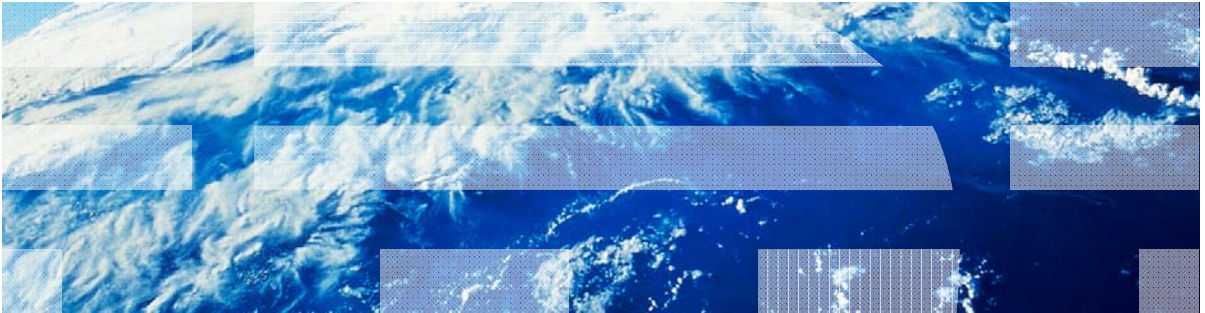


# ***IBM Worklight V5.0.6 Getting Started***

**Moving from development environment to stand-alone QA  
and production servers**



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## ***Using this module***

- This module is intended for use with either the IBM® Worklight® Consumer Edition or the IBM Worklight Enterprise Edition.

# Agenda

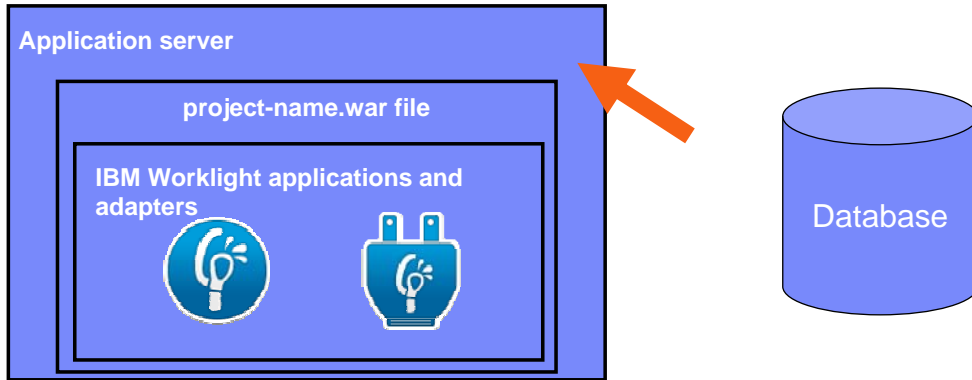
- Overview
- Prepare your application for deployment
- Deploy your application to a remote server
- IBM Worklight Apache Ant utility
- IBM Working in cluster environments

# Overview

- The Worklight project contains various components, such as applications, adapters, configuration files, custom Java™ code, and libraries.
- During development stages all of these components are deployed to a local development server bundled within Worklight Studio.
- Deploying those components to a local development server is automated by Worklight Studio.
- Each environment (for example production, pre-production, QA, and development) has its own unique Worklight-specific settings, for example: locations of back-end services, public URL, database connectivity parameters, logging setting.
- Eventually a need to transfer these settings and components to the remote server arises.
- This module describes how to package those IBM Worklight components and deploy them to a remote server.

## Overview

- The following diagram shows a stand-alone Worklight Server architecture. See the [IBM Worklight user documentation](#) for a full guide to installing Worklight Server.

