**Total days 9**

**PG FSD: Integration and Deployment Aug cohort**

Devops tools

Docker

Docker compose

CI and CD tool using Jenkin jobs and Pipe line jobs

Overview AWS : S3, RDS and EC2 instance

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Multi OS machine.

VWare software. : it is tool which help to run more than one OS. We can run multi os like window xp, linux, mac etc.

Oracle Virtual Box

If we want to run Guest OS with help of VMWare software we need to share resource for VM

Base machine 16 GM RAM 1TB hard disk

Guest OS 4GB 100 Gib Hard disk

If we want to run 10 OS 1GB

VM is use to create abstraction version of Physical machine or OS.

Docker is an advanced OS virtualization an open source software platform which help create application, build application with required dependencies, test the application and deploy the application very easily.

Docker is use to create Containerization application.

Virtualization Vs Containerization

Virtualization is use to create the abstract version of an operation system.

Containerization is use to create abstract version of an application. To run the application software develop in any language we need system software. This system software provide by docker engine.

Container : run the environment.

JRE

Web container : responsible to run servlet and jsp

Spring container



If we develop any application like using java, python, angular, database mysql or oracle or mongo db.

To run that application in your machine you need to install all required software as well as their dependencies.

Docker platform which help to pack all application with their dependencies in form of image.

Docker image is a read only template created using Docker file. Which contains application details as well as required dependencies which help to run the application.

Docker-file : set of instruction or set of rules which help to create the image.

Once we run the image actual application become up with the help of container

Docker container java Demo

Docker Image (read only template format) -🡪 source code

Docker file --🡪 Demo.java

Docker hub : Docker hub an open source public repository (by default one private). Which help to publish or push as well as pull the Docker image. It is like a git hub. In git hub we can push as well as pull any type of data.

In Window 10 we can install Docker. Docker internally use kernel.

1. If you want to install docker in local machine.
2. Please use Virtual Lab.

Docker software

1. Docker Desktop is GUI base docker software which we can do all operation using command prompt as well gui base.
2. Please use Virtual machine

Open the terminal and command prompt

docker version this command is use to find the version of docker

or

sudo docker version

docker info this command is use to find the information about docker.

docker images this command is use to find the images.

docker pull imageName this command is use to pull the image

hello-world

docker pull hello-world

docker images

docker run imageName/imageId

hello-world image responsible to run the C program.

debian or busybox os images.

docker pull busybox

docker run -it busybox it means iterative mode

docker run -it debian pull and run the image

docker run -it ubuntu bash

if we want to create custom image we need take the help of pre defined OS images like busybox, ubuntu etc. create the docker file and inside this file we need to write the instruction to run the application with required dependencies.

If we want to create the image we need to create Dockerfile without extension.

Dockerfile (default name Dockerfile consider)

FROM busybox

CMD ["echo","Welcome Simple Docker example created by Akash"]

In command prompt

docker build -t imageName . -f Dockerfile

Example

docker build -t my-busybox . -f Dockerfile

docker build -t my-busybox . file name must be Dockerfile

docker images

docker run my-busybox

we will another image to run java program

create another separate folder java\_image

Docker provided openjdk images which internally use OS image and this image provide java run time environment.

**Demo.java**

import java.util.Scanner;

public class Demo {

    public static void main(String[] args) {

        System.out.println("Simple Basic Operation");

        Scanner sc = new Scanner(System.in);

        System.out.println("Enter the vaue of a");

        int a = sc.nextInt();

        System.out.println("Enter the vaue of b");

        int b = sc.nextInt();

        int sum  = a+b;

        System.out.println("Sum of two number is "+sum);

        sc.close();

