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Topic- Docker

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OVERVIEW

- What is Docker?
- Advantages of using Docker
- Docker vs Virtual Machine
- Docker Components
- Docker Architecture

What is Docker?

- An open platform for developing, shipping and running applications
- Packages software into standardized units called containers
- Containers have everything to run including libraries, system tools, code and a runtime
- Containers can run on developer laptops, servers on premise and in the cloud

Advantages of Docker.

- Applications running on different containers are completely segregated and isolated from each other, thus providing security

- Provides methodologies for shipping, testing and deploying applications rapidly
- Enables separation of application from the underlying infrastructure
- Reduces delay between writing code and running it in production environments
- Helps increase standardization and hence productivity

Docker vs Virtual Machine.

Narration	Virtual Machine	Docker
Infrastructure Management	Hypervisor Layer	Docker Engine layer
Memory Usage	Very high	Very low
Memory Reallocation	Not possible	Unused memory can be reallocated to other containers
Performance	As virtual machines increase, the performance decreases	As Docker uses a single engine, the performance is high, regardless of the increase in containers
Portability	Virtual machines depend on the Host OS, libraries and dependencies. So, portability is a challenge	Docker is highly portable
Boot Time	VMs take time to boot	Docker containers take milliseconds to boot on.

Docker Components.

Docker Objects.

- IMAGES

- Similar to a VM template, a read only template with instructions for creating a container.
- Can be created afresh or from another image by customizing it.

- CONTAINERS

- Runnable instance of an image.
- Can be created, started, stopped, moved or deleted using the API or CLI

Docker Components.

Docker Objects. (Cont.)

- NETWORKS

- Similar to VMs, docker containers also make use of the underlying host network to communicate with each other, with other applications on the host and with application anywhere on internet.
- Main types of networks that can be created like bridge, host, overlay and ipvlan networks

- VOLUMES

- File system volumes mounted on Docker container for persisting the data generated by the running container

Docker Components.

Docker Objects. (Cont.)

- Docker daemon (dockerd)

- The main process that listens to the requests from APIs and CLI
- Manages all the Dockers objects such as images, containers, networks, volumes
- Daemon can be on the same host or on another host

- Docker Client (docker)

- A primary means by which the Docker users interact with Docker
- All API and CLI (client) commands are sent to the daemon
- Client can communicate with more than one daemon

Docker Components.

Docker Objects. (Cont.)

- Docker desktop

- Easy to install application on Mac, Windows or Linux
- Enables building containerized applications and microservices
- Includes docker daemon and client

- Docker Registries

- A place to store docker images
- Docker Hub is a public registry that anyone can use
- Docker is configured to look for any images on the Docker Hub first
- We pull or run images from the registry and push images to the registry

Docker Architecture (Demo)