

# Quarkus - Scripting with Quarkus

Quarkus provides integration with [jbang](#) which allows you to write java scripts/applications requiring no maven nor gradle to get running.

In this guide, we will see how you can write a REST application using just a single java file.



This technology is considered preview.

In *preview*, backward compatibility and presence in the ecosystem is not guaranteed. Specific improvements might require to change configuration or APIs and plans to become *stable* are under way. 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 5 minutes
- [jbang v0.40.3+](#)
- an IDE
- GraalVM installed if you want to run in native mode

## Solution

Normally we would link to a Git repository to clone but in this case there is no additional files than the following:

```

//usr/bin/env jbang "$0" "$@" ; exit $?
//DEPS io.quarkus:quarkus-resteasy:999-SNAPSHOT
//JAVAC_OPTIONS -parameters
//JAVA_OPTIONS
-Djava.util.logging.manager=org.jboss.logmanager.LogManager

import io.quarkus.runtime.Quarkus;
import javax.enterprise.context.ApplicationScoped;
import javax.inject.Inject;
import javax.ws.rs.GET;
import javax.ws.rs.Path;
import javax.ws.rs.Produces;
import javax.ws.rs.core.MediaType;
import org.jboss.resteasy.annotations.jaxrs.PathParam;
import org.jboss.logging.Logger;

@Path("/hello")
@ApplicationScoped
public class quarkusapp {

    @GET
    public String sayHello() {
        return "hello";
    }

    public static void main(String[] args) {
        Quarkus.run(args);
    }

    @Inject
    GreetingService service;

    @GET
    @Produces(MediaType.TEXT_PLAIN)
    @Path("/greeting/{name}")
    public String greeting(@PathParam String name) {
        return service.greeting(name);
    }

    @ApplicationScoped
    static public class GreetingService {

        public String greeting(String name) {
            return "hello " + name;
        }
    }
}

```

# Architecture

In this guide, we create a straightforward application serving a **hello** endpoint with a single source file, no additional build files like **pom.xml** or **build.gradle** needed. To demonstrate dependency injection, this endpoint uses a **greeting** bean.



## Creating the initial file

First, we need a java file. jbang lets you create an initial version using:

```
jbang scripting/quarkusapp.java  
cd scripting
```

This command generates a .java file that you can directly run on Linux and OS X, i.e. **./quarkusapp.java** - on Windows you need to use **jbang quarkusapp.java**

This initial version will print **Hello World** when run.

Once generated, look at the **quarkusapp.java**.

You will find at the top a line looking like this:

```
//usr/bin/env jbang "$0" "$@" ; exit $?
```

This line is what on Linux and OS X allows you to run it as a script. On Windows this line is ignored.

The next line

```
// //DEPS <dependency1> <dependency2>
```

Is illustrating how you add dependencies to this script. This is a feature of **jbang**.

Go ahead and update this line to include the **quarkus-resteasy** dependency like so:

```
//DEPS io.quarkus:quarkus-resteasy:1.8.0.Final
```

Now, run **jbang quarkusapp.java** and you will see **jbang** resolving this dependency and building the jar with help from Quarkus jbang integration.

```
$ jbang quarkusapp.java
jbang quarkusapp.java
[jbang] Resolving dependencies...
[jbang] Resolving io.quarkus:quarkus-
resteasy:1.8.0.Final...Done
[jbang] Dependencies resolved
[jbang] Building jar...
[jbang] Post build with io.quarkus.launcher.JBangIntegration
Aug 30, 2020 5:40:55 AM org.jboss.threads.Version <clinit>
INFO: JBoss Threads version 3.1.1.Final
Aug 30, 2020 5:40:56 AM io.quarkus.deployment.QuarkusAugmentor run
INFO: Quarkus augmentation completed in 722ms
Hello World
```

For now the application does nothing new.



*How do I edit this file and get content assist ?*

As there is nothing but a `.java` file most IDE's does not handle content assist well. To work around that you can run `jbang edit quarkusapp.java` which will print out a directory that will have a temporary project setup you can use in your IDE.

On Linux/OSX you can run `<idecommand> `jbang edit quarkusapp.java``.

If you add dependencies while editing you can get jbang to automatically refresh the IDE project using `jbang edit --live=<idecommand> quarkusapp.java`.

## The JAX-RS resources

Now let us replace the class with one that uses Quarkus features.

```
import io.quarkus.runtime.Quarkus;
import javax.enterprise.context.ApplicationScoped;
import javax.ws.rs.GET;
import javax.ws.rs.Path;

@Path("/hello")
@ApplicationScoped
public class quarkusapp {

    @GET
    public String sayHello() {
        return "hello";
    }

    public static void main(String[] args) {
        Quarkus.run(args);
    }
}
```

It's a very simple class with a main method that starts Quarkus with a REST endpoint, returning "hello" to requests on "/hello".



*Why is the **main** method there ?*

A **main** method is currently needed for the **jbang** integration to work - will be possible to remove in the future.

## Running the application

Now when you run the application you will see Quarkus start up.

