforge.net/</a></td>
</tr>
<tr>
<td>Other Tutorial</td>
<td><a href="http://java.sun.com/webservices/docs/1.2/tutorial/doc/">http://java.sun.com/webservices/docs/1.2/tutorial/doc/</a></td>
</tr>
<tr>
<td>Other Tutorial</td>
<td><a href="http://www.brics.dk/~amoeller/WWW/">http://www.brics.dk/~amoeller/WWW/</a></td>
</tr>
<tr>
<td>SUN Web Service</td>
<td><a href="http://java.sun.com/webservices/index.jsp">http://java.sun.com/webservices/index.jsp</a></td>
</tr>
<tr>
<td>Addons for XAMPP</td>
<td><a href="http://addons.xampp.org/cgi-bin/index.pl">http://addons.xampp.org/cgi-bin/index.pl</a></td>
</tr>
<tr>
<td>Apache Axis Addon for XAMPP</td>
<td><a href="http://www.apachefriends.org/de/xampp-window.html">http://www.apachefriends.org/de/xampp-window.html</a></td>
</tr>
</tbody>
</table>

3 Web Services in PHP

3.1 Pre-requisites in Windows

These pre-requisites were installed in a Windows 2000 with Service Pack 4.

3.1.1 Installing Apache and PHP

For this tutorial we used the XAMPP for Windows version 1.4.9 (xampp-win32-1.4.9-installer.exe) containing Apache HTTPD 2.0.52 and PHP 5.0.2 + 4.3.9

3.1.2 Installing NuSOAP
For this tutorial we used the NuSOAP version 1.81 (nusoap.php)
Download from: http://cvs.sourceforge.net/viewcvs.py/nusoap/lib/
or http://research.cip.cgiar.org/docs/ws/downloads/nusoap.zip
For installing NuSOAP in XAMPP for Windows you only need to copy this file inside a directory of your web document root (for example d:\apache\friends\xampp\htdocs\includes\nusoap.php)

3.2 Create and deploy a new Web Services
3.2.1 Example for sum numbers
We will develop a simple Web Services that sum two numbers.

- In "d:\apache\friends\xampp\htdocs" create the directory named "arithmetic"
- Create a directory "includes" into "d:\apache\friends\xampp\htdocs" and copy the NuSOAP file (nusoap.php) inside the new directory.
- Create a php file (sumwsdl.php) into "d:\apache\friends\xampp\htdocs\arithmetic"
- Add the following code to the file.

<table>
<thead>
<tr>
<th>Action</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open the php code</td>
<td>&lt;?php</td>
</tr>
<tr>
<td>Pull in the NuSOAP code</td>
<td>require_once('./includes/nusoap.php');</td>
</tr>
<tr>
<td>Create the server instance</td>
<td>$server = new soap_server();</td>
</tr>
<tr>
<td>Initialize WSDL support</td>
<td>$server-&gt;configureWSDL('sumwsdl', 'urn:sumwsdl');</td>
</tr>
<tr>
<td>Register the method to expose</td>
<td>$server-&gt;register('sum', // method name array('first' =&gt; 'xsd:int', // input parameters 'second' =&gt; 'xsd:int'), // output param 'urn:sumwsdl', // namespace 'urn:sumwsdl#sum', // soapaction 'rpc', // style 'encoded', // use 'Sums two numbers' // documentation );</td>
</tr>
<tr>
<td>Define the method as a PHP function</td>
<td>function sum ($first,$second) { $result = $first + $second; return $result; }</td>
</tr>
<tr>
<td>Use the request to invoke the service</td>
<td>$HTTP_RAW_POST_DATA = isset($HTTP_RAW_POST_DATA) ? $HTTP_RAW_POST_DATA : ''; $server-&gt;service($HTTP_RAW_POST_DATA);</td>
</tr>
</tbody>
</table>
When you run the web page the WSDL file will be autogenerate, and it is not necessary to create a WSDD file.

To see the WSDL, load the web page sending the parameter "?wsdl" (for this example http://localhost/arithmetic/sumwsdl.php?wsdl).

### 3.2.2 Example for LDAP

We will develop a Web Services that validate user name and password using LDAP.

First enable LDAP:

LDAP support in PHP is not enabled by default. You will need to use the --with-ldap[=DIR] configuration option when compiling PHP to enable LDAP support. DIR is the LDAP base install directory. To enable SASL support, be sure --with-ldap-sasl[=DIR] is used, and that sasl.h exists on the system.

**Note to Win32 Users:** In order to enable this module on a Windows environment, you must copy several files from the DLL folder of the PHP/Win32 binary package to the SYSTEM folder of your windows machine. (Ex: C:\WINNT\SYSTEM32, or C:\WINDOWS\SYSTEM). For PHP <= 4.2.0 copy libasasl.dll, for PHP >= 4.3.0 copy libeay32.dll and ssleay32.dll to your SYSTEM folder.

