

virtualization partitions physical resources into multiple isolated logical resources

↳ motivations

- resource usage pay for usage only, SLAs, VMs from cloud providers
- isolation
- portability

interfaces in computer system:

- API application programming interface
- ABI application binary interface
- ISA instruction set architecture

the system virtual machine provides the ISA interface

a VMM, or virtual machine monitor, realizes a system virtual machine

process VMs only have a process/program running in a VM  
↓  
no interaction with hardware

native VMM → VMM directly on hardware

hosted VMM → VMM delegates most work to an underlying OS.

Control-sensitive instructions may affect the configuration of a machine } sensitive instructions need to run in kernel mode  
behavior-sensitive instructions have an effect partially determined by context

for virtualization modifies a guest OS to replace all sensitive instructions by hypervisor calls

VM resource allocation can be done statically or by a virtual resource manager

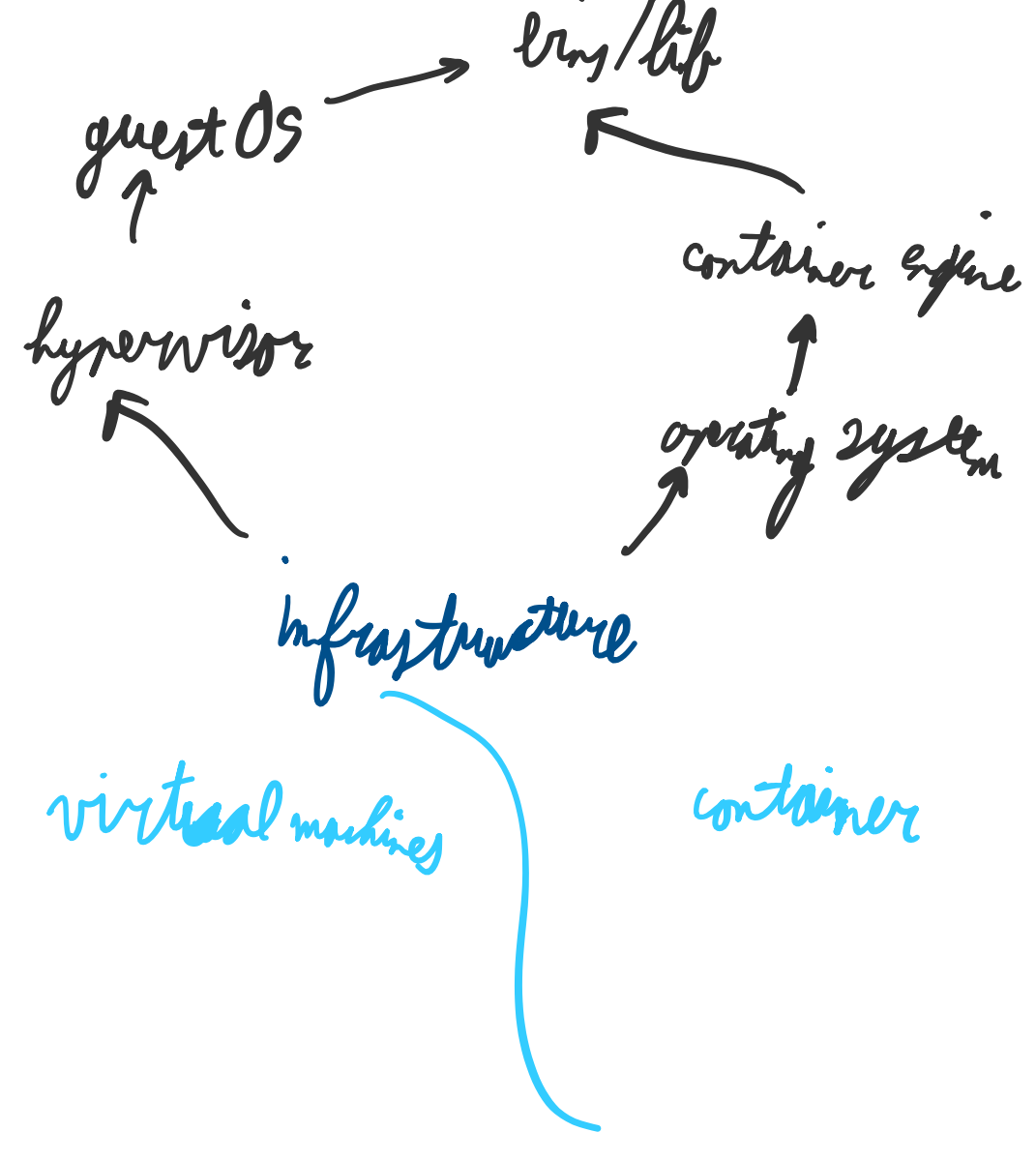


VM migration: cold or live  
↳ transfer CPU, connections, memory, storage  
↓  
stop, move, start ⇒ large downtime

over-subscription → contractually provisioned resource exceeds capacity  
↳ optimizes efficiency

overload → total demand > capacity for a resource on a given machine  
↳ CPU, network, storage

containers → more lightweight, by sharing more parts



longer resource footprint  
longer start-up time

Docker → layered style

Docker Swarm → cluster of hosts

Docker Compose → manage containers + interaction between them