OpenL Tablets Installation Guide

OpenL Tablets 5.11

OpenL Tablets BRMS

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Contents

Preface

OpenL Tablets is a Business Rules Management System (BRMS) based on tables presented in Excel documents. Using unique concepts, OpenL Tablets facilitates treating business documents containing business logic specifications as executable source code.

OpenL Tablets provides a set of tools addressing BRMS related capabilities including *OpenL Tablets WebStudio* that can be used for creating, testing and managing business rules and business rule projects, and *OpenL Tablets Web Services* designed for integration of business rules into customer's applications.

The OpenL Tablets Installation Guide provides instructions for installing and customizing OpenL Tablets software. The document describes how to install OpenL Tablets under Apache Tomcat.. Information on how to deploy and setup OpenL Web Services is provided as well.

How This Book Is Organized

Chapter 1 lists system requirements for installing and using OpenL Tablets software.

Chapter 2 explains how to install OpenL Tablets WebStudio under Apache Tomcat.

Chapter 3 explains how to install OpenL Tablets WebStudio on WebSphere Application Server.

Chapter 4 is designed for developers and describes how to deploy OpenL Tablets Web Services.

Chapter 5 explains how to setup OpenL Tablets WebStudio and Web Services as an integrated environment.

FAQs and Troubleshooting Notes sections provide useful information related to OpenL Tablets installation.

Audience

This guide is mainly targeted at business users and rule experts who will define, view, and manage their business rules and rule projects via OpenL Tablets WebStudio. Developers will also use this document to learn how to install and setup OpenL Web Services.

Basic knowledge of Java and Apache Tomcat is required to use this guide effectively.

Related Information

The following table lists sources of information related to contents of this guide:

Related information	
Title	**Description**
OpenL Tablets WebStudio User Guide	Document describing OpenL WebStudio, a web application for managing OpenL Tablets projects through web browser.
OpenL Tablets Reference Guide	Provides overview of OpenL Tablets technology, as well as its basic concepts and principles.
http://openl-tablets.sourceforge.net/	OpenL Tablets open source project website.

Typographic Conventions

The following styles and conventions are used in this guide:

Typographic styles and conventions	
Convention	**Description**
Bold	• Represents user interface items such as check boxes, command buttons, dialog boxes, drop-down list values, field names, menu commands, menus, option buttons, perspectives, tabs, tooltip labels, tree elements, views, and windows. • Represents keys, such as **F9** or **CTRL+A.** • Represents a term the first time it is defined.
`Courier`	Represents file and directory names, code, system messages, and command-line commands.
`Courier Bold`	Represents emphasized text in code.
Select **File > Save As**	Represents a command to perform, such as opening the **File** menu and selecting **Save As.**
Italic	• Represents any information to be entered in a field. • Represents documentation titles.
< >	Represents placeholder values to be substituted with user specific values.
Hyperlink	Represents a hyperlink. Clicking a hyperlink displays the information topic or external source.

Chapter 1: Before You Begin

This chapter covers system requirements for installing and running OpenL Tablets software provided in the following table.

Software requirements	
Operating systems	Microsoft Windows 7 x32/64; Ubuntu 12.x; Linux 3.x. **NOTE:** *OpenL Tablets software can potentially run on any Operating System that supports Java Virtual Machine, e.g. Mac OS. In this table we only provide operating systems on which the OpenL Tablets software is tested and supported.*
Browsers	Microsoft Internet Explorer 9.x or later, Firefox 27.x or later, Chrome 31.x or later.
Other Software	• Java v6 x32/64 - JDK 1.7.0_x or later • Apache Tomcat 7.0.x or later **NOTE:** *Instructions on how to install and configure these software packages are provided further in this document.*
Hardware requirements	
	• RAM 4 Gb min (6 Gb is recommended) • 1 GHz or faster 32-bit (x86) or 64-bit (x64) processor
User rights requirements	
	• You must have administrative permissions to install the software under Microsoft Windows / UNIX system.

NOTE: *We highly recommend you to avoid using spaces and special characters in paths.*

Chapter 2: Install OpenL Tablets WebStudio under Apache Tomcat

This chapter first describes how to setup an environment for working with OpenL Tablets software; then we move to deploy OpenL Tablets WebStudio under Apache Tomcat, and also provide information about settings required for proper functioning of the application.

Follow these steps:

Step 1: Install Java Development Kit (JDK)

Step 2: Install Apache Tomcat

Step 3: Deploy OpenL Tablets WebStudio

Step 4: Configure External User Database (if required)

Step 5: Set up OpenL Tablets WebStudio with the Installation Wizard

Step 6: Make settings for Microsoft Excel Application (if required)

Step 1: Installing the JDK

Follow the steps below to install the JDK.

1. Download JDK 1.7.0_x or later from *http://www.oracle.com/technetwork/java/javase/downloads/index.html* to the target directory. Further in the document this catalog is referred as `<JAVA_HOME>`.

   NOTE: We highly recommend you to avoid installing Java in the default Program Files directory because it may cause some problems due to space characters in the path to the folder.

