ICWA - Camel 4 Hands-On

Install VSCode extensions:

- Language Support for Apache Camel by Red Hat
- Debug Adapter for Apache Camel by Red Hat

1.0 Camel 4 on Quarkus

https://github.com/apache/camel-quarkus-examples

1.1 A Simple Rest Service using Camel Rest DSL

This project illustrates how to use the Camel Rest DSL component to build a simple Rest API.

Generate your first Quarkus project at site:
Go to: https://code.quarkus.redhat.com/
Select:

- camel-quarkus-rest
- camel-quarkus-jackson
- Camel-quarkus-direct

Generate and download the generated project as a zip file.
Unzip the file and change the directory name from “code-with-quarkus” to “simple-rest-quarkus”
Open that folder using your VSCode IDE
Open the pom.xml file
Change the line from:

```
Unset
<artifactId>code-with-quarkus</artifactId>
```

To

```
Unset
<artifactId>simple-rest-quarkus</artifactId>
```

Add path: com/redhat to src/main/java
Add Routes.java with content:

```java
package com.redhat;

import java.util.Collections;
import java.util.LinkedHashSet;
import java.util.Set;

import org.apache.camel.builder.RouteBuilder;
import org.apache.camel.model.rest.RestBindingMode;

public class Routes extends RouteBuilder {

  private final Set<Fruit> fruits = Collections.synchronizedSet(new
LinkedHashSet<>());
  public Routes() {

    /* Add some initial fruits */
    this.fruits.add(new Fruit("Apple", "Winter fruit"));
    this.fruits.add(new Fruit("Pineapple", "Tropical fruit"));
  }

  @Override
  public void configure() throws Exception {
    restConfiguration().bindingMode(RestBindingMode.json);

    rest("/fruits")
        .get()
        .to("direct:getFruits")

        .post()
        .type(Fruit.class)
        .to("direct:addFruit");

    from("direct:getFruits")
        .setBody().constant(fruits);

    from("direct:addFruit")
        .process().body(Fruit.class, fruits::add)
        .setBody().constant(fruits);
  }
}
```

Add file Fruit.java with content:

```java
package com.redhat;

import java.util.Objects;
import io.quarkus.runtime.annotations.RegisterForReflection;

@RegisterForReflection // Lets Quarkus register this class for reflection during the native build
public class Fruit {
  private String name;
  private String description;

  public Fruit() {
  }

  public Fruit(String name, String description) {
    this.name = name;
    this.description = description;
  }

  public String getName() {
    return name;
  }

  public void setName(String name) {
    this.name = name;
  }

  public String getDescription() {
    return description;
  }

  public void setDescription(String description) {
    this.description = description;
  }

  @Override
  public boolean equals(Object obj) {
    if (!(obj instanceof Fruit)) {
      return false;
    }
```

```
    Fruit other = (Fruit) obj;

    return Objects.equals(other.name, this.name);
  }

  @Override
  public int hashCode() {
    return Objects.hash(this.name);
  }

}
```

Add path: test/java/com/redhat to src
Add file RestTest.java with content:

```java
package com.redhat;

import io.quarkus.test.junit.QuarkusTest;
import org.junit.jupiter.api.Test;

import static io.restassured.RestAssured.given;
import static org.hamcrest.CoreMatchers.is;
import static org.hamcrest.Matchers.containsInAnyOrder;

@QuarkusTest
public class RestTest {

  @Test
  public void fruits() {

    /* Assert the initial fruits are there */
    given()
        .when().get("/fruits")
        .then()
        .statusCode(200)
        .body(
            "$.size()", is(2),
            "name", containsInAnyOrder("Apple", "Pineapple"),
            "description", containsInAnyOrder("Winter fruit", "Tropical fruit"));

    /* Add a new fruit */
```

```
    given()
        .body("{\"name\": \"Pear\", \"description\": \"Winter fruit\"}")
        .header("Content-Type", "application/json")
        .when()
        .post("/fruits")
        .then()
        .statusCode(200)
        .body(
            "$.size()", is(3),
            "name", containsInAnyOrder("Apple", "Pineapple", "Pear"),
            "description", containsInAnyOrder("Winter fruit", "Tropical fruit",
"Winter fruit"));
  }
}
```

And add the following dependency to the pom.xml file:
Note: In Quarkus, a dependency in the pom.xml file is called an extension. There are 3 different ways to add an extension. This is one of them. The other 2 will be shown in a later section.

```
Unset
  <dependency>
    <groupId>io.rest-assured</groupId>
    <artifactId>rest-assured</artifactId>
    <scope>test</scope>
  </dependency>
```

Perform Unit testing from terminal:

```
Unset
./mvnw test
```

Enter Quarkus dev mode and compile/run the app from a terminal:

```
Unset
./mvnw clean compile quarkus:dev
```

It takes a while to download all dependencies the first time.

From browser: http://localhost:8080/fruits

Command to get all fruits:

```
Unset
curl http://localhost:8080/fruits 2>/dev/null | python -m json.tool
Or
curl http://localhost:8080/fruits 2>/dev/null | jq
```

Output should be:

```
Unset
[
  {
    "name": "Apple",
    "description": "Winter fruit"
  },
  {
    "name": "Pineapple",
    "description": "Tropical fruit"
  }
]
```

Command to add a new fruit:

```
Unset
curl -X POST http://localhost:8080/fruits \
  -H 'Content-Type: application/json' \
  -d '{"name": "Avocado", "description": "Super fruit"}' 2>/dev/null | python -m
json.tool

Or

curl -X POST http://localhost:8080/fruits \
  -H 'Content-Type: application/json' \
  -d '{"name": "Orange", "description": "Popular fruit"}' 2>/dev/null | jq
```

Output should be:

```
Unset
[
  {
    "name": "Apple",
    "description": "Winter fruit"
  },
  {
    "name": "Pineapple",
    "description": "Tropical fruit"
  },
  {
    "name": "Avocado",
    "description": "Super fruit"
  }
]
```

Deploying to OpenShift

Deploy the Application

Install extension:

```
Unset
./mvnw quarkus:add-extension -Dextensions="io.quarkus:quarkus-openshift"
```

Add to pom.xml

```
Unset
<maven.compiler.source>17</maven.compiler.source>
<maven.compiler.target>17</maven.compiler.target>
```

To avoid certificate problems, add the following entry to the application.properties file:

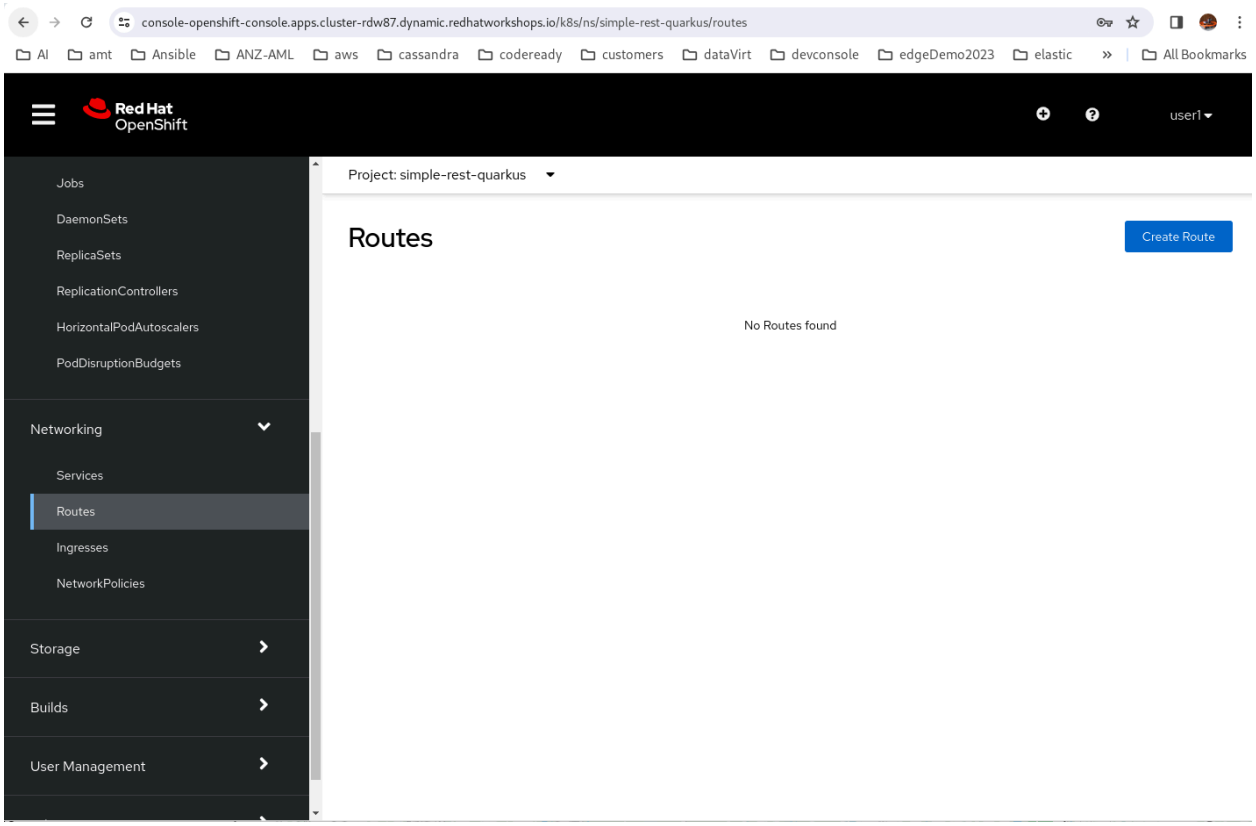
```
Unset
quarkus.kubernetes-client.trust-certs=true
```

And execute the following command:

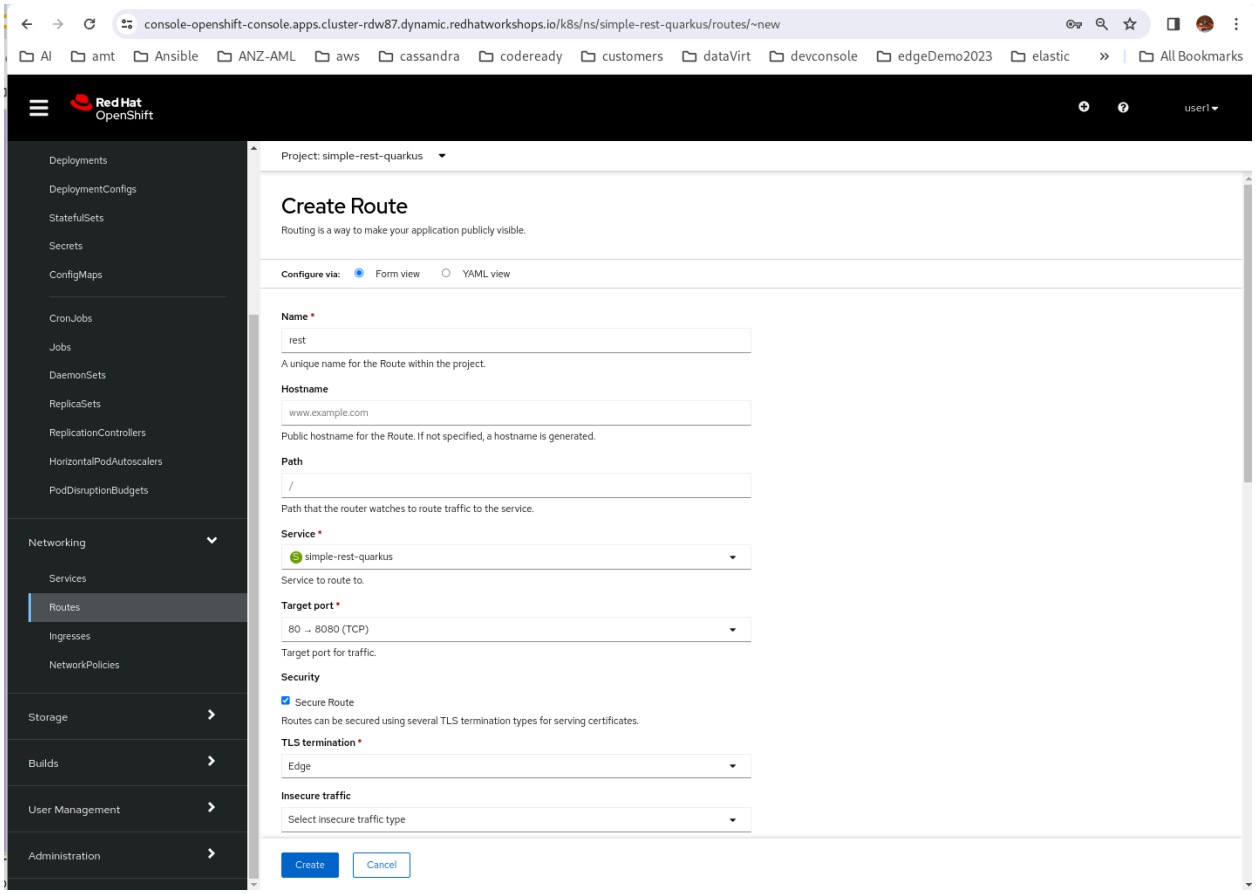
```
Unset
oc login -u yourUserName OpenShiftApiServerURL

oc new-project simple-rest-quarkus

./mvnw clean install -Dquarkus.kubernetes.deploy=true -DskipTests
```

Log in the the OpenShift console:

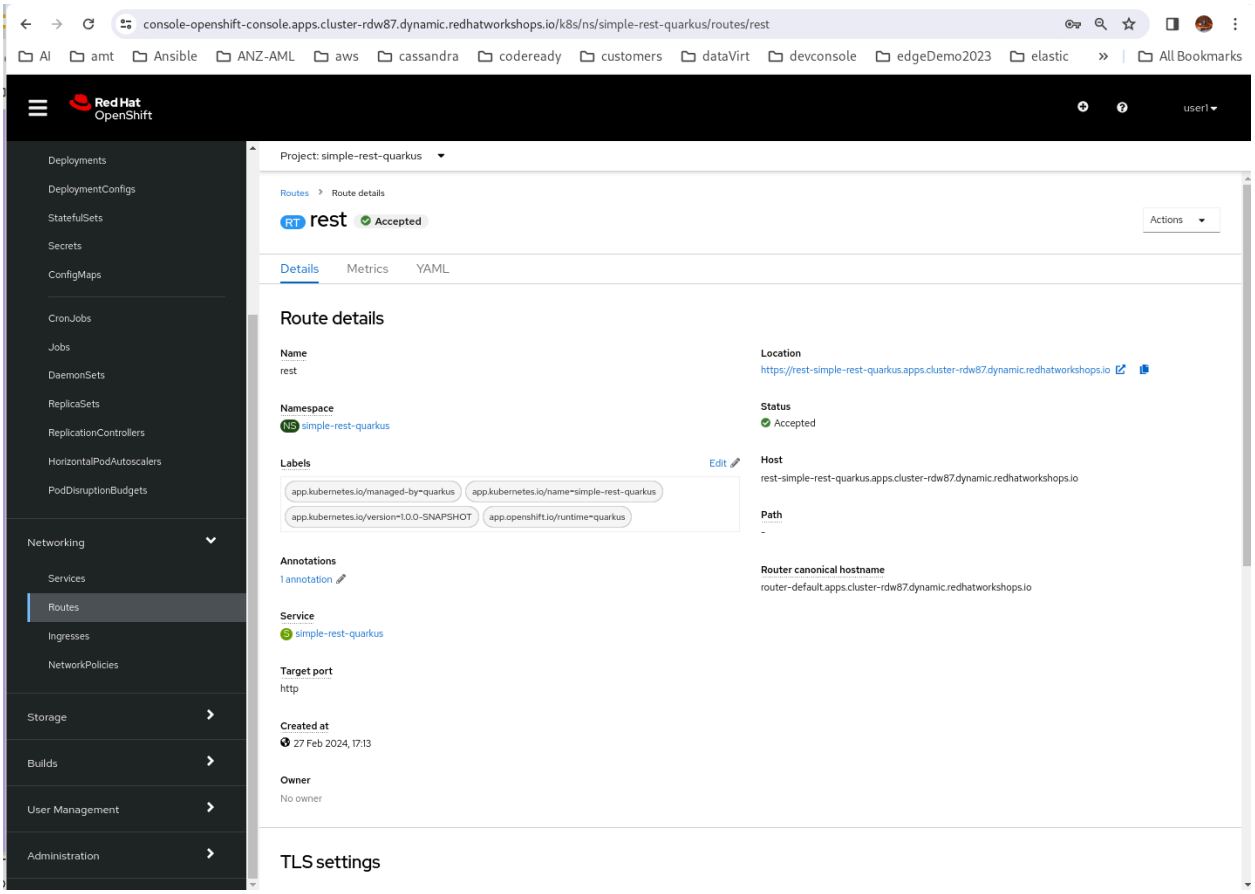
Select the Administrator tab and then Networking->Routes.
Create a route for the service which has been created by the mvnw command above.



