DV1566

Introduction to Cloud Computing

1. Laboratory 1 booklet

Scope: The purpose of Lab 1 is to practice with Docker Containers.

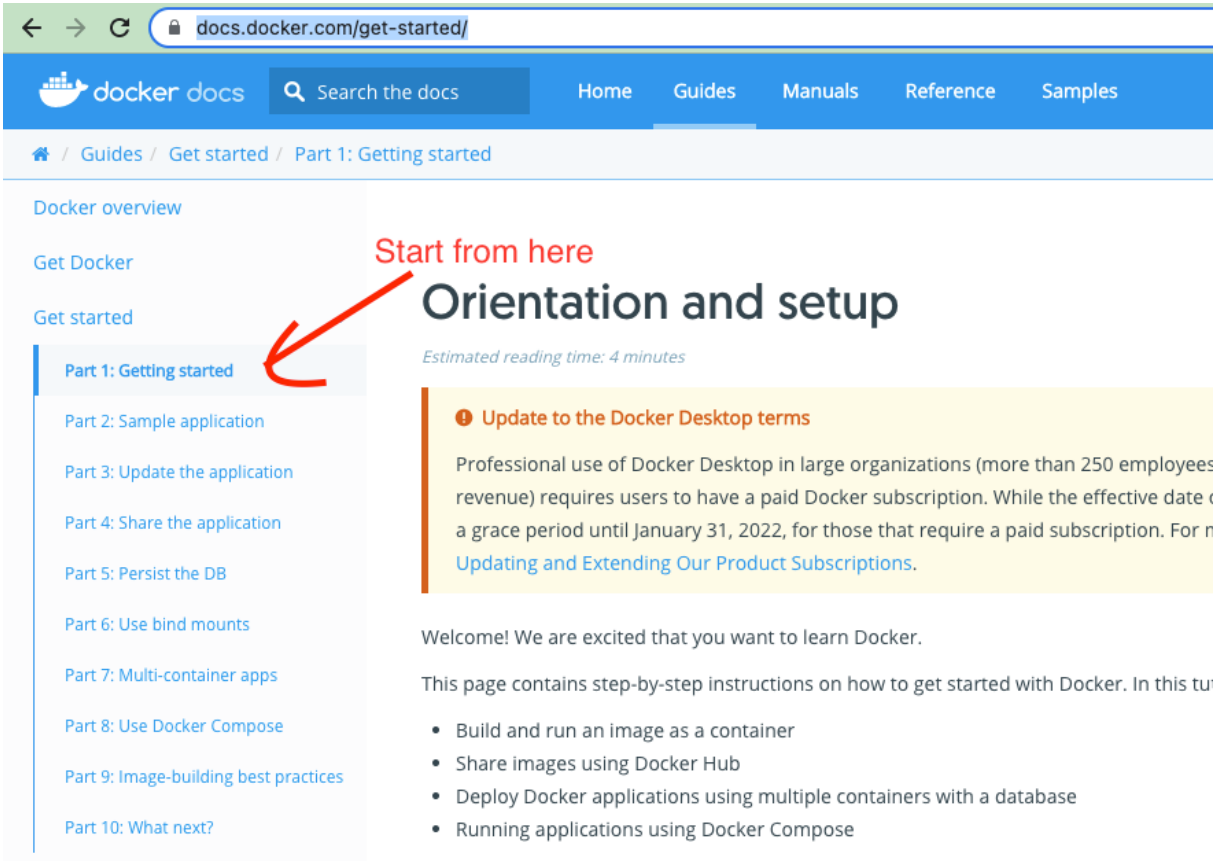
Group work: the group member should equally contribute to the project (unless you do not decide to work by yourself)

Working environment: your own pc/laptop/server.

Assessment (U/UX/G): You will be evaluated based on the submitted report.

1 Introduction

This lab is based on the docker tutorial available at https://docs.docker.com/get-started/



In this experience you will learn how to

- Download and install docker
- Build and run an image as a container
- Share images using Docker Hub
- Deploy Docker applications using multiple containers with a database
- Running applications using Docker Compose

The reference documentation is the Docker Documentation available at https://docs.docker.com/

2 Instructions

The instructions to proceed with the lab are the following

1 Download and install docker on your computer
2 Start the tutorial mentioned above and complete from "Part 1: Getting Started" to "Part 9: Image-building best practices"
3 After you complete each experience, you should answer the questions listed in the next section. **Please do not provide YES or NO answers but always motivate your responses.**
4 Produce a report in pdf containing your answers and submit it to canvas (this is a group submission - only one submission for the group is enough).

2.1 Questionnaire

2.1.1 Part 1: Getting started

Q1: Why you run the container docker/gettingstarted in detached mode?

Q2: What is the difference between a container and a container image?

2.1.2 Part 2: Sample application

Q1: What is the meaning of the docker's directives used in the docker file? Please comment on each of the directives.

Q2: Why it is important to tag a container image?

Q3: Why we should bind a host port with the container port?

2.1.3 Part 3: Update the application

Q1: It is possible to bind two containers on the same host port?

Q2: Why, after stopping a container, you need to remove it?

Q3: It is possible to remove a running container, without stopping it before the removal?

2.1.4 Part 4: Share the application

Q1: Given a container image available on a docker image repository, can you start an instance of the image on any docker host? Is there any limitation?

2.1.5 Part 5: Persist the DB

Q1: If you run two instances of the same container image, let's call them container A and container B, and you create a file in container A, is that new file visible in container B?

Q2: While in the docker command "docker run -d ubuntu bash -c "shuf -i 1-10000 -n 1 -o /data.txt && tail -f /dev/null" we need to keep the container running with "tail -f /dev/null"?

Q3: What you can do with the "docker exec" command?

Q4: Let assume you need to use a volume. Why you need to mount the volume in the container file system? Does that mean you modify the container filesystem?

Q5: In this part of the tutorial, you have created a volume. Where is the volume located in the file system of your docker host?

2.1.6 Part 6: Use bind mounts

Q1: What is a dev-mode container?

Q2: Can we run a container, install software dependencies, and then use the updated container without building first the image?

2.1.7 Part 7: Multi container app & Part 8: Use Docker Compose

Q1: What is a Docker service?

Q2: Can we spin up a single instance of a docker container using a docker-compose file?

Q3: Can we run a MySQL container and store the database structure and data in a volume?

Q4: Is the order of the services defined in a docker-compose file important, or it is irrelevant which service is defined first?

Q5: Is it mandatory to define the network in a docker-compose file?

Q6: If you would like to run a multi-container app, is it necessary to use docker compose (i.e. to define a service) or you can achieve the same objective using docker commands from the shell? Does a service offers more than just running a multiple container app with a single command?

3 Assessment

Your answers will be assessed as follow:

- PASS (G): you correctly answer more than the 75% of questions
- TO FIX (UX): you correctly answer between the 50% and the 75% of the questions
- NO PASS (U): your answers are wrong for more than the 50% of the questions

No specific template for the report is provided. You can use your own template.

The assessment is pass or fail (U/Ux/G). I expect that all the group members will give a valuable contribution to the work. However, do not hesitate to contact me if there are group's members not contributing.