    }

}

Dockerfile

FROM openjdk:11

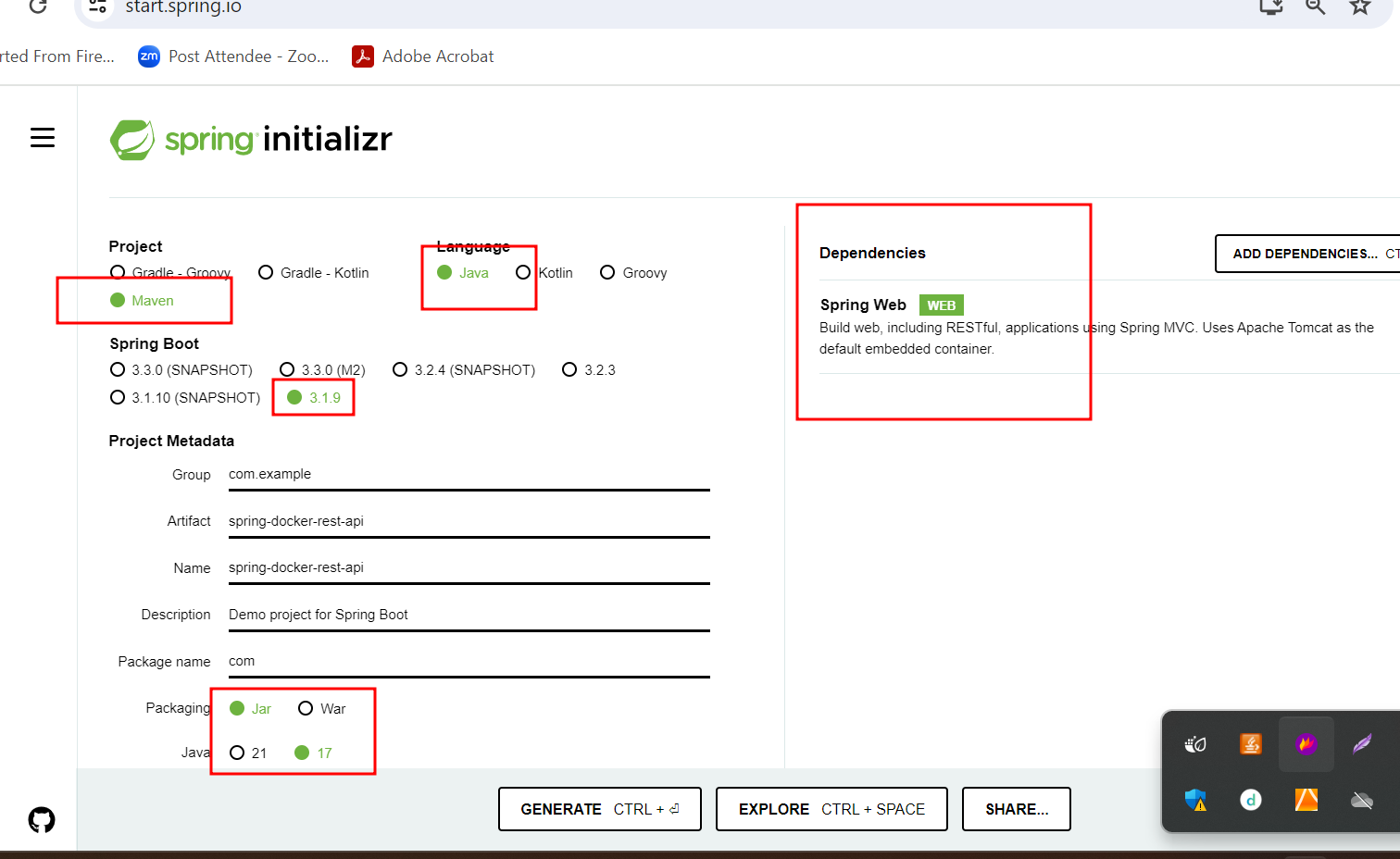
COPY Demo.java .

RUN javac Demo.java

CMD ["java","Demo"]

docker build -t my-java . -f Dockerfile

creating image to run the spring boot application



Create simple rest api and using eclipse IDE. After create application create the jar file using Eclipse IDE with help of run with install or build command.

