



spring



WEB SERVICES

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About the Tutorial

Spring Web Services (Spring-WS) is one of the project developed by the Spring Community. Its prime focus is to create document-driven Web Services. The Spring Web Services project facilitates contract-first SOAP service development, provides multiple ways to create flexible web services, which can manipulate XML payloads in multiple ways. Being Spring based, Spring Web Services uses Spring Concepts like Dependency Injection and Configurations seamlessly. Spring-WS requires Spring 3.0 version.

Spring Framework was initially written by Rod Johnson and was first released under the Apache 2.0 license in June 2003. This tutorial has been written based on the Spring Framework Version 4.1.6 released in March 2015.

Audience

This tutorial is designed for Java Programmers with a need to understand the Spring Web Services Framework in detail along with its architecture and actual usage. This tutorial will bring the readers to the intermediate level of expertise and from there they can take themselves to a higher level of proficiency.

Prerequisites

Before proceeding with this tutorial, you should have a good understanding of Java Programming Language. Additionally, understanding of the Eclipse IDE (Integrated Development Environment) is also required because all the examples have been compiled using the Eclipse IDE.

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1. Spring WS – Overview

Spring Web Services (Spring-WS) is one of the projects developed by the Spring Community. Its prime focus is to create document-driven Web Services. The Spring Web Services project facilitates contract-first **SOAP Service Development**, provides multiple ways to create flexible web services, which can manipulate XML payloads in multiple ways.

The Spring web services uses Spring concepts like dependency injection and configurations seamlessly. The Spring-WS requires Spring 3.0 Version. With contract-first development, we start with **WSDL Contract** and then will use JAVA to implement the required contract.

As opposed to the contract-last approach where JAVA interfaces generate WSDL/XSD contract. The WSDL based contract remains independent of JAVA implementation in the contract-first approach. In case we require changing the JAVA interfaces, then there is no need to communicate the changes made in the existing WSDL contract to the web services users. Spring-WS aims to provide loose coupling between the WSDL contract and its JAVA based implementation.

Features

Following are the features of Spring Web Services:

- **XML Mapping to Objects** – XML based requests can be mapped to any object using the information stored in the Message Payload, SOAP Action Header or by using an XPath Expression.
- **Multiple API Support to parse XML** – Apart from the standard JAXP APIs (DOM, SAX, StAX) to parse the incoming XML requests, other libraries like JDOM, dom4j, XOM are also supported.
- **Multiple API Support to marshal XML** – Spring Web Services supports JAXB 1 and 2, Castor, XMLBeans, JiBX, and XStream libraries using its Object/XML Mapping module. The Object/XML Mapping module can also be used in non-web services code as well.
- **Spring based configurations** – Spring Web Services uses the Spring Application Contexts for its configurations having a similar architecture as that of the Spring Web MVC.
- **Integrated WS-Security module** – Using the WS-Security module, you can Sign, Encrypt, Decrypt SOAP Messages or Authenticate them.
- **Support for Acegi Security** – Using the WS-Security implementation of Spring Web Services, Acegi configuration can be used for your SOAP services.

