Experiment 2 - Docker on Linux/Windows/Play-with-Docker

Pre-reading and Installation Guide

This guide contains two sections.
- **Pre-reading section:** This contains reading material to help familiarise yourself with the need and fundamental concepts of Docker. Go through the reading material before starting the lab experiment so as to have a well-rounded understanding of Docker which will aid you in debugging tasks.
- **Installation section:** Contains steps to install docker on linux as well as the installation of Docker Desktop for Windows users. Play-with-docker can also be used for this lab experiment, which does not require docker installation. If you choose to use play-with-docker, keep in mind you will need to install Docker in the future to complete upcoming lab experiments. This section also contains steps to install docker-compose. **You will also have to create an account on Docker hub!**

1. Pre-reading section:

Understanding containers and Docker:

A container is a standard unit of software that packages up code and all its dependencies so the application runs quickly and reliably from one computing environment to another.

Container engines are the technology/software that are used to run the containers. There are many container engines available, but the most popular and easy-to-use CE is *Docker.*

Docker images and docker files:

A Docker image is a *read-only* template that contains a set of instructions for creating a container that can run on the Docker platform.

Docker files are used to create Docker images. Dockerfile are a series of steps that specify which base image to use, which files/folders to copy into the container, run which commands while starting up the container and which will be the main process of the container.

Docker hub is a central public repository containing Docker images and documentation on how to use these base images.

Exposing ports, docker networks:

Docker networking is primarily used to establish communication between Docker containers and the outside world via the host machine where the Docker daemon is running.

Bridge networks are usually used when your applications run in standalone containers that need to communicate.

Docker-compose:

Docker-compose helps bootstrap complex multi-container applications, helps maintain the dependencies between them, creates a network among these containers and even helps scale the entire application entirely or particular containers within the application.

2. Installation section:

Installation of Docker Engine

The following task can be carried out in 3 different methods.

- Docker on Linux (you can also use this method if you have a Linux VM with Oracle VirtualBox installed on your system).
- Docker Desktop (for Windows users)

- Play-with-Docker (Keep in mind that you'd still have to install Docker onto your local system for the upcoming experiments. Use this as a last resort.)

Installation instructions will be provided for all 3 methods below.

Method 1 (Docker on Linux):

1. Install docker engine, instructions are in the given link:
   a. Install Docker Engine on Ubuntu
2. Use the following link to make docker a "sudo-less" command:
   a. Post-installation steps for Linux

Method 2 (Docker Desktop for Windows Users):

1. Install docker engine, instructions are in the given link:
   a. https://docs.docker.com/desktop/windows/install/

Method 3 (Play-with-Docker):

PWD (Play-with-docker) is a Docker playground that allows users to run Docker commands in a matter of seconds. It gives the experience of having a free **Alpine Linux Virtual Machine** in the browser, where you can build and run Docker containers and even create clusters in Docker Swarm Mode.

1. Visit the link below and sign up for a new account. After completion, a verification email will be sent to the registered email address. Verify your account and login.
   a. https://labs.play-with-docker.com/

Compulsory step for all 3 methods!

Verify that Docker Engine is installed correctly by running : docker run hello-world

Additional References:
docker command not found even though installed with apt-get

Installation of Docker-Compose (Only for Linux users)

Install docker-compose, instructions are in the given link: Install Docker Compose

To check installation run *docker-compose -- version*

Docker Desktop for Windows includes Compose along with other Docker apps, so most Windows users do not need to install Compose separately.