Click on ‘Create Route’.



Enter the name and select from the drop down boxes as shown above and click ‘Create’



The route is shown at the ‘Location’. Use it to interact with your application.

Testing:
SImilar to what you did when testing locally. Only the URL is different. Your URL will be different when running in a different OpenShift environment.

```
Unset
curl https://rest-simple-rest-quarkus.apps.cluster-rdw87.dynamic.redhatworkshops.io/fruits 2>/dev/null | jq


curl -X POST https://rest-simple-rest-quarkus.apps.cluster-rdw87.dynamic.redhatworkshops.io/fruits \
  -H 'Content-Type: application/json' \
  -d '{"name": "Orange", "description": "Popular fruit"}' 2>/dev/null | jq
```

1.2 A Simple Camel SQL Rest Service

This project shows you how one can use the Camel Rest DSL together with the SQL component to create a database application.

You can generate another project at https://code.quarkus.redhat.com/, or you can make a copy of the previous project and start from there. Change the name of the copy's directory to simple-sql-quarkus.

Open that folder using your VSCode IDE
Open the pom.xml file
Change the line from:

```
Unset
<artifactId>simple-rest-quarkus</artifactId>
```

To

```
Unset
<artifactId>simple-sql-quarkus</artifactId>
```

Delete the simple-rest-quarkus/src/main/java/com/redhat/Fruit.java file.

We need to add Quarkus extensions (dependencies in the maven pom.xml file) for this project. There are multiple ways of adding a Quarkus extension:

```
Unset
quarkus ext add org.apache.camel.quarkus:camel-quarkus-sql
```

Or

```
Unset
./mvnw quarkus:add-extension
-Dextensions="org.apache.camel.quarkus:camel-quarkus-sql"
```

Or add dependency directly to pom.xml

```
Unset
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-sql</artifactId>
</dependency>
```

We are going to add the following extensions using the second approach although any of the mentioned ways will work.

```
Unset
./mvnw quarkus:add-extension
-Dextensions="org.apache.camel.quarkus:camel-quarkus-sql"
./mvnw quarkus:add-extension -Dextensions="jdbc-h2"
```

Replace the content of Router.java with that shown below:

```
Java

package com.redhat;

import org.apache.camel.builder.RouteBuilder;
import org.apache.camel.model.rest.RestBindingMode;

import jakarta.inject.Inject;
import org.apache.camel.model.rest.RestParamType;
```

```
public class Router extends RouteBuilder {


    @Override
    public void configure() {

        // Accept the default host and port
        restConfiguration().bindingMode(RestBindingMode.json);

        rest("/")
            .get("customers")
                .produces("application/json")
                .to("direct:getallcustomer");

        rest("/customer")
            .get("{custid}")
                .produces("application/json")
                .to("direct:getcustomer");

        rest("/customer")
            .post()
                .produces("application/json")
                .to("direct:addcustomer");

        from("direct:getallcustomer")
            .routeId("allcustomer")
            .to("sql:select * from customerdemo")
            .log("getallcustomer result: ${body}")
            .end();

        from("direct:getcustomer")
            .routeId("specificcustomer")
            .log("getcustomer - ${header.custid}")
            .to("sql:select * from customerdemo where customerID =
:#${header.custid}")
            .log("specificcustomer: ${body}")
            .end();

        from("direct:addcustomer")
            .routeId("addnewcustomer")
            .setHeader("customerID", simple("customerID"))
            .setHeader("vipStatus", simple("vipStatus"))
            .setHeader("balance", simple("balance"))
```

```
            .to("sql:insert into customerdemo (customerID,vipStatus,balance)
VALUES (:#customerID, :#vipStatus, :#balance)")
            .log("addcustomer: ${body}")
            .end();


    }
}
```

Replace the content of the simple-rest-quarkus/src/main/resources/application.properties file with that shown below:

```
Unset
%dev.quarkus.datasource.db-kind=h2
%dev.quarkus.datasource.username=sa
%dev.quarkus.datasource.password=
%dev.quarkus.datasource.jdbc.url=jdbc:h2:mem:mydb;DB_CLOSE_DELAY=-1;DB_CLOSE_ON
_EXIT=FALSE;DATABASE_TO_UPPER=false;INIT=RUNSCRIPT FROM 'classpath:schema.sql'
%dev.quarkus.datasource.jdbc.max-size=12
```

Create a new file named simple-rest-quarkus/src/main/resources/schema.sql and paste in the content below:

```
Unset
DROP TABLE IF EXISTS customerdemo;
CREATE TABLE customerdemo (
       customerID varchar(10) NOT NULL,
       vipStatus varchar(10) NOT NULL ,
       balance integer NOT NULL
);
INSERT INTO customerdemo (customerID,vipStatus,balance) VALUES
('A01','Diamond',1000);
INSERT INTO customerdemo (customerID,vipStatus,balance) VALUES
('A02','Gold',500);
```

Run project in Quarkus dev mode:

```
Unset
./mvnw clean compile quarkus:dev
```

In another termina, run the following commands to:

1. List all customers in the database. Remove the “| jq” part if you don’t have jq installed. Jq beautifies the output json. Without it, you will still see the result.

```
Unset
curl http://localhost:8080/customers 2>/dev/null | jq
```

You will see the result below:

```
Unset
[
  {
    "customerID": "A01",
    "vipStatus": "Diamond",
    "balance": 1000
  },
  {
    "customerID": "A02",
    "vipStatus": "Gold",
    "balance": 500
  }
]
```

2. List a specific customer.

```
Unset
curl http://localhost:8080/customer/A01  2>/dev/null | jq
```

With result:

```
Unset
[
```

```
  {
    "customerID": "A01",
    "vipStatus": "Diamond",
    "balance": 1000
  }
]
```

3. Add a new customer:

```
Unset
curl -X POST http://localhost:8080/customer \
   -H 'Content-Type: application/json' \
   -d '{"customerID": "A04", "vipStatus": "Silver","balance": 300 }'
2>/dev/null | jq
```

With result

```
Unset
{
  "customerID": "A04",
  "vipStatus": "Silver",
  "balance": 300
}
```

If you run the list all customers command again, you will see that customer A04 has been added to the database.

```
Unset
[
  {
    "customerID": "A01",
    "vipStatus": "Diamond",
    "balance": 1000
  },
  {
    "customerID": "A02",
    "vipStatus": "Gold",
    "balance": 500
  },
```

```
  {
    "customerID": "A04",
    "vipStatus": "Silver",
    "balance": 300
  }
]
```

Observed Limitations

A database application usually supports CRUD (Create, Read,Update, Delete) operations. Our application only supports C and R.

You may have noticed that you can add the same customer more than once.

Suggested TODO List

Here is a list of enhancements that you may work on yourselves.

1. Add an Update operation
2. Add a Delete operation
3. The add customer endpoint currently only creates one customer per call. Investigate how to process a list of customers.
4. Disallow the same customer to be entered multiple times. HINT: you have to change the database schema.

Deploying to OpenShift

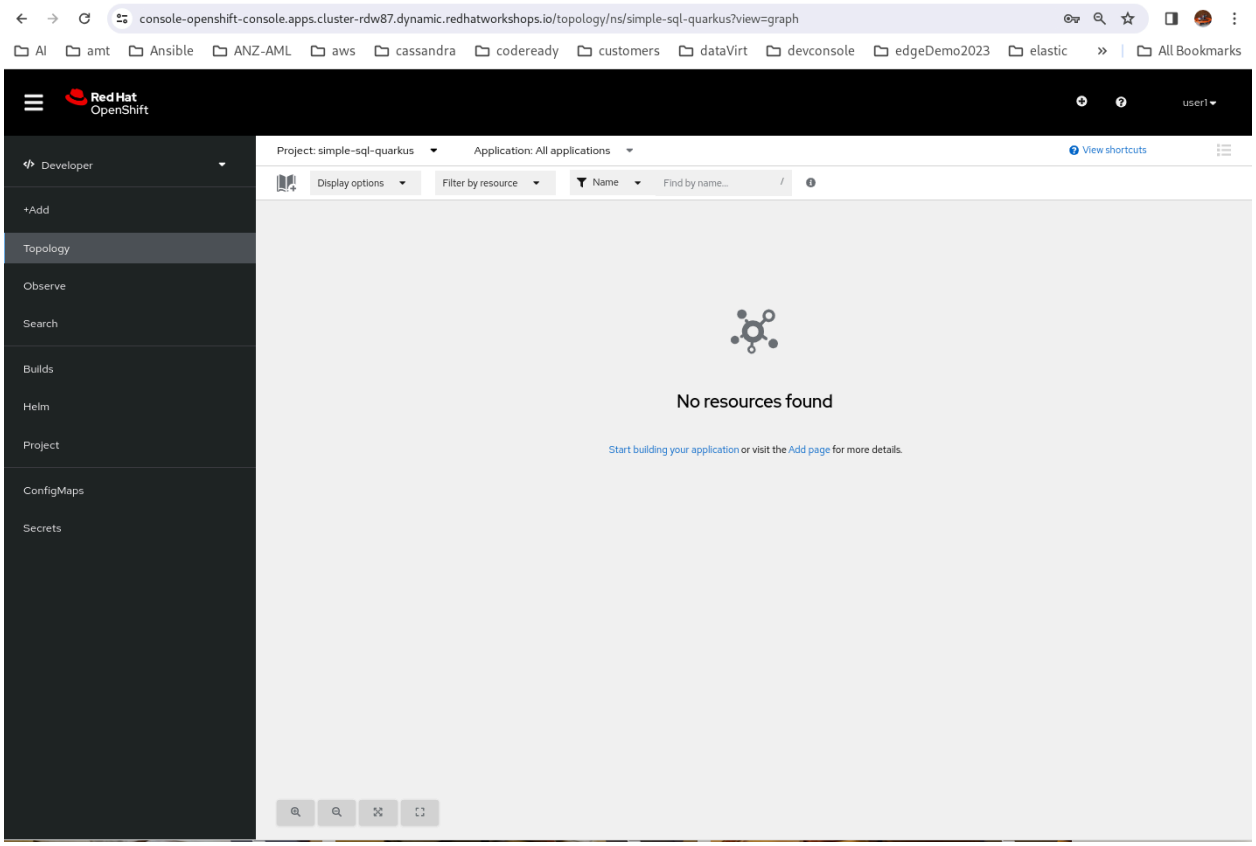
Log in to OpenShift and create a new project:

```
Unset
oc login -u yourUserName OpenShiftApiServerURL

oc new-project simple-sql-quarkus
```

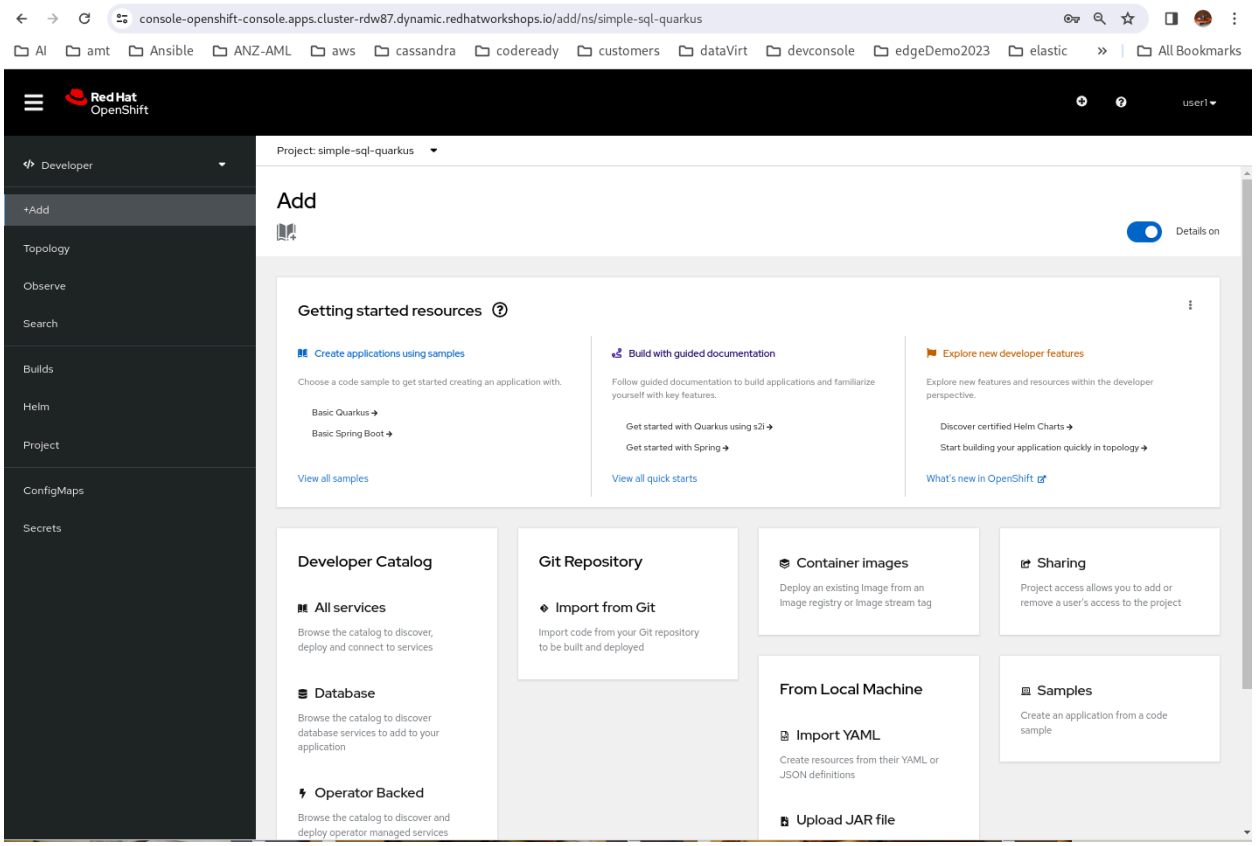
Deploy a MySQL Database and Populate It

Before you deploy your Quarkus app, you have to install a MySQL database. H2 is not meant for production. However, you can continue to use the H2 database when deploying to Openshift. If that is what you want, you may skip this part and jump directly to the section: Deploy Your Quarkus App.