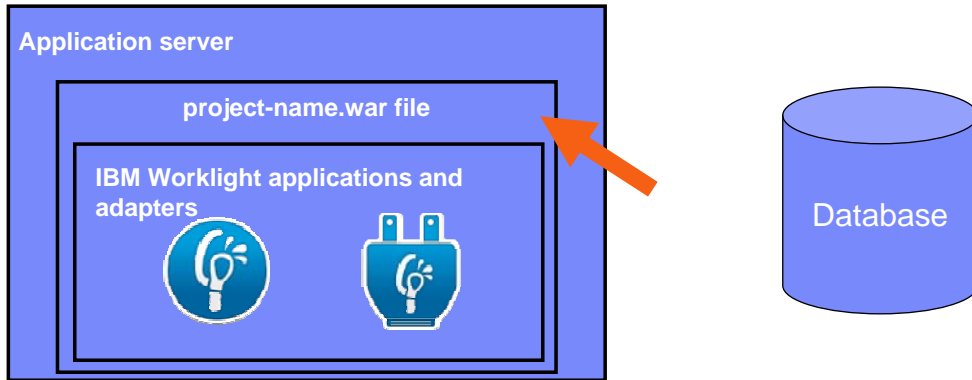


You need a Java web application server to run Worklight – such as WebSphere Application Server (full profile or Liberty profile) or Tomcat.

When your server is set up, copy the supplied `worklight-jee.jar` file to its libraries folder.

## Overview

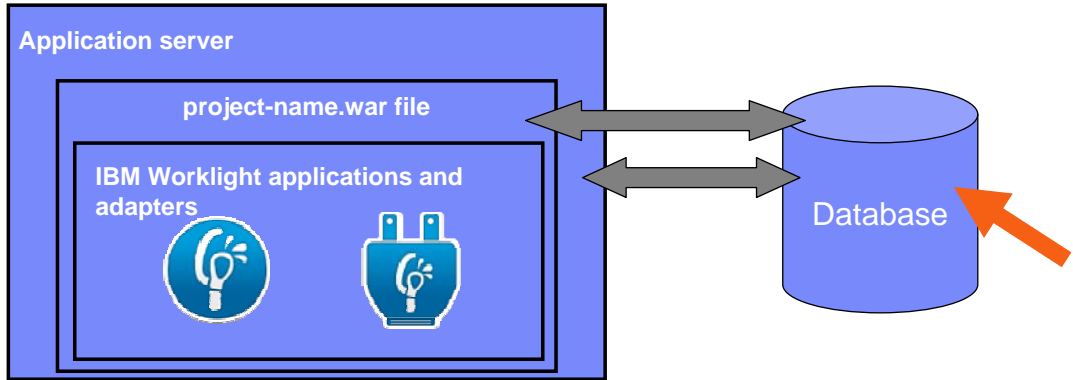
- The following diagram shows a stand-alone Worklight Server architecture. See the [IBM Worklight user documentation](#) for a full guide to installing Worklight Server.



Your IBM Worklight project contains various server-related settings under the `\server\conf` folder, for example `worklight.properties` and `AuthenticationConfig.xml` files. In addition, it is possible to add custom Java code and libraries to the `\server\java` and `\server\lib` folders. All these files are automatically compiled to the `project-name.war` file under the `\bin\` folder of your project.

## Overview

- The following diagram shows a stand-alone Worklight Server architecture. See the [IBM Worklight user documentation](#) for a full guide to installing Worklight Server.



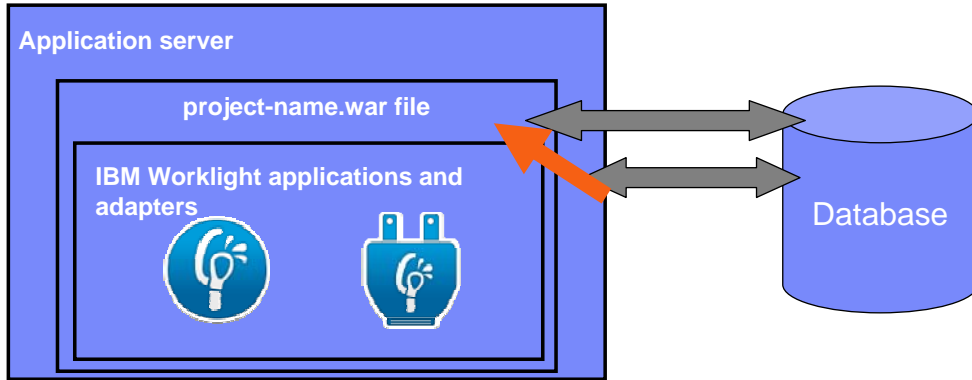
The database connection properties are defined in the `worklight.properties` file.

