



# Quarkus

## Create Your First Application

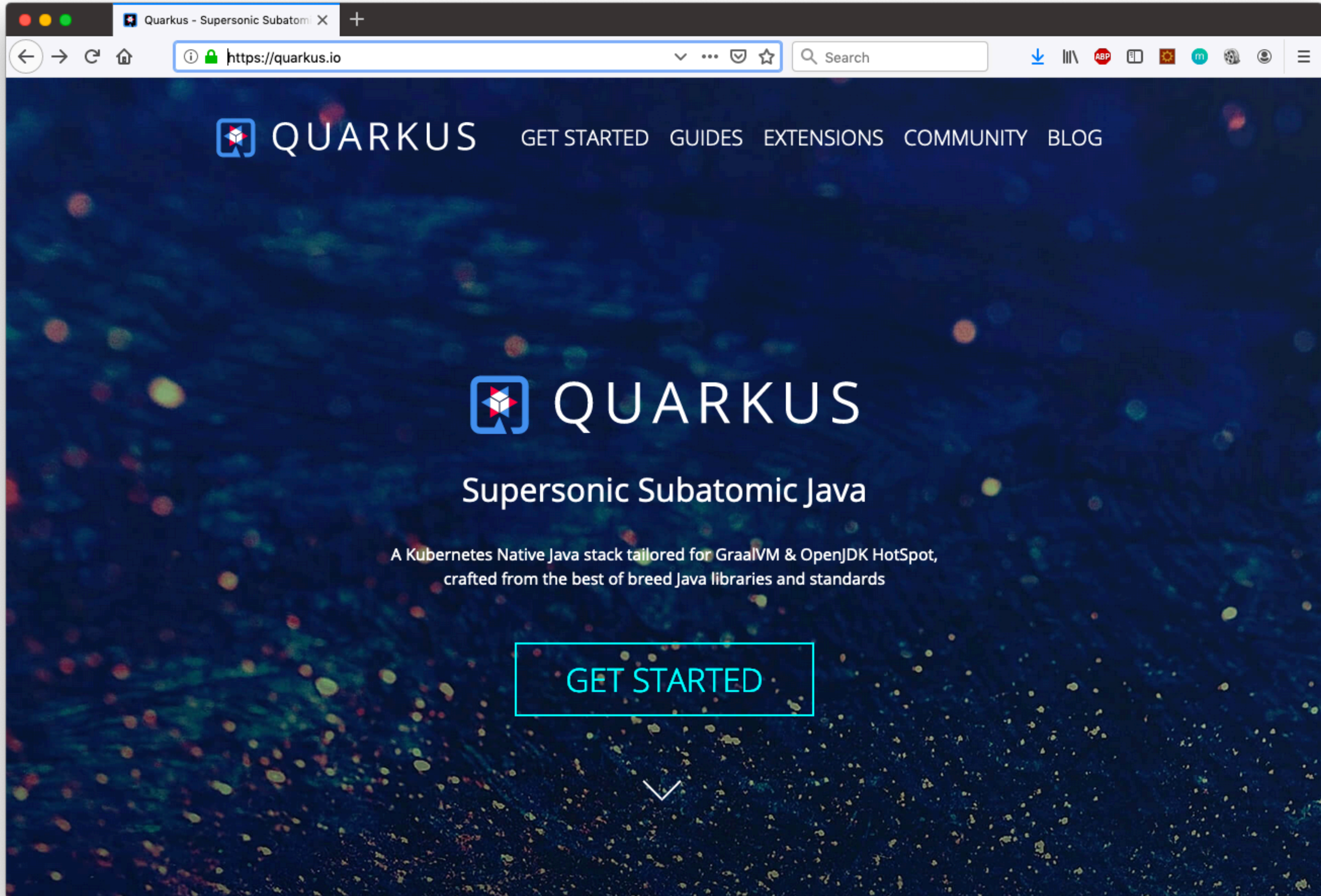
<https://quarkus.io/guides/getting-started-guide>