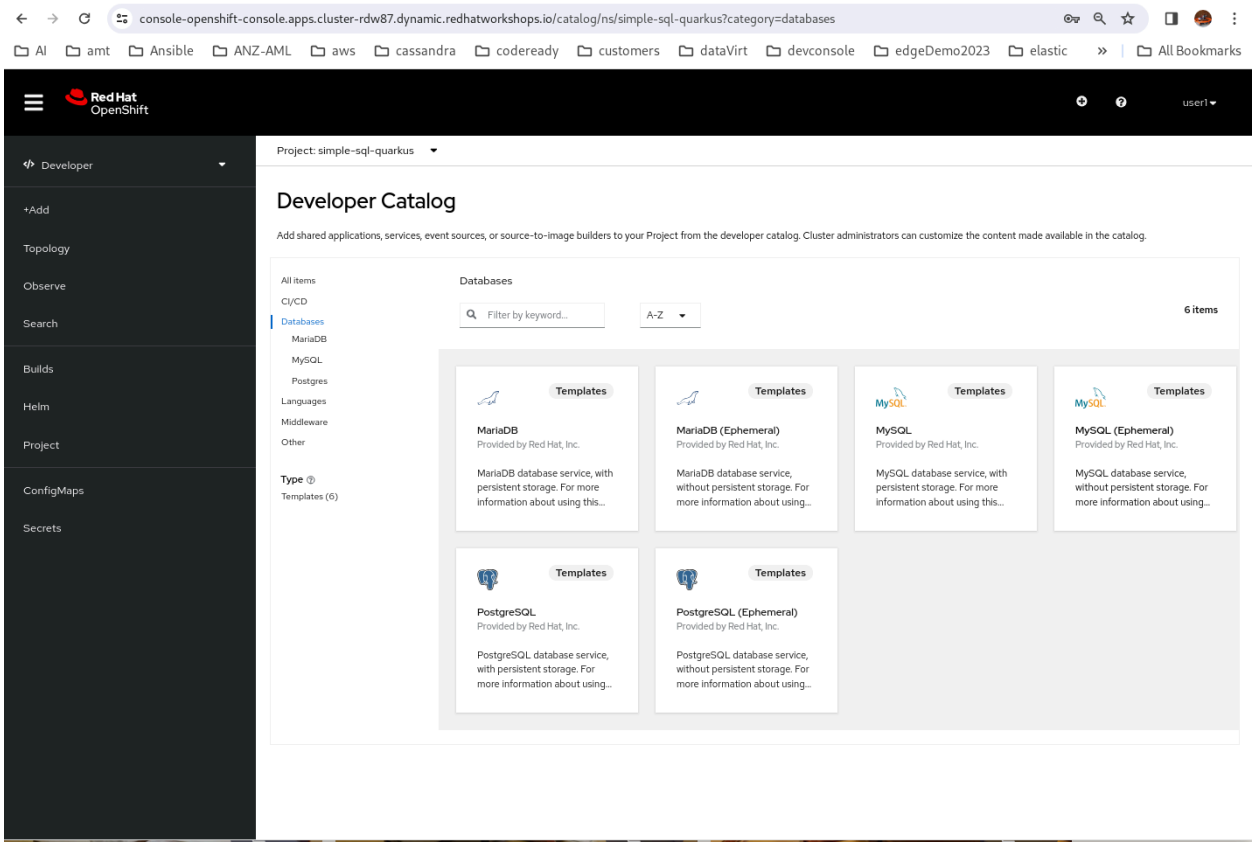
Log into the OpenShift Console and change to the Developer tab.



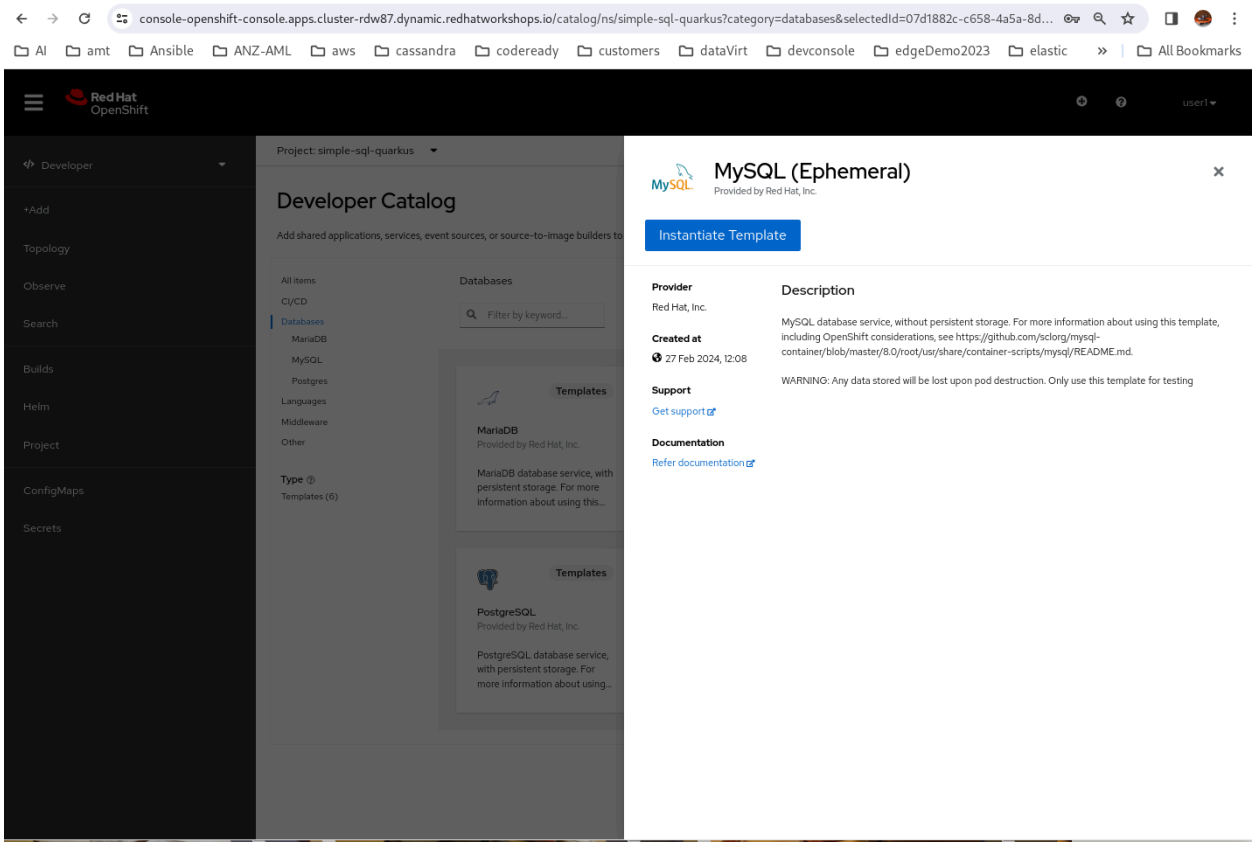
Select +Add on the left-hand pane.



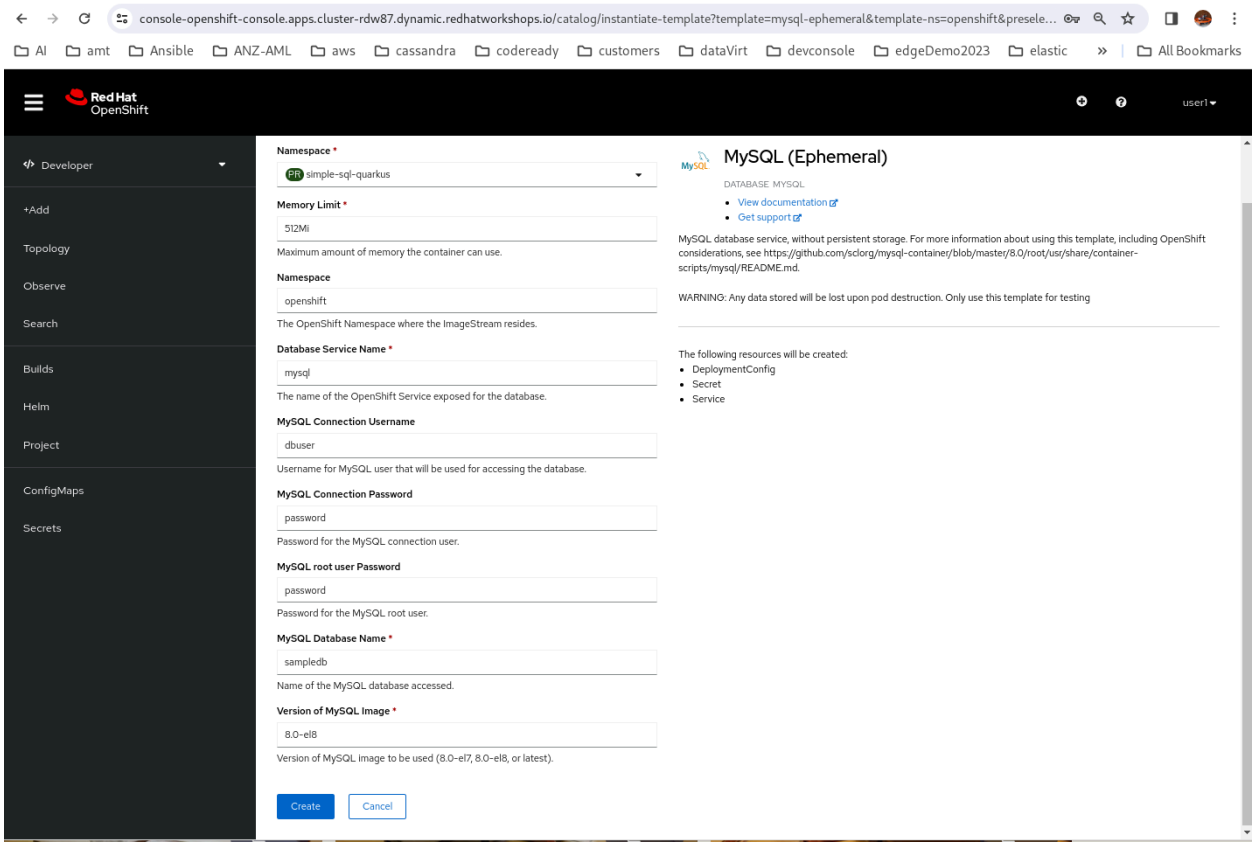
Select Database and then MySQL (Ephemeral).



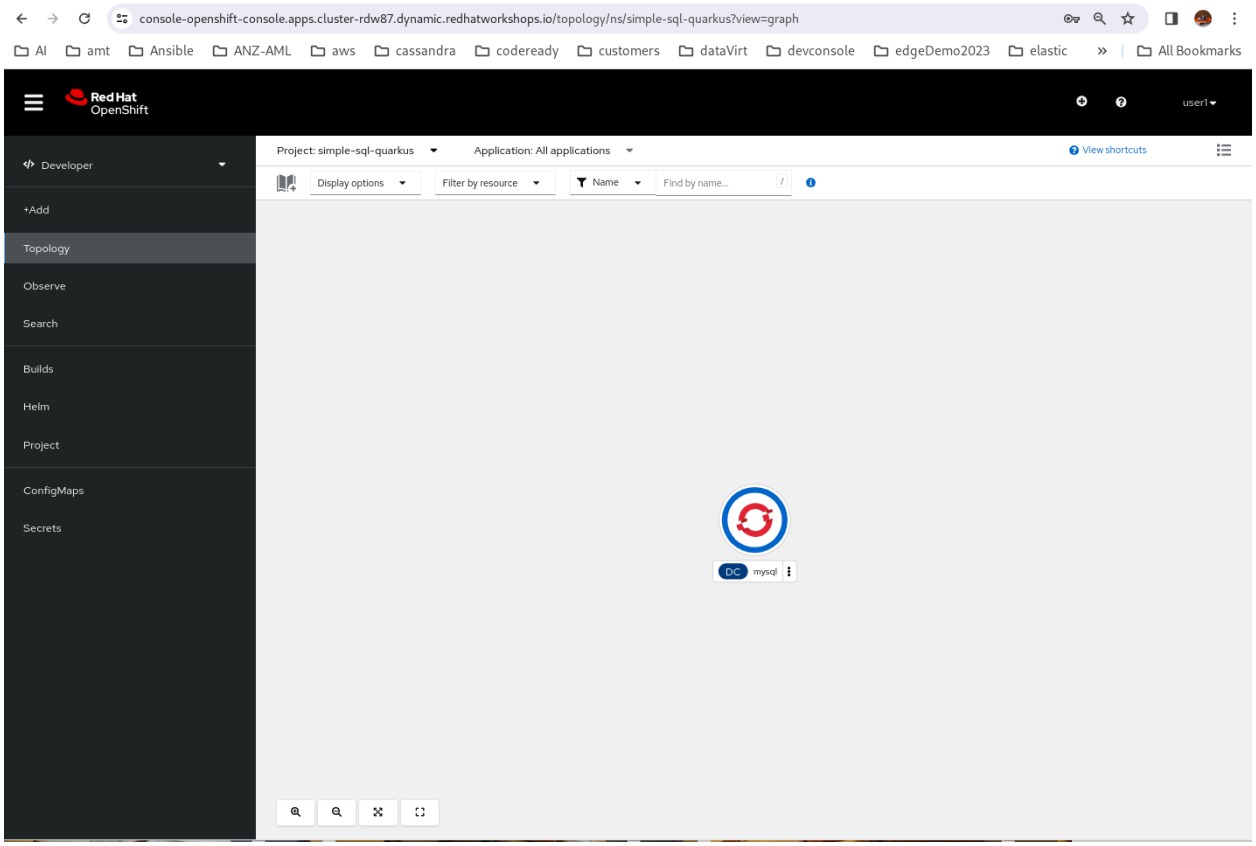
Select Instantiate Template.



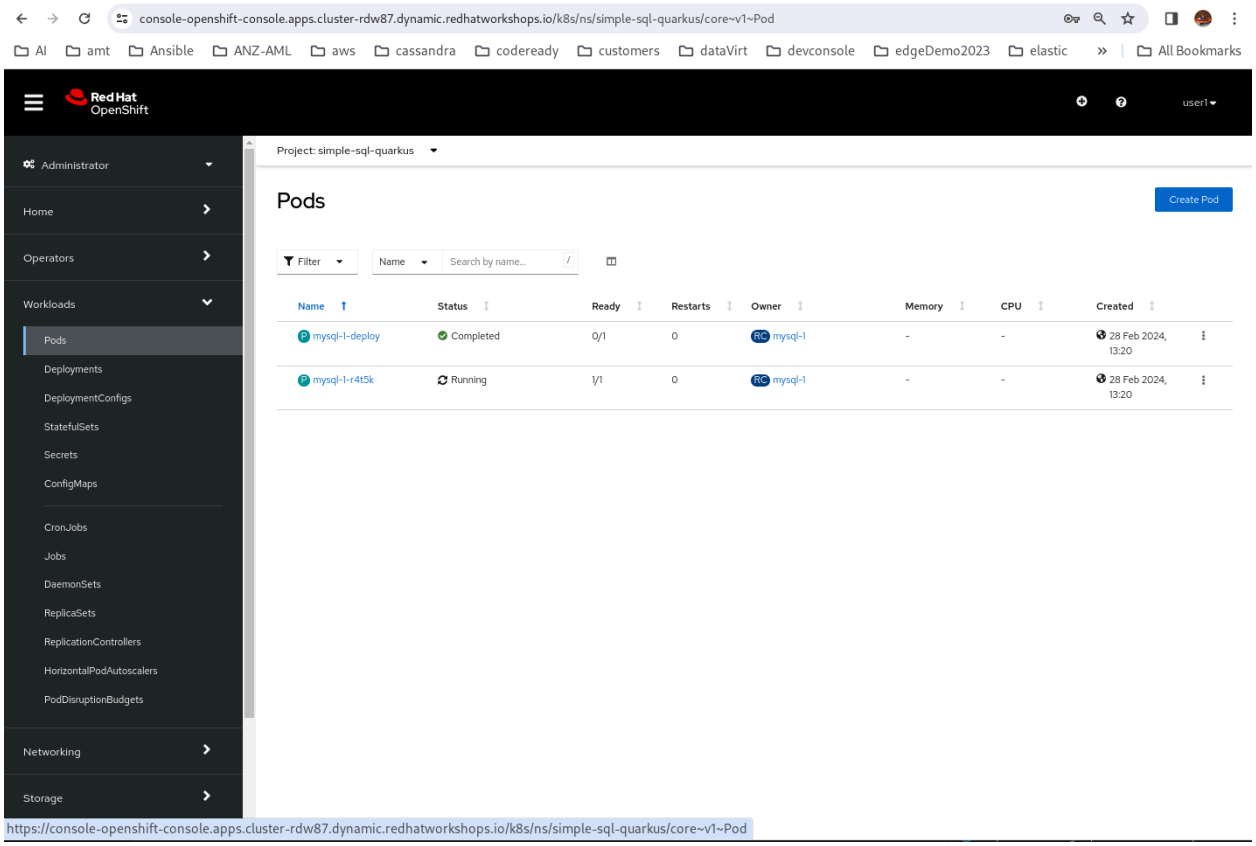
Fill in the page as shown. The info has to match that in the application.properties file described in the next section.



