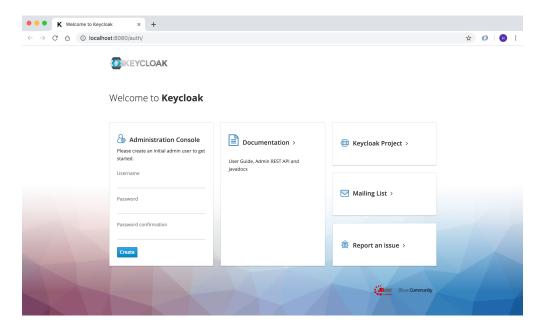
## MicroProfile JWT

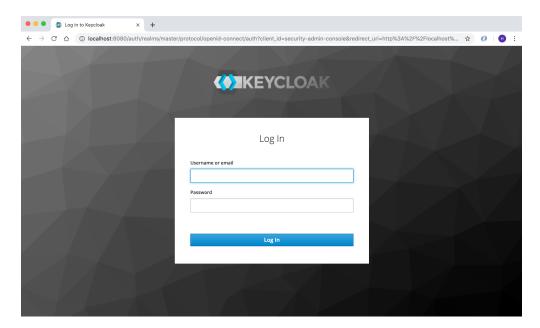
In this chapter, we will learn how to secure our services using MicroProfile JWT and Keycloak. Go to <a href="https://www.keycloak.org/downloads.html">https://www.keycloak.org/downloads.html</a> and download latest Standalone server distribution. Unzip the zip file and open a new terminal window and navigate to the keycloak folder. Now type the following command to start the Keycloak server:

```
./bin/standalone.sh -Djboss.http.port=8084
```

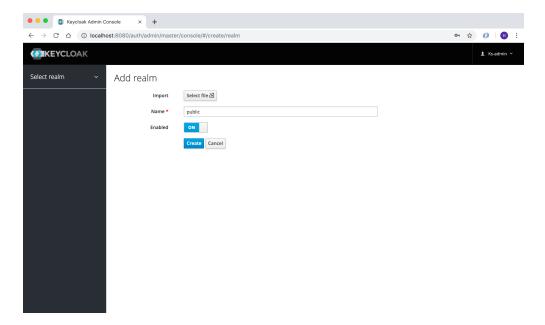
First thing we will do is to create a new user, open your browser and navigate to <a href="http://localhost:8084/auth/">http://localhost:8084/auth/</a> and create a new user with admin access.



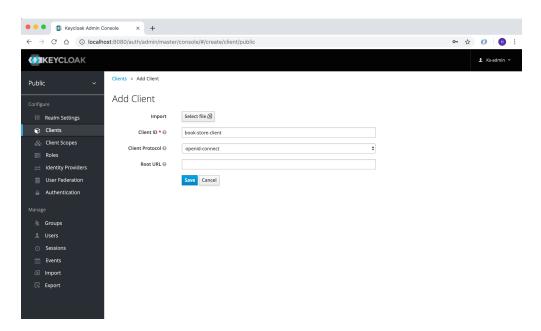
Now go to http://localhost:8084/auth/admin/ and login with the newly created user.



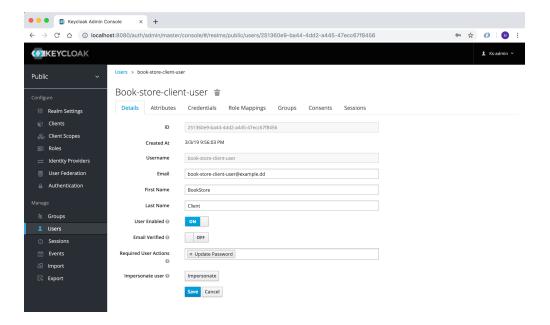
Click on Select Realm and click on Add Realm and create a new realm called public.



Now click on Client and create a new client called book-store-client, which we will use in our services.



Now, we need to create another user which will be used by our services. Click on Users and create a new user called book-store-client-user. Update the Email, First Name and Last Name fields and click Save.



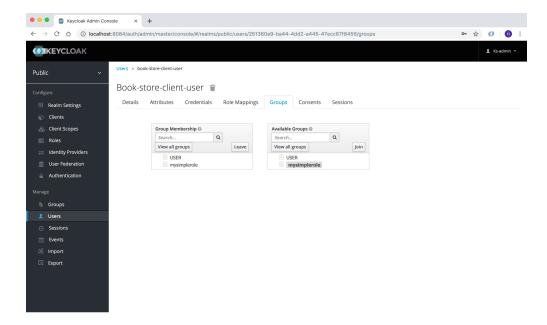
Now click on Credentials and create a new password and click on Reset password, now we are done with the Keycloak setup for the user we will use.

Before we implement security in our services, we need to configure Keycloak.

• Click on Groups and create a new group called mysimpleservice



• Click on Users and find the book-store-client-user and click on Group and click on the mysimpleservice and click join.



It's time to implement Keycloak authentication in our services.

