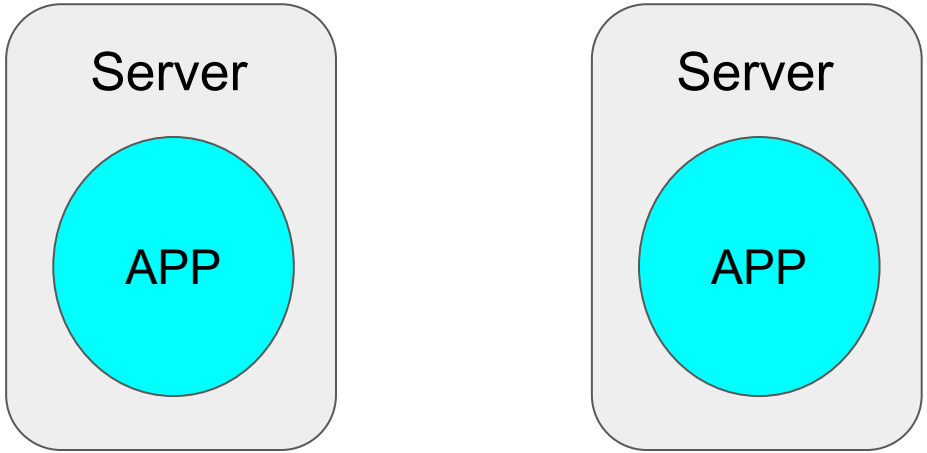
Assalam-u-alaikum

BILAL KHAN

This is my 18th video of DevOps

Today we’re going to talk about Docker.

Applications are running on the servers but there was a time when only one application was running on one server.



How to run multiple applications or instances of an application running on a single server?

Virtual machines(vmware etc) solved this problem.

What is a virtual machine?

Virtual machine will allow multiple applications to run on a single server.

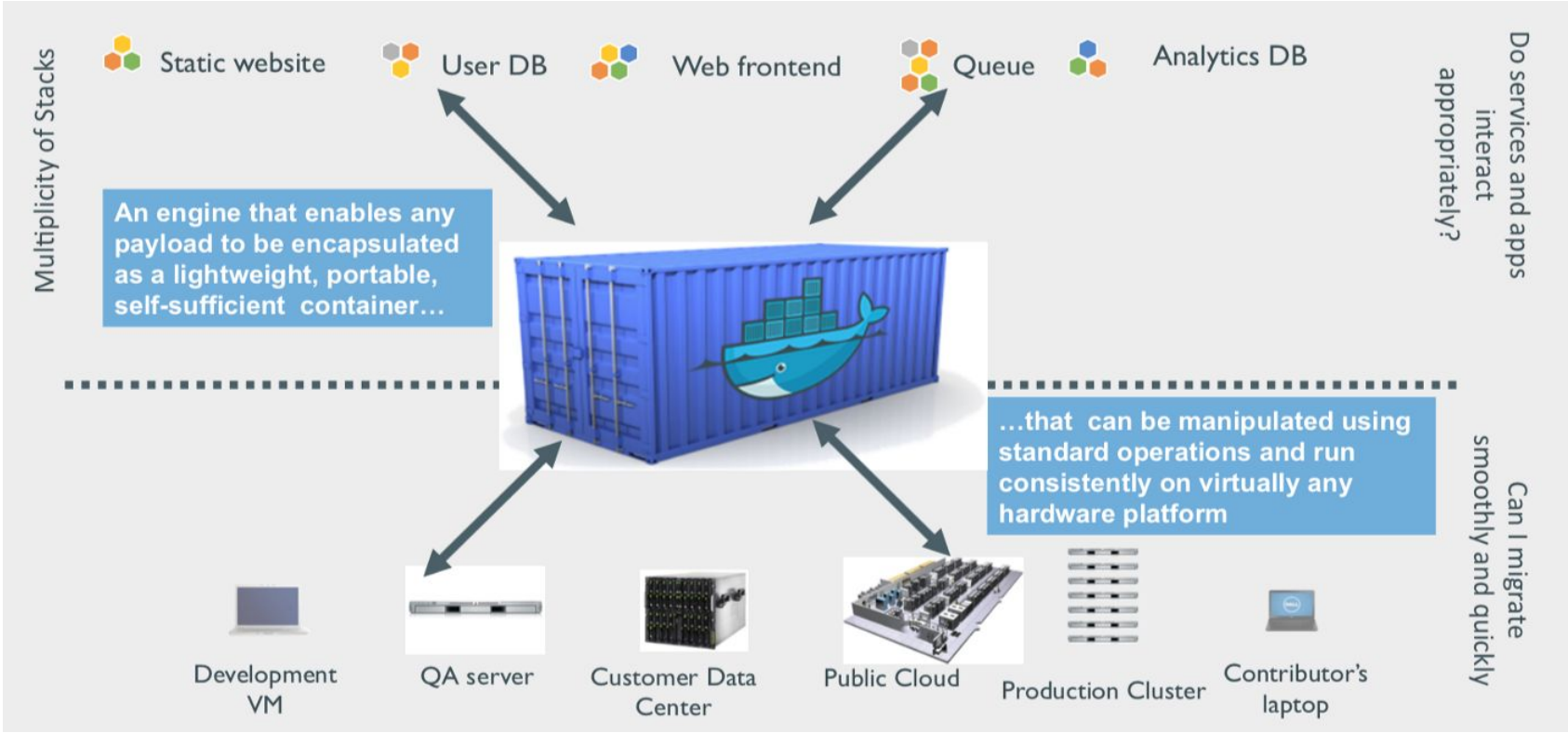
Even if it is better than one application running on one server but it is still not perfect because virtual machine requires its own operating system. OS uses a dedicated amount of CPU, RAM, and Hard Disk, etc. It requires time to boot to another operating system. It is not fast. There may come issues with licenses in operating system. It overloads the machine.

