# Virtualization 101

Virtual machines is a computer system created using software on one physical computer in order to emulate the functionality of another separate physical computer.

### Virtualization Types

* Desktop virtualization
* Server virtualization
* Network virtualization
* Storage virtualization
* Application virtualization

### Vendors of virtualisation

* VM ware
* Microsoft
* Citrix
* Oracle

### Components of virtual machines

* Config files
* HDD files
* Virtual machine files
* In memory files

### Hypervisor

Also called a virtual machine manager (VMM)  
It is a program that allows multiple operating systems to share a single hardware host. Ach operating system appears to have the hosts processor memory and other resources and other resources all to itself. However the hypervisor is controlling the host processor and resources  
Allocating what is needed to each OS in turn making sure that each OS gets its fair share of resources. The hypervisor acts as a middleman between the operating systems and the physical hardware, managing and allocating resources as required. By using a hypervisor, organizations can maximize the utilization of their hardware resources, as multiple operating systems can run simultaneously on a single physical server. This helps in reducing costs by consolidating multiple servers into one, making the most out of the available hardware. Another advantage of using a hypervisor is the ability to isolate operating systems from one another. Each operating system runs independently within its own virtualized environment, which provides security and stability. This isolation prevents any issues or failures in one operating system from affecting others, ensuring a reliable and stable computing environment. Moreover, hypervisors also offer features such as live migration, which allows virtual machines to be moved from one physical host to another without any downtime. This capability enables organizations to perform maintenance tasks or balance the load across different servers without interrupting critical services or applications. In conclusion, hypervisors play a crucial role in enabling the efficient and effective utilization of hardware resources by allowing multiple operating systems to coexist on a single physical host. They provide isolation, flexibility, and manageability, making them a valuable tool for organizations looking to maximize their infrastructure investments.

Cloud computing

1. Iaas(Infrastructure as a service) Cloud Infrastructure is the collection of hardware and software elements such as computing power, networking, storage, and virtualization resources needed to enable cloud computing. Cloud infrastructure types usually also include a user interface (UI) for managing these virtual resources.
2. PaaS(platform as a service) A cloud platform refers to the operating system and hardware of a server in an Internet-based data center. It allows software and hardware products to co-exist remotely and at scale.
3. SaaS (software as a service) Cloud-based software simply refers to any software program or application that's stored, managed, and available through the cloud. To access such services or software programs, users must have an internet connection. It is generally stored on shared computing resources, such as cloud servers.

Amazon Web Services (AWS)

* IaaS cloud computing services launched in 2006
* Businesses in 200 Countries used AWS in 2012

Instances AN instance is a virtual server with a well specified set of resources including CPU cycles main main memory Secondary storage communication and I/O bandwidth

The userchooses the region and availability zone where this virtual server should be placed

When launched an instance provided with a DNS (domain name server) this name maps to a

-private IP address (for communication within the internal EC2 (elastic computing) Communication network

-Public IP address

Steps to run an application

Retrieve the user input from the front end

Retrieve the disk image (a copy / backup) of a VM from a repository

Locate a system and requests the VMM (virtual Machine monitor) running on that system to set up a VM

Invoke the dynamic Host configuration Protocol (DHCP) and the IP Bridging software to set up MAC and IP addresses for the VM

System VM

Capable of supporting an individual process

Process VM

Supports a complete environment

If you dont want to take your laptop office just access the lapto via remote desktop

Protocol RDP over the internet