2. Refer to *http://www.oracle.com/technetwork/java/javase/index-137561.html* for installation details if required.

3. Install the JDK according to the instructions.

4. Set the environment variable `JAVA_HOME` to the pathname of the directory where the JDK is installed as follows:

   - For Microsoft Windows:
   a. Open the **System Properties** dialog: press **<Windows>** + **<Pause>** hotkey or right-click the **My Computer** icon and select **Properties** in the pop-up menu.
   b. On the **Advanced** tab, click the **Environment Variables** button.
   c. In the **System variables** area, click the **New** button.
   d. Enter *JAVA_HOME* in the **Variable name** field.
   e. Enter the path to the directory where the JDK is installed in the **Variable value** field, for example, `C:\Java\jdk1.7.0_20`.

f. Click **OK** to complete.

- For Unix/Linux environments (let's assume that the target directory is `/usr/lib/jvm/java-6-sun`):

To set up `JAVA_HOME` for a single user:

a. Login to your account and open `.bash_profile`

```
nano ~/.bash_profile
```

b. Add the following line

```
export JAVA_HOME=/usr/lib/jvm/java-6-sun
```

c. Add/correct system PATH

```
export PATH=$PATH:$JAVA_HOME/bin
```

d. Press **CTRL+O** to save your work, and then press **CTRL+X** to exit.

To set up `JAVA_HOME` for all users:

a. Login as root and open /etc/profile:

```
nano /etc/profile
```

b. Add the following line

```
export JAVA_HOME=/usr/lib/jvm/java-6-sun
```

c. Add/correct system PATH

```
export PATH=$PATH:$JAVA_HOME/bin
```

Step 2: Installing Apache Tomcat

You can install Apache Tomcat from zip file or using Windows Service Installer.

How to Install Apache Tomcat on Windows

From Zip File

Follow the steps below to install Apache Tomcat 7.0.x (or later):

1. Open Apache Tomcat home page at *http://tomcat.apache.org/index.html*.
2. In the left-hand **Download** menu, click the latest available Tomcat version.
3. Locate the **Binary Distributions** area; in the **Core** list click on the zip file corresponding to your Windows version.
4. Save the zip file in a temporary directory.
5. Unpack downloaded zip into target folder on your computer. This folder is referred as `<TOMCAT_HOME>` further in this document.
6. Configure JVM options for Tomcat web server as follows:

    a. For Windows, create `TOMCAT_HOME/bin/setenv.bat` file and write:

    ```
    set JAVA_OPTS=%JAVA_OPTS% -Xms256m -Xmx1024m -XX:+UseParallelOldGC -XX:PermSize=128m -XX:MaxPermSize=384m
    ```

    b. Open the `TOMCAT_HOME/conf/server.xml` file and add the `URIEncoding="UTF-8"` attribute for all `<Connector>` elements. For example:

```
<Connector port="8080" protocol="HTTP/1.1" connectionTimeout="20000" redirectPort="8443"
URIEncoding="UTF-8"/>
```

How to Install Apache Tomcat Using Windows Service Installer

This section describes how to install Apache Tomcat using Windows Service Installer.

Note!   We don't recommend you to select this type of installation if you are planning to edit your rule tables in Excel files from OpenL Tablets WebStudio (See the *Modifying Tables* section in *OpenL Tablets WebStudio User Guide*) because some additional settings are required for that. Please contact your OpenL Tablets administrator to solve the issue.

Note!   For OpenL Tablets administrator. To allow editing rule tables in Excel files from OpenL Tablets WebStudio, please enable the Allow service to interact with desktop Tomcat service option using MMC or from the command line.

1. Navigate to Apache Tomcat site at *http://tomcat.apache.org/index.html* and n the left-hand **Download** menu, click the latest available Tomcat version.
2. Locate the **Binary Distributions** area; in the **Core** list click the 32-bit/64-bit Windows Service Installer link. Save the apache-tomcat exe file in a temporary folder.
3. Run the exe file and follow the instructions of the installation wizard. Click **Next** to move to the next step or return to the previous step by clicking the **Back** button.
4. In the **License Agreement** window, click **I Agree**.
5. In the **Choose Components** dialog, leave the default **Normal** type of installation. If you are an experienced Tomcat user you can also select another installation type from drop-down list.
6. In the **Configuration** dialog, leave the settings at their default values.
7. In the next window the Wizard displays the folder where Tomcat will be installed – the **Destination Folder**. This folder is referred as <TOMCAT_HOME> further in this document.
8. Click **Install** to start the installation.
9. Click **Finish** to complete.

   As a result, Apache Tomcat is installed and started on your computer. In the Notification Area (next to the clock) the 🐱 icon appears. You can manage Tomcat by using this icon or from the Start menu.

10. Configure JVM options for Tomcat. For that right click the **Apache Tomcat** icon in the Notification area and select **Configure**; or click **start->All Programs->Apache Tomcat 7.0-> Configure Tomcat**. The **Apache Tomcat Properties** dialog appears.

   Click the Java tab and add in the Java Options text box (every option should be manually entered in a separate row):

   ```
   -Xms256m
   -Xmx1024m
   -XX:+UseParallelOldGC
   -XX:PermSize=128m
   -XX:MaxPermSize=384m
   ```

Note!   You can add that settings using the Copy/Paste feature; just make sure there are no spaces in the end of every row.

   Click **Apply** and then click **OK**.

11. Restart Tomcat: right click the Tomcat icon in the Notification Area and select **Stop service** (the

    Tomcat icon changes to) and then select **Start Service** again. You can also restart Tomcat
    from the **General** tab in the **Apache Tomcat Properties** dialog which appears after selecting
    start->All Programs->Apache Tomcat 7.0-> Configure Tomcat.

