Introduction

Monday, September 04, 2017 08:05

Virtual Machine - includes entire operating system. Also it require hypervisor to support.

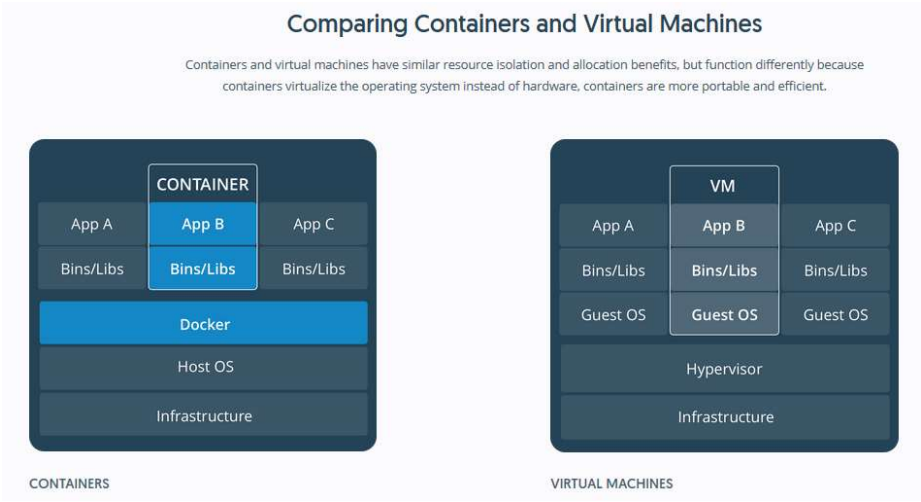
segment physical computing resources
emulated CPU instructions - Although technologies like Intel VT-x and AMD-V provided solutions specifically to avoid emulation

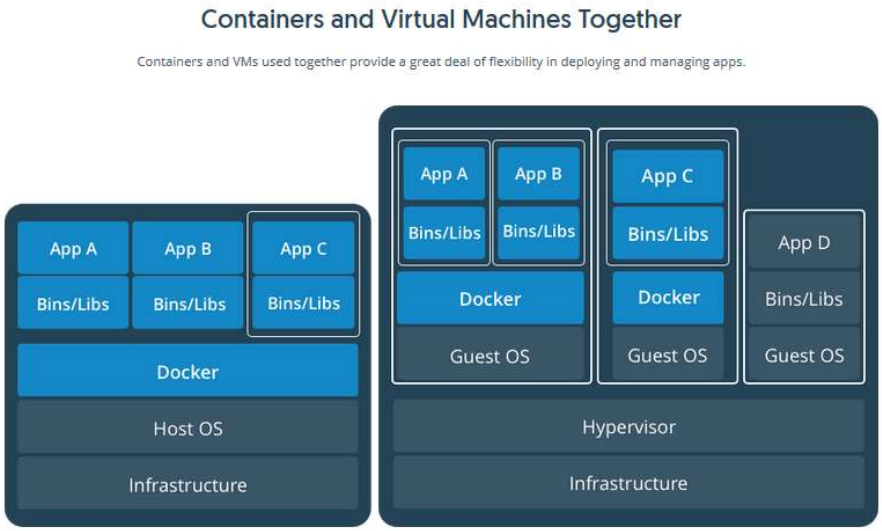
Virtual Machines were being used for major deployments inside cloud providers or internal data centers in order to segment physical computing resources. Virtual Machines provide resource isolation and segmentation but are slow to start and require emulated CPU instructions to function. Although technologies like Intel VT-x (Vanderpool) and AMD-V provided solutions specifically to avoid emulation, the performance is not equal to a bare metal machine with the same specs.

multitasking, a single operating system and several programs running at the same time.
Multi-core technology allows a single processor to have more than one physical processor inside
Hyper-Threading technology simulates an additional processor per CPU core.