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# QUARKUS

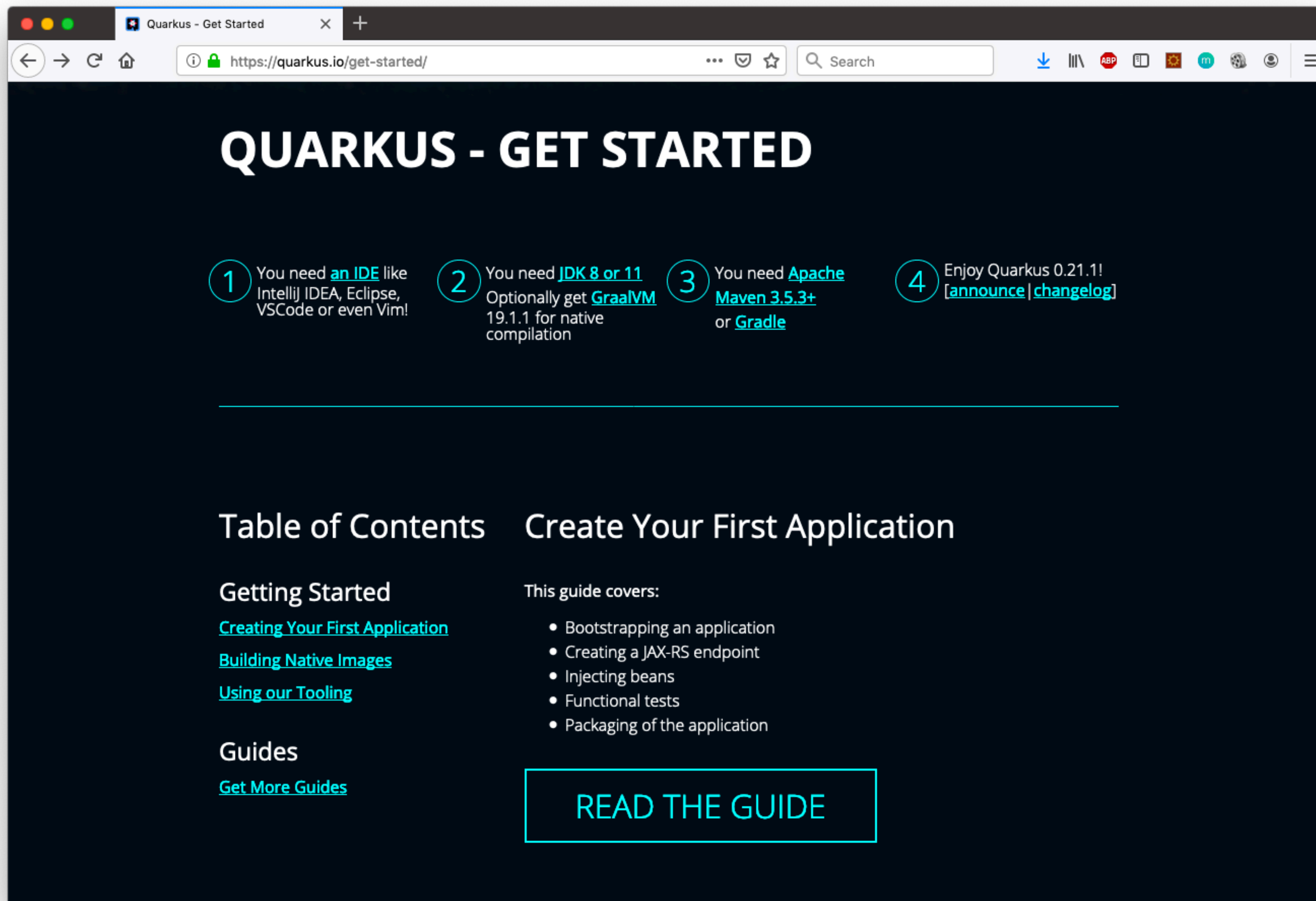
## Supersonic Subatomic Java

A Kubernetes Native Java stack tailored for GraalVM & OpenJDK HotSpot,  
crafted from the best of breed Java libraries and standards

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<https://quarkus.io/get-started/>

# QUARKUS - CREATING YOUR FIRST APPLICATION

Learn how to create a Hello World Quarkus app. This guide covers:

- Bootstrapping an application
- Creating a JAX-RS endpoint
- Injecting beans
- Functional tests
- Packaging of the application

## 1. Prerequisites

To complete this guide, you need:

- less than 15 minutes
- an IDE
- JDK 1.8+ installed with **JAVA\_HOME** configured appropriately
- Apache Maven 3.5.3+

1. Prerequisites
2. Architecture
3. Solution
4. Bootstrapping the project
  - 4.1. The JAX-RS resources
5. Running the application
6. Using injection
7. Development Mode
8. Testing
9. Packaging and run the application
10. Async
11. What's next?



## 2. Architecture

In this guide, we create a straightforward application serving a **hello** endpoint. To demonstrate dependency injection, this endpoint uses a **greeting** bean.



This guide also covers the testing of the endpoint.



# Bootstrapping the project

```
mvn io.quarkus:quarkus-maven-plugin:0.21.1:create \
-DprojectId=at.htl \
-DprojectId=getting-started \
-DclassName="at.htl.quickstart.GreetingResource" \
-Dpath="/hello"
```

It generates:

