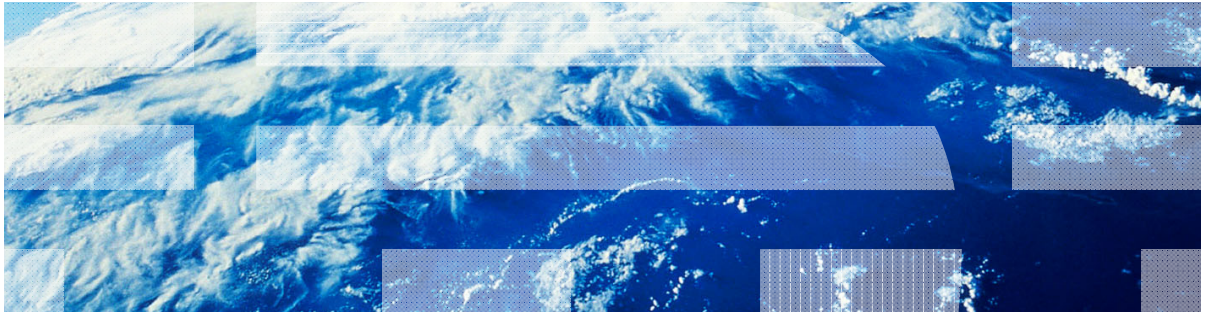# *IBM Worklight V5.0.5 Getting Started*

Module 5.1 – Creating SQL adapters

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Agenda

- What is it?
- Creating an adapter
- Exercise

What is it?

- A Worklight® SQL adapter is designed to communicate with any SQL data source

- Both plain SQL queries or stored procedures can be used

- Worklight supports MySQL, Oracle 11g and DB2® databases

- JDBC connector driver for specific database type must be downloaded separately by the developer and added to the lib\ folder of a Worklight project

- JDBC connector driver can be downloaded at MySQL/Oracle/DB2 website

- In this training module and accompanying sample, you will learn how to use a Worklight Adapter to connect to a MySQL database
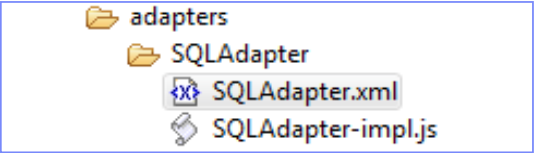
Agenda

- What is it?
- Creating an adapter
- Exercise

Creating a Worklight SQL adapter

- In Worklight Studio, create a Worklight Adapter

- Choose the SQL Adapter type

- Save the downloaded JDBC connector file in the project lib\ folder
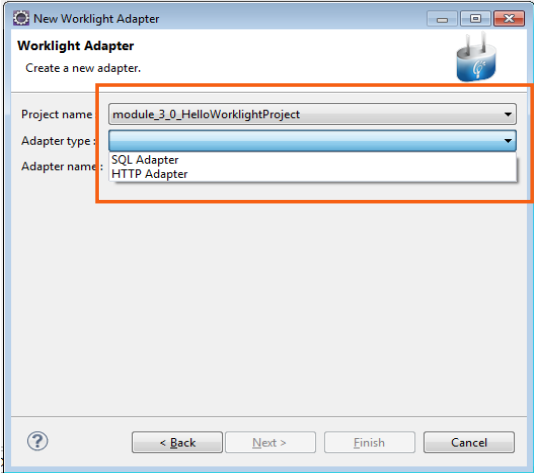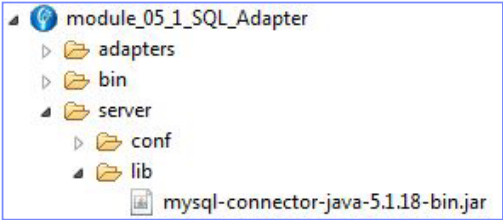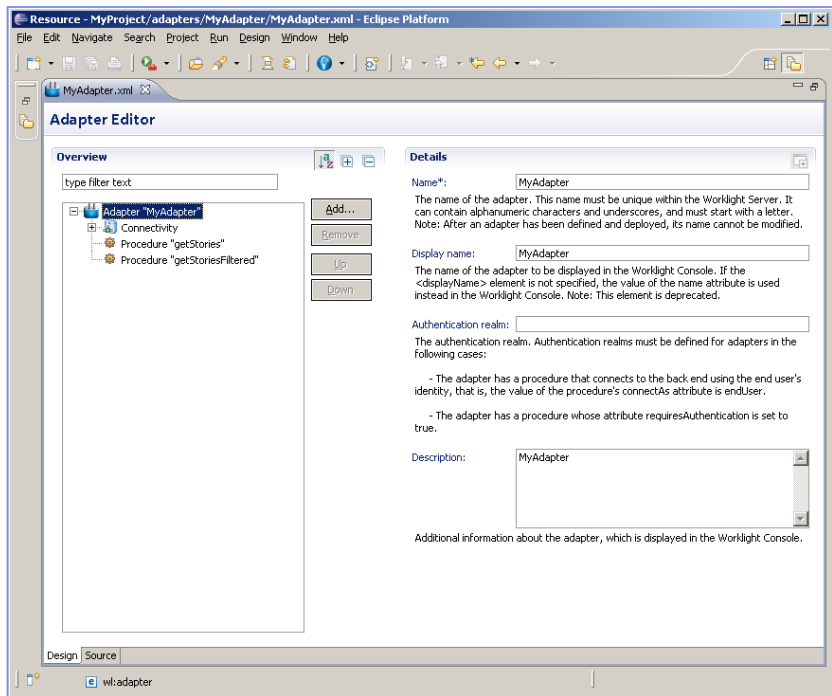

