Java Adapters

Overview

Java adapters are based on the JAX-RS 2.0 specification. In other words, a Java adapter is a JAX-RS 2.0 service that can easily be deployed to a MobileFirst Server instance and has access to MobileFirst Server APIs and other 3rd party APIs.

Prerequisite: Make sure to read the Creating Java and JavaScript Adapters (../creating-adapters) tutorial first.

Jump to:

- File structure
- JAX-RS 2.0 application class
- Implementing a JAX-RS 2.0 resource
- HTTP Session
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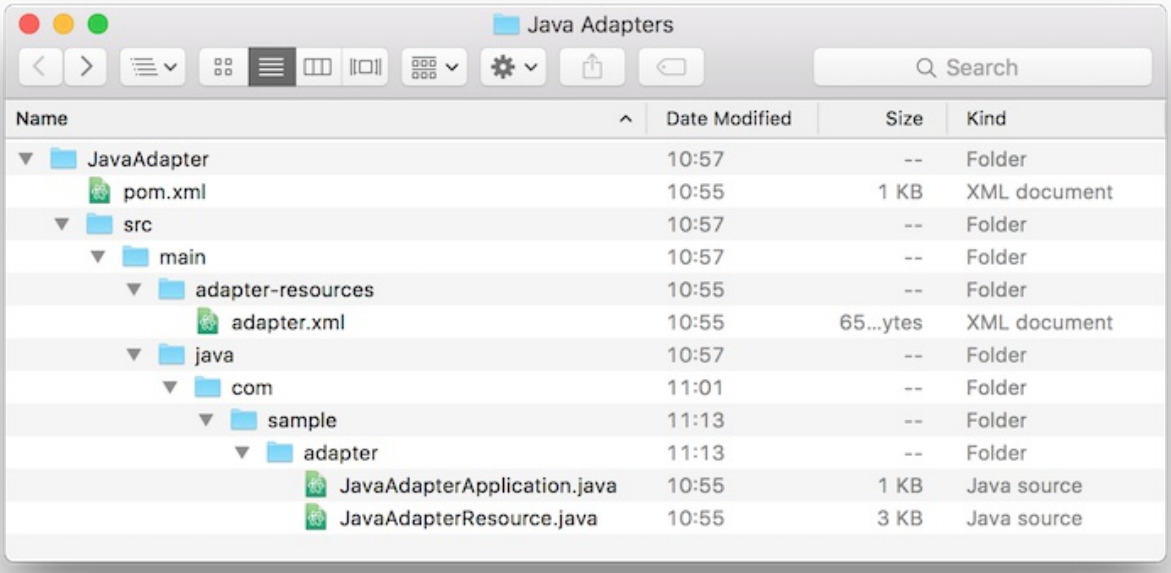
File structure



The adapter-resources folder

The **adapter-resources** folder contains an XML configuration file (**adapter.xml**). In this configuration file you configure the class name of the JAX-RS 2.0 application for this adapter. For example: `com.sample.JavaAdapterApplication`.

```
<?xml version="1.0" encoding="UTF-8"?>
<mfp:adapter name="JavaAdapter"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:mfp="http://www.ibm.com/mfp/integration"
    xmlns:http="http://www.ibm.com/mfp/integration/http">

    <displayName>JavaAdapter</displayName>
    <description>JavaAdapter</description>

    <JAXRSApplicationClass>com.sample.JavaAdapterApplication</JAXRSApplicationClass>
</mfp:adapter>
```

Custom properties

The **adapter.xml** file can also contain custom properties:

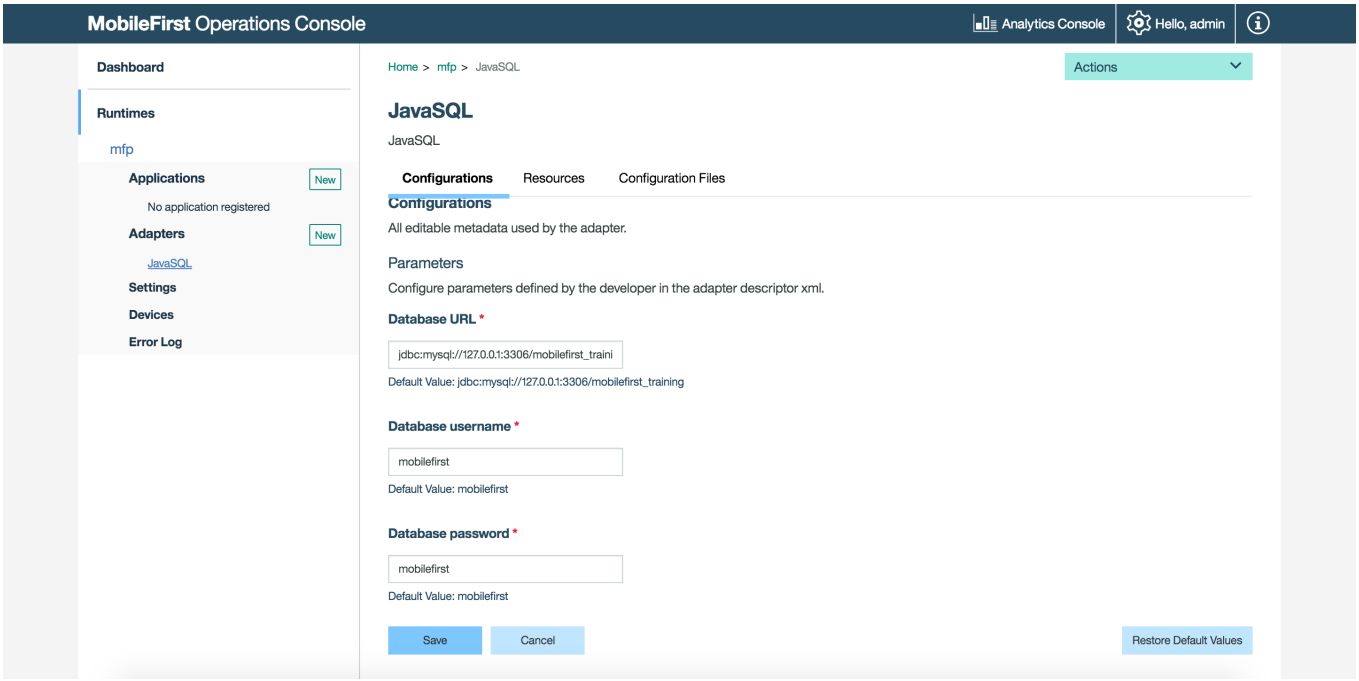
```
<mfp:adapter name="JavaSQL"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:mfp="http://www.ibm.com/mfp/integration"
    xmlns:http="http://www.ibm.com/mfp/integration/http">

    <displayName>JavaSQL</displayName>
    <description>JavaSQL</description>

    <JAXRSApplicationClass>com.sample.JavaSQLApplication</JAXRSApplicationClass>

    <property name="DB_url" displayName="Database URL" defaultValue="jdbc:mysql://127.0.0.1:3306/m
obilefirst_training"  />
    <property name="DB_username" displayName="Database username" defaultValue="mobilefirst"  />
    <property name="DB_password" displayName="Database password" defaultValue="mobilefirst"  />
</mfp:adapter>
```

> **Note:** The configuration properties elements must be located **below** the `JAXRSApplicationClass` element.
> Here we define the connection settings and give them a default value, so they could be used later in the AdapterApplication class.

The `<property>` element takes the following attributes:

- **name**: The name of the property, as defined in the configuration class.
- **defaultValue**: Overrides the default value defined in the configuration class.
- **displayName**: *optional*, a friendly name to be displayed in the console.
- **description**: *optional*, a description to be displayed in the console.
- **type**: *optional*, ensures that the property is of a specific type such as `integer`, `string`, `boolean` or a list of valid values (for example `type="['1','2','3']"`).

These properties can be overridden in the **MobileFirst Operations Console → [your adapter] → Configurations tab** without having to deploy the adapter again:



Pull and Push Configurations

Customized adapter properties can be shared using the adapter configuration file found in the **Configuration files tab**.
To do so, use the `pull` and `push` commands described below. For the properties to be shared, you need to *change the default values given to the properties*.

Replace the **DmfpfConfigFile** placeholder with the actual value, for example: `config.json`. Then, run the command from the root folder of the adapter Maven project:

- To **pull** the configurations file - `mvn adapter:configpull -DmfpfConfigFile=<path to a file that will store the configuration>`.
- To **push** the configurations file - `mvn adapter:configpush -DmfpfConfigFile=<path to the file that stores the configuration>`.

> **Note:** The file can be of any file extension and if the file does not exist, it will be created.

The java folder

the Java sources of the JAX-RS 2.0 service are placed in this folder. JAX-RS 2.0 services are composed of an application class (which extends `com.ibm.mfp.adapter.api.MFPJAXRSApplication`) and the resources classes.

The JAX-RS 2.0 application and resources classes define the Java methods and their mapping to URLs. `com.sample.JavaAdapterApplication` is the JAX-RS 2.0 application class and `com.sample.JavaAdapterResource` is a JAX-RS 2.0 resource included in the application.

JAX-RS 2.0 application class

The JAX-RS 2.0 application class tells the JAX-RS 2.0 framework which resources are included in the application.

```
package com.sample.adapter;

import java.util.logging.Logger;
import com.ibm.mfp.adapter.api.MFPJAXRSApplication;

public class JavaAdapterApplication extends MFPJAXRSApplication{

    static Logger logger = Logger.getLogger(JavaAdapterApplication.class.getName());

    @Override
    protected void init() throws Exception {
        logger.info("Adapter initialized!");
    }

    @Override
    protected String getPackageToScan() {
        //The package of this class will be scanned (recursively) to find JAX-RS 2.0 resources.
        return getClass().getPackage().getName();
    }
}
```

The `MFPJAXRSApplication` class scans the package for JAX-RS 2.0 resources and automatically creates a list. Additionally, its `init` method is called by MobileFirst Server as soon as the adapter is deployed (before it starts serving) and when the MobileFirst runtime starts up.