Container:

- Container is a lightweight image that includes everything needed to run a piece of software: code, runtime env. , system tools, system libraries, settings.
- Multiple container runs on single OS, each container share base OS kernel.
- Container is there in Linux from last 10 year, in form of LXC similar as **jails** in FreeBSD, **Workload Partition** in AIX.
- **Open Container Project** (OCP) was announced in 2015 approx, later names as "Open Container Initiative (OCI)" - to develop standard container format.





OS distributions to run Container:

- Container Linux (CoreOS)
- RancherOS
- Photon OS (vmware) - minimal Linux container host optimized to run on VMware platform. Containers running on top of Photon OS can be managed by vCenter. VMware has also introduced vSphere Integrated Containers (VICs). These containers can be deployed directly to a standalone ESXi host or deployed to vCenter Server as if they were virtual machines. This is VMware's "container as a VM" strategy.
- Atomic host - Redhat light weight OS based on Fedora and CentOS.
- Ubuntu Core - smallest Ubuntu version, designed for IoT and large scale container environment.

DOCKER:

- Docker is a Linux utility that can efficiently create, ship, and run containers.
- Dockers provide a command line interface and API to manage containers. Instead issuing multiple commands manually to configure Namespace, SELinux and Cgroups - docker does that with single command.
- Ships binary with all application dependencies .
- Same docker images can run on laptop, datacenter VMs and cloud providers without any change.
- Docker is most popular container software - alternative of Docker are:
  - **LXD** - by Canonical
  - **RKT** (CoreOS) which also works with Kubernetes. - https://coreos.com/rkt/docs/latest/rkt-vs-other-projects.html
- Docker also provides standard container image.

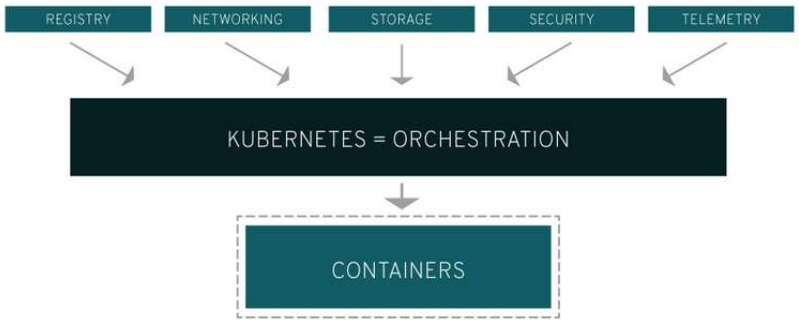
Docker Vs LXD:

- Docker specializes in deploying apps.
- LXD specializes in deploying (Linux) Virtual Machines

Demo URL - https://www.docker.com/itpro

Kubernetes - Open source project provides you the orchestration and container management capabilities. It was originated by Google. Provides deployment, scaling and HA to container applications.

- Kubernetes also needs to integrate with networking, storage, security, telemetry and other services to provide a comprehensive container infrastructure.
- Uses YAML files for orchestration.
- Supported by Amazon AWS, Google Cloud Engine (GCE) and Microsoft Azure, also available on openstack (private cloud).
- Kubernetes in 5 min, good URL - https://www.youtube.com/watch?v=PH-2FfFD2PU



- Kubernetes **alternative -**
  - Messos/Marathon by Apache - opensouce
  - Swarm into Docker core (DOCKER SWARM).
  - Nomad - by HashiCorp
  - Amazon ECS
  - Rackspace Carina

Container Management Solution: build around Kubernetes.

- Docker Enterprise Edition
  - Docker launched in 2013
- Tectonic - by CoreOS, a commercial distribution of Kubernetes.
- OpenShift Container Platform - by Redhat (foundation - Redhat Linux, Mgmt & orchestration - Kubernetes, Container - docker)
- Rancher - by Rancher lab, a commercial open source tool.

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OpenShift / Origin:

Origin is open source based project for OpenShift. Origin and OpenShift version goes in parallel:

Origin (1.0, 1.1, 1.2, 1.3, 1.4, 1.5 and most recent is 3.6)

OpenShift (3, 3.1, 3.2, 3.3, 3.4, 3.5 and most recent is 3.6)