- A standard SQL adapter structure is created
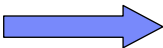
Adapter XML editor

- Settings and metadata are stored in the adapter XML file

- You can use either the Design or the Source editors to modify the adapter XML file

XML file connectivity settings

- Four parameters must be declared in the adapter XML file:
  - Driver Class
  - Database URL
  - User name
  - Password

```
<connectivity>
    <connectionPolicy xsi:type="sql:SQLConnectionPolicy">
        <dataSourceDefinition>
            <driverClass>com.mysql.jdbc.Driver</driverClass>
            <url>jdbc:mysql://127.0.0.1:3306/worklight_training</url>
            <user>Worklight</user>
            <password>Worklight</password>
        </dataSourceDefinition>
    </connectionPolicy>
    <loadConstraints maxConcurrentConnectionsPerNode="5" />
</connectivity>
```

JavaScript file procedure

- A procedure must be declared in the adapter XML file

  ```
  <procedure name="GetAccounts"/>
  ```

- The adapter JavaScript file is used to implement the procedure logic

- IMPORTANT – The name declared in the XML file must be used for the procedure JavaScript function

- There are two ways of running SQL statements:
  - SQL statement query
  - SQL Stored Procedure

JavaScript file SQL query

- To run an SQL query:
  - 1. Use the WL.Server.createSQLStatement API to prepare an SQL query
  - 2. WL.Server.createSQLStatement must ALWAYS be called outside the function
  - 3. Add additional parameters, if required
  - 4. Use the WL.Server.invokeSQLStatement API to invoke prepared queries
  - 5. Return invocation result to application or another procedure

```
var procedure1Statement =
    WL.Server.createSQLStatement("select FirstName, LastName from Customers where CustomerID = ?");
function GetAccounts(param) {
    return WL.Server.invokeSQLStatement({
        preparedStatement : procedure1Statement,
        parameters : [param]
    });
}
```
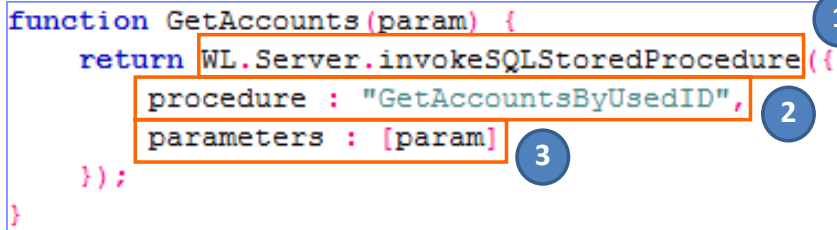
(1) (4) (3)