From this point you can run OpenL Tablets WebStudio as described in .

How to Install Apache Tomcat on UNIX / Linux Machine

Installing Apache Tomcat from Repository

Note! All commands should be entered into a terminal window using an account with `sudo` privileges.

This section describes how to install Apache Tomcat from repository as a service on Ubuntu 12.x.

1. Open a terminal window and enter the following:
   ```
   sudo apt-get install tomcat7
   ```
2. Start Tomcat with the next command:
   ```
   sudo /etc/init.d/tomcat7 start
   ```
   All necessary folders should be located in `/var/lib/tomcat7`.
3. To ensure that Tomcat works properly, open your browser and enter http://localhost:8080.

   If all is correct, you will see Apache Tomcat welcome page with a message similar to the following:

   "**If you're seeing this, you've successfully installed Tomcat. Congratulations!**"

   In case 404 Error appears, try to restart Tomcat:
   ```
   sudo /etc/init.d/tomcat7 restart
   ```
   Or you can stop Tomcat by entering the next command:
   ```
   sudo /etc/init.d/tomcat7 stop
   ```
   Start Tomcat again as described above.

Installing Apache Tomcat from zip File

This section describes how to install Apache Tomcat on Ubuntu 12.04 and Centos 6.3. The instructions are valid for other Linux distributions with some small changes.

1. Download the appropriate Tomcat archive file from its official website:
   http://tomcat.apache.org/download-70.cgi (zip or tar.gz archive) to your user folder. In our
   example, we use Tomcat 7.0.39 and download it to the following folder:
   ```
   /home/myuser
   ```
2. Open a terminal window and change directory to the folder containing the Tomcat archive.
3. Extract the archive by entering in the terminal the following command (you can change tomcat
   version as required):
   ```
   tar -zxvf apache-tomcat-7.0.39.tar.gz
   ```
   The apache-tomcat-7.0.39 folder appears; for our example:
   ```
   /home/myuser/apache-tomcat-7.0.39
   ```
4. Change directory to the tomcat/bin:
   ```
   cd apache-tomcat-7.0.39/bin
   ```
5. Make sure all `*.sh` files are executable, i.e. they have r in all positions to the left of the file name, for
   example, `-rwxr-xr-x`. For that, enter in terminal the following:
   ```
   ls –la
   ```

You should see something like this:

Figure 1: OpenL Tablets package is added

6. If some `sh` files aren't executable, enter the following command:
   ```
   chmod +x ./*.sh
   ```
7. Run the `sturtup.sh` file:
   ```
   sh ./startup.sh
   ```
8. In your browser, enter the following URL: http://localhost:8080

If the installation completed successfully, you will see the Apache Tomcat welcome screen. The next thing to be done is to configure JVM options for Tomcat.

Configure JVM options for Tomcat on UNIX / Linux Machine

1. For UNIX, create `TOMCAT_HOME/bin/setenv.sh` file and write

   ```
   export JAVA_OPTS="$JAVA_OPTS -Xms256m -Xmx1024m -XX:+UseParallelOldGC -
   XX:PermSize=128m -XX:MaxPermSize=384m"
   ```

2. Locate the `TOMCAT_HOME/conf/server.xml` file and add the `URIEncoding="UTF-8"` attribute for all `<Connector>` elements. For example:
   ```
   <Connector port="8080" protocol="HTTP/1.1" connectionTimeout="20000"
   redirectPort="8443" URIEncoding="UTF-8"/>
   ```

From this point you can deploy OpenL Tablets WebStudio as described in the next step.

Step 3: Deploying OpenL Tablets WebStudio

This section describes how to deploy and run OpenL Tablets WebStudio under Tomcat.

On a Windows Machine

This section describes how to deploy and run OpenL Tablets WebStudio under Tomcat on a Windows machine.

1. Go to *http://openl-tablets.sourceforge.net/downloads* page.
2. Click the appropriate WebStudio (war) link.
3. Save the file in a temporary folder and then copy the WebStudio war file (for example, `openl-tablets-webstudio-X.X.X.war`) to the `<TOMCAT_HOME>\webapps` folder.
4. Run Tomcat.
   a. If you have installed Tomcat from ZIP file you should click the *startup.bat* file in `TOMCAT_HOME\bin`.
   b. If Tomcat is installed using Windows Service Installer, restart Tomcat as described in Step 2, paragraph 13.

   Tomcat will unpack the war file into the `<TOMCAT_HOME>\webapps\<war file name>` folder. For example, for 5.9.4 version the target folder can be `<TOMCAT_HOME>\webapps\openl-tablets-webstudio-5.9.4`. For convenience, you can rename the folder as you need but please remember that you will use this name to launch WebStudio under Tomcat.

   From this point on, you can run OpenL Tablets WebStudio with default settings or make additional customizations: change User Mode and/or configure an external User Database as described in the *OpenL Tablets WebStudio Customization* section.
5. Run OpenL Tablets WebStudio by entering in your browser the following URL:
   http://localhost:8080/<war file name>. I.e. for our example you should enter
   http://localhost:8080/openl-tablets-webstudio-5.9.4.

OpenLTablets WebStudio opens in your browser on the **Welcome to Installation Wizard** page. The wizard will guide you through the setup process as described in Step 5. After the setup process is complete you can work in the OpenLTablets WebStudio — create new projects or download existing ones.

