Containerization and Docker Fundamentals

.NET

Containerization is the packaging of software along with the libraries and dependencies required to run the code. The lightweight executable, a container, runs consistently on any infrastructure.

What is Containerization?

Containerization involves bundling together all the configuration files, libraries, and dependencies required for an application to run efficiently and bug-free across different computing environments.

More portable and resource-efficient than virtual machines (VMs), containers have become the de facto compute units of modern cloud-native applications.

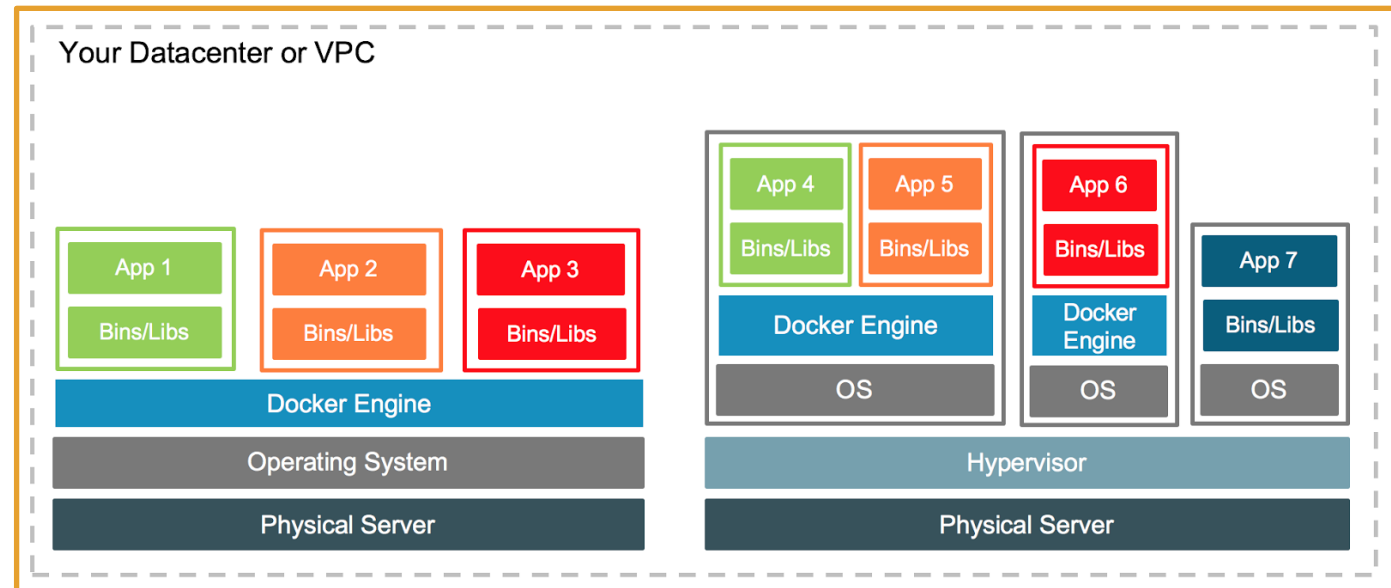The most popular *containerization* ecosystems are *Docker* and *Kubernetes*.

What is Virtualization?

Hardware or platform *virtualization* refers to the creation of a Virtual Machine. A virtual machine is an application that simulates a computer within an existing operating system.

Software executed on a Virtual Machine is isolated from the underlying hardware resources.

Virtualization Software Examples

V · T · E	**Virtualization software**	[hide]
	Comparison of platform virtualization software	

Hardware virtualization (hypervisors)	**Native**		Adeos · CP/CMS · Hyper-V · KVM (Red Hat Enterprise Virtualization) · LDoms / Oracle VM Server for SPARC · Logical Partition (LPAR) · LynxSecure · PikeOS · Proxmox VE · SIMMON · VMware ESXi (VMware vSphere · vCloud) · VMware Infrastructure · Xen (Oracle VM Server for x86 · XenServer) · XtratuM · z/VM
	Hosted	**Specialized**	Basilisk II · bhyve · Bochs · Cooperative Linux · DOSBox · DOSEMU · PCem · PikeOS · SheepShaver · SIMH · Windows on Windows (Virtual DOS machine) · Win4Lin
		Independent	Microsoft Virtual Server · Parallels Workstation · Parallels Desktop for Mac · Parallels Server for Mac · PearPC · QEMU · VirtualBox · Virtual Iron · VMware Fusion · VMware Server · VMware Workstation (Player) · Windows Virtual PC
	Tools		Ganeti · oVirt · System Center Virtual Machine Manager · Virtual Machine Manager
OS-level virtualization	**OS containers**		FreeBSD jail · iCore Virtual Accounts · Linux-VServer · LXC · OpenVZ · Solaris Containers · Virtuozzo · Workload Partitions
	Application containers		Docker · lmctfy · rkt
	Virtual kernel architectures		User-mode Linux · vkernel
	Related kernel features		BrandZ · cgroups · chroot · namespaces · seccomp
	Orchestration		Amazon ECS · Kubernetes · OpenShift
Desktop virtualization			Citrix XenApp · Citrix XenDesktop · Remote Desktop Services · VMware Horizon View · Ulteo Open Virtual Desktop
Application virtualization			Ceedo · Citrix XenApp · Dalvik · InstallFree · Microsoft App-V · Remote Desktop Services · Symantec Workspace Virtualization · Turbo · VMware ThinApp · ZeroVM
Network virtualization			Distributed Overlay Virtual Ethernet (DOVE) · Ethernet VPN (EVPN) · NVGRE · Open vSwitch · Virtual security switch · Virtual Extensible LAN (VXLAN)
	See also: List of emulators	