TP1 Devops

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I. Dockerizing a Springboot Application

1. SpringBoot Application Overview

We start by creating a basic SpringBoot application with a single controller. The controller responds to a GET request by returning a simple "Hello" message.

2. Unit tests of the controller with Junit

Test 1: `shouldReturnDefaultMessage()` : This test checks if calling the `/hello` endpoint without passing any parameters returns "Hello World!".
Test 2: `shouldReturnCustomMessage()` : This test checks if calling the `/hello` endpoint with the `name` parameter returns the correct personalized message.

```
@Test
    void shouldReturnDefaultMessage() throws Exception {
        this.mockMvc.perform(get("/hello"))
                .andExpect(status().isOk())
                .andExpect(content().string("Hello World!"));
    }

    @Test
    void shouldReturnCustomMessage() throws Exception {
        this.mockMvc.perform(get("/hello").param("name", "GL5"))
```

```
                  .andExpect(status().isOk())

                  .andExpect(content().string("Hello GL5!"));

    }
```

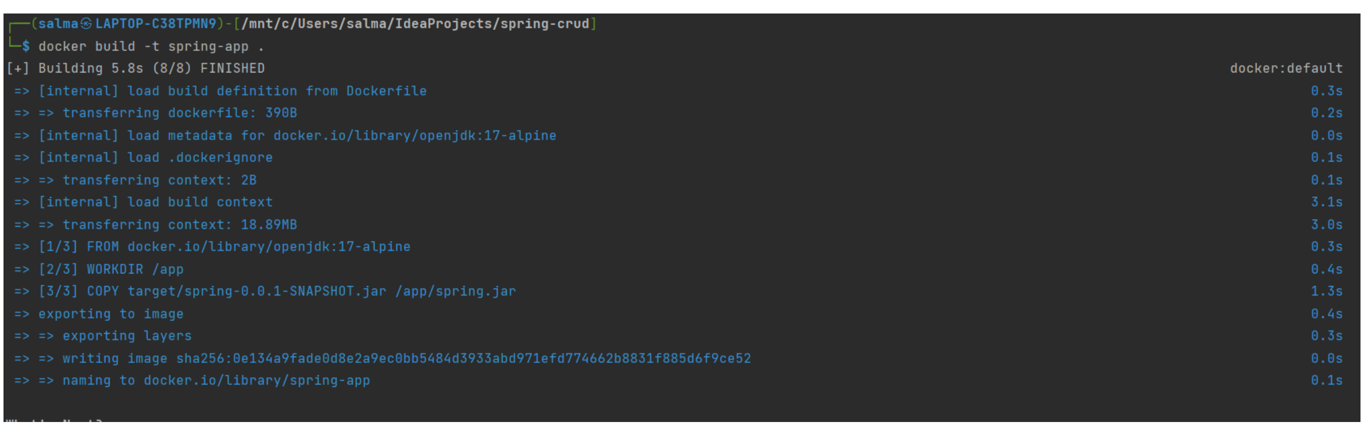
Dockerfile

To containerize the SpringBoot application, we define this Dockerfile.

```
# Use OpenJDK 17 as base image
FROM openjdk:17-alpine

# Set the working directory in the container
WORKDIR /app

# Copy the packaged jar file into the container at /app
COPY target/spring-0.0.1-SNAPSHOT.jar /app/spring.jar

# Expose port 8080
EXPOSE 8080

# Command to run the spring boot application
CMD ["java", "-jar", "spring.jar"]
```