JavaScript file SQL Stored Procedure

- To run an SQL Stored Procedure:
  - 1. Use the WL.Server.invokeSQLStoredProcedure API to execute a Stored Procedure
  - 2. Specify an SQL Stored Procedure name as an invocation parameter
  - 3. Add additional parameters, if required
  - 4. Return invocation result to application or another procedure

```
function GetAccounts(param) {
    return WL.Server.invokeSQLStoredProcedure({
        procedure : "GetAccountsByUsedID",
        parameters : [param]
    });
}
```

1
2
3

WL adapters: Invocation result

- Result retrieved as a JSON object

- isSuccessful property defines whether the invocation was successful

- resultSet is an array of returned records

Invocation Result from the WorkLight Server:

```
{
  "isSuccessful": true,
  "resultSet": [
    {
      "accountId": "12345",
      "accountType": "Checking",
      "userId": "bjones"
    },
    {
      "accountId": "54321",
      "accountType": "Savings",
      "userId": "bjones"
    }
  ]
}
```

Agenda

- What is it?
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Exercise preparation

Account Transactions
An adapter that retrieves account transactions details

- Create a fictitious bank schema

- Execute worklightTraining.sql found in the SQL folder on your local mySQL server to create a training database

- Make sure that the Worklight@% user has all access permissions assigned to it

```
/*!40101 SET NAMES utf8 */;

/*!40101 SET SQL_MODE=''*/;

CREATE DATABASE IF NOT EXISTS `WorkLight Training`;

USE `WorkLight Training`;

/*!40014 SET @OLD_FOREIGN_KEY_CHECKS=@@FOREIGN_KEY_CHECKS,
/*!40101 SET @OLD_SQL_MODE=@@SQL_MODE, SQL_MODE='NO_AUTO_VA

/*Table structure for table `accounts` */

DROP TABLE IF EXISTS `accounts`;

CREATE TABLE `accounts` (
`accountId` VARCHAR(15) NOT NULL,
`userId` VARCHAR(100) NOT NULL DEFAULT '',
`accountType` VARCHAR(50) NOT NULL
```
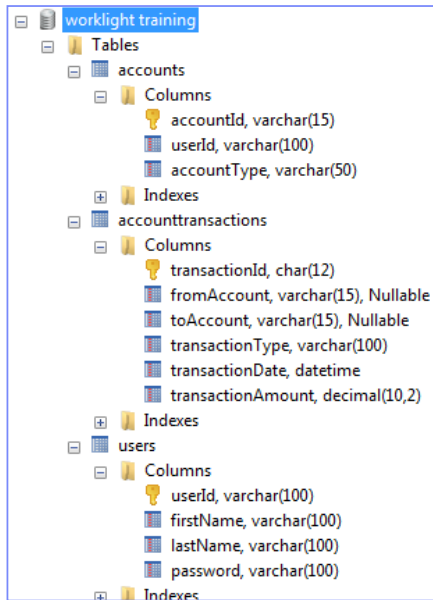
- worklight training
  - Tables
    - accounts
      - Columns
        - accountId, varchar(15)
        - userId, varchar(100)
        - accountType, varchar(50)
      - Indexes
    - accounttransactions
      - Columns
        - transactionId, char(12)
        - fromAccount, varchar(15), Nullable
        - toAccount, varchar(15), Nullable
        - transactionType, varchar(100)
        - transactionDate, datetime
        - transactionAmount, decimal(10,2)
      - Indexes
    - users
      - Columns
        - userId, varchar(100)
        - firstName, varchar(100)
        - lastName, varchar(100)
        - password, varchar(100)
      - Indexes

Exercise

Account Transactions
An adapter that retrieves account transactions details

- Create an SQL adapter:
  - In the connectivity section, supply the JNDI name as follows:

```xml
<connectivity>
    <connectionPolicy xsi:type="sql:SQLConnectionPolicy">
        <dataSourceDefinition>
            <driverClass>com.mysql.jdbc.Driver</driverClass>
            <url>jdbc:mysql://127.0.0.1:3306/worklight_training</url>
            <user>Worklight</user>
            <password>Worklight</password>
        </dataSourceDefinition>
    </connectionPolicy>
    <loadConstraints maxConcurrentConnectionsPerNode="5" />
</connectivity>
```