Note!   After you have installed a new release of the WebStudio, click **CTRL+F5** (or clear cookies and cash manualy) to reload the page in your browser.

On a Linux Machine

Follow the steps below to install OpenL Tablets WebStudio under Linux.

1. Create the `<OPENl_HOME>` folder where the application will be deployed as follows:
   ```
   sudo mkdir /<OPENl_HOME>
   ```
2. Change access rights for this folder:
   ```
   sudo chmod 775 -R /<OPENl_HOME>
   ```
3. Change the owner for this folder:
   ```
   sudo chown tomcat7:tomcat7 /<OPENl_HOME>
   ```
4. Download OpenL WebStudio war file from *http://sourceforge.net/projects/openl-tablets/files/openl-tablets/* to a temporary folder.
5. Copy the downloaded war file to your Tomcat webapps folder:
   ```
   cp /home/myuser/Downloads/<openl-tablets-webstudio-
   xxxx.war>/home/myuser/<TOMCAT_HOME>/webapps/webstudio.war
   ```

6. Stop Tomcat — run the following command from `/home/myuser/<TOMCAT_HOME>/bin` :
   `sh shutdown.sh`
7. Start Tomcat from the same folder:
   `sh startup.sh`
8. In your browser enter *http://localhost:8080/webstudio*

In case the deployment succeeded without any errors, the OpenL Tablets Web Studio Installation Wizard described in the next step opens in your browser.

If you encounter any problems, open the following log files for details:
`home/myuser/<TOMCAT_HOME>/logs/catalina.out` and `home/myuser//<TOMCAT_HOME>/logs/webstudio.log`

Step 4: Configuring External User Database

This step is only required if you are planning to work in the **Production application mode** (see the next topic for details) and use an external database like MySQL for managing users in the WebStudio.

By default, OpenL Tablets WebStudio may run using an internal User Database (User DB) based on the HSQLDB database engine. It is a good idea to use the internal User DB for demonstration purposes because it is provided by default and requires no additional setup. But in this case all user management changes will be lost after server restart.

In a production environment, we strongly recommend using an external database. This section explains how to set up a MySQL database.

Follow the steps below to configure external MySQL database.

1. Go to http://dev.mysql.com/downloads/mysql/.
2. Select the appropriate MSI Installer for your system configuration and click **Download**. For example, you may need **Windows (x86, 32-bit), MSI Installer**. We don't recommend you to use **ZIP Archive** version since it's intended for advanced users.
3. In the next screen you will be prompted to register or login on MySQL site. You can skip this step and proceed to **No thanks, just start my download!** link.
4. Select **Save File** in the next dialog and save the .msi file in a target folder.
5. Navigate to the folder containing the .msi file and double click on the file to start the installation process. The **MYSQL Server Setup Wizard Welcome** screen of appears.
6. Follow the steps the Wizard takes you through leaving the defaults and clicking **Next**.
7. Click **Finish** to close the Wizard when installation is complete.

Note! It is recommended to configure your database server to use UTF-8 character set.

After MySQL is successfully installed on your computer, create an empty database for WebStudio in MySQL and grant permissions to modify this database to the user from which the WebStudio will work with this database.

For that:

1. Open MySQL Command Line Client as follows: **start -> All Programs -> MySQL -> MySQL Server 5.5 -> MySQL Command Line Client**.

2. Type the following commands:

```
CREATE USER openl_user IDENTIFIED BY 'openl_password';
CREATE DATABASE openl CHARACTER SET utf8;
GRANT ALL PRIVILEGES ON openl.* TO openl_user;
```

Step 5: Setting Up OpenL Tablets Web Studio with Installation Wizard

This topic describes the steps you should take after the first run of OpenL Tablets WebStudio under Tomcat or WAS (See the *Install OpenL Tablets WebStudio on WAS* section for details). You can accept the default options provided by the Wizard. For that, just click **Next** to move to the next step; or you can change the options as you need and then click **Next** to proceed.

All steps are accompanied by detailed explanations that help you choose the right option.

1. Click the **Start** button in the **Welcome to OpenL Tablets WebStudio Installation Wizard** page.
2. In the next screen, specify a *working directory* for OpenL Tablets. This folder is referred as `<OPENL_HOME>` in the documentation. (We highly recommend you not to use the system drive for that.) Click **Next** to proceed.
3. Select a user mode:
   - **Single-user** — Only the user currently logged on to the computer can work with the WebStudio (refer to *OpenL Tablets WebStudio User Guide* for details);
   - **Multi-user** (recommended) — Multiple users can run the WebStudio with their unique names.
4. For the **Multi-user** mode, in the **Select application mode** area specify the database for users management:
   - **Demo** — The default database which contains a predefined list of users and does not require additional settings;
   - **Production** — An external MySQL database with a customizable list of users.
5. If you have selected **Production** mode, the **Configure database** area appears with the following database parameters:
   - **Database URL** — By default, `localhost:3306/openl` should be used;
   - **Username** / **Password** — Enter your username and password that you have specified for MySQL database. (See the *Configuring External User Database* section further in this guide.)
6. Click the **Finish** button to complete.

As a result, for the **Multi-user** mode, the logging screen appears where you should enter your credentials to start working with OpenL Tablets WebStudio.

Note!   List of predefined users defined in Demo application mode you can find in WebStudio User Guide (User Management -> Manage Users).

