Docker

Introduction

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What is Docker?

- A company driving forward the container movement
- In our context, we will focus on docker containers
- Docker (software) is a program that performs operating-system-level virtualization also known as containerization.

https://ww.docker.com/

Containers

- OS kernel (linux for example) has namespaces to allow independent "containers" to run within a single instance, avoiding the overhead of starting and maintaining virtual machines (VMs)
- Container concept was integrated into Sun Solaris in the early 2000s
- They reduce cost by compared with virtual machines
  - All VM installs have separate file systems and duplicate all operating system, runtimes, jars, etc. files.
  - Containers share the file system of the host. You can mount and share the same files with all containers.
  - Containers start very fast.

Docker Flavors

Docker Enterprise Edition (EE)

https://www.docker.com/enterprise-edition

Docker Community Edition (CE)

https://www.docker.com/community-edition

Install Docker CE

Mac, Linux, Windows, etc.

Let's install the mac version

https://store.docker.com/search?type=edition&offering=community

Kitematic

Run containers through a simple, yet powerful graphical user interface.

https://kitematic.com/

Is docker running?

```
$ docker version

Client:

 Version: 18.03.0-ce

 API version:  1.37

 ...
```

Command Line

Usage: docker COMMAND

ps - List containers

run - Run a command in a new container

top - Display the running processes of a container

Quick launch Ubuntu image

$ docker run -it ubuntu bash

root@02ca69506a6f:/#

A few run options:

-i, --interactive

-t, --tty

Attach to a running container

```
$ docker ps

CONTAINER ID       IMAGE           COMMAND          CREATED
STATUS                  PORTS                  NAMES

f1af76e2e88c       ubuntu          "bash"           Less than a second ago   Up
1 second                                  vigorous_swanson

$ docker attach f1af76e2e88c

root@f1af76e2e88c:/#
```

Awesome Docker

https://github.com/veggiemonk/awesome-docker

https://stackify.com/top-docker-tools/

Docker Hub

https://hub.docker.com/

Example Tomcat:<version>

$ docker run -it --rm tomcat:8.0

You can then go to http://localhost:8888 or http://host-ip:8888 in a browser.

Dockerfile

https://docs.docker.com/engine/reference/builder/

$ docker images -a[ll]

ubuntu	latest	c9d990395902	11 days ago	113MB
redis	latest	c5355f8853e4	3 weeks ago	107MB
neo4j	latest	75ae85cc12a7	4 weeks ago	190MB
elasticsearch	latest	6c0bdf761f3b	5 weeks ago	570MB

Java

```
FROM java:8
COPY . /usr/src/myapp
WORKDIR /usr/src/myapp
RUN javac Main.java
CMD ["java", "Main"]
```

You can then run and build the Docker image:

```
$ docker build -t my-java-app .
$ docker run -it --rm --name my-running-app my-java-app
```

Create Custom Images/Containers

https://github.com/jenkinsci/docker/blob/master/Dockerfile

https://www.jetbrains.com/help/idea/running-a-java-app-in-a-container.html

The End

Questions?

Comments?