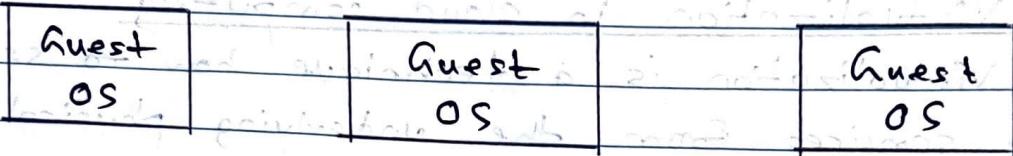
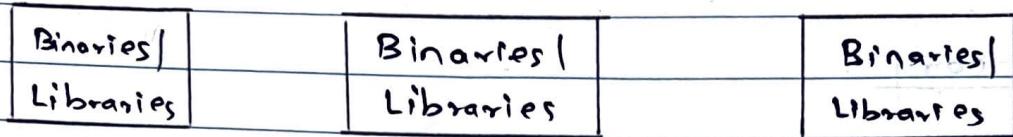
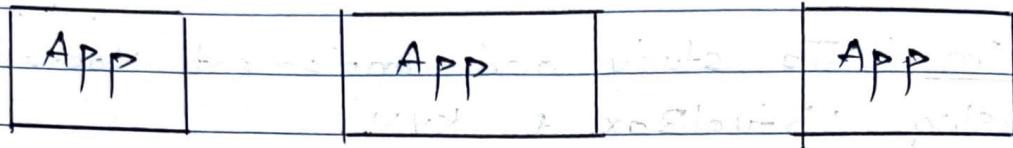


Experiment No. 2

Aim : To study and implement Hosted virtualization using VirtualBox & KVM.

Theory :

- Virtualization in cloud computing
 - Virtualization is a technique how to separate services from the underlying physical delivery of that service.
 - It is the process of creating a virtual version of something like computer hardware. It was initially developed during the mainframe era.
 - It involves using specialized software to create a virtual or software-created version of a computing resources rather than the actual version of the same resource.
 - With the help of virtualization, multiple operating systems and applications can run on the same machine and its same hardware at the same time, increasing the utilization and flexibility of hardware.
 - In other words, one of the main cost-effective, hardware-reducing, and energy-saving techniques used by cloud providers is Virtualization.
 - Virtualization allows sharing of a single physical instance of a resource or an application among multiple customers and organizations at one time.



Hypervisor

Host OS

Server Hardware

- Benefits of Virtualization
-
- 1) More flexible and efficient allocation of resources.
 - 2) Enhance development productivity.
 - 3) It lowers the cost of IT infrastructure.
 - 4) Remote access and rapid scalability.
 - 5) High availability and disaster recovery.
 - 6) Enables running multiple operating systems.
 - 7) Pay per use of the IT infrastructure on demand.

- Hypervisors

- A Hypervisor is a form of virtualization software used in cloud hosting to divide and allocate the resources on various pieces of hardware.
- The program which provides partitioning, isolation or abstraction is called a virtualization hypervisor.
- - The hypervisor is a hardware virtualization technique that allows multiple guest operating system to run on a single host system at the same time.
- A hypervisor is sometimes also called a virtual machine manager (VMM).
- For e.g., Amazon Elastic Compute Cloud (EC2) allows organizations to scale their cloud computing capabilities with Xen-based hypervisors.

- Types of Hypervisors

- - 1) TYPE - 1 Hypervisor! The hypervisor runs directly on the underlying host system.
 - It is also known as a "Native Hypervisor" or "Bare Metal Hypervisor".
 - It does not require any base server operating system.
 - It has direct access to hardware resources.
 - For e.g., VMware ESXi, Citrix XenServer, Microsoft Hyper-V hypervisor.

2) Type 2 Hypervisor : A host operating system runs on the underlying host system.

- It is also known as "Hosted Hypervisor"
- Such kind of hypervisors doesn't run directly over the underlying hardware rather than they run as an application in a Host system.
- Basically, the software is installed on an OS. Hypervisor asks the OS to make hardware calls.
- For e.g., VMware Players or Parallel desktops.

• Comparison between VirtualBox and KVM :

1) Performance

- ⇒ KVM, being a type 1 hypervisor, provides better performance compared to VirtualBox which is a type 2 hypervisor.
- KVM has direct access to the host hardware, resulting in faster execution and better overall performance.

2) Management

- ⇒ KVM is managed through command-line tools and APIs, making it suitable for advanced users and system administrators. VirtualBox, on the other hand, ~~KVM~~ provides a user-friendly graphical interface that makes it

easier for beginners to manage virtual machines.

3) Compatibility

- VirtualBox offers compatibility with various operating systems, including Windows, macOS and Linux, making it a popular choice for desktop virtualization. On the other hand, KVM is primarily used in Linux environments and is well-integrated with the Linux kernel.

4) Resource Allocation

- KVM allows for dynamic allocation of resources like CPU and memory to virtual machines.
- It also provides better control over resources utilization and allocation.
- In contrast, VirtualBox has limitations in resource management, making it less suitable for resource-intensive applications.

5) Community Support

- VirtualBox has a larger user community and a vast amount of online resources available for support and troubleshooting.
- KVM, on the other hand, has a more niche user base, mostly consisting of Linux enthusiasts and developers.

(A)

SP
26/2/24