Step 6: Make settings for Microsoft Excel Application

Functionality "Open in Excel" doesn't work under the default settings if *Apache Tomcat is installed on Windows using Windows Service Installer*. This case requires a user to make several configuration changes.

The following steps are required to change DCOMConfig settings for Excel.

1. Run the dcomconfig.exe utility:

   start -> **dcomcnfg.exe** (you might be prompted for administrator credentials)

   The **Component Services** dialog appears.

2. In the **Console Root** select **Component Services -> Computers -> My Computer -> DCOM Config**.

3. Navigate to the **Microsoft Excel Application** at the right.

4. Right click **Microsoft Excel Application** and select the **Properties** item in the drop-down menu.

5. In the **Microsoft Excel Application** dialog, click the **Identity** tab.

6. Select the **This user** option.

7. Click **OK** to complete.
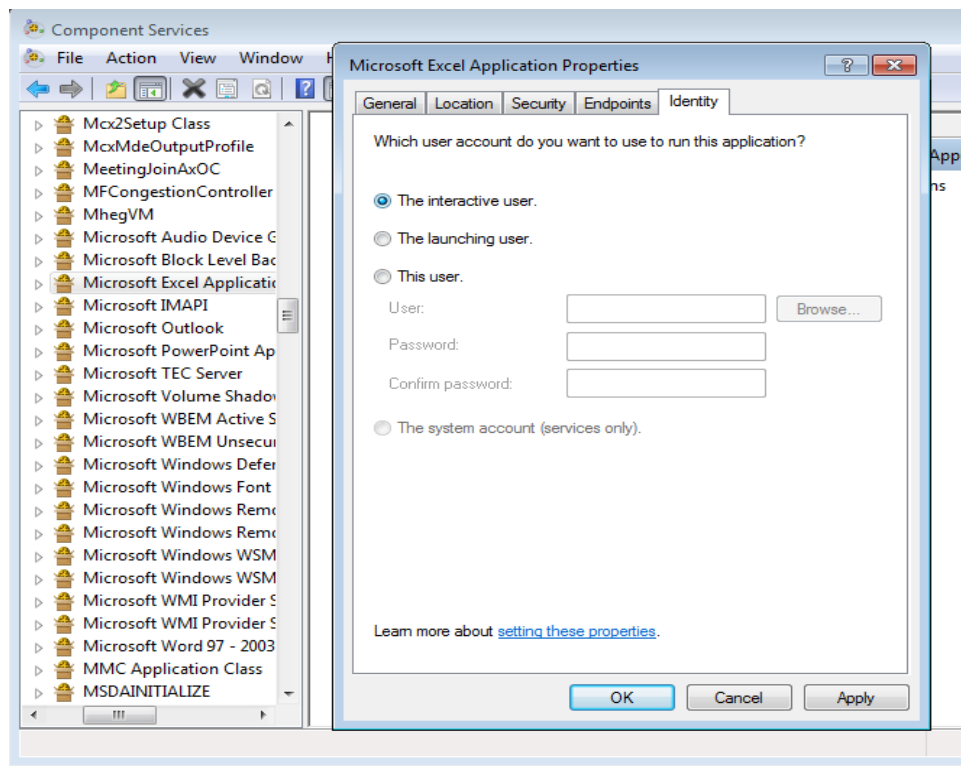
Figure 2: Microsoft Excel Application Properties

Note!   If Microsoft Excel Application is not available under dcomcnfg settings, follow the next steps to set it: On 64 bit system with 32 bit Office - **start** -> run **mmc -32** -> **File** -> **Add/Remove Snap-in… -> Component Services** -> **Add** -> **OK** -> **Console Root** -> **Component Services** -> **Computers** -> **My Computer** -> **DCOM Config** -> **Microsoft Excel Application**. And perform remaining steps mentioned in the section.

OpenL Tablets WebStudio Customization

This section provides information on what additional configurations can be made for OpenL Tablets WebStudio and how to make them.

Update User Database Configuration

If for some reasons your user database settings such as connection, login/password and so on need to be changed, you can use the `<OPENL_HOME>/system-settings/db.properties` file for that.

Here is an example of the configuration you can use for your User Database:

```
db.hibernate.dialect = org.hibernate.dialect.MySQLDialect
db.driver = com.mysql.jdbc.Driver
db.url = jdbc:mysql://localhost:3306/openl
db.user = openl_user
db.password = openl_password
```

Configuring User Mode

Normally, user mode in OpenL Tablets WebStudio is set to **Multi-user** by using *OpenL Tablets WebStudio Installation Wizard*.

You can also change user mode as a JVM option for Tomcat. For that, open the **Apache Tomcat Properties** dialog (see point 12 in the *How to Install Apache Tomcat Using Windows Service Installer* section) and add in the **Java Options** text box:

```
-Duser.mode=multi
```

Note!   User mode set as a Java option takes precedence over the corresponding value specified in the OpenL Tablets WebStudio Installation Wizard. So if both of them are defined the Java option value will be used.

Configuring Private Key for Repository Security

WebStudio allows connecting to secured repositories. Then passwords are stored in WebStudio workspace. To improve protection of the passwords, a private key can be used.

Private key is a special secure sentence for coding and encoding of repositories passwords. By default, the private key is empty. But it can be setup as a JVM option for Tomcat by adding and specifying value of the parameter

```
repository.encode.decode.key.
```

The private key should be specified without spaces.

Note!   The private key must be configured prior to creating any secured connections. Otherwise, all stored passwords won't be valid.