You can use either application server level JNDI or Worklight server level JDBC connections.



## Overview

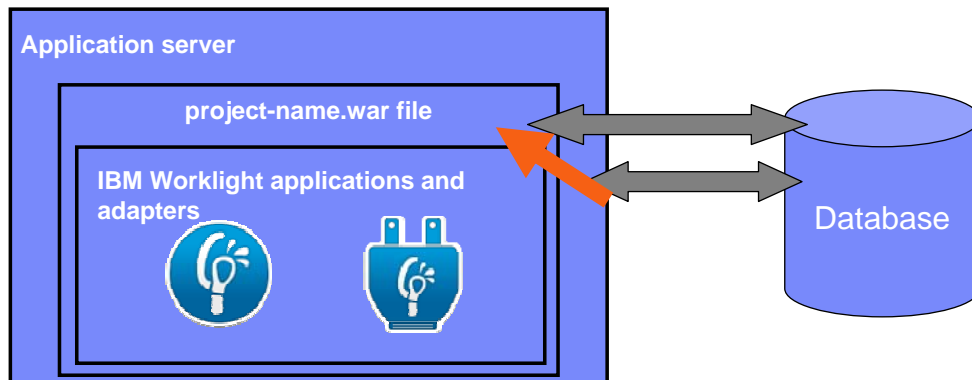
- The following diagram shows a stand-alone Worklight Server architecture. See the [IBM Worklight user documentation](#) for a full guide to installing Worklight Server.



When you have finished updating server-related files under the `\server\` folder of your project, you must deploy the generated `.war` file to the application server. The Worklight Console is also bundled within this `.war` file. In IBM Worklight terms, this `.war` file is called a *Server customization bundle*. You can have only one `.war` file deployed per application server.

## Overview

- The following diagram shows a stand-alone Worklight Server architecture. See the IBM Worklight user documentation for a full guide to installing Worklight Server.

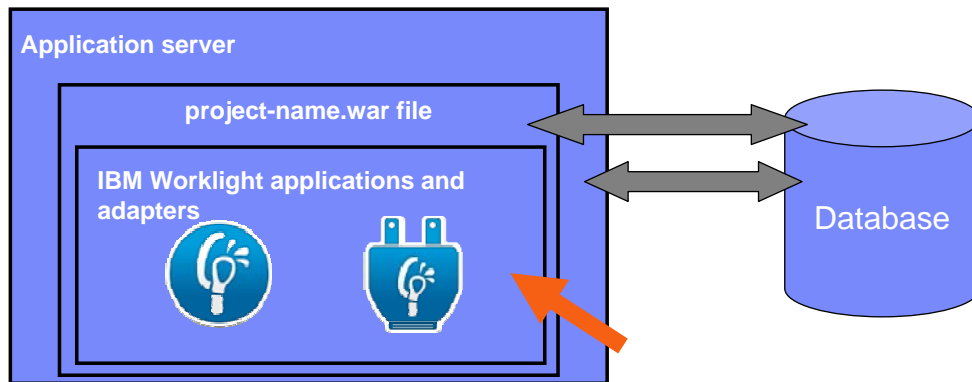


After having deployed a .war file to your application server, you can open the Worklight Console at <http://server:port/context/console>.

Note that this .war file functionality is using the `worklight-jee.jar` file that you previously copied to the `lib` folder of the application server.