It will create jar file inside target folder.

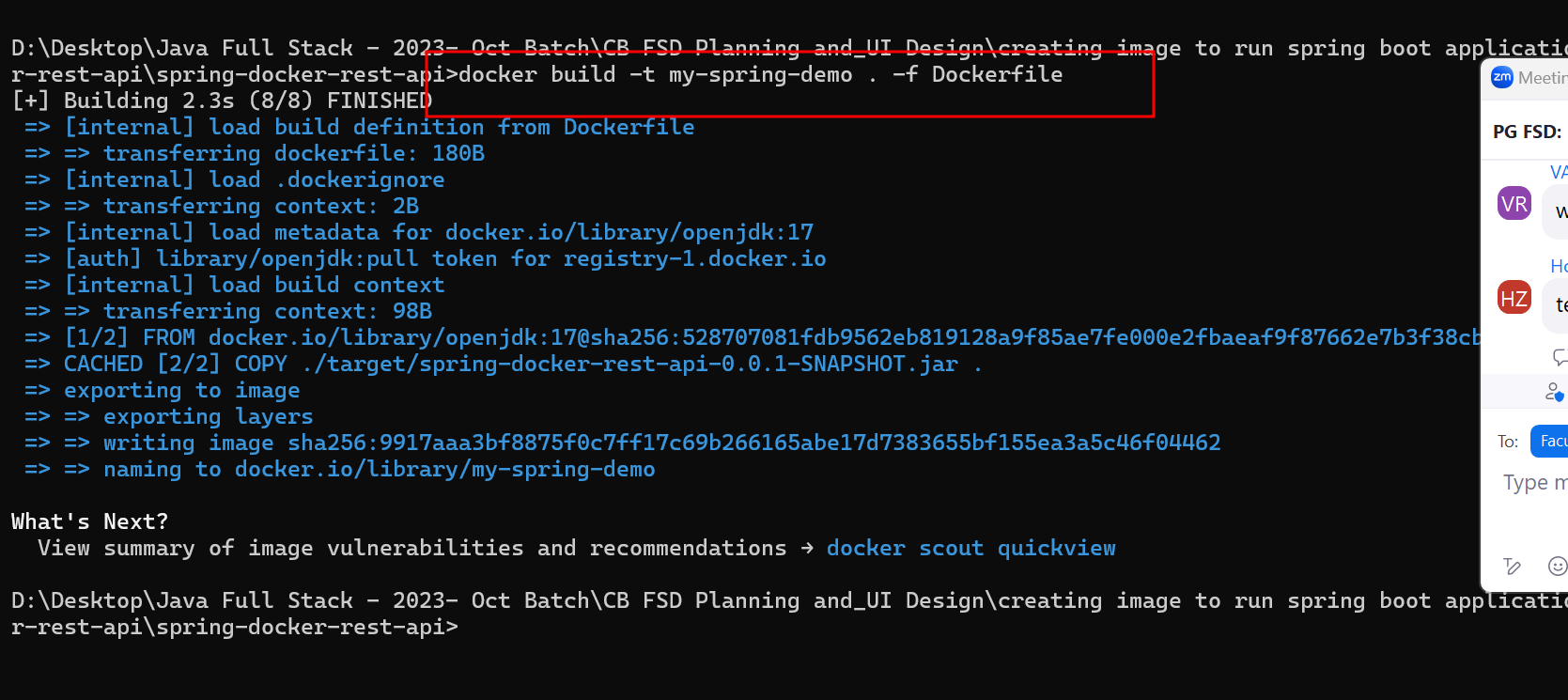
Dockerfile

FROM openjdk:17

COPY ./target/spring-docker-rest-api-0.0.1-SNAPSHOT.jar .

CMD ["java","-jar","spring-docker-rest-api-0.0.1-SNAPSHOT.jar"]

docker build -t my-spring-boot . -f Dockerfile



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If image is responsible to run web application we need to run using below command.

docker run -d -p 8080:8080 imageName/Imageid

docker run -d -p 8081:8080 imageName/Imageid

docker run -d -p 8082:8080 imageName/Imageid

-d detached mode or background

-p public port number

Red colour port number 8080 actual application port number.