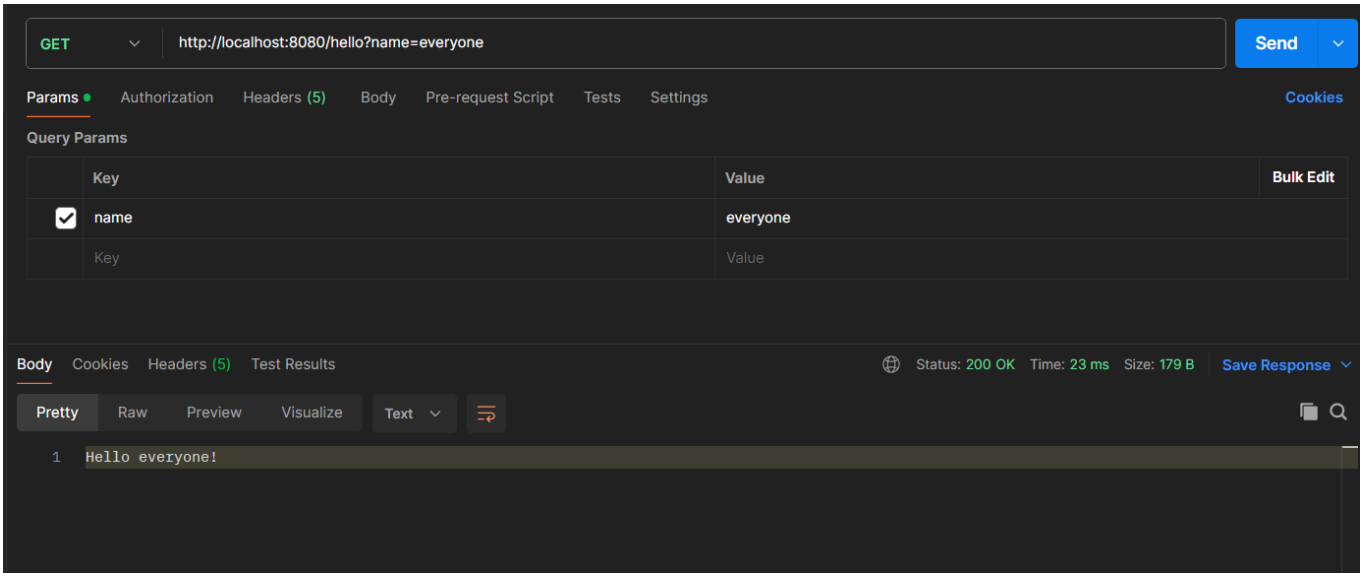
Building and Running the Docker Image

```
docker build -t .
```


```
┌──(salma㉿LAPTOP-C38TPMN9)-[/mnt/c/Users/salma/IdeaProjects/spring-crud]
└─$ docker build -t spring-app .
[+] Building 5.8s (8/8) FINISHED                                     docker:default
 => [internal] load build definition from Dockerfile                           0.3s
 => => transferring dockerfile: 390B                                           0.2s
 => [internal] load metadata for docker.io/library/openjdk:17-alpine           0.0s
 => [internal] load .dockerignore                                              0.1s
 => => transferring context: 2B                                                0.1s
 => [internal] load build context                                              3.1s
 => => transferring context: 18.89MB                                           3.0s
 => [1/3] FROM docker.io/library/openjdk:17-alpine                             0.3s
 => [2/3] WORKDIR /app                                                         0.4s
 => [3/3] COPY target/spring-0.0.1-SNAPSHOT.jar /app/spring.jar                1.3s
 => exporting to image                                                         0.4s
 => => exporting layers                                                        0.3s
 => => writing image sha256:0e134a9fade0d8e2a9ec0bb5484d3933abd971efd774662b8831f885d6f9ce52   0.0s
 => => naming to docker.io/library/spring-app                                  0.1s
```

Then, we launch the Docker container while exposing port 8080 to allow access to the SpringBoot application.

```
docker run -p 8080:8080 spring-app
```



II. Building and pushing docker image with github actions

1. GitHub Actions workflow for Building and pushing docker image

This GitHub Actions workflow file automates the process of building a Spring Boot application, packaging it with Maven, building a Docker image, and pushing it to Docker Hub.

```
name: Build and Push Docker Image

  on:
  push:
  branches:
  - master
  env:
  USERNAME: ${{ secrets.DOCKERHUB_USERNAME }}
  DOCKER_TOKEN: ${{ secrets.DOCKER_TOKEN }}

  jobs:
```