## Overview

- The following diagram shows a stand-alone Worklight Server architecture. See the [IBM Worklight user documentation](#) for a full guide to installing Worklight Server.



When your Worklight Console is accessible, you can start deploying applications and adapters. You are not limited to the number of applications and adapters that are deployed, but remember that they all share the same server customization bundle. Note that you must update the `<worklightServerRootURL>` property in the `application-descriptor.xml` file with the new server address and rebuild your app.

## Process review

- The previously described process consists of two main steps:
  - Prepare the application for deployment:
    - Adjust application properties in the `application-descriptor.xml` file.
    - Adjust server and database properties in the `worklight.properties` file.
    - Build the application.
    - Rename the generated `.war` file (optional).
  - Deploy the application:
    - Deploy the `.war` file to the remote server.
    - Deploy applications and adapters by using the Worklight Console.

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## *Adjusting application-descriptor.xml*

- The `application-descriptor.xml` file contains all the application-specific information and settings.
- When you work with a local development environment, IBM Worklight applications try to connect to a local developer workstation.
- You can set up the URL that applications try to connect to in the `application-descriptor.xml` file.
- The `worklightServerRootURL` element contains the URL that the applications attempt to connect to. Update it to the URL of the remote server that the application will be using.

```
<worklightServerRootURL>http://your-remote-server-url:8080</worklightServerRootURL>
```

- You can also adjust other properties, such as security features, before you build the application.

## Adjusting `worklight.properties`

- When you are working with a remote server, the `worklight.properties` file must contain the properties that describe the connection to an SQL database that Worklight Server uses:
  - Select the required database type, such as: MySQL, Oracle, DB2
  - Enter the jdbc URL.
  - Enter your database user name and password.

```
#####  
# DB Settings  
#####  
# jndi name; empty value means Apache DBCP data source  
#wl.db.jndi.name=  
  
# For MySQL  
wl.db.type=MYSQL  
wl.db.url=jdbc:mysql://localhost:3306/Worklight  
# For Derby  
#wl.db.type=DERBY  
#wl.db.url=jdbc:derby:${worklight.home}/derby/Worklight  
#wl.reports.db.url=jdbc:derby:${worklight.home}/derby/  
# For HSQL  
#wl.db.type=HSQL  
#wl.db.url=jdbc:hsqldb:file:${worklight.home}/hsqldb/W  
#wl.reports.db.url=jdbc:hsqldb:file:${worklight.home}/  
# For DB2  
#wl.db.type=DB2  
#wl.db.url=jdbc:db2:Worklight  
# For Oracle  
#wl.db.type=ORACLE  
#wl.db.url=jdbc:oracle:thin:@localhost:1521:SID  
  
wl.db.username=Worklight  
wl.db.password=Worklight
```

## Adjusting *worklight.properties*

- Adjust properties that describe the public Worklight Server access:
  - Protocol
  - Port
  - Context

```
#####  
# Public Worklight Server address  
#####  
#publicWorkLightHostname=localhost  
# http or https  
publicWorkLightProtocol=http  
# For default port leave empty  
publicWorkLightPort=8181  
publicWorkLightContext=/MyContext/
```

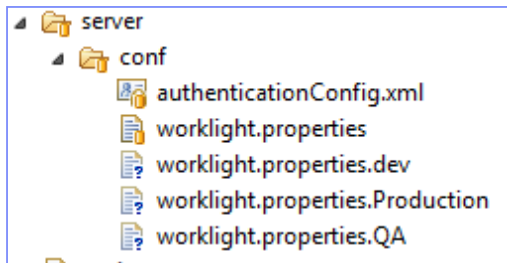


Your Worklight Server will be available at  
`http://<remote-server>:8181/MyContext/`



## Building the project

- When you have made all the required modifications to the configuration of your IBM Worklight project, build your application, your adapter, or both.
- This build creates a *projectName.war* file in the `\bin` folder that you later use to deploy the project configuration to a remote server.
- In addition to the project configuration, this `.war` file contains classes that are built from Java code in the `server\java` folder.
- Change the name of this `.war` file to *context-root-name.war*. Use the same context root name as in previous steps.
- For ease of use, you can create copies of the configuration files, with different names, and then copy their contents to the main configuration file before you build your application.