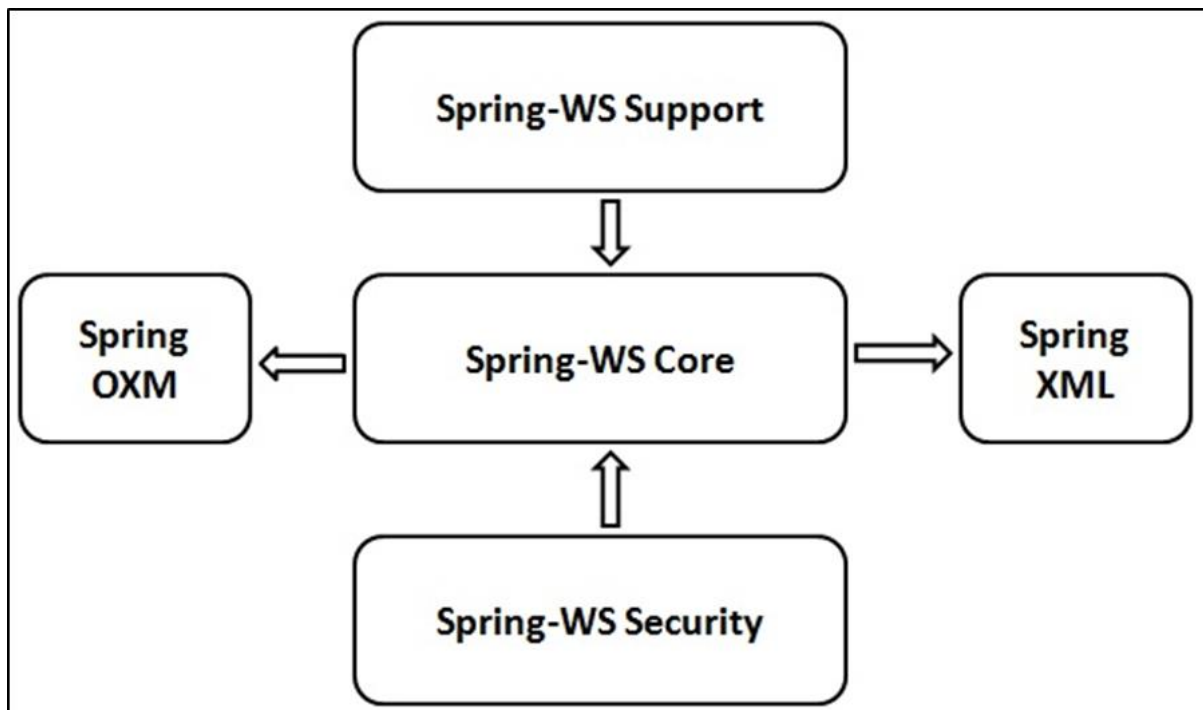
Architecture

The Spring-WS project consists of five major modules, which are explained below.

- **Spring-WS Core** – It is the primary module and provides the Central Interfaces like **WebServiceMessage** and **SoapMessage**, the server-side framework,

powerful message dispatching capability and support classes to implement Web service endpoints. It also provides Web Service consumer client as **WebServiceTemplate**.

- **Spring-WS Support** – This module provides supports for JMS, emails, etc.
- **Spring-WS Security** – This module is responsible to provide WS-Security implementation integrated with core Web Service Module. Using this module, we can add principal tokens, sign, encrypt and decrypt SOAP messages. This module allows using the existing Spring Security Implementation for authentication and authorization.
- **Spring XML** – This module provides XML support classes for Spring Web Services. This module is internally used by Spring-WS framework.
- **Spring OXM** – This module provides support classes for XML vs Object Mapping.



2. Spring WS – Environment Setup

In this Chapter, we will understand the process of setting up Spring-WS on Windows and Linux based systems. The Spring-WS can be easily installed and integrated with your current **Java environment** and **MAVEN** by following a few simple steps without any complex setup procedures. User administration is required while installation.

System Requirements

The following table lists out the system requirements, while the subsequent steps will guide us through the environment setup procedure.

JDK	Java SE 2 JDK 1.5 or above
Memory	1 GB RAM (recommended)
Disk Space	No minimum requirement
Operating System Version	Windows XP or above, Linux

Let us now proceed with the steps to install Spring-WS.

Step1 – Verify the Java Installation

To begin with, you need to have Java Software Development Kit (SDK) installed on your system. To verify this, execute any of the following two commands depending on the platform you are working on.

If the Java installation has been done properly, then it will display the current version and specification of your Java installation. A sample output is given in the following table.

Platform	Command	Sample Output
Windows	Open command console and type: <code>\>java -version</code>	Java version "1.7.0_60" Java (TM) SE Run Time Environment (build 1.7.0_60-b19) Java Hotspot (TM) 64-bit Server VM (build 24.60-b09,mixed mode)
Linux	Open command terminal and type: <code>\$java -version</code>	java version "1.7.0_25" Open JDK Runtime Environment (rhel-2.3.10.4.el6_4-x86_64) Open JDK 64-Bit Server VM (build 23.7-b01, mixed mode)

- We assume the readers of this tutorial have Java SDK version 1.7.0_60 installed on their system.
- In case you do not have Java SDK, download its current version from – <http://www.oracle.com/technetwork/java/javase/downloads/index.html> and have it installed.

Step 2: Set your Java Environment

Set the environment variable **JAVA_HOME** to point to the base directory location where Java is installed on your machine.

For example:

Platform	Description
Windows	Set JAVA_HOME to C:\ProgramFiles\java\jdk1.7.0_60
Linux	Export JAVA_HOME=/usr/local/java-current

Append the full path of Java compiler location to the System Path.

Platform	Description
Windows	Append the String "C:\Program Files\Java\jdk1.7.0_60\bin" to the end of the system variable PATH.
Linux	Export PATH=\$PATH:\$JAVA_HOME/bin/

Execute the command **java -version** from the command prompt as explained above.

Step 3: Download Maven archive

Download Maven 3.3.3 from – <http://maven.apache.org/download.cgi>

OS	Archive name
Windows	apache-maven-3.3.3-bin.zip
Linux	apache-maven-3.3.3-bin.tar.gz
Mac	apache-maven-3.3.3-bin.tar.gz

Step 4: Extract the Maven archive

Extract the archive, to the directory you wish to install Maven 3.3.3. The subdirectory apache-maven-3.3.3 will be created from the archive.