Blue colour port number 8080 publish port number. It can be same or different. But make sure in your machine that port number must be free.

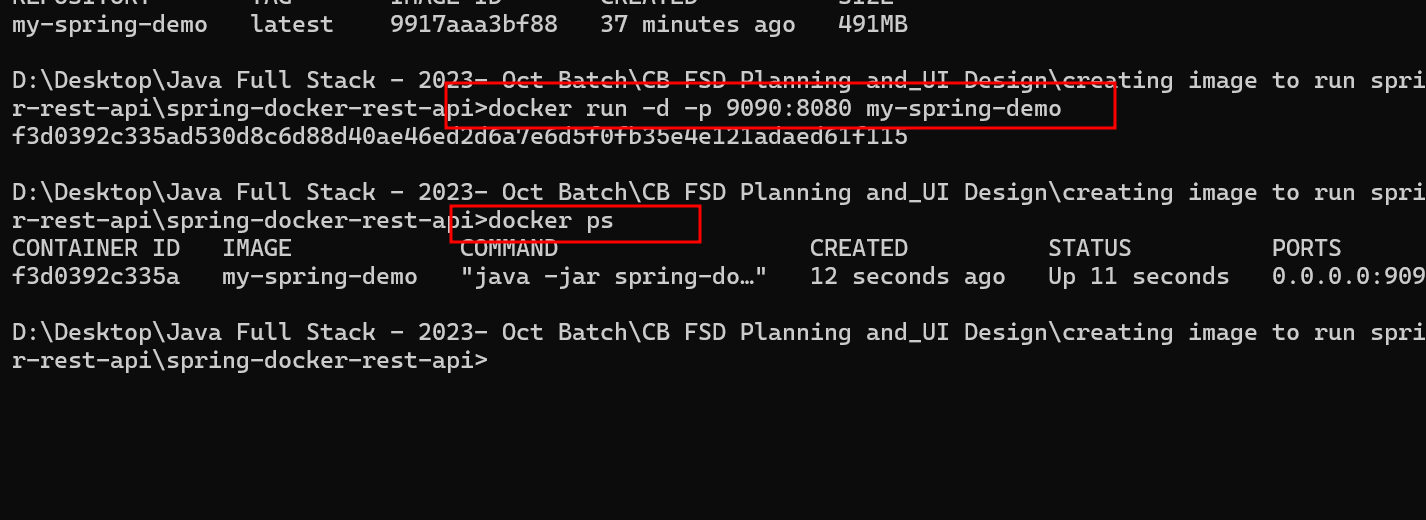
After run web application run successfully you can see one container get started.

If we wan to see running container then we can run the command as

docker ps

or

docker container ls



then open the browser

<http://localhost:9090>

creating image to run the angular application

Develop simple angular project

Create angular project using ng command

ng new angular-docker-app

routing 🡪 no

styling -🡪 css

please open app.component.html page write simple static message.

<div>

<p>Welcome to angular with docker project created by akash</p>

</div>

ng serve -o to run the program in development mode

we need to build the project

ng build build the project

after build successfully it will create dist folder inside a project.

Inside dist folder it contains project folder name and that folder contains build files.

After build the project these build file we can give to backend developer like spring boot developer and we can deploy independently.

We need server

Like tomcat, web logic, IIS server.

NgInx

Engine -x : open source web server which help to deploy the application.

Docker hub provide us nginx server or tomcat etc.

Dockerfile

FROM nginx

COPY ./dist/angular-docker-app/ /usr/share/nginx/html

Then create the image

docker build -t my-angular-test-app . -f Dockerfile

Angular by default provide small web server and that server we can use in development mode which use internally 4200 port number.

ng serve -o (we run angular application using inbuild web server with port number 4200)

we created image of angular with build file with help of nginx server.

nginx server internally use 80 port number.