Chapter 3: Install OpenL Tablets WebStudio on WAS

This section explains how to install OpenL Tablets WebStudio on WebSphere Application Server (hereafter referred as WAS).

Prerequisites

The following tasks must be completed prior to deploying OpenL Tablets WebStudio on WAS.

IBM WebSphere Application Server v. 8.5 or later should be installed on your local machine, or you need access to a WAS instance with logon that has appropriate permissions to configure JVM options. For information on how to install IBM WebSphere Application Server visit Oracle Online documentation, section *Installing and Configuring WebSphere 8.5* section on http://docs.oracle.com/cd/E24902_01/doc.91/e23435/inst_config_was85_win.htm

> **IMPORTANT!** When defining the Shared Resource Directory during the installation process, the path to the directory should be specified without spaces. Otherwise, OpenL Tablets WebStudio will fail.

Follow the steps below to deploy OpenL Tablets WebStudio on WAS.

Step 1: Set up JVM Options for WAS

1. In the WebSphere Application Server Console, navigate to **Servers/ServerTypes/WebSphere Application Servers**. You will see your server in the right pane.
2. In the right pane, click your sever name; by default it is **server1**.
3. Locate the **Server Infrastructure** area and expand the **Java Process Management** node.
4. Click **Process Definition**.
5. Click the **Java Virtual Machine** link on the upper right.
6. In the **Initial heap size** text box, enter 256.
7. In the **Maximum heap size** text box, enter 1024.
8. In the **Generic JVM Arguments** add the following string
   ```
   -XX:+UseParallelOldGC -XX:PermSize=128m -XX:MaxPermSize=384M -
   Dclient.encoding.override=UTF-8
   ```
9. Click **OK**.
10. In the **Message** dialog which appears in the top of the form, click the **Save directly to the master configuration** item to save your work.
11. Restart your WebSphere Application Server.

Step 2: Prepare OpenL Tablets WebStudio WAR File

1. Go to *http://openl-tablets.sourceforge.net/downloads* page.
2. Click the appropriate WebStudio (war) link.
3. Save the file in a temporary folder.
4. Open the downloaded war file as a zip archive.
5. From the `\WEB-INF\lib\` folder, remove the following jar files:
   ```
   validation-api-1.0.0.GA.jar
   xercesImpl-2.8.1.jar
   xml-apis-1.3.03.jar
   ```
6. Save the war file.

Step 3: Deploy OpenL Tablets WebStudio on WAS

1. Enter in your browser the following URL https://localhost:9043/ibm/console (this is default port for local installation). The **WebSphere Application Server Console** opens.
2. Navigate to **Applications** / **Application Types** / **WebSphere enterprise applications**
3. Click the **Install** button in the top line tool bar.
4. In the **Path to the new application** area, select your modified WebStudio war file (the **Local file system** option is selected by default).
5. Click the **Next** button to proceed until you get to **Step 2: Map modules to servers**.
6. In the **Step 2: Map modules to servers** page, select the checkbox on the left of the file name and click **Next** to proceed.
7. In the **Step 3: Map virtual hosts for Web modules** page, select the checkbox on the left of the file name and click **Next** to proceed.
8. In the **Step 4: Map context roots for Web modules** page, enter in the **Context Root** text field `/webstudio` and click **Next** to proceed.
9. Click the **Finish** button in the bottom of the screen to complete. After the installation process complete, clock the **Manage Applications** link.
10. In the next screen, click on the webstudio war file link in the list of applications.
11. In the next screen, locate the **Default Properties** area and click the **Class loading and update detection** link.
12. In the next screen, select the following radio-buttons: **Classes loaded with local class loader first (parent last)** and **Single class loader for application**.
13. Click **OK** to finish.
14. In the next window, again click the **Save directly to the master configuration** link.

    Now the OpenL Tablets WebStudio application is installed and started (if no, start the application).

15. Run OpenL Tablets WebStudio by entering http://localhost:9080/webstudio/ in your browser. The **Welcome to OpenL Tablets WebStudio Installation Wizard** page appears allowing you to set up the application as needed. Refer to the *Configuring External User Database*, *Setting Up OpenL Tablets Web Studio with Installation Wizard* and *OpenL Tablets WebStudio Customization* sections for details.

Step 4: Make settings for Microsoft Excel Application

Functionality "Open in Excel" doesn't work while using WAS 8.5 under the default settings which requires a user to make several configuration changes described in *Make settings for Microsoft Excel Application* section of Chapter 2.

Chapter 4: Deploy OpenL Tablets Web Services

This chapter is designed for rule developers who will want to use business rules as separate web services.

Note!   We will consider a particular case when you will use a file system as a data source for your projects. In such a case all OpenL Tablets projects should be placed into a local folder; this folder will represent a single deployment containing all the projects. In turn, every project should also be represented as a separate folder.

For more information on how to configure OpenL Tablets Web Services see the *OpenL Tablets Web Services Usage and Customization* guide.

Prerequisites

Make sure the following tasks have been performed:

- The JDK 1.7.0_x (or later) and Apache Tomcat 7.0.x (or later) is correctly installed.
- We will refer the folder where Tomcat is installed as `<TOMCAT_HOME>`.
- An environment variable `JAVA_HOME` is set to the pathname of the directory where the JDK is installed.
- JVM options should be set up as described in the *Installing Apache Tomcat* section.