Teams communicate and exchange data b/w each other.
Previously the developers were creating an application in VMs, and after that, they were creating the whole image of VM and transferring it to the next team because the image contains all the necessary files to be used in an application and the receiving team was also using VMs to use that image.

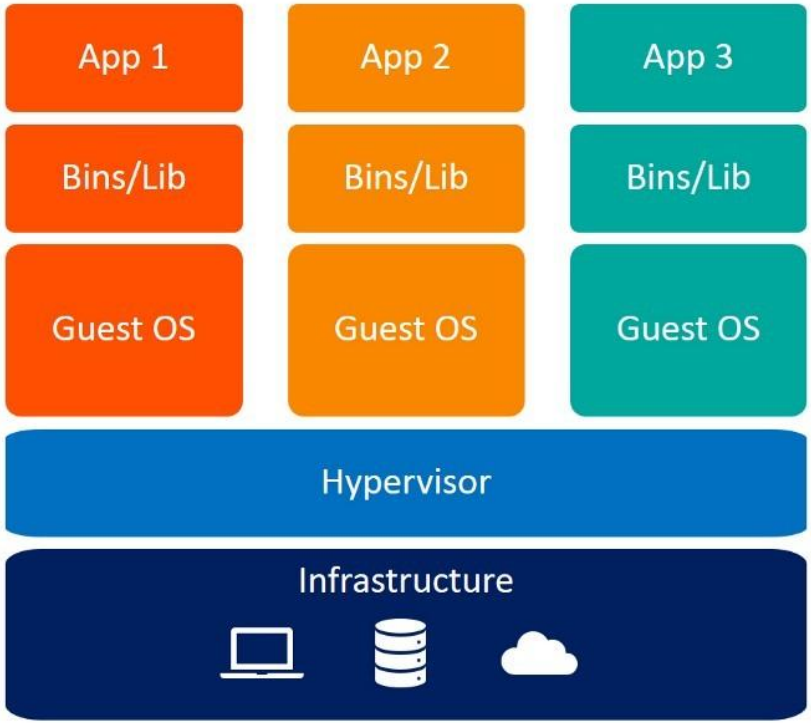
Instead of installing multiple operating systems you can just take the files required for an application to run it.

Containers

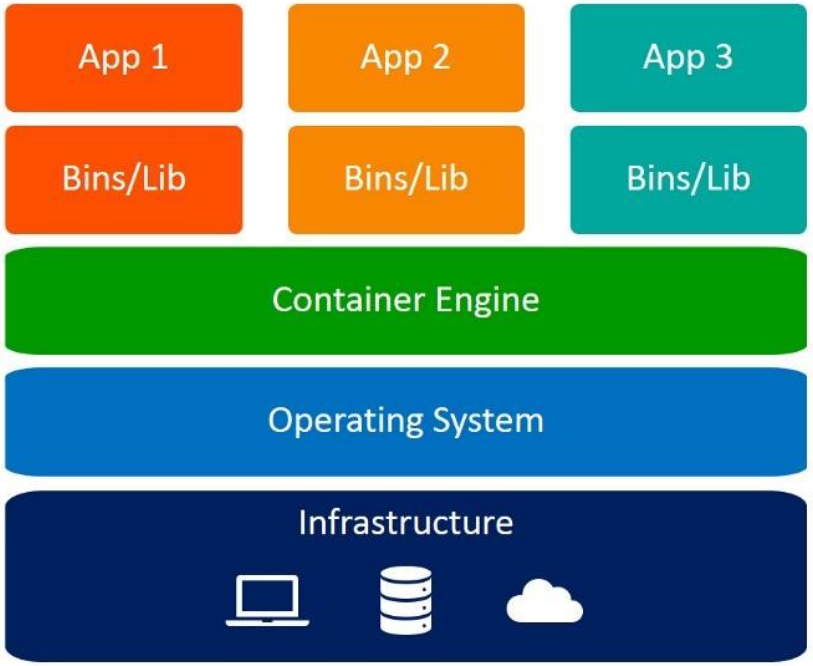
Containers contain all the necessary elements to be used in an application. An application will work in an isolated environment in a container.