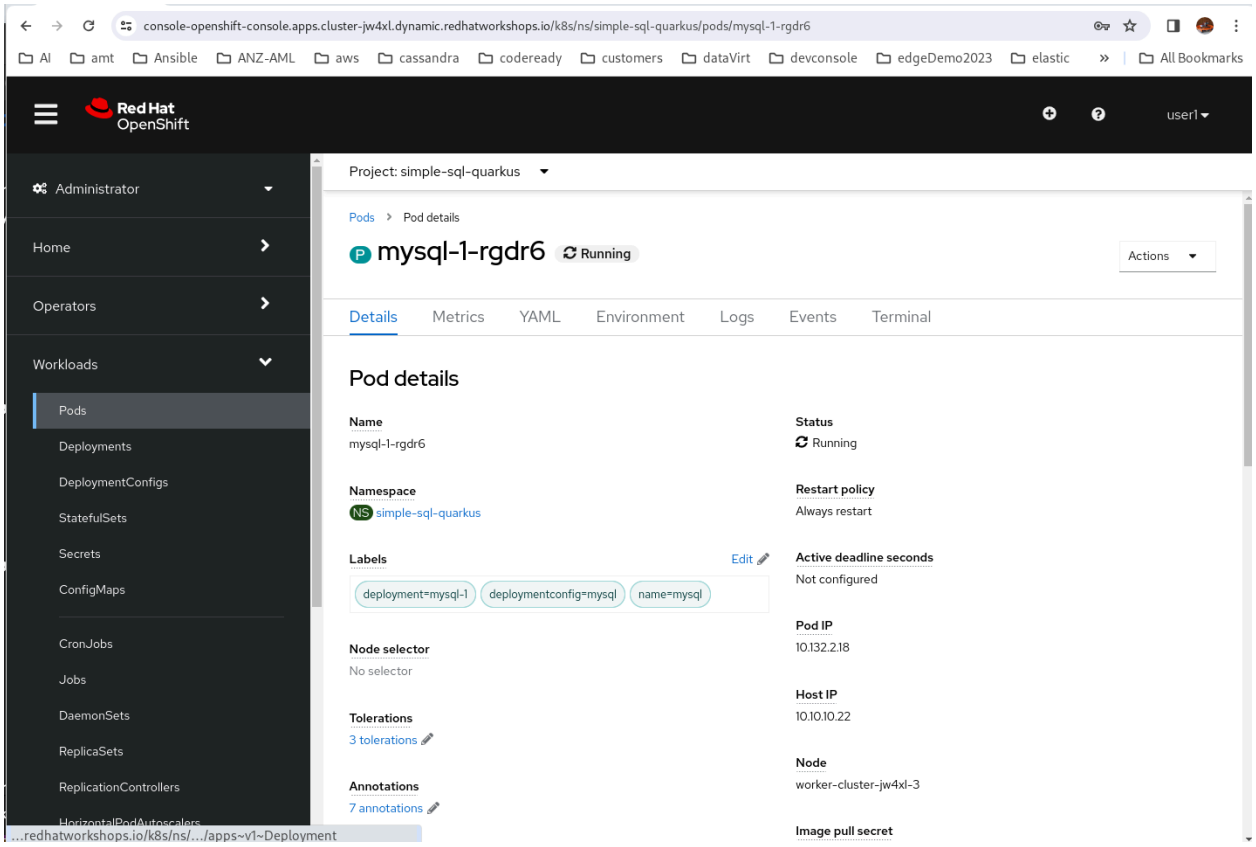
Click Create and after a while, you will see the database is up (icon with solid deep blue circle)



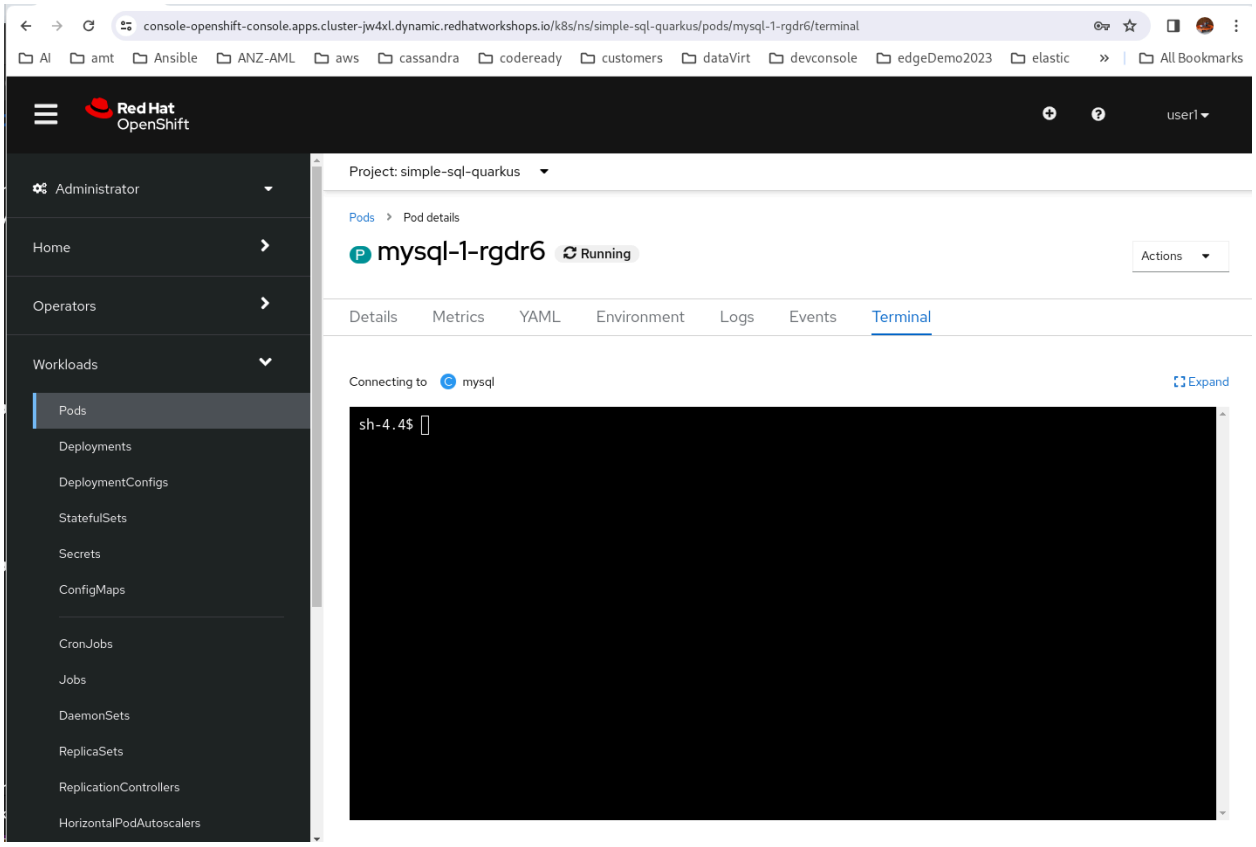
Select the Administrator tab and the Workloads->Pods



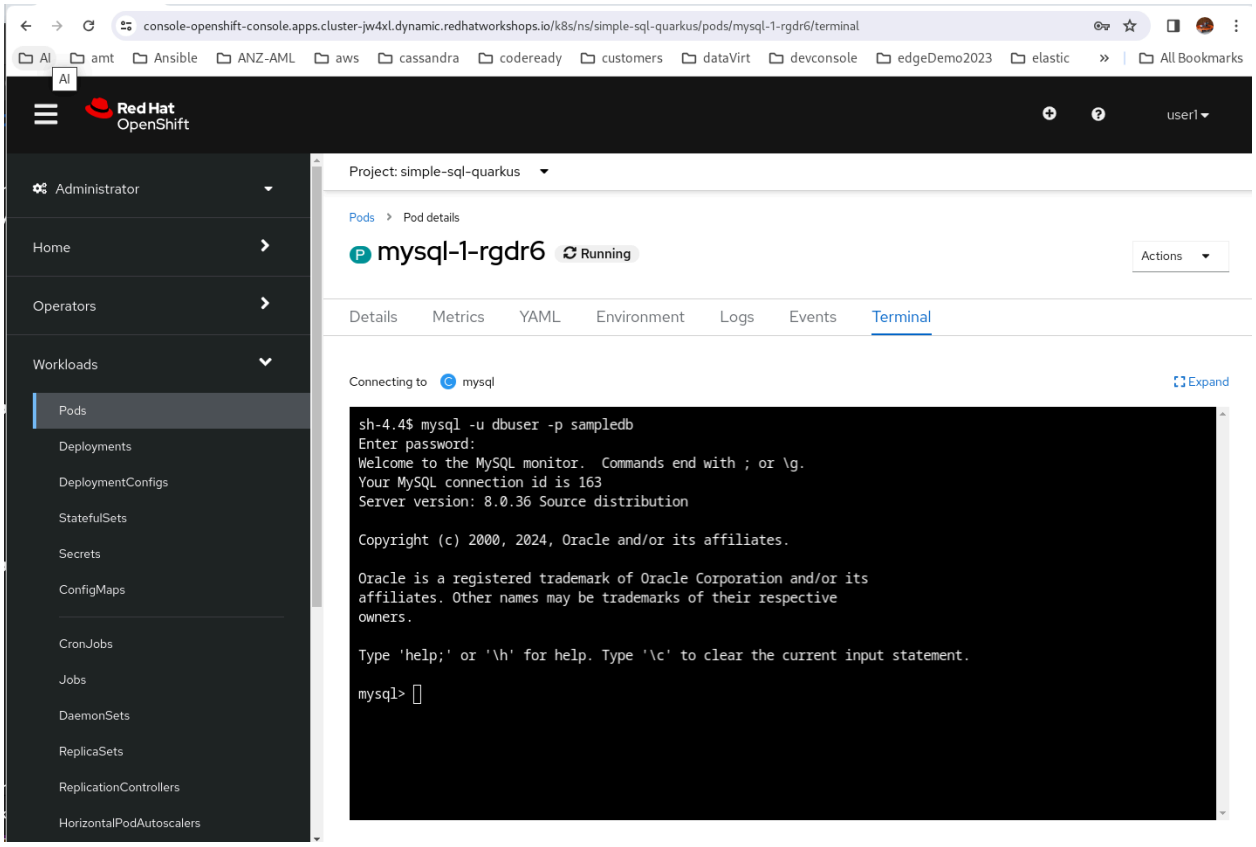
Click on the running mysql pod.



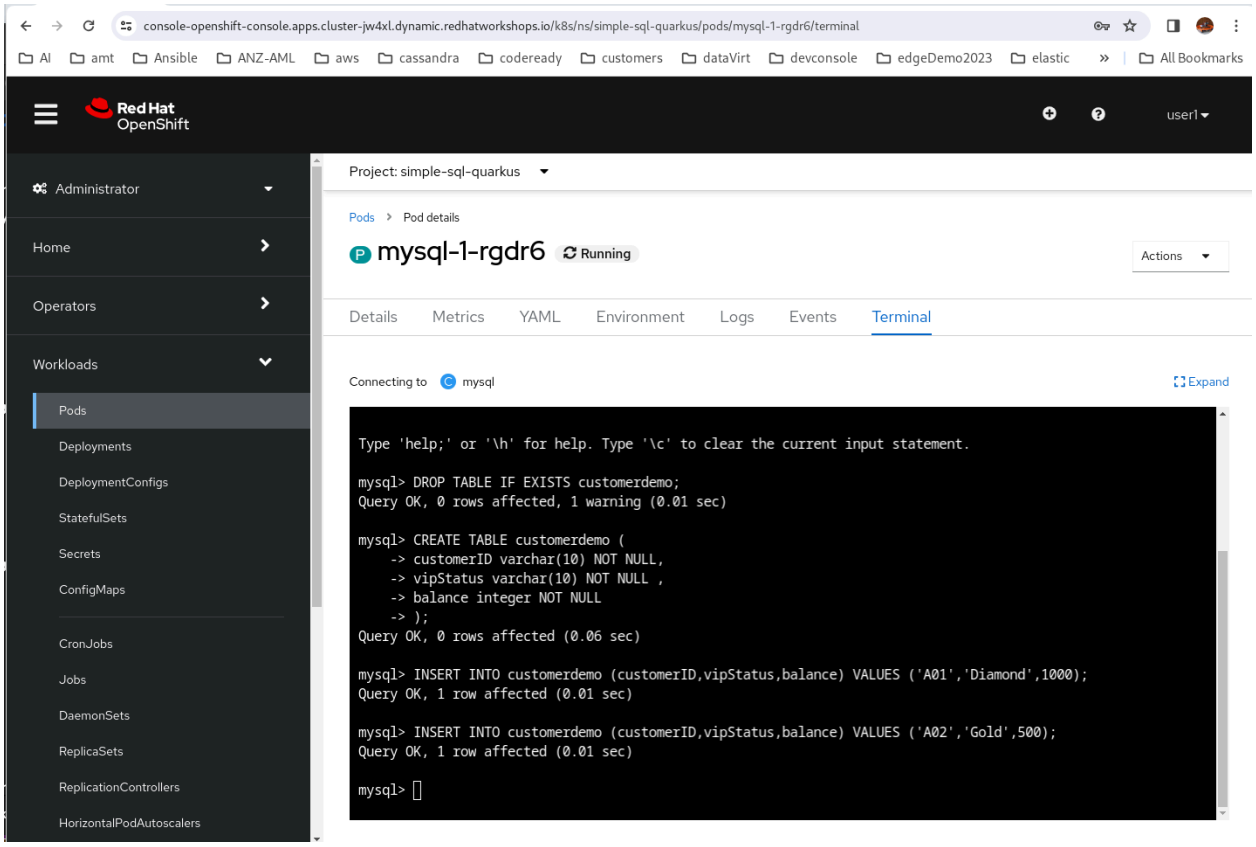
Click on Terminal to open a terminal window to the pod.



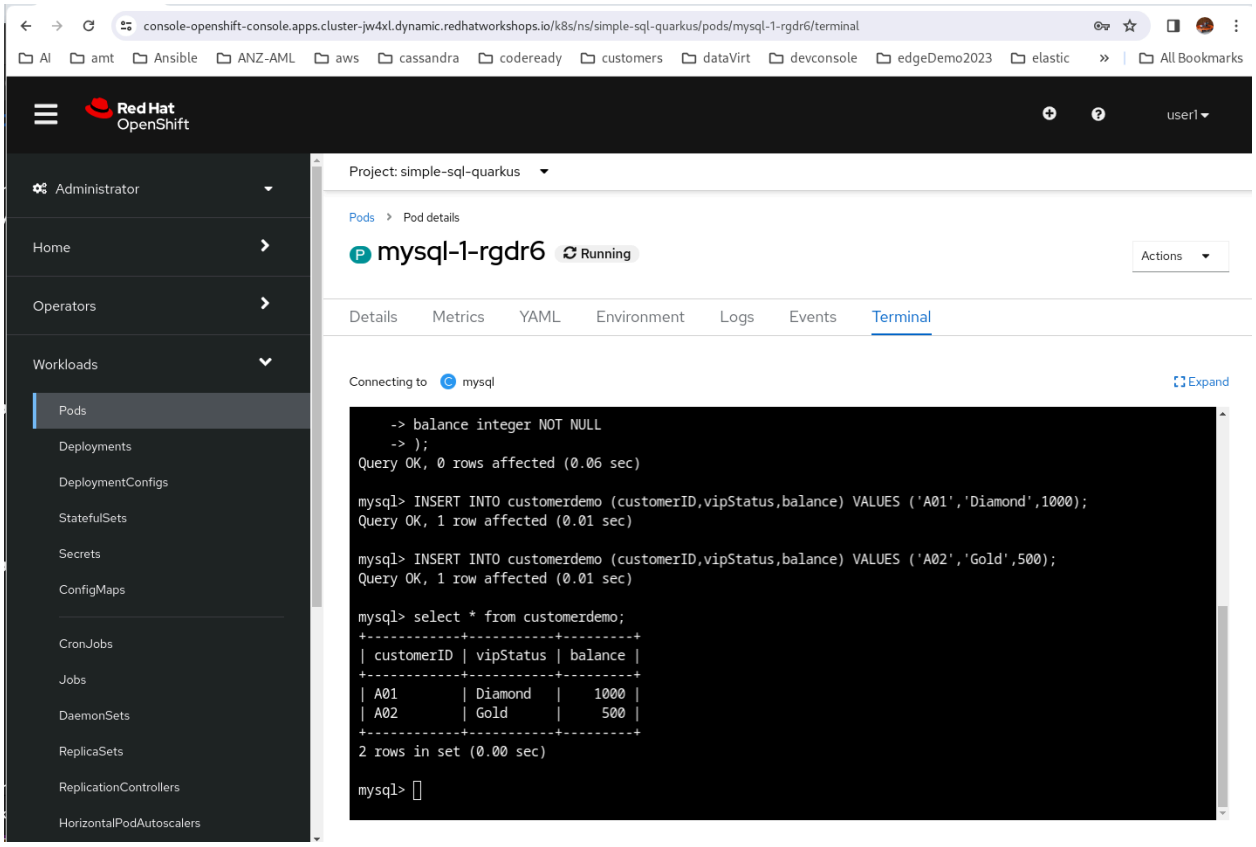
Log in to mysql.