Use: **jbang quarkusapp.java**:

```

$ jbang quarkusapp.java
jbang quarkusapp.java
[jbang] Building jar...
[jbang] Post build with io.quarkus.launcher.JBangIntegration
Aug 30, 2020 5:49:01 AM org.jboss.threads.Version <clinit>
INFO: JBoss Threads version 3.1.1.Final
Aug 30, 2020 5:49:02 AM io.quarkus.deployment.QuarkusAugmentor run
INFO: Quarkus augmentation completed in 681ms

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--\ _ _ \ _ _ \ / / | _ / | _ / | _ | \ _ _ /
2020-08-30 05:49:03,255 INFO [io.quarkus] (main) Quarkus
1.8.0.Final on JVM started in 0.638s. Listening on:
http://0.0.0.0:8080
2020-08-30 05:49:03,272 INFO [io.quarkus] (main) Profile prod
activated.
2020-08-30 05:49:03,272 INFO [io.quarkus] (main) Installed
features: [cdi, resteasy]

```

Once started, you can request the provided endpoint:

```

$ curl -w "\n" http://localhost:8080/hello
hello

```

Hit **CTRL+C** to stop the application, or keep it running and enjoy the blazing fast hot-reload.



*Automatically add newline with `curl -w "\n"`*

We are using `curl -w "\n"` in this example to avoid your terminal printing a '%' or put both result and next command prompt on the same line.



*Why is `quarkus-resteasy` not resolved ?*

In this second run you should not see a line saying it is resolving `quarkus-resteasy` as jbang caches the dependency resolution between runs. If you want to clear the caches to force resolution use `jbang cache clear`

## Using injection

Dependency injection in Quarkus is based on ArC which is a CDI-based dependency injection solution tailored for Quarkus' architecture. You can learn more about it in the [Contexts and Dependency Injection guide](#).

ArC comes as a dependency of `quarkus-resteasy` so you already have it handy.

Let's modify the application and add a companion bean.

Normally you would add a separate class, but as we are aiming to have it all in one file you will add a nested class.

Add the following **inside** the `quarkusapp` class body.

```
@ApplicationScoped
static public class GreetingService {

    public String greeting(String name) {
        return "hello " + name;
    }

}
```

#### *Use of nested static public classes*

We are using a nested static public class instead of a top level class for two reasons:



1. jbang currently does not currently support multiple source files
2. All Java frameworks relying on introspection have challenges using top level classes as they are not as visible as public classes; and in java there can only be one top level public class in a file.

Edit the `quarkusapp` class to inject the `GreetingService` and create a new endpoint using it, you should end up with something like:

```

//usr/bin/env jbang "$0" "$@" ; exit $?
//DEPS io.quarkus:quarkus-resteasy:999-SNAPSHOT

import io.quarkus.runtime.Quarkus;
import javax.enterprise.context.ApplicationScoped;
import javax.inject.Inject;
import javax.ws.rs.GET;
import javax.ws.rs.Path;
import javax.ws.rs.Produces;
import javax.ws.rs.core.MediaType;
import org.jboss.resteasy.annotations.jaxrs.PathParam;

@Path("/hello")
@ApplicationScoped
public class quarkusapp {

    @GET
    public String sayHello() {
        return "hello from Quarkus with jbang.dev";
    }

    public static void main(String[] args) {
        Quarkus.run(args);
    }

    @Inject
    GreetingService service;

    @GET
    @Produces(MediaType.TEXT_PLAIN)
    @Path("/greeting/{name}")
    public String greeting(@PathParam String name) {
        return service.greeting(name);
    }

    @ApplicationScoped
    static public class GreetingService {

        public String greeting(String name) {
            return "hello " + name;
        }
    }
}

```

Now when you run `jbang quarkusapp.java` you can check what the new end point returns:



```
$ curl -w "\n" http://localhost:8080/hello/greeting/quarkus
hello null
```

Now that is unexpected, why is it returning `hello null` and not `hello quarkus` ?

The reason is that JAX-RS `@PathParam` relies on the `-parameters` compiler flag to be set to be able to map `{name}` to the `name` parameter.

We fix that by adding the following comment instruction to the file:

```
//JAVAC_OPTIONS -parameters
```

Now when you run with `jbang quarkusapp.java` the end point should return what you expect:

```
$ curl -w "\n" http://localhost:8080/hello/greeting/quarkus
hello quarkus
```

## Debugging

To debug the application you use `jbang --debug quarkusapp.java` and you can use your IDE to connect on port 4004; if you want to use the more traditional Quarkus debug port you can use `jbang --debug=5005 quarkusapp.java`.

Note: `jbang` debugging always suspends thus you need to connect the debugger to have the application run.

## Logging

To use logging in Quarkus scripting with `jbang` you do as usual, with configuring a logger, i.e.

```
public static final Logger LOG =
    Logger.getLogger(quarkusapp.class);
```

To get it to work you need to add a java option to ensure the logging is initialized properly, i.e.

```
//JAVA_OPTIONS
-Djava.util.logging.manager=org.jboss.logmanager.LogManager
```

With that in place running `jbang quarkusapp.java` will log and render as expected.

