

CS 4740 Programming Assignment 4

Goals: Utilize Docker in creation of web application. Understand structure of Docker as well as deploy a web application via AWS Elastic Beanstalk and Amazon Container Service.

Note: You can pause any time during this assignment. It may take more than 5 hours.

IMPORTANT: Do NOT use Windows OS for this PA. If you have Windows PC only, install VirtualBox and create a VM with Linux (e.g., Ubuntu 14.04) installed (20GB disk size and 3GB memory are enough).

Part 1:

Please follow the tutorial below:

<https://docker-curriculum.com/>

Read through all text and finish all steps 1.1-3.4 (inclusive). To make our explanation below clear, we marked steps in the tutorial with indices. Please see file "P4-TutorialIndex.docx" for the step indices.

Notes:

1. Ignore the following part in the tutorial

Note that if you are using Elasticsearch version 5 or higher you need to do the following to make it work.

- Increase the memory size of your docker-machine instance to at least 2gb.
- Do an SSH in your docker-machine instance by `docker-machine ssh` and run this command `sysctl -w vm.max_map_count=262144`. This will fix the max virtual memory areas error.

2. Before you start step 3.1, you will need to execute command:

`git clone https://github.com/prakhar1989/FoodTrucks.git`

to download the source code for the app and do the work in the directory of the downloaded source code.

3. In step 3.4, before command "ecs-cli configure --region us-east-1 --cluster foodtrucks", please follow the instructions below to do the ecs-cli configuration.

<http://docs.aws.amazon.com/cli/latest/userguide/installing.html>

http://docs.aws.amazon.com/AmazonECS/latest/developerguide/ECS_CLI_Configuration.html

4. In step 3.4, when you execute the command "ecs-cli compose --file aws-compose.yml up", you might see the desired status of the containers are stopped. When you see this error, try the following solution:

(1). At this command "ecs-cli up --keypair ecs --capability-iam --size 2 --instance-type t2.micro", change t2.micro to t2.medium.

(2). In the file of aws-compose.yml, change the memory size for both containers from

262144000 to 1004144000.

5. When you fail to create container, check whether the resources in your machine are sufficient first.

(1) The disk size of your machine is not enough. You can try to remove the stopped containers in your machine. Those containers occupy lots of disk space. Use "docker rm" command to delete the stopped containers. Check the command in the tutorial.

(2) The memory size of your machine is not enough. If you are using virtualbox, make sure to increase the memory size to at least 2.5GB.

Part 2:

Please answer the following questions:

1. What is Docker?
2. What is the difference between a Docker image and a Docker container?
3. What is the command used to create a Docker container?
4. What command is used to remove a Docker container?
5. What are the advantages of Docker versus a Virtual Machine?
6. What are some tools in the Docker ecosystem and what do they do?
7. What are Dockerfiles and why do we use them?

Submission:

In addition to your answers to the questions above, please additionally include the following screenshots:

1. Terminal output of all Docker containers - "docker ps -a" (step 1.1)
2. Initial "Hello Docker!" web page ("This is being served from a docker container running Nginx") (step 2.1)
3. Terminal output of all Docker images (step 2.2)
4. Web page at the end of step 2.4
5. Elastic Beanstalk page on Amazon (greek tick mark) with your Amazon account name showing on the right top and website page with the website address (end of step 2.5)
6. Output of command "docker-compose up" (step 3.3)
7. Running ECS cluster (end of step 3.4)

Submit ONE PDF with both screenshots and written answers, in that order

Remember to terminate the services on AWS after you finish PA4.