OS	Location (can be different based on your installation)
Windows	C:\Program Files\Apache Software Foundation\apache-maven-3.3.3
Linux	/usr/local/apache-maven
Mac	/usr/local/apache-maven

Step 5: Set Maven environment variables

Add M2_HOME, M2 and MAVEN_OPTS to the environment variables.

OS	Output
Windows	<p>Set the environment variables using system properties.</p> <p>M2_HOME=C:\Program Files\Apache Software Foundation\apache-maven-3.3.3</p> <p>M2=%M2_HOME%\bin</p> <p>MAVEN_OPTS=-Xms256m -Xmx512m</p>
Linux	<p>Open command terminal and set environment variables.</p> <p>export M2_HOME=/usr/local/apache-maven/apache-maven-3.3.3</p> <p>export M2=\$M2_HOME/bin</p> <p>export MAVEN_OPTS=-Xms256m -Xmx512m</p>
Mac	<p>Open command terminal and set environment variables.</p> <p>export M2_HOME=/usr/local/apache-maven/apache-maven-3.3.3</p> <p>export M2=\$M2_HOME/bin</p> <p>export MAVEN_OPTS=-Xms256m -Xmx512m</p>

Step 6: Add Maven bin directory location to the system path

Now append M2 variable to the System Path.

OS	Output
Windows	Append the string ;%M2% to the end of the system variable, Path.
Linux	export PATH=\$M2:\$PATH
Mac	export PATH=\$M2:\$PATH

Step 7: Verify Maven installation

Now open the console, execute the following **mvn** command.

OS	Task	Command
Windows	Open Command Console	c:\> mvn --version
Linux	Open Command Terminal	\$ mvn --version
Mac	Open Terminal	machine:< joseph\$ mvn --version

Finally, verify the output of the above commands, which should be something as shown below:

OS	Output
Windows	<pre> Apache Maven 3.3.3 (7994120775791599e205a5524ec3e0dfe41d4a06; 2015-04- 22T17:27:37+05:30) Maven home: C:\Program Files\Apache Software Foundation\apache- maven-3.3.3 Java version: 1.7.0_75, vendor: Oracle Corporation Java home: C:\Program Files\Java\jdk1.7.0_75\jre Default locale: en_US, platform encoding: Cp1252 </pre>
Linux	<pre> Apache Maven 3.3.3 (7994120775791599e205a5524ec3e0dfe41d4a06; 2015-04- 22T17:27:37+05:30) </pre>

	Maven home: /usr/local/apache-maven/apache-maven-3.3.3 Java version: 1.7.0_75, vendor: Oracle Corporation Java home: /usr/local/java-current/jdk1.7.0_75/jre
Mac	Apache Maven 3.3.3 (7994120775791599e205a5524ec3e0dfe41d4a06; 2015-04-22T17:27:37+05:30) Maven home: /usr/local/apache-maven/apache-maven-3.3.3 Java version: 1.7.0_75, vendor: Oracle Corporation Java home: /Library/Java/Home/jdk1.7.0_75/jre

Step 8 - Setup Eclipse IDE

All the examples in this tutorial have been written using the Eclipse IDE. It is recommended that the readers should have the latest version of Eclipse installed on their machine. To install the Eclipse IDE, download the latest Eclipse binaries from the following link – <http://www.eclipse.org/downloads/>. Once the installation is downloaded, unpack the binary distribution into a convenient location.

