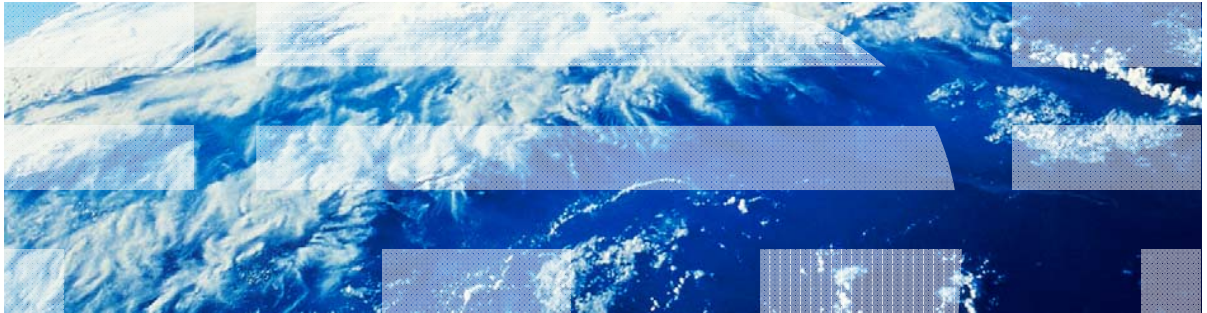


IBM Worklight V6.0.0 Getting Started

SQL adapter – Communicating with SQL database



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Agenda

- What is it?
- Creating an adapter
- Exercise

What is it?

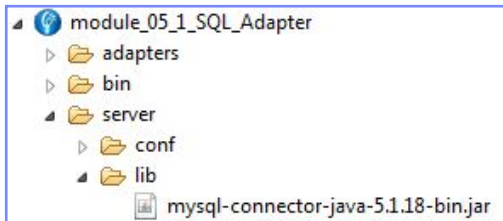
- An IBM Worklight® SQL adapter is designed to communicate with any SQL data source.
- Plain SQL queries or stored procedures can be used.
- Worklight supports MySQL, Oracle 11g and DB2® databases.
- The JDBC connector driver for specific database type must be downloaded separately by the developer and added to the lib\ folder of a Worklight project.
- The JDBC connector driver can be downloaded at MySQL/Oracle/DB2 website.
- In this training module and accompanying sample, you learn how to use a Worklight Adapter to connect to a MySQL database.

Agenda

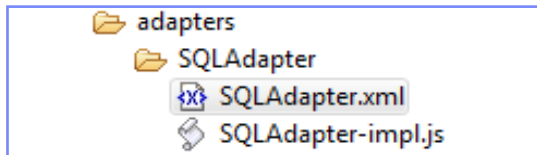
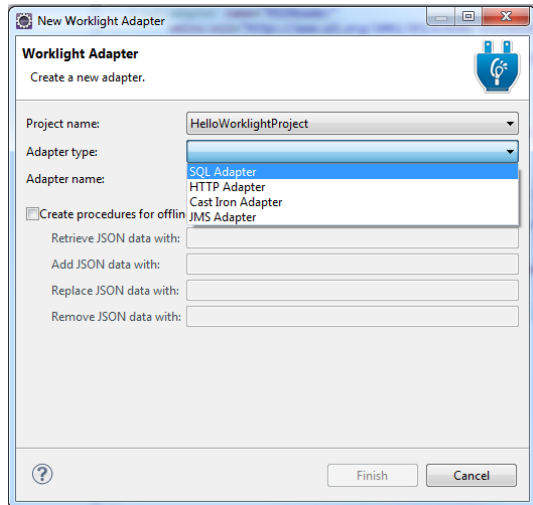
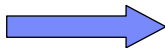
- What is it?
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Creating a Worklight SQL adapter

- In Worklight Studio, create a Worklight Adapter
- Choose the SQL Adapter type
- Save the downloaded JDBC connector file in the project lib\ folder

