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B.Tech-Computer Science & Engineering (Sem-VI)
Cloud Computing Lab(20CP322P)

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Lab 1 Assignment: Study of Various Virtualization Software

Aim:

Study of Various Virtualization Software such as VMware, QEMU, KVM, XEN Hypervisor and Oracle Virtual Box

Experiment: -

Virtualization refers to virtualization technology that makes it possible to provide hardware components using software regardless of their physical form. A good example of hardware virtualization is a virtual machine (VM).

Virtualization type: -

1. Type-1 (native or bare-metal hypervisors): -

   These hypervisors run directly on the host's hardware to control the hardware and to manage guest operating systems.

2. Type-2 (hosted hypervisors): -

   These hypervisors run on a conventional operating system (OS) just as other computer programs do.

Virtualization Software: -

VMware: -

VMware ESXi is Type-1, native or bare-metal hypervisors and VMware Player and VMware Workstation are Type-2 or hosted hypervisors.

QEMU: -

QEMU is a free and open-source hypervisor. It is hosted hypervisors.

KVM: -

KVM (Kernel-based Virtual Machine) is an open-source virtualization technology built into Linux. It is native or bare-metal hypervisors.

XEN: -

XEN is native or bare-metal hypervisors.

Oracle Virtual Box: -

It is hosted hypervisors.

Architectural difference between type-1 and type-2 hypervisor: -

No.	Type-1	Type-2
1	It is also known as Bare-metal or Native.	It is also known as Hosted.
2	Runs directly on the system with VMs running on them.	Runs on a conventional Operating System.
3	Hardware Virtualization	OS Virtualization

4	Guest OS and applications run on the hypervisor.	Runs as an application on the host OS.
5	Better Scalability	Not so much scalability, because of its reliance on the underlying OS.
6	Simple, as long as you have the necessary hardware support.	Lot simpler setup, as you already have an Operating system.
7	Has direct access to hardware along with virtual machines it hosts.	Are not allowed to directly access the host hardware and its resources.
8	Faster	Slower because of the system's dependency
9	Higher-performance as there's no middle layer.	Comparatively has reduced performance rate as it runs with extra overhead.
10	More Secure	Less Secure, as any problem in the base operating system affects the entire system including the protected Hypervisor.

• **<u>List out various advantages and disadvantages</u>**

<u>VMware:</u>

Advantages:

- Solid Vendor Support
- Easily Control Layer Components Without Security Patches
- An Ultimate Feature Set

Disadvantage:

- ➢ Some Complex Device Slows Down Initialization Time
- ➢ Sometimes Corrupt External Code Also Hang Server
- ➢ Limited Options With Trial Version

Oracle Virtual Box

Advantages:

- ➢ Running multiple VM's on a simple laptop or desktop
- ➢ Making a backup of a VM to quickly roll back to a known good state
- ➢ Easy deployment of various operating system types and configurations

Disadvantages:

- ➢ Reporting is a little lacking
- ➢ Network settings for VM's can be hard to find or understand for the casual user

KVM:-

Advantages:-

- ➢ Better security thanks to the isolation of system resources
- ➢ Clear allocation of resources

Disadvantages:-

- Administration of the whole virtual entity
- Higher operational costs (virtual machine, system administration and application development)
- Longer set-up time with a new entity, even if automation tools are being used

• <u>Applications of virtualization software</u>

Virtualization software allows multiple operating systems and applications to run on the same server at the same time, and, as a result, lowers costs and increases efficiency of a company's existing hardware. It's a fundamental technology that powers cloud computing.

Virtualization thus emulates hardware. Cloud computing is a service that results from that manipulation and is an external service. Cloud computing almost always assumes virtualization of certain resources (storage or data) that will be then delivered to the customer on- demand.