After created angular image we need to run this application using below command

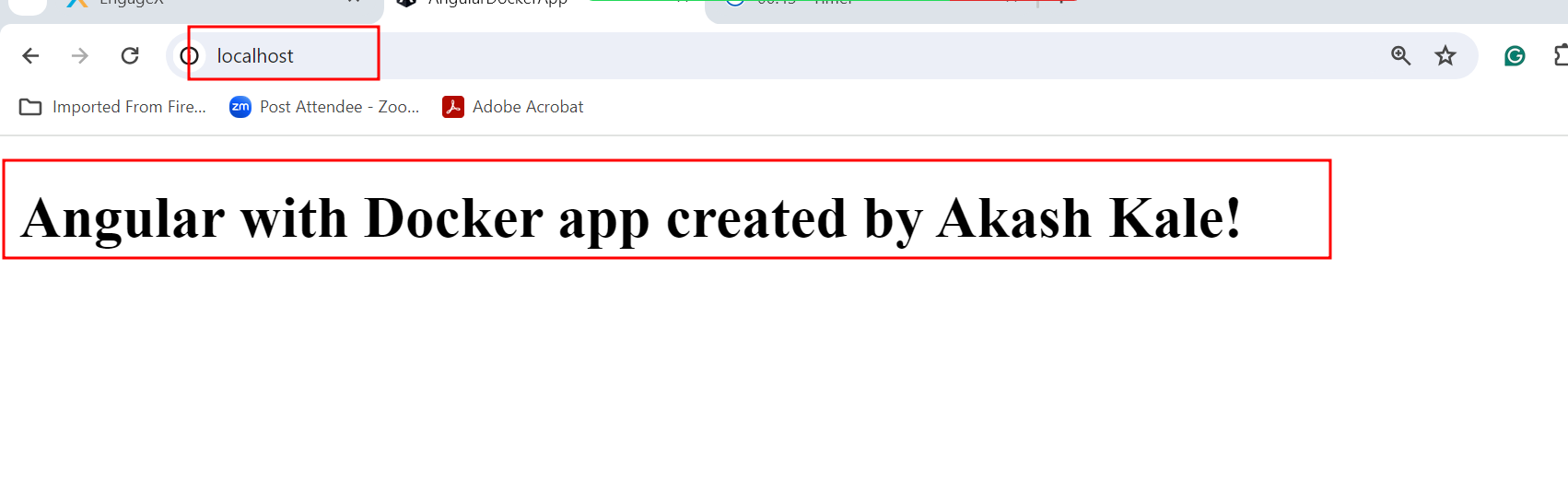
docker run -d -p 80:80 my-angular-test-app

(because nginx server default port number is 80)

docker ps check running container.

<http://localhost:80>

80 is default port number of http protocol.



If want to pause the container

docker stop containerId/containerName

docker start containerId/containerName : to start the container

**docker rm containerId/containerName**  : to remove container

if container running state we can’t remove we need to stop and then remove or we can use -f option