Copy and paste the content of schema.sql into the terminal.



Run a simple SQL statement, “select * from customerdemo;”, to list all entries in the database.



Now you have completed the MySQL database setup on OpenShift

Deploy your Quarkus App
cd to your project.
Install extensions:

```
Unset
./mvnw quarkus:add-extension -Dextensions="io.quarkus:quarkus-openshift"
./mvnw quarkus:add-extension -Dextensions="io.quarkus:quarkus-jdbc-mysql"
```

Add to pom.xml
Inside the <properties> element.

```
Unset
<maven.compiler.source>17</maven.compiler.source>
<maven.compiler.target>17</maven.compiler.target>
```

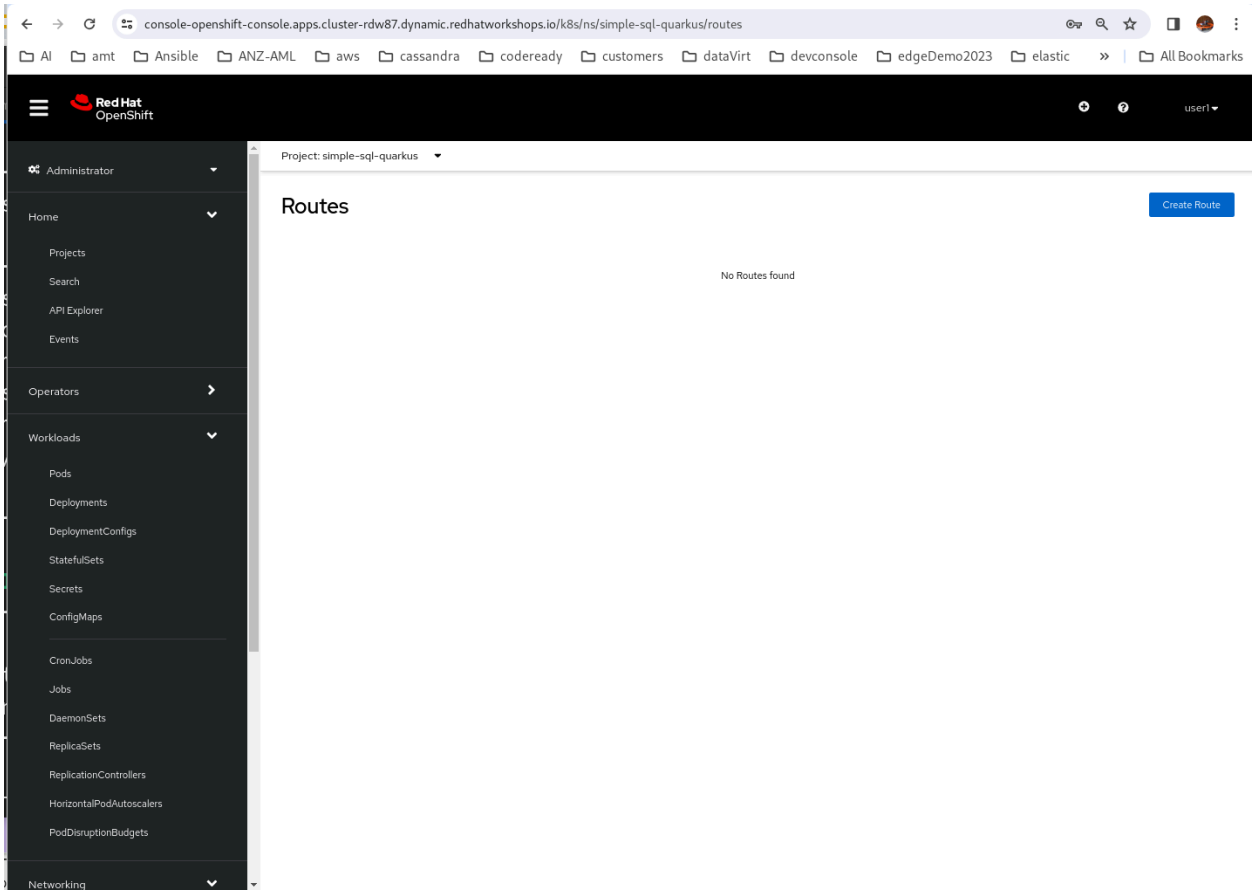
Add the following entries to the application.properties file:

```
Unset
quarkus.kubernetes-client.trust-certs=true

# Use this section if you are not using the YySQL database
# If you do that you do not have to do the previous section to
# create and populate a MySQL database in OpenShift.
# ######################################################
#quarkus.datasource.db-kind=h2
#quarkus.datasource.username=sa
#quarkus.datasource.password=
#quarkus.datasource.jdbc.url=jdbc:h2:mem:mydb;DB_CLOSE_DELAY=-1;DB_CLOSE_ON_EXI
T=FALSE;DATABASE_TO_UPPER=false;INIT=RUNSCRIPT FROM 'classpath:schema.sql'
#quarkus.datasource.jdbc.max-size=12

# Use this section if you are using the MySQL database
# Make sure you have created and populated the database as described
# in the previous section.
# database in OpenShift
# ######################################################
quarkus.datasource.db-kind=mysql
quarkus.datasource.username=dbuser
quarkus.datasource.password=password
quarkus.datasource.jdbc.url=jdbc:mysql://mysql:3306/sampledb
quarkus.datasource.jdbc.max-size=12
```

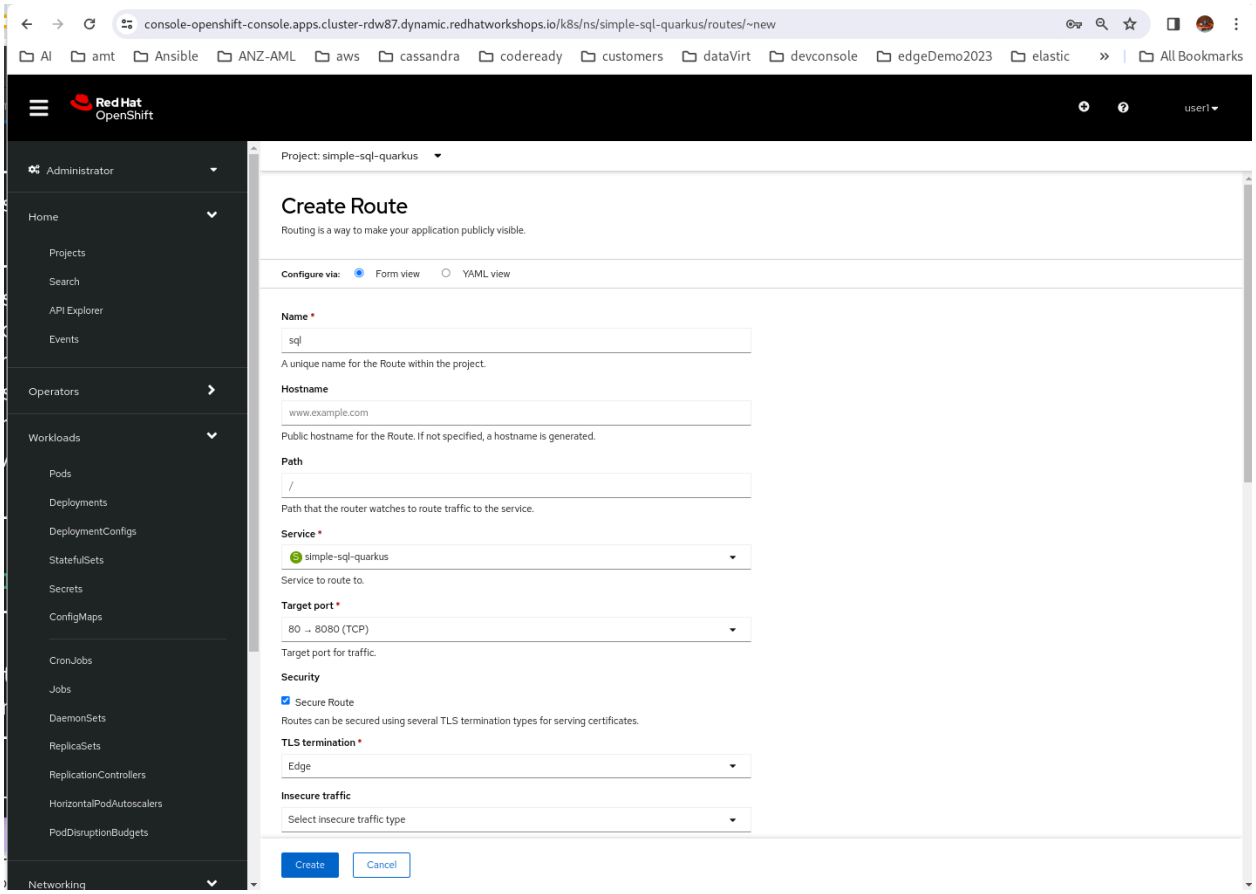
And execute the following command:

```
Unset
oc login -u yourUserName OpenShiftApiServerURL

oc project simple-sql-quarkus

./mvnw install -Dquarkus.kubernetes.deploy=true -DskipTests
```

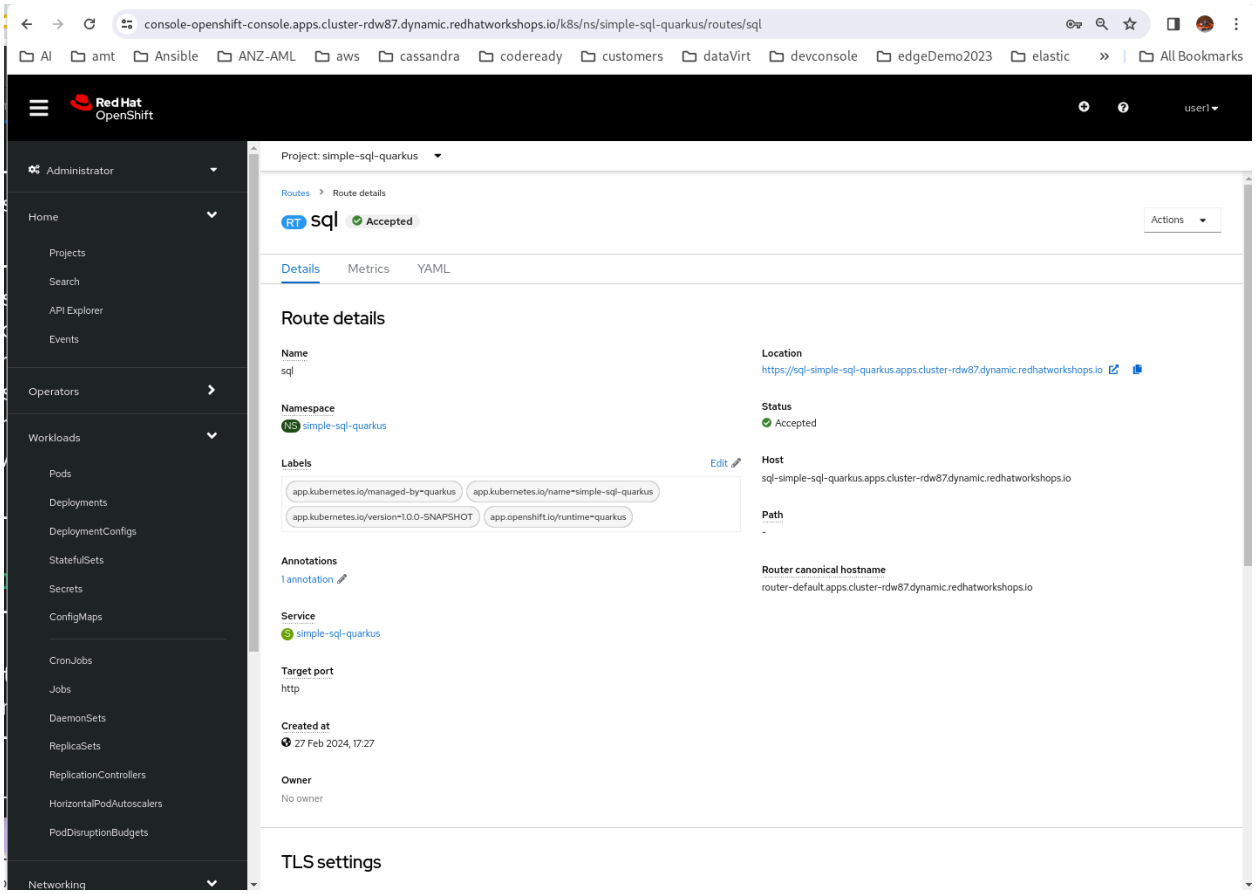
Log in the the OpenShift console:
Create a route for the service which has been created by the mvnw command above.



Click on ‘Create Route’.



Enter the name and select from the drop down boxes as shown above and click ‘Create’



The route is shown at the ‘Location’. Use it to interact with your application.

Testing:
Note: Your URL will be different running on a different OpenShift environment.

```
curl https://rest-simple-sql-quarkus.apps.cluster-rdw87.dynamic.redhatworkshops.io/fruits 2>/dev/null | jq


curl -X POST https://rest-simple-sql-quarkus.apps.cluster-rdw87.dynamic.redhatworkshops.io/fruits \
  -H 'Content-Type: application/json' \
  -d '{"name": "Orange", "description": "Popular fruit"}' 2>/dev/null | jq
```

1.3 An Application Using EIPs

This application demonstrates the use of Content-based Routing, WireTap EIPs using additional Camel components(jsonpath, qson, SEDA) and a Processor. This app is an enhancement to the simple-rest-project.

You POST a fruit with name and description to the Rest API. If the description is one of {“Winter fruit”, “Tropical fruit”, “Super fruit”}, it takes the path to log the fruit preceded by the description.

If the description is unknown, the route uses a wiretap (an EIP) to send the request asynchronously to the “seda:correction” endpoint. So far, all routing eg, direct:submit, was done synchronously.

The “seda:correction” endpoint uses a LookupProcessor, with some predefined fruits, to lookup the fruit passed to it should contain what description. If the lookup is successful, it will update the fruit description and send it back to the “direct:submit” endpoint for re-processing otherwise, it logs the message:” SEDA ignoring fruit with unknown description: ….”

