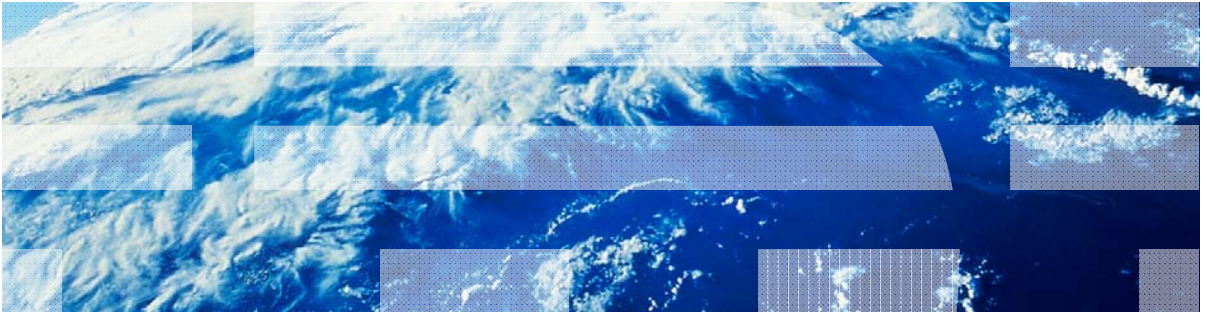


IBM Worklight V5.0.6 Getting Started

Using Java in adapters



Trademarks

- IBM, the IBM logo, and [ibm.com](http://www.ibm.com) are trademarks or registered trademarks of International Business Machines Corporation, registered in many jurisdictions worldwide. Worklight is a trademark or registered trademark of Worklight, an IBM Company. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at “[Copyright and trademark information](http://www.ibm.com/legal/copytrade.shtml)” at www.ibm.com/legal/copytrade.shtml.
- Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.
- Other company products or service names may be trademarks or service marks of others.
- This document may not be reproduced in whole or in part without the prior written permission of IBM.

About IBM®

- See <http://www.ibm.com/ibm/us/en/>

Agenda

- Overview
- Adding custom Java™ classes to your project
- Invoking custom Java classes from adapter
- Invoking adapter procedures from Java code
- Exercise

Overview

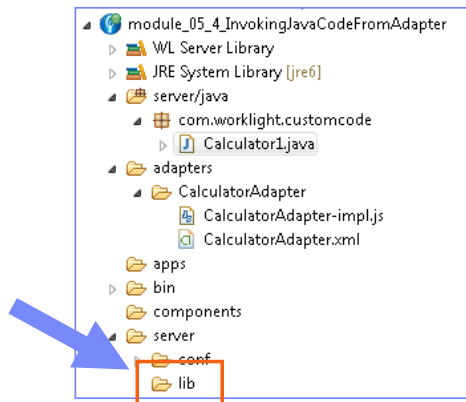
- Adapter is a server-side entity
- Adapters are implemented in JavaScript™
- Use the adapter to perform some complex functions; for example, encrypting and decrypting data, or generating and validating security tokens
- Where JavaScript is not enough to implement these functions, or a Java class exists, it is possible to use Java code in your adapter
- **Important – The Java™ code is an extension of the adapter function and not a replacement**

Agenda

- Overview
- Adding custom Java classes to your project
- Invoking custom Java classes from adapter
- Invoking adapter procedures from Java code
- Exercise

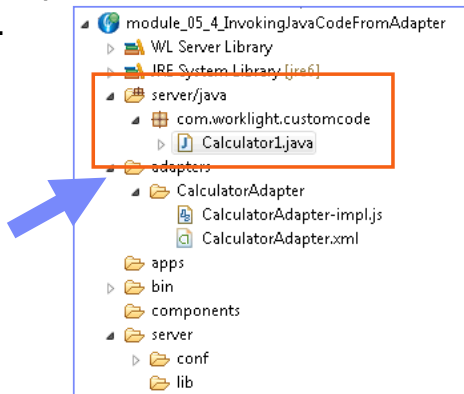
Adding custom Java classes to your project

- To use an existing Java library, add the JAR file to the server\lib folder of your Worklight® Project
- After the Worklight Adapter is built and deployed, this JAR file is automatically deployed to a Worklight server



Adding custom Java classes to your project

- To add custom Java code to your project, right-click the server/java folder in your Worklight project and add a Java class file. Name it **Calculator1.java**.
- Important – package name must start with **com**.
- Add this file to a package. In this sample, the `com.worklight.customcode` is used.



