

## Virtual Machines

Monisha. K , Sangavi. R, Dr.M.Sujithra M.C.A, M.Phil,PhD.,  
 Dr.A.D.Chitra M.C.A M.Phil,PhD,

2<sup>nd</sup> Year,M.sc.Software Systems(Integrated), Coimbatore Institute of Technology, Coimbatore  
 Assistant Professor,Assistant Professor, Department of Data Science,Department of Software Systems  
 Coimbatore Institute of Technology,CoimbatoreCoimbatore Institute of Technology,Coimbatore

Date of Submission: 20-11-2020

Date of Acceptance: 06-12-2020

**ABSTRACT:** In this paper, we are concentrating about what is the role of Virtual Machine with Operating system. The Operating System actually running on the hardware is called host operating system and the operating system running in the simulated environment is called guest operating system. A virtual machine (VM) is an operating system ( OS ) or application environment that is installed on software, which imitates hardware

**KEYWORDS :** Virtual machine – Types of VM - Virtualization – Types of Virtualization - Virtualization Techniques - Hypervisor – Types of Hypervisor - Advantage – Disadvantage.

### I.INTRODUCTION

A virtual machine is a program that acts as a virtual computer. It runs on your current operating system (the host operating system) and provides virtual hardware to guest operating systems. It is a software-defined computer with its own operating system that runs on a host server with a different underlying operating system. Virtual Machine is a completely separate individual operating system installation on your usual operating system. It is implemented by software emulation and hardware virtualization. A virtual machine (VM) is a virtual environment that works like a computer within a computer. It runs on an isolated partition of its host computer with its own resources of CPU power, memory, an operating system and other resources. This allows end-users to run applications on VMs and use them as they normally would on their workstation.

### II.VIRTUAL MACHINE

A Virtual Machine (VM) may be a compute resource that uses software rather than a physical computer to run programs and deploy apps. One or more virtual “guest” machines run on a physical “host” machine. Each virtual machine runs its own OS and functions

separately from the opposite VMs, even once they are all running on the identical host. This implies that, for instance, a virtual MacOS virtual machine can run on a physical PC. Virtual machine technology is employed for several use cases across on-premises and cloud environments. More recently, public cloud services are using virtual machines to produce virtual application resources to multiple users without delay, for even more cost efficient and versatile compute.

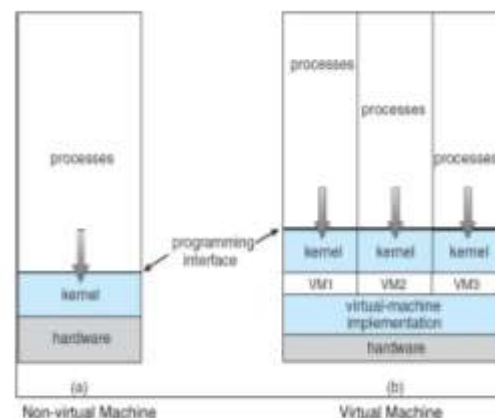


Figure 1 Virtual Machine

The main purpose of VMs is to control multiple operating systems at the identical time, from the identical piece of hardware. Hardware also requires many upkeep costs — repair costs when hardware fails, maintenance costs to form sure your hardware stays in shape, and energy costs for power and cooling.

### III.TYPES OF VIRTUAL MACHINE

#### 1.System Virtual Machines

A system virtual machine provides a whole system platform which supports the execution of a whole software system (OS). Multiple OS environments can co-exist on the identical computer, in strong isolation from one another. The virtual machine can provide

(ISA) that's somewhat different from that of the important machine. Application provisioning, maintenance, high availability and disaster recovery.

## 2.Process virtual machines

A process virtual machine is intended to run one program, which suggests that it supports one process. Its purpose is to supply a platform-independent programming environment that abstracts away details of the underlying hardware or software system, and allows a program to execute within the same way on any platform.

## IV.VIRTUALIZATION

Virtualization is that the process of running a virtual instance of a automatic data processing system in a very layer abstracted from the particular hardware. most typically, it refers to running multiple operating systems on a ADPS simultaneously. To the applications running on top of the virtualized machine, it can appear as if they're on their own dedicated machine, where the package, libraries, and other programs are unique to the guest virtualized system and unconnected to the host package which sits below it.

## V.TYPES OF VIRTUALIZATION

### 1.Application virtualization

This is a process where applications are virtualized and delivered from a server to the top user's device, like laptops, smartphones, and tablets

### 2.Desktop virtualization

Similar to application virtualization mentioned above, desktop virtualization separates the desktop environment from the physical device and configured as a "virtual desktop infrastructure" (VDI)

### 3.Hardware virtualization

Perhaps the foremost common kind of virtualization today, hardware virtualization is formed possible by a virtual machine manager (VM) called the "hypervisor".

### 4.Network virtualization

Network virtualization combines all physical networking equipment into one, software-based resource. It also divides available bandwidth into multiple, independent channels, each of which might be assigned to servers and devices in real time

## 5.Storage virtualization

It involves compiling your physical hard drives into one cluster. Storage virtualization is handy when it involves planning for disaster recovery, since the information stored on your computer memory may be replicated and transferred to a different location.