# Configuring Application

You can use `//Q:CONFIG <property>=<value>` to setup static configuration for your application.

i.e. if you wanted to add the `smallrye-openapi` and `swagger-ui` and have the swagger-ui always show up you would add the following:

```
//DEPS io.quarkus:quarkus-smallrye-openapi:1.8.0.Final
//DEPS io.quarkus:quarkus-swagger-ui:1.8.0.Final
//Q:CONFIG quarkus.swagger-ui.always-include=true
```

Now during build the `quarkus.swagger-ui.always-include` will be generated into the resulting jar and `http://0.0.0.0:8080/swagger-ui` will be available when run.

## Running as a native application

If you have `native-image` binary installed and `GRAALVM_HOME` set you can get native binary built and run using `jbang --native quarkusapp.java`:

```
$ jbang --native quarkusapp
jbang --native quarkusapp.java
[jbang] Building jar...
[jbang] Post build with io.quarkus.launcher.JBangIntegration
Aug 30, 2020 6:21:15 AM org.jboss.threads.Version <clinit>
INFO: JBoss Threads version 3.1.1.Final
Aug 30, 2020 6:21:16 AM
io.quarkus.deployment.pkg.steps.JarResultBuildStep
buildNativeImageThinJar
INFO: Building native image source jar:
/var/folders/yb/sytszfld4sg8vwr1h0w20jlw0000gn/T/quarkus-
jbang3291688251685023074/quarkus-application-native-image-source-
jar/quarkus-application-runner.jar
Aug 30, 2020 6:21:16 AM
io.quarkus.deployment.pkg.steps.NativeImageBuildStep build
INFO: Building native image from
/var/folders/yb/sytszfld4sg8vwr1h0w20jlw0000gn/T/quarkus-
jbang3291688251685023074/quarkus-application-native-image-source-
jar/quarkus-application-runner.jar
Aug 30, 2020 6:21:16 AM
io.quarkus.deployment.pkg.steps.NativeImageBuildStep
checkGraalVMVersion
INFO: Running Quarkus native-image plugin on GraalVM Version 20.1.0
(Java Version 11.0.7)
Aug 30, 2020 6:21:16 AM
io.quarkus.deployment.pkg.steps.NativeImageBuildStep build
INFO: /Users/max/.sdkman/candidates/java/20.1.0.r11-grl/bin/native-
```

```
image -J-Djava.util.logging.manager=org.jboss.logmanager.LogManager
-J-Dsun.nio.ch.maxUpdateArraySize=100 -J-Dvertx.logger-delegate
-factory-class
-name=io.quarkus.vertx.core.runtime.VertxLogDelegateFactory -J
-Dvertx.disableDnsResolver=true -J
-Dio.netty.leakDetection.level=DISABLED -J
-Dio.netty allocator.maxOrder=1 -J-Duser.language=en -J
-Dfile.encoding=UTF-8 --initialize-at-build-time=
-H:InitialCollectionPolicy=com.oracle.svm.core.genscavenge.Collecti
onPolicy\$$BySpaceAndTime -H:+JNI -jar quarkus-application-
runner.jar -H:FallbackThreshold=0 -H:+ReportExceptionStackTraces
-H:--AddAllCharsets -H:EnableURLProtocols=http --no-server -H:
-UseServiceLoaderFeature -H:+StackTrace quarkus-application-runner
```

```
Aug 30, 2020 6:22:31 AM io.quarkus.deployment.QuarkusAugmentor run
INFO: Quarkus augmentation completed in 76010ms
```

```
--/ _ _ \ / / / / _ | / _ \ / / / / / / _ /
-/ / / / / / / _ | / , _ / , < / / / / \ \
--\ _ _ \ _ _ \ / / | _ / | _ / | _ | \ _ _ \ _ _ /
2020-08-30 06:22:32,012 INFO [io.quarkus] (main) Quarkus
1.8.0.Final native started in 0.017s. Listening on:
http://0.0.0.0:8080
2020-08-30 06:22:32,013 INFO [io.quarkus] (main) Profile prod
activated.
2020-08-30 06:22:32,013 INFO [io.quarkus] (main) Installed
features: [cdi, resteasy]
```

This native build will take some time on first run but any subsequent runs (without changing `quarkusapp.java`) will be close to instant:

```
$ jbang --native quarkusapp.java
```

```
--/ _ _ \ / / / / _ | / _ \ / / / / / / _ /
-/ / / / / / / _ | / , _ / , < / / / / \ \
--\ _ _ \ _ _ \ / / | _ / | _ / | _ | \ _ _ \ _ _ /
2020-08-30 06:23:36,846 INFO [io.quarkus] (main) Quarkus
1.8.0.Final native started in 0.015s. Listening on:
http://0.0.0.0:8080
2020-08-30 06:23:36,846 INFO [io.quarkus] (main) Profile prod
activated.
2020-08-30 06:23:36,846 INFO [io.quarkus] (main) Installed
features: [cdi, resteasy]
```

## Conclusion

If you want to get started with Quarkus or write something quickly, Quarkus Scripting with jbang lets you do that. No Maven, no Gradle - just a java file. In this guide we outlined the very basics on using Quarkus with jbang; if you want to learn more about what jbang can do go see <https://jbang.dev>.