# Docker

1. What is container?

Container is like a virtual machine in which we can deploy any type of applications, softwares and libraries. It's a light weight virtual machines which uses OS in the form of image which is having less in size compare to traditional VMware and oracle virtual box OS images. Container word took from shipping containers. It has everything to run a application.

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2. What is virtualization?

Logically dividing big machine into multiple virtual machines so that each virtual machine acts as new server and we can deploy any kind of applications in it. For this first we install any virtualization software on top of base OS. This virtualization software will divide base machine resources in to logical components. In a simple terms, logically dividing one machine into multiple machines call virtualization.

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3. What is Docker?

Docker is a tool by using which we create containers in less time. Docker uses light weight OS in the form of docker images which we will get docker hub. Docker is open source now. It became so popular because of its unique virtualization concept which is not there in other tools. We can use docker in both windows and Linux machines.

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3. What do you mean by docker image?

Docker image is light weight OS provided by docker company. We can get any type of docker images form docker hub. We use these docker images to create docker containers. This docker images may contain only OS or may contain OS + other

softwares as well. Every software in docker image will be stored in the form of layer. Advantage of using docker images is we can replicate the same environment any no of times.

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4. What are the ways through which we can create docker images?

There are three ways through which we can create docker images.

1. We can take any type of docker image directly from docker hub being provided by docker company and docker community.

2. We can create our own docker images form our own docker containers. i.e. first we create container form base docker image taken form docker hub and the by going inside container, we can install all required softwares and then create docker image from our own docker container.

3. We can create docker image form docker file. It is the most preferred way of creating docker images.

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5. What is docker file and why do we use it?

It is a just normal text file with instructions in it to build docker image. It the the automated way of creating docker images. Once you build docker image, automatically docker file will be created. In this file, we mention required OS image and all required softwares in the form of instructions. Once we build docker file, back end docker container will be created and then docker image will be crated from that container and that container will be destroyed automatically.

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6. Differenced between docker and VM Ware?

VM Ware uses complete OS which contains around GBs in size. But docker image size will be in MBs only. So it takes less size. That's why it takes less base machine resources. This docker imaged is compressed version of OS. The second advantage of docker is, there is no pre-allocation of RAM. During run time, it takes RAM as pre requirement form base machine and one's work is over, it release RAM. But in VM Ware, pre-allocation of RAM is there and it blocked by VM Ware whether it uses it

or not. So need more RAM for base machine if you want to use VM Ware unlike Docker.

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7. What is OS-Lever Virtualization?

It is the unique feature of Docker which is not available in other virtualization softwares. Docker takes most of UNIX features form host machine OS and it only takes extra layers of required OS in the form of docker image. So docker image contains only extra layers of required OS. For core UNIX kernel, it depends on host OS why because UNIX kernel is same in any of the Unix and Linux flavors. In a simple terms, docker takes host OS virtually. That's why we call this concept as OS-Lever Virtualization.

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8. What is Layered file system/Union file system?

Inside docker container, wheat ever we do, that forms as a new layer. For instance, creating files, directories, installing packages etc. This is what we call as layered file system. Each layer takes less space. We can create docker image form this container. In that docker image also we get all these layers and forms unity. That’s why we also call Union File System. If we create container out of docker image, you can able to see all those files, directories and packages. This is what replication the same environment.

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9. What are the benefits of Docker?

Containerization (OS level virtualization)(No need guest OS)

No pre-allocation of RAM

Can replicate same environment

Less cost

Less weight (MB’s in size)

Fast to fire up

Can run on physical/virtual/cloud

Can re-use (same image)

Can create containers in less time

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10. List of Docker components?

Docker image: - Contains OS (very small)(almost negligible) + soft wares

Docker Container: - Container like a machine which is created from Docker image.

Docker file:- Describes steps to create a docker image.

Docker hub/registry: - Stores all docker images publicly.

Docker daemon: - Docker service runs at back end

Above five components we call as Docker components

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11. What is Docker workflow?

First we create Docker file by mentioning instructions in it to build docker image. Form this Docker image we are going to create container. This Docker image we can push to docker hub. This image will be pulled by others to create docker containers. Then they are going to create docker images from docker containers. Like this we can create Docker images form either docker file or docker containers. We can create docker containers from docker images. This is the work flow of docker.

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12. Sample Docker file instructions?

FROM ubuntu

WORKDIR /tmp

RUN echo "Hello" > /tmp/testfile

ENV myname user1

COPY testfile1 /tmp

ADD test.tar.gz /tmp

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13. What is the importance of volumes in Docker?

.Volume is a directory inside your container

.First declare directory as a volume and then share volume

.Even if we stop container, still we can access volume

.Volume will be created in one container

.You can share one volume across any no of containers

.Volume will not be included when you update an image

.Map volumes in two ways

Share host – container

Share container - container

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14. What do you mean by port mapping in Docker?

Suppose if you want to make any container as web server by installing web package it. You need to provide containers IP address to public in order to access website which is running inside docker container. But Docker containers don't have an IP address. So to address this issue, we have a concept called Docker port mapping. We map host port with container port and customers use public IP of host machine. Then their request will be routed from host port to container port and will be loaded web page which is running inside docker container. This is how we can access website which is running inside container through port mapping.

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15. What is Registry server in Docker?

Registry server is our own docker hub created to store private docker images instead of storing in public Docker hub. Registry server OS one of the docker containers. We create this Registry server from "registry" image form docker hub specially created to create private docker hub. We can store any no of private docker images. We can give access to others so that other also can store their docker images whomever you provide access. Whenever we want, we can pull these images and can create containers out of these images.

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17. Important docker commands?

1. Docker ps (to see list of running containers)

2. Docker ps -a (to see list of all containers)

3. Docker images (to see list of all images)

4. Docker run (to create docker container)

4. Docker attach (to go inside container)

6. Docker stop (to stop container)

7. Docker start (to start container)

8. Docker commit (to create image out of docker file)

9. Docker rm (to delete container)

10. Docker rmi (to delete image)