- the Maven structure
- an `org.acme.quickstart.GreetingResource` resource exposed on `/hello`
- an associated unit test
- a landing page that is accessible on `http://localhost:8080` after starting the application
- example `Dockerfile` files for both `native` and `jvm` modes
- the application configuration file



```
Default (bash) 1
[INFO] Building Maven Stub Project (No POM) 1
[INFO] -----[ pom ]-----
[INFO]
[INFO] --- quarkus-maven-plugin:0.21.1:create (default-cli) @ standalone-pom ---
Creating a new project in /Users/stuetz/CloudStation/htl/skripten/themen/javaee/quarkus/demo/getting-started/.
[INFO]
[INFO] Maven Wrapper version 0.5.5 has been successfully set up for your project.
[INFO] Using Apache Maven: 3.6.1
[INFO] Repo URL in properties file: https://repo.maven.apache.org/maven2
[INFO]
[INFO]
[INFO] =====
[INFO] Your new application has been created in /Users/stuetz/CloudStation/htl/skripten/themen/javaee/quarkus/demo/getting-started/.
[INFO] Navigate into this directory and launch your application with mvn compile quarkus:dev
[INFO] Your application will be accessible on http://localhost:8080
[INFO] =====
[INFO]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 2.906 s
[INFO] Finished at: 2019-08-30T14:11:44+02:00
[INFO] -----
Toms-MBP:getting-started stuetz$
```



# Starten des Projekts

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

```
Default (java)
-spi-0.21.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/io/quarkus/quarkus-jaxb-deployment/0.21.1/quarkus-jaxb-deployment-0.21.1.jar (11 kB at 32 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/io/quarkus/quarkus-undertow-deployment/0.21.1/quarkus-undertow-deployment-0.21.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/io/quarkus/quarkus-resteasy-server-common-deployment/0.21.1/quarkus-resteasy-server-common-deployment-0.21.1.jar (27 kB at 78 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/io/quarkus/quarkus-kubernetes-spi/0.21.1/quarkus-kubernetes-spi-0.21.1.jar (4.3 kB at 13 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/io/quarkus/quarkus-resteasy-deployment/0.21.1/quarkus-resteasy-deployment-0.21.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/io/quarkus/quarkus-arc-deployment/0.21.1/quarkus-arc-deployment-0.21.1.jar (80 kB at 171 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/io/quarkus/quarkus-resteasy-deployment/0.21.1/quarkus-resteasy-deployment-0.21.1.jar (7.0 kB at 13 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/io/quarkus/arc/arc-processor/0.21.1/arc-processor-0.21.1.jar (244 kB at 428 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/io/quarkus/quarkus-undertow-deployment/0.21.1/quarkus-undertow-deployment-0.21.1.jar (58 kB at 97 kB/s)
Listening for transport dt_socket at address: 5005
2019-08-30 14:20:10,527 INFO [io.qua.dep.QuarkusAugmentor] (main) Beginning quarkus augmentation
2019-08-30 14:20:11,416 INFO [io.qua.dep.QuarkusAugmentor] (main) Quarkus augmentation completed in 889ms
2019-08-30 14:20:11,888 INFO [io.quarkus] (main) Quarkus 0.21.1 started in 1.488s. Listening on: http://localhost:8080
2019-08-30 14:20:11,890 INFO [io.quarkus] (main) Installed features: [cdi, resteasy]
```