The deployment process consists of the following steps:

1. Download pre-configured OpenL Tablets Web Services application (war-file):
   a. Go to http://openl-tablets.sourceforge.net/downloads page.
   b. Click the appropriate **Services Frontend (war)** link.
   c. Save the chosen war file to the `<TOMCAT_HOME>\webapps` directory.
2. Configure a local file system as a data source as follows:
   a. Navigate to the `<TOMCAT_HOME>\webapps` folder and unzip the web services war file. For example, you can right-click the web services war file name and select 7-zip > Open archive.
   b. Navigate to the `WEB-INF\classes` folder, open the `openl-ruleservice.properties` file and define address to the folder with projects for the following setting `ruleservice.datasource.dir`. For example:
      `ruleservice.datasource.dir = d:/datasource/`
   c. Put your rule project to the appropriate datasource folder. Every rule project should be represented as a separate folder. As an example you can use OpenL Tablets Tutorial that you can download from the OpenL Tablets web site.
   d. Run Tomcat by clicking the startup.bat file in `<TOMCAT_HOME>\bin`.

To ensure the deployment is successful you can try to go to appropriate CXF page with web services. In our case it will be: `http://localhost:8080/openl-tablets-ws-5.12.0`

Note!   In the Tomcat log file you can find the URL that you should use to run your Web Service. For file system data source, the URL should look like `http://localhost:8080/<ws war file name>/<datasource`

`folder>/<rule project name>?wsdl`, where `<datasource folder>/<rule project name>` can be taken from the Tomcat log file.

Chapter 5: OpenL Tablets WebStudio and Web Services Integration

Earlier in this document we discussed how to install OpenL Tablets WebStudio, and also how to properly deploy and configure OpenL Tablets Web Services.

This section describes how to setup an integrated environment that enables you to work with business rules from OpenL Tablets WebStudio and launch these rules as Web Services. Here we describe how to setup OpenL Tablets WebStudio and Web Services integration via RMI.

Note!   In the given example OpenL Tablets WebStudio should run under Tomcat. As a repository we will use a production-repository which you can create yourself while running WebStudio using local production repository.

1. If not done earlier, put and unzip jackrabbit to the `\<TOMCAT_HOME>\webapps`. We recommend you to use the `jackrabbit-webapp-2.4.4.war` file (you can download it from *http://central.maven.org/maven2/org/apache/jackrabbit/jackrabbit-webapp/2.4.4/jackrabbit-webapp-2.4.4.war*).

   Add the `jcr-2.0.jar` file to the `\<TOMCAT_HOME>\webapps\jackrabbit-webapp-2.4.4\WEB-INF\lib`. (You can download it from http://search.maven.org/remotecontent?filepath=javax/jcr/jcr/2.0/jcr-2.0.jar).

   Replace `derby-10.5.3.0_1.jar` to `derby-10.7.1.1.jar` file in the same folder (You can download this file from http://repo1.maven.org/maven2/org/apache/derby/derby/10.7.1.1/derby-10.7.1.1.jar).

2. Locate your created production-repository folder into `<OPEN1_HOME>` folder.

3. Set up jackrabbit.zip:

   a. Download the `jackrabbit.zip` file from the OpenL Tablets web site (Currently the file is not accessible from this site. Please refer to OpenL Tablets team for the file). Unpack the file to the `\<TOMCAT_HOME>\bin\jackrabbit` folder (create the `jackrabbit` folder if it does not exist).

   b. Locate `\<TOMCAT_HOME>\webapps\bin\jackrabbit\bootstrap.properties` file. It should contain the following settings(in our example `<OPEN1_HOME>` is located on d disc):
   ```
   repository.config=jackrabbit/jackrabbit-repository.xml
   repository.home=d:/<OPEN1_HOME>/production-repository
   repository.name=production-repository
   # RMI Settings
   rmi.enabled=true
   rmi.port=1099
   rmi.host=localhost
   # If the URI is not specified, it's composed as follows:
   #rmi.uri=//${rmi.host}:${rmi.port}/${repository.name}
   rmi.uri=//localhost:1099/production-repository
   ```

4. Set up Web Services as follows:

   a. Open the `\<TOMCAT_HOME>\webapps\<ws project name>\WEB-INF\classes\rules-production.properties` file. Update the `rules-production.properties` file.

   Define appropriate `<OpenL_Home>` for `ruleservice.tmp.dir`:
   ```
   ruleservice.tmp.dir = d:/<OpenL_Home>/rules-deploy
   ```

   Mark as comment these lines:

```
# production-repository.factory =
org.openl.rules.repository.factories.LocalJackrabbitProductionRepositoryFactory
# production-repository.local.home=/openl/production-repository
```