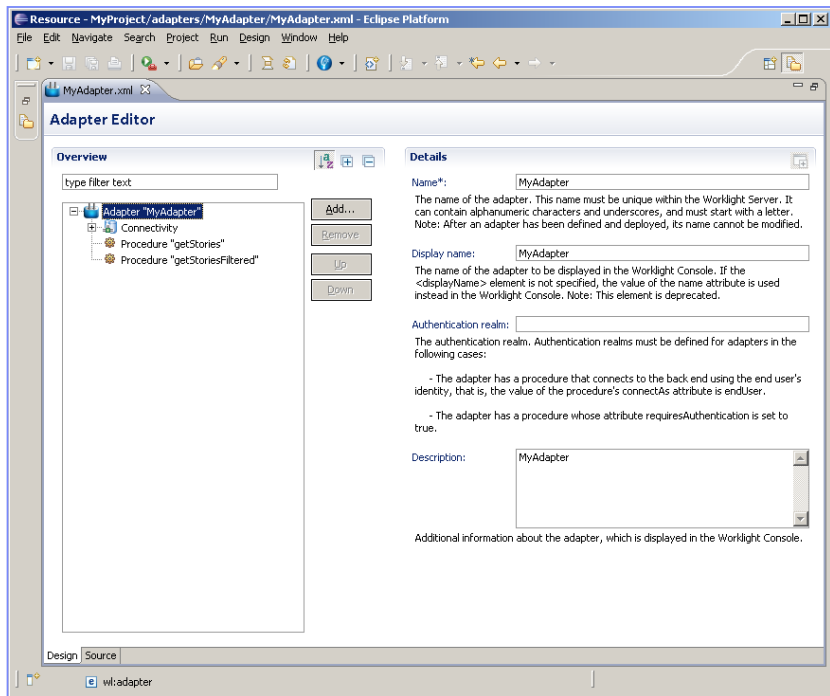


- A standard SQL adapter structure is created



Adapter XML editor

- Settings and metadata are stored in the adapter XML file
- You can use either the Design or the Source editor 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://localhost:3306/mydb</url>
      <user>myUsername</user>
      <password>myPassword</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 a SQL query:
 - 1. Use the WL.Server.createStatement API to prepare a SQL query.
 - 2. WL.Server.createStatement must ALWAYS be called outside the function.
 - 3. Add more 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.createStatement("select FirstName, LastName from Customers where CustomerID = ?");  
function GetAccounts([param]) {  
    return WL.Server.invokeSQLStatement({  
        preparedStatement : procedure1Statement,  
        parameters : [param]  
    });  
}
```

Diagram illustrating the steps for running a SQL query in JavaScript:

- 1. `WL.Server.createStatement` is used to prepare the SQL query.
- 2. The query is prepared outside the function.
- 3. The `parameters` array is defined within the function.
- 4. `WL.Server.invokeSQLStatement` is used to invoke the prepared query.

JavaScript file SQL Stored Procedure

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

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

WL adapters: invocation result

- Result that is 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

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Exercise preparation

Account Transactions

An adapter that retrieves account transactions details

- Create a fictitious bank schema
- Run 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 that are assigned to it

```

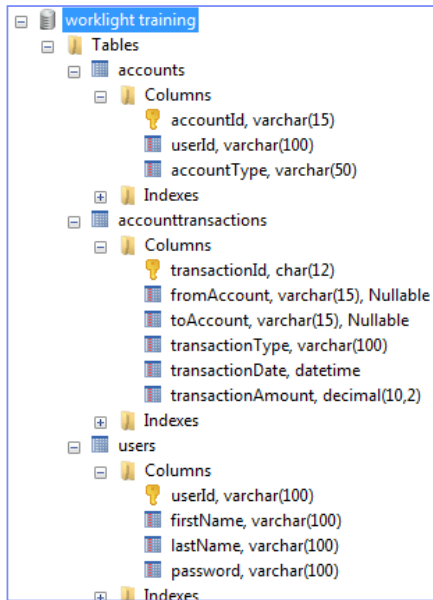
/*!40101 SET NAMES utf8 */;
/*!40101 SET SQL_MODE='';
CREATE DATABASE IF NOT EXISTS `WorkLight Training`;
USE `WorkLight Training`;

/*!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

```



Exercise

Account Transactions

An adapter that retrieves account transactions details

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

```
<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.createStatement(  
    "SELECT transactionId, fromAccount, toAccount, transactionDate, transactionAmount, transactionType " +  
    "FROM accounttransactions " +  
    "WHERE accounttransactions.fromAccount = ? OR accounttransactions.toAccount = ? " +  
    "ORDER BY transactionDate DESC " +  
    "LIMIT 20;"  
);
```

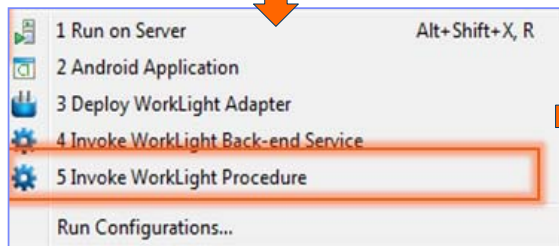
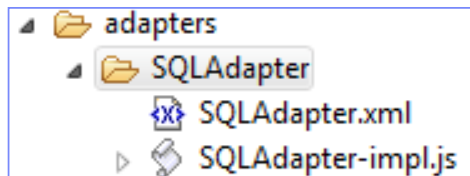
- Start the **getAccountTransactions** Stored Procedure that is created as part of the Worklight Training schema

```
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>



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

- The following SQL servers are supported by Worklight SQL adapter:
 - MySQL
 - Oracle 11g
 - DB2
 - All of the above
- When you are 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 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

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