You can generate another project at https://code.quarkus.redhat.com/, or you can make a copy of the previous project ‘simple-rest-quarkus’ and start from there.
Change the directory name of your copy to “simple-cbr-quarkus”
Open that folder using your VSCode IDE
Open the pom.xml file
Change the line from:

```
Unset
<artifactId>simple-rest-quarkus</artifactId>
```

To

```
Unset
<artifactId>simple-cbr-quarkus</artifactId>
```

Open the simple-cbr-quarkus/src/main/java/com/redhat/Routes.java and replace its content with the following:

Java

```java
package com.redhat;

import java.util.Collections;
import java.util.LinkedHashSet;
import java.util.Set;

import org.apache.camel.builder.RouteBuilder;
import org.apache.camel.model.rest.RestBindingMode;
import org.apache.camel.component.jackson.JacksonDataFormat;
import org.apache.camel.model.dataformat.JsonLibrary;

public class Routes extends RouteBuilder {


  @Override
  public void configure() throws Exception {
    restConfiguration().bindingMode(RestBindingMode.json);

    rest("/submitFruit")

        .post()
        .type(Fruit.class)
        .to("direct:submit");

    from("direct:submit")
      .marshal().json(JsonLibrary.Gson)
      .choice()
        .when().jsonpath("$[?(@.description == 'Winter fruit')]")
          .log("Winter fruit: ${body}")
        .when().jsonpath("$[?(@.description == 'Tropical fruit')]")
          .log("Tropical fruit: ${body}")
        .when().jsonpath("$[?(@.description == 'Super fruit')]")
          .log("Super fruit: ${body}")
        .otherwise()
          .wireTap("seda:correction")
          .log("Unknown fruit: ${body}");

    from("seda:correction")
      .choice()
        .when().jsonpath("$[?(@.description != 'Unknown fruit')]")
          .unmarshal().json(JsonLibrary.Jackson, Fruit.class)
          .process("lookupProcessor")
          .log("SEDA resubmitting modified unknown fruit: ${body}")
          .to("direct:submit")
        .otherwise()
```

```
        .log("SEDA ignoring fruit with unknown description: ${body}");
  }
}
```

Create simple-cbr-quarkus/src/main/java/com/redhat/LookupProcessor.java and paste in the content shown below.

Java

```java
package com.redhat;

import java.util.Map;
import java.util.HashMap;

import jakarta.enterprise.context.ApplicationScoped;
import jakarta.inject.Named;
import org.apache.camel.Exchange;
import org.apache.camel.Processor;
import org.apache.camel.Message;

@ApplicationScoped
@Named
public class LookupProcessor implements Processor {

  private final String WINTER_FRUIT = "Winter fruit";
  private final String TROPICAL_FRUIT = "Tropical fruit";
  private final String SUPER_FRUIT = "Super fruit";
  private final String UNKNOWN_FRUIT = "Unknown fruit";

  private final Map<String, String> descMap = new HashMap<>();

  public LookupProcessor() {

    descMap.put("Apple", WINTER_FRUIT);
    descMap.put("Kiwi", WINTER_FRUIT);
    descMap.put("Pear", WINTER_FRUIT);
    descMap.put("Orange", WINTER_FRUIT);
    descMap.put("Pineapple", TROPICAL_FRUIT);
    descMap.put("Durian", TROPICAL_FRUIT);
    descMap.put("Lychee", TROPICAL_FRUIT);
    descMap.put("Mango", TROPICAL_FRUIT);
    descMap.put("Avocado", SUPER_FRUIT);
    descMap.put("Plum", SUPER_FRUIT);
```

```
    descMap.put("Strawberry", SUPER_FRUIT);
    descMap.put("Peaches", SUPER_FRUIT);

  }

  public boolean lookup(String fruit) {
    if (descMap.containsKey(fruit)) {
      return true;
    }
    return false;

  }

  public String lookupDescription(String fruit) {
    if (lookup(fruit)) {
      return descMap.get(fruit);
    }
    return UNKNOWN_FRUIT;
  }

  @Override
  public void process(Exchange exchange) {
    Message msg = exchange.getMessage();
    Fruit fruit = msg.getBody(Fruit.class);
    fruit.setDescription(lookupDescription(fruit.getName()));
    System.out.println("message: " + fruit.getName() + " is a " +
fruit.getDescription() );
  }

}
```

Add the following Quarkus extensions:

```
Unset
./mvnw quarkus:add-extension -Dextensions="jsonpath"
./mvnw quarkus:add-extension -Dextensions="gson"
./mvnw quarkus:add-extension -Dextensions="camel-quarkus-seda"
```

Run the app in DEV mode:

```
Unset
./mvnw clean compile quarkus:dev
```

‘

The app knows about 3 fruit descriptions: ‘Winter fruit’, ‘Tropical fruit’ and ‘Super fruit’ only.

Interact with the app:
For fruit description for the 3 known one, the message will be logged prefixed with the description in the console:

```
Unset
curl -X POST http://localhost:8080/submitFruit \
   -H 'Content-Type: application/json' \
   -d '{"name": "Orange", "description": "Winter fruit"}'

2024-02-27 10:51:19,780 INFO  [route1] (vert.x-worker-thread-1) Winter fruit:
{"name":"Orange","description":"Winter fruit"}
```

For unknown or missing description, the message will be route asynchronously to “seda:correction”. It uses a Camel processor to look up the proper description of known fruits. If the lookup is successful, it routes it back to ‘direct:submit’ for processing again.

```
Unset
curl -X POST http://localhost:8080/submitFruit \
   -H 'Content-Type: application/json' \
   -d '{"name": "Orange", "description": "Popular fruit"}'

2024-02-27 10:59:01,848 INFO  [route1] (vert.x-worker-thread-1) Unknown fruit:
{"name":"Orange","description":"Popular fruit"}

message: Orange is a Winter fruit <-----gets wiretapped and sent to
seda:correction. The LookupProcessor looks up orange's description and outputs
it here.

2024-02-27 10:59:01,862 INFO  [route2] (Camel (camel-1) thread #1 -
seda://correction) SEDA resubmitting modified unknown fruit:
com.redhat.Fruit@8d43126d <----- the message was updated with the proper
description provided by the LookupProcessor and routed back to direct:submit
2024-02-27 10:59:01,863 INFO  [route1] (Camel (camel-1) thread #1 -
seda://correction) Winter fruit: {"name":"Orange","description":"Winter fruit"}
```

```
<----- The message is logged  normally as the fruit contains a proper
description
```

Same as above, but this time the LookupProcessor fails to look up the fruit's description:

```
Unset
curl -X POST http://localhost:8080/submitFruit \
   -H 'Content-Type: application/json' \
   -d '{"name": "Jackfood", "description": "Unusual fruit"}'

2024-02-27 10:59:01,862 INFO  [route2] (Camel (camel-1) thread #1 -
seda://correction) SEDA resubmitting modified unknown fruit:
com.redhat.Fruit@8d43126d
2024-02-27 10:59:01,863 INFO  [route1] (Camel (camel-1) thread #1 -
seda://correction) Winter fruit: {"name":"Orange","description":"Winter fruit"}
2024-02-27 11:09:25,987 INFO  [route1] (vert.x-worker-thread-1) Unknown fruit:
{"name":"Jackfood","description":"Unusual fruit"}

message: Jackfood is a Unknown fruit<-----gets wiretapped and sent  to
seda:correction. The LookupProcessor fails to look up Jackfood's description
and outputs it here.
2024-02-27 11:09:25,988 INFO  [route2] (Camel (camel-1) thread #1 -
seda://correction) SEDA ignoring fruit with unknown description:
com.redhat.Fruit@c15710fc<-----no more rerouting
```

Deploying to OpenShift

Deploy the Application

Install extension:

```
Unset
./mvnw quarkus:add-extension -Dextensions="io.quarkus:quarkus-openshift"
```

Add to pom.xml

```
Unset
<maven.compiler.source>17</maven.compiler.source>
<maven.compiler.target>17</maven.compiler.target>
```

To avoid certificate problems, add the following entry to the application.properties file:

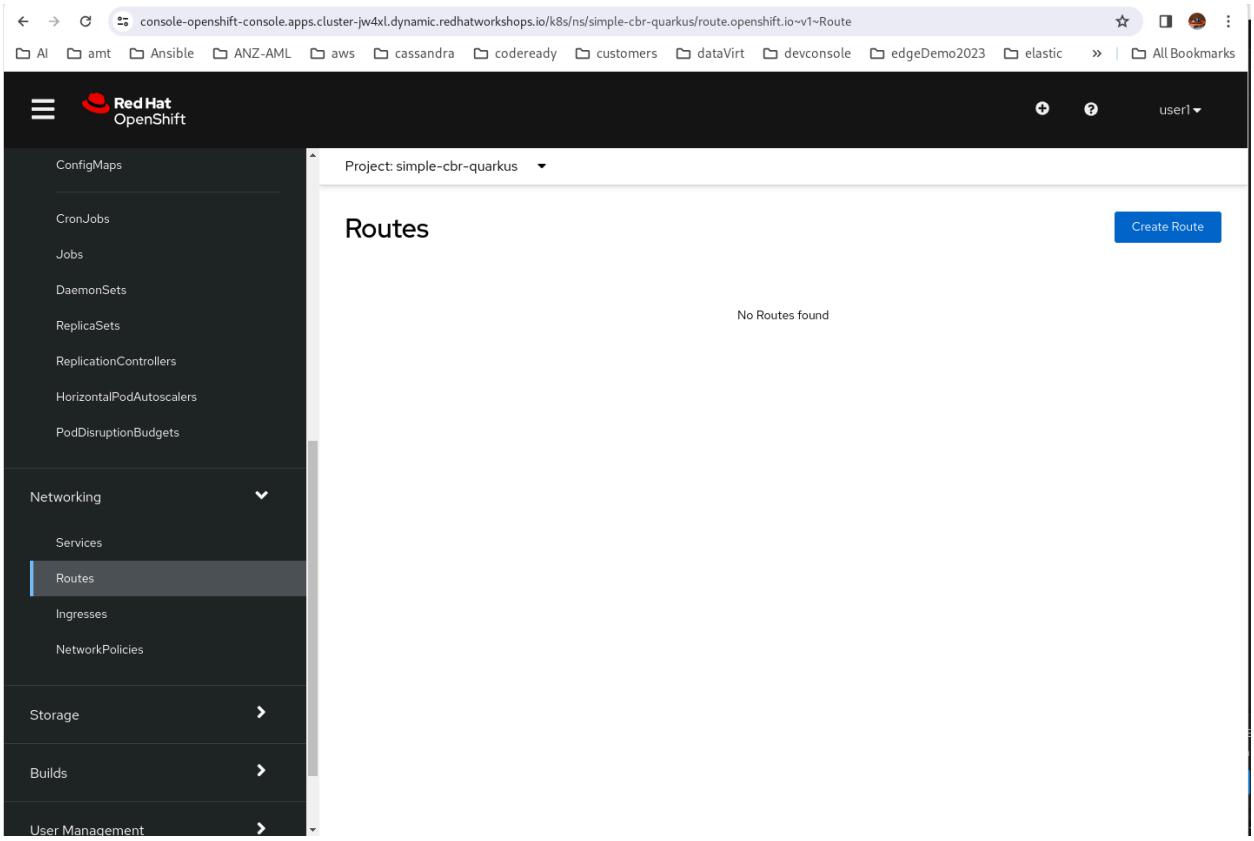
```
Unset
quarkus.kubernetes-client.trust-certs=true
```

And execute the following command:

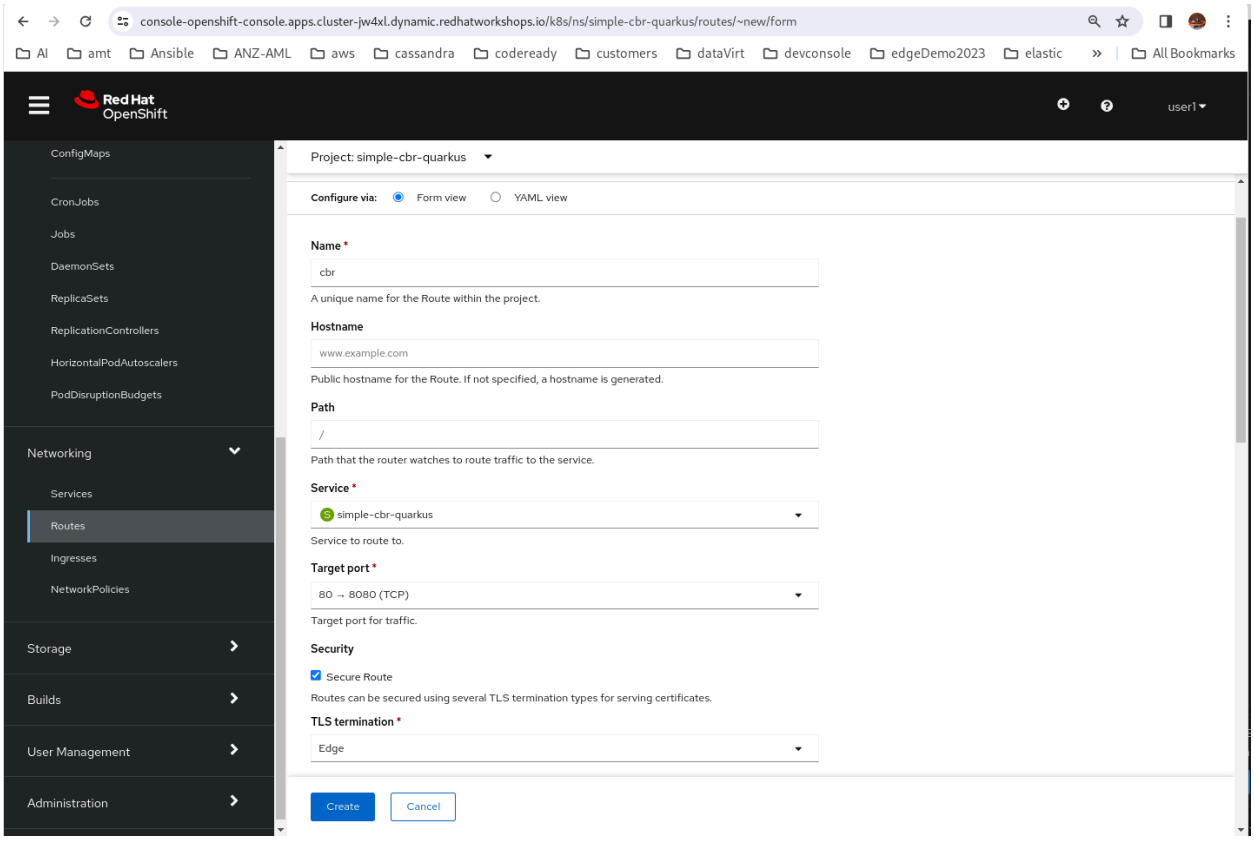
```
Unset
oc login -u yourUserName OpenShiftApiServerURL

oc new-project simple-cbr-quarkus

./mvnw clean install -Dquarkus.kubernetes.deploy=true -DskipTests
```

Log in the the OpenShift console:

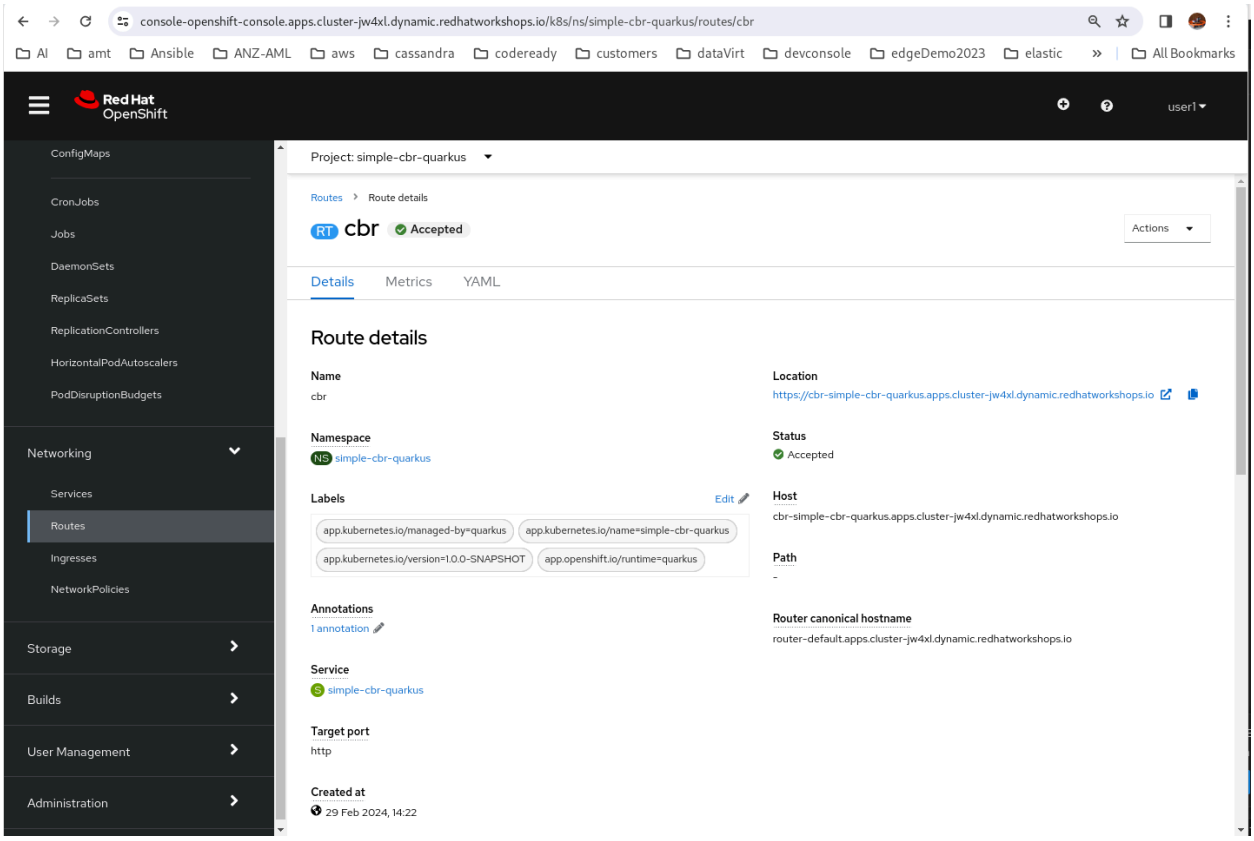
Select the Administrator tab and then Networking->Routes.
Create a route for the service which has been created by the mvnw command above.