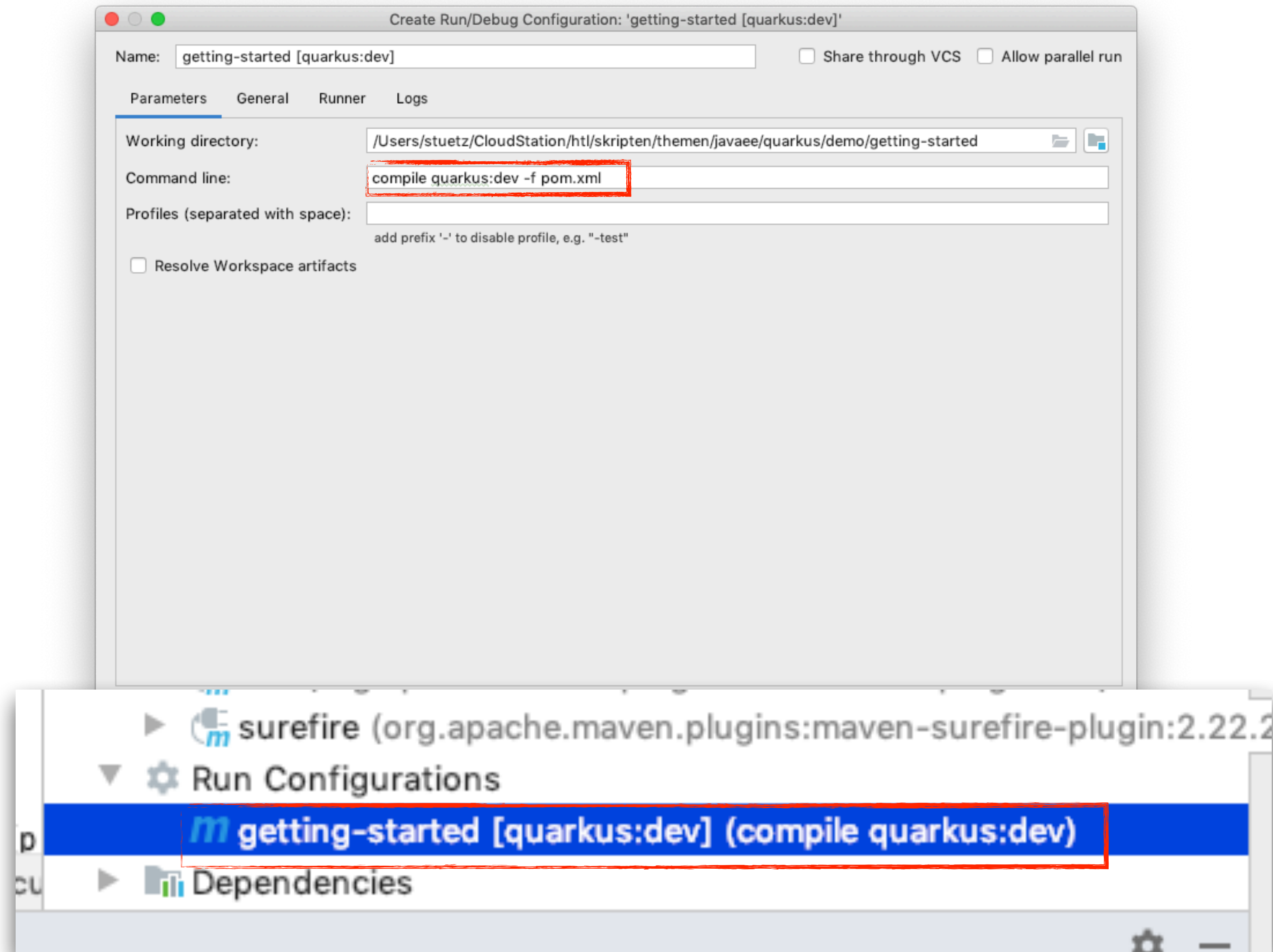
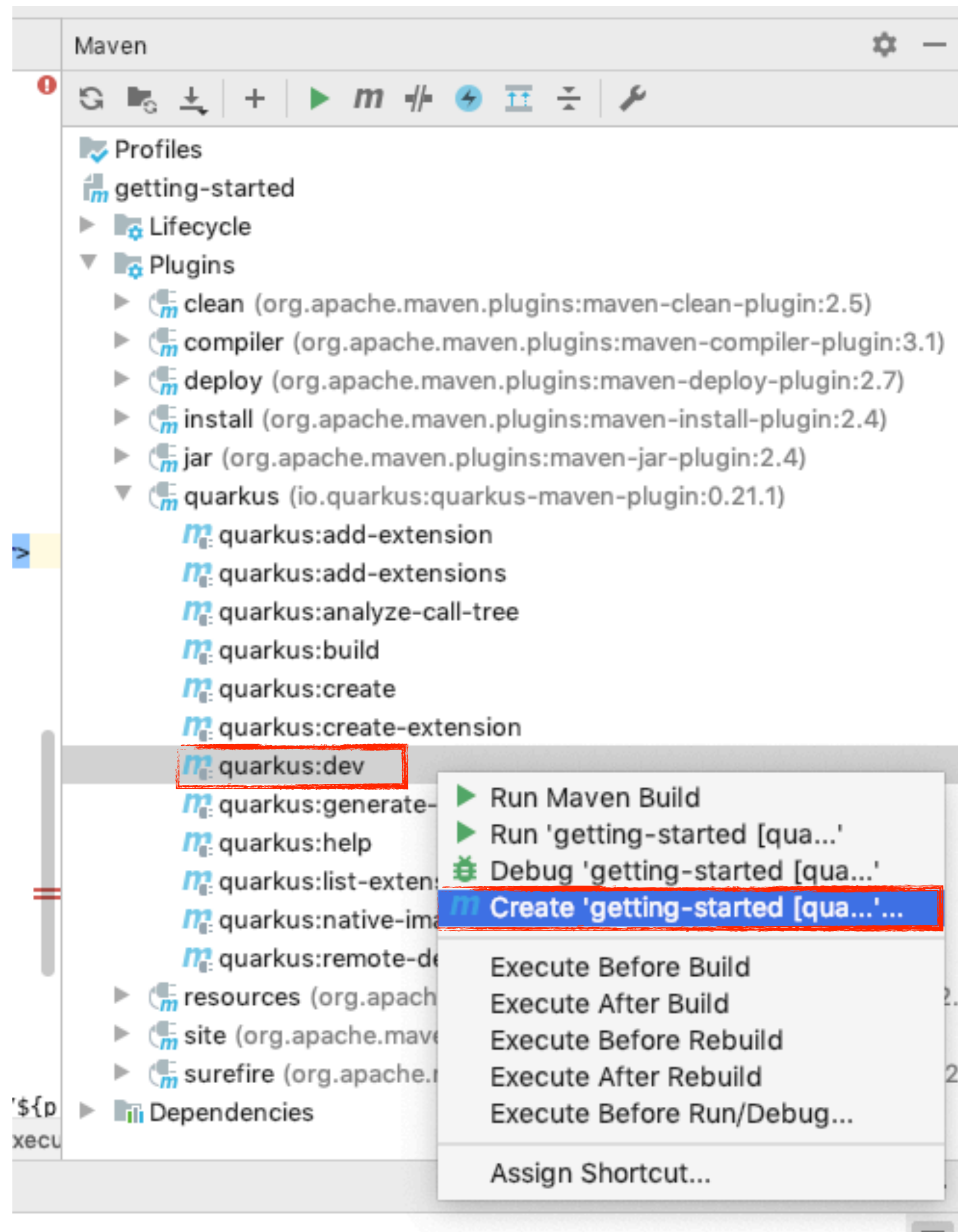
```
localhost:8080/hello
hello
```

```
Default (bash)
Toms-MBP:~ stuetz$ curl http://localhost:8080/hello
hello
```

```
http://localhost:8080
Your new Cloud-Native application is ready!
Congratulations, you have created a new Quarkus application.
Why do you see this?
This page is served by Quarkus. The source is in src/main/resources/META-INF/resources/index.html.
What can I do from here?
If not already done, run the application in dev mode using: mvn compile quarkus:dev.
• Add REST resources, Servlets, functions and other services in src/main/java.
• Your static assets are located in src/main/resources/META-INF/resources.
• Configure your application in src/main/resources/application.properties.
How do I get rid of this page?
Just delete the src/main/resources/META-INF/resources/index.html file.
```