If you are using XAMPP you may need to edit your php.ini file probably located at C:\Windows\php.ini

There is a section for optional modules and you probably need to enable ldap support by uncommenting the following line (remove the semi-colon to uncomment)

```ini
;extension=php_ldap.dll
```

and second:

- In "d:\apache\htdocs\authentication" create the directory named "authentication"
- Create a directory "includes" into "d:\apache\htdocs\authentication" and copy the NuSOAP file (nusoap.php) inside the new directory.
- Create a php file (checkNTuserwsdl.php) into "d:\apache\htdocs\authentication"
- Add the following code to the file.

```php
<?php
```

<table>
<thead>
<tr>
<th>Action</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open the php code</td>
<td>&lt;?php</td>
</tr>
</tbody>
</table>
### Quick Tutorial for Web Services

**Documentatio**

<table>
<thead>
<tr>
<th>Pull in the NuSOAP code</th>
<th>require_once('../includes/nusoap.php');</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create the server instance</td>
<td>$server = new soap_server();</td>
</tr>
<tr>
<td>Initialize WSDL support</td>
<td>$server-&gt;configureWSDL('checkNTuserwsdl', 'urn:checkNTuserwsdl');</td>
</tr>
<tr>
<td>Register the method to expose</td>
<td>$server-&gt;register('checkNTuser', // method name array('username' =&gt; 'xsd:string', 'password' =&gt; 'xsd:string', 'DomainName' =&gt; 'xsd:string', 'ldap_server' =&gt; 'xsd:string'), // input parameters array('return' =&gt; 'xsd:string'), // output param 'urn:checkNTuserwsdl', // namespace 'urn:checkNTuserwsdl#checkNTuser', // soapaction 'rpc', // style 'encoded', // use 'Validate NT user name and password using LDAP' // documentation</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Define the method as a PHP function

```php
function checkNTuser($username, $password, $DomainName, $ldap_server)
{
    // returns true when user/pass enable bind to LDAP (Windows 2k).
    $auth_user=$username.'@'.$DomainName;
    $ldap_server='ldap://'.$ldap_server;

    if($connect=@ldap_connect($ldap_server)){
        if($bind=@ldap_bind($connect, $auth_user, $password)){
            @ldap_close($connect);
            return('true');
        }//if bound to ldap
    }//if connected to ldap

    @ldap_close($connect);

    return('false');
}//end function checkNTuser
```

Use the request to invoke the service

```php
$HTTP_RAW_POST_DATA = isset($HTTP_RAW_POST_DATA) ? $HTTP_RAW_POST_DATA : '';
$server->service($HTTP_RAW_POST_DATA);
```

Close the PHP code

```php
?>
```

- When you run the web page the WSDL file will be autogenerated, and it is not necessary to create a WDD file.
- To see the WSDL, load the web page sending the parameter “?wsdl” (for this example http://localhost/authentication/checkNTuserwsdl.php?wsdl).

Download code from: [http://research.cip.cgiar.org/docs/ws/downloads/checkNTuserwsdl.txt](http://research.cip.cgiar.org/docs/ws/downloads/checkNTuserwsdl.txt)

Ejemplo de los parámetros:

- $user = jperes
- $password = xxyyzz
- $domain = cgiarad.org
- $server = 172.00.00.00:00
- $sessionpath = www.google.com

Ejemplo de llamada desde un cliente PHP:
function validationUser($user,$password ,$domain,$server, $sessionpath){
    include_once "nusoap.php";
    $parameters = array('username'=> $user, 'password'=> $password, 'DomainName'=> $domain, 'ldap_server'=> $server);
    $wsdl = "http://".$sessionpath."/authentication/checkNTuserwsdl.php?wsdl";
    $soapclient= new soapclient($wsdl, 'wsdl');
    $result = $soapclient->call("checkNTuser",$parameters);
    if ($err = $soapclient->getError()) {
        return 'error';
    } else {
        return $result;
    }
}

3.3 Related Links

<table>
<thead>
<tr>
<th>Related Links</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Tutorial</td>
<td><a href="http://www.nonplus.net/geek/000752.php">http://www.nonplus.net/geek/000752.php</a></td>
</tr>
<tr>
<td>Other Tutorial</td>
<td><a href="http://www.scottnichol.com/nusoapprogwsdl.htm">http://www.scottnichol.com/nusoapprogwsdl.htm</a></td>
</tr>
</tbody>
</table>

4 Web Services in .NET

4.1 Pre-requisites in Windows

Theses pre-requisites was installed in a Windows 2000 with Service pack 4.

After installing the pre-requisites, the structure should see as fallow:
4.1.1 Installing IIS

For this tutorial we used the Internet Information Services (IIS) that come with the installers of Windows 2000 CDs. The IIS not require to shop any licence.