Containerization vs Virtualization



Virtual Machines



Containers

What is Hypervisor?

Hypervisor is used to create multiple machines on a host operating system and it manages virtual machines. It divides and allocate the resources on various pieces of hardware.

Containers can be used in Windows, macOS, and Linux. If a windows based application is containerized, it will only run in windows host. Similarly linux based container will only run in linux host. By using container, there is no need to install multiple operating systems. Containers run in these applications.

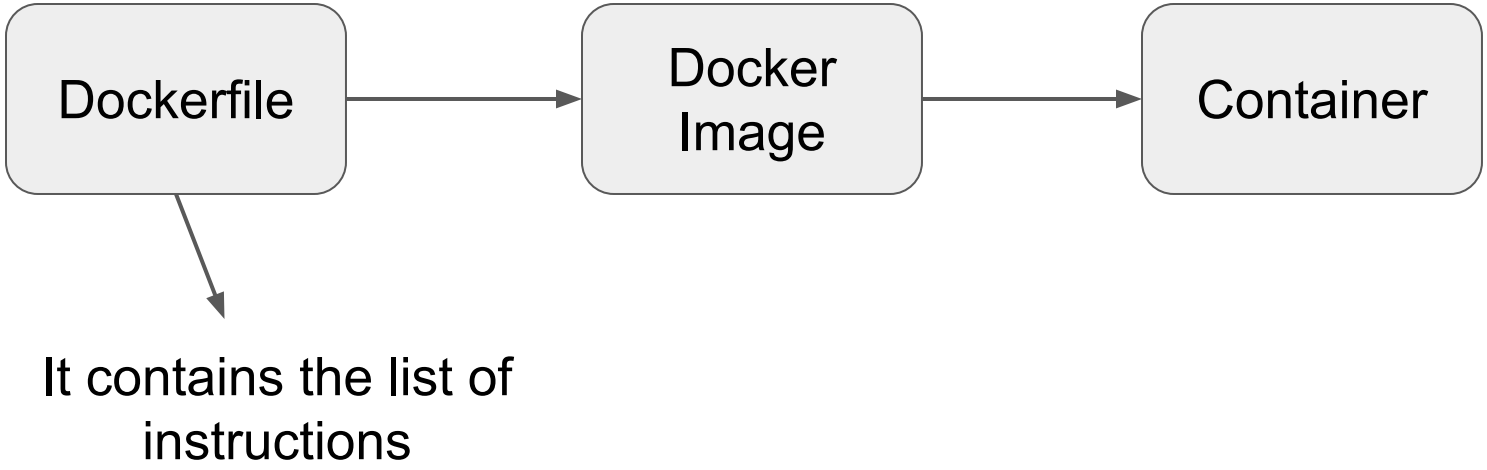
- **Windows:** Docker Desktop, WSL(Windows subsystem for Linux).
- **macOS:** VMs and Docker Desktop.
- **Linux:** As it is.

What is Docker?

Docker is a company and docker engine is a tool that helps in creating, managing and scaling the containers.

A developer defines all the applications and it's dependencies in a Dockerfile which is then used to build the Docker images that defines a Docker container.

A Dockerfile is a recipe for creating Docker images. A Docker image gets built by running the Docker commands(which uses that Dockerfile). **The Dockerfile is a source code, the image is an executable and the container is a process.** You can run 1000+ containers from the same Image. That's why the container is a running instance of the Docker image.



