Lab 2: Docker Container

Handout: 24 Feb, Hand-in: 17 March 23:59 (Thursday)

Overview

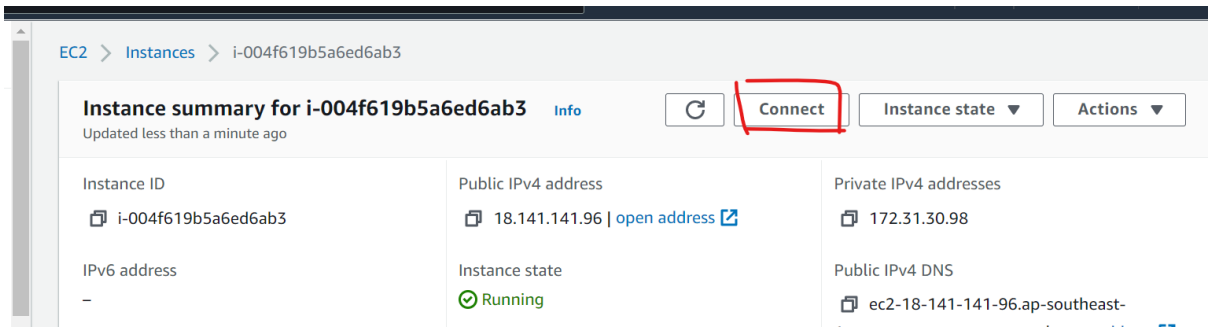
In this lab, you will practice how to set up containers with Docker, deploy WebApps in the docker, create your own apps as well as to manage a multi-container environment. The lab was developed by Prakhar Srivastav. You may access the original post from https://docker-curriculum.com/#our-first-image

1) **Set up a Docker environment.** You'll learn how to use Docker containers and get familiar with basic docker commands.

   Your task is to install Docker on **AWS EC2** and demo basic docker operations.

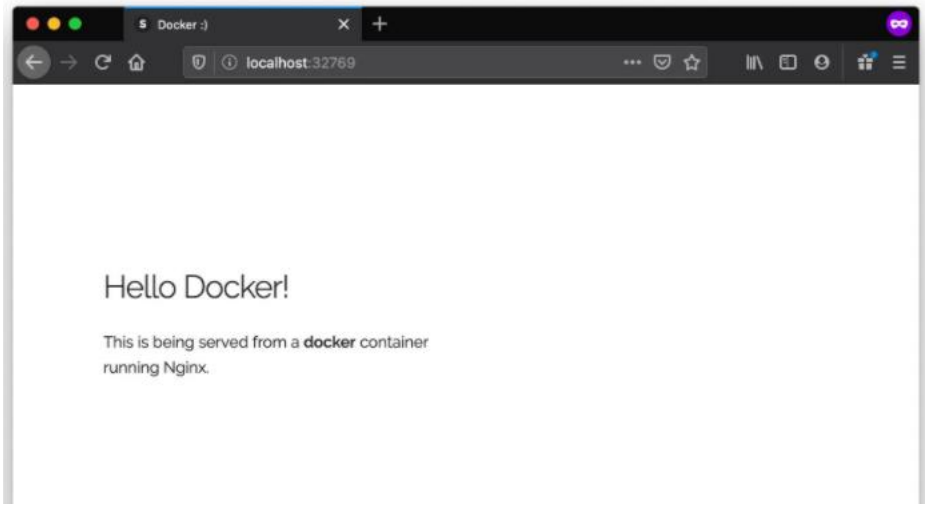
   - Print all local **docker images**
   - **Run** a 'hello-world' container in the docker
   - Print all running docker **process status**

   Hints:
   - You may create a free-tier AWS EC2 instance with an Ubuntu OS. Don't forget to set up the public IP address so that you can remotely access to the EC2 instance.
   - To access the EC2, you may use AWS CLI or any remote access tools you prefer, such as putty.
   - To install Docker on Ubuntu, you may refer to the tutorial here



2) **Run a Webapp with Docker.** You will learn how to pull a web server container and launch it in the Docker.

   Your task is to follow the instructions to set up the 'static-site'. To showcase the server is running properly at localhost, such as:



Hints:

- In a command line environment, you can use the command '**curl localhost:1234'** to test whether a server is running properly.
- To have a GUI environment, you may set up a GUI server on EC2 and use remote desktop access.
- To open multiple CLI environment on AWS, you can 'connect' the EC2 instances multiple times.

3) **Make your first Docker image**. You'll learn how to compile a Docker image from a Dockerfile and how to upload it to AWS beanstalk and Docker Hub.

   Your task is to follow the instructions to work on the 'capnip' example. To showcase

   - You are able to create a Docker image from a Dockerfile and it is working properly both at your local environment and the AWS Elastic Beanstalk.
   - You are able to upload the Docker image to a repository and load it elsewhere.

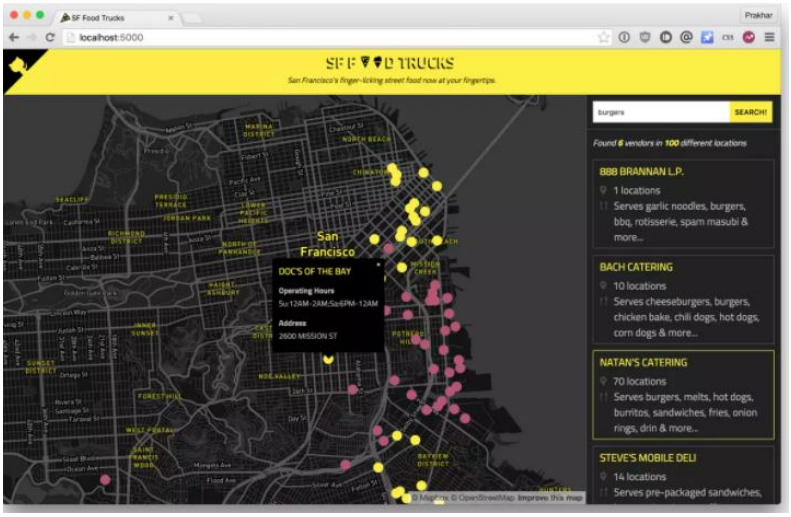
   Hints:

   - Known issue 1: in the 'requirements.txt', set 'flask **>= 2.0'**
   - Known issue 2: in the 'Dockerfile', set 'FROM python:**3.9'**
   - More troubleshoot https://github.com/prakhar1989/docker-curriculum/issues

4) **Multi-container environment**. You'll learn how to run a multi-container app.

Your task is to follow the instructions to work on the 'foodtrucks' example. To showcase

- You are able to run the FoodTrucks example.
- You are able to explain how do the Docker Network and Docker Compose work.



What to hand-in?

1) **Demonstrate** to Prof. Wenchao or TA your two working systems **by 17 March (Thur)**. You can show us earlier when your group completes the tasks. You can show us the two systems in two different time slots (before the deadline). We will take note of what you have demonstrated.

2) Write a brief **lab report** documenting the following:
   - Did you encounter any issue(s) during the setup?
     - For each issue you encountered, briefly describe the issue and how you solve it.
   - Explain how a microservice architecture is implemented using the example of Docker Network and Docker Compose.

Submit your lab report to eDimension before **17 March 23:59**. This is a group-based lab and each group just need to submit one lab report. Indicate your group ID and all the members' names and student IDs (including audit students, if any) in your lab report.

Total marks for this lab: 30pt

- 15pt: Task 1 to 3 demo (5 pt each)
- 7pt: Task 4 Multi-container demo
- 8pt: Lab report