# Create Maven Configuration





# pom.xml

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
3         xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
4     <modelVersion>4.0.0</modelVersion>
5     <groupId>at.htl</groupId>
6     <artifactId>getting-started</artifactId>
7     <version>1.0-SNAPSHOT</version>
8     <properties>
9         <surefire-plugin.version>2.22.2</surefire-plugin.version>
10        <maven.compiler.target>1.8</maven.compiler.target>
11        <maven.compiler.source>1.8</maven.compiler.source>
12        <quarkus.version>0.21.1</quarkus.version>
13        <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
14        <project.reporting.outputEncoding>UTF-8</project.reporting.outputEncoding>
15    </properties>
16    <dependencyManagement>
17        <dependencies>
18            <dependency>
19                <groupId>io.quarkus</groupId>
20                <artifactId>quarkus-bom</artifactId>
21                <version>${quarkus.version}</version>
22                <type>pom</type>
23                <scope>import</scope>
24            </dependency>
25        </dependencies>
26    </dependencyManagement>
27    <dependencies>
28        <dependency>
29            <groupId>io.quarkus</groupId>
30            <artifactId>quarkus-resteasy</artifactId>
31        </dependency>
32        <dependency>
33            <groupId>io.quarkus</groupId>
34            <artifactId>quarkus-junit5</artifactId>
35            <scope>test</scope>
36        </dependency>
37        <dependency>
38            <groupId>io.rest-assured</groupId>
39            <artifactId>rest-assured</artifactId>
40            <scope>test</scope>
41        </dependency>
42    </dependencies>
43    <build>
44        <plugins>
45            <plugin>
46                <groupId>io.quarkus</groupId>
47                <artifactId>quarkus-maven-plugin</artifactId>
```

# Create Service

The screenshot shows an IDE window with the following components:

- Project Explorer (Left):** Shows the project structure for 'getting-started'. The 'at.htl.quickstart' package is selected, containing 'GreetingResource', 'resources', 'test', and 'target'.
- Code Editor (Center):** Displays the source code for 'GreetingResource.java'. The code is as follows:

```
1 package at.htl.quickstart;  
2  
3 import ...  
4  
5 @Path("/hello")  
6  
7 public class GreetingResource {  
8  
9     @GET  
10    @Produces(MediaType.TEXT_PLAIN)  
11    public String hello() { return "hello"; }  
12  
13 }  
14  
15  
16
```
- New Java Class Dialog (Center):** A dialog box titled 'New Java Class' is open. It shows a list of class types: 'GreetingService', 'Class', 'Interface', 'Enum', 'Annotation', and 'JavaFXApplication'. The 'Class' option is selected.
- Right Sidebar:** Contains toolbars for 'Database', 'Maven', 'Bean Validation', and 'CDI'.
- Bottom Panel:** Shows tabs for '8: Services', 'YouTrack', 'Terminal', 'Build', 'Java Enterprise', '4: Run', and '6: TODO'. The status bar at the bottom indicates '9:14 LF UTF-8 4 spaces' and '318 of 725M'.



# Development Mode

`quarkus:dev` runs Quarkus in development mode. This enables hot deployment with background compilation, which means that when you modify your Java files and/or your resource files and refresh your browser, these changes will automatically take effect. This works too for resource files like the configuration property file. Refreshing the browser triggers a scan of the workspace, and if any changes are detected, the Java files are recompiled and the application is redeployed; your request is then serviced by the redeployed application. If there are any issues with compilation or deployment an error page will let you know.

This will also listen for a debugger on port `5005`. If you want to wait for the debugger to attach before running you can pass `-Ddebug` on the command line. If you don't want the debugger at all you can use `-Ddebug=false`.

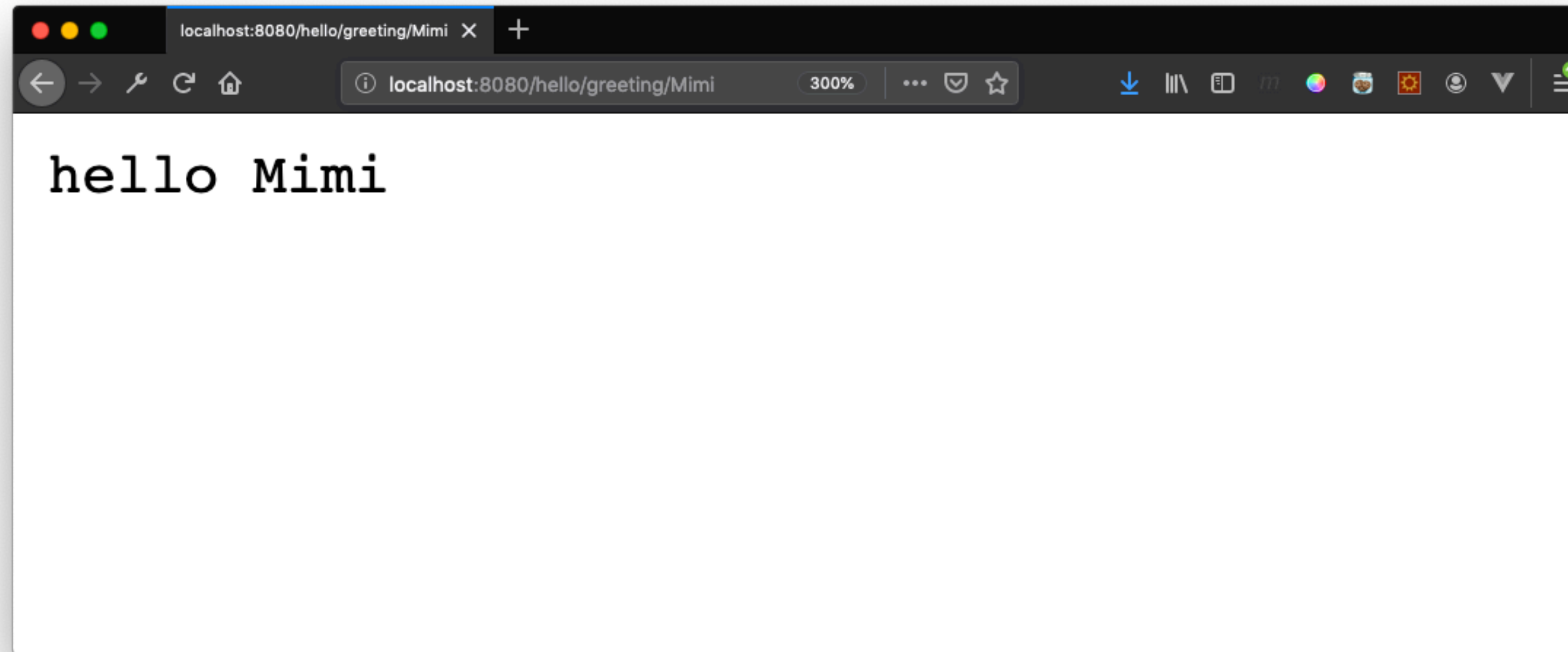
# Änderungen im Code

```
GreetingService.java x
1 package at.htl.quickstart;
2
3 import javax.enterprise.context.ApplicationScoped;
4
5 @ApplicationScoped
6 public class GreetingService {
7
8     public String greeting(String name) {
9         return "hello " + name + "\n";
10    }
11
12 }
```

```
GreetingResource.java x
1 package at.htl.quickstart;
2
3 import ...
9
10 @Path("/hello")
11 public class GreetingResource {
12
13     @Inject
14     GreetingService service;
15
16     @GET
17     @Produces(MediaType.TEXT_PLAIN)
18     @Path("/greeting/{name}")
19     public String greeting(@PathParam("name") String name) {
20         return service.greeting(name);
21     }
22
23     @GET
24     @Produces(MediaType.TEXT_PLAIN)
25     public String hello() {
26         return "hello\n";
27     }
28 }
```



# Ergebnis



```
Default (bash)
Toms-MBP:getting-started stuetz$ curl http://localhost:8080/hello/greeting/Mimi
hello Mimi
Toms-MBP:getting-started stuetz$ █
```

**Testen**



# GreetingResourceTest.java

