DevOps

Introduction to Virtualization

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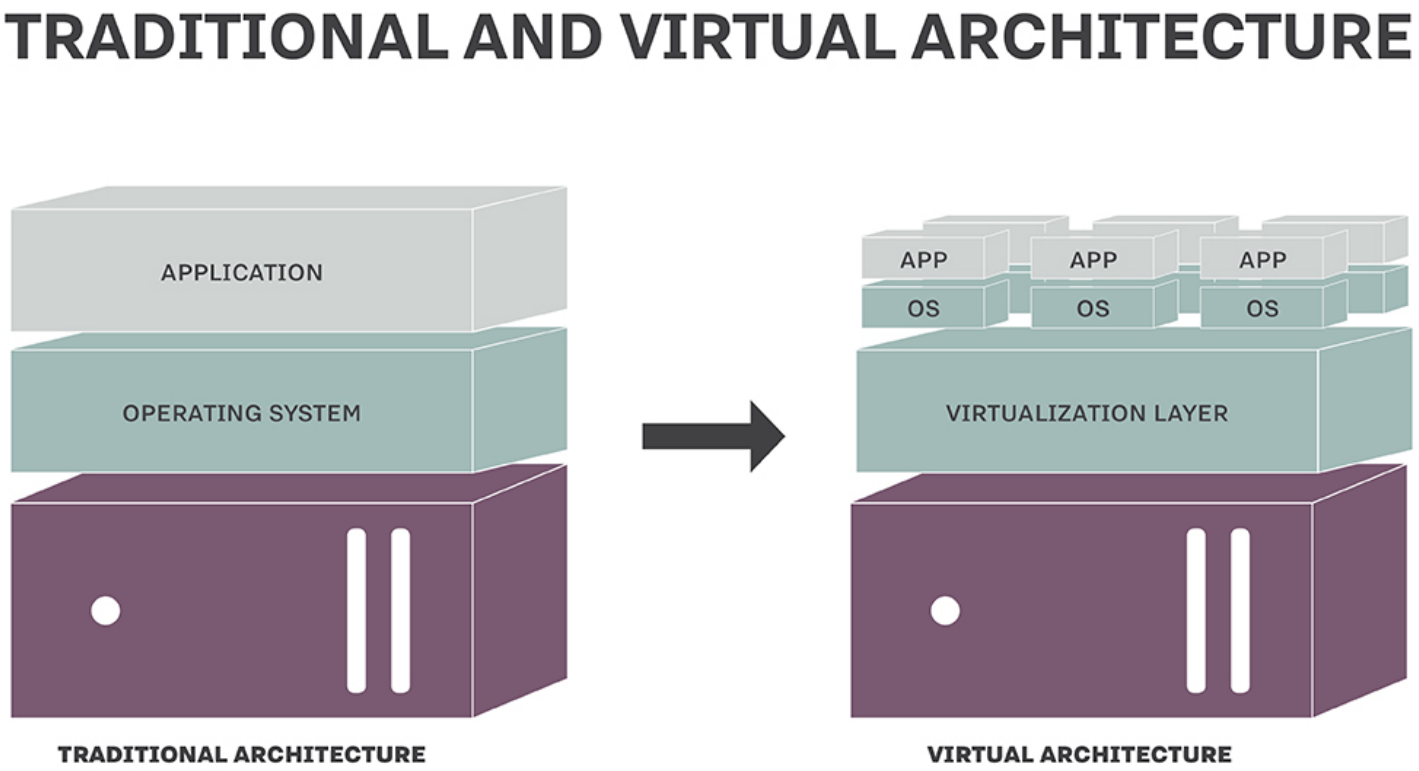
What is Virtualization?

Virtualization is the creation of a virtual -- rather than actual -- version of something, such as an operating system, a server, a storage device or network resources

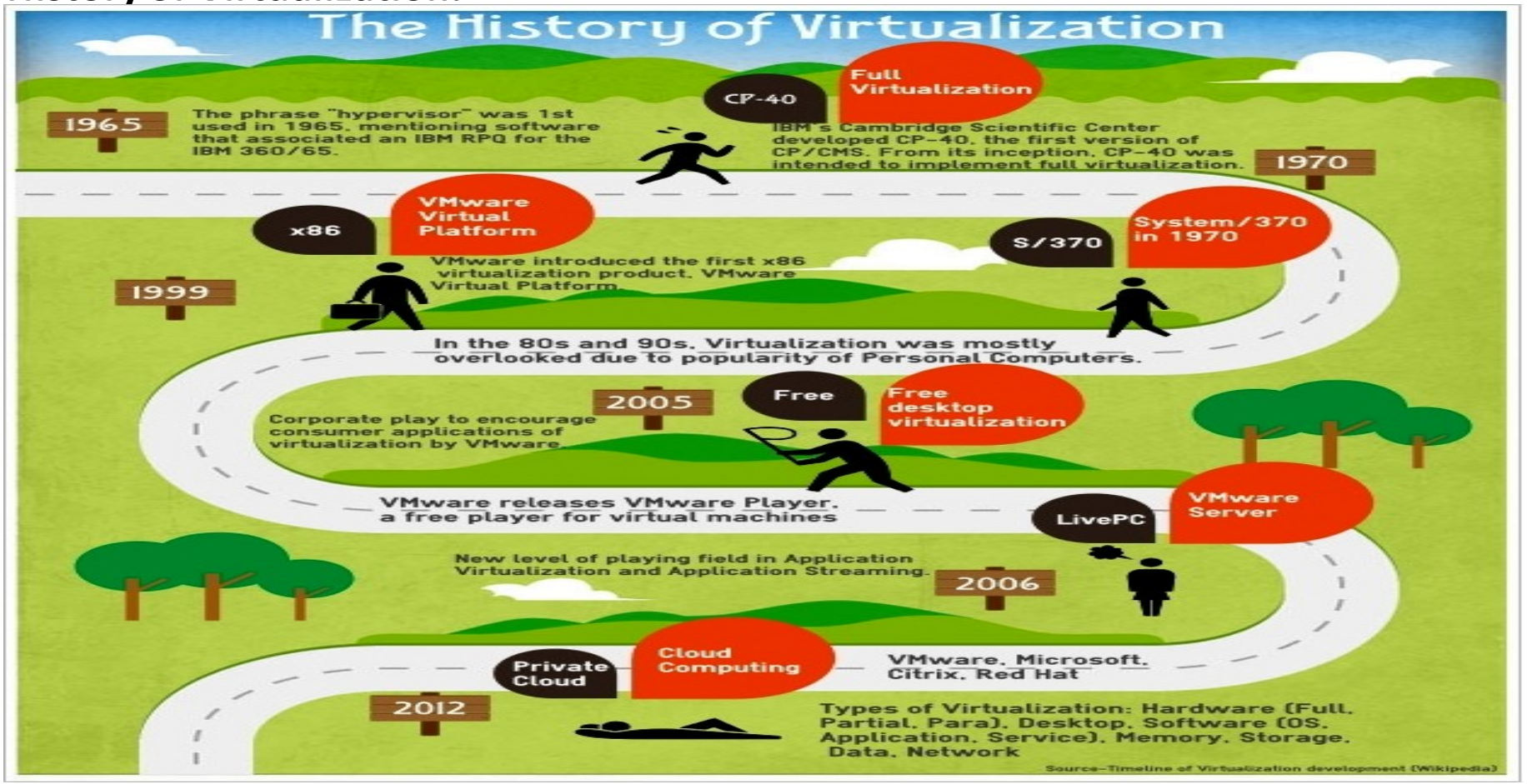
How Does Virtualization Works?



How Does Virtualization Works? (continued)

- Hypervisor, a software layer, emulates the hardware. This often includes the CPU's memory, I/O and network traffic.
- The operating system, normally interacting with true hardware, is now doing so with a software emulation of that hardware, and often the operating system has no idea it's on virtualized hardware.

History of Virtualization.



What is Hypervisor?

- The layer of software that enables the masking of resources is often referred to as the hypervisor. It emulates the hardware, often including the CPU's memory, I/O and network traffic.

Types of Server Virtualization

There are three types of server virtualization.

- **Full Virtualization (Hypervisor most common)**:
  Hypervisor is used to interact directly with the physical server's CPU and disk space. Each guest server runs on its own OS -- you can even have one guest running on Linux and another on Windows. *Eg:- hypervisor – Hyper-V, KVM, VMWare ESXi*

2. **Para-Virtualization (relatively new):**
   Unlike the full virtualization technique, the guest servers in a para-virtualization system are aware of one another. A para-virtualization hypervisor doesn't need as much processing power to manage the guest operating systems, because each OS is already aware of the demands the other OS. *Eg:- Xen open source hypervisor in the Linux Kernel*
3. **OS-level Virtualization (limited use):**
   No Hypervisor instead, the virtualization capability is part of the host OS, which performs all the functions of a fully virtualized hypervisor. The biggest limitation of this approach is that all the guest servers must run the same OS. All the guest operating systems must be the same, this is called a homogeneous environment. *Eg:- LXC, Linux-Vserver, Open VZ, Solaris, FreeBSD jail*

Types of Server Virtualization

VirtualBox is a Type 2 hypervisor. That is to say that it is virtualization host software that runs as an application on an established operating system. Alternatively, a Type 1 hypervisor is host software that runs on what's now known as "bare metal," a term that means onto a computer without an operating system

Type 1 Hypervisor Eg:- *VMware ESXi Server, Microsoft Hyper-V, Citrix/Xen Server*
Type 2 Hypervisor Eg:- *VMware Workstation, Microsoft Virtual PC, Oracle Virtual Box*

Benefits of Virtualization

1. Reduced spending.

2. Easier backup and disaster recovery.

3. Easy to provision

4. Easy to Replicate

Important Virtualization Products

1. **VMWare**
   If you are targeting enterprise environment then VMWare. It is the market leader in virtualization.

2. **VirtualBox (from Oracle)**
   If you want virtualization in desktop then Virtualbox as it is very simple to install and configure.Also, it is very lightweight.

3. There are others like Microsoft, Google and so on, the list is huge. We will be focusing on VirtualBox for this course.

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