Viettel Digital Talent Program Cloud - 2021

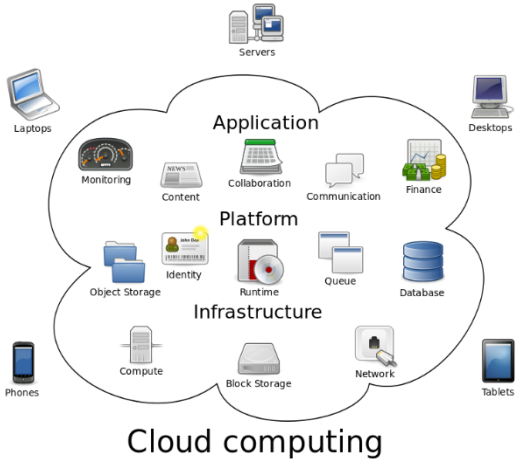
Virtualization & Cloud

Chapter 1.1

1. Cloud
2. Virtualization
3. Container
4. Docker

Cloud Computing

iCloud



Dropbox

OneDrive

flickr

Cloud Computing

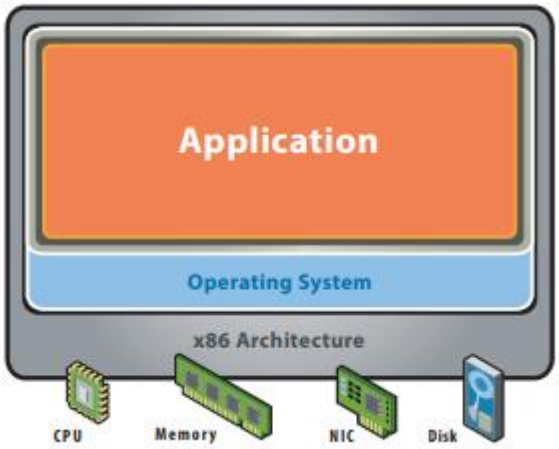
- IT paradigm
- Set of principles and approaches
- On-demand delivery of compute power, database storage, applications, and other IT resources through a cloud services platform via network

Cloud Computing

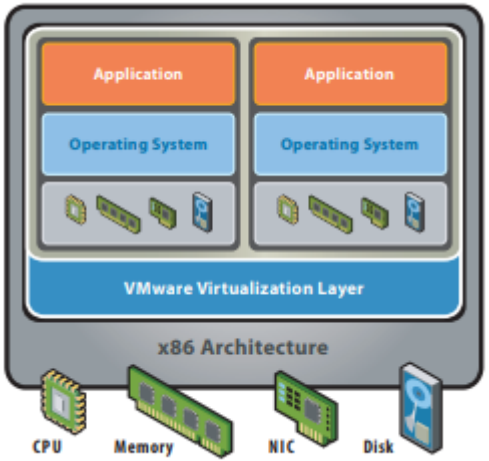
- Generally used to describe data centers available to many users over the Network

Virtualization

- Before



- After

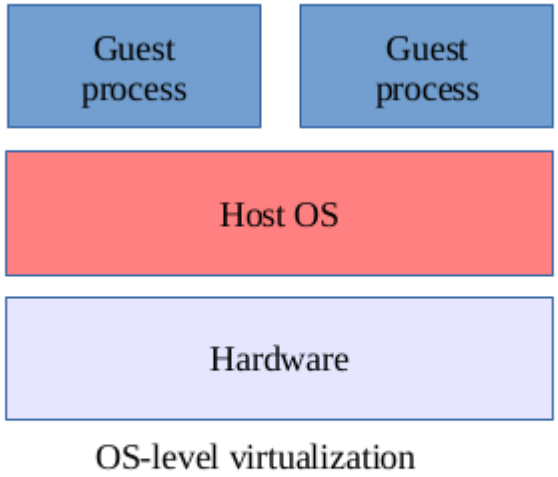


Source Image: https://www.vmware.com/pdf/virtualization.pdf

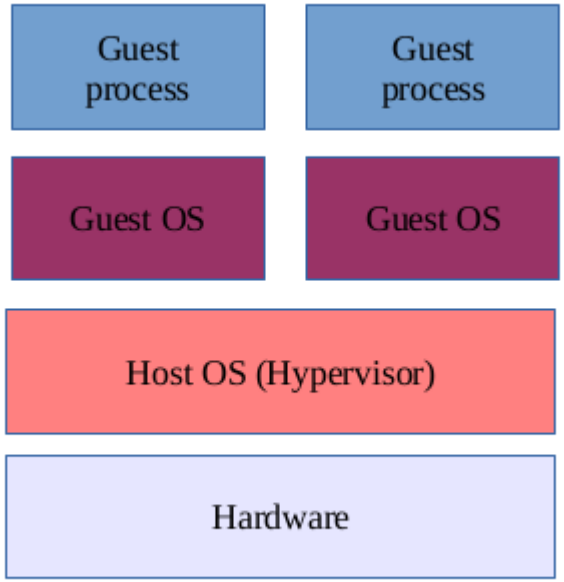
Virtualization

- Before
  - Single OS image per machine.
  - Software and hardware tightly coupled.
  - Running multiple applications on same machine often creates conflict.
  - Underutilized resources.
  - Inflexible and costly infrastructure.
- After
  - Hardware-independence of operating system and applications.
  - Virtual machines can be provisioned to any system.
  - Can manage OS and application as a single unit by encapsulating them into virtual machines.