Implementing a JAX-RS 2.0 resource

JAX-RS 2.0 resource is a POJO (Plain Old Java Object) which is mapped to a root URL and has Java methods for serving requests to this root URL and its child URLs. Any resource can have a separate set of URLs.

```
package com.sample.adapter;

import java.util.logging.Logger;

import javax.ws.rs.GET;
import javax.ws.rs.Path;
import javax.ws.rs.PathParam;

@Path("/")
public class JavaAdapterResource {

    //Define logger (Standard java.util.Logger)
    static Logger logger = Logger.getLogger(JavaAdapterResource.class.getName());

    //Path for method: "<server address>/Adapters/adapters/JavaAdapter/{username}"
    @GET
    @Path("/{username}")
    public String helloUser(@PathParam("username") String name){
        return "Hello " + name;
    }
}
```

- `@Path("/")` before the class definition determines the root path of this resource. If you have multiple resource classes, you should set each resource a different path.

For example, if you have a `UserResource` with `@Path("/users")` to manage users of a blog, that resource is accessible via `http(s)://host:port/ProjectName/adapters/AdapterName/users/`.

That same adapter may contain another resource `PostResource` with `@Path("/posts")` to manage posts of a blog. It is accessible via the `http(s)://host:port/ProjectName/adapters/AdapterName/posts/` URL.

In the example above, because there it has only one resource class, it is set to `@Path("/")` so that it is accessible via `http(s)://host:port/Adapters/adapters/JavaAdapter/`.

- Each method is preceded by one or more JAX-RS 2.0 annotations, for example an annotation of type "HTTP request" such as `@GET`, `@PUT`, `@POST`, `@DELETE`, or `@HEAD`. Such annotations define how the method can be accessed.
- Another example is `@Path("/{username}")`, which defines the path to access this procedure (in addition to the resource-level path). As you can see, this path can include a variable part. This variable is then used as a parameter of the method, as defined `@PathParam("username") String name`.

> You can use many other annotations. See **Annotation Types Summary** here: https://jax-rs-spec.java.net/nonav/2.0-rev-a/apidocs/javax/ws/rs/package-summary.html (https://jax-rs-spec.java.net/nonav/2.0-rev-a/apidocs/javax/ws/rs/package-summary.html)

HTTP Session

The MobileFirst server does not rely on HTTP sessions and each request may reach a different node. You should not rely on HTTP sessions to keep data from one request to the next.

Server-side APIs

Java adapters can use the MobileFirst server-side Java APIs to perform operations that are related to MobileFirst Server, such as calling other adapters, logging to the server log, getting values of configuration properties, reporting activities to Analytics and getting the identity of the request issuer.

Configuration API

The `ConfigurationAPI` class provides an API to retrieve properties defined in the **adapter.xml** or in the MobileFirst Operations console.

Inside your Java class, add the following at the class level:

```
@Context
ConfigurationAPI configurationAPI;
```

Then you can use the `configurationAPI` instance to get properties:

```
configurationAPI.getPropertyValue("DB_url");
```

When the adapter configuration is modified from the MobileFirst Operations console, the JAX-RS application class is reloaded and its `init` method is called again.

The `getServerJNDIProperty` method can also be used to retrieve a JNDI property from your server configuration.

You can see usage examples on the Java SQL Adapter tutorial (java-sql-adapter).

> Learn more about `ConfigurationAPI` in the user documentation.

Adapters API

The `AdaptersAPI` class provides an API to retrieve information about the current adapter and send REST requests to other adapters.

Inside your Java class, add the following at the class level:

```
@Context
AdaptersAPI adaptersAPI;
```

You can see usage examples on the advanced adapter usage mashup tutorial (../advanced-adapter-usage-mashup).

> Learn more about `AdaptersAPI` in the user documentation.

Analytics API

The `AnalyticsAPI` class provides an API for reporting information to analytics.

Inside your Java class, add the following at the class level:

```
@Context
AnalyticsAPI adaptersAPI;
```

You can see usage examples on the Analytics API tutorial (../../analytics/analytics-api).

Security API

The `AdapterSecurityContext` class provides the security context of an adapter REST call.

Inside your Java class, add the following at the class level:

```
@Context
AdapterSecurityContext securityContext;
```

You can then get the current `AuthenticatedUser` using:

```
AuthenticatedUser currentUser = securityContext.getAuthenticatedUser();
```

Java adapter examples

For examples of Java adapters communicating with an HTTP or SQL back end, see: