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Experiment No: 9

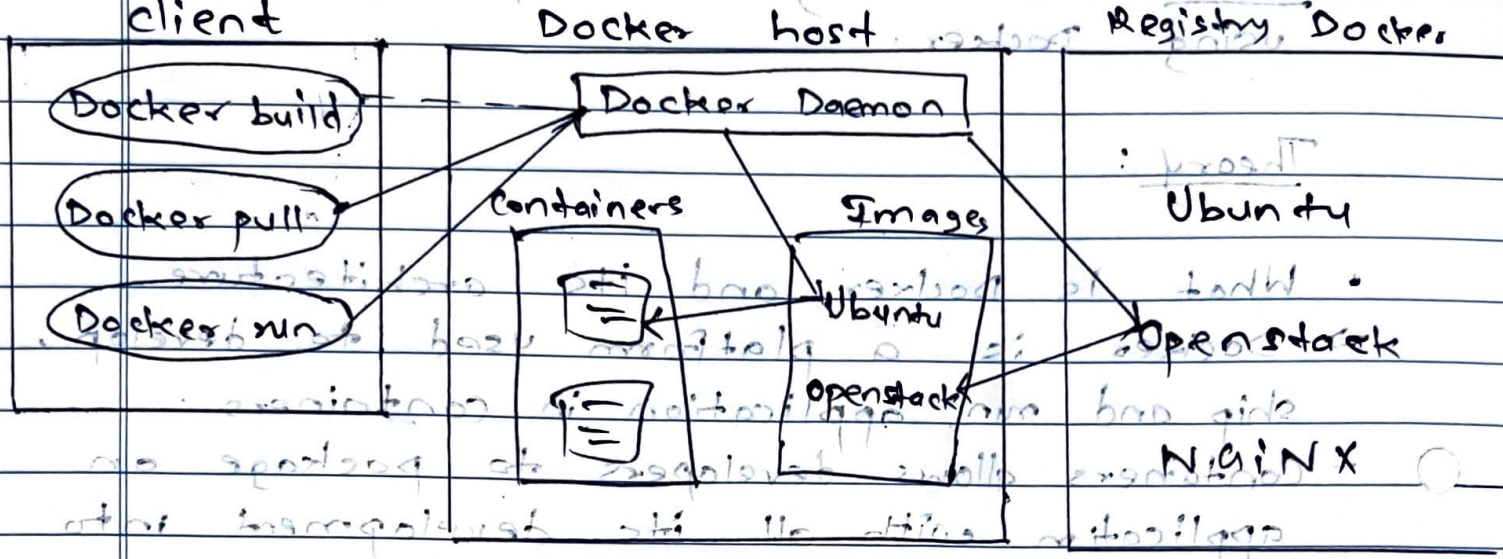
Aim: To study and implement Containerization using Docker.

Theory:

- What is Docker and its architecture

⇒ Docker is a platform used to develop, ship and run application in containers.

- Containers allows developers to package an application with all its development into a standardized unit for software development
- Docker makes use of client-server architecture. The Docker client talks with the docker daemon which helps in building, running, and distributing the docker containers.
- The Docker client runs with the daemon on the same system or we can connect the Docker client with the Docker daemon remotely.
- With the help of REST API over a UNIX socket or a network, the docker client and daemon interact with each other.
- Docker daemon manages all the services by communication with other daemon.
- It manages docker objects such as images, containers, networks and volumes with the help of the API requests of Docker.



- Benefits of Containerization

⇒ Containerization offers several advantages :-

1) Portability : Containers encapsulates application and their dependencies, making them portable across different environments, from the development to production.

2) Isolation

⇒ Containers provide isolated environments for applications, ensuring that changes or dependencies of one container do not affect others.

3) Scalability : Containers can be easily scaled up or down based on the demand, allowing for efficient resource utilization.

- Explain the following with Docker

1) Containers

⇒ A container is a lightweight, standalone, executable package that includes everything needed to run a piece of software, including the code, runtime, system tools, system libraries and setting.

2) Images

⇒ Images are read-only templates used to create containers. They contain the application code, dependencies and other necessary files and metadata required to run the app.

3) Docker file

⇒ A Dockerfile is a text file that contains instruction for building a Docker image. It specifies the base image, environment variables, commands to run during the image build process and other configuration setting necessary to create the image

- Compare the following

1) Container and virtual machine

Virtual Machine	Container
1) Application running on VM system or hypervisor, can run different os.	1) While application running in a container environment share a single os.
2) VM virtualizes the computer system, meaning its hardware	2) While container virtualize the os or software only.
3) VM size is very large, generally in GB	3) While the size of container is very light.
4) E.g., Type 1 hypervisor are KVM, Xen	4) E.g., Rancher OS, PhotonOS etc.

2) Image and container

Image	Container
1) It is a blueprint of the container.	1) It is the instance of the image.
2) Image is a logical entity.	2) The container is real world entity.
3) Images are created only once.	3) The containers are created any no. of times using an image.
4) Sharing of docker image is possible.	4) Sharing of containers is not exactly possible.

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