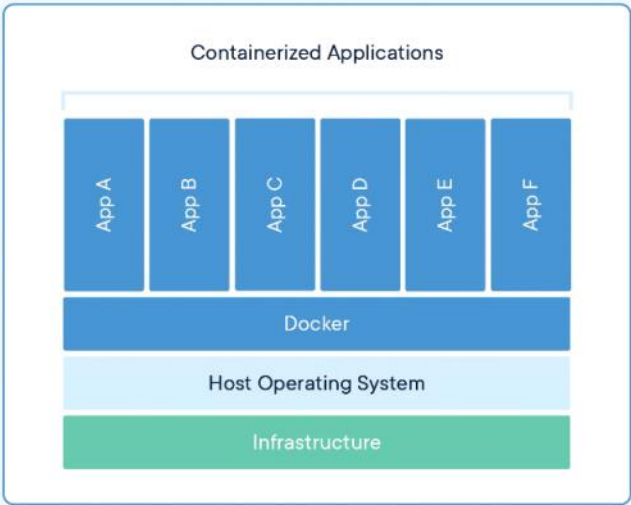# Containers

18 June 2023   19:59

Containers are lightweight, stand-alone, and executable packages that can run an application and all its dependencies in an isolated environment. In other words, a container is a standardized unit of software that packages up code and its dependencies so that the application runs smoothly and reliably across different computing environments.

Containers achieve this level of isolation by leveraging containerization technology, such as Docker or Kubernetes. These technologies provide an abstraction layer between the operating system and the application, allowing multiple containers to run on the same machine or cluster without interfering with each other. Each container has its own file system, networking, and resource allocation, making it possible to deploy and manage applications consistently across different environments.

A container holds an application or a microservice, as well as everything needed to execute it. Everything within a container is preserved in an image, a code-based file that includes libraries and dependencies. A container image comes with RPM packages and configuration files, so we can think of it as a Linux distribution installation. Because containers are very small, there are usually hundreds of them loosely coupled together—which is why container orchestration platforms are used to provision and manage them!

Containers vs. Virtual Machines

CONTAINERS

Containers are an abstraction at the app layer that packages code and dependencies together. Multiple containers can run on the same machine and share the OS kernel with other containers, each running as isolated processes in user space. Containers take up less space than VMs (container images are typically tens of MBs in size), can handle more applications and require fewer VMs and Operating systems.
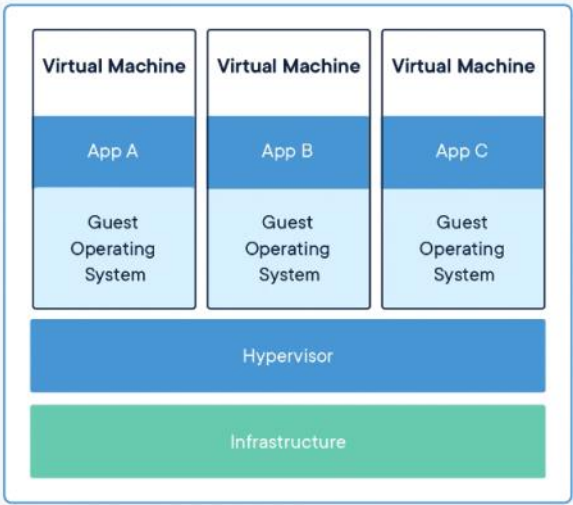
VIRTUAL MACHINES

Virtual machines (VMs) are an abstraction of physical hardware turning one server into many servers. The hypervisor allows multiple VMs to run on a single machine. Each VM includes a full copy of an operating system, the application, necessary binaries and libraries – taking up tens of GBs. VMs can also be slow to boot.