Adding custom Java classes to your project

- Add two methods to your Calculator1.java class
 - Static method; does not require a new instance of a class
 - Instance method

```
package com.worklight.customcode;

public class Calculator1 {

    public static int addTwoIntegers(int first, int second){
        return first + second;
    }

    public int subtractTwoIntegers(int first, int second){
        return first - second;
    }

}
```

- If your Java code has additional dependencies, put the required JARs in the serverlib folder of your Worklight project


Agenda

- Overview
- Adding custom Java classes to your project
- Invoking custom Java classes from adapter
- Invoking adapter procedures from Java code
- Exercise

Invoking custom Java classes from the adapter

- After your custom Java code is created and any required JAR files added, you can reference it from your Worklight Adapter JavaScript as if it was written in Java

```
function addTwoIntegers(a,b){  
  return {  
    result: com.worklight.customcode.Calculator1.addTwoIntegers(a,b)  
  };  
}  
  
function subtractTwoIntegers(a,b){  
  var calcInstance = new com.worklight.customcode.Calculator1();  
  
  return {  
    result : calcInstance.  
  };  
}
```



Invoke the static Java method as shown, and use the full class name to reference it directly

Invoking custom Java classes from the adapter

- After your custom Java code is created and any required JAR files added, you can reference it from your Worklight Adapter JavaScript as if it was written in Java

```
function addTwoIntegers(a,b){  
  return {  
    result: com.workli  
  };  
}
```

To use the instance method, create a class instance and invoke the instance method from it

```
function subtractTwoIntegers(a,b){  
  var calcInstance = new com.worklight.customcode.Calculator1();  
  return {  
    result : calcInstance.subtractTwoIntegers(a,b)  
  };  
}
```

Agenda

- Overview
- Adding custom Java classes to your project
- Invoking custom Java classes from adapter
- Invoking adapter procedures from Java code
- Exercise

Invoking adapter procedures from Java code

- You can also invoke Worklight Adapter procedures from your Java code

```
public void callProcedure(){
    DataAccessService service = WorklightBundles.getInstance().getDataAccessService();
    String paramArray = "[" + param1 + ',' + param2 + ',' + param3 + "]";
    ProcedureQName procedureQName = new ProcedureQName("adapterName", "procedureName");
    InvocationResult result = service.invokeProcedure(procedureQName, paramArray);
    JSONObject jsonObject = result.toJSON();
    String value = (String)jsonObject.get("key");
}
```

Invoking adapter procedures from Java code

- You can also invoke Worklight Adapter procedures from your Java code

```
public void callProcedure(){  
    DataAccessService service = WorklightBundles.getInstance().getDataAccessService();  
    String paramArray = "[" + param1 + ", " + param2 + ", " + param3 + "];"  
    ProcedureQName procedureQName = new ProcedureQName("adapterName", "procedureName");  
    InvocationResult result = service.invokeProcedure(procedureQName, paramArray);  
    JSONObject jsonObject = result.toJSON();  
    String value = (String)jsonObject.get("key");  
}
```

Get a reference to a
DataAccessService instance

Invoking adapter procedures from Java code

- You can also invoke Worklight Adapter procedures from your Java code


```
public void callProcedure(){  
    DataAccessService service = WorklightBundles.getInstance().getDataAccessService();  
    String paramArray = "["param1', 'param2', 'param3']";  
    ProcedureQName procedureQName = new ProcedureQName("adapterName", "procedureName");  
    InvocationResult result = service.invokeProcedure(procedureQName, paramArray);  
    JSONObject jsonObject = result.toJSON();  
    String value = (String)jsonObject.get("key");  
}
```

Create a parameter array and a
ProcedureQName object

Invoking adapter procedures from Java code

- You can also invoke Worklight Adapter procedures from your Java code

```
public void callProcedure(){  
    DataAccessService service = WorklightBundles.getInstance().getDataAccessService();  
    String paramArray = "[" + param1 + ',' + param2 + ',' + param3 + "];"  
    ProcedureQName procedureQName = new ProcedureQName("adapterName", "procedureName");  
    InvocationResult result = service.invokeProcedure(procedureQName, paramArray);  
    JSONObject jsonObject = result.toJSON();  
    String value = (String)jsonObject.get("key");  
}
```



Invoke the procedure and use the
InvocationResult returned

Agenda

- Overview
- Adding custom Java classes to your project
- Invoking custom Java classes from the adapter
- Invoking the adapter procedures from the Java code
- Exercise

Exercise

- Implement the addition and removal that is shown in this module as the custom Java code that is called by the adapter

```
Invocation Result of procedure: 'addTwoIntegers' from the Worklight Server:
```

```
{  
  "isSuccessful": true,  
  "result": 7  
}
```

- The sample for this training module can be found on the Getting Started page of the IBM Worklight documentation website at <http://www.ibm.com/mobile-docs>.