Remove the comment mark from these lines:

```
production-repository.factory =
org.openl.rules.repository.factories.RmiJackrabbitProductionRepositoryFactory

production-repository.remote.rmi.url = //localhost:1099/production-repository
```

b. Open the `\<TOMCAT_HOME>\webapps\<ws project name>\WEB-INF\classes\openl-ruleservice.properties` file. Update settings in the `openl-ruleservice.properties` file with appropriate `<OPENl_HOME>` folder.

```
ruleservice.tmp.dir = d:/<OPENl_HOME>/rules-deploy
ruleservice.datasource.dir = d:/<OPENl_HOME>/openl-ruleservice/datasource
```

c. Open the `\<TOMCAT_HOME>\webapps\<ws project name>\WEB-INF\classes\openl-ruleservice-override-beans.xml` file. Add into the `openl-ruleservice-override-beans.xml` file the following settings:

```
<bean id="productionRepositoryConfigManagerFactory"
class="org.openl.config.ConfigurationManagerFactory">
        <constructor-arg name="useSystemProperties" value="true" />
        <constructor-arg name="defaultPropertiesLocation" value="" />
        <constructor-arg name="propertiesFolder"
value="${ruleservice.datasource.propertiesFolder}" />
    </bean>
    <bean id="productionRepositoryFactoryProxy"
class="org.openl.rules.repository.ProductionRepositoryFactoryProxy" destroy-
method="destroy">
        <property name="configManagerFactory"
ref="productionRepositoryConfigManagerFactory"/>
    </bean>
    <!-- Data source storage that provides information about deployments, projects
        and their properties and version -->
    <!-- This implementation based on JCR repository -->
    <bean id="datasource" class="org.openl.rules.ruleservice.loader.JcrDataSource">
        <property name="productionRepositoryFactoryProxy"
ref="productionRepositoryFactoryProxy"/>
        <property name="repositoryPropertiesFile"
value="${ruleservice.datasource.repositoryPropertiesFile}"/>
    </bean>
```

5. Set up OpenL Tablets WebStudio:

a. Locate WebStudio war file into `<TOMCAT_HOME>\webapps`

b. In case you want to create **production repository** via remote connection - open `\<TOMCAT_HOME>\webapps\<webstudio project name>\WEB-INF\classes\rules-production.properties`.

Mark as comment these lines:

```
# production-repository.factory =
org.openl.rules.repository.factories.LocalJackrabbitProductionRepositoryFactory
```

Remove the comment mark from these lines

```
production-repository.factory =
org.openl.rules.repository.factories.RmiJackrabbitProductionRepositoryFactory
```

c. In case you want to create **design repository** via remote connection - open `\<TOMCAT_HOME>\webapps\<webstudio project name>\WEB-INF\classes\system.properties`.

Mark as comment these lines:

```
# design-repository.factory =
org.openl.rules.repository.factories.LocalJackrabbitDesignRepositoryFactory
```

Remove the comment mark from these lines

```
design-repository.factory =
org.openl.rules.repository.factories.RmiJackrabbitDesignRepositoryFactory
```

d. Run WebStudio by entering in your browser http://localhost:8080/<webstudio war file name>.

As a result, OpenL Tablets WebStudio home page appears with your project deployed. From this point you can make any changes in your rule in WebStudio, then save project with these updates and redeploy it, these change will immediately affect your rule represented as Web Service.

Backward Compatibility of OpenL Tablets WebStudio with Previous Versions of Web Services

To configure the compatibility of OpenL Tablets WebStudio deployment configuration with previous versions of OpenL Tablets Web Services (v.5.9.3 and earlier), you should switch the `deployment.format.old` parameter in the `system.properties` file to true. If the parameter doesn't exist you need to create it.

Troubleshooting Notes

If you deploy OpenL Tablets WebStudio under Tomcat in Unix/Linux environment, the following troubleshooting recommendations can be taken into account.

1. Before starting tomcat under Linux make sure that no java processes are running:

   ```
   sudo ps -A | grep j
   ```

   If found, the process name and number will be displayed.

2. If any Java process is running, stop it:

   ```
   kill -9 <process number>
   ```

3. Make sure that port 8080 is available:

   ```
   sudo netstart -an | grep 8080
   ```

4. Run Tomcat under Linux:

   ```
   <TOMCAT_HOME>/bin/startup.sh
   ```

5. If the 'command not found' error appears, you should mark `.sh` file as executable script:

   ```
   chmod +x startup.sh
   ```

6. If one of the errors 'Permission denied' or 'The BASEDIR environment variable is not defined correctly' is shown then make all `.sh` files in the bin folder executable:

   ```
   chmod 777 *.sh
   ```

7. Verify that all `.sh` files in the bin folder are executable:

   ```
   ls -la
   ```

8. Run Tomcat

   ```
   <TOMCAT_HOME>/bin/startup.sh
   ```

FAQs

This section provides the most common questions and answer related to OpenL Tablets installation procedure. For detailed Information about working with Java, Tomcat, etc please refer to corresponding sites of the software manufacturers.

1. Q: How can I check if Java is installed on my PC?

1. R: You can do it as follows:

    For Windows XP:

    a. Open **start > Control Panel**

    b. Double click **Add or Remove Programs**

    For Windows 7/Vista:

    a. Open **start > Control Panel**

    b. Click **Programs > Programs and Features**

Look through the list for 'Java(TM)…' or 'Java(TM) Update…' items. If any of them are present then you have Java installed on your PC.

2. Q: During Java installation the page for Java registration appears. Do I have to register Java?

2. R: No, it is optional. You can just close the registration page.

3. Q: How can I check which version of Java is installed on my PC?

3. R: Open the Verify Java Version page and click the **Verify Java Version** button. In just a few seconds a new page appears where you will find the message similar to the following one: *"Your Java version: Version 6 Update 26"*.

4. Q: How can I see the error message in the Tomcat console that appears when I start Tomcat? The error screen disappears too quickly.

4. R: Run **catalina.bat run** in the command line window as follows: click **Start > Run**, browse to `<TOMCAT_HOME>\bin` folder, select **catalina.bat** and add **run** in the command line.