## VI.VIRTUALIZATION TECHNIQUES

### 1.Para Virtualization

The para Virtualization approach could be a little different. Unlike the complete Virtualization technique, the guest servers during a para Virtualization system are awake to each other .Its hypervisor doesn't need the maximum amount processing power to manage the guest OS

### 2.Full Virtualization

Full Virtualization uses a special reasonably software called a hypervisor. The hypervisor interacts directly with the physical server's CPU and disc space, It servers as a platform for the virtual servers' s OS

### 3.OS Level Virtualization

An OS level Virtualization approach doesn't use a hypervisor the least bit .Instead, the Virtualization capability is an element of the host OS Which performs all the functions of a completely Virtualized hypervisor

## VII. HYPERVISOR(VMM)

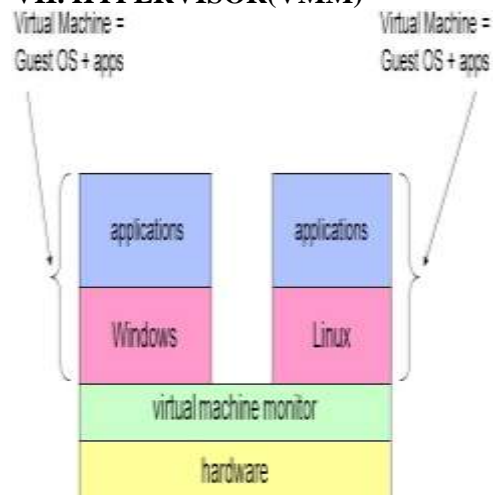


Figure2 Virtual Machine Monitor

Hypervisor could be a kind of virtualization software employed in Cloud hosting to divide and allocate the resources on various pieces of hardware The program which give partitioning, isolation or abstraction is

termed virtualization hypervisor. Hypervisor may be a hardware virtualization technique that permits multiple guest operating systems (OS) to run on one host system at the identical time. A hypervisor is usually also called a virtual machine manager(VMM).

### VIII.TYPES OF HYPERVISOR

#### 1.TYPE-1 Hypervisor

Hypervisor runs directly on underlying host system .It is also referred to as “Native Hypervisor” or “Bare metal hypervisor” .It dose not require any base server package. it's direct access to hardware resources. samples of Type 1 hypervisors include VMware ES Xi , Citrix Xen Server and Microsoft Hyper-V hypervisor.

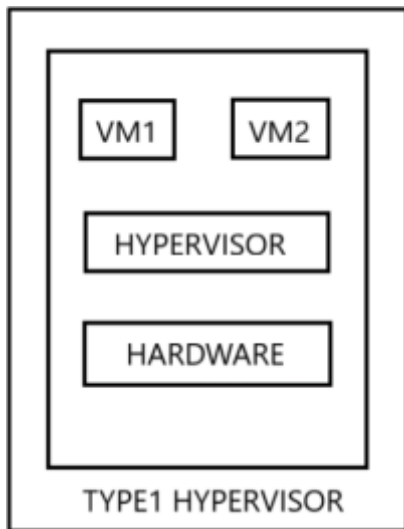


Figure3 Type1 Hypervisor

#### 2.TYPE-2 Hypervisor:

A Host software system runs on underlying host system it's also referred to as ‘Hosted Hypervisor’. Basically a software installed on an software system. Hypervisor asks OS to form hardware calls. Example of Type 2 hypervisor include VMware Player or Parallels Desktop. Hosted hypervisors are often found on endpoints like PCs.

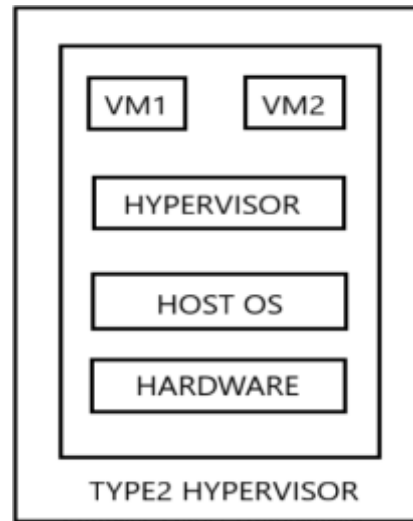


Figure4 Type2 Hypervisor

### IX.ADVANTAGES

1. Multiple OS environments can exist simultaneously on the identical machine, isolated from one another.
2. Virtual machine can give an instruction set architecture that differs from real computer's.
3. Easy maintenance, application provisioning, availability and convenient recovery.

### X. DISADVANTAGES

1. Virtual machine isn't that efficient as a true one when accessing the hardware.
2. When multiple virtual machines are simultaneously running on a number computer, each virtual machine may introduce an unstable performance, which depends on the workload on the system by other running virtual machines.
3. The host OS required a separate host user process to regulate the most guest-machine process, and this generated an oversized number of host context switches.

### XI. CONCLUSION

Virtual machines are convenient because they allow you to access your files, email, and anything else on your computer from another location. They are great for people who travel or need to bring their office work home with them. In this presentation we examine Virtual Machine on the basis of operating system. We study how there is actual working between Operating system and virtual machine and how we can access multiple operating system on same hardware.

### **REFERENCES**

- [1]. William Stallings, Operating Systems Internals and Design Principles, Ninth Edition ,Dorling Kindersley Pvd.Ltd,2018
- [2]. <https://www.geeksforgeeks.org/virtual-machines-in-operating-system/>
- [3]. <https://book.cyberyozh.com/virtual-machine-and-virtual-operating-system/>