Virtualization



OS-level virtualization



Hardware virtualization

Source Image: wikimedia.org

Virtualization

Source Image: abopen.com, line.17qq.com, hoangminhkhang.com

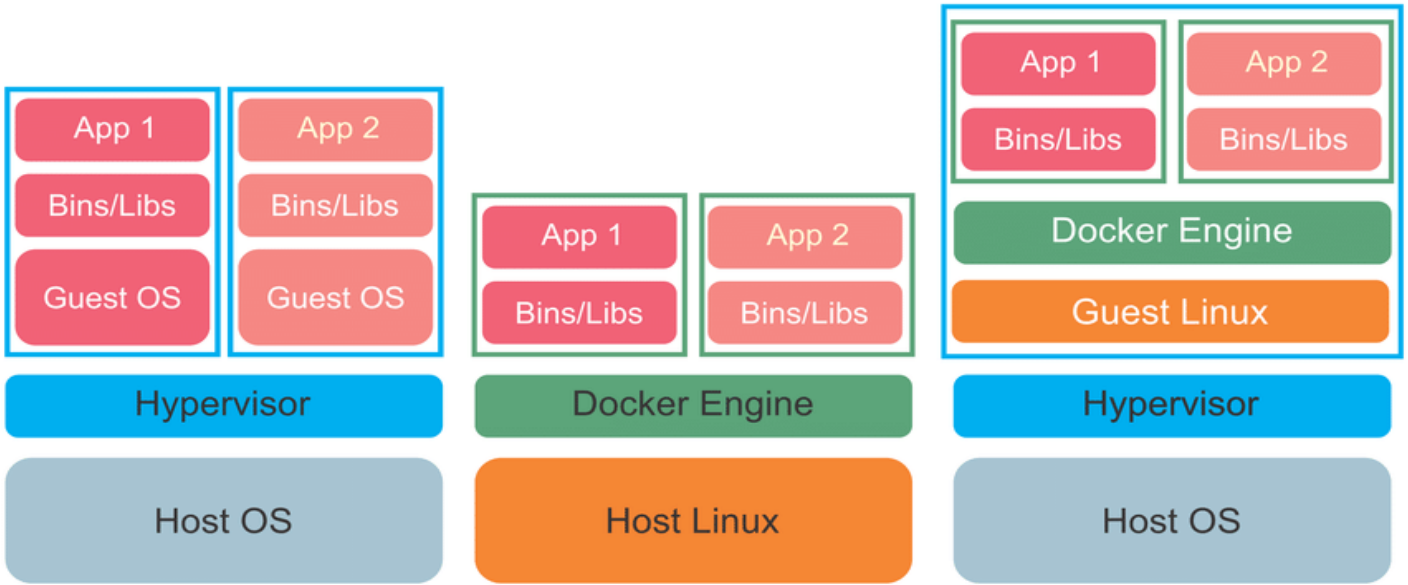
Container

Source Image: dw.com

Container

Virtual Machine	Container
Each VM runs its own OS	All containers share the host OS
Host OS can be different than the guest OS	Host OS and Container OS has to be the same (Linux Kernel)
Startup time in minutes	Startup time in milliseconds
VMs snapshots are used sparingly	Images are built incrementally on top of another like layers.
Fully isolated and hence more secure	Process-level isolation and hence less secure

