

# Quarkus - Google Cloud Functions (Serverless) with RESTEasy, Undertow, or Vert.x Web

The `quarkus-google-cloud-functions-http` extension allows you to write microservices with RESTEasy (JAX-RS), Undertow (servlet) or Vert.x Web, and make these microservices deployable to the Google Cloud Functions runtime.

One Google Cloud Functions deployment can represent any number of JAX-RS, servlet, or Vert.x Web endpoints.

As the Google Cloud Function Java engine is a new Beta feature of Google Cloud, this extension is flagged as experimental.



This technology is considered experimental.

In *experimental* mode, early feedback is requested to mature the idea. There is no guarantee of stability nor long term presence in the platform until the solution matures. Feedback is welcome on our [mailing list](#) or as issues in our [GitHub issue tracker](#).

For a full list of possible extension statuses, check our [FAQ entry](#).

## Prerequisites

To complete this guide, you need:

- less than 15 minutes
- JDK 11 (Google Cloud Functions requires JDK 11)
- Apache Maven 3.6.3
- [A Google Cloud Account](#). Free accounts work.
- [Cloud SDK CLI Installed](#)

## Solution

This guide walks you through generating a sample project followed by creating three HTTP endpoints written with JAX-RS APIs, Servlet APIs or Vert.x Web APIs. Once built, you will be able to deploy the project to Google Cloud.

# Creating the Maven Deployment Project

Create an application with the `quarkus-google-cloud-functions-http` extension. You can use the following Maven command to create it:

```
mvn io.quarkus:quarkus-maven-plugin:1.6.0.Final:create \
  -DprojectId=org.acme \
  -DprojectArtifactId=google-cloud-functions-http \
  -DclassName="org.acme.quickstart.GreetingResource" \
  -Dpath="/hello" \
  -Dextensions="google-cloud-functions-http,resteasy
  -json,undertow,vertx-web"
```

## Login to Google Cloud

Login to Google Cloud is necessary for deploying the application and it can be done as follows:

```
gcloud auth login
```

At the time of this writing, Cloud Functions are still in beta so make sure to install the `beta` command group.

```
gcloud components install beta
```

## Creating the endpoints

For this example project, we will create three endpoints, one for RESTEasy (JAX-RS), one for Undertow (Servlet) and one for Vert.x Web (reactive routes).

If you don't need endpoints of each type, you can remove the corresponding extensions from your `pom.xml`.

## The JAX-RS endpoint

```

import javax.ws.rs.GET;
import javax.ws.rs.Path;
import javax.ws.rs.Produces;
import javax.ws.rs.core.MediaType;

@Path("/hello")
public class GreetingResource {

    @GET
    @Produces(MediaType.TEXT_PLAIN)
    public String hello() {
        return "hello";
    }
}

```

## The Servlet endpoint

```

import java.io.IOException;

import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

@WebServlet(name = "ServletGreeting", urlPatterns = {
    "/servlet/hello"})
public class GreetingServlet extends HttpServlet {
    @Override
    protected void doGet(HttpServletRequest req,
        HttpServletResponse resp) throws ServletException, IOException {
        resp.setStatus(200);
        resp.addHeader("Content-Type", "text/plain");
        resp.getWriter().write("hello");
    }

    @Override
    protected void doPost(HttpServletRequest req,
        HttpServletResponse resp) throws ServletException, IOException {
        String name = req.getReader().readLine();
        resp.setStatus(200);
        resp.addHeader("Content-Type", "text/plain");
        resp.getWriter().write("hello " + name);
    }
}

```

## The Vert.x Web endpoint

```
import static io.vertx.core.http.HttpMethod.GET;

import io.quarkus.vertx.web.Route;
import io.vertx.ext.web.RoutingContext;

public class GreetingRoutes {
    @Route(path = "/vertx/hello", methods = GET)
    void hello(RoutingContext context) {
        context.response().headers().set("Content-Type",
"text/plain");
        context.response().setStatusCode(200).end("hello");
    }
}
```

## Build and Deploy to Google Cloud



Quarkus forces a packaging of type `uber-jar` for your function as Google Cloud Function deployment requires a single JAR.

Package your application using the standard `mvn clean package` command. The result of the previous command is a single JAR file inside the `target/deployment` directory that contains the classes and the dependencies of the project.

Then you will be able to use `gcloud` to deploy your function to Google Cloud.

```
gcloud beta functions deploy quarkus-example-http \
  --entry-point=io.quarkus.gcp.functions.http.QuarkusHttpFunction \
  --runtime=java11 --trigger-http --source=target/deployment
```



The entry point must always be set to `io.quarkus.gcp.functions.http.QuarkusHttpFunction` as this is the class that integrates Cloud Functions with Quarkus.



The first time you launch this command, you can have the following error message:

```
ERROR: (gcloud.beta.functions.deploy) OperationError:
code=7, message=Build Failed: Cloud Build has not been
used in project <project_name> before or it is
disabled. Enable it by visiting
https://console.developers.google.com/apis/api/cloudbui
ld.googleapis.com/overview?project=<my-project> then
retry.
```

This means that Cloud Build is not activated yet. To overcome this error, open the URL shown in the error, follow the instructions and then wait a few minutes before retrying the command.

This command will give you as output a `httpsTrigger.url` that points to your function.

You can then call your endpoints via:

- For JAX-RS: `{httpsTrigger.url}/hello`
- For servlet: `{httpsTrigger.url}/servlet/hello`
- For Vert.x Web: `{httpsTrigger.url}/vertx/hello`

## Testing locally

The easiest way to locally test your function is using the Cloud Function invoker JAR.

You can download it via Maven using the following command:

```
mvn dependency:copy \
  -Dartifact='com.google.cloud.functions.invoker:java-function
  -invoker:1.0.0-beta1' \
  -DoutputDirectory=.
```

Then you can use it to launch your function locally.

```
java -jar java-function-invoker-1.0.0-beta1.jar \
  --classpath target/deployment/google-cloud-functions-http-1.0-
  SNAPSHOT-runner.jar \
  --target io.quarkus.gcp.functions.http.QuarkusHttpFunction
```

Your endpoints will be available on <http://localhost:8080>.