Check yourself questions

- Is it possible to use existing JAR functions in my Worklight adapter?
 - No, it is not possible
 - Yes, it is possible: the JAR file is added to the server\lib folder
 - Yes, it is possible: the JAR file is copied to the Eclipse workspace
 - Yes, it is possible: the JAR file is added to the server\java folder
- What types of Java methods can be called from the Worklight adapter?
 - Only static methods that do not require a class instance to be created
 - Only instance methods that are called after the new class instance is created
 - Both static and instance methods can be called from the adapter
 - The adapter has a full access to supplied Java code: static, public, and private methods can be called
- How can Java code replace a Worklight adapter?
 - Remove need for Worklight adapter by routing directly to Java code
 - Set useJavaAdapters property to `true` in the adapter XML file
 - Delete the adapter JS file and declare a Java class in the XML file
 - The Java code is an extension of the adapter function and not a replacement

Check yourself questions

- Is it possible to use existing JAR functions in my Worklight adapter?
 - No, it is not possible
 - Yes, it is possible: the JAR file is added to the server\lib folder
 - Yes, it is possible: the JAR file is copied to the Eclipse workspace
 - Yes, it is possible: the JAR file is added to the server\java folder
- What types of Java methods can be called from the Worklight adapter?
 - Only static methods that do not require a class instance to be created
 - Only instance methods that are called after the new class instance is created
 - Both static and instance methods can be called from the adapter
 - Adapter has a full access to supplied Java code: static, public, and private methods can be called
- How can Java code replace Worklight adapter?
 - Remove the need for a Worklight adapter by routing directly to Java code
 - Set useJavaAdapters property to `true` in the adapter XML file
 - Delete adapter JS file and declare Java class in the XML file
 - Java code is an extension of the adapter function and not a replacement

Notices

- Permission for the use of these publications is granted subject to these terms and conditions.
- This information was developed for products and services offered in the U.S.A.
- IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.
- IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:
 - IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.
- For license inquiries regarding double-byte character set (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:
 - Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan Ltd.
1623-14, Shimotsuruma, Yamato-shi
Kanagawa 242-8502 Japan
- **The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.**
- This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.
- Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.
- IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.
- Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:
 - IBM Corporation
Dept F6, Bldg 1
294 Route 100
Somers NY 10589-3216
USA

- Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.
- The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.
- Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

COPYRIGHT LICENSE:

- This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.
- Each copy or any portion of these sample programs or any derivative work, must include a copyright notice as follows:
 - © (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corp., enter the year or years. All rights reserved.

Privacy Policy Considerations

- IBM Software products, including software as a service solutions, ("Software Offerings") may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user or for other purposes. In many cases no personally identifiable information is collected by the Software Offerings. Some of our Software Offerings can help enable you to collect personally identifiable information. If this Software Offering uses cookies to collect personally identifiable information, specific information about this offering's use of cookies is set forth below.
- Depending upon the configurations deployed, this Software Offering may use session cookies that collect session information (generated by the application server). These cookies contain no personally identifiable information and are required for session management. Additionally, persistent cookies may be randomly generated to recognize and manage anonymous users. These cookies also contain no personally identifiable information and are required.
- If the configurations deployed for this Software Offering provide you as customer the ability to collect personally identifiable information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for notice and consent. For more information about the use of various technologies, including cookies, for these purposes, see IBM's Privacy Policy at <http://www.ibm.com/privacy>; and IBM's Online Privacy Statement at <http://www.ibm.com/privacy/details/en/us> sections entitled "Cookies, Web Beacons and Other Technologies" and "Software Products and Software-as-a-Service".

Support and comments

- For the entire IBM Worklight documentation set, training material and online forums where you can post questions, see the IBM website at:
 - <http://www.ibm.com/mobile-docs>
- **Support**
 - Software Subscription and Support (also referred to as Software Maintenance) is included with licenses purchased through Passport Advantage and Passport Advantage Express. For additional information about the International Passport Advantage Agreement and the IBM International Passport Advantage Express Agreement, visit the Passport Advantage website at:
 - <http://www.ibm.com/software/passportadvantage>
 - If you have a Software Subscription and Support in effect, IBM provides you assistance for your routine, short duration installation and usage (how-to) questions, and code-related questions. For additional details, consult your IBM Software Support Handbook at:
 - <http://www.ibm.com/support/handbook>
- **Comments**
 - We appreciate your comments about this publication. Please comment on specific errors or omissions, accuracy, organization, subject matter, or completeness of this document. The comments you send should pertain to only the information in this manual or product and the way in which the information is presented.
 - For technical questions and information about products and prices, please contact your IBM branch office, your IBM business partner, or your authorized remarketer.
 - When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you. IBM or any other organizations will only use the personal information that you supply to contact you about the issues that you state.
 - Thank you for your support.
 - Submit your comments in the IBM Worklight forums at:
 - <https://www.ibm.com/developerworks/mobile/mobileforum.html>
 - If you would like a response from IBM, please provide the following information:
 - Name
 - Address
 - Company or Organization
 - Phone No.
 - Email address

Thank You