**docker rm containerId/containerName -f remove forcefully**

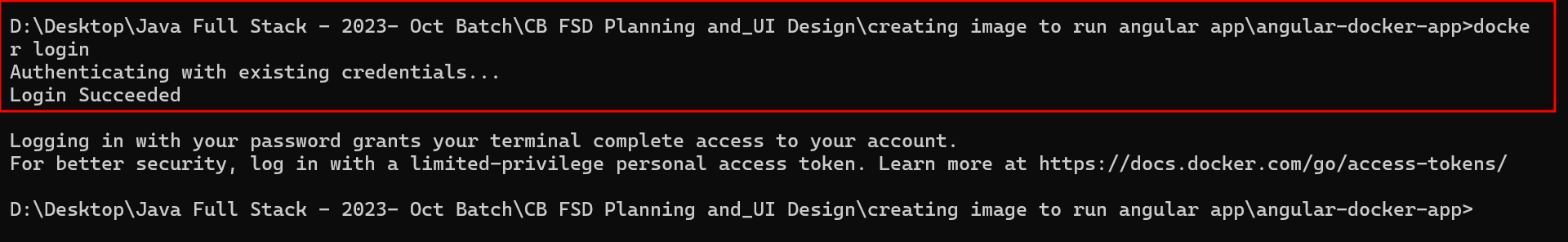
**docker rmi imageName/imageId**

**if image link with any container we can’t remove then we need to use option as -f**

**docker rmi imageName/imageId -f**

**Publish the docker images in Docker hub account**

**docker login**



**If ask emailid and password please provide docker hub account details.**

**Before push the image or publish the image we need to create the tag for that image. Tag is like a identity or version which help to keep the track between multiple update in our application**

**docker tag imagename dockerhubaccountid/imagename:version**

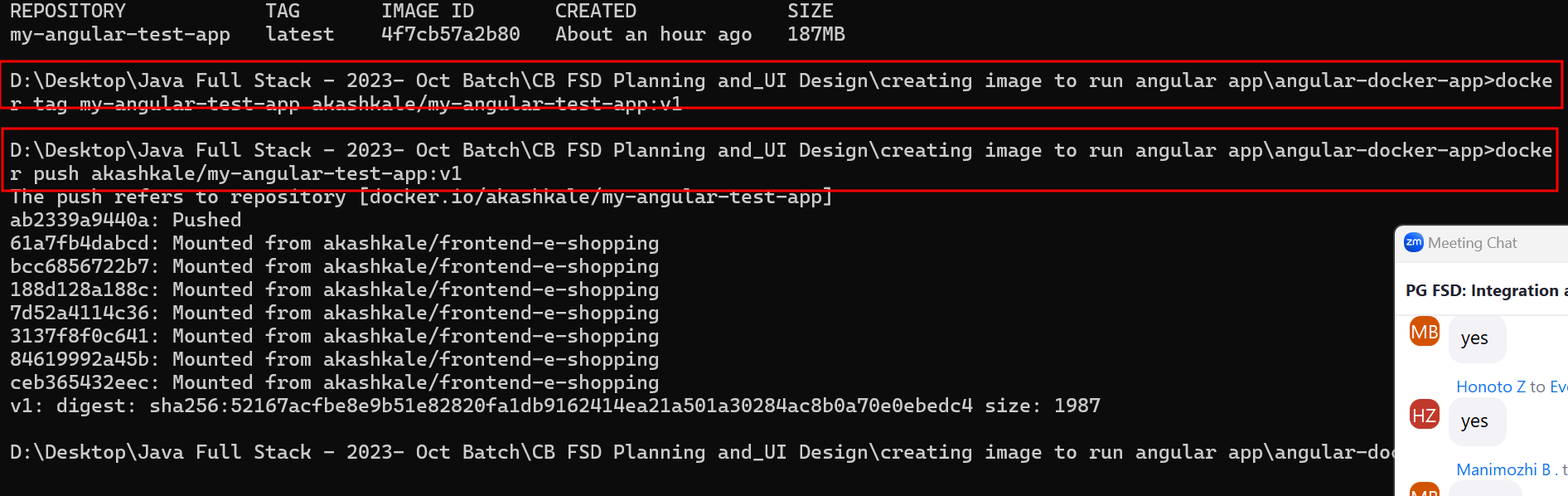
**docker tag my-angular-test-app akashkale/my-angular-test-app:v1**

**version can be number or alphabets etc.**

**after tag create now you can push or publish your image in docker hub account**

**docker push dockerhubaccountid/imagename:version**

**docker push akashkale/my-angular-test-app:v1**



**docker pull akashkale/my-angular-test-app:v1**

**docker run -d -p 91:80 akashkale/my-angular-test-app:v1**

we created image to run core java, spring boot, angular application and every image is responsible to run the application using container. All these images internally use OS image to run the application.