- Create an adapter procedure "getAccountTransactions":
  - Accepts a single parameter: "accountId"
  - Get resultSet with the following fields:
    - transactionId, transactionType, transactionDate, transactionAmount, fromAccount, toAccount

Exercise

Account Transactions
An adapter that retrieves account transactions details

- Repeat the exercise with both options:
  - Write the SQL query inline, as a prepared statement

```
var getAccountsTransactionsStatement = WL.Server.createSQLStatement(
    "SELECT transactionId, fromAccount, toAccount, transactionDate, transactionAmount, transactionType " +
    "FROM accounttransactions " +
    "WHERE accounttransactions.fromAccount = ? OR accounttransactions.toAccount = ? " +
    "ORDER BY transactionDate DESC " +
    "LIMIT 20;"
);
```
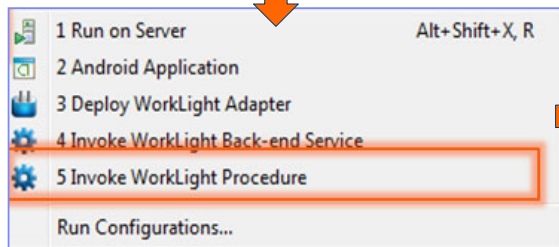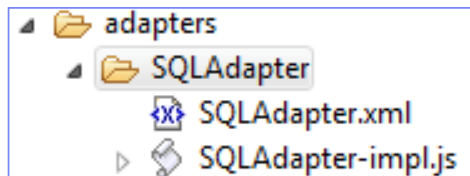
  - Invoke the **getAccountTransactions** Stored Procedure created as part of the Worklight Training schema

```
function getAccountTransactions2(accountId){
    return WL.Server.invokeSQLStoredProcedure({
        procedure : "getAccountTransactions",
        parameters : [accountId]

    });
}
```

  - In both cases, use 12345 as an accountId parameter

Exercise

- 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


```
⊿ 📂 adapters
   ⊿ 📂 SQLAdapter
       {x} SQLAdapter.xml
     ▷ 📄 SQLAdapter-impl.js
```

📇	1 Run on Server	Alt+Shift+X, R
🔲	2 Android Application	
📥	3 Deploy WorkLight Adapter	
⚙	4 Invoke WorkLight Back-end Service	
⚙	5 Invoke WorkLight Procedure	
	Run Configurations...	

Invocation Result from the WorkLight Server:
```
{
  "isSuccessful": true,
  "resultSet": [
    {
      "fromAccount": "12345",
      "toAccount": "54321",
      "transactionAmount": 180,
      "transactionDate": "2009-03-11 11:08:39.0",
      "transactionId": "W06091500863",
      "transactionType": "Funds Transfer"
    },
    {
      "fromAccount": "12345",
      "toAccount": null,
      "transactionAmount": 130,
      "transactionDate": "2009-03-07 11:09:39.0",
      "transactionId": "W214122/5337",
      "transactionType": "ATM Withdrawal"
    },
    {
      "fromAccount": "12345",
      "toAccount": "54321",
      "transactionAmount": 150,
      "transactionDate": "2009-03-04 10:35:24.0",
      "transactionId": "W214122/5332",
      "transactionType": "Funds Transfer"
    },
```

module_5_1_AccountTransactions_Adapter.zip

Check yourself questions

- Following SQL servers are supported by Worklight SQL adapter
  - MySQL
  - Oracle 11g
  - DB2
  - All of the above

- When working with an SQL adapter, the following file is manually added to project
  - JDBC connector driver
  - Database schema
  - Properties file containing SQL server credentials and configuration
  - Startup script that connects Worklight server to a specified SQL database

- SQL statements can be invoked in the following way or ways
  - Only with SQL statement query
  - Only with SQL Stored Procedure
  - Only with a separate file with SQL queries
  - With both SQL statement query and SQL Stored Procedures

Check yourself questions

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