Click on ‘Create Route’.



Enter the name and select from the drop down boxes as shown above and click ‘Create’



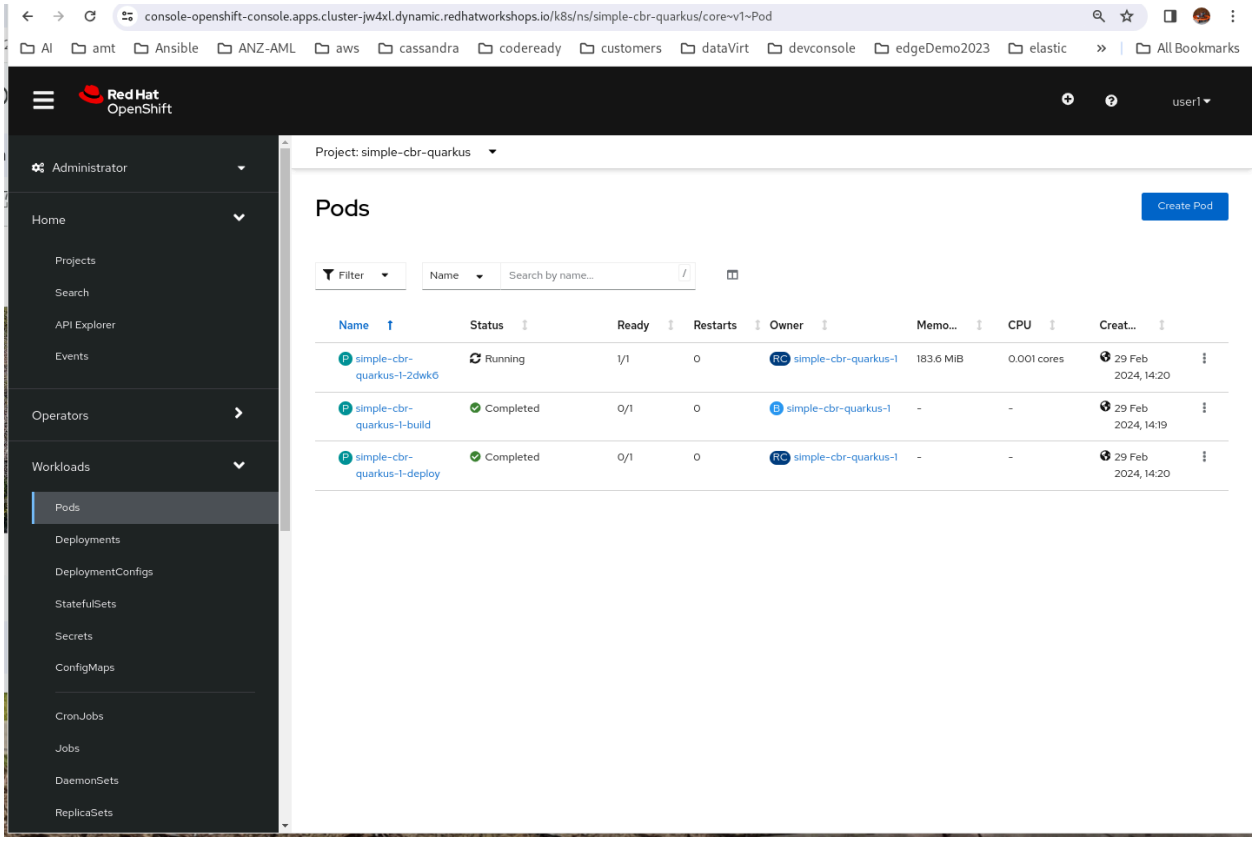
The route is shown at the ‘Location’. Use it to interact with your application.

Testing:
SImilar to what you did when testing locally. Only the URL is different. Your URL will be different when running in a different OpenShift environment.

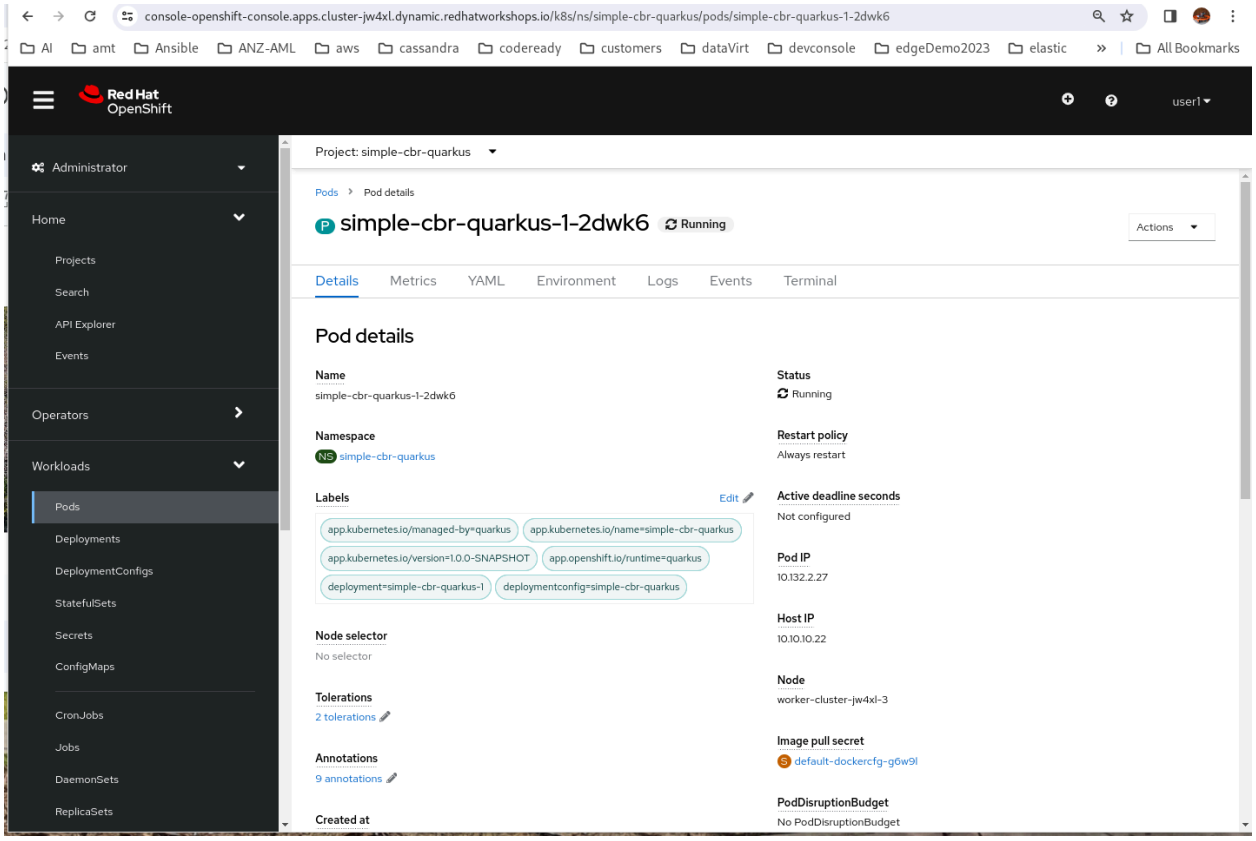
```
Unset

curl -X POST
https://cbr-simple-cbr-quarkus.apps.cluster-jw4xl.dynamic.redhatworkshops.io/su
bmitFruit \
  -H 'Content-Type: application/json' \
  -d '{"name": "Orange", "description": "Popular fruit"}' 2>/dev/null | jq

and

curl -X POST
https://cbr-simple-cbr-quarkus.apps.cluster-jw4xl.dynamic.redhatworkshops.io/su
bmitFruit \
  -H 'Content-Type: application/json' \
  -d '{"name": "Orange", "description": "Winter fruit"}' 2>/dev/null | jq
```

The results are in the pod's log file which you can access as follows:

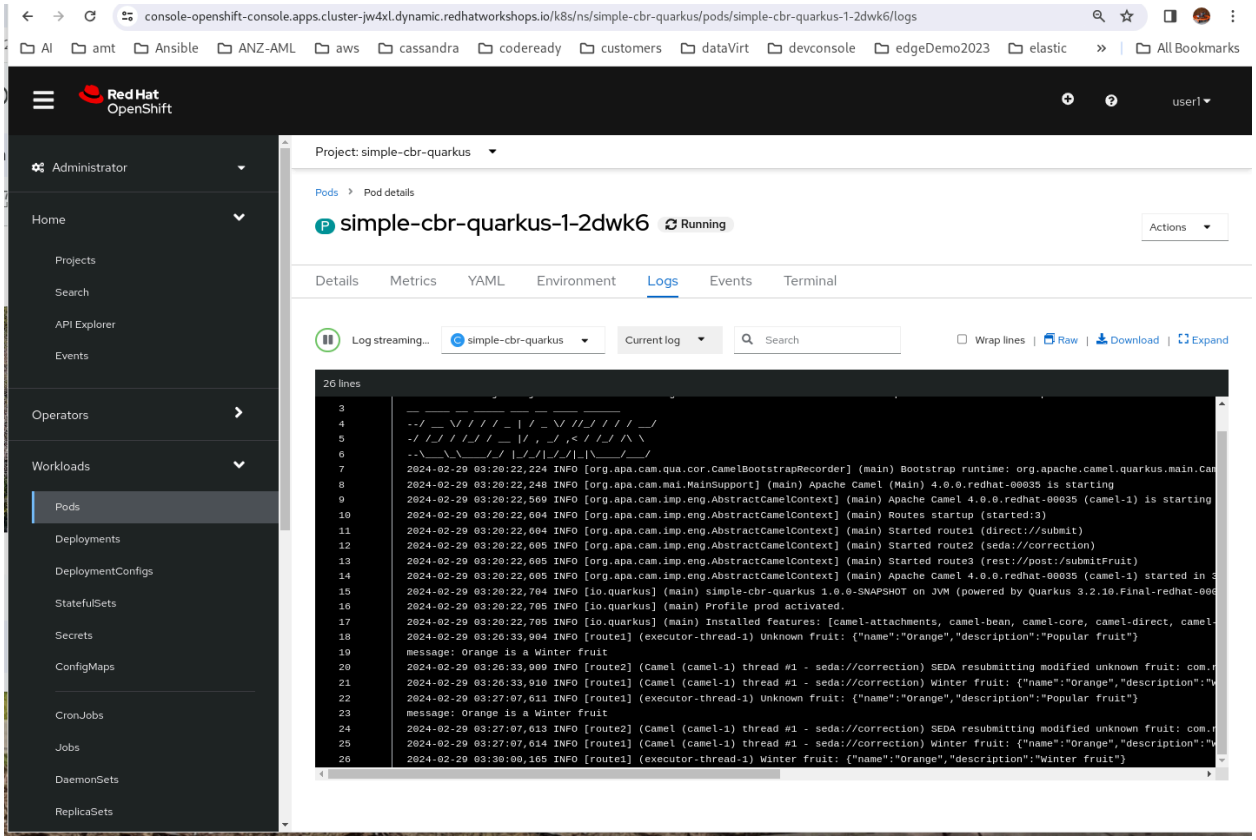
Login to the OpenShift Console.
Change to the Administrator tab. Click Workloads->Pods and select the simple-cbr-qurkus project near the top.



Click on the running simple-cbr-quarkus-... pod.



Click on Logs and you will see the log.


console-openshift-console.apps.cluster-jw4xl.dynamic.redhatworkshops.io/k8s/ns/simple-cbr-quarkus/pods/simple-cbr-quarkus-1-2dwk6/logs
Red Hat OpenShift
user1
Administrator
Home
Projects
Search
API Explorer
Events
Operators
Workloads
Pods
Deployments
DeploymentConfigs
StatefulSets
Secrets
ConfigMaps
CronJobs
Jobs
DaemonSets
ReplicaSets
Project: simple-cbr-quarkus
Pods > Pod details
simple-cbr-quarkus-1-2dwk6
Running
Actions
Details
Metrics
YAML
Environment
Logs
Events
Terminal
Log streaming...
simple-cbr-quarkus
Current log
Search
Wrap lines
Raw
Download
Expand
26 lines
2024-02-29 03:20:22,224 INFO [org.apa.cam.qua.cor.CamelBootstrapRecorder] (main) Bootstrap runtime: org.apache.camel.quarkus.main.Cam
2024-02-29 03:20:22,248 INFO [org.apa.cam.mai.MainSupport] (main) Apache Camel (Main) 4.0.0.redhat-00035 is starting
2024-02-29 03:20:22,569 INFO [org.apa.cam.imp.eng.AbstractCamelContext] (main) Apache Camel 4.0.0.redhat-00035 (camel-1) is starting
2024-02-29 03:20:22,604 INFO [org.apa.cam.imp.eng.AbstractCamelContext] (main) Routes startup (started:3)
2024-02-29 03:20:22,604 INFO [org.apa.cam.imp.eng.AbstractCamelContext] (main) Started route1 (direct://submit)
2024-02-29 03:20:22,605 INFO [org.apa.cam.imp.eng.AbstractCamelContext] (main) Started route2 (seda://correction)
2024-02-29 03:20:22,605 INFO [org.apa.cam.imp.eng.AbstractCamelContext] (main) Started route3 (rest://post:/submitFruit)
2024-02-29 03:20:22,605 INFO [org.apa.cam.imp.eng.AbstractCamelContext] (main) Apache Camel 4.0.0.redhat-00035 (camel-1) started in
2024-02-29 03:20:22,704 INFO [io.quarkus] (main) simple-cbr-quarkus 1.0.0-SNAPSHOT on JVM (powered by Quarkus 3.2.10.Final-redhat-00
2024-02-29 03:20:22,705 INFO [io.quarkus] (main) Profile prod activated.
2024-02-29 03:20:22,705 INFO [io.quarkus] (main) Installed features: [camel-attachments, camel-bean, camel-core, camel-direct, camel-
2024-02-29 03:26:33,904 INFO [route1] (executor-thread-1) Unknown fruit: {"name":"Orange","description":"Popular fruit"}
message: Orange is a Winter fruit
2024-02-29 03:26:33,909 INFO [route2] (Camel (camel-1) thread #1 - seda://correction) SEDA resubmitting modified unknown fruit: com.r
2024-02-29 03:26:33,910 INFO [route1] (Camel (camel-1) thread #1 - seda://correction) Winter fruit: {"name":"Orange","description":"W
2024-02-29 03:27:07,611 INFO [route1] (executor-thread-1) Unknown fruit: {"name":"Orange","description":"Popular fruit"}
message: Orange is a Winter fruit
2024-02-29 03:27:07,613 INFO [route2] (Camel (camel-1) thread #1 - seda://correction) SEDA resubmitting modified unknown fruit: com.r
2024-02-29 03:27:07,614 INFO [route1] (Camel (camel-1) thread #1 - seda://correction) Winter fruit: {"name":"Orange","description":"W
2024-02-29 03:30:00,165 INFO [route1] (executor-thread-1) Winter fruit: {"name":"Orange","description":"Winter fruit"}

2.0 Red Hat build of Apache Camel for Spring Boot

2.1 Your First Spring Boot Apache Camel Application

Generating a Camel for Spring Boot application skeleton using Maven.