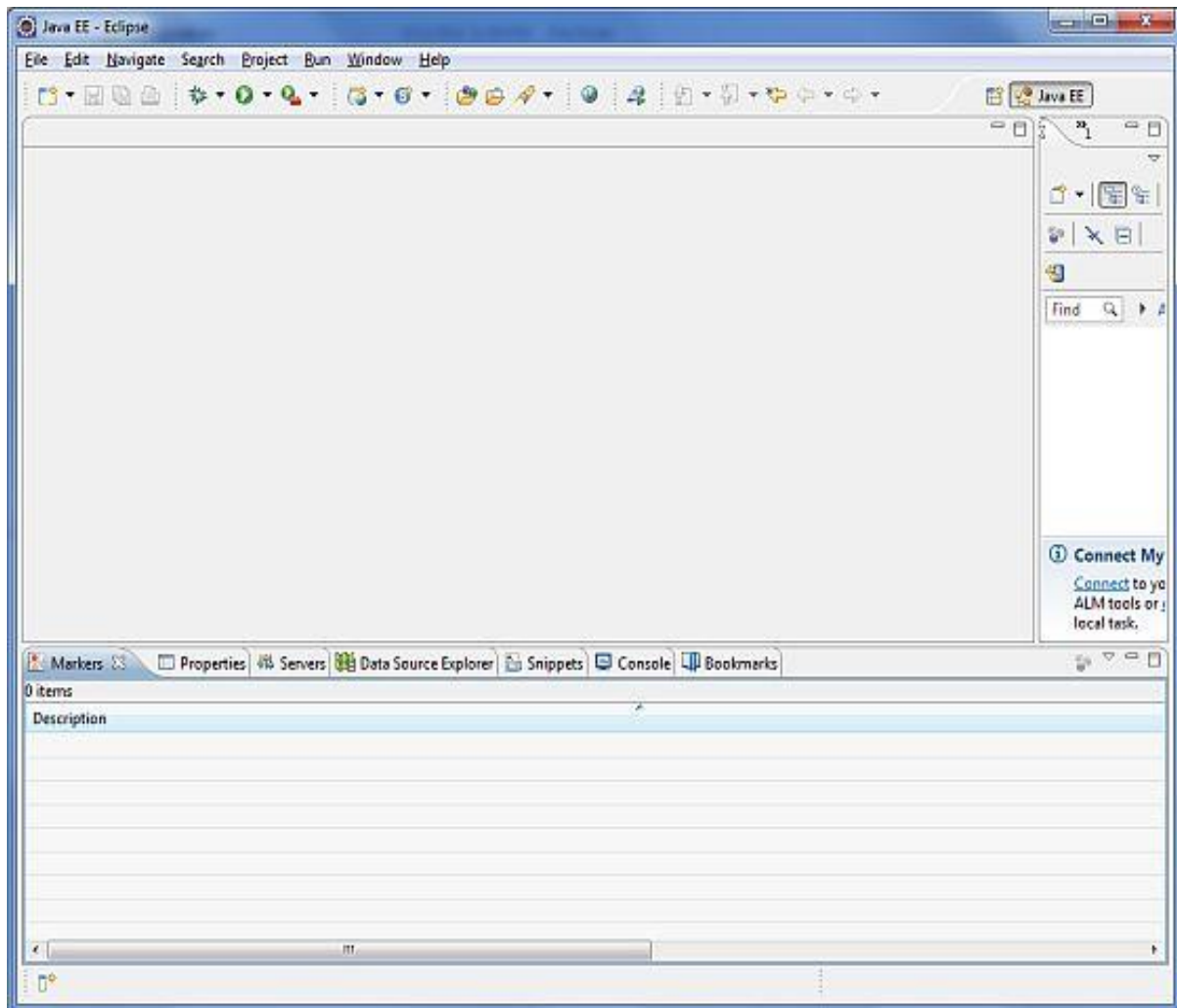
For example in **C:\eclipse** on windows, or **/usr/local/eclipse** on Linux/Unix and finally set the PATH variable appropriately. Eclipse can be started by executing the following commands on the windows machine, or you can simply double click on eclipse.exe.

```
%C:\eclipse\eclipse.exe
```

Eclipse can be started by executing the following commands on the UNIX (Solaris, Linux, etc.) machine:

```
$/usr/local/eclipse/eclipse
```

After a successful startup, if everything is fine then it should display the following screen:



Step 9: Setup Apache Tomcat

We can download the latest version of Tomcat from – <http://tomcat.apache.org/>. Once the installation is downloaded, unpack the binary distribution into a convenient location. For example in the **C:\apache-tomcat-7.0.59** on a windows machine, or in the **/usr/local/apache-tomcat-7.0.59** on a Linux/Unix machine and then set the **CATALINA_HOME** environment variable pointing to the installation locations.

Tomcat can be started by executing the following commands on a windows machine, or you can simply double click on startup.bat

```
%CATALINA_HOME%\bin\startup.bat
```

or

```
C:\apache-tomcat-7.0.59\bin\startup.bat
```

Tomcat can be started by executing the following commands on UNIX (Solaris, Linux, etc.) machine:

```
$CATALINA_HOME/bin/startup.sh

or

/usr/local/apache-tomcat-7.0.59/bin/startup.sh
```

After a successful startup, the default web applications included with Tomcat will be available by visiting – **http://localhost:8080/**. If everything is ok, then it should display the following screen:

Further information about configuring and running Tomcat can be found in the documentation included here, as well as on the Tomcat website – <http://tomcat.apache.org>.

Tomcat can be stopped by executing the following commands on a windows machine:

```
%CATALINA_HOME%\bin\shutdown

or

C:\apache-tomcat-7.0.59\bin\shutdown
```

Tomcat can be stopped by executing the following commands on the UNIX (Solaris, Linux, etc.) machine:

```
$CATALINA_HOME/bin/shutdown.sh
```

or

```
/usr/local/apache-tomcat-7.0.59/bin/shutdown.sh
```

Once we are done with this last step, we are ready to proceed for the first Web Services Example, which we will discuss in the next chapter.

End of ebook preview

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