- To install goto "Panel Control" --> "Add/Remove Programs" --> Add/Remove Windows Components
- Select with a check in "Internet Information Services (IIS)"
- Finally clicking in button "Next"

After installation finished, to active the service of IIS follow the next steps:
- Goto Menu Start --> Run --> Type "inetmgr" and <enter>
- In the window below:
4.1.2 Installing Framework .NET
This component will be installed when installing the Visual Studio .NET (version 2002 or 2003)

4.1.3 Installing Visual Studio .NET
For this tutorial we used the Visual Studio 2003

4.2 Create and deploy a new Web Services
We will develop a simple Web Services that sum two numbers.

- Open Visual Studio .NET 2003
- Goto: Menu File --> New --> Click "Project"
- In the window below:
In "Project Types:" select "Visual Basic Project"
In "Templates:" select "ASP .NET Web Service"
In the "location" box rename to "http://localhost/TestWebService"
Click in button OK
When finish creating the project, click in "click here to switch to code view"
In the window below:

- Add the code in red as shown in the table below:
Quick Tutorial for Web Services

<table>
<thead>
<tr>
<th>File</th>
<th>Code</th>
</tr>
</thead>
</table>
| `<WebMethod(Description := "Hello, World as Web Service")>` | `Public Function HelloWorld() As String`  
| | `Return "Hello World"`  
| | `End Function` |
| `<WebMethod(Description := "Sum two numbers")>` | `Public Function sumnumbers(ByVal first As Double, ByVal second As Double) As Double`  
| | `Return first + second`  
| | `End Function` |

- After change the code you should see the code as fallow:

- Finally give click in button , this will deploy the Web Service to IIS, create the WSDL, run and open the Browser to test the Web Service as shown below:
Web Services in .NET

My first Web Services

The following operations are supported. For a formal definition, please review the Service Description.

- **HelloWorld**
  Hello, World as Web Service

- **sumnumbers**
  Sum two numbers

- To test the methods, click in "HelloWorld" or "sumnumbers"
- To see the WSDL, click in "Service Description"

4.3 Related Links

<table>
<thead>
<tr>
<th>Other Tutorial</th>
<th><a href="http://www.developer.com/net/vb/article.php/10926_1004081_1">http://www.developer.com/net/vb/article.php/10926_1004081_1</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Tutorial</td>
<td><a href="http://www.dotnetjunkies.com/Tutorial/4D13CEFA-D0FD-44BE-8749-8D17B577564.dck">http://www.dotnetjunkies.com/Tutorial/4D13CEFA-D0FD-44BE-8749-8D17B577564.dck</a></td>
</tr>
<tr>
<td>Microsoft Web Service</td>
<td><a href="http://msdn.microsoft.com/webservices/">http://msdn.microsoft.com/webservices/</a></td>
</tr>
<tr>
<td>Visual Studio .NET</td>
<td><a href="http://msdn.microsoft.com/vstudio/">http://msdn.microsoft.com/vstudio/</a></td>
</tr>
</tbody>
</table>

5 Web Services with Lavadora

The Lavadora is a plug-in for the Eclipse for web services

Main Features:
- Automatic Web Service client code generation
- Class-to-Web Service conversion
- Deployment and undeployment of thus created Web Services to a local installation of Tomcat server
- WSDL document structure browsing
- Caching of WSDL documents of frequently used Web Services (so called web references)
- Browsing, searching and publishing in UDDI registries
- Keeping track of all generated resources
- Presentation of all plug-in related project data in a dedicated view

Related Links:
- Plug-in for Eclipse: http://www.eclipse-plugins.info/eclipse/plugin_details.jsp?id=833
6 **Java vs PHP vs .NET**

These comparisons is using the pre-requisites mentioned in the tutorial.

<table>
<thead>
<tr>
<th></th>
<th>Java</th>
<th>PHP</th>
<th>.NET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>difficult</td>
<td>very easy</td>
<td>regular</td>
</tr>
<tr>
<td>Cost of tools</td>
<td>free</td>
<td>free</td>
<td>cost</td>
</tr>
<tr>
<td>Support management console for security (users and groups)</td>
<td>yes (using Tomcat)</td>
<td>no</td>
<td>yes (using COM services)</td>
</tr>
<tr>
<td>More richness data type supported</td>
<td>more</td>
<td>less</td>
<td>more</td>
</tr>
<tr>
<td>Generate automatic UI for test Web Services</td>
<td>no</td>
<td>no</td>
<td>yes (with Visual Studio)</td>
</tr>
<tr>
<td>Need to learn about WSDL or WSDD</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>More used for research and investigation activities</td>
<td>view details or view details</td>
<td>more</td>
<td>less</td>
</tr>
<tr>
<td>Support for the latest standards like security and reliability</td>
<td>very good</td>
<td>more or less</td>
<td>very good</td>
</tr>
<tr>
<td>debugging and test features</td>
<td>view details</td>
<td>good</td>
<td>bad</td>
</tr>
<tr>
<td>Use a richness framework (virtual machine)</td>
<td>view details</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Available libraries and free sources</td>
<td>too much</td>
<td>regular</td>
<td>regular</td>
</tr>
</tbody>
</table>