From a terminal, run the command:

```
mvn archetype:generate \
 -DarchetypeGroupId=org.apache.camel.archetypes \
 -DarchetypeArtifactId=camel-archetype-spring-boot \
 -DarchetypeVersion=4.0.0.redhat-00045 \
 -DgroupId=com.redhat \
 -DartifactId=simple-eip-springboot \
 -Dversion=1.0-SNAPSHOT \
 -DinteractiveMode=false
```

The generated projects has the following directory structure:

```
├── pom.xml
└── src
    ├── main
    │   ├── java
    │   │   └── com
    │   │       └── redhat
    │   │           ├── MySpringBean.java
    │   │           ├── MySpringBootApplication.java
    │   │           └── MySpringBootRouter.java
    │   └── resources
    │       ├── application.properties
    │       └── META-INF
    │           ├── LICENSE.txt
    │           └── NOTICE.txt
    └── test
        ├── java
        │   └── com
        │       └── redhat
        │           └── MySpringBootApplicationTest.java
        └── resources
```

From VSCode, open the simple-eip folder and examine the source code ie, java and resources.

From a terminal window, execute the command:

```
Unset
mvn clean spring-boot:run
```

The above command may take some time to download the dependencies.

The result look like:

```
Unset
…
2024-02-22T07:26:25.344+11:00 INFO 47089 --- [      main]
o.a.c.impl.engine.AbstractCamelContext  : Routes startup (started:1)
2024-02-22T07:26:25.344+11:00 INFO 47089 --- [      main]
o.a.c.impl.engine.AbstractCamelContext  :   Started hello (timer://hello)
2024-02-22T07:26:25.344+11:00 INFO 47089 --- [      main]
o.a.c.impl.engine.AbstractCamelContext  : Apache Camel 4.0.0.redhat-00036
(MyCamel) started in 15ms (build:0ms init:0ms start:15ms)
2024-02-22T07:26:25.348+11:00 INFO 47089 --- [      main]
com.redhat.MySpringBootApplication    : Started MySpringBootApplication in 2.976
seconds (process running for 3.399)
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
Hello World
```

It should be clear by now that the application has nothing to do with EIP, yet. We just want to see that the generated simple Apache Camel application is working.

We are now converting the application to do the following:

- This app is very similar to the Quarkus 1.3 app. The difference is that it uses a timer to generate a random Fruit object and passes it through the routes. The output will be similar to that of Quarkus app 1.3. This is to show you how similar the source code are when using Camel in Quarkus and Spring Boot..
- Deploy your application to OpenShift

2.2 An Application Using EIPs

This application demonstrates the use of Content-based Routing, WireTap EIPs using additional Camel components(jsonpath, qson, SEDA, Bean) and a Processor.

It is very similar to the simple-cbr-quarkus project. The difference is that it uses a timer and a Bean (MySpringBean) to generate a random fruit and submit it to the “direct:submit” endpoint every 10 seconds instead of relying on a user to call a Rest API. Some of the generated fruit will have a description and/or name not known to the MySpringBean ending up exercising all the defined routes eventually.

We are going to change the ‘simple-eip’project.

If you have the feeling that you have seen the code before, that is correct. You have seen most of the code in projects described in this document.

Open that folder using your VSCode IDE

Add the following dependencies to the pom.xml file:
Note that unlike Quarkus, you have to manually add the dependencies to the pom.xml file.

```
Unset
…
  <dependency>
   <groupId>org.apache.camel.springboot</groupId>
   <artifactId>camel-jsonpath-starter</artifactId>
  </dependency>
  <dependency>
   <groupId>org.apache.camel.springboot</groupId>
   <artifactId>camel-seda-starter</artifactId>
  </dependency>
       <dependency>
       <groupId>org.apache.camel.springboot</groupId>
       <artifactId>camel-jackson-starter</artifactId>
</dependency>
  <dependency>
   <groupId>org.apache.camel</groupId>
   <artifactId>camel-gson</artifactId>
   <version>4.0.0</version>
  </dependency>
```

```
  <dependency>
    <groupId>jakarta.enterprise</groupId>
    <artifactId>jakarta.enterprise.cdi-api</artifactId>
    <version>3.0.0</version>
  </dependency>
…
```

Add file simple-eip-springboot/src/main/java/com/redhat/Fruit.java
Paste in the content:

```java
package com.redhat;

import java.util.Objects;


public class Fruit {
  private String name;
  private String description;

  public Fruit() {
  }

  public Fruit(String name, String description) {
    this.name = name;
    this.description = description;
  }

  public String getName() {
    return name;
  }

  public void setName(String name) {
    this.name = name;
  }

  public String getDescription() {
    return description;
  }

  public void setDescription(String description) {
    this.description = description;
  }
```

```
  @Override
  public boolean equals(Object obj) {
    if (!(obj instanceof Fruit)) {
      return false;
    }

    Fruit other = (Fruit) obj;

    return Objects.equals(other.name, this.name);
  }

  @Override
  public int hashCode() {
    return Objects.hash(this.name);
  }

}
```

Add file simple-eip-springboot/src/main/java/com/redhat/LookupProcessor.java
Paste in the content:

```java
package com.redhat;

import java.util.Map;
import java.util.HashMap;

import jakarta.enterprise.context.ApplicationScoped;
import jakarta.inject.Named;
import org.apache.camel.Exchange;
import org.apache.camel.Processor;
import org.apache.camel.Message;

@ApplicationScoped
@Named
public class LookupProcessor implements Processor {

  private final String WINTER_FRUIT = "Winter fruit";
  private final String TROPICAL_FRUIT = "Tropical fruit";
  private final String SUPER_FRUIT = "Super fruit";
  private final String UNKNOWN_FRUIT = "Unknown fruit";
```

```
  private final Map<String, String> descMap = new HashMap<>();

  public LookupProcessor() {

    descMap.put("Apple", WINTER_FRUIT);
    descMap.put("Kiwi", WINTER_FRUIT);
    descMap.put("Pear", WINTER_FRUIT);
    descMap.put("Orange", WINTER_FRUIT);
    descMap.put("Pineapple", TROPICAL_FRUIT);
    descMap.put("Durian", TROPICAL_FRUIT);
    descMap.put("Lychee", TROPICAL_FRUIT);
    descMap.put("Mango", TROPICAL_FRUIT);
    descMap.put("Avocado", SUPER_FRUIT);
    descMap.put("Plum", SUPER_FRUIT);
    descMap.put("Strawberry", SUPER_FRUIT);
    descMap.put("Peaches", SUPER_FRUIT);

  }

  public boolean lookup(String fruit) {
    if (descMap.containsKey(fruit)) {
      return true;
    }
    return false;

  }

  public String lookupDescription(String fruit) {
    if (lookup(fruit)) {
      return descMap.get(fruit);
    }
    return UNKNOWN_FRUIT;
  }

  @Override
  public void process(Exchange exchange) {
    Message msg = exchange.getMessage();
    Fruit fruit = msg.getBody(Fruit.class);
    fruit.setDescription(lookupDescription(fruit.getName()));
    System.out.println("message: " + fruit.getName() + " is a " +
fruit.getDescription() );
  }

}
```

Open file simple-eip-springboot/src/main/java/com/redhat/MySpringBean.java
Replace the content with:

```java
package com.redhat;

import org.springframework.stereotype.Component;

@Component("myBean")
public class MySpringBean {

  static final String[] fruitName = new String[] {
    "Apple", "Banana",
    "Kiwi", "Grape",
    "Pear", "Strawberry",
    "Orange", "Melon",
    "Pineapple", "Blueberry",
    "Durian", "Mandarin",
    "Lychee", "Peach",
    "Mango", "Raspberry",
    "Avocado", "Blackberry",
    "Plum", "Lemon",
    "Strawberry", "Line",
    "Peaches", "Grapefruit"
  };

  static final String[] fruitDescription = new String[] {
    "Winter fruit", "Tropical fruit",
    "Super fruit", "Popular fruit",
    "Summer fruit", "Autumn fruit",
    "Spring fruit", "Seasonal fruit"
  };

  public Fruit getFruit() {
    int nameIndex = (int) (Math.random() * fruitName.length);
    int descIndex = (int) (Math.random() * fruitDescription.length);
    return new Fruit(fruitName[nameIndex], fruitDescription[descIndex]);
  }

}
```

Open file simple-eip-springboot/src/main/java/com/redhat/MySpringBootRouter.java
Replace the content with:

Java

```java
package com.redhat;

import org.apache.camel.builder.RouteBuilder;
import org.springframework.stereotype.Component;
import org.apache.camel.component.jackson.JacksonDataFormat;
import org.apache.camel.model.dataformat.JsonLibrary;

@Component
public class MySpringBootRouter extends RouteBuilder {

  @Override
  public void configure() {
    from("timer:generate?period={{timer.period}}")
      .transform().method("myBean", "getFruit")
      .to("direct:submit");

    from("direct:submit")
      .marshal().json(JsonLibrary.Gson)
      .choice()
        .when().jsonpath("$[?(@.description == 'Winter fruit')]")
          .log("Winter fruit: ${body}")
        .when().jsonpath("$[?(@.description == 'Tropical fruit')]")
          .log("Tropical fruit: ${body}")
        .when().jsonpath("$[?(@.description == 'Super fruit')]")
          .log("Super fruit: ${body}")
        .otherwise()
          .wireTap("seda:correction")
          .log("Unknown fruit: ${body}");

    from("seda:correction")
      .choice()
        .when().jsonpath("$[?(@.description != 'Unknown fruit')]")
          .unmarshal().json(JsonLibrary.Jackson, Fruit.class)
          .process("lookupProcessor")
          .log("SEDA resubmitting modified unknown fruit: ${body}")
          .to("direct:submit")
        .otherwise()
          .log("SEDA ignoring fruit with unknown description: ${body}");
  }
}
```

Open the file simple-eipl-quarkus/src/main/resources/application.properties
Replace the entry:

```
Unset
# how often to trigger the timer
timer.period = 2000
```

With

```
Unset
# how often to trigger the timer
timer.period = 10000
```

And run the following command in a terminal:

```
Unset
mvn clean spring-boot:run
```

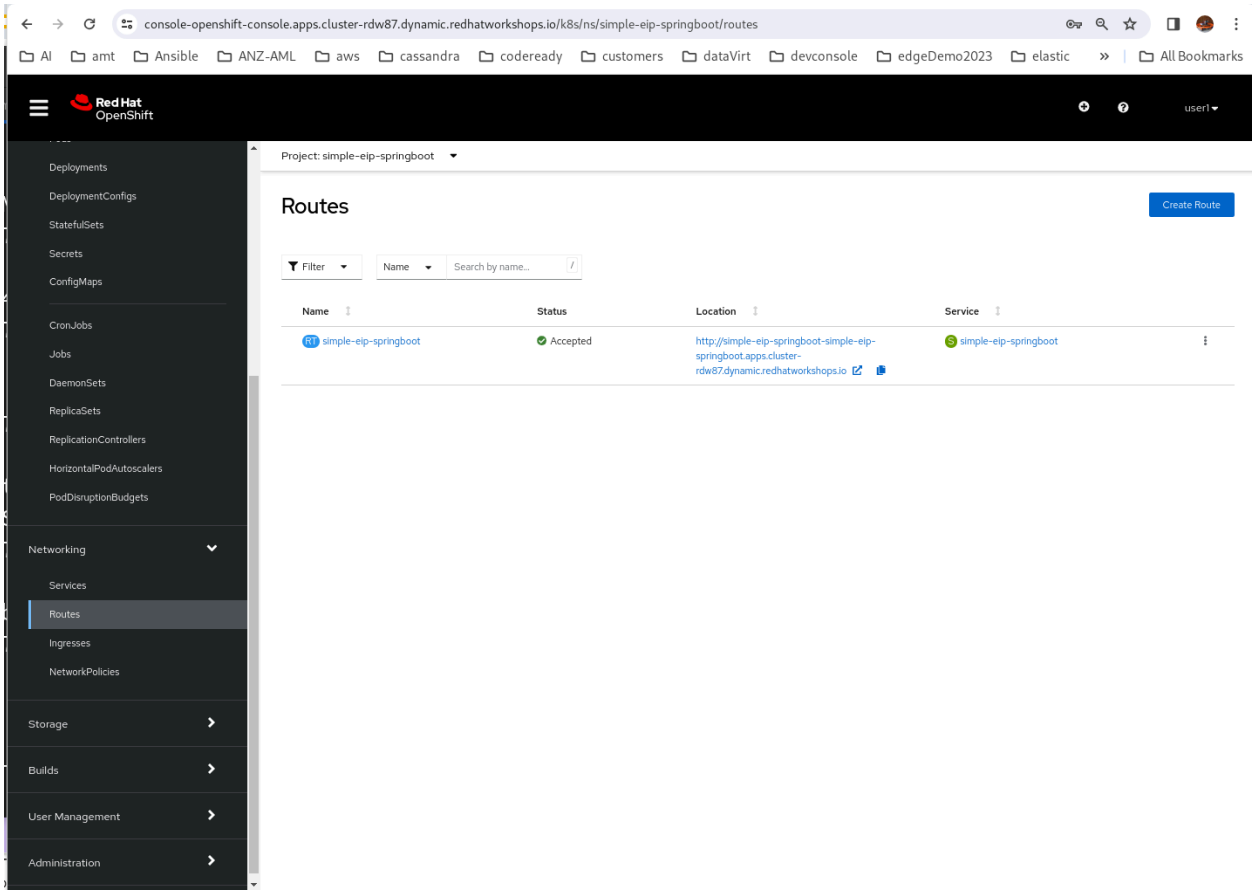
You will see in the console a randomly generated fruit with name and description go through the routes every 10 seconds. You can interpret the log entries as described for the output of Quarkus app 1.3.

Deploying to OpenShift

cd to your project.
And execute the following command:

```
Unset
oc login -u yourUserName OpenShiftApiServerURL

oc new-project simple-eip-springboot

mvn -Popenshift oc:deploy -DskipTests
```

Log in the the OpenShift console:
Select the Administrator tap and then Networking->Routes
Select the project simple-eip-springboot



The route has already been created by the deployment but we do not need the route for this app as the result can be observed in the logs.

Testing:
Here is another way of looking at the log from the command line instead of from the OpenShift Console.
Assuming you are still in the OpenShift simple-eip-springbooot project, find out the pod name of your app.

```
Unset
oc get pod

or

oc get pod -n simple-eip-springboot
```

And you should see something like this:

```
Unset

NAME                                READY   STATUS      RESTARTS   AGE
simple-eip-springboot-1-deploy      0/1     Completed   0          10m
simple-eip-springboot-1-tnx82       1/1     Running     0          10m
simple-eip-springboot-s2i-1-build   0/1     Completed   0          11m
```

Identify the running pod. In this case, it is simple-eip-springboot-1-tnx82. In your case it will have a different name.
Access the log as follows from a terminal:

```
Unset
oc logs -f simple-eip-springboot-1-tnx82
```

And you will see the similar log entries as you saw on the Spring Boot console when you run the app locally using ‘mvn clean spring-boot:run’.
The -f option stands for follow meaning it will continually update the screen with the latest log entries.
Make sure you understand what you are seeing as described previously.

And that’s it folks!