

Getting Started with Celtix

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Overview

This document shows you how to get started with Celtix. It describes how how to build and run a basic SOAP over HTTP client and server.

For information on how to install Celtix and set up your development environment, see *The Celtix Installation Guide*, which is included in the product download and is available from the Celtix website, <http://celtix.objectweb.org/docs/index.html>

This document was written for the Celtix 1.0 release. As Celtix matures future versions might deviate from the material covered in this document. The Celtix team will endeavor, however, to keep this document as up-to-date as possible.

Using a Script to Set Up the Shell Environment

The Celtix Installation Guide describes how to set up your development environment. To avoid having to set the environment variables for every command window, you can use a script. An example script, `setenvs.bat`, for use on Windows with the Celtix binary distribution, is shown below in Example 1.

Using a Script to Set Up the Shell Environment:Using a Script to Set Up the Shell Environment

```
@echo off
REM Ensure that the values for the following variables are
REM set correctly for your installation.
set CELTIX_HOME=c:\Celtix_bin4\celtix
set JAVA_HOME=c:\jdk1.5.0
set ANT_HOME=c:\Ant\apache-ant-1.6.5

REM You should not have to modify anything below this point.
echo.
echo Take note of the following important variables - are they correct for your
echo system? If not then edit this file and correct them!
echo.
echo CELTIX_HOME = %CELTIX_HOME%
echo JAVA_HOME   = %JAVA_HOME%
echo ANT_HOME    = %ANT_HOME%
echo.
set PATH=%CELTIX_HOME%\bin;%PATH%
set PATH=%JAVA_HOME%\bin;%PATH%
set PATH=%ANT_HOME%\bin;%PATH%

set CELTIX_JAR=%CELTIX_HOME%\lib\celtix.jar
set CLASSPATH=%CELTIX_JAR%;.;.\build\classes;%CLASSPATH%
title Celtix Shell
```

Example 1: Setting Celtix Environment for Binary Distribution—setenvs.bat

A corresponding script for use on Windows with the Celtix source distribution is shown in Example 2. This script is only suitable for compiling and running Celtix applications when using the Apache Ant build system, as described in the rest of this document.

```
@echo off
REM Ensure that the values for the following variables are
REM set correctly for your installation.
set JAVA_HOME=c:\jdk1.5.0
set ANT_HOME=c:\Ant\apache-ant-1.6.5
set ANT_ARGS=-Dmaven.repo.local=c:\local\celtix\maven\repo

REM You should not have to modify anything below this point.
echo.
echo Take note of the following important variables - are they correct for your
echo system? If not then edit this file and correct them!
echo.
echo JAVA_HOME   = %JAVA_HOME%
echo ANT_HOME    = %ANT_HOME%
echo.
set PATH=%JAVA_HOME%\bin;%PATH%
set PATH=%ANT_HOME%\bin;%PATH%

set CLASSPATH=.;.\build\classes;%CLASSPATH%
title Celtix Shell
```

Example 2: Setting Celtix Environment for Source Distribution—setenvs.bat

Celtix Development Environment

Developing applications with Celtix code is no different from developing with any other Java library or API. You set the **CLASSPATH** appropriately and begin coding. You can develop with your favorite text editor, Integrated Development Environment (IDE), or build system. In this section, we recommend two open-source tools that are used extensively by Celtix developers:

- Eclipse
- Apache Ant

Using Celtix with Eclipse

Eclipse provides an excellent Java IDE for Celtix development. It is available from <http://www.eclipse.org>. Celtix requires you to use Eclipse 3.1.1 or higher. This is because Celtix requires support for Java 1.5 language constructs, which are only available in Eclipse 3.1.1 or higher.

Eclipse allows you to store collections of JARs and classes that can be reused across projects as “User Libraries”. To create a Celtix user library:

1. Open Eclipse and navigate to:

Window | Preferences | Java | Build Path | User Libraries

2. Create a new user library by selecting **New** and giving it a name, such as Celtix.

3. Highlight your newly created Celtix user library and select **Add JARs**. Add the `celtix.jar` file to the user library. In the Celtix binary distribution, the `celtix.jar` file can be found in the `CELTIX_HOME/lib` directory.

At the time of writing, Eclipse could not pick up the manifest classpath present in the `celtix.jar` file. As a result, you must add all of the JAX-WS JAR files to your user library as well. In the Celtix binary distribution these files can be found in the `CELTIX_HOME/lib` directory.

After you have created a user library for Celtix, you can add it to the Java project build path and Eclipse will auto-compile your code.

Using Celtix with Ant

Many Java developers use the Apache Ant build system. It is available from <http://ant.apache.org>. The Celtix samples, available in the `CELTIX_HOME/samples` directory of your Celtix installation, include example Ant build files. Example 3 shows one such file.

```
<project default="build">
  <!-- Import generic celtix build.xml file -->
  <property environment="env"/>
  <import file="${env.CELTIX_HOME}/samples/common_build.xml"/>

  <target name="generate.code" unless="codegen.notrequired">
    <echo message="Generating code using wsdl2java..."/>
    <wsdl2java file="HelloWorld.wsdl"/>
    <touch file="${codegen.timestamp.file}"/>
  </target>

  <!-- Targets to run the client and server -->
  <target name="server" depends="build">
    <celtixrun classname="helloworld.Server"/>
  </target>

  <target name="client" depends="build">
    <celtixrun classname="helloworld.Client"/>
  </target>
</project>
```

Example 3: Celtix Sample Applications Ant build.xml File

The build file shown in Example 3 can be explained as follows:

- Imports the `common_build.xml` file. The `common_build.xml` file includes most of the commands that compile and run the sample applications. It can be found in the `CELTIX_HOME/samples` directory of your Celtix installation.
- The `codegen.notrequired` variable is true if no XSD or WSDL files in the project have changed since the last time the `wsdl2java` utility was run. If you do not declare `wsdl.dir` as a property that identifies the location of XSD and/or WSDL files, then the default value of `./wsdl` is used.
- The `wsdl2java` task generates Java code from the specified WSDL file.
- The `celtixrun` task runs a Java class with the appropriate `CLASSPATH` and JVM argument settings for use with Celtix.

The `common_build.xml` and `build.xml` files that are supplied with the Celtix sample applications are useful models for building applications using a directory structure similar to that used by the Celtix samples.

Directory Structure for Celtix Projects

How you arrange a project's directory structure depends on whether you are modeling your hierarchy on the Celtix samples, available in the `CELTIX_HOME/samples` directory of your Celtix installation, or using the Celtix `wsdl2java` utility to generate starting point code. The Celtix `wsdl2java` utility is a command-line utility that you can use to generate Java files from a specified WSDL file, including files that represent the types, service proxy, and service interface for an application, starting point code for the client and server mainlines, and the implementation object. Which files are generated is dependent of the command-line switches that you use. For more information on the `wsdl2java` utility, see the Celtix Command-Line Tools documentation, available at <http://celtix.objectweb.org/docs/index.html>.

The Celtix Sample Application Approach

The Celtix sample applications use the `wsdl2java` utility to generate files that represent the types, service proxy, and service interface for an application. The `wsdl2java` utility is not used to generate starting point code for the client and server mainlines or the implementation object. These files are provided as completed implementations so that the sample applications run without requiring the user to add processing logic.

The Celtix sample applications contain the following directories:

- `build/classes`, which contains compiled Java classes, including those generated by the `wsdl2java` utility.
- `build/src`, which contains Java source code generated by the `wsdl2java` utility.
- `src`, which contains the supplied Java source code. These files can be in a different Java package than the Java source code files generated by the `wsdl2java` utility.
- `wsdl`, which contains WSDL and XSD files.



The top-level project directory contains the Ant build file (`build.xml`).

As shown in Example 3 above, the `build.xml` file imports the `common_build.xml` file, which is located at the top level of the Celtix samples directory, `CELTIX_HOME/samples`.

The Developer Driven Approach

The developer driven approach uses the `wsdl2java` utility to generate the complete complement of source code files, starting point code for the client mainline, server mainline, and implementation object. These files are included in the same Java package as the files representing the types, service proxy, and service interface.

Developer written Celtix applications contain the following directories:

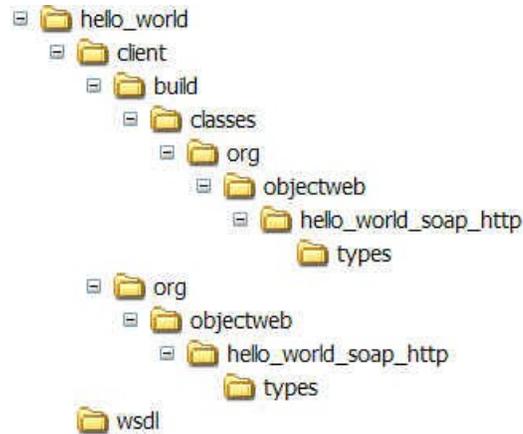
- A project directory that includes:
 - One, or more, top-level application directories that contain:
 - The source code files for the application. The source code files include both the files generated by the `wsdl2java` utility as well as any other files that you want to include in the application.
 - A `build/classes` subdirectory that contains the compiled application files.
 - The Ant build file (`build.xml`) generated by the `wsdl2java` utility.
 - A `wsdl` directory that contains WSDL and XSD files.

The following figure illustrates this directory hierarchy:

- The project directory is `hello_world`.
 - The top-level application directory is `client`.

Directory Structure for Celtix Projects: The Developer Driven Approach

- The source code generated by the `wsdl2java` utility is in the package hierarchies `org/objectweb/hello_world_soap_http` and `org/objectweb/hello_world_soap_http/types` under the `hello_world/client` directory. The package name was derived from the target namespace defined in the WSDL file.
- The `hello_world/client/build/classes` directory includes the compiled code in the package hierarchies `org/objectweb/hello_world_soap_http` and `org/objectweb/hello_world_soap_http/types`.
- The `wsdl` directory contains the WSDL file used to generate the application code.



Writing a SOAP over HTTP Client and Server with Celtix

This section describes how you can use Celtix to write a SOAP over HTTP client and server. Both the Celtix sample application approach and the developer driven approach are discussed.

The `HelloWorld` interface used in this section is defined in the `HelloWorld.wsdl` WSDL file shown in Example 5. It corresponds to the Java interface shown in Example 4. It is slightly different to the WSDL file used in the `HelloWorld` sample that is included with the Celtix distribution.

```
public interface HelloWorld {
    public String sayHello(String message);
}
```

Example 4: HelloWorld Interface—Java

Writing a SOAP over HTTP Client and Server with Celtix: Writing a SOAP over HTTP Client and Server with Celtix

```
<?xml version="1.0" encoding="UTF-8"?>
<!--WSDL file template-->
<!--(c) 2005, IONA Technologies, Inc.-->
<definitions name="HelloWorld.wsdl"
  targetNamespace="http://www.celtix.org/courseware/HelloWorld"
  xmlns="http://schemas.xmlsoap.org/wsdl/"
  xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:tns="http://www.celtix.org/courseware/HelloWorld"
  xmlns:wSDL="http://schemas.xmlsoap.org/wsdl/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">

  <types>
    <schema targetNamespace="http://www.celtix.org/courseware/HelloWorld"
      xmlns="http://www.w3.org/2001/XMLSchema"
      xmlns:wSDL="http://schemas.xmlsoap.org/wsdl/">
      <element name="sayHello">
        <complexType>
          <sequence>
            <element maxOccurs="1" minOccurs="1" name="message"
              nillable="true" type="xsd:string"/>
          </sequence>
        </complexType>
      </element>
      <element name="sayHelloResponse">
        <complexType>
          <sequence>
            <element maxOccurs="1" minOccurs="1" name="return"
              nillable="true" type="xsd:string"/>
          </sequence>
        </complexType>
      </element>
    </schema>
  </types>
  <message name="sayHello">
    <part element="tns:sayHello" name="parameters"/>
  </message>
  <message name="sayHelloResponse">
    <part element="tns:sayHelloResponse" name="parameters"/>
  </message>
  <portType name="HelloWorld">
    <operation name="sayHello">
      <input message="tns:sayHello" name="sayHello"/>
      <output message="tns:sayHelloResponse" name="sayHelloResponse"/>
    </operation>
  </portType>
  <binding name="HelloWorld_DocLiteral_SOAPBinding" type="tns:HelloWorld">
    <soap:binding style="document"
      transport="http://schemas.xmlsoap.org/soap/http"/>
    <operation name="sayHello">
      <soap:operation soapAction="" style="document"/>
      <input name="sayHello" <soap:body use="literal"/>
    </input>
      <output name="sayHelloResponse">
        <soap:body use="literal"/>
      </output>
    </operation>
  </binding>
  <service name="HelloWorldService">
    <port binding="tns:HelloWorld_DocLiteral_SOAPBinding" name="SOAPoverHTTP">
      <soap:address location="http://localhost:9090/helloworld"/>
    </port>
  </service>
</definitions>
```

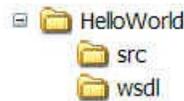
Example 5: HelloWorld.wsdl File

Using the Celtix Sample Application Approach

Use the Celtix sample application approach to build applications when working with the Celtix source distribution. In the Celtix source distribution, the collection of JAR files that comprise the Celtix product are distributed throughout the product directories. As a result, it is somewhat involved to list all of these JAR files on the **CLASSPATH**. When you use the Celtix sample application approach, the `common_build.xml` file correctly sets the **CLASSPATH**.

To use the Celtix sample application approach, do the following:

- Replicate the directory hierarchy used in the sample applications. For instance, using the `HelloWorld` interface described in Example 4 as an example, create the following directory structure:



- Place your WSDL file into the `wsdl` directory. For example, place the `HelloWorld.wsdl` file, shown in Example 5 in the `wsdl` directory.
- Copy a `build.xml` file from one of the sample applications and modify it as required. For example, place the `build.xml` file shown in Example 6 in the top-level `HelloWorld` directory.
- Write the client mainline, server mainline, and implementation object source code files and add them to the `src` directory.
- Use Ant to generate code for the type, service proxy, and service interface files and to compile the applications. For example, from the top-level `HelloWorld` directory, issue the `ant build` command. This creates the `build/classes` directory hierarchy and generates the type, service proxy, and service interface files, and compiles the applications.
- Use Ant to run the client and server applications. For example, from the top-level `HelloWorld` directory, issue the `ant server` and `ant client` commands to run the client and server applications.

```
<?xml version="1.0"?>
<project name="HelloWorld Application" default="build" basedir=".">

  <import file="../common_build.xml"/>

  <target name="client" description="run client">
    <property name="param" value=""/>
    <celtixrun classname="<full package name of client>"
      param1="${basedir}/wsdl/HelloWorld.wsdl"
      param2="${op}" param3="${param}"/>
  </target>

  <target name="server" description="run server">
    <celtixrun classname="<full package name of server>"
      param1="${basedir}/wsdl/HelloWorld.wsdl"/>
  </target>

  <target name="generate.code">
    <echo level="info" message="Generating code using wsdl2java..."/>
    <wsdl2java file="HelloWorld.wsdl"/>
  </target>

</project>
```

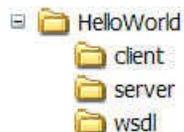
Example 6: HelloWorld Application Ant Build File

Using the Developer Driven Approach

The developer driven approach refers to an approach in which you use the Celtix `wsdl2java` utility to generate an Ant `build.xml` file that accurately lists all Celtix JARs on the `CLASSPATH`. This approach is suitable when you are working with the Celtix binary distribution.

To use the developer driven approach, do the following:

- Create the project directory structure as shown below:



- Place the WSDL file into the `wsdl` directory. Use the `HelloWorld.wsdl` file shown in Example 5 as an example.
- Use the `wsdl2java` utility to generate the starting point code, including the client mainline, for the client application. For example, from the `HelloWorld` top-level directory, issue the following command:

```
wsdl2java -client -d client -ant .\wsdl\HelloWorld.wsdl
```

- Use the `wsdl2java` utility to generate starting point code, including the server mainline and implementation object, for the server application. For example, from the `HelloWorld` top-level directory, issue the following command:

```
wsdl2java -server -impl -d server -ant .\wsdl\HelloWorld.wsdl
```

Writing a SOAP over HTTP Client and Server with Celtix:Using the Developer Driven Approach

- Complete coding the client mainline and implementation object.
- The `wsdl2java` utility creates an Ant `build.xml` file in each of the top-level application directories—`client` and `server`. Issue the command `ant build` in each of these directories to compile your applications.

Running the Applications using Ant

You can use Ant to run each of the applications. The actual syntax of the command depends on the name of the port type defined in the WSDL file. For example, in the `HelloWorld.wsdl` file, the port type is called `HelloWorld`, and the `build.xml` file targets used to run the client and server applications are `HelloWorld.Client` and `HelloWorld.Server`.

Running the Applications using java

The Celtix runtime uses the `java.util.logging` framework. You can configure Celtix logging levels by pointing the JVM to a `logging.properties` file by defining the JVM system variable `java.util.logging.config.file`. Celtix provides a default `logging.properties` file in the `etc` directory, so you can use:

```
-Djava.util.logging.config.file=%CELTIX_HOME%/etc/logging.properties
```

To run the server application using `java`, move to the `server/build/classes` directory and issue the following command:

```
java -Djava.util.logging.config.file=%CELTIX_HOME%/etc/logging.properties  
<full package name of server>
```

To run the client application, move to the `client/build/classes` directory and issue the following command:

```
java -Djava.util.logging.config.file=%CELTIX_HOME%/etc/logging.properties  
<full package name of client> <path to WSDL file>
```

Note that you must supply the relative, or absolute, path to the WSDL file when running the client.