```
package at.htl.quickstart;
```

```
import ...
```

```
@QuarkusTest
```

```
public class GreetingResourceTest {
```

```
    @Test
```

```
    public void testHelloEndpoint() {
```

```
        given() RequestSpecification
```

```
            .when().get("/hello") Response
```

```
            .then() ValidatableResponse
```

```
            .statusCode(200) ValidatableResponse
```

```
            .body(is("hello\n"));
```

```
    }
```

```
    @Test
```

```
    public void testGreetingEndpoint() {
```

```
        String uuid = UUID.randomUUID().toString();
```

```
        given() RequestSpecification
```

```
            .pathParam("name", uuid) RequestSpecification
```

```
            .when().get("/hello/greeting/{name}") Response
```

```
            .then() ValidatableResponse
```

```
            .statusCode(200) ValidatableResponse
```

```
            .body(is("hello " + uuid + "\n"));
```

```
    }
```

```
}
```

# Einen Produktions-Build erstellen

```
getting-started [~/CloudStation/htl/skripten/themen/javaee/quarkus/demo/getting-started] - .../src/test/java/at/htl/quickstart/GreetingResourceTest.java
Terminal: Local x +
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 2 resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ getting-started ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ getting-started ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory /Users/stuetz/CloudStation/htl/skripten/themen/javaee/quarkus/demo/getting-started/src/test/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:testCompile (default-testCompile) @ getting-started ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-surefire-plugin:2.22.2:test (default-test) @ getting-started ---
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running at.htl.quickstart.GreetingResourceTest
2019-08-30 15:42:09,951 INFO [io.qua.dep.QuarkusAugmentor] (main) Beginning quarkus augmentation
2019-08-30 15:42:10,961 INFO [io.qua.dep.QuarkusAugmentor] (main) Quarkus augmentation completed in 1009ms
2019-08-30 15:42:11,395 INFO [io.quarkus] (main) Quarkus 0.21.1 started in 0.432s. Listening on: http://[::]:8081
2019-08-30 15:42:11,395 INFO [io.quarkus] (main) Installed features: [cdi, resteasy]
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 3.738 s - in at.htl.quickstart.GreetingResourceTest
2019-08-30 15:42:12,603 INFO [io.quarkus] (main) Quarkus stopped in 0.005s
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] --- maven-jar-plugin:2.4:jar (default-jar) @ getting-started ---
[INFO] Building jar: /Users/stuetz/CloudStation/htl/skripten/themen/javaee/quarkus/demo/
[INFO]
[INFO] --- quarkus-maven-plugin:0.21.1:build (default) @ getting-started ---
[INFO] [io.quarkus.deployment.QuarkusAugmentor] Beginning quarkus augmentation
[INFO] [org.jboss.threads] JBoss Threads version 3.0.0.Beta5
[INFO] [io.quarkus.deployment.QuarkusAugmentor] Quarkus augmentation completed in 1233ms
[INFO] [io.quarkus.creator.phase.runnerjar.RunnerJarPhase] Building jar: /Users/stuetz/C
-runner.jar
[INFO]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 9.771 s
[INFO] Finished at: 2019-08-30T15:42:15+02:00
[INFO]
Toms-MBP:getting-started stuetz$
```

Im Terminal

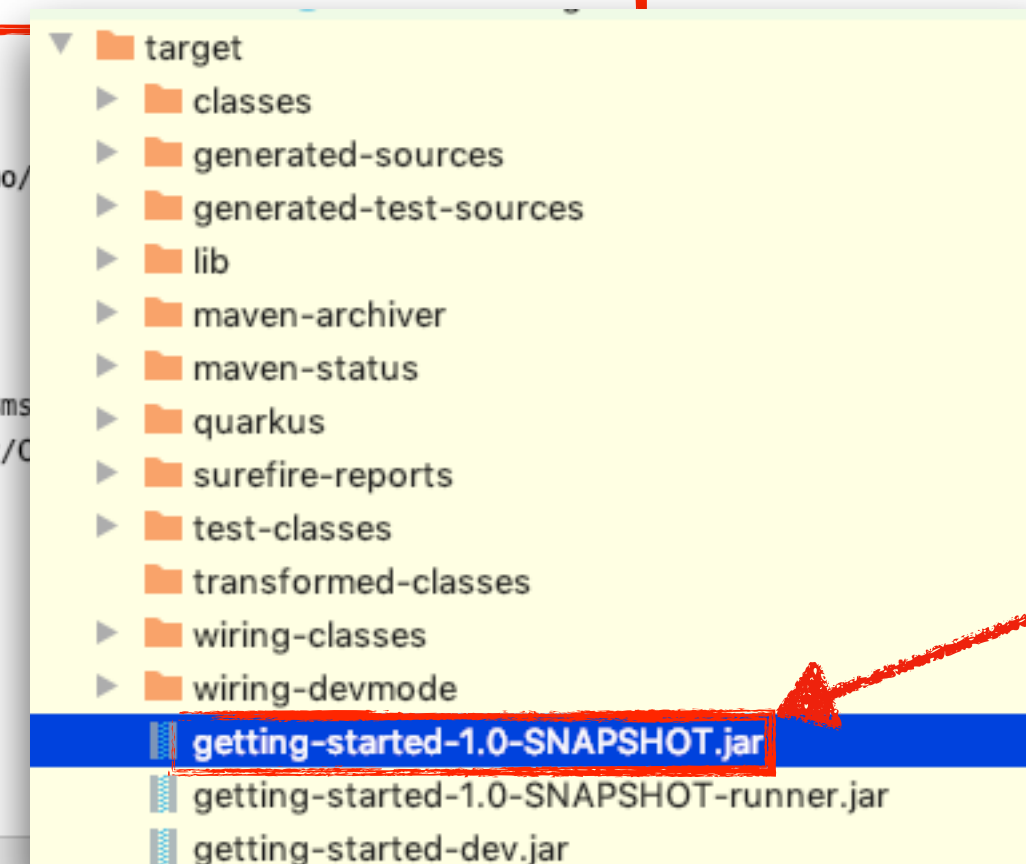
`./mvnw package`

aufrufen

Dabei werden automatisch beide Test ausgeführt.

Man kann aber die Test auch separat ausführen.

Im target-Verzeichnis muss sich jedoch das kompilierte jar-file befinden.





# Tests ausführen

The screenshot shows an IDE window with the following components:

- Project View (Left):** Shows the project structure for 'getting-started', including 'src/main/java' and 'src/test/java'. The 'test' directory is highlighted in green.
- Code Editor (Center):** Displays the code for `GreetingResourceTest.java`. It contains two test methods:

```
@QuarkusTest
public class GreetingResourceTest {

    @Test
    public void testHelloEndpoint() {
        given() RequestSpecification
            .when().get("/hello") Response
            .then() ValidatableResponse
            .statusCode(200) ValidatableResponse
            .body(is("hello\n"));
    }

    @Test
    public void testGreetingEndpoint() {
        String uuid = UUID.randomUUID().toString();
        given() RequestSpecification
            .pathParam("name", uuid) RequestSpecification
            .when().get("/hello/greeting/{name}") Response
            .then() ValidatableResponse
            .statusCode(200) ValidatableResponse
            .body(is("hello {name}"));
    }
}
```
- Maven View (Right):** Shows a list of Maven goals, with `surefire:test` highlighted in a red box.
- Run Console (Bottom):** Shows the output of the test execution, enclosed in a red box:

```
getting-started [org.apache.maven.plugins:maven-surefire-plugin:2.22.1]
[INFO]
[INFO] T E S T S
[INFO]
[INFO] Running at.htl.quickstart.GreetingResourceTest
2019-08-30 15:50:30,932 INFO [io.qua.dep.QuarkusAugmentor] (main) Beginning quarkus augmentation
2019-08-30 15:50:31,859 INFO [io.qua.dep.QuarkusAugmentor] (main) Quarkus augmentation completed in 927ms
2019-08-30 15:50:32,285 INFO [io.quarkus] (main) Quarkus 0.21.1 started in 0.424s. Listening on: http://[::]:8081
2019-08-30 15:50:32,286 INFO [io.quarkus] (main) Installed features: [cdi, resteasy]
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 3.652 s - in at.htl.quickstart
.GreetingResourceTest
2019-08-30 15:50:33,631 INFO [io.quarkus] (main) Quarkus stopped in 0.006s
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[IJ]-1-ProjectSucceeded-[IJ]-id=at.htl:getting-started:jar:1.0-SNAPSHOT
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 7.385 s
[INFO] Finished at: 2019-08-30T15:50:34+02:00
[INFO]
```

**Projekt ausführen**



```
Default (java)
Toms-MBP:getting-started stuetz$ java -jar target/getting-started-1.0-SNAPSHOT-runner.jar
2019-08-30 15:53:50,760 INFO [io.quarkus] (main) Quarkus 0.21.1 started in 0.854s. Listening on: http://[::]:8080
2019-08-30 15:53:50,786 INFO [io.quarkus] (main) Installed features: [cdi, resteasy]
```

```
localhost:8080/hello/greeting/Maxi
localhost:8080/hello/greeting/Maxi
hello Maxi
```

```
Default (bash)
Toms-MBP:~ stuetz$ curl http://localhost:8080/hello/greeting/Susi
hello Susi
Toms-MBP:~ stuetz$
```

# Sources

- Migrating Java applications to Quarkus: Lessons learned  
<https://developers.redhat.com/blog/2019/04/12/migrating-java-applications-to-quarkus-lessons-learned/>
-





Noch  
Fragen?

HTL LE  NDING

**Schön, hier zu lernen**