Docker Containers

CMIS 545 - Cloud Computing Architecture

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Section 1

Just Enough Microservices

What are Microservices?

- Microservices are

How do Microservices relate to Containers?

- Containers facilitate the modularized development and deployment of microservices.
- Using one service per container guarantees independence

Section 2

Containerization

Section 3

Containers vs Virtual Machines

Containers vs Virtual Machines

Random explanation xxx

Differences

- Virtualization
- Containerization
- third bullet
- fourth bullet

Section 4

Docker

Definition

Docker is a Platform xxx

Section 5

Docker Primitives

Docker Engine

Docker Image

- We can think of a Docker Image as a stopped Docker Container
- Each element within an image represents an image layer. Layers are then stacked on top of each other and ready to run.
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Docker Container

- A Docker Container is essentially the environment where an image runs, more technically, it is a runtime instance of that image with a writable container layer on top*.
- Containers are the central unit on top of which all Docker is built, and they are better examined practically.

Note

* If the data generated in the container needs to be persisted beyond the container's existence then it should be written using data volumes.

Docker Compose

Section 6

Docker Demo

Graylog App

- Graylog is an open source log management solution for capturing, storing, and analyzing machine data. It needs two dependencies:
  - MongoDB: An open-source, “general purpose, document-based, distributed database”
  - Elasticsearch: An open-source, “powerful analytics engine to explore data easily”.

Docker Run

- ~$ docker container run : *

Ubuntu Screenshots

```
eduardo@eduardo-L380:~$ docker run --name elasticsearch \
    -e "http.host=0.0.0.0" \
    -e "ES_JAVA_OPTS=-Xms512m -Xmx512m" \
    -d docker.elastic.co/elasticsearch/elasticsearch-oss:6.8.10

eduardo@eduardo-L380:~$ docker run --name graylog --link mongo --link
elasticsearch \
    -p 9000:9000 -p 12201:12201 -p 1514:1514 -p 5555:5555\
    -e GRAYLOG_HTTP_EXTERNAL_URI="http://127.0.0.1:9000/" \
    -d graylog/graylog:3.3
```

Figure 1: Graylog Setup Commands

Note

In Ubuntu 20.04 LTS stock, installing Graylog requires adjusting default virtual memory settings using: *sudo sysctl -w vm.max_map_count=262144*

Further Container Commands[1]

Command	Description
docker container prune	Remove all stopped containers
docker container start	Start one or more stopped containers
docker container diff	Inspect file or directory changes
docker container exec	Run a command in a running container
docker container export	Export a container's filesystem as a tar
docker container inspect	Display detailed information
docker container kill	Kill one or more running containers
docker container logs	Fetch the logs of a container

[1] Docker Documentation

https://docs.docker.com/engine/reference/commandline/container_run/