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## Deploy your application to a remote server

- Deploy the generated `.war` file to your remote server.
- If you are using Tomcat application server, copy the `.war` file to the `webapps` directory and restart the server.
- Alternatively, Tomcat provides a management console to deploy `.war` files.

The screenshot shows the Tomcat management console deployment interface. It is divided into two main sections: "Deploy" and "WAR file to deploy".

The "Deploy" section has a yellow header and contains the text "Deploy directory or WAR file located on server". Below this, there are three input fields: "Context Path (required):", "XML Configuration file URL:", and "WAR or Directory URL:". A "Deploy" button is located below these fields.

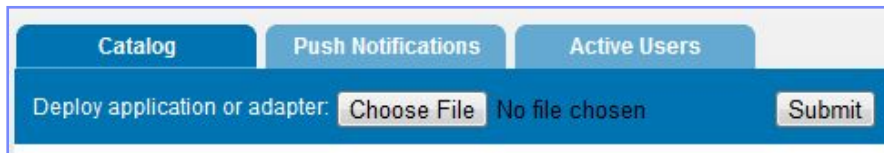
The "WAR file to deploy" section also has a yellow header and contains the text "Select WAR file to upload". Below this, there is a "Choose File" button and the text "No file chosen". A "Deploy" button is located below these elements.

A red rectangular box highlights the "Choose File" button and the "No file chosen" text in the "WAR file to deploy" section.

- For more information about how to deploy to other application servers, see the IBM Worklight user documentation.

## Deploy your application to a remote server

- After you deploy the `.war` file, open the Worklight Console at <http://<server>:<port>/<context root name>/console>
- Now you can deploy `.wlap` and `.adapter` files from the `bin\` folder of your Worklight project
  - In the console, click **Choose File**.
  - Select the `.wlap` or `.adapter` file.
  - Click **Submit** to deploy the adapter.



- Your application is now ready to use.

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## ***IBM Worklight Apache Ant utility***

- Apache Ant is a project that is developed and maintained by the Apache Software Foundation.
- It provides command-line tools that can be used for various tasks such as building applications and copying files.
- Apache Ant can be downloaded at <http://ant.apache.org/>.
- IBM Worklight provides an Apache Ant utility for automating build and deploy processes of Worklight artifacts.
- In the following slides, you learn how to use it for various tasks.
- For more information about Apache Ant, see <http://ant.apache.org/manual/index.html>.

## Apache Ant basics

- Install Apache Ant and make sure that its binary files are in the **path** variable of your operating system.
- Apache Ant is run by invoking the following syntax from the command line.

```
ant -buildfile build-script-name.xml
```

- The build script is an XML file with the following structure template.

```
<?xml version="1.0" encoding="UTF-8"?>
<project base="." default="target-name">
  <target name="target-name">
  </target>
</project>
```

- The <target> element contains a set of tasks that are performed one by one. You learn how to define them in the following slides.
- You can use <echo message="messageText"/> task to output the debug information.

## Adding a reference to Worklight Ant JAR file


- The first element to add in your <target> element is a <taskdef> reference to the IBM Worklight Ant utility.

```
<?xml version="1.0" encoding="UTF-8"?>
<project basedir="." default="buildApplication">

  <target name="buildApplication">

    <echo message="Loading ANT tool"/>
    <taskdef resource="com/worklight/ant/defaults.properties">
      <classpath>
        <pathelement location="c:\IBM\Workspace\worklight-ant-5.0.2.jar" />
      </classpath>
    </taskdef>

  </target>
</project>
```

 **Add IBM Worklight tasks here.**

- This addition ensures that Ant recognizes the IBM Worklight tasks and has a default configuration for performing them.