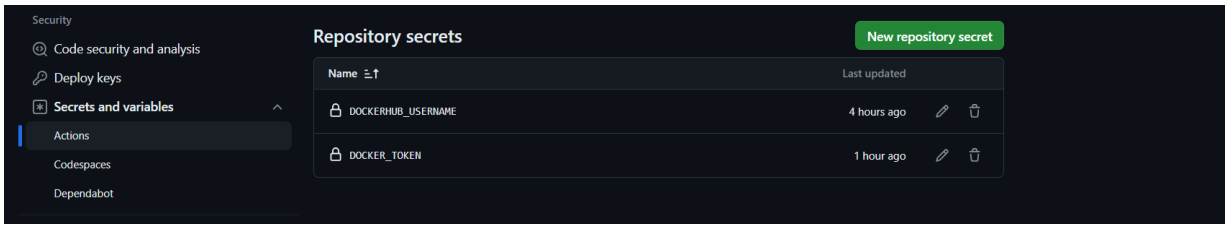
```yaml
  build:
  runs-on: ubuntu-latest

  steps:
  - name: Checkout code
  uses: actions/checkout@v2
  - name: Set up JDK 17
  uses: actions/setup-java@v2
  with:
  java-version: 17
  distribution: 'adopt'

  - name: Build with Maven
  run: ./mvnw clean package

  # Login to DockerHub
  - name: Login to DockerHub
  run: docker login -u $USERNAME --password $DOCKER_TOKEN

  # Build and push Docker image
  - name: Build and push Docker image
  run: \
  docker build -t salmaghabri/with-ga:latest .
  docker push salmaghabri/with-ga:latest
```

① **Workflow Triggers**:

② The workflow triggers on `push` events to the `master` branch.

③ **Environment Variables**:

④ It sets up environment variables `USERNAME` and `DOCKER_TOKEN` to store Docker Hub credentials. These are sourced from GitHub secrets.



⑤ **Jobs**:

⑥ **build**: This job runs on an `ubuntu-latest` virtual machine.

⑦ **Steps**:

⑧ `Checkout code`: Checks out the source code from the repository.

⑨ `Set up JDK 17`: Sets up JDK 17 using the `actions/setup-java@v2` action.

⑩ `Build with Maven`: Runs the Maven wrapper script (`mvnw`) to clean the project and package it into an executable JAR file. But first, we need to ensure that git has the execution permission on mnvw by running `git update-index --chmod=+x ./mvnw`

⑪ `Login to DockerHub`: Logs in to Docker Hub using the provided credentials.

⑫ `Build and push Docker image`: Builds a Docker image from the Dockerfile in the repository and pushes it to Docker Hub. The Docker image is tagged as `salmaghabri/with-ga:latest`.

⑬ **Docker Hub Credentials**:

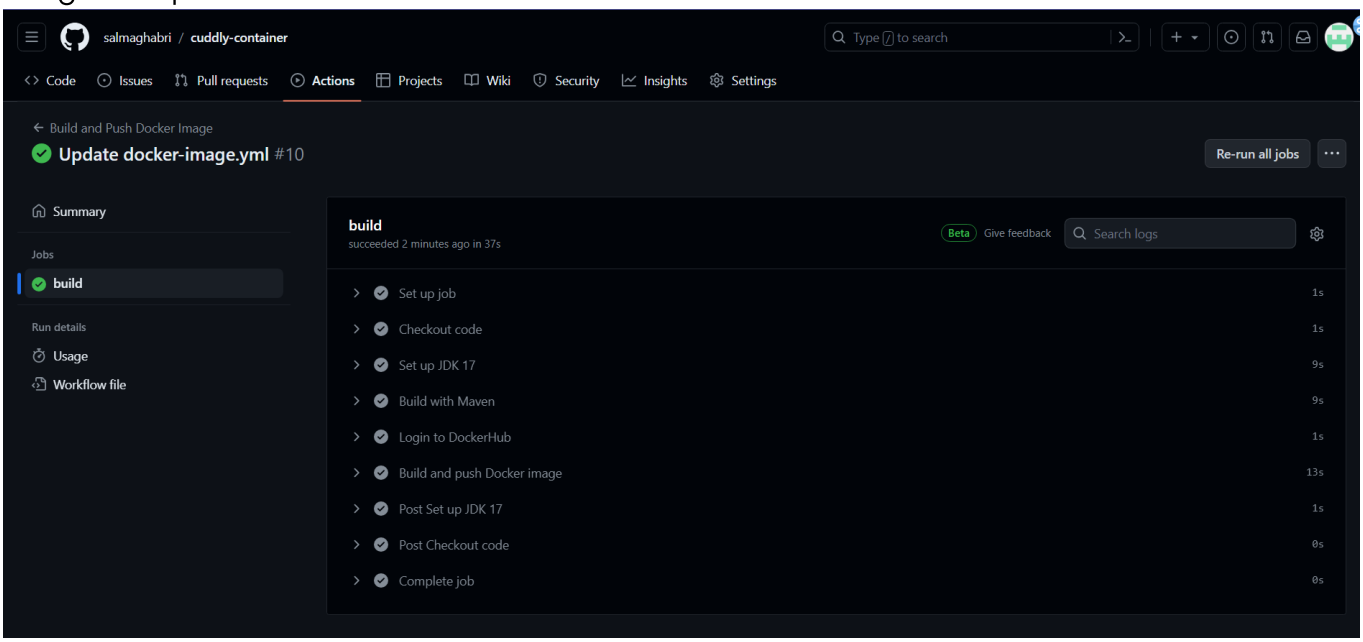
⑭ The workflow uses the `DOCKERHUB_USERNAME` and `DOCKER_TOKEN` secrets to authenticate with Docker Hub.

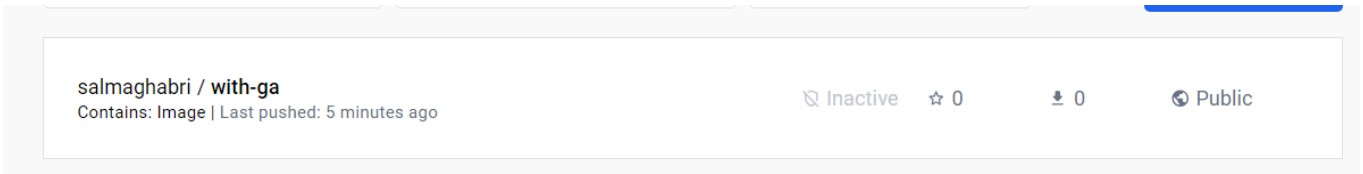
⑮ **Docker Image Tagging**:

⑯ The Docker image is tagged with `salmaghabri/with-ga:latest`.

Testing the workflow

After running run the jobs of the workflow, we can see that the build succeeded and the image was pushed.





2. Running Junit tests on pull requests triggers

This GitHub Actions workflow file automates the process of building and running tests with Junit.

```yaml
name: Run Tests on Pull Request

on:
  pull_request:

    branches:

      - master

jobs:

  test:

    runs-on: ubuntu-latest

      steps:

      # Checkout the code

      - name: Checkout code

        uses: actions/checkout@v2
      # Set up JDK 17

      - name: Set up JDK 17

        uses: actions/setup-java@v2

        with:

          java-version: 17

          distribution: "adopt"

      # Build and run unit tests with Maven
      - name: Build and run tests with Maven

        run: ./mvnw clean verify
```

- **Trigger**: The workflow is triggered by `pull_request` events targeting the `master` branch.
- **Job**: A single job named `test` runs on an `ubuntu-latest` virtual machine.
- **Steps**:
  - **Checkout code**: Uses the `actions/checkout@v2` action to check out the source code from the repository.
  - **Set up JDK 17**: Uses `actions/setup-java@v2` to set up JDK 17 for the build.
  - **Build and run tests**: Runs the Maven wrapper script (`mvnw`) to clean the project and execute unit tests.

Testing the workflow

We created a new branch called `non_main_branch` in order to create a pull request to the main branch `master` and trigger our automated tests.