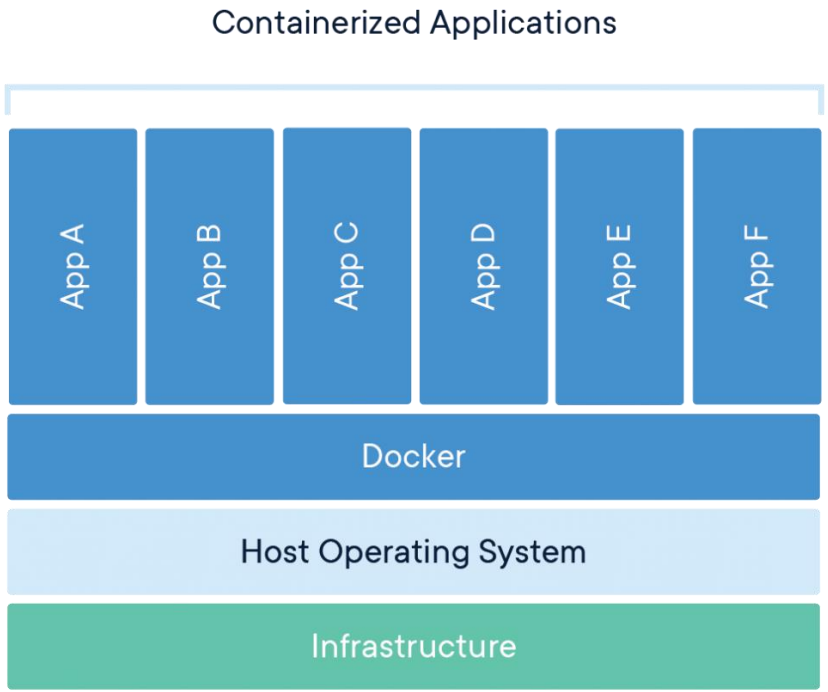
Container



Source Image: researchgate.net

Docker

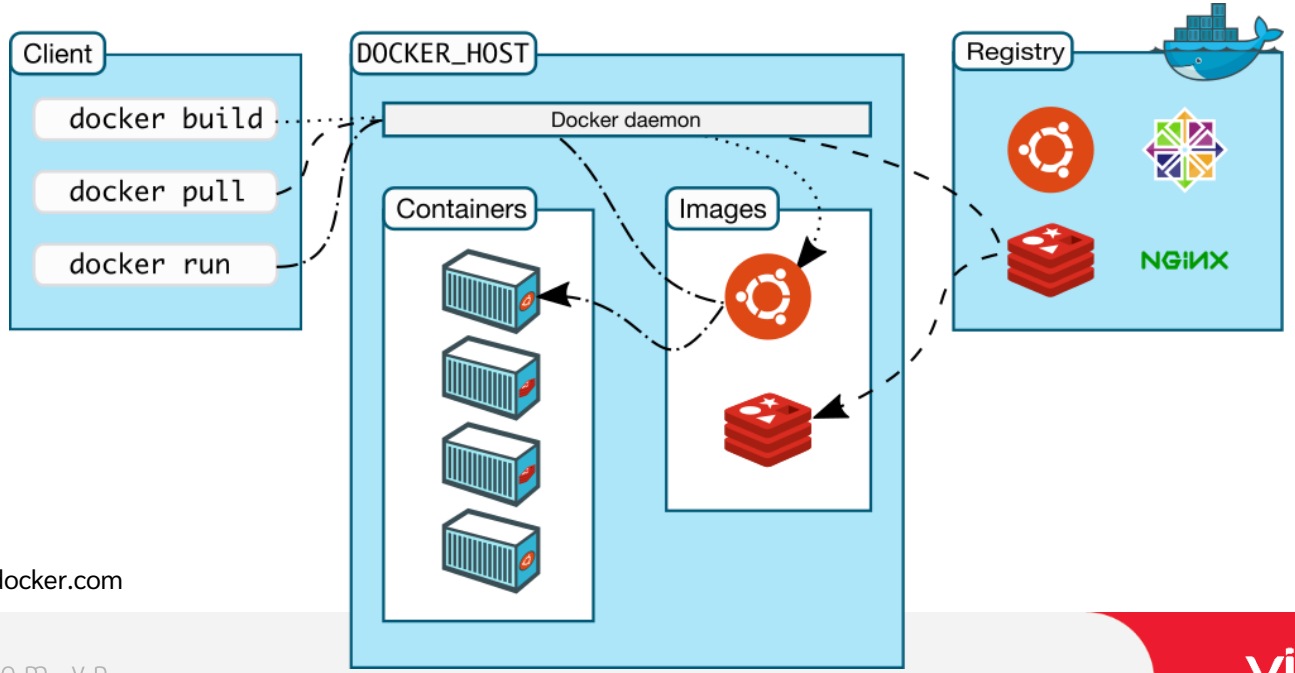
- Package Software into Standardized Units
  - Development
  - Shipment
  - Deployment



Source Image: docker.com

Docker

- Client-Server Architecture



Source Image: docker.com

Practice 1

- Setup VirtualBox
- Create Ubuntu virtual machine
- Setup Docker inside VM
- Deploy WordPress with Command Line
  - Example: https://github.com/bitnami/bitnami-docker-wordpress#using-the-docker-command-line

Practice 2

- Deploy WordPress with Docker Compose
  - Example: https://github.com/bitnami/bitnami-docker-wordpress#run-the-application-using-docker-compose

Practice 3

- Create two Ubuntu virtual machines
- Setup Docker inside VMs
- Deploy WordPress with Command Line on two virtual machines
  - Example: https://github.com/bitnami/bitnami-docker-wordpress#run-the-application-using-docker-compose
  - Requirements:
    - MariaDB container on VM1
    - WordPress container on VM2