## Ant task - Application builder

- To build your application, add an <app-builder> task with the following syntax:

```
<echo message="Building application"/>
<app-builder
  applicationFolder="c:\IBM\Workspace\TestProject\apps\TestApplication"
  environments="common"
  nativeProjectPrefix="com.mycompany.TestApplication"
  outputFolder="c:\IBM\Workspace\TestProject\bin"
/>
```

- Parameters:
  - **applicationFolder** – the root folder of your application.
  - **environments** – comma-separated list of environments to build. Optional parameter, omitting it means build all environments that are found in the application-descriptor.xml file.
  - **nativeProjectPrefix** – mandatory parameter when building iOS applications.
  - **outputFolder** – the folder to put generated .wlapp files in.

## Ant task - Application deployer

- To deploy your application, add an <app-deployer> task with the following syntax:

```
<echo message="Deploying application"/>
<app-deployer
  worklightServerHost="http://localhost:8080/"
  deployable="c:\IBM\Workspace\TestProject\bin\TestApplication-common.wlapp"
/>
```

- Parameters:
  - **worklightServerHost** – full URL of your Worklight server. Deployment fails if Worklight console is protected by a user name and password.
  - **deployable** – the .wlapp file to deploy.
- If you need to deploy several .wlapp files, you can add several <app-deployer> entries.

## Ant task - Adapter builder

- To build your adapter, add an <adapter-builder> task with the following syntax:

```
<echo message="Building adapter"/>
<adapter-builder
  folder="c:\IBM\Workspace\TestProject\adapters\TestAdapter"
  destinationfolder="c:\IBM\Workspace\TestProject\bin"
/>
```

- Parameters:
  - **folder** – the root folder of your adapter
  - **destinationfolder** – the folder to put the generated .adapter file in
- If you need to build several adapters, you can add several <adapter-builder> entries.

## Ant task - Adapter deployer

- To deploy your adapter, add an <adapter-deployer> task with the following syntax:

```
<echo message="Deploying adapter"/>
<adapter-deployer
  worklightServerHost="http://localhost:8080/"
  deployable="c:\IBM\Workspace\TestProject\bin\TestAdapter.adapter"
/>
```

- Parameters:
  - **worklightServerHost** – full URL of your Worklight server. Deploy fails if Worklight console is protected by a user name and password.
  - **deployable** – the .adapter file to deploy
- If you need to deploy several .wla<sub>pp</sub> files, you can add several <adapter-deployer> entries.

## Ant task – WAR builder

- To build the server customization archive file (.war), add a <war-builder> task with the following syntax:

```
<war-builder
  projectfolder="c:\IBM\Workspace\TestProject"
  destinationfolder="c:\IBM\Workspace\TestProject\bin\"
  warfile="c:\IBM\Workspace\TestProject\bin\TestProject.war"
  classesFolder="c:\IBM\Workspace\TestProject\bin\classes"
/>
```

- Parameters:
  - **projectfolder** – the path to your project
  - **destinationfolder** – folder for temporary files generation
  - **warfile** – destination and file name of a generated .war file
  - **classesFolder** – a folder with compiled Java classes to add to the .war file
- **.jar** files under the `projectfolder\server\lib` directory are added automatically.

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## ***IBM Working in cluster environments***

- Several Worklight Servers can be set up in a cluster environment, sharing a database.
- When a `.wlapp` or `.adapter` file is deployed on one of the servers in a cluster, it is automatically synchronized to other servers.
- When an application or an adapter is deleted from one of the servers in a cluster, it is automatically deleted from the other servers as well.
- A `.war` file, however, is a part of the application server customization. It must therefore be deployed manually to each server in the cluster.
- By default, cluster synchronization is performed with a 2-second interval. You can change this interval by adjusting **`cluster.data.synchronization.taskFrequencyInSeconds`** property in the `worklight.properties` file.

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