Open microprofile-config.properties in book-store-client and add the following:

```
mp.jwt.verify.publickey.location=/META-INF/keycloak-public-key.pem
mp.jwt.verify.issuer=http://localhost:8084/auth/realms/public
```

And create a new file called keycloak-public-key.pem inside src/main/resources/META-INF and store the public key.

```
----BEGIN PUBLIC KEY----
MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAmDmSR9FxmQdjy7lLColVAILD3Gxj8uV5O9PS32CbVN
KC1pTh/LvUUigCq5SVVyLb8Ctw4wcC+Ax/AK0GgN76P6bEy9C3k22AqV8TZ7P41oPUSf70hKBDHpPT2KBz/7tc
NTaWHaJQu29ZnlIzqds+0EotjMAQCBU/wz/DwWesM0L/6nN99/mTtYm20DoFBAyJkLH0x0wyaHPiFTWz+jxUsH
YEEPaSFncsWrOY3M+x8AmeI63Wo8D6qTkgvDhjVq/zFTg2E0vb3d86X8sb1nYqLR4aInzQq+qzMFhUZQT9j/rg
eLKdmneL8gYSiF4Yt0nPWBTygmwizYOU/86Db6cGawIDAQAB
-----END PUBLIC KEY-----
```

You find the public key here http://localhost:8084/auth/realms/public/

Now open the ApplicationConfig. java in book-store-client application and make it look like this:

```
@LoginConfig(authMethod = "MP-JWT")
@ApplicationPath("/")
@DeclareRoles({"mysimplerole", "ADMIN"})
public class ApplicationConfig extends Application {
}
```

<code>@LoginConfig</code> annotation describe what associated realm name will be used in the application. <code>@DeclareRoles</code> annotation is used to declare security roles.

Now open the BookStoreEndpoint.java file and add @RolesAllowed("mysimplerole") to the mpConfig() method.

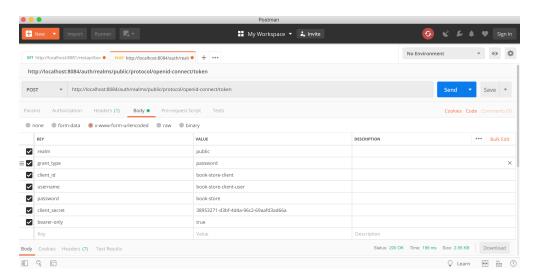
```
@GET
@Path("mp-config")
@Produces(MediaType.APPLICATION_JSON)
@RolesAllowed("mysimplerole")
public Response mpConfig() {
    Map<String, Object> configProperties = new HashMap<>();

    configProperties.put("username", username);
    configProperties.put("password", config.getValue("password", String.class));
    configProperties.put("microprofile-apis", config.getValue("microprofile.apis", String[].class));

    return Response.ok(configProperties).build();
}
```

<code>@RolesAllowed</code> annotation is used to declare security roles and specifies a list of roles to access methods in the application.

Download Postman, if you don't already have it installed. We will now invoke the Keycloak auth token endpoint to retrieve the access token to use in our service. Open Postman and add the following to retrieve access token.



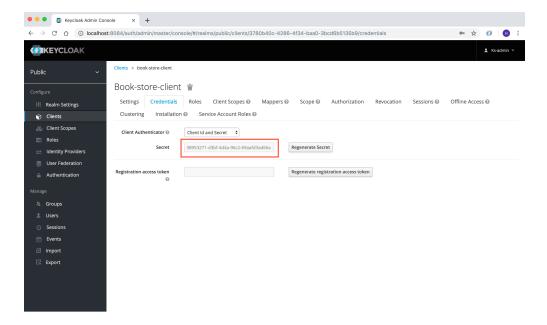
POST: http://localhost:8084/auth/realms/public/protocol/openid-connect/token

realm: public

grant\_type: password

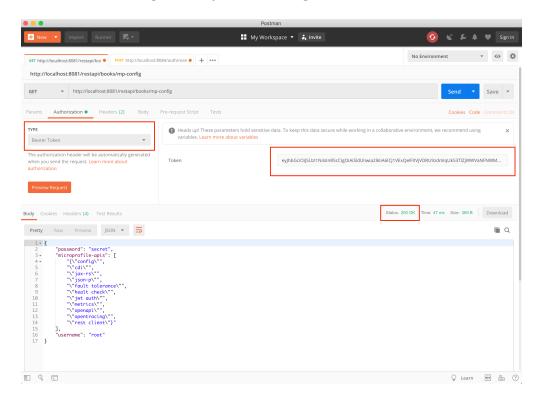
client\_id: book-store-client

username: the\_username\_of\_the\_user password: the\_password\_of\_the\_user client\_secret: the book store client secret You find this in the Credentials menu.



Now click on Send and you will retrieve access token. Copy the access token and open a new Postman tab. Now, make a GET request to http://localhost:8081/restapi/books/mp-config, if you don't send the request with access token, you will get 401 Unauthorized.

In Type dropdown menu, choose Bearer Token and paste the token in Token field. Now click on Send again and you will now get 200 OK.



And that's it, we have secured our /mp-config endpoint.

## **Summary**

In this chapter, we learned how to add MicroProfile JWT security to our service.