

Getting Started with IBM Worklight

IBM Redbooks Solution Guide

IBM® Worklight is a platform for the development of mobile applications. It is a member of the MobileFirst family of products. Worklight consists of five parts:

- Worklight Studio. A plug-in that is added to the Eclipse integrated development environment (IDE). It provides a development framework for Worklight applications.
- Worklight server. An application that runs on an application server. It gives access to deployed Worklight applications.
- Worklight console. An application that is distributed with Worklight server. It is used to manage deployed Worklight applications.
- Device run time. A collection of application programming interfaces (APIs) that are used to develop hybrid Worklight applications.
- Application Center: A private app store where developers can upload applications and users can upload feedback on the application.

This IBM Redbooks® Solution Guide describes how to build a mobile application with IBM Worklight Studio and deploy it to a test or production environment. The components of the Worklight platform are illustrated in Figure 1.

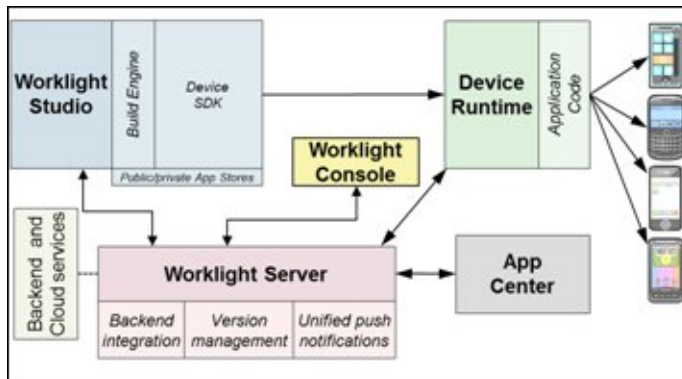


Figure 1. The components of the Worklight platform

Did you know?

Worklight builds applications on a common environment, which means that when you view an application on, for example, an iPhone and a BlackBerry, by default they automatically have the same appearance. You can modify this default as much as you want because Worklight provides environments for each device operating system that it supports. Worklight server can alert the user to the availability of a new version of an application, and it can even block an application so that it cannot be used until the new version is installed.

Business value

Worklight supports the development of web applications (HTML5, CSS3, and JavaScript), native applications (written in the native programming language of the device), and hybrid applications (a mix of web and native). Runtime capabilities include encryption of local data, offline authentication, device-type detection, and integration with frameworks, such as Dojo mobile, Sencha Touch, and JQuery.

Worklight Studio provides a single environment for the development, testing, and deployment of an application. It has its own integrated server, a console view that provides a mobile browser simulator, and, if the Android Software Development Kit (SDK) is installed, an Android Emulator, which can give a more precise indication of the rendering of the Android environment (see Figure 2).

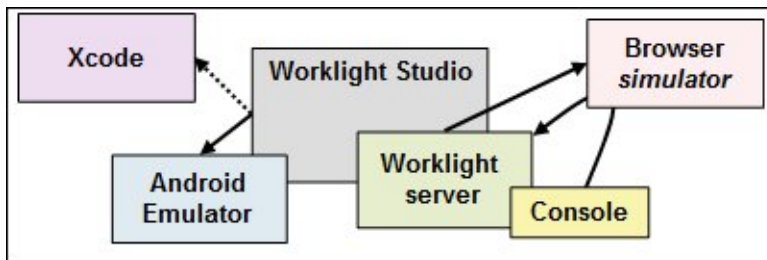


Figure 2. Worklight as an integrated development environment

Worklight can integrate with iOS by exporting the environment to Xcode. This exported environment runs only on an Apple computer.

From the developer's point of view, there is no need to install extra software, or to package code to send outside of the environment for testing. From the governance point of view, Worklight can manage application accessibility and updates, security, and authentication. Worklight provides analytics for smart application usage activation of events, and can integrate with other analytics tools, such as Business Intelligence and Reporting Tools (BIRT), and IBM Tealeaf®.

Developers can be provided with a predefined shell component that includes web coding, such as company headers and logo, or contact information, and native coding and security. This shell ensures uniform development across teams: headers always have the same appearance, security always is implemented in the same way, and so on.

Solution overview

This section examines each component of the Worklight platform.

Worklight Studio

This is a plug-in that runs on Eclipse. It is an IDE that provides a single location for developing application and adapter code in the following languages:

- HTML5: The design language of web pages. Used for presentation of information in a browser.
- JavaScript: Functions that allow web pages to interact with the user.
- CSS3: Definitions for style elements, such as font type, colors, and cell padding.
- XML: Used to transmit data in a predefined format.
- Java: A server-side programming language. Widely used for the Internet.

Worklight Studio holds Worklight projects. A project has at least one application, and may also have adapters. Adapters are described in the "Adapters" section. Initially, an application is web-centric. It is provided with an HTML file, a CSS file, and three JavaScript files, which are contained logically in their own folders (Figure 3).



Figure 3. Common folder structure

Applications

With this fundamental structure, you can create a web application that is tailored to the mobile environment by providing style information in the CSS file. However, Worklight is above all a hybrid environment; that is, it provides applications that mix web code and device native code. A decision must be made: which device or devices will use the application? A specific environment is added for each device (Figure 4).



Figure 4. Device environments

One device type may include several models with different characteristics: screen density, shape, screen size, and so on. For example, a Samsung Galaxy S3 has a screen size of 1280x720, but the S4 measures 1920x1080. Worklight accommodates this difference by providing *skins*. A skin is specific to a device type, but can have its own styles, images, and JavaScript that modify the appearance, and even the functionality, of the application (Figure 5).



Figure 5. Skin folder structure

How do common, device, and skin environments all fit together in the application? It is simple: the code is cumulative, unless there is a conflict, in which case the innermost code wins out. In Figure 6, the common CSS specifies a background color of red, but this is overridden by the Android CSS. The skin specifies a minimum height of 100%, and because this does not conflict with any other value, it is added into the final mix.

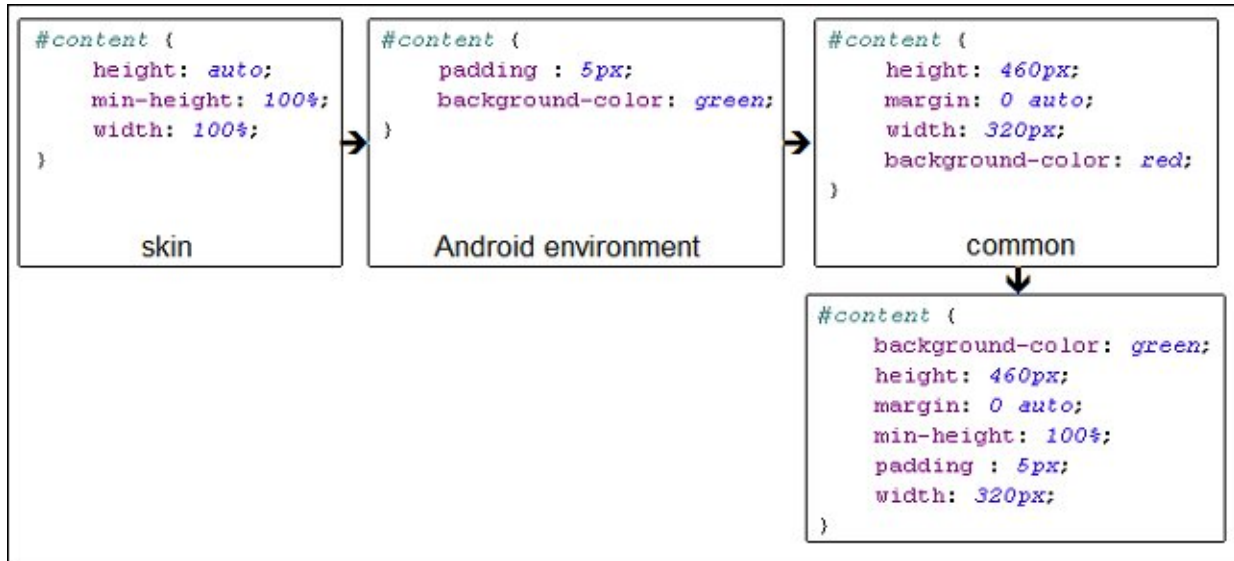


Figure 6. Cumulative and overridden code

Adapters

Adapters can be added to the project (none are required by default). Unlike applications, adapters are server-side artifacts. They are written in JavaScript and are called either by a request from a device, a notification, or another adapter. Their structure is not as complex as an application because there is no environment to consider; an adapter is called by any device, with no recoding. Adapters can be of four types:

- HTTP: Retrieves information from a web service, for example.
- SQL: Retrieves data from a database.
- IBM Cast Iron®: Communicates with a private or a public cloud.
- JMS: Sends or receives messages from a Java message service.

A typical scenario is shown in the "Usage scenarios" section.

Worklight server

The Worklight server is an application that runs on an application server, such as IBM WebSphere® Application Server. Worklight applications and adapters do not run directly on an application server, but are controlled by the Worklight server, which itself is controlled by the application server.

The server manages two things: communication with the back end, and communication with the device. When an application starts, or is brought to the foreground, it can call the server automatically and check whether there is any available update. The server can respond in one of three ways: it can indicate that there is no new version, it can warn you that there is a new version that you should get, or it can block the device from using the application until the new version is installed. The server also provides application management and updates, push notifications, user authentication and device authentication, and so on. The server can provide only a new version of web content. Native content is available only through the app store where the application was downloaded.

Worklight console

This is an application that is installed with the Worklight server. It is used to manage applications and adapters that are deployed to the server (Figure 7).



Figure 7. Worklight console

Device run time

This term refers to the APIs that provide functionality to an application. They do not function as stand-alone components, but may be used by applications. Device run time includes these capabilities:

- Troubleshooting: Detection and correction of connectivity problems.
- Analytics: Collection of information about application and device usage.
- Skins: Optimization of appearance, features, and functions of different types in a single device family.
- Authentication: Managing the authentication sequence for an application.
- Local security: Encryption of data that is stored on a device.
- Version control: Apply new versions, or disable old versions in accordance with the information that is received from the Worklight console.

Application Center

This is a private, enterprise store that can provide feedback for developers. Applications that are placed in the store are not necessarily complete; the developer might want users to download it to a device, use it, and then provide criticism or suggestions through the app store. Native applications can be distributed only through an app store, which leads to the following limitations:

- App stores review applications to verify that they are complete and non-malicious. An incomplete application is rejected.
- There is typically a lengthy delay between submitting an application and having it accepted. Developers need a fast response to their application.
- There is no feedback mechanism, where the user can provide suggestions, advice, criticism, and so on, to the developer.
- This application store is not intended as a place to get new applications; it is a work tool for interaction between developers and users.

Solution architecture

The five components of Worklight fit together as shown in Figure 8.

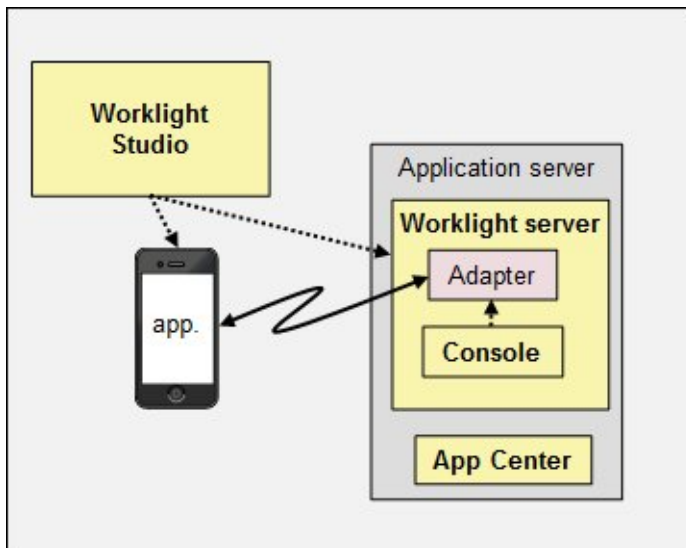


Figure 8. Worklight platform

The Worklight platform is packaged with other components of the MobileFirst family, and the choice of package depends on two factors: what other components are required, and what licensing is required.

The Mobile Foundation package includes IBM WebSphere Cast Iron (in the Consumer Edition) and IBM Endpoint Manager for Mobile Devices (in the Enterprise Edition). WebSphere Cast Iron is an integration framework that enables companies to connect to clouds, as well as on-premise application, with a minimum of coding (the coding is declarative, which means that it is done by configuration rather than development language coding). IBM Endpoint Manager for Mobile Devices addresses issues of security, Bring Your Own Device policies, and connectivity issues. The Worklight package includes no component other than the Worklight platform.

Worklight can be licensed based on the number of devices that are connected, or the number of applications that are deployed.

The first decision is whether the scenario is business-to-employee or business-to-consumer. In the first case, the number of devices is known (or can be calculated). The license is therefore related to the installation and the number of devices. In the second case, the number of consumers cannot be known and therefore licensing is based on installation and the number of applications that are deployed.

The second decision is whether there is need for other components. If the answer is yes, the Mobile Foundation package is used; otherwise, the requirement is for Worklight alone. It could be, for example, that a company has IBM WebSphere Cast Iron, or some other solution for connectivity to the cloud, and does not require that component.

Figure 9 sums up these four high-level scenarios.

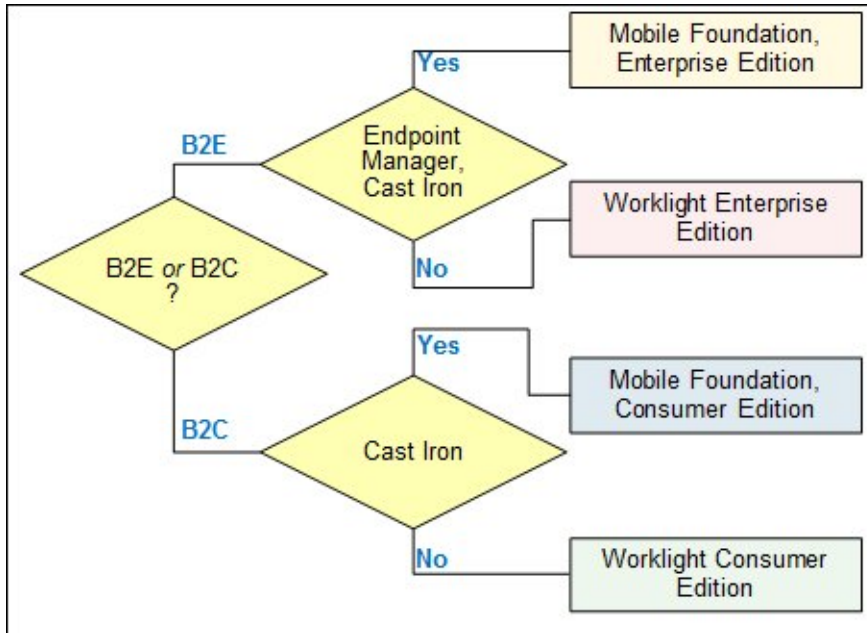


Figure 9. Packaging of Worklight

Usage scenarios

This section provides two scenarios for using Worklight.

Mashup of web service information

A mobile user might need to book a flight to a particular location. They have no preference for an airline company, so they provide just the destination and the flight date. The application that they use is local to their device, but it has the URL of the Worklight server to which it should link (this is stipulated as a part of the configuration of the application), and the name of the adapter and the function to call.

On the server side, the SQL adapter starts by querying a database to retrieve a number of URLs. There are the URLs of the airline companies, and maybe also a weather report site to retrieve the expected weather conditions on the flight date. There might be sites that provide entertainment information or restaurant information. The adapter then calls an HTTP adapter and hands in each URL. The HTTP adapter makes the request to each web service and returns the response to the adapter. When each site has responded (or timed out), the information may be assembled and formatted by using an XSL transformation that is a part of the adapter, and the resulting data is passed back to the device that sent the original request (Figure 10).

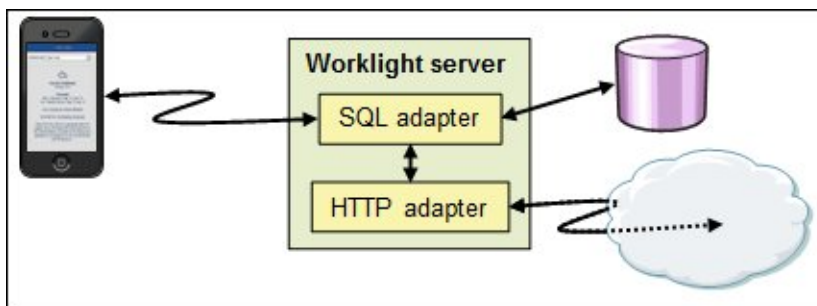


Figure 10. Mashup scenario

Push notification

The flight in the previous scenario is booked, and the client wants to be informed if there is any delay or cancellation. Typically, interactions with the server are initiated by the client, but for notification, it must be the server that initiates the call and returns the information to the device.

The numbers in the following paragraphs refer to Figure 11. Register the device so that it requires notification. The first communication is with a push service mediator, which registers the device that called, and returns a token (1). This is not a part of Worklight: it could be an Apple or a Google push server, for example. The token is used to subscribe to an event source through a Worklight adapter. As a part of this process of subscription, the token is passed in (2). The adapter event source has two options: it can poll the back end for events, or it can wait until the back end pushes a notification to it (3). In both scenarios, the adapter calls the push service mediator and hands it the notification and the token (4). The push service mediator retrieves the device URL that is associated with the token, and pushes the notification out to the device (5).

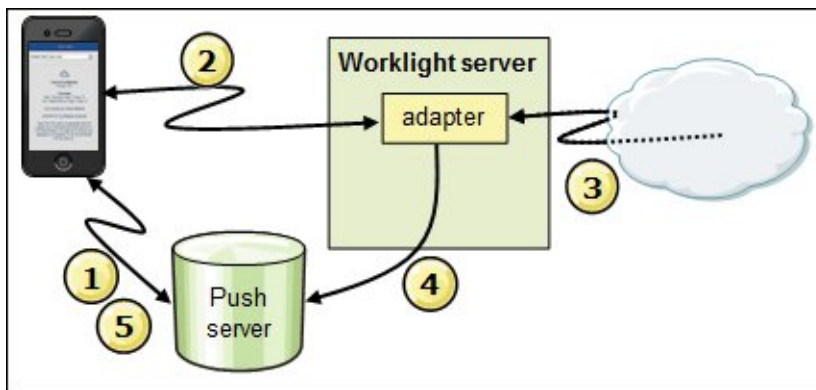


Figure 11. Push notification scenario

Integration

Worklight Studio is a plug-in for Eclipse. A plug-in is a software component that adds functionality to an application. Eclipse accepts plug-ins (you can even write your own), which means that Worklight can benefit from the utilities that are provided by Eclipse, such as editors, a code completion feature, and syntax problem reporting. Worklight also can link to Java classes that are developed in Eclipse.

Worklight server is an application in itself, so it requires an application server in order to function. It integrates with WebSphere Application Server, including the Liberty profile, or Apache Tomcat. Applications that are served by Worklight server can benefit from the security environment of the application server, the data sources, and so on. It has access to the application server components.

Supported platforms

For more information about supported platforms, see <http://www.ibm.com/support/docview.wss?uid=swg27024838>.

Ordering information

Ordering information is shown in Table 1.

Table 1. Ordering information

Program name	PID number	Charge metric
IBM Mobile Foundation Enterprise Edition	5725-I41	Client Device Install
IBM Mobile Foundation Consumer Edition	5725-I42	Application
IBM Worklight	5725-I43	Client Device Install Application
IBM Mobile Application Platform Pattern	5725-G24	Client Device Application Virtual Server

Related information

For more information, see the following documents:

- IBM Worklight product page
<http://www.ibm.com/software/products/us/en/worklight/>
- IBM Worklight V6.0 - technology overview
http://www.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/ecm/en/wsw14181usen/index.html&lang=en&request_locale=en
- IBM Worklight V6.0 Information Center
<http://pic.dhe.ibm.com/infocenter/wrklght/v6r0m0/index.jsp>
- IBM Worklight V6.0 data sheet
<http://public.dhe.ibm.com/common/ssi/ecm/en/wsd14109usen/WSD14109USEN.PDF>
- IBM Offering Information page (to search on announcement letters, sales manuals, or both):
http://www.ibm.com/common/ssi/index.wss?request_locale=en

On this page, enter `IBM Worklight`, select the information type, and then click **Search**. On the next page, narrow your search results by geography and language.

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