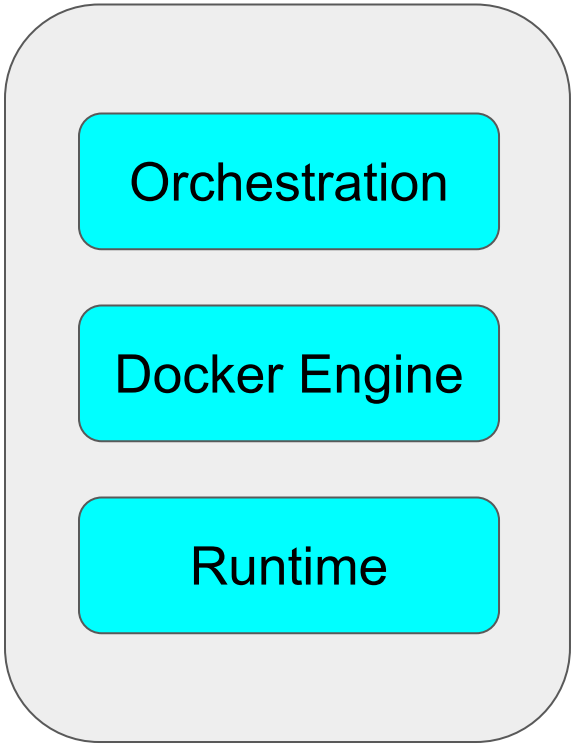
You don’t need to share the whole running application. Instead, you just need to share the instructions of an application and by following the instructions, the receiver can get the required results.

Docker has three parts.

1. **Runtime**
   It allows us to start and stop containers.
   Runtime is of two types.

   1. Low level runtime or runc
   It works with operating system and starts and stops the container.

   2. Containerd
   It manages the runc, connect with the network, and pull the images from the internet.



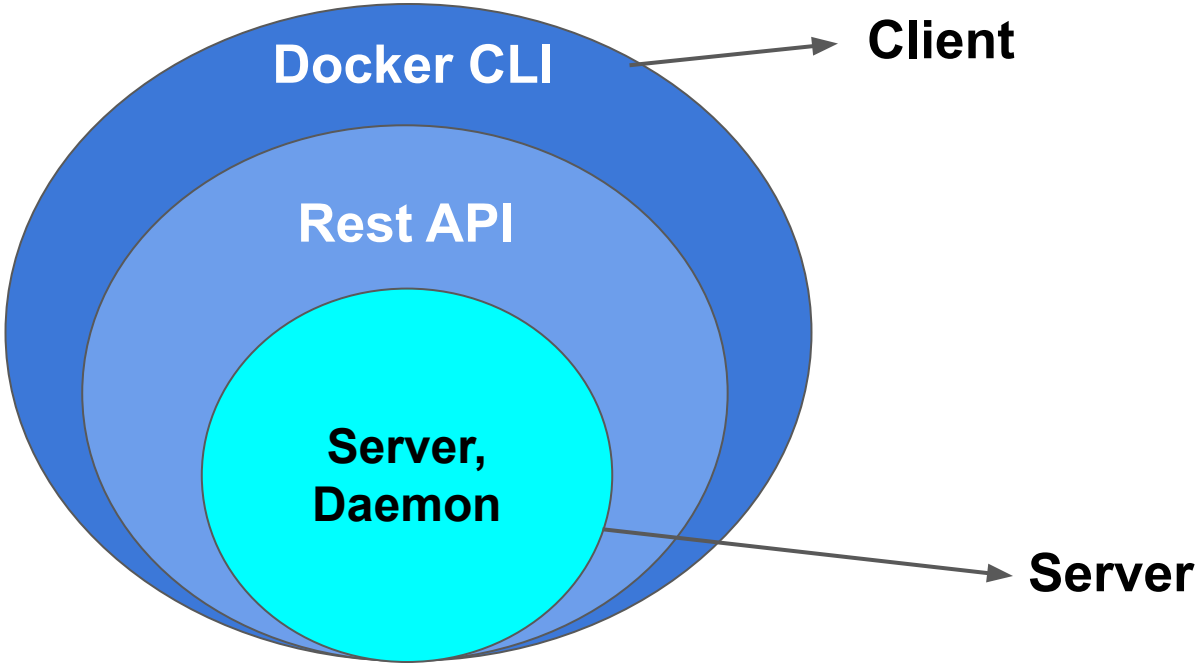
Docker

2. **Docker Engine**

   Docker engine is used to interact with the daemon/server.

   Docker Daemon

   The Docker daemon constantly listens to Docker API requests and processes them.



3. Orchestration

(1) Let's say that your application is running in 10 containers and you want to scale them up to 20 containers. **(2)** Let's say few containers got down and you want to restart those containers. **(3)** Let's say multiple containers contain the version 1 of an application and you want to update them with version 2.

These things require time to do it manually. It would be cool if you automate them all. To solve this problem, orchestration comes into picture. There are some tools built for orchestration like Docker swarm, and Kubernetes.

You can learn about Open Container Initiative by clicking here.

What we have learned?

What is a virtual machine and container

What is a hypervisor?

What is docker?

Runtime, Docker engine, and orchestration

That’s It

I hope you will like this video.

Make